CRWMS/M&O

Design Analysis Cover Sheet

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01	Issued Approved with addition of Section 7.5 and 10 Attachments to provide data on a long term low power criticality event within a waste package.

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1. Purpose

This analysis is prepared by the Mined Geologic Disposal System (MGDS) Waste Package Development Department (WPDD) to provide pressurized water reactor (PWR) isotopic composition data as a function of time for use in criticality analyses. The objectives of this evaluation are to generate burnup and decay dependant isotopic inventories and to provide these inventories in a form which can easily be utilized in subsequent criticality calculations.

2. Quality Assurance

The work performed for this analysis is covered by a Waste Package Development (WPD) QAP-2-0 work control Activity Evaluation entitled "Perform Criticality, Thermal, Structural, and Shielding Analyses" (Ref. 5.1). The QAP-2-0 evaluation determined that such activities are subject to Quality Assurance Requirements and Description (QARD) (Ref. 5.2) controls. Applicable procedural controls are listed in the activity evaluation. The waste package is on the Q-List (Ref. 5.3) by direct inclusion by the Department of Energy (DOE), as an item important to safety and waste isolation; because of the direct inclusion of the waste package on the Q-List, a QAP-2-3 evaluation is not required to be conducted.

The work reported in this document is part of the neutronic analysis for the preliminary design; thus, design inputs include unqualified data and unconfirmed assumptions. These design inputs will require subsequent qualification (or superseding inputs) as the waste package design proceeds. This document will not directly support any construction, fabrication, or procurement activity and, therefore, does not require initiation of a TBV (to be verified) number for tracking purposes. However, use of any data or output from this analysis for input into documents supporting procurement, fabrication, or construction is required to be controlled as TBV in accordance with appropriate procedures.

3. Method

The SAS2H sequence in SCALE 4.2 (Ref. 5.4) is used to calculate the isotopic composition, as a function of time, for the PWR criticality design basis fuel assembly. The prime module of this sequence is the ORIGEN-S code. This code does a point depletion of a selected fuel type with user specified irradiation conditions. At the completion of the depletion calculation, decay of the irradiated fuel with user specified time intervals is computed.

4. Design Inputs

The design inputs identified in this document are for preliminary design and shall be treated as unqualified data; the design inputs will require subsequent qualification (or superseding inputs) as the waste package design proceeds. This document will not support any construction, fabrication, or procurement activity and therefore is not required to be procedurally controlled as TBV.

The dimensions listed in this section and throughout this analysis are in the metric units used directly in the neutronics codes to facilitate checking and preclude errors in input.

4.1 Design Parameters

The fuel assembly upon which this calculation is based is the B&W 15 x 15 fuel assembly. The mechanical parameters and typical operating parameters for this assembly type are shown in the two tables below.

Table 4.1-1 Mechanical Parameters of B&W 15x15 Fuel Assembly

Parameter	Value	Units	Metric	Units	Radius (cm)	Ref
Fuel Rods	208	/assbly	208	/assbly		5.5
Fuel Rods on a Lattice Side	15	/side	15	/side		5.5
Guide Tubes	16	/assbly	16	/assbly		5.5
Instrumentation Tubes	1	/assbly	1	/assbly		5.5
Total Guide + Instrument Tubes	17	/assbly	17	/assbly		-
Clad/Tube Material	ZIRC-4		ZIRC-4			5.5
Fuel Pellet OD	0.3686	inches	0.936244	cm	0.468122	5.5
Fuel Stack Height	141.8	inches	360.172	cm		5.5
Mass of U	1023	lb	464	kg		5.6
Mass of UO_2	1160.64	lb	526.38	kg		5.5
Percent of Theoretical Density	95	%	95	%		5.5
Fuel Clad OD	0.430	inches	1.0922	cm	0.5461	5.5
Clad Thickness	0.0265	inches	0.06731	cm		5.5
Fuel Clad ID*	0.377	inches	0.95758	cm	0.47879	-
Fuel Rod Pitch	0.568	inches	1.44272	cm		5.5
Guide Tube OD	0.530	inches	1.3462	cm	0.6731	5.5
Guide Tube Thickness	0.016	inches	0.04064	cm		5.5
Guide Tube ID*	0.498	inches	1.26492	cm	0.63246	-
Instrumentation Tube OD	0.493	inches	1.25222	cm	0.62611	5.5
Fuel Assembly Envelope	8.536	inches	21.6814	cm		5.5

* The inner diameters (IDs) above are calculated by subtracting 2 × thickness from the outer diameter (OD).

The values listed in Table 4.1-2 are preliminary and were obtained through a phone conversation with Framatome Cogema Fuels (formerly B&W Fuel Company) personnel.

Table 4.1-2 Typical Assembly/Core Operating Parameters for a B&W 15x15 Fuel Assembly

Parameter	Value	Units	Metric	Units	Ref
Pellet Average Fuel Temperature	1200	°F	922	K	BWFC
Maximum (peaked) Pellet Average Fuel Temperature	1295	°F	975	K	BWFC
Clad Temperature	50-75 above moderator	°F	28-42 above moderator	K	BWFC
Average Core Exit Moderator Temperature	612	°F	595.4	K	BWFC
Peak Core Exit Moderator Temperature	634	°F	607.6	K	BWFC
Core Exit Moderator Density	-	-	0.6272	g/cm^3	Sat @ 607.6 K
Maximum Beginning of Cycle Boron Concentration	1050	ppm	-	-	BWFC
Number of Assemblies in the Core	177		177		BWFC
Total Core Thermal Power			2568	MWth	BWFC
Typical Power Peaking Across Core	1.2	-	-	-	BWFC
Capacity Factor (lowest expected)	0.6	-	-	-	-
Average Specific Power MW/MTU			31.27	MW/ MTU	BWFC

The theoretical density of UO_2 is 10.96 g/cm^3 as indicated in Table M8.2.1 of the SCALE 4.2 manual (Ref. 5.4).

The atomic weights of isotopes are listed in Table 4.1-3 below (Ref. 5.7).

Avogadro's Number $[N_A] = 0.602252\ (g\text{-}mol)^{-1} \times 10^{24}$ (Ref. 5.7 p. 933). A physical constant is taken to be established fact that requires no additional qualification.

Table 4.1-3 Atomic Weights (Ref 5.7)

Isotope	MCNP ID	Atomic Weight
O-16	8016.50C	15.994915
nat. Mo	42000.50C	95.94
Mo-95	42095.50C	94.905839
Tc-99	43099.50C	98.90627501
Ru-101	44101.50C	100.905576
Rh-103	45103.50C	102.905511
Ag-109	47109.50C	108.904756
nat. Cd	48000.50C	112.4
Cs-133	55133.50C	132.905355
Cs-135	55135.50C	134.90577
Nd-143	60143.50C	142.909779
Nd-145	60145.50C	144.912538
Sm-147	62147.50C	146.914867
Sm-149	62149.50C	148.91718
Sm-150	62150.50C	149.917276
Sm-151	62151.50C	150.919919
Sm-152	62152.50C	151.919756
Eu-151	63151.55C	150.919838
Eu-153	63153.55C	152.921242
Eu-154	63154.50C	153.923053
Gd-155	64155.50C	154.922664
Gd-157	64157.50C	156.924025
U-233	92233.50C	233.039522
U-234	92234.50C	234.040904
U-235	92235.50C	235.043915
U-236	92236.50C	236.045637
U-238	92238.50C	238.05077
Np-237	93237.55C	237.048056
Pu-238	94238.50C	238.049511
Pu-239	94239.55C	239.052146
Pu-240	94240.50C	240.053882
Pu-241	94241.50C	241.056737
Pu-242	94242.50C	242.058725
Pu-243	94243.35C	243.061972
Am-241	95241.50C	241.056714
Am-242m	95242.50C	242.059502
Am-243	95243.50C	243.061367
Cm-243	96243.35C	243.06137
Cm-245	96245.35C	245.065371

4.2 Criteria

This design analysis provides input for criticality analyses which evaluate whether waste package designs meet the repository criticality control design criteria from requirement documents. The *Mined Geological Disposal System Requirements Document* (Ref. 5.8) and the *Engineered Barrier Design Requirements Document* (Ref. 5.9) have criteria which pertain to criticality analyses. Reference 5.9 is the lower level document and contains all of the criteria listed in Reference 5.8. The criteria cited that have bearing on this analysis are the following:

EBDRD Requirements (Ref. 5.9)

"3.2.2.6 CRITICALITY PROTECTION

A. The Engineered Barrier Segment shall be designed to ensure that a nuclear criticality accident is not possible unless at least two unlikely, independent, and concurrent or sequential changes have occurred in the conditions essential to nuclear criticality safety. Each system shall be designed for criticality safety under normal and accident conditions. The calculated effective multiplication factor must be sufficiently below unity to show at least a five percent margin, after allowance for the bias in the method of calculation and the uncertainty in the experiments used to validate the methods of calculation.

[MGDS-RD 3.2.2.6.A] [10CFR60.131(b)(7)]

B. To mitigate the potential for nuclear criticality, the Engineering Barrier Segment shall be designed and constructed to comply with the nuclear criticality requirements specified by DOE order 6430.1A, 1300-4.

[MGDS-RD 3.2.2.6.B] [DOE Order 6430.1A, 1300-4]"

"3.7.1.3 INTERNAL STRUCTURE REQUIREMENTS

A. The internal structure shall provide separation of the waste forms such that nuclear criticality shall not be possible unless at least two unlikely, independent, and concurrent or sequential changes have occurred in the conditions essential to nuclear criticality safety. The calculated effective multiplication factor (k_{eff}) must be sufficiently below unity to show at least a five percent margin after allowance for the bias in the method of calculation and the uncertainty in the experiments used to validate the methods of calculation (TBD). [MGDS-RD 3.2.2.6.A][10CFR60.131(b)(7)]"

This document provides SNF composition data which may potentially be used in subsequent analyses for calculation of k_{eff} values. This document does not directly address the above listed requirements, but provides input for future analyses which may address these requirements. This document will not directly support any construction, fabrication, or procurement activity and therefore is not required to carry TBV (to be verified) or TBD (to be determined) items

associated with criteria to design outputs.

4.3 Assumptions

All assumptions identified in this section will require verification (or superseding assumptions) as the waste package design proceeds and should be treated as unconfirmed items for preliminary design. For this preliminary design, that will not be used to support procurement, fabrication, or construction, the assumptions are clearly identified and traceable to a source, but are not procedurally controlled as TBV.

4.3.1 Principal Isotope (PI) burnup credit is an acceptable criticality control mechanism for the waste package. (CDA Key 009, Ref. 5.10). This assumption is used throughout Section 7.

4.3.2 The Reference PWR fuel assembly selected for conceptual development is the B&W 15 x 15 fuel type, which has been established as one of the more reactive PWR fuel designs under intact fuel assembly and fixed Multi-Purpose Canister (MPC) geometry conditions (Ref. 5.11 p. II.A.3-35). This assumption is used throughout Section 7.

4.3.3 It is assumed that the criticality design basis fuel (DBF) characteristics are 3.0% U-235 enrichment and 20 GWd/MTU burnup. The basis for this assumption is a re-evaluation of the DBF in which scoping analysis indicates this DBF bounds (regarding criticality) 98% of the PWR SNF. This is more appropriate than the previous analysis which designated a primary criticality DBF with characterisitics of 3.75% U-235 enrichment and 32 GWd/MTU and a secondary criticality DBF with characteristics of 3.75% U-235 enrichment and 18 GWd/MTU providing reactivity coverage of 80% and 96% (Ref. 5.12, p. 11), respectively. Re-evaluation of the DBF will be finalized in early FY97 to verifiy these characteristics. This assumption is used throughout Section 7.

4.3.4 For SNF, the list of "Principal Isotopes" previously established (Ref. 5.13 p 4-4) for long-term criticality control was used. The 29 principal isotopes are shown in Table 4.3-1. This assumption is used in Sections 7.3.2 and 7.4.

Table 4.3-1 Principal Long-Term Burnup Credit Isotopes

-	Mo-95	Ru-101	Tc-99	Rh-103
Ag-109	Nd-143	Nd-145	Sm-147	Sm-149
Sm-150	Sm-151	Sm-152	Eu-151	Eu-153
Gd-155	U-233	U-234	U-235	U-236
U-238	Np-237	Pu-238	Pu-239	Pu-240
Pu-241	Pu-242	Am-241	Am-242m	Am-243

4.3.5 The assembly specific power is assumed to be a reasonable "minimum" value of 7.25 MW/assembly. This assumption should maximize the reactivity of the decayed SNF as documented in ORNL/TM-12973 (Ref. 5.14) studies using a similar group of isotopes as included in this analysis. The use of this value will require verification through a parametric analysis applicable to PI burnup credit. This assumption is used in Section 7.3.7.

4.3.6 The maximum core outlet temperature for B&W 15x15 reactor cores (607.6 K) is used and the reactor operating pressure is assumed to be saturation for the purposes of calculating moderator density. Minimizing moderator density should result in maximizing SNF residual reactivity consistent with DOE/RW-0472, Chapter 4 assumptions (Ref. 5.15). The use of this value will require verification through a parametric analysis applicable to PI burnup credit. This assumption is used in Sections 7.3.4 and 7.3.5.

4.3.7 The maximum pellet average temperature is assumed to be 975 K based on personal communication with BWFC personnel. This is a volume weighted average. The use of this value will require verification through a parametric analysis applicable to PI burnup credit. This assumption is used in Section 7.3.2.

4.3.8 The maximum beginning of cycle, hot full power boron concentration is assumed to be 1050 ppm based on personal communication with BWFC personnel. This is the maximum parts per million boron (ppmb) with Xe and Sm equilibrium buildup. The use of this value will require verification through a parametric analysis applicable to PI burnup credit. This assumption is used in Section 7.3.5.

4.3.9 The clad temperature is assumed to be 42 K higher than the moderator temperature based on personal communication with BWFC personnel. The use of this value will require verification through a parametric analysis applicable to PI burnup credit. This assumption is used in Section 7.3.3.

4.3.10 SAS2H/ORIGEN-S is assumed to provide reasonable predictions of isotopic compositions for a low power criticality event in a waste package over several thousand years. This assumptions will require future verification. This assumption is used in Section 7.5.2.

4.3.11 The temperature in a waste package during a long term low power criticality event is assumed to be an average of 373 K and the water density is assumed to be 1.0 g/cm^3. SAS2H allows only a single average temperature to be entered as was required for this case. This assumption is used in Section 7.5.1.

4.3.12 The power level in a waste package during a long term low power criticality event is assumed to be 2.182 kw (Ref. 5.20, p. 55). This assumption is used in Section 7.5.2.

4.4 Codes and Standards

Not Applicable.

5. References

5.1 "Perform Criticality, Thermal, Structural, and Shielding Analyses," Document Identifier (DI) Number: BB0000000-01717-2200-00025 REV 02, Civilian Radioactive Waste Management System (CRWMS) Management and Operating Contractor (M&O).

5.2 *Quality Assurance Requirements and Description* (QARD), DOE/RW-0333P, REV 5, U. S. Department of Energy (USDOE) Office of Civilian Radioactive Waste Management (OCRWM).

5.3 *Yucca Mountain Site Characterization Project Q-List*, YMP/90-55Q, REV 3, Yucca Mountain Site Characterization Project.

5.4 *SCALE 4.2*, RSIC Computer Code Collection, CCC-545, Oak Ridge National Laboratory, September 1994.

5.5 *Preliminary Waste Form Characteristics Report Version 1.0*, UCRL-ID-108314 Rev 1, Lawrence Livermore National Laboratory (LLNL), page 2.1.2.2-6, December 1994.

5.6 *Characteristics of Potential Repository Wastes*, DOE/RW-0184-R1, Volume 1, USDOE OCRWM, page 2A-8, July 1992.

5.7 Benedict, Manson, et al., Nuclear Chemical Engineering, Second Edition, McGraw-Hill Book Company, New York, 1981.

5.8 *Mined Geological Disposal System Requirements Document*, DOE/RW-0404P, DI#: B00000000-00811-1708-00002 REV 02 ICN 1, USDOE OCRWM.

5.9 *Engineered Barrier Design Requirements Document*, YMP/CM-0024, REV 0, ICN 1, Yucca Mountain Site Characterization Project.

5.10 *Controlled Design Assumptions (CDA) Document*, DI#: B00000000-01717-4600-00032 REV 03, CRWMS M&O. (TBV-221-DD)

5.11 "Multi-Purpose Canister (MPC) Implementation Program Conceptual Design Phase Report, Volume II A - MPC Conceptual Design Report", DI#: A20000000-00811-5705-00002 Rev 00, CRWMS M&O, Pages II.A.3-35.

5.12 "Waste Package Design Basis Fuel Analysis," DI#: BBA000000-01717-0200-00121 REV

00, CRWMS M&O.

5.13 "Disposal Criticality Analysis Technical Report," DI#: B00000000-01717-5705-00020 REV 00, CRWMS M&O.

5.14 DeHart, M. D., *Sensitivity and Parametric Evaluations of Significant Aspects of Burnup Credit for PWR Spent Fuel Packages*, ORNL/TM-12973, Oak Ridge National Laboratory, June 1995.

5.15 *Topical Report of Actinide-Only Burnup Credit for PWR Spent Nuclear Fuel Packages*, DOE/RW-0472, USDOE OCRWM, May 1995.

5.16 "Characteristics Data Base (CDB_R)," CSCI#: A00000000-02268-1200-20002 V1.1 REV 01, CRWMS M&O.

5.17 Bowman, S. M., and O. W. Hermann, *SCALE-4 Analysis of Pressurized Water Reactor Critical Configurations: Volume 3 - Surry Unit 1 Cycle 2*, ORNL/TM-12294/V2, Oak Ridge National Laboratory, March 1995, page 18.

5.18 Incropera, F. P., and D. P. Dewitt, Fundamentals of Heat Transfer, John Wiley & Sons, NY, 1981, Table A.6, page 783.

5.19 LaMarsh, J. R., Introduction to Nuclear Engineering, 2nd Edition, Addison-Wesley Publishing Company, Reading, MA, 1983, page 34.

5.20 "Second Waste Package Probabilistic Criticality Analysis: Generation and Evaluation of Internal Criticality Configurations," DI#: BBA000000-01717-2200-00005 REV 00, CRWMS M&O.

6. Use of Computer Software

6.1 Scientific and Engineering Software

SCALE 4.2 CSCI 30004 V1.0 Rev 0. Hewlett Packard Apollo 9000, Series 735 Workstations

The SAS2H sequence of the SCALE 4.2 code system (Ref. 5.4) was used for this analysis. This software was designed for PWR fuel depletion calculations to determine spent fuel isotopic content, decay heat rates, and radioactive source terms. The application to PWR fuel depletion in a reactor is appropriate for the use of this software and falls within the range of validation of this software. The application to long term low power depletion in a waste package does not fall within the range of validation and must be validated in the future. The associated 27BURNUPLIB cross section library was used for these calculations.

A benchmarking and result biasing methodology is in the process of being developed for SAS2H. Bias and uncertainties are applied to the MCNP results which are based on input from SAS2H.

6.2 Computational Support Software

LOTUS 1-2-3, Release 4.01 for Windows was used to calculate the isotopic number densities from the g/assembly output per time step provided in the SAS2H/ORIGEN-S output.

7. Design Analysis

This analysis is performed to provide the isotopic inventories as a function of time for the design basis PWR fuel and to provide the change in activity of the isotopic inventories as the result of a long term low power criticality event in a waste package.

7.1 Background

Previous analyses have been performed based on spent nuclear fuel (SNF) isotopic compositions obtained from the Characteristics Data Base (CDB) (Ref. 5.16). This is a preliminary analysis to generate PWR SNF isotopic compositions using SCALE 4.2 (Ref. 5.4). The data in the CDB was generated based on nominal fuel and operating characteristics. SCALE 4.2 can utilize bounding physical and operating paramaters as input to provide a conservative estimate of isotopic inventories.

7.2 Evaluation Procedure

The evaluation procedure is broken into three major tasks, with subtasks in each. The general procedure is as follows:

1) Parameter (Input) Identification
    a) Develop physical fuel description - mechanical parameters
    b) Obtain typical operating parameters

2) Run SCALE 4.2
    a) Calculate/ determine input parameters from task 1 for burnup calculation
    b) Determine decay time steps required for isotopic inventories

3) Process Output
    a) Using a spreadsheet, calculate isotopic number densities based upon selected output
    b) Format and extract number densities in a form suitable for use in MCNP

The results of task 1 are listed in Section 4.1. Details of tasks 2 and 3 are presented in Sections

7.3 and 7.4, respectively.

7.3 Code Input Calculations

7.3.1 SAS2H Data Block 5 Input

Table 4.1-1 provides the dimensions required for Data Block 5 in the SAS2H input file. The data is shown in the table below. The material numbers are standard (Ref. 5.4, p. S.2.5.10) for SAS2H.

Table 7.3.1-1 - Data Block 5

PITCH	1.44272
FUELOD	0.936244
MFUEL	1
MMOD	3
CLADOD	1.0922
MCLAD	2
CLADID	0.95758
MGAP	0

7.3.2 Fuel Density and Composition Calculations

The effective density to be used in the calculations is determined by dividing the UO_2 mass in Table 4.1-1 by the volume of the fuel in the assembly. The dimensions necessary to calculate the volume of fuel in the assembly are available in Table 4.1-1. The density is calculated as follows:

ρ_{UO2} = UO_2 mass / {π*(fuel pellet radius)^2 * fueled height * # of fuel Rods/assembly}
= 526.38 kg / {π*(0.468122 cm)^2 * 360.172 cm * 208} = 10.206 g/cm^3

The theoretical density of UO_2 is listed as 10.96 g/cm^3 in the SCALE 4.2 database (Ref. 5.4). Therefore, the effective density of fuel is 93.12% of theoretical.

The isotopic distribution of the uranium is determined by the given initial enrichment and the following emperical relationship (Ref. 5.17).

$wt\%_{234} = 0.007731(wt\%_{235})^{1.0837}$,
$wt\%_{236} = 0.0046 wt\%_{235}$,
$wt\%_{238} = 100\% - wt\%_{234} - wt\%_{235} - wt\%_{236}$

Using this formulation, the fresh fuel isotopics for 3.00% U_{235} enrichment was calculated as shown in Table 7.3.2-1. The U-234 and U-238 concentrations were found to be in error in the check of Rev 00. The wt% used was 0.0240 and 96.9622, for U-234 and U-238, respectively. These minor variations compared to the values in Table 7.3.2-1 would have no effect on the

resulting calculations. For consistency, these concentrations were also used in Rev 01 since only variations of the original case were run.

Table 7.3.2-1 Isotopic Breakdown of Uranium for 3% U_{235} Enrichment.

ISOTOPE	WT%
U-234	0.0254
U-235	3.0000
U-236	0.0138
U-238	96.9608

A trace amount of the fission products for which time dependant cross sections are desired are input along with the U mass fractions on the UO_2 "standard composition specification data" cards as described in Section S2.5.4.1 in the SCALE 4.2 manual (Ref. 5.4). The peak fuel temperature (975 K) from Table 4.1-2 is also entered on each of these cards.

7.3.3 Clad Temperature

The clad temperature is calculated by adding the maximum of 42 K to the peak moderator temperature of 607.6 K, as indicated in Table 4.1-2, giving approximately 650 K. Using the peak or maximum is consistent with the temperatures used for the other material regions. This information is listed on a zircaloy standard composition card as material 2.

7.3.4 Moderator Density

The maximum moderator temperature is assumed to provide a minimum moderator density and maximum temperature to result in maximum SNF residual reactivity consistent with Chapter 4 of the Burnup Credit Topical Report (Ref. 5.15). A temperature of 607.6 K is used from Table 4.1-2. The corresponding density is interpolated from the values listed for saturated water (Ref. 5.18) shown in Table 7.3.3-1. The density for 590 K is also included for trending and estimation of the density corresponding to the average exit temperature (595.4 K).

Table 7.3.3-1 Saturated Water Properties from Fundamentals of Heat Transfer (Ref. 5.18)

Temp (K)	Specific Volume (cm^3/g)	Calculated Density (Inverse Specific Volume, g/cm^3)
590	1.482	0.674764
600	1.541	0.648929
610	1.612	0.620347

The density at 607.6 K is determined as shown below:

$$\{(.648929 - .620347)/(600 - 610)\}(607.6 - 600) + .648929 = 0.6272$$

The moderator temperature and density are entered on a H_2O standard composition card as material number 3.

7.3.5 Boron Concentration

As indicated on page S2.5.12 of the SCALE 4.2 manual (Ref. 5.4), the average boron concentration is calculated by dividing the beginning of cycle value by 1.9. The beginning of cycle value is taken from Table 4.1-2 and the average value is determined to be 552.6 ppm.

The boron concentration along with the moderator temperature and density are entered on an arbitrary material card as described in Table M7.4.5 in the SCALE 4.2 manual (Ref. 5.4) as material number 3.

7.3.6 SAS2H Data Block 8 Input

This problem is making use of the larger unit cell capability of SAS2H. Therefore, the inputs for Data Block 8 must be determined. Four zones are modeled using information from Table 4.1-1.

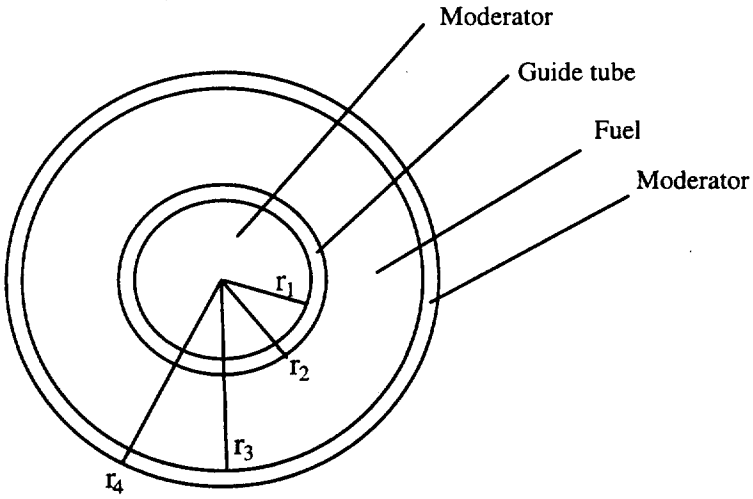


Figure 7.3.6-1 - Larger Unit Cell Model

The first radius, r_1, corresponds to the actual ID of the guide tube (OD of the moderator channel) with a material set to that of the moderator. $r_1 = 0.63246$ cm. The second radius, r_2, is the actual OD of the guide tube with the material set to that of the cladding. $r_2 = 0.67310$ cm. The third radius, r_3, is calculated to give an equal area equivalent to the maximum area of the fuel cell (or the pitch squared). The fourth radius is calculated to preserve the fuel to moderator ratio with the material set to a special number in the code -- 500. The method was determined in consultation with the author of the program at the Radiation Shielding Information Center (RSIC) at Oak Ridge National Laboratory.

The third radius is determined by setting the maximum area of the fuel cell equal to the area of

the equivalent circle.

$$s^2 = \pi \times r_3^2 \qquad r_3^2 = \frac{s^2}{\pi}$$

$$r_3 = \sqrt{\frac{s^2}{\pi}} = \frac{s}{\sqrt{\pi}} = \frac{1.44272}{\sqrt{\pi}} = 0.814 cm$$

where r_3 = the third radius of the larger unit cell encompassing the moderator
s = side of the square (or the rod pitch in this case)

The fourth radius is calculated by taking a ratio of the number of available positions for fuel rods in the assembly to the number of positions used by the guide tubes and instrumentation tubes. For this model, the instrumentation tube is taken as equivalent to a guide tube. This ratio is set equal to the ratio of the areas of the fuel and moderator.

$$\frac{N_{positions}}{N_{guidetubes}} = \frac{\pi \times r_4^2}{\pi \times r_3^2} = \frac{r_4^2}{r_3^2}$$

$$r_4^2 = r_3^2 \times \frac{N_{positions}}{N_{guidetubes}}$$

$$r_4 = \sqrt{r_3^2 \times \frac{N_{positions}}{N_{guidetubes}}} = \sqrt{0.814^2 \times \frac{15 \times 15}{17}} = 2.961 cm$$

where r_4 = fourth radius of the larger unit cell encompassing the fuel
$N_{positions}$ = total number of available positions in the lattice structure
$N_{guidetubes}$ = number of positions taken up by instrument & guide tubes

To summarize and group these radii and material numbers with the keywords used in the Data Block 8 input table in the SAS2H manual, the Table is presented below:

Table 7.3.6-1 Data Block 8

MIXES	3	Material No. for the moderator
RADIUS	0.63246	cm
MIXES	2	Material No. for the Zircaloy
RADIUS	0.67310	cm
MIXES	3	Material No. for the moderator
RADIUS	0.814	cm
MIXES	500	Special Material No. for fuel in the larger unit cell
RADIUS	2.961	cm

7.3.7 Specific Power and Effective Full Power Days Calculations

The calculated average assembly specific power is 2568 MW / 177 assemblies, or 14.51 MW/assembly. The reasonable minimum assembly specific power is calculated as follows:

1. Divide the average specific power by 1.2 (Table 4.1-2) to account for variation in assembly power across the core; 14.51/1.2 = 12.09 MW/assembly.

2. Multiply the minimum core assembly specific power by a capacity factor assumption of 0.6 (Table 4.1-2); 0.6 x 12.09 = 7.25 MW/assembly.

The Effective Full Power Day (EFPD) input is calculated for the desired burnup assuming the minimum assembly power and an assembly uranium loading of 0.464 MTU/assembly (Table 4.1-1): EFPD = Burnup of 20,000 (MWd/MTU) x 0.464 (MTU/assembly) / 7.25 (MW/assembly) = 1280 days. The power and burn values are entered in Data Block 9.

The burnup calculation was divided into 8 substeps through use of the nlib/cyc entry in Data Block 8.

7.3.8 Decay Input

The decay out to 1 million years was run as a separate case from the burnup calculation. The decay case is a stand alone ORIGEN-S problem which utilizes the output from the SAS2H burnup calculation and decays to a number of specified times.

The ORIGEN-S case was run immediately after the corresponding SAS2H case and utilized the final binary cross section file on unit 21 from the SAS2H case. The case input and output are included in Attachment II. The fact that the correct SAS2H generated library is used (unit 21) is verified by comparing the final downtime print of concentrations in the SAS2H output with the concentrations in the corresponding decay times in the ORIGEN-S output (compositions will match). The library contains only the final cycle step (1 position in library). The library unit

number and data position are entered in the input by the following line:

3$$ 21 0 1 e

The decay times are grouped in 10 steps with the units changing from days to years as appropriate. Based on the SAS2H input, the activities and masses listed in the output are per assembly.

7.4 Number Density Calculations Using ORIGEN-S Output

The grams/assembly output per time step from Attachment II was used to calculate the number density of each of the Principal Isotopes using a LOTUS 1-2-3 spreadsheet. The equation for number density is shown below (Ref. 5.19).

$$N = \rho N_A / M$$

where ρ is the physical density in g/cm^3,
N_A is Avagadro's Number - 0.602252E+24 atoms/mole,
and M is the gram atomic weight.

The units of the resulting number density is in atoms/cm^3. The required units for subsequent use are atoms/b-cm where 1 barn equals 10^{-24} cm^2. The calculations in the spreadsheet drops the E+24 from Avagadro's Number to account for the conversion. As a conservatism in the criticality calculations which will use these number densities, the values are adjusted up to a 96% theoretical density.

The input and output from these calculations are shown in Attachment III.

7.5 Effects of Long Term Low Power Criticality in the Waste Package

An additional set of calculations were performed to demonstrate the effects of a long term low power criticality in the waste package per the request of the originators of Ref. 5.20. These calculations required minor modifications of the previous SAS2H and ORIGEN-S inputs.

7.5.1 SAS2H Input Modifications

Minor changes as indicated below were made to the SAS2H input to facilitate cross section production at an appropriate temperature for the criticality effects calculations performed using ORIGEN-S. The nlib/cycle entry was changed to 1 from 8 and ncycles was increased to 9 from 1 in Data Block 8. Instead of 1 cycle at 7.25 MW/assembly for 1280 days, the Data Block 9 entries were changed to eight cycles at 7.25 MW/assembly for 160 days each with 0 down time between each cycle. The ninth cycle was set up with an arbitrary low power level (4.976E-5 MW/assembly) for 1 day with the addition of the following parameters which are assumed

representative of the postulated criticality in the waste package (Assumption 4.3.11).

bfrac (boron fraction)	-	0.
h2ofrac (inverse of the density in reactor calculation to bring density=1 g/cm^3)	-	1.594
temkcyc (modified temperature of all materials in current cycle)	-	373 K

SAS2H is limited to a single average temperature using this method. The input for this case (s3020ucf4.in) is included in Attachment IV. The output is essentially the same as that included in Attachment I for the original SAS2H case.

7.5.2 ORIGEN-S Input Modifications

Four ORIGEN-S cases were run based on the binary output files created by the SAS2H case discussed in Section 7.5.1. The data used includes cross sections and isotopic compositions from the last cycle run.

The first case (s3020ucfo1.in) is the same as the case described in Section 7.3.8 with minor modification to the time step edits and the addition of activity edits in curies for comparison to the long term low power criticality event simulations that follow. The input for this case is included in Attachment V and the activity edits from the output are summarized in Attachment VI.

The second through fourth cases (joklo7.in, joklo8.in, and joklo9.in) have depletion at a power level of 1.039-4 MW/assembly (2.182 kw/waste package divided by 21 assemblies/package) for periods of 10,000, 1000, and 5000 years, respectively, starting 15,000 years after discharge from the reactor cycles. The inputs for these cases are included in Attachments VII through IX. The summarized activity edits for these three cases are included in Attachment X for times after the depletion at a low power level which simulates a criticality event over a long time period.

The summarized grams/assembly table for the 15,000 year decay point of the decay only case is included in Attachment XI. The summarized grams/assembly tables for the criticality cases for the 10 decay times immediately following the criticality are included in Attachment XII.

8. Conclusions

The number densities calculated as indicated in Section 7.4 are shown in Table 8.1 for each isotope for 27 time steps from 1 to 999,999 years.

The activity tables generated in the cases for long term low power criticality simulations in a waste package are included in Attachments VI and X. The neutron flux distribution between the fast, epi-thermal, and thermal groups is provided from s3020ucf4.out (summarized in Attachment XIII) to demonstrate the components of the total flux indicated in Attachment X.

Table 8-1 Number Densities as a Function of TIme for 3.0% Enriched, 20GWD/MT Burnup B&W 15x15 SNF

MCNP ID	1 years	5 years	10 years	20 years	50 years	100 years	200 years
	NUMBER DENSITY (atoms/b-cm)						
8016.50C	4.6947E-02	4.6947E-02	4.6947E-02	4.6947E-02	4.6947E-02	4.6947E-02	4.6947E-02
42095.50C	2.8413E-05	2.8413E-05	2.8413E-05	2.8413E-05	2.8413E-05	2.8413E-05	2.8413E-05
43099.50C	2.8116E-05	2.8116E-05	2.8116E-05	2.8116E-05	2.8116E-05	2.7994E-05	2.7994E-05
44101.50C	2.6008E-05	2.6008E-05	2.6008E-05	2.6008E-05	2.6008E-05	2.6008E-05	2.6008E-05
45103.50C	1.6846E-05	1.6846E-05	1.6846E-05	1.6846E-05	1.6846E-05	1.6846E-05	1.6846E-05
47109.50C	2.4208E-06	2.4208E-06	2.4208E-06	2.4208E-06	2.4208E-06	2.4208E-06	2.4208E-06
60143.50C	2.2660E-05	2.2660E-05	2.2660E-05	2.2660E-05	2.2660E-05	2.2660E-05	2.2660E-05
60145.50C	1.6864E-05	1.6864E-05	1.6864E-05	1.6864E-05	1.6864E-05	1.6864E-05	1.6864E-05
62147.50C	3.6054E-06	6.0472E-06	6.9977E-06	7.3255E-06	7.3501E-06	7.3501E-06	7.3501E-06
62149.50C	1.1479E-07	1.1479E-07	1.1479E-07	1.1479E-07	1.1479E-07	1.1479E-07	1.1479E-07
62150.50C	6.4561E-06	6.4561E-06	6.4561E-06	6.4561E-06	6.4561E-06	6.4561E-06	6.4561E-06
62151.50C	4.9056E-07	4.7620E-07	4.5786E-07	4.2436E-07	3.3661E-07	2.2893E-07	1.0609E-07
63151.55C	5.0253E-09	1.9942E-08	3.7889E-08	7.1869E-08	1.5953E-07	2.6722E-07	3.9006E-07
62152.50C	2.9636E-06	2.9636E-06	2.9636E-06	2.9636E-06	2.9636E-06	2.9636E-06	2.9636E-06
63153.55C	2.1255E-06	2.1255E-06	2.1255E-06	2.1255E-06	2.1255E-06	2.1255E-06	2.1255E-06
64155.50C	3.7532E-08	1.3132E-07	1.9193E-07	2.3467E-07	2.4710E-07	2.4710E-07	2.4710E-07
92233.50C	5.2691E-11	6.1989E-11	7.2321E-11	9.3501E-11	1.6324E-10	2.9755E-10	6.3539E-10
92234.50C	4.1561E-06	4.2024E-06	4.2590E-06	4.3670E-06	4.6447E-06	4.9842E-06	5.3494E-06
92235.50C	3.2267E-04	3.2267E-04	3.2267E-04	3.2267E-04	3.2267E-04	3.2318E-04	3.2318E-04
92236.50C	7.1910E-05	7.1910E-05	7.1910E-05	7.1910E-05	7.2420E-05	7.2420E-05	7.2930E-05
92238.50C	2.2352E-02	2.2352E-02	2.2352E-02	2.2352E-02	2.2352E-02	2.2352E-02	2.2352E-02
93237.55C	6.5004E-06	6.5512E-06	6.6019E-06	6.7543E-06	7.5669E-06	9.0396E-06	1.1782E-05
94238.50C	1.4969E-06	1.4817E-06	1.4210E-06	1.3148E-06	1.0418E-06	7.0293E-07	3.2163E-07
94239.55C	1.3244E-04	1.3244E-04	1.3244E-04	1.3244E-04	1.3244E-04	1.3194E-04	1.3194E-04
94240.50C	3.3700E-05	3.3700E-05	3.3700E-05	3.3650E-05	3.3599E-05	3.3399E-05	3.3048E-05
94241.50C	1.9277E-05	1.5881E-05	1.2485E-05	7.6907E-06	1.8078E-06	1.6131E-07	1.2884E-09
94242.50C	3.5211E-06	3.5211E-06	3.5211E-06	3.5211E-06	3.5211E-06	3.5211E-06	3.5211E-06
95241.50C	1.8028E-06	5.1438E-06	8.5397E-06	1.3134E-05	1.8228E-05	1.8378E-05	1.5781E-05
95242.50C	2.1385E-08	2.0938E-08	2.0440E-08	1.9446E-08	1.6810E-08	1.3129E-08	8.0567E-09
95243.50C	5.0023E-07	5.0023E-07	5.0023E-07	5.0023E-07	4.9528E-07	4.9478E-07	4.9033E-07
Total	7.005442E-02	7.005698E-02	7.005804E-02	7.005831E-02	7.005883E-02	7.005849E-02	7.005861E-02

Table 8-1 Number Densities as a Function of Time for 3.0% Enriched, 20GWD/MT Burnup B&W 15x15 SNF Continued

MCNP ID	300 years	400 years	500 years	1000 years	4000 years	8000 years	10000 years
	NUMBER DENSITY (atoms/b-cm)						
8016.50C	4.6947E-02	4.6947E-02	4.6947E-02	4.6947E-02	4.6947E-02	4.6947E-02	4.6947E-02
42095.50C	2.8413E-05	2.8413E-05	2.8413E-05	2.8413E-05	2.8413E-05	2.8413E-05	2.8413E-05
43099.50C	2.7994E-05	2.7994E-05	2.7994E-05	2.7994E-05	2.7751E-05	2.7386E-05	2.7142E-05
44101.50C	2.6008E-05	2.6008E-05	2.6008E-05	2.6008E-05	2.6008E-05	2.6008E-05	2.6008E-05
45103.50C	1.6846E-05	1.6846E-05	1.6846E-05	1.6846E-05	1.6846E-05	1.6846E-05	1.6846E-05
47109.50C	2.4208E-06	2.4208E-06	2.4208E-06	2.4208E-06	2.4208E-06	2.4208E-06	2.4208E-06
60143.50C	2.2660E-05	2.2660E-05	2.2660E-05	2.2660E-05	2.2660E-05	2.2660E-05	2.2660E-05
60145.50C	1.6864E-05	1.6864E-05	1.6864E-05	1.6864E-05	1.6864E-05	1.6864E-05	1.6864E-05
62147.50C	7.3501E-06	7.3501E-06	7.3501E-06	7.3501E-06	7.3501E-06	7.3501E-06	7.3501E-06
62149.50C	1.1479E-07	1.1479E-07	1.1479E-07	1.1479E-07	1.1479E-07	1.1479E-07	1.1479E-07
62150.50C	6.4561E-06	6.4561E-06	6.4561E-06	6.4561E-06	6.4561E-06	6.4561E-06	6.4561E-06
62151.50C	4.9056E-08	2.2733E-08	1.0529E-08	2.2335E-10	2.0580E-20	8.5350E-34	1.7469E-40
63151.55C	4.4669E-07	4.7301E-07	4.8498E-07	4.9535E-07	4.9615E-07	4.9615E-07	4.9615E-07
62152.50C	2.9636E-06	2.9636E-06	2.9636E-06	2.9636E-06	2.9636E-06	2.9636E-06	2.9636E-06
63153.55C	2.1255E-06	2.1255E-06	2.1255E-06	2.1255E-06	2.1255E-06	2.1255E-06	2.1255E-06
64155.50C	2.4710E-07	2.4710E-07	2.4710E-07	2.4710E-07	2.4710E-07	2.4710E-07	2.4710E-07
92233.50C	1.0538E-09	1.5446E-09	2.0973E-09	5.4757E-09	3.1150E-08	6.6122E-08	8.3169E-08
92234.50C	5.5552E-06	5.6066E-06	5.6580E-06	5.7095E-06	5.6580E-06	5.6066E-06	5.5552E-06
92235.50C	3.2369E-04	3.2421E-04	3.2472E-04	3.2625E-04	3.3701E-04	3.4981E-04	3.5596E-04
92236.50C	7.2930E-05	7.3440E-05	7.3950E-05	7.5480E-05	8.3640E-05	9.1290E-05	9.3840E-05
92238.50C	2.2352E-02	2.2352E-02	2.2352E-02	2.2352E-02	2.2352E-02	2.2352E-02	2.2352E-02
93237.55C	1.4118E-05	1.6099E-05	1.7825E-05	2.3208E-05	2.7525E-05	2.7525E-05	2.7474E-05
94238.50C	1.4767E-07	6.8270E-08	3.1556E-08	7.7373E-10	8.4453E-17	2.4426E-25	1.3148E-29
94239.55C	1.3144E-04	1.3093E-04	1.3043E-04	1.2892E-04	1.1834E-04	1.0575E-04	9.9710E-05
94240.50C	3.2697E-05	3.2396E-05	3.2045E-05	3.0390E-05	2.2115E-05	1.4493E-05	1.1735E-05
94241.50C	1.3983E-11	3.7655E-12	3.6556E-12	3.5108E-12	2.7467E-12	1.9826E-12	1.6830E-12
94242.50C	3.5211E-06	3.5211E-06	3.5211E-06	3.5161E-06	3.4962E-06	3.4714E-06	3.4614E-06
95241.50C	1.3434E-05	1.1486E-05	9.7882E-06	4.3797E-06	3.5857E-08	1.2135E-10	5.5433E-11
95242.50C	4.9136E-09	3.0088E-09	1.8401E-09	1.5765E-10	6.2166E-17	1.7904E-25	9.5984E-30
95243.50C	4.8537E-07	4.8092E-07	4.7646E-07	4.5467E-07	3.4273E-07	2.3526E-07	1.9514E-07
Total	7.005827E-02	7.005849E-02	7.005870E-02	7.005857E-02	7.005821E-02	7.005790E-02	7.005741E-02

Table 8-1 Number Densities as a Function of TIme for 3.0% Enriched, 20GWD/MT Burnup B&W 15x15 SNF Continued

MCNP ID	14000 years	18000 years	22000 years	26000 years	30000 years	36000 years	45000 years
	NUMBER DENSITY (atoms/b-cm)						
8016.50C	4.6947E-02	4.6947E-02	4.6947E-02	4.6947E-02	4.6947E-02	4.6947E-02	4.6947E-02
42095.50C	2.8413E-05	2.8413E-05	2.8413E-05	2.8413E-05	2.8413E-05	2.8413E-05	2.8413E-05
43099.50C	2.6777E-05	2.6412E-05	2.6047E-05	2.5803E-05	2.5438E-05	2.4951E-05	2.4221E-05
44101.50C	2.6008E-05	2.6008E-05	2.6008E-05	2.6008E-05	2.6008E-05	2.6008E-05	2.6008E-05
45103.50C	1.6846E-05	1.6846E-05	1.6846E-05	1.6846E-05	1.6846E-05	1.6846E-05	1.6846E-05
47109.50C	2.4208E-06	2.4208E-06	2.4208E-06	2.4208E-06	2.4208E-06	2.4208E-06	2.4208E-06
60143.50C	2.2660E-05	2.2660E-05	2.2660E-05	2.2660E-05	2.2660E-05	2.2660E-05	2.2660E-05
60145.50C	1.6864E-05	1.6864E-05	1.6864E-05	1.6864E-05	1.6864E-05	1.6864E-05	1.6864E-05
62147.50C	7.3501E-06	7.3501E-06	7.3501E-06	7.3501E-06	7.3501E-06	7.3501E-06	7.3501E-06
62149.50C	1.1479E-07	1.1479E-07	1.1479E-07	1.1479E-07	1.1479E-07	1.1479E-07	1.1479E-07
62150.50C	6.4561E-06	6.4561E-06	6.4561E-06	6.4561E-06	6.4561E-06	6.4561E-06	6.4561E-06
62151.50C	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
63151.55C	4.9615E-07	4.9615E-07	4.9615E-07	4.9615E-07	4.9615E-07	4.9615E-07	4.9615E-07
62152.50C	2.9636E-06	2.9636E-06	2.9636E-06	2.9636E-06	2.9636E-06	2.9636E-06	2.9636E-06
63153.55C	2.1255E-06	2.1255E-06	2.1255E-06	2.1255E-06	2.1255E-06	2.1255E-06	2.1255E-06
64155.50C	2.4710E-07	2.4710E-07	2.4710E-07	2.4710E-07	2.4710E-07	2.4710E-07	2.4710E-07
92233.50C	1.1675E-07	1.5032E-07	1.8287E-07	2.1490E-07	2.4641E-07	2.9238E-07	3.5902E-07
92234.50C	5.5037E-06	5.5037E-06	5.4523E-06	5.4009E-06	5.3494E-06	5.2465E-06	5.1437E-06
92235.50C	3.6672E-04	3.7645E-04	3.8515E-04	3.9284E-04	3.9949E-04	4.0820E-04	4.1896E-04
92236.50C	9.7920E-05	1.0098E-04	1.0251E-04	1.0353E-04	1.0455E-04	1.0506E-04	1.0557E-04
92238.50C	2.2352E-02	2.2352E-02	2.2352E-02	2.2352E-02	2.2352E-02	2.2352E-02	2.2352E-02
93237.55C	2.7474E-05	2.7423E-05	2.7373E-05	2.7373E-05	2.7322E-05	2.7271E-05	2.7170E-05
94238.50C	3.7877E-38	1.0923E-46	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
94239.55C	8.9135E-05	7.9063E-05	7.0502E-05	6.2948E-05	5.6401E-05	4.7287E-05	3.6510E-05
94240.50C	7.6727E-06	5.0650E-06	3.3048E-06	2.1664E-06	1.4192E-06	7.5223E-07	2.9136E-07
94241.50C	1.2135E-12	8.7894E-13	6.3423E-13	4.5645E-13	3.2960E-13	2.0176E-13	9.6883E-14
94242.50C	3.4365E-06	3.4067E-06	3.3818E-06	3.3570E-06	3.3321E-06	3.2973E-06	3.2426E-06
95241.50C	3.8254E-11	2.7567E-11	1.9926E-11	1.4383E-11	1.0387E-11	6.3923E-12	2.9265E-12
95242.50C	2.7701E-38	8.0070E-47	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
95243.50C	1.3373E-07	9.2122E-08	6.2900E-08	4.3287E-08	2.9717E-08	1.6889E-08	7.2311E-09
Total	7.005714E-02	7.005680E-02	7.005623E-02	7.005593E-02	7.005584E-02	7.005463E-02	7.005373E-02

Table 8-1 Number Densities as a Function of Time for 3.0% Enriched, 20GWD/MT Burnup B&W 15x15 SNF Continued

MCNP ID	60000 years	70000 years	100000 years	250000 years	500000 years	999999 years
	NUMBER DENSITY (atoms/b-cm)					
8016.50C	4.6947E-02	4.6947E-02	4.6947E-02	4.6947E-02	4.6947E-02	4.6947E-02
42095.50C	2.8413E-05	2.8413E-05	2.8413E-05	2.8413E-05	2.8413E-05	2.8413E-05
43099.50C	2.3004E-05	2.2274E-05	2.0205E-05	1.2293E-05	5.4285E-06	1.0516E-06
44101.50C	2.6008E-05	2.6008E-05	2.6008E-05	2.6008E-05	2.6008E-05	2.6008E-05
45103.50C	1.6846E-05	1.6846E-05	1.6846E-05	1.6846E-05	1.6846E-05	1.6846E-05
47109.50C	2.4208E-06	2.4208E-06	2.4208E-06	2.4208E-06	2.4208E-06	2.4208E-06
60143.50C	2.2660E-05	2.2660E-05	2.2660E-05	2.2660E-05	2.2660E-05	2.2660E-05
60145.50C	1.6864E-05	1.6864E-05	1.6864E-05	1.6864E-05	1.6864E-05	1.6864E-05
62147.50C	7.3501E-06	7.3501E-06	7.3501E-06	7.3501E-06	7.3501E-06	7.3501E-06
62149.50C	1.1479E-07	1.1479E-07	1.1479E-07	1.1479E-07	1.1479E-07	1.1479E-07
62150.50C	6.4561E-06	6.4561E-06	6.4561E-06	6.4561E-06	6.4561E-06	6.4561E-06
62151.50C	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
63151.55C	4.9615E-07	4.9615E-07	4.9615E-07	4.9615E-07	4.9615E-07	4.9615E-07
62152.50C	2.9636E-06	2.9636E-06	2.9636E-06	2.9636E-06	2.9636E-06	2.9636E-06
63153.55C	2.1255E-06	2.1255E-06	2.1255E-06	2.1255E-06	2.1255E-06	2.1255E-06
64155.50C	2.4710E-07	2.4710E-07	2.4710E-07	2.4710E-07	2.4710E-07	2.4710E-07
92233.50C	4.6389E-07	5.3208E-07	7.0771E-07	1.2966E-06	1.6324E-06	1.5756E-06
92234.50C	5.0048E-06	4.8968E-06	4.5984E-06	3.4360E-06	2.3198E-06	1.4968E-06
92235.50C	4.3176E-04	4.3791E-04	4.4815E-04	4.5532E-04	4.5532E-04	4.5532E-04
92236.50C	1.0557E-04	1.0557E-04	1.0557E-04	1.0506E-04	1.0455E-04	1.0251E-04
92238.50C	2.2352E-02	2.2352E-02	2.2352E-02	2.2352E-02	2.2352E-02	2.2352E-02
93237.55C	2.7068E-05	2.6966E-05	2.6713E-05	2.5443E-05	2.3462E-05	1.9958E-05
94238.50C	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
94239.55C	2.3719E-05	1.7827E-05	7.5034E-06	1.0072E-07	7.6041E-11	2.3215E-15
94240.50C	5.9677E-08	2.0761E-08	8.7258E-10	1.1735E-16	3.8163E-18	5.1653E-18
94241.50C	2.8516E-14	1.2635E-14	1.0937E-15	5.2936E-21	7.3911E-30	0.0000E+00
94242.50C	3.1531E-06	3.0934E-06	2.9293E-06	2.2181E-06	1.3925E-06	5.5204E-07
95241.50C	8.5896E-13	3.8054E-13	3.2910E-14	1.5981E-19	2.3472E-28	4.5645E-46
95242.50C	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
95243.50C	1.7681E-09	6.8844E-10	4.1108E-11	7.5282E-16	7.1320E-16	6.9834E-16
Total	7.005206E-02	7.005135E-02	7.004864E-02	7.003743E-02	7.002636E-02	7.001472E-02

9. Attachments

The following attachments are case input and output files and spreadsheets as listed. The name of the file is listed in parenthesis. The first three attachments are included in Revision 00 of this document and are unchanged by Revision 01.

I. SAS2H Burnup Case Output (s3020ucf.out) 2/16/96 825 pages
II. ORIGEN-S Decay Case Output (s3020ucfo.out) 2/16/96 122 pages
III. Spreadsheet for Number Density Calculation 3/31/96 18 pages
IV. Modified SAS2H Burnup Case Input (s3020ucf4.in) 3/7/96 2 pages
V. Modified ORIGEN-S Decay Case Input (s3020ucfo1.in) 3/12/96 1 page
VI. Modified ORIGEN-S Decay Case Output Summary (decay.sum) 3/29/96 93 pages
VII. Modified ORIGEN-S 10,000 year Criticality Case Input (joklo7.in) 3/14/96 1 page
VIII. Modified ORIGEN-S 1000 year Criticality Case Input (joklo8.in) 3/14/96 1 page
IX. Modified ORIGEN-S 5000 year Criticality Case Input (joklo9.in) 3/14/96 1 page
X. Modified ORIGEN-S Criticality Cases Output Summary (joklo8.sum) 3/14/96 95 pages
XI. Modified ORIGEN Decay Case Output Summary of grams/assembly tables (s3020ucfO1.sum) 8/8/96 19 pages
XII. Modified ORIGEN Criticality Cases Output Summary of grams/assembly tables (joklo8.grams) 8/9/96 51 pages
XIII. Modified SAS2H Burnup Case Flux Output Summary (flux) 3/12/96 1 page

```
*                                                                      *
*                  scale4.2 bulletin board                             *
*                  -------- -------- -----                             *
*                                                                      *
*     welcome to the configuration controlled version of scale4.2.     *
*     any problems should be reported to kay martin at 4-9213.         *
*                                                                      *
*     updates that have been made from version 4.1 to 4.2 include:     *
*                                                                      *
*     nitawl: parameter added to prevent exponent underflows for very  *
*     dilute resonance calculations on workstation. (mrr 93-011)       *
*                                                                      *
*     nitawl: corrected discrepancies in maximum fractional energy loss*
*     of neutron in admixed moderator calculation and simpson rule     *
*     calculation of collision density as documented in "improved      *
*     calculation of flux shapes with the resonance shielding code     *
*     nitawl", by j. oppe, ecn-i--93-003. affects all calculations.    *
*     impact will vary, but is insignificant for hydrogen-moderated    *
*     systems. (mrr 93-030)                                            *
*                                                                      *
*     sas4: added option of axial source profile input for both radial *
*     and axial dose calculations. also added option idr = 2 for       *
*     estimation to point detectors from collisions in both top and    *
*     bottom halves of geometry. (mrr 92-016)                          *
*                                                                      *
*     morse: modifications made for compatibility with the new options in*
*     sas4 (i.e., the axial source profile input option and            *
*     the option idr = 2 for estimation to point detectors from collisions*
*     in both top and bottom halves of geometry). (mrr 92-016)         *
*                                                                      *
*     csas & keno-v.a: error checking during input processing was added*
*     so that these modules terminate with an error message if input   *
*     errors are encountered. (mrr 93-013, 93-014, 93-015, 93-018)     *
*                                                                      *
*     keno-v.a: corrections made for applying differential albedo      *
*     boundary conditions to supergrouped problems where global unit   *
*     contains only an array specification. effect on keff is very large*
*     for this type of problem. (mrr 93-033)                           *
*                                                                      *
*     keno-v.a: corrected an error introduced with modification on may 24,*
*     1993 (mrr 93-033). this error affected problems with mirror or   *
*     periodic boundary conditions and could cause problem to loop, fail,*
*     or run incorrectly.                                              *
*                                                                      *
*     xsdrnpm: corrected calculation of number of direct access data   *
*     blocks needed to weight the cross sections to prevent occasional *
*     failure. improved calculation of balance tables. (mrr 93-021)    *
*                                                                      *
*     origen-s: modified program to read combined binary libraries that*
*     include multi-cycle cross sections. add option to edit binary    *
*     library. (mrr 93-026)                                            *
*                                                                      *
*     sas2: modified to produce combined binary libraries for origen-s.*
*     (mrr 93-027)                                                     *
*                                                                      *
*     couple: modified to allow combined binary libraries to be made by*
*     sas2. (mrr 93-031)                                               *
*                                                                      *
*     origen-s couple, sas2: modified programs to accept the new updated*
```

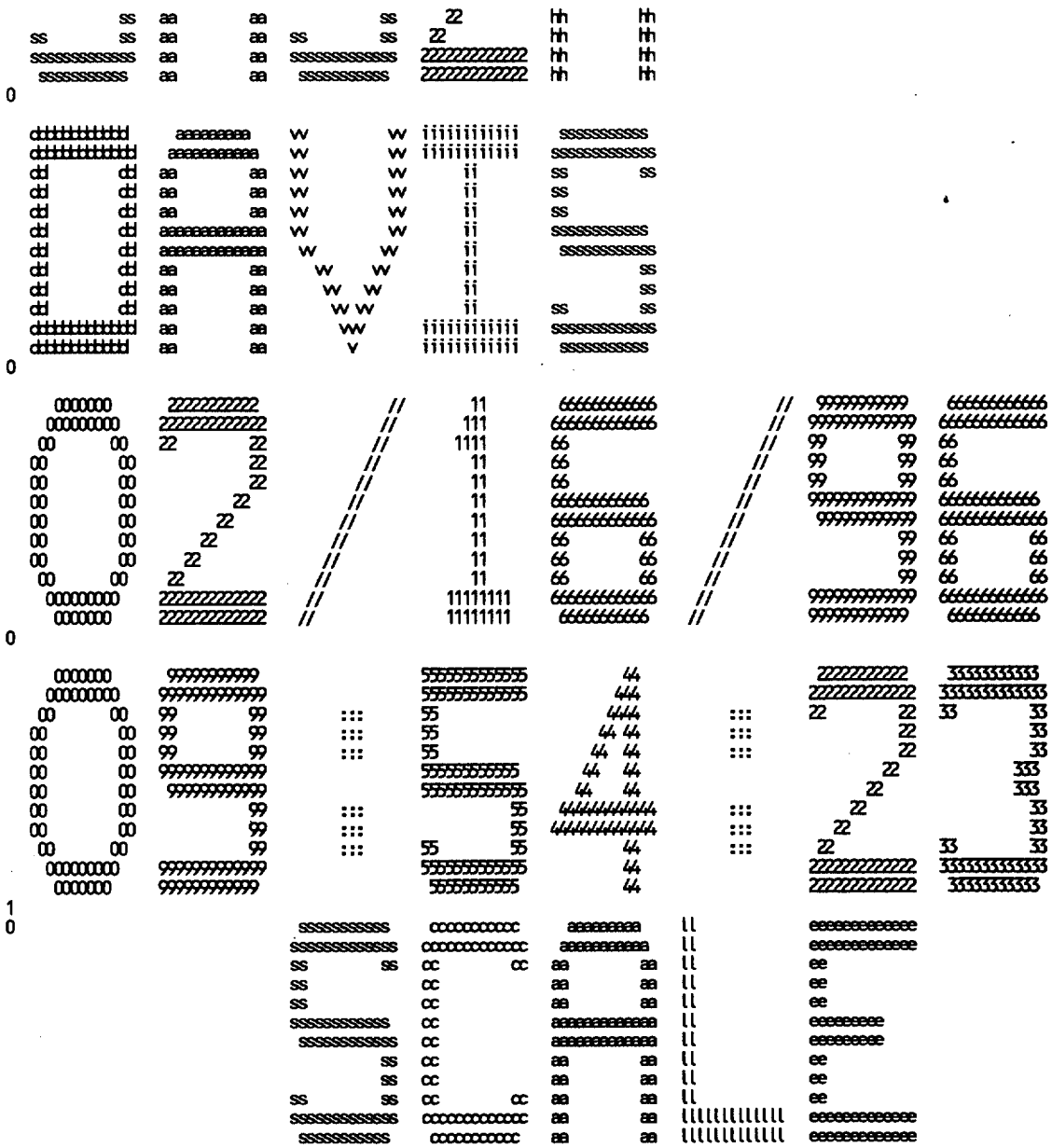
```
*     and expanded decay data and fission product yield libraries. (mrr      *
*     92-088, 92-025, 92-026)                                                *
*                                                                            *
*     origen-s libraries: the six standard origen-s card image libraries     *
*     have been replaced by two new libraries, end6dec and xsectpho.         *
*     end6dec contains the updated and expanded decay data library based     *
*     on endf/b-vi data. xsectpho contains the basic cross section and       *
*     photon spectra data and updated fission product yield data based on    *
*     endf/b-v data. (drr 92-006, 007, 008, 009, 010, and drr 93-001,        *
*     002, 003, 006, 008, 009)                                               *
*                                                                            *
*     std. comp. library: in drr 92-033, the following nuclides were         *
*     changed to turn on resonance processing flag but should not have       *
*     been changed: niss, fess, mnss, crss, niirconel, crirconel,            *
*     feirconel. flags for these nuclides have now been returned to off.     *
*     (drr 93-014)                                                           *
*                                                                            *
*     heating7: replaced heating6 with version 7.2. (mrr 93-038)             *
*                                                                            *
*     htas1: updated for compatibility with heating7 and to interact         *
*     effectively with ocular. fin effectiveness technique was added.        *
*     (mrr 93-036)                                                           *
*                                                                            *
*     ocular: made compatible with heating7 and htas1 on mainframe and       *
*     workstation. (mrr 93-037)                                              *
*                                                                            *
*     sas2: corrected so that 'parm=skipshipdata' would work on              *
*     workstation. (mrr 93-051)                                              *
*                                                                            *
*     aim: ft47ft001 is no longer require for aim to execute on              *
*     workstation. (mrr 93-052)                                              *
*                                                                            *
*     27group, 27burnup, and 218group - these libraries have been            *
*     updated to correct an error found in the chlorine cross-sections.      *
*     (drr93-022)                                                            *
*                                                                            *
*     bonami: corrected so that a case with a number density of zero         *
*     for a nuclide that has bondarenko data will run without failing.       *
*     (mrr 93-060)                                                           *
*                                                                            *
*     csas: corrected calculation of dancoff correction factor for           *
*     cylindrical cells. note that previous calculations of small            *
*     cylindrical cells (o.d. < 0.3 cm) gave non-conservative keff           *
*     values. also corrected dancoff factor for multiregion slab             *
*     cell with vacuum boundary conditions to be set to zero.                *
*     (mrr 93-065)                                                           *
*                                                                            *
*     csas, sas1, sas2, sas3, sas4: error in miplib was corrected. for       *
*     resonance materials that are not part of the unit cell in lattice-     *
*     cell or multiregion problems, the dancoff factor defaulted to -1.      *
*     check your nitawl output in any previous scale-4.2 calculations        *
*     for dancoff factors =-1.                                               *
*     (mrr 93-070)                                                           *
*                                                                            *
******************************************************************************
1         primary module access and input record ( scale driver - 10/01/86 - 14:00 )
-  module sas2h    will be called
     SAS2H: Babcock Wilcox 15x15, 3.00wt%, 20gwd/mtu burn High Temp
     27burnuplib    latticecell
     '
```

```
' mixtures of fuel-pin-unit-cell:
'   denmass UO2/ Volume assembly = 526377.3 g/5.15752#E4
uo2 1 den=10.2060 1 975 92235 3.00 92234 0.0240 92236 0.0138 92238 96.9622 end
kr-83     1 0 1-20 975 end
kr-85     1 0 1-20 975 end
sr-90     1 0 1-20 975 end
 y-89     1 0 1-20 975 end
mo-95     1 0 1-20 975 end
zr-93     1 0 1-20 975 end
zr-94     1 0 1-20 975 end
zr-95     1 0 1-20 975 end
nb-94     1 0 1-20 975 end
tc-99     1 0 1-20 975 end
rh-103    1 0 1-20 975 end
rh-105    1 0 1-20 975 end
ru-101    1 0 1-20 975 end
ru-106    1 0 1-20 975 end
pd-105    1 0 1-20 975 end
pd-108    1 0 1-20 975 end
ag-109    1 0 1-20 975 end
sb-124    1 0 1-20 975 end
xe-131    1 0 1-20 975 end
xe-132    1 0 1-20 975 end
xe-135    1 0 1-20 975 end
xe-136    1 0 1-20 975 end
cs-134    1 0 1-20 975 end
cs-135    1 0 1-20 975 end
cs-137    1 0 1-20 975 end
ba-136    1 0 1-20 975 end
la-139    1 0 1-20 975 end
pr-141    1 0 1-20 975 end
pr-143    1 0 1-20 975 end
ce-144    1 0 1-20 975 end
nd-143    1 0 1-20 975 end
nd-145    1 0 1-20 975 end
pm-147    1 0 1-20 975 end
pm-148    1 0 1-20 975 end
nd-147    1 0 1-20 975 end
sm-147    1 0 1-20 975 end
sm-149    1 0 1-20 975 end
sm-150    1 0 1-20 975 end
sm-151    1 0 1-20 975 end
sm-152    1 0 1-20 975 end
gd-155    1 0 1-20 975 end
eu-153    1 0 1-20 975 end
eu-154    1 0 1-20 975 end
eu-155    1 0 1-20 975 end
zircalloy 2   1.0  650 end
h2o       3 den=0.6272 1 607.6 end
arbm-bormod 0.6272 1 1 0 0 5000 100 3 552.6e-6 607.6 end
'
' 1050 ppm boron
' - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
end comp
'
' - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
'
'  fuel-pin-cell geometry:
'
squarepitch  1.44272  0.936244 1 3 1.0922 2 0.95758 0 end
```

```
      '
      '- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
      '
      '
      '  assembly and cycle parameters:
      '
      rpin/assm=208 fuelngth=360.172 ncycles=1 nlib/cyc=8
      printlevel=5 irplevel=2 numztotal=4  end
      3 0.63246 2 0.67310 3 0.814 500 2.961
      power=7.25 burn=1280 down=1826.25
        end
0   secondary module c0c008   has been called.
0   module c0c008   is finished. completion code    0. cpu time used    1.00 (seconds).
0   secondary module c0c002   has been called.
0   module c0c002   is finished. completion code    0. cpu time used   20.00 (seconds).
0   secondary module c0c001   has been called.
0   module c0c001   is finished. completion code    0. cpu time used    3.00 (seconds).
0   secondary module c0c008   has been called.
0   module c0c008   is finished. completion code    0. cpu time used    1.00 (seconds).
0   secondary module c0c002   has been called.
0   module c0c002   is finished. completion code    0. cpu time used    1.00 (seconds).
0   secondary module c0c001   has been called.
0   module c0c001   is finished. completion code    0. cpu time used    2.00 (seconds).
0   secondary module c0c005   has been called.
0   module c0c005   is finished. completion code    0. cpu time used    1.00 (seconds).
0   secondary module c0c004   has been called.
0   module c0c004   is finished. completion code    0. cpu time used    1.00 (seconds).
0   secondary module c0c008   has been called.
0   module c0c008   is finished. completion code    0. cpu time used    1.00 (seconds).
0   secondary module c0c002   has been called.
0   module c0c002   is finished. completion code    0. cpu time used   20.00 (seconds).
0   secondary module c0c001   has been called.
0   module c0c001   is finished. completion code    0. cpu time used    2.00 (seconds).
0   secondary module c0c008   has been called.
0   module c0c008   is finished. completion code    0. cpu time used     .00 (seconds).
0   secondary module c0c002   has been called.
0   module c0c002   is finished. completion code    0. cpu time used    1.00 (seconds).
0   secondary module c0c001   has been called.
0   module c0c001   is finished. completion code    0. cpu time used    2.00 (seconds).
0   secondary module c0c005   has been called.
0   module c0c005   is finished. completion code    0. cpu time used    1.00 (seconds).
0   secondary module c0c004   has been called.
0   module c0c004   is finished. completion code    0. cpu time used    2.00 (seconds).
0   secondary module c0c008   has been called.
0   module c0c008   is finished. completion code    0. cpu time used     .00 (seconds).
0   secondary module c0c002   has been called.
0   module c0c002   is finished. completion code    0. cpu time used   22.00 (seconds).
0   secondary module c0c001   has been called.
0   module c0c001   is finished. completion code    0. cpu time used    3.00 (seconds).
0   secondary module c0c008   has been called.
0   module c0c008   is finished. completion code    0. cpu time used     .00 (seconds).
0   secondary module c0c002   has been called.
0   module c0c002   is finished. completion code    0. cpu time used    2.00 (seconds).
0   secondary module c0c001   has been called.
0   module c0c001   is finished. completion code    0. cpu time used    2.00 (seconds).
0   secondary module c0c005   has been called.
0   module c0c005   is finished. completion code    0. cpu time used     .00 (seconds).
0   secondary module c0c004   has been called.
0   module c0c004   is finished. completion code    0. cpu time used    3.00 (seconds).
0   secondary module c0c008   has been called.
```

```
0  module c0c008  is finished. completion code    0. cpu time used     .00 (seconds).
0  secondary module c0c002  has been called.
0  module c0c002  is finished. completion code    0. cpu time used   20.00 (seconds).
0  secondary module c0c001  has been called.
0  module c0c001  is finished. completion code    0. cpu time used    2.00 (seconds).
0  secondary module c0c008  has been called.
0  module c0c008  is finished. completion code    0. cpu time used     .00 (seconds).
0  secondary module c0c002  has been called.
0  module c0c002  is finished. completion code    0. cpu time used    1.00 (seconds).
0  secondary module c0c001  has been called.
0  module c0c001  is finished. completion code    0. cpu time used    2.00 (seconds).
0  secondary module c0c005  has been called.
0  module c0c005  is finished. completion code    0. cpu time used    1.00 (seconds).
0  secondary module c0c004  has been called.
0  module c0c004  is finished. completion code    0. cpu time used    2.00 (seconds).
0  secondary module c0c008  has been called.
0  module c0c008  is finished. completion code    0. cpu time used    1.00 (seconds).
0  secondary module c0c002  has been called.
0  module c0c002  is finished. completion code    0. cpu time used   20.00 (seconds).
0  secondary module c0c001  has been called.
0  module c0c001  is finished. completion code    0. cpu time used    2.00 (seconds).
0  secondary module c0c008  has been called.
0  module c0c008  is finished. completion code    0. cpu time used    1.00 (seconds).
0  secondary module c0c002  has been called.
0  module c0c002  is finished. completion code    0. cpu time used    1.00 (seconds).
0  secondary module c0c001  has been called.
0  module c0c001  is finished. completion code    0. cpu time used    2.00 (seconds).
0  secondary module c0c005  has been called.
0  module c0c005  is finished. completion code    0. cpu time used    1.00 (seconds).
0  secondary module c0c004  has been called.
0  module c0c004  is finished. completion code    0. cpu time used    2.00 (seconds).
0  secondary module c0c008  has been called.
0  module c0c008  is finished. completion code    0. cpu time used    1.00 (seconds).
0  secondary module c0c002  has been called.
0  module c0c002  is finished. completion code    0. cpu time used   20.00 (seconds).
0  secondary module c0c001  has been called.
0  module c0c001  is finished. completion code    0. cpu time used    2.00 (seconds).
0  secondary module c0c008  has been called.
0  module c0c008  is finished. completion code    0. cpu time used    1.00 (seconds).
0  secondary module c0c002  has been called.
0  module c0c002  is finished. completion code    0. cpu time used    1.00 (seconds).
0  secondary module c0c001  has been called.
0  module c0c001  is finished. completion code    0. cpu time used    2.00 (seconds).
0  secondary module c0c005  has been called.
0  module c0c005  is finished. completion code    0. cpu time used     .00 (seconds).
0  secondary module c0c004  has been called.
0  module c0c004  is finished. completion code    0. cpu time used    3.00 (seconds).
0  secondary module c0c008  has been called.
0  module c0c008  is finished. completion code    0. cpu time used     .00 (seconds).
0  secondary module c0c002  has been called.
0  module c0c002  is finished. completion code    0. cpu time used   20.00 (seconds).
0  secondary module c0c001  has been called.
0  module c0c001  is finished. completion code    0. cpu time used    2.00 (seconds).
0  secondary module c0c008  has been called.
0  module c0c008  is finished. completion code    0. cpu time used     .00 (seconds).
0  secondary module c0c002  has been called.
0  module c0c002  is finished. completion code    0. cpu time used    1.00 (seconds).
0  secondary module c0c001  has been called.
0  module c0c001  is finished. completion code    0. cpu time used    2.00 (seconds).
0  secondary module c0c005  has been called.
```

```
0   module c0c005   is finished. completion code     0. cpu time used     1.00 (seconds).
0   secondary module c0c004   has been called.
0   module c0c004   is finished. completion code     0. cpu time used     2.00 (seconds).
0   secondary module c0c008   has been called.
0   module c0c008   is finished. completion code     0. cpu time used     1.00 (seconds).
0   secondary module c0c002   has been called.
0   module c0c002   is finished. completion code     0. cpu time used    20.00 (seconds).
0   secondary module c0c001   has been called.
0   module c0c001   is finished. completion code     0. cpu time used     3.00 (seconds).
0   secondary module c0c008   has been called.
0   module c0c008   is finished. completion code     0. cpu time used      .00 (seconds).
0   secondary module c0c002   has been called.
0   module c0c002   is finished. completion code     0. cpu time used     1.00 (seconds).
0   secondary module c0c001   has been called.
0   module c0c001   is finished. completion code     0. cpu time used     2.00 (seconds).
0   secondary module c0c005   has been called.
0   module c0c005   is finished. completion code     0. cpu time used     1.00 (seconds).
0   secondary module c0c004   has been called.
0   module c0c004   is finished. completion code     0. cpu time used     2.00 (seconds).
0   secondary module c0c008   has been called.
0   module c0c008   is finished. completion code     0. cpu time used     1.00 (seconds).
0   secondary module c0c002   has been called.
0   module c0c002   is finished. completion code     0. cpu time used    20.00 (seconds).
0   secondary module c0c001   has been called.
0   module c0c001   is finished. completion code     0. cpu time used     2.00 (seconds).
0   secondary module c0c008   has been called.
0   module c0c008   is finished. completion code     0. cpu time used     1.00 (seconds).
0   secondary module c0c002   has been called.
0   module c0c002   is finished. completion code     0. cpu time used     1.00 (seconds).
0   secondary module c0c001   has been called.
0   module c0c001   is finished. completion code     0. cpu time used     2.00 (seconds).
0   secondary module c0c005   has been called.
0   module c0c005   is finished. completion code     0. cpu time used      .00 (seconds).
0   secondary module c0c004   has been called.
0   module c0c004   is finished. completion code     0. cpu time used    13.00 (seconds).
0   module sas2h    is finished. completion code     0. cpu time used   281.00 (seconds).
0requested parm=halt8,skipcellwt,skipshipdata
  pass= 0, exec halts after pass  8

0                    90      unit no. of master storage data
0                    96      unit no. of bonami input data
0                    97      unit no. of nitawl input data
0                    98      unit no. of xsdrnpm input data
0                    93      unit no. of couple input data
0                    94      unit no. of origens input data
0                    95      unit no. of xsdose input data
0                    71      unit no. of recycled densities
0                    74      unit no. of neut. & gamma sources
0                    21      unit no. of origens input library
0                    33      unit no. of final origens library produced by sas2 case
0                    70      unit no. of sas2h storage data
0                    72      unit no. of (formatted) cycle atom densities, burnups, sources, etc.
1  sssssssssss     aaaaaaaaa     sssssssssss    zzzzzzzzzz   hh        hh
   sssssssssssss   aaaaaaaaaa    sssssssssssss  zzzzzzzzzzz  hh        hh
   ss          ss  aa        aa  ss          ss 22        22  hh        hh
   ss              aa        aa  ss                     22  hh        hh
   ss              aa        aa  ss                     22  hh        hh
   sssssssssssss   aaaaaaaaaaaa  sssssssssssss         22   hhhhhhhhhhh
    sssssssssssss  aaaaaaaaaaaa   sssssssssssss      22     hhhhhhhhhhh
             ss    aa        aa            ss     22        hh        hh
```



```
*******************************************************************************
*******************************************************************************
*******************************************************************************
*****                                                                     *****
*****                  program verification information                *****
*****                                                                     *****
*****                  code system:    scale  version:    4.2          *****
*****                                                                     *****
*******************************************************************************
*******************************************************************************
*****                                                                     *****
*****                                                                     *****
*****              program:  sas2                                         *****
*****                                                                     *****
*****         creation date:  04/27/95                                    *****
*****                                                                     *****
*****              library:  /neutronics/scale/exe                        *****
*****                                                                     *****
*****                                                                     *****
*****     this is not a   scale  configuration controlled code            *****
*****                                                                     *****
*****              jobname:  davis                                        *****
*****                                                                     *****
*****     date of execution:  02/16/96                                    *****
*****                                                                     *****
*****     time of execution:  09:54:23                                    *****
*****                                                                     *****
*****                                                                     *****
*******************************************************************************
*******************************************************************************
*******************************************************************************
```

```
1
0'
0'  mixtures of fuel-pin-unit-cell:
0'   den=mass UO2/ Volume assembly = 526377.3 g/5.1575264
0'
0'  1050 ppm boron
0'  - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
0'
0'  - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
0'
0'   fuel-pin-cell geometry:
0'
0'
0'  - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
0'
0'
0'   assembly and cycle parameters:
0'
0'
0'  mixtures of fuel-pin-unit-cell:
0'   den=mass UO2/ Volume assembly = 526377.3 g/5.1575264
     sas2h: babcock wilcox 15x15, 3.00wt%, 20gwd/mtu burn high temp

0    **** problem parameters ****
```

```
    lib 27burnuplib  library
    mx           3 mixtures
    msc         48 composition specifications
    izm          4 material zones
    ge  latticecell  geometry
    more         0 0/1 do not read/read optional parameter data
    msln         0 fuel solutions

0   **** problem composition description ****

    sc  uo2          standard composition
    mx           1 mixture no.
    vf      1.0000 volume fraction
    roth   10.2060 specified density
    temp    975.0 deg kelvin
            92235  3.00%
            92234   .02%
            92236   .01%
            92238  96.96%
    end

    sc  kr-83        standard composition
    mx           1 mixture no.
    den  1.0000E-20 atomic density
    roth    1.0000 theoretical density
    temp     975.0 deg kelvin
    end

    sc  kr-85        standard composition
    mx           1 mixture no.
    den  1.0000E-20 atomic density
    roth    1.0000 theoretical density
    temp     975.0 deg kelvin
    end

    sc  sr-90        standard composition
    mx           1 mixture no.
    den  1.0000E-20 atomic density
    roth    1.0000 theoretical density
    temp     975.0 deg kelvin
    end

    sc  y-89         standard composition
    mx           1 mixture no.
    den  1.0000E-20 atomic density
    roth    1.0000 theoretical density
    temp     975.0 deg kelvin
    end

    sc  mo-95        standard composition
    mx           1 mixture no.
    den  1.0000E-20 atomic density
    roth    1.0000 theoretical density
    temp     975.0 deg kelvin
    end

    sc  zr-93        standard composition
    mx           1 mixture no.
    den  1.0000E-20 atomic density
    roth    1.0000 theoretical density
```

```
temp       975.0 deg kelvin
end

sc  zr-94        standard composition
mx             1 mixture no.
den   1.0000E-20 atomic density
roth      1.0000 theoretical density
temp       975.0 deg kelvin
end

sc  zr-95        standard composition
mx             1 mixture no.
den   1.0000E-20 atomic density
roth      1.0000 theoretical density
temp       975.0 deg kelvin
end

sc  nb-94        standard composition
mx             1 mixture no.
den   1.0000E-20 atomic density
roth      1.0000 theoretical density
temp       975.0 deg kelvin
end

sc  tc-99        standard composition
mx             1 mixture no.
den   1.0000E-20 atomic density
roth      1.0000 theoretical density
temp       975.0 deg kelvin
end

sc  rh-103       standard composition
mx             1 mixture no.
den   1.0000E-20 atomic density
roth     12.5000 theoretical density
temp       975.0 deg kelvin
end

sc  rh-105       standard composition
mx             1 mixture no.
den   1.0000E-20 atomic density
roth     12.5000 theoretical density
temp       975.0 deg kelvin
end

sc  ru-101       standard composition
mx             1 mixture no.
den   1.0000E-20 atomic density
roth      1.0000 theoretical density
temp       975.0 deg kelvin
end

sc  ru-106       standard composition
mx             1 mixture no.
den   1.0000E-20 atomic density
roth      1.0000 theoretical density
temp       975.0 deg kelvin
end

sc  pd-105       standard composition
```

```
mx              1 mixture no.
den    1.0000E-20 atomic density
roth       1.0000 theoretical density
temp        975.0 deg kelvin
end

sc  pd-108        standard composition
mx              1 mixture no.
den    1.0000E-20 atomic density
roth       1.0000 theoretical density
temp        975.0 deg kelvin
end

sc  ag-109        standard composition
mx              1 mixture no.
den    1.0000E-20 atomic density
roth      10.6010 theoretical density
temp        975.0 deg kelvin
end

sc  sb-124        standard composition
mx              1 mixture no.
den    1.0000E-20 atomic density
roth       1.0000 theoretical density
temp        975.0 deg kelvin
end

sc  xe-131        standard composition
mx              1 mixture no.
den    1.0000E-20 atomic density
roth       1.0000 theoretical density
temp        975.0 deg kelvin
end

sc  xe-132        standard composition
mx              1 mixture no.
den    1.0000E-20 atomic density
roth       1.0000 theoretical density
temp        975.0 deg kelvin
end

sc  xe-135        standard composition
mx              1 mixture no.
den    1.0000E-20 atomic density
roth       1.0000 theoretical density
temp        975.0 deg kelvin
end

sc  xe-136        standard composition
mx              1 mixture no.
den    1.0000E-20 atomic density
roth       1.0000 theoretical density
temp        975.0 deg kelvin
end

sc  cs-134        standard composition
mx              1 mixture no.
den    1.0000E-20 atomic density
roth       1.8730 theoretical density
temp        975.0 deg kelvin
```

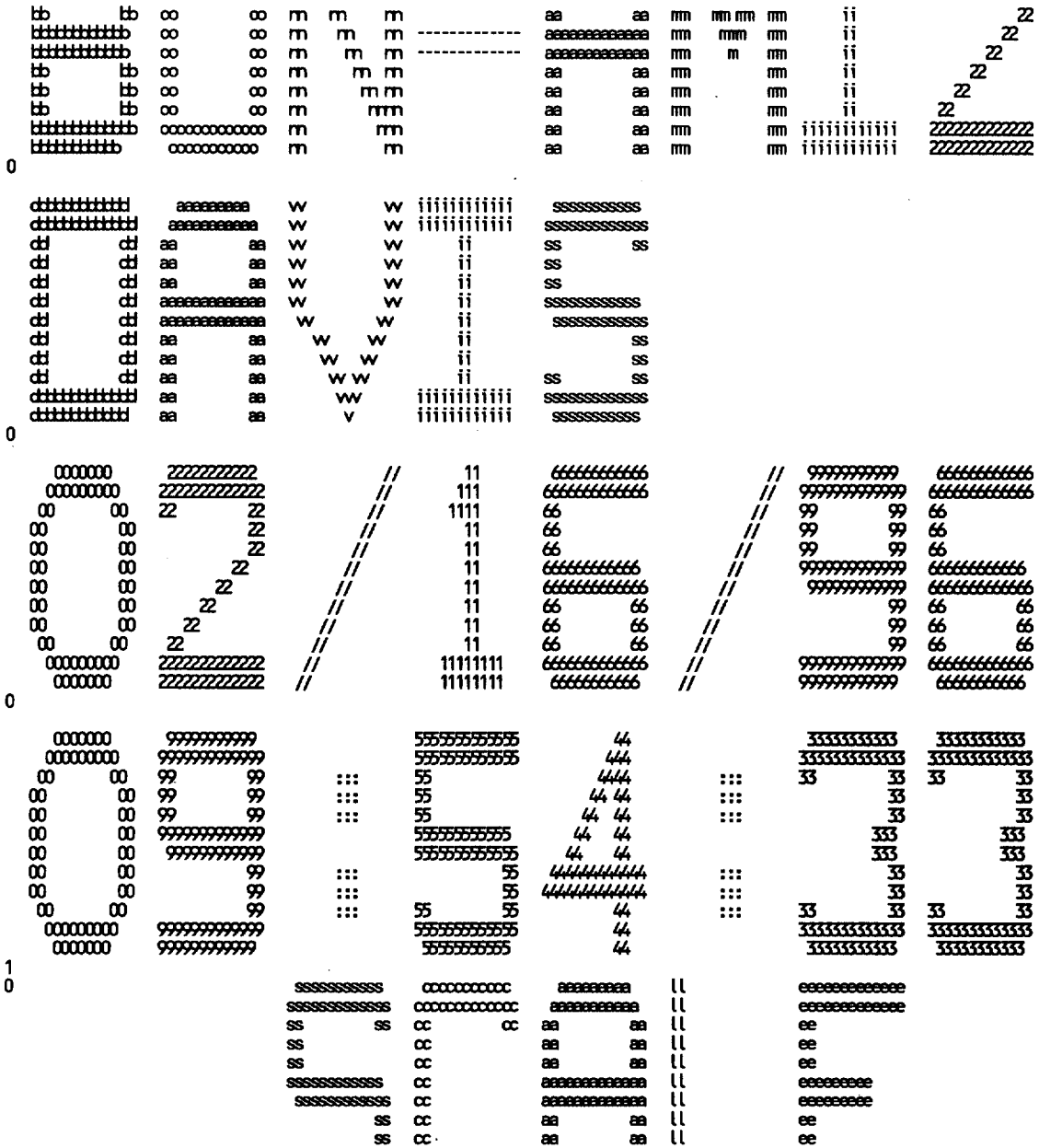
```
end

sc  cs-135        standard composition
mx              1 mixture no.
den   1.0000E-20 atomic density
roth       1.8730 theoretical density
temp        975.0 deg kelvin
end

sc  cs-137        standard composition
mx              1 mixture no.
den   1.0000E-20 atomic density
roth       1.0000 theoretical density
temp        975.0 deg kelvin
end

sc  ba-136        standard composition
mx              1 mixture no.
den   1.0000E-20 atomic density
roth       1.0000 theoretical density
temp        975.0 deg kelvin
end

sc  la-139        standard composition
mx              1 mixture no.
den   1.0000E-20 atomic density
roth       1.0000 theoretical density
temp        975.0 deg kelvin
end

sc  pr-141        standard composition
mx              1 mixture no.
den   1.0000E-20 atomic density
roth       1.0000 theoretical density
temp        975.0 deg kelvin
end

sc  pr-143        standard composition
mx              1 mixture no.
den   1.0000E-20 atomic density
roth       1.0000 theoretical density
temp        975.0 deg kelvin
end

sc  ce-144        standard composition
mx              1 mixture no.
den   1.0000E-20 atomic density
roth       1.0000 theoretical density
temp        975.0 deg kelvin
end

sc  nd-143        standard composition
mx              1 mixture no.
den   1.0000E-20 atomic density
roth       6.9600 theoretical density
temp        975.0 deg kelvin
end

sc  nd-145        standard composition
mx              1 mixture no.
```

```
den   1.0000E-20 atomic density
roth      6.9600 theoretical density
temp       975.0 deg kelvin
end

sc  pm-147       standard composition
mx             1 mixture no.
den   1.0000E-20 atomic density
roth      1.0000 theoretical density
temp       975.0 deg kelvin
end

sc  pm-148       standard composition
mx             1 mixture no.
den   1.0000E-20 atomic density
roth      1.0000 theoretical density
temp       975.0 deg kelvin
end

sc  nd-147       standard composition
mx             1 mixture no.
den   1.0000E-20 atomic density
roth      1.0000 theoretical density
temp       975.0 deg kelvin
end

sc  sm-147       standard composition
mx             1 mixture no.
den   1.0000E-20 atomic density
roth      1.0000 theoretical density
temp       975.0 deg kelvin
end

sc  sm-149       standard composition
mx             1 mixture no.
den   1.0000E-20 atomic density
roth      7.7000 theoretical density
temp       975.0 deg kelvin
end

sc  sm-150       standard composition
mx             1 mixture no.
den   1.0000E-20 atomic density
roth      7.7000 theoretical density
temp       975.0 deg kelvin
end

sc  sm-151       standard composition
mx             1 mixture no.
den   1.0000E-20 atomic density
roth      7.7000 theoretical density
temp       975.0 deg kelvin
end

sc  sm-152       standard composition
mx             1 mixture no.
den   1.0000E-20 atomic density
roth      7.7000 theoretical density
temp       975.0 deg kelvin
end
```

```
    sc  gd-155          standard composition
    mx                1 mixture no.
    den    1.0000E-20 atomic density
    roth        1.0000 theoretical density
    temp         975.0 deg kelvin
    end

    sc  eu-153          standard composition
    mx                1 mixture no.
    den    1.0000E-20 atomic density
    roth        5.2400 theoretical density
    temp         975.0 deg kelvin
    end

    sc  eu-154          standard composition
    mx                1 mixture no.
    den    1.0000E-20 atomic density
    roth        5.2400 theoretical density
    temp         975.0 deg kelvin
    end

    sc  eu-155          standard composition
    mx                1 mixture no.
    den    1.0000E-20 atomic density
    roth        5.2400 theoretical density
    temp         975.0 deg kelvin
    end

    sc  zircalloy       standard composition
    mx                2 mixture no.
    vf          1.0000 volume fraction
    roth        6.4400 theoretical density
    temp         650.0 deg kelvin
    end

    sc  h2o             standard composition
    mx                3 mixture no.
    vf          1.0000 volume fraction
    roth         .6272 specified density
    temp         607.6 deg kelvin
    end

    sc  artm-bormod  standard composition
    mx                3 mixture no.
    vf           .0006 volume fraction
    temp         607.6 deg kelvin
    roth         .6272 density
    nel               1 no. elements
    ivis              1 0/1 no variable isotope/variable isotope
    icp               0 0/1 mixture/compound
    irs               0 0/1 no resonance mtl./resonance mtl.

                   5000 100.00
0'
0' 1050 ppm boron
0' - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
    end

0   **** problem geometry ****
```

```
0'
0' - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
0'
0'  fuel-pin-cell geometry:
0'
     ctp squarepitch  cell type
     pitch     1.4427 cm center to center spacing
     fuelod     .9362 cm fuel diameter or slab thickness
     mfuel         1 mixture no. of fuel
     mmod          3 mixture no. of moderator
     cladod    1.0922 cm clad outer diameter
     mclad         2 mixture no. of clad
     gapod      .9576 cm gap outer diameter
     mgap          0 mixture no. of gap

0    zone specifications for latticecell geometry

                zone  1 is fuel
                zone  2 is gap
                zone  3 is clad
                zone  4 is mod
1    ******************************************************************************************************************
     ***                                                                                                            ***
     ***                              sas2h: babcock wilcox 15x15, 3.00wt%, 20gwd/mtu burn high temp                ***
     ***                                                                                                            ***
     ******************************************************************************************************************
     ******************************************************************************************************************
     ***                                                                                                            ***
     ***                                 ********** data library information **********                          ***
     ***                                                                                                            ***
     ***          unit                                                  volume                                      ***
     ***         number                 data set name                   name        unit function                  ***
     ***         ------                 -------------                   ----        -------------                  ***
     ***                                                                                                            ***
     ***           89      /neutronics/scale/datalib/scale.rev04.sclib                standard composition library   ***
     ***                                                                                                            ***
     ***           87      /neutronics/scale/datalib/scale.rev03.xn27bu               cross section library          ***
     ***                                                                                                            ***
     ***           12      ft12f001                                                   short cross section library    ***
     ***                                                                                                            ***
     ******************************************************************************************************************
     ******************************************************************************************************************
     ***                                                                                                            ***
     ***                                                                                                            ***
     ***                                    standard composition library data                                       ***
     ***                                    ---------------------------------                                       ***
     ***                                                                                                            ***
     ***             unit number  :  89                                                                             ***
     ***                                                                                                            ***
     ***             dataset name :  /neutronics/scale/datalib/scale.rev04.sclib                                    ***
     ***                                                                                                            ***
     ***             library title:  scale-4 standard composition library                                           ***
     ***                             385 standard compositions, 332 nuclides                                        ***
     ***                             10 elements with variable isotopic distributions.                              ***
     ***                                                                                                            ***
     ***             creation date:   4/17/95                                                                       ***
     ***                                                                                                            ***
     ***                                                                                                            ***
     ***                                                                                                            ***
```

```
      ***                                 cross section library data                                   ***
      ***                                 ---------------------------                                  ***
      ***                                                                                              ***
      ***        unit number  :  87                                                                    ***
      ***                                                                                              ***
      ***        dataset name :  /neutronics/scale/datalib/scale.rev03.xn27bu                          ***
      ***                                                                                              ***
      ***        library title:  scale 4.2 - 27 group neutron burnup library                           ***
      ***                          based on endf-b version 4 data with endf-b version 5 fission products ***
      ***                            compiled for nrc     1/27/89                                      ***
      ***                               last updated      9/16/93                                      ***
      ***                                 l.m.petrie  -   ornl                                         ***
      ***                                                                                              ***
      ***                                                                                              ***
      ***                                                                                              ***
      ***                                                                                              ***
      ************************************************************************************************
      ************************************************************************************************
1
0   **** xsdrn mesh intervals ****

      8 mesh intervals in zone  1
      4 mesh intervals in zone  2
      4 mesh intervals in zone  3
      8 mesh intervals in zone  4
0'
0' - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
0'
0'
0'  assembly and cycle parameters:
0'
1     **** larger cell data (using sas2h) ****
0     inplevel=          2
      numzones=          4
      mixmoder=          3
      mxrepeats=         1
      facmesh=   1.000E+00
0     **** larger cell geometry
0     zone   xsdrnpm mixture   radius (cm)

        1          3          6.3246E-01
        2          2          6.7310E-01
        3          3          8.1400E-01
        4          1          2.9610E+00
1      **** reactor history data ****
0      npin/assm=       208
       fuelngth=  3.602E+02
       ncycles=           1
       nlib/cyc=          8
       lightel=           0
       printlevel=        5
0                                              ......average density......
       cycle   power(mw)  burn, days  down, days  relative to that in cycle 1
                                                       boron       water
         1     7.250E+00   1.280E+03   1.826E+03    1.000E+00   1.000E+00
1  bbbbbbbbbbbb      oooooooooo    nn          nn                  aaaaaaaaa     mm          mm  iiiiiiiiiii      22222222222
   bbbbbbbbbbbbb    oooooooooooo   nnn         nn                 aaaaaaaaaaa    mmm        mmm  iiiiiiiiiii     222222222222
   bb          bb  oo          oo  nnnn        nn                 aa         aa  mmmm      mmmm      ii          22         22
   bb          bb  oo          oo  nn nn       nn                 aa         aa  mm mm    mm mm      ii                     22
```



```
      ss       ss  cc        cc  aa       aa  ll           ee
      sssssssssss  ccccccccccc  aa       aa  lllllllllll  eeeeeeeeeee
       sssssssss    ccccccccc   aa       aa  lllllllllll  eeeeeeeeeee
```

```
*********************************************************************
*********************************************************************
*********************************************************************
*****                                                           *****
*****                program verification information            *****
*****                                                           *****
*****                code system:   scale  version:   4.2       *****
*****                                                           *****
*********************************************************************
*********************************************************************
*****                                                           *****
*****                                                           *****
*****           program:  c0c008                                *****
*****                                                           *****
*****      creation date:  04/27/95                             *****
*****                                                           *****
*****           library:  /neutronics/scale/exe                 *****
*****                                                           *****
*****                                                           *****
*****   this is not a  scale  configuration controlled code     *****
*****                                                           *****
*****           jobname:  davis                                 *****
*****                                                           *****
*****   date of execution:  02/16/96                            *****
*****                                                           *****
*****   time of execution:  09:54:33                            *****
*****                                                           *****
*****                                                           *****
*********************************************************************
*********************************************************************
*********************************************************************
```

```
1
0      -1q array has      1 entries.
0       0q array has      4 entries.
0       1q array has      6 entries.
0       2q array has      2 entries.
1logical assignments
0master library   12
 working library   0
 scratch file     18
 new library       1
0p r o b l e m   d e s c r i p t i o n
0igr--geometry (0/1/2/3--inf med/slab/cyl/sphere              2
0izm--number of zones or material regions                     4
0ms--mixing table length                                     66
0ibl--shielded cross section edit option (0/1--no/yes)        0
0ibr--bondarenko factor edit option (0/1--no/yes)             0
0issopt--dancoff factor option                                0
0convergence criterion    1.00000E-03
0geometry correction factor for wigner rational approximation  1.350E+00
0       3q array has     66 entries.
0       4q array has     66 entries.
```

```
0       5q array has     66 entries.
0       6q array has      4 entries.
0       7q array has      4 entries.
0       8q array has      4 entries.
0       9q array has      4 entries.
0      10q array has     66 entries.
0      11q array has      4 entries.
0m i x i n g   t a b l e
0entry  mixture   isotope   number density   new identifier
    1        1     92235    6.91508E-04            92235
    2        1     92234    5.55578E-06            92234
    3        1     92236    3.16744E-06            92236
    4        1     92238    2.20677E-02            92238
    5        1      8016    4.55359E-02             8016
    6        3      8016    2.09710E-02                6
    7        1     36083    1.00000E-20            36083
    8        1     36085    1.00000E-20            36085
    9        1     38090    1.00000E-20            38090
   10        1     39089    1.00000E-20            39089
   11        1     42095    1.00000E-20            42095
   12        1     40093    1.00000E-20            40093
   13        1     40094    1.00000E-20            40094
   14        1     40095    1.00000E-20            40095
   15        1     41094    1.00000E-20            41094
   16        1     43099    1.00000E-20            43099
   17        1     45103    1.00000E-20            45103
   18        1     45105    1.00000E-20            45105
   19        1     44101    1.00000E-20            44101
   20        1     44106    1.00000E-20            44106
   21        1     46105    1.00000E-20            46105
   22        1     46108    1.00000E-20            46108
   23        1     47109    1.00000E-20            47109
   24        1     51124    1.00000E-20            51124
   25        1     54131    1.00000E-20            54131
   26        1     54132    1.00000E-20            54132
   27        1     54135    1.00000E-20            54135
   28        1     54136    1.00000E-20            54136
   29        1     55134    1.00000E-20            55134
   30        1     55135    1.00000E-20            55135
   31        1     55137    1.00000E-20            55137
   32        1     56136    1.00000E-20            56136
   33        1     57139    1.00000E-20            57139
   34        1     59141    1.00000E-20            59141
   35        1     59143    1.00000E-20            59143
   36        1     58144    1.00000E-20            58144
   37        1     60143    1.00000E-20            60143
   38        1     60145    1.00000E-20            60145
   39        1     61147    1.00000E-20            61147
   40        1     61148    1.00000E-20            61148
   41        1     60147    1.00000E-20            60147
   42        1     62147    1.00000E-20            62147
   43        1     62149    1.00000E-20            62149
   44        1     62150    1.00000E-20            62150
   45        1     62151    1.00000E-20            62151
   46        1     62152    1.00000E-20            62152
   47        1     64155    1.00000E-20            64155
   48        1     63153    1.00000E-20            63153
   49        1     63154    1.00000E-20            63154
   50        1     63155    1.00000E-20            63155
   51        2     40302    4.25156E-02            40302
```

```
   52      3         1001    4.19420E-02            1001
   53      3         5010    3.81515E-06            5010
   54      3         5011    1.54884E-05            5011
   55      1        55133    1.00000E-20           55133
   56      1        95237    1.00000E-20           95237
   57      1        94238    1.00000E-20           94238
   58      1        94239    1.00000E-20           94239
   59      1        94240    1.00000E-20           94240
   60      1        94241    1.00000E-20           94241
   61      1        94242    1.00000E-20           94242
   62      1        95241    1.00000E-20           95241
   63      1        95243    1.00000E-20           95243
   64      1        96244    1.00000E-20           96244
   65      1          999    1.00000E-20             999
   66      4          999    1.00000E-20              66
0geometry and material description
0zone  mixture  outer dimension  temperature      extra xs  type (0/1--fuel/mod)
   1       1      4.68122E-01   9.75000E+02  9.05844E-01             0
   2       4      4.78790E-01   2.95000E+02  5.49010E-01             0
   3       2      5.46100E-01   6.50000E+02   .00000E+00             0
   4       3      8.13968E-01   6.07600E+02   .00000E+00             0
     7711 locations of   200000 available are required to make a new master containing the self-shielded values
0no nuclides in your problem have bondarenko factor data**bonami will copy from logical 12 to logical  1
0copy      999  1/v cross sectio from log 12 to log 18   bondarenko trigger 0
0copy      999  1/v cross sectio from log 18 to log  1   bondarenko trigger 0
0copy      999  1/v cross sectio from log 18 to log  1   bondarenko trigger 0
0copy     1001   hydrogen        from log 12 to log  1   bondarenko trigger 0
0copy     5010  b-10 1273 218mgp from log 12 to log  1   bondarenko trigger 0
0copy     5011   boron-11        from log 12 to log  1   bondarenko trigger 0
0copy     8016   oxygen-16       from log 12 to log 18   bondarenko trigger 0
0copy     8016   oxygen-16       from log 18 to log  1   bondarenko trigger 0
0copy     8016   oxygen-16       from log 18 to log  1   bondarenko trigger 0
0copy    36083   kr-83           from log 12 to log  1   bondarenko trigger 0
0copy    36085   kr-85           from log 12 to log  1   bondarenko trigger 0
0copy    38090   sr-90           from log 12 to log  1   bondarenko trigger 0
0copy    39089    y-89           from log 12 to log  1   bondarenko trigger 0
0copy    40093   zr-93           from log 12 to log  1   bondarenko trigger 0
0copy    40094   zr-94           from log 12 to log  1   bondarenko trigger 0
0copy    40095   zr-95           from log 12 to log  1   bondarenko trigger 0
0copy    40302   zircalloy       from log 12 to log  1   bondarenko trigger 0
0copy    41094   nb-94           from log 12 to log  1   bondarenko trigger 0
0copy    42095   mo-95           from log 12 to log  1   bondarenko trigger 0
0copy    43099   tc-99           from log 12 to log  1   bondarenko trigger 0
0copy    44101   ru-101          from log 12 to log  1   bondarenko trigger 0
0copy    44106   ru-106          from log 12 to log  1   bondarenko trigger 0
0copy    45103   rh-103          from log 12 to log  1   bondarenko trigger 0
0copy    45105   rh-105          from log 12 to log  1   bondarenko trigger 0
0copy    46105   pd-105          from log 12 to log  1   bondarenko trigger 0
0copy    46108   pd-108          from log 12 to log  1   bondarenko trigger 0
0copy    47109   silver-109      from log 12 to log  1   bondarenko trigger 0
0copy    51124   sb-124          from log 12 to log  1   bondarenko trigger 0
0copy    54131   xe-131          from log 12 to log  1   bondarenko trigger 0
0copy    54132   xe-132          from log 12 to log  1   bondarenko trigger 0
0copy    54135   xenon-135       from log 12 to log  1   bondarenko trigger 0
0copy    54136   xe-136          from log 12 to log  1   bondarenko trigger 0
0copy    55133   cesium-133      from log 12 to log  1   bondarenko trigger 0
0copy    55134   cs-134          from log 12 to log  1   bondarenko trigger 0
0copy    55135   cs-135          from log 12 to log  1   bondarenko trigger 0
0copy    55137   cs-137          from log 12 to log  1   bondarenko trigger 0
0copy    56136   ba-136          from log 12 to log  1   bondarenko trigger 0
```

```
0ccpy     57139  la-139          from log 12 to log  1    bondarenko trigger 0
0ccpy     58144  ce-144          from log 12 to log  1    bondarenko trigger 0
0ccpy     59141  pr-141          from log 12 to log  1    bondarenko trigger 0
0ccpy     59143  pr-143          from log 12 to log  1    bondarenko trigger 0
0ccpy     60143  nd-143          from log 12 to log  1    bondarenko trigger 0
0ccpy     60145  nd-145          from log 12 to log  1    bondarenko trigger 0
0ccpy     60147  nd-147          from log 12 to log  1    bondarenko trigger 0
0ccpy     61147  pm-147          from log 12 to log  1    bondarenko trigger 0
0ccpy     61148  pm-148          from log 12 to log  1    bondarenko trigger 0
0ccpy     62147  sm-147          from log 12 to log  1    bondarenko trigger 0
0ccpy     62149  sm-149          from log 12 to log  1    bondarenko trigger 0
0ccpy     62150  sm-150          from log 12 to log  1    bondarenko trigger 0
0ccpy     62151  sm-151          from log 12 to log  1    bondarenko trigger 0
0ccpy     62152  sm-152          from log 12 to log  1    bondarenko trigger 0
0ccpy     63153  eu-153          from log 12 to log  1    bondarenko trigger 0
0ccpy     63154  eu-154          from log 12 to log  1    bondarenko trigger 0
0ccpy     63155  eu-155          from log 12 to log  1    bondarenko trigger 0
0ccpy     64155  gd-155          from log 12 to log  1    bondarenko trigger 0
0ccpy     92234  u-234 1043 sigo= from log 12 to log  1   bondarenko trigger 0
0ccpy     92235  uranium-235     from log 12 to log  1    bondarenko trigger 0
0ccpy     92236  u-236 1163 sigo= from log 12 to log  1   bondarenko trigger 0
0ccpy     92238  uranium-238     from log 12 to log  1    bondarenko trigger 0
0ccpy     93237  neptunium-237   from log 12 to log  1    bondarenko trigger 0
0ccpy     94238  pu-238 1050 sigo from log 12 to log  1   bondarenko trigger 0
0ccpy     94239  plutonium-239   from log 12 to log  1    bondarenko trigger 0
0ccpy     94240  plutonium-240   from log 12 to log  1    bondarenko trigger 0
0ccpy     94241  plutonium-241   from log 12 to log  1    bondarenko trigger 0
0ccpy     94242  plutonium-242   from log 12 to log  1    bondarenko trigger 0
0ccpy     95241  am-241 1056 sigp from log 12 to log  1   bondarenko trigger 0
0ccpy     95243  am-243 1057 218 from log 12 to log  1    bondarenko trigger 0
0ccpy     96244  curium-244      from log 12 to log  1    bondarenko trigger 0
1     scale 4.2 - 27 group neutron burnup library
        based on endf-b version 4 data with endf-b version 5 fission products
          compiled for nrc      1/27/89
             last updated       9/16/93
               l.m.petrie  -  ornl
         tape id                             4321        number of nuclides                66
         number of neutron groups              27        number of gamma groups             0
         first thermal group                   15        logical unit                       1
                                      table of contents
        1/v cross sections normalized to 1.0 at 0.0253 ev                          id      999
        1/v cross sections normalized to 1.0 at 0.0253 ev                          id       66
         hydrogen       endf/b-iv mat 1269/thrm1002    updated 10/13/89            id     1001
        b-10 1273 218ngp 042375 p-3 293k                                           id     5010
         boron-11       endf/b-iv mat 1160             updated 10/13/89            id     5011
         oxygen-16      endf/b-iv mat 1276             updated 10/13/89            id     8016
         oxygen-16      endf/b-iv mat 1276             updated 10/13/89            id        6
         kr-83          mt=102,103,103,105,106,107     updated 10/13/89            id    36083
         kr-85             mt=  102                                                id    36085
         sr-90          mt=102                         updated 10/13/89            id    38090
          y-89          mt=102                         updated 10/13/89            id    39089
         zr-93             mt=  102                                                id    40093
         zr-94          mt=102                         updated 10/13/89            id    40094
         zr-95          mt=102                         updated 10/13/89            id    40095
         zircalloy      endf/b-iv mat 1284             updated 10/13/89            id    40302
         nb-94          mt=102                         updated 10/13/89            id    41094
         mo-95          mt=102                         updated 10/13/89            id    42095
         tc-99          mt=102                         updated 10/13/89            id    43099
         ru-101         mt=102                         updated 10/13/89            id    44101
         ru-106         mt=102                         updated 10/13/89            id    44106
```

```
        rh-103        mt=102                          updated 10/13/89              id    45103
        rh-105          mt=  102                                                    id    45105
        pd-105        mt=102                          updated 10/13/89              id    46105
        pd-108        mt=102                          updated 10/13/89              id    46108
        silver-109    endf/b-iv mat 1139              updated 10/13/89              id    47109
        sb-124        mt=102                          updated 10/13/89              id    51124
        xe-131        mt=102,103,104,105,106          updated 10/13/89              id    54131
        xe-132        mt=102,103,104,105,106          updated 10/13/89              id    54132
        xenon-135     endf/b-iv mat 1294              updated 10/13/89              id    54135
        xe-136          mt=  102, 103,  104,  105,  107                             id    54136
        cesium-133    endf/b-iv mat 1141              updated 10/13/89              id    55133
        cs-134        mt=102                          updated 10/13/89              id    55134
        cs-135          mt=  102                                                    id    55135
        cs-137        mt=102                          updated 10/13/89              id    55137
        ba-136        mt=102                          updated 10/13/89              id    56136
        la-139        mt=102                          updated 10/13/89              id    57139
        ce-144          mt=  102                                                    id    58144
        pr-141        mt=102,103,104,105,106,107      updated 10/13/89              id    59141
        pr-143        mt=102                          updated 10/13/89              id    59143
        nd-143        mt=102                          updated 10/13/89              id    60143
        nd-145        mt=102                          updated 10/13/89              id    60145
        nd-147        mt=102                          updated 10/13/89              id    60147
        pm-147        mt=102                          updated 10/13/89              id    61147
        pm-148          mt=  102                                                    id    61148
        sm-147        endf/b-v fission product        updated 10/13/89              id    62147
        sm-149        mt=102,103,107                  updated 10/13/89              id    62149
        sm-150        mt=102                          updated 10/13/89              id    62150
        sm-151        mt=102,103,104,105,106,107      updated 10/13/89              id    62151
        sm-152        mt=102,103,104,105,106,107      updated 10/13/89              id    62152
        eu-153        mt=102,103,104,105,106,107      updated 10/13/89              id    63153
        eu-154        mt=102,103,104,105,106,107      updated 10/13/89              id    63154
        eu-155        mt=102,103,104,105,106,107      updated 10/13/89              id    63155
        gd-155        mt=102                          updated 10/13/89              id    64155
       u-234 1043 sigo=5+4 newklacs p-3 293k f-1/e-m(1.+5)                          id    92234
        uranium-235   endf/b-iv mat 1261              updated 10/13/89              id    92235
       u-236 1163 sigo=5+4 newklacs p-3 293k f-1/e-m(1.+5)                          id    92236
        uranium-238   endf/b-iv mat 1262              updated 10/13/89              id    92238
        neptunium-237 endf/b-iv mat 1263              updated 10/13/89              id    93237
       pu-238 1050 sigo=5+4 newklacs p-3 293k f-1/e-m(1.+5)                         id    94238
        plutonium-239 endf/b-iv mat 1264              updated 10/13/89              id    94239
        plutonium-240 endf/b-iv mat 1265              updated 10/13/89              id    94240
        plutonium-241 endf/b-iv mat 1266              updated 10/13/89              id    94241
        plutonium-242 endf/b-iv mat 1161              updated 10/13/89              id    94242
       am-241 1056 sigo=5+4 newklacs 218ngp p-3 293k                                id    95241
       am-243 1057 218 gp wt f-1/e-m 090376 p3 293k                                 id    95243
        curium-244    endf/b-iv mat 1162              updated 10/13/89              id    96244
0        tape copy used      0 i/o's, and took     .00 seconds
1              m         m  iiiiiiiiiiii   ttttttttttttt     aaaaaaaa    ww         ww  ll
               mm        m  iiiiiiiiiiii   ttttttttttttt    aaaaaaaaaa   ww         ww  ll
               mmm       m       ii            tt         aa        aa   ww         ww  ll
               m m       m       ii            tt         aa        aa   ww         ww  ll
               m  m      m       ii            tt         aa        aa   ww         ww  ll
               m   m     m       ii            tt         aaaaaaaaaaaa   ww    w    ww  ll
               m    m    m       ii            tt         aaaaaaaaaaaa   ww   www   ww  ll
               m     m   m       ii            tt         aa        aa   ww  ww ww  ww  ll
               m      m  m       ii            tt         aa        aa   ww ww   ww ww  ll
               m       mm        ii            tt         aa        aa   wwww     wwww  ll
               m        mm  iiiiiiiiiiii       tt         aa        aa   www       www  llllllllllll
               m         m  iiiiiiiiiiii       tt         aa        aa   ww         ww  llllllllllll
0
```

```
 ddddddddddd    aaaaaaaaaa   ww        ww  iiiiiiiiiiii   ssssssssss
 dddddddddddd  aaaaaaaaaaaa  ww        ww  iiiiiiiiiiii  ssssssssssss
 dd        dd  aa        aa  ww        ww       ii       ss        ss
 dd        dd  aa        aa  ww        ww       ii       ss
 dd        dd  aa        aa  ww        ww       ii       ss
 dd        dd  aaaaaaaaaaaa  ww        ww       ii       sssssssssss
 dd        dd  aaaaaaaaaaaa   ww      ww        ii        sssssssssss
 dd        dd  aa        aa    ww    ww         ii                 ss
 dd        dd  aa        aa     ww  ww          ii                 ss
 dd        dd  aa        aa      wwww           ii       ss        ss
 dddddddddddd  aa        aa       ww       iiiiiiiiiiii  ssssssssssss
 ddddddddddd   aa        aa        v       iiiiiiiiiiii   ssssssssss
0
   00000000     2222222222             //       11        6666666666             //   9999999999    6666666666
  0000000000   222222222222           //       111       666666666666           //   999999999999  666666666666
 00        00  22        22          //       1111       66                    //    99        99  66
 00        00            22         //          11       66                   //     99        99  66
 00        00            22        //           11       66                  //      99        99  66
 00        00           22        //            11       66666666666        //       999999999999  66666666666
 00        00         22         //             11       666666666666      //         99999999999  666666666666
 00        00       22          //              11       66        66     //                   99  66        66
 00        00     22           //               11       66        66    //                    99  66        66
 00        00  22             //                11       66        66   //                     99  66        66
  0000000000   222222222222  //              11111111    666666666666  //            999999999999  666666666666
   00000000    222222222222  //              11111111     6666666666   //            9999999999     6666666666
0
   00000000     9999999999                 555555555555          44                   3333333333   555555555555
  0000000000   999999999999                555555555555         444                  333333333333  555555555555
 00        00  99        99      :::       55                  4444        :::       33        33  55
 00        00  99        99      :::       55                 44 44        :::                 33  55
 00        00  99        99      :::       55                44  44        :::                 33  55
 00        00  999999999999                55555555555      44   44                          333   55555555555
 00        00   99999999999                555555555555    44    44                          333   555555555555
 00        00            99      :::                 55  444444444444      :::                 33            55
 00        00            99      :::                 55  444444444444      :::                 33            55
 00        00            99      :::       55        55          44        :::       33        33  55        55
  0000000000   999999999999                555555555555          44                  333333333333  555555555555
   00000000    99999999999                  5555555555           44                   3333333333    5555555555
1
0                             ssssssssss    cccccccccc    aaaaaaaaaa   ll            eeeeeeeeeeee
                             ssssssssssss  cccccccccccc  aaaaaaaaaaaa  ll            eeeeeeeeeeee
                             ss        ss  cc        cc  aa        aa  ll            ee
                             ss            cc            aa        aa  ll            ee
                             ss            cc            aa        aa  ll            ee
                             sssssssssss   cc            aaaaaaaaaaaa  ll            eeeeeeee
                              sssssssssss  cc            aaaaaaaaaaaa  ll            eeeeeeee
                                       ss  cc            aa        aa  ll            ee
                                       ss  cc            aa        aa  ll            ee
                             ss        ss  cc        cc  aa        aa  ll            ee
                             ssssssssssss  cccccccccccc  aa        aa  llllllllllll  eeeeeeeeeeee
                              ssssssssss    cccccccccc   aa        aa  llllllllllll  eeeeeeeeeeee


                     ****************************************************************************************************
```

```
                    ********************************************************************************
                    ********************************************************************************
                    *****                                                                      *****
                    *****                  program verification information                   *****
                    *****                                                                      *****
                    *****                  code system:    scale  version:    4.2             *****
                    *****                                                                      *****
                    ********************************************************************************
                    ********************************************************************************
                    *****                                                                      *****
                    *****                                                                      *****
                    *****              program:  c0c002                                        *****
                    *****                                                                      *****
                    *****          creation date:  04/27/95                                    *****
                    *****                                                                      *****
                    *****              library:  /neutronics/scale/exe                         *****
                    *****                                                                      *****
                    *****                                                                      *****
                    *****     this is not a   scale  configuration controlled code            *****
                    *****                                                                      *****
                    *****              jobname:  davis                                         *****
                    *****                                                                      *****
                    *****     date of execution:  02/16/96                                     *****
                    *****                                                                      *****
                    *****     time of execution:  09:54:35                                     *****
                    *****                                                                      *****
                    *****                                                                      *****
                    ********************************************************************************
                    ********************************************************************************
                    ********************************************************************************
1
0       -1q array has       1 entries.
0        0q array has       9 entries.
0        1q array has      12 entries.
0select 65 nuclides from the master  library on logical  1
         0 nuclides from the working library on logical  2
         0 nuclides from the working library on logical  3
           to create the new working library on logical  4

        61 resonance calculations have been requested
         0 output option for ampx formatted cross section data
0the storage allocated for this case is 200000 words
0        2q array has      65 entries.
0        3q array has     915 entries.
0        4q array has      65 entries.
0 general information concerning cross section library
    tape identification number                  4321
    number of nuclides on tape                    66
    number of neutron energy groups               27
    first thermal neutron energy group            15
    number of gamma energy groups                  0
0   direct access unit number  9 requires 117 blocks of length  1484 words
- xsdrn tape   4321
                        scale 4.2 - 27 group neutron burnup library
                          based on endf-b version 4 data with endf-b version 5 fission products
                             compiled for nrc      1/27/89
                                last updated       9/16/93
                                   l.m.petrie   -   ornl
0 nuclides from xsdrn tape
    1     1/v cross sections normalized to 1.0 at 0.0253 ev                          999
```

```
  2   hydrogen       endf/b-iv mat 1269/thrm1002    updated 10/13/89          1001
  3  b-10 1273 218ngp 042375 p-3 293k                                         5010
  4   boron-11       endf/b-iv mat 1160             updated 10/13/89          5011
  5   oxygen-16      endf/b-iv mat 1276             updated 10/13/89          8016
  6   oxygen-16      endf/b-iv mat 1276             updated 10/13/89             .6
  7   kr-83          mt=102,103,103,105,106,107     updated 10/13/89         36083
  8   kr-85            mt=  102                                               36085
  9   sr-90          mt=102                         updated 10/13/89         38090
 10    y-89          mt=102                         updated 10/13/89         39089
 11   zr-93            mt=  102                                               40093
 12   zr-94          mt=102                         updated 10/13/89         40094
 13   zr-95          mt=102                         updated 10/13/89         40095
 14   zircalloy      endf/b-iv mat 1284             updated 10/13/89         40302
 15   nb-94          mt=102                         updated 10/13/89         41094
 16   mo-95          mt=102                         updated 10/13/89         42095
 17   tc-99          mt=102                         updated 10/13/89         43099
 18   ru-101         mt=102                         updated 10/13/89         44101
 19   ru-106         mt=102                         updated 10/13/89         44106
 20   rh-103         mt=102                         updated 10/13/89         45103
 21   rh-105           mt=  102                                               45105
 22   pd-105         mt=102                         updated 10/13/89         46105
 23   pd-108         mt=102                         updated 10/13/89         46108
 24   silver-109     endf/b-iv mat 1139             updated 10/13/89         47109
 25   sb-124         mt=102                         updated 10/13/89         51124
 26   xe-131         mt=102,103,104,105,106         updated 10/13/89         54131
 27   xe-132         mt=102,103,104,105,106         updated 10/13/89         54132
 28   xenon-135      endf/b-iv mat 1294             updated 10/13/89         54135
 29   xe-136           mt=  102, 103, 104, 105, 107                           54136
 30   cesium-133     endf/b-iv mat 1141             updated 10/13/89         55133
 31   cs-134         mt=102                         updated 10/13/89         55134
 32   cs-135           mt=  102                                               55135
 33   cs-137         mt=102                         updated 10/13/89         55137
 34   ba-136         mt=102                         updated 10/13/89         56136
 35   la-139         mt=102                         updated 10/13/89         57139
 36   ce-144           mt=  102                                               58144
 37   pr-141         mt=102,103,104,105,106,107     updated 10/13/89         59141
 38   pr-143         mt=102                         updated 10/13/89         59143
 39   nd-143         mt=102                         updated 10/13/89         60143
 40   nd-145         mt=102                         updated 10/13/89         60145
 41   nd-147         mt=102                         updated 10/13/89         60147
 42   pm-147         mt=102                         updated 10/13/89         61147
 43   pm-148           mt=  102                                               61148
 44   sm-147         endf/b-v fission product       updated 10/13/89         62147
 45   sm-149         mt=102,103,107                 updated 10/13/89         62149
 46   sm-150         mt=102                         updated 10/13/89         62150
 47   sm-151         mt=102,103,104,105,106,107     updated 10/13/89         62151
 48   sm-152         mt=102,103,104,105,106,107     updated 10/13/89         62152
 49   eu-153         mt=102,103,104,105,106,107     updated 10/13/89         63153
 50   eu-154         mt=102,103,104,105,106,107     updated 10/13/89         63154
 51   eu-155         mt=102,103,104,105,106,107     updated 10/13/89         63155
 52   gd-155         mt=102                         updated 10/13/89         64155
 53  u-234 1043 sigo=5+4 newklacs p-3 293k f-1/e-m(1.+5)                       92234
 54   uranium-235    endf/b-iv mat 1261             updated 10/13/89         92235
 55  u-236 1163 sigo=5+4 newklacs p-3 293k f-1/e-m(1.+5)                       92236
 56   uranium-238    endf/b-iv mat 1262             updated 10/13/89         92238
 57   neptunium-237  endf/b-iv mat 1263             updated 10/13/89         93237
 58  pu-238 1050 sigo=5+4 newklacs p-3 293k f-1/e-m(1.+5)                      94238
 59   plutonium-239  endf/b-iv mat 1264             updated 10/13/89         94239
 60   plutonium-240  endf/b-iv mat 1265             updated 10/13/89         94240
 61   plutonium-241  endf/b-iv mat 1266             updated 10/13/89         94241
```

```
    62.   plutonium-242  endf/b-iv mat 1161            updated 10/13/89              94242
    63    am-241 1056 sigp=5+4 newxlacs 218ngp p-3 293k                              95241
    64    am-243 1057 218 gp wt f-1/e-m 090576 p3 293k                               95243
    65     curium-244     endf/b-iv mat 1162           updated 10/13/89              96244
01/v cross sections normalized to 1.0 at 0.0253 ev                        999    temperature=  975.00
0 hydrogen        endf/b-iv mat 1269/thrm1002    updated 10/13/89          1001    temperature=  607.60
                              thermal scattering matrix number  2 at a temperature of   550.00 was selected.
0b-10 1273 218ngp 042375 p-3 293k                                        5010    temperature=  607.60
                              thermal scattering matrix number  2 at a temperature of   550.00 was selected.
0 boron-11        endf/b-iv mat 1160          updated 10/13/89           5011    temperature=  607.60
                              thermal scattering matrix number  2 at a temperature of   550.00 was selected.
0 oxygen-16       endf/b-iv mat 1276          updated 10/13/89           8016    temperature=  975.00
0 oxygen-16       endf/b-iv mat 1276          updated 10/13/89              6    temperature=  607.60
0 kr-83           mt=102,103,103,105,106,107  updated 10/13/89          36083    temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   82.202          temperature(kelvin)      =   975.000
0potential scatter sigma  =    7.004          lumped nuclear density   = 9.9999997E-21
0spin factor (g)          =  4988.190         lump dimension (a-bar)   = 4.6812201E-01
0inner radius             = .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =   15.995          sigma(per absorber atom)= 1.7075970E+19
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =  237.953          sigma(per absorber atom)= 1.9051458E+19
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs        res fiss       res scat
  11      1.809447E-04     .000000E+00    2.092318E-04
  12      2.169717E-02     .000000E+00    9.922354E-03
  13     -4.337918E-03     .000000E+00   -6.988131E-03
  14      4.783569E-05     .000000E+00   -1.724112E-05
0excess resonance integrals
0              resolved
0absorption    1.45275E+02
 fission       .00000E+00
- elapsed time  .00 min.
0 kr-85           mt= 102                                                 36085    temperature=  975.00
0 sr-90           mt=102                      updated 10/13/89            38090    temperature=  975.00
0  y-89           mt=102                      updated 10/13/89            39089    temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   88.142          temperature(kelvin)      =   975.000
0potential scatter sigma  =    3.644          lumped nuclear density   = 9.9999997E-21
0spin factor (g)          =   78.664          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             = .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =   15.995          sigma(per absorber atom)= 1.7075970E+19
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =  237.953          sigma(per absorber atom)= 1.9051458E+19
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs        res fiss       res scat
   9      1.364407E-06     .000000E+00    2.180942E-04
  10      2.638645E-06     .000000E+00    7.570678E-06
0excess resonance integrals
0              resolved
0absorption    1.46528E-01
 fission       .00000E+00
- elapsed time  .00 min.
0 zr-93           mt= 102                                                 40093    temperature=  975.00
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0 zr-94        mt=102                    updated 10/13/89          40094    temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   93.100          temperature(kelvin)      =  975.000
0potential scatter sigma  =    3.779          lumped nuclear density   = 9.9999997E-21
0spin factor (g)          =  180.853          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             = .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1   =   15.995             sigma(per absorber atom)= 1.7075970E+19
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2   =  237.953             sigma(per absorber atom)= 1.9051458E+19
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs        res fiss       res scat
   8     3.255227E-07    .000000E+00    2.652856E-04
   9     1.224071E-06    .000000E+00    9.974551E-05
0excess resonance integrals
0                resolved
0absorption     3.44401E-02
 fission         .00000E+00
-  elapsed time    .00 min.
0 zr-95        mt=102                    updated 10/13/89          40095    temperature=  975.00
0 zircalloy    endf/b-iv mat 1284        updated 10/13/89          40302    temperature=  650.00
0resonance data for this nuclide
0mass number (a)          =   90.436          temperature(kelvin)      =  650.000
0potential scatter sigma  =    6.385          lumped nuclear density   = 4.2515602E-02
0spin factor (g)          =    1.079          lump dimension (a-bar)   = 5.4610002E-01
0inner radius             = 4.7878999E-01     dancoff correction (c)   = 5.0364637E-01
0the absorber will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs        res fiss       res scat
   8    -1.780596E-03    .000000E+00   -1.285907E+00
   9    -5.895373E-02    .000000E+00   -2.695297E+00
  10    -6.959955E-02    .000000E+00   -1.601321E+00
  11    -1.883957E-01    .000000E+00   -7.920912E-01
0excess resonance integrals
0                resolved
0absorption     2.28539E-01
 fission         .00000E+00
-  elapsed time    .02 min.
0 rb-94        mt=102                    updated 10/13/89          41094    temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   93.101          temperature(kelvin)      =  975.000
0potential scatter sigma  =    3.779          lumped nuclear density   = 9.9999997E-21
0spin factor (g)          = 43808.801         lump dimension (a-bar)   = 4.6812201E-01
0inner radius             = .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1   =   15.995             sigma(per absorber atom)= 1.7075970E+19
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2   =  237.953             sigma(per absorber atom)= 1.9051458E+19
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs        res fiss       res scat
  13     1.043336E-02    .000000E+00    9.253548E-04
  14     9.836751E-03    .000000E+00   -4.064909E-04
0excess resonance integrals
0                resolved
0absorption     9.15001E+01
```

```
 fission          .00000E+00
- elapsed time    .02 min.
0 mo-95         mt=102                    updated 10/13/89          42095     temperature=  975.00
0resonance data for this nuclide
0mass number (a)         =   94.091          temperature(kelvin)     =  975.000
0potential scatter sigma =    3.806          lumped nuclear density  = 9.9999997E-21
0spin factor (g)         =  607.724          lump dimension (a-bar)  = 4.6812201E-01
0inner radius            = .0000000E+00      dancoff correction (c)  = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1     =   15.995          sigma(per absorber atom)= 1.7075970E+19
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2     =  237.933          sigma(per absorber atom)= 1.9051458E+19
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs         res fiss        res scat
  10     -7.915671E-05     .000000E+00    2.663419E-04
  11      2.016730E-04     .000000E+00    2.080861E-05
  12      9.774911E-03     .000000E+00    8.762282E-03
  13      1.615204E-04     .000000E+00   -2.779906E-05
0excess resonance integrals
0                resolved
0absorption     1.05222E+02
 fission          .00000E+00
- elapsed time    .02 min.
0 tc-99         mt=102                    updated 10/13/89          43099     temperature=  975.00
0resonance data for this nuclide
0mass number (a)         =   98.150          temperature(kelvin)     =  975.000
0potential scatter sigma =    6.000          lumped nuclear density  = 9.9999997E-21
0spin factor (g)         = 4527.940          lump dimension (a-bar)  = 4.6812201E-01
0inner radius            = .0000000E+00      dancoff correction (c)  = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1     =   15.995          sigma(per absorber atom)= 1.7075970E+19
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2     =  237.933          sigma(per absorber atom)= 1.9051458E+19
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs         res fiss        res scat
  11      2.904125E-04     .000000E+00    1.159129E-04
  12      2.889429E-04     .000000E+00    1.895800E-05
  13      5.058687E-03     .000000E+00    2.067952E-04
  14      9.705323E-02     .000000E+00    2.243266E-03
  15      1.072213E-02     .000000E+00   -5.414662E-04
  16      4.836156E-03     .000000E+00   -2.802451E-04
  17      2.074327E-04     .000000E+00   -1.191957E-05
0excess resonance integrals
0                resolved
0absorption     3.35536E+02
 fission          .00000E+00
- elapsed time    .03 min.
0 ru-101        mt=102                    updated 10/13/89          44101     temperature=  975.00
0resonance data for this nuclide
0mass number (a)         =  100.089          temperature(kelvin)     =  975.000
0potential scatter sigma =    3.965          lumped nuclear density  = 9.9999997E-21
0spin factor (g)         = 8785.290          lump dimension (a-bar)  = 4.6812201E-01
0inner radius            = .0000000E+00      dancoff correction (c)  = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1     =   15.995          sigma(per absorber atom)= 1.7075970E+19
0moderator-1 will be treated by the nordheim integral method.
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0mass of moderator-2    =  237.933              sigma(per absorber atom)= 1.9051458E+19
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs         res fiss        res scat
  11      -3.518813E-02     .000000E+00   -3.622225E-03
  12       5.204958E-02     .000000E+00    5.420228E-03
  13       7.549752E-03     .000000E+00    1.902731E-04
  14       2.381085E-04     .000000E+00   -4.201588E-05
0excess resonance integrals
0                 resolved
0absorption      8.00378E+01
 fission          .00000E+00
-  elapsed time    .03 min.
0 ru-106        mt=102                  updated 10/13/89            44106     temperature=  975.00
0 rh-103        mt=102                  updated 10/13/89            45103     temperature=  975.00
0resonance data for this nuclide
0mass number (a)         =   102.021          temperature(kelvin)     =   975.000
0potential scatter sigma =     5.408          lumped nuclear density  = 9.9999997E-21
0spin factor (g)         =      .500          lump dimension (a-bar)  = 4.6812201E-01
0inner radius            = .0000000E+00       dancoff correction (c)  = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1    =   15.995              sigma(per absorber atom)= 1.7075970E+19
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2    =  237.933              sigma(per absorber atom)= 1.9051458E+19
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs         res fiss        res scat
   9       1.326827E-03     .000000E+00    2.167915E-03
  10      -1.286871E-03     .000000E+00   -1.980879E-03
  11       4.747010E-04     .000000E+00    2.049829E-04
  12       6.839059E-05     .000000E+00   -1.216555E-05
  13        .000000E+00     .000000E+00     .000000E+00
  14        .000000E+00     .000000E+00     .000000E+00
  15       2.333214E-01     .000000E+00    3.451227E-03
  16       4.081323E+01     .000000E+00   -2.742478E-02
  17      -1.809042E+02     .000000E+00   -1.277730E-01
  18       8.817304E+01     .000000E+00    2.622113E-01
  19       1.162716E+01     .000000E+00   -1.845762E-03
  20       1.066385E+00     .000000E+00   -2.236318E-03
  21       2.092157E-01     .000000E+00    2.075584E-03
  22       2.606502E-01     .000000E+00    2.727417E-03
  23      -8.670080E-02     .000000E+00    1.600945E-03
0excess resonance integrals
0                 resolved
0absorption      1.17075E+03
 fission          .00000E+00
-  elapsed time    .07 min.
0 rh-105         mt=  102                                            45105     temperature=  975.00
0 pd-105        mt=102                  updated 10/13/89            46105     temperature=  975.00
0resonance data for this nuclide
0mass number (a)         =   104.004          temperature(kelvin)     =   975.000
0potential scatter sigma =     4.069          lumped nuclear density  = 9.9999997E-21
0spin factor (g)         = 15210.000          lump dimension (a-bar)  = 4.6812201E-01
0inner radius            = .0000000E+00       dancoff correction (c)  = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1    =   15.995              sigma(per absorber atom)= 1.7075970E+19
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2    =  237.933              sigma(per absorber atom)= 1.9051458E+19
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0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs         res fiss        res scat
  12      -4.362008E-02     .000000E+00   -2.957456E-04
  13       5.553506E-02     .000000E+00    5.201802E-04
  14       7.784640E-04     .000000E+00   -8.188062E-05
0excess resonance integrals
0                 resolved
0absorption       6.13404E+01
 fission           .00000E+00
- elapsed time     .07 min.
0 pd-108          mt=102                    updated 10/13/89              46108     temperature=   975.00
0resonance data for this nuclide
0mass number (a)          =   106.977          temperature(kelvin)      =   975.000
0potential scatter sigma  =     4.146          lumped nuclear density   = 9.9999997E-21
0spin factor (g)          = 21175.100          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995          sigma(per absorber atom)= 1.7075970E+19
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   237.953          sigma(per absorber atom)= 1.9051458E+19
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs         res fiss        res scat
  11       1.170581E-04     .000000E+00    3.532039E-04
  12       1.367686E-02     .000000E+00    9.317974E-03
  13       6.983784E-03     .000000E+00    1.812033E-03
  14       8.561562E-02     .000000E+00   -3.205911E-05
  15      -1.840045E-01     .000000E+00    8.083935E-05
  16       2.946594E-04     .000000E+00   -9.255802E-06
0excess resonance integrals
0                 resolved
0absorption       2.14135E+02
 fission           .00000E+00
- elapsed time     .07 min.
0 silver-109      endf/b-iv mat 1139        updated 10/13/89              47109     temperature=   975.00
0resonance data for this nuclide
0mass number (a)          =   107.969          temperature(kelvin)      =   975.000
0potential scatter sigma  =     4.988          lumped nuclear density   = 9.9999997E-21
0spin factor (g)          =  1441.870          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995          sigma(per absorber atom)= 1.7075970E+19
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   237.953          sigma(per absorber atom)= 1.9051458E+19
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs         res fiss        res scat
  10       3.941120E-05     .000000E+00    8.699980E-05
  11       5.547873E-04     .000000E+00    3.035632E-04
  12      -6.959971E-01     .000000E+00   -3.045062E-02
  13       7.673479E-01     .000000E+00    3.380764E-02
  14       4.382060E-01     .000000E+00    2.461560E-02
0excess resonance integrals
0                 resolved
0absorption       1.40425E+03
 fission           .00000E+00
```

