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A THERMAL, HYDRAULIC, FUEL PERFORMANCE, AND GASEOUS FISSION PRODUCT RELEASE CODE FOR PEBBLE BED REACTOR CORE ANALYSIS

by

B. I. SHAMASUNDAR and M. E. FEHRENBACH

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SUMMARY

The KUGEL code was developed to analyze the thermal/hydraulic and fuel particle performance characteristics of axisymmetric pebble bed reactors (PBRs). The code structure is divided into three main parts:

1. Physics interface. Axisymmetric core geometry, power distributions, and nuclide densities are obtained directly from the neutron diffusion code 2DB. Part 1 calculates the fission rate, fuel burnup, fast neutron fluence, thermal conductivities, and temperatures. Temperatures are determined by a one-dimensional thermal-flow model and serve as an initial estimate for temperatures at the start of the iterative cycle in part 2.
2. Thermal/hydraulic. Part 2 consists of a two-dimensional, thermal/hydraulic model of an axisymmetric, heat-generating, conducting, porous medium characterized by its uniform pebble diameter and core diameter. The flow model is two-dimensional, and the predominant assumption is that the change in pressure is a quadratic function of coolant superficial velocity. The rate of heat transfer is separated into solid and fluid phases. An effective heat transfer coefficient is calculated for each phase. Solid phase heat transfer mechanisms include thermal conduction through the solid pebbles, conduction through the stagnant fluid film near the contact point of adjacent pebbles, thermal conduction by contact between pebbles, and radiant heat exchange. The thermal conductivity of the pebble is a function of axial variations in fluence, time, and temperature. The thermal conductivities of the fueled matrix and unfueled graphite are assumed equal. In the fluid phase, heat is transferred between fluid regions seeing a temperature differential by the two mechanisms of molecular

conduction and turbulent dispersion in the interconnected interstitial voids of the solid phase.

3. Fuel performance. Part 3 consists of fuel particle performance and the gaseous fission product release models. The fuel particle coating integrity is determined by the environment of temperature, temperature gradient, fast neutron fluence, and fuel particle burnup as a function of time. The fuel particle coating integrity is treated by empirical calculational models formed from experimentally observed characteristics. The coating integrity models are available for several combinations of fuel particle types, such as TRISO or BISO coatings, low-enriched uranium (LEU) or high-enriched uranium (HEU) fuel, and carbide or oxide compounds. The release of gaseous fission products from fuel is obtained from experimental correlations of release/birth rate ratio (R/B) (i.e., fractional release). From known measured R/Bs of as-manufactured fuel and fuel particles with failed coatings, the R/B for each gaseous species is obtained as a function of calculated fuel particle burnup, fuel particle failure, and fuel temperatures. The release rate is obtained by multiplying the R/B by the calculated fuel birth rate.

The KUGEL code is written in FORTRAN V for the UNIVAC 1110 computer. The program is overlaid into three main segments to minimize core storage. Variable dimensioning has been introduced so that storage allocation is based on the user-specified problem size. Therefore, the code can handle any problem size with uniform mesh interval. This provides the flexibility to choose a thermal problem mesh size different from that used in the physics analysis. The code can also handle a non-uniform void fraction distribution.

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1. INTRODUCTION

The KUGEL computer code is designed to perform thermal/hydraulic analysis and coated-fuel particle performance calculations for axisymmetric pebble bed reactor (PBR) cores. This computer code was developed as part of a Department of Energy (DOE)-funded study designed to verify the published core performance data on PBRs. The PBR shown in Fig. 1 consists of a cylindrical core volume containing a randomly packed bed of spherical fuel-moderator elements. The elements are graphite spheres containing fuel zones in which coated fissile and fertile fuel particles are dispersed in a graphite matrix. The fuel-moderator elements are cooled by helium flowing through the pebble bed under high pressure. The fuel elements are loaded at the core top and are discharged at the core bottom.

The KUGEL code is designed to interface directly with the 2DB code (Ref. 1), a two-dimensional neutron diffusion code, to obtain distributions of thermal power, fission rate, fuel burnup, and fast neutron fluence, which are needed for thermal/hydraulic and fuel performance calculations. The code is variably dimensioned so that problem size can be easily varied. An interpolation routine allows variable mesh size to be used between the 2DB output and the two-dimensional thermal/hydraulic calculations.

Two-dimensional axisymmetric equations for conservation of mass, momentum, and energy are solved numerically, assuming that the effect of the fuel balls can be smeared into a distributed resistance and effective thermal conductivities. The mathematical model and numerical solution technique are modified from the PEBBLE code (Ref. 2). These modifications include rearranging energy equations to obtain a faster stable convergence of an iterative solution. (The number of iterations is reduced by a factor of 4 to 10, depending on problem size.) The technique also includes a model to calculate thermal conductivity of fuel-moderator balls as a function of

temperature and fast neutron fluence history using A3-3 graphite matrix experimental data from Refs. 3 and 4.

The nonlinear, elliptic, thermal/hydraulic, partial differential equations are reduced to a coupled set of nonlinear, finite difference equations, based on assumptions about the variable distribution between the grid modes (Ref. 2). This approach is appropriate if the variables in a given porous bed volume are assumed to be well characterized by macroscopically averaged values. The finite difference equations are solved by a successive substitution technique.

Part 3 of the KUGEL code performs detailed fuel performance calculations for the PBRs. The environments of fuel temperature, temperature gradient, fuel particle burnup, and fast neutron fluence are used to determine fuel particle coating failure fractions in the reactor core. Temperature, fission rate, and fuel failure distributions are used to determine the gaseous fission product release calculations. The fuel performance and gaseous release models have been taken directly from the SURVEY code (Ref. 5). The KUGEL models consider several modes of particle failure for several types of fissile and fertile particles. The modes of fuel failure include kernel migration failure, pressure vessel failure, fission product reaction with silicon carbide coating, heavy metal contamination, and manufacturing defect models. The gaseous fission product birth rate, release rate, and release-to-birth rate ratio (R/B) are calculated for the nuclides of Kr-85m and Xe-138. These R/Bs are then used to predict the release rates of other gaseous fission products.

The KUGEL code has been interfaced with the metallic fission product release code TRAMP (Ref. 6), which uses the KUGEL output to calculate fractional releases of nuclides, such as Cs-137 and Sr-90.

1-4

2. CODE DESCRIPTION

The KUGEL computer code has been organized into three main parts: (1) physics interface, (2) thermal/hydraulic, and (3) fuel performance. This section describes the functions of these three parts.

2.1. PHYSICS INTERFACE

The physics interface of the KUGEL code reads the output of the reactor physics code and the card input data, then performs initial calculations to establish all the reactor physics and reactor core data needed for the subsequent thermal/hydraulic and fuel performance calculations. Subroutine PRELIM drives the physics interface by calling other routines to read physics data tape, input card data, input problem data printout, and required initial calculations. These calculations determine fuel particle burnup in units of fissions per initial metal atom (FIMA), fast neutron fluence, and fission rate. One-dimensional thermal calculations provide initial guesses for two-dimensional thermal calculation. The thermal conductivity model for graphite calculates the thermal conductivity of pebbles and pebble temperatures on an iterative basis. The models and calculational techniques of these calculations are discussed below.

2.1.1. Fuel Particle Burnup Calculations

Subroutine CALCUL calculates the fuel particle burnup (FIMA). The following formula is used for the FIMA calculations:

$$\text{FIMA}(t) = \frac{\sum_{i=1}^n N_i(t_0) - \sum_{i=1}^n N_i(t)}{\sum_{i=1}^n N_i(t_0)}, \quad (2-1)$$

where N_i = atom density of heavy metal nuclide i ,

t_0 = initial time at zero burnup (fresh fuel),

n = number of heavy metal nuclide included in the summation, and

t = time at which FIMA is calculated.

Fuel particle burnup is calculated for each fuel particle type and as a function of radial and axial positions. For simplicity, Eq. 2-1 does not show FIMA dependence on particle type and spatial position.

The FIMA calculations are designed for only the once-through-and-then-out (OTTO) fuel cycle, where the fuel is charged at the core top and discharged at the core bottom. In the OTTO cycle, the FIMA is zero at the core top, and it builds up to its maximum value near the core bottom.

2.1.2. Fast Neutron Fluence Calculations

The fast neutron fluence is obtained by integrating the total fast neutron flux with time for fast neutrons with energy ≥ 0.18 MeV. The fast neutron fluence is given by

$$\Psi(t) = \int_0^t \int_{E \geq 0.18}^{\infty} \phi(E) dt' dE, \quad (2-2)$$

where $\phi(E)$ = neutron flux of neutrons in energy interval dE , and

$\Psi(t)$ = fast neutron fluence at time t .

The fast neutron fluence is also given by using discrete energy groups and time steps:

$$\Psi_K = \sum_{j=1}^K \Delta t_j \sum_{i=1}^n \phi_i \Delta E_i, \quad (2-3)$$

where ϕ_i = fast neutron flux in group i ,

ΔE_i = energy interval of group i ,

n = number of energy groups with energy ≥ 0.18 MeV,

K = numbers of time intervals until time t , and

ΔT_j = time interval of time step j .

The fluence calculations are designed for only the OTTO cycle under equilibrium, where the time variable increases with axial position as the fuel balls travel down the reactor core. Options are provided to specify the number of neutron energy groups ($E \geq 0.18$ MeV) to be included in the fluence calculations.

2.1.3. One-Dimensional Thermal Calculations

The KUGEL one-dimensional calculations provide initial temperatures for the two-dimensional calculations and help assess the importance of two-dimensional versus one-dimensional calculations. The one-dimensional calculations assume that the core flow is purely axial and parallel. They also assume that the heat exchange occurs primarily from the fuel elements to the coolant by convective heat transfer. They neglect radial and axial heat transfer among the fuel balls and the heat transfer by turbulent diffusion. These assumptions allow one-dimensional heat transfer equations to rapidly calculate the coolant temperatures and fuel temperatures throughout the core.

The spatial mesh used in the reactor physics calculations is directly adopted to calculate the temperatures. The procedure and the equations to calculate temperatures are given below.

Assume that $Q(i,j)$ is the heat generation rate per unit volume of bed in location (i,j) , where i and j are node indicators along the axial and

radial axes, respectively. Then heat generation rate in ring j, accumulated up to axial location n, is

$$Q(n, j) = \sum_{i=1}^n Q(i, j) V(i, j) \quad , \quad (2-4)$$

where n = desired number of mesh i along core height, and

$V(i, j)$ = bed volume in location (i, j).

Also, the total core power generation rate is given by

$$Q_t = \sum_{j=1}^M \sum_{i=1}^N Q(i, j) V(i, j) \quad , \quad (2-5)$$

where M = total number of mesh j along the core radius. The coolant temperature is then given by Eq. 2-6 at axial location n and ring j:

$$T_c(n, j) = T_{in} + \left\{ [T(N, j) - T_{in}] \frac{Q(n, j)}{Q(N, j)} \right\} \quad , \quad (2-6)$$

where T_{in} = coolant temperature at core inlet, and

N = total number of mesh i along the core height.

The coolant temperature at core exit along ring j is given by

$$T_c(N, j) = T_{in} + \left[(T_{ex} - T_{in}) \frac{Q(N, j)}{Q_t} \right] \quad , \quad (2-7)$$

where T_{ex} = the average core exit coolant temperature. The ball surface temperature is given by

$$T_s = T_c + \frac{\dot{Q}}{4\pi r_3 h} \quad , \quad (2-8)$$

where T_s = fuel ball surface temperature,

T_c = bulk coolant temperature,

h = convective heat transfer coefficient (see Eq. 2-37),

r_3 = fuel ball radius, and

$\dot{Q}$ = power per ball (see Eq. 2-11).

For simplicity, Eq. 2-8 does not show spatial dependencies.

The temperature profile within the spherical fuel balls is obtained by integrating the one-dimensional conduction equation, if spherical symmetry of the fuel balls is assumed. Figure 2 shows the two types of fuel-moderator balls considered for PBRs: (1) a two-region ball with a central fueled region and (2) a three-region ball in which the fuel is in the middle shell. The fueled region contains dispersed-coated fissile and fertile fuel particles in a graphite matrix. The fueled region is surrounded by graphite matrix. For the two-region ball, the temperatures at r_1 and r_2 are given by

$$T_1 = \frac{\dot{Q}}{8\pi K_s r_2} + T_2 \quad , \quad (2-9)$$

and

$$T_2 = \frac{\dot{Q}}{4\pi K_s} \left(\frac{1}{r_2} - \frac{1}{r_3} \right) + T_s \quad , \quad (2-10)$$

where T_1, T_2 = temperatures at r_1 and r_2 , respectively,

r_1 = radius of inner fueled/unfueled interface (this is equal to zero for the two-region ball),

r_2 = radius of outer fueled/unfueled interface,

r_3 = fuel-moderator ball radius, and

$\dot{Q}$ = power per ball.

(a)

(b)

NOTE: SHADED AREA IS FUELED MATRIX
REMAINDER OF FUEL ELEMENT IS UNFUELED GRAPHITE

Fig. 2. PBR fuel element types: (a) conventional design two-region fuel element, (b) shell design three-region fuel element

The power per ball ($\dot{Q}$) is related to the power per unit volume of bed (q) by Eq. 2-11:

$$\dot{Q} = q \left(\frac{1}{1 - \epsilon} \right) \frac{4 \pi r_3^3}{3} , \quad (2-11)$$

where ϵ = bed void fraction.

For the three-region ball, the temperatures at r_1 and r_2 are given by

$$T_1 = \frac{\dot{Q}}{4 \pi K_s} \left(\frac{1}{r_2^3 - r_1^3} \right) \left[\frac{(r_2^2 - r_1^2)}{2} - r_1^3 \left(\frac{1}{r_1} - \frac{1}{r_2} \right) \right] + T_2 , \quad (2-12)$$

and T_2 is given by Eq. 2-10.

The thermal conductivity of the fuel-moderator ball (K_s) is a function of temperature and fast neutron fluence history experienced by the ball. Subsection 2.1.4 gives the model for calculating the thermal conductivity.

The fuel element thermal conductivity (K_s) must be known before the fuel element temperature can be calculated. On the other hand, the thermal conductivity is a function of fuel element temperature and fast neutron fluence. Therefore, an iterative procedure is needed to calculate the fuel element temperature and thermal conductivity. Subsection 2.1.4 gives the calculational model for thermal conductivity.

2.1.4. Thermal Conductivity of PBR Fuel Elements

The thermal conductivity of the spherical graphite fuel elements in a PBR is a function of neutron fluence, irradiation temperature, and measurement temperature. Thermal design calculations are complicated further by the change in temperature as a fuel element moves from the top to the bottom of the reactor core during a fuel cycle. This section recommends thermal

conductivity values and calculational methods to be used in thermal calculations for the spherical graphite fuel elements in a PBR operating with the OTTO cycle.

2.1.4.1. Thermal Conductivity-Isothermal Irradiation. The thermal conductivity of unirradiated graphite is a function of the structure of the material (conductivity increases with increasing crystallinity and density), and it decreases as the measurement temperature rises. Neutron irradiation reduces the conductivity rapidly at first; however, after the initial reduction, the conductivity remains constant or slowly decreases. The lower the irradiation temperature becomes, the more rapid the initial reduction, and the lower the saturation value. Irradiation also reduces the dependence of the conductivity on measurement temperature. For most thermal design problems, the measurement temperature can be taken as equal to the irradiation temperature; thus, for a given material, the thermal conductivity is a function of two variables: (1) the neutron fluence and (2) the irradiation temperature.

The reference matrix material for German-designed PBR fuel elements, designated A3-3 standard matrix, is formulated from 64% natural graphite powder, a 16% graphitized petroleum coke, and 20% phenolic resin binder. The thermal conductivity of irradiated A3-3 matrix graphite has been reported by Binkele (Refs. 3 and 4), who used a steady-state heat flow method especially adapted for irradiated graphite specimens. The experiments appear to have been carefully conducted, and the results are consistent with measurements on other irradiated graphites. Irradiation temperatures of 435°, 750°, 1080°, and 1350°C were used. Irradiations were conducted in the Petten High Flux Reactor, and the fluences were reported as the DIDO nickel equivalent fluence (DNE). DNE fluences can be converted to the more fundamental equivalent fission fluence for graphite damage (EFFGD) by multiplying by 1.77 (Ref. 7), and the EFFGD can be divided by a factor 1.25 to convert to the corresponding fluence of neutrons in an high temperature gas-cooled reactor (HTGR) spectrum with energies greater than 0.18 MeV.

Thus, for present purposes, a factor of 1.42 (1.77/1.25) was used to convert the reported DNE fluence to the HTGR fluence of neutrons with $E > 0.18$ MeV.

The Binkelle data were reported as families of curves showing the thermal conductivity as a function of measurement temperature for a series of specimens subjected to different neutron fluences. The conductivity value, measured at the irradiation temperature, was read off from these curves (in some cases, a minor extrapolation was necessary.) Figure 3 shows the resulting data points. The experimental data points were used to construct empirical curves for predicting the thermal conductivity (K) as a function of temperature (T) and fluence (ϕt). The recommended design curves are based on the following observations:

1. The thermal conductivity of unirradiated graphite may be represented by Eq. 2-13:

$$K_0 = 1/(A + BT) \quad . \quad (2-13)$$

2. During the early transient decrease in conductivity, the conductivity approaches a steady-state value (K_2), according to Eq. 2-14:

$$K_1 = K_2 + (K_0 - K_2) [\exp - \psi(C - DT)] \quad . \quad (2-14)$$

3. After the early transient decrease, the steady-state value declines slowly with increasing fluence according to Eq. 2-15:

$$K_2 = E - F/T - G\psi \quad . \quad (2-15)$$

Fig. 3. Thermal conductivity of A3-3 standard matrix graphite, measured at the irradiation temperature as a function of fast neutron fluence

The constants A through G in Eqs. 2-13 through 2-15 are empirical constants which were graphically evaluated from the experimental data. The final expression for the thermal conductivity of A3-3 matrix graphite is

$$K = 26 - 5 \times 10^3 T^{-1} - 1.1 \times 10^{-21} \psi + [(0.018 + 2.3 \times 10^{-5} T)^{-1} - 26 + 5 \times 10^3 T^{-1}] \exp[-10^{-21} \psi (5 - 3.4 \times 10^{-3} T)] \quad , \quad (2-16)$$

where K = thermal conductivity (W/m-K),

T = irradiation and measurement temperature (°C), and

ψ = fast neutron fluence (n/cm²) (E > 0.18 MeV, HTGR).

Equation 2-16 is applicable between 400° and 1100°C and at fluences up to 5×10^{21} n/cm². Figure 3 includes lines calculated from Eq. 2-16.

Although the Binkle data were obtained on specimens of unfueled matrix graphite, they should also be applicable to the fueled inner zone of a pebble bed fuel element. One German source (Ref. 8) quotes (without attribution) almost identical ranges of K values for the inner fueled zone and the unfueled outer zone of spherical fuel elements (16.2 to 39.5 W/m-K for the inner zone and 16.2 to 36.0 W/m-K for the outer zone).

2.1.4.2. Irradiation at Changing Temperatures. Reference 9 discusses property changes in graphite irradiated at changing temperatures. If a graphite specimen is irradiated at a low temperature beyond the initial period of conductivity reduction, then irradiated further at a higher temperature, the thermal conductivity will show some recovery toward the steady-state value corresponding to the higher temperature. Reference 9 discusses methods for accounting for temperature changes in design calculations and experimental evidence. The method recommended here is based on Ref. 9, except that the scaled fluence defined in Ref. 9 is not used.

The irradiation period should be divided into intervals during which the temperature can be assumed to remain constant. Figure 4 schematically

Fig. 4. Schematic illustration of the thermal conductivity of graphite irradiated at T_1 , T_2 , T_3 ($T_3 > T_2 > T_1$)

shows isothermal curves showing the conductivity change at three temperatures. During the first irradiation period at T_1 to a fluence of ψ_A , the thermal conductivity will follow the T_1 isotherm to point A. The temperature now changes to T_2 , and the second irradiation period commences. The conductivity trends toward the T_2 isotherm, as shown by the solid line A-B-C; the approach rate is characterized by the same time constant as the initial part of the T_2 isotherm. At point B in the second irradiation period, the conductivity is given by Eq. 2-17:

$$K = K^* - \Delta K \exp[-10^{-21}(\psi_B - \psi_A)(5 - 3.4 \times 10^{-3}T_2)] \quad , \quad (2-17)$$

where K^* = the conductivity predicted for an isothermal irradiation at T_2 to a fluence ψ_B , and

ΔK = the difference between the predicted conductivity for point A and the predicted conductivity for irradiation to ψ_A at T_2 (see Fig. 4). At point C, the temperature changes to T_3 , and the thermal conductivity trends towards the T_3 isotherm in a similar manner, except that T_3 is now the appropriate temperature for determining the approach rate.

The progressive approach to the new isotherm is physically reasonable, since after a temperature change the concentration of irradiation-induced defect clusters that control the thermal conductivity is expected to move toward the dynamic equilibrium concentration characteristic of the new irradiation temperature. Limited experimental data on nuclear graphite specimens, whose thermal conductivity was measured after a step change in irradiation temperature, confirm this behavior (Refs. 10 and 11).

2.2. TWO-DIMENSIONAL THERMAL/HYDRAULIC MODEL

The cylindrical core volume of a PBR contains a randomly packed bed of spherical elements. These elements are graphite spheres containing a central region of dispersed fissile and fertile coated fuel particles. The

elements are cooled by a downward flow of helium through the void spaces in the randomly packed bed. A modified version of the mathematical model and numerical solution technique from Ref. 2 has been used for the thermal/hydraulic analysis of the pebble bed core. The fluid flow/thermal analysis allows calculation of macroscopic values of thermal-hydraulic variables in an axisymmetric geometry. The mass continuity, thermal energy balance equations for the solid and fluid phases, and the momentum equations are solved assuming that the net effect of the fuel balls can be represented as distributed resistance.

2.2.1. Thermal/Hydraulic Equations

This subsection gives thermal/hydraulic equations for the conducting, generating porous medium. The equations are for conservation of momentum, mass, and energy in two-dimensional axisymmetric geometry. The effect of the fuel balls is assumed to be smeared into a distributed resistance and effective thermal conductivities. The mathematical model and numerical solution technique is a modified version from the PEBBLE code (Ref. 2).

2.2.1.1. Conservation of Momentum. Momentum equation in the r direction is

$$\frac{1}{r} \left[\frac{\partial}{\partial z} (\rho V_z r V_r) + \frac{\partial}{\partial r} (\rho V_r r V_r) \right] = - \frac{\partial P}{\partial r} - F_r \quad . \quad (2-18)$$

Momentum equation in the z direction is

$$\frac{1}{r} \left[\frac{\partial}{\partial z} (\rho V_z r V_z) + \frac{\partial}{\partial r} (\rho V_r r V_z) \right] = - \frac{\partial P}{\partial z} - F_z \quad , \quad (2-19)$$

where V_r , V_z = superficial velocities in the r and z directions, calculated as if no fuel balls were present,

ρ = fluid density,

P = pressure, and

F_r, F_z = resistance forces in the r and z directions.

These equations neglect the body forces, since their effect is negligible for the high gas velocities that occur in the core during normal operating conditions. The equations are further simplified by assuming that the inertial terms (left-hand terms in Eqs. 2-18 and 2-19) can be safely ignored, since their effects are much smaller than those on the right-hand side. These assumptions should not be made in the future versions of the KUGEL code for analyzing conditions other than normal reactor operating conditions.

The distributed resistance forces F_r and F_z are given by a Forchheimer equation (Ref. 12):

$$F_n = -v_n \left[\frac{A\mu}{\epsilon R_h^2} + \left(\frac{B\rho}{\epsilon^2 R_h} \right) v \right], \quad (2-20)$$

$$\text{where } v = (v_r^2 + v_z^2)^{0.5}, \quad (2-21)$$

$$R_h = \left(\frac{d_p}{6} \right) \frac{\epsilon}{1 - \epsilon}, \quad \text{the hydraulic radius}, \quad (2-22)$$

A and B = 24.5 and 0.1754, respectively

= empirical coefficients derived in Ref. 2 ($10^3 \leq N_{Re} \leq 4 \times 10^4$),

ϵ = bed void fraction

μ = fluid dynamic viscosity,

d_p = fuel ball diameter, and

$$N_{Re_n} = \rho v_n d_p / \mu, \quad \text{Reynolds number.} \quad (2-23)$$

The first term of the distributed resistance in Eq. 2-20 represents flow resistance due to viscous shear. The second term represents inertial

losses caused by sudden increase and decrease in the flow area as the fluid traverses the continuously changing interstitial pore geometry.

2.2.1.2. Mass Continuity Equation.

$$\frac{\partial}{\partial z} (\rho r V_z) + \frac{\partial}{\partial r} (\rho r V_r) = 0 \quad . \quad (2-24)$$

2.2.1.3. Energy Equations. The heat transfer rate in a porous medium with a flowing fluid is governed by conduction through solid and stagnant fluid, radiation, convective transfer from solid to fluid, movement of fluid, and turbulent thermal diffusivity. The distributions of local fluid bulk temperature and pebble average surface temperature can be obtained by solving equations derived from thermal energy balances on the two phases (Ref. 2).

A thermal energy balance on the solid phase results in Eq. 2-25:

$$\begin{aligned} - \frac{\partial}{\partial z} \left[r K_{se} \left(\frac{\partial T_s}{\partial z} \right) \right] - \frac{\partial}{\partial r} \left[r K_{se} \left(\frac{\partial T_s}{\partial r} \right) \right] \\ + r \left[h a_v (T_s - T_f) - q \right] \equiv 0 \quad , \end{aligned} \quad (2-25)$$

where T_s = average surface temperature of pebble,

T_f = bulk fluid temperature,

a_v = pebble surface area per unit volume of bed,

h = convective heat transfer coefficient between solid and fluid phase (Eq. 2-37),

K_{se} = effective thermal conductivity of solid phase (Eq. 2-27), and

q = energy release rate per unit volume of bed.

A thermal energy balance on the fluid phase yields Eq. 2-26:

$$C \left[\frac{\partial}{\partial z} (\rho V_z r T_f) + \frac{\partial}{\partial r} (\rho V_r r T_f) \right] - \frac{\partial}{\partial z} \left(r K_{ez} \frac{\partial T_f}{\partial z} \right) - \frac{\partial}{\partial r} \left(r K_{er} \frac{\partial T_f}{\partial r} \right) - r h_{av} (T_s - T_f) \equiv 0, \quad (2-26)$$

where C = fluid specific heat capacity, and

K_{ez} , K_{er} = effective thermal conductivity of fluid phase in the r and z directions (see Eq. 2-34).

2.2.2. Auxiliary Equations

The effective thermal conductivity coefficient for the solid phase (K_{se}) was taken from Kunni and Smith (Ref. 13). The effective thermal conductivity (K_{se}) represents the combined effects of all the heat transfer modes in the solid phase. These modes are conduction through solid, molecular conduction through stagnant fluid, radiation heat exchange between void spaces and between solid surfaces, and thermal conduction by contact between pebbles.

Figure 5 gives a network analogy representing the heat transfer processes in the solid phase. Reference 13 gives the effective thermal conductivity for the solid phase:

$$K_{se}/K_f = \epsilon (1 + \beta Nu_{rv}) + \beta (1 - \epsilon) / \left[1 / \left(\frac{1}{\phi} + Nu_{rs} \right) + \gamma \frac{K_f}{K_s} \right], \quad (2-27)$$

where K_f = fluid molecular thermal conductivity,

K_s = solid thermal conductivity,

Fig. 5. Network analogy for the effective thermal conductivity in the solid phase

β = effective length between centers of two neighboring spheres
expressed as a fraction of diameter of the spheres, and

γ = effective length for conduction through solid between two
neighboring spheres.

The values for geometry factors β and γ are 0.95 and 2/3, respectively. In Eq. 2-27, thermal conduction by contact between pebbles has been neglected, since its contribution is small. The units NU_{rv} and NU_{rs} are Nusselt numbers for radiant heat transfer between void spaces and between solid surfaces:

$$NU_{rv} = h_{rv} d_p / K_f \quad , \quad (2-28)$$

$$h_{rv} = 4\sigma T_s^3 \left/ \left[1 + \frac{\epsilon}{2(1 - \epsilon)} \left(\frac{1 - \epsilon_r}{\epsilon_r} \right) \right] \right. \quad , \quad (2-29)$$

$$NU_{rs} = h_{rs} d_p / K_f \quad , \quad (2-30)$$

$$h_{rs} = 4\sigma T_s^3 \left(\frac{\epsilon_r}{2 - \epsilon_r} \right) \quad , \quad (2-31)$$

where ϵ_r = solid surface emissivity, and
 σ = Stephen Boltzmann constant.

The empirical factor ϕ is a measure of the effective thickness of fluid adjacent to the contact surface of the solid spheres for molecular conduction. The factor ϕ is calculated from

$$\phi = \phi_2 + (\phi_1 - \phi_2) (\epsilon - 0.26) / 0.216 \quad . \quad (2-32)$$

If $\epsilon \leq 0.26$, then $\phi = \phi_2$. If $\epsilon \geq 0.476$, then $\phi = \phi_1$. Reference 13 graphically gives ϕ_1 and ϕ_2 . Curve fits of these parameters (Ref. 2) are used here. For the range $10 \leq K_s/K_f \leq 300$,

$$\begin{aligned}\phi_1 &= 0.2770 \left(\frac{K_f}{K_s} \right)^{0.2426}, \text{ and} \\ \phi_2 &= 0.1293 \left(\frac{K_f}{K_s} \right)^{0.3292}.\end{aligned}\tag{2-33}$$

The effective thermal conductivity coefficient for the fluid phase has been taken from Ref. 14. In the fluid phase, heat transfer is by two mechanisms: molecular conduction and turbulent dispersion. The combined effects are expressed by an effective thermal conductivity (K_e):

$$K_{en} = \epsilon K_f + \rho C E_n, \tag{2-34}$$

where E = turbulent thermal diffusivity of the fluid phase, and
 n = subscript to indicate that the parameters vary along radial and axial directions.

The numerical values of E are calculated by the method suggested by Finlayson (Ref. 15). The turbulent peclet number is defined as

$$N_{pe} = \frac{Vd}{E}. \tag{2-35}$$

The radial and axial variations of E are correlated with variations in the axial fluid velocity V_z (Ref. 15), such that

$$\left. \frac{E_r}{V_z} \right|_{r=r} = \frac{d}{N_{pe,r}}, \tag{2-36}$$

$$\text{and} \quad \left. \frac{E_z}{V_z} \right|_{z=z} = \frac{d_p}{N_{pe,z}} \quad . \quad (2-36)$$

Presently, the radial and axial turbulent peclet numbers are set to 10 and 2, respectively. These values assume that the turbulent thermal diffusivity is numerically equal to the turbulent mass diffusivity. The above turbulent peclet numbers correspond also to values reported by Deans and Lapidus (Ref. 16).

Values for the convective heat transfer coefficient (h) are obtained from Jeschar correlation (Ref. 17) for the Nusselt number:

$$N_{Nu} = \frac{hd_p}{K_f} = 2.0 + \left[\frac{(1 - \epsilon)}{\epsilon^2} N_{Re} \right]^{0.5} + 0.005 \frac{N_{Re}}{\epsilon} \quad , \quad (2-37)$$

where $250 \leq N_{Re} \leq 5.5 \times 10^4$, and the Reynolds number N_{Re} is defined in Eq. 2-23.

The temperature profile within the spherical fuel balls is obtained by integrating the one-dimensional conduction equation by assuming spherical symmetry. The temperature profile within the ball is calculated by using Eqs. 2-9 through 2-12.

2.2.3. Boundary Conditions

The radial boundary conditions for the temperature are based on symmetry at the core centerline, and the outer walls of the core are assumed to be adiabatic (i.e., temperature gradients are set to zero at the core walls and the core centerline). The fluid temperature is given at the core inlet plane. The temperature boundary conditions at the inlet plane are based on thermal energy balances between the incoming gas and the solid front surface. The boundary condition at the exit plane assumes a constant

thermal flux condition (i.e., the temperature gradient is assumed to be zero).

The pressure boundary conditions are based on imposed uniform pressure at the core inlet plane and constrained uniform pressure at the core exit plane. The radial pressure boundary conditions are based on symmetry at the core centerline and at the outer walls.

The boundary conditions on stream function at both the inlet and outlet planes assume parallel and axial flow. Also, the core centerline and impervious outer walls must both be lines of constant stream function.

2.2.4. Numerical Solution Technique

Reference 2 describes the numerical solution technique for solving the set of nonlinear partial differential equations (given by Eqs. 2-18 and 2-19 and 2-24 through 2-26). The equations are expressed nondimensionally. Since the density changes appreciably in the core, the momentum equations are expressed in terms of mass flux (rather than fluid velocity) and stream function. The complete thermal/hydraulic description is a set of coupled nonlinear elliptical partial differential equations, which are solved using the numerical technique described in Ref. 18.

The nonlinear elliptic partial differential equations are reduced to a set of coupled nonlinear finite difference equations by integrating over finite area, based on assumptions about the distributions of the variables between the nodes of the spatial grid. The finite difference equations thus obtained are solved by a successive substitution technique.

2.2.5. Modified Numerical Solution

The first test runs of KUGEL demonstrated that the numerical solution was unstable. In some cases, even with extremely low relaxation parameters,

the solution did not converge. An examination of the mathematical expressions (see Table 1, Appendix A of Ref. 2) and the successive-substitution formula explained the problem. In the energy equations of the solid and fluid phases, the dependent variable appeared both on the left-hand and right-hand sides of the equations, causing the instability. Algebraic manipulations of the energy equations corrected the instability problem, and the results improved dramatically. Convergence now takes place much faster than before. Sample runs indicate that convergence time is 10 times less than before.

Appendix A of Ref. 2 derives the successive-substitution formula, which will not be reproduced here. The modified successive-substitution formula to obtain stable convergence is given below:

$$\phi_P = \frac{\left\{ \sum_{j=N,S,E,W} \left[A'_j + C_{\phi,j} (b_{\phi,j} + b_{\phi,P}) B'_j \right] \phi_j \right\} - d'_{\phi,P}}{\left\{ \sum_{j=N,S,E,W} \left[A'_j + C_{\phi,P} (b_{\phi,j} + b_{\phi,P}) B'_j \right] \right\} + T_{COE,P}} \quad (2-38)$$

Equation 2-38 replaces Eq. A-26 in Appendix A of Ref. 2. All the variables in Eq. 2-38 are defined in Appendix A of Ref. 2, except for the variables d'_{ϕ} and T_{COE} , which are defined in Table 1. The new formulation given here uses the same assumptions as Ref. 2 for deriving the integral of the source terms (see Eq. A-16 of Ref. 2).

The new substitution formula given in Eq. 2-38 and the new definitions given in Table 1 have been incorporated in subroutine DTERM of the KUGEL code.

2.3. FUEL PERFORMANCE MODELS

The fuel performance models are available for combinations of fissile, fertile, TRISO, BISO, low-enriched uranium (LEU), and high-enriched uranium (HEU) fuel particles as a function of fast neutron fluence, particle burnup,

TABLE 1
DEFINITION OF NEW TERMS IN THE
SUCCESSIVE SUBSTITUTION FORMULA

Equation	Dependent Variable, ϕ	d_{ϕ}'	T_{COE}
Stream function	ψ	$\frac{2}{r^a} (\zeta + G^*) g_2^* \frac{\partial \psi}{\partial r}$	0
Fluid thermal energy balance	T_f	$-h^* a_v^* T_s$	$h^* a_v^*$
Solid thermal energy balance	T_s	$-h^* a_v^* T_f - q^*$	$h^* a_v^*$

temperature, and temperature gradients. The fissile particle consists of LEU, HEU, or a mixed uranium/thorium. The fertile particle is thorium. The uranium and thorium fuel are either a carbide or an oxide compound. The TRISO particle has a carbon buffer coating with an inner silicon carbide (SiC) coating and an outer pyrolytic carbon (PyC) coating. The BISO particle has a carbon buffer coating with an outer PyC coating. The user can select desired combinations of TRISO, BISO, fissile, fertile, LEU, and HEU variables.

The fuel performance models have been taken from Ref. 5. The performance model descriptions are briefly given here for completeness and continuity. See Ref. 5 for more details on fuel performance models.

The following subsections describe each of the important fuel performance models used in the KUGEL code. The fuel performance calculations are driven by the subroutine PERFOR. The subsections below are ordered by the flow of calculations within the PERFOR subroutine. PERFOR can calculate up to five different types of fuel particle failure:

1. Kernel migration failure.
2. SiC attack by fission products.
3. High-temperature failure.
4. Pressure vessel failure.
5. Manufacturing defect failure.

Any or all of the above modes can be turned off by the user if desired.

At the end of a PERFOR run, all failure values and their locations are summarized if specified.

2.3.1. Kernel Migration

A fuel particle is said to fail due to kernel migration if its migrating kernel penetrates the particle buffer layer and contacts the inner

PyC layer. The distribution of buffer thicknesses for each type of fuel particle within an HTGR core is described by an average value and the standard deviation (both provided by the user). Failure caused by kernel migration, for a specific location within the core, is determined by estimating the percent of fuel particles having kernels that penetrate the buffer layer.

PERFOR allows the user to divide the fuel into as many as 10 annular rings for this calculation. The division is intended to determine the location within the ball where the largest number of migrations are occurring. Contrary to what might be expected, the fuel centerline, which has the highest temperature, does not necessarily have the highest kernel migration failure. Because kernel migration distance is also a function of the temperature gradient in the area, the center fuel ring, which usually has a very small gradient, may sustain less kernel migration failure than perhaps the next closest ring, which has a greater temperature gradient.

Once the distance of kernel migration has been determined in each of the annular rings, the percent failure is calculated by determining the fraction of fuel particles that have buffer thickness less than or equal to the kernel migration distance.

2.3.2. SiC Attack by Fission Products

For some fuel particle models, SiC-fission product reactions will occur when the particle is in the environment of a thermal gradient. These reactions do not cause rupture or cracking of the particle coating. However, as the metallic fission products penetrate the SiC layer, they make it possible for other metallic fission products to pass through the SiC.

As in the kernel migration calculations (Subsection 2.3.1), the fraction of the fuel having SiC-fission product reactions is equal to the

probability that SiC layer thicknesses are less than the computed penetration distance. The rate of penetration is given by

$$R = Ae^{(-Q/RT)} \quad , \quad (2-39)$$

where R = rate ($\mu\text{m/h}$),

A = pre-exponential constant ($\mu\text{m/h}$) (input by the user).

Q = activation energy (cal/mole) (input by the user),

R = gas constant [1.9869 cal/(mole $\cdot$ K)], and

T = temperature (K).

The penetration distance is calculated by integrating Eq. 2-39 with respect to time.

2.3.3. High-Temperature Failure

High-temperature failure is calculated in addition to and in conjunction with SiC-fission product reaction failure. High-temperature failure is SiC attack failure occurring at high temperature (usually 1600°C) and high burnup. Whereas SiC-fission product reaction failure (Subsection 2.3.2) does not promote gaseous fission product release, high-temperature failure does. Note that the ThO₂-BISO particle does not experience SiC-fission product reaction failure, since it has no SiC coating.

In the high-temperature failure model, failure is assumed to increase linearly from the pressure vessel failure at some temperature and burnup values which depend directly on the particle model (to 100%) at a limiting temperature and burnup which also depend upon the particle model. Failure estimates for intermediate burnups are made by estimating the critical temperature at which SiC-fission product interaction failure exceeds pressure vessel failure and by assuming that the failure increases from the pressure vessel value at the critical temperature to 100% at the limiting temperature. In developing the high-temperature model, the design assumed that the

SiC-fission product interaction mechanism causes an additional increment of failure each 100 h.

2.3.4. Pressure Vessel Failure

The term pressure vessel failure is used to describe particles which have sustained failed coatings due to excessive stress. This stress, in turn, is caused by buildup of internal fission gas pressure in combination with irradiation-induced stresses. As a consequence, pressure vessel failure is a function of dose, burnup, and temperature. Built-in experimental correlations are used to determine the pressure vessel failure for various particle systems.

2.3.5. Manufacturing Defect Failure

During the manufacture of the fuel particles, a very small fraction of the particles may be damaged (e.g., cracked coatings or partially missing coatings). Depending on the extent of the damage, many of these particles may fail when placed under a thermal gradient and irradiation. This type of failure has been given the name "manufacturing defect failure" and is used to refer to those particles which fail because of defects present before burnup in the reactor.

For lengthy PERFOR runs, the code will provide, on option, a summary of the fuel failure results at the end of the run. Rather than search through mountains of local point printout, users can easily scan the few summary pages to locate high failure locations within the analyzed core.

A summary can be generated, if desired, for any or all of the following (by particle):

1. Kernel migration distances and failures.
2. Pressure vessel failures.
3. Manufacturing defect failures.

4. SiC-fission product attack distances and failures.
5. High-temperature failures.
6. Total failures.

2.4. GASEOUS FISSION PRODUCT RELEASE

This section details the gaseous fission product release model. Experimental correlations of the R/B for the fuel rods are used to estimate the gaseous fission product release rates. The first step is the calculation of the R/B values. First, the R/B for each (failed) fuel particle and for each gas and time point is given by

$$\left(\frac{R}{B}\right)(T_f) = \left(\frac{R}{B}\right)(T_{ref}) \left\{ \frac{(R/B)(0)}{(R/B)(T_{ref})} + \left[1 - \frac{(R/B)(0)}{(R/B)(T_{ref})} \right] \exp \left[\left(\frac{1}{T_{ref}} - \frac{1}{T_f} \right) \frac{Q}{R_g} \right] \right\} \quad (2-40)$$

where $(R/B)(T_f)$, $(R/B)(T_{ref})$, $(R/B)(0)$

= R/B, for that particular particle, at the average fuel temperature (K), the reference temperature (usually 1373 K), and 0 K, respectively,

T_{ref} = reference temperature (usually 1373 K),

T_f = average fuel temperature (K),

Q = gas activation energy (cal/mole), and

R_g = gas constant (1.987 cal/mole-K).

The FIMA dependence of R/B is then accounted for in the next step, as shown in the following equation:

$$\left(\frac{R}{B}\right)(T_{f,F}) = \left(\frac{R}{B}\right)(T_f) \left\{ A + BF^C + D[\exp(E*F)] \right\}, \quad (2-41)$$

where $(R/B)(T_f, F) = R/B$, for a particular fuel particle, at the average fuel temperature (T_f) and for FIMA (F) ,

A, B, C, D, E = coefficients and exponents (supplied by the user), and
 F = FIMA (%).

The R/B for as-manufactured fuel is then given for each gas and time point by

$$\left(\frac{R}{B}\right)_m(T_f) = \frac{(R/B)_m(T_{ref})}{(R/B)_1(T_{ref})} \left(\frac{R}{B}\right)_1(T_f, F_1) \quad , \quad (2-42)$$

where $(R/B)_m(T_f) = R/B$ for as-manufactured fuel at the average fuel temperature,

$(R/B)_m(T_{ref}) = R/B$ at the reference temperature,

$(R/B)_1(T_{ref}) = R/B$ at the reference temperature for particle 1,

$(R/B)_1(T_f, F_1) = R/B$ at the average fuel temperature and FIMA (F) for particle 1.

The fission gas birth rate, which depends upon gas, particle type, and time step, is given by

$$B(T_f, F) = FR * Y \quad , \quad (2-43)$$

where $B(T_f, F)$ = birth rate at the average fuel temperature and FIMA (F)
(number/cm³ of block/s),

FR = fission rate (number/cm³ of block/s), and

Y = particle yield (input by the user).

The release rate for the failed particles for each gas and time point is given by

$$R(T_f, F) = (TOTFLR + 29.*HYD)* \left(\frac{R}{B}\right) (T_f, F)*B(T_f, F) \quad , \quad (2-44)$$

where $R(T_f, F)$ = release rate at the average fuel temperature and FIMA (F)
(number/cm³ of block/s),

TOTFLR = total failure fraction for the particle, and

HYD = fuel hydrolysis fraction for the particle.

Finally, the as-manufactured release is given by summing the birth rates for each particle and multiplying by the as-manufactured R/B:

$$R_m(T_f) = \left(\frac{R}{B}\right)_m (T_f) * \sum_{i=1}^N B_i(T_f, F_i) \quad , \quad (2-45)$$

where $R_m(T_f)$ = as-manufactured release for the average fuel temperature
(number/cm³ of block/s), and

N = number of fuel particles.

For lengthy PERFOR runs, the code will print, as an option, a summary of the gaseous fission product results for each gas. The first set of tables contains the block-averaged results for each block, analyzed by segment and at time points requested by the user.

The second set of tables contains the segment-averaged results for the same time points, while the third set contains core-averaged results.

3. CODE ORGANIZATION AND USER INFORMATION

The KUGEL computer code is written entirely in FORTRAN V. The program is overlayed into three main segments to minimize core storage. This allows fairly large meshes to be run during the prime time hours when the 70 K core restriction applies. The segmentation of KUGEL increases run time due to the additional input/output required, but most of the problems can be run in less than 4 min and 200 pages on the UNIVAC 1110 computer. The KUGEL code is stored on tape in the General Atomic Company (GA) fire master library. The tape contains two files. The first file, KUGEL*ED4, contains the complete KUGEL code plus data files necessary for execution. The second file on the tape contains the plotting code, PLOT*3D, which is written to run on standard Tektronix graphics terminals (4012, 4014) and uses the standard PLOT-10 graphics library on the UNIVAC 1110.

3.1. PROGRAM ORGANIZATION

This section gives program organization chart that contains all the subroutine names used in the KUGEL code. This chart reflects the logical arrangement and calling hierarchy of the subroutines in the code.

3.1.1. Subroutine Calling Hierarchy (One-Dimensional Thermal Section)

```
KUGEL
  GALOGO
    PAGES
  PRELIM
    INPUT1
      PAGEB (PAGES entry print)
    FILES
    PLOTA
    LOCATE
      PAGEB
```

```

    TAPEIN
      CALCUL
        WRITEA
        PTABLE
        PAGEB
    FREAD
    ONEDIM
      PTABLE
      PAGEB
      WRITEA
      PAGEB
      KINIT (KBALL entry point)
      KBALL

```

3.1.2. Subroutine Calling Hierarchy (Two-Dimensional Thermal Section)

```

KUGEL
  THERM
    PAGEB (PAGES entry point)
    INPUT2
      PAGEB
    DATAIN
      INTERP
        TABLE
      PLOTB
      OUTPUT
        PAGEB
      WRITEB
    GRID
    INIT
      STATE
      OUTPUT
        PAGEB
      MFLUX
        DBYDZ
        DBYDR
      PROPS
        STATE
        SOLIDK
    PDE
      MFLUX
        DBYDZ
        DBYDR
      SOLUE
        DTERM
          DBYDZ
          DBYDR
      BOUND
      BOUND1
        MFLUX

```

```

                                DBYDZ
                                DBYDR
                                ADVEC
                                BOUND2
                                    DBYDZ
                                BOUND3
                                    DBYDZ
                                BOUND4
                                PROPS
                                    STATE
                                    SOLIDK
                                TEMPS
                                RESULT
                                    PAGEB
                                    PLOTB
                                    OUTPUT
                                        PAGEB
                                    WRITEB

```

3.1.3. Subroutine Calling Hierarchy (Performance Section)

```

KUGEL
  PERFOR
    PAGEB (PAGES entry point)
    INPUT3
    INPUT3B (INPUT3 entry point)
    PAGEB
  SETUP
    CALCS
    CALC1 (CALCS entry point)
    CALC2 (CALCS entry point)
    CALC3 (CALCS entry point)
    FAILUR
      KERMIG
      KFAIL
      LOOKUP
      TRUC2
      TABLE2
      BITHO2
      TABLE2
      TTHUC2
      FSVPVF
      TRTHC2
      FSVPVF
      TRTHO2
      TTHUO2
      TABLE2

```

```

ROB2
ROVERB
RELSRY
    PAGEB
PRINTH
    PAGEB
    PRINFL
        PAGEB
        CLEAR
    PRINRB

```

3.2. OPERATING INSTRUCTIONS

This section shows the required control cards and input and output files required for making a KUGEL run:

```
@ASG,A      KUGEL*ED4.
```

File assignments for optional plotting to be executed at the CRT terminal (see below).

```
@ASG,T      13.
```

```
@ASG, A      (2DB output file)
```

```
@USE 14.,    (2DB output file)
```

```
@XQT        KUGEL*ED4. MAP
```

Should plotting be desired, the assignment of plot files takes the following form:

```
@ASG, UP* _____*_____.
```

```
@USE  n., _____*_____.
```

---

*If file has been previously catalogued, use @ASG,AX _____*_____.

The unit number "n" is described below:

<u>Unit (n)</u>	<u>Usage</u>	<u>Necessary Options</u>
2	One-dimensional calculations	IPLT2D = 1 IPRINT(I) = -1 Where I = 1 to 15
3	Two-dimensional calculations	IPLT2D = 1 IOUTP(I) = -1 Where I = 1 to 22
4	Fuel performance calculations	IPROB = 5
10	Interpolated data	IPLT2D = 1 INPT(I) = -1 Where I = 1 to 7
11	Neutron flux by energy group	NTG = 1
13	Output file for metallic fission product interface	IPROB = 5

Assignment of files 2, 3, 4, and 10 is not absolutely required, since the program internally assigns scratch files. However, if any plots are desired, then assignment of catalogued files is necessary.

For a sample input deck, see Appendix B.

3.3. INPUT INSTRUCTIONS

Appendix A gives the input instructions for setting up the data deck. The input card descriptions provide the information to run the options for physics interface, one-dimensional, two-dimensional thermal and flow, fuel particle performance, and gaseous fission product release models.

3.4. KUGEL SAMPLE PROBLEM

The sample problem illustrates the use of the KUGEL code for a 3000-MW(t) PBR operating with a primary coolant pressure of 8.03 MPa(a), mixed mean coolant temperature of 507°C at the inlet, and 850°C at the outlet. The core power density is 5.50 MW/m³ with an effective core diameter of 11.2 m and a height of 5.54 m. Table 2 lists the reactor and fuel definition and parameters used in the sample problem.

TABLE 2
PBR PARAMETERS

Core rating	3000 MW(t)
Av power density	5.5 MW/m ³
Effective core diameter	11.2 m
Effective core height	5.54 m
Mixed coolant temp	
Inlet	507°C
Outlet	850°C
Primary coolant pressure	8.03 MPa(a)
Fuel cycle	MEU, <20% enriched, stowaway OTTO, on-line refueling
Av fuel residence, yr (0.8 PCF)	~3.2
Radial zones	2
Particles (separable):	

Fissile			Fertile	
	Dimension (μm)	Density (g/cm ³)	Dimension (μm)	Density (g/cm ³)
Kernel	300 UC ₂	10.7	600 ThO ₂	9.99
Buffer	105	1.0	110	1.0
Inner PyC	35	1.9	35	1.9
SiC	35	3.2	35	3.2
Outer PyC	40	1.88	40	1.88

Fuel elements, spherical, molded graphite

Diameter	60 mm
Outer shell	5 mm thick, 1.70 g/cm ³ graphite density
Fuel and matrix	50 mm diam, 1.70 g/cm ³ matrix density
Max fuel particle volume fraction <20%	

Fuel element packing in core   0.61 volume fraction, av

Effective reflector:

	Thickness (m)	Density (g/cm ³)
Top	1.5	1.3
Plenum	1.0	Helium
Side	1.0	1.6
Bottom	>1.0	1.3

A two fuel particle system is chosen for the sample problem where particle type 1 is a ThO₂-TRISO fertile particle and particle type 2 is a UC₂-TRISO fissile particle. The sample problem also includes the R/B calculations for the nuclides Kr-85m and Xe-138. File 13, which is not included in this sample problem, should be assigned if the user wants to use the TRAMP interface to calculate metallic fission product release. All the options offered by the KUGEL code have been selected to illustrate its capabilities. Appendix B gives the input and the output of the KUGEL for the sample problem.

3.5. POSTPROCESSING CODE FOR PLOTTING

A special plotting code was developed for use with the KUGEL code. The three-dimensional image produced by the code enables the user to better visualize the radial and axial components of the various parameters that KUGEL analyzes. The code is written to run on the standard Tektronix graphics terminals (4012 and 4014) and uses the standard PLOT-10 graphics library on the UNIVAC 1110 computer.

The executable version of the code is contained in the absolute element PLOT in the file KUGEL*ED4. To execute the code, merely type @XQT KUGEL*ED4.PLOT and answer the prompts. The source elements for the plotting code are contained in PLOT*3D on the second file of the KUGEL archive tape.

3.5.1. Program Logic

The three-dimensional plotting code consists of four subroutines linked in the following calling sequence:

1. MAIN.
  - a. Contains plot queries.
  - b. Assigns plot file.
  - c. Locates data to be plotted.
  - d. Sets variable dimensions.
2. FILERD. Reads in plot data into $A3D(N,3)$, where N is the number of points to be plotted and 3 represents the X,Y,Z coordinates of the plot in three-dimensional space, respectively.
3. PLOT3D.
  - a. Contains plotting logic.
  - b. Calls to Tektronix library subroutines.
4. PROJEC. Projection subroutine. Takes $A3D(N,3)$ and projects three-dimensional space into a set of coplanar points: $A3D(N,2)$ for plotting.

3.5.2. Axis Plotting

The plot code enables the user to display the projected image in one of several forms. If no axes are desired, they can be omitted from the plot, resulting in a slightly larger projected image. If axes are desired, either

the real (R-Z-P) axis or the virtual axis (X-Y-Z) can be displayed. The real axis will always be displayed around the data, while the virtual axis will indicate how to move from one viewpoint to another. In general, however, the virtual axis plotting capability should not be used, since it will tend to compress the three-dimensional plot, because it will include both the axis and the data in the projection.

3.5.3. Viewpoint Selection

Selecting of a good viewpoint in three-dimensional plotting is very important to obtain an understandable projected image. The following discussion will cover mainly the points 10, 15, 20, representing X, Y, Z coordinates, respectively. Other viewpoints will also be discussed as to their merit and special application to PBR analysis.

Figure 6 shows the spacial relation between the virtual axis and real axis. This relationship must be understood for selecting the proper viewpoint. A list of suggested viewpoints and their resulting view are given below.

<u>Viewpoint</u>	<u>Description</u>
10, 15, 20	Standard view of top side of mesh
10, -15, 20	Rear view of top side of mesh
1000, 5, 5	Side view (axial profile)
5, 1000, 5	Side view (radial profile)
5, 5, 1000	Top view
10, 15, -20	Bottom view of mesh

The viewpoints found to be most applicable to pebble bed analysis are (10, 15, 20 and 10, -15, 20). These two views give one of the best overall representations of the function curvature. Other functions might need to be viewed from another angle for good resolution on a particular mesh portion. The code presently does not contain any hidden line capability, and often, a particular viewpoint will result in a confusing plot. This can be avoided by not trying to view the plot too closely. The relative axis length with respect to the viewpoint is 10 units. The plotting code also contains an

VIEWPOINT 10, 15, 20

REAL AXIS (R - Z - P)
VIRTUAL AXIS (X - Y - Z)

AXIS
DESCRIPTION
R = RADIAL DIRECTION
Z = AXIAL DIRECTION
P = F(R,Z)
X = X VIEWPOINT
Y = Y VIEWPOINT
Z = Z VIEWPOINT

Fig. 6. Spatial relation between the virtual axis and the real axis

option to plot the function in either the (+X, +Y) quadrant or the (+X, -Y) quadrant. This option allows a pebble bed parameter to be properly represented as it is printed in the KUGEL run. Flipping the plot from one quadrant to another is actually redundant, since an identical view could be obtained merely by selecting the proper viewpoint.

An example run given in Appendix C should answer most remaining questions of viewpoint selection, axis plotting, and quadrant flipping. If not, use trial and error in three-dimensional plotting.

3.5.4. Plot File Format

Record 1	
NPLOT, IFILE, (DATE(I), I = 1, 5)*	FORMAT (2I4, T13, 2A6, 3X, 3A3)
(NPLOT) Records 2	
TITLE(I), I = 1, 12	FORMAT (12A6)
(NPLOT) Records 3-6	
Record 3	
IX, IY	FORMAT (2I4)
Record 4	
(X(I), I = 1, IX)	FORMAT (10E12.6)
Record 5	
(Y(I), J = 1, IY)	FORMAT (10E12.6)
Record 6	
((F(I,J), I = 1, IX), J = 1, IY)	FORMAT (10E12.6)

NPLOT = Number of plots on file
 *IFILE = Must be 3 for this format

4. REFERENCES

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APPENDIX A
INPUT INSTRUCTIONS

(SUBROUTINE INPUT 1)

Word	1-12					
Column	1-72					
Format	12A6					
Card 1	Problem Title					
Symbol						

Word	1	2	3	4	5	6
Column	1-4	5-8	9-12	13-16	17-20	21-24
Format	I4	I4	I4	I4	I4	I4
Card 2	Problem Type 1: Physics only 2: 1 + 1D thermal 3: NOT AVAILABLE 4: 2 + 2D thermal 5: 4 + perfor- mance	Number of neutron energy groups with $E > 0.18$ MEV for fluence calculations	Number of fuel parti- cle types* $1 \leq \text{NPART} \leq 2$	0/1: NO/YES Write on unit 11 info for 30 plots of neutron flux	Power density input 0: 2DB std 1: modify by card input	Plot files written? 0: NO 1: YES
Symbol	IPROB	NFG	NPART	NTG	IPOWRD	IPLT2D

*NPART must be
2 if IPROB = 5
Particle 1 =
Fertile
Particle 2 =
Fissile

Word	7	8				
Column	25-28	29-32				
Format	I4	I4				
Card 2 (Cont.)	Number of radial fuel residence zones*	Graphite thermal conductivity model				
Symbol	NRZONE	KMODEL				

*Fuel residence
time can vary
radially ≤ 6

**
0: Model A
1: Model B

Word	1	2				
Column	1-4	5-8				
Format	I4	I4				
Card 3	Number of heavy metal nuclides in particle 1	Number of heavy metal nuclides in particle NPART				
Symbol	NNUC(1)	NNUC(NPART)				

Heavy metal nuclides should correspond to 2DB input

CARD 4 Read in a loop I = 1, NPART

Word	1	2	3	N		
Column	1-4	5-8	9-12			
Format	I4	I4	I4	I4		
Card 4	1st nuclide ID # from 2DB	2nd nuclide ID # from 2DB	. . .	Nth nuclide ID # from 2DB		
Symbol	NUCL(I,1)	NUCL(I,2)		NUCL(I,N)		

N = NNUC (NPART)

If more than 18 nuclides in a particle, use additional card 4 as needed

Word	1	2				
Column	1-12	13-24				
Format	E12	E12				
Card 5	Time to locate on 2DB flux tape (days)	CORE AVERAGE Fuel residence time (days)				
Symbol	TIME	TRES				

Word	1	2	3	4	5	6
Column	1-4	5-8	9-12	13-16	17-20	21-24
Format	I4	I4	I4	I4	I4	I4
Card 6	Print/plot* particle 1 FIMAs	Print/plot* particle 2 FIMAs	Print/plot* fast fluence	Print/plot* power density	Print/plot* pressure drop	Print/plot* Reynolds number
Symbol	IPRINT(1)	IPRINT(2)	IPRINT(3)	IPRINT(4)	IPRINT(5)	IPRINT(6)

*0 = Do not print
table or
write on
plot file
1 = Print table
-1 = Print table
and write on
plot file 2

Word	7	8	9	10	11	12
Column	25-28	29-32	33-36	37-40	41-44	45-48
Format	I4	I4	I4	I4	I4	I4
Card 6 (Cont.)	Print/plot* convective heat transfer coefficient	Print/plot* ball power	Print/plot* bulk coolant temperature	Print/plot* ball surface temperature	Print/plot* region outer- most tempera- ture	Print/plot* fueled region central temperature
Symbol	IPRINT(7)	IPRINT(8)	IPRINT(9)	IPRINT(10)	IPRINT(11)	IPRINT(12)

Word	13	14	15			
Column	49-52	53-56	57-60			
Format	I4	I4	I4			
Card 6 (Cont.)	Print/plot* conductivity of coating	Print/plot* conductivity of fueled region	Print/plot* fast neutron flux			
Symbol	IPRINT(13)	IPRINT(14)	IPRINT(15)			

Word	1	2				
Column	1-4	5-8				
Format	I4	I4				
Card 7	Fuel element type 0: Conventional 1: Zoned	Number of special points within a ball for volume-temp calculations				
Symbol	IBALL	NPTS				

Both must be zero in Edition 4

Word	1	2	3	4	5	6
Column	1-12	13-24	25-36	37-48	49-60	61-72
Format	E12	E12	E12	E12	E12	E12
Card 8	Coolant mass flow rate (kg/sec)	Inlet coolant pressure (Pascals)	Inlet coolant temperature (Kelvin)	Ball radius (meters)	Fueled region outer radius (meters)	Fueled region inner radius* (meters)
Symbol	FLOW	PIN	TIN	RBALL	RFUEL	RINNER

For
IBALL = 0
RINNER = 0
also

Word	1	2				
Column	1-4	13-24				
Format	I4	E12				
Card 9	Leftmost, i.e., lowest numbered 2DB radial zone within this residence zone	Zone* residence time (days)				
Symbol	IRZONE	ZTRES				

* For only one radial residence zone
IRZONE = 1
ZTRES = TRES
CARD 5/WORD 2

CARD 10 read in a loop J = 1, JM

(SUBROUTINE CALCUL)

Word	1					
Column	1-12					
Format	E12					
Card 10	Power density W/cm ³					
Symbol	F2(1,J)	F2(2,J)	. . .	F2(1M,J)		

Include CARD
10 only
If IPOWRD = 1
CARD 2/WORD 5

*** 2D THERMAL SECTION ***

(SUBROUTINE INPUT 2)

Word	1	2	3	4	5	6
Column	1-4	5-8	9-12	13-16	17-20	21-24
Format	I4	I4	I4	I4	I4	I4
Card 11	Maximum number of outer iterations	Number of axial mesh points	Number of radial mesh points	Not used	Number of sweeps through stream func- tion equation per outer iteration	Number of sweeps through coolant temp equation per outer iteration
Symbol	NMAX	IN	JN	NDEG	NSWP1	NSWP2

Word	7	8	9	10	11	
Column	25-28	29-32	33-36	37-40	41-44	
Format	I4	I4	I4	I4	I4	
Card 11 (Cont.)	Number of sweeps through surface temp equation per outer iter- ation	Number of sweeps through pressure equation per outer iter- ation	Advection* differencing scheme 0 = Central 1 = Upwind	Uniform** void fraction 0 = YES 1 = NO	2D thermal problem ID number	
Symbol	NSWP3	NSWP4	IU	IVFNOM	ID	

* Upwind dif-
ferencing is
more accurate,
but also more
expensive

** Nonuniform void
fraction must
be input

Word	1	2	3	4		
Column	1-12	13-24	25-36	37-48		
Format	E12	E12	E12	E12		
Card 12	Relaxation parameter for stream function equation	Relaxation parameter for coolant temperature	Relaxation parameter for surface temperature	Relaxation parameter for pressure equation		
Symbol	RP(1)	RP(2)	RP(3)	RP(4)		

Word	1	2	3	4		
Column	1-12	13-24	25-36	37-48		
Format	E12.5	E12.5	E12.5	E12.5		
Card 13	Convergence criterion RV = 0.001	Reduction factor if substitution override is necessary RV = 0.995	Maximum run time (sec) RV >> 60.	Uniform void fraction ϵ RV = 0.39		
Symbol	CC	REDUCE	CPTMAX	UFNOM		

Word	1	2	3	4	5	6
Column	1-4	5-8	9-12	13-16	17-20	21-24
Format	I4	I4	I4	I4	I4	I4
Card 14	Print sub- stitution override information	Print program control information	Print numer- ical conver- gence information	Print inter- polated fluence*	Print inter- polated power per ball*	Print inter- polated fueled graphite thermal con- ductivity*
Symbol	IOVER	ICTRL	INUM	INPT(1)	INPT(2)	INPT(3)

RV = Recommended
Value

Print Flags
0 = NO
1 = YES
-1 = Write plot
file on
Unit 10*

Word	7	8	9	10		
Column	25-28	29-32	33-36	37-40		
Format	I4	I4	I4	I4		
Card 14 (cont.)	Print inter- polated non- fueled graphite thermal con- ductivity*	Print 3rd region thermal conductivity (only for zoned ball)	Print inter- polated coolant temperature*	Print inter- polated pebble surface temperature*		
Symbol	INPT(4)	INPT(5)	INPT(6)	INPT(7)		

Print Flags

0 = NO
1 = YES
-1 = Write plot
file on
Unit 10*

Word	1	2	3	4	5	6
Column	1-4	5-8	9-12	13-16	17-20	21-24
Format	I4	I4	I4	I4	I4	I4
Card 15	Print dimensionless stream function	Print dimensionless coolant pressure	Print dimensionless mass flux	Print radial derivative of stream function	Print axial derivative of stream function	Print axial component of dimensionless mass flux
Symbol	IOUTP(1)	IOUTP(2)	IOUTP(3)	IOUTP(4)	IOUTP(5)	IOUTP(6)

PRINT/PLOT FLAGS

1 = Print only
0 = No output
-1 = Print and
write plot
file on
Unit 3

Word	7	8	9	10	11	12
Column	25-28	29-32	33-36	37-40	41-44	45-48
Format	I4	I4	I4	I4	I4	I4
Card 15 (Cont.)	Print radial component of dimensionless mass flux	Print Reynolds number	Print coolant density	Print dimensionless convective coefficient	Print dimensionless volumetric heat genera- tion rate	Print dimensionless effective solid phase thermal conductivity
Symbol	IOUTP(7)	IOUTP(8)	IOUTP(9)	IOUTP(10)	IOUTP(11)	IOUTP(12)

Printing Reynolds
number increases
storage by
IN x JN locations

Word	13	14	15	16	17	18
Column	49-52	53-56	57-60	61-64	65-68	69-72
Format	I4	I4	I4	I4	I4	I4
Card 15 (cont.)	Print radial dimensionless effective fluid phase thermal conductivity	Print axial dimensionless effective fluid phase thermal conductivity	Print fueled region graphite thermal conductivity	Print non-fueled region graphite thermal conductivity	Print 3rd region thermal conductivity (only for zoned ball)	Print bulk coolant temperature
Symbol	IOUTP(13)	IOUTP(14)	IOUTP(15)	IOUTP(16)	IOUTP(17)	IOUTP(18)

PRINT/PLOT FLAGS

1 = Print only
0 = No output
-1 = Print and write plot file on Unit 3

Word	1	2	3	4		
Column	1-4	5-8	9-12	13-16		
Format	I4	I4	I4	I4		
Card 15A	Print pebble surface temperature	Print fuel-shell interface temperature	Print fuel centerline temperature	Print fuel-shell interface temperature gradient		
Symbol	IOUTP(19)	IOUTP(20)	IOUTP(21)	IOUTP(22)		

PRINT/PLOT FLAGS

1 = Print only
0 = No output
-1 = Print and write plot file on Unit 3

Word	1	2	3	4	5	6
Column	1-12	13-24	25-36	37-48	49-60	61-72
Format	E12	E12	E12	E12	E12	E12
Card 16	Solid phase thermal conductivity model coefficient β RV = 0.995	Solid phase thermal conductivity model coefficient γ RV = 0.6667	Convective coefficient entrance region correction factor RV = 1.0	Radial turbulent Peclet number RV = 10.0	Axial turbulent Peclet number RV = 2.0	Overall pressure drop factor RV = 1.90
Symbol	BETAK	GAMMAK	HENTC	PECLTR	PECLTA	PER1

RV: Recommended Value

CARD 17 read in a loop I = 1, IN

(SUBROUTINE INIT)

Word	1					
Column	1-6					
Format	12F6.4					
Card 17	Void fraction ϵ					
Symbol	PROPTY(I,1,4)	PROPTY(I,2,4)	. . .	PROPTY(I,JN,4)		

Radial Index
J = 1, JNAxial Index
I = 1, IN

See: CARD 11

*** PERFORMANCE SECTION ***

(SUBROUTINE INPUT3)

Word	1	2	3			
Column	1-6	7-12	13-18			
Format	I6	I6	I6			
Card 18	Number of fuel parti- cles (must match physics calc.) NPART $\geq$ 1	Number of fission gases to calculate R/B values for NGAS $\geq$ 0	Number of annular shells to divide fuel into for failure calculations RV = 10 NANVL			
Symbol	NPART	NGAS	NANVL			

RV: Recommended
Value

Word	1	2	3	4		
Column	1-6	7-12	13-18	19-24		
Format	I6	I6	I6	I6		
Card 19	Kernel migration failure (km)	SiC reaction failure (SiC)	Pressure vessel failure (PV)	Manufacturing defects failure (MD)		
Symbol	ICALC(1)	ICALC(2)	ICALC(3)	ICALC(4)		

Failure
calculations
to be
performed
0 = YES
1 = NO

CARDS 20-30 are read in a loop IP - 1, NPART

Word	1	2	3			
Column	1-6	7-12	13-18			
Format	I6	A6	A6			
Card 20	Calculational model number for PV and MD failures. see FMD:103:WWH:78	Alphanumeric particle name. If left blank, the standard name as indicated by index will be used.				
Symbol	INDEX	NMEIN(1)	NMEIN(2)			

H
E
U

Model Numbers	
1:	UC ₂ TRISO
2:	ThO ₂ BISO
3:	(Th/U)C ₂ TRISO
4:	ThC ₂ TRISO
5:	ThO ₂ TRISO
6:	(Th/U)O ₂ TRISO
7:	ThO ₂ TRISO
8:	UC ₂ TRISO

L
E
U

Word	1-12					
Column	1-72					
Format	12A6					
Card 21	Alphanumeric title for kernel migration parameters					
Symbol	NTITLE(I)					

A blank card must follow the title card or cards

Word	1	2	3	4	5	6
Column	1-12	13-24	25-36	37-48	49-60	61-72
Format	E12	E12	E12	E12	E12	E12
Card 22	$\bar{x}$	$\hat{a}$	$\hat{\beta}$	t_{α} Student's t value such that $P(-t_{\alpha} \leq t \leq t_{\alpha}) = 1 - 2\alpha$	s	n
Symbol	TMEAN	ENTCPT	SLOPE	TTBLE	SS	TOTPTS

Kernel migration parameters

A-12

Word	1	2	3			
Column	1-12	13-24	25-36			
Format	E12	E12	E12			
Card 22A	$\sum_{i=1}^n x_i^2$	Pre-exponential incubation time τ_o	Q^* (cal/mole)			
Symbol	XDFSQ	COEFSP	ACTESP			

Additional
kernel
migration
parameters

Word	1	2				
Column	1-12	13-24				
Format	E12	E12				
Card 23	Mean thick- ness of buffer plus IPyC coating	Standard deviation of buffer plus IPyC thickness (μm)				
Symbol	FAIL	SIGM				

Word	1-12					
Column	1-72					
Format	12A6					
Card 24	Alphanumeric title for fission product SiC interaction parameters					
Symbol	NTITLE(I)					

A blank card
must follow the
last title card
or cards

Word	1	2	3	4	5	6
Column	1-12	13-24	25-36	37-48	49-60	61-72
Format	E12	E12	E12	E12	E12	E12
Card 25	$\dot{P}_1$ ($\mu\text{m/hr}$)	Q_1 (cal/mole)	$\dot{P}_2$ ($\mu\text{m/hr}$)	Q_2 (cal/mole)	Burnup at which SiC penetration starts (FIMA)	Transition temperature T_t ($^{\circ}\text{C}$)
Symbol	COEFHT(1)	ACTEN(1)	COEFHT(2)	ACTEN(2)	FIMLIM	TTRANS

Word	1	2				
Column	1-12	13-24				
Format	E12	E12				
Card 26	Mean SiC thickness (μm)	Standard deviation of SiC thickness (μm)				
Symbol	AUGSIC	SIGSIC				

Word	1-12					
Column	1-72					
Format	12A6					
Card 27	Alphanumeric title card for pressure vessel					
Symbol	NTITLE(I)					

A blank card
must follow
the last title
card or cards

Word	1					
Column	1-12					
Format	E12					
Card 28	Confidence factor for the pressure vessel failure = 1, 50% > 1, > 50%					
Symbol	PARPV					

Word	1-12					
Column	1-72					
Format	12A6					
Card 29	Alphanumeric title card for manu- facturing defects parameters					
Symbol	NTITLE(I)					

Word	1	2	3	4		
Column	1-12	13-24	25-36	37-48		
Format	E12	E12	E12	E12		
Card 30	Mean percentage of fuel having missing or defective coatings	Probability that fuel with missing or defective coatings will fail	Confidence factor for EXMD = 1, 50% > 1, > 50%	Maximum expected burnup (FIMA)		
Symbol	EXMD	PRMD1	PRMD2	BURN		

Skip CARDS 31-40 if NGAS = 0 (CARD 2)

Word	1					
Column	1-6					
Format	I6					
Card	R/B calculation 0 = Old Model 1 = New Model					
31						
Symbol	IMODEL					

CARDS 32-40 are read in a loop IGAS = 1, NGAS

Word	1-12					
Column	1-72					
Format	12A6					
Card	Alphanumeric title card for R/B calculation					
32						
Symbol	NTITLE(I)					

Word	1	2	3	4	5	6
Column	1-6	13-24	25-36	37-48	49-60	61-72
Format	A6	E12	E12	E12	E12	E12
Card	Alphanumeric fission gas name	Q (cal/mole)	IMODEL = 0 $f(\infty)/f(T_o)$ IMODEL = 1 $\lambda(\text{sec}^{-1})$	Reduced gas diffusion constant	Molecular mass of fission gas	C in the compiled R/B value $f(T) =$ $(1 - C) f_{\text{gas}}$ $+ C f_{\text{solid}}$
33						
Symbol	NGNME	ACTE	DECAY	DFGAS	WMASS	FRAC

A blank card
must follow
the title
card or cards

Words 4-6
needed only
if IMODEL = 1
CARD 31

Word	1	2				
Column	1-12	13-24				
Format	E12	E12				
Card 34	f(T ₀) for failed fuel					
Symbol	RBFIN(1)	RBFIN(NPART)				

CARD 35 read in a loop IP = 1, NPART

Word	1	2	3			
Column	1-12	13-24	25-36			
Format	E12	E12	E12			
Card 35	$F(T,B) = f(T)[x + y B^2 (\% \text{ FIMA})]$					
	x	y	z			
Symbol	ACOF	BCOF	CEXP			

Word	1	2				
Column	1-12	13-24				
Format	E12	E12				
Card 36	Ratio of R/B of gas 1 to R/B of gas 2 assuming both gases have a 1 hr half life (failed fuel)	Same ratio but for as- manufactured fuel				
Symbol	RAT(1)	RAT(2)				

Read Card 34
for both gases
if IMODEL = 0,
read only for
gas 1 if
IMODEL = 1

Skip Card 35
if IGAS = 2

Card 35 contains
the burnup
dependence of
R/B

Read Card 36
only if
IMODEL = 1
and
IGAS = 2
Cards 31 & 32

Word	1					
Column	1-12					
Format	E12					
Card 37	Decay constant (sec ⁻¹) for a 1 hr half life species					
Symbol	DECAY1					

Read Card 37
only if
IMODEL = 1
CARD 31

Word	1	2				
Column	1-12	13-24				
Format	E12	E12				
Card 38	Accumulated fission gas yield for gas IGAS in particle 1	Accumulated fission gas yield for gas IGAS in particle 2				
Symbol	YIELD(1)	YIELD(2)				

Word	1					
Column	1-12					
Format	E12					
Card 39	f(T ₀) for as- manufactured fuel					
Symbol	RBMIN					

Read Card 39
for both gases
if IMODEL = 0
but only for
gas 1 if
IMODEL = 1

(END OF GAS LOOP)

Word	1	2	3			
Column	1-12	13-24	25-36			
Format	E12	E12	E12			
Card 40	Parameters for calcu- lating the gas phase R/B value f _{gas}	Exponent in f _{gas} equation	Pressure at which reference values were obtained (atm)			
Symbol	RO	THTA	PRESUR			

Read Card 40
only if
IMODEL = 1

Word	1	2		JN		
Column	1-3	4-6				
Format	I3	I3		I3		
Card 41	Print axial results for radial point 1	Print axial results for radial point 2		Print axial results for radial point JN		
Symbol	IPRINT(1)	IPRINT(2)	. . .	IPRINT(JN)		

Use more than
1 Card 41 if
necessary

```

FLAGS
0 = Print
    Results
1 = Don't
    Print

```

Word						
Column						
Format						
Card						
Symbol						

APPENDIX B
INPUT AND OUTPUT OF THE SAMPLE PROBLEM

.

.

.

.

	SSSSSSSS	HH	HH	AAAAAAAA	HH	HH
	SSSSSSSSSS	HH	HH	AAAAAAAAAA	HH	HH
	SS SS	HH	HH	AA AA	HH	HH
	SSS SS	HH	HH	AA AA	HHHH	HHHH
	SSS	HH	HH	AA AA	HH	HHHHHH
	SSS	HHHHHHHHHHHH	AAAAAAAAAAAA	HH	HH	HH
IC	SSS	HHHHHHHHHHHH	AAAAAAAAAAAA	HH	HH	HH
	SSS	HH	HH	AA AA	HH	HH
	SS SS	HH	HH	AA AA	HH	HH
	SS SS	HH	HH	AA AA	HH	HH
	SSSSSSSS	HH	HH	AA AA	HH	HH
	SSSSSSSS	HH	HH	AA AA	HH	HH

```

SSSSSSSS      TTTTTTTTTT      22222      111111111111      33333      2222
SSSSSSSSSS    TTTTTTTTTT      2222222222      111111111111      3333333333      2222222222

```

	SSSSSSSS	TTTTTTTTTTTT	222222	777777777777	333333	222222
	SSSSSSSSSS	TTTTTTTTTTTT	2222222222	777777777777	3333333333	2222222222
	SS SS	TT	222 222	777	333 333	222 222
	SSS SS	TT	22 222	777	33 33	22 222
	SSS	TT	222	777	33	222
	SSS	TT	222	777	333	222
RUN	SSS	TT	222	777	333	222
	SSS	TT	222	777	33	222
	SS SS	TT	222	777	33 33	222
	SS SS	TT	222	777	333 333	222
	SSSSSSSSSS	TT	222222222222	777	3333333333	2222222222
	SSSSSSSS	TT	222222222222	777	3333333	2222222222

```

      222222                555555555555
    2222222222            555555555555
      22      222          55
    22      222          55
      222          55
      222          5555555555
PUX . 222          555555555555
      222          55
    222          55
    222          55
    222222222222          5555555555
    222222222222          55555555

```

	44	44	33333	33333	11
	44	44	333333333	333333333	111
	44	44	33	33	333
	44	44	33	33	33
	44	44		33	33
	444444444		333	333	11
444444444444444			333	333	11
	44			33	11
	44	33	33	33	33
	44	333	333	333	333
	44	333333333	333333333		111111
	44	333333	333333		111111

	SSSSSSSS	HH	HH	AAAAAAAA	MM	MM
	SSSSSSSSSS	HH	HH	AAAAAAAAAA	MM	MM
	SS SS	HH	HH	AA AA	MM	MM
	SSS SS	HH	HH	AA AA	MM	MM
	SSS	HH	HH	AA AA	MM	MM
	SSS	HHHHHHHHHH	HH	AAAAAAAAAA	MM	MM
10	SSS	HHHHHHHHHH	HH	AAAAAAAAAA	MM	MM
	SSS	HH	HH	AA AA	MM	MM
	SS SS	HH	HH	AA AA	MM	MM
	SS SS	HH	HH	AA AA	MM	MM
	SSSSSSSS	HH	HH	AA AA	MM	MM
	SSSSSSSS	HH	HH	AA AA	MM	MM

FILE NAME * PR000DST2732   CREATED AT: 9:10:33 JAN 15, 1981   PRINTED AT: 19:12:13 JAN 15, 1981

3 RUN

B-4

qELf,L SHAM*KUGEL.R1

ELT BR1 S74Q1C 01/15/81 09:05:34 (0)

1. 00

qASG,T DUM.

2. 00

qASG,A KUGEL*ED4.

3. 00

qELT,DL KUGEL*ED4,FLATOUTPUT,DUM.DUM JPHYSICS AND THERMAL DATA

4. 00

-34

5. 00

qADD,DP KUGEL*ED4,THO2/NEUTR qLEU/TH FERTILE PARTICLE

6. 00

qADD,DP KUGEL*ED4,UC2/NEUTR qLEU/TH FISSILE PARTICLE 20 PER. FNFICHEL

7. 00

qEND

8. 00

qADD,DP DLM.DUM

9. 00

qPMD,RELU

END ELf. ERRORS: NONE. TIME: C.086 SEC. IMAGE COUNT: 9

qADD,P SHAM*KUGEL.R1

qASG,T DUM.

qASG,A KUGEL*ED4.

```

*ELT,DL KUGEL*ED4.FLATOUTPUT,DUM.DUM  @PHYSICS AND THERMAL DATA
ELT 8R1 S74Q1C 01/15/81 09:05:35 (C->D)
1. 00 @ASG,A KUGEL*2. @PHYSICS AND 1D THERMAL (PLOT FILE)
2. 00 @ASG,A KUGEL*3. @2D THERMAL (PLOT FILE)
3. 00 @ASG,A KUGEL*4. @PERFORMANCE (PLOT FILE)
4. 00 @ASG,A KUGEL*10. @INTERPOLATED DATA 1D (PLOT FILE)
5. 00 @ASG,A KUGEL*11. @NEUTRON FLUX BY ENERGY GROUP (PLOT FILE)
6. 00 @USE 2,KUGEL*2.
7. 00 @USE 3,KUGEL*3.
8. 00 @USE 4,KUGEL*4.
9. 00 @USE 10,KUGEL*1C.
10. 00 @USE 11,KUGEL*11.
11. 00 @ASG,T X.,U9S,11074 @THIS LINE REPLACES @ASG,A FLAT*OUTPUT
12. 00 @ASG,T 14
13. 00 @COPY,G X.,14
14. 00 @XGT KUGEL*ED4.MAP
15. 00 3000 MW PEBBLE BED::507-850 DEG C::5.5 W/CC::LEU/TH 20% ENRICHED
16. 00 1 RADIAL RES. ZONES::COMPLETE CALCULATION>> PHYSICS-THERMAL-PERFORMANCE
17. 00
18. 00 5 1 2 1 0 1 1 1 CARD 2
19. 00 8 19 CARD 3
20. 00 1 2 3 4 5 6 7 8 CARD 4
21. 00 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 CARD 4
22. 00 27 CARD 4
23. 00 12.0 1168. CARD 5
24. 00 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 CARD 6
25. 00 0 0 CARD 7
26. 00 1684.3 8.03 +06 78J. .003J 0.025 CARD 8
27. 00 1 1168. CARD 9
28. 00 5C 25 24 1 2 2 3 1 0 0 1 CARD 11
29. 00 1.5 0.75 1.0 1.0 CARD 12
30. 00 0.001 0.995 3.0. 0.39 CARD 13
31. 00 1 1 1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 CARD 14
32. 00 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 CARD 15
33. 00 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 CARD 15A
34. 00 0.95 0.6667 1.0 1.0 2.0 1.90 CARD 16

```

```

*ADD,DP KUGEL*ED4.THO2/MEUTR @LEU/TH FERTILE PARTICLE
35. NEW 00 2 2 10 CARD 16
36. NEW 00 0 0 0 3 CARD 17
37. NEW 00 7 CARD 18
38. NEW 00 FROM MDD-FDDM-B-024 (MARCH 21, 1977) BY C. L. SMITH CARD 19
39. NEW 00 CARD 21
40. NEW 00 5.577719 -6.512281 1.547879 1.6655 .370112 EC.CARD 22
41. NEW 00 11.036182 1. 4.7-4 7.55+4 .02 CARD 22A
42. NEW 00 145. 20.6 CARD 23
43. NEW 00 NO HIGH TEMPERATURE FAILURE BELOW TCMT (MDD-FSV-003-77) CARD 24
44. NEW 00 CARD 24
45. NEW 00 L. L. CARD 25
46. NEW 00 35. 4. CARD 26
47. NEW 00 FROM MDC-FSV-006-77 (JULY 22, 1977) BY C.L. SMITH CARD 27
48. NEW 00 CARD 27
49. NEW 00 1.0 CARD 28
50. NEW 00 FROM MDD-FSV-006-77 (JULY 22, 1977) BY C.L. SMITH CARD 28A
51. NEW 00 CARD 29

```


USE 3,KUGEL*3.

USE 4,KUGEL*4.

USE 10,KUGEL*10.

USE 11,KUGEL*11.

