

Waste Package Development
Civilian Radioactive Waste Management System
Management & Operating Contractor

MGDS
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DESIGN ANALYSIS

Title: **Probabilistic Criticality Consequence Evaluation**
(SCPB: N/A)

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Attachments Volume I

Derivation of Power-Temperature Relationship for External Criticality

The following formulas are valid in any consistent set of units. However SI (or MKS) is recommended, for which the units of distance is meters, temperature is Kelvin or Centigrade, and thermal conductivity is W/m·C.

The heat conduction equation in spherical coordinates, assuming spherical symmetry so that the derivatives with respect to angle are zero, and the system is in a steady state, is given in Reference 5.14, p. 6, Eq. 1-3(c):

$$\frac{1}{r} \frac{d^2}{dr^2}(rT) = -\frac{\dot{q}}{k},$$

where \dot{q} is the power (heat generation rate) per unit volume and k is the thermal conductivity. Three forms of the solution are of interest:

Outside a sphere

There are no heat sources outside the sphere, so the right side of the heat conduction equation is zero. The solution is of the form:

$$T = c_1 + c_2/r.$$

This assumes a fixed temperature at large distances from the sphere, $c_1 = T_\infty$.

At the surface of the sphere, the temperature gradient is determined by the heat outflow per unit area. If the power generated inside the sphere is P , the boundary condition at the surface of the sphere ($r=R$) becomes:

$$\left. \frac{dT}{dr} \right|_{r=R} = -\frac{P}{4\pi k R^2},$$

which is satisfied if $c_2 = P/(4\pi k)$, so that the solution outside the sphere becomes:

$$T = T_\infty + P/(4k\pi r),$$

so that the temperature at the surface is determined by the temperature at infinity and the total power generated within the sphere as:

$$T_s = T_\infty + P/(4k\pi R).$$

Inside a sphere which is homogeneously heated

If the total power generated is P , homogeneously distributed in a sphere of radius R , the power per unit volume is $3P/(4\pi R^3)$. Integrating the heat conduction equation gives the solution:

$$T = T_s + P(1-r^2/R^2)/(8k\pi R),$$

where the two integration constants have been determined by the conditions that the temperature be finite at the center of the sphere ($r=0$) and that the temperature at the surface ($r=R$) be T_s .

The average temperature is computed by multiplying by $4\pi r^2$ and integrating from $r=0$ to $r=R$, and dividing the result by the volume of the sphere, $4\pi R^3/3$, to get:

$$T_{av} = T_s + P/(20k\pi R).$$

Inside a sphere with parabolic power density

The parabolic power density normalized to integrate to the total power P through the volume of a sphere of radius R is:

$$15P(1-r^2/R^2)/(8\pi R^3).$$

Using this power density on the right side of the heat conduction equation leads to the solution:

$$T = T_s + 7P/(32k\pi R) - 15P[r^2/(6R^2) - r^4/(20R^4)]/(8k\pi R),$$

where the two integration constants have been determined in the same manner as for the homogeneously heated case described above. Averaging this form over the sphere gives:

$$T_{av} = T_s + P/(14k\pi R).$$

SAS2H Number Density Worksheet: Consequence Analysis - Internal Criticality

Time Effects Curve
BURNUP: PWR 20 GWd/MT
ENRICHMENT: 3.00%
DECAY TIME: 15,000 YEARS
PWR B&W 15x15, 3.00% , Burnup 20 GWd/MTHM
DECAY TIME: 15,000 YEARS
Volume 51575.24 pwr 3.0% 20 G

Number Density = (mass/assembly) / (volume) * (Na) / (Aw) * correction to 96% density for fresh fu
Avogadro's Number [Na 0.602252
Atomic Weight [Aw]
Volume= Pi X .468122 X .468122 X 360.172 X 208
= 51575.24
SAS2H UO2 density=10.206
Correction to 96% density
1.0309278
(REF. 5.43)

Isotope List:

Table with columns: Element, Symbol, Isotope, MCNP ID, Atomic Wei, ORIGINS ID. Lists isotopes from Oxygen to Xenon.

Table with columns: ISOTOPE, GRAMS/, fraction, Aw, MCNP ID, Number Density. Lists isotopes and their properties.

Table with columns: ISOTOPE, GRAMS/, %, Aw, MCNP ID, Number Density. Lists isotopes and their properties.

Number Density = grams/assembly / Assembly Volume * Avagadro's Number / Atomic Weight
* (Density Correction to 96% TD) * (Isotopic Correction Factor)

For Time Effects Cases, the Isotopic Correction Factor is set to 1.0.

Number Density Calculation for 26 volume% Fe2O3 in Water
density of Fe2O3 is 5.24 g/cc from Handbook of Chemistry and Physics (Ref. 5.17)

Note: O is O-16 66 Edition, page B-104
AW of Fe= 55.847 AW of O= 15.99492 from Nuclear Chemical Engineering (Ref. 5.43)

Molecular Density = 5.24 X .602252 / (2x55.847 + 3x15.9949)
= 0.019763 ND for 26%
ND of Fe=2x.019762= 0.039527 0.010277
ND of O=3x.019762= 0.05929 0.0154155

Water Number Density
ND of H= 0.066878 from Material Compositions and Number Densities...
ND of O= 0.033439 BBA000000-01717-0200-00002 Rev 00

H ND for 74% 0.0494897
O 0.0247449

Total ND for O = .024745+.015414= 0.040160

B-10 Number Density (Assume no volume offset)
mass of B= 30.474 kg from Second WP Probabilistic Criticality Analysis...
void space 5.714E6 cc BBA000000-01717-2200-00005 REV 00 (Ref. 5.54)

AW of B-10 10.0129 from page I-10 of Material Compositions and Number Densities...
WT Fractio .288/1.6= 0.18 BBA000000-01717-0200-00002 Rev 00 (Ref. 5.5)

ND of B-10=30.474E3*.18/5.714E6*.602252/10.0129= 5.7740E-05
ND for 5% 2.8870E-06

TOTAL ND =sum of O, Fe, H, B-10 0.09993

mass density=1.00x.74 + 5.24x.26= 2.1024

sm151	0.00E+00	0.000%	1	150.9199	62151.50C	0.0000E+00
eu151	6.22E+00	0.001%	1	150.9198	63151.55C	4.9615E-07
sm152	3.74E+01	0.007%	1	151.9198	62152.50C	2.9636E-06
eu153	2.70E+01	0.005%	1	152.9212	63153.55C	2.1255E-06
gd155	3.18E+00	0.001%	1	154.9227	64155.50C	2.4710E-07
gd157	3.11E-02	0.000%	1	156.924	64157.50C	2.3858E-09
cd(113)	1.77E+01	0.003%	1	112.4	48000.50C	1.8989E-06
xe131	1.38E+02	0.027%	1	130.9051	54131.50C	1.2691E-05
cs133	3.41E+02	0.066%	1	132.9054	55133.50C	3.0887E-05
u233	2.43E+00	0.000%	1	233.0395	92233.50C	1.2553E-07
u234	1.07E+02	0.021%	1	234.0409	92234.50C	5.5037E-06
u235	7.21E+03	1.391%	1	235.0439	92235.50C	3.6928E-04
u236	1.94E+03	0.374%	1	236.0456	92236.50C	9.8940E-05
u238	4.42E+05	85.304%	1	238.0508	92238.50C	2.2352E-02
np237	5.41E+02	0.104%	1	237.0481	93237.55C	2.7474E-05
pu238	0.00E+00	0.000%	1	238.0495	94238.50C	0.0000E+00
pu239	1.72E+03	0.332%	1	239.0521	94239.55C	8.6617E-05
pu240	1.38E+02	0.027%	1	240.0539	94240.50C	6.9205E-06
pu241	2.24E-05	0.000%	1	241.0567	94241.50C	1.1186E-12
pu242	6.89E+01	0.013%	1	242.0587	94242.50C	3.4266E-06
am241	7.04E-04	0.000%	1	241.0567	95241.50C	3.5158E-11
am242m	0.00E+00	0.000%	1	242.0595	95242.50C	0.0000E+00
am243	2.46E+00	0.000%	1	243.0614	95243.50C	1.2184E-07
total	518148.1	100.00%			Total	7.010280E-02

oxygen mass/assembly = 464000 g UO / (1-11.8503E-2) * 11.8503E-2 fraction of O in UO2
62377.29
Effective density = 10.04645

Time Effects Curve

BURNUP:	PWR 20 Gwd/MT	PWR B&W 15x15, 3.00% , Burnup 20 Gwd/MTHM
ENRICHMENT:	3.00%	DECAY TIME: 15000 YEARS
DECAY TIME:	15000 YEARS	Volume 51575.24 pwr 3.0% 20 Gwd/MT
CRITICALITY	DURATION 1000 Years	1000 yr crit
ISOTOPE	GRAMS/ %	Aw MCNP ID Number Density
O 16	62377.29 0.120385	1 15.99492 8016.50C 4.6947E-02
mo 95	225 0.000434	1 94.90584 42095.50C 2.8540E-05
tc 99	220 0.000425	1 98.90628 43099.50C 2.6777E-05
ru101	219 0.000423	1 100.9056 44101.50C 2.6127E-05
rh103	144 0.000278	1 102.9055 45103.50C 1.6846E-05
ag109	21.9 0.000042	1 108.9048 47109.50C 2.4208E-06
nd143	270 0.000521	1 142.9098 60143.50C 2.2744E-05
nd145	2.04E+02 0.039%	1 144.9125 60145.50C 1.6947E-05
sm147	9.01E+01 0.017%	1 146.9149 62147.50C 7.3829E-06
sm149	1.18E+00 0.000%	1 148.9172 62149.50C 9.5390E-08
sm150	8.08E+01 0.016%	1 149.9173 62150.50C 6.4882E-06
sm151	3.01E-02 0.000%	1 150.9199 62151.50C 2.4010E-09
eu151	6.12E+00 0.001%	1 150.9198 63151.55C 4.8817E-07
sm152	3.75E+01 0.007%	1 151.9198 62152.50C 2.9715E-06
eu153	2.71E+01 0.005%	1 152.9212 63153.55C 2.1334E-06
gd155	2.73E+00 0.001%	1 154.9227 64155.50C 2.1214E-07
gd157	2.36E-02 0.000%	1 156.924 64157.50C 1.8105E-09
cd(113)	1.78E+01 0.003%	1 112.4 48000.50C 1.9107E-06
xe131	1.38E+02 0.027%	1 130.9051 54131.50C 1.2691E-05
cs133	3.42E+02 0.066%	1 132.9054 55133.50C 3.0978E-05
u233	2.58E+00 0.000%	1 233.0395 92233.50C 1.3328E-07
u234	1.08E+02 0.021%	1 234.0409 92234.50C 5.5552E-06
u235	7.23E+03 1.395%	1 235.0439 92235.50C 3.7030E-04
u236	1.96E+03 0.378%	1 236.0456 92236.50C 9.9960E-05

inp=a26xb5c outp=a26xb5c0

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1- AUCF - B&W 15x15 FUEL,21 ASSEMBLY DBF CS/SS-B Corroded & collapsed - (a26xb5c)
2- C Advanced Uncanistered Fuel Waste Package, collapsed basket 10k 26%/5%B
3- C 15000 year decay 0 yr criticality
4- C CELL SPECIFICATIONS
5- C Assembly Sub-lattices - 1/2 Model
6- 1 0 1 3 -13 -20 FILL=1 (0 -74 0) IMP:N=1
7- C 1 0 1 3 -4 -13 -20 FILL=1 (0 -73.8 0) IMP:N=1
8- C 2 0 3 4 -5 -13 -20 FILL=1 (0 -73.8 0) IMP:N=1
9- C 3 0 3 5 -13 -20 FILL=1 (0 -73.8 0) IMP:N=1
10- C Assembly Sub-lattices - 1/4 Model
11- C 1 0 1 2 3 -4 -13 -20 FILL=1 (0 -12.3 0) IMP:N=1
12- C 2 0 2 3 4 -5 -13 -20 FILL=1 (0 -12.3 0) IMP:N=1
13- C 3 0 2 3 5 -13 -20 FILL=1 (0 -12.3 0) IMP:N=1
14- C ASSEMBLY LATTICE DESCRIPTION
15- 5 1 -2.1024 -61 60 -63 62 IMP:N=1 LAT=1 U=1
16- FILL=0:3 0:7 0:0 1 1 1 1 56 56 1 1 56 56 1 1
17- 56 56 56 1 56 56 56 1 56 56 1 1
18- 1 1 1 1 1 1 1 1 $ 1/2 model
19- C 5 1 -2.1024 60 -61 62 -63 IMP:N=1 LAT=1 U=1
20- C FILL=0:3 0:3 0:0 58 58 64 70 58 58 62 70
21- C 60 62 70 1 70 70 1 1 $ 1/4 model
22- C BARRIER CELLS
23- C Basket Material-Lid Gap
24- 76 3 -1.0000 1 -20 13 -14 IMP:N=1 $ 1/2 model
25- C 76 1 -2.1024 1 2 -20 13 -14 IMP:N=1 $ 1/4 model
26- C Inner Barrier
27- 77 5 -8.1400 1 3 20 -21 -14 IMP:N=1 $ 1/2 model
28- C 77 5 -8.1400 1 2 3 20 -21 -14 IMP:N=1 $ 1/4 model
29- C Inner Lid
30- 78 5 -8.1400 1 14 -15 -21 IMP:N=1 $ 1/2 model
31- C 78 5 -8.1400 1 2 14 -15 -21 IMP:N=1 $ 1/4 model
32- C Gap between Inner and Outer Barrier Lids
33- 79 3 -1.0000 1 15 -16 -21 IMP:N=1 $ 1/2 model
34- C 79 1 -2.1024 1 2 15 -16 -21 IMP:N=1 $ 1/4 model
35- C Gap between Inner and Outer Barriers
36- 80 3 -1.0000 21 -22 1 3 -16 IMP:N=1 $ 1/2 model
37- C 80 1 -2.1024 21 -22 1 2 3 -16 IMP:N=1 $ 1/4 model
38- C Outer Barrier
39- 81 7 -7.8320 22 -24 1 3 -16 IMP:N=1 $ 1/2 model
40- C 81 7 -7.8320 22 -24 1 2 3 -16 IMP:N=1 $ 1/4 model
41- C Outer Barrier Lid
42- 82 7 -7.8320 1 -24 16 -17 IMP:N=1 $ 1/2 model
43- C 82 7 -7.8320 1 2 -24 16 -17 IMP:N=1 $ 1/4 model
44- C 12" of Water around Container
45- 83 3 -1.0000 24 -25 1 3 -17 IMP:N=1 $ 1/2 model
46- C 83 1 -2.1024 24 -25 1 2 3 -17 IMP:N=1 $ 1/4 model
47- C 12" of Water above Container
48- 84 3 -1.0000 17 -19 1 -25 IMP:N=1 $ 1/2 model
49- C 84 1 -2.1024 17 -58 1 2 -59 IMP:N=1 $ 1/4 model
50- C OUTSIDE WORLD
51- 85 0 -1:-3:19:25 IMP:N=0 $ 1/2 model
52- C 85 0 -1:-2:-3:19:25 IMP:N=0 $ 1/4 model
53- C WET PIN LATTICE DESCRIPTION
54- 86 1 -2.1024 -26 27 -28 29 IMP:N=1 LAT=1 U=56
55- FILL -8:8 -8:8 0:0 56 16R 56 2 14R 56 56 2 14R 56
56- 56 2 4R 4 2 2R 4 2 4R 56

```

u238	4.42E+05	85.304%	1	238.0508	92238.50C	2.2352E-02
np237	5.41E+02	0.104%	1	237.0481	93237.55C	2.7474E-05
pu238	1.69E-01	0.000%	1	238.0495	94238.50C	8.5464E-09
pu239	1.68E+03	0.324%	1	239.0521	94239.55C	8.4602E-05
pu240	1.30E+02	0.025%	1	240.0539	94240.50C	6.5193E-06
pu241	3.14E-02	0.000%	1	241.0567	94241.50C	1.5681E-09
pu242	6.86E+01	0.013%	1	242.0587	94242.50C	3.4117E-06
am241	7.54E-01	0.000%	1	241.0567	95241.50C	3.7655E-08
am242m	1.90E-04	0.000%	1	242.0595	95242.50C	9.4492E-12
am243	2.40E+00	0.000%	1	243.0614	95243.50C	1.1887E-07
total	518148.1	100.00%			Total	7.010317E-02

oxygen mass/assembly = 464000 g UO / (1-11.8503E-2) * 11.8503E-2 fraction of O in UO2
62377.29

Effective density = 10.04645

Time Effects Curve

BURNUP:	PWR 20 GWd/MT	PWR B&W 15x15, 3.00%	Burnup 20 GWd/MTHM		
ENRICHMENT:	3.00%		DECAY TIME: 15000 YEARS		
DECAY TIME:	15000 YEARS	Volume 51575.24	pwr 3.0%		
CRITICALITY	DURATION 5000 Years		20 GWd/MT		
ISOTOPE	GRAMS/	%	Aw		
			MCNP ID		
			Number		
			Density		
O 16	62377.29	0.120385	1 15.99492	8016.50C	4.6947E-02
mo 95	229	0.000442	1 94.90584	42095.50C	2.9047E-05
tc 99	220	0.000425	1 98.90628	43099.50C	2.6777E-05
ru101	223	0.00043	1 100.9056	44101.50C	2.6604E-05
rh103	145	0.00028	1 102.9055	45103.50C	1.6963E-05
ag109	22.2	0.000043	1 108.9048	47109.50C	2.4540E-06
nd143	273	0.000527	1 142.9098	60143.50C	2.2997E-05
nd145	2.07E+02	0.040%	1 144.9125	60145.50C	1.7196E-05
sm147	9.16E+01	0.018%	1 146.9149	62147.50C	7.5058E-06
sm149	7.88E-01	0.000%	1 148.9172	62149.50C	6.3701E-08
sm150	8.21E+01	0.016%	1 149.9173	62150.50C	6.5926E-06
sm151	3.04E-02	0.000%	1 150.9199	62151.50C	2.4249E-09
eu151	5.87E+00	0.001%	1 150.9198	63151.55C	4.6823E-07
sm152	3.77E+01	0.007%	1 151.9198	62152.50C	2.9874E-06
eu153	2.77E+01	0.005%	1 152.9212	63153.55C	2.1806E-06
gd155	1.51E+00	0.000%	1 154.9227	64155.50C	1.1733E-07
gd157	1.63E-02	0.000%	1 156.924	64157.50C	1.2504E-09
cd(113)	1.83E+01	0.004%	1 112.4	48000.50C	1.9600E-06
xe131	1.40E+02	0.027%	1 130.9051	54131.50C	1.2875E-05
cs133	3.47E+02	0.067%	1 132.9054	55133.50C	3.1431E-05
u233	3.16E+00	0.001%	1 233.0395	92233.50C	1.6324E-07
u234	1.12E+02	0.022%	1 234.0409	92234.50C	5.7609E-06
u235	7.29E+03	1.407%	1 235.0439	92235.50C	3.7337E-04
u236	2.02E+03	0.390%	1 236.0456	92236.50C	1.0302E-04
u238	4.42E+05	85.304%	1 238.0508	92238.50C	2.2352E-02
np237	5.46E+02	0.105%	1 237.0481	93237.55C	2.7728E-05
pu238	1.74E-01	0.000%	1 238.0495	94238.50C	8.7993E-09
pu239	1.54E+03	0.297%	1 239.0521	94239.55C	7.7552E-05
pu240	1.03E+02	0.020%	1 240.0539	94240.50C	5.1653E-06
pu241	2.54E-02	0.000%	1 241.0567	94241.50C	1.2685E-09
pu242	6.74E+01	0.013%	1 242.0587	94242.50C	3.3520E-06
am241	7.77E-01	0.000%	1 241.0567	95241.50C	3.8803E-08
am242m	2.27E-04	0.000%	1 242.0595	95242.50C	1.1289E-11
am243	2.21E+00	0.000%	1 243.0614	95243.50C	1.0946E-07
total	518133.9	100.00%		Total	7.010379E-02

oxygen mass/assembly = 464000 g UO / (1-11.8503E-2) * 11.8503E-2 fraction of O in UO2
62377.29

Effective density = 10.04617

Time Effects Curve
 BURNUP: PWR 20 GWd/MT PWR B&W 15x15, 3.00% Burnup 20 GWd/MTHM
 ENRICHMENT: 3.00% DECADE TIME: 15000 YEARS
 DECADE TIME: 15000 YEARS Volume 51575.24 pwr 3.0% 20 GWd/MT
 CRITICALITY DURATION 10,000 Years 10,000 yr crit Number
 ISOTOPE GRAMS/ % Aw MCNP ID Density

O 16	62377.29	0.120385	1	15.99492	8016.50C	4.6947E-02
mo 95	233	0.00045	1	94.90584	42095.50C	2.9555E-05
tc 99	221	0.000427	1	98.90628	43099.50C	2.6899E-05
ru101	227	0.000438	1	100.9056	44101.50C	2.7082E-05
rh103	147	0.000284	1	102.9055	45103.50C	1.7197E-05
ag109	22.5	0.000043	1	108.9048	47109.50C	2.4871E-06
nd143	277	0.000535	1	142.9098	60143.50C	2.3334E-05
nd145	2.11E+02	0.041%	1	144.9125	60145.50C	1.7528E-05
sm147	9.34E+01	0.018%	1	146.9149	62147.50C	7.6533E-06
sm149	6.96E-01	0.000%	1	148.9172	62149.50C	5.6264E-08
sm150	8.32E+01	0.016%	1	149.9173	62150.50C	6.6809E-06
sm151	3.06E-02	0.000%	1	150.9199	62151.50C	2.4408E-09
eu151	5.60E+00	0.001%	1	150.9198	63151.55C	4.4669E-07
sm152	3.79E+01	0.007%	1	151.9198	62152.50C	3.0032E-06
eu153	2.84E+01	0.005%	1	152.9212	63153.55C	2.2357E-06
gd155	7.60E-01	0.000%	1	154.9227	64155.50C	5.9056E-08
gd157	1.55E-02	0.000%	1	156.924	64157.50C	1.1891E-09
cd(113)	1.89E+01	0.004%	1	112.4	48000.50C	2.0221E-06
xe131	1.42E+02	0.027%	1	130.9051	54131.50C	1.3059E-05
cs133	3.53E+02	0.068%	1	132.9054	55133.50C	3.1974E-05
u233	3.88E+00	0.001%	1	233.0395	92233.50C	2.0043E-07
u234	1.16E+02	0.022%	1	234.0409	92234.50C	5.9667E-06
u235	7.35E+03	1.419%	1	235.0439	92235.50C	3.7645E-04
u236	2.09E+03	0.403%	1	236.0456	92236.50C	1.0659E-04
u238	4.42E+05	85.304%	1	238.0508	92238.50C	2.2352E-02
np237	5.50E+02	0.106%	1	237.0481	93237.55C	2.7931E-05
pu238	1.80E-01	0.000%	1	238.0495	94238.50C	9.1027E-09
pu239	1.40E+03	0.270%	1	239.0521	94239.55C	7.0502E-05
pu240	8.09E+01	0.016%	1	240.0539	94240.50C	4.0570E-06
pu241	2.05E-02	0.000%	1	241.0567	94241.50C	1.0238E-09
pu242	6.59E+01	0.013%	1	242.0587	94242.50C	3.2774E-06
am241	6.23E-01	0.000%	1	241.0567	95241.50C	3.1112E-08
am242m	1.86E-04	0.000%	1	242.0595	95242.50C	9.2503E-12
am243	2.05E+00	0.000%	1	243.0614	95243.50C	1.0153E-07
total	518139.2	100.00%			Total	7.010568E-02

oxygen mass/assembly = 464000 g UO / (1-11.8503E-2) * 11.8503E-2 fraction of O in UO2
 62377.29
 Effective density = 10.04628

```

57- 56 2 2R 4 2 6R 4 2 2R 56 56 2 14R 56
58- 56 2 2 4 2 2 4 2 2R 4 2 2 4 2 2 56
59- 56 2 14R 56
60- 56 2 6R 6 2 6R 56
61- 56 2 14R 56
62- 56 2 2 4 2 2 4 2 2R 4 2 2 4 2 2 56
63- 56 2 14R 56 56 2 2R 4 2 6R 4 2 2R 56
64- 56 2 4R 4 2 2R 4 2 4R 56
65- 56 2 14R 56 56 2 14R 56 56 16R
66- C MIXED PIN LATTICE DESCRIPTION
67- 87 3 -0.001225 -26 27 -28 29 IMP:N=1 LAT=1 U=72
68- C FILL -8:8 -8:8 0:0 57 16R 57 3 14R 57 57 3 14R 57
69- C 57 3 4R 5 3 2R 5 3 4R 57
70- C 57 3 2R 5 3 6R 5 3 2R 57 57 3 14R 57
71- C 57 3 3 5 3 3 5 3 2R 5 3 3 5 3 3 57
72- C 57 3 14R 57
73- C 57 3 6R 7 3 6R 57
74- C 57 2 14R 57
75- C 57 2 2 4 2 2 4 2 2R 4 2 2 4 2 2 57
76- C 57 2 14R 57 57 2 2R 4 2 6R 4 2 2R 57
77- C 57 2 4R 4 2 2R 4 2 4R 57
78- C 57 2 14R 57 57 2 14R 57 57 16R
79- C DRY PIN LATTICE DESCRIPTION
80- 88 3 -0.001225 -26 27 -28 29 IMP:N=1 LAT=1 U=57
81- FILL -8:8 -8:8 0:0 57 16R 57 3 14R 57 57 3 14R 57
82- 57 3 4R 5 3 2R 5 3 4R 57
83- 57 3 2R 5 3 6R 5 3 2R 57 57 3 14R 57
84- 57 3 3 5 3 3 5 3 2R 5 3 3 5 3 3 57
85- 57 3 14R 57
86- 57 3 6R 7 3 6R 57
87- 57 3 14R 57
88- 57 3 3 5 3 3 5 3 2R 5 3 3 5 3 3 57
89- 57 3 14R 57 57 3 2R 5 3 6R 5 3 2R 57
90- 57 3 4R 5 3 2R 5 3 4R 57
91- 57 3 14R 57 57 3 14R 57 57 16R
92- C WET FUEL ROD
93- 89 2 7.0103E-02 -30 -10 IMP:N=1 U=2
94- 90 4 -6.5600 -30 10 -11 IMP:N=1 U=2
95- 91 1 -2.1024 -30 11 IMP:N=1 U=2
96- 92 1 -2.1024 30 -31 -11 IMP:N=1 U=2
97- 93 1 -2.1024 30 -31 11 IMP:N=1 U=2
98- 94 4 -6.5600 31 -32 -11 IMP:N=1 U=2
99- 95 1 -2.1024 31 -32 11 IMP:N=1 U=2
100- 96 1 -2.1024 32 IMP:N=1 U=2
101- C DRY FUEL ROD
102- 97 2 7.0103E-02 -30 -10 IMP:N=1 U=3
103- 98 4 -6.5600 -30 10 -11 IMP:N=1 U=3
104- 99 3 -0.001225 -30 11 IMP:N=1 U=3
105- 100 3 -0.001225 30 -31 -11 IMP:N=1 U=3
106- 101 3 -0.001225 30 -31 11 IMP:N=1 U=3
107- 102 4 -6.5600 31 -32 -11 IMP:N=1 U=3
108- 103 3 -0.001225 31 -32 11 IMP:N=1 U=3
109- 104 3 -0.001225 32 IMP:N=1 U=3
110- C WET CONTROL ROD/GUIDE TUBE
111- 105 1 -2.1024 -33 IMP:N=1 U=4 $ No DCRA Rod
112- C 105 9 -7.8300 -33 IMP:N=1 U=4 $ DCRA Rod
113- 106 1 -2.1024 33 -34 IMP:N=1 U=4
114- 107 1 -2.1024 34 -35 IMP:N=1 U=4 $ No DCRA Cladding
115- C 107 4 -6.5600 34 -35 IMP:N=1 U=4 $ DCRA Cladding
116- 108 1 -2.1024 35 -36 IMP:N=1 U=4

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117- 109 4 -6.5600 36 -37 IMP:N=1 U=4
118- 110 1 -2.1024 37 IMP:N=1 U=4
119- C DRY CONTROL ROD/GUIDE TUBE
120- 111 3 -0.001225 -33 IMP:N=1 U=5 $ No DCRA Rod
121- C 111 9 -7.8300 -33 IMP:N=1 U=5 $ DCRA Rod
122- 112 3 -0.001225 33 -34 IMP:N=1 U=5
123- 113 3 -0.001225 34 -35 IMP:N=1 U=5 $ No DCRA Cladding
124- C 113 4 -6.5600 34 -35 IMP:N=1 U=5 $ DCRA Cladding
125- 114 3 -0.001225 35 -36 IMP:N=1 U=5
126- 115 4 -6.5600 36 -37 IMP:N=1 U=5
127- 116 3 -0.001225 37 IMP:N=1 U=5
128- C WET INSTRUMENTATION TUBE
129- 117 1 -2.1024 -38 IMP:N=1 U=6
130- 118 4 -6.5600 38 -39 IMP:N=1 U=6
131- 119 1 -2.1024 39 IMP:N=1 U=6
132- C DRY INSTRUMENTATION TUBE
133- 120 3 -0.001225 -38 IMP:N=1 U=7
134- 121 4 -6.5600 38 -39 IMP:N=1 U=7
135- 122 3 -0.001225 39 IMP:N=1 U=7
136- C FUEL CELL BASKET STRUCTURE
137- C Code: boron in [B=] all panels [all], left [l], bottom [b], right [r], to
138- C FUEL CELL BASKET STRUCTURE - WET - Borated panels
139- C WATER GAP - ASSEMBLY LEFT
140- 123 1 -2.1024 52 IMP:N=1 U=8
141- C 123 1 -2.1024 48 IMP:N=1 U=8
142- C OXIDATION LAYER CS TUBE - ASSEMBLY LEFT
143- C 124 6 -7.8320 -48 52 IMP:N=1 U=8
144- C CS TUBE - ASSEMBLY LEFT
145- C 125 7 -7.8320 -52 56 IMP:N=1 U=8
146- C SS PANEL - ASSEMBLY LEFT
147- 126 8 -7.7700 -52 IMP:N=1 U=8
148- C WATER GAP - ASSEMBLY BOTTOM
149- 127 1 -2.1024 53 IMP:N=1 U=9
150- C 127 1 -2.1024 49 IMP:N=1 U=9
151- C OXIDATION LAYER CS TUBE - ASSEMBLY BOTTOM
152- C 128 6 -7.8320 -49 53 IMP:N=1 U=9
153- C CS TUBE - ASSEMBLY BOTTOM
154- C 129 7 -7.8320 -53 57 IMP:N=1 U=9
155- C SS PANEL - ASSEMBLY BOTTOM
156- 130 8 -7.7700 -53 IMP:N=1 U=9
157- C WATER GAP - ASSEMBLY RIGHT
158- 131 1 -2.1024 -54 IMP:N=1 U=10
159- C 131 1 -2.1024 -50 IMP:N=1 U=10
160- C OXIDATION LAYER CS TUBE - ASSEMBLY RIGHT
161- C 132 6 -7.8320 50 -54 IMP:N=1 U=10
162- C CS TUBE - ASSEMBLY RIGHT
163- C 133 7 -7.8320 54 -58 IMP:N=1 U=10
164- C SS PANEL - ASSEMBLY RIGHT
165- 134 8 -7.7700 54 IMP:N=1 U=10
166- C WATER GAP - ASSEMBLY TOP
167- 135 1 -2.1024 -55 IMP:N=1 U=11
168- C 135 1 -2.1024 -51 IMP:N=1 U=11
169- C OXIDATION LAYER CS TUBE - ASSEMBLY TOP
170- C 136 6 -7.8320 51 -55 IMP:N=1 U=11
171- C CS TUBE - ASSEMBLY TOP
172- C 137 7 -7.8320 55 -59 IMP:N=1 U=11
173- C SS PANEL - ASSEMBLY TOP
174- 138 8 -7.7700 55 IMP:N=1 U=11
175- C FUEL CELL BASKET STRUCTURE - DRY - Borated panels
176- C GAP - ASSEMBLY LEFT

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177- 139 3 -0.001225 52 IMP:N=1 U=12
178- C 139 3 -0.001225 48 IMP:N=1 U=12
179- C OXIDATION LAYER CS TUBE - ASSEMBLY LEFT
180- C 140 6 -7.8320 -48 52 IMP:N=1 U=12
181- C CS TUBE - ASSEMBLY LEFT
182- C 141 7 -7.8320 -52 56 IMP:N=1 U=12
183- C SS PANEL - ASSEMBLY LEFT
184- 142 8 -7.7700 -52 IMP:N=1 U=12
185- C GAP - ASSEMBLY BOTTOM
186- 143 3 -0.001225 53 IMP:N=1 U=13
187- C 143 3 -0.001225 49 IMP:N=1 U=13
188- C OXIDATION LAYER CS TUBE - ASSEMBLY BOTTOM
189- C 144 6 -7.8320 -49 53 IMP:N=1 U=13
190- C CS TUBE - ASSEMBLY BOTTOM
191- C 145 7 -7.8320 -53 57 IMP:N=1 U=13
192- C SS PANEL - ASSEMBLY BOTTOM
193- 146 8 -7.7700 -53 IMP:N=1 U=13
194- C GAP - ASSEMBLY RIGHT
195- 147 3 -0.001225 -54 IMP:N=1 U=14
196- C 147 3 -0.001225 -50 IMP:N=1 U=14
197- C OXIDATION LAYER CS TUBE - ASSEMBLY RIGHT
198- C 148 6 -7.8320 50 -54 IMP:N=1 U=14
199- C CS TUBE - ASSEMBLY RIGHT
200- C 149 7 -7.8320 54 -58 IMP:N=1 U=14
201- C SS PANEL - ASSEMBLY RIGHT
202- 150 8 -7.7700 54 IMP:N=1 U=14
203- C GAP - ASSEMBLY TOP
204- 151 3 -0.001225 -55 IMP:N=1 U=15
205- C 151 3 -0.001225 -51 IMP:N=1 U=15
206- C OXIDATION LAYER CS TUBE - ASSEMBLY TOP
207- C 152 6 -7.8320 51 -55 IMP:N=1 U=15
208- C CS TUBE - ASSEMBLY TOP
209- C 153 7 -7.8320 55 -59 IMP:N=1 U=15
210- C SS PANEL - ASSEMBLY TOP
211- 154 8 -7.7700 55 IMP:N=1 U=15
212- C FUEL CELL BASKET STRUCTURE - WET - Unborated panels
213- C WATER GAP - ASSEMBLY LEFT
214- 155 1 -2.1024 52 IMP:N=1 U=16
215- C 155 1 -2.1024 48 IMP:N=1 U=16
216- C OXIDATION LAYER CS TUBE - ASSEMBLY LEFT
217- C 156 6 -7.8320 -48 52 IMP:N=1 U=16
218- C CS TUBE - ASSEMBLY LEFT
219- C 157 7 -7.8320 -52 56 IMP:N=1 U=16
220- C PANEL - ASSEMBLY LEFT
221- 158 1 -2.1024 -52 IMP:N=1 U=16
222- C WATER GAP - ASSEMBLY BOTTOM
223- 159 1 -2.1024 53 IMP:N=1 U=17
224- C 159 1 -2.1024 49 IMP:N=1 U=17
225- C OXIDATION LAYER CS TUBE - ASSEMBLY BOTTOM
226- C 160 6 -7.8320 -49 53 IMP:N=1 U=17
227- C CS TUBE - ASSEMBLY BOTTOM
228- C 161 7 -7.8320 -53 57 IMP:N=1 U=17
229- C PANEL - ASSEMBLY BOTTOM
230- 162 1 -2.1024 -53 IMP:N=1 U=17
231- C WATER GAP - ASSEMBLY RIGHT
232- 163 1 -2.1024 -54 IMP:N=1 U=18
233- C 163 1 -2.1024 -50 IMP:N=1 U=18
234- C OXIDATION LAYER CS TUBE - ASSEMBLY RIGHT
235- C 164 6 -7.8320 50 -54 IMP:N=1 U=18
236- C CS TUBE - ASSEMBLY RIGHT

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237-	C	165	7	-7.8320	54	-58	IMP:N=1 U=18	
238-	C			PANEL - ASSEMBLY RIGHT				
239-	166	1	-2.1024	54			IMP:N=1 U=18	
240-	C			WATER GAP - ASSEMBLY TOP				
241-	167	1	-2.1024	-55			IMP:N=1 U=19	
242-	C	167	1	-2.1024	-51		IMP:N=1 U=19	
243-	C			OXIDATION LAYER CS TUBE - ASSEMBLY TOP				
244-	C	168	6	-7.8320	51	-55	IMP:N=1 U=19	
245-	C			CS TUBE - ASSEMBLY TOP				
246-	C	169	7	-7.8320	55	-59	IMP:N=1 U=19	
247-	C			PANEL - ASSEMBLY TOP				
248-	170	1	-2.1024	55			IMP:N=1 U=19	
249-	C			FUEL CELL BASKET STRUCTURE - DRY - Unborated panels				
250-	C			GAP - ASSEMBLY LEFT				
251-	171	3	-0.001225	52			IMP:N=1 U=20	
252-	C	171	3	-0.001225	48		IMP:N=1 U=20	
253-	C			OXIDATION LAYER CS TUBE - ASSEMBLY LEFT				
254-	C	172	6	-7.8320	-48	52	IMP:N=1 U=20	
255-	C			CS TUBE - ASSEMBLY LEFT				
256-	C	173	7	-7.8320	-52	56	IMP:N=1 U=20	
257-	C			PANEL - ASSEMBLY LEFT				
258-	174	3	-0.001225	-52			IMP:N=1 U=20	
259-	C			GAP - ASSEMBLY BOTTOM				
260-	175	3	-0.001225	53			IMP:N=1 U=21	
261-	C	175	3	-0.001225	49		IMP:N=1 U=21	
262-	C			OXIDATION LAYER CS TUBE - ASSEMBLY BOTTOM				
263-	C	176	6	-7.8320	-49	53	IMP:N=1 U=21	
264-	C			CS TUBE - ASSEMBLY BOTTOM				
265-	C	177	7	-7.8320	-53	57	IMP:N=1 U=21	
266-	C			PANEL - ASSEMBLY BOTTOM				
267-	178	3	-0.001225	-53			IMP:N=1 U=21	
268-	C			GAP - ASSEMBLY RIGHT				
269-	179	3	-0.001225	-54			IMP:N=1 U=22	
270-	C	179	3	-0.001225	-50		IMP:N=1 U=22	
271-	C			OXIDATION LAYER CS TUBE - ASSEMBLY RIGHT				
272-	C	180	6	-7.8320	50	-54	IMP:N=1 U=22	
273-	C			CS TUBE - ASSEMBLY RIGHT				
274-	C	181	7	-7.8320	54	-58	IMP:N=1 U=22	
275-	C			PANEL - ASSEMBLY RIGHT				
276-	182	3	-0.001225	54			IMP:N=1 U=22	
277-	C			GAP - ASSEMBLY TOP				
278-	183	3	-0.001225	-55			IMP:N=1 U=23	
279-	C	183	3	-0.001225	-51		IMP:N=1 U=23	
280-	C			OXIDATION LAYER CS TUBE - ASSEMBLY TOP				
281-	C	184	6	-7.8320	51	-55	IMP:N=1 U=23	
282-	C			CS TUBE - ASSEMBLY TOP				
283-	C	185	7	-7.8320	55	-59	IMP:N=1 U=23	
284-	C			PANEL - ASSEMBLY TOP				
285-	186	3	-0.001225	55			IMP:N=1 U=23	
286-								
287-	C			SURFACE SPECIFICATIONS				
288-	1*	PX		0.0				
289-	C	2*	PY	0.00			\$ For 1/4 Model	
290-	3*	PZ		0.00				
291-	C	4	PX	12.30			\$ For Collapsed Model	
292-	C	5	PX	36.90			\$ For Collapsed Model	
293-	C	6	PY	12.30			\$ Water Level Surface	
294-	C	7	PY	36.90			\$ Water Level Surface	
295-	C	8	PY	-12.30			\$ Water Level Surface	
296-	C	9	PY	-36.90			\$ Water Level Surface	

297-	10	PZ	180.0860	\$ TOP ACTIVE FUEL
298-	11	PZ	201.2360	\$ TOP FUEL HARDWARE
299-	C	12	PZ 226.75	\$ TOP TUBE - (Shielding Model)
300-	13	PZ	228.75	\$ TOP OF BASKET MATERIAL
301-	14	PZ	229.25	\$ TOP RING/WATER GAP
302-	15	PZ	231.75	\$ TOP INNER LID
303-	16	PZ	234.75	\$ TOP LID GAP
304-	17	PZ	245.75	\$ TOP OUTER LID
305-	C	18	PZ 268.25	\$ TOP SKIRT - (Shielding Model)
306-	19	PZ	298.75	\$ TOP REFLECTOR REGION
307-	20	CZ	71.095	\$ ID OF INNER BARRIER
308-	21	CZ	73.095	\$ OD OF INNER BARRIER
309-	22	CZ	73.10	\$ ID OF OUTER BARRIER
310-	C	23	CZ 76.45	\$ ID OF SKIRT LIP - (Shielding Model)
311-	24	CZ	83.10	\$ OD OF OUTER BARRIER
312-	25	CZ	113.60	\$ OD OF REFLECTOR REGION
313-	C			PIN LATTICE BOUNDS
314-	26	PX	0.72136	
315-	27	PX	-0.72136	
316-	28	PY	0.72136	
317-	29	PY	-0.72136	
318-	C			FUEL ROD
319-	30	CZ	0.468122	
320-	31	CZ	0.478790	
321-	32	CZ	0.546100	
322-	C			CONTROL ROD/GUIDE TUBE
323-	33	CZ	0.45340	\$ 0.49022
324-	34	CZ	0.46990	\$ 0.50292
325-	35	CZ	0.54610	\$ 0.56007
326-	36	CZ	0.62230	\$ 0.63246
327-	37	CZ	0.67310	
328-	C			INSTRUMENTATION TUBE
329-	38	CZ	0.56007	
330-	39	CZ	0.62611	
331-	C			ASSEMBLY LATTICE BOUNDS Actual
332-	44	PX	-10.65	\$ ACTUAL 10.82025
333-	45	PY	-10.65	
334-	46	PX	10.65	
335-	47	PY	10.65	
336-	C	48	PX -11.0	\$ Corrosion Expansion Cards
337-	C	49	PY -11.0	
338-	C	50	PX 11.0	
339-	C	51	PY 11.0	
340-	52	PX	-10.650001	\$ UCF Intact Inside Tube ID
341-	53	PY	-10.650001	
342-	54	PX	10.650001	
343-	55	PY	10.650001	
344-	56	PX	-11.95	\$ UCF Intact Outside Tube ID
345-	57	PY	-11.95	
346-	58	PX	11.95	
347-	59	PY	11.95	
348-	C			FUEL CELL LATTICE BOUNDS
349-	60	PX	-10.65	\$ ACTUAL 12.30
350-	61	PX	10.65	
351-	62	PY	-10.65	
352-	63	PY	10.65	
353-	C			45 degree planes
354-	64	P	1. -1. 0. 0.	
355-	65	P	1. 1. 0. 0.	
356-	C			EXTRA CARDS

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357-
358- MODE N
359- C VOL 88J
360- KCODE 4000 1. 7 97
361- C KSRC -4.3 -5.7 1. -2.8 -5.7 5. -1.4 -5.7 10. 0. -5.7 5.
362- C 1.44 -5.7 3. 2.88 -5.7 8. 4.32 -5.7 9.
363- C -5.7 -4.3 2. -4.3 -4.3 1. -2.8 -4.3 5. -1.4 -4.3 10.
364- C 0. -4.3 5. 1.44 -4.3 3. 2.88 -4.3 8. 4.32 -4.3 9.
365- C -5.7 -2.9 2. -4.3 -2.9 1. -1.4 -2.9 10.
366- C 0. -2.9 5. 2.88 -2.9 8. 4.32 -2.0 9.
367- C -5.7 -1.4 2. -4.3 -1.4 1. -2.8 -1.4 5. -1.4 -1.4 10.
368- C 0. -1.4 5. 1.44 -1.4 3. 2.88 -1.4 8. 4.32 -1.4 9.
369- C -5.7 0.0 2. -4.3 0.0 1. -2.8 0.0 5. -1.4 0.0 10.
370- C 1.44 0.0 3. 2.88 0.0 8. 4.32 0.0 9.
371- C -5.7 1.4 2. -2.8 1.4 5. -1.4 1.4 10.
372- C 0. 1.4 5. 1.44 1.4 3. 2.88 1.4 8. 4.32 1.4 9.
373- C -5.7 2.9 2. -4.3 2.9 1. -2.8 2.9 5. -1.4 2.9 10.
374- C 0. 2.9 5. 1.44 2.9 3. 2.88 2.9 8. 4.32 2.9 9.
375- C -5.7 4.3 2. -4.3 4.3 1. -2.8 4.3 5. -1.4 4.3 10.
376- C 0. 4.3 5. 1.44 4.3 3. 2.88 4.3 8. 4.32 4.3 9.
377- MATERIAL SPECIFICATIONS
378- WATER AT 300 K d=1.0000 g/cc w/ 26% Fe2O3 w/ 5% B10
379- M1 1001.50C 4.9490-2 8016.50C 4.0160-2 26000.55C 1.0277-2
380- 5010.50C 2.8870-6
381- MT1 LWTR.01T
382- C 3.00%/20 GWD 15000 yr decay 0 yr crit
383- M2 8016.50C 4.6947E-02
384- 42095.50C 2.8413E-05
385- 43099.50C 2.6655E-05
386- 44101.50C 2.6008E-05
387- 45103.50C 1.6846E-05
388- 47109.50C 2.4208E-06
389- 60143.50C 2.2660E-05
390- 60145.50C 1.6864E-05
391- 62147.50C 7.3501E-06
392- 62149.50C 1.1479E-07
393- 62150.50C 6.4561E-06
394- 63151.55C 4.9615E-07
395- 62152.50C 2.9636E-06
396- 63153.55C 2.1255E-06
397- 64155.50C 2.4710E-07
398- 64157.50C 2.3858E-09
399- 48000.50C 1.8989E-06
400- 54131.50C 1.2691E-05
401- 55133.50C 3.0887E-05
402- 92233.50C 1.2553E-07
403- 92234.50C 5.5037E-06
404- 92235.50C 3.6928E-04
405- 92236.50C 9.8940E-05
406- 92238.50C 2.2352E-02
407- 93237.55C 2.7474E-05
408- 94239.55C 8.6617E-05
409- 94240.50C 6.9205E-06
410- 94241.50C 1.1186E-12
411- 94242.50C 3.4266E-06
412- 95241.50C 3.5158E-11
413- 95243.50C 1.2184E-07
414- C WATER AT 300 K d=1.0000 g/cc
415- M3 1001.50C 6.6878-2 8016.50C 3.3439-2
416- MT3 LWTR.01T