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- elapsed time    .07 min.
0 sb-124        mt=102                          updated 10/13/89            51124    temperature=  975.00
0 xe-131        mt=102,103,104,105,106          updated 10/13/89            54131    temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   129.781             temperature(kelvin)      =   975.000
0potential scatter sigma  =     4.301             lumped nuclear density   = 9.9999997E-21
0spin factor (g)          =   246.825             lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00         dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995             sigma(per absorber atom)= 1.7075970E+19
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   237.933             sigma(per absorber atom)= 1.9051458E+19
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs         res fiss        res scat
   9       3.548233E-07     .000000E+00     2.687395E-06
  10       1.703408E-05     .000000E+00     2.475561E-05
  11       1.002568E-04     .000000E+00     3.780379E-05
  12       8.386960E-04     .000000E+00     6.769228E-05
  13       1.244908E-01     .000000E+00     1.863688E-01
  14       1.136255E-02     .000000E+00     1.588561E-02
0excess resonance integrals
0                 resolved
0absorption       8.4054E+02
 fission          .0000E+00
- elapsed time    .08 min.
0 xe-132        mt=102,103,104,105,106          updated 10/13/89            54132    temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   130.771             temperature(kelvin)      =   975.000
0potential scatter sigma  =     4.301             lumped nuclear density   = 9.9999997E-21
0spin factor (g)          =   675.899             lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00         dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995             sigma(per absorber atom)= 1.7075970E+19
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   237.933             sigma(per absorber atom)= 1.9051458E+19
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs         res fiss        res scat
   9       3.846073E-07     .000000E+00     4.707593E-06
  10       2.022905E-05     .000000E+00     2.391328E-04
  11       3.346509E-08     .000000E+00    -9.309281E-07
0excess resonance integrals
0                 resolved
0absorption       9.8435E-01
 fission          .0000E+00
- elapsed time    .08 min.
0 xenon-135     endf/b-iv mat 1294              updated 10/13/89            54135    temperature=  975.00
0 xe-136          mt=  102, 103, 104, 105, 107                              54136    temperature=  975.00
0 cesium-133    endf/b-iv mat 1141              updated 10/13/89            55133    temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   131.764             temperature(kelvin)      =   975.000
0potential scatter sigma  =     7.100             lumped nuclear density   = 9.9999997E-21
0spin factor (g)          =   374.437             lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00         dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995             sigma(per absorber atom)= 1.7075969E+19
0moderator-1 will be treated by the nordheim integral method.
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0mass of moderator-2    =   238.051              sigma(per absorber atom)= 1.8316216E+19
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs         res fiss        res scat
  9      -3.705633E-06     .000000E+00    4.731736E-05
 10       6.616260E-05     .000000E+00    8.590073E-05
 11       5.686005E-04     .000000E+00    7.995660E-04
 12       1.210576E-03     .000000E+00    1.180891E-04
 13       2.886432E-03     .000000E+00    1.459001E-04
 14       7.713464E-02     .000000E+00    2.332192E-03
 15       5.632077E-03     .000000E+00   -4.067794E-04
 16       2.777925E-03     .000000E+00   -2.215554E-04
 17       2.352236E-03     .000000E+00   -1.830806E-04
 18       2.214984E-03     .000000E+00   -1.679470E-04
 19       1.316890E-03     .000000E+00   -9.665920E-05
0excess resonance integrals
0                resolved
0absorption      3.67817E+02
 fission          .00000E+00
-  elapsed time    .10 min.
0 cs-134        mt=102                    updated 10/13/89          55134    temperature=  975.00
0 cs-135          mt=  102                                          55135    temperature=  975.00
0 cs-137        mt=102                    updated 10/13/89          55137    temperature=  975.00
0 ba-136        mt=102                    updated 10/13/89          56136    temperature=  975.00
0resonance data for this nuclide
0mass number (a)         =   134.737          temperature(kelvin)      =   975.000
0potential scatter sigma =     4.835          lumped nuclear density   = 9.9999997E-21
0spin factor (g)         =  1247.690          lump dimension (a-bar)   = 4.6812201E-01
0inner radius            =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1    =    15.995              sigma(per absorber atom)= 1.7075970E+19
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2    =   237.933              sigma(per absorber atom)= 1.9051458E+19
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs         res fiss        res scat
 10       1.392643E-06     .000000E+00    6.052888E-07
 11       2.651689E-05     .000000E+00    2.268840E-05
0excess resonance integrals
0                resolved
0absorption      1.39478E+00
 fission          .00000E+00
-  elapsed time    .10 min.
0 la-139        mt=102                    updated 10/13/89          57139    temperature=  975.00
0resonance data for this nuclide
0mass number (a)         =   137.713          temperature(kelvin)      =   975.000
0potential scatter sigma =     4.906          lumped nuclear density   = 9.9999997E-21
0spin factor (g)         =   145.855          lump dimension (a-bar)   = 4.6812201E-01
0inner radius            =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1    =    15.995              sigma(per absorber atom)= 1.7075970E+19
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2    =   237.933              sigma(per absorber atom)= 1.9051458E+19
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs         res fiss        res scat
  9       5.785221E-05     .000000E+00    8.074925E-03
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  10      -5.416118E-05     .000000E+00   -7.962958E-03
  11        .000000E+00     .000000E+00     .000000E+00
  12       3.425439E-04     .000000E+00    1.623582E-04
0excess resonance integrals
0                resolved
0absorption       8.15213E+00
 fission           .00000E+00
- elapsed time     .12 min.
0 ce-144           mt=  102                                          58144     temperature=  975.00
0 pr-141         mt=102,103,104,105,106,107     updated 10/13/89      59141     temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   139.697          temperature(kelvin)      =   975.000
0potential scatter sigma  =     4.953          lumped nuclear density   = 9.9999997E-21
0spin factor (g)          =  1026.500          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995          sigma(per absorber atom)= 1.7075970E+19
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   237.933          sigma(per absorber atom)= 1.9051458E+19
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs          res fiss          res scat
  10       2.722221E-05     .000000E+00    9.441898E-04
  11       1.657300E-04     .000000E+00    1.836016E-03
  12       6.502524E-05     .000000E+00    8.269918E-06
0excess resonance integrals
0                resolved
0absorption       1.23055E+01
 fission           .00000E+00
- elapsed time     .12 min.
0 pr-143         mt=102                 updated 10/13/89      59143     temperature=  975.00
0 nd-143         mt=102                 updated 10/13/89      60143     temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   141.682          temperature(kelvin)      =   975.000
0potential scatter sigma  =     5.000          lumped nuclear density   = 9.9999997E-21
0spin factor (g)          =  1964.860          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995          sigma(per absorber atom)= 1.7075970E+19
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   237.933          sigma(per absorber atom)= 1.9051458E+19
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs          res fiss          res scat
  10      -5.299144E-06     .000000E+00    3.773363E-05
  11       8.773024E-04     .000000E+00    7.552954E-03
  12       1.098715E-03     .000000E+00    4.429725E-04
0excess resonance integrals
0                resolved
0absorption       5.16983E+01
 fission           .00000E+00
- elapsed time     .12 min.
0 nd-145         mt=102                 updated 10/13/89      60145     temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   143.668          temperature(kelvin)      =   975.000
0potential scatter sigma  =     5.047          lumped nuclear density   = 9.9999997E-21
0spin factor (g)          =  1007.250          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
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0the absorber will be treated by the nordheim integral method.
0mass of moderator-1    =    15.995              sigma(per absorber atom)= 1.7075970E+19
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2    =   237.933              sigma(per absorber atom)= 1.9051458E+19
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs        res fiss       res scat
  10      9.267461E-05     .000000E+00    1.134150E-03
  11      5.599182E-05     .000000E+00    9.379933E-04
  12      3.607317E-03     .000000E+00    1.292681E-02
  13      9.669940E-05     .000000E+00    2.031052E-04
  14      3.997842E-02     .000000E+00    9.739675E-04
  15      5.917626E-03     .000000E+00   -4.639855E-04
  16      1.326674E-03     .000000E+00   -1.451365E-04
  17      9.642377E-04     .000000E+00   -1.063806E-04
  18      8.539549E-04     .000000E+00   -9.312791E-05
  19      7.633875E-04     .000000E+00   -8.068838E-05
  20      2.839147E-05     .000000E+00   -2.919823E-06
0excess resonance integrals
0              resolved
0absorption    2.10327E+02
 fission        .00000E+00
- elapsed time   .13 min.
0 nd-147      mt=102                  updated 10/13/89          60147    temperature=  975.00
0 pm-147      mt=102                  updated 10/13/89          61147    temperature=  975.00
0resonance data for this nuclide
0mass number (a)       =   145.653          temperature(kelvin)     =   975.000
0potential scatter sigma =    5.093         lumped nuclear density  = 9.9999997E-21
0spin factor (g)       = 21589.500          lump dimension (a-bar)  = 4.6812201E-01
0inner radius          =  .0000000E+00      dancoff correction (c)  = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1    =    15.995              sigma(per absorber atom)= 1.7075970E+19
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2    =   237.933              sigma(per absorber atom)= 1.9051458E+19
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs        res fiss       res scat
  12      6.966507E-03     .000000E+00    1.468595E-03
  13      1.578501E-03     .000000E+00   -2.277522E-04
  14      5.786348E-01     .000000E+00    1.423051E-01
  15      4.142128E-02     .000000E+00    7.001469E-03
  16      1.698034E-02     .000000E+00    1.746893E-03
  17      1.369746E-02     .000000E+00    1.150502E-03
  18      1.253748E-02     .000000E+00    9.648900E-04
  19      6.999250E-04     .000000E+00    5.068569E-05
0excess resonance integrals
0              resolved
0absorption    2.12313E+03
 fission        .00000E+00
- elapsed time   .13 min.
0 pm-148       mt= 102                                                61148    temperature=  975.00
0 sm-147      endf/b-v fission product     updated 10/13/89          62147    temperature=  975.00
0resonance data for this nuclide
0mass number (a)       =   145.653          temperature(kelvin)     =   975.000
0potential scatter sigma =    5.093         lumped nuclear density  = 9.9999997E-21
0spin factor (g)       =      .000          lump dimension (a-bar)  = 4.6812201E-01
0inner radius          =  .0000000E+00      dancoff correction (c)  = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
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  10      -8.693130E-05     .000000E+00   -2.192214E-04
  11       3.915146E-04     .000000E+00    2.219730E-03
  12       1.559308E-03     .000000E+00    4.600983E-04
  13       2.722763E-02     .000000E+00    1.456118E-02
  14       1.067168E-04     .000000E+00   -6.439571E-05
0excess resonance integrals
0                 resolved
0absorption      2.95075E+02
 fission          .00000E+00
- elapsed time    .15 min.
0 sm-151        mt=102,103,104,105,106,107     updated 10/13/89              62151     temperature=   975.00
0resonance data for this nuclide
0mass number (a)          =   149.623              temperature(kelvin)      =   975.000
0potential scatter sigma  =     5.185              lumped nuclear density   = 9.9999997E-21
0spin factor (g)          = 75574.703              lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00          dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995              sigma(per absorber atom)= 1.7075970E+19
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   237.933              sigma(per absorber atom)= 1.9051458E+19
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs          res fiss         res scat
  14       5.260533E-03     .000000E+00   -7.897375E-03
  15       1.507732E+01     .000000E+00    7.666258E-02
  16      -2.165288E+01     .000000E+00   -6.105221E-02
  17       1.746777E+02     .000000E+00    8.370620E-01
  18      -3.198567E+02     .000000E+00   -1.772521E+00
  19       6.261735E+01     .000000E+00    3.870579E-01
  20       1.102369E+00     .000000E+00    3.251883E-04
  21      -8.248987E-02     .000000E+00    1.288040E-02
  22       7.434122E-02     .000000E+00    3.612924E-03
  23      -9.669451E-03     .000000E+00    3.056623E-04
0excess resonance integrals
0                 resolved
0absorption      2.06074E+03
 fission          .00000E+00
- elapsed time    .15 min.
0 sm-152        mt=102,103,104,105,106,107     updated 10/13/89              62152     temperature=   975.00
0resonance data for this nuclide
0mass number (a)          =   150.615              temperature(kelvin)      =   975.000
0potential scatter sigma  =     5.208              lumped nuclear density   = 9.9999997E-21
0spin factor (g)          =   863.594              lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00          dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995              sigma(per absorber atom)= 1.7075970E+19
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   237.933              sigma(per absorber atom)= 1.9051458E+19
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs          res fiss         res scat
   9       2.403198E-06     .000000E+00    1.159116E-04
  10       9.314650E-05     .000000E+00    7.525454E-04
  11       5.544180E-04     .000000E+00    1.900341E-03
  12       1.606336E-03     .000000E+00    3.771814E-03
  13       4.295352E-02     .000000E+00    1.044723E-01
  14       5.906535E-01     .000000E+00    6.507989E-01
0excess resonance integrals
```

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0                resolved
0absorption      2.91111E+03
 fission          .00000E+00
- elapsed time    .17 min.
0 eu-153        mt=102,103,104,105,106,107     updated 10/13/89            63153     temperature=   975.00
0resonance data for this nuclide
0mass number (a)          =   151.607            temperature(kelvin)      =   975.000
0potential scatter sigma  =     9.731            lumped nuclear density   = 9.9999997E-21
0spin factor (g)          = 12265.900            lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00        dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1    =    15.995              sigma(per absorber atom)= 1.7075970E+19
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2    =   237.933              sigma(per absorber atom)= 1.9051458E+19
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs         res fiss        res scat
  12      -2.580043E-01     .000000E+00   -5.022002E-02
  13      -2.080346E-02     .000000E+00    2.732525E-03
  14      -4.284205E-01     .000000E+00    5.670392E-03
  15       3.649734E+00     .000000E+00   -9.770704E-03
  16      -3.288213E+00     .000000E+00    8.161153E-03
  17       1.505635E-01     .000000E+00   -3.437884E-03
  18       7.726885E-02     .000000E+00   -2.231282E-03
  19       5.055514E-02     .000000E+00   -1.541163E-03
  20      -1.265644E-01     .000000E+00   -1.041209E-03
0excess resonance integrals
0                resolved
0absorption      1.35663E+03
 fission          .00000E+00
- elapsed time    .17 min.
0 eu-154        mt=102,103,104,105,106,107     updated 10/13/89            63154     temperature=   975.00
0resonance data for this nuclide
0mass number (a)          =   152.601            temperature(kelvin)      =   975.000
0potential scatter sigma  =     9.731            lumped nuclear density   = 9.9999997E-21
0spin factor (g)          = 19135.801            lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00        dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1    =    15.995              sigma(per absorber atom)= 1.7075970E+19
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2    =   237.933              sigma(per absorber atom)= 1.9051458E+19
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs         res fiss        res scat
  12      -3.844084E-01     .000000E+00   -6.007666E-02
  13      -2.933085E-01     .000000E+00   -2.421374E-02
  14       3.604651E-01     .000000E+00    1.521953E-02
  15       2.304189E-01     .000000E+00    2.127269E-02
  16       7.322216E+00     .000000E+00    9.281573E-02
  17      -1.435965E+02     .000000E+00   -1.894614E+00
  18       1.138804E+02     .000000E+00    1.860162E+00
  19      -1.039527E+02     .000000E+00    1.221570E+00
0excess resonance integrals
0                resolved
0absorption      2.13732E+03
 fission          .00000E+00
- elapsed time    .18 min.
0 eu-155        mt=102,103,104,105,106,107     updated 10/13/89            63155     temperature=   975.00
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0 gd-155        mt=102                    updated 10/13/89          64155     temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   153.592          temperature(kelvin)      =  975.000
0potential scatter sigma  =     5.277          lumped nuclear density   = 9.9999997E-21
0spin factor (g)          = 12700.100          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             = .0000000E+00       dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1    =   15.995             sigma(per absorber atom)= 1.7075970E+19
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2    =  237.953             sigma(per absorber atom)= 1.9051458E+19
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs        res fiss       res scat
  12      -1.439257E+00     .000000E+00   -1.839427E-01
  13       1.541437E+00     .000000E+00    1.985446E-01
  14       2.192559E-01     .000000E+00    9.810235E-03
  15      -3.286444E-01     .000000E+00    5.341723E-05
  16       1.477360E+00     .000000E+00   -4.148862E-03
  17       1.568653E-01     .000000E+00   -1.479130E-03
  18       9.605146E-02     .000000E+00   -1.078069E-03
  19       6.295317E-02     .000000E+00   -8.026487E-04
  20       1.400321E-02     .000000E+00    3.090602E-04
  21        .000000E+00     .000000E+00     .000000E+00
  22        .000000E+00     .000000E+00     .000000E+00
  23        .000000E+00     .000000E+00     .000000E+00
  24        .000000E+00     .000000E+00     .000000E+00
  25      -2.406941E+03     .000000E+00   -1.882743E+00
  26      -5.227043E+03     .000000E+00    1.971364E+00
  27      -1.662799E+03     .000000E+00    7.404465E-01
0excess resonance integrals
0                 resolved
0absorption     3.82529E+04
 fission         .00000E+00
-  elapsed time    .18 min.
0u-234 1043 sigo=5+4 newlacs p-3 293k f-1/e-m(1.+5)                 92234     temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   232.029          temperature(kelvin)      =  975.000
0potential scatter sigma  =    10.021          lumped nuclear density   = 5.5557821E-06
0spin factor (g)          =  6948.450          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             = .0000000E+00       dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1    =   15.995             sigma(per absorber atom)= 3.0735492E+04
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2    =  237.955             sigma(per absorber atom)= 3.4280727E+04
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs        res fiss       res scat
  11      -2.660897E-02     .000000E+00   -7.755044E-02
  12      -2.166410E-01     .000000E+00   -9.087195E-02
  13       7.759067E-04     .000000E+00   -6.469014E-04
  14      -2.108644E+01     .000000E+00   -3.452136E+00
0excess resonance integrals
0                 resolved
0absorption     5.78630E+02
 fission         .00000E+00
-  elapsed time    .20 min.
0 uranium-235   endf/b-iv mat 1261          updated 10/13/89          92235     temperature=  975.00
0resonance data for this nuclide
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0mass number (a)          =  233.025          temperature(kelvin)      =  975.000
0potential scatter sigma  =   11.500          lumped nuclear density   = 6.9150812E-04
0spin factor (g)          = 15171.100         lump dimension (a-bar)   = 4.6812201E-01
0inner radius             = .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1   =   15.995             sigma(per absorber atom)= 2.4693810E+02
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2   =  238.049             sigma(per absorber atom)= 2.6500592E+02
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs        res fiss       res scat
  12     -2.802867E+00  -1.745419E+00  -6.529980E-02
  13     -9.404244E+00  -4.671767E+00  -2.017245E-01
  14     -7.541845E+00  -4.596020E+00  -5.108717E-02
0excess resonance integrals
0              resolved
0absorption   2.0486E+02
 fission      1.2225E+02
- elapsed time   .22 min.
0u-236 1163 sigo=5+4 newklacs p-3 293k f-1/e-m(1.+5)                  92236     temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =  234.017          temperature(kelvin)      =  975.000
0potential scatter sigma  =   10.995          lumped nuclear density   = 3.1674365E-06
0spin factor (g)          = 6328.490          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             = .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1   =   15.995             sigma(per absorber atom)= 5.3911008E+04
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2   =  237.934             sigma(per absorber atom)= 6.0137379E+04
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs        res fiss       res scat
  11     -1.742947E-02   .000000E+00  -3.756222E-02
  12     -4.166518E-02   .000000E+00  -5.612943E-02
  13     -5.275458E-02   .000000E+00  -3.181131E-03
  14     -3.376845E+00   .000000E+00  -2.965938E-01
0excess resonance integrals
0              resolved
0absorption   3.2930E+02
 fission      .0000E+00
- elapsed time   .22 min.
0 uranium-238   endf/b-iv mat 1262          updated 10/13/89          92238     temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =  236.006          temperature(kelvin)      =  975.000
0potential scatter sigma  =   10.599          lumped nuclear density   = 2.2067729E-02
0spin factor (g)          =  656.527          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             = .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1   =   15.995             sigma(per absorber atom)= 7.7379818E+00
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2   =  235.041             sigma(per absorber atom)= 3.3317560E-01
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs        res fiss       res scat
   9     -3.953677E-02   .000000E+00  -4.059601E-01
  10     -1.027990E+00  -1.759790E-05  -6.492478E+00
  11     -9.713745E+00   .000000E+00  -2.691004E+01
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  12      -4.305893E+01     .000000E+00   -4.999826E+01
  13      -5.402488E+01     .000000E+00   -1.769476E+01
  14      -1.045212E+02     .000000E+00   -6.060839E+00
0excess resonance integrals
0                  resolved
0absorption       1.79456E+01
 fission          5.03812E-04
-  elapsed time     .23 min.
0 neptunium-237  endf/b-iv mat 1263            updated 10/13/89            93237     temperature=   975.00
0resonance data for this nuclide
0mass number (a)          =   235.012              temperature(kelvin)      =   975.000
0potential scatter sigma  =    10.500              lumped nuclear density   = 9.9999997E-21
0spin factor (g)          = 10100.800              lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00          dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =   15.995               sigma(per absorber atom)= 1.7075969E+19
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =  238.051               sigma(per absorber atom)= 1.8316216E+19
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs          res fiss          res scat
  11      -6.297421E-02   -1.837015E-06   -7.368062E-03
  12       4.699678E-02   -7.827351E-05    9.789990E-03
  13       4.846796E-02    9.304715E-05    1.906104E-03
  14       2.287751E-02    1.978009E-06   -4.934850E-04
0excess resonance integrals
0                  resolved
0absorption       2.95269E+02
 fission          1.38613E-01
-  elapsed time     .27 min.
0pu-238 1050 sigo=5+4 newklacs p-3 293k f-1/e-m(1.+5)                        94238     temperature=   975.00
0resonance data for this nuclide
0mass number (a)          =   236.167              temperature(kelvin)      =   975.000
0potential scatter sigma  =    10.890              lumped nuclear density   = 9.9999997E-21
0spin factor (g)          = 13130.600              lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00          dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =   15.995               sigma(per absorber atom)= 1.7075969E+19
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =  238.051               sigma(per absorber atom)= 1.8316216E+19
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs          res fiss          res scat
  11       4.300073E-04    7.349576E-05    3.254688E-04
  12       3.435531E-04    4.151627E-05    1.223377E-04
  13       4.169841E-01    7.581419E-02   -8.996852E-03
  14      -3.821973E-01   -6.987069E-02    8.538967E-03
0excess resonance integrals
0                  resolved
0absorption       8.25561E+01
 fission          9.08581E+00
-  elapsed time     .27 min.
0 plutonium-239  endf/b-iv mat 1264            updated 10/13/89            94239     temperature=   975.00
0resonance data for this nuclide
0mass number (a)          =   236.999              temperature(kelvin)      =   975.000
0potential scatter sigma  =    10.200              lumped nuclear density   = 9.9999997E-21
0spin factor (g)          =  6435.710              lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00          dancoff correction (c)   = 3.4269261E-01
```

```
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1    =    15.995              sigma(per absorber atom)= 1.7075969E+19
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2    =   238.051              sigma(per absorber atom)= 1.8316216E+19
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs        res fiss       res scat
  11      1.026091E-03   7.365740E-04   7.731064E-05
  12      3.649406E-03   1.987919E-03   3.495293E-04
  13      3.192807E-03   1.440402E-05   8.998066E-04
  14      1.640449E-02   1.127308E-02  -5.654235E-04
0excess resonance integrals
0                resolved
0absorption     3.19726E+02
 fission        1.79269E+02
- elapsed time    .28 min.
0 plutonium-240  endf/b-iv mat 1265          updated 10/13/89          9424     temperature=   975.00
0resonance data for this nuclide
0mass number (a)          =   237.992          temperature(kelvin)      =   975.000
0potential scatter sigma  =    10.599          lumped nuclear density   = 9.9999997E-21
0spin factor (g)          =   669.244          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1    =    15.995              sigma(per absorber atom)= 1.7075969E+19
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2    =   238.051              sigma(per absorber atom)= 1.8316216E+19
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs        res fiss       res scat
   9     -9.114988E-06   1.994661E-07   6.593086E-05
  10      6.315603E-05   2.939710E-06   2.577517E-04
  11      4.433857E-04   2.762662E-06   4.575704E-04
  12      3.239271E-03   1.745970E-05   2.000425E-03
  13      1.275347E-03   7.819998E-06   8.856602E-05
  14       .000000E+00    .000000E+00    .000000E+00
  15      1.760503E-02   3.359997E-06   3.506874E-03
  16      3.385359E+00   6.461107E-04   4.328788E-01
  17      5.735937E+02   1.094729E-01   5.201967E+01
  18     -2.554376E+03  -4.875140E-01  -2.052582E+02
  19      1.057519E+03   2.018322E-01   8.031049E+01
  20     -9.453103E+01  -1.804166E-02   1.836000E+00
0excess resonance integrals
0                resolved
0absorption     8.44126E+03
 fission        2.63833E+00
- elapsed time    .30 min.
0 plutonium-241  endf/b-iv mat 1266          updated 10/13/89          9424     temperature=   975.00
0resonance data for this nuclide
0mass number (a)          =   238.978          temperature(kelvin)      =   975.000
0potential scatter sigma  =    10.959          lumped nuclear density   = 9.9999997E-21
0spin factor (g)          = 16402.100          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1    =    15.995              sigma(per absorber atom)= 1.7075969E+19
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2    =   238.051              sigma(per absorber atom)= 1.8316216E+19
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
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```
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs         res fiss        res scat
  12       1.377094E-02    1.229498E-02    6.801242E-04
  13      -2.439721E-02   -2.559265E-02   -1.833407E-03
  14       7.042534E-02    6.269953E-02    1.419312E-03
  15       1.801109E-02    1.614762E-02   -4.699414E-04
0excess resonance integrals
0                 resolved
0absorption      5.09543E+02
 fission         4.27111E+02
- elapsed time    .32 min.
0 plutonium-242  endf/b-iv mat 1161          updated 10/13/89            9242     temperature=   975.00
0resonance data for this nuclide
0mass number (a)          =   240.145          temperature(kelvin)      =   975.000
0potential scatter sigma  =    10.694          lumped nuclear density   = 9.9999997E-21
0spin factor (g)          =   6606.710          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00       dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995           sigma(per absorber atom)= 1.7075969E+19
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   238.051           sigma(per absorber atom)= 1.8316216E+19
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs         res fiss        res scat
  11       1.732151E-04    .000000E+00     2.955152E-04
  12       1.338541E-03    .000000E+00     2.000390E-03
  13       1.258568E-04    .000000E+00     4.973793E-06
  14       8.150769E-02    .000000E+00     1.527770E-02
  15       5.500306E-01    .000000E+00     5.579308E-03
  16       4.034138E-02    .000000E+00    -3.459574E-03
  17       1.550422E-02    .000000E+00    -1.848340E-03
  18       1.112562E-02    .000000E+00    -1.430774E-03
0excess resonance integrals
0                 resolved
0absorption      1.11245E+03
 fission          .00000E+00
- elapsed time    .32 min.
0am-241 1056 sigp-5+4 newklacs 218ngp p-3 293k                                95241    temperature=   975.00
0resonance data for this nuclide
0mass number (a)          =   238.950          temperature(kelvin)      =   975.000
0potential scatter sigma  =     9.511          lumped nuclear density   = 9.9999997E-21
0spin factor (g)          =  82058.203          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00       dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995           sigma(per absorber atom)= 1.7075969E+19
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   238.051           sigma(per absorber atom)= 1.8316216E+19
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs         res fiss        res scat
  13       4.924720E-01    1.212994E-02    4.967665E-03
  14      -4.283262E-01   -1.106696E-02   -4.417147E-03
0excess resonance integrals
0                 resolved
0absorption      1.93478E+02
 fission         1.07615E+00
- elapsed time    .32 min.
0am-243 1057 218 gp wt f-1/e-m 090376 p3 293k                                 95243    temperature=   975.00
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```
0resonance data for this nuclide
0mass number (a)          =   240.940          temperature(kelvin)      =   975.000
0potential scatter sigma  =     9.511          lumped nuclear density   = 9.9999997E-21
0spin factor (g)          = 82052.602          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995          sigma(per absorber atom)= 1.7075969E+19
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   238.051          sigma(per absorber atom)= 1.8316216E+19
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs         res fiss        res scat
  13     -6.597584E-03     .000000E+00    4.390141E-04
  14      2.233211E-02     .000000E+00    2.374156E-04
0excess resonance integrals
0                resolved
0absorption     1.60152E+02
 fission         .0000E+00
- elapsed time    .32 min.
0 curium-244    endf/b-iv mat 1162          updated 10/13/89          96244    temperature=   975.00
0resonance data for this nuclide
0mass number (a)          =   242.133          temperature(kelvin)      =   975.000
0potential scatter sigma  =    10.320          lumped nuclear density   = 9.9999997E-21
0spin factor (g)          =  5251.150          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995          sigma(per absorber atom)= 1.7075969E+19
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   238.051          sigma(per absorber atom)= 1.8316216E+19
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs         res fiss        res scat
  11      2.590136E-04    7.087814E-06    3.065648E-04
  12      7.074901E-04    3.320512E-05    1.406014E-04
  13      2.721952E-03    1.336724E-04    7.130241E-04
  14      8.470870E-02    5.068042E-03    1.606959E-02
0excess resonance integrals
0                resolved
0absorption     6.13904E+02
 fission        3.54222E+01
- elapsed time    .33 min.
- elapsed time    .33 min.
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        based on endf-b version 4 data with endf-b version 5 fission products
          compiled for nrc     1/27/89
         tape id                      4321      number of nuclides              65
         number of neutron groups       27      number of gamma groups           0
         first thermal group            15      logical unit                     4
                                table of contents
       1/v cross sections normalized to 1.0 at 0.0253 ev                    id    999
        hydrogen       endf/b-iv mat 1269/thrmf1002  updated 10/13/89      id   1001
       b-10 1273 218ngp 042375 p-3 293k                                     id   5010
        boron-11       endf/b-iv mat 1160            updated 10/13/89      id   5011
        oxygen-16      endf/b-iv mat 1276            updated 10/13/89      id   8016
        oxygen-16      endf/b-iv mat 1276            updated 10/13/89      id      6
        kr-83          mt=102,103,103,105,106,107    updated 10/13/89      id  36083
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      sr-90          mt=102                    updated 10/13/89       id   38090
       y-89          mt=102                    updated 10/13/89       id   39089
      zr-93          mt= 102                                          id   40093
      zr-94          mt=102                    updated 10/13/89       id   40094
      zr-95          mt=102                    updated 10/13/89       id   40095
      zircalloy      endf/b-iv mat 1284        updated 10/13/89       id   40302
      nb-94          mt=102                    updated 10/13/89       id   41094
      mo-95          mt=102                    updated 10/13/89       id   42095
      tc-99          mt=102                    updated 10/13/89       id   43099
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      ru-106         mt=102                    updated 10/13/89       id   44106
      rh-103         mt=102                    updated 10/13/89       id   45103
      rh-105         mt= 102                                          id   45105
      pd-105         mt=102                    updated 10/13/89       id   46105
      pd-108         mt=102                    updated 10/13/89       id   46108
      silver-109     endf/b-iv mat 1139        updated 10/13/89       id   47109
      sb-124         mt=102                    updated 10/13/89       id   51124
      xe-131         mt=102,103,104,105,106    updated 10/13/89       id   54131
      xe-132         mt=102,103,104,105,106    updated 10/13/89       id   54132
      xenon-135      endf/b-iv mat 1294        updated 10/13/89       id   54135
      xe-136         mt= 102, 103, 104, 105, 107                      id   54136
      cesium-133     endf/b-iv mat 1141        updated 10/13/89       id   55133
      cs-134         mt=102                    updated 10/13/89       id   55134
      cs-135         mt= 102                                          id   55135
      cs-137         mt=102                    updated 10/13/89       id   55137
      ba-136         mt=102                    updated 10/13/89       id   56136
      la-139         mt=102                    updated 10/13/89       id   57139
      ce-144         mt= 102                                          id   58144
      pr-141         mt=102,103,104,105,106,107  updated 10/13/89     id   59141
      pr-143         mt=102                    updated 10/13/89       id   59143
      nd-143         mt=102                    updated 10/13/89       id   60143
      nd-145         mt=102                    updated 10/13/89       id   60145
      nd-147         mt=102                    updated 10/13/89       id   60147
      pm-147         mt=102                    updated 10/13/89       id   61147
      pm-148         mt= 102                                          id   61148
      sm-147         endf/b-v fission product  updated 10/13/89       id   62147
      sm-149         mt=102,103,107            updated 10/13/89       id   62149
      sm-150         mt=102                    updated 10/13/89       id   62150
      sm-151         mt=102,103,104,105,106,107  updated 10/13/89     id   62151
      sm-152         mt=102,103,104,105,106,107  updated 10/13/89     id   62152
      eu-153         mt=102,103,104,105,106,107  updated 10/13/89     id   63153
      eu-154         mt=102,103,104,105,106,107  updated 10/13/89     id   63154
      eu-155         mt=102,103,104,105,106,107  updated 10/13/89     id   63155
      gd-155         mt=102                    updated 10/13/89       id   64155
     u-234 1043 sigo=5+4 newklacs p-3 293k f-1/e-m(1.+5)              id   92234
      uranium-235    endf/b-iv mat 1261        updated 10/13/89       id   92235
     u-236 1163 sigo=5+4 newklacs p-3 293k f-1/e-m(1.+5)              id   92236
      uranium-238    endf/b-iv mat 1262        updated 10/13/89       id   92238
      neptunium-237  endf/b-iv mat 1263        updated 10/13/89       id   93237
     pu-238 1050 sigo=5+4 newklacs p-3 293k f-1/e-m(1.+5)             id   94238
      plutonium-239  endf/b-iv mat 1264        updated 10/13/89       id   94239
      plutonium-240  endf/b-iv mat 1265        updated 10/13/89       id   94240
      plutonium-241  endf/b-iv mat 1266        updated 10/13/89       id   94241
      plutonium-242  endf/b-iv mat 1161        updated 10/13/89       id   94242
     am-241 1056 sigo=5+4 newklacs 218ngp p-3 293k                    id   95241
     am-243 1057 218 gp wt f-1/e-m 090576 p3 293k                     id   95243
      curium-244     endf/b-iv mat 1162        updated 10/13/89       id   96244
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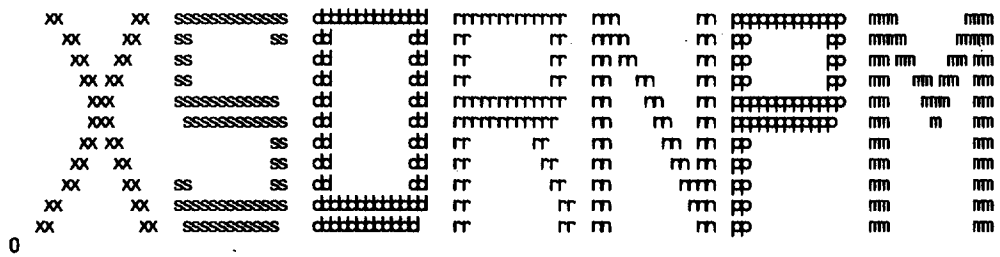
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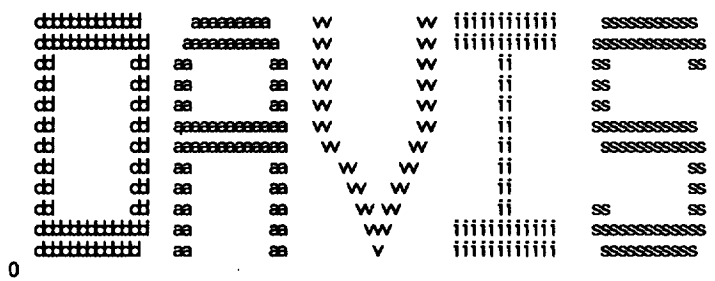
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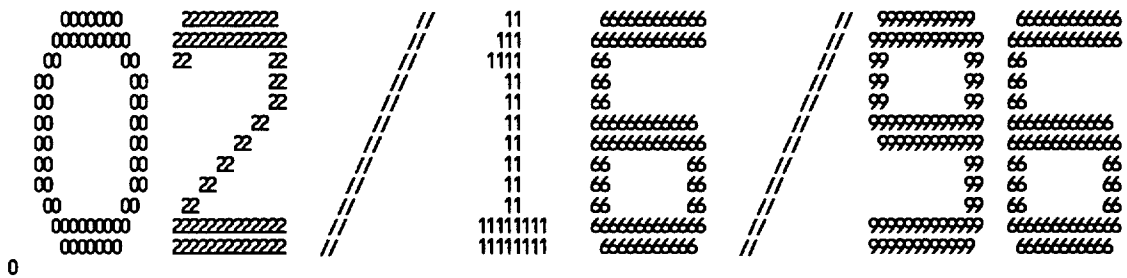
ddddddddddd aa aa w w iiiiiiiiiii SSSSSSSSSS
ddddddddd aa aa v iiiiiiiiiii SSSSSSSSS

0


OOOOOO ZZZZZZZZZ // 11 6666666666 // 9999999999 6666666666
OOOOOOOO ZZZZZZZZZZ // 111 6666666666 // 9999999999 6666666666
OO OO 22 22 // 1111 66 // 99 99 66
OO OO 22 // 11 66 // 99 99 66
OO OO 22 // 11 66 // 99 99 66
OO OO 22 // 11 6666666666 // 9999999999 6666666666
OO OO 22 // 11 6666666666 // 9999999999 6666666666
OO OO 22 // 11 66 66 // 99 66 66
OO OO 22 // 11 66 66 // 99 66 66
OO OO 22 // 11 66 66 // 99 66 66
OOOOOOOO ZZZZZZZZZZ // 11111111 6666666666 // 9999999999 6666666666
OOOOOO ZZZZZZZZZZ // 11111111 6666666666 // 9999999999 6666666666

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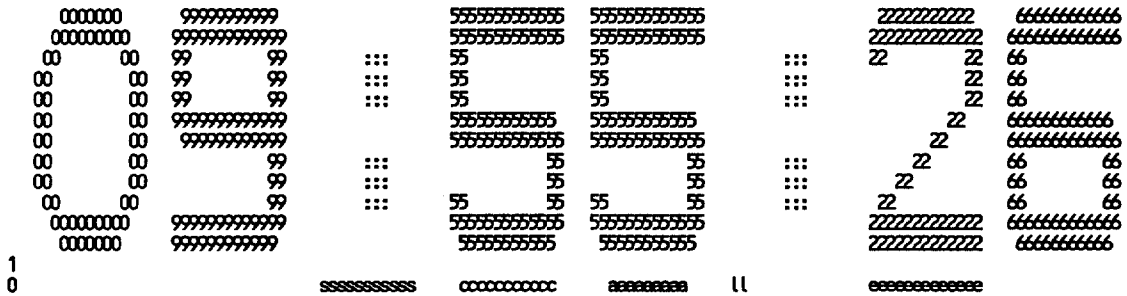

OOOOOO 9999999999 555555555555 555555555555 ZZZZZZZZZ 6666666666
OOOOOOOO 9999999999 555555555555 555555555555 ZZZZZZZZZZ 6666666666
OO OO 99 99 ::: 55 55 ::: 22 22 66
OO OO 99 99 ::: 55 55 ::: 22 66
OO OO 99 99 ::: 55 55 ::: 22 66
OO OO 9999999999 555555555 555555555 22 6666666666
OO OO 9999999999 555555555555 555555555555 22 6666666666
OO OO 99 ::: 55 55 ::: 22 66 66
OO OO 99 ::: 55 55 ::: 22 66 66
OO OO 99 ::: 55 55 55 55 ::: 22 66 66
OOOOOOOO 9999999999 555555555555 555555555555 ZZZZZZZZZZ 6666666666
OOOOOO 9999999999 5555555555 5555555555 ZZZZZZZZZZ 6666666666

1
0


SSSSSSSSSS ccccccccc aaaaaaaa ll eeeeeeeeeee
SSSSSSSSSSS ccccccccccc aaaaaaaaaa ll eeeeeeeeeee
SS SS cc cc aa aa ll ee
SS cc aa aa ll ee
SS cc aa aa ll ee
SSSSSSSSSSS cc aaaaaaaaaaa ll eeeeeeee

```
 ssssssssssss   cc             aaaaaaaaaaaa   ll             eeeeeeeee
        ss      cc            aa        aa    ll             ee
        ss      cc            aa        aa    ll             ee
 ss     ss      cc      cc    aa        aa    ll             ee
 ssssssssssss   ccccccccccc   aa        aa    lllllllllllll  eeeeeeeeeeee
  ssssssssss     ccccccccc    aa        aa    lllllllllllll  eeeeeeeeeeee
```

```
**********************************************************************
**********************************************************************
**********************************************************************
******                                                          ******
******              program verification information            ******
******                                                          ******
******              code system:   scale  version:   4.2        ******
******                                                          ******
**********************************************************************
**********************************************************************
******                                                          ******
******                                                          ******
******              program:  c0c001                            ******
******                                                          ******
******          creation date:  04/27/95                        ******
******                                                          ******
******              library:  /neutronics/scale/exe             ******
******                                                          ******
******                                                          ******
******    this is not a   scale  configuration controlled code  ******
******                                                          ******
******              jobname:  davis                             ******
******                                                          ******
******    date of execution:  02/16/96                          ******
******                                                          ******
******    time of execution:  09:55:27                          ******
******                                                          ******
******                                                          ******
**********************************************************************
**********************************************************************
**********************************************************************
```

```
1
                    at 0 d, sas2h: babcock wilcox 15x15, 3.00wt%, 20gwd/mtu burn high temp
0       -1q array has      1 entries.
0        1q array has     15 entries.
0        2q array has     10 entries.
0        3q array has     12 entries.
0        4q array has      9 entries.
0        5q array has     12 entries.
0direct access unit   9 requires    12 blocks of length  704 for cross section mixing.
1                    at 0 d, sas2h: babcock wilcox 15x15, 3.00wt%, 20gwd/mtu burn high temp
0general problem description data block
0                          general problem data

 ige  1/2/3 = plane/cylinder/sphere      2       isn  quadrature order                  8
 izm  number of zones                    4       isct order of scattering               3
 im   number of special intervals       24       ievt 0/1/2/3/4/5/6=q/k/alpha/c/z/r/h   1
 ibl  0/1/2/3 = vacuum/refl/per/white    1       iim  inner iteration maximum          20
 ibr  right boundary condition           3       iom  outer iteration maximum          25
```

```
 mxx  number of mixtures                3      iclc -1/0/n--flat res/sn/cpt        0
 ms   mixing table length              65      ith  0/1 = forward/adjoint          0
 igm  number of energy groups          27      iflu not used(always wgtd)          0
 nng  number of neutron groups         27      iprt -2/-1/0/n=mixture xsec print  -2
 ngg  number of gamma groups            0      id1  0/1/2/3=no/prt nd/pch n/both  53
 iftg number of first thermal group    15      ipbt -1/0/1=none/fine/all bal. prt  0
0                               special options

 ifg  0/1 = none/weighting calculation  1      ipn  0/1/2 diff. coef. param        0
 iqm  volumetric sources (0/n=no/yes)   0      idfm 0/1 = none/density factors 38* 1
 ipm  boundary sources (0/n=no/yes)     0      iaz  0/n = none/n activities by zone 0
 ifn  0/1/2 = input 33*/34*/use last   53      iai  0/1=none/activities by interval 0
 itmx maximum time (minutes)           10      ifct 0/1=no/yes upscatter scaling   0
 idt1 0/1/2/3=no/xsect/srce/flux--out   0      ipvt 0/1/2=no/k/alpha parametric srch 0
 isx  broad group fluxes                0      isen outer iteration acceleration   0
 ibln activity data unit                0      nbnd band rebaln parameter          0
 jbkl 0/1/2 buckling geometry           0
0                               weighting data (ifg=1)

 icon -1/0/1=cell/zone/region weight   -1      ihtf total xsect psn in brd gp tables 3
 igmf number of broad groups           27      ndsf psn g-g or file number         4
 itp  0/10/20/30/40 0/c/e/ac/a          0      nusf table length or max order      4
 ipp  -2/-1/0/n=wgted xsect print      -2      msom extra 1-d x-sect positions     0
 iap  -1/n anisn xsect print           -1
0                               floating point parameters

 eps  overall convergence       1.00000E-04   dy   cyl/pla ht for buckling   .00000E+00
 ptc  point convergence         1.00000E-04   dz   plane depth for buckling  .00000E+00
 xnf  normalization factor      1.00000E+00   vsc  void streaming correction .00000E+00
 ev   eigenvalue guess           .00000E+00   pv   ipvt=1/2--k/alpha        1.00000E+00
 evm  eigenvalue modifier        .00000E+00   eql  ev change eps for search 1.00000E-03
 bf   buckling factor=1.420892  1.42089E+00   xnpm new param mod for search 7.50000E-01
    this case will require       2535 locations for mixing
    this case has been allocated 200000 locations
1                   at 0 d, sas2h: babcock wilcox 15x15, 3.00wt%, 20gwd/mtu burn high temp
0       13q array has     65 entries.
0       14q array has     65 entries.
0       15q array has     65 entries.
0                               data block 2 (mixing table, etc.)
```

0	nuclides on tape	cccc identification	mixture	mixing table component	atom density	extra xsect id's
1	999		1	92235	6.91508E-04	
2	1001		1	92234	5.55578E-06	
3	5010		1	92236	3.16744E-06	
4	5011		1	92238	2.20677E-02	
5	8016		1	8016	4.55359E-02	
6	6		3	6	2.09710E-02	
7	36083		1	36083	1.00000E-20	
8	36085		1	36085	1.00000E-20	
9	38090		1	38090	1.00000E-20	
10	39089		1	39089	1.00000E-20	
11	40093		1	42095	1.00000E-20	
12	40094		1	40093	1.00000E-20	
13	40095		1	40094	1.00000E-20	
14	40302		1	40095	1.00000E-20	
15	41094		1	41094	1.00000E-20	
16	42095		1	43099	1.00000E-20	
17	43099		1	45103	1.00000E-20	
18	44101		1	45105	1.00000E-20	
19	44106		1	44101	1.00000E-20	

20	45103	1	44106	1.00000E-20
21	45105	1	46105	1.00000E-20
22	46105	1	46108	1.00000E-20
23	46108	1	47109	1.00000E-20
24	47109	1	51124	1.00000E-20
25	51124	1	54131	1.00000E-20
26	54131	1	54132	1.00000E-20
27	54132	1	54135	1.00000E-20
28	54135	1	54136	1.00000E-20
29	54136	1	55134	1.00000E-20
30	55133	1	55135	1.00000E-20
31	55134	1	55137	1.00000E-20
32	55135	1	56136	1.00000E-20
33	55137	1	57139	1.00000E-20
34	56136	1	59141	1.00000E-20
35	57139	1	59143	1.00000E-20
36	58144	1	58144	1.00000E-20
37	59141	1	60143	1.00000E-20
38	59143	1	60145	1.00000E-20
39	60143	1	61147	1.00000E-20
40	60145	1	61148	1.00000E-20
41	60147	1	60147	1.00000E-20
42	61147	1	62147	1.00000E-20
43	61148	1	62149	1.00000E-20
44	62147	1	62150	1.00000E-20
45	62149	1	62151	1.00000E-20
46	62150	1	62152	1.00000E-20
47	62151	1	64155	1.00000E-20
48	62152	1	63153	1.00000E-20
49	63153	1	63154	1.00000E-20
50	63154	1	63155	1.00000E-20
51	63155	2	40302	4.25156E-02
52	64155	3	1001	4.19420E-02
53	92234	3	5010	3.81515E-06
54	92235	3	5011	1.54884E-05
55	92236	1	55133	1.00000E-20
56	92238	1	93237	1.00000E-20
57	93237	1	94238	1.00000E-20
58	94238	1	94239	1.00000E-20
59	94239	1	94240	1.00000E-20
60	94240	1	94241	1.00000E-20
61	94241	1	94242	1.00000E-20
62	94242	1	95241	1.00000E-20
63	95241	1	95243	1.00000E-20
64	95243	1	96244	1.00000E-20
65	96244	1	999	1.00000E-20

- elapsed time .00 min.
0 21649 locations will be used
0 35q array has 25 entries.
0 36q array has 24 entries.
0 38q array has 24 entries.
0 39q array has 4 entries.
0 40q array has 4 entries.
0 47q array has 27 entries.
0 51q array has 27 entries.
1 at 0 d, sas2h: babcock wilcox 15x15, 3.00wt%, 20gwd/mtu burn high temp

0 neutron group parameters

gp	energy boundaries	lethargy boundaries	weighted velocities	broad gp numbers	calc type	group band	right albedo	left albedo
1	2.00000E+07	-6.93147E-01	4.60581E+09	1	0	1	1.00000E+00	

2	6.43400E+06	4.40989E-01	2.88737E+09	2	0	2	1.00000E+00
3	3.00000E+06	1.20397E+00	2.12201E+09	3	0	3	1.00000E+00
4	1.85000E+06	1.68740E+00	1.75673E+09	4	0	4	1.00000E+00
5	1.40000E+06	1.96611E+00	1.46535E+09	5	0	5	1.00000E+00
6	9.00000E+05	2.40795E+00	1.06620E+09	6	0	6	1.00000E+00
7	4.00000E+05	3.21888E+00	6.07557E+08	7	0	7	1.00000E+00
8	1.00000E+05	4.60517E+00	2.72415E+08	8	0	8	1.00000E+00
9	1.70000E+04	6.37713E+00	1.13526E+08	9	0	9	1.00000E+00
10	3.00000E+03	8.11173E+00	4.82126E+07	10	0	10	1.00000E+00
11	5.50000E+02	9.80818E+00	2.05946E+07	11	0	11	1.00000E+00
12	1.00000E+02	1.15129E+01	1.01036E+07	12	0	12	1.00000E+00
13	3.00000E+01	1.27169E+01	5.69595E+06	13	0	13	1.00000E+00
14	1.00000E+01	1.38155E+01	3.20957E+06	14	0	14	1.00000E+00
15	3.04999E+00	1.50080E+01	2.10601E+06	15	0	15	1.00000E+00
16	1.77000E+00	1.55471E+01	1.70522E+06	16	0	16	1.00000E+00
17	1.29999E+00	1.58557E+01	1.52545E+06	17	0	17	1.00000E+00
18	1.12999E+00	1.59959E+01	1.42867E+06	18	0	18	1.00000E+00
19	1.00000E+00	1.61181E+01	1.31002E+06	19	0	19	1.00000E+00
20	8.00000E-01	1.63412E+01	9.05898E+05	20	0	20	1.00000E+00
21	4.00000E-01	1.70344E+01	8.17974E+05	21	0	21	1.00000E+00
22	3.25000E-01	1.72420E+01	6.90070E+05	22	0	22	1.00000E+00
23	2.25000E-01	1.76098E+01	4.86933E+05	23	0	23	1.00000E+00
24	9.99999E-02	1.84207E+01	3.57766E+05	24	0	24	1.00000E+00
25	5.00000E-02	1.91138E+01	2.71895E+05	25	0	25	1.00000E+00
26	3.00000E-02	1.96247E+01	1.87283E+05	26	0	26	1.00000E+00
27	1.00000E-02	2.07233E+01	8.88201E+04	27	0	27	1.00000E+00
28	1.00000E-05	2.76310E+01					

1 at 0 d, sas2h: babcock wilcox 15x15, 3.00wt%, 20gwd/mtu burn high temp

0

	mixture by zone	order p(l) by zone	activity table matl no.	reaction	quadrature constants weights	directions	refl direc	wt x cos
1	1	3			0	-2.79004E-01	3	0
2	1	3			5.06143E-02	-1.97286E-01	3	-9.98548E-03
3	2	3			5.06143E-02	1.97286E-01	2	9.98548E-03
4	3	3			0	-6.04419E-01	8	0
5					5.55953E-02	-5.58410E-01	8	-3.10450E-02
6					5.55953E-02	-2.31301E-01	7	-1.28593E-02
7					5.55953E-02	2.31301E-01	6	1.28593E-02
8					5.55953E-02	5.58410E-01	5	3.10450E-02
9					0	-8.50774E-01	15	0
10					5.22844E-02	-8.21784E-01	15	-4.29665E-02
11					5.22844E-02	-6.01588E-01	14	-3.14537E-02
12					5.22844E-02	-2.20196E-01	13	-1.15128E-02
13					5.22844E-02	2.20196E-01	12	1.15128E-02
14					5.22844E-02	6.01588E-01	11	3.14537E-02
15					5.22844E-02	8.21784E-01	10	4.29665E-02
16					0	-9.83032E-01	24	0
17					4.53355E-02	-9.64143E-01	24	-4.37099E-02
18					4.53355E-02	-8.17361E-01	23	-3.70655E-02
19					4.53355E-02	-5.46143E-01	22	-2.47597E-02
20					4.53355E-02	-1.91780E-01	21	-8.69444E-03
21					4.53355E-02	1.91780E-01	20	8.69444E-03
22					4.53355E-02	5.46143E-01	19	2.47597E-02
23					4.53355E-02	8.17361E-01	18	3.70655E-02
24					4.53355E-02	9.64143E-01	17	4.37099E-02

0constants for p(3) scattering

0angl	set 1	set 2	set 3	set 4	set 5
1	-2.79004E-01	8.85235E-01	6.74143E-02	-6.16919E-01	-1.71701E-02
2	-1.97286E-01	8.85235E-01	.00000E+00	-4.36228E-01	1.21411E-02
3	1.97286E-01	8.85235E-01	.00000E+00	4.36228E-01	-1.21411E-02
4	-6.04419E-01	4.52016E-01	3.16379E-01	-8.04435E-01	-1.74564E-01

5	-5.58410E-01	4.52016E-01	2.23714E-01	-7.43201E-01	-6.68028E-02
6	-2.31301E-01	4.52016E-01	-2.23713E-01	-3.07844E-01	1.61276E-01
7	2.31301E-01	4.52016E-01	-2.23713E-01	3.07844E-01	-1.61276E-01
8	5.58410E-01	4.52016E-01	2.23713E-01	7.43201E-01	6.68028E-02
9	-8.50774E-01	-8.57235E-02	6.26843E-01	-1.98456E-01	-4.86835E-01
10	-8.21784E-01	-8.57235E-02	5.42862E-01	-1.91694E-01	-3.44245E-01
11	-6.01588E-01	-8.57235E-02	.00000E+00	-1.40330E-01	3.44244E-01
12	-2.20196E-01	-8.57235E-02	-5.42862E-01	-5.13643E-02	3.44245E-01
13	2.20196E-01	-8.57235E-02	-5.42862E-01	5.13643E-02	-3.44245E-01
14	6.01588E-01	-8.57235E-02	.00000E+00	1.40330E-01	-3.44245E-01
15	8.21784E-01	-8.57235E-02	5.42862E-01	1.91694E-01	3.44245E-01
16	-9.83052E-01	-4.49528E-01	8.36885E-01	5.00703E-01	-7.51005E-01
17	-9.64143E-01	-4.49528E-01	7.73181E-01	4.91083E-01	-6.24438E-01
18	-8.17361E-01	-4.49528E-01	3.20262E-01	4.16320E-01	1.46514E-01
19	-5.46143E-01	-4.49528E-01	-3.20262E-01	2.78176E-01	7.36575E-01
20	-1.91780E-01	-4.49528E-01	-7.73181E-01	9.76824E-02	4.17256E-01
21	1.91780E-01	-4.49528E-01	-7.73181E-01	-9.76824E-02	-4.17256E-01
22	5.46143E-01	-4.49528E-01	-3.20262E-01	-2.78176E-01	-7.36575E-01
23	8.17361E-01	-4.49528E-01	3.20262E-01	-4.16320E-01	-1.46514E-01
24	9.64143E-01	-4.49528E-01	7.73181E-01	-4.91083E-01	6.24438E-01

1 int radii mid pts zone no. areas volumes dens fact radius mod spec(int)

1	0	1.29551E-02	1	0	2.10906E-03	1.00000E+00	0
2	2.59102E-02	4.33406E-02	1	1.62798E-01	9.49318E-03	1.00000E+00	0
3	6.07710E-02	8.75100E-02	1	3.81835E-01	2.94045E-02	1.00000E+00	0
4	1.14249E-01	1.74155E-01	1	7.17848E-01	1.31104E-01	1.00000E+00	0
5	2.34061E-01	2.93967E-01	1	1.47065E+00	2.21299E-01	1.00000E+00	
6	3.53873E-01	3.80612E-01	1	2.22345E+00	1.27890E-01	1.00000E+00	
7	4.07351E-01	4.24781E-01	1	2.55946E+00	9.30429E-02	1.00000E+00	
8	4.42212E-01	4.55167E-01	1	2.77850E+00	7.41004E-02	1.00000E+00	
9	4.68122E-01	4.68814E-01	2	2.94130E+00	4.07944E-03	0	
10	4.69507E-01	4.71481E-01	2	2.95000E+00	1.16988E-02	0	
11	4.73456E-01	4.75431E-01	2	2.97481E+00	1.17968E-02	0	
12	4.77405E-01	4.78098E-01	2	2.99962E+00	4.16023E-03	0	
13	4.78790E-01	4.83159E-01	3	3.00833E+00	2.65268E-02	1.00000E+00	
14	4.87528E-01	4.99987E-01	3	3.06323E+00	7.82768E-02	1.00000E+00	
15	5.12445E-01	5.24903E-01	3	3.21979E+00	8.21777E-02	1.00000E+00	
16	5.37362E-01	5.41731E-01	3	3.37634E+00	2.97427E-02	1.00000E+00	
17	5.46100E-01	5.53513E-01	4	3.43125E+00	5.15631E-02	1.00000E+00	
18	5.60926E-01	5.70900E-01	4	3.52440E+00	7.15548E-02	1.00000E+00	
19	5.80874E-01	5.96175E-01	4	3.64974E+00	1.14628E-01	1.00000E+00	
20	6.11475E-01	6.45755E-01	4	3.84201E+00	2.78169E-01	1.00000E+00	
21	6.80034E-01	7.14313E-01	4	4.27278E+00	3.07702E-01	1.00000E+00	
22	7.48592E-01	7.63893E-01	4	4.70354E+00	1.46875E-01	1.00000E+00	
23	7.79193E-01	7.89167E-01	4	4.89582E+00	9.89116E-02	1.00000E+00	
24	7.99141E-01	8.06554E-01	4	5.02115E+00	7.51357E-02	1.00000E+00	
25	8.13968E-01			5.11431E+00			

- elapsed time .00 min.

1 outer inner 1 - balance eigenvalue 1 - source 1 - scatter 1 - upscat search time

iter	iters			ratio	ratio	ratio	parameter	(min)
1	197	1.90564E-05	1.22058E+00	-2.19260E-01	1.00000E+00	3.33668E-03	.00000E+00	.0000
2	292	-1.88981E-06	1.23107E+00	1.08980E-03	-1.73021E-02	2.88363E-02	.00000E+00	.0000
3	377	8.20433E-06	1.22188E+00	1.02605E-03	9.41306E-03	1.25031E-02	.00000E+00	.0167
4	451	-4.50866E-07	1.21741E+00	3.84249E-04	4.54793E-03	2.87685E-03	.00000E+00	.0167
5	509	1.88203E-06	1.21627E+00	7.21640E-05	1.07277E-03	4.13854E-04	.00000E+00	.0167
6	551	-1.33478E-05	1.21632E+00	1.05179E-05	1.45281E-04	6.29152E-05	.00000E+00	.0167

grp to grp	inner iters	mfd int.	max. flux difference	msf int.	max. scale factor	coarse mesh
1	1	1	3.06407E-07	24	1.00000E+00	1
2	1	1	3.57448E-07	24	1.00000E+00	1
3	1	1	3.28814E-07	24	1.00000E+00	1

4	4	1	1	3.17300E-07	24	1.00000E+00	1
5	5	1	1	3.22693E-07	24	1.00000E+00	1
6	6	1	1	2.04244E-07	24	1.00000E+00	1
7	7	1	1	1.38576E-07	24	1.00000E+00	1
8	8	1	1	3.61431E-08	24	1.00000E+00	1
9	9	1	7	2.25372E-09	24	1.00000E+00	1
10	10	1	2	2.80847E-09	24	1.00000E+00	1
11	11	1	2	3.17741E-09	24	1.00000E+00	1
12	12	1	2	3.75445E-09	24	1.00000E+00	1
13	13	1	2	3.48470E-09	24	1.00000E+00	1
14	14	1	2	3.38799E-09	24	1.00000E+00	1
15	15	1	18	2.27172E-05	24	1.00010E+00	1
16	16	1	20	3.39167E-05	24	1.00009E+00	1
17	17	1	19	4.61487E-05	24	1.00009E+00	1
18	18	1	19	5.17709E-05	24	1.00010E+00	1
19	19	1	20	4.88440E-05	24	1.00011E+00	1
20	20	1	20	4.79851E-05	24	1.00018E+00	1
21	21	1	20	8.31927E-05	24	1.00017E+00	1
22	22	1	20	3.24259E-05	24	1.00008E+00	1
23	23	1	24	9.90472E-06	24	1.00000E+00	1
24	24	1	24	2.76203E-05	24	9.99989E-01	1
25	25	1	24	3.16361E-05	24	9.99992E-01	1
26	26	1	21	3.19527E-05	24	1.00008E+00	2
27	27	1	24	1.33300E-05	19	9.99999E-01	2

7 578 1.51990E-05 1.21590E+00 2.13601E-06 2.19379E-05 8.19833E-06 .00000E+00 .0167

final monitor

lambda 1.21611E+00 production/absorption 1.21611E+00 angular flux on 16

- elapsed time .02 min.

1 at 0 d, sas2h: babcock wilcox 15x15, 3.00wt%, 20gwd/mtu burn high temp

0 int. zone number radius int. midpoint area volume prod density

1	1	.00000E+00	1.29551E-02	.00000E+00	2.10906E-03	3.57472E-03
2	1	2.59102E-02	4.33406E-02	1.62798E-01	9.49318E-03	1.60836E-02
3	1	6.07710E-02	8.75100E-02	3.81835E-01	2.94045E-02	4.99010E-02
4	1	1.14249E-01	1.74155E-01	7.17848E-01	1.31104E-01	2.24410E-01
5	1	2.34061E-01	2.93967E-01	1.47065E+00	2.21299E-01	3.86876E-01
6	1	3.53873E-01	3.80612E-01	2.22345E+00	1.27890E-01	2.28822E-01
7	1	4.07351E-01	4.24781E-01	2.55946E+00	9.30429E-02	1.69575E-01
8	1	4.42212E-01	4.55167E-01	2.77850E+00	7.41004E-02	1.37069E-01
9	2	4.68122E-01	4.68814E-01	2.94130E+00	4.07946E-03	.00000E+00
10	2	4.69507E-01	4.71481E-01	2.95000E+00	1.16988E-02	.00000E+00
11	2	4.73456E-01	4.75431E-01	2.97481E+00	1.17968E-02	.00000E+00
12	2	4.77405E-01	4.78098E-01	2.99962E+00	4.16023E-03	.00000E+00
13	3	4.78790E-01	4.83159E-01	3.00833E+00	2.65268E-02	.00000E+00
14	3	4.87528E-01	4.99387E-01	3.06323E+00	7.82768E-02	.00000E+00
15	3	5.12445E-01	5.24903E-01	3.21979E+00	8.21777E-02	.00000E+00
16	3	5.37362E-01	5.41731E-01	3.37634E+00	2.97427E-02	.00000E+00
17	4	5.46100E-01	5.53513E-01	3.43125E+00	5.15631E-02	.00000E+00
18	4	5.60926E-01	5.70900E-01	3.52440E+00	7.15548E-02	.00000E+00
19	4	5.80874E-01	5.96175E-01	3.64974E+00	1.14628E-01	.00000E+00
20	4	6.11475E-01	6.45755E-01	3.84201E+00	2.78169E-01	.00000E+00
21	4	6.80034E-01	7.14313E-01	4.27278E+00	3.07702E-01	.00000E+00
22	4	7.48592E-01	7.63893E-01	4.70354E+00	1.46875E-01	.00000E+00
23	4	7.79193E-01	7.89167E-01	4.89582E+00	9.89116E-02	.00000E+00
24	4	7.99141E-01	8.06554E-01	5.02115E+00	7.51357E-02	.00000E+00
25		8.13968E-01		5.11431E+00		

1 at 0 d, sas2h: babcock wilcox 15x15, 3.00wt%, 20gwd/mtu burn high temp

0 total flux

0 int.	grp. 1	grp. 2	grp. 3	grp. 4	grp. 5	grp. 6	grp. 7	grp. 8
1	1.68015E-01	1.30203E+00	1.66737E+00	1.05770E+00	1.57363E+00	3.03069E+00	2.90515E+00	2.07866E+00
2	1.68074E-01	1.30265E+00	1.66820E+00	1.05819E+00	1.57433E+00	3.03199E+00	2.90582E+00	2.07872E+00

3	1.68019E-01	1.30203E+00	1.66741E+00	1.03771E+00	1.57353E+00	3.03036E+00	2.90478E+00	2.07852E+00
4	1.67635E-01	1.29778E+00	1.66190E+00	1.03434E+00	1.56816E+00	3.01975E+00	2.89839E+00	2.07747E+00
5	1.66643E-01	1.28691E+00	1.64797E+00	1.02586E+00	1.55471E+00	2.99351E+00	2.88269E+00	2.07488E+00
6	1.65504E-01	1.27456E+00	1.63252E+00	1.01639E+00	1.53980E+00	2.96479E+00	2.86559E+00	2.07201E+00
7	1.64602E-01	1.26492E+00	1.62080E+00	1.00921E+00	1.52861E+00	2.94364E+00	2.85308E+00	2.06985E+00
8	1.63709E-01	1.25556E+00	1.60880E+00	1.00244E+00	1.51822E+00	2.92433E+00	2.84178E+00	2.06781E+00
9	1.63221E-01	1.25050E+00	1.60264E+00	9.98849E-01	1.51275E+00	2.91429E+00	2.83594E+00	2.06674E+00
10	1.63120E-01	1.24948E+00	1.60141E+00	9.98157E-01	1.51175E+00	2.91249E+00	2.83494E+00	2.06655E+00
11	1.62971E-01	1.24801E+00	1.59963E+00	9.97166E-01	1.51033E+00	2.90994E+00	2.83354E+00	2.06626E+00
12	1.62873E-01	1.24703E+00	1.59846E+00	9.96523E-01	1.50941E+00	2.90830E+00	2.83264E+00	2.06608E+00
13	1.62691E-01	1.24522E+00	1.59626E+00	9.95282E-01	1.50758E+00	2.90485E+00	2.83070E+00	2.06570E+00
14	1.62195E-01	1.24008E+00	1.58978E+00	9.91446E-01	1.50175E+00	2.89353E+00	2.82424E+00	2.06467E+00
15	1.61638E-01	1.23384E+00	1.58143E+00	9.86127E-01	1.49333E+00	2.87682E+00	2.81460E+00	2.06354E+00
16	1.61366E-01	1.23039E+00	1.57644E+00	9.82668E-01	1.48759E+00	2.86523E+00	2.80786E+00	2.06308E+00
17	1.61235E-01	1.22842E+00	1.57334E+00	9.80329E-01	1.48361E+00	2.85726E+00	2.80318E+00	2.06290E+00
18	1.61063E-01	1.22585E+00	1.56957E+00	9.77358E-01	1.47854E+00	2.84726E+00	2.79729E+00	2.06277E+00
19	1.60848E-01	1.22281E+00	1.56477E+00	9.73995E-01	1.47284E+00	2.83608E+00	2.79070E+00	2.06254E+00
20	1.60562E-01	1.21887E+00	1.55891E+00	9.69779E-01	1.46575E+00	2.82219E+00	2.78253E+00	2.06223E+00
21	1.60364E-01	1.21612E+00	1.55480E+00	9.66795E-01	1.46072E+00	2.81234E+00	2.77682E+00	2.06214E+00
22	1.60366E-01	1.21600E+00	1.55450E+00	9.66514E-01	1.46020E+00	2.81133E+00	2.77637E+00	2.06237E+00
23	1.60438E-01	1.21684E+00	1.55562E+00	9.67244E-01	1.46137E+00	2.81363E+00	2.77786E+00	2.06265E+00
24	1.60522E-01	1.21783E+00	1.55698E+00	9.68142E-01	1.46284E+00	2.81649E+00	2.77967E+00	2.06292E+00
0 int.	grp. 9	grp. 10	grp. 11	grp. 12	grp. 13	grp. 14	grp. 15	grp. 16
1	1.58406E+00	1.44107E+00	1.29878E+00	7.92535E-01	6.74146E-01	6.01091E-01	3.73477E-01	2.08862E-01
2	1.58398E+00	1.44096E+00	1.29857E+00	7.92302E-01	6.73989E-01	6.00810E-01	3.73446E-01	2.08845E-01
3	1.58417E+00	1.44118E+00	1.29904E+00	7.92847E-01	6.74374E-01	6.01452E-01	3.73522E-01	2.08881E-01
4	1.58523E+00	1.44245E+00	1.30172E+00	7.95911E-01	6.76866E-01	6.05077E-01	3.73989E-01	2.09085E-01
5	1.58787E+00	1.44556E+00	1.30831E+00	8.03477E-01	6.83016E-01	6.14063E-01	3.74947E-01	2.09582E-01
6	1.59082E+00	1.44895E+00	1.31552E+00	8.11807E-01	6.89775E-01	6.23996E-01	3.76052E-01	2.10122E-01
7	1.59306E+00	1.45144E+00	1.32083E+00	8.17982E-01	6.94773E-01	6.31395E-01	3.76814E-01	2.10517E-01
8	1.59517E+00	1.45369E+00	1.32567E+00	8.23652E-01	6.99354E-01	6.38211E-01	3.77512E-01	2.10873E-01
9	1.59630E+00	1.45486E+00	1.32817E+00	8.26597E-01	7.01734E-01	6.41755E-01	3.77870E-01	2.11058E-01
10	1.59649E+00	1.45505E+00	1.32857E+00	8.27072E-01	7.02125E-01	6.42326E-01	3.77931E-01	2.11089E-01
11	1.59678E+00	1.45532E+00	1.32915E+00	8.27749E-01	7.02684E-01	6.43142E-01	3.78017E-01	2.11135E-01
12	1.59697E+00	1.45549E+00	1.32952E+00	8.28188E-01	7.03044E-01	6.43670E-01	3.78073E-01	2.11164E-01
13	1.59736E+00	1.45585E+00	1.33028E+00	8.29082E-01	7.03785E-01	6.44749E-01	3.78188E-01	2.11224E-01
14	1.59840E+00	1.45700E+00	1.33271E+00	8.31881E-01	7.06099E-01	6.48127E-01	3.78556E-01	2.11413E-01
15	1.59957E+00	1.45864E+00	1.33613E+00	8.35743E-01	7.09292E-01	6.52781E-01	3.79078E-01	2.11674E-01
16	1.60013E+00	1.45972E+00	1.33838E+00	8.38234E-01	7.11351E-01	6.55778E-01	3.79424E-01	2.11843E-01
17	1.60044E+00	1.46054E+00	1.34006E+00	8.40064E-01	7.12830E-01	6.57961E-01	3.79615E-01	2.11947E-01
18	1.60089E+00	1.46164E+00	1.34236E+00	8.42566E-01	7.14832E-01	6.60936E-01	3.79829E-01	2.12077E-01
19	1.60146E+00	1.46290E+00	1.34498E+00	8.45446E-01	7.17144E-01	6.64366E-01	3.80081E-01	2.12229E-01
20	1.60225E+00	1.46448E+00	1.34830E+00	8.49115E-01	7.20089E-01	6.68739E-01	3.80389E-01	2.12419E-01
21	1.60285E+00	1.46562E+00	1.35068E+00	8.51730E-01	7.22160E-01	6.71838E-01	3.80546E-01	2.12529E-01
22	1.60291E+00	1.46573E+00	1.35090E+00	8.51959E-01	7.22295E-01	6.72081E-01	3.80463E-01	2.12501E-01
23	1.60275E+00	1.46544E+00	1.35031E+00	8.51279E-01	7.21707E-01	6.71247E-01	3.80320E-01	2.12434E-01
24	1.60255E+00	1.46509E+00	1.34956E+00	8.50440E-01	7.20997E-01	6.70228E-01	3.80175E-01	2.12363E-01
0 int.	grp. 17	grp. 18	grp. 19	grp. 20	grp. 21	grp. 22	grp. 23	grp. 24
1	9.08523E-02	7.68450E-02	1.43864E-01	4.69466E-01	1.45353E-01	2.97143E-01	9.02604E-01	6.43355E-01
2	9.08353E-02	7.68258E-02	1.43836E-01	4.69370E-01	1.45298E-01	2.97006E-01	9.02133E-01	6.42930E-01
3	9.08656E-02	7.68604E-02	1.43885E-01	4.69544E-01	1.45404E-01	2.97302E-01	9.03157E-01	6.44069E-01
4	9.10451E-02	7.70659E-02	1.44176E-01	4.70575E-01	1.46024E-01	2.98993E-01	9.09010E-01	6.50538E-01
5	9.14884E-02	7.75741E-02	1.44889E-01	4.73112E-01	1.47559E-01	3.03184E-01	9.23508E-01	6.65915E-01
6	9.19747E-02	7.81326E-02	1.45667E-01	4.75887E-01	1.49249E-01	3.07812E-01	9.39496E-01	6.83214E-01
7	9.23339E-02	7.85458E-02	1.46239E-01	4.77929E-01	1.50502E-01	3.11254E-01	9.51373E-01	6.96175E-01
8	9.26632E-02	7.89253E-02	1.46760E-01	4.79795E-01	1.51652E-01	3.14424E-01	9.62296E-01	7.08188E-01
9	9.28347E-02	7.91229E-02	1.47030E-01	4.80764E-01	1.52250E-01	3.16072E-01	9.67970E-01	7.14441E-01
10	9.28638E-02	7.91559E-02	1.47076E-01	4.80927E-01	1.52348E-01	3.16336E-01	9.68864E-01	7.15386E-01
11	9.29053E-02	7.92032E-02	1.47141E-01	4.81159E-01	1.52486E-01	3.16712E-01	9.70136E-01	7.16730E-01
12	9.29322E-02	7.92337E-02	1.47184E-01	4.81309E-01	1.52575E-01	3.16955E-01	9.70957E-01	7.17596E-01

13	9.29871E-02	7.92962E-02	1.47270E-01	4.81617E-01	1.52759E-01	3.17452E-01	9.72636E-01	7.19366E-01
14	9.31586E-02	7.94919E-02	1.47540E-01	4.82575E-01	1.53336E-01	3.19002E-01	9.77871E-01	7.24827E-01
15	9.33940E-02	7.97616E-02	1.47912E-01	4.83886E-01	1.54137E-01	3.21121E-01	9.84994E-01	7.32137E-01
16	9.35447E-02	7.99352E-02	1.48150E-01	4.84725E-01	1.54656E-01	3.22470E-01	9.89500E-01	7.36668E-01
17	9.36519E-02	8.00625E-02	1.48321E-01	4.85333E-01	1.55060E-01	3.23526E-01	9.95257E-01	7.40826E-01
18	9.37970E-02	8.02370E-02	1.48552E-01	4.86173E-01	1.55629E-01	3.25038E-01	9.98876E-01	7.47375E-01
19	9.39654E-02	8.04386E-02	1.48820E-01	4.87150E-01	1.56288E-01	3.26808E-01	1.00558E+00	7.55265E-01
20	9.41792E-02	8.06955E-02	1.49163E-01	4.88403E-01	1.57135E-01	3.29109E-01	1.01451E+00	7.65898E-01
21	9.43266E-02	8.08770E-02	1.49401E-01	4.89289E-01	1.57750E-01	3.30800E-01	1.02130E+00	7.74195E-01
22	9.43320E-02	8.08908E-02	1.49413E-01	4.89350E-01	1.57821E-01	3.31007E-01	1.02237E+00	7.75782E-01
23	9.42863E-02	8.08417E-02	1.49341E-01	4.89102E-01	1.57678E-01	3.30626E-01	1.02108E+00	7.74477E-01
24	9.42324E-02	8.07821E-02	1.49256E-01	4.88803E-01	1.57497E-01	3.30139E-01	1.01934E+00	7.72611E-01

0 int.

	grp. 25	grp. 26	grp. 27
1	2.61593E-01	1.55540E-01	1.98117E-02
2	2.61414E-01	1.55433E-01	1.98150E-02
3	2.62054E-01	1.56069E-01	2.00107E-02
4	2.65425E-01	1.59236E-01	2.08915E-02
5	2.73818E-01	1.67159E-01	2.31327E-02
6	2.85196E-01	1.76124E-01	2.57599E-02
7	2.90280E-01	1.83005E-01	2.78849E-02
8	2.96905E-01	1.89535E-01	3.00040E-02
9	3.00363E-01	1.92968E-01	3.11391E-02
10	3.00866E-01	1.93429E-01	3.12682E-02
11	3.01580E-01	1.94085E-01	3.14518E-02
12	3.02041E-01	1.94507E-01	3.15701E-02
13	3.02978E-01	1.95364E-01	3.18102E-02
14	3.05823E-01	1.97947E-01	3.25203E-02
15	3.09528E-01	2.01258E-01	3.33988E-02
16	3.11747E-01	2.03198E-01	3.38891E-02
17	3.13970E-01	2.05105E-01	3.46467E-02
18	3.17643E-01	2.09524E-01	3.60276E-02
19	3.22115E-01	2.14398E-01	3.78432E-02
20	3.28207E-01	2.21025E-01	3.97654E-02
21	3.33062E-01	2.26425E-01	4.15082E-02
22	3.34116E-01	2.27807E-01	4.20254E-02
23	3.33481E-01	2.27525E-01	4.19646E-02
24	3.32503E-01	2.26443E-01	4.17693E-02

- elapsed time .02 min.

1fine group summary for zone 1 by group including sum for all groups in line 28

0 grp.	fix source	fiss source	in scatter	slf scatter	out scatter	absorption	leakage	balance
1	.00000E+00	2.13807E-02	.00000E+00	1.20349E-02	9.98292E-03	3.06431E-03	1.05147E-02	9.98827E-01
2	.00000E+00	1.89181E-01	2.19886E-03	1.63986E-01	6.50952E-02	1.34448E-02	1.12853E-01	1.00004E+00
3	.00000E+00	2.15035E-01	2.56537E-02	1.59961E-01	8.05577E-02	1.55674E-02	1.44563E-01	1.00001E+00
4	.00000E+00	1.24418E-01	3.85217E-02	1.04771E-01	6.76868E-02	7.46119E-03	8.77894E-02	1.00001E+00
5	.00000E+00	1.65841E-01	6.73968E-02	2.58678E-01	9.47626E-02	4.50099E-03	1.33976E-01	9.99991E-01
6	.00000E+00	1.79949E-01	1.34067E-01	6.53736E-01	5.44567E-02	7.18526E-03	2.52364E-01	1.00003E+00
7	.00000E+00	8.95229E-02	9.82419E-02	7.45743E-01	3.63484E-02	7.86084E-03	1.43354E-01	1.00001E+00
8	.00000E+00	1.37908E-02	4.25643E-02	6.31201E-01	2.14672E-02	1.43444E-02	2.05411E-02	1.00004E+00
9	.00000E+00	1.00142E-03	2.16884E-02	5.34272E-01	2.06097E-02	2.36016E-02	-2.15209E-02	9.99989E-01
10	.00000E+00	7.43875E-05	2.06315E-02	4.56925E-01	1.06293E-02	3.67080E-02	-2.66320E-02	1.00001E+00
11	.00000E+00	5.85240E-06	1.06302E-02	4.16452E-01	8.08901E-03	5.90627E-02	-5.65161E-02	1.00001E+00
12	.00000E+00	4.11122E-07	8.08906E-03	2.35668E-01	9.32623E-03	6.36957E-02	-6.49273E-02	9.99957E-01
13	.00000E+00	6.52825E-08	9.32624E-03	1.74157E-01	6.16830E-03	5.65834E-02	-5.34258E-02	1.00001E+00
14	.00000E+00	1.29573E-08	6.16830E-03	1.51972E-01	7.56523E-03	7.67766E-02	-7.81738E-02	1.00000E+00
15	.00000E+00	1.46206E-09	7.65500E-03	8.58061E-02	8.98340E-03	6.81610E-03	-8.14481E-03	1.00002E+00
16	.00000E+00	4.29309E-10	9.16672E-03	4.37935E-02	9.81815E-03	3.66138E-03	-4.31287E-03	1.00000E+00
17	.00000E+00	1.38258E-10	8.07550E-03	1.55718E-02	7.99007E-03	4.06731E-03	-3.98153E-03	9.99970E-01
18	.00000E+00	9.89890E-11	7.55144E-03	1.25548E-02	7.48546E-03	4.63627E-03	-4.56982E-03	9.99962E-01
19	.00000E+00	1.39949E-10	9.44175E-03	2.73846E-02	1.01027E-02	5.65122E-03	-6.31168E-03	9.99972E-01
20	.00000E+00	2.27572E-10	1.19658E-02	1.12576E-01	1.05948E-02	2.38759E-02	-2.25040E-02	9.99976E-01

21	.00000E+00	3.33092E-11	1.06521E-02	2.78215E-02	1.07506E-02	1.36800E-02	-1.37768E-02	9.99929E-01
22	.00000E+00	3.86463E-11	1.52984E-02	6.49242E-02	1.45572E-02	3.78728E-02	-3.71298E-02	9.99966E-01
23	.00000E+00	3.69501E-11	2.06823E-02	2.19015E-01	2.39756E-02	1.26019E-01	-1.29313E-01	9.99999E-01
24	.00000E+00	1.00573E-11	2.87406E-02	1.48197E-01	2.85378E-02	1.38739E-01	-1.38536E-01	1.00001E+00
25	.00000E+00	2.94413E-12	2.42538E-02	5.52382E-02	1.80605E-02	7.97872E-02	-7.35946E-02	1.00001E+00
26	.00000E+00	2.06444E-12	1.17657E-02	3.77369E-02	7.98684E-03	7.31048E-02	-6.95275E-02	9.99995E-01
27	.00000E+00	4.91967E-13	2.49716E-03	5.52789E-03	1.33605E-03	2.03787E-02	-1.92179E-02	1.00001E+00
28	.00000E+00	1.00000E+00	6.52922E-01	5.55571E+00	6.52922E-01	9.28144E-01	7.40395E-02	9.99993E-01

0 grp.	rt bdy flux	rt leakage	lft bdy flux	lft leakage	n2n rate	fiss rate	flux*dv**2	total flux
1	1.65248E-01	1.05147E-02	1.67957E-01	.00000E+00	2.15356E-03	2.51447E-03	.00000E+00	1.14358E-01
2	1.25077E+00	1.12853E-01	1.30142E+00	.00000E+00	1.79132E-05	1.17117E-02	.00000E+00	8.82066E-01
3	1.60296E+00	1.44563E-01	1.66656E+00	.00000E+00	.00000E+00	1.45446E-02	.00000E+00	1.12969E+00
4	9.99032E-01	8.77894E-02	1.03721E+00	.00000E+00	.00000E+00	6.31230E-03	.00000E+00	7.03353E-01
5	1.51302E+00	1.33976E-01	1.57291E+00	.00000E+00	.00000E+00	1.88452E-03	.00000E+00	1.06583E+00
6	2.91477E+00	2.52364E-01	3.02952E+00	.00000E+00	.00000E+00	1.74220E-03	.00000E+00	2.05239E+00
7	2.83620E+00	1.43354E-01	2.90441E+00	.00000E+00	.00000E+00	1.81389E-03	.00000E+00	1.97957E+00
8	2.06679E+00	2.05411E-02	2.07856E+00	.00000E+00	.00000E+00	1.93179E-03	.00000E+00	1.42757E+00
9	1.59624E+00	-2.15209E-02	1.58416E+00	.00000E+00	.00000E+00	2.67782E-03	.00000E+00	1.09406E+00
10	1.45481E+00	-2.66320E-02	1.44119E+00	.00000E+00	.00000E+00	5.70145E-03	.00000E+00	9.96179E-01
11	1.32806E+00	-5.65161E-02	1.29904E+00	.00000E+00	.00000E+00	1.16776E-02	.00000E+00	9.02821E-01
12	8.26472E-01	-6.49273E-02	7.98828E-01	.00000E+00	.00000E+00	1.47800E-02	.00000E+00	5.55624E-01
13	7.01630E-01	-5.34258E-02	6.74396E-01	.00000E+00	.00000E+00	1.36248E-02	.00000E+00	4.72221E-01
14	6.41604E-01	-7.81738E-02	6.01440E-01	.00000E+00	.00000E+00	9.97937E-03	.00000E+00	4.25718E-01
15	3.77821E-01	-8.14481E-03	3.73485E-01	.00000E+00	.00000E+00	2.51433E-03	.00000E+00	2.58441E-01
16	2.11033E-01	-4.31287E-03	2.08868E-01	.00000E+00	.00000E+00	1.66606E-03	.00000E+00	1.44443E-01
17	9.28196E-02	-3.98153E-03	9.08647E-02	.00000E+00	.00000E+00	2.52477E-03	.00000E+00	6.31285E-02
18	7.91074E-02	-4.56982E-03	7.68607E-02	.00000E+00	.00000E+00	3.35695E-03	.00000E+00	5.35711E-02
19	1.47004E-01	-6.31168E-03	1.43881E-01	.00000E+00	.00000E+00	4.06104E-03	.00000E+00	9.99763E-02
20	4.80644E-01	-2.25040E-02	4.69502E-01	.00000E+00	.00000E+00	1.72805E-02	.00000E+00	3.26528E-01
21	1.52201E-01	-1.37768E-02	1.45395E-01	.00000E+00	.00000E+00	1.00277E-02	.00000E+00	1.02089E-01
22	3.15982E-01	-3.71298E-02	2.97291E-01	.00000E+00	.00000E+00	2.72668E-02	.00000E+00	2.10107E-01
23	9.67743E-01	-1.29313E-01	9.03188E-01	.00000E+00	.00000E+00	9.16735E-02	.00000E+00	6.40548E-01
24	7.14209E-01	-1.38536E-01	6.43952E-01	.00000E+00	.00000E+00	1.04029E-01	.00000E+00	4.63665E-01
25	3.00237E-01	-7.35946E-02	2.61867E-01	.00000E+00	.00000E+00	6.04430E-02	.00000E+00	1.91360E-01
26	1.92847E-01	-6.95275E-02	1.55752E-01	.00000E+00	.00000E+00	5.56009E-02	.00000E+00	1.17858E-01
27	3.11053E-02	-1.92179E-02	1.98486E-02	.00000E+00	.00000E+00	1.55149E-02	.00000E+00	1.67887E-02
28	2.39584E+01	7.40392E-02	2.39421E+01	.00000E+00	2.17148E-03	4.96856E-01	.00000E+00	1.64899E+01

1fine group summary for zone 2 by group including sum for all groups in line 28

0 grp.	fix source	fiss source	in scatter	slf scatter	out scatter	absorption	leakage	balance
1	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	-3.72529E-09	1.00000E+00
2	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	-5.21541E-08	1.00000E+00
3	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	1.00000E+00
4	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	-1.49012E-08	1.00000E+00
5	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	1.49012E-08	1.00000E+00
6	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	1.19209E-07	1.00000E+00
7	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	1.04308E-07	9.99999E-01
8	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	-4.84288E-08	1.00000E+00
9	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	-1.86265E-08	1.00000E+00
10	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	-4.28408E-08	1.00000E+00
11	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	1.11759E-08	1.00000E+00
12	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	-2.98023E-08	1.00000E+00
13	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	4.47035E-08	9.99999E-01
14	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	7.45058E-09	1.00000E+00
15	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	9.31323E-10	1.00000E+00
16	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	-1.86265E-09	1.00000E+00
17	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	-4.65661E-09	1.00000E+00
18	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	1.00000E+00
19	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	-4.65661E-09	1.00000E+00
20	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	-1.11759E-08	1.00000E+00
21	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	-1.86265E-09	1.00000E+00

22	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	3.72529E-09	1.00000E+00
23	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	-1.49012E-08	1.00000E+00
24	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	2.98023E-08	1.00000E+00
25	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	2.98023E-08	1.00000E+00
26	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	7.45058E-09	1.00000E+00
27	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	1.86265E-09	1.00000E+00
28	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	1.58325E-07	1.00001E+00

0 grp.	rt bdy flux	rt leakage	lft bdy flux	lft leakage	n2n rate	fiss rate	flux*db**2	total flux
1	1.62848E-01	1.05147E-02	1.63248E-01	1.05147E-02	.00000E+00	.00000E+00	.00000E+00	5.17429E-03
2	1.24679E+00	1.12853E-01	1.25077E+00	1.12853E-01	.00000E+00	.00000E+00	.00000E+00	3.96292E-02
3	1.59817E+00	1.44563E-01	1.60296E+00	1.44563E-01	.00000E+00	.00000E+00	.00000E+00	5.07928E-02
4	9.96361E-01	8.77894E-02	9.99032E-01	8.77894E-02	.00000E+00	.00000E+00	.00000E+00	3.16611E-02
5	1.50918E+00	1.33976E-01	1.51302E+00	1.33976E-01	.00000E+00	.00000E+00	.00000E+00	4.79533E-02
6	2.90789E+00	2.52365E-01	2.91477E+00	2.52364E-01	.00000E+00	.00000E+00	.00000E+00	9.23885E-02
7	2.83241E+00	1.43355E-01	2.83620E+00	1.43354E-01	.00000E+00	.00000E+00	.00000E+00	8.99455E-02
8	2.06603E+00	2.05410E-02	2.06679E+00	2.05411E-02	.00000E+00	.00000E+00	.00000E+00	6.55779E-02
9	1.59702E+00	-2.15209E-02	1.59624E+00	-2.15209E-02	.00000E+00	.00000E+00	.00000E+00	5.06697E-02
10	1.45554E+00	-2.66320E-02	1.45481E+00	-2.66320E-02	.00000E+00	.00000E+00	.00000E+00	4.61806E-02
11	1.32961E+00	-5.65161E-02	1.32806E+00	-5.65161E-02	.00000E+00	.00000E+00	.00000E+00	4.21717E-02
12	8.28298E-01	-6.49273E-02	8.26472E-01	-6.49273E-02	.00000E+00	.00000E+00	.00000E+00	2.62580E-02
13	7.03136E-01	-5.34258E-02	7.01630E-01	-5.34258E-02	.00000E+00	.00000E+00	.00000E+00	2.22909E-02
14	6.43802E-01	-7.81738E-02	6.41604E-01	-7.81738E-02	.00000E+00	.00000E+00	.00000E+00	2.03973E-02
15	3.78054E-01	-8.14481E-03	3.77821E-01	-8.14481E-03	.00000E+00	.00000E+00	.00000E+00	1.19951E-02
16	2.11155E-01	-4.31287E-03	2.11033E-01	-4.31287E-03	.00000E+00	.00000E+00	.00000E+00	6.69969E-03
17	9.29315E-02	-3.98154E-03	9.28196E-02	-3.98153E-03	.00000E+00	.00000E+00	.00000E+00	2.94771E-03
18	7.92346E-02	-4.56982E-03	7.91074E-02	-4.56982E-03	.00000E+00	.00000E+00	.00000E+00	2.51278E-03
19	1.47180E-01	-6.31168E-03	1.47004E-01	-6.31168E-03	.00000E+00	.00000E+00	.00000E+00	4.66852E-03
20	4.81270E-01	-2.25040E-02	4.80644E-01	-2.25040E-02	.00000E+00	.00000E+00	.00000E+00	1.52660E-02
21	1.52574E-01	-1.37768E-02	1.52201E-01	-1.37768E-02	.00000E+00	.00000E+00	.00000E+00	4.83697E-03
22	3.16996E-01	-3.71298E-02	3.15982E-01	-3.71298E-02	.00000E+00	.00000E+00	.00000E+00	1.00449E-02
23	9.71172E-01	-1.29313E-01	9.67743E-01	-1.29313E-01	.00000E+00	.00000E+00	.00000E+00	3.07672E-02
24	7.17831E-01	-1.38536E-01	7.14209E-01	-1.38536E-01	.00000E+00	.00000E+00	.00000E+00	2.27242E-02
25	3.02163E-01	-7.35946E-02	3.00257E-01	-7.35946E-02	.00000E+00	.00000E+00	.00000E+00	9.55931E-03
26	1.94614E-01	-6.93275E-02	1.92847E-01	-6.93275E-02	.00000E+00	.00000E+00	.00000E+00	6.14885E-03
27	3.16001E-02	-1.92179E-02	3.11053E-02	-1.92179E-02	.00000E+00	.00000E+00	.00000E+00	9.95198E-04
28	2.39539E+01	7.40887E-02	2.39584E+01	7.40892E-02	.00000E+00	.00000E+00	.00000E+00	7.60257E-01

1fine group summary for zone 3 by group including sum for all groups in line 28

0 grp.	fix source	fiss source	in scatter	slf scatter	out scatter	absorption	leakage	balance
1	.00000E+00	.00000E+00	.00000E+00	3.58926E-03	2.69061E-03	1.37883E-05	-2.60842E-03	1.00001E+00
2	.00000E+00	.00000E+00	4.69909E-04	2.54049E-02	1.82293E-02	5.04709E-05	-1.78100E-02	1.00000E+00
3	.00000E+00	.00000E+00	2.57258E-03	4.97107E-02	1.57180E-02	1.35962E-04	-1.32804E-02	9.99993E-01
4	.00000E+00	.00000E+00	5.04472E-03	4.19119E-02	5.42668E-03	1.02889E-04	-4.84414E-04	9.99995E-01
5	.00000E+00	.00000E+00	1.08974E-02	8.14660E-02	5.15211E-03	1.51770E-04	5.58315E-03	1.00000E+00
6	.00000E+00	.00000E+00	1.82610E-02	2.34896E-01	3.20953E-03	3.19861E-04	1.47317E-02	1.00000E+00
7	.00000E+00	.00000E+00	1.21890E-02	2.35087E-01	1.18167E-03	3.44606E-04	1.06628E-02	9.99999E-01
8	.00000E+00	.00000E+00	2.14897E-03	1.58413E-01	7.62782E-03	2.94604E-04	-5.77393E-03	1.00002E+00
9	.00000E+00	.00000E+00	7.66074E-03	1.05026E-01	8.75504E-04	1.10747E-03	5.67798E-03	9.99991E-01
10	.00000E+00	.00000E+00	8.76669E-04	8.53265E-02	8.46587E-04	8.33265E-04	-8.03193E-04	1.00000E+00
11	.00000E+00	.00000E+00	8.46648E-04	7.67312E-02	8.66566E-04	1.33141E-03	-1.35131E-03	1.00000E+00
12	.00000E+00	.00000E+00	8.66572E-04	4.66180E-02	8.67312E-04	4.15054E-05	-4.22965E-05	1.00000E+00
13	.00000E+00	.00000E+00	8.67313E-04	3.95841E-02	8.07489E-04	6.01001E-05	-2.68221E-07	1.00000E+00
14	.00000E+00	.00000E+00	8.07490E-04	3.64751E-02	6.87378E-04	9.71530E-05	2.29552E-05	1.00000E+00
15	.00000E+00	.00000E+00	7.32160E-04	2.08015E-02	8.51337E-04	8.35362E-05	-2.03078E-04	1.00004E+00
16	.00000E+00	.00000E+00	9.56741E-04	1.11217E-02	9.63492E-04	5.24080E-05	-5.94230E-05	1.00005E+00
17	.00000E+00	.00000E+00	1.07626E-03	4.27625E-03	1.05261E-03	2.58338E-05	-2.28314E-06	1.00002E+00
18	.00000E+00	.00000E+00	1.11370E-03	3.43879E-03	1.11037E-03	2.35486E-05	-2.02870E-05	1.00001E+00
19	.00000E+00	.00000E+00	1.12015E-03	7.35449E-03	1.08509E-03	4.76470E-05	-1.28211E-05	1.00003E+00
20	.00000E+00	.00000E+00	1.33653E-03	2.64811E-02	1.12581E-03	1.96890E-04	1.18613E-05	1.00004E+00
21	.00000E+00	.00000E+00	1.53258E-03	7.08989E-03	1.69352E-03	7.81089E-05	-2.39557E-04	1.00002E+00
22	.00000E+00	.00000E+00	2.17055E-03	1.61303E-02	2.15576E-03	1.87947E-04	-1.73450E-04	1.00001E+00

23	.00000E+00	.00000E+00	3.02517E-03	5.22345E-02	3.83489E-03	7.91044E-04	-1.60043E-03	9.99998E-01
24	.00000E+00	.00000E+00	4.68155E-03	3.66019E-02	5.02305E-03	8.52627E-04	-1.19369E-03	9.99997E-01
25	.00000E+00	.00000E+00	4.51051E-03	1.39792E-02	3.59805E-03	4.75468E-04	4.37118E-04	9.99998E-01
26	.00000E+00	.00000E+00	1.87269E-03	1.00717E-02	1.33100E-03	4.39791E-04	1.02103E-04	9.99997E-01
27	.00000E+00	.00000E+00	3.85945E-04	1.88163E-03	9.69488E-07	1.37625E-04	2.47361E-04	1.00000E+00
28	.00000E+00	.00000E+00	8.80122E-02	1.43170E+00	8.80122E-02	8.27732E-03	-8.18214E-03	9.99999E-01

0 grp.	rt bdy flux	rt leakage	lft bdy flux	lft leakage	n2n rate	fiss rate	flux*dv**2	total flux
1	1.61312E-01	7.90628E-03	1.62848E-01	1.05147E-02	9.61326E-05	.00000E+00	.00000E+00	3.50942E-02
2	1.22961E+00	9.50427E-02	1.24679E+00	1.12853E-01	.00000E+00	.00000E+00	.00000E+00	2.68091E-01
3	1.57521E+00	1.31282E-01	1.59817E+00	1.44563E-01	.00000E+00	.00000E+00	.00000E+00	3.43632E-01
4	9.81750E-01	8.73049E-02	9.96361E-01	8.77894E-02	.00000E+00	.00000E+00	.00000E+00	2.14273E-01
5	1.48604E+00	1.39559E-01	1.50918E+00	1.33976E-01	.00000E+00	.00000E+00	.00000E+00	3.24507E-01
6	2.86208E+00	2.67096E-01	2.90789E+00	2.52365E-01	.00000E+00	.00000E+00	.00000E+00	6.25182E-01
7	2.80602E+00	1.54017E-01	2.83241E+00	1.43355E-01	.00000E+00	.00000E+00	.00000E+00	6.10973E-01
8	2.06294E+00	1.47671E-02	2.06603E+00	2.05410E-02	.00000E+00	.00000E+00	.00000E+00	4.47349E-01
9	1.60024E+00	-1.58430E-02	1.59702E+00	-2.15209E-02	.00000E+00	.00000E+00	.00000E+00	3.46532E-01
10	1.46001E+00	-2.74352E-02	1.45554E+00	-2.66320E-02	.00000E+00	.00000E+00	.00000E+00	3.15952E-01
11	1.33897E+00	-5.78674E-02	1.32961E+00	-5.65161E-02	.00000E+00	.00000E+00	.00000E+00	2.89215E-01
12	8.38878E-01	-6.49696E-02	8.28298E-01	-6.49273E-02	.00000E+00	.00000E+00	.00000E+00	1.80721E-01
13	7.11882E-01	-5.34261E-02	7.03136E-01	-5.34258E-02	.00000E+00	.00000E+00	.00000E+00	1.53386E-01
14	6.56551E-01	-7.81509E-02	6.43802E-01	-7.81738E-02	.00000E+00	.00000E+00	.00000E+00	1.40985E-01
15	3.79482E-01	-8.34788E-03	3.78054E-01	-8.14481E-03	.00000E+00	.00000E+00	.00000E+00	8.21012E-02
16	2.11870E-01	-4.37229E-03	2.11155E-01	-4.31287E-03	.00000E+00	.00000E+00	.00000E+00	4.58474E-02
17	9.35760E-02	-3.98382E-03	9.29315E-02	-3.98154E-03	.00000E+00	.00000E+00	.00000E+00	2.02160E-02
18	7.99731E-02	-4.59011E-03	7.92346E-02	-4.56982E-03	.00000E+00	.00000E+00	.00000E+00	1.72580E-02
19	1.48197E-01	-6.32450E-03	1.47180E-01	-6.31168E-03	.00000E+00	.00000E+00	.00000E+00	3.20170E-02
20	4.84860E-01	-2.24921E-02	4.81270E-01	-2.25040E-02	.00000E+00	.00000E+00	.00000E+00	1.04732E-01
21	1.54767E-01	-1.40164E-02	1.52574E-01	-1.37768E-02	.00000E+00	.00000E+00	.00000E+00	3.33214E-02
22	3.22794E-01	-3.73033E-02	3.16996E-01	-3.71298E-02	.00000E+00	.00000E+00	.00000E+00	6.93716E-02
23	9.90653E-01	-1.30913E-01	9.71172E-01	-1.29513E-01	.00000E+00	.00000E+00	.00000E+00	2.12720E-01
24	7.37816E-01	-1.39730E-01	7.17831E-01	-1.38536E-01	.00000E+00	.00000E+00	.00000E+00	1.57895E-01
25	3.12291E-01	-7.31575E-02	3.02163E-01	-7.35946E-02	.00000E+00	.00000E+00	.00000E+00	6.66844E-02
26	2.03660E-01	-6.92254E-02	1.94614E-01	-6.93275E-02	.00000E+00	.00000E+00	.00000E+00	4.32596E-02
27	3.40010E-02	-1.89705E-02	3.16001E-02	-1.92179E-02	.00000E+00	.00000E+00	.00000E+00	7.14200E-03
28	2.39254E+01	6.58578E-02	2.39539E+01	7.40387E-02	9.61326E-05	.00000E+00	.00000E+00	5.18846E+00

1fine group summary for zone 4 by group including sum for all groups in line 28

0 grp.	fix source	fiss source	in scatter	slf scatter	out scatter	absorption	leakage	balance
1	.00000E+00	.00000E+00	.00000E+00	5.67143E-03	7.50661E-03	4.00069E-04	-7.90628E-03	9.99950E-01
2	.00000E+00	.00000E+00	4.30715E-03	7.47921E-02	9.83005E-02	1.05321E-03	-9.50428E-02	9.99962E-01
3	.00000E+00	.00000E+00	4.65988E-02	6.83678E-02	1.77880E-01	5.37362E-06	-1.31282E-01	9.99977E-01
4	.00000E+00	.00000E+00	6.94784E-02	4.56305E-02	1.56782E-01	3.21524E-06	-8.73049E-02	9.99988E-01
5	.00000E+00	.00000E+00	1.28846E-01	1.48151E-01	2.68404E-01	3.76632E-06	-1.39559E-01	9.99991E-01
6	.00000E+00	.00000E+00	2.73628E-01	4.54952E-01	5.40714E-01	1.14684E-05	-2.67096E-01	9.99998E-01
7	.00000E+00	.00000E+00	5.51713E-01	7.94789E-01	7.05714E-01	2.53392E-05	-1.54017E-01	9.99987E-01
8	.00000E+00	.00000E+00	7.34931E-01	9.99864E-01	7.49717E-01	4.69623E-05	-1.47671E-02	9.99912E-01
9	.00000E+00	.00000E+00	7.40853E-01	9.14471E-01	7.24178E-01	9.57405E-05	1.58429E-02	9.99890E-01
10	.00000E+00	.00000E+00	7.20995E-01	8.62845E-01	6.93424E-01	2.10831E-04	2.74352E-02	9.99896E-01
11	.00000E+00	.00000E+00	6.98564E-01	8.01997E-01	6.40283E-01	4.55433E-04	5.78673E-02	9.99941E-01
12	.00000E+00	.00000E+00	5.57567E-01	4.18158E-01	4.92015E-01	5.94990E-04	6.49696E-02	9.99979E-01
13	.00000E+00	.00000E+00	4.87977E-01	3.38160E-01	4.33667E-01	8.98228E-04	5.34261E-02	9.99969E-01
14	.00000E+00	.00000E+00	4.69838E-01	3.26666E-01	3.90215E-01	1.47835E-03	7.81508E-02	9.99988E-01
15	.00000E+00	.00000E+00	2.53350E-01	1.30086E-01	2.43703E-01	1.29614E-03	8.37076E-03	9.99922E-01
16	.00000E+00	.00000E+00	1.68220E-01	5.53113E-02	1.62952E-01	8.95343E-04	4.38508E-03	9.99925E-01
17	.00000E+00	.00000E+00	8.71688E-02	1.59025E-02	8.27399E-02	4.44195E-04	3.99135E-03	9.99924E-01
18	.00000E+00	.00000E+00	7.75862E-02	1.32844E-02	7.25884E-02	4.06450E-04	4.59729E-03	9.99923E-01
19	.00000E+00	.00000E+00	1.31159E-01	3.73668E-02	1.24014E-01	8.19018E-04	6.33721E-03	9.99913E-01
20	.00000E+00	.00000E+00	3.23868E-01	2.63568E-01	2.97999E-01	3.37195E-03	2.25337E-02	9.99888E-01
21	.00000E+00	.00000E+00	1.58104E-01	5.48634E-02	1.42725E-01	1.35939E-03	1.40380E-02	9.99885E-01
22	.00000E+00	.00000E+00	3.09794E-01	1.72985E-01	2.69202E-01	3.28812E-03	3.75215E-02	9.99944E-01
23	.00000E+00	.00000E+00	7.75988E-01	9.61250E-01	6.31227E-01	1.38581E-02	1.30921E-01	9.99977E-01

24	.00000E+00	.00000E+00	8.06292E-01	8.43719E-01	6.51274E-01	1.52960E-02	1.39736E-01	9.99984E-01
25	.00000E+00	.00000E+00	5.21382E-01	3.41671E-01	4.39561E-01	8.66600E-03	7.31596E-02	9.99991E-01
26	.00000E+00	.00000E+00	4.10999E-01	3.61002E-01	3.33434E-01	8.33987E-03	6.92373E-02	9.99972E-01
27	.00000E+00	.00000E+00	1.36260E-01	7.51161E-02	1.14432E-01	2.85820E-03	1.89708E-02	9.99995E-01
28	.00000E+00	.00000E+00	9.64465E+00	9.58063E+00	9.64465E+00	6.61818E-02	-6.56843E-02	9.99949E-01

0 grp.	rt bdy flux	rt leakage	lft bdy flux	lft leakage	n2n rate	fiss rate	flux*df**2	total flux
1	1.60565E-01	5.25118E-10	1.61312E-01	7.90628E-03	4.15137E-10	.00000E+00	.00000E+00	1.83769E-01
2	1.21835E+00	-5.67621E-08	1.22961E+00	9.50427E-02	.00000E+00	.00000E+00	.00000E+00	1.39494E+00
3	1.55768E+00	-3.72236E-08	1.57521E+00	1.31282E-01	.00000E+00	.00000E+00	.00000E+00	1.78401E+00
4	9.68612E-01	-1.06027E-09	9.81750E-01	8.73049E-02	.00000E+00	.00000E+00	.00000E+00	1.10975E+00
5	1.46360E+00	-6.34128E-08	1.48604E+00	1.39559E-01	.00000E+00	.00000E+00	.00000E+00	1.67724E+00
6	2.81799E+00	2.11228E-08	2.86208E+00	2.67096E-01	.00000E+00	.00000E+00	.00000E+00	3.22940E+00
7	2.78061E+00	-2.06552E-08	2.80602E+00	1.54017E-01	.00000E+00	.00000E+00	.00000E+00	3.18443E+00
8	2.06305E+00	-3.17924E-08	2.06294E+00	1.47671E-02	.00000E+00	.00000E+00	.00000E+00	2.36050E+00
9	1.60244E+00	-4.16572E-08	1.60024E+00	-1.58430E-02	.00000E+00	.00000E+00	.00000E+00	1.83391E+00
10	1.46491E+00	-5.43783E-08	1.46001E+00	-2.74352E-02	.00000E+00	.00000E+00	.00000E+00	1.67624E+00
11	1.34918E+00	-5.43663E-08	1.33897E+00	-5.78674E-02	.00000E+00	.00000E+00	.00000E+00	1.54336E+00
12	8.50000E-01	-2.03588E-08	8.38878E-01	-6.49696E-02	.00000E+00	.00000E+00	.00000E+00	9.72025E-01
13	7.20627E-01	3.52663E-08	7.11882E-01	-5.34261E-02	.00000E+00	.00000E+00	.00000E+00	8.24272E-01
14	6.69695E-01	-1.66829E-08	6.56651E-01	-7.81509E-02	.00000E+00	.00000E+00	.00000E+00	7.65587E-01
15	3.80070E-01	2.28811E-05	3.79482E-01	-8.34788E-03	.00000E+00	.00000E+00	.00000E+00	4.35291E-01
16	2.12311E-01	1.27901E-05	2.11870E-01	-4.37229E-03	.00000E+00	.00000E+00	.00000E+00	2.43095E-01
17	9.41972E-02	7.53311E-06	9.35760E-02	-3.98582E-03	.00000E+00	.00000E+00	.00000E+00	1.07795E-01
18	8.07441E-02	7.17857E-06	7.99731E-02	-4.59011E-03	.00000E+00	.00000E+00	.00000E+00	9.23698E-02
19	1.49198E-01	1.27066E-05	1.48197E-01	-6.32450E-03	.00000E+00	.00000E+00	.00000E+00	1.70731E-01
20	4.88569E-01	4.16091E-05	4.84860E-01	-2.24921E-02	.00000E+00	.00000E+00	.00000E+00	5.59046E-01
21	1.57378E-01	2.16381E-05	1.54767E-01	-1.40164E-02	.00000E+00	.00000E+00	.00000E+00	1.79006E-01
22	3.29861E-01	1.82521E-05	3.22794E-01	-3.73033E-02	.00000E+00	.00000E+00	.00000E+00	3.76862E-01
23	1.01843E+00	8.20884E-06	9.90653E-01	-1.30913E-01	.00000E+00	.00000E+00	.00000E+00	1.16216E+00
24	7.71623E-01	6.19712E-06	7.37816E-01	-1.39730E-01	.00000E+00	.00000E+00	.00000E+00	8.78121E-01
25	3.31975E-01	2.09127E-06	3.12291E-01	-7.31575E-02	.00000E+00	.00000E+00	.00000E+00	3.76664E-01
26	2.25941E-01	1.18510E-05	2.03660E-01	-6.92254E-02	.00000E+00	.00000E+00	.00000E+00	2.54277E-01
27	4.16513E-02	3.20953E-07	3.40010E-02	-1.89705E-02	.00000E+00	.00000E+00	.00000E+00	4.59747E-02
28	2.39693E+01	1.72942E-04	2.39254E+01	6.58578E-02	4.15137E-10	.00000E+00	.00000E+00	2.74217E+01

1fine group summary for system

0 grp.	fix source	fiss source	in scatter	slf scatter	out scatter	absorption	leakage	balance
1	.00000E+00	2.13807E-02	.00000E+00	2.12956E-02	2.01801E-02	3.47816E-05	5.25118E-10	9.98822E-01
2	.00000E+00	1.89181E-01	6.97592E-03	2.64185E-01	1.81623E-01	1.45485E-02	-5.67621E-08	1.00002E+00
3	.00000E+00	2.15035E-01	7.48251E-02	2.78040E-01	2.74155E-01	1.57087E-02	-3.72236E-08	9.99987E-01
4	.00000E+00	1.24418E-01	1.13045E-01	1.92313E-01	2.29896E-01	7.56725E-03	-1.06027E-09	1.00000E+00
5	.00000E+00	1.65841E-01	2.07131E-01	4.88495E-01	3.68319E-01	4.65653E-03	-6.34128E-08	9.99989E-01
6	.00000E+00	1.79949E-01	4.25956E-01	1.34358E+00	5.98380E-01	7.51659E-03	2.11228E-08	1.00001E+00
7	.00000E+00	8.95229E-02	6.62144E-01	1.77562E+00	7.43244E-01	8.23079E-03	-2.06552E-08	9.99989E-01
8	.00000E+00	1.37908E-02	7.79644E-01	1.78948E+00	7.78812E-01	1.46859E-02	-3.17924E-08	9.99920E-01
9	.00000E+00	1.00142E-03	7.69382E-01	1.55377E+00	7.45662E-01	2.48048E-02	-4.16572E-08	9.99893E-01
10	.00000E+00	7.43875E-05	7.42503E-01	1.40510E+00	7.04900E-01	3.77521E-02	-5.43783E-08	9.99900E-01
11	.00000E+00	5.85240E-06	7.10041E-01	1.29518E+00	6.49238E-01	6.08495E-02	-5.43663E-08	9.99942E-01
12	.00000E+00	4.11122E-07	5.66523E-01	7.00444E-01	5.02208E-01	6.43302E-02	-2.03588E-08	9.99974E-01
13	.00000E+00	6.52825E-08	4.98170E-01	5.51901E-01	4.40643E-01	5.75417E-02	3.52663E-08	9.99971E-01
14	.00000E+00	1.29373E-08	4.76814E-01	5.15108E-01	3.98467E-01	7.83521E-02	-1.66829E-08	9.99989E-01
15	.00000E+00	1.46205E-09	2.61737E-01	2.36692E-01	2.53537E-01	8.19578E-03	2.28811E-05	9.99927E-01
16	.00000E+00	4.29309E-10	1.78343E-01	1.10226E-01	1.75734E-01	4.60914E-03	1.27901E-05	9.99931E-01
17	.00000E+00	1.38258E-10	9.63206E-02	3.57505E-02	9.17826E-02	4.53734E-03	7.53311E-06	9.99928E-01
18	.00000E+00	9.89890E-11	8.62513E-02	2.92780E-02	8.11842E-02	5.06627E-03	7.17857E-06	9.99926E-01
19	.00000E+00	1.39949E-10	1.41720E-01	7.21049E-02	1.35201E-01	6.51788E-03	1.27066E-05	9.99918E-01
20	.00000E+00	2.27572E-10	3.37170E-01	4.02425E-01	3.09720E-01	2.74447E-02	4.16091E-05	9.99892E-01
21	.00000E+00	3.33092E-11	1.70289E-01	8.97747E-02	1.55169E-01	1.51175E-02	2.16381E-05	9.99885E-01
22	.00000E+00	3.86463E-11	3.27263E-01	2.54039E-01	2.85915E-01	4.13489E-02	1.82521E-05	9.99943E-01
23	.00000E+00	3.69501E-11	7.99695E-01	1.23250E+00	6.59057E-01	1.40669E-01	8.20884E-06	9.99977E-01
24	.00000E+00	1.00573E-11	8.39715E-01	1.02852E+00	6.84834E-01	1.54886E-01	6.19712E-06	9.99985E-01

25	.00000E+00	2.94413E-12	5.50146E-01	4.10889E-01	4.61220E-01	8.89287E-02	2.09127E-06	9.99992E-01
26	.00000E+00	2.06444E-12	4.24636E-01	4.08811E-01	3.42752E-01	8.18845E-02	1.18510E-05	9.99971E-01
27	.00000E+00	4.91967E-13	1.39143E-01	8.25256E-02	1.15769E-01	2.33745E-02	3.20933E-07	9.99997E-01
28	.00000E+00	1.00000E+00	1.08856E+01	1.65680E+01	1.03856E+01	1.00260E+00	1.72916E-04	9.99956E-01

0 grp.	rt bdy flux	rt leakage	lft bdy flux	lft leakage	n2n rate	fiss rate	flux*db**2	total flux
1	1.60565E-01	5.25118E-10	1.67957E-01	.00000E+00	2.24970E-03	2.51447E-03	.00000E+00	3.38394E-01
2	1.21835E+00	-5.67621E-08	1.30142E+00	.00000E+00	1.79132E-05	1.17117E-02	.00000E+00	2.58473E+00
3	1.55768E+00	-3.72236E-08	1.66656E+00	.00000E+00	.00000E+00	1.45446E-02	.00000E+00	3.30813E+00
4	9.68612E-01	-1.06027E-09	1.03721E+00	.00000E+00	.00000E+00	6.31230E-03	.00000E+00	2.05904E+00
5	1.46360E+00	-6.34128E-08	1.57291E+00	.00000E+00	.00000E+00	1.88452E-03	.00000E+00	3.11553E+00
6	2.81799E+00	2.11228E-08	3.02952E+00	.00000E+00	.00000E+00	1.74220E-03	.00000E+00	5.99736E+00
7	2.78061E+00	-2.06552E-08	2.90441E+00	.00000E+00	.00000E+00	1.81389E-03	.00000E+00	5.86492E+00
8	2.06305E+00	-3.17924E-08	2.07856E+00	.00000E+00	.00000E+00	1.93179E-03	.00000E+00	4.30099E+00
9	1.60244E+00	-4.16572E-08	1.58416E+00	.00000E+00	.00000E+00	2.67782E-03	.00000E+00	3.32517E+00
10	1.46491E+00	-5.43783E-08	1.44119E+00	.00000E+00	.00000E+00	5.70145E-03	.00000E+00	3.03455E+00
11	1.34918E+00	-5.43663E-08	1.29904E+00	.00000E+00	.00000E+00	1.16776E-02	.00000E+00	2.77757E+00
12	8.50000E-01	-2.03588E-08	7.92828E-01	.00000E+00	.00000E+00	1.47800E-02	.00000E+00	1.73463E+00
13	7.20627E-01	3.52663E-08	6.74396E-01	.00000E+00	.00000E+00	1.36248E-02	.00000E+00	1.47217E+00
14	6.69695E-01	-1.66829E-08	6.01440E-01	.00000E+00	.00000E+00	9.97957E-03	.00000E+00	1.35269E+00
15	3.80070E-01	2.28811E-05	3.73486E-01	.00000E+00	.00000E+00	2.51433E-03	.00000E+00	7.87828E-01
16	2.12311E-01	1.27901E-05	2.08868E-01	.00000E+00	.00000E+00	1.66606E-03	.00000E+00	4.40084E-01
17	9.41972E-02	7.53311E-06	9.08647E-02	.00000E+00	.00000E+00	2.52477E-03	.00000E+00	1.94087E-01
18	8.07441E-02	7.17857E-06	7.68607E-02	.00000E+00	.00000E+00	3.35695E-03	.00000E+00	1.65712E-01
19	1.49198E-01	1.27066E-05	1.43881E-01	.00000E+00	.00000E+00	4.06104E-03	.00000E+00	3.07395E-01
20	4.88569E-01	4.16091E-05	4.69502E-01	.00000E+00	.00000E+00	1.72805E-02	.00000E+00	1.00557E+00
21	1.57378E-01	2.16381E-05	1.45395E-01	.00000E+00	.00000E+00	1.00277E-02	.00000E+00	3.20153E-01
22	3.29861E-01	1.82521E-05	2.97291E-01	.00000E+00	.00000E+00	2.72668E-02	.00000E+00	6.66385E-01
23	1.01843E+00	8.20884E-06	9.05188E-01	.00000E+00	.00000E+00	9.16735E-02	.00000E+00	2.04620E+00
24	7.71623E-01	6.19712E-06	6.43952E-01	.00000E+00	.00000E+00	1.04029E-01	.00000E+00	1.52239E+00
25	3.31975E-01	2.09127E-06	2.61867E-01	.00000E+00	.00000E+00	6.04430E-02	.00000E+00	6.44267E-01
26	2.25941E-01	1.18510E-05	1.55752E-01	.00000E+00	.00000E+00	5.56009E-02	.00000E+00	4.21543E-01
27	4.16513E-02	3.20933E-07	1.98489E-02	.00000E+00	.00000E+00	1.55149E-02	.00000E+00	7.09007E-02
28	2.39693E+01	1.72942E-04	2.39421E+01	.00000E+00	2.26761E-03	4.98856E-01	.00000E+00	4.98604E+01

- elapsed time .02 min.
0direct access unit 9 requires 516 blocks of length 1456 for cross section weighting.
1 transport cross section weighting function

0zone	grp. 1	grp. 2	grp. 3	grp. 4	grp. 5	grp. 6	grp. 7	grp. 8
1	2.26228E-03	2.44524E-02	3.14807E-02	1.91558E-02	2.98609E-02	5.60589E-02	3.19451E-02	4.59551E-03
2	3.53462E-03	3.79866E-02	4.85962E-02	2.95113E-02	4.50373E-02	8.48349E-02	4.81901E-02	6.90508E-03
3	2.87209E-03	3.23666E-02	4.29057E-02	2.72045E-02	4.24752E-02	8.06478E-02	4.61598E-02	5.50959E-03
4	9.91417E-04	1.19105E-02	1.64469E-02	1.09526E-02	1.74707E-02	3.34402E-02	1.99574E-02	1.97631E-03
5	1.64636E-03	1.85855E-02	2.46645E-02	1.56300E-02	2.44272E-02	4.66204E-02	2.67512E-02	3.28566E-03

0zone	grp. 9	grp. 10	grp. 11	grp. 12	grp. 13	grp. 14	grp. 15	grp. 16
1	4.81624E-03	5.96728E-03	1.26299E-02	1.44556E-02	1.19054E-02	1.73290E-02	1.84194E-03	9.67101E-04
2	7.23449E-03	8.95263E-03	1.89985E-02	2.18260E-02	1.79596E-02	2.62789E-02	2.73820E-03	1.44995E-03
3	5.82794E-03	8.39654E-03	1.77648E-02	2.01806E-02	1.66006E-02	2.42867E-02	2.56194E-03	1.34920E-03
4	1.94925E-03	3.41518E-03	7.21395E-03	8.10619E-03	6.70527E-03	9.76968E-03	1.11069E-03	5.69566E-04
5	3.38194E-03	4.86239E-03	1.02855E-02	1.16727E-02	9.62716E-03	1.40832E-02	1.52847E-03	7.95542E-04

0zone	grp. 17	grp. 18	grp. 19	grp. 20	grp. 21	grp. 22	grp. 23	grp. 24
1	8.86997E-04	1.01715E-03	1.41319E-03	5.03154E-03	3.06020E-03	8.23309E-03	2.86578E-02	3.04788E-02
2	1.33854E-03	1.53632E-03	2.12194E-03	7.56616E-03	4.63193E-03	1.24824E-02	4.34695E-02	4.65691E-02
3	1.23753E-03	1.42307E-03	1.96336E-03	6.99187E-03	4.31747E-03	1.15639E-02	4.04213E-02	4.32245E-02
4	5.01070E-04	5.75536E-04	7.96136E-04	2.82623E-03	1.74630E-03	4.67389E-03	1.66004E-02	1.76715E-02
5	7.18167E-04	8.23998E-04	1.14198E-03	4.06164E-03	2.49259E-03	6.68756E-03	2.34784E-02	2.50088E-02

0zone	grp. 25	grp. 26	grp. 27	grp. 28
1	1.60858E-02	1.49143E-02	3.92940E-03	3.82932E-01
2	2.47390E-02	2.33049E-02	6.46018E-03	5.84204E-01
3	2.28009E-02	2.15254E-02	5.95407E-03	5.38513E-01
4	9.22248E-03	8.56924E-03	2.17097E-03	2.16717E-01
5	1.31429E-02	1.22416E-02	3.20979E-03	3.10808E-01

1 at 0 d, sas2h: babcock wilcox 15x15, 3.00wt%, 20gwd/mtu burn high temp
0cell averaged fluxes

Ozone	grp. 1	grp. 2	grp. 3	grp. 4	grp. 5	grp. 6	grp. 7	grp. 8
1	1.66111E-01	1.28125E+00	1.64093E+00	1.02166E+00	1.54818E+00	2.98120E+00	2.87543E+00	2.07362E+00
2	1.63045E-01	1.24874E+00	1.60052E+00	9.97663E-01	1.51104E+00	2.91123E+00	2.83425E+00	2.06640E+00
3	1.61931E-01	1.23701E+00	1.58658E+00	9.88693E-01	1.49733E+00	2.88469E+00	2.81913E+00	2.06414E+00
4	1.60561E-01	1.21878E+00	1.55872E+00	9.69603E-01	1.46543E+00	2.82157E+00	2.78228E+00	2.06240E+00
5	1.62577E-01	1.24180E+00	1.58934E+00	9.89236E-01	1.49682E+00	2.88231E+00	2.81772E+00	2.06635E+00
Ozone	grp. 9	grp. 10	grp. 11	grp. 12	grp. 13	grp. 14	grp. 15	grp. 16
1	1.58918E+00	1.44700E+00	1.31140E+00	8.07074E-01	6.85986E-01	6.18378E-01	3.75399E-01	2.09811E-01
2	1.59664E+00	1.45518E+00	1.32886E+00	8.27409E-01	7.02403E-01	6.42752E-01	3.77974E-01	2.11112E-01
3	1.59896E+00	1.45786E+00	1.33449E+00	8.33875E-01	7.07747E-01	6.50528E-01	3.78828E-01	2.11548E-01
4	1.60231E+00	1.46456E+00	1.34845E+00	8.49272E-01	7.20178E-01	6.68904E-01	3.80320E-01	2.12395E-01
5	1.59753E+00	1.45791E+00	1.33444E+00	8.33379E-01	7.07284E-01	6.49880E-01	3.78501E-01	2.11433E-01
Ozone	grp. 17	grp. 18	grp. 19	grp. 20	grp. 21	grp. 22	grp. 23	grp. 24
1	9.16975E-02	7.78148E-02	1.45221E-01	4.74299E-01	1.48289E-01	3.05191E-01	9.30430E-01	6.73485E-01
2	9.28864E-02	7.91794E-02	1.47109E-01	4.81043E-01	1.52416E-01	3.16623E-01	9.69496E-01	7.16054E-01
3	9.32798E-02	7.96310E-02	1.47732E-01	4.83249E-01	1.53750E-01	3.20092E-01	9.81527E-01	7.28655E-01
4	9.41821E-02	8.07048E-02	1.49170E-01	4.88446E-01	1.57187E-01	3.29269E-01	1.01540E+00	7.67227E-01
5	9.32466E-02	7.96138E-02	1.47683E-01	4.83113E-01	1.53813E-01	3.20156E-01	9.85068E-01	7.31414E-01
Ozone	grp. 25	grp. 26	grp. 27					
1	2.77960E-01	1.71195E-01	2.43865E-02					
2	3.01221E-01	1.95755E-01	3.13594E-02					
3	3.07693E-01	1.99607E-01	3.29544E-02					
4	3.29096E-01	2.22165E-01	4.01688E-02					
5	3.09529E-01	2.02525E-01	3.40632E-02					

0flux disadvantage factors (zone average/cell average-flux)

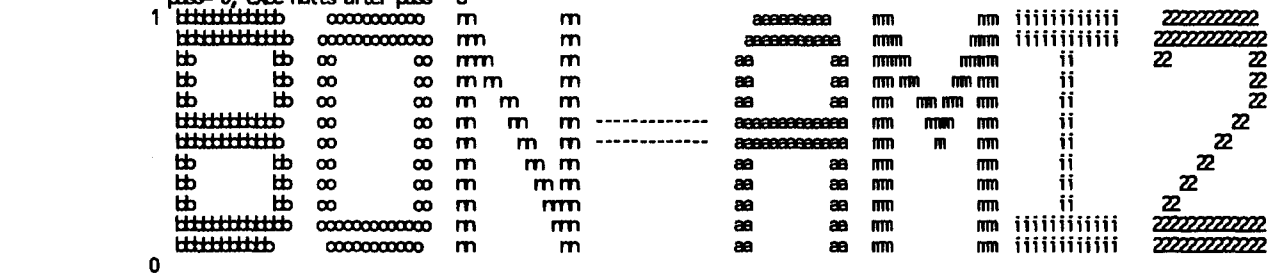
Ozone	grp. 1	grp. 2	grp. 3	grp. 4	grp. 5	grp. 6	grp. 7	grp. 8
1	1.02174E+00	1.03177E+00	1.03246E+00	1.03278E+00	1.03431E+00	1.03431E+00	1.02048E+00	1.00852E+00
2	1.00288E+00	1.00599E+00	1.00703E+00	1.00852E+00	1.00951E+00	1.01003E+00	1.00587E+00	1.00003E+00
3	9.96024E-01	9.96149E-01	9.97629E-01	9.99451E-01	1.00034E+00	1.00083E+00	1.00050E+00	9.98930E-01
4	9.87597E-01	9.81465E-01	9.80731E-01	9.80154E-01	9.79031E-01	9.78927E-01	9.87424E-01	9.98087E-01
5	1.00000E+00	1.00000E+00	1.00000E+00	1.00000E+00	1.00000E+00	1.00000E+00	1.00000E+00	1.00000E+00
Ozone	grp. 9	grp. 10	grp. 11	grp. 12	grp. 13	grp. 14	grp. 15	grp. 16
1	9.94772E-01	9.92519E-01	9.82728E-01	9.68436E-01	9.69804E-01	9.51526E-01	9.91804E-01	9.92529E-01
2	9.99440E-01	9.98130E-01	9.95816E-01	9.92837E-01	9.93099E-01	9.89001E-01	9.98606E-01	9.98484E-01
3	1.00085E+00	9.99962E-01	1.00003E+00	1.00060E+00	1.00066E+00	1.00100E+00	1.00086E+00	1.00054E+00
4	1.00299E+00	1.00456E+00	1.01050E+00	1.01907E+00	1.01823E+00	1.02927E+00	1.00481E+00	1.00455E+00
5	1.00000E+00	1.00000E+00	1.00000E+00	1.00000E+00	1.00000E+00	1.00000E+00	1.00000E+00	1.00000E+00
Ozone	grp. 17	grp. 18	grp. 19	grp. 20	grp. 21	grp. 22	grp. 23	grp. 24
1	9.83387E-01	9.77405E-01	9.85331E-01	9.81756E-01	9.64085E-01	9.53259E-01	9.46455E-01	9.20796E-01
2	9.96116E-01	9.94544E-01	9.96113E-01	9.95714E-01	9.90920E-01	9.88654E-01	9.86194E-01	9.79000E-01
3	1.00086E+00	1.00022E+00	1.00083E+00	1.00028E+00	9.99592E-01	9.99802E-01	9.98432E-01	9.96092E-01
4	1.01003E+00	1.01370E+00	1.01007E+00	1.01104E+00	1.02193E+00	1.02847E+00	1.03289E+00	1.04896E+00
5	1.00000E+00	1.00000E+00	1.00000E+00	1.00000E+00	1.00000E+00	1.00000E+00	1.00000E+00	1.00000E+00
Ozone	grp. 25	grp. 26	grp. 27					
1	8.98010E-01	8.45308E-01	7.15919E-01					
2	9.73157E-01	9.56697E-01	9.20623E-01					
3	9.94067E-01	9.85593E-01	9.67446E-01					
4	1.06322E+00	1.09698E+00	1.17924E+00					
5	1.00000E+00	1.00000E+00	1.00000E+00					

0cell averaged currents

Ozone	grp. 1	grp. 2	grp. 3	grp. 4	grp. 5	grp. 6	grp. 7	grp. 8
1	2.26228E-03	2.44524E-02	3.14807E-02	1.91558E-02	2.98609E-02	5.60589E-02	3.19451E-02	4.59551E-03
2	3.53462E-03	3.79366E-02	4.86962E-02	2.95113E-02	4.50373E-02	8.48349E-02	4.81901E-02	6.90508E-03
3	2.87209E-03	3.23666E-02	4.29057E-02	2.72045E-02	4.24752E-02	8.06478E-02	4.61598E-02	5.50959E-03
4	9.91417E-04	1.19105E-02	1.64469E-02	1.09526E-02	1.74707E-02	3.34402E-02	1.95574E-02	1.97631E-03