ASG,T X.,U9S,10074 THIS LINE REPLACES ASG,A FLAT*OUTPUT

ASG,T 14

COPY,G X.,14
FURPUR 27R3A GA E35 SL73H1 01/15/81 09:05:37
FLAT*OUTPUT(1) COPIED ON 02/19/80 AT 16:28:50
311 BLOCKS COPIED.
EOF ENCOUNTERED ON INPUT TAPE

XQT KUGEL*E04.MAP

B-9

```

GGGGG EEEEE N N EEEEE RRRRR AAAAA L AAAAA TTTTTT GGGG M H IIIII CCCC
G G E NN N L R R A A L A A T O O G M M I C L
E N N N L R R A A L A A T O O G M M I C
G EEE N N EEE RRRRR A A L A A T O O " " I C
G GGG E N N N L R R AAAAA L AAAAA T O O M F I C
G G E N NN E R R A A L A A T O O G M F I C C
GGGGGG EEEEE N N EEEEE R R A A LLLLLL A A T GGGG M H IIIII CCCC
*****
* THIS RUN WAS MADE WITH KLGE1*ED4 *
* THE ABSOLUTE ELEMENT USED WAS MAP WHICH WAS CREATED ON 11/06/14 AT 10100 *
*****

```

3000 MW PEBBLE BED::507-850 DEG C::5.5 W/CC::LEU/TH 20% ENRICHED

1 RADIAL RES. ZONES::COMPLETE CALCULATION>> PHYSICS-THERMAL-PERFORMANCE

*****
* PHYSICS INPUT DATA *
*****

IPROB= 5 :KUGEL PROBLEM TYPE
NFG= 1 :N FAST ENERGY GROUPS FOR FLUENCE CALCS
NPART= 2 :NUMBER OF PARTICLE GROUPS FOR FIMA CALCS
NTG= 1 :0/1::NO/YES PLOT FLUXES BY GROUP:UNIT 11
IPOWERD= 0 :SPECIAL POWER OVERRIDE ::INPUT MW/L
IPLT2D= 1 :0/1::NO/YES 3D PLOTS DESIRED
NRZONE= 1 :NRADIAL ZONES IN 2DB WITH DIFFERENT TRES
KMODEL= 1 :GRAPHITE CONDUCTIVITY MODEL U/1::A/B

PARTICLE 1 CONSISTS OF NUCLIDES

1 2 3 4 5 6 7 8

PARTICLE 2 CONSISTS OF NUCLIDES

9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26
27

BURNUP TIME TO LOCATE ON 2DB TAPE = 12.0000 DAYS
FUEL ELEMENT AVERAGE RESIDENCE TIME= 1168.00 DAYS

PHYSICS PRINT INDICATORS ARE

-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1

*****
* THERMAL INPUT DATA *
*****

IBALL= 0	0/1 STANDARD/ZONED ELEMENT
NPTS= 0	NUMBER OF POINTS IN VUL-TLMP CALCS
IPRNP= 0	0/1 ** NOT USED AT PRESENT **
FLOW= 1.684+03	REACTOR MASS FLOW RATE KG/SEC
Pin= 8.030+06	INLET PRESSURE PASCALS
Tin= 780.	INLET TEMPERATURE DEGREES KELVIN
RBALL= 3.000-02	FUEL ELEMENT RADIUS IN METERS
RFUEL= 2.500-02	OUTER RADIUS OF FUELED REG - METERS
RINNER= 0.000	INNER RADIUS OF FUELED REG - METERS

KUGEL RUN AT 09:08:02 ON 15 JAN 81 WITH ABSOLUTE ELEMENT MAP

CREATED ON 060064 AT 000010

PAGE 3

TOOK 37.36 SECONDS TO LOCATE TIME POINT 9

TAPE 14 PROBLEM TITLE AND INTEGER PARAMETERS

ID(11)	:TAPE TITLE IS-- 3000 MWT PEBBLE BED	
IM	:NUMBER OF RADIAL ZONES	22
JM	:NUMBER OF AXIAL ZONES	36
IGM	:NUMBER OF ENERGY GROUP	4
IGE	:GEOMETRY INDICATOR 0/1 :: X-Y/R-Z,	1
IZM	:NUMBER OF BURNUP ZONES	153
NACT	:NUMBER OF POINTWISE ACTIVATION RECORDS	J
AJ2	:NUMBER OF	J
IDENT(5)	:DATE AND TIME OF TAPE IS 03 DEC 75	18:06:32
DAY	:TIME IN DAYS	1.20000+J1
MU1	:NUMBER OF MIXTURE ATOM DENSITIES	4721
ML	:NUMBER OF NUCLIDES	56
ITYPE	:2DB FLUX TAPE TYPE	TYPE 1

KUGEL HAS CALCULATED THE SIZE OF THE 0 ARRAY TO BE 22,26 DECIMAL ON 00053776 OCTAL
THE HIGHEST CGRE LOCATION IS 00127623 OCTAL
THE BEGINNING LOCATIONS IN THE 0 ARRAY ARE CURRENTLY AS FOLLOWS

LR1= 60	LZ1= 83	LFLUX= 120	LF2= 912	LFIMA= 1704
LMO= 3288	LMOLN= 4680	LATW= 4136	LMASS= 4192	L12= 12816
LVOL= 21537	LTEMP= 21690	LZDEN= 22462	LAST= 22526	