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417- C      Air d=0.001225 g/cc
418- C      M3      7014.50C -0.80  8016.50C -0.20
419- C      ZIRCALOY-4 d=6.56 g/cc
420- M4      8016.50C -0.0012  24000.50C -0.0010  26000.55C -0.0020
421- C      40000.50C -0.9818  50000.35C -0.0140
422- C      ALLOY 825 d=8.14 g/cc
423- M5      6000.50C -0.0005  13027.50C -0.0020  14000.50C -0.0050
424- C      16032.50C -0.0003  22000.50C -0.0090  24000.50C -0.2150
425- C      25055.50C -0.0100  26000.55C -0.2857  28000.50C -0.4200
426- C      29000.50C -0.0225  42000.50C -0.0300
427- C      Oxidized A516 CARBON STEEL and Water Mixture d=7.832 g/cc
428- C      M6      6000.50C -0.00220  14000.50C -0.002750  15031.50C -0.00035
429- C      16032.50C -0.00035  25055.50C -0.0090
430- C      26000.55C -0.98535
431- C      A516 CARBON STEEL d=7.832 g/cc
432- M7      6000.50C -0.00220  14000.50C -0.002750  15031.50C -0.00035
433- C      16032.50C -0.00035  25055.50C -0.0090
434- C      26000.55C -0.98535
435- C      SS316B6A 1.6% d=7.77 g/cc
436- M8      5010.50C -0.00288  5011.50C -0.013120
437- C      6000.50C -0.00030  7014.50C -0.00100  14000.50C -0.0075
438- C      15031.50C -0.00045  16032.50C -0.00030  24000.50C -0.19000
439- C      25055.50C -0.02000  26000.55C -0.60445  28000.50C -0.13500
440- C      42000.50C -0.02500
441- C      SS316B3A 0.87wt% B d=7.83 g/cc
442- M9      5010.50C -0.001566  5011.50C -0.007134
443- C      6000.50C -0.00030  7014.50C -0.00100  14000.50C -0.00750
444- C      15031.50C -0.00045  16032.50C -0.00030  24000.50C -0.19000
445- C      25055.50C -0.02000  26000.55C -0.60445  28000.50C -0.13500
446- C      42000.50C -0.02500
447- C      Al 6063 d=2.69 g/cc
448- M10     12000.50C -0.00675  13027.50C -0.98125  14000.50C -0.00400
449- C      22000.50C -0.00150  24000.50C -0.00100  25055.50C -0.00100
450- C      26000.55C -0.00350  29000.50C -0.00100
451- C      TALLIES
452- PRINT
453-

```

1 initial source from file srctp

1problem summary

run terminated when 97 kcode cycles were done.

* AUCF - B&W 15x15 FUEL,21 ASSEMBLY DBF CS/SS-B Corroded & collapsed - (a26xb5c) probid = 08/20/96 19:10:37
08/20/96 17:19:50

neutron creation				neutron loss			
source	tracks	weight (per source particle)	energy	tracks	weight (per source particle)	energy	
source	387087	1.0024E+00	2.0572E+00	escape	5	7.0869E-06	1.8240E-05
				energy cutoff	0	0.	0.
				time cutoff	0	0.	0.
weight window	0	0.	0.	weight window	0	0.	0.
cell importance	0	0.	0.	cell importance	0	0.	0.
weight cutoff	0	4.9996E-02	6.1536E-06	weight cutoff	387745	4.9806E-02	8.3240E-06
energy importance	0	0.	0.	energy importance	0	0.	0.
dxtran	0	0.	0.	dxtran	0	0.	0.
forced collisions	0	0.	0.	forced collisions	0	0.	0.
exp. transform	0	0.	0.	exp. transform	0	0.	0.

upscattering	0	0.	7.3602E-08	downscattering	0	0.	1.9223E+00
(n,xn)	1324	2.7042E-03	2.1498E-03	capture	0	6.5791E-01	3.5810E-02
fission	0	0.	0.	loss to (n,xn)	661	1.3507E-03	1.1386E-02
total	388411	1.0551E+00	2.0594E+00	loss to fission	0	3.4598E-01	8.9877E-02
				total	388411	1.0551E+00	2.0594E+00

number of neutrons banked	663	average lifetime, shakes		cutoffs	
neutron tracks per source particle	1.0034E+00	escape	1.9585E+04	tco	1.0000E+34
neutron collisions per source particle	4.6254E+01	capture	2.3100E+03	eco	.0000E+00
total neutron collisions	17904367	capture or escape	2.3101E+03	wc1	-5.0000E-01
net multiplication	1.0014E+00 .0001	any termination	2.4720E+03	wc2	-2.5000E-01

computer time so far in this run	110.41 minutes	maximum number ever in bank	2
computer time in mcrun	110.31 minutes	bank overflows to backup file	0
source particles per minute	3.5090E+03	field length	0
random numbers generated	251075470	most random numbers used was	8243 in history 186679

range of sampled source weights = 9.5648E-01 to 1.1034E+00
1keff results for: AUCF - B&W 15x15 FUEL,21 ASSEMBLY DBF CS/SS-B Corroded & collapsed - (a26xb5c) probid = 08/20/96 17:19:50

the initial fission neutron source distribution was read from the srctp file named srctp .
the criticality problem was scheduled to skip 7 cycles and run a total of 97 cycles with nominally 4000 neutrons per cycle.
this problem has run 7 inactive cycles with 27818 neutron histories and 90 active cycles with 359269 neutron histories.

this calculation has completed the requested number of keff cycles using a total of 387087 fission neutron source histories.
XX

the following cells with fissionable material had no neutron tracks entering:
97

the following cells with fissionable material had no neutron collisions:
97

the following cells with fissionable material had no fission source points:
97

warning. 1 fissionable cells had no tracks entering, 1 cells had no collisions, and 1 cells had no fission source points.
the keff results could be too small because these cells with fissionable material were not sampled.

XX
the results of the w test for normality applied to the individual collision, absorption, and track-length keff cycle values are:

- the k(collision) cycle values appear normally distributed at the 95 percent confidence level
- the k(absorption) cycle values appear normally distributed at the 95 percent confidence level
- the k(trk length) cycle values appear normally distributed at the 95 percent confidence level

the final estimated combined collision/absorption/track-length keff = .89668 with an estimated standard deviation of .00102
the estimated 68, 95, & 99 percent keff confidence intervals are .89565 to .89770, .89464 to .89871, and .89398 to .89938
the estimated collision/absorption neutron removal lifetime = 2.31E-05 seconds with an estimated standard deviation of 4.98E-08

the estimated average keffs, one standard deviations, and 68, 95, and 99 percent confidence intervals are:

keff estimator	keff	standard deviation	68% confidence	95% confidence	99% confidence	corr
collision	.89604	.00130	.89474 to .89734	.89346 to .89862	.89262 to .89946	
absorption	.89705	.00120	.89584 to .89825	.89464 to .89945	.89386 to .90023	
track length	.89634	.00139	.89495 to .89773	.89357 to .89910	.89267 to .90000	
col/absorp	.89661	.00107	.89554 to .89768	.89448 to .89874	.89378 to .89943	.4478
abs/trk len	.89676	.00102	.89573 to .89778	.89472 to .89879	.89406 to .89945	.2475
col/trk len	.89615	.00124	.89492 to .89739	.89369 to .89862	.89289 to .89942	.6950
col/abs/trk len	.89668	.00102	.89565 to .89770	.89464 to .89871	.89398 to .89938	

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57- 56 2 2R 4 2 6R 4 2 2R 56 56 2 14R 56
58- 56 2 2 4 2 2 4 2 2R 4 2 2 4 2 2 56
59- 56 2 14R 56
60- 56 2 6R 6 2 6R 56
61- 56 2 14R 56
62- 56 2 2 4 2 2 4 2 2R 4 2 2 4 2 2 56
63- 56 2 14R 56 56 2 2R 4 2 6R 4 2 2R 56
64- 56 2 4R 4 2 2R 4 2 4R 56
65- 56 2 14R 56 56 2 14R 56 56 16R
66- C MIXED PIN LATTICE DESCRIPTION
67- 87 3 -0.001225 -26 27 -28 29 IMP:N=1 LAT=1 U=72
68- C FILL -8:8 -8:8 0:0 57 16R 57 3 14R 57 57 3 14R 57
69- C 57 3 4R 5 3 2R 5 3 4R 57
70- C 57 3 2R 5 3 6R 5 3 2R 57 57 3 14R 57
71- C 57 3 3 5 3 3 5 3 2R 5 3 3 5 3 3 57
72- C 57 3 14R 57
73- C 57 3 6R 7 3 6R 57
74- C 57 2 14R 57
75- C 57 2 2 4 2 2 4 2 2R 4 2 2 4 2 2 57
76- C 57 2 14R 57 57 2 2R 4 2 6R 4 2 2R 57
77- C 57 2 4R 4 2 2R 4 2 4R 57
78- C 57 2 14R 57 57 2 14R 57 57 16R
79- C DRY PIN LATTICE DESCRIPTION
80- 88 3 -0.001225 -26 27 -28 29 IMP:N=1 LAT=1 U=57
81- C FILL -8:8 -8:8 0:0 57 16R 57 3 14R 57 57 3 14R 57
82- C 57 3 4R 5 3 2R 5 3 4R 57
83- C 57 3 2R 5 3 6R 5 3 2R 57 57 3 14R 57
84- C 57 3 3 5 3 3 5 3 2R 5 3 3 5 3 3 57
85- C 57 3 14R 57
86- C 57 3 6R 7 3 6R 57
87- C 57 3 14R 57
88- C 57 3 3 5 3 3 5 3 2R 5 3 3 5 3 3 57
89- C 57 3 14R 57 57 3 2R 5 3 6R 5 3 2R 57
90- C 57 3 4R 5 3 2R 5 3 4R 57
91- C 57 3 14R 57 57 3 14R 57 57 16R
92- C WET FUEL ROD
93- 89 2 7.0103E-02 -30 -10 IMP:N=1 U=2
94- 90 4 -6.5600 -30 10 -11 IMP:N=1 U=2
95- 91 1 -2.1024 -30 11 IMP:N=1 U=2
96- 92 1 -2.1024 30 -31 -11 IMP:N=1 U=2
97- 93 1 -2.1024 30 -31 11 IMP:N=1 U=2
98- 94 4 -6.5600 31 -32 -11 IMP:N=1 U=2
99- 95 1 -2.1024 31 -32 11 IMP:N=1 U=2
100- 96 1 -2.1024 32 IMP:N=1 U=2
101- C DRY FUEL ROD
102- 97 2 7.0103E-02 -30 -10 IMP:N=1 U=3
103- 98 4 -6.5600 -30 10 -11 IMP:N=1 U=3
104- 99 3 -0.001225 -30 11 IMP:N=1 U=3
105- 100 3 -0.001225 30 -31 -11 IMP:N=1 U=3
106- 101 3 -0.001225 30 -31 11 IMP:N=1 U=3
107- 102 4 -6.5600 31 -32 -11 IMP:N=1 U=3
108- 103 3 -0.001225 31 -32 11 IMP:N=1 U=3
109- 104 3 -0.001225 32 IMP:N=1 U=3
110- C WET CONTROL ROD/GUIDE TUBE
111- 105 1 -2.1024 -33 IMP:N=1 U=4 $ No DCRA Rod
112- C 105 9 -7.8300 -33 IMP:N=1 U=4 $ DCRA Rod
113- 106 1 -2.1024 33 -34 IMP:N=1 U=4
114- 107 1 -2.1024 34 -35 IMP:N=1 U=4 $ No DCRA Cladding
115- C 107 4 -6.5600 34 -35 IMP:N=1 U=4 $ DCRA Cladding
116- 108 1 -2.1024 35 -36 IMP:N=1 U=4

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117- 109 4 -6.5600 36 -37 IMP:N=1 U=4
118- 110 1 -2.1024 37 IMP:N=1 U=4
119- C DRY CONTROL ROD/GUIDE TUBE
120- 111 3 -0.001225 -33 IMP:N=1 U=5 $ No DCRA Rod
121- C 111 9 -7.8300 -33 IMP:N=1 U=5 $ DCRA Rod
122- 112 3 -0.001225 33 -34 IMP:N=1 U=5
123- 113 3 -0.001225 34 -35 IMP:N=1 U=5 $ No DCRA Cladding
124- C 113 4 -6.5600 34 -35 IMP:N=1 U=5 $ DCRA Cladding
125- 114 3 -0.001225 35 -36 IMP:N=1 U=5
126- 115 4 -6.5600 36 -37 IMP:N=1 U=5
127- 116 3 -0.001225 37 IMP:N=1 U=5
128- C WET INSTRUMENTATION TUBE
129- 117 1 -2.1024 -38 IMP:N=1 U=6
130- 118 4 -6.5600 38 -39 IMP:N=1 U=6
131- 119 1 -2.1024 39 IMP:N=1 U=6
132- C DRY INSTRUMENTATION TUBE
133- 120 3 -0.001225 -38 IMP:N=1 U=7
134- 121 4 -6.5600 38 -39 IMP:N=1 U=7
135- 122 3 -0.001225 39 IMP:N=1 U=7
136- C FUEL CELL BASKET STRUCTURE
137- C Code: boron in [B=] all panels [all], left [l], bottom [b], right [r], to
138- C FUEL CELL BASKET STRUCTURE - WET - Borated panels
139- C WATER GAP - ASSEMBLY LEFT
140- 123 1 -2.1024 52 IMP:N=1 U=8
141- C 123 1 -2.1024 48 IMP:N=1 U=8
142- C OXIDATION LAYER CS TUBE - ASSEMBLY LEFT
143- C 124 6 -7.8320 -48 52 IMP:N=1 U=8
144- C CS TUBE - ASSEMBLY LEFT
145- C 125 7 -7.8320 -52 56 IMP:N=1 U=8
146- C SS PANEL - ASSEMBLY LEFT
147- 126 8 -7.7700 -52 IMP:N=1 U=8
148- C WATER GAP - ASSEMBLY BOTTOM
149- 127 1 -2.1024 53 IMP:N=1 U=9
150- C 127 1 -2.1024 49 IMP:N=1 U=9
151- C OXIDATION LAYER CS TUBE - ASSEMBLY BOTTOM
152- C 128 6 -7.8320 -49 53 IMP:N=1 U=9
153- C CS TUBE - ASSEMBLY BOTTOM
154- C 129 7 -7.8320 -53 57 IMP:N=1 U=9
155- C SS PANEL - ASSEMBLY BOTTOM
156- 130 8 -7.7700 -53 IMP:N=1 U=9
157- C WATER GAP - ASSEMBLY RIGHT
158- 131 1 -2.1024 -54 IMP:N=1 U=10
159- C 131 1 -2.1024 -50 IMP:N=1 U=10
160- C OXIDATION LAYER CS TUBE - ASSEMBLY RIGHT
161- C 132 6 -7.8320 50 -54 IMP:N=1 U=10
162- C CS TUBE - ASSEMBLY RIGHT
163- C 133 7 -7.8320 54 -58 IMP:N=1 U=10
164- C SS PANEL - ASSEMBLY RIGHT
165- 134 8 -7.7700 54 IMP:N=1 U=10
166- C WATER GAP - ASSEMBLY TOP
167- 135 1 -2.1024 -55 IMP:N=1 U=11
168- C 135 1 -2.1024 -51 IMP:N=1 U=11
169- C OXIDATION LAYER CS TUBE - ASSEMBLY TOP
170- C 136 6 -7.8320 51 -55 IMP:N=1 U=11
171- C CS TUBE - ASSEMBLY TOP
172- C 137 7 -7.8320 55 -59 IMP:N=1 U=11
173- C SS PANEL - ASSEMBLY TOP
174- 138 8 -7.7700 55 IMP:N=1 U=11
175- C FUEL CELL BASKET STRUCTURE - DRY - Borated panels
176- C GAP - ASSEMBLY LEFT

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177- 139 3 -0.001225 52 IMP:N=1 U=12
178- C 139 3 -0.001225 48 IMP:N=1 U=12
179- C OXIDATION LAYER CS TUBE - ASSEMBLY LEFT
180- C 140 6 -7.8320 -48 52 IMP:N=1 U=12
181- C CS TUBE - ASSEMBLY LEFT
182- C 141 7 -7.8320 -52 56 IMP:N=1 U=12
183- C SS PANEL - ASSEMBLY LEFT
184- 142 8 -7.7700 -52 IMP:N=1 U=12
185- C GAP - ASSEMBLY BOTTOM
186- 143 3 -0.001225 53 IMP:N=1 U=13
187- C 143 3 -0.001225 49 IMP:N=1 U=13
188- C OXIDATION LAYER CS TUBE - ASSEMBLY BOTTOM
189- C 144 6 -7.8320 -49 53 IMP:N=1 U=13
190- C CS TUBE - ASSEMBLY BOTTOM
191- C 145 7 -7.8320 -53 57 IMP:N=1 U=13
192- C SS PANEL - ASSEMBLY BOTTOM
193- 146 8 -7.7700 -53 IMP:N=1 U=13
194- C GAP - ASSEMBLY RIGHT
195- 147 3 -0.001225 -54 IMP:N=1 U=14
196- C 147 3 -0.001225 -50 IMP:N=1 U=14
197- C OXIDATION LAYER CS TUBE - ASSEMBLY RIGHT
198- C 148 6 -7.8320 50 -54 IMP:N=1 U=14
199- C CS TUBE - ASSEMBLY RIGHT
200- C 149 7 -7.8320 54 -58 IMP:N=1 U=14
201- C SS PANEL - ASSEMBLY RIGHT
202- 150 8 -7.7700 54 IMP:N=1 U=14
203- C GAP - ASSEMBLY TOP
204- 151 3 -0.001225 -55 IMP:N=1 U=15
205- C 151 3 -0.001225 -51 IMP:N=1 U=15
206- C OXIDATION LAYER CS TUBE - ASSEMBLY TOP
207- C 152 6 -7.8320 51 -55 IMP:N=1 U=15
208- C CS TUBE - ASSEMBLY TOP
209- C 153 7 -7.8320 55 -59 IMP:N=1 U=15
210- C SS PANEL - ASSEMBLY TOP
211- 154 8 -7.7700 55 IMP:N=1 U=15
212- C FUEL CELL BASKET STRUCTURE - WET - Unborated panels
213- C WATER GAP - ASSEMBLY LEFT
214- 155 1 -2.1024 52 IMP:N=1 U=16
215- C 155 1 -2.1024 48 IMP:N=1 U=16
216- C OXIDATION LAYER CS TUBE - ASSEMBLY LEFT
217- C 156 6 -7.8320 -48 52 IMP:N=1 U=16
218- C CS TUBE - ASSEMBLY LEFT
219- C 157 7 -7.8320 -52 56 IMP:N=1 U=16
220- C PANEL - ASSEMBLY LEFT
221- 158 1 -2.1024 -52 IMP:N=1 U=16
222- C WATER GAP - ASSEMBLY BOTTOM
223- 159 1 -2.1024 53 IMP:N=1 U=17
224- C 159 1 -2.1024 49 IMP:N=1 U=17
225- C OXIDATION LAYER CS TUBE - ASSEMBLY BOTTOM
226- C 160 6 -7.8320 -49 53 IMP:N=1 U=17
227- C CS TUBE - ASSEMBLY BOTTOM
228- C 161 7 -7.8320 -53 57 IMP:N=1 U=17
229- C PANEL - ASSEMBLY BOTTOM
230- 162 1 -2.1024 -53 IMP:N=1 U=17
231- C WATER GAP - ASSEMBLY RIGHT
232- 163 1 -2.1024 -54 IMP:N=1 U=18
233- C 163 1 -2.1024 -50 IMP:N=1 U=18
234- C OXIDATION LAYER CS TUBE - ASSEMBLY RIGHT
235- C 164 6 -7.8320 50 -54 IMP:N=1 U=18
236- C CS TUBE - ASSEMBLY RIGHT

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237-	C	165	7	-7.8320	54	-58	IMP:N=1 U=18
238-	C			PANEL - ASSEMBLY RIGHT			
239-	166	1	-2.1024	54			IMP:N=1 U=18
240-	C			WATER GAP - ASSEMBLY TOP			
241-	167	1	-2.1024	-55			IMP:N=1 U=19
242-	C	167	1	-2.1024	-51		IMP:N=1 U=19
243-	C			OXIDATION LAYER CS TUBE - ASSEMBLY TOP			
244-	C	168	6	-7.8320	51	-55	IMP:N=1 U=19
245-	C			CS TUBE - ASSEMBLY TOP			
246-	C	169	7	-7.8320	55	-59	IMP:N=1 U=19
247-	C			PANEL - ASSEMBLY TOP			
248-	170	1	-2.1024	55			IMP:N=1 U=19
249-	C			FUEL CELL BASKET STRUCTURE -			DRY - Unborated panels
250-	C			GAP - ASSEMBLY LEFT			
251-	171	3	-0.001225	52			IMP:N=1 U=20
252-	C	171	3	-0.001225	48		IMP:N=1 U=20
253-	C			OXIDATION LAYER CS TUBE - ASSEMBLY LEFT			
254-	C	172	6	-7.8320	-48	52	IMP:N=1 U=20
255-	C			CS TUBE - ASSEMBLY LEFT			
256-	C	173	7	-7.8320	-52	56	IMP:N=1 U=20
257-	C			PANEL - ASSEMBLY LEFT			
258-	174	3	-0.001225	-52			IMP:N=1 U=20
259-	C			GAP - ASSEMBLY BOTTOM			
260-	175	3	-0.001225	53			IMP:N=1 U=21
261-	C	175	3	-0.001225	49		IMP:N=1 U=21
262-	C			OXIDATION LAYER CS TUBE - ASSEMBLY BOTTOM			
263-	C	176	6	-7.8320	-49	53	IMP:N=1 U=21
264-	C			CS TUBE - ASSEMBLY BOTTOM			
265-	C	177	7	-7.8320	-53	57	IMP:N=1 U=21
266-	C			PANEL - ASSEMBLY BOTTOM			
267-	178	3	-0.001225	-53			IMP:N=1 U=21
268-	C			GAP - ASSEMBLY RIGHT			
269-	179	3	-0.001225	-54			IMP:N=1 U=22
270-	C	179	3	-0.001225	-50		IMP:N=1 U=22
271-	C			OXIDATION LAYER CS TUBE - ASSEMBLY RIGHT			
272-	C	180	6	-7.8320	50	-54	IMP:N=1 U=22
273-	C			CS TUBE - ASSEMBLY RIGHT			
274-	C	181	7	-7.8320	54	-58	IMP:N=1 U=22
275-	C			PANEL - ASSEMBLY RIGHT			
276-	182	3	-0.001225	54			IMP:N=1 U=22
277-	C			GAP - ASSEMBLY TOP			
278-	183	3	-0.001225	-55			IMP:N=1 U=23
279-	C	183	3	-0.001225	-51		IMP:N=1 U=23
280-	C			OXIDATION LAYER CS TUBE - ASSEMBLY TOP			
281-	C	184	6	-7.8320	51	-55	IMP:N=1 U=23
282-	C			CS TUBE - ASSEMBLY TOP			
283-	C	185	7	-7.8320	55	-59	IMP:N=1 U=23
284-	C			PANEL - ASSEMBLY TOP			
285-	186	3	-0.001225	55			IMP:N=1 U=23

287-	C			SURFACE SPECIFICATIONS			
288-	1*	PX	0.0				
289-	C	2*	PY	0.00			\$ For 1/4 Model
290-	3*	PZ	0.00				
291-	C	4	PX	12.30			\$ For Collapsed Model
292-	C	5	PX	36.90			\$ For Collapsed Model
293-	C	6	PY	12.30			\$ Water Level Surface
294-	C	7	PY	36.90			\$ Water Level Surface
295-	C	8	PY	-12.30			\$ Water Level Surface
296-	C	9	PY	-36.90			\$ Water Level Surface

297-	10	PZ	180.0860	\$ TOP ACTIVE FUEL
298-	11	PZ	201.2360	\$ TOP FUEL HARDWARE
299-	C	12	PZ 226.75	\$ TOP TUBE - (Shielding Model)
300-	13	PZ	228.75	\$ TOP OF BASKET MATERIAL
301-	14	PZ	229.25	\$ TOP RING/WATER GAP
302-	15	PZ	231.75	\$ TOP INNER LID
303-	16	PZ	234.75	\$ TOP LID GAP
304-	17	PZ	245.75	\$ TOP OUTER LID
305-	C	18	PZ 268.25	\$ TOP SKIRT - (Shielding Model)
306-	19	PZ	298.75	\$ TOP REFLECTOR REGION
307-	20	CZ	71.095	\$ ID OF INNER BARRIER
308-	21	CZ	73.095	\$ OD OF INNER BARRIER
309-	22	CZ	73.10	\$ ID OF OUTER BARRIER
310-	C	23	CZ 76.45	\$ ID OF SKIRT LIP - (Shielding Model)
311-	24	CZ	83.10	\$ OD OF OUTER BARRIER
312-	25	CZ	113.60	\$ OD OF REFLECTOR REGION
313-	C	PIN LATTICE BOUNDS		
314-	26	PX	0.72136	
315-	27	PX	-0.72136	
316-	28	PY	0.72136	
317-	29	PY	-0.72136	
318-	C	FUEL ROD		
319-	30	CZ	0.468122	
320-	31	CZ	0.478790	
321-	32	CZ	0.546100	
322-	C	CONTROL ROD/GUIDE TUBE		
323-	33	CZ	0.45340	\$ 0.49022
324-	34	CZ	0.46990	\$ 0.50292
325-	35	CZ	0.54610	\$ 0.56007
326-	36	CZ	0.62230	\$ 0.63246
327-	37	CZ	0.67310	
328-	C	INSTRUMENTATION TUBE		
329-	38	CZ	0.56007	
330-	39	CZ	0.62611	
331-	C	ASSEMBLY LATTICE BOUNDS Actual		
332-	44	PX	-10.65	\$ ACTUAL 10.82025
333-	45	PY	-10.65	
334-	46	PX	10.65	
335-	47	PY	10.65	
336-	C	48	PX -11.0	\$ Corrosion Expansion Cards
337-	C	49	PY -11.0	
338-	C	50	PX 11.0	
339-	C	51	PY 11.0	
340-	52	PX	-10.650001	\$ UCF Intact Inside Tube ID
341-	53	PY	-10.650001	
342-	54	PX	10.650001	
343-	55	PY	10.650001	
344-	56	PX	-11.95	\$ UCF Intact Outside Tube ID
345-	57	PY	-11.95	
346-	58	PX	11.95	
347-	59	PY	11.95	
348-	C	FUEL CELL LATTICE BOUNDS		
349-	60	PX	-10.65	\$ ACTUAL 12.30
350-	61	PX	10.65	
351-	62	PY	-10.65	
352-	63	PY	10.65	
353-	C	45 degree planes		
354-	64	P	1. -1. 0. 0.	
355-	65	P	1. 1. 0. 0.	
356-	C	EXTRA CARDS		

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357-
358- MODE N
359- C VOL 88J
360- KCODE 4000 1. 7 97
361- C KSRC -4.3 -5.7 1. -2.8 -5.7 5. -1.4 -5.7 10. 0. -5.7 5.
362- C 1.44 -5.7 3. 2.88 -5.7 8. 4.32 -5.7 9.
363- C -5.7 -4.3 2. -4.3 -4.3 1. -2.8 -4.3 5. -1.4 -4.3 10.
364- C 0. -4.3 5. 1.44 -4.3 3. 2.88 -4.3 8. 4.32 -4.3 9.
365- C -5.7 -2.9 2. -4.3 -2.9 1.
366- C 0. -2.9 5. 2.88 -2.9 8. 4.32 -2.0 9.
367- C -5.7 -1.4 2. -4.3 -1.4 1. -2.8 -1.4 5. -1.4 -1.4 10.
368- C 0. -1.4 5. 1.44 -1.4 3. 2.88 -1.4 8. 4.32 -1.4 9.
369- C -5.7 0.0 2. -4.3 0.0 1. -2.8 0.0 5. -1.4 0.0 10.
370- C 0. 1.44 0.0 3. 2.88 0.0 8. 4.32 0.0 9.
371- C -5.7 1.4 2. -2.8 1.4 5. -1.4 1.4 10.
372- C 0. 1.4 5. 1.44 1.4 3. 2.88 1.4 8. 4.32 1.4 9.
373- C -5.7 2.9 2. -4.3 2.9 1. -2.8 2.9 5. -1.4 2.9 10.
374- C 0. 2.9 5. 1.44 2.9 3. 2.88 2.9 8. 4.32 2.9 9.
375- C -5.7 4.3 2. -4.3 4.3 1. -2.8 4.3 5. -1.4 4.3 10.
376- C 0. 4.3 5. 1.44 4.3 3. 2.88 4.3 8. 4.32 4.3 9.
377- MATERIAL SPECIFICATIONS
378- C WATER AT 300 K d=1.0000 g/cc w/ 26% Fe2O3 w/ 5% B10
379- M1 1001.50C 4.9490-2 8016.50C 4.0160-2 26000.55C 1.0277-2
380- 5010.50C 2.8870-6
381- MT1 LWTR.01T
382- C 3.00%/20 GWD 15000 yr decay 1000 yr crit
383- M2 8016.50C 4.6947E-02
384- 42095.50C 2.8540E-05
385- 43099.50C 2.6777E-05
386- 44101.50C 2.6127E-05
387- 45103.50C 1.6846E-05
388- 47109.50C 2.4208E-06
389- 60143.50C 2.2744E-05
390- 60145.50C 1.6947E-05
391- 62147.50C 7.3829E-06
392- 62149.50C 9.5390E-08
393- 62150.50C 6.4882E-06
394- 62151.50C 2.4010E-09
395- 63151.55C 4.8817E-07
396- 62152.50C 2.9715E-06
397- 63153.55C 2.1334E-06
398- 64155.50C 2.1214E-07
399- 64157.50C 1.8105E-09
400- 48000.50C 1.9107E-06
401- 54131.50C 1.2691E-05
402- 55133.50C 3.0978E-05
403- 92233.50C 1.3328E-07
404- 92234.50C 5.5552E-06
405- 92235.50C 3.7030E-04
406- 92236.50C 9.9960E-05
407- 92238.50C 2.2352E-02
408- 93237.55C 2.7474E-05
409- 94238.50C 8.5464E-09
410- 94239.55C 8.4602E-05
411- 94240.50C 6.5193E-06
412- 94241.50C 1.5681E-09
413- 94242.50C 3.4117E-06
414- 95241.50C 3.7655E-08
415- 95242.50C 9.4492E-12
416- 95243.50C 1.1887E-07

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417- C WATER AT 300 K d=1.0000 g/cc
418- M3 1001.50C 6.6878-2 8016.50C 3.3439-2
419- MT3 LWTR.01T
420- C Air d=0.001225 g/cc
421- M3 7014.50C -0.80 8016.50C -0.20
422- C ZIRCALOY-4 d=6.56 g/cc
423- M4 8016.50C -0.0012 24000.50C -0.0010 26000.55C -0.0020
424- 40000.50C -0.9818 50000.35C -0.0140
425- C ALLOY 825 d=8.14 g/cc
426- M5 6000.50C -0.0005 13027.50C -0.0020 14000.50C -0.0050
427- 16032.50C -0.0003 22000.50C -0.0090 24000.50C -0.2150
428- 25055.50C -0.0100 26000.55C -0.2857 28000.50C -0.4200
429- 29000.50C -0.0225 42000.50C -0.0300
430- C Oxidized A516 CARBON STEEL and Water Mixture d=7.832 g/cc
431- M6 6000.50C -0.00220 14000.50C -0.002750 15031.50C -0.00035
432- 16032.50C -0.00035 25055.50C -0.0090
433- 26000.55C -0.98535
434- C A516 CARBON STEEL d=7.832 g/cc
435- M7 6000.50C -0.00220 14000.50C -0.002750 15031.50C -0.00035
436- 16032.50C -0.00035 25055.50C -0.0090
437- 26000.55C -0.98535
438- C SS316B6A 1.6% d=7.77 g/cc
439- M8 5010.50C -0.00288 5011.50C -0.013120
440- 6000.50C -0.00030 7014.50C -0.00100 14000.50C -0.0075
441- 15031.50C -0.00045 16032.50C -0.00030 24000.50C -0.19000
442- 25055.50C -0.02000 26000.55C -0.60445 28000.50C -0.13500
443- 42000.50C -0.02500
444- C SS316B3A 0.87wt% B d=7.83 g/cc
445- M9 5010.50C -0.001566 5011.50C -0.007134
446- 6000.50C -0.00030 7014.50C -0.00100 14000.50C -0.00750
447- 15031.50C -0.00045 16032.50C -0.00030 24000.50C -0.19000
448- 25055.50C -0.02000 26000.55C -0.60445 28000.50C -0.13500
449- 42000.50C -0.02500
450- C Al 6063 d=2.69 g/cc
451- M10 12000.50C -0.00675 13027.50C -0.98125 14000.50C -0.00400
452- 22000.50C -0.00150 24000.50C -0.00100 25055.50C -0.00100
453- 26000.55C -0.00350 29000.50C -0.00100
454- C TALLIES
455- PRINT
456-

```

1 initial source from file srctp
1problem summary

run terminated when 97 kcode cycles were done.

+ AUCF - B&W 15x15 FUEL,21 ASSEMBLY DBF CS/SS-B Corroded & collapsed - (a26xb5d) probid = 08/22/96 21:47:49
0 08/22/96 17:36:25

neutron creation	tracks	weight (per source particle)	energy	neutron loss	tracks	weight (per source particle)	energy
source	387082	1.0024E+00	2.0569E+00	escape	3	4.2712E-06	2.1235E-05
				energy cutoff	0	0.	0.
				time cutoff	0	0.	0.
weight window	0	0.	0.	weight window	0	0.	0.
cell importance	0	0.	0.	cell importance	0	0.	0.
weight cutoff	0	5.0178E-02	2.3040E-06	weight cutoff	387754	5.0286E-02	6.6705E-06
energy importance	0	0.	0.	energy importance	0	0.	0.
dextran	0	0.	0.	dextran	0	0.	0.
forced collisions	0	0.	0.	forced collisions	0	0.	0.
exp. transform	0	0.	0.	exp. transform	0	0.	0.

upscattering	0	0.	7.4166E-08	downscattering	0	0.	1.9217E+00
(n,xn)	1349	2.7469E-03	2.0453E-03	capture	0	6.5703E-01	3.6044E-02
fission	0	0.	0.	loss to (n,xn)	674	1.3724E-03	1.1617E-02
total	388431	1.0553E+00	2.0589E+00	loss to fission	0	3.4660E-01	8.9473E-02
				total	388431	1.0553E+00	2.0589E+00

number of neutrons banked	675	average lifetime, shakes		cutoffs	
neutron tracks per source particle	1.0035E+00	escape	9.9733E+03	tco	1.0000E+34
neutron collisions per source particle	4.6435E+01	capture	2.3235E+03	eco	.0000E+00
total neutron collisions	17974161	capture or escape	2.3235E+03	wc1	-5.0000E-01
net multiplication	1.0014E+00 .0001	any termination	2.4866E+03	wc2	-2.5000E-01

computer time so far in this run	115.30 minutes	maximum number ever in bank	2
computer time in mcrun	115.19 minutes	bank overflows to backup file	0
source particles per minute	3.3603E+03	field length	0
random numbers generated	251752202	most random numbers used was	11029 in history 177534

range of sampled source weights = 9.4496E-01 to 1.1287E+00
 1keff results for: AUCF - B&W 15x15 FUEL,21 ASSEMBLY DBF CS/SS-B Corroded & collapsed - (a26xb5d) probid = 08/22/96 17:36:25

the initial fission neutron source distribution was read from the srctp file named srctp .
 the criticality problem was scheduled to skip 7 cycles and run a total of 97 cycles with nominally 4000 neutrons per cycle.
 this problem has run 7 inactive cycles with 27659 neutron histories and 90 active cycles with 359423 neutron histories.

this calculation has completed the requested number of keff cycles using a total of 387082 fission neutron source histories.

XX

the following cells with fissionable material had no neutron tracks entering:
 97

the following cells with fissionable material had no neutron collisions:
 97

the following cells with fissionable material had no fission source points:
 97

warning. 1 fissionable cells had no tracks entering, 1 cells had no collisions, and 1 cells had no fission source points.
 the keff results could be too small because these cells with fissionable material were not sampled.

XX

the results of the w test for normality applied to the individual collision, absorption, and track-length keff cycle values are:

the k(collision) cycle values appear normally distributed at the 95 percent confidence level
 the k(absorption) cycle values appear normally distributed at the 95 percent confidence level
 the k(trk length) cycle values appear normally distributed at the 95 percent confidence level

 the final estimated combined collision/absorption/track-length keff = .89888 with an estimated standard deviation of .00096
 the estimated 68, 95, & 99 percent keff confidence intervals are .89792 to .89984, .89696 to .90080, and .89634 to .90142
 the estimated collision/absorption neutron removal lifetime = 2.33E-05 seconds with an estimated standard deviation of 5.63E-08

the estimated average keffs, one standard deviations, and 68, 95, and 99 percent confidence intervals are:

keff estimator	keff	standard deviation	68% confidence	95% confidence	99% confidence	corr
collision	.89997	.00113	.89884 to .90110	.89772 to .90222	.89698 to .90296	
absorption	.89758	.00111	.89647 to .89870	.89537 to .89980	.89464 to .90052	
track length	.90063	.00134	.89928 to .90197	.89795 to .90330	.89708 to .90418	
col/absorp	.89874	.00097	.89778 to .89971	.89682 to .90067	.89619 to .90130	.4106
abs/trk len	.89872	.00099	.89773 to .89971	.89675 to .90069	.89611 to .90134	.2656
col/trk len	.90011	.00112	.89899 to .90123	.89788 to .90235	.89715 to .90307	.7102
col/abs/trk len	.89888	.00096	.89792 to .89984	.89696 to .90080	.89634 to .90142	