```
    5 1.64636E-03 1.85855E-02 2.46645E-02 1.56300E-02 2.44272E-02 4.66204E-02 2.67512E-02 3.28566E-03
Ozone   grp. 9     grp. 10     grp. 11     grp. 12     grp. 13     grp. 14     grp. 15     grp. 16
    1 4.81624E-03 5.96728E-03 1.26295E-02 1.44556E-02 1.19054E-02 1.73290E-02 1.84194E-03 9.67101E-04
    2 7.23449E-03 8.95263E-03 1.89985E-02 2.18260E-02 1.79596E-02 2.62789E-02 2.73820E-03 1.44995E-03
    3 5.82794E-03 8.39654E-03 1.77648E-02 2.01806E-02 1.66006E-02 2.42867E-02 2.56194E-03 1.34920E-03
    4 1.94925E-03 3.41518E-03 7.21395E-03 8.10619E-03 6.70527E-03 9.76968E-03 1.11069E-03 5.69366E-04
    5 3.38196E-03 4.86239E-03 1.02855E-02 1.16727E-02 9.62716E-03 1.40332E-02 1.52847E-03 7.95542E-04
Ozone   grp. 17     grp. 18     grp. 19     grp. 20     grp. 21     grp. 22     grp. 23     grp. 24
    1 8.86997E-04 1.01715E-03 1.41319E-03 5.03154E-03 3.06020E-03 8.23309E-03 2.86578E-02 3.04788E-02
    2 1.33854E-03 1.53632E-03 2.12194E-03 7.56616E-03 4.63193E-03 1.24824E-02 4.34693E-02 4.65691E-02
    3 1.23753E-03 1.42307E-03 1.96336E-03 6.99187E-03 4.31747E-03 1.15639E-02 4.04213E-02 4.32245E-02
    4 5.01070E-04 5.73536E-04 7.96136E-04 2.82623E-03 1.74630E-03 4.67389E-03 1.66004E-02 1.76715E-02
    5 7.18167E-04 8.23998E-04 1.14198E-03 4.06164E-03 2.49259E-03 6.68756E-03 2.34784E-02 2.50088E-02
Ozone   grp. 25     grp. 26     grp. 27
    1 1.60858E-02 1.49143E-02 3.92940E-03
    2 2.47390E-02 2.33049E-02 6.46018E-03
    3 2.28009E-02 2.15254E-02 5.93407E-03
    4 9.22248E-03 8.56924E-03 2.17097E-03
    5 1.31429E-02 1.22416E-02 3.20975E-03
Ozone      volume      vol. fraction

    1    6.88443E-01    3.30753E-01
    2    3.17352E-02    1.52468E-02
    3    2.16724E-01    1.04122E-01
    4    1.14454E+00    5.49878E-01
    5    2.08144E+00    1.00000E+00
 - elapsed time    .03 min.
 Orequested parm=halt8,skipcellwt,skipshipdata
   pass= 0, exec halts after pass  8
```



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0
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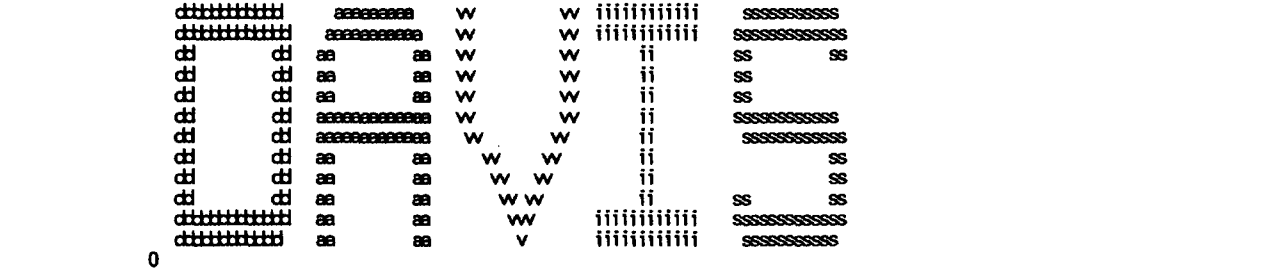

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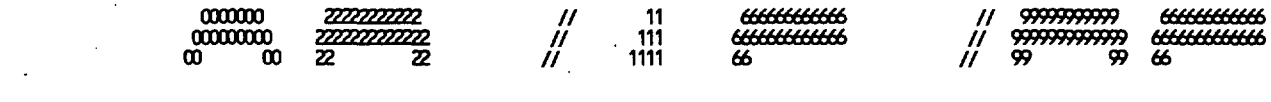
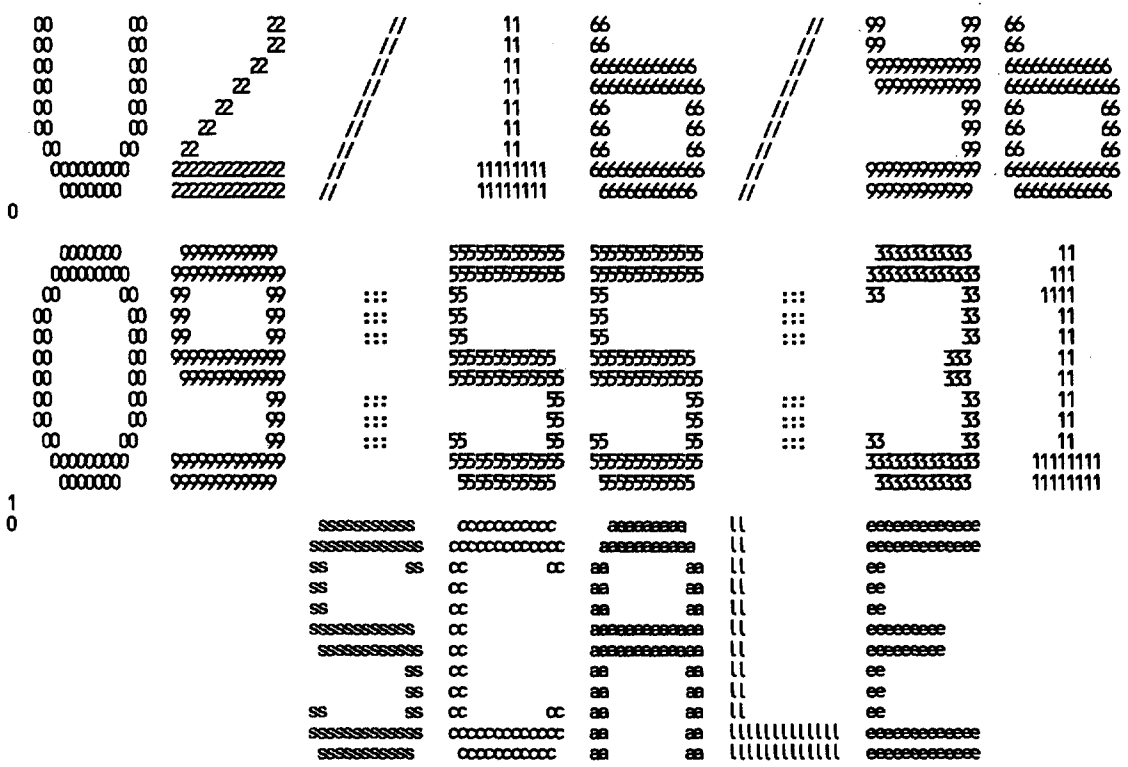



SCALE 4.2
program verification information
code system: scale version: 4.2
program: c0c00B
creation date: 04/27/95
library: /nautronics/scale/exe

```
                    *****   this is not a   scale  configuration controlled code          *****
                    *****                                                                 *****
                    *****              jobname:  davis                                    *****
                    *****                                                                 *****
                    *****   date of execution:  02/16/96                                  *****
                    *****                                                                 *****
                    *****   time of execution:  09:55:31                                  *****
                    *****                                                                 *****
                    *****                                                                 *****
                    ***************************************************************************
                    ***************************************************************************
                    ***************************************************************************

1
0      -1q array has      1 entries.
0       0q array has      4 entries.
0       1q array has      6 entries.
0       2q array has      2 entries.
1logical assignments
0master library   12
 working library  17
 scratch file     18
 new library       1
0p r o b l e m   d e s c r i p t i o n
0igr--geometry (0/1/2/3--inf med/slab/cyl/sphere                2
0izm--number of zones or material regions                       4
0ms--mixing table length                                       70
0ibl--shielded cross section edit option (0/1--no/yes)          0
0ibr--bondarenko factor edit option (0/1--no/yes)               0
0issopt--dancoff factor option                                  0
0convergence criterion    1.00000E-03
0geometry correction factor for wigner rational approximation  1.350E+00
0       3q array has     70 entries.
0       4q array has     70 entries.
0       5q array has     70 entries.
0       6q array has      4 entries.
0       7q array has      4 entries.
0       8q array has      4 entries.
0       9q array has      4 entries.
0      10q array has     70 entries.
0      11q array has      4 entries.
0m i x i n g   t a b l e
0entry  mixture  isotope  number density  new identifier
    1        3     8016    2.09710E-02             201
    2        3     1001    4.19420E-02             202
    3        3     5010    3.81515E-06             203
    4        3     5011    1.54884E-05             204
    5        2    40802    4.25156E-02             205
    6        1    92235    2.28718E-04          200006
    7        1    92234    1.83759E-06          200007
    8        1    92236    1.04764E-06          200008
    9        1    92238    7.29896E-03          200009
   10        1     8016    1.50611E-02          200010
   11        1     8016    1.15315E-02          200011
   12        1    36083    3.30753E-21          200012
   13        1    36085    3.30753E-21          200013
   14        1    38090    3.30753E-21          200014
   15        1    39089    3.30753E-21          200015
   16        1    42095    3.30753E-21          200016
   17        1    40093    3.30753E-21          200017
   18        1    40094    3.30753E-21          200018
```

19	1	40095	3.30753E-21	200019
20	1	41094	3.30753E-21	200020
21	1	43099	3.30753E-21	200021
22	1	45103	3.30753E-21	200022
23	1	45105	3.30753E-21	200023
24	1	44101	3.30753E-21	200024
25	1	44106	3.30753E-21	200025
26	1	46105	3.30753E-21	200026
27	1	46108	3.30753E-21	200027
28	1	47109	3.30753E-21	200028
29	1	51124	3.30753E-21	200029
30	1	54131	3.30753E-21	200030
31	1	54132	3.30753E-21	200031
32	1	54135	3.30753E-21	200032
33	1	54136	3.30753E-21	200033
34	1	55134	3.30753E-21	200034
35	1	55135	3.30753E-21	200035
36	1	55137	3.30753E-21	200036
37	1	56136	3.30753E-21	200037
38	1	57139	3.30753E-21	200038
39	1	59141	3.30753E-21	200039
40	1	59143	3.30753E-21	200040
41	1	58144	3.30753E-21	200041
42	1	60143	3.30753E-21	200042
43	1	60145	3.30753E-21	200043
44	1	61147	3.30753E-21	200044
45	1	61148	3.30753E-21	200045
46	1	60147	3.30753E-21	200046
47	1	62147	3.30753E-21	200047
48	1	62149	3.30753E-21	200048
49	1	62150	3.30753E-21	200049
50	1	62151	3.30753E-21	200050
51	1	62152	3.30753E-21	200051
52	1	64155	3.30753E-21	200052
53	1	63153	3.30753E-21	200053
54	1	63154	3.30753E-21	200054
55	1	63155	3.30753E-21	200055
56	1	40302	4.42681E-03	200056
57	1	1001	2.30630E-02	200057
58	1	5010	2.09787E-06	200058
59	1	5011	8.51673E-06	200059
60	1	55133	3.30753E-21	200060
61	1	95237	3.30753E-21	200061
62	1	94238	3.30753E-21	200062
63	1	94239	3.30753E-21	200063
64	1	94240	3.30753E-21	200064
65	1	94241	3.30753E-21	200065
66	1	94242	3.30753E-21	200066
67	1	95241	3.30753E-21	200067
68	1	95243	3.30753E-21	200068
69	1	96244	3.30753E-21	200069
70	1	999	3.30753E-21	200070

0geometry and material description

0zone	mixture	outer dimension	temperature	extra xs	type (0/1--fuel/mod)
1	3	6.32460E-01	6.07600E+02	7.90564E-01	0
2	2	6.73100E-01	6.50000E+02	1.23052E+01	0
3	3	8.14000E-01	6.07600E+02	3.54862E+00	0
4	1	2.98100E+00	9.75000E+02	2.32883E-01	0

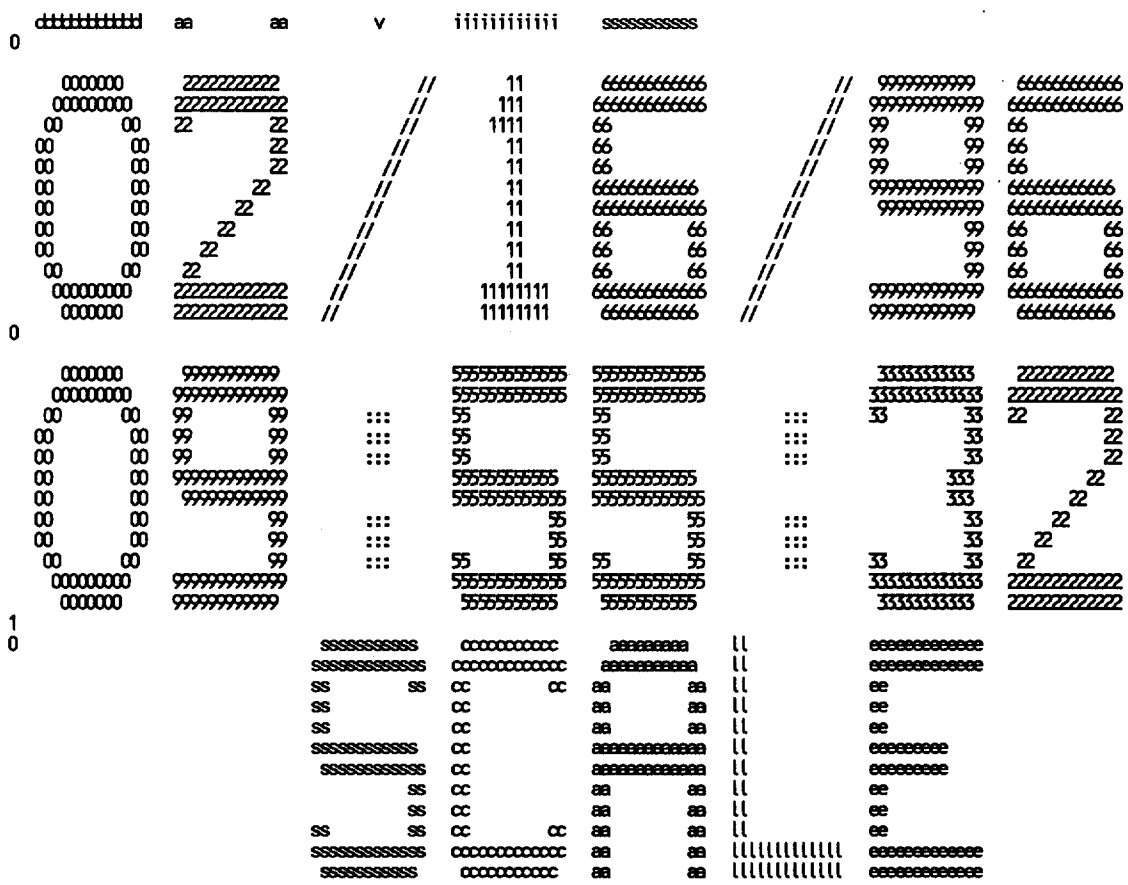
8067 locations of 200000 available are required to make a new master containing the self-shielded values
0no nuclides in your problem have bondarenko factor data**bonami will copy from logical 12 to logical 1

```
Ocopy      999  1/v cross sectio from log 12 to log  1   bondarenko trigger 0
Ocopy     1001   hydrogen        from log 12 to log 18   bondarenko trigger 0
Ocopy     1001   hydrogen        from log 18 to log  1   bondarenko trigger 0
Ocopy     1001   hydrogen        from log 18 to log  1   bondarenko trigger 0
Ocopy     5010  b-10 1273 218ngp from log 12 to log 18   bondarenko trigger 0
Ocopy     5010  b-10 1273 218ngp from log 18 to log  1   bondarenko trigger 0
Ocopy     5010  b-10 1273 218ngp from log 18 to log  1   bondarenko trigger 0
Ocopy     5011   boron-11        from log 12 to log 18   bondarenko trigger 0
Ocopy     5011   boron-11        from log 18 to log  1   bondarenko trigger 0
Ocopy     5011   boron-11        from log 18 to log  1   bondarenko trigger 0
Ocopy     8016   oxygen-16       from log 12 to log 18   bondarenko trigger 0
Ocopy     8016   oxygen-16       from log 18 to log  1   bondarenko trigger 0
Ocopy     8016   oxygen-16       from log 18 to log  1   bondarenko trigger 0
Ocopy     8016   oxygen-16       from log 18 to log  1   bondarenko trigger 0
Ocopy    36083   kr-83           from log 12 to log  1   bondarenko trigger 0
Ocopy    36085   kr-85           from log 12 to log  1   bondarenko trigger 0
Ocopy    38090   sr-90           from log 12 to log  1   bondarenko trigger 0
Ocopy    39089    y-89           from log 12 to log  1   bondarenko trigger 0
Ocopy    40093   zr-93           from log 12 to log  1   bondarenko trigger 0
Ocopy    40094   zr-94           from log 12 to log  1   bondarenko trigger 0
Ocopy    40095   zr-95           from log 12 to log  1   bondarenko trigger 0
Ocopy    40302   zircalloy       from log 12 to log 18   bondarenko trigger 0
Ocopy    40302   zircalloy       from log 18 to log  1   bondarenko trigger 0
Ocopy    40302   zircalloy       from log 18 to log  1   bondarenko trigger 0
Ocopy    41094   nb-94           from log 12 to log  1   bondarenko trigger 0
Ocopy    42095   mo-95           from log 12 to log  1   bondarenko trigger 0
Ocopy    43099   tc-99           from log 12 to log  1   bondarenko trigger 0
Ocopy    44101   ru-101          from log 12 to log  1   bondarenko trigger 0
Ocopy    44106   ru-106          from log 12 to log  1   bondarenko trigger 0
Ocopy    45103   rh-103          from log 12 to log  1   bondarenko trigger 0
Ocopy    45105   rh-105          from log 12 to log  1   bondarenko trigger 0
Ocopy    46105   pd-105          from log 12 to log  1   bondarenko trigger 0
Ocopy    46108   pd-108          from log 12 to log  1   bondarenko trigger 0
Ocopy    47109   silver-109      from log 12 to log  1   bondarenko trigger 0
Ocopy    51124   sb-124          from log 12 to log  1   bondarenko trigger 0
Ocopy    54131   xe-131          from log 12 to log  1   bondarenko trigger 0
Ocopy    54132   xe-132          from log 12 to log  1   bondarenko trigger 0
Ocopy    54135   xenon-135       from log 12 to log  1   bondarenko trigger 0
Ocopy    54136   xe-136          from log 12 to log  1   bondarenko trigger 0
Ocopy    55133   cesium-133      from log 12 to log  1   bondarenko trigger 0
Ocopy    55134   cs-134          from log 12 to log  1   bondarenko trigger 0
Ocopy    55135   cs-135          from log 12 to log  1   bondarenko trigger 0
Ocopy    55137   cs-137          from log 12 to log  1   bondarenko trigger 0
Ocopy    56136   ba-136          from log 12 to log  1   bondarenko trigger 0
Ocopy    57139   la-139          from log 12 to log  1   bondarenko trigger 0
Ocopy    58144   ce-144          from log 12 to log  1   bondarenko trigger 0
Ocopy    59141   pr-141          from log 12 to log  1   bondarenko trigger 0
Ocopy    59143   pr-143          from log 12 to log  1   bondarenko trigger 0
Ocopy    60143   nd-143          from log 12 to log  1   bondarenko trigger 0
Ocopy    60145   nd-145          from log 12 to log  1   bondarenko trigger 0
Ocopy    60147   nd-147          from log 12 to log  1   bondarenko trigger 0
Ocopy    61147   pm-147          from log 12 to log  1   bondarenko trigger 0
Ocopy    61148   pm-148          from log 12 to log  1   bondarenko trigger 0
Ocopy    62147   sm-147          from log 12 to log  1   bondarenko trigger 0
Ocopy    62149   sm-149          from log 12 to log  1   bondarenko trigger 0
Ocopy    62150   sm-150          from log 12 to log  1   bondarenko trigger 0
Ocopy    62151   sm-151          from log 12 to log  1   bondarenko trigger 0
Ocopy    62152   sm-152          from log 12 to log  1   bondarenko trigger 0
Ocopy    63153   eu-153          from log 12 to log  1   bondarenko trigger 0
Ocopy    63154   eu-154          from log 12 to log  1   bondarenko trigger 0
```

```
0copy    63155  eu-155          from log 12 to log  1   bondarenko trigger 0
0copy    64155  gd-155          from log 12 to log  1   bondarenko trigger 0
0copy    92234  u-234 1043 sigo= from log 12 to log  1   bondarenko trigger 0
0copy    92235  uranium-235     from log 12 to log  1   bondarenko trigger 0
0copy    92236  u-236 1163 sigo= from log 12 to log  1   bondarenko trigger 0
0copy    92238  uranium-238     from log 12 to log  1   bondarenko trigger 0
0copy    93237  neptunium-237   from log 12 to log  1   bondarenko trigger 0
0copy    94238  pu-238 1050 sigo from log 12 to log  1   bondarenko trigger 0
0copy    94239  plutonium-239   from log 12 to log  1   bondarenko trigger 0
0copy    94240  plutonium-240   from log 12 to log  1   bondarenko trigger 0
0copy    94241  plutonium-241   from log 12 to log  1   bondarenko trigger 0
0copy    94242  plutonium-242   from log 12 to log  1   bondarenko trigger 0
0copy    95241  am-241 1056 sigo from log 12 to log  1   bondarenko trigger 0
0copy    95243  am-243 1057 218 from log 12 to log  1   bondarenko trigger 0
0copy    96244  curium-244      from log 12 to log  1   bondarenko trigger 0
1    scale 4.2 - 27 group neutron burnup library
      based on endf-b version 4 data with endf-b version 5 fission products
         compiled for nrc     1/27/89
            last updated      9/16/93
               l.m.petrie  -  ornl
     tape id                        4321        number of nuclides              70
     number of neutron groups         27        number of gamma groups           0
     first thermal group              15        logical unit                     1
                              table of contents
    1/v cross sections normalized to 1.0 at 0.0253 ev                id    200070
     hydrogen      endf/b-iv mat 1269/thrm1002   updated 10/13/89    id       202
     hydrogen      endf/b-iv mat 1269/thrm1002   updated 10/13/89    id    200057
    b-10 1273 218ngp 042375 p-3 293k                                 id       203
    b-10 1273 218ngp 042375 p-3 293k                                 id    200058
     boron-11      endf/b-iv mat 1160            updated 10/13/89    id       204
     boron-11      endf/b-iv mat 1160            updated 10/13/89    id    200059
     oxygen-16     endf/b-iv mat 1276            updated 10/13/89    id       201
     oxygen-16     endf/b-iv mat 1276            updated 10/13/89    id    200010
     oxygen-16     endf/b-iv mat 1276            updated 10/13/89    id    200011
     kr-83         mt=102,103,103,105,106,107    updated 10/13/89    id    200012
     kr-85            mt=  102                                       id    200013
     sr-90         mt=102                        updated 10/13/89    id    200014
      y-89         mt=102                        updated 10/13/89    id    200015
     zr-93            mt=  102                                       id    200017
     zr-94         mt=102                        updated 10/13/89    id    200018
     zr-95         mt=102                        updated 10/13/89    id    200019
     zircalloy     endf/b-iv mat 1284            updated 10/13/89    id       205
     zircalloy     endf/b-iv mat 1284            updated 10/13/89    id    200056
     nb-94         mt=102                        updated 10/13/89    id    200020
     mo-95         mt=102                        updated 10/13/89    id    200016
     tc-99         mt=102                        updated 10/13/89    id    200021
     ru-101        mt=102                        updated 10/13/89    id    200024
     ru-106        mt=102                        updated 10/13/89    id    200025
     rh-103        mt=102                        updated 10/13/89    id    200022
     rh-105           mt=  102                                       id    200023
     pd-105        mt=102                        updated 10/13/89    id    200026
     pd-108        mt=102                        updated 10/13/89    id    200027
     silver-109    endf/b-iv mat 1139            updated 10/13/89    id    200028
     sb-124        mt=102                        updated 10/13/89    id    200029
     xe-131        mt=102,103,104,105,106        updated 10/13/89    id    200030
     xe-132        mt=102,103,104,105,106        updated 10/13/89    id    200031
     xenon-135     endf/b-iv mat 1294            updated 10/13/89    id    200032
     xe-136           mt=  102, 103, 104, 105, 107                   id    200033
     cesium-133    endf/b-iv mat 1141            updated 10/13/89    id    200060
     cs-134        mt=102                        updated 10/13/89    id    200034
```

```
        cs-135          mt=  102                                                id   200035
        cs-137        mt=102                        updated 10/13/89            id   200036
        ba-136        mt=102                        updated 10/13/89            id   200037
        la-139        mt=102                        updated 10/13/89            id   200038
        ce-144          mt=  102                                                id   200041
        pr-141        mt=102,103,104,105,106,107    updated 10/13/89            id   200039
        pr-143        mt=102                        updated 10/13/89            id   200040
        nd-143        mt=102                        updated 10/13/89            id   200042
        nd-145        mt=102                        updated 10/13/89            id   200043
        nd-147        mt=102                        updated 10/13/89            id   200046
        pm-147        mt=102                        updated 10/13/89            id   200044
        pm-148          mt=  102                                                id   200045
        sm-147        endf/b-v fission product      updated 10/13/89            id   200047
        sm-149        mt=102,103,107                updated 10/13/89            id   200048
        sm-150        mt=102                        updated 10/13/89            id   200049
        sm-151        mt=102,103,104,105,106,107    updated 10/13/89            id   200050
        sm-152        mt=102,103,104,105,106,107    updated 10/13/89            id   200051
        eu-153        mt=102,103,104,105,106,107    updated 10/13/89            id   200053
        eu-154        mt=102,103,104,105,106,107    updated 10/13/89            id   200054
        eu-155        mt=102,103,104,105,106,107    updated 10/13/89            id   200055
        gd-155        mt=102                        updated 10/13/89            id   200052
       u-234 1043 sigo=5+4 newklacs p-3 293k f-1/e-m(1.+5)                       id   200007
        uranium-235   endf/b-iv mat 1261           updated 10/13/89            id   200006
       u-236 1163 sigo=5+4 newklacs p-3 293k f-1/e-m(1.+5)                       id   200008
        uranium-238   endf/b-iv mat 1262           updated 10/13/89            id   200009
        neptunium-237 endf/b-iv mat 1263           updated 10/13/89            id   200061
       pu-238 1050 sigo=5+4 newklacs p-3 293k f-1/e-m(1.+5)                      id   200062
        plutonium-239 endf/b-iv mat 1264           updated 10/13/89            id   200063
        plutonium-240 endf/b-iv mat 1265           updated 10/13/89            id   200064
        plutonium-241 endf/b-iv mat 1266           updated 10/13/89            id   200065
        plutonium-242 endf/b-iv mat 1161           updated 10/13/89            id   200066
       am-241 1056 sigo=5+4 newklacs 218ngp p-3 293k                             id   200067
       am-243 1057 218 gp wt f-1/e-m 090376 p3 293k                              id   200068
        curium-244    endf/b-iv mat 1162           updated 10/13/89            id   200069
0       tape copy used      0 i/o's, and took     .00 seconds
1               m         m  iiiiiiiiiiii   ttttttttttt     aaaaaaaa    ww        ww  ll
                mm        m  iiiiiiiiiiii   ttttttttttt    aaaaaaaaaa   ww        ww  ll
                mmm       m      ii             tt        aa      aa   ww        ww  ll
                m m m     m      ii             tt        aa      aa   ww        ww  ll
                m  m      m      ii             tt        aa      aa   ww        ww  ll
                m   m     m      ii             tt        aaaaaaaaaaaa ww    w   ww  ll
                m    m    m      ii             tt        aaaaaaaaaaaa ww   www  ww  ll
                m     m m m      ii             tt        aa      aa   ww  ww ww ww  ll
                m      m m       ii             tt        aa      aa   ww ww   ww ww  ll
                m       mmm      ii             tt        aa      aa   wwww     wwww  ll
                m        mm  iiiiiiiiiii       tt        aa      aa   www       www  lllllllllll
                m         m  iiiiiiiiiii       tt        aa      aa   ww         ww  lllllllllll
0

  ddddddddd     aaaaaaaa    w        w iiiiiiiiiii   sssssssss
  ddddddddddd   aaaaaaaaa   w        w iiiiiiiiiii   ssssssssss
  dd       dd  aa      aa   w        w     ii       ss      ss
  dd       dd  aa      aa   w        w     ii       ss
  dd       dd  aa      aa   w        w     ii       ss
  dd       dd  aaaaaaaaaa   w        w     ii       ssssssssss
  dd       dd  aaaaaaaaaa    w      w      ii        ssssssssss
  dd       dd  aa      aa     w    w       ii              ss
  dd       dd  aa      aa      w  w        ii              ss
  dd       dd  aa      aa       ww         ii       ss     ss
  ddddddddddd  aa      aa       ww    iiiiiiiiiii  ssssssssss
```



****
****
****
***** *****
***** program verification information *****
***** *****
***** code system: scale version: 4.2 *****
***** *****
****
****
***** *****
***** *****
***** program: c0c002 *****

```
                    *****                                                   *****
                    *****       creation date:  04/27/95                    *****
                    *****                                                   *****
                    *****            library:  /neutronics/scale/exe        *****
                    *****                                                   *****
                    *****                                                   *****
                    *****   this is not a   scale  configuration controlled code *****
                    *****                                                   *****
                    *****            jobname:  davis                        *****
                    *****                                                   *****
                    *****   date of execution:  02/16/96                    *****
                    *****                                                   *****
                    *****   time of execution:  09:55:32                    *****
                    *****                                                   *****
                    *****                                                   *****
                    ***************************************************************
                    ***************************************************************
                    ***************************************************************
1
0      -1q array has      1 entries.
0       0q array has      4 entries.
0       1q array has     12 entries.
0select  5 nuclides from the master  library on logical  1
        65 nuclides from the working library on logical  3
         0 nuclides from the working library on logical  0
           to create the new working library on logical  4

         1 resonance calculations have been requested
         0 output option for ampx formatted cross section data
0the storage allocated for this case is 200000 words
0       2q array has     70 entries.
0       3q array has     15 entries.
0       4q array has      5 entries.
0 general information concerning cross section library
    tape identification number                4349
    number of nuclides on tape                  65
    number of neutron energy groups             27
    first thermal neutron energy group          15
    number of gamma energy groups                0
0   direct access unit number  9 requires  72 blocks of length  1484 words
- xsdrn tape   4321
                        scale 4.2 - 27 group neutron burnup library
                           based on endf-b version 4 data with endf-b version 5 fission products
                              compiled for nrc      1/27/89
                                 last updated       9/16/93
                                    l.m.petrie   -   ornl
-  work tape   4349

 xsdrn weighted tape--parent case entitled-- at 0 d, sas2h: babcock wilcox 15x15,
  3.00wt%, 20gwd/mtu burn high temp



0 nuclides from xsdrn tape
     1     hydrogen        endf/b-iv mat 1269/thrml002    updated 10/13/89          202
     2    b-10 1273 218ngp 042375 p-3 293k                                          203
     3     boron-11        endf/b-iv mat 1160             updated 10/13/89          204
     4     oxygen-16       endf/b-iv mat 1276             updated 10/13/89          201
     5     zircalloy       endf/b-iv mat 1284             updated 10/13/89          205
0 nuclides from  work tape
```

```
  6   1/v cross sections normalized to 1.0 at 0.0253 ev                          999
  7    hydrogen        endf/b-iv mat 1269/thrml002    updated 10/13/89          1001
  8   b-10 1273 218ngp 042375 p-3 293k                                          5010
  9    boron-11        endf/b-iv mat 1160             updated 10/13/89          5011
 10    oxygen-16       endf/b-iv mat 1276             updated 10/13/89          8016
 11    oxygen-16       endf/b-iv mat 1276             updated 10/13/89             6
 12    kr-83           mt=102,103,103,105,106,107     updated 10/13/89         36083
 13    kr-85             mt=  102                                               36085
 14    sr-90           mt=102                         updated 10/13/89         38090
 15     y-89           mt=102                         updated 10/13/89         39089
 16    zr-93             mt=  102                                               40093
 17    zr-94           mt=102                         updated 10/13/89         40094
 18    zr-95           mt=102                         updated 10/13/89         40095
 19    zircalloy       endf/b-iv mat 1284             updated 10/13/89         40302
 20    nb-94           mt=102                         updated 10/13/89         41094
 21    mo-95           mt=102                         updated 10/13/89         42095
 22    tc-99           mt=102                         updated 10/13/89         43099
 23    ru-101          mt=102                         updated 10/13/89         44101
 24    ru-106          mt=102                         updated 10/13/89         44106
 25    rh-103          mt=102                         updated 10/13/89         45103
 26    rh-105            mt=  102                                               45105
 27    pd-105          mt=102                         updated 10/13/89         46105
 28    pd-108          mt=102                         updated 10/13/89         46108
 29    silver-109      endf/b-iv mat 1139             updated 10/13/89         47109
 30    sb-124          mt=102                         updated 10/13/89         51124
 31    xe-131          mt=102,103,104,105,106         updated 10/13/89         54131
 32    xe-132          mt=102,103,104,105,106         updated 10/13/89         54132
 33    xenon-135       endf/b-iv mat 1294             updated 10/13/89         54135
 34    xe-136            mt=  102, 103, 104, 105, 107                           54136
 35    cesium-133      endf/b-iv mat 1141             updated 10/13/89         55133
 36    cs-134          mt=102                         updated 10/13/89         55134
 37    cs-135            mt=  102                                               55135
 38    cs-137          mt=102                         updated 10/13/89         55137
 39    ba-136          mt=102                         updated 10/13/89         56136
 40    la-139          mt=102                         updated 10/13/89         57139
 41    ce-144            mt=  102                                               58144
 42    pr-141          mt=102,103,104,105,106,107     updated 10/13/89         59141
 43    pr-143          mt=102                         updated 10/13/89         59143
 44    nd-143          mt=102                         updated 10/13/89         60143
 45    nd-145          mt=102                         updated 10/13/89         60145
 46    nd-147          mt=102                         updated 10/13/89         60147
 47    pm-147          mt=102                         updated 10/13/89         61147
 48    pm-148            mt=  102                                               61148
 49    sm-147          endf/b-v fission product       updated 10/13/89         62147
 50    sm-149          mt=102,103,107                 updated 10/13/89         62149
 51    sm-150          mt=102                         updated 10/13/89         62150
 52    sm-151          mt=102,103,104,105,106,107     updated 10/13/89         62151
 53    sm-152          mt=102,103,104,105,106,107     updated 10/13/89         62152
 54    eu-153          mt=102,103,104,105,106,107     updated 10/13/89         63153
 55    eu-154          mt=102,103,104,105,106,107     updated 10/13/89         63154
 56    eu-155          mt=102,103,104,105,106,107     updated 10/13/89         63155
 57    gd-155          mt=102                         updated 10/13/89         64155
 58   u-234 1043 sigo=5+4 newklacs p-3 293k f-1/e-m(1.+5)                        92234
 59    uranium-235     endf/b-iv mat 1261             updated 10/13/89         92235
 60   u-236 1163 sigo=5+4 newklacs p-3 293k f-1/e-m(1.+5)                        92236
 61    uranium-238     endf/b-iv mat 1262             updated 10/13/89         92238
 62    neptunium-237   endf/b-iv mat 1263             updated 10/13/89         93237
 63   pu-238 1050 sigo=5+4 newklacs p-3 293k f-1/e-m(1.+5)                       94238
 64    plutonium-239   endf/b-iv mat 1264             updated 10/13/89         94239
 65    plutonium-240   endf/b-iv mat 1265             updated 10/13/89         94240
```

```
    66     plutonium-241  endf/b-iv mat 1266              updated 10/13/89                94241
    67     plutonium-242  endf/b-iv mat 1161              updated 10/13/89                94242
    68    am-241 1056 sigp=5+4 newxlacs 218ngp p-3 293k                                    95241
    69    am-243 1057 218 gp wt f-1/e-m 090376 p3 293k                                     95243
    70     curium-244     endf/b-iv mat 1162              updated 10/13/89                96244
0 hydrogen        endf/b-iv mat 1269/thrm1002    updated 10/13/89              202     temperature=  607.60
                              thermal scattering matrix number   2 at a temperature of   550.00 was selected.
0b-10 1273 218ngp 042375 p-3 293k                                                 203     temperature=  607.60
                              thermal scattering matrix number   2 at a temperature of   550.00 was selected.
0 boron-11        endf/b-iv mat 1160             updated 10/13/89              204     temperature=  607.60
                              thermal scattering matrix number   2 at a temperature of   550.00 was selected.
0 oxygen-16       endf/b-iv mat 1276             updated 10/13/89              201     temperature=  607.60
0 zircalloy       endf/b-iv mat 1284             updated 10/13/89              205     temperature=  650.00
0resonance data for this nuclide
0mass number (a)          =    90.436              temperature(kelvin)       =   650.000
0potential scatter sigma  =     6.385              lumped nuclear density    = 4.2515602E-02
0spin factor (g)          =     1.079              lump dimension (a-bar)    = 6.7309999E-01
0inner radius             = 6.3246000E-01          dancoff correction (c)    = 1.6805907E-01
0the absorber will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs          res fiss          res scat
   8     -1.156752E-03     .000000E+00    -7.806033E-01
   9     -4.625978E-02     .000000E+00    -2.073270E+00
  10     -5.962230E-02     .000000E+00    -1.351984E+00
  11     -1.761672E-01     .000000E+00    -7.350731E-01
0excess resonance integrals
0                 resolved
0absorption      2.92402E-01
 fission          .00000E+00
-  elapsed time     .00 min.
-  elapsed time     .02 min.
1     this xsdrn working tape was created 02/16/96 at 09:55:32
      the title of the parent case is as follows
      xsdrn weighted tape--parent case entitled-- at 0 d, sas2h: babcock wilcox 15x15,
       3.00wt%, 20gwd/mtu burn high temp

        tape id                          8670        number of nuclides              70
        number of neutron groups           27        number of gamma groups           0
        first thermal group                15        logical unit                     4
                                  table of contents
       hydrogen       endf/b-iv mat 1269/thrm1002    updated 10/13/89          id    202
      b-10 1273 218ngp 042375 p-3 293k                                          id    203
       boron-11       endf/b-iv mat 1160             updated 10/13/89          id    204
       oxygen-16      endf/b-iv mat 1276             updated 10/13/89          id    201
       zircalloy      endf/b-iv mat 1284             updated 10/13/89          id    205
      1/v cross sections normalized to 1.0 at 0.0253 ev                         id    999
       hydrogen       endf/b-iv mat 1269/thrm1002    updated 10/13/89          id   1001
      b-10 1273 218ngp 042375 p-3 293k                                          id   5010
       boron-11       endf/b-iv mat 1160             updated 10/13/89          id   5011
       oxygen-16      endf/b-iv mat 1276             updated 10/13/89          id   8016
       oxygen-16      endf/b-iv mat 1276             updated 10/13/89          id      6
       kr-83          mt=102,103,103,105,106,107     updated 10/13/89          id  36083
       kr-85             mt=  102                                               id  36085
       sr-90          mt=102                         updated 10/13/89          id  38090
        y-89          mt=102                         updated 10/13/89          id  39089
       zr-93             mt=  102                                               id  40093
       zr-94          mt=102                         updated 10/13/89          id  40094
       zr-95          mt=102                         updated 10/13/89          id  40095
       zircalloy      endf/b-iv mat 1284             updated 10/13/89          id  40302
```

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        nb-94          mt=102                          updated 10/13/89              id    41094
        mo-95          mt=102                          updated 10/13/89              id    42095
        tc-99          mt=102                          updated 10/13/89              id    43099
        ru-101         mt=102                          updated 10/13/89              id    44101
        ru-106         mt=102                          updated 10/13/89              id    44106
        rh-103         mt=102                          updated 10/13/89              id    45103
        rh-105           mt=  102                                                    id    45105
        pd-105         mt=102                          updated 10/13/89              id    46105
        pd-108         mt=102                          updated 10/13/89              id    46108
        silver-109     endf/b-iv mat 1139              updated 10/13/89              id    47109
        sb-124         mt=102                          updated 10/13/89              id    51124
        xe-131         mt=102,103,104,105,106          updated 10/13/89              id    54131
        xe-132         mt=102,103,104,105,106          updated 10/13/89              id    54132
        xenon-135      endf/b-iv mat 1294              updated 10/13/89              id    54135
        xe-136           mt=  102, 103,  104,  105,  107                           id    54136
        cesium-133     endf/b-iv mat 1141              updated 10/13/89              id    55133
        cs-134         mt=102                          updated 10/13/89              id    55134
        cs-135           mt=  102                                                    id    55135
        cs-137         mt=102                          updated 10/13/89              id    55137
        ba-136         mt=102                          updated 10/13/89              id    56136
        la-139         mt=102                          updated 10/13/89              id    57139
        ce-144           mt=  102                                                    id    58144
        pr-141         mt=102,103,104,105,106,107      updated 10/13/89              id    59141
        pr-143         mt=102                          updated 10/13/89              id    59143
        nd-143         mt=102                          updated 10/13/89              id    60143
        nd-145         mt=102                          updated 10/13/89              id    60145
        nd-147         mt=102                          updated 10/13/89              id    60147
        pm-147         mt=102                          updated 10/13/89              id    61147
        pm-148           mt=  102                                                    id    61148
        sm-147         endf/b-v fission product        updated 10/13/89              id    62147
        sm-149         mt=102,103,107                  updated 10/13/89              id    62149
        sm-150         mt=102                          updated 10/13/89              id    62150
        sm-151         mt=102,103,104,105,106,107      updated 10/13/89              id    62151
        sm-152         mt=102,103,104,105,106,107      updated 10/13/89              id    62152
        eu-153         mt=102,103,104,105,106,107      updated 10/13/89              id    63153
        eu-154         mt=102,103,104,105,106,107      updated 10/13/89              id    63154
        eu-155         mt=102,103,104,105,106,107      updated 10/13/89              id    63155
        gd-155         mt=102                          updated 10/13/89              id    64155
       u-234 1043 sigo=5+4 newxlacs p-3 295k f-1/e-m(1.+5)                           id    92234
        uranium-235    endf/b-iv mat 1261              updated 10/13/89              id    92235
       u-236 1163 sigo=5+4 newxlacs p-3 295k f-1/e-m(1.+5)                           id    92236
        uranium-238    endf/b-iv mat 1262              updated 10/13/89              id    92238
        neptunium-237  endf/b-iv mat 1263              updated 10/13/89              id    93237
       pu-238 1050 sigo=5+4 newxlacs p-3 295k f-1/e-m(1.+5)                          id    94238
        plutonium-239  endf/b-iv mat 1264              updated 10/13/89              id    94239
        plutonium-240  endf/b-iv mat 1265              updated 10/13/89              id    94240
        plutonium-241  endf/b-iv mat 1266              updated 10/13/89              id    94241
        plutonium-242  endf/b-iv mat 1161              updated 10/13/89              id    94242
       am-241 1056 sigo=5+4 newxlacs 218ngp p-3 295k                                 id    95241
       am-243 1057 218 gp wt f-1/e-m 090376 p3 295k                                  id    95243
        curium-244     endf/b-iv mat 1162              updated 10/13/89              id    96244
0        tape copy used      0 i/o's, and took      .00 seconds
1 xx         xx  sssssssssss    ddddddddddd   rrrrrrrrrrr   m          m  ppppppppp    mm          mm
   xx        xx  sssssssssssss  ddddddddddddd  rrrrrrrrrrrr  mm         m  ppppppppppp   mmm        mmm
     xx    xx   ss          ss  dd          dd  rr         rr  mmm       m  pp       pp   mmmm      mmmm
      xx  xx    ss              dd          dd  rr         rr  m mm     m  pp       pp   mm mm    mm mm
       xx xx    ss              dd          dd  rr         rr  m  mm    m  pp       pp   mm  mm mm  mm
        xxx      sssssssssss    dd          dd  rrrrrrrrrrrr  m   mm   m  ppppppppppp   mm   mmm   mm
        xxx       sssssssssss   dd          dd  rrrrrrrrrrr   m    mm  m  ppppppppppp   mm    m    mm
       xx xx              ss    dd          dd  rr       rr   m     mm m  pp           mm          mm
```
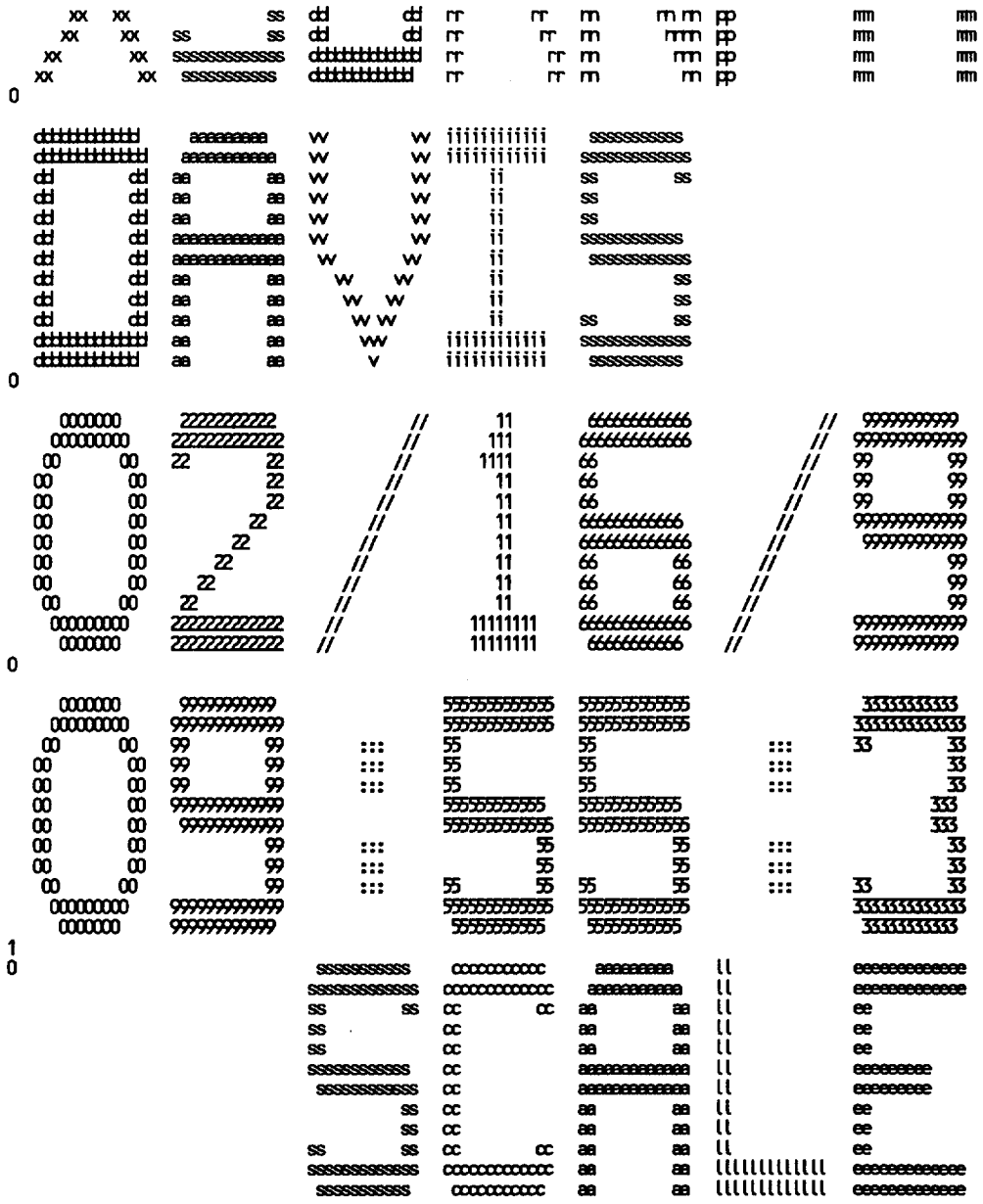



```
                    ********************************************************************************
                    ********************************************************************************
                    ********************************************************************************
                    *****                                                                      *****
                    *****                  program verification information                   *****
                    *****                                                                      *****
                    *****                  code system:    scale  version:    4.2             *****
                    *****                                                                      *****
                    ********************************************************************************
                    ********************************************************************************
                    *****                                                                      *****
                    *****                                                                      *****
                    *****              program:  c0c001                                        *****
                    *****                                                                      *****
                    *****         creation date:  04/27/95                                     *****
                    *****                                                                      *****
                    *****              library:  /neutronics/scale/exe                         *****
                    *****                                                                      *****
                    *****                                                                      *****
                    *****     this is not a   scale  configuration controlled code            *****
                    *****                                                                      *****
                    *****              jobname:  davis                                         *****
                    *****                                                                      *****
                    *****     date of execution:  02/16/96                                     *****
                    *****                                                                      *****
                    *****     time of execution:  09:55:33                                     *****
                    *****                                                                      *****
                    *****                                                                      *****
                    ********************************************************************************
                    ********************************************************************************
                    ********************************************************************************
1
                   at 0 d, second part of sas2h pass to make library
0       -1q array has      1 entries.
0        0q array has     11 entries.
0        1q array has     15 entries.
0        2q array has     10 entries.
0        3q array has     12 entries.
0        4q array has      9 entries.
0        5q array has     12 entries.
0direct access unit   9 requires    12 blocks of length  704 for cross section mixing.
1                  at 0 d, second part of sas2h pass to make library
0general problem description data block
0                            general problem data

 ige  1/2/3 = plane/cylinder/sphere      2       isn  quadrature order                    8
 izn  number of zones                    4       isct order of scattering                 3
 im   number of special intervals       28       ievt 0/1/2/3/4/5/6=q/k/alpha/c/z/r/h     1
 ibl  0/1/2/3 = vacuum/refl/per/white    1       iim  inner iteration maximum            20
 ibr  right boundary condition           3       iom  outer iteration maximum            25
 mxx  number of mixtures                 3       iclc -1/0/n--flat res/sry/opt            0
 ms   mixing table length               70       ith  0/1 = forward/adjoint            0
 igm  number of energy groups           27       iflu not used(always wgtd)               0
 nng  number of neutron groups          27       iprt -2/-1/0/n=mixture xsec print       -2
 ngg  number of gamma groups             0       idl  0/1/2/3=no/prt rd/pch n/both     14
 iftg number of first thermal group     15       ipbt -1/0/1=none/fine/all bal. prt       0
```

```
0                                special options

 ifg  0/1 = none/weighting calculation    1      ipn  0/1/2 diff. coef. param            0
 iqm  volumetric sources (0/n=no/yes)     0      idfm 0/1 = none/density factors 38*     0
 ipm  boundary sources (0/n=no/yes)       0      iaz  0/n = none/n activities by zone    0
 ifn  0/1/2 = input 33*/34*/use last     14      iai  0/1=none/activities by interval    0
 itmx maximum time (minutes)             10      ifct 0/1=no/yes upscatter scaling       0
 idt1 0/1/2/3=no/xsect/srce/flux--out     0      ipvt 0/1/2=no/k/alpha parametric srch   0
 isx  broad group fluxes                  0      isen outer iteration acceleration       0
 ibln activity data unit                  0      rbnd band rebaln parameter              0
 jbkl 0/1/2 buckling geometry             0
0                                 weighting data (ifg=1)

 icon -1/0/1=cell/zone/region weight     -1      ihtf total xsect psn in brd gp tables   3
 igmf number of broad groups              3      ndsf psn g-g or file number             4
 itp  0/10/20/30/40 0/c/e/ac/a            0      nusf table length or max order          6
 ipp  -2/-1/0/n=wgted xsect print        -2      msom extra 1-d x-sect positions         0
 iap  -1/n anisn xsect print             -1
0                                floating point parameters

 eps  overall convergence        1.00000E-04     dy   cyl/pla ht for buckling     .00000E+00
 ptc  point convergence          1.00000E-04     dz   plane depth for buckling  2.00000E+02
 xnf  normalization factor       1.00000E+00     vsc  void streaming correction  .00000E+00
 ev   eigenvalue guess            .00000E+00     pv   ipvt=1/2--k/alpha         1.00000E+00
 evm  eigenvalue modifier         .00000E+00     eql  ev change eps for search  1.00000E-03
 bf   buckling factor=1.420892   1.42089E+00     xnpm new param mod for search  7.50000E-01
     this case will require       2611 locations for mixing
     this case has been allocated 200000 locations
1                      at 0 d, second part of sas2h pass to make library
0        13q array has      70 entries.
0        14q array has      70 entries.
0        15q array has      70 entries.
0                                 data block 2 (mixing table, etc.)
```

	nuclides on tape	cccc identification	mixture	mixing table component	atom density	extra xsect id's
1	202		3	201	2.09710E-02	
2	203		3	202	4.19420E-02	
3	204		3	203	3.81515E-06	
4	201		3	204	1.54884E-05	
5	205		2	205	4.25156E-02	
6	999		1	92235	2.28718E-04	
7	1001		1	92234	1.83759E-06	
8	5010		1	92236	1.04764E-06	
9	5011		1	92238	7.29896E-03	
10	8016		1	8016	1.50611E-02	
11	6		1	6	1.15315E-02	
12	36083		1	36083	3.30753E-21	
13	36085		1	36085	3.30753E-21	
14	38090		1	38090	3.30753E-21	
15	39089		1	39089	3.30753E-21	
16	40093		1	42095	3.30753E-21	
17	40094		1	40093	3.30753E-21	
18	40095		1	40094	3.30753E-21	
19	40302		1	40095	3.30753E-21	
20	41094		1	41094	3.30753E-21	
21	42095		1	43099	3.30753E-21	
22	43099		1	45103	3.30753E-21	
23	44101		1	45105	3.30753E-21	
24	44106		1	44101	3.30753E-21	
25	45103		1	44106	3.30753E-21	

26	45105	1	46105	3.30753E-21
27	46105	1	46108	3.30753E-21
28	46108	1	47109	3.30753E-21
29	47109	1	51124	3.30753E-21
30	51124	1	54131	3.30753E-21
31	54131	1	54132	3.30753E-21
32	54132	1	54135	3.30753E-21
33	54135	1	54136	3.30753E-21
34	54136	1	55134	3.30753E-21
35	55133	1	55135	3.30753E-21
36	55134	1	55137	3.30753E-21
37	55135	1	56136	3.30753E-21
38	55137	1	57139	3.30753E-21
39	56136	1	59141	3.30753E-21
40	57139	1	59143	3.30753E-21
41	58144	1	58144	3.30753E-21
42	59141	1	60143	3.30753E-21
43	59143	1	60145	3.30753E-21
44	60143	1	61147	3.30753E-21
45	60145	1	61148	3.30753E-21
46	60147	1	60147	3.30753E-21
47	61147	1	62147	3.30753E-21
48	61148	1	62149	3.30753E-21
49	62147	1	62150	3.30753E-21
50	62149	1	62151	3.30753E-21
51	62150	1	62152	3.30753E-21
52	62151	1	64155	3.30753E-21
53	62152	1	63153	3.30753E-21
54	63153	1	63154	3.30753E-21
55	63154	1	63155	3.30753E-21
56	63155	1	40302	4.42681E-03
57	64155	1	1001	2.30630E-02
58	92234	1	5010	2.09787E-06
59	92235	1	5011	8.51673E-06
60	92236	1	55133	3.30753E-21
61	92238	1	93237	3.30753E-21
62	93237	1	94238	3.30753E-21
63	94238	1	94239	3.30753E-21
64	94239	1	94240	3.30753E-21
65	94240	1	94241	3.30753E-21
66	94241	1	94242	3.30753E-21
67	94242	1	95241	3.30753E-21
68	95241	1	95243	3.30753E-21
69	95243	1	96244	3.30753E-21
70	96244	1	999	3.30753E-21

- elapsed time .00 min.
0 24259 locations will be used
0 35q array has 29 entries.
0 36q array has 28 entries.
0 39q array has 4 entries.
0 40q array has 4 entries.
0 47q array has 27 entries.
0 51q array has 27 entries.
1 at 0 d, second part of sas2h pass to make library

neutron group parameters

0 gp	energy boundaries	lethargy boundaries	weighted velocities	broad gp numbers	calc type	group band	right albedo	left albedo
1	2.00000E+07	-6.93147E-01	4.60581E+09	1	0	1	1.00000E+00	
2	6.43400E+06	4.40989E-01	2.88737E+09	1	0	2	1.00000E+00	
3	3.00000E+06	1.20397E+00	2.12201E+09	1	0	3	1.00000E+00	

4	1.85000E+06	1.68740E+00	1.75673E+09	1	0	4	1.00000E+00
5	1.40000E+06	1.96611E+00	1.46535E+09	1	0	5	1.00000E+00
6	9.00000E+05	2.40795E+00	1.06620E+09	2	0	6	1.00000E+00
7	4.00000E+05	3.21888E+00	6.07557E+08	2	0	7	1.00000E+00
8	1.00000E+05	4.60517E+00	2.72415E+08	2	0	8	1.00000E+00
9	1.70000E+04	6.37713E+00	1.13526E+08	2	0	9	1.00000E+00
10	3.00000E+03	8.11173E+00	4.82126E+07	2	0	10	1.00000E+00
11	5.50000E+02	9.80818E+00	2.05946E+07	2	0	11	1.00000E+00
12	1.00000E+02	1.15129E+01	1.01036E+07	2	0	12	1.00000E+00
13	3.00000E+01	1.27169E+01	5.69595E+06	2	0	13	1.00000E+00
14	1.00000E+01	1.38155E+01	3.20957E+06	2	0	14	1.00000E+00
15	3.04999E+00	1.50030E+01	2.10601E+06	2	0	15	1.00000E+00
16	1.77000E+00	1.55471E+01	1.70522E+06	2	0	16	1.00000E+00
17	1.29999E+00	1.58557E+01	1.52545E+06	2	0	17	1.00000E+00
18	1.12999E+00	1.59959E+01	1.42867E+06	2	0	18	1.00000E+00
19	1.00000E+00	1.61181E+01	1.31002E+06	2	0	19	1.00000E+00
20	8.00000E-01	1.63412E+01	9.05898E+05	2	0	20	1.00000E+00
21	4.00000E-01	1.70844E+01	8.17974E+05	3	0	21	1.00000E+00
22	3.25000E-01	1.72420E+01	6.90070E+05	3	0	22	1.00000E+00
23	2.25000E-01	1.76098E+01	4.86933E+05	3	0	23	1.00000E+00
24	9.99999E-02	1.84207E+01	3.57766E+05	3	0	24	1.00000E+00
25	5.00000E-02	1.91138E+01	2.71895E+05	3	0	25	1.00000E+00
26	3.00000E-02	1.96247E+01	1.87283E+05	3	0	26	1.00000E+00
27	1.00000E-02	2.07233E+01	8.88201E+04	3	0	27	1.00000E+00
28	1.00000E-05	2.76310E+01					

1 at 0 d, second part of sas2h pass to make library

0

	mixture by zone	order p(l) by zone	activity table matl no.	reaction	quadrature constants weights	directions	refl direc	wt x cos
1	3	3			0	-2.79004E-01	3	0
2	2	3			5.06143E-02	-1.97286E-01	3	-9.98548E-03
3	3	3			5.06143E-02	1.97286E-01	2	9.98548E-03
4	1	3			0	-6.04419E-01	8	0
5					5.55953E-02	-5.58410E-01	8	-3.10450E-02
6					5.55953E-02	-2.31301E-01	7	-1.28593E-02
7					5.55953E-02	2.31301E-01	6	1.28593E-02
8					5.55953E-02	5.58410E-01	5	3.10450E-02
9					0	-8.50774E-01	15	0
10					5.22844E-02	-8.21784E-01	15	-4.29665E-02
11					5.22844E-02	-6.01588E-01	14	-3.14537E-02
12					5.22844E-02	-2.20196E-01	13	-1.15128E-02
13					5.22844E-02	2.20196E-01	12	1.15128E-02
14					5.22844E-02	6.01588E-01	11	3.14537E-02
15					5.22844E-02	8.21784E-01	10	4.29665E-02
16					0	-9.83032E-01	24	0
17					4.53355E-02	-9.64143E-01	24	-4.37099E-02
18					4.53355E-02	-8.17361E-01	23	-3.70655E-02
19					4.53355E-02	-5.46143E-01	22	-2.47597E-02
20					4.53355E-02	-1.91780E-01	21	-8.69444E-03
21					4.53355E-02	1.91780E-01	20	8.69444E-03
22					4.53355E-02	5.46143E-01	19	2.47597E-02
23					4.53355E-02	8.17361E-01	18	3.70655E-02
24					4.53355E-02	9.64143E-01	17	4.37099E-02

0constants for p(3) scattering

0angl	set 1	set 2	set 3	set 4	set 5
1	-2.79004E-01	8.83236E-01	6.74143E-02	-6.16919E-01	-1.71701E-02
2	-1.97286E-01	8.83236E-01	.00000E+00	-4.36228E-01	1.21411E-02
3	1.97286E-01	8.83236E-01	.00000E+00	4.36228E-01	-1.21411E-02
4	-6.04419E-01	4.52016E-01	3.16379E-01	-8.04436E-01	-1.74564E-01
5	-5.58410E-01	4.52016E-01	2.23714E-01	-7.43201E-01	-6.68028E-02
6	-2.31301E-01	4.52016E-01	-2.23713E-01	-3.07844E-01	1.61276E-01

```
     7 2.31301E-01  4.52016E-01 -2.23713E-01  3.07844E-01 -1.61276E-01
     8 5.58410E-01  4.52016E-01  2.23713E-01  7.43201E-01  6.68028E-02
     9 -8.50774E-01 -8.57235E-02  6.26843E-01 -1.98456E-01 -4.86835E-01
    10 -8.21784E-01 -8.57235E-02  5.42852E-01 -1.91694E-01 -3.44245E-01
    11 -6.01588E-01 -8.57235E-02   .00000E+00 -1.40530E-01  3.44244E-01
    12 -2.20196E-01 -8.57235E-02 -5.42852E-01 -5.13643E-02  3.44245E-01
    13  2.20196E-01 -8.57235E-02 -5.42852E-01  5.13643E-02 -3.44245E-01
    14  6.01588E-01 -8.57235E-02   .00000E+00  1.40530E-01 -3.44245E-01
    15  8.21784E-01 -8.57235E-02  5.42852E-01  1.91694E-01  3.44245E-01
    16 -9.83032E-01 -4.49528E-01  8.36886E-01  5.00703E-01 -7.51005E-01
    17 -9.64143E-01 -4.49528E-01  7.73181E-01  4.91083E-01 -6.24438E-01
    18 -8.17361E-01 -4.49528E-01  3.20262E-01  4.16320E-01  1.46514E-01
    19 -5.46143E-01 -4.49528E-01 -3.20262E-01  2.78176E-01  7.36575E-01
    20 -1.91780E-01 -4.49528E-01 -7.73181E-01  9.76824E-02  4.17236E-01
    21  1.91780E-01 -4.49528E-01 -7.73181E-01 -9.76824E-02 -4.17236E-01
    22  5.46143E-01 -4.49528E-01 -3.20262E-01 -2.78176E-01 -7.36575E-01
    23  8.17361E-01 -4.49528E-01  3.20262E-01 -4.16320E-01 -1.46514E-01
    24  9.64143E-01 -4.49528E-01  7.73181E-01 -4.91083E-01  6.24438E-01
1  int     radii       mid pts     zone no.       areas       volumes    dens fact    radius mod     spec(int)
     1         0     1.97644E-02         1           0     4.90881E-03                    0
     2 3.95287E-02   5.92931E-02         1     2.48366E-01 1.47264E-02                    0
     3 7.90575E-02   1.18586E-01         1     4.96733E-01 5.89057E-02                    0
     4 1.58115E-01   1.97644E-01         1     9.93466E-01 9.81762E-02                    0
     5 2.37172E-01   2.76701E-01         1     1.49020E+00 1.37447E-01
     6 3.16230E-01   3.55759E-01         1     1.98693E+00 1.76717E-01
     7 3.95288E-01   4.34816E-01         1     2.48366E+00 2.15988E-01
     8 4.74345E-01   5.13874E-01         1     2.98040E+00 2.55258E-01
     9 5.53403E-01   5.73167E-01         1     3.47713E+00 1.42355E-01
    10 5.92931E-01   6.12696E-01         1     3.72550E+00 1.52173E-01
    11 6.32460E-01   6.42620E-01         2     3.97386E+00 8.20460E-02
    12 6.52780E-01   6.62940E-01         2     4.10154E+00 8.46405E-02
    13 6.73100E-01   6.96589E-01         3     4.22921E+00 2.05562E-01
    14 7.20067E-01   7.43550E-01         3     4.52431E+00 2.19422E-01
    15 7.67033E-01   7.90517E-01         3     4.81941E+00 2.33282E-01
    16 8.14000E-01   8.62795E-01         4     5.11451E+00 5.29051E-01
    17 9.11591E-01   9.60386E-01         4     5.72769E+00 5.88891E-01
    18 1.00918E+00   1.10677E+00         4     6.34088E+00 1.35731E+00
    19 1.20436E+00   1.30195E+00         4     7.56724E+00 1.59667E+00
    20 1.39955E+00   1.49714E+00         4     8.79360E+00 1.83603E+00
    21 1.59473E+00   1.69232E+00         4     1.00200E+01 2.07540E+00
    22 1.78991E+00   1.88750E+00         4     1.12463E+01 2.31476E+00
    23 1.98509E+00   2.08268E+00         4     1.24727E+01 2.55412E+00
    24 2.18027E+00   2.27786E+00         4     1.36991E+01 2.79349E+00
    25 2.37545E+00   2.47305E+00         4     1.49254E+01 3.03285E+00
    26 2.57064E+00   2.66823E+00         4     1.61518E+01 3.27221E+00
    27 2.76582E+00   2.81461E+00         4     1.73781E+01 1.72587E+00
    28 2.86341E+00   2.91220E+00         4     1.79913E+01 1.78571E+00
    29 2.96100E+00                             1.86045E+01
-  elapsed time    .00 min.
1 outer inner  1 - balance   eigenvalue  1 - source  1 - scatter  1 - upscat     search        time
  iter iters                               ratio       ratio        ratio      parameter     (min)
     1   298  1.04391E-06  1.25444E+00 -2.24723E-01  1.00000E+00 4.94988E-02  .00000E+00      .0000
     2   422  1.08560E-06  1.23658E+00  3.25266E-03  1.64749E-02 3.07640E-02  .00000E+00      .0167
     3   541  4.33274E-06  1.22463E+00  1.56369E-03  1.30333E-02 1.22907E-02  .00000E+00      .0167
     4   642  5.48531E-06  1.21957E+00  5.17811E-04  5.65449E-03 2.68604E-03  .00000E+00      .0167
     5   721 -6.68063E-06  1.21831E+00  1.04339E-04  1.26694E-03 3.03774E-04  .00000E+00      .0167
     6   773 -2.39859E-06  1.21809E+00  1.96049E-05  1.22027E-04 1.80469E-05  .00000E+00      .0333
                                                                      grp to grp inner  mfd   max. flux  msf  max. scale coarse
                                                                                 iters  int.  difference  int.    factor    mesh
                                                                        1     1     1   17  1.97858E-05   28 9.99998E-01     1
```

2	2	1	17	2.43694E-05	28	9.99998E-01	1
3	3	1	17	2.22065E-05	28	9.99998E-01	1
4	4	1	17	2.15955E-05	28	9.99998E-01	1
5	5	1	17	2.15005E-05	28	9.99998E-01	1
6	6	1	17	1.48570E-05	28	9.99999E-01	1
7	7	1	17	7.95796E-06	28	9.99997E-01	2
8	8	1	15	1.63517E-06	20	1.00000E+00	2
9	9	1	27	6.04249E-06	28	1.00001E+00	3
10	10	1	26	1.45127E-06	28	1.00000E+00	3
11	11	1	26	1.07523E-06	28	1.00000E+00	3
12	12	1	26	3.17028E-07	28	1.00000E+00	3
13	13	1	26	2.02823E-06	28	9.99998E-01	3
14	14	1	25	6.37018E-07	28	1.00000E+00	3
15	15	1	2	2.21687E-05	28	1.00002E+00	2
16	16	1	2	2.88768E-05	28	1.00002E+00	2
17	17	1	2	4.29906E-05	28	1.00003E+00	2
18	18	1	2	4.95055E-05	28	1.00012E+00	3
19	19	1	2	5.41915E-05	28	1.00013E+00	3
20	20	1	2	7.96373E-05	28	1.00011E+00	3
21	21	2	28	3.55246E-05	28	9.99984E-01	3
22	22	2	17	1.12423E-05	16	9.99999E-01	3
23	23	2	15	3.65537E-05	28	1.00001E+00	4
24	24	2	10	4.08816E-05	9	1.00000E+00	4
25	25	2	26	3.01312E-05	28	1.00003E+00	5
26	26	2	16	2.66475E-05	28	1.00000E+00	6
27	27	2	28	1.69554E-05	28	1.00000E+00	8

7 807 3.15920E-06 1.21799E+00 4.31073E-06 2.13203E-06 -6.07809E-06 .00000E+00 .0333

final monitor

lambda 1.21804E+00 production/absorption 1.23409E+00 angular flux on 16

- elapsed time .03 min.

1 at 0 d, second part of sas2h pass to make library

0 int.	zone	number	radius	int. midpoint	area	volume	prod density
1	1		.00000E+00	1.97644E-02	.00000E+00	4.90881E-03	.00000E+00
2	1		3.95287E-02	5.92931E-02	2.48366E-01	1.47264E-02	.00000E+00
3	1		7.90575E-02	1.18586E-01	4.96733E-01	5.89057E-02	.00000E+00
4	1		1.58115E-01	1.97644E-01	9.93466E-01	9.81762E-02	.00000E+00
5	1		2.37172E-01	2.76701E-01	1.49020E+00	1.37447E-01	.00000E+00
6	1		3.16230E-01	3.55759E-01	1.98693E+00	1.76717E-01	.00000E+00
7	1		3.95288E-01	4.34816E-01	2.48366E+00	2.15988E-01	.00000E+00
8	1		4.74345E-01	5.13874E-01	2.98040E+00	2.55258E-01	.00000E+00
9	1		5.53408E-01	5.73167E-01	3.47713E+00	1.42355E-01	.00000E+00
10	1		5.92931E-01	6.12696E-01	3.72550E+00	1.52173E-01	.00000E+00
11	2		6.32460E-01	6.42620E-01	3.97386E+00	8.20460E-02	.00000E+00
12	2		6.52780E-01	6.62940E-01	4.10154E+00	8.46405E-02	.00000E+00
13	3		6.73100E-01	6.96583E-01	4.22921E+00	2.05562E-01	.00000E+00
14	3		7.20067E-01	7.43550E-01	4.52431E+00	2.19422E-01	.00000E+00
15	3		7.67033E-01	7.90517E-01	4.81941E+00	2.33282E-01	.00000E+00
16	4		8.14000E-01	8.62795E-01	5.11451E+00	5.29051E-01	2.75743E-02
17	4		9.11591E-01	9.60386E-01	5.72769E+00	5.88891E-01	3.00622E-02
18	4		1.00918E+00	1.10677E+00	6.34088E+00	1.35731E+00	6.79756E-02
19	4		1.20436E+00	1.30195E+00	7.56724E+00	1.59667E+00	7.84531E-02
20	4		1.39955E+00	1.49714E+00	8.79360E+00	1.85603E+00	8.90244E-02
21	4		1.59473E+00	1.69232E+00	1.00200E+01	2.07540E+00	9.96516E-02
22	4		1.78991E+00	1.88750E+00	1.12463E+01	2.31478E+00	1.10839E-01
23	4		1.98509E+00	2.08268E+00	1.24727E+01	2.55412E+00	1.21098E-01
24	4		2.18027E+00	2.27786E+00	1.36991E+01	2.79349E+00	1.31928E-01
25	4		2.37545E+00	2.47305E+00	1.49254E+01	3.03285E+00	1.42861E-01
26	4		2.57064E+00	2.66823E+00	1.61518E+01	3.27221E+00	1.53922E-01
27	4		2.76582E+00	2.81461E+00	1.73781E+01	1.72587E+00	8.11563E-02
28	4		2.86341E+00	2.91220E+00	1.79913E+01	1.78571E+00	8.40025E-02

29 2.96100E+00 1.86045E+01
1 at 0 d, second part of sas2h pass to make library
0 total flux

0 int.	grp. 1	grp. 2	grp. 3	grp. 4	grp. 5	grp. 6	grp. 7	grp. 8
1	1.18199E-02	8.76944E-02	1.10876E-01	6.84606E-02	1.02528E-01	1.92543E-01	1.92954E-01	1.46861E-01
2	1.18151E-02	8.76446E-02	1.10812E-01	6.84223E-02	1.02275E-01	1.92456E-01	1.92914E-01	1.46855E-01
3	1.18156E-02	8.76570E-02	1.10833E-01	6.84401E-02	1.02310E-01	1.92526E-01	1.92967E-01	1.46866E-01
4	1.18218E-02	8.77348E-02	1.10944E-01	6.85188E-02	1.02440E-01	1.92770E-01	1.93124E-01	1.46895E-01
5	1.18329E-02	8.78717E-02	1.11138E-01	6.86511E-02	1.02657E-01	1.93170E-01	1.93374E-01	1.46939E-01
6	1.18481E-02	8.80603E-02	1.11405E-01	6.88342E-02	1.02955E-01	1.93722E-01	1.93715E-01	1.46995E-01
7	1.18674E-02	8.83016E-02	1.11748E-01	6.90719E-02	1.03344E-01	1.94442E-01	1.94160E-01	1.47065E-01
8	1.18906E-02	8.86030E-02	1.12183E-01	6.93789E-02	1.03851E-01	1.95382E-01	1.94740E-01	1.47148E-01
9	1.19101E-02	8.88582E-02	1.12574E-01	6.96604E-02	1.04320E-01	1.96254E-01	1.95279E-01	1.47217E-01
10	1.19234E-02	8.90760E-02	1.12900E-01	6.99082E-02	1.04742E-01	1.97042E-01	1.95768E-01	1.47266E-01
11	1.19346E-02	8.92482E-02	1.13173E-01	7.01161E-02	1.05096E-01	1.97720E-01	1.96188E-01	1.47310E-01
12	1.19467E-02	8.93763E-02	1.13345E-01	7.02263E-02	1.05266E-01	1.98059E-01	1.96392E-01	1.47354E-01
13	1.19722E-02	8.96096E-02	1.13612E-01	7.03620E-02	1.05457E-01	1.98402E-01	1.96587E-01	1.47422E-01
14	1.20096E-02	8.99812E-02	1.14061E-01	7.06172E-02	1.05834E-01	1.99066E-01	1.96970E-01	1.47514E-01
15	1.20536E-02	9.04591E-02	1.14679E-01	7.10033E-02	1.06434E-01	2.00145E-01	1.97603E-01	1.47614E-01
16	1.21220E-02	9.12252E-02	1.15686E-01	7.16477E-02	1.07452E-01	2.01996E-01	1.98703E-01	1.47784E-01
17	1.21897E-02	9.19899E-02	1.16695E-01	7.22967E-02	1.08489E-01	2.03903E-01	1.99855E-01	1.47980E-01
18	1.22440E-02	9.26139E-02	1.17526E-01	7.28356E-02	1.09363E-01	2.05554E-01	2.00883E-01	1.48185E-01
19	1.22918E-02	9.31712E-02	1.18277E-01	7.33253E-02	1.10165E-01	2.07098E-01	2.01861E-01	1.48398E-01
20	1.23201E-02	9.35094E-02	1.18740E-01	7.36294E-02	1.10669E-01	2.08095E-01	2.02509E-01	1.48554E-01
21	1.23381E-02	9.37289E-02	1.19044E-01	7.38308E-02	1.11006E-01	2.08778E-01	2.02962E-01	1.48671E-01
22	1.23498E-02	9.38737E-02	1.19248E-01	7.39663E-02	1.11235E-01	2.09253E-01	2.03282E-01	1.48759E-01
23	1.23573E-02	9.39679E-02	1.19382E-01	7.40560E-02	1.11388E-01	2.09577E-01	2.03504E-01	1.48822E-01
24	1.23617E-02	9.40249E-02	1.19465E-01	7.41112E-02	1.11483E-01	2.09784E-01	2.03648E-01	1.48864E-01
25	1.23637E-02	9.40517E-02	1.19505E-01	7.41381E-02	1.11531E-01	2.09891E-01	2.03724E-01	1.48886E-01
26	1.23634E-02	9.40497E-02	1.19504E-01	7.41376E-02	1.11531E-01	2.09899E-01	2.03731E-01	1.48887E-01
27	1.23618E-02	9.40300E-02	1.19478E-01	7.41200E-02	1.11502E-01	2.09844E-01	2.03693E-01	1.48874E-01
28	1.23594E-02	9.40005E-02	1.19438E-01	7.40930E-02	1.11457E-01	2.09752E-01	2.03629E-01	1.48853E-01

0 int.	grp. 9	grp. 10	grp. 11	grp. 12	grp. 13	grp. 14	grp. 15	grp. 16
1	1.15771E-01	1.06876E-01	1.00523E-01	6.51792E-02	5.58608E-02	5.37705E-02	2.95248E-02	1.63404E-02
2	1.15771E-01	1.06878E-01	1.00528E-01	6.51842E-02	5.58656E-02	5.37771E-02	2.95269E-02	1.63413E-02
3	1.15769E-01	1.06869E-01	1.00507E-01	6.51608E-02	5.58440E-02	5.37465E-02	2.95208E-02	1.63384E-02
4	1.15764E-01	1.06846E-01	1.00456E-01	6.51029E-02	5.57920E-02	5.36729E-02	2.95057E-02	1.63312E-02
5	1.15757E-01	1.06812E-01	1.00379E-01	6.50153E-02	5.57132E-02	5.35609E-02	2.94833E-02	1.63206E-02
6	1.15746E-01	1.06765E-01	1.00274E-01	6.48964E-02	5.56067E-02	5.34092E-02	2.94536E-02	1.63064E-02
7	1.15733E-01	1.06708E-01	1.00136E-01	6.47405E-02	5.54678E-02	5.32107E-02	2.94162E-02	1.62884E-02
8	1.15718E-01	1.06621E-01	9.99534E-02	6.45351E-02	5.52860E-02	5.29501E-02	2.91690E-02	1.62656E-02
9	1.15706E-01	1.06543E-01	9.97816E-02	6.43434E-02	5.51173E-02	5.27073E-02	2.91266E-02	1.62448E-02
10	1.15705E-01	1.06470E-01	9.96228E-02	6.41690E-02	5.49648E-02	5.24869E-02	2.90895E-02	1.62266E-02
11	1.15710E-01	1.06413E-01	9.94972E-02	6.40321E-02	5.48436E-02	5.23127E-02	2.90570E-02	1.62106E-02
12	1.15704E-01	1.06392E-01	9.94501E-02	6.39785E-02	5.47985E-02	5.22427E-02	2.90392E-02	1.62027E-02
13	1.15695E-01	1.06365E-01	9.93858E-02	6.38965E-02	5.47224E-02	5.21391E-02	2.90242E-02	1.61953E-02
14	1.15587E-01	1.06297E-01	9.92394E-02	6.37191E-02	5.45725E-02	5.19179E-02	2.89994E-02	1.61819E-02
15	1.15508E-01	1.06187E-01	9.89998E-02	6.34399E-02	5.43382E-02	5.15708E-02	2.89618E-02	1.61609E-02
16	1.15399E-01	1.06007E-01	9.86051E-02	6.29802E-02	5.39517E-02	5.09961E-02	2.88931E-02	1.61242E-02
17	1.15301E-01	1.05828E-01	9.82065E-02	6.25207E-02	5.35600E-02	5.04191E-02	2.88113E-02	1.60830E-02
18	1.15230E-01	1.05676E-01	9.78673E-02	6.21280E-02	5.32160E-02	4.99233E-02	2.87235E-02	1.60407E-02
19	1.15175E-01	1.05537E-01	9.75508E-02	6.17619E-02	5.28896E-02	4.94592E-02	2.86307E-02	1.59967E-02
20	1.15148E-01	1.05448E-01	9.73461E-02	6.15256E-02	5.26738E-02	4.91575E-02	2.85612E-02	1.59643E-02
21	1.15135E-01	1.05387E-01	9.72038E-02	6.13610E-02	5.25212E-02	4.89467E-02	2.85080E-02	1.59395E-02
22	1.15128E-01	1.05345E-01	9.71024E-02	6.12439E-02	5.24111E-02	4.87959E-02	2.84675E-02	1.59207E-02
23	1.15124E-01	1.05315E-01	9.70304E-02	6.11606E-02	5.23323E-02	4.86885E-02	2.84377E-02	1.59068E-02
24	1.15121E-01	1.05295E-01	9.69814E-02	6.11040E-02	5.22786E-02	4.86154E-02	2.84172E-02	1.58973E-02
25	1.15119E-01	1.05282E-01	9.69521E-02	6.10702E-02	5.22470E-02	4.85722E-02	2.84057E-02	1.58920E-02
26	1.15116E-01	1.05278E-01	9.69427E-02	6.10595E-02	5.22380E-02	4.85594E-02	2.84039E-02	1.58912E-02
27	1.15114E-01	1.05280E-01	9.69485E-02	6.10663E-02	5.22458E-02	4.85694E-02	2.84089E-02	1.58936E-02

28	1.15113E-01	1.05286E-01	9.69644E-02	6.10848E-02	5.22649E-02	4.85946E-02	2.84181E-02	1.58979E-02
0 int.	grp. 17	grp. 18	grp. 19	grp. 20	grp. 21	grp. 22	grp. 23	grp. 24
1	7.32821E-03	6.33269E-03	1.16362E-02	3.84160E-02	1.29140E-02	2.85902E-02	9.63479E-02	7.90104E-02
2	7.32868E-03	6.33313E-03	1.16369E-02	3.84179E-02	1.29147E-02	2.85912E-02	9.63424E-02	7.89958E-02
3	7.32681E-03	6.33116E-03	1.16338E-02	3.84070E-02	1.29078E-02	2.85688E-02	9.62227E-02	7.88493E-02
4	7.32230E-03	6.32641E-03	1.16266E-02	3.83811E-02	1.28921E-02	2.85181E-02	9.59597E-02	7.85386E-02
5	7.31549E-03	6.31923E-03	1.16157E-02	3.83422E-02	1.28684E-02	2.84423E-02	9.55695E-02	7.80782E-02
6	7.30633E-03	6.30951E-03	1.16011E-02	3.82899E-02	1.28364E-02	2.83405E-02	9.50495E-02	7.74641E-02
7	7.29447E-03	6.29685E-03	1.15821E-02	3.82222E-02	1.27947E-02	2.82092E-02	9.43869E-02	7.66820E-02
8	7.27904E-03	6.28027E-03	1.15574E-02	3.81342E-02	1.27402E-02	2.80401E-02	9.35498E-02	7.56970E-02
9	7.26478E-03	6.26488E-03	1.15347E-02	3.80530E-02	1.26894E-02	2.78852E-02	9.27971E-02	7.48153E-02
10	7.25186E-03	6.25076E-03	1.15142E-02	3.79797E-02	1.26430E-02	2.77471E-02	9.21427E-02	7.40540E-02
11	7.24139E-03	6.23951E-03	1.14976E-02	3.79215E-02	1.26072E-02	2.76429E-02	9.16676E-02	7.35237E-02
12	7.23687E-03	6.23496E-03	1.14906E-02	3.78980E-02	1.25948E-02	2.76071E-02	9.15230E-02	7.33901E-02
13	7.23119E-03	6.22879E-03	1.14815E-02	3.78654E-02	1.25759E-02	2.75458E-02	9.12413E-02	7.30552E-02
14	7.21944E-03	6.21553E-03	1.14626E-02	3.77962E-02	1.25325E-02	2.74096E-02	9.06127E-02	7.22862E-02
15	7.20087E-03	6.19439E-03	1.14331E-02	3.76881E-02	1.24625E-02	2.72012E-02	8.96953E-02	7.11792E-02
16	7.17006E-03	6.15962E-03	1.13843E-02	3.75118E-02	1.23501E-02	2.68713E-02	8.82917E-02	6.95356E-02
17	7.13836E-03	6.12455E-03	1.13340E-02	3.73522E-02	1.22389E-02	2.65415E-02	8.68739E-02	6.79068E-02
18	7.10954E-03	6.09364E-03	1.12879E-02	3.71691E-02	1.21417E-02	2.62450E-02	8.55179E-02	6.63639E-02
19	7.08140E-03	6.06415E-03	1.12430E-02	3.70104E-02	1.20491E-02	2.59570E-02	8.41519E-02	6.48211E-02
20	7.06211E-03	6.04431E-03	1.12119E-02	3.69012E-02	1.19871E-02	2.57596E-02	8.31760E-02	6.37302E-02
21	7.04802E-03	6.03009E-03	1.11892E-02	3.68215E-02	1.19427E-02	2.56154E-02	8.24431E-02	6.29187E-02
22	7.03762E-03	6.01972E-03	1.11724E-02	3.67627E-02	1.19101E-02	2.55082E-02	8.18871E-02	6.23087E-02
23	7.03008E-03	6.01225E-03	1.11602E-02	3.67197E-02	1.18864E-02	2.54290E-02	8.14695E-02	6.18533E-02
24	7.02494E-03	6.00714E-03	1.11518E-02	3.66901E-02	1.18697E-02	2.53729E-02	8.11678E-02	6.15239E-02
25	7.02200E-03	6.00417E-03	1.11469E-02	3.66725E-02	1.18596E-02	2.53371E-02	8.09688E-02	6.13080E-02
26	7.02137E-03	6.00338E-03	1.11457E-02	3.66681E-02	1.18559E-02	2.53220E-02	8.08720E-02	6.11864E-02
27	7.02259E-03	6.00468E-03	1.11480E-02	3.66724E-02	1.18572E-02	2.53238E-02	8.08630E-02	6.11594E-02
28	7.02445E-03	6.00653E-03	1.11511E-02	3.66826E-02	1.18619E-02	2.53371E-02	8.09154E-02	6.11972E-02

0 int.	grp. 25	grp. 26	grp. 27
1	3.56378E-02	2.56275E-02	4.85640E-03
2	3.56251E-02	2.56130E-02	4.85290E-03
3	3.55450E-02	2.55415E-02	4.83822E-03
4	3.53744E-02	2.53902E-02	4.80707E-03
5	3.51214E-02	2.51643E-02	4.75986E-03
6	3.47836E-02	2.48597E-02	4.69498E-03
7	3.43531E-02	2.44682E-02	4.60974E-03
8	3.38127E-02	2.39724E-02	4.49912E-03
9	3.33318E-02	2.35288E-02	4.39859E-03
10	3.29220E-02	2.31477E-02	4.31152E-03
11	3.26478E-02	2.29017E-02	4.25873E-03
12	3.25894E-02	2.28650E-02	4.25538E-03
13	3.23959E-02	2.26812E-02	4.20561E-03
14	3.19450E-02	2.22411E-02	4.08455E-03
15	3.13140E-02	2.16125E-02	3.90221E-03
16	3.08968E-02	2.07082E-02	3.63369E-03
17	2.95082E-02	1.98611E-02	3.40450E-03
18	2.86697E-02	1.91154E-02	3.23675E-03
19	2.78430E-02	1.84023E-02	3.08811E-03
20	2.72680E-02	1.79259E-02	3.00019E-03
21	2.68464E-02	1.75972E-02	2.94218E-03
22	2.65338E-02	1.73591E-02	2.90272E-03
23	2.63031E-02	1.71880E-02	2.87507E-03
24	2.61373E-02	1.70675E-02	2.85604E-03
25	2.60257E-02	1.69870E-02	2.84349E-03
26	2.59633E-02	1.69408E-02	2.83629E-03
27	2.59454E-02	1.69244E-02	2.83357E-03
28	2.59575E-02	1.69278E-02	2.83344E-03

- elapsed time .03 min.