READING RECORDS 2-13 FROM NEW 2DB FLUX OUTPUT TAPE

FINISHED READING TAPE>>>>ENTERING SUBROUTINE CALCUL

B-11

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*****
* OUTPUT FROM THE PHYSICS SECTION OF KUGEL *
* NOTE THAT THE POINT (1,1) CORRESPONDS TO THE *
* CORE CENTERLINE AT THE TOP OF THE CORE *
* *****

```

RADII	DISTANCE FROM CENTER OF CORE IN CM								
.000000	30.0000	60.0000	90.0000	120.000	150.000	180.000	210.000	240.000	270.000
300.000	325.269	360.000	380.000	398.372	430.000	460.000	500.000	530.000	560.000
590.000	620.000	660.000							

AXII	DISTANCE FROM TOP OF CORE IN CM								
.000000	79.0000	154.000	200.000	218.470	236.930	255.400	273.870	292.330	310.800
329.270	347.730	366.200	384.670	403.130	421.600	440.070	458.530	477.000	495.470
513.930	532.400	550.870	569.330	587.800	606.270	624.730	643.200	661.670	680.130
698.600	717.070	735.530	754.000	804.000	829.000	904.000			

ZDB MATERIAL ZONE VOLUMES IN CM**3 FOR ZONES 1 TO 153

3.0695+06	3.0695+06	3.0695+06	3.0695+06	3.0679+06	3.0679+06	3.0679+06	3.0679+06	3.0695+06	3.0695+06
3.0695+06	3.0695+06	3.0695+06	3.0695+06	3.0695+06	3.0695+06	3.0679+06	3.0679+06	3.0679+06	3.0679+06
3.0695+06	3.0695+06	3.0695+06	3.0695+06	3.0695+06	3.0695+06	3.0695+06	3.0695+06	3.0679+06	3.0679+06
3.0679+06	3.0679+06	3.0695+06	3.0695+06	3.0695+06	3.0695+06	3.0695+06	3.0695+06	3.0695+06	3.0695+06
3.0679+06	3.0679+06	3.0679+06	3.0679+06	3.0695+06	3.0695+06	3.0695+06	3.0695+06	3.0695+06	3.0695+06
3.0695+06	3.0695+06	3.0679+06	3.0679+06	3.0679+06	3.0679+06	3.0679+06	3.0695+06	3.0695+06	3.0695+06
3.0695+06	3.0695+06	3.0695+06	3.0695+06	3.0679+06	3.0679+06	3.0679+06	3.0679+06	3.0695+06	3.0695+06
3.0695+06	3.0695+06	3.0695+06	3.0695+06	3.0695+06	3.0695+06	3.0679+06	3.0679+06	3.0679+06	3.0679+06
3.0695+06	3.0695+06	3.0695+06	3.0695+06	3.0695+06	3.0695+06	3.0695+06	3.0695+06	3.0695+06	3.0695+06
3.0679+06	3.0679+06	3.0695+06	3.0695+06	3.0695+06	3.0695+06	3.0695+06	3.0695+06	3.0695+06	3.0695+06
3.0679+06	3.0679+06	3.0679+06	3.0679+06	3.0695+06	3.0695+06	3.0695+06	3.0695+06	3.0695+06	3.0695+06
3.0695+06	3.0695+06	3.0679+06	3.0679+06	3.0679+06	3.0679+06	3.0695+06	3.0695+06	3.0695+06	3.0695+06
5.9186+06	5.9154+06	5.9186+06	5.9186+06	5.9154+06	5.9186+06	5.9186+06	5.9154+06	5.9186+06	5.9186+06
5.9154+06	5.9186+06	5.9186+06	5.9154+06	5.9186+06	5.9186+06	5.9154+06	5.9186+06	5.9186+06	5.9154+06
5.9186+06	5.9186+06	5.9154+06	5.9186+06	5.9186+06	5.9154+06	5.9186+06	5.9186+06	5.9154+06	5.9186+06
2.0527+08	2.1233+08	2.7370+08							

RUGEL RUN AT 19:08:02

ON 15 JAN 81 WITH ABSOLUTE ELEMENT

MAP

CREATED ON P00064 AT 000000

PAGE 4

	FAST FLUX				EXP. 10 MLV		N/ CM**2-SEC					
R>>>	15.0	45.0	75.0	105.0	135.0	165.0	195.0	220.0	250.0	285.0	312.6	342.6
39.5	1.701+12	1.700+12	1.698+12	1.696+12	1.692+12	1.688+12	1.681+12	1.675+12	1.665+12	1.648+12	1.630+12	1.605+12
116.5	7.596+12	7.593+12	7.587+12	7.577+12	7.563+12	7.545+12	7.521+12	7.496+12	7.459+12	7.399+12	7.336+12	7.249+12
177.0	2.385+13	2.384+13	2.382+13	2.379+13	2.375+13	2.370+13	2.364+13	2.357+13	2.347+13	2.332+13	2.317+13	2.296+13
209.2	5.311+13	5.309+13	5.305+13	5.299+13	5.291+13	5.280+13	5.267+13	5.253+13	5.234+13	5.203+13	5.172+13	5.133+13
227.7	6.650+13	6.648+13	6.644+13	6.638+13	6.630+13	6.619+13	6.605+13	6.593+13	6.577+13	6.548+13	6.521+13	6.490+13
246.2	7.392+13	7.390+13	7.386+13	7.380+13	7.372+13	7.363+13	7.351+13	7.341+13	7.330+13	7.308+13	7.289+13	7.272+13
264.6	7.755+13	7.753+13	7.750+13	7.745+13	7.738+13	7.730+13	7.721+13	7.714+13	7.707+13	7.693+13	7.682+13	7.676+13
283.1	7.819+13	7.818+13	7.815+13	7.810+13	7.805+13	7.799+13	7.792+13	7.787+13	7.784+13	7.776+13	7.772+13	7.775+13
301.6	7.653+13	7.651+13	7.649+13	7.646+13	7.641+13	7.637+13	7.632+13	7.629+13	7.629+13	7.626+13	7.627+13	7.636+13
320.0	7.320+13	7.319+13	7.317+13	7.314+13	7.311+13	7.308+13	7.305+13	7.304+13	7.306+13	7.307+13	7.310+13	7.322+13
338.5	6.883+13	6.882+13	6.881+13	6.879+13	6.877+13	6.875+13	6.873+13	6.873+13	6.876+13	6.879+13	6.885+13	6.898+13
357.0	6.387+13	6.386+13	6.385+13	6.384+13	6.382+13	6.381+13	6.380+13	6.380+13	6.384+13	6.388+13	6.395+13	6.408+13
375.4	5.863+13	5.863+13	5.862+13	5.861+13	5.860+13	5.859+13	5.859+13	5.860+13	5.864+13	5.868+13	5.874+13	5.886+13
393.9	5.337+13	5.337+13	5.336+13	5.335+13	5.335+13	5.335+13	5.334+13	5.334+13	5.336+13	5.339+13	5.343+13	5.358+13
412.4	4.827+13	4.827+13	4.826+13	4.826+13	4.825+13	4.825+13	4.826+13	4.827+13	4.829+13	4.833+13	4.837+13	4.844+13
430.8	4.343+13	4.343+13	4.343+13	4.343+13	4.342+13	4.342+13	4.342+13	4.343+13	4.345+13	4.348+13	4.351+13	4.355+13
449.3	3.892+13	3.892+13	3.892+13	3.892+13	3.891+13	3.891+13	3.891+13	3.892+13	3.893+13	3.895+13	3.896+13	3.899+13
467.8	3.477+13	3.476+13	3.476+13	3.476+13	3.476+13	3.475+13	3.475+13	3.475+13	3.476+13	3.476+13	3.476+13	3.477+13
486.2	3.098+13	3.098+13	3.098+13	3.097+13	3.097+13	3.097+13	3.096+13	3.096+13	3.096+13	3.095+13	3.094+13	3.093+13
504.7	2.756+13	2.756+13	2.755+13	2.755+13	2.755+13	2.754+13	2.754+13	2.753+13	2.752+13	2.751+13	2.748+13	2.746+13
523.2	2.448+13	2.448+13	2.448+13	2.448+13	2.447+13	2.446+13	2.446+13	2.445+13	2.443+13	2.441+13	2.438+13	2.434+13
541.6	2.173+13	2.173+13	2.173+13	2.172+13	2.172+13	2.171+13	2.170+13	2.168+13	2.167+13	2.163+13	2.160+13	2.155+13
560.1	1.929+13	1.928+13	1.928+13	1.927+13	1.927+13	1.926+13	1.924+13	1.923+13	1.921+13	1.917+13	1.913+13	1.907+13
578.6	1.711+13	1.711+13	1.711+13	1.710+13	1.709+13	1.708+13	1.707+13	1.705+13	1.703+13	1.698+13	1.694+13	1.687+13
597.0	1.519+13	1.519+13	1.519+13	1.518+13	1.517+13	1.516+13	1.514+13	1.512+13	1.510+13	1.505+13	1.500+13	1.493+13
615.5	1.350+13	1.349+13	1.349+13	1.348+13	1.347+13	1.346+13	1.344+13	1.342+13	1.339+13	1.334+13	1.329+13	1.322+13
634.0	1.200+13	1.200+13	1.200+13	1.199+13	1.198+13	1.197+13	1.195+13	1.193+13	1.190+13	1.184+13	1.179+13	1.172+13
652.4	1.070+13	1.069+13	1.069+13	1.068+13	1.067+13	1.066+13	1.064+13	1.062+13	1.058+13	1.053+13	1.048+13	1.040+13
670.9	9.554+12	9.552+12	9.547+12	9.539+12	9.528+12	9.514+12	9.494+12	9.472+12	9.441+12	9.387+12	9.331+12	9.259+12
689.4	8.566+12	8.564+12	8.559+12	8.551+12	8.540+12	8.525+12	8.505+12	8.483+12	8.451+12	8.398+12	8.343+12	8.271+12
707.8	7.722+12	7.720+12	7.715+12	7.707+12	7.696+12	7.682+12	7.662+12	7.640+12	7.608+12	7.555+12	7.501+12	7.429+12
726.3	6.986+12	6.984+12	6.979+12	6.971+12	6.961+12	6.946+12	6.927+12	6.905+12	6.874+12	6.822+12	6.769+12	6.699+12
744.8	6.132+12	6.130+12	6.126+12	6.119+12	6.109+12	6.095+12	6.077+12	6.057+12	6.029+12	5.981+12	5.931+12	5.866+12
779.0	2.984+11	2.983+11	2.981+11	2.977+11	2.972+11	2.960+11	2.957+11	2.947+11	2.933+11	2.909+11	2.885+11	2.853+11
816.5	2.241+10	2.240+10	2.238+10	2.236+10	2.232+10	2.227+10	2.220+10	2.213+10	2.200+10	2.185+10	2.166+10	2.142+10
866.5	4.616+08	4.615+08	4.611+08	4.606+08	4.598+08	4.588+08	4.574+08	4.556+08	4.536+08	4.499+08	4.462+08	4.411+08

	FAST FLUX					E>L18MLV					N/ CM**2-SEC				
R>>>	370.0	389.2	414.2	445.0	480.0	515.0	545.0	575.0	615.0	640.0					
2															
39.5	1.570+12	1.539+12	1.489+12	1.399+12	1.252+12	1.032+12	8.027+11	5.598+11	3.475+11	1.508+11					
116.5	7.133+12	7.030+12	6.859+12	6.539+12	5.975+12	4.957+12	3.761+12	2.368+12	1.326+12	5.02+11					
177.0	2.270+13	2.249+13	2.215+13	2.155+13	2.049+13	1.754+13	1.317+13	5.951+12	2.568+12	8.172+11					
209.2	5.085+13	5.046+13	4.991+13	4.911+13	4.911+13	4.426+13	3.707+13	4.052+12	7.247+11	1.753+11					
227.7	6.452+13	6.424+13	6.391+13	6.353+13	6.457+13	5.922+13	5.067+13	4.696+12	4.179+11	4.367+10					
246.2	7.250+13	7.237+13	7.232+13	7.238+13	7.406+13	6.862+13	5.940+13	5.425+12	4.153+11	2.399+10					
264.6	7.669+13	7.669+13	7.686+13	7.724+13	7.913+13	7.381+13	6.437+13	5.881+12	4.405+11	2.201+10					
283.1	7.779+13	7.789+13	7.821+13	7.876+13	8.055+13	7.545+13	6.614+13	6.054+12	4.534+11	2.212+10					
301.6	7.648+13	7.663+13	7.703+13	7.763+13	7.909+13	7.430+13	6.537+13	5.995+12	4.496+11	2.189+10					
320.0	7.338+13	7.356+13	7.399+13	7.455+13	7.557+13	7.112+13	6.275+13	5.766+12	4.332+11	2.111+10					
338.5	6.915+13	6.933+13	6.973+13	7.021+13	7.077+13	6.667+13	5.896+13	5.424+12	4.062+11	1.992+10					
357.0	6.424+13	6.440+13	6.476+13	6.512+13	6.524+13	6.149+13	5.447+13	5.018+12	3.780+11	1.847+10					
375.4	5.900+13	5.913+13	5.944+13	5.968+13	5.941+13	5.600+13	4.967+13	4.581+12	3.454+11	1.690+10					
393.9	5.369+13	5.379+13	5.404+13	5.416+13	5.360+13	5.053+13	4.486+13	4.139+12	3.124+11	1.530+10					
412.4	4.852+13	4.859+13	4.878+13	4.880+13	4.802+13	4.524+13	4.017+13	3.711+12	2.603+11	1.373+10					
430.8	4.360+13	4.364+13	4.378+13	4.371+13	4.276+13	4.027+13	3.576+13	3.306+12	2.499+11	1.225+10					
449.3	3.900+13	3.902+13	3.910+13	3.897+13	3.793+13	3.569+13	3.172+13	2.932+12	2.217+11	1.087+10					
467.8	3.476+13	3.475+13	3.480+13	3.462+13	3.353+13	3.152+13	2.801+13	2.590+12	1.959+11	9.612+09					
486.2	3.089+13	3.087+13	3.088+13	3.066+13	2.956+13	2.777+13	2.467+13	2.282+12	1.720+11	8.473+09					
504.7	2.741+13	2.737+13	2.735+13	2.711+13	2.602+13	2.442+13	2.169+13	2.006+12	1.518+11	7.453+09					
523.2	2.427+13	2.422+13	2.419+13	2.393+13	2.287+13	2.144+13	1.904+13	1.761+12	1.333+11	6.545+09					
541.6	2.147+13	2.141+13	2.136+13	2.110+13	2.009+13	1.881+13	1.669+13	1.545+12	1.169+11	5.742+09					
560.1	1.899+13	1.892+13	1.886+13	1.859+13	1.764+13	1.650+13	1.463+13	1.354+12	1.025+11	5.034+09					
578.6	1.678+13	1.671+13	1.664+13	1.638+13	1.549+13	1.447+13	1.282+13	1.187+12	8.985+10	4.412+09					
597.0	1.484+13	1.477+13	1.469+13	1.443+13	1.361+13	1.269+13	1.123+13	1.040+12	7.872+10	3.667+09					
615.5	1.313+13	1.305+13	1.297+13	1.272+13	1.195+13	1.113+13	9.847+12	9.113+11	6.901+10	3.389+09					
634.0	1.162+13	1.155+13	1.146+13	1.122+13	1.051+13	9.773+12	8.633+12	7.989+11	6.048+10	2.971+09					
652.4	1.031+13	1.023+13	1.014+13	9.913+12	9.254+12	8.584+12	7.569+12	7.005+11	5.303+10	2.605+09					
670.9	9.164+12	9.089+12	8.998+12	8.774+12	8.162+12	7.548+12	6.639+12	6.144+11	4.651+10	2.284+09					
689.4	8.176+12	8.102+12	8.010+12	7.790+12	7.218+12	6.649+12	5.826+12	5.390+11	4.079+10	2.001+09					
707.8	7.336+12	7.262+12	7.168+12	6.953+12	6.410+12	5.873+12	5.114+12	4.725+11	3.566+10	1.744+09					
726.3	6.607+12	6.534+12	6.440+12	6.227+12	5.708+12	5.191+12	4.479+12	4.101+11	3.062+10	1.482+09					
744.8	5.781+12	5.712+12	5.624+12	5.422+12	4.938+12	4.456+12	3.801+12	3.328+11	2.406+10	1.140+09					
779.0	2.812+11	2.778+11	2.732+11	2.630+11	2.401+11	2.152+11	1.754+11	2.476+10	2.656+09	1.650+08					
816.5	2.111+10	2.086+10	2.049+10	1.969+10	1.801+10	1.601+10	1.261+10	2.463+09	3.400+08	2.574+07					
866.5	4.347+08	4.295+08	4.215+08	4.045+08	3.730+08	3.263+08	2.497+08	6.192+07	1.058+07	9.630+05					

	PARTICLE ONE FIMAS											
R>>>	15.0	45.0	75.0	105.0	135.0	165.0	195.0	220.0	250.0	285.0	312.6	342.6
39.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
116.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
177.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
209.2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
227.7	1.079-04	1.079-04	1.079-04	1.079-04	1.079-04	1.079-04	1.079-04	1.079-04	1.079-04	1.079-04	1.079-04	1.079-04
246.2	4.683-04	4.683-04	4.683-04	4.683-04	4.683-04	4.683-04	4.683-04	4.683-04	4.683-04	4.683-04	4.683-04	4.683-04
264.6	1.053-03	1.053-03	1.053-03	1.053-03	1.053-03	1.053-03	1.053-03	1.053-03	1.053-03	1.053-03	1.053-03	1.053-03
283.1	1.934-03	1.934-03	1.934-03	1.934-03	1.934-03	1.934-03	1.934-03	1.934-03	1.934-03	1.934-03	1.934-03	1.934-03
301.6	3.089-03	3.089-03	3.089-03	3.089-03	3.089-03	3.089-03	3.089-03	3.089-03	3.089-03	3.089-03	3.089-03	3.089-03
320.0	4.569-03	4.569-03	4.569-03	4.569-03	4.569-03	4.569-03	4.569-03	4.569-03	4.569-03	4.569-03	4.569-03	4.569-03
338.5	6.101-03	6.101-03	6.101-03	6.101-03	6.101-03	6.101-03	6.101-03	6.101-03	6.101-03	6.101-03	6.101-03	6.101-03
357.0	7.728-03	7.728-03	7.728-03	7.728-03	7.728-03	7.728-03	7.728-03	7.728-03	7.728-03	7.728-03	7.728-03	7.728-03
375.4	9.393-03	9.393-03	9.393-03	9.393-03	9.393-03	9.393-03	9.393-03	9.393-03	9.393-03	9.393-03	9.393-03	9.393-03
393.9	1.116-02	1.116-02	1.116-02	1.116-02	1.116-02	1.116-02	1.116-02	1.116-02	1.116-02	1.116-02	1.116-02	1.116-02
412.4	1.278-02	1.278-02	1.278-02	1.278-02	1.278-02	1.278-02	1.278-02	1.278-02	1.278-02	1.278-02	1.278-02	1.278-02
430.8	1.432-02	1.432-02	1.432-02	1.432-02	1.432-02	1.432-02	1.432-02	1.432-02	1.432-02	1.432-02	1.432-02	1.432-02
449.3	1.577-02	1.577-02	1.577-02	1.577-02	1.577-02	1.577-02	1.577-02	1.577-02	1.577-02	1.577-02	1.577-02	1.577-02
467.8	1.722-02	1.722-02	1.722-02	1.722-02	1.722-02	1.722-02	1.722-02	1.722-02	1.722-02	1.722-02	1.722-02	1.722-02
486.2	1.848-02	1.848-02	1.848-02	1.848-02	1.848-02	1.848-02	1.848-02	1.848-02	1.848-02	1.848-02	1.848-02	1.848-02
504.7	1.963-02	1.963-02	1.963-02	1.963-02	1.963-02	1.963-02	1.963-02	1.963-02	1.963-02	1.963-02	1.963-02	1.963-02
523.2	2.068-02	2.068-02	2.068-02	2.068-02	2.068-02	2.068-02	2.068-02	2.068-02	2.068-02	2.068-02	2.068-02	2.068-02
541.6	2.170-02	2.170-02	2.170-02	2.170-02	2.170-02	2.170-02	2.170-02	2.170-02	2.170-02	2.170-02	2.170-02	2.170-02
560.1	2.257-02	2.257-02	2.257-02	2.257-02	2.257-02	2.257-02	2.257-02	2.257-02	2.257-02	2.257-02	2.257-02	2.257-02
578.6	2.334-02	2.334-02	2.334-02	2.334-02	2.334-02	2.334-02	2.334-02	2.334-02	2.334-02	2.334-02	2.334-02	2.334-02
597.0	2.405-02	2.405-02	2.405-02	2.405-02	2.405-02	2.405-02	2.405-02	2.405-02	2.405-02	2.405-02	2.405-02	2.405-02
615.5	2.472-02	2.472-02	2.472-02	2.472-02	2.472-02	2.472-02	2.472-02	2.472-02	2.472-02	2.472-02	2.472-02	2.472-02
634.0	2.529-02	2.529-02	2.529-02	2.529-02	2.529-02	2.529-02	2.529-02	2.529-02	2.529-02	2.529-02	2.529-02	2.529-02
652.4	2.580-02	2.580-02	2.580-02	2.580-02	2.580-02	2.580-02	2.580-02	2.580-02	2.580-02	2.580-02	2.580-02	2.580-02
670.9	2.625-02	2.625-02	2.625-02	2.625-02	2.625-02	2.625-02	2.625-02	2.625-02	2.625-02	2.625-02	2.625-02	2.625-02
689.4	2.670-02	2.670-02	2.670-02	2.670-02	2.670-02	2.670-02	2.670-02	2.670-02	2.670-02	2.670-02	2.670-02	2.670-02
707.8	2.707-02	2.707-02	2.707-02	2.707-02	2.707-02	2.707-02	2.707-02	2.707-02	2.707-02	2.707-02	2.707-02	2.707-02
726.3	2.741-02	2.741-02	2.741-02	2.741-02	2.741-02	2.741-02	2.741-02	2.741-02	2.741-02	2.741-02	2.741-02	2.741-02
744.8	2.774-02	2.774-02	2.774-02	2.774-02	2.774-02	2.774-02	2.774-02	2.774-02	2.774-02	2.774-02	2.774-02	2.774-02
779.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
816.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
866.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

PARTICLE ONE FIMAS

R>>>	370.0	389.2	414.2	445.0	480.0	515.0	545.0	575.0	605.0	640.0
2										
39.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
116.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
177.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
209.2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
227.7	1.018-04	1.018-04	9.659-05	9.659-05	9.380-05	9.380-05	9.380-05	9.380-05	0.000	0.000
246.2	4.428-04	4.428-04	4.216-04	4.216-04	3.730-04	3.730-04	3.730-04	0.000	0.000	0.000
264.6	1.014-03	1.014-03	9.854-04	9.854-04	9.080-04	9.080-04	9.080-04	0.000	0.000	0.000
283.1	1.886-03	1.886-03	1.854-03	1.854-03	1.650-03	1.650-03	1.650-03	0.000	0.000	0.000
301.6	3.036-03	3.036-03	3.010-03	3.010-03	2.658-03	2.658-03	2.658-03	0.000	0.000	0.000
320.0	4.505-03	4.505-03	4.480-03	4.480-03	3.959-03	3.959-03	3.959-03	0.000	0.000	0.000
338.5	6.050-03	6.050-03	6.046-03	6.046-03	5.360-03	5.360-03	5.360-03	0.000	0.000	0.000
357.0	7.695-03	7.695-03	7.719-03	7.719-03	6.870-03	6.870-03	6.870-03	0.000	0.000	0.000
375.4	9.384-03	9.384-03	9.437-03	9.437-03	8.492-03	8.492-03	8.492-03	0.000	0.000	0.000
393.9	1.117-02	1.117-02	1.124-02	1.124-02	1.005-02	1.005-02	1.005-02	0.000	0.000	0.000
412.4	1.281-02	1.281-02	1.291-02	1.291-02	1.158-02	1.158-02	1.158-02	0.000	0.000	0.000
430.8	1.438-02	1.438-02	1.450-02	1.450-02	1.310-02	1.310-02	1.310-02	0.000	0.000	0.000
449.3	1.586-02	1.586-02	1.601-02	1.601-02	1.448-02	1.448-02	1.448-02	0.000	0.000	0.000
467.8	1.733-02	1.733-02	1.748-02	1.748-02	1.576-02	1.576-02	1.576-02	0.000	0.000	0.000
486.2	1.860-02	1.860-02	1.877-02	1.877-02	1.699-02	1.699-02	1.699-02	0.000	0.000	0.000
504.7	1.977-02	1.977-02	1.996-02	1.996-02	1.807-02	1.807-02	1.807-02	0.000	0.000	0.000
523.2	2.084-02	2.084-02	2.103-02	2.103-02	1.906-02	1.906-02	1.906-02	0.000	0.000	0.000
541.6	2.187-02	2.187-02	2.206-02	2.206-02	1.998-02	1.998-02	1.998-02	0.000	0.000	0.000
560.1	2.274-02	2.274-02	2.293-02	2.293-02	2.078-02	2.078-02	2.078-02	0.000	0.000	0.000
578.6	2.352-02	2.352-02	2.372-02	2.372-02	2.149-02	2.149-02	2.149-02	0.000	0.000	0.000
597.0	2.423-02	2.423-02	2.443-02	2.443-02	2.216-02	2.216-02	2.216-02	0.000	0.000	0.000
615.5	2.490-02	2.490-02	2.509-02	2.509-02	2.273-02	2.273-02	2.273-02	0.000	0.000	0.000
634.0	2.547-02	2.547-02	2.566-02	2.566-02	2.324-02	2.324-02	2.324-02	0.000	0.000	0.000
652.4	2.598-02	2.598-02	2.616-02	2.616-02	2.371-02	2.371-02	2.371-02	0.000	0.000	0.000
670.9	2.643-02	2.643-02	2.661-02	2.661-02	2.412-02	2.412-02	2.412-02	0.000	0.000	0.000
689.4	2.687-02	2.687-02	2.704-02	2.704-02	2.447-02	2.447-02	2.447-02	0.000	0.000	0.000
707.8	2.724-02	2.724-02	2.740-02	2.740-02	2.481-02	2.481-02	2.481-02	0.000	0.000	0.000
726.3	2.757-02	2.757-02	2.773-02	2.773-02	2.509-02	2.509-02	2.509-02	0.000	0.000	0.000
744.8	2.789-02	2.789-02	2.805-02	2.805-02	2.536-02	2.536-02	2.536-02	0.000	0.000	0.000
779.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
816.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
866.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

	PARTICLE TWO FIMAS											
R>>>	15.0	45.0	75.0	105.0	135.0	165.0	195.0	220.0	250.0	285.0	312.6	342.6
2												
39.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
116.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
177.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
209.2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
227.7	1.606-02	1.606-02	1.606-02	1.606-02	1.606-02	1.606-02	1.606-02	1.606-02	1.606-02	1.606-02	1.606-02	1.606-02
246.2	3.127-02	3.127-02	3.127-02	3.127-02	3.127-02	3.127-02	3.127-02	3.127-02	3.127-02	3.127-02	3.127-02	3.127-02
264.6	4.601-02	4.601-02	4.601-02	4.601-02	4.601-02	4.601-02	4.601-02	4.601-02	4.601-02	4.601-02	4.601-02	4.601-02
283.1	6.054-02	6.054-02	6.054-02	6.054-02	6.054-02	6.054-02	6.054-02	6.054-02	6.054-02	6.054-02	6.054-02	6.054-02
301.6	7.442-02	7.442-02	7.442-02	7.442-02	7.442-02	7.442-02	7.442-02	7.442-02	7.442-02	7.442-02	7.442-02	7.442-02
320.0	8.802-02	8.802-02	8.802-02	8.802-02	8.802-02	8.802-02	8.802-02	8.802-02	8.802-02	8.802-02	8.802-02	8.802-02
338.5	9.987-02	9.987-02	9.987-02	9.987-02	9.987-02	9.987-02	9.987-02	9.987-02	9.987-02	9.987-02	9.987-02	9.987-02
357.0	1.106-01	1.106-01	1.106-01	1.106-01	1.106-01	1.106-01	1.106-01	1.106-01	1.106-01	1.106-01	1.106-01	1.106-01
375.4	1.202-01	1.202-01	1.202-01	1.202-01	1.202-01	1.202-01	1.202-01	1.202-01	1.202-01	1.202-01	1.202-01	1.202-01
393.9	1.292-01	1.292-01	1.292-01	1.292-01	1.292-01	1.292-01	1.292-01	1.292-01	1.292-01	1.292-01	1.292-01	1.292-01
412.4	1.368-01	1.368-01	1.368-01	1.368-01	1.368-01	1.368-01	1.368-01	1.368-01	1.368-01	1.368-01	1.368-01	1.368-01
430.8	1.435-01	1.435-01	1.435-01	1.435-01	1.435-01	1.435-01	1.435-01	1.435-01	1.435-01	1.435-01	1.435-01	1.435-01
449.3	1.494-01	1.494-01	1.494-01	1.494-01	1.494-01	1.494-01	1.494-01	1.494-01	1.494-01	1.494-01	1.494-01	1.494-01
467.8	1.549-01	1.549-01	1.549-01	1.549-01	1.549-01	1.549-01	1.549-01	1.549-01	1.549-01	1.549-01	1.549-01	1.549-01
486.2	1.594-01	1.594-01	1.594-01	1.594-01	1.594-01	1.594-01	1.594-01	1.594-01	1.594-01	1.594-01	1.594-01	1.594-01
504.7	1.635-01	1.635-01	1.635-01	1.635-01	1.635-01	1.635-01	1.635-01	1.635-01	1.635-01	1.635-01	1.635-01	1.635-01
523.2	1.670-01	1.670-01	1.670-01	1.670-01	1.670-01	1.670-01	1.670-01	1.670-01	1.670-01	1.670-01	1.670-01	1.670-01
541.6	1.703-01	1.703-01	1.703-01	1.703-01	1.703-01	1.703-01	1.703-01	1.703-01	1.703-01	1.703-01	1.703-01	1.703-01
560.1	1.730-01	1.730-01	1.730-01	1.730-01	1.730-01	1.730-01	1.730-01	1.730-01	1.730-01	1.730-01	1.730-01	1.730-01
578.6	1.754-01	1.754-01	1.754-01	1.754-01	1.754-01	1.754-01	1.754-01	1.754-01	1.754-01	1.754-01	1.754-01	1.754-01
597.0	1.775-01	1.775-01	1.775-01	1.775-01	1.775-01	1.775-01	1.775-01	1.775-01	1.775-01	1.775-01	1.775-01	1.775-01
615.5	1.795-01	1.795-01	1.795-01	1.795-01	1.795-01	1.795-01	1.795-01	1.795-01	1.795-01	1.795-01	1.795-01	1.795-01
634.0	1.811-01	1.811-01	1.811-01	1.811-01	1.811-01	1.811-01	1.811-01	1.811-01	1.811-01	1.811-01	1.811-01	1.811-01
652.4	1.826-01	1.826-01	1.826-01	1.826-01	1.826-01	1.826-01	1.826-01	1.826-01	1.826-01	1.826-01	1.826-01	1.826-01
670.9	1.839-01	1.839-01	1.839-01	1.839-01	1.839-01	1.839-01	1.839-01	1.839-01	1.839-01	1.839-01	1.839-01	1.839-01
689.4	1.851-01	1.851-01	1.851-01	1.851-01	1.851-01	1.851-01	1.851-01	1.851-01	1.851-01	1.851-01	1.851-01	1.851-01
707.8	1.862-01	1.862-01	1.862-01	1.862-01	1.862-01	1.862-01	1.862-01	1.862-01	1.862-01	1.862-01	1.862-01	1.862-01
726.3	1.871-01	1.871-01	1.871-01	1.871-01	1.871-01	1.871-01	1.871-01	1.871-01	1.871-01	1.871-01	1.871-01	1.871-01
744.8	1.880-01	1.880-01	1.880-01	1.880-01	1.880-01	1.880-01	1.880-01	1.880-01	1.880-01	1.880-01	1.880-01	1.880-01
779.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
816.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
866.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

	PARTICLE TWO FIMAS									
R>>>	370.0	389.2	414.2	445.0	480.0	515.0	545.0	575.0	605.0	641.0
2										
39.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
116.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
177.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
209.2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
227.7	1.564-02	1.564-02	1.524-02	1.524-02	7.291-03	7.291-03	7.291-03	0.000	0.000	0.000
246.2	3.661-02	3.061-02	3.000-02	3.000-02	2.076-02	2.076-02	2.076-02	0.000	0.000	0.000
264.6	4.531-02	4.531-02	4.471-02	4.471-02	3.506-02	3.536-02	3.506-02	0.000	0.000	0.000
283.1	5.990-02	5.990-02	5.941-02	5.941-02	4.898-02	4.898-02	4.898-02	0.000	0.000	0.000
301.6	7.390-02	7.390-02	7.357-02	7.357-02	6.255-02	6.255-02	6.255-02	0.000	0.000	0.000
320.0	8.763-02	8.763-02	8.744-02	8.744-02	7.586-02	7.586-02	7.586-02	0.000	0.000	0.000
338.5	9.965-02	9.965-02	9.963-02	9.963-02	8.772-02	8.772-02	8.772-02	0.000	0.000	0.000
357.0	1.105-01	1.105-01	1.107-01	1.107-01	9.852-02	9.852-02	9.852-02	0.000	0.000	0.000
375.4	1.203-01	1.203-01	1.206-01	1.206-01	1.086-01	1.106-01	1.086-01	0.000	0.000	0.000
393.9	1.294-01	1.294-01	1.298-01	1.298-01	1.172-01	1.172-01	1.172-01	0.000	0.000	0.000
412.4	1.372-01	1.372-01	1.377-01	1.377-01	1.249-01	1.249-01	1.249-01	0.000	0.000	0.000
430.8	1.440-01	1.440-01	1.446-01	1.446-01	1.319-01	1.319-01	1.319-01	0.000	0.000	0.000
449.3	1.500-01	1.500-01	1.506-01	1.506-01	1.379-01	1.379-01	1.379-01	0.000	0.000	0.000
467.8	1.555-01	1.555-01	1.562-01	1.562-01	1.431-01	1.431-01	1.431-01	0.000	0.000	0.000
486.2	1.602-01	1.602-01	1.609-01	1.609-01	1.478-01	1.478-01	1.478-01	0.000	0.000	0.000
504.7	1.642-01	1.642-01	1.650-01	1.650-01	1.518-01	1.518-01	1.518-01	0.000	0.000	0.000
523.2	1.678-01	1.678-01	1.685-01	1.685-01	1.553-01	1.553-01	1.553-01	0.000	0.000	0.000
541.6	1.711-01	1.711-01	1.718-01	1.718-01	1.585-01	1.585-01	1.585-01	0.000	0.000	0.000
560.1	1.738-01	1.738-01	1.746-01	1.746-01	1.612-01	1.612-01	1.612-01	0.000	0.000	0.000
578.6	1.762-01	1.762-01	1.770-01	1.770-01	1.635-01	1.635-01	1.635-01	0.000	0.000	0.000
597.0	1.783-01	1.783-01	1.791-01	1.791-01	1.656-01	1.656-01	1.656-01	0.000	0.000	0.000
615.5	1.803-01	1.803-01	1.811-01	1.811-01	1.674-01	1.674-01	1.674-01	0.000	0.000	0.000
634.0	1.820-01	1.820-01	1.827-01	1.827-01	1.690-01	1.690-01	1.690-01	0.000	0.000	0.000
652.4	1.834-01	1.834-01	1.841-01	1.841-01	1.704-01	1.704-01	1.704-01	0.000	0.000	0.000
670.9	1.847-01	1.847-01	1.854-01	1.854-01	1.717-01	1.717-01	1.717-01	0.000	0.000	0.000
689.4	1.859-01	1.859-01	1.866-01	1.866-01	1.727-01	1.727-01	1.727-01	0.000	0.000	0.000
707.8	1.869-01	1.869-01	1.876-01	1.876-01	1.737-01	1.737-01	1.737-01	0.000	0.000	0.000
726.3	1.878-01	1.878-01	1.885-01	1.885-01	1.745-01	1.745-01	1.745-01	0.000	0.000	0.000
744.8	1.887-01	1.887-01	1.893-01	1.893-01	1.753-01	1.753-01	1.753-01	0.000	0.000	0.000
779.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
816.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
866.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

KUGEL HAS CALCULATED THE SIZE OF THE 0 ARRAY TO BE 1091 DECIMAL OR 00073460 OCTAL
 THE HIGHEST CORE LOCATION IS
 THE BEGINNING LOCATIONS IN THE 0 ARRAY ARE CURRENTLY AS FOLLOWS

LR1= 60 L21= 80 LFLUX= 111 LF2= 681 LFIMA= 1251
 LT= 2391 LCOND= 4671 LSTORE= 5811

	FAST FLUENCE											
	E>0.13MEV N/CM**2											
R>>>	15.0	45.0	75.0	105.0	135.0	165.0	195.0	220.0	250.0	285.0	312.6	342.6
18.5	1.787+20	1.786+20	1.785+20	1.783+20	1.780+20	1.776+20	1.772+20	1.767+20	1.761+20	1.751+20	1.740+20	1.727+20
36.9	4.023+20	4.022+20	4.019+20	4.015+20	4.009+20	4.002+20	3.993+20	3.984+20	3.973+20	3.952+20	3.933+20	3.910+20
55.4	6.510+20	6.508+20	6.504+20	6.498+20	6.490+20	6.479+20	6.466+20	6.454+20	6.435+20	6.411+20	6.386+20	6.356+20
73.9	9.119+20	9.116+20	9.111+20	9.103+20	9.093+20	9.080+20	9.064+20	9.049+20	9.032+20	9.000+20	8.970+20	8.939+20
92.3	1.175+21	1.175+21	1.174+21	1.173+21	1.172+21	1.170+21	1.168+21	1.167+21	1.165+21	1.161+21	1.158+21	1.155+21
110.8	1.432+21	1.432+21	1.431+21	1.430+21	1.429+21	1.427+21	1.425+21	1.423+21	1.422+21	1.418+21	1.415+21	1.412+21
129.3	1.679+21	1.678+21	1.677+21	1.676+21	1.675+21	1.673+21	1.671+21	1.669+21	1.667+21	1.664+21	1.661+21	1.659+21
147.7	1.910+21	1.910+21	1.909+21	1.908+21	1.906+21	1.904+21	1.902+21	1.900+21	1.899+21	1.895+21	1.892+21	1.890+21
166.2	2.125+21	2.124+21	2.124+21	2.122+21	2.121+21	2.119+21	2.117+21	2.115+21	2.113+21	2.110+21	2.108+21	2.106+21
184.7	2.322+21	2.322+21	2.321+21	2.320+21	2.318+21	2.316+21	2.314+21	2.312+21	2.311+21	2.308+21	2.305+21	2.304+21
203.1	2.502+21	2.501+21	2.500+21	2.499+21	2.497+21	2.495+21	2.493+21	2.492+21	2.490+21	2.487+21	2.485+21	2.484+21
221.6	2.664+21	2.664+21	2.663+21	2.661+21	2.660+21	2.658+21	2.656+21	2.654+21	2.653+21	2.650+21	2.648+21	2.647+21
240.1	2.810+21	2.810+21	2.809+21	2.807+21	2.806+21	2.804+21	2.802+21	2.800+21	2.799+21	2.796+21	2.794+21	2.794+21
258.5	2.941+21	2.941+21	2.940+21	2.938+21	2.937+21	2.935+21	2.933+21	2.931+21	2.930+21	2.927+21	2.925+21	2.925+21
277.0	3.058+21	3.058+21	3.057+21	3.055+21	3.054+21	3.052+21	3.049+21	3.048+21	3.047+21	3.044+21	3.042+21	3.042+21
295.5	3.162+21	3.162+21	3.161+21	3.159+21	3.158+21	3.156+21	3.154+21	3.152+21	3.151+21	3.148+21	3.146+21	3.146+21
313.9	3.255+21	3.254+21	3.253+21	3.252+21	3.250+21	3.248+21	3.246+21	3.245+21	3.243+21	3.241+21	3.239+21	3.238+21
332.4	3.337+21	3.337+21	3.336+21	3.334+21	3.333+21	3.331+21	3.329+21	3.327+21	3.326+21	3.323+21	3.321+21	3.320+21
350.9	3.410+21	3.410+21	3.409+21	3.408+21	3.406+21	3.404+21	3.402+21	3.400+21	3.399+21	3.396+21	3.393+21	3.393+21
369.3	3.475+21	3.475+21	3.474+21	3.472+21	3.471+21	3.468+21	3.466+21	3.464+21	3.463+21	3.460+21	3.458+21	3.457+21
387.8	3.533+21	3.532+21	3.531+21	3.530+21	3.528+21	3.526+21	3.524+21	3.522+21	3.521+21	3.517+21	3.515+21	3.514+21
406.3	3.584+21	3.583+21	3.582+21	3.581+21	3.579+21	3.577+21	3.575+21	3.573+21	3.571+21	3.568+21	3.565+21	3.564+21
424.7	3.629+21	3.629+21	3.628+21	3.626+21	3.624+21	3.622+21	3.620+21	3.618+21	3.616+21	3.613+21	3.610+21	3.608+21
443.2	3.670+21	3.669+21	3.668+21	3.667+21	3.665+21	3.662+21	3.660+21	3.658+21	3.656+21	3.652+21	3.649+21	3.648+21
461.7	3.706+21	3.705+21	3.704+21	3.703+21	3.701+21	3.698+21	3.696+21	3.694+21	3.692+21	3.688+21	3.685+21	3.683+21
480.1	3.738+21	3.737+21	3.736+21	3.735+21	3.733+21	3.730+21	3.728+21	3.726+21	3.724+21	3.719+21	3.716+21	3.714+21
498.6	3.767+21	3.766+21	3.765+21	3.763+21	3.761+21	3.759+21	3.756+21	3.754+21	3.752+21	3.748+21	3.744+21	3.742+21
517.1	3.793+21	3.792+21	3.791+21	3.789+21	3.787+21	3.785+21	3.782+21	3.780+21	3.778+21	3.773+21	3.769+21	3.767+21
535.5	3.816+21	3.816+21	3.814+21	3.813+21	3.811+21	3.808+21	3.805+21	3.803+21	3.801+21	3.796+21	3.792+21	3.789+21
554.0	3.837+21	3.836+21	3.835+21	3.833+21	3.831+21	3.829+21	3.826+21	3.823+21	3.821+21	3.816+21	3.812+21	3.809+21

	FAST FLUENCE							E>0.13MEV	N/CM**2
R>>>	370.0	389.2	414.2	445.0	480.0	515.0	545.0		
18.5	1.711+20	1.698+20	1.679+20	1.652+20	1.652+20	1.489+20	1.247+20		
36.9	3.881+20	3.858+20	3.828+20	3.788+20	3.823+20	3.481+20	2.951+20		
55.4	6.320+20	6.293+20	6.261+20	6.223+20	6.315+20	5.789+20	4.950+20		
73.9	8.900+20	8.873+20	8.848+20	8.822+20	8.977+20	8.273+20	7.115+20		
92.3	1.152+21	1.149+21	1.148+21	1.147+21	1.169+21	1.031+21	9.339+20		
110.8	1.409+21	1.407+21	1.407+21	1.408+21	1.435+21	1.331+21	1.154+21		
129.3	1.656+21	1.655+21	1.656+21	1.659+21	1.689+21	1.570+21	1.365+21		
147.7	1.888+21	1.888+21	1.890+21	1.895+21	1.927+21	1.794+21	1.563+21		
166.2	2.104+21	2.104+21	2.108+21	2.114+21	2.146+21	2.001+21	1.747+21		
184.7	2.303+21	2.303+21	2.308+21	2.315+21	2.346+21	2.190+21	1.914+21		
203.1	2.483+21	2.484+21	2.490+21	2.497+21	2.527+21	2.360+21	2.064+21		
221.6	2.647+21	2.648+21	2.654+21	2.661+21	2.688+21	2.512+21	2.200+21		
240.1	2.793+21	2.794+21	2.801+21	2.808+21	2.832+21	2.647+21	2.320+21		
258.5	2.924+21	2.926+21	2.933+21	2.939+21	2.959+21	2.767+21	2.427+21		
277.0	3.041+21	3.043+21	3.050+21	3.056+21	3.072+21	2.873+21	2.521+21		
295.5	3.145+21	3.146+21	3.154+21	3.159+21	3.172+21	2.967+21	2.604+21		
313.9	3.238+21	3.238+21	3.246+21	3.250+21	3.259+21	3.049+21	2.677+21		
332.4	3.319+21	3.320+21	3.327+21	3.331+21	3.336+21	3.121+21	2.741+21		
350.9	3.391+21	3.392+21	3.399+21	3.402+21	3.404+21	3.184+21	2.797+21		
369.3	3.455+21	3.456+21	3.462+21	3.464+21	3.463+21	3.240+21	2.846+21		
387.8	3.512+21	3.512+21	3.518+21	3.519+21	3.515+21	3.289+21	2.889+21		
406.3	3.562+21	3.562+21	3.568+21	3.568+21	3.561+21	3.331+21	2.927+21		
424.7	3.606+21	3.605+21	3.611+21	3.611+21	3.601+21	3.369+21	2.960+21		
443.2	3.645+21	3.644+21	3.650+21	3.648+21	3.637+21	3.402+21	2.989+21		
461.7	3.680+21	3.679+21	3.684+21	3.682+21	3.668+21	3.430+21	3.015+21		
480.1	3.710+21	3.709+21	3.714+21	3.711+21	3.695+21	3.456+21	3.037+21		
498.6	3.738+21	3.737+21	3.741+21	3.737+21	3.719+21	3.478+21	3.057+21		
517.1	3.763+21	3.761+21	3.765+21	3.761+21	3.741+21	3.498+21	3.074+21		
535.5	3.785+21	3.783+21	3.787+21	3.782+21	3.760+21	3.515+21	3.089+21		
554.0	3.804+21	3.802+21	3.806+21	3.800+21	3.777+21	3.530+21	3.102+21		

	POWER DENSITY WATTS PER CUBIC METER											
R>>>	15.0	45.0	75.0	105.0	135.0	165.0	195.0	220.0	250.0	285.0	312.6	342.6
9.2	9.955+06	9.951+06	9.943+06	9.931+06	9.914+06	9.891+06	9.862+06	9.832+06	9.792+06	9.722+06	9.652+06	9.564+06
27.7	1.067+07	1.067+07	1.066+07	1.065+07	1.064+07	1.062+07	1.060+07	1.057+07	1.055+07	1.050+07	1.046+07	1.041+07
46.2	1.139+07	1.139+07	1.138+07	1.138+07	1.136+07	1.135+07	1.133+07	1.131+07	1.130+07	1.127+07	1.124+07	1.122+07
64.6	1.173+07	1.173+07	1.172+07	1.172+07	1.170+07	1.169+07	1.168+07	1.167+07	1.166+07	1.164+07	1.162+07	1.162+07
83.1	1.165+07	1.165+07	1.165+07	1.164+07	1.163+07	1.162+07	1.161+07	1.161+07	1.161+07	1.159+07	1.159+07	1.160+07
101.6	1.126+07	1.126+07	1.126+07	1.125+07	1.125+07	1.124+07	1.123+07	1.123+07	1.123+07	1.123+07	1.123+07	1.124+07
120.0	1.065+07	1.065+07	1.064+07	1.064+07	1.064+07	1.063+07	1.063+07	1.062+07	1.063+07	1.063+07	1.063+07	1.066+07
138.5	9.924+06	9.923+06	9.921+06	9.918+06	9.914+06	9.911+06	9.909+06	9.907+06	9.915+06	9.918+06	9.924+06	9.946+06
157.0	9.139+06	9.138+06	9.137+06	9.135+06	9.132+06	9.133+06	9.129+06	9.129+06	9.136+06	9.142+06	9.149+06	9.168+06
175.4	8.339+06	8.339+06	8.338+06	8.336+06	8.335+06	8.334+06	8.333+06	8.334+06	8.341+06	8.346+06	8.353+06	8.370+06
193.9	7.548+06	7.548+06	7.547+06	7.546+06	7.545+06	7.544+06	7.545+06	7.545+06	7.551+06	7.556+06	7.562+06	7.575+06
212.4	6.799+06	6.799+06	6.798+06	6.798+06	6.797+06	6.797+06	6.797+06	6.798+06	6.802+06	6.806+06	6.811+06	6.820+06
230.6	6.098+06	6.097+06	6.097+06	6.096+06	6.096+06	6.096+06	6.096+06	6.096+06	6.099+06	6.102+06	6.105+06	6.111+06
249.3	5.450+06	5.449+06	5.449+06	5.449+06	5.448+06	5.448+06	5.448+06	5.448+06	5.450+06	5.451+06	5.453+06	5.455+06
267.8	4.855+06	4.854+06	4.854+06	4.854+06	4.853+06	4.853+06	4.853+06	4.853+06	4.853+06	4.853+06	4.852+06	4.852+06
286.2	4.318+06	4.318+06	4.318+06	4.318+06	4.317+06	4.316+06	4.316+06	4.315+06	4.315+06	4.313+06	4.311+06	4.308+06
304.7	3.836+06	3.836+06	3.835+06	3.835+06	3.834+06	3.834+06	3.833+06	3.832+06	3.831+06	3.827+06	3.824+06	3.819+06
323.2	3.404+06	3.404+06	3.404+06	3.403+06	3.402+06	3.401+06	3.400+06	3.396+06	3.396+06	3.392+06	3.388+06	3.381+06
341.6	3.018+06	3.018+06	3.017+06	3.017+06	3.016+06	3.015+06	3.013+06	3.011+06	3.008+06	3.004+06	2.998+06	2.990+06
360.1	2.676+06	2.676+06	2.676+06	2.675+06	2.674+06	2.673+06	2.671+06	2.668+06	2.665+06	2.659+06	2.653+06	2.644+06
378.6	2.374+06	2.374+06	2.373+06	2.372+06	2.371+06	2.369+06	2.367+06	2.365+06	2.361+06	2.355+06	2.348+06	2.338+06
397.0	2.106+06	2.106+06	2.106+06	2.105+06	2.103+06	2.102+06	2.099+06	2.097+06	2.092+06	2.086+06	2.078+06	2.069+06
415.5	1.870+06	1.870+06	1.869+06	1.869+06	1.867+06	1.865+06	1.863+06	1.860+06	1.856+06	1.848+06	1.841+06	1.831+06
434.0	1.663+06	1.663+06	1.662+06	1.661+06	1.660+06	1.658+06	1.655+06	1.652+06	1.646+06	1.640+06	1.632+06	1.622+06
452.4	1.481+06	1.481+06	1.480+06	1.479+06	1.478+06	1.476+06	1.473+06	1.470+06	1.465+06	1.456+06	1.450+06	1.440+06
470.9	1.323+06	1.322+06	1.322+06	1.321+06	1.319+06	1.317+06	1.314+06	1.311+06	1.306+06	1.299+06	1.291+06	1.281+06
489.4	1.185+06	1.185+06	1.184+06	1.183+06	1.181+06	1.179+06	1.176+06	1.173+06	1.169+06	1.161+06	1.153+06	1.143+06
507.6	1.071+06	1.070+06	1.070+06	1.069+06	1.067+06	1.065+06	1.062+06	1.059+06	1.055+06	1.047+06	1.039+06	1.029+06
526.1	9.927+05	9.924+05	9.917+05	9.906+05	9.891+05	9.870+05	9.841+05	9.810+05	9.765+05	9.689+05	9.609+05	9.509+05
544.8	9.983+05	9.980+05	9.972+05	9.960+05	9.944+05	9.921+05	9.890+05	9.856+05	9.808+05	9.725+05	9.639+05	9.531+05

	POWER DENSITY WATTS PER CUBIC METER						
R>>>	370.0	389.2	414.2	445.0	480.0	515.0	545.0
9.2	9.451+06	9.357+06	9.222+06	8.982+06	9.182+06	8.290+06	7.704+06
27.7	1.034+07	1.029+07	1.024+07	1.012+07	1.061+07	9.755+06	9.411+06
46.2	1.118+07	1.116+07	1.116+07	1.113+07	1.174+07	1.092+07	1.073+07
64.6	1.161+07	1.160+07	1.165+07	1.167+07	1.230+07	1.152+07	1.144+07
83.1	1.160+07	1.161+07	1.168+07	1.173+07	1.230+07	1.159+07	1.159+07
101.6	1.126+07	1.127+07	1.135+07	1.142+07	1.190+07	1.124+07	1.131+07
120.0	1.068+07	1.069+07	1.077+07	1.085+07	1.120+07	1.052+07	1.073+07
138.5	9.968+06	9.986+06	1.006+07	1.013+07	1.037+07	9.843+06	9.931+06
157.0	9.189+06	9.205+06	9.272+06	9.334+06	9.458+06	8.991+06	9.147+06
175.4	8.387+06	8.399+06	8.457+06	8.507+06	8.533+06	8.120+06	8.280+06
193.9	7.588+06	7.596+06	7.646+06	7.683+06	7.643+06	7.278+06	7.434+06
212.4	6.829+06	6.833+06	6.873+06	6.899+06	6.805+06	6.441+06	6.629+06
230.8	6.115+06	6.115+06	6.147+06	6.162+06	6.026+06	5.740+06	5.876+06
249.3	5.455+06	5.452+06	5.476+06	5.482+06	5.321+06	5.068+06	5.190+06
267.8	4.849+06	4.843+06	4.861+06	4.859+06	4.686+06	4.462+06	4.571+06
286.2	4.302+06	4.294+06	4.307+06	4.299+06	4.117+06	3.919+06	4.015+06
304.7	3.810+06	3.800+06	3.809+06	3.796+06	3.615+06	3.439+06	3.522+06
323.2	3.371+06	3.360+06	3.364+06	3.348+06	3.171+06	3.015+06	3.087+06
341.6	2.978+06	2.966+06	2.968+06	2.950+06	2.780+06	2.640+06	2.702+06
360.1	2.632+06	2.619+06	2.618+06	2.598+06	2.437+06	2.313+06	2.366+06
378.6	2.325+06	2.312+06	2.309+06	2.288+06	2.137+06	2.027+06	2.071+06
397.0	2.055+06	2.042+06	2.038+06	2.016+06	1.875+06	1.776+06	1.813+06
415.5	1.817+06	1.804+06	1.798+06	1.776+06	1.646+06	1.557+06	1.588+06
434.0	1.608+06	1.596+06	1.589+06	1.567+06	1.446+06	1.366+06	1.391+06
452.4	1.426+06	1.413+06	1.406+06	1.384+06	1.272+06	1.199+06	1.218+06
470.9	1.267+06	1.255+06	1.247+06	1.225+06	1.121+06	1.054+06	1.068+06
489.4	1.129+06	1.118+06	1.109+06	1.087+06	9.956+05	9.274+05	9.357+05
507.8	1.016+06	1.004+06	9.947+05	9.720+05	8.813+05	8.200+05	8.212+05
526.3	9.372+05	9.253+05	9.152+05	8.911+05	8.024+05	7.410+05	7.293+05
544.8	9.382+05	9.253+05	9.137+05	8.854+05	7.892+05	7.132+05	6.822+05

--- KUGEL RUN AT 09:08:02 ON 15 JAN 81 WITH ABSOLUTE ELEMENT MAP

CREATED ON 100064 AT 000000

PAGE 14

OUTLET TEMP=	1122.99	DEGREES K
CORE POWER=	.300000+10	WATTS
----- AVERAGE BALL POWER=	1019.08	WATTS
NUMBER OF BALLS IN CORE=	.294383+07	
CORE VOLUME=	545.802	M**3
CORE POWER DENSITY=	5.49649	WATTS PER CC
CORE HEIGHT=	5.54000	METERS
CORE DIAMETER=	11.2000	METERS

***** CONDUCTIVITY MODEL B WILL BE USED *****

LOCAL PRESSURE DROP IN PASCALS

R>>> Z	15.0	45.0	75.0	105.0	135.0	165.0	195.0	220.0	250.0	285.0	312.6	342.6
9.2	3.082+04	3.082+04	3.082+04	3.082+04	3.082+04	3.081+04	3.081+04	3.081+04	3.081+04	3.081+04	3.080+04	3.080+04
27.7	3.277+04	3.277+04	3.276+04	3.276+04	3.276+04	3.276+04	3.275+04	3.275+04	3.275+04	3.274+04	3.273+04	3.272+04
46.2	3.484+04	3.484+04	3.484+04	3.484+04	3.483+04	3.483+04	3.482+04	3.482+04	3.481+04	3.480+04	3.479+04	3.477+04
64.6	3.704+04	3.704+04	3.703+04	3.703+04	3.702+04	3.702+04	3.701+04	3.700+04	3.700+04	3.698+04	3.697+04	3.695+04
83.1	3.931+04	3.931+04	3.931+04	3.931+04	3.931+04	3.929+04	3.928+04	3.928+04	3.927+04	3.925+04	3.923+04	3.922+04
101.6	4.164+04	4.164+04	4.163+04	4.163+04	4.162+04	4.161+04	4.160+04	4.159+04	4.159+04	4.157+04	4.155+04	4.154+04
120.0	4.398+04	4.398+04	4.397+04	4.397+04	4.396+04	4.395+04	4.394+04	4.393+04	4.392+04	4.390+04	4.389+04	4.387+04
138.5	4.632+04	4.632+04	4.631+04	4.631+04	4.630+04	4.629+04	4.628+04	4.627+04	4.626+04	4.624+04	4.622+04	4.621+04
157.0	4.863+04	4.863+04	4.863+04	4.862+04	4.861+04	4.860+04	4.859+04	4.858+04	4.857+04	4.855+04	4.853+04	4.853+04
175.4	5.092+04	5.092+04	5.091+04	5.090+04	5.090+04	5.088+04	5.087+04	5.086+04	5.086+04	5.083+04	5.082+04	5.081+04
193.9	5.316+04	5.316+04	5.316+04	5.315+04	5.314+04	5.313+04	5.312+04	5.310+04	5.310+04	5.308+04	5.306+04	5.306+04
212.4	5.536+04	5.536+04	5.536+04	5.535+04	5.534+04	5.533+04	5.532+04	5.530+04	5.530+04	5.528+04	5.526+04	5.526+04
230.8	5.752+04	5.752+04	5.751+04	5.751+04	5.750+04	5.748+04	5.747+04	5.746+04	5.745+04	5.743+04	5.742+04	5.741+04
249.3	5.963+04	5.963+04	5.962+04	5.962+04	5.961+04	5.959+04	5.958+04	5.957+04	5.956+04	5.954+04	5.952+04	5.952+04
267.8	6.170+04	6.169+04	6.169+04	6.168+04	6.167+04	6.166+04	6.164+04	6.163+04	6.163+04	6.161+04	6.159+04	6.158+04
286.2	6.372+04	6.372+04	6.371+04	6.370+04	6.369+04	6.368+04	6.366+04	6.365+04	6.365+04	6.363+04	6.361+04	6.360+04
304.7	6.570+04	6.570+04	6.569+04	6.568+04	6.567+04	6.566+04	6.564+04	6.563+04	6.563+04	6.561+04	6.558+04	6.558+04
323.2	6.764+04	6.764+04	6.764+04	6.763+04	6.761+04	6.760+04	6.759+04	6.757+04	6.757+04	6.754+04	6.752+04	6.752+04
341.6	6.955+04	6.955+04	6.954+04	6.953+04	6.952+04	6.951+04	6.949+04	6.948+04	6.947+04	6.945+04	6.943+04	6.942+04
360.1	7.143+04	7.143+04	7.142+04	7.141+04	7.140+04	7.138+04	7.137+04	7.135+04	7.134+04	7.132+04	7.129+04	7.129+04
378.6	7.327+04	7.327+04	7.326+04	7.325+04	7.324+04	7.322+04	7.321+04	7.319+04	7.319+04	7.316+04	7.313+04	7.313+04
397.0	7.509+04	7.509+04	7.508+04	7.507+04	7.506+04	7.504+04	7.502+04	7.501+04	7.500+04	7.497+04	7.494+04	7.494+04
415.5	7.689+04	7.688+04	7.687+04	7.686+04	7.685+04	7.683+04	7.681+04	7.680+04	7.679+04	7.676+04	7.673+04	7.672+04
434.0	7.866+04	7.865+04	7.864+04	7.863+04	7.862+04	7.860+04	7.858+04	7.856+04	7.856+04	7.852+04	7.849+04	7.848+04
452.4	8.041+04	8.040+04	8.040+04	8.038+04	8.037+04	8.035+04	8.033+04	8.031+04	8.030+04	8.027+04	8.024+04	8.022+04
470.9	8.215+04	8.215+04	8.214+04	8.213+04	8.211+04	8.209+04	8.207+04	8.205+04	8.204+04	8.200+04	8.197+04	8.195+04
489.4	8.387+04	8.386+04	8.386+04	8.384+04	8.383+04	8.381+04	8.379+04	8.377+04	8.375+04	8.372+04	8.368+04	8.366+04
507.8	8.557+04	8.557+04	8.556+04	8.555+04	8.553+04	8.551+04	8.549+04	8.547+04	8.546+04	8.542+04	8.538+04	8.536+04
526.3	8.727+04	8.727+04	8.726+04	8.724+04	8.723+04	8.721+04	8.718+04	8.716+04	8.715+04	8.710+04	8.707+04	8.704+04
544.8	8.897+04	8.896+04	8.895+04	8.894+04	8.892+04	8.890+04	8.888+04	8.885+04	8.884+04	8.879+04	8.875+04	8.873+04

LOCAL PRESSURE DROP IN PASCALS

R>>>	370.0	389.2	414.2	445.0	480.0	515.0	545.0
9.2	3.080+04	3.079+04	3.079+04	3.078+04	3.076+04	3.075+04	3.072+04
27.7	3.271+04	3.270+04	3.268+04	3.265+04	3.269+04	3.258+04	3.251+04
46.2	3.476+04	3.474+04	3.472+04	3.469+04	3.478+04	3.458+04	3.449+04
64.6	3.693+04	3.691+04	3.690+04	3.686+04	3.702+04	3.674+04	3.662+04
83.1	3.920+04	3.918+04	3.917+04	3.914+04	3.935+04	3.879+04	3.887+04
101.6	4.151+04	4.150+04	4.149+04	4.147+04	4.174+04	4.133+04	4.118+04
120.0	4.385+04	4.384+04	4.384+04	4.382+04	4.415+04	4.363+04	4.351+04
138.5	4.619+04	4.618+04	4.619+04	4.618+04	4.655+04	4.595+04	4.584+04
157.0	4.851+04	4.850+04	4.852+04	4.851+04	4.891+04	4.824+04	4.815+04
175.4	5.079+04	5.078+04	5.081+04	5.081+04	5.123+04	5.049+04	5.042+04
193.9	5.304+04	5.303+04	5.307+04	5.307+04	5.351+04	5.270+04	5.264+04
212.4	5.524+04	5.523+04	5.528+04	5.529+04	5.572+04	5.485+04	5.481+04
230.8	5.740+04	5.739+04	5.744+04	5.745+04	5.788+04	5.675+04	5.693+04
249.3	5.951+04	5.950+04	5.955+04	5.956+04	5.999+04	5.900+04	5.899+04
267.8	6.157+04	6.156+04	6.162+04	6.163+04	6.204+04	6.100+04	6.101+04
286.2	6.359+04	6.358+04	6.364+04	6.365+04	6.405+04	6.296+04	6.297+04
304.7	6.557+04	6.555+04	6.562+04	6.563+04	6.601+04	6.497+04	6.490+04
323.2	6.750+04	6.749+04	6.755+04	6.756+04	6.793+04	6.674+04	6.678+04
341.6	6.940+04	6.938+04	6.945+04	6.946+04	6.981+04	6.857+04	6.862+04
360.1	7.127+04	7.125+04	7.132+04	7.132+04	7.166+04	7.037+04	7.043+04
378.6	7.310+04	7.308+04	7.315+04	7.315+04	7.347+04	7.214+04	7.221+04
397.0	7.491+04	7.489+04	7.496+04	7.496+04	7.526+04	7.388+04	7.396+04
415.5	7.669+04	7.666+04	7.674+04	7.673+04	7.702+04	7.560+04	7.569+04
434.0	7.845+04	7.842+04	7.849+04	7.848+04	7.876+04	7.730+04	7.739+04
452.4	8.019+04	8.016+04	8.023+04	8.022+04	8.048+04	7.898+04	7.907+04
470.9	8.192+04	8.188+04	8.196+04	8.194+04	8.219+04	8.065+04	8.075+04
489.4	8.362+04	8.358+04	8.366+04	8.364+04	8.388+04	8.229+04	8.240+04
507.8	8.531+04	8.527+04	8.535+04	8.532+04	8.555+04	8.393+04	8.403+04
526.3	8.700+04	8.695+04	8.703+04	8.700+04	8.721+04	8.555+04	8.566+04
544.8	8.868+04	8.863+04	8.870+04	8.867+04	8.887+04	8.717+04	8.727+04

LOCAL REYNOLDS NUMBER

R>>>	15.0	45.0	75.0	105.0	135.0	165.0	195.0	220.0	250.0	285.0	312.6	342.6
9.2	4.345+04	4.345+04	4.345+04	4.345+04	4.345+04	4.345+04	4.345+04	4.345+04	4.346+04	4.346+04	4.346+04	4.346+04
27.7	4.266+04	4.266+04	4.266+04	4.266+04	4.266+04	4.266+04	4.267+04	4.267+04	4.267+04	4.268+04	4.269+04	4.270+04
46.2	4.185+04	4.185+04	4.185+04	4.185+04	4.185+04	4.186+04	4.186+04	4.187+04	4.187+04	4.188+04	4.189+04	4.190+04
64.6	4.104+04	4.104+04	4.104+04	4.104+04	4.105+04	4.105+04	4.106+04	4.106+04	4.107+04	4.108+04	4.109+04	4.110+04
83.1	4.026+04	4.026+04	4.026+04	4.027+04	4.027+04	4.027+04	4.028+04	4.029+04	4.029+04	4.030+04	4.031+04	4.032+04
101.0	3.953+04	3.953+04	3.953+04	3.954+04	3.954+04	3.954+04	3.955+04	3.956+04	3.956+04	3.957+04	3.958+04	3.959+04
120.0	3.886+04	3.886+04	3.886+04	3.887+04	3.887+04	3.888+04	3.888+04	3.889+04	3.889+04	3.890+04	3.892+04	3.892+04
138.5	3.826+04	3.826+04	3.826+04	3.827+04	3.827+04	3.827+04	3.828+04	3.829+04	3.829+04	3.830+04	3.831+04	3.832+04
157.0	3.772+04	3.772+04	3.772+04	3.773+04	3.773+04	3.774+04	3.774+04	3.775+04	3.775+04	3.776+04	3.777+04	3.777+04
175.4	3.724+04	3.724+04	3.725+04	3.725+04	3.725+04	3.726+04	3.726+04	3.727+04	3.727+04	3.728+04	3.729+04	3.729+04
193.9	3.682+04	3.682+04	3.682+04	3.683+04	3.683+04	3.684+04	3.684+04	3.685+04	3.685+04	3.686+04	3.687+04	3.687+04
212.4	3.645+04	3.645+04	3.645+04	3.646+04	3.646+04	3.647+04	3.647+04	3.648+04	3.648+04	3.649+04	3.649+04	3.650+04
230.8	3.613+04	3.613+04	3.613+04	3.613+04	3.614+04	3.614+04	3.615+04	3.615+04	3.615+04	3.616+04	3.617+04	3.617+04
249.3	3.584+04	3.584+04	3.584+04	3.585+04	3.585+04	3.585+04	3.586+04	3.586+04	3.587+04	3.587+04	3.588+04	3.588+04
267.8	3.559+04	3.559+04	3.559+04	3.560+04	3.560+04	3.561+04	3.561+04	3.562+04	3.562+04	3.563+04	3.563+04	3.563+04
286.2	3.537+04	3.537+04	3.537+04	3.538+04	3.538+04	3.539+04	3.539+04	3.540+04	3.540+04	3.540+04	3.541+04	3.541+04
304.7	3.518+04	3.518+04	3.518+04	3.518+04	3.519+04	3.519+04	3.520+04	3.520+04	3.521+04	3.521+04	3.522+04	3.522+04
323.2	3.501+04	3.501+04	3.501+04	3.502+04	3.502+04	3.503+04	3.503+04	3.503+04	3.504+04	3.504+04	3.505+04	3.505+04
341.6	3.486+04	3.486+04	3.487+04	3.487+04	3.487+04	3.488+04	3.488+04	3.489+04	3.489+04	3.490+04	3.490+04	3.491+04
360.1	3.473+04	3.473+04	3.474+04	3.474+04	3.474+04	3.475+04	3.475+04	3.476+04	3.476+04	3.477+04	3.477+04	3.478+04
378.6	3.462+04	3.462+04	3.462+04	3.463+04	3.463+04	3.463+04	3.464+04	3.464+04	3.465+04	3.465+04	3.466+04	3.466+04
397.0	3.452+04	3.452+04	3.452+04	3.452+04	3.453+04	3.453+04	3.454+04	3.454+04	3.455+04	3.455+04	3.456+04	3.456+04
415.5	3.443+04	3.443+04	3.443+04	3.444+04	3.444+04	3.444+04	3.445+04	3.446+04	3.446+04	3.447+04	3.447+04	3.448+04
434.0	3.435+04	3.435+04	3.436+04	3.436+04	3.436+04	3.437+04	3.437+04	3.438+04	3.438+04	3.439+04	3.440+04	3.440+04
452.4	3.428+04	3.428+04	3.429+04	3.429+04	3.429+04	3.430+04	3.430+04	3.431+04	3.431+04	3.432+04	3.433+04	3.433+04
470.9	3.422+04	3.422+04	3.422+04	3.423+04	3.423+04	3.424+04	3.424+04	3.425+04	3.425+04	3.426+04	3.427+04	3.427+04
489.4	3.417+04	3.417+04	3.417+04	3.417+04	3.418+04	3.418+04	3.419+04	3.419+04	3.420+04	3.421+04	3.422+04	3.422+04
507.8	3.412+04	3.412+04	3.412+04	3.412+04	3.413+04	3.413+04	3.414+04	3.414+04	3.415+04	3.416+04	3.417+04	3.417+04
526.3	3.407+04	3.407+04	3.408+04	3.408+04	3.408+04	3.409+04	3.409+04	3.410+04	3.410+04	3.411+04	3.412+04	3.413+04
544.8	3.403+04	3.403+04	3.403+04	3.404+04	3.404+04	3.405+04	3.405+04	3.406+04	3.406+04	3.407+04	3.408+04	3.409+04

LOCAL REYNOLDS NUMBER

R>>>	370.0	389.2	414.2	445.0	480.0	515.0	545.0
2							
9.2	4.347+04	4.347+04	4.348+04	4.349+04	4.348+04	4.351+04	4.354+04
27.7	4.271+04	4.272+04	4.273+04	4.275+04	4.272+04	4.282+04	4.288+04
46.2	4.192+04	4.193+04	4.194+04	4.197+04	4.198+04	4.205+04	4.213+04
64.6	4.112+04	4.113+04	4.114+04	4.116+04	4.115+04	4.126+04	4.134+04
83.1	4.034+04	4.035+04	4.036+04	4.038+04	4.023+04	4.048+04	4.056+04
101.6	3.961+04	3.962+04	3.962+04	3.964+04	3.947+04	3.974+04	3.981+04
120.0	3.893+04	3.894+04	3.894+04	3.895+04	3.876+04	3.906+04	3.913+04
138.5	3.833+04	3.833+04	3.833+04	3.833+04	3.814+04	3.846+04	3.851+04
157.0	3.778+04	3.779+04	3.778+04	3.778+04	3.758+04	3.792+04	3.796+04
175.4	3.735+04	3.731+04	3.729+04	3.729+04	3.709+04	3.744+04	3.748+04
193.9	3.688+04	3.688+04	3.686+04	3.686+04	3.667+04	3.703+04	3.700+04
212.4	3.650+04	3.651+04	3.649+04	3.648+04	3.630+04	3.667+04	3.669+04
230.8	3.617+04	3.618+04	3.616+04	3.615+04	3.598+04	3.636+04	3.637+04
249.3	3.589+04	3.589+04	3.587+04	3.587+04	3.571+04	3.608+04	3.609+04
267.8	3.564+04	3.564+04	3.562+04	3.561+04	3.546+04	3.585+04	3.585+04
286.2	3.542+04	3.542+04	3.540+04	3.540+04	3.525+04	3.565+04	3.564+04
304.7	3.523+04	3.523+04	3.521+04	3.520+04	3.507+04	3.547+04	3.546+04
323.2	3.506+04	3.506+04	3.504+04	3.504+04	3.492+04	3.532+04	3.530+04
341.6	3.491+04	3.492+04	3.490+04	3.489+04	3.478+04	3.518+04	3.517+04
360.1	3.478+04	3.479+04	3.477+04	3.477+04	3.466+04	3.507+04	3.505+04
378.6	3.467+04	3.468+04	3.466+04	3.466+04	3.456+04	3.497+04	3.495+04
397.0	3.457+04	3.458+04	3.456+04	3.456+04	3.447+04	3.488+04	3.486+04
415.5	3.449+04	3.449+04	3.447+04	3.447+04	3.439+04	3.483+04	3.478+04
434.0	3.441+04	3.442+04	3.440+04	3.440+04	3.432+04	3.474+04	3.471+04
452.4	3.434+04	3.435+04	3.433+04	3.433+04	3.426+04	3.468+04	3.465+04
470.9	3.428+04	3.429+04	3.427+04	3.428+04	3.421+04	3.463+04	3.460+04
489.4	3.423+04	3.424+04	3.422+04	3.423+04	3.416+04	3.458+04	3.456+04
507.8	3.418+04	3.419+04	3.418+04	3.418+04	3.412+04	3.454+04	3.452+04
526.3	3.414+04	3.415+04	3.413+04	3.414+04	3.409+04	3.451+04	3.448+04
544.8	3.410+04	3.411+04	3.409+04	3.410+04	3.405+04	3.448+04	3.445+04

LOCAL CONVECTIVE COEFFICIENT W/M**2-K

R>>>	15.0	45.0	75.0	105.0	135.0	165.0	195.0	225.0	250.0	285.0	312.6	342.6	370.0	389.2	414.2
2															
9.2	3318.9	3318.9	3318.9	3318.9	3318.9	3318.8	3318.8	3318.8	3318.8	3318.7	3318.6	3318.6	3318.5	3318.4	3318.3
27.7	3335.3	3335.3	3335.3	3335.2	3335.2	3335.2	3335.1	3335.0	3334.9	3334.8	3334.6	3334.5	3334.2	3334.1	3333.8
46.2	3352.5	3352.5	3352.5	3352.5	3352.4	3352.3	3352.2	3352.1	3352.0	3351.8	3351.6	3351.4	3351.1	3350.8	3350.6
64.6	3370.3	3370.3	3370.2	3370.2	3370.1	3370.0	3369.9	3369.8	3369.7	3369.4	3369.2	3368.9	3368.6	3368.3	3368.1
83.1	3387.9	3387.9	3387.8	3387.8	3387.7	3387.6	3387.4	3387.3	3387.2	3386.9	3386.7	3386.5	3386.1	3385.9	3385.7
101.6	3404.9	3404.8	3404.8	3404.7	3404.6	3404.5	3404.4	3404.2	3404.1	3403.8	3403.6	3403.4	3403.1	3402.8	3402.8
120.0	3420.8	3420.8	3420.7	3420.7	3420.6	3420.4	3420.3	3420.1	3420.0	3419.8	3419.5	3419.3	3419.1	3418.8	3418.9
136.5	3435.5	3435.5	3435.5	3435.4	3435.3	3435.2	3435.0	3434.9	3434.8	3434.5	3434.3	3434.1	3433.9	3433.7	3433.9
157.0	3449.0	3449.0	3448.9	3448.9	3448.7	3448.6	3448.5	3448.3	3448.2	3448.0	3447.7	3447.6	3447.4	3447.3	3447.5
175.4	3461.2	3461.2	3461.1	3461.0	3460.9	3460.8	3460.7	3460.5	3460.4	3460.2	3460.0	3459.9	3459.7	3459.6	3459.9
193.9	3472.2	3472.1	3472.1	3472.0	3471.9	3471.8	3471.6	3471.5	3471.4	3471.2	3471.0	3470.9	3470.7	3470.6	3471.1
212.4	3482.0	3481.9	3481.9	3481.8	3481.7	3481.5	3481.4	3481.3	3481.2	3481.0	3480.8	3480.7	3480.6	3480.5	3481.0
230.8	3490.7	3490.7	3490.6	3490.5	3490.4	3490.3	3490.1	3490.0	3490.0	3489.7	3489.5	3489.5	3489.4	3489.3	3489.8
249.3	3498.4	3498.4	3498.4	3498.3	3498.2	3498.1	3497.9	3497.8	3497.7	3497.5	3497.3	3497.3	3497.1	3497.0	3497.6
267.8	3505.3	3505.3	3505.2	3505.1	3505.0	3504.9	3504.8	3504.6	3504.6	3504.4	3504.2	3504.2	3504.0	3503.9	3504.5
286.2	3511.4	3511.4	3511.3	3511.2	3511.1	3511.0	3510.8	3510.7	3510.7	3510.4	3510.3	3510.2	3510.1	3510.0	3510.6
304.7	3516.8	3516.7	3516.7	3516.6	3516.5	3516.3	3516.2	3516.1	3516.0	3515.8	3515.6	3515.6	3515.4	3515.3	3515.9
323.2	3521.5	3521.5	3521.4	3521.3	3521.2	3521.1	3520.9	3520.8	3520.8	3520.5	3520.3	3520.3	3520.1	3520.0	3520.6
341.6	3525.7	3525.7	3525.6	3525.5	3525.4	3525.3	3525.1	3525.0	3525.0	3524.7	3524.5	3524.5	3524.3	3524.1	3524.8
360.1	3529.4	3529.4	3529.3	3529.2	3529.1	3529.0	3528.8	3528.7	3528.6	3528.4	3528.2	3528.1	3528.0	3527.8	3528.4
378.6	3532.7	3532.6	3532.6	3532.5	3532.4	3532.2	3532.1	3532.0	3531.9	3531.7	3531.4	3531.4	3531.2	3531.0	3531.6
397.0	3535.6	3535.5	3535.5	3535.4	3535.3	3535.1	3535.0	3534.8	3534.8	3534.5	3534.3	3534.2	3534.0	3533.8	3534.4
415.5	3538.1	3538.1	3538.0	3537.9	3537.8	3537.7	3537.5	3537.4	3537.3	3537.1	3536.8	3536.7	3536.5	3536.3	3536.9
434.0	3540.4	3540.4	3540.3	3540.2	3540.1	3540.0	3539.8	3539.7	3539.6	3539.3	3539.1	3539.0	3538.7	3538.5	3539.1
452.4	3542.4	3542.4	3542.3	3542.2	3542.1	3542.0	3541.8	3541.7	3541.6	3541.3	3541.1	3541.0	3540.7	3540.4	3541.0
470.9	3544.2	3544.2	3544.1	3544.0	3543.9	3543.8	3543.6	3543.4	3543.4	3543.1	3542.8	3542.7	3542.4	3542.1	3542.7
489.4	3545.8	3545.8	3545.7	3545.6	3545.5	3545.4	3545.2	3545.1	3544.9	3544.6	3544.4	3544.2	3543.9	3543.6	3544.2
507.8	3547.3	3547.2	3547.2	3547.1	3546.9	3546.8	3546.6	3546.5	3546.4	3546.1	3545.8	3545.6	3545.3	3545.0	3545.5
526.3	3548.6	3548.5	3548.5	3548.4	3548.3	3548.1	3547.9	3547.8	3547.7	3547.3	3547.1	3546.9	3546.5	3546.2	3546.8
544.8	3549.8	3549.8	3549.7	3549.6	3549.5	3549.4	3549.2	3549.1	3548.9	3548.6	3548.3	3548.1	3547.7	3547.4	3547.9

KUGEL RUN AT 09:08:02

ON 15 JAN 81 WITH ABSOLUTE ELEMENT MAP

CREATED ON 000064 AT 000000

PAGE 20

LOCAL CONVECTIVE COEFFICIENT W/M**2-K

R>>>	445.0	480.0	515.0	545.0
9.2	3318.1	3318.3	3317.6	3317.1
27.7	3333.3	3334.0	3331.9	3330.7
46.2	3350.0	3351.5	3348.2	3346.6
64.6	3367.5	3370.0	3365.5	3363.7
83.1	3385.2	3388.5	3383.1	3381.1
101.6	3402.4	3406.4	3400.0	3398.2
120.0	3418.6	3423.2	3415.9	3414.3
138.5	3433.7	3438.6	3430.7	3429.3
157.0	3447.5	3452.5	3444.1	3442.9
175.4	3459.9	3465.0	3456.0	3455.1
193.9	3471.1	3476.2	3466.7	3466.0
212.4	3481.1	3486.0	3476.2	3475.7
230.8	3489.9	3494.6	3484.5	3484.2
249.3	3497.7	3502.2	3491.8	3491.7
267.8	3504.6	3508.9	3498.2	3498.2
286.2	3510.7	3514.7	3503.8	3503.9
304.7	3516.0	3519.7	3508.6	3508.9
323.2	3520.7	3524.2	3512.9	3513.3
341.6	3524.8	3528.1	3516.6	3517.1
360.1	3528.4	3531.4	3519.9	3520.4
378.6	3531.6	3534.4	3522.7	3523.3
397.0	3534.4	3537.0	3525.2	3525.9
415.5	3536.8	3539.3	3527.4	3528.1
434.0	3539.0	3541.2	3529.3	3530.0
452.4	3540.9	3543.0	3530.9	3531.7
470.9	3542.6	3544.5	3532.4	3533.2
489.4	3544.0	3545.9	3533.7	3534.5
507.8	3545.4	3547.1	3534.8	3535.6
526.3	3546.6	3548.1	3535.8	3536.6
544.8	3547.7	3549.2	3536.8	3537.5

BALL POWER KW PER BALL

R>>>	15.0	45.0	75.0	105.0	135.0	165.0	195.0	220.0	250.0	285.0	312.6	342.6
9.2	1.846+00	1.845+00	1.844+00	1.841+00	1.838+00	1.834+00	1.828+00	1.823+00	1.615+00	1.803+00	1.790+00	1.773+00
27.7	1.979+00	1.978+00	1.977+00	1.975+00	1.972+00	1.969+00	1.965+00	1.961+00	1.956+00	1.947+00	1.939+00	1.930+00
46.2	2.112+00	2.112+00	2.111+00	2.109+00	2.107+00	2.104+00	2.101+00	2.098+00	2.095+00	2.089+00	2.083+00	2.080+00
64.6	2.175+00	2.174+00	2.173+00	2.172+00	2.170+00	2.168+00	2.165+00	2.163+00	2.162+00	2.158+00	2.155+00	2.155+00
83.1	2.161+00	2.160+00	2.160+00	2.158+00	2.157+00	2.155+00	2.153+00	2.152+00	2.152+00	2.150+00	2.148+00	2.150+00
101.6	2.088+00	2.088+00	2.087+00	2.086+00	2.085+00	2.084+00	2.083+00	2.082+00	2.083+00	2.081+00	2.081+00	2.085+00
120.0	1.974+00	1.974+00	1.974+00	1.973+00	1.972+00	1.971+00	1.970+00	1.970+00	1.971+00	1.971+00	1.972+00	1.976+00
138.5	1.840+00	1.840+00	1.839+00	1.839+00	1.838+00	1.838+00	1.837+00	1.837+00	1.838+00	1.839+00	1.840+00	1.844+00
157.0	1.694+00	1.694+00	1.694+00	1.694+00	1.693+00	1.693+00	1.693+00	1.693+00	1.694+00	1.695+00	1.696+00	1.700+00
175.4	1.546+00	1.546+00	1.546+00	1.546+00	1.545+00	1.545+00	1.545+00	1.545+00	1.546+00	1.547+00	1.549+00	1.552+00
193.9	1.399+00	1.399+00	1.399+00	1.399+00	1.399+00	1.399+00	1.399+00	1.399+00	1.400+00	1.401+00	1.402+00	1.405+00
212.4	1.261+00	1.261+00	1.260+00	1.260+00	1.260+00	1.260+00	1.260+00	1.260+00	1.261+00	1.262+00	1.263+00	1.265+00
230.8	1.131+00	1.130+00	1.130+00	1.130+00	1.130+00	1.130+00	1.130+00	1.130+00	1.131+00	1.131+00	1.132+00	1.133+00
249.3	1.010+00	1.010+00	1.010+00	1.010+00	1.010+00	1.010+00	1.010+00	1.010+00	1.010+00	1.011+00	1.011+00	1.011+00
267.8	9.001-01	9.000-01	9.000-01	8.999-01	8.998-01	8.998-01	8.997-01	8.997-01	8.996-01	8.998-01	8.997-01	8.996-01
286.2	8.007-01	8.006-01	8.006-01	8.005-01	8.004-01	8.003-01	8.002-01	8.001-01	8.000-01	7.997-01	7.993-01	7.988-01
304.7	7.112-01	7.112-01	7.111-01	7.110-01	7.109-01	7.108-01	7.106-01	7.104-01	7.101-01	7.096-01	7.089-01	7.081-01
323.2	6.312-01	6.311-01	6.311-01	6.309-01	6.308-01	6.306-01	6.304-01	6.301-01	6.297-01	6.290-01	6.281-01	6.269-01
341.6	5.596-01	5.595-01	5.595-01	5.593-01	5.592-01	5.589-01	5.586-01	5.583-01	5.578-01	5.569-01	5.558-01	5.544-01
360.1	4.962-01	4.962-01	4.961-01	4.960-01	4.958-01	4.955-01	4.951-01	4.947-01	4.941-01	4.931-01	4.919-01	4.903-01
378.6	4.401-01	4.401-01	4.400-01	4.398-01	4.396-01	4.393-01	4.389-01	4.384-01	4.377-01	4.366-01	4.353-01	4.336-01
397.0	3.905-01	3.905-01	3.904-01	3.902-01	3.900-01	3.897-01	3.892-01	3.887-01	3.880-01	3.867-01	3.853-01	3.835-01
415.5	3.468-01	3.467-01	3.466-01	3.464-01	3.462-01	3.458-01	3.454-01	3.448-01	3.440-01	3.427-01	3.413-01	3.394-01
434.0	3.084-01	3.083-01	3.082-01	3.080-01	3.077-01	3.074-01	3.069-01	3.063-01	3.055-01	3.041-01	3.026-01	3.008-01
452.4	2.747-01	2.746-01	2.745-01	2.743-01	2.740-01	2.736-01	2.731-01	2.725-01	2.717-01	2.703-01	2.688-01	2.669-01
470.9	2.452-01	2.452-01	2.450-01	2.448-01	2.445-01	2.442-01	2.436-01	2.431-01	2.422-01	2.408-01	2.393-01	2.374-01
489.4	2.197-01	2.196-01	2.195-01	2.193-01	2.190-01	2.186-01	2.181-01	2.175-01	2.167-01	2.153-01	2.138-01	2.119-01
507.8	1.985-01	1.985-01	1.983-01	1.981-01	1.979-01	1.975-01	1.970-01	1.964-01	1.955-01	1.942-01	1.927-01	1.908-01
526.3	1.841-01	1.840-01	1.839-01	1.837-01	1.834-01	1.833-01	1.825-01	1.819-01	1.810-01	1.796-01	1.782-01	1.763-01
544.8	1.651-01	1.650-01	1.649-01	1.647-01	1.644-01	1.639-01	1.634-01	1.627-01	1.616-01	1.603-01	1.587-01	1.567-01

BALL POWER KW PER BALL

R>>>	370.0	389.2	414.2	445.0	480.0	515.0	545.0
9.2	1.752+00	1.735+00	1.710+00	1.665+00	1.702+00	1.537+00	1.428+00
27.7	1.917+00	1.908+00	1.898+00	1.876+00	1.966+00	1.809+00	1.745+00
46.2	2.073+00	2.068+00	2.070+00	2.063+00	2.177+00	2.025+00	1.989+00
64.6	2.152+00	2.151+00	2.160+00	2.163+00	2.280+00	2.136+00	2.120+00
83.1	2.151+00	2.153+00	2.165+00	2.175+00	2.281+00	2.119+00	2.148+00
101.6	2.087+00	2.090+00	2.104+00	2.118+00	2.206+00	2.085+00	2.096+00
120.0	1.979+00	1.983+00	1.997+00	2.012+00	2.077+00	1.968+00	1.989+00
138.5	1.848+00	1.852+00	1.865+00	1.879+00	1.922+00	1.824+00	1.850+00
157.0	1.704+00	1.707+00	1.719+00	1.731+00	1.754+00	1.667+00	1.696+00
175.4	1.555+00	1.557+00	1.568+00	1.577+00	1.582+00	1.505+00	1.535+00
193.9	1.407+00	1.408+00	1.418+00	1.425+00	1.417+00	1.349+00	1.378+00
212.4	1.266+00	1.267+00	1.274+00	1.279+00	1.262+00	1.202+00	1.229+00
230.8	1.134+00	1.134+00	1.146+00	1.142+00	1.117+00	1.064+00	1.089+00
249.3	1.011+00	1.011+00	1.015+00	1.016+00	9.865-01	9.396-01	9.623-01
267.8	8.990-01	8.979-01	9.013-01	9.009-01	8.689-01	8.273-01	8.476-01
286.2	7.976-01	7.961-01	7.985-01	7.970-01	7.634-01	7.266-01	7.444-01
304.7	7.065-01	7.046-01	7.062-01	7.038-01	6.702-01	6.376-01	6.530-01
323.2	6.250-01	6.229-01	6.237-01	6.208-01	5.880-01	5.590-01	5.723-01
341.6	5.522-01	5.500-01	5.503-01	5.469-01	5.153-01	4.876-01	5.010-01
360.1	4.879-01	4.856-01	4.854-01	4.817-01	4.519-01	4.289-01	4.380-01
378.6	4.311-01	4.287-01	4.282-01	4.243-01	3.963-01	3.758-01	3.844-01
397.0	3.810-01	3.786-01	3.778-01	3.738-01	3.476-01	3.292-01	3.361-01
415.5	3.368-01	3.345-01	3.334-01	3.294-01	3.052-01	2.887-01	2.944-01
434.0	2.982-01	2.958-01	2.946-01	2.905-01	2.682-01	2.533-01	2.579-01
452.4	2.643-01	2.620-01	2.607-01	2.566-01	2.358-01	2.223-01	2.259-01
470.9	2.349-01	2.326-01	2.311-01	2.270-01	2.078-01	1.953-01	1.980-01
489.4	2.094-01	2.072-01	2.056-01	2.015-01	1.837-01	1.720-01	1.735-01
507.8	1.883-01	1.861-01	1.844-01	1.802-01	1.634-01	1.521-01	1.522-01
526.3	1.738-01	1.716-01	1.697-01	1.652-01	1.488-01	1.374-01	1.352-01
544.8	1.739-01	1.715-01	1.694-01	1.642-01	1.463-01	1.332-01	1.265-01

AVERAGE BULK FLUID TEMP DEGREES KELVIN

R>>>	15.0	45.0	75.0	105.0	135.0	165.0	195.0	220.0	250.0	285.0	312.6	342.6	370.0	389.2	414.2
9.2	790.4	790.4	790.3	790.3	790.3	790.3	790.3	790.2	790.2	790.1	790.0	789.9	789.8	789.7	789.6
27.7	811.8	811.8	811.8	811.7	811.7	811.6	811.5	811.4	811.3	811.1	811.0	810.7	810.4	810.2	809.8
46.2	834.8	834.7	834.7	834.6	834.6	834.5	834.3	834.2	834.1	833.8	833.5	833.2	832.8	832.5	832.1
64.6	858.8	858.8	858.7	858.7	858.6	858.4	858.3	858.1	858.0	857.6	857.3	857.0	856.5	856.1	855.8
83.1	883.1	883.1	883.0	882.9	882.8	882.7	882.5	882.3	882.2	881.8	881.4	881.1	880.6	880.3	880.1
101.6	907.0	906.9	906.9	906.8	906.6	906.5	906.3	906.1	905.9	905.5	905.1	904.9	904.4	904.1	904.0
120.0	929.8	929.7	929.6	929.5	929.4	929.2	929.0	928.8	928.7	928.2	927.9	927.6	927.2	926.9	927.0
138.5	951.1	951.1	951.0	950.9	950.8	950.6	950.4	950.1	950.0	949.6	949.3	949.1	948.7	948.4	948.7
157.0	971.0	970.9	970.8	970.7	970.6	970.4	970.1	969.9	969.8	969.4	969.1	968.9	968.6	968.4	968.8
175.4	989.2	989.1	989.0	988.9	988.7	988.5	988.3	988.1	988.0	987.6	987.3	987.2	986.9	986.7	987.2
193.9	1005.7	1005.6	1005.5	1005.4	1005.2	1005.1	1004.8	1004.6	1004.5	1004.2	1003.9	1003.8	1003.5	1003.3	1004.0
212.4	1020.6	1020.6	1020.5	1020.3	1020.2	1020.0	1019.7	1019.5	1019.5	1019.1	1018.8	1018.7	1018.5	1018.4	1019.1
230.8	1034.0	1034.0	1033.9	1033.7	1033.6	1033.4	1033.2	1032.9	1032.9	1032.5	1032.2	1032.2	1032.0	1031.8	1032.6
249.3	1046.0	1046.0	1045.9	1045.8	1045.6	1045.4	1045.2	1045.0	1044.9	1044.5	1044.3	1044.2	1044.0	1043.8	1044.7
267.8	1056.7	1056.7	1056.6	1056.5	1056.3	1056.1	1055.9	1055.7	1055.6	1055.3	1055.0	1054.9	1054.7	1054.6	1055.5
286.2	1066.3	1066.2	1066.1	1066.0	1065.8	1065.6	1065.4	1065.2	1065.1	1064.8	1064.5	1064.5	1064.2	1064.1	1065.0
304.7	1074.8	1074.7	1074.6	1074.5	1074.3	1074.1	1073.9	1073.7	1073.6	1073.3	1073.0	1072.9	1072.7	1072.5	1073.4
323.2	1082.3	1082.2	1082.1	1082.0	1081.8	1081.6	1081.4	1081.2	1081.1	1080.8	1080.5	1080.4	1080.1	1079.9	1080.9
341.6	1089.0	1088.9	1088.8	1088.7	1088.5	1088.3	1088.1	1087.9	1087.8	1087.4	1087.1	1087.0	1086.7	1086.5	1087.5
360.1	1094.9	1094.8	1094.7	1094.6	1094.4	1094.2	1094.0	1093.8	1093.7	1093.3	1093.0	1092.9	1092.6	1092.3	1093.3
378.6	1100.1	1100.1	1100.0	1099.9	1099.7	1099.5	1099.2	1099.0	1098.9	1098.5	1098.2	1098.1	1097.7	1097.4	1098.4
397.0	1104.8	1104.8	1104.7	1104.5	1104.3	1104.1	1103.9	1103.6	1103.5	1103.1	1102.8	1102.7	1102.3	1102.0	1102.9
415.5	1108.9	1108.9	1108.8	1108.6	1108.5	1108.2	1108.0	1107.8	1107.7	1107.2	1106.9	1106.7	1106.3	1106.0	1106.9
434.0	1112.6	1112.6	1112.5	1112.3	1112.1	1111.9	1111.6	1111.4	1111.3	1110.9	1110.5	1110.3	1109.9	1109.5	1110.5
452.4	1115.9	1115.8	1115.7	1115.6	1115.4	1115.2	1114.9	1114.7	1114.5	1114.1	1113.7	1113.5	1113.0	1112.6	1113.6
470.9	1118.8	1118.7	1118.6	1118.5	1118.3	1118.1	1117.8	1117.5	1117.4	1117.0	1116.5	1116.3	1115.8	1115.4	1116.3
489.4	1121.4	1121.4	1121.3	1121.1	1120.9	1120.7	1120.4	1120.1	1120.0	1119.5	1119.1	1118.8	1118.3	1117.9	1118.8
507.8	1123.8	1123.7	1123.6	1123.4	1123.2	1123.0	1122.7	1122.5	1122.3	1121.8	1121.3	1121.1	1120.6	1120.1	1121.0
526.3	1125.9	1125.8	1125.7	1125.6	1125.4	1125.1	1124.8	1124.6	1124.4	1123.9	1123.4	1123.2	1122.6	1122.1	1123.0
544.8	1128.0	1127.9	1127.8	1127.6	1127.4	1127.2	1126.9	1126.6	1126.5	1125.9	1125.4	1125.1	1124.5	1124.0	1124.9

KUGEL RUN AT 09:08:02

ON 15 JAN 81 WITH ABSOLUTE ELEMENT MAP

CREATED ON 11/00/64 AT 000000

PAGE 24

AVERAGE BULK FLUID TEMP DEGREES KELVIN

R>>>	445.0	480.0	515.0	545.0
Z				
9.2	789.3	789.6	788.6	788.0
27.7	809.2	810.1	807.4	805.8
46.2	831.3	833.4	828.9	826.8
64.6	855.0	858.4	852.2	849.8
83.1	879.4	884.0	876.3	873.8
101.6	903.4	909.1	900.0	897.6
120.0	926.6	933.1	922.8	920.5
138.5	948.4	955.6	944.0	942.0
157.0	968.7	976.2	963.6	961.9
175.4	987.2	994.9	981.4	980.0
193.9	1004.1	1011.7	997.4	996.4
212.4	1019.2	1026.8	1011.7	1011.0
230.8	1032.8	1040.1	1024.5	1024.0
249.3	1044.9	1051.9	1035.7	1035.5
267.8	1055.7	1062.3	1045.6	1045.7
286.2	1065.2	1071.5	1054.3	1054.6
304.7	1073.6	1079.5	1062.0	1062.4
323.2	1081.0	1086.6	1068.7	1069.3
341.6	1087.6	1092.8	1074.6	1075.3
360.1	1093.4	1098.2	1079.7	1080.6
378.6	1098.4	1102.9	1084.2	1085.2
397.0	1102.9	1107.1	1088.2	1089.3
415.5	1106.9	1110.8	1091.7	1092.8
434.0	1110.3	1114.0	1094.7	1095.9
452.4	1113.4	1116.8	1097.4	1098.6
470.9	1116.1	1119.3	1099.7	1101.0
489.4	1118.5	1121.5	1101.8	1103.1
507.8	1120.7	1123.4	1103.6	1104.9
526.3	1122.6	1125.2	1105.2	1106.5
544.8	1124.5	1126.9	1106.7	1108.0

PEBBLE SURFACE TEMPERATURE DEGREES KELVIN

R>>>	15.0	45.0	75.0	105.0	135.0	165.0	195.0	220.0	250.0	285.0	312.6	342.6	370.0	389.2	414.2
2															
9.2	839.5	839.5	839.5	839.4	839.3	839.1	839.0	838.8	838.6	838.1	837.7	837.2	836.5	836.0	835.2
27.7	864.3	864.2	864.2	864.1	864.0	863.8	863.6	863.4	863.2	862.8	862.4	861.9	861.3	860.8	860.2
46.2	890.5	890.4	890.4	890.3	890.1	890.0	889.7	889.5	889.3	888.9	888.5	888.1	887.5	887.0	886.7
64.6	915.9	915.8	915.8	915.6	915.5	915.3	915.1	914.9	914.7	914.2	913.8	913.5	913.0	912.6	912.5
83.1	939.5	939.5	939.4	939.3	939.1	938.9	938.7	938.5	938.3	937.9	937.5	937.2	936.8	936.5	936.6
101.6	961.2	961.1	961.1	960.9	960.8	960.6	960.3	960.1	960.0	959.6	959.2	959.0	958.6	958.4	958.7
120.0	980.8	980.7	980.7	980.5	980.4	980.2	979.9	979.7	979.6	979.2	978.9	978.7	978.4	978.2	978.7
138.5	998.5	998.5	998.4	998.2	998.1	997.9	997.6	997.4	997.3	997.0	996.6	996.5	996.3	996.1	996.7
157.0	1014.4	1014.4	1014.3	1014.1	1014.0	1013.8	1013.5	1013.3	1013.3	1012.9	1012.6	1012.5	1012.3	1012.2	1012.9
175.4	1028.7	1028.6	1028.5	1028.4	1028.2	1028.0	1027.8	1027.6	1027.5	1027.2	1026.9	1026.8	1026.6	1026.5	1027.3
193.9	1041.3	1041.3	1041.2	1041.0	1040.9	1040.7	1040.5	1040.2	1040.2	1039.8	1039.6	1039.5	1039.4	1039.2	1040.1
212.4	1052.6	1052.6	1052.5	1052.3	1052.2	1052.0	1051.7	1051.5	1051.5	1051.2	1050.9	1050.9	1050.7	1050.5	1051.5
230.8	1062.6	1062.6	1062.5	1062.4	1062.2	1062.0	1061.8	1061.6	1061.5	1061.2	1060.9	1060.9	1060.7	1060.6	1061.5
249.3	1071.6	1071.5	1071.4	1071.3	1071.1	1070.9	1070.7	1070.5	1070.4	1070.1	1069.8	1069.8	1069.6	1069.4	1070.4
267.8	1079.4	1079.4	1079.3	1079.2	1079.0	1078.8	1078.6	1078.4	1078.3	1078.0	1077.7	1077.6	1077.4	1077.2	1078.2
286.2	1086.4	1086.4	1086.3	1086.2	1086.0	1085.8	1085.6	1085.3	1085.3	1084.9	1084.6	1084.6	1084.3	1084.1	1085.1
304.7	1092.6	1092.6	1092.5	1092.4	1092.2	1092.0	1091.7	1091.5	1091.5	1091.1	1090.8	1090.7	1090.4	1090.2	1091.2
323.2	1098.1	1098.1	1098.0	1097.9	1097.7	1097.5	1097.2	1097.0	1096.9	1096.6	1096.2	1096.2	1095.8	1095.6	1096.6
341.6	1103.0	1103.0	1102.9	1102.7	1102.5	1102.3	1102.1	1101.9	1101.8	1101.4	1101.0	1100.9	1100.6	1100.3	1101.3
360.1	1107.3	1107.3	1107.2	1107.0	1106.9	1106.6	1106.4	1106.2	1106.1	1105.7	1105.3	1105.2	1104.8	1104.5	1105.5
378.6	1111.2	1111.1	1111.0	1110.9	1110.7	1110.5	1110.2	1110.0	1109.9	1109.5	1109.1	1108.9	1108.5	1108.2	1109.1
397.0	1114.6	1114.5	1114.4	1114.3	1114.1	1113.9	1113.6	1113.4	1113.3	1112.8	1112.4	1112.3	1111.8	1111.4	1112.4
415.5	1117.6	1117.6	1117.5	1117.3	1117.1	1116.9	1116.6	1116.4	1116.3	1115.8	1115.4	1115.2	1114.7	1114.3	1115.3
434.0	1120.3	1120.3	1120.2	1120.0	1119.8	1119.6	1119.3	1119.1	1118.9	1118.5	1118.0	1117.8	1117.3	1116.9	1117.8
452.4	1122.7	1122.7	1122.6	1122.4	1122.2	1122.0	1121.7	1121.5	1121.3	1120.8	1120.4	1120.2	1119.6	1119.2	1120.1
470.9	1124.9	1124.9	1124.8	1124.6	1124.4	1124.2	1123.9	1123.6	1123.5	1123.0	1122.5	1122.2	1121.7	1121.2	1122.1
489.4	1126.9	1126.8	1126.7	1126.6	1126.4	1126.1	1125.8	1125.6	1125.4	1124.9	1124.4	1124.1	1123.6	1123.0	1123.9
507.8	1128.7	1128.6	1128.5	1128.4	1128.2	1127.9	1127.6	1127.3	1127.2	1126.6	1126.2	1125.9	1125.3	1124.7	1125.6
526.3	1130.5	1130.4	1130.3	1130.2	1129.9	1129.7	1129.4	1129.1	1128.9	1128.4	1127.9	1127.6	1126.9	1126.4	1127.2
544.8	1132.6	1132.5	1132.4	1132.2	1132.0	1131.8	1131.5	1131.2	1131.0	1130.4	1129.9	1129.5	1128.9	1128.3	1129.1

KUGEL RUN AT 09:08:02

ON 15 JAN 81 WITH ABSOLUTE ELEMENT MAP

CREATED ON 00064 AT 000000

PAGE 26

PEBBLE SURFACE TEMPERATURE DEGREES KELVIN

R>>>	445.0	480.0	515.0	545.0
2				
9.2	833.7	834.9	829.6	826.1
27.7	859.0	862.3	855.4	852.1
46.2	885.8	890.8	882.4	879.3
64.6	911.8	918.2	908.4	905.5
83.1	936.2	943.5	932.4	929.9
101.6	958.5	966.4	954.2	952.1
120.0	978.6	986.8	973.7	972.0
138.5	996.8	1005.0	991.1	989.7
157.0	1013.0	1021.1	1006.4	1005.5
175.4	1027.5	1035.3	1019.9	1019.3
193.9	1040.3	1047.8	1031.8	1031.5
212.4	1051.7	1058.8	1042.3	1042.3
230.8	1061.8	1068.4	1051.5	1051.6
249.3	1070.6	1076.8	1059.5	1059.9
267.8	1078.4	1084.2	1066.5	1067.1
286.2	1085.3	1090.7	1072.7	1073.4
304.7	1091.3	1096.3	1078.0	1078.9
323.2	1096.6	1101.3	1082.8	1083.7
341.6	1101.3	1105.7	1086.9	1087.9
360.1	1105.4	1109.5	1090.5	1091.6
378.6	1109.1	1112.8	1093.7	1094.8
397.0	1112.3	1115.8	1096.4	1097.7
415.5	1115.1	1118.4	1098.9	1100.2
434.0	1117.6	1120.7	1101.0	1102.3
452.4	1119.8	1122.7	1102.9	1104.3