1mcpn version 4a ld=10/01/93 08/20/96 21:00:04

 inp=a26xb5e outp=a26xb5e0

probid = 08/20/96 21:00:04

```

1- AUCF - B&W 15x15 FUEL,21 ASSEMBLY DBF CS/SS-B Corroded & collapsed - (a26xb5e)
2- C Advanced Uncanistered Fuel Waste Package, collapsed basket 10k 26%/5%B
3- C 15000 year decay 1000 yr criticality
4- C CELL SPECIFICATIONS
5- C Assembly Sub-lattices - 1/2 Model
6- 1 0 1 3 -13 -20 FILL=1 (0 -74 0) IMP:N=1
7- C 1 0 1 3 -4 -13 -20 FILL=1 (0 -73.8 0) IMP:N=1
8- C 2 0 3 4 -5 -13 -20 FILL=1 (0 -73.8 0) IMP:N=1
9- C 3 0 3 5 -13 -20 FILL=1 (0 -73.8 0) IMP:N=1
10- C Assembly Sub-lattices - 1/4 Model
11- C 1 0 1 2 3 -4 -13 -20 FILL=1 (0 -12.3 0) IMP:N=1
12- C 2 0 2 3 4 -5 -13 -20 FILL=1 (0 -12.3 0) IMP:N=1
13- C 3 0 2 3 5 -13 -20 FILL=1 (0 -12.3 0) IMP:N=1
14- C ASSEMBLY LATTICE DESCRIPTION
15- 5 1 -2.1024 -61 60 -63 62 IMP:N=1 LAT=1 U=1
16- FILL=0:3 0:7 0:0 1 1 1 1 56 56 1 1 56 56 56 1
17- 56 56 56 1 56 56 56 1 56 56 1 1
18- 1 1 1 1 1 1 1 $ 1/2 model
19- C 5 1 -2.1024 60 -61 62 -63 IMP:N=1 LAT=1 U=1
20- C FILL=0:3 0:3 0:0 58 58 64 70 58 58 62 70
21- C 60 62 70 1 70 70 1 1 $ 1/4 model
22- C BARRIER CELLS
23- C Basket Material-Lid Gap
24- 76 3 -1.0000 1 -20 15 -14 IMP:N=1 $ 1/2 model
25- C 76 1 -2.1024 1 2 -20 13 -14 IMP:N=1 $ 1/4 model
26- C Inner Barrier
27- 77 5 -8.1400 1 3 20 -21 -14 IMP:N=1 $ 1/2 model
28- C 77 5 -8.1400 1 2 3 20 -21 -14 IMP:N=1 $ 1/4 model
29- C Inner Lid
30- 78 5 -8.1400 1 14 -15 -21 IMP:N=1 $ 1/2 model
31- C 78 5 -8.1400 1 2 14 -15 -21 IMP:N=1 $ 1/4 model
32- C Gap between Inner and Outer Barrier Lids
33- 79 3 -1.0000 1 15 -16 -21 IMP:N=1 $ 1/2 model
34- C 79 1 -2.1024 1 2 15 -16 -21 IMP:N=1 $ 1/4 model
35- C Gap between Inner and Outer Barriers
36- 80 3 -1.0000 21 -22 1 3 -16 IMP:N=1 $ 1/2 model
37- C 80 1 -2.1024 21 -22 1 2 3 -16 IMP:N=1 $ 1/4 model
38- C Outer Barrier
39- 81 7 -7.8320 22 -24 1 3 -16 IMP:N=1 $ 1/2 model
40- C 81 7 -7.8320 22 -24 1 2 3 -16 IMP:N=1 $ 1/4 model
41- C Outer Barrier Lid
42- 82 7 -7.8320 1 -24 16 -17 IMP:N=1 $ 1/2 model
43- C 82 7 -7.8320 1 2 -24 16 -17 IMP:N=1 $ 1/4 model
44- C 12" of Water around Container
45- 83 3 -1.0000 24 -25 1 3 -17 IMP:N=1 $ 1/2 model
46- C 83 1 -2.1024 24 -25 1 2 3 -17 IMP:N=1 $ 1/4 model
47- C 12" of Water above Container
48- 84 3 -1.0000 17 -19 1 -25 IMP:N=1 $ 1/2 model
49- C 84 1 -2.1024 17 -19 1 2 -19 IMP:N=1 $ 1/4 model
50- C OUTSIDE WORLD
51- 85 0 -1:-3:19:25 IMP:N=0 $ 1/2 model
52- C 85 0 -1:-2:-3:19:25 IMP:N=0 $ 1/4 model
53- C WET PIN LATTICE DESCRIPTION
54- 86 1 -2.1024 -26 27 -28 29 IMP:N=1 LAT=1 U=56
55- FILL -8:8 -8:8 0:0 56 16R 56 2 14R 56 56 2 14R 56
56- 56 2 4R 4 2 2R 4 2 4R 56
  
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57-          56 2 2R 4 2 6R 4 2 2R 56 56 2 14R 56
58-          56 2 2 4 2 2 4 2 2R 4 2 2 4 2 2 56
59-          56 2 14R 56
60-          56 2 6R 6 2 6R 56
61-          56 2 14R 56
62-          56 2 2 4 2 2 4 2 2R 4 2 2 4 2 2 56
63-          56 2 14R 56 56 2 2R 4 2 6R 4 2 2R 56
64-          56 2 4R 4 2 2R 4 2 4R 56
65-          56 2 14R 56 56 2 14R 56 56 16R
66- C          MIXED PIN LATTICE DESCRIPTION
67-   87 3 -0.001225 -26 27 -28 29 IMP:N=1 LAT=1 U=72
68-   C          FILL -8:8 -8:8 0:0 57 16R 57 3 14R 57 57 3 14R 57
69-   C          57 3 4R 5 3 2R 5 3 4R 57
70-   C          57 3 2R 5 3 6R 5 3 2R 57 57 3 14R 57
71-   C          57 3 3 5 3 3 5 3 2R 5 3 3 5 3 3 57
72-   C          57 3 14R 57
73-   C          57 3 6R 7 3 6R 57
74-   C          57 2 14R 57
75-   C          57 2 2 4 2 2 4 2 2R 4 2 2 4 2 2 57
76-   C          57 2 14R 57 57 2 2R 4 2 6R 4 2 2R 57
77-   C          57 2 4R 4 2 2R 4 2 4R 57
78-   C          57 2 14R 57 57 2 14R 57 57 16R
79- C          DRY PIN LATTICE DESCRIPTION
80-   88 3 -0.001225 -26 27 -28 29 IMP:N=1 LAT=1 U=57
81-   C          FILL -8:8 -8:8 0:0 57 16R 57 3 14R 57 57 3 14R 57
82-   C          57 3 4R 5 3 2R 5 3 4R 57
83-   C          57 3 2R 5 3 6R 5 3 2R 57 57 3 14R 57
84-   C          57 3 3 5 3 3 5 3 2R 5 3 3 5 3 3 57
85-   C          57 3 14R 57
86-   C          57 3 6R 7 3 6R 57
87-   C          57 3 14R 57
88-   C          57 3 3 5 3 3 5 3 2R 5 3 3 5 3 3 57
89-   C          57 3 14R 57 57 3 2R 5 3 6R 5 3 2R 57
90-   C          57 3 4R 5 3 2R 5 3 4R 57
91-   C          57 3 14R 57 57 3 14R 57 57 16R
92- C          WET FUEL ROD
93-   89 2 7.0104E-02 -30 -10 IMP:N=1 U=2
94-   90 4 -6.5600 -30 10 -11 IMP:N=1 U=2
95-   91 1 -2.1024 -30 11 IMP:N=1 U=2
96-   92 1 -2.1024 30 -31 -11 IMP:N=1 U=2
97-   93 1 -2.1024 30 -31 11 IMP:N=1 U=2
98-   94 4 -6.5600 31 -32 -11 IMP:N=1 U=2
99-   95 1 -2.1024 31 -32 11 IMP:N=1 U=2
100-  96 1 -2.1024 32 IMP:N=1 U=2
101- C          DRY FUEL ROD
102-  97 2 7.0104E-02 -30 -10 IMP:N=1 U=3
103-  98 4 -6.5600 -30 10 -11 IMP:N=1 U=3
104-  99 3 -0.001225 -30 11 IMP:N=1 U=3
105-  100 3 -0.001225 30 -31 -11 IMP:N=1 U=3
106-  101 3 -0.001225 30 -31 11 IMP:N=1 U=3
107-  102 4 -6.5600 31 -32 -11 IMP:N=1 U=3
108-  103 3 -0.001225 31 -32 11 IMP:N=1 U=3
109-  104 3 -0.001225 32 IMP:N=1 U=3
110- C          WET CONTROL ROD/GUIDE TUBE
111-  105 1 -2.1024 -33 IMP:N=1 U=4 $ No DCRA Rod
112-   C 105 9 -7.8300 +33 IMP:N=1 U=4 $ DCRA Rod
113-  106 1 -2.1024 33 -34 IMP:N=1 U=4
114-  107 1 -2.1024 34 -35 IMP:N=1 U=4 $ No DCRA Cladding
115-   C 107 4 -6.5600 34 -35 IMP:N=1 U=4 $ DCRA Cladding
116-  108 1 -2.1024 35 -36 IMP:N=1 U=4

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117- 109 4 -6.5600 36 -37 IMP:N=1 U=4
118- 110 1 -2.1024 37 IMP:N=1 U=4
119- C DRY CONTROL ROD/GUIDE TUBE
120- 111 3 -0.001225 -33 IMP:N=1 U=5 $ No DCRA Rod
121- C 111 9 -7.8300 -33 IMP:N=1 U=5 $ DCRA Rod
122- 112 3 -0.001225 33 -34 IMP:N=1 U=5
123- 113 3 -0.001225 34 -35 IMP:N=1 U=5 $ No DCRA Cladding
124- C 113 4 -6.5600 34 -35 IMP:N=1 U=5 $ DCRA Cladding
125- 114 3 -0.001225 35 -36 IMP:N=1 U=5
126- 115 4 -6.5600 36 -37 IMP:N=1 U=5
127- 116 3 -0.001225 37 IMP:N=1 U=5
128- C WET INSTRUMENTATION TUBE
129- 117 1 -2.1024 -38 IMP:N=1 U=6
130- 118 4 -6.5600 38 -39 IMP:N=1 U=6
131- 119 1 -2.1024 39 IMP:N=1 U=6
132- C DRY INSTRUMENTATION TUBE
133- 120 3 -0.001225 -38 IMP:N=1 U=7
134- 121 4 -6.5600 38 -39 IMP:N=1 U=7
135- 122 3 -0.001225 39 IMP:N=1 U=7
136- C FUEL CELL BASKET STRUCTURE
137- C Code: boron in [B=] all panels [all], left [l], bottom, [b], right [r], to
138- C FUEL CELL BASKET STRUCTURE - WET - Borated panels
139- C WATER GAP - ASSEMBLY LEFT
140- 123 1 -2.1024 52 IMP:N=1 U=8
141- C 123 1 -2.1024 48 IMP:N=1 U=8
142- C OXIDATION LAYER CS TUBE - ASSEMBLY LEFT
143- C 124 6 -7.8320 -48 52 IMP:N=1 U=8
144- C CS TUBE - ASSEMBLY LEFT
145- C 125 7 -7.8320 -52 56 IMP:N=1 U=8
146- C SS PANEL - ASSEMBLY LEFT
147- 126 8 -7.7700 -52 IMP:N=1 U=8
148- C WATER GAP - ASSEMBLY BOTTOM
149- 127 1 -2.1024 53 IMP:N=1 U=9
150- C 127 1 -2.1024 49 IMP:N=1 U=9
151- C OXIDATION LAYER CS TUBE - ASSEMBLY BOTTOM
152- C 128 6 -7.8320 -49 53 IMP:N=1 U=9
153- C CS TUBE - ASSEMBLY BOTTOM
154- C 129 7 -7.8320 -53 57 IMP:N=1 U=9
155- C SS PANEL - ASSEMBLY BOTTOM
156- 130 8 -7.7700 -53 IMP:N=1 U=9
157- C WATER GAP - ASSEMBLY RIGHT
158- 131 1 -2.1024 -54 IMP:N=1 U=10
159- C 131 1 -2.1024 -50 IMP:N=1 U=10
160- C OXIDATION LAYER CS TUBE - ASSEMBLY RIGHT
161- C 132 6 -7.8320 50 -54 IMP:N=1 U=10
162- C CS TUBE - ASSEMBLY RIGHT
163- C 133 7 -7.8320 54 -58 IMP:N=1 U=10
164- C SS PANEL - ASSEMBLY RIGHT
165- 134 8 -7.7700 54 IMP:N=1 U=10
166- C WATER GAP - ASSEMBLY TOP
167- 135 1 -2.1024 -55 IMP:N=1 U=11
168- C 135 1 -2.1024 -51 IMP:N=1 U=11
169- C OXIDATION LAYER CS TUBE - ASSEMBLY TOP
170- C 136 6 -7.8320 51 -55 IMP:N=1 U=11
171- C CS TUBE - ASSEMBLY TOP
172- C 137 7 -7.8320 55 -59 IMP:N=1 U=11
173- C SS PANEL - ASSEMBLY TOP
174- 138 8 -7.7700 55 IMP:N=1 U=11
175- C FUEL CELL BASKET STRUCTURE - DRY - Borated panels
176- C GAP - ASSEMBLY LEFT

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177-	C	139	3	-0.001225	52			IMP:N=1 U=12
178-	C	139	3	-0.001225	48			IMP:N=1 U=12
179-	C			OXIDATION LAYER CS TUBE - ASSEMBLY LEFT				
180-	C	140	6	-7.8320	-48	52		IMP:N=1 U=12
181-	C			CS TUBE - ASSEMBLY LEFT				
182-	C	141	7	-7.8320	-52	56		IMP:N=1 U=12
183-	C			SS PANEL - ASSEMBLY LEFT				
184-	C	142	8	-7.7700	-52			IMP:N=1 U=12
185-	C			GAP - ASSEMBLY BOTTOM				
186-	C	143	3	-0.001225	53			IMP:N=1 U=13
187-	C	143	3	-0.001225	49			IMP:N=1 U=13
188-	C			OXIDATION LAYER CS TUBE - ASSEMBLY BOTTOM				
189-	C	144	6	-7.8320	-49	53		IMP:N=1 U=13
190-	C			CS TUBE - ASSEMBLY BOTTOM				
191-	C	145	7	-7.8320	-53	57		IMP:N=1 U=13
192-	C			SS PANEL - ASSEMBLY BOTTOM				
193-	C	146	8	-7.7700	-53			IMP:N=1 U=13
194-	C			GAP - ASSEMBLY RIGHT				
195-	C	147	3	-0.001225	-54			IMP:N=1 U=14
196-	C	147	3	-0.001225	-50			IMP:N=1 U=14
197-	C			OXIDATION LAYER CS TUBE - ASSEMBLY RIGHT				
198-	C	148	6	-7.8320	50	-54		IMP:N=1 U=14
199-	C			CS TUBE - ASSEMBLY RIGHT				
200-	C	149	7	-7.8320	54	-58		IMP:N=1 U=14
201-	C			SS PANEL - ASSEMBLY RIGHT				
202-	C	150	8	-7.7700	54			IMP:N=1 U=14
203-	C			GAP - ASSEMBLY TOP				
204-	C	151	3	-0.001225	-55			IMP:N=1 U=15
205-	C	151	3	-0.001225	-51			IMP:N=1 U=15
206-	C			OXIDATION LAYER CS TUBE - ASSEMBLY TOP				
207-	C	152	6	-7.8320	51	-55		IMP:N=1 U=15
208-	C			CS TUBE - ASSEMBLY TOP				
209-	C	153	7	-7.8320	55	-59		IMP:N=1 U=15
210-	C			SS PANEL - ASSEMBLY TOP				
211-	C	154	8	-7.7700	55			IMP:N=1 U=15
212-	C			FUEL CELL BASKET STRUCTURE - WET - Unborated panels				
213-	C			WATER GAP - ASSEMBLY LEFT				
214-	C	155	1	-2.1024	52			IMP:N=1 U=16
215-	C	155	1	-2.1024	48			IMP:N=1 U=16
216-	C			OXIDATION LAYER CS TUBE - ASSEMBLY LEFT				
217-	C	156	6	-7.8320	-48	52		IMP:N=1 U=16
218-	C			CS TUBE - ASSEMBLY LEFT				
219-	C	157	7	-7.8320	-52	56		IMP:N=1 U=16
220-	C			PANEL - ASSEMBLY LEFT				
221-	C	158	1	-2.1024	-52			IMP:N=1 U=16
222-	C			WATER GAP - ASSEMBLY BOTTOM				
223-	C	159	1	-2.1024	53			IMP:N=1 U=17
224-	C	159	1	-2.1024	49			IMP:N=1 U=17
225-	C			OXIDATION LAYER CS TUBE - ASSEMBLY BOTTOM				
226-	C	160	6	-7.8320	-49	53		IMP:N=1 U=17
227-	C			CS TUBE - ASSEMBLY BOTTOM				
228-	C	161	7	-7.8320	-53	57		IMP:N=1 U=17
229-	C			PANEL - ASSEMBLY BOTTOM				
230-	C	162	1	-2.1024	-53			IMP:N=1 U=17
231-	C			WATER GAP - ASSEMBLY RIGHT				
232-	C	163	1	-2.1024	-54			IMP:N=1 U=18
233-	C	163	1	-2.1024	-50			IMP:N=1 U=18
234-	C			OXIDATION LAYER CS TUBE - ASSEMBLY RIGHT				
235-	C	164	6	-7.8320	50	-54		IMP:N=1 U=18
236-	C			CS TUBE - ASSEMBLY RIGHT				

237- C 165 7 -7.8320 54 -58 IMP:N=1 U=18
 238- C PANEL - ASSEMBLY RIGHT
 239- 166 1 -2.1024 54 IMP:N=1 U=18
 240- C WATER GAP - ASSEMBLY TOP
 241- 167 1 -2.1024 -55 IMP:N=1 U=19
 242- C 167 1 -2.1024 -51 IMP:N=1 U=19
 243- C OXIDATION LAYER CS TUBE - ASSEMBLY TOP
 244- C 168 6 -7.8320 51 -55 IMP:N=1 U=19
 245- C CS TUBE - ASSEMBLY TOP
 246- C 169 7 -7.8320 55 -59 IMP:N=1 U=19
 247- C PANEL - ASSEMBLY TOP
 248- 170 1 -2.1024 55 IMP:N=1 U=19
 249- C FUEL CELL BASKET STRUCTURE - DRY - Unborated panels
 250- C GAP - ASSEMBLY LEFT
 251- 171 3 -0.001225 52 IMP:N=1 U=20
 252- C 171 3 -0.001225 48 IMP:N=1 U=20
 253- C OXIDATION LAYER CS TUBE - ASSEMBLY LEFT
 254- C 172 6 -7.8320 -48 52 IMP:N=1 U=20
 255- C CS TUBE - ASSEMBLY LEFT
 256- C 173 7 -7.8320 -52 56 IMP:N=1 U=20
 257- C PANEL - ASSEMBLY LEFT
 258- 174 3 -0.001225 -52 IMP:N=1 U=20
 259- C GAP - ASSEMBLY BOTTOM
 260- 175 3 -0.001225 53 IMP:N=1 U=21
 261- C 175 3 -0.001225 49 IMP:N=1 U=21
 262- C OXIDATION LAYER CS TUBE - ASSEMBLY BOTTOM
 263- C 176 6 -7.8320 -49 53 IMP:N=1 U=21
 264- C CS TUBE - ASSEMBLY BOTTOM
 265- C 177 7 -7.8320 -53 57 IMP:N=1 U=21
 266- C PANEL - ASSEMBLY BOTTOM
 267- 178 3 -0.001225 -53 IMP:N=1 U=21
 268- C GAP - ASSEMBLY RIGHT
 269- 179 3 -0.001225 -54 IMP:N=1 U=22
 270- C 179 3 -0.001225 -50 IMP:N=1 U=22
 271- C OXIDATION LAYER CS TUBE - ASSEMBLY RIGHT
 272- C 180 6 -7.8320 50 -54 IMP:N=1 U=22
 273- C CS TUBE - ASSEMBLY RIGHT
 274- C 181 7 -7.8320 54 -58 IMP:N=1 U=22
 275- C PANEL - ASSEMBLY RIGHT
 276- 182 3 -0.001225 54 IMP:N=1 U=22
 277- C GAP - ASSEMBLY TOP
 278- 183 3 -0.001225 -55 IMP:N=1 U=23
 279- C 183 3 -0.001225 -51 IMP:N=1 U=23
 280- C OXIDATION LAYER CS TUBE - ASSEMBLY TOP
 281- C 184 6 -7.8320 51 -55 IMP:N=1 U=23
 282- C CS TUBE - ASSEMBLY TOP
 283- C 185 7 -7.8320 55 -59 IMP:N=1 U=23
 284- C PANEL - ASSEMBLY TOP
 285- 186 3 -0.001225 55 IMP:N=1 U=23
 286-

287- C SURFACE SPECIFICATIONS
 288- 1* PX 0.0
 289- C 2* PY 0.00 \$ For 1/4 Model
 290- 3* PZ 0.00
 291- C 4 PX 12.30 \$ For Collapsed Model
 292- C 5 PX 36.90 \$ For Collapsed Model
 293- C 6 PY 12.30 \$ Water Level Surface
 294- C 7 PY 36.90 \$ Water Level Surface
 295- C 8 PY -12.30 \$ Water Level Surface
 296- C 9 PY -36.90 \$ Water Level Surface

297-	10	PZ	180.0860	\$ TOP ACTIVE FUEL
298-	11	PZ	201.2360	\$ TOP FUEL HARDWARE
299-	C	12	PZ 226.75	\$ TOP TUBE - (Shielding Model)
300-	13	PZ	228.75	\$ TOP OF BASKET MATERIAL
301-	14	PZ	229.25	\$ TOP RING/WATER GAP
302-	15	PZ	231.75	\$ TOP INNER LID
303-	16	PZ	234.75	\$ TOP LID GAP
304-	17	PZ	245.75	\$ TOP OUTER LID
305-	C	18	PZ 268.25	\$ TOP SKIRT - (Shielding Model)
306-	19	PZ	298.75	\$ TOP REFLECTOR REGION
307-	20	CZ	71.095	\$ ID OF INNER BARRIER
308-	21	CZ	73.095	\$ OD OF INNER BARRIER
309-	22	CZ	73.10	\$ ID OF OUTER BARRIER
310-	C	23	CZ 76.45	\$ ID OF SKIRT LIP - (Shielding Model)
311-	24	CZ	83.10	\$ OD OF OUTER BARRIER
312-	25	CZ	113.60	\$ OD OF REFLECTOR REGION
313-	C		PIN LATTICE BOUNDS	
314-	26	PX	0.72136	
315-	27	PX	-0.72136	
316-	28	PY	0.72136	
317-	29	PY	-0.72136	
318-	C		FUEL ROD	
319-	30	CZ	0.468122	
320-	31	CZ	0.478790	
321-	32	CZ	0.546100	
322-	C		CONTROL ROD/GUIDE TUBE	
323-	33	CZ	0.45340	\$ 0.49022
324-	34	CZ	0.46990	\$ 0.50292
325-	35	CZ	0.54610	\$ 0.56007
326-	36	CZ	0.62230	\$ 0.63246
327-	37	CZ	0.67310	
328-	C		INSTRUMENTATION TUBE	
329-	38	CZ	0.56007	
330-	39	CZ	0.62611	
331-	C		ASSEMBLY LATTICE BOUNDS Actual	
332-	44	PX	-10.65	\$ ACTUAL 10.82025
333-	45	PY	-10.65	
334-	46	PX	10.65	
335-	47	PY	10.65	
336-	C	48	PX -11.0	\$ Corrosion Expansion Cards
337-	C	49	PY -11.0	
338-	C	50	PX 11.0	
339-	C	51	PY 11.0	
340-	52	PX	-10.650001	\$ UCF Intact Inside Tube ID
341-	53	PY	-10.650001	
342-	54	PX	10.650001	
343-	55	PY	10.650001	
344-	56	PX	-11.95	\$ UCF Intact Outside Tube ID
345-	57	PY	-11.95	
346-	58	PX	11.95	
347-	59	PY	11.95	
348-	C		FUEL CELL LATTICE BOUNDS	
349-	60	PX	-10.65	\$ ACTUAL 12.30
350-	61	PX	10.65	
351-	62	PY	-10.65	
352-	63	PY	10.65	
353-	C		45 degree planes	
354-	64	P	1. -1. 0. 0.	
355-	65	P	1. 1. 0. 0.	
356-	C		EXTRA CARDS	

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357-
358- MODE N
359- C VOL 88J
360- KCODE 4000 1. 7 97
361- C KSRC -4.3 -5.7 1. -2.8 -5.7 5. -1.4 -5.7 10. 0. -5.7 5.
362- C 1.44 -5.7 3. 2.88 -5.7 8. 4.32 -5.7 9.
363- C -5.7 -4.3 2. -4.3 -4.3 1. -2.8 -4.3 5. -1.4 -4.3 10.
364- C 0. -4.3 5. 1.44 -4.3 3. 2.88 -4.3 8. 4.32 -4.3 9.
365- C -5.7 -2.9 2. -4.3 -2.9 1. -1.4 -2.9 10.
366- C 0. -2.9 5. 2.88 -2.9 8. 4.32 -2.0 9.
367- C -5.7 -1.4 2. -4.3 -1.4 1. -2.8 -1.4 5. -1.4 -1.4 10.
368- C 0. -1.4 5. 1.44 -1.4 3. 2.88 -1.4 8. 4.32 -1.4 9.
369- C -5.7 0.0 2. -4.3 0.0 1. -2.8 0.0 5. -1.4 0.0 10.
370- C 1.44 0.0 3. 2.88 0.0 8. 4.32 0.0 9.
371- C -5.7 1.4 2. -2.8 1.4 5. -1.4 1.4 10.
372- C 0. 1.4 5. 1.44 1.4 3. 2.88 1.4 8. 4.32 1.4 9.
373- C -5.7 2.9 2. -4.3 2.9 1. -2.8 2.9 5. -1.4 2.9 10.
374- C 0. 2.9 5. 1.44 2.9 3. 2.88 2.9 8. 4.32 2.9 9.
375- C -5.7 4.3 2. -4.3 4.3 1. -2.8 4.3 5. -1.4 4.3 10.
376- C 0. 4.3 5. 1.44 4.3 3. 2.88 4.3 8. 4.32 4.3 9.
377- MATERIAL SPECIFICATIONS
378- C WATER AT 300 K d=1.0000 g/cc w/ 26% Fe2O3 w/ 5% B10
379- M1 1001.50C 4.9490-2 8016.50C 4.0160-2 26000.55C 1.0277-2
380- 5010.50C 2.8870-6
381- MT1 LWTR.01T
382- C 3.00%/20 GWD 15000 yr decay 5000 yr crit
383- M2 8016.50C 4.6947E-02
384- 42095.50C 2.9047E-05
385- 43099.50C 2.6777E-05
386- 44101.50C 2.6604E-05
387- 45103.50C 1.6963E-05
388- 47109.50C 2.4540E-06
389- 60143.50C 2.2997E-05
390- 60145.50C 1.7196E-05
391- 62147.50C 7.5058E-06
392- 62149.50C 6.3701E-08
393- 62150.50C 6.5926E-06
394- 62151.50C 2.4249E-09
395- 63151.55C 4.6823E-07
396- 62152.50C 2.9874E-06
397- 63153.55C 2.1806E-06
398- 64155.50C 1.1733E-07
399- 64157.50C 1.2504E-09
400- 48000.50C 1.9600E-06
401- 54131.50C 1.2875E-05
402- 55133.50C 3.1431E-05
403- 92233.50C 1.6324E-07
404- 92234.50C 5.7609E-06
405- 92235.50C 3.7337E-04
406- 92236.50C 1.0302E-04
407- 92238.50C 2.2352E-02
408- 93237.55C 2.7728E-05
409- 94238.50C 8.7993E-09
410- 94239.55C 7.7552E-05
411- 94240.50C 5.1653E-06
412- 94241.50C 1.2685E-09
413- 94242.50C 3.3520E-06
414- 95241.50C 3.8803E-08
415- 95242.50C 1.1289E-11
416- 95243.50C 1.0946E-07

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417- C WATER AT 300 K d=1.0000 g/cc
418- M3 1001.50C 6.6878-2 8016.50C 3.3439-2
419- MT3 LWTR.01T
420- C Air d=0.001225 g/cc
421- C M3 7014.50C -0.80 8016.50C -0.20
422- C ZIRCALOY-4 d=6.56 g/cc
423- M4 8016.50C -0.0012 24000.50C -0.0010 26000.55C -0.0020
424- 40000.50C -0.9818 50000.35C -0.0140
425- C ALLOY 825 d=8.14 g/cc
426- M5 6000.50C -0.0005 13027.50C -0.0020 14000.50C -0.0050
427- 16032.50C -0.0003 22000.50C -0.0090 24000.50C -0.2150
428- 25055.50C -0.0100 26000.55C -0.2857 28000.50C -0.4200
429- 29000.50C -0.0225 42000.50C -0.0300
430- C Oxidized A516 CARBON STEEL and Water Mixture d=7.832 g/cc
431- C M6 6000.50C -0.00220 14000.50C -0.002750 15031.50C -0.00035
432- C 16032.50C -0.00035 25055.50C -0.0090
433- C 26000.55C -0.98535
434- C A516 CARBON STEEL d=7.832 g/cc
435- M7 6000.50C -0.00220 14000.50C -0.002750 15031.50C -0.00035
436- 16032.50C -0.00035 25055.50C -0.0090
437- 26000.55C -0.98535
438- C SS316B6A 1.6% d=7.77 g/cc
439- M8 5010.50C -0.00288 5011.50C -0.013120
440- 6000.50C -0.00030 7014.50C -0.00100 14000.50C -0.0075
441- 15031.50C -0.00045 16032.50C -0.00030 24000.50C -0.19000
442- 25055.50C -0.02000 26000.55C -0.60445 28000.50C -0.13500
443- 42000.50C -0.02500
444- C SS316B3A 0.87wt% B d=7.83 g/cc
445- M9 5010.50C -0.001566 5011.50C -0.007134
446- C 6000.50C -0.00030 7014.50C -0.00100 14000.50C -0.00750
447- C 15031.50C -0.00045 16032.50C -0.00030 24000.50C -0.19000
448- C 25055.50C -0.02000 26000.55C -0.60445 28000.50C -0.13500
449- C 42000.50C -0.02500
450- C Al 6063 d=2.69 g/cc
451- M10 12000.50C -0.00675 13027.50C -0.98125 14000.50C -0.00400
452- C 22000.50C -0.00150 24000.50C -0.00100 25055.50C -0.00100
453- C 26000.55C -0.00350 29000.50C -0.00100
454- C TALLIES
455- PRINT
456-

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1 initial source from file srctp

1problem summary

run terminated when 97 kcode cycles were done.

+ AUCF - B&W 15x15 FUEL,21 ASSEMBLY DBF CS/SS-B Corroded & collapsed - (a26xb5e) probid = 08/20/96 22:55:23
0 08/20/96 21:00:04

neutron creation	tracks	weight (per source particle)	energy	neutron loss	tracks	weight (per source particle)	energy
source	388004	9.9999E-01	2.0600E+00	escape	10	1.7170E-05	3.6994E-05
				energy cutoff	0	0.	0.
				time cutoff	0	0.	0.
weight window	0	0.	0.	weight window	0	0.	0.
cell importance	0	0.	0.	cell importance	0	0.	0.
weight cutoff	0	5.1088E-02	7.4122E-06	weight cutoff	388630	5.1257E-02	5.9796E-06
energy importance	0	0.	0.	energy importance	0	0.	0.
dextran	0	0.	0.	dextran	0	0.	0.

forced collisions 0 0. 0. forced collisions 0 0. 0.
exp. transform 0 0. 0. exp. transform 0 0. 0.
upscattering 0 0. 7.5977E-08 downscattering 0 0. 1.9258E+00
capture 0 6.5312E-01 3.5701E-02
loss to (n,xn) 633 1.2827E-03 1.0840E-02
loss to fission 0 3.4797E-01 8.9545E-02
total 389273 1.0536E+00 2.0620E+00 total 389273 1.0536E+00 2.0620E+00

number of neutrons banked 636 average lifetime, shakes cutoffs
neutron tracks per source particle 1.0033E+00 escape 9.2675E+03 tco 1.0000E+34
neutron collisions per source particle 4.6989E+01 capture 2.3781E+03 eco .0000E+00
total neutron collisions 18231800 capture or escape 2.3782E+03 wc1 -5.0000E-01
net multiplication 1.0013E+00 .0001 any termination 2.5508E+03 wc2 -2.5000E-01

computer time so far in this run 115.20 minutes maximum number ever in bank 2
computer time in mcrun 115.10 minutes bank overflows to backup file 0
source particles per minute 3.3711E+03 field length 0
random numbers generated 254604968 most random numbers used was 10424 in history 346341

1keff results for: AUCF - B&W 15x15 FUEL,21 ASSEMBLY DBF CS/SS-B Corroded & collapsed - (a26xb5e) probid = 08/20/96 21:00:04

the initial fission neutron source distribution was read from the srctp file named srctp .
the criticality problem was scheduled to skip 7 cycles and run a total of 97 cycles with nominally 4000 neutrons per cycle.
this problem has run 7 inactive cycles with 27651 neutron histories and 90 active cycles with 360353 neutron histories.

this calculation has completed the requested number of keff cycles using a total of 388004 fission neutron source histories.

XX

the following cells with fissionable material had no neutron tracks entering:
97

the following cells with fissionable material had no neutron collisions:
97

the following cells with fissionable material had no fission source points:
97

warning. 1 fissionable cells had no tracks entering, 1 cells had no collisions, and 1 cells had no fission source points.
the keff results could be too small because these cells with fissionable material were not sampled.

XX

the results of the w test for normality applied to the individual collision, absorption, and track-length keff cycle values are:

- the k(collision) cycle values appear normally distributed at the 95 percent confidence level
the k(absorption) cycle values appear normally distributed at the 95 percent confidence level
the k(trk length) cycle values appear normally distributed at the 95 percent confidence level

the final estimated combined collision/absorption/track-length keff = .90061 with an estimated standard deviation of .00107
the estimated 68, 95, & 99 percent keff confidence intervals are .89955 to .90168, .89849 to .90274, and .89780 to .90343
the estimated collision/absorption neutron removal lifetime = 2.38E-05 seconds with an estimated standard deviation of 5.97E-08

 the estimated average keffs, one standard deviations, and 68, 95, and 99 percent confidence intervals are:

keff estimator	keff	standard deviation	68% confidence	95% confidence	99% confidence	corr
collision	.90078	.00131	.89946 to .90209	.89816 to .90340	.89731 to .90425	
absorption	.90042	.00118	.89924 to .90159	.89808 to .90276	.89731 to .90352	
track length	.90126	.00162	.89964 to .90288	.89803 to .90449	.89698 to .90554	
col/absorp	.90056	.00106	.89950 to .90163	.89844 to .90268	.89775 to .90337	.4650
abs/trk len	.90066	.00108	.89958 to .90174	.89851 to .90280	.89781 to .90351	.2902
col/trk len	.90079	.00132	.89947 to .90212	.89816 to .90343	.89730 to .90429	.7969
col/abs/trk len	.90061	.00107	.89955 to .90168	.89849 to .90274	.89780 to .90343	

1mcnp version 4a ld=10/01/93 08/20/96 21:00:04

 inp=a26xb5e outp=a26xb5e0

probid = 08/20/96 21:00:04

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1- AUCF - B&W 15x15 FUEL,21 ASSEMBLY DBF CS/SS-B Corroded & collapsed - (a26xb5e)
2- C Advanced Uncanistered Fuel Waste Package, collapsed basket 10k 26%/5%
3- C 15000 year decay 1000 yr criticality
4- C CELL SPECIFICATIONS
5- C Assembly Sub-lattices - 1/2 Model
6- 1 0 1 3 -13 -20 FILL=1 (0 -74 0) IMP:N=1
7- C 1 0 1 3 -4 -13 -20 FILL=1 (0 -73.8 0) IMP:N=1
8- C 2 0 3 4 -5 -13 -20 FILL=1 (0 -73.8 0) IMP:N=1
9- C 3 0 3 5 -13 -20 FILL=1 (0 -73.8 0) IMP:N=1
10- C Assembly Sub-lattices - 1/4 Model
11- C 1 0 1 2 3 -4 -13 -20 FILL=1 (0 -12.3 0) IMP:N=1
12- C 2 0 2 3 4 -5 -13 -20 FILL=1 (0 -12.3 0) IMP:N=1
13- C 3 0 2 3 5 -13 -20 FILL=1 (0 -12.3 0) IMP:N=1
14- C ASSEMBLY LATTICE DESCRIPTION
15- 5 1 -2.1024 -61 60 -63 62 IMP:N=1 LAT=1 U=1
16- FILL=0:3 0:7 0:0 1 1 1 1 56 56 1 1 56 56 56 1
17- 56 56 56 1 56 56 56 1 56 56 1 1
18- 1 1 1 1 1 1 1 $ 1/2 model
19- C 5 1 -2.1024 60 -61 62 -63 IMP:N=1 LAT=1 U=1
20- C FILL=0:3 0:3 0:0 58 58 64 70 58 58 62 70
21- C 60 62 70 1 70 70 1 1 $ 1/4 model
22- C BARRIER CELLS
23- C Basket Material-Lid Gap
24- 76 3 -1.0000 1 -20 13 -14 IMP:N=1 $ 1/2 model
25- C 76 1 -2.1024 1 2 -20 13 -14 IMP:N=1 $ 1/4 model
26- C Inner Barrier
27- 77 5 -8.1400 1 3 20 -21 -14 IMP:N=1 $ 1/2 model
28- C 77 5 -8.1400 1 2 3 20 -21 -14 IMP:N=1 $ 1/4 model
29- C Inner Lid
30- 78 5 -8.1400 1 14 -15 -21 IMP:N=1 $ 1/2 model
31- C 78 5 -8.1400 1 2 14 -15 -21 IMP:N=1 $ 1/4 model
32- C Gap between Inner and Outer Barrier Lids
33- 79 3 -1.0000 1 15 -16 -21 IMP:N=1 $ 1/2 model
34- C 79 1 -2.1024 1 2 15 -16 -21 IMP:N=1 $ 1/4 model
35- C Gap between Inner and Outer Barriers
36- 80 3 -1.0000 21 -22 1 3 -16 IMP:N=1 $ 1/2 model
37- C 80 1 -2.1024 21 -22 1 2 3 -16 IMP:N=1 $ 1/4 model
38- C Outer Barrier
39- 81 7 -7.8320 22 -24 1 3 -16 IMP:N=1 $ 1/2 model
40- C 81 7 -7.8320 22 -24 1 2 3 -16 IMP:N=1 $ 1/4 model
41- C Outer Barrier Lid
42- 82 7 -7.8320 1 -24 16 -17 IMP:N=1 $ 1/2 model
43- C 82 7 -7.8320 1 2 -24 16 -17 IMP:N=1 $ 1/4 model
44- C 12" of Water around Container
45- 83 3 -1.0000 24 -25 1 3 -17 IMP:N=1 $ 1/2 model
46- C 83 1 -2.1024 24 -25 1 2 3 -17 IMP:N=1 $ 1/4 model
47- C 12" of Water above Container
48- 84 3 -1.0000 17 -19 1 -25 IMP:N=1 $ 1/2 model
49- C 84 1 -2.1024 17 -58 1 2 -59 IMP:N=1 $ 1/4 model
50- C OUTSIDE WORLD
51- 85 0 -1:-3:19:25 IMP:N=0 $ 1/2 model
52- C 85 0 -1:-2:-3:19:25 IMP:N=0 $ 1/4 model
53- C WET PIN LATTICE DESCRIPTION
54- 86 1 -2.1024 -26 27 -28 29 IMP:N=1 LAT=1 U=56
55- FILL -8:8 -8:8 0:0 56 16R 56 2 14R 56 56 2 14R 56
56- 56 2 4R 4 2 2R 4 2 4R 56
  
```

57- 56 2 2R 4 2 6R 4 2 2R 56 56 2 14R 56
 58- 56 2 2 4 2 2 4 2 2R 4 2 2 4 2 2 56
 59- 56 2 14R 56
 60- 56 2 6R 6 2 6R 56
 61- 56 2 14R 56
 62- 56 2 2 4 2 2 4 2 2R 4 2 2 4 2 2 56
 63- 56 2 14R 56 56 2 2R 4 2 6R 4 2 2R 56
 64- 56 2 4R 4 2 2R 4 2 4R 56
 65- 56 2 14R 56 56 2 14R 56 56 16R

66- C MIXED PIN LATTICE DESCRIPTION
 67- C 87 3 -0.001225 -26 27 -28 29 IMP:N=1 LAT=1 U=72
 68- C FILL -8:8 -8:8 0:0 57 16R 57 3 14R 57 57 3 14R 57
 69- C 57 3 4R 5 3 2R 5 3 4R 57
 70- C 57 3 2R 5 3 6R 5 3 2R 57 57 3 14R 57
 71- C 57 3 3 5 3 3 5 3 2R 5 3 3 5 3 3 57
 72- C 57 3 14R 57
 73- C 57 3 6R 7 3 6R 57
 74- C 57 2 14R 57
 75- C 57 2 2 4 2 2 4 2 2R 4 2 2 4 2 2 57
 76- C 57 2 14R 57 57 2 2R 4 2 6R 4 2 2R 57
 77- C 57 2 4R 4 2 2R 4 2 4R 57
 78- C 57 2 14R 57 57 2 14R 57 57 16R

79- C DRY PIN LATTICE DESCRIPTION
 80- 88 3 -0.001225 -26 27 -28 29 IMP:N=1 LAT=1 U=57
 81- C FILL -8:8 -8:8 0:0 57 16R 57 3 14R 57 57 3 14R 57
 82- C 57 3 4R 5 3 2R 5 3 4R 57
 83- C 57 3 2R 5 3 6R 5 3 2R 57 57 3 14R 57
 84- C 57 3 3 5 3 3 5 3 2R 5 3 3 5 3 3 57
 85- C 57 3 14R 57
 86- C 57 3 6R 7 3 6R 57
 87- C 57 3 14R 57
 88- C 57 3 3 5 3 3 5 3 2R 5 3 3 5 3 3 57
 89- C 57 3 14R 57 57 3 2R 5 3 6R 5 3 2R 57
 90- C 57 3 4R 5 3 2R 5 3 4R 57
 91- C 57 3 14R 57 57 3 14R 57 57 16R

92- C WET FUEL ROD
 93- 89 2 7.0104E-02 -30 -10 IMP:N=1 U=2
 94- 90 4 -6.5600 -30 10 -11 IMP:N=1 U=2
 95- 91 1 -2.1024 -30 11 IMP:N=1 U=2
 96- 92 1 -2.1024 30 -31 -11 IMP:N=1 U=2
 97- 93 1 -2.1024 30 -31 11 IMP:N=1 U=2
 98- 94 4 -6.5600 31 -32 -11 IMP:N=1 U=2
 99- 95 1 -2.1024 31 -32 11 IMP:N=1 U=2
 100- 96 1 -2.1024 32 IMP:N=1 U=2

101- C DRY FUEL ROD
 102- 97 2 7.0104E-02 -30 -10 IMP:N=1 U=3
 103- 98 4 -6.5600 -30 10 -11 IMP:N=1 U=3
 104- 99 3 -0.001225 -30 11 IMP:N=1 U=3
 105- 100 3 -0.001225 30 -31 -11 IMP:N=1 U=3
 106- 101 3 -0.001225 30 -31 11 IMP:N=1 U=3
 107- 102 4 -6.5600 31 -32 -11 IMP:N=1 U=3
 108- 103 3 -0.001225 31 -32 11 IMP:N=1 U=3
 109- 104 3 -0.001225 32 IMP:N=1 U=3

110- C WET CONTROL ROD/GUIDE TUBE
 111- 105 1 -2.1024 -33 IMP:N=1 U=4 \$ No DCRA Rod
 112- C 105 9 -7.8300 +33 IMP:N=1 U=4 \$ DCRA Rod
 113- 106 1 -2.1024 33 -34 IMP:N=1 U=4
 114- 107 1 -2.1024 34 -35 IMP:N=1 U=4 \$ No DCRA Cladding
 115- C 107 4 -6.5600 34 -35 IMP:N=1 U=4 \$ DCRA Cladding
 116- 108 1 -2.1024 35 -36 IMP:N=1 U=4

177-	C	139	3	-0.001225	52			IMP:N=1 U=12
178-	C	139	3	-0.001225	48			IMP:N=1 U=12
179-	C			OXIDATION LAYER CS TUBE - ASSEMBLY LEFT				
180-	C	140	6	-7.8320	-48	52		IMP:N=1 U=12
181-	C			CS TUBE - ASSEMBLY LEFT				
182-	C	141	7	-7.8320	-52	56		IMP:N=1 U=12
183-	C			SS PANEL - ASSEMBLY LEFT				
184-	C	142	8	-7.7700	-52			IMP:N=1 U=12
185-	C			GAP - ASSEMBLY BOTTOM				
186-	C	143	3	-0.001225	53			IMP:N=1 U=13
187-	C	143	3	-0.001225	49			IMP:N=1 U=13
188-	C			OXIDATION LAYER CS TUBE - ASSEMBLY BOTTOM				
189-	C	144	6	-7.8320	-49	53		IMP:N=1 U=13
190-	C			CS TUBE - ASSEMBLY BOTTOM				
191-	C	145	7	-7.8320	-53	57		IMP:N=1 U=13
192-	C			SS PANEL - ASSEMBLY BOTTOM				
193-	C	146	8	-7.7700	-53			IMP:N=1 U=13
194-	C			GAP - ASSEMBLY RIGHT				
195-	C	147	3	-0.001225	-54			IMP:N=1 U=14
196-	C	147	3	-0.001225	-50			IMP:N=1 U=14
197-	C			OXIDATION LAYER CS TUBE - ASSEMBLY RIGHT				
198-	C	148	6	-7.8320	50	-54		IMP:N=1 U=14
199-	C			CS TUBE - ASSEMBLY RIGHT				
200-	C	149	7	-7.8320	54	-58		IMP:N=1 U=14
201-	C			SS PANEL - ASSEMBLY RIGHT				
202-	C	150	8	-7.7700	54			IMP:N=1 U=14
203-	C			GAP - ASSEMBLY TOP				
204-	C	151	3	-0.001225	-55			IMP:N=1 U=15
205-	C	151	3	-0.001225	-51			IMP:N=1 U=15
206-	C			OXIDATION LAYER CS TUBE - ASSEMBLY TOP				
207-	C	152	6	-7.8320	51	-55		IMP:N=1 U=15
208-	C			CS TUBE - ASSEMBLY TOP				
209-	C	153	7	-7.8320	55	-59		IMP:N=1 U=15
210-	C			SS PANEL - ASSEMBLY TOP				
211-	C	154	8	-7.7700	55			IMP:N=1 U=15
212-	C			FUEL CELL BASKET STRUCTURE - WET - Unborated panels				
213-	C			WATER GAP - ASSEMBLY LEFT				
214-	C	155	1	-2.1024	52			IMP:N=1 U=16
215-	C	155	1	-2.1024	48			IMP:N=1 U=16
216-	C			OXIDATION LAYER CS TUBE - ASSEMBLY LEFT				
217-	C	156	6	-7.8320	-48	52		IMP:N=1 U=16
218-	C			CS TUBE - ASSEMBLY LEFT				
219-	C	157	7	-7.8320	-52	56		IMP:N=1 U=16
220-	C			PANEL - ASSEMBLY LEFT				
221-	C	158	1	-2.1024	-52			IMP:N=1 U=16
222-	C			WATER GAP - ASSEMBLY BOTTOM				
223-	C	159	1	-2.1024	53			IMP:N=1 U=17
224-	C	159	1	-2.1024	49			IMP:N=1 U=17
225-	C			OXIDATION LAYER CS TUBE - ASSEMBLY BOTTOM				
226-	C	160	6	-7.8320	-49	53		IMP:N=1 U=17
227-	C			CS TUBE - ASSEMBLY BOTTOM				
228-	C	161	7	-7.8320	-53	57		IMP:N=1 U=17
229-	C			PANEL - ASSEMBLY BOTTOM				
230-	C	162	1	-2.1024	-53			IMP:N=1 U=17
231-	C			WATER GAP - ASSEMBLY RIGHT				
232-	C	163	1	-2.1024	-54			IMP:N=1 U=18
233-	C	163	1	-2.1024	-50			IMP:N=1 U=18
234-	C			OXIDATION LAYER CS TUBE - ASSEMBLY RIGHT				
235-	C	164	6	-7.8320	50	-54		IMP:N=1 U=18
236-	C			CS TUBE - ASSEMBLY RIGHT				

297-	10	PZ	180.0860	\$ TOP ACTIVE FUEL
298-	11	PZ	201.2360	\$ TOP FUEL HARDWARE
299-	C	12	PZ 226.75	\$ TOP TUBE - (Shielding Model)
300-	13	PZ	228.75	\$ TOP OF BASKET MATERIAL
301-	14	PZ	229.25	\$ TOP RING/WATER GAP
302-	15	PZ	231.75	\$ TOP INNER LID
303-	16	PZ	234.75	\$ TOP LID GAP
304-	17	PZ	245.75	\$ TOP OUTER LID
305-	C	18	PZ 268.25	\$ TOP SKIRT - (Shielding Model)
306-	19	PZ	298.75	\$ TOP REFLECTOR REGION
307-	20	CZ	71.095	\$ ID OF INNER BARRIER
308-	21	CZ	73.095	\$ OD OF INNER BARRIER
309-	22	CZ	73.10	\$ ID OF OUTER BARRIER
310-	C	23	CZ 76.45	\$ ID OF SKIRT LIP - (Shielding Model)
311-	24	CZ	83.10	\$ OD OF OUTER BARRIER
312-	25	CZ	113.60	\$ OD OF REFLECTOR REGION
313-	C	PIN LATTICE BOUNDS		
314-	26	PX	0.72136	
315-	27	PX	-0.72136	
316-	28	PY	0.72136	
317-	29	PY	-0.72136	
318-	C	FUEL ROD		
319-	30	CZ	0.468122	
320-	31	CZ	0.478790	
321-	32	CZ	0.546100	
322-	C	CONTROL ROD/GUIDE TUBE		
323-	33	CZ	0.45340	\$ 0.49022
324-	34	CZ	0.46990	\$ 0.50292
325-	35	CZ	0.54610	\$ 0.56007
326-	36	CZ	0.62230	\$ 0.63246
327-	37	CZ	0.67310	
328-	C	INSTRUMENTATION TUBE		
329-	38	CZ	0.56007	
330-	39	CZ	0.62611	
331-	C	ASSEMBLY LATTICE BOUNDS Actual		
332-	44	PX	-10.65	\$ ACTUAL 10.82025
333-	45	PY	-10.65	
334-	46	PX	10.65	
335-	47	PY	10.65	
336-	C	48	PX -11.0	\$ Corrosion Expansion Cards
337-	C	49	PY -11.0	
338-	C	50	PX 11.0	
339-	C	51	PY 11.0	
340-	52	PX	-10.650001	\$ UCF Intact Inside Tube ID
341-	53	PY	-10.650001	
342-	54	PX	10.650001	
343-	55	PY	10.650001	
344-	56	PX	-11.95	\$ UCF Intact Outside Tube ID
345-	57	PY	-11.95	
346-	58	PX	11.95	
347-	59	PY	11.95	
348-	C	FUEL CELL LATTICE BOUNDS		
349-	60	PX	-10.65	\$ ACTUAL 12.30
350-	61	PX	10.65	
351-	62	PY	-10.65	
352-	63	PY	10.65	
353-	C	45 degree planes		
354-	64	P	1. -1. 0. 0.	
355-	65	P	1. 1. 0. 0.	
356-	C	EXTRA CARDS		

```

417- C WATER AT 300 K d=1.0000 g/cc
418- M3 1001.50C 6.6878-2 8016.50C 3.3439-2
419- MT3 LWTR.01T
420- C Air d=0.001225 g/cc
421- C M3 7014.50C -0.80 8016.50C -0.20
422- C ZIRCALLOY-4 d=6.56 g/cc
423- M4 8016.50C -0.0012 24000.50C -0.0010 26000.55C -0.0020
424- 40000.50C -0.9818 50000.35C -0.0140
425- C ALLOY 825 d=8.14 g/cc
426- M5 6000.50C -0.0005 13027.50C -0.0020 14000.50C -0.0050
427- 16032.50C -0.0003 22000.50C -0.0090 24000.50C -0.2150
428- 25055.50C -0.0100 26000.55C -0.2857 28000.50C -0.4200
429- 29000.50C -0.0225 42000.50C -0.0300
430- C Oxidized A516 CARBON STEEL and Water Mixture d=7.832 g/cc
431- M6 6000.50C -0.00220 14000.50C -0.002750 15031.50C -0.00035
432- C 16032.50C -0.00035 25055.50C -0.0090
433- C 26000.55C -0.98535
434- C A516 CARBON STEEL d=7.832 g/cc
435- M7 6000.50C -0.00220 14000.50C -0.002750 15031.50C -0.00035
436- 16032.50C -0.00035 25055.50C -0.0090
437- 26000.55C -0.98535
438- C SS316B6A 1.6% d=7.77 g/cc
439- M8 5010.50C -0.00288 5011.50C -0.013120
440- 6000.50C -0.00030 7014.50C -0.00100 14000.50C -0.0075
441- 15031.50C -0.00045 16032.50C -0.00030 24000.50C -0.19000
442- 25055.50C -0.02000 26000.55C -0.60445 28000.50C -0.13500
443- 42000.50C -0.02500
444- C SS316B3A 0.87wt% B d=7.83 g/cc
445- M9 5010.50C -0.001566 5011.50C -0.007134
446- C 6000.50C -0.00030 7014.50C -0.00100 14000.50C -0.00750
447- C 15031.50C -0.00045 16032.50C -0.00030 24000.50C -0.19000
448- C 25055.50C -0.02000 26000.55C -0.60445 28000.50C -0.13500
449- C 42000.50C -0.02500
450- C Al 6063 d=2.69 g/cc
451- M10 12000.50C -0.00675 13027.50C -0.98125 14000.50C -0.00400
452- C 22000.50C -0.00150 24000.50C -0.00100 25055.50C -0.00100
453- C 26000.55C -0.00350 29000.50C -0.00100
454- C TALLIES
455- PRINT
456-

```

1 initial source from file srctp

1problem summary

run terminated when 97 kcode cycles were done.