1fine group summary for zone 1 by group including sum for all groups in line 28

0 grp.	fix source	fiss source	in scatter	slf scatter	out scatter	absorption	leakage	balance
1	.00000E+00	.00000E+00	.00000E+00	4.60370E-04	6.09337E-04	5.07372E-05	-6.60049E-04	9.99962E-01
2	.00000E+00	.00000E+00	3.49626E-04	5.95317E-03	7.82435E-03	1.70120E-04	-7.64465E-03	9.99976E-01
3	.00000E+00	.00000E+00	3.71088E-03	5.38573E-03	1.40126E-02	9.14396E-05	-1.03930E-02	9.99985E-01
4	.00000E+00	.00000E+00	5.48493E-03	3.57253E-03	1.22749E-02	4.16912E-05	-6.83155E-03	9.99994E-01
5	.00000E+00	.00000E+00	1.01291E-02	1.14843E-02	2.08060E-02	4.94905E-05	-1.07265E-02	1.00000E+00
6	.00000E+00	.00000E+00	2.13346E-02	3.44620E-02	4.09583E-02	8.42046E-05	-1.97082E-02	1.00001E+00
7	.00000E+00	.00000E+00	4.21123E-02	6.09891E-02	5.41094E-02	6.11903E-05	-1.20581E-02	9.99995E-01
8	.00000E+00	.00000E+00	5.63040E-02	7.82869E-02	5.87010E-02	3.63752E-05	-2.42834E-03	9.99914E-01
9	.00000E+00	.00000E+00	5.77401E-02	7.25211E-02	5.74300E-02	2.92392E-05	2.87403E-04	9.99887E-01
10	.00000E+00	.00000E+00	5.70144E-02	6.90088E-02	5.54588E-02	3.59781E-05	1.52560E-03	9.99895E-01
11	.00000E+00	.00000E+00	5.57524E-02	6.53608E-02	5.21816E-02	5.49608E-05	3.51934E-03	9.99938E-01
12	.00000E+00	.00000E+00	4.52588E-02	3.49724E-02	4.11494E-02	6.02369E-05	4.05021E-03	9.99978E-01
13	.00000E+00	.00000E+00	4.04233E-02	2.85746E-02	3.66450E-02	8.46469E-05	3.69489E-03	9.99969E-01
14	.00000E+00	.00000E+00	3.94219E-02	2.84977E-02	3.40426E-02	1.37530E-04	5.24222E-03	9.99988E-01
15	.00000E+00	.00000E+00	2.18148E-02	1.09688E-02	2.05489E-02	1.13809E-04	1.15256E-03	9.99978E-01
16	.00000E+00	.00000E+00	1.43447E-02	4.65599E-03	1.37170E-02	7.76467E-05	5.50388E-04	9.99978E-01
17	.00000E+00	.00000E+00	7.40583E-03	1.35166E-03	7.08265E-03	3.86930E-05	3.34613E-04	9.99983E-01
18	.00000E+00	.00000E+00	6.59488E-03	1.13732E-03	6.21456E-03	3.55873E-05	3.44854E-04	9.99982E-01
19	.00000E+00	.00000E+00	1.11652E-02	3.18589E-03	1.05671E-02	7.13098E-05	5.27021E-04	9.99978E-01
20	.00000E+00	.00000E+00	2.76967E-02	2.26336E-02	2.55903E-02	2.95190E-04	1.81139E-03	9.99994E-01
21	.00000E+00	.00000E+00	1.38756E-02	4.89838E-03	1.27430E-02	1.22844E-04	1.00926E-03	1.00004E+00
22	.00000E+00	.00000E+00	2.85411E-02	1.62509E-02	2.52899E-02	3.12136E-04	2.93663E-03	1.00009E+00
23	.00000E+00	.00000E+00	7.80827E-02	9.79401E-02	6.43146E-02	1.42175E-03	1.23333E-02	1.00017E+00
24	.00000E+00	.00000E+00	8.54159E-02	9.23651E-02	7.12974E-02	1.68040E-03	1.24262E-02	1.00014E+00
25	.00000E+00	.00000E+00	5.71760E-02	3.90471E-02	5.02342E-02	9.92412E-04	5.94429E-03	1.00009E+00
26	.00000E+00	.00000E+00	4.56459E-02	4.34833E-02	4.01626E-02	1.00562E-03	4.47523E-03	1.00005E+00
27	.00000E+00	.00000E+00	1.54627E-02	9.41508E-03	1.43429E-02	3.58375E-04	7.61410E-04	1.00000E+00
28	.00000E+00	.00000E+00	8.48258E-01	8.46811E-01	8.48258E-01	7.51361E-03	-7.52357E-03	1.00001E+00

0 grp.	rt bdy flux	rt leakage	lft bdy flux	lft leakage	n2n rate	fiss rate	flux*db**2	total flux
1	1.19298E-02	-6.60049E-04	1.18258E-02	.00000E+00	3.36981E-11	.00000E+00	1.82622E-05	1.49171E-02
2	8.91860E-02	-7.64465E-03	8.77366E-02	.00000E+00	.00000E+00	.00000E+00	8.62881E-05	1.11052E-01
3	1.13078E-01	-1.03930E-02	1.10952E-01	.00000E+00	.00000E+00	.00000E+00	9.10163E-05	1.40537E-01
4	7.00480E-02	-6.83155E-03	6.84948E-02	.00000E+00	.00000E+00	.00000E+00	4.14395E-05	8.68850E-02
5	1.04982E-01	-1.07265E-02	1.02378E-01	.00000E+00	.00000E+00	.00000E+00	4.91986E-05	1.30015E-01
6	1.97494E-01	-1.97082E-02	1.92627E-01	.00000E+00	.00000E+00	.00000E+00	8.33359E-05	2.44622E-01
7	1.96049E-01	-1.20581E-02	1.92997E-01	.00000E+00	.00000E+00	.00000E+00	5.92475E-05	2.44161E-01
8	1.47290E-01	-2.42834E-03	1.46868E-01	.00000E+00	.00000E+00	.00000E+00	3.26982E-05	1.84821E-01
9	1.15707E-01	2.87403E-04	1.15770E-01	.00000E+00	.00000E+00	.00000E+00	2.16466E-05	1.45436E-01
10	1.06428E-01	1.52560E-03	1.06873E-01	.00000E+00	.00000E+00	.00000E+00	1.91161E-05	1.34063E-01
11	9.95311E-02	3.51934E-03	1.00516E-01	.00000E+00	.00000E+00	.00000E+00	1.78442E-05	1.25780E-01
12	6.40691E-02	4.05021E-03	6.51703E-02	.00000E+00	.00000E+00	.00000E+00	1.04751E-05	8.12948E-02
13	5.48775E-02	3.69489E-03	5.58525E-02	.00000E+00	.00000E+00	.00000E+00	8.74647E-06	6.96511E-02
14	5.23606E-02	5.24222E-03	5.37589E-02	.00000E+00	.00000E+00	.00000E+00	8.55773E-06	6.67904E-02
15	2.90675E-02	1.15256E-03	2.95207E-02	.00000E+00	.00000E+00	.00000E+00	4.51887E-06	3.67035E-02
16	1.62154E-02	5.50388E-04	1.63386E-02	.00000E+00	.00000E+00	.00000E+00	2.27851E-06	2.04632E-02
17	7.24423E-03	3.34613E-04	7.32720E-03	.00000E+00	.00000E+00	.00000E+00	9.37779E-07	9.16227E-03
18	6.24242E-03	3.44854E-04	6.33167E-03	.00000E+00	.00000E+00	.00000E+00	7.89624E-07	7.90811E-03
19	1.15018E-02	5.27021E-04	1.16344E-02	.00000E+00	.00000E+00	.00000E+00	1.52219E-06	1.45478E-02
20	3.79339E-02	1.81139E-03	3.84083E-02	.00000E+00	.00000E+00	.00000E+00	5.62688E-06	4.80074E-02
21	1.26162E-02	1.00926E-03	1.29119E-02	.00000E+00	.00000E+00	.00000E+00	1.47280E-06	1.60624E-02
22	2.76680E-02	2.93663E-03	2.85845E-02	.00000E+00	.00000E+00	.00000E+00	3.23450E-06	3.54039E-02
23	9.17714E-02	1.23333E-02	9.63274E-02	.00000E+00	.00000E+00	.00000E+00	9.76650E-06	1.18411E-01
24	7.36258E-02	1.24262E-02	7.89950E-02	.00000E+00	.00000E+00	.00000E+00	5.89247E-06	9.61312E-02
25	3.26920E-02	5.94429E-03	3.56328E-02	.00000E+00	.00000E+00	.00000E+00	2.03839E-06	4.30461E-02
26	2.29329E-02	4.47523E-03	2.56260E-02	.00000E+00	.00000E+00	.00000E+00	1.07109E-06	3.06280E-02
27	4.26245E-03	7.61410E-04	4.85670E-03	.00000E+00	.00000E+00	.00000E+00	1.25901E-07	5.76249E-03
28	1.79680E+00	-7.52357E-03	1.80409E+00	.00000E+00	3.36981E-11	.00000E+00	5.87150E-04	2.26224E+00

1fine group summary for zone 2 by group including sum for all groups in line 28

0 grp.	fix source	fiss source	in scatter	slf scatter	out scatter	absorption	leakage	balance
1	.00000E+00	.00000E+00	.00000E+00	2.03564E-04	1.52597E-04	2.28919E-06	-1.49446E-04	1.00002E+00
2	.00000E+00	.00000E+00	2.66507E-05	1.41078E-03	1.01229E-03	1.35879E-05	-9.99266E-04	1.00000E+00
3	.00000E+00	.00000E+00	1.43570E-04	2.73107E-03	8.63535E-04	1.99849E-05	-7.39940E-04	9.99999E-01
4	.00000E+00	.00000E+00	2.79114E-04	2.28785E-03	2.96227E-04	1.30011E-05	-3.01311E-05	1.00000E+00
5	.00000E+00	.00000E+00	6.01541E-04	4.40145E-03	2.78358E-04	1.68062E-05	3.06284E-04	1.00001E+00
6	.00000E+00	.00000E+00	1.00347E-03	1.23936E-02	1.69332E-04	2.70429E-05	8.06959E-04	1.00001E+00
7	.00000E+00	.00000E+00	6.62953E-04	1.25895E-02	6.32815E-05	2.68049E-05	5.72767E-04	1.00001E+00
8	.00000E+00	.00000E+00	1.16440E-04	9.20079E-03	4.43053E-04	2.20949E-05	-3.48723E-04	1.00001E+00
9	.00000E+00	.00000E+00	4.44842E-04	6.35120E-03	5.29442E-05	7.66081E-05	3.15298E-04	9.99989E-01
10	.00000E+00	.00000E+00	5.30082E-05	4.97591E-03	4.93697E-05	5.91964E-05	-5.55519E-05	9.99996E-01
11	.00000E+00	.00000E+00	4.95730E-05	4.43879E-03	5.01296E-05	8.96966E-05	-9.04498E-05	9.99999E-01
12	.00000E+00	.00000E+00	5.01259E-05	2.75207E-03	5.12013E-05	5.65411E-06	-6.73393E-06	1.00000E+00
13	.00000E+00	.00000E+00	5.12014E-05	2.35809E-03	4.81035E-05	6.31845E-06	-3.21912E-06	1.00000E+00
14	.00000E+00	.00000E+00	4.81035E-05	2.25443E-03	4.24849E-05	8.60956E-06	-2.99001E-06	1.00000E+00
15	.00000E+00	.00000E+00	4.51235E-05	1.22676E-03	5.02074E-05	6.35311E-06	-1.14636E-05	1.00002E+00
16	.00000E+00	.00000E+00	5.64988E-05	6.55314E-04	5.67709E-05	3.88394E-06	-4.17326E-06	1.00003E+00
17	.00000E+00	.00000E+00	6.36239E-05	2.55243E-04	6.28287E-05	1.89734E-06	-1.11171E-06	1.00002E+00
18	.00000E+00	.00000E+00	6.65004E-05	2.07160E-04	6.68911E-05	1.72471E-06	-2.12374E-06	1.00002E+00
19	.00000E+00	.00000E+00	6.74950E-05	4.40094E-04	6.49319E-05	3.41502E-06	-8.73522E-07	1.00003E+00
20	.00000E+00	.00000E+00	8.12622E-05	1.59775E-03	6.79260E-05	1.37364E-05	-5.14090E-07	1.00006E+00
21	.00000E+00	.00000E+00	9.59079E-05	4.46910E-04	1.06751E-04	5.53980E-06	-1.63880E-05	1.00001E+00
22	.00000E+00	.00000E+00	1.44652E-04	1.07068E-03	1.43095E-04	1.38245E-05	-1.22739E-05	1.00000E+00
23	.00000E+00	.00000E+00	2.16892E-04	3.74901E-03	2.75240E-04	6.12330E-05	-1.19589E-04	1.00000E+00
24	.00000E+00	.00000E+00	3.53050E-04	2.83832E-03	3.89516E-04	6.96707E-05	-1.06273E-04	1.00001E+00
25	.00000E+00	.00000E+00	3.59770E-04	1.13977E-03	2.95361E-04	4.03348E-05	2.60305E-05	1.00001E+00
26	.00000E+00	.00000E+00	1.52652E-04	8.88045E-04	1.17357E-04	3.98662E-05	-4.57093E-06	1.00000E+00
27	.00000E+00	.00000E+00	3.40292E-05	1.86949E-04	9.63229E-08	1.38700E-05	2.00606E-05	1.00000E+00
28	.00000E+00	.00000E+00	5.26786E-03	8.30512E-02	5.26785E-03	6.63045E-04	-6.58410E-04	1.00006E+00

0 grp.	rt bdy flux	rt leakage	lft bdy flux	lft leakage	n2n rate	fiss rate	flux*db**2	total flux
1	1.19541E-02	-8.09496E-04	1.19298E-02	-6.60049E-04	5.45214E-06	.00000E+00	1.50719E-06	1.99036E-03
2	8.94422E-02	-8.64391E-03	8.91850E-02	-7.64465E-03	.00000E+00	.00000E+00	1.07852E-05	1.48873E-02
3	1.13422E-01	-1.11329E-02	1.13078E-01	-1.03930E-02	.00000E+00	.00000E+00	1.25152E-05	1.88789E-02
4	7.02645E-02	-6.86168E-03	7.00480E-02	-6.83155E-03	.00000E+00	.00000E+00	7.38470E-06	1.16966E-02
5	1.05323E-01	-1.04202E-02	1.04982E-01	-1.07265E-02	.00000E+00	.00000E+00	8.60640E-06	1.75325E-02
6	1.98171E-01	-1.89013E-02	1.97494E-01	-1.97082E-02	.00000E+00	.00000E+00	1.01663E-05	3.29860E-02
7	1.96458E-01	-1.14853E-02	1.96049E-01	-1.20581E-02	.00000E+00	.00000E+00	8.35056E-06	3.27192E-02
8	1.47377E-01	-2.77706E-03	1.47290E-01	-2.42834E-03	.00000E+00	.00000E+00	5.27056E-06	2.45585E-02
9	1.15696E-01	6.02701E-04	1.15707E-01	2.87403E-04	.00000E+00	.00000E+00	4.57772E-06	1.92868E-02
10	1.06386E-01	1.47006E-03	1.06428E-01	1.52560E-03	.00000E+00	.00000E+00	4.89844E-06	1.77358E-02
11	9.94369E-02	3.42889E-03	9.95311E-02	3.51934E-03	.00000E+00	.00000E+00	4.74734E-06	1.65809E-02
12	6.39618E-02	4.04347E-03	6.40691E-02	4.05021E-03	.00000E+00	.00000E+00	3.20388E-06	1.06688E-02
13	5.47775E-02	3.69167E-03	5.48775E-02	3.69489E-03	.00000E+00	.00000E+00	2.73818E-06	9.13745E-03
14	5.22205E-02	5.23923E-03	5.23606E-02	5.24222E-03	.00000E+00	.00000E+00	2.60480E-06	8.71390E-03
15	2.90319E-02	1.14109E-03	2.90675E-02	1.15256E-03	.00000E+00	.00000E+00	1.42658E-06	4.84190E-03
16	1.61995E-02	5.46215E-04	1.62154E-02	5.50888E-04	.00000E+00	.00000E+00	7.95959E-07	2.70142E-03
17	7.23519E-03	3.33501E-04	7.24423E-03	3.34613E-04	.00000E+00	.00000E+00	3.55364E-07	1.20666E-03
18	6.23331E-03	3.42730E-04	6.24242E-03	3.44854E-04	.00000E+00	.00000E+00	3.06085E-07	1.03966E-03
19	1.14877E-02	5.26147E-04	1.15018E-02	5.27021E-04	.00000E+00	.00000E+00	5.63813E-07	1.91590E-03
20	3.78869E-02	1.81087E-03	3.79339E-02	1.81139E-03	.00000E+00	.00000E+00	1.85696E-06	6.31902E-03
21	1.25913E-02	9.92869E-04	1.26162E-02	1.00926E-03	.00000E+00	.00000E+00	6.16223E-07	2.10041E-03
22	2.75965E-02	2.92435E-03	2.76680E-02	2.93663E-03	.00000E+00	.00000E+00	1.34918E-06	4.60467E-03
23	9.14823E-02	1.22137E-02	9.17714E-02	1.23333E-02	.00000E+00	.00000E+00	4.45761E-06	1.52675E-02
24	7.33567E-02	1.23199E-02	7.36238E-02	1.24262E-02	.00000E+00	.00000E+00	3.55316E-06	1.22441E-02
25	3.25755E-02	5.97032E-03	3.26920E-02	5.94429E-03	.00000E+00	.00000E+00	1.56841E-06	5.43695E-03
26	2.28595E-02	4.47065E-03	2.29529E-02	4.47523E-03	.00000E+00	.00000E+00	1.08673E-06	3.81430E-03
27	4.25575E-03	7.81470E-04	4.26245E-03	7.61410E-04	.00000E+00	.00000E+00	1.96335E-07	7.09585E-04
28	1.79768E+00	-8.18191E-03	1.79680E+00	-7.52357E-03	5.45214E-06	.00000E+00	1.05491E-04	2.99575E-01

1fine group summary for zone 3 by group including sum for all groups in line 28

0 grp.	fix source	fiss source	in scatter	slf scatter	out scatter	absorption	leakage	balance

1	.00000E+00	.00000E+00	.00000E+00	2.44059E-04	3.23032E-04	2.68976E-05	-3.49917E-04	9.99989E-01
2	.00000E+00	.00000E+00	1.85349E-04	3.17788E-03	4.17648E-03	9.08064E-05	-4.08184E-03	9.99993E-01
3	.00000E+00	.00000E+00	1.98045E-03	2.87933E-03	7.49146E-03	4.88857E-05	-5.55979E-03	9.99994E-01
4	.00000E+00	.00000E+00	2.95133E-03	1.91291E-03	6.57256E-03	2.23235E-05	-3.66353E-03	9.99998E-01
5	.00000E+00	.00000E+00	5.41861E-03	6.15920E-03	1.11586E-02	2.65426E-05	-5.76656E-03	1.00000E+00
6	.00000E+00	.00000E+00	1.14299E-02	1.84767E-02	2.19597E-02	4.51461E-05	-1.05752E-02	1.00001E+00
7	.00000E+00	.00000E+00	2.25729E-02	3.23781E-02	2.87493E-02	3.25115E-05	-6.20877E-03	9.99996E-01
8	.00000E+00	.00000E+00	2.99674E-02	4.11331E-02	3.08424E-02	1.91121E-05	-8.91483E-04	9.99920E-01
9	.00000E+00	.00000E+00	3.04006E-02	3.79586E-02	3.00439E-02	1.52962E-05	3.44866E-04	9.99890E-01
10	.00000E+00	.00000E+00	2.98601E-02	3.60117E-02	2.89408E-02	1.87749E-05	9.03647E-04	9.99900E-01
11	.00000E+00	.00000E+00	2.91134E-02	3.39528E-02	2.70906E-02	2.85335E-05	1.99609E-03	9.99945E-01
12	.00000E+00	.00000E+00	2.35226E-02	1.80317E-02	2.12165E-02	3.10580E-05	2.27558E-03	9.99982E-01
13	.00000E+00	.00000E+00	2.08951E-02	1.47278E-02	1.88874E-02	4.36284E-05	1.96470E-03	9.99974E-01
14	.00000E+00	.00000E+00	2.03396E-02	1.45667E-02	1.74010E-02	7.02989E-05	2.85855E-03	9.99991E-01
15	.00000E+00	.00000E+00	1.11856E-02	5.70369E-03	1.06853E-02	5.91801E-05	4.41317E-04	9.99979E-01
16	.00000E+00	.00000E+00	7.40269E-03	2.42316E-03	7.13885E-03	4.04103E-05	2.23601E-04	9.99979E-01
17	.00000E+00	.00000E+00	3.83129E-03	7.00802E-04	3.66624E-03	2.00613E-05	1.65049E-04	9.99984E-01
18	.00000E+00	.00000E+00	3.41233E-03	5.88106E-04	3.21353E-03	1.84021E-05	1.80459E-04	9.99983E-01
19	.00000E+00	.00000E+00	5.77524E-03	1.65072E-03	5.47860E-03	3.69712E-05	2.59800E-04	9.99979E-01
20	.00000E+00	.00000E+00	1.43202E-02	1.17247E-02	1.32564E-02	1.52915E-04	9.11076E-04	9.99991E-01
21	.00000E+00	.00000E+00	7.14958E-03	2.51352E-03	6.53883E-03	6.30850E-05	5.47494E-04	1.00003E+00
22	.00000E+00	.00000E+00	1.45695E-02	8.27243E-03	1.28737E-02	1.58891E-04	1.53611E-03	1.00005E+00
23	.00000E+00	.00000E+00	3.90628E-02	4.92649E-02	3.23509E-02	7.15155E-04	5.99209E-03	1.00009E+00
24	.00000E+00	.00000E+00	4.22981E-02	4.56231E-02	3.52168E-02	8.30021E-04	6.26587E-03	1.00010E+00
25	.00000E+00	.00000E+00	2.80716E-02	1.90249E-02	2.44756E-02	4.83533E-04	3.11048E-03	1.00006E+00
26	.00000E+00	.00000E+00	2.22987E-02	2.07057E-02	1.91245E-02	4.78853E-04	2.69480E-03	1.00002E+00
27	.00000E+00	.00000E+00	7.50638E-03	4.36414E-03	6.64831E-03	1.66116E-04	6.91940E-04	1.00000E+00
28	.00000E+00	.00000E+00	4.35501E-01	4.34130E-01	4.35501E-01	3.74336E-03	-3.74358E-03	1.00000E+00

0 grp.	rt bdy flux	rt leakage	lft bdy flux	lft leakage	n2n rate	fiss rate	flux*dv**2	total flux
1	1.20783E-02	-1.15941E-03	1.19541E-02	-8.09496E-04	1.78644E-11	.00000E+00	9.68147E-06	7.90807E-03
2	9.07332E-02	-1.27258E-02	8.94422E-02	-8.64391E-03	.00000E+00	.00000E+00	4.60588E-05	5.92666E-02
3	1.15039E-01	-1.66927E-02	1.13422E-01	-1.11329E-02	.00000E+00	.00000E+00	4.86594E-05	7.51344E-02
4	7.12318E-02	-1.05252E-02	7.02645E-02	-6.86168E-03	.00000E+00	.00000E+00	2.21887E-05	4.65225E-02
5	1.06791E-01	-1.61868E-02	1.05323E-01	-1.04202E-02	.00000E+00	.00000E+00	2.63860E-05	6.97294E-02
6	2.00791E-01	-2.94766E-02	1.98171E-01	-1.89013E-02	.00000E+00	.00000E+00	4.46803E-05	1.31154E-01
7	1.97982E-01	-1.76941E-02	1.96458E-01	-1.14853E-02	.00000E+00	.00000E+00	3.14792E-05	1.29727E-01
8	1.47669E-01	-3.66854E-03	1.47377E-01	-2.77706E-03	.00000E+00	.00000E+00	1.71801E-05	9.71079E-02
9	1.15469E-01	9.47567E-04	1.15696E-01	6.02701E-04	.00000E+00	.00000E+00	1.13242E-05	7.60833E-02
10	1.06121E-01	2.37370E-03	1.06386E-01	1.47006E-03	.00000E+00	.00000E+00	9.97560E-06	6.99597E-02
11	9.88555E-02	5.42498E-03	9.94369E-02	3.42889E-03	.00000E+00	.00000E+00	9.26398E-06	6.53001E-02
12	6.32728E-02	6.31905E-03	6.39618E-02	4.04347E-03	.00000E+00	.00000E+00	5.40096E-06	4.19154E-02
13	5.41988E-02	5.65638E-03	5.47775E-02	3.69167E-03	.00000E+00	.00000E+00	4.50808E-06	3.58995E-02
14	5.13627E-02	8.10778E-03	5.22206E-02	5.23923E-03	.00000E+00	.00000E+00	4.37432E-06	3.41401E-02
15	2.87394E-02	1.58241E-03	2.90319E-02	1.14109E-03	.00000E+00	.00000E+00	2.34979E-06	1.90856E-02
16	1.61482E-02	7.69816E-04	1.61995E-02	5.46215E-04	.00000E+00	.00000E+00	1.18582E-06	1.06498E-02
17	7.18959E-03	4.98650E-04	7.23519E-03	3.33601E-04	.00000E+00	.00000E+00	4.86213E-07	4.75039E-03
18	6.18150E-03	5.23189E-04	6.23331E-03	3.42730E-04	.00000E+00	.00000E+00	4.08313E-07	4.08926E-03
19	1.14150E-02	7.85947E-04	1.14877E-02	5.26147E-04	.00000E+00	.00000E+00	7.89195E-07	7.54244E-03
20	3.76202E-02	2.72195E-03	3.78869E-02	1.81087E-03	.00000E+00	.00000E+00	2.91485E-06	2.48689E-02
21	1.24205E-02	1.54036E-03	1.25913E-02	9.92869E-04	.00000E+00	.00000E+00	7.55743E-07	8.24225E-03
22	2.70778E-02	4.46046E-03	2.75965E-02	2.92435E-03	.00000E+00	.00000E+00	1.64753E-06	1.80222E-02
23	8.91589E-02	1.82068E-02	9.14823E-02	1.22137E-02	.00000E+00	.00000E+00	4.91265E-06	5.95619E-02
24	7.05374E-02	1.85668E-02	7.33567E-02	1.23199E-02	.00000E+00	.00000E+00	2.91054E-06	4.74834E-02
25	3.09493E-02	9.08080E-03	3.25755E-02	5.97032E-03	.00000E+00	.00000E+00	9.95167E-07	2.09734E-02
26	2.12447E-02	7.16545E-03	2.28595E-02	4.47065E-03	.00000E+00	.00000E+00	5.10028E-07	1.45843E-02
27	3.79067E-03	1.47341E-03	4.25575E-03	7.81470E-04	.00000E+00	.00000E+00	5.83584E-08	2.67107E-03
28	1.79426E+00	-1.19255E-02	1.79768E+00	-8.18191E-03	1.78644E-11	.00000E+00	3.11083E-04	1.18237E+00

1fine group summary for zone 4 by group including sum for all groups in line 28

0 grp.	fix source	fiss source	in scatter	slf scatter	out scatter	absorption	leakage	balance
1	.00000E+00	2.12780E-02	.00000E+00	1.97669E-02	1.87315E-02	3.50123E-03	1.15935E-03	9.98896E-01

2	.00000E+00	1.88887E-01	6.47514E-03	2.43892E-01	1.67674E-01	1.49760E-02	1.27250E-02	1.00002E+00
3	.00000E+00	2.14987E-01	6.90926E-02	2.54748E-01	2.51189E-01	1.62006E-02	1.66918E-02	9.99991E-01
4	.00000E+00	1.24456E-01	1.03752E-01	1.75581E-01	2.09894E-01	7.78824E-03	1.05246E-02	1.00000E+00
5	.00000E+00	1.66945E-01	1.89669E-01	4.43213E-01	3.34177E-01	5.25480E-03	1.61857E-02	9.99991E-01
6	.00000E+00	1.80122E-01	3.88153E-01	1.19094E+00	5.30399E-01	8.39576E-03	2.94745E-02	1.00002E+00
7	.00000E+00	8.94322E-02	5.91879E-01	1.56615E+00	6.55144E-01	8.48104E-03	1.76916E-02	9.99993E-01
8	.00000E+00	1.38095E-02	6.89078E-01	1.57541E+00	6.85649E-01	1.36262E-02	3.66836E-03	9.99921E-01
9	.00000E+00	1.00281E-03	6.77766E-01	1.36995E+00	6.57448E-01	2.23407E-02	-9.43830E-04	9.99888E-01
10	.00000E+00	7.44912E-05	6.54568E-01	1.24239E+00	6.23274E-01	3.38081E-02	-2.37267E-03	9.99898E-01
11	.00000E+00	5.86056E-06	6.27477E-01	1.15377E+00	5.78353E-01	5.45917E-02	-5.42428E-03	9.99940E-01
12	.00000E+00	4.11695E-07	5.03904E-01	6.30654E-01	4.52098E-01	5.81387E-02	-6.31912E-03	9.99974E-01
13	.00000E+00	6.53735E-08	4.46764E-01	5.00998E-01	4.00002E-01	5.24317E-02	-5.65701E-03	9.99972E-01
14	.00000E+00	1.29553E-08	4.30986E-01	4.74158E-01	3.66794E-01	7.23045E-02	-8.10798E-03	9.99990E-01
15	.00000E+00	1.46409E-09	2.39500E-01	2.17918E-01	2.33428E-01	7.65784E-03	-1.58003E-03	9.99977E-01
16	.00000E+00	4.29908E-10	1.63661E-01	1.01598E-01	1.60126E-01	4.30729E-03	-7.67970E-04	9.99976E-01
17	.00000E+00	1.38451E-10	8.85328E-02	3.30364E-02	8.48148E-02	4.21693E-03	-4.97260E-04	9.99981E-01
18	.00000E+00	9.91271E-11	7.95631E-02	2.71108E-02	7.51751E-02	4.71118E-03	-5.19385E-04	9.99953E-01
19	.00000E+00	1.40145E-10	1.30522E-01	6.67880E-02	1.25232E-01	6.07616E-03	-7.78759E-04	9.99946E-01
20	.00000E+00	2.27889E-10	3.11566E-01	3.74954E-01	2.88577E-01	2.57076E-02	-2.71367E-03	9.99981E-01
21	.00000E+00	3.33557E-11	1.60058E-01	8.51752E-02	1.47219E-01	1.43790E-02	-1.54262E-03	1.00001E+00
22	.00000E+00	3.87002E-11	3.15268E-01	2.48135E-01	2.79270E-01	4.04630E-02	-4.46053E-03	9.99985E-01
23	.00000E+00	3.70016E-11	7.99109E-01	1.25933E+00	6.73384E-01	1.43952E-01	-1.81996E-02	9.99966E-01
24	.00000E+00	1.00713E-11	8.60207E-01	1.07621E+00	7.16591E-01	1.62198E-01	-1.85610E-02	9.99976E-01
25	.00000E+00	2.94824E-12	5.70970E-01	4.33195E-01	4.86258E-01	9.37998E-02	-9.07487E-03	9.99979E-01
26	.00000E+00	2.06732E-12	4.41694E-01	4.32114E-01	3.62289E-01	8.65731E-02	-7.16413E-03	9.99992E-01
27	.00000E+00	4.92653E-13	1.45249E-01	8.70195E-02	1.22073E-01	2.46495E-02	-1.47326E-03	9.99997E-01
28	.00000E+00	1.00000E+00	9.68526E+00	1.52831E+01	9.68526E+00	9.90529E-01	1.19633E-02	9.99964E-01

0 grp.	rt bdy flux	rt leakage	lft bdy flux	lft leakage	n2n rate	fiss rate	flux*db**2	total flux
1	1.23580E-02	-6.64037E-08	1.20783E-02	-1.15941E-03	2.08820E-03	2.33396E-03	2.72749E-04	3.14103E+00
2	9.39823E-02	-7.17095E-07	9.07332E-02	-1.27258E-02	1.65374E-05	1.08121E-02	1.54489E-03	2.38621E+00
3	1.19413E-01	-8.72858E-07	1.15039E-01	-1.66927E-02	.00000E+00	1.33262E-02	1.80780E-03	3.03101E+00
4	7.40762E-02	-5.89581E-07	7.12318E-02	-1.05252E-02	.00000E+00	5.76311E-03	8.79525E-04	1.87990E+00
5	1.11429E-01	-1.06623E-06	1.06791E-01	-1.61868E-02	.00000E+00	1.70983E-03	1.02991E-03	2.82673E+00
6	2.09694E-01	-1.90959E-06	2.00791E-01	-2.94765E-02	.00000E+00	1.54427E-03	1.73112E-03	5.31778E+00
7	2.03589E-01	-2.45783E-06	1.97982E-01	-1.78941E-02	.00000E+00	1.59888E-03	1.22588E-03	5.16972E+00
8	1.48840E-01	-1.85387E-07	1.47669E-01	-3.66854E-03	.00000E+00	1.70070E-03	6.97047E-04	3.78649E+00
9	1.15112E-01	3.73622E-06	1.15465E-01	9.47567E-04	.00000E+00	2.36103E-03	4.70373E-04	2.93179E+00
10	1.05290E-01	1.02529E-06	1.06121E-01	2.37370E-03	.00000E+00	5.04123E-03	4.27740E-04	2.68316E+00
11	9.69750E-02	7.00472E-07	9.88655E-02	5.42498E-03	.00000E+00	1.04025E-02	3.86016E-04	2.47430E+00
12	6.10973E-02	-7.44237E-08	6.32728E-02	6.31906E-03	.00000E+00	1.33053E-02	2.27420E-04	1.56155E+00
13	5.22776E-02	-6.29925E-07	5.41988E-02	5.65638E-03	.00000E+00	1.23682E-02	1.97250E-04	1.33639E+00
14	4.86115E-02	-2.05207E-07	5.13627E-02	8.10778E-03	.00000E+00	9.18611E-03	1.80553E-04	1.24516E+00
15	2.84229E-02	2.37714E-06	2.89394E-02	1.58241E-03	.00000E+00	2.31490E-03	1.12122E-04	7.25340E-01
16	1.59001E-02	1.84514E-06	1.61482E-02	7.69816E-04	.00000E+00	1.53656E-03	5.91769E-05	4.05614E-01
17	7.02561E-03	1.28993E-06	7.18959E-03	4.98650E-04	.00000E+00	2.33310E-03	2.40450E-05	1.79553E-01
18	6.00693E-03	3.80411E-06	6.18150E-03	5.23189E-04	.00000E+00	3.10847E-03	1.99208E-05	1.53446E-01
19	1.11514E-02	7.18773E-06	1.14150E-02	7.85947E-04	.00000E+00	3.76158E-03	3.88964E-05	2.84726E-01
20	3.66847E-02	8.27838E-06	3.76202E-02	2.72195E-03	.00000E+00	1.61008E-02	1.36354E-04	9.36926E-01
21	1.18652E-02	-2.05195E-06	1.24205E-02	1.54036E-03	.00000E+00	9.51397E-03	3.60080E-05	3.03750E-01
22	2.53461E-02	-6.47962E-08	2.70778E-02	4.46046E-03	.00000E+00	2.66331E-02	7.51286E-05	6.50898E-01
23	8.09522E-02	6.20171E-06	8.91589E-02	1.82058E-02	.00000E+00	9.36691E-02	2.21487E-04	2.09074E+00
24	6.12274E-02	4.77858E-06	7.05374E-02	1.85658E-02	.00000E+00	1.08853E-01	1.29682E-04	1.59299E+00
25	2.59679E-02	5.95396E-06	3.09493E-02	9.08080E-03	.00000E+00	6.37241E-02	4.35942E-05	6.79242E-01
26	1.69322E-02	1.32238E-06	2.12447E-02	7.16545E-03	.00000E+00	5.87701E-02	2.11954E-05	4.45571E-01
27	2.83361E-03	1.54423E-07	3.79067E-03	1.47341E-03	.00000E+00	1.63597E-02	2.15556E-06	7.47615E-02
28	1.78306E+00	3.77761E-05	1.79426E+00	-1.19255E-02	2.10474E-03	4.98131E-01	1.19978E-02	4.54677E+01

1fine group summary for system

0 grp.	fix source	fiss source	in scatter	slf scatter	out scatter	absorption	leakage	balance
1	.00000E+00	2.12780E-02	.00000E+00	2.06749E-02	1.98165E-02	3.58115E-03	-6.64037E-08	9.98895E-01
2	.00000E+00	1.88887E-01	7.03677E-03	2.54434E-01	1.80687E-01	1.52505E-02	-7.17095E-07	1.00002E+00

3	.00000E+00	2.14987E-01	7.49275E-02	2.65745E-01	2.73557E-01	1.63609E-02	-8.72858E-07	9.99990E-01
4	.00000E+00	1.24456E-01	1.12447E-01	1.83355E-01	2.29088E-01	7.86526E-03	-5.89581E-07	1.00000E+00
5	.00000E+00	1.65945E-01	2.05818E-01	4.65258E-01	3.66420E-01	5.34764E-03	-1.06623E-06	9.99992E-01
6	.00000E+00	1.80122E-01	4.21921E-01	1.25627E+00	5.93486E-01	8.55015E-03	-1.90959E-06	1.00002E+00
7	.00000E+00	8.94322E-02	6.57227E-01	1.67105E+00	7.38066E-01	8.60154E-03	-2.45783E-06	9.99993E-01
8	.00000E+00	1.38095E-02	7.75466E-01	1.70404E+00	7.75635E-01	1.37038E-02	-1.85387E-07	9.99920E-01
9	.00000E+00	1.00281E-03	7.66351E-01	1.48676E+00	7.44975E-01	2.24618E-02	3.73622E-06	9.99888E-01
10	.00000E+00	7.44912E-05	7.41496E-01	1.35238E+00	7.07723E-01	3.39221E-02	1.02529E-06	9.99898E-01
11	.00000E+00	5.86056E-06	7.12392E-01	1.25750E+00	6.57675E-01	5.47649E-02	7.00472E-07	9.99940E-01
12	.00000E+00	4.11695E-07	5.72736E-01	6.86310E-01	5.14515E-01	5.82557E-02	-7.44237E-08	9.99974E-01
13	.00000E+00	6.53735E-08	5.08133E-01	5.46668E-01	4.55582E-01	5.25663E-02	-6.29925E-07	9.99972E-01
14	.00000E+00	1.29553E-08	4.90795E-01	5.19477E-01	4.18280E-01	7.25209E-02	-2.05207E-07	9.99989E-01
15	.00000E+00	1.46409E-09	2.72546E-01	2.35818E-01	2.64712E-01	7.83718E-03	2.37714E-06	9.99977E-01
16	.00000E+00	4.29908E-10	1.85465E-01	1.09527E-01	1.81038E-01	4.42923E-03	1.84514E-06	9.99976E-01
17	.00000E+00	1.38451E-10	9.98336E-02	3.53441E-02	9.55565E-02	4.27758E-03	1.28993E-06	9.99982E-01
18	.00000E+00	9.91271E-11	8.94369E-02	2.90434E-02	8.46701E-02	4.76690E-03	3.80411E-06	9.99956E-01
19	.00000E+00	1.40145E-10	1.47530E-01	7.20627E-02	1.41343E-01	6.18785E-03	7.18773E-06	9.99950E-01
20	.00000E+00	2.27889E-10	3.53663E-01	4.10910E-01	3.27491E-01	2.61694E-02	8.27838E-06	9.99983E-01
21	.00000E+00	3.33557E-11	1.81179E-01	9.30840E-02	1.66608E-01	1.45704E-02	-2.05195E-06	1.00001E+00
22	.00000E+00	3.87002E-11	3.58523E-01	2.73729E-01	3.17577E-01	4.09479E-02	-6.47962E-08	9.99996E-01
23	.00000E+00	3.70016E-11	9.16472E-01	1.41028E+00	7.70325E-01	1.46150E-01	6.20171E-06	9.99989E-01
24	.00000E+00	1.00713E-11	9.88274E-01	1.21704E+00	8.23495E-01	1.64778E-01	4.77858E-06	9.99996E-01
25	.00000E+00	2.94824E-12	6.56578E-01	4.92406E-01	5.61261E-01	9.53161E-02	5.95359E-06	9.99992E-01
26	.00000E+00	2.06732E-12	5.09791E-01	4.97191E-01	4.21693E-01	8.80974E-02	1.32238E-06	9.99999E-01
27	.00000E+00	4.92653E-13	1.68252E-01	1.00986E-01	1.43064E-01	2.51879E-02	1.54423E-07	9.99998E-01
28	.00000E+00	1.00000E+00	1.09743E+01	1.66471E+01	1.09743E+01	1.00245E+00	3.77442E-05	9.99969E-01

0 grp.	rt bdy flux	rt leakage	lft bdy flux	lft leakage	n2n rate	fiss rate	flux*db**2	total flux
1	1.23580E-02	-6.64037E-08	1.18238E-02	.00000E+00	2.09365E-03	2.33396E-03	3.02200E-04	3.38918E-01
2	9.39823E-02	-7.17095E-07	8.77366E-02	.00000E+00	1.65374E-05	1.08121E-02	1.68802E-03	2.57140E+00
3	1.19413E-01	-8.72858E-07	1.10952E-01	.00000E+00	.00000E+00	1.33262E-02	1.95999E-03	3.26556E+00
4	7.40762E-02	-5.89581E-07	6.84948E-02	.00000E+00	.00000E+00	5.76311E-03	9.50338E-04	2.02500E+00
5	1.11429E-01	-1.06623E-06	1.02378E-01	.00000E+00	.00000E+00	1.70983E-03	1.11410E-03	3.04401E+00
6	2.09694E-01	-1.90959E-06	1.92627E-01	.00000E+00	.00000E+00	1.54427E-03	1.86980E-03	5.72654E+00
7	2.08589E-01	-2.45783E-06	1.92997E-01	.00000E+00	.00000E+00	1.59888E-03	1.32496E-03	5.57633E+00
8	1.48840E-01	-1.85387E-07	1.46868E-01	.00000E+00	.00000E+00	1.70070E-03	7.52196E-04	4.09298E+00
9	1.15112E-01	3.73622E-06	1.15770E-01	.00000E+00	.00000E+00	2.36103E-03	5.07921E-04	3.17260E+00
10	1.05290E-01	1.02529E-06	1.06873E-01	.00000E+00	.00000E+00	5.04123E-03	4.61730E-04	2.90492E+00
11	9.69750E-02	7.00472E-07	1.00516E-01	.00000E+00	.00000E+00	1.04025E-02	4.17871E-04	2.68196E+00
12	6.10973E-02	-7.44237E-08	6.51703E-02	.00000E+00	.00000E+00	1.33053E-02	2.46500E-04	1.69543E+00
13	5.22778E-02	-6.29925E-07	5.58525E-02	.00000E+00	.00000E+00	1.23682E-02	2.13243E-04	1.45108E+00
14	4.86115E-02	-2.05207E-07	5.37588E-02	.00000E+00	.00000E+00	9.18611E-03	1.96090E-04	1.35481E+00
15	2.84229E-02	2.37714E-06	2.95207E-02	.00000E+00	.00000E+00	2.31490E-03	1.20417E-04	7.85971E-01
16	1.59001E-02	1.84514E-06	1.63385E-02	.00000E+00	.00000E+00	1.53656E-03	6.34372E-05	4.39428E-01
17	7.02551E-03	1.28993E-06	7.32720E-03	.00000E+00	.00000E+00	2.33310E-03	2.58243E-05	1.94472E-01
18	6.00693E-03	3.80411E-06	6.33167E-03	.00000E+00	.00000E+00	3.10847E-03	2.14248E-05	1.66483E-01
19	1.11514E-02	7.18773E-06	1.16344E-02	.00000E+00	.00000E+00	3.76158E-03	4.17716E-05	3.08732E-01
20	3.66847E-02	8.27838E-06	3.84083E-02	.00000E+00	.00000E+00	1.61008E-02	1.46754E-04	1.01612E+00
21	1.18652E-02	-2.05195E-06	1.29119E-02	.00000E+00	.00000E+00	9.51397E-03	3.88527E-05	3.30155E-01
22	2.53461E-02	-6.47962E-08	2.85845E-02	.00000E+00	.00000E+00	2.66331E-02	8.13618E-05	7.08928E-01
23	8.09522E-02	6.20171E-06	9.63274E-02	.00000E+00	.00000E+00	9.36691E-02	2.40624E-04	2.28398E+00
24	6.12274E-02	4.77858E-06	7.89950E-02	.00000E+00	.00000E+00	1.08853E-01	1.42038E-04	1.74885E+00
25	2.59679E-02	5.95396E-06	3.56328E-02	.00000E+00	.00000E+00	6.37241E-02	4.81941E-05	7.48698E-01
26	1.69522E-02	1.32238E-06	2.56260E-02	.00000E+00	.00000E+00	5.87701E-02	2.38652E-05	4.94598E-01
27	2.83361E-03	1.54423E-07	4.85670E-03	.00000E+00	.00000E+00	1.63597E-02	2.53615E-06	8.39046E-02
28	1.78306E+00	3.77761E-05	1.80409E+00	.00000E+00	2.11019E-03	4.98131E-01	1.30016E-02	4.92118E+01

- elapsed time .03 min.

0direct access unit 9 requires 556 blocks of length 216 for cross section weighting.

1 transport cross section weighting function

0zone	grp. 1	grp. 2	grp. 3	grp. 4	grp. 5	grp. 6	grp. 7	grp. 8
1	1.05802E-03	4.90074E-03	5.23101E-03	2.49702E-03	3.18128E-03	5.53412E-03	3.72450E-03	1.74270E-03

2	6.44558E-04	4.84076E-03	5.72652E-03	3.42789E-03	4.29945E-03	6.17429E-03	4.34711E-03	2.14750E-03
3	1.08468E-03	5.31306E-03	5.81350E-03	2.90628E-03	3.86953E-03	6.80402E-03	4.39517E-03	1.82342E-03
4	7.45609E-04	4.17379E-03	4.88188E-03	2.37843E-03	2.82768E-03	4.80678E-03	3.32958E-03	1.79588E-03
5	7.67354E-04	4.23822E-03	4.92519E-03	2.40280E-03	2.87762E-03	4.89597E-03	3.37922E-03	1.79624E-03

Ozone	grp. 9	grp. 10	grp. 11	grp. 12	grp. 13	grp. 14	grp. 15	grp. 16
1	1.11186E-03	1.01521E-03	1.09810E-03	8.72879E-04	7.75523E-04	9.87936E-04	3.12593E-04	1.53467E-04
2	1.78609E-03	1.95226E-03	2.04432E-03	1.59830E-03	1.40199E-03	1.63645E-03	6.25509E-04	3.39600E-04
3	1.12149E-03	1.05890E-03	1.30638E-03	1.21988E-03	1.08690E-03	1.48015E-03	3.71550E-04	1.82336E-04
4	1.19333E-03	1.09357E-03	1.03044E-03	6.77667E-04	6.01603E-04	6.36550E-04	3.11361E-04	1.61725E-04
5	1.19150E-03	1.09436E-03	1.04626E-03	7.05103E-04	6.25980E-04	6.78794E-04	3.14757E-04	1.62915E-04

Ozone	grp. 17	grp. 18	grp. 19	grp. 20	grp. 21	grp. 22	grp. 23	grp. 24
1	7.55757E-05	7.17018E-05	1.20655E-04	4.27531E-04	1.86248E-04	5.24162E-04	2.16734E-03	2.12216E-03
2	1.61434E-04	1.46426E-04	2.55703E-04	8.51725E-04	3.43534E-04	8.89215E-04	3.46637E-03	3.32368E-03
3	1.00487E-04	1.00288E-04	1.59534E-04	5.60242E-04	2.78847E-04	8.01077E-04	3.27563E-03	3.29927E-03
4	6.92857E-05	5.99060E-05	1.11534E-04	3.88516E-04	1.25667E-04	3.11337E-04	1.16175E-03	9.75384E-04
5	7.08741E-05	6.19527E-05	1.13965E-04	3.97203E-04	1.33401E-04	3.36248E-04	1.27209E-03	1.09745E-03

Ozone	grp. 25	grp. 26	grp. 27	grp. 28
1	9.99428E-04	7.23432E-04	1.11046E-04	4.17261E-02
2	1.57751E-03	1.17131E-03	2.03199E-04	5.53857E-02
3	1.60282E-03	1.23236E-03	2.33226E-04	5.14809E-02
4	4.15738E-04	2.55395E-04	3.17970E-05	3.45521E-02
5	4.77769E-04	3.05638E-04	4.12637E-05	3.54101E-02

1broad group parameters

grp	upper energy	mid energy	velocity	fiss spec
1	2.0000E+07	2.6244E+06	1.9614E+09	7.1555E-01
2	9.0000E+05	1.5038E+05	9.4943E+06	2.8445E-01
3	4.0000E-01	1.2730E-01	3.6885E+05	1.2464E-10
4	1.0000E-05			

1 at 0 d, second part of sas2h pass to make library

0cell averaged fluxes

Ozone	grp. 1	grp. 2	grp. 3
1	3.84661E-01	1.14066E+00	2.74893E-01
2	3.89867E-01	1.14233E+00	2.65034E-01
3	3.92791E-01	1.14281E+00	2.60592E-01
4	4.09936E-01	1.14647E+00	2.29278E-01
5	4.08252E-01	1.14609E+00	2.32324E-01

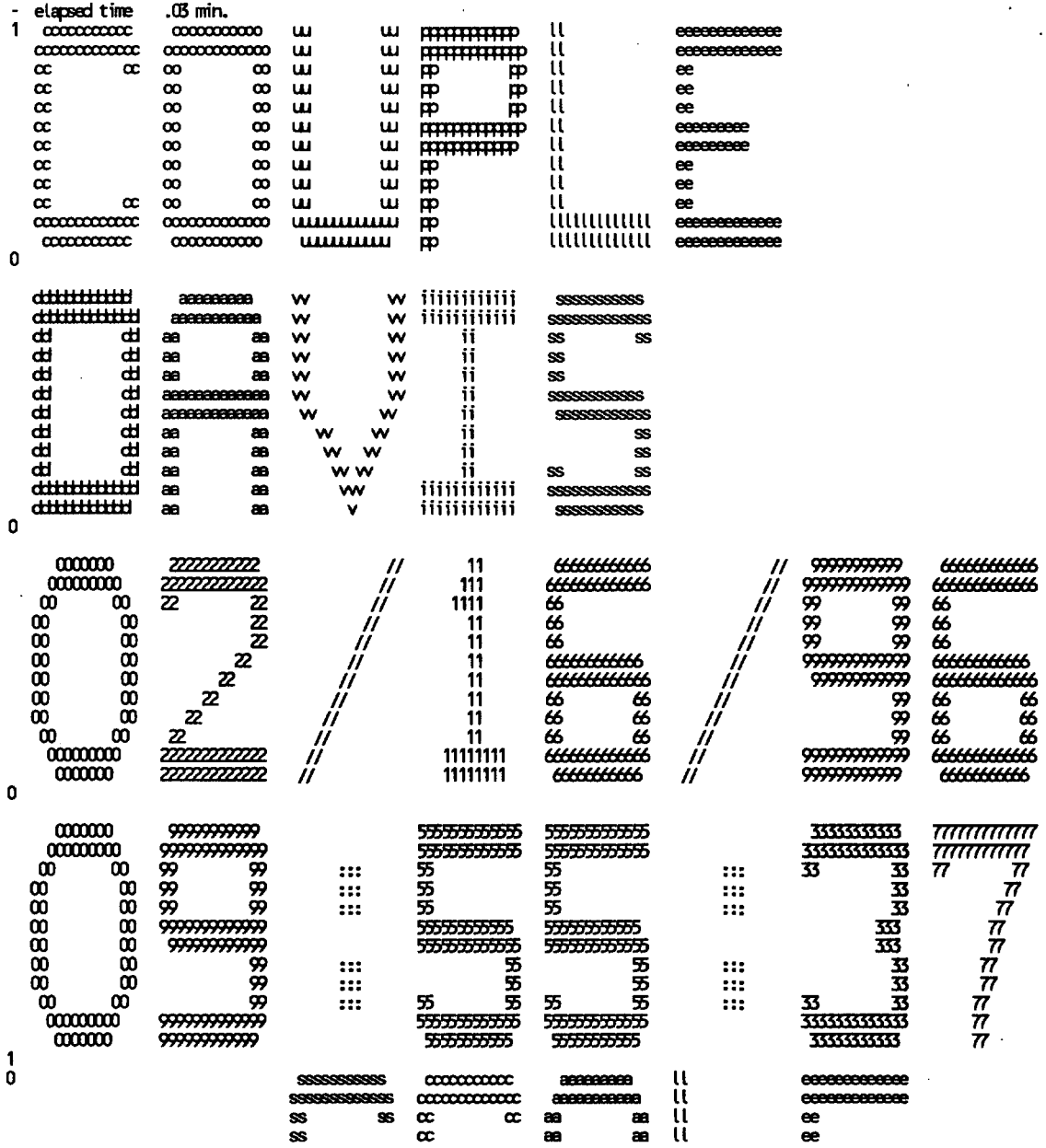
0flux disadvantage factors (zone average/cell average-flux)

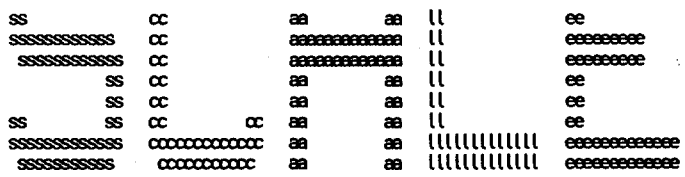
Ozone	grp. 1	grp. 2	grp. 3
1	9.42216E-01	9.95260E-01	1.18523E+00
2	9.54967E-01	9.96729E-01	1.14080E+00
3	9.62129E-01	9.97140E-01	1.12168E+00
4	1.00413E+00	1.00033E+00	9.86890E-01
5	1.00000E+00	1.00000E+00	1.00000E+00

0cell averaged currents

Ozone	grp. 1	grp. 2	grp. 3
1	1.68681E-02	1.80243E-02	6.83381E-03
2	1.89392E-02	2.54717E-02	1.09748E-02
3	1.89870E-02	2.17707E-02	1.07231E-02
4	1.50074E-02	1.62677E-02	3.27705E-03
5	1.52112E-02	1.65351E-02	3.66386E-03

Ozone	volume	vol. fraction
1	1.25665E+00	4.56236E-02
2	1.66687E-01	6.05165E-03
3	6.58265E-01	2.38987E-02
4	2.54624E+01	9.24426E-01
5	2.75440E+01	1.00000E+00


- elapsed time .03 min.
1
0
1
0



```
*********************************************************************
*********************************************************************
*********************************************************************
*****                                                           *****
*****                program verification information            *****
*****                                                           *****
*****              code system:   scale  version:   4.2         *****
*****                                                           *****
*********************************************************************
*********************************************************************
*****                                                           *****
*****                                                           *****
*****              program:  c0c005                             *****
*****                                                           *****
*****           creation date:  04/27/95                        *****
*****                                                           *****
*****              library:  /neutronics/scale/exe              *****
*****                                                           *****
*****                                                           *****
*****     this is not a  scale  configuration controlled code   *****
*****                                                           *****
*****              jobname:  davis                              *****
*****                                                           *****
*****     date of execution:  02/16/96                          *****
*****                                                           *****
*****     time of execution:  09:55:37                          *****
*****                                                           *****
*****                                                           *****
*********************************************************************
*********************************************************************
*********************************************************************
```

```
1
0      -1q array has      1 entries.
0       0q array has      1 entries.
0       0q array has      1 entries.
0       1q array has      1 entries.
0       1q array has      1 entries.
0       1q array has      1 entries.
0       1q array has      1 entries.
0       1q array has      1 entries.
0       1q array has      1 entries.
0       2q array has      1 entries.
0        * core allocated to array-data (by -19$ or default) was   200000 words. *
1         * broad 3-group flux weighting factors *
0
0               therm =    .5135
0               res   =    .3373
```

0 fast = 2.5480
0 user requested (see jadd) that all nuclide transitions available from ampx data be updated,
0 including those not present in prior origen library.
1cross sections, available from ampx (normalized to thermal flux), barns

10010 to 10020	2.66896E-01
10010 tot-cap	2.66896E-01
50100 to 40100	1.81165E-02
50100 to 10010	1.81165E-02
50100 to 40090	2.64465E-03
50100 to 10020	2.64465E-03
50100 to 30070	3.07004E+03
50100 to 20040	3.07018E+03
50100 to 10030	6.74369E-02
50100 tot-cap	3.07013E+03
50110 to 50100	7.48316E-06
50110 to 50120	4.05557E-03
50110 to 40110	9.54925E-07
50110 to 10010	9.54925E-07
50110 to 40090	8.52174E-06
50110 to 10030	8.52174E-06
50110 to 30080	1.11247E-04
50110 to 20040	1.11247E-04
50110 tot-cap	4.18378E-03
80160 to 80170	1.42557E-04
80160 to 70160	6.54764E-05
80160 to 10010	6.54764E-05
80160 to 70150	1.23488E-05
80160 to 10020	1.23488E-05
80160 to 60130	1.89717E-02
80160 to 20040	1.89717E-02
80160 to 80161	2.87156E-03
80160 tot-cap	1.91921E-02
360830 to 360820	1.48692E-02
360830 to 360810	1.56982E-09
360830 to 360840	1.43253E+02
360830 to 350830	6.24822E-04
360830 to 10010	6.24822E-04
360830 to 350820	4.91091E-06
360830 to 10020	4.91091E-06
360830 to 350810	1.71646E-06
360830 to 10030	1.71646E-06
360830 to 340810	2.77794E-08
360830 to 20030	2.77794E-08
360830 to 340800	3.26687E-05
360830 to 20040	3.26687E-05
360830 tot-cap	1.43268E+02
360850 to 360860	1.27987E+00
360850 tot-cap	1.27987E+00
380900 to 380910	5.96492E-01
380900 tot-cap	5.96492E-01
390890 to 390900	9.19218E-01
390890 tot-cap	9.19218E-01
400930 to 400940	1.05458E+01
400930 tot-cap	1.05458E+01
400940 to 400950	1.49321E-01
400940 tot-cap	1.49321E-01
400950 to 400960	1.76090E+00
400950 tot-cap	1.76090E+00
410940 to 410950	3.13074E+01

410940 tot-cap 3.13074E+01
420950 to 420960 3.20135E+01
420950 tot-cap 3.20135E+01
430990 to 430980 4.51155E-03
430990 to 431000 7.36808E+01
430990 tot-cap 7.36853E+01
441010 to 441020 2.21494E+01
441010 tot-cap 2.21494E+01
441060 to 441070 6.80340E-01
441060 tot-cap 6.80340E-01
451030 to 451020 1.63392E-03
451030 to 451040 3.16604E+02
451030 tot-cap 3.16605E+02
451050 to 451060 7.55330E+03
451050 tot-cap 7.55330E+03
461050 to 461060 2.77114E+01
461050 tot-cap 2.77114E+01
461080 to 461090 5.41240E+01
461080 tot-cap 5.41240E+01
471090 to 471080 3.79956E-03
471090 to 471100 3.03309E+02
471090 to 461090 2.18946E-04
471090 to 10010 2.18946E-04
471090 to 451060 1.78860E-04
471090 to 20040 1.78860E-04
471090 to 471091 4.85547E-01
471090 tot-cap 3.03314E+02
511240 to 511250 1.00854E+01
511240 tot-cap 1.00854E+01
541310 to 541300 4.60710E-02
541310 to 541290 9.63355E-06
541310 to 541320 2.22180E+02
541310 to 531310 2.84678E-05
541310 to 10010 2.84678E-05
541310 to 531300 3.86352E-07
541310 to 10020 3.86352E-07
541310 to 531290 3.96165E-07
541310 to 10080 3.96165E-07
541310 to 521280 1.32134E-05
541310 to 20040 1.32134E-05
541310 tot-cap 2.22226E+02
541320 to 541310 7.44257E-03
541320 to 541300 1.57851E-05
541320 to 541330 7.67510E-01
541320 to 531320 5.73290E-06
541320 to 10010 5.73290E-06
541320 to 531310 2.39875E-07
541320 to 10020 2.39875E-07
541320 to 531300 3.22992E-08
541320 to 10080 3.22992E-08
541320 to 521290 6.99477E-07
541320 to 20040 6.99477E-07
541320 tot-cap 7.74975E-01
541350 to 541360 1.45451E+06
541350 tot-cap 1.45451E+06
541360 to 541350 1.27310E-02
541360 to 541340 3.88836E-05
541360 to 541370 1.14774E-01
541360 to 531360 2.35156E-07
541360 to 10010 2.35156E-07

541360 to 531350	8.75217E-03
541360 to 10020	8.75217E-03
541360 to 531340	1.97727E-03
541360 to 10030	1.97727E-03
541360 to 521330	1.97201E-07
541360 to 20040	1.97201E-07
541360 tot-cap	1.27544E-01
551330 to 551320	5.96169E-03
551330 to 551340	8.49278E+01
551330 to 541330	6.64118E-04
551330 to 10010	6.64118E-04
551330 to 531300	1.01880E-05
551330 to 20040	1.01880E-05
551330 tot-cap	8.49345E+01
551340 to 551350	1.16499E+02
551340 tot-cap	1.16499E+02
551350 to 551360	1.74991E+01
551350 tot-cap	1.74991E+01
551370 to 551380	1.89455E-01
551370 tot-cap	1.89455E-01
561360 to 561370	7.40243E-01
561360 tot-cap	7.40243E-01
571390 to 571400	7.23852E+00
571390 tot-cap	7.23852E+00
581440 to 581450	1.07327E+00
581440 tot-cap	1.07327E+00
591410 to 591400	4.27200E-03
591410 to 591390	1.22745E-06
591410 to 571370	1.85279E-06
591410 to 20040	3.83396E-05
591410 to 581400	1.30563E-05
591410 to 10010	3.75300E-05
591410 to 591420	1.05570E+01
591410 to 581410	3.53579E-05
591410 to 10020	1.08842E-05
591410 to 581390	1.14145E-06
591410 to 10030	1.14145E-06
591410 to 571390	1.10237E-03
591410 to 20030	1.10237E-03
591410 to 571380	3.64869E-05
591410 tot-cap	1.05613E+01
591430 to 591440	8.62961E+01
591430 tot-cap	8.62961E+01
601430 to 601420	6.54806E-02
601430 to 601410	6.67121E-06
601430 to 581390	1.50245E-05
601430 to 20040	4.19139E-04
601430 to 591420	2.79256E-06
601430 to 10010	2.90234E-05
601430 to 601440	1.92236E+02
601430 to 591430	2.79713E-05
601430 to 10020	1.74047E-06
601430 to 591410	2.50801E-06
601430 to 10030	2.50801E-06
601430 to 581410	1.20500E-03
601430 to 20030	1.20500E-03
601430 to 581400	4.04115E-04
601430 tot-cap	1.92302E+02
601450 to 601440	8.41167E-02
601450 to 601430	8.51763E-05

601450 to 581410	6.15051E-06
601450 to 20040	1.55137E-04
601450 to 591440	1.59998E-06
601450 to 10010	1.04520E-05
601450 to 601460	6.65327E+01
601450 to 591450	9.81384E-06
601450 to 10020	9.61787E-07
601450 to 591430	1.51627E-06
601450 to 10030	1.51627E-06
601450 to 581430	3.08714E-09
601450 to 20030	3.08714E-09
601450 to 581420	1.48986E-04
601450 tot-cap	6.66170E+01
601470 to 601480	1.51802E+02
601470 tot-cap	1.51802E+02
611470 to 611460	2.29508E-02
611470 to 611450	7.16100E-05
611470 to 591430	6.41668E-06
611470 to 20040	5.99075E-05
611470 to 601460	8.79970E-06
611470 to 10010	2.01743E-05
611470 to 611480	4.92318E+02
611470 to 601470	1.79795E-05
611470 to 10020	6.60469E-06
611470 to 601450	2.49369E-06
611470 to 10030	2.49369E-06
611470 to 591450	3.74933E-09
611470 to 20030	3.74933E-09
611470 to 591440	5.34908E-05
611470 tot-cap	4.92341E+02
611480 to 611490	1.05385E+04
611480 tot-cap	1.05385E+04
621470 to 621460	5.98828E-02
621470 to 621450	5.39108E-03
621470 to 601430	4.80610E-05
621470 to 20040	9.47967E-04
621470 to 611460	1.08654E-04
621470 to 10010	1.57037E-04
621470 to 621480	1.87417E+02
621470 to 611470	1.38720E-04
621470 to 10020	9.03379E-05
621470 to 611450	9.70023E-05
621470 to 10030	9.70023E-05
621470 to 601450	4.46326E-06
621470 to 20030	4.46326E-06
621470 to 601440	8.99905E-04
621470 to 621471	1.27230E+00
621470 tot-cap	1.87489E+02
621490 to 621480	3.38650E-02
621490 to 621470	2.68719E-05
621490 to 621500	4.49490E+04
621490 to 611490	3.53511E-04
621490 to 10010	3.53511E-04
621490 to 601460	3.53511E-04
621490 to 20040	3.53511E-04
621490 tot-cap	4.49491E+04
621500 to 621510	1.16371E+02
621500 tot-cap	1.16371E+02
621510 to 621500	1.13863E-01
621510 to 621490	1.01117E-04

621510	to 601470	1.15091E-05
621510	to 20040	9.05073E-05
621510	to 611500	1.38459E-06
621510	to 10010	1.08487E-05
621510	to 621520	4.75106E+03
621510	to 611510	1.00028E-05
621510	to 10020	5.38656E-07
621510	to 611490	9.78974E-07
621510	to 10030	9.78974E-07
621510	to 601490	1.00853E-09
621510	to 20030	1.00853E-09
621510	to 601480	7.89982E-05
621510	tot-cap	4.75117E+03
621520	to 621510	1.35406E-02
621520	to 621500	9.14946E-05
621520	to 601480	2.04655E-06
621520	to 20040	8.50518E-06
621520	to 611510	5.86501E-07
621520	to 10010	1.73075E-06
621520	to 621530	6.22065E+02
621520	to 611520	1.53744E-06
621520	to 10020	3.93192E-07
621520	to 611500	1.02260E-07
621520	to 10030	1.02260E-07
621520	to 601500	3.09906E-10
621520	to 20030	3.09906E-10
621520	to 601490	6.45864E-06
621520	tot-cap	6.22079E+02
631530	to 631520	1.31512E-02
631530	to 631510	1.96388E-05
631530	to 611490	3.38063E-05
631530	to 20040	4.75442E-04
631530	to 621520	5.51433E-06
631530	to 10010	4.72410E-05
631530	to 631540	5.24135E+02
631530	to 621530	4.53653E-05
631530	to 10020	3.62861E-06
631530	to 621510	8.12082E-07
631530	to 10030	8.12082E-07
631530	to 611510	1.85602E-08
631530	to 20030	1.85602E-08
631530	to 611500	4.41636E-04
631530	tot-cap	5.24149E+02
631540	to 631530	2.10237E-02
631540	to 631520	7.55214E-06
631540	to 611500	7.34312E-11
631540	to 20040	5.64502E-04
631540	to 621530	1.65340E-06
631540	to 10010	9.02814E-04
631540	to 631550	9.65321E+02
631540	to 621540	9.02815E-04
631540	to 10020	1.65248E-06
631540	to 621520	2.80047E-06
631540	to 10030	2.80047E-06
631540	to 611520	1.18657E-08
631540	to 20030	1.18657E-08
631540	to 611510	5.64502E-04
631540	tot-cap	9.65344E+02
631550	to 631540	1.72613E-02
631550	to 631530	4.83354E-05

631550 to 611510 1.30274E-06
631550 to 20040 6.41203E-06
631550 to 621540 2.63564E-06
631550 to 10010 5.55710E-06
631550 to 631560 2.46919E+03
631550 to 621550 4.27468E-06
631550 to 10020 1.35322E-06
631550 to 621530 4.47964E-07
631550 to 10030 4.47964E-07
631550 to 611530 1.01533E-10
631550 to 20030 1.01533E-10
631550 to 611520 5.10929E-06
631550 tot-cap 2.46921E+03
641550 to 641560 1.65647E+04
641550 tot-cap 1.65647E+04
922340 to 922330 4.52222E-03
922340 fission 3.36683E+00
922340 nu-sigf 8.84026E+00
922340 to 922320 6.55695E-05
922340 to 922350 1.54966E+02
922340 to 922341 2.28357E+00
922340 tot-cap 1.58337E+02
922350 to 922340 2.08089E-02
922350 fission 3.45274E+02
922350 nu-sigf 8.35906E+02
922350 to 922330 1.97518E-05
922350 to 922360 7.79041E+01
922350 to 922351 6.49553E-02
922350 tot-cap 4.23199E+02
922360 to 922350 2.30871E-02
922360 fission 1.43625E+00
922360 nu-sigf 3.93370E+00
922360 to 922340 3.07009E-04
922360 to 922370 6.53622E+01
922360 to 922361 2.49832E+00
922360 tot-cap 6.68208E+01
922380 to 922370 4.60256E-02
922380 fission 7.16463E-01
922380 nu-sigf 2.01392E+00
922380 to 922360 2.97346E-04
922380 to 922390 6.85785E+00
922380 tot-cap 7.62061E+00
932370 to 932360 1.04888E-02
932370 fission 3.90501E+00
932370 nu-sigf 1.17476E+01
932370 to 932350 4.01271E-05
932370 to 932380 2.56347E+02
932370 to 932371 5.85573E-01
932370 tot-cap 2.60262E+02
942380 to 942370 1.68594E-03
942380 fission 1.85098E+01
942380 nu-sigf 5.23282E+01
942380 to 942360 9.43537E-06
942380 to 942390 2.54280E+02
942380 to 942381 2.27351E+00
942380 tot-cap 2.72791E+02
942390 to 942380 8.96190E-03
942390 fission 8.64299E+02
942390 nu-sigf 2.48458E+03
942390 to 942370 1.51904E-05

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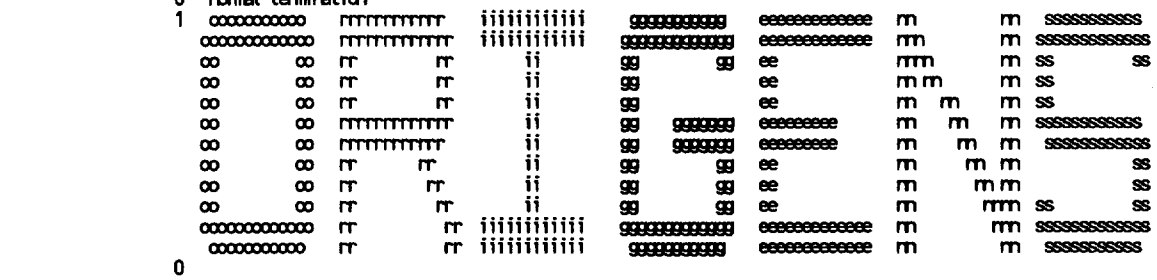
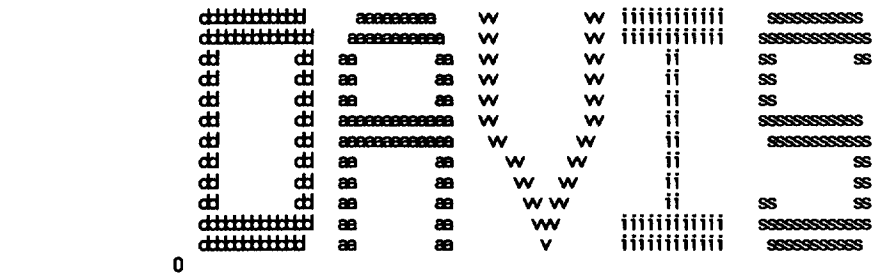
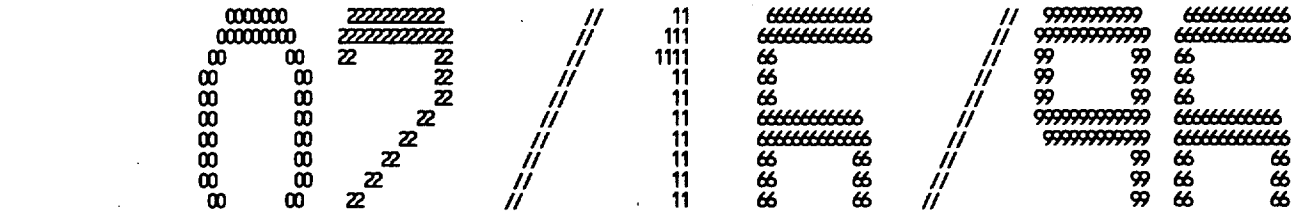
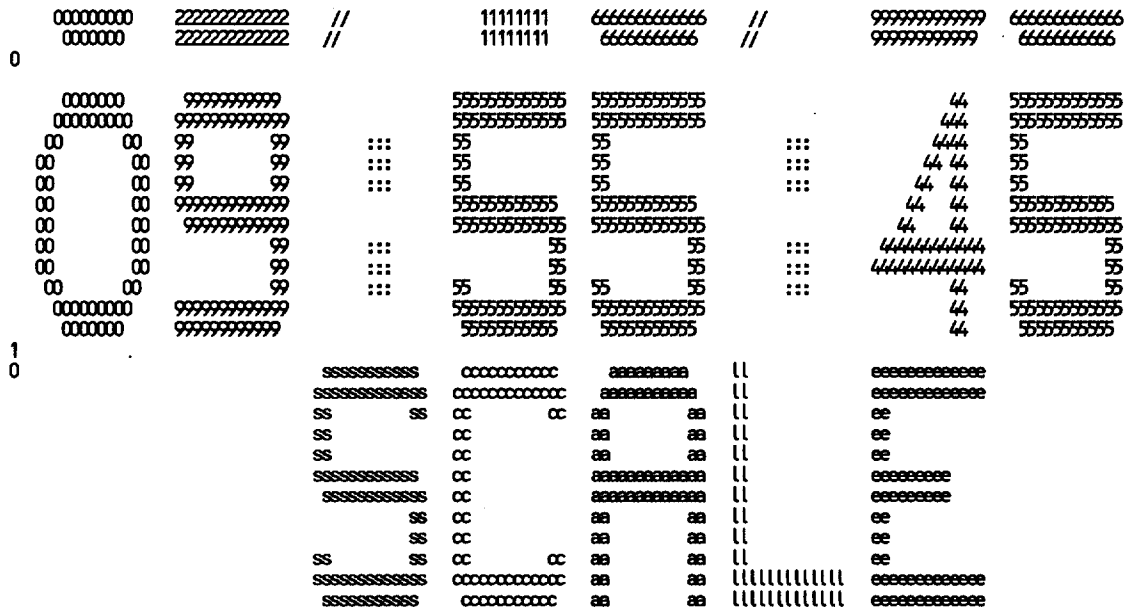
                    942390 to 942360  1.50585E-08
                    942390 to 942400  4.90677E+02
                    942390 tot-cap    1.35499E+03
                    942400 to 942390  4.19874E-03
                    942400 fission    4.59747E+00
                    942400 nu-sigf    1.43440E+01
                    942400 to 942380  4.09730E-05
                    942400 to 942410  1.93411E+03
                    942400 tot-cap    1.93887E+03
                    942410 to 942400  5.38011E-02
                    942410 fission    8.86980E+02
                    942410 nu-sigf    2.60217E+03
                    942410 to 942390  8.76709E-05
                    942410 to 942420  2.95973E+02
                    942410 tot-cap    1.18501E+03
                    942420 to 942410  1.71166E-02
                    942420 fission    3.37854E+00
                    942420 nu-sigf    1.05719E+01
                    942420 to 942400  2.08084E-04
                    942420 to 942430  2.62084E+02
                    942420 tot-cap    2.65480E+02
                    952410 fission    1.08184E+01
                    952410 nu-sigf    3.47448E+01
                    952410 to 952420  9.79069E+02
                    952410 tot-cap    9.89887E+02
                    952430 fission    2.60540E+00
                    952430 nu-sigf    8.75092E+00
                    952430 to 952440  3.44795E+02
                    952430 tot-cap    3.47400E+02
                    962440 to 962430  4.11346E-03
                    962440 fission    1.19573E+01
                    962440 nu-sigf    4.00144E+01
                    962440 to 962420  4.10210E-05
                    962440 to 962450  1.12244E+02
                    962440 to 962441  2.90118E+00
                    962440 tot-cap    1.24206E+02
0the reaction   50100 to  30070 was not used, because   50100 is not in library., (in subr pool)
                                        in the search of library number 3
0the reaction   50100 to  40090 was not used, because   50100 is not in library., (in subr pool)
                                        in the search of library number 3
0the reaction   50110 to  40090 was not used, because   50110 is not in library., (in subr pool)
                                        in the search of library number 3
0the reaction   50100 to  40100 was not used, because   50100 is not in library., (in subr pool)
                                        in the search of library number 3
0the reaction   80160 to  80161 was not used, because   80161 is not in library., (in subr pool)
0the reaction  621470 to 621471 was not used, because  621471 is not in library., (in subr pool)
0the fission product transitions for  922340 were not used.  library fissile nuclides are
   922330   922350   942410   922380   942390
0use substitute nuclide in block 8 data.  or, update with new fission yield data.
0the reaction  922340 to 922341 was not used, because  922341 is not in library., (in subr pool)
0the reaction  922350 to 922351 was not used, because  922351 is not in library., (in subr pool)
0the fission product transitions for  922360 were not used.  library fissile nuclides are
   922330   922350   942410   922380   942390
0use substitute nuclide in block 8 data.  or, update with new fission yield data.
0the reaction  922360 to 922361 was not used, because  922361 is not in library., (in subr pool)
0the fission product transitions for  932370 were not used.  library fissile nuclides are
   922330   922350   942410   922380   942390
0use substitute nuclide in block 8 data.  or, update with new fission yield data.
0the reaction  932370 to 932371 was not used, because  932371 is not in library., (in subr pool)
0the fission product transitions for  942380 were not used.  library fissile nuclides are
```

```
   922330  922350  942410  922380  942390
0use substitute nuclide in block 8 data.  or, update with new fission yield data.
0the reaction  942380 to 942381 was not used, because  942381 is not in library., (in subr pool)
0the fission product transitions for  942400 were not used.  library fissile nuclides are
   922330  922350  942410  922380  942390
0use substitute nuclide in block 8 data.  or, update with new fission yield data.
0the fission product transitions for  942420 were not used.  library fissile nuclides are
   922330  922350  942410  922380  942390
0use substitute nuclide in block 8 data.  or, update with new fission yield data.
0the fission product transitions for  952410 were not used.  library fissile nuclides are
   922330  922350  942410  922380  942390
0use substitute nuclide in block 8 data.  or, update with new fission yield data.
0the fission product transitions for  952430 were not used.  library fissile nuclides are
   922330  922350  942410  922380  942390
0use substitute nuclide in block 8 data.  or, update with new fission yield data.
0the fission product transitions for  962440 were not used.  library fissile nuclides are
   922330  922350  942410  922380  942390
0use substitute nuclide in block 8 data.  or, update with new fission yield data.
0the reaction  962440 to 962441 was not used, because  962441 is not in library., (in subr pool)
1
0                          case completed.  date,   2/16/1996
0 * normal termination *
```










```
**********************************************************************
**********************************************************************
**********************************************************************
*****                                                            *****
*****              program verification information               *****
*****                                                            *****
*****              code system:   scale  version:   4.2          *****
*****                                                            *****
**********************************************************************
**********************************************************************
*****                                                            *****
*****                                                            *****
*****          program:  c0c004                                  *****
*****                                                            *****
*****       creation date:  04/27/95                             *****
*****                                                            *****
*****          library:  /neutronics/scale/exe                   *****
*****                                                            *****
*****                                                            *****
*****   this is not a  scale  configuration controlled code      *****
*****                                                            *****
*****          jobname:  davis                                   *****
*****                                                            *****
*****   date of execution:  02/16/96                             *****
*****                                                            *****
*****   time of execution:  09:55:45                             *****
```

```
                    *****                                                   *****
                    *****                                                   *****
                    ********************************************************************************
                    ********************************************************************************
                    ********************************************************************************
1
0       -1q array has       1 entries.
0        0q array has       1 entries.
0        0q array has       1 entries.
0        0q array has       1 entries.
0        0q array has       1 entries.
0         dbl. prec. machine word applied has, at least, a 16 significant figure accuracy.
0             short-lived split test fraction, qxn =    9.1188E-04
0             half-norm of matrix used, axn =    7.0000E+00
0             4-place-accuracy-retention ratio, ratio4 =    6.4516E-13
0        1q array has      20 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        3q array has       1 entries.
0        4q array has       1 entries.
0       54q array has      12 entries.
1library information...

          cross-section data taken from position number  1 of library on unit 15.

          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *           prelim lwr origen-s binary working library--id = 1143              *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *       data from the light element, actinide, and fission product libraries   *
          *         decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                              *
          *       neutron flux spectrum factors and cross sections were produced from    *
          *      the "presas2" case updating all nuclides on the scale "burnup" library  *
          *                                                                              *
          *                   fission product yields are from endf/b-v                   *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
```

0 .other identification and sizes of library.
0 data set name: ft15f001
0 2/16/1996 date library was produced
0 1697 total number of nuclides in library
689 number of light-element nuclides
129 number of actinide nuclides
879 number of fission product nuclides
0 7985 number of nonzero off-diagonal matrix elements
0 **********
1

sas2h: babcock wilcox 15x15, 3.00wt%, 20gwd/mtu burn high temp actinides page 1
power= 8.466E-05mw, burnup=6.7727E-03mwd, flux= 1.72E+13n/cm**2-sec
0 nuclide concentrations, gram atoms
basis = converted to atoms/(barn-cm)

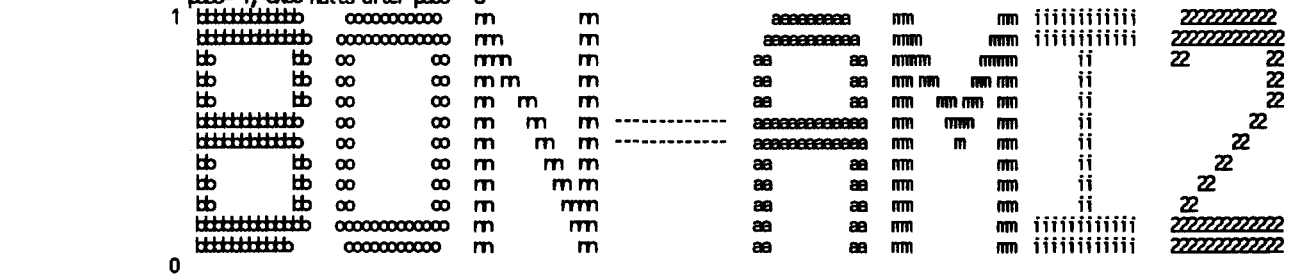
	charge	20.0 d	40.0 d	60.0 d	80.0 d
u230	.00E+00	1.00E-23	3.36E-23	6.45E-23	9.96E-23
u231	.00E+00	6.20E-22	1.50E-21	2.40E-21	3.31E-21
u232	.00E+00	1.09E-14	2.21E-14	3.36E-14	4.55E-14
u233	.00E+00	1.14E-12	2.26E-12	3.35E-12	4.42E-12
u234	5.56E-06	5.53E-06	5.50E-06	5.48E-06	5.45E-06
u235	6.92E-04	6.83E-04	6.74E-04	6.66E-04	6.58E-04
u236	3.17E-06	4.75E-06	6.32E-06	7.86E-06	9.37E-06
u237	.00E+00	1.63E-08	1.97E-08	2.14E-08	2.28E-08
u238	2.21E-02	2.21E-02	2.21E-02	2.21E-02	2.20E-02
u239	.00E+00	5.29E-09	5.31E-09	5.29E-09	5.27E-09
u240	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	.00E+00	9.63E-18	5.61E-17	1.48E-16	2.86E-16
np236m	.00E+00	3.36E-16	9.23E-16	1.57E-15	2.26E-15
np236	.00E+00	6.61E-16	3.85E-15	1.03E-14	2.03E-14
np237	.00E+00	2.15E-08	5.89E-08	1.01E-07	1.45E-07
np238	.00E+00	1.95E-11	6.16E-11	1.09E-10	1.60E-10
np239	.00E+00	7.60E-07	7.66E-07	7.63E-07	7.61E-07
np240m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np240	.00E+00	1.20E-11	1.21E-11	1.20E-11	1.19E-11
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	.00E+00	8.39E-16	5.07E-15	1.36E-14	2.67E-14
pu237	.00E+00	6.58E-16	2.80E-15	6.02E-15	9.98E-15
pu238	.00E+00	4.28E-11	3.03E-10	8.58E-10	1.73E-09
pu239	.00E+00	3.66E-06	7.94E-06	1.20E-05	1.60E-05
pu240	.00E+00	2.60E-08	1.11E-07	2.51E-07	4.39E-07
pu241	.00E+00	4.63E-10	4.08E-09	1.39E-08	3.27E-08
pu242	.00E+00	9.67E-13	1.75E-11	9.09E-11	2.87E-10
pu243	.00E+00	1.12E-16	2.04E-15	1.06E-14	3.32E-14
pu244	.00E+00	6.19E-40	1.61E-36	1.48E-34	3.62E-33
pu245	.00E+00	.00E+00	.00E+00	7.64E-41	2.75E-39
pu246	.00E+00	.00E+00	1.40E-45	1.28E-43	3.79E-42
am239	.00E+00	3.92E-24	7.04E-23	3.65E-22	1.15E-21
am240	.00E+00	9.80E-22	2.26E-20	1.29E-19	4.25E-19
am241	.00E+00	2.90E-13	5.18E-12	2.69E-11	8.48E-11
am242m	.00E+00	2.55E-16	9.12E-15	7.03E-14	2.91E-13
am242	.00E+00	3.39E-16	6.10E-15	3.16E-14	9.92E-14
am243	.00E+00	1.42E-15	5.23E-14	4.14E-13	1.76E-12
am244m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am244	.00E+00	4.41E-19	1.63E-17	1.29E-16	5.47E-16
am245	.00E+00	.00E+00	1.04E-40	9.67E-39	2.34E-37
am246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
totals	2.28E-02	2.28E-02	2.28E-02	2.27E-02	2.27E-02
0 flux		1.72E+13	1.73E+13	1.72E+13	1.72E+13

0 .results on logical unit no. 71, position 1, for time step 4, subcase 1. (run position 1, case position 1)

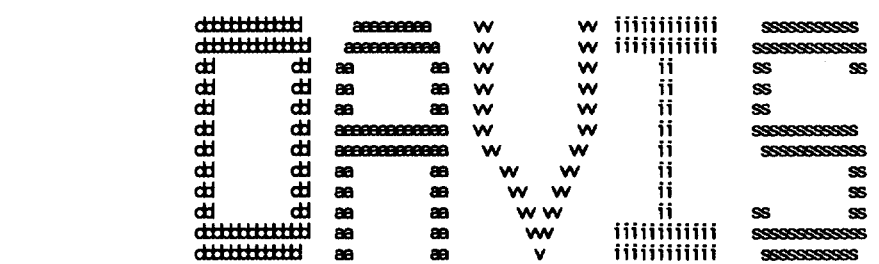
```
   title: sas2h: babcock wilcox 15x15, 3.00wt%, 20gwd/mtu burn high temp
0  .results on logical unit no. 71, position  2, for time step  4, subcase 1. (run position 1, case position 1)
   title: sas2h: babcock wilcox 15x15, 3.00wt%, 20gwd/mtu burn high temp
0  .results on logical unit no. 71, position  3, for time step  0, subcase 1. (run position 1, case position 1)
   title: sas2h: babcock wilcox 15x15, 3.00wt%, 20gwd/mtu burn high temp
0  .results on logical unit no. 71, position  4, for time step  1, subcase 1. (run position 1, case position 1)
   title: sas2h: babcock wilcox 15x15, 3.00wt%, 20gwd/mtu burn high temp
0     .terminated logical unit no. 71 with zero flag record.
1  * normal termination of execution *
0                                  table of contents for material tables
0                                    case or subcase printed     page

                                                    1              1
0ndset          33
          15          4          1         27          6          0          0          0          0          0
           0          0          0          0          0          2         -1       1698        690        130
         880       7935          0          5         99          2         16         96         18         18
          18          0         71
0       56q array has       1 entries.
0       56q array has       1 entries.
0       56q array has       1 entries.
0       56q array has       1 entries.
0       56q array has       1 entries.
0       56q array has       1 entries.
0       56q array has       1 entries.
0       56q array has       1 entries.
0       57q array has       4 entries.
0        1q array has      20 entries.
0        1q array has      10 entries.
     l90   92270
     l116  55405
     l32   33663 nudata (library) storage size
     l44   33734
     l103  70769
0       58q array has       4 entries.
0       60q array has       4 entries.
0       66q array has       1 entries.
0       73q array has       4 entries.
0       74q array has       4 entries.
0       75q array has       4 entries.
     l140  61885
     used   94591 in size   200000
0jqpt           12
           0          0          0          0          0          0          0          0          0          0
           0          0
0therm          4
  5.134568E-01 3.372767E-01 2.548021E+00 1.000000E-31
0nan            5
        7935         20          6         18       1697
0mm            19
           4          4          0          0          1          1          0          0          0          0
          21        100          4          4          3         74          4          1          0
0tconst         5
  8.640000E+04 1.000000E-20  .000000E+00  .000000E+00 1.000000E-08
0mzero          4
           0        689        129        879
0pow            3
   .000000E+00  .000000E+00  .000000E+00
0 lirp          9
           6          0         51         26          2       3000       1000       1697         94
```

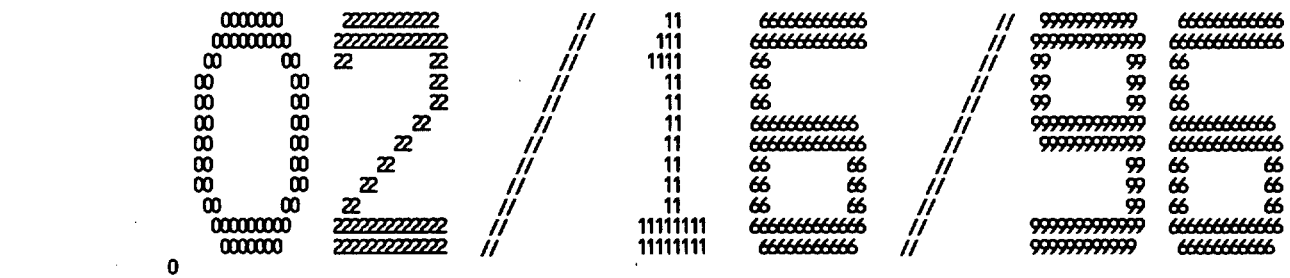
```
 n-gamma, fission and total mev/fission =          4.2823E+00     1.9427E+02     1.9856E+02
 start of interval flux =       1.73556E+13
 n-gamma, fission and total mev/fission =          4.6429E+00     1.9435E+02     1.9899E+02
 start of interval flux =       1.73046E+13
 n-gamma, fission and total mev/fission =          4.6996E+00     1.9444E+02     1.9914E+02
 start of interval flux =       1.72419E+13
 n-gamma, fission and total mev/fission =          4.7478E+00     1.9452E+02     1.9927E+02
 start of interval flux =       1.71873E+13
0 case or subcase    1  sas2h: babcock wilcox 15x15, 3.00wt%, 20gwd/mtu burn high temp
0       56q array has     20 entries.
0       56q array has      1 entries.
0       56q array has      1 entries.
0       56q array has     20 entries.
0       56q array has      1 entries.
0       56q array has      1 entries.
0       56q array has     20 entries.
0       56q array has     20 entries.
0requested parm=halt8,skipcellwt,skipshipdata
  pass= 1, exec halts after pass  8
```



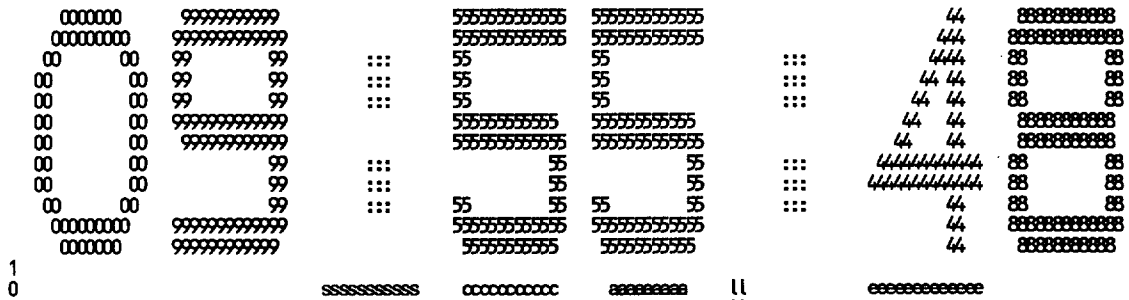
```
0
```

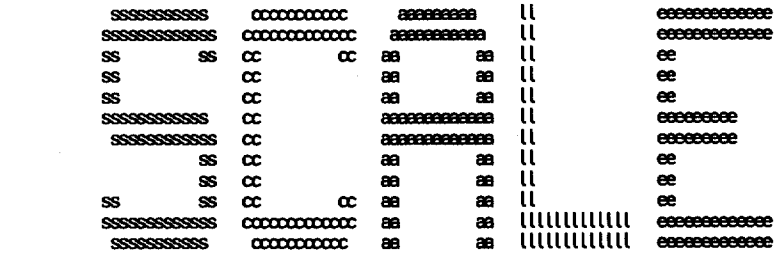


```
0
```



```
0
```





```
**********************************************************************
**********************************************************************
**********************************************************************
******                                                          ******
******                program verification information          ******
******                                                          ******
******                code system:   scale  version:   4.2      ******
******                                                          ******
**********************************************************************
**********************************************************************
******                                                          ******
******                                                          ******
******           program:  c0c008                               ******
******                                                          ******
******      creation date:  04/27/95                            ******
******                                                          ******
******           library:  /neutronics/scale/exe                ******
******                                                          ******
******                                                          ******
******   this is not a  scale  configuration controlled code    ******
******                                                          ******
******           jobname:  davis                                ******
******                                                          ******
******   date of execution:  02/16/96                           ******
******                                                          ******
******   time of execution:  09:55:48                           ******
******                                                          ******
******                                                          ******
**********************************************************************
```

```
                    ********************************************************************************
                    ********************************************************************************
1
0       -1q array has       1 entries.
0        0q array has       4 entries.
0        1q array has       6 entries.
0        2q array has       2 entries.
1logical assignments
Qmaster library   12
 working library   0
 scratch file     18
 new library       1
Qp r o b l e m   d e s c r i p t i o n
Oigr--geometry (0/1/2/3--inf med/slab/cyl/sphere                2
Oizm--number of zones or material regions                       4
Oms--mixing table length                                       66
Oibl--shielded cross section edit option (0/1--no/yes)          0
Oibr--bondarenko factor edit option (0/1--no/yes)               0
Oissopt--dancoff factor option                                  0
Oconvergence criterion    1.00000E-03
Ogeometry correction factor for wigner rational approximation 1.350E+00
0        3q array has      66 entries.
0        4q array has      66 entries.
0        5q array has      66 entries.
0        6q array has       4 entries.
0        7q array has       4 entries.
0        8q array has       4 entries.
0        9q array has       4 entries.
0       10q array has      66 entries.
0       11q array has       4 entries.
Qm i x i n g   t a b l e
Oentry  mixture  isotope  number density  new identifier
    1        1    92235    6.57647E-04           92235
    2        1    92234    5.45374E-06           92234
    3        1    92236    9.37010E-06           92236
    4        1    92238    2.20477E-02           92238
    5        1     8016    4.55359E-02            8016
    6        3     8016    2.09710E-02               6
    7        1    36083    1.57183E-07           36083
    8        1    36085    7.63106E-08           36085
    9        1    38090    1.70684E-06           38090
   10        1    39089    5.60000E-07           39089
   11        1    42095    2.50288E-07           42095
   12        1    40093    1.24307E-06           40093
   13        1    40094    1.91444E-06           40094
   14        1    40095    1.29859E-06           40095
   15        1    41094    5.36198E-13           41094
   16        1    43099    1.77703E-06           43099
   17        1    45103    4.59914E-07           45103
   18        1    45105    1.10044E-08           45105
   19        1    44101    1.56724E-06           44101
   20        1    44106    1.80896E-07           44106
   21        1    46105    3.66502E-07           46105
   22        1    46108    4.74250E-08           46108
   23        1    47109    2.91333E-08           47109
   24        1    51124    9.07937E-12           51124
   25        1    54131    7.49268E-07           54131
   26        1    54132    1.26842E-06           54132
   27        1    54135    6.32256E-09           54135
   28        1    54136    3.00800E-06           54136
```

```
   29      1        55134    8.18674E-09          55134
   30      1        55135    9.06121E-07          55135
   31      1        55137    1.90508E-06          55137
   32      1        56136    2.19836E-09          56136
   33      1        57139    1.91454E-06          57139
   34      1        59141    9.07627E-07          59141
   35      1        59143    4.07103E-07          59143
   36      1        58144    1.48283E-06          58144
   37      1        60143    1.31604E-06          60143
   38      1        60145    1.17029E-06          60145
   39      1        61147    5.25252E-07          61147
   40      1        61148    1.26721E-09          61148
   41      1        60147    1.34940E-07          60147
   42      1        62147    1.30142E-08          62147
   43      1        62149    6.35746E-08          62149
   44      1        62150    2.60260E-07          62150
   45      1        62151    1.03932E-07          62151
   46      1        62152    1.16691E-07          62152
   47      1        64155    1.02921E-10          64155
   48      1        63153    5.54702E-08          63153
   49      1        63154    1.61916E-09          63154
   50      1        63155    1.09678E-08          63155
   51      2        40302    4.25156E-02          40302
   52      3         1001    4.19420E-02           1001
   53      3         5010    3.81515E-06           5010
   54      3         5011    1.54884E-05           5011
   55      1        55133    1.82872E-06          55133
   56      1        93237    1.45033E-07          93237
   57      1        94238    1.72916E-09          94238
   58      1        94239    1.59534E-05          94239
   59      1        94240    4.39198E-07          94240
   60      1        94241    3.26765E-08          94241
   61      1        94242    2.86985E-10          94242
   62      1        95241    8.48261E-11          95241
   63      1        95243    1.76207E-12          95243
   64      1        96244    1.17608E-14          96244
   65      1          999    1.00000E-20            999
   66      4          999    1.00000E-20             66
0geometry and material description
0zone   mixture   outer dimension   temperature      extra xs   type (0/1--fuel/mod)
    1         1      4.68122E-01   9.75000E+02   9.05844E-01             0
    2         4      4.78790E-01   2.93000E+02   5.49010E-01             0
    3         2      5.46100E-01   6.50000E+02    .00000E+00             0
    4         3      8.13968E-01   6.07600E+02    .00000E+00             0
     7711 locations of   200000 available are required to make a new master containing the self-shielded values
0no nuclides in your problem have bondarenko factor data**bonami will copy from logical 12 to logical  1
0copy       999  1/v cross sectio from log 12 to log 18    bondarenko trigger 0
0copy       999  1/v cross sectio from log 18 to log  1    bondarenko trigger 0
0copy       999  1/v cross sectio from log 18 to log  1    bondarenko trigger 0
0copy      1001   hydrogen        from log 12 to log  1    bondarenko trigger 0
0copy      5010  b-10 1273 218ngp from log 12 to log  1    bondarenko trigger 0
0copy      5011   boron-11        from log 12 to log  1    bondarenko trigger 0
0copy      8016   oxygen-16       from log 12 to log 18    bondarenko trigger 0
0copy      8016   oxygen-16       from log 18 to log  1    bondarenko trigger 0
0copy      8016   oxygen-16       from log 18 to log  1    bondarenko trigger 0
0copy     36083   kr-83           from log 12 to log  1    bondarenko trigger 0
0copy     36085   kr-85           from log 12 to log  1    bondarenko trigger 0
0copy     38090   sr-90           from log 12 to log  1    bondarenko trigger 0
0copy     39089    y-89           from log 12 to log  1    bondarenko trigger 0
0copy     40093   zr-93           from log 12 to log  1    bondarenko trigger 0
```

```
0copy    40094  zr-94           from log 12 to log  1    bondarenko trigger 0
0copy    40095  zr-95           from log 12 to log  1    bondarenko trigger 0
0copy    40302  zircalloy       from log 12 to log  1    bondarenko trigger 0
0copy    41094  nb-94           from log 12 to log  1    bondarenko trigger 0
0copy    42095  mo-95           from log 12 to log  1    bondarenko trigger 0
0copy    43099  tc-99           from log 12 to log  1    bondarenko trigger 0
0copy    44101  ru-101          from log 12 to log  1    bondarenko trigger 0
0copy    44106  ru-106          from log 12 to log  1    bondarenko trigger 0
0copy    45103  rh-103          from log 12 to log  1    bondarenko trigger 0
0copy    45105  rh-105          from log 12 to log  1    bondarenko trigger 0
0copy    46105  pd-105          from log 12 to log  1    bondarenko trigger 0
0copy    46108  pd-108          from log 12 to log  1    bondarenko trigger 0
0copy    47109  silver-109      from log 12 to log  1    bondarenko trigger 0
0copy    51124  sb-124          from log 12 to log  1    bondarenko trigger 0
0copy    54131  xe-131          from log 12 to log  1    bondarenko trigger 0
0copy    54132  xe-132          from log 12 to log  1    bondarenko trigger 0
0copy    54135  xenon-135       from log 12 to log  1    bondarenko trigger 0
0copy    54136  xe-136          from log 12 to log  1    bondarenko trigger 0
0copy    55133  cesium-133      from log 12 to log  1    bondarenko trigger 0
0copy    55134  cs-134          from log 12 to log  1    bondarenko trigger 0
0copy    55135  cs-135          from log 12 to log  1    bondarenko trigger 0
0copy    55137  cs-137          from log 12 to log  1    bondarenko trigger 0
0copy    56136  ba-136          from log 12 to log  1    bondarenko trigger 0
0copy    57139  la-139          from log 12 to log  1    bondarenko trigger 0
0copy    58144  ce-144          from log 12 to log  1    bondarenko trigger 0
0copy    59141  pr-141          from log 12 to log  1    bondarenko trigger 0
0copy    59143  pr-143          from log 12 to log  1    bondarenko trigger 0
0copy    60143  nd-143          from log 12 to log  1    bondarenko trigger 0
0copy    60145  nd-145          from log 12 to log  1    bondarenko trigger 0
0copy    60147  nd-147          from log 12 to log  1    bondarenko trigger 0
0copy    61147  pm-147          from log 12 to log  1    bondarenko trigger 0
0copy    61148  pm-148          from log 12 to log  1    bondarenko trigger 0
0copy    62147  sm-147          from log 12 to log  1    bondarenko trigger 0
0copy    62149  sm-149          from log 12 to log  1    bondarenko trigger 0
0copy    62150  sm-150          from log 12 to log  1    bondarenko trigger 0
0copy    62151  sm-151          from log 12 to log  1    bondarenko trigger 0
0copy    62152  sm-152          from log 12 to log  1    bondarenko trigger 0
0copy    63153  eu-153          from log 12 to log  1    bondarenko trigger 0
0copy    63154  eu-154          from log 12 to log  1    bondarenko trigger 0
0copy    63155  eu-155          from log 12 to log  1    bondarenko trigger 0
0copy    64155  gd-155          from log 12 to log  1    bondarenko trigger 0
0copy    92234  u-234 1043 sigc= from log 12 to log  1    bondarenko trigger 0
0copy    92235  uranium-235     from log 12 to log  1    bondarenko trigger 0
0copy    92236  u-236 1163 sigc= from log 12 to log  1    bondarenko trigger 0
0copy    92238  uranium-238     from log 12 to log  1    bondarenko trigger 0
0copy    93237  neptunium-237   from log 12 to log  1    bondarenko trigger 0
0copy    94238  pu-238 1050 sigc from log 12 to log  1    bondarenko trigger 0
0copy    94239  plutonium-239   from log 12 to log  1    bondarenko trigger 0
0copy    94240  plutonium-240   from log 12 to log  1    bondarenko trigger 0
0copy    94241  plutonium-241   from log 12 to log  1    bondarenko trigger 0
0copy    94242  plutonium-242   from log 12 to log  1    bondarenko trigger 0
0copy    95241  am-241 1056 sigc from log 12 to log  1    bondarenko trigger 0
0copy    95243  am-243 1057 218  from log 12 to log  1    bondarenko trigger 0
0copy    96244  curium-244      from log 12 to log  1    bondarenko trigger 0
1     scale 4.2 - 27 group neutron burnup library
        based on endf-b version 4 data with endf-b version 5 fission products
          compiled for nrc     1/27/89
            last updated       9/16/93
               l.m.petrie   -   ornl
        tape id                          4321          number of nuclides          66
```

number of neutron groups 27 number of gamma groups 0
first thermal group 15 logical unit 1

table of contents

1/v cross sections normalized to 1.0 at 0.0253 ev			id	999
1/v cross sections normalized to 1.0 at 0.0253 ev			id	66
hydrogen	endf/b-iv mat 1269/thrml002	updated 10/13/89	id	1001
b-10 1273 218ngp 042375 p-3 293k			id	5010
boron-11	endf/b-iv mat 1160	updated 10/13/89	id	5011
oxygen-16	endf/b-iv mat 1276	updated 10/13/89	id	8016
oxygen-16	endf/b-iv mat 1276	updated 10/13/89	id	6
kr-83	mt=102,103,103,105,106,107	updated 10/13/89	id	36083
kr-85	mt= 102		id	36085
sr-90	mt=102	updated 10/13/89	id	38090
y-89	mt=102	updated 10/13/89	id	39089
zr-93	mt= 102		id	40093
zr-94	mt=102	updated 10/13/89	id	40094
zr-95	mt=102	updated 10/13/89	id	40095
zircalloy	endf/b-iv mat 1284	updated 10/13/89	id	40302
nb-94	mt=102	updated 10/13/89	id	41094
mo-95	mt=102	updated 10/13/89	id	42095
tc-99	mt=102	updated 10/13/89	id	43099
ru-101	mt=102	updated 10/13/89	id	44101
ru-106	mt=102	updated 10/13/89	id	44106
rh-103	mt=102	updated 10/13/89	id	45103
rh-105	mt= 102		id	45105
pd-105	mt=102	updated 10/13/89	id	46105
pd-108	mt=102	updated 10/13/89	id	46108
silver-109	endf/b-iv mat 1139	updated 10/13/89	id	47109
sb-124	mt=102	updated 10/13/89	id	51124
xe-131	mt=102,103,104,105,106	updated 10/13/89	id	54131
xe-132	mt=102,103,104,105,106	updated 10/13/89	id	54132
xenon-135	endf/b-iv mat 1294	updated 10/13/89	id	54135
xe-136	mt= 102, 103, 104, 105, 107		id	54136
cesium-133	endf/b-iv mat 1141	updated 10/13/89	id	55133
cs-134	mt=102	updated 10/13/89	id	55134
cs-135	mt= 102		id	55135
cs-137	mt=102	updated 10/13/89	id	55137
ba-136	mt=102	updated 10/13/89	id	56136
la-139	mt=102	updated 10/13/89	id	57139
ce-144	mt= 102		id	58144
pr-141	mt=102,103,104,105,106,107	updated 10/13/89	id	59141
pr-143	mt=102	updated 10/13/89	id	59143
nd-143	mt=102	updated 10/13/89	id	60143
nd-145	mt=102	updated 10/13/89	id	60145
nd-147	mt=102	updated 10/13/89	id	60147
pm-147	mt=102	updated 10/13/89	id	61147
pm-148	mt= 102		id	61148
sm-147	endf/b-v fission product	updated 10/13/89	id	62147
sm-149	mt=102,103,107	updated 10/13/89	id	62149
sm-150	mt=102	updated 10/13/89	id	62150
sm-151	mt=102,103,104,105,106,107	updated 10/13/89	id	62151
sm-152	mt=102,103,104,105,106,107	updated 10/13/89	id	62152
eu-153	mt=102,103,104,105,106,107	updated 10/13/89	id	63153
eu-154	mt=102,103,104,105,106,107	updated 10/13/89	id	63154
eu-155	mt=102,103,104,105,106,107	updated 10/13/89	id	63155
gd-155	mt=102	updated 10/13/89	id	64155
u-234 1043 sigo=5+4 newklacs p-3 293k f-1/e-m(1.+5)			id	92234
uranium-235	endf/b-iv mat 1261	updated 10/13/89	id	92235
u-236 1163 sigo=5+4 newklacs p-3 293k f-1/e-m(1.+5)			id	92236
uranium-238	endf/b-iv mat 1262	updated 10/13/89	id	92238

```
      neptunium-237  endf/b-iv mat 1263          updated 10/13/89              id    95237
      pu-238 1050 sigp=5+4 newklacs p-3 293k f-1/e-m(1.+5)                     id    94238
      plutonium-239  endf/b-iv mat 1264          updated 10/13/89              id    94239
      plutonium-240  endf/b-iv mat 1265          updated 10/13/89              id    94240
      plutonium-241  endf/b-iv mat 1266          updated 10/13/89              id    94241
      plutonium-242  endf/b-iv mat 1161          updated 10/13/89              id    94242
      am-241 1056 sigp=5+4 newklacs 218ngp p-3 293k                            id    95241
      am-243 1057 218 gp wt f-1/e-m 090576 p3 293k                             id    95243
      curium-244     endf/b-iv mat 1162          updated 10/13/89              id    96244
0      tape copy used      0 i/o's, and took     .00 seconds
1
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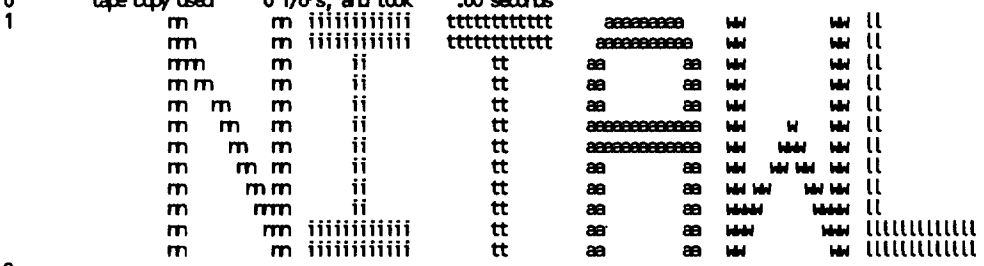

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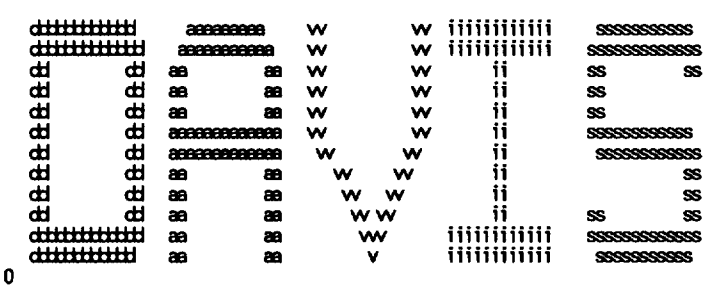

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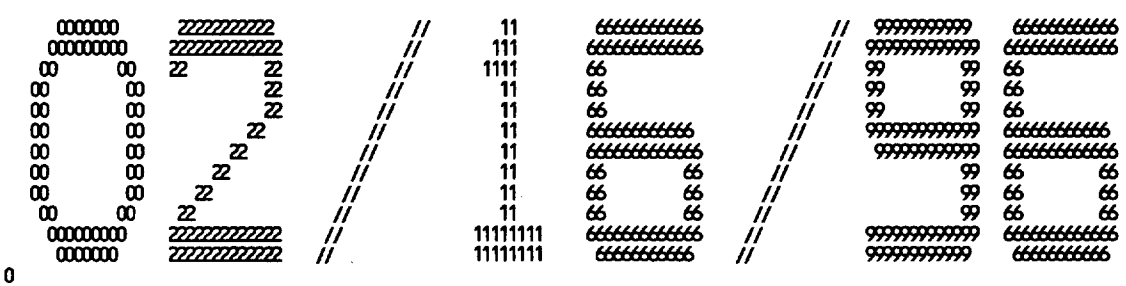

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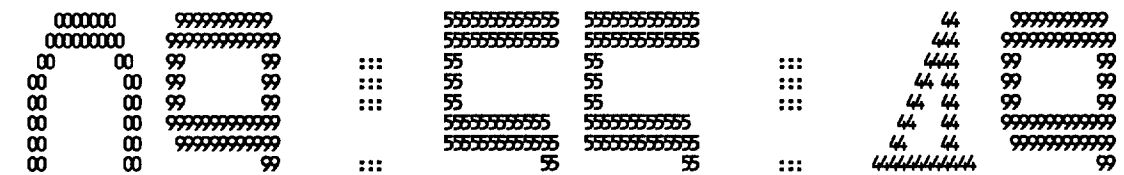

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0
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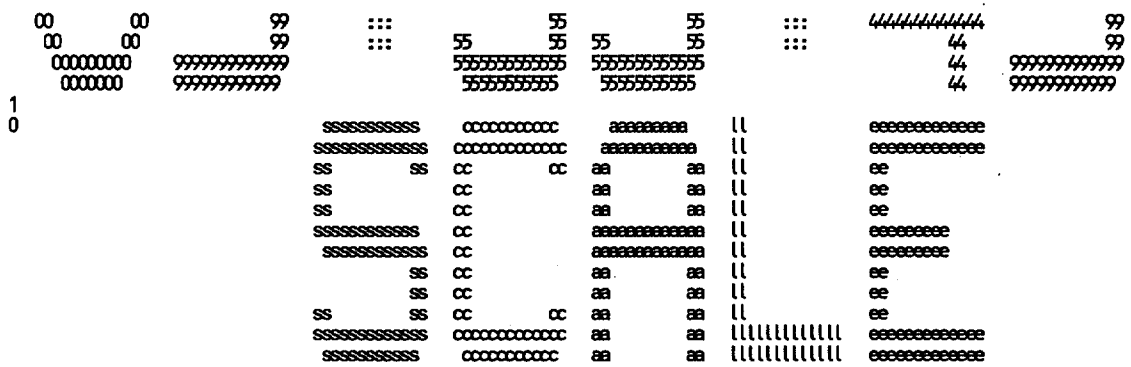