470.9	1121.8	1124.5	1104.6	1105.9
489.4	1123.6	1126.1	1106.1	1107.4
507.8	1125.2	1127.5	1107.4	1108.7
526.3	1126.7	1128.9	1108.6	1109.9
544.8	1128.6	1130.5	1110.0	1111.1

FUELED REGION SURFACE TEMP DEGREES KELVIN

R>>>	15.0	45.0	75.0	105.0	135.0	165.0	195.0	220.0	250.0	285.0	312.6	342.6	370.0	389.2	414.2
9.2	868.4	868.4	868.3	868.2	868.0	867.8	867.5	867.3	866.9	866.2	865.6	864.8	863.7	862.9	861.6
27.7	897.8	897.8	897.7	897.6	897.4	897.2	896.9	896.6	896.3	895.6	895.0	894.3	893.4	892.7	891.8
46.2	936.5	936.4	936.3	936.2	936.0	935.7	935.4	935.1	934.8	934.1	933.5	932.9	932.1	931.5	931.1
64.6	971.4	971.4	971.3	971.1	970.9	970.6	970.3	970.0	969.8	969.2	968.6	968.2	967.6	967.1	967.1
83.1	999.9	999.8	999.7	999.6	999.4	999.1	998.8	998.5	998.4	997.8	997.3	997.1	996.6	996.3	996.8
101.6	1022.4	1022.3	1022.2	1022.1	1021.9	1021.6	1021.3	1021.1	1021.0	1020.5	1020.1	1020.0	1019.7	1019.5	1020.2
120.0	1040.2	1040.1	1040.0	1039.9	1039.7	1039.4	1039.2	1038.9	1038.9	1038.5	1038.1	1038.1	1037.9	1037.8	1038.7
138.5	1054.8	1054.7	1054.6	1054.5	1054.3	1054.1	1053.8	1053.6	1053.5	1053.2	1052.9	1052.9	1052.8	1052.7	1053.7
157.0	1066.8	1066.8	1066.7	1066.6	1066.4	1066.2	1065.9	1065.7	1065.7	1065.3	1065.1	1065.1	1065.0	1065.0	1066.0
175.4	1076.9	1076.9	1076.8	1076.7	1076.5	1076.3	1076.0	1075.8	1075.8	1075.5	1075.2	1075.3	1075.2	1075.1	1076.3
193.9	1085.4	1085.3	1085.2	1085.1	1084.9	1084.7	1084.5	1084.3	1084.3	1084.0	1083.7	1083.8	1083.6	1083.6	1084.7
212.4	1092.6	1092.5	1092.4	1092.3	1092.1	1091.9	1091.7	1091.5	1091.5	1091.2	1090.9	1091.0	1090.8	1090.7	1091.9
230.8	1098.7	1098.7	1098.6	1098.5	1098.3	1098.1	1097.9	1097.7	1097.6	1097.3	1097.0	1097.1	1096.9	1096.7	1097.9
249.3	1104.0	1104.0	1103.9	1103.7	1103.5	1103.3	1103.1	1102.9	1102.9	1102.5	1102.3	1102.3	1102.0	1101.9	1103.0
267.8	1108.5	1108.4	1108.4	1108.2	1108.0	1107.8	1107.6	1107.4	1107.3	1107.0	1106.7	1106.7	1106.4	1106.2	1107.3
286.2	1112.4	1112.4	1112.3	1112.1	1111.9	1111.7	1111.5	1111.3	1111.2	1110.9	1110.6	1110.5	1110.2	1109.9	1111.0
304.7	1115.8	1115.8	1115.7	1115.5	1115.3	1115.1	1114.9	1114.7	1114.6	1114.2	1113.9	1113.8	1113.5	1113.2	1114.2
323.2	1118.8	1118.7	1118.6	1118.5	1118.3	1118.1	1117.8	1117.6	1117.5	1117.1	1116.8	1116.6	1116.3	1115.9	1117.0
341.6	1121.4	1121.3	1121.2	1121.1	1120.9	1120.7	1120.4	1120.2	1120.1	1119.7	1119.3	1119.1	1118.7	1118.4	1119.4
360.1	1123.7	1123.6	1123.5	1123.4	1123.2	1122.9	1122.7	1122.4	1122.3	1121.9	1121.5	1121.3	1120.9	1120.5	1121.4
378.6	1125.7	1125.6	1125.5	1125.4	1125.2	1125.0	1124.7	1124.4	1124.3	1123.9	1123.4	1123.2	1122.8	1122.3	1123.3
397.0	1127.5	1127.4	1127.3	1127.2	1127.0	1126.8	1126.5	1126.2	1126.1	1125.6	1125.2	1124.9	1124.4	1124.0	1124.9
415.5	1129.1	1129.1	1129.0	1128.8	1128.6	1128.4	1128.1	1127.8	1127.7	1127.2	1126.7	1126.5	1125.9	1125.4	1126.3
434.0	1130.6	1130.5	1130.4	1130.2	1130.0	1129.8	1129.5	1129.2	1129.1	1128.6	1128.1	1127.8	1127.2	1126.7	1127.6
452.4	1131.9	1131.8	1131.7	1131.6	1131.4	1131.1	1130.8	1130.5	1130.4	1129.8	1129.3	1129.0	1128.4	1127.9	1128.8
470.9	1133.1	1133.0	1132.9	1132.8	1132.6	1132.3	1132.0	1131.7	1131.5	1131.0	1130.5	1130.2	1129.5	1129.0	1129.8
489.4	1134.2	1134.2	1134.1	1133.9	1133.7	1133.4	1133.1	1132.8	1132.6	1132.1	1131.5	1131.2	1130.5	1130.0	1130.8
507.8	1135.3	1135.3	1135.2	1135.0	1134.8	1134.5	1134.2	1133.9	1133.7	1133.1	1132.6	1132.2	1131.6	1130.9	1131.7
526.3	1136.7	1136.6	1136.5	1136.3	1136.1	1135.8	1135.5	1135.2	1135.0	1134.4	1133.8	1133.5	1132.7	1132.1	1132.9
544.8	1138.8	1138.7	1138.6	1138.4	1138.2	1137.9	1137.6	1137.3	1137.1	1136.5	1135.9	1135.5	1134.7	1134.0	1134.8

FUELED REGION SURFACE TEMP DEGREES KELVIN

R>>>	445.0	480.0	515.0	545.0
9.2	859.5	861.2	853.0	847.3
27.7	890.2	895.0	884.6	878.9
46.2	929.9	937.4	924.4	917.9
64.6	966.5	975.9	961.1	954.7
83.1	996.6	1006.9	991.2	985.8
101.6	1020.4	1030.7	1014.5	1010.5
120.0	1039.1	1049.1	1032.4	1029.6
138.5	1054.2	1063.6	1046.5	1044.6
157.0	1066.6	1075.2	1057.7	1056.5
175.4	1076.8	1084.6	1066.7	1066.0
193.9	1085.2	1092.3	1074.1	1073.8
212.4	1092.3	1098.7	1080.2	1080.2
230.8	1098.2	1104.0	1085.2	1085.5
249.3	1103.3	1108.4	1089.5	1089.9
267.8	1107.5	1112.2	1093.1	1093.7
286.2	1111.1	1115.4	1096.1	1096.8
304.7	1114.3	1118.1	1098.7	1099.5
323.2	1116.9	1120.5	1100.9	1101.8
341.6	1119.3	1122.6	1102.8	1103.8
360.1	1121.3	1124.3	1104.5	1105.6
378.6	1123.1	1125.9	1106.0	1107.1
397.0	1124.6	1127.3	1107.2	1108.4
415.5	1126.0	1128.5	1108.4	1109.6
434.0	1127.3	1129.6	1109.4	1110.6
452.4	1128.4	1130.5	1110.3	1111.5
470.9	1129.4	1131.4	1111.0	1112.3
489.4	1130.3	1132.2	1111.7	1113.0
507.8	1131.2	1133.0	1112.4	1113.6
526.3	1132.3	1133.9	1113.2	1114.2
544.8	1134.0	1135.4	1114.5	1115.2

FUELED REGION CENTRAL TEMP DEGREES KELVIN

R>>>	15.0	45.0	75.0	105.0	135.0	165.0	195.0	225.0	250.0	285.0	312.6	342.6	370.0	389.2	414.2
9.2	956.2	956.1	955.9	955.7	955.4	954.9	954.4	953.8	953.0	951.7	950.3	948.6	946.5	944.7	942.1
27.7	995.6	995.5	995.3	995.1	994.8	994.3	993.8	993.2	992.6	991.4	990.2	989.0	987.2	985.9	984.4
46.2	1067.4	1067.3	1067.1	1066.8	1066.4	1065.9	1065.3	1064.7	1064.2	1063.0	1061.6	1060.9	1059.4	1058.3	1057.7
64.6	1127.4	1127.3	1127.1	1126.8	1126.4	1125.9	1125.4	1124.8	1124.5	1123.4	1122.5	1121.9	1120.9	1120.3	1120.7
83.1	1168.6	1168.5	1168.4	1168.1	1167.7	1167.3	1166.8	1166.4	1166.2	1165.4	1164.7	1164.5	1164.0	1163.8	1165.0
101.6	1193.8	1193.7	1193.5	1193.3	1193.0	1192.6	1192.2	1191.8	1191.8	1191.1	1190.7	1190.8	1190.6	1190.7	1192.4
120.0	1207.4	1207.3	1207.1	1206.9	1206.6	1206.3	1206.0	1205.7	1205.7	1205.2	1204.9	1205.2	1205.3	1205.5	1207.5
138.5	1214.0	1213.9	1213.8	1213.6	1213.3	1213.0	1212.7	1212.5	1212.5	1212.2	1212.0	1212.3	1212.5	1212.7	1214.9
157.0	1215.9	1215.8	1215.7	1215.5	1215.3	1215.0	1214.8	1214.6	1214.6	1214.4	1214.2	1214.5	1214.7	1214.9	1217.1
175.4	1214.8	1214.8	1214.7	1214.5	1214.3	1214.0	1213.8	1213.6	1213.7	1213.4	1213.3	1213.6	1213.8	1213.9	1216.0
193.9	1211.7	1211.6	1211.5	1211.4	1211.2	1210.9	1210.7	1210.5	1210.6	1210.3	1210.2	1210.4	1210.5	1210.6	1212.5
212.4	1207.6	1207.5	1207.4	1207.3	1207.1	1206.9	1206.6	1206.4	1206.5	1206.2	1206.0	1206.2	1206.2	1206.2	1208.0
230.8	1202.8	1202.8	1202.7	1202.5	1202.4	1202.1	1201.9	1201.7	1201.7	1201.5	1201.2	1201.3	1201.2	1201.1	1202.8
249.3	1197.9	1197.8	1197.7	1197.6	1197.4	1197.2	1196.9	1196.7	1196.7	1196.4	1196.1	1196.2	1195.9	1195.7	1197.3
267.8	1192.8	1192.7	1192.6	1192.5	1192.3	1192.1	1191.8	1191.6	1191.6	1191.2	1190.9	1190.9	1190.5	1190.2	1191.7
286.2	1187.9	1187.9	1187.8	1187.6	1187.4	1187.2	1187.0	1186.7	1186.6	1186.3	1185.9	1185.8	1185.4	1185.0	1186.3
304.7	1183.3	1183.3	1183.2	1183.0	1182.8	1182.6	1182.3	1182.1	1182.0	1181.5	1181.1	1181.1	1180.5	1180.0	1181.2
323.2	1179.0	1179.0	1178.9	1178.7	1178.5	1178.3	1178.0	1177.8	1177.6	1177.2	1176.7	1176.5	1175.9	1175.4	1176.5
341.6	1175.1	1175.0	1174.9	1174.7	1174.5	1174.3	1174.0	1173.7	1173.6	1173.1	1172.6	1172.3	1171.7	1171.1	1172.1
360.1	1171.5	1171.4	1171.3	1171.2	1171.0	1170.7	1170.4	1170.1	1170.0	1169.4	1168.9	1168.6	1167.9	1167.3	1168.2
378.6	1168.3	1168.2	1168.1	1168.0	1167.7	1167.5	1167.2	1166.9	1166.7	1166.1	1165.6	1165.2	1164.5	1163.8	1164.7
397.0	1165.5	1165.4	1165.3	1165.1	1164.9	1164.6	1164.3	1164.0	1163.8	1163.2	1162.6	1162.2	1161.4	1160.7	1161.6
415.5	1162.9	1162.9	1162.7	1162.6	1162.3	1162.1	1161.7	1161.4	1161.2	1160.6	1160.0	1159.5	1158.7	1158.0	1158.8
434.0	1160.7	1160.7	1160.5	1160.4	1160.1	1159.9	1159.5	1159.2	1158.9	1158.3	1157.7	1157.2	1156.4	1155.6	1156.4
452.4	1158.8	1158.8	1158.6	1158.5	1158.2	1157.9	1157.6	1157.3	1157.0	1156.3	1155.7	1155.2	1154.3	1153.6	1154.3
470.9	1157.2	1157.1	1157.0	1156.8	1156.6	1156.3	1155.9	1155.6	1155.3	1154.7	1154.0	1153.5	1152.6	1151.8	1152.5
489.4	1155.9	1155.8	1155.7	1155.5	1155.3	1154.9	1154.6	1154.2	1154.0	1153.3	1152.6	1152.1	1151.2	1150.4	1151.0
507.8	1154.9	1154.9	1154.7	1154.6	1154.3	1154.0	1153.6	1153.3	1153.0	1152.3	1151.6	1151.1	1150.1	1149.3	1149.9
526.3	1154.8	1154.8	1154.7	1154.5	1154.2	1153.9	1153.5	1153.2	1152.9	1152.1	1151.4	1150.9	1149.9	1149.1	1149.6
544.8	1157.1	1157.0	1156.9	1156.7	1156.5	1156.1	1155.8	1155.4	1155.1	1154.3	1153.6	1152.9	1151.9	1151.0	1151.5

KUGEL RUN AT 09:08:02

ON 15 JAN 81 WITH ABSOLUTE ELEMENT MAP

CREATED ON 100064 AT 000000

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FUELED REGION CENTRAL TEMP DEGREES KELVIN

R>>>	445.0	480.0	515.0	545.0
9.2	937.6	941.1	924.0	911.8
27.7	981.4	990.5	970.3	957.8
46.2	1055.9	1070.3	1044.8	1029.3
64.6	1120.2	1137.7	1109.7	1094.1
83.1	1165.6	1183.8	1155.6	1142.8
101.6	1193.7	1210.6	1183.3	1174.1
120.0	1209.1	1224.1	1197.4	1191.4
138.5	1216.5	1229.2	1203.1	1199.4
157.0	1216.6	1228.9	1203.4	1201.3
175.4	1217.3	1225.3	1200.2	1199.1
193.9	1213.7	1219.9	1195.2	1194.8
212.4	1208.9	1213.5	1189.2	1189.2
230.8	1203.4	1206.7	1182.7	1183.0
249.3	1197.6	1199.9	1176.3	1176.8
267.8	1191.8	1193.5	1170.0	1170.7
286.2	1186.3	1187.3	1164.1	1164.9
304.7	1181.0	1181.7	1158.8	1159.5
323.2	1176.2	1176.6	1153.9	1154.7
341.6	1171.7	1171.9	1149.4	1150.3
360.1	1167.7	1167.8	1145.5	1146.4
378.6	1164.1	1164.2	1142.0	1143.0
397.0	1161.0	1161.0	1138.9	1139.9
415.5	1158.1	1158.2	1136.3	1137.2
434.0	1155.7	1155.7	1133.9	1134.9
452.4	1153.5	1153.6	1131.8	1132.8
470.9	1151.7	1151.8	1130.0	1131.0
489.4	1150.1	1150.2	1128.5	1129.4
507.8	1149.0	1149.0	1127.3	1128.0
526.3	1148.6	1148.5	1126.6	1127.1
544.8	1150.3	1149.8	1127.5	1127.2

CONDUCTIVITY OF OUTER COATING M/ M-K

R>>>	15.0	45.0	75.0	105.0	135.0	165.0	195.0	225.0	250.0	285.0	312.6	342.6	370.0	389.2	414.2
9.2	33.91	33.91	33.91	33.92	33.93	33.94	33.95	33.97	33.99	34.02	34.05	34.09	34.14	34.19	34.25
27.7	31.27	31.28	31.28	31.29	31.31	31.32	31.35	31.37	31.40	31.45	31.50	31.57	31.65	31.71	31.80
46.2	24.36	24.37	24.37	24.38	24.39	24.40	24.42	24.44	24.46	24.50	24.54	24.59	24.65	24.69	24.75
64.6	20.76	20.76	20.76	20.77	20.78	20.79	20.80	20.81	20.82	20.84	20.87	20.89	20.92	20.94	20.97
83.1	18.99	18.99	18.99	18.99	19.00	19.00	19.01	19.01	19.02	19.03	19.04	19.06	19.07	19.08	19.09
101.6	18.11	18.11	18.11	18.11	18.11	18.11	18.12	18.12	18.12	18.13	18.13	18.14	18.15	18.15	18.16
120.0	17.63	17.63	17.64	17.64	17.64	17.64	17.64	17.64	17.64	17.65	17.65	17.65	17.66	17.66	17.66
138.5	17.35	17.35	17.35	17.35	17.35	17.35	17.35	17.35	17.35	17.35	17.36	17.36	17.36	17.36	17.36
157.0	17.14	17.14	17.14	17.15	17.15	17.15	17.15	17.15	17.15	17.15	17.15	17.15	17.15	17.15	17.16
175.4	16.98	16.98	16.98	16.99	16.99	16.99	16.99	16.99	16.99	16.99	16.99	16.99	16.99	16.99	16.99
193.9	16.85	16.85	16.85	16.85	16.85	16.85	16.85	16.85	16.85	16.85	16.85	16.85	16.85	16.85	16.86
212.4	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73
230.8	16.62	16.62	16.62	16.62	16.62	16.62	16.62	16.62	16.62	16.62	16.62	16.63	16.63	16.62	16.62
249.3	16.52	16.52	16.52	16.52	16.52	16.52	16.53	16.53	16.53	16.53	16.53	16.53	16.53	16.53	16.53
267.8	16.43	16.43	16.44	16.44	16.44	16.44	16.44	16.44	16.44	16.44	16.44	16.44	16.44	16.44	16.44
286.2	16.36	16.36	16.36	16.36	16.36	16.36	16.36	16.36	16.36	16.36	16.36	16.36	16.36	16.36	16.36
304.7	16.28	16.28	16.28	16.28	16.29	16.29	16.29	16.29	16.29	16.29	16.29	16.29	16.29	16.29	16.29
323.2	16.22	16.22	16.22	16.22	16.22	16.22	16.22	16.22	16.22	16.22	16.22	16.23	16.22	16.22	16.22
341.6	16.16	16.16	16.16	16.16	16.16	16.16	16.17	16.17	16.17	16.17	16.17	16.17	16.17	16.16	16.16
360.1	16.11	16.11	16.11	16.11	16.11	16.11	16.11	16.12	16.12	16.12	16.12	16.12	16.12	16.11	16.11
378.6	16.07	16.07	16.07	16.07	16.07	16.07	16.07	16.07	16.07	16.07	16.07	16.07	16.07	16.07	16.07
397.0	16.02	16.03	16.03	16.03	16.03	16.03	16.03	16.03	16.03	16.03	16.03	16.03	16.03	16.03	16.03
415.5	15.99	15.99	15.99	15.99	15.99	15.99	15.99	15.99	15.99	15.99	16.00	16.00	16.00	15.99	15.99
434.0	15.96	15.96	15.96	15.96	15.96	15.96	15.96	15.96	15.96	15.96	15.96	15.96	15.96	15.96	15.96
452.4	15.93	15.93	15.93	15.93	15.93	15.93	15.93	15.93	15.93	15.93	15.93	15.94	15.94	15.93	15.93
470.9	15.90	15.90	15.90	15.90	15.90	15.90	15.91	15.91	15.91	15.91	15.91	15.91	15.91	15.91	15.91
489.4	15.88	15.88	15.88	15.88	15.88	15.88	15.88	15.88	15.88	15.89	15.89	15.89	15.89	15.89	15.89
507.8	15.86	15.86	15.86	15.86	15.86	15.86	15.86	15.86	15.86	15.87	15.87	15.87	15.87	15.87	15.87
526.3	15.84	15.84	15.84	15.84	15.84	15.84	15.84	15.84	15.85	15.85	15.85	15.85	15.85	15.85	15.85
544.8	15.82	15.82	15.82	15.82	15.82	15.83	15.83	15.83	15.83	15.83	15.83	15.83	15.84	15.83	15.84

KUGEL RUN AT 09:08:02

ON 15 JAN 81 WITH ABSOLUTE ELEMENT MAP

CREATED ON 100064 AT 000000

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CONDUCTIVITY OF OUTER COATING d/ M-K

R>>>	445.0	480.0	515.0	545.0
2				
9.2	34.34	34.33	34.87	35.69
27.7	31.92	31.90	32.85	34.59
46.2	24.82	24.77	25.60	27.35
64.6	20.99	20.97	21.51	22.89
83.1	19.09	19.10	19.41	20.40
101.6	18.15	18.18	18.36	19.05
120.0	17.66	17.69	17.79	18.32
138.5	17.36	17.40	17.46	17.89
157.0	17.15	17.19	17.24	17.62
175.4	16.99	17.02	17.07	17.43
193.9	16.85	16.88	16.94	17.29
212.4	16.73	16.76	16.82	17.17
230.8	16.62	16.65	16.71	17.07
249.3	16.52	16.55	16.62	16.99
267.8	16.43	16.46	16.54	16.92
286.2	16.35	16.38	16.46	16.85
304.7	16.28	16.31	16.40	16.80
323.2	16.22	16.25	16.34	16.75
341.6	16.16	16.19	16.29	16.71
360.1	16.11	16.14	16.25	16.67
378.6	16.07	16.10	16.21	16.63
397.0	16.03	16.06	16.17	16.60
415.5	15.99	16.03	16.14	16.58
434.0	15.96	16.00	16.11	16.56
452.4	15.94	15.97	16.09	16.54
470.9	15.91	15.95	16.07	16.52
489.4	15.89	15.93	16.05	16.50
507.8	15.87	15.91	16.03	16.49
526.3	15.85	15.90	16.02	16.48
544.8	15.84	15.88	16.01	16.47

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--- RUGEL RUN AT 09:08:02

ON 15 JAN 81 WITH ABSOLUTE ELEMENT MAP

CORREL ON 000064 AT 000000

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CONDUCTIVITY OF FUELED REGION W/ M-K

R>>>	15.0	45.0	75.0	105.0	135.0	165.0	195.0	220.0	250.0	285.0	312.0	342.0	370.0	389.2	414.2
2															
9.2	33.47	33.47	33.48	33.48	33.49	33.50	33.52	33.53	33.55	33.59	33.62	33.66	33.71	33.76	33.82
27.7	32.21	32.21	32.22	32.23	32.24	32.26	32.27	32.29	32.32	32.36	32.41	32.46	32.53	32.58	32.66
46.2	25.69	25.69	25.69	25.70	25.71	25.72	25.74	25.75	25.77	25.80	25.84	25.88	25.92	25.96	26.01
64.6	22.20	22.20	22.21	22.21	22.21	22.22	22.23	22.24	22.25	22.27	22.29	22.31	22.34	22.35	22.38
83.1	20.38	20.38	20.38	20.39	20.39	20.39	20.40	20.40	20.41	20.42	20.43	20.44	20.45	20.46	20.48
101.6	19.39	19.39	19.39	19.39	19.39	19.40	19.40	19.40	19.41	19.41	19.42	19.42	19.43	19.43	19.44
120.0	18.80	18.80	18.80	18.80	18.80	18.80	18.80	18.80	18.81	18.81	18.81	18.82	18.82	18.82	18.83
138.5	18.39	18.39	18.40	18.40	18.40	18.40	18.40	18.40	18.40	18.40	18.41	18.41	18.41	18.41	18.42
157.0	18.09	18.09	18.09	18.09	18.09	18.10	18.10	18.10	18.10	18.10	18.10	18.11	18.11	18.11	18.11
175.4	17.85	17.85	17.85	17.85	17.85	17.85	17.85	17.85	17.85	17.85	17.86	17.86	17.86	17.86	17.87
193.9	17.64	17.64	17.64	17.64	17.64	17.64	17.64	17.64	17.64	17.64	17.64	17.65	17.65	17.65	17.65
212.4	17.45	17.45	17.45	17.45	17.45	17.45	17.45	17.45	17.45	17.46	17.46	17.46	17.46	17.46	17.46
230.8	17.28	17.28	17.28	17.28	17.28	17.28	17.29	17.29	17.29	17.29	17.29	17.29	17.29	17.29	17.29
249.3	17.13	17.13	17.13	17.13	17.13	17.14	17.14	17.14	17.14	17.14	17.14	17.14	17.14	17.14	17.14
267.8	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.01	17.01	17.01	17.01
286.2	16.88	16.88	16.88	16.88	16.88	16.88	16.88	16.88	16.88	16.88	16.88	16.88	16.88	16.88	16.88
304.7	16.77	16.77	16.77	16.77	16.77	16.77	16.77	16.77	16.77	16.77	16.78	16.78	16.78	16.77	16.77
323.2	16.67	16.67	16.67	16.67	16.67	16.67	16.68	16.68	16.68	16.68	16.68	16.68	16.68	16.68	16.68
341.6	16.59	16.59	16.59	16.59	16.59	16.59	16.59	16.59	16.59	16.59	16.59	16.59	16.59	16.59	16.59
360.1	16.51	16.51	16.51	16.51	16.51	16.51	16.51	16.51	16.51	16.51	16.51	16.51	16.51	16.51	16.51
378.6	16.44	16.44	16.44	16.44	16.44	16.44	16.44	16.44	16.44	16.45	16.45	16.45	16.45	16.44	16.44
397.0	16.38	16.38	16.38	16.38	16.38	16.38	16.38	16.38	16.38	16.38	16.38	16.38	16.38	16.38	16.38
415.5	16.32	16.32	16.32	16.32	16.32	16.32	16.33	16.33	16.33	16.33	16.33	16.33	16.33	16.33	16.33
434.0	16.27	16.27	16.27	16.28	16.28	16.28	16.28	16.28	16.28	16.28	16.28	16.28	16.28	16.28	16.28
452.4	16.23	16.23	16.23	16.23	16.23	16.23	16.23	16.24	16.24	16.24	16.24	16.24	16.24	16.24	16.24
470.9	16.19	16.19	16.19	16.19	16.19	16.20	16.20	16.20	16.20	16.20	16.20	16.20	16.20	16.20	16.20
489.4	16.16	16.16	16.16	16.16	16.16	16.16	16.16	16.16	16.16	16.17	16.17	16.17	16.17	16.17	16.17
507.8	16.13	16.13	16.13	16.13	16.13	16.13	16.13	16.13	16.13	16.13	16.14	16.14	16.14	16.14	16.14
526.3	16.10	16.10	16.10	16.10	16.10	16.10	16.10	16.10	16.11	16.11	16.11	16.11	16.11	16.11	16.11
544.8	16.07	16.07	16.07	16.08	16.08	16.08	16.08	16.08	16.08	16.08	16.08	16.09	16.09	16.09	16.09

KUGEL RUN AT 09:08:02

ON 15 JAN 81 WITH ABSOLUTE ELEMENT MAP

CREATED ON 000064 AT 000000

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CONDUCTIVITY OF FUELED REGION W/ M-K

R>>>	445.0	480.0	515.0	545.0
2				
9.2	33.91	33.90	34.44	35.25
27.7	32.75	32.77	33.59	35.19
46.2	26.66	26.07	26.77	28.41
64.6	22.40	22.42	22.88	24.20
83.1	20.48	20.52	20.79	21.78
101.6	19.44	19.50	19.65	20.39
120.0	18.83	18.88	18.98	19.56
138.5	18.42	18.47	18.54	19.02
157.0	18.11	18.16	18.21	18.64
175.4	17.86	17.90	17.95	18.36
193.9	17.65	17.68	17.74	18.13
212.4	17.46	17.48	17.55	17.94
230.8	17.29	17.31	17.38	17.78
249.3	17.14	17.16	17.23	17.64
267.8	17.00	17.02	17.10	17.52
286.2	16.88	16.90	16.99	17.41
304.7	16.77	16.79	16.88	17.31
323.2	16.67	16.70	16.79	17.23
341.6	16.59	16.61	16.71	17.16
360.1	16.51	16.54	16.64	17.09
378.6	16.44	16.47	16.58	17.04
397.0	16.38	16.41	16.53	16.99
415.5	16.33	16.36	16.48	16.94
434.0	16.28	16.32	16.43	16.91
452.4	16.24	16.28	16.40	16.87
470.9	16.20	16.24	16.36	16.84
489.4	16.17	16.21	16.34	16.82
507.8	16.14	16.18	16.31	16.79
526.3	16.12	16.16	16.29	16.77
544.8	16.09	16.14	16.27	16.76

KUGEL RUN AT 09:08:02 ON 15 JAN 81 WITH ABSOLUTE ELEMENT MAP

CREATED ON 000064 AT 000000

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*****
* ENTERING THE 2D THERMAL PORTION OF KUGEL *
* MESH REPRESENTS POINT VALUES *
* AT RELATIVE AXIAL AND RADIAL LOCATIONS *
*****

KUGEL WILL USE CENTRAL DIFFERENCING OF ADVECTION TERMS

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KUGEL RUN AT 09:08:02 ON 15 JAN 81 WITH ABSOLUTE ELEMENT MAP

CREATED ON 100064 AT 000000

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PROGRAM CONTROL VARIABLES

IN	JN	NMAX	NSWP1	NSWP2	NSWP3
25	24	50	2	2	3
NSWP4	CC	RP(1)	RP(2)	RP(3)	RP(4)
1	.00100	1.5000	.7500	1.0000	1.0000

19097 STORAGE LOCATIONS USED FOR /BIG/

INTERPOLATED FLUENCE (N/CM**2)

	.0000	.0435	.0870	.1304	.1739	.2174	.2609	.3043	.3478	.3913	.4348	.4783
.0000	6.684+19	6.681+19	6.679+19	6.674+19	6.666+19	6.656+19	6.644+19	6.629+19	6.616+19	6.587+19	6.558+19	6.522+19
.0417	3.464+20	3.464+20	3.462+20	3.461+20	3.458+20	3.454+20	3.450+20	3.444+20	3.436+20	3.430+20	3.422+20	3.411+20
.0833	6.511+20	6.510+20	6.508+20	6.504+20	6.500+20	6.493+20	6.486+20	6.477+20	6.467+20	6.455+20	6.442+20	6.425+20
.1250	9.777+20	9.775+20	9.773+20	9.768+20	9.762+20	9.754+20	9.744+20	9.732+20	9.719+20	9.704+20	9.690+20	9.669+20
.1667	1.304+21	1.303+21	1.303+21	1.303+21	1.302+21	1.301+21	1.300+21	1.298+21	1.297+21	1.295+21	1.294+21	1.291+21
.2083	1.617+21	1.617+21	1.617+21	1.616+21	1.615+21	1.614+21	1.613+21	1.611+21	1.610+21	1.608+21	1.606+21	1.604+21
.2500	1.910+21	1.910+21	1.910+21	1.909+21	1.908+21	1.907+21	1.905+21	1.904+21	1.902+21	1.900+21	1.899+21	1.897+21
.2917	2.174+21	2.174+21	2.174+21	2.173+21	2.172+21	2.171+21	2.169+21	2.168+21	2.166+21	2.164+21	2.163+21	2.161+21
.3333	2.412+21	2.412+21	2.411+21	2.411+21	2.411+21	2.410+21	2.408+21	2.407+21	2.405+21	2.404+21	2.402+21	2.399+21
.3750	2.624+21	2.623+21	2.623+21	2.622+21	2.621+21	2.620+21	2.618+21	2.617+21	2.615+21	2.613+21	2.612+21	2.611+21
.4167	2.810+21	2.810+21	2.810+21	2.809+21	2.808+21	2.807+21	2.805+21	2.803+21	2.802+21	2.800+21	2.799+21	2.797+21
.4583	2.971+21	2.970+21	2.970+21	2.969+21	2.968+21	2.967+21	2.965+21	2.964+21	2.962+21	2.960+21	2.959+21	2.958+21
.5000	3.110+21	3.110+21	3.110+21	3.109+21	3.108+21	3.106+21	3.105+21	3.103+21	3.102+21	3.100+21	3.099+21	3.097+21
.5417	3.232+21	3.232+21	3.231+21	3.230+21	3.229+21	3.228+21	3.226+21	3.225+21	3.223+21	3.221+21	3.221+21	3.219+21
.5833	3.338+21	3.337+21	3.337+21	3.336+21	3.335+21	3.333+21	3.332+21	3.330+21	3.329+21	3.327+21	3.326+21	3.324+21
.6250	3.427+21	3.426+21	3.426+21	3.425+21	3.424+21	3.423+21	3.421+21	3.420+21	3.418+21	3.416+21	3.415+21	3.413+21
.6667	3.504+21	3.504+21	3.503+21	3.503+21	3.502+21	3.500+21	3.499+21	3.497+21	3.495+21	3.493+21	3.492+21	3.490+21
.7083	3.571+21	3.571+21	3.571+21	3.570+21	3.569+21	3.567+21	3.566+21	3.564+21	3.562+21	3.560+21	3.559+21	3.557+21
.7500	3.630+21	3.629+21	3.629+21	3.628+21	3.627+21	3.625+21	3.624+21	3.622+21	3.620+21	3.618+21	3.617+21	3.614+21
.7917	3.679+21	3.679+21	3.678+21	3.677+21	3.676+21	3.675+21	3.673+21	3.671+21	3.669+21	3.667+21	3.666+21	3.663+21
.8333	3.722+21	3.722+21	3.721+21	3.720+21	3.719+21	3.718+21	3.716+21	3.714+21	3.712+21	3.710+21	3.708+21	3.706+21
.8750	3.760+21	3.759+21	3.759+21	3.758+21	3.757+21	3.755+21	3.753+21	3.751+21	3.749+21	3.747+21	3.745+21	3.743+21
.9167	3.793+21	3.792+21	3.792+21	3.791+21	3.790+21	3.788+21	3.786+21	3.784+21	3.782+21	3.780+21	3.778+21	3.775+21
.9583	3.822+21	3.821+21	3.821+21	3.820+21	3.818+21	3.817+21	3.815+21	3.813+21	3.811+21	3.808+21	3.806+21	3.803+21
1.0000	3.847+21	3.847+21	3.846+21	3.845+21	3.844+21	3.842+21	3.841+21	3.838+21	3.836+21	3.834+21	3.832+21	3.829+21

KUGEL RUN AT 09:08:02

ON 15 JAN 81 WITH ABSOLUTE ELEMENT MAP

CREATED ON 000064 AT 000000

PAGE 38

INTERPOLATED FLUENCE (N/CM**2)

	.5217	.5652	.6087	.6522	.6957	.7391	.7826	.8261	.8696	.9130	.9565	1.0000
.0000	6.479+19	6.425+19	6.361+19	6.275+19	6.172+19	6.045+19	5.882+19	5.748+19	5.515+19	5.110+19	4.257+19	3.459+19
.0417	3.398+20	3.382+20	3.365+20	3.343+20	3.318+20	3.291+20	3.262+20	3.267+20	3.221+20	3.014+20	2.668+20	2.296+20
.0833	6.405+20	6.382+20	6.358+20	6.326+20	6.293+20	6.262+20	6.232+20	6.270+20	6.211+20	5.845+20	5.212+20	4.530+20
.1250	9.645+20	9.619+20	9.594+20	9.560+20	9.527+20	9.535+20	9.488+20	9.570+20	9.506+20	8.986+20	8.056+20	7.053+20
.1667	1.289+21	1.286+21	1.284+21	1.281+21	1.278+21	1.277+21	1.278+21	1.290+21	1.283+21	1.216+21	1.194+21	9.629+20
.2083	1.602+21	1.599+21	1.597+21	1.595+21	1.593+21	1.594+21	1.596+21	1.611+21	1.603+21	1.523+21	1.374+21	1.213+21
.2500	1.894+21	1.892+21	1.891+21	1.889+21	1.888+21	1.890+21	1.894+21	1.911+21	1.901+21	1.808+21	1.635+21	1.448+21
.2917	2.159+21	2.157+21	2.156+21	2.154+21	2.154+21	2.158+21	2.163+21	2.180+21	2.167+21	2.064+21	1.869+21	1.658+21
.3333	2.397+21	2.395+21	2.394+21	2.393+21	2.394+21	2.399+21	2.404+21	2.421+21	2.404+21	2.292+21	2.078+21	1.846+21
.3750	2.609+21	2.607+21	2.607+21	2.606+21	2.607+21	2.613+21	2.619+21	2.634+21	2.613+21	2.492+21	2.262+21	2.012+21
.4167	2.796+21	2.794+21	2.794+21	2.793+21	2.795+21	2.801+21	2.807+21	2.820+21	2.795+21	2.667+21	2.422+21	2.156+21
.4583	2.956+21	2.954+21	2.954+21	2.954+21	2.955+21	2.962+21	2.967+21	2.978+21	2.949+21	2.814+21	2.557+21	2.279+21
.5000	3.096+21	3.094+21	3.094+21	3.093+21	3.095+21	3.102+21	3.106+21	3.115+21	3.082+21	2.941+21	2.674+21	2.384+21
.5417	3.217+21	3.215+21	3.215+21	3.215+21	3.216+21	3.223+21	3.226+21	3.232+21	3.196+21	3.050+21	2.774+21	2.474+21
.5833	3.322+21	3.321+21	3.320+21	3.319+21	3.320+21	3.327+21	3.330+21	3.333+21	3.293+21	3.144+21	2.859+21	2.551+21
.6250	3.411+21	3.409+21	3.409+21	3.408+21	3.408+21	3.415+21	3.417+21	3.418+21	3.375+21	3.221+21	2.931+21	2.615+21
.6667	3.488+21	3.486+21	3.485+21	3.484+21	3.484+21	3.490+21	3.491+21	3.490+21	3.444+21	3.288+21	2.991+21	2.670+21
.7083	3.554+21	3.552+21	3.551+21	3.550+21	3.549+21	3.555+21	3.556+21	3.553+21	3.514+21	3.345+21	3.043+21	2.716+21
.7500	3.612+21	3.610+21	3.608+21	3.606+21	3.606+21	3.611+21	3.611+21	3.606+21	3.555+21	3.393+21	3.088+21	2.756+21
.7917	3.661+21	3.658+21	3.656+21	3.654+21	3.653+21	3.658+21	3.657+21	3.650+21	3.598+21	3.434+21	3.124+21	2.789+21
.8333	3.703+21	3.700+21	3.698+21	3.696+21	3.694+21	3.699+21	3.697+21	3.689+21	3.634+21	3.468+21	3.156+21	2.817+21
.8750	3.740+21	3.737+21	3.735+21	3.732+21	3.730+21	3.735+21	3.732+21	3.722+21	3.665+21	3.498+21	3.183+21	2.842+21
.9167	3.772+21	3.769+21	3.767+21	3.763+21	3.761+21	3.765+21	3.762+21	3.751+21	3.693+21	3.524+21	3.206+21	2.862+21
.9583	3.800+21	3.797+21	3.794+21	3.790+21	3.788+21	3.792+21	3.788+21	3.775+21	3.716+21	3.545+21	3.225+21	2.879+21
1.0000	3.825+21	3.822+21	3.819+21	3.815+21	3.812+21	3.815+21	3.811+21	3.797+21	3.736+21	3.564+21	3.242+21	2.893+21

B-47

INTERPOLATED POWER PER BALL FROM 208 (KW/BALL)

	.0000	.0435	.0870	.1304	.1739	.2174	.2609	.3043	.3476	.3913	.4348	.4783
.0000	1.780+00	1.779+00	1.778+00	1.777+00	1.775+00	1.772+00	1.769+00	1.765+00	1.760+00	1.754+00	1.747+00	1.737+00
.0417	1.946+00	1.945+00	1.945+00	1.944+00	1.942+00	1.940+00	1.937+00	1.934+00	1.931+00	1.926+00	1.922+00	1.916+00
.0833	2.113+00	2.112+00	2.112+00	2.111+00	2.109+00	2.108+00	2.106+00	2.103+00	2.101+00	2.098+00	2.096+00	2.092+00
.1250	2.172+00	2.171+00	2.171+00	2.170+00	2.169+00	2.168+00	2.166+00	2.164+00	2.162+00	2.160+00	2.160+00	2.158+00
.1667	2.125+00	2.124+00	2.124+00	2.124+00	2.124+00	2.123+00	2.122+00	2.121+00	2.119+00	2.118+00	2.117+00	2.116+00
.2083	2.003+00	2.003+00	2.002+00	2.002+00	2.001+00	2.001+00	2.000+00	1.999+00	1.998+00	1.998+00	1.999+00	1.999+00
.2500	1.840+00	1.840+00	1.840+00	1.839+00	1.839+00	1.838+00	1.838+00	1.838+00	1.837+00	1.837+00	1.838+00	1.839+00
.2917	1.657+00	1.657+00	1.657+00	1.657+00	1.657+00	1.656+00	1.656+00	1.656+00	1.656+00	1.656+00	1.657+00	1.658+00
.3333	1.473+00	1.473+00	1.473+00	1.473+00	1.472+00	1.472+00	1.472+00	1.472+00	1.472+00	1.472+00	1.473+00	1.474+00
.3750	1.295+00	1.295+00	1.295+00	1.295+00	1.295+00	1.295+00	1.295+00	1.295+00	1.295+00	1.295+00	1.296+00	1.296+00
.4167	1.131+00	1.131+00	1.130+00	1.130+00	1.130+00	1.130+00	1.130+00	1.130+00	1.130+00	1.130+00	1.131+00	1.131+00
.4583	9.828-01	9.828-01	9.828-01	9.827-01	9.826-01	9.826-01	9.825-01	9.825-01	9.825-01	9.825-01	9.825-01	9.829-01
.5000	8.504-01	8.504-01	8.503-01	8.503-01	8.502-01	8.502-01	8.501-01	8.500-01	8.500-01	8.499-01	8.499-01	8.498-01
.5417	7.336-01	7.336-01	7.335-01	7.335-01	7.334-01	7.333-01	7.332-01	7.331-01	7.330-01	7.328-01	7.326-01	7.324-01
.5833	6.312-01	6.311-01	6.311-01	6.310-01	6.310-01	6.309-01	6.307-01	6.306-01	6.304-01	6.301-01	6.298-01	6.293-01
.6250	5.438-01	5.437-01	5.437-01	5.436-01	5.435-01	5.434-01	5.432-01	5.430-01	5.428-01	5.424-01	5.420-01	5.414-01
.6667	4.682-01	4.682-01	4.681-01	4.680-01	4.679-01	4.678-01	4.676-01	4.673-01	4.670-01	4.666-01	4.661-01	4.654-01
.7083	4.030-01	4.029-01	4.029-01	4.028-01	4.027-01	4.025-01	4.023-01	4.020-01	4.016-01	4.012-01	4.006-01	3.998-01
.7500	3.468-01	3.468-01	3.467-01	3.466-01	3.465-01	3.463-01	3.460-01	3.457-01	3.454-01	3.448-01	3.442-01	3.434-01
.7917	3.000-01	2.999-01	2.999-01	2.998-01	2.996-01	2.994-01	2.992-01	2.988-01	2.984-01	2.979-01	2.972-01	2.963-01
.8333	2.600-01	2.599-01	2.599-01	2.598-01	2.596-01	2.594-01	2.591-01	2.588-01	2.584-01	2.578-01	2.572-01	2.563-01
.8750	2.261-01	2.261-01	2.260-01	2.259-01	2.257-01	2.255-01	2.253-01	2.249-01	2.245-01	2.239-01	2.233-01	2.224-01
.9167	1.986-01	1.985-01	1.985-01	1.984-01	1.982-01	1.980-01	1.977-01	1.974-01	1.970-01	1.964-01	1.957-01	1.948-01
.9583	1.843-01	1.843-01	1.842-01	1.841-01	1.840-01	1.838-01	1.835-01	1.831-01	1.827-01	1.821-01	1.814-01	1.805-01
1.0000	1.856-01	1.856-01	1.855-01	1.854-01	1.852-01	1.850-01	1.847-01	1.843-01	1.838-01	1.832-01	1.824-01	1.814-01

INTERPOLATED POWER PER BALL FROM 20B (KW/BALL)

	.5217	.5652	.6087	.6522	.6957	.7391	.7826	.8261	.8696	.9130	.9565	1.0000
.0000	1.726+00	1.712+00	1.696+00	1.674+00	1.648+00	1.616+00	1.572+00	1.565+00	1.537+00	1.419+00	1.311+00	1.205+00
.0417	1.909+00	1.900+00	1.891+00	1.879+00	1.864+00	1.851+00	1.830+00	1.862+00	1.869+00	1.758+00	1.689+00	1.628+00
.0833	2.087+00	2.083+00	2.080+00	2.074+00	2.068+00	2.070+00	2.065+00	2.120+00	2.147+00	2.041+00	2.000+00	1.971+00
.1250	2.155+00	2.153+00	2.153+00	2.152+00	2.152+00	2.161+00	2.165+00	2.224+00	2.252+00	2.154+00	2.131+00	2.121+00
.1667	2.115+00	2.115+00	2.117+00	2.119+00	2.122+00	2.134+00	2.144+00	2.195+00	2.216+00	2.130+00	2.121+00	2.125+00
.2083	1.999+00	1.999+00	2.003+00	2.006+00	2.010+00	2.024+00	2.035+00	2.074+00	2.087+00	2.009+00	2.010+00	2.025+00
.2500	1.839+00	1.841+00	1.844+00	1.847+00	1.852+00	1.865+00	1.876+00	1.900+00	1.902+00	1.835+00	1.842+00	1.863+00
.2917	1.658+00	1.660+00	1.663+00	1.666+00	1.669+00	1.681+00	1.690+00	1.702+00	1.694+00	1.636+00	1.647+00	1.670+00
.3333	1.474+00	1.476+00	1.478+00	1.480+00	1.483+00	1.493+00	1.499+00	1.500+00	1.485+00	1.435+00	1.448+00	1.471+00
.3750	1.297+00	1.298+00	1.299+00	1.301+00	1.302+00	1.310+00	1.314+00	1.308+00	1.288+00	1.245+00	1.258+00	1.280+00
.4167	1.132+00	1.132+00	1.133+00	1.134+00	1.134+00	1.140+00	1.142+00	1.130+00	1.117+00	1.070+00	1.082+00	1.102+00
.4583	9.830-01	9.831-01	9.834-01	9.833-01	9.826-01	9.868-01	9.874-01	9.722-01	9.481-01	9.164-01	9.268-01	9.447-01
.5000	8.497-01	8.494-01	8.492-01	8.484-01	8.470-01	8.498-01	8.492-01	8.325-01	8.064-01	7.811-01	7.900-01	8.055-01
.5417	7.320-01	7.314-01	7.308-01	7.295-01	7.275-01	7.292-01	7.276-01	7.102-01	6.868-01	6.634-01	6.739-01	6.839-01
.5833	6.287-01	6.279-01	6.270-01	6.253-01	6.229-01	6.237-01	6.214-01	6.043-01	5.822-01	5.620-01	5.681-01	5.790-01
.6250	5.406-01	5.396-01	5.385-01	5.365-01	5.339-01	5.341-01	5.314-01	5.149-01	4.945-01	4.770-01	4.820-01	4.909-01
.6667	4.645-01	4.633-01	4.620-01	4.599-01	4.571-01	4.568-01	4.538-01	4.384-01	4.197-01	4.046-01	4.085-01	4.158-01
.7083	3.988-01	3.976-01	3.961-01	3.939-01	3.911-01	3.904-01	3.873-01	3.730-01	3.560-01	3.428-01	3.458-01	3.517-01
.7500	3.423-01	3.410-01	3.395-01	3.373-01	3.344-01	3.334-01	3.303-01	3.172-01	3.019-01	2.904-01	2.926-01	2.972-01
.7917	2.953-01	2.939-01	2.924-01	2.902-01	2.874-01	2.862-01	2.829-01	2.710-01	2.572-01	2.470-01	2.485-01	2.521-01
.8333	2.552-01	2.538-01	2.523-01	2.501-01	2.473-01	2.459-01	2.427-01	2.318-01	2.192-01	2.102-01	2.110-01	2.135-01
.8750	2.213-01	2.199-01	2.184-01	2.162-01	2.135-01	2.120-01	2.088-01	1.987-01	1.873-01	1.791-01	1.790-01	1.805-01
.9167	1.938-01	1.924-01	1.909-01	1.888-01	1.861-01	1.844-01	1.811-01	1.718-01	1.612-01	1.533-01	1.522-01	1.523-01
.9583	1.794-01	1.781-01	1.765-01	1.743-01	1.715-01	1.696-01	1.660-01	1.565-01	1.459-01	1.376-01	1.341-01	1.314-01
1.0000	1.802-01	1.787-01	1.770-01	1.745-01	1.715-01	1.693-01	1.649-01	1.543-01	1.423-01	1.325-01	1.249-01	1.176-01

INITIAL FUELED REGION THERMAL CONDUCTIVITY (W/M-K)

	.0000	.0435	.0870	.1304	.1739	.2174	.2609	.3043	.3478	.3913	.4348	.4783	.5217	.5652	.6087
.0000	34.1	34.1	34.1	34.1	34.1	34.1	34.1	34.1	34.1	34.2	34.2	34.2	34.2	34.2	34.3
.0417	32.5	32.5	32.5	32.5	32.5	32.5	32.6	32.6	32.6	32.6	32.6	32.6	32.7	32.7	32.8
.0833	25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.8	25.8	25.8	25.8	25.9
.1250	21.7	21.7	21.7	21.7	21.8	21.8	21.8	21.8	21.8	21.8	21.8	21.8	21.8	21.8	21.8
.1667	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9
.2083	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	19.0	19.0	19.0	19.0	19.0	19.0	19.0
.2500	18.4	18.4	18.4	18.4	18.4	18.4	18.4	18.4	18.4	18.4	18.4	18.4	18.4	18.4	18.4
.2917	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
.3333	17.7	17.7	17.7	17.7	17.7	17.7	17.7	17.7	17.7	17.7	17.7	17.7	17.7	17.8	17.8
.3750	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
.4167	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3
.4583	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1
.5000	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9
.5417	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8
.5833	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7
.6250	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6
.6667	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5
.7083	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4
.7500	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3
.7917	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3
.8333	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2
.8750	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2
.9167	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1
.9583	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1
1.0000	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1

INITIAL FUELED REGION THERMAL CONDUCTIVITY (W/M-K)

	.6522	.6957	.7391	.7826	.8261	.8696	.9130	.9565	1.0000
.0000	34.3	34.3	34.4	34.5	34.5	34.5	34.8	35.2	35.5
.0417	32.8	32.9	32.9	33.0	33.0	33.2	33.7	34.8	35.9
.0833	25.9	26.0	26.0	26.1	26.1	26.2	26.7	27.9	29.2
.1250	21.9	21.9	21.9	21.9	21.9	22.0	22.3	23.2	24.2
.1667	19.9	19.9	20.0	20.0	20.0	20.1	20.2	20.8	21.5
.2083	19.0	19.0	19.0	19.0	19.0	19.1	19.1	19.6	20.1
.2500	18.4	18.4	18.4	18.4	18.4	18.5	18.5	18.9	19.3
.2917	18.0	18.0	18.1	18.1	18.1	18.1	18.1	18.4	18.8
.3333	17.8	17.8	17.8	17.8	17.8	17.8	17.8	18.1	18.4
.3750	17.5	17.5	17.5	17.5	17.5	17.5	17.6	17.9	18.2
.4167	17.3	17.3	17.3	17.3	17.3	17.3	17.4	17.7	18.0
.4583	17.1	17.1	17.1	17.1	17.1	17.1	17.2	17.5	17.8
.5000	16.9	16.9	16.9	16.9	17.0	17.0	17.0	17.3	17.7
.5417	16.8	16.8	16.8	16.8	16.8	16.8	16.9	17.2	17.6
.5833	16.7	16.7	16.7	16.7	16.7	16.7	16.8	17.1	17.4
.6250	16.6	16.6	16.6	16.6	16.6	16.6	16.7	17.0	17.4
.6667	16.5	16.5	16.5	16.5	16.5	16.5	16.6	16.9	17.3
.7083	16.4	16.4	16.4	16.4	16.4	16.4	16.5	16.9	17.2
.7500	16.3	16.3	16.3	16.3	16.3	16.4	16.5	16.8	17.2
.7917	16.3	16.3	16.3	16.3	16.3	16.3	16.4	16.8	17.1
.8333	16.2	16.2	16.2	16.2	16.2	16.3	16.4	16.7	17.1
.8750	16.2	16.2	16.2	16.2	16.2	16.2	16.3	16.7	17.1
.9167	16.1	16.1	16.1	16.1	16.2	16.2	16.3	16.6	17.0
.9583	16.1	16.1	16.1	16.1	16.1	16.2	16.3	16.6	17.0
1.0000	16.1	16.1	16.1	16.1	16.1	16.2	16.2	16.6	17.0

KUGEL RUN AT 09:08:02

ON 15 JAN 81 WITH ABSOLUTE ELEMENT MAP

CREATED ON 000064 AT 000000

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INITIAL NON-FUELED REGION THERMAL CONDUCTIVITY (W/M-K)

	.0000	.0435	.0870	.1304	.1739	.2174	.2609	.3043	.3478	.3913	.4348	.4783	.5217	.5652	.6067
.0000	35.2	35.2	35.2	35.2	35.2	35.2	35.2	35.2	35.3	35.3	35.3	35.3	35.3	35.3	35.4
.0417	31.9	31.9	31.9	31.9	31.9	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.1	32.1	32.2
.0833	24.4	24.4	24.4	24.4	24.4	24.4	24.4	24.4	24.4	24.4	24.4	24.5	24.5	24.5	24.6
.1250	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.4	20.4	20.4	20.4	20.4	20.4
.1667	18.5	18.5	18.5	18.5	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6
.2083	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8
.2500	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.4	17.4	17.4	17.4	17.4	17.4	17.4
.2917	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1
.3333	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9
.3750	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8
.4167	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6
.4583	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5
.5000	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4
.5417	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3
.5833	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2
.6250	16.1	16.1	16.1	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2
.6667	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1
.7083	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
.7500	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
.7917	15.9	15.9	15.9	15.9	15.9	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
.8333	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9
.8750	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9
.9167	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9
.9583	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8
1.0000	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8

KUGEL RUN AT 09:08:02

ON 15 JAN 81 WITH ABSOLUTE ELEMENT MAP

CELATED ON 000064 AT 000000

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INITIAL NON-FUELED REGION THERMAL CONDUCTIVITY (W/M-K)

	.6522	.6957	.7391	.7826	.8261	.8696	.9130	.9565	1.0000
.0000	35.4	35.4	35.5	35.5	35.5	35.6	35.8	36.1	36.4
.0417	32.3	32.3	32.4	32.5	32.5	32.7	33.3	34.4	35.6
.0833	24.6	24.7	24.7	24.8	24.8	24.9	25.5	26.3	28.2
.1250	20.5	20.5	20.5	20.5	20.5	20.6	20.9	21.9	22.9
.1667	18.6	18.6	18.6	18.6	18.6	18.7	18.9	19.5	20.1
.2083	17.8	17.8	17.8	17.8	17.8	17.8	17.9	18.3	18.8
.2500	17.4	17.4	17.4	17.4	17.4	17.4	17.5	17.8	18.1
.2917	17.1	17.1	17.1	17.1	17.1	17.2	17.2	17.5	17.8
.3333	16.9	16.9	16.9	16.9	16.9	17.0	17.0	17.2	17.5
.3750	16.8	16.8	16.8	16.8	16.8	16.8	16.8	17.1	17.4
.4167	16.6	16.6	16.6	16.6	16.6	16.7	16.7	17.0	17.3
.4583	16.5	16.5	16.5	16.5	16.5	16.5	16.6	16.9	17.2
.5000	16.4	16.4	16.4	16.4	16.4	16.4	16.5	16.8	17.1
.5417	16.3	16.3	16.3	16.3	16.3	16.3	16.4	16.7	17.0
.5833	16.2	16.2	16.2	16.2	16.2	16.3	16.3	16.6	17.0
.6250	16.2	16.2	16.2	16.1	16.2	16.2	16.3	16.6	16.9
.6667	16.1	16.1	16.1	16.1	16.1	16.1	16.2	16.5	16.9
.7083	16.0	16.0	16.0	16.0	16.1	16.1	16.2	16.5	16.8
.7500	16.0	16.0	16.0	16.0	16.0	16.1	16.1	16.4	16.8
.7917	16.0	16.0	16.0	16.0	16.0	16.0	16.1	16.4	16.8
.8333	15.9	15.9	15.9	15.9	15.9	16.0	16.1	16.4	16.8
.8750	15.9	15.9	15.9	15.9	15.9	16.0	16.0	16.4	16.7
.9167	15.9	15.9	15.9	15.9	15.9	16.0	16.0	16.3	16.7
.9583	15.8	15.8	15.8	15.8	15.9	15.9	16.0	16.3	16.7
1.0000	15.8	15.8	15.8	15.8	15.9	15.9	16.0	16.3	16.7

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INITIAL COOLANT BULK TEMPERATURE (K)

	.0000	.0435	.0870	.1304	.1739	.2174	.2609	.3043	.3478	.3913	.4348	.4783	.5217	.5652	.6087
.0000	779.6	779.6	779.6	779.6	779.6	779.6	779.6	779.6	779.6	779.6	779.6	779.6	779.6	779.6	779.6
.0417	806.4	806.4	806.4	806.4	806.4	806.4	806.3	806.3	806.2	806.1	806.1	806.0	805.8	805.7	805.5
.0833	834.8	834.7	834.7	834.7	834.7	834.6	834.5	834.4	834.3	834.2	834.1	833.9	833.7	833.5	833.2
.1250	864.9	864.9	864.9	864.8	864.8	864.7	864.5	864.5	864.3	864.2	864.0	863.8	863.6	863.3	863.0
.1667	895.1	895.0	895.0	895.0	894.9	894.8	894.7	894.5	894.4	894.2	894.1	893.8	893.5	893.2	893.0
.2083	924.1	924.0	924.0	924.0	923.9	923.8	923.6	923.5	923.3	923.1	923.0	922.8	922.5	922.2	922.0
.2500	951.2	951.1	951.1	951.0	950.9	950.6	950.7	950.5	950.4	950.1	950.0	949.8	949.5	949.2	949.1
.2917	975.5	975.5	975.5	975.4	975.3	975.2	975.0	974.9	974.7	974.5	974.4	974.2	973.9	973.6	973.5
.3333	997.4	997.4	997.4	997.3	997.2	997.1	996.9	996.8	996.6	996.4	996.3	996.1	995.8	995.6	995.5
.3750	1016.9	1016.9	1016.8	1016.7	1016.6	1016.5	1016.4	1016.2	1016.0	1015.8	1015.7	1015.5	1015.3	1015.1	1015.0
.4167	1034.0	1034.0	1034.0	1033.9	1033.8	1033.6	1033.5	1033.3	1033.2	1033.0	1032.9	1032.7	1032.4	1032.2	1032.2
.4583	1048.7	1048.7	1048.6	1048.6	1048.5	1048.3	1048.2	1048.0	1047.8	1047.6	1047.6	1047.4	1047.1	1046.9	1046.9
.5000	1061.5	1061.5	1061.4	1061.4	1061.3	1061.1	1061.0	1060.8	1060.6	1060.4	1060.4	1060.2	1060.0	1059.7	1059.7
.5417	1072.7	1072.6	1072.6	1072.5	1072.4	1072.3	1072.1	1071.9	1071.8	1071.6	1071.5	1071.3	1071.1	1070.8	1070.8
.5833	1082.3	1082.3	1082.2	1082.2	1082.0	1081.9	1081.8	1081.6	1081.4	1081.2	1081.1	1080.9	1080.7	1080.5	1080.4
.6250	1090.5	1090.4	1090.4	1090.3	1090.2	1090.1	1089.9	1089.7	1089.6	1089.3	1089.3	1089.1	1088.8	1088.6	1088.5
.6667	1097.5	1097.5	1097.5	1097.4	1097.3	1097.1	1097.0	1096.8	1096.6	1096.4	1096.3	1096.1	1095.8	1095.6	1095.5
.7083	1103.7	1103.6	1103.6	1103.5	1103.4	1103.2	1103.1	1102.9	1102.7	1102.5	1102.4	1102.2	1101.9	1101.6	1101.5
.7500	1109.0	1108.9	1108.9	1108.8	1108.7	1108.5	1108.4	1108.2	1108.0	1107.8	1107.7	1107.4	1107.1	1106.8	1106.7
.7917	1113.5	1113.4	1113.4	1113.3	1113.2	1113.0	1112.9	1112.7	1112.5	1112.2	1112.1	1111.9	1111.6	1111.2	1111.1
.8333	1117.4	1117.3	1117.3	1117.2	1117.1	1116.9	1116.8	1116.6	1116.4	1116.1	1116.0	1115.7	1115.4	1115.1	1114.9
.8750	1120.8	1120.7	1120.7	1120.6	1120.5	1120.3	1120.2	1120.0	1119.7	1119.5	1119.4	1119.1	1118.8	1118.4	1118.2
.9167	1123.8	1123.7	1123.7	1123.6	1123.5	1123.3	1123.1	1122.9	1122.7	1122.5	1122.3	1122.1	1121.7	1121.3	1121.1
.9583	1126.4	1126.4	1126.4	1126.3	1126.1	1126.0	1125.8	1125.6	1125.4	1125.1	1125.0	1124.7	1124.3	1123.9	1123.7
1.0000	1129.0	1129.0	1128.9	1128.8	1128.7	1128.6	1128.4	1128.2	1127.9	1127.7	1127.5	1127.2	1126.8	1126.4	1126.1

INITIAL COOLANT BULK TEMPERATURE (K)

	.6522	.6957	.7391	.7826	.8261	.8696	.9131	.9565	1.0000
.0000	779.5	779.5	779.5	779.4	779.3	779.3	779.2	779.2	779.0
.0417	805.3	805.1	804.8	804.4	804.6	804.5	802.9	801.8	800.7
.0833	832.9	832.5	832.1	831.5	832.3	832.5	829.4	827.4	825.7
.1250	862.6	862.2	861.9	861.3	862.9	863.5	858.9	856.6	854.6
.1667	892.6	892.2	892.0	891.5	894.0	894.9	889.0	886.4	884.4
.2083	921.6	921.2	921.3	920.9	924.0	925.1	918.1	915.5	913.6
.2500	948.8	948.4	948.7	948.5	952.0	953.3	945.3	942.6	941.0
.2917	973.2	973.0	973.4	973.3	977.1	978.3	969.4	966.9	965.6
.3333	995.3	995.0	995.6	995.6	999.5	1000.6	991.9	988.6	987.6
.3750	1014.8	1014.6	1015.3	1015.4	1019.2	1020.0	1009.7	1007.6	1006.9
.4167	1032.0	1031.8	1032.6	1032.8	1036.5	1037.0	1026.1	1024.1	1023.8
.4583	1046.7	1046.5	1047.4	1047.6	1051.1	1051.3	1039.9	1038.1	1038.0
.5000	1059.5	1059.3	1060.2	1060.4	1063.7	1063.5	1051.7	1050.1	1050.2
.5417	1070.6	1070.4	1071.3	1071.5	1074.5	1074.0	1061.9	1060.3	1060.7
.5833	1080.2	1079.9	1080.9	1081.0	1083.8	1083.0	1070.6	1069.1	1069.6
.6250	1088.3	1088.0	1088.9	1089.0	1091.6	1090.5	1077.8	1076.4	1077.0
.6667	1095.2	1094.9	1095.9	1095.9	1098.2	1096.9	1083.9	1082.6	1083.4
.7083	1101.2	1100.9	1101.8	1101.8	1103.9	1102.3	1089.2	1087.9	1088.8
.7500	1106.4	1106.0	1106.9	1106.9	1108.8	1107.0	1093.7	1092.4	1093.4
.7917	1110.7	1110.3	1111.2	1111.1	1112.9	1110.8	1097.4	1096.2	1097.2
.8333	1114.5	1114.0	1114.9	1114.8	1116.4	1114.2	1100.6	1099.4	1100.4
.8750	1117.8	1117.3	1118.2	1118.0	1119.4	1117.0	1103.3	1102.1	1103.2
.9167	1120.7	1120.1	1121.0	1120.7	1122.1	1119.5	1105.7	1104.5	1105.5
.9583	1123.2	1122.6	1123.4	1123.2	1124.3	1121.6	1107.7	1106.5	1107.5
1.0000	1125.6	1125.0	1125.8	1125.5	1126.5	1123.7	1109.6	1108.3	1109.3

INITIAL PEBBLE SURFACE TEMPERATURE (K)

	.0000	.0435	.0870	.1304	.1739	.2174	.2609	.3043	.3478	.3913	.4348	.4783	.5217	.5652	.6087
.0000	827.2	827.2	827.1	827.1	827.0	827.0	826.9	826.8	826.6	826.5	826.3	826.1	825.7	825.3	824.9
.0417	858.1	858.1	858.0	858.0	857.9	857.8	857.7	857.6	857.5	857.3	857.1	856.6	856.5	856.1	855.7
.0833	890.5	890.5	890.4	890.4	890.3	890.2	890.1	889.9	889.8	889.5	889.4	889.1	888.8	888.4	888.1
.1250	921.8	921.8	921.7	921.7	921.6	921.5	921.3	921.2	921.0	920.8	920.6	920.4	920.1	919.7	919.5
.1667	950.4	950.3	950.3	950.2	950.1	950.0	949.9	949.7	949.5	949.3	949.2	948.9	948.6	948.3	948.1
.2083	975.9	975.9	975.8	975.8	975.7	975.5	975.4	975.2	975.0	974.8	974.7	974.5	974.2	973.9	973.8
.2500	998.5	998.5	998.4	998.4	998.3	998.1	998.0	997.8	997.6	997.4	997.4	997.1	996.9	996.6	996.6
.2917	1018.0	1018.0	1017.9	1017.8	1017.7	1017.6	1017.5	1017.3	1017.1	1016.9	1016.8	1016.6	1016.4	1016.2	1016.1
.3333	1035.0	1035.0	1034.9	1034.9	1034.7	1034.6	1034.5	1034.3	1034.1	1033.9	1033.9	1033.7	1033.4	1033.2	1033.2
.3750	1049.8	1049.8	1049.7	1049.7	1049.5	1049.4	1049.3	1049.1	1048.9	1048.7	1048.7	1048.5	1048.3	1048.0	1048.0
.4167	1062.7	1062.6	1062.6	1062.5	1062.4	1062.3	1062.1	1062.0	1061.8	1061.6	1061.5	1061.4	1061.1	1060.9	1060.9
.4583	1073.6	1073.5	1073.5	1073.4	1073.3	1073.2	1073.0	1072.8	1072.7	1072.5	1072.4	1072.2	1072.0	1071.8	1071.8
.5000	1083.0	1082.9	1082.9	1082.8	1082.7	1082.6	1082.4	1082.2	1082.1	1081.9	1081.8	1081.6	1081.4	1081.1	1081.1
.5417	1091.1	1091.1	1091.0	1091.0	1090.8	1090.7	1090.6	1090.4	1090.2	1090.0	1089.9	1089.7	1089.5	1089.2	1089.2
.5833	1098.2	1098.1	1098.1	1098.0	1097.9	1097.8	1097.6	1097.4	1097.2	1097.0	1096.8	1096.6	1096.5	1096.2	1096.2
.6250	1104.1	1104.1	1104.0	1103.9	1103.8	1103.7	1103.5	1103.4	1103.2	1102.9	1102.9	1102.7	1102.4	1102.1	1102.0
.6667	1109.3	1109.2	1109.2	1109.1	1109.0	1108.8	1108.7	1108.5	1108.3	1108.1	1108.0	1107.8	1107.5	1107.2	1107.1
.7083	1113.7	1113.7	1113.7	1113.6	1113.5	1113.3	1113.1	1113.0	1112.8	1112.5	1112.4	1112.2	1111.9	1111.6	1111.4
.7500	1117.6	1117.6	1117.5	1117.5	1117.3	1117.2	1117.0	1116.8	1116.6	1116.4	1116.3	1116.0	1115.7	1115.4	1115.2
.7917	1120.9	1120.9	1120.9	1120.8	1120.7	1120.5	1120.3	1120.1	1119.9	1119.7	1119.6	1119.3	1118.9	1118.6	1118.4
.8333	1123.9	1123.8	1123.8	1123.7	1123.6	1123.4	1123.2	1123.0	1122.8	1122.5	1122.4	1122.1	1121.8	1121.4	1121.2
.8750	1126.4	1126.4	1126.3	1126.2	1126.1	1126.0	1125.8	1125.6	1125.3	1125.1	1124.9	1124.7	1124.3	1123.9	1123.7
.9167	1128.7	1128.7	1128.6	1128.5	1128.4	1128.3	1128.1	1127.9	1127.6	1127.4	1127.2	1126.9	1126.5	1126.1	1125.9
.9583	1131.0	1131.0	1130.9	1130.9	1130.7	1130.6	1130.4	1130.2	1129.9	1129.6	1129.5	1129.2	1128.8	1128.3	1128.1
1.0000	1133.7	1133.6	1133.6	1133.5	1133.3	1133.2	1133.0	1132.8	1132.5	1132.2	1132.1	1131.7	1131.3	1130.8	1130.6

INITIAL PEBBLE SURFACE TEMPERATURE (K)

	.6522	.6957	.7391	.7826	.8261	.8696	.913	.9565	1.0000
.0000	824.3	823.5	822.6	821.4	821.2	820.3	817.2	814.2	811.3
.0417	855.2	854.5	853.9	852.9	854.1	854.1	849.6	846.7	844.0
.0833	887.6	887.0	886.7	886.0	888.3	889.1	883.3	880.3	877.8
.1250	919.0	918.6	918.5	918.0	921.2	922.5	915.5	912.5	910.3
.1667	947.8	947.4	947.6	947.4	951.1	952.6	944.6	941.7	939.9
.2083	973.5	973.3	973.7	973.6	977.7	979.1	970.2	967.6	966.1
.2500	996.3	996.1	996.7	996.8	1000.9	1002.2	992.5	993.1	989.1
.2917	1015.9	1015.8	1016.5	1016.6	1020.7	1021.7	1011.4	1009.2	1008.5
.3333	1033.0	1032.9	1033.7	1033.9	1037.8	1038.4	1027.5	1025.6	1025.2
.3750	1047.9	1047.7	1048.6	1048.8	1052.5	1052.8	1041.4	1039.6	1039.5
.4167	1060.7	1060.6	1061.5	1061.7	1065.1	1065.0	1053.2	1051.6	1051.7
.4583	1071.6	1071.4	1072.3	1072.5	1075.6	1075.2	1063.1	1061.5	1061.9
.5000	1080.9	1080.7	1081.7	1081.8	1084.7	1083.9	1071.5	1070.0	1070.6
.5417	1089.0	1088.7	1089.7	1089.8	1092.4	1091.3	1078.6	1077.3	1077.9
.5833	1095.9	1095.6	1096.6	1096.6	1099.0	1097.6	1084.7	1083.4	1084.2
.6250	1101.7	1101.4	1102.3	1102.3	1104.5	1102.9	1089.8	1088.5	1089.4
.6667	1106.7	1106.3	1107.3	1107.3	1109.2	1107.4	1094.1	1092.9	1093.8
.7083	1111.1	1110.6	1111.6	1111.5	1113.3	1111.2	1097.8	1095.6	1097.6
.7500	1114.8	1114.3	1115.3	1115.1	1116.8	1114.5	1100.9	1099.8	1100.8
.7917	1118.0	1117.5	1118.4	1118.2	1119.7	1117.3	1103.6	1102.4	1103.5
.8333	1120.8	1120.2	1121.1	1120.9	1122.2	1119.7	1105.9	1104.7	1105.8
.8750	1123.2	1122.6	1123.4	1123.2	1124.4	1121.7	1107.8	1106.6	1107.7
.9167	1125.4	1124.9	1125.6	1125.3	1126.4	1123.5	1109.5	1108.3	1109.4
.9583	1127.5	1126.9	1127.7	1127.3	1128.3	1125.3	1111.1	1109.8	1110.8
1.0000	1130.0	1129.3	1130.0	1129.6	1130.4	1127.2	1112.9	1111.4	1112.3

KUGEL RUN AT 09:08:02

ON 15 JAN 81 WITH ABSOLUTE ELEMENT MAP

CREATED CN 000064 AT 000000

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NUMERICAL CONVERGENCE INFORMATION

MAJOR ITERATION	EXECUTION CP TIME	EQUATION NUMBER	MAXIMUM RESIDUAL	LOCATION I INDEX	LOCATION J INDEX
1	25.193 SEC	1	-.J00323	24	21
		2	.000968	2	2
		3	-.000000	24	21
		4	.000060	2	20

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KUGEL RUN AT 09:08:02 ON 15 JAN 81 WITH ABSOLUTE ELEMENT MAP

CREATED ON 000064 AT 000000 PAGE 50

PEBBLE BED REACTOR THERMAL/HYDRAULIC ANALYSIS CASE 1

COOLANT MASS FLOW (KG/S)	THERMAL POWER (MW)	INLET PLENUM PRESSURE (MPA)	MIXED MEAN INLET COOLANT TEMPERATURE (K)
1684.30	2994.	8.030	780.000

BED RADIUS (M)	BED HEIGHT (M)	NOMINAL VOID FRACTION
5.600	5.540	.390

FUEL/MODERATOR ELEMENT TYPE	PEBBLE DIAMETER (M)	MATRIX/SHELL INTERFACE RADIUS (M)
CONVENTIONAL	.0600	.1200

MAXIMUM POWER/BALL (KW/BALL)	LOCATION: RADIUS / DEPTH FROM TOP (M)
2.25	4.37 / .692

CALCULATED VALUES

INLET REYNOLDS NUMBER	MIXED MEAN OUTLET PRESSURE (MPA)	CORE PRESSURE DROP (MPA)
-----	-----	-----
26390.	7.915	.1149
MIXED MEAN OUTLET COOLANT TEMPERATURE (K)	FIRST LAW ERROR (PERCENT)	
-----	-----	
1123.	.2	
MAXIMUM OUTLET COOLANT TEMPERATURE (K)	RADIAL LOCATION (M)	
-----	-----	
1129.	.000	
MAXIMUM FUELED MATRIX TEMPERATURE IN CORE (K)	LOCATION, RADIUS / DEPTH FROM TOP (M)	
-----	-----	
1224.	4.870 / 1.365	
MAXIMUM INTERNAL SHELL/MATRIX INTERFACE TEMPERATURE GRADIENT (K/CM)	LOCATION, RADIUS / DEPTH FROM TOP (M)	
-----	-----	
-151.	4.870 / .923	

DIMENSIONLESS STREAM FUNCTION

	.0000	.0435	.0870	.1304	.1739	.2174	.2609	.3043	.3478	.3913	.4348	.4783
.0000	0.000	9.451-04	3.781-03	8.506-03	1.512-02	2.363-02	3.402-02	4.631-02	6.049-02	7.656-02	9.451-02	1.144-01
.0417	0.000	9.451-04	3.781-03	8.506-03	1.512-02	2.363-02	3.402-02	4.631-02	6.049-02	7.656-02	9.451-02	1.144-01
.0833	0.000	9.451-04	3.780-03	8.506-03	1.512-02	2.363-02	3.402-02	4.631-02	6.049-02	7.655-02	9.451-02	1.144-01
.1250	0.000	9.451-04	3.780-03	8.506-03	1.512-02	2.363-02	3.402-02	4.631-02	6.049-02	7.655-02	9.451-02	1.144-01
.1667	0.000	9.451-04	3.780-03	8.506-03	1.512-02	2.363-02	3.402-02	4.631-02	6.049-02	7.655-02	9.451-02	1.144-01
.2083	0.000	9.451-04	3.780-03	8.506-03	1.512-02	2.363-02	3.402-02	4.631-02	6.048-02	7.655-02	9.451-02	1.144-01
.2500	0.000	9.451-04	3.780-03	8.506-03	1.512-02	2.363-02	3.402-02	4.631-02	6.048-02	7.655-02	9.451-02	1.144-01
.2917	0.000	9.451-04	3.780-03	8.506-03	1.512-02	2.363-02	3.402-02	4.631-02	6.048-02	7.655-02	9.451-02	1.144-01
.3333	0.000	9.451-04	3.780-03	8.506-03	1.512-02	2.363-02	3.402-02	4.631-02	6.048-02	7.655-02	9.451-02	1.144-01
.3750	0.000	9.451-04	3.780-03	8.506-03	1.512-02	2.363-02	3.402-02	4.631-02	6.048-02	7.655-02	9.451-02	1.144-01
.4167	0.000	9.451-04	3.780-03	8.506-03	1.512-02	2.363-02	3.402-02	4.631-02	6.048-02	7.655-02	9.451-02	1.144-01
.4583	0.000	9.451-04	3.780-03	8.506-03	1.512-02	2.363-02	3.402-02	4.631-02	6.048-02	7.655-02	9.451-02	1.144-01
.5000	0.000	9.451-04	3.780-03	8.506-03	1.512-02	2.363-02	3.402-02	4.631-02	6.048-02	7.655-02	9.451-02	1.144-01
.5417	0.000	9.451-04	3.780-03	8.506-03	1.512-02	2.363-02	3.402-02	4.631-02	6.048-02	7.655-02	9.451-02	1.144-01
.5833	0.000	9.451-04	3.780-03	8.506-03	1.512-02	2.363-02	3.402-02	4.631-02	6.048-02	7.655-02	9.451-02	1.144-01
.6250	0.000	9.451-04	3.780-03	8.506-03	1.512-02	2.363-02	3.402-02	4.631-02	6.048-02	7.655-02	9.451-02	1.144-01
.6667	0.000	9.451-04	3.780-03	8.506-03	1.512-02	2.363-02	3.402-02	4.631-02	6.048-02	7.655-02	9.451-02	1.144-01
.7083	0.000	9.451-04	3.780-03	8.506-03	1.512-02	2.363-02	3.402-02	4.631-02	6.048-02	7.655-02	9.451-02	1.144-01
.7500	0.000	9.451-04	3.780-03	8.506-03	1.512-02	2.363-02	3.402-02	4.631-02	6.048-02	7.655-02	9.451-02	1.144-01
.7917	0.000	9.451-04	3.780-03	8.506-03	1.512-02	2.363-02	3.402-02	4.631-02	6.048-02	7.655-02	9.451-02	1.144-01
.8333	0.000	9.451-04	3.780-03	8.506-03	1.512-02	2.363-02	3.402-02	4.631-02	6.048-02	7.655-02	9.451-02	1.144-01
.8750	0.000	9.451-04	3.780-03	8.506-03	1.512-02	2.363-02	3.402-02	4.631-02	6.048-02	7.655-02	9.451-02	1.144-01
.9167	0.000	9.451-04	3.780-03	8.506-03	1.512-02	2.363-02	3.402-02	4.631-02	6.048-02	7.655-02	9.451-02	1.144-01
.9583	0.000	9.451-04	3.780-03	8.506-03	1.512-02	2.363-02	3.402-02	4.631-02	6.048-02	7.655-02	9.450-02	1.143-01
1.0000	0.000	9.451-04	3.780-03	8.506-03	1.512-02	2.363-02	3.402-02	4.631-02	6.048-02	7.655-02	9.450-02	1.143-01

DIMENSIONLESS STREAM FUNCTION

	.5217	.5652	.6087	.6522	.6957	.7391	.7826	.8261	.8696	.9130	.9565	1.0000
.0000	1.361-01	1.597-01	1.852-01	2.126-01	2.419-01	2.731-01	3.062-01	3.412-01	3.780-01	4.167-01	4.574-01	5.000-01
.0417	1.361-01	1.597-01	1.852-01	2.126-01	2.419-01	2.731-01	3.062-01	3.412-01	3.780-01	4.167-01	4.574-01	5.000-01
.0833	1.361-01	1.597-01	1.852-01	2.126-01	2.419-01	2.731-01	3.062-01	3.412-01	3.780-01	4.167-01	4.574-01	5.000-01
.1250	1.361-01	1.597-01	1.852-01	2.126-01	2.419-01	2.731-01	3.062-01	3.412-01	3.780-01	4.167-01	4.574-01	5.000-01
.1667	1.361-01	1.597-01	1.852-01	2.126-01	2.419-01	2.731-01	3.063-01	3.412-01	3.779-01	4.166-01	4.574-01	5.000-01
.2083	1.361-01	1.597-01	1.852-01	2.126-01	2.419-01	2.732-01	3.063-01	3.412-01	3.779-01	4.166-01	4.574-01	5.000-01
.2500	1.361-01	1.597-01	1.852-01	2.126-01	2.420-01	2.732-01	3.063-01	3.412-01	3.779-01	4.166-01	4.574-01	5.000-01
.2917	1.361-01	1.597-01	1.852-01	2.126-01	2.420-01	2.732-01	3.063-01	3.412-01	3.779-01	4.166-01	4.574-01	5.000-01
.3333	1.361-01	1.597-01	1.852-01	2.126-01	2.420-01	2.732-01	3.063-01	3.412-01	3.779-01	4.166-01	4.573-01	5.000-01
.3750	1.361-01	1.597-01	1.852-01	2.127-01	2.420-01	2.732-01	3.063-01	3.412-01	3.779-01	4.166-01	4.573-01	5.000-01
.4167	1.361-01	1.597-01	1.852-01	2.127-01	2.420-01	2.732-01	3.063-01	3.412-01	3.779-01	4.166-01	4.573-01	5.000-01
.4583	1.361-01	1.597-01	1.852-01	2.127-01	2.420-01	2.732-01	3.063-01	3.412-01	3.779-01	4.166-01	4.573-01	5.000-01
.5000	1.361-01	1.597-01	1.852-01	2.127-01	2.420-01	2.732-01	3.063-01	3.412-01	3.778-01	4.166-01	4.573-01	5.000-01
.5417	1.361-01	1.597-01	1.852-01	2.127-01	2.420-01	2.732-01	3.063-01	3.412-01	3.778-01	4.166-01	4.573-01	5.000-01
.5833	1.361-01	1.597-01	1.852-01	2.127-01	2.420-01	2.732-01	3.063-01	3.411-01	3.778-01	4.165-01	4.573-01	5.000-01
.6250	1.361-01	1.597-01	1.852-01	2.127-01	2.420-01	2.732-01	3.063-01	3.411-01	3.778-01	4.165-01	4.573-01	5.000-01
.6667	1.361-01	1.597-01	1.852-01	2.127-01	2.420-01	2.732-01	3.063-01	3.411-01	3.778-01	4.165-01	4.573-01	5.000-01
.7083	1.361-01	1.597-01	1.852-01	2.127-01	2.420-01	2.732-01	3.063-01	3.411-01	3.778-01	4.165-01	4.573-01	5.000-01
.7500	1.361-01	1.597-01	1.852-01	2.126-01	2.420-01	2.732-01	3.062-01	3.411-01	3.778-01	4.165-01	4.573-01	5.000-01
.7917	1.361-01	1.597-01	1.852-01	2.126-01	2.420-01	2.732-01	3.062-01	3.411-01	3.778-01	4.165-01	4.573-01	5.000-01
.8333	1.361-01	1.597-01	1.852-01	2.126-01	2.420-01	2.732-01	3.062-01	3.411-01	3.777-01	4.165-01	4.573-01	5.000-01
.8750	1.361-01	1.597-01	1.852-01	2.126-01	2.420-01	2.732-01	3.062-01	3.411-01	3.777-01	4.165-01	4.573-01	5.000-01
.9167	1.361-01	1.597-01	1.852-01	2.126-01	2.420-01	2.732-01	3.062-01	3.411-01	3.777-01	4.165-01	4.573-01	5.000-01
.9583	1.361-01	1.597-01	1.852-01	2.126-01	2.420-01	2.732-01	3.062-01	3.410-01	3.777-01	4.165-01	4.573-01	5.000-01
1.0000	1.361-01	1.597-01	1.852-01	2.126-01	2.420-01	2.732-01	3.062-01	3.410-01	3.777-01	4.165-01	4.573-01	5.000-01

DIMENSIONLESS COOLANT PRESSURE, PSTAR

	.LC00	.C435	.LC870	.13J4	.1739	.2174	.2609	.3043	.3478	.3913	.4348	.4783
.0000	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.0417	9.994-01	9.994-01	9.995-01	9.995-01	9.995-01	9.995-01	9.995-01	9.995-01	9.995-01	9.995-01	9.995-01	9.995-01
.0833	9.988-01	9.988-01	9.988-01	9.988-01	9.988-01	9.988-01	9.988-01	9.988-01	9.988-01	9.988-01	9.988-01	9.988-01
.1250	9.982-01	9.982-01	9.982-01	9.982-01	9.982-01	9.982-01	9.982-01	9.982-01	9.982-01	9.982-01	9.982-01	9.982-01
.1667	9.976-01	9.976-01	9.976-01	9.976-01	9.976-01	9.976-01	9.976-01	9.976-01	9.976-01	9.976-01	9.976-01	9.976-01
.2083	9.970-01	9.970-01	9.970-01	9.970-01	9.970-01	9.970-01	9.970-01	9.970-01	9.970-01	9.970-01	9.970-01	9.970-01
.2500	9.964-01	9.964-01	9.964-01	9.964-01	9.964-01	9.964-01	9.964-01	9.964-01	9.964-01	9.964-01	9.964-01	9.964-01
.2917	9.958-01	9.958-01	9.958-01	9.958-01	9.958-01	9.958-01	9.958-01	9.958-01	9.958-01	9.958-01	9.958-01	9.958-01
.3333	9.952-01	9.952-01	9.952-01	9.952-01	9.952-01	9.952-01	9.952-01	9.952-01	9.952-01	9.952-01	9.952-01	9.952-01
.3750	9.946-01	9.946-01	9.946-01	9.946-01	9.946-01	9.946-01	9.946-01	9.946-01	9.946-01	9.946-01	9.946-01	9.946-01
.4167	9.940-01	9.940-01	9.940-01	9.940-01	9.940-01	9.940-01	9.940-01	9.940-01	9.940-01	9.940-01	9.940-01	9.940-01
.4583	9.934-01	9.934-01	9.934-01	9.934-01	9.934-01	9.934-01	9.934-01	9.934-01	9.934-01	9.934-01	9.934-01	9.934-01
.5000	9.928-01	9.928-01	9.928-01	9.928-01	9.928-01	9.928-01	9.928-01	9.928-01	9.928-01	9.928-01	9.928-01	9.928-01
.5417	9.922-01	9.922-01	9.922-01	9.922-01	9.922-01	9.922-01	9.922-01	9.922-01	9.922-01	9.922-01	9.922-01	9.922-01
.5833	9.916-01	9.916-01	9.916-01	9.916-01	9.916-01	9.916-01	9.916-01	9.916-01	9.916-01	9.916-01	9.916-01	9.916-01
.6250	9.910-01	9.910-01	9.910-01	9.910-01	9.910-01	9.910-01	9.910-01	9.910-01	9.910-01	9.910-01	9.910-01	9.910-01
.6667	9.904-01	9.904-01	9.904-01	9.904-01	9.904-01	9.904-01	9.904-01	9.904-01	9.904-01	9.904-01	9.904-01	9.904-01
.7083	9.898-01	9.898-01	9.898-01	9.898-01	9.898-01	9.898-01	9.898-01	9.898-01	9.898-01	9.898-01	9.898-01	9.898-01
.7500	9.892-01	9.892-01	9.892-01	9.892-01	9.892-01	9.892-01	9.892-01	9.892-01	9.892-01	9.892-01	9.892-01	9.892-01
.7917	9.886-01	9.886-01	9.886-01	9.886-01	9.886-01	9.886-01	9.886-01	9.886-01	9.886-01	9.886-01	9.886-01	9.886-01
.8333	9.880-01	9.880-01	9.880-01	9.880-01	9.880-01	9.880-01	9.880-01	9.880-01	9.880-01	9.880-01	9.880-01	9.880-01
.8750	9.874-01	9.874-01	9.874-01	9.874-01	9.874-01	9.874-01	9.874-01	9.874-01	9.874-01	9.874-01	9.874-01	9.874-01
.9167	9.868-01	9.868-01	9.868-01	9.868-01	9.868-01	9.868-01	9.868-01	9.868-01	9.868-01	9.868-01	9.868-01	9.868-01
.9583	9.862-01	9.862-01	9.862-01	9.862-01	9.862-01	9.862-01	9.862-01	9.862-01	9.862-01	9.862-01	9.862-01	9.862-01
1.0000	9.857-01	9.857-01	9.857-01	9.857-01	9.857-01	9.857-01	9.857-01	9.857-01	9.857-01	9.857-01	9.857-01	9.857-01

DIMENSIONLESS COOLANT PRESSURE, PSTAR

	.5217	.5652	.6087	.6522	.6957	.7391	.7826	.8261	.8696	.9130	.9565	1.0000
.0000	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.0417	9.995-01	9.995-01	9.995-01	9.995-01	9.995-01	9.995-01	9.995-01	9.995-01	9.995-01	9.995-01	9.995-01	9.995-01
.0833	9.988-01	9.988-01	9.988-01	9.988-01	9.988-01	9.988-01	9.988-01	9.988-01	9.988-01	9.988-01	9.988-01	9.988-01
.1250	9.982-01	9.982-01	9.982-01	9.982-01	9.982-01	9.982-01	9.982-01	9.982-01	9.982-01	9.982-01	9.982-01	9.982-01
.1667	9.976-01	9.976-01	9.976-01	9.976-01	9.976-01	9.976-01	9.976-01	9.976-01	9.976-01	9.976-01	9.976-01	9.976-01
.2083	9.970-01	9.970-01	9.970-01	9.970-01	9.970-01	9.970-01	9.970-01	9.970-01	9.970-01	9.970-01	9.970-01	9.970-01
.2500	9.964-01	9.964-01	9.964-01	9.964-01	9.964-01	9.964-01	9.964-01	9.964-01	9.964-01	9.964-01	9.964-01	9.964-01
.2917	9.958-01	9.958-01	9.958-01	9.958-01	9.958-01	9.958-01	9.958-01	9.958-01	9.958-01	9.958-01	9.958-01	9.958-01
.3333	9.952-01	9.952-01	9.952-01	9.952-01	9.952-01	9.952-01	9.952-01	9.952-01	9.952-01	9.952-01	9.952-01	9.952-01
.3750	9.946-01	9.946-01	9.946-01	9.946-01	9.946-01	9.946-01	9.946-01	9.946-01	9.946-01	9.946-01	9.946-01	9.946-01
.4167	9.940-01	9.940-01	9.940-01	9.940-01	9.940-01	9.940-01	9.940-01	9.940-01	9.940-01	9.940-01	9.940-01	9.940-01
.4583	9.934-01	9.934-01	9.934-01	9.934-01	9.934-01	9.934-01	9.934-01	9.934-01	9.934-01	9.934-01	9.934-01	9.934-01
.5000	9.928-01	9.928-01	9.928-01	9.928-01	9.928-01	9.928-01	9.928-01	9.928-01	9.928-01	9.928-01	9.928-01	9.928-01
.5417	9.922-01	9.922-01	9.922-01	9.922-01	9.922-01	9.922-01	9.922-01	9.922-01	9.922-01	9.922-01	9.922-01	9.922-01
.5833	9.916-01	9.916-01	9.916-01	9.916-01	9.916-01	9.916-01	9.916-01	9.916-01	9.916-01	9.916-01	9.916-01	9.916-01
.6250	9.910-01	9.910-01	9.910-01	9.910-01	9.910-01	9.910-01	9.910-01	9.910-01	9.910-01	9.910-01	9.910-01	9.910-01
.6667	9.904-01	9.904-01	9.904-01	9.904-01	9.904-01	9.904-01	9.904-01	9.904-01	9.904-01	9.904-01	9.904-01	9.904-01
.7083	9.898-01	9.898-01	9.898-01	9.898-01	9.898-01	9.898-01	9.898-01	9.898-01	9.898-01	9.898-01	9.898-01	9.898-01
.7500	9.892-01	9.892-01	9.892-01	9.892-01	9.892-01	9.892-01	9.892-01	9.892-01	9.892-01	9.892-01	9.892-01	9.892-01
.7917	9.886-01	9.886-01	9.886-01	9.886-01	9.886-01	9.886-01	9.886-01	9.886-01	9.886-01	9.886-01	9.886-01	9.886-01
.8333	9.880-01	9.880-01	9.880-01	9.880-01	9.880-01	9.880-01	9.880-01	9.880-01	9.880-01	9.880-01	9.880-01	9.880-01
.8750	9.874-01	9.874-01	9.874-01	9.874-01	9.874-01	9.874-01	9.874-01	9.874-01	9.874-01	9.874-01	9.874-01	9.874-01
.9167	9.868-01	9.868-01	9.868-01	9.868-01	9.868-01	9.868-01	9.868-01	9.868-01	9.868-01	9.868-01	9.868-01	9.868-01
.9583	9.862-01	9.862-01	9.862-01	9.862-01	9.862-01	9.862-01	9.862-01	9.862-01	9.862-01	9.862-01	9.862-01	9.862-01
1.0000	9.857-01	9.857-01	9.857-01	9.857-01	9.857-01	9.857-01	9.857-01	9.857-01	9.857-01	9.857-01	9.857-01	9.857-01

DIMENSIONLESS MASS FLUX, GSTAR

	.0000	.0435	.0870	.1304	.1739	.2174	.2609	.3043	.3478	.3913	.4348	.4783
.0000	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.0417	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.0833	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.1250	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.1667	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.2083	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.2500	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.2917	1.000+00	9.999-01	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.3333	9.999-01	9.999-01	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.3750	9.999-01	9.999-01	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.4167	9.999-01	9.999-01	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.4583	9.999-01	9.999-01	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.5000	9.999-01	9.999-01	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.5417	9.999-01	9.999-01	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.5833	9.999-01	9.999-01	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.6250	9.999-01	9.999-01	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.6667	9.999-01	9.999-01	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.7083	9.999-01	9.999-01	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.7500	9.999-01	9.999-01	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.7917	9.999-01	9.999-01	9.999-01	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.8333	9.999-01	9.999-01	9.999-01	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.8750	9.999-01	9.999-01	9.999-01	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.9167	9.999-01	9.999-01	9.999-01	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.9583	9.999-01	9.999-01	9.999-01	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
1.0000	9.999-01	9.999-01	9.999-01	9.999-01	9.999-01	9.999-01	9.999-01	9.999-01	9.999-01	1.000+00	9.999-01	9.999-01

DIMENSIONLESS MASS FLUX, GSTAR

	.5217	.5652	.6087	.6522	.6957	.7391	.7826	.8261	.8696	.9131	.9565	1.0000
.0000	1.000+00	9.999-01	9.999-01	9.999-01	9.999-01	1.000+00	1.000+00	9.997-01	9.992-01	9.998-01	1.001+00	0.000
.0417	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	9.998-01	9.994-01	1.000+00	1.001+00	0.000
.0833	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.001+00	9.995-01	9.989-01	1.000+00	1.002+00	0.000
.1250	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.001+00	1.001+00	9.992-01	9.985-01	1.000+00	1.002+00	0.000
.1667	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.001+00	1.001+00	9.990-01	9.982-01	1.000+00	1.002+00	0.000
.2083	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.001+00	1.001+00	9.987-01	9.980-01	1.000+00	1.002+00	0.000
.2500	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.001+00	1.001+00	9.985-01	9.978-01	1.001+00	1.002+00	0.000
.2917	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.001+00	1.001+00	9.983-01	9.976-01	1.001+00	1.003+00	0.000
.3333	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.001+00	1.001+00	9.982-01	9.977-01	1.001+00	1.003+00	0.000
.3750	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.001+00	1.001+00	9.981-01	9.976-01	1.001+00	1.003+00	0.000
.4167	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.001+00	1.001+00	9.980-01	9.976-01	1.001+00	1.003+00	0.000
.4583	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.001+00	1.001+00	9.980-01	9.975-01	1.001+00	1.003+00	0.000
.5000	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.001+00	1.001+00	9.979-01	9.975-01	1.001+00	1.003+00	0.000
.5417	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.001+00	1.001+00	9.979-01	9.976-01	1.002+00	1.003+00	0.000
.5833	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.001+00	1.001+00	9.979-01	9.981-01	1.002+00	1.003+00	0.000
.6250	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.001+00	1.001+00	9.979-01	9.982-01	1.002+00	1.004+00	0.000
.6667	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.001+00	1.001+00	9.979-01	9.983-01	1.002+00	1.004+00	0.000
.7083	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.001+00	1.001+00	9.979-01	9.983-01	1.002+00	1.004+00	0.000
.7500	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.001+00	1.001+00	9.979-01	9.984-01	1.002+00	1.004+00	0.000
.7917	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.001+00	1.001+00	9.979-01	9.985-01	1.002+00	1.004+00	0.000
.8333	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.001+00	1.001+00	9.979-01	9.985-01	1.002+00	1.004+00	0.000
.8750	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.001+00	1.001+00	9.979-01	9.986-01	1.002+00	1.004+00	0.000
.9167	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.001+00	1.001+00	9.979-01	9.987-01	1.003+00	1.004+00	0.000
.9583	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.001+00	1.001+00	9.979-01	9.987-01	1.003+00	1.004+00	0.000
1.0000	9.999-01	9.999-01	9.999-01	1.000+00	1.000+00	1.001+00	9.979-01	9.975-01	9.987-01	1.000+00	1.003+00	0.000

RADIAL DERIVATIVE OF DIMENSIONLESS STREAM FUNCTION

	.CC00	.C435	.C870	.1304	.1739	.2174	.2609	.3043	.3478	.3913	.4348	.4783
.0000	2.174-02	4.348-02	8.696-02	1.304-01	1.739-01	2.174-01	2.609-01	3.043-01	3.478-01	3.913-01	4.348-01	4.782-01
.0417	2.174-02	4.348-02	8.695-02	1.304-01	1.739-01	2.174-01	2.609-01	3.043-01	3.478-01	3.913-01	4.347-01	4.782-01
.0833	2.174-02	4.348-02	8.695-02	1.304-01	1.739-01	2.174-01	2.608-01	3.043-01	3.478-01	3.913-01	4.347-01	4.782-01
.1250	2.174-02	4.348-02	8.695-02	1.304-01	1.739-01	2.174-01	2.608-01	3.043-01	3.478-01	3.913-01	4.347-01	4.782-01
.1667	2.174-02	4.347-02	8.695-02	1.304-01	1.739-01	2.174-01	2.608-01	3.043-01	3.478-01	3.913-01	4.347-01	4.782-01
.2083	2.174-02	4.347-02	8.695-02	1.304-01	1.739-01	2.174-01	2.608-01	3.043-01	3.478-01	3.913-01	4.347-01	4.782-01
.2500	2.174-02	4.347-02	8.695-02	1.304-01	1.739-01	2.174-01	2.608-01	3.043-01	3.478-01	3.913-01	4.347-01	4.782-01
.2917	2.174-02	4.347-02	8.695-02	1.304-01	1.739-01	2.174-01	2.608-01	3.043-01	3.478-01	3.913-01	4.347-01	4.782-01
.3333	2.174-02	4.347-02	8.695-02	1.304-01	1.739-01	2.174-01	2.608-01	3.043-01	3.478-01	3.913-01	4.347-01	4.782-01
.3750	2.174-02	4.347-02	8.695-02	1.304-01	1.739-01	2.174-01	2.608-01	3.043-01	3.478-01	3.913-01	4.347-01	4.782-01
.4167	2.174-02	4.347-02	8.695-02	1.304-01	1.739-01	2.174-01	2.608-01	3.043-01	3.478-01	3.913-01	4.347-01	4.782-01
.4583	2.174-02	4.347-02	8.695-02	1.304-01	1.739-01	2.174-01	2.608-01	3.043-01	3.478-01	3.913-01	4.347-01	4.782-01
.5000	2.174-02	4.347-02	8.695-02	1.304-01	1.739-01	2.174-01	2.608-01	3.043-01	3.478-01	3.913-01	4.347-01	4.782-01
.5417	2.174-02	4.347-02	8.695-02	1.304-01	1.739-01	2.174-01	2.608-01	3.043-01	3.478-01	3.913-01	4.347-01	4.782-01
.5833	2.174-02	4.347-02	8.695-02	1.304-01	1.739-01	2.174-01	2.608-01	3.043-01	3.478-01	3.913-01	4.347-01	4.782-01
.6250	2.174-02	4.347-02	8.695-02	1.304-01	1.739-01	2.174-01	2.608-01	3.043-01	3.478-01	3.913-01	4.347-01	4.782-01
.6667	2.174-02	4.347-02	8.695-02	1.304-01	1.739-01	2.174-01	2.608-01	3.043-01	3.478-01	3.913-01	4.347-01	4.782-01
.7083	2.174-02	4.347-02	8.695-02	1.304-01	1.739-01	2.174-01	2.608-01	3.043-01	3.478-01	3.913-01	4.347-01	4.782-01
.7500	2.174-02	4.347-02	8.695-02	1.304-01	1.739-01	2.174-01	2.608-01	3.043-01	3.478-01	3.913-01	4.347-01	4.782-01
.7917	2.174-02	4.347-02	8.695-02	1.304-01	1.739-01	2.174-01	2.608-01	3.043-01	3.478-01	3.913-01	4.347-01	4.782-01