+ AUCF - B&W 15x15 FUEL,21 ASSEMBLY DBF CS/SS-B Corroded & collapsed - (a26xb5e) probid = 08/20/96 22:55:23
0 08/20/96 21:00:04

neutron creation	tracks	weight (per source particle)	energy	neutron loss	tracks	weight (per source particle)	energy
source	388004	9.9999E-01	2.0600E+00	escape	10	1.7170E-05	3.6994E-05
				energy cutoff	0	0.	0.
				time cutoff	0	0.	0.
weight window	0	0.	0.	weight window	0	0.	0.
cell importance	0	0.	0.	cell importance	0	0.	0.
weight cutoff	0	5.1088E-02	7.4122E-06	weight cutoff	388630	5.1257E-02	5.9796E-06
energy importance	0	0.	0.	energy importance	0	0.	0.
dextran	0	0.	0.	dextran	0	0.	0.

forced collisions	0	0.	0.	forced collisions	0	0.	0.
exp. transform	0	0.	0.	exp. transform	0	0.	0.
upscattering	0	0.	7.5977E-08	downscattering	0	0.	1.9258E+00
(n,xn)	1269	2.5713E-03	2.0152E-03	capture	0	6.5312E-01	3.5701E-02
fission	0	0.	0.	loss to (n,xn)	633	1.2827E-03	1.0840E-02
total	389273	1.0536E+00	2.0620E+00	loss to fission	0	3.4797E-01	8.9545E-02
				total	389273	1.0536E+00	2.0620E+00

number of neutrons banked	636	average lifetime, shakes		cutoffs	
neutron tracks per source particle	1.0033E+00	escape	9.2675E+03	tco	1.0000E+34
neutron collisions per source particle	4.6989E+01	capture	2.3781E+03	eco	.0000E+00
total neutron collisions	18231800	capture or escape	2.3782E+03	wc1	-5.0000E-01
net multiplication	1.0013E+00 .0001	any termination	2.5508E+03	wc2	-2.5000E-01

computer time so far in this run	115.20 minutes	maximum number ever in bank	2
computer time in mcrun	115.10 minutes	bank overflows to backup file	0
source particles per minute	3.3711E+03	field length	0
random numbers generated	254604968	most random numbers used was	10424 in history 346341

1keff results for: AUCF - B&W 15x15 FUEL,21 ASSEMBLY DBF CS/SS-B Corroded & collapsed - (a26xb5e) probid = 08/20/96 21:00:04

the initial fission neutron source distribution was read from the srctp file named srctp .
 the criticality problem was scheduled to skip 7 cycles and run a total of 97 cycles with nominally 4000 neutrons per cycle.
 this problem has run 7 inactive cycles with 27651 neutron histories and 90 active cycles with 360353 neutron histories.

this calculation has completed the requested number of keff cycles using a total of 388004 fission neutron source histories.

XX

the following cells with fissionable material had no neutron tracks entering:

97

the following cells with fissionable material had no neutron collisions:

97

the following cells with fissionable material had no fission source points:

97

warning. 1 fissionable cells had no tracks entering, 1 cells had no collisions, and 1 cells had no fission source points.
 the keff results could be too small because these cells with fissionable material were not sampled.

XX

the results of the w test for normality applied to the individual collision, absorption, and track-length keff cycle values are:

the k(collision) cycle values appear normally distributed at the 95 percent confidence level
 the k(absorption) cycle values appear normally distributed at the 95 percent confidence level
 the k(trk length) cycle values appear normally distributed at the 95 percent confidence level

 the final estimated combined collision/absorption/track-length keff = .90061 with an estimated standard deviation of .00107
 the estimated 68, 95, & 99 percent keff confidence intervals are .89955 to .90168, .89849 to .90274, and .89780 to .90343
 the estimated collision/absorption neutron removal lifetime = 2.38E-05 seconds with an estimated standard deviation of 5.97E-08

 the estimated average keffs, one standard deviations, and 68, 95, and 99 percent confidence intervals are:

keff estimator	keff	standard deviation	68% confidence	95% confidence	99% confidence	corr
collision	.90078	.00131	.89946 to .90209	.89816 to .90340	.89731 to .90425	
absorption	.90042	.00118	.89924 to .90159	.89808 to .90276	.89731 to .90352	
track length	.90126	.00162	.89964 to .90288	.89803 to .90449	.89698 to .90554	
col/absorp	.90056	.00106	.89950 to .90163	.89844 to .90268	.89775 to .90337	.4650
abs/trk len	.90066	.00108	.89958 to .90174	.89851 to .90280	.89781 to .90351	.2902
col/trk len	.90079	.00132	.89947 to .90212	.89816 to .90343	.89730 to .90429	.7969
col/abs/trk len	.90061	.00107	.89955 to .90168	.89849 to .90274	.89780 to .90343	

1mcnp version 4a ld=10/01/93 08/20/96 22:55:24

inp=a26xb5f outp=a26xb5f0

probid = 08/20/96 22:55:24

```

1- AUCF - B&W 15x15 FUEL,21 ASSEMBLY DBF CS/SS-B Corroded & collapsed - (a26xb5f)
2- C Advanced Uncanistered Fuel Waste Package, collapsed basket 10k 26%/5%B
3- C 15000 year decay 10000 yr criticality
4- C CELL SPECIFICATIONS
5- C Assembly Sub-lattices - 1/2 Model
6- 1 0 1 3 -13 -20 FILL=1 (0 -74 0) IMP:N=1
7- C 1 0 1 3 -4 -13 -20 FILL=1 (0 -73.8 0) IMP:N=1
8- C 2 0 3 4 -5 -13 -20 FILL=1 (0 -73.8 0) IMP:N=1
9- C 3 0 3 5 -13 -20 FILL=1 (0 -73.8 0) IMP:N=1
10- C Assembly Sub-lattices - 1/4 Model
11- C 1 0 1 2 3 -4 -13 -20 FILL=1 (0 -12.3 0) IMP:N=1
12- C 2 0 2 3 4 -5 -13 -20 FILL=1 (0 -12.3 0) IMP:N=1
13- C 3 0 2 3 5 -13 -20 FILL=1 (0 -12.3 0) IMP:N=1
14- C ASSEMBLY LATTICE DESCRIPTION
15- 5 1 -2.1024 -61 60 -63 62 IMP:N=1 LAT=1 U=1
16- FILL=0:3 0:7 0:0 1 1 1 1 56 56 1 1 56 56 56 1
17- 56 56 56 1 56 56 56 1 56 56 1 1
18- 1 1 1 1 1 1 1 $ 1/2 model
19- C 5 1 -2.1024 60 -61 62 -63 IMP:N=1 LAT=1 U=1
20- C FILL=0:3 0:3 0:0 58 58 64 70 58 58 62 70
21- C 60 62 70 1 70 70 1 1 $ 1/4 model
22- C BARRIER CELLS
23- C Basket Material-Lid Gap
24- 76 3 -1.0000 1 -20 13 -14 IMP:N=1 $ 1/2 model
25- C 76 1 -2.1024 1 2 -20 13 -14 IMP:N=1 $ 1/4 model
26- C Inner Barrier
27- 77 5 -8.1400 1 3 20 -21 -14 IMP:N=1 $ 1/2 model
28- C 77 5 -8.1400 1 2 3 20 -21 -14 IMP:N=1 $ 1/4 model
29- C Inner Lid
30- 78 5 -8.1400 1 14 -15 -21 IMP:N=1 $ 1/2 model
31- C 78 5 -8.1400 1 2 14 -15 -21 IMP:N=1 $ 1/4 model
32- C Gap between Inner and Outer Barrier Lids
33- 79 3 -1.0000 1 15 -16 -21 IMP:N=1 $ 1/2 model
34- C 79 1 -2.1024 1 2 15 -16 -21 IMP:N=1 $ 1/4 model
35- C Gap between Inner and Outer Barriers
36- 80 3 -1.0000 21 -22 1 3 -16 IMP:N=1 $ 1/2 model
37- C 80 1 -2.1024 21 -22 1 2 3 -16 IMP:N=1 $ 1/4 model
38- C Outer Barrier
39- 81 7 -7.8320 22 -24 1 3 -16 IMP:N=1 $ 1/2 model
40- C 81 7 -7.8320 22 -24 1 2 3 -16 IMP:N=1 $ 1/4 model
41- C Outer Barrier Lid
42- 82 7 -7.8320 1 -24 16 -17 IMP:N=1 $ 1/2 model
43- C 82 7 -7.8320 1 2 -24 16 -17 IMP:N=1 $ 1/4 model
44- C 12" of Water around Container
45- 83 3 -1.0000 24 -25 1 3 -17 IMP:N=1 $ 1/2 model
46- C 83 1 -2.1024 24 -25 1 2 3 -17 IMP:N=1 $ 1/4 model
47- C 12" of Water above Container
48- 84 3 -1.0000 17 -19 1 -25 IMP:N=1 $ 1/2 model
49- C 84 1 -2.1024 17 -58 1 2 -59 IMP:N=1 $ 1/4 model
50- C OUTSIDE WORLD
51- 85 0 -1:-3:19:25 IMP:N=0 $ 1/2 model
52- C 85 0 -1:-2:-3:19:25 IMP:N=0 $ 1/4 model
53- C WET PIN LATTICE DESCRIPTION
54- 86 1 -2.1024 -26 27 -28 29 IMP:N=1 LAT=1 U=56
55- FILL -8:8 -8:8 0:0 56 16R 56 2 14R 56 56 2 14R 56
56- 56 2 4R 4 2 2R 4 2 4R 56

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57- 56 2 2R 4 2 6R 4 2 2R 56 56 2 14R 56
58- 56 2 2 4 2 2 4 2 2R 4 2 2 4 2 2 56
59- 56 2 14R 56
60- 56 2 6R 6 2 6R 56
61- 56 2 14R 56
62- 56 2 2 4 2 2 4 2 2R 4 2 2 4 2 2 56
63- 56 2 14R 56 56 2 2R 4 2 6R 4 2 2R 56
64- 56 2 4R 4 2 2R 4 2 4R 56
65- 56 2 14R 56 56 2 14R 56 56 16R
66- C MIXED PIN LATTICE DESCRIPTION
67- 87 3 -0.001225 -26 27 -28 29 IMP:N=1 LAT=1 U=72
68- C FILL -8:8 -8:8 0:0 57 16R 57 3 14R 57 57 3 14R 57
69- C 57 3 4R 5 3 2R 5 3 4R 57
70- C 57 3 2R 5 3 6R 5 3 2R 57 57 3 14R 57
71- C 57 3 3 5 3 3 5 3 2R 5 3 3 5 3 3 57
72- C 57 3 14R 57
73- C 57 3 6R 7 3 6R 57
74- C 57 2 14R 57
75- C 57 2 2 4 2 2 4 2 2R 4 2 2 4 2 2 57
76- C 57 2 14R 57 57 2 2R 4 2 6R 4 2 2R 57
77- C 57 2 4R 4 2 2R 4 2 4R 57
78- C 57 2 14R 57 57 2 14R 57 57 16R
79- C DRY PIN LATTICE DESCRIPTION
80- 88 3 -0.001225 -26 27 -28 29 IMP:N=1 LAT=1 U=57
81- C FILL -8:8 -8:8 0:0 57 16R 57 3 14R 57 57 3 14R 57
82- C 57 3 4R 5 3 2R 5 3 4R 57
83- C 57 3 2R 5 3 6R 5 3 2R 57 57 3 14R 57
84- C 57 3 3 5 3 3 5 3 2R 5 3 3 5 3 3 57
85- C 57 3 14R 57
86- C 57 3 6R 7 3 6R 57
87- C 57 3 14R 57
88- C 57 3 3 5 3 3 5 3 2R 5 3 3 5 3 3 57
89- C 57 3 14R 57 57 3 2R 5 3 6R 5 3 2R 57
90- C 57 3 4R 5 3 2R 5 3 4R 57
91- C 57 3 14R 57 57 3 14R 57 57 16R
92- C WET FUEL ROD
93- 89 2 7.0106E-02 -30 -10 IMP:N=1 U=2
94- 90 4 -6.5600 -30 10 -11 IMP:N=1 U=2
95- 91 1 -2.1024 -30 11 IMP:N=1 U=2
96- 92 1 -2.1024 30 -31 -11 IMP:N=1 U=2
97- 93 1 -2.1024 30 -31 11 IMP:N=1 U=2
98- 94 4 -6.5600 31 -32 -11 IMP:N=1 U=2
99- 95 1 -2.1024 31 -32 11 IMP:N=1 U=2
100- 96 1 -2.1024 32 IMP:N=1 U=2
101- C DRY FUEL ROD
102- 97 2 7.0106E-02 -30 -10 IMP:N=1 U=3
103- 98 4 -6.5600 -30 10 -11 IMP:N=1 U=3
104- 99 3 -0.001225 -30 11 IMP:N=1 U=3
105- 100 3 -0.001225 30 -31 -11 IMP:N=1 U=3
106- 101 3 -0.001225 30 -31 11 IMP:N=1 U=3
107- 102 4 -6.5600 31 -32 -11 IMP:N=1 U=3
108- 103 3 -0.001225 31 -32 11 IMP:N=1 U=3
109- 104 3 -0.001225 32 IMP:N=1 U=3
110- C WET CONTROL ROD/GUIDE TUBE
111- 105 1 -2.1024 -33 IMP:N=1 U=4 $ No DCRA Rod
112- C 105 9 -7.8300 -33 IMP:N=1 U=4 $ DCRA Rod
113- 106 1 -2.1024 33 -34 IMP:N=1 U=4
114- 107 1 -2.1024 34 -35 IMP:N=1 U=4 $ No DCRA Cladding
115- C 107 4 -6.5600 34 -35 IMP:N=1 U=4 $ DCRA Cladding
116- 108 1 -2.1024 35 -36 IMP:N=1 U=4

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117- 109 4 -6.5600 36 -37 IMP:N=1 U=4
118- 110 1 -2.1024 37 IMP:N=1 U=4
119- C DRY CONTROL ROD/GUIDE TUBE
120- 111 3 -0.001225 -33 IMP:N=1 U=5 $ No DCRA Rod
121- C 111 9 -7.8300 -33 IMP:N=1 U=5 $ DCRA Rod
122- 112 3 -0.001225 33 -34 IMP:N=1 U=5
123- 113 3 -0.001225 34 -35 IMP:N=1 U=5 $ No DCRA Cladding
124- C 113 4 -6.5600 34 -35 IMP:N=1 U=5 $ DCRA Cladding
125- 114 3 -0.001225 35 -36 IMP:N=1 U=5
126- 115 4 -6.5600 36 -37 IMP:N=1 U=5
127- 116 3 -0.001225 37 IMP:N=1 U=5
128- C WET INSTRUMENTATION TUBE
129- 117 1 -2.1024 -38 IMP:N=1 U=6
130- 118 4 -6.5600 38 -39 IMP:N=1 U=6
131- 119 1 -2.1024 39 IMP:N=1 U=6
132- C DRY INSTRUMENTATION TUBE
133- 120 3 -0.001225 -38 IMP:N=1 U=7
134- 121 4 -6.5600 38 -39 IMP:N=1 U=7
135- 122 3 -0.001225 39 IMP:N=1 U=7
136- C FUEL CELL BASKET STRUCTURE
137- C Code: boron in [B=] all panels [all], left [l], bottom [b], right [r], to
138- C FUEL CELL BASKET STRUCTURE - WET - Borated panels
139- C WATER GAP - ASSEMBLY LEFT
140- 123 1 -2.1024 52 IMP:N=1 U=8
141- C 123 1 -2.1024 48 IMP:N=1 U=8
142- C OXIDATION LAYER CS TUBE - ASSEMBLY LEFT
143- C 124 6 -7.8320 -48 52 IMP:N=1 U=8
144- C CS TUBE - ASSEMBLY LEFT
145- C 125 7 -7.8320 -52 56 IMP:N=1 U=8
146- C SS PANEL - ASSEMBLY LEFT
147- 126 8 -7.7700 -52 IMP:N=1 U=8
148- C WATER GAP - ASSEMBLY BOTTOM
149- 127 1 -2.1024 53 IMP:N=1 U=9
150- C 127 1 -2.1024 49 IMP:N=1 U=9
151- C OXIDATION LAYER CS TUBE - ASSEMBLY BOTTOM
152- C 128 6 -7.8320 -49 53 IMP:N=1 U=9
153- C CS TUBE - ASSEMBLY BOTTOM
154- C 129 7 -7.8320 -53 57 IMP:N=1 U=9
155- C SS PANEL - ASSEMBLY BOTTOM
156- 130 8 -7.7700 -53 IMP:N=1 U=9
157- C WATER GAP - ASSEMBLY RIGHT
158- 131 1 -2.1024 -54 IMP:N=1 U=10
159- C 131 1 -2.1024 -50 IMP:N=1 U=10
160- C OXIDATION LAYER CS TUBE - ASSEMBLY RIGHT
161- C 132 6 -7.8320 50 -54 IMP:N=1 U=10
162- C CS TUBE - ASSEMBLY RIGHT
163- C 133 7 -7.8320 54 -58 IMP:N=1 U=10
164- C SS PANEL - ASSEMBLY RIGHT
165- 134 8 -7.7700 54 IMP:N=1 U=10
166- C WATER GAP - ASSEMBLY TOP
167- 135 1 -2.1024 -55 IMP:N=1 U=11
168- C 135 1 -2.1024 -51 IMP:N=1 U=11
169- C OXIDATION LAYER CS TUBE - ASSEMBLY TOP
170- C 136 6 -7.8320 51 -55 IMP:N=1 U=11
171- C CS TUBE - ASSEMBLY TOP
172- C 137 7 -7.8320 55 -59 IMP:N=1 U=11
173- C SS PANEL - ASSEMBLY TOP
174- 138 8 -7.7700 55 IMP:N=1 U=11
175- C FUEL CELL BASKET STRUCTURE - DRY - Borated panels
176- C GAP - ASSEMBLY LEFT
    
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177-	C	139	3	-0.001225	52			IMP:N=1 U=12
178-	C	139	3	-0.001225	48			IMP:N=1 U=12
179-	C			OXIDATION LAYER CS TUBE - ASSEMBLY LEFT				
180-	C	140	6	-7.8320	-48	52		IMP:N=1 U=12
181-	C			CS TUBE - ASSEMBLY LEFT				
182-	C	141	7	-7.8320	-52	56		IMP:N=1 U=12
183-	C			SS PANEL - ASSEMBLY LEFT				
184-	C	142	8	-7.7700	-52			IMP:N=1 U=12
185-	C			GAP - ASSEMBLY BOTTOM				
186-	C	143	3	-0.001225	53			IMP:N=1 U=13
187-	C	143	3	-0.001225	49			IMP:N=1 U=13
188-	C			OXIDATION LAYER CS TUBE - ASSEMBLY BOTTOM				
189-	C	144	6	-7.8320	-49	53		IMP:N=1 U=13
190-	C			CS TUBE - ASSEMBLY BOTTOM				
191-	C	145	7	-7.8320	-53	57		IMP:N=1 U=13
192-	C			SS PANEL - ASSEMBLY BOTTOM				
193-	C	146	8	-7.7700	-53			IMP:N=1 U=13
194-	C			GAP - ASSEMBLY RIGHT				
195-	C	147	3	-0.001225	-54			IMP:N=1 U=14
196-	C	147	3	-0.001225	-50			IMP:N=1 U=14
197-	C			OXIDATION LAYER CS TUBE - ASSEMBLY RIGHT				
198-	C	148	6	-7.8320	50	-54		IMP:N=1 U=14
199-	C			CS TUBE - ASSEMBLY RIGHT				
200-	C	149	7	-7.8320	54	-58		IMP:N=1 U=14
201-	C			SS PANEL - ASSEMBLY RIGHT				
202-	C	150	8	-7.7700	54			IMP:N=1 U=14
203-	C			GAP - ASSEMBLY TOP				
204-	C	151	3	-0.001225	-55			IMP:N=1 U=15
205-	C	151	3	-0.001225	-51			IMP:N=1 U=15
206-	C			OXIDATION LAYER CS TUBE - ASSEMBLY TOP				
207-	C	152	6	-7.8320	51	-55		IMP:N=1 U=15
208-	C			CS TUBE - ASSEMBLY TOP				
209-	C	153	7	-7.8320	55	-59		IMP:N=1 U=15
210-	C			SS PANEL - ASSEMBLY TOP				
211-	C	154	8	-7.7700	55			IMP:N=1 U=15
212-	C			FUEL CELL BASKET STRUCTURE - WET - Unborated panels				
213-	C			WATER GAP - ASSEMBLY LEFT				
214-	C	155	1	-2.1024	52			IMP:N=1 U=16
215-	C	155	1	-2.1024	48			IMP:N=1 U=16
216-	C			OXIDATION LAYER CS TUBE - ASSEMBLY LEFT				
217-	C	156	6	-7.8320	-48	52		IMP:N=1 U=16
218-	C			CS TUBE - ASSEMBLY LEFT				
219-	C	157	7	-7.8320	-52	56		IMP:N=1 U=16
220-	C			PANEL - ASSEMBLY LEFT				
221-	C	158	1	-2.1024	-52			IMP:N=1 U=16
222-	C			WATER GAP - ASSEMBLY BOTTOM				
223-	C	159	1	-2.1024	53			IMP:N=1 U=17
224-	C	159	1	-2.1024	49			IMP:N=1 U=17
225-	C			OXIDATION LAYER CS TUBE - ASSEMBLY BOTTOM				
226-	C	160	6	-7.8320	-49	53		IMP:N=1 U=17
227-	C			CS TUBE - ASSEMBLY BOTTOM				
228-	C	161	7	-7.8320	-53	57		IMP:N=1 U=17
229-	C			PANEL - ASSEMBLY BOTTOM				
230-	C	162	1	-2.1024	-53			IMP:N=1 U=17
231-	C			WATER GAP - ASSEMBLY RIGHT				
232-	C	163	1	-2.1024	-54			IMP:N=1 U=18
233-	C	163	1	-2.1024	-50			IMP:N=1 U=18
234-	C			OXIDATION LAYER CS TUBE - ASSEMBLY RIGHT				
235-	C	164	6	-7.8320	50	-54		IMP:N=1 U=18
236-	C			CS TUBE - ASSEMBLY RIGHT				

237-	C	165	7	-7.8320	54	-58	IMP:N=1 U=18
238-	C						PANEL - ASSEMBLY RIGHT
239-	166	1	-2.1024	54			IMP:N=1 U=18
240-	C						WATER GAP - ASSEMBLY TOP
241-	167	1	-2.1024	-55			IMP:N=1 U=19
242-	C	167	1	-2.1024	-51		IMP:N=1 U=19
243-	C						OXIDATION LAYER CS TUBE - ASSEMBLY TOP
244-	C	168	6	-7.8320	51	-55	IMP:N=1 U=19
245-	C						CS TUBE - ASSEMBLY TOP
246-	C	169	7	-7.8320	55	-59	IMP:N=1 U=19
247-	C						PANEL - ASSEMBLY TOP
248-	170	1	-2.1024	55			IMP:N=1 U=19
249-	C						FUEL CELL BASKET STRUCTURE - DRY - Unborated panels
250-	C						GAP - ASSEMBLY LEFT
251-	171	3	-0.001225	52			IMP:N=1 U=20
252-	C	171	3	-0.001225	48		IMP:N=1 U=20
253-	C						OXIDATION LAYER CS TUBE - ASSEMBLY LEFT
254-	C	172	6	-7.8320	-48	52	IMP:N=1 U=20
255-	C						CS TUBE - ASSEMBLY LEFT
256-	C	173	7	-7.8320	-52	56	IMP:N=1 U=20
257-	C						PANEL - ASSEMBLY LEFT
258-	174	3	-0.001225	-52			IMP:N=1 U=20
259-	C						GAP - ASSEMBLY BOTTOM
260-	175	3	-0.001225	53			IMP:N=1 U=21
261-	C	175	3	-0.001225	49		IMP:N=1 U=21
262-	C						OXIDATION LAYER CS TUBE - ASSEMBLY BOTTOM
263-	C	176	6	-7.8320	-49	53	IMP:N=1 U=21
264-	C						CS TUBE - ASSEMBLY BOTTOM
265-	C	177	7	-7.8320	-53	57	IMP:N=1 U=21
266-	C						PANEL - ASSEMBLY BOTTOM
267-	178	3	-0.001225	-53			IMP:N=1 U=21
268-	C						GAP - ASSEMBLY RIGHT
269-	179	3	-0.001225	-54			IMP:N=1 U=22
270-	C	179	3	-0.001225	-50		IMP:N=1 U=22
271-	C						OXIDATION LAYER CS TUBE - ASSEMBLY RIGHT
272-	C	180	6	-7.8320	50	-54	IMP:N=1 U=22
273-	C						CS TUBE - ASSEMBLY RIGHT
274-	C	181	7	-7.8320	54	-58	IMP:N=1 U=22
275-	C						PANEL - ASSEMBLY RIGHT
276-	182	3	-0.001225	54			IMP:N=1 U=22
277-	C						GAP - ASSEMBLY TOP
278-	183	3	-0.001225	-55			IMP:N=1 U=23
279-	C	183	3	-0.001225	-51		IMP:N=1 U=23
280-	C						OXIDATION LAYER CS TUBE - ASSEMBLY TOP
281-	C	184	6	-7.8320	51	-55	IMP:N=1 U=23
282-	C						CS TUBE - ASSEMBLY TOP
283-	C	185	7	-7.8320	55	-59	IMP:N=1 U=23
284-	C						PANEL - ASSEMBLY TOP
285-	186	3	-0.001225	55			IMP:N=1 U=23
286-							
287-	C						SURFACE SPECIFICATIONS
288-	1*	PX		0.0			
289-	C	2*	PY	0.00			\$ For 1/4 Model
290-	3*	PZ		0.00			
291-	C	4	PX	12.30			\$ For Collapsed Model
292-	C	5	PX	36.90			\$ For Collapsed Model
293-	C	6	PY	12.30			\$ Water Level Surface
294-	C	7	PY	36.90			\$ Water Level Surface
295-	C	8	PY	-12.30			\$ Water Level Surface
296-	C	9	PY	-36.90			\$ Water Level Surface

297-	10	PZ	180.0860	\$ TOP ACTIVE FUEL
298-	11	PZ	201.2360	\$ TOP FUEL HARDWARE
299-	C	12	PZ 226.75	\$ TOP TUBE - (Shielding Model)
300-	13	PZ	228.75	\$ TOP OF BASKET MATERIAL
301-	14	PZ	229.25	\$ TOP RING/WATER GAP
302-	15	PZ	231.75	\$ TOP INNER LID
303-	16	PZ	234.75	\$ TOP LID GAP
304-	17	PZ	245.75	\$ TOP OUTER LID
305-	C	18	PZ 268.25	\$ TOP SKIRT - (Shielding Model)
306-	19	PZ	298.75	\$ TOP REFLECTOR REGION
307-	20	CZ	71.095	\$ ID OF INNER BARRIER
308-	21	CZ	73.095	\$ OD OF INNER BARRIER
309-	22	CZ	73.10	\$ ID OF OUTER BARRIER
310-	C	23	CZ 76.45	\$ ID OF SKIRT LIP - (Shielding Model)
311-	24	CZ	83.10	\$ OD OF OUTER BARRIER
312-	25	CZ	113.60	\$ OD OF REFLECTOR REGION
313-	C		PIN LATTICE BOUNDS	
314-	26	PX	0.72136	
315-	27	PX	-0.72136	
316-	28	PY	0.72136	
317-	29	PY	-0.72136	
318-	C		FUEL ROD	
319-	30	CZ	0.468122	
320-	31	CZ	0.478790	
321-	32	CZ	0.546100	
322-	C		CONTROL ROD/GUIDE TUBE	
323-	33	CZ	0.45340	\$ 0.49022
324-	34	CZ	0.46990	\$ 0.50292
325-	35	CZ	0.54610	\$ 0.56007
326-	36	CZ	0.62230	\$ 0.63246
327-	37	CZ	0.67310	
328-	C		INSTRUMENTATION TUBE	
329-	38	CZ	0.56007	
330-	39	CZ	0.62611	
331-	C		ASSEMBLY LATTICE BOUNDS Actual	
332-	44	PX	-10.65	\$ ACTUAL 10.82025
333-	45	PY	-10.65	
334-	46	PX	10.65	
335-	47	PY	10.65	
336-	C	48	PX -11.0	\$ Corrosion Expansion Cards
337-	C	49	PY -11.0	
338-	C	50	PX 11.0	
339-	C	51	PY 11.0	
340-	52	PX	-10.650001	\$ UCF Intact Inside Tube ID
341-	53	PY	-10.650001	
342-	54	PX	10.650001	
343-	55	PY	10.650001	
344-	56	PX	-11.95	\$ UCF Intact Outside Tube ID
345-	57	PY	-11.95	
346-	58	PX	11.95	
347-	59	PY	11.95	
348-	C		FUEL CELL LATTICE BOUNDS	
349-	60	PX	-10.65	\$ ACTUAL 12.30
350-	61	PX	10.65	
351-	62	PY	-10.65	
352-	63	PY	10.65	
353-	C		45 degree planes	
354-	64	P	1. -1. 0. 0.	
355-	65	P	1. 1. 0. 0.	
356-	C		EXTRA CARDS	

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357-
358-
359- MODE N
360- VOL 88J
361- KCODE 4000 1. 7 97
362- C KSRC -4.3 -5.7 1. -2.8 -5.7 5. -1.4 -5.7 10. 0. -5.7 5.
363- C 1.44 -5.7 3. 2.88 -5.7 8. 4.32 -5.7 9.
364- C -5.7 -4.3 2. -4.3 -4.3 1. -2.8 -4.3 5. -1.4 -4.3 10.
365- C 0. -4.3 5. 1.44 -4.3 3. 2.88 -4.3 8. 4.32 -4.3 9.
366- C -5.7 -2.9 2. -4.3 -2.9 1. -1.4 -2.9 10.
367- C 0. -2.9 5. 2.88 -2.9 8. 4.32 -2.0 9.
368- C -5.7 -1.4 2. -4.3 -1.4 1. -2.8 -1.4 5. -1.4 -1.4 10.
369- C 0. -1.4 5. 1.44 -1.4 3. 2.88 -1.4 8. 4.32 -1.4 9.
370- C -5.7 0.0 2. -4.3 0.0 1. -2.8 0.0 5. -1.4 0.0 10.
371- C 0. 1.44 0.0 3. 2.88 0.0 8. 4.32 0.0 9.
372- C -5.7 1.4 2. -2.8 1.4 5. -1.4 1.4 10.
373- C 0. 1.4 5. 1.44 1.4 3. 2.88 1.4 8. 4.32 1.4 9.
374- C -5.7 2.9 2. -4.3 2.9 1. -2.8 2.9 5. -1.4 2.9 10.
375- C 0. 2.9 5. 1.44 2.9 3. 2.88 2.9 8. 4.32 2.9 9.
376- C -5.7 4.3 2. -4.3 4.3 1. -2.8 4.3 5. -1.4 4.3 10.
377- C 0. 4.3 5. 1.44 4.3 3. 2.88 4.3 8. 4.32 4.3 9.
378- C MATERIAL SPECIFICATIONS
379- M1 WATER AT 300 K d=1.0000 g/cc w/ 26% Fe2O3 w/ 5% B10
380- 1001.50C 4.9490-2 8016.50C 4.0160-2 26000.55C 1.0277-2
381- 5010.50C 2.8870-6
382- MT1 LWTR.01T
383- C 3.00%/20 GWD 15000 yr decay 10000 yr crit
384- M2 8016.50C 4.6947E-02
385- 42095.50C 2.9555E-05
386- 43099.50C 2.6899E-05
387- 44101.50C 2.7082E-05
388- 45103.50C 1.7197E-05
389- 47109.50C 2.4871E-06
390- 60143.50C 2.3334E-05
391- 60145.50C 1.7528E-05
392- 62147.50C 7.6533E-06
393- 62149.50C 5.6264E-08
394- 62150.50C 6.6809E-06
395- 62151.50C 2.4408E-09
396- 63151.55C 4.4669E-07
397- 62152.50C 3.0032E-06
398- 63153.55C 2.2357E-06
399- 64155.50C 5.9056E-08
400- 64157.50C 1.1891E-09
401- 48000.50C 2.0221E-06
402- 54131.50C 1.3059E-05
403- 55133.50C 3.1974E-05
404- 92233.50C 2.0043E-07
405- 92234.50C 5.9667E-06
406- 92235.50C 3.7645E-04
407- 92236.50C 1.0659E-04
408- 92238.50C 2.2352E-02
409- 93237.55C 2.7931E-05
410- 94238.50C 9.1027E-09
411- 94239.55C 7.0502E-05
412- 94240.50C 4.0570E-06
413- 94241.50C 1.0238E-09
414- 94242.50C 3.2774E-06
415- 95241.50C 3.1112E-08
416- 95242.50C 9.2503E-12
417- 95243.50C 1.0153E-07

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417- C WATER AT 300 K d=1.0000 g/cc
418- M3 1001.50C 6.6878-2 8016.50C 3.3439-2
419- MT3 LWTR.01T
420- C Air d=0.001225 g/cc
421- C M3 7014.50C -0.80 8016.50C -0.20
422- C ZIRCALOY-4 d=6.56 g/cc
423- M4 8016.50C -0.0012 24000.50C -0.0010 26000.55C -0.0020
424- 40000.50C -0.9818 50000.35C -0.0140
425- C ALLOY 825 d=8.14 g/cc
426- M5 6000.50C -0.0005 13027.50C -0.0020 14000.50C -0.0050
427- 16032.50C -0.0003 22000.50C -0.0090 24000.50C -0.2150
428- 25055.50C -0.0100 26000.55C -0.2857 28000.50C -0.4200
429- 29000.50C -0.0225 42000.50C -0.0300
430- C Oxidized A516 CARBON STEEL and Water Mixture d=7.832 g/cc
431- C M6 6000.50C -0.00220 14000.50C -0.002750 15031.50C -0.00035
432- 16032.50C -0.00035 25055.50C -0.0090
433- C 26000.55C -0.98535
434- C A516 CARBON STEEL d=7.832 g/cc
435- M7 6000.50C -0.00220 14000.50C -0.002750 15031.50C -0.00035
436- 16032.50C -0.00035 25055.50C -0.0090
437- 26000.55C -0.98535
438- C SS316B6A 1.6% d=7.77 g/cc
439- M8 5010.50C -0.00288 5011.50C -0.013120
440- 6000.50C -0.00030 7014.50C -0.00100 14000.50C -0.0075
441- 15031.50C -0.00045 16032.50C -0.00030 24000.50C -0.19000
442- 25055.50C -0.02000 26000.55C -0.60445 28000.50C -0.13500
443- 42000.50C -0.02500
444- C SS316B3A 0.87wt% B d=7.83 g/cc
445- M9 5010.50C -0.001566 5011.50C -0.007134
446- 6000.50C -0.00030 7014.50C -0.00100 14000.50C -0.00750
447- 15031.50C -0.00045 16032.50C -0.00030 24000.50C -0.19000
448- 25055.50C -0.02000 26000.55C -0.60445 28000.50C -0.13500
449- C 42000.50C -0.02500
450- C Al 6063 d=2.69 g/cc
451- M10 12000.50C -0.00675 13027.50C -0.98125 14000.50C -0.00400
452- 22000.50C -0.00150 24000.50C -0.00100 25055.50C -0.00100
453- C 26000.55C -0.00350 29000.50C -0.00100
454- C TALLIES
455- PRINT
456-

```

1 initial source from file srctp
1 problem summary

run terminated when 97 kcode cycles were done.

+ AUCF - B&W 15x15 FUEL,21 ASSEMBLY DBF CS/SS-B Corroded & collapsed - (a26xb5f) probid = 08/21/96 00:50:24
08/20/96 22:55:24

neutron creation				neutron loss			
source	tracks	weight (per source particle)	energy	tracks	weight (per source particle)	energy	
source	388354	9.9909E-01	2.0536E+00	escape	7	9.1811E-06	2.6297E-05
				energy cutoff	0	0.	0.
				time cutoff	0	0.	0.
weight window	0	0.	0.	weight window	0	0.	0.
cell importance	0	0.	0.	cell importance	0	0.	0.
weight cutoff	0	5.1206E-02	5.3136E-06	weight cutoff	389025	5.1889E-02	1.0547E-05
energy importance	0	0.	0.	energy importance	0	0.	0.
dxtran	0	0.	0.	dxtran	0	0.	0.
forced collisions	0	0.	0.	forced collisions	0	0.	0.
exp. transform	0	0.	0.	exp. transform	0	0.	0.

upscattering	0	0.	7.6094E-08	downscattering	0	0.	1.9191E+00
(n,xn)	1352	2.7427E-03	2.2046E-03	capture	0	6.5097E-01	3.5891E-02
fission	0	0.	0.	loss to (n,xn)	674	1.3673E-03	1.1601E-02
total	389706	1.0530E+00	2.0559E+00	loss to fission	0	3.4880E-01	8.9234E-02
				total	389706	1.0530E+00	2.0559E+00
number of neutrons banked			678	average lifetime, shakes		cutoffs	
neutron tracks per source particle			1.0035E+00	escape	2.1281E+04	tco	1.0000E+34
neutron collisions per source particle			4.7025E+01	capture	2.3934E+03	eco	.0000E+00
total neutron collisions			18262445	capture or escape	2.3936E+03	wc1	-5.0000E-01
net multiplication		1.0014E+00	.0001	any termination	2.5626E+03	wc2	-2.5000E-01
computer time so far in this run			114.87 minutes	maximum number ever in bank			2
computer time in mcrun			114.77 minutes	bank overflows to backup file			0
source particles per minute			3.3838E+03	field length			0
random numbers generated			255297822	most random numbers used was		9706 in history	186745

range of sampled source weights = 9.5034E-01 to 1.1019E+00

1keff results for: AUCF - B&W 15x15 FUEL,21 ASSEMBLY DBF CS/SS-B Corroded & collapsed - (a26xb5f) probid = 08/20/96 22:55:24

the initial fission neutron source distribution was read from the srctp file named srctp
the criticality problem was scheduled to skip 7 cycles and run a total of 97 cycles with nominally 4000 neutrons per cycle.
this problem has run 7 inactive cycles with 27794 neutron histories and 90 active cycles with 360560 neutron histories.

this calculation has completed the requested number of keff cycles using a total of 388354 fission neutron source histories.

XX

the following cells with fissionable material had no neutron tracks entering:
97

the following cells with fissionable material had no neutron collisions:
97

the following cells with fissionable material had no fission source points:
97

warning. 1 fissionable cells had no tracks entering, 1 cells had no collisions, and 1 cells had no fission source points.
the keff results could be too small because these cells with fissionable material were not sampled.

XX

the results of the w test for normality applied to the individual collision, absorption, and track-length keff cycle values are:

the k(collision) cycle values appear normally distributed at the 95 percent confidence level
the k(absorption) cycle values appear normally distributed at the 95 percent confidence level
the k(trk length) cycle values appear normally distributed at the 95 percent confidence level

the final estimated combined collision/absorption/track-length keff = .90019 with an estimated standard deviation of .00108
the estimated 68, 95, & 99 percent keff confidence intervals are .89910 to .90127, .89803 to .90235, and .89732 to .90305
the estimated collision/absorption neutron removal lifetime = 2.39E-05 seconds with an estimated standard deviation of 5.71E-08

the estimated average keffs, one standard deviations, and 68, 95, and 99 percent confidence intervals are:

keff estimator	keff	standard deviation	68% confidence	95% confidence	99% confidence	corr
collision	.90068	.00127	.89941 to .90196	.89815 to .90322	.89732 to .90405	
absorption	.90008	.00132	.89876 to .90140	.89746 to .90270	.89660 to .90356	
track length	.89966	.00142	.89824 to .90108	.89683 to .90249	.89591 to .90342	
col/absorp	.90040	.00109	.89931 to .90149	.89822 to .90258	.89751 to .90329	.4081
abs/trk len	.89989	.00111	.89879 to .90100	.89769 to .90210	.89697 to .90282	.2980
col/trk len	.90039	.00126	.89913 to .90165	.89789 to .90290	.89707 to .90371	.7472
col/abs/trk len	.90019	.00108	.89910 to .90127	.89803 to .90235	.89732 to .90305	

C	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1											***** Base Case at 300 K *****			case sp40a	
2		Number Density Worksheet:			Isotope List					Far Field Criticality - 8%	UO2 in beginning - 40%	Porosity Tuff w/ water			
3										Tuff Porosit	40%			Years Critical	0
4										Volume	11494000.00			UO2 added	0
5		Element	Symbol	Isotope	MCNP ID	Atomic Weight				UO2%	8%				Number
6	1	Hydrogen	H	H-1	1001.50C	1.007825				ISOTOPE	Gm/Critic	Aw	Wt%	MCNP ID	Density
7			D	H-2	1002.55C	2.014102				SM149	0	148.91718		62149.50c	0.0000E+00
8			T	H-3	1003.50C	3.01605				SM151	0	150.919919		62151.50c	0.0000E+00
9	2	Helium	He	nat.	2000.01C	4.0026				ND143	0	142.909779		60143.50c	0.0000E+00
10			He	He-4	2004.50C	4.002631				RH103	0	102.905511		45103.50c	0.0000E+00
11	3	Lithium	Li	Li-6	3006.50C	6.015125				EU151	0	150.919838		63151.55c	0.0000E+00
12			Li	Li-7	3007.55C	7.016004				GD157	0	156.924025		64157.50c	0.0000E+00
13	4	Beryllium	Be	Be-9	4009.50C	9.012186				GD155	0	154.922664		64155.50c	0.0000E+00
14	5	Boron	B	B-10	5010.50C	10.01294				CD(113)	0	112.4		48000.50c	0.0000E+00
15			B	B-11	5011.56C	11.00931				XE131	0	130.905069		54131.50c	0.0000E+00
16	6	Carbon	C	nat.	6000.50C	12.01115				CS133	0	132.905355		55133.50c	0.0000E+00
17			C	C-12	6012.50C	12				TC99	0	98.90628		43099.50c	0.0000E+00
18	7	Nitrogen	N	N-14	7014.50C	14.00307				SM147	0	146.914867		62147.50c	0.0000E+00
19	8	Oxygen	O	O-16	8016.50C	15.99492				XE135	0	134.9063		54135.50c	0.0000E+00
20	9	Fluorine	F	F-19	9019.50C	18.9984				ND145	0	144.912538		60145.50c	0.0000E+00
21	11	Sodium	Na	Na-23	11023.50C	22.98977				MO95	0	94.905839		42095.50c	0.0000E+00
22	12	Magnesium	Mg	nat.	12000.50C	24.312				U233	0	233.039522		92233.50c	0.0000E+00
23	13	Aluminum	Al	Al-27	13027.50C	26.98154				U234	0	234.040904		92234.50c	4.6944E-07
24	14	Silicon	Si	nat.	14000.50C	28.086				U235	0	235.043915		92235.50c	3.8253E-05
25	15	Phosphoru	P	P-31	15031.50C	30.97376				U236	0	236.045637		92236.50c	9.1532E-06
26	16	Sulfur	S	S-32	16032.50C	31.97207				U238	0	238.05077		92238.50c	1.9055E-03
27	17	Chlorine	Cl	nat.	17000.50C	35.452				NP237	0	237.048056		92237.55c	2.1829E-06
28	19	Potassium	K	nat.	19000.50C	39.102				PU238	0	238.049511		94238.50c	0.0000E+00
29	20	Calcium	Ca	nat.	20000.50C	40.08				PU239	0	239.052146		94239.55c	0.0000E+00
30	22	Titanium	Ti	nat.	22000.50C	47.9				PU240	0	240.053882		94240.50c	0.0000E+00
31	23	Vanadium	V	nat.	23000.50C	50.942				O	0	15.994915		8016.50c	4.2818E-02
32	24	Chromium	Cr	nat.	24000.50C	51.996		water		H		1.00782519		1001.50c	2.1396E-02
33	25	Manganese	Mn	Mn-55	25055.50C	54.93805				O		15.994915			
34	26	Iron	Fe	nat.	26000.55C	55.847		Tuff		O		15.994915			
35	27	Cobalt	Co	Co-59	27059.50C	58.93319				Na		22.9897707		11023.50c	3.9366E-04
36	28	Nickel	Ni	nat.	28000.50C	58.71				Mg		24.312		12000.50c	2.3128E-04
37	29	Copper	Cu	nat.	29000.50C	63.54				Al		26.9815389		13027.50c	2.6070E-03
38	30	Zinc	Zn	nat.		65.37				Si		28.086		14000.50c	1.1406E-02
39	33	Arsenic	As	As-75	33075.35C	74.9216				K		39.102		19000.50c	5.5591E-04
40	38	Strontium	Sr	nat.		87.62				Ca		40.08		20000.50c	5.6949E-04
41	40	Zirconium	Zr	nat.	40000.50C	91.22				Fe		55.847		26000.55c	1.4037E-04
42	41	Niobium	Nb	Nb-93	41093.50C	92.90638				TOTAL	0				8.20735E-02
43	42	Molybdenu	Mo	nat.	42000.50C	95.94									
44			Mo	Mo-95	42095.50c	94.90584									
45	43	Technetium	Tc	Tc-99*	43099.50c	98.90628									
46	44	Ruthenium	Ru	Ru-101	44101.50c	100.9056				Far Field Criticality - 8%	UO2 in beginning - 40%	Porosity Tuff w/ water			
47	45	Rhodium	Rh	Rh-103	45103.50C	102.9055				Tuff Porosit	40%			Years Critical	0
48	47	Silver	Ag	Ag-109	47109.50C	108.9048				Volume	11494000.00			UO2 added	0
49	48	Cadmium	Cd	nat.	48000.50C	112.4				UO2%	8%	T=50 C de		0.99	Number
50	49	Indium	In	nat.		114.82				ISOTOPE	Gm/Critic	Aw	Wt%	MCNP ID	Density
51	50	Tin	Sn	nat.	50000.35C	118.69				SM149	0	148.91718		62149.50c	0.0000E+00
52	54	Xenon	Xe	Xe-131 *	54131.50c	130.9051		* AW from Chart of the Nuclides		SM151	0	150.919919		62151.50c	0.0000E+00
53			Xe	Xe-135 *	54135.50c	134.9063				ND143	0	142.909779		60143.50c	0.0000E+00
54	55	Cesium	Cs	Cs-133	55133.50c	132.9054				RH103	0	102.905511		45103.50c	0.0000E+00
55			Cs	Cs-135	55135.50c	134.9058				EU151	0	150.919838		63151.55c	0.0000E+00