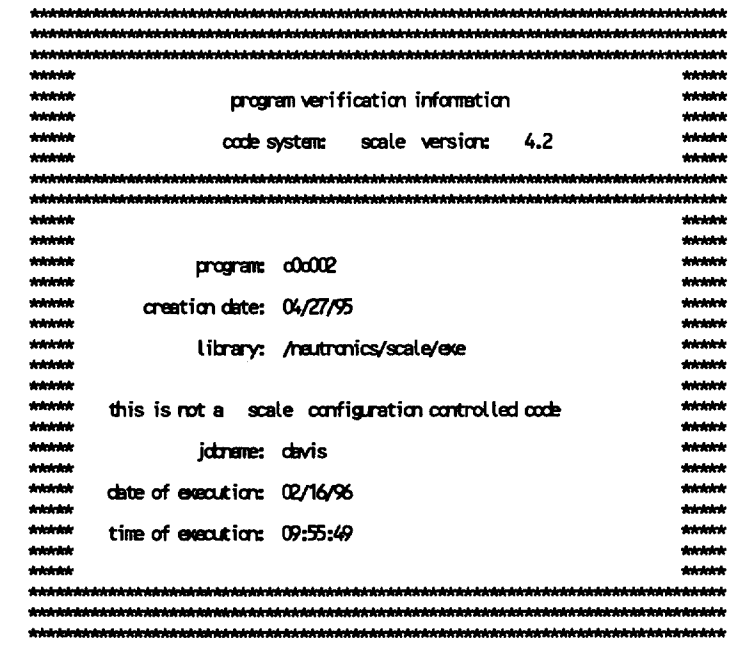


```
1
0      -1q array has      1 entries.
0       0q array has      9 entries.
0       1q array has     12 entries.
0select 65 nuclides from the master  library on logical  1
        0 nuclides from the working library on logical  2
        0 nuclides from the working library on logical  3
```

```
          to create the new working library on logical  4

        61 resonance calculations have been requested
         0 output option for ampx formatted cross section data
0the storage allocated for this case is 200000 words
0        2q array has      65 entries.
0        3q array has     915 entries.
0        4q array has      65 entries.
0 general information concerning cross section library
    tape identification number                  4321
    number of nuclides on tape                    66
    number of neutron energy groups               27
    first thermal neutron energy group            15
    number of gamma energy groups                  0
0   direct access unit number  9 requires 117 blocks of length  1484 words
- xsdrn tape   4321
                        scale 4.2 - 27 group neutron burnup library
                          based on endf-b version 4 data with endf-b version 5 fission products
                             compiled for nrc      1/27/89
                                last updated       9/16/93
                                  l.m.petrie   -   ornl
0 nuclides from xsdrn tape
     1    1/v cross sections normalized to 1.0 at 0.0253 ev                                  999
     2    hydrogen        endf/b-iv mat 1269/thrml002    updated 10/13/89                   1001
     3   b-10 1273 218ngp 042375 p-3 293k                                                   5010
     4    boron-11        endf/b-iv mat 1160             updated 10/13/89                   5011
     5    oxygen-16       endf/b-iv mat 1276             updated 10/13/89                   8016
     6    oxygen-16       endf/b-iv mat 1276             updated 10/13/89                      6
     7    kr-83           mt=102,103,103,105,106,107     updated 10/13/89                  36083
     8    kr-85             mt=  102                                                        36085
     9    sr-90           mt=102                         updated 10/13/89                  38090
    10     y-89           mt=102                         updated 10/13/89                  39089
    11    zr-93             mt=  102                                                      40093
    12    zr-94           mt=102                         updated 10/13/89                  40094
    13    zr-95           mt=102                         updated 10/13/89                  40095
    14    zircalloy       endf/b-iv mat 1284             updated 10/13/89                  40302
    15    nb-94           mt=102                         updated 10/13/89                  41094
    16    mo-95           mt=102                         updated 10/13/89                  42095
    17    tc-99           mt=102                         updated 10/13/89                  43099
    18    ru-101          mt=102                         updated 10/13/89                  44101
    19    ru-106          mt=102                         updated 10/13/89                  44106
    20    rh-103          mt=102                         updated 10/13/89                  45103
    21    rh-105            mt=  102                                                      45105
    22    pd-105          mt=102                         updated 10/13/89                  46105
    23    pd-108          mt=102                         updated 10/13/89                  46108
    24    silver-109      endf/b-iv mat 1139             updated 10/13/89                  47109
    25    sb-124          mt=102                         updated 10/13/89                  51124
    26    xe-131          mt=102,103,104,105,106         updated 10/13/89                  54131
    27    xe-132          mt=102,103,104,105,106         updated 10/13/89                  54132
    28    xenon-135       endf/b-iv mat 1294             updated 10/13/89                  54135
    29    xe-136            mt=  102, 103,  104,  105,  107                                 54136
    30    cesium-133      endf/b-iv mat 1141             updated 10/13/89                  55133
    31    cs-134          mt=102                         updated 10/13/89                  55134
    32    cs-135            mt=  102                                                      55135
    33    cs-137          mt=102                         updated 10/13/89                  55137
    34    ba-136          mt=102                         updated 10/13/89                  56136
    35    la-139          mt=102                         updated 10/13/89                  57139
    36    ce-144            mt=  102                                                      58144
    37    pr-141          mt=102,103,104,105,106,107     updated 10/13/89                  59141
    38    pr-143          mt=102                         updated 10/13/89                  59143
```

```
   39    nd-143          mt=102                          updated 10/13/89              60143
   40    nd-145          mt=102                          updated 10/13/89              60145
   41    nd-147          mt=102                          updated 10/13/89              60147
   42    pm-147          mt=102                          updated 10/13/89              61147
   43    pm-148             mt=  102                                                   61148
   44    sm-147          endf/b-v fission product        updated 10/13/89              62147
   45    sm-149          mt=102,105,107                  updated 10/13/89              62149
   46    sm-150          mt=102                          updated 10/13/89              62150
   47    sm-151          mt=102,103,104,105,106,107      updated 10/13/89              62151
   48    sm-152          mt=102,103,104,105,106,107      updated 10/13/89              62152
   49    eu-153          mt=102,103,104,105,106,107      updated 10/13/89              63153
   50    eu-154          mt=102,103,104,105,106,107      updated 10/13/89              63154
   51    eu-155          mt=102,103,104,105,106,107      updated 10/13/89              63155
   52    gd-155          mt=102                          updated 10/13/89              64155
   53   u-234 1043 sigo=5+4 newxlacs p-3 293k f-1/e-m(1.+5)                            92234
   54    uranium-235     endf/b-iv mat 1261              updated 10/13/89              92235
   55   u-236 1163 sigo=5+4 newxlacs p-3 293k f-1/e-m(1.+5)                            92236
   56    uranium-238     endf/b-iv mat 1262              updated 10/13/89              92238
   57    neptunium-237   endf/b-iv mat 1263              updated 10/13/89              93237
   58   pu-238 1050 sigo=5+4 newxlacs p-3 293k f-1/e-m(1.+5)                           94238
   59    plutonium-239   endf/b-iv mat 1264              updated 10/13/89              94239
   60    plutonium-240   endf/b-iv mat 1265              updated 10/13/89              94240
   61    plutonium-241   endf/b-iv mat 1266              updated 10/13/89              94241
   62    plutonium-242   endf/b-iv mat 1161              updated 10/13/89              94242
   63   am-241 1056 sigo=5+4 newxlacs 218ngp p-3 293k                                  95241
   64   am-243 1057 218 gp wt f-1/e-m 090376 p3 293k                                   95243
   65    curium-244      endf/b-iv mat 1162              updated 10/13/89              96244
01/v cross sections normalized to 1.0 at 0.0253 ev                          999    temperature=   975.00
0 hydrogen       endf/b-iv mat 1269/thrm1002    updated 10/13/89            1001    temperature=   607.60
                          thermal scattering matrix number  2 at a temperature of   550.00 was selected.
0b-10 1273 218ngp 042375 p-3 293k                                          5010    temperature=   607.60
                          thermal scattering matrix number  2 at a temperature of   550.00 was selected.
0 boron-11       endf/b-iv mat 1160          updated 10/13/89               5011    temperature=   607.60
                          thermal scattering matrix number  2 at a temperature of   550.00 was selected.
0 oxygen-16      endf/b-iv mat 1276          updated 10/13/89               8016    temperature=   975.00
0 oxygen-16      endf/b-iv mat 1276          updated 10/13/89                  6    temperature=   607.60
0 kr-83          mt=102,103,103,105,106,107  updated 10/13/89              36083    temperature=   975.00
0resonance data for this nuclide
0mass number (a)          =    82.202          temperature(kelvin)      =  975.000
0potential scatter sigma  =     7.004          lumped nuclear density   = 1.5718290E-07
0spin factor (g)          =  4988.190          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1    =    15.995            sigma(per absorber atom)= 1.0863758E+06
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2    =   237.953            sigma(per absorber atom)= 1.2120566E+06
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs         res fiss        res scat
  11      -7.007637E-05     .000000E+00   -1.064840E-04
  12       2.169233E-02     .000000E+00    9.918883E-03
  13      -5.551231E-02     .000000E+00   -2.178956E-02
  14       4.784844E-05     .000000E+00   -1.725850E-05
0excess resonance integrals
0                 resolved
0absorption      1.45215E+02
 fission          .00000E+00
-  elapsed time    .00 min.
0 kr-85             mt=  102                                               36085    temperature=   975.00
```

```
0 sr-90        mt=102                    updated 10/13/89          38090    temperature=  975.00
0 y-89         mt=102                    updated 10/13/89          39089    temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   88.142          temperature(kelvin)      =  975.000
0potential scatter sigma  =    3.644          lumped nuclear density   = 5.5999971E-07
0spin factor (g)          =   78.664          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             = .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1   =   15.995             sigma(per absorber atom)= 3.0492819E+05
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2   =  237.953             sigma(per absorber atom)= 3.4020478E+05
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs        res fiss       res scat
   9      1.147057E-06    .000000E+00    1.964017E-04
  10     -8.969451E-07    .000000E+00   -2.405887E-06
0excess resonance integrals
0                resolved
0absorption     1.46522E-01
 fission         .00000E+00
- elapsed time    .00 min.
0 zr-93          mt=  102                                            40093    temperature=  975.00
0 zr-94        mt=102                    updated 10/13/89          40094    temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   93.100          temperature(kelvin)      =  975.000
0potential scatter sigma  =    3.779          lumped nuclear density   = 1.9144359E-06
0spin factor (g)          =  180.853          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             = .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1   =   15.995             sigma(per absorber atom)= 8.9195828E+04
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2   =  237.953             sigma(per absorber atom)= 9.9514734E+04
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs        res fiss       res scat
   8      1.752696E-07    .000000E+00    1.280213E-04
   9     -2.632779E-06    .000000E+00   -2.404757E-04
0excess resonance integrals
0                resolved
0absorption     3.44332E-02
 fission         .00000E+00
- elapsed time    .00 min.
0 zr-95        mt=102                    updated 10/13/89          40095    temperature=  975.00
0 zircalloy    endf/b-iv mat 1284        updated 10/13/89          40302    temperature=  650.00
0resonance data for this nuclide
0mass number (a)          =   90.436          temperature(kelvin)      =  650.000
0potential scatter sigma  =    6.385          lumped nuclear density   = 4.2515602E-02
0spin factor (g)          =    1.079          lump dimension (a-bar)   = 5.4610002E-01
0inner radius             = 4.7878999E-01     dancoff correction (c)   = 5.0364637E-01
0the absorber will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs        res fiss       res scat
   8     -1.780596E-03    .000000E+00   -1.286907E+00
   9     -5.893373E-02    .000000E+00   -2.695297E+00
  10     -6.959985E-02    .000000E+00   -1.601321E+00
  11     -1.883957E-01    .000000E+00   -7.920912E-01
0excess resonance integrals
```

```
0                resolved
0absorption      2.28539E-01
 fission          .00000E+00
- elapsed time    .02 min.
0 rb-94          mt=102                    updated 10/13/89          41094     temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   93.101          temperature(kelvin)      =  975.000
0potential scatter sigma  =    3.779          lumped nuclear density   = 5.3619826E-13
0spin factor (g)          = 43808.801          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =   15.995          sigma(per absorber atom)= 3.1846371E+11
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =  237.933          sigma(per absorber atom)= 3.5530621E+11
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs         res fiss        res scat
  13      1.043534E-02     .000000E+00    9.254236E-04
  14      9.836719E-03     .000000E+00   -4.064797E-04
0excess resonance integrals
0                resolved
0absorption      9.15001E+01
 fission          .00000E+00
- elapsed time    .02 min.
0 mo-95          mt=102                    updated 10/13/89          42095     temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   94.091          temperature(kelvin)      =  975.000
0potential scatter sigma  =    3.806          lumped nuclear density   = 2.5028831E-07
0spin factor (g)          =  607.724          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =   15.995          sigma(per absorber atom)= 6.8225200E+05
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =  237.933          sigma(per absorber atom)= 7.6118050E+05
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs         res fiss        res scat
  10     -1.314701E-04     .000000E+00   -5.604130E-05
  11      9.917398E-05     .000000E+00   -1.432015E-04
  12     -6.555217E-02     .000000E+00   -7.786971E-02
  13      1.614598E-04     .000000E+00   -2.769205E-05
0excess resonance integrals
0                resolved
0absorption      1.03129E+02
 fission          .00000E+00
- elapsed time    .02 min.
0 tc-99          mt=102                    updated 10/13/89          43099     temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   98.150          temperature(kelvin)      =  975.000
0potential scatter sigma  =    6.000          lumped nuclear density   = 1.7770319E-06
0spin factor (g)          = 4527.940          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =   15.995          sigma(per absorber atom)= 9.6092641E+04
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =  237.933          sigma(per absorber atom)= 1.0720943E+05
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
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```
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs         res fiss        res scat
  11      -2.052939E-03     .000000E+00    -9.781914E-04
  12      -3.433435E-04     .000000E+00    -3.992052E-06
  13      -3.315390E-02     .000000E+00    -1.799115E-03
  14      -7.441444E-01     .000000E+00    -2.450169E-02
  15       1.072025E-02     .000000E+00    -5.412184E-04
  16       4.836158E-03     .000000E+00    -2.802598E-04
  17       2.074484E-04     .000000E+00    -1.191909E-05
0excess resonance integrals
0                 resolved
0absorption      3.34362E+02
 fission          .00000E+00
- elapsed time    .03 min.
0 ru-101        mt=102                    updated 10/13/89            44101     temperature=   975.00
0resonance data for this nuclide
0mass number (a)          =   100.039          temperature(kelvin)      =   975.000
0potential scatter sigma  =     3.965          lumped nuclear density   = 1.5672425E-06
0spin factor (g)          =  8785.290          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             = .0000000E+00       dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1    =    15.995            sigma(per absorber atom)= 1.0895549E+05
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2    =   237.933            sigma(per absorber atom)= 1.2156036E+05
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs         res fiss        res scat
  11      -3.530341E-02     .000000E+00    -3.627792E-03
  12       3.445391E-02     .000000E+00     1.698120E-03
  13      -3.580828E-02     .000000E+00    -9.759586E-04
  14       2.380160E-04     .000000E+00    -4.197040E-05
0excess resonance integrals
0                 resolved
0absorption      7.99648E+01
 fission          .00000E+00
- elapsed time    .03 min.
0 ru-106        mt=102                    updated 10/13/89            44106     temperature=   975.00
0 rh-103        mt=102                    updated 10/13/89            45103     temperature=   975.00
0resonance data for this nuclide
0mass number (a)          =   102.021          temperature(kelvin)      =   975.000
0potential scatter sigma  =     5.408          lumped nuclear density   = 4.5991399E-07
0spin factor (g)          =      .500          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             = .0000000E+00       dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1    =    15.995            sigma(per absorber atom)= 3.7128616E+05
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2    =   237.933            sigma(per absorber atom)= 4.1423959E+05
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs         res fiss        res scat
   9       1.322985E-03     .000000E+00     2.155805E-03
  10      -1.406820E-03     .000000E+00    -2.137499E-03
  11      -4.716894E-04     .000000E+00    -6.202842E-04
  12       5.042953E-05     .000000E+00    -1.266816E-05
  13        .000000E+00     .000000E+00     .000000E+00
  14        .000000E+00     .000000E+00     .000000E+00
  15       2.330871E-01     .000000E+00     3.442109E-03
  16       4.040019E+01     .000000E+00    -2.952411E-02
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  17      -1.811418E+02     .000000E+00   -1.294069E-01
  18       8.811710E+01     .000000E+00    2.621466E-01
  19       1.161939E+01     .000000E+00   -1.825308E-03
  20       1.097992E+00     .000000E+00   -2.562609E-03
  21       2.166123E-01     .000000E+00    1.924473E-03
  22       2.583952E-01     .000000E+00    2.928509E-03
  23      -9.881767E-02     .000000E+00    1.799271E-03
0excess resonance integrals
0                 resolved
0absorption      1.16621E+03
 fission          .00000E+00
-  elapsed time    .07 min.
0 rh-105          mt=  102                                          45105     temperature=  975.00
0 pd-105       mt=102                        updated 10/13/89       46105     temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   104.004          temperature(kelvin)      =   975.000
0potential scatter sigma  =     4.069          lumped nuclear density   = 3.665016/E-07
0spin factor (g)          = 15210.000          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995          sigma(per absorber atom)= 4.6591797E+05
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   237.933          sigma(per absorber atom)= 5.1981919E+05
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs         res fiss        res scat
  12      -4.449027E-02     .000000E+00   -3.682612E-04
  13       5.071309E-02     .000000E+00    4.354690E-04
  14       7.783609E-04     .000000E+00   -8.185214E-05
0excess resonance integrals
0                 resolved
0absorption      6.13337E+01
 fission          .00000E+00
-  elapsed time    .07 min.
0 pd-108       mt=102                        updated 10/13/89       46108     temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   106.977          temperature(kelvin)      =   975.000
0potential scatter sigma  =     4.146          lumped nuclear density   = 4.7424962E-08
0spin factor (g)          = 21175.100          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995          sigma(per absorber atom)= 3.6006290E+06
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   237.933          sigma(per absorber atom)= 4.0171793E+06
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs         res fiss        res scat
  11       1.170738E-04     .000000E+00    3.533151E-04
  12      -3.023156E-02     .000000E+00   -2.297723E-02
  13       6.979191E-03     .000000E+00    1.813166E-03
  14       8.561563E-02     .000000E+00   -3.205774E-05
  15      -1.840067E-01     .000000E+00    8.089946E-05
  16       2.946583E-04     .000000E+00   -9.255608E-06
0excess resonance integrals
0                 resolved
0absorption      2.14081E+02
 fission          .00000E+00
-  elapsed time    .07 min.
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0 silver-109     endf/b-iv mat 1139          updated 10/13/89          47109     temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   107.969          temperature(kelvin)      =   975.000
0potential scatter sigma  =     4.988          lumped nuclear density   = 2.9133252E-08
0spin factor (g)          =  1441.870          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995          sigma(per absorber atom)= 5.8613330E+06
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   237.933          sigma(per absorber atom)= 6.5394200E+06
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs         res fiss        res scat
  10      3.599254E-05     .000000E+00    8.195275E-05
  11      4.112723E-04     .000000E+00    2.005312E-04
  12     -6.966888E-01     .000000E+00   -3.053876E-02
  13      7.673391E-01     .000000E+00    3.380763E-02
  14      1.471428E-01     .000000E+00   -2.159336E-03
0excess resonance integrals
0                 resolved
0absorption      1.40385E+03
 fission          .00000E+00
-  elapsed time    .08 min.
0 sb-124         mt=102                      updated 10/13/89          51124     temperature=  975.00
0 xe-131         mt=102,103,104,105,106      updated 10/13/89          54131     temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   129.781          temperature(kelvin)      =   975.000
0potential scatter sigma  =     4.301          lumped nuclear density   = 7.4926834E-07
0spin factor (g)          =   266.825          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995          sigma(per absorber atom)= 2.2790192E+05
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   237.933          sigma(per absorber atom)= 2.5426748E+05
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs         res fiss        res scat
   9      9.295499E-08     .000000E+00    2.277645E-07
  10     -9.651885E-07     .000000E+00    8.448204E-06
  11     -1.101953E-04     .000000E+00   -1.165399E-04
  12     -3.101842E-03     .000000E+00   -2.983734E-04
  13     -6.808714E+00     .000000E+00   -1.607342E+01
  14      1.129630E-02     .000000E+00    1.579549E-02
0excess resonance integrals
0                 resolved
0absorption      8.32449E+02
 fission          .00000E+00
-  elapsed time    .08 min.
0 xe-132         mt=102,103,104,105,106      updated 10/13/89          54132     temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   130.771          temperature(kelvin)      =   975.000
0potential scatter sigma  =     4.301          lumped nuclear density   = 1.2684194E-06
0spin factor (g)          =   675.899          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995          sigma(per absorber atom)= 1.3462400E+05
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   237.933          sigma(per absorber atom)= 1.5019841E+05
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0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs          res fiss         res scat
   9      -1.566102E-06     .000000E+00    -4.532205E-06
  10      -5.907378E-04     .000000E+00    -7.536434E-03
  11       3.346802E-08     .000000E+00    -9.308126E-07
0excess resonance integrals
0                 resolved
0absorption      9.83393E-01
 fission          .00000E+00
- elapsed time    .08 min.
0 xenon-135     endf/b-iv mat 1294          updated 10/13/89              54135     temperature=  975.00
0 xe-136          mt=  102, 103, 104, 105, 107                            54136     temperature=  975.00
0 cesium-133    endf/b-iv mat 1141          updated 10/13/89              55133     temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   131.764          temperature(kelvin)      =   975.000
0potential scatter sigma  =     7.100          lumped nuclear density   = 1.8287258E-06
0spin factor (g)          =   374.437          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1    =    15.995            sigma(per absorber atom)= 9.3376414E+04
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2    =   238.051            sigma(per absorber atom)= 1.0015845E+05
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs          res fiss         res scat
   9      -8.437516E-06     .000000E+00     9.105389E-06
  10      -1.919221E-04     .000000E+00    -4.047224E-04
  11      -9.040843E-03     .000000E+00    -1.602248E-02
  12      -1.364221E-02     .000000E+00    -1.943838E-03
  13      -2.195588E-02     .000000E+00    -1.204872E-03
  14      -1.053674E+00     .000000E+00    -4.706611E-02
  15       5.631141E-03     .000000E+00    -4.066079E-04
  16       2.777963E-03     .000000E+00    -2.215676E-04
  17       2.352220E-03     .000000E+00    -1.830804E-04
  18       2.215081E-03     .000000E+00    -1.679524E-04
  19       1.316858E-03     .000000E+00    -9.664818E-05
0excess resonance integrals
0                 resolved
0absorption      3.66270E+02
 fission          .00000E+00
- elapsed time    .10 min.
0 cs-134        mt=102                      updated 10/13/89              55134     temperature=  975.00
0 cs-135          mt=  102                                                55135     temperature=  975.00
0 cs-137        mt=102                      updated 10/13/89              55137     temperature=  975.00
0 ba-136        mt=102                      updated 10/13/89              56136     temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   134.737          temperature(kelvin)      =   975.000
0potential scatter sigma  =     4.835          lumped nuclear density   = 2.1983582E-09
0spin factor (g)          =  1247.690          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1    =    15.995            sigma(per absorber atom)= 7.7676008E+07
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2    =   237.953            sigma(per absorber atom)= 8.6662208E+07
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
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0group       res abs        res fiss       res scat
  10      1.385397E-06     .000000E+00    6.006004E-07
  11      2.594320E-05     .000000E+00    2.223017E-05
0excess resonance integrals
0                  resolved
0absorption       1.38477E+00
 fission           .00000E+00
-  elapsed time    .10 min.
0 la-139        mt=102                    updated 10/13/89              57139    temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   137.713          temperature(kelvin)      =   975.000
0potential scatter sigma  =     4.906          lumped nuclear density   = 1.9145427E-06
0spin factor (g)          =   145.865          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             = .0000000E+00       dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1    =    15.995              sigma(per absorber atom)= 8.9190852E+04
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2    =   237.933              sigma(per absorber atom)= 9.9509180E+04
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs        res fiss       res scat
   9      5.121917E-05     .000000E+00    7.292469E-03
  10     -8.648757E-05     .000000E+00   -9.339951E-03
  11       .000000E+00     .000000E+00     .000000E+00
  12     -6.327806E-03     .000000E+00   -3.860514E-03
0excess resonance integrals
0                  resolved
0absorption       8.14388E+00
 fission           .00000E+00
-  elapsed time    .12 min.
0 ce-144          mt=  102                                                58144    temperature=  975.00
0 pr-141        mt=102,103,104,105,106,107    updated 10/13/89              59141    temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   139.697          temperature(kelvin)      =   975.000
0potential scatter sigma  =     4.953          lumped nuclear density   = 9.0762717E-07
0spin factor (g)          =  1026.500          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             = .0000000E+00       dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1    =    15.995              sigma(per absorber atom)= 1.8813859E+05
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2    =   237.933              sigma(per absorber atom)= 2.0990400E+05
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs        res fiss       res scat
  10     -3.350278E-04     .000000E+00   -1.134887E-02
  11     -5.860446E-03     .000000E+00   -7.827497E-02
  12     -7.141109E-05     .000000E+00   -5.150514E-06
0excess resonance integrals
0                  resolved
0absorption       1.22945E+01
 fission           .00000E+00
-  elapsed time    .12 min.
0 pr-143        mt=102                    updated 10/13/89              59143    temperature=  975.00
0 nd-143        mt=102                    updated 10/13/89              60143    temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   141.682          temperature(kelvin)      =   975.000
0potential scatter sigma  =     5.000          lumped nuclear density   = 1.3160375E-06
0spin factor (g)          =  1964.860          lump dimension (a-bar)   = 4.6812201E-01
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0inner radius            =  .0000000E+00          dancoff correction (c)    = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1     =   15.995               sigma(per absorber atom)= 1.2975291E+05
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2     =  237.933               sigma(per absorber atom)= 1.4476378E+05
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs          res fiss        res scat
  10      -1.795914E-05     .000000E+00    2.725170E-05
  11      -3.079928E-02     .000000E+00   -3.612095E-01
  12      -1.958079E-02     .000000E+00   -9.719688E-03
0excess resonance integrals
0                 resolved
0absorption      5.16188E+01
 fission          .00000E+00
- elapsed time    .12 min.
0 rd-145        mt=102                    updated 10/13/89            60145     temperature=   975.00
0resonance data for this nuclide
0mass number (a)         =  143.668              temperature(kelvin)      =   975.000
0potential scatter sigma =    5.047              lumped nuclear density   = 1.1702858E-06
0spin factor (g)         = 1007.250              lump dimension (a-bar)   = 4.6812201E-01
0inner radius            =  .0000000E+00         dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1     =   15.995              sigma(per absorber atom)= 1.4591281E+05
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2     =  237.933              sigma(per absorber atom)= 1.6279319E+05
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs          res fiss        res scat
  10      -3.951190E-04     .000000E+00   -6.503459E-03
  11      -7.208139E-03     .000000E+00   -2.112537E-02
  12      -1.811622E-01     .000000E+00   -1.149293E+00
  13       9.661075E-05     .000000E+00    2.032320E-04
  14      -1.255845E-01     .000000E+00   -3.369452E-03
  15       5.915707E-03     .000000E+00   -4.636812E-04
  16       1.326696E-03     .000000E+00   -1.451393E-04
  17       9.642720E-04     .000000E+00   -1.064030E-04
  18       8.539658E-04     .000000E+00   -9.313533E-05
  19       7.634105E-04     .000000E+00   -8.069882E-05
  20       2.839218E-05     .000000E+00   -2.919774E-06
0excess resonance integrals
0                 resolved
0absorption      2.09875E+02
 fission          .00000E+00
- elapsed time    .13 min.
0 rd-147        mt=102                    updated 10/13/89            60147     temperature=   975.00
0 pm-147        mt=102                    updated 10/13/89            61147     temperature=   975.00
0resonance data for this nuclide
0mass number (a)         =  145.653              temperature(kelvin)      =   975.000
0potential scatter sigma =    5.093              lumped nuclear density   = 5.2525246E-07
0spin factor (g)         = 21589.500             lump dimension (a-bar)   = 4.6812201E-01
0inner radius            =  .0000000E+00         dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1     =   15.995              sigma(per absorber atom)= 3.2510022E+05
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2     =  237.933              sigma(per absorber atom)= 3.6271047E+05
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
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```
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs         res fiss        res scat
  12       -2.040409E-02     .000000E+00    -7.208586E-03
  13       -5.404604E-03     .000000E+00    -5.833069E-04
  14       -1.221971E+01     .000000E+00    -5.349689E+00
  15        4.140149E-02     .000000E+00     6.998098E-03
  16        1.698019E-02     .000000E+00     1.746873E-03
  17        1.369755E-02     .000000E+00     1.150426E-03
  18        1.253780E-02     .000000E+00     9.649097E-04
  19        6.999617E-04     .000000E+00     5.070222E-05
0excess resonance integrals
0                 resolved
0absorption      2.10647E+03
 fission          .00000E+00
- elapsed time    .13 min.
0 pm-148          mt=  102                                          61148     temperature=  975.00
0 sm-147        endf/b-v fission product       updated 10/13/89     62147     temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   145.653          temperature(kelvin)      =   975.000
0potential scatter sigma  =     5.093          lumped nuclear density   = 1.3014213E-08
0spin factor (g)          =      .000          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995          sigma(per absorber atom)= 1.3121015E+07
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   237.933          sigma(per absorber atom)= 1.4638962E+07
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs         res fiss        res scat
  11        2.967257E-01     .000000E+00     1.149734E+00
  12        1.258913E+00     .000000E+00    -1.239840E+00
  13       -1.807624E+00     .000000E+00    -4.074593E-01
  14       -6.597064E-02     .000000E+00     1.964657E-03
  15        3.121567E-01     .000000E+00    -1.931211E-03
  16        7.287992E-03     .000000E+00    -3.738814E-04
  17        4.281415E-03     .000000E+00    -2.401535E-04
  18        3.510378E-03     .000000E+00    -1.997170E-04
  19        2.910571E-03     .000000E+00    -1.649401E-04
  20        8.435346E-04     .000000E+00    -4.627653E-05
0excess resonance integrals
0                 resolved
0absorption      7.25125E+02
 fission          .00000E+00
- elapsed time    .15 min.
                          thermal scattering matrix number  3 at a temperature of   900.03 was selected.
0 sm-149        mt=102,103,107          updated 10/13/89     62149     temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   147.638          temperature(kelvin)      =   975.000
0potential scatter sigma  =     3.260          lumped nuclear density   = 6.3574589E-08
0spin factor (g)          = 10407.900          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995          sigma(per absorber atom)= 2.6859740E+06
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   237.933          sigma(per absorber atom)= 2.9967095E+06
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs         res fiss        res scat
```

```
  11      8.546689E-03     .000000E+00    3.071200E-02
  12     -5.072578E-02     .000000E+00   -1.737960E-01
  13      2.521316E-02     .000000E+00    3.150472E-03
  14      2.713762E-02     .000000E+00   -5.009187E-03
0excess resonance integrals
0                resolved
0absorption      8.04371E+02
 fission          .00000E+00
- elapsed time    .15 min.
0 sm-150        mt=102                    updated 10/13/89          62150     temperature=   975.00
0resonance data for this nuclide
0mass number (a)          =   148.629          temperature(kelvin)      =   975.000
0potential scatter sigma  =     5.162          lumped nuclear density   = 2.6025995E-07
0spin factor (g)          =  4376.420          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995              sigma(per absorber atom)= 6.5611206E+05
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   237.953              sigma(per absorber atom)= 7.3201660E+05
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs          res fiss        res scat
  10     -1.683061E-04     .000000E+00   -1.037995E-03
  11     -1.614389E-03     .000000E+00   -2.032840E-02
  12     -4.965373E-03     .000000E+00   -1.511098E-03
  13     -4.439732E-01     .000000E+00   -3.559171E-01
  14      1.066893E-04     .000000E+00   -6.433339E-05
0excess resonance integrals
0                resolved
0absorption      2.94529E+02
 fission          .00000E+00
- elapsed time    .15 min.
0 sm-151        mt=102,103,104,105,106,107    updated 10/13/89          62151     temperature=   975.00
0resonance data for this nuclide
0mass number (a)          =   149.623          temperature(kelvin)      =   975.000
0potential scatter sigma  =     5.185          lumped nuclear density   = 1.0395211E-07
0spin factor (g)          = 75574.703          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995              sigma(per absorber atom)= 1.6429926E+06
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   237.953              sigma(per absorber atom)= 1.8330675E+06
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs          res fiss        res scat
  14     -5.597873E-02     .000000E+00   -1.154314E-02
  15      1.502008E+01     .000000E+00    7.627277E-02
  16     -2.169632E+01     .000000E+00   -6.130017E-02
  17      1.743943E+02     .000000E+00    8.344538E-01
  18     -3.199297E+02     .000000E+00   -1.775551E+00
  19      6.259717E+01     .000000E+00    3.869825E-01
  20      1.142084E+00     .000000E+00   -1.454869E-04
  21     -7.117520E-02     .000000E+00    1.244099E-02
  22      6.952579E-02     .000000E+00    3.838905E-03
  23     -1.091952E-02     .000000E+00    3.374090E-04
0excess resonance integrals
0                resolved
0absorption      2.05794E+03
```

```
 fission          .00000E+00
- elapsed time    .15 min.
0 sm-152        mt=102,103,104,105,106,107     updated 10/13/89              62152     temperature=   975.00
0resonance data for this nuclide
0mass number (a)          =   150.615              temperature(kelvin)       =   975.000
0potential scatter sigma  =     5.208              lumped nuclear density    = 1.1669065E-07
0spin factor (g)          =   863.594              lump dimension (a-bar)    = 4.6812201E-01
0inner radius             =  .0000000E+00          dancoff correction (c)    = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1    =    15.995              sigma(per absorber atom)= 1.4633536E+06
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2    =   237.933              sigma(per absorber atom)= 1.6326464E+06
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs          res fiss         res scat
   9       2.403188E-06     .000000E+00     1.159107E-04
  10      -6.514952E-06     .000000E+00    -7.579467E-04
  11      -8.335952E-04     .000000E+00    -3.378294E-03
  12      -7.662735E-03     .000000E+00    -2.555129E-02
  13       4.286544E-02     .000000E+00     1.043012E-01
  14      -8.078294E+00     .000000E+00    -1.606656E+01
0excess resonance integrals
0                 resolved
0absorption      2.8999E+03
 fission          .00000E+00
- elapsed time    .17 min.
0 eu-153        mt=102,103,104,105,106,107     updated 10/13/89              63153     temperature=   975.00
0resonance data for this nuclide
0mass number (a)          =   151.607              temperature(kelvin)       =   975.000
0potential scatter sigma  =     9.731              lumped nuclear density    = 5.5470167E-08
0spin factor (g)          =  12265.900             lump dimension (a-bar)    = 4.6812201E-01
0inner radius             =  .0000000E+00          dancoff correction (c)    = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1    =    15.995              sigma(per absorber atom)= 3.0784060E+06
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2    =   237.933              sigma(per absorber atom)= 3.4345413E+06
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs          res fiss         res scat
  12      -2.597126E-01     .000000E+00    -5.056223E-02
  13      -2.789283E-02     .000000E+00     2.309569E-03
  14      -4.507691E-01     .000000E+00     5.321742E-03
  15       3.539744E+00     .000000E+00    -1.128380E-02
  16      -3.288790E+00     .000000E+00     8.160900E-03
  17       1.505626E-01     .000000E+00    -3.437863E-03
  18       7.726877E-02     .000000E+00    -2.231234E-03
  19       5.055485E-02     .000000E+00    -1.541142E-03
  20      -1.253799E-01     .000000E+00    -1.275125E-03
0excess resonance integrals
0                 resolved
0absorption      1.3565OE+03
 fission          .00000E+00
- elapsed time    .18 min.
0 eu-154        mt=102,103,104,105,106,107     updated 10/13/89              63154     temperature=   975.00
0resonance data for this nuclide
0mass number (a)          =   152.601              temperature(kelvin)       =   975.000
0potential scatter sigma  =     9.731              lumped nuclear density    = 1.6191551E-09
0spin factor (g)          = 19135.801              lump dimension (a-bar)    = 4.6812201E-01
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0inner radius            = .0000000E+00          dancoff correction (c)    = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1     =    15.995             sigma(per absorber atom)= 1.0546222E+08
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2     =   237.953             sigma(per absorber atom)= 1.1766295E+08
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs          res fiss        res scat
  12      -3.844891E-01     .000000E+00    -6.008866E-02
  13      -2.935247E-01     .000000E+00    -2.422147E-02
  14       3.601668E-01     .000000E+00     1.521403E-02
  15       2.296982E-01     .000000E+00     2.126992E-02
  16       7.321141E+00     .000000E+00     9.281098E-02
  17      -1.436011E+02     .000000E+00    -1.894634E+00
  18       1.138777E+02     .000000E+00     1.860143E+00
  19      -1.014543E+02     .000000E+00     1.187191E+00
0excess resonance integrals
0                 resolved
0absorption      2.13732E+03
 fission          .00000E+00
- elapsed time    .18 min.
0 eu-155        mt=102,103,104,105,106,107    updated 10/13/89          63155    temperature=  975.00
0 gd-155        mt=102                        updated 10/13/89          64155    temperature=  975.00
0resonance data for this nuclide
0mass number (a)         =   153.592            temperature(kelvin)      =   975.000
0potential scatter sigma =     5.277            lumped nuclear density   = 1.0292096E-10
0spin factor (g)         = 12700.100            lump dimension (a-bar)   = 4.6812201E-01
0inner radius            = .0000000E+00         dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1     =    15.995            sigma(per absorber atom)= 1.6591342E+09
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2     =   237.953            sigma(per absorber atom)= 1.8510764E+09
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs          res fiss        res scat
  12      -1.439253E+00     .000000E+00    -1.839414E-01
  13       1.541435E+00     .000000E+00     1.985424E-01
  14       2.192417E-01     .000000E+00     9.810260E-03
  15      -3.289537E-01     .000000E+00     4.624879E-05
  16       1.477360E+00     .000000E+00    -4.148879E-03
  17       1.568659E-01     .000000E+00    -1.479158E-03
  18       9.605154E-02     .000000E+00    -1.078060E-03
  19       6.295321E-02     .000000E+00    -8.026883E-04
  20       1.670435E-02     .000000E+00     1.626720E-04
  21        .000000E+00     .000000E+00      .000000E+00
  22        .000000E+00     .000000E+00      .000000E+00
  23        .000000E+00     .000000E+00      .000000E+00
  24        .000000E+00     .000000E+00      .000000E+00
  25      -2.127644E+03     .000000E+00    -1.621878E+00
  26      -5.205572E+03     .000000E+00     1.961425E+00
  27      -1.659929E+03     .000000E+00     7.392391E-01
0excess resonance integrals
0                 resolved
0absorption      3.97085E+04
 fission          .00000E+00
- elapsed time    .20 min.
0u-234 1043 sigo=5+4 new+acs p-3 293k f-1/e-m(1.+5)                 92234    temperature=  975.00
0resonance data for this nuclide
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```
0mass number (a)          =   232.029          temperature(kelvin)      =   975.000
0potential scatter sigma  =    10.021          lumped nuclear density   = 5.4537390E-06
0spin factor (g)          =  6948.450          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995          sigma(per absorber atom)= 3.1310574E+04
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   237.955          sigma(per absorber atom)= 3.4922141E+04
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs         res fiss        res scat
  11     -2.611689E-02    .000000E+00   -7.612181E-02
  12     -2.126682E-01    .000000E+00   -8.919328E-02
  13      7.759202E-04    .000000E+00   -6.469444E-04
  14     -2.071877E+01    .000000E+00   -3.392051E+00
0excess resonance integrals
0                resolved
0absorption     5.79095E+02
 fission         .00000E+00
- elapsed time    .20 min.
0 uranium-235   endf/b-iv mat 1261          updated 10/13/89          92235    temperature=   975.00
0resonance data for this nuclide
0mass number (a)          =   233.025          temperature(kelvin)      =   975.000
0potential scatter sigma  =    11.500          lumped nuclear density   = 6.5764709E-04
0spin factor (g)          = 15171.100          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995          sigma(per absorber atom)= 2.5985250E+02
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   238.049          sigma(per absorber atom)= 2.7865057E+02
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs         res fiss        res scat
  12     -2.678189E+00   -1.667779E+00   -6.244083E-02
  13     -9.037070E+00   -4.490606E+00   -1.940758E-01
  14     -7.249037E+00   -4.421912E+00   -4.915668E-02
0excess resonance integrals
0                resolved
0absorption     2.05799E+02
 fission        1.22777E+02
- elapsed time    .22 min.
0u-236 1163 sigo=5+4 newxlacs p-3 293k f-1/e-m(1.+5)          92236    temperature=   975.00
0resonance data for this nuclide
0mass number (a)          =   234.017          temperature(kelvin)      =   975.000
0potential scatter sigma  =    10.995          lumped nuclear density   = 9.3700974E-06
0spin factor (g)          =  6528.490          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995          sigma(per absorber atom)= 1.8223898E+04
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   237.934          sigma(per absorber atom)= 2.0328641E+04
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs         res fiss        res scat
  11     -4.831673E-02    .000000E+00   -1.159986E-01
  12     -2.168180E-01    .000000E+00   -1.716520E-01
  13     -5.450143E-02    .000000E+00   -3.220878E-03
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  14      -9.747294E+00     .000000E+00   -8.535867E-01
0excess resonance integrals
0                  resolved
0absorption       3.21073E+02
 fission           .00000E+00
-  elapsed time     .22 min.
0 uranium-238   endf/b-iv mat 1262            updated 10/13/89            92238     temperature=   975.00
0resonance data for this nuclide
0mass number (a)          =   236.006              temperature(kelvin)      =   975.000
0potential scatter sigma  =    10.599              lumped nuclear density   = 2.2047726E-02
0spin factor (g)          =   656.527              lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00          dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995              sigma(per absorber atom)= 7.7450018E+00
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   235.041              sigma(per absorber atom)= 3.3347785E-01
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs          res fiss         res scat
   9      -3.951845E-02     .000000E+00   -4.057914E-01
  10      -1.027710E+00   -1.758559E-05   -6.491040E+00
  11      -9.712980E+00     .000000E+00   -2.690844E+01
  12      -4.305748E+01     .000000E+00   -4.999686E+01
  13      -5.402344E+01     .000000E+00   -1.769432E+01
  14      -1.045185E+02     .000000E+00   -6.060695E+00
0excess resonance integrals
0                  resolved
0absorption       1.79540E+01
 fission          5.03833E-04
-  elapsed time     .23 min.
0 neptunium-237  endf/b-iv mat 1263            updated 10/13/89            93237     temperature=   975.00
0resonance data for this nuclide
0mass number (a)          =   235.012              temperature(kelvin)      =   975.000
0potential scatter sigma  =    10.500              lumped nuclear density   = 1.4503298E-07
0spin factor (g)          = 10100.800              lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00          dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995              sigma(per absorber atom)= 1.1773851E+06
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   238.051              sigma(per absorber atom)= 1.2628999E+06
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs          res fiss         res scat
  11      -6.300456E-02   -1.849998E-06   -7.370356E-03
  12       4.587611E-02   -7.972195E-05    9.659518E-03
  13       4.458425E-02    9.277667E-05    1.734402E-03
  14       1.792238E-02    1.408681E-06   -5.424600E-04
0excess resonance integrals
0                  resolved
0absorption       2.95257E+02
 fission          1.38610E-01
-  elapsed time     .27 min.
0pu-238 1050 sigo=5+4 newklacs p-3 293k f-1/e-m(1.+5)                          94238     temperature=   975.00
0resonance data for this nuclide
0mass number (a)          =   236.167              temperature(kelvin)      =   975.000
0potential scatter sigma  =    10.890              lumped nuclear density   = 1.7291568E-09
0spin factor (g)          = 13130.600              lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00          dancoff correction (c)   = 3.4269261E-01
```

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0the absorber will be treated by the nordheim integral method.
0mass of moderator-1    =    15.995              sigma(per absorber atom)= 9.875315E+07
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2    =   238.051              sigma(per absorber atom)= 1.059257E+08
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs        res fiss       res scat
  11      4.118560E-04   7.149554E-05   3.085266E-04
  12      3.330833E-04   4.031993E-05   1.176153E-04
  13      4.169017E-01   7.581078E-02  -9.008851E-03
  14     -3.821986E-01  -6.987093E-02   8.538968E-03
0excess resonance integrals
0              resolved
0absorption   8.25559E+01
 fission      9.08580E+00
-  elapsed time    .27 min.
0 plutonium-239  endf/b-iv mat 1264          updated 10/13/89          94239     temperature=   975.00
0resonance data for this nuclide
0mass number (a)        =   236.999          temperature(kelvin)      =   975.000
0potential scatter sigma =    10.200         lumped nuclear density   = 1.5953416E-05
0spin factor (g)        =  6435.710          lump dimension (a-bar)   = 4.6812201E-01
0inner radius           =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1    =    15.995              sigma(per absorber atom)= 1.070364E+04
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2    =   238.051              sigma(per absorber atom)= 1.148106E+04
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs        res fiss       res scat
  11     -3.307465E-02  -1.302456E-02  -1.037173E-02
  12     -3.050663E-01  -1.139565E-01  -4.043588E-02
  13     -1.019066E+00  -6.017618E-01  -1.484912E-02
  14     -3.148845E-01  -1.654496E-01  -3.384406E-03
0excess resonance integrals
0              resolved
0absorption   3.17688E+02
 fission      1.78181E+02
-  elapsed time    .28 min.
0 plutonium-240  endf/b-iv mat 1265          updated 10/13/89          94240     temperature=   975.00
0resonance data for this nuclide
0mass number (a)        =   237.992          temperature(kelvin)      =   975.000
0potential scatter sigma =    10.599         lumped nuclear density   = 4.3919763E-07
0spin factor (g)        =   669.244          lump dimension (a-bar)   = 4.6812201E-01
0inner radius           =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1    =    15.995              sigma(per absorber atom)= 3.887991E+05
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2    =   238.051              sigma(per absorber atom)= 4.170580E+05
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs        res fiss       res scat
   9     -1.008772E-05   1.570376E-07   5.930599E-05
  10     -4.365462E-05  -3.644221E-06  -2.292318E-04
  11     -2.966929E-03  -1.695186E-05  -4.080089E-03
  12     -4.489477E-02  -2.454242E-04  -4.435376E-02
  13     -4.563926E-03  -2.798445E-05  -3.368801E-04
  14      .000000E+00    .000000E+00    .000000E+00
```

```
  15      1.759898E-02   3.358843E-06   3.504733E-03
  16      3.373545E+00   6.438560E-04   4.311619E-01
  17      5.702000E+02   1.088252E-01   5.169532E+01
  18     -2.762740E+03  -5.272812E-01  -2.215981E+02
  19      1.044371E+03   1.995229E-01   7.936591E+01
  20     -9.244925E+01  -1.764435E-02   1.799040E+00
0excess resonance integrals
0                resolved
0absorption     8.26108E+03
 fission        2.60355E+00
- elapsed time    .30 min.
0 plutonium-241  endf/b-iv mat 1266          updated 10/13/89            94241     temperature=   975.00
0resonance data for this nuclide
0mass number (a)         =   238.978          temperature(kelvin)      =   975.000
0potential scatter sigma =    10.939          lumped nuclear density   = 3.2676517E-08
0spin factor (g)         = 16402.100          lump dimension (a-bar)   = 4.6812201E-01
0inner radius            = .0000000E+00       dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1     =   15.995           sigma(per absorber atom)= 5.2257610E+06
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2     =   238.051          sigma(per absorber atom)= 5.6053140E+06
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs        res fiss       res scat
  12      1.372528E-02   1.225321E-02   6.796907E-04
  13     -2.650113E-02  -2.718522E-02  -1.892098E-03
  14      6.810925E-02   6.103687E-02   1.410021E-03
  15      1.801013E-02   1.614665E-02  -4.699224E-04
0excess resonance integrals
0                resolved
0absorption     5.09537E+02
 fission        4.27107E+02
- elapsed time    .32 min.
0 plutonium-242  endf/b-iv mat 1161          updated 10/13/89            94242     temperature=   975.00
0resonance data for this nuclide
0mass number (a)         =   240.145          temperature(kelvin)      =   975.000
0potential scatter sigma =    10.694          lumped nuclear density   = 2.8698505E-10
0spin factor (g)         = 6606.710           lump dimension (a-bar)   = 4.6812201E-01
0inner radius            = .0000000E+00       dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1     =   15.995           sigma(per absorber atom)= 5.9501248E+08
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2     =   238.051          sigma(per absorber atom)= 6.3822893E+08
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs        res fiss       res scat
  11      1.679452E-04   .000000E+00    2.904724E-04
  12      1.326794E-03   .000000E+00    1.980113E-03
  13      1.259602E-04   .000000E+00    4.977790E-06
  14      8.150859E-02   .000000E+00    1.527816E-02
  15      5.440519E-01   .000000E+00    5.107752E-03
  16      4.034123E-02   .000000E+00   -3.459572E-03
  17      1.550421E-02   .000000E+00   -1.848309E-03
  18      1.112563E-02   .000000E+00   -1.430716E-03
0excess resonance integrals
0                resolved
0absorption     1.11244E+03
 fission         .00000E+00
```

```
- elapsed time    .32 min.
0am-241 1056 sigp=5+4 newklacs 218ngp p-3 295k                    95241    temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   238.950          temperature(kelvin)      =   975.000
0potential scatter sigma  =     9.511          lumped nuclear density   = 8.4826070E-11
0spin factor (g)          = 82058.203          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =   15.995           sigma(per absorber atom)= 2.0130566E+09
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   238.051          sigma(per absorber atom)= 2.1592673E+09
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs          res fiss         res scat
  13      4.924914E-01     1.213001E-02     4.968112E-03
  14     -4.283253E-01    -1.106702E-02    -4.417265E-03
0excess resonance integrals
0                 resolved
0absorption      1.93478E+02
 fission         1.07615E+00
-  elapsed time    .32 min.
0am-243 1057 218 gp wt f-1/e-m 090376 p3 295k                     95243    temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   240.940          temperature(kelvin)      =   975.000
0potential scatter sigma  =     9.511          lumped nuclear density   = 1.7620729E-12
0spin factor (g)          = 82052.602          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =   15.995           sigma(per absorber atom)= 9.6908411E+10
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   238.051          sigma(per absorber atom)= 1.0394698E+11
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs          res fiss         res scat
  13     -6.599347E-03     .000000E+00     4.388259E-04
  14      2.233646E-02     .000000E+00     2.374189E-04
0excess resonance integrals
0                 resolved
0absorption      1.60152E+02
 fission          .00000E+00
-  elapsed time    .32 min.
0 curium-244     endf/b-iv mat 1162          updated 10/13/89      96244    temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   242.133          temperature(kelvin)      =   975.000
0potential scatter sigma  =    10.320          lumped nuclear density   = 1.1760777E-14
0spin factor (g)          =  5251.150          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =   15.995           sigma(per absorber atom)= 1.4519421E+13
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   238.051          sigma(per absorber atom)= 1.5573983E+13
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs          res fiss         res scat
  11      2.589377E-04     7.085153E-06     3.064264E-04
  12      7.070909E-04     3.316986E-05     1.405958E-04
  13      2.721885E-03     1.336778E-04     7.128943E-04
```

```
  14       8.471698E-02    5.068537E-03    1.607083E-02
0excess resonance integrals
0                resolved
0absorption       6.13904E+02
 fission          3.54222E+01
-  elapsed time     .33 min.
-  elapsed time     .33 min.
1     this xsdrn working tape was created 02/16/96 at 09:55:49
      the title of the parent case is as follows
      scale 4.2 - 27 group neutron burnup library
        based on endf-b version 4 data with endf-b version 5 fission products
          compiled for nrc     1/27/89
         tape id                          4321        number of nuclides              65
         number of neutron groups           27        number of gamma groups           0
         first thermal group                15        logical unit                     4
                                  table of contents
       1/v cross sections normalized to 1.0 at 0.0253 ev                          id    999
        hydrogen        endf/b-iv mat 1269/thrml002    updated 10/13/89           id   1001
       b-10 1273 218ngp 042375 p-3 293k                                           id   5010
        boron-11        endf/b-iv mat 1160             updated 10/13/89           id   5011
        oxygen-16       endf/b-iv mat 1276             updated 10/13/89           id   8016
        oxygen-16       endf/b-iv mat 1276             updated 10/13/89           id      6
        kr-83           mt=102,103,103,105,106,107     updated 10/13/89           id  36083
        kr-85             mt=  102                                                 id  36085
        sr-90           mt=102                         updated 10/13/89           id  38090
         y-89           mt=102                         updated 10/13/89           id  39089
        zr-93             mt=  102                                                 id  40093
        zr-94           mt=102                         updated 10/13/89           id  40094
        zr-95           mt=102                         updated 10/13/89           id  40095
        zircalloy       endf/b-iv mat 1284             updated 10/13/89           id  40302
        nb-94           mt=102                         updated 10/13/89           id  41094
        mo-95           mt=102                         updated 10/13/89           id  42095
        tc-99           mt=102                         updated 10/13/89           id  43099
        ru-101          mt=102                         updated 10/13/89           id  44101
        ru-106          mt=102                         updated 10/13/89           id  44106
        rh-103          mt=102                         updated 10/13/89           id  45103
        rh-105            mt=  102                                                 id  45105
        pd-105          mt=102                         updated 10/13/89           id  46105
        pd-108          mt=102                         updated 10/13/89           id  46108
        silver-109      endf/b-iv mat 1139             updated 10/13/89           id  47109
        sb-124          mt=102                         updated 10/13/89           id  51124
        xe-131          mt=102,103,104,105,106         updated 10/13/89           id  54131
        xe-132          mt=102,103,104,105,106         updated 10/13/89           id  54132
        xenon-135       endf/b-iv mat 1294             updated 10/13/89           id  54135
        xe-136            mt=  102, 103, 104, 105, 107                           id  54136
        cesium-133      endf/b-iv mat 1141             updated 10/13/89           id  55133
        cs-134          mt=102                         updated 10/13/89           id  55134
        cs-135            mt=  102                                                 id  55135
        cs-137          mt=102                         updated 10/13/89           id  55137
        ba-136          mt=102                         updated 10/13/89           id  56136
        la-139          mt=102                         updated 10/13/89           id  57139
        ce-144            mt=  102                                                 id  58144
        pr-141          mt=102,103,104,105,106,107     updated 10/13/89           id  59141
        pr-143          mt=102                         updated 10/13/89           id  59143
        nd-143          mt=102                         updated 10/13/89           id  60143
        nd-145          mt=102                         updated 10/13/89           id  60145
        nd-147          mt=102                         updated 10/13/89           id  60147
        pm-147          mt=102                         updated 10/13/89           id  61147
        pm-148            mt=  102                                                 id  61148
        sm-147          endf/b-v fission product       updated 10/13/89           id  62147
```

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        sm-149          mt=102,103,107                  updated 10/13/89            id    62149
        sm-150          mt=102                          updated 10/13/89            id    62150
        sm-151          mt=102,103,104,105,106,107      updated 10/13/89            id    62151
        sm-152          mt=102,103,104,105,106,107      updated 10/13/89            id    62152
        eu-153          mt=102,103,104,105,106,107      updated 10/13/89            id    63153
        eu-154          mt=102,103,104,105,106,107      updated 10/13/89            id    63154
        eu-155          mt=102,103,104,105,106,107      updated 10/13/89            id    63155
        gd-155          mt=102                          updated 10/13/89            id    64155
       u-234 1043 sigo=5+4 newxlacs p-3 293k f-1/e-m(1.+5)                         id    92234
        uranium-235     endf/b-iv mat 1261              updated 10/13/89            id    92235
       u-236 1163 sigo=5+4 newxlacs p-3 293k f-1/e-m(1.+5)                         id    92236
        uranium-238     endf/b-iv mat 1262              updated 10/13/89            id    92238
        neptunium-237   endf/b-iv mat 1263              updated 10/13/89            id    93237
       pu-238 1050 sigo=5+4 newxlacs p-3 293k f-1/e-m(1.+5)                        id    94238
        plutonium-239   endf/b-iv mat 1264              updated 10/13/89            id    94239
        plutonium-240   endf/b-iv mat 1265              updated 10/13/89            id    94240
        plutonium-241   endf/b-iv mat 1266              updated 10/13/89            id    94241
        plutonium-242   endf/b-iv mat 1161              updated 10/13/89            id    94242
       am-241 1056 sigo=5+4 newxlacs 218ngp p-3 293k                               id    95241
       am-243 1057 218 gp wt f-1/e-m 090376 p3 293k                                id    95243
        curium-244      endf/b-iv mat 1162              updated 10/13/89            id    96244
0        tape copy used      0 i/o's, and took     .00 seconds
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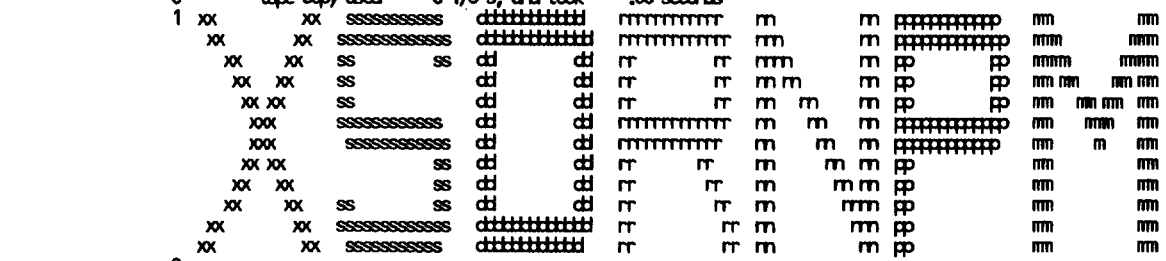

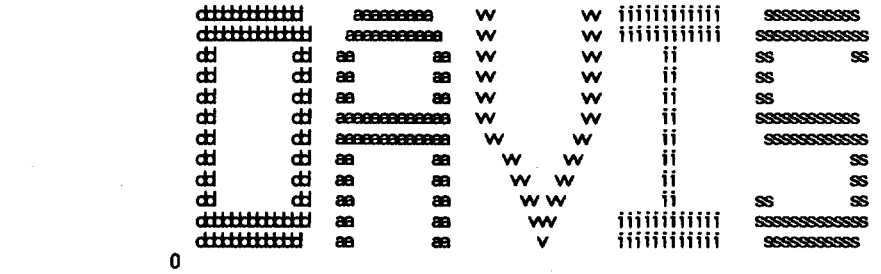

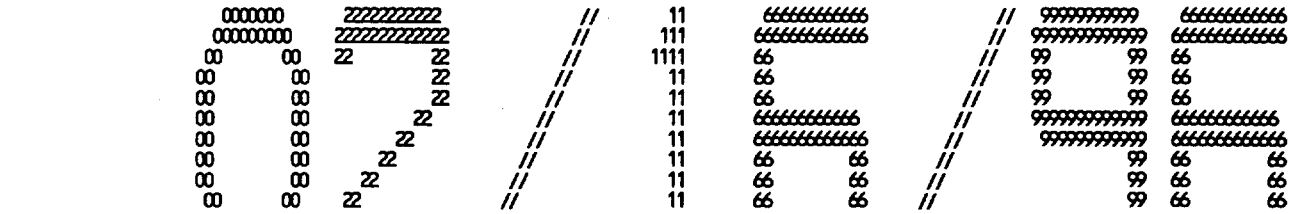

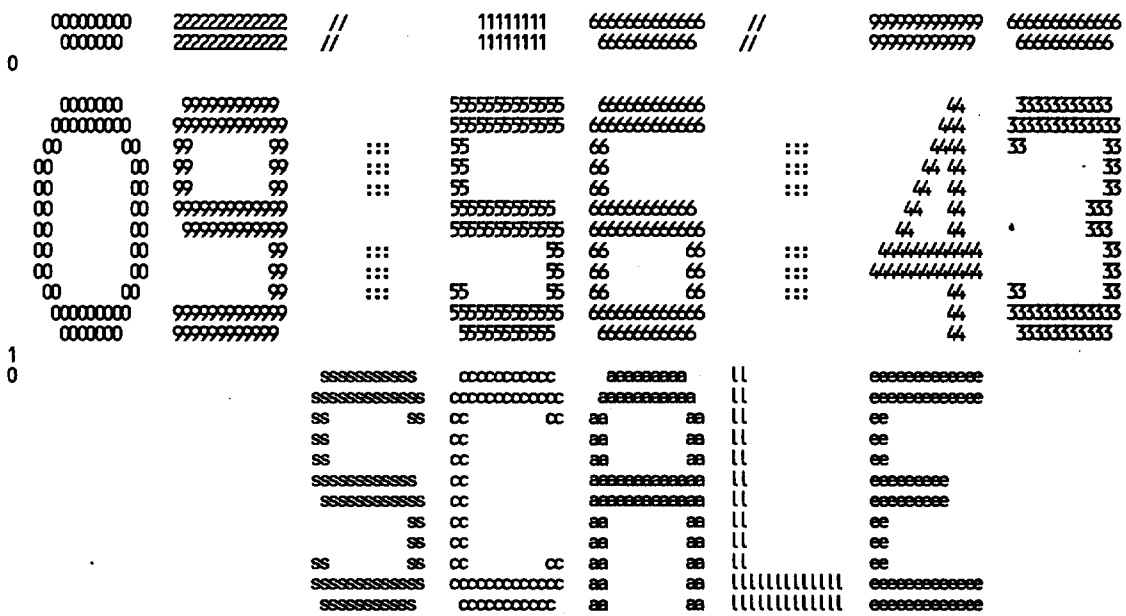

program verification information

code system: scale version: 4.2

program: c0c001

creation date: 04/27/95

library: /neutronics/scale/exe

this is not a scale configuration controlled code

jobname: davis

date of execution: 02/16/96

time of execution: 09:56:43

```
                    *****                                                    *****
                    *****                                                    *****
                    ************************************************************
                    ************************************************************
                    ************************************************************
1
                    80 d, sas2h: babcock wilcox 15x15, 3.00wt%, 20gwd/mtu burn high temp
0      -1q array has      1 entries.
0       1q array has     15 entries.
0       2q array has     10 entries.
0       3q array has     12 entries.
0       4q array has      9 entries.
0       5q array has     12 entries.
0direct access unit   9 requires     12 blocks of length  704 for cross section mixing.
1                    80 d, sas2h: babcock wilcox 15x15, 3.00wt%, 20gwd/mtu burn high temp
0general problem description data block
0                              general problem data

 ige  1/2/3 = plane/cylinder/sphere      2        isn  quadrature order                  8
 izm  number of zones                    4        isct order of scattering               3
 im   number of special intervals       24        ievt 0/1/2/3/4/5/6=q/k/alpha/c/z/r/h   1
 ibl  0/1/2/3 = vacuum/refl/per/white    1        iim  inner iteration maximum         20
 ibr  right boundary condition           3        iom  outer iteration maximum         25
 mxx  number of mixtures                 3        iclc -1/0/n--flat res/sn/opt           0
 ms   mixing table length               65        ith  0/1 = forward/adjoint            0
 igm  number of energy groups           27        iflu not used(always wgtd)             0
 nrg  number of neutron groups          27        iprt -2/-1/0/n=mixture xsec print     -2
 ngg  number of gamma groups             0        idl  0/1/2/3=no/prt nd/pch n/both    53
 iftg number of first thermal group     15        ipbt -1/0/1=none/fine/all bal. prt     0
0                            special options

 ifg  0/1 = none/weighting calculation   1        ipn  0/1/2 diff. coef. param          0
 iqm  volumetric sources (0/n=no/yes)    0        idfm 0/1 = none/density factors 39*    1
 ipm  boundary sources (0/n=no/yes)      0        iaz  0/n = none/n activities by zone   0
 ifn  0/1/2 = input 33*/34*/use last    53        iai  0/1=none/activities by interval  0
 itmx maximum time (minutes)            10        ifct 0/1=no/yes upscatter scaling     0
 idt1 0/1/2/3=no/xsect/srce/flux--out    0        ipvt 0/1/2=no/k/alpha parametric srch 0
 isx  broad group fluxes                 0        isen outer iteration acceleration     0
 ibln activity data unit                 0        nbnd band rebaln parameter            0
 jbkl 0/1/2 buckling geometry            0
0                          weighting data (ifg=1)

 icon -1/0/1=cell/zone/region weight     -1        ihtf total xsect psn in brd gp tables  3
 igmf number of broad groups             27        ndsf psn g-g or file number            4
 itp  0/10/20/30/40 0/c/e/ac/a            0        nusf table length or max order         4
 ipp  -2/-1/0/n=wgted xsect print        -2        mxm extra 1-d x-sect positions         0
 iap  -1/n anisn xsect print             -1
0                          floating point parameters

 eps  overall convergence       1.00000E-04        dy   cyl/pla ht for buckling    .00000E+00
 ptc  point convergence         1.00000E-04        dz   plane depth for buckling   .00000E+00
 xnf  normalization factor      1.00000E+00        vsc  void streaming correction  .00000E+00
 ev   eigenvalue guess           .00000E+00        pv   ipvt=1/2--k/alpha          1.00000E+00
 evm  eigenvalue modifier        .00000E+00        eql  ev change eps for search  1.00000E-03
 bf   buckling factor=1.420892  1.42089E+00        xnpm new param mod for search  7.50000E-01
     this case will require      2535 locations for mixing
     this case has been allocated 200000 locations
1                    80 d, sas2h: babcock wilcox 15x15, 3.00wt%, 20gwd/mtu burn high temp
0      13q array has     65 entries.
0      14q array has     65 entries.
```

0 15q array has 65 entries.
0 data block 2 (mixing table, etc.)

0		nuclides on tape	cccc identification	mixture	mixing table component	atom density	extra xsect id's
	1	999		1	92235	6.57647E-04	
	2	1001		1	92234	5.45374E-06	
	3	5010		1	92236	9.37010E-06	
	4	5011		1	92238	2.20477E-02	
	5	8016		1	8016	4.55359E-02	
	6	6		3	6	2.09710E-02	
	7	36083		1	36083	1.57183E-07	
	8	36085		1	36085	7.63106E-08	
	9	38090		1	38090	1.70684E-06	
	10	39089		1	39089	5.60000E-07	
	11	40093		1	42095	2.50288E-07	
	12	40094		1	40093	1.24307E-06	
	13	40095		1	40094	1.91444E-06	
	14	40802		1	40095	1.29859E-06	
	15	41094		1	41094	5.36198E-13	
	16	42095		1	43099	1.77703E-06	
	17	43099		1	45103	4.59914E-07	
	18	44101		1	45105	1.10044E-08	
	19	44106		1	44101	1.56724E-06	
	20	45103		1	44106	1.80396E-07	
	21	45105		1	46105	3.66502E-07	
	22	46105		1	46108	4.74250E-08	
	23	46108		1	47109	2.91333E-08	
	24	47109		1	51124	9.07937E-12	
	25	51124		1	54131	7.49268E-07	
	26	54131		1	54132	1.26842E-06	
	27	54132		1	54135	6.32256E-09	
	28	54135		1	54136	3.00300E-06	
	29	54136		1	55134	8.18674E-09	
	30	55133		1	55135	9.06121E-07	
	31	55134		1	55137	1.90508E-06	
	32	55135		1	56136	2.19836E-09	
	33	55137		1	57139	1.91454E-06	
	34	56136		1	59141	9.07627E-07	
	35	57139		1	59143	4.07103E-07	
	36	58144		1	58144	1.48283E-06	
	37	59141		1	60143	1.31604E-06	
	38	59143		1	60145	1.17029E-06	
	39	60143		1	61147	5.25252E-07	
	40	60145		1	61148	1.26721E-09	
	41	60147		1	60147	1.34940E-07	
	42	61147		1	62147	1.30142E-08	
	43	61148		1	62149	6.35746E-08	
	44	62147		1	62150	2.60260E-07	
	45	62149		1	62151	1.03952E-07	
	46	62150		1	62152	1.16691E-07	
	47	62151		1	64155	1.02921E-10	
	48	62152		1	63153	5.54702E-08	
	49	63153		1	63154	1.61916E-09	
	50	63154		1	63155	1.09678E-08	
	51	63155		2	40802	4.25156E-02	
	52	64155		3	1001	4.19420E-02	
	53	92234		3	5010	3.81515E-06	
	54	92235		3	5011	1.54884E-05	
	55	92236		1	55133	1.82872E-06	
	56	92238		1	95237	1.45033E-07	

57	95237	1	94238	1.72916E-09
58	94238	1	94239	1.59534E-05
59	94239	1	94240	4.39198E-07
60	94240	1	94241	3.26765E-08
61	94241	1	94242	2.86985E-10
62	94242	1	95241	8.48261E-11
63	95241	1	95243	1.76207E-12
64	95243	1	96244	1.17608E-14
65	96244	1	999	1.00000E-20

- elapsed time .00 min.
0 21649 locations will be used
0 35q array has 25 entries.
0 36q array has 24 entries.
0 38q array has 24 entries.
0 39q array has 4 entries.
0 40q array has 4 entries.
0 47q array has 27 entries.
0 51q array has 27 entries.
1 80 d, sas2h: babcock wilcox 15x15, 3.00wt%, 20gwd/mtu burn high temp

0 neutron group parameters

gp	energy boundaries	lethargy boundaries	weighted velocities	broad gp numbers	calc type	group band	right albedo	left albedo
1	2.00000E+07	-6.93147E-01	4.60581E+09	1	0	1	1.00000E+00	
2	6.43400E+06	4.40989E-01	2.88737E+09	2	0	2	1.00000E+00	
3	3.00000E+06	1.20397E+00	2.12201E+09	3	0	3	1.00000E+00	
4	1.85000E+06	1.68740E+00	1.75673E+09	4	0	4	1.00000E+00	
5	1.40000E+06	1.96611E+00	1.46535E+09	5	0	5	1.00000E+00	
6	9.00000E+05	2.40795E+00	1.06620E+09	6	0	6	1.00000E+00	
7	4.00000E+05	3.21888E+00	6.07557E+08	7	0	7	1.00000E+00	
8	1.00000E+05	4.60517E+00	2.72415E+08	8	0	8	1.00000E+00	
9	1.70000E+04	6.37713E+00	1.13526E+08	9	0	9	1.00000E+00	
10	3.00000E+03	8.11173E+00	4.82126E+07	10	0	10	1.00000E+00	
11	5.50000E+02	9.80818E+00	2.05946E+07	11	0	11	1.00000E+00	
12	1.00000E+02	1.15129E+01	1.01036E+07	12	0	12	1.00000E+00	
13	3.00000E+01	1.27169E+01	5.69595E+06	13	0	13	1.00000E+00	
14	1.00000E+01	1.38155E+01	3.20957E+06	14	0	14	1.00000E+00	
15	3.04999E+00	1.50030E+01	2.10601E+06	15	0	15	1.00000E+00	
16	1.77000E+00	1.55471E+01	1.70522E+06	16	0	16	1.00000E+00	
17	1.29999E+00	1.58557E+01	1.52545E+06	17	0	17	1.00000E+00	
18	1.12999E+00	1.59959E+01	1.42857E+06	18	0	18	1.00000E+00	
19	1.00000E+00	1.61181E+01	1.31002E+06	19	0	19	1.00000E+00	
20	8.00000E-01	1.63412E+01	9.05898E+05	20	0	20	1.00000E+00	
21	4.00000E-01	1.70344E+01	8.17974E+05	21	0	21	1.00000E+00	
22	3.25000E-01	1.72420E+01	6.90070E+05	22	0	22	1.00000E+00	
23	2.25000E-01	1.76098E+01	4.86953E+05	23	0	23	1.00000E+00	
24	9.99999E-02	1.84207E+01	3.57766E+05	24	0	24	1.00000E+00	
25	5.00000E-02	1.91138E+01	2.71895E+05	25	0	25	1.00000E+00	
26	3.00000E-02	1.96247E+01	1.87283E+05	26	0	26	1.00000E+00	
27	1.00000E-02	2.07233E+01	8.88201E+04	27	0	27	1.00000E+00	
28	1.00000E-05	2.76310E+01						

1 80 d, sas2h: babcock wilcox 15x15, 3.00wt%, 20gwd/mtu burn high temp

0

	mixture by zone	order p(l) by zone	activity table matl no.	activity table reaction	quadrature constants weights	quadrature constants directions	quadrature constants refl direc	quadrature constants wt x cos
1	1	3			0	-2.79004E-01	3	0
2	1	3			5.06143E-02	-1.97286E-01	3	-9.98548E-03
3	2	3			5.06143E-02	1.97286E-01	2	9.98548E-03
4	3	3			0	-6.04419E-01	8	0
5					5.55953E-02	-5.58410E-01	8	-3.10450E-02
6					5.55953E-02	-2.31301E-01	7	-1.28593E-02
7					5.55953E-02	2.31301E-01	6	1.28593E-02

8						5.55953E-02	5.58410E-01	5	3.10450E-02
9						0	-8.50774E-01	15	0
10						5.22844E-02	-8.21784E-01	15	-4.29665E-02
11						5.22844E-02	-6.01588E-01	14	-3.14537E-02
12						5.22844E-02	-2.20196E-01	13	-1.15128E-02
13						5.22844E-02	2.20196E-01	12	1.15128E-02
14						5.22844E-02	6.01588E-01	11	3.14537E-02
15						5.22844E-02	8.21784E-01	10	4.29665E-02
16						0	-9.83032E-01	24	0
17						4.53355E-02	-9.64143E-01	24	-4.37099E-02
18						4.53355E-02	-8.17361E-01	23	-3.70555E-02
19						4.53355E-02	-5.46143E-01	22	-2.47597E-02
20						4.53355E-02	-1.91780E-01	21	-8.69444E-03
21						4.53355E-02	1.91780E-01	20	8.69444E-03
22						4.53355E-02	5.46143E-01	19	2.47597E-02
23						4.53355E-02	8.17361E-01	18	3.70555E-02
24						4.53355E-02	9.64143E-01	17	4.37099E-02

0constants for p(3) scattering

0angl	set 1	set 2	set 3	set 4	set 5
1	-2.79004E-01	8.83235E-01	6.74143E-02	-6.16919E-01	-1.71701E-02
2	-1.97286E-01	8.83235E-01	.00000E+00	-4.36228E-01	1.21411E-02
3	1.97286E-01	8.83235E-01	.00000E+00	4.36228E-01	-1.21411E-02
4	-6.04419E-01	4.52016E-01	3.16379E-01	-8.04435E-01	-1.74564E-01
5	-5.58410E-01	4.52016E-01	2.23714E-01	-7.43201E-01	-6.68028E-02
6	-2.31301E-01	4.52016E-01	-2.23713E-01	-3.07844E-01	1.61276E-01
7	2.31301E-01	4.52016E-01	-2.23713E-01	3.07844E-01	-1.61276E-01
8	5.58410E-01	4.52016E-01	2.23713E-01	7.43201E-01	6.68028E-02
9	-8.50774E-01	-8.57235E-02	6.26843E-01	-1.98456E-01	-4.86835E-01
10	-8.21784E-01	-8.57235E-02	5.42862E-01	-1.91694E-01	-3.44245E-01
11	-6.01588E-01	-8.57235E-02	.00000E+00	-1.40330E-01	3.44244E-01
12	-2.20194E-01	-8.57235E-02	-5.42862E-01	-5.13643E-02	3.44245E-01
13	2.20196E-01	-8.57235E-02	-5.42862E-01	5.13643E-02	-3.44245E-01
14	6.01588E-01	-8.57235E-02	.00000E+00	1.40330E-01	-3.44245E-01
15	8.21784E-01	-8.57235E-02	5.42862E-01	1.91694E-01	3.44245E-01
16	-9.83032E-01	-4.49528E-01	8.36885E-01	5.00708E-01	-7.51005E-01
17	-9.64143E-01	-4.49528E-01	7.73181E-01	4.91083E-01	-6.24438E-01
18	-8.17361E-01	-4.49528E-01	3.20262E-01	4.16520E-01	1.46514E-01
19	-5.46143E-01	-4.49528E-01	-3.20262E-01	2.78176E-01	7.36575E-01
20	-1.91780E-01	-4.49528E-01	-7.73181E-01	9.76824E-02	4.17236E-01
21	1.91780E-01	-4.49528E-01	-7.73181E-01	-9.76824E-02	-4.17236E-01
22	5.46143E-01	-4.49528E-01	-3.20262E-01	-2.78176E-01	-7.36575E-01
23	8.17361E-01	-4.49528E-01	3.20262E-01	-4.16520E-01	-1.46514E-01
24	9.64143E-01	-4.49528E-01	7.73181E-01	-4.91083E-01	6.24438E-01

1 int	radii	mid pts	zone no.	areas	volumes	dens fact	radius mod	spec(int)
1	0	1.29551E-02	1	0	2.10906E-03	1.00000E+00	0	
2	2.59102E-02	4.33406E-02	1	1.62798E-01	9.49318E-03	1.00000E+00	0	
3	6.07710E-02	8.75100E-02	1	3.81835E-01	2.94045E-02	1.00000E+00	0	
4	1.14249E-01	1.74155E-01	1	7.17848E-01	1.31104E-01	1.00000E+00	0	
5	2.34061E-01	2.93967E-01	1	1.47065E+00	2.21299E-01	1.00000E+00		
6	3.53873E-01	3.80612E-01	1	2.22345E+00	1.27890E-01	1.00000E+00		
7	4.07351E-01	4.24781E-01	1	2.55946E+00	9.30429E-02	1.00000E+00		
8	4.42212E-01	4.55167E-01	1	2.77850E+00	7.41004E-02	1.00000E+00		
9	4.68122E-01	4.68814E-01	2	2.94130E+00	4.07946E-03	0		
10	4.69507E-01	4.71481E-01	2	2.95000E+00	1.16988E-02	0		
11	4.73456E-01	4.75431E-01	2	2.97481E+00	1.17968E-02	0		
12	4.77405E-01	4.78098E-01	2	2.99962E+00	4.16023E-03	0		
13	4.78790E-01	4.83159E-01	3	3.00833E+00	2.65268E-02	1.00000E+00		
14	4.87528E-01	4.99987E-01	3	3.06329E+00	7.82768E-02	1.00000E+00		
15	5.12445E-01	5.24903E-01	3	3.21979E+00	8.21777E-02	1.00000E+00		
16	5.37362E-01	5.41731E-01	3	3.37634E+00	2.97427E-02	1.00000E+00		

17	5.46100E-01	5.53513E-01	4	3.43125E+00	5.15631E-02	1.00000E+00
18	5.60926E-01	5.70900E-01	4	3.52440E+00	7.15548E-02	1.00000E+00
19	5.80874E-01	5.96175E-01	4	3.64974E+00	1.14628E-01	1.00000E+00
20	6.11475E-01	6.45755E-01	4	3.84201E+00	2.78169E-01	1.00000E+00
21	6.80034E-01	7.14313E-01	4	4.27278E+00	3.07702E-01	1.00000E+00
22	7.48592E-01	7.63893E-01	4	4.70354E+00	1.46875E-01	1.00000E+00
23	7.79193E-01	7.89167E-01	4	4.89582E+00	9.89116E-02	1.00000E+00
24	7.99141E-01	8.06554E-01	4	5.02115E+00	7.51357E-02	1.00000E+00
25	8.13968E-01			5.11431E+00		

- elapsed time .00 min.

1 outer iter	inner iters	1 - balance	eigenvalue	1 - source ratio	1 - scatter ratio	1 - upscat ratio	search parameter	time (min)
1	147	2.05396E-05	1.15254E+00	-1.69535E-01	1.00000E+00	-5.15655E-02	.00000E+00	.0000
2	224	-1.01925E-05	1.16913E+00	-8.23960E-04	-1.94420E-02	-4.25725E-03	.00000E+00	.0000
3	284	9.99778E-06	1.17018E+00	-6.02814E-05	-1.40603E-03	-7.20483E-04	.00000E+00	.0000
4	330	-9.17736E-06	1.17066E+00	-8.10909E-06	-2.39247E-04	-1.18746E-04	.00000E+00	.0167
5	358	-1.26134E-05	1.17074E+00	-1.63350E-06	-3.91102E-05	-1.71441E-05	.00000E+00	.0167

grp to grp	inner iters	mfd int.	max. flux difference	msf int.	max. scale factor	coarse mesh
1	1	1	4.99248E-08	24	1.00000E+00	1
2	1	1	5.87108E-08	24	1.00000E+00	1
3	1	1	5.47128E-08	24	1.00000E+00	1
4	1	1	5.34388E-08	24	1.00000E+00	1
5	1	1	5.75189E-08	24	1.00000E+00	1
6	1	1	3.76123E-08	24	1.00000E+00	1
7	1	1	2.81291E-08	24	1.00000E+00	1
8	1	1	6.92915E-09	24	1.00000E+00	1
9	1	2	3.52378E-09	24	1.00000E+00	1
10	1	1	3.58770E-09	24	1.00000E+00	1
11	1	1	3.62354E-09	24	1.00000E+00	1
12	1	2	8.81806E-10	24	1.00000E+00	1
13	1	24	1.33697E-09	24	1.00000E+00	1
14	1	24	1.52826E-09	24	1.00000E+00	1
15	1	24	2.88251E-05	24	9.99989E-01	1
16	1	24	3.60887E-05	24	9.99993E-01	1
17	1	24	4.82095E-05	24	9.99997E-01	1
18	1	24	5.34901E-05	24	9.99998E-01	1
19	1	24	4.87907E-05	24	9.99994E-01	1
20	1	24	4.32702E-05	24	9.99978E-01	1
21	1	18	2.04876E-05	24	9.99950E-01	1
22	1	24	3.74352E-05	24	9.99995E-01	1
23	1	24	2.78780E-06	24	1.00000E+00	1
24	1	24	1.01146E-05	24	1.00000E+00	1
25	1	24	1.09008E-05	24	1.00000E+00	1
26	1	1	5.53252E-06	21	1.00000E+00	2
27	1	2	1.83599E-06	24	1.00000E+00	2

6	385	3.06809E-07	1.17058E+00	-2.09826E-07	-5.63458E-06	-2.91083E-06	.00000E+00	.0167

final monitor
lambda 1.17058E+00 production/absorption 1.17058E+00 angular flux cn 16

- elapsed time .02 min.

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0 int.	zone number	radius	int. midpoint	area	volume	prod density
1	1	.00000E+00	1.29551E-02	.00000E+00	2.10905E-03	3.43615E-03
2	1	2.59102E-02	4.33406E-02	1.62798E-01	9.49318E-03	1.54601E-02
3	1	6.07710E-02	8.75100E-02	3.81835E-01	2.94045E-02	4.79692E-02
4	1	1.14249E-01	1.74155E-01	7.17848E-01	1.31104E-01	2.15784E-01
5	1	2.34061E-01	2.98967E-01	1.47065E+00	2.21299E-01	3.72264E-01
6	1	3.53873E-01	3.80612E-01	2.22345E+00	1.27890E-01	2.20345E-01
7	1	4.07351E-01	4.24781E-01	2.55946E+00	9.30429E-02	1.63191E-01
8	1	4.42212E-01	4.55167E-01	2.77850E+00	7.41004E-02	1.32131E-01

9	2	4.68122E-01	4.68814E-01	2.94130E+00	4.07946E-03	.00000E+00
10	2	4.69507E-01	4.71481E-01	2.95000E+00	1.16988E-02	.00000E+00
11	2	4.73456E-01	4.75431E-01	2.97481E+00	1.17968E-02	.00000E+00
12	2	4.77405E-01	4.78098E-01	2.99962E+00	4.16023E-03	.00000E+00
13	3	4.78790E-01	4.83159E-01	3.00833E+00	2.65268E-02	.00000E+00
14	3	4.87528E-01	4.99987E-01	3.06323E+00	7.82768E-02	.00000E+00
15	3	5.12445E-01	5.24903E-01	3.21979E+00	8.21777E-02	.00000E+00
16	3	5.37362E-01	5.41731E-01	3.37634E+00	2.97427E-02	.00000E+00
17	4	5.46100E-01	5.53513E-01	3.43125E+00	5.15631E-02	.00000E+00
18	4	5.60926E-01	5.70900E-01	3.52440E+00	7.15548E-02	.00000E+00
19	4	5.80874E-01	5.98175E-01	3.64974E+00	1.14628E-01	.00000E+00
20	4	6.11475E-01	6.45755E-01	3.84201E+00	2.78169E-01	.00000E+00
21	4	6.80034E-01	7.14313E-01	4.27278E+00	3.07702E-01	.00000E+00
22	4	7.48592E-01	7.63893E-01	4.70354E+00	1.46875E-01	.00000E+00
23	4	7.79195E-01	7.89167E-01	4.89582E+00	9.89116E-02	.00000E+00
24	4	7.99141E-01	8.06554E-01	5.02115E+00	7.51357E-02	.00000E+00
25		8.13968E-01		5.11431E+00		

1 80 d, sas2h: babcock wilcox 15x15, 3.00wt%, 20gwd/mtu burn high temp

0 total flux

0 int.	grp. 1	grp. 2	grp. 3	grp. 4	grp. 5	grp. 6	grp. 7	grp. 8
1	1.69674E-01	1.30668E+00	1.66967E+00	1.03835E+00	1.57396E+00	3.03068E+00	2.90513E+00	2.07895E+00
2	1.69735E-01	1.30730E+00	1.67050E+00	1.03885E+00	1.57467E+00	3.03199E+00	2.90580E+00	2.07901E+00
3	1.69679E-01	1.30668E+00	1.66971E+00	1.03837E+00	1.57386E+00	3.03036E+00	2.90478E+00	2.07892E+00
4	1.69293E-01	1.30244E+00	1.66423E+00	1.03502E+00	1.56852E+00	3.01978E+00	2.89839E+00	2.07777E+00
5	1.68296E-01	1.29157E+00	1.65033E+00	1.02656E+00	1.55512E+00	2.99359E+00	2.88272E+00	2.07517E+00
6	1.67150E-01	1.27921E+00	1.63471E+00	1.01712E+00	1.54025E+00	2.96494E+00	2.86565E+00	2.07230E+00
7	1.66239E-01	1.26955E+00	1.62269E+00	1.00995E+00	1.52908E+00	2.94381E+00	2.85316E+00	2.07014E+00
8	1.65338E-01	1.26016E+00	1.61118E+00	1.00318E+00	1.51870E+00	2.92453E+00	2.84187E+00	2.06810E+00
9	1.64845E-01	1.25508E+00	1.60501E+00	9.99591E-01	1.51324E+00	2.91449E+00	2.83604E+00	2.06703E+00
10	1.64743E-01	1.25406E+00	1.60378E+00	9.98859E-01	1.51224E+00	2.91269E+00	2.83505E+00	2.06683E+00
11	1.64593E-01	1.25258E+00	1.60200E+00	9.97908E-01	1.51081E+00	2.91015E+00	2.83364E+00	2.06655E+00
12	1.64493E-01	1.25160E+00	1.60083E+00	9.97264E-01	1.50989E+00	2.90851E+00	2.83274E+00	2.06637E+00
13	1.64309E-01	1.24978E+00	1.59863E+00	9.96024E-01	1.50807E+00	2.90506E+00	2.83080E+00	2.06599E+00
14	1.63808E-01	1.24462E+00	1.59214E+00	9.92187E-01	1.50224E+00	2.89574E+00	2.82435E+00	2.06495E+00
15	1.63245E-01	1.23836E+00	1.58378E+00	9.86869E-01	1.49382E+00	2.87704E+00	2.81472E+00	2.06383E+00
16	1.62970E-01	1.23490E+00	1.57878E+00	9.83399E-01	1.48809E+00	2.86546E+00	2.80795E+00	2.06332E+00
17	1.62838E-01	1.23291E+00	1.57568E+00	9.81070E-01	1.48410E+00	2.85749E+00	2.80331E+00	2.06318E+00
18	1.62664E-01	1.23034E+00	1.57171E+00	9.78099E-01	1.47903E+00	2.84750E+00	2.79742E+00	2.06305E+00
19	1.62447E-01	1.22728E+00	1.56710E+00	9.74735E-01	1.47334E+00	2.83632E+00	2.79084E+00	2.06282E+00
20	1.62158E-01	1.22333E+00	1.56124E+00	9.70519E-01	1.46625E+00	2.82243E+00	2.78267E+00	2.06251E+00
21	1.61958E-01	1.22057E+00	1.55712E+00	9.67535E-01	1.46122E+00	2.81259E+00	2.77696E+00	2.06241E+00
22	1.61960E-01	1.22045E+00	1.55683E+00	9.67253E-01	1.46070E+00	2.81158E+00	2.77651E+00	2.06264E+00
23	1.62033E-01	1.22129E+00	1.55795E+00	9.67983E-01	1.46188E+00	2.81388E+00	2.77800E+00	2.06292E+00
24	1.62118E-01	1.22229E+00	1.55931E+00	9.68881E-01	1.46334E+00	2.81674E+00	2.77981E+00	2.06319E+00

0 int.	grp. 9	grp. 10	grp. 11	grp. 12	grp. 13	grp. 14	grp. 15	grp. 16
1	1.58454E+00	1.44189E+00	1.29989E+00	7.95191E-01	6.73673E-01	5.99085E-01	3.73113E-01	2.08434E-01
2	1.58446E+00	1.44179E+00	1.29968E+00	7.92959E-01	6.73465E-01	5.98803E-01	3.73083E-01	2.08416E-01
3	1.58465E+00	1.44201E+00	1.30015E+00	7.93504E-01	6.73904E-01	5.99453E-01	3.73158E-01	2.08453E-01
4	1.58570E+00	1.44327E+00	1.30282E+00	7.96568E-01	6.76417E-01	6.03118E-01	3.73574E-01	2.08661E-01
5	1.58834E+00	1.44636E+00	1.30959E+00	8.04134E-01	6.82618E-01	6.12205E-01	3.74578E-01	2.09167E-01
6	1.59128E+00	1.44973E+00	1.31658E+00	8.12464E-01	6.89433E-01	6.22251E-01	3.75660E-01	2.09718E-01
7	1.59350E+00	1.45220E+00	1.32188E+00	8.18639E-01	6.94474E-01	6.29737E-01	3.76439E-01	2.10120E-01
8	1.59561E+00	1.45444E+00	1.32670E+00	8.24308E-01	6.99094E-01	6.36633E-01	3.77134E-01	2.10484E-01
9	1.59673E+00	1.45560E+00	1.32920E+00	8.27254E-01	7.01495E-01	6.40219E-01	3.77490E-01	2.10672E-01
10	1.59693E+00	1.45579E+00	1.32960E+00	8.27728E-01	7.01889E-01	6.40796E-01	3.77550E-01	2.10704E-01
11	1.59722E+00	1.45606E+00	1.33017E+00	8.28406E-01	7.02452E-01	6.41621E-01	3.77636E-01	2.10751E-01
12	1.59741E+00	1.45624E+00	1.33054E+00	8.28844E-01	7.02817E-01	6.42155E-01	3.77692E-01	2.10781E-01
13	1.59779E+00	1.45659E+00	1.33130E+00	8.29739E-01	7.03562E-01	6.43245E-01	3.77806E-01	2.10842E-01
14	1.59883E+00	1.45774E+00	1.33372E+00	8.32537E-01	7.05894E-01	6.46658E-01	3.78173E-01	2.11034E-01
15	1.59999E+00	1.45936E+00	1.33713E+00	8.36398E-01	7.09112E-01	6.51361E-01	3.78693E-01	2.11300E-01

16	1.60055E+00	1.46044E+00	1.33938E+00	8.38889E-01	7.11186E-01	6.54389E-01	3.79037E-01	2.11472E-01
17	1.60085E+00	1.46125E+00	1.34106E+00	8.40719E-01	7.12677E-01	6.56595E-01	3.79226E-01	2.11579E-01
18	1.60130E+00	1.46234E+00	1.34334E+00	8.43220E-01	7.14696E-01	6.59601E-01	3.79438E-01	2.11711E-01
19	1.60187E+00	1.46359E+00	1.34596E+00	8.46099E-01	7.17027E-01	6.63068E-01	3.79686E-01	2.11868E-01
20	1.60266E+00	1.46517E+00	1.34927E+00	8.49769E-01	7.19996E-01	6.67486E-01	3.79990E-01	2.12062E-01
21	1.60324E+00	1.46630E+00	1.35164E+00	8.52384E-01	7.22084E-01	6.70617E-01	3.80144E-01	2.12176E-01
22	1.60331E+00	1.46641E+00	1.35187E+00	8.52613E-01	7.22221E-01	6.70862E-01	3.80060E-01	2.12148E-01
23	1.60315E+00	1.46613E+00	1.35127E+00	8.51933E-01	7.21629E-01	6.70019E-01	3.79917E-01	2.12080E-01
24	1.60295E+00	1.46578E+00	1.35053E+00	8.51094E-01	7.20913E-01	6.68989E-01	3.79772E-01	2.12008E-01

0 int.	grp. 17	grp. 18	grp. 19	grp. 20	grp. 21	grp. 22	grp. 23	grp. 24
1	9.05268E-02	7.49131E-02	1.42844E-01	4.65014E-01	1.38200E-01	2.70211E-01	8.38324E-01	5.89345E-01
2	9.05094E-02	7.48906E-02	1.42816E-01	4.64916E-01	1.38139E-01	2.70062E-01	8.37865E-01	5.88943E-01
3	9.05404E-02	7.49325E-02	1.42866E-01	4.65095E-01	1.38264E-01	2.70428E-01	8.38603E-01	5.90084E-01
4	9.07239E-02	7.51788E-02	1.43168E-01	4.66152E-01	1.38983E-01	2.72472E-01	8.44796E-01	5.96305E-01
5	9.11771E-02	7.57895E-02	1.43908E-01	4.68756E-01	1.40768E-01	2.77553E-01	8.59395E-01	6.11777E-01
6	9.16742E-02	7.64622E-02	1.44715E-01	4.71604E-01	1.42738E-01	2.83190E-01	8.75511E-01	6.28988E-01
7	9.20415E-02	7.69620E-02	1.45307E-01	4.73697E-01	1.44208E-01	2.87409E-01	8.87496E-01	6.41911E-01
8	9.23782E-02	7.74224E-02	1.45846E-01	4.75614E-01	1.45553E-01	2.91311E-01	8.98527E-01	6.53909E-01
9	9.25535E-02	7.76624E-02	1.46126E-01	4.76609E-01	1.46255E-01	2.93342E-01	9.04257E-01	6.60159E-01
10	9.25852E-02	7.77023E-02	1.46173E-01	4.76775E-01	1.46368E-01	2.93660E-01	9.05154E-01	6.61095E-01
11	9.26256E-02	7.77592E-02	1.46240E-01	4.77013E-01	1.46528E-01	2.94114E-01	9.06432E-01	6.62428E-01
12	9.26530E-02	7.77960E-02	1.46284E-01	4.77167E-01	1.46632E-01	2.94408E-01	9.07256E-01	6.63287E-01
13	9.27091E-02	7.78712E-02	1.46373E-01	4.77482E-01	1.46845E-01	2.95008E-01	9.08942E-01	6.65042E-01
14	9.28844E-02	7.81064E-02	1.46653E-01	4.78464E-01	1.47514E-01	2.96876E-01	9.14195E-01	6.70452E-01
15	9.31249E-02	7.84295E-02	1.47037E-01	4.79809E-01	1.48440E-01	2.99426E-01	9.21338E-01	6.77688E-01
16	9.32790E-02	7.86367E-02	1.47285E-01	4.80667E-01	1.49037E-01	3.01047E-01	9.25852E-01	6.82169E-01
17	9.33886E-02	7.87900E-02	1.47461E-01	4.81298E-01	1.49502E-01	3.02316E-01	9.29604E-01	6.86272E-01
18	9.35372E-02	7.90012E-02	1.47701E-01	4.82151E-01	1.50157E-01	3.04134E-01	9.35210E-01	6.92730E-01
19	9.37094E-02	7.92450E-02	1.47979E-01	4.83151E-01	1.50915E-01	3.06256E-01	9.41902E-01	7.00510E-01
20	9.39283E-02	7.95560E-02	1.48333E-01	4.84433E-01	1.51890E-01	3.09008E-01	9.50809E-01	7.10988E-01
21	9.40794E-02	7.97776E-02	1.48581E-01	4.85339E-01	1.52599E-01	3.11027E-01	9.57573E-01	7.19156E-01
22	9.40854E-02	7.97972E-02	1.48593E-01	4.85402E-01	1.52682E-01	3.11273E-01	9.58629E-01	7.20707E-01
23	9.40389E-02	7.97402E-02	1.48519E-01	4.85148E-01	1.52519E-01	3.10816E-01	9.57321E-01	7.19412E-01
24	9.39841E-02	7.96700E-02	1.48432E-01	4.84842E-01	1.52311E-01	3.10233E-01	9.55576E-01	7.17566E-01

0 int.	grp. 25	grp. 26	grp. 27
1	2.40405E-01	1.43372E-01	1.82493E-02
2	2.40239E-01	1.43274E-01	1.82530E-02
3	2.40861E-01	1.43880E-01	1.84376E-02
4	2.44117E-01	1.46888E-01	1.92662E-02
5	2.52227E-01	1.54414E-01	2.13758E-02
6	2.61299E-01	1.62936E-01	2.38511E-02
7	2.68161E-01	1.69486E-01	2.58564E-02
8	2.74583E-01	1.75708E-01	2.78589E-02
9	2.77935E-01	1.78980E-01	2.89520E-02
10	2.78423E-01	1.79417E-01	2.90534E-02
11	2.79113E-01	1.80039E-01	2.92262E-02
12	2.79567E-01	1.80439E-01	2.93375E-02
13	2.80460E-01	1.81253E-01	2.95635E-02
14	2.83203E-01	1.83702E-01	3.02317E-02
15	2.86775E-01	1.86840E-01	3.10579E-02
16	2.88913E-01	1.88679E-01	3.15188E-02
17	2.91054E-01	1.90865E-01	3.22314E-02
18	2.94591E-01	1.94675E-01	3.35314E-02
19	2.98899E-01	1.99300E-01	3.50536E-02
20	3.04769E-01	2.05594E-01	3.70554E-02
21	3.09447E-01	2.10726E-01	3.87006E-02
22	3.10461E-01	2.12035E-01	3.91892E-02
23	3.09846E-01	2.11579E-01	3.91320E-02
24	3.08903E-01	2.10742E-01	3.89481E-02

- elapsed time .02 min.

1fine group summary for zone 1 by group including sum for all groups in line 28

0 grp.	fix source	fiss source	in scatter	slf scatter	out scatter	absorption	leakage	balance
1	.00000E+00	2.15908E-02	.00000E+00	1.21481E-02	1.00810E-02	3.09144E-03	1.06192E-02	9.98828E-01
2	.00000E+00	1.89806E-01	2.22135E-03	1.64506E-01	6.53231E-02	1.34789E-02	1.13236E-01	1.00004E+00
3	.00000E+00	2.15143E-01	2.57551E-02	1.60145E-01	8.06667E-02	1.55694E-02	1.44661E-01	1.00001E+00
4	.00000E+00	1.24340E-01	3.85958E-02	1.04853E-01	6.77161E-02	7.45529E-03	8.77619E-02	1.00001E+00
5	.00000E+00	1.65620E-01	6.74914E-02	2.58969E-01	9.47629E-02	4.48859E-03	1.33862E-01	9.99991E-01
6	.00000E+00	1.79580E-01	1.34188E-01	6.53717E-01	5.44423E-02	7.15425E-03	2.52157E-01	1.00008E+00
7	.00000E+00	8.90899E-02	9.82808E-02	7.45598E-01	3.63447E-02	7.81134E-03	1.43213E-01	1.00001E+00
8	.00000E+00	1.37510E-02	4.25657E-02	6.31132E-01	2.14716E-02	1.42741E-02	2.05686E-02	1.00004E+00
9	.00000E+00	9.98454E-04	2.16931E-02	5.34415E-01	2.06194E-02	2.35072E-02	-2.14347E-02	9.99991E-01
10	.00000E+00	7.41661E-05	2.06412E-02	4.57425E-01	1.06386E-02	3.65472E-02	-2.64710E-02	1.00001E+00
11	.00000E+00	5.83497E-06	1.06395E-02	4.17259E-01	8.09771E-03	5.88987E-02	-5.63515E-02	1.00001E+00
12	.00000E+00	4.09897E-07	8.09775E-03	2.36125E-01	9.33482E-03	6.36837E-02	-6.49171E-02	9.99956E-01
13	.00000E+00	6.50880E-08	9.33483E-03	1.74619E-01	6.16570E-03	5.70097E-02	-5.38409E-02	1.00001E+00
14	.00000E+00	1.28987E-08	6.16570E-03	1.51883E-01	7.54330E-03	7.76143E-02	-7.89921E-02	1.00000E+00
15	.00000E+00	1.45770E-09	7.63279E-03	8.56730E-02	8.97342E-03	6.76299E-03	-8.10665E-03	1.00019E+00
16	.00000E+00	4.28030E-10	9.15594E-03	4.36835E-02	9.79747E-03	3.75713E-03	-4.40072E-03	1.00015E+00
17	.00000E+00	1.37847E-10	8.04885E-03	1.55153E-02	7.96427E-03	4.15374E-03	-4.07002E-03	1.00007E+00
18	.00000E+00	9.86942E-11	7.52834E-03	1.23595E-02	7.32564E-03	5.68849E-03	-5.48621E-03	1.00003E+00
19	.00000E+00	1.39533E-10	9.29626E-03	2.71943E-02	1.00349E-02	5.78997E-03	-6.52589E-03	1.00005E+00
20	.00000E+00	2.26894E-10	1.18167E-02	1.11290E-01	1.04966E-02	2.43915E-02	-2.30741E-02	1.00008E+00
21	.00000E+00	3.32100E-11	1.03831E-02	2.66557E-02	1.02679E-02	1.60485E-02	-1.59358E-02	1.00009E+00
22	.00000E+00	3.85312E-11	1.45623E-02	5.95232E-02	1.33542E-02	4.58394E-02	-4.46335E-02	1.00004E+00
23	.00000E+00	3.68400E-11	1.90095E-02	2.05773E-01	2.23190E-02	1.26400E-01	-1.29720E-01	1.00007E+00
24	.00000E+00	1.00274E-11	2.66695E-02	1.36172E-01	2.62370E-02	1.37548E-01	-1.37123E-01	1.00005E+00
25	.00000E+00	2.93536E-12	2.23268E-02	5.08687E-02	1.66509E-02	7.66285E-02	-7.09556E-02	1.00003E+00
26	.00000E+00	2.05829E-12	1.08445E-02	3.48524E-02	7.38309E-03	6.92194E-02	-6.57597E-02	1.00002E+00
27	.00000E+00	4.90502E-13	2.30870E-03	5.10900E-03	1.23604E-03	1.91515E-02	-1.80791E-02	1.00001E+00
28	.00000E+00	1.00000E+00	6.45248E-01	5.51537E+00	6.45248E-01	9.31963E-01	7.01984E-02	1.00002E+00

0 grp.	rt bdy flux	rt leakage	lft bdy flux	lft leakage	n2n rate	fiss rate	flux*db**2	total flux
1	1.64872E-01	1.06192E-02	1.69616E-01	.00000E+00	2.17259E-03	2.53617E-03	.00000E+00	1.15493E-01
2	1.25535E+00	1.13236E-01	1.30607E+00	.00000E+00	1.77724E-05	1.17400E-02	.00000E+00	8.85265E-01
3	1.60534E+00	1.44661E-01	1.66886E+00	.00000E+00	.00000E+00	1.45464E-02	.00000E+00	1.13131E+00
4	9.99774E-01	8.77619E-02	1.03787E+00	.00000E+00	.00000E+00	6.30671E-03	.00000E+00	7.03842E-01
5	1.51350E+00	1.33862E-01	1.57324E+00	.00000E+00	.00000E+00	1.87378E-03	.00000E+00	1.06612E+00
6	2.91497E+00	2.52157E-01	3.02952E+00	.00000E+00	.00000E+00	1.71699E-03	.00000E+00	2.05246E+00
7	2.83630E+00	1.43213E-01	2.90439E+00	.00000E+00	.00000E+00	1.77358E-03	.00000E+00	1.97960E+00
8	2.06708E+00	2.05686E-02	2.07885E+00	.00000E+00	.00000E+00	1.87589E-03	.00000E+00	1.42777E+00
9	1.59668E+00	-2.14347E-02	1.58463E+00	.00000E+00	.00000E+00	2.58686E-03	.00000E+00	1.09438E+00
10	1.45555E+00	-2.64710E-02	1.44202E+00	.00000E+00	.00000E+00	5.50833E-03	.00000E+00	9.96724E-01
11	1.32905E+00	-5.63515E-02	1.30015E+00	.00000E+00	.00000E+00	1.13391E-02	.00000E+00	9.03660E-01
12	8.27128E-01	-6.49171E-02	7.98485E-01	.00000E+00	.00000E+00	1.44411E-02	.00000E+00	5.56077E-01
13	7.01391E-01	-5.38409E-02	6.73925E-01	.00000E+00	.00000E+00	1.36448E-02	.00000E+00	4.71964E-01
14	6.40067E-01	-7.89921E-02	5.99437E-01	.00000E+00	.00000E+00	9.68757E-03	.00000E+00	4.24473E-01
15	3.77478E-01	-8.10665E-03	3.73156E-01	.00000E+00	.00000E+00	2.44874E-03	.00000E+00	2.58186E-01
16	2.10664E-01	-4.40072E-03	2.08456E-01	.00000E+00	.00000E+00	1.63364E-03	.00000E+00	1.44160E-01
17	9.25454E-02	-4.07002E-03	9.05465E-02	.00000E+00	.00000E+00	2.42217E-03	.00000E+00	6.29174E-02
18	7.76516E-02	-5.48621E-03	7.49389E-02	.00000E+00	.00000E+00	3.14991E-03	.00000E+00	5.23772E-02
19	1.46114E-01	-6.52589E-03	1.42876E-01	.00000E+00	.00000E+00	3.90643E-03	.00000E+00	9.93090E-02
20	4.76573E-01	-2.30741E-02	4.65135E-01	.00000E+00	.00000E+00	1.72471E-02	.00000E+00	3.23651E-01
21	1.46231E-01	-1.59358E-02	1.38279E-01	.00000E+00	.00000E+00	1.11861E-02	.00000E+00	9.74988E-02
22	2.95258E-01	-4.46335E-02	2.70401E-01	.00000E+00	.00000E+00	3.11145E-02	.00000E+00	1.92774E-01
23	9.04014E-01	-1.29720E-01	8.38883E-01	.00000E+00	.00000E+00	8.70385E-02	.00000E+00	5.96454E-01
24	6.59905E-01	-1.37123E-01	5.89883E-01	.00000E+00	.00000E+00	9.44123E-02	.00000E+00	4.26370E-01
25	2.77809E-01	-7.09556E-02	2.40658E-01	.00000E+00	.00000E+00	5.47217E-02	.00000E+00	1.76407E-01
26	1.78862E-01	-6.57597E-02	1.43568E-01	.00000E+00	.00000E+00	5.03591E-02	.00000E+00	1.08950E-01
27	2.88995E-02	-1.80791E-02	1.82834E-02	.00000E+00	.00000E+00	1.40471E-02	.00000E+00	1.55307E-02
28	2.37771E+01	7.01982E-02	2.37569E+01	.00000E+00	2.19078E-03	4.73264E-01	.00000E+00	1.63635E+01

1fine group summary for zone 2 by group including sum for all groups in line 28

0 grp.	fix source	fiss source	in scatter	slf scatter	out scatter	absorption	leakage	balance
1	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	1.00000E+00
2	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	1.49012E-08	1.00000E+00
3	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	1.00000E+00
4	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	2.98023E-08	1.00000E+00
5	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	1.49012E-08	1.00000E+00
6	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	-2.08616E-07	1.00000E+00
7	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	1.49012E-08	1.00000E+00
8	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	-1.45286E-07	1.00001E+00
9	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	-2.79397E-08	1.00000E+00
10	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	-2.98023E-08	1.00000E+00
11	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	-2.23517E-08	1.00000E+00
12	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	1.00000E+00
13	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	5.58794E-08	9.99999E-01
14	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	-2.23517E-08	1.00000E+00
15	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	-1.49012E-08	1.00000E+00
16	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	2.32831E-09	9.99999E-01
17	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	-4.65661E-10	1.00000E+00
18	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	1.86265E-09	1.00000E+00
19	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	6.98492E-09	9.99999E-01
20	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	-1.11759E-08	1.00000E+00
21	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	-1.86265E-09	1.00000E+00
22	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	1.86265E-08	1.00000E+00
23	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	2.98023E-08	1.00000E+00
24	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	1.49012E-08	1.00000E+00
25	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	-7.45058E-09	1.00000E+00
26	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	1.00000E+00
27	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	1.86265E-09	1.00000E+00
28	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	-2.88710E-07	9.99996E-01

0 grp.	rt bdy flux	rt leakage	lft bdy flux	lft leakage	n2n rate	fiss rate	flux*db**2	total flux
1	1.64468E-01	1.06192E-02	1.64872E-01	1.06192E-02	.00000E+00	.00000E+00	.00000E+00	5.22576E-03
2	1.25135E+00	1.13236E-01	1.25535E+00	1.13236E-01	.00000E+00	.00000E+00	.00000E+00	3.97743E-02
3	1.60054E+00	1.44661E-01	1.60534E+00	1.44661E-01	.00000E+00	.00000E+00	.00000E+00	5.08681E-02
4	9.97103E-01	8.77619E-02	9.99774E-01	8.77619E-02	.00000E+00	.00000E+00	.00000E+00	3.16846E-02
5	1.50966E+00	1.33862E-01	1.51350E+00	1.33862E-01	.00000E+00	.00000E+00	.00000E+00	4.79687E-02
6	2.90810E+00	2.52157E-01	2.91497E+00	2.52157E-01	.00000E+00	.00000E+00	.00000E+00	9.23949E-02
7	2.85252E+00	1.43213E-01	2.85630E+00	1.43213E-01	.00000E+00	.00000E+00	.00000E+00	8.99488E-02
8	2.06632E+00	2.05684E-02	2.06708E+00	2.05684E-02	.00000E+00	.00000E+00	.00000E+00	6.55870E-02
9	1.59745E+00	-2.14347E-02	1.59668E+00	-2.14347E-02	.00000E+00	.00000E+00	.00000E+00	5.06834E-02
10	1.45628E+00	-2.64710E-02	1.45555E+00	-2.64710E-02	.00000E+00	.00000E+00	.00000E+00	4.62042E-02
11	1.33063E+00	-5.63516E-02	1.32909E+00	-5.63515E-02	.00000E+00	.00000E+00	.00000E+00	4.22042E-02
12	8.28954E-01	-6.49171E-02	8.27128E-01	-6.49171E-02	.00000E+00	.00000E+00	.00000E+00	2.62789E-02
13	7.02909E-01	-5.38409E-02	7.01391E-01	-5.38409E-02	.00000E+00	.00000E+00	.00000E+00	2.22835E-02
14	6.42288E-01	-7.89922E-02	6.40067E-01	-7.89921E-02	.00000E+00	.00000E+00	.00000E+00	2.03488E-02
15	3.77708E-01	-8.10666E-03	3.77476E-01	-8.10665E-03	.00000E+00	.00000E+00	.00000E+00	1.19830E-02
16	2.10788E-01	-4.40071E-03	2.10664E-01	-4.40072E-03	.00000E+00	.00000E+00	.00000E+00	6.68746E-03
17	9.26597E-02	-4.07002E-03	9.25454E-02	-4.07002E-03	.00000E+00	.00000E+00	.00000E+00	2.93882E-03
18	7.78049E-02	-5.48621E-03	7.76516E-02	-5.48621E-03	.00000E+00	.00000E+00	.00000E+00	2.46680E-03
19	1.46295E-01	-6.52939E-03	1.46114E-01	-6.52939E-03	.00000E+00	.00000E+00	.00000E+00	4.63990E-03
20	4.77214E-01	-2.30741E-02	4.76573E-01	-2.30741E-02	.00000E+00	.00000E+00	.00000E+00	1.51343E-02
21	1.46665E-01	-1.59358E-02	1.46231E-01	-1.59358E-02	.00000E+00	.00000E+00	.00000E+00	4.64755E-03
22	2.94481E-01	-4.46335E-02	2.95258E-01	-4.46335E-02	.00000E+00	.00000E+00	.00000E+00	9.32655E-03
23	9.07457E-01	-1.29720E-01	9.04014E-01	-1.29720E-01	.00000E+00	.00000E+00	.00000E+00	2.87454E-02
24	6.63497E-01	-1.37123E-01	6.59905E-01	-1.37123E-01	.00000E+00	.00000E+00	.00000E+00	2.10010E-02
25	2.79666E-01	-7.09556E-02	2.77809E-01	-7.09556E-02	.00000E+00	.00000E+00	.00000E+00	8.84671E-03
26	1.80538E-01	-6.57597E-02	1.78862E-01	-6.57597E-02	.00000E+00	.00000E+00	.00000E+00	5.70366E-03
27	2.98651E-02	-1.80791E-02	2.88995E-02	-1.80791E-02	.00000E+00	.00000E+00	.00000E+00	9.24742E-04
28	2.37727E+01	7.01985E-02	2.37771E+01	7.01982E-02	.00000E+00	.00000E+00	.00000E+00	7.54501E-01

1fine group summary for zone 3 by group including sum for all groups in line 28

0 grp.	fix source	fiss source	in scatter	slf scatter	out scatter	absorption	leakage	balance

1	.00000E+00	.00000E+00	.00000E+00	3.62496E-03	2.71736E-03	1.39254E-05	-2.63436E-03	1.00001E+00
2	.00000E+00	.00000E+00	4.74582E-04	2.54979E-02	1.82960E-02	5.06557E-05	-1.78724E-02	1.00000E+00
3	.00000E+00	.00000E+00	2.58577E-03	4.97845E-02	1.57413E-02	1.36164E-04	-1.32907E-02	9.99993E-01
4	.00000E+00	.00000E+00	5.06014E-03	4.19433E-02	5.43075E-03	1.02966E-04	-4.73171E-04	9.99996E-01
5	.00000E+00	.00000E+00	1.09180E-02	8.14928E-02	5.15380E-03	1.51820E-04	5.61206E-03	1.00000E+00
6	.00000E+00	.00000E+00	1.82989E-02	2.34914E-01	3.20958E-03	3.19886E-04	1.47696E-02	9.99999E-01
7	.00000E+00	.00000E+00	1.22080E-02	2.35097E-01	1.18172E-03	3.44620E-04	1.05818E-02	9.99999E-01
8	.00000E+00	.00000E+00	2.15095E-03	1.58434E-01	7.62887E-03	2.94644E-04	-5.77305E-03	1.00002E+00
9	.00000E+00	.00000E+00	7.66186E-03	1.05053E-01	8.75736E-04	1.10776E-03	5.67863E-03	9.99989E-01
10	.00000E+00	.00000E+00	8.76903E-04	8.53690E-02	8.47009E-04	8.33680E-04	-8.05752E-04	9.99999E-01
11	.00000E+00	.00000E+00	8.47070E-04	7.67891E-02	8.67220E-04	1.33241E-03	-1.35254E-03	1.00000E+00
12	.00000E+00	.00000E+00	8.67226E-04	4.66546E-02	8.67993E-04	4.15380E-05	-4.23958E-05	1.00000E+00
13	.00000E+00	.00000E+00	8.67995E-04	3.95734E-02	8.07270E-04	6.00838E-05	6.29574E-07	1.00000E+00
14	.00000E+00	.00000E+00	8.07271E-04	3.63942E-02	6.85853E-04	9.69374E-05	2.44528E-05	1.00000E+00
15	.00000E+00	.00000E+00	7.30655E-04	2.07804E-02	8.50473E-04	8.34515E-05	-2.03013E-04	9.99961E-01
16	.00000E+00	.00000E+00	9.55570E-04	1.11020E-02	9.61779E-04	5.23149E-05	-5.82626E-05	9.99952E-01
17	.00000E+00	.00000E+00	1.07193E-03	4.26381E-03	1.04955E-03	2.57586E-05	-3.23359E-06	9.99972E-01
18	.00000E+00	.00000E+00	1.10994E-03	3.38014E-03	1.09143E-03	2.31470E-05	-4.51598E-06	9.99982E-01
19	.00000E+00	.00000E+00	1.10250E-03	7.31065E-03	1.07862E-03	4.73630E-05	-2.32426E-05	9.99969E-01
20	.00000E+00	.00000E+00	1.31433E-03	2.62568E-02	1.11627E-03	1.95222E-04	3.60049E-06	9.99969E-01
21	.00000E+00	.00000E+00	1.48515E-03	6.82438E-03	1.63010E-03	7.51857E-05	-2.20064E-04	9.99996E-01
22	.00000E+00	.00000E+00	2.06471E-03	1.50265E-02	2.00823E-03	1.75085E-04	-1.18293E-04	9.99993E-01
23	.00000E+00	.00000E+00	2.80913E-03	4.88464E-02	3.58614E-03	7.39733E-04	-1.51676E-03	1.00000E+00
24	.00000E+00	.00000E+00	4.36243E-03	3.38682E-02	4.64790E-03	7.88947E-04	-1.07452E-03	1.00000E+00
25	.00000E+00	.00000E+00	4.17635E-03	1.29484E-02	3.33275E-03	4.40410E-04	4.03121E-04	1.00000E+00
26	.00000E+00	.00000E+00	1.73460E-03	9.34854E-03	1.23543E-03	4.08214E-04	9.09269E-05	1.00000E+00
27	.00000E+00	.00000E+00	3.58235E-04	1.74948E-03	9.01397E-07	1.27959E-04	2.29368E-04	1.00000E+00
28	.00000E+00	.00000E+00	8.69000E-02	1.42233E+00	8.69001E-02	8.06988E-03	-7.97013E-03	9.99987E-01

0 grp.	rt bdy flux	rt leakage	lft bdy flux	lft leakage	n2n rate	fiss rate	flux*db**2	total flux
1	1.62916E-01	7.98487E-03	1.64468E-01	1.06192E-02	9.70886E-05	.00000E+00	.00000E+00	3.54432E-02
2	1.23411E+00	9.53635E-02	1.25135E+00	1.13236E-01	.00000E+00	.00000E+00	.00000E+00	2.69072E-01
3	1.57756E+00	1.31370E-01	1.60054E+00	1.44661E-01	.00000E+00	.00000E+00	.00000E+00	3.44143E-01
4	9.82490E-01	8.72887E-02	9.97103E-01	8.77619E-02	.00000E+00	.00000E+00	.00000E+00	2.14434E-01
5	1.48654E+00	1.39474E-01	1.50966E+00	1.33862E-01	.00000E+00	.00000E+00	.00000E+00	3.24614E-01
6	2.86231E+00	2.66927E-01	2.90810E+00	2.52157E-01	.00000E+00	.00000E+00	.00000E+00	6.25230E-01
7	2.80614E+00	1.53895E-01	2.85252E+00	1.43213E-01	.00000E+00	.00000E+00	.00000E+00	6.10998E-01
8	2.06323E+00	1.47954E-02	2.06632E+00	2.05684E-02	.00000E+00	.00000E+00	.00000E+00	4.47411E-01
9	1.60065E+00	-1.57561E-02	1.59745E+00	-2.14347E-02	.00000E+00	.00000E+00	.00000E+00	3.46624E-01
10	1.46073E+00	-2.72748E-02	1.45628E+00	-2.64710E-02	.00000E+00	.00000E+00	.00000E+00	3.16110E-01
11	1.33997E+00	-5.77041E-02	1.33063E+00	-5.63516E-02	.00000E+00	.00000E+00	.00000E+00	2.89433E-01
12	8.39532E-01	-6.49595E-02	8.28954E-01	-6.49171E-02	.00000E+00	.00000E+00	.00000E+00	1.80863E-01
13	7.11721E-01	-5.38402E-02	7.02909E-01	-5.38409E-02	.00000E+00	.00000E+00	.00000E+00	1.53344E-01
14	6.55170E-01	-7.89677E-02	6.42288E-01	-7.89922E-02	.00000E+00	.00000E+00	.00000E+00	1.40672E-01
15	3.79130E-01	-8.30968E-03	3.77708E-01	-8.10666E-03	.00000E+00	.00000E+00	.00000E+00	8.20179E-02
16	2.11517E-01	-4.45898E-03	2.10788E-01	-4.40071E-03	.00000E+00	.00000E+00	.00000E+00	4.57660E-02
17	9.33183E-02	-4.07325E-03	9.26597E-02	-4.07002E-03	.00000E+00	.00000E+00	.00000E+00	2.01571E-02
18	7.86898E-02	-5.49073E-03	7.78049E-02	-5.48621E-03	.00000E+00	.00000E+00	.00000E+00	1.69636E-02
19	1.47348E-01	-6.55263E-03	1.46295E-01	-6.52938E-03	.00000E+00	.00000E+00	.00000E+00	3.18261E-02
20	4.80895E-01	-2.30705E-02	4.77214E-01	-2.30741E-02	.00000E+00	.00000E+00	.00000E+00	1.03845E-01
21	1.49198E-01	-1.61558E-02	1.46665E-01	-1.59858E-02	.00000E+00	.00000E+00	.00000E+00	3.20735E-02
22	3.01460E-01	-4.47518E-02	2.94481E-01	-4.46335E-02	.00000E+00	.00000E+00	.00000E+00	6.46242E-02
23	9.26991E-01	-1.31257E-01	9.07457E-01	-1.29720E-01	.00000E+00	.00000E+00	.00000E+00	1.98922E-01
24	6.85279E-01	-1.38197E-01	6.63497E-01	-1.37123E-01	.00000E+00	.00000E+00	.00000E+00	1.46103E-01
25	2.89428E-01	-7.05525E-02	2.79666E-01	-7.09556E-02	.00000E+00	.00000E+00	.00000E+00	6.17675E-02
26	1.89113E-01	-6.56687E-02	1.80538E-01	-6.57597E-02	.00000E+00	.00000E+00	.00000E+00	4.01536E-02
27	3.16252E-02	-1.78497E-02	2.95651E-02	-1.80791E-02	.00000E+00	.00000E+00	.00000E+00	6.64035E-03
28	2.37450E+01	6.22278E-02	2.37727E+01	7.01985E-02	9.70886E-05	.00000E+00	.00000E+00	5.14925E+00

1fine group summary for zone 4 by group including sum for all groups in line 28

0 grp.	fix source	fiss source	in scatter	slf scatter	out scatter	absorption	leakage	balance
1	.00000E+00	.00000E+00	.00000E+00	5.72781E-03	7.58123E-03	4.04045E-04	-7.98488E-03	9.99951E-01

2	.00000E+00	.00000E+00	4.34996E-03	7.50659E-02	9.86603E-02	1.05707E-03	-9.53634E-02	9.99960E-01
3	.00000E+00	.00000E+00	4.67764E-02	6.84700E-02	1.78146E-01	5.38166E-06	-1.31370E-01	9.99977E-01
4	.00000E+00	.00000E+00	6.96142E-02	4.56654E-02	1.56902E-01	3.21769E-06	-8.72888E-02	9.99988E-01
5	.00000E+00	.00000E+00	1.29023E-01	1.48202E-01	2.68496E-01	3.76761E-06	-1.39474E-01	9.99991E-01
6	.00000E+00	.00000E+00	2.73845E-01	4.54992E-01	5.40761E-01	1.14694E-05	-2.66927E-01	9.99998E-01
7	.00000E+00	.00000E+00	5.51870E-01	7.94828E-01	7.05749E-01	2.53405E-05	-1.53895E-01	9.99987E-01
8	.00000E+00	.00000E+00	7.35003E-01	9.99998E-01	7.49818E-01	4.69686E-05	-1.47955E-02	9.99912E-01
9	.00000E+00	.00000E+00	7.40128E-01	9.14701E-01	7.24358E-01	9.57646E-05	1.57562E-02	9.99889E-01
10	.00000E+00	.00000E+00	7.21161E-01	8.63250E-01	6.93750E-01	2.10931E-04	2.72748E-02	9.99896E-01
11	.00000E+00	.00000E+00	6.98861E-01	8.02573E-01	6.40743E-01	4.55760E-04	5.77041E-02	9.99941E-01
12	.00000E+00	.00000E+00	5.57986E-01	4.18480E-01	4.92393E-01	5.95448E-04	6.49595E-02	9.99979E-01
13	.00000E+00	.00000E+00	4.88335E-01	3.38116E-01	4.33612E-01	8.98113E-04	5.38402E-02	9.99969E-01
14	.00000E+00	.00000E+00	4.69922E-01	3.26044E-01	3.86484E-01	1.47558E-03	7.89677E-02	9.99888E-01
15	.00000E+00	.00000E+00	2.53052E-01	1.29946E-01	2.43446E-01	1.29478E-03	8.31182E-03	9.99994E-01
16	.00000E+00	.00000E+00	1.68081E-01	5.52184E-02	1.62679E-01	8.93839E-04	4.46062E-03	9.99989E-01
17	.00000E+00	.00000E+00	8.70363E-02	1.58602E-02	8.25198E-02	4.43013E-04	4.07423E-03	9.99991E-01
18	.00000E+00	.00000E+00	7.74593E-02	1.30975E-02	7.15674E-02	4.00733E-04	5.49168E-03	9.99993E-01
19	.00000E+00	.00000E+00	1.30693E-01	3.71582E-02	1.23525E-01	8.14468E-04	6.55422E-03	9.99993E-01
20	.00000E+00	.00000E+00	3.21996E-01	2.61426E-01	2.95577E-01	3.34455E-03	2.30752E-02	9.99995E-01
21	.00000E+00	.00000E+00	1.55439E-01	5.30859E-02	1.37971E-01	1.31411E-03	1.61487E-02	1.00003E+00
22	.00000E+00	.00000E+00	3.00632E-01	1.62439E-01	2.52791E-01	3.08767E-03	4.47558E-02	9.99992E-01
23	.00000E+00	.00000E+00	7.35845E-01	9.00933E-01	5.91619E-01	1.29885E-02	1.31236E-01	1.00000E+00
24	.00000E+00	.00000E+00	7.57086E-01	7.83301E-01	6.04637E-01	1.42009E-02	1.38195E-01	1.00001E+00
25	.00000E+00	.00000E+00	4.86811E-01	3.17303E-01	4.08211E-01	8.04795E-03	7.05515E-02	1.00000E+00
26	.00000E+00	.00000E+00	3.85619E-01	3.35838E-01	3.10191E-01	7.75853E-03	6.56678E-02	1.00000E+00
27	.00000E+00	.00000E+00	1.27163E-01	7.00078E-02	1.06650E-01	2.66383E-03	1.78498E-02	9.99999E-01
28	.00000E+00	.00000E+00	9.47164E+00	9.39168E+00	9.47164E+00	6.25415E-02	-6.22249E-02	9.99967E-01

0 grp.	rt bdy flux	rt leakage	lft bdy flux	lft leakage	n2n rate	fiss rate	flux*dd**2	total flux
1	1.62161E-01	-9.49344E-09	1.62916E-01	7.98487E-03	4.19863E-10	.00000E+00	.00000E+00	1.85594E-01
2	1.22281E+00	1.00706E-07	1.23411E+00	9.53635E-02	.00000E+00	.00000E+00	.00000E+00	1.40005E+00
3	1.56001E+00	-9.93787E-09	1.57756E+00	1.31370E-01	.00000E+00	.00000E+00	.00000E+00	1.78668E+00
4	9.69351E-01	-4.15396E-08	9.82490E-01	8.72887E-02	.00000E+00	.00000E+00	.00000E+00	1.11059E+00
5	1.46411E+00	-7.27154E-08	1.48654E+00	1.39474E-01	.00000E+00	.00000E+00	.00000E+00	1.67782E+00
6	2.81824E+00	-5.61769E-09	2.86231E+00	2.66927E-01	.00000E+00	.00000E+00	.00000E+00	3.22968E+00
7	2.78075E+00	-1.58678E-07	2.80614E+00	1.53895E-01	.00000E+00	.00000E+00	.00000E+00	3.18459E+00
8	2.06332E+00	-1.54147E-07	2.06323E+00	1.47954E-02	.00000E+00	.00000E+00	.00000E+00	2.36081E+00
9	1.60284E+00	9.33769E-08	1.60066E+00	-1.57561E-02	.00000E+00	.00000E+00	.00000E+00	1.83437E+00
10	1.46559E+00	3.18761E-08	1.46073E+00	-2.72748E-02	.00000E+00	.00000E+00	.00000E+00	1.67703E+00
11	1.35014E+00	1.97995E-08	1.33997E+00	-5.77041E-02	.00000E+00	.00000E+00	.00000E+00	1.54447E+00
12	8.50654E-01	-1.33726E-10	8.39532E-01	-6.49595E-02	.00000E+00	.00000E+00	.00000E+00	9.72774E-01
13	7.20541E-01	-1.23753E-08	7.11721E-01	-5.38402E-02	.00000E+00	.00000E+00	.00000E+00	8.24166E-01
14	6.68451E-01	3.14674E-08	6.55170E-01	-7.89677E-02	.00000E+00	.00000E+00	.00000E+00	7.64154E-01
15	3.79703E-01	2.14114E-06	3.79130E-01	-8.30968E-03	.00000E+00	.00000E+00	.00000E+00	4.34834E-01
16	2.11973E-01	1.64051E-06	2.11517E-01	-4.45898E-03	.00000E+00	.00000E+00	.00000E+00	2.42685E-01
17	9.39554E-02	9.74090E-07	9.33183E-02	-4.07525E-03	.00000E+00	.00000E+00	.00000E+00	1.07508E-01
18	7.96330E-02	9.57096E-07	7.86898E-02	-5.49073E-03	.00000E+00	.00000E+00	.00000E+00	9.10705E-02
19	1.48386E-01	1.59252E-06	1.47348E-01	-6.55263E-03	.00000E+00	.00000E+00	.00000E+00	1.69782E-01
20	4.84690E-01	4.64088E-06	4.80895E-01	-2.30705E-02	.00000E+00	.00000E+00	.00000E+00	5.54503E-01
21	1.52209E-01	-7.15299E-06	1.49198E-01	-1.61558E-02	.00000E+00	.00000E+00	.00000E+00	1.73914E-01
22	3.09925E-01	3.96618E-06	3.01460E-01	-4.47518E-02	.00000E+00	.00000E+00	.00000E+00	3.53887E-01
23	9.54642E-01	-1.09747E-06	9.26991E-01	-1.31237E-01	.00000E+00	.00000E+00	.00000E+00	1.08924E+00
24	7.16562E-01	-2.49207E-06	6.85279E-01	-1.38197E-01	.00000E+00	.00000E+00	.00000E+00	8.15240E-01
25	3.08383E-01	-1.02446E-06	2.89428E-01	-7.05525E-02	.00000E+00	.00000E+00	.00000E+00	3.49800E-01
26	2.10268E-01	-8.84297E-07	1.89113E-01	-6.56687E-02	.00000E+00	.00000E+00	.00000E+00	2.36552E-01
27	3.88360E-02	1.29718E-07	3.16252E-02	-1.78497E-02	.00000E+00	.00000E+00	.00000E+00	4.28482E-02
28	2.37882E+01	3.21612E-06	2.37450E+01	6.22278E-02	4.19263E-10	.00000E+00	.00000E+00	2.72146E+01

1fine group summary for system

0 grp.	fix source	fiss source	in scatter	slf scatter	out scatter	absorption	leakage	balance
1	.00000E+00	2.15908E-02	.00000E+00	2.15009E-02	2.05796E-02	3.50941E-03	-9.49344E-09	9.98823E-01
2	.00000E+00	1.89806E-01	7.04589E-03	2.65070E-01	1.82279E-01	1.45866E-02	1.00706E-07	1.00002E+00

3	.00000E+00	2.15143E-01	7.51173E-02	2.78400E-01	2.74554E-01	1.57110E-02	-9.95787E-09	9.99986E-01
4	.00000E+00	1.24340E-01	1.13270E-01	1.92461E-01	2.30049E-01	7.56141E-03	-4.15396E-08	1.00000E+00
5	.00000E+00	1.65620E-01	2.07433E-01	4.88664E-01	3.68413E-01	4.64417E-03	-7.27154E-08	9.99989E-01
6	.00000E+00	1.79580E-01	4.26327E-01	1.34362E+00	5.98413E-01	7.48561E-03	-5.61769E-09	1.00001E+00
7	.00000E+00	8.90899E-02	6.62359E-01	1.77552E+00	7.43275E-01	8.18130E-03	-1.58678E-07	9.99990E-01
8	.00000E+00	1.37510E-02	7.79720E-01	1.78956E+00	7.78918E-01	1.46157E-02	-1.54147E-07	9.99921E-01
9	.00000E+00	9.98454E-04	7.69483E-01	1.55417E+00	7.45854E-01	2.47108E-02	9.33769E-08	9.99895E-01
10	.00000E+00	7.41661E-05	7.42679E-01	1.40604E+00	7.05236E-01	3.75918E-02	3.18761E-08	9.99900E-01
11	.00000E+00	5.83497E-06	7.10348E-01	1.29662E+00	6.49708E-01	6.06868E-02	1.97993E-08	9.99942E-01
12	.00000E+00	4.09897E-07	5.66901E-01	7.01260E-01	5.02596E-01	6.43206E-02	-1.33726E-10	9.99974E-01
13	.00000E+00	6.50880E-08	4.98538E-01	5.52309E-01	4.40685E-01	5.79679E-02	-1.25753E-08	9.99971E-01
14	.00000E+00	1.28987E-08	4.76895E-01	5.14321E-01	3.97713E-01	7.91868E-02	3.14674E-08	9.99989E-01
15	.00000E+00	1.45770E-09	2.61415E-01	2.36402E-01	2.53270E-01	8.14122E-03	2.14114E-06	1.00000E+00
16	.00000E+00	4.28030E-10	1.78143E-01	1.10004E-01	1.73438E-01	4.70329E-03	1.64051E-06	9.99999E-01
17	.00000E+00	1.37847E-10	9.61571E-02	3.56395E-02	9.15337E-02	4.62251E-03	9.74090E-07	1.00000E+00
18	.00000E+00	9.86942E-11	8.60976E-02	2.88371E-02	7.99845E-02	6.11237E-03	9.57098E-07	9.99997E-01
19	.00000E+00	1.39533E-10	1.41091E-01	7.16631E-02	1.34438E-01	6.65180E-03	1.59252E-06	9.99997E-01
20	.00000E+00	2.26894E-10	3.35127E-01	3.98972E-01	3.07190E-01	2.79813E-02	4.64089E-06	1.00000E+00
21	.00000E+00	3.32100E-11	1.67307E-01	8.64159E-02	1.49869E-01	1.74378E-02	-7.15299E-06	1.00005E+00
22	.00000E+00	3.85312E-11	3.17259E-01	2.36989E-01	2.68153E-01	4.91022E-02	3.96618E-06	9.99998E-01
23	.00000E+00	3.68400E-11	7.57664E-01	1.15355E+00	6.17524E-01	1.40128E-01	-1.09747E-06	1.00002E+00
24	.00000E+00	1.00274E-11	7.88068E-01	9.53341E-01	6.35522E-01	1.52537E-01	-2.49207E-06	1.00002E+00
25	.00000E+00	2.95536E-12	5.13315E-01	3.81120E-01	4.28195E-01	8.51169E-02	-1.02446E-06	1.00001E+00
26	.00000E+00	2.05829E-12	3.96198E-01	3.80039E-01	3.18810E-01	7.73861E-02	-8.84297E-07	1.00001E+00
27	.00000E+00	4.90502E-13	1.29830E-01	7.68663E-02	1.07887E-01	2.19433E-02	1.29718E-07	1.00000E+00
28	.00000E+00	1.00000E+00	1.02038E+01	1.63294E+01	1.02038E+01	1.00257E+00	3.20340E-06	9.99974E-01

0 grp.	rt bdy flux	rt leakage	lft bdy flux	lft leakage	n2n rate	fiss rate	flux*bdy**2	total flux
1	1.62161E-01	-9.49344E-09	1.69616E-01	.00000E+00	2.27008E-03	2.53617E-03	.00000E+00	3.41756E-01
2	1.22281E+00	1.00706E-07	1.30607E+00	.00000E+00	1.77724E-05	1.17400E-02	.00000E+00	2.59416E+00
3	1.56001E+00	-9.95787E-09	1.66886E+00	.00000E+00	.00000E+00	1.45464E-02	.00000E+00	3.31300E+00
4	9.69351E-01	-4.15396E-08	1.03787E+00	.00000E+00	.00000E+00	6.30671E-03	.00000E+00	2.06056E+00
5	1.46411E+00	-7.27154E-08	1.57324E+00	.00000E+00	.00000E+00	1.87378E-03	.00000E+00	3.11652E+00
6	2.81824E+00	-5.61769E-09	3.02952E+00	.00000E+00	.00000E+00	1.71699E-03	.00000E+00	5.99977E+00
7	2.78075E+00	-1.58678E-07	2.90439E+00	.00000E+00	.00000E+00	1.77358E-03	.00000E+00	5.86513E+00
8	2.06332E+00	-1.54147E-07	2.07886E+00	.00000E+00	.00000E+00	1.87589E-03	.00000E+00	4.30158E+00
9	1.60284E+00	9.33769E-08	1.58463E+00	.00000E+00	.00000E+00	2.58685E-03	.00000E+00	3.32605E+00
10	1.46559E+00	3.18761E-08	1.44202E+00	.00000E+00	.00000E+00	5.50833E-03	.00000E+00	3.03607E+00
11	1.35014E+00	1.97993E-08	1.30015E+00	.00000E+00	.00000E+00	1.13391E-02	.00000E+00	2.77967E+00
12	8.50654E-01	-1.33726E-10	7.95485E-01	.00000E+00	.00000E+00	1.44411E-02	.00000E+00	1.73599E+00
13	7.20541E-01	-1.23753E-08	6.73925E-01	.00000E+00	.00000E+00	1.36448E-02	.00000E+00	1.47178E+00
14	6.68451E-01	3.14674E-08	5.99437E-01	.00000E+00	.00000E+00	9.68757E-03	.00000E+00	1.34965E+00
15	3.79703E-01	2.14114E-06	3.73156E-01	.00000E+00	.00000E+00	2.44874E-03	.00000E+00	7.87020E-01
16	2.11973E-01	1.64051E-06	2.08456E-01	.00000E+00	.00000E+00	1.63364E-03	.00000E+00	4.39800E-01
17	9.39556E-02	9.74090E-07	9.05465E-02	.00000E+00	.00000E+00	2.42217E-03	.00000E+00	1.93522E-01
18	7.96330E-02	9.57096E-07	7.49389E-02	.00000E+00	.00000E+00	3.14991E-03	.00000E+00	1.62878E-01
19	1.48386E-01	1.59252E-06	1.42876E-01	.00000E+00	.00000E+00	3.90643E-03	.00000E+00	3.05558E-01
20	4.84690E-01	4.64088E-06	4.65135E-01	.00000E+00	.00000E+00	1.72471E-02	.00000E+00	9.97033E-01
21	1.52209E-01	-7.15299E-06	1.38279E-01	.00000E+00	.00000E+00	1.11861E-02	.00000E+00	3.08133E-01
22	3.09925E-01	3.96618E-06	2.70401E-01	.00000E+00	.00000E+00	3.11145E-02	.00000E+00	6.20613E-01
23	9.54642E-01	-1.09747E-06	8.38888E-01	.00000E+00	.00000E+00	8.70385E-02	.00000E+00	1.91336E+00
24	7.16562E-01	-2.49207E-06	5.89883E-01	.00000E+00	.00000E+00	9.44123E-02	.00000E+00	1.40871E+00
25	3.08383E-01	-1.02446E-06	2.40658E-01	.00000E+00	.00000E+00	5.47217E-02	.00000E+00	5.96821E-01
26	2.10268E-01	-8.84297E-07	1.43568E-01	.00000E+00	.00000E+00	5.03591E-02	.00000E+00	3.91359E-01
27	3.88360E-02	1.29718E-07	1.82834E-02	.00000E+00	.00000E+00	1.40471E-02	.00000E+00	6.59440E-02
28	2.37882E+01	3.21612E-06	2.37569E+01	.00000E+00	2.28785E-03	4.75264E-01	.00000E+00	4.94819E+01

- elapsed time .02 min.

0direct access unit 9 requires 516 blocks of length 1456 for cross section weighting.

1 transport cross section weighting function

0zone	grp. 1	grp. 2	grp. 3	grp. 4	grp. 5	grp. 6	grp. 7	grp. 8
1	2.28201E-03	2.45111E-02	3.14747E-02	1.91341E-02	2.98150E-02	5.59903E-02	3.19026E-02	4.59996E-03

2	3.56976E-03	3.80654E-02	4.86295E-02	2.95021E-02	4.49991E-02	8.47653E-02	4.81425E-02	6.91430E-03
3	2.90054E-03	3.24762E-02	4.29348E-02	2.71977E-02	4.24442E-02	8.05892E-02	4.61187E-02	5.51826E-03
4	1.00127E-03	1.19508E-02	1.64580E-02	1.09506E-02	1.74601E-02	3.34190E-02	1.93421E-02	1.97977E-03
5	1.66181E-03	1.86404E-02	2.46721E-02	1.56208E-02	2.44024E-02	4.65789E-02	2.67257E-02	3.29008E-03

Ozone	grp. 9	grp. 10	grp. 11	grp. 12	grp. 13	grp. 14	grp. 15	grp. 16
1	4.79708E-03	5.93129E-03	1.25933E-02	1.44534E-02	1.19970E-02	1.75072E-02	1.83347E-03	9.86573E-04
2	7.20549E-03	8.89850E-03	1.89432E-02	2.18226E-02	1.80992E-02	2.65540E-02	2.72512E-03	1.47934E-03
3	5.80106E-03	8.34660E-03	1.77139E-02	2.01774E-02	1.67294E-02	2.45408E-02	2.54984E-03	1.37622E-03
4	1.98844E-03	3.39517E-03	7.19347E-03	8.10473E-03	6.75643E-03	9.87134E-03	1.10883E-03	5.81428E-04
5	3.36643E-03	4.83346E-03	1.02540E-02	1.16707E-02	9.70110E-03	1.41787E-02	1.52319E-03	8.11876E-04

Ozone	grp. 17	grp. 18	grp. 19	grp. 20	grp. 21	grp. 22	grp. 23	grp. 24
1	9.06648E-04	1.21812E-03	1.46287E-03	5.15797E-03	3.53078E-03	9.85200E-03	2.87242E-02	3.01170E-02
2	1.36818E-03	1.84425E-03	2.19492E-03	7.75647E-03	5.35673E-03	1.50040E-02	4.36069E-02	4.60956E-02
3	1.26507E-03	1.70526E-03	2.05242E-03	7.16904E-03	4.98443E-03	1.38862E-02	4.05360E-02	4.27688E-02
4	5.12890E-04	6.84691E-04	8.26263E-04	2.90586E-03	2.01327E-03	5.59257E-03	1.66466E-02	1.74718E-02
5	7.34486E-04	9.85068E-04	1.18528E-03	4.16750E-03	2.87553E-03	8.00844E-03	2.35398E-02	2.47246E-02

Ozone	grp. 25	grp. 26	grp. 27	grp. 28
1	1.54907E-02	1.41313E-02	3.69046E-03	3.83691E-01
2	2.38526E-02	2.21059E-02	6.07750E-03	5.85578E-01
3	2.19868E-02	2.04189E-02	5.58307E-03	5.39751E-01
4	8.89766E-03	8.13641E-03	2.04488E-03	2.17222E-01
5	1.26692E-02	1.16111E-02	3.01905E-03	3.11448E-01

1 80 d, sas2h: babcock wilcox 15x15, 3.00w%, 20gwd/mtu burn high temp

Ocell averaged fluxes

Ozone	grp. 1	grp. 2	grp. 3	grp. 4	grp. 5	grp. 6	grp. 7	grp. 8
1	1.67760E-01	1.28589E+00	1.64329E+00	1.02237E+00	1.54860E+00	2.98131E+00	2.87547E+00	2.07391E+00
2	1.64667E-01	1.25332E+00	1.60289E+00	9.98405E-01	1.51153E+00	2.91143E+00	2.83435E+00	2.06669E+00
3	1.63541E-01	1.24154E+00	1.58793E+00	9.89434E-01	1.49782E+00	2.88491E+00	2.81924E+00	2.06443E+00
4	1.62157E-01	1.22524E+00	1.56105E+00	9.70842E-01	1.46593E+00	2.82182E+00	2.78242E+00	2.06268E+00
5	1.64192E-01	1.24633E+00	1.59169E+00	9.89966E-01	1.49729E+00	2.88251E+00	2.81782E+00	2.06664E+00

Ozone	grp. 9	grp. 10	grp. 11	grp. 12	grp. 13	grp. 14	grp. 15	grp. 16
1	1.58964E+00	1.44780E+00	1.31247E+00	8.07731E-01	6.85553E-01	6.16570E-01	3.75028E-01	2.09401E-01
2	1.59707E+00	1.45595E+00	1.32988E+00	8.28065E-01	7.02170E-01	6.41207E-01	3.77593E-01	2.10727E-01
3	1.59958E+00	1.45858E+00	1.33549E+00	8.34530E-01	7.07555E-01	6.49085E-01	3.78444E-01	2.11172E-01
4	1.60271E+00	1.46525E+00	1.34942E+00	8.49926E-01	7.20086E-01	6.67653E-01	3.79920E-01	2.12039E-01
5	1.59796E+00	1.45864E+00	1.33545E+00	8.34033E-01	7.07086E-01	6.48420E-01	3.78113E-01	2.11056E-01

Ozone	grp. 17	grp. 18	grp. 19	grp. 20	grp. 21	grp. 22	grp. 23	grp. 24
1	9.13908E-02	7.60806E-02	1.44252E-01	4.69975E-01	1.41622E-01	2.80015E-01	8.66382E-01	6.19525E-01
2	9.26043E-02	7.77306E-02	1.46207E-01	4.76894E-01	1.46448E-01	2.93886E-01	9.05789E-01	6.61758E-01
3	9.30083E-02	7.82729E-02	1.46851E-01	4.79156E-01	1.47992E-01	2.98187E-01	9.17860E-01	6.74141E-01
4	9.39316E-02	7.95696E-02	1.48341E-01	4.84477E-01	1.51951E-01	3.09196E-01	9.51684E-01	7.12287E-01
5	9.29749E-02	7.82526E-02	1.46801E-01	4.79011E-01	1.48088E-01	2.98165E-01	9.19249E-01	6.76797E-01

Ozone	grp. 25	grp. 26	grp. 27
1	2.56240E-01	1.58256E-01	2.25591E-02
2	2.78764E-01	1.79726E-01	2.91393E-02
3	2.85005E-01	1.85275E-01	3.06398E-02
4	3.05625E-01	2.06679E-01	3.74371E-02
5	2.86734E-01	1.88023E-01	3.16819E-02

Oflux disadvantage factors (zone average/cell average-flux)

Ozone	grp. 1	grp. 2	grp. 3	grp. 4	grp. 5	grp. 6	grp. 7	grp. 8
1	1.02173E+00	1.03175E+00	1.03242E+00	1.03279E+00	1.03427E+00	1.03428E+00	1.02046E+00	1.00852E+00
2	1.00289E+00	1.00561E+00	1.00704E+00	1.00853E+00	1.00951E+00	1.01008E+00	1.00587E+00	1.00003E+00
3	9.96033E-01	9.96160E-01	9.97640E-01	9.99463E-01	1.00036E+00	1.00084E+00	1.00050E+00	9.98931E-01
4	9.87602E-01	9.81478E-01	9.80751E-01	9.80178E-01	9.79057E-01	9.78946E-01	9.87437E-01	9.98084E-01
5	1.00000E+00	1.00000E+00	1.00000E+00	1.00000E+00	1.00000E+00	1.00000E+00	1.00000E+00	1.00000E+00

Ozone	grp. 9	grp. 10	grp. 11	grp. 12	grp. 13	grp. 14	grp. 15	grp. 16
1	9.94795E-01	9.92567E-01	9.82790E-01	9.68463E-01	9.69547E-01	9.50880E-01	9.91842E-01	9.92158E-01
2	9.99446E-01	9.98141E-01	9.95830E-01	9.92844E-01	9.93047E-01	9.88875E-01	9.98625E-01	9.98444E-01

3	1.00089E+00	9.99962E-01	1.00003E+00	1.00060E+00	1.00066E+00	1.00103E+00	1.00087E+00	1.00055E+00
4	1.00298E+00	1.00453E+00	1.01046E+00	1.01906E+00	1.01858E+00	1.02966E+00	1.00478E+00	1.00466E+00
5	1.00000E+00	1.00000E+00	1.00000E+00	1.00000E+00	1.00000E+00	1.00000E+00	1.00000E+00	1.00000E+00

Ozone	grp. 17	grp. 18	grp. 19	grp. 20	grp. 21	grp. 22	grp. 23	grp. 24
1	9.82963E-01	9.72245E-01	9.82634E-01	9.81136E-01	9.56658E-01	9.39129E-01	9.42489E-01	9.15083E-01
2	9.96014E-01	9.93330E-01	9.95952E-01	9.95581E-01	9.89253E-01	9.85650E-01	9.85358E-01	9.77779E-01
3	1.00036E+00	1.00026E+00	1.00034E+00	1.00030E+00	9.99689E-01	1.00007E+00	9.98490E-01	9.96076E-01
4	1.01029E+00	1.01683E+00	1.01049E+00	1.01141E+00	1.02643E+00	1.03700E+00	1.03528E+00	1.05244E+00
5	1.00000E+00	1.00000E+00	1.00000E+00	1.00000E+00	1.00000E+00	1.00000E+00	1.00000E+00	1.00000E+00

Ozone	grp. 25	grp. 26	grp. 27
1	8.93651E-01	8.41680E-01	7.12051E-01
2	9.72210E-01	9.55872E-01	9.19745E-01
3	9.98969E-01	9.85385E-01	9.67109E-01
4	1.06588E+00	1.09922E+00	1.18166E+00
5	1.00000E+00	1.00000E+00	1.00000E+00

Ocell averaged currents

Ozone	grp. 1	grp. 2	grp. 3	grp. 4	grp. 5	grp. 6	grp. 7	grp. 8
1	2.28201E-03	2.45111E-02	3.14747E-02	1.91341E-02	2.95150E-02	5.59903E-02	3.19026E-02	4.59996E-03
2	3.56976E-03	3.80654E-02	4.86295E-02	2.95021E-02	4.49991E-02	8.47653E-02	4.81425E-02	6.91430E-03
3	2.90064E-03	3.24762E-02	4.29348E-02	2.71977E-02	4.24442E-02	8.05892E-02	4.61187E-02	5.51826E-03
4	1.00127E-03	1.19508E-02	1.64580E-02	1.09506E-02	1.74601E-02	3.34190E-02	1.98421E-02	1.97977E-03
5	1.66181E-03	1.86404E-02	2.46721E-02	1.56208E-02	2.44024E-02	4.65789E-02	2.67257E-02	3.29008E-03

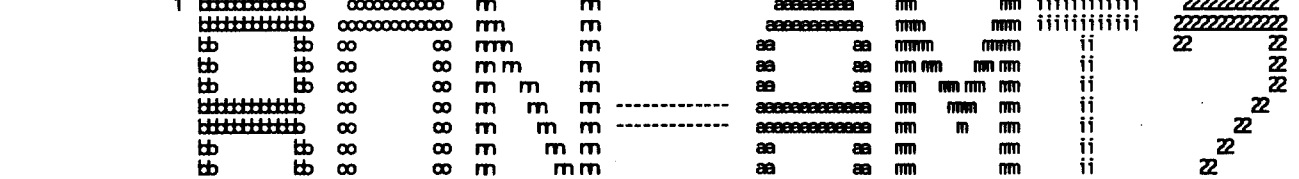
Ozone	grp. 9	grp. 10	grp. 11	grp. 12	grp. 13	grp. 14	grp. 15	grp. 16
1	4.79708E-03	5.93129E-03	1.25933E-02	1.44534E-02	1.19970E-02	1.75072E-02	1.83347E-03	9.86573E-04
2	7.20549E-03	8.89850E-03	1.89432E-02	2.18226E-02	1.80992E-02	2.65540E-02	2.72512E-03	1.47934E-03
3	5.80105E-03	8.34660E-03	1.77139E-02	2.01774E-02	1.67294E-02	2.45408E-02	2.54984E-03	1.37622E-03
4	1.95844E-03	3.39517E-03	7.19347E-03	8.10473E-03	6.75643E-03	9.87134E-03	1.10883E-03	5.81428E-04
5	3.36643E-03	4.83346E-03	1.02540E-02	1.16707E-02	9.70110E-03	1.41787E-02	1.52319E-03	8.11876E-04

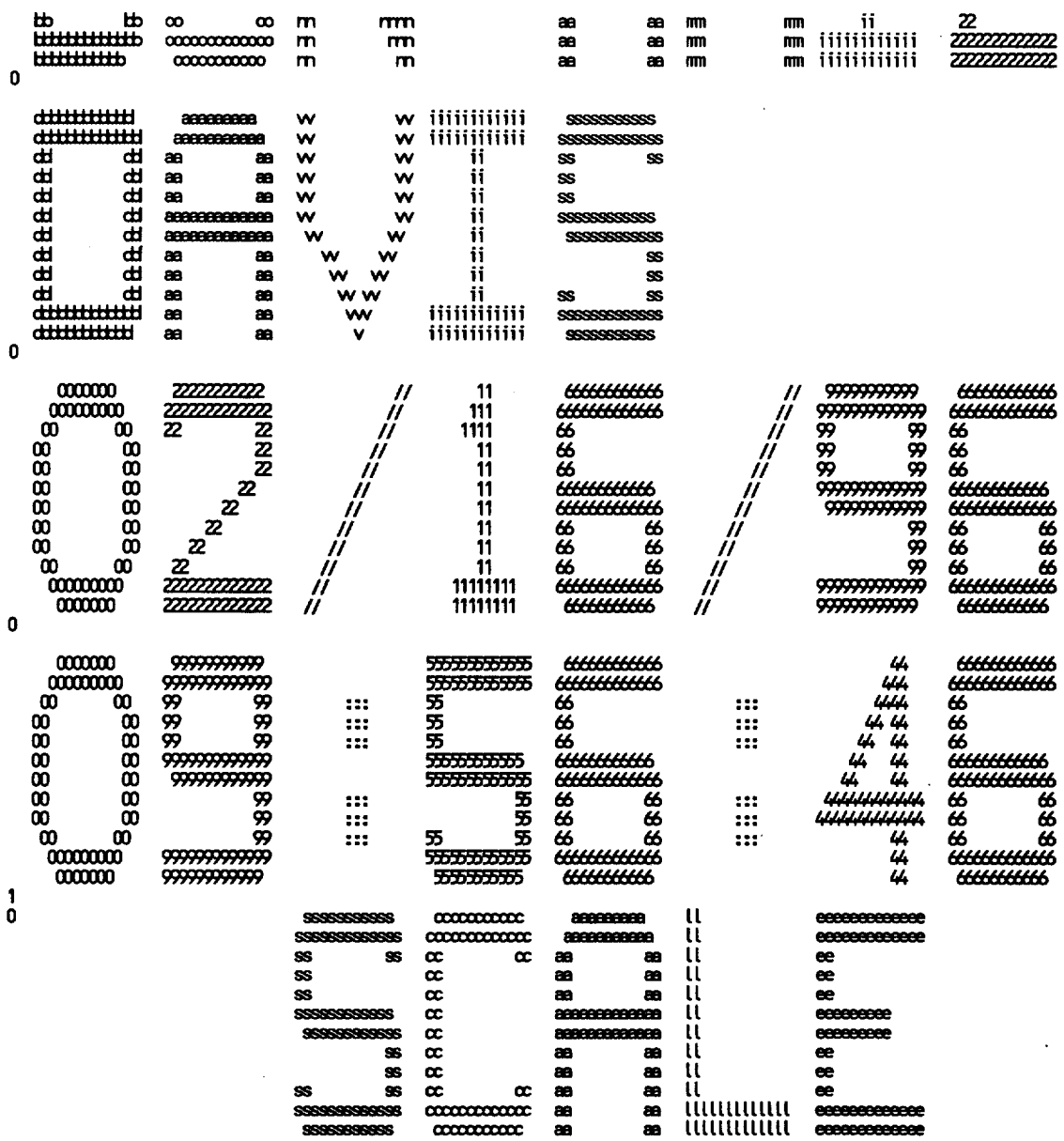
Ozone	grp. 17	grp. 18	grp. 19	grp. 20	grp. 21	grp. 22	grp. 23	grp. 24
1	9.06648E-04	1.21812E-03	1.46287E-03	5.15797E-03	3.53076E-03	9.85200E-03	2.87242E-02	3.01170E-02
2	1.36818E-03	1.84425E-03	2.19492E-03	7.75647E-03	5.35673E-03	1.50040E-02	4.36069E-02	4.60956E-02
3	1.26507E-03	1.70526E-03	2.03242E-03	7.16904E-03	4.98443E-03	1.38862E-02	4.05360E-02	4.27688E-02
4	5.12890E-04	6.84691E-04	8.26263E-04	2.90886E-03	2.01327E-03	5.59257E-03	1.66466E-02	1.74718E-02
5	7.34486E-04	9.85068E-04	1.18328E-03	4.16750E-03	2.87553E-03	8.00844E-03	2.35398E-02	2.47246E-02

Ozone	grp. 25	grp. 26	grp. 27
1	1.54907E-02	1.41313E-02	3.69046E-03
2	2.38526E-02	2.21059E-02	6.07750E-03
3	2.19868E-02	2.04189E-02	5.58307E-03
4	8.89766E-03	8.13641E-03	2.04488E-03
5	1.26692E-02	1.16111E-02	3.01905E-03

Ozone	volume	vol. fraction
1	6.88443E-01	3.30753E-01
2	3.17352E-02	1.52468E-02
3	2.16724E-01	1.04122E-01
4	1.14454E+00	5.49878E-01
5	2.08144E+00	1.00000E+00

- elapsed time .03 min.
Orequested parm=halt8,skipcellwt,skipshipdata
pass= 1, exec halts after pass 8