.8333	2.174-02	4.347-02	8.695-02	1.304-01	1.739-01	2.174-01	2.608-01	3.043-01	3.478-01	3.913-01	4.347-01	4.782-01
.8750	2.174-02	4.347-02	8.695-02	1.304-01	1.739-01	2.174-01	2.608-01	3.043-01	3.478-01	3.913-01	4.347-01	4.782-01
.9167	2.174-02	4.347-02	8.695-02	1.304-01	1.739-01	2.174-01	2.608-01	3.043-01	3.478-01	3.913-01	4.347-01	4.782-01
.9583	2.174-02	4.347-02	8.695-02	1.304-01	1.739-01	2.174-01	2.608-01	3.043-01	3.478-01	3.913-01	4.347-01	4.782-01
1.0000	2.174-02	4.348-02	8.695-02	1.304-01	1.739-01	2.174-01	2.608-01	3.043-01	3.478-01	3.913-01	4.347-01	4.782-01

RADIAL DERIVATIVE OF DIMENSIONLESS STREAM FUNCTION

	.5217	.5652	.6087	.6522	.6957	.7391	.7826	.8261	.8696	.9130	.9565	1.0000
.0000	5.217-01	5.652-01	6.086-01	6.521-01	6.956-01	7.392-01	7.828-01	8.258-01	8.688-01	9.129-01	9.572-01	0.000
.0417	5.217-01	5.651-01	6.086-01	6.521-01	6.956-01	7.393-01	7.827-01	8.254-01	8.685-01	9.131-01	9.570-01	0.000
.0833	5.217-01	5.651-01	6.086-01	6.521-01	6.957-01	7.394-01	7.827-01	8.251-01	8.681-01	9.131-01	9.582-01	0.000
.1250	5.217-01	5.651-01	6.086-01	6.521-01	6.958-01	7.396-01	7.827-01	8.247-01	8.677-01	9.132-01	9.584-01	0.000
.1667	5.217-01	5.651-01	6.086-01	6.522-01	6.959-01	7.398-01	7.827-01	8.243-01	8.674-01	9.132-01	9.586-01	0.000
.2083	5.217-01	5.651-01	6.086-01	6.522-01	6.960-01	7.399-01	7.827-01	8.240-01	8.672-01	9.133-01	9.588-01	0.000
.2500	5.217-01	5.652-01	6.087-01	6.523-01	6.961-01	7.400-01	7.826-01	8.237-01	8.670-01	9.134-01	9.589-01	0.000
.2917	5.217-01	5.652-01	6.087-01	6.523-01	6.962-01	7.400-01	7.825-01	8.235-01	8.669-01	9.135-01	9.590-01	0.000
.3333	5.217-01	5.652-01	6.087-01	6.524-01	6.962-01	7.400-01	7.824-01	8.233-01	8.669-01	9.136-01	9.591-01	0.000
.3750	5.217-01	5.652-01	6.087-01	6.524-01	6.962-01	7.399-01	7.822-01	8.232-01	8.668-01	9.137-01	9.592-01	0.000
.4167	5.217-01	5.652-01	6.087-01	6.524-01	6.962-01	7.399-01	7.821-01	8.231-01	8.669-01	9.138-01	9.593-01	0.000
.4583	5.217-01	5.652-01	6.087-01	6.524-01	6.962-01	7.398-01	7.819-01	8.230-01	8.669-01	9.140-01	9.594-01	0.000
.5000	5.217-01	5.652-01	6.087-01	6.524-01	6.962-01	7.397-01	7.818-01	8.229-01	8.669-01	9.141-01	9.595-01	0.000
.5417	5.217-01	5.652-01	6.087-01	6.524-01	6.962-01	7.396-01	7.817-01	8.228-01	8.670-01	9.142-01	9.597-01	0.000
.5833	5.217-01	5.652-01	6.087-01	6.524-01	6.961-01	7.395-01	7.815-01	8.227-01	8.670-01	9.143-01	9.598-01	0.000
.6250	5.217-01	5.652-01	6.087-01	6.524-01	6.961-01	7.394-01	7.814-01	8.226-01	8.670-01	9.144-01	9.599-01	0.000
.6667	5.217-01	5.652-01	6.087-01	6.524-01	6.961-01	7.394-01	7.813-01	8.226-01	8.671-01	9.145-01	9.600-01	0.000
.7083	5.217-01	5.652-01	6.087-01	6.524-01	6.961-01	7.393-01	7.812-01	8.225-01	8.671-01	9.146-01	9.601-01	0.000
.7500	5.217-01	5.652-01	6.087-01	6.524-01	6.960-01	7.392-01	7.811-01	8.224-01	8.671-01	9.147-01	9.603-01	0.000
.7917	5.217-01	5.652-01	6.087-01	6.524-01	6.960-01	7.392-01	7.810-01	8.224-01	8.672-01	9.148-01	9.604-01	0.000
.8333	5.217-01	5.652-01	6.087-01	6.524-01	6.960-01	7.391-01	7.810-01	8.224-01	8.672-01	9.149-01	9.605-01	0.000
.8750	5.217-01	5.652-01	6.087-01	6.524-01	6.960-01	7.390-01	7.809-01	8.223-01	8.672-01	9.150-01	9.606-01	0.000
.9167	5.217-01	5.651-01	6.087-01	6.523-01	6.959-01	7.390-01	7.808-01	8.223-01	8.672-01	9.150-01	9.606-01	0.000
.9583	5.217-01	5.651-01	6.087-01	6.523-01	6.959-01	7.390-01	7.808-01	8.223-01	8.672-01	9.151-01	9.607-01	0.000
1.0000	5.217-01	5.652-01	6.086-01	6.522-01	6.958-01	7.393-01	7.825-01	8.240-01	8.667-01	9.133-01	9.595-01	0.000

AXIAL DERIVATIVE OF DIMENSIONLESS STREAM FUNCTION

	.0000	.0435	.0870	.1304	.1739	.2174	.2609	.3043	.3478	.3913	.4348	.4783
.0000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
.0417	0.000	-2.013-07	-7.914-07	-1.869-06	-3.478-06	-5.666-06	-8.466-06	-1.180-05	-1.533-05	-1.898-05	-2.494-05	-3.314-05
.0833	0.000	-3.810-07	-1.500-06	-3.544-06	-6.578-06	-1.065-05	-1.580-05	-2.173-05	-2.746-05	-3.312-05	-4.277-05	-5.611-05
.1250	0.000	-3.217-07	-1.278-06	-3.020-06	-5.582-06	-8.943-06	-1.307-05	-1.744-05	-2.276-05	-2.804-05	-3.853-05	-5.599-05
.1667	0.000	-2.452-07	-9.887-07	-2.348-06	-4.322-06	-6.845-06	-9.829-06	-1.267-05	-1.355-05	-1.571-05	-1.543-05	-1.777-05
.2083	0.000	-1.732-07	-7.090-07	-1.689-06	-3.087-06	-4.834-06	-6.773-06	-8.365-06	-8.111-06	-6.258-06	-5.230-06	-3.856-06
.2500	0.000	-1.132-07	-4.690-07	-1.108-06	-2.014-06	-3.101-06	-4.208-06	-4.845-06	-3.861-06	-1.006-06	1.699-06	5.197-06
.2917	0.000	-6.697-08	-2.811-07	-6.636-07	-1.186-06	-1.755-06	-2.246-06	-2.274-06	-6.382-07	2.174-06	5.599-06	1.001-05
.3333	0.000	-3.536-08	-1.502-07	-3.534-07	-6.077-07	-8.494-07	-9.611-07	-6.538-07	8.436-07	3.643-06	7.030-06	1.150-05
.3750	0.000	-1.510-08	-6.706-08	-1.565-07	-2.487-07	-2.934-07	-2.068-07	2.570-07	1.587-06	3.678-06	6.795-06	1.063-05
.4167	0.000	-4.191-09	-2.270-08	-5.169-08	-5.667-08	-8.382-09	1.621-07	5.700-07	1.559-06	3.196-06	5.364-06	6.136-06
.4583	0.000	-9.604-10	-5.937-09	-4.191-09	1.118-08	6.426-08	2.179-07	4.694-07	1.034-06	1.967-06	3.252-06	4.794-06
.5000	0.000	-1.834-09	-6.636-09	-9.779-09	-1.537-08	2.794-09	6.147-08	1.565-07	3.017-07	5.364-07	9.499-07	1.330-06
.5417	0.000	-5.151-09	-2.061-08	-4.889-08	-8.941-08	-1.369-07	-2.123-07	-3.297-07	-5.476-07	-9.276-07	-1.341-06	-2.079-06
.5833	0.000	-1.065-08	-4.156-08	-9.919-08	-1.942-07	-3.269-07	-5.532-07	-8.997-07	-1.475-06	-2.358-06	-3.543-06	-5.264-06
.6250	0.000	-1.659-08	-6.252-08	-1.537-07	-3.143-07	-5.476-07	-8.941-07	-1.453-06	-2.314-06	-3.722-06	-5.487-06	-7.924-06
.6667	0.000	-2.157-08	-8.452-08	-2.123-07	-4.191-07	-7.460-07	-1.224-06	-1.973-06	-3.146-06	-4.828-06	-7.108-06	-1.008-05
.7083	0.000	-2.680-08	-1.069-07	-2.668-07	-5.197-07	-7.276-07	-1.537-06	-2.436-06	-3.861-06	-5.756-06	-8.393-06	-1.164-05
.7500	0.000	-3.239-08	-1.275-07	-3.143-07	-6.258-07	-1.098-06	-1.794-06	-2.800-06	-4.342-06	-6.527-06	-9.365-06	-1.318-05
.7917	0.000	-3.615-08	-1.421-07	-3.534-07	-7.069-07	-1.221-06	-1.978-06	-3.079-06	-4.739-06	-7.141-06	-1.011-05	-1.414-05
.8333	0.000	-3.781-08	-1.526-07	-3.786-07	-7.488-07	-1.308-06	-2.101-06	-3.269-06	-4.984-06	-7.376-06	-1.061-05	-1.479-05
.8750	0.000	-3.929-08	-1.596-07	-3.953-07	-7.809-07	-1.363-06	-2.202-06	-3.409-06	-5.169-06	-7.611-06	-1.090-05	-1.517-05
.9167	0.000	-3.693-08	-1.477-07	-3.646-07	-7.139-07	-1.235-06	-1.984-06	-3.085-06	-4.621-06	-6.750-06	-9.600-06	-1.338-05
.9583	0.000	-1.685-08	-6.706-08	-1.634-07	-3.157-07	-5.448-07	-8.605-07	-1.341-06	-1.955-06	-2.895-06	-4.090-06	-5.722-06
1.0000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AXIAL DERIVATIVE OF DIMENSIONLESS STREAM FUNCTION

	.5217	.5652	.6087	.6522	.6957	.7391	.7826	.8261	.8696	.9130	.9565	1.0000
.0000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
.0417	-4.077-05	-4.826-05	-5.803-05	-6.643-05	-5.557-05	8.225-06	1.021-04	1.270-05	-2.903-04	-3.652-04	-1.824-04	0.000
.0833	-6.692-05	-7.568-05	-8.637-05	-8.963-05	-4.967-05	9.893-05	2.963-04	1.083-04	-5.031-04	-6.496-04	-2.931-04	0.000
.1250	-3.871-05	-3.661-05	-3.196-05	-1.243-05	5.505-05	2.262-04	4.174-04	2.160-04	-3.845-04	-4.920-04	-1.748-04	0.000
.1667	-1.455-05	-5.051-06	9.991-06	4.361-05	1.225-04	2.839-04	4.301-04	2.224-04	-2.091-04	-3.567-04	-1.021-04	0.000
.2083	3.040-06	1.623-05	3.643-05	7.609-05	1.542-04	2.862-04	3.732-04	1.592-04	-2.287-04	-2.695-04	-6.491-05	0.000
.2500	1.361-05	2.758-05	4.844-05	8.775-05	1.570-04	2.505-04	2.697-04	5.816-05	-2.311-04	-2.224-04	-5.311-05	0.000
.2917	1.828-05	3.105-05	4.975-05	8.453-05	1.410-04	1.954-04	1.581-04	-4.908-05	-2.586-04	-2.061-04	-5.695-05	0.000
.3333	1.864-05	2.897-05	4.403-05	7.251-05	1.157-04	1.365-04	5.691-05	-1.431-04	-2.913-04	-2.095-04	-6.875-05	0.000
.3750	1.605-05	2.340-05	3.402-05	5.575-05	8.626-05	0.078-05	-2.870-05	-2.209-04	-3.240-04	-2.226-04	-8.270-05	0.000
.4167	1.167-05	1.596-05	2.206-05	3.697-05	5.621-05	3.102-05	-9.719-05	-2.795-04	-3.511-04	-2.374-04	-9.616-05	0.000
.4583	6.460-06	7.957-06	1.001-05	1.878-05	2.888-05	-9.701-06	-1.467-04	-3.172-04	-3.680-04	-2.500-04	-1.072-04	0.000
.5000	1.296-06	3.353-07	-9.611-07	2.772-06	5.633-06	-4.122-05	-1.800-04	-3.364-04	-3.752-04	-2.583-04	-1.147-04	0.000
.5417	-3.509-06	-6.437-06	-1.055-05	-1.082-05	-1.346-05	-6.478-05	-2.005-04	-3.460-04	-3.739-04	-2.614-04	-1.192-04	0.000
.5833	-7.801-06	-1.227-05	-1.860-05	-2.204-05	-2.857-05	-8.123-05	-2.102-04	-3.424-04	-3.646-04	-2.591-04	-1.206-04	0.000
.6250	-1.151-05	-1.714-05	-2.499-05	-3.076-05	-4.005-05	-9.209-05	-2.122-04	-3.317-04	-3.496-04	-2.526-04	-1.195-04	0.000
.6667	-1.448-05	-2.099-05	-2.979-05	-3.726-05	-4.844-05	-9.862-05	-2.090-04	-3.165-04	-3.323-04	-2.436-04	-1.167-04	0.000
.7083	-1.674-05	-2.378-05	-3.326-05	-4.202-05	-5.420-05	-1.017-04	-2.023-04	-2.985-04	-3.125-04	-2.326-04	-1.129-04	0.000
.7500	-1.840-05	-2.577-05	-3.570-05	-4.524-05	-5.827-05	-1.027-04	-1.935-04	-2.794-04	-2.921-04	-2.027-04	-1.088-04	0.000
.7917	-1.956-05	-2.711-05	-3.722-05	-4.723-05	-6.082-05	-1.021-04	-1.841-04	-2.606-04	-2.725-04	-2.094-04	-1.049-04	0.000
.8333	-2.030-05	-2.785-05	-3.809-05	-4.844-05	-6.218-05	-1.007-04	-1.750-04	-2.441-04	-2.564-04	-2.005-04	-1.023-04	0.000
.8750	-2.072-05	-2.841-05	-3.862-05	-4.942-05	-6.334-05	-9.969-05	-1.678-04	-2.315-04	-2.450-04	-1.977-04	-1.047-04	0.000
.9167	-1.817-05	-2.497-05	-3.377-05	-4.303-05	-5.550-05	-8.837-05	-1.454-04	-1.953-04	-2.037-04	-1.591-04	-7.604-05	0.000
.9583	-7.711-06	-1.062-05	-1.435-05	-1.806-05	-2.354-05	-3.840-05	-6.299-05	-6.203-05	-6.315-05	-5.990-05	-2.208-05	0.000
1.0000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AXIAL COMPONENT OF DIMENSIONLESS MASS FLUX, G2STAR

	.0000	.0435	.0870	.1304	.1739	.2174	.2609	.3043	.3478	.3913	.4348	.4783
.0000	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.0417	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.0833	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.1250	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.1667	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.2083	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.2500	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.2917	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.3333	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.3750	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.4167	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.4583	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.5000	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.5417	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.5833	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.6250	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.6667	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.7083	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.7500	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.7917	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.8333	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.8750	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.9167	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
.9583	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00
1.0000	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00

AXIAL COMPONENT OF DIMENSIONLESS MASS FLUX, GZSTAR

	.5217	.5652	.6087	.6522	.6957	.7391	.7826	.8261	.8696	.9130	.9565	1.0000
.0000	1.000+00	9.999-01	9.999-01	9.999-01	9.999-01	1.000+00	1.000+00	9.997-01	9.992-01	9.998-01	1.001+00	0.000
.0417	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	9.998-01	9.994-01	1.000+00	1.001+00	0.000
.0833	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.001+00	9.995-01	9.989-01	1.000+00	1.002+00	0.000
.1250	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.001+00	1.001+00	9.992-01	9.985-01	1.000+00	1.002+00	0.000
.1667	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.001+00	1.001+00	9.990-01	9.982-01	1.000+00	1.002+00	0.000
.2083	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.001+00	1.001+00	9.987-01	9.980-01	1.000+00	1.002+00	0.000
.2500	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.001+00	1.001+00	9.985-01	9.978-01	1.001+00	1.002+00	0.000
.2917	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.001+00	1.001+00	9.983-01	9.976-01	1.001+00	1.003+00	0.000
.3333	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.001+00	1.001+00	9.982-01	9.977-01	1.001+00	1.003+00	0.000
.3750	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.001+00	1.000+00	9.981-01	9.976-01	1.001+00	1.003+00	0.000
.4167	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.001+00	1.000+00	9.980-01	9.976-01	1.001+00	1.003+00	0.000
.4583	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.001+00	1.000+00	9.980-01	9.979-01	1.001+00	1.003+00	0.000
.5000	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	9.979-01	9.979-01	1.001+00	1.003+00	0.000
.5417	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	9.979-01	9.980-01	1.002+00	1.003+00	0.000
.5833	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	9.979-01	9.981-01	1.002+00	1.003+00	0.000
.6250	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	9.979-01	9.982-01	1.002+00	1.004+00	0.000
.6667	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	9.979-01	9.983-01	1.002+00	1.004+00	0.000
.7083	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	9.979-01	9.983-01	1.002+00	1.004+00	0.000
.7500	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	9.999-01	9.979-01	9.984-01	1.002+00	1.004+00	0.000
.7917	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	9.999-01	9.979-01	9.985-01	1.002+00	1.004+00	0.000
.8333	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	9.999-01	9.979-01	9.985-01	1.002+00	1.004+00	0.000
.8750	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	9.999-01	9.979-01	9.986-01	1.002+00	1.004+00	0.000
.9167	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	9.999-01	9.979-01	9.987-01	1.003+00	1.004+00	0.000
.9583	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	1.000+00	9.999-01	9.979-01	9.987-01	1.003+00	1.004+00	0.000
1.0000	9.999-01	9.999-01	9.999-01	1.000+00	1.000+00	1.000+00	9.999-01	9.975-01	9.967-01	1.000+00	1.003+00	0.000

RADIAL COMPONENT OF DIMENSIONLESS MASS FLUX, GRSTAR

	.0000	.0435	.0870	.1304	.1739	.2174	.2609	.3043	.3478	.3913	.4348	.4783
.0000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
.0417	0.000	1.084-05	2.170-05	3.446-05	4.860-05	6.397-05	8.063-05	9.820-05	1.152-04	1.325-04	1.588-04	1.921-04
.0633	0.000	8.859-06	1.743-05	2.747-05	3.824-05	4.954-05	6.121-05	7.216-05	7.986-05	8.531-05	9.944-05	1.186-04
.1250	0.000	7.480-06	1.485-05	2.341-05	3.245-05	4.159-05	5.064-05	5.792-05	6.033-05	5.553-05	6.633-05	7.606-05
.1667	0.000	5.700-06	1.149-05	1.820-05	2.512-05	3.183-05	3.809-05	4.209-05	4.055-05	3.542-05	3.588-05	3.756-05
.2083	0.000	4.027-06	8.241-06	1.309-05	1.794-05	2.248-05	2.624-05	2.778-05	2.377-05	1.817-05	1.216-05	8.149-06
.2500	0.000	2.633-06	5.452-06	8.585-06	1.171-05	1.442-05	1.630-05	1.609-05	1.186-05	2.598-06	-3.949-06	-1.098-05
.2917	0.000	1.557-06	3.268-06	5.142-06	6.894-06	8.159-06	8.704-06	7.554-06	2.436-06	-5.630-06	-1.302-05	-2.116-05
.3333	0.000	8.221-07	1.746-06	2.739-06	3.532-06	3.949-06	3.724-06	2.171-06	-2.452-06	-9.412-06	-1.634-05	-2.431-05
.3750	0.000	3.512-07	7.795-07	1.213-06	1.445-06	1.364-06	6.011-07	-8.537-07	-4.612-06	-1.002-05	-1.580-05	-2.246-05
.4167	0.000	9.744-08	2.639-07	4.006-07	3.410-07	3.897-08	-6.279-07	-1.893-06	-4.531-06	-6.257-06	-1.247-05	-1.720-05
.4583	0.000	2.233-08	6.902-08	3.248-08	-6.496-08	-2.988-07	-8.444-07	-1.559-06	-3.004-06	-5.081-06	-7.561-06	-1.013-05
.5000	0.000	4.263-08	7.714-08	7.578-08	8.932-08	-1.299-08	-2.382-07	-5.197-07	-8.789-07	-1.386-06	-2.209-06	-2.811-06
.5417	0.000	1.198-07	2.395-07	3.789-07	5.197-07	6.366-07	8.228-07	1.095-06	1.591-06	2.390-06	3.118-06	4.393-06
.5833	0.000	2.476-07	4.831-07	7.687-07	1.129-06	1.520-06	2.144-06	2.988-06	4.287-06	6.092-06	8.237-06	1.113-05
.6250	0.000	3.857-07	7.267-07	1.191-06	1.827-06	2.546-06	3.464-06	4.825-06	6.085-06	7.614-06	1.276-05	1.675-05
.6667	0.000	5.014-07	9.825-07	1.646-06	2.436-06	3.469-06	4.742-06	6.551-06	9.143-06	1.247-05	1.653-05	2.131-05
.7083	0.000	6.232-07	1.242-06	2.068-06	3.021-06	4.113-06	5.954-06	8.092-06	1.114-05	1.487-05	1.951-05	2.501-05
.7500	0.000	7.531-07	1.482-06	2.436-06	3.638-06	5.136-06	6.950-06	9.298-06	1.262-05	1.686-05	2.177-05	2.785-05
.7917	0.000	8.404-07	1.652-06	2.739-06	4.109-06	5.677-06	7.665-06	1.023-05	1.577-05	1.819-05	2.351-05	2.988-05
.8333	0.000	8.790-07	1.774-06	2.934-06	4.352-06	6.080-06	8.141-06	1.086-05	1.449-05	1.915-05	2.466-05	3.125-05
.8750	0.000	9.135-07	1.855-06	3.064-06	4.539-06	6.340-06	8.531-06	1.132-05	1.502-05	1.966-05	2.533-05	3.205-05
.9167	0.000	8.587-07	1.717-06	2.826-06	4.149-06	5.742-06	7.687-06	1.024-05	1.343-05	1.744-05	2.232-05	2.827-05
.9583	0.000	-1.543-05	-3.340-05	-5.245-05	-7.213-05	-9.215-05	-1.125-04	-1.295-04	-1.323-04	-1.486-04	-1.813-04	-2.041-04
1.0000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

RADIAL COMPONENT OF DIMENSIONLESS MASS FLUX, GRSTAR

	.5217	.5652	.6087	.6522	.6957	.7391	.7826	.8261	.8696	.9131	.9565	1.0000
.0000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
.0417	2.246-04	2.578-04	3.006-04	3.431-04	3.394-04	1.976-04	-9.673-06	2.382-04	9.092-04	1.069-03	3.050-04	0.000
.0833	1.297-04	1.354-04	1.434-04	1.389-04	7.217-05	-1.353-04	-3.827-04	-1.325-04	5.854-04	7.192-04	7.516-05	0.000
.1250	7.500-05	6.548-05	5.308-05	1.926-05	-7.999-05	-3.094-04	-5.391-04	-2.643-04	4.237-04	5.447-04	1.332-05	0.000
.1667	2.819-05	9.034-06	-1.659-05	-6.759-05	-1.780-04	-3.883-04	-5.555-04	-2.721-04	3.127-04	3.572-04	-3.331-05	0.000
.2083	-5.889-06	-2.902-05	-6.050-05	-1.179-04	-2.241-04	-3.915-04	-4.781-04	-1.948-04	2.056-04	2.584-04	-6.675-05	0.000
.2500	-2.637-05	-4.933-05	-8.044-05	-1.360-04	-2.281-04	-3.420-04	-3.483-04	-7.117-05	2.687-04	2.462-04	-8.929-05	0.000
.2917	-3.542-05	-5.552-05	-8.263-05	-1.310-04	-2.046-04	-2.672-04	-2.042-04	0.006-05	2.983-04	2.282-04	-1.028-04	0.000
.3333	-3.612-05	-5.181-05	-7.312-05	-1.124-04	-1.681-04	-1.667-04	-7.350-05	1.751-04	3.375-04	2.319-04	-1.107-04	0.000
.3750	-3.109-05	-4.185-05	-5.649-05	-8.640-05	-1.253-04	-1.105-04	3.707-05	2.703-04	3.766-04	2.464-04	-1.156-04	0.000
.4167	-2.261-05	-2.854-05	-3.664-05	-5.730-05	-8.168-05	-4.243-05	1.255-04	3.420-04	4.081-04	2.628-04	-1.196-04	0.000
.4583	-1.252-05	-1.423-05	-1.663-05	-2.910-05	-4.196-05	1.327-05	1.894-04	3.881-04	4.277-04	2.768-04	-1.238-04	0.000
.5000	-2.512-06	-5.996-07	1.596-06	-4.296-06	-8.185-06	5.637-05	2.325-04	4.140-04	4.302-04	2.860-04	-1.299-04	0.000
.5417	6.799-06	1.151-05	1.752-05	1.677-05	1.955-05	8.859-05	2.589-04	4.234-04	4.347-04	2.694-04	-1.375-04	0.000
.5833	1.511-05	2.195-05	3.088-05	3.416-05	4.151-05	1.111-04	2.716-04	4.190-04	4.238-04	2.869-04	-1.468-04	0.000
.6250	2.230-05	3.066-05	4.150-05	4.767-05	5.820-05	1.259-04	2.740-04	4.058-04	4.006-04	2.797-04	-1.577-04	0.000
.6667	2.806-05	3.754-05	4.948-05	5.775-05	7.036-05	1.349-04	2.699-04	3.873-04	3.863-04	2.657-04	-1.697-04	0.000
.7083	3.244-05	4.253-05	5.523-05	6.513-05	7.876-05	1.391-04	2.613-04	3.652-04	3.633-04	2.576-04	-1.824-04	0.000
.7500	3.564-05	4.609-05	5.928-05	7.012-05	8.467-05	1.404-04	2.500-04	3.419-04	3.395-04	2.443-04	-1.951-04	0.000
.7917	3.789-05	4.849-05	6.180-05	7.320-05	8.837-05	1.396-04	2.378-04	3.191-04	3.173-04	2.318-04	-2.076-04	0.000
.8333	3.932-05	4.981-05	6.325-05	7.507-05	9.036-05	1.377-04	2.261-04	2.987-04	2.980-04	2.220-04	-2.193-04	0.000
.8750	4.014-05	5.081-05	6.414-05	7.660-05	9.204-05	1.363-04	2.167-04	2.833-04	2.848-04	2.189-04	-2.294-04	0.000
.9167	3.521-05	4.465-05	5.609-05	6.669-05	8.064-05	1.204-04	1.878-04	2.389-04	2.368-04	1.762-04	-2.325-04	0.000
.9583	-2.081-04	-2.339-04	-2.464-04	-1.162-04	-2.176-05	6.792-05	-4.347-04	-2.086-03	-2.454-03	-1.264-03	-2.895-04	0.000
1.0000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

	REYNOLDS NUMBER											
	.0000	.0435	.0870	.1304	.1739	.2174	.2609	.3043	.3478	.3913	.4348	.4783
.0000	4.242+04	4.242+04	4.242+04	4.242+04	4.242+04	4.242+04	4.242+04	4.242+04	4.243+04	4.243+04	4.243+04	4.244+04
.0417	4.127+04	4.127+04	4.127+04	4.127+04	4.127+04	4.127+04	4.127+04	4.128+04	4.128+04	4.129+04	4.129+04	4.130+04
.0833	4.025+04	4.025+04	4.025+04	4.025+04	4.025+04	4.026+04	4.026+04	4.026+04	4.027+04	4.027+04	4.028+04	4.029+04
.1250	3.928+04	3.928+04	3.928+04	3.929+04	3.929+04	3.929+04	3.930+04	3.930+04	3.931+04	3.931+04	3.932+04	3.932+04
.1667	3.841+04	3.841+04	3.841+04	3.842+04	3.842+04	3.842+04	3.843+04	3.843+04	3.844+04	3.844+04	3.845+04	3.845+04
.2083	3.765+04	3.765+04	3.765+04	3.765+04	3.766+04	3.766+04	3.767+04	3.767+04	3.768+04	3.768+04	3.768+04	3.769+04
.2500	3.699+04	3.699+04	3.699+04	3.699+04	3.699+04	3.700+04	3.700+04	3.701+04	3.701+04	3.702+04	3.702+04	3.703+04
.2917	3.642+04	3.642+04	3.642+04	3.642+04	3.643+04	3.643+04	3.643+04	3.644+04	3.644+04	3.644+04	3.645+04	3.646+04
.3333	3.594+04	3.594+04	3.594+04	3.594+04	3.594+04	3.595+04	3.595+04	3.595+04	3.596+04	3.597+04	3.597+04	3.597+04
.3750	3.553+04	3.553+04	3.553+04	3.553+04	3.553+04	3.553+04	3.554+04	3.554+04	3.555+04	3.555+04	3.556+04	3.556+04
.4167	3.517+04	3.517+04	3.517+04	3.518+04	3.518+04	3.518+04	3.519+04	3.519+04	3.520+04	3.520+04	3.520+04	3.521+04
.4583	3.488+04	3.488+04	3.488+04	3.488+04	3.488+04	3.489+04	3.489+04	3.489+04	3.490+04	3.490+04	3.490+04	3.491+04
.5000	3.462+04	3.462+04	3.462+04	3.463+04	3.463+04	3.463+04	3.464+04	3.464+04	3.465+04	3.465+04	3.465+04	3.466+04
.5417	3.441+04	3.441+04	3.441+04	3.441+04	3.441+04	3.442+04	3.442+04	3.443+04	3.443+04	3.444+04	3.444+04	3.444+04
.5833	3.423+04	3.423+04	3.423+04	3.423+04	3.423+04	3.423+04	3.424+04	3.424+04	3.425+04	3.425+04	3.425+04	3.426+04
.6250	3.407+04	3.407+04	3.407+04	3.407+04	3.408+04	3.408+04	3.408+04	3.409+04	3.409+04	3.410+04	3.410+04	3.410+04
.6667	3.394+04	3.394+04	3.394+04	3.394+04	3.394+04	3.395+04	3.395+04	3.395+04	3.396+04	3.397+04	3.397+04	3.397+04
.7083	3.382+04	3.382+04	3.383+04	3.383+04	3.383+04	3.383+04	3.384+04	3.384+04	3.385+04	3.385+04	3.385+04	3.386+04
.7500	3.373+04	3.373+04	3.373+04	3.373+04	3.373+04	3.374+04	3.374+04	3.374+04	3.375+04	3.376+04	3.376+04	3.376+04
.7917	3.364+04	3.364+04	3.364+04	3.365+04	3.365+04	3.365+04	3.366+04	3.366+04	3.367+04	3.367+04	3.367+04	3.368+04
.8333	3.357+04	3.357+04	3.357+04	3.357+04	3.358+04	3.358+04	3.358+04	3.359+04	3.360+04	3.360+04	3.360+04	3.361+04
.8750	3.351+04	3.351+04	3.351+04	3.351+04	3.351+04	3.352+04	3.352+04	3.353+04	3.353+04	3.354+04	3.354+04	3.355+04
.9167	3.345+04	3.345+04	3.345+04	3.346+04	3.346+04	3.346+04	3.347+04	3.347+04	3.348+04	3.348+04	3.349+04	3.349+04
.9583	3.340+04	3.340+04	3.340+04	3.340+04	3.341+04	3.341+04	3.342+04	3.342+04	3.343+04	3.343+04	3.344+04	3.344+04
1.0000	3.335+04	3.335+04	3.335+04	3.335+04	3.335+04	3.336+04	3.336+04	3.337+04	3.337+04	3.338+04	3.338+04	3.339+04

KEYNOLUS NUMBER

	.5217	.5652	.6087	.6522	.6957	.7391	.7826	.8261	.8696	.9130	.9565	1.0000	
.0000	4.244+04	4.245+04	4.245+04	4.246+04	4.248+04	4.250+04	4.253+04	4.250+04	4.250+04	4.258+04	4.267+04	0.000	
.0417	4.131+04	4.132+04	4.133+04	4.134+04	4.136+04	4.138+04	4.141+04	4.136+04	4.135+04	4.150+04	4.161+04	0.000	
.0833	4.030+04	4.031+04	4.032+04	4.033+04	4.035+04	4.037+04	4.040+04	4.030+04	4.026+04	4.046+04	4.060+04	0.000	
.1250	3.933+04	3.934+04	3.935+04	3.937+04	3.938+04	3.940+04	3.942+04	3.929+04	3.923+04	3.948+04	3.963+04	0.000	
.1667	3.846+04	3.847+04	3.848+04	3.849+04	3.851+04	3.852+04	3.853+04	3.837+04	3.831+04	3.860+04	3.875+04	0.000	
.2083	3.770+04	3.771+04	3.771+04	3.773+04	3.774+04	3.775+04	3.775+04	3.758+04	3.752+04	3.782+04	3.797+04	0.000	
.2500	3.704+04	3.704+04	3.705+04	3.706+04	3.706+04	3.707+04	3.707+04	3.689+04	3.683+04	3.716+04	3.730+04	0.000	
.2917	3.647+04	3.647+04	3.647+04	3.648+04	3.649+04	3.649+04	3.649+04	3.630+04	3.626+04	3.660+04	3.674+04	0.000	
.3333	3.598+04	3.599+04	3.599+04	3.600+04	3.600+04	3.600+04	3.599+04	3.581+04	3.578+04	3.613+04	3.626+04	0.000	
.3750	3.557+04	3.557+04	3.557+04	3.558+04	3.559+04	3.558+04	3.557+04	3.540+04	3.536+04	3.574+04	3.586+04	0.000	
.4167	3.521+04	3.522+04	3.522+04	3.522+04	3.523+04	3.523+04	3.522+04	3.521+04	3.505+04	3.504+04	3.541+04	3.553+04	0.000
.4583	3.492+04	3.492+04	3.492+04	3.493+04	3.494+04	3.492+04	3.491+04	3.476+04	3.476+04	3.514+04	3.525+04	0.000	
.5000	3.466+04	3.467+04	3.467+04	3.468+04	3.468+04	3.467+04	3.465+04	3.451+04	3.453+04	3.491+04	3.501+04	0.000	
.5417	3.445+04	3.446+04	3.446+04	3.447+04	3.447+04	3.446+04	3.444+04	3.430+04	3.433+04	3.472+04	3.482+04	0.000	
.5833	3.427+04	3.427+04	3.427+04	3.428+04	3.429+04	3.427+04	3.426+04	3.413+04	3.417+04	3.456+04	3.466+04	0.000	
.6250	3.411+04	3.412+04	3.412+04	3.413+04	3.414+04	3.412+04	3.410+04	3.398+04	3.403+04	3.442+04	3.452+04	0.000	
.6667	3.398+04	3.399+04	3.399+04	3.400+04	3.401+04	3.399+04	3.397+04	3.386+04	3.392+04	3.431+04	3.441+04	0.000	
.7083	3.387+04	3.387+04	3.388+04	3.389+04	3.390+04	3.388+04	3.387+04	3.376+04	3.382+04	3.422+04	3.431+04	0.000	
.7500	3.377+04	3.378+04	3.378+04	3.379+04	3.380+04	3.379+04	3.377+04	3.367+04	3.374+04	3.414+04	3.423+04	0.000	
.7917	3.369+04	3.370+04	3.370+04	3.371+04	3.372+04	3.371+04	3.369+04	3.359+04	3.367+04	3.407+04	3.416+04	0.000	
.8333	3.362+04	3.363+04	3.363+04	3.364+04	3.366+04	3.364+04	3.362+04	3.353+04	3.361+04	3.401+04	3.411+04	0.000	
.8750	3.356+04	3.357+04	3.357+04	3.358+04	3.360+04	3.358+04	3.357+04	3.348+04	3.356+04	3.396+04	3.406+04	0.000	
.9167	3.350+04	3.351+04	3.352+04	3.353+04	3.355+04	3.353+04	3.352+04	3.343+04	3.352+04	3.392+04	3.402+04	0.000	
.9583	3.345+04	3.346+04	3.347+04	3.348+04	3.350+04	3.348+04	3.347+04	3.339+04	3.348+04	3.388+04	3.398+04	0.000	
1.0000	3.340+04	3.340+04	3.341+04	3.343+04	3.344+04	3.343+04	3.342+04	3.333+04	3.337+04	3.377+04	3.390+04	0.000	

COOLANT DENSITY, RHO (KG/M**3)

	.0000	.0435	.0870	.1304	.1739	.2174	.2609	.3043	.3478	.3913	.4348	.4783
.0000	4.743+00	4.743+00	4.743+00	4.743+00	4.743+00	4.743+00	4.743+00	4.744+00	4.744+00	4.744+00	4.745+00	4.746+00
.0417	4.560+00	4.560+00	4.560+00	4.560+00	4.560+00	4.561+00	4.561+00	4.562+00	4.562+00	4.563+00	4.564+00	4.565+00
.0633	4.400+00	4.400+00	4.400+00	4.400+00	4.400+00	4.401+00	4.401+00	4.402+00	4.403+00	4.403+00	4.404+00	4.405+00
.1250	4.249+00	4.249+00	4.250+00	4.250+00	4.250+00	4.251+00	4.251+00	4.252+00	4.253+00	4.253+00	4.254+00	4.255+00
.1667	4.115+00	4.115+00	4.115+00	4.115+00	4.115+00	4.116+00	4.116+00	4.117+00	4.118+00	4.118+00	4.119+00	4.121+00
.2083	3.998+00	3.998+00	3.998+00	3.998+00	3.999+00	3.999+00	3.999+00	4.000+00	4.000+00	4.001+00	4.002+00	4.003+00
.2500	3.897+00	3.897+00	3.897+00	3.897+00	3.897+00	3.898+00	3.898+00	3.899+00	3.900+00	3.901+00	3.901+00	3.902+00
.2917	3.810+00	3.810+00	3.810+00	3.811+00	3.811+00	3.812+00	3.812+00	3.813+00	3.813+00	3.814+00	3.814+00	3.815+00
.3333	3.737+00	3.737+00	3.737+00	3.737+00	3.738+00	3.738+00	3.739+00	3.739+00	3.740+00	3.741+00	3.741+00	3.742+00
.3750	3.675+00	3.675+00	3.675+00	3.675+00	3.675+00	3.676+00	3.676+00	3.677+00	3.677+00	3.678+00	3.678+00	3.679+00
.4167	3.621+00	3.621+00	3.621+00	3.621+00	3.622+00	3.622+00	3.623+00	3.623+00	3.624+00	3.625+00	3.625+00	3.625+00
.4583	3.576+00	3.576+00	3.576+00	3.576+00	3.576+00	3.577+00	3.577+00	3.578+00	3.579+00	3.579+00	3.579+00	3.580+00
.5000	3.537+00	3.537+00	3.537+00	3.537+00	3.538+00	3.538+00	3.539+00	3.539+00	3.540+00	3.541+00	3.541+00	3.541+00
.5417	3.504+00	3.504+00	3.504+00	3.505+00	3.505+00	3.505+00	3.506+00	3.506+00	3.507+00	3.508+00	3.508+00	3.508+00
.5833	3.476+00	3.476+00	3.476+00	3.476+00	3.476+00	3.477+00	3.477+00	3.478+00	3.478+00	3.479+00	3.479+00	3.480+00
.6250	3.451+00	3.451+00	3.451+00	3.452+00	3.452+00	3.452+00	3.453+00	3.454+00	3.454+00	3.455+00	3.455+00	3.456+00
.6667	3.430+00	3.430+00	3.430+00	3.431+00	3.431+00	3.431+00	3.432+00	3.433+00	3.433+00	3.434+00	3.434+00	3.435+00
.7083	3.412+00	3.412+00	3.412+00	3.413+00	3.413+00	3.413+00	3.414+00	3.414+00	3.415+00	3.416+00	3.416+00	3.417+00
.7500	3.396+00	3.396+00	3.396+00	3.397+00	3.397+00	3.397+00	3.398+00	3.398+00	3.399+00	3.400+00	3.400+00	3.401+00
.7917	3.382+00	3.382+00	3.382+00	3.383+00	3.383+00	3.383+00	3.384+00	3.385+00	3.385+00	3.386+00	3.386+00	3.387+00
.8333	3.370+00	3.370+00	3.370+00	3.370+00	3.371+00	3.371+00	3.372+00	3.372+00	3.373+00	3.374+00	3.374+00	3.375+00
.8750	3.359+00	3.359+00	3.359+00	3.360+00	3.360+00	3.360+00	3.361+00	3.361+00	3.362+00	3.363+00	3.363+00	3.364+00
.9167	3.349+00	3.349+00	3.350+00	3.350+00	3.350+00	3.351+00	3.351+00	3.352+00	3.352+00	3.353+00	3.354+00	3.354+00
.9583	3.340+00	3.340+00	3.340+00	3.340+00	3.341+00	3.341+00	3.342+00	3.342+00	3.343+00	3.344+00	3.344+00	3.345+00
1.0000	3.331+00	3.331+00	3.331+00	3.332+00	3.332+00	3.332+00	3.333+00	3.334+00	3.334+00	3.335+00	3.336+00	3.337+00

COOLANT DENSITY, RHO (KG/M**3)

	.5417	.5652	.6087	.6522	.6957	.7391	.7826	.8261	.8696	.9130	.9565	1.0000
.0000	4.746+00	4.747+00	4.749+00	4.750+00	4.752+00	4.754+00	4.758+00	4.758+00	4.760+00	4.769+00	4.777+00	4.777+00
.0417	4.566+00	4.567+00	4.569+00	4.571+00	4.574+00	4.576+00	4.580+00	4.576+00	4.576+00	4.594+00	4.605+00	4.605+00
.0833	4.407+00	4.408+00	4.410+00	4.412+00	4.414+00	4.416+00	4.419+00	4.410+00	4.408+00	4.431+00	4.443+00	4.443+00
.1250	4.257+00	4.258+00	4.259+00	4.261+00	4.263+00	4.264+00	4.266+00	4.254+00	4.250+00	4.277+00	4.290+00	4.290+00
.1667	4.122+00	4.123+00	4.124+00	4.126+00	4.127+00	4.127+00	4.129+00	4.115+00	4.111+00	4.140+00	4.152+00	4.152+00
.2083	4.005+00	4.006+00	4.006+00	4.008+00	4.009+00	4.008+00	4.008+00	3.994+00	3.989+00	4.021+00	4.033+00	4.033+00
.2500	3.903+00	3.904+00	3.904+00	3.905+00	3.906+00	3.905+00	3.904+00	3.890+00	3.885+00	3.919+00	3.930+00	3.930+00
.2917	3.816+00	3.817+00	3.817+00	3.818+00	3.819+00	3.817+00	3.816+00	3.802+00	3.799+00	3.834+00	3.843+00	3.843+00
.3333	3.743+00	3.743+00	3.744+00	3.744+00	3.745+00	3.743+00	3.741+00	3.728+00	3.726+00	3.762+00	3.770+00	3.770+00
.3750	3.680+00	3.681+00	3.681+00	3.681+00	3.682+00	3.679+00	3.678+00	3.666+00	3.665+00	3.701+00	3.709+00	3.709+00
.4167	3.626+00	3.627+00	3.627+00	3.627+00	3.628+00	3.625+00	3.624+00	3.613+00	3.613+00	3.650+00	3.657+00	3.657+00
.4583	3.581+00	3.581+00	3.582+00	3.582+00	3.583+00	3.580+00	3.579+00	3.566+00	3.570+00	3.607+00	3.614+00	3.614+00
.5000	3.542+00	3.543+00	3.543+00	3.544+00	3.544+00	3.541+00	3.540+00	3.531+00	3.533+00	3.571+00	3.577+00	3.577+00
.5417	3.509+00	3.510+00	3.510+00	3.511+00	3.511+00	3.509+00	3.508+00	3.499+00	3.503+00	3.541+00	3.546+00	3.546+00
.5833	3.481+00	3.482+00	3.482+00	3.483+00	3.483+00	3.480+00	3.480+00	3.472+00	3.477+00	3.515+00	3.520+00	3.520+00
.6250	3.457+00	3.457+00	3.456+00	3.456+00	3.459+00	3.457+00	3.456+00	3.449+00	3.454+00	3.493+00	3.498+00	3.498+00
.6667	3.436+00	3.436+00	3.437+00	3.438+00	3.439+00	3.436+00	3.435+00	3.430+00	3.435+00	3.474+00	3.479+00	3.479+00
.7083	3.418+00	3.418+00	3.419+00	3.420+00	3.421+00	3.418+00	3.418+00	3.413+00	3.419+00	3.456+00	3.463+00	3.463+00
.7500	3.402+00	3.403+00	3.403+00	3.404+00	3.405+00	3.403+00	3.403+00	3.398+00	3.405+00	3.444+00	3.449+00	3.449+00
.7917	3.388+00	3.389+00	3.390+00	3.391+00	3.392+00	3.389+00	3.390+00	3.385+00	3.393+00	3.432+00	3.437+00	3.437+00
.8333	3.376+00	3.377+00	3.378+00	3.379+00	3.380+00	3.376+00	3.378+00	3.374+00	3.382+00	3.421+00	3.426+00	3.426+00
.8750	3.365+00	3.366+00	3.367+00	3.366+00	3.370+00	3.367+00	3.368+00	3.364+00	3.373+00	3.414+00	3.417+00	3.417+00
.9167	3.356+00	3.357+00	3.357+00	3.359+00	3.360+00	3.358+00	3.359+00	3.356+00	3.364+00	3.404+00	3.409+00	3.409+00
.9583	3.346+00	3.348+00	3.346+00	3.350+00	3.352+00	3.349+00	3.350+00	3.348+00	3.357+00	3.396+00	3.401+00	3.401+00
1.0000	3.338+00	3.339+00	3.340+00	3.341+00	3.343+00	3.341+00	3.342+00	3.340+00	3.349+00	3.385+00	3.394+00	3.394+00

DIMENSIONLESS CONVECTIVE COEFFICIENT, HSTAR

	.0000	.0435	.0870	.1304	.1739	.2174	.2609	.3043	.3478	.3913	.4348	.4783
.0000	6.176+04	6.176+04	6.176+04	6.176+04	6.176+04	6.176+04	6.176+04	6.176+04	6.176+04	6.176+04	6.175+04	6.175+04
.0417	6.218+04	6.218+04	6.218+04	6.218+04	6.218+04	6.218+04	6.218+04	6.218+04	6.218+04	6.218+04	6.218+04	6.217+04
.0833	6.257+04	6.257+04	6.257+04	6.257+04	6.257+04	6.257+04	6.257+04	6.257+04	6.256+04	6.256+04	6.256+04	6.256+04
.1250	6.295+04	6.295+04	6.295+04	6.295+04	6.295+04	6.295+04	6.295+04	6.295+04	6.295+04	6.294+04	6.294+04	6.294+04
.1667	6.331+04	6.331+04	6.331+04	6.331+04	6.331+04	6.330+04	6.330+04	6.330+04	6.330+04	6.330+04	6.330+04	6.329+04
.2083	6.363+04	6.363+04	6.363+04	6.363+04	6.363+04	6.363+04	6.363+04	6.362+04	6.362+04	6.362+04	6.362+04	6.362+04
.2500	6.392+04	6.392+04	6.392+04	6.392+04	6.392+04	6.392+04	6.391+04	6.391+04	6.391+04	6.391+04	6.391+04	6.391+04
.2917	6.417+04	6.417+04	6.417+04	6.417+04	6.417+04	6.417+04	6.417+04	6.417+04	6.417+04	6.416+04	6.416+04	6.416+04
.3333	6.439+04	6.439+04	6.439+04	6.439+04	6.439+04	6.439+04	6.439+04	6.439+04	6.439+04	6.439+04	6.438+04	6.438+04
.3750	6.458+04	6.458+04	6.458+04	6.458+04	6.458+04	6.458+04	6.458+04	6.458+04	6.458+04	6.458+04	6.458+04	6.457+04
.4167	6.475+04	6.475+04	6.475+04	6.475+04	6.475+04	6.475+04	6.475+04	6.474+04	6.474+04	6.474+04	6.474+04	6.474+04
.4583	6.489+04	6.489+04	6.489+04	6.489+04	6.489+04	6.489+04	6.489+04	6.489+04	6.489+04	6.489+04	6.488+04	6.488+04
.5000	6.501+04	6.501+04	6.501+04	6.501+04	6.501+04	6.501+04	6.501+04	6.501+04	6.501+04	6.501+04	6.501+04	6.500+04
.5417	6.512+04	6.512+04	6.512+04	6.512+04	6.512+04	6.512+04	6.512+04	6.511+04	6.511+04	6.511+04	6.511+04	6.511+04
.5833	6.521+04	6.521+04	6.521+04	6.521+04	6.521+04	6.521+04	6.521+04	6.521+04	6.521+04	6.521+04	6.520+04	6.520+04
.6250	6.529+04	6.529+04	6.529+04	6.529+04	6.529+04	6.528+04	6.528+04	6.528+04	6.528+04	6.528+04	6.528+04	6.528+04
.6667	6.535+04	6.535+04	6.535+04	6.535+04	6.535+04	6.535+04	6.535+04	6.535+04	6.535+04	6.535+04	6.534+04	6.534+04
.7083	6.541+04	6.541+04	6.541+04	6.541+04	6.541+04	6.541+04	6.541+04	6.541+04	6.541+04	6.540+04	6.540+04	6.540+04
.7500	6.546+04	6.546+04	6.546+04	6.546+04	6.546+04	6.546+04	6.546+04	6.545+04	6.545+04	6.545+04	6.545+04	6.545+04
.7917	6.550+04	6.550+04	6.550+04	6.550+04	6.550+04	6.550+04	6.550+04	6.550+04	6.550+04	6.549+04	6.549+04	6.549+04
.8333	6.554+04	6.554+04	6.554+04	6.554+04	6.554+04	6.554+04	6.553+04	6.553+04	6.553+04	6.553+04	6.553+04	6.553+04
.8750	6.557+04	6.557+04	6.557+04	6.557+04	6.557+04	6.557+04	6.557+04	6.556+04	6.556+04	6.556+04	6.556+04	6.556+04
.9167	6.560+04	6.560+04	6.560+04	6.560+04	6.560+04	6.560+04	6.559+04	6.559+04	6.559+04	6.559+04	6.559+04	6.559+04
.9583	6.562+04	6.562+04	6.562+04	6.562+04	6.562+04	6.562+04	6.562+04	6.562+04	6.562+04	6.562+04	6.561+04	6.561+04
1.0000	6.565+04	6.565+04	6.565+04	6.565+04	6.565+04	6.565+04	6.564+04	6.564+04	6.564+04	6.564+04	6.563+04	6.563+04

DIMENSIONLESS CONVECTIVE COEFFICIENT, HSTAR

	.5217	.5652	.6087	.6522	.6957	.7391	.7826	.8261	.8696	.9130	.9565	1.0000
.0000	6.175+04	6.175+04	6.174+04	6.174+04	6.174+04	6.174+04	6.174+04	6.171+04	6.166+04	6.169+04	6.172+04	1.874+02
.0417	6.217+04	6.217+04	6.216+04	6.216+04	6.216+04	6.216+04	6.215+04	6.213+04	6.212+04	6.212+04	6.214+04	1.922+02
.0833	6.256+04	6.255+04	6.255+04	6.255+04	6.254+04	6.255+04	6.255+04	6.252+04	6.251+04	6.251+04	6.254+04	1.971+02
.1250	6.294+04	6.293+04	6.293+04	6.293+04	6.292+04	6.294+04	6.294+04	6.290+04	6.288+04	6.290+04	6.294+04	2.020+02
.1667	6.329+04	6.329+04	6.329+04	6.329+04	6.328+04	6.330+04	6.331+04	6.326+04	6.324+04	6.326+04	6.331+04	2.066+02
.2083	6.362+04	6.361+04	6.361+04	6.361+04	6.361+04	6.363+04	6.364+04	6.358+04	6.356+04	6.359+04	6.364+04	2.108+02
.2500	6.391+04	6.390+04	6.390+04	6.390+04	6.390+04	6.393+04	6.393+04	6.387+04	6.385+04	6.388+04	6.394+04	2.146+02
.2917	6.416+04	6.416+04	6.416+04	6.416+04	6.416+04	6.418+04	6.419+04	6.412+04	6.410+04	6.413+04	6.420+04	2.179+02
.3333	6.438+04	6.438+04	6.438+04	6.438+04	6.438+04	6.441+04	6.441+04	6.434+04	6.432+04	6.435+04	6.442+04	2.208+02
.3750	6.457+04	6.457+04	6.457+04	6.457+04	6.457+04	6.460+04	6.460+04	6.452+04	6.451+04	6.454+04	6.461+04	2.233+02
.4167	6.474+04	6.474+04	6.474+04	6.474+04	6.474+04	6.476+04	6.476+04	6.468+04	6.467+04	6.471+04	6.477+04	2.254+02
.4583	6.488+04	6.488+04	6.488+04	6.488+04	6.488+04	6.490+04	6.490+04	6.482+04	6.481+04	6.485+04	6.491+04	2.273+02
.5000	6.500+04	6.500+04	6.500+04	6.501+04	6.501+04	6.502+04	6.502+04	6.494+04	6.493+04	6.497+04	6.503+04	2.288+02
.5417	6.511+04	6.511+04	6.511+04	6.511+04	6.511+04	6.513+04	6.512+04	6.504+04	6.503+04	6.507+04	6.514+04	2.301+02
.5833	6.520+04	6.520+04	6.520+04	6.520+04	6.520+04	6.521+04	6.520+04	6.512+04	6.512+04	6.516+04	6.522+04	2.312+02
.6250	6.528+04	6.527+04	6.527+04	6.528+04	6.528+04	6.529+04	6.527+04	6.519+04	6.519+04	6.523+04	6.530+04	2.321+02
.6667	6.534+04	6.534+04	6.534+04	6.534+04	6.534+04	6.535+04	6.534+04	6.526+04	6.525+04	6.530+04	6.536+04	2.329+02
.7083	6.540+04	6.540+04	6.539+04	6.540+04	6.540+04	6.541+04	6.539+04	6.531+04	6.531+04	6.535+04	6.542+04	2.336+02
.7500	6.545+04	6.544+04	6.544+04	6.545+04	6.544+04	6.545+04	6.544+04	6.535+04	6.535+04	6.540+04	6.546+04	2.342+02
.7917	6.549+04	6.549+04	6.548+04	6.549+04	6.549+04	6.549+04	6.547+04	6.539+04	6.539+04	6.544+04	6.550+04	2.347+02
.8333	6.553+04	6.552+04	6.552+04	6.552+04	6.552+04	6.553+04	6.551+04	6.542+04	6.543+04	6.547+04	6.554+04	2.351+02
.8750	6.556+04	6.555+04	6.555+04	6.555+04	6.555+04	6.556+04	6.554+04	6.545+04	6.546+04	6.550+04	6.557+04	2.354+02
.9167	6.558+04	6.558+04	6.558+04	6.558+04	6.558+04	6.558+04	6.556+04	6.548+04	6.548+04	6.553+04	6.560+04	2.357+02
.9583	6.561+04	6.561+04	6.560+04	6.561+04	6.560+04	6.561+04	6.558+04	6.550+04	6.550+04	6.555+04	6.562+04	2.360+02
1.0000	6.563+04	6.562+04	6.562+04	6.562+04	6.562+04	6.563+04	6.561+04	6.550+04	6.543+04	6.546+04	6.558+04	2.363+02

DIMENSIONLESS VOLUMETRIC GENERATION RATE, QSTAR

	.0000	.0435	.0870	.1304	.1739	.2174	.2609	.3043	.3476	.3913	.4348	.4783
.0000	1.232+06	1.232+06	1.232+06	1.231+06	1.229+06	1.227+06	1.225+06	1.222+06	1.219+06	1.215+06	1.210+06	1.203+06
.0417	1.347+06	1.347+06	1.347+06	1.346+06	1.345+06	1.343+06	1.342+06	1.340+06	1.337+06	1.334+06	1.331+06	1.327+06
.0833	1.463+06	1.463+06	1.462+06	1.462+06	1.461+06	1.460+06	1.458+06	1.457+06	1.455+06	1.453+06	1.451+06	1.449+06
.1250	1.504+06	1.504+06	1.503+06	1.503+06	1.502+06	1.501+06	1.500+06	1.499+06	1.496+06	1.496+06	1.496+06	1.494+06
.1667	1.471+06	1.471+06	1.471+06	1.471+06	1.470+06	1.469+06	1.469+06	1.468+06	1.467+06	1.466+06	1.466+06	1.466+06
.2083	1.387+06	1.387+06	1.387+06	1.386+06	1.386+06	1.386+06	1.385+06	1.384+06	1.384+06	1.383+06	1.384+06	1.384+06
.2500	1.274+06	1.274+06	1.274+06	1.274+06	1.274+06	1.273+06	1.273+06	1.273+06	1.272+06	1.272+06	1.273+06	1.273+06
.2917	1.148+06	1.148+06	1.148+06	1.148+06	1.147+06	1.147+06	1.147+06	1.147+06	1.147+06	1.147+06	1.147+06	1.148+06
.3333	1.020+06	1.020+06	1.020+06	1.020+06	1.020+06	1.020+06	1.019+06	1.019+06	1.019+06	1.019+06	1.020+06	1.021+06
.3750	8.971+05	8.970+05	8.970+05	8.969+05	8.969+05	8.968+05	8.967+05	8.967+05	8.967+05	8.968+05	8.973+05	8.977+05
.4167	7.829+05	7.829+05	7.829+05	7.828+05	7.828+05	7.827+05	7.827+05	7.827+05	7.827+05	7.828+05	7.831+05	7.834+05
.4583	6.806+05	6.806+05	6.806+05	6.806+05	6.805+05	6.805+05	6.804+05	6.804+05	6.804+05	6.804+05	6.806+05	6.807+05
.5000	5.889+05	5.889+05	5.889+05	5.888+05	5.888+05	5.888+05	5.887+05	5.887+05	5.886+05	5.886+05	5.886+05	5.885+05
.5417	5.080+05	5.080+05	5.080+05	5.080+05	5.079+05	5.079+05	5.078+05	5.077+05	5.076+05	5.075+05	5.074+05	5.072+05
.5833	4.371+05	4.371+05	4.371+05	4.370+05	4.370+05	4.369+05	4.368+05	4.367+05	4.366+05	4.364+05	4.361+05	4.358+05
.6250	3.766+05	3.765+05	3.765+05	3.765+05	3.764+05	3.763+05	3.762+05	3.761+05	3.759+05	3.756+05	3.753+05	3.749+05
.6667	3.242+05	3.242+05	3.242+05	3.241+05	3.240+05	3.239+05	3.238+05	3.236+05	3.234+05	3.231+05	3.228+05	3.223+05
.7083	2.791+05	2.790+05	2.790+05	2.789+05	2.789+05	2.787+05	2.786+05	2.784+05	2.781+05	2.778+05	2.774+05	2.769+05
.7500	2.402+05	2.401+05	2.401+05	2.400+05	2.399+05	2.398+05	2.396+05	2.394+05	2.392+05	2.388+05	2.384+05	2.378+05
.7917	2.077+05	2.077+05	2.077+05	2.076+05	2.075+05	2.074+05	2.072+05	2.070+05	2.067+05	2.063+05	2.058+05	2.052+05
.8333	1.800+05	1.800+05	1.800+05	1.799+05	1.798+05	1.796+05	1.795+05	1.792+05	1.789+05	1.786+05	1.781+05	1.775+05
.8750	1.566+05	1.565+05	1.565+05	1.564+05	1.563+05	1.562+05	1.560+05	1.556+05	1.553+05	1.551+05	1.546+05	1.540+05
.9167	1.375+05	1.375+05	1.374+05	1.374+05	1.373+05	1.371+05	1.369+05	1.367+05	1.364+05	1.360+05	1.355+05	1.349+05
.9583	1.277+05	1.276+05	1.276+05	1.275+05	1.274+05	1.273+05	1.271+05	1.268+05	1.265+05	1.261+05	1.256+05	1.250+05
1.0000	1.286+05	1.285+05	1.285+05	1.284+05	1.283+05	1.281+05	1.279+05	1.276+05	1.273+05	1.269+05	1.263+05	1.256+05

DIMENSIONLESS VOLUMETRIC GENERATION RATE, QSTAR

	.5217	.5652	.6087	.6522	.6957	.7391	.7826	.8261	.8696	.9130	.9565	1.0000
.0000	1.195+06	1.186+06	1.175+06	1.159+06	1.141+06	1.119+06	1.089+06	1.084+06	1.064+06	9.828+05	9.079+05	8.342+05
.0417	1.322+06	1.316+06	1.310+06	1.301+06	1.291+06	1.282+06	1.267+06	1.290+06	1.294+06	1.217+06	1.170+06	1.128+06
.0833	1.446+06	1.442+06	1.440+06	1.436+06	1.432+06	1.433+06	1.430+06	1.468+06	1.487+06	1.414+06	1.385+06	1.365+06
.1250	1.493+06	1.491+06	1.491+06	1.490+06	1.490+06	1.496+06	1.499+06	1.540+06	1.560+06	1.492+06	1.476+06	1.469+06
.1667	1.465+06	1.465+06	1.466+06	1.467+06	1.469+06	1.478+06	1.485+06	1.520+06	1.536+06	1.475+06	1.469+06	1.472+06
.2083	1.384+06	1.385+06	1.387+06	1.389+06	1.392+06	1.402+06	1.409+06	1.436+06	1.445+06	1.391+06	1.392+06	1.402+06
.2500	1.274+06	1.275+06	1.277+06	1.279+06	1.282+06	1.292+06	1.299+06	1.316+06	1.317+06	1.271+06	1.276+06	1.290+06
.2917	1.148+06	1.149+06	1.151+06	1.154+06	1.156+06	1.164+06	1.170+06	1.178+06	1.173+06	1.133+06	1.140+06	1.157+06
.3333	1.021+06	1.022+06	1.024+06	1.025+06	1.027+06	1.034+06	1.038+06	1.039+06	1.029+06	9.938+05	1.002+06	1.019+06
.3750	8.982+05	8.988+05	8.999+05	9.010+05	9.019+05	9.073+05	9.102+05	9.058+05	8.921+05	8.623+05	8.710+05	8.866+05
.4167	7.836+05	7.846+05	7.846+05	7.851+05	7.853+05	7.893+05	7.908+05	7.824+05	7.664+05	7.409+05	7.490+05	7.631+05
.4583	6.808+05	6.809+05	6.810+05	6.816+05	6.805+05	6.834+05	6.838+05	6.733+05	6.566+05	6.346+05	6.418+05	6.542+05
.5000	5.884+05	5.883+05	5.881+05	5.876+05	5.866+05	5.885+05	5.881+05	5.765+05	5.596+05	5.409+05	5.471+05	5.578+05
.5417	5.069+05	5.065+05	5.061+05	5.052+05	5.038+05	5.050+05	5.039+05	4.919+05	4.756+05	4.594+05	4.646+05	4.736+05
.5833	4.354+05	4.349+05	4.342+05	4.330+05	4.314+05	4.319+05	4.304+05	4.185+05	4.032+05	3.892+05	3.935+05	4.010+05
.6250	3.744+05	3.737+05	3.729+05	3.716+05	3.697+05	3.699+05	3.680+05	3.566+05	3.424+05	3.304+05	3.338+05	3.400+05
.6667	3.217+05	3.209+05	3.200+05	3.185+05	3.166+05	3.164+05	3.143+05	3.036+05	2.907+05	2.802+05	2.829+05	2.880+05
.7083	2.762+05	2.753+05	2.743+05	2.728+05	2.709+05	2.704+05	2.682+05	2.583+05	2.465+05	2.374+05	2.395+05	2.436+05
.7500	2.371+05	2.362+05	2.351+05	2.336+05	2.316+05	2.309+05	2.287+05	2.197+05	2.091+05	2.011+05	2.026+05	2.058+05
.7917	2.045+05	2.036+05	2.025+05	2.010+05	1.990+05	1.982+05	1.960+05	1.877+05	1.781+05	1.711+05	1.721+05	1.746+05
.8333	1.767+05	1.758+05	1.747+05	1.732+05	1.713+05	1.703+05	1.681+05	1.605+05	1.518+05	1.456+05	1.461+05	1.478+05
.8750	1.532+05	1.523+05	1.513+05	1.497+05	1.479+05	1.468+05	1.446+05	1.376+05	1.297+05	1.240+05	1.240+05	1.250+05
.9167	1.342+05	1.333+05	1.322+05	1.307+05	1.289+05	1.277+05	1.254+05	1.189+05	1.116+05	1.062+05	1.054+05	1.055+05
.9583	1.243+05	1.233+05	1.222+05	1.207+05	1.188+05	1.175+05	1.149+05	1.084+05	1.010+05	9.528+04	9.284+04	9.098+04
1.0000	1.248+05	1.238+05	1.226+05	1.209+05	1.188+05	1.172+05	1.142+05	1.068+05	9.853+04	9.178+04	8.649+04	8.146+04

DIMENSIONLESS EFFECTIVE SOLID PHASE THERMAL CONDUCTIVITY, KS

	.0000	.0435	.0870	.1304	.1739	.2174	.2609	.3043	.3478	.3913	.4348	.4783
.0000	1.623+01	1.623+01	1.623+01	1.623+01	1.623+01	1.623+01	1.622+01	1.622+01	1.622+01	1.621+01	1.621+01	1.620+01
.0417	1.753+01	1.753+01	1.753+01	1.753+01	1.752+01	1.752+01	1.752+01	1.751+01	1.751+01	1.750+01	1.750+01	1.749+01
.0833	1.807+01	1.807+01	1.807+01	1.807+01	1.806+01	1.806+01	1.806+01	1.805+01	1.805+01	1.804+01	1.803+01	1.803+01
.1250	1.881+01	1.881+01	1.881+01	1.881+01	1.881+01	1.881+01	1.880+01	1.880+01	1.879+01	1.878+01	1.877+01	1.876+01
.1667	1.975+01	1.975+01	1.975+01	1.975+01	1.975+01	1.975+01	1.974+01	1.973+01	1.973+01	1.972+01	1.971+01	1.970+01
.2083	2.074+01	2.074+01	2.074+01	2.074+01	2.073+01	2.073+01	2.072+01	2.071+01	2.071+01	2.070+01	2.069+01	2.068+01
.2500	2.171+01	2.171+01	2.171+01	2.171+01	2.170+01	2.170+01	2.169+01	2.168+01	2.167+01	2.166+01	2.166+01	2.165+01
.2917	2.260+01	2.260+01	2.260+01	2.260+01	2.259+01	2.259+01	2.258+01	2.257+01	2.256+01	2.255+01	2.255+01	2.254+01
.3333	2.341+01	2.341+01	2.340+01	2.340+01	2.340+01	2.339+01	2.338+01	2.337+01	2.336+01	2.335+01	2.335+01	2.334+01
.3750	2.412+01	2.412+01	2.412+01	2.411+01	2.411+01	2.410+01	2.409+01	2.408+01	2.407+01	2.406+01	2.406+01	2.405+01
.4167	2.475+01	2.475+01	2.475+01	2.474+01	2.474+01	2.473+01	2.472+01	2.472+01	2.471+01	2.470+01	2.469+01	2.468+01
.4583	2.530+01	2.530+01	2.530+01	2.530+01	2.529+01	2.529+01	2.528+01	2.527+01	2.526+01	2.525+01	2.525+01	2.524+01
.5000	2.579+01	2.579+01	2.578+01	2.578+01	2.577+01	2.577+01	2.576+01	2.575+01	2.574+01	2.573+01	2.572+01	2.571+01
.5417	2.620+01	2.620+01	2.620+01	2.620+01	2.619+01	2.618+01	2.617+01	2.617+01	2.615+01	2.614+01	2.614+01	2.613+01
.5833	2.657+01	2.657+01	2.657+01	2.656+01	2.656+01	2.655+01	2.654+01	2.653+01	2.652+01	2.651+01	2.650+01	2.649+01
.6250	2.689+01	2.689+01	2.688+01	2.688+01	2.687+01	2.686+01	2.686+01	2.685+01	2.683+01	2.682+01	2.682+01	2.681+01
.6667	2.716+01	2.716+01	2.716+01	2.715+01	2.715+01	2.714+01	2.713+01	2.712+01	2.711+01	2.710+01	2.709+01	2.708+01
.7083	2.740+01	2.740+01	2.739+01	2.739+01	2.738+01	2.738+01	2.737+01	2.735+01	2.734+01	2.733+01	2.732+01	2.731+01
.7500	2.760+01	2.760+01	2.760+01	2.760+01	2.759+01	2.758+01	2.757+01	2.756+01	2.755+01	2.754+01	2.753+01	2.751+01
.7917	2.779+01	2.779+01	2.778+01	2.778+01	2.777+01	2.776+01	2.775+01	2.774+01	2.773+01	2.771+01	2.771+01	2.769+01
.8333	2.794+01	2.794+01	2.794+01	2.794+01	2.793+01	2.792+01	2.791+01	2.790+01	2.789+01	2.787+01	2.786+01	2.785+01
.8750	2.808+01	2.808+01	2.808+01	2.808+01	2.807+01	2.806+01	2.805+01	2.804+01	2.802+01	2.801+01	2.800+01	2.796+01
.9167	2.821+01	2.821+01	2.820+01	2.820+01	2.819+01	2.818+01	2.817+01	2.816+01	2.815+01	2.813+01	2.812+01	2.810+01
.9583	2.834+01	2.834+01	2.833+01	2.833+01	2.832+01	2.831+01	2.830+01	2.829+01	2.827+01	2.826+01	2.825+01	2.823+01
1.0000	2.847+01	2.847+01	2.847+01	2.846+01	2.845+01	2.844+01	2.843+01	2.842+01	2.840+01	2.839+01	2.838+01	2.836+01

DIMENSIONLESS EFFECTIVE SOLID PHASE THERMAL CONDUCTIVITY, K5

	.5217	.5652	.6087	.6522	.6957	.7391	.7826	.8261	.8696	.9130	.9565	1.0000
.0000	1.619+01	1.618+01	1.617+01	1.615+01	1.614+01	1.611+01	1.608+01	1.607+01	1.605+01	1.597+01	1.591+01	1.594+01
.0017	1.748+01	1.747+01	1.745+01	1.744+01	1.742+01	1.740+01	1.738+01	1.741+01	1.743+01	1.730+01	1.728+01	1.739+01
.0033	1.801+01	1.800+01	1.799+01	1.798+01	1.796+01	1.795+01	1.793+01	1.803+01	1.809+01	1.791+01	1.794+01	1.810+01
.01250	1.875+01	1.874+01	1.873+01	1.871+01	1.870+01	1.870+01	1.868+01	1.883+01	1.890+01	1.864+01	1.866+01	1.881+01
.1667	1.968+01	1.967+01	1.966+01	1.965+01	1.964+01	1.965+01	1.964+01	1.982+01	1.990+01	1.956+01	1.955+01	1.968+01
.2083	2.067+01	2.066+01	2.065+01	2.064+01	2.063+01	2.065+01	2.065+01	2.085+01	2.093+01	2.053+01	2.049+01	2.059+01
.2500	2.163+01	2.162+01	2.162+01	2.161+01	2.160+01	2.163+01	2.164+01	2.185+01	2.191+01	2.146+01	2.141+01	2.150+01
.2917	2.253+01	2.252+01	2.251+01	2.251+01	2.250+01	2.253+01	2.255+01	2.276+01	2.280+01	2.231+01	2.226+01	2.234+01
.3333	2.333+01	2.332+01	2.332+01	2.331+01	2.330+01	2.334+01	2.336+01	2.356+01	2.359+01	2.306+01	2.302+01	2.310+01
.3750	2.404+01	2.403+01	2.403+01	2.402+01	2.401+01	2.406+01	2.408+01	2.427+01	2.426+01	2.371+01	2.368+01	2.376+01
.4167	2.467+01	2.466+01	2.466+01	2.465+01	2.464+01	2.469+01	2.471+01	2.489+01	2.487+01	2.428+01	2.425+01	2.434+01
.4583	2.522+01	2.521+01	2.521+01	2.520+01	2.519+01	2.524+01	2.526+01	2.542+01	2.539+01	2.477+01	2.475+01	2.485+01
.5000	2.570+01	2.569+01	2.569+01	2.567+01	2.566+01	2.571+01	2.573+01	2.588+01	2.583+01	2.519+01	2.518+01	2.528+01
.5417	2.611+01	2.610+01	2.610+01	2.608+01	2.607+01	2.612+01	2.614+01	2.628+01	2.621+01	2.555+01	2.555+01	2.565+01
.5833	2.648+01	2.646+01	2.646+01	2.644+01	2.643+01	2.648+01	2.649+01	2.662+01	2.653+01	2.586+01	2.586+01	2.596+01
.6250	2.679+01	2.677+01	2.677+01	2.675+01	2.673+01	2.678+01	2.679+01	2.691+01	2.681+01	2.612+01	2.613+01	2.623+01
.6667	2.706+01	2.704+01	2.704+01	2.702+01	2.700+01	2.705+01	2.705+01	2.716+01	2.705+01	2.635+01	2.636+01	2.647+01
.7083	2.729+01	2.727+01	2.727+01	2.725+01	2.722+01	2.727+01	2.728+01	2.737+01	2.725+01	2.654+01	2.655+01	2.666+01
.7500	2.750+01	2.748+01	2.747+01	2.744+01	2.742+01	2.747+01	2.747+01	2.756+01	2.742+01	2.670+01	2.672+01	2.683+01
.7917	2.767+01	2.765+01	2.764+01	2.762+01	2.759+01	2.764+01	2.763+01	2.772+01	2.757+01	2.684+01	2.686+01	2.698+01
.8333	2.783+01	2.780+01	2.779+01	2.777+01	2.774+01	2.778+01	2.778+01	2.785+01	2.770+01	2.696+01	2.698+01	2.710+01
.8750	2.796+01	2.794+01	2.792+01	2.790+01	2.786+01	2.791+01	2.790+01	2.797+01	2.781+01	2.707+01	2.708+01	2.720+01
.9167	2.808+01	2.806+01	2.804+01	2.801+01	2.798+01	2.802+01	2.801+01	2.807+01	2.790+01	2.716+01	2.717+01	2.729+01
.9583	2.821+01	2.818+01	2.816+01	2.813+01	2.810+01	2.814+01	2.812+01	2.818+01	2.799+01	2.725+01	2.725+01	2.738+01
1.0000	2.833+01	2.831+01	2.829+01	2.826+01	2.822+01	2.826+01	2.824+01	2.828+01	2.809+01	2.734+01	2.734+01	2.746+01

DIMENSIONLESS EFFECTIVE FLUID PHASE THERMAL CONDUCTIVITY (RADIAL), KFR

	.0000	.0435	.0870	.1304	.1739	.2174	.2609	.3043	.3478	.3913	.4348	.4783
.0000	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03
.0417	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03
.0833	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03
.1250	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03
.1667	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03
.2083	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03
.2500	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03
.2917	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03
.3333	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03
.3750	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03
.4167	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03
.4583	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03
.5000	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03
.5417	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03
.5833	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03
.6250	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03
.6667	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03
.7083	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03
.7500	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03
.7917	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03
.8333	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03
.8750	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03
.9167	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03
.9583	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03
1.0000	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03

DIMENSIONLESS EFFECTIVE FLUID PHASE THERMAL CONDUCTIVITY (RADIAL), KFR

	.5217	.5652	.6087	.6522	.6957	.7391	.7826	.8261	.8696	.9130	.9565	1.0000
.0000	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.740+03	1.739+03	1.736+03	1.739+03	1.741+03	3.957-01
.0417	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.740+03	1.739+03	1.738+03	1.740+03	1.742+03	4.060-01
.0833	1.739+03	1.739+03	1.739+03	1.739+03	1.739+03	1.740+03	1.740+03	1.738+03	1.737+03	1.740+03	1.742+03	4.162-01
.1250	1.739+03	1.739+03	1.739+03	1.740+03	1.740+03	1.740+03	1.740+03	1.738+03	1.737+03	1.740+03	1.743+03	4.265-01
.1667	1.739+03	1.739+03	1.739+03	1.740+03	1.740+03	1.740+03	1.741+03	1.738+03	1.736+03	1.740+03	1.743+03	4.363-01
.2083	1.739+03	1.740+03	1.739+03	1.740+03	1.740+03	1.740+03	1.741+03	1.737+03	1.736+03	1.740+03	1.743+03	4.452-01
.2500	1.739+03	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.741+03	1.737+03	1.736+03	1.740+03	1.744+03	4.533-01
.2917	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.736+03	1.735+03	1.740+03	1.744+03	4.603-01
.3333	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.736+03	1.735+03	1.741+03	1.744+03	4.664-01
.3750	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.736+03	1.735+03	1.741+03	1.744+03	4.716-01
.4167	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.736+03	1.736+03	1.741+03	1.744+03	4.761-01
.4583	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.736+03	1.736+03	1.741+03	1.745+03	4.799-01
.5000	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.736+03	1.736+03	1.742+03	1.745+03	4.832-01
.5417	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.736+03	1.736+03	1.742+03	1.745+03	4.859-01
.5833	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.739+03	1.736+03	1.742+03	1.745+03	4.883-01
.6250	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.739+03	1.736+03	1.742+03	1.746+03	4.903-01
.6667	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.739+03	1.736+03	1.743+03	1.746+03	4.920-01
.7083	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.739+03	1.736+03	1.743+03	1.746+03	4.934-01
.7500	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.739+03	1.736+03	1.743+03	1.746+03	4.946-01
.7917	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.739+03	1.736+03	1.743+03	1.746+03	4.956-01
.8333	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.739+03	1.736+03	1.743+03	1.747+03	4.965-01
.8750	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.739+03	1.736+03	1.744+03	1.747+03	4.972-01
.9167	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.739+03	1.736+03	1.744+03	1.747+03	4.978-01
.9583	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.740+03	1.739+03	1.736+03	1.744+03	1.747+03	4.984-01
1.0000	1.739+03	1.739+03	1.739+03	1.739+03	1.740+03	1.740+03	1.740+03	1.739+03	1.735+03	1.734+03	1.745+03	4.989-01

DIMENSIONLESS EFFECTIVE FLUID PHASE THERMAL CONDUCTIVITY (AXIAL), K/FZ

	.0000	.0435	.0870	.1304	.1739	.2174	.2609	.3043	.3476	.3913	.4348	.4783
.0000	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.694+03	8.694+03	8.694+03	8.694+03	8.694+03	8.694+03
.0417	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03
.0833	8.694+03	8.694+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03
.1250	8.694+03	8.694+03	8.694+03	8.694+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03
.1667	8.694+03	8.694+03	8.694+03	8.694+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03
.2083	8.694+03	8.694+03	8.694+03	8.694+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03
.2500	8.694+03	8.694+03	8.694+03	8.694+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03
.2917	8.694+03	8.694+03	8.694+03	8.694+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03
.3333	8.694+03	8.694+03	8.694+03	8.694+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03
.3750	8.694+03	8.694+03	8.694+03	8.694+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03
.4167	8.694+03	8.694+03	8.694+03	8.694+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03
.4583	8.694+03	8.694+03	8.694+03	8.694+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03
.5000	8.694+03	8.694+03	8.694+03	8.694+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03
.5417	8.694+03	8.694+03	8.694+03	8.694+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03
.5833	8.694+03	8.694+03	8.694+03	8.694+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03
.6250	8.694+03	8.694+03	8.694+03	8.694+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03
.6667	8.694+03	8.694+03	8.694+03	8.694+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03
.7083	8.694+03	8.694+03	8.694+03	8.694+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03
.7500	8.694+03	8.694+03	8.694+03	8.694+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03
.7917	8.694+03	8.694+03	8.694+03	8.694+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03
.8333	8.694+03	8.694+03	8.694+03	8.694+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03
.8750	8.694+03	8.694+03	8.694+03	8.694+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03
.9167	8.694+03	8.694+03	8.694+03	8.694+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03
.9583	8.694+03	8.694+03	8.694+03	8.694+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03	8.695+03
1.0000	8.694+03	8.694+03	8.694+03	8.694+03	8.694+03	8.694+03	8.694+03	8.694+03	8.694+03	8.694+03	8.694+03	8.694+03

DIMENSIONLESS EFFECTIVE FLUID PHASE THERMAL CONDUCTIVITY (AXIAL), KFZ

	.5217	.5652	.6087	.6522	.6957	.7391	.7826	.8261	.8696	.9130	.9565	1.0000
.0000	8.694+03	8.694+03	8.694+03	8.694+03	8.694+03	8.695+03	8.697+03	8.692+03	8.687+03	8.693+03	8.701+03	3.957-01
.0417	8.695+03	8.695+03	8.695+03	8.695+03	8.696+03	8.697+03	8.698+03	8.693+03	8.688+03	8.698+03	8.706+03	4.060-01
.0833	8.695+03	8.695+03	8.695+03	8.695+03	8.696+03	8.696+03	8.698+03	8.691+03	8.686+03	8.698+03	8.710+03	4.162-01
.1250	8.695+03	8.695+03	8.695+03	8.695+03	8.696+03	8.696+03	8.699+03	8.701+03	8.688+03	8.688+03	8.712+03	4.265-01
.1667	8.695+03	8.696+03	8.696+03	8.696+03	8.696+03	8.696+03	8.701+03	8.686+03	8.679+03	8.698+03	8.714+03	4.363-01
.2083	8.696+03	8.696+03	8.696+03	8.696+03	8.697+03	8.697+03	8.700+03	8.684+03	8.677+03	8.699+03	8.715+03	4.452-01
.2500	8.696+03	8.696+03	8.696+03	8.696+03	8.697+03	8.697+03	8.701+03	8.682+03	8.676+03	8.699+03	8.716+03	4.533-01
.2917	8.696+03	8.696+03	8.696+03	8.696+03	8.697+03	8.697+03	8.700+03	8.680+03	8.675+03	8.700+03	8.717+03	4.603-01
.3333	8.696+03	8.696+03	8.696+03	8.696+03	8.697+03	8.697+03	8.700+03	8.679+03	8.675+03	8.701+03	8.718+03	4.664-01
.3750	8.696+03	8.696+03	8.696+03	8.696+03	8.697+03	8.697+03	8.700+03	8.678+03	8.675+03	8.703+03	8.719+03	4.716-01
.4167	8.696+03	8.696+03	8.696+03	8.696+03	8.697+03	8.697+03	8.700+03	8.678+03	8.676+03	8.704+03	8.720+03	4.761-01
.4583	8.696+03	8.696+03	8.696+03	8.696+03	8.697+03	8.697+03	8.699+03	8.677+03	8.676+03	8.705+03	8.721+03	4.799-01
.5000	8.696+03	8.696+03	8.696+03	8.696+03	8.697+03	8.697+03	8.699+03	8.677+03	8.677+03	8.707+03	8.722+03	4.832-01
.5417	8.696+03	8.696+03	8.696+03	8.696+03	8.697+03	8.697+03	8.698+03	8.676+03	8.676+03	8.708+03	8.723+03	4.859-01
.5833	8.696+03	8.696+03	8.696+03	8.696+03	8.697+03	8.697+03	8.698+03	8.676+03	8.676+03	8.709+03	8.725+03	4.883-01
.6250	8.696+03	8.696+03	8.696+03	8.696+03	8.697+03	8.697+03	8.698+03	8.676+03	8.679+03	8.710+03	8.726+03	4.903-01
.6667	8.696+03	8.696+03	8.696+03	8.696+03	8.697+03	8.697+03	8.698+03	8.676+03	8.680+03	8.712+03	8.727+03	4.920-01
.7083	8.696+03	8.696+03	8.696+03	8.696+03	8.697+03	8.698+03	8.698+03	8.676+03	8.680+03	8.713+03	8.728+03	4.934-01
.7500	8.696+03	8.696+03	8.696+03	8.696+03	8.697+03	8.698+03	8.698+03	8.676+03	8.681+03	8.713+03	8.729+03	4.946-01
.7917	8.696+03	8.696+03	8.696+03	8.696+03	8.697+03	8.698+03	8.698+03	8.676+03	8.682+03	8.714+03	8.730+03	4.956-01
.8333	8.696+03	8.696+03	8.696+03	8.696+03	8.697+03	8.698+03	8.698+03	8.677+03	8.682+03	8.715+03	8.731+03	4.965-01
.8750	8.696+03	8.696+03	8.696+03	8.696+03	8.697+03	8.698+03	8.697+03	8.677+03	8.683+03	8.716+03	8.731+03	4.972-01
.9167	8.696+03	8.696+03	8.696+03	8.696+03	8.697+03	8.698+03	8.697+03	8.677+03	8.683+03	8.717+03	8.732+03	4.978-01
.9583	8.696+03	8.696+03	8.696+03	8.696+03	8.697+03	8.698+03	8.697+03	8.677+03	8.683+03	8.717+03	8.733+03	4.984-01
1.0000	8.694+03	8.694+03	8.694+03	8.695+03	8.697+03	8.697+03	8.694+03	8.673+03	8.666+03	8.697+03	8.722+03	4.989-01

KUGEL RUN AT 09:08:02

ON 15 JAN 81 WITH ABSOLUTE ELEMENT MAP

CREATED ON 160064 AT 000000

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FUELED REGION THERMAL CONDUCTIVITY (W/M-K)

	.0000	.0435	.0870	.1304	.1739	.2174	.2609	.3043	.3478	.3913	.4348	.4783	.5217	.5652	.6087
.0000	34.1	34.1	34.1	34.1	34.1	34.1	34.1	34.1	34.1	34.2	34.2	34.2	34.2	34.2	34.3
.0417	32.5	32.5	32.5	32.5	32.5	32.5	32.6	32.6	32.6	32.6	32.6	32.6	32.7	32.7	32.8
.0833	25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.8	25.8	25.8	25.8	25.9
.1250	21.7	21.7	21.7	21.7	21.8	21.8	21.8	21.8	21.8	21.8	21.8	21.8	21.8	21.8	21.8
.1667	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9
.2083	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	19.0	19.0	19.0	19.0	19.0	19.0	19.0
.2500	18.4	18.4	18.4	18.4	18.4	18.4	18.4	18.4	18.4	18.4	18.4	18.4	18.4	18.4	18.4
.2917	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
.3333	17.7	17.7	17.7	17.7	17.7	17.7	17.7	17.7	17.7	17.7	17.7	17.7	17.7	17.8	17.8
.3750	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
.4167	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3
.4583	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1
.5000	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9
.5417	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8
.5833	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7
.6250	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6
.6667	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5
.7083	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4
.7500	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3
.7917	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3
.8333	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2
.8750	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2
.9167	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1
.9583	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1
1.0000	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1

KUGEL RUN AT 09:08:02

ON 15 JAN 81 WITH ABSOLUTE ELEMENT MAP

CREATED ON 060064 AT 060000

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FUELED REGION THERMAL CONDUCTIVITY (W/M-K)

	.6522	.6957	.7391	.7826	.8261	.8696	.9131	.9565	1.0000
.0000	34.3	34.3	34.4	34.5	34.5	34.5	34.8	35.2	35.5
.0417	32.8	32.9	32.9	33.0	33.0	33.2	33.7	34.8	35.9
.0833	25.9	26.0	26.0	26.1	26.1	26.2	26.7	27.9	29.2
.1250	21.9	21.9	21.9	21.9	21.9	22.0	22.3	23.2	24.2
.1667	19.9	19.9	20.0	20.0	20.0	20.1	20.2	20.8	21.5
.2083	19.0	19.0	19.0	19.0	19.0	19.1	19.1	19.6	20.1
.2500	18.4	18.4	18.4	18.4	18.4	18.5	18.5	18.9	19.3
.2917	18.0	18.0	18.1	18.1	18.1	18.1	18.1	18.4	18.8
.3333	17.8	17.8	17.8	17.8	17.8	17.8	17.8	18.1	18.4
.3750	17.5	17.5	17.5	17.5	17.5	17.5	17.6	17.9	18.2
.4167	17.3	17.3	17.3	17.3	17.3	17.3	17.4	17.7	18.0
.4583	17.1	17.1	17.1	17.1	17.1	17.1	17.2	17.5	17.8
.5000	16.9	16.9	16.9	16.9	17.0	17.0	17.1	17.3	17.7
.5417	16.8	16.8	16.8	16.8	16.8	16.8	16.9	17.2	17.6
.5833	16.7	16.7	16.7	16.7	16.7	16.7	16.8	17.1	17.4
.6250	16.6	16.6	16.6	16.6	16.6	16.6	16.7	17.1	17.4
.6667	16.5	16.5	16.5	16.5	16.5	16.5	16.6	16.9	17.3
.7083	16.4	16.4	16.4	16.4	16.4	16.4	16.5	16.9	17.2
.7500	16.3	16.3	16.3	16.3	16.3	16.4	16.5	16.8	17.2
.7917	16.3	16.3	16.3	16.3	16.3	16.3	16.4	16.8	17.1
.8333	16.2	16.2	16.2	16.2	16.2	16.3	16.4	16.7	17.1
.8750	16.2	16.2	16.2	16.2	16.2	16.2	16.3	16.7	17.1
.9167	16.1	16.1	16.1	16.1	16.2	16.2	16.3	16.6	17.0
.9583	16.1	16.1	16.1	16.1	16.1	16.2	16.3	16.6	17.0
1.0000	16.1	16.1	16.1	16.1	16.1	16.2	16.2	16.6	17.0

B-90

NON-FUELED REGION THERMAL CONDUCTIVITY (W/M-K)

	.0000	.0435	.0870	.1304	.1739	.2174	.2609	.3043	.3478	.3913	.4348	.4783	.5217	.5652	.6087
.0000	35.2	35.2	35.2	35.2	35.2	35.2	35.2	35.2	35.3	35.3	35.3	35.3	35.3	35.3	35.4
.0417	31.9	31.9	31.9	31.9	31.9	32.0	32.0	32.0	32.0	32.0	32.0	32.1	32.1	32.1	32.2
.0833	24.4	24.4	24.4	24.4	24.4	24.4	24.4	24.4	24.4	24.4	24.5	24.5	24.5	24.5	24.6
.1250	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.4	20.4	20.4	20.4	20.4	20.4
.1667	18.5	18.5	18.5	18.5	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6
.2083	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8
.2500	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.4	17.4	17.4	17.4	17.4	17.4	17.4
.2917	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1
.3333	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9
.3750	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8
.4167	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6
.4583	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5
.5000	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4
.5417	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3
.5833	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2
.6250	16.1	16.1	16.1	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2
.6667	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1
.7083	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
.7500	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
.7917	15.9	15.9	15.9	15.9	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
.8333	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9
.8750	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9
.9167	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9
.9583	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8
1.0000	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8

KUGEL RUN AT 09:08:02

ON 15 JAN 81 WITH ABSOLUTE ELEMENT MAP

CREATED ON 060064 AT 000000

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NON-FUELED REGION THERMAL CONDUCTIVITY (W/M-K)

	.6522	.6957	.7391	.7826	.8261	.8696	.9131	.9565	1.0000
.0000	35.4	35.4	35.5	35.5	35.5	35.6	35.8	36.1	36.4
.0417	32.3	32.3	32.4	32.5	32.5	32.7	33.3	34.4	35.6
.0833	24.6	24.7	24.7	24.8	24.8	24.9	25.5	26.8	28.2
.1250	20.5	20.5	20.5	20.5	20.5	20.6	21.9	21.9	22.9
.1667	18.6	18.6	18.6	18.6	18.6	18.7	18.9	19.5	20.1
.2083	17.8	17.8	17.8	17.8	17.8	17.8	17.9	18.3	18.8
.2500	17.4	17.4	17.4	17.4	17.4	17.4	17.5	17.8	18.1
.2917	17.1	17.1	17.1	17.1	17.1	17.2	17.2	17.5	17.8
.3333	16.9	16.9	16.9	16.9	16.9	17.0	17.2	17.2	17.5
.3750	16.8	16.8	16.8	16.8	16.8	16.8	16.8	17.1	17.4
.4167	16.6	16.6	16.6	16.6	16.6	16.7	16.7	17.3	17.3
.4583	16.5	16.5	16.5	16.5	16.5	16.5	16.6	16.9	17.2
.5000	16.4	16.4	16.4	16.4	16.4	16.4	16.5	16.8	17.1
.5417	16.3	16.3	16.3	16.3	16.3	16.3	16.4	16.7	17.0
.5833	16.2	16.2	16.2	16.2	16.2	16.3	16.3	16.6	17.0
.6250	16.2	16.2	16.2	16.1	16.2	16.2	16.3	16.6	16.9
.6667	16.1	16.1	16.1	16.1	16.1	16.1	16.2	16.5	16.9
.7083	16.0	16.0	16.0	16.0	16.1	16.1	16.2	16.5	16.8
.7500	16.0	16.0	16.0	16.0	16.0	16.1	16.1	16.4	16.8
.7917	16.0	16.0	16.0	16.0	16.0	16.0	16.1	16.4	16.8
.8333	15.9	15.9	15.9	15.9	15.9	16.0	16.1	16.4	16.8
.8750	15.9	15.9	15.9	15.9	15.9	16.0	16.0	16.4	16.7
.9167	15.9	15.9	15.9	15.9	15.9	15.9	16.0	16.3	16.7
.9583	15.8	15.8	15.8	15.8	15.9	15.9	16.0	16.3	16.7
1.0000	15.8	15.8	15.8	15.8	15.9	15.9	16.0	16.3	16.7

RUGEL RUN AT 09:08:02

ON 15 JAN 81 WITH ABSOLUTE ELEMENT MAP

CREATED ON 060864 AT 000000

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COOLANT BULK TEMPERATURE (K)

	.0000	.0435	.0870	.1304	.1739	.2174	.2609	.3043	.3478	.3913	.4346	.4783	.5217	.5652	.6087
.0000	781.2	781.2	781.2	781.2	781.2	781.2	781.2	781.2	781.2	781.2	781.2	781.1	781.1	781.1	781.1
.0417	809.4	809.4	809.4	809.4	809.4	809.3	809.3	809.2	809.2	809.1	809.0	808.9	808.8	808.6	808.4
.0833	837.7	837.7	837.7	837.7	837.6	837.6	837.5	837.4	837.3	837.2	837.1	836.9	836.7	836.4	836.2