C	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
56	Barium	Ba	nat.			137.34				GD157	0	156.924025		64157.50c	0.0000E+00
57	Lanthanum	La	nat.			138.91				GD155	0	154.922664		64155.50c	0.0000E+00
58	Cerium	Ce	nat.			140.12				CD(113)	0	112.4		48000.50c	0.0000E+00
59	60 Neodymiu	Nd	Nd-143		60143.50c	142.9098				XE131	0	130.905069		54131.50c	0.0000E+00
60		Nd	Nd-145		60145.50c	144.9125				CS133	0	132.905355		55133.50c	0.0000E+00
61										TC99	0	98.90628		43099.50c	0.0000E+00
62										SM147	0	146.914867		62147.50c	0.0000E+00
63										XE135	0	134.9063		54135.50c	0.0000E+00
64										ND145	0	144.912538		60145.50c	0.0000E+00
65	Number Density Worksheet:				Isotope List (Continued)					MO95	0	94.905839		42095.50c	0.0000E+00
66										U233	0	233.039522		92233.50c	0.0000E+00
67										U234	0	234.040904		92234.50c	4.6944E-07
68	Element	Symbol	Isotope		MCNP ID	Atomic Weight				U235	0	235.043915		92235.53c	3.8253E-05
69	62 Samarium	Sm	Sm-147			146.9149				U236	0	236.045637		92236.50c	9.1532E-06
70		Sm	Sm-149		62149.50C	148.9172				U238	0	238.05077		92238.53c	1.9055E-03
71		Sm	Sm-150			149.9173				NP237	0	237.048056		93237.50c	2.1829E-06
72		Sm	Sm-151			150.9199				PU238	0	238.049511		94238.50c	0.0000E+00
73		Sm	Sm-152			151.9198				PU239	0	239.052146		94239.55c	0.0000E+00
74	63 Europium	Eu	Eu-151		63151.55C	150.9198				PU240	0	240.053882		94240.50c	0.0000E+00
75		Eu	Eu-153		63153.55C	152.9212				O	0	15.994915		8016.53c	4.2711E-02
76		Eu	Eu-154		63154.50C	153.9231				H		1.00782519		1001.53c	2.1182E-02
77	64 Gadolinium	Gd	nat.		64000.35C	157.25				O		15.994915			
78		Gd	Gd-155			154.9227				O		15.994915			
79		Gd	Gd-157			156.924				Na		22.9897707		11023.50c	3.9366E-04
80	72 Hafnium	Hf	nat.		72000.50C	178.49				Mg		24.312		12000.50c	2.3128E-04
81	73 Tantalum	Ta	Ta-181		73181.50C	180.948				Al		26.9815389		13027.50c	2.6070E-03
82	74 Tungsten	W	nat.		74000.55C	183.85				Si		28.086		14000.50c	1.1406E-02
83	82 Lead	Pb	nat.		82000.50C	207.19				K		39.102		19000.50c	5.5591E-04
84	92 Uranium	U	U-233		92233.50C	233.0395				Ca		40.08		20000.50c	5.6949E-04
85		U	U-234		92234.50C	234.0409				Fe		55.847		26000.55c	1.4037E-04
86		U	U-235		92235.50C	235.0439				TOTAL	0				8.17526E-02
87		U	U-236		92236.50C	236.0456			*****	100,000 year hydrologic cycle cases - years critical indicated below is full power equivalent c					
88		U	U-238		92238.50C	238.0508				Far Field Criticality - 8%	UO2 in beginning - 40%	Porosity Tuff w/ water	w/ UO2 additio		
89	93 Neptunium	Np	Np-237		93237.55C	237.0481				Tuff Porosit	40%			Years Critical	50000
90	94 Plutonium	Pu	Pu-238		94238.50C	238.0495				Volume	11494000.00			UO2 added	0.052391664
91		Pu	Pu-239		94239.55C	239.0521				UO2%	8%	T=50 C de	0.99		Number
92		Pu	Pu-240		94240.50C	240.0539				ISOTOPE	Gm/Critic	Aw	Wt%	MCNP ID	Density
93		Pu	Pu-241		94241.50C	241.0567				SM149	8.79E+00	148.91718		62149.50c	3.0928E-09
94		Pu	Pu-242		94242.50C	242.0587				SM150	1.85E+02	149.917276		62150.50c	6.4659E-08
95		Pu	Pu-243		94243.35C	243.062				ND143	9.53E+02	142.909779		60143.50c	3.4941E-07
96	95 Americium	Am	Am-241		95241.50C	241.0567				RH103	3.99E+02	102.905511		45103.50c	2.0316E-07
97		Am	Am-242m		95242.50C	242.0595				EU151	3.76E+01	150.919838		63151.55c	1.3054E-08
98		Am	Am-243		95243.50C	243.0614				KR83	5.03E+01	82.914137		36083.50c	3.1787E-08
99	96 Curium	Cm	Cm-243		96243.35C	243.0614				GD155	6.66E-01	154.922664		64155.50c	2.2525E-10
100		Cm	Cm-245		96245.35C	245.0654				CS135	1.05E+03	134.90577		55135.50c	4.0782E-07
101		Cm	Cm-248		96248.35C	248.0722				XE131	4.50E+02	130.905069		54131.50c	1.8012E-07
102	36 Krypton	Kr	Kr-83		36083.50C	82.91414				CS133	1.06E+03	132.905355		55133.50c	4.1790E-07
103										TC99	6.21E+02	98.90628		43099.50c	3.2898E-07
104	Number Density Worksheet:									SM147	3.89E+02	146.914867		62147.50c	1.3874E-07
105										SM152	7.57E+01	151.919756		62152.50c	2.6109E-08
106	Number Density = (Weight %) * (Density) * (Na) / (Aw)									ND145	6.66E+02	144.912538		60145.50c	2.4081E-07
107	Avogadro's Number (Na)			0.602252						MO95	7.23E+02	94.905839		42095.50c	3.9916E-07
108	Atomic Weight (Aw)									U233	1.87E+02	233.039522		92233.50c	4.2045E-08
109										U234	2.38E+03	234.040904		92234.50c	8.4027E-07
110										U235	1.54E+05	235.043915		92235.50c	5.9382E-05

	C	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	
1		**** Base case at Power T=265 C case sp40a1								Backcheck of initial composition from SAQ2H which was based on MCNP wt. fractions							
2		Far Field Criticality - 8% UO2 in beginning - 40% Porosity Tuff w/ water				Years Critical				Far Field Criticality - 8% UO2 in beginning - 40% Porosity Tuff w/ water				*** These # densities were not			
3		Tuff Porosity= 40%				0				Tuff Porosity= 40%				0			
4		Volume 11494000.00				UO2 added 0				Volume 11494000.00				UO2 added 0			
5		UO2% 8% T=265 C den= 0.776				Number				UO2% 8% T=265 C d 0.776				Number			
6		ISOTOPE Gm/Critical AwWt%				MCNP ID Density				ISOTOPE Gm/Critical AwWt%				MCNP ID Density			
7		SM149 0 148.91718				62149.50c 0.0000E+00				SM149 0 148.91718				62149.50c 0.0000E+00			
8		SM151 0 150.919919				62151.50c 0.0000E+00				SM151 0 150.919919				62151.50c 0.0000E+00			
9		ND143 0 142.909779				60143.50c 0.0000E+00				ND143 0 142.909779				60143.50c 0.0000E+00			
10		RH103 0 102.905511				45103.50c 0.0000E+00				RH103 0 102.905511				45103.50c 0.0000E+00			
11		EU151 0 150.919838				63151.55c 0.0000E+00				EU151 0 150.919838				63151.55c 0.0000E+00			
12		GD157 0 156.924025				64157.50c 0.0000E+00				GD157 0 156.924025				64157.50c 0.0000E+00			
13		GD155 0 154.922664				64155.50c 0.0000E+00				GD155 0 154.922664				64155.50c 0.0000E+00			
14		CD(113) 0 112.4				48000.50c 0.0000E+00				CD(113) 0 112.4				48000.50c 0.0000E+00			
15		XE131 0 130.905069				54131.50c 0.0000E+00				XE131 0 130.905069				54131.50c 0.0000E+00			
16		CS133 0 132.905355				55133.50c 0.0000E+00				CS133 0 132.905355				55133.50c 0.0000E+00			
17		TC99 0 98.90628				43099.50c 0.0000E+00				TC99 0 98.90628				43099.50c 0.0000E+00			
18		SM147 0 146.914867				62147.50c 0.0000E+00				SM147 0 146.914867				62147.50c 0.0000E+00			
19		XE135 0 134.9063				54135.50c 0.0000E+00				XE135 0 134.9063				54135.50c 0.0000E+00			
20		ND145 0 144.912538				60145.50c 0.0000E+00				ND145 0 144.912538				60145.50c 0.0000E+00			
21		MO95 0 94.905839				42095.50c 0.0000E+00				MO95 0 94.905839				42095.50c 0.0000E+00			
22		U233 0 233.039522				92233.50c 0.0000E+00				U233 0 233.039522				92233.50c 0.0000E+00			
23		U234 0 234.040904				92234.50c 4.6944E-07				U234 2119.55337 234.040904				92234.50c 4.7453E-07			
24		U235 0 235.043915				92235.53c 3.8253E-05				U235 171683.823 235.043915				92235.53c 3.8273E-05			
25		U236 0 236.045637				92236.50c 9.1532E-06				U236 41179.894 236.045637				92236.50c 9.1411E-06			
26		U238 0 238.05077				92238.53c 1.9055E-03				U238 8657769.92 238.05077				92238.53c 1.9057E-03			
27		NP237 0 237.048056				93237.50c 2.1829E-06				NP237 9992.18017 237.048056				93237.50c 2.2087E-06			
28		PU238 0 238.049511				94238.50c 0.0000E+00				PU238 0 238.049511				94238.50c 0.0000E+00			
29		PU239 0 239.052146				94239.55c 0.0000E+00				PU239 0 239.052146				94239.55c 0.0000E+00			
30		PU240 0 240.053882				94240.50c 0.0000E+00				PU240 0 240.053882				94240.50c 0.0000E+00			
31		O 0 15.994915				8016.53c 4.0422E-02				O 0 15.994915				8016.53c 4.0422E-02			
32		water H 1.00782519				1001.53c 1.6603E-02				water H 1.00782519				1001.53c 1.6603E-02			
33		O 15.994915								O 15.994915							
34		Tuff O 15.994915								Tuff O 15.994915							
35		Na 22.9897707				11023.50c 3.9366E-04				Na 22.9897707				11023.50c 3.9366E-04			
36		Mg 24.312				12000.50c 2.3128E-04				Mg 24.312				12000.50c 2.3128E-04			
37		Al 26.9815389				13027.50c 2.6070E-03				Al 26.9815389				13027.50c 2.6070E-03			
38		Si 28.086				14000.50c 1.1406E-02				Si 28.086				14000.50c 1.1406E-02			
39		K 39.102				19000.50c 5.5591E-04				K 39.102				19000.50c 5.5591E-04			
40		Ca 40.08				20000.50c 5.6949E-04				Ca 40.08				20000.50c 5.6949E-04			
41		Fe 55.847				26000.55c 1.4037E-04				Fe 55.847				26000.55c 1.4037E-04			
42		TOTAL 0				7.48846E-02				TOTAL 8882745.38				7.48848E-02			
43																	
44		***** Cases w/ UO2 addition at 132 g/year *****								***** Assume no additional UO2 infiltration after criticality initiation.*****							
45		case names sp40(alpha)1								MCNP case names sp40(alpha)1n							
46		Far Field Criticality - 8% UO2 in beginning - 40% Porosity Tuff w/ water				Years Critical				Far Field Criticality - 8% UO2 in beginning - 40% Porosity Tuff w/ water				1			
47		Tuff Porosity= 40%				1.04783E-06				Tuff Porosity= 40%				0			
48		Volume 11494000.00				UO2 added 0				Volume 11494000.00				UO2 added 0			
49		UO2% 8% T=265 C den= 0.776				Number				UO2% 8% T=265 C d 0.776				Number			
50		ISOTOPE Gm/Critical AwWt%				MCNP ID Density				ISOTOPE Gm/Critical AwWt%				MCNP ID Density			
51		SM149 1.05E-02 148.91718				62149.50c 3.6945E-12				SM149 1.05E-02 148.91718				62149.50c 3.6945E-12			
52		SM151 4.62E-03 150.919919				62150.50c 1.6040E-12				SM151 4.62E-03 150.919919				62150.50c 1.6040E-12			
53		ND143 5.84E-02 142.909779				60143.50c 2.1412E-11				ND143 5.84E-02 142.909779				60143.50c 2.1412E-11			
54		RH103 1.79E-02 102.905511				45103.50c 9.1143E-12				RH103 1.79E-02 102.905511				45103.50c 9.1143E-12			
55		SM152 2.75E-03 151.919756				62152.50c 9.4847E-13				SM152 2.75E-03 151.919756				62152.50c 9.4847E-13			
56		GD157 7.73E-05 156.924025				64157.50c 2.5811E-14				GD157 7.73E-05 156.924025				64157.50c 2.5811E-14			
57		GD155 3.58E-04 154.922664				64155.50c 1.2118E-13				GD155 3.58E-04 154.922664				64155.50c 1.2118E-13			
58		CD(113) 6.62E-04 112.4				48000.50c 3.0860E-13				CD(113) 6.62E-04 112.4				48000.50c 3.0860E-13			
59		XE131 2.44E-02 130.905069				54131.50c 9.7665E-12				XE131 2.44E-02 130.905069				54131.50c 9.7665E-12			
60		CS133 6.18E-02 132.905355				55133.50c 2.4364E-11				CS133 6.18E-02 132.905355				55133.50c 2.4364E-11			
61		TC99 3.98E-02 98.90628				43099.50c 2.1085E-11				TC99 3.98E-02 98.90628				43099.50c 2.1085E-11			
62		SM147 2.08E-02 146.914867				62147.50c 7.4290E-12				SM147 2.08E-02 146.914867				62147.50c 7.4290E-12			
63		XE135 8.7E-05 134.9063				54135.50c 3.3790E-14				XE135 8.7E-05 134.9063				54135.50c 3.3790E-14			

Table with columns P-AD and rows 190-252. It contains two identical data tables side-by-side. The left table has columns P, Q, R, S, T, U, V, W, X, Y, Z, AA, AB, AC, AD. The right table has columns AA, AB, AC, AD. Rows include isotopes (ND145, MO95, U233, U234, U235, U236, U238, NP237, PU238, PU239, PU240) and elements (Na, Mg, Al, Si, K, Ca, Fe) with numerical values in scientific notation. Summary rows (201-204) show totals for U, V, Y, Z, AA, AB, AC, AD. A section from row 214 describes 'Far Field Criticality - 8% UO2 in beginning - 40% Porosity Tuff w/ water' with parameters like Tuff Porosity=40%, Volume=11494000.00, and UO2 added=0.0052391664.

C	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD
316		SM150	9.83E+01	149.917276			62150.50c	3.4356E-08							
317		KR83	2.78E+01	82.914137			36083.50c	1.7568E-08							
318		CS135	5.81E+02	134.90577			55135.50c	2.2566E-07							
319		GD157	7.02E-02	156.924025			64157.50c	2.3440E-11							
320		RU101	3.40E+02	100.905576			44101.50c	1.7655E-07							
321		EU153	1.90E+01	152.921242			63153.55c	6.5102E-09							
322		PR141	5.30E+02	140.907648 *			59141.50c	1.9708E-07							
323		SM151	6.13E-01	150.919919			62151.50c	2.1282E-10							
324		AG109	1.05E+01	108.904756			47109.50c	5.0518E-09							
325		PD105	9.04E+01	104.90508 *			46105.50c	4.5152E-08							
326		ZR93	2.49E+02	92.905676 *			40093.50c	1.4043E-07							
327		GD152	7.10E+00	151.919788			64152.50c	2.4488E-09							
328		PD108	1.45E+01	107.903894 *			46108.50c	7.0411E-09							
329		U233	2.95E+01	233.039522			92233.50c	6.6328E-09							
330		U234	2.43E+03	234.040904			92234.50c	6.0552E-07							
331		U235	1.56E+05	235.043915			92235.53c	3.9787E-05							
332		U236	4.37E+04	236.045637			92236.50c	1.0899E-05							
333		U238	8.64E+06	238.05077			92238.53c	2.1513E-03							
334		NP237	9.83E+03	237.048056			93237.50c	2.4587E-06							
335		PU238	5.43E+00	238.049511			94238.50c	1.1952E-09							
336		PU239	9.03E+03	239.052146			94239.55c	1.9793E-06							
337		PU240	3.21E+02	240.053882			94240.50c	7.0065E-08							
338		O	0	15.994915		SUM	8016.53c	4.0662E-02							
339		H		1.00782519			1001.53c	1.6059E-02							
340		O		15.994915											
341		O		15.994915											
342		Na		22.9897707			11023.50c	3.9366E-04							
343		Mg		24.312			12000.50c	2.3128E-04							
344		Al		26.9815389			13027.50c	2.6070E-03							
345		Si		28.086			14000.50c	1.1406E-02							
346		K		39.102			19000.50c	5.5591E-04							
347		Ca		40.08			20000.50c	5.6949E-04							
348		Fe		55.847			26000.55c	1.4037E-04							
349		TOTAL	8866338.8062					7.48351E-02							

decay only												
	65000 yr			Ref. 5.53	Ref. 5.53	Ref. 5.53	Ref. 5.54	Ref. 5.54	Ref. 5.54	Ref. 5.54	Ref. 5.54	Ref. 5.54
10k crit	1k crit	5k crit	10k crit	30 yr	400 yr	15000 yr	16000 yr	20000 yr	25000 yr	45000 yr	65000 yr	65000 yr
1.5E-02	1.3E-02	1.4E-02	1.6E-02	1.1E-05	1.2E-04	4.0E-03	4.3E-03	5.2E-03	6.3E-03	1.0E-02	1.3E-02	
1.7E-04	3.9E-05	3.6E-05	3.4E-05	1.1E+03	7.9E+02	2.4E-03	2.2E-03	1.6E-03	1.1E-03	2.0E-04	3.9E-05	
0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.9E+00	6.3E-01	4.6E-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	
6.3E-02	4.8E-03	6.4E-03	9.5E-03	2.0E+00	1.9E+00	4.9E-01	4.5E-01	3.1E-01	1.9E-01	2.9E-02	4.5E-03	
2.1E-07	1.3E-08	1.5E-08	1.9E-08	3.3E-05	3.2E-05	5.4E-06	4.8E-06	3.0E-06	1.6E-06	1.4E-07	1.3E-08	
0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.9E+01	2.7E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	
1.7E-04	3.9E-05	3.6E-05	3.4E-05	7.9E-03	7.6E-03	2.3E-03	2.1E-03	1.5E-03	1.0E-03	2.0E-04	3.9E-05	
2.8E-06	7.3E-08	1.0E-07	1.5E-07	9.2E-04	8.7E-04	1.0E-04	8.8E-05	4.9E-05	2.4E-05	1.3E-06	6.7E-08	
2.2E-01	2.0E-01	2.1E-01	2.2E-01	2.0E-01	2.0E-01	2.0E-01	2.0E-01	2.0E-01	2.0E-01	2.0E-01	2.0E-01	
9.2E-03	8.8E-03	9.0E-03	9.2E-03	8.8E-03	8.8E-03	8.8E-03	8.8E-03	8.8E-03	8.8E-03	8.8E-03	8.8E-03	
3.6E-01	3.4E-01	3.5E-01	3.5E-01	2.6E-01	3.5E-01	3.5E-01	3.5E-01	3.5E-01	3.4E-01	3.4E-01	3.4E-01	
3.7E-05	3.6E-06	8.9E-06	1.9E-05	2.3E-05	2.3E-05	1.4E-05	1.4E-05	1.2E-05	1.0E-05	5.0E-06	2.5E-06	
3.9E-01	3.8E-01	3.8E-01	3.8E-01	9.7E-02	2.2E-01	3.8E-01	3.8E-01	3.8E-01	3.8E-01	3.8E-01	3.8E-01	
1.5E-02	1.3E-02	1.4E-02	1.6E-02	2.2E-05	1.3E-04	4.0E-03	4.3E-03	5.2E-03	6.3E-03	1.0E-02	1.3E-02	
2.2E-01	2.8E-01	2.9E-01	3.1E-01	2.9E-07	1.6E-04	7.5E-02	8.0E-02	1.0E-01	1.3E-01	2.1E-01	2.8E-01	
2.7E-02	2.6E-02	2.7E-02	2.7E-02	2.6E-02	2.6E-02	2.6E-02	2.6E-02	2.6E-02	2.6E-02	2.6E-02	2.6E-02	
0.0E+00	0.0E+00	0.0E+00	0.0E+00	4.1E+02	2.3E+01	4.6E-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	
4.9E+01	2.6E+01	2.6E+01	2.8E+01	1.6E+02	1.6E+02	1.1E+02	1.0E+02	9.2E+01	8.0E+01	4.5E+01	2.5E+01	
2.2E+00	1.7E-01	2.0E-01	2.7E-01	1.5E+02	1.5E+02	3.1E+01	2.8E+01	1.9E+01	1.1E+01	1.3E+00	1.6E-01	
1.7E-04	3.9E-05	3.6E-05	3.4E-05	9.8E+03	7.8E-03	2.3E-03	2.1E-03	1.5E-03	1.0E-03	2.0E-04	3.9E-05	
2.5E-01	2.5E-01	2.5E-01	2.4E-01	2.8E-01	2.8E-01	2.7E-01	2.7E-01	2.7E-01	2.7E-01	2.6E-01	2.5E-01	
2.2E-01	2.8E-01	2.9E-01	3.1E-01	1.1E-06	1.8E-04	7.5E-02	8.0E-02	1.0E-01	1.3E-01	2.1E-01	2.8E-01	
2.8E-07	4.1E-07	4.2E-07	4.2E-07	1.1E-10	1.8E-09	8.4E-08	9.0E-08	1.1E-07	1.5E-07	2.8E-07	4.1E-07	
7.9E-02	4.9E-02	5.1E-02	5.2E-02	1.9E-01	1.9E-01	1.4E-01	1.4E-01	1.3E-01	1.1E-01	7.5E-02	4.9E-02	
0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.3E+02	7.5E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	
1.1E-01	8.9E-02	9.1E-02	9.3E-02	1.4E-01	1.4E-01	1.3E-01	1.2E-01	1.2E-01	1.2E-01	1.0E-01	8.8E-02	
3.5E+00	3.2E+00	3.3E+00	3.3E+00	3.9E+00	3.9E+00	3.8E+00	3.7E+00	3.7E+00	3.6E+00	3.4E+00	3.2E+00	
5.1E-02	7.8E-02	7.8E-02	7.8E-02	4.8E-08	4.5E-06	1.0E-02	1.2E-02	1.6E-02	2.3E-02	5.1E-02	7.8E-02	
2.3E-01	2.9E-01	3.0E-01	3.1E-01	1.6E-04	2.3E-03	8.7E-02	9.2E-02	1.1E-01	1.4E-01	2.2E-01	2.9E-01	
2.8E-07	4.1E-07	4.2E-07	4.2E-07	1.5E-10	1.8E-09	8.4E-08	9.0E-08	1.1E-07	1.5E-07	2.8E-07	4.1E-07	
6.7E-02	9.3E-02	9.3E-02	9.3E-02	2.2E-05	2.9E-04	2.3E-02	2.5E-02	3.1E-02	3.9E-02	6.7E-02	9.3E-02	
6.9E-01	6.1E-01	6.3E-01	6.6E-01	5.4E-01	6.8E-01	6.7E-01	6.7E-01	6.6E-01	6.5E-01	6.3E-01	6.0E-01	
1.7E-02	1.8E-02	1.8E-02	1.8E-02	1.4E-02	1.4E-02	1.6E-02	1.6E-02	1.6E-02	1.6E-02	1.8E-02	1.8E-02	
1.4E-01	1.4E-01	1.4E-01	1.4E-01	9.2E-02	9.3E-02	1.3E-01	1.3E-01	1.3E-01	1.3E-01	1.3E-01	1.3E-01	
1.5E-01	1.5E-01	1.5E-01	1.5E-01	1.5E-01	1.5E-01	1.5E-01	1.5E-01	1.5E-01	1.5E-01	1.5E-01	1.5E-01	
3.6E-01	3.4E-01	3.5E-01	3.5E-01	3.5E-01	3.5E-01	3.5E-01	3.5E-01	3.5E-01	3.4E-01	3.4E-01	3.4E-01	
5.8E+01	3.3E+01	3.3E+01	3.5E+01	1.2E+04	1.1E+03	1.4E+02	1.4E+02	1.2E+02	9.8E+01	5.3E+01	3.2E+01	

Internal Criticality Radionuclide Inventory Comparisons										
	Total Ci of 36 Isotopes per assembly									
	30	400	15000	16000	20000	25000	45000	65000		
PWR Thermal/Shielding DBF, Decay Only					1.73E+02					
PWR Criticality DBF, Decay Only	1.18E+04	1.14E+03	1.45E+02	1.40E+02	1.20E+02	9.80E+01	5.30E+01	3.20E+01		
PWR Criticality DBF, 1000 yr Criticality				1.50E+02			5.40E+01	3.30E+01		
PWR Criticality DBF, 5000 yr Criticality					1.40E+02		5.50E+01	3.30E+01		
PWR Criticality DBF, 10000 yr Criticality						1.20E+02	5.80E+01	3.50E+01		
	Total Ci of 36 TSPA 95 Isotopes Per Unit Burnup									
	Incremental			Age of Fuel (years)						
	Burnup (GWd)	30	400	15000	16000	20000	25000	45000	65000	
PWR Thermal/Shielding DBF, Decay Only		9.280	1274.58	122.40	15.60	15.09	12.93	10.56	5.71	3.45
PWR Criticality DBF, Decay Only		0.038				263.16			26.32	26.32
PWR Criticality DBF, 1000 yr Criticality		0.190					105.40		10.54	5.27
PWR Criticality DBF, 5000 yr Criticality		0.380						57.97	13.17	7.90
PWR Criticality DBF, 10000 yr Criticality										

			Imported												
			Data from CDB-R												
			Therm/Shld												
			decay only				PWR Crit. DBF								
			20000 yrs	(Ci/MTHM*.464)							From Ref. 5.53				
			ISOTOPE	CURIES/MTIHM	CURIES/ASSY				16000 yr	20000 yr	25000 yr	45000 yr			
			=====	=====				Isotopes	1k crit	5k crit	10k crit	1k crit	5k crit		
			AC227	6.77E-03	3.14E-03		ac227	4.9E-03	8.8E-03	1.4E-02	1.0E-02	1.2E-02			
			AM241	1.45E-01	6.74E-02		am241	2.6E+00	2.7E+00	2.1E+00	2.0E-04	1.9E-04			
			AM242M	7.23E-39	3.35E-39		am242m	2.0E-03	2.4E-03	1.9E-03	0.0E+00	0.0E+00			
			AM243	5.67E+00	2.63E+00		am243	4.8E-01	4.4E-01	4.1E-01	3.1E-02	4.2E-02			
			C 14	1.45E-01	6.71E-02		c 14	4.9E-06	3.5E-06	2.4E-06	1.5E-07	1.7E-07			
			CM244	1.19E-10	5.51E-11		cm244	1.7E-02	1.6E-02	1.5E-02	0.0E+00	0.0E+00			
			CM245	1.45E-01	6.73E-02		cm245	2.1E-03	1.4E-03	8.8E-04	2.0E-04	1.9E-04			
			CM246	1.04E-02	4.80E-03		cm246	9.6E-05	7.4E-05	5.2E-05	1.4E-06	1.9E-06			
			CS135	6.90E-01	3.20E-01		cs135	2.0E-01	2.1E-01	2.2E-01	2.0E-01	2.1E-01			
			I129	4.50E-02	2.09E-02		i129	8.8E-03	9.0E-03	9.2E-03	8.8E-03	9.0E-03			
			NB 93M	2.83E+00	1.31E+00		nb 93m	3.5E-01	3.5E-01	3.6E-01	3.4E-01	3.5E-01			
			NB 94	7.40E-01	3.43E-01		nb 94	1.9E-05	4.1E-05	7.4E-05	7.1E-06	1.8E-05			
			NP237	1.75E+00	8.10E-01		np237	3.8E-01	3.8E-01	3.9E-01	3.8E-01	3.8E-01			
			PA231	6.77E-03	3.14E-03		pa231	4.9E-03	8.8E-03	1.4E-02	1.0E-02	1.2E-02			
			PB210	5.10E-01	2.37E-01		pb210	8.0E-02	1.0E-01	1.3E-01	2.1E-01	2.2E-01			
			PD107	1.66E-01	7.68E-02		pd107	2.6E-02	2.7E-02	2.7E-02	2.6E-02	2.7E-02			
			PU238	1.42E-38	6.59E-39		pu238	2.9E+00	3.0E+00	3.1E+00	0.0E+00	0.0E+00			
			PU239	2.44E+02	1.13E+02		pu239	1.0E+02	9.6E+01	8.7E+01	4.5E+01	4.7E+01			
			PU240	8.62E+01	4.00E+01		pu240	2.9E+01	2.3E+01	1.8E+01	1.4E+00	1.7E+00			
			PU241	1.45E-01	6.74E-02		pu241	3.2E+00	2.6E+00	2.1E+00	2.0E-04	1.9E-04			
			PU242	2.45E+00	1.14E+00		pu242	2.7E-01	2.7E-01	2.6E-01	2.6E-01	2.5E-01			
			RA226	5.10E-01	2.37E-01		ra226	8.0E-02	1.0E-01	1.3E-01	2.1E-01	2.2E-01			
			RA228	4.65E-07	2.16E-07		ra228	9.0E-08	1.1E-07	1.5E-07	2.8E-07	2.8E-07			
			SE 79	4.77E-01	2.21E-01		se 79	1.4E-01	1.3E-01	1.2E-01	7.5E-02	7.7E-02			
			SM151	0.00E+00	0.00E+00		sm151	7.9E-01	8.0E-01	8.1E-01	0.0E+00	0.0E+00			
			SN126	9.83E-01	4.56E-01		sn126	1.3E-01	1.2E-01	1.2E-01	1.0E-01	1.0E-01			
			TC 99	1.70E+01	7.90E+00		tc 99	3.8E+00	3.8E+00	3.8E+00	3.4E+00	3.5E+00			
			TH229	7.91E-02	3.67E-02		th229	1.1E-02	1.6E-02	2.3E-02	5.1E-02	5.1E-02			
			TH230	5.71E-01	2.65E-01		th230	9.2E-02	1.1E-01	1.4E-01	2.2E-01	2.3E-01			
			TH232	4.64E-07	2.15E-07		th232	9.0E-08	1.1E-07	1.5E-07	2.8E-07	2.8E-07			
			U233	1.44E-01	6.66E-02		u233	2.5E-02	3.1E-02	3.7E-02	6.7E-02	6.7E-02			
			U234	3.39E+00	1.57E+00		u234	6.7E-01	6.9E-01	7.2E-01	6.3E-01	6.6E-01			
			U235	2.23E-02	1.03E-02		u235	1.6E-02	1.6E-02	1.6E-02	1.8E-02	1.8E-02			
			U236	5.30E-01	2.46E-01		u236	1.3E-01	1.3E-01	1.4E-01	1.3E-01	1.4E-01			
			U238	3.11E-01	1.44E-01		u238	1.5E-01	1.5E-01	1.5E-01	1.5E-01	1.5E-01			
			ZR 93	2.97E+00	1.38E+00		zr 93	3.5E-01	3.5E-01	3.6E-01	3.4E-01	3.5E-01			
			36 TSPA Total	3.73E+02	1.73E+02			1.5E+02	1.4E+02	1.2E+02	5.4E+01	5.5E+01			

1mcpn version 4a ld=10/01/93 07/26/96 08:40:39

probid = 07/26/96 08:40:39

inp=sp40a outp=sp40a.0

```

1- Far-Field Consequence Study - 32% H2O/ 8% UO2 (sp40a) 0 Years 300K
2- C Calico Hills Tuff 1.5095 g/cc .40 porosity - sphere surrounded by tuff
3- C Water and UO2 offset each other in porous space
4- C CELL SPECIFICATIONS
5- C INNER WATER REGION
6- 1 1 8.20735-2 -1 IMP:N=1
7- 2 2 8.42302-2 1 -2 IMP:N=1
8- C OUTSIDE WORLD
9- 3 0 2 IMP:N=0
10-
11- C SURFACE SPECIFICATIONS
12- 1 SO 140 $ INNER FUEL ZONE
13- 2 SO 200 $ TUFF REFLECTOR
14-
15- MODE N
16- KCODE 4000 1. 30 130
17- C KSRC 0 0 1 0 0 10 0 0 -20 0 0 29 0 20 5 0 0 -5 -10 0 -10
18- C 0 -5 -20 -10 0 -13 0 -10 14 0 0 -15 -10 -5 -16 5 5 0 10 10 17
19- C MATERIAL SPECIFICATIONS
20- c 32 vol% water in calico Hills tuff - 8 vol% UO2
21- c 3.0% Original Enrichment/ 20 GWD/MT decayed to Uranium isotopes
22- m1 1001.50c 2.1396-2 8016.50c 4.2818-2 11023.50c 3.9366-4
23- 12000.50c 2.3128-4 13027.50c 2.6070-3 14000.50c 1.1406-2
24- 19000.50c 5.5591-4 20000.50c 5.6949-4 26000.55c 1.4037-4
25- 92234.50c 4.6944-7 92235.50c 3.8253-5 92236.50c 9.1532-6
26- 92238.50c 1.9055-3 93237.50c 2.1829-6
27- mt1 lwtr.01t
28- c 40 vol% water in calico Hills tuff
29- m2 1001.50c 2.6744-2 8016.50c 4.1582-2 11023.50c 3.9366-4
30- 12000.50c 2.3128-4 13027.50c 2.6070-3 14000.50c 1.1406-2
31- 19000.50c 5.5591-4 20000.50c 5.6949-4 26000.55c 1.4037-4
32- mt2 lwtr.01t
33- PRINT
  
```

1 initial source from file srctp

```

original number of points          4015
  points not in any cell            0
  points in cells of zero importance 0
  points in void cells              0
  points in ambiguous cells         0
total points rejected              0
points remaining                   4015
points after expansion or contraction 4001
nominal source size                4000
  
```

```

initial guess for k(eff.)          1.000000
cycles to skip before tallying      30
number of keff cycles that can be stored 260
  
```

total fission nubar data are being used.
 1material composition

print table 40

material
 number component nuclide, atom fraction

```

1      1001, .26069      8016, .52170      11023, .00480      12000, .00282
      13027, .03176      14000, .13897      19000, .00677      20000, .00694
      26000, .00171      92234, .00001      92235, .00047      92236, .00011
      92238, .02322      93237, .00003
associated thermal s(a,b) data sets: lwtr.01t
2      1001, .31751      8016, .49367      11023, .00467      12000, .00275
      13027, .03095      14000, .13542      19000, .00660      20000, .00676
      26000, .00167
associated thermal s(a,b) data sets: lwtr.01t
    
```

```

material
number      component nuclide, mass fraction
1      1001, .01323      8016, .42028      11023, .00555      12000, .00345
      13027, .04317      14000, .19658      19000, .01334      20000, .01401
      26000, .00481      92234, .00007      92235, .00552      92236, .00133
      92238, .27836      93237, .00032
2      1001, .02344      8016, .57845      11023, .00787      12000, .00489
      13027, .06118      14000, .27861      19000, .01890      20000, .01985
      26000, .00682
    
```

1cell volumes and masses

print table 50

cell	atom density	gram density	input volume	calculated volume	mass	pieces	reason volume not calculated
1	1	8.20735E-02	2.70602E+00	.00000E+00	1.14940E+07	3.11031E+07	1
2	2	8.42302E-02	1.90934E+00	.00000E+00	2.20163E+07	4.20366E+07	1
3	3	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	0 infinite

1problem summary

run terminated when 130 kcode cycles were done.

+ Far-Field Consequence Study - 32% H2O/ 8% UO2 (sp40a) 0 Years 300K probid = 07/26/96 11:15:45
 07/26/96 08:40:39

neutron creation	tracks	weight (per source particle)	energy	neutron loss	tracks	weight (per source particle)	energy
source	519712	1.0006E+00	2.0304E+00	escape	71	7.8193E-05	4.8272E-05
				energy cutoff	0	0.	0.
				time cutoff	0	0.	0.
weight window	0	0.	0.	weight window	0	0.	0.
cell importance	0	0.	0.	cell importance	0	0.	0.
weight cutoff	0	5.8391E-02	2.5613E-05	weight cutoff	519894	5.8323E-02	2.4633E-05
energy importance	0	0.	0.	energy importance	0	0.	0.
dextran	0	0.	0.	dextran	0	0.	0.
forced collisions	0	0.	0.	forced collisions	0	0.	0.
exp. transform	0	0.	0.	exp. transform	0	0.	0.
upscattering	0	0.	1.9735E-07	downscattering	0	0.	1.9368E+00
				capture	0	6.0074E-01	5.8408E-02
(n,xn)	505	7.4376E-04	5.4034E-04	loss to (n,xn)	252	3.7112E-04	3.1107E-03
fission	0	0.	0.	loss to fission	0	4.0018E-01	3.2580E-02
total	520217	1.0597E+00	2.0310E+00	total	520217	1.0597E+00	2.0310E+00

number of neutrons banked 253 average lifetime, shakes cutoffs
 neutron tracks per source particle 1.0010E+00 escape 2.0960E+04 tco 1.0000E+34

neutron collisions per source particle	7.7830E+01	capture	9.3384E+03	eco	.0000E+00
total neutron collisions	40449082	capture or escape	9.3393E+03	wc1	-5.0000E-01
net multiplication	1.0004E+00 .0000	any termination	1.0085E+04	wc2	-2.5000E-01

computer time so far in this run	89.99 minutes	maximum number ever in bank	2
computer time in mcrun	89.95 minutes	bank overflows to backup file	0
source particles per minute	5.7777E+03	field length	0
random numbers generated	466116603	most random numbers used was	12366 in history 242791

range of sampled source weights = 9.5102E-01 to 1.0692E+00
 1neutron activity in each cell

print table 126

cell	tracks entering	population	collisions	collisions * weight (per history)	number weighted energy	flux weighted energy	average track weight (relative)	average track mfp (cm)
1	1	577532	519965	35423477	4.9823E+01	2.5818E-04	8.1462E-01	2.1899E+00
2	2	75241	36493	5025605	5.1939E+00	4.7126E-05	5.9409E-01	1.3345E+00

1keff results for: Far-Field Consequence Study - 32% H2O/ 8% UO2 (sp40a) 0 Years 300K probid = 07/26/96 08:40:39

the initial fission neutron source distribution was read from the srctp file named srctp .
 the criticality problem was scheduled to skip 30 cycles and run a total of 130 cycles with nominally 4000 neutrons per cycle.
 this problem has run 30 inactive cycles with 120293 neutron histories and 100 active cycles with 399419 neutron histories.

this calculation has completed the requested number of keff cycles using a total of 519712 fission neutron source histories.
 all cells with fissionable material were sampled and had fission neutron source points.

the results of the w test for normality applied to the individual collision, absorption, and track-length keff cycle values are:

the k(collision) cycle values appear normally distributed at the 95 percent confidence level
 the k(absorption) cycle values appear normally distributed at the 95 percent confidence level
 the k(trk length) cycle values appear normally distributed at the 95 percent confidence level

the final estimated combined collision/absorption/track-length keff = .97755 with an estimated standard deviation of .00081
 the estimated 68, 95, & 99 percent keff confidence intervals are .97674 to .97835, .97593 to .97916, and .97541 to .97968
 the estimated collision/absorption neutron removal lifetime = 9.36E-05 seconds with an estimated standard deviation of 1.75E-07

the estimated average keffs, one standard deviations, and 68, 95, and 99 percent confidence intervals are:

keff estimator	keff	standard deviation	68% confidence	95% confidence	99% confidence	corr
collision	.97699	.00138	.97561 to .97838	.97424 to .97974	.97334 to .98064	
absorption	.97847	.00110	.97736 to .97957	.97627 to .98066	.97556 to .98138	
track length	.97663	.00134	.97529 to .97797	.97397 to .97929	.97310 to .98016	
col/absorp	.97788	.00082	.97706 to .97870	.97624 to .97952	.97571 to .98005	-.1060
abs/trk len	.97770	.00080	.97690 to .97851	.97610 to .97930	.97558 to .97983	-.1259
col/trk len	.97645	.00135	.97510 to .97780	.97376 to .97914	.97288 to .98002	.9838
col/abs/trk len	.97755	.00081	.97674 to .97835	.97593 to .97916	.97541 to .97968	

1mcpn version 4a ld=10/01/93 08/23/96 10:15:41

probid = 08/23/96 10:15:41

inp=sp40a2 outp=sp40a20

```

1- Far-Field Consequence Study - 32% H2O/ 8% UO2 (sp40a2) 0 Years 300K
2- C Calico Hills Tuff 1.5095 g/cc .40 porosity - sphere surrounded by tuff
3- C Water and UO2 offset each other in porous space 50 C uniform
4- C CELL SPECIFICATIONS
5- C INNER WATER REGION
6- 1 1 8.17526-2 -1 IMP:N=1
7- 2 2 8.38290-2 1 -2 IMP:N=1
8- C OUTSIDE WORLD
9- 3 0 2 IMP:N=0
10-
11- C SURFACE SPECIFICATIONS
12- 1 SO 140 $ INNER FUEL ZONE
13- 2 SO 200 $ TUFF REFLECTOR
14-
15- MODE N
16- KCODE 4000 1. 30 130
17- C KSRC 0 0 1 0 0 10 0 0 -20 0 0 29 0 20 5 0 0 -5 -10 0 -10
18- C 0 -5 -20 -10 0 -13 0 -10 14 0 0 -15 -10 -5 -16 5 5 0 10 10 17
19- C MATERIAL SPECIFICATIONS
20- c 32 (x .99 at 50 C) vol% water in calico Hills tuff - 8 vol% UO2
21- c 3.0% Original Enrichment/ 20 GWD/MT decayed to Uranium isotopes
22- m1 1001.50c 2.1182-2 8016.50c 4.2711-2 11023.50c 3.9366-4
23- 12000.50c 2.3128-4 13027.50c 2.6070-3 14000.50c 1.1406-2
24- 19000.50c 5.5591-4 20000.50c 5.6949-4 26000.55c 1.4037-4
25- 92234.50c 4.6944-7 92235.50c 3.8253-5 92236.50c 9.1532-6
26- 92238.50c 1.9055-3 93237.50c 2.1829-6
27- mt1 lwtr.01t
28- c 40 (x .99 at 50 C) vol% water in calico Hills tuff
29- m2 1001.50c 2.6477-2 8016.50c 4.1448-2 11023.50c 3.9366-4
30- 12000.50c 2.3128-4 13027.50c 2.6070-3 14000.50c 1.1406-2
31- 19000.50c 5.5591-4 20000.50c 5.6949-4 26000.55c 1.4037-4
32- mt2 lwtr.01t
33- PRINT
  
```

1 initial source from file srctp

```

original number of points          4048
  points not in any cell            0
  points in cells of zero importance 0
  points in void cells              0
  points in ambiguous cells         0
total points rejected              0
points remaining                   4048
points after expansion or contraction 3997
nominal source size                4000
  
```

```

initial guess for k(eff.)          1.000000
cycles to skip before tallying      30
number of keff cycles that can be stored 260
  
```

total fission nuubar data are being used.
 material composition

print table 40

```

material
number      component nuclide, atom fraction
  
```

```

1      1001, .25910      8016, .52244      11023, .00482      12000, .00283
      13027, .03189      14000, .13952      19000, .00680      20000, .00697
      26000, .00172      92234, .00001      92235, .00047      92236, .00011
      92238, .02331      93237, .00003
associated thermal s(a,b) data sets: lwtr.01t
2      1001, .31585      8016, .49444      11023, .00470      12000, .00276
      13027, .03110      14000, .13606      19000, .00663      20000, .00679
      26000, .00167
associated thermal s(a,b) data sets: lwtr.01t
    
```

```

material
number      component nuclide, mass fraction
1      1001, .01312      8016, .41972      11023, .00556      12000, .00345
      13027, .04322      14000, .19681      19000, .01335      20000, .01402
      26000, .00482      92234, .00007      92235, .00552      92236, .00133
      92238, .27869      93237, .00032
2      1001, .02326      8016, .57779      11023, .00789      12000, .00490
      13027, .06130      14000, .27919      19000, .01894      20000, .01989
      26000, .00683
    
```

1cell volumes and masses

print table 50

cell	atom density	gram density	input volume	calculated volume	mass	pieces	reason volume not calculated
1	1	8.17526E-02	2.70282E+00	.00000E+00	1.14940E+07	3.10664E+07	1
2	2	8.38290E-02	1.90533E+00	.00000E+00	2.20163E+07	4.19483E+07	1
3	3	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	0 infinite

1problem summary

run terminated when 130 kcode cycles were done.