```
*********************************************************************
*********************************************************************
*********************************************************************
*****                                                           *****
*****                program verification information           *****
*****                                                           *****
*****                code system:    scale  version:    4.2     *****
*****                                                           *****
*********************************************************************
*********************************************************************
*****                                                           *****
*****                                                           *****
*****                program:  c0c008                           *****
*****                                                           *****
*****           creation date:  04/27/95                        *****
*****                                                           *****
*****                library:  /neutronics/scale/exe            *****
*****                                                           *****
*****                                                           *****
*****      this is not a  scale  configuration controlled code  *****
*****                                                           *****
*****                jobname:  davis                            *****
*****                                                           *****
*****      date of execution:  02/16/96                         *****
*****                                                           *****
*****      time of execution:  09:56:46                         *****
*****                                                           *****
*****                                                           *****
*********************************************************************
*********************************************************************
*********************************************************************
```

```
1
0       -1q array has      1 entries.
0        0q array has      4 entries.
0        1q array has      6 entries.
0        2q array has      2 entries.
1logical assignments
0master library   12
 working library  17
 scratch file     18
 new library       1
0p r o b l e m   d e s c r i p t i o n
0igr--geometry (0/1/2/3--inf med/slab/cyl/sphere                2
0izm--number of zones or material regions                       4
0ms--mixing table length                                       70
0ibl--shielded cross section edit option (0/1--no/yes)          0
0ibr--bondarenko factor edit option (0/1--no/yes)               0
0issopt--dancoff factor option                                  0
0convergence criterion    1.00000E-03
0geometry correction factor for wigner rational approximation 1.350E+00
0        3q array has     70 entries.
0        4q array has     70 entries.
0        5q array has     70 entries.
0        6q array has      4 entries.
0        7q array has      4 entries.
0        8q array has      4 entries.
0        9q array has      4 entries.
```

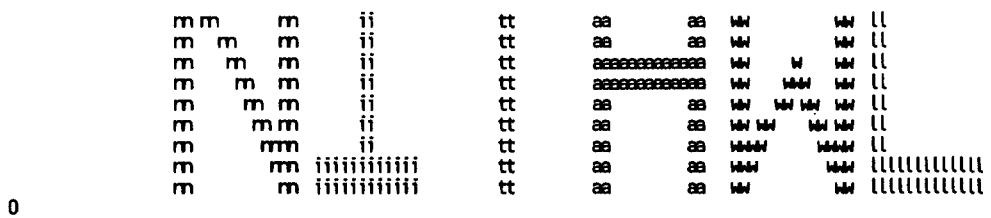
0 10q array has 70 entries.
0 11q array has 4 entries.
0 m i x i n g t a b l e

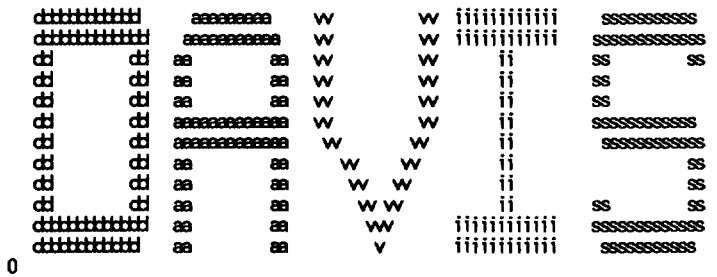
0entry	mixture	isotope	number density	new identifier
1	3	8016	2.09710E-02	201
2	3	1001	4.19420E-02	202
3	3	5010	3.81515E-06	203
4	3	5011	1.54884E-05	204
5	2	40302	4.25156E-02	205
6	1	92235	2.17519E-04	200006
7	1	92234	1.80384E-06	200007
8	1	92236	3.09919E-06	200008
9	1	92238	7.29235E-05	200009
10	1	8016	1.50611E-02	200010
11	1	8016	1.15315E-02	200011
12	1	36083	5.19887E-08	200012
13	1	36085	2.52399E-08	200013
14	1	38090	5.64542E-07	200014
15	1	39089	1.85221E-07	200015
16	1	42095	8.27836E-08	200016
17	1	40093	4.11148E-07	200017
18	1	40094	6.33205E-07	200018
19	1	40095	4.27857E-07	200019
20	1	41094	1.77349E-13	200020
21	1	43099	5.87758E-07	200021
22	1	45103	1.52118E-07	200022
23	1	45105	3.63974E-09	200023
24	1	44101	5.18370E-07	200024
25	1	44106	5.96664E-08	200025
26	1	46105	1.21221E-07	200026
27	1	46108	1.56859E-08	200027
28	1	47109	9.63590E-09	200028
29	1	51124	3.00803E-12	200029
30	1	54131	2.47825E-07	200030
31	1	54132	4.19533E-07	200031
32	1	54135	2.09120E-09	200032
33	1	54136	9.95252E-07	200033
34	1	55134	2.70779E-09	200034
35	1	55135	2.99702E-07	200035
36	1	55137	6.30110E-07	200036
37	1	56136	7.27113E-10	200037
38	1	57139	6.33240E-07	200038
39	1	59141	3.00200E-07	200039
40	1	59143	1.34650E-07	200040
41	1	58144	4.90451E-07	200041
42	1	60143	4.35283E-07	200042
43	1	60145	3.87075E-07	200043
44	1	61147	1.73729E-07	200044
45	1	61148	4.19133E-10	200045
46	1	60147	4.46317E-08	200046
47	1	62147	4.30449E-09	200047
48	1	62149	2.10275E-08	200048
49	1	62150	8.60817E-08	200049
50	1	62151	3.43758E-08	200050
51	1	62152	3.85958E-08	200051
52	1	64155	3.40414E-11	200052
53	1	63153	1.83469E-08	200053
54	1	63154	5.35540E-10	200054
55	1	63155	3.62762E-09	200055
56	1	40302	4.42681E-05	200056

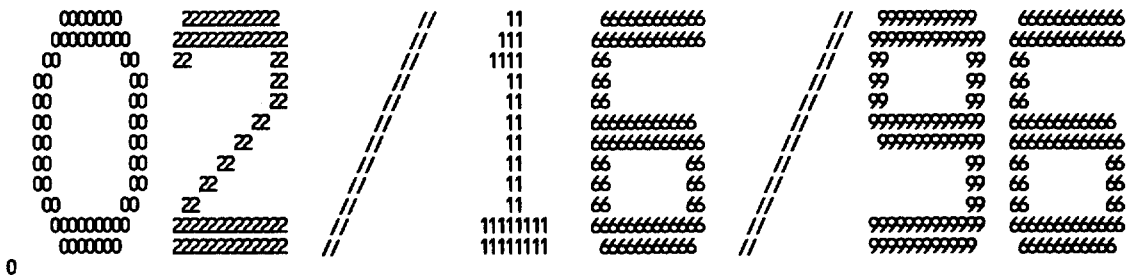
```
   57     1      1001   2.30630E-02         200057
   58     1      5010   2.09787E-06         200058
   59     1      5011   8.51673E-06         200059
   60     1     55133   6.04856E-07         200060
   61     1     93237   4.79701E-08         200061
   62     1     94238   5.71923E-10         200062
   63     1     94239   5.27664E-06         200063
   64     1     94240   1.45266E-07         200064
   65     1     94241   1.08078E-08         200065
   66     1     94242   9.49211E-11         200066
   67     1     95241   2.80565E-11         200067
   68     1     95243   5.82811E-13         200068
   69     1     96244   3.88991E-15         200069
   70     1       999   3.30753E-21         200070
0geometry and material description
0zone  mixture  outer dimension  temperature    extra xs   type (0/1--fuel/mod)
    1     3       6.32460E-01    6.07600E+02  7.90564E-01         0
    2     2       6.73100E-01    6.50000E+02  1.23032E+01         0
    3     3       8.14000E-01    6.07600E+02  3.54862E+00         0
    4     1       2.96100E+00    9.75000E+02  2.32883E-01         0
     8067 locations of   200000 available are required to make a new master containing the self-shielded values
0no nuclides in your problem have bondarenko factor data**bonami will copy from logical 12 to logical  1
0copy      999  1/v cross sectio from log 12 to log  1   bondarenko trigger 0
0copy     1001  hydrogen         from log 12 to log 18   bondarenko trigger 0
0copy     1001  hydrogen         from log 18 to log  1   bondarenko trigger 0
0copy     1001  hydrogen         from log 18 to log  1   bondarenko trigger 0
0copy     5010  b-10 1273 218grp from log 12 to log 18   bondarenko trigger 0
0copy     5010  b-10 1273 218grp from log 18 to log  1   bondarenko trigger 0
0copy     5010  b-10 1273 218grp from log 18 to log  1   bondarenko trigger 0
0copy     5011  boron-11         from log 12 to log 18   bondarenko trigger 0
0copy     5011  boron-11         from log 18 to log  1   bondarenko trigger 0
0copy     5011  boron-11         from log 18 to log  1   bondarenko trigger 0
0copy     8016  oxygen-16        from log 12 to log 18   bondarenko trigger 0
0copy     8016  oxygen-16        from log 18 to log  1   bondarenko trigger 0
0copy     8016  oxygen-16        from log 18 to log  1   bondarenko trigger 0
0copy     8016  oxygen-16        from log 18 to log  1   bondarenko trigger 0
0copy    36083  kr-83            from log 12 to log  1   bondarenko trigger 0
0copy    36085  kr-85            from log 12 to log  1   bondarenko trigger 0
0copy    38090  sr-90            from log 12 to log  1   bondarenko trigger 0
0copy    39089   y-89            from log 12 to log  1   bondarenko trigger 0
0copy    40093  zr-93            from log 12 to log  1   bondarenko trigger 0
0copy    40094  zr-94            from log 12 to log  1   bondarenko trigger 0
0copy    40095  zr-95            from log 12 to log  1   bondarenko trigger 0
0copy    40302  zircalloy        from log 12 to log 18   bondarenko trigger 0
0copy    40302  zircalloy        from log 18 to log  1   bondarenko trigger 0
0copy    40302  zircalloy        from log 18 to log  1   bondarenko trigger 0
0copy    41094  nb-94            from log 12 to log  1   bondarenko trigger 0
0copy    42095  mo-95            from log 12 to log  1   bondarenko trigger 0
0copy    43099  tc-99            from log 12 to log  1   bondarenko trigger 0
0copy    44101  ru-101           from log 12 to log  1   bondarenko trigger 0
0copy    44106  ru-106           from log 12 to log  1   bondarenko trigger 0
0copy    45103  rh-103           from log 12 to log  1   bondarenko trigger 0
0copy    45105  rh-105           from log 12 to log  1   bondarenko trigger 0
0copy    46105  pd-105           from log 12 to log  1   bondarenko trigger 0
0copy    46108  pd-108           from log 12 to log  1   bondarenko trigger 0
0copy    47109  silver-109       from log 12 to log  1   bondarenko trigger 0
0copy    51124  sb-124           from log 12 to log  1   bondarenko trigger 0
0copy    54131  xe-131           from log 12 to log  1   bondarenko trigger 0
0copy    54132  xe-132           from log 12 to log  1   bondarenko trigger 0
0copy    54135  xenon-135        from log 12 to log  1   bondarenko trigger 0
```

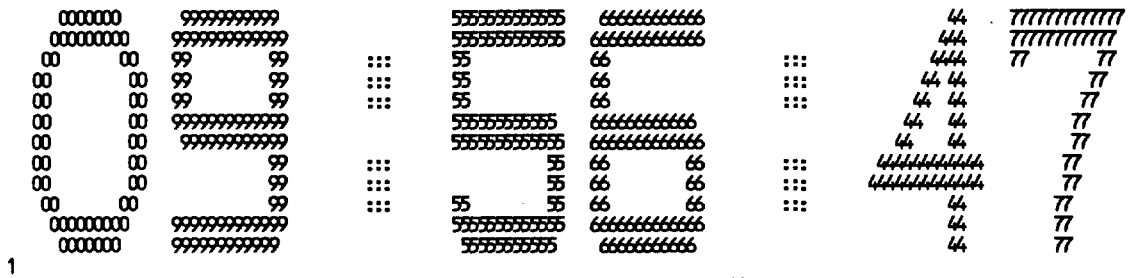
```
0copy    54136  xe-136          from log 12 to log  1    bondarenko trigger 0
0copy    55133  cesium-133      from log 12 to log  1    bondarenko trigger 0
0copy    55134  cs-134          from log 12 to log  1    bondarenko trigger 0
0copy    55135  cs-135          from log 12 to log  1    bondarenko trigger 0
0copy    55137  cs-137          from log 12 to log  1    bondarenko trigger 0
0copy    56136  ba-136          from log 12 to log  1    bondarenko trigger 0
0copy    57139  la-139          from log 12 to log  1    bondarenko trigger 0
0copy    58144  ce-144          from log 12 to log  1    bondarenko trigger 0
0copy    59141  pr-141          from log 12 to log  1    bondarenko trigger 0
0copy    59143  pr-143          from log 12 to log  1    bondarenko trigger 0
0copy    60143  nd-143          from log 12 to log  1    bondarenko trigger 0
0copy    60145  nd-145          from log 12 to log  1    bondarenko trigger 0
0copy    60147  nd-147          from log 12 to log  1    bondarenko trigger 0
0copy    61147  pm-147          from log 12 to log  1    bondarenko trigger 0
0copy    61148  pm-148          from log 12 to log  1    bondarenko trigger 0
0copy    62147  sm-147          from log 12 to log  1    bondarenko trigger 0
0copy    62149  sm-149          from log 12 to log  1    bondarenko trigger 0
0copy    62150  sm-150          from log 12 to log  1    bondarenko trigger 0
0copy    62151  sm-151          from log 12 to log  1    bondarenko trigger 0
0copy    62152  sm-152          from log 12 to log  1    bondarenko trigger 0
0copy    63153  eu-153          from log 12 to log  1    bondarenko trigger 0
0copy    63154  eu-154          from log 12 to log  1    bondarenko trigger 0
0copy    63155  eu-155          from log 12 to log  1    bondarenko trigger 0
0copy    64155  gd-155          from log 12 to log  1    bondarenko trigger 0
0copy    92234  u-234 1043 sigo= from log 12 to log  1    bondarenko trigger 0
0copy    92235  uranium-235     from log 12 to log  1    bondarenko trigger 0
0copy    92236  u-236 1163 sigo= from log 12 to log  1    bondarenko trigger 0
0copy    92238  uranium-238     from log 12 to log  1    bondarenko trigger 0
0copy    93237  neptunium-237   from log 12 to log  1    bondarenko trigger 0
0copy    94238  pu-238 1050 sigo from log 12 to log  1    bondarenko trigger 0
0copy    94239  plutonium-239   from log 12 to log  1    bondarenko trigger 0
0copy    94240  plutonium-240   from log 12 to log  1    bondarenko trigger 0
0copy    94241  plutonium-241   from log 12 to log  1    bondarenko trigger 0
0copy    94242  plutonium-242   from log 12 to log  1    bondarenko trigger 0
0copy    95241  am-241 1056 sigo from log 12 to log  1    bondarenko trigger 0
0copy    95243  am-243 1057 218  from log 12 to log  1    bondarenko trigger 0
0copy    96244  curium-244      from log 12 to log  1    bondarenko trigger 0
1     scale 4.2 - 27 group neutron burnup library
        based on endf-b version 4 data with endf-b version 5 fission products
           compiled for nrc     1/27/89
              last updated      9/16/93
                 l.m.petrie  -   ornl
         tape id                            4321          number of nuclides               70
         number of neutron groups             27          number of gamma groups            0
         first thermal group                  15          logical unit                      1
                                          table of contents
       1/v cross sections normalized to 1.0 at 0.0253 ev                            id    200070
        hydrogen      endf/b-iv mat 1269/thrm1002   updated 10/13/89                id       202
        hydrogen      endf/b-iv mat 1269/thrm1002   updated 10/13/89                id    200057
       b-10 1273 218grp 042375 p-3 293k                                             id       203
       b-10 1273 218grp 042375 p-3 293k                                             id    200058
        boron-11      endf/b-iv mat 1160            updated 10/13/89                id       204
        boron-11      endf/b-iv mat 1160            updated 10/13/89                id    200059
        oxygen-16     endf/b-iv mat 1276            updated 10/13/89                id       201
        oxygen-16     endf/b-iv mat 1276            updated 10/13/89                id    200010
        oxygen-16     endf/b-iv mat 1276            updated 10/13/89                id    200011
        kr-83         mt=102,103,103,105,106,107    updated 10/13/89                id    200012
        kr-85            mt=  102                                                   id    200013
        sr-90         mt=102                        updated 10/13/89                id    200014
        y-89          mt=102                        updated 10/13/89                id    200015
```

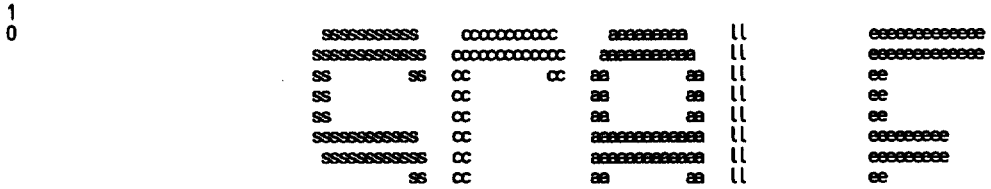
```
        zr-93          mt=  102                                                  id   200017
        zr-94          mt=102                          updated 10/13/89          id   200018
        zr-95          mt=102                          updated 10/13/89          id   200019
        zircalloy      endf/b-iv mat 1284              updated 10/13/89          id     205
        zircalloy      endf/b-iv mat 1284              updated 10/13/89          id   200056
        nb-94          mt=102                          updated 10/13/89          id   200020
        mo-95          mt=102                          updated 10/13/89          id   200016
        tc-99          mt=102                          updated 10/13/89          id   200021
        ru-101         mt=102                          updated 10/13/89          id   200024
        ru-106         mt=102                          updated 10/13/89          id   200025
        rh-103         mt=102                          updated 10/13/89          id   200022
        rh-105         mt=  102                                                  id   200023
        pd-105         mt=102                          updated 10/13/89          id   200026
        pd-108         mt=102                          updated 10/13/89          id   200027
        silver-109     endf/b-iv mat 1139              updated 10/13/89          id   200028
        sb-124         mt=102                          updated 10/13/89          id   200029
        xe-131         mt=102,103,104,105,106          updated 10/13/89          id   200030
        xe-132         mt=102,103,104,105,106          updated 10/13/89          id   200031
        xenon-135      endf/b-iv mat 1294              updated 10/13/89          id   200032
        xe-136         mt=  102, 103, 104, 105, 107                              id   200033
        cesium-133     endf/b-iv mat 1141              updated 10/13/89          id   200060
        cs-134         mt=102                          updated 10/13/89          id   200034
        cs-135         mt=  102                                                  id   200035
        cs-137         mt=102                          updated 10/13/89          id   200036
        ba-136         mt=102                          updated 10/13/89          id   200037
        la-139         mt=102                          updated 10/13/89          id   200038
        ce-144         mt=  102                                                  id   200041
        pr-141         mt=102,103,104,105,106,107      updated 10/13/89          id   200039
        pr-143         mt=102                          updated 10/13/89          id   200040
        nd-143         mt=102                          updated 10/13/89          id   200042
        nd-145         mt=102                          updated 10/13/89          id   200043
        nd-147         mt=102                          updated 10/13/89          id   200046
        pm-147         mt=102                          updated 10/13/89          id   200044
        pm-148         mt=  102                                                  id   200045
        sm-147         endf/b-v fission product        updated 10/13/89          id   200047
        sm-149         mt=102,103,107                  updated 10/13/89          id   200048
        sm-150         mt=102                          updated 10/13/89          id   200049
        sm-151         mt=102,103,104,105,106,107      updated 10/13/89          id   200050
        sm-152         mt=102,103,104,105,106,107      updated 10/13/89          id   200051
        eu-153         mt=102,103,104,105,106,107      updated 10/13/89          id   200053
        eu-154         mt=102,103,104,105,106,107      updated 10/13/89          id   200054
        eu-155         mt=102,103,104,105,106,107      updated 10/13/89          id   200055
        gd-155         mt=102                          updated 10/13/89          id   200052
       u-234 1043 sigo=5+4 newklacs p-3 293k f-1/e-m(1.+5)                       id   200007
        uranium-235    endf/b-iv mat 1261              updated 10/13/89          id   200006
       u-236 1163 sigo=5+4 newklacs p-3 293k f-1/e-m(1.+5)                       id   200008
        uranium-238    endf/b-iv mat 1262              updated 10/13/89          id   200009
        neptunium-237  endf/b-iv mat 1263              updated 10/13/89          id   200061
       pu-238 1050 sigo=5+4 newklacs p-3 293k f-1/e-m(1.+5)                      id   200062
        plutonium-239  endf/b-iv mat 1264              updated 10/13/89          id   200063
        plutonium-240  endf/b-iv mat 1265              updated 10/13/89          id   200064
        plutonium-241  endf/b-iv mat 1266              updated 10/13/89          id   200065
        plutonium-242  endf/b-iv mat 1161              updated 10/13/89          id   200066
       am-241 1056 sigo=5+4 newklacs 218ngp p-3 293k                             id   200067
       am-243 1057 218 gp wt f-1/e-m 090376 p3 293k                              id   200068
        curium-244     endf/b-iv mat 1162              updated 10/13/89          id   200069
0        tape copy used      0 i/o's, and took      .00 seconds
1              m         m  iiiiiiiiiii   ttttttttttt      eeeeeeee     kk        kk  ll
               mm        m  iiiiiiiiiii   ttttttttttt     eeeeeeeeee    kk        kk  ll
               mmm       m       ii           tt         ee        ee   kk        kk  ll
```











```
                 ss  cc          aa      aa  ll          ee
            ss   ss  cc      cc  aa      aa  ll          ee
            sssssssssssss  ccccccccccc  aa      aa  lllllllllll  eeeeeeeeeee
             sssssssssss    ccccccccc   aa      aa  lllllllllll  eeeeeeeeeee
```

```
*********************************************************************
*********************************************************************
*********************************************************************
*****                                                           *****
*****              program verification information              *****
*****                                                           *****
*****              code system:  scale  version:  4.2           *****
*****                                                           *****
*********************************************************************
*********************************************************************
*****                                                           *****
*****                                                           *****
*****              program:  c0c002                             *****
*****                                                           *****
*****          creation date:  04/27/95                         *****
*****                                                           *****
*****              library:  /neutronics/scale/exe              *****
*****                                                           *****
*****                                                           *****
*****    this is not a  scale  configuration controlled code    *****
*****                                                           *****
*****              jobname:  davis                              *****
*****                                                           *****
*****    date of execution:  02/16/96                           *****
*****                                                           *****
*****    time of execution:  09:56:47                           *****
*****                                                           *****
*****                                                           *****
*********************************************************************
*********************************************************************
*********************************************************************
```

```
1
0      -1q array has      1 entries.
0       0q array has      4 entries.
0       1q array has     12 entries.
0select  5 nuclides from the master  library on logical  1
        65 nuclides from the working library on logical  3
         0 nuclides from the working library on logical  0
           to create the new working library on logical  4

         1 resonance calculations have been requested
         0 output option for ampx formatted cross section data
0the storage allocated for this case is 200000 words
0       2q array has     70 entries.
0       3q array has     15 entries.
0       4q array has      5 entries.
0 general information concerning cross section library
    tape identification number                4349
    number of nuclides on tape                  65
    number of neutron energy groups             27
    first thermal neutron energy group          15
```

```
    number of gamma energy groups                0
0   direct access unit number  9 requires  72 blocks of length  1484 words
- xsdrn tape   4321
                        scale 4.2 - 27 group neutron burnup library
                          based on endf-b version 4 data with endf-b version 5 fission products
                            compiled for nrc      1/27/89
                              last updated        9/16/93
                                l.m.petrie   -    ornl
- work tape   4349

 xsdrn weighted tape--parent case entitled--   80 d, sas2h: babcock wilcox 15x15,
  3.00wt%, 20gwd/mtu burn high temp


0 nuclides from xsdrn tape
     1    hydrogen        endf/b-iv mat 1269/thrm1002    updated 10/13/89          202
     2   b-10 1273 218ngp 042375 p-3 293k                                           203
     3    boron-11        endf/b-iv mat 1160             updated 10/13/89          204
     4    oxygen-16       endf/b-iv mat 1276             updated 10/13/89          201
     5    zircalloy       endf/b-iv mat 1284             updated 10/13/89          205
0 nuclides from  work tape
     6   1/v cross sections normalized to 1.0 at 0.0253 ev                           999
     7    hydrogen        endf/b-iv mat 1269/thrm1002    updated 10/13/89         1001
     8   b-10 1273 218ngp 042375 p-3 293k                                          5010
     9    boron-11        endf/b-iv mat 1160             updated 10/13/89         5011
    10    oxygen-16       endf/b-iv mat 1276             updated 10/13/89         8016
    11    oxygen-16       endf/b-iv mat 1276             updated 10/13/89            6
    12    kr-83           mt=102,103,103,105,106,107     updated 10/13/89        36083
    13    kr-85             mt=  102                                              36085
    14    sr-90           mt=102                         updated 10/13/89        38090
    15     y-89           mt=102                         updated 10/13/89        39089
    16    zr-93             mt=  102                                              40093
    17    zr-94           mt=102                         updated 10/13/89        40094
    18    zr-95           mt=102                         updated 10/13/89        40095
    19    zircalloy       endf/b-iv mat 1284             updated 10/13/89        40302
    20    nb-94           mt=102                         updated 10/13/89        41094
    21    mo-95           mt=102                         updated 10/13/89        42095
    22    tc-99           mt=102                         updated 10/13/89        43099
    23    ru-101          mt=102                         updated 10/13/89        44101
    24    ru-106          mt=102                         updated 10/13/89        44106
    25    rh-103          mt=102                         updated 10/13/89        45103
    26    rh-105            mt=  102                                              45105
    27    pd-105          mt=102                         updated 10/13/89        46105
    28    pd-108          mt=102                         updated 10/13/89        46108
    29    silver-109      endf/b-iv mat 1139             updated 10/13/89        47109
    30    sb-124          mt=102                         updated 10/13/89        51124
    31    xe-131          mt=102,103,104,105,106         updated 10/13/89        54131
    32    xe-132          mt=102,103,104,105,106         updated 10/13/89        54132
    33    xenon-135       endf/b-iv mat 1294             updated 10/13/89        54135
    34    xe-136            mt=  102,  103,  104,  105,  107                      54136
    35    cesium-133      endf/b-iv mat 1141             updated 10/13/89        55133
    36    cs-134          mt=102                         updated 10/13/89        55134
    37    cs-135            mt=  102                                              55135
    38    cs-137          mt=102                         updated 10/13/89        55137
    39    ba-136          mt=102                         updated 10/13/89        56136
    40    la-139          mt=102                         updated 10/13/89        57139
    41    ce-144            mt=  102                                              58144
    42    pr-141          mt=102,103,104,105,106,107     updated 10/13/89        59141
    43    pr-143          mt=102                         updated 10/13/89        59143
```

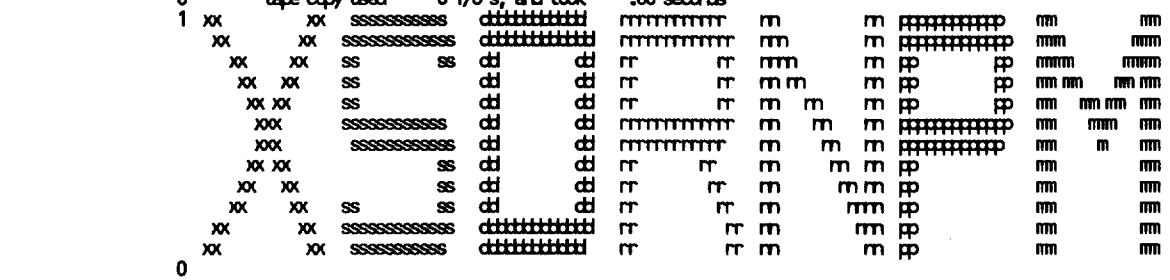
```
    44    nd-143          mt=102                          updated 10/13/89              60143
    45    nd-145          mt=102                          updated 10/13/89              60145
    46    nd-147          mt=102                          updated 10/13/89              60147
    47    pm-147          mt=102                          updated 10/13/89              61147
    48    pm-148             mt=  102                                                   61148
    49    sm-147          endf/b-v fission product        updated 10/13/89              62147
    50    sm-149          mt=102,103,107                  updated 10/13/89              62149
    51    sm-150          mt=102                          updated 10/13/89              62150
    52    sm-151          mt=102,103,104,105,106,107      updated 10/13/89              62151
    53    sm-152          mt=102,103,104,105,106,107      updated 10/13/89              62152
    54    eu-153          mt=102,103,104,105,106,107      updated 10/13/89              63153
    55    eu-154          mt=102,103,104,105,106,107      updated 10/13/89              63154
    56    eu-155          mt=102,103,104,105,106,107      updated 10/13/89              63155
    57    gd-155          mt=102                          updated 10/13/89              64155
    58   u-234 1043 sigo=5+4 nsw=lacs p-3 293k f-1/e-m(1.+5)                            92234
    59    uranium-235     endf/b-iv mat 1261              updated 10/13/89              92235
    60   u-236 1163 sigo=5+4 nsw=lacs p-3 293k f-1/e-m(1.+5)                            92236
    61    uranium-238     endf/b-iv mat 1262              updated 10/13/89              92238
    62    neptunium-237   endf/b-iv mat 1263              updated 10/13/89              93237
    63   pu-238 1050 sigo=5+4 nsw=lacs p-3 293k f-1/e-m(1.+5)                           94238
    64    plutonium-239   endf/b-iv mat 1264              updated 10/13/89              94239
    65    plutonium-240   endf/b-iv mat 1265              updated 10/13/89              94240
    66    plutonium-241   endf/b-iv mat 1266              updated 10/13/89              94241
    67    plutonium-242   endf/b-iv mat 1161              updated 10/13/89              94242
    68   am-241 1056 sigo=5+4 nsw=lacs 218ngp p-3 293k                                  95241
    69   am-243 1057 218 gp wt f-1/e-m 090376 p3 293k                                   95243
    70    curium-244      endf/b-iv mat 1162              updated 10/13/89              96244
0 hydrogen        endf/b-iv mat 1269/thrm1002    updated 10/13/89              202    temperature=  607.60
                                thermal scattering matrix number   2 at a temperature of   550.00 was selected.
0b-10 1273 218ngp 042375 p-3 293k                                               203    temperature=  607.60
                                thermal scattering matrix number   2 at a temperature of   550.00 was selected.
0 boron-11        endf/b-iv mat 1160             updated 10/13/89              204    temperature=  607.60
                                thermal scattering matrix number   2 at a temperature of   550.00 was selected.
0 oxygen-16       endf/b-iv mat 1276             updated 10/13/89              201    temperature=  607.60
0 zircalloy       endf/b-iv mat 1284             updated 10/13/89              205    temperature=  650.00
0resonance data for this nuclide
0mass number (a)          =    90.436              temperature(kelvin)      =   650.000
0potential scatter sigma  =     6.385              lumped nuclear density   = 4.2515602E-02
0spin factor (g)          =     1.079              lump dimension (a-bar)   = 6.7309999E-01
0inner radius             = 6.3246000E-01          dancoff correction (c)   = 1.6805907E-01
0the absorber will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs         res fiss        res scat
   8     -1.156752E-03     .000000E+00   -7.805033E-01
   9     -4.625978E-02     .000000E+00   -2.073270E+00
  10     -5.962230E-02     .000000E+00   -1.351984E+00
  11     -1.761672E-01     .000000E+00   -7.350731E-01
0excess resonance integrals
0                resolved
0absorption      2.9240ZE-01
 fission          .00000E+00
-  elapsed time    .00 min.
-  elapsed time    .02 min.
1     this xsdrn working tape was created 02/16/96 at 09:56:47
      the title of the parent case is as follows
      xsdrn weighted tape--parent case entitled--   80 d, sas2h: babcock wilcox 15x15,
       3.00wt%, 20gwd/mtu burn high temp

         tape id                        8670          number of nuclides              70
```

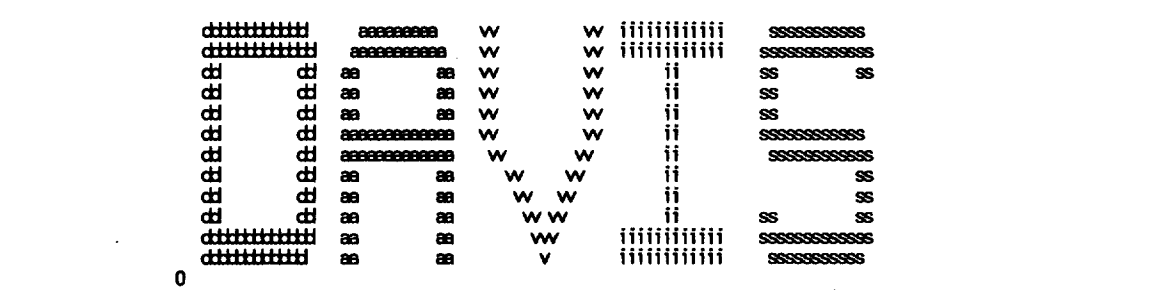
number of neutron groups 27 number of gamma groups 0
first thermal group 15 logical unit 4

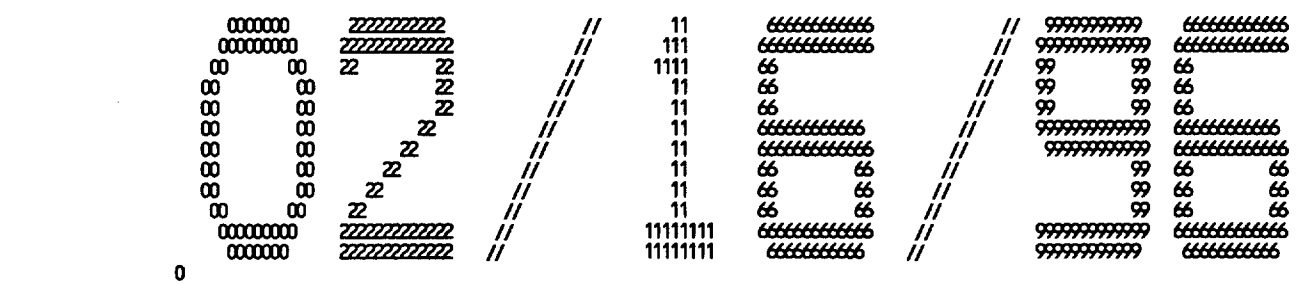
table of contents

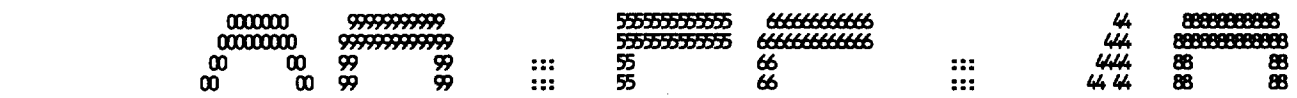
hydrogen	endf/b-iv mat 1269/thrm1002	updated 10/13/89	id 202
b-10 1273 218grp 042375 p-3 293k			id 203
boron-11	endf/b-iv mat 1160	updated 10/13/89	id 204
oxygen-16	endf/b-iv mat 1276	updated 10/13/89	id 201
zircalloy	endf/b-iv mat 1284	updated 10/13/89	id 205
1/v cross sections normalized to 1.0 at 0.0253 ev			id 999
hydrogen	endf/b-iv mat 1269/thrm1002	updated 10/13/89	id 1001
b-10 1273 218grp 042375 p-3 293k			id 5010
boron-11	endf/b-iv mat 1160	updated 10/13/89	id 5011
oxygen-16	endf/b-iv mat 1276	updated 10/13/89	id 8016
oxygen-16	endf/b-iv mat 1276	updated 10/13/89	id 6
kr-83	mt=102,103,103,105,106,107	updated 10/13/89	id 36083
kr-85	mt= 102		id 36085
sr-90	mt=102	updated 10/13/89	id 38090
y-89	mt=102	updated 10/13/89	id 39089
zr-93	mt= 102		id 40093
zr-94	mt=102	updated 10/13/89	id 40094
zr-95	mt=102	updated 10/13/89	id 40095
zircalloy	endf/b-iv mat 1284	updated 10/13/89	id 40302
nb-94	mt=102	updated 10/13/89	id 41094
mo-95	mt=102	updated 10/13/89	id 42095
tc-99	mt=102	updated 10/13/89	id 43099
ru-101	mt=102	updated 10/13/89	id 44101
ru-106	mt=102	updated 10/13/89	id 44106
rh-103	mt=102	updated 10/13/89	id 45103
rh-105	mt= 102		id 45105
pd-105	mt=102	updated 10/13/89	id 46105
pd-108	mt=102	updated 10/13/89	id 46108
silver-109	endf/b-iv mat 1139	updated 10/13/89	id 47109
sb-124	mt=102	updated 10/13/89	id 51124
xe-131	mt=102,103,104,105,106	updated 10/13/89	id 54131
xe-132	mt=102,103,104,105,106	updated 10/13/89	id 54132
xenon-135	endf/b-iv mat 1294	updated 10/13/89	id 54135
xe-136	mt= 102, 103, 104, 105, 107		id 54136
cesium-133	endf/b-iv mat 1141	updated 10/13/89	id 55133
cs-134	mt=102	updated 10/13/89	id 55134
cs-135	mt= 102		id 55135
cs-137	mt=102	updated 10/13/89	id 55137
ba-136	mt=102	updated 10/13/89	id 56136
la-139	mt=102	updated 10/13/89	id 57139
ce-144	mt= 102		id 58144
pr-141	mt=102,103,104,105,106,107	updated 10/13/89	id 59141
pr-143	mt=102	updated 10/13/89	id 59143
nd-143	mt=102	updated 10/13/89	id 60143
nd-145	mt=102	updated 10/13/89	id 60145
nd-147	mt=102	updated 10/13/89	id 60147
pm-147	mt=102	updated 10/13/89	id 61147
pm-148	mt= 102		id 61148
sm-147	endf/b-v fission product	updated 10/13/89	id 62147
sm-149	mt=102,103,107	updated 10/13/89	id 62149
sm-150	mt=102	updated 10/13/89	id 62150
sm-151	mt=102,103,104,105,106,107	updated 10/13/89	id 62151
sm-152	mt=102,103,104,105,106,107	updated 10/13/89	id 62152
eu-153	mt=102,103,104,105,106,107	updated 10/13/89	id 63153
eu-154	mt=102,103,104,105,106,107	updated 10/13/89	id 63154
eu-155	mt=102,103,104,105,106,107	updated 10/13/89	id 63155
gd-155	mt=102	updated 10/13/89	id 64155

```
      u-234 1043 sigo=5+4 newxlacs p-3 295k f-1/e-m(1.+5)                    id    92234
       uranium-235    endf/b-iv mat 1261          updated 10/13/89           id    92235
      u-236 1163 sigo=5+4 newxlacs p-3 295k f-1/e-m(1.+5)                    id    92236
       uranium-238    endf/b-iv mat 1262          updated 10/13/89           id    92238
       neptunium-237  endf/b-iv mat 1263          updated 10/13/89           id    93237
      pu-238 1050 sigo=5+4 newxlacs p-3 295k f-1/e-m(1.+5)                   id    94238
       plutonium-239  endf/b-iv mat 1264          updated 10/13/89           id    94239
       plutonium-240  endf/b-iv mat 1265          updated 10/13/89           id    94240
       plutonium-241  endf/b-iv mat 1266          updated 10/13/89           id    94241
       plutonium-242  endf/b-iv mat 1161          updated 10/13/89           id    94242
      am-241 1056 sigo=5+4 newxlacs 218ngp p-3 295k                          id    95241
      am-243 1057 218 gp wt f-1/e-m 090576 p3 295k                           id    95243
       curium-244     endf/b-iv mat 1162          updated 10/13/89           id    96244
0       tape copy used      0 i/o's, and took     .00 seconds
```



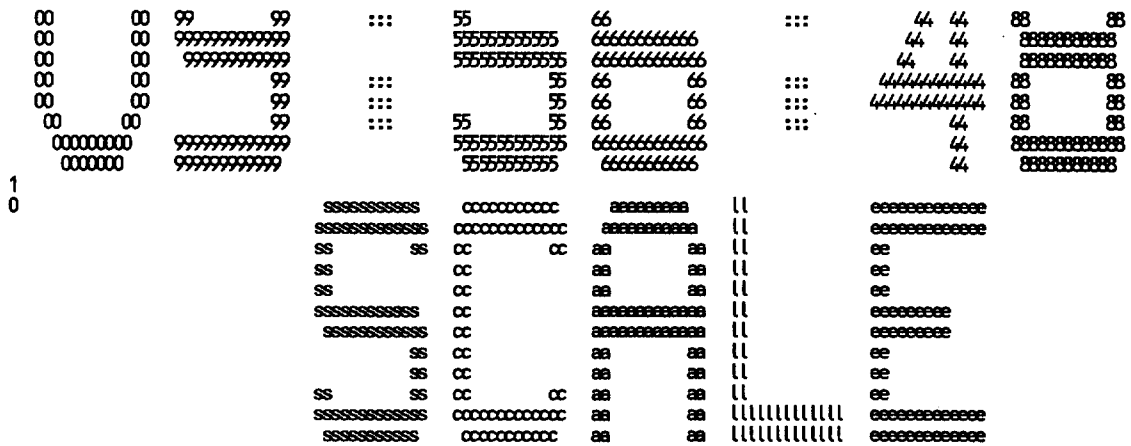






```
0       0q array has     11 entries.
0       1q array has     15 entries.
0       2q array has     10 entries.
0       3q array has     12 entries.
0       4q array has      9 entries.
0       5q array has     12 entries.
0direct access unit  9 requires    12 blocks of length  704 for cross section mixing.
1                    80 d, second part of ses2h pass to make library
0general problem description data block
0                              general problem data

 ige  1/2/3 = plane/cylinder/sphere      2        isn  quadrature order                 8
 izm  number of zones                    4        isct order of scattering              3
 im   number of special intervals       28        ievt 0/1/2/3/4/5/6=q/k/alpha/c/z/r/h  1
 ibl  0/1/2/3 = vacuum/refl/per/white    1        iim  inner iteration maximum       20
 ibr  right boundary condition           3        iom  outer iteration maximum       25
 mxx  number of mixtures                 3        iclc -1/0/n--flat res/snr/qpt         0
 ms   mixing table length               70        ith  0/1 = forward/adjoint           0
 igm  number of energy groups           27        iflu not used(always wgtd)            0
 nng  number of neutron groups          27        iprt -2/-1/0/n=mixture xsec print     -2
 ngg  number of gamma groups             0        idl  0/1/2/3=no/prt nd/pch n/both    14
 iftg number of first thermal group     15        ipbt -1/0/1=none/fine/all bal. prt    0
0                            special options

 ifg  0/1 = none/weighting calculation   1        ipn  0/1/2 diff. coef. param         0
 iqm  volumetric sources (0/n=no/yes)    0        idfm 0/1 = none/density factors 39*  0
 ipm  boundary sources (0/n=no/yes)      0        iaz  0/n = none/n activities by zone 0
 ifn  0/1/2 = input 33*/34*/use last    14        iai  0/1=none/activities by interval 0
 itmx maximum time (minutes)            10        ifct 0/1=no/yes upscatter scaling    0
 idt1 0/1/2/3=no/xsect/srce/flux--out    0        ipvt 0/1/2=no/k/alpha parametric srch 0
 isx  broad group fluxes                 0        isen outer iteration acceleration    0
 ibln activity data unit                 0        nbnd band rebaln parameter           0
 jbkl 0/1/2 buckling geometry            0
0                          weighting data (ifg=1)

 icon -1/0/1=cell/zone/region weight    -1        ihtf total xsect psn in brd gp tables 3
 igmf number of broad groups             3        ndsf psn g-g or file number           4
 itp  0/10/20/30/40 0/c/e/ac/a           0        nusf table length or mxx order        6
 igp  -2/-1/0/n=wgted xsect print       -2        msm  extra 1-d x-sect positions      0
 iap  -1/n anisn xsect print            -1
0                            floating point parameters

 eps  overall convergence       1.00000E-04       dy   cyl/pla ht for buckling    .00000E+00
 ptc  point convergence         1.00000E-04       dz   plane depth for buckling 2.00000E+02
 xnf  normalization factor      1.00000E+00       vsc  void streaming correction  .00000E+00
 ev   eigenvalue guess           .00000E+00       pv   ipvt=1/2--k/alpha          1.00000E+00
 evm  eigenvalue modifier        .00000E+00       eql  ev change eps for search   1.00000E-05
 bf   buckling factor=1.420892  1.42089E+00       xnpm new param mod for search   7.50000E-01
     this case will require      2611 locations for mixing
     this case has been allocated 200000 locations
1                    80 d, second part of ses2h pass to make library
0       13q array has     70 entries.
0       14q array has     70 entries.
0       15q array has     70 entries.
0                          data block 2 (mixing table, etc.)
0     nuclides        cccc                          mixing table                    extra
        on tape    identification              mixture   component    atom density   xsect id's
     1     202                                      3         201    2.09710E-02
     2     203                                      3         202    4.19420E-02
     3     204                                      3         203    3.81515E-06
```

4	201	3	204	1.54884E-05
5	205	2	205	4.25156E-02
6	999	1	92235	2.17519E-04
7	1001	1	92234	1.80384E-06
8	5010	1	92236	3.09919E-06
9	5011	1	92238	7.29235E-05
10	8016	1	8016	1.50611E-02
11	6	1	6	1.15315E-02
12	36083	1	36083	5.19887E-08
13	36085	1	36085	2.52399E-08
14	38090	1	38090	5.64542E-07
15	39089	1	39089	1.85221E-07
16	40093	1	42095	8.27836E-08
17	40094	1	40093	4.11148E-07
18	40095	1	40094	6.33205E-07
19	40802	1	40095	4.27857E-07
20	41094	1	41094	1.77349E-13
21	42095	1	43099	5.87758E-07
22	43099	1	45103	1.52118E-07
23	44101	1	45105	3.63974E-09
24	44106	1	44101	5.18370E-07
25	45103	1	44106	5.96664E-08
26	45105	1	46105	1.21221E-07
27	46105	1	46108	1.56859E-08
28	46108	1	47109	9.63590E-09
29	47109	1	51124	3.00803E-12
30	51124	1	54131	2.47823E-07
31	54131	1	54132	4.19533E-07
32	54132	1	54135	2.09120E-09
33	54135	1	54136	9.95252E-07
34	54136	1	55134	2.70779E-09
35	55133	1	55135	2.99702E-07
36	55134	1	55137	6.30110E-07
37	55135	1	56136	7.27113E-10
38	55137	1	57139	6.33240E-07
39	56136	1	59141	3.00200E-07
40	57139	1	59143	1.34650E-07
41	58144	1	58144	4.90451E-07
42	59141	1	60143	4.35283E-07
43	59143	1	60145	3.87075E-07
44	60143	1	61147	1.73729E-07
45	60145	1	61148	4.19133E-10
46	60147	1	60147	4.46317E-08
47	61147	1	62147	4.30449E-09
48	61148	1	62149	2.10275E-08
49	62147	1	62150	8.60817E-08
50	62149	1	62151	3.43758E-08
51	62150	1	62152	3.85958E-08
52	62151	1	64155	3.40414E-11
53	62152	1	63153	1.83469E-08
54	63153	1	63154	5.35540E-10
55	63154	1	63155	3.62762E-09
56	63155	1	40802	4.42681E-05
57	64155	1	1001	2.30530E-02
58	92234	1	5010	2.09787E-06
59	92235	1	5011	8.51673E-06
60	92236	1	55133	6.04866E-07
61	92238	1	95237	4.79701E-08
62	95237	1	94238	5.71925E-10
63	94238	1	94239	5.27664E-06



80 d, second part of sas2h pass to make library

-1q array has 1 entries.

64	94239	1	94240	1.45266E-07
65	94240	1	94241	1.08078E-08
66	94241	1	94242	9.49211E-11
67	94242	1	95241	2.80565E-11
68	95241	1	95243	5.82811E-13
69	95243	1	96244	3.88991E-15
70	96244	1	999	3.30753E-21

- elapsed time .00 min.
0 24259 locations will be used
0 35q array has 29 entries.
0 36q array has 28 entries.
0 39q array has 4 entries.
0 40q array has 4 entries.
0 47q array has 27 entries.
0 51q array has 27 entries.
1 80 d, second part of sas2h pass to make library
neutron group parameters

0 gp	energy boundaries	lethargy boundaries	weighted velocities	broad gp numbers	calc type	group band	right albedo	left albedo
1	2.00000E+07	-6.93147E-01	4.60581E+09	1	0	1	1.00000E+00	
2	6.43400E+06	4.40989E-01	2.88737E+09	1	0	2	1.00000E+00	
3	3.00000E+06	1.20397E+00	2.12201E+09	1	0	3	1.00000E+00	
4	1.85000E+06	1.68740E+00	1.75673E+09	1	0	4	1.00000E+00	
5	1.40000E+06	1.96611E+00	1.46535E+09	1	0	5	1.00000E+00	
6	9.00000E+05	2.40795E+00	1.06620E+09	2	0	6	1.00000E+00	
7	4.00000E+05	3.21888E+00	6.07557E+08	2	0	7	1.00000E+00	
8	1.00000E+05	4.60517E+00	2.72415E+08	2	0	8	1.00000E+00	
9	1.70000E+04	6.37713E+00	1.13526E+08	2	0	9	1.00000E+00	
10	3.00000E+03	8.11173E+00	4.82126E+07	2	0	10	1.00000E+00	
11	5.50000E+02	9.80818E+00	2.05946E+07	2	0	11	1.00000E+00	
12	1.00000E+02	1.15129E+01	1.01086E+07	2	0	12	1.00000E+00	
13	3.00000E+01	1.27169E+01	5.69595E+06	2	0	13	1.00000E+00	
14	1.00000E+01	1.38155E+01	3.20957E+06	2	0	14	1.00000E+00	
15	3.04999E+00	1.50030E+01	2.10601E+06	2	0	15	1.00000E+00	
16	1.77000E+00	1.55471E+01	1.70522E+06	2	0	16	1.00000E+00	
17	1.29999E+00	1.58657E+01	1.52545E+06	2	0	17	1.00000E+00	
18	1.12999E+00	1.59959E+01	1.42867E+06	2	0	18	1.00000E+00	
19	1.00000E+00	1.61181E+01	1.31002E+06	2	0	19	1.00000E+00	
20	8.00000E-01	1.63412E+01	9.05898E+05	2	0	20	1.00000E+00	
21	4.00000E-01	1.70344E+01	8.17974E+05	3	0	21	1.00000E+00	
22	3.25000E-01	1.72420E+01	6.90070E+05	3	0	22	1.00000E+00	
23	2.25000E-01	1.76098E+01	4.86933E+05	3	0	23	1.00000E+00	
24	9.99999E-02	1.84207E+01	3.57766E+05	3	0	24	1.00000E+00	
25	5.00000E-02	1.91138E+01	2.71895E+05	3	0	25	1.00000E+00	
26	3.00000E-02	1.96247E+01	1.87283E+05	3	0	26	1.00000E+00	
27	1.00000E-02	2.07233E+01	8.85201E+04	3	0	27	1.00000E+00	
28	1.00000E-05	2.76310E+01						

1 80 d, second part of sas2h pass to make library

0	mixture by zone	order p(l) by zone	activity table matl no.	activity table reaction	quadrature constants weights	quadrature constants directions	quadrature constants refl direc	quadrature constants wt x cos
1	3	3			0	-2.79004E-01	3	0
2	2	3			5.06143E-02	-1.97286E-01	3	-9.98548E-03
3	3	3			5.06143E-02	1.97286E-01	2	9.98548E-03
4	1	3			0	-6.04419E-01	8	0
5					5.55953E-02	-5.58410E-01	8	-3.10450E-02
6					5.55953E-02	-2.31301E-01	7	-1.28593E-02
7					5.55953E-02	2.31301E-01	6	1.28593E-02
8					5.55953E-02	5.58410E-01	5	3.10450E-02
9					0	-8.50774E-01	15	0
10					5.22844E-02	-8.21784E-01	15	-4.29665E-02

11					5.22844E-02	-6.01588E-01	14	-3.14537E-02
12					5.22844E-02	-2.20196E-01	13	-1.15128E-02
13					5.22844E-02	2.20196E-01	12	1.15128E-02
14					5.22844E-02	6.01588E-01	11	3.14537E-02
15					5.22844E-02	8.21784E-01	10	4.29665E-02
16					0	-9.83052E-01	24	0
17					4.53365E-02	-9.64143E-01	24	-4.37099E-02
18					4.53365E-02	-8.17361E-01	23	-3.70555E-02
19					4.53365E-02	-5.46143E-01	22	-2.47597E-02
20					4.53365E-02	-1.91780E-01	21	-8.69444E-03
21					4.53365E-02	1.91780E-01	20	8.69444E-03
22					4.53365E-02	5.46143E-01	19	2.47597E-02
23					4.53365E-02	8.17361E-01	18	3.70555E-02
24					4.53365E-02	9.64143E-01	17	4.37099E-02

0constants for p(3) scattering

0angl	set 1	set 2	set 3	set 4	set 5
1	-2.79004E-01	8.83235E-01	6.74143E-02	-6.16919E-01	-1.71701E-02
2	-1.97286E-01	8.83235E-01	.00000E+00	-4.36228E-01	1.21411E-02
3	1.97286E-01	8.83235E-01	.00000E+00	4.36228E-01	-1.21411E-02
4	-6.04419E-01	4.52016E-01	3.16379E-01	-8.04435E-01	-1.74564E-01
5	-5.58410E-01	4.52016E-01	2.23714E-01	-7.43201E-01	-6.68028E-02
6	-2.31301E-01	4.52016E-01	-2.23713E-01	-3.07844E-01	1.61276E-01
7	2.31301E-01	4.52016E-01	-2.23713E-01	3.07844E-01	-1.61276E-01
8	5.58410E-01	4.52016E-01	2.23713E-01	7.43201E-01	6.68028E-02
9	-8.50774E-01	-8.57235E-02	6.26843E-01	-1.98456E-01	-4.86855E-01
10	-8.21784E-01	-8.57235E-02	5.42862E-01	-1.91694E-01	-3.44245E-01
11	-6.01588E-01	-8.57235E-02	.00000E+00	-1.40330E-01	3.44244E-01
12	-2.20196E-01	-8.57235E-02	-5.42862E-01	-5.13643E-02	3.44245E-01
13	2.20196E-01	-8.57235E-02	-5.42862E-01	5.13643E-02	-3.44245E-01
14	6.01588E-01	-8.57235E-02	.00000E+00	1.40330E-01	-3.44245E-01
15	8.21784E-01	-8.57235E-02	5.42862E-01	1.91694E-01	3.44245E-01
16	-9.83052E-01	-4.49528E-01	8.36886E-01	5.00703E-01	-7.51005E-01
17	-9.64143E-01	-4.49528E-01	7.73181E-01	4.91083E-01	-6.24438E-01
18	-8.17361E-01	-4.49528E-01	3.20862E-01	4.16320E-01	1.46514E-01
19	-5.46143E-01	-4.49528E-01	-3.20862E-01	2.78176E-01	7.36575E-01
20	-1.91780E-01	-4.49528E-01	-7.73181E-01	9.76824E-02	4.17234E-01
21	1.91780E-01	-4.49528E-01	-7.73181E-01	-9.76824E-02	-4.17234E-01
22	5.46143E-01	-4.49528E-01	-3.20862E-01	-2.78176E-01	-7.36575E-01
23	8.17361E-01	-4.49528E-01	3.20862E-01	-4.16320E-01	-1.46514E-01
24	9.64143E-01	-4.49528E-01	7.73181E-01	-4.91083E-01	6.24438E-01

1 int	radii	mid pts	zone no.	areas	volumes	dens fact	radius mod	spec(int)
1	0	1.97644E-02	1	0	4.90881E-03		0	
2	3.95287E-02	5.92931E-02	1	2.48366E-01	1.47264E-02		0	
3	7.90575E-02	1.18586E-01	1	4.96733E-01	5.89057E-02		0	
4	1.58115E-01	1.97644E-01	1	9.93466E-01	9.81762E-02		0	
5	2.37172E-01	2.76701E-01	1	1.49020E+00	1.37447E-01			
6	3.16230E-01	3.55759E-01	1	1.98698E+00	1.76717E-01			
7	3.95288E-01	4.34816E-01	1	2.48366E+00	2.15988E-01			
8	4.74345E-01	5.13874E-01	1	2.98040E+00	2.55258E-01			
9	5.53403E-01	5.73167E-01	1	3.47713E+00	1.42355E-01			
10	5.92931E-01	6.12696E-01	1	3.72550E+00	1.52173E-01			
11	6.32460E-01	6.42620E-01	2	3.97386E+00	8.20460E-02			
12	6.52780E-01	6.62940E-01	2	4.10154E+00	8.46405E-02			
13	6.73100E-01	6.96589E-01	3	4.22921E+00	2.05562E-01			
14	7.20057E-01	7.43550E-01	3	4.52431E+00	2.19422E-01			
15	7.67053E-01	7.90517E-01	3	4.81941E+00	2.33282E-01			
16	8.14000E-01	8.62795E-01	4	5.11451E+00	5.29051E-01			
17	9.11591E-01	9.60386E-01	4	5.72769E+00	5.88891E-01			
18	1.00918E+00	1.10677E+00	4	6.34088E+00	1.35731E+00			
19	1.20436E+00	1.30195E+00	4	7.56724E+00	1.59667E+00			

20	1.39955E+00	1.49714E+00	4	8.79360E+00	1.83603E+00
21	1.59473E+00	1.69232E+00	4	1.00200E+01	2.07540E+00
22	1.78991E+00	1.88750E+00	4	1.12463E+01	2.31478E+00
23	1.98509E+00	2.08268E+00	4	1.24727E+01	2.55412E+00
24	2.18027E+00	2.27786E+00	4	1.36991E+01	2.79349E+00
25	2.37545E+00	2.47305E+00	4	1.49254E+01	3.03285E+00
26	2.57064E+00	2.66823E+00	4	1.61518E+01	3.27221E+00
27	2.76582E+00	2.81461E+00	4	1.73781E+01	1.72587E+00
28	2.86341E+00	2.91220E+00	4	1.79913E+01	1.78571E+00
29	2.96100E+00			1.86045E+01	

- elapsed time .00 min.

1 outer iter	inner iters	1 - balance	eigenvalue	1 - source ratio	1 - scatter ratio	1 - upscat ratio	search parameter	time (min)
1	214	-7.06698E-06	1.15443E+00	-1.71280E-01	1.00000E+00	-4.60674E-02	.00000E+00	.0000
2	311	-1.00740E-08	1.17067E+00	-7.90221E-04	-2.27080E-02	-3.84405E-03	.00000E+00	.0167
3	385	-5.23615E-08	1.17198E+00	-4.52431E-05	-1.70393E-03	-6.85077E-04	.00000E+00	.0167
4	439	2.42396E-07	1.17221E+00	-3.01259E-06	-3.08065E-04	-1.27030E-04	.00000E+00	.0167
5	480	3.75332E-06	1.17220E+00	2.97588E-07	-5.87089E-05	-2.53117E-05	.00000E+00	.0167

grp to grp		inner iters	mfd int.	max. flux difference	msf int.	max. scale factor	coarse mesh
1	1	1	17	4.33775E-06	28	1.00000E+00	1
2	2	1	17	5.27413E-06	28	1.00000E+00	1
3	3	1	17	4.89446E-06	28	1.00000E+00	1
4	4	1	17	4.78465E-06	28	1.00000E+00	1
5	5	1	17	4.99087E-06	28	1.00000E+00	1
6	6	1	17	3.40179E-06	28	1.00000E+00	1
7	7	1	24	1.68467E-06	28	1.00000E+00	2
8	8	1	3	3.67338E-07	20	1.00000E+00	2
9	9	1	27	7.98624E-06	28	9.99992E-01	3
10	10	1	26	1.20169E-06	28	1.00000E+00	3
11	11	1	26	2.62173E-06	28	1.00000E+00	3
12	12	1	26	1.32747E-06	28	9.99999E-01	3
13	13	1	26	1.73455E-06	28	1.00000E+00	3
14	14	1	25	5.12378E-07	28	1.00000E+00	3
15	15	1	2	2.87106E-05	28	9.99968E-01	2
16	16	1	2	3.53844E-05	28	9.99970E-01	2
17	17	1	2	4.43141E-05	28	9.99972E-01	2
18	18	1	26	7.66225E-05	18	9.99988E-01	3
19	19	1	2	4.23971E-05	28	9.99916E-01	3
20	20	1	2	3.49095E-05	28	9.99931E-01	3
21	21	1	25	5.28731E-05	28	9.99933E-01	3
22	22	1	24	2.65469E-05	28	9.99967E-01	3
23	23	1	1	3.77642E-05	28	9.99964E-01	4
24	24	1	1	4.99425E-05	9	1.00008E+00	4
25	25	1	1	5.76682E-05	8	1.00008E+00	5
26	26	1	1	4.33597E-05	6	1.00008E+00	6
27	27	1	1	4.07989E-05	5	1.00002E+00	8

6	507	-4.34097E-06	1.17232E+00	2.72614E-07	-1.20606E-05	-5.80553E-06	.00000E+00	.0167

final monitor lambda 1.17226E+00 production/absorption 1.18767E+00 angular flux on 16

- elapsed time .02 min.

1 80 d, second part of sas2h pass to make library

0 int.	zone number	radius	int. midpoint	area	volume	prod density
1	1	.00000E+00	1.97644E-02	.00000E+00	4.90881E-03	.00000E+00
2	1	3.95287E-02	5.92931E-02	2.48366E-01	1.47264E-02	.00000E+00
3	1	7.90575E-02	1.18586E-01	4.96733E-01	5.89057E-02	.00000E+00
4	1	1.58115E-01	1.97644E-01	9.93466E-01	9.81762E-02	.00000E+00
5	1	2.37172E-01	2.76701E-01	1.49020E+00	1.37447E-01	.00000E+00
6	1	3.16230E-01	3.55759E-01	1.98693E+00	1.76717E-01	.00000E+00
7	1	3.95288E-01	4.34816E-01	2.48366E+00	2.15988E-01	.00000E+00

8	1	4.74345E-01	5.13874E-01	2.98040E+00	2.55258E-01	.00000E+00
9	1	5.53408E-01	5.73167E-01	3.47713E+00	1.42355E-01	.00000E+00
10	1	5.92931E-01	6.12694E-01	3.72550E+00	1.52173E-01	.00000E+00
11	2	6.32460E-01	6.42620E-01	3.97386E+00	8.20460E-02	.00000E+00
12	2	6.52780E-01	6.62940E-01	4.10154E+00	8.46405E-02	.00000E+00
13	3	6.73100E-01	6.96583E-01	4.22921E+00	2.05562E-01	.00000E+00
14	3	7.20067E-01	7.43550E-01	4.52431E+00	2.19422E-01	.00000E+00
15	3	7.67033E-01	7.90517E-01	4.81941E+00	2.33282E-01	.00000E+00
16	4	8.14000E-01	8.62795E-01	5.11451E+00	5.29051E-01	2.66053E-02
17	4	9.11591E-01	9.60386E-01	5.72769E+00	5.88891E-01	2.89895E-02
18	4	1.00918E+00	1.10677E+00	6.34088E+00	1.35731E+00	6.55135E-02
19	4	1.20436E+00	1.30195E+00	7.56724E+00	1.59667E+00	7.55684E-02
20	4	1.39955E+00	1.49714E+00	8.79360E+00	1.85603E+00	8.57156E-02
21	4	1.59473E+00	1.69232E+00	1.00200E+01	2.07540E+00	9.59183E-02
22	4	1.78991E+00	1.88750E+00	1.12463E+01	2.31476E+00	1.06180E-01
23	4	1.98509E+00	2.08268E+00	1.24727E+01	2.55412E+00	1.16508E-01
24	4	2.18027E+00	2.27786E+00	1.36991E+01	2.79349E+00	1.26917E-01
25	4	2.37545E+00	2.47305E+00	1.49254E+01	3.03285E+00	1.37423E-01
26	4	2.57064E+00	2.66823E+00	1.61518E+01	3.27221E+00	1.48057E-01
27	4	2.76582E+00	2.81461E+00	1.73781E+01	1.72587E+00	7.80634E-02
28	4	2.86341E+00	2.91220E+00	1.79913E+01	1.78571E+00	8.08029E-02
29		2.96100E+00		1.86045E+01		

1 80 d, second part of sas2h pass to make library

0 total flux

0 int.	grp. 1	grp. 2	grp. 3	grp. 4	grp. 5	grp. 6	grp. 7	grp. 8
1	1.20007E-02	8.81879E-02	1.11134E-01	6.85422E-02	1.02386E-01	1.92570E-01	1.92962E-01	1.46870E-01
2	1.19959E-02	8.81379E-02	1.11069E-01	6.85039E-02	1.02333E-01	1.92483E-01	1.92922E-01	1.46865E-01
3	1.19965E-02	8.81504E-02	1.11091E-01	6.85218E-02	1.02367E-01	1.92553E-01	1.92975E-01	1.46876E-01
4	1.20027E-02	8.82287E-02	1.11202E-01	6.86000E-02	1.02497E-01	1.92797E-01	1.93132E-01	1.46905E-01
5	1.20140E-02	8.83665E-02	1.11394E-01	6.87329E-02	1.02714E-01	1.93197E-01	1.93382E-01	1.46948E-01
6	1.20295E-02	8.85562E-02	1.11663E-01	6.89161E-02	1.03012E-01	1.93748E-01	1.93722E-01	1.47005E-01
7	1.20491E-02	8.87990E-02	1.12007E-01	6.91539E-02	1.03401E-01	1.94468E-01	1.94166E-01	1.47075E-01
8	1.20727E-02	8.91023E-02	1.12444E-01	6.94610E-02	1.03908E-01	1.95407E-01	1.94746E-01	1.47158E-01
9	1.20925E-02	8.93690E-02	1.12855E-01	6.97426E-02	1.04377E-01	1.96278E-01	1.95284E-01	1.47227E-01
10	1.21061E-02	8.95781E-02	1.13161E-01	6.99904E-02	1.04798E-01	1.97067E-01	1.95773E-01	1.47275E-01
11	1.21174E-02	8.97514E-02	1.13435E-01	7.01985E-02	1.05152E-01	1.97744E-01	1.96195E-01	1.47319E-01
12	1.21297E-02	8.98803E-02	1.13607E-01	7.03067E-02	1.05322E-01	1.98083E-01	1.96397E-01	1.47363E-01
13	1.21556E-02	9.01151E-02	1.13875E-01	7.04445E-02	1.05514E-01	1.98425E-01	1.96590E-01	1.47432E-01
14	1.21957E-02	9.04891E-02	1.14325E-01	7.06998E-02	1.05890E-01	1.99089E-01	1.96973E-01	1.47523E-01
15	1.22384E-02	9.09702E-02	1.14945E-01	7.10861E-02	1.06489E-01	2.00167E-01	1.97605E-01	1.47624E-01
16	1.23080E-02	9.17412E-02	1.15953E-01	7.17309E-02	1.07508E-01	2.02017E-01	1.98704E-01	1.47793E-01
17	1.23768E-02	9.25100E-02	1.16963E-01	7.23797E-02	1.08543E-01	2.03921E-01	1.99855E-01	1.47989E-01
18	1.24318E-02	9.31359E-02	1.17794E-01	7.29176E-02	1.09415E-01	2.05568E-01	2.00880E-01	1.48194E-01
19	1.24800E-02	9.36939E-02	1.18543E-01	7.34055E-02	1.10214E-01	2.07109E-01	2.01856E-01	1.48406E-01
20	1.25085E-02	9.40314E-02	1.19003E-01	7.37079E-02	1.10714E-01	2.08102E-01	2.02501E-01	1.48562E-01
21	1.25265E-02	9.42497E-02	1.19306E-01	7.39077E-02	1.11050E-01	2.08782E-01	2.02952E-01	1.48679E-01
22	1.25381E-02	9.43932E-02	1.19508E-01	7.40417E-02	1.11277E-01	2.09253E-01	2.03270E-01	1.48766E-01
23	1.25455E-02	9.44863E-02	1.19640E-01	7.41302E-02	1.11428E-01	2.09575E-01	2.03491E-01	1.48829E-01
24	1.25499E-02	9.45423E-02	1.19721E-01	7.41844E-02	1.11522E-01	2.09780E-01	2.03634E-01	1.48871E-01
25	1.25518E-02	9.45684E-02	1.19761E-01	7.42109E-02	1.11568E-01	2.09886E-01	2.03709E-01	1.48893E-01
26	1.25515E-02	9.45660E-02	1.19759E-01	7.42101E-02	1.11568E-01	2.09894E-01	2.03716E-01	1.48893E-01
27	1.25499E-02	9.45463E-02	1.19733E-01	7.41926E-02	1.11540E-01	2.09839E-01	2.03678E-01	1.48880E-01
28	1.25475E-02	9.45169E-02	1.19693E-01	7.41657E-02	1.11494E-01	2.09747E-01	2.03615E-01	1.48859E-01

0 int.	grp. 9	grp. 10	grp. 11	grp. 12	grp. 13	grp. 14	grp. 15	grp. 16
1	1.15786E-01	1.06908E-01	1.00573E-01	6.52162E-02	5.58645E-02	5.37128E-02	2.92968E-02	1.63189E-02
2	1.15787E-01	1.06909E-01	1.00577E-01	6.52211E-02	5.58693E-02	5.37195E-02	2.92989E-02	1.63198E-02
3	1.15785E-01	1.06900E-01	1.00566E-01	6.51973E-02	5.58475E-02	5.36886E-02	2.92928E-02	1.63168E-02
4	1.15780E-01	1.06878E-01	1.00506E-01	6.51399E-02	5.57953E-02	5.36142E-02	2.92777E-02	1.63095E-02
5	1.15773E-01	1.06844E-01	1.00429E-01	6.50524E-02	5.57160E-02	5.35012E-02	2.92552E-02	1.62987E-02
6	1.15762E-01	1.06797E-01	1.00324E-01	6.49335E-02	5.56088E-02	5.33480E-02	2.92255E-02	1.62844E-02

7	1.15749E-01	1.06736E-01	1.00187E-01	6.47777E-02	5.54691E-02	5.31477E-02	2.91880E-02	1.62662E-02
8	1.15734E-01	1.06653E-01	1.00004E-01	6.45724E-02	5.52862E-02	5.28845E-02	2.91407E-02	1.62431E-02
9	1.15723E-01	1.06578E-01	9.98331E-02	6.43809E-02	5.51164E-02	5.26394E-02	2.90983E-02	1.62220E-02
10	1.15722E-01	1.06503E-01	9.96748E-02	6.42066E-02	5.49629E-02	5.24168E-02	2.90612E-02	1.62033E-02
11	1.15728E-01	1.06446E-01	9.95495E-02	6.40698E-02	5.48409E-02	5.22410E-02	2.90286E-02	1.61874E-02
12	1.15721E-01	1.06426E-01	9.95026E-02	6.40162E-02	5.47906E-02	5.21705E-02	2.90107E-02	1.61794E-02
13	1.15676E-01	1.06398E-01	9.94386E-02	6.39543E-02	5.47189E-02	5.20657E-02	2.89958E-02	1.61719E-02
14	1.15604E-01	1.06332E-01	9.92926E-02	6.37569E-02	5.45679E-02	5.18421E-02	2.89710E-02	1.61581E-02
15	1.15526E-01	1.06223E-01	9.90538E-02	6.34778E-02	5.43319E-02	5.14910E-02	2.89336E-02	1.61368E-02
16	1.15417E-01	1.06043E-01	9.86582E-02	6.30188E-02	5.39425E-02	5.09106E-02	2.88651E-02	1.60995E-02
17	1.15320E-01	1.05865E-01	9.82629E-02	6.25589E-02	5.35479E-02	5.03276E-02	2.87834E-02	1.60576E-02
18	1.15249E-01	1.05715E-01	9.79247E-02	6.21664E-02	5.32016E-02	4.98267E-02	2.86955E-02	1.60147E-02
19	1.15194E-01	1.05578E-01	9.76092E-02	6.18006E-02	5.28752E-02	4.93581E-02	2.86025E-02	1.59702E-02
20	1.15167E-01	1.05488E-01	9.74052E-02	6.15643E-02	5.26560E-02	4.90535E-02	2.85325E-02	1.59372E-02
21	1.15154E-01	1.05428E-01	9.72633E-02	6.13999E-02	5.25026E-02	4.88407E-02	2.84791E-02	1.59121E-02
22	1.15147E-01	1.05385E-01	9.71623E-02	6.12829E-02	5.23920E-02	4.86886E-02	2.84385E-02	1.58932E-02
23	1.15143E-01	1.05356E-01	9.70905E-02	6.11997E-02	5.23128E-02	4.85803E-02	2.84085E-02	1.58791E-02
24	1.15141E-01	1.05336E-01	9.70414E-02	6.11431E-02	5.22588E-02	4.85065E-02	2.83880E-02	1.58696E-02
25	1.15139E-01	1.05323E-01	9.70124E-02	6.11095E-02	5.22269E-02	4.84630E-02	2.83765E-02	1.58643E-02
26	1.15136E-01	1.05319E-01	9.70080E-02	6.10986E-02	5.22178E-02	4.84500E-02	2.83748E-02	1.58635E-02
27	1.15134E-01	1.05321E-01	9.70089E-02	6.11054E-02	5.22257E-02	4.84600E-02	2.83799E-02	1.58660E-02
28	1.15132E-01	1.05327E-01	9.70244E-02	6.11239E-02	5.22449E-02	4.84854E-02	2.83892E-02	1.58704E-02

0 int.	grp. 17	grp. 18	grp. 19	grp. 20	grp. 21	grp. 22	grp. 23	grp. 24
1	7.31416E-03	6.28415E-03	1.15895E-02	3.81663E-02	1.26128E-02	2.73563E-02	9.12864E-02	7.43944E-02
2	7.31463E-03	6.28463E-03	1.15906E-02	3.81688E-02	1.26136E-02	2.73575E-02	9.12810E-02	7.43780E-02
3	7.31273E-03	6.28239E-03	1.15875E-02	3.81570E-02	1.26059E-02	2.73325E-02	9.11607E-02	7.42348E-02
4	7.30814E-03	6.27699E-03	1.15800E-02	3.81304E-02	1.25884E-02	2.72752E-02	9.08965E-02	7.39269E-02
5	7.30120E-03	6.26879E-03	1.15687E-02	3.80904E-02	1.25619E-02	2.71896E-02	9.05045E-02	7.34707E-02
6	7.29188E-03	6.25768E-03	1.15536E-02	3.80366E-02	1.25261E-02	2.70745E-02	8.99823E-02	7.28624E-02
7	7.27981E-03	6.24316E-03	1.15339E-02	3.79670E-02	1.24794E-02	2.69256E-02	8.93168E-02	7.20875E-02
8	7.26405E-03	6.22408E-03	1.15085E-02	3.78766E-02	1.24181E-02	2.67329E-02	8.84762E-02	7.11118E-02
9	7.24956E-03	6.20628E-03	1.14849E-02	3.77931E-02	1.23611E-02	2.65557E-02	8.77205E-02	7.02585E-02
10	7.23640E-03	6.19002E-03	1.14637E-02	3.77178E-02	1.23089E-02	2.63970E-02	8.70637E-02	6.94840E-02
11	7.22574E-03	6.17713E-03	1.14466E-02	3.76581E-02	1.22688E-02	2.62773E-02	8.65867E-02	6.89588E-02
12	7.22114E-03	6.17202E-03	1.14398E-02	3.76339E-02	1.22549E-02	2.62367E-02	8.64410E-02	6.88064E-02
13	7.21535E-03	6.16471E-03	1.14299E-02	3.76004E-02	1.22331E-02	2.61653E-02	8.61574E-02	6.84957E-02
14	7.20335E-03	6.14886E-03	1.14104E-02	3.75294E-02	1.21830E-02	2.60056E-02	8.55260E-02	6.77303E-02
15	7.18440E-03	6.12363E-03	1.13799E-02	3.74187E-02	1.21029E-02	2.57598E-02	8.46024E-02	6.66314E-02
16	7.15294E-03	6.08227E-03	1.13295E-02	3.72579E-02	1.19738E-02	2.53680E-02	8.31925E-02	6.49957E-02
17	7.12061E-03	6.04095E-03	1.12776E-02	3.70535E-02	1.18464E-02	2.49785E-02	8.17641E-02	6.33730E-02
18	7.09124E-03	6.00519E-03	1.12299E-02	3.68859E-02	1.17362E-02	2.46359E-02	8.03982E-02	6.18414E-02
19	7.06259E-03	5.97137E-03	1.11831E-02	3.67222E-02	1.16321E-02	2.43078E-02	7.90229E-02	6.03115E-02
20	7.04285E-03	5.94904E-03	1.11509E-02	3.66098E-02	1.15632E-02	2.40869E-02	7.80410E-02	5.92308E-02
21	7.02854E-03	5.93321E-03	1.11275E-02	3.65279E-02	1.15141E-02	2.39274E-02	7.73044E-02	5.84282E-02
22	7.01799E-03	5.92177E-03	1.11102E-02	3.64674E-02	1.14784E-02	2.38099E-02	7.67450E-02	5.78252E-02
23	7.01035E-03	5.91357E-03	1.10976E-02	3.64233E-02	1.14524E-02	2.37237E-02	7.63259E-02	5.73753E-02
24	7.00515E-03	5.90799E-03	1.10891E-02	3.63929E-02	1.14344E-02	2.36625E-02	7.60230E-02	5.70501E-02
25	7.00220E-03	5.90474E-03	1.10842E-02	3.63750E-02	1.14230E-02	2.36238E-02	7.58233E-02	5.68316E-02
26	7.00159E-03	5.90388E-03	1.10831E-02	3.63692E-02	1.14189E-02	2.36073E-02	7.57263E-02	5.67154E-02
27	7.00267E-03	5.90487E-03	1.10842E-02	3.63738E-02	1.14203E-02	2.36089E-02	7.57175E-02	5.66895E-02
28	7.00481E-03	5.90691E-03	1.10876E-02	3.63846E-02	1.14254E-02	2.36232E-02	7.57680E-02	5.67266E-02

0 int.	grp. 25	grp. 26	grp. 27
1	3.35491E-02	2.41530E-02	4.58300E-03
2	3.35367E-02	2.41390E-02	4.57960E-03
3	3.34582E-02	2.40695E-02	4.56537E-03
4	3.32911E-02	2.39225E-02	4.53517E-03
5	3.30435E-02	2.37031E-02	4.48942E-03
6	3.27127E-02	2.34075E-02	4.42663E-03
7	3.22914E-02	2.30277E-02	4.34423E-03
8	3.17630E-02	2.25476E-02	4.23750E-03

9	3.12927E-02	2.21183E-02	4.14064E-03
10	3.08925E-02	2.17501E-02	4.05691E-03
11	3.06246E-02	2.15126E-02	4.00616E-03
12	3.05676E-02	2.14770E-02	4.00288E-03
13	3.03768E-02	2.12995E-02	3.95515E-03
14	2.99393E-02	2.08753E-02	3.89931E-03
15	2.98249E-02	2.02711E-02	3.66548E-03
16	2.84310E-02	1.94025E-02	3.40967E-03
17	2.75885E-02	1.85863E-02	3.19073E-03
18	2.67431E-02	1.78654E-02	3.02957E-03
19	2.59347E-02	1.71748E-02	2.88633E-03
20	2.53719E-02	1.67161E-02	2.80122E-03
21	2.49590E-02	1.63925E-02	2.74490E-03
22	2.46528E-02	1.61607E-02	2.70646E-03
23	2.44265E-02	1.59957E-02	2.67950E-03
24	2.42641E-02	1.58762E-02	2.66089E-03
25	2.41547E-02	1.57977E-02	2.64852E-03
26	2.40957E-02	1.57524E-02	2.64158E-03
27	2.40756E-02	1.57364E-02	2.63897E-03
28	2.40875E-02	1.57398E-02	2.63880E-03

- elapsed time .02 min.

1fine group summary for zone 1 by group including sum for all groups in line 28

0 grp.	fix source	fiss source	in scatter	slf scatter	out scatter	absorption	leakage	balance
1	.00000E+00	.00000E+00	.00000E+00	4.67418E-04	6.18667E-04	5.15140E-05	-6.70150E-04	9.99954E-01
2	.00000E+00	.00000E+00	3.54979E-04	5.98670E-03	7.86842E-03	1.71078E-04	-7.68424E-03	9.99965E-01
3	.00000E+00	.00000E+00	3.73267E-03	5.39824E-03	1.40451E-02	9.16518E-05	-1.04038E-02	9.99979E-01
4	.00000E+00	.00000E+00	5.50156E-03	3.57677E-03	1.22894E-02	4.17405E-05	-6.82947E-03	9.99990E-01
5	.00000E+00	.00000E+00	1.01507E-02	1.14906E-02	2.08174E-02	4.95177E-05	-1.07161E-02	9.99995E-01
6	.00000E+00	.00000E+00	2.13613E-02	3.44665E-02	4.09637E-02	8.42157E-05	-1.96866E-02	1.00000E+00
7	.00000E+00	.00000E+00	4.21313E-02	6.09411E-02	5.41112E-02	6.11925E-05	-1.20405E-02	9.99989E-01
8	.00000E+00	.00000E+00	5.63106E-02	7.82920E-02	5.87049E-02	3.63776E-05	-2.42543E-03	9.99912E-01
9	.00000E+00	.00000E+00	5.77444E-02	7.25311E-02	5.74379E-02	2.92432E-05	2.83608E-04	9.99889E-01
10	.00000E+00	.00000E+00	5.70217E-02	6.90297E-02	5.54756E-02	3.59889E-05	1.51609E-03	9.99895E-01
11	.00000E+00	.00000E+00	5.57675E-02	6.53938E-02	5.22079E-02	5.49886E-05	3.50803E-03	9.99939E-01
12	.00000E+00	.00000E+00	4.52797E-02	3.49926E-02	4.11731E-02	6.02716E-05	4.04730E-03	9.99978E-01
13	.00000E+00	.00000E+00	4.04451E-02	2.85751E-02	3.66456E-02	8.46484E-05	3.71606E-03	9.99968E-01
14	.00000E+00	.00000E+00	3.94298E-02	2.84635E-02	3.40018E-02	1.37365E-04	5.29107E-03	9.99888E-01
15	.00000E+00	.00000E+00	2.17987E-02	1.09582E-02	2.05290E-02	1.13699E-04	1.15599E-03	9.99999E-01
16	.00000E+00	.00000E+00	1.43326E-02	4.64962E-03	1.36982E-02	7.75404E-05	5.56808E-04	9.99998E-01
17	.00000E+00	.00000E+00	7.39742E-03	1.34858E-03	7.01844E-03	3.86148E-05	3.40339E-04	1.00000E+00
18	.00000E+00	.00000E+00	6.58663E-03	1.12750E-03	6.16090E-03	3.52800E-05	3.90472E-04	9.99998E-01
19	.00000E+00	.00000E+00	1.11382E-02	3.17060E-03	1.05229E-02	7.10121E-05	5.44186E-04	1.00001E+00
20	.00000E+00	.00000E+00	2.75750E-02	2.24821E-02	2.54191E-02	2.95214E-04	1.86249E-03	1.00001E+00
21	.00000E+00	.00000E+00	1.36786E-02	4.77690E-03	1.24269E-02	1.19797E-04	1.13166E-03	1.00001E+00
22	.00000E+00	.00000E+00	2.77871E-02	1.55070E-02	2.41322E-02	2.97848E-04	3.35632E-03	1.00003E+00
23	.00000E+00	.00000E+00	7.46213E-02	9.26697E-02	6.08537E-02	1.34524E-03	1.26178E-02	1.00006E+00
24	.00000E+00	.00000E+00	8.09249E-02	8.68198E-02	6.70169E-02	1.57951E-03	1.23240E-02	1.00005E+00
25	.00000E+00	.00000E+00	5.39521E-02	3.66998E-02	4.72144E-02	9.32754E-04	5.80328E-03	1.00003E+00
26	.00000E+00	.00000E+00	4.30580E-02	4.09199E-02	3.77950E-02	9.46340E-04	4.31571E-03	1.00002E+00
27	.00000E+00	.00000E+00	1.45827E-02	8.87213E-03	1.35158E-02	3.37707E-04	7.29229E-04	1.00000E+00
28	.00000E+00	.00000E+00	8.32664E-01	8.29607E-01	8.32664E-01	7.17836E-03	-7.16596E-03	9.99985E-01

0 grp.	rt bdy flux	rt leakage	lft bdy flux	lft leakage	r2n rate	fiss rate	flux*db**2	total flux
1	1.21126E-02	-6.70150E-04	1.20047E-02	.00000E+00	3.42140E-11	.00000E+00	1.85418E-05	1.51455E-02
2	8.96886E-02	-7.68424E-03	8.82302E-02	.00000E+00	.00000E+00	.00000E+00	8.67742E-05	1.11658E-01
3	1.13340E-01	-1.04038E-02	1.11189E-01	.00000E+00	.00000E+00	.00000E+00	9.12276E-05	1.40863E-01
4	7.01303E-02	-6.82947E-03	6.85763E-02	.00000E+00	.00000E+00	.00000E+00	4.14886E-05	8.69880E-02
5	1.05039E-01	-1.07161E-02	1.02436E-01	.00000E+00	.00000E+00	.00000E+00	4.92256E-05	1.30087E-01
6	1.97518E-01	-1.96866E-02	1.92654E-01	.00000E+00	.00000E+00	.00000E+00	8.33469E-05	2.44654E-01
7	1.96054E-01	-1.20405E-02	1.93005E-01	.00000E+00	.00000E+00	.00000E+00	5.92494E-05	2.44169E-01
8	1.47299E-01	-2.42543E-03	1.46877E-01	.00000E+00	.00000E+00	.00000E+00	3.27003E-05	1.84833E-01

9	1.15724E-01	2.83608E-04	1.15786E-01	.00000E+00	.00000E+00	.00000E+00	2.16496E-05	1.45456E-01
10	1.06461E-01	1.51609E-03	1.06904E-01	.00000E+00	.00000E+00	.00000E+00	1.91219E-05	1.34104E-01
11	9.95833E-02	3.50803E-03	1.00565E-01	.00000E+00	.00000E+00	.00000E+00	1.78532E-05	1.25844E-01
12	6.41067E-02	4.04730E-03	6.52073E-02	.00000E+00	.00000E+00	.00000E+00	1.04812E-05	8.13417E-02
13	5.48750E-02	3.71606E-03	5.58561E-02	.00000E+00	.00000E+00	.00000E+00	8.74662E-06	6.96523E-02
14	5.22893E-02	5.29107E-03	5.37011E-02	.00000E+00	.00000E+00	.00000E+00	8.54748E-06	6.67104E-02
15	2.90406E-02	1.15599E-03	2.92941E-02	.00000E+00	.00000E+00	.00000E+00	4.51451E-06	3.66681E-02
16	1.61929E-02	5.56898E-04	1.63177E-02	.00000E+00	.00000E+00	.00000E+00	2.27539E-06	2.04352E-02
17	7.22892E-03	3.40339E-04	7.31343E-03	.00000E+00	.00000E+00	.00000E+00	9.35884E-07	9.14376E-03
18	6.18067E-03	3.90472E-04	6.28528E-03	.00000E+00	.00000E+00	.00000E+00	7.82806E-07	7.83982E-03
19	1.14517E-02	5.44186E-04	1.15888E-02	.00000E+00	.00000E+00	.00000E+00	1.51584E-06	1.44870E-02
20	3.76758E-02	1.86249E-03	3.81635E-02	.00000E+00	.00000E+00	.00000E+00	5.58922E-06	4.76861E-02
21	1.22791E-02	1.13166E-03	1.26109E-02	.00000E+00	.00000E+00	.00000E+00	1.43628E-06	1.56642E-02
22	2.63063E-02	3.35632E-03	2.73504E-02	.00000E+00	.00000E+00	.00000E+00	3.08835E-06	3.37835E-02
23	8.66904E-02	1.24178E-02	9.12651E-02	.00000E+00	.00000E+00	.00000E+00	9.24094E-06	1.12039E-01
24	6.90572E-02	1.23240E-02	7.43776E-02	.00000E+00	.00000E+00	.00000E+00	5.53871E-06	9.03598E-02
25	3.06675E-02	5.80528E-03	3.35434E-02	.00000E+00	.00000E+00	.00000E+00	1.91586E-06	4.04585E-02
26	2.15422E-02	4.31571E-03	2.41510E-02	.00000E+00	.00000E+00	.00000E+00	1.00795E-06	2.88225E-02
27	4.00971E-03	7.29229E-04	4.58320E-03	.00000E+00	.00000E+00	.00000E+00	1.18640E-07	5.43018E-03
28	1.78254E+00	-7.16597E-03	1.78983E+00	.00000E+00	3.42140E-11	.00000E+00	5.86915E-04	2.24432E+00

1fine group summary for zone 2 by group including sum for all groups in line 28

0 grp.	fix source	fiss source	in scatter	slf scatter	out scatter	absorption	leakage	balance
1	.00000E+00	.00000E+00	.00000E+00	2.06683E-04	1.54985E-04	2.32426E-06	-1.51733E-04	1.00001E+00
2	.00000E+00	.00000E+00	2.70590E-05	1.41871E-03	1.01799E-03	1.36646E-05	-1.00462E-03	1.00000E+00
3	.00000E+00	.00000E+00	1.44709E-04	2.73739E-03	8.65533E-04	2.00311E-05	-7.40822E-04	9.99997E-01
4	.00000E+00	.00000E+00	2.80440E-04	2.29053E-03	2.96575E-04	1.30164E-05	-2.91355E-05	9.99998E-01
5	.00000E+00	.00000E+00	6.04168E-04	4.40381E-03	2.78508E-04	1.68152E-05	3.08803E-04	1.00000E+00
6	.00000E+00	.00000E+00	1.00673E-03	1.23951E-02	1.69352E-04	2.70462E-05	8.10288E-04	1.00000E+00
7	.00000E+00	.00000E+00	6.64585E-04	1.25898E-02	6.32829E-05	2.68056E-05	5.74487E-04	1.00000E+00
8	.00000E+00	.00000E+00	1.16608E-04	9.20138E-03	4.43061E-04	2.20963E-05	-3.48580E-04	1.00001E+00
9	.00000E+00	.00000E+00	4.44876E-04	6.35212E-03	5.29519E-05	7.66192E-05	3.15312E-04	9.99990E-01
10	.00000E+00	.00000E+00	5.30161E-05	4.97750E-03	4.95855E-05	5.92153E-05	-5.55899E-05	1.00000E+00
11	.00000E+00	.00000E+00	4.95888E-05	4.44113E-03	5.01560E-05	8.97438E-05	-9.05024E-05	9.99998E-01
12	.00000E+00	.00000E+00	5.01563E-05	2.75369E-03	5.12315E-05	5.65744E-06	-6.73952E-06	1.00000E+00
13	.00000E+00	.00000E+00	5.12316E-05	2.35797E-03	4.81010E-05	6.31812E-06	-3.18396E-06	9.99999E-01
14	.00000E+00	.00000E+00	4.81010E-05	2.25132E-03	4.24263E-05	8.59768E-06	-2.92389E-06	1.00000E+00
15	.00000E+00	.00000E+00	4.50612E-05	1.22556E-03	5.01583E-05	6.34690E-06	-1.14108E-05	9.99972E-01
16	.00000E+00	.00000E+00	5.64361E-05	6.54372E-04	5.66892E-05	3.87836E-06	-4.11121E-06	9.99967E-01
17	.00000E+00	.00000E+00	6.34504E-05	2.54690E-04	6.26925E-05	1.89529E-06	-1.12472E-06	9.99974E-01
18	.00000E+00	.00000E+00	6.63330E-05	2.05079E-04	6.62190E-05	1.70738E-06	-1.58354E-06	9.99978E-01
19	.00000E+00	.00000E+00	6.68473E-05	4.38134E-04	6.46427E-05	3.39981E-06	-1.17876E-06	9.99973E-01
20	.00000E+00	.00000E+00	8.03046E-05	1.58663E-03	6.74533E-05	1.36408E-05	-7.37724E-07	9.99973E-01
21	.00000E+00	.00000E+00	9.36267E-05	4.34878E-04	1.05877E-04	5.39066E-06	-1.56213E-05	9.99984E-01
22	.00000E+00	.00000E+00	1.39921E-04	1.01766E-03	1.36006E-04	1.31399E-05	-1.02203E-05	9.99999E-01
23	.00000E+00	.00000E+00	2.04742E-04	3.54102E-03	2.59970E-04	5.78359E-05	-1.13147E-04	1.00001E+00
24	.00000E+00	.00000E+00	3.32536E-04	2.66196E-03	3.65313E-04	6.53416E-05	-9.82163E-05	1.00001E+00
25	.00000E+00	.00000E+00	3.37536E-04	1.06910E-03	2.75171E-04	3.78539E-05	2.44845E-05	1.00001E+00
26	.00000E+00	.00000E+00	1.43187E-04	8.34158E-04	1.10256E-04	3.74471E-05	-4.51738E-06	1.00000E+00
27	.00000E+00	.00000E+00	3.19642E-05	1.75859E-04	9.06089E-08	1.30472E-05	1.88212E-05	1.00001E+00
28	.00000E+00	.00000E+00	5.20201E-03	8.24763E-02	5.20201E-03	6.48854E-04	-6.43502E-04	1.00002E+00

0 grp.	rt bdy flux	rt leakage	lft bdy flux	lft leakage	n2n rate	fiss rate	flux*db**2	total flux
1	1.21372E-02	-8.21883E-04	1.21126E-02	-6.70150E-04	5.53564E-06	.00000E+00	1.53028E-06	2.02085E-03
2	8.99465E-02	-8.69886E-03	8.96896E-02	-7.68424E-03	.00000E+00	.00000E+00	1.08461E-05	1.49713E-02
3	1.13684E-01	-1.11446E-02	1.13340E-01	-1.04088E-02	.00000E+00	.00000E+00	1.25442E-05	1.89226E-02
4	7.03469E-02	-6.85860E-03	7.01303E-02	-6.82947E-03	.00000E+00	.00000E+00	7.39337E-06	1.17108E-02
5	1.05379E-01	-1.04073E-02	1.05089E-01	-1.07161E-02	.00000E+00	.00000E+00	8.61102E-06	1.75419E-02
6	1.98195E-01	-1.88763E-02	1.97518E-01	-1.96866E-02	.00000E+00	.00000E+00	1.01676E-05	3.29900E-02
7	1.96462E-01	-1.14660E-02	1.96054E-01	-1.20405E-02	.00000E+00	.00000E+00	8.35054E-06	3.27199E-02
8	1.47387E-01	-2.77401E-03	1.47299E-01	-2.42543E-03	.00000E+00	.00000E+00	5.27090E-06	2.45599E-02
9	1.15714E-01	5.98921E-04	1.15724E-01	2.83608E-04	.00000E+00	.00000E+00	4.57858E-06	1.92896E-02

10	1.06420E-01	1.46050E-03	1.06461E-01	1.51609E-03	.00000E+00	.00000E+00	4.90000E-06	1.77414E-02
11	9.94894E-02	3.41753E-03	9.95853E-02	3.50808E-03	.00000E+00	.00000E+00	4.74984E-06	1.65896E-02
12	6.39995E-02	4.04056E-03	6.41067E-02	4.04730E-03	.00000E+00	.00000E+00	3.20575E-06	1.06750E-02
13	5.47744E-02	3.71288E-03	5.48750E-02	3.71606E-03	.00000E+00	.00000E+00	2.73804E-06	9.13697E-03
14	5.21479E-02	5.28815E-03	5.22893E-02	5.29107E-03	.00000E+00	.00000E+00	2.60121E-06	8.70188E-03
15	2.90048E-02	1.14458E-03	2.90406E-02	1.15599E-03	.00000E+00	.00000E+00	1.42518E-06	4.83717E-03
16	1.61768E-02	5.52787E-04	1.61929E-02	5.56898E-04	.00000E+00	.00000E+00	7.94814E-07	2.69754E-03
17	7.21972E-03	3.39215E-04	7.22892E-03	3.40339E-04	.00000E+00	.00000E+00	3.54593E-07	1.20404E-03
18	6.17045E-03	3.88889E-04	6.18067E-03	3.90472E-04	.00000E+00	.00000E+00	3.03010E-07	1.02921E-03
19	1.14371E-02	5.43008E-04	1.14517E-02	5.44186E-04	.00000E+00	.00000E+00	5.61302E-07	1.90737E-03
20	3.76275E-02	1.86175E-03	3.76758E-02	1.86249E-03	.00000E+00	.00000E+00	1.84404E-06	6.27505E-03
21	1.22513E-02	1.11604E-03	1.22791E-02	1.13166E-03	.00000E+00	.00000E+00	5.99633E-07	2.04386E-03
22	2.62251E-02	3.34610E-03	2.63063E-02	3.35632E-03	.00000E+00	.00000E+00	1.28236E-06	4.37663E-03
23	8.63991E-02	1.23045E-02	8.66904E-02	1.24178E-02	.00000E+00	.00000E+00	4.21031E-06	1.44205E-02
24	6.87923E-02	1.22258E-02	6.90572E-02	1.23240E-02	.00000E+00	.00000E+00	3.33238E-06	1.14833E-02
25	3.05535E-02	5.82776E-03	3.06675E-02	5.80528E-03	.00000E+00	.00000E+00	1.47116E-06	5.09888E-03
26	2.14711E-02	4.31119E-03	2.15422E-02	4.31571E-03	.00000E+00	.00000E+00	1.02266E-06	3.58285E-03
27	4.00315E-03	7.48050E-04	4.00971E-03	7.29225E-04	.00000E+00	.00000E+00	1.84689E-07	6.67496E-04
28	1.78341E+00	-7.80948E-03	1.78254E+00	-7.16597E-03	5.53566E-06	.00000E+00	1.04873E-04	2.97196E-01

1fine group summary for zone 3 by group including sum for all groups in line 28

0 grp.	fix source	fiss source	in scatter	slf scatter	out scatter	absorption	leakage	balance
1	.00000E+00	.00000E+00	.00000E+00	2.47800E-04	3.27983E-04	2.73099E-05	-3.55276E-04	9.99985E-01
2	.00000E+00	.00000E+00	1.88190E-04	3.19562E-03	4.20005E-03	9.13191E-05	-4.10803E-03	9.99988E-01
3	.00000E+00	.00000E+00	1.99211E-03	2.88600E-03	7.50880E-03	4.89988E-05	-5.56652E-03	9.99991E-01
4	.00000E+00	.00000E+00	2.94020E-03	1.91515E-03	6.58025E-03	2.23496E-05	-3.66233E-03	9.99995E-01
5	.00000E+00	.00000E+00	5.43012E-03	6.16245E-03	1.11645E-02	2.65566E-05	-5.78089E-03	9.99996E-01
6	.00000E+00	.00000E+00	1.14440E-02	1.84788E-02	2.19622E-02	4.51512E-05	-1.05634E-02	1.00000E+00
7	.00000E+00	.00000E+00	2.25827E-02	3.23786E-02	2.87488E-02	3.25120E-05	-6.19931E-03	9.99992E-01
8	.00000E+00	.00000E+00	2.99704E-02	4.11358E-02	3.08444E-02	1.91133E-05	-8.90349E-04	9.99919E-01
9	.00000E+00	.00000E+00	3.04027E-02	3.79442E-02	3.00483E-02	1.52984E-05	3.42473E-04	9.99892E-01
10	.00000E+00	.00000E+00	2.98641E-02	3.60235E-02	2.89502E-02	1.87810E-05	8.98221E-04	9.99900E-01
11	.00000E+00	.00000E+00	2.91219E-02	3.39510E-02	2.71052E-02	2.85488E-05	1.98999E-03	9.99945E-01
12	.00000E+00	.00000E+00	2.35342E-02	1.80424E-02	2.12291E-02	3.10764E-05	2.27449E-03	9.99982E-01
13	.00000E+00	.00000E+00	2.09068E-02	1.47265E-02	1.88857E-02	4.36246E-05	1.97811E-03	9.99974E-01
14	.00000E+00	.00000E+00	2.03424E-02	1.45453E-02	1.73754E-02	7.01955E-05	2.89710E-03	9.99990E-01
15	.00000E+00	.00000E+00	1.11751E-02	5.69812E-03	1.06749E-02	5.91225E-05	4.41088E-04	1.00000E+00
16	.00000E+00	.00000E+00	7.39560E-03	2.41959E-03	7.12886E-03	4.03509E-05	2.26916E-04	9.99998E-01
17	.00000E+00	.00000E+00	3.82634E-03	6.99233E-04	3.68808E-03	2.00164E-05	1.68248E-04	1.00000E+00
18	.00000E+00	.00000E+00	3.40758E-03	5.81734E-04	3.17871E-03	1.82027E-05	2.10671E-04	9.99998E-01
19	.00000E+00	.00000E+00	5.75868E-03	1.64318E-03	5.45357E-03	3.68029E-05	2.68262E-04	1.00001E+00
20	.00000E+00	.00000E+00	1.42494E-02	1.16418E-02	1.31626E-02	1.51834E-04	9.34789E-04	1.00001E+00
21	.00000E+00	.00000E+00	7.04013E-03	2.44308E-03	6.35558E-03	6.12685E-05	6.25242E-04	1.00000E+00
22	.00000E+00	.00000E+00	1.41662E-02	7.84643E-03	1.22107E-02	1.50709E-04	1.80448E-03	1.00001E+00
23	.00000E+00	.00000E+00	3.72510E-02	4.64951E-02	3.05321E-02	6.74946E-04	6.02222E-03	1.00004E+00
24	.00000E+00	.00000E+00	3.99739E-02	4.27423E-02	3.29951E-02	7.77611E-04	6.20128E-03	1.00004E+00
25	.00000E+00	.00000E+00	2.64138E-02	1.78287E-02	2.29366E-02	4.53130E-04	3.02337E-03	1.00002E+00
26	.00000E+00	.00000E+00	2.09760E-02	1.94328E-02	1.79488E-02	4.49415E-04	2.57752E-03	1.00001E+00
27	.00000E+00	.00000E+00	7.06032E-03	4.10187E-03	6.24878E-03	1.56133E-04	6.55396E-04	1.00000E+00
28	.00000E+00	.00000E+00	4.27394E-01	4.25207E-01	4.27394E-01	3.57038E-03	-3.56223E-03	9.99981E-01

0 grp.	rt bdy flux	rt leakage	lft bdy flux	lft leakage	r2n rate	fiss rate	flux*db**2	total flux
1	1.22635E-02	-1.17716E-03	1.21372E-02	-8.21883E-04	1.81394E-11	.00000E+00	9.82987E-06	8.02929E-03
2	9.12460E-02	-1.27919E-02	8.99468E-02	-8.68886E-03	.00000E+00	.00000E+00	4.63188E-05	5.96012E-02
3	1.15305E-01	-1.67102E-02	1.13684E-01	-1.11446E-02	.00000E+00	.00000E+00	4.87719E-05	7.53082E-02
4	7.13148E-02	-1.05209E-02	7.03469E-02	-6.85860E-03	.00000E+00	.00000E+00	2.22147E-05	4.65769E-02
5	1.06847E-01	-1.61682E-02	1.05379E-01	-1.04073E-02	.00000E+00	.00000E+00	2.63999E-05	6.97662E-02
6	2.00812E-01	-2.94397E-02	1.98195E-01	-1.88763E-02	.00000E+00	.00000E+00	4.46854E-05	1.31168E-01
7	1.97984E-01	-1.76653E-02	1.96462E-01	-1.14660E-02	.00000E+00	.00000E+00	3.14798E-05	1.29729E-01
8	1.47678E-01	-3.66436E-03	1.47387E-01	-2.77401E-03	.00000E+00	.00000E+00	1.71812E-05	9.71141E-02
9	1.15482E-01	9.41398E-04	1.15714E-01	5.98921E-04	.00000E+00	.00000E+00	1.13259E-05	7.60946E-02
10	1.06157E-01	2.35872E-03	1.06420E-01	1.46050E-03	.00000E+00	.00000E+00	9.97886E-06	6.99826E-02

11	9.89099E-02	5.40752E-03	9.94894E-02	3.41753E-03	.00000E+00	.00000E+00	9.26896E-06	6.53352E-02
12	6.33108E-02	6.31505E-03	6.39995E-02	4.04056E-03	.00000E+00	.00000E+00	5.40416E-06	4.19403E-02
13	5.41914E-02	5.69099E-03	5.47744E-02	3.71288E-03	.00000E+00	.00000E+00	4.50767E-06	3.58962E-02
14	5.12812E-02	8.18524E-03	5.21479E-02	5.28815E-03	.00000E+00	.00000E+00	4.36788E-06	3.40899E-02
15	2.89128E-02	1.58566E-03	2.90048E-02	1.14458E-03	.00000E+00	.00000E+00	2.34749E-06	1.90670E-02
16	1.61246E-02	7.79704E-04	1.61768E-02	5.52787E-04	.00000E+00	.00000E+00	1.18408E-06	1.06342E-02
17	7.17317E-03	5.07462E-04	7.21972E-03	3.39215E-04	.00000E+00	.00000E+00	4.85125E-07	4.73978E-03
18	6.10852E-03	5.99560E-04	6.17045E-03	3.88889E-04	.00000E+00	.00000E+00	4.03889E-07	4.04498E-03
19	1.13620E-02	8.11270E-04	1.14371E-02	5.43008E-04	.00000E+00	.00000E+00	7.85590E-07	7.50798E-03
20	3.73541E-02	2.79654E-03	3.76275E-02	1.86175E-03	.00000E+00	.00000E+00	2.89424E-06	2.46931E-02
21	1.20552E-02	1.73928E-03	1.22513E-02	1.11604E-03	.00000E+00	.00000E+00	7.34564E-07	8.01127E-03
22	2.56141E-02	5.15059E-03	2.62251E-02	3.34610E-03	.00000E+00	.00000E+00	1.56268E-06	1.70941E-02
23	8.40664E-02	1.85267E-02	8.69991E-02	1.23045E-02	.00000E+00	.00000E+00	4.63645E-06	5.62131E-02
24	6.59934E-02	1.84271E-02	6.87923E-02	1.22258E-02	.00000E+00	.00000E+00	2.72676E-06	4.44851E-02
25	2.89696E-02	8.85113E-03	3.05335E-02	5.82776E-03	.00000E+00	.00000E+00	9.30720E-07	1.98546E-02
26	1.99179E-02	6.88871E-03	2.14711E-02	4.31119E-03	.00000E+00	.00000E+00	4.78674E-07	1.36878E-02
27	3.55929E-03	1.40345E-03	4.00315E-03	7.48050E-04	.00000E+00	.00000E+00	5.48513E-08	2.51055E-03
28	1.77999E+00	-1.13717E-02	1.78341E+00	-7.80948E-03	1.81384E-11	.00000E+00	3.10960E-04	1.17298E+00

1fine group summary for zone 4 by group including sum for all groups in line 28

0 grp.	fix source	fiss source	in scatter	slf scatter	out scatter	absorption	leakage	balance
1	.00000E+00	2.16008E-02	.00000E+00	2.00624E-02	1.90161E-02	3.55152E-03	1.17714E-03	9.98896E-01
2	.00000E+00	1.89845E-01	6.57451E-03	2.45171E-01	1.68591E-01	1.50450E-02	1.27917E-02	1.00002E+00
3	.00000E+00	2.15153E-01	6.95018E-02	2.55257E-01	2.51731E-01	1.62167E-02	1.67100E-02	9.99989E-01
4	.00000E+00	1.24336E-01	1.04064E-01	1.75766E-01	2.10095E-01	7.78570E-03	1.05208E-02	1.00000E+00
5	.00000E+00	1.65607E-01	1.90083E-01	4.43392E-01	3.34282E-01	5.24419E-03	1.61679E-02	9.99990E-01
6	.00000E+00	1.79557E-01	3.88650E-01	1.19090E+00	5.30894E-01	8.36588E-03	2.94394E-02	1.00001E+00
7	.00000E+00	8.90750E-02	5.92130E-01	1.56491E+00	6.55110E-01	8.43674E-03	1.76660E-02	9.99989E-01
8	.00000E+00	1.37484E-02	6.89104E-01	1.57535E+00	6.85681E-01	1.35633E-02	3.66444E-03	9.99919E-01
9	.00000E+00	9.98261E-04	6.77797E-01	1.37018E+00	6.57554E-01	2.22558E-02	-9.46345E-04	9.99900E-01
10	.00000E+00	7.41517E-05	6.54661E-01	1.24308E+00	6.23498E-01	3.36628E-02	-2.35799E-03	9.99897E-01
11	.00000E+00	5.83383E-06	6.27678E-01	1.15489E+00	5.78688E-01	5.44398E-02	-5.40594E-03	9.99939E-01
12	.00000E+00	4.09818E-07	5.04172E-01	6.31195E-01	4.52379E-01	5.81215E-02	-6.31550E-03	9.99975E-01
13	.00000E+00	6.50753E-08	4.47028E-01	5.01330E-01	3.99918E-01	5.28143E-02	-5.69044E-03	9.99970E-01
14	.00000E+00	1.28962E-08	4.31015E-01	4.73474E-01	3.66127E-01	7.30776E-02	-8.18508E-03	9.99988E-01
15	.00000E+00	1.45741E-09	2.39208E-01	2.17654E-01	2.33184E-01	7.60760E-03	-1.58942E-03	1.00002E+00
16	.00000E+00	4.27947E-10	1.63478E-01	1.01394E-01	1.59853E-01	4.39429E-03	-7.82303E-04	1.00002E+00
17	.00000E+00	1.37820E-10	8.83870E-02	3.29388E-02	8.45978E-02	4.29620E-03	-5.08981E-04	1.00002E+00
18	.00000E+00	9.86750E-11	7.92269E-02	2.67308E-02	7.41409E-02	5.68515E-03	-5.98836E-04	9.99996E-01
19	.00000E+00	1.39505E-10	1.29972E-01	6.64088E-02	1.24581E-01	6.20269E-03	-8.15618E-04	1.00004E+00
20	.00000E+00	2.26850E-10	3.09741E-01	3.71921E-01	2.86362E-01	2.61725E-02	-2.80546E-03	1.00004E+00
21	.00000E+00	3.32035E-11	1.57289E-01	8.21225E-02	1.42423E-01	1.66057E-02	-1.74392E-03	1.00003E+00
22	.00000E+00	3.85237E-11	3.05675E-01	2.32134E-01	2.62659E-01	4.81644E-02	-5.15476E-03	1.00002E+00
23	.00000E+00	3.68329E-11	7.57959E-01	1.18160E+00	6.32537E-01	1.43741E-01	-1.83410E-02	1.00003E+00
24	.00000E+00	1.00254E-11	8.08964E-01	1.00077E+00	6.67141E-01	1.60245E-01	-1.84294E-02	1.00001E+00
25	.00000E+00	2.93479E-12	5.34122E-01	4.03112E-01	4.52903E-01	9.00686E-02	-8.85264E-03	1.00001E+00
26	.00000E+00	2.05789E-12	4.13185E-01	4.02923E-01	3.38007E-01	8.20655E-02	-6.88947E-03	1.00001E+00
27	.00000E+00	4.90406E-13	1.35879E-01	8.12775E-02	1.14078E-01	2.32046E-02	-1.40358E-03	1.00000E+00
28	.00000E+00	1.00000E+00	9.50655E+00	1.50459E+01	9.50554E+00	9.91034E-01	1.13207E-02	9.99979E-01

0 grp.	rt bdy flux	rt leakage	lft bdy flux	lft leakage	r2n rate	fiss rate	flux*db**2	total flux
1	1.25460E-02	-1.82671E-08	1.22635E-02	-1.17716E-03	2.11820E-03	2.36649E-03	2.76897E-04	3.18892E-01
2	9.44986E-02	-2.12016E-07	9.12460E-02	-1.27919E-02	1.64382E-05	1.08586E-02	1.55345E-03	2.39941E+00
3	1.19668E-01	-2.14495E-07	1.15305E-01	-1.67102E-02	.00000E+00	1.33372E-02	1.81172E-03	3.05761E+00
4	7.41490E-02	-1.59579E-07	7.13148E-02	-1.05209E-02	.00000E+00	5.75964E-03	8.80201E-04	1.88181E+00
5	1.11466E-01	-2.99055E-07	1.06847E-01	-1.61682E-02	.00000E+00	1.70018E-03	1.03027E-03	2.82779E+00
6	2.09690E-01	-3.15309E-07	2.00812E-01	-2.94397E-02	.00000E+00	1.52183E-03	1.73113E-03	5.31780E+00
7	2.03574E-01	7.19751E-07	1.97984E-01	-1.76653E-02	.00000E+00	1.56320E-03	1.22589E-03	5.16943E+00
8	1.48846E-01	8.91858E-08	1.47678E-01	-3.66436E-03	.00000E+00	1.65134E-03	6.97159E-04	3.78668E+00
9	1.15132E-01	-4.95225E-06	1.15482E-01	9.41398E-04	.00000E+00	2.28061E-03	4.70483E-04	2.93229E+00
10	1.05331E-01	7.30195E-07	1.06157E-01	2.35872E-03	.00000E+00	4.86990E-03	4.27886E-04	2.68418E+00
11	9.70350E-02	1.57992E-06	9.89099E-02	5.40752E-03	.00000E+00	1.00996E-02	3.86187E-04	2.47582E+00

12	6.11364E-02	-4.48833E-07	6.33108E-02	6.31505E-03	.00000E+00	1.29982E-02	2.27518E-04	1.56254E+00
13	5.22575E-02	5.56128E-07	5.41914E-02	5.69099E-03	.00000E+00	1.23853E-02	1.96952E-04	1.33591E+00
14	4.85024E-02	1.64006E-07	5.12812E-02	8.18524E-03	.00000E+00	8.91818E-03	1.79823E-04	1.24246E+00
15	2.83957E-02	-3.75582E-06	2.89128E-02	1.58566E-03	.00000E+00	2.25454E-03	1.12053E-04	7.24604E-01
16	1.58735E-02	-2.59897E-06	1.61246E-02	7.79704E-04	.00000E+00	1.50578E-03	5.90541E-05	4.04918E-01
17	7.00632E-03	-1.51869E-06	7.17317E-03	5.07462E-04	.00000E+00	2.23863E-03	2.39567E-05	1.78858E-01
18	5.90814E-03	7.23973E-07	6.10852E-03	5.99560E-04	.00000E+00	2.91977E-03	1.93466E-05	1.50978E-01
19	1.10906E-02	-4.34831E-06	1.13620E-02	8.11270E-04	.00000E+00	3.61999E-03	3.86401E-05	2.83152E-01
20	3.63989E-02	-8.92089E-06	3.73541E-02	2.79654E-03	.00000E+00	1.60777E-02	1.35090E-04	9.29430E-01
21	1.14295E-02	-4.63980E-06	1.20552E-02	1.73928E-03	.00000E+00	1.06303E-02	3.41892E-05	2.92824E-01
22	2.36338E-02	-4.17178E-06	2.56141E-02	5.15059E-03	.00000E+00	3.04770E-02	6.83018E-05	6.07898E-01
23	7.58090E-02	-1.42541E-05	8.40664E-02	1.83267E-02	.00000E+00	8.91544E-02	2.06240E-04	1.95988E+00
24	5.67570E-02	-2.29032E-06	6.59934E-02	1.84271E-02	.00000E+00	9.91094E-02	1.19408E-04	1.47880E+00
25	2.40987E-02	-1.50983E-06	2.89696E-02	8.85113E-03	.00000E+00	5.78792E-02	4.03110E-05	6.31259E-01
26	1.57444E-02	-7.66454E-07	1.99179E-02	6.88871E-03	.00000E+00	5.33914E-02	1.96715E-05	4.14925E-01
27	2.63900E-03	-1.38607E-07	3.55929E-03	1.40345E-03	.00000E+00	1.48532E-02	2.00523E-06	6.97283E-02
28	1.76851E+00	-5.10214E-05	1.77999E+00	-1.13717E-02	2.13464E-03	4.74422E-01	1.19738E-02	4.50999E+01

1fine group summary for system

0 grp.	fix source	fiss source	in scatter	slf scatter	out scatter	absorption	leakage	balance
1	.00000E+00	2.16008E-02	.00000E+00	2.09843E-02	2.01177E-02	3.63266E-03	-1.82671E-08	9.98894E-01
2	.00000E+00	1.89845E-01	7.14474E-03	2.55772E-01	1.81682E-01	1.53211E-02	-2.12016E-07	1.00001E+00
3	.00000E+00	2.15153E-01	7.53713E-02	2.66279E-01	2.74150E-01	1.63774E-02	-2.14495E-07	9.99888E-01
4	.00000E+00	1.24336E-01	1.12786E-01	1.83549E-01	2.29259E-01	7.86281E-03	-1.59579E-07	1.00000E+00
5	.00000E+00	1.65607E-01	2.06268E-01	4.65449E-01	3.66542E-01	5.33708E-03	-2.99065E-07	9.99990E-01
6	.00000E+00	1.79557E-01	4.22462E-01	1.25624E+00	5.93489E-01	8.52229E-03	-3.15309E-07	1.00001E+00
7	.00000E+00	8.90750E-02	6.57509E-01	1.67082E+00	7.38034E-01	8.55725E-03	7.19751E-07	9.99989E-01
8	.00000E+00	1.37484E-02	7.75501E-01	1.70898E+00	7.75673E-01	1.36409E-02	8.91868E-08	9.99918E-01
9	.00000E+00	9.98261E-04	7.66389E-01	1.48700E+00	7.45093E-01	2.23769E-02	-4.95225E-06	9.99899E-01
10	.00000E+00	7.41517E-05	7.41600E-01	1.35311E+00	7.07973E-01	3.37767E-02	7.30195E-07	9.99897E-01
11	.00000E+00	5.83389E-06	7.12616E-01	1.25867E+00	6.58052E-01	5.46125E-02	1.57992E-06	9.99959E-01
12	.00000E+00	4.09818E-07	5.73036E-01	6.86982E-01	5.14832E-01	5.82185E-02	-4.48833E-07	9.99975E-01
13	.00000E+00	6.50753E-08	5.08432E-01	5.46990E-01	4.55498E-01	5.29488E-02	5.56128E-07	9.99969E-01
14	.00000E+00	1.28962E-08	4.90835E-01	5.18734E-01	4.17547E-01	7.32957E-02	1.64006E-07	9.99988E-01
15	.00000E+00	1.45741E-09	2.72226E-01	2.35536E-01	2.64439E-01	7.78677E-03	-3.75582E-06	1.00002E+00
16	.00000E+00	4.27947E-10	1.85263E-01	1.09118E-01	1.80747E-01	4.51600E-03	-2.59897E-06	1.00002E+00
17	.00000E+00	1.37820E-10	9.96743E-02	3.52416E-02	9.53170E-02	4.35672E-03	-1.51869E-06	1.00002E+00
18	.00000E+00	9.86750E-11	8.92874E-02	2.86446E-02	8.35467E-02	5.74034E-03	7.23973E-07	9.99996E-01
19	.00000E+00	1.39506E-10	1.46936E-01	7.16602E-02	1.40622E-01	6.31390E-03	-4.34831E-06	1.00003E+00
20	.00000E+00	2.26850E-10	3.51646E-01	4.07631E-01	3.25011E-01	2.66312E-02	-8.92089E-06	1.00004E+00
21	.00000E+00	3.32036E-11	1.78102E-01	8.97774E-02	1.61310E-01	1.67921E-02	-4.63980E-06	1.00003E+00
22	.00000E+00	3.85257E-11	3.47768E-01	2.56505E-01	2.99138E-01	4.86261E-02	-4.17178E-06	1.00002E+00
23	.00000E+00	3.68329E-11	8.70016E-01	1.32430E+00	7.24183E-01	1.45819E-01	-1.42541E-05	1.00008E+00
24	.00000E+00	1.00254E-11	9.30196E-01	1.13300E+00	7.67516E-01	1.62668E-01	-2.29032E-06	1.00002E+00
25	.00000E+00	2.93479E-12	6.14825E-01	4.58709E-01	5.25329E-01	9.14923E-02	-1.50983E-06	1.00001E+00
26	.00000E+00	2.05789E-12	4.77362E-01	4.64110E-01	3.98861E-01	8.34987E-02	-7.66454E-07	1.00001E+00
27	.00000E+00	4.90406E-13	1.57554E-01	9.44273E-02	1.33843E-01	2.37115E-02	-1.38607E-07	1.00000E+00
28	.00000E+00	1.00000E+00	1.07708E+01	1.63832E+01	1.07708E+01	1.00243E+00	-5.09702E-05	9.99980E-01

0 grp.	rt bdy flux	rt leakage	lft bdy flux	lft leakage	r2n rate	fiss rate	flux*db**2	total flux
1	1.25460E-02	-1.82671E-08	1.20047E-02	.00000E+00	2.12374E-03	2.36649E-03	3.06799E-04	3.44088E-01
2	9.44986E-02	-2.12016E-07	8.82302E-02	.00000E+00	1.64382E-05	1.08586E-02	1.69758E-03	2.58564E+00
3	1.19668E-01	-2.14495E-07	1.11189E-01	.00000E+00	.00000E+00	1.33372E-02	1.96426E-03	3.27270E+00
4	7.41490E-02	-1.59579E-07	6.85763E-02	.00000E+00	.00000E+00	5.75964E-03	9.51298E-04	2.02709E+00
5	1.11466E-01	-2.99055E-07	1.02435E-01	.00000E+00	.00000E+00	1.70018E-03	1.11451E-03	3.04519E+00
6	2.09690E-01	-3.15309E-07	1.92654E-01	.00000E+00	.00000E+00	1.52183E-03	1.86953E-03	5.72661E+00
7	2.03574E-01	7.19751E-07	1.93006E-01	.00000E+00	.00000E+00	1.56320E-03	1.32497E-03	5.57605E+00
8	1.48846E-01	8.91858E-08	1.46877E-01	.00000E+00	.00000E+00	1.65134E-03	7.52311E-04	4.09518E+00
9	1.15132E-01	-4.95225E-06	1.15786E-01	.00000E+00	.00000E+00	2.28061E-03	5.08057E-04	3.17313E+00
10	1.05331E-01	7.30195E-07	1.06904E-01	.00000E+00	.00000E+00	4.86990E-03	4.61887E-04	2.90601E+00
11	9.70350E-02	1.57992E-06	1.00568E-01	.00000E+00	.00000E+00	1.00996E-02	4.18059E-04	2.68359E+00
12	6.11364E-02	-4.48833E-07	6.52073E-02	.00000E+00	.00000E+00	1.29982E-02	2.46609E-04	1.69650E+00

13	5.22575E-02	5.56128E-07	5.58561E-02	.00000E+00	.00000E+00	1.23853E-02	2.12925E-04	1.45060E+00
14	4.85024E-02	1.64006E-07	5.37011E-02	.00000E+00	.00000E+00	8.91818E-03	1.95339E-04	1.35196E+00
15	2.83957E-02	-3.75582E-06	2.92941E-02	.00000E+00	.00000E+00	2.25454E-03	1.20320E-04	7.85176E-01
16	1.58735E-02	-2.59897E-06	1.63177E-02	.00000E+00	.00000E+00	1.50578E-03	6.33084E-05	4.38685E-01
17	7.00632E-03	-1.51869E-06	7.31343E-03	.00000E+00	.00000E+00	2.23863E-03	2.57323E-05	1.93945E-01
18	5.90814E-03	7.23973E-07	6.28328E-03	.00000E+00	.00000E+00	2.91977E-03	2.08363E-05	1.63892E-01
19	1.10906E-02	-4.34831E-06	1.15888E-02	.00000E+00	.00000E+00	3.61999E-03	4.15029E-05	3.07055E-01
20	3.63959E-02	-8.92089E-06	3.81635E-02	.00000E+00	.00000E+00	1.60777E-02	1.45418E-04	1.00808E+00
21	1.14295E-02	-4.63980E-06	1.26109E-02	.00000E+00	.00000E+00	1.06303E-02	3.69596E-05	3.18544E-01
22	2.36338E-02	-4.17178E-06	2.73504E-02	.00000E+00	.00000E+00	3.04770E-02	7.42352E-05	6.63152E-01
23	7.58090E-02	-1.42541E-05	9.12651E-02	.00000E+00	.00000E+00	8.91544E-02	2.24328E-04	2.14255E+00
24	5.67570E-02	-2.29032E-06	7.43776E-02	.00000E+00	.00000E+00	9.91094E-02	1.31005E-04	1.62513E+00
25	2.40987E-02	-1.50985E-06	3.35434E-02	.00000E+00	.00000E+00	5.78792E-02	4.46288E-05	6.96472E-01
26	1.57444E-02	-7.66454E-07	2.41510E-02	.00000E+00	.00000E+00	5.33914E-02	2.21808E-05	4.61018E-01
27	2.63900E-03	-1.38607E-07	4.58520E-03	.00000E+00	.00000E+00	1.48532E-02	2.36341E-06	7.83366E-02
28	1.76861E+00	-5.10214E-05	1.78983E+00	.00000E+00	2.14017E-03	4.74422E-01	1.29765E-02	4.88144E+01

- elapsed time .02 min.
0direct access unit 9 requires 556 blocks of length 216 for cross section weighting.
1 transport cross section weighting function

0zone	grp. 1	grp. 2	grp. 3	grp. 4	grp. 5	grp. 6	grp. 7	grp. 8
1	1.07422E-03	4.92818E-03	5.24236E-03	2.49915E-03	3.18142E-03	5.53234E-03	3.72288E-03	1.74266E-03
2	6.54432E-04	4.86769E-03	5.73826E-03	3.43066E-03	4.29923E-03	6.17028E-03	4.34420E-03	2.14741E-03
3	1.10130E-03	5.34262E-03	5.82505E-03	2.90781E-03	3.86805E-03	6.79941E-03	4.39160E-03	1.82522E-03
4	7.56919E-04	4.19640E-03	4.89163E-03	2.38012E-03	2.82742E-03	4.80501E-03	3.32850E-03	1.79604E-03
5	7.79006E-04	4.26124E-03	4.95507E-03	2.40452E-03	2.87734E-03	4.89412E-03	3.37804E-03	1.79638E-03

0zone	grp. 9	grp. 10	grp. 11	grp. 12	grp. 13	grp. 14	grp. 15	grp. 16
1	1.11199E-03	1.01507E-03	1.09743E-03	8.72673E-04	7.78309E-04	9.94814E-04	3.12890E-04	1.54070E-04
2	1.78929E-03	1.95243E-03	2.04407E-03	1.59844E-03	1.40528E-03	1.64490E-03	6.25391E-04	3.39817E-04
3	1.12150E-03	1.05819E-03	1.30452E-03	1.21936E-03	1.09228E-03	1.49279E-03	3.71988E-04	1.83579E-04
4	1.19360E-03	1.09382E-03	1.08054E-03	6.77736E-04	6.01721E-04	6.37346E-04	3.11332E-04	1.61644E-04
5	1.19176E-03	1.09457E-03	1.04627E-03	7.05146E-04	6.26364E-04	6.80196E-04	3.14753E-04	1.62901E-04

0zone	grp. 17	grp. 18	grp. 19	grp. 20	grp. 21	grp. 22	grp. 23	grp. 24
1	7.62481E-05	7.76098E-05	1.22573E-04	4.32713E-04	2.03616E-04	5.85562E-04	2.17475E-03	2.10193E-03
2	1.61881E-04	1.52163E-04	2.56965E-04	8.53914E-04	3.61149E-04	9.59598E-04	3.43723E-03	3.26641E-03
3	1.01804E-04	1.12103E-04	1.63311E-04	5.70749E-04	3.11326E-04	9.14972E-04	3.29418E-03	3.27295E-03
4	6.92960E-05	6.03873E-05	1.11611E-04	3.87665E-04	1.27641E-04	3.18483E-04	1.14133E-03	9.51111E-04
5	7.09504E-05	6.29644E-05	1.14227E-04	3.96917E-04	1.36911E-04	3.48803E-04	1.25382E-03	1.07312E-03

0zone	grp. 25	grp. 26	grp. 27	grp. 28
1	9.76151E-04	6.98886E-04	1.06706E-04	4.18172E-02
2	1.53098E-03	1.12572E-03	1.94077E-04	5.53519E-02
3	1.56317E-03	1.18646E-03	2.22660E-04	5.16169E-02
4	4.02748E-04	2.45817E-04	3.04580E-05	3.45368E-02
5	4.63469E-04	2.94298E-04	3.95200E-05	3.54027E-02

1broad group parameters

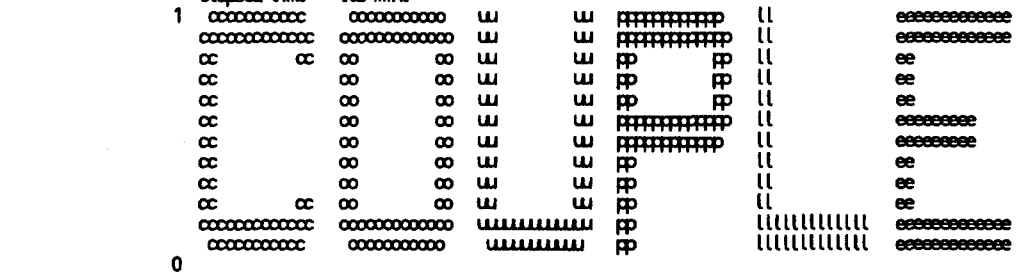
grp	upper energy	mid energy	velocity	fiss spec
1	2.0000E+07	2.6301E+06	1.9627E+09	7.1654E-01
2	9.0000E+05	1.5044E+05	9.5300E+06	2.8346E-01
3	4.0000E-01	1.2789E-01	3.6950E+05	1.2407E-10
4	1.0000E-05			

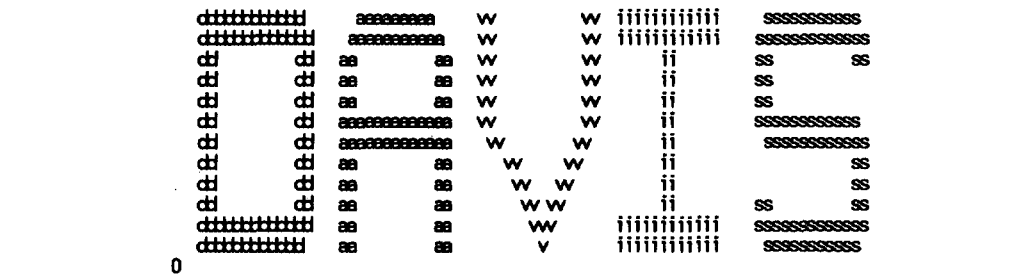
1 80 d, second part of sas2h pass to make library
0cell averaged fluxes

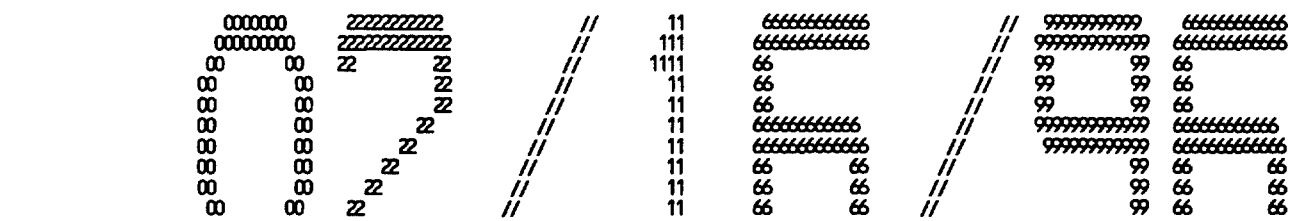
0zone	grp. 1	grp. 2	grp. 3
1	3.85739E-01	1.14035E+00	2.59862E-01
2	3.90955E-01	1.14199E+00	2.50017E-01
3	3.95886E-01	1.14245E+00	2.45580E-01
4	4.11019E-01	1.14597E+00	2.14250E-01
5	4.09335E-01	1.14560E+00	2.17296E-01

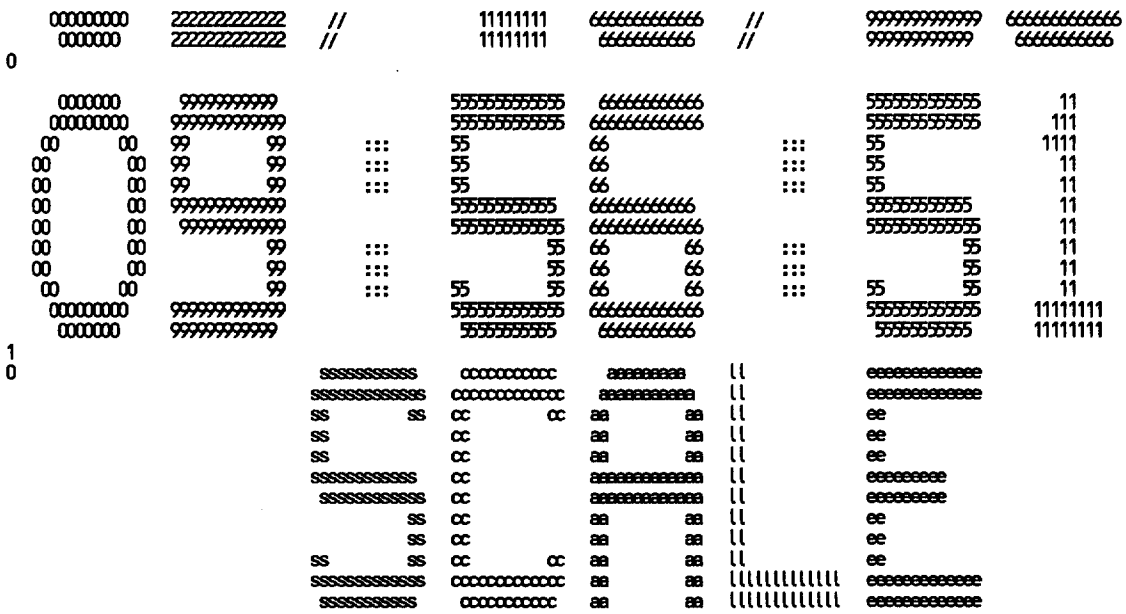
0flux disadvantage factors (zone average/cell average-flux)