.1250	867.6	867.6	867.6	867.6	867.5	867.4	867.3	867.2	867.1	866.9	866.8	866.6	866.3	866.0	865.8
.1667	897.5	897.5	897.5	897.4	897.3	897.2	897.1	897.0	896.8	896.6	896.5	896.3	896.0	895.7	895.5
.2083	926.0	926.0	926.0	925.9	925.8	925.7	925.6	925.4	925.3	925.1	925.0	924.7	924.4	924.1	923.9
.2500	952.6	952.6	952.6	952.5	952.4	952.3	952.2	952.0	951.9	951.7	951.6	951.3	951.0	950.8	950.6
.2917	976.8	976.8	976.7	976.7	976.6	976.4	976.3	976.1	976.0	975.8	975.7	975.5	975.2	974.9	974.8
.3333	998.4	998.4	998.3	998.3	998.2	998.0	997.9	997.7	997.5	997.3	997.3	997.1	996.8	996.5	996.5
.3750	1017.5	1017.5	1017.4	1017.4	1017.3	1017.1	1017.0	1016.8	1016.6	1016.4	1016.4	1016.2	1015.9	1015.7	1015.6
.4167	1034.3	1034.3	1034.3	1034.2	1034.1	1034.0	1033.9	1033.7	1033.5	1033.3	1033.2	1033.1	1032.8	1032.6	1032.5
.4583	1049.0	1049.0	1049.0	1048.9	1048.8	1048.7	1048.5	1048.4	1048.2	1048.0	1047.9	1047.7	1047.5	1047.3	1047.2
.5000	1061.7	1061.7	1061.7	1061.6	1061.5	1061.4	1061.2	1061.1	1060.9	1060.7	1060.6	1060.4	1060.2	1060.0	1059.9
.5417	1072.7	1072.7	1072.7	1072.6	1072.5	1072.4	1072.2	1072.1	1071.9	1071.7	1071.6	1071.4	1071.2	1071.0	1070.9
.5833	1082.3	1082.3	1082.2	1082.2	1082.1	1081.9	1081.8	1081.6	1081.4	1081.2	1081.2	1081.0	1080.7	1080.5	1080.4
.6250	1090.5	1090.5	1090.4	1090.4	1090.3	1090.1	1090.0	1089.8	1089.6	1089.4	1089.3	1089.1	1088.9	1088.6	1088.5
.6667	1097.5	1097.5	1097.5	1097.4	1097.3	1097.2	1097.0	1096.8	1096.6	1096.4	1096.4	1096.1	1095.9	1095.6	1095.5
.7083	1103.6	1103.6	1103.6	1103.5	1103.4	1103.2	1103.1	1102.9	1102.7	1102.5	1102.4	1102.2	1101.9	1101.6	1101.5
.7500	1108.9	1108.9	1108.8	1108.8	1108.6	1108.5	1108.3	1108.2	1108.0	1107.7	1107.6	1107.4	1107.1	1106.8	1106.7
.7917	1113.4	1113.4	1113.4	1113.3	1113.2	1113.0	1112.9	1112.7	1112.5	1112.2	1112.1	1111.9	1111.6	1111.3	1111.1
.8333	1117.3	1117.3	1117.3	1117.2	1117.1	1116.9	1116.8	1116.6	1116.4	1116.1	1116.0	1115.7	1115.4	1115.1	1114.9
.8750	1120.7	1120.7	1120.7	1120.6	1120.5	1120.3	1120.2	1120.0	1119.7	1119.5	1119.4	1119.1	1118.7	1118.4	1118.2
.9167	1123.7	1123.7	1123.7	1123.6	1123.4	1123.3	1123.1	1122.9	1122.7	1122.4	1122.3	1122.0	1121.7	1121.3	1121.1
.9583	1126.4	1126.4	1126.3	1126.2	1126.1	1126.0	1125.9	1125.6	1125.3	1125.1	1124.9	1124.6	1124.3	1123.9	1123.6
1.0000	1129.0	1129.0	1129.0	1128.9	1128.8	1128.6	1128.4	1128.2	1128.0	1127.7	1127.5	1127.2	1126.8	1126.4	1126.2

KUGEL RUN AT C9:08:02

ON 15 JAN 81 WITH ABSOLUTE ELEMENT MAP

CREATED ON C00064 AT 000000

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COOLANT BULK TEMPERATURE (K)

	.6522	.6957	.7391	.7826	.8261	.8696	.9131	.9565	1.0000
.0000	781.1	781.1	781.1	781.0	781.0	781.0	781.9	780.8	780.8
.0417	808.2	807.9	807.6	807.1	807.5	807.4	805.6	804.3	804.3
.0833	835.8	835.4	835.1	834.5	835.5	835.7	832.5	831.5	830.5
.1250	865.4	864.9	864.7	864.1	865.9	866.5	861.9	859.5	859.5
.1667	895.1	894.7	894.5	894.2	896.7	897.5	891.7	889.1	889.1
.2083	923.6	923.2	923.3	923.1	926.2	927.2	920.3	917.6	917.6
.2500	950.3	950.0	950.2	950.2	953.7	954.8	947.5	944.3	944.3
.2917	974.5	974.3	974.7	974.8	978.5	979.5	970.7	968.3	968.3
.3333	996.2	996.0	996.6	996.8	1000.5	1001.3	992.0	989.6	989.6
.3750	1015.4	1015.2	1015.9	1016.2	1019.9	1020.4	1010.5	1008.2	1008.2
.4167	1032.4	1032.2	1032.9	1033.3	1036.8	1037.0	1026.6	1024.5	1024.5
.4583	1047.0	1046.9	1047.7	1048.0	1051.4	1051.2	1040.4	1038.4	1038.4
.5000	1059.8	1059.6	1060.4	1060.8	1063.8	1063.4	1052.2	1050.3	1050.3
.5417	1070.7	1070.5	1071.4	1071.7	1074.5	1073.7	1062.3	1060.4	1060.4
.5833	1080.2	1080.0	1080.9	1081.1	1083.7	1082.6	1070.9	1069.1	1069.1
.6250	1088.3	1088.0	1088.9	1089.2	1091.5	1090.1	1078.1	1076.4	1076.4
.6667	1095.2	1095.0	1095.9	1096.0	1098.2	1096.5	1084.3	1082.6	1082.6
.7083	1101.2	1100.9	1101.8	1101.9	1103.8	1101.9	1089.5	1087.9	1087.9
.7500	1106.3	1106.0	1106.8	1106.9	1108.7	1106.5	1094.5	1092.4	1092.4
.7917	1110.7	1110.3	1111.2	1111.2	1112.8	1110.4	1097.8	1096.2	1096.2
.8333	1114.5	1114.1	1114.9	1114.9	1116.3	1113.8	1101.5	1099.4	1099.4
.8750	1117.8	1117.3	1118.1	1118.0	1119.3	1116.6	1103.7	1102.1	1102.1
.9167	1120.6	1120.1	1120.9	1120.8	1121.9	1119.1	1106.1	1104.5	1104.5
.9583	1123.1	1122.6	1123.3	1123.2	1124.1	1121.1	1108.2	1106.5	1106.5
1.0000	1125.7	1125.1	1125.8	1125.6	1126.4	1123.3	1110.1	1108.4	1108.4

KUGEL RUN AT 09:08:02

ON 15 JAN 81 WITH ABSOLUTE ELEMENT MAP

CREATED ON 000064 AT 000000

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PEBBLE AVERAGE SURFACE TEMPERATURE (K)

	.0000	.0435	.0870	.1304	.1739	.2174	.2609	.3043	.3478	.3913	.4348	.4783	.5217	.5652	.6087
.0000	823.3	823.3	823.3	823.3	823.2	823.2	823.1	823.0	822.9	822.7	822.5	822.3	822.0	821.7	821.3
.0417	859.5	859.5	859.4	859.4	859.3	859.2	859.1	859.0	858.8	858.7	858.5	858.2	857.9	857.5	857.1
.0833	891.7	891.7	891.7	891.6	891.5	891.4	891.3	891.2	891.0	890.8	890.6	890.4	890.0	889.7	889.4
.1250	922.8	922.8	922.8	922.7	922.6	922.5	922.4	922.2	922.0	921.8	921.7	921.4	921.1	920.7	920.5
.1667	951.1	951.1	951.1	951.0	950.9	950.8	950.7	950.5	950.3	950.1	950.0	949.7	949.4	949.1	949.0
.2083	976.3	976.3	976.3	976.2	976.1	976.0	975.8	975.7	975.5	975.3	975.2	975.0	974.7	974.4	974.3
.2500	998.7	998.7	998.6	998.5	998.4	998.3	998.2	998.0	997.8	997.6	997.5	997.3	997.1	996.8	996.7
.2917	1018.1	1018.1	1018.0	1017.9	1017.8	1017.7	1017.6	1017.4	1017.2	1017.0	1016.9	1016.8	1016.5	1016.3	1016.2
.3333	1034.9	1034.9	1034.9	1034.8	1034.7	1034.6	1034.4	1034.3	1034.1	1033.9	1033.8	1033.6	1033.4	1033.2	1033.2
.3750	1049.5	1049.5	1049.5	1049.4	1049.3	1049.2	1049.0	1048.9	1048.7	1048.5	1048.4	1048.3	1048.0	1047.8	1047.8
.4167	1062.3	1062.3	1062.2	1062.1	1062.0	1061.9	1061.8	1061.6	1061.4	1061.2	1061.2	1061.0	1060.8	1060.5	1060.5
.4583	1073.2	1073.2	1073.2	1073.1	1073.0	1072.9	1072.7	1072.6	1072.4	1072.2	1072.1	1071.9	1071.7	1071.5	1071.5
.5000	1082.6	1082.6	1082.6	1082.5	1082.4	1082.3	1082.1	1082.0	1081.8	1081.6	1081.5	1081.3	1081.1	1080.9	1080.8
.5417	1090.7	1090.7	1090.7	1090.6	1090.5	1090.4	1090.2	1090.1	1089.9	1089.7	1089.6	1089.4	1089.1	1088.9	1088.8
.5833	1097.8	1097.8	1097.7	1097.6	1097.5	1097.4	1097.2	1097.1	1096.9	1096.7	1096.6	1096.4	1096.1	1095.9	1095.8
.6250	1103.8	1103.8	1103.8	1103.7	1103.6	1103.4	1103.3	1103.1	1102.9	1102.7	1102.6	1102.4	1102.1	1101.8	1101.7
.6667	1109.0	1109.0	1108.9	1108.9	1108.8	1108.6	1108.5	1108.3	1108.1	1107.9	1107.8	1107.5	1107.2	1106.9	1106.8
.7083	1113.5	1113.5	1113.4	1113.3	1113.2	1113.1	1112.9	1112.7	1112.5	1112.3	1112.2	1112.0	1111.6	1111.3	1111.2
.7500	1117.4	1117.4	1117.3	1117.2	1117.1	1117.0	1116.8	1116.6	1116.4	1116.2	1116.0	1115.8	1115.5	1115.1	1115.0
.7917	1120.7	1120.7	1120.7	1120.6	1120.5	1120.3	1120.2	1120.0	1119.7	1119.5	1119.4	1119.1	1118.8	1118.4	1118.2
.8333	1123.7	1123.7	1123.6	1123.5	1123.4	1123.3	1123.1	1122.9	1122.7	1122.4	1122.3	1122.0	1121.6	1121.3	1121.1
.8750	1126.2	1126.2	1126.2	1126.1	1126.0	1125.8	1125.6	1125.4	1125.2	1125.0	1124.8	1124.5	1124.1	1123.8	1123.5
.9167	1128.5	1128.5	1128.5	1128.4	1128.3	1128.1	1127.9	1127.7	1127.5	1127.2	1127.1	1126.8	1126.4	1126.0	1125.7
.9583	1130.9	1130.9	1130.8	1130.7	1130.6	1130.4	1130.2	1130.0	1129.8	1129.5	1129.3	1129.0	1128.6	1128.2	1127.9
1.0000	1133.2	1133.2	1133.2	1133.1	1133.0	1132.8	1132.6	1132.4	1132.1	1131.8	1131.7	1131.3	1130.9	1130.5	1130.2

KUGEL RUN AT 09:08:02

ON 15 JAN 81 WITH ABSOLUTE ELEMENT MAP

CREATED ON 010064 AT 000000

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PEBBLE AVERAGE SURFACE TEMPERATURE (K)

	.6522	.6957	.7391	.7826	.8261	.8696	.9130	.9565	1.0000
.0000	820.8	820.1	819.4	818.3	818.1	817.4	814.6	812.0	812.0
.0417	856.5	855.9	855.2	854.2	855.4	855.5	850.9	847.8	847.8
.0833	888.9	888.3	888.0	887.3	889.7	890.6	884.7	881.7	881.7
.1250	920.1	919.6	919.6	919.2	922.4	923.7	916.7	913.7	913.7
.1667	948.6	948.3	948.5	948.3	952.1	953.5	945.6	942.7	942.7
.2083	974.0	973.7	974.1	974.2	978.3	979.6	970.9	968.2	968.2
.2500	996.5	996.3	996.9	997.1	1001.2	1002.3	992.9	990.4	990.4
.2917	1016.1	1015.9	1016.6	1016.9	1020.9	1021.6	1011.7	1009.4	1009.4
.3333	1033.0	1032.9	1033.6	1034.0	1037.7	1038.1	1027.7	1025.6	1025.6
.3750	1047.6	1047.5	1048.3	1048.7	1052.2	1052.2	1041.4	1039.4	1039.4
.4167	1060.4	1060.2	1061.1	1061.5	1064.7	1064.3	1053.1	1051.2	1051.2
.4583	1071.3	1071.1	1072.0	1072.4	1075.3	1074.5	1063.0	1061.2	1061.2
.5000	1080.6	1080.4	1081.3	1081.7	1084.3	1083.2	1071.5	1069.7	1069.7
.5417	1088.6	1088.4	1089.3	1089.6	1092.0	1090.6	1078.6	1076.9	1076.9
.5833	1095.5	1095.2	1096.2	1096.4	1098.5	1096.9	1084.7	1083.1	1083.1
.6250	1101.4	1101.1	1102.0	1102.2	1104.1	1102.2	1089.9	1088.3	1088.3
.6667	1106.5	1106.1	1107.0	1107.1	1108.9	1106.7	1094.2	1092.7	1092.7
.7083	1110.8	1110.4	1111.3	1111.4	1112.9	1110.6	1097.9	1096.4	1096.4
.7500	1114.6	1114.1	1115.0	1115.0	1116.4	1113.9	1101.1	1099.6	1099.6
.7917	1117.8	1117.4	1118.2	1118.1	1119.4	1116.7	1103.8	1102.3	1102.3
.8333	1120.6	1120.1	1120.9	1120.8	1121.9	1119.1	1106.1	1104.6	1104.6
.8750	1123.1	1122.5	1123.3	1123.1	1124.1	1121.2	1108.1	1106.5	1106.5
.9167	1125.2	1124.6	1125.4	1125.2	1126.1	1123.0	1109.8	1108.2	1108.2
.9583	1127.4	1126.8	1127.5	1127.2	1128.0	1124.7	1111.5	1109.7	1109.7
1.0000	1129.6	1129.0	1129.6	1129.3	1129.9	1126.4	1113.2	1111.3	1111.3

KUGEL RUN AT 09:08:02

ON 15 JAN 81 WITH ABSOLUTE ELEMENT MAP

CREATED ON 060064 AT 000000

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PEBBLE INTERNAL SHELL/MATRIX INTERFACE TEMPERATURE (K)

	.0000	.0435	.0870	.1304	.1739	.2174	.2609	.3043	.3478	.3913	.4348	.4783	.5217	.5652	.6087
.0000	850.1	850.1	850.1	850.0	849.9	849.8	849.7	849.5	849.4	849.1	848.8	848.4	848.0	847.4	846.8
.0417	891.8	891.8	891.7	891.7	891.6	891.4	891.3	891.1	890.9	890.6	890.3	889.9	889.4	888.8	888.3
.0833	937.7	937.7	937.7	937.6	937.4	937.3	937.1	936.9	936.6	936.3	936.1	935.7	935.2	934.7	934.2
.1250	979.5	979.5	979.4	979.3	979.2	979.1	978.9	978.6	978.4	978.1	977.9	977.6	977.1	976.7	976.4
.1667	1011.9	1011.9	1011.9	1011.8	1011.6	1011.5	1011.3	1011.1	1010.8	1010.6	1010.5	1010.2	1009.8	1009.5	1009.4
.2083	1036.2	1036.2	1036.1	1036.0	1035.9	1035.8	1035.6	1035.4	1035.2	1034.9	1034.9	1034.6	1034.3	1034.1	1034.0
.2500	1054.9	1054.9	1054.9	1054.8	1054.7	1054.6	1054.4	1054.2	1054.0	1053.8	1053.7	1053.5	1053.3	1053.1	1053.1
.2917	1069.5	1069.5	1069.4	1069.3	1069.2	1069.1	1068.9	1068.7	1068.6	1068.4	1068.3	1068.1	1067.9	1067.7	1067.8
.3333	1081.1	1081.1	1081.1	1081.0	1080.9	1080.7	1080.6	1080.4	1080.2	1080.0	1080.0	1079.8	1079.6	1079.5	1079.5
.3750	1090.5	1090.5	1090.5	1090.4	1090.3	1090.2	1090.0	1089.8	1089.7	1089.5	1089.4	1089.3	1089.1	1088.9	1088.9
.4167	1098.3	1098.3	1098.3	1098.2	1098.1	1098.0	1097.8	1097.7	1097.5	1097.3	1097.3	1097.1	1096.9	1096.7	1096.7
.4583	1104.8	1104.8	1104.8	1104.7	1104.6	1104.5	1104.3	1104.1	1104.0	1103.8	1103.7	1103.5	1103.3	1103.1	1103.1
.5000	1110.2	1110.2	1110.1	1110.0	1109.9	1109.8	1109.6	1109.5	1109.3	1109.1	1109.0	1108.8	1108.6	1108.3	1108.3
.5417	1114.6	1114.6	1114.6	1114.5	1114.4	1114.2	1114.1	1113.9	1113.7	1113.5	1113.4	1113.2	1113.0	1112.7	1112.6
.5833	1118.4	1118.4	1118.4	1118.3	1118.2	1118.0	1117.9	1117.7	1117.5	1117.3	1117.2	1117.0	1116.7	1116.4	1116.3
.6250	1121.7	1121.7	1121.6	1121.5	1121.4	1121.3	1121.1	1120.9	1120.7	1120.5	1120.4	1120.2	1119.9	1119.6	1119.4
.6667	1124.4	1124.4	1124.4	1124.3	1124.2	1124.0	1123.9	1123.7	1123.5	1123.2	1123.1	1122.9	1122.5	1122.2	1122.1
.7083	1126.8	1126.8	1126.7	1126.7	1126.5	1126.4	1126.2	1126.0	1125.8	1125.6	1125.4	1125.2	1124.8	1124.5	1124.3
.7500	1128.9	1128.9	1128.8	1128.7	1128.6	1128.5	1128.3	1128.1	1127.8	1127.6	1127.5	1127.2	1126.8	1126.4	1126.2
.7917	1130.7	1130.7	1130.7	1130.6	1130.4	1130.3	1130.1	1129.9	1129.7	1129.4	1129.3	1129.0	1128.6	1128.2	1128.0
.8333	1132.3	1132.3	1132.3	1132.2	1132.1	1131.9	1131.7	1131.5	1131.3	1131.0	1130.8	1130.6	1130.1	1129.7	1129.5
.8750	1133.8	1133.8	1133.7	1133.7	1133.5	1133.4	1133.2	1133.0	1132.7	1132.4	1132.3	1131.9	1131.5	1131.1	1130.8
.9167	1135.2	1135.2	1135.1	1135.0	1134.9	1134.7	1134.5	1134.3	1134.1	1133.8	1133.6	1133.3	1132.9	1132.4	1132.1
.9583	1137.0	1137.0	1137.0	1136.9	1136.8	1136.6	1136.4	1136.2	1135.9	1135.6	1135.4	1135.1	1134.6	1134.2	1133.8
1.0000	1139.5	1139.5	1139.4	1139.3	1139.2	1139.0	1138.8	1138.6	1138.3	1138.0	1137.8	1137.4	1137.0	1136.5	1136.1

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KUGEL RUN AT 09:08:02

ON 15 JAN 81 WITH ABSOLUTE ELEMENT MAP

CREATED ON 000064 AT 000000

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PEBBLE INTERNAL SHELL/MATRIX INTERFACE TEMPERATURE (K)

	.6522	.6957	.7391	.7826	.8261	.8696	.9130	.9565	1.0000
.0000	845.9	844.8	843.5	841.8	841.5	840.3	835.6	831.3	829.6
.0417	887.4	886.5	885.5	884.1	885.8	885.8	878.9	873.9	872.1
.0833	933.5	932.8	932.4	931.5	935.1	936.3	927.2	921.3	918.7
.1250	975.9	975.4	975.5	975.2	979.9	981.7	971.3	965.4	962.8
.1667	1009.0	1008.7	1009.3	1009.4	1014.6	1016.5	1005.5	1000.5	998.7
.2083	1033.9	1033.7	1034.5	1034.9	1040.1	1041.7	1030.3	1026.4	1025.4
.2500	1053.0	1052.9	1053.9	1054.5	1059.2	1060.3	1048.7	1045.5	1045.0
.2917	1067.7	1067.6	1068.7	1069.3	1073.6	1074.0	1062.1	1059.4	1059.3
.3333	1079.4	1079.3	1080.4	1081.0	1084.7	1084.6	1072.5	1070.1	1070.1
.3750	1088.8	1088.7	1089.8	1090.3	1093.6	1092.9	1080.6	1078.4	1078.5
.4167	1096.5	1096.4	1097.4	1097.9	1100.7	1099.5	1087.1	1085.0	1085.1
.4583	1102.9	1102.7	1103.7	1104.1	1106.5	1104.9	1092.3	1090.4	1090.5
.5000	1108.1	1107.8	1108.8	1109.1	1111.2	1109.3	1096.6	1094.7	1094.8
.5417	1112.3	1112.0	1113.0	1113.2	1115.1	1112.9	1100.0	1098.2	1098.2
.5833	1116.6	1115.6	1116.6	1116.7	1118.3	1115.9	1102.9	1101.2	1101.2
.6250	1119.1	1118.7	1119.6	1119.6	1121.0	1118.4	1105.4	1103.7	1103.7
.6667	1121.7	1121.2	1122.1	1122.1	1123.3	1120.5	1107.5	1105.8	1105.7
.7083	1123.9	1123.4	1124.2	1124.2	1125.3	1122.3	1109.2	1107.5	1107.5
.7500	1125.8	1125.2	1126.1	1126.0	1126.9	1123.9	1110.7	1109.0	1109.0
.7917	1127.5	1126.9	1127.7	1127.5	1128.4	1125.2	1112.1	1110.3	1110.3
.8333	1128.9	1128.4	1129.1	1128.9	1129.7	1126.4	1113.1	1111.4	1111.3
.8750	1130.3	1129.6	1130.4	1130.1	1130.8	1127.4	1114.5	1112.3	1112.2
.9167	1131.5	1130.9	1131.6	1131.2	1131.8	1128.3	1114.9	1113.1	1113.0
.9583	1133.2	1132.5	1133.2	1132.8	1133.2	1129.5	1116.1	1114.1	1113.9
1.0000	1135.5	1134.7	1135.3	1134.8	1135.1	1131.2	1117.6	1115.4	1115.0

--- KUGEL RUN AT 09:08:02

ON 15 JAN 81 WITH ABSOLUTE ELEMENT MAP

CREATED ON 100000 AT 000000

PAGE 90

MAXIMUM FUEL CENTERLINE TEMPERATURE (K)

	.0000	.0435	.0870	.1304	.1739	.2174	.2609	.3043	.3478	.3913	.4348	.4783	.5217	.5652	.6087
0.0000	933.2	933.1	933.1	932.9	932.8	932.5	932.2	931.9	931.4	930.9	930.2	929.3	928.3	927.0	925.6
0.0417	987.0	987.0	986.9	986.7	986.6	986.3	986.0	985.6	985.2	984.6	984.1	983.3	982.4	981.3	980.2
0.0833	1068.6	1068.6	1068.5	1068.3	1068.1	1067.8	1067.4	1067.0	1066.5	1066.0	1065.6	1064.8	1063.9	1063.0	1062.2
0.1250	1138.5	1138.4	1138.3	1138.2	1137.9	1137.6	1137.3	1136.9	1136.5	1136.0	1135.7	1135.1	1134.4	1133.7	1133.3
0.1667	1182.0	1181.9	1181.8	1181.7	1181.5	1181.2	1181.0	1180.6	1180.3	1179.9	1179.7	1179.4	1178.9	1178.4	1178.4
0.2083	1204.5	1204.4	1204.3	1204.2	1204.0	1203.8	1203.6	1203.3	1203.0	1202.7	1202.7	1202.4	1202.1	1201.9	1202.1
0.2500	1214.1	1214.1	1214.0	1213.9	1213.8	1213.6	1213.4	1213.1	1212.9	1212.7	1212.7	1212.5	1212.3	1212.2	1212.5
0.2917	1215.8	1215.7	1215.7	1215.6	1215.4	1215.3	1215.1	1214.9	1214.7	1214.5	1214.5	1214.4	1214.2	1214.2	1214.4
0.3333	1213.2	1213.2	1213.2	1213.1	1213.0	1212.8	1212.6	1212.4	1212.3	1212.1	1212.1	1212.0	1211.8	1211.8	1212.0
0.3750	1208.4	1208.4	1208.3	1208.2	1208.1	1208.0	1207.8	1207.6	1207.4	1207.3	1207.3	1207.2	1207.0	1206.9	1207.1
0.4167	1202.5	1202.4	1202.4	1202.3	1202.2	1202.1	1201.9	1201.7	1201.5	1201.4	1201.4	1201.2	1201.0	1200.9	1201.0
0.4583	1196.3	1196.3	1196.3	1196.2	1196.1	1195.9	1195.8	1195.6	1195.4	1195.2	1195.2	1195.0	1194.8	1194.6	1194.6
0.5000	1190.1	1190.1	1190.0	1189.9	1189.8	1189.7	1189.5	1189.3	1189.1	1188.9	1188.9	1188.7	1188.4	1188.1	1188.1
0.5417	1184.1	1184.1	1184.1	1184.0	1183.9	1183.7	1183.6	1183.4	1183.2	1182.9	1182.8	1182.6	1182.3	1182.0	1181.8
0.5833	1178.7	1178.6	1178.6	1178.5	1178.4	1178.2	1178.1	1177.9	1177.7	1177.4	1177.3	1177.0	1176.7	1176.3	1176.1
0.6250	1173.9	1173.9	1173.8	1173.8	1173.6	1173.5	1173.3	1173.1	1172.9	1172.6	1172.5	1172.2	1171.8	1171.4	1171.1
0.6667	1169.7	1169.7	1169.6	1169.5	1169.4	1169.2	1169.0	1168.8	1168.6	1168.3	1168.1	1167.8	1167.4	1167.0	1166.7
0.7083	1165.9	1165.9	1165.9	1165.8	1165.6	1165.5	1165.3	1165.0	1164.8	1164.5	1164.3	1164.0	1163.5	1163.1	1162.7
0.7500	1162.7	1162.7	1162.6	1162.5	1162.4	1162.2	1162.0	1161.8	1161.5	1161.2	1161.0	1160.6	1160.2	1159.7	1159.3
0.7917	1160.1	1160.1	1160.0	1159.9	1159.8	1159.6	1159.4	1159.1	1158.9	1158.6	1158.3	1158.0	1157.5	1157.0	1156.6
0.8333	1157.9	1157.9	1157.8	1157.7	1157.6	1157.4	1157.2	1156.9	1156.6	1156.3	1156.1	1155.7	1155.2	1154.6	1154.2
0.8750	1156.1	1156.0	1156.0	1155.9	1155.7	1155.6	1155.3	1155.1	1154.8	1154.5	1154.2	1153.8	1153.3	1152.7	1152.3
0.9167	1154.8	1154.8	1154.7	1154.6	1154.5	1154.3	1154.1	1153.8	1153.5	1153.2	1152.9	1152.5	1152.0	1151.4	1150.9
0.9583	1153.3	1153.3	1153.2	1153.1	1152.9	1152.8	1152.6	1152.4	1152.1	1151.8	1151.5	1151.2	1150.8	1150.3	1149.8
1.0000	1157.9	1157.8	1157.8	1157.7	1157.5	1157.3	1157.1	1156.8	1156.5	1156.1	1155.9	1155.4	1154.8	1154.2	1153.6

RUDEL RUN AT 09:08:02

ON 15 JAN 81 WITH ABSOLUTE ELEMENT MAP

CREATED ON 060064 AT 000000

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MAXIMUM FUEL CENTERLINE TEMPERATURE (K)

	.6522	.6957	.7391	.7826	.8261	.8696	.9130	.9565	1.0000
.0000	923.5	921.2	918.3	914.3	913.7	911.1	900.4	890.6	883.6
.0417	978.5	976.7	975.0	972.3	975.5	975.4	961.8	951.2	944.2
.0833	1060.9	1059.6	1059.0	1057.6	1064.6	1066.6	1048.9	1035.4	1026.1
.1250	1132.6	1131.9	1132.5	1132.4	1141.3	1144.4	1124.9	1111.5	1102.3
.1667	1178.1	1178.0	1179.4	1180.3	1189.4	1192.6	1173.3	1162.7	1155.9
.2083	1202.1	1202.3	1204.2	1205.6	1213.7	1215.9	1197.4	1189.8	1185.9
.2500	1212.7	1213.0	1215.0	1216.5	1223.2	1224.1	1206.2	1200.9	1199.0
.2917	1214.6	1214.9	1216.9	1218.3	1223.4	1222.9	1205.6	1201.5	1200.8
.3333	1212.1	1212.3	1214.2	1215.4	1219.1	1217.4	1200.5	1197.2	1197.0
.3750	1207.1	1207.1	1208.9	1209.8	1212.4	1209.6	1193.3	1190.5	1190.5
.4167	1200.9	1200.8	1202.3	1203.0	1204.6	1201.2	1185.1	1182.5	1182.6
.4583	1194.4	1194.1	1195.5	1196.0	1196.9	1193.0	1177.2	1174.8	1174.9
.5000	1187.8	1187.4	1188.6	1188.9	1189.4	1185.1	1169.6	1167.3	1167.3
.5417	1181.4	1181.0	1182.1	1182.2	1182.3	1177.8	1162.5	1161.3	1160.3
.5833	1175.6	1175.1	1176.1	1176.0	1175.9	1171.3	1156.2	1154.1	1154.0
.6250	1170.6	1169.9	1170.9	1170.7	1170.5	1165.8	1150.9	1148.8	1148.7
.6667	1166.1	1165.4	1166.2	1165.9	1165.6	1161.0	1146.3	1144.2	1144.0
.7083	1162.1	1161.3	1162.1	1161.8	1161.4	1156.8	1142.2	1140.2	1140.0
.7500	1158.6	1157.8	1158.6	1158.1	1157.8	1153.2	1138.7	1136.7	1136.5
.7917	1155.8	1155.0	1155.7	1155.2	1154.9	1150.3	1135.9	1133.9	1133.7
.8333	1153.5	1152.6	1153.2	1152.7	1152.4	1147.8	1133.5	1131.5	1131.2
.8750	1151.5	1150.7	1151.2	1150.6	1150.3	1145.8	1131.5	1129.4	1129.1
.9167	1150.1	1149.2	1149.7	1149.1	1148.7	1144.2	1129.9	1127.7	1127.3
.9583	1150.4	1149.5	1149.9	1149.2	1148.6	1143.9	1129.5	1126.9	1126.2
1.0000	1152.7	1151.7	1152.1	1151.2	1151.3	1145.2	1131.6	1127.3	1126.1

PEBBLE INTERNAL SELL/MATRIX INTERFACE TEMPERATURE GRADIENT (K/CM)

	.0000	.0435	.0870	.1304	.1739	.2174	.2609	.3043	.3478	.3913	.4348	.4783	.5217	.5652	.6087
.0000	-64.3	-64.3	-64.3	-64.2	-64.1	-64.0	-63.9	-63.8	-63.6	-63.3	-63.1	-62.7	-62.2	-61.7	-61.1
.0417	-77.6	-77.6	-77.5	-77.5	-77.4	-77.3	-77.2	-77.1	-76.8	-76.6	-76.4	-76.1	-75.7	-75.2	-74.8
.0833	-110.4	-110.4	-110.3	-110.3	-110.2	-110.1	-109.9	-109.7	-109.5	-109.3	-109.1	-108.8	-108.4	-108.0	-107.7
.1250	-136.1	-136.1	-136.0	-136.0	-135.9	-135.8	-135.6	-135.5	-135.3	-135.1	-135.0	-134.8	-134.5	-134.3	-134.2
.1667	-145.9	-145.8	-145.8	-145.8	-145.7	-145.6	-145.5	-145.4	-145.3	-145.2	-145.2	-145.1	-144.9	-144.9	-144.9
.2083	-143.7	-143.6	-143.6	-143.6	-143.5	-143.5	-143.4	-143.3	-143.3	-143.2	-143.3	-143.2	-143.2	-143.3	-143.4
.2500	-135.1	-135.0	-135.0	-135.0	-135.0	-134.9	-134.9	-134.9	-134.8	-134.8	-134.9	-134.9	-134.9	-135.0	-135.2
.2917	-123.4	-123.4	-123.4	-123.3	-123.3	-123.3	-123.3	-123.2	-123.2	-123.2	-123.3	-123.3	-123.4	-123.5	-123.7
.3333	-110.9	-110.9	-110.8	-110.8	-110.8	-110.8	-110.8	-110.8	-110.8	-110.8	-110.8	-110.9	-110.9	-111.0	-111.2
.3750	-98.4	-98.4	-98.4	-98.4	-98.4	-98.4	-98.4	-98.4	-98.4	-98.4	-98.4	-98.5	-98.5	-98.6	-98.7
.4167	-86.6	-86.6	-86.6	-86.6	-86.6	-86.6	-86.6	-86.6	-86.6	-86.6	-86.6	-86.6	-86.7	-86.7	-86.8
.4583	-75.8	-75.8	-75.8	-75.8	-75.8	-75.8	-75.8	-75.8	-75.8	-75.8	-75.8	-75.8	-75.8	-75.8	-75.9
.5000	-66.0	-66.0	-66.0	-66.0	-66.0	-66.0	-66.0	-66.0	-66.0	-66.0	-66.0	-66.0	-66.0	-65.9	-65.9
.5417	-57.3	-57.3	-57.3	-57.3	-57.3	-57.3	-57.3	-57.3	-57.2	-57.2	-57.2	-57.2	-57.2	-57.1	-57.1
.5833	-49.5	-49.5	-49.5	-49.5	-49.5	-49.5	-49.5	-49.5	-49.5	-49.5	-49.4	-49.4	-49.3	-49.3	-49.2
.6250	-42.9	-42.9	-42.9	-42.9	-42.8	-42.8	-42.8	-42.8	-42.8	-42.8	-42.7	-42.7	-42.6	-42.5	-42.4
.6667	-37.1	-37.0	-37.0	-37.0	-37.0	-37.0	-37.0	-37.0	-36.9	-36.9	-36.9	-36.8	-36.7	-36.7	-36.5
.7083	-32.0	-32.0	-32.0	-32.0	-32.0	-32.0	-31.9	-31.9	-31.9	-31.8	-31.8	-31.7	-31.7	-31.6	-31.4
.7500	-27.6	-27.6	-27.6	-27.6	-27.6	-27.6	-27.5	-27.5	-27.5	-27.5	-27.4	-27.3	-27.3	-27.1	-27.0
.7917	-23.9	-23.9	-23.9	-23.9	-23.9	-23.9	-23.9	-23.9	-23.8	-23.8	-23.7	-23.6	-23.6	-23.5	-23.3
.8333	-20.8	-20.8	-20.8	-20.8	-20.8	-20.8	-20.7	-20.7	-20.7	-20.6	-20.6	-20.5	-20.4	-20.3	-20.2
.8750	-18.1	-18.1	-18.1	-18.1	-18.1	-18.1	-18.0	-18.0	-18.0	-17.9	-17.9	-17.8	-17.7	-17.6	-17.5
.9167	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9	-15.8	-15.8	-15.7	-15.6	-15.6	-15.4	-15.3
.9583	-14.8	-14.8	-14.8	-14.8	-14.8	-14.8	-14.8	-14.7	-14.7	-14.6	-14.6	-14.5	-14.4	-14.3	-14.2
1.0000	-14.9	-14.9	-14.9	-14.9	-14.9	-14.9	-14.9	-14.8	-14.8	-14.7	-14.7	-14.6	-14.5	-14.4	-14.2

PEBBLE INTERNAL SELL/MATRIX INTERFACE TEMPERATURE GRADIENT (K/CM)

	.6522	.6957	.7391	.7826	.8261	.8696	.9130	.9565	1.0000
.0000	-60.2	-59.2	-58.0	-56.3	-56.1	-55.0	-50.4	-46.2	-42.1
.0417	-74.2	-73.4	-72.7	-71.7	-72.9	-72.8	-67.3	-62.5	-58.2
.0833	-107.2	-106.7	-106.5	-106.0	-108.9	-109.6	-101.9	-95.0	-88.9
.1250	-134.0	-133.8	-134.2	-134.4	-138.0	-139.2	-131.0	-124.1	-117.9
.1667	-145.0	-145.1	-145.9	-146.6	-150.0	-151.1	-143.8	-138.7	-134.3
.2083	-143.6	-143.9	-144.9	-145.7	-148.4	-149.0	-142.7	-139.7	-137.3
.2500	-135.5	-135.8	-136.8	-137.6	-139.2	-139.1	-133.8	-132.1	-131.1
.2917	-123.9	-124.2	-125.1	-125.7	-126.5	-125.7	-121.1	-120.1	-119.8
.3333	-111.4	-111.6	-112.3	-112.8	-112.8	-111.5	-107.5	-106.9	-106.8
.3750	-98.8	-98.9	-99.5	-99.8	-99.3	-97.6	-94.1	-93.7	-93.8
.4167	-86.8	-86.8	-87.3	-87.5	-86.5	-84.6	-81.5	-81.2	-81.3
.4583	-75.9	-75.8	-76.1	-76.2	-75.0	-73.0	-70.3	-70.0	-70.1
.5000	-65.9	-65.8	-66.0	-66.0	-64.6	-62.6	-60.3	-60.0	-60.0
.5417	-57.0	-56.8	-56.9	-56.8	-55.4	-53.5	-51.5	-51.2	-51.2
.5833	-49.1	-48.9	-49.0	-48.8	-47.4	-45.6	-43.8	-43.5	-43.5
.6250	-42.3	-42.1	-42.1	-41.9	-40.6	-38.9	-37.3	-37.0	-37.0
.6667	-36.4	-36.2	-36.1	-35.9	-34.7	-33.1	-31.8	-31.5	-31.4
.7083	-31.3	-31.0	-31.0	-30.7	-29.6	-28.2	-27.0	-26.7	-26.6
.7500	-26.8	-26.6	-26.5	-26.3	-25.2	-23.9	-22.9	-22.7	-22.5
.7917	-23.2	-22.9	-22.8	-22.6	-21.6	-20.4	-19.5	-19.3	-19.1
.8333	-20.0	-19.8	-19.7	-19.4	-18.5	-17.5	-16.7	-16.4	-16.2
.8750	-17.3	-17.1	-17.0	-16.7	-15.9	-14.9	-14.2	-13.9	-13.7
.9167	-15.1	-14.9	-14.8	-14.5	-13.8	-12.9	-12.2	-11.9	-11.6
.9583	-14.0	-13.8	-13.6	-13.3	-12.6	-11.7	-10.9	-10.5	-10.0
1.0000	-14.0	-13.8	-13.6	-13.3	-12.4	-11.4	-10.6	-9.7	-9.0

B-102

KUGEL RUN AT 09:08:02

ON 15 JAN 81 WITH ABSOLUTE ELEMENT

MAP

CRLATED ON 00064 AT 000000

PAGE 94

FLOW = 1.6843000+03 KG/S
PIN = 8.0300000+06 PASCAL
TIN = 7.8000000+02 K
PCORE = 2.9999993+09 J
DCORE = 1.1200000+01 M
HCORE = 5.5400000+00 M
RF1 = 0.0000000 M
RF2 = 2.5000000-02 M
RBALL = 3.0000000-02 M
NPAR = 2 PARTICLE TYPES

THE REQUIRED STORAGE IS 17363 LOCATIONS.

ROBEL RUN AT 09:06:02 ON 15 JAN 81 WITH ABSOLUTE ELEMENT MAP

CREATED ON 10064 AT 000000

PAGE 95

THE FOLLOWING DATA PERTAINS TO PARTICLE FAILURE AND/OR FUEL HYDROLYSIS AND/OR R/B CALCULATIONS

*****

NANUL = 10 NUMBER OF FUEL ROD ANNULAR RINGS
NPART = 2 NUMBER OF FUEL PARTICLES
NGAS = 2 NUMBER OF R/B GASES

***** THE FOLLOWING CALCULATIONS WILL BE PERFORMED

KERNEL MIGRATION DISTANCES AND FAILURES
PENETRATION DISTANCES AND RESULTING FAILURES
PRESSURE VESSEL FAILURE
MANUFACTURING DEFECT FAILURE
R/B

***** THE FOLLOWING DATA IS FOR THE THO2 NEUTR PARTICLE *****

***** THE KERNEL MIGRATION DATA *****

FROM MDD-FDDM-8-024 (MARCH 21, 1977) BY C. L. SMITH
 TMEAN = .558+01 FOR A LINEAR REGRESSION OF LN(1/KMC) VS. (10**4/TEMPERATURE):
 ENTCPY = -.651+01 THE AVERAGE OF THE POINTS (10**4/T)
 SLOPE = .155+01 INTERCEPT OF THE REGRESSION LINE AT LIMIT (10**4/T) = 0
 TTBLE = .167+01 SLOPE OF THE LINE
 SS = .370+00 STUDENT T TABLE STAT. CORRESPONDING TO THE # OF DATA POINTS AND THE DESIRED FRACTION IN ONE TAIL
 TOTPTS = .860+02 # OF EXPERIMENTAL POINTS
 XDIFSQ = .110+02 THE SUM OF (X(I)-XBAR)**2, I=1,N, WHERE X(I) = 10**4/T(I)

NOTE --> THE FOLLOWING 3 VALUES APPLY ONLY FOR THE THO2 HISO MODEL

COEFSP = .100+01 PRE-EXPONENTIAL CONSTANT A IN THE EQUATION BELOW
 ACTESP = .470+03 APPARENT ACTIVATION ENERGY Q IN THE EQ. BELOW
 BRNLM = .755+05 FRACTIONAL BURNUP AT WHICH THE KERNEL STARTS TO MIGRATE
 EQUATION --> $\theta = A \exp(-Q/RT)$ WHERE θ = THE INCUBATION PERIOD
 FAIL = .145+03 BUFFER THICKNESS
 SIGM = .206+02 VALUE OF SIGMA FOR THE NORMAL DISTRIBUTION ABOUT FAIL

***** THE HIGH TEMPERATURE DATA *****

NO HIGH TEMPERATURE FAILURE BELOW TCRT (MDD-FSV-008-77)
 COEFHT(IPAR,1) = .000 , COEFHT(IPAR,2) = .000 PRL EXPONENTIAL CONSTANTS IN THE PENETRATION DISTANCE EQUATION
 ACTEN (IPAR,1) = .000 ACTEN (IPAR,2) = .000 ACTIVATION ENERGIES FOR THE PENETRATION PROCESS
 TTRANS(IPAR) = .000 TRANSITION TEMPERATURE(TC) OF THE PENETRATION RATE
 NOTE --> THE FOLLOWING VALUE APPLIES ONLY TO THE HEUC2 AND HEUC2 TRISO MODEL
 FIMLM = .000 FRACTIONAL BURNUP AT WHICH LOW TEMP. FAILURE BEGINS TO OCCUR
 AVGSIC = .350+02 MEAN DISTANCE REQUIRED FOR HIGH TEMPERATURE FAILURE
 SIGSIC = .400+01 VALUE OF SIGMA FOR THE NORMAL DISTRIBUTION ABOUT AVGSIC

***** THE PRESSURE VESSEL DATA *****

FROM MDD-FSV-008-77 (JULY 22, 1977) BY C.L. SMITH
 PARPV = .100+01 PRESSURE VESSEL CORRELATION PARAMETER FOR COATING FAILURE

***** THE MANUFACTURING DEFECT DATA *****

FROM MDD-FSV-008-77 (JULY 22, 1977) BY C.L. SMITH
 EXMD = .940+01 EXPECTED VALUE FOR THE PERCENT OF FUEL HAVING MISSING OR DEFECTIVE COATINGS
 PRMD1 = .700+00 CORRELATION PARAMETER DESCRIBING THE PROBABILITY THAT FUEL HAVING MISSING OR DEFECTIVE COATINGS WILL FAIL
 PRMD2 = .750+00 CORRELATION PARAMETER FOR THE FRACTION OF FUEL HAVING MISSING OR DEFECTIVE COATINGS
 BURN = .640+01 MAXIMUM EXPECTED BURNUP
 DSEMAX = .730+01 MAXIMUM EXPECTED FAST DOSE

***** THE FOLLOWING DATA IS FOR THE ME UC2 TRISO PARTICLE *****

***** THE KERNEL MIGRATION DATA *****

DERIVED FROM THE EQUATIONS CONTAINED IN THE DESIGN DATA MANUAL

THEAN = .556+01 FOR A LINEAR REGRESSION OF $\ln(1/\mu_{KL})$ VS. $(1/\mu_{KL}/\text{TEMPERATURE})$:

THE AVERAGE OF THE POINTS $(1/\mu_{KL}/T)$

ENTCPT = -.631+01 INTERCEPT OF THE REGRESSION LINE AT LIMIT $(1/\mu_{KL}/T) = 0$

SLOPE = .163+01 SLOPE OF THE LINE

TTBLE = .164+01 STUDENT T TABLE STAT. CORRESPONDING TO THE # OF DATA POINTS AND THE DESIRED FRACTION IN ONE TAIL

SS = .000

TOTPTS = .168+03 # OF EXPERIMENTAL POINTS

XGIFSQ = .732+02 THE SUM OF $(X(I)-\bar{X})^2, I=1, N$, WHERE $X(I) = 1/\mu_{KL}/T(I)$

NOTE --> THE FOLLOWING 3 VALUES APPLY ONLY FOR THE THO2 BISO MODEL

COEFSP = .000 PRE-EXPONENTIAL CONSTANT A IN THE EQUATION BELOW

ACTESP = .000 APPARENT ACTIVATION ENERGY Q IN THE EQ. BELOW

BRNLIM = .000 FRACTIONAL BURNUP AT WHICH THE KERNEL STARTS TO MIGRATE

EQUATION --> $\theta = A \exp(-Q/RT)$ WHERE θ = THE INCUBATION PERIOD

FAIL = .140+03 BUFFER THICKNESS

SIGP = .194+02 VALUE OF SIGMA FOR THE NORMAL DISTRIBUTION ABOUT FAIL

***** THE HIGH TEMPERATURE DATA *****

FROM CLS:C31:FMB:75

AND FROM DESIGN MEMO MOD-FUOM-B-G22 OF JANUARY, 1977

COEFHT(IPAR,1) = .643+01, COEFHT(IPAR,2) = .420+08 PRE-EXPONENTIAL CONSTANTS IN THE PENETRATION DISTANCE EQUATION

ACTEN(IPAR,1) = .258+05 ACTEN(IPAR,2) = .785+05 ACTIVATION ENERGIES FOR THE PENETRATION PROCESS

TTRANS(IPAR) = .142+04 TRANSITION TEMPERATURE(C) OF THE PENETRATION RATE

NOTE --> THE FOLLOWING VALUE APPLIES ONLY TO THE HE UC2 AND ME UC2 TRISO MODEL

FIMLIM = .100+01 FRACTIONAL BURNUP AT WHICH LOW TEMP. FAILURE BEGINS TO OCCUR

AVGSIC = .350+02 MEAN DISTANCE REQUIRED FOR HIGH TEMPERATURE FAILURE

SIGSIC = .530+01 VALUE OF SIGMA FOR THE NORMAL DISTRIBUTION ABOUT AVGSIC

***** THE PRESSURE VESSEL DATA *****

FROM THE DESIGN DATA MANUAL

PARPV = .100+01 PRESSURE VESSEL CORRELATION PARAMETER FOR COATING FAILURE

***** THE MANUFACTURING DEFECT DATA *****

FROM THE DESIGN DATA MANUAL

EXMO = .940+01 EXPECTED VALUE FOR THE PERCENT OF FUEL HAVING MISSING OR DEFECTIVE COATINGS

PRMD1 = .700+00 CORRELATION PARAMETER DESCRIBING THE PROBABILITY THAT FUEL HAVING MISSING OR DEFECTIVE COATINGS WILL FAIL

PRMD2 = .750+00 CORRELATION PARAMETER FOR THE FRACTION OF FUEL HAVING MISSING OR DEFECTIVE COATINGS

BURN = .265+00 MAXIMUM EXPECTED BURNUP

DOSEMAX = .730+01 MAXIMUM EXPECTED FAST DOSE

***** THE FOLLOWING CONSISTS OF THE DATA NECESSARY TO DO R/B CALCULATIONS
 >>>> OLD MODEL <<<<

***** DATA FOR GAS 1 *****

KR85M DATA

NGNME	=	KR85 M	NAME OF GAS
ACTE	=	.127+05	ACTIVATION ENERGY (CAL/MOLE)
DECAY	=	.733-01	DECAY CONSTANT (NEW MODEL), R/B AT 0 DEG K DIVIDED BY R/B AT 1373 DEG K (OLD MODEL)
DFGAS	=	.000	REDUCED GAS PHASE DIFFUSION CONSTANT (NEW MODEL)
WMASS	=	.000	GAS ATOMIC WEIGHT (NEW MODEL)
FRAC	=	.000	FRACTIONAL CONTRIBUTION OF THE FIRST TERM IN THE R/B EQUATION (NEW MODEL)
RBFIN	=	.500-02	R/B AT THE REFERENCE TEMP., FAILED FUEL, PARTICLE 1
		.500-02	PARTICLE 2

THE FOLLOWING EQUATION EXPRESSES AN R/B DEPENDENCE ON FIMA (X) - FROM FCB:242:BFM:77

$$(ACOF + BCOF * B(X) ** CEXP) * (R/B) = (R/B \text{ AT BURNUP } B)$$

ACOF	=	.260+00	PARTICLE 1
		.100+01	PARTICLE 2
BCOF	=	.370+00	PARTICLE 1
		.000	PARTICLE 2
CEXP	=	.900+00	PARTICLE 1
		.000	PARTICLE 2

** DATA FOR PARTICLE 1 **

YIELD	=	.216-01	PARTICLE YIELD

** DATA FOR PARTICLE 2 **

YIELD	=	.130-01	PARTICLE YIELD
RBMIN	=	.300-04	R/B AT REF. TEMP., AS-MANUFACTURED FUEL

***** DATA FOR GAS 2 *****

XE138 DATA

NGNME	=	XE 138	NAME OF GAS
ACTE	=	.118+05	ACTIVATION ENERGY (CAL/MOLE)
DECAY	=	.252+00	DECAY CONSTANT (NEW MODEL), R/B AT 0 DEG K DIVIDED BY R/B AT 1373 DEG K (OLD MODEL)
DFGAS	=	.000	REDUCED GAS PHASE DIFFUSION CONSTANT (NEW MODEL)
WMASS	=	.000	GAS ATOMIC WEIGHT (NEW MODEL)
FRAC	=	.000	FRACTIONAL CONTRIBUTION OF THE FIRST TERM IN THE R/B EQUATION (NEW MODEL)
RBFIN	=	.375-03	R/B AT THE REFERENCE TEMP., FAILED FUEL, PARTICLE 1
		.375-03	PARTICLE 2

** DATA FOR PARTICLE 1 **

YIELD	=	.467-01	PARTICLE YIELD

** DATA FOR PARTICLE 2 **

YIELD	=	.642-01	PARTICLE YIELD
RBMIN	=	.210-05	R/B AT REF. TEMP., AS-MANUFACTURED FUEL

RESULTS FOR THE FOLLOWING RADIAL NODAL POINT WILL BE PRINTED : 1
 RESULTS FOR THE FOLLOWING RADIAL NODAL POINT WILL BE PRINTED : 2

RESULTS FOR THE FOLLOWING RADIAL NODAL POINT WILL BE PRINTED : 3
RESULTS FOR THE FOLLOWING RADIAL NODAL POINT WILL BE PRINTED : 4
RESULTS FOR THE FOLLOWING RADIAL NODAL POINT WILL BE PRINTED : 5
RESULTS FOR THE FOLLOWING RADIAL NODAL POINT WILL BE PRINTED : 6
RESULTS FOR THE FOLLOWING RADIAL NODAL POINT WILL BE PRINTED : 7
RESULTS FOR THE FOLLOWING RADIAL NODAL POINT WILL BE PRINTED : 8
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RESULTS FOR THE FOLLOWING RADIAL NODAL POINT WILL BE PRINTED : 19
RESULTS FOR THE FOLLOWING RADIAL NODAL POINT WILL BE PRINTED : 20
RESULTS FOR THE FOLLOWING RADIAL NODAL POINT WILL BE PRINTED : 21
RESULTS FOR THE FOLLOWING RADIAL NODAL POINT WILL BE PRINTED : 22
RESULTS FOR THE FOLLOWING RADIAL NODAL POINT WILL BE PRINTED : 23
RESULTS FOR THE FOLLOWING RADIAL NODAL POINT WILL BE PRINTED : 24

RADIAL POINT 1

PARTICLE FAILURES
DISTANCES IN MICRONS, FAILURES (%)

THU2 MEUTR									ME UC2 TRISO								
MAX DISTANCE			** PERCENT FAILURES OF TOTAL FAILURE **						*MAX DISTANCE*			** PERCENT FAILURES OF TOTAL FAILURE **					
AX	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	HIGH	AX	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	HIGH
PT	MIGRAT	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAT	IN SIC	TEMP	PT	MIGRAT	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAT	IN SIC	TEMP
1	5.50-07	0.00	3.01-02	1.00+02	0.00	0.00	0.00	J.00	8.54-09	0.00	3.38-02	1.00+02	0.00	0.00	0.00	0.00	0.00
2	7.80-06	0.00	3.07-02	1.00+02	0.00	0.00	0.00	J.00	1.63-07	1.44-02	4.36-02	1.00+02	0.00	0.00	0.00	0.00	0.00
3	1.04-04	0.00	3.23-02	1.00+02	0.00	0.00	0.00	J.00	3.22-06	5.36-02	5.56-02	9.99+01	1.16-01	0.00	0.00	0.00	0.00
4	7.50-04	0.00	3.49-02	1.00+02	0.00	0.00	0.00	U.00	3.03-05	1.36-01	6.70-02	9.99+01	9.60-02	0.00	0.00	0.00	0.00
5	2.60-03	0.00	3.88-02	1.00+02	0.00	0.00	0.00	U.00	1.21-04	2.62-01	7.44-02	9.68+01	3.15+00	0.00	0.00	0.00	0.00
6	5.64-03	0.00	4.34-02	1.00+02	0.00	0.00	0.00	J.00	2.82-04	4.17-01	7.81-02	9.28+01	7.23+00	0.00	0.00	0.00	0.00
7	9.26-03	0.00	4.86-02	1.00+02	0.00	0.00	0.00	J.00	4.80-04	5.86-01	7.97-02	9.14+01	8.55+00	0.00	0.00	0.00	0.00
8	1.28-02	0.00	5.40-02	1.00+02	0.00	0.00	0.00	J.00	6.77-04	7.57-01	8.60-02	9.15+01	8.52+00	0.00	0.00	0.00	0.00
9	1.60-02	0.00	5.96-02	1.00+02	0.00	0.00	0.00	J.00	8.52-04	9.24-01	8.03-02	9.15+01	8.48+00	0.00	0.00	0.00	0.00
10	1.86-02	0.00	6.48-02	1.00+02	0.00	0.00	0.00	J.00	9.96-04	1.08+00	8.05-02	9.15+01	8.46+00	0.00	0.00	0.00	0.00
11	2.08-02	0.00	6.97-02	1.00+02	0.00	0.00	0.00	J.00	1.11-03	1.24+00	8.07-02	9.16+01	8.43+00	0.00	0.00	0.00	0.00
12	2.26-02	0.00	7.19-02	1.00+02	0.00	0.00	0.00	U.00	1.20-03	1.38+00	8.19-02	9.06+01	9.42+00	0.00	0.00	0.00	0.00
13	2.41-02	0.00	7.23-02	9.97+01	3.22-01	0.00	0.00	U.00	1.27-03	1.52+00	8.44-02	8.81+01	1.19+01	0.00	0.00	0.00	0.00
14	2.53-02	0.00	7.28-02	9.92+01	7.70-01	0.00	0.00	J.00	1.32-03	1.65+00	8.69-02	8.57+01	1.43+01	0.00	0.00	0.00	0.00
15	2.63-02	0.00	7.31-02	9.89+01	1.09+00	0.00	0.00	U.00	1.37-03	1.77+00	8.94-02	8.35+01	1.65+01	0.00	0.00	0.00	0.00
16	2.70-02	0.00	7.34-02	9.87+01	1.31+00	0.00	0.00	U.00	1.40-03	1.89+00	9.17-02	8.14+01	1.86+01	0.00	0.00	0.00	0.00
17	2.76-02	0.00	7.36-02	9.86+01	1.43+00	0.00	0.00	U.00	1.43-03	2.00+00	9.39-02	7.97+01	2.13+01	0.00	0.00	0.00	0.00
18	2.82-02	0.00	7.38-02	9.85+01	1.51+00	0.00	0.00	U.00	1.45-03	2.11+00	9.59-02	7.81+01	2.19+01	0.00	0.00	0.00	0.00
19	2.86-02	0.00	7.39-02	9.84+01	1.55+00	0.00	0.00	J.00	1.46-03	2.21+00	9.78-02	7.67+01	2.33+01	0.00	0.00	0.00	0.00
20	2.89-02	0.00	7.40-02	9.84+01	1.57+00	0.00	0.00	U.00	1.48-03	2.31+00	9.94-02	7.55+01	2.45+01	0.00	0.00	0.00	0.00
21	2.92-02	0.00	7.41-02	9.84+01	1.57+00	0.00	0.00	J.00	1.50-03	2.41+00	1.01-01	7.44+01	2.56+01	0.00	0.00	0.00	0.00
22	2.95-02	0.00	7.41-02	9.84+01	1.57+00	0.00	0.00	J.00	1.51-03	2.51+00	1.02-01	7.35+01	2.65+01	0.00	0.00	0.00	0.00
23	2.97-02	0.00	7.42-02	9.84+01	1.57+00	0.00	0.00	U.00	1.52-03	2.61+00	1.04-01	7.26+01	2.74+01	0.00	0.00	0.00	0.00
24	2.99-02	0.00	7.42-02	9.84+01	1.57+00	0.00	0.00	J.00	1.53-03	2.71+00	1.05-01	7.17+01	2.83+01	0.00	0.00	0.00	0.00
25	3.00-02	0.00	7.42-02	9.84+01	1.58+00	0.00	0.00	J.00	1.53-03	2.76+00	1.06-01	7.09+01	2.91+01	0.00	0.00	0.00	0.00

KUGEL RUN AT 09:08:02

ON 15 JAN 81 WITH ABSOLUTE ELEMENT MAP

CREATED ON PLOQ64 AT 000000

PAGE 100

RADIAL POINT 1

DETAILED PRINTOUT FOR THE GAS KR85 M

PT	CC	AVG FUEL VOL	TEMP	MICMOL	R/B	BIRTHRATE	MICMOL	R/B	BIRTHRATE	MICMOL	R/B	CONTAM	FUEL	R/B	FUEL REL	RTM MICMOL	THO2 NEUTR	ME UC2 TRISO	CONTAM
1	1.897+03	6.185+02	6.801-11	5.711-08	4.374-09	2.441-07	4.442-09	4.334-06	4.575-06	2.032-14	1.911-02	5.254+00	9.473+01						
2	3.794+03	6.662+02	3.257-10	7.404-08	6.982-09	3.832-07	7.3 8-09	5.268-06	5.637-06	4.120-14	5.854-02	6.495+00	9.345+01						
3	3.794+03	7.300+02	6.763-10	1.115-07	6.673-09	6.377-07	7.349-09	6.887-06	7.476-06	5.494-14	1.373-01	7.745+00	9.212+01						
4	3.794+03	7.858+02	1.041-09	1.741-07	6.480-09	9.740-07	7.521-09	8.727-06	9.590-06	7.213-14	2.514-01	8.751+00	9.100+01						
5	3.794+03	8.238+02	1.418-09	2.636-07	6.225-09	1.269-06	7.644-09	1.024-05	1.132-05	8.655-14	4.319-01	9.129+00	9.044+01						
6	3.794+03	8.472+02	1.599-09	3.794-07	5.538-09	1.471-06	7.137-09	1.130-05	1.253-05	8.942-14	6.784-01	9.112+00	9.021+01						
7	3.794+03	8.614+02	1.717-09	5.182-07	4.764-09	1.595-06	6.441-09	1.201-05	1.332-05	8.636-14	1.030+00	8.799+00	9.017+01						
8	3.794+03	8.695+02	1.793-09	6.774-07	4.251-09	1.661-06	6.144-09	1.246-05	1.383-05	8.360-14	1.453+00	8.448+00	9.010+01						
9	3.794+03	8.740+02	1.761-09	8.524-07	3.702-09	1.765-06	5.463-09	1.274-05	1.418-05	7.744-14	1.938+00	8.152+00	8.991+01						
10	3.794+03	8.763+02	1.636-09	1.032-06	3.123-09	1.733-06	4.759-09	1.292-05	1.441-05	6.857-14	2.463+00	7.895+00	8.964+01						
11	3.794+03	8.772+02	1.528-09	1.211-06	2.643-09	1.752-06	4.171-09	1.302-05	1.457-05	6.078-14	3.044+00	7.618+00	8.934+01						
12	3.794+03	8.774+02	1.442-09	1.341-06	2.322-09	1.784-06	3.763-09	1.308-05	1.469-05	5.528-14	3.497+00	7.491+00	8.901+01						
13	3.794+03	8.770+02	1.254-09	1.431-06	1.924-09	1.842-06	3.178-09	1.310-05	1.478-05	4.697-14	3.619+00	7.545+00	8.864+01						
14	3.794+03	8.762+02	1.125-09	1.511-06	1.647-09	1.897-06	2.772-09	1.311-05	1.485-05	4.115-14	4.132+00	7.592+00	8.828+01						
15	3.794+03	8.754+02	1.039-09	1.582-06	1.436-09	1.951-06	2.476-09	1.310-05	1.490-05	3.688-14	4.458+00	7.600+00	8.794+01						
16	3.794+03	8.746+02	8.715-10	1.644-06	1.180-09	2.003-06	2.051-09	1.310-05	1.495-05	3.066-14	4.673+00	7.705+00	8.762+01						
17	3.794+03	8.739+02	7.691-10	1.696-06	1.013-09	2.049-06	1.732-09	1.309-05	1.499-05	2.670-14	4.884+00	7.769+00	8.735+01						
18	3.794+03	8.732+02	7.152-10	1.742-06	9.090-10	2.091-06	1.624-09	1.308-05	1.502-05	2.439-14	5.106+00	7.793+00	8.710+01						
19	3.794+03	8.726+02	5.828-10	1.781-06	7.325-10	2.136-06	1.315-09	1.308-05	1.505-05	1.980-14	5.244+00	7.882+00	8.687+01						
20	3.794+03	8.722+02	5.128-10	1.815-06	6.341-10	2.166-06	1.147-09	1.308-05	1.509-05	1.730-14	5.381+00	7.937+00	8.668+01						
21	3.794+03	8.719+02	4.715-10	1.846-06	5.697-10	2.199-06	1.041-09	1.308-05	1.512-05	1.574-14	5.529+00	7.958+00	8.651+01						
22	3.794+03	8.718+02	4.061-10	1.874-06	4.879-10	2.230-06	8.940-10	1.309-05	1.515-05	1.355-14	5.617+00	8.032+00	8.635+01						
23	3.794+03	8.718+02	3.574-10	1.960-06	4.263-10	2.261-06	7.836-10	1.310-05	1.520-05	1.191-14	5.700+00	8.092+00	8.621+01						
24	3.794+03	8.730+02	3.458-10	1.931-06	4.124-10	2.305-06	7.582-10	1.317-05	1.531-05	1.160-14	5.754+00	8.192+00	8.605+01						
25	1.897+03	8.755+02	3.458-10	1.962-06	4.124-10	2.353-06	7.582-10	1.331-05	1.548-05	1.174-14	5.780+00	8.269+00	8.595+01						

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RADIAL POINT 1

DETAILED PRINTOUT FOR THE GAS XE 138

[illegible]

B-111

RADIAL POINT 2

PARTICLE FAILURES
DISTANCES IN MICRONS, FAILURES (2)

<-----THO2 NEUTR----->									<-----ME UC2 TRISO----->								
MAX DISTANCE			** PERCENT FAILURES OF			TOTAL FAILURE **			*MAX DISTANCE*			** PERCENT FAILURES OF			TOTAL FAILURE **		
AX	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	HIGH	AX	KERNEL	FIPROD	TOTAL	MANUF.	PPLSS.	KERNEL	FIPROD	HIGH
PT	MIGRAT	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAT	IN SIC	TEMP	PT	MIGRAT	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAT	IN SIC	TEMP
1	5.49-07	0.00	3.01-02	1.00+02	0.00	0.00	0.00	J.00	6.53-09	0.00	3.38-02	1.00+02	0.00	0.00	0.00	0.00	0.00
2	7.79-06	0.00	3.07-02	1.00+02	0.00	0.00	0.00	J.00	1.63-07	1.44-02	4.36-02	1.00+02	0.00	0.00	0.00	0.00	0.00
3	1.04-04	0.00	3.23-02	1.00+02	0.00	0.00	0.00	J.00	3.22-06	5.36-02	5.56-02	9.99+01	1.16-01	0.00	0.00	0.00	0.00
4	7.49-04	0.00	3.49-02	1.00+02	0.00	0.00	0.00	J.00	3.33-05	1.36-01	6.70-02	9.99+01	9.00-02	0.00	0.00	0.00	0.00
5	2.60-03	0.00	3.88-02	1.00+02	0.00	0.00	0.00	J.00	1.21-04	2.62-01	7.44-02	9.66+01	3.45+00	0.00	0.00	0.00	0.00
6	5.63-03	0.00	4.34-02	1.00+02	0.00	0.00	0.00	J.00	2.81-04	4.17-01	7.81-02	9.28+01	7.23+00	0.00	0.00	0.00	0.00
7	9.26-03	0.00	4.86-02	1.00+02	0.00	0.00	0.00	J.00	4.80-04	5.66-01	7.97-02	9.14+01	8.55+00	0.00	0.00	0.00	0.00
8	1.28-02	0.00	5.40-02	1.00+02	0.00	0.00	0.00	J.00	6.77-04	7.57-01	8.00-02	9.15+01	8.51+00	0.00	0.00	0.00	0.00
9	1.60-02	0.00	5.96-02	1.00+02	0.00	0.00	0.00	J.00	8.51-04	9.24-01	8.03-02	9.15+01	8.48+00	0.00	0.00	0.00	0.00
10	1.86-02	0.00	6.48-02	1.00+02	0.00	0.00	0.00	J.00	9.96-04	1.08+00	8.05-02	9.15+01	8.46+00	0.00	0.00	0.00	0.00
11	2.08-02	0.00	6.97-02	1.00+02	0.00	0.00	0.00	J.00	1.11-03	1.24+00	8.07-02	9.16+01	8.43+00	0.00	0.00	0.00	0.00
12	2.26-02	0.00	7.19-02	1.00+02	0.00	0.00	0.00	J.00	1.20-03	1.38+00	8.19-02	9.06+01	9.42+00	0.00	0.00	0.00	0.00
13	2.41-02	0.00	7.23-02	9.97+01	3.22-01	0.00	0.00	J.00	1.27-03	1.52+00	8.44-02	8.81+01	1.19+01	0.00	0.00	0.00	0.00
14	2.53-02	0.00	7.28-02	9.92+01	7.70-01	0.00	0.00	J.00	1.32-03	1.65+00	8.69-02	8.57+01	1.43+01	0.00	0.00	0.00	0.00
15	2.62-02	0.00	7.31-02	9.89+01	1.09+00	0.00	0.00	J.00	1.37-03	1.77+00	8.94-02	8.35+01	1.65+01	0.00	0.00	0.00	0.00
16	2.70-02	0.00	7.34-02	9.87+01	1.31+00	0.00	0.00	J.00	1.40-03	1.88+00	9.17-02	8.14+01	1.86+01	0.00	0.00	0.00	0.00
17	2.76-02	0.00	7.36-02	9.86+01	1.43+00	0.00	0.00	J.00	1.42-03	2.00+00	9.39-02	7.97+01	2.03+01	0.00	0.00	0.00	0.00
18	2.81-02	0.00	7.38-02	9.85+01	1.51+00	0.00	0.00	J.00	1.45-03	2.11+00	9.59-02	7.81+01	2.19+01	0.00	0.00	0.00	0.00
19	2.86-02	0.00	7.39-02	9.84+01	1.55+00	0.00	0.00	J.00	1.46-03	2.21+00	9.78-02	7.67+01	2.33+01	0.00	0.00	0.00	0.00
20	2.89-02	0.00	7.40-02	9.84+01	1.57+00	0.00	0.00	J.00	1.48-03	2.31+00	9.94-02	7.55+01	2.45+01	0.00	0.00	0.00	0.00
21	2.92-02	0.00	7.41-02	9.84+01	1.57+00	0.00	0.00	J.00	1.49-03	2.41+00	1.01-01	7.44+01	2.56+01	0.00	0.00	0.00	0.00
22	2.95-02	0.00	7.41-02	9.84+01	1.57+00	0.00	0.00	J.00	1.51-03	2.51+00	1.02-01	7.35+01	2.65+01	0.00	0.00	0.00	0.00
23	2.97-02	0.00	7.42-02	9.84+01	1.57+00	0.00	0.00	J.00	1.52-03	2.61+00	1.04-01	7.26+01	2.74+01	0.00	0.00	0.00	0.00
24	2.99-02	0.00	7.42-02	9.84+01	1.57+00	0.00	0.00	J.00	1.53-03	2.71+00	1.05-01	7.17+01	2.83+01	0.00	0.00	0.00	0.00
25	3.00-02	0.00	7.42-02	9.84+01	1.58+00	0.00	0.00	J.00	1.53-03	2.76+00	1.06-01	7.09+01	2.91+01	0.00	0.00	0.00	0.00

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DETAILED PRINTOUT FOR THE GAS KR45 M

B-113

RADIAL POINT 2

DETAILED PRINTOUT FOR THE GAS XE 138

* * * * *		* < THO2 NEUTR --> * < HE UC2 TRISO --> * FUEL * * * * *		* * * * *		* * * * *		* * * * *		* * * * *		* * * * *	
* * * * *		* AVG FUEL * BIRTHRTE * * * * *		* BIRTHRTE * * * * *		* BIRTHRTE * * * * *		* FUEL REL * * * * *		* * * * *		* * * * *	
* * * * *		* MICROL / * * * * *		* MICROL / * * * * *		* MICROL / * * * * *		* FUEL * * * * *		* RTE MICR * * * * *		* RELEASE RATE COMING FROM --> * * * * *	
PT	(CC)	(C)	(CC*S)	R/B	(CC*S)	R/B	(CC*S)	R/B	R/B	R/B	OL/CC/S	THO2 NEUTR	HE UC2 TRISO
1	1.518+04	6.185+02	1.469-10	9.966-09	2.155-08	4.260-08	2.170-08	7.359-07	7.483-07	1.624-14	9.617-13	5.654+00	9.434+01
2	3.035+04	6.662+02	7.035-10	1.159-08	3.440-08	6.000-08	3.511-08	7.678-07	8.288-07	2.910-14	2.805-12	7.094+00	9.288+01
3	3.035+04	7.300+02	1.461-09	1.516-08	3.288-08	8.669-08	3.434-08	8.738-07	9.574-07	3.267-14	6.737-12	8.669+00	9.126+01
4	3.035+04	7.858+02	2.249-09	2.107-08	3.193-08	1.179-07	3.416-08	9.655-07	1.097-06	3.749-14	1.264-01	1.604+01	8.984+01
5	3.035+04	8.238+02	3.064-09	2.962-08	3.067-08	1.426-07	3.374-08	1.374-06	1.207-06	4.070-14	2.231-01	1.075+01	8.903+01
6	3.035+04	8.471+02	3.454-09	4.082-08	2.729-08	1.583-07	3.074-08	1.135-06	1.280-06	3.935-14	3.583-01	1.098+01	8.866+01
7	3.035+04	8.614+02	3.709-09	5.432-08	2.347-08	1.672-07	2.718-08	1.175-06	1.327-06	3.608-14	5.584-01	1.088+01	8.856+01
8	3.035+04	8.694+02	3.873-09	6.993-08	2.095-08	1.715-07	2.482-08	1.211-06	1.356-06	3.366-14	6.646-01	1.067+01	8.852+01
9	3.035+04	8.740+02	3.803-09	8.719-08	1.824-08	1.744-07	2.255-08	1.217-06	1.376-06	3.034-14	1.093+00	1.049+01	8.842+01
10	3.035+04	8.763+02	3.534-09	1.050-07	1.539-08	1.764-07	1.892-08	1.226-06	1.390-06	2.629-14	1.412+00	1.032+01	8.827+01
11	3.035+04	8.772+02	3.301-09	1.228-07	1.302-08	1.777-07	1.632-08	1.232-06	1.399-06	2.283-14	1.775+00	1.013+01	8.809+01
12	3.035+04	8.774+02	3.114-09	1.358-07	1.144-08	1.806-07	1.455-08	1.236-06	1.407-06	2.047-14	2.065+00	1.009+01	8.784+01
13	3.035+04	8.770+02	2.708-09	1.448-07	9.481-09	1.864-07	1.219-08	1.237-06	1.414-06	1.724-14	2.274+00	1.025+01	8.748+01
14	3.035+04	8.762+02	2.431-09	1.529-07	8.113-09	1.920-07	1.154-08	1.238-06	1.421-06	1.498-14	2.481+00	1.040+01	8.712+01
15	3.035+04	8.754+02	2.245-09	1.601-07	7.077-09	1.975-07	9.322-09	1.238-06	1.426-06	1.329-14	2.744+00	1.051+01	8.678+01
16	3.035+04	8.746+02	1.882-09	1.664-07	5.812-09	2.027-07	7.695-09	1.237-06	1.431-06	1.101-14	2.844+00	1.070+01	8.646+01
17	3.035+04	8.739+02	1.661-09	1.717-07	4.989-09	2.074-07	6.651-09	1.237-06	1.436-06	9.547-15	2.986+00	1.084+01	8.617+01
18	3.035+04	8.732+02	1.545-09	1.764-07	4.479-09	2.118-07	6.024-09	1.237-06	1.439-06	8.670-15	3.145+00	1.094+01	8.592+01
19	3.035+04	8.726+02	1.259-09	1.804-07	3.609-09	2.158-07	4.868-09	1.236-06	1.443-06	7.024-15	3.234+00	1.109+01	8.568+01
20	3.035+04	8.722+02	1.108-09	1.839-07	3.124-09	2.194-07	4.232-09	1.236-06	1.446-06	6.121-15	3.326+00	1.120+01	8.547+01
21	3.035+04	8.719+02	1.018-09	1.870-07	2.807-09	2.227-07	3.825-09	1.237-06	1.450-06	5.546-15	3.434+00	1.127+01	8.529+01
22	3.035+04	8.718+02	8.772-10	1.898-07	2.404-09	2.258-07	3.281-09	1.237-06	1.453-06	4.768-15	3.491+00	1.139+01	8.512+01
23	3.035+04	8.718+02	7.719-10	1.923-07	2.100-09	2.268-07	2.812-09	1.238-06	1.457-06	4.184-15	3.547+00	1.149+01	8.497+01
24	3.035+04	8.730+02	7.469-10	1.951-07	2.032-09	2.328-07	2.779-09	1.242-06	1.464-06	4.069-15	3.580+00	1.163+01	8.479+01
25	1.518+04	8.755+02	7.469-10	1.973-07	2.032-09	2.367-07	2.779-09	1.249-06	1.475-06	4.099-15	3.595+00	1.173+01	8.467+01

RADIAL POINT 3

PARTICLE FAILURES
DISTANCES IN MICRONS, FAILURES (18)

THO2 NEUTR								PL UC2 TRISO									
MAX DISTANCE				** PERCENT FAILURES OF TOTAL FAILURE **				*MAX DISTANCE*				** PERCENT FAILURES OF TOTAL FAILURE **					
AX	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	HIGH	AX	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	HIGH
PT	MIGRAT	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAT	IN SIC	TEMP	PT	MIGRAT	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAT	IN SIC	TEMP
1	5.47-07	0.00	3.01-02	1.00+02	0.00	0.00	0.00	J.00	8.50-09	0.00	3.38-02	1.00+02	0.00	0.00	0.00	0.00	0.00
2	7.77-06	0.00	3.07-02	1.00+02	0.00	0.00	0.00	J.00	1.62-07	1.44-02	4.36-02	1.00+02	0.00	0.00	0.00	0.00	0.00
3	1.04-04	0.00	3.23-02	1.00+02	0.00	0.00	0.00	J.00	3.21-06	5.36-02	5.56-02	9.99+01	1.16-01	0.00	0.00	0.00	0.00
4	7.48-04	0.00	3.49-02	1.00+02	0.00	0.00	0.00	J.00	3.02-05	1.36-01	6.70-02	9.99+01	9.60-02	0.00	0.00	0.00	0.00
5	2.60-03	0.00	3.88-02	1.00+02	0.00	0.00	0.00	J.00	1.21-04	2.62-01	7.44-02	9.66+01	3.15+00	0.00	0.00	0.00	0.00
6	5.62-03	0.00	4.34-02	1.00+02	0.00	0.00	0.00	J.00	2.81-04	4.17-01	7.81-02	9.28+01	7.23+00	0.00	0.00	0.00	0.00
7	9.24-03	0.00	4.86-02	1.00+02	0.00	0.00	0.00	J.00	4.79-04	5.85-01	7.96-02	9.15+01	8.55+00	0.00	0.00	0.00	0.00
8	1.28-02	0.00	5.40-02	1.00+02	0.00	0.00	0.00	J.00	6.75-04	7.56-01	8.00-02	9.15+01	8.51+00	0.00	0.00	0.00	0.00
9	1.60-02	0.00	5.96-02	1.00+02	0.00	0.00	0.00	J.00	8.50-04	9.23-01	8.03-02	9.15+01	8.48+00	0.00	0.00	0.00	0.00
10	1.86-02	0.00	6.48-02	1.00+02	0.00	0.00	0.00	J.00	9.94-04	1.08+00	8.05-02	9.15+01	8.46+00	0.00	0.00	0.00	0.00
11	2.07-02	0.00	6.97-02	1.00+02	0.00	0.00	0.00	J.00	1.11-03	1.24+00	8.07-02	9.16+01	8.43+00	0.00	0.00	0.00	0.00
12	2.26-02	0.00	7.19-02	1.00+02	0.00	0.00	0.00	J.00	1.20-03	1.38+00	8.19-02	9.06+01	9.42+00	0.00	0.00	0.00	0.00
13	2.41-02	0.00	7.23-02	9.97+01	3.22-01	0.00	0.00	J.00	1.27-03	1.52+00	8.44-02	8.61+01	1.19+01	0.00	0.00	0.00	0.00
14	2.53-02	0.00	7.28-02	9.92+01	7.70-01	0.00	0.00	J.00	1.32-03	1.64+00	8.69-02	8.57+01	1.43+01	0.00	0.00	0.00	0.00
15	2.62-02	0.00	7.31-02	9.89+01	1.09+00	0.00	0.00	J.00	1.36-03	1.77+00	8.94-02	8.35+01	1.05+01	0.00	0.00	0.00	0.00
16	2.70-02	0.00	7.34-02	9.87+01	1.30+00	0.00	0.00	J.00	1.40-03	1.88+00	9.17-02	8.14+01	1.86+01	0.00	0.00	0.00	0.00
17	2.76-02	0.00	7.36-02	9.86+01	1.43+00	0.00	0.00	J.00	1.42-03	2.00+00	9.39-02	7.97+01	2.03+01	0.00	0.00	0.00	0.00
18	2.81-02	0.00	7.38-02	9.85+01	1.51+00	0.00	0.00	J.00	1.44-03	2.10+00	9.59-02	7.81+01	2.19+01	0.00	0.00	0.00	0.00
19	2.85-02	0.00	7.39-02	9.84+01	1.55+00	0.00	0.00	J.00	1.46-03	2.21+00	9.76-02	7.67+01	2.33+01	0.00	0.00	0.00	0.00
20	2.89-02	0.00	7.40-02	9.84+01	1.57+00	0.00	0.00	J.00	1.48-03	2.31+00	9.94-02	7.55+01	2.45+01	0.00	0.00	0.00	0.00
21	2.92-02	0.00	7.41-02	9.84+01	1.57+00	0.00	0.00	J.00	1.49-03	2.41+00	1.01-01	7.45+01	2.55+01	0.00	0.00	0.00	0.00
22	2.94-02	0.00	7.41-02	9.84+01	1.57+00	0.00	0.00	J.00	1.50-03	2.51+00	1.02-01	7.35+01	2.65+01	0.00	0.00	0.00	0.00
23	2.96-02	0.00	7.42-02	9.84+01	1.57+00	0.00	0.00	J.00	1.51-03	2.61+00	1.04-01	7.26+01	2.74+01	0.00	0.00	0.00	0.00
24	2.99-02	0.00	7.42-02	9.84+01	1.57+00	0.00	0.00	J.00	1.52-03	2.71+00	1.05-01	7.17+01	2.83+01	0.00	0.00	0.00	0.00
25	3.00-02	0.00	7.42-02	9.84+01	1.58+00	0.00	0.00	J.00	1.53-03	2.76+00	1.06-01	7.09+01	2.91+01	0.00	0.00	0.00	0.00

RADIAL POINT 3

DETAILED PRINTOUT FOR THE GAS KR85 M

[illegible]

RADIAL POINT 3

DETAILED PRINTOUT FOR THE GAS XE 130

[illegible]

B-117

RADIAL POINT 4

PARTICLE FAILURES
DISTANCES IN MICRONS, FAILURES (2)

<-----THO2 NEUTR----->									<-----FE UC2 TPISU----->								
MAX DISTANCE				** PERCENT FAILURES OF TOTAL FAILURE **					*MAX DISTANCE*				** PERCENT FAILURES OF TOTAL FAILURE **				
AX	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	HIGH	AX	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	HIGH
PI	MIGRAT	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAT	IN SIC	TEMP	PI	MIGRAT	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAT	IN SIC	TEMP
1	5.45-07	0.00	3.01-02	1.00+02	0.00	0.00	0.00	0.00	8.45-09	0.00	3.38-02	1.00+02	0.00	0.00	0.00	0.00	0.00
2	7.73-06	0.00	3.07-02	1.00+02	0.00	0.00	0.00	0.00	1.62-07	1.43-02	4.36-02	1.00+02	0.00	0.00	0.00	0.00	0.00
3	1.03-04	0.00	3.23-02	1.00+02	0.00	0.00	0.00	0.00	3.17-06	5.35-02	5.56-02	9.99+01	1.16-01	0.00	0.00	0.00	0.00
4	7.44-04	0.00	3.49-02	1.00+02	0.00	0.00	0.00	0.00	3.01-05	1.36-01	6.70-02	9.99+01	9.00-02	0.00	0.00	0.00	0.00
5	2.59-03	0.00	3.88-02	1.00+02	0.00	0.00	0.00	0.00	1.20-04	2.62-01	7.44-02	9.68+01	3.15+00	0.00	0.00	0.00	0.00
6	5.61-03	0.00	4.34-02	1.00+02	0.00	0.00	0.00	0.00	2.80-04	4.16-01	7.81-02	9.26+01	7.23+00	0.00	0.00	0.00	0.00
7	9.21-03	0.00	4.86-02	1.00+02	0.00	0.00	0.00	0.00	4.77-04	5.84-01	7.96-02	9.15+01	6.55+00	0.00	0.00	0.00	0.00
8	1.28-02	0.00	5.40-02	1.00+02	0.00	0.00	0.00	0.00	6.73-04	7.55-01	8.00-02	9.15+01	8.51+00	0.00	0.00	0.00	0.00
9	1.59-02	0.00	5.96-02	1.00+02	0.00	0.00	0.00	0.00	8.47-04	9.22-01	8.03-02	9.15+01	8.48+00	0.00	0.00	0.00	0.00
10	1.86-02	0.00	6.48-02	1.00+02	0.00	0.00	0.00	0.00	9.91-04	1.08+00	8.05-02	9.15+01	6.45+00	0.00	0.00	0.00	0.00
11	2.07-02	0.00	6.97-02	1.00+02	0.00	0.00	0.00	0.00	1.11-03	1.23+00	8.07-02	9.16+01	8.43+00	0.00	0.00	0.00	0.00
12	2.25-02	0.00	7.19-02	1.00+02	0.00	0.00	0.00	0.00	1.20-03	1.38+00	8.18-02	9.06+01	9.42+00	0.00	0.00	0.00	0.00
13	2.40-02	0.00	7.23-02	9.97+01	3.22-01	0.00	0.00	0.00	1.26-03	1.51+00	8.43-02	8.81+01	1.19+01	0.00	0.00	0.00	0.00
14	2.52-02	0.00	7.28-02	9.92+01	7.70-01	0.00	0.00	0.00	1.32-03	1.64+00	8.69-02	8.57+01	1.43+01	0.00	0.00	0.00	0.00
15	2.62-02	0.00	7.31-02	9.89+01	1.09+00	0.00	0.00	0.00	1.36-03	1.77+00	8.94-02	8.35+01	1.05+01	0.00	0.00	0.00	0.00
16	2.69-02	0.00	7.34-02	9.87+01	1.30+00	0.00	0.00	0.00	1.39-03	1.88+00	9.17-02	8.15+01	1.05+01	0.00	0.00	0.00	0.00
17	2.75-02	0.00	7.36-02	9.86+01	1.43+00	0.00	0.00	0.00	1.42-03	1.99+00	9.39-02	7.97+01	2.03+01	0.00	0.00	0.00	0.00
18	2.80-02	0.00	7.38-02	9.85+01	1.51+00	0.00	0.00	0.00	1.44-03	2.10+00	9.59-02	7.61+01	2.19+01	0.00	0.00	0.00	0.00
19	2.85-02	0.00	7.39-02	9.84+01	1.55+00	0.00	0.00	0.00	1.46-03	2.21+00	9.77-02	7.67+01	2.33+01	0.00	0.00	0.00	0.00
20	2.88-02	0.00	7.40-02	9.84+01	1.57+00	0.00	0.00	0.00	1.47-03	2.31+00	9.94-02	7.55+01	2.45+01	0.00	0.00	0.00	0.00
21	2.91-02	0.00	7.41-02	9.84+01	1.57+00	0.00	0.00	0.00	1.49-03	2.41+00	1.01-01	7.45+01	2.55+01	0.00	0.00	0.00	0.00
22	2.94-02	0.00	7.41-02	9.84+01	1.57+00	0.00	0.00	0.00	1.50-03	2.51+00	1.02-01	7.35+01	2.65+01	0.00	0.00	0.00	0.00
23	2.96-02	0.00	7.42-02	9.84+01	1.57+00	0.00	0.00	0.00	1.51-03	2.61+00	1.04-01	7.26+01	2.74+01	0.00	0.00	0.00	0.00
24	2.98-02	0.00	7.42-02	9.84+01	1.57+00	0.00	0.00	0.00	1.52-03	2.70+00	1.05-01	7.17+01	2.83+01	0.00	0.00	0.00	0.00
25	2.99-02	0.00	7.42-02	9.84+01	1.58+00	0.00	0.00	0.00	1.53-03	2.76+00	1.06-01	7.05+01	2.91+01	0.00	0.00	0.00	0.00

RADIAL POINT 4

DETAILED PRINTOUT FOR THE GAS KR85 M

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B-119

474

[illegible]

B-120

RADIAL POINT 5

- PARTICLE FAILURES -
DISTANCES IN MICRONS, FAILURES (4)

<-----THO2 NEUTR----->								<-----ME UC2 TRISO----->							
MAX DISTANCE		TOTAL FAILUR	** PERCENT FAILURES OF TOTAL FAILURE **					*MAX DISTANCE*		TOTAL FAILUR	** PERCENT FAILURES OF TOTAL FAILURE **				
AX KERNEL PT MIGRAT	FIPROD IN SIC		MANUF. DEFECT	PRESS. VESSEL	KERNEL MIGRAT	FIPROD IN SIC	HIGH TEMP	KERNEL MIGRAT	FIPROD IN SIC		MANUF. DEFECT	PRESS. VESSEL	KERNEL MIGRAT	FIPROD IN SIC	HIGH TEMP
1	5.41-07 0.00	3.01-02	1.00+02	0.00	0.00	0.00	0.00	8.38-09 0.00	3.38-02	1.00+02	0.00	0.00	0.00	0.00	0.00
2	7.68-06 0.00	3.07-02	1.00+02	0.00	0.00	0.00	0.00	1.60-07 1.43-02	4.36-02	1.00+02	0.00	0.00	0.00	0.00	0.00
3	1.02-04 0.00	3.23-02	1.00+02	0.00	0.00	0.00	0.00	3.16-06 5.33-02	5.56-02	9.99+01	1.16-01	0.00	0.00	0.00	0.00
4	7.40-04 0.00	3.49-02	1.00+02	0.00	0.00	0.00	0.00	2.99-05 1.36-01	6.70-02	9.99+01	9.00-02	0.00	0.00	0.00	0.00
5	2.57-03 0.00	3.88-02	1.00+02	0.00	0.00	0.00	0.00	1.20-04 2.61-01	7.44-02	9.69+01	3.15+00	0.00	0.00	0.00	0.00
6	5.58-03 0.00	4.34-02	1.00+02	0.00	0.00	0.00	0.00	2.78-04 4.15-01	7.81-02	9.28+01	7.22+00	0.00	0.00	0.00	0.00
7	9.17-03 0.00	4.86-02	1.00+02	0.00	0.00	0.00	0.00	4.75-04 5.83-01	7.96-02	9.15+01	8.54+00	0.00	0.00	0.00	0.00
8	1.27-02 0.00	5.40-02	1.00+02	0.00	0.00	0.00	0.00	6.70-04 7.54-01	8.00-02	9.15+01	8.51+00	0.00	0.00	0.00	0.00
9	1.59-02 0.00	5.96-02	1.00+02	0.00	0.00	0.00	0.00	8.44-04 9.21-01	8.03-02	9.15+01	8.47+00	0.00	0.00	0.00	0.00
10	1.85-02 0.00	6.48-02	1.00+02	0.00	0.00	0.00	0.00	9.87-04 1.08+00	8.05-02	9.16+01	8.45+00	0.00	0.00	0.00	0.00
11	2.06-02 0.00	6.97-02	1.00+02	0.00	0.00	0.00	0.00	1.13-03 1.23+00	8.07-02	9.16+01	8.42+00	0.00	0.00	0.00	0.00
12	2.25-02 0.00	7.19-02	1.00+02	0.00	0.00	0.00	0.00	1.19-03 1.38+00	8.18-02	9.16+01	9.42+00	0.00	0.00	0.00	0.00
13	2.39-02 0.00	7.23-02	9.97+01	3.22-01	0.00	0.00	0.00	1.26-03 1.51+00	8.43-02	8.81+01	1.19+01	0.00	0.00	0.00	0.00
14	2.51-02 0.00	7.28-02	9.92+01	7.70-01	0.00	0.00	0.00	1.31-03 1.64+00	8.69-02	8.57+01	1.43+01	0.00	0.00	0.00	0.00
15	2.61-02 0.00	7.31-02	9.89+01	1.09+00	0.00	0.00	0.00	1.36-03 1.76+00	8.94-02	8.35+01	1.65+01	0.00	0.00	0.00	0.00
16	2.68-02 0.00	7.34-02	9.87+01	1.30+00	0.00	0.00	0.00	1.39-03 1.88+00	9.17-02	8.15+01	1.65+01	0.00	0.00	0.00	0.00
17	2.75-02 0.00	7.36-02	9.86+01	1.43+00	0.00	0.00	0.00	1.41-03 1.99+00	9.39-02	7.57+01	2.03+01	0.00	0.00	0.00	0.00
18	2.80-02 0.00	7.38-02	9.85+01	1.51+00	0.00	0.00	0.00	1.43-03 2.10+00	9.59-02	7.81+01	2.19+01	0.00	0.00	0.00	0.00
19	2.84-02 0.00	7.39-02	9.84+01	1.55+00	0.00	0.00	0.00	1.45-03 2.21+00	9.77-02	7.67+01	2.33+01	0.00	0.00	0.00	0.00
20	2.87-02 0.00	7.40-02	9.84+01	1.57+00	0.00	0.00	0.00	1.47-03 2.31+00	9.93-02	7.55+01	2.45+01	0.00	0.00	0.00	0.00
21	2.90-02 0.00	7.41-02	9.84+01	1.57+00	0.00	0.00	0.00	1.48-03 2.41+00	1.01-01	7.45+01	2.55+01	0.00	0.00	0.00	0.00
22	2.93-02 0.00	7.41-02	9.84+01	1.57+00	0.00	0.00	0.00	1.49-03 2.51+00	1.02-01	7.35+01	2.65+01	0.00	0.00	0.00	0.00
23	2.95-02 0.00	7.42-02	9.84+01	1.57+00	0.00	0.00	0.00	1.51-03 2.60+00	1.03-01	7.27+01	2.73+01	0.00	0.00	0.00	0.00
24	2.97-02 0.00	7.42-02	9.84+01	1.57+00	0.00	0.00	0.00	1.51-03 2.70+00	1.05-01	7.17+01	2.83+01	0.00	0.00	0.00	0.00
25	2.98-02 0.00	7.42-02	9.84+01	1.58+00	0.00	0.00	0.00	1.52-03 2.75+00	1.06-01	7.10+01	2.90+01	0.00	0.00	0.00	0.00

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RADIAL POINT 5

DETAILED PRINTOUT FOR THE GAS KR85 M

* * AX*	* * FUEL	* * VCL	* * TEMP	* * MICHOL/	* * R/B	* * MICHOL/	* * R/B	* * MICHOL/	* * R/B	* * FUEL	* * RTE MICH	* * THU. MEUTR	* * ME UC2 TRISO	* * CONTAM
Pts	(CC)	(C)	(CC+S)	(C)	(CC+S)	(C)	(CC+S)	(C)	(CC+S)	(C)	(CC+S)	(C)	(CC+S)	(C)
1	6.070+04	6.182+02	6.801-11	5.704-08	4.374-09	2.439-07	4.442-09	4.329-06	4.570-06	2.030-14	1.911-02	5.254+00	9.473+01	
2	1.214+05	6.659+02	3.257-10	7.394-08	6.982-09	3.827-07	7.308-09	5.261-06	5.630-06	4.114-14	5.854-12	6.495+00	9.345+01	
3	1.214+05	7.296+02	6.763-10	1.113-07	6.673-09	6.366-07	7.349-09	6.475-06	7.463-06	5.485-14	1.373-01	7.745+00	9.212+01	
4	1.214+05	7.854+02	1.041-09	1.738-07	6.480-09	9.723-07	7.521-09	8.712-06	9.573-06	7.200-14	2.514-01	8.751+00	9.100+01	
5	1.214+05	8.234+02	1.418-09	2.632-07	6.225-09	1.267-06	7.644-09	1.023-05	1.131-05	8.642-14	4.319-01	9.129+00	9.044+01	
6	1.214+05	8.468+02	1.599-09	3.789-07	5.538-09	1.469-06	7.137-09	1.129-05	1.251-05	8.930-14	6.785-01	9.111+00	9.021+01	
7	1.214+05	8.611+02	1.717-09	5.176-07	4.764-09	1.593-06	6.481-09	1.200-05	1.331-05	8.626-14	1.030-00	8.798+00	9.017+01	
8	1.214+05	8.692+02	1.793-09	6.767-07	4.251-09	1.659-06	6.044-09	1.245-05	1.382-05	8.351-14	1.453-00	8.447+00	9.010+01	
9	1.214+05	8.738+02	1.761-09	8.515-07	3.702-09	1.703-06	5.463-09	1.273-05	1.416-05	7.736-14	1.538-00	8.151+00	8.991+01	
10	1.214+05	8.761+02	1.636-09	1.031-06	3.123-09	1.731-06	4.759-09	1.290-05	1.439-05	6.850-14	2.463-00	7.894+00	8.964+01	
11	1.214+05	8.770+02	1.528-09	1.210-06	2.643-09	1.750-06	4.171-09	1.301-05	1.456-05	6.072-14	3.044-00	7.617+00	8.934+01	
12	1.214+05	8.772+02	1.442-09	1.340-06	2.322-09	1.782-06	3.763-09	1.306-05	1.468-05	5.523-14	3.497-00	7.491+00	8.901+01	
13	1.214+05	8.767+02	1.254-09	1.429-06	1.924-09	1.840-06	3.176-09	1.309-05	1.477-05	4.693-14	3.619-00	7.544+00	8.864+01	
14	1.214+05	8.760+02	1.125-09	1.510-06	1.647-09	1.895-06	2.772-09	1.309-05	1.483-05	4.111-14	4.132-00	7.591+00	8.828+01	
15	1.214+05	8.751+02	1.039-09	1.581-06	1.436-09	1.949-06	2.476-09	1.309-05	1.488-05	3.684-14	4.456-00	7.599+00	8.794+01	
16	1.214+05	8.744+02	8.715-10	1.642-06	1.180-09	2.000-06	2.051-09	1.308-05	1.493-05	3.063-14	4.673-00	7.703+00	8.762+01	
17	1.214+05	8.736+02	7.691-10	1.694-06	1.013-09	2.046-06	1.782-09	1.308-05	1.497-05	2.667-14	4.684-00	7.767+00	8.735+01	
18	1.214+05	8.729+02	7.152-10	1.740-06	9.090-10	2.089-06	1.624-09	1.307-05	1.500-05	2.437-14	5.100-00	7.791+00	8.710+01	
19	1.214+05	8.723+02	5.828-10	1.779-06	7.325-10	2.127-06	1.315-09	1.306-05	1.503-05	1.978-14	5.244-00	7.880+00	8.688+01	
20	1.214+05	8.720+02	5.128-10	1.813-06	6.341-10	2.163-06	1.147-09	1.306-05	1.507-05	1.728-14	5.381-00	7.934+00	8.668+01	
21	1.214+05	8.717+02	4.715-10	1.844-06	5.697-10	2.295-06	1.041-09	1.306-05	1.510-05	1.572-14	5.529-00	7.955+00	8.652+01	
22	1.214+05	8.715+02	4.061-10	1.872-06	4.879-10	2.227-06	8.940-10	1.307-05	1.514-05	1.353-14	5.617-00	8.028+00	8.636+01	
23	1.214+05	8.715+02	3.574-10	1.897-06	4.263-10	2.257-06	7.836-10	1.307-05	1.518-05	1.190-14	5.700-00	8.086+00	8.621+01	
24	1.214+05	8.727+02	3.456-10	1.929-06	4.124-10	2.301-06	7.582-10	1.316-05	1.529-05	1.159-14	5.754-00	8.188+00	8.606+01	
25	6.070+04	8.752+02	3.458-10	1.959-06	4.124-10	2.349-06	7.582-10	1.329-05	1.546-05	1.172-14	5.780-00	6.266+00	8.595+01	

RADIAL POINT 6

PARTICLE FAILURES
DISTANCES IN MICRONS, FAILURES (X)

<-----THO2 NEUTR----->									<-----ML UC2 TRISO----->								
MAX DISTANCE			** PERCENT FAILURES OF TOTAL FAILURE **						*MAX DISTANCE*			** PERCENT FAILURES OF TOTAL FAILURE **					
AX	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	HIGH	KERNEL	FIPROD	TOTAL	MANUF.	PKLSS.	KERNEL	FIPROD	HIGH	
PI	MIGRAI	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAI	IN SIC	TEMP	MIGRAI	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAI	IN SIC	TEMP	
1	5.36-07	0.00	3.01-02	1.00+02	0.00	0.00	0.00	J.00	8.29-09	0.00	3.38-02	1.00+02	0.00	0.00	0.00	0.00	
2	7.61-06	0.00	3.07-02	1.00+02	0.00	0.00	0.00	J.00	1.59-07	1.42-02	4.36-02	1.00+02	0.00	0.00	0.00	0.00	
3	1.02-04	0.00	3.23-02	1.00+02	0.00	0.00	0.00	J.00	3.13-06	5.31-02	5.56-02	9.99+01	1.16-01	0.00	0.00	0.00	
4	7.34-04	0.00	3.49-02	1.00+02	0.00	0.00	0.00	J.00	2.96-05	1.35-01	6.70-02	9.99+01	9.60-02	0.00	0.00	0.00	
5	2.56-03	0.00	3.88-02	1.00+02	0.00	0.00	0.00	J.00	1.19-04	2.60-01	7.44-02	9.69+01	3.14+00	0.00	0.00	0.00	
6	5.55-03	0.00	4.34-02	1.00+02	0.00	0.00	0.00	J.00	2.76-04	4.14-01	7.81-02	9.28+01	7.21+00	0.00	0.00	0.00	
7	9.13-03	0.00	4.86-02	1.00+02	0.00	0.00	0.00	J.00	4.72-04	5.82-01	7.96-02	9.15+01	8.54+00	0.00	0.00	0.00	
8	1.27-02	0.00	5.40-02	1.00+02	0.00	0.00	0.00	J.00	6.67-04	7.52-01	8.00-02	9.15+01	8.50+00	0.00	0.00	0.00	
9	1.58-02	0.00	5.96-02	1.00+02	0.00	0.00	0.00	J.00	8.40-04	9.19-01	8.03-02	9.15+01	8.47+00	0.00	0.00	0.00	
10	1.84-02	0.00	6.48-02	1.00+02	0.00	0.00	0.00	J.00	9.83-04	1.08+00	8.05-02	9.16+01	8.44+00	0.00	0.00	0.00	
11	2.05-02	0.00	6.97-02	1.00+02	0.00	0.00	0.00	J.00	1.10-03	1.23+00	8.07-02	9.16+01	8.42+00	0.00	0.00	0.00	
12	2.24-02	0.00	7.19-02	1.00+02	0.00	0.00	0.00	J.00	1.19-03	1.37+00	8.18-02	9.06+01	9.42+00	0.00	0.00	0.00	
13	2.38-02	0.00	7.23-02	9.97+01	3.21-01	0.00	0.00	J.00	1.25-03	1.51+00	8.43-02	8.81+01	1.19+01	0.00	0.00	0.00	
14	2.50-02	0.00	7.28-02	9.92+01	7.69-01	0.00	0.00	J.00	1.31-03	1.64+00	8.69-02	8.57+01	1.43+01	0.00	0.00	0.00	
15	2.60-02	0.00	7.31-02	9.89+01	1.09+00	0.00	0.00	J.00	1.35-03	1.76+00	8.93-02	8.35+01	1.65+01	0.00	0.00	0.00	
16	2.67-02	0.00	7.34-02	9.87+01	1.30+00	0.00	0.00	J.00	1.38-03	1.88+00	9.17-02	8.15+01	1.65+01	0.00	0.00	0.00	
17	2.73-02	0.00	7.36-02	9.86+01	1.43+00	0.00	0.00	J.00	1.41-03	1.99+00	9.39-02	7.97+01	2.13+01	0.00	0.00	0.00	
18	2.78-02	0.00	7.38-02	9.85+01	1.51+00	0.00	0.00	J.00	1.43-03	2.10+00	9.59-02	7.81+01	2.19+01	0.00	0.00	0.00	
19	2.83-02	0.00	7.39-02	9.84+01	1.55+00	0.00	0.00	J.00	1.45-03	2.20+00	9.77-02	7.67+01	2.33+01	0.00	0.00	0.00	
20	2.86-02	0.00	7.40-02	9.84+01	1.57+00	0.00	0.00	J.00	1.46-03	2.30+00	9.93-02	7.56+01	2.44+01	0.00	0.00	0.00	
21	2.89-02	0.00	7.40-02	9.84+01	1.57+00	0.00	0.00	J.00	1.48-03	2.40+00	1.01-01	7.45+01	2.55+01	0.00	0.00	0.00	
22	2.91-02	0.00	7.41-02	9.84+01	1.57+00	0.00	0.00	J.00	1.49-03	2.50+00	1.02-01	7.35+01	2.65+01	0.00	0.00	0.00	
23	2.94-02	0.00	7.42-02	9.84+01	1.57+00	0.00	0.00	J.00	1.51-03	2.60+00	1.03-01	7.27+01	2.73+01	0.00	0.00	0.00	
24	2.96-02	0.00	7.42-02	9.84+01	1.57+00	0.00	0.00	J.00	1.51-03	2.70+00	1.05-01	7.17+01	2.83+01	0.00	0.00	0.00	
25	2.97-02	0.00	7.42-02	9.84+01	1.58+00	0.00	0.00	J.00	1.51-03	2.75+00	1.06-01	7.10+01	2.90+01	0.00	0.00	0.00	

RADIAL POINT 6

DETAILED PRINTOUT FOR THE GAS KR85 M

* * *		* * * *-THO2 MEUTR -->*-ME UC2 TRISO-->*				* FUEL *				* * * * *				* * * * *			
* * *		*AVG FUEL* BIRTHRTE*				*BIRTHRTE*				*BIRTHRTE*				*FUEL KELC*			
AX*FUEL VOL* TEMP		*MICHL*/ * *				*MICHL*/ * *				*CONTAM *				*FUEL MICL*---1 RELEASE RATE COMING FROM--->*			
PT#	[CC]	* [C]	* [CC/S]	* R/B	* [CC/S]	* R/B	* [CC/S]	* R/B	* R/B	* R/B	* R/B	* R/B	* R/B	* R/B	* R/B	* R/B	
1	7.588+04	6.180+02	6.801-11	5.701-08	4.374-09	2.437-07	4.442-09	4.327-06	4.567-06	2.029-14	1.911-02	5.254+00	9.473+01				
2	1.518+05	6.657+02	3.257-10	7.388-08	6.982-09	3.824-07	7.3 8-09	5.256-06	5.625-06	4.111-14	5.654-02	6.495+00	9.345+01				
3	1.518+05	7.294+02	6.763-10	1.112-07	6.673-09	6.360-07	7.349-09	6.868-06	7.456-06	5.479-14	1.373-01	7.745+00	9.212+01				
4	1.518+05	7.852+02	1.041-09	1.737-07	6.480-09	9.714-07	7.521-09	8.7J3-06	9.564-06	7.194-14	2.514-01	8.751+00	9.100+01				
5	1.518+05	8.232+02	1.418-09	2.630-07	6.225-09	1.266-06	7.644-09	1.122-05	1.130-05	8.635-14	4.319-01	9.128+00	9.044+01				
6	1.518+05	8.466+02	1.599-09	3.786-07	5.538-09	1.468-06	7.137-09	1.128-05	1.250-05	8.923-14	6.785-01	9.111+00	9.021+01				
7	1.518+05	8.609+02	1.717-09	5.172-07	4.764-09	1.592-06	6.481-09	1.199-05	1.330-05	8.620-14	1.030-00	8.798+00	9.017+01				
8	1.518+05	8.690+02	1.793-09	6.762-07	4.251-09	1.658-06	6.044-09	1.244-05	1.381-05	8.345-14	1.453+00	8.446+00	9.010+01				
9	1.518+05	8.736+02	1.761-09	8.510-07	3.702-09	1.702-06	5.463-09	1.272-05	1.415-05	7.731-14	1.938+00	8.151+00	8.991+01				
10	1.518+05	8.759+02	1.636-09	1.031-06	3.123-09	1.730-06	4.759-09	1.293-05	1.439-05	6.846-14	2.463+00	7.894+00	8.964+01				
11	1.518+05	8.769+02	1.528-09	1.209-06	2.643-09	1.749-06	4.171-09	1.303-05	1.455-05	6.068-14	3.044+00	7.617+00	8.934+01				
12	1.518+05	8.770+02	1.442-09	1.339-06	2.322-09	1.781-06	3.763-09	1.306-05	1.467-05	5.520-14	3.497+00	7.491+00	8.901+01				
13	1.518+05	8.766+02	1.254-09	1.429-06	1.924-09	1.839-06	3.178-09	1.308-05	1.476-05	4.690-14	3.819+00	7.544+00	8.864+01				
14	1.518+05	8.758+02	1.125-09	1.509-06	1.647-09	1.894-06	2.772-09	1.309-05	1.482-05	4.109-14	4.132+00	7.591+00	8.828+01				
15	1.518+05	8.750+02	1.039-09	1.580-06	1.436-09	1.948-06	2.476-09	1.308-05	1.487-05	3.662-14	4.456+00	7.598+00	8.794+01				
16	1.518+05	8.742+02	8.715-10	1.641-06	1.180-09	1.999-06	2.051-09	1.308-05	1.492-05	3.061-14	4.673+00	7.703+00	8.762+01				
17	1.518+05	8.735+02	7.691-10	1.693-06	1.013-09	2.044-06	1.782-09	1.307-05	1.496-05	2.666-14	4.884+00	7.766+00	8.735+01				
18	1.518+05	8.728+02	7.152-10	1.739-06	9.090-10	2.087-06	1.624-09	1.306-05	1.499-05	2.435-14	5.116+00	7.790+00	8.710+01				
19	1.518+05	8.722+02	5.828-10	1.778-06	7.325-10	2.126-06	1.315-09	1.305-05	1.502-05	1.976-14	5.244+00	7.878+00	8.688+01				
20	1.518+05	8.718+02	5.128-10	1.812-06	6.341-10	2.161-06	1.147-09	1.305-05	1.506-05	1.727-14	5.381+00	7.933+00	8.669+01				
21	1.518+05	8.715+02	4.715-10	1.843-06	5.6												

B-125

RADIAL POINT 6

DETAILED PRINTOUT FOR THE GAS XE 138

* AX	* FUEL	* VOL	* TEMP	* MICMOL/	* R/B	* MICMOL/	* R/B	* MICMOL/	* R/B	* FUEL	* REL	* THO2	* ME	* UC2	* TRISO	* CONTAM
* PT	* (CC)	* (C)	* (CC*S)	* R/B	* (CC*S)	* R/B	* (CC*S)	* R/B	* R/B	* OL/CC/S	* THO2	* ME	* UC2	* TRISO	* CONTAM	
1	7.588+04	6.180+02	1.469-10	9.959-09	2.155-08	4.257-C8	2.170-J8	7.354-07	7.478-07	1.622-14	9.017-L3	5.654+00	9.434+01			
2	1.518+05	6.657+02	7.035-10	1.158-08	3.440-08	5.994-C8	3.511-U8	7.693-07	8.280-07	2.907-14	2.803-U2	7.094+00	9.288+01			
3	1.518+05	7.294+02	1.461-09	1.514-08	3.288-08	8.658-08	3.434-U9	8.727-J7	9.562-07	3.263-14	6.737-L2	8.669+00	9.126+01			
4	1.518+05	7.852+02	2.249-09	2.104-08	3.193-08	1.177-07	3.416-U8	9.842-U7	1.096-L6	3.744-14	1.264-U1	1.004+01	8.984+01			
5	1.518+05	8.232+02	3.064-U9	2.958-08	3.067-08	1.425-07	3.374-U8	1.073-06	1.205-U6	4.065-14	2.23L-L1	1.075+01	8.903+01			
6	1.518+05	8.466+02	3.454-U9	4.077-C8	2.729-08	1.581-07	3.374-U8	1.134-06	1.279-U6	3.931-14	3.583-L1	1.098+01	8.867+01			
7	1.518+05	8.609+02	3.709-09	5.426-U8	2.347-U8	1.670-07	2.718-U8	1.174-06	1.326-06	3.604-14	5.585-U1	1.088+01	8.857+01			
8	1.518+05	8.690+02	3.873-C9	6.986-C8	2.095-C8	1.713-C7	2.482-U8	1.200-U6	1.355-U6	3.363-14	8.046-U1	1.067+01	8.853+01			