+ Far-Field Consequence Study - 32% H2O/ 8% UO2 (sp40a2) 0 Years 300K probid = 08/23/96 13:47:25
0 08/23/96 10:15:41

neutron creation	tracks	weight (per source particle)	energy	neutron loss	tracks	weight (per source particle)	energy
source	518810	1.0023E+00	2.0305E+00	escape	113	1.2903E-04	1.2917E-04
				energy cutoff	0	0.	0.
				time cutoff	0	0.	0.
weight window	0	0.	0.	weight window	0	0.	0.
cell importance	0	0.	0.	cell importance	0	0.	0.
weight cutoff	0	5.8402E-02	3.2972E-05	weight cutoff	518942	5.8636E-02	3.3741E-05
energy importance	0	0.	0.	energy importance	0	0.	0.
dxtran	0	0.	0.	dxtran	0	0.	0.
forced collisions	0	0.	0.	forced collisions	0	0.	0.
exp. transform	0	0.	0.	exp. transform	0	0.	0.
upscattering	0	0.	1.9681E-07	downscattering	0	0.	1.9372E+00
				capture	0	6.0199E-01	5.8119E-02
(n,xn)	488	7.1361E-04	4.8042E-04	loss to (n,xn)	243	3.5546E-04	2.9646E-03
fission	0	0.	0.	loss to fission	0	4.0030E-01	3.2620E-02
total	519298	1.0614E+00	2.0310E+00	total	519298	1.0614E+00	2.0310E+00

number of neutrons banked 245 average lifetime, shakes cutoffs
neutron tracks per source particle 1.0009E+00 escape 2.1238E+04 tco 1.0000E+34

neutron collisions per source particle	7.7862E+01	capture	9.3706E+03	eco	.0000E+00
total neutron collisions	40395375	capture or escape	9.3722E+03	wc1	-5.0000E-01
net multiplication	1.0004E+00 .0000	any termination	1.0137E+04	wc2	-2.5000E-01

computer time so far in this run	89.65 minutes	maximum number ever in bank	2
computer time in mcrun	89.61 minutes	bank overflows to backup file	0
source particles per minute	5.7894E+03	field length	0
random numbers generated	465318405	most random numbers used was	12040 in history 376270

range of sampled source weights = 9.2915E-01 to 1.0650E+00
 1neutron activity in each cell

print table 126

cell	tracks entering	population	collisions	collisions * weight (per history)	number weighted energy	flux weighted energy	average track weight (relative)	average track mfp (cm)
1	1	578169	519055	35184913	4.9712E+01	2.6018E-04	8.1658E-01	2.2038E+00
2	2	77612	37548	5210462	5.3914E+00	4.6338E-05	5.9394E-01	1.3362E+00
total	655781	556603	40395375	5.5103E+01				

1keff results for: Far-Field Consequence Study - 32% H2O/ 8% UO2 (sp40a2) 0 Years 300K

probid = 08/23/96 10:15:41

the initial fission neutron source distribution was read from the srctp file named srctp .
 the criticality problem was scheduled to skip 30 cycles and run a total of 130 cycles with nominally 4000 neutrons per cycle.
 this problem has run 30 inactive cycles with 119746 neutron histories and 100 active cycles with 399064 neutron histories.

this calculation has completed the requested number of keff cycles using a total of 518810 fission neutron source histories.
 all cells with fissionable material were sampled and had fission neutron source points.

the results of the w test for normality applied to the individual collision, absorption, and track-length keff cycle values are:

the k(collision) cycle values appear normally distributed at the 95 percent confidence level
 the k(absorption) cycle values appear normally distributed at the 95 percent confidence level
 the k(trk length) cycle values appear normally distributed at the 95 percent confidence level

the final estimated combined collision/absorption/track-length keff = .97716 with an estimated standard deviation of .00073
 the estimated 68, 95, & 99 percent keff confidence intervals are .97643 to .97789, .97571 to .97861, and .97524 to .97909
 the estimated collision/absorption neutron removal lifetime = 9.37E-05 seconds with an estimated standard deviation of 1.80E-07

the estimated average keffs, one standard deviations, and 68, 95, and 99 percent confidence intervals are:

keff estimator	keff	standard deviation	68% confidence	95% confidence	99% confidence	corr
collision	.97733	.00132	.97600 to .97866	.97469 to .97997	.97383 to .98083	
absorption	.97701	.00099	.97602 to .97800	.97504 to .97897	.97440 to .97961	
track length	.97708	.00134	.97573 to .97842	.97440 to .97975	.97353 to .98062	
col/absorp	.97713	.00072	.97641 to .97785	.97569 to .97857	.97522 to .97904	-.1824
abs/trk len	.97703	.00073	.97630 to .97776	.97558 to .97849	.97510 to .97896	-.1692
col/trk len	.97731	.00134	.97597 to .97865	.97464 to .97998	.97377 to .98085	.9845

col/abs/trk len .97716 .00073 .97643 to .97789 .97571 to .97861 .97524 to .97909

1mcpn version 4a ld=10/01/93 07/26/96 12:01:33

 inp=sp40a1 outp=sp40a1.0

probid = 07/26/96 12:01:33

```

1- Far-Field Consequence Study - 32% H2O/ 8% UO2 (sp40a1) 0 Years 600K
2- C Calico Hills Tuff 1.5095 g/cc .40 porosity - sphere surrounded by tuff
3- C Water and UO2 offset each other in porous space / H2O @ 500k
4- C CELL SPECIFICATIONS
5- C INNER WATER REGION
6- 1 1 7.48846-2 -1 IMP:N=1
7- 2 2 8.38290-2 1 -2 IMP:N=1
8- C OUTSIDE WORLD
9- 3 0 2 IMP:N=0
10-
11- C SURFACE SPECIFICATIONS
12- 1 SO 140 $ INNER FUEL ZONE
13- 2 SO 200 $ TUFF REFLECTOR
14-
15- MODE N
16- KCODE 4000 1. 30 130
17- C KSRC 0 0 1 0 0 10 0 0 -20 0 0 29 0 20 5 0 0 -5 -10 0 -10
18- C 0 -5 -20 -10 0 -13 0 -10 14 0 0 -15 -10 -5 -16 5 5 0 10 10 17
19- C MATERIAL SPECIFICATIONS
20- c 32 (x .776 at 265 C) vol% water in calico Hills tuff - 8 vol% UO2
21- c 3.0% Original Enrichment/ 20 GWD/MT decayed to Uranium isotopes
22- m1 1001.53c 1.6603-2 8016.53c 4.0422-2 11023.50c 3.9366-4
23- 12000.50c 2.3128-4 13027.50c 2.6070-3 14000.50c 1.1406-2
24- 19000.50c 5.5591-4 20000.50c 5.6949-4 26000.55c 1.4037-4
25- 92234.50c 4.6944-7 92235.53c 3.8253-5 92236.50c 9.1532-6
26- 92238.53c 1.9055-3 93237.50c 2.1829-6
27- mt1 lwtr.03t
28- c 40 (x .99 at 50 C) vol% water in calico Hills tuff
29- m2 1001.53c 2.6477-2 8016.53c 4.1448-2 11023.50c 3.9366-4
30- 12000.50c 2.3128-4 13027.50c 2.6070-3 14000.50c 1.1406-2
31- 19000.50c 5.5591-4 20000.50c 5.6949-4 26000.55c 1.4037-4
32- mt2 lwtr.02t
33- PRINT
  
```

1 initial source from file srctp

```

original number of points          4001
  points not in any cell            0
  points in cells of zero importance 0
  points in void cells              0
  points in ambiguous cells         0
total points rejected                0
points remaining                     4001
points after expansion or contraction 4000
nominal source size                  4000
  
```

```

initial guess for k(eff.)          1.000000
cycles to skip before tallying      30
number of keff cycles that can be stored 260
  
```

total fission nubar data are being used.

warning. lwtr.02t and lwtr.03t are both called for.
 1material composition

print table 40

```

material
number      component nuclide, atom fraction
  1          1001, .22172      8016, .53979      11023, .00526      12000, .00309
            13027, .03481      14000, .15232      19000, .00742      20000, .00760
            26000, .00187      92234, .00001      92235, .00051      92236, .00012
            92238, .02545      93237, .00003
associated thermal s(a,b) data sets: lwtr.03t
  2          1001, .31585      8016, .49444      11023, .00470      12000, .00276
            13027, .03110      14000, .13606      19000, .00663      20000, .00679
            26000, .00167
associated thermal s(a,b) data sets: lwtr.02t
    
```

```

material
number      component nuclide, mass fraction
  1          1001, .01055      8016, .40755      11023, .00570      12000, .00354
            13027, .04434      14000, .20193      19000, .01370      20000, .01439
            26000, .00494      92234, .00007      92235, .00567      92236, .00136
            92238, .28593      93237, .00033
  2          1001, .02326      8016, .57779      11023, .00789      12000, .00490
            13027, .06130      14000, .27919      19000, .01894      20000, .01989
            26000, .00683
    
```

1cell volumes and masses

print table 50

cell	atom density	gram density	input volume	calculated volume	mass	pieces	reason volume not calculated
1	1	7.48846E-02	2.63436E+00	.00000E+00	1.14940E+07	3.02795E+07	1
2	2	8.38290E-02	1.90533E+00	.00000E+00	2.20163E+07	4.19483E+07	1
3	3	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	0 infinite

1problem summary

run terminated when 130 kcode cycles were done.

+ Far-Field Consequence Study - 32% H2O/ 8% UO2 (sp40a1) 0 Years 600K probid = 07/26/96 14:46:59
 07/26/96 12:01:33

neutron creation	tracks	weight (per source particle)	energy	neutron loss	tracks	weight (per source particle)	energy
source	519688	1.0006E+00	2.0277E+00	escape	112	1.1480E-04	1.1651E-04
				energy cutoff	0	0.	0.
				time cutoff	0	0.	0.
weight window	0	0.	0.	weight window	0	0.	0.
cell importance	0	0.	0.	cell importance	0	0.	0.
weight cutoff	0	6.4155E-02	1.7917E-05	weight cutoff	519846	6.4103E-02	3.9674E-05
energy importance	0	0.	0.	energy importance	0	0.	0.
dxtran	0	0.	0.	dxtran	0	0.	0.
forced collisions	0	0.	0.	forced collisions	0	0.	0.
exp. transform	0	0.	0.	exp. transform	0	0.	0.
upscattering	0	0.	3.4039E-07	downscattering	0	0.	1.9255E+00
				capture	0	6.1590E-01	6.2459E-02
(n,xn)	538	7.8906E-04	5.5245E-04	loss to (n,xn)	268	3.9334E-04	3.2773E-03
fission	0	0.	0.	loss to fission	0	3.8503E-01	3.6840E-02
total	520226	1.0655E+00	2.0283E+00	total	520226	1.0655E+00	2.0283E+00

number of neutrons banked	270	average lifetime, shakes		cutoffs	
neutron tracks per source particle	1.0010E+00	escape	3.0559E+04	tco	1.0000E+34
neutron collisions per source particle	7.9711E+01	capture	9.5684E+03	eco	.0000E+00
total neutron collisions	41424645	capture or escape	9.5708E+03	wc1	-5.0000E-01
net multiplication	1.0004E+00 .0000	any termination	1.0408E+04	wc2	-2.5000E-01

computer time so far in this run	95.66 minutes	maximum number ever in bank	2
computer time in mcrun	95.62 minutes	bank overflows to backup file	0
source particles per minute	5.4349E+03	field length	0
random numbers generated	480822729	most random numbers used was	12386 in history 367999

range of sampled source weights = 9.0744E-01 to 1.0579E+00
 1neutron activity in each cell

print table 126

cell	tracks entering	population	collisions	collisions * weight (per history)	number weighted energy	flux weighted energy	average track weight (relative)	average track mfp (cm)	
1	1	599158	519957	34357801	4.8313E+01	3.0916E-04	5.0477E-01	8.0256E-01	2.5043E+00
2	2	102454	48279	7066844	7.2108E+00	4.6390E-05	1.9975E-01	5.7956E-01	1.3152E+00
total	701612	568236	41424645	5.5524E+01					

1keff results for: Far-Field Consequence Study - 32% H2O/ 8% UO2 (sp40a1) 0 Years 600K

probid = 07/26/96 12:01:33

the initial fission neutron source distribution was read from the srctp file named srctp .
 the criticality problem was scheduled to skip 30 cycles and run a total of 130 cycles with nominally 4000 neutrons per cycle.
 this problem has run 30 inactive cycles with 119927 neutron histories and 100 active cycles with 399761 neutron histories.

this calculation has completed the requested number of keff cycles using a total of 519688 fission neutron source histories.
 all cells with fissionable material were sampled and had fission neutron source points.

the results of the w test for normality applied to the individual collision, absorption, and track-length keff cycle values are:

- the k(collision) cycle values appear normally distributed at the 95 percent confidence level
- the k(absorption) cycle values appear normally distributed at the 95 percent confidence level
- the k(trk length) cycle values appear normally distributed at the 95 percent confidence level

the final estimated combined collision/absorption/track-length keff = .94240 with an estimated standard deviation of .00099
 the estimated 68, 95, & 99 percent keff confidence intervals are .94141 to .94339, .94042 to .94437, and .93978 to .94502
 the estimated collision/absorption neutron removal lifetime = 9.56E-05 seconds with an estimated standard deviation of 2.03E-07

the estimated average keffs, one standard deviations, and 68, 95, and 99 percent confidence intervals are:

keff estimator	keff	standard deviation	68% confidence	95% confidence	99% confidence	corr
collision	.94224	.00151	.94073 to .94375	.93924 to .94524	.93826 to .94622	
absorption	.94255	.00119	.94136 to .94375	.94017 to .94493	.93940 to .94571	
track length	.94207	.00153	.94054 to .94361	.93902 to .94513	.93802 to .94613	
col/absorp	.94244	.00099	.94145 to .94342	.94047 to .94440	.93983 to .94504	.1015

abs/trk len	.94238	.00099	.94139 to .94336	.94042 to .94434	.93978 to .94498	.0842
col/trk len	.94227	.00152	.94075 to .94379	.93924 to .94529	.93826 to .94628	.9876
col/abs/trk len	.94240	.00099	.94141 to .94339	.94042 to .94437	.93978 to .94502	

1 primary module access and input record (scale driver - 95/03/29 - 09:06:37)

- module sas2h will be called
 SAS2H: Far-Field Crit based on B&W 15x15, 3.00wt%, 20gwd/mtu 40% H2O/ 8% UO2
 44group latticecell

' mixtures of tuff infinite slabs:

arbm-ftuff 2.6344 14 0 0 0 1001 1.055 8016 40.755 11023 0.570 12000 0.354
 13027 4.434 14000 20.193 19000 1.370 20000 1.439
 26000 0.494 92235 0.567 92234 0.007 92236 0.136
 92238 28.593 93237 0.033 1 1.0 538 end

kr-83 1 0 1-20 538 end
 kr-85 1 0 1-20 538 end
 sr-90 1 0 1-20 538 end
 y-89 1 0 1-20 538 end
 mo-95 1 0 1-20 538 end
 zr-93 1 0 1-20 538 end
 zr-94 1 0 1-20 538 end
 zr-95 1 0 1-20 538 end
 nb-94 1 0 1-20 538 end
 tc-99 1 0 1-20 538 end
 rh-103 1 0 1-20 538 end
 rh-105 1 0 1-20 538 end
 ru-101 1 0 1-20 538 end
 ru-106 1 0 1-20 538 end
 pd-105 1 0 1-20 538 end
 pd-108 1 0 1-20 538 end
 ag-109 1 0 1-20 538 end
 sb-124 1 0 1-20 538 end
 xe-131 1 0 1-20 538 end
 xe-132 1 0 1-20 538 end
 xe-135 1 0 1-20 538 end
 xe-136 1 0 1-20 538 end
 cs-134 1 0 1-20 538 end
 cs-135 1 0 1-20 538 end
 cs-137 1 0 1-20 538 end
 ba-136 1 0 1-20 538 end
 la-139 1 0 1-20 538 end
 pr-141 1 0 1-20 538 end
 pr-143 1 0 1-20 538 end
 ce-144 1 0 1-20 538 end
 nd-143 1 0 1-20 538 end
 nd-145 1 0 1-20 538 end
 pm-147 1 0 1-20 538 end
 pm-148 1 0 1-20 538 end
 nd-147 1 0 1-20 538 end
 sm-147 1 0 1-20 538 end
 sm-149 1 0 1-20 538 end
 sm-150 1 0 1-20 538 end
 sm-151 1 0 1-20 538 end
 sm-152 1 0 1-20 538 end
 gd-155 1 0 1-20 538 end
 eu-153 1 0 1-20 538 end
 eu-154 1 0 1-20 538 end
 eu-155 1 0 1-20 538 end

arbm-tuff1 1.90533 9 0 0 0 1001 2.326 8016 57.779 11023 0.789 12000 0.490
 13027 6.130 14000 27.919 19000 1.894 20000 1.989
 26000 0.683 2 1.0 323. end
 arbm-tuff2 1.90533 9 0 0 0 1001 2.326 8016 57.779 11023 0.789 12000 0.490
 13027 6.130 14000 27.919 19000 1.894 20000 1.989
 26000 0.683 3 1.0 323. end

```

/
/ -----
/ end comp
/
/ -----
/ fuel-pin-cell geometry:
/
/ symmslabcell 340. 280. 1 3 281. 2 end
/
/ -----
/
/ assembly and cycle parameters:
/
/ npin/assm=1 fuelngth=280. ncycles=1 nlib/cyc=5 volfueltot=1.1494E7
/ printlevel=6 inplevel=0 end
/ power=0.004 burn=3.6525e2 down=1.82625e3
/ end

```

```

0 * normal termination *
1 oooooooooo rrrrrrrrrr iiiiiiiiii gggggggggg eeeeeeeeeee nn nn ssssssssss
oooooooooooo rrrrrrrrrr iiiiiiiiii gggggggggg eeeeeeeeeee nnn nn ssssssssssss
oo oo rr rr ii gg gg ee nnnn nn ss ss
oo oo rr rr ii gg ee nn nn nn ss
oo oo rrrrrrrrrr ii gg ggggggg eeeeeeee nn nn nn ssssssssssss
oo oo rrrrrrrrrr ii gg ggggggg eeeeeeee nn nn nn ssssssssssss
oo oo rr rr ii gg gg ee nn nn nn ss
oo oo rr rr ii gg gg ee nn nn nn ss
oo oo rr rr ii gg gg ee nn nnnn ss ss
oooooooooooo rr rr iiiiiiiiii gggggggggg eeeeeeeeeee nn nnn ssssssssssss
oooooooooooo rr rr iiiiiiiiii gggggggggg eeeeeeeeeee nn nn ssssssssss
0

```

```

dddddddddd aaaaaaaaaa vv vv iiiiiiiiii ssssssssss
dddddddddd aaaaaaaaaa vv vv iiiiiiiiii ssssssssssss
dd dd aa aa vv vv ii ss ss
dd dd aa aa vv vv ii ss
dd dd aaaaaaaaaa vv vv ii ssssssssssss
dd dd aaaaaaaaaa vv vv ii ssssssssssss
dd dd aa aa vv vv ii ss
dd dd aa aa vv vv ii ss
dd dd aa aa vv vv ii ss
dddddddddd aa aa vvvv iiiiiiiiii ssssssssssss
dddddddddd aa aa v v iiiiiiiiii ssssssssss
0

```

```

0000000 8888888888 // 2222222222 8888888888 // 9999999999 6666666666
00000000 888888888888 222222222222 888888888888 999999999999 666666666666
00 00 88 88 22 22 88 88 99 99 66
00 00 88 88 22 22 88 88 99 99 66
00 00 88 88 22 22 88 88 99 99 66
00 00 8888888888 22 8888888888 999999999999 666666666666
00 00 8888888888 22 8888888888 999999999999 666666666666
00 00 88 88 22 22 88 88 99 99 66 66
00 00 88 88 22 22 88 88 99 99 66 66
00 00 88 88 22 22 88 88 99 99 66 66
00000000 888888888888 // 222222222222 888888888888 // 999999999999 666666666666
0000000 888888888888 222222222222 888888888888 // 999999999999 666666666666

```

0

```
11      777777777777      555555555555 555555555555 555555555555 888888888888
111     777777777777      555555555555 555555555555 555555555555 888888888888
1111    77      77      :::  55      55      :::  55      88      88
11      77      77      :::  55      55      :::  55      88      88
11      77      77      :::  55      55      :::  55      88      88
11      77      77      555555555555 555555555555 555555555555 888888888888
11      77      77      555555555555 555555555555 555555555555 888888888888
11      77      77      55      55      55      55      55      88      88
11      77      77      55      55      55      55      55      88      88
11      77      77      55      55      55      55      55      88      88
11      77      77      55      55      55      55      55      88      88
11111111 77      77      555555555555 555555555555 555555555555 888888888888
11111111 77      77      555555555555 555555555555 555555555555 888888888888
```

1
0

```
SSSSSSSSSS CCCCCCCCCC          aaaaaaaaa ll          eeeeeeeeeee
SSSSSSSSSS CCCCCCCCCC          aaaaaaaaa ll          eeeeeeeeeee
SS         SS CC         CC          aa         aa ll          ee
SS         SS CC         CC          aa         aa ll          ee
SS         SS CC         CC          aa         aa ll          ee
SSSSSSSSSS CC          aaaaaaaaa ll          eeeeeee
SSSSSSSSSS CC          aaaaaaaaa ll          eeeeeee
         SS CC         CC          aa         aa ll          ee
         SS CC         CC          aa         aa ll          ee
SS         SS CC         CC          aa         aa ll          ee
SSSSSSSSSS CCCCCCCCCC          aa         aa ll llllllllll eeeeeeeeeee
SSSSSSSSSS CCCCCCCCCC          aa         aa ll llllllllll eeeeeeeeeee
```

```
*****
*****
*****
*****
*****           program verification information          *****
*****           code system:  scale version:  4.3         *****
*****
*****
*****
*****           program:  o0o004                       *****
*****           creation date:  03/13/96                 *****
*****           library:  /usr1/ornl/Scale/bin           *****
*****
*****           test code:  origens                      *****
*****           version:  3.0                            *****
*****           jobname:  davis                          *****
*****           date of execution:  08/28/96             *****
*****           time of execution:  17:55:58             *****
```


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 densities
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 densities
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 8/28/1996 date library was produced
0 1697 total number of nuclides in library
0 689 number of light-element nuclides
0 129 number of actinide nuclides
0 879 number of fission product nuclides
0 7993 number of nonzero off-diagonal matrix elements
0 *****
1

```

```

0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 1
0 nuclide concentrations, grams
0 basis =single reactor assembly

```

```

initial 1E-18 d
na 23 1.73E+05 1.73E+05
al 27 1.35E+06 1.35E+06
total 1.52E+06 1.52E+06

```

```

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 2
0 nuclide concentrations, grams
0 basis =single reactor assembly

```

```

initial 1E-18 d
u234 2.12E+03 2.12E+03
u235 1.72E+05 1.72E+05
u236 4.12E+04 4.12E+04
u238 8.66E+06 8.66E+06
np237 9.99E+03 9.99E+03
total 8.88E+06 8.88E+06

```

```

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 page 3
0 power= .00mw, burnup= 0.mwd, flux= 3.00E+08n/cm**2-sec
0 basis =

```

(note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)

```

initial 18.3 d 36.5 d 54.8 d 73.1 d 73.1 d
productions 1.023182E+06 1.023182E+06 1.023183E+06 1.023183E+06 1.023183E+06 1.023183E+06
absorptions 8.460824E+05 8.460847E+05 8.460852E+05 8.460858E+05 8.460863E+05 8.460863E+05
k infinity 1.209317E+00 1.209314E+00 1.209314E+00 1.209314E+00 1.209314E+00 1.209313E+00
initial 18.3 d 36.5 d 54.8 d 73.1 d 73.1 d

```

```

actinide
absorptions 8.423173E+05 8.423174E+05 8.423176E+05 8.423178E+05 8.423180E+05 8.423180E+05
non-actinide
abs. fracs. 4.450083E-03 4.452646E-03 4.453003E-03 4.453421E-03 4.453838E-03 4.453838E-03

```

```

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 4
0 fraction of total absorption rate
0 power= .00mw, burnup= 0.mwd, flux= 3.00E+08n/cm**2-sec

```