```
0zone  grp. 1     grp. 2     grp. 3
    1 9.42357E-01 9.95413E-01 1.19589E+00
    2 9.55098E-01 9.96848E-01 1.15058E+00
    3 9.62260E-01 9.97251E-01 1.13016E+00
    4 1.00411E+00 1.00032E+00 9.85981E-01
    5 1.00000E+00 1.00000E+00 1.00000E+00
0cell averaged currents

0zone  grp. 1     grp. 2     grp. 3
    1 1.69253E-02 1.80443E-02 6.84760E-03
    2 1.89903E-02 2.54864E-02 1.08752E-02
    3 1.90448E-02 2.18064E-02 1.07657E-02
    4 1.50525E-02 1.62663E-02 3.21759E-03
    5 1.52572E-02 1.65356E-02 3.60995E-03
0zone      volume     vol. fraction

   1    1.25665E+00    4.56236E-02
   2    1.66687E-01    6.05165E-03
   3    6.58265E-01    2.38987E-02
   4    2.5462&E+01    9.24428E-01
   5    2.7544&E+01    1.00000E+00
-  elapsed time    .03 min.
```










```
**********************************************************************
**********************************************************************
**********************************************************************
*****                                                            *****
*****                program verification information             *****
*****                                                            *****
*****              code system:   scale  version:   4.2          *****
*****                                                            *****
**********************************************************************
**********************************************************************
*****                                                            *****
*****                                                            *****
*****                    program:  c0c005                        *****
*****                                                            *****
*****               creation date:  04/27/95                      *****
*****                                                            *****
*****                    library:  /neutronics/scale/exe         *****
*****                                                            *****
*****                                                            *****
*****          this is not a  scale  configuration controlled code *****
*****                                                            *****
*****                    jobname:  davis                         *****
*****                                                            *****
*****          date of execution:  02/16/96                      *****
*****                                                            *****
*****          time of execution:  09:56:51                      *****
```

```
                     *****                                                                       *****
                     *****                                                                       *****
                     *****************************************************************************
                     *****************************************************************************
                     *****************************************************************************
1
0       -1q array has      1 entries.
0        0q array has      1 entries.
0        0q array has      1 entries.
0        1q array has      1 entries.
0        1q array has      1 entries.
0        1q array has      1 entries.
0        1q array has      1 entries.
0        1q array has      1 entries.
0        2q array has      1 entries.
0         * core allocated to array-data (by -1$$ or default) was   200000 words. *
1          * broad 3-group flux weighting factors *
0
0                therm =    .5092
0                res   =    .3604
0                fast  =   2.7315
0 user requested (see jadd) that only the nuclide transitions presently included in
0 origen library be updated.
1cross sections, available from ampx (normalized to thermal flux), barns

                     10010 to  10020  2.71089E-01
                     10010 tot-cap    2.71089E-01
                     50100 to  40100  1.94358E-02
                     50100 to  10010  1.94358E-02
                     50100 to  40090  2.86217E-03
                     50100 to  10020  2.86217E-03
                     50100 to  30070  3.11798E+03
                     50100 to  20040  3.11813E+03
                     50100 to  10030  7.24701E-02
                     50100 tot-cap    3.11808E+03
                     50110 to  50100  8.12321E-06
                     50110 to  50120  4.12119E-03
                     50110 to  40110  1.03660E-06
                     50110 to  10010  1.03660E-06
                     50110 to  40090  9.25064E-06
                     50110 to  10030  9.25064E-06
                     50110 to  30080  1.20762E-04
                     50110 to  20040  1.20762E-04
                     50110 tot-cap    4.26037E-03
                     80160 to  80170  1.44801E-04
                     80160 to  70160  7.10768E-05
                     80160 to  10010  7.10768E-05
                     80160 to  70150  1.34050E-05
                     80160 to  10020  1.34050E-05
                     80160 to  60130  2.04523E-02
                     80160 to  20040  2.04523E-02
                     80160 to  80161  3.11718E-03
                     80160 tot-cap    2.06816E-02
                    360830 to 360820  1.61398E-02
                    360830 to 360810  1.70396E-09
                    360830 to 360840  1.45243E+02
                    360830 to 350830  6.75101E-04
                    360830 to  10010  6.75101E-04
                    360830 to 350820  5.33053E-06
                    360830 to  10020  5.33053E-06
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360830 to 350810 1.86312E-06
360830 to 10030 1.86312E-06
360830 to 340810 3.01531E-08
360830 to 20030 3.01531E-08
360830 to 340800 3.54517E-05
360830 to 20040 3.54517E-05
360830 tot-cap 1.45260E+02
360850 to 360860 1.30308E+00
360850 tot-cap 1.30308E+00
380900 to 380910 6.02302E-01
380900 tot-cap 6.02302E-01
390890 to 390900 9.32409E-01
390890 tot-cap 9.32409E-01
400930 to 400940 1.11829E+01
400930 tot-cap 1.11829E+01
400940 to 400950 1.57479E-01
400940 tot-cap 1.57479E-01
400950 to 400960 1.86408E+00
400950 tot-cap 1.86408E+00
410940 to 410950 3.29242E+01
410940 tot-cap 3.29242E+01
420950 to 420960 3.36517E+01
420950 tot-cap 3.36517E+01
430990 to 430980 4.89705E-03
430990 to 431000 7.76754E+01
430990 tot-cap 7.76808E+01
441010 to 441020 2.35436E+01
441010 tot-cap 2.35436E+01
441060 to 441070 7.21853E-01
441060 tot-cap 7.21853E-01
451030 to 451020 1.77353E-03
451030 to 451040 3.30609E+02
451030 tot-cap 3.30610E+02
451050 to 451060 7.72918E+03
451050 tot-cap 7.72918E+03
461050 to 461060 2.90735E+01
461050 tot-cap 2.90735E+01
461080 to 461090 5.74038E+01
461080 tot-cap 5.74038E+01
471090 to 471080 4.12423E-03
471090 to 471100 3.19744E+02
471090 to 461090 2.36885E-04
471090 to 10010 2.36885E-04
471090 to 451060 1.93998E-04
471090 to 20040 1.93998E-04
471090 to 471091 5.19478E-01
471090 tot-cap 3.19748E+02
511240 to 511250 1.04754E+01
511240 tot-cap 1.04754E+01
541310 to 541300 5.00077E-02
541310 to 541290 1.04567E-05
541310 to 541320 2.32235E+02
541310 to 531310 3.07430E-05
541310 to 10010 3.07430E-05
541310 to 531300 4.19366E-07
541310 to 10020 4.19366E-07
541310 to 531290 4.30016E-07
541310 to 10030 4.30016E-07
541310 to 521280 1.42920E-05
541310 to 20040 1.42920E-05

541310	tot-cap	2.32286E+02
541320	to 541310	8.07852E-03
541320	to 541300	1.71339E-05
541320	to 541330	8.02739E-01
541320	to 531320	6.21127E-06
541320	to 10010	6.21127E-06
541320	to 531310	2.60372E-07
541320	to 10020	2.60372E-07
541320	to 531300	3.50691E-08
541320	to 10080	3.50691E-08
541320	to 521290	7.59245E-07
541320	to 20040	7.59245E-07
541320	tot-cap	8.10842E-01
541350	to 541360	1.43961E+06
541350	tot-cap	1.43961E+06
541360	to 541350	1.38188E-02
541360	to 541340	4.22060E-05
541360	to 541370	1.16414E-01
541360	to 531360	2.55237E-07
541360	to 10010	2.55237E-07
541360	to 531350	9.50002E-08
541360	to 10020	9.50002E-08
541360	to 531340	2.14623E-08
541360	to 10080	2.14623E-08
541360	to 521330	2.14051E-07
541360	to 20040	2.14051E-07
541360	tot-cap	1.30276E-01
551330	to 551320	6.47110E-03
551330	to 551340	8.91954E+01
551330	to 541330	7.16967E-04
551330	to 10010	7.16967E-04
551330	to 531300	1.10582E-05
551330	to 20040	1.10582E-05
551330	tot-cap	8.92026E+01
551340	to 551350	1.19033E+02
551340	tot-cap	1.19033E+02
551350	to 551360	1.83684E+01
551350	tot-cap	1.83684E+01
551370	to 551380	1.98276E-01
551370	tot-cap	1.98276E-01
561360	to 561370	7.75574E-01
561360	tot-cap	7.75574E-01
571390	to 571400	7.38489E+00
571390	tot-cap	7.38489E+00
581440	to 581450	1.10831E+00
581440	tot-cap	1.10831E+00
591410	to 591400	4.63708E-03
591410	to 591390	1.33233E-06
591410	to 571370	2.00747E-06
591410	to 20040	4.15244E-05
591410	to 581400	1.41654E-05
591410	to 10010	4.06384E-05
591410	to 591420	1.08333E+01
591410	to 581410	3.82873E-05
591410	to 10020	1.18143E-05
591410	to 581390	1.23859E-06
591410	to 10080	1.23899E-06
591410	to 571390	1.19656E-08
591410	to 20080	1.19656E-08
591410	to 571380	3.95169E-05

591410	tot-cap	1.08381E+01
591430	to 591440	8.87636E+01
591430	tot-cap	8.87636E+01
601430	to 601420	7.10500E-02
601430	to 601410	7.24124E-06
601430	to 581390	1.61835E-05
601430	to 20040	4.51721E-04
601430	to 591420	3.03118E-06
601430	to 10010	3.14386E-05
601430	to 601440	1.93022E+02
601430	to 591430	3.02966E-05
601430	to 10020	1.88919E-06
601430	to 591410	2.72231E-06
601430	to 10030	2.72231E-06
601430	to 581410	1.30796E-08
601430	to 20030	1.30796E-08
601430	to 581400	4.35537E-04
601430	tot-cap	1.93094E+02
601450	to 601440	9.12502E-02
601450	to 601430	9.24545E-05
601450	to 581410	6.64915E-06
601450	to 20040	1.67466E-04
601450	to 591440	1.73670E-06
601450	to 10010	1.13346E-05
601450	to 601460	6.93315E+01
601450	to 591450	1.06419E-05
601450	to 10020	1.04397E-06
601450	to 591430	1.64584E-06
601450	to 10030	1.64584E-06
601450	to 581430	3.35093E-09
601450	to 20030	3.35093E-09
601450	to 581420	1.60817E-04
601450	tot-cap	6.94231E+01
601470	to 601480	1.60240E+02
601470	tot-cap	1.60240E+02
611470	to 611460	2.49119E-02
611470	to 611450	7.77289E-05
611470	to 591430	6.95141E-06
611470	to 20040	6.48065E-05
611470	to 601460	9.54605E-06
611470	to 10010	2.18569E-05
611470	to 611480	5.15641E+02
611470	to 601470	1.94799E-05
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611470	to 601450	2.70677E-06
611470	to 10030	2.70677E-06
611470	to 591450	4.06970E-09
611470	to 20030	4.06970E-09
611470	to 591440	5.78551E-05
611470	tot-cap	5.15667E+02
611480	to 611490	1.11167E+04
611480	tot-cap	1.11167E+04
621470	to 621460	6.49974E-02
621470	to 621450	5.85168E-03
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621470	to 20040	1.01687E-03
621470	to 611460	1.17939E-04
621470	to 10010	1.70331E-04
621470	to 621480	1.97780E+02
621470	to 611470	1.50150E-04

621470 to 10020 9.80571E-05
621470 to 611450 1.05291E-04
621470 to 10030 1.05291E-04
621470 to 601450 4.84463E-06
621470 to 20030 4.84463E-06
621470 to 601440 9.65032E-04
621470 to 621471 1.36059E+00
621470 tot-cap 1.97853E+02
621490 to 621480 3.67532E-02
621490 to 621470 2.91681E-05
621490 to 621500 4.45711E+04
621490 to 611490 3.82096E-04
621490 to 10010 3.82096E-04
621490 to 601460 3.82096E-04
621490 to 20040 3.82096E-04
621490 tot-cap 4.45711E+04
621500 to 621510 1.20427E+02
621500 tot-cap 1.20427E+02
621510 to 621500 1.23392E-01
621510 to 621490 1.09757E-04
621510 to 601470 1.24567E-05
621510 to 20040 9.77814E-05
621510 to 611500 1.50290E-06
621510 to 10010 1.17581E-05
621510 to 621520 4.75884E+03
621510 to 611510 1.08399E-05
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621510 to 611490 1.06263E-06
621510 to 10030 1.06263E-06
621510 to 601490 1.09471E-09
621510 to 20030 1.09471E-09
621510 to 601480 8.53249E-05
621510 tot-cap 4.75896E+03
621520 to 621510 1.46977E-02
621520 to 621500 9.93126E-05
621520 to 601480 2.22102E-06
621520 to 20040 9.22918E-06
621520 to 611510 6.36616E-07
621520 to 10010 1.87864E-06
621520 to 621530 6.53500E+02
621520 to 611520 1.66881E-06
621520 to 10020 4.26789E-07
621520 to 611500 1.10998E-07
621520 to 10030 1.10998E-07
621520 to 601500 3.36886E-10
621520 to 20030 3.36886E-10
621520 to 601490 7.00814E-06
621520 tot-cap 6.53515E+02
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631530 to 631510 2.13169E-05
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631530 to 10010 5.10799E-05
631530 to 631540 5.45298E+02
631530 to 621530 4.90348E-05
631530 to 10020 3.93741E-06
631530 to 621510 8.81432E-07
631530 to 10030 8.81432E-07
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631530 to 20030 2.01461E-08
631530 to 611500 4.74728E-04
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631540 to 631530 2.28202E-02
631540 to 631520 8.19747E-06
631540 to 611500 7.97057E-11
631540 to 20040 6.07772E-04
631540 to 621530 1.79461E-06
631540 to 10010 9.75262E-04
631540 to 631550 9.96274E+02
631540 to 621540 9.75261E-04
631540 to 10020 1.79362E-06
631540 to 621520 3.03935E-06
631540 to 10030 3.03935E-06
631540 to 611520 1.28796E-08
631540 to 20030 1.28796E-08
631540 to 611510 6.07772E-04
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631550 to 631540 1.87362E-02
631550 to 631530 5.24656E-05
631550 to 611510 1.41368E-06
631550 to 20040 6.95794E-06
631550 to 621540 2.86085E-06
631550 to 10010 6.02659E-06
631550 to 631560 2.48080E+03
631550 to 621550 4.63459E-06
631550 to 10020 1.46885E-06
631550 to 621530 4.86241E-07
631550 to 10030 4.86241E-07
631550 to 611530 1.10209E-10
631550 to 20030 1.10209E-10
631550 to 611520 5.54427E-06
631550 tot-cap 2.48082E+03
641550 to 641560 1.64517E+04
641550 tot-cap 1.64517E+04
922340 to 922330 4.90863E-03
922340 fission 3.60699E+00
922340 nu-sigf 9.47289E+00
922340 to 922320 7.11723E-05
922340 to 922350 1.61906E+02
922340 to 922341 2.44147E+00
922340 tot-cap 1.65518E+02
922350 to 922340 2.25517E-02
922350 fission 3.47364E+02
922350 nu-sigf 8.41025E+02
922350 to 922330 2.14395E-05
922350 to 922360 7.94250E+01
922350 to 922351 6.9449E-02
922350 tot-cap 4.26811E+02
922360 to 922350 2.50056E-02
922360 fission 1.53934E+00
922360 nu-sigf 4.22025E+00
922360 to 922340 3.33242E-04
922360 to 922370 6.81206E+01
922360 to 922361 2.67106E+00
922360 tot-cap 6.98853E+01
922380 to 922370 4.99532E-02
922380 fission 7.69022E-01
922380 nu-sigf 2.16235E+00
922380 to 922360 3.22753E-04

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                922380 to 922390  7.22104E+00
                922380 tot-cap    8.04034E+00
                932370 to 932360  1.13851E-02
                932370 fission    4.18314E+00
                932370 nu-sigf    1.25870E+01
                932370 to 932350  4.35558E-05
                932370 to 932380  2.67252E+02
                932370 to 932371  6.26053E-01
                932370 tot-cap    2.71446E+02
                942380 to 942370  1.83000E-03
                942380 fission    1.92885E+01
                942380 nu-sigf    5.45744E+01
                942380 to 942360  1.02416E-05
                942380 to 942390  2.54526E+02
                942380 to 942381  2.43431E+00
                942380 tot-cap    2.73816E+02
                942390 to 942380  9.72024E-03
                942390 fission    8.63828E+02
                942390 nu-sigf    2.48333E+03
                942390 to 942370  1.64884E-05
                942390 to 942360  1.63452E-08
                942390 to 942400  4.90626E+02
                942390 tot-cap    1.35446E+03
                942400 to 942390  4.55751E-03
                942400 fission    4.91362E+00
                942400 nu-sigf    1.53359E+01
                942400 to 942380  4.44741E-05
                942400 to 942410  2.01524E+03
                942400 tot-cap    2.02016E+03
                942410 to 942400  5.82221E-02
                942410 fission    8.88807E+02
                942410 nu-sigf    2.60762E+03
                942410 to 942390  9.51621E-05
                942410 to 942420  2.95569E+02
                942410 tot-cap    1.18443E+03
                942420 to 942410  1.85790E-02
                942420 fission    3.62068E+00
                942420 nu-sigf    1.13321E+01
                942420 to 942400  2.25864E-04
                942420 to 942430  2.79175E+02
                942420 tot-cap    2.82814E+02
                952410 fission    1.12519E+01
                952410 nu-sigf    3.61820E+01
                952410 to 952420  9.97806E+02
                952410 tot-cap    1.00906E+03
                952430 fission    2.79868E+00
                952430 nu-sigf    9.38139E+00
                952430 to 952440  3.63841E+02
                952430 tot-cap    3.66634E+02
                962440 to 962430  4.46494E-03
                962440 fission    1.27444E+01
                962440 nu-sigf    4.26595E+01
                962440 to 962420  4.45861E-05
                962440 to 962450  1.19183E+02
                962440 to 962441  3.10608E+00
                962440 tot-cap    1.31952E+02
0the reaction   50100 to  30070 was not used, because  50100 is not in library., (in subr pool)
                                                  in the search of library number 3
0the reaction   50100 to  40090 was not used, because  50100 is not in library., (in subr pool)
                                                  in the search of library number 3
```

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0the reaction  50110 to  40090 was not used, because  50110 is not in library., (in subr pool)
                                    in the search of library number 3
0the reaction  50100 to  40100 was not used, because  50100 is not in library., (in subr pool)
                                    in the search of library number 3
0the reaction  80160 to  80161 was not used, because  80161 is not in library., (in subr pool)
0the reaction 621470 to 621471 was not used, because 621471 is not in library., (in subr pool)
0the fission product transitions for  922340 were not used.  library fissile nuclides are
   922330  922350  942410  922380  942390
0use substitute nuclide in block 8 data.  or, update with new fission yield data.
0the reaction  922340 to 922341 was not used, because  922341 is not in library., (in subr pool)
0the reaction  922360 to 922361 was not used, because  922361 is not in library., (in subr pool)
0the fission product transitions for  922360 were not used.  library fissile nuclides are
   922330  922350  942410  922380  942390
0use substitute nuclide in block 8 data.  or, update with new fission yield data.
0the reaction  922360 to 922361 was not used, because  922361 is not in library., (in subr pool)
0the fission product transitions for  952370 were not used.  library fissile nuclides are
   922330  922350  942410  922380  942390
0use substitute nuclide in block 8 data.  or, update with new fission yield data.
0the reaction  952370 to 952371 was not used, because  952371 is not in library., (in subr pool)
0the fission product transitions for  942380 were not used.  library fissile nuclides are
   922330  922350  942410  922380  942390
0use substitute nuclide in block 8 data.  or, update with new fission yield data.
0the reaction  942380 to 942381 was not used, because  942381 is not in library., (in subr pool)
0the fission product transitions for  942400 were not used.  library fissile nuclides are
   922330  922350  942410  922380  942390
0use substitute nuclide in block 8 data.  or, update with new fission yield data.
0the fission product transitions for  942420 were not used.  library fissile nuclides are
   922330  922350  942410  922380  942390
0use substitute nuclide in block 8 data.  or, update with new fission yield data.
0the fission product transitions for  952410 were not used.  library fissile nuclides are
   922330  922350  942410  922380  942390
0use substitute nuclide in block 8 data.  or, update with new fission yield data.
0the fission product transitions for  952430 were not used.  library fissile nuclides are
   922330  922350  942410  922380  942390
0use substitute nuclide in block 8 data.  or, update with new fission yield data.
0the fission product transitions for  962440 were not used.  library fissile nuclides are
   922330  922350  942410  922380  942390
0use substitute nuclide in block 8 data.  or, update with new fission yield data.
0the reaction  962440 to 962441 was not used, because  962441 is not in library., (in subr pool)
1
0                          case completed.  date,  2/16/1996
0 * normal termination *
1   ooooooooo    rrrrrrrrrr    iiiiiiiiiii     ggggggggg    eeeeeeeeeee  mm        mm  sssssssss
   ooooooooooo   rrrrrrrrrrr   iiiiiiiiiii    ggggggggggg   eeeeeeeeeee  mmm       mm sssssssssss
   oo     oo     rr      rr       ii        gg      gg     ee           mmm       mm ss      ss
   oo     oo     rr      rr       ii        gg             ee           mm mm     mm ss
   oo     oo     rr      rr       ii        gg             ee           mm  mm    mm ss
   oo     oo     rrrrrrrrrr       ii        gg   ggggggg   eeeeeeee     mm   mm   mm sssssssss
   oo     oo     rrrrrrrrrr       ii        gg   ggggggg   eeeeeeee     mm    mm  mm  sssssssss
   oo     oo     rr    rr         ii        gg      gg     ee           mm     mm mm        ss
   oo     oo     rr     rr        ii        gg      gg     ee           mm      mmm ss      ss
   ooooooooooo   rr      rr  iiiiiiiiiii    ggggggggggg   eeeeeeeeeee  mm       mm sssssssssss
    ooooooooo    rr      rr  iiiiiiiiiii     ggggggggg    eeeeeeeeeee  mm        mm  sssssssss
0

   ddddddddddd     aaaaaaaa    w        w  iiiiiiiiiii    sssssssss
   ddddddddddd    aaaaaaaaaa   w        w  iiiiiiiiiii   sssssssssss
   dd      dd    aa      aa   w        w      ii        ss      ss
   dd      dd    aa      aa   w        w      ii        ss
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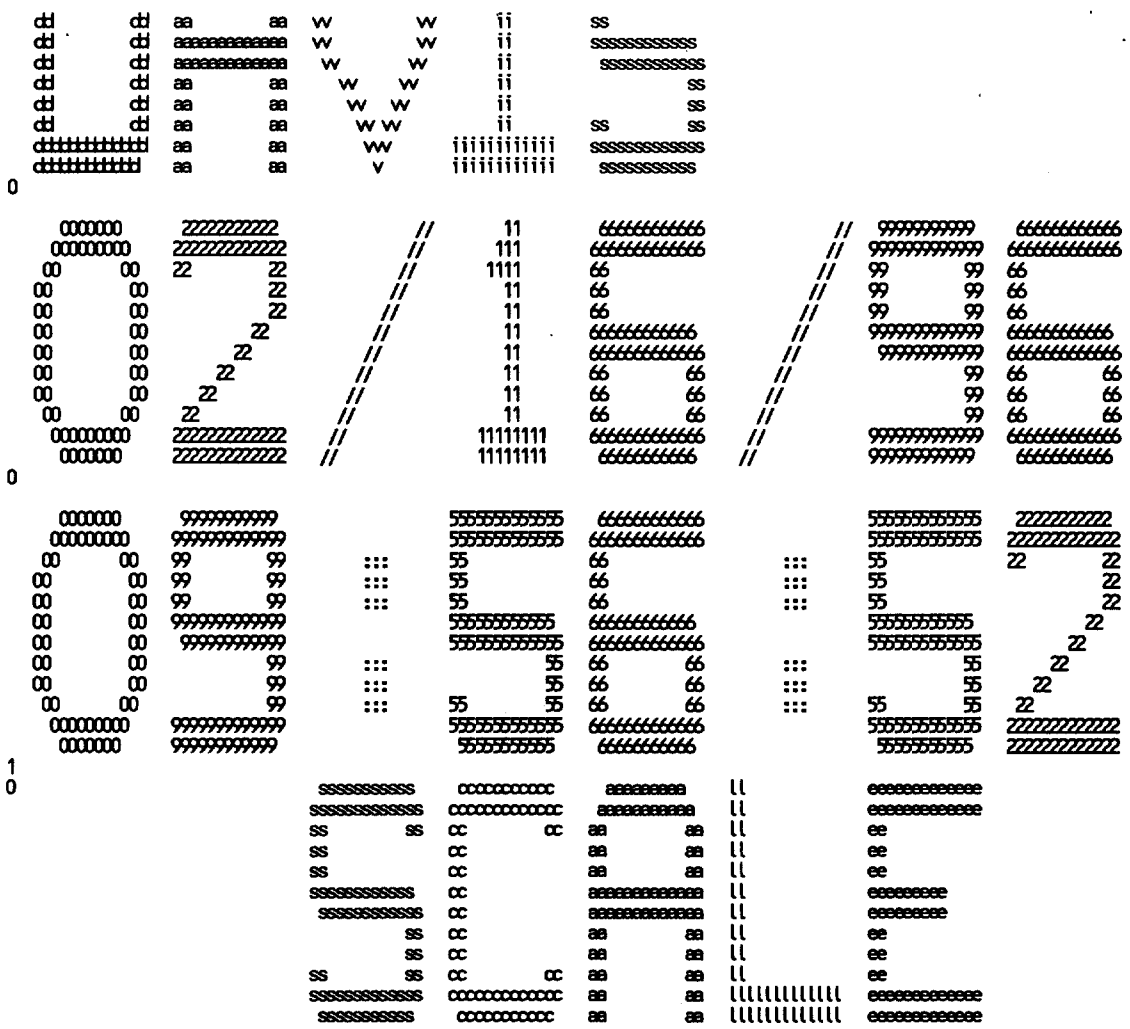

program verification information

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                    *****              code system:    scale  version:    4.2             *****
                    *****                                                                 *****
                    ***************************************************************************
                    ***************************************************************************
                    *****                                                                 *****
                    *****                                                                 *****
                    *****             program:  c0c004                                    *****
                    *****                                                                 *****
                    *****         creation date:  04/27/95                                *****
                    *****                                                                 *****
                    *****             library:  /nautronics/scale/exe                     *****
                    *****                                                                 *****
                    *****                                                                 *****
                    *****    this is not a   scale  configuration controlled code         *****
                    *****                                                                 *****
                    *****             jobname:  davis                                     *****
                    *****                                                                 *****
                    *****    date of execution:  02/16/96                                 *****
                    *****                                                                 *****
                    *****    time of execution:  09:56:52                                 *****
                    *****                                                                 *****
                    *****                                                                 *****
                    ***************************************************************************
                    ***************************************************************************
                    ***************************************************************************
1
0      -1q array has      1 entries.
0       0q array has      1 entries.
0       0q array has      1 entries.
0       0q array has      1 entries.
0       0q array has      1 entries.
0        dbl. prec. machine word applied has, at least, a 16 significant figure accuracy.
0            short-lived split test fraction, qxn =    9.1188E-04
0            half-norm of matrix used, axn =    7.0000E+00
0            4-place-accuracy-retention ratio, ratio4 =    6.4516E-13
0       1q array has     20 entries.
0       3q array has      1 entries.
0       3q array has      1 entries.
0       3q array has      1 entries.
0       3q array has      1 entries.
0       4q array has      1 entries.
0      54q array has     12 entries.
1library information...

         cross-section data taken from position number  1 of library on unit 33.

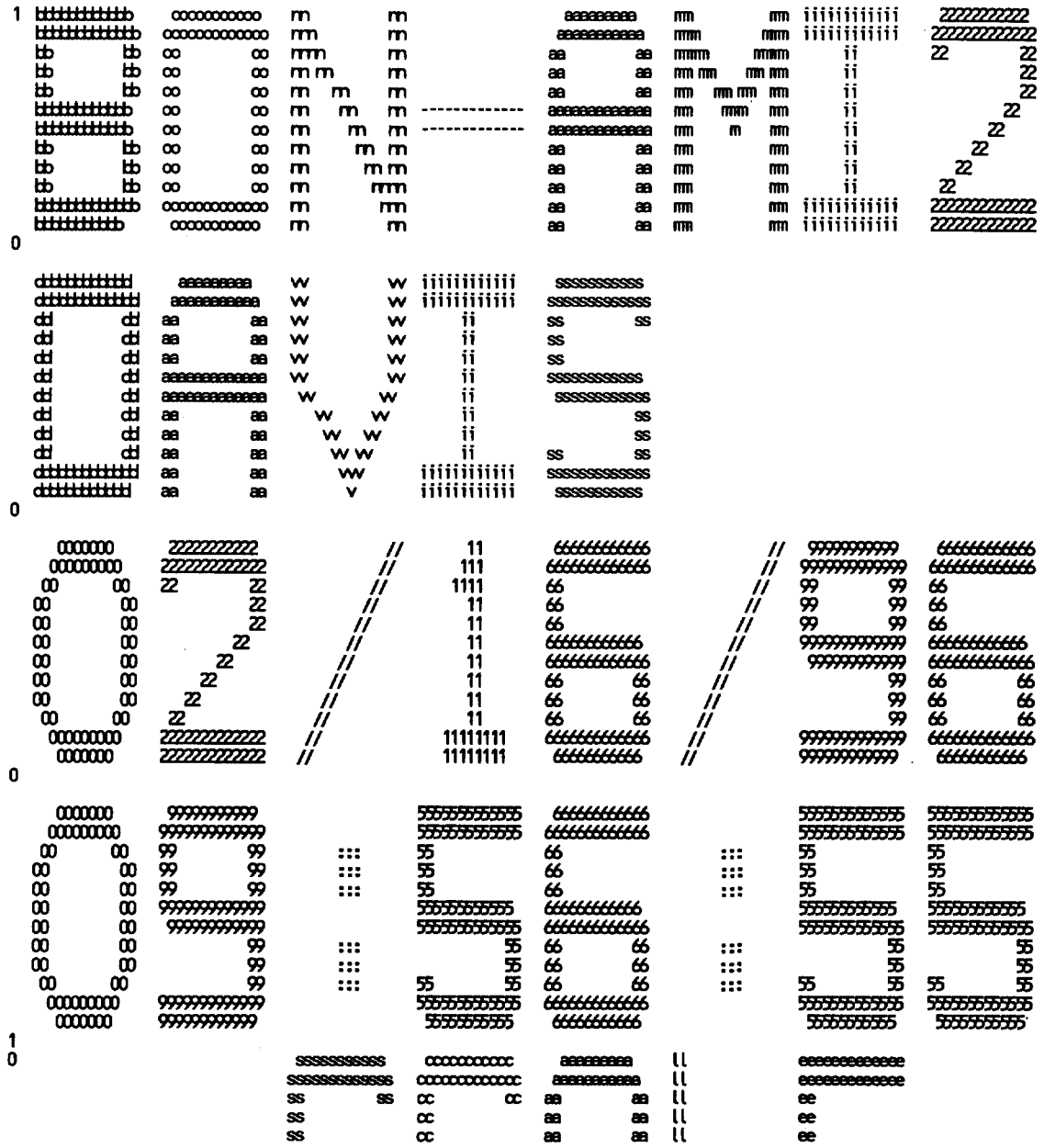
         pass   1
         pass   0
         *scale-system control module sas2 library*
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densiities
           pass n applies mid time densities of nth library interval
         first library updated was...
         pass   1
         pass   0
         *scale-system control module sas2 library*
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densiities
           pass n applies mid time densities of nth library interval
         first library updated was...
```

```
      ************************************************************************
      *                                                                      *
      *          prelim lwr origen-s binary working library--id = 1143       *
      *        made from modified card-image origen-s libraries of scale 4.2 *
      *      data from the light element, actinide, and fission product libraries *
      *       decay data, including gamma and total energy, are from endf/b-vi *
      *                                                                      *
      *     neutron flux spectrum factors and cross sections were produced from *
      *    the "presas2" case updating all nuclides on the scale "burnup" library *
      *                                                                      *
      *                 fission product yields are from endf/b-v             *
      *                                                                      *
      *            photon libraries use an 18-energy-group structure         *
      *           the photon data are from the master photon data base,      *
      *            produced to include bremsstrahlung from uo2 matrix        *
      *                                                                      *
      *       see information above this box (if present) for later updates  *
      *                                                                      *
      ************************************************************************
      *                                                                      *
0     ************************************************************************
0              .other identification and sizes of library.
0               data set name:  ft33f001
0             2/16/1996    date library was produced
0                  1697    total number of nuclides in library
                    689    number of light-element nuclides
                    129    number of actinide nuclides
                    879    number of fission product nuclides
0                  7935    number of nonzero off-diagonal matrix elements
0     ************************************************************************
1
   sas2h: babcock wilcox 15x15, 3.00wt%, 20gwd/mtu burn high temp                    actinides        page   1
     power= 8.466E-05mw, burnup=2.0318E-02mwd, flux= 1.69E+13n/cm**2-sec
0                                        nuclide concentrations, gram atoms
                                         basis = converted to atoms/(barn-cm)
         charge    40.0 d    80.0 d   120.0 d   160.0 d   160.0 d   200.0 d   240.0 d
  u230   .00E+00  3.84E-23  1.13E-22  2.02E-22  3.02E-22  3.02E-22  4.15E-22  5.44E-22
  u231   .00E+00  1.72E-21  3.76E-21  5.89E-21  8.19E-21  8.18E-21  1.07E-20  1.35E-20
  u232   .00E+00  2.37E-14  4.88E-14  7.61E-14  1.07E-13  1.07E-13  1.42E-13  1.82E-13
  u233   .00E+00  2.43E-12  4.74E-12  6.94E-12  9.03E-12  9.03E-12  1.10E-11  1.29E-11
  u234  5.56E-06  5.50E-06  5.45E-06  5.40E-06  5.35E-06  5.35E-06  5.30E-06  5.25E-06
  u235  6.92E-04  6.74E-04  6.58E-04  6.42E-04  6.26E-04  6.26E-04  6.11E-04  5.96E-04
  u236  3.17E-06  6.35E-06  9.43E-06  1.24E-05  1.53E-05  1.53E-05  1.80E-05  2.07E-05
  u237   .00E+00  2.10E-08  2.42E-08  2.69E-08  2.96E-08  2.96E-08  3.22E-08  3.47E-08
  u238  2.21E-02  2.21E-02  2.20E-02  2.20E-02  2.20E-02  2.20E-02  2.20E-02  2.20E-02
  u239   .00E+00  5.53E-09  5.49E-09  5.46E-09  5.43E-09  4.13E-09  5.41E-09  5.39E-09
  u240   .00E+00   .00E+00   .00E+00   .00E+00  2.05E-40  2.05E-40  2.46E-39  1.71E-38
  u241   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
 np235   .00E+00  6.46E-17  3.27E-16  8.08E-16  1.51E-15  1.51E-15  2.45E-15  3.62E-15
np236m   .00E+00  1.06E-15  2.58E-15  4.25E-15  6.07E-15  6.04E-15  8.03E-15  1.01E-14
 np236   .00E+00  4.47E-15  2.32E-14  5.84E-14  1.12E-13  1.12E-13  1.85E-13  2.79E-13
 np237   .00E+00  6.29E-08  1.54E-07  2.56E-07  3.67E-07  3.67E-07  4.87E-07  6.16E-07
 np238   .00E+00  7.56E-11  1.84E-10  3.04E-10  4.34E-10  4.33E-10  5.73E-10  7.23E-10
 np239   .00E+00  7.99E-07  7.93E-07  7.88E-07  7.84E-07  7.84E-07  7.81E-07  7.78E-07
np240m   .00E+00   .00E+00   .00E+00   .00E+00  1.75E-42  1.75E-42  2.10E-41  1.44E-40
 np240   .00E+00  1.32E-11  1.30E-11  1.28E-11  1.27E-11  1.15E-11  1.26E-11  1.25E-11
 np241   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
 pu236   .00E+00  5.86E-15  3.05E-14  7.67E-14  1.46E-13  1.46E-13  2.39E-13  3.58E-13
 pu237   .00E+00  3.37E-15  1.15E-14  2.18E-14  3.28E-14  3.28E-14  4.39E-14  5.48E-14
 pu238   .00E+00  3.73E-10  1.99E-09  5.06E-09  9.70E-09  9.70E-09  1.60E-08  2.41E-08
```

```
      pu239    .00E+00 8.27E-06 1.66E-05 2.42E-05 3.13E-05 3.13E-05 3.77E-05 4.37E-05
      pu240    .00E+00 1.24E-07 4.70E-07 9.91E-07 1.65E-06 1.65E-06 2.41E-06 3.25E-06
      pu241    .00E+00 5.06E-09 3.72E-08 1.16E-07 2.56E-07 2.56E-07 4.66E-07 7.51E-07
      pu242    .00E+00 2.30E-11 3.32E-10 1.56E-09 4.63E-09 4.63E-09 1.06E-08 2.07E-08
      pu243    .00E+00 2.82E-15 4.05E-14 1.90E-13 5.59E-13 5.47E-13 1.28E-12 2.48E-12
      pu244    .00E+00 3.86E-36 6.63E-33 5.11E-31 1.12E-29 1.12E-29 1.22E-28 8.52E-28
      pu245    .00E+00  .00E+00 5.04E-39 3.83E-37 8.34E-36 8.26E-36 9.05E-35 6.32E-34
      pu246    .00E+00 2.80E-45 7.04E-42 7.01E-40 1.79E-38 1.79E-38 2.17E-37 1.65E-36
      am239    .00E+00 9.95E-23 1.42E-21 6.64E-21 1.95E-20 1.93E-20 4.41E-20 8.52E-20
      am240    .00E+00 4.26E-20 6.10E-19 2.85E-18 8.36E-18 8.34E-18 1.90E-17 3.67E-17
      am241    .00E+00 6.90E-12 9.93E-11 4.66E-10 1.37E-09 1.37E-09 3.13E-09 6.05E-09
      am242m   .00E+00 1.30E-14 3.53E-13 2.39E-12 9.02E-12 9.02E-12 2.48E-11 5.57E-11
      am242    .00E+00 8.19E-15 1.17E-13 5.47E-13 1.60E-12 1.59E-12 3.64E-12 7.02E-12
      am243    .00E+00 7.80E-14 2.21E-12 1.57E-11 6.20E-11 6.20E-11 1.78E-10 4.19E-10
      am244m   .00E+00  .00E+00  .00E+00  .00E+00  .00E+00  .00E+00  .00E+00  .00E+00
      am244    .00E+00 2.54E-17 7.17E-16 5.04E-15 1.99E-14 1.97E-14 5.69E-14 1.33E-13
      am245    .00E+00 2.69E-40 4.52E-37 3.42E-35 7.35E-34 7.35E-34 7.88E-33 5.43E-32
      am246    .00E+00  .00E+00  .00E+00  .00E+00 4.26E-41 4.29E-41 5.44E-40 4.11E-39
      cm241    .00E+00 3.93E-26 3.89E-24 5.47E-23 3.43E-22 3.43E-22 1.39E-21 4.24E-21
      cm242    .00E+00 5.54E-14 1.53E-12 1.06E-11 4.07E-11 4.07E-11 1.14E-10 2.59E-10
      cm243    .00E+00 3.65E-17 1.99E-15 2.05E-14 1.05E-13 1.05E-13 3.65E-13 9.97E-13
      cm244    .00E+00 2.84E-16 1.59E-14 1.69E-13 8.95E-13 8.95E-13 3.23E-12 9.14E-12
      cm245    .00E+00 2.91E-19 3.21E-17 5.03E-16 3.51E-15 3.51E-15 1.56E-14 5.26E-14
      cm246    .00E+00 5.29E-22 1.16E-19 2.71E-18 2.51E-17 2.51E-17 1.40E-16 5.67E-16
      cm247    .00E+00 1.58E-25 6.84E-23 2.37E-21 2.91E-20 2.91E-20 2.02E-19 9.79E-19
      cm248    .00E+00 2.02E-28 1.74E-25 8.94E-24 1.46E-22 1.46E-22 1.27E-21 7.39E-21
1
      sas2h: babcock wilcox 15x15, 3.00wt%, 20gwd/mtu burn high temp                  actinides      page   2
        power= 8.466E-05mw, burnup=2.0318E-02mwd, flux= 1.69E+13n/cm**2-sec
0                                          nuclide concentrations, gram atoms
                                           basis = converted to atoms/(barn-cm)
               charge   40.0 d   80.0 d  120.0 d  160.0 d  160.0 d  200.0 d  240.0 d
      cm249    .00E+00 1.21E-33 1.03E-30 5.29E-29 8.61E-28 7.79E-28 7.45E-27 4.32E-26
      cm250    .00E+00 9.51E-39 1.61E-35 1.23E-33 2.66E-32 2.66E-32 2.87E-31 2.00E-30
      cm251    .00E+00  .00E+00  .00E+00 3.06E-41 6.60E-40 4.51E-40 7.12E-39 4.95E-38
    totals    2.28E-02 2.28E-02 2.27E-02 2.27E-02 2.27E-02 2.27E-02 2.27E-02 2.27E-02
0     flux             1.71E+13 1.70E+13 1.69E+13 1.68E+13  .00E+00 1.67E+13 1.67E+13
0  .results on logical unit no. 71, position  1, for time step  7, subcase 1. (run position 1, case position 1)
    title: sas2h: babcock wilcox 15x15, 3.00wt%, 20gwd/mtu burn high temp
0  .results on logical unit no. 71, position  2, for time step  5, subcase 1. (run position 1, case position 1)
    title: sas2h: babcock wilcox 15x15, 3.00wt%, 20gwd/mtu burn high temp
0  .results on logical unit no. 71, position  3, for time step  4, subcase 1. (run position 1, case position 1)
    title: sas2h: babcock wilcox 15x15, 3.00wt%, 20gwd/mtu burn high temp
0      .terminated logical unit no. 71 with zero flag record.
1  * normal termination of execution *
0                                        table of contents for material tables
0                                          case or subcase printed       page

                                                  1                1
0ndset        33
            33         4         1        27         6         0         0         0         0         0
             0         0         0         0         0         2        -1      1698       690       130
           880      7935         0         5        99         2        16        96        18        18
            18         0        71
0       56q array has      2 entries.
0       56q array has      1 entries.
0       56q array has      1 entries.
0       56q array has      1 entries.
0       56q array has      1 entries.
0       56q array has      1 entries.
```

```
0       56q array has       1 entries.
0       57q array has       3 entries.
0        1q array has      20 entries.
0        1q array has      10 entries.
     l90   97376
     l116  60826
     l32   33663 nudata (library) storage size
     l44   33734
     l103  75953
0       58q array has       4 entries.
0       60q array has       7 entries.
0       58q array has       7 entries.
0       66q array has       1 entries.
0       73q array has       4 entries.
0       74q array has       4 entries.
0       75q array has       4 entries.
     l140  66991
     used   101044 in size   200000
0jqpt          12
             0          0          0          0          0          0          0          0          0          0
             0          0
0therm          4
  5.091678E-01 3.604486E-01 2.731459E+00 1.000000E-31
0nan            5
          7935         20          6         18       1697
0mm            19
             7          7          0          0          1          1          0          0          0          0
            21        100          4          4          3         74          4          1          0
0tconst         5
  8.640000E+04  .000000E+00  .000000E+00  .000000E+00 1.000000E-08
0mzero          4
             0        689        129        879
0pow            3
   .000000E+00  .000000E+00  .000000E+00
0 lirp          9
             6          0         51         26          2       3000       1000       1697         94
 n-gamma, fission and total mev/fission =          4.4180E+00 1.9429E+02 1.9871E+02
 start of interval flux =       1.71666E+13
 n-gamma, fission and total mev/fission =          4.8296E+00 1.9446E+02 1.9929E+02
 start of interval flux =       1.70387E+13
 n-gamma, fission and total mev/fission =          4.9247E+00 1.9462E+02 1.9955E+02
 start of interval flux =       1.69221E+13
 n-gamma, fission and total mev/fission =          5.0218E+00 1.9477E+02 1.9980E+02
 start of interval flux =       1.68318E+13
 start of interval flux =        .0000E+00
 n-gamma, fission and total mev/fission =          5.1263E+00 1.9491E+02 2.0004E+02
 start of interval flux =       1.67626E+13
 n-gamma, fission and total mev/fission =          5.2266E+00 1.9505E+02 2.0027E+02
 start of interval flux =       1.67125E+13
0 case or subcase    1  sas2h: babcock wilcox 15x15, 3.00wt%, 20gwd/mtu burn high temp
0       56q array has      20 entries.
0       56q array has       1 entries.
0       56q array has       1 entries.
0       56q array has      20 entries.
0       56q array has       1 entries.
0       56q array has       1 entries.
0       56q array has      20 entries.
0       56q array has      20 entries.
0requested parm=halt8,skipcellwt,skipshipdata
  pass= 2, exec halts after pass   8
```



```
   sssssssssss    cc             aaaaaaaaaaa   ll             eeeeeeee
    sssssssssss   cc             aaaaaaaaaaa   ll             eeeeeeee
          ss      cc             aa        aa  ll             ee
          ss      cc             aa        aa  ll             ee
   ss     ss      cc         cc  aa        aa  ll             ee
   sssssssssss    ccccccccccc    aa        aa  lllllllllll    eeeeeeeeeee
    sssssssssss    ccccccccc     aa        aa  lllllllllll    eeeeeeeeeee
```

```
*****************************************************************
*****************************************************************
*****************************************************************
*****                                                       *****
*****                program verification information       *****
*****                                                       *****
*****              code system:  scale  version:  4.2       *****
*****                                                       *****
*****************************************************************
*****************************************************************
*****                                                       *****
*****                                                       *****
*****            program:  c0c008                           *****
*****                                                       *****
*****       creation date:  04/27/95                        *****
*****                                                       *****
*****            library:  /neutronics/scale/exe            *****
*****                                                       *****
*****                                                       *****
*****   this is not a  scale  configuration controlled code *****
*****                                                       *****
*****            jobname:  davis                            *****
*****                                                       *****
*****   date of execution:  02/16/96                        *****
*****                                                       *****
*****   time of execution:  09:56:55                        *****
*****                                                       *****
*****                                                       *****
*****************************************************************
*****************************************************************
*****************************************************************
```

```
1
0      -1q array has      1 entries.
0       0q array has      4 entries.
0       1q array has      6 entries.
0       2q array has      2 entries.
1logical assignments
0master library   12
 working library   0
 scratch file     18
 new library       1
0problem description
0ig--geometry (0/1/2/3--inf med/slab/cyl/sphere              2
0izm--number of zones or material regions                    4
0ms--mixing table length                                    66
0ibl--shielded cross section edit option (0/1--no/yes)       0
0ibr--bondarenko factor edit option (0/1--no/yes)            0
0issopt--dancoff factor option                               0
```

```
0convergence criterion    1.00000E-03
0geometry correction factor for wigner rational approximation  1.350E+00
0       3q array has     66 entries.
0       4q array has     66 entries.
0       5q array has     66 entries.
0       6q array has      4 entries.
0       7q array has      4 entries.
0       8q array has      4 entries.
0       9q array has      4 entries.
0      10q array has     66 entries.
0      11q array has      4 entries.
0m i x i n g   t a b l e
0entry  mixture   isotope   number density   new identifier
    1        1     92235    5.95891E-04            92235
    2        1     92234    5.24821E-06            92234
    3        1     92236    2.07230E-05            92236
    4        1     92238    2.20058E-02            92238
    5        1      8016    4.55359E-02             8016
    6        3      8016    2.09710E-02                6
    7        1     36083    4.52870E-07            36083
    8        1     36085    2.19160E-07            36085
    9        1     38090    4.90462E-06            38090
   10        1     39089    2.95210E-06            39089
   11        1     42095    2.67690E-06            42095
   12        1     40093    3.66334E-06            40093
   13        1     40094    5.64806E-06            40094
   14        1     40095    2.02113E-06            40095
   15        1     41094    1.92647E-12            41094
   16        1     43099    5.40899E-06            43099
   17        1     45103    2.34075E-06            45103
   18        1     45105    1.42341E-08            45105
   19        1     44101    4.73216E-06            44101
   20        1     44106    6.38003E-07            44106
   21        1     46105    1.32971E-06            46105
   22        1     46108    2.44774E-07            46108
   23        1     47109    1.71902E-07            47109
   24        1     51124    4.79520E-11            51124
   25        1     54131    2.48623E-06            54131
   26        1     54132    4.07046E-06            54132
   27        1     54135    6.51168E-09            54135
   28        1     54136    9.02456E-06            54136
   29        1     55134    8.14148E-08            55134
   30        1     55135    2.79804E-06            55135
   31        1     55137    5.70749E-06            55137
   32        1     56136    1.66625E-08            56136
   33        1     57139    5.70699E-06            57139
   34        1     59141    4.20358E-06            59141
   35        1     59143    4.03826E-07            59143
   36        1     58144    3.63429E-06            58144
   37        1     60143    4.64738E-06            60143
   38        1     60145    3.44985E-06            60145
   39        1     61147    1.63014E-06            61147
   40        1     61148    4.34751E-09            61148
   41        1     60147    1.34141E-07            60147
   42        1     62147    1.37482E-07            62147
   43        1     62149    6.87658E-08            62149
   44        1     62150    9.85383E-07            62150
   45        1     62151    2.22942E-07            62151
   46        1     62152    4.58639E-07            62152
   47        1     64155    4.46617E-10            64155
```

48	1	63153	2.02361E-07	63153
49	1	63154	1.57326E-08	63154
50	1	63155	3.12565E-08	63155
51	2	40302	4.25156E-02	40302
52	3	1001	4.19420E-02	1001
53	3	5010	3.81515E-06	5010
54	3	5011	1.54884E-05	5011
55	1	55133	5.85210E-06	55133
56	1	93237	6.15523E-07	93237
57	1	94238	2.41332E-08	94238
58	1	94239	4.36784E-05	94239
59	1	94240	3.25386E-06	94240
60	1	94241	7.50900E-07	94241
61	1	94242	2.06625E-08	94242
62	1	95241	6.04966E-09	95241
63	1	95243	4.19145E-10	95243
64	1	96244	9.13732E-12	96244
65	1	999	1.00000E-20	999
66	4	999	1.00000E-20	66

Ogeometry and material description

Ozone	mixture	outer dimension	temperature	extra xs	type (0/1--fuel/mod)
1	1	4.68122E-01	9.75000E+02	9.05844E-01	0
2	4	4.78790E-01	2.93000E+02	5.49010E-01	0
3	2	5.46100E-01	6.50000E+02	.00000E+00	0
4	3	8.13968E-01	6.07600E+02	.00000E+00	0

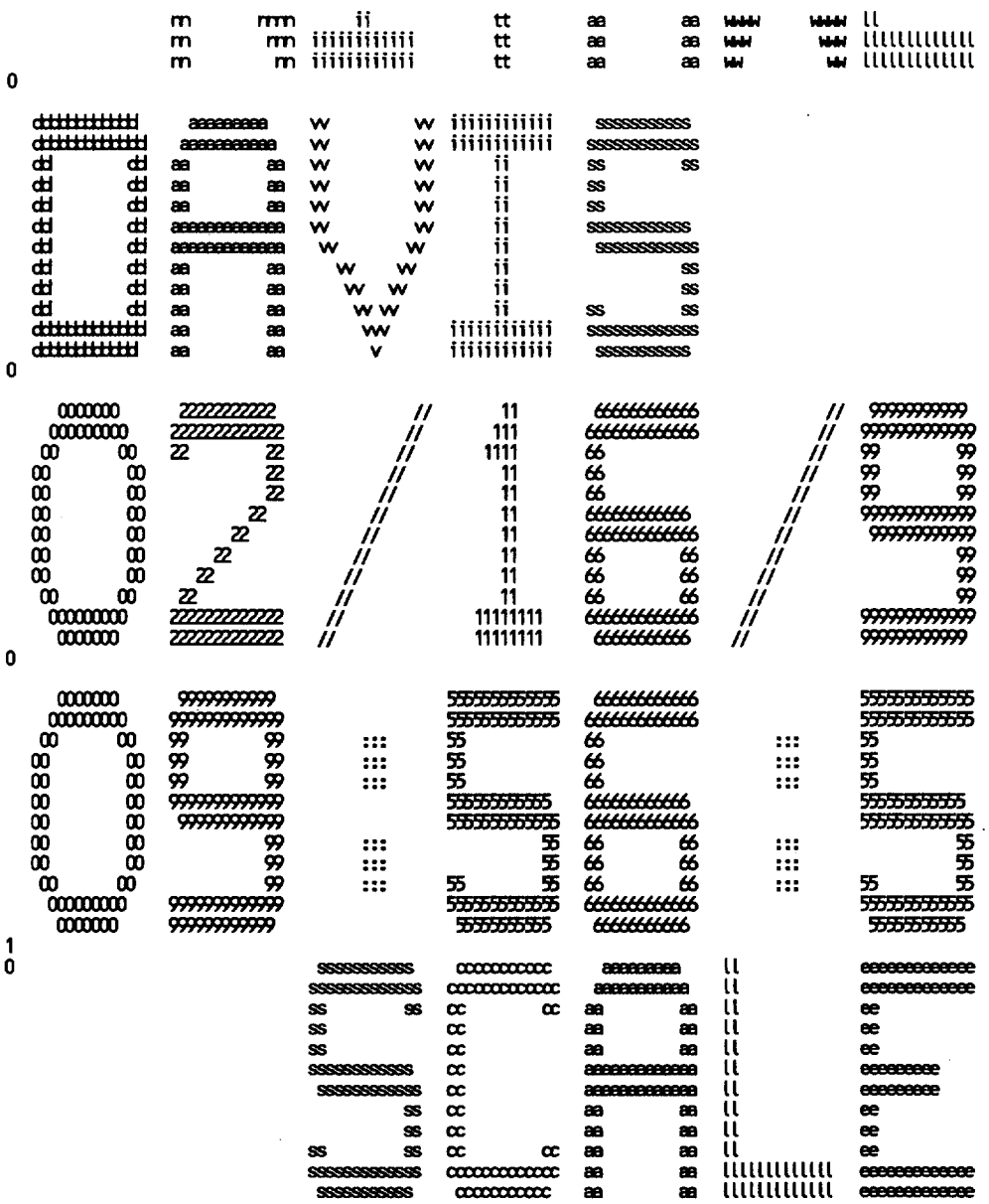
7711 locations of 200000 available are required to make a new master containing the self-shielded values

Ono nuclides in your problem have bondarenko factor data**bonami will copy from logical 12 to logical 1

Ocopy 999 1/v cross sectio from log 12 to log 18 bondarenko trigger 0
Ocopy 999 1/v cross sectio from log 18 to log 1 bondarenko trigger 0
Ocopy 999 1/v cross sectio from log 18 to log 1 bondarenko trigger 0
Ocopy 1001 hydrogen from log 12 to log 1 bondarenko trigger 0
Ocopy 5010 b-10 1273 218ngp from log 12 to log 1 bondarenko trigger 0
Ocopy 5011 boron-11 from log 12 to log 1 bondarenko trigger 0
Ocopy 8016 oxygen-16 from log 12 to log 18 bondarenko trigger 0
Ocopy 8016 oxygen-16 from log 18 to log 1 bondarenko trigger 0
Ocopy 8016 oxygen-16 from log 18 to log 1 bondarenko trigger 0
Ocopy 36083 kr-83 from log 12 to log 1 bondarenko trigger 0
Ocopy 36085 kr-85 from log 12 to log 1 bondarenko trigger 0
Ocopy 38090 sr-90 from log 12 to log 1 bondarenko trigger 0
Ocopy 39089 y-89 from log 12 to log 1 bondarenko trigger 0
Ocopy 40093 zr-93 from log 12 to log 1 bondarenko trigger 0
Ocopy 40094 zr-94 from log 12 to log 1 bondarenko trigger 0
Ocopy 40095 zr-95 from log 12 to log 1 bondarenko trigger 0
Ocopy 40302 zircalloy from log 12 to log 1 bondarenko trigger 0
Ocopy 41094 rb-94 from log 12 to log 1 bondarenko trigger 0
Ocopy 42095 mo-95 from log 12 to log 1 bondarenko trigger 0
Ocopy 43099 tc-99 from log 12 to log 1 bondarenko trigger 0
Ocopy 44101 ru-101 from log 12 to log 1 bondarenko trigger 0
Ocopy 44106 ru-106 from log 12 to log 1 bondarenko trigger 0
Ocopy 45103 rh-103 from log 12 to log 1 bondarenko trigger 0
Ocopy 45105 rh-105 from log 12 to log 1 bondarenko trigger 0
Ocopy 46105 pd-105 from log 12 to log 1 bondarenko trigger 0
Ocopy 46108 pd-108 from log 12 to log 1 bondarenko trigger 0
Ocopy 47109 silver-109 from log 12 to log 1 bondarenko trigger 0
Ocopy 51124 sb-124 from log 12 to log 1 bondarenko trigger 0
Ocopy 54131 xe-131 from log 12 to log 1 bondarenko trigger 0
Ocopy 54132 xe-132 from log 12 to log 1 bondarenko trigger 0
Ocopy 54135 xenon-135 from log 12 to log 1 bondarenko trigger 0
Ocopy 54136 xe-136 from log 12 to log 1 bondarenko trigger 0
Ocopy 55133 cesium-133 from log 12 to log 1 bondarenko trigger 0

```
0copy   55134  cs-134            from log 12 to log  1   bondarenko trigger 0
0copy   55135  cs-135            from log 12 to log  1   bondarenko trigger 0
0copy   55137  cs-137            from log 12 to log  1   bondarenko trigger 0
0copy   56136  ba-136            from log 12 to log  1   bondarenko trigger 0
0copy   57139  la-139            from log 12 to log  1   bondarenko trigger 0
0copy   58144  ce-144            from log 12 to log  1   bondarenko trigger 0
0copy   59141  pr-141            from log 12 to log  1   bondarenko trigger 0
0copy   59143  pr-143            from log 12 to log  1   bondarenko trigger 0
0copy   60143  nd-143            from log 12 to log  1   bondarenko trigger 0
0copy   60145  nd-145            from log 12 to log  1   bondarenko trigger 0
0copy   60147  nd-147            from log 12 to log  1   bondarenko trigger 0
0copy   61147  pm-147            from log 12 to log  1   bondarenko trigger 0
0copy   61148  pm-148            from log 12 to log  1   bondarenko trigger 0
0copy   62147  sm-147            from log 12 to log  1   bondarenko trigger 0
0copy   62149  sm-149            from log 12 to log  1   bondarenko trigger 0
0copy   62150  sm-150            from log 12 to log  1   bondarenko trigger 0
0copy   62151  sm-151            from log 12 to log  1   bondarenko trigger 0
0copy   62152  sm-152            from log 12 to log  1   bondarenko trigger 0
0copy   63153  eu-153            from log 12 to log  1   bondarenko trigger 0
0copy   63154  eu-154            from log 12 to log  1   bondarenko trigger 0
0copy   63155  eu-155            from log 12 to log  1   bondarenko trigger 0
0copy   64155  gd-155            from log 12 to log  1   bondarenko trigger 0
0copy   92234  u-234 1043 sigo=  from log 12 to log  1   bondarenko trigger 0
0copy   92235   uranium-235      from log 12 to log  1   bondarenko trigger 0
0copy   92236  u-236 1163 sigo=  from log 12 to log  1   bondarenko trigger 0
0copy   92238   uranium-238      from log 12 to log  1   bondarenko trigger 0
0copy   93237   neptunium-237    from log 12 to log  1   bondarenko trigger 0
0copy   94238  pu-238 1050 sigo  from log 12 to log  1   bondarenko trigger 0
0copy   94239   plutonium-239    from log 12 to log  1   bondarenko trigger 0
0copy   94240   plutonium-240    from log 12 to log  1   bondarenko trigger 0
0copy   94241   plutonium-241    from log 12 to log  1   bondarenko trigger 0
0copy   94242   plutonium-242    from log 12 to log  1   bondarenko trigger 0
0copy   95241  am-241 1056 sigo  from log 12 to log  1   bondarenko trigger 0
0copy   95243  am-243 1057 218   from log 12 to log  1   bondarenko trigger 0
0copy   96244   curium-244       from log 12 to log  1   bondarenko trigger 0
1     scale 4.2 - 27 group neutron burnup library
        based on endf-b version 4 data with endf-b version 5 fission products
           compiled for nrc      1/27/89
              last updated      9/16/93
                 l.m.petrie   -   ornl
         tape id                               4321        number of nuclides                66
         number of neutron groups               27         number of gamma groups             0
         first thermal group                    15         logical unit                       1
                                          table of contents
       1/v cross sections normalized to 1.0 at 0.0253 ev                              id      999
       1/v cross sections normalized to 1.0 at 0.0253 ev                              id       66
        hydrogen      endf/b-iv mat 1269/thrm1002   updated 10/13/89                  id     1001
      b-10 1273 218ngp 042375 p-3 293k                                                id     5010
        boron-11      endf/b-iv mat 1160            updated 10/13/89                  id     5011
        oxygen-16     endf/b-iv mat 1276            updated 10/13/89                  id     8016
        oxygen-16     endf/b-iv mat 1276            updated 10/13/89                  id        6
        kr-83         mt=102,103,103,105,106,107    updated 10/13/89                  id    36083
        kr-85            mt=  102                                                     id    36085
        sr-90         mt=102                        updated 10/13/89                  id    38090
         y-89         mt=102                        updated 10/13/89                  id    39089
        zr-93            mt=  102                                                     id    40093
        zr-94         mt=102                        updated 10/13/89                  id    40094
        zr-95         mt=102                        updated 10/13/89                  id    40095
        zircalloy     endf/b-iv mat 1284            updated 10/13/89                  id    40302
        nb-94         mt=102                        updated 10/13/89                  id    41094
```

```
mo-95          mt=102                          updated 10/13/89              id    42095
tc-99          mt=102                          updated 10/13/89              id    43099
ru-101         mt=102                          updated 10/13/89              id    44101
ru-106         mt=102                          updated 10/13/89              id    44106
rh-103         mt=102                          updated 10/13/89              id    45103
rh-105           mt=  102                                                    id    45105
pd-105         mt=102                          updated 10/13/89              id    46105
pd-108         mt=102                          updated 10/13/89              id    46108
silver-109     endf/b-iv mat 1139              updated 10/13/89              id    47109
sb-124         mt=102                          updated 10/13/89              id    51124
xe-131         mt=102,103,104,105,106          updated 10/13/89              id    54131
xe-132         mt=102,103,104,105,106          updated 10/13/89              id    54132
xenon-135      endf/b-iv mat 1294              updated 10/13/89              id    54135
xe-136           mt=  102, 103,  104,  105,  107                             id    54136
cesium-133     endf/b-iv mat 1141              updated 10/13/89              id    55133
cs-134         mt=102                          updated 10/13/89              id    55134
cs-135           mt=  102                                                    id    55135
cs-137         mt=102                          updated 10/13/89              id    55137
ba-136         mt=102                          updated 10/13/89              id    56136
la-139         mt=102                          updated 10/13/89              id    57139
ce-144           mt=  102                                                    id    58144
pr-141         mt=102,103,104,105,106,107      updated 10/13/89              id    59141
pr-143         mt=102                          updated 10/13/89              id    59143
nd-143         mt=102                          updated 10/13/89              id    60143
nd-145         mt=102                          updated 10/13/89              id    60145
nd-147         mt=102                          updated 10/13/89              id    60147
pm-147         mt=102                          updated 10/13/89              id    61147
pm-148           mt=  102                                                    id    61148
sm-147         endf/b-v fission product        updated 10/13/89              id    62147
sm-149         mt=102,103,107                  updated 10/13/89              id    62149
sm-150         mt=102                          updated 10/13/89              id    62150
sm-151         mt=102,103,104,105,106,107      updated 10/13/89              id    62151
sm-152         mt=102,103,104,105,106,107      updated 10/13/89              id    62152
eu-153         mt=102,103,104,105,106,107      updated 10/13/89              id    63153
eu-154         mt=102,103,104,105,106,107      updated 10/13/89              id    63154
eu-155         mt=102,103,104,105,106,107      updated 10/13/89              id    63155
gd-155         mt=102                          updated 10/13/89              id    64155
u-234 1043 sigo=5+4 newklacs p-3 293k f-1/e-m(1.+5)                          id    92234
uranium-235    endf/b-iv mat 1261              updated 10/13/89              id    92235
u-236 1163 sigo=5+4 newklacs p-3 293k f-1/e-m(1.+5)                          id    92236
uranium-238    endf/b-iv mat 1262              updated 10/13/89              id    92238
neptunium-237  endf/b-iv mat 1263              updated 10/13/89              id    93237
pu-238 1050 sigo=5+4 newklacs p-3 293k f-1/e-m(1.+5)                         id    94238
plutonium-239  endf/b-iv mat 1264              updated 10/13/89              id    94239
plutonium-240  endf/b-iv mat 1265              updated 10/13/89              id    94240
plutonium-241  endf/b-iv mat 1266              updated 10/13/89              id    94241
plutonium-242  endf/b-iv mat 1161              updated 10/13/89              id    94242
am-241 1056 sigo=5+4 newklacs 218ngp p-3 293k                                id    95241
am-243 1057 218 gp wt f-1/e-m 090576 p3 293k                                 id    95243
curium-244     endf/b-iv mat 1162              updated 10/13/89              id    96244
0       tape copy used      0 i/o's, and took      .00 seconds
1              m         m  iiiiiiiiiiii   ttttttttttt      aaaaaaaa     ww         ww  ll
               mm        m  iiiiiiiiiiii   ttttttttttt     aaaaaaaaaa    ww         ww  ll
               mmm       m       ii           tt         aa        aa     ww         ww  ll
               m m       m       ii           tt         aa        aa     ww         ww  ll
               m  m      m       ii           tt         aa        aa     ww         ww  ll
               m   m     m       ii           tt         aaaaaaaaaaaa     ww    w    ww  ll
               m    m    m       ii           tt         aaaaaaaaaaaa     ww   www   ww  ll
               m     m   m       ii           tt         aa        aa     ww  ww ww  ww  ll
               m      m  m       ii           tt         aa        aa     ww ww   ww ww  ll
```



```
                    ********************************************************************************
                    ********************************************************************************
                    ********************************************************************************
                    *****                                                                      *****
                    *****                  program verification information                   *****
                    *****                                                                      *****
                    *****                  code system:    scale  version:    4.2             *****
                    *****                                                                      *****
                    ********************************************************************************
                    ********************************************************************************
                    *****                                                                      *****
                    *****                                                                      *****
                    *****              program:  c0c002                                        *****
                    *****                                                                      *****
                    *****         creation date:  04/27/95                                     *****
                    *****                                                                      *****
                    *****              library:  /neutronics/scale/exe                         *****
                    *****                                                                      *****
                    *****                                                                      *****
                    *****    this is not a   scale  configuration controlled code             *****
                    *****                                                                      *****
                    *****              jobname:  davis                                         *****
                    *****                                                                      *****
                    *****    date of execution:  02/16/96                                      *****
                    *****                                                                      *****
                    *****    time of execution:  09:56:56                                      *****
                    *****                                                                      *****
                    *****                                                                      *****
                    ********************************************************************************
                    ********************************************************************************
                    ********************************************************************************
1
0       -1q array has       1 entries.
0        0q array has       9 entries.
0        1q array has      12 entries.
0select 65 nuclides from the master  library on logical  1
         0 nuclides from the working library on logical  2
         0 nuclides from the working library on logical  3
           to create the new working library on logical  4

        61 resonance calculations have been requested
         0 output option for ampx formatted cross section data
0the storage allocated for this case is 200000 words
0        2q array has      65 entries.
0        3q array has     915 entries.
0        4q array has      65 entries.
0 general information concerning cross section library
    tape identification number                  4321
    number of nuclides on tape                    66
    number of neutron energy groups               27
    first thermal neutron energy group            15
    number of gamma energy groups                  0
0   direct access unit number  9 requires 117 blocks of length  1484 words
- xsdrn tape   4321
                        scale 4.2 - 27 group neutron burnup library
                          based on endf-b version 4 data with endf-b version 5 fission products
                            compiled for nrc     1/27/89
```