9	1.518+05	8.736+02	3.803-09	8.711-C8	1.824-U8	1.742-U7	2.235-U8	1.216-U6	1.375-U6	3.031-14	1.093+00	1.049+01	8.842+01			
10	1.518+05	8.759+02	3.534-09	1.049-07	1.539-U8	1.762-C7	1.892-J8	1.225-U6	1.388-U6	2.627-14	1.412+00	1.032+01	8.827+01			
11	1.518+05	8.769+02	3.301-09	1.227-07	1.302-U8	1.775-07	1.632-U8	1.231-U6	1.398-U6	2.281-14	1.775+00	1.013+01	8.609+01			
12	1.518+05	8.770+02	3.114-09	1.357-07	1.144-08	1.805-07	1.455-U8	1.235-U6	1.406-U6	2.046-14	2.065+00	1.009+01	8.784+01			
13	1.518+05	8.766+02	2.708-09	1.447-07	9.481-09	1.862-07	1.219-U8	1.236-U6	1.413-U6	1.723-14	2.274+00	1.025+01	8.748+01			
14	1.518+05	8.758+02	2.431-09	1.528-07	8.113-09	1.918-07	1.054-U8	1.237-U6	1.419-U6	1.497-14	2.481+00	1.040+01	8.712+01			
15	1.518+05	8.750+02	2.245-09	1.600-07	7.077-09	1.973-C7	9.322-U9	1.236-U6	1.425-U6	1.328-14	2.704+00	1.051+01	8.678+01			
16	1.518+05	8.742+02	1.882-09	1.662-07	5.812-09	2.024-07	7.695-J9	1.236-U6	1.430-U6	1.100-14	2.644+00	1.070+01	8.646+01			
17	1.518+05	8.735+02	1.661-09	1.715-07	4.989-09	2.071-07	6.651-U9	1.236-U6	1.434-U6	9.538-15	2.988+00	1.084+01	8.618+01			
18	1.518+05	8.728+02	1.545-09	1.762-07	4.479-U9	2.115-07	6.024-U9	1.235-U6	1.438-U6	8.661-15	3.143+00	1.094+01	8.592+01			
19	1.518+05	8.722+02	1.259-09	1.803-C7	3.609-C9	2.155-U7	4.868-U9	1.235-U6	1.441-U6	7.017-15	3.234+00	1.108+01	8.568+01			
20	1.518+05	8.718+02	1.108-09	1.837-07	3.124-U9	2.190-07	4.232-U9	1.235-U6	1.445-U6	6.114-15	3.328+00	1.119+01	8.548+01			
21	1.518+05	8.715+02	1.018-09	1.868-C7	2.807-09	2.223-C7	3.825-U9	1.235-U6	1.448-U6	5.540-15	3.434+00	1.127+01	8.530+01			
22	1.518+05	8.713+02	8.772-10	1.896-07	2.404-U9	2.254-U7	3.281-J9	1.236-U6	1.451-U6	4.762-15	3.491+00	1.138+01	8.513+01			
23	1.518+05	8.714+02	7.719-10	1.921-07	2.100-09	2.284-C7	2.872-J9	1.236-U6	1.455-U6	4.179-15	3.547+00	1.148+01	8.497+01			
24	1.518+05	8.725+02	7.469-10	1.948-07	2.032-09	2.324-C7	2.779-J9	1.240-U6	1.463-U6	4.064-15	3.58+00	1.162+01	8.480+01			
25	7.588+04	8.750+02	7.469-10	1.971-07	2.032-09	2.362-07	2.779-J9	1.248-U6	1.473-U6	4.094-15	3.595+00	1.172+01	8.468+01			

RADIAL POINT 7

PARTICLE FAILURES
DISTANCES IN MICRONS, FAILURES (X)

THO2 NEUTR									ML UC2 TRISC								
MAX DISTANCE			** PERCENT FAILURES OF TOTAL FAILURE **						*MAX DISTANCE*			** PERCENT FAILURES OF TOTAL FAILURE **					
AX	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	HIGH	AX	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	HIGH
PT	MIGRAT	IN SIC	FAILURE	DEFECT	VESSEL	MIGRAT	IN SIC	TEMP	PT	MIGRAT	IN SIC	FAILURE	DEFECT	VESSEL	MIGRAT	IN SIC	TEMP
1	5.30-07	0.00	3.01-02	1.00+02	0.00	0.00	0.00	J.00	8.19-09	0.00	3.36-02	1.00+02	0.00	0.00	0.00	0.00	0.00
2	7.53-06	0.00	3.07-02	1.00+02	0.00	0.00	0.00	J.00	1.57-07	1.42-02	4.36-02	1.00+02	0.00	0.00	0.00	0.00	0.00
3	1.00-04	0.00	3.23-02	1.00+02	0.00	0.00	0.00	J.00	3.10-06	5.29-02	5.56-02	9.99+01	1.16-01	0.00	0.00	0.00	0.00
4	7.28-04	0.00	3.49-02	1.00+02	0.00	0.00	0.00	J.00	2.93-05	1.35-01	6.70-02	9.99+01	9.00-02	0.00	0.00	0.00	0.00
5	2.54-03	0.00	3.88-02	1.00+02	0.00	0.00	0.00	J.00	1.18-04	2.60-01	7.44-02	9.69+01	3.14+00	0.00	0.00	0.00	0.00
6	5.51-03	0.00	4.34-02	1.00+02	0.00	0.00	0.00	J.00	2.74-04	4.13-01	7.81-02	9.26+01	7.21+00	0.00	0.00	0.00	0.00
7	9.07-03	0.00	4.86-02	1.00+02	0.00	0.00	0.00	J.00	4.69-04	5.80-01	7.96-02	9.15+01	8.53+00	0.00	0.00	0.00	0.00
8	1.26-02	0.00	5.40-02	1.00+02	0.00	0.00	0.00	J.00	6.63-04	7.51-01	8.00-02	9.15+01	8.49+00	0.00	0.00	0.00	0.00
9	1.57-02	0.00	5.96-02	1.00+02	0.00	0.00	0.00	J.00	8.35-04	9.17-01	8.03-02	9.15+01	8.46+00	0.00	0.00	0.00	0.00
10	1.83-02	0.00	6.48-02	1.00+02	0.00	0.00	0.00	J.00	9.77-04	1.08+00	8.05-02	9.16+01	8.44+00	0.00	0.00	0.00	0.00
11	2.04-02	0.00	6.97-02	1.00+02	0.00	0.00	0.00	J.00	1.09-03	1.23+00	8.07-02	9.16+01	8.41+00	0.00	0.00	0.00	0.00
12	2.23-02	0.00	7.19-02	1.00+02	0.00	0.00	0.00	J.00	1.18-03	1.37+00	8.18-02	9.06+01	9.41+00	0.00	0.00	0.00	0.00
13	2.37-02	0.00	7.23-02	9.97+01	3.21-01	0.00	0.00	J.00	1.25-03	1.51+00	8.43-02	6.61+01	1.19+01	0.00	0.00	0.00	0.00
14	2.49-02	0.00	7.28-02	9.92+01	7.69-01	0.00	0.00	J.00	1.30-03	1.63+00	8.68-02	8.57+01	1.43+01	0.00	0.00	0.00	0.00
15	2.58-02	0.00	7.31-02	9.89+01	1.09+00	0.00	0.00	J.00	1.34-03	1.76+00	8.93-02	8.35+01	1.65+01	0.00	0.00	0.00	0.00
16	2.66-02	0.00	7.34-02	9.87+01	1.30+00	0.00	0.00	J.00	1.37-03	1.87+00	9.17-02	8.15+01	1.85+01	0.00	0.00	0.00	0.00
17	2.72-02	0.00	7.36-02	9.86+01	1.43+00	0.00	0.00	J.00	1.40-03	1.98+00	9.38-02	7.97+01	2.03+01	0.00	0.00	0.00	0.00
18	2.77-02	0.00	7.38-02	9.85+01	1.51+00	0.00	0.00	J.00	1.42-03	2.09+00	9.59-02	7.61+01	2.19+01	0.00	0.00	0.00	0.00
19	2.81-02	0.00	7.39-02	9.85+01	1.55+00	0.00	0.00	J.00	1.44-03	2.20+00	9.77-02	7.68+01	2.32+01	0.00	0.00	0.00	0.00
20	2.85-02	0.00	7.40-02	9.84+01	1.56+00	0.00	0.00	J.00	1.46-03	2.30+00	9.93-02	7.56+01	2.44+01	0.00	0.00	0.00	0.00
21	2.88-02	0.00	7.40-02	9.84+01	1.57+00	0.00	0.00	J.00	1.47-03	2.40+00	1.01-01	7.45+01	2.55+01	0.00	0.00	0.00	0.00
22	2.90-02	0.00	7.41-02	9.84+01	1.57+00	0.00	0.00	J.00	1.48-03	2.50+00	1.02-01	7.36+01	2.64+01	0.00	0.00	0.00	0.00
23	2.92-02	0.00	7.42-02	9.84+01	1.56+00	0.00	0.00	J.00	1.49-03	2.59+00	1.03-01	7.27+01	2.73+01	0.00	0.00	0.00	0.00
24	2.94-02	0.00	7.42-02	9.84+01	1.56+00	0.00	0.00	J.00	1.50-03	2.69+00	1.05-01	7.17+01	2.83+01	0.00	0.00	0.00	0.00
25	2.95-02	0.00	7.42-02	9.84+01	1.57+00	0.00	0.00	J.00	1.51-03	2.74+00	1.06-01	7.10+01	2.90+01	0.00	0.00	0.00	0.00

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DETAILED PRINTOUT FOR THE GAS KR85 M

B-128

DETAILED PRINTOUT FOR THE GAS XE 138

B-129

RADIAL POINT 8

PARTICLE FAILURES
DISTANCES IN MICRONS, FAILURES (%)

THO2 NEUTR			ME UC2 TRISO		
MAX DISTANCE			*MAX DISTANCE*		
AX KERNEL FIPROD	TOTAL	** PERCENT FAILURES OF TOTAL FAILURE **	AX KERNEL FIPROD	TOTAL	** PERCENT FAILURES OF TOTAL FAILURE **
PT MIGRAT IN SIC	FAILUR	MANUF. PRESS. KERNEL FIPROD HIGH	PT MIGRAT IN SIC	FAILUR	MANUF. PRESS. KERNEL FIPROD HIGH
		DEFECT VESSEL MIGRAT IN SIC TEMP			DEFECT VESSEL MIGRAT IN SIC TEMP
1	5.23-07 0.00	3.01-02 1.00+02 0.00 0.00 0.00 0.00	8.05-09 0.00	3.38-02 1.00+02 0.00 0.00 0.00	
2	7.43-06 0.00	3.07-02 1.00+02 0.00 0.00 0.00 0.00	1.54-07 1.41-02	4.36-02 1.00+02 0.00 0.00 0.00	
3	9.93-05 0.00	3.23-02 1.00+02 0.00 0.00 0.00 0.00	3.05-06 5.27-02	5.56-02 9.99+01 1.16-01 0.00 0.00 0.00	
4	7.20-04 0.00	3.49-02 1.00+02 0.00 0.00 0.00 0.00	2.90-05 1.34-01	6.70-02 9.99+01 9.60-02 0.00 0.00 0.00	
5	2.52-03 0.00	3.88-02 1.00+02 0.00 0.00 0.00 0.00	1.16-04 2.59-01	7.44-02 9.69+01 3.14+00 0.00 0.00 0.00	
6	5.47-03 0.00	4.34-02 1.00+02 0.00 0.00 0.00 0.00	2.72-04 4.12-01	7.81-02 9.26+01 7.20+00 0.00 0.00 0.00	
7	9.02-03 0.00	4.86-02 1.00+02 0.00 0.00 0.00 0.00	4.06-04 5.79-01	7.96-02 9.15+01 8.52+00 0.00 0.00 0.00	
8	1.25-02 0.00	5.40-02 1.00+02 0.00 0.00 0.00 0.00	6.58-04 7.49-01	8.00-02 9.15+01 8.49+00 0.00 0.00 0.00	
9	1.56-02 0.00	5.96-02 1.00+02 0.00 0.00 0.00 0.00	8.30-04 9.15-01	8.02-02 9.15+01 8.46+00 0.00 0.00 0.00	
10	1.82-02 0.00	6.48-02 1.00+02 0.00 0.00 0.00 0.00	9.71-04 1.07+00	8.05-02 9.16+01 8.43+00 0.00 0.00 0.00	
11	2.03-02 0.00	6.97-02 1.00+02 0.00 0.00 0.00 0.00	1.08-03 1.23+00	8.07-02 9.16+01 8.41+00 0.00 0.00 0.00	
12	2.22-02 0.00	7.19-02 1.00+02 0.00 0.00 0.00 0.00	1.17-03 1.37+00	8.18-02 9.06+01 9.41+00 0.00 0.00 0.00	
13	2.36-02 0.00	7.23-02 9.97+01 3.21-01 0.00 0.00 0.00	1.24-03 1.50+00	8.43-02 8.61+01 1.19+01 0.00 0.00 0.00	
14	2.48-02 0.00	7.28-02 9.92+01 7.68-01 0.00 0.00 0.00	1.29-03 1.63+00	8.68-02 8.58+01 1.42+01 0.00 0.00 0.00	
15	2.57-02 0.00	7.31-02 9.89+01 1.09+00 0.00 0.00 0.00	1.33-03 1.75+00	8.93-02 8.35+01 1.65+01 0.00 0.00 0.00	
16	2.65-02 0.00	7.34-02 9.87+01 1.30+00 0.00 0.00 0.00	1.37-03 1.87+00	9.17-02 8.15+01 1.85+01 0.00 0.00 0.00	
17	2.71-02 0.00	7.36-02 9.86+01 1.43+00 0.00 0.00 0.00	1.39-03 1.98+00	9.38-02 7.97+01 2.03+01 0.00 0.00 0.00	
18	2.76-02 0.00	7.38-02 9.85+01 1.51+00 0.00 0.00 0.00	1.41-03 2.09+00	9.56-02 7.82+01 2.18+01 0.00 0.00 0.00	
19	2.80-02 0.00	7.39-02 9.85+01 1.55+00 0.00 0.00 0.00	1.43-03 2.19+00	9.77-02 7.68+01 2.32+01 0.00 0.00 0.00	
20	2.83-02 0.00	7.40-02 9.84+01 1.56+00 0.00 0.00 0.00	1.45-03 2.29+00	9.93-02 7.56+01 2.44+01 0.00 0.00 0.00	
21	2.86-02 0.00	7.40-02 9.84+01 1.57+00 0.00 0.00 0.00	1.46-03 2.39+00	1.01-01 7.45+01 2.55+01 0.00 0.00 0.00	
22	2.89-02 0.00	7.41-02 9.84+01 1.56+00 0.00 0.00 0.00	1.47-03 2.49+00	1.02-01 7.36+01 2.64+01 0.00 0.00 0.00	
23	2.91-02 0.00	7.42-02 9.84+01 1.56+00 0.00 0.00 0.00	1.48-03 2.59+00	1.03-01 7.27+01 2.73+01 0.00 0.00 0.00	
24	2.93-02 0.00	7.42-02 9.84+01 1.56+00 0.00 0.00 0.00	1.49-03 2.69+00	1.05-01 7.18+01 2.82+01 0.00 0.00 0.00	
25	2.94-02 0.00	7.42-02 9.84+01 1.57+00 0.00 0.00 0.00	1.50-03 2.74+00	1.06-01 7.10+01 2.90+01 0.00 0.00 0.00	

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RADIAL POINT 8

DETAILED PRINTOUT FOR THE GAS KR65 M

* * AX*FUEL VCL* PT#	* * TEMP (C)	* * *MICMOL/ (C*S)	* * R/B	* * *MICMOL/ (C*S)	* * R/B	* * *MICMOL/ (C*S)	* * R/B	* * *FUEL R/B	* * *FUEL R/B	* * *FUEL REL* *RTIE MICM* *OL/CC/S	* * *THO2 MLUR	* * *ME UC2 TRISO*	* * *CONTAM*
1	1.062+05	6.176+02	6.801-11	5.690-C8	4.374-J9	2.433-07	4.442-J9	4.319-J6	4.559-06	2.025-14	1.911-L2	5.254+00	9.473+01
2	2.125+05	6.652+02	3.257-10	7.373-08	6.982-09	3.816-C7	7.338-J9	5.245-06	5.613-06	4.102-14	5.854-U2	6.495+00	9.345+01
3	2.125+05	7.288+02	6.763-10	1.110-07	6.673-09	6.344-07	7.349-J9	6.851-06	7.438-06	5.466-14	1.373-U1	7.745+00	9.212+01
4	2.125+05	7.846+02	1.041-09	1.733-07	6.480-09	9.691-C7	7.521-J9	8.082-06	9.541-06	7.176-14	2.514-L1	8.751+00	9.100+01
5	2.125+05	8.227+02	1.418-09	2.624-07	6.225-09	1.263-06	7.644-U9	1.323-U5	1.127-U5	8.616-14	4.319-L1	9.128+00	9.044+01
6	2.125+05	8.462+02	1.599-09	3.779-07	5.538-09	1.465-06	7.137-J9	1.126-05	1.248-05	8.907-14	6.785-L1	9.109+00	9.021+01
7	2.125+05	8.605+02	1.717-C9	5.164-C7	4.764-U9	1.589-06	6.481-U9	1.197-05	1.328-U5	8.606-14	1.130+U0	8.797+00	9.017+01
8	2.125+05	8.687+02	1.793-C9	6.752-C7	4.251-J9	1.655-C6	6.044-U9	1.242-05	1.379-U5	8.333-14	1.453+U0	8.445+00	9.010+01
9	2.125+05	8.733+02	1.761-09	8.498-07	3.702-C9	1.700-06	5.463-J9	1.271-05	1.413-U5	7.721-14	1.936+U0	8.150+00	8.991+01
10	2.125+05	8.756+02	1.636-C9	1.029-C6	3.123-C9	1.728-06	4.757-J9	1.288-05	1.437-U5	6.837-14	2.463+U0	7.893+00	8.964+01
11	2.125+05	8.765+02	1.528-J9	1.207-06	2.643-U9	1.746-C6	4.171-J9	1.298-05	1.453-U5	6.060-14	3.044+U0	7.616+00	8.934+01
12	2.125+05	8.767+02	1.442-09	1.337-06	2.322-J9	1.779-06	3.703-J9	1.304-U5	1.465-U5	5.513-14	3.497+U0	7.490+00	8.901+01
13	2.125+05	8.762+02	1.254-09	1.427-06	1.924-09	1.836-C6	3.178-J9	1.306-U5	1.474-U5	4.684-14	3.619+U0	7.543+00	8.864+01
14	2.125+05	8.755+02	1.125-09	1.507-06	1.647-09	1.891-06	2.772-U9	1.307-05	1.480-U5	4.103-14	4.132+U0	7.589+00	8.828+01
15	2.125+05	8.746+02	1.039-09	1.577-06	1.436-09	1.944-06	2.476-U9	1.306-U5	1.485-U5	3.677-14	4.458+U0	7.596+00	8.795+01
16	2.125+05	8.739+02	8.715-10	1.639-06	1.180-09	1.995-06	2.051-J9	1.306-U5	1.490-U5	3.056-14	4.673+U0	7.700+00	8.763+01
17	2.125+05	8.731+02	7.691-10	1.690-06	1.013-09	2.040-06	1.782-U9	1.305-U5	1.494-U5	2.662-14	4.884+U0	7.763+00	8.735+01
18	2.125+05	8.724+02	7.152-10	1.736-06	9.090-10	2.083-06	1.624-U9	1.304-U5	1.497-U5	2.431-14	5.106+U0	7.787+00	8.711+01
19	2.125+05	8.718+02	5.828-10	1.775-06	7.325-10	2.121-06	1.315-U9	1.303-U5	1.500-U5	1.973-14	5.244+U0	7.875+00	8.688+01
20	2.125+05	8.714+02	5.128-10	1.809-06	6.341-10	2.156-C6	1.147-U9	1.303-U5	1.503-U5	1.724-14	5.381+U0	7.929+00	8.669+01
21	2.125+05	8.711+02	4.715-10	1.839-06	5.697-10	2.188-C6	1.041-U9	1.303-U5	1.506-U5	1.568-14	5.529+U0	7.949+00	8.652+01
22	2.125+05	8.709+02	4.061-10	1.867-C6	4.879-10	2.219-C6	8.940-U9	1.304-U5	1.510-U5	1.350-14	5.617+U0	8.022+00	8.636+01
23	2.125+05	8.709+02	3.574-10	1.892-06	4.263-10	2.249-C6	7.836-U9	1.305-U5	1.514-U5	1.186-14	5.700+U0	8.081+00	8.622+01
24	2.125+05	8.721+02	3.458-10	1.924-06	4.124-10	2.293-C6	7.582-10	1.312-U5	1.525-U5	1.156-14	5.755+U0	8.180+00	8.607+01
25	1.062+05	8.745+02	3.458-10	1.954-06	4.124-10	2.340-C6	7.582-10	1.325-U5	1.542-U5	1.169-14	5.780+U0	8.257+00	8.596+01

RADIAL POINT 8

DETAILED PRINTOUT FOR THE GAS XE 138

	* * AX*FUEL VOL* PT* (C)	* * TEMP (C)	* * MICMOL* (CC+S)	* * R/B	* * MICMOL* (CC+S)	* * R/B	* * MICMOL* (CC+S)	* * R/B	* * FUEL R/B	* * FUEL REL* RTE MICMOL* OL/CC/S	* * THO2 MEUTR	* * ME UC2 TRISO* CONTAM *	
1	1.062+05	6.176+02	1.469-10	9.951-09	2.155-08	4.254-08	2.170-08	7.349-07	7.472-07	1.621-14	9.017-03	5.654+00	9.434+01
2	2.125+05	6.652+02	7.035-10	1.157-08	3.440-08	5.988-08	3.511-08	7.683-07	8.272-07	2.904-14	2.803-02	7.094+00	9.288+01
3	2.125+05	7.288+02	1.461-09	1.513-08	3.288-08	8.647-08	3.434-08	8.716-07	9.550-07	3.279-14	6.737-02	8.669+00	9.126+01
4	2.125+05	7.846+02	2.249-09	2.102-08	3.193-08	1.176-07	3.418-08	9.830-07	1.094-06	3.740-14	1.264-01	1.004+01	8.984+01
5	2.125+05	8.227+02	3.064-09	2.955-08	3.067-08	1.423-07	3.374-08	1.072-06	1.204-06	4.061-14	2.230-01	1.075+01	8.903+01
6	2.125+05	8.462+02	3.454-09	4.073-08	2.729-08	1.579-07	3.074-08	1.133-06	1.277-06	3.926-14	3.583-01	1.097+01	8.867+01
7	2.125+05	8.605+02	3.709-09	5.421-08	2.347-08	1.668-07	2.718-08	1.173-06	1.325-06	3.601-14	5.585-01	1.088+01	8.857+01
8	2.125+05	8.687+02	3.873-09	6.981-08	2.095-08	1.711-07	2.482-08	1.199-06	1.354-06	3.360-14	6.046-01	1.067+01	8.853+01
9	2.125+05	8.733+02	3.803-09	8.704-08	1.824-08	1.741-07	2.205-08	1.215-06	1.374-06	3.028-14	1.093+00	1.049+01	8.842+01
10	2.125+05	8.756+02	3.534-09	1.048-07	1.539-08	1.760-07	1.892-08	1.224-06	1.387-06	2.625-14	1.412+00	1.032+01	8.827+01
11	2.125+05	8.765+02	3.301-09	1.226-07	1.302-08	1.774-07	1.632-08	1.230-06	1.397-06	2.280-14	1.775+00	1.013+01	8.809+01
12	2.125+05	8.767+02	3.114-09	1.356-07	1.144-08	1.803-07	1.455-08	1.234-06	1.405-06	2.044-14	2.065+00	1.009+01	8.784+01
13	2.125+05	8.762+02	2.708-09	1.445-07	9.481-09	1.860-07	1.219-08	1.235-06	1.412-06	1.721-14	2.274+00	1.025+01	8.748+01
14	2.125+05	8.755+02	2.431-09	1.526-07	8.113-09	1.916-07	1.054-08	1.236-06	1.418-06	1.495-14	2.481+00	1.040+01	8.712+01
15	2.125+05	8.746+02	2.245-09	1.598-07	7.077-09	1.970-07	9.322-09	1.235-06	1.423-06	1.327-14	2.704+00	1.051+01	8.679+01
16	2.125+05	8.739+02	1.882-09	1.661-07	5.812-09	2.022-07	7.695-09	1.235-06	1.429-06	1.099-14	2.844+00	1.069+01	8.646+01
17	2.125+05	8.731+02	1.661-09	1.714-07	4.989-09	2.069-07	6.651-09	1.235-06	1.433-06	9.529-15	2.988+00	1.083+01	8.618+01
18	2.125+05	8.724+02	1.545-09	1.760-07	4.479-09	2.112-07	6.024-09	1.234-06	1.436-06	8.653-15	3.143+00	1.093+01	8.592+01
19	2.125+05	8.718+02	1.259-09	1.801-07	3.609-09	2.152-07	4.868-09	1.234-06	1.440-06	7.010-15	3.234+00	1.108+01	8.569+01
20	2.125+05	8.714+02	1.108-09	1.835-07	3.124-09	2.187-07	4.232-09	1.234-06	1.443-06	6.108-15	3.328+00	1.119+01	8.549+01
21	2.125+05	8.711+02	1.018-09	1.866-07	2.807-09	2.220-07	3.825-09	1.234-06	1.447-06	5.534-15	3.434+00	1.126+01	8.531+01
22	2.125+05	8.709+02	8.772-10	1.894-07	2.404-09	2.251-07	3.281-09	1.234-06	1.450-06	4.757-15	3.491+00	1.137+01	8.513+01
23	2.125+05	8.709+02	7.719-10	1.918-07	2.100-09	2.280-07	2.872-09	1.235-06	1.453-06	4.175-15	3.547+00	1.147+01	8.498+01
24	2.125+05	8.701+02	7.469-10	1.946-07	2.032-09	2.319-07	2.779-09	1.239-06	1.461-06	4.060-15	3.581+00	1.161+01	8.481+01
25	1.062+05	8.745+02	7.469-10	1.969-07	2.032-09	2.358-07	2.779-09	1.246-06	1.472-06	4.089-15	3.595+00	1.172+01	8.469+01

B-132

RADIAL POINT 9

PARTICLE FAILURES
DISTANCES IN MICRONS, FAILURES (1)

<-----THO2 NEUTR----->									<-----ME UC2 TRISO----->								
MAX DISTANCE			** PERCENT FAILURES OF TOTAL FAILURE **						*MAX DISTANCE*			** PERCENT FAILURES OF TOTAL FAILURE **					
AX	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	HIGH	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	HIGH	
PT	MIGRAT	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAT	IN SIC	TEMP	MIGRAT	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAT	IN SIC	TEMP	
1	5.14-07	0.00	3.01-02	1.00+02	0.00	0.00	0.00	0.00	7.88-09	0.00	3.38-02	1.00+02	0.00	0.00	0.00	0.00	
2	7.32-06	0.00	3.07-02	1.00+02	0.00	0.00	0.00	0.00	1.52-07	1.40-02	4.36-02	1.00+02	0.00	0.00	0.00	0.00	
3	9.78-05	0.00	3.23-02	1.00+02	0.00	0.00	0.00	0.00	3.00-06	5.24-02	5.56-02	9.99+01	1.16-01	0.00	0.00	0.00	
4	7.12-04	0.00	3.49-02	1.00+02	0.00	0.00	0.00	0.00	2.86-05	1.33-01	6.70-02	9.99+01	9.60-02	0.00	0.00	0.00	
5	2.49-03	0.00	3.88-02	1.00+02	0.00	0.00	0.00	0.00	1.15-04	2.57-01	7.43-02	9.69+01	3.13+00	0.00	0.00	0.00	
6	5.43-03	0.00	4.34-02	1.00+02	0.00	0.00	0.00	0.00	2.7J-04	4.10-01	7.81-02	9.28+01	7.19+00	0.00	0.00	0.00	
7	8.95-03	0.00	4.86-02	1.00+02	0.00	0.00	0.00	0.00	4.62-04	5.77-01	7.96-02	9.15+01	8.52+00	0.00	0.00	0.00	
8	1.24-02	0.00	5.40-02	1.00+02	0.00	0.00	0.00	0.00	6.54-04	7.46-01	8.00-02	9.15+01	8.46+00	0.00	0.00	0.00	
9	1.55-02	0.00	5.96-02	1.00+02	0.00	0.00	0.00	0.00	8.24-04	9.12-01	8.62-02	9.16+01	8.45+00	0.00	0.00	0.00	
10	1.81-02	0.00	6.48-02	1.00+02	0.00	0.00	0.00	0.00	9.65-04	1.07+00	8.05-02	9.16+01	8.42+00	0.00	0.00	0.00	
11	2.02-02	0.00	6.97-02	1.00+02	0.00	0.00	0.00	0.00	1.08-03	1.22+00	8.07-02	9.16+01	8.40+00	0.00	0.00	0.00	
12	2.20-02	0.00	7.19-02	1.00+02	0.00	0.00	0.00	0.00	1.17-03	1.37+00	8.18-02	9.06+01	9.40+00	0.00	0.00	0.00	
13	2.35-02	0.00	7.23-02	9.97+01	3.21-01	0.00	0.00	0.00	1.23-03	1.50+00	8.43-02	8.81+01	1.19+01	0.00	0.00	0.00	
14	2.47-02	0.00	7.28-02	9.92+01	7.68-01	0.00	0.00	0.00	1.29-03	1.63+00	8.68-02	8.56+01	1.42+01	0.00	0.00	0.00	
15	2.56-02	0.00	7.31-02	9.89+01	1.09+00	0.00	0.00	0.00	1.33-03	1.75+00	8.93-02	8.35+01	1.05+01	0.00	0.00	0.00	
16	2.63-02	0.00	7.34-02	9.87+01	1.30+00	0.00	0.00	0.00	1.36-03	1.86+00	9.17-02	8.15+01	1.85+01	0.00	0.00	0.00	
17	2.69-02	0.00	7.36-02	9.86+01	1.43+00	0.00	0.00	0.00	1.38-03	1.98+00	9.38-02	7.98+01	2.12+01	0.00	0.00	0.00	
18	2.74-02	0.00	7.38-02	9.85+01	1.51+00	0.00	0.00	0.00	1.40-03	2.08+00	9.58-02	7.82+01	2.18+01	0.00	0.00	0.00	
19	2.79-02	0.00	7.39-02	9.85+01	1.55+00	0.00	0.00	0.00	1.42-03	2.19+00	9.76-02	7.68+01	2.32+01	0.00	0.00	0.00	
20	2.82-02	0.00	7.40-02	9.84+01	1.56+00	0.00	0.00	0.00	1.44-03	2.29+00	9.92-02	7.56+01	2.44+01	0.00	0.00	0.00	
21	2.85-02	0.00	7.40-02	9.84+01	1.56+00	0.00	0.00	0.00	1.45-03	2.39+00	1.01-01	7.46+01	2.54+01	0.00	0.00	0.00	
22	2.87-02	0.00	7.41-02	9.84+01	1.56+00	0.00	0.00	0.00	1.46-03	2.49+00	1.02-01	7.36+01	2.64+01	0.00	0.00	0.00	
23	2.89-02	0.00	7.42-02	9.84+01	1.56+00	0.00	0.00	0.00	1.47-03	2.58+00	1.03-01	7.26+01	2.72+01	0.00	0.00	0.00	
24	2.91-02	0.00	7.42-02	9.84+01	1.56+00	0.00	0.00	0.00	1.48-03	2.68+00	1.05-01	7.18+01	2.82+01	0.00	0.00	0.00	
25	2.92-02	0.00	7.42-02	9.84+01	1.57+00	0.00	0.00	0.00	1.49-03	2.73+00	1.06-01	7.11+01	2.89+01	0.00	0.00	0.00	

RADIAL POINT 10

PARTICLE FAILURES
DISTANCES IN MICRONS, FAILURES (%)

<----- TH02 MEUTR ----->									FE UC2 TRISU ----->								
MAX DISTANCE			** PERCENT FAILURES OF			TOTAL FAILURE **			*MAX DISTANCE*			** PERCENT FAILURES OF			TOTAL FAILURE **		
AX	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	HIGH	AX	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	HIGH
PT	MIGRAT	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAT	IN SIC	TEMP	PT	MIGRAT	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAT	IN SIC	TEMP
1	5.03-07	0.00	3.01-02	1.00+02	0.00	0.00	0.00	0.00	7.68-09	0.00	3.38-02	1.00+02	0.00	0.00	0.00	0.00	0.00
2	7.18-06	0.00	3.07-02	1.00+02	0.00	0.00	0.00	0.00	1.48-07	1.39-02	4.36-02	1.00+02	0.00	0.00	0.00	0.00	0.00
3	9.62-05	0.00	3.23-02	1.00+02	0.00	0.00	0.00	0.00	2.94-06	5.20-02	5.56-02	9.99+01	1.16-01	0.00	0.00	0.00	0.00
4	7.02-04	0.00	3.49-02	1.00+02	0.00	0.00	0.00	0.00	2.82-05	1.33-01	6.70-02	9.99+01	9.60-02	0.00	0.00	0.00	0.00
5	2.47-03	0.00	3.88-02	1.00+02	0.00	0.00	0.00	0.00	1.14-04	2.56-01	7.43-02	9.69+01	3.13+00	0.00	0.00	0.00	0.00
6	5.38-03	0.00	4.34-02	1.00+02	0.00	0.00	0.00	0.00	2.67-04	4.09-01	7.81-02	9.28+01	7.18+00	0.00	0.00	0.00	0.00
7	8.89-03	0.00	4.86-02	1.00+02	0.00	0.00	0.00	0.00	4.58-04	5.75-01	7.96-02	9.15+01	8.51+00	0.00	0.00	0.00	0.00
8	1.24-02	0.00	5.40-02	1.00+02	0.00	0.00	0.00	0.00	6.49-04	7.44-01	7.99-02	9.15+01	8.47+00	0.00	0.00	0.00	0.00
9	1.54-02	0.00	5.96-02	1.00+02	0.00	0.00	0.00	0.00	8.19-04	9.10-01	8.02-02	9.16+01	8.44+00	0.00	0.00	0.00	0.00
10	1.80-02	0.00	6.48-02	1.00+02	0.00	0.00	0.00	0.00	9.59-04	1.07+00	6.05-02	9.16+01	8.42+00	0.00	0.00	0.00	0.00
11	2.01-02	0.00	6.97-02	1.00+02	0.00	0.00	0.00	0.00	1.07-03	1.22+00	6.07-02	9.16+01	8.39+00	0.00	0.00	0.00	0.00
12	2.19-02	0.00	7.19-02	1.00+02	0.00	0.00	0.00	0.00	1.16-03	1.36+00	8.18-02	9.06+01	9.40+00	0.00	0.00	0.00	0.00
13	2.34-02	0.00	7.23-02	9.97+01	3.21-01	0.00	0.00	0.00	1.23-03	1.50+00	8.43-02	8.61+01	1.19+01	0.00	0.00	0.00	0.00
14	2.45-02	0.00	7.28-02	9.92+01	7.67-01	0.00	0.00	0.00	1.28-03	1.62+00	8.68-02	8.58+01	1.42+01	0.00	0.00	0.00	0.00
15	2.55-02	0.00	7.31-02	9.89+01	1.09+00	0.00	0.00	0.00	1.32-03	1.74+00	8.93-02	8.35+01	1.65+01	0.00	0.00	0.00	0.00
16	2.62-02	0.00	7.34-02	9.87+01	1.30+00	0.00	0.00	0.00	1.35-03	1.86+00	9.16-02	8.15+01	1.85+01	0.00	0.00	0.00	0.00
17	2.68-02	0.00	7.36-02	9.86+01	1.43+00	0.00	0.00	0.00	1.38-03	1.97+00	9.38-02	7.98+01	2.02+01	0.00	0.00	0.00	0.00
18	2.73-02	0.00	7.38-02	9.85+01	1.50+00	0.00	0.00	0.00	1.40-03	2.08+00	9.58-02	7.82+01	2.18+01	0.00	0.00	0.00	0.00
19	2.77-02	0.00	7.39-02	9.85+01	1.54+00	0.00	0.00	0.00	1.41-03	2.18+00	9.76-02	7.68+01	2.32+01	0.00	0.00	0.00	0.00
20	2.80-02	0.00	7.40-02	9.84+01	1.56+00	0.00	0.00	0.00	1.43-03	2.28+00	9.92-02	7.57+01	2.43+01	0.00	0.00	0.00	0.00
21	2.83-02	0.00	7.40-02	9.84+01	1.56+00	0.00	0.00	0.00	1.44-03	2.38+00	1.01-01	7.46+01	2.54+01	0.00	0.00	0.00	0.00
22	2.86-02	0.00	7.41-02	9.84+01	1.56+00	0.00	0.00	0.00	1.45-03	2.48+00	1.02-01	7.37+01	2.63+01	0.00	0.00	0.00	0.00
23	2.88-02	0.00	7.41-02	9.84+01	1.56+00	0.00	0.00	0.00	1.46-03	2.58+00	1.03-01	7.28+01	2.72+01	0.00	0.00	0.00	0.00
24	2.90-02	0.00	7.42-02	9.84+01	1.56+00	0.00	0.00	0.00	1.47-03	2.67+00	1.05-01	7.16+01	2.82+01	0.00	0.00	0.00	0.00
25	2.91-02	0.00	7.42-02	9.84+01	1.56+00	0.00	0.00	0.00	1.48-03	2.72+00	1.06-01	7.11+01	2.89+01	0.00	0.00	0.00	0.00

KUGEL RUN AT 09:08:02

ON 15 JAN 81 WITH ABSOLUTE ELEMENT MAP

CREATED ON 000064 AT 000000

PAGE 127

RADIAL POINT 10

DETAILED PRINTOUT FOR THE GAS KR85 M

* PT*	* AX*	* FUEL VOL*	* TEMP (C)	* *AVG FUEL *BIRTHRTE* (CC/S)	* *MICROL/ * R/B	* *BIRTHRTE* (CC/S)	* *R/B	* *FUEL (CC/S)	* *CONTAM R/B	* *FUEL REL*	* *FUEL REL*	* *FUEL REL*	* *FUEL REL*	
RTG MICR (---) * RELEASE RATE COMING FROM --- *														
*OL/CC/S *THO2 NEUTR *ME UC2 TRISO* CONTAM *														
1	1.366	+C5	6.168	+02	6.801	-11	5.675	-08	4.374	-09	2.426	-07	4.442	-09
2	2.732	+C5	6.644	+02	3.257	-10	7.350	-08	6.982	-09	3.804	-07	7.308	-09
3	2.732	+05	7.280	+02	6.763	-10	1.106	-07	6.673	-09	6.323	-07	7.349	-09
4	2.732	+05	7.839	+02	1.041	-09	1.727	-07	6.480	-09	9.661	-07	7.521	-09
5	2.732	+05	8.221	+02	1.418	-09	2.617	-07	6.225	-09	1.260	-06	7.644	-09
6	2.732	+05	8.457	+02	1.599	-09	3.771	-07	5.538	-09	1.462	-06	7.137	-09
7	2.732	+05	8.601	+02	1.717	-09	5.155	-07	4.764	-09	1.586	-06	6.481	-09
8	2.732	+05	8.683	+02	1.793	-09	6.741	-07	4.251	-09	1.652	-06	6.344	-09
9	2.732	+05	8.729	+02	1.761	-09	8.485	-07	3.702	-09	1.697	-06	5.463	-09
10	2.732	+05	8.752	+02	1.636	-09	1.028	-06	3.123	-09	1.725	-06	4.759	-09
11	2.732	+05	8.762	+02	1.528	-09	1.205	-06	2.643	-09	1.744	-06	4.171	-09
12	2.732	+05	8.763	+02	1.442	-09	1.335	-06	2.322	-09	1.776	-06	3.763	-09
13	2.732	+05	8.759	+02	1.254	-09	1.424	-06	1.924	-09	1.833	-06	3.178	-09
14	2.732	+05	8.751	+02	1.125	-09	1.504	-06	1.647	-09	1.888	-06	2.772	-09
15	2.732	+05	8.742	+02	1.039	-09	1.574	-06	1.436	-09	1.940	-06	2.476	-09
16	2.732	+05	8.734	+02	8.715	-10	1.636	-06	1.180	-09	1.993	-06	2.051	-09
17	2.732	+05	8.726	+02	7.691	-10	1.687	-06	1.013	-09	2.035	-06	1.782	-09
18	2.732	+05	8.719	+02	7.152	-10	1.732	-06	9.090	-10	2.077	-06	1.624	-09
19	2.732	+05	8.712	+02	5.828	-10	1.771	-06	7.325	-10	2.115	-06	1.315	-09
20	2.732	+05	8.708	+02	5.128	-10	1.805	-06	6.341	-10	2.149	-06	1.147	-09
21	2.732	+05	8.705	+02	4.715	-10	1.835	-06	5.697	-10	2.182	-06	1.041	-09
22	2.732	+05	8.703	+02	4.061	-10	1.863	-06	4.879	-10	2.212	-06	8.940	-10
23	2.732	+05	8.703	+02	3.574	-10	1.888	-06	4.263	-10	2.242	-06	7.836	-10
24	2.732	+05	8.715	+02	3.458	-10	1.919	-06	4.124	-10	2.285	-06	7.582	-10
25	1.366	+05	8.739	+02	3.458	-10	1.949	-06	4.124	-10	2.332	-06	7.582	-10

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DETAILED PRINTOUT FOR THE GAS XE 138

B-138

RADIAL POINT 11

PARTICLE FAILURES
DISTANCES IN MICRONS, FAILURES (%)

<-----TH02 MEUTR----->								<-----PE LC2 TPIS0----->							
MAX DISTANCE		TOTAL FAILUR	** PERCENT FAILURES OF		TOTAL FAILURE **			*MAX DISTANCE*		TOTAL FAILUR	** PERCENT FAILURES OF		TOTAL FAILURE **		
AX KERNEL	FIPROD		MANUF.	PRESS.	KERNEL	FIPROD	HIGH	KERNEL	FIPROD		MANUF.	PRESS.	KERNEL	FIPROD	HIGH
PT MIGRAT	IN SIC		DEFECT	VESSEL	MIGRAT	IN SIC	TEMP	MIGRAT	IN SIC		DEFECT	VESSEL	MIGRAT	IN SIC	TEMP
1	4.90-07	0.00	3.01-02	1.00+02	0.00	0.00	J.00	7.45-09	0.00	3.38-02	1.00+02	0.00	0.00	0.00	0.00
2	7.05-06	0.00	3.07-02	1.00+02	0.00	0.00	J.00	1.45-07	1.38-02	4.36-02	1.00+02	0.00	0.00	0.00	0.00
3	9.50-05	0.00	3.22-02	1.00+02	0.00	0.00	J.00	2.90-06	5.17-02	5.54-02	9.98+01	1.50-01	0.00	0.00	0.00
4	6.97-04	0.00	3.49-02	1.00+02	0.00	0.00	J.00	2.79-05	1.32-01	6.68-02	9.99+01	1.24-01	0.00	0.00	0.00
5	2.46-03	0.00	3.87-02	1.00+02	0.00	0.00	J.00	1.13-04	2.56-01	7.43-02	9.69+01	3.17+00	0.00	0.00	0.00
6	5.37-03	0.00	4.34-02	1.00+02	0.00	0.00	J.00	2.67-04	4.08-01	7.80-02	9.28+01	7.16+00	0.00	0.00	0.00
7	8.88-03	0.00	4.85-02	1.00+02	0.00	0.00	J.00	4.58-04	5.74-01	7.96-02	9.15+01	8.51+00	0.00	0.00	0.00
8	1.24-02	0.00	5.40-02	1.00+02	0.00	0.00	J.00	6.49-04	7.44-01	7.99-02	9.15+01	8.46+00	0.00	0.00	0.00
9	1.54-02	0.00	5.95-02	1.00+02	0.00	0.00	J.00	8.19-04	9.09-01	8.02-02	9.16+01	8.44+00	0.00	0.00	0.00
10	1.80-02	0.00	6.48-02	1.00+02	0.00	0.00	J.00	9.60-04	1.07+00	8.05-02	9.16+01	8.42+00	0.00	0.00	0.00
11	2.01-02	0.00	6.97-02	1.00+02	0.00	0.00	J.00	1.07-03	1.22+00	8.07-02	9.16+01	8.46+00	0.00	0.00	0.00
12	2.19-02	0.00	7.19-02	1.00+02	0.00	0.00	J.00	1.16-03	1.36+00	8.19-02	9.16+01	9.44+00	0.00	0.00	0.00
13	2.34-02	0.00	7.23-02	9.97+01	3.25-01	0.00	J.00	1.23-03	1.50+00	8.44-02	8.81+01	1.19+01	0.00	0.00	0.00
14	2.45-02	0.00	7.28-02	9.92+01	7.72-01	0.00	J.00	1.28-03	1.62+00	8.69-02	8.57+01	1.43+01	0.00	0.00	0.00
15	2.54-02	0.00	7.31-02	9.89+01	1.09+00	0.00	J.00	1.32-03	1.74+00	8.94-02	8.35+01	1.65+01	0.00	0.00	0.00
16	2.62-02	0.00	7.34-02	9.87+01	1.30+00	0.00	J.00	1.35-03	1.86+00	9.18-02	8.14+01	1.86+01	0.00	0.00	0.00
17	2.68-02	0.00	7.36-02	9.86+01	1.43+00	0.00	J.00	1.38-03	1.97+00	9.39-02	7.97+01	2.13+01	0.00	0.00	0.00
18	2.73-02	0.00	7.38-02	9.85+01	1.51+00	0.00	J.00	1.40-03	2.08+00	9.59-02	7.81+01	2.19+01	0.00	0.00	0.00
19	2.77-02	0.00	7.39-02	9.85+01	1.54+00	0.00	J.00	1.41-03	2.18+00	9.77-02	7.67+01	2.33+01	0.00	0.00	0.00
20	2.80-02	0.00	7.40-02	9.84+01	1.56+00	0.00	J.00	1.43-03	2.28+00	9.93-02	7.56+01	2.44+01	0.00	0.00	0.00
21	2.83-02	0.00	7.40-02	9.84+01	1.56+00	0.00	J.00	1.44-03	2.38+00	1.01-01	7.45+01	2.55+01	0.00	0.00	0.00
22	2.85-02	0.00	7.41-02	9.84+01	1.56+00	0.00	J.00	1.45-03	2.48+00	1.02-01	7.36+01	2.64+01	0.00	0.00	0.00
23	2.87-02	0.00	7.42-02	9.84+01	1.56+00	0.00	J.00	1.46-03	2.57+00	1.03-01	7.27+01	2.73+01	0.00	0.00	0.00
24	2.89-02	0.00	7.42-02	9.84+01	1.56+00	0.00	J.00	1.47-03	2.67+00	1.05-01	7.18+01	2.82+01	0.00	0.00	0.00
25	2.90-02	0.00	7.42-02	9.84+01	1.56+00	0.00	J.00	1.48-03	2.72+00	1.06-01	7.10+01	2.95+01	0.00	0.00	0.00

RADIAL POINT 11

DETAILED PRINTOUT FOR THE GAS KR85 M

[illegible]

B-140

KUGEL RUN AT 09:08:02

ON 15 JAN 81 WITH ABSOLUTE ELEMENT MAP

CREATED ON 010064 AT 000000

PAGE 131

RADIAL POINT 11

DETAILED PRINTOUT FOR THE GAS XE 138

* * AX*FULL VOL* TEMP P1* (CC) *		* * *AVG FUEL*BIRTHRTE* * (CC*S) *		* * *THO2 NEUTR -->* * (CC*S) *		* * *ME UC2 TRISO-->* * (CC*S) *		* * *FUEL * * (CC*S) *		* * *FUEL REL* * (CC*S) *		* * *FUEL REL* * (CC*S) *		* * *FUEL REL* * (CC*S) *	
* * *FUEL REL* * (CC*S) *		* * *FUEL REL* * (CC*S) *		* * *FUEL REL* * (CC*S) *		* * *FUEL REL* * (CC*S) *		* * *FUEL REL* * (CC*S) *		* * *FUEL REL* * (CC*S) *		* * *FUEL REL* * (CC*S) *		* * *FUEL REL* * (CC*S) *	
* * *FUEL REL* * (CC*S) *		* * *FUEL REL* * (CC*S) *		* * *FUEL REL* * (CC*S) *		* * *FUEL REL* * (CC*S) *		* * *FUEL REL* * (CC*S) *		* * *FUEL REL* * (CC*S) *		* * *FUEL REL* * (CC*S) *		* * *FUEL REL* * (CC*S) *	
1	1.518+05	6.164+02	1.443-10	9.929-09	2.138-08	4.242-08	2.152-08	7.335-07	7.457-07	1.605-14	6.929-03	5.650+00	9.434+01		
2	3.035+05	6.640+02	6.908-10	1.153-08	3.420-08	5.962-08	3.487-08	7.666-07	6.253-07	2.880-14	2.766-02	7.081+00	9.289+01		
3	3.035+05	7.277+02	1.450-09	1.505-08	3.284-08	8.608-08	3.429-08	8.696-07	9.526-07	3.266-14	6.683-02	8.654+00	9.128+01		
4	3.035+05	7.837+02	2.240-09	2.091-08	3.195-08	1.171-07	3.419-08	9.809-07	1.092-06	3.733-14	1.254-01	1.002+01	8.985+01		
5	3.035+05	8.220+02	3.053-09	2.939-08	3.073-08	1.419-07	3.378-03	1.070-06	1.202-06	4.059-14	2.011-01	1.074+01	8.903+01		
6	3.035+05	8.456+02	3.453-09	4.053-08	2.737-08	1.576-07	3.083-08	1.131-06	1.276-06	3.932-14	3.559-01	1.097+01	8.867+01		
7	3.035+05	8.601+02	3.716-09	5.400-08	2.357-08	1.666-07	2.729-08	1.172-06	1.323-06	3.611-14	5.558-01	1.088+01	8.857+01		
8	3.035+05	8.683+02	3.881-09	6.959-08	2.104-08	1.709-07	2.492-08	1.197-06	1.353-06	3.371-14	6.012-01	1.067+01	8.853+01		
9	3.035+05	8.729+02	3.814-09	8.684-08	1.833-08	1.739-07	2.214-08	1.214-06	1.372-06	3.039-14	1.090+00	1.049+01	8.842+01		
10	3.035+05	8.752+02	3.549-09	1.047-07	1.546-08	1.758-07	1.901-08	1.223-06	1.386-06	2.635-14	1.410+00	1.032+01	8.827+01		
11	3.035+05	8.762+02	3.314-09	1.225-07	1.308-08	1.772-07	1.640-08	1.227-06	1.395-06	2.288-14	1.774+00	1.013+01	8.809+01		
12	3.035+05	8.763+02	3.124-09	1.355-07	1.149-08	1.802-07	1.461-08	1.233-06	1.403-06	2.050-14	2.064+00	1.010+01	8.784+01		
13	3.035+05	8.758+02	2.720-09	1.444-07	9.519-09	1.859-07	1.224-08	1.234-06	1.411-06	1.726-14	2.276+00	1.025+01	8.747+01		
14	3.035+05	8.750+02	2.440-09	1.525-07	8.140-09	1.915-07	1.058-08	1.234-06	1.417-06	1.499-14	2.483+00	1.040+01	8.712+01		
15	3.035+05	8.741+02	2.246-09	1.597-07	7.095-09	1.969-07	9.343-09	1.234-06	1.422-06	1.328-14	2.704+00	1.052+01	8.678+01		
16	3.035+05	8.733+02	1.887-09	1.666-07	5.823-09	2.021-07	7.710-09	1.233-06	1.427-06	1.100-14	2.648+00	1.070+01	8.645+01		
17	3.035+05	8.725+02	1.664-09	1.712-07	4.994-09	2.067-07	6.658-09	1.233-06	1.431-06	9.526-15	2.991+00	1.084+01	8.617+01		
18	3.035+05	8.717+02	1.544-09	1.759-07	4.480-09	2.111-07	6.024-09	1.232-06	1.434-06	8.640-15	3.143+00	1.094+01	8.591+01		
19	3.035+05	8.711+02	1.258-09	1.799-07	3.605-09	2.150-07	4.863-09	1.232-06	1.436-06	6.992-15	3.238+00	1.108+01	8.568+01		
20	3.035+05	8.707+02	1.106-09	1.833-07	3.117-09	2.185-07	4.223-09	1.232-06	1.441-06	6.085-15	3.332+00	1.119+01	8.548+01		
21	3.035+05	8.703+02	1.015-09	1.864-07	2.797-09	2.217-07	3.812-09	1.232-06	1.444-06	5.505-15	3.435+00	1.127+01	8.530+01		
22	3.035+05	8.701+02	8.734-10	1.891-07	2.393-09	2.248-07	3.266-09	1.232-06	1.447-06	4.727-15	3.494+00	1.138+01	8.513+01		
23	3.035+05	8.701+02	7.678-10	1.916-07	2.088-09	2.277-07	2.856-09	1.233-06	1.451-06	4.143-15	3.554+00	1.147+01	8.498+01		
24	3.035+05	8.712+02	7.424-10	1.943-07	2.019-09	2.315-07	2.761-09	1.237-06	1.458-06	4.026-15	3.564+00	1.161+01	8.481+01		
25	1.518+05	8.737+02	7.424-10	1.965-07	2.019-09	2.353-07	2.761-09	1.244-06	1.469-06	4.055-15	3.598+00	1.172+01	8.469+01		

B-141

RADIAL POINT 12

PARTICLE FAILURES
DISTANCES IN MICRONS, FAILURES (%)

TH02 NEUTR									ML UC2 TRISO								
MAX DISTANCE			** PERCENT FAILURES OF			TOTAL FAILURE **			*MAX DISTANCE*			** PERCENT FAILURES OF			TOTAL FAILURE **		
AX	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	HIGH	AX	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	HIGH
PT	MIGRAT	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAT	IN SIC	TEMP	PT	MIGRAT	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAT	IN SIC	TEMP
1	4.74-07	0.00	3.01-02	1.00+02	0.00	0.00	0.00	0.00	7.16-09	0.00	3.38-02	1.00+02	0.00	0.00	0.00	0.00	0.00
2	6.86-06	0.00	3.07-02	1.00+02	0.00	0.00	0.00	0.00	1.40-07	1.37-02	4.35-02	1.00+02	0.00	0.00	0.00	0.00	0.00
3	9.29-05	0.00	3.22-02	1.00+02	0.00	0.00	0.00	0.00	2.83-06	5.13-02	5.54-02	9.98+01	1.00-01	0.00	0.00	0.00	0.00
4	6.86-04	0.00	3.49-02	1.00+02	0.00	0.00	0.00	0.00	2.74-05	1.31-01	0.68-02	9.99+01	1.33-01	0.00	0.00	0.00	0.00
5	2.43-03	0.00	3.87-02	1.00+02	0.00	0.00	0.00	0.00	1.12-04	2.54-01	7.43-02	9.69+01	3.05+00	0.00	0.00	0.00	0.00
6	5.33-03	0.00	4.34-02	1.00+02	0.00	0.00	0.00	0.00	2.64-04	4.06-01	7.80-02	9.29+01	7.14+00	0.00	0.00	0.00	0.00
7	8.83-03	0.00	4.85-02	1.00+02	0.00	0.00	0.00	0.00	4.55-04	5.72-01	7.96-02	9.15+01	8.51+00	0.00	0.00	0.00	0.00
8	1.23-02	0.00	5.40-02	1.00+02	0.00	0.00	0.00	0.00	6.46-04	7.41-01	7.99-02	9.15+01	8.47+00	0.00	0.00	0.00	0.00
9	1.54-02	0.00	5.95-02	1.00+02	0.00	0.00	0.00	0.00	8.15-04	9.07-01	8.02-02	9.16+01	8.44+00	0.00	0.00	0.00	0.00
10	1.80-02	0.00	6.48-02	1.00+02	0.00	0.00	0.00	0.00	9.55-04	1.07+00	8.05-02	9.16+01	8.41+00	0.00	0.00	0.00	0.00
11	2.00-02	0.00	6.97-02	1.00+02	0.00	0.00	0.00	0.00	1.07-03	1.22+00	8.07-02	9.16+01	8.39+00	0.00	0.00	0.00	0.00
12	2.18-02	0.00	7.19-02	1.00+02	0.00	0.00	0.00	0.00	1.15-03	1.36+00	8.19-02	9.06+01	9.45+00	0.00	0.00	0.00	0.00
13	2.33-02	0.00	7.23-02	9.97+01	3.26-01	0.00	0.00	0.00	1.22-03	1.49+00	8.44-02	8.81+01	1.19+01	0.00	0.00	0.00	0.00
14	2.44-02	0.00	7.28-02	9.92+01	7.73-01	0.00	0.00	0.00	1.27-03	1.62+00	8.69-02	8.57+01	1.43+01	0.00	0.00	0.00	0.00
15	2.53-02	0.00	7.31-02	9.89+01	1.09+00	0.00	0.00	0.00	1.31-03	1.74+00	8.94-02	8.34+01	1.66+01	0.00	0.00	0.00	0.00
16	2.61-02	0.00	7.34-02	9.87+01	1.30+00	0.00	0.00	0.00	1.34-03	1.86+00	9.18-02	8.14+01	1.86+01	0.00	0.00	0.00	0.00
17	2.67-02	0.00	7.36-02	9.86+01	1.43+00	0.00	0.00	0.00	1.37-03	1.97+00	9.39-02	7.97+01	2.03+01	0.00	0.00	0.00	0.00
18	2.72-02	0.00	7.38-02	9.85+01	1.50+00	0.00	0.00	0.00	1.39-03	2.07+00	9.59-02	7.81+01	2.19+01	0.00	0.00	0.00	0.00
19	2.76-02	0.00	7.39-02	9.85+01	1.54+00	0.00	0.00	0.00	1.41-03	2.18+00	9.77-02	7.67+01	2.33+01	0.00	0.00	0.00	0.00
20	2.79-02	0.00	7.40-02	9.84+01	1.56+00	0.00	0.00	0.00	1.42-03	2.28+00	9.93-02	7.56+01	2.44+01	0.00	0.00	0.00	0.00
21	2.82-02	0.00	7.40-02	9.84+01	1.56+00	0.00	0.00	0.00	1.43-03	2.38+00	1.01-01	7.45+01	2.55+01	0.00	0.00	0.00	0.00
22	2.84-02	0.00	7.41-02	9.84+01	1.56+00	0.00	0.00	0.00	1.45-03	2.47+00	1.02-01	7.36+01	2.64+01	0.00	0.00	0.00	0.00
23	2.86-02	0.00	7.41-02	9.84+01	1.55+00	0.00	0.00	0.00	1.45-03	2.57+00	1.03-01	7.27+01	2.73+01	0.00	0.00	0.00	0.00
24	2.88-02	0.00	7.42-02	9.84+01	1.55+00	0.00	0.00	0.00	1.46-03	2.66+00	1.05-01	7.18+01	2.82+01	0.00	0.00	0.00	0.00
25	2.89-02	0.00	7.42-02	9.84+01	1.56+00	0.00	0.00	0.00	1.47-03	2.71+00	1.06-01	7.10+01	2.90+01	0.00	0.00	0.00	0.00

RADIAL POINT 12

DETAILED PRINTOUT FOR THE GAS KR65 M

AX*	FUEL VOL*	TEMP	*MICMOL/ *	*MICMOL/ *	*MICMOL/ *	*CONTAM	*FUEL	*FUEL REL*	*RTE MICMOL*	*THC2 HEUR	*THE UC2 TRISO*	*CONTAM *	
PT#	(CC)	(C)	(CC+S)	R/B	(CC+S)	R/B	(CC+S)	R/B	R/B	OL/CC/S	THC2 HEUR	THE UC2 TRISO*	CONTAM *
1	1.669+05	6.157+02	6.649-11	5.649-08	4.330-09	2.413-07	4.396-09	4.289-06	4.527-06	1.990-14	1.887-02	5.249+00	9.473+01
2	3.339+05	6.634+02	3.182-10	7.308-08	6.930-09	3.778-07	7.248-09	5.208-06	5.572-06	4.039-14	5.757-02	6.482+00	9.346+01
3	3.339+05	7.271+02	6.700-10	1.098-07	6.662-09	6.281-07	7.332-09	6.802-06	7.383-06	5.413-14	1.359-01	7.730+00	9.213+01
4	3.339+05	7.832+02	1.036-09	1.715-07	6.487-09	9.610-07	7.522-09	8.630-06	9.483-06	7.133-14	2.490-01	8.739+00	9.101+01
5	3.339+05	8.216+02	1.412-09	2.600-07	6.240-09	1.256-06	7.652-09	1.015-05	1.122-05	8.587-14	4.275-01	9.131+00	9.044+01
6	3.339+05	8.454+02	1.598-09	3.749-07	5.560-09	1.459-06	7.159-09	1.122-05	1.244-05	8.904-14	6.730-01	9.112+00	9.021+01
7	3.339+05	8.599+02	1.721-09	5.132-07	4.790-09	1.584-06	6.511-09	1.194-05	1.324-05	8.622-14	1.024+00	8.802+00	9.017+01
8	3.339+05	8.681+02	1.798-09	6.719-07	4.276-09	1.651-06	6.073-09	1.239-05	1.376-05	8.354-14	1.446+00	8.452+00	9.010+01
9	3.339+05	8.728+02	1.767-09	8.465-07	3.724-09	1.696-06	5.491-09	1.268-05	1.410-05	7.744-14	1.931+00	8.155+00	8.991+01
10	3.339+05	8.751+02	1.645-09	1.026-06	3.142-09	1.724-06	4.787-09	1.285-05	1.434-05	6.862-14	2.459+00	7.894+00	8.965+01
11	3.339+05	8.780+02	1.536-09	1.204-06	2.658-09	1.742-06	4.194-09	1.295-05	1.450-05	6.081-14	3.043+00	7.617+00	8.934+01
12	3.339+05	8.761+02	1.447-09	1.334-06	2.334-09	1.775-06	3.782-09	1.301-05	1.461-05	5.527-14	3.495+00	7.497+00	8.901+01
13	3.339+05	8.756+02	1.261-09	1.424-06	1.934-09	1.832-06	3.194-09	1.303-05	1.470-05	4.696-14	3.822+00	7.546+00	8.863+01
14	3.339+05	8.748+02	1.131-09	1.503-06	1.654-09	1.887-06	2.784-09	1.303-05	1.476-05	4.110-14	4.136+00	7.593+00	8.827+01
15	3.339+05	8.738+02	1.041-09	1.574-06	1.441-09	1.940-06	2.482-09	1.302-05	1.481-05	3.676-14	4.459+00	7.606+00	8.794+01
16	3.339+05	8.730+02	8.742-10	1.635-06	1.182-09	1.990-06	2.057-09	1.301-05	1.485-05	3.054-14	4.679+00	7.704+00	8.762+01
17	3.339+05	8.722+02	7.707-10	1.686-06	1.014-09	2.035-06	1.785-09	1.300-05	1.489-05	2.656-14	4.891+00	7.766+00	8.734+01
18	3.339+05	8.714+02	7.147-10	1.731-06	9.092-10	2.076-06	1.624-09	1.299-05	1.491-05	2.422-14	5.107+00	7.796+00	8.710+01
19	3.339+05	8.708+02	5.825-10	1.770-06	7.313-10	2.114-06	1.314-09	1.298-05	1.494-05	1.963-14	5.251+00	7.876+00	8.687+01
20	3.339+05	8.703+02	5.118-10	1.803-06	6.321-10	2.148-06	1.144-09	1.298-05	1.497-05	1.712-14	5.388+00	7.929+00	8.668+01
21	3.339+05	8.700+02	4.693-10	1.833-06	5.672-10	2.180-06	1.036-09	1.298-05	1.500-05	1.555-14	5.532+00	7.953+00	8.651+01
22	3.339+05	8.697+02	4.039-10	1.860-06	4.850-10	2.210-06	8.889-10	1.293-05	1.503-05	1.336-14	5.622+00	8.022+00	8.636+01
23	3.339+05	8.697+02	3.549-10	1.885-06	4.230-10	2.239-06	7.780-10	1.299-05	1.507-05	1.172-14	5.706+00	8.079+00	8.622+01
24	3.339+05	8.708+02	3.432-10	1.915-06	4.090-10	2.261-06	7.521-10	1.306-05	1.517-05	1.141-14	5.760+00	8.176+00	8.606+01
25	1.669+05	8.733+02	3.432-10	1.945-06	4.090-10	2.328-06	7.521-10	1.319-05	1.534-05	1.154-14	5.785+00	8.252+00	8.596+01

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RADIAL POINT 12

DETAILED PRINTOUT FOR THE GAS XC 138

* AX*	* FUEL	* VOL	* TEMP	* MICMOL/	* *	* MICMOL/	* *	* MICMOL/	* *	* CONTAM	* FUEL	* RTE MICMOL/	* THO2 MEUTR	* ME UC2 TRISO	* CONTAM
Pt	(CC)	(C)	(CC*S)	R/B	(CC*S)	R/B	(CC*S)	R/B	R/B	R/B	OL/CC/S	THO2 MEUTR	ME UC2 TRISO	CONTAM	
1	1.669+05	6.157+02	1.436-10	9.919-09	2.133-08	4.236-08	2.148-08	7.028-07	7.449-07	1.600-14	6.904-03	5.649+00	9.434+01		
2	3.339+05	6.634+02	6.872-10	1.151-08	3.414-08	5.952-08	3.483-08	7.658-07	8.244-07	2.871-14	2.756-12	7.077+00	9.290+01		
3	3.339+05	7.271+02	1.447-09	1.502-08	3.282-08	8.593-08	3.427-08	8.685-07	9.515-07	3.261-14	6.668-12	8.650+00	9.128+01		
4	3.339+05	7.832+02	2.237-09	2.087-08	3.196-08	1.169-07	3.420-08	9.799-07	1.091-06	3.729-14	1.252-01	1.002+01	8.986+01		
5	3.339+05	8.216+02	3.050-09	2.934-08	3.075-08	1.418-07	3.330-08	1.069-06	1.201-06	4.057-14	2.205-01	1.074+01	8.904+01		
6	3.339+05	8.454+02	3.452-09	4.047-08	2.740-08	1.575-07	3.385-08	1.130-06	1.275-06	3.933-14	3.553-01	1.097+01	8.867+01		
7	3.339+05	8.599+02	3.718-09	5.393-08	2.360-08	1.665-07	2.732-08	1.171-06	1.323-06	3.613-14	5.550-01	1.088+01	8.857+01		
8	3.339+05	8.681+02	3.883-09	6.953-08	2.107-08	1.709-07	2.495-08	1.197-06	1.352-06	3.373-14	8.003-01	1.067+01	8.853+01		
9	3.339+05	8.728+02	3.816-09	8.677-08	1.835-08	1.738-07	2.217-08	1.213-06	1.372-06	3.041-14	1.089+00	1.049+01	8.842+01		
10	3.339+05	8.751+02	3.553-09	1.046-07	1.548-08	1.758-07	1.904-08	1.223-06	1.385-06	2.637-14	1.409+00	1.032+01	8.827+01		
11	3.339+05	8.760+02	3.318-09	1.224-07	1.310-08	1.771-07	1.642-08	1.229-06	1.395-06	2.290-14	1.774+00	1.013+01	8.810+01		
12	3.339+05	8.761+02	3.126-09	1.354-07	1.150-08	1.801-07	1.463-08	1.232-06	1.403-06	2.052-14	2.064+00	1.010+01	8.784+01		
13	3.339+05	8.756+02	2.723-09	1.444-07	9.529-09	1.858-07	1.225-08	1.233-06	1.410-06	1.727-14	2.276+00	1.025+01	8.747+01		
14	3.339+05	8.748+02	2.443-09	1.525-07	8.148-09	1.914-07	1.059-08	1.233-06	1.416-06	1.499-14	2.484+00	1.040+01	8.711+01		
15	3.339+05	8.738+02	2.250-09	1.597-07	7.100-09	1.969-07	9.349-09	1.233-06	1.421-06	1.329-14	2.704+00	1.052+01	8.678+01		
16	3.339+05	8.730+02	1.888-09	1.659-07	5.825-09	2.020-07	7.714-09	1.233-06	1.426-06	1.100-14	2.849+00	1.070+01	8.645+01		
17	3.339+05	8.722+02	1.665-09	1.712-07	4.995-09	2.066-07	6.660-09	1.232-06	1.430-06	9.523-15	2.992+00	1.084+01	8.617+01		
18	3.339+05	8.714+02	1.544-09	1.758-07	4.480-09	2.109-07	6.024-09	1.231-06	1.433-06	8.634-15	3.143+00	1.094+01	8.591+01		
19	3.339+05	8.708+02	1.258-09	1.798-07	3.603-09	2.148-07	4.861-09	1.231-06	1.437-06	6.984-15	3.239+00	1.108+01	8.568+01		
20	3.339+05	8.703+02	1.105-09	1.832-07	3.114-09	2.183-07	4.220-09	1.231-06	1.440-06	6.076-15	3.333+00	1.119+01	8.548+01		
21	3.339+05	8.700+02	1.014-09	1.862-07	2.795-09	2.215-07	3.808-09	1.231-06	1.443-06	5.495-15	3.436+00	1.127+01	8.530+01		
22	3.339+05	8.697+02	8.724-10	1.890-07	2.390-09	2.245-07	3.262-09	1.231-06	1.446-06	4.717-15	3.495+00	1.138+01	8.513+01		
23	3.339+05	8.697+02	7.667-10	1.914-07	2.084-09	2.274-07	2.851-09	1.232-06	1.450-06	4.133-15	3.551+00	1.147+01	8.498+01		
24	3.339+05	8.708+02	7.412-10	1.942-07	2.015-09	2.313-07	2.756-09	1.235-06	1.457-06	4.015-15	3.585+00	1.161+01	8.481+01		
25	1.669+05	8.733+02	7.412-10	1.964-07	2.015-09	2.350-07	2.756-09	1.242-06	1.467-06	4.044-15	3.599+00	1.171+01	8.469+01		

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RADIAL POINT 13

PARTICLE FAILURES
DISTANCES IN MICRONS, FAILURES (13)

<----- THO2 NEUTR ----->									<----- ME UC2 TRISO ----->								
MAX DISTANCE			** PERCENT FAILURES OF TOTAL FAILURE **						*MAX DISTANCE*			** PERCENT FAILURES OF TOTAL FAILURE **					
AX	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	HIGH	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	HIGH	
PT	MIGRAT	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAT	IN SIC	TEMP	MIGRAT	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAT	IN SIC	TEMP	
1	4.55-07	0.00	3.01-02	1.00+02	0.00	0.00	0.00	J.00	6.83-09	0.00	3.38-02	1.00+02	0.00	0.00	0.00	0.00	
2	6.63-06	0.00	3.07-02	1.00+02	0.00	0.00	0.00	J.00	1.35-07	1.35-02	4.35-02	1.00+02	0.00	0.00	0.00	0.00	
3	9.04-05	0.00	3.22-02	1.00+02	0.00	0.00	0.00	J.00	2.74-06	5.07-02	5.54-02	9.98+01	1.60-01	0.00	0.00	0.00	
4	6.73-04	0.00	3.49-02	1.00+02	0.00	0.00	0.00	J.00	2.68-05	1.30-01	6.68-02	9.59+01	1.33-01	0.00	0.00	0.00	
5	2.40-03	0.00	3.87-02	1.00+02	0.00	0.00	0.00	J.00	1.10-04	2.53-01	7.43-02	9.70+01	3.04+00	0.00	0.00	0.00	
6	5.27-03	0.00	4.34-02	1.00+02	0.00	0.00	0.00	J.00	2.61-04	4.04-01	7.80-02	9.29+01	7.13+00	0.00	0.00	0.00	
7	8.76-03	0.00	4.85-02	1.00+02	0.00	0.00	0.00	J.00	4.51-04	5.70-01	7.96-02	9.15+01	8.50+00	0.00	0.00	0.00	
8	1.22-02	0.00	5.40-02	1.00+02	0.00	0.00	0.00	J.00	6.41-04	7.39-01	7.99-02	9.15+01	8.47+00	0.00	0.00	0.00	
9	1.53-02	0.00	5.95-02	1.00+02	0.00	0.00	0.00	J.00	8.10-04	9.04-01	8.02-02	9.16+01	8.43+00	0.00	0.00	0.00	
10	1.79-02	0.00	6.48-02	1.00+02	0.00	0.00	0.00	J.00	9.49-04	1.06+00	8.05-02	9.16+01	8.41+00	0.00	0.00	0.00	
11	1.99-02	0.00	6.97-02	1.00+02	0.00	0.00	0.00	J.00	1.06-03	1.21+00	8.07-02	9.16+01	8.38+00	0.00	0.00	0.00	
12	2.17-02	0.00	7.19-02	1.00+02	0.00	0.00	0.00	J.00	1.15-03	1.35+00	8.19-02	9.06+01	9.44+00	0.00	0.00	0.00	
13	2.31-02	0.00	7.23-02	9.97+01	3.25-01	0.00	0.00	J.00	1.21-03	1.49+00	8.44-02	8.61+01	1.19+01	0.00	0.00	0.00	
14	2.43-02	0.00	7.28-02	9.92+01	7.72-01	0.00	0.00	J.00	1.26-03	1.62+00	8.69-02	8.57+01	1.43+01	0.00	0.00	0.00	
15	2.52-02	0.00	7.31-02	9.89+01	1.09+00	0.00	0.00	J.00	1.30-03	1.74+00	8.94-02	8.35+01	1.65+01	0.00	0.00	0.00	
16	2.59-02	0.00	7.34-02	9.87+01	1.30+00	0.00	0.00	J.00	1.34-03	1.85+00	9.17-02	8.15+01	1.85+01	0.00	0.00	0.00	
17	2.65-02	0.00	7.36-02	9.86+01	1.43+00	0.00	0.00	J.00	1.36-03	1.96+00	9.39-02	7.97+01	2.03+01	0.00	0.00	0.00	
18	2.70-02	0.00	7.38-02	9.85+01	1.50+00	0.00	0.00	J.00	1.38-03	2.07+00	9.59-02	7.81+01	2.19+01	0.00	0.00	0.00	
19	2.74-02	0.00	7.39-02	9.85+01	1.54+00	0.00	0.00	J.00	1.40-03	2.17+00	9.77-02	7.68+01	2.32+01	0.00	0.00	0.00	
20	2.77-02	0.00	7.40-02	9.84+01	1.55+00	0.00	0.00	J.00	1.41-03	2.27+00	9.93-02	7.56+01	2.44+01	0.00	0.00	0.00	
21	2.80-02	0.00	7.40-02	9.84+01	1.55+00	0.00	0.00	J.00	1.42-03	2.37+00	1.01-01	7.46+01	2.54+01	0.00	0.00	0.00	
22	2.82-02	0.00	7.41-02	9.84+01	1.55+00	0.00	0.00	J.00	1.44-03	2.46+00	1.02-01	7.36+01	2.64+01	0.00	0.00	0.00	
23	2.84-02	0.00	7.41-02	9.84+01	1.55+00	0.00	0.00	J.00	1.44-03	2.56+00	1.03-01	7.28+01	2.72+01	0.00	0.00	0.00	
24	2.86-02	0.00	7.42-02	9.85+01	1.55+00	0.00	0.00	J.00	1.45-03	2.65+00	1.05-01	7.18+01	2.82+01	0.00	0.00	0.00	
25	2.87-02	0.00	7.42-02	9.84+01	1.55+00	0.00	0.00	J.00	1.46-03	2.70+00	1.06-01	7.11+01	2.69+01	0.00	0.00	0.00	

RADIAL POINT 13

DETAILED PRINTOUT FOR THE GAS KR85 M

	* * AX*FUEL VOL* PT* (CC)	* * TEMP (C)	*<-THO2 NEUTR *AVG FUEL*BIRTHRTE* *MICMOL/ * (CC*S) *	* * R/B	-->*-<ME UC2 TRISO-->* *BIRTHRTE* *MICMOL/ * (CC*S) *	* * R/B	* FUEL *BIRTHRTE* *MICMOL/ * (CC*S) *	* * R/B	* * FUEL R/B	* * *FUEL REL* *RTE MICM*-->1 RELEASE RATE COPYING FROM-->*<--> *OL/CC/S *THO2 NEUTR	* * *ME UC2 TRISO*	* * CONTAM *	
1	1.821+05	6.150+02	6.649-11	5.634-08	4.330-09	2.406-07	4.396-09	4.277-06	4.515-06	1.985-14	1.887-02	5.249+00	9.473+01
2	3.642+05	6.627+02	3.182-10	7.287-08	6.930-09	3.767-07	7.248-09	5.193-06	5.556-06	4.027-14	5.757-02	6.482+00	9.346+01
3	3.642+05	7.264+02	6.700-10	1.095-07	6.662-09	6.263-07	7.332-09	6.782-06	7.361-06	5.397-14	1.359-01	7.730+00	9.213+01
4	3.642+05	7.826+02	1.036-09	1.711-07	6.487-09	9.587-07	7.522-09	8.609-06	9.460-06	7.116-14	2.490-01	8.739+00	9.101+01
5	3.642+05	8.212+02	1.412-09	2.596-07	6.240-09	1.254-06	7.652-09	1.013-05	1.120-05	8.572-14	4.275-01	9.130+00	9.044+01
6	3.642+05	8.451+02	1.598-09	3.744-07	5.560-09	1.457-06	7.159-09	1.121-05	1.242-05	8.892-14	6.731-01	9.112+00	9.022+01
7	3.642+05	8.596+02	1.721-09	5.127-07	4.790-09	1.583-06	6.511-09	1.193-05	1.323-05	8.614-14	1.024-00	8.801+00	9.017+01
8	3.642+05	8.679+02	1.798-09	6.714-07	4.276-09	1.650-06	6.073-09	1.238-05	1.374-05	8.347-14	1.446-00	8.451+00	9.010+01
9	3.642+05	8.726+02	1.767-09	8.458-07	3.724-09	1.694-06	5.491-09	1.267-05	1.409-05	7.738-14	1.931-00	8.154+00	8.991+01
10	3.642+05	8.749+02	1.645-09	1.025-06	3.142-09	1.722-06	4.787-07	1.284-05	1.432-05	6.857-14	2.459+00	7.894+00	8.965+01
11	3.642+05	8.758+02	1.536-09	1.203-06	2.658-09	1.741-06	4.194-09	1.294-05	1.448-05	6.076-14	3.043+00	7.616+00	8.934+01
12	3.642+05	8.759+02	1.447-09	1.333-06	2.334-09	1.773-06	3.782-09	1.300-05	1.460-05	5.521-14	3.495+00	7.497+00	8.901+01
13	3.642+05	8.753+02	1.261-09	1.422-06	1.934-09	1.830-06	3.194-09	1.301-05	1.468-05	4.691-14	3.822+00	7.546+00	8.863+01
14	3.642+05	8.745+02	1.131-09	1.502-06	1.654-09	1.885-06	2.784-09	1.301-05	1.474-05	4.105-14	4.136+00	7.592+00	8.827+01
15	3.642+05	8.735+02	1.041-09	1.572-06	1.441-09	1.937-06	2.482-09	1.300-05	1.479-05	3.671-14	4.459+00	7.604+00	8.794+01
16	3.642+05	8.727+02	8.742-10	1.632-06	1.182-09	1.987-06	2.057-09	1.299-05	1.483-05	3.050-14	4.674+00	7.701+00	8.762+01
17	3.642+05	8.718+02	7.707-10	1.683-06	1.014-09	2.031-06	1.785-09	1.298-05	1.486-05	2.652-14	4.891+00	7.763+00	8.735+01
18	3.642+05	8.710+02	7.147-10	1.728-06	9.092-10	2.072-06	1.624-09	1.297-05	1.489-05	2.418-14	5.107+00	7.792+00	8.710+01
19	3.642+05	8.703+02	5.825-10	1.767-06	7.313-10	2.109-06	1.314-09	1.296-05	1.491-05	1.959-14	5.251+00	7.872+00	8.688+01
20	3.642+05	8.699+02	5.118-10	1.800-06	6.321-10	2.143-06	1.144-09	1.295-05	1.494-05	1.709-14	5.388+00	7.925+00	8.669+01
21	3.642+05	8.695+02	4.693-10	1.829-06	5.672-10	2.174-06	1.036-09	1.295-05	1.497-05	1.552-14	5.532+00	7.948+00	8.652+01
22	3.642+05	8.693+02	4.039-10	1.856-06	4.850-10	2.204-06	8.889-10	1.296-05	1.500-05	1.333-14	5.622+00	8.016+00	8.636+01
23	3.642+05	8.693+02	3.549-10	1.881-06	4.230-10	2.233-06	7.780-10	1.297-05	1.504-05	1.170-14	5.706+00	8.073+00	8.622+01
24	3.642+05	8.703+02	3.432-10	1.912-06	4.090-10	2.275-06	7.521-10	1.303-05	1.514-05	1.139-14	5.760+00	8.170+00	8.607+01
25	1.821+05	8.727+02	3.432-10	1.941-06	4.090-10	2.321-06	7.521-10	1.316-05	1.531-05	1.151-14	5.785+00	8.245+00	8.597+01

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DETAILED PRINTOUT FOR THE GAS XC 138

* <-THG2 MEUTR -->* <-HE UC2 TRISO-->* FUEL *														* BIRTH RATE *														* FUEL * FUEL MICM* <---% RELEASE RATE COMING FROM--->*													
* AVG FUEL * BIRTH RATE *				* BIRTH RATE *				* BIRTH RATE *				* FUEL * FUEL MICM* <---% RELEASE RATE COMING FROM--->*				* FUEL * FUEL MICM* <---% RELEASE RATE COMING FROM--->*				* FUEL * FUEL MICM* <---% RELEASE RATE COMING FROM--->*																					
AX*	FUEL	VOL*	TEMP	*MICMOL/	* R/B	*MICMOL/	* R/B	*MICMOL/	* R/B	*MICMOL/	* R/B	* FUEL	* FUEL	* FUEL	* FUEL	* FUEL	* FUEL	* FUEL	* FUEL	* FUEL	* FUEL	* FUEL	* FUEL																		
Pt*	(CC)	(C)	(CC+S)			(CC+S)		(CC+S)		(CC+S)																															
1	1.021	+05	6.150	+02	1.436	-10	9.907	-09	2.133	-08	4.231	-08	2.148	-09	7.019	-07	7.440	-07	1.598	-14	6.904	-13	5.649	+00	9.434	+01															
2	3.642	+05	6.627	+02	6.872	-10	1.150	-08	3.414	-08	5.944	-08	3.483	-08	7.648	-07	8.233	-07	2.868	-14	2.756	-02	7.177	+00	9.290	+01															
3	3.642	+05	7.264	+02	1.447	-09	1.500	-08	3.282	-08	8.501	-08	3.427	-08	8.673	-07	9.501	-07	3.256	-14	6.668	-02	8.650	+00	9.128	+01															
4	3.642	+05	7.826	+02	2.237	-09	2.084	-08	3.196	-08	1.168	-07	3.420	-09	9.786	-07	1.089	-06	3.725	-14	1.252	-01	1.002	+01	8.986	+01															
5	3.642	+05	8.212	+02	3.050	-09	2.931	-08	3.075	-08	1.416	-07	3.380	-08	1.068	-06	1.199	-06	4.053	-14	2.205	-01	1.074	+01	8.904	+01															
6	3.642	+05	8.451	+02	3.452	-09	4.044	-08	2.740	-08	1.574	-07	3.385	-08	1.130	-06	1.274	-06	3.930	-14	3.553	-01	1.097	+01	8.867	+01															
7	3.642	+05	8.596	+02	3.718	-09	5.390	-08	2.360	-08	1.664	-07	2.732	-08	1.171	-06	1.322	-06	3.611	-14	5.550	-01	1.088	+01	8.857	+01															
8	3.642	+05	8.679	+02	3.883	-09	6.949	-08	2.107	-08	1.708	-07	2.495	-08	1.196	-06	1.351	-06	3.372	-14	8.003	-01	1.067	+01	8.853	+01															
9	3.642	+05	8.726	+02	3.816	-09	8.673	-08	1.835	-08	1.737	-07	2.217	-08	1.213	-06	1.371	-06	3.040	-14	1.085	-01	1.049	+01	8.842	+01															
10	3.642	+05	8.749	+02	3.553	-09	1.046	-07	1.548	-08	1.757	-07	1.904	-08	1.222	-06	1.385	-06	2.636	-14	1.401	-01	1.032	+01	8.827	+01															
11	3.642	+05	8.758	+02	3.318	-09	1.224	-07	1.310	-08	1.770	-07	1.642	-08	1.228	-06	1.394	-06	2.289	-14	1.774	-01	1.013	+01	8.810	+01															
12	3.642	+05	8.759	+02	3.126	-09	1.353	-07	1.150	-08	1.800	-07	1.463	-08	1.231	-06	1.402	-06	2.051	-14	2.064	-01	1.010	+01	8.784	+01															
13	3.642	+05	8.753	+02	2.723	-09	1.443	-07	9.529	-09	1.857	-07	1.225	-08	1.233	-06	1.409	-06	1.726	-14	2.278	-01	1.025	+01	8.747	+01															
14	3.642	+05	8.745	+02	2.443	-09	1.524	-07	8.148	-09	1.913	-07	1.059	-08	1.233	-06	1.415	-06	1.498	-14	2.484	-01	1.040	+01	8.712	+01															
15	3.642	+05	8.735	+02	2.250	-09	1.596	-07	7.100	-09	1.967	-07	9.349	-09	1.232	-06	1.420	-06	1.328	-14	2.704	-01	1.052	+01	8.678	+01															
16																																									

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RADIAL POINT 14

PARTICLE FAILURES
DISTANCES IN MICRONS, FAILURES (%)

TH02 NEUTR								ME UC2 TP150							
MAX DISTANCE				** PERCENT FAILURES OF TOTAL FAILURE **				*MAX DISTANCE*				** PERCENT FAILURES OF TOTAL FAILURE **			
AX	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	AX	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD
PT	MIGRAT	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAT	IN SIC	PT	MIGRAT	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAT	IN SIC
1	4.33-07	0.00	3.01-02	1.00+02	0.00	0.00	0.00	J.00	6.44-09	0.00	3.37-02	1.00+02	0.00	0.00	0.00
2	6.38-06	0.00	3.07-02	1.00+02	0.00	0.00	0.00	J.00	1.29-07	1.33-02	4.35-02	1.00+02	0.00	0.00	0.00
3	8.78-05	0.00	3.22-02	1.00+02	0.00	0.00	0.00	J.00	2.65-06	5.01-02	5.54-02	9.98+01	1.68-01	0.00	0.00
4	6.60-04	0.00	3.49-02	1.00+02	0.00	0.00	0.00	J.00	2.62-05	1.29-01	6.68-02	9.99+01	1.39-01	0.00	0.00
5	2.37-03	0.00	3.87-02	1.00+02	0.00	0.00	0.00	J.00	1.09-04	2.51-01	7.43-02	9.70+01	3.03+00	0.00	0.00
6	5.23-03	0.00	4.33-02	1.00+02	0.00	0.00	0.00	J.00	2.59-04	4.02-01	7.80-02	9.29+01	7.12+00	0.00	0.00
7	8.71-03	0.00	4.85-02	1.00+02	0.00	0.00	0.00	J.00	4.48-04	5.68-01	7.96-02	9.15+01	8.50+00	0.00	0.00
8	1.22-02	0.00	5.40-02	1.00+02	0.00	0.00	0.00	J.00	6.38-04	7.37-01	7.99-02	9.15+01	8.46+00	0.00	0.00
9	1.52-02	0.00	5.95-02	1.00+02	0.00	0.00	0.00	J.00	8.07-04	9.02-01	8.02-02	9.16+01	8.43+00	0.00	0.00
10	1.78-02	0.00	6.48-02	1.00+02	0.00	0.00	0.00	J.00	9.46-04	1.06+00	8.05-02	9.16+01	8.41+00	0.00	0.00
11	1.99-02	0.00	6.98-02	1.00+02	0.00	0.00	0.00	J.00	1.06-03	1.21+00	8.07-02	9.16+01	8.38+00	0.00	0.00
12	2.16-02	0.00	7.19-02	1.00+02	0.00	0.00	0.00	J.00	1.14-03	1.35+00	8.19-02	9.05+01	9.46+00	0.00	0.00
13	2.31-02	0.00	7.23-02	9.97+01	3.30-01	0.00	0.00	J.00	1.21-03	1.49+00	8.44-02	8.81+01	1.19+01	0.00	0.00
14	2.42-02	0.00	7.28-02	9.92+01	7.76-01	0.00	0.00	J.00	1.26-03	1.61+00	8.69-02	8.57+01	1.43+01	0.00	0.00
15	2.51-02	0.00	7.31-02	9.89+01	1.09+00	0.00	0.00	J.00	1.30-03	1.73+00	8.94-02	8.34+01	1.66+01	0.00	0.00
16	2.58-02	0.00	7.34-02	9.87+01	1.30+00	0.00	0.00	J.00	1.33-03	1.85+00	9.18-02	8.14+01	1.86+01	0.00	0.00
17	2.64-02	0.00	7.36-02	9.86+01	1.43+00	0.00	0.00	J.00	1.35-03	1.96+00	9.39-02	7.97+01	2.03+01	0.00	0.00
18	2.69-02	0.00	7.38-02	9.85+01	1.50+00	0.00	0.00	J.00	1.37-03	2.06+00	9.59-02	7.81+01	2.19+01	0.00	0.00
19	2.73-02	0.00	7.39-02	9.85+01	1.54+00	0.00	0.00	J.00	1.39-03	2.16+00	9.77-02	7.67+01	2.33+01	0.00	0.00
20	2.76-02	0.00	7.40-02	9.85+01	1.55+00	0.00	0.00	J.00	1.40-03	2.26+00	9.93-02	7.56+01	2.44+01	0.00	0.00
21	2.79-02	0.00	7.40-02	9.85+01	1.55+00	0.00	0.00	J.00	1.42-03	2.36+00	1.01-01	7.46+01	2.54+01	0.00	0.00
22	2.81-02	0.00	7.41-02	9.85+01	1.55+00	0.00	0.00	J.00	1.43-03	2.46+00	1.02-01	7.36+01	2.64+01	0.00	0.00
23	2.83-02	0.00	7.41-02	9.85+01	1.55+00	0.00	0.00	J.00	1.44-03	2.55+00	1.03-01	7.28+01	2.72+01	0.00	0.00
24	2.85-02	0.00	7.42-02	9.85+01	1.55+00	0.00	0.00	J.00	1.45-03	2.65+00	1.05-01	7.18+01	2.82+01	0.00	0.00
25	2.86-02	0.00	7.42-02	9.85+01	1.55+00	0.00	0.00	J.00	1.45-03	2.69+00	1.06-01	7.11+01	2.89+01	0.00	0.00

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RADIAL POINT 14

DETAILED PRINTOUT FOR THE GAS KR85 M

[illegible]

B-149

DETAILED PRINTOUT FOR THE GAS XE 138

B-150

RADIAL POINT 15

PARTICLE FAILURES
DISTANCES IN MICRONS, FAILURES (%)

<----- TH02 NEUTR ----->									<----- ME UC2 TRISO ----->								
MAX DISTANCE			** PERCENT FAILURES OF TOTAL FAILURE **			*MAX DISTANCE*			** PERCENT FAILURES OF TOTAL FAILURE **			*MAX DISTANCE*			** PERCENT FAILURES OF TOTAL FAILURE **		
AX	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	HIGH	AX	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	HIGH
PI	MIGRAT	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAT	IN SIC	TEMP	PI	MIGRAT	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAT	IN SIC	TEMP
1	4.08-07	0.00	3.01-02	1.00+02	0.00	0.00	0.00	J.U0	6.01-09	0.00	3.37-02	1.00+02	0.00	0.00	0.00	0.00	0.00
2	6.13-06	0.00	3.07-02	1.00+02	0.00	0.00	0.00	J.U0	1.23-07	1.31-02	4.34-02	1.00+02	0.00	0.00	0.00	0.00	0.00
3	8.57-05	0.00	3.22-02	1.00+02	0.00	0.00	0.00	J.U0	2.58-06	4.96-02	5.51-02	1.00+02	0.00	0.00	0.00	0.00	0.00
4	6.52-04	0.00	3.48-02	1.00+02	0.00	0.00	0.00	J.U0	2.59-05	1.28-01	6.65-02	1.00+02	0.00	0.00	0.00	0.00	0.00
5	2.36-03	0.00	3.86-02	1.00+02	0.00	0.00	0.00	J.U0	1.08-04	2.50-01	7.42-02	9.70+01	2.98+00	0.00	0.00	0.00	0.00
6	5.24-03	0.00	4.33-02	1.00+02	0.00	0.00	0.00	J.U0	2.59-04	4.01-01	7.60-02	9.29+01	7.12+00	0.00	0.00	0.00	0.00
7	8.74-03	0.00	4.85-02	1.00+02	0.00	0.00	0.00	J.U0	4.50-04	5.68-01	7.96-02	9.15+01	8.51+00	0.00	0.00	0.00	0.00
8	1.22-02	0.00	5.40-02	1.00+02	0.00	0.00	0.00	J.U0	6.41-04	7.37-01	7.99-02	9.15+01	8.47+00	0.00	0.00	0.00	0.00
9	1.53-02	0.00	5.96-02	1.00+02	0.00	0.00	0.00	J.U0	8.11-04	9.02-01	8.02-02	9.16+01	8.44+00	0.00	0.00	0.00	0.00
10	1.79-02	0.00	6.49-02	1.00+02	0.00	0.00	0.00	J.U0	9.51-04	1.06+00	8.05-02	9.16+01	8.41+00	0.00	0.00	0.00	0.00
11	1.99-02	0.00	6.99-02	1.00+02	0.00	0.00	0.00	J.U0	1.06-03	1.21+00	8.07-02	9.16+01	8.39+00	0.00	0.00	0.00	0.00
12	2.17-02	0.00	7.19-02	1.00+02	0.00	0.00	0.00	J.U0	1.15-03	1.35+00	8.21-02	9.04+01	9.64+00	0.00	0.00	0.00	0.00
13	2.31-02	0.00	7.23-02	9.96+01	3.62-01	0.00	0.00	J.U0	1.21-03	1.49+00	8.46-02	8.78+01	1.22+01	0.00	0.00	0.00	0.00
14	2.43-02	0.00	7.28-02	9.92+01	8.05-01	0.00	0.00	J.U0	1.26-03	1.61+00	8.72-02	8.54+01	1.46+01	0.00	0.00	0.00	0.00
15	2.52-02	0.00	7.32-02	9.89+01	1.12+00	0.00	0.00	J.U0	1.30-03	1.73+00	8.98-02	8.31+01	1.69+01	0.00	0.00	0.00	0.00
16	2.59-02	0.00	7.34-02	9.87+01	1.32+00	0.00	0.00	J.U0	1.33-03	1.85+00	9.21-02	8.11+01	1.89+01	0.00	0.00	0.00	0.00
17	2.65-02	0.00	7.36-02	9.86+01	1.44+00	0.00	0.00	J.U0	1.36-03	1.96+00	9.43-02	7.93+01	2.07+01	0.00	0.00	0.00	0.00
18	2.69-02	0.00	7.38-02	9.85+01	1.51+00	0.00	0.00	J.U0	1.38-03	2.06+00	9.63-02	7.78+01	2.22+01	0.00	0.00	0.00	0.00
19	2.73-02	0.00	7.39-02	9.85+01	1.54+00	0.00	0.00	J.U0	1.39-03	2.16+00	9.82-02	7.64+01	2.36+01	0.00	0.00	0.00	0.00
20	2.76-02	0.00	7.40-02	9.84+01	1.55+00	0.00	0.00	J.U0	1.41-03	2.26+00	9.97-02	7.53+01	2.47+01	0.00	0.00	0.00	0.00
21	2.79-02	0.00	7.41-02	9.85+01	1.55+00	0.00	0.00	J.U0	1.42-03	2.36+00	1.01-01	7.42+01	2.58+01	0.00	0.00	0.00	0.00
22	2.81-02	0.00	7.41-02	9.85+01	1.55+00	0.00	0.00	J.U0	1.43-03	2.45+00	1.03-01	7.33+01	2.67+01	0.00	0.00	0.00	0.00
23	2.83-02	0.00	7.42-02	9.85+01	1.55+00	0.00	0.00	J.U0	1.44-03	2.55+00	1.04-01	7.25+01	2.75+01	0.00	0.00	0.00	0.00
24	2.85-02	0.00	7.42-02	9.85+01	1.55+00	0.00	0.00	J.U0	1.45-03	2.64+00	1.05-01	7.15+01	2.85+01	0.00	0.00	0.00	0.00
25	2.86-02	0.00	7.42-02	9.85+01	1.55+00	0.00	0.00	J.U0	1.45-03	2.69+00	1.06-01	7.08+01	2.92+01	0.00	0.00	0.00	0.00

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RADIAL POINT 15

DETAILED PRINTOUT FOR THE GAS XC 138

* * AX*FUEL VOL* PT*	* * TEMP (C)	* * *MICMOL/ (CC*S)	* * R/B	* * *MICMOL/ (CC*S)	* * R/B	* * *MICMOL/ (CC*S)	* * R/B	* * FUEL R/B	* * FUEL R/B	* * FUEL REL* *RTE MICM* *OL/CC/S	* * *THU2 MEUTR *ME UC2 TRISO*	* * *CONTAM *CONTAM*	
1	2.125+05	6.130+02	1.389-10	9.871-09	2.102-08	4.211-08	2.116-08	6.997-07	7.416-07	1.569-14	6.735-03	5.641+00	9.435+01
2	4.249+05	6.611+02	6.667-10	1.144-08	3.381-08	5.902-08	3.448-08	7.624-07	8.205-07	2.829-14	2.696-02	7.054+00	9.292+01
3	4.249+05	7.251+02	1.434-09	1.490-08	3.284-08	8.507-08	3.427-08	8.649-07	9.470-07	3.246-14	6.581-02	8.608+00	9.133+01
4	4.249+05	7.817+02	2.231-09	2.071-08	3.211-08	1.160-07	3.434-08	9.767-07	1.087-06	3.731-14	1.236-01	9.984+00	8.989+01
5	4.249+05	8.207+02	3.046-09	2.916-08	3.095-08	1.414-07	3.399-08	1.067-06	1.198-06	4.072-14	2.181-01	1.074+01	8.904+01
6	4.249+05	8.449+02	3.470-09	4.030-08	2.764-08	1.573-07	3.111-08	1.129-06	1.273-06	3.961-14	3.530-01	1.097+01	8.867+01
7	4.249+05	8.596+02	3.752-09	5.385-08	2.384-08	1.664-07	2.759-08	1.171-06	1.322-06	3.647-14	5.540-01	1.088+01	8.857+01
8	4.249+05	8.680+02	3.917-09	6.957-08	2.128-08	1.708-07	2.519-08	1.196-06	1.351-06	3.405-14	8.603-01	1.067+01	8.853+01
9	4.249+05	8.726+02	3.853-09	8.697-08	1.853-08	1.738-07	2.238-08	1.213-06	1.371-06	3.070-14	1.092+00	1.049+01	8.842+01
10	4.249+05	8.748+02	3.595-09	1.050-07	1.564-08	1.757-07	1.923-08	1.222-06	1.385-06	2.663-14	1.418+00	1.032+01	8.827+01
11	4.249+05	8.757+02	3.354-09	1.230-07	1.321-08	1.770-07	1.657-08	1.228-06	1.394-06	2.309-14	1.787+00	1.013+01	8.809+01
12	4.249+05	8.757+02	3.152-09	1.357-07	1.159-08	1.804-07	1.474-08	1.231-06	1.402-06	2.065-14	2.071+00	1.012+01	8.781+01
13	4.249+05	8.750+02	2.751-09	1.448-07	9.594-09	1.861-07	1.235-08	1.232-06	1.409-06	1.739-14	2.291+00	1.027+01	8.744+01
14	4.249+05	8.741+02	2.465-09	1.529-07	8.194-09	1.918-07	1.066-03	1.231-06	1.414-06	1.508-14	2.501+00	1.042+01	8.708+01
15	4.249+05	8.730+02	2.259-09	1.601-07	7.123-09	1.973-07	9.382-09	1.231-06	1.419-06	1.331-14	2.716+00	1.055+01	8.673+01
16	4.249+05	8.721+02	1.900-09	1.663-07	5.840-09	2.024-07	7.740-09	1.231-06	1.424-06	1.102-14	2.866+00	1.073+01	8.640+01
17	4.249+05	8.712+02	1.673-09	1.715-07	4.999-09	2.070-07	6.672-09	1.229-06	1.427-06	9.524-15	3.012+00	1.087+01	8.612+01
18	4.249+05	8.704+02	1.543-09	1.761-07	4.473-09	2.113-07	6.015-09	1.228-06	1.431-06	8.607-15	3.157+00	1.098+01	8.586+01
19	4.249+05	8.696+02	1.259-09	1.801-07	3.591-09	2.152-07	4.850-09	1.228-06	1.434-06	6.954-15	3.260+00	1.111+01	8.563+01
20	4.249+05	8.691+02	1.104-09	1.834-07	3.098-09	2.186-07	4.201-09	1.227-06	1.437-06	6.036-15	3.353+00	1.122+01	8.543+01
21	4.249+05	8.687+02	1.007-09	1.864-07	2.772-09	2.218-07	3.779-09	1.227-06	1.440-06	5.440-15	3.450+00	1.130+01	8.525+01
22	4.249+05	8.684+02	8.657-10	1.891-07	2.366-09	2.247-07	3.231-09	1.227-06	1.442-06	4.661-15	3.512+00	1.141+01	8.508+01
23	4.249+05	8.684+02	7.593-10	1.915-07	2.057-09	2.276-07	2.817-09	1.228-06	1.446-06	4.072-15	3.571+00	1.150+01	8.493+01
24	4.249+05	8.694+02	7.326-10	1.942-07	1.986-09	2.313-07	2.718-09	1.231-06	1.453-06	3.949-15	3.603+00	1.163+01	8.477+01
25	2.125+05	8.717+02	7.328-10	1.963-07	1.986-09	2.350-07	2.718-09	1.238-06	1.463-06	3.976-15	3.617+00	1.174+01	8.465+01

RADIAL POINT 16

PARTICLE FAILURES
DISTANCES IN MICRONS, FAILURES (%)

<----- THO2 NEUTR ----->									<----- ME UC2 TRISO ----->								
MAX DISTANCE			** PERCENT FAILURES OF TOTAL FAILURE **						*MAX DISTANCE*			** PERCENT FAILURES OF TOTAL FAILURE **					
AX	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	HIGH	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	HIGH	
PT	MIGRAT	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAT	IN SIC	TEMP	MIGRAT	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAT	IN SIC	TEMP	
1	3.77-07	0.00	3.01-02	1.00+02	0.00	0.00	0.00	J.00	5.47-09	0.00	3.37-02	1.00+02	0.00	0.00	0.00	0.00	
2	5.79-06	0.00	3.07-02	1.00+02	0.00	0.00	0.00	J.00	1.15-07	1.28-02	4.33-02	1.00+02	0.00	0.00	0.00	0.00	
3	8.24-05	0.00	3.22-02	1.00+02	0.00	0.00	0.00	J.00	2.47-06	4.88-02	5.51-02	1.00+02	0.00	0.00	0.00	0.00	
4	6.38-04	0.00	3.48-02	1.00+02	0.00	0.00	0.00	J.00	2.53-05	1.27-01	6.65-02	1.00+02	0.00	0.00	0.00	0.00	
5	2.33-03	0.00	3.86-02	1.00+02	0.00	0.00	0.00	J.00	1.07-04	2.48-01	7.42-02	9.70+01	2.97+00	0.00	0.00	0.00	
6	5.22-03	0.00	4.33-02	1.00+02	0.00	0.00	0.00	J.00	2.59-04	4.00-01	7.80-02	9.29+01	7.12+00	0.00	0.00	0.00	
7	8.73-03	0.00	4.85-02	1.00+02	0.00	0.00	0.00	J.00	4.50-04	5.66-01	7.96-02	9.15+01	8.51+00	0.00	0.00	0.00	
8	1.22-02	0.00	5.40-02	1.00+02	0.00	0.00	0.00	J.00	6.42-04	7.36-01	8.00-02	9.15+01	8.47+00	0.00	0.00	0.00	
9	1.53-02	0.00	5.96-02	1.00+02	0.00	0.00	0.00	J.00	8.13-04	9.01-01	8.02-02	9.16+01	8.44+00	0.00	0.00	0.00	
10	1.79-02	0.00	6.49-02	1.00+02	0.00	0.00	0.00	J.00	9.53-04	1.06+00	8.05-02	9.16+01	8.42+00	0.00	0.00	0.00	
11	2.00-02	0.00	6.99-02	1.00+02	0.00	0.00	0.00	J.00	1.05-03	1.21+00	8.07-02	9.16+01	8.39+00	0.00	0.00	0.00	
12	2.17-02	0.00	7.19-02	1.00+02	0.00	0.00	0.00	J.00	1.15-03	1.35+00	8.21-02	9.04+01	9.64+00	0.00	0.00	0.00	
13	2.31-02	0.00	7.23-02	9.96+01	3.64-01	0.00	0.00	J.00	1.21-03	1.48+00	8.46-02	8.78+01	1.22+01	0.00	0.00	0.00	
14	2.43-02	0.00	7.28-02	9.92+01	8.06-01	0.00	0.00	J.00	1.26-03	1.61+00	8.72-02	8.54+01	1.46+01	0.00	0.00	0.00	
15	2.51-02	0.00	7.32-02	9.89+01	1.12+00	0.00	0.00	J.00	1.30-03	1.73+00	8.97-02	8.31+01	1.69+01	0.00	0.00	0.00	
16	2.59-02	0.00	7.34-02	9.87+01	1.32+00	0.00	0.00	J.00	1.33-03	1.84+00	9.21-02	8.11+01	1.69+01	0.00	0.00	0.00	
17	2.64-02	0.00	7.36-02	9.86+01	1.44+00	0.00	0.00	J.00	1.36-03	1.95+00	9.43-02	7.94+01	2.06+01	0.00	0.00	0.00	
18	2.69-02	0.00	7.38-02	9.85+01	1.50+00	0.00	0.00	J.00	1.38-03	2.06+00	9.63-02	7.78+01	2.22+01	0.00	0.00	0.00	
19	2.73-02	0.00	7.39-02	9.85+01	1.54+00	0.00	0.00	J.00	1.39-03	2.16+00	9.81-02	7.64+01	2.36+01	0.00	0.00	0.00	
20	2.76-02	0.00	7.40-02	9.85+01	1.55+00	0.00	0.00	J.00	1.40-03	2.26+00	9.97-02	7.53+01	2.47+01	0.00	0.00	0.00	
21	2.78-02	0.00	7.41-02	9.85+01	1.54+00	0.00	0.00	J.00	1.42-03	2.35+00	1.01-01	7.43+01	2.57+01	0.00	0.00	0.00	
22	2.80-02	0.00	7.41-02	9.85+01	1.54+00	0.00	0.00	J.00	1.43-03	2.45+00	1.02-01	7.34+01	2.66+01	0.00	0.00	0.00	
23	2.82-02	0.00	7.42-02	9.85+01	1.54+00	0.00	0.00	J.00	1.43-03	2.54+00	1.04-01	7.25+01	2.75+01	0.00	0.00	0.00	
24	2.84-02	0.00	7.42-02	9.85+01	1.54+00	0.00	0.00	J.00	1.44-03	2.63+00	1.05-01	7.16+01	2.84+01	0.00	0.00	0.00	
25	2.85-02	0.00	7.42-02	9.85+01	1.54+00	0.00	0.00	J.00	1.45-03	2.68+00	1.06-01	7.09+01	2.91+01	0.00	0.00	0.00	

B-154

RADIAL POINT 16

DETAILED PRINTOUT FOR THE GAS KR85 M

* * *	* * *	* *-TH02 MEUTR	-->*-ME UC2 TRISO-->	* FUEL *	* * *	* * *	* * *						
* * *	* AVG FUEL	* BIRTHRT*	* BIRTHRT*	* BIRTHRT*	* * *	* FUEL K/L*	* * *						
AX*FUEL VOL* TEMP	* MICHL*/ *	* MICHL*/ *	* MICHL*/ *	* MICHL*/ *	* CONTAM	* FUEL	* RTE MICH*---						
PT* (CC) * (C)	* (CC*S) *	R/B	* (CC*S) *	R/B	* (CC*S) *	R/B	* R/B						
							* RELEASE RATE COMING FROM----						
							* TH02 MEUTR * ME UC2 TRISO* CONTAM *						
1	2.276+05	6.116+02	6.417-11	5.559-08	4.262-09	2.371-07	4.326-09	4.222-06	4.456-06	1.928-14	1.850-02	5.242+00	9.474+01
2	4.553+05	6.598+02	3.081-10	7.185-08	6.858-09	3.707-07	7.166-09	5.131-06	5.489-06	3.934-14	5.627-02	6.462+00	9.348+01
3	4.553+05	7.241+02	6.633-10	1.080-07	6.665-09	6.163-07	7.328-09	6.715-06	7.285-06	5.339-14	1.341-01	7.694+00	9.217+01
4	4.553+05	7.811+02	1.033-09	1.692-07	6.519-09	9.481-07	7.552-09	8.554-06	9.395-06	7.095-14	2.463-01	8.711+00	9.104+01
5	4.553+05	8.204+02	1.410-09	2.576-07	6.283-09	1.249-06	7.693-09	1.010-05	1.117-05	6.590-14	4.228-01	9.136+00	9.044+01
6	4.553+05	8.448+02	1.607-09	3.728-07	5.613-09	1.455-06	7.219-09	1.119-05	1.241-05	8.958-14	6.688-01	9.118+00	9.021+01
7	4.553+05	8.597+02	1.738-09	5.121-07	4.842-09	1.583-06	6.580-09	1.193-05	1.323-05	8.705-14	1.023+00	8.805+00	9.017+01
8	4.553+05	8.680+02	1.814-09	6.723-07	4.321-09	1.650-06	6.135-09	1.239-05	1.375-05	8.434-14	1.446+00	8.456+00	9.010+01
9	4.553+05	8.726+02	1.785-09	8.483-07	3.763-09	1.695-06	5.548-09	1.267-05	1.409-05	7.818-14	1.937+00	8.156+00	8.991+01
10	4.553+05	8.748+02	1.666-09	1.030-06	3.176-09	1.722-06	4.841-09	1.283-05	1.432-05	6.932-14	2.474+00	7.889+00	8.964+01
11	4.553+05	8.755+02	1.554-09	1.209-06	2.683-09	1.739-06	4.237-09	1.293-05	1.447-05	6.132-14	3.065+00	7.611+00	8.932+01
12	4.553+05	8.755+02	1.460-09	1.336-06	2.352-09	1.775-06	3.812-09	1.297-05	1.458-05	5.559-14	3.509+00	7.510+00	8.898+01
13	4.553+05	8.748+02	1.274-09	1.425-06	1.948-09	1.832-06	3.223-09	1.298-05	1.466-05	4.723-14	3.846+00	7.555+00	8.860+01
14	4.553+05	8.737+02	1.142-09	1.504-06	1.664-09	1.886-06	2.806-09	1.298-05	1.471-05	4.126-14	4.164+00	7.604+00	8.823+01
15	4.553+05	8.727+02	1.046-09	1.574-06	1.446-09	1.938-06	2.492-09	1.296-05	1.474-05	3.674-14	4.483+00	7.629+00	8.789+01
16	4.553+05	8.717+02	0.802-10	1.634-06	1.185-09	1.988-06	2.066-09	1.294-05	1.478-05	3.053-14	4.711+00	7.717+00	8.757+01
17	4.553+05	8.707+02	7.746-10	1.684-06	1.015-09	2.031-06	1.789-09	1.293-05	1.481-05	2.649-14	4.922+00	7.780+00	8.730+01
18	4.553+05	8.698+02	7.141-10	1.727-06	9.077-10	2.072-06	1.622-09	1.291-05	1.483-05	2.405-14	5.130+00	7.820+00	8.705+01