```

initial 18.3 d 36.5 d 54.8 d 73.1 d 73.1 d

```

```

xe135 .00E+00 2.28E-06 2.28E-06 2.28E-06 2.28E-06 2.28E-06
sm149 .00E+00 3.01E-07 6.68E-07 1.04E-06 1.40E-06 1.40E-06
sm151 .00E+00 1.54E-08 3.22E-08 4.91E-08 6.59E-08 6.59E-08
nd143 .00E+00 2.56E-09 8.54E-09 1.59E-08 2.37E-08 2.37E-08
gd157 .00E+00 3.74E-09 7.67E-09 1.16E-08 1.55E-08 1.55E-08
cd113 .00E+00 3.18E-09 6.42E-09 9.65E-09 1.29E-08 1.29E-08
pm147 .00E+00 1.47E-09 4.39E-09 7.73E-09 1.12E-08 1.12E-08
rh105 .00E+00 8.28E-09 8.28E-09 8.28E-09 8.28E-09 8.28E-09
xe131 .00E+00 1.16E-09 3.30E-09 5.64E-09 8.03E-09 8.03E-09
cs133 .00E+00 1.14E-09 3.05E-09 5.04E-09 7.03E-09 7.03E-09
rh103 .00E+00 5.01E-10 1.82E-09 3.73E-09 6.06E-09 6.07E-09
tc 99 .00E+00 1.07E-09 2.44E-09 3.82E-09 5.21E-09 5.21E-09
eu155 .00E+00 1.18E-09 2.34E-09 3.50E-09 4.65E-09 4.65E-09

```

nd145	.00E+00	1.04E-09	2.10E-09	3.17E-09	4.23E-09	4.23E-09
pr143	.00E+00	1.61E-09	2.36E-09	2.66E-09	2.78E-09	2.78E-09
sm152	.00E+00	5.54E-10	1.11E-09	1.66E-09	2.22E-09	2.22E-09
xe133	.00E+00	1.81E-09	2.01E-09	2.03E-09	2.03E-09	2.03E-09
kr 83	.00E+00	4.42E-10	8.90E-10	1.34E-09	1.79E-09	1.79E-09
cs135	.00E+00	4.04E-10	8.29E-10	1.25E-09	1.68E-09	1.68E-09
ru101	.00E+00	3.25E-10	6.50E-10	9.75E-10	1.30E-09	1.30E-09
ce141	.00E+00	5.08E-10	8.58E-10	1.10E-09	1.26E-09	1.26E-09
eu153	.00E+00	2.36E-10	5.15E-10	7.93E-10	1.07E-09	1.07E-09
la139	.00E+00	2.48E-10	4.98E-10	7.47E-10	9.96E-10	9.96E-10
pm149	.00E+00	9.59E-10	9.62E-10	9.62E-10	9.62E-10	9.62E-10
nd147	.00E+00	6.46E-10	8.50E-10	9.15E-10	9.35E-10	9.35E-10
pr141	.00E+00	5.22E-11	1.87E-10	3.78E-10	6.06E-10	6.06E-10
pd105	.00E+00	1.05E-10	2.24E-10	3.43E-10	4.62E-10	4.62E-10
zr 93	.00E+00	1.03E-10	2.09E-10	3.15E-10	4.22E-10	4.22E-10
mo 95	.00E+00	7.52E-12	5.27E-11	1.57E-10	3.28E-10	3.28E-10
gd155	.00E+00	1.81E-11	7.23E-11	1.62E-10	2.88E-10	2.88E-10
i 129	.00E+00	6.40E-11	1.33E-10	2.04E-10	2.78E-10	2.78E-10
ru103	.00E+00	9.82E-11	1.69E-10	2.21E-10	2.58E-10	2.58E-10
mo 97	.00E+00	5.33E-11	1.10E-10	1.67E-10	2.23E-10	2.23E-10
ag109	.00E+00	3.84E-11	7.86E-11	1.19E-10	1.59E-10	1.59E-10
pm151	.00E+00	1.09E-10	1.09E-10	1.09E-10	1.09E-10	1.09E-10
ce144	.00E+00	2.61E-11	5.10E-11	7.48E-11	9.77E-11	9.77E-11
sm147	.00E+00	2.65E-12	1.69E-11	4.69E-11	9.39E-11	9.39E-11
zr 95	.00E+00	3.01E-11	5.48E-11	7.51E-11	9.18E-11	9.18E-11
ru102	.00E+00	2.29E-11	4.58E-11	6.87E-11	9.16E-11	9.16E-11
sr 90	.00E+00	2.09E-11	4.18E-11	6.26E-11	8.34E-11	8.34E-11
y 91	.00E+00	2.71E-11	4.97E-11	6.80E-11	8.27E-11	8.27E-11
ce142	.00E+00	2.05E-11	4.12E-11	6.18E-11	8.25E-11	8.25E-11
nd148	.00E+00	1.99E-11	3.99E-11	5.98E-11	7.98E-11	7.98E-11
nd146	.00E+00	1.66E-11	3.32E-11	4.99E-11	6.65E-11	6.65E-11
ba138	.00E+00	1.41E-11	2.83E-11	4.25E-11	5.67E-11	5.67E-11
pd108	.00E+00	1.37E-11	2.75E-11	4.12E-11	5.50E-11	5.50E-11
in115	.00E+00	1.10E-11	2.46E-11	3.84E-11	5.22E-11	5.22E-11
ba140	.00E+00	2.97E-11	4.07E-11	4.48E-11	4.63E-11	4.63E-11
xe132	.00E+00	9.05E-12	2.12E-11	3.33E-11	4.55E-11	4.55E-11

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 0 fraction of total absorption rate
 0 power= .00mw, burnup= 0. mwd, flux= 3.00E+08n/cm**2-sec
 initial 18.3 d 36.5 d 54.8 d 73.1 d 73.1 d

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nb 95	.00E+00	4.55E-12	1.53E-11	2.89E-11	4.35E-11	4.35E-11
ce140	.00E+00	4.43E-12	1.48E-11	2.74E-11	4.08E-11	4.08E-11
sm153	.00E+00	3.79E-11	3.79E-11	3.79E-11	3.79E-11	3.79E-11
eu151	.00E+00	2.20E-12	9.19E-12	2.10E-11	3.76E-11	3.76E-11
y 89	.00E+00	2.93E-12	1.08E-11	2.26E-11	3.75E-11	3.75E-11
zr 91	.00E+00	2.63E-12	1.00E-11	2.12E-11	3.54E-11	3.54E-11
mo 98	.00E+00	8.46E-12	1.69E-11	2.54E-11	3.38E-11	3.38E-11
eu156	.00E+00	1.91E-11	2.78E-11	3.16E-11	3.32E-11	3.32E-11
mo100	.00E+00	8.09E-12	1.62E-11	2.43E-11	3.24E-11	3.24E-11
pd107	.00E+00	7.96E-12	1.59E-11	2.39E-11	3.19E-11	3.19E-11
xe134	.00E+00	7.83E-12	1.57E-11	2.36E-11	3.14E-11	3.14E-11
zr 92	.00E+00	6.33E-12	1.28E-11	1.92E-11	2.57E-11	2.57E-11
nd144	.00E+00	1.62E-12	6.40E-12	1.42E-11	2.49E-11	2.49E-11
kr 87	.00E+00	2.26E-11	2.26E-11	2.26E-11	2.26E-11	2.20E-11
zr 96	.00E+00	5.21E-12	1.04E-11	1.56E-11	2.08E-11	2.08E-11
ru104	.00E+00	4.96E-12	9.93E-12	1.49E-11	1.99E-11	1.99E-11
sr 89	.00E+00	6.73E-12	1.20E-11	1.61E-11	1.92E-11	1.92E-11
nd150	.00E+00	4.44E-12	8.88E-12	1.33E-11	1.78E-11	1.78E-11
cs137	.00E+00	4.37E-12	8.74E-12	1.31E-11	1.75E-11	1.75E-11

ce143	.00E+00	1.74E-11	1.74E-11	1.74E-11	1.74E-11	1.74E-11
xe136	.00E+00	4.25E-12	8.49E-12	1.27E-11	1.70E-11	1.70E-11
i127	.00E+00	3.07E-12	7.59E-12	1.22E-11	1.70E-11	1.70E-11
la140	.00E+00	9.71E-12	1.39E-11	1.54E-11	1.60E-11	1.60E-11
mo 99	.00E+00	1.30E-11	1.32E-11	1.32E-11	1.32E-11	1.32E-11
br 81	.00E+00	3.23E-12	6.46E-12	9.69E-12	1.29E-11	1.29E-11
zr 94	.00E+00	2.76E-12	5.51E-12	8.27E-12	1.10E-11	1.10E-11
rb 85	.00E+00	2.47E-12	4.98E-12	7.50E-12	1.00E-11	1.00E-11
te130	.00E+00	1.92E-12	3.85E-12	5.77E-12	7.69E-12	7.69E-12
sm154	.00E+00	1.88E-12	3.75E-12	5.63E-12	7.50E-12	7.50E-12
kr 85	.00E+00	1.84E-12	3.69E-12	5.55E-12	7.39E-12	7.39E-12
rb 87	.00E+00	1.82E-12	3.66E-12	5.49E-12	7.32E-12	7.32E-12
cd111	.00E+00	1.07E-12	2.95E-12	4.97E-12	7.02E-12	7.02E-12
i131	.00E+00	5.34E-12	6.49E-12	6.73E-12	6.78E-12	6.78E-12
se 77	.00E+00	1.26E-12	2.69E-12	4.13E-12	5.56E-12	5.56E-12
kr 84	.00E+00	8.70E-13	1.74E-12	2.61E-12	3.48E-12	3.48E-12
ru106	.00E+00	8.64E-13	1.70E-12	2.51E-12	3.29E-12	3.29E-12
sb121	.00E+00	6.31E-13	1.32E-12	2.01E-12	2.69E-12	2.69E-12
se 79	.00E+00	6.52E-13	1.30E-12	1.96E-12	2.61E-12	2.61E-12
te127m	.00E+00	5.77E-13	1.31E-12	1.98E-12	2.57E-12	2.57E-12
kr 86	.00E+00	4.73E-13	9.47E-13	1.42E-12	1.89E-12	1.89E-12
sb123	.00E+00	4.65E-13	9.36E-13	1.41E-12	1.89E-12	1.89E-12
te128	.00E+00	4.25E-13	8.53E-13	1.28E-12	1.71E-12	1.71E-12
te129m	.00E+00	5.59E-13	9.49E-13	1.22E-12	1.40E-12	1.40E-12
se 80	.00E+00	3.05E-13	6.10E-13	9.15E-13	1.22E-12	1.22E-12
ba137	.00E+00	8.52E-14	3.07E-13	6.64E-13	1.16E-12	1.16E-12
gd156	.00E+00	1.07E-13	3.46E-13	6.43E-13	9.66E-13	9.66E-13
dy161	.00E+00	1.44E-13	3.89E-13	6.51E-13	9.15E-13	9.15E-13
tb159	.00E+00	1.82E-13	3.76E-13	5.69E-13	7.63E-13	7.63E-13
sb125	.00E+00	1.57E-13	3.36E-13	5.19E-13	7.01E-13	7.01E-13

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 0 fraction of total absorption rate
 0 power=.00mw, burnup= 0. mwd, flux= 3.00E+08n/cm**2-sec
 initial 18.3 d 36.5 d 54.8 d 73.1 d 73.1 d

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li 6	.00E+00	1.73E-13	3.46E-13	5.19E-13	6.92E-13	6.92E-13
cd112	.00E+00	1.62E-13	3.37E-13	5.13E-13	6.89E-13	6.89E-13
sn117	.00E+00	1.36E-13	2.75E-13	4.13E-13	5.51E-13	5.51E-13
sn119	.00E+00	1.12E-13	2.25E-13	3.37E-13	4.50E-13	4.50E-13
sn115	.00E+00	8.49E-14	1.89E-13	2.94E-13	3.99E-13	3.99E-13
sr 88	.00E+00	8.64E-14	1.74E-13	2.61E-13	3.48E-13	3.48E-13
sm150	.00E+00	2.92E-14	9.62E-14	2.02E-13	3.46E-13	3.46E-13
ag111	.00E+00	2.61E-13	3.09E-13	3.18E-13	3.19E-13	3.19E-13
eu157	.00E+00	2.95E-13	2.95E-13	2.95E-13	2.95E-13	2.95E-13
pd110	.00E+00	6.31E-14	1.26E-13	1.89E-13	2.53E-13	2.53E-13
cd114	.00E+00	6.16E-14	1.23E-13	1.85E-13	2.46E-13	2.46E-13
pd106	.00E+00	1.57E-14	6.19E-14	1.38E-13	2.42E-13	2.42E-13
se 82	.00E+00	5.91E-14	1.18E-13	1.77E-13	2.36E-13	2.36E-13
gd158	.00E+00	5.69E-14	1.14E-13	1.71E-13	2.28E-13	2.28E-13
sn126	.00E+00	4.71E-14	9.42E-14	1.41E-13	1.88E-13	1.88E-13
se 78	.00E+00	4.50E-14	9.03E-14	1.36E-13	1.81E-13	1.81E-13
cd115m	.00E+00	5.82E-14	1.02E-13	1.35E-13	1.60E-13	1.60E-13
pm148m	.00E+00	6.01E-15	3.23E-14	8.12E-14	1.49E-13	1.49E-13
sn124	.00E+00	3.68E-14	7.37E-14	1.11E-13	1.47E-13	1.47E-13
dy162	.00E+00	3.48E-14	6.97E-14	1.05E-13	1.39E-13	1.39E-13
dy164	.00E+00	3.11E-14	6.23E-14	9.34E-14	1.25E-13	1.25E-13
eu154	.00E+00	2.67E-14	5.38E-14	8.14E-14	1.09E-13	1.09E-13
as 75	.00E+00	2.69E-14	5.40E-14	8.11E-14	1.08E-13	1.08E-13
y 90	.00E+00	1.58E-14	3.56E-14	5.54E-14	7.51E-14	7.51E-14
sn118	.00E+00	1.51E-14	3.02E-14	4.54E-14	6.05E-14	6.05E-14

cs136	.00E+00	3.45E-14	4.77E-14	5.27E-14	5.47E-14	5.47E-14
cd116	.00E+00	1.28E-14	2.55E-14	3.83E-14	5.10E-14	5.10E-14
sn122	.00E+00	1.25E-14	2.49E-14	3.74E-14	4.98E-14	4.98E-14
ba136	.00E+00	5.16E-15	1.60E-14	2.91E-14	4.29E-14	4.29E-14
sn120	.00E+00	9.38E-15	1.88E-14	2.81E-14	3.75E-14	3.75E-14
kr 82	.00E+00	7.80E-15	1.65E-14	2.52E-14	3.39E-14	3.39E-14
cs134	.00E+00	7.60E-15	1.53E-14	2.31E-14	3.10E-14	3.10E-14
dy163	.00E+00	7.67E-15	1.53E-14	2.30E-14	3.07E-14	3.07E-14
ru105	.00E+00	3.00E-14	3.00E-14	3.00E-14	3.00E-14	3.00E-14
sn125	.00E+00	2.15E-14	2.73E-14	2.88E-14	2.93E-14	2.92E-14
ge 73	.00E+00	7.17E-15	1.45E-14	2.17E-14	2.90E-14	2.90E-14
ru 99	.00E+00	5.42E-15	1.25E-14	1.96E-14	2.67E-14	2.67E-14
zr 90	.00E+00	1.04E-15	5.05E-15	1.21E-14	2.23E-14	2.23E-14
te125	.00E+00	1.06E-15	4.62E-15	1.09E-14	2.01E-14	2.01E-14
xe130	.00E+00	4.76E-15	9.70E-15	1.46E-14	1.96E-14	1.96E-14
mo 96	.00E+00	3.41E-15	7.09E-15	1.08E-14	1.44E-14	1.44E-14
pm148	.00E+00	1.05E-15	4.31E-15	8.63E-15	1.33E-14	1.33E-14
rb 88	.00E+00	1.27E-14	1.27E-14	1.27E-14	1.27E-14	1.27E-14
ge 76	.00E+00	2.66E-15	5.33E-15	7.99E-15	1.07E-14	1.07E-14
i135	.00E+00	1.00E-14	1.00E-14	1.00E-14	1.00E-14	9.95E-15
te132	.00E+00	9.30E-15	9.49E-15	9.49E-15	9.49E-15	9.49E-15
gd160	.00E+00	1.69E-15	3.37E-15	5.06E-15	6.75E-15	6.75E-15
te134	.00E+00	5.77E-15	5.77E-15	5.77E-15	5.77E-15	5.39E-15
te126	.00E+00	9.22E-16	2.08E-15	3.33E-15	4.60E-15	4.60E-15

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 0 fraction of total absorption rate
 0 power= .00mw, burnup= 0.mwd, flux= 3.00E+08n/cm**2-sec
 initial 18.3 d 36.5 d 54.8 d 73.1 d 73.1 d

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sn123	.00E+00	9.65E-16	1.84E-15	2.63E-15	3.35E-15	3.35E-15
sb126	.00E+00	1.91E-15	2.60E-15	2.85E-15	2.94E-15	2.94E-15
ru100	.00E+00	6.49E-16	1.30E-15	1.96E-15	2.63E-15	2.63E-15
ho165	.00E+00	5.26E-16	1.06E-15	1.59E-15	2.12E-15	2.12E-15
in117m	.00E+00	2.07E-15	2.07E-15	2.07E-15	2.07E-15	2.07E-15
sr 87	.00E+00	3.04E-16	6.09E-16	9.13E-16	1.22E-15	1.22E-15
sb124	.00E+00	3.98E-16	7.21E-16	9.83E-16	1.20E-15	1.20E-15
i130	.00E+00	7.10E-16	7.11E-16	7.11E-16	7.11E-16	7.08E-16
nb 94	.00E+00	1.75E-16	3.51E-16	5.26E-16	7.01E-16	7.01E-16
in117	.00E+00	6.07E-16	6.07E-16	6.07E-16	6.07E-16	6.07E-16
ge 74	.00E+00	1.47E-16	2.93E-16	4.40E-16	5.86E-16	5.86E-16
te124	.00E+00	4.65E-17	1.42E-16	2.78E-16	4.47E-16	4.47E-16
in113	.00E+00	2.49E-17	1.00E-16	2.26E-16	4.02E-16	4.02E-16
ge 72	.00E+00	8.33E-17	1.86E-16	2.89E-16	3.92E-16	3.92E-16
eu152	.00E+00	8.17E-17	1.66E-16	2.57E-16	3.57E-16	3.57E-16
se 76	.00E+00	5.68E-17	1.19E-16	1.80E-16	2.42E-16	2.42E-16
sr 86	.00E+00	2.40E-17	7.85E-17	1.48E-16	2.26E-16	2.26E-16
rb 86	.00E+00	1.18E-16	1.78E-16	2.08E-16	2.23E-16	2.23E-16
dy165	.00E+00	2.08E-16	2.08E-16	2.08E-16	2.08E-16	2.07E-16
ba135	.00E+00	3.50E-17	7.35E-17	1.15E-16	1.61E-16	1.61E-16
tb160	.00E+00	4.73E-17	8.72E-17	1.21E-16	1.49E-16	1.49E-16
cd118	.00E+00	1.19E-16	1.19E-16	1.19E-16	1.19E-16	1.12E-16
ge 75	.00E+00	8.51E-17	8.51E-17	8.51E-17	8.51E-17	8.39E-17
xe128	.00E+00	1.36E-17	2.73E-17	4.09E-17	5.46E-17	5.46E-17
er166	.00E+00	9.94E-18	2.45E-17	3.92E-17	5.39E-17	5.39E-17
nd142	.00E+00	7.24E-18	1.63E-17	2.77E-17	4.22E-17	4.22E-17
gd152	.00E+00	7.41E-18	1.52E-17	2.33E-17	3.20E-17	3.20E-17
gd154	.00E+00	1.97E-18	7.50E-18	1.66E-17	2.95E-17	2.95E-17
sm148	.00E+00	4.19E-19	3.84E-18	1.29E-17	2.91E-17	2.91E-17
in119m	.00E+00	2.97E-17	2.97E-17	2.97E-17	2.97E-17	2.80E-17
cd110	.00E+00	3.68E-18	8.09E-18	1.32E-17	1.90E-17	1.90E-17

	ba134	.00E+00	1.22E-18	4.73E-18	1.06E-17	1.88E-17	1.88E-17			
	kr 80	.00E+00	4.07E-18	8.19E-18	1.23E-17	1.64E-17	1.64E-17			
	dy160	.00E+00	9.41E-19	3.55E-18	7.55E-18	1.27E-17	1.27E-17			
	pd104	.00E+00	4.32E-19	1.64E-18	4.18E-18	8.50E-18	8.50E-18			
	br 79	.00E+00	3.76E-19	1.02E-18	1.94E-18	3.13E-18	3.13E-18			
	te122	.00E+00	4.26E-19	9.68E-19	1.52E-18	2.07E-18	2.07E-18			
	in119	.00E+00	2.32E-18	2.32E-18	2.32E-18	2.32E-18	1.54E-18			
	be 9	.00E+00	3.43E-19	6.85E-19	1.02E-18	1.37E-18	1.37E-18			
	pr142	.00E+00	6.42E-19	7.95E-19	1.01E-18	1.27E-18	1.27E-18			
	xe129	.00E+00	1.03E-19	3.39E-19	7.15E-19	1.24E-18	1.24E-18			
	ag107	.00E+00	6.99E-20	2.83E-19	6.39E-19	1.13E-18	1.13E-18			
	nb 93	.00E+00	1.76E-19	3.56E-19	5.36E-19	7.22E-19	7.22E-19			
	sn116	.00E+00	1.53E-19	3.16E-19	4.82E-19	6.55E-19	6.55E-19			
	li 7	.00E+00	1.33E-19	2.66E-19	3.99E-19	5.32E-19	5.32E-19			
	te123	.00E+00	7.98E-20	1.80E-19	3.03E-19	4.42E-19	4.42E-19			
	er167	.00E+00	5.32E-20	1.06E-19	1.60E-19	2.13E-19	2.13E-19			
	cd109	.00E+00	3.33E-21	9.98E-21	1.33E-20	2.00E-20	2.00E-20			
	cs134m	.00E+00	.00E+00	3.33E-21	6.65E-21	9.98E-21	9.98E-21			
1	sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2							fission products	page	8
0	fraction of total absorption rate									
0	power=	.00mw,	burnup=	0.mwd,	flux=	3.00E+08n/cm**2-sec				
	initial	18.3 d	36.5 d	54.8 d	73.1 d	73.1 d				
1	cd108	.00E+00	3.33E-21	6.65E-21	6.65E-21	9.98E-21	9.98E-21			
0	sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2							light elements	page	9
	power= 4.000E-03mw, burnup=2.9220E-01mwd, flux= 3.00E+08n/cm**2-sec									
	nuclide concentrations, gram atoms									
	basis = single reactor assembly									
	charge	18.3 d	36.5 d	54.8 d	73.1 d	73.1 d				
	h 1	.00E+00	4.40E-09	8.81E-09	1.32E-08	1.76E-08	1.76E-08			
	h 2	.00E+00	1.31E-11	2.61E-11	3.92E-11	5.22E-11	5.22E-11			
	h 3	.00E+00	9.56E-14	1.91E-13	2.86E-13	3.81E-13	3.81E-13			
	h 4	.00E+00	3.87E-37	7.72E-37	1.16E-36	1.54E-36	.00E+00			
	he 3	.00E+00	1.34E-16	5.37E-16	1.21E-15	2.15E-15	2.15E-15			
	he 4	.00E+00	7.28E-10	1.46E-09	2.18E-09	2.91E-09	2.91E-09			
	he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00			
	na 22	.00E+00	5.68E-13	1.13E-12	1.68E-12	2.23E-12	2.23E-12			
	na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03			
	na 24	.00E+00	3.64E-08	3.64E-08	3.64E-08	3.64E-08	3.63E-08			
	na 24m	.00E+00	5.99E-15	5.99E-15	5.99E-15	5.99E-15	5.99E-30			
	na 25	.00E+00	2.88E-30	5.76E-30	8.64E-30	1.15E-29	6.08E-31			
	mg 24	.00E+00	7.55E-07	1.55E-06	2.34E-06	3.13E-06	3.13E-06			
	mg 25	.00E+00	9.58E-14	1.92E-13	2.87E-13	3.83E-13	3.83E-13			
	mg 26	.00E+00	1.31E-11	2.61E-11	3.92E-11	5.22E-11	5.22E-11			
	mg 27	.00E+00	2.18E-12	2.18E-12	2.18E-12	2.18E-12	1.60E-12			
	mg 28	.00E+00	4.41E-24	4.41E-24	4.41E-24	4.41E-24	4.40E-24			
	al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04			
	al 28	.00E+00	2.70E-10	2.70E-10	2.70E-10	2.70E-10	7.33E-11			
	al 29	.00E+00	3.80E-32	1.52E-31	3.42E-31	6.08E-31	3.89E-31			
	al 30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00			
	si 28	.00E+00	2.20E-06	4.40E-06	6.60E-06	8.79E-06	8.79E-06			
	si 29	.00E+00	1.41E-16	5.64E-16	1.27E-15	2.26E-15	2.26E-15			
	si 30	.00E+00	9.70E-27	7.76E-26	2.62E-25	6.21E-25	6.21E-25			
	si 31	.00E+00	6.95E-39	5.56E-38	1.88E-37	4.45E-37	4.37E-37			
	si 32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00			
0	totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04			
1	flux	3.00E+08	3.00E+08	3.00E+08	3.00E+08	3.00E+08	3.00E-07			
	sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2							actinides	page	10

power= 4.000E-03mw, burnup=2.9220E-01mwd, flux= 3.00E+08n/cm**2-sec
 nuclide concentrations, gram atoms
 basis = single reactor assembly

0

	charge	18.3 d	36.5 d	54.8 d	73.1 d	73.1 d
he 4	.00E+00	2.54E-06	5.08E-06	7.63E-06	1.02E-05	1.02E-05
th226	.00E+00	5.65E-31	2.72E-30	6.90E-30	1.34E-29	1.34E-29
th227	.00E+00	8.47E-18	6.06E-17	1.82E-16	3.85E-16	3.85E-16
th228	.00E+00	3.89E-17	2.14E-16	6.13E-16	1.32E-15	1.32E-15
th229	.00E+00	1.04E-14	7.46E-14	2.28E-13	4.93E-13	4.93E-13
th230	.00E+00	1.28E-06	2.55E-06	3.83E-06	5.11E-06	5.11E-06
th231	.00E+00	3.02E-09	3.02E-09	3.02E-09	3.02E-09	3.02E-09
th232	.00E+00	2.58E-07	5.16E-07	7.74E-07	1.03E-06	1.03E-06
th233	.00E+00	2.39E-18	4.78E-18	7.17E-18	9.57E-18	8.39E-18
th234	.00E+00	2.19E-07	3.49E-07	4.26E-07	4.71E-07	4.71E-07
pa231	.00E+00	3.60E-08	7.50E-08	1.14E-07	1.53E-07	1.53E-07
pa232	.00E+00	6.18E-16	1.29E-15	1.96E-15	2.63E-15	2.63E-15
pa233	.00E+00	5.45E-07	8.86E-07	1.10E-06	1.23E-06	1.23E-06
pa234m	.00E+00	7.40E-12	1.18E-11	1.44E-11	1.59E-11	1.59E-11
pa234	.00E+00	3.31E-12	5.26E-12	6.42E-12	7.10E-12	7.10E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	.00E+00	5.48E-28	2.63E-27	6.69E-27	1.29E-26	1.29E-26
u231	.00E+00	6.12E-23	2.84E-22	6.26E-22	1.04E-21	1.04E-21
u232	.00E+00	1.86E-13	5.56E-13	1.11E-12	1.84E-12	1.84E-12
u233	.00E+00	1.38E-07	4.79E-07	9.49E-07	1.50E-06	1.50E-06
u234	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00
u235	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02
u236	1.74E+02	1.74E+02	1.74E+02	1.74E+02	1.74E+02	1.74E+02
u237	.00E+00	2.74E-06	3.16E-06	3.22E-06	3.23E-06	3.23E-06
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04
u239	.00E+00	3.29E-07	3.29E-07	3.29E-07	3.29E-07	2.90E-07
u240	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	.00E+00	2.85E-13	5.62E-13	8.30E-13	1.09E-12	1.09E-12
np236m	.00E+00	2.16E-12	2.16E-12	2.16E-12	2.16E-12	2.15E-12
np236	.00E+00	1.02E-11	2.05E-11	3.07E-11	4.10E-11	4.10E-11
np237	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.22E+01
np238	.00E+00	1.57E-06	1.58E-06	1.58E-06	1.58E-06	1.58E-06
np239	.00E+00	4.73E-05	4.75E-05	4.75E-05	4.75E-05	4.75E-05
np240m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np240	.00E+00	9.69E-15	9.74E-15	9.74E-15	9.74E-15	9.29E-15
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	.00E+00	1.39E-11	2.87E-11	4.33E-11	5.77E-11	5.77E-11
pu237	.00E+00	9.13E-18	3.94E-17	8.62E-17	1.46E-16	1.46E-16
pu238	.00E+00	7.86E-06	1.73E-05	2.67E-05	3.62E-05	3.62E-05
pu239	.00E+00	2.08E-04	4.63E-04	7.19E-04	9.74E-04	9.74E-04
pu240	.00E+00	4.61E-11	2.14E-10	5.08E-10	9.28E-10	9.28E-10
pu241	.00E+00	1.42E-17	1.37E-16	4.97E-16	1.22E-15	1.22E-15
pu242	.00E+00	1.26E-24	2.52E-23	1.39E-22	4.61E-22	4.61E-22
pu243	.00E+00	2.77E-33	5.52E-32	3.05E-31	1.01E-30	1.00E-30
pu244	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu245	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
totals	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04
flux		3.00E+08	3.00E+08	3.00E+08	3.00E+08	3.00E-07

0
0
0
0
0
0
0

1q array has 20 entries.
 3q array has 1 entries.
 3q array has 1 entries.
 3q array has 1 entries.
 4q array has 1 entries.
 54q array has 12 entries.

1library information...

cross-section data taken from position number 2 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 denisiities
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 denisiities
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
0
0

.other identification and sizes of library.
data set name: ft33f001
8/28/1996 date library was produced
1697 total number of nuclides in library
689 number of light-element nuclides
129 number of actinide nuclides
879 number of fission product nuclides
7993 number of nonzero off-diagonal matrix elements

0
1
0
0
0

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
power= .00mw, burnup= 1.mwd, flux= 2.82E+08n/cm**2-sec
basis =

page 11

(note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)

0
0
0
0
0
0

Table with 7 columns representing different parameters and 4 rows of data: initial, productions, absorptions, k infinity, actinide absorptions, non-actinide. Values include decay constants in days and various scientific notations.

abs. fracs.	3.791451E-03	3.791869E-03	3.792226E-03	3.792703E-03	3.793120E-03	3.793120E-03	
1	sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2					fission products	page 12
0	fraction of total absorption rate						
	power=	.00mw, burnup=	1.mwd, flux=	2.82E+08n/cm**2-sec			
0	initial	91.3 d	109.6 d	127.8 d	146.1 d	146.1 d	
sm149	1.42E-06	1.79E-06	2.17E-06	2.54E-06	2.91E-06	2.91E-06	
xe135	2.31E-06	2.31E-06	2.31E-06	2.31E-06	2.31E-06	2.31E-06	
sm151	6.68E-08	8.38E-08	1.01E-07	1.18E-07	1.35E-07	1.35E-07	
nd143	2.40E-08	3.21E-08	4.04E-08	4.87E-08	5.69E-08	5.69E-08	
gd157	1.57E-08	1.97E-08	2.37E-08	2.76E-08	3.16E-08	3.16E-08	
cd113	1.31E-08	1.63E-08	1.96E-08	2.29E-08	2.61E-08	2.61E-08	
pm147	1.11E-08	1.45E-08	1.79E-08	2.13E-08	2.46E-08	2.46E-08	
rh103	6.05E-09	8.69E-09	1.16E-08	1.46E-08	1.77E-08	1.77E-08	
xe131	7.97E-09	1.04E-08	1.27E-08	1.51E-08	1.75E-08	1.75E-08	
cs133	6.97E-09	8.95E-09	1.09E-08	1.29E-08	1.49E-08	1.49E-08	
tc 99	5.15E-09	6.52E-09	7.88E-09	9.25E-09	1.06E-08	1.06E-08	
eu155	4.64E-09	5.78E-09	6.91E-09	8.03E-09	9.14E-09	9.14E-09	
nd145	4.22E-09	5.28E-09	6.34E-09	7.40E-09	8.46E-09	8.46E-09	
rh105	8.35E-09	8.33E-09	8.33E-09	8.33E-09	8.33E-09	8.33E-09	
sm152	2.20E-09	2.75E-09	3.30E-09	3.85E-09	4.40E-09	4.40E-09	
kr 83	1.80E-09	2.26E-09	2.71E-09	3.16E-09	3.61E-09	3.61E-09	
cs135	1.67E-09	2.09E-09	2.52E-09	2.94E-09	3.36E-09	3.36E-09	
pr143	2.79E-09	2.84E-09	2.86E-09	2.86E-09	2.87E-09	2.87E-09	
ru101	1.28E-09	1.60E-09	1.92E-09	2.24E-09	2.56E-09	2.56E-09	
eu153	1.07E-09	1.35E-09	1.63E-09	1.91E-09	2.18E-09	2.18E-09	
xe133	2.05E-09	2.05E-09	2.05E-09	2.05E-09	2.05E-09	2.05E-09	
la139	1.00E-09	1.26E-09	1.51E-09	1.76E-09	2.01E-09	2.01E-09	
pr141	6.10E-10	8.66E-10	1.14E-09	1.42E-09	1.72E-09	1.72E-09	
mo 95	3.26E-10	5.65E-10	8.69E-10	1.23E-09	1.65E-09	1.65E-09	
ce141	1.27E-09	1.38E-09	1.46E-09	1.51E-09	1.54E-09	1.54E-09	
gd155	2.93E-10	4.56E-10	6.55E-10	8.89E-10	1.16E-09	1.16E-09	
pm149	9.75E-10	9.75E-10	9.75E-10	9.75E-10	9.75E-10	9.75E-10	
nd147	9.27E-10	9.33E-10	9.36E-10	9.36E-10	9.36E-10	9.36E-10	
pd105	4.60E-10	5.78E-10	6.96E-10	8.15E-10	9.33E-10	9.33E-10	
zr 93	4.18E-10	5.23E-10	6.28E-10	7.34E-10	8.39E-10	8.39E-10	
i129	2.81E-10	3.56E-10	4.32E-10	5.09E-10	5.86E-10	5.86E-10	
mo 97	2.25E-10	2.82E-10	3.39E-10	3.96E-10	4.53E-10	4.53E-10	
sm147	9.31E-11	1.57E-10	2.37E-10	3.34E-10	4.48E-10	4.48E-10	
ru103	2.59E-10	2.86E-10	3.06E-10	3.20E-10	3.30E-10	3.30E-10	
ag109	1.58E-10	1.97E-10	2.37E-10	2.76E-10	3.16E-10	3.16E-10	
ru102	9.24E-11	1.15E-10	1.39E-10	1.62E-10	1.85E-10	1.85E-10	
ce144	9.81E-11	1.20E-10	1.41E-10	1.61E-10	1.80E-10	1.80E-10	
sr 90	8.43E-11	1.05E-10	1.26E-10	1.47E-10	1.68E-10	1.68E-10	
ce142	8.34E-11	1.04E-10	1.25E-10	1.46E-10	1.67E-10	1.67E-10	
nd148	8.01E-11	1.00E-10	1.20E-10	1.40E-10	1.60E-10	1.60E-10	
eu151	3.80E-11	5.97E-11	8.62E-11	1.18E-10	1.54E-10	1.54E-10	
nd146	6.72E-11	8.40E-11	1.01E-10	1.18E-10	1.34E-10	1.34E-10	
zr 95	9.09E-11	1.04E-10	1.16E-10	1.25E-10	1.32E-10	1.32E-10	
y 91	8.36E-11	9.56E-11	1.05E-10	1.13E-10	1.19E-10	1.19E-10	
y 89	3.78E-11	5.51E-11	7.43E-11	9.49E-11	1.17E-10	1.17E-10	
ba138	5.74E-11	7.17E-11	8.61E-11	1.00E-10	1.15E-10	1.15E-10	
zr 91	3.57E-11	5.25E-11	7.14E-11	9.18E-11	1.14E-10	1.14E-10	
pm151	1.10E-10	1.10E-10	1.10E-10	1.10E-10	1.10E-10	1.10E-10	
pd108	5.43E-11	6.78E-11	8.12E-11	9.47E-11	1.08E-10	1.08E-10	
1	sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2					fission products	page 13
0	fraction of total absorption rate						
	power=	.00mw, burnup=	1.mwd, flux=	2.82E+08n/cm**2-sec			
0	initial	91.3 d	109.6 d	127.8 d	146.1 d	146.1 d	

in115	5.22E-11	6.61E-11	8.00E-11	9.39E-11	1.08E-10	1.08E-10
ce140	4.13E-11	5.52E-11	6.93E-11	8.34E-11	9.75E-11	9.75E-11
nd144	2.52E-11	3.88E-11	5.50E-11	7.38E-11	9.51E-11	9.51E-11
xe132	4.54E-11	5.76E-11	6.98E-11	8.19E-11	9.41E-11	9.41E-11
nb 95	4.35E-11	5.78E-11	7.12E-11	8.33E-11	9.41E-11	9.41E-11
mo 98	3.34E-11	4.18E-11	5.02E-11	5.85E-11	6.69E-11	6.69E-11
mo100	3.23E-11	4.03E-11	4.84E-11	5.65E-11	6.45E-11	6.45E-11
pd107	3.21E-11	4.00E-11	4.80E-11	5.60E-11	6.39E-11	6.39E-11
xe134	3.17E-11	3.97E-11	4.76E-11	5.56E-11	6.35E-11	6.35E-11
zr 92	2.59E-11	3.24E-11	3.90E-11	4.55E-11	5.20E-11	5.20E-11
ba140	4.65E-11	4.71E-11	4.73E-11	4.74E-11	4.74E-11	4.74E-11
zr 96	2.04E-11	2.55E-11	3.06E-11	3.57E-11	4.08E-11	4.08E-11
ru104	1.98E-11	2.48E-11	2.98E-11	3.47E-11	3.97E-11	3.97E-11
sm153	3.82E-11	3.81E-11	3.81E-11	3.81E-11	3.81E-11	3.81E-11
i 127	1.69E-11	2.17E-11	2.65E-11	3.14E-11	3.64E-11	3.64E-11
nd150	1.78E-11	2.22E-11	2.66E-11	3.11E-11	3.55E-11	3.55E-11
cs137	1.74E-11	2.18E-11	2.61E-11	3.05E-11	3.48E-11	3.48E-11
eu156	3.35E-11	3.42E-11	3.45E-11	3.46E-11	3.46E-11	3.46E-11
xe136	1.71E-11	2.14E-11	2.57E-11	3.00E-11	3.43E-11	3.43E-11
sr 89	1.95E-11	2.20E-11	2.39E-11	2.54E-11	2.66E-11	2.66E-11
br 81	1.29E-11	1.61E-11	1.94E-11	2.26E-11	2.58E-11	2.58E-11
zr 94	1.09E-11	1.37E-11	1.64E-11	1.92E-11	2.19E-11	2.19E-11
kr 87	2.23E-11	2.30E-11	2.30E-11	2.30E-11	2.30E-11	2.15E-11
rb 85	1.00E-11	1.25E-11	1.51E-11	1.76E-11	2.01E-11	2.01E-11
ce143	1.75E-11	1.75E-11	1.75E-11	1.75E-11	1.75E-11	1.75E-11
la140	1.59E-11	1.61E-11	1.62E-11	1.62E-11	1.62E-11	1.62E-11
te130	7.78E-12	9.73E-12	1.17E-11	1.36E-11	1.56E-11	1.56E-11
cd111	7.09E-12	9.16E-12	1.12E-11	1.33E-11	1.54E-11	1.54E-11
sm154	7.55E-12	9.44E-12	1.13E-11	1.32E-11	1.51E-11	1.51E-11
kr 85	7.45E-12	9.31E-12	1.12E-11	1.30E-11	1.48E-11	1.48E-11
rb 87	7.31E-12	9.14E-12	1.10E-11	1.28E-11	1.46E-11	1.46E-11
mo 99	1.32E-11	1.32E-11	1.32E-11	1.32E-11	1.32E-11	1.32E-11
se 77	5.63E-12	7.08E-12	8.54E-12	9.99E-12	1.14E-11	1.14E-11
kr 84	3.45E-12	4.31E-12	5.17E-12	6.04E-12	6.90E-12	6.90E-12
i 131	6.79E-12	6.80E-12	6.80E-12	6.80E-12	6.80E-12	6.80E-12
ru106	3.25E-12	3.99E-12	4.70E-12	5.40E-12	6.07E-12	6.07E-12
sb121	2.68E-12	3.36E-12	4.04E-12	4.73E-12	5.41E-12	5.41E-12
se 79	2.64E-12	3.30E-12	3.96E-12	4.62E-12	5.29E-12	5.29E-12
ba137	1.17E-12	1.81E-12	2.58E-12	3.49E-12	4.54E-12	4.54E-12
te127m	2.59E-12	3.12E-12	3.60E-12	4.02E-12	4.39E-12	4.39E-12
kr 86	1.91E-12	2.39E-12	2.87E-12	3.35E-12	3.83E-12	3.83E-12
sb123	1.88E-12	2.36E-12	2.84E-12	3.33E-12	3.82E-12	3.82E-12
te128	1.71E-12	2.14E-12	2.56E-12	2.99E-12	3.42E-12	3.42E-12
se 80	1.23E-12	1.54E-12	1.85E-12	2.16E-12	2.47E-12	2.47E-12
gd156	9.52E-13	1.28E-12	1.61E-12	1.95E-12	2.28E-12	2.28E-12
dy161	9.25E-13	1.19E-12	1.46E-12	1.72E-12	1.99E-12	1.99E-12
te129m	1.41E-12	1.54E-12	1.62E-12	1.68E-12	1.72E-12	1.72E-12
tb159	7.62E-13	9.55E-13	1.15E-12	1.34E-12	1.53E-12	1.53E-12
sb125	6.99E-13	8.79E-13	1.06E-12	1.23E-12	1.40E-12	1.40E-12

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
fraction of total absorption rate
power= .00mw, burnup= 1.mwd, flux= 2.82E+08n/cm**2-sec
initial 91.3 d 109.6 d 127.8 d 146.1 d 146.1 d

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li 6	7.01E-13	8.76E-13	1.05E-12	1.23E-12	1.40E-12	1.40E-12
cd112	6.93E-13	8.69E-13	1.05E-12	1.22E-12	1.40E-12	1.40E-12
sm150	3.47E-13	5.32E-13	7.55E-13	1.02E-12	1.32E-12	1.32E-12
sn117	5.54E-13	6.93E-13	8.32E-13	9.71E-13	1.11E-12	1.11E-12
pd106	2.40E-13	3.71E-13	5.29E-13	7.11E-13	9.19E-13	9.19E-13
sn119	4.55E-13	5.68E-13	6.82E-13	7.96E-13	9.09E-13	9.09E-13

sn115	4.04E-13	5.10E-13	6.15E-13	7.21E-13	8.27E-13	8.27E-13
sr 88	3.51E-13	4.39E-13	5.27E-13	6.15E-13	7.03E-13	7.03E-13
pm148m	1.50E-13	2.31E-13	3.21E-13	4.19E-13	5.22E-13	5.22E-13
pd110	2.51E-13	3.13E-13	3.75E-13	4.38E-13	5.00E-13	5.00E-13
cd114	2.43E-13	3.04E-13	3.65E-13	4.26E-13	4.86E-13	4.86E-13
se 82	2.38E-13	2.98E-13	3.58E-13	4.17E-13	4.77E-13	4.77E-13
gd158	2.27E-13	2.84E-13	3.41E-13	3.98E-13	4.54E-13	4.54E-13
sn126	1.91E-13	2.38E-13	2.86E-13	3.34E-13	3.81E-13	3.81E-13
se 78	1.81E-13	2.27E-13	2.72E-13	3.18E-13	3.63E-13	3.63E-13
ag111	3.17E-13	3.17E-13	3.17E-13	3.17E-13	3.17E-13	3.17E-13
eu157	2.97E-13	2.96E-13	2.96E-13	2.96E-13	2.96E-13	2.96E-13
sn124	1.46E-13	1.82E-13	2.19E-13	2.55E-13	2.91E-13	2.91E-13
dy162	1.40E-13	1.74E-13	2.09E-13	2.43E-13	2.78E-13	2.78E-13
dy164	1.26E-13	1.57E-13	1.89E-13	2.20E-13	2.51E-13	2.51E-13
eu154	1.10E-13	1.39E-13	1.69E-13	1.98E-13	2.28E-13	2.28E-13
as 75	1.08E-13	1.35E-13	1.62E-13	1.90E-13	2.17E-13	2.17E-13
cd115m	1.61E-13	1.80E-13	1.94E-13	2.04E-13	2.12E-13	2.12E-13
y 90	7.60E-14	9.60E-14	1.16E-13	1.36E-13	1.56E-13	1.56E-13
sn118	5.96E-14	7.45E-14	8.93E-14	1.04E-13	1.19E-13	1.19E-13
cd116	5.05E-14	6.32E-14	7.58E-14	8.84E-14	1.01E-13	1.01E-13
sn122	5.02E-14	6.27E-14	7.52E-14	8.77E-14	1.00E-13	1.00E-13
ba136	4.28E-14	5.70E-14	7.13E-14	8.56E-14	9.99E-14	1.00E-13
zr 90	2.25E-14	3.58E-14	5.23E-14	7.18E-14	9.44E-14	9.44E-14
te125	2.01E-14	3.22E-14	4.73E-14	6.53E-14	8.64E-14	8.64E-14
sn120	3.76E-14	4.70E-14	5.63E-14	6.57E-14	7.51E-14	7.51E-14
kr 82	3.41E-14	4.29E-14	5.17E-14	6.04E-14	6.92E-14	6.92E-14
cs134	3.12E-14	3.93E-14	4.75E-14	5.58E-14	6.42E-14	6.42E-14
dy163	3.08E-14	3.84E-14	4.61E-14	5.37E-14	6.13E-14	6.13E-14
ge 73	2.92E-14	3.66E-14	4.39E-14	5.13E-14	5.86E-14	5.86E-14
cs136	5.43E-14	5.51E-14	5.54E-14	5.55E-14	5.56E-14	5.55E-14
ru 99	2.66E-14	3.38E-14	4.10E-14	4.82E-14	5.54E-14	5.54E-14
xe130	1.98E-14	2.48E-14	2.99E-14	3.49E-14	3.99E-14	3.99E-14
pm148	1.31E-14	1.76E-14	2.22E-14	2.67E-14	3.13E-14	3.12E-14
ru105	2.97E-14	2.96E-14	2.96E-14	2.96E-14	2.96E-14	2.95E-14
sn125	2.91E-14	2.92E-14	2.92E-14	2.93E-14	2.93E-14	2.92E-14
mo 96	1.44E-14	1.81E-14	2.17E-14	2.54E-14	2.91E-14	2.91E-14
ge 76	1.07E-14	1.34E-14	1.60E-14	1.87E-14	2.14E-14	2.14E-14
gd160	6.76E-15	8.44E-15	1.01E-14	1.18E-14	1.35E-14	1.35E-14
rb 88	1.28E-14	1.29E-14	1.29E-14	1.29E-14	1.29E-14	1.28E-14
i135	1.01E-14	1.01E-14	1.01E-14	1.01E-14	1.01E-14	1.00E-14
te126	4.62E-15	5.91E-15	7.21E-15	8.50E-15	9.80E-15	9.80E-15
te132	9.56E-15	9.56E-15	9.56E-15	9.56E-15	9.56E-15	9.56E-15
sn123	3.30E-15	3.94E-15	4.52E-15	5.05E-15	5.53E-15	5.53E-15

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 0 fraction of total absorption rate
 0 power= .00mw, burnup= 1.mwd, flux= 2.82E+08n/cm**2-sec
 initial 91.3 d 109.6 d 127.8 d 146.1 d 146.1 d

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ru100	2.66E-15	3.34E-15	4.03E-15	4.72E-15	5.42E-15	5.42E-15
te134	5.46E-15	5.85E-15	5.85E-15	5.85E-15	5.85E-15	5.09E-15
ho165	2.12E-15	2.65E-15	3.18E-15	3.71E-15	4.24E-15	4.24E-15
sb126	2.95E-15	2.98E-15	3.00E-15	3.00E-15	3.00E-15	3.00E-15
sr 87	1.23E-15	1.53E-15	1.84E-15	2.15E-15	2.45E-15	2.45E-15
in117m	2.09E-15	2.09E-15	2.09E-15	2.09E-15	2.09E-15	2.09E-15
sb124	1.19E-15	1.37E-15	1.51E-15	1.62E-15	1.71E-15	1.71E-15
in113	4.02E-16	6.28E-16	9.04E-16	1.23E-15	1.61E-15	1.61E-15
nb 94	6.97E-16	8.72E-16	1.05E-15	1.22E-15	1.40E-15	1.40E-15
te124	4.52E-16	6.49E-16	8.67E-16	1.10E-15	1.35E-15	1.35E-15
ge 74	5.93E-16	7.41E-16	8.89E-16	1.04E-15	1.19E-15	1.19E-15
eu152	3.61E-16	4.74E-16	6.03E-16	7.51E-16	9.22E-16	9.22E-16

ge 72	3.96E-16	5.00E-16	6.04E-16	7.09E-16	8.13E-16	8.13E-16
i130	7.11E-16	7.14E-16	7.14E-16	7.15E-16	7.15E-16	7.10E-16
in117	6.15E-16	6.14E-16	6.14E-16	6.14E-16	6.14E-16	6.14E-16
sr 86	2.28E-16	3.11E-16	3.96E-16	4.81E-16	5.68E-16	5.68E-16
se 76	2.45E-16	3.08E-16	3.71E-16	4.33E-16	4.96E-16	4.96E-16
ba135	1.61E-16	2.09E-16	2.61E-16	3.17E-16	3.76E-16	3.76E-16
rb 86	2.25E-16	2.33E-16	2.37E-16	2.39E-16	2.40E-16	2.40E-16
tb160	1.51E-16	1.75E-16	1.95E-16	2.12E-16	2.27E-16	2.27E-16
dy165	2.10E-16	2.09E-16	2.09E-16	2.09E-16	2.09E-16	2.06E-16
sm148	2.92E-17	5.32E-17	8.55E-17	1.26E-16	1.76E-16	1.76E-16
nd142	4.27E-17	6.09E-17	8.30E-17	1.09E-16	1.40E-16	1.40E-16
gd154	2.98E-17	4.65E-17	6.71E-17	9.16E-17	1.20E-16	1.20E-16
er166	5.43E-17	6.91E-17	8.40E-17	9.88E-17	1.14E-16	1.14E-16
xe128	5.51E-17	6.90E-17	8.28E-17	9.67E-17	1.11E-16	1.11E-16
cd118	1.14E-16	1.20E-16	1.20E-16	1.20E-16	1.20E-16	1.07E-16
ge 75	8.50E-17	8.64E-17	8.64E-17	8.64E-17	8.64E-17	8.26E-17
ba134	1.88E-17	2.95E-17	4.25E-17	5.80E-17	7.61E-17	7.61E-17
gd152	3.24E-17	4.16E-17	5.17E-17	6.27E-17	7.49E-17	7.49E-17
cd110	1.92E-17	2.57E-17	3.29E-17	4.07E-17	4.92E-17	4.92E-17
pd104	8.40E-18	1.46E-17	2.31E-17	3.40E-17	4.73E-17	4.73E-17
dy160	1.27E-17	1.88E-17	2.58E-17	3.35E-17	4.18E-17	4.18E-17
kr 80	1.66E-17	2.07E-17	2.49E-17	2.91E-17	3.32E-17	3.32E-17
in119m	2.83E-17	3.01E-17	3.01E-17	3.01E-17	3.01E-17	2.50E-17
br 79	3.13E-18	4.59E-18	6.32E-18	8.32E-18	1.06E-17	1.06E-17
xe129	1.24E-18	1.91E-18	2.73E-18	3.70E-18	4.82E-18	4.82E-18
ag107	1.14E-18	1.79E-18	2.57E-18	3.50E-18	4.57E-18	4.57E-18
te122	2.05E-18	2.60E-18	3.16E-18	3.71E-18	4.27E-18	4.27E-18
be 9	1.34E-18	1.68E-18	2.01E-18	2.35E-18	2.69E-18	2.69E-18
pr142	1.28E-18	1.57E-18	1.88E-18	2.21E-18	2.54E-18	2.52E-18
nb 93	7.25E-19	9.13E-19	1.11E-18	1.31E-18	1.52E-18	1.52E-18
sn116	6.45E-19	8.19E-19	1.00E-18	1.19E-18	1.38E-18	1.38E-18
te123	4.43E-19	5.98E-19	7.65E-19	9.47E-19	1.14E-18	1.14E-18
li 7	5.40E-19	6.75E-19	8.09E-19	9.43E-19	1.08E-18	1.08E-18
in119	1.56E-18	2.35E-18	2.35E-18	2.35E-18	2.35E-18	7.42E-19
er167	2.15E-19	2.69E-19	3.26E-19	3.79E-19	4.33E-19	4.33E-19
cd109	2.01E-20	2.35E-20	2.69E-20	3.36E-20	3.69E-20	3.69E-20
cd108	1.01E-20	1.34E-20	1.68E-20	2.01E-20	2.35E-20	2.35E-20

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 0 fraction of total absorption rate
 power= .00mw, burnup= 1.mwd, flux= 2.82E+08n/cm**2-sec
 0 initial 91.3 d 109.6 d 127.8 d 146.1 d 146.1 d

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cs134m	1.01E-20	1.34E-20	1.68E-20	1.68E-20	2.01E-20	2.01E-20
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1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 0 power= 4.000E-03mw, burnup=5.8440E-01mwd, flux= 2.82E+08n/cm**2-sec
 nuclide concentrations, gram atoms
 basis = single reactor assembly

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h 1	charge	91.3 d	109.6 d	127.8 d	146.1 d	146.1 d
h 2	1.76E-08	2.19E-08	2.62E-08	3.05E-08	3.48E-08	3.48E-08
h 3	5.22E-11	6.50E-11	7.77E-11	9.04E-11	1.03E-10	1.03E-10
h 4	3.81E-13	4.73E-13	5.65E-13	6.57E-13	7.48E-13	7.48E-13
h 4	.00E+00	1.92E-36	2.29E-36	2.67E-36	3.04E-36	.00E+00
he 3	2.15E-15	3.35E-15	4.81E-15	6.52E-15	8.50E-15	8.50E-15
he 4	2.91E-09	3.62E-09	4.33E-09	5.04E-09	5.75E-09	5.75E-09
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ne 20	3.50E-10	4.35E-10	5.20E-10	6.05E-10	6.91E-10	6.91E-10
ne 21	2.62E-18	4.03E-18	5.71E-18	7.66E-18	9.88E-18	9.88E-18
ne 22	5.99E-14	9.31E-14	1.33E-13	1.80E-13	2.34E-13	2.34E-13
ne 23	6.56E-17	7.10E-15	7.10E-15	7.10E-15	7.10E-15	5.66E-19

na 22	2.23E-12	2.75E-12	3.27E-12	3.78E-12	4.28E-12	4.28E-12
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	3.63E-08	3.07E-08	3.07E-08	3.07E-08	3.07E-08	3.05E-08
na 24m	5.99E-30	5.05E-15	5.05E-15	5.05E-15	5.05E-15	5.05E-30
na 25	6.08E-31	1.39E-29	1.66E-29	1.93E-29	2.20E-29	6.06E-32
mg 24	3.13E-06	3.80E-06	4.47E-06	5.14E-06	5.81E-06	5.81E-06
mg 25	3.83E-13	4.77E-13	5.70E-13	6.64E-13	7.58E-13	7.58E-13
mg 26	5.22E-11	6.50E-11	7.77E-11	9.04E-11	1.03E-10	1.03E-10
mg 27	1.60E-12	2.12E-12	2.12E-12	2.12E-12	2.12E-12	1.14E-12
mg 28	4.40E-24	4.32E-24	4.32E-24	4.32E-24	4.32E-24	4.30E-24
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	7.33E-11	2.28E-10	2.28E-10	2.28E-10	2.28E-10	1.67E-11
al 29	3.89E-31	9.14E-31	1.30E-30	1.75E-30	2.27E-30	9.29E-31
al 30	.00E+00	7.01E-45	7.01E-45	1.40E-44	1.40E-44	.00E+00
si 28	8.79E-06	1.06E-05	1.25E-05	1.44E-05	1.62E-05	1.62E-05
si 29	2.26E-15	3.51E-15	5.00E-15	6.73E-15	8.70E-15	8.70E-15
si 30	6.21E-25	1.21E-24	2.09E-24	3.30E-24	4.90E-24	4.90E-24
si 31	4.37E-37	8.72E-37	1.50E-36	2.37E-36	3.51E-36	3.39E-36
si 32	.00E+00	.00E+00	.00E+00	.00E+00	1.40E-45	1.40E-45
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		2.82E+08	2.82E+08	2.82E+08	2.82E+08	2.82E-07

0
1
0

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
power= 4.000E-03mw, burnup=5.8440E-01mwd, flux= 2.82E+08n/cm**2-sec

actinides page 18

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	91.3 d	109.6 d	127.8 d	146.1 d	146.1 d
he 4	1.02E-05	1.27E-05	1.53E-05	1.78E-05	2.04E-05	2.04E-05
th226	1.34E-29	2.17E-29	3.24E-29	4.55E-29	6.08E-29	6.08E-29
th227	3.85E-16	6.77E-16	1.06E-15	1.54E-15	2.11E-15	2.11E-15
th228	1.32E-15	2.42E-15	3.98E-15	6.09E-15	8.81E-15	8.81E-15
th229	4.93E-13	8.84E-13	1.41E-12	2.07E-12	2.88E-12	2.88E-12
th230	5.11E-06	6.39E-06	7.66E-06	8.94E-06	1.02E-05	1.02E-05
th231	3.02E-09	3.02E-09	3.02E-09	3.02E-09	3.02E-09	3.02E-09
th232	1.03E-06	1.29E-06	1.55E-06	1.81E-06	2.07E-06	2.07E-06
th233	8.39E-18	1.19E-17	1.43E-17	1.66E-17	1.90E-17	1.46E-17
th234	4.71E-07	4.98E-07	5.14E-07	5.23E-07	5.29E-07	5.29E-07
pa231	1.53E-07	1.92E-07	2.31E-07	2.70E-07	3.09E-07	3.09E-07
pa232	2.63E-15	3.30E-15	3.97E-15	4.64E-15	5.31E-15	5.29E-15
pa233	1.23E-06	1.32E-06	1.37E-06	1.40E-06	1.42E-06	1.42E-06
pa234m	1.59E-11	1.68E-11	1.73E-11	1.76E-11	1.78E-11	1.78E-11
pa234	7.10E-12	7.50E-12	7.74E-12	7.88E-12	7.97E-12	7.97E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	1.29E-26	2.10E-26	3.14E-26	4.40E-26	5.89E-26	5.89E-26
u231	1.04E-21	1.46E-21	1.94E-21	2.43E-21	2.94E-21	2.94E-21
u232	1.84E-12	2.74E-12	3.81E-12	5.05E-12	6.46E-12	6.46E-12
u233	1.50E-06	2.10E-06	2.73E-06	3.38E-06	4.04E-06	4.04E-06
u234	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00
u235	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02
u236	1.74E+02	1.74E+02	1.74E+02	1.74E+02	1.74E+02	1.74E+02
u237	3.23E-06	3.16E-06	3.15E-06	3.15E-06	3.15E-06	3.15E-06
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04
u239	2.90E-07	3.22E-07	3.22E-07	3.22E-07	3.22E-07	2.51E-07
u240	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	1.09E-12	1.33E-12	1.57E-12	1.79E-12	2.01E-12	2.01E-12
np236m	2.15E-12	2.09E-12	2.09E-12	2.09E-12	2.09E-12	2.08E-12
np236	4.10E-11	5.09E-11	6.08E-11	7.07E-11	8.06E-11	8.06E-11
np237	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.22E+01
np238	1.58E-06	1.56E-06	1.56E-06	1.56E-06	1.56E-06	1.56E-06

np239	4.75E-05	4.65E-05	4.65E-05	4.65E-05	4.65E-05	4.65E-05
np240m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np240	9.29E-15	9.48E-15	9.48E-15	9.48E-15	9.48E-15	8.63E-15
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	5.77E-11	7.15E-11	8.51E-11	9.85E-11	1.12E-10	1.12E-10
pu237	1.46E-16	2.11E-16	2.83E-16	3.61E-16	4.42E-16	4.42E-16
pu238	3.62E-05	4.55E-05	5.48E-05	6.42E-05	7.35E-05	7.35E-05
pu239	9.74E-04	1.23E-03	1.48E-03	1.73E-03	1.98E-03	1.98E-03
pu240	9.28E-10	1.47E-09	2.14E-09	2.92E-09	3.83E-09	3.83E-09
pu241	1.22E-15	2.42E-15	4.21E-15	6.73E-15	1.01E-14	1.01E-14
pu242	4.61E-22	1.15E-21	2.42E-21	4.53E-21	7.79E-21	7.79E-21
pu243	1.00E-30	2.46E-30	5.18E-30	9.69E-30	1.67E-29	1.63E-29
pu244	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu245	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
totals	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04
flux		2.82E+08	2.82E+08	2.82E+08	2.82E+08	2.82E-07

```

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      4q array has       1 entries.
0      54q array has      12 entries.
1library information...

```

cross-section data taken from position number 3 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 densities
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 densities
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      8/28/1996      date library was produced
0      1697      total number of nuclides in library
0      689      number of light-element nuclides
0      129      number of actinide nuclides
0      879      number of fission product nuclides
0      7993      number of nonzero off-diagonal matrix elements
0
*****

```

```

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2      page 19
power= .00mw, burnup= 1.mwd, flux= 2.74E+08n/cm**2-sec
basis =

```

(note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)

	initial	164.4 d	182.6 d	200.9 d	219.2 d	219.2 d
productions	1.122439E+06	1.122440E+06	1.122440E+06	1.122440E+06	1.122441E+06	1.122441E+06
absorptions	9.157813E+05	9.157819E+05	9.157824E+05	9.157831E+05	9.157836E+05	9.157836E+05
k infinity	1.225663E+00	1.225662E+00	1.225662E+00	1.225662E+00	1.225661E+00	1.225661E+00
	initial	164.4 d	182.6 d	200.9 d	219.2 d	219.2 d
actinide absorptions	9.125454E+05	9.125456E+05	9.125458E+05	9.125460E+05	9.125463E+05	9.125463E+05
non-actinide abs. fracs.	3.533483E-03	3.533840E-03	3.534257E-03	3.534734E-03	3.535092E-03	3.535092E-03

```

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2      page 20
0 fraction of total absorption rate
power= .00mw, burnup= 1.mwd, flux= 2.74E+08n/cm**2-sec
0 initial 164.4 d 182.6 d 200.9 d 219.2 d 219.2 d

```

sm149	2.93E-06	3.30E-06	3.67E-06	4.05E-06	4.42E-06	4.42E-06
xe135	2.33E-06	2.33E-06	2.33E-06	2.33E-06	2.33E-06	2.33E-06
sm151	1.36E-07	1.53E-07	1.70E-07	1.87E-07	2.04E-07	2.04E-07
nd143	5.72E-08	6.55E-08	7.39E-08	8.22E-08	9.06E-08	9.06E-08
gd157	3.18E-08	3.58E-08	3.97E-08	4.37E-08	4.77E-08	4.77E-08
cd113	2.63E-08	2.96E-08	3.29E-08	3.62E-08	3.94E-08	3.94E-08
pm147	2.45E-08	2.77E-08	3.09E-08	3.41E-08	3.72E-08	3.72E-08
rh103	1.77E-08	2.09E-08	2.42E-08	2.75E-08	3.09E-08	3.09E-08
xe131	1.74E-08	1.98E-08	2.22E-08	2.46E-08	2.69E-08	2.69E-08
cs133	1.48E-08	1.68E-08	1.88E-08	2.07E-08	2.27E-08	2.27E-08
tc 99	1.06E-08	1.19E-08	1.33E-08	1.47E-08	1.60E-08	1.60E-08
eu155	9.13E-09	1.02E-08	1.13E-08	1.24E-08	1.35E-08	1.35E-08
nd145	8.46E-09	9.52E-09	1.06E-08	1.16E-08	1.27E-08	1.27E-08
rh105	8.36E-09	8.36E-09	8.36E-09	8.36E-09	8.36E-09	8.36E-09
sm152	4.38E-09	4.93E-09	5.48E-09	6.02E-09	6.57E-09	6.57E-09
kr 83	3.63E-09	4.08E-09	4.54E-09	4.99E-09	5.45E-09	5.45E-09
cs135	3.36E-09	3.78E-09	4.20E-09	4.62E-09	5.05E-09	5.05E-09
ru101	2.54E-09	2.86E-09	3.18E-09	3.49E-09	3.81E-09	3.81E-09
mo 95	1.65E-09	2.11E-09	2.62E-09	3.16E-09	3.73E-09	3.73E-09
eu153	2.18E-09	2.46E-09	2.74E-09	3.02E-09	3.29E-09	3.29E-09
la139	2.02E-09	2.27E-09	2.52E-09	2.77E-09	3.03E-09	3.03E-09
pr141	1.72E-09	2.02E-09	2.33E-09	2.63E-09	2.94E-09	2.94E-09
pr143	2.87E-09	2.87E-09	2.87E-09	2.87E-09	2.87E-09	2.87E-09
gd155	1.17E-09	1.47E-09	1.81E-09	2.19E-09	2.60E-09	2.60E-09
xe133	2.06E-09	2.06E-09	2.06E-09	2.06E-09	2.06E-09	2.06E-09
ce141	1.55E-09	1.57E-09	1.59E-09	1.60E-09	1.61E-09	1.61E-09
pd105	9.31E-10	1.05E-09	1.17E-09	1.28E-09	1.40E-09	1.40E-09
zr 93	8.36E-10	9.41E-10	1.05E-09	1.15E-09	1.26E-09	1.26E-09
sm147	4.46E-10	5.76E-10	7.22E-10	8.83E-10	1.06E-09	1.06E-09
pm149	9.80E-10	9.80E-10	9.80E-10	9.80E-10	9.80E-10	9.80E-10
nd147	9.33E-10	9.33E-10	9.33E-10	9.33E-10	9.33E-10	9.33E-10

i129	5.89E-10	6.67E-10	7.45E-10	8.23E-10	9.01E-10	9.01E-10
mo 97	4.53E-10	5.11E-10	5.68E-10	6.25E-10	6.82E-10	6.82E-10
ag109	3.15E-10	3.54E-10	3.93E-10	4.33E-10	4.72E-10	4.72E-10
ru103	3.31E-10	3.38E-10	3.44E-10	3.48E-10	3.50E-10	3.50E-10
eu151	1.55E-10	1.96E-10	2.42E-10	2.93E-10	3.49E-10	3.49E-10
ru102	1.85E-10	2.09E-10	2.32E-10	2.55E-10	2.78E-10	2.78E-10
sr 90	1.69E-10	1.90E-10	2.11E-10	2.32E-10	2.53E-10	2.53E-10
ce142	1.68E-10	1.89E-10	2.10E-10	2.31E-10	2.52E-10	2.52E-10
ce144	1.81E-10	1.99E-10	2.17E-10	2.33E-10	2.50E-10	2.49E-10
nd148	1.61E-10	1.81E-10	2.01E-10	2.21E-10	2.41E-10	2.41E-10
y 89	1.17E-10	1.40E-10	1.63E-10	1.87E-10	2.11E-10	2.11E-10
zr 91	1.14E-10	1.37E-10	1.61E-10	1.85E-10	2.10E-10	2.10E-10
nd144	9.56E-11	1.19E-10	1.45E-10	1.73E-10	2.04E-10	2.04E-10
nd146	1.35E-10	1.52E-10	1.69E-10	1.86E-10	2.02E-10	2.02E-10
ba138	1.15E-10	1.30E-10	1.44E-10	1.59E-10	1.73E-10	1.73E-10
in115	1.08E-10	1.22E-10	1.36E-10	1.50E-10	1.64E-10	1.64E-10
pd108	1.08E-10	1.21E-10	1.34E-10	1.48E-10	1.61E-10	1.61E-10
ce140	9.79E-11	1.12E-10	1.26E-10	1.40E-10	1.55E-10	1.55E-10