last updated 9/16/93
l.m.petrie - ornl

0 nuclides from xsdrn tape

1	1/v cross sections normalized to 1.0 at 0.0253 ev			999
2	hydrogen	endf/b-iv mat 1269/thrml002	updated 10/13/89	1001
3	b-10 1273 218ngp 042575 p-3 293k			5010
4	boron-11	endf/b-iv mat 1160	updated 10/13/89	5011
5	oxygen-16	endf/b-iv mat 1276	updated 10/13/89	8016
6	oxygen-16	endf/b-iv mat 1276	updated 10/13/89	6
7	kr-83	mt=102,103,103,105,106,107	updated 10/13/89	36083
8	kr-85	mt= 102		36085
9	sr-90	mt=102	updated 10/13/89	38090
10	y-89	mt=102	updated 10/13/89	39089
11	zr-93	mt= 102		40093
12	zr-94	mt=102	updated 10/13/89	40094
13	zr-95	mt=102	updated 10/13/89	40095
14	zircalloy	endf/b-iv mat 1284	updated 10/13/89	40302
15	nb-94	mt=102	updated 10/13/89	41094
16	mo-95	mt=102	updated 10/13/89	42095
17	tc-99	mt=102	updated 10/13/89	43099
18	ru-101	mt=102	updated 10/13/89	44101
19	ru-106	mt=102	updated 10/13/89	44106
20	rh-103	mt=102	updated 10/13/89	45103
21	rh-105	mt= 102		45105
22	pd-105	mt=102	updated 10/13/89	46105
23	pd-108	mt=102	updated 10/13/89	46108
24	silver-109	endf/b-iv mat 1139	updated 10/13/89	47109
25	sb-124	mt=102	updated 10/13/89	51124
26	xe-131	mt=102,103,104,105,106	updated 10/13/89	54131
27	xe-132	mt=102,103,104,105,106	updated 10/13/89	54132
28	xenon-135	endf/b-iv mat 1294	updated 10/13/89	54135
29	xe-136	mt= 102, 103, 104, 105, 107		54136
30	cesium-133	endf/b-iv mat 1141	updated 10/13/89	55133
31	cs-134	mt=102	updated 10/13/89	55134
32	cs-135	mt= 102		55135
33	cs-137	mt=102	updated 10/13/89	55137
34	ba-136	mt=102	updated 10/13/89	56136
35	la-139	mt=102	updated 10/13/89	57139
36	ce-144	mt= 102		58144
37	pr-141	mt=102,103,104,105,106,107	updated 10/13/89	59141
38	pr-143	mt=102	updated 10/13/89	59143
39	nd-143	mt=102	updated 10/13/89	60143
40	nd-145	mt=102	updated 10/13/89	60145
41	nd-147	mt=102	updated 10/13/89	60147
42	pm-147	mt=102	updated 10/13/89	61147
43	pm-148	mt= 102		61148
44	sm-147	endf/b-v fission product	updated 10/13/89	62147
45	sm-149	mt=102,103,107	updated 10/13/89	62149
46	sm-150	mt=102	updated 10/13/89	62150
47	sm-151	mt=102,103,104,105,106,107	updated 10/13/89	62151
48	sm-152	mt=102,103,104,105,106,107	updated 10/13/89	62152
49	eu-153	mt=102,103,104,105,106,107	updated 10/13/89	63153
50	eu-154	mt=102,103,104,105,106,107	updated 10/13/89	63154
51	eu-155	mt=102,103,104,105,106,107	updated 10/13/89	63155
52	gd-155	mt=102	updated 10/13/89	64155
53	u-234 1043 sigo=5+4 newklacs p-3 293k f-1/e-m(1.+5)			92234
54	uranium-235	endf/b-iv mat 1261	updated 10/13/89	92235
55	u-236 1163 sigo=5+4 newklacs p-3 293k f-1/e-m(1.+5)			92236
56	uranium-238	endf/b-iv mat 1262	updated 10/13/89	92238
57	neptunium-237	endf/b-iv mat 1263	updated 10/13/89	93237

```
    58    pu-238 1050 sigp=5+4 newxlacs p-3 293k f-1/e-m(1.+5)                    94238
    59     plutonium-239  endf/b-iv mat 1264              updated 10/13/89       94239
    60     plutonium-240  endf/b-iv mat 1265              updated 10/13/89       94240
    61     plutonium-241  endf/b-iv mat 1266              updated 10/13/89       94241
    62     plutonium-242  endf/b-iv mat 1161              updated 10/13/89       94242
    63    am-241 1056 sigp=5+4 newxlacs 218grp p-3 293k                           95241
    64    am-243 1057 218 gp wt f-1/e-m 090576 p3 293k                            95243
    65     curium-244     endf/b-iv mat 1162              updated 10/13/89       96244
01/v cross sections normalized to 1.0 at 0.0253 ev                      999     temperature=  975.00
0 hydrogen       endf/b-iv mat 1269/thrm1002    updated 10/13/89        1001    temperature=  607.60
                         thermal scattering matrix number   2 at a temperature of   550.00 was selected.
0b-10 1273 218grp 042375 p-3 293k                                       5010    temperature=  607.60
                         thermal scattering matrix number   2 at a temperature of   550.00 was selected.
0 boron-11       endf/b-iv mat 1160             updated 10/13/89        5011    temperature=  607.60
                         thermal scattering matrix number   2 at a temperature of   550.00 was selected.
0 oxygen-16      endf/b-iv mat 1276             updated 10/13/89        8016    temperature=  975.00
0 oxygen-16      endf/b-iv mat 1276             updated 10/13/89           6    temperature=  607.60
0 kr-83          mt=102,103,103,105,106,107     updated 10/13/89       36083    temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =    82.202              temperature(kelvin)      =   975.000
0potential scatter sigma  =     7.004              lumped nuclear density   = 4.5287047E-07
0spin factor (g)          =  4988.190              lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00          dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1   =    15.995                sigma(per absorber atom)= 3.7706078E+05
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2   =   237.953                sigma(per absorber atom)= 4.2068225E+05
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs          res fiss         res scat
  11      -5.450051E-04     .000000E+00    -7.029958E-04
  12       2.168358E-02     .000000E+00     9.912749E-03
  13      -1.516420E-01     .000000E+00    -4.953383E-02
  14       4.784648E-05     .000000E+00    -1.725391E-05
0excess resonance integrals
0                 resolved
0absorption      1.45103E+02
 fission          .00000E+00
-  elapsed time    .00 min.
0 kr-85           mt=  102                                              36085    temperature=  975.00
0 sr-90          mt=102                          updated 10/13/89       38090    temperature=  975.00
0  y-89          mt=102                          updated 10/13/89       39089    temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =    88.142              temperature(kelvin)      =   975.000
0potential scatter sigma  =     3.644              lumped nuclear density   = 2.9520956E-06
0spin factor (g)          =    78.664              lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00          dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1   =    15.995                sigma(per absorber atom)= 5.8238105E+04
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2   =   237.953                sigma(per absorber atom)= 6.4975566E+04
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs          res fiss         res scat
   9       2.370156E-07     .000000E+00     1.062742E-04
  10      -1.586452E-05     .000000E+00    -4.463920E-05
0excess resonance integrals
0                 resolved
```

```
0absorption       1.46497E-01
 fission           .00000E+00
- elapsed time     .00 min.
0 zr-93            mt= 102                                          40093     temperature=  975.00
0 zr-94          mt=102                        updated 10/13/89      40094     temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =    93.100          temperature(kelvin)     =   975.000
0potential scatter sigma  =     3.779          lumped nuclear density  = 5.6480576E-06
0spin factor (g)          =   180.853          lump dimension (a-bar)  = 4.6812201E-01
0inner radius             =  .0000000E+00      dancoff correction (c)  = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995          sigma(per absorber atom)= 3.0233348E+04
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   237.953          sigma(per absorber atom)= 3.3730988E+04
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs         res fiss        res scat
   8      -1.168889E-07     .000000E+00   -1.393906E-04
   9      -1.014232E-05     .000000E+00   -9.031245E-04
0excess resonance integrals
0                 resolved
0absorption       3.44197E-02
 fission           .00000E+00
- elapsed time     .00 min.
0 zr-95          mt=102                        updated 10/13/89      40095     temperature=  975.00
0 zircalloy      endf/b-iv mat 1284            updated 10/13/89      40302     temperature=  650.00
0resonance data for this nuclide
0mass number (a)          =    90.436          temperature(kelvin)     =   650.000
0potential scatter sigma  =     6.385          lumped nuclear density  = 4.2515602E-02
0spin factor (g)          =     1.079          lump dimension (a-bar)  = 5.4610002E-01
0inner radius             = 4.7878999E-01      dancoff correction (c)  = 5.0364637E-01
0the absorber will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs         res fiss        res scat
   8      -1.780596E-03     .000000E+00   -1.286907E+00
   9      -5.895373E-02     .000000E+00   -2.695297E+00
  10      -6.959985E-02     .000000E+00   -1.601321E+00
  11      -1.883937E-01     .000000E+00   -7.920912E-01
0excess resonance integrals
0                 resolved
0absorption       2.28539E-01
 fission           .00000E+00
- elapsed time     .02 min.
0 rb-94          mt=102                        updated 10/13/89      41094     temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =    93.101          temperature(kelvin)     =   975.000
0potential scatter sigma  =     3.779          lumped nuclear density  = 1.9264685E-12
0spin factor (g)          = 43808.801          lump dimension (a-bar)  = 4.6812201E-01
0inner radius             =  .0000000E+00      dancoff correction (c)  = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995          sigma(per absorber atom)= 8.8638710E+10
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   237.953          sigma(per absorber atom)= 9.8893160E+10
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs         res fiss        res scat
  13       1.043058E-02     .000000E+00    9.252687E-04
```

```
  14      9.836714E-03     .000000E+00   -4.064824E-04
0excess resonance integrals
0                 resolved
0absorption      9.15001E+01
 fission          .00000E+00
- elapsed time    .02 min.
0 mo-95          mt=102                    updated 10/13/89            42095     temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =    94.091          temperature(kelvin)      =   975.000
0potential scatter sigma  =     3.806          lumped nuclear density   = 2.6769019E-06
0spin factor (g)          =   607.724          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             = .0000000E+00       dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995          sigma(per absorber atom)= 6.3790047E+04
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   237.933          sigma(per absorber atom)= 7.1169805E+04
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs          res fiss         res scat
  10      -6.394451E-04     .000000E+00   -3.186197E-03
  11      -8.918543E-04     .000000E+00   -1.739890E-03
  12      -7.859523E-01     .000000E+00   -9.063395E-01
  13       1.608656E-04     .000000E+00   -2.672945E-05
0excess resonance integrals
0                 resolved
0absorption      1.02239E+02
 fission          .00000E+00
- elapsed time    .03 min.
0 tc-99          mt=102                    updated 10/13/89            43099     temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =    98.150          temperature(kelvin)      =   975.000
0potential scatter sigma  =     6.000          lumped nuclear density   = 5.4039870E-06
0spin factor (g)          =  4527.940          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             = .0000000E+00       dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995          sigma(per absorber atom)= 3.1598834E+04
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   237.933          sigma(per absorber atom)= 3.5254445E+04
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs          res fiss         res scat
  11      -6.777676E-03     .000000E+00   -3.210475E-03
  12      -1.631648E-03     .000000E+00   -5.081438E-05
  13      -1.107964E-01     .000000E+00   -5.874934E-03
  14      -2.435848E+00     .000000E+00   -7.828959E-02
  15       1.071626E-02     .000000E+00   -5.407191E-04
  16       4.836187E-03     .000000E+00   -2.802631E-04
  17       2.074322E-04     .000000E+00   -1.191812E-05
0excess resonance integrals
0                 resolved
0absorption      3.32001E+02
 fission          .00000E+00
- elapsed time    .03 min.
0 ru-101         mt=102                    updated 10/13/89            44101     temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   100.089          temperature(kelvin)      =   975.000
0potential scatter sigma  =     3.965          lumped nuclear density   = 4.7321578E-06
0spin factor (g)          =  8785.290          lump dimension (a-bar)   = 4.6812201E-01
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0inner radius            =  .0000000E+00          dancoff correction (c)    = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1     =    15.995              sigma(per absorber atom)= 3.6084953E+04
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2     =   237.953              sigma(per absorber atom)= 4.0259555E+04
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs          res fiss         res scat
  11      -3.553836E-02     .000000E+00    -3.639097E-03
  12      -9.755727E-04     .000000E+00    -5.808237E-03
  13      -1.229985E-01     .000000E+00    -3.321174E-03
  14       2.378476E-04     .000000E+00    -4.188966E-05
0excess resonance integrals
0                  resolved
0absorption       7.98180E+01
 fission          .00000E+00
- elapsed time    .03 min.
0 ru-106         mt=102                    updated 10/13/89          44106    temperature=  975.00
0 rh-103         mt=102                    updated 10/13/89          45103    temperature=  975.00
0resonance data for this nuclide
0mass number (a)         =   102.021          temperature(kelvin)      =   975.000
0potential scatter sigma =     5.408          lumped nuclear density   = 2.3407463E-06
0spin factor (g)         =      .500          lump dimension (a-bar)   = 4.6812201E-01
0inner radius            =  .0000000E+00          dancoff correction (c)    = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1     =    15.995              sigma(per absorber atom)= 7.2950961E+04
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2     =   237.953              sigma(per absorber atom)= 8.1390531E+04
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs          res fiss         res scat
   9       1.306869E-03     .000000E+00     2.105955E-03
  10      -1.898117E-03     .000000E+00    -2.778616E-03
  11      -4.338274E-03     .000000E+00    -3.986314E-03
  12      -2.262462E-05     .000000E+00    -1.475302E-05
  13        .000000E+00     .000000E+00      .000000E+00
  14        .000000E+00     .000000E+00      .000000E+00
  15       2.318858E-01     .000000E+00     3.405204E-03
  16       3.871956E+01     .000000E+00    -3.705610E-02
  17      -1.821079E+02     .000000E+00    -1.360483E-01
  18       8.788906E+01     .000000E+00     2.618830E-01
  19       1.158776E+01     .000000E+00    -1.741986E-03
  20       1.095437E+00     .000000E+00    -2.541057E-03
  21       2.166068E-01     .000000E+00     1.924626E-03
  22       2.583945E-01     .000000E+00     2.928515E-03
  23      -9.881276E-02     .000000E+00     1.799191E-03
0excess resonance integrals
0                  resolved
0absorption       1.16157E+03
 fission          .00000E+00
- elapsed time    .07 min.
0 rh-105          mt=  102                                                45105    temperature=  975.00
0 pd-105         mt=102                    updated 10/13/89          46105    temperature=  975.00
0resonance data for this nuclide
0mass number (a)         =   104.004          temperature(kelvin)      =   975.000
0potential scatter sigma =     4.069          lumped nuclear density   = 1.3297126E-06
0spin factor (g)         = 15210.000          lump dimension (a-bar)   = 4.6812201E-01
0inner radius            =  .0000000E+00          dancoff correction (c)    = 3.4269261E-01
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0the absorber will be treated by the nordheim integral method.
0mass of moderator-1    =    15.995              sigma(per absorber atom)= 1.284184E+05
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2    =   237.933              sigma(per absorber atom)= 1.432750E+05
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs         res fiss        res scat
  12      -4.677669E-02     .000000E+00   -5.586722E-04
  13       3.803558E-02     .000000E+00    2.126497E-04
  14       7.780862E-04     .000000E+00   -8.177772E-05
0excess resonance integrals
0                 resolved
0absorption      6.13159E+01
 fission          .00000E+00
- elapsed time    .07 min.
0 pd-108        mt=102                  updated 10/13/89            46108     temperature=   975.00
0resonance data for this nuclide
0mass number (a)          =   106.977            temperature(kelvin)      =   975.000
0potential scatter sigma  =     4.146            lumped nuclear density   = 2.447744E-07
0spin factor (g)          = 21175.100            lump dimension (a-bar)   = 4.681220IE-01
0inner radius             =  .0000000E+00        dancoff correction (c)   = 3.426926IE-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1    =    15.995              sigma(per absorber atom)= 6.976206E+05
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2    =   237.933              sigma(per absorber atom)= 7.783270E+05
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs         res fiss        res scat
  11       1.170669E-04     .000000E+00    3.532981E-04
  12      -2.125912E-01     .000000E+00   -1.571068E-01
  13       6.960011E-03     .000000E+00    1.817820E-03
  14       8.561519E-02     .000000E+00   -3.206084E-05
  15      -1.840163E-01     .000000E+00    8.089916E-05
  16       2.946572E-04     .000000E+00   -9.255520E-06
0excess resonance integrals
0                 resolved
0absorption      2.13856E+02
 fission          .00000E+00
- elapsed time    .07 min.
0 silver-109    endf/b-iv mat 1139          updated 10/13/89            47109     temperature=   975.00
0resonance data for this nuclide
0mass number (a)          =   107.969            temperature(kelvin)      =   975.000
0potential scatter sigma  =     4.988            lumped nuclear density   = 1.719020IE-07
0spin factor (g)          =  1441.870            lump dimension (a-bar)   = 4.681220IE-01
0inner radius             =  .0000000E+00        dancoff correction (c)   = 3.426926IE-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1    =    15.995              sigma(per absorber atom)= 9.933544E+05
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2    =   237.933              sigma(per absorber atom)= 1.108273E+06
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs         res fiss        res scat
  10       1.572875E-05     .000000E+00    5.607148E-05
  11      -2.958349E-04     .000000E+00   -3.086447E-04
  12      -7.000611E-01     .000000E+00   -3.096924E-02
  13       7.672952E-01     .000000E+00    3.380760E-02
  14      -1.276054E+00     .000000E+00   -1.330846E-01
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0excess resonance integrals
0                resolved
0absorption      1.40192E+03
 fission          .00000E+00
- elapsed time    .08 min.
0 sb-124        mt=102                          updated 10/13/89          51124    temperature=  975.00
0 xe-131        mt=102,103,104,105,106          updated 10/13/89          54131    temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   129.781           temperature(kelvin)      =   975.000
0potential scatter sigma  =     4.301           lumped nuclear density   = 2.4862286E-06
0spin factor (g)          =   266.825           lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00       dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995           sigma(per absorber atom)= 6.8682219E+04
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   237.953           sigma(per absorber atom)= 7.6627938E+04
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs          res fiss         res scat
   9     -5.435217E-07     .000000E+00    -5.546435E-06
  10     -4.275769E-05     .000000E+00    -2.949953E-05
  11     -5.985983E-04     .000000E+00    -4.738494E-04
  12     -1.223367E-02     .000000E+00    -1.146901E-03
  13     -2.212901E+01     .000000E+00    -5.198911E+01
  14      1.114542E-02     .000000E+00     1.558993E-02
0excess resonance integrals
0                resolved
0absorption      8.14574E+02
 fission          .00000E+00
- elapsed time    .08 min.
0 xe-132        mt=102,103,104,105,106          updated 10/13/89          54132    temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   130.771           temperature(kelvin)      =   975.000
0potential scatter sigma  =     4.301           lumped nuclear density   = 4.0704567E-06
0spin factor (g)          =   675.899           lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00       dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995           sigma(per absorber atom)= 4.1950988E+04
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   237.953           sigma(per absorber atom)= 4.6804223E+04
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs          res fiss         res scat
   9     -5.962792E-06     .000000E+00    -2.529266E-05
  10     -1.933940E-03     .000000E+00    -2.463120E-02
  11      3.344756E-08     .000000E+00    -9.288666E-07
0excess resonance integrals
0                resolved
0absorption      9.81102E-01
 fission          .00000E+00
- elapsed time    .08 min.
0 xenon-135     endf/b-iv mat 1294              updated 10/13/89          54135    temperature=  975.00
0 xe-136          mt=  102,  103,  104,  105,  107                        54136    temperature=  975.00
0 cesium-133    endf/b-iv mat 1141              updated 10/13/89          55133    temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   131.764           temperature(kelvin)      =   975.000
0potential scatter sigma  =     7.100           lumped nuclear density   = 5.8520964E-06
0spin factor (g)          =   374.437           lump dimension (a-bar)   = 4.6812201E-01
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0inner radius            =  .0000000E+00          dancoff correction (c)    = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1     =   15.995               sigma(per absorber atom)= 2.9179234E+04
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2     =  238.051               sigma(per absorber atom)= 3.1298555E+04
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs        res fiss       res scat
   9     -1.887062E-05     .000000E+00   -7.495133E-05
  10     -7.596672E-04     .000000E+00   -1.483612E-03
  11     -3.006341E-02     .000000E+00   -5.280977E-02
  12     -4.622045E-02     .000000E+00   -6.466606E-03
  13     -7.637489E-02     .000000E+00   -4.163861E-03
  14     -3.492669E+00     .000000E+00   -1.536146E-01
  15      5.629050E-03     .000000E+00   -4.062004E-04
  16      2.777937E-03     .000000E+00   -2.215569E-04
  17      2.352212E-03     .000000E+00   -1.830899E-04
  18      2.215046E-03     .000000E+00   -1.679641E-04
  19      1.316962E-03     .000000E+00   -9.669043E-05
0excess resonance integrals
0                resolved
0absorption     3.62934E+02
 fission         .0000E+00
- elapsed time    .12 min.
0 cs-134       mt=102                    updated 10/13/89          55134    temperature=  975.00
0 cs-135         mt=  102                                          55135    temperature=  975.00
0 cs-137       mt=102                    updated 10/13/89          55137    temperature=  975.00
0 ba-136       mt=102                    updated 10/13/89          56136    temperature=  975.00
0resonance data for this nuclide
0mass number (a)         =   134.737          temperature(kelvin)      =   975.000
0potential scatter sigma =     4.835          lumped nuclear density   = 1.6662506E-08
0spin factor (g)         =  1247.690          lump dimension (a-bar)   = 4.6812201E-01
0inner radius            =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1     =   15.995           sigma(per absorber atom)= 1.0248140E+07
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2     =  237.933           sigma(per absorber atom)= 1.1433728E+07
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs        res fiss       res scat
  10      1.369930E-06     .000000E+00    5.943214E-07
  11      2.314354E-05     .000000E+00    1.988492E-05
0excess resonance integrals
0                resolved
0absorption     1.38477E+00
 fission         .0000E+00
- elapsed time    .12 min.
0 la-139       mt=102                    updated 10/13/89          57139    temperature=  975.00
0resonance data for this nuclide
0mass number (a)         =   137.713          temperature(kelvin)      =   975.000
0potential scatter sigma =     4.906          lumped nuclear density   = 5.7069874E-06
0spin factor (g)         =   145.855          lump dimension (a-bar)   = 4.6812201E-01
0inner radius            =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1     =   15.995           sigma(per absorber atom)= 2.9921162E+04
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2     =  237.933           sigma(per absorber atom)= 3.3382688E+04
0moderator-2 will be treated by the nordheim integral method.
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0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs         res fiss        res scat
   9       3.805399E-05     .000000E+00     5.740214E-03
  10      -1.504161E-04     .000000E+00    -1.204486E-02
  11        .000000E+00     .000000E+00      .000000E+00
  12      -1.948691E-02     .000000E+00    -1.179694E-02
0excess resonance integrals
0                  resolved
0absorption       8.12762E+00
 fission           .00000E+00
-  elapsed time     .12 min.
0 ce-144            mt=  102                                          58144     temperature=  975.00
0 pr-141         mt=102,103,104,105,106,107     updated 10/13/89      59141     temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   139.697          temperature(kelvin)     =   975.000
0potential scatter sigma  =     4.953          lumped nuclear density  = 4.2035758E-06
0spin factor (g)          =  1026.500          lump dimension (a-bar)  = 4.6812201E-01
0inner radius             =  .0000000E+00      dancoff correction (c)  = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995          sigma(per absorber atom)= 4.0622484E+04
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   237.953          sigma(per absorber atom)= 4.5322023E+04
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs         res fiss        res scat
  10      -1.643180E-03     .000000E+00    -5.576479E-02
  11      -2.754610E-02     .000000E+00    -3.665692E-01
  12      -5.687621E-04     .000000E+00    -5.415349E-03
0excess resonance integrals
0                  resolved
0absorption       1.22546E+01
 fission           .00000E+00
-  elapsed time     .13 min.
0 pr-143         mt=102                 updated 10/13/89          59143     temperature=  975.00
0 nd-143         mt=102                 updated 10/13/89          60143     temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   141.682          temperature(kelvin)     =   975.000
0potential scatter sigma  =     5.000          lumped nuclear density  = 4.6473847E-06
0spin factor (g)          =  1964.860          lump dimension (a-bar)  = 4.6812201E-01
0inner radius             =  .0000000E+00      dancoff correction (c)  = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995          sigma(per absorber atom)= 3.6743180E+04
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   237.953          sigma(per absorber atom)= 4.0993934E+04
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs         res fiss        res scat
  10      -4.982481E-05     .000000E+00     8.771327E-07
  11      -1.101106E-01     .000000E+00    -1.283758E+00
  12      -7.161235E-02     .000000E+00    -3.529003E-02
0excess resonance integrals
0                  resolved
0absorption       5.14195E+01
 fission           .00000E+00
-  elapsed time     .13 min.
0 nd-145         mt=102                 updated 10/13/89          60145     temperature=  975.00
0resonance data for this nuclide
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```
0mass number (a)          =   143.668          temperature(kelvin)      =   975.000
0potential scatter sigma  =     5.047          lumped nuclear density   = 3.4498573E-06
0spin factor (g)          =  1007.250          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995          sigma(per absorber atom)= 4.9497613E+04
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   237.933          sigma(per absorber atom)= 5.5223902E+04
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs         res fiss        res scat
  10      -1.344789E-03     .000000E+00    -2.136374E-02
  11      -2.129543E-02     .000000E+00    -6.395525E-02
  12      -5.333031E-01     .000000E+00    -3.363911E+00
  13       9.642947E-05     .000000E+00     2.035074E-04
  14      -4.462860E-01     .000000E+00    -1.178288E-02
  15       5.911948E-03     .000000E+00    -4.630747E-04
  16       1.326684E-03     .000000E+00    -1.451429E-04
  17       9.642449E-04     .000000E+00    -1.063933E-04
  18       8.539560E-04     .000000E+00    -9.313719E-05
  19       7.633858E-04     .000000E+00    -8.069340E-05
  20       2.838788E-05     .000000E+00    -2.918880E-06
0excess resonance integrals
0                resolved
0absorption     2.0900E+02
 fission          .0000E+00
-  elapsed time    .15 min.
0 nd-147        mt=102                  updated 10/13/89          60147    temperature=  975.00
0 pm-147        mt=102                  updated 10/13/89          61147    temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   145.653          temperature(kelvin)      =   975.000
0potential scatter sigma  =     5.093          lumped nuclear density   = 1.6301379E-06
0spin factor (g)          = 21589.500          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995          sigma(per absorber atom)= 1.0475168E+05
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   237.933          sigma(per absorber atom)= 1.1687021E+05
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs         res fiss        res scat
  12      -7.792760E-02     .000000E+00    -2.542797E-02
  13      -2.008160E-02     .000000E+00    -1.330387E-03
  14      -3.819863E+01     .000000E+00    -1.649132E+01
  15       4.136012E-02     .000000E+00     6.991183E-03
  16       1.698022E-02     .000000E+00     1.746796E-03
  17       1.369751E-02     .000000E+00     1.150444E-03
  18       1.253791E-02     .000000E+00     9.648220E-04
  19       6.998988E-04     .000000E+00     5.069710E-05
0excess resonance integrals
0                resolved
0absorption     2.0727E+03
 fission          .0000E+00
-  elapsed time    .15 min.
0 pm-148         mt= 102                                            61148    temperature=  975.00
0 sm-147        endf/b-v fission product  updated 10/13/89          62147    temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   145.653          temperature(kelvin)      =   975.000
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0potential scatter sigma =    5.093          lumped nuclear density   = 1.3748208E-07
0spin factor (g)         =     .000          lump dimension (a-bar)   = 4.6812201E-01
0inner radius            = .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1     =   15.995          sigma(per absorber atom)= 1.2420506E+06
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2     =  237.933          sigma(per absorber atom)= 1.3857411E+06
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs       res fiss       res scat
  11      2.942457E-01   .000000E+00   1.142727E+00
  12      1.226539E+00   .000000E+00  -1.271958E+00
  13     -1.998422E+00   .000000E+00  -5.783997E-01
  14     -9.921163E-02   .000000E+00   1.325926E-03
  15      3.120832E-01   .000000E+00  -1.928839E-03
  16      7.287928E-03   .000000E+00  -3.738814E-04
  17      4.281534E-03   .000000E+00  -2.401662E-04
  18      3.510477E-03   .000000E+00  -1.997241E-04
  19      2.910625E-03   .000000E+00  -1.649498E-04
  20      8.434717E-04   .000000E+00  -4.626269E-05
0excess resonance integrals
0              resolved
0absorption   7.24819E+02
 fission       .00000E+00
- elapsed time   .15 min.
                        thermal scattering matrix number  3 at a temperature of   900.03 was selected.
0 sm-149      mt=102,103,107          updated 10/13/89          62149    temperature=  975.00
0resonance data for this nuclide
0mass number (a)         =  147.638          temperature(kelvin)      =  975.000
0potential scatter sigma =    3.260          lumped nuclear density   = 6.8765765E-08
0spin factor (g)         = 10407.900          lump dimension (a-bar)   = 4.6812201E-01
0inner radius            = .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1     =   15.995          sigma(per absorber atom)= 2.4832080E+06
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2     =  237.933          sigma(per absorber atom)= 2.7704858E+06
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs       res fiss       res scat
  11      8.546665E-03   .000000E+00   3.071190E-02
  12     -5.175606E-02   .000000E+00  -1.756437E-01
  13      2.469983E-02   .000000E+00   3.072132E-03
  14      2.173088E-02   .000000E+00  -5.657746E-03
0excess resonance integrals
0              resolved
0absorption   8.04362E+02
 fission       .00000E+00
- elapsed time   .17 min.
0 sm-150      mt=102                  updated 10/13/89          62150    temperature=  975.00
0resonance data for this nuclide
0mass number (a)         =  148.629          temperature(kelvin)      =  975.000
0potential scatter sigma =    5.162          lumped nuclear density   = 9.8938278E-07
0spin factor (g)         = 4376.420          lump dimension (a-bar)   = 4.6812201E-01
0inner radius            = .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1     =   15.995          sigma(per absorber atom)= 1.7259214E+05
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2     =  237.933          sigma(per absorber atom)= 1.9255902E+05
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0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs         res fiss        res scat
  10      -3.977634E-04    .000000E+00   -3.346134E-03
  11      -7.212800E-03    .000000E+00   -8.334447E-02
  12      -2.322022E-02    .000000E+00   -7.025721E-03
  13      -1.750211E+00    .000000E+00   -1.382926E+00
  14       1.066729E-04    .000000E+00   -6.428760E-05
0excess resonance integrals
0                 resolved
0absorption      2.95016E+02
 fission          .00000E+00
- elapsed time    .17 min.
0 sm-151        mt=102,103,104,105,106,107     updated 10/13/89              62151     temperature=   975.00
0resonance data for this nuclide
0mass number (a)          =   149.623              temperature(kelvin)      =   975.000
0potential scatter sigma  =     5.185              lumped nuclear density   = 2.2294195E-07
0spin factor (g)          = 75574.703              lump dimension (a-bar)   = 4.6812201E-01
0inner radius             = .0000000E+00           dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1    =    15.995              sigma(per absorber atom)= 7.6593794E+05
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2    =   237.933              sigma(per absorber atom)= 8.5454788E+05
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs         res fiss        res scat
  14      -1.260789E-01    .000000E+00   -1.571515E-02
  15       1.495457E+01    .000000E+00    7.582636E-02
  16      -2.174609E+01    .000000E+00   -6.158413E-02
  17       1.740700E+02    .000000E+00    8.314693E-01
  18      -3.202416E+02    .000000E+00   -1.779017E+00
  19       6.257412E+01    .000000E+00    3.868963E-01
  20       1.141725E+00    .000000E+00   -1.430370E-04
  21      -7.117601E-02    .000000E+00    1.244101E-02
  22       6.952590E-02    .000000E+00    3.838911E-03
  23      -1.091934E-02    .000000E+00    3.374082E-04
0excess resonance integrals
0                 resolved
0absorption      2.05723E+03
 fission          .00000E+00
- elapsed time    .17 min.
0 sm-152        mt=102,103,104,105,106,107     updated 10/13/89              62152     temperature=   975.00
0resonance data for this nuclide
0mass number (a)          =   150.615              temperature(kelvin)      =   975.000
0potential scatter sigma  =     5.208              lumped nuclear density   = 4.5863854E-07
0spin factor (g)          =   863.594              lump dimension (a-bar)   = 4.6812201E-01
0inner radius             = .0000000E+00           dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1    =    15.995              sigma(per absorber atom)= 3.7231869E+05
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2    =   237.933              sigma(per absorber atom)= 4.1539156E+05
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs         res fiss        res scat
   9       2.403099E-06    .000000E+00    1.159013E-04
  10      -2.977777E-04    .000000E+00   -5.161796E-03
  11      -4.910418E-03    .000000E+00   -1.886720E-02
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  12      -3.476384E-02     .000000E+00   -1.112866E-01
  13       4.267894E-02     .000000E+00    1.038350E-01
  14      -3.296637E+01     .000000E+00   -6.405277E+01
0excess resonance integrals
0                 resolved
0absorption      2.86785E+03
 fission          .0000E+00
-  elapsed time    .18 min.
0 eu-153        mt=102,103,104,105,106,107    updated 10/13/89            63153     temperature=   975.00
0resonance data for this nuclide
0mass number (a)         =   151.607            temperature(kelvin)      =   975.000
0potential scatter sigma =     9.731            lumped nuclear density   = 2.0236102E-07
0spin factor (g)         = 12265.900            lump dimension (a-bar)   = 4.6812201E-01
0inner radius            =  .0000000E+00        dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1     =    15.995            sigma(per absorber atom)= 8.4383688E+05
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2     =   237.933            sigma(per absorber atom)= 9.4145881E+05
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs          res fiss         res scat
  12      -2.642001E-01     .000000E+00   -5.146335E-02
  13      -4.666036E-02     .000000E+00    1.190590E-03
  14      -5.099637E-01     .000000E+00    4.398705E-03
  15       3.248557E+00     .000000E+00   -1.528816E-02
  16      -3.290308E+00     .000000E+00    8.160203E-03
  17       1.505621E-01     .000000E+00   -3.437866E-03
  18       7.726887E-02     .000000E+00   -2.231257E-03
  19       5.055489E-02     .000000E+00   -1.541136E-03
  20      -1.253800E-01     .000000E+00   -1.275099E-03
0excess resonance integrals
0                 resolved
0absorption      1.35617E+03
 fission          .0000E+00
-  elapsed time    .18 min.
0 eu-154        mt=102,103,104,105,106,107    updated 10/13/89            63154     temperature=   975.00
0resonance data for this nuclide
0mass number (a)         =   152.601            temperature(kelvin)      =   975.000
0potential scatter sigma =     9.731            lumped nuclear density   = 1.5732551E-08
0spin factor (g)         = 19135.801            lump dimension (a-bar)   = 4.6812201E-01
0inner radius            =  .0000000E+00        dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1     =    15.995            sigma(per absorber atom)= 1.0853910E+07
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2     =   237.933            sigma(per absorber atom)= 1.2109579E+07
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs          res fiss         res scat
  12      -3.850079E-01     .000000E+00   -6.016346E-02
  13      -2.952728E-01     .000000E+00   -2.428586E-02
  14       3.575466E-01     .000000E+00    1.516496E-02
  15       2.236322E-01     .000000E+00    2.124466E-02
  16       7.311881E+00     .000000E+00    9.277001E-02
  17      -1.436421E+02     .000000E+00   -1.894816E+00
  18       1.138535E+02     .000000E+00    1.859974E+00
  19      -1.014556E+02     .000000E+00    1.187201E+00
0excess resonance integrals
0                 resolved
```

```
0absorption       2.13726E+03
 fission           .00000E+00
- elapsed time     .20 min.
0 eu-155         mt=102,103,104,105,106,107     updated 10/13/89              63155     temperature=  975.00
0 gd-155         mt=102                         updated 10/13/89              64155     temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   153.592              temperature(kelvin)      =   975.000
0potential scatter sigma  =     5.277              lumped nuclear density   = 4.4661727E-10
0spin factor (g)          = 12700.100              lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00          dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995                sigma(per absorber atom)= 3.8234010E+08
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   237.933                sigma(per absorber atom)= 4.2657255E+08
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs          res fiss         res scat
  12      -1.439265E+00      .000000E+00     -1.839428E-01
  13       1.541370E+00      .000000E+00      1.985343E-01
  14       2.191864E-01      .000000E+00      9.809159E-03
  15      -3.299638E-01      .000000E+00      2.121291E-05
  16       1.477360E+00      .000000E+00     -4.148869E-03
  17       1.568660E-01      .000000E+00     -1.479107E-03
  18       9.605215E-02      .000000E+00     -1.078090E-03
  19       6.295375E-02      .000000E+00     -8.026897E-04
  20       1.670387E-02      .000000E+00      1.627052E-04
  21        .000000E+00      .000000E+00       .000000E+00
  22        .000000E+00      .000000E+00       .000000E+00
  23        .000000E+00      .000000E+00       .000000E+00
  24        .000000E+00      .000000E+00       .000000E+00
  25      -2.127682E+03      .000000E+00     -1.621909E+00
  26      -5.205600E+03      .000000E+00      1.961438E+00
  27      -1.699943E+03      .000000E+00      7.392455E-01
0excess resonance integrals
0                  resolved
0absorption       3.97076E+04
 fission           .00000E+00
- elapsed time     .20 min.
0u-234 1043 sigo=5+4 new(lacs p-3 293k f-1/e-m(1.+5)                              92234     temperature=  975.00
0resonance data for this nuclide
0mass number (a)          =   232.029              temperature(kelvin)      =   975.000
0potential scatter sigma  =    10.021              lumped nuclear density   = 5.2482073E-06
0spin factor (g)          =  6948.450              lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00          dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995                sigma(per absorber atom)= 3.2536768E+04
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   237.935                sigma(per absorber atom)= 3.6289773E+04
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs          res fiss         res scat
  11      -2.512538E-02      .000000E+00     -7.324254E-02
  12      -2.046606E-01      .000000E+00     -8.580936E-02
  13       7.759475E-04      .000000E+00     -6.470333E-04
  14      -1.997561E+01      .000000E+00     -3.270589E+00
0excess resonance integrals
0                  resolved
0absorption       5.80035E+02
```

```
 fission          .00000E+00
- elapsed time    .22 min.
0 uranium-235   endf/b-iv mat 1261          updated 10/13/89            92235     temperature=   975.00
0resonance data for this nuclide
0mass number (a)          =   233.025          temperature(kelvin)      =   975.000
0potential scatter sigma  =    11.500          lumped nuclear density   = 5.9589074E-04
0spin factor (g)          = 15171.100          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             = .0000000E+00       dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1    =    15.995            sigma(per absorber atom)= 2.8656207E+02
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2    =   238.049            sigma(per absorber atom)= 3.0752908E+02
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs         res fiss        res scat
  12      -2.447811E+00   -1.524337E+00   -5.714441E-02
  13      -8.348241E+00   -4.150502E+00   -1.796663E-01
  14      -6.699653E+00   -4.094368E+00   -4.552142E-02
0excess resonance integrals
0                 resolved
0absorption      2.07551E+02
 fission         1.23750E+02
- elapsed time    .23 min.
0u-236 1163 sigo=5+4 nawklacs p-3 293k f-1/e-m(1.+5)                          92236     temperature=   975.00
0resonance data for this nuclide
0mass number (a)          =   234.017          temperature(kelvin)      =   975.000
0potential scatter sigma  =    10.995          lumped nuclear density   = 2.0722968E-05
0spin factor (g)          =  6528.490          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             = .0000000E+00       dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1    =    15.995            sigma(per absorber atom)= 8.2401172E+03
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2    =   237.934            sigma(per absorber atom)= 9.1917979E+03
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs         res fiss        res scat
  11      -1.039277E-01    .000000E+00    -2.571798E-01
  12      -5.309988E-01    .000000E+00    -3.788066E-01
  13      -5.769046E-02    .000000E+00    -3.295442E-03
  14      -2.037627E+01    .000000E+00    -1.783048E+00
0excess resonance integrals
0                 resolved
0absorption      3.07348E+02
 fission          .00000E+00
- elapsed time    .23 min.
0 uranium-238   endf/b-iv mat 1262          updated 10/13/89            92238     temperature=   975.00
0resonance data for this nuclide
0mass number (a)          =   236.006          temperature(kelvin)      =   975.000
0potential scatter sigma  =    10.599          lumped nuclear density   = 2.2005754E-02
0spin factor (g)          =   656.527          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             = .0000000E+00       dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1    =    15.995            sigma(per absorber atom)= 7.7597747E+00
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2    =   235.041            sigma(per absorber atom)= 3.3411396E-01
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
```

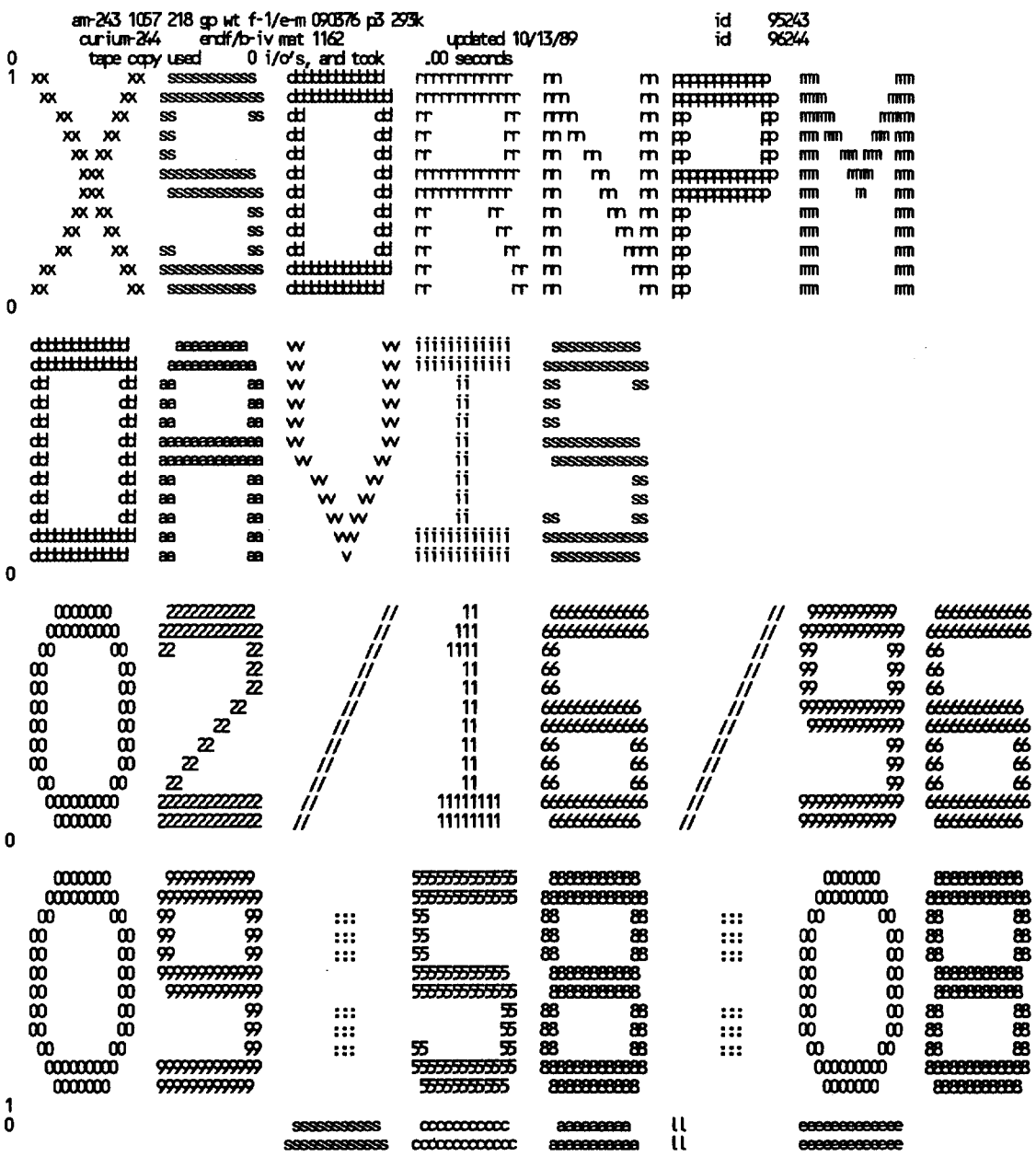
```
0group        res abs         res fiss        res scat
   9      -3.947995E-02     .000000E+00    -4.054367E-01
  10      -1.027122E+00    -1.755973E-05    -6.488024E+00
  11      -9.711375E+00     .000000E+00    -2.690508E+01
  12      -4.305445E+01     .000000E+00    -4.999392E+01
  13      -5.402042E+01     .000000E+00    -1.769342E+01
  14      -1.045127E+02     .000000E+00    -6.060392E+00
0excess resonance integrals
0                  resolved
0absorption       1.79715E+01
 fission          5.08877E-04
- elapsed time     .27 min.
0 neptunium-237  endf/b-iv mat 1263            updated 10/13/89            93237     temperature=   975.00
0resonance data for this nuclide
0mass number (a)          =   235.012              temperature(kelvin)      =   975.000
0potential scatter sigma  =    10.500              lumped nuclear density   = 6.1552282E-07
0spin factor (g)          = 10100.800              lump dimension (a-bar)   = 4.6812201E-01
0inner radius             = .0000000E+00           dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1    =    15.995              sigma(per absorber atom)= 2.7742219E+05
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2    =   238.051              sigma(per absorber atom)= 2.9757166E+05
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs         res fiss        res scat
  11      -6.310253E-02    -1.891714E-06    -7.378057E-03
  12       4.218429E-02    -8.454046E-05     9.232542E-03
  13       3.188290E-02     9.189823E-05     1.176374E-03
  14       1.812240E-03    -4.420698E-07    -7.012343E-04
0excess resonance integrals
0                  resolved
0absorption       2.95217E+02
 fission          1.38601E-01
- elapsed time     .28 min.
0pu-238 1050 sigo=5+4 new+lacs p-3 293k f-1/e-m(1.+5)                          94238     temperature=   975.00
0resonance data for this nuclide
0mass number (a)          =   236.167              temperature(kelvin)      =   975.000
0potential scatter sigma  =    10.890              lumped nuclear density   = 2.4133211E-08
0spin factor (g)          = 13130.600              lump dimension (a-bar)   = 4.6812201E-01
0inner radius             = .0000000E+00           dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1    =    15.995              sigma(per absorber atom)= 7.0757130E+06
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2    =   238.051              sigma(per absorber atom)= 7.5896300E+06
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs         res fiss        res scat
  11       2.558166E-04     4.698399E-05     1.618825E-04
  12       2.251013E-04     2.790732E-05     6.807128E-05
  13       4.159104E-01     7.576818E-02    -9.050646E-03
  14      -3.822199E-01    -6.987483E-02     8.538971E-03
0excess resonance integrals
0                  resolved
0absorption       8.25544E+01
 fission          9.08569E+00
- elapsed time     .28 min.
0 plutonium-239  endf/b-iv mat 1264            updated 10/13/89            94239     temperature=   975.00
0resonance data for this nuclide
```

```
0mass number (a)          =   236.999          temperature(kelvin)      =   975.000
0potential scatter sigma  =    10.200          lumped nuclear density   = 4.3678352E-05
0spin factor (g)          =  6435.710          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995          sigma(per absorber atom)= 3.9094807E+03
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   238.051          sigma(per absorber atom)= 4.1934307E+03
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs        res fiss       res scat
  11     -9.177634E-02  -3.673252E-02  -2.831647E-02
  12     -8.298708E-01  -3.110823E-01  -1.095888E-01
  13     -2.744968E+00  -1.617178E+00  -4.145862E-02
  14     -8.716330E-01  -4.624437E-01  -8.125940E-03
0excess resonance integrals
0                resolved
0absorption     3.1424E+02
 fission        1.7634E+02
- elapsed time    .30 min.
0 plutonium-240  endf/b-iv mat 1265          updated 10/13/89          94240     temperature=   975.00
0resonance data for this nuclide
0mass number (a)          =   237.992          temperature(kelvin)      =   975.000
0potential scatter sigma  =    10.599          lumped nuclear density   = 3.2538619E-06
0spin factor (g)          =   669.244          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995          sigma(per absorber atom)= 5.2479082E+04
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =   238.051          sigma(per absorber atom)= 5.6290699E+04
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs        res fiss       res scat
   9     -1.665389E-05  -9.641771E-08   1.595931E-05
  10     -7.262856E-04  -4.573093E-05  -3.344887E-03
  11     -2.478088E-02  -1.430572E-04  -3.309150E-02
  12     -3.513186E-01  -1.918701E-03  -3.392016E-01
  13     -4.186758E-02  -2.567179E-04  -3.054945E-03
  14      .000000E+00    .000000E+00    .000000E+00
  15      1.756127E-02   3.351646E-06   3.491331E-03
  16      3.297924E+00   6.294232E-04   4.201667E-01
  17      5.489525E+02   1.047662E-01   4.966195E+01
  18     -3.939466E+03  -7.518645E-01  -3.138248E+02
  19      9.648171E+02   1.841398E-01   7.365369E+01
  20     -9.268590E+01  -1.768951E-02   1.798660E+00
0excess resonance integrals
0                resolved
0absorption     7.2988E+03
 fission        2.4176E+00
- elapsed time    .33 min.
0 plutonium-241  endf/b-iv mat 1266          updated 10/13/89          94241     temperature=   975.00
0resonance data for this nuclide
0mass number (a)          =   238.978          temperature(kelvin)      =   975.000
0potential scatter sigma  =    10.939          lumped nuclear density   = 7.5090043E-07
0spin factor (g)          = 16402.100          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             =  .0000000E+00      dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =    15.995          sigma(per absorber atom)= 2.2740656E+05
```

```
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2    =   238.051              sigma(per absorber atom)= 2.4392334E+05
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs          res fiss         res scat
  12      1.261874E-02     1.123536E-02     6.726373E-04
  13     -7.312723E-02    -6.251993E-02    -3.190468E-03
  14      1.711866E-02     2.446088E-02     1.205490E-03
  15      1.800097E-02     1.613804E-02    -4.695504E-04
0excess resonance integrals
0                resolved
0absorption      5.0940E+02
 fission         4.2700E+02
-  elapsed time    .33 min.
0 plutonium-242  endf/b-iv mat 1161          updated 10/13/89              9424?     temperature=   975.00
0resonance data for this nuclide
0mass number (a)         =   240.145          temperature(kelvin)      =   975.000
0potential scatter sigma =    10.694          lumped nuclear density   = 2.0662535E-08
0spin factor (g)         =  6606.710          lump dimension (a-bar)   = 4.6812201E-01
0inner radius            = .0000000E+00       dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1    =    15.995              sigma(per absorber atom)= 8.2642175E+06
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2    =   238.051              sigma(per absorber atom)= 8.8644570E+06
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs          res fiss         res scat
  11      1.105936E-04     .000000E+00     1.365222E-04
  12      1.446949E-04     .000000E+00    -3.032951E-04
  13      1.216182E-04     .000000E+00     4.935473E-06
  14      8.150499E-02     .000000E+00     1.527700E-02
  15      1.234793E-01     .000000E+00    -2.843461E-02
  16      4.034068E-02     .000000E+00    -3.459403E-03
  17      1.550418E-02     .000000E+00    -1.848301E-03
  18      1.112553E-02     .000000E+00    -1.430647E-03
0excess resonance integrals
0                resolved
0absorption      1.1121?E+03
 fission          .0000E+00
-  elapsed time    .35 min.
0am-241 1056 sigp=5+4 new*lacs 218ngp p-3 293k                                 9524?     temperature=   975.00
0resonance data for this nuclide
0mass number (a)         =   238.950          temperature(kelvin)      =   975.000
0potential scatter sigma =     9.511          lumped nuclear density   = 6.0496634E-09
0spin factor (g)         = 82058.203          lump dimension (a-bar)   = 4.6812201E-01
0inner radius            = .0000000E+00       dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1    =    15.995              sigma(per absorber atom)= 2.8226312E+07
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2    =   238.051              sigma(per absorber atom)= 3.0276420E+07
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group       res abs          res fiss         res scat
  13      4.929901E-01     1.212940E-02     4.962131E-03
  14     -4.288642E-01    -1.107121E-02    -4.428857E-03
0excess resonance integrals
0                resolved
```

```
0absorption       1.95477E+02
 fission          1.07614E+00
- elapsed time     .35 min.
0am-243 1057 218 gp wt f-1/e-m 090376 p3 295k                          95243     temperature=   975.00
0resonance data for this nuclide
0mass number (a)          =   240.940          temperature(kelvin)      =   975.000
0potential scatter sigma  =     9.511          lumped nuclear density   = 4.1914475E-10
0spin factor (g)          = 82052.602          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             = .0000000E+00       dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =   15.995           sigma(per absorber atom)= 4.0740029E+08
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =  238.051           sigma(per absorber atom)= 4.3699021E+08
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs         res fiss        res scat
  13      -6.604252E-03     .000000E+00    4.386608E-04
  14       2.231602E-02     .000000E+00    2.371130E-04
0excess resonance integrals
0                 resolved
0absorption       1.60152E+02
 fission          .00000E+00
- elapsed time     .35 min.
0 curium-244      endf/b-iv mat 1162          updated 10/13/89           96244     temperature=   975.00
0resonance data for this nuclide
0mass number (a)          =   242.133          temperature(kelvin)      =   975.000
0potential scatter sigma  =    10.320          lumped nuclear density   = 9.1373150E-12
0spin factor (g)          =  5251.150          lump dimension (a-bar)   = 4.6812201E-01
0inner radius             = .0000000E+00       dancoff correction (c)   = 3.4269261E-01
0the absorber will be treated by the nordheim integral method.
0mass of moderator-1      =   15.995           sigma(per absorber atom)= 1.8688168E+10
0moderator-1 will be treated by the nordheim integral method.
0mass of moderator-2      =  238.051           sigma(per absorber atom)= 2.0045511E+10
0moderator-2 will be treated by the nordheim integral method.
0this resonance material will be treated as a 2-dimensional object.
0volume fraction of lump in cell used to account for spatial self-shielding=1.00000
0group        res abs         res fiss        res scat
  11       2.582341E-04    7.064275E-06    3.053164E-04
  12       6.932982E-04    3.252501E-05    1.372209E-04
  13       2.720734E-03    1.336612E-04    7.128655E-04
  14       8.467852E-02    5.066236E-03    1.605748E-02
0excess resonance integrals
0                 resolved
0absorption       6.13504E+02
 fission          3.54222E+01
- elapsed time     .35 min.
- elapsed time     .35 min.
1     this xsdrn working tape was created 02/16/96 at 09:56:57
      the title of the parent case is as follows
      scale 4.2 - 27 group neutron burnup library
         based on endf-b version 4 data with endf-b version 5 fission products
            compiled for nrc     1/27/89
          tape id                        4321        number of nuclides          65
          number of neutron groups         27        number of gamma groups       0
          first thermal group              15        logical unit                 4
                                table of contents
        1/v cross sections normalized to 1.0 at 0.0253 ev                      id    999
         hydrogen        endf/b-iv mat 1269/thrm1002   updated 10/13/89        id   1001
        b-10 1273 218ngp 042375 p-3 295k                                       id   5010
```

```
 boron-11      endf/b-iv mat 1160          updated 10/13/89          id    5011
 oxygen-16     endf/b-iv mat 1276          updated 10/13/89          id    8016
 oxygen-16     endf/b-iv mat 1276          updated 10/13/89          id       6
 kr-83         mt=102,103,103,105,106,107  updated 10/13/89          id   36083
 kr-85           mt=  102                                            id   36085
 sr-90         mt=102                      updated 10/13/89          id   38090
  y-89         mt=102                      updated 10/13/89          id   39089
 zr-93           mt=  102                                            id   40093
 zr-94         mt=102                      updated 10/13/89          id   40094
 zr-95         mt=102                      updated 10/13/89          id   40095
 zircalloy     endf/b-iv mat 1284          updated 10/13/89          id   40802
 nb-94         mt=102                      updated 10/13/89          id   41094
 mo-95         mt=102                      updated 10/13/89          id   42095
 tc-99         mt=102                      updated 10/13/89          id   43099
 ru-101        mt=102                      updated 10/13/89          id   44101
 ru-106        mt=102                      updated 10/13/89          id   44106
 rh-103        mt=102                      updated 10/13/89          id   45103
 rh-105          mt=  102                                            id   45105
 pd-105        mt=102                      updated 10/13/89          id   46105
 pd-108        mt=102                      updated 10/13/89          id   46108
 silver-109    endf/b-iv mat 1139          updated 10/13/89          id   47109
 sb-124        mt=102                      updated 10/13/89          id   51124
 xe-131        mt=102,103,104,105,106      updated 10/13/89          id   54131
 xe-132        mt=102,103,104,105,106      updated 10/13/89          id   54132
 xenon-135     endf/b-iv mat 1294          updated 10/13/89          id   54135
 xe-136          mt=  102, 103, 104, 105, 107                        id   54136
 cesium-133    endf/b-iv mat 1141          updated 10/13/89          id   55133
 cs-134        mt=102                      updated 10/13/89          id   55134
 cs-135          mt=  102                                            id   55135
 cs-137        mt=102                      updated 10/13/89          id   55137
 ba-136        mt=102                      updated 10/13/89          id   56136
 la-139        mt=102                      updated 10/13/89          id   57139
 ce-144          mt=  102                                            id   58144
 pr-141        mt=102,103,104,105,106,107  updated 10/13/89          id   59141
 pr-143        mt=102                      updated 10/13/89          id   59143
 nd-143        mt=102                      updated 10/13/89          id   60143
 nd-145        mt=102                      updated 10/13/89          id   60145
 nd-147        mt=102                      updated 10/13/89          id   60147
 pm-147        mt=102                      updated 10/13/89          id   61147
 pm-148          mt=  102                                            id   61148
 sm-147        endf/b-v fission product    updated 10/13/89          id   62147
 sm-149        mt=102,103,107              updated 10/13/89          id   62149
 sm-150        mt=102                      updated 10/13/89          id   62150
 sm-151        mt=102,103,104,105,106,107  updated 10/13/89          id   62151
 sm-152        mt=102,103,104,105,106,107  updated 10/13/89          id   62152
 eu-153        mt=102,103,104,105,106,107  updated 10/13/89          id   63153
 eu-154        mt=102,103,104,105,106,107  updated 10/13/89          id   63154
 eu-155        mt=102,103,104,105,106,107  updated 10/13/89          id   63155
 gd-155        mt=102                      updated 10/13/89          id   64155
u-234 1043 sigp=5+4 newklacs p-3 293k f-1/e-m(1.+5)                  id   92234
 uranium-235   endf/b-iv mat 1261          updated 10/13/89          id   92235
u-236 1163 sigp=5+4 newklacs p-3 293k f-1/e-m(1.+5)                  id   92236
 uranium-238   endf/b-iv mat 1262          updated 10/13/89          id   92238
 neptunium-237 endf/b-iv mat 1263          updated 10/13/89          id   93237
pu-238 1050 sigp=5+4 newklacs p-3 293k f-1/e-m(1.+5)                 id   94238
 plutonium-239 endf/b-iv mat 1264          updated 10/13/89          id   94239
 plutonium-240 endf/b-iv mat 1265          updated 10/13/89          id   94240
 plutonium-241 endf/b-iv mat 1266          updated 10/13/89          id   94241
 plutonium-242 endf/b-iv mat 1161          updated 10/13/89          id   94242
am-241 1056 sigp=5+4 newklacs 218ngp p-3 293k                        id   95241
```


am-243 1057 218 gp wt f-1/e-m 090376 p3 293k
id 95243
curium-244 endf/b-iv mat 1162 updated 10/13/89
id 96244
tape copy used 0 i/o's, and took .00 seconds

```
ss        ss  cc        cc  aa        aa  ll            ee
ss            cc            aa        aa  ll            ee
ss            cc            aa        aa  ll            ee
ssssssssssss  cc            aaaaaaaaaaaa  ll            eeeeeeeee
 ssssssssssss cc            aaaaaaaaaaaa  ll            eeeeeeeee
         ss   cc            aa        aa  ll            ee
         ss   cc            aa        aa  ll            ee
ss       ss   cc        cc  aa        aa  ll            ee
ssssssssssss  cccccccccccc  aa        aa  lllllllllllll eeeeeeeeeeee
 sssssssssss   ccccccccccc  aa        aa  lllllllllllll eeeeeeeeeeee
```

```
**********************************************************************
**********************************************************************
**********************************************************************
*****                                                            *****
*****                program verification information             *****
*****                                                            *****
*****                code system:   scale  version:   4.2        *****
*****                                                            *****
**********************************************************************
**********************************************************************
*****                                                            *****
*****                                                            *****
*****           program:  c0c001                                 *****
*****                                                            *****
*****      creation date:  04/27/95                              *****
*****                                                            *****
*****           library:  /neutronics/scale/exe                  *****
*****                                                            *****
*****                                                            *****
*****   this is not a  scale  configuration controlled code      *****
*****                                                            *****
*****           jobname:  davis                                  *****
*****                                                            *****
*****   date of execution:  02/16/96                             *****
*****                                                            *****
*****   time of execution:  09:58:08                             *****
*****                                                            *****
*****                                                            *****
**********************************************************************
**********************************************************************
**********************************************************************
```

```
1
                  240 d, sas2h: babcock wilcox 15x15, 3.00wt%, 20gwd/mtu burn high temp
0      -1q array has      1 entries.
0       1q array has     15 entries.
0       2q array has     10 entries.
0       3q array has     12 entries.
0       4q array has      9 entries.
0       5q array has     12 entries.
0direct access unit   9 requires     12 blocks of length  704 for cross section mixing.
1                  240 d, sas2h: babcock wilcox 15x15, 3.00wt%, 20gwd/mtu burn high temp
0general problem description data block
0                        general problem data

 ige  1/2/3 = plane/cylinder/sphere       2        isn  quadrature order              8
```

```
 izm  number of zones                    4        isct order of scattering               3
 im   number of spacial intervals       24        ievt 0/1/2/3/4/5/6=q/k/alpha/c/z/r/h   1
 ibl  0/1/2/3 = vacuum/refl/per/white    1        iim  inner iteration maximum          20
 ibr  right boundary condition           3        icm  outer iteration maximum          25
 mxx  number of mixtures                 3        iclc -1/0/n--flat res/sn/opt           0
 ms   mixing table length               65        ith  0/1 = forward/adjoint             0
 igm  number of energy groups           27        iflu not used(always wgtd)             0
 nng  number of neutron groups          27        iprt -2/-1/0/n=mixture xsec print     -2
 ngg  number of gamma groups             0        id1  0/1/2/3=no/prt nd/pch n/both     53
 iftg number of first thermal group     15        ipbt -1/0/1=none/fine/all bal. prt     0
0                                   special options

 ifg  0/1 = none/weighting calculation   1        ipn  0/1/2 diff. coef. param           0
 iqm  volumetric sources (0/n=no/yes)    0        idfm 0/1 = none/density factors 38*    1
 ipm  boundary sources (0/n=no/yes)      0        iaz  0/n = none/n activities by zone   0
 ifn  0/1/2 = input 33*/34*/use last    53        iai  0/1=none/activities by interval   0
 itmx maximum time (minutes)            10        ifct 0/1=no/yes upscatter scaling      0
 idt1 0/1/2/3=no/xsect/srce/flux--out    0        ipvt 0/1/2=no/k/alpha parametric srch  0
 isx  broad group fluxes                 0        isen outer iteration acceleration      0
 ibln activity data unit                 0        rbnd band rebaln parameter             0
 jbkl 0/1/2 buckling geometry            0
0                                     weighting data (ifg=1)

 icon -1/0/1=cell/zone/region weight    -1        ihtf total xsect psn in brd gp tables  3
 igmf number of broad groups            27        ndsf psn g-g or file number            4
 itp  0/10/20/30/40 0/c/e/ac/a           0        nusf table length or max order         4
 ipp  -2/-1/0/n=wgted xsect print       -2        mscm extra 1-d x-sect positions        0
 iap  -1/n anisn xsect print            -1
0                                   floating point parameters

 eps  overall convergence        1.00000E-04      dy   cyl/pla ht for buckling     .00000E+00
 ptc  point convergence          1.00000E-04      dz   plane depth for buckling    .00000E+00
 xnf  normalization factor       1.00000E+00      vsc  void streaming correction   .00000E+00
 ev   eigenvalue guess            .00000E+00      pv   ipvt=1/2--k/alpha          1.00000E+00
 evm  eigenvalue modifier         .00000E+00      eql  ev change eps for search   1.00000E-03
 bf   buckling factor=1.420892   1.42089E+00      xnpm new param mod for search   7.50000E-01
      this case will require       2535 locations for mixing
      this case has been allocated 200000 locations
1                          240 d, sas2h: babcock wilcox 15x15, 3.00wt%, 20gwd/mtu burn high temp
0          13q array has      65 entries.
0          14q array has      65 entries.
0          15q array has      65 entries.
0                                    data block 2 (mixing table, etc.)
```

nuclides	on tape	cccc identification	mixture	mixing table component	atom density	extra xsect id's
1	999		1	92235	5.95891E-04	
2	1001		1	92234	5.24821E-06	
3	5010		1	92236	2.07230E-05	
4	5011		1	92238	2.20058E-02	
5	8016		1	8016	4.55359E-02	
6	6		3	6	2.09710E-02	
7	36083		1	36083	4.52870E-07	
8	36085		1	36085	2.19160E-07	
9	38090		1	38090	4.90462E-06	
10	39089		1	39089	2.93210E-06	
11	40093		1	42095	2.67690E-06	
12	40094		1	40093	3.66334E-06	
13	40095		1	40094	5.64806E-06	
14	40302		1	40095	2.02113E-06	
15	41094		1	41094	1.92647E-12	

	16	42095	1	43099	5.40899E-06
	17	43099	1	45103	2.34075E-06
	18	44101	1	45105	1.42341E-08
	19	44106	1	44101	4.73216E-06
	20	45103	1	44106	6.38003E-07
	21	45105	1	46105	1.32971E-06
	22	46105	1	46108	2.44774E-07
	23	46108	1	47109	1.71902E-07
	24	47109	1	51124	4.79520E-11
	25	51124	1	54131	2.48623E-06
	26	54131	1	54132	4.07046E-06
	27	54132	1	54135	6.51168E-09
	28	54135	1	54136	9.02456E-06
	29	54136	1	55134	8.14148E-08
	30	55133	1	55135	2.79804E-06
	31	55134	1	55137	5.70749E-06
	32	55135	1	56136	1.66625E-08
	33	55137	1	57139	5.70699E-06
	34	56136	1	59141	4.20858E-06
	35	57139	1	59143	4.03826E-07
	36	58144	1	58144	3.63429E-06
	37	59141	1	60143	4.64738E-06
	38	59143	1	60145	3.44986E-06
	39	60143	1	61147	1.63014E-06
	40	60145	1	61148	4.34751E-09
	41	60147	1	60147	1.34141E-07
	42	61147	1	62147	1.37482E-07
	43	61148	1	62149	6.87658E-08
	44	62147	1	62150	9.89883E-07
	45	62149	1	62151	2.22942E-07
	46	62150	1	62152	4.58639E-07
	47	62151	1	64155	4.46617E-10
	48	62152	1	63153	2.02361E-07
	49	63153	1	63154	1.57326E-08
	50	63154	1	63155	3.12565E-08
	51	63155	2	40302	4.25156E-02
	52	64155	3	1001	4.19420E-02
	53	92234	3	5010	3.81515E-06
	54	92235	3	5011	1.54884E-05
	55	92236	1	55133	5.85210E-06
	56	92238	1	95237	6.15523E-07
	57	95237	1	94238	2.41332E-08
	58	94238	1	94239	4.36784E-05
	59	94239	1	94240	3.25386E-06
	60	94240	1	94241	7.50900E-07
	61	94241	1	94242	2.06625E-08
	62	94242	1	95241	6.04966E-09
	63	95241	1	95243	4.19145E-10
	64	95243	1	96244	9.13732E-12
	65	96244	1	999	1.00000E-20

- elapsed time .00 min.
0 21649 locations will be used
0 35q array has 25 entries.
0 36q array has 24 entries.
0 38q array has 24 entries.
0 39q array has 4 entries.
0 40q array has 4 entries.
0 47q array has 27 entries.
0 51q array has 27 entries.
1 240 d, sas2h: babcock wilcox 15x15, 3.00w%, 20gwd/mtu burn high temp

neutron group parameters

0 gp	energy boundaries	lethargy boundaries	weighted velocities	broad gp numbers	calc type	group band	right albedo	left albedo
1	2.00000E+07	-6.93147E-01	4.60581E+09	1	0	1	1.00000E+00	
2	6.43400E+06	4.40985E-01	2.88737E+09	2	0	2	1.00000E+00	
3	3.00000E+06	1.20397E+00	2.12201E+09	3	0	3	1.00000E+00	
4	1.85000E+06	1.68740E+00	1.75673E+09	4	0	4	1.00000E+00	
5	1.40000E+06	1.96611E+00	1.46535E+09	5	0	5	1.00000E+00	
6	9.00000E+05	2.40795E+00	1.06620E+09	6	0	6	1.00000E+00	
7	4.00000E+05	3.21888E+00	6.07557E+08	7	0	7	1.00000E+00	
8	1.00000E+05	4.60517E+00	2.72415E+08	8	0	8	1.00000E+00	
9	1.70000E+04	6.37713E+00	1.13526E+08	9	0	9	1.00000E+00	
10	3.00000E+03	8.11173E+00	4.82126E+07	10	0	10	1.00000E+00	
11	5.50000E+02	9.80818E+00	2.05946E+07	11	0	11	1.00000E+00	
12	1.00000E+02	1.15129E+01	1.01036E+07	12	0	12	1.00000E+00	
13	3.00000E+01	1.27169E+01	5.69595E+06	13	0	13	1.00000E+00	
14	1.00000E+01	1.38155E+01	3.20957E+06	14	0	14	1.00000E+00	
15	3.04999E+00	1.50030E+01	2.10601E+06	15	0	15	1.00000E+00	
16	1.77000E+00	1.55471E+01	1.70522E+06	16	0	16	1.00000E+00	
17	1.29999E+00	1.58557E+01	1.52545E+06	17	0	17	1.00000E+00	
18	1.12999E+00	1.59959E+01	1.42867E+06	18	0	18	1.00000E+00	
19	1.00000E+00	1.61181E+01	1.31002E+06	19	0	19	1.00000E+00	
20	8.00000E-01	1.63412E+01	9.05898E+05	20	0	20	1.00000E+00	
21	4.00000E-01	1.70344E+01	8.17974E+05	21	0	21	1.00000E+00	
22	3.25000E-01	1.72420E+01	6.90070E+05	22	0	22	1.00000E+00	
23	2.25000E-01	1.76098E+01	4.86953E+05	23	0	23	1.00000E+00	
24	9.99999E-02	1.84207E+01	3.57766E+05	24	0	24	1.00000E+00	
25	5.00000E-02	1.91138E+01	2.71895E+05	25	0	25	1.00000E+00	
26	3.00000E-02	1.96247E+01	1.87283E+05	26	0	26	1.00000E+00	
27	1.00000E-02	2.07233E+01	8.88201E+04	27	0	27	1.00000E+00	
28	1.00000E-05	2.76310E+01						

1 240 d, sas2h: babcock wilcox 15x15, 3.00wt%, 20gwd/mtu burn high temp

0	mixture by zone	order p(l) by zone	activity table matl no.	activity table reaction	quadrature constants weights	directions	refl direc	wt x cos
1	1	3			0	-2.79004E-01	3	0
2	1	3			5.06143E-02	-1.97286E-01	3	-9.98548E-03
3	2	3			5.06143E-02	1.97286E-01	2	9.98548E-03
4	3	3			0	-6.04419E-01	8	0
5					5.55953E-02	-5.58410E-01	8	-3.10450E-02
6					5.55953E-02	-2.31301E-01	7	-1.28593E-02
7					5.55953E-02	2.31301E-01	6	1.28593E-02
8					5.55953E-02	5.58410E-01	5	3.10450E-02
9					0	-8.50774E-01	15	0
10					5.22844E-02	-8.21784E-01	15	-4.29665E-02
11					5.22844E-02	-6.01588E-01	14	-3.14537E-02
12					5.22844E-02	-2.20196E-01	13	-1.15128E-02
13					5.22844E-02	2.20196E-01	12	1.15128E-02
14					5.22844E-02	6.01588E-01	11	3.14537E-02
15					5.22844E-02	8.21784E-01	10	4.29665E-02
16					0	-9.83052E-01	24	0
17					4.53355E-02	-9.64143E-01	24	-4.37099E-02
18					4.53355E-02	-8.17361E-01	23	-3.70655E-02
19					4.53355E-02	-5.46143E-01	22	-2.47597E-02
20					4.53355E-02	-1.91780E-01	21	-8.69444E-03
21					4.53355E-02	1.91780E-01	20	8.69444E-03
22					4.53355E-02	5.46143E-01	19	2.47597E-02
23					4.53355E-02	8.17361E-01	18	3.70655E-02
24					4.53355E-02	9.64143E-01	17	4.37099E-02

0constants for p(3) scattering

0angl	set 1	set 2	set 3	set 4	set 5

1	-2.79004E-01	8.83235E-01	6.74143E-02	-6.16919E-01	-1.71701E-02
2	-1.97286E-01	8.83235E-01	.00000E+00	-4.36228E-01	1.21411E-02
3	1.97286E-01	8.83235E-01	.00000E+00	4.36228E-01	-1.21411E-02
4	-6.04419E-01	4.52016E-01	3.16379E-01	-8.04435E-01	-1.74564E-01
5	-5.58410E-01	4.52016E-01	2.23714E-01	-7.43201E-01	-6.68028E-02
6	-2.31301E-01	4.52016E-01	-2.23713E-01	-3.07844E-01	1.61276E-01
7	2.31301E-01	4.52016E-01	-2.23713E-01	3.07844E-01	-1.61276E-01
8	5.58410E-01	4.52016E-01	2.23713E-01	7.43201E-01	6.68028E-02
9	-8.50774E-01	-8.57235E-02	6.26843E-01	-1.98456E-01	-4.86835E-01
10	-8.21784E-01	-8.57235E-02	5.42862E-01	-1.91694E-01	-3.44245E-01
11	-6.01588E-01	-8.57235E-02	.00000E+00	-1.40330E-01	3.44244E-01
12	-2.20196E-01	-8.57235E-02	-5.42862E-01	-5.13643E-02	3.44245E-01
13	2.20196E-01	-8.57235E-02	-5.42862E-01	5.13643E-02	-3.44245E-01
14	6.01588E-01	-8.57235E-02	.00000E+00	1.40330E-01	-3.44245E-01
15	8.21784E-01	-8.57235E-02	5.42862E-01	1.91694E-01	3.44245E-01
16	-9.83052E-01	-4.49528E-01	8.36885E-01	5.00703E-01	-7.51005E-01
17	-9.64143E-01	-4.49528E-01	7.73181E-01	4.91083E-01	-6.24438E-01
18	-8.17361E-01	-4.49528E-01	3.20862E-01	4.16320E-01	1.46514E-01
19	-5.46143E-01	-4.49528E-01	-3.20862E-01	2.78176E-01	7.36575E-01
20	-1.91780E-01	-4.49528E-01	-7.73181E-01	9.76824E-02	4.17236E-01
21	1.91780E-01	-4.49528E-01	-7.73181E-01	-9.76824E-02	-4.17236E-01
22	5.46143E-01	-4.49528E-01	-3.20862E-01	-2.78176E-01	-7.36575E-01
23	8.17361E-01	-4.49528E-01	3.20862E-01	-4.16320E-01	-1.46514E-01
24	9.64143E-01	-4.49528E-01	7.73181E-01	-4.91083E-01	6.24438E-01

1 int	radii	mid pts	zone no.	areas	volumes	dens fact	radius mod	spec(int)
1	0	1.29551E-02	1	0	2.10906E-03	1.00000E+00	0	
2	2.59102E-02	4.33406E-02	1	1.62798E-01	9.49318E-03	1.00000E+00	0	
3	6.07710E-02	8.75100E-02	1	3.81835E-01	2.94045E-02	1.00000E+00	0	
4	1.14249E-01	1.74155E-01	1	7.17848E-01	1.31104E-01	1.00000E+00	0	
5	2.34061E-01	2.93967E-01	1	1.47065E+00	2.21259E-01	1.00000E+00		
6	3.53873E-01	3.80612E-01	1	2.22345E+00	1.27890E-01	1.00000E+00		
7	4.07351E-01	4.24781E-01	1	2.55946E+00	9.30429E-02	1.00000E+00		
8	4.42212E-01	4.55167E-01	1	2.77850E+00	7.41004E-02	1.00000E+00		
9	4.68122E-01	4.68814E-01	2	2.94130E+00	4.07946E-03	0		
10	4.69507E-01	4.71481E-01	2	2.95000E+00	1.16988E-02	0		
11	4.73456E-01	4.75431E-01	2	2.97481E+00	1.17968E-02	0		
12	4.77405E-01	4.78098E-01	2	2.99962E+00	4.16023E-03	0		
13	4.78790E-01	4.83159E-01	3	3.00833E+00	2.65268E-02	1.00000E+00		
14	4.87528E-01	4.99987E-01	3	3.06323E+00	7.82768E-02	1.00000E+00		
15	5.12445E-01	5.24908E-01	3	3.21979E+00	8.21777E-02	1.00000E+00		
16	5.37362E-01	5.41731E-01	3	3.37634E+00	2.97427E-02	1.00000E+00		
17	5.46100E-01	5.53513E-01	4	3.43125E+00	5.15631E-02	1.00000E+00		
18	5.60926E-01	5.70900E-01	4	3.52440E+00	7.15548E-02	1.00000E+00		
19	5.80874E-01	5.96175E-01	4	3.64974E+00	1.14628E-01	1.00000E+00		
20	6.11475E-01	6.45755E-01	4	3.84201E+00	2.78169E-01	1.00000E+00		
21	6.80034E-01	7.14313E-01	4	4.27278E+00	3.07702E-01	1.00000E+00		
22	7.48592E-01	7.63993E-01	4	4.70354E+00	1.46875E-01	1.00000E+00		
23	7.79193E-01	7.89167E-01	4	4.89582E+00	9.89116E-02	1.00000E+00		
24	7.99141E-01	8.06554E-01	4	5.02115E+00	7.51357E-02	1.00000E+00		
25	8.13968E-01			5.11431E+00				

- elapsed time .00 min.

1 outer iter	inner iters	1 - balance	eigenvalue	1 - source ratio	1 - scatter ratio	1 - upscat ratio	search parameter	time (min)
1	144	2.10439E-05	1.12498E+00	-1.38515E-01	1.00000E+00	-4.43609E-02	.00000E+00	.0000
2	221	-9.63613E-06	1.13858E+00	-1.26102E-03	-1.51759E-02	-4.62359E-03	.00000E+00	.0000
3	284	3.53239E-06	1.13978E+00	-1.41229E-04	-1.45082E-03	-8.89717E-04	.00000E+00	.0000
4	330	-6.49129E-06	1.14017E+00	-2.40409E-05	-2.85584E-04	-1.66783E-04	.00000E+00	.0167
5	361	-1.10716E-05	1.14028E+00	-5.19524E-06	-5.29126E-05	-2.70676E-05	.00000E+00	.0167

grp to grp iters	inner mfd int.	max. flux difference	msf int.	max. scale factor	coarse mesh

1	1	1	1	3.99968E-08	24	1.00000E+00	1
2	2	1	1	4.75658E-08	24	1.00000E+00	1
3	3	1	1	4.42471E-08	24	1.00000E+00	1
4	4	1	1	4.34071E-08	24	1.00000E+00	1
5	5	1	1	4.76548E-08	24	1.00000E+00	1
6	6	1	1	3.14257E-08	24	1.00000E+00	1
7	7	1	1	2.35128E-08	24	1.00000E+00	1
8	8	1	1	5.70768E-09	24	1.00000E+00	1
9	9	1	2	3.06282E-09	24	1.00000E+00	1
10	10	1	1	3.10512E-09	24	1.00000E+00	1
11	11	1	1	3.15985E-09	24	1.00000E+00	1
12	12	1	2	7.43236E-10	24	1.00000E+00	1
13	13	1	24	1.12172E-09	24	1.00000E+00	1
14	14	1	24	1.28540E-09	24	1.00000E+00	1
15	15	1	24	3.89540E-05	24	9.99982E-01	1
16	16	1	24	4.84754E-05	24	9.99987E-01	1
17	17	1	18	1.60114E-05	24	9.99960E-01	1
18	18	1	18	1.77016E-05	24	9.99958E-01	1
19	19	1	18	1.54054E-05	24	9.99955E-01	1
20	20	1	24	5.22631E-05	24	9.99969E-01	1
21	21	1	18	2.56650E-05	24	9.99938E-01	1
22	22	1	24	4.65365E-05	24	9.99991E-01	1
23	23	1	24	2.26127E-06	24	1.00000E+00	1
24	24	1	24	1.31691E-05	24	1.00000E+00	1
25	25	1	24	1.56653E-05	24	1.00000E+00	1
26	26	1	21	1.67109E-05	24	1.00008E+00	2
27	27	1	2	2.98553E-06	24	1.00000E+00	2

6 388 -5.48863E-07 1.14015E+00 -7.61250E-07 -8.69375E-06 -5.37447E-06 .00000E+00 .0167

final monitor

lambda 1.14015E+00 productionyabsorption 1.14014E+00 angular flux on 16

- elapsed time .02 min.

1 240 d, sas2h: babcock wilcox 15x15, 3.00w%, 20gwd/mtu burn high temp

0 int. zone number radius int. midpoint area volume prod density

1	1	.00000E+00	1.29551E-02	.00000E+00	2.10906E-03	3.34398E-03
2	1	2.59102E-02	4.33406E-02	1.62798E-01	9.49318E-03	1.50451E-02
3	1	6.07710E-02	8.75100E-02	3.81835E-01	2.94045E-02	4.66852E-02
4	1	1.14249E-01	1.74155E-01	7.17848E-01	1.31104E-01	2.10039E-01
5	1	2.34061E-01	2.95967E-01	1.47065E+00	2.21299E-01	3.62514E-01
6	1	3.53873E-01	3.80612E-01	2.22345E+00	1.27890E-01	2.14674E-01
7	1	4.07351E-01	4.24781E-01	2.55946E+00	9.30429E-02	1.59042E-01
8	1	4.42212E-01	4.55167E-01	2.77850E+00	7.41004E-02	1.28805E-01
9	2	4.68122E-01	4.68814E-01	2.94130E+00	4.07946E-03	.00000E+00
10	2	4.69507E-01	4.71481E-01	2.95000E+00	1.16988E-02	.00000E+00
11	2	4.73456E-01	4.75431E-01	2.97481E+00	1.17968E-02	.00000E+00
12	2	4.77405E-01	4.78098E-01	2.99962E+00	4.16023E-03	.00000E+00
13	3	4.78790E-01	4.83159E-01	3.00833E+00	2.65268E-02	.00000E+00
14	3	4.87528E-01	4.99987E-01	3.06323E+00	7.82768E-02	.00000E+00
15	3	5.12445E-01	5.24903E-01	3.21979E+00	8.21777E-02	.00000E+00
16	3	5.37362E-01	5.41731E-01	3.37634E+00	2.97427E-02	.00000E+00
17	4	5.46100E-01	5.53513E-01	3.43125E+00	5.15631E-02	.00000E+00
18	4	5.60926E-01	5.70900E-01	3.52440E+00	7.15548E-02	.00000E+00
19	4	5.80874E-01	5.96175E-01	3.69774E+00	1.14628E-01	.00000E+00
20	4	6.11475E-01	6.45755E-01	3.84201E+00	2.78169E-01	.00000E+00
21	4	6.80034E-01	7.14313E-01	4.27278E+00	3.07702E-01	.00000E+00
22	4	7.48592E-01	7.63893E-01	4.70354E+00	1.46875E-01	.00000E+00
23	4	7.79193E-01	7.89167E-01	4.89582E+00	9.89116E-02	.00000E+00
24	4	7.99141E-01	8.06554E-01	5.02115E+00	7.51357E-02	.00000E+00
25		8.13968E-01		5.11431E+00		

1 240 d, sas2h: babcock wilcox 15x15, 3.00w%, 20gwd/mtu burn high temp

0 total flux

0 int.	grp. 1	grp. 2	grp. 3	grp. 4	grp. 5	grp. 6	grp. 7	grp. 8
1	1.72636E-01	1.31508E+00	1.67386E+00	1.03961E+00	1.57466E+00	3.03077E+00	2.90515E+00	2.07949E+00
2	1.72697E-01	1.31566E+00	1.67469E+00	1.04011E+00	1.57537E+00	3.03208E+00	2.90582E+00	2.07955E+00
3	1.72641E-01	1.31508E+00	1.67391E+00	1.03963E+00	1.57457E+00	3.03046E+00	2.90479E+00	2.07936E+00
4	1.72250E-01	1.31078E+00	1.66843E+00	1.03628E+00	1.56925E+00	3.01991E+00	2.89843E+00	2.07830E+00
5	1.71238E-01	1.29987E+00	1.65454E+00	1.02785E+00	1.55588E+00	2.99378E+00	2.88280E+00	2.07571E+00
6	1.70073E-01	1.28745E+00	1.63892E+00	1.01842E+00	1.54105E+00	2.96518E+00	2.86577E+00	2.07283E+00
7	1.69148E-01	1.27774E+00	1.62689E+00	1.01126E+00	1.52991E+00	2.94410E+00	2.85331E+00	2.07066E+00
8	1.68231E-01	1.26829E+00	1.61537E+00	1.00450E+00	1.51954E+00	2.92485E+00	2.84204E+00	2.06863E+00
9	1.67729E-01	1.26318E+00	1.60919E+00	1.00091E+00	1.51409E+00	2.91485E+00	2.83622E+00	2.06755E+00
10	1.67625E-01	1.26216E+00	1.60796E+00	1.00021E+00	1.51309E+00	2.91303E+00	2.83523E+00	2.06736E+00
11	1.67472E-01	1.26066E+00	1.60617E+00	9.99224E-01	1.51167E+00	2.91049E+00	2.83383E+00	2.06707E+00
12	1.67371E-01	1.25968E+00	1.60501E+00	9.98581E-01	1.51075E+00	2.90885E+00	2.83293E+00	2.06688E+00
13	1.67184E-01	1.25785E+00	1.60280E+00	9.97340E-01	1.50894E+00	2.90541E+00	2.83100E+00	2.06651E+00
14	1.66673E-01	1.25265E+00	1.59630E+00	9.93505E-01	1.50312E+00	2.89411E+00	2.82456E+00	2.06547E+00
15	1.66101E-01	1.24636E+00	1.58793E+00	9.88188E-01	1.49470E+00	2.87743E+00	2.81494E+00	2.06434E+00
16	1.65821E-01	1.24287E+00	1.58292E+00	9.84718E-01	1.48897E+00	2.86586E+00	2.80821E+00	2.06383E+00
17	1.65686E-01	1.24087E+00	1.57982E+00	9.82589E-01	1.48499E+00	2.85790E+00	2.80354E+00	2.06369E+00
18	1.65510E-01	1.23829E+00	1.57584E+00	9.79418E-01	1.47993E+00	2.84791E+00	2.79766E+00	2.06356E+00
19	1.65289E-01	1.23521E+00	1.57123E+00	9.76054E-01	1.47424E+00	2.83674E+00	2.79108E+00	2.06333E+00
20	1.64994E-01	1.23124E+00	1.56536E+00	9.71839E-01	1.46716E+00	2.82287E+00	2.78292E+00	2.06301E+00
21	1.64791E-01	1.22846E+00	1.56124E+00	9.68855E-01	1.46212E+00	2.81303E+00	2.77722E+00	2.06291E+00
22	1.64792E-01	1.22834E+00	1.56094E+00	9.68573E-01	1.46160E+00	2.81202E+00	2.77678E+00	2.06314E+00
23	1.64867E-01	1.22919E+00	1.56207E+00	9.69302E-01	1.46278E+00	2.81432E+00	2.77826E+00	2.06342E+00
24	1.64953E-01	1.23019E+00	1.56342E+00	9.70201E-01	1.46424E+00	2.81718E+00	2.78007E+00	2.06369E+00

0 int.	grp. 9	grp. 10	grp. 11	grp. 12	grp. 13	grp. 14	grp. 15	grp. 16
1	1.58539E+00	1.44334E+00	1.30173E+00	7.94048E-01	6.72549E-01	5.94755E-01	3.72125E-01	2.07129E-01
2	1.58531E+00	1.44324E+00	1.30152E+00	7.93816E-01	6.72340E-01	5.94471E-01	3.72095E-01	2.07110E-01
3	1.58550E+00	1.44346E+00	1.30199E+00	7.94362E-01	6.72787E-01	5.95138E-01	3.72170E-01	2.07149E-01
4	1.58655E+00	1.44471E+00	1.30465E+00	7.97431E-01	6.75339E-01	5.98885E-01	3.72585E-01	2.07371E-01
5	1.58916E+00	1.44776E+00	1.31119E+00	8.05009E-01	6.81638E-01	6.08178E-01	3.73587E-01	2.07914E-01
6	1.59208E+00	1.45110E+00	1.31836E+00	8.13353E-01	6.88562E-01	6.18456E-01	3.74667E-01	2.08505E-01
7	1.59430E+00	1.45355E+00	1.32363E+00	8.19538E-01	6.93685E-01	6.26119E-01	3.75444E-01	2.08936E-01
8	1.59639E+00	1.45577E+00	1.32843E+00	8.25217E-01	6.98381E-01	6.33181E-01	3.76136E-01	2.09327E-01
9	1.59750E+00	1.45691E+00	1.33092E+00	8.28167E-01	7.00822E-01	6.36853E-01	3.76491E-01	2.09529E-01
10	1.59770E+00	1.45710E+00	1.33132E+00	8.28642E-01	7.01221E-01	6.37442E-01	3.76551E-01	2.09564E-01
11	1.59799E+00	1.45737E+00	1.33189E+00	8.29321E-01	7.01791E-01	6.38284E-01	3.76637E-01	2.09613E-01
12	1.59818E+00	1.45754E+00	1.33226E+00	8.29760E-01	7.02163E-01	6.38829E-01	3.76692E-01	2.09646E-01
13	1.59865E+00	1.45789E+00	1.33301E+00	8.30655E-01	7.02919E-01	6.39943E-01	3.76807E-01	2.09711E-01
14	1.59959E+00	1.45902E+00	1.33542E+00	8.33457E-01	7.05288E-01	6.43428E-01	3.77172E-01	2.09918E-01
15	1.60074E+00	1.46063E+00	1.33881E+00	8.37322E-01	7.08548E-01	6.48230E-01	3.77690E-01	2.10204E-01
16	1.60129E+00	1.46170E+00	1.34105E+00	8.39816E-01	7.10652E-01	6.51320E-01	3.78034E-01	2.10388E-01
17	1.60159E+00	1.46250E+00	1.34272E+00	8.41649E-01	7.12166E-01	6.53572E-01	3.78221E-01	2.10504E-01
18	1.60204E+00	1.46358E+00	1.34500E+00	8.44154E-01	7.14216E-01	6.56642E-01	3.78428E-01	2.10649E-01
19	1.60260E+00	1.46482E+00	1.34760E+00	8.47057E-01	7.16582E-01	6.60181E-01	3.78672E-01	2.10819E-01
20	1.60338E+00	1.46638E+00	1.35090E+00	8.50711E-01	7.19598E-01	6.64691E-01	3.78970E-01	2.11052E-01
21	1.60396E+00	1.46750E+00	1.35326E+00	8.53329E-01	7.21716E-01	6.67886E-01	3.79117E-01	2.11159E-01
22	1.60402E+00	1.46761E+00	1.35349E+00	8.53559E-01	7.21856E-01	6.68136E-01	3.79031E-01	2.11133E-01
23	1.60386E+00	1.46733E+00	1.35290E+00	8.52878E-01	7.21256E-01	6.67275E-01	3.78887E-01	2.11061E-01
24	1.60366E+00	1.46698E+00	1.35214E+00	8.52038E-01	7.20531E-01	6.66224E-01	3.78742E-01	2.10985E-01

0 int.	grp. 17	grp. 18	grp. 19	grp. 20	grp. 21	grp. 22	grp. 23	grp. 24
1	8.87329E-02	6.41539E-02	1.37538E-01	4.52611E-01	1.26457E-01	2.32781E-01	7.73834E-01	5.51708E-01
2	8.87124E-02	6.41199E-02	1.37504E-01	4.52510E-01	1.26391E-01	2.32629E-01	7.73391E-01	5.51331E-01
3	8.87485E-02	6.42070E-02	1.37567E-01	4.52698E-01	1.26545E-01	2.33102E-01	7.74432E-01	5.52403E-01
4	8.89622E-02	6.46898E-02	1.37956E-01	4.53806E-01	1.27413E-01	2.35645E-01	7.80297E-01	5.58250E-01
5	8.94902E-02	6.58982E-02	1.38839E-01	4.56632E-01	1.29574E-01	2.41995E-01	7.94832E-01	5.72790E-01
6	9.00699E-02	6.72497E-02	1.39821E-01	4.59513E-01	1.31970E-01	2.49097E-01	8.10890E-01	5.88964E-01
7	9.04987E-02	6.82718E-02	1.40538E-01	4.61705E-01	1.33763E-01	2.54463E-01	8.22844E-01	6.01106E-01
8	9.08922E-02	6.92257E-02	1.41188E-01	4.63706E-01	1.35421E-01	2.59464E-01	8.33853E-01	6.12377E-01
9	9.10971E-02	6.97241E-02	1.41525E-01	4.64745E-01	1.36284E-01	2.62073E-01	8.39571E-01	6.18249E-01

10	9.11316E-02	6.98023E-02	1.41581E-01	4.64919E-01	1.36420E-01	2.62468E-01	8.40462E-01	6.19129E-01
11	9.11809E-02	6.99141E-02	1.41661E-01	4.65167E-01	1.36615E-01	2.63031E-01	8.41729E-01	6.20881E-01
12	9.12128E-02	6.99866E-02	1.41713E-01	4.65327E-01	1.36740E-01	2.63396E-01	8.42547E-01	6.21187E-01
13	9.12780E-02	7.01342E-02	1.41819E-01	4.65655E-01	1.36997E-01	2.64140E-01	8.44221E-01	6.22835E-01
14	9.14818E-02	7.05930E-02	1.42154E-01	4.66678E-01	1.37803E-01	2.66453E-01	8.49431E-01	6.27915E-01
15	9.17621E-02	7.12184E-02	1.42619E-01	4.68081E-01	1.38913E-01	2.69603E-01	8.56512E-01	6.34708E-01
16	9.19418E-02	7.16165E-02	1.42920E-01	4.68978E-01	1.39627E-01	2.71601E-01	8.60983E-01	6.38913E-01
17	9.20709E-02	7.19160E-02	1.43136E-01	4.69624E-01	1.40180E-01	2.73165E-01	8.64686E-01	6.42762E-01
18	9.22463E-02	7.23529E-02	1.43426E-01	4.70507E-01	1.40960E-01	2.75402E-01	8.70214E-01	6.48824E-01
19	9.24494E-02	7.28130E-02	1.43763E-01	4.71536E-01	1.41863E-01	2.78008E-01	8.76811E-01	6.56131E-01
20	9.27076E-02	7.34263E-02	1.44195E-01	4.72856E-01	1.43023E-01	2.81378E-01	8.85591E-01	6.65982E-01
21	9.28877E-02	7.38692E-02	1.44493E-01	4.73782E-01	1.43865E-01	2.83839E-01	8.92245E-01	6.73662E-01
22	9.28976E-02	7.39178E-02	1.44509E-01	4.73836E-01	1.43961E-01	2.84129E-01	8.95264E-01	6.75120E-01
23	9.28450E-02	7.38136E-02	1.44421E-01	4.73566E-01	1.43765E-01	2.83565E-01	8.91956E-01	6.73901E-01
24	9.27822E-02	7.36823E-02	1.44315E-01	4.73242E-01	1.43517E-01	2.82845E-01	8.90221E-01	6.72164E-01

0 int. grp. 25 grp. 26 grp. 27

1	2.26151E-01	1.35519E-01	1.75802E-02
2	2.25995E-01	1.35425E-01	1.75830E-02
3	2.26573E-01	1.35987E-01	1.75545E-02
4	2.29606E-01	1.38781E-01	1.83261E-02
5	2.37159E-01	1.45770E-01	2.02894E-02
6	2.45604E-01	1.53679E-01	2.25902E-02
7	2.51990E-01	1.59752E-01	2.44507E-02
8	2.57964E-01	1.65517E-01	2.63057E-02
9	2.61086E-01	1.68548E-01	2.72992E-02
10	2.61537E-01	1.68955E-01	2.74122E-02
11	2.62179E-01	1.69532E-01	2.75729E-02
12	2.62593E-01	1.69904E-01	2.76765E-02
13	2.63434E-01	1.70660E-01	2.78867E-02
14	2.65988E-01	1.72935E-01	2.85082E-02
15	2.69314E-01	1.75851E-01	2.92768E-02
16	2.71305E-01	1.77558E-01	2.97056E-02
17	2.73299E-01	1.79591E-01	3.03692E-02
18	2.76595E-01	1.83136E-01	3.15804E-02
19	2.80614E-01	1.87441E-01	3.29992E-02
20	2.86093E-01	1.93304E-01	3.48657E-02
21	2.90462E-01	1.98086E-01	3.64000E-02
22	2.91411E-01	1.99310E-01	3.68559E-02
23	2.90838E-01	1.98885E-01	3.68027E-02
24	2.89959E-01	1.98107E-01	3.66313E-02

- elapsed time .02 min.

1fine group summary for zone 1 by group including sum for all groups in line 28

0 grp.	fix source	fiss source	in scatter	slf scatter	out scatter	absorption	leakage	balance
1	.00000E+00	2.19649E-02	.00000E+00	1.23497E-02	1.02562E-02	3.13908E-03	1.08050E-02	9.98830E-01
2	.00000E+00	1.90919E-01	2.26176E-03	1.65430E-01	6.57391E-02	1.35378E-02	1.13914E-01	1.00004E+00
3	.00000E+00	2.15337E-01	2.59391E-02	1.60488E-01	8.08686E-02	1.55714E-02	1.44834E-01	1.00001E+00
4	.00000E+00	1.24201E-01	3.87324E-02	1.05020E-01	6.77712E-02	7.44454E-03	8.77151E-02	1.00001E+00
5	.00000E+00	1.65227E-01	6.76670E-02	2.59170E-01	9.47659E-02	4.46831E-03	1.33662E-01	9.99991E-01
6	.00000E+00	1.78924E-01	1.34395E-01	6.53746E-01	5.44214E-02	7.09942E-03	2.51788E-01	1.00008E+00
7	.00000E+00	8.86746E-02	9.83529E-02	7.45389E-01	3.63396E-02	7.72135E-03	1.42965E-01	1.00001E+00
8	.00000E+00	1.36799E-02	4.25696E-02	6.31051E-01	2.14803E-02	1.41481E-02	2.06187E-02	1.00004E+00
9	.00000E+00	9.93164E-04	2.17022E-02	5.34747E-01	2.06381E-02	2.33408E-02	-2.12831E-02	9.99990E-01
10	.00000E+00	7.37715E-05	2.06600E-02	4.58514E-01	1.06567E-02	3.62691E-02	-2.61926E-02	1.00001E+00
11	.00000E+00	5.80390E-06	1.06576E-02	4.18975E-01	8.11287E-03	5.86471E-02	-5.60971E-02	1.00001E+00
12	.00000E+00	4.07714E-07	8.11292E-03	2.37012E-01	9.34645E-03	6.37660E-02	-6.49960E-02	9.99957E-01
13	.00000E+00	6.47414E-08	9.34646E-03	1.75650E-01	6.15925E-03	5.78126E-02	-5.46259E-02	1.00001E+00
14	.00000E+00	1.28300E-08	6.15925E-03	1.51833E-01	7.46595E-03	7.95121E-02	-8.06490E-02	1.00000E+00
15	.00000E+00	1.44993E-09	7.58475E-03	8.53715E-02	8.94771E-03	6.68964E-03	-8.06808E-03	1.00099E+00
16	.00000E+00	4.25751E-10	9.12581E-03	4.33987E-02	9.73769E-03	4.10607E-03	-4.72877E-03	1.00078E+00
17	.00000E+00	1.37112E-10	7.94491E-03	1.52643E-02	7.83004E-03	4.84674E-03	-4.73746E-03	1.00044E+00

18	.00000E+00	9.81685E-11	7.42006E-03	1.13022E-02	6.44406E-03	1.16314E-02	-1.06587E-02	1.00018E+00
19	.00000E+00	1.38789E-10	8.50848E-03	2.62845E-02	9.69011E-03	6.64942E-03	-7.85733E-03	1.00038E+00
20	.00000E+00	2.25686E-10	1.12799E-02	1.08306E-01	1.02220E-02	2.50697E-02	-2.40287E-02	1.00048E+00
21	.00000E+00	3.30331E-11	9.90182E-03	2.44678E-02	9.47212E-03	1.95529E-02	-1.91301E-02	1.00024E+00
22	.00000E+00	3.83259E-11	1.35344E-02	5.20389E-02	1.16875E-02	5.69047E-02	-5.50674E-02	1.00014E+00
23	.00000E+00	3.66438E-11	1.71087E-02	1.88300E-01	2.06445E-02	1.25074E-01	-1.28646E-01	1.00025E+00
24	.00000E+00	9.97397E-12	2.48121E-02	1.27301E-01	2.45551E-02	1.29080E-01	-1.28849E-01	1.00017E+00
25	.00000E+00	2.91973E-12	2.09252E-02	4.77306E-02	1.56581E-02	7.13802E-02	-6.61239E-02	1.00012E+00
26	.00000E+00	2.04733E-12	1.01983E-02	3.28529E-02	6.96721E-03	6.43571E-02	-6.11315E-02	1.00008E+00
27	.00000E+00	4.87889E-13	2.17960E-03	4.83590E-03	1.17205E-03	1.78452E-02	-1.68386E-02	1.00005E+00
28	.00000E+00	1.00000E+00	6.37080E-01	5.47681E+00	6.37080E-01	9.35465E-01	6.66139E-02	1.00009E+00

0 grp.	rt bdy flux	rt leakage	lft bdy flux	lft leakage	n2n rate	fiss rate	flux*db**2	total flux
1	1.67756E-01	1.08050E-02	1.72576E-01	.00000E+00	2.20711E-03	2.57414E-03	.00000E+00	1.17512E-01
2	1.26345E+00	1.13914E-01	1.31441E+00	.00000E+00	1.75309E-05	1.17886E-02	.00000E+00	8.90955E-01
3	1.60952E+00	1.44834E-01	1.67305E+00	.00000E+00	.00000E+00	1.45478E-02	.00000E+00	1.13420E+00
4	1.00109E+00	8.77151E-02	1.03912E+00	.00000E+00	.00000E+00	6.29661E-03	.00000E+00	7.04728E-01
5	1.51436E+00	1.33662E-01	1.57395E+00	.00000E+00	.00000E+00	1.85640E-03	.00000E+00	1.06666E+00
6	2.91531E+00	2.51788E-01	3.02941E+00	.00000E+00	.00000E+00	1.67207E-03	.00000E+00	2.05260E+00
7	2.83649E+00	1.42985E-01	2.90442E+00	.00000E+00	.00000E+00	1.69875E-03	.00000E+00	1.97966E+00
8	2.06760E+00	2.06187E-02	2.07959E+00	.00000E+00	.00000E+00	1.77522E-03	.00000E+00	1.42814E+00
9	1.59745E+00	-2.12851E-02	1.58549E+00	.00000E+00	.00000E+00	2.42091E-03	.00000E+00	1.09494E+00
10	1.45689E+00	-2.61936E-02	1.44347E+00	.00000E+00	.00000E+00	5.15569E-03	.00000E+00	9.97681E-01
11	1.33081E+00	-5.60971E-02	1.30199E+00	.00000E+00	.00000E+00	1.07150E-02	.00000E+00	9.04795E-01
12	8.28042E-01	-6.49960E-02	7.94341E-01	.00000E+00	.00000E+00	1.37916E-02	.00000E+00	5.56683E-01
13	7.00716E-01	-5.46259E-02	6.72804E-01	.00000E+00	.00000E+00	1.36260E-02	.00000E+00	4.71522E-01
14	6.36697E-01	-8.06490E-02	5.95112E-01	.00000E+00	.00000E+00	9.17978E-03	.00000E+00	4.21772E-01
15	3.76479E-01	-8.06808E-03	3.72168E-01	.00000E+00	.00000E+00	2.32477E-03	.00000E+00	2.57503E-01
16	2.09521E-01	-4.72877E-03	2.07153E-01	.00000E+00	.00000E+00	1.56920E-03	.00000E+00	1.43309E-01
17	9.10908E-02	-4.75746E-03	8.87581E-02	.00000E+00	.00000E+00	2.20864E-03	.00000E+00	6.17808E-02
18	6.97057E-02	-1.06587E-02	6.42002E-02	.00000E+00	.00000E+00	2.54206E-03	.00000E+00	4.57787E-02
19	1.41515E-01	-7.85733E-03	1.37581E-01	.00000E+00	.00000E+00	3.54318E-03	.00000E+00	9.58691E-02
20	4.64710E-01	-2.40287E-02	4.52738E-01	.00000E+00	.00000E+00	1.69539E-02	.00000E+00	3.15174E-01
21	1.36255E-01	-1.91301E-02	1.26547E-01	.00000E+00	.00000E+00	1.28788E-02	.00000E+00	8.99247E-02
22	2.61969E-01	-5.50674E-02	2.32994E-01	.00000E+00	.00000E+00	3.65695E-02	.00000E+00	1.68760E-01
23	8.39527E-01	-1.28646E-01	7.74383E-01	.00000E+00	.00000E+00	8.32006E-02	.00000E+00	5.51995E-01
24	6.18007E-01	-1.28849E-01	5.52211E-01	.00000E+00	.00000E+00	8.61648E-02	.00000E+00	3.99216E-01
25	2.60964E-01	-6.61239E-02	2.26387E-01	.00000E+00	.00000E+00	4.96836E-02	.00000E+00	1.65841E-01
26	1.68437E-01	-6.11315E-02	1.35701E-01	.00000E+00	.00000E+00	4.56895E-02	.00000E+00	1.02806E-01
27	2.72689E-02	-1.68386E-02	1.74124E-02	.00000E+00	.00000E+00	1.27786E-02	.00000E+00	1.47238E-02
28	2.35914E+01	6.66138E-02	2.35678E+01	.00000E+00	2.22464E-03	4.53208E-01	.00000E+00	1.62343E+01

1fine group summary for zone 2 by group including sum for all groups in line 28

0 grp.	fix source	fiss source	in scatter	slf scatter	out scatter	absorption	leakage	balance
1	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	3.72529E-09	1.00000E+00
2	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	1.49012E-08	1.00000E+00
3	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	2.98023E-08	1.00000E+00
4	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	-7.45058E-09	1.00000E+00
5	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	1.00000E+00
6	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	-5.96046E-08	1.00000E+00
7	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	5.96046E-08	1.00000E+00
8	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	7.45058E-09	1.00000E+00
9	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	-1.11759E-08	1.00000E+00
10	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	6.70552E-08	9.99997E-01
11	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	-2.23517E-08	1.00000E+00
12	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	-1.49012E-08	1.00000E+00
13	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	-7.45058E-09	1.00000E+00
14	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	2.23517E-08	1.00000E+00
15	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	1.00000E+00
16	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	-1.16415E-08	1.00000E+00
17	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	1.86265E-09	1.00000E+00
18	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	-1.86265E-09	1.00000E+00

19	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	2.79397E-09	1.00000E+00
20	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	-2.23517E-08	1.00000E+00
21	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	5.58794E-09	1.00000E+00
22	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	1.00000E+00
23	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	1.49012E-08	1.00000E+00
24	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	-1.49012E-08	1.00000E+00
25	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	1.00000E+00
26	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	3.72529E-09	1.00000E+00
27	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	-1.86265E-09	1.00000E+00
28	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	7.63685E-08	9.99992E-01
0 grp.	rt bdy flux	rt leakage	lft bdy flux	lft leakage	n2n rate	fiss rate	flux*db**2	total flux
1	1.67346E-01	1.08050E-02	1.67756E-01	1.08050E-02	.00000E+00	.00000E+00	.00000E+00	5.31719E-03
2	1.25943E+00	1.13914E-01	1.26345E+00	1.13914E-01	.00000E+00	.00000E+00	.00000E+00	4.00311E-02
3	1.60471E+00	1.44834E-01	1.60952E+00	1.44834E-01	.00000E+00	.00000E+00	.00000E+00	5.10006E-02
4	9.98419E-01	8.77151E-02	1.00109E+00	8.77151E-02	.00000E+00	.00000E+00	.00000E+00	3.17264E-02
5	1.51053E+00	1.33662E-01	1.51436E+00	1.33662E-01	.00000E+00	.00000E+00	.00000E+00	4.79960E-02
6	2.90844E+00	2.51788E-01	2.91531E+00	2.51788E-01	.00000E+00	.00000E+00	.00000E+00	9.24057E-02
7	2.83271E+00	1.42965E-01	2.83649E+00	1.42965E-01	.00000E+00	.00000E+00	.00000E+00	8.99547E-02
8	2.06684E+00	-2.06187E-02	2.06760E+00	2.06187E-02	.00000E+00	.00000E+00	.00000E+00	6.56035E-02
9	1.59822E+00	-2.12831E-02	1.59745E+00	-2.12831E-02	.00000E+00	.00000E+00	.00000E+00	5.07079E-02
10	1.45758E+00	-2.61925E-02	1.45686E+00	-2.61926E-02	.00000E+00	.00000E+00	.00000E+00	4.62456E-02
11	1.33235E+00	-5.60971E-02	1.33081E+00	-5.60971E-02	.00000E+00	.00000E+00	.00000E+00	4.22587E-02
12	8.29870E-01	-6.49960E-02	8.28042E-01	-6.49960E-02	.00000E+00	.00000E+00	.00000E+00	2.63079E-02
13	7.02256E-01	-5.46259E-02	7.00716E-01	-5.46259E-02	.00000E+00	.00000E+00	.00000E+00	2.22625E-02
14	6.38966E-01	-8.06490E-02	6.36697E-01	-8.06490E-02	.00000E+00	.00000E+00	.00000E+00	2.02427E-02
15	3.76710E-01	-8.06808E-03	3.76479E-01	-8.06808E-03	.00000E+00	.00000E+00	.00000E+00	1.19513E-02
16	2.09654E-01	-4.72878E-03	2.09521E-01	-4.72877E-03	.00000E+00	.00000E+00	.00000E+00	6.65134E-03
17	9.12236E-02	-4.73746E-03	9.10908E-02	-4.73746E-03	.00000E+00	.00000E+00	.00000E+00	2.89286E-03
18	7.00070E-02	-1.06587E-02	6.97057E-02	-1.06587E-02	.00000E+00	.00000E+00	.00000E+00	2.21696E-03
19	1.41731E-01	-7.85733E-03	1.41515E-01	-7.85733E-03	.00000E+00	.00000E+00	.00000E+00	4.49438E-03
20	4.65377E-01	-2.40287E-02	4.64710E-01	-2.40287E-02	.00000E+00	.00000E+00	.00000E+00	1.47582E-02
21	1.36779E-01	-1.91301E-02	1.36255E-01	-1.91301E-02	.00000E+00	.00000E+00	.00000E+00	4.33240E-03
22	2.63487E-01	-5.50674E-02	2.61969E-01	-5.50674E-02	.00000E+00	.00000E+00	.00000E+00	8.33838E-03
23	8.42744E-01	-1.28644E-01	8.39327E-01	-1.28644E-01	.00000E+00	.00000E+00	.00000E+00	2.66922E-02
24	6.21380E-01	-1.28849E-01	6.18007E-01	-1.28849E-01	.00000E+00	.00000E+00	.00000E+00	1.96679E-02
25	2.62693E-01	-6.61239E-02	2.60964E-01	-6.61239E-02	.00000E+00	.00000E+00	.00000E+00	8.31006E-03
26	1.69994E-01	-6.11315E-02	1.68437E-01	-6.11315E-02	.00000E+00	.00000E+00	.00000E+00	5.37092E-03
27	2.77020E-02	-1.68385E-02	2.72689E-02	-1.68385E-02	.00000E+00	.00000E+00	.00000E+00	8.72467E-04
28	2.35871E+01	6.66144E-02	2.35914E+01	6.66138E-02	.00000E+00	.00000E+00	.00000E+00	7.48610E-01

1fine group summary for zone 3 by group including sum for all groups in line 28

0 grp.	fix source	fiss source	in scatter	slf scatter	out scatter	absorption	leakage	balance
1	.00000E+00	.00000E+00	.00000E+00	3.68857E-03	2.76490E-03	1.41690E-05	-2.68044E-03	1.00001E+00
2	.00000E+00	.00000E+00	4.82884E-04	2.56625E-02	1.84141E-02	5.09828E-05	-1.79825E-02	1.00000E+00
3	.00000E+00	.00000E+00	2.60917E-03	4.99148E-02	1.57825E-02	1.36521E-04	-1.33089E-02	9.99993E-01
4	.00000E+00	.00000E+00	5.08745E-03	4.19992E-02	5.43799E-03	1.03108E-04	-4.53241E-04	9.99996E-01
5	.00000E+00	.00000E+00	1.09722E-02	8.15405E-02	5.15682E-03	1.51908E-04	5.66314E-03	1.00000E+00
6	.00000E+00	.00000E+00	1.83660E-02	2.34945E-01	3.21000E-03	3.19927E-04	1.48362E-02	9.99999E-01
7	.00000E+00	.00000E+00	1.22417E-02	2.35115E-01	1.18181E-03	3.44647E-04	1.07153E-02	9.99999E-01
8	.00000E+00	.00000E+00	2.15447E-03	1.58474E-01	7.63077E-03	2.94718E-04	-5.77158E-03	1.00002E+00
9	.00000E+00	.00000E+00	7.66388E-03	1.05103E-01	8.76150E-04	1.10829E-03	5.67971E-03	9.99988E-01
10	.00000E+00	.00000E+00	8.77321E-04	8.54438E-02	8.47751E-04	8.34410E-04	-8.04784E-04	9.99998E-01
11	.00000E+00	.00000E+00	8.47812E-04	7.68865E-02	8.68319E-04	1.33410E-03	-1.35452E-03	9.99999E-01
12	.00000E+00	.00000E+00	8.68325E-04	4.67062E-02	8.68953E-04	4.15839E-05	-4.22820E-05	1.00000E+00
13	.00000E+00	.00000E+00	8.68954E-04	3.95406E-02	8.06602E-04	6.00341E-05	2.37301E-06	9.99999E-01
14	.00000E+00	.00000E+00	8.06602E-04	3.62159E-02	6.82493E-04	9.64626E-05	2.76342E-05	1.00000E+00
15	.00000E+00	.00000E+00	7.26961E-04	2.07254E-02	8.48221E-04	8.32306E-05	-2.03991E-04	9.99944E-01
16	.00000E+00	.00000E+00	9.51757E-04	1.10438E-02	9.56740E-04	5.20408E-05	-5.66542E-05	9.99936E-01
17	.00000E+00	.00000E+00	1.05252E-03	4.20045E-03	1.03395E-03	2.53759E-05	-6.76839E-06	9.99995E-01
18	.00000E+00	.00000E+00	1.09083E-03	3.06237E-03	9.88825E-04	2.09709E-05	8.10549E-05	9.99999E-01
19	.00000E+00	.00000E+00	1.01046E-03	7.08879E-03	1.04589E-03	4.59256E-05	-8.12821E-05	9.99992E-01

20	.00000E+00	.00000E+00	1.26042E-03	2.56127E-02	1.08889E-03	1.90432E-04	-1.80267E-05	9.99965E-01
21	.00000E+00	.00000E+00	1.40802E-03	6.38091E-03	1.52417E-03	7.02981E-05	-1.86367E-04	9.99996E-01
22	.00000E+00	.00000E+00	1.92587E-03	1.35088E-02	1.80541E-03	1.57402E-04	-3.65935E-05	9.99994E-01
23	.00000E+00	.00000E+00	2.57550E-03	4.53980E-02	3.33297E-03	6.87511E-04	-1.44492E-03	1.00000E+00
24	.00000E+00	.00000E+00	4.07022E-03	3.17198E-02	4.35306E-03	7.38901E-04	-1.02194E-03	1.00000E+00
25	.00000E+00	.00000E+00	3.91555E-03	1.21607E-02	3.13000E-03	4.13616E-04	3.71881E-04	1.00000E+00
26	.00000E+00	.00000E+00	1.62904E-03	8.79963E-03	1.16289E-03	3.84246E-04	8.19713E-05	9.99999E-01
27	.00000E+00	.00000E+00	3.37200E-04	1.64945E-03	8.49857E-07	1.20642E-04	2.15705E-04	1.00000E+00
28	.00000E+00	.00000E+00	8.58011E-02	1.41259E+00	8.58010E-02	7.88144E-03	-7.77970E-03	9.99986E-01

0 grp.	rt bdy flux	rt leakage	lft bdy flux	lft leakage	r2n rate	fiss rate	flux*db**2	total flux
1	1.65766E-01	8.12654E-03	1.67346E-01	1.08050E-02	9.87871E-05	.00000E+00	.00000E+00	3.60633E-02
2	1.24208E+00	9.59318E-02	1.25943E+00	1.13914E-01	.00000E+00	.00000E+00	.00000E+00	2.70809E-01
3	1.58170E+00	1.31526E-01	1.60471E+00	1.44834E-01	.00000E+00	.00000E+00	.00000E+00	3.45043E-01
4	9.85810E-01	8.72619E-02	9.98419E-01	8.77151E-02	.00000E+00	.00000E+00	.00000E+00	2.14720E-01
5	1.48743E+00	1.39825E-01	1.51053E+00	1.33662E-01	.00000E+00	.00000E+00	.00000E+00	3.24804E-01
6	2.86271E+00	2.66624E-01	2.90844E+00	2.51788E-01	.00000E+00	.00000E+00	.00000E+00	6.25312E-01
7	2.80637E+00	1.53681E-01	2.85271E+00	1.42965E-01	.00000E+00	.00000E+00	.00000E+00	6.11044E-01
8	2.05374E+00	1.48471E-02	2.06684E+00	2.06187E-02	.00000E+00	.00000E+00	.00000E+00	4.47523E-01
9	1.60140E+00	-1.56034E-02	1.59822E+00	-2.12831E-02	.00000E+00	.00000E+00	.00000E+00	3.46788E-01
10	1.46198E+00	-2.69973E-02	1.45758E+00	-2.61925E-02	.00000E+00	.00000E+00	.00000E+00	3.16386E-01
11	1.34164E+00	-5.74517E-02	1.33235E+00	-5.60971E-02	.00000E+00	.00000E+00	.00000E+00	2.89800E-01
12	8.40460E-01	-6.50889E-02	8.29870E-01	-6.49960E-02	.00000E+00	.00000E+00	.00000E+00	1.81063E-01
13	7.11196E-01	-5.46235E-02	7.02256E-01	-5.46259E-02	.00000E+00	.00000E+00	.00000E+00	1.53217E-01
14	6.52118E-01	-8.06213E-02	6.38966E-01	-8.06490E-02	.00000E+00	.00000E+00	.00000E+00	1.39989E-01
15	3.78128E-01	-8.27207E-03	3.76710E-01	-8.06808E-03	.00000E+00	.00000E+00	.00000E+00	8.18008E-02
16	2.10436E-01	-4.78543E-03	2.09654E-01	-4.72878E-03	.00000E+00	.00000E+00	.00000E+00	4.55262E-02
17	9.19909E-02	-4.74423E-03	9.12256E-02	-4.73746E-03	.00000E+00	.00000E+00	.00000E+00	1.98676E-02
18	7.17207E-02	-1.05777E-02	7.00070E-02	-1.06587E-02	.00000E+00	.00000E+00	.00000E+00	1.53689E-02
19	1.43004E-01	-7.91861E-03	1.41731E-01	-7.85733E-03	.00000E+00	.00000E+00	.00000E+00	3.08603E-02
20	4.69219E-01	-2.40467E-02	4.65377E-01	-2.40287E-02	.00000E+00	.00000E+00	.00000E+00	1.01297E-01
21	1.39818E-01	-1.93165E-02	1.36779E-01	-1.91301E-02	.00000E+00	.00000E+00	.00000E+00	2.99895E-02
22	2.72111E-01	-5.51040E-02	2.63487E-01	-5.50674E-02	.00000E+00	.00000E+00	.00000E+00	5.80974E-02
23	8.62108E-01	-1.30090E-01	8.42744E-01	-1.28646E-01	.00000E+00	.00000E+00	.00000E+00	1.84879E-01
24	6.39951E-01	-1.29871E-01	6.21380E-01	-1.28849E-01	.00000E+00	.00000E+00	.00000E+00	1.36835E-01
25	2.71783E-01	-6.57520E-02	2.62693E-01	-6.61239E-02	.00000E+00	.00000E+00	.00000E+00	5.80097E-02
26	1.77959E-01	-6.10495E-02	1.69994E-01	-6.11315E-02	.00000E+00	.00000E+00	.00000E+00	3.77959E-02
27	2.98025E-02	-1.66228E-02	2.77020E-02	-1.68385E-02	.00000E+00	.00000E+00	.00000E+00	6.26071E-03
28	2.35604E+01	5.88338E-02	2.35871E+01	6.66144E-02	9.87871E-05	.00000E+00	.00000E+00	5.10913E+00

1fine group summary for zone 4 by group including sum for all groups in line 28

0 grp.	fix source	fiss source	in scatter	slf scatter	out scatter	absorption	leakage	balance
1	.00000E+00	.00000E+00	.00000E+00	5.82799E-03	7.71383E-03	4.11113E-04	-8.12454E-03	9.99950E-01
2	.00000E+00	.00000E+00	4.42605E-03	7.55509E-02	9.92978E-02	1.06390E-03	-9.59318E-02	9.99962E-01
3	.00000E+00	.00000E+00	4.70913E-02	6.86507E-02	1.78616E-01	5.39586E-06	-1.31526E-01	9.99977E-01
4	.00000E+00	.00000E+00	6.98545E-02	4.57275E-02	1.57115E-01	3.22207E-06	-8.72619E-02	9.99988E-01
5	.00000E+00	.00000E+00	1.29337E-01	1.48258E-01	2.68661E-01	3.76995E-06	-1.39525E-01	9.99991E-01
6	.00000E+00	.00000E+00	2.74231E-01	4.55062E-01	5.40845E-01	1.14712E-05	-2.66624E-01	9.99998E-01
7	.00000E+00	.00000E+00	5.52150E-01	7.94902E-01	7.05814E-01	2.53428E-05	-1.53680E-01	9.99987E-01
8	.00000E+00	.00000E+00	7.35133E-01	1.00024E+00	7.50000E-01	4.69800E-05	-1.48472E-02	9.99912E-01
9	.00000E+00	.00000E+00	7.40301E-01	9.15111E-01	7.24684E-01	9.58075E-05	1.56033E-02	9.99889E-01
10	.00000E+00	.00000E+00	7.21457E-01	8.63964E-01	6.94323E-01	2.11105E-04	2.69973E-02	9.99896E-01
11	.00000E+00	.00000E+00	6.99386E-01	8.03544E-01	6.41518E-01	4.56312E-04	5.74516E-02	9.99941E-01
12	.00000E+00	.00000E+00	5.58562E-01	4.18944E-01	4.92959E-01	5.96109E-04	6.50383E-02	9.99979E-01
13	.00000E+00	.00000E+00	4.88879E-01	3.37930E-01	4.33372E-01	8.97617E-04	5.46235E-02	9.99970E-01
14	.00000E+00	.00000E+00	4.69941E-01	3.24681E-01	3.87864E-01	1.46941E-03	8.06213E-02	9.99988E-01
15	.00000E+00	.00000E+00	2.52365E-01	1.29599E-01	2.42791E-01	1.29130E-03	8.27416E-03	9.99994E-01
16	.00000E+00	.00000E+00	1.67564E-01	5.49505E-02	1.61889E-01	8.89502E-04	4.78708E-03	9.99990E-01
17	.00000E+00	.00000E+00	8.66306E-02	1.56546E-02	8.14500E-02	4.37270E-04	4.74087E-03	1.00003E+00
18	.00000E+00	.00000E+00	7.70199E-02	1.20920E-02	6.60731E-02	3.69968E-04	1.05744E-02	1.00003E+00
19	.00000E+00	.00000E+00	1.28594E-01	3.61216E-02	1.19885E-01	7.91748E-04	7.91324E-03	1.00003E+00
20	.00000E+00	.00000E+00	3.15825E-01	2.55175E-01	2.88510E-01	3.26458E-03	2.40503E-02	9.99999E-01

21	.00000E+00	.00000E+00	1.50480E-01	4.99443E-02	1.29928E-01	1.23751E-03	1.93081E-02	1.00004E+00
22	.00000E+00	.00000E+00	2.88144E-01	1.47940E-01	2.30226E-01	2.81206E-03	5.51076E-02	9.99993E-01
23	.00000E+00	.00000E+00	6.95248E-01	8.39165E-01	5.51057E-01	1.20981E-02	1.30090E-01	1.00001E+00
24	.00000E+00	.00000E+00	7.09544E-01	7.33724E-01	5.66368E-01	1.33018E-02	1.29869E-01	1.00001E+00
25	.00000E+00	.00000E+00	4.56601E-01	2.97857E-01	3.83194E-01	7.55472E-03	6.57505E-02	1.00000E+00
26	.00000E+00	.00000E+00	3.59984E-01	3.15751E-01	2.91638E-01	7.29449E-03	6.10573E-02	9.99983E-01
27	.00000E+00	.00000E+00	1.19468E-01	6.58655E-02	1.00339E-01	2.50622E-03	1.66230E-02	9.99998E-01
28	.00000E+00	.00000E+00	9.29610E+00	9.21227E+00	9.29610E+00	5.91468E-02	-5.88402E-02	9.99967E-01

0 grp.	rt bdy flux	rt leakage	lft bdy flux	lft leakage	n2n rate	fiss rate	flux*db**2	total flux
1	1.64997E-01	2.10805E-09	1.65766E-01	8.12454E-03	4.26597E-10	.00000E+00	.00000E+00	1.88841E-01
2	1.23071E+00	-4.87721E-08	1.24208E+00	9.59318E-02	.00000E+00	.00000E+00	.00000E+00	1.40909E+00
3	1.56413E+00	-3.94333E-09	1.58170E+00	1.31526E-01	.00000E+00	.00000E+00	.00000E+00	1.79140E+00
4	9.70670E-01	2.16520E-08	9.85810E-01	8.72619E-02	.00000E+00	.00000E+00	.00000E+00	1.11211E+00
5	1.46501E+00	-2.23687E-08	1.48743E+00	1.39525E-01	.00000E+00	.00000E+00	.00000E+00	1.67885E+00
6	2.81868E+00	2.37695E-07	2.86271E+00	2.66624E-01	.00000E+00	.00000E+00	.00000E+00	3.23018E+00
7	2.78100E+00	1.75571E-07	2.80637E+00	1.53681E-01	.00000E+00	.00000E+00	.00000E+00	3.18488E+00
8	2.06382E+00	-1.20095E-07	2.06374E+00	1.48471E-02	.00000E+00	.00000E+00	.00000E+00	2.36139E+00
9	1.60356E+00	-4.92143E-08	1.60140E+00	-1.56034E-02	.00000E+00	.00000E+00	.00000E+00	1.83519E+00
10	1.46680E+00	-6.01523E-08	1.46198E+00	-2.69973E-02	.00000E+00	.00000E+00	.00000E+00	1.67842E+00
11	1.35177E+00	-4.26168E-08	1.34164E+00	-5.74517E-02	.00000E+00	.00000E+00	.00000E+00	1.54634E+00
12	8.51598E-01	-1.92106E-08	8.40460E-01	-6.50883E-02	.00000E+00	.00000E+00	.00000E+00	9.73852E-01
13	7.20153E-01	-1.56201E-09	7.11196E-01	-5.46235E-02	.00000E+00	.00000E+00	.00000E+00	8.23711E-01
14	6.65674E-01	1.05850E-08	6.52118E-01	-8.06213E-02	.00000E+00	.00000E+00	.00000E+00	7.60959E-01
15	3.78673E-01	2.09122E-06	3.78128E-01	-8.27207E-03	.00000E+00	.00000E+00	.00000E+00	4.33663E-01
16	2.10948E-01	1.64750E-06	2.10436E-01	-4.78543E-03	.00000E+00	.00000E+00	.00000E+00	2.41509E-01
17	9.27525E-02	-3.35600E-06	9.19909E-02	-4.74423E-03	.00000E+00	.00000E+00	.00000E+00	1.06115E-01
18	7.36155E-02	-3.21498E-06	7.17207E-02	-1.05777E-02	.00000E+00	.00000E+00	.00000E+00	8.40789E-02
19	1.44266E-01	-5.37192E-06	1.43004E-01	-7.91861E-03	.00000E+00	.00000E+00	.00000E+00	1.65046E-01
20	4.73085E-01	3.61124E-06	4.69219E-01	-2.40467E-02	.00000E+00	.00000E+00	.00000E+00	5.41245E-01
21	1.43393E-01	-8.45319E-06	1.39818E-01	-1.93165E-02	.00000E+00	.00000E+00	.00000E+00	1.63776E-01
22	2.82465E-01	3.57357E-06	2.72111E-01	-5.51040E-02	.00000E+00	.00000E+00	.00000E+00	3.22299E-01
23	8.89289E-01	-5.71100E-07	8.62108E-01	-1.30090E-01	.00000E+00	.00000E+00	.00000E+00	1.01456E+00
24	6.71217E-01	-2.53733E-06	6.39951E-01	-1.29871E-01	.00000E+00	.00000E+00	.00000E+00	7.63641E-01
25	2.89473E-01	-1.55391E-06	2.71783E-01	-6.57520E-02	.00000E+00	.00000E+00	.00000E+00	3.28362E-01
26	1.97659E-01	7.83225E-06	1.77959E-01	-6.10495E-02	.00000E+00	.00000E+00	.00000E+00	2.22404E-01
27	3.65267E-02	2.27438E-07	2.98025E-02	-1.66228E-02	.00000E+00	.00000E+00	.00000E+00	4.03129E-02
28	2.36019E+01	-5.96958E-06	2.35604E+01	5.88338E-02	4.26597E-10	.00000E+00	.00000E+00	2.70022E+01

1fine group summary for system

0 grp.	fix source	fiss source	in scatter	slf scatter	out scatter	absorption	leakage	balance
1	.00000E+00	2.19649E-02	.00000E+00	2.18660E-02	2.07350E-02	3.56436E-03	2.10805E-09	9.98825E-01
2	.00000E+00	1.90919E-01	7.17069E-03	2.66643E-01	1.83451E-01	1.46527E-02	-4.87721E-08	1.00002E+00
3	.00000E+00	2.15337E-01	7.56396E-02	2.79053E-01	2.75267E-01	1.57133E-02	-3.94333E-09	9.99987E-01
4	.00000E+00	1.24201E-01	1.13674E-01	1.92747E-01	2.30324E-01	7.55087E-03	2.16520E-08	1.00000E+00
5	.00000E+00	1.65227E-01	2.07976E-01	4.89008E-01	3.68584E-01	4.62399E-03	-2.23687E-08	9.99986E-01
6	.00000E+00	1.78924E-01	4.26992E-01	1.34375E+00	5.98476E-01	7.43082E-03	2.37695E-07	1.00001E+00
7	.00000E+00	8.86746E-02	6.62744E-01	1.77541E+00	7.43336E-01	8.09134E-03	1.75571E-07	9.99986E-01
8	.00000E+00	1.36799E-02	7.79858E-01	1.78977E+00	7.79111E-01	1.44898E-02	-1.20095E-07	9.99921E-01
9	.00000E+00	9.93164E-04	7.69667E-01	1.55496E+00	7.46198E-01	2.45449E-02	-4.92143E-08	9.99893E-01
10	.00000E+00	7.37715E-05	7.42994E-01	1.40792E+00	7.05827E-01	3.73147E-02	-6.01523E-08	9.99900E-01
11	.00000E+00	5.80390E-06	7.10890E-01	1.29941E+00	6.50499E-01	6.04375E-02	-4.26168E-08	9.99942E-01
12	.00000E+00	4.07714E-07	5.67543E-01	7.02662E-01	5.03155E-01	6.44037E-02	-1.92106E-08	9.99974E-01
13	.00000E+00	6.47414E-08	4.99094E-01	5.53120E-01	4.40338E-01	5.87703E-02	-1.56201E-09	9.99971E-01
14	.00000E+00	1.28300E-08	4.76506E-01	5.12730E-01	3.96034E-01	8.08780E-02	1.05850E-08	9.99986E-01
15	.00000E+00	1.44993E-09	2.60667E-01	2.35696E-01	2.52587E-01	8.06416E-03	2.09122E-06	1.00005E+00
16	.00000E+00	4.25751E-10	1.77642E-01	1.09393E-01	1.72583E-01	5.04761E-03	1.64750E-06	1.00005E+00
17	.00000E+00	1.37112E-10	9.56281E-02	3.51198E-02	9.03140E-02	5.30938E-03	-3.35600E-06	1.00008E+00
18	.00000E+00	9.81685E-11	8.55308E-02	2.64566E-02	7.35059E-02	1.20225E-02	-3.21495E-06	1.00007E+00
19	.00000E+00	1.38789E-10	1.38113E-01	6.94949E-02	1.30621E-01	7.48710E-03	-5.37192E-06	1.00008E+00
20	.00000E+00	2.25686E-10	3.28365E-01	3.89095E-01	2.99821E-01	2.85247E-02	3.61124E-06	1.00005E+00
21	.00000E+00	3.30331E-11	1.61790E-01	8.07930E-02	1.40925E-01	2.08608E-02	-8.45319E-06	1.00008E+00