19	4.553+05	8.690+02	5.828-10	1.765-06	7.287-10	2.108-06	1.312-09	1.289-05	1.485-05	1.947-14	5.283+00	7.889+00	8.683+01
20	4.553+05	8.685+02	5.108-10	1.797-06	6.285-10	2.141-06	1.139-09	1.288-05	1.487-05	1.694-14	5.419+00	7.941+00	8.664+01
21	4.553+05	8.681+02	4.659-10	1.826-06	5.624-10	2.171-06	1						

RADIAL POINT 16

DETAILED PRINTOUT FOR THE GAS XE 138

* AX*	* FUEL VOL*	* TEMP	* MICMOL/	* R/B	* MICMOL/	* R/B	* MICMOL/	* R/B	* FUEL	* R/B	* FUEL REL*	* RTE MICM*	* THO2 MEUTR	* ME UC2 TRISO*	* CONTAM
PT*	(CC)	(C)	(CC*S)		(CC*S)		(CC*S)				*OL/CC/S	*THO2 MEUTR			
1	2.276+05	6.116+02	1.386-10	9.848-09	2.100-08	4.200-08	2.114-08	6.981-07	7.399-07	1.564-14	8.729-13	5.640+00	9.435+01		
2	4.553+05	6.598+02	6.654-10	1.141-08	3.379-08	5.888-08	3.446-08	7.607-07	8.187-07	2.821-14	2.692-12	7.053+00	9.292+01		
3	4.553+05	7.241+02	1.433-09	1.487-08	3.284-08	8.488-08	3.427-08	8.631-07	9.450-07	3.239-14	6.577-12	8.606+00	9.133+01		
4	4.553+05	7.811+02	2.231-09	2.067-08	3.212-08	1.158-07	3.435-08	9.753-07	1.085-06	3.727-14	1.237-11	9.983+00	8.989+01		
5	4.553+05	8.204+02	3.045-09	2.913-08	3.096-08	1.413-07	3.430-08	1.066-06	1.197-06	4.071-14	2.179-11	1.074+01	8.904+01		
6	4.553+05	8.448+02	3.471-09	4.129-08	2.765-08	1.572-07	3.113-08	1.129-06	1.273-06	3.962-14	3.529-11	1.097+01	8.867+01		
7	4.553+05	8.597+02	3.754-09	5.385-08	2.386-08	1.664-07	2.761-08	1.171-06	1.322-06	3.650-14	5.539-11	1.088+01	8.857+01		
8	4.553+05	8.680+02	3.919-09	6.958-08	2.129-08	1.708-07	2.521-08	1.196-06	1.352-06	3.407-14	6.003-11	1.067+01	8.853+01		
9	4.553+05	8.726+02	3.855-09	8.699-08	1.854-08	1.738-07	2.240-08	1.213-06	1.371-06	3.071-14	1.092+10	1.049+01	8.842+01		
10	4.553+05	8.748+02	3.598-09	1.050-07	1.565-08	1.757-07	1.924-08	1.222-06	1.384-06	2.664-14	1.416+10	1.032+01	8.827+01		
11	4.553+05	8.755+02	3.356-09	1.230-07	1.322-08	1.769-07	1.656-08	1.227-06	1.393-06	2.310-14	1.788+10	1.013+01	8.809+01		
12	4.553+05	8.755+02	3.154-09	1.357-07	1.159-08	1.803-07	1.474-08	1.230-06	1.401-06	2.066-14	2.072+10	1.012+01	8.781+01		
13	4.553+05	8.748+02	2.753-09	1.447-07	9.599-09	1.860-07	1.235-08	1.231-06	1.408-06	1.739-14	2.292+10	1.027+01	8.744+01		
14	4.553+05	8.737+02	2.467-09	1.528-07	8.196-09	1.916-07	1.066-08	1.231-06	1.413-06	1.507-14	2.502+10	1.042+01	8.707+01		
15	4.553+05	8.727+02	2.259-09	1.600-07	7.125-09	1.971-07	9.384-09	1.230-06	1.418-06	1.330-14	2.717+10	1.055+01	8.673+01		
16	4.553+05	8.717+02	1.901-09	1.662-07	5.840-09	2.022-07	7.742-09	1.229-06	1.422-06	1.101-14	2.869+10	1.072+01	8.641+01		
17	4.553+05	8.707+02	1.673-09	1.714-07	4.999-09	2.068-07	6.673-09	1.228-06	1.426-06	9.514-15	3.014+10	1.086+01	8.612+01		
18	4.553+05	8.698+02	1.543-09	1.759-07	4.472-09	2.110-07	6.015-09	1.227-06	1.429-06	8.595-15	3.158+10	1.098+01	8.586+01		
19	4.553+05	8.690+02	1.259-09	1.799-07	3.591-09	2.148-07	4.849-09	1.226-06	1.432-06	6.944-15	3.261+10	1.111+01	8.563+01		
20	4.553+05	8.685+02	1.103-09	1.832-07	3.097-09	2.182-07	4.200-09	1.226-06	1.435-06	6.026-15	3.355+10	1.121+01	8.543+01		
21	4.553+05	8.681+02	1.006-09	1.862-07	2.771-09	2.213-07	3.777-09	1.225-06	1.437-06	5.429-15	3.451+10	1.130+01	8.525+01		
22	4.553+05	8.678+02	8.653-10	1.888-07	2.364-09	2.242-07	3.229-09	1.225-06	1.440-06	4.651-15	3.513+10	1.140+01	8.509+01		
23	4.553+05	8.677+02	7.588-10	1.912-07	2.056-09	2.270-07	2.814-09	1.226-06	1.443-06	4.062-15	3.572+10	1.149+01	8.494+01		
24	4.553+05	8.687+02	7.322-10	1.939-07	1.984-09	2.307-07	2.716-09	1.227-06	1.450-06	3.936-15	3.604+10	1.162+01	8.477+01		
25	2.276+05	8.709+02	7.322-10	1.960-07	1.984-09	2.343-07	2.716-09	1.236-06	1.460-06	3.965-15	3.619+10	1.172+01	8.466+01		

RADIAL POINT 17

PARTICLE FAILURES
DISTANCES IN MICRONS, FAILURES (4)

<----- TH02 MEUTR ----->									<----- PE UC2 TRISC ----->								
MAX DISTANCE			** PERCENT FAILURES OF TOTAL FAILURE **						*MAX DISTANCE*			** PERCENT FAILURES OF TOTAL FAILURE **					
AX	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	HIGH	AX	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	HIGH
PT	MIGRAT	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAT	IN SIC	TEMP	PT	MIGRAT	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAT	IN SIC	TEMP
1	3.43-07	0.00	3.01-02	1.00+C2	0.00	0.00	0.00	J.00	4.89-09	J.00	3.37-02	1.00+02	0.00	0.00	0.00	0.00	0.00
2	5.42-06	0.00	3.07-02	1.00+02	0.00	0.00	0.00	J.00	1.07-07	1.25-02	4.33-02	1.00+02	0.00	0.00	0.00	0.00	0.00
3	7.90-05	0.00	3.22-02	1.00+02	0.00	0.00	0.00	J.00	2.36-06	4.79-02	5.51-02	1.00+02	0.00	0.00	0.00	0.00	0.00
4	6.25-04	0.00	3.48-02	1.00+02	0.00	0.00	0.00	J.00	2.47-05	1.25-01	6.65-02	1.00+02	0.00	0.00	0.00	0.00	0.00
5	2.32-03	0.00	3.86-02	1.00+02	0.00	0.00	0.00	0.00	1.06-04	2.47-01	7.42-02	9.70+01	2.97+00	0.00	0.00	0.00	0.00
6	5.21-03	0.00	4.33-02	1.00+02	0.00	0.00	0.00	0.00	2.59-04	3.98-01	7.80-02	9.29+01	7.12+00	0.00	0.00	0.00	0.00
7	8.76-03	0.00	4.85-02	1.00+C2	0.00	0.00	0.00	0.00	4.52-04	5.65-C1	7.96-C2	9.15+01	8.52+00	0.00	0.00	0.00	0.00
8	1.23-02	0.00	5.40-02	1.00+C2	0.00	0.00	0.00	0.00	6.45-J4	7.35-01	8.00-02	9.15+01	8.48+00	0.00	0.00	0.00	0.00
9	1.54-02	0.00	5.96-02	1.00+02	0.00	0.00	0.00	0.00	8.17-04	9.01-01	8.03-02	9.15+01	8.45+00	0.00	0.00	0.00	0.00
10	1.80-02	0.00	6.49-02	1.00+C2	0.00	0.00	0.00	0.00	9.57-04	1.06+00	8.05-02	9.16+C1	8.43+00	0.00	0.00	0.00	0.00
11	2.00-02	0.00	6.99-02	1.00+02	0.00	0.00	0.00	0.00	1.07-03	1.21+00	8.07-C2	9.16+01	8.40+00	0.00	0.00	0.00	0.00
12	2.18-02	0.00	7.19-C2	1.00+C2	0.00	0.00	0.00	0.00	1.15-03	1.35+00	8.21-02	9.04+01	9.04+00	0.00	0.00	0.00	0.00
13	2.32-02	0.00	7.23-02	9.96+C1	3.64-J01	0.00	0.00	0.00	1.22-03	1.48+00	8.46-02	8.76+C1	1.22+01	0.00	0.00	0.00	0.00
14	2.43-02	0.00	7.28-02	9.92+C1	8.05-J01	0.00	0.00	0.00	1.27-03	1.61+00	8.72-02	8.54+C1	1.46+01	0.00	0.00	0.00	0.00
15	2.51-02	0.00	7.32-02	9.89+C1	1.11+00	0.00	0.00	0.00	1.33-03	1.73+00	8.97-C2	8.32+01	1.68+01	0.00	0.00	0.00	0.00
16	2.58-02	0.00	7.34-02	9.87+C1	1.31+00	0.00	0.00	0.00	1.33-03	1.84+00	9.21-C2	8.12+01	1.68+01	0.00	0.00	0.00	0.00
17	2.64-02	0.00	7.36-02	9.86+C1	1.43+00	0.00	0.00	0.00	1.36-03	1.95+00	9.42-02	7.94+C1	2.16+C1	0.00	0.00	0.00	0.00
18	2.68-02	0.00	7.38-02	9.85+C1	1.50+00	0.00	0.00	0.00	1.37-J3	2.05+00	9.62-C2	7.79+C1	2.21+01	0.00	0.00	0.00	0.00
19	2.72-02	0.00	7.39-C2	9.85+C1	1.53+00	0.00	0.00	0.00	1.39-03	2.15+00	9.80-02	7.65+C1	2.35+01	0.00	0.00	0.00	0.00
20	2.75-02	0.00	7.40-02	9.85+C1	1.54+00	0.00	0.00	0.00	1.40-03	2.25+00	9.96-02	7.54+01	2.46+C1	0.00	0.00	0.00	0.00
21	2.78-02	0.00	7.40-02	9.85+C1	1.54+00	0.00	0.00	0.00	1.41-03	2.35+00	1.01-01	7.43+C1	2.57+01	0.00	0.00	0.00	0.00
22	2.80-02	0.00	7.41-02	9.85+C1	1.54+00	0.00	0.00	0.00	1.42-03	2.44+00	1.02-01	7.34+01	2.66+C1	0.00	0.00	0.00	0.00
23	2.82-02	0.00	7.42-02	9.85+C1	1.54+00	0.00	0.00	0.00	1.43-J3	2.53+00	1.04-01	7.26+C1	2.74+01	0.00	0.00	0.00	0.00
24	2.83-02	0.00	7.42-02	9.85+C1	1.53+00	0.00	0.00	0.00	1.44-03	2.62+00	1.05-C1	7.17+C1	2.83+01	0.00	0.00	0.00	0.00
25	2.84-02	0.00	7.42-02	9.85+C1	1.53+00	0.00	0.00	0.00	1.44-J3	2.67+00	1.06-01	7.10+01	2.90+01	0.00	0.00	0.00	0.00

RADIAL POINT 17

DETAILED PRINTOUT FOR THE GAS KR85 M

	* * AX*FUEL VOL* PT* (CC)	* * TEMP * (C)	*<-THO2 MEUTR * BIRTHRTE* * MICROL/ * * (CC*S) *	* * R/B	*<-ME UC2 TRISO-->* * BIRTHRTE* * MICROL/ * * (CC*S) *	* * R/B	* * FUEL * (CC*S) *	* * R/B	* * FUEL * (CC*S) *	* * R/B	* * FUEL REL* * RTE MICH* * OL/CC/S *THO2 MEUTR	* * RELEASE RATE COMING FROM---->* * ME UC2 TRISO* CONTAM *	* * CONTAM *
1	2.428+05	6.098+02	6.412-11	5.523-08	4.260-09	2.356-07	4.324-09	4.195-06	4.428-06	1.915-14	1.850-02	5.242+00	9.474+01
2	4.856+05	6.584+02	3.078-10	7.144-08	6.857-09	3.685-07	7.164-09	5.102-06	5.458-06	3.910-14	5.624-02	6.462+00	9.348+01
3	4.856+05	7.230+02	6.632-10	1.075-07	6.665-09	6.135-07	7.328-09	6.665-06	7.253-06	5.315-14	1.341-01	7.694+00	9.217+01
4	4.856+05	7.805+02	1.033-09	1.688-07	6.520-09	9.456-07	7.553-09	8.531-06	9.371-06	7.076-14	2.463-01	8.711+00	9.104+01
5	4.856+05	8.202+02	1.416-09	2.573-07	6.284-09	1.248-06	7.694-09	1.009-05	1.116-05	8.583-14	4.227-01	9.136+00	9.044+01
6	4.856+05	8.449+02	1.607-09	3.728-07	5.614-09	1.455-06	7.221-09	1.119-05	1.241-05	8.960-14	6.687-01	9.118+00	9.021+01
7	4.856+05	8.598+02	1.739-09	5.123-07	4.843-09	1.584-06	6.582-09	1.193-05	1.323-05	8.711-14	1.023+00	8.805+00	9.017+01
8	4.856+05	8.681+02	1.815-09	6.726-07	4.322-09	1.651-06	6.137-09	1.239-05	1.375-05	8.439-14	1.446+00	8.456+00	9.010+01
9	4.856+05	8.727+02	1.785-09	8.485-07	3.764-09	1.695-06	5.549-09	1.267-05	1.409-05	7.820-14	1.937+00	8.157+00	8.991+01
10	4.856+05	8.748+02	1.666-09	1.030-06	3.176-09	1.722-06	4.842-09	1.283-05	1.432-05	6.932-14	2.474+00	7.889+00	8.964+01
11	4.856+05	8.754+02	1.554-09	1.209-06	2.684-09	1.739-06	4.236-09	1.292-05	1.446-05	6.130-14	3.065+00	7.611+00	8.932+01
12	4.856+05	8.752+02	1.460-09	1.335-06	2.353-09	1.773-06	3.813-09	1.296-05	1.457-05	5.554-14	3.509+00	7.510+00	8.898+01
13	4.856+05	8.744+02	1.275-09	1.424-06	1.948-09	1.829-06	3.223-09	1.297-05	1.464-05	4.718-14	3.846+00	7.555+00	8.860+01
14	4.856+05	8.734+02	1.142-09	1.502-06	1.664-09	1.883-06	2.806-09	1.296-05	1.468-05	4.120-14	4.164+00	7.603+00	8.823+01
15	4.856+05	8.722+02	1.046-09	1.571-06	1.446-09	1.934-06	2.492-09	1.294-05	1.472-05	3.667-14	4.480+00	7.626+00	8.789+01
16	4.856+05	8.711+02	8.802-10	1.630-06	1.185-09	1.983-06	2.066-09	1.292-05	1.475-05	3.047-14	4.710+00	7.714+00	8.758+01
17	4.856+05	8.701+02	7.746-10	1.680-06	1.015-09	2.025-06	1.789-09	1.290-05	1.477-05	2.643-14	4.923+00	7.775+00	8.730+01
18	4.856+05	8.692+02	7.140-10	1.723-06	9.076-10	2.065-06	1.622-09	1.288-05	1.479-05	2.398-14	5.130+00	7.815+00	8.705+01
19	4.856+05	8.684+02	5.828-10	1.761-06	7.287-10	2.101-06	1.311-09	1.286-05	1.481-05	1.942-14	5.284+00	7.883+00	8.683+01
20	4.856+05	8.678+02	5.108-10	1.792-06	6.284-10	2.133-06	1.139-09	1.285-05	1.483-05	1.689-14	5.420+00	7.934+00	8.665+01
21	4.856+05	8.673+02	4.658-10	1.821-06	5.622-10	2.162-06	1.026-09	1.284-05	1.485-05	1.527-14	5.556+00	7.965+00	8.648+01
22	4.856+05	8.670+02	4.005-10	1.847-06	4.797-10	2.190-06	8.801-10	1.284-05	1.487-05	1.309-14	5.649+00	8.026+00	8.632+01
23	4.856+05	8.669+02	3.512-10	1.870-06	4.170-10	2.218-06	7.682-10	1.285-05	1.491-05	1.145-14	5.736+00	8.076+00	8.619+01
24	4.856+05	8.679+02	3.389-10	1.899-06	4.025-10	2.257-06	7.413-10	1.290-05	1.500-05	1.112-14	5.789+00	8.171+00	8.604+01
25	2.428+05	8.701+02	3.389-10	1.927-06	4.025-10	2.301-06	7.413-10	1.302-05	1.515-05	1.123-14	5.814+00	8.244+00	8.594+01

B-158

RADIAL POINT 17

DETAILED PRINTOUT FOR THE GAS XE 138

* AX*	* FUEL	* VOL	* TEMP	* MICROL/ * (CC)	* MICROL/ * (CC*S)	* R/B	* MICROL/ * (CC*S)	* R/B	* MICROL/ * (CC*S)	* R/B	* FUEL	* REL	* MICROL/ * (CC/S)	* THU2	* MEUTR	* ME UC2	* TRISO	* CONTAM
1	2.428+05	6.098+02	1.385-10	9.821-C9	2.099-08	4.189-08	2.113-08	6.961-07	7.378-07	1.559-14	6.725-C3	5.640+00	9.435+01					
2	4.856+05	6.584+02	6.650-10	1.138-08	3.378-08	5.872-06	3.445-08	7.588-07	8.166-07	2.813-14	2.691-C2	7.052+00	9.292+01					
3	4.856+05	7.230+02	1.433-09	1.403-08	3.284-08	8.468-08	3.427-08	8.612-07	9.430-07	3.232-14	6.575-C2	8.605+00	9.133+01					
4	4.856+05	7.805+02	2.231-C9	2.064-08	3.213-08	1.157-C7	3.436-08	9.740-07	1.083-06	3.723-14	1.237-01	9.982+00	8.989+01					
5	4.856+05	8.202+02	3.045-C9	2.912-08	3.096-C8	1.412-C7	3.401-08	1.065-06	1.197-06	4.070-14	2.179-01	1.074+01	8.904+01					
6	4.856+05	8.449+02	3.471-09	4.028-C8	2.766-C8	1.572-07	3.113-08	1.129-06	1.273-06	3.963-14	3.529-01	1.097+01	8.867+01					
7	4.856+05	8.598+02	3.755-09	5.386-08	2.386-C8	1.665-07	2.762-08	1.171-06	1.322-06	3.651-14	5.539-01	1.088+01	8.857+01					
8	4.856+05	8.681+02	3.919-09	6.960-08	2.130-08	1.709-07	2.521-08	1.197-06	1.352-06	3.409-14	8.003-01	1.067+01	8.852+01					
9	4.856+05	8.727+02	3.856-09	8.701-08	1.854-08	1.738-07	2.240-08	1.213-06	1.372-06	3.072-14	1.092+00	1.049+01	8.842+01					
10	4.856+05	8.748+02	3.599-09	1.050-07	1.565-08	1.757-07	1.925-08	1.222-06	1.384-06	2.665-14	1.419+00	1.032+01	8.826+01					
11	4.856+05	8.754+02	3.357-09	1.230-07	1.322-08	1.769-07	1.658-08	1.227-06	1.393-06	2.310-14	1.788+00	1.013+01	8.808+01					
12	4.856+05	8.752+02	3.154-09	1.356-07	1.159-08	1.802-07	1.475-08	1.230-06	1.400-06	2.065-14	2.072+00	1.012+01	8.781+01					
13	4.856+05	8.744+02	2.753-C9	1.447-C7	9.599-09	1.859-07	1.235-03	1.230-06	1.407-06	1.738-14	2.292+00	1.027+01	8.744+01					
14	4.856+05	8.734+02	2.467-09	1.527-07	8.197-09	1.914-C7	1.066-08	1.229-06	1.412-06	1.506-14	2.502+00	1.042+01	8.708+01					
15	4.856+05	8.722+02	2.259-C9	1.598-07	7.125-C9	1.968-C7	9.384-09	1.228-06	1.416-06	1.329-14	2.717+00	1.055+01	8.673+01					
16	4.856+05	8.711+02	1.901-09	1.660-07	5.841-C9	2.018-C7	7.742-09	1.227-06	1.420-06	1.100-14	2.870+00	1.072+01	8.641+01					
17	4.856+05	8.701+02	1.673-09	1.711-07	4.999-09	2.064-C7	6.672-09	1.226-06	1.424-06	9.501-15	3.014+00	1.086+01	8.613+01					
18	4.856+05	8.692+02	1.542-09	1.757-07	4.472-09	2.105-07	6.014-09	1.225-06	1.427-06	8.581-15	3.158+00	1.097+01	8.587+01					
19	4.856+05	8.684+02	1.259-09	1.796-07	3.590-09	2.143-07	4.849-09	1.224-06	1.430-06	6.932-15	3.262+00	1.110+01	8.564+01					
20	4.856+05	8.678+02	1.103-09	1.829-07	3.096-09	2.176-07	4.199-09	1.224-06	1.432-06	6.015-15	3.355+00	1.120+01	8.544+01					
21	4.856+05	8.673+02	1.006-09	1.859-07	2.770-09	2.207-07	3.776-09	1.223-06	1.435-06	5.418-15	3.451+00	1.129+01	8.526+01					
22	4.856+05	8.670+02	8.651-10	1.885-07	2.363-09	2.236-07	3.228-09	1.223-06	1.437-06	4.641-15	3.514+00	1.139+01	8.510+01					
23	4.856+05	8.669+02	7.586-10	1.909-07	2.055-09	2.263-07	2.813-09	1.224-06	1.440-06	4.053-15	3.573+00	1.148+01	8.495+01					
24	4.856+05	8.679+02	7.319-10	1.935-07	1.983-09	2.300-07	2.715-09	1.227-06	1.447-06	3.928-15	3.605+00	1.161+01	8.479+01					
25	2.428+05	8.701+02	7.319-10	1.956-07	1.983-09	2.335-07	2.715-09	1.233-06	1.457-06	3.954-15	3.620+00	1.171+01	8.467+01					

RUGEL RUN AT 09:08:02

ON 15 JAN 81 WITH ABSOLUTE ELEMENT MAP

CREATED ON 000064 AT 000000

PAGE 156

RADIAL POINT 18

PARTICLE FAILURES
DISTANCES IN MICRONS, FAILURES (%)

THO2 NEUTR									PL UC2 TRISO								
MAX DISTANCE			** PERCENT FAILURES OF TOTAL FAILURE **						*MAX DISTANCE*			** PERCENT FAILURES OF TOTAL FAILURE **					
AX	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	HIGH	AX	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	HIGH
PT	MIGRAT	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAT	IN SIC	TEMP	PT	MIGRAT	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAT	IN SIC	TEMP
1	3.06-07	0.00	3.01-02	1.00+02	0.00	0.00	0.00	0.00	4.27-09	0.00	3.36-02	1.00+02	0.00	0.00	0.00	0.00	0.00
2	5.08-06	0.00	3.06-02	1.00+02	0.00	0.00	0.00	0.00	9.90-08	1.22-02	4.31-02	1.00+02	0.00	0.00	0.00	0.00	0.00
3	7.75-05	0.00	3.21-02	1.00+02	0.00	0.00	0.00	0.00	2.31-06	4.74-02	5.47-02	1.00+02	0.00	0.00	0.00	0.00	0.00
4	6.33-04	0.00	3.47-02	1.00+02	0.00	0.00	0.00	0.00	2.51-05	1.25-01	6.62-02	1.00+02	0.00	0.00	0.00	0.00	0.00
5	2.38-03	0.00	3.85-02	1.00+02	0.00	0.00	0.00	0.00	1.10-04	2.48-01	7.42-02	4.71+01	2.91+00	0.00	0.00	0.00	0.00
6	5.42-03	0.00	4.33-02	1.00+02	0.00	0.00	0.00	0.00	2.7J-04	4.03-01	7.80-02	4.28+01	7.15+00	0.00	0.00	0.00	0.00
7	9.14-03	0.00	4.85-02	1.00+02	0.00	0.00	0.00	0.00	4.74-04	5.73-01	7.97-02	9.14+01	8.58+00	0.00	0.00	0.00	0.00
8	1.28-02	0.00	5.41-02	1.00+02	0.00	0.00	0.00	0.00	6.79-04	7.45-01	8.00-02	9.15+01	8.54+00	0.00	0.00	0.00	0.00
9	1.61-02	0.00	5.98-02	1.00+02	0.00	0.00	0.00	0.00	8.59-04	9.14-01	8.03-02	9.15+01	8.51+00	0.00	0.00	0.00	0.00
10	1.88-02	0.00	6.52-02	1.00+02	0.00	0.00	0.00	0.00	1.01-03	1.08+00	8.06-02	9.15+01	8.48+00	0.00	0.00	0.00	0.00
11	2.09-02	0.00	7.03-02	1.00+02	0.00	0.00	0.00	0.00	1.12-03	1.23+00	8.08-02	9.15+01	8.46+00	0.00	0.00	0.00	0.00
12	2.27-02	0.00	7.19-02	1.00+02	0.00	0.00	0.00	0.00	1.21-03	1.37+00	8.24-02	9.00+01	9.96+00	0.00	0.00	0.00	0.00
13	2.41-02	0.00	7.24-02	9.96+01	4.23-01	0.00	0.00	0.00	1.28-03	1.50+00	8.50-02	8.74+01	1.26+01	0.00	0.00	0.00	0.00
14	2.53-02	0.00	7.29-02	9.91+01	8.60-01	0.00	0.00	0.00	1.33-03	1.63+00	8.77-02	8.49+01	1.51+01	0.00	0.00	0.00	0.00
15	2.62-02	0.00	7.32-02	9.88+01	1.16+00	0.00	0.00	0.00	1.37-03	1.75+00	9.03-02	8.22+01	1.74+01	0.00	0.00	0.00	0.00
16	2.69-02	0.00	7.35-02	9.86+01	1.35+00	0.00	0.00	0.00	1.40-03	1.86+00	9.28-02	8.00+01	1.94+01	0.00	0.00	0.00	0.00
17	2.74-02	0.00	7.37-02	9.85+01	1.46+00	0.00	0.00	0.00	1.42-03	1.97+00	9.50-02	7.66+01	2.12+01	0.00	0.00	0.00	0.00
18	2.79-02	0.00	7.38-02	9.85+01	1.52+00	0.00	0.00	0.00	1.44-03	2.08+00	9.70-02	7.73+01	2.27+01	0.00	0.00	0.00	0.00
19	2.83-02	0.00	7.39-02	9.85+01	1.55+00	0.00	0.00	0.00	1.45-03	2.18+00	9.88-02	7.59+01	2.41+01	0.00	0.00	0.00	0.00
20	2.86-02	0.00	7.40-02	9.85+01	1.55+00	0.00	0.00	0.00	1.46-03	2.28+00	1.00-01	7.48+01	2.52+01	0.00	0.00	0.00	0.00
21	2.88-02	0.00	7.41-02	9.85+01	1.55+00	0.00	0.00	0.00	1.43-03	2.37+00	1.02-01	7.38+01	2.62+01	0.00	0.00	0.00	0.00
22	2.90-02	0.00	7.41-02	9.85+01	1.55+00	0.00	0.00	0.00	1.48-03	2.47+00	1.03-01	7.29+01	2.71+01	0.00	0.00	0.00	0.00
23	2.92-02	0.00	7.42-02	9.85+01	1.55+00	0.00	0.00	0.00	1.49-03	2.56+00	1.04-01	7.21+01	2.79+01	0.00	0.00	0.00	0.00
24	2.94-02	0.00	7.42-02	9.85+01	1.55+00	0.00	0.00	0.00	1.50-03	2.65+00	1.06-01	7.12+01	2.68+01	0.00	0.00	0.00	0.00
25	2.95-02	0.00	7.42-02	9.85+01	1.55+00	0.00	0.00	0.00	1.51-03	2.70+00	1.07-01	7.05+01	2.55+01	0.00	0.00	0.00	0.00

B-160

RADIAL POINT 18

DETAILED PRINTOUT FOR THE GAS KR85 M

**--*--TH02 NEUTR --*--*--ME UC2 TRISO--*--* FUEL **															
AVG FUEL*BIRTHRTEBIRTHRTE**BIRTHRTE**FUEL REL*															
**AX*FUEL VOL* TEMP **MICMOL/ **MICMOL/ **MICMOL/ **CONTAM * FUEL *RTE MICH*(*--															

B-161

RADIAL POINT 19

PARTICLE FAILURES
DISTANCES IN MICRONS, FAILURES (%)

THO2 NEUTR									ML UC2 TRISU								
MAX DISTANCE			** PERCENT FAILURES OF TOTAL FAILURE **						*MAX DISTANCE*			** PERCENT FAILURES OF TOTAL FAILURE **					
AX	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	HIGH	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	HIGH	
PT	MIGRAT	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAT	IN SIC	TEMP	MIGRAT	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAT	IN SIC	TEMP	
1	2.60-07	0.00	3.01-02	1.00+02	0.00	0.00	0.00	0.00	3.53-09	0.00	3.36-02	1.00+02	0.00	0.00	0.00	0.00	
2	4.61-06	0.00	3.06-02	1.00+02	0.00	0.00	0.00	0.00	8.83-08	1.18-02	4.31-02	1.00+02	0.00	0.00	0.00	0.00	
3	7.41-05	0.00	3.21-02	1.00+02	0.00	0.00	0.00	0.00	2.19-06	4.64-02	5.47-02	1.00+02	0.00	0.00	0.00	0.00	
4	6.29-04	0.00	3.47-02	1.00+02	0.00	0.00	0.00	0.00	2.49-05	1.24-01	6.62-02	1.00+02	0.00	0.00	0.00	0.00	
5	2.42-03	0.00	3.85-02	1.00+02	0.00	0.00	0.00	0.00	1.12-04	2.48-01	7.42-02	9.71+01	2.92+00	0.00	0.00	0.00	
6	5.55-03	0.00	4.33-02	1.00+02	0.00	0.00	0.00	0.00	2.78-04	4.05-01	7.81-02	9.26+01	7.19+00	0.00	0.00	0.00	
7	9.41-03	0.00	4.85-02	1.00+02	0.00	0.00	0.00	0.00	4.91-04	5.77-01	7.97-02	9.14+01	8.62+00	0.00	0.00	0.00	
8	1.32-02	0.00	5.41-02	1.00+02	0.00	0.00	0.00	0.00	7.03-04	7.52-01	8.01-02	9.14+01	8.58+00	0.00	0.00	0.00	
9	1.66-02	0.00	5.98-02	1.00+02	0.00	0.00	0.00	0.00	8.89-04	9.22-01	8.04-02	9.14+01	8.55+00	0.00	0.00	0.00	
10	1.93-02	0.00	6.52-02	1.00+02	0.00	0.00	0.00	0.00	1.04-03	1.08+00	8.06-02	9.15+01	8.52+00	0.00	0.00	0.00	
11	2.15-02	0.00	7.03-02	1.00+02	0.00	0.00	0.00	0.00	1.16-03	1.24+00	8.08-02	9.15+01	8.50+00	0.00	0.00	0.00	
12	2.33-02	0.00	7.19-02	1.00+02	0.00	0.00	0.00	0.00	1.25-03	1.38+00	8.24-02	9.00+01	9.97+00	0.00	0.00	0.00	
13	2.47-02	0.00	7.24-02	9.96+01	4.24-01	0.00	0.00	0.00	1.31-03	1.52+00	8.51-02	8.74+01	1.6+01	0.00	0.00	0.00	
14	2.59-02	0.00	7.29-02	9.91+01	8.61-01	0.00	0.00	0.00	1.36-03	1.64+00	8.77-02	8.49+01	1.51+01	0.00	0.00	0.00	
15	2.68-02	0.00	7.32-02	9.88+01	1.16+00	0.00	0.00	0.00	1.43-03	1.76+00	9.03-02	8.26+01	1.74+01	0.00	0.00	0.00	
16	2.75-02	0.00	7.35-02	9.86+01	1.35+00	0.00	0.00	0.00	1.43-03	1.88+00	9.28-02	8.06+01	1.94+01	0.00	0.00	0.00	
17	2.80-02	0.00	7.37-02	9.85+01	1.46+00	0.00	0.00	0.00	1.46-03	1.98+00	9.50-02	7.88+01	2.12+01	0.00	0.00	0.00	
18	2.85-02	0.00	7.38-02	9.85+01	1.52+00	0.00	0.00	0.00	1.47-03	2.09+00	9.70-02	7.73+01	2.27+01	0.00	0.00	0.00	
19	2.88-02	0.00	7.39-02	9.85+01	1.54+00	0.00	0.00	0.00	1.49-03	2.19+00	9.88-02	7.59+01	2.41+01	0.00	0.00	0.00	
20	2.91-02	0.00	7.40-02	9.85+01	1.55+00	0.00	0.00	0.00	1.50-03	2.29+00	1.00-01	7.48+01	2.52+01	0.00	0.00	0.00	
21	2.94-02	0.00	7.41-02	9.85+01	1.55+00	0.00	0.00	0.00	1.51-03	2.38+00	1.02-01	7.36+01	2.62+01	0.00	0.00	0.00	
22	2.96-02	0.00	7.41-02	9.85+01	1.54+00	0.00	0.00	0.00	1.52-03	2.48+00	1.03-01	7.29+01	2.71+01	0.00	0.00	0.00	
23	2.98-02	0.00	7.42-02	9.85+01	1.54+00	0.00	0.00	0.00	1.53-03	2.57+00	1.04-01	7.21+01	2.79+01	0.00	0.00	0.00	
24	2.99-02	0.00	7.42-02	9.85+01	1.54+00	0.00	0.00	0.00	1.53-03	2.66+00	1.06-01	7.12+01	2.68+01	0.00	0.00	0.00	
25	3.00-02	0.00	7.42-02	9.85+01	1.54+00	0.00	0.00	0.00	1.54-03	2.71+00	1.07-01	7.06+01	2.54+01	0.00	0.00	0.00	

RADIAL POINT 19

DETAILED PRINTOUT FOR THE GAS KR85 M

	* AX*	* FUEL VOL*	* TEMP	* MICMOL/	* R/B	* MICMOL/	* R/B	* MICMOL/	* CONTAM	* FUEL	* R/B	* FUEL REL*	* RTE MICMOL/	* THO2 MLTR	* ME UC2 TRISO*	* CONTAM
PT#	(CC)	(C)	(CC*S)			(CC*S)		(CC*S)				OL/CC/S	THO2 MLTR	ME UC2 TRISO*	CONTAM	
1	2.732+05	6.049+02	6.089-11	5.419-08	4.153-09	2.306-07	4.213-09	4.118-06	4.346-06	1.831-14	1.802-02	5.230+00	9.475+01			
2	5.463+05	6.550+02	2.936-10	7.023-08	6.748-09	3.611-07	7.042-09	5.332-06	5.381-06	3.789-14	5.441-02	6.430+00	9.352+01			
3	5.463+05	7.214+02	6.564-10	1.061-07	6.680-09	6.052-07	7.336-09	6.639-06	7.199-06	5.282-14	1.319-01	7.654+00	9.221+01			
4	5.463+05	7.806+02	1.034-09	1.679-07	6.579-09	9.417-07	7.613-09	8.536-06	9.373-06	7.135-14	2.433-01	8.683+00	9.107+01			
5	5.463+05	8.217+02	1.412-09	2.578-07	6.352-09	1.255-06	7.764-09	1.015-05	1.122-05	8.713-14	4.179-01	9.145+00	9.044+01			
6	5.463+05	8.471+02	1.625-09	3.754-07	5.692-09	1.469-06	7.317-09	1.129-05	1.252-05	9.161-14	6.660-01	9.129+00	9.020+01			
7	5.463+05	8.623+02	1.767-09	5.183-07	4.917-09	1.601-06	6.684-09	1.205-05	1.337-05	8.936-14	1.025+00	8.812+00	9.016+01			
8	5.463+05	8.707+02	1.839-09	6.825-07	4.381-09	1.670-06	6.220-09	1.251-05	1.389-05	8.640-14	1.453+00	8.465+00	9.008+01			
9	5.463+05	8.751+02	1.809-09	8.624-07	3.810-09	1.713-06	5.619-09	1.279-05	1.423-05	7.996-14	1.951+00	8.162+00	8.989+01			
10	5.463+05	8.769+02	1.694-09	1.047-06	3.216-09	1.739-06	4.909-09	1.294-05	1.444-05	7.090-14	2.502+00	7.886+00	8.961+01			
11	5.463+05	8.773+02	1.575-09	1.231-06	2.711-09	1.754-06	4.285-09	1.302-05	1.458-05	6.248-14	3.102+00	7.609+00	8.929+01			
12	5.463+05	8.769+02	1.471-09	1.351-06	2.369-09	1.792-06	3.840-09	1.305-05	1.467-05	5.634-14	3.529+00	7.534+00	8.894+01			
13	5.463+05	8.759+02	1.289-09	1.441-06	1.962-09	1.849-06	3.251-09	1.304-05	1.473-05	4.789-14	3.880+00	7.575+00	8.855+01			
14	5.463+05	8.746+02	1.153-09	1.520-06	1.672-09	1.904-06	2.825-09	1.302-05	1.477-05	4.172-14	4.201+00	7.629+00	8.817+01			
15	5.463+05	8.732+02	1.045-09	1.588-06	1.447-09	1.956-06	2.492-09	1.299-05	1.479-05	3.686-14	4.503+00	7.676+00	8.782+01			
16	5.463+05	8.720+02	8.842-10	1.647-06	1.186-09	2.004-06	2.070-09	1.296-05	1.482-05	3.067-14	4.747+00	7.751+00	8.750+01			
17	5.463+05	8.709+02	7.762-10	1.695-06	1.013-09	2.047-06	1.789-09	1.294-05	1.483-05	2.654-14	4.959+00	7.816+00	8.723+01			
18	5.463+05	8.698+02	7.082-10	1.738-06	9.023-10	2.087-06	1.611-09	1.291-05	1.484-05	2.390-14	5.149+00	7.876+00	8.697+01			
19	5.463+05	8.689+02	5.804-10	1.774-06	7.236-10	2.122-06	1.504-09	1.289-05	1.485-05	1.937-14	5.316+00	7.927+00	8.676+01			
20	5.463+05	8.682+02	5.070-10	1.805-06	6.222-10	2.153-06	1.129-09	1.287-05	1.487-05	1.679-14	5.451+00	7.980+00	8.657+01			
21	5.463+05	8.677+02	4.580-10	1.833-06	5.541-10	2.182-06	1.012-09	1.286-05	1.488-05	1.506-14	5.572+00	8.026+00	8.640+01			
22	5.463+05	8.672+02	3.934-10	1.857-06	4.711-10	2.209-06	8.645-10	1.285-05	1.490-05	1.288-14	5.671+00	8.078+00	8.625+01			
23	5.463+05	8.670+02	3.437-10	1.880-06	4.075-10	2.235-06	7.512-10	1.286-05	1.493-05	1.121-14	5.761+00	8.122+00	8.612+01			
24	5.463+05	8.678+02	3.304-10	1.907-06	3.919-10	2.273-06	7.223-10	1.291-05	1.501-05	1.084-14	5.812+00	8.216+00	8.597+01			
25	2.732+05	8.698+02	3.304-10	1.933-06	3.919-10	2.314-06	7.223-10	1.301-05	1.515-05	1.094-14	5.836+00	8.285+00	8.588+01			

RADIAL POINT 19

DETAILED PRINTOUT FOR THE GAS XC 138

[illegible]

B-165

RADIAL POINT 20

PARTICLE FAILURES
DISTANCES IN MICRONS, FAILURES (%)

TH02 NEUTR									PL UC2 TPISC								
MAX DISTANCE									*MAX DISTANCE*								
AX	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	HIGH	AX	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	HIGH
PT	MIGRAT	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAT	IN SIC	TEMP	PT	MIGRAT	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAT	IN SIC	TEMP
1	2.54-07	0.00	3.01-02	1.00+02	0.00	0.00	0.00	0.00	3.43-09	0.00	3.27-02	1.00+02	0.00	0.00	0.00	0.00	0.00
2	5.11-06	0.00	3.06-02	1.00+02	0.00	0.00	0.00	0.00	1.00-07	1.23-02	4.06-02	1.00+02	0.00	0.00	0.00	0.00	0.00
3	9.06-05	0.00	3.20-02	1.00+02	0.00	0.00	0.00	0.00	2.77-06	4.98-02	5.17-02	1.00+02	0.00	0.00	0.00	0.00	0.00
4	7.88-04	0.00	3.45-02	1.00+02	0.00	0.00	0.00	0.00	3.23-05	1.35-01	6.29-02	1.00+02	0.00	0.00	0.00	0.00	0.00
5	3.01-03	0.00	3.80-02	1.00+02	0.00	0.00	0.00	0.00	1.44-04	2.70-01	7.29-02	9.85+01	1.50+00	0.00	0.00	0.00	0.00
6	6.78-03	0.00	4.25-02	1.00+02	0.00	0.00	0.00	0.00	3.49-04	4.38-01	7.71-02	9.37+01	6.25+00	0.00	0.00	0.00	0.00
7	1.13-02	0.00	4.75-02	1.00+02	0.00	0.00	0.00	0.00	6.00-04	6.20-01	7.96-02	9.13+01	8.69+00	0.00	0.00	0.00	0.00
8	1.55-02	0.00	5.28-02	1.00+02	0.00	0.00	0.00	0.00	8.41-04	8.03-01	7.99-02	9.13+01	6.66+00	0.00	0.00	0.00	0.00
9	1.91-02	0.00	5.82-02	1.00+02	0.00	0.00	0.00	0.00	1.04-03	9.80-01	8.02-02	9.14+01	8.62+00	0.00	0.00	0.00	0.00
10	2.20-02	0.00	6.34-02	1.00+02	0.00	0.00	0.00	0.00	1.23-03	1.15+00	8.05-02	9.14+01	8.66+00	0.00	0.00	0.00	0.00
11	2.43-02	0.00	6.83-02	1.00+02	0.00	0.00	0.00	0.00	1.33-03	1.30+00	8.07-02	9.14+01	8.57+00	0.00	0.00	0.00	0.00
12	2.60-02	0.00	7.18-02	1.00+02	0.00	0.00	0.00	0.00	1.42-03	1.45+00	8.09-02	9.14+01	8.55+00	0.00	0.00	0.00	0.00
13	2.75-02	0.00	7.20-02	9.99+01	9.98-02	0.00	0.00	0.00	1.43-03	1.58+00	8.20-02	9.04+01	7.55+00	0.00	0.00	0.00	0.00
14	2.86-02	0.00	7.25-02	9.94+01	5.73-01	0.00	0.00	0.00	1.53-03	1.71+00	8.40-02	8.85+01	1.15+01	0.00	0.00	0.00	0.00
15	2.94-02	0.00	7.29-02	9.91+01	9.16-01	0.00	0.00	0.00	1.57-03	1.83+00	8.60-02	8.66+01	1.34+01	0.00	0.00	0.00	0.00
16	3.01-02	0.00	7.32-02	9.89+01	1.15+00	0.00	0.00	0.00	1.60-03	1.94+00	8.78-02	8.49+01	1.51+01	0.00	0.00	0.00	0.00
17	3.07-02	0.00	7.34-02	9.87+01	1.30+00	0.00	0.00	0.00	1.62-03	2.05+00	8.95-02	8.34+01	1.66+01	0.00	0.00	0.00	0.00
18	3.11-02	0.00	7.36-02	9.86+01	1.40+00	0.00	0.00	0.00	1.64-03	2.15+00	9.11-02	8.20+01	1.66+01	0.00	0.00	0.00	0.00
19	3.14-02	0.00	7.37-02	9.85+01	1.45+00	0.00	0.00	0.00	1.65-03	2.25+00	9.25-02	8.09+01	1.91+01	0.00	0.00	0.00	0.00
20	3.17-02	0.00	7.38-02	9.85+01	1.48+00	0.00	0.00	0.00	1.66-03	2.35+00	9.37-02	7.98+01	2.02+01	0.00	0.00	0.00	0.00
21	3.20-02	0.00	7.39-02	9.85+01	1.50+00	0.00	0.00	0.00	1.67-03	2.45+00	9.48-02	7.90+01	2.10+01	0.00	0.00	0.00	0.00
22	3.22-02	0.00	7.40-02	9.85+01	1.50+00	0.00	0.00	0.00	1.68-03	2.54+00	9.59-02	7.82+01	2.18+01	0.00	0.00	0.00	0.00
23	3.23-02	0.00	7.40-02	9.85+01	1.50+00	0.00	0.00	0.00	1.69-03	2.63+00	9.68-02	7.75+01	2.25+01	0.00	0.00	0.00	0.00
24	3.25-02	0.00	7.40-02	9.85+01	1.51+00	0.00	0.00	0.00	1.69-03	2.72+00	9.78-02	7.67+01	2.33+01	0.00	0.00	0.00	0.00
25	3.26-02	0.00	7.41-02	9.85+01	1.52+00	0.00	0.00	0.00	1.70-03	2.77+00	9.85-02	7.62+01	2.38+01	0.00	0.00	0.00	0.00

KUGEL RUN AT 09:08:02

ON 15 JAN 81 WITH ABSOLUTE ELEMENT MAP

CREATED ON 000064 AT 000000

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RADIAL POINT 20

DETAILED PRINTOUT FOR THE GAS KR85 M

PT	ICC	AVG FUEL	TEMP	MICMOL/	R/B	BIRTHRTE	MICMOL/	R/B	BIRTHRTE	MICMOL/	CONTAM	FUEL	RTE MICMOL/CC/S	THO2 NEUTR	ME UC2 TRISO	CONTAM
1	2.883+05	6.045+02	3.295-11	5.409-08	3.303-09	2.238-07	3.336-09	4.112-06	4.334-06	1.446-14	1.233-02	5.113+00	9.487+01			
2	5.767+05	6.575+02	1.504-10	7.069-08	6.631-09	3.443-07	6.782-09	5.082-06	5.420-06	3.676-14	2.894-02	6.211+00	9.376+01			
3	5.767+05	7.267+02	3.465-10	1.076-07	7.083-09	5.846-07	7.430-09	6.789-06	7.351-06	5.462-14	6.623-02	7.582+00	9.235+01			
4	5.767+05	7.875+02	5.284-10	1.696-07	6.922-09	9.213-07	7.450-09	8.764-06	9.652-06	7.191-14	1.246-01	8.869+00	9.101+01			
5	5.767+05	8.289+02	7.290-10	2.573-07	6.708-09	1.271-06	7.437-09	1.045-05	1.162-05	8.645-14	2.170-01	9.860+00	8.992+01			
6	5.767+05	8.537+02	8.444-10	3.702-07	6.045-09	1.491-06	6.890-09	1.160-05	1.295-05	8.926-14	3.503-01	1.010+01	8.955+01			
7	5.767+05	8.680+02	9.268-10	5.060-07	5.260-09	1.636-06	6.187-09	1.233-05	1.380-05	8.538-14	5.492-01	1.008+01	8.937+01			
8	5.767+05	8.753+02	9.658-10	6.607-07	4.689-09	1.699-06	5.654-09	1.275-05	1.427-05	8.071-14	7.906-01	9.870+00	8.934+01			
9	5.767+05	8.788+02	9.411-10	8.283-07	4.029-09	1.736-06	4.970-09	1.299-05	1.455-05	7.232-14	1.078+00	9.675+00	8.925+01			
10	5.767+05	8.798+02	9.026-10	1.001-06	3.485-09	1.757-06	4.388-09	1.310-05	1.470-05	6.450-14	1.401+00	9.494+00	8.911+01			
11	5.767+05	8.795+02	8.250-10	1.172-06	2.881-09	1.767-06	3.7.6-09	1.314-05	1.477-05	5.475-14	1.765+00	9.300+00	8.893+01			
12	5.767+05	8.786+02	7.677-10	1.318-06	2.508-09	1.772-06	3.276-09	1.314-05	1.481-05	4.851-14	2.086+00	9.162+00	8.875+01			
13	5.767+05	8.772+02	6.830-10	1.398-06	2.109-09	1.793-06	2.792-09	1.312-05	1.481-05	4.137-14	2.308+00	9.141+00	8.855+01			
14	5.767+05	8.755+02	6.062-10	1.472-06	1.780-09	1.831-06	2.387-09	1.308-05	1.482-05	3.537-14	2.524+00	9.217+00	8.826+01			
15	5.767+05	8.740+02	5.455-10	1.537-06	1.535-09	1.868-06	2.180-09	1.304-05	1.482-05	3.083-14	2.724+00	9.301+00	8.798+01			
16	5.767+05	8.726+02	4.639-10	1.593-06	1.260-09	1.903-06	1.724-09	1.303-05	1.482-05	2.555-14	2.892+00	9.385+00	8.772+01			
17	5.767+05	8.713+02	4.110-10	1.640-06	1.089-09	1.935-06	1.500-09	1.297-05	1.482-05	2.224-14	3.036+00	9.479+00	8.749+01			
18	5.767+05	8.702+02	3.648-10	1.680-06	9.415-10	1.964-06	1.306-09	1.294-05	1.482-05	1.936-14	3.166+00	9.552+00	8.728+01			
19	5.767+05	8.692+02	3.041-10	1.714-06	7.681-10	1.990-06	1.072-09	1.291-05	1.482-05	1.589-14	3.281+00	9.620+00	8.710+01			
20	5.767+05	8.685+02	2.673-10	1.744-06	6.666-10	2.014-06	9.339-10	1.289-05	1.483-05	1.385-14	3.366+00	9.695+00	8.694+01			
21	5.767+05	8.679+02	2.342-10	1.770-06	5.730-10	2.036-06	8.472-10	1.288-05	1.483-05	1.197-14	3.461+00	9.741+00	8.680+01			
22	5.767+05	8.674+02	2.053-10	1.793-06	5.006-10	2.056-06	7.360-10	1.287-05	1.485-05	1.048-14	3.512+00	9.819+00	8.667+01			
23	5.767+05	8.671+02	1.759-10	1.814-06	4.219-10	2.075-06	5.978-10	1.287-05	1.486-05	8.886-15	3.591+00	9.852+00	8.656+01			
24	5.767+05	8.678+02	1.677-10	1.838-06	4.022-10	2.103-06	5.700-10	1.291-05	1.493-05	8.511-15	3.623+00	9.940+00	8.644+01			
25	2.883+05	8.695+02	1.677-10	1.861-06	4.022-10	2.134-06	5.700-10	1.300-05	1.506-05	8.581-15	3.639+00	1.000+01	8.636+01			

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RADIAL POINT 21

PARTICLE FAILURES
DISTANCES IN MICRONS, FAILURES (%)

<----- TH02 NEUTR ----->										<----- ML LC2 TRISL ----->									
MAX DISTANCE		** PERCENT FAILURES OF		TOTAL FAILURE		*MAX DISTANCE*		** PERCENT FAILURES OF		TOTAL FAILURE		*MAX DISTANCE*		** PERCENT FAILURES OF		TOTAL FAILURE		*MAX DISTANCE*	
AX	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	HIGH	AX	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	HIGH	AX	KERNEL
PT	MIGRAT	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAT	IN SIC	TEMP	PT	MIGRAT	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAT	IN SIC	TEMP	PT	MIGRAT
1	2.28-07	0.00	3.01-02	1.00+02	0.00	0.00	0.00	0.00	3.03-09	0.00	3.17-02	1.00+02	0.00	0.00	0.00	0.00	0.00		
2	5.07-06	0.00	3.06-02	1.00+02	0.00	0.00	0.00	0.00	9.94-08	1.23-02	3.63-02	1.00+02	0.00	0.00	0.00	0.00	0.00		
3	9.59-05	0.00	3.19-02	1.00+02	0.00	0.00	0.00	0.00	2.96-06	5.07-02	4.87-02	1.00+02	0.00	0.00	0.00	0.00	0.00		
4	8.51-04	0.00	3.42-02	1.00+02	0.00	0.00	0.00	0.00	3.53-05	1.38-01	5.97-02	1.00+02	0.00	0.00	0.00	0.00	0.00		
5	3.25-03	0.00	3.76-02	1.00+02	0.00	0.00	0.00	0.00	1.57-04	2.77-01	7.07-02	9.96+01	3.74-01	0.00	0.00	0.00	0.00		
6	7.21-03	0.00	4.17-02	1.00+02	0.00	0.00	0.00	0.00	3.73-04	4.49-01	7.58-02	9.52+01	4.81+00	0.00	0.00	0.00	0.00		
7	1.18-02	0.00	4.65-02	1.00+02	0.00	0.00	0.00	0.00	6.30-04	6.33-01	7.89-02	9.19+01	8.12+00	0.00	0.00	0.00	0.00		
8	1.60-02	0.00	5.16-02	1.00+02	0.00	0.00	0.00	0.00	8.67-04	8.15-01	7.99-02	9.12+01	8.79+00	0.00	0.00	0.00	0.00		
9	1.94-02	0.00	5.67-02	1.00+02	0.00	0.00	0.00	0.00	1.06-03	9.88-01	8.02-02	9.12+01	8.76+00	0.00	0.00	0.00	0.00		
10	2.21-02	0.00	6.17-02	1.00+02	0.00	0.00	0.00	0.00	1.21-03	1.15+00	8.04-02	9.13+01	8.73+00	0.00	0.00	0.00	0.00		
11	2.42-02	0.00	6.64-02	1.00+02	0.00	0.00	0.00	0.00	1.32-03	1.30+00	8.06-02	9.13+01	8.71+00	0.00	0.00	0.00	0.00		
12	2.57-02	0.00	7.07-02	1.00+02	0.00	0.00	0.00	0.00	1.40-03	1.44+00	8.08-02	9.13+01	8.69+00	0.00	0.00	0.00	0.00		
13	2.70-02	0.00	7.19-02	1.00+02	0.00	0.00	0.00	0.00	1.46-03	1.57+00	8.10-02	9.13+01	8.67+00	0.00	0.00	0.00	0.00		
14	2.80-02	0.00	7.22-02	9.97+01	2.53-01	0.00	0.00	0.00	1.50-03	1.69+00	8.12-02	9.13+01	8.70+00	0.00	0.00	0.00	0.00		
15	2.87-02	0.00	7.26-02	9.94+01	6.21-01	0.00	0.00	0.00	1.53-03	1.81+00	8.26-02	8.99+01	1.01+01	0.00	0.00	0.00	0.00		
16	2.93-02	0.00	7.29-02	9.91+01	8.87-01	0.00	0.00	0.00	1.56-03	1.92+00	8.40-02	8.85+01	1.15+01	0.00	0.00	0.00	0.00		
17	2.98-02	0.00	7.32-02	9.89+01	1.07+00	0.00	0.00	0.00	1.58-03	2.02+00	8.52-02	8.73+01	1.27+01	0.00	0.00	0.00	0.00		
18	3.02-02	0.00	7.33-02	9.88+01	1.20+00	0.00	0.00	0.00	1.59-03	2.12+00	8.64-02	8.62+01	1.38+01	0.00	0.00	0.00	0.00		
19	3.05-02	0.00	7.35-02	9.87+01	1.29+00	0.00	0.00	0.00	1.60-03	2.21+00	8.74-02	8.53+01	1.47+01	0.00	0.00	0.00	0.00		
20	3.07-02	0.00	7.36-02	9.87+01	1.34+00	0.00	0.00	0.00	1.61-03	2.31+00	8.84-02	8.44+01	1.56+01	0.00	0.00	0.00	0.00		
21	3.09-02	0.00	7.37-02	9.86+01	1.38+00	0.00	0.00	0.00	1.62-03	2.40+00	8.92-02	8.37+01	1.63+01	0.00	0.00	0.00	0.00		
22	3.11-02	0.00	7.37-02	9.86+01	1.40+00	0.00	0.00	0.00	1.63-03	2.49+00	8.99-02	8.31+01	1.69+01	0.00	0.00	0.00	0.00		
23	3.12-02	0.00	7.38-02	9.86+01	1.42+00	0.00	0.00	0.00	1.63-03	2.58+00	9.06-02	8.25+01	1.75+01	0.00	0.00	0.00	0.00		
24	3.14-02	0.00	7.38-02	9.86+01	1.43+00	0.00	0.00	0.00	1.64-03	2.66+00	9.13-02	8.19+01	1.81+01	0.00	0.00	0.00	0.00		
25	3.14-02	0.00	7.39-02	9.85+01	1.45+00	0.00	0.00	0.00	1.64-03	2.71+00	9.18-02	8.15+01	1.85+01	0.00	0.00	0.00	0.00		

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RADIAL POINT 21

DETAILED PRINTOUT FOR THE GAS KR85 M

* AX*	* FUEL	* VOL*	* TEMP	* MICMOL/	* *	* (CC*S)	* R/B	* (CC*S)	* R/B	* (CC*S)	* R/B	* FUEL	* RTE	* MICMOL/	* ---	* RELEASE RATE	* COMING FROM---	* ---	* *	
PT#	(CC)	*	(C)	*	(CC*S)	*	R/B	*	(CC*S)	*	R/B	*	FUEL	* RTE	* MICMOL/	* ---	* RELEASE RATE	* COMING FROM---	* ---	* *
1	3.035+05	6.026+02	3.247-11	5.371-08	2.143-09	2.159-07	2.175-J9	4.383-06	4.297-06	9.345-15	1.866-12	4.949+00	9.503+01							
2	6.070+05	6.574+02	1.397-10	7.045-08	5.994-09	3.241-07	6.133-09	5.082-06	5.400-06	3.312-14	2.972-12	5.865+00	9.411+01							
3	6.070+05	7.283+02	3.326-10	1.073-07	6.965-09	5.546-07	7.297-J9	6.835-J6	7.370-06	5.378-14	6.639-12	7.183+00	9.275+01							
4	6.070+05	7.899+02	4.896-10	1.681-07	6.751-09	8.832-07	7.241-09	8.874-J6	9.709-J6	7.030-14	1.171-01	8.482+00	9.140+01							
5	6.070+05	8.314+02	6.829-10	2.520-07	6.569-09	1.244-06	7.252-J9	1.056-J5	1.171-05	8.493-14	2.026-01	9.624+00	9.017+01							
6	6.070+05	8.557+02	7.970-10	3.580-07	5.954-09	1.477-06	6.751-J9	1.169-05	1.304-05	8.801-14	3.242-01	9.989+00	8.969+01							
7	6.070+05	8.690+02	8.838-10	4.843-07	5.217-09	1.629-06	6.101-J9	1.238-05	1.385-05	8.449-14	5.066-01	1.006+01	8.943+01							
8	6.070+05	8.753+02	9.222-10	6.273-07	4.654-09	1.698-06	5.576-J9	1.276-05	1.428-05	7.960-14	7.268-01	9.927+00	8.935+01							
9	6.070+05	8.778+02	8.893-10	7.803-07	3.951-09	1.729-06	4.844-J9	1.294-05	1.450-05	7.017-14	4.891-01	9.737+00	8.927+01							
10	6.070+05	8.782+02	8.753-10	9.381-07	3.502-09	1.745-06	4.377-J9	1.332-05	1.460-05	6.392-14	1.285+00	9.561+00	8.915+01							
11	6.070+05	8.772+02	7.856-10	1.094-06	2.840-09	1.751-06	3.625-J9	1.302-05	1.463-05	5.305-14	1.620+00	9.370+00	8.901+01							
12	6.070+05	8.758+02	7.280-10	1.243-06	2.462-09	1.752-06	3.190-J9	1.301-05	1.464-05	4.671-14	1.938+00	9.235+00	8.883+01							
13	6.070+05	8.741+02	6.582-10	1.334-06	2.103-09	1.750-06	2.761-J9	1.296-05	1.462-05	4.036-14	2.176+00	9.119+00	8.870+01							
14	6.070+05	8.722+02	5.796-10	1.401-06	1.758-09	1.747-06	2.337-J9	1.291-05	1.457-05	3.406-14	2.383+00	9.014+00	8.860+01							
15	6.070+05	8.704+02	5.174-10	1.460-06	1.509-09	1.771-06	2.327-J9	1.286-05	1.455-05	2.950-14	2.562+00	9.061+00	8.838+01							
16	6.070+05	8.689+02	4.426-10	1.512-06	1.241-09	1.794-06	1.683-J9	1.282-J5	1.454-05	2.447-14	2.735+00	9.095+00	8.817+01							
17	6.070+05	8.676+02	3.959-10	1.556-06	1.086-09	1.816-06	1.482-J9	1.278-J5	1.453-05	2.153-14	2.862+00	9.159+00	8.798+01							
18	6.070+05	8.664+02	3.410-10	1.594-06	9.103-10	1.835-06	1.251-J9	1.274-05	1.451-05	1.816-14	2.993+00	9.199+00	8.781+01							
19	6.070+05	8.654+02	2.896-10	1.626-06	7.560-10	1.853-06	1.346-J9	1.272-J5	1.451-05	1.517-14	3.105+00	9.236+00	8.766+01							
20	6.070+05	8.646+02	2.563-10	1.654-06	6.623-10	1.870-06	9.187-11	1.273-J5	1.450-05	1.332-14	3.182+00	9.294+00	8.752+01							
21	6.070+05	8.640+02	2.170-10	1.678-06	5.488-10	1.885-06	7.659-10	1.268-05	1.450-05	1.111-14	3.279+00	9.311+00	8.741+01							
22	6.070+05	8.634+02	1.947-10	1.699-06	4.933-10	1.898-06	6.380-11	1.267-05	1.451-05	9.982-15	3.315+00	9.382+00	8.730+01							
23	6.070+05	8.631+02	1.633-10	1.718-06	4.045-10	1.912-06	5.678-10	1.266-J5	1.452-J5	8.243-15	3.405+00	9.382+00	8.721+01							
24	6.070+05	8.635+02	1.542-10	1.740-06	3.821-10	1.931-06	5.363-11	1.267-05	1.457-05	7.812-15	3.435+00	9.446+00	8.712+01							
25	3.035+05	8.650+02	1.542-10	1.759-06	3.821-10	1.954-06	5.363-11	1.277-05	1.467-05	7.867-15	3.442+00	9.490+00	8.706+01							

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KUGEL RUN AT 09:08:02

ON 15 JAN 81 WITH ABSOLUTE ELEMENT MAP

CREATED ON 100064 AT 000000

PAGE 162

RADIAL POINT 22

PARTICLE FAILURES
DISTANCES IN MICRONS, FAILURES (2)

TH02 NEUTR									ME UC2 TPISG								
MAX DISTANCE			** PERCENT FAILURES OF			TOTAL FAILURE			*MAX DISTANCE*			** PERCENT FAILURES OF			TOTAL FAILURE		
AX	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	HIGH	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	HIGH	
PT	MIGRAT	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAT	IN SIC	TEMP	MIGRAT	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAT	IN SIC	TEMP	
1	1.46-07	0.00	3.01-02	1.00+02	0.00	0.00	0.00	J.00	1.82-09	0.00	3.17-02	1.00+02	0.00	0.00	0.00	0.00	
2	3.13-06	0.00	3.06-02	1.00+02	0.00	0.00	0.00	J.00	5.63-08	1.02-02	3.83-02	1.00+02	0.00	0.00	0.00	0.00	
3	5.64-05	0.00	3.19-02	1.00+02	0.00	0.00	0.00	U.0J	1.61-06	4.14-02	4.87-02	1.00+02	0.00	0.00	0.00	0.00	
4	5.12-04	0.00	3.42-02	1.00+02	0.00	0.00	0.00	U.00	1.98-05	1.14-01	5.97-02	1.00+02	0.00	0.00	0.00	0.00	
5	2.02-03	0.00	3.76-02	1.00+02	0.00	0.00	0.00	U.00	9.17-05	2.30-01	7.07-02	9.96+01	3.74-01	0.00	0.00	0.00	
6	4.62-03	0.00	4.17-02	1.00+02	0.00	0.00	0.00	J.00	2.26-04	3.75-01	7.55-02	9.55+01	4.47+00	0.00	0.00	0.00	
7	7.66-03	0.00	4.65-02	1.00+02	0.00	0.00	0.00	U.00	3.88-04	5.32-01	7.85-02	9.24+01	7.60+00	0.00	0.00	0.00	
8	1.05-02	0.00	5.16-02	1.00+02	0.00	0.00	0.00	J.0J	5.40-04	6.89-01	7.94-02	9.17+01	8.30+00	0.00	0.00	0.00	
9	1.29-02	0.00	5.67-02	1.00+02	0.00	0.00	0.00	J.00	6.05-04	8.38-01	7.97-02	9.17+01	8.26+00	0.00	0.00	0.00	
10	1.47-02	0.00	6.17-02	1.00+02	0.00	0.00	0.00	J.00	7.61-04	9.78-01	8.00-02	9.18+01	6.24+00	0.00	0.00	0.00	
11	1.61-02	0.00	6.64-02	1.00+02	0.00	0.00	0.00	J.00	8.32-04	1.11+00	8.02-02	9.18+01	6.22+00	0.00	0.00	0.00	
12	1.72-02	0.00	7.07-02	1.00+02	0.00	0.00	0.00	J.00	8.85-04	1.23+00	8.04-02	9.18+01	8.20+00	0.00	0.00	0.00	
13	1.81-02	0.00	7.19-02	1.00+02	0.00	0.00	0.00	J.00	9.23-04	1.34+00	8.06-02	9.18+01	8.18+00	0.00	0.00	0.00	
14	1.88-02	0.00	7.22-02	9.98+01	2.43-01	0.00	0.00	U.0J	9.52-04	1.45+00	8.09-02	9.18+01	8.39+00	0.00	0.00	0.00	
15	1.93-02	0.00	7.26-02	9.94+01	5.87-01	0.00	0.00	J.00	9.73-04	1.54+00	8.22-02	9.03+01	9.70+00	0.00	0.00	0.00	
16	1.97-02	0.00	7.29-02	9.92+01	8.35-01	0.00	0.00	U.00	9.89-04	1.64+00	8.34-02	8.91+01	1.09+01	0.00	0.00	0.00	
17	2.00-02	0.00	7.31-02	9.90+01	1.01+00	0.00	0.00	U.00	1.00-03	1.73+00	8.46-02	8.80+01	1.20+01	0.00	0.00	0.00	
18	2.03-02	0.00	7.33-02	9.89+01	1.13+00	0.00	0.00	J.00	1.01-03	1.81+00	8.56-02	8.70+01	1.30+01	0.00	0.00	0.00	
19	2.05-02	0.00	7.34-02	9.88+01	1.21+00	0.00	0.00	U.00	1.02-03	1.90+00	8.66-02	8.61+01	1.39+01	0.00	0.00	0.00	
20	2.07-02	0.00	7.35-02	9.87+01	1.26+00	0.00	0.00	J.00	1.02-03	1.98+00	8.74-02	8.54+01	1.46+01	0.00	0.00	0.00	
21	2.08-02	0.00	7.36-02	9.87+01	1.29+00	0.00	0.00	J.00	1.03-03	2.06+00	8.81-02	8.47+01	1.53+01	0.00	0.00	0.00	
22	2.09-02	0.00	7.37-02	9.87+01	1.31+00	0.00	0.00	U.0J	1.03-03	2.14+00	8.88-02	8.41+01	1.59+01	0.00	0.00	0.00	
23	2.10-02	0.00	7.37-02	9.87+01	1.32+00	0.00	0.00	J.00	1.04-03	2.21+00	8.94-02	8.36+01	1.64+01	0.00	0.00	0.00	
24	2.11-02	0.00	7.38-02	9.87+01	1.33+00	0.00	0.00	J.00	1.04-03	2.29+00	9.01-02	8.30+01	1.70+01	0.00	0.00	0.00	
25	2.11-02	0.00	7.38-02	9.87+01	1.34+00	0.00	0.00	J.00	1.04-03	2.33+00	9.05-02	8.27+01	1.73+01	0.00	0.00	0.00	

B-172

RADIAL POINT 22

DETAILED PRINTOUT FOR THE GAS KR85 M

	AVG FUEL BIRTHRTE*		*MICMOL/ *		*MICMOL/ *		*MICMOL/ *		*FUEL REL*		*FUEL REL*		*FUEL REL*	
AX*	FUEL	VOL	TEMP	*MICMOL/ *	*MICMOL/ *	*MICMOL/ *	CONTAM	*FUEL	*FUEL	*FUEL	*FUEL	*FUEL	*FUEL	*FUEL
PT*	(CC)	* (C)	* (CC+S)	* R/B	* (CC+S)	* R/B	* (CC+S)	* R/B	* R/B	* R/B	* R/B	* R/B	* R/B	* R/B
1	3.187+05	5.949+02	3.247-11	5.222-08	2.143-09	2.099-07	2.175-09	3.973-06	4.177-06	9.086-15	1.866-02	4.949+00	9.503+01	
2	6.374+05	6.472+02	1.397-10	6.760-08	5.994-09	3.110-07	6.133-09	4.876-06	5.182-06	3.178-14	2.972-02	5.865+00	9.411+01	
3	6.374+05	7.149+02	3.326-10	1.014-07	6.965-09	5.241-07	7.297-09	6.459-06	6.964-06	5.082-14	6.639-02	7.183+00	9.275+01	
4	6.374+05	7.750+02	4.896-10	1.579-07	6.751-09	8.295-07	7.241-09	8.335-06	9.119-06	6.603-14	1.171-01	8.482+00	9.140+01	
5	6.374+05	8.163+02	6.829-10	2.368-07	6.569-09	1.169-06	7.252-09	9.924-06	1.101-05	7.981-14	2.026-01	9.624+00	9.017+01	
6	6.374+05	8.407+02	7.970-10	3.370-07	5.954-09	1.385-06	6.751-09	1.101-05	1.227-05	8.282-14	3.244-01	9.957+00	8.972+01	
7	6.374+05	8.543+02	8.838-10	4.565-07	5.217-09	1.627-06	6.101-09	1.167-05	1.305-05	7.959-14	5.069-01	1.001+01	8.948+01	
8	6.374+05	8.607+02	9.222-10	5.917-07	4.654-09	1.593-06	5.576-09	1.203-05	1.346-05	7.504-14	7.271-01	9.879+00	8.939+01	
9	6.374+05	8.634+02	8.893-10	7.363-07	3.951-09	1.623-06	4.840-09	1.221-05	1.367-05	6.618-14	9.895-01	9.689+00	8.932+01	
10	6.374+05	8.638+02	8.753-10	8.856-07	3.502-09	1.638-06	4.377-09	1.229-05	1.378-05	6.031-14	1.265+00	9.514+00	8.920+01	
11	6.374+05	8.629+02	7.856-10	1.033-06	2.840-09	1.644-06	3.025-09	1.230-05	1.381-05	5.007-14	1.621+00	9.325+00	8.905+01	
12	6.374+05	8.616+02	7.280-10	1.174-06	2.462-09	1.646-06	3.190-09	1.228-05	1.382-05	4.409-14	1.939+00	9.190+00	8.887+01	
13	6.374+05	8.599+02	6.582-10	1.260-06	2.103-09	1.644-06	2.761-09	1.225-05	1.380-05	3.810-14	2.177+00	9.075+00	8.875+01	
14	6.374+05	8.581+02	5.796-10	1.323-06	1.758-09	1.644-06	2.337-09	1.220-05	1.376-05	3.217-14	2.383+00	8.986+00	8.863+01	
15	6.374+05	8.564+02	5.174-10	1.379-06	1.509-09	1.665-06	2.027-09	1.215-05	1.374-05	2.786-14	2.562+00	9.021+00	8.842+01	
16	6.374+05	8.550+02	4.426-10	1.428-06	1.241-09	1.684-06	1.683-09	1.211-05	1.373-05	2.311-14	2.735+00	9.042+00	8.822+01	
17	6.374+05	8.537+02	3.959-10	1.470-06	1.086-09	1.703-06	1.482-09	1.208-05	1.372-05	2.033-14	2.862+00	9.095+00	8.804+01	
18	6.374+05	8.526+02	3.410-10	1.505-06	9.103-10	1.719-06	1.251-09	1.204-05	1.371-05	1.715-14	2.994+00	9.125+00	8.788+01	
19	6.374+05	8.516+02	2.896-10	1.536-06	7.560-10	1.734-06	1.146-09	1.202-05	1.370-05	1.432-14	3.106+00	9.152+00	8.774+01	
20	6.374+05	8.508+02	2.563-10	1.562-06	6.623-10	1.748-06	9.187-10	1.200-05	1.369-05	1.258-14	3.182+00	9.202+00	8.762+01	
21	6.374+05	8.501+02	2.170-10	1.584-06	5.488-10	1.761-06	7.659-10	1.193-05	1.369-05	1.049-14	3.280+00	9.213+00	8.751+01	
22	6.374+05	8.496+02	1.947-10	1.604-06	4.933-10	1.771-06	6.880-10	1.197-05	1.369-05	9.420-15	3.316+00	9.276+00	8.741+01	
23	6.374+05	8.492+02	1.633-10	1.622-06	4.045-10	1.782-06	5.678-10	1.196-05	1.370-05	7.777-15	3.405+00	9.270+00	8.732+01	
24	6.374+05	8.497+02	1.542-10	1.642-06	3.821-10	1.799-06	5.363-10	1.199-05	1.374-05	7.370-15	3.435+00	9.328+00	8.724+01	
25	3.187+05	8.509+02	1.542-10	1.659-06	3.821-10	1.818-06	5.363-10	1.205-05	1.383-05	7.415-15	3.455+00	9.366+00	8.718+01	

RADIAL POINT 22

DETAILED PRINTOUT FOR THE GAS XE 138

[illegible]

B-174

KUGEL RUN AT 09:08:02

ON 15 JAN 81 WITH ABSOLUTE ELEMENT MAP

CREATED ON 000064 AT 000000

PAGE 165

RADIAL POINT 23

PARTICLE FAILURES
DISTANCES IN MICRONS, FAILURES (%)

THO2 NEUTR								PL UC2 TRISL								
MAX DISTANCE				** PERCENT FAILURES OF TOTAL FAILURE **				*MAX DISTANCE*				** PERCENT FAILURES OF TOTAL FAILURE **				
AX	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	HIGH	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	HIGH
PT	MIGRAT	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAT	IN SIC	TEMP	MIGRAT	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAT	IN SIC	TEMP
1	9.54-08	0.00	3.01-02	1.00+02	0.00	0.00	0.00	J.U0	1.12-09	0.00	3.17-02	1.00+02	0.00	0.00	0.00	0.00
2	2.11-06	0.00	3.06-02	1.00+02	0.00	0.00	0.00	J.U0	3.54-08	8.76-03	3.83-02	1.00+02	0.00	0.00	0.00	0.00
3	3.69-05	0.00	3.19-02	1.00+02	0.00	0.00	0.00	J.U0	9.92-07	3.54-02	4.87-02	1.00+02	0.00	0.00	0.00	0.00
4	3.54-04	0.00	3.42-02	1.00+02	0.00	0.00	0.00	J.U0	1.30-05	9.81-02	5.97-02	1.00+02	0.00	0.00	0.00	0.00
5	1.51-03	0.00	3.76-02	1.00+02	0.00	0.00	0.00	J.U0	6.63-05	2.03-01	7.07-02	9.96+01	3.74+01	0.00	0.00	0.00
6	3.68-03	0.00	4.17-02	1.00+02	0.00	0.00	0.00	J.U0	1.75-04	3.39-01	7.54-02	9.57+01	4.33+00	0.00	0.00	0.00
7	6.36-03	0.00	4.65-02	1.00+02	0.00	0.00	0.00	J.U0	3.16-04	4.88-01	7.83-02	9.46+01	7.44+00	0.00	0.00	0.00
8	8.94-03	0.00	5.16-02	1.00+02	0.00	0.00	0.00	J.U0	4.53-04	6.39-01	7.93-02	9.18+01	8.18+00	0.00	0.00	0.00
9	1.11-02	0.00	5.67-02	1.00+02	0.00	0.00	0.00	J.U0	5.67-04	7.84-01	7.96-02	9.19+01	8.15+00	0.00	0.00	0.00
10	1.29-02	0.00	6.17-02	1.00+02	0.00	0.00	0.00	J.U0	6.57-04	9.21-01	7.99-02	9.19+01	8.12+00	0.00	0.00	0.00
11	1.42-02	0.00	6.64-02	1.00+02	0.00	0.00	0.00	J.U0	7.23-04	1.05+00	8.01-02	9.19+01	8.10+00	0.00	0.00	0.00
12	1.53-02	0.00	7.07-02	1.00+02	0.00	0.00	0.00	J.U0	7.72-04	1.17+00	8.03-02	9.19+01	8.08+00	0.00	0.00	0.00
13	1.61-02	0.00	7.19-02	1.00+02	0.00	0.00	0.00	J.U0	8.08-04	1.28+00	8.05-02	9.19+01	8.07+00	0.00	0.00	0.00
14	1.68-02	0.00	7.22-02	9.98+01	2.41-01	0.00	0.00	J.U0	8.35-04	1.38+00	8.09-02	9.17+01	8.34+00	0.00	0.00	0.00
15	1.73-02	0.00	7.26-02	9.94+01	5.82-01	0.00	0.00	J.U0	8.55-04	1.48+00	8.21-02	9.04+01	9.63+00	0.00	0.00	0.00
16	1.77-02	0.00	7.29-02	9.92+01	8.28-01	0.00	0.00	J.U0	8.73-04	1.57+00	8.34-02	8.92+01	1.08+01	0.00	0.00	0.00
17	1.80-02	0.00	7.31-02	9.90+01	9.99-01	0.00	0.00	J.U0	8.81-04	1.65+00	8.45-02	8.61+01	1.19+01	0.00	0.00	0.00
18	1.82-02	0.00	7.33-02	9.89+01	1.12+00	0.00	0.00	J.U0	8.90-04	1.74+00	8.55-02	8.71+01	1.29+01	0.00	0.00	0.00
19	1.84-02	0.00	7.34-02	9.88+01	1.19+00	0.00	0.00	J.U0	8.97-04	1.82+00	8.64-02	8.62+01	1.38+01	0.00	0.00	0.00
20	1.86-02	0.00	7.35-02	9.88+01	1.24+00	0.00	0.00	J.U0	9.03-04	1.90+00	8.73-02	8.55+01	1.45+01	0.00	0.00	0.00
21	1.87-02	0.00	7.36-02	9.87+01	1.27+00	0.00	0.00	J.U0	9.07-04	1.98+00	8.80-02	8.48+01	1.52+01	0.00	0.00	0.00
22	1.88-02	0.00	7.37-02	9.87+01	1.29+00	0.00	0.00	J.U0	9.12-04	2.05+00	8.87-02	8.43+01	1.57+01	0.00	0.00	0.00
23	1.89-02	0.00	7.37-02	9.87+01	1.30+00	0.00	0.00	J.U0	9.15-04	2.13+00	8.92-02	8.38+01	1.62+01	0.00	0.00	0.00
24	1.90-02	0.00	7.37-02	9.87+01	1.31+00	0.00	0.00	J.U0	9.19-04	2.20+00	8.98-02	8.32+01	1.68+01	0.00	0.00	0.00
25	1.90-02	0.00	7.38-02	9.87+01	1.32+00	0.00	0.00	J.U0	9.23-04	2.24+00	9.02-02	8.25+01	1.71+01	0.00	0.00	0.00

B-175

DETAILED PRINTOUT FOR THE GAS KR85 M

[illegible]

B-176

RADIAL POINT 23

DETAILED PRINTOUT FOR THE GAS XE 138

[illegible]

B-177

KUGEL RUN AT 09:08:02

ON 15 JAN 81 WITH ABSOLUTE ELEMENT MAP

CREATED ON 000064 AT 000000

PAGE 168

RADIAL POINT 24

PARTICLE FAILURES
DISTANCES IN MICKONS, FAILURES (%)

<----- TH02 NEUTR ----->									<----- ME UC2 TRISO ----->								
MAX DISTANCE			** PERCENT FAILURES OF TOTAL FAILURE **						*MAX DISTANCE*			** PERCENT FAILURES OF TOTAL FAILURE **					
AX	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	HIGH	AX	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	HIGH
PT	MIGRAT	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAT	IN SIC	TEMP	PT	MIGRAT	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAT	IN SIC	TEMP
1	6.87-08	0.00	3.01-02	1.00+02	0.00	0.00	0.00	0.00	7.69-10	0.00	3.17-02	1.00+02	0.00	0.00	0.00	0.00	0.00
2	1.60-06	0.00	3.06-02	1.00+02	0.00	0.00	0.00	0.00	2.59-08	7.93-03	3.63-02	1.00+02	0.00	0.00	0.00	0.00	0.00
3	2.71-05	0.00	3.19-02	1.00+02	0.00	0.00	0.00	0.00	6.98-07	3.17-02	4.67-02	1.00+02	0.00	0.00	0.00	0.00	0.00
4	2.71-04	0.00	3.42-02	1.00+02	0.00	0.00	0.00	0.00	9.62-06	8.86-02	5.97-02	1.00+02	0.00	0.00	0.00	0.00	0.00
5	1.25-03	0.00	3.76-02	1.00+02	0.00	0.00	0.00	0.00	5.34-05	1.87-01	7.07-02	9.96+01	3.74+01	0.00	0.00	0.00	0.00
6	3.21-03	0.00	4.17-02	1.00+02	0.00	0.00	0.00	0.00	1.51-04	3.18-01	7.53-02	9.57+01	4.25+00	0.00	0.00	0.00	0.00
7	5.77-03	0.00	4.65-02	1.00+02	0.00	0.00	0.00	0.00	2.85-04	4.65-01	7.83-02	9.26+01	7.38+00	0.00	0.00	0.00	0.00
8	8.30-03	0.00	5.16-02	1.00+02	0.00	0.00	0.00	0.00	4.19-04	6.15-01	7.93-02	9.18+01	8.16+00	0.00	0.00	0.00	0.00
9	1.05-02	0.00	5.67-02	1.00+02	0.00	0.00	0.00	0.00	5.33-04	7.59-01	7.96-02	9.19+01	8.13+00	0.00	0.00	0.00	0.00
10	1.22-02	0.00	6.17-02	1.00+02	0.00	0.00	0.00	0.00	6.22-04	8.96-01	7.99-02	9.19+01	8.10+00	0.00	0.00	0.00	0.00
11	1.36-02	0.00	6.64-02	1.00+02	0.00	0.00	0.00	0.00	6.89-04	1.02+00	8.01-02	9.19+01	8.18+00	0.00	0.00	0.00	0.00
12	1.47-02	0.00	7.07-02	1.00+02	0.00	0.00	0.00	0.00	7.38-04	1.14+00	8.03-02	9.19+01	8.16+00	0.00	0.00	0.00	0.00
13	1.55-02	0.00	7.19-02	1.00+02	0.00	0.00	0.00	0.00	7.74-04	1.25+00	8.04-02	9.20+01	8.14+00	0.00	0.00	0.00	0.00
14	1.62-02	0.00	7.22-02	9.98+01	2.41-01	0.00	0.00	0.00	8.00-04	1.35+00	8.08-02	9.17+01	8.34+00	0.00	0.00	0.00	0.00
15	1.67-02	0.00	7.26-02	9.94+01	5.82-01	0.00	0.00	0.00	8.20-04	1.45+00	8.21-02	9.04+01	9.13+00	0.00	0.00	0.00	0.00
16	1.71-02	0.00	7.29-02	9.92+01	8.27-01	0.00	0.00	0.00	8.35-04	1.54+00	8.34-02	8.92+01	1.06+01	0.00	0.00	0.00	0.00
17	1.74-02	0.00	7.31-02	9.90+01	9.98-01	0.00	0.00	0.00	8.46-04	1.63+00	8.45-02	8.61+01	1.19+01	0.00	0.00	0.00	0.00
18	1.76-02	0.00	7.33-02	9.89+01	1.12+00	0.00	0.00	0.00	8.55-04	1.71+00	8.55-02	8.71+01	1.29+01	0.00	0.00	0.00	0.00
19	1.78-02	0.00	7.34-02	9.88+01	1.19+00	0.00	0.00	0.00	8.63-04	1.80+00	8.64-02	8.63+01	1.37+01	0.00	0.00	0.00	0.00
20	1.79-02	0.00	7.35-02	9.88+01	1.24+00	0.00	0.00	0.00	8.70-04	1.67+00	8.73-02	8.55+01	1.45+01	0.00	0.00	0.00	0.00
21	1.81-02	0.00	7.36-02	9.87+01	1.27+00	0.00	0.00	0.00	8.76-04	1.95+00	8.80-02	8.49+01	1.51+01	0.00	0.00	0.00	0.00
22	1.82-02	0.00	7.36-02	9.87+01	1.29+00	0.00	0.00	0.00	8.80-04	2.03+00	8.86-02	8.43+01	1.57+01	0.00	0.00	0.00	0.00
23	1.83-02	0.00	7.37-02	9.87+01	1.30+00	0.00	0.00	0.00	8.84-04	2.10+00	8.92-02	8.36+01	1.62+01	0.00	0.00	0.00	0.00
24	1.83-02	0.00	7.37-02	9.87+01	1.31+00	0.00	0.00	0.00	8.87-04	2.18+00	8.98-02	8.33+01	1.67+01	0.00	0.00	0.00	0.00
25	1.84-02	0.00	7.38-02	9.87+01	1.31+00	0.00	0.00	0.00	8.88-04	2.21+00	9.01-02	8.30+01	1.70+01	0.00	0.00	0.00	0.00

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KUGEL RUN AT 09:08:02

ON 15 JAN 81 WITH ABSOLUTE ELEMENT MAP

CREATED ON 000064 AT 000000

PAGE 170

RADIAL POINT 24

DETAILED PRINTOUT FOR THE GAS XE 138

	* * AX+FUEL VOL* PF* (CC)	* * TEMP (C)	* * *AVG FUEL*BIRTHRTE* *MICROL/ * (CC*S)	* * R/B	* * *BIRTHRTE* *MICROL/ * (CC*S)	* * R/B	* * *BIRTHRTE* *MICROL/ * (CC*S)	* * R/B	* * *FUEL REL* *RTE MICM* *OL/CC/S	* * *FUEL REL* *RTE MICM* *THG2 NEUTR	* * *FUEL REL* *RTE MICM* *ME UC2 TRISO*	* * *FUEL REL* *RTE MICM* *CONTAM *	
1	1.726+05	5.834+02	7.015-11	9.424-09	1.056-08	3.788-08	1.063-08	6.667-07	7.064-07	7.507-15	0.806-03	5.327+00	9.466+01
2	3.453+05	6.350+02	3.018-10	1.081-08	2.953-08	4.975-08	2.983-08	7.280-07	7.774-07	2.319-14	1.407-02	6.335+00	9.365+01
3	3.453+05	6.993+02	7.185-10	1.382-08	3.432-08	7.141-08	3.503-08	8.214-07	8.916-07	3.124-14	3.179-02	7.845+00	9.212+01
4	3.453+05	7.594+02	1.058-09	1.890-08	3.327-08	9.928-08	3.432-08	9.311-07	1.028-06	3.526-14	5.667-02	9.361+00	9.058+01
5	3.453+05	8.042+02	1.475-09	2.629-08	3.237-08	1.298-07	3.384-08	1.028-06	1.154-06	3.904-14	9.933-02	1.076+01	8.914+01
6	3.453+05	8.325+02	1.722-09	3.602-08	2.934-08	1.477-07	3.106-08	1.098-06	1.239-06	3.849-14	1.611-01	1.126+01	8.858+01
7	3.453+05	8.489+02	1.909-09	4.786-08	2.571-08	1.597-07	2.762-08	1.142-06	1.294-06	3.574-14	2.556-01	1.149+01	8.826+01
8	3.453+05	8.569+02	1.992-09	6.146-08	2.293-08	1.652-07	2.492-08	1.106-06	1.323-06	3.298-14	3.712-01	1.149+01	8.814+01
9	3.453+05	8.604+02	1.921-09	7.617-08	1.947-08	1.676-07	2.139-08	1.179-06	1.339-06	2.863-14	5.111-01	1.140+01	8.809+01
10	3.453+05	8.613+02	1.891-09	9.149-08	1.726-08	1.690-07	1.915-08	1.185-06	1.346-06	2.578-14	6.711-01	1.131+01	8.802+01
11	3.453+05	8.607+02	1.697-09	1.068-07	1.399-08	1.697-07	1.569-08	1.186-06	1.349-06	2.117-14	0.559-01	1.121+01	8.793+01
12	3.453+05	8.595+02	1.572-09	1.215-07	1.213-08	1.700-07	1.370-08	1.186-06	1.350-06	1.850-14	1.032+00	1.114+01	8.782+01
13	3.453+05	8.579+02	1.422-09	1.306-07	1.036-08	1.701-07	1.178-08	1.184-06	1.349-06	1.590-14	1.167+00	1.108+01	8.775+01
14	3.453+05	8.561+02	1.252-09	1.373-07	0.661-09	1.706-07	9.913-07	1.182-06	1.346-06	1.336-14	1.286+00	1.106+01	8.766+01
15	3.453+05	8.544+02	1.118-09	1.434-07	7.438-09	1.730-07	8.555-09	1.179-06	1.348-06	1.153-14	1.390+00	1.115+01	8.746+01
16	3.453+05	8.530+02	9.561-10	1.487-07	6.112-09	1.752-07	7.368-09	1.177-06	1.349-06	9.534-15	1.491+00	1.123+01	8.728+01
17	3.453+05	8.517+02	8.552-10	1.532-07	5.351-09	1.773-07	6.206-09	1.175-06	1.349-06	8.373-15	1.565+00	1.133+01	8.711+01
18	3.453+05	8.506+02	7.366-10	1.571-07	4.485-09	1.792-07	5.222-09	1.173-06	1.350-06	7.047-15	1.642+00	1.141+01	8.695+01
19	3.453+05	8.496+02	6.256-10	1.604-07	3.725-09	1.809-07	4.351-09	1.172-06	1.350-06	5.873-15	1.709+00	1.147+01	8.682+01
20	3.453+05	8.488+02	5.536-10	1.633-07	3.263-09	1.824-07	3.817-09	1.171-06	1.351-06	5.155-15	1.754+00	1.155+01	8.670+01
21	3.453+05	8.481+02	4.688-10	1.657-07	2.704-09	1.838-07	3.173-09	1.170-06	1.351-06	4.287-15	1.813+00	1.159+01	8.659+01
22	3.453+05	8.475+02	4.207-10	1.678-07	2.430-09	1.850-07	2.851-09	1.169-06	1.351-06	3.853-15	1.832+00	1.167+01	8.650+01
23	3.453+05	8.470+02	3.528-10	1.697-07	1.993-09	1.861-07	2.346-09	1.168-06	1.352-06	3.171-15	1.688+00	1.169+01	8.642+01
24	3.453+05	8.469+02	3.331-10	1.714-07	1.882-09	1.873-07	2.216-09	1.163-06	1.353-06	2.996-15	1.904+00	1.176+01	8.634+01
25	1.726+05	8.474+02	3.331-10	1.725-07	1.882-09	1.882-07	2.216-09	1.170-06	1.350-06	3.004-15	1.912+00	1.179+01	8.629+01

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KUGEL RUN AT 09:08:02

ON 15 JAN 81 WITH ABSOLUTE ELEMENT MAP

CREATED ON 000064 AT 000000

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***** AXIALLY *****
 *** VOLUME AVERAGED FAILURE RESULTS ***
 *****

PARTICLE FAILURES
 DISTANCES IN MICRONS, FAILURES (%)

THO2 NEUTR								PE UC2 TPISU								
MAX DISTANCE				** PERCENT FAILURES OF TOTAL FAILURE **				*MAX DISTANCE*				** PERCENT FAILURES OF TOTAL FAILURE **				
RD	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	HIGH	KERNEL	FIPROD	TOTAL	MANUF.	PRESS.	KERNEL	FIPROD	HIGH
PT	MIGRAT	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAT	IN SIC	TEMP	MIGRAT	IN SIC	FAILUR	DEFECT	VESSEL	MIGRAT	IN SIC	TEMP
1			6.18-02	9.92+01	8.27-01	0.00	0.00	J.00			8.43-02	8.43+01	1.57+01	0.00	0.00	0.00
2			6.18-02	9.92+01	8.27-01	0.00	0.00	J.00			8.43-02	8.43+01	1.57+01	0.00	0.00	0.00
3			6.18-02	9.92+01	8.27-01	0.00	0.00	J.00			8.43-02	8.43+01	1.57+01	0.00	0.00	0.00
4			6.18-02	9.92+01	8.27-01	0.00	0.00	J.00			8.43-02	8.43+01	1.57+01	0.00	0.00	0.00
5			6.18-02	9.92+01	8.26-01	0.00	0.00	J.00			8.43-02	8.43+01	1.57+01	0.00	0.00	0.00
6			6.18-02	9.92+01	8.25-01	0.00	0.00	J.00			8.42-02	8.43+01	1.57+01	0.00	0.00	0.00
7			6.18-02	9.92+01	8.25-01	0.00	0.00	J.00			8.42-02	8.43+01	1.57+01	0.00	0.00	0.00
8			6.18-02	9.92+01	8.24-01	0.00	0.00	J.00			8.42-02	8.43+01	1.57+01	0.00	0.00	0.00
9			6.18-02	9.92+01	8.23-01	0.00	0.00	J.00			8.42-02	8.44+01	1.56+01	0.00	0.00	0.00
10			6.18-02	9.92+01	8.22-01	0.00	0.00	J.00			8.42-02	8.44+01	1.56+01	0.00	0.00	0.00
11			6.18-02	9.92+01	8.22-01	0.00	0.00	J.00			8.42-02	8.43+01	1.57+01	0.00	0.00	0.00
12			6.18-02	9.92+01	8.22-01	0.00	0.00	J.00			8.42-02	8.43+01	1.57+01	0.00	0.00	0.00
13			6.18-02	9.92+01	8.20-01	0.00	0.00	J.00			8.42-02	8.43+01	1.57+01	0.00	0.00	0.00
14			6.18-02	9.92+01	8.19-01	0.00	0.00	J.00			8.42-02	8.43+01	1.57+01	0.00	0.00	0.00
15			6.18-02	9.92+01	8.26-01	0.00	0.00	J.00			8.44-02	8.41+01	1.59+01	0.00	0.00	0.00
16			6.18-02	9.92+01	8.24-01	0.00	0.00	J.00			8.44-02	8.42+01	1.58+01	0.00	0.00	0.00
17			6.18-02	9.92+01	8.21-01	0.00	0.00	J.00			8.43-02	8.42+01	1.58+01	0.00	0.00	0.00
18			6.19-02	9.92+01	8.37-01	0.00	0.00	J.00			8.47-02	8.38+01	1.62+01	0.00	0.00	0.00
19			6.19-02	9.92+01	8.35-01	0.00	0.00	J.00			8.47-02	8.36+01	1.62+01	0.00	0.00	0.00
20			6.14-02	9.92+01	7.57-01	0.00	0.00	J.00			8.10-02	8.69+01	1.31+01	0.00	0.00	0.00
21			6.08-02	9.93+01	6.56-01	0.00	0.00	J.00			7.80-02	8.95+01	1.05+01	0.00	0.00	0.00
22			6.08-02	9.94+01	6.13-01	0.00	0.00	J.00			7.75-02	9.01+01	9.92+00	0.00	0.00	0.00
23			6.08-02	9.94+01	6.06-01	0.00	0.00	J.00			7.74-02	9.02+01	9.81+00	0.00	0.00	0.00
24			6.08-02	9.94+01	6.05-01	0.00	0.00	J.00			7.74-02	9.02+01	9.76+00	0.00	0.00	0.00

*****
 CORE VOLUME
 AVERAGED RESULTS 6.15-02 9.92+01 7.64-01 0.00 0.00 J.00 8.42-02 8.59+01 1.41+01 0.00 0.00 J.00
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*** AXIAL AVERAGES ***
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DETAILED PRINTOUT FOR THE GAS KR65 M

* RD*	* FUEL VOL*	* TEMP	*<TH02 NEUTR (ICCH)* (IC)	*<ME UC2 TRISO--> (ICCH*S) *	* R/B	* BIRTHRTE*	* MICMOL/ *	* R/B	* BIRTHRTE*	* MICMOL/ *	* R/B	* FUEL	* CONTAM	* FUEL	* R/B	* FUEL REL*	* RTE (MICMOL/ S)	*<TH02 NEUTR (ICCH*S) *	*<ME UC2 TRISO--> (ICCH*S) *	* CONTAM	* RELEASE RATE COMING FROM-->*
1	9.106+04			9.831-10		2.769-09			3.753-09			1.209-05	4.132-09			2.273+00		8.124+00		8.960+01	
2	7.284+05			9.831-10		2.769-09			3.753-09			1.209-05	3.305-08			2.273+00		8.124+00		8.960+01	
3	1.457+06			9.831-10		2.769-09			3.753-09			1.209-05	6.609-06			2.273+00		8.124+00		8.960+01	
4	2.185+06			9.831-10		2.769-09			3.753-09			1.209-05	9.909-06			2.273+00		8.124+00		8.960+01	
5	2.914+06			9.831-10		2.769-09			3.753-09			1.209-05	1.320-07			2.273+00		8.123+00		8.960+01	
6	3.642+06			9.831-10		2.769-09			3.753-09			1.209-05	1.649-07			2.273+00		8.123+00		8.960+01	
7	4.371+06			9.831-10		2.769-09			3.753-09			1.209-05	1.978-07			2.273+00		8.122+00		8.960+01	
8	5.099+06			9.831-10		2.769-09			3.753-09			1.209-05	2.305-07			2.273+00		8.121+00		8.961+01	
9	5.828+06			9.831-10		2.769-09			3.753-09			1.209-05	2.632-07			2.274+00		8.120+00		8.961+01	
10	6.556+06			9.831-10		2.769-09			3.753-09			1.209-05	2.958-07			2.274+00		8.119+00		8.961+01	
11	7.284+06			9.836-10		2.772-09			3.756-09			1.203-05	3.290-07			2.273+00		8.123+00		8.960+01	
12	8.013+06			9.838-10		2.773-09			3.757-09			1.201-05	3.617-07			2.273+00		8.123+00		8.960+01	
13	8.741+06			9.838-10		2.773-09			3.757-09			1.200-05	3.940-07			2.273+00		8.122+00		8.960+01	
14	9.470+06			9.844-10		2.774-09			3.759-09			1.198-05	4.265-07			2.275+00		8.122+00		8.960+01	
15	1.020+07			9.881-10		2.782-09			3.771-09			1.199-05	4.611-07			2.281+00		8.128+00		8.959+01	
16	1.093+07			9.884-10		2.783-09			3.771-09			1.198-05	4.935-07			2.261+00		8.128+00		8.959+01	
17	1.166+07			9.884-10		2.783-09			3.772-09			1.196-05	5.258-07			2.261+00		8.127+00		8.959+01	
18	1.238+07			9.933-10		2.795-09			3.788-09			1.203-05	5.642-07			2.289+00		8.141+00		8.957+01	
19	1.311+07			9.934-10		2.795-09			3.798-09			1.204-05	5.980-07			2.289+00		8.144+00		8.957+01	
20	1.384+07			5.190-10		2.923-09			3.442-09			1.212-05	5.772-07			1.266+00		9.333+00		8.940+01	
21	1.457+07			4.929-10		2.832-09			3.325-09			1.216-05	5.891-07			1.177+00		9.211+00		8.961+01	
22	1.530+07			4.929-10		2.832-09			3.325-09			1.147-05	5.835-07			1.170+00		9.170+00		8.965+01	
23	1.603+07			4.929-10		2.832-09			3.325-09			1.126-05	6.002-07			1.187+00		9.166+00		8.965+01	
24	1.686+06			4.929-10		2.832-09			3.325-09			1.119-05	3.083-07			1.194+00		9.168+00		8.964+01	

*****
CORE RESULTS
1.927+08   8.143-10   2.804-09   3.017-09   1.190-05 8.299-06   1.533+00   8.475+00   8.959+01
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*** AXIAL AVERAGES ***
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DETAILED PRINTOUT FOR THE GAS KE 138

* RD*	* FUEL VOL*	* TEMP	*<THO2 MEUTR MICMOL/ *	* R/B	*<ME UC2 TRISO--> MICMOL/ *	* R/B	* FUEL MICMOL/ *	* CONTAM R/B	* FUEL R/B	* FUEL REL* RTIEINICM* (OL/S)	* THO2 MEUTR	* ME UC2 TRISO*	* CONTAM *
1	9.106+04		2.124-09		1.365-08		1.577-J8		1.231-06	1.767-05	1.173+00	1.016+01	8.867+01
2	7.284+05		2.124-09		1.365-08		1.577-J8		1.231-06	1.414-08	1.173+00	1.016+01	8.867+01
3	1.457+06		2.124-09		1.365-08		1.577-J8		1.231-06	2.827-06	1.173+00	1.016+01	8.867+01
4	2.185+06		2.124-09		1.365-08		1.577-J8		1.230-06	4.240-08	1.173+00	1.016+01	8.867+01
5	2.914+06		2.124-09		1.365-08		1.577-J8		1.230-06	5.652-08	1.173+00	1.016+01	8.867+01
6	3.642+06		2.124-09		1.365-08		1.577-J8		1.230-06	7.062-08	1.173+00	1.016+01	8.867+01
7	4.371+06		2.124-09		1.365-08		1.577-J8		1.229-06	8.470-06	1.173+00	1.016+01	8.867+01
8	5.099+06		2.124-09		1.365-08		1.577-J8		1.228-06	9.877-08	1.173+00	1.016+01	8.867+01
9	5.828+06		2.124-09		1.365-08		1.577-J8		1.226-06	1.128-07	1.173+00	1.016+01	8.867+01
10	6.556+06		2.124-09		1.365-08		1.577-J8		1.227-06	1.268-07	1.173+00	1.016+01	8.867+01
11	7.284+06		2.125-09		1.366-08		1.578-J8		1.227-06	1.411-07	1.173+00	1.016+01	8.867+01
12	8.013+06		2.125-09		1.366-08		1.579-J8		1.226-06	1.552-07	1.173+00	1.016+01	8.867+01
13	8.741+06		2.125-09		1.366-08		1.579-J8		1.225-06	1.691-07	1.173+00	1.016+01	8.867+01
14	9.470+06		2.126-09		1.367-08		1.580-J8		1.225-06	1.832-07	1.173+00	1.016+01	8.867+01
15	1.020+07		2.134-09		1.371-08		1.584-08		1.225-06	1.980-07	1.177+00	1.017+01	8.866+01
16	1.093+07		2.135-09		1.371-08		1.585-08		1.224-06	2.120-07	1.177+00	1.017+01	8.866+01
17	1.166+07		2.135-09		1.371-08		1.585-08		1.223-06	2.260-07	1.177+00	1.017+01	8.866+01
18	1.238+07		2.146-09		1.377-08		1.592-08		1.227-06	2.419-07	1.182+00	1.018+01	8.864+01
19	1.311+07		2.146-09		1.377-08		1.592-08		1.228-06	2.562-07	1.182+00	1.019+01	8.863+01
20	1.384+07		1.121-09		1.440-08		1.552-08		1.237-06	2.658-07	0.066-01	1.075+01	8.864+01
21	1.457+07		1.065-09		1.396-08		1.552-08		1.240-06	2.713-07	5.662-01	1.059+01	8.885+01
22	1.530+07		1.065-09		1.396-08		1.552-08		1.200-06	2.758-07	5.657-01	1.054+01	8.889+01
23	1.603+07		1.065-09		1.396-08		1.552-08		1.188-06	2.859-07	5.685-01	1.054+01	8.890+01
24	8.286+06		1.065-09		1.396-08		1.552-08		1.183-06	1.472-07	5.702-01	1.054+01	8.889+01

*****
CORE RESULTS
1.927+08 1.759-09 1.382-08 1.558-J8 1.221-06 3.665-06 5.720-01 1.031+01 8.872+01
*****

PERFORMANCE CALCULATIONS TOOK 37.277 SECONDS

***EXIT LOC**L1061

PHD,RELU

LOAD 10074 2300 X -1 ST2732

ST2732 FIN

GENERAL ATOMIC CSD COMPUTER CENTER
1100 EXEC LEVEL 36R2B - 3440

*****
*** RUN NO. ST2732 ***
*****

NAME **SHAM ** WORK ORDER NO. 7422J7U8UJ RCN 169 ORG 648 BCx NO. 25
EXTENSION **4331 ** START 9:05:33 15JAN81 TERM. 9:11:51 15JAN81 SUBMITTED 0905

REQUESTED FACILITIES

	SUP TIME	PAGES	CARDS-OUT	CARDS-IN	TAPES	PACKS	
ESTIMATED	360-SEC	200	0	0	1	0	
ACTUAL	152-SEC	182	0	0	1	0	
SCOST		7.28	0.00	0.03	0.50	0.00	7.81

MEMORY CATEGORIES

MEMORY SIZE	0-19K	20-39K	40-59K	60-79K	80-99K	100-149K	150K-UP
TIME (SEC)	35	117	0	0	0	0	0
SCOST	2.14	9.10	0.00	0.00	0.00	0.00	11.24

TAPE USAGE 2 TAPE MINS. 0.50

DRUM USAGE 12.7 TRACK HRS. 1.65

TOTAL COST \$ 21.20

COMPUTER TASK STATISTICS

TASK	REFS.	MEMORY	SUPS(SEC)	TAPE UNITS	TOTAL	
					DISC PACKS	DRUM/DISC TRACKS
CNTRL CARDS	-	2048	13.83	-	-	-
ELT	2	8704	3.39	0.00	0.00	2
FURPUR	1	12800	17.31	1.00	0.00	117
MAP	1	38400	117.23	1.00	0.00	362

ACCESSSES(X10) 33
WORDS TRANSFERRED(X1000) 558

TAPE 0
USLR 0
DRUM/DISC 0

DISC 480
DRUM/DISC 1644

APPENDIX C
PLOTting SAMPLE PROBLEM OUTPUT

C.1. EXAMPLE RUN

@XQT PLOT*3D.MAP   OR @XQT KUGEL *ED4 .PLOT

INPUT BAUD RATE
>4800

INPUT PROBLEM TYPE::MUST BE 1
>1

TYPE IN THE FILE NAME TO READ DATA FROM
>KUGEL*2

UNFORMATTED DATA FILE?
>N

THERE ARE 15 ARRAYS ON FILE KUGEL*2
ARRAY 1: FAST FLUX E>0.18MEV N/ CM**2-SEC
ARRAY 2: PARTICLE ONE FIMAS
ARRAY 3: PARTICLE TWO FIMAS
ARRAY 4: FAST FLUENCE E>0.18MEV N/CM**2
ARRAY 5: POWER DENSITY WATTS PER CUBIC METER
ARRAY 6: LOCAL PRESSURE DROP IN PASCALS
ARRAY 7: LOCAL REYNOLDS NUMBER
ARRAY 8: LOCAL CONVECTIVE COEFFICIENT W/M**2-K
ARRAY 9: BALL POWER KW PER BALL
ARRAY 10: AVERAGE BULK FLUID TEMP DEGREES KELVIN
ARRAY 11: PEBBLE SURFACE TEMPERATURE DEGREES KELVIN
ARRAY 12: FUELED REGION SURFACE TEMP DEGREES KELVIN
ARRAY 13: FUELED REGION CENTRAL TEMP DEGREES KELVIN
ARRAY 14: CONDUCTIVITY OF OUTER COATING W/ M-K
ARRAY 15: CONDUCTIVITY OF FUELED REGION W/ M-K

WHICH ARRAY DO YOU WANT TO PLOT? <= 15
>1

DO YOU WANT THE +X +Y QUADRANT?
>NO

INPUT THE X-Y-Z COORDINATES OF THE VIEW POINT
>10 15 20

DO YOU WANT THE REAL IE (R-Z-P) AXIS PLOTTED
THE VIRTUAL AXIS IE (X-Y-Z) PLOTTED
OR NO COORDINATE AXIS PLOTTED?
>REAL

HIT RETURN TO PLOT
>

C.2. FIGURES

Figure C-1 is a three-dimensional plot of the group 1 flux as calculated by 2DB for a PBR (3000-MW MEU core) from a viewpoint of (10, 15, 20). Figure C-1 has the real axis plotted. Figure C-2 plots the fast fluence as calculated by the KUGEL code. Fluence is best viewed from the coordinates 10, -15, 20. Finally, Fig. C-3 is an example of the fast flux being flipped into the (+X, +Y) quadrant. The coordinates of the viewpoint in Fig. C-3 are (10, 15, 20).

FAST FLUX $E > 0.18 \text{ MeV}$ $\text{N/CM} \times 10^2 \cdot \text{s}$

MAX VALUES

$R = 640$

$Z = 866$

$F(R,Z) = 8.05 \times 10^{13}$

PLOT ID

TIME
11:51:55

DATE
01/FEB/80

VIEWPOINT
(10,15,20)

Fig. C-1. Fast flux distribution

FAST FLUENCE $E > 0.18 \text{ MeV}$ $\text{N/CM} \times 10^2$

MAX VALUES

$R = 545$

$Z = 545$

$F(R,Z) = 3.84 \times 10^{21}$

PLOT ID

TIME

16:26:44

DATE

09/JAN/80

VIEWPOINT

(10,-15,20)

Fig. C-2. Fast fluence distribution

FAST FLUX $E > 0.18 \text{ MeV}$ $\text{N/CM} \times 10^2 \cdot \text{S}$

MAX VALUES

$R = 640$

$Z = 866$

$F(R,Z) = 8.05 \times 10^{13}$

PLOT ID

TIME

11:35:06

DATE

15/JAN/80

VIEWPOINT

(10,15,20)

Fig. C-3. Fast flux distribution in the +X +Y quadrant