1
0
0
sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
fraction of total absorption rate
power= .00mw, burnup= 1.mwd, flux= 2.74E+08n/cm**2-sec
initial 164.4 d 182.6 d 200.9 d 219.2 d 219.2 d

fission products page 21

zr 95	1.32E-10	1.38E-10	1.43E-10	1.47E-10	1.50E-10	1.50E-10
xe132	9.40E-11	1.06E-10	1.18E-10	1.30E-10	1.43E-10	1.43E-10
y 91	1.20E-10	1.25E-10	1.29E-10	1.32E-10	1.35E-10	1.35E-10
nb 95	9.40E-11	1.03E-10	1.12E-10	1.18E-10	1.24E-10	1.24E-10
pm151	1.10E-10	1.10E-10	1.10E-10	1.10E-10	1.10E-10	1.10E-10
mo 98	6.65E-11	7.49E-11	8.32E-11	9.15E-11	9.98E-11	9.98E-11
mo100	6.44E-11	7.25E-11	8.05E-11	8.86E-11	9.67E-11	9.67E-11
pd107	6.41E-11	7.21E-11	8.00E-11	8.80E-11	9.60E-11	9.60E-11
xe134	6.38E-11	7.17E-11	7.97E-11	8.77E-11	9.57E-11	9.57E-11
zr 92	5.22E-11	5.87E-11	6.52E-11	7.18E-11	7.83E-11	7.83E-11
zr 96	4.04E-11	4.55E-11	5.05E-11	5.56E-11	6.07E-11	6.07E-11
ru104	3.97E-11	4.46E-11	4.96E-11	5.45E-11	5.95E-11	5.95E-11
i127	3.63E-11	4.13E-11	4.63E-11	5.14E-11	5.65E-11	5.65E-11
nd150	3.55E-11	4.00E-11	4.44E-11	4.88E-11	5.33E-11	5.33E-11
cs137	3.48E-11	3.91E-11	4.34E-11	4.77E-11	5.20E-11	5.20E-11
xe136	3.44E-11	3.87E-11	4.30E-11	4.73E-11	5.16E-11	5.16E-11
ba140	4.75E-11	4.75E-11	4.75E-11	4.75E-11	4.75E-11	4.75E-11
br 81	2.58E-11	2.90E-11	3.22E-11	3.55E-11	3.87E-11	3.87E-11
sm153	3.82E-11	3.82E-11	3.82E-11	3.82E-11	3.82E-11	3.82E-11
eu156	3.48E-11	3.48E-11	3.48E-11	3.48E-11	3.48E-11	3.48E-11
zr 94	2.18E-11	2.46E-11	2.73E-11	3.00E-11	3.28E-11	3.28E-11
rb 85	2.01E-11	2.26E-11	2.52E-11	2.77E-11	3.02E-11	3.02E-11
sr 89	2.67E-11	2.77E-11	2.84E-11	2.90E-11	2.94E-11	2.94E-11
cd111	1.54E-11	1.75E-11	1.96E-11	2.17E-11	2.38E-11	2.38E-11
te130	1.56E-11	1.76E-11	1.96E-11	2.15E-11	2.35E-11	2.35E-11
sm154	1.51E-11	1.70E-11	1.89E-11	2.08E-11	2.27E-11	2.27E-11
kr 85	1.49E-11	1.67E-11	1.86E-11	2.04E-11	2.22E-11	2.22E-11
rb 87	1.46E-11	1.64E-11	1.83E-11	2.01E-11	2.19E-11	2.19E-11
kr 87	2.16E-11	2.31E-11	2.31E-11	2.31E-11	2.31E-11	2.08E-11
ce143	1.76E-11	1.76E-11	1.76E-11	1.76E-11	1.76E-11	1.75E-11
se 77	1.15E-11	1.30E-11	1.44E-11	1.59E-11	1.74E-11	1.74E-11
la140	1.62E-11	1.62E-11	1.62E-11	1.62E-11	1.62E-11	1.62E-11
mo 99	1.31E-11	1.32E-11	1.32E-11	1.32E-11	1.32E-11	1.31E-11
kr 84	6.87E-12	7.73E-12	8.59E-12	9.45E-12	1.03E-11	1.03E-11
ba137	4.56E-12	5.76E-12	7.08E-12	8.55E-12	1.02E-11	1.02E-11
ru106	6.03E-12	6.68E-12	7.30E-12	7.90E-12	8.48E-12	8.48E-12
sb121	5.40E-12	6.08E-12	6.76E-12	7.44E-12	8.12E-12	8.12E-12

se 79	5.31E-12	5.98E-12	6.64E-12	7.31E-12	7.97E-12	7.97E-12
i131	6.81E-12	6.81E-12	6.81E-12	6.81E-12	6.81E-12	6.81E-12
sb123	3.81E-12	4.30E-12	4.79E-12	5.28E-12	5.78E-12	5.78E-12
kr 86	3.84E-12	4.32E-12	4.80E-12	5.28E-12	5.76E-12	5.76E-12
te127m	4.41E-12	4.74E-12	5.04E-12	5.31E-12	5.54E-12	5.54E-12
te128	3.42E-12	3.85E-12	4.27E-12	4.70E-12	5.13E-12	5.13E-12
se 80	2.48E-12	2.79E-12	3.10E-12	3.41E-12	3.72E-12	3.72E-12
gd156	2.27E-12	2.60E-12	2.93E-12	3.27E-12	3.60E-12	3.60E-12
dy161	2.00E-12	2.26E-12	2.53E-12	2.79E-12	3.06E-12	3.06E-12
sm150	1.32E-12	1.66E-12	2.04E-12	2.46E-12	2.92E-12	2.92E-12
tb159	1.53E-12	1.72E-12	1.91E-12	2.11E-12	2.30E-12	2.30E-12
li 6	1.41E-12	1.59E-12	1.76E-12	1.94E-12	2.11E-12	2.11E-12

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2

fission products

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0 fraction of total absorption rate
 0 power= .00mw, burnup= 1.mwd, flux= 2.74E+08n/cm**2-sec
 initial 164.4 d 182.6 d 200.9 d 219.2 d 219.2 d

cd112	1.40E-12	1.58E-12	1.75E-12	1.93E-12	2.11E-12	2.11E-12
sb125	1.40E-12	1.57E-12	1.74E-12	1.91E-12	2.07E-12	2.07E-12
pd106	9.16E-13	1.15E-12	1.40E-12	1.67E-12	1.97E-12	1.97E-12
te129m	1.73E-12	1.76E-12	1.78E-12	1.79E-12	1.80E-12	1.80E-12
sn117	1.11E-12	1.25E-12	1.39E-12	1.53E-12	1.67E-12	1.67E-12
sn119	9.14E-13	1.03E-12	1.14E-12	1.26E-12	1.37E-12	1.37E-12
sn115	8.31E-13	9.38E-13	1.04E-12	1.15E-12	1.26E-12	1.26E-12
sr 88	7.05E-13	7.94E-13	8.82E-13	9.70E-13	1.06E-12	1.06E-12
pm148m	5.25E-13	6.30E-13	7.37E-13	8.45E-13	9.54E-13	9.54E-13
pd110	4.99E-13	5.61E-13	6.23E-13	6.85E-13	7.47E-13	7.47E-13
cd114	4.84E-13	5.44E-13	6.05E-13	6.65E-13	7.25E-13	7.25E-13
se 82	4.79E-13	5.39E-13	5.99E-13	6.58E-13	7.18E-13	7.18E-13
gd158	4.53E-13	5.10E-13	5.67E-13	6.23E-13	6.80E-13	6.80E-13
sn126	3.83E-13	4.31E-13	4.79E-13	5.27E-13	5.75E-13	5.75E-13
se 78	3.64E-13	4.09E-13	4.55E-13	5.00E-13	5.46E-13	5.46E-13
sn124	2.90E-13	3.26E-13	3.63E-13	3.99E-13	4.35E-13	4.35E-13
dy162	2.78E-13	3.13E-13	3.47E-13	3.81E-13	4.16E-13	4.16E-13
dy164	2.53E-13	2.84E-13	3.15E-13	3.47E-13	3.78E-13	3.78E-13
eu154	2.29E-13	2.60E-13	2.91E-13	3.23E-13	3.55E-13	3.55E-13
as 75	2.17E-13	2.44E-13	2.71E-13	2.98E-13	3.25E-13	3.25E-13
ag111	3.16E-13	3.15E-13	3.15E-13	3.15E-13	3.15E-13	3.15E-13
eu157	2.96E-13	2.96E-13	2.96E-13	2.96E-13	2.96E-13	2.96E-13
y 90	1.57E-13	1.77E-13	1.96E-13	2.16E-13	2.36E-13	2.36E-13
cd115m	2.13E-13	2.19E-13	2.23E-13	2.27E-13	2.29E-13	2.29E-13
zr 90	9.47E-14	1.20E-13	1.49E-13	1.81E-13	2.16E-13	2.16E-13
te125	8.63E-14	1.10E-13	1.37E-13	1.67E-13	2.00E-13	2.00E-13
sn118	1.18E-13	1.33E-13	1.48E-13	1.63E-13	1.77E-13	1.77E-13
ba136	9.98E-14	1.14E-13	1.29E-13	1.43E-13	1.57E-13	1.57E-13
cd116	1.01E-13	1.13E-13	1.26E-13	1.38E-13	1.51E-13	1.51E-13
sn122	1.01E-13	1.13E-13	1.26E-13	1.38E-13	1.51E-13	1.51E-13
sn120	7.52E-14	8.45E-14	9.39E-14	1.03E-13	1.13E-13	1.13E-13
kr 82	6.94E-14	7.82E-14	8.70E-14	9.58E-14	1.05E-13	1.05E-13
cs134	6.44E-14	7.30E-14	8.16E-14	9.03E-14	9.92E-14	9.92E-14
dy163	6.14E-14	6.90E-14	7.66E-14	8.42E-14	9.18E-14	9.18E-14
ge 73	5.88E-14	6.62E-14	7.36E-14	8.09E-14	8.83E-14	8.83E-14
ru 99	5.53E-14	6.26E-14	6.99E-14	7.73E-14	8.47E-14	8.47E-14
xe130	4.01E-14	4.51E-14	5.02E-14	5.52E-14	6.03E-14	6.03E-14
cs136	5.54E-14	5.54E-14	5.55E-14	5.55E-14	5.55E-14	5.54E-14
pm148	3.11E-14	3.53E-14	3.97E-14	4.40E-14	4.83E-14	4.82E-14
mo 96	2.90E-14	3.27E-14	3.64E-14	4.01E-14	4.37E-14	4.37E-14
ge 76	2.14E-14	2.41E-14	2.68E-14	2.94E-14	3.21E-14	3.21E-14
sn125	2.92E-14	2.92E-14	2.92E-14	2.92E-14	2.92E-14	2.92E-14
ru105	2.94E-14	2.95E-14	2.95E-14	2.95E-14	2.95E-14	2.91E-14

gd160	1.35E-14	1.51E-14	1.68E-14	1.85E-14	2.02E-14	2.02E-14		
te126	9.81E-15	1.11E-14	1.24E-14	1.37E-14	1.50E-14	1.50E-14		
rb 88	1.29E-14	1.30E-14	1.30E-14	1.30E-14	1.30E-14	1.28E-14		
i135	1.00E-14	1.02E-14	1.02E-14	1.02E-14	1.02E-14	9.98E-15		
te132	9.58E-15	9.59E-15	9.59E-15	9.59E-15	9.59E-15	9.58E-15		
ru100	5.45E-15	6.16E-15	6.87E-15	7.59E-15	8.32E-15	8.32E-15		
1	sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2						fission products	page 23
0	fraction of total absorption rate							
0	power= .00mw, burnup= 1.0mwd, flux= 2.74E+08n/cm**2-sec							
	initial 164.4 d	182.6 d	200.9 d	219.2 d	219.2 d			
sn123	5.49E-15	5.92E-15	6.31E-15	6.67E-15	6.99E-15	6.99E-15		
ho165	4.24E-15	4.77E-15	5.30E-15	5.82E-15	6.35E-15	6.35E-15		
te134	5.12E-15	5.89E-15	5.89E-15	5.89E-15	5.89E-15	4.78E-15		
sr 87	2.46E-15	2.77E-15	3.08E-15	3.39E-15	3.70E-15	3.70E-15		
in113	1.60E-15	2.03E-15	2.50E-15	3.03E-15	3.60E-15	3.60E-15		
sb126	3.01E-15	3.01E-15	3.01E-15	3.01E-15	3.01E-15	3.01E-15		
te124	1.36E-15	1.62E-15	1.89E-15	2.17E-15	2.46E-15	2.46E-15		
in117m	2.10E-15	2.10E-15	2.10E-15	2.10E-15	2.10E-15	2.10E-15		
nb 94	1.39E-15	1.57E-15	1.74E-15	1.92E-15	2.09E-15	2.09E-15		
sb124	1.71E-15	1.79E-15	1.85E-15	1.89E-15	1.93E-15	1.93E-15		
eu152	9.26E-16	1.12E-15	1.35E-15	1.61E-15	1.90E-15	1.90E-15		
ge 74	1.19E-15	1.34E-15	1.49E-15	1.64E-15	1.79E-15	1.79E-15		
ge 72	8.17E-16	9.21E-16	1.03E-15	1.13E-15	1.24E-15	1.24E-15		
sr 86	5.70E-16	6.57E-16	7.44E-16	8.31E-16	9.19E-16	9.19E-16		
se 76	4.98E-16	5.62E-16	6.25E-16	6.88E-16	7.51E-16	7.51E-16		
i130	7.11E-16	7.16E-16	7.16E-16	7.16E-16	7.16E-16	7.09E-16		
ba135	3.76E-16	4.38E-16	5.04E-16	5.73E-16	6.45E-16	6.45E-16		
in117	6.17E-16	6.17E-16	6.17E-16	6.17E-16	6.17E-16	6.16E-16		
sm148	1.76E-16	2.35E-16	3.03E-16	3.80E-16	4.66E-16	4.66E-16		
nd142	1.40E-16	1.75E-16	2.15E-16	2.58E-16	3.07E-16	3.07E-16		
gd154	1.21E-16	1.53E-16	1.90E-16	2.31E-16	2.76E-16	2.76E-16		
tb160	2.28E-16	2.40E-16	2.50E-16	2.59E-16	2.67E-16	2.67E-16		
rb 86	2.41E-16	2.42E-16	2.42E-16	2.42E-16	2.42E-16	2.42E-16		
dy165	2.07E-16	2.10E-16	2.10E-16	2.10E-16	2.10E-16	2.03E-16		
ba134	7.61E-17	9.67E-17	1.20E-16	1.46E-16	1.74E-16	1.74E-16		
er166	1.14E-16	1.29E-16	1.44E-16	1.59E-16	1.74E-16	1.74E-16		
xe128	1.11E-16	1.25E-16	1.39E-16	1.53E-16	1.67E-16	1.67E-16		
gd152	7.54E-17	8.89E-17	1.04E-16	1.21E-16	1.39E-16	1.39E-16		
pd104	4.71E-17	6.29E-17	8.13E-17	1.02E-16	1.26E-16	1.26E-16		
cd118	1.08E-16	1.21E-16	1.21E-16	1.21E-16	1.21E-16	1.02E-16		
cd110	4.94E-17	5.85E-17	6.81E-17	7.84E-17	8.93E-17	8.93E-17		
ge 75	8.31E-17	8.69E-17	8.69E-17	8.69E-17	8.69E-17	8.04E-17		
dy160	4.17E-17	5.05E-17	5.97E-17	6.93E-17	7.91E-17	7.91E-17		
kr 80	3.33E-17	3.75E-17	4.17E-17	4.59E-17	5.00E-17	5.00E-17		
br 79	1.06E-17	1.31E-17	1.60E-17	1.90E-17	2.24E-17	2.24E-17		
in119m	2.51E-17	3.02E-17	3.02E-17	3.02E-17	3.02E-17	2.17E-17		
xe129	4.82E-18	6.10E-18	7.52E-18	9.10E-18	1.08E-17	1.08E-17		
ag107	4.59E-18	5.81E-18	7.16E-18	8.66E-18	1.03E-17	1.03E-17		
te122	4.26E-18	4.82E-18	5.38E-18	5.95E-18	6.51E-18	6.51E-18		
be 9	2.67E-18	3.00E-18	3.33E-18	3.67E-18	4.00E-18	4.00E-18		
pr142	2.53E-18	2.88E-18	3.22E-18	3.57E-18	3.92E-18	3.89E-18		
nb 93	1.53E-18	1.75E-18	1.98E-18	2.23E-18	2.48E-18	2.48E-18		
sn116	1.37E-18	1.57E-18	1.78E-18	1.98E-18	2.20E-18	2.20E-18		
te123	1.14E-18	1.35E-18	1.56E-18	1.78E-18	2.01E-18	2.01E-18		
li 7	1.09E-18	1.22E-18	1.36E-18	1.49E-18	1.63E-18	1.63E-18		
er167	4.35E-19	4.89E-19	5.43E-19	6.00E-19	6.54E-19	6.54E-19		
in119	7.45E-19	2.36E-18	2.36E-18	2.36E-18	2.36E-18	3.40E-19		
cd109	3.71E-20	4.04E-20	4.38E-20	4.72E-20	5.05E-20	5.05E-20		
cd108	2.36E-20	2.36E-20	2.70E-20	3.03E-20	3.37E-20	3.37E-20		

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 24
 0 fraction of total absorption rate
 power= .00mw, burnup= 1.mwd, flux= 2.74E+08n/cm**2-sec
 0 initial 164.4 d 182.6 d 200.9 d 219.2 d 219.2 d
 cs134m 2.02E-20 2.36E-20 2.70E-20 3.03E-20 3.03E-20 3.03E-20

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 25
 0 power= 4.000E-03mw, burnup=8.7659E-01mwd, flux= 2.74E+08n/cm**2-sec
 nuclide concentrations, gram atoms
 basis = single reactor assembly

	charge	164.4 d	182.6 d	200.9 d	219.2 d	219.2 d
h 1	3.48E-08	3.91E-08	4.33E-08	4.76E-08	5.18E-08	5.18E-08
h 2	1.03E-10	1.16E-10	1.28E-10	1.41E-10	1.54E-10	1.54E-10
h 3	7.48E-13	8.39E-13	9.29E-13	1.02E-12	1.11E-12	1.11E-12
h 4	.00E+00	3.41E-36	3.78E-36	4.14E-36	4.51E-36	.00E+00
he 3	8.50E-15	1.07E-14	1.32E-14	1.59E-14	1.89E-14	1.89E-14
he 4	5.75E-09	6.45E-09	7.16E-09	7.86E-09	8.57E-09	8.57E-09
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ne 20	6.91E-10	7.75E-10	8.60E-10	9.44E-10	1.03E-09	1.03E-09
ne 21	9.88E-18	1.23E-17	1.50E-17	1.80E-17	2.12E-17	2.12E-17
ne 22	2.34E-13	2.94E-13	3.61E-13	4.34E-13	5.14E-13	5.14E-13
ne 23	5.66E-19	7.04E-15	7.04E-15	7.04E-15	7.04E-15	5.25E-21
na 22	4.28E-12	4.78E-12	5.26E-12	5.74E-12	6.22E-12	6.22E-12
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	3.05E-08	2.85E-08	2.85E-08	2.85E-08	2.85E-08	2.82E-08
na 24m	5.05E-30	4.68E-15	4.68E-15	4.68E-15	4.68E-15	4.68E-30
na 25	6.06E-32	2.44E-29	2.71E-29	2.97E-29	3.24E-29	4.81E-33
mg 24	5.81E-06	6.43E-06	7.05E-06	7.67E-06	8.29E-06	8.29E-06
mg 25	7.58E-13	8.51E-13	9.43E-13	1.04E-12	1.13E-12	1.13E-12
mg 26	1.03E-10	1.16E-10	1.28E-10	1.41E-10	1.54E-10	1.54E-10
mg 27	1.14E-12	2.10E-12	2.10E-12	2.10E-12	2.10E-12	8.34E-13
mg 28	4.30E-24	4.29E-24	4.29E-24	4.29E-24	4.29E-24	4.26E-24
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	1.67E-11	2.11E-10	2.11E-10	2.11E-10	2.11E-10	4.24E-12
al 29	9.29E-31	2.80E-30	3.42E-30	4.10E-30	4.84E-30	1.27E-30
al 30	.00E+00	2.24E-44	2.94E-44	4.34E-44	5.89E-44	.00E+00
si 28	1.62E-05	1.79E-05	1.96E-05	2.14E-05	2.31E-05	2.31E-05
si 29	8.70E-15	1.09E-14	1.33E-14	1.60E-14	1.88E-14	1.88E-14
si 30	4.90E-24	6.93E-24	9.43E-24	1.25E-23	1.61E-23	1.61E-23
si 31	3.39E-36	4.98E-36	6.78E-36	8.96E-36	1.16E-35	1.09E-35
si 32	1.40E-45	2.80E-45	4.20E-45	7.01E-45	1.12E-44	1.12E-44
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		2.74E+08	2.74E+08	2.74E+08	2.74E+08	2.74E-07

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 26
 0 power= 4.000E-03mw, burnup=8.7659E-01mwd, flux= 2.74E+08n/cm**2-sec
 nuclide concentrations, gram atoms
 basis = single reactor assembly

	charge	164.4 d	182.6 d	200.9 d	219.2 d	219.2 d
he 4	2.04E-05	2.30E-05	2.56E-05	2.81E-05	3.07E-05	3.07E-05
th226	6.08E-29	7.78E-29	9.72E-29	1.19E-28	1.43E-28	1.43E-28
th227	2.11E-15	2.77E-15	3.53E-15	4.39E-15	5.33E-15	5.34E-15
th228	8.81E-15	1.22E-14	1.64E-14	2.13E-14	2.72E-14	2.72E-14
th229	2.88E-12	3.83E-12	4.93E-12	6.18E-12	7.57E-12	7.57E-12
th230	1.02E-05	1.15E-05	1.28E-05	1.41E-05	1.53E-05	1.53E-05
th231	3.02E-09	3.02E-09	3.02E-09	3.02E-09	3.02E-09	3.02E-09
th232	2.07E-06	2.32E-06	2.58E-06	2.84E-06	3.10E-06	3.10E-06
th233	1.46E-17	2.13E-17	2.37E-17	2.61E-17	2.84E-17	1.92E-17
th234	5.29E-07	5.32E-07	5.34E-07	5.35E-07	5.36E-07	5.36E-07

pa231	3.09E-07	3.48E-07	3.87E-07	4.26E-07	4.65E-07	4.65E-07
pa232	5.29E-15	5.98E-15	6.65E-15	7.32E-15	7.99E-15	7.96E-15
pa233	1.42E-06	1.43E-06	1.44E-06	1.45E-06	1.45E-06	1.45E-06
pa234m	1.78E-11	1.79E-11	1.80E-11	1.81E-11	1.81E-11	1.81E-11
pa234	7.97E-12	8.02E-12	8.05E-12	8.06E-12	8.07E-12	8.07E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	5.89E-26	7.54E-26	9.42E-26	1.15E-25	1.38E-25	1.38E-25
u231	2.94E-21	3.41E-21	3.91E-21	4.43E-21	4.94E-21	4.94E-21
u232	6.46E-12	8.02E-12	9.75E-12	1.16E-11	1.37E-11	1.37E-11
u233	4.04E-06	4.71E-06	5.38E-06	6.06E-06	6.74E-06	6.74E-06
u234	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00
u235	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02
u236	1.74E+02	1.74E+02	1.74E+02	1.74E+02	1.74E+02	1.74E+02
u237	3.15E-06	3.12E-06	3.11E-06	3.11E-06	3.11E-06	3.11E-06
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04
u239	2.51E-07	3.19E-07	3.19E-07	3.19E-07	3.19E-07	2.19E-07
u240	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	2.01E-12	2.22E-12	2.42E-12	2.62E-12	2.81E-12	2.81E-12
np236m	2.08E-12	2.06E-12	2.06E-12	2.06E-12	2.06E-12	2.05E-12
np236	8.06E-11	9.04E-11	1.00E-10	1.10E-10	1.20E-10	1.20E-10
np237	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.22E+01
np238	1.56E-06	1.56E-06	1.56E-06	1.56E-06	1.56E-06	1.55E-06
np239	4.65E-05	4.61E-05	4.61E-05	4.61E-05	4.61E-05	4.61E-05
np240m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np240	8.63E-15	9.37E-15	9.37E-15	9.37E-15	9.37E-15	8.14E-15
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	1.12E-10	1.25E-10	1.38E-10	1.50E-10	1.63E-10	1.63E-10
pu237	4.42E-16	5.24E-16	6.08E-16	6.95E-16	7.82E-16	7.82E-16
pu238	7.35E-05	8.28E-05	9.20E-05	1.01E-04	1.11E-04	1.11E-04
pu239	1.98E-03	2.22E-03	2.47E-03	2.72E-03	2.97E-03	2.97E-03
pu240	3.83E-09	4.87E-09	6.02E-09	7.29E-09	8.69E-09	8.69E-09
pu241	1.01E-14	1.44E-14	1.98E-14	2.63E-14	3.42E-14	3.42E-14
pu242	7.79E-21	1.25E-20	1.92E-20	2.81E-20	3.99E-20	3.99E-20
pu243	1.63E-29	2.65E-29	4.05E-29	5.95E-29	8.44E-29	8.19E-29
pu244	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu245	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
totals	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04
flux		2.74E+08	2.74E+08	2.74E+08	2.74E+08	2.74E-07
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	4q array has	1 entries.				
0	54q array has	12 entries.				
1	library information...					

cross-section data taken from position number 4 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 densities
  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 densities
 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 8/28/1996 date library was produced
 0 1697 total number of nuclides in library
 0 689 number of light-element nuclides
 0 129 number of actinide nuclides
 0 879 number of fission product nuclides
 0 7993 number of nonzero off-diagonal matrix elements
 0 *****

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 page 27
 power= .00mw, burnup= 1.mwd, flux= 2.71E+08n/cm**2-sec
 basis =

(note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)

	initial	237.4 d	255.7 d	274.0 d	292.2 d	292.2 d
productions	1.134699E+06	1.134700E+06	1.134700E+06	1.134700E+06	1.134701E+06	1.134701E+06
absorptions	9.243443E+05	9.243449E+05	9.243456E+05	9.243463E+05	9.243468E+05	9.243468E+05
k infinity	1.227572E+00	1.227571E+00	1.227571E+00	1.227570E+00	1.227570E+00	1.227570E+00
	initial	237.4 d	255.7 d	274.0 d	292.2 d	292.2 d

actinide						
absorptions	9.211681E+05	9.211683E+05	9.211685E+05	9.211688E+05	9.211689E+05	9.211689E+05
non-actinide						
abs. fracs.	3.436208E-03	3.436625E-03	3.437161E-03	3.437579E-03	3.437996E-03	3.437996E-03

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 page 28

0 fraction of total absorption rate
 power= .00mw, burnup= 1.mwd, flux= 2.71E+08n/cm**2-sec
 0 initial 237.4 d 255.7 d 274.0 d 292.2 d 292.2 d

sm149	4.43E-06	4.81E-06	5.18E-06	5.56E-06	5.93E-06	5.93E-06
xe135	2.33E-06	2.33E-06	2.33E-06	2.33E-06	2.33E-06	2.33E-06
sm151	2.04E-07	2.21E-07	2.39E-07	2.56E-07	2.73E-07	2.73E-07
nd143	9.07E-08	9.91E-08	1.07E-07	1.16E-07	1.24E-07	1.24E-07
gd157	4.78E-08	5.18E-08	5.58E-08	5.97E-08	6.37E-08	6.37E-08
cd113	3.95E-08	4.28E-08	4.61E-08	4.94E-08	5.27E-08	5.27E-08
pm147	3.72E-08	4.03E-08	4.33E-08	4.63E-08	4.93E-08	4.93E-08
rh103	3.09E-08	3.43E-08	3.77E-08	4.11E-08	4.45E-08	4.45E-08

xe131	2.69E-08	2.93E-08	3.17E-08	3.40E-08	3.64E-08	3.64E-08
cs133	2.27E-08	2.46E-08	2.66E-08	2.86E-08	3.06E-08	3.06E-08
tc 99	1.60E-08	1.73E-08	1.87E-08	2.01E-08	2.14E-08	2.14E-08
eu155	1.35E-08	1.46E-08	1.56E-08	1.67E-08	1.77E-08	1.77E-08
nd145	1.27E-08	1.38E-08	1.48E-08	1.59E-08	1.69E-08	1.69E-08
sm152	6.56E-09	7.11E-09	7.65E-09	8.20E-09	8.75E-09	8.75E-09
rh105	8.37E-09	8.36E-09	8.36E-09	8.36E-09	8.36E-09	8.36E-09
kr 83	5.46E-09	5.91E-09	6.37E-09	6.82E-09	7.28E-09	7.28E-09
cs135	5.04E-09	5.47E-09	5.89E-09	6.31E-09	6.73E-09	6.73E-09
mo 95	3.72E-09	4.32E-09	4.94E-09	5.57E-09	6.22E-09	6.22E-09
ru101	3.80E-09	4.12E-09	4.44E-09	4.75E-09	5.07E-09	5.07E-09
gd155	2.61E-09	3.05E-09	3.53E-09	4.04E-09	4.58E-09	4.58E-09
eu153	3.29E-09	3.57E-09	3.85E-09	4.13E-09	4.40E-09	4.40E-09
pr141	2.94E-09	3.25E-09	3.56E-09	3.87E-09	4.18E-09	4.18E-09
la139	3.03E-09	3.28E-09	3.53E-09	3.79E-09	4.04E-09	4.04E-09
pr143	2.88E-09	2.88E-09	2.88E-09	2.88E-09	2.88E-09	2.88E-09
xe133	2.07E-09	2.07E-09	2.07E-09	2.07E-09	2.07E-09	2.07E-09
sm147	1.06E-09	1.25E-09	1.46E-09	1.68E-09	1.92E-09	1.92E-09
pd105	1.40E-09	1.52E-09	1.64E-09	1.75E-09	1.87E-09	1.87E-09
zr 93	1.25E-09	1.36E-09	1.46E-09	1.57E-09	1.67E-09	1.67E-09
ce141	1.61E-09	1.61E-09	1.62E-09	1.62E-09	1.62E-09	1.62E-09
i129	9.03E-10	9.81E-10	1.06E-09	1.14E-09	1.22E-09	1.22E-09
pm149	9.82E-10	9.82E-10	9.82E-10	9.82E-10	9.82E-10	9.82E-10
nd147	9.31E-10	9.31E-10	9.32E-10	9.32E-10	9.32E-10	9.31E-10
mo 97	6.83E-10	7.40E-10	7.97E-10	8.54E-10	9.11E-10	9.11E-10
ag109	4.71E-10	5.11E-10	5.50E-10	5.89E-10	6.29E-10	6.29E-10
eu151	3.49E-10	4.10E-10	4.76E-10	5.47E-10	6.22E-10	6.22E-10
ru102	2.78E-10	3.02E-10	3.25E-10	3.48E-10	3.71E-10	3.71E-10
ru103	3.51E-10	3.53E-10	3.54E-10	3.55E-10	3.56E-10	3.56E-10
nd144	2.04E-10	2.36E-10	2.70E-10	3.06E-10	3.44E-10	3.44E-10
sr 90	2.53E-10	2.74E-10	2.95E-10	3.16E-10	3.37E-10	3.37E-10
ce142	2.52E-10	2.73E-10	2.95E-10	3.16E-10	3.37E-10	3.37E-10
nd148	2.41E-10	2.61E-10	2.81E-10	3.01E-10	3.21E-10	3.21E-10
zr 91	2.10E-10	2.36E-10	2.61E-10	2.87E-10	3.14E-10	3.14E-10
y 89	2.12E-10	2.37E-10	2.61E-10	2.87E-10	3.12E-10	3.12E-10
ce144	2.50E-10	2.65E-10	2.80E-10	2.94E-10	3.07E-10	3.07E-10
nd146	2.03E-10	2.20E-10	2.37E-10	2.53E-10	2.70E-10	2.70E-10
ba138	1.73E-10	1.88E-10	2.02E-10	2.17E-10	2.31E-10	2.31E-10
in115	1.64E-10	1.78E-10	1.92E-10	2.06E-10	2.20E-10	2.20E-10
pd108	1.61E-10	1.74E-10	1.87E-10	2.01E-10	2.14E-10	2.14E-10
ce140	1.55E-10	1.69E-10	1.83E-10	1.98E-10	2.12E-10	2.12E-10

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2

fission products

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0 fraction of total absorption rate
 power= .00mw, burnup= 1.mwd, flux= 2.71E+08n/cm**2-sec
 0 initial 237.4 d 255.7 d 274.0 d 292.2 d 292.2 d

xe132	1.43E-10	1.55E-10	1.67E-10	1.79E-10	1.91E-10	1.91E-10
zr 95	1.50E-10	1.53E-10	1.55E-10	1.57E-10	1.58E-10	1.58E-10
y 91	1.35E-10	1.37E-10	1.39E-10	1.41E-10	1.42E-10	1.42E-10
nb 95	1.24E-10	1.29E-10	1.33E-10	1.37E-10	1.40E-10	1.40E-10
mo 98	9.96E-11	1.08E-10	1.16E-10	1.25E-10	1.33E-10	1.33E-10
mo100	9.66E-11	1.05E-10	1.13E-10	1.21E-10	1.29E-10	1.29E-10
pd107	9.60E-11	1.04E-10	1.12E-10	1.20E-10	1.28E-10	1.28E-10
xe134	9.58E-11	1.04E-10	1.12E-10	1.20E-10	1.28E-10	1.28E-10
pm151	1.10E-10	1.11E-10	1.11E-10	1.11E-10	1.11E-10	1.10E-10
zr 92	7.84E-11	8.50E-11	9.15E-11	9.81E-11	1.05E-10	1.05E-10
zr 96	6.05E-11	6.55E-11	7.05E-11	7.56E-11	8.06E-11	8.06E-11
ru104	5.95E-11	6.44E-11	6.93E-11	7.43E-11	7.92E-11	7.93E-11
i127	5.65E-11	6.16E-11	6.67E-11	7.19E-11	7.71E-11	7.71E-11
nd150	5.33E-11	5.77E-11	6.22E-11	6.66E-11	7.10E-11	7.10E-11

cs137	5.20E-11	5.63E-11	6.06E-11	6.49E-11	6.92E-11	6.92E-11
xe136	5.17E-11	5.60E-11	6.03E-11	6.46E-11	6.89E-11	6.89E-11
br 81	3.87E-11	4.19E-11	4.51E-11	4.84E-11	5.16E-11	5.16E-11
ba140	4.75E-11	4.76E-11	4.76E-11	4.76E-11	4.76E-11	4.75E-11
zr 94	3.27E-11	3.54E-11	3.82E-11	4.09E-11	4.36E-11	4.36E-11
rb 85	3.02E-11	3.28E-11	3.53E-11	3.79E-11	4.04E-11	4.04E-11
sm153	3.82E-11	3.82E-11	3.82E-11	3.82E-11	3.82E-11	3.82E-11
eu156	3.48E-11	3.48E-11	3.48E-11	3.48E-11	3.48E-11	3.48E-11
cd111	2.38E-11	2.59E-11	2.80E-11	3.01E-11	3.21E-11	3.21E-11
te130	2.35E-11	2.55E-11	2.74E-11	2.94E-11	3.13E-11	3.13E-11
sr 89	2.94E-11	2.98E-11	3.01E-11	3.03E-11	3.04E-11	3.04E-11
sm154	2.27E-11	2.46E-11	2.65E-11	2.84E-11	3.03E-11	3.03E-11
kr 85	2.23E-11	2.41E-11	2.59E-11	2.77E-11	2.95E-11	2.95E-11
rb 87	2.19E-11	2.38E-11	2.56E-11	2.74E-11	2.92E-11	2.92E-11
se 77	1.74E-11	1.89E-11	2.03E-11	2.18E-11	2.33E-11	2.33E-11
kr 87	2.09E-11	2.32E-11	2.32E-11	2.32E-11	2.32E-11	2.01E-11
ba137	1.02E-11	1.19E-11	1.38E-11	1.58E-11	1.80E-11	1.80E-11
ce143	1.76E-11	1.76E-11	1.76E-11	1.76E-11	1.76E-11	1.76E-11
la140	1.62E-11	1.62E-11	1.62E-11	1.62E-11	1.62E-11	1.62E-11
kr 84	1.03E-11	1.11E-11	1.20E-11	1.29E-11	1.37E-11	1.37E-11
mo 99	1.31E-11	1.32E-11	1.32E-11	1.32E-11	1.32E-11	1.31E-11
sb121	8.11E-12	8.79E-12	9.47E-12	1.02E-11	1.08E-11	1.08E-11
se 79	7.99E-12	8.66E-12	9.32E-12	9.99E-12	1.07E-11	1.07E-11
ru106	8.46E-12	9.02E-12	9.56E-12	1.01E-11	1.06E-11	1.06E-11
sb123	5.77E-12	6.27E-12	6.76E-12	7.26E-12	7.76E-12	7.76E-12
kr 86	5.77E-12	6.25E-12	6.73E-12	7.22E-12	7.70E-12	7.70E-12
te128	5.13E-12	5.56E-12	5.98E-12	6.41E-12	6.84E-12	6.84E-12
i131	6.81E-12	6.81E-12	6.81E-12	6.81E-12	6.81E-12	6.81E-12
te127m	5.55E-12	5.76E-12	5.95E-12	6.12E-12	6.27E-12	6.27E-12
sm150	2.92E-12	3.42E-12	3.96E-12	4.54E-12	5.15E-12	5.15E-12
se 80	3.72E-12	4.03E-12	4.34E-12	4.65E-12	4.96E-12	4.96E-12
gd156	3.59E-12	3.92E-12	4.26E-12	4.59E-12	4.92E-12	4.92E-12
dy161	3.06E-12	3.33E-12	3.59E-12	3.86E-12	4.13E-12	4.13E-12
pd106	1.97E-12	2.29E-12	2.62E-12	2.98E-12	3.35E-12	3.35E-12
tb159	2.30E-12	2.49E-12	2.68E-12	2.87E-12	3.06E-12	3.06E-12

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 0 fraction of total absorption rate
 0 power= .00mw, burnup= 1.mwd, flux= 2.71E+08n/cm**2-sec
 initial 237.4 d 255.7 d 274.0 d 292.2 d 292.2 d

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li 6	2.12E-12	2.30E-12	2.47E-12	2.65E-12	2.83E-12	2.83E-12
cd112	2.11E-12	2.29E-12	2.46E-12	2.64E-12	2.81E-12	2.81E-12
sb125	2.07E-12	2.23E-12	2.39E-12	2.55E-12	2.71E-12	2.71E-12
sn117	1.67E-12	1.81E-12	1.95E-12	2.09E-12	2.23E-12	2.23E-12
sn119	1.37E-12	1.49E-12	1.60E-12	1.72E-12	1.83E-12	1.83E-12
te129m	1.80E-12	1.81E-12	1.81E-12	1.81E-12	1.82E-12	1.82E-12
sn115	1.26E-12	1.37E-12	1.47E-12	1.58E-12	1.68E-12	1.68E-12
sr 88	1.06E-12	1.15E-12	1.24E-12	1.33E-12	1.41E-12	1.41E-12
pm148m	9.56E-13	1.06E-12	1.17E-12	1.28E-12	1.39E-12	1.39E-12
pd110	7.46E-13	8.08E-13	8.71E-13	9.33E-13	9.95E-13	9.95E-13
cd114	7.24E-13	7.84E-13	8.44E-13	9.05E-13	9.65E-13	9.65E-13
se 82	7.19E-13	7.79E-13	8.39E-13	8.99E-13	9.59E-13	9.59E-13
gd158	6.79E-13	7.36E-13	7.92E-13	8.49E-13	9.06E-13	9.06E-13
sn126	5.76E-13	6.25E-13	6.73E-13	7.21E-13	7.69E-13	7.69E-13
se 78	5.46E-13	5.92E-13	6.37E-13	6.83E-13	7.28E-13	7.28E-13
sn124	4.34E-13	4.70E-13	5.07E-13	5.43E-13	5.79E-13	5.79E-13
dy162	4.16E-13	4.50E-13	4.85E-13	5.19E-13	5.53E-13	5.53E-13
dy164	3.79E-13	4.10E-13	4.41E-13	4.73E-13	5.04E-13	5.04E-13
eu154	3.56E-13	3.88E-13	4.21E-13	4.55E-13	4.89E-13	4.89E-13
as 75	3.25E-13	3.53E-13	3.80E-13	4.07E-13	4.34E-13	4.34E-13

zr 90	2.17E-13	2.55E-13	2.96E-13	3.41E-13	3.88E-13	3.88E-13
te125	2.00E-13	2.36E-13	2.75E-13	3.16E-13	3.61E-13	3.61E-13
y 90	2.37E-13	2.57E-13	2.77E-13	2.96E-13	3.16E-13	3.16E-13
ag111	3.15E-13	3.15E-13	3.15E-13	3.15E-13	3.15E-13	3.15E-13
eu157	2.96E-13	2.97E-13	2.97E-13	2.97E-13	2.97E-13	2.95E-13
sn118	1.77E-13	1.92E-13	2.06E-13	2.21E-13	2.36E-13	2.36E-13
cd115m	2.30E-13	2.32E-13	2.33E-13	2.34E-13	2.35E-13	2.35E-13
ba136	1.57E-13	1.72E-13	1.86E-13	2.00E-13	2.15E-13	2.15E-13
sn122	1.51E-13	1.64E-13	1.76E-13	1.89E-13	2.01E-13	2.01E-13
cd116	1.51E-13	1.63E-13	1.76E-13	1.88E-13	2.01E-13	2.01E-13
sn120	1.13E-13	1.22E-13	1.31E-13	1.41E-13	1.50E-13	1.50E-13
kr 82	1.05E-13	1.14E-13	1.22E-13	1.31E-13	1.40E-13	1.40E-13
cs134	9.93E-14	1.08E-13	1.17E-13	1.26E-13	1.36E-13	1.36E-13
dy163	9.19E-14	9.95E-14	1.07E-13	1.15E-13	1.22E-13	1.22E-13
ge 73	8.84E-14	9.58E-14	1.03E-13	1.11E-13	1.18E-13	1.18E-13
ru 99	8.46E-14	9.20E-14	9.95E-14	1.07E-13	1.15E-13	1.15E-13
xe130	6.04E-14	6.54E-14	7.05E-14	7.56E-14	8.06E-14	8.06E-14
pm148	4.81E-14	5.23E-14	5.64E-14	6.05E-14	6.45E-14	6.44E-14
mo 96	4.37E-14	4.74E-14	5.11E-14	5.47E-14	5.84E-14	5.84E-14
cs136	5.54E-14	5.54E-14	5.54E-14	5.54E-14	5.54E-14	5.54E-14
ge 76	3.21E-14	3.48E-14	3.75E-14	4.02E-14	4.29E-14	4.29E-14
sn125	2.91E-14	2.92E-14	2.92E-14	2.92E-14	2.92E-14	2.91E-14
ru105	2.91E-14	2.94E-14	2.94E-14	2.94E-14	2.94E-14	2.89E-14
gd160	2.02E-14	2.18E-14	2.35E-14	2.52E-14	2.69E-14	2.69E-14
te126	1.50E-14	1.63E-14	1.76E-14	1.89E-14	2.02E-14	2.02E-14
rb 88	1.28E-14	1.30E-14	1.30E-14	1.30E-14	1.30E-14	1.27E-14
ru100	8.33E-15	9.07E-15	9.81E-15	1.06E-14	1.13E-14	1.13E-14
i135	1.00E-14	1.02E-14	1.02E-14	1.02E-14	1.02E-14	9.92E-15
te132	9.59E-15	9.60E-15	9.61E-15	9.61E-15	9.61E-15	9.59E-15

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 0 fraction of total absorption rate
 0 power= .00mw, burnup= 1.mwd, flux= 2.71E+08n/cm**2-sec
 initial 237.4 d 255.7 d 274.0 d 292.2 d

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ho165	6.35E-15	6.88E-15	7.41E-15	7.93E-15	8.46E-15	8.46E-15
sn123	6.97E-15	7.26E-15	7.52E-15	7.76E-15	7.98E-15	7.98E-15
in113	3.60E-15	4.22E-15	4.89E-15	5.61E-15	6.38E-15	6.38E-15
sr 87	3.70E-15	4.01E-15	4.32E-15	4.63E-15	4.93E-15	4.93E-15
te134	4.79E-15	5.90E-15	5.90E-15	5.90E-15	5.90E-15	4.46E-15
te124	2.47E-15	2.76E-15	3.05E-15	3.35E-15	3.65E-15	3.65E-15
eu152	1.91E-15	2.24E-15	2.62E-15	3.04E-15	3.51E-15	3.51E-15
sb126	3.01E-15	3.02E-15	3.02E-15	3.02E-15	3.02E-15	3.02E-15
nb 94	2.09E-15	2.26E-15	2.44E-15	2.61E-15	2.78E-15	2.78E-15
ge 74	1.79E-15	1.94E-15	2.09E-15	2.24E-15	2.39E-15	2.39E-15
in117m	2.10E-15	2.10E-15	2.10E-15	2.10E-15	2.10E-15	2.10E-15
sb124	1.93E-15	1.97E-15	1.99E-15	2.01E-15	2.03E-15	2.03E-15
ge 72	1.24E-15	1.34E-15	1.45E-15	1.55E-15	1.66E-15	1.66E-15
sr 86	9.20E-16	1.01E-15	1.10E-15	1.18E-15	1.27E-15	1.27E-15
se 76	7.52E-16	8.15E-16	8.79E-16	9.42E-16	1.00E-15	1.00E-15
ba135	6.45E-16	7.21E-16	8.01E-16	8.83E-16	9.69E-16	9.69E-16
sm148	4.66E-16	5.61E-16	6.64E-16	7.77E-16	8.99E-16	8.99E-16
i130	7.10E-16	7.17E-16	7.17E-16	7.17E-16	7.17E-16	7.08E-16
in117	6.18E-16	6.18E-16	6.18E-16	6.18E-16	6.18E-16	6.17E-16
nd142	3.07E-16	3.60E-16	4.18E-16	4.80E-16	5.46E-16	5.46E-16
gd154	2.76E-16	3.26E-16	3.79E-16	4.38E-16	5.00E-16	5.00E-16
ba134	1.74E-16	2.05E-16	2.39E-16	2.75E-16	3.14E-16	3.14E-16
tb160	2.67E-16	2.74E-16	2.79E-16	2.84E-16	2.88E-16	2.88E-16
pd104	1.26E-16	1.52E-16	1.81E-16	2.13E-16	2.47E-16	2.47E-16
rb 86	2.42E-16	2.43E-16	2.43E-16	2.43E-16	2.43E-16	2.43E-16
gd152	1.39E-16	1.60E-16	1.83E-16	2.08E-16	2.35E-16	2.35E-16

er166	1.74E-16	1.89E-16	2.04E-16	2.19E-16	2.34E-16	2.34E-16
xe128	1.67E-16	1.81E-16	1.95E-16	2.09E-16	2.23E-16	2.23E-16
dy165	2.03E-16	2.10E-16	2.10E-16	2.10E-16	2.10E-16	1.99E-16
cd110	8.94E-17	1.01E-16	1.13E-16	1.25E-16	1.38E-16	1.38E-16
dy160	7.91E-17	8.92E-17	9.95E-17	1.10E-16	1.21E-16	1.21E-16
cd118	1.02E-16	1.21E-16	1.21E-16	1.21E-16	1.21E-16	9.61E-17
ge 75	8.06E-17	8.71E-17	8.71E-17	8.71E-17	8.71E-17	7.78E-17
kr 80	5.01E-17	5.43E-17	5.85E-17	6.27E-17	6.69E-17	6.69E-17
br 79	2.24E-17	2.60E-17	2.99E-17	3.41E-17	3.85E-17	3.85E-17
xe129	1.08E-17	1.27E-17	1.48E-17	1.70E-17	1.93E-17	1.93E-17
in119m	2.17E-17	3.03E-17	3.03E-17	3.03E-17	3.03E-17	1.85E-17
ag107	1.03E-17	1.21E-17	1.40E-17	1.61E-17	1.83E-17	1.83E-17
te122	6.51E-18	7.08E-18	7.65E-18	8.23E-18	8.81E-18	8.81E-18
be 9	3.99E-18	4.32E-18	4.65E-18	4.98E-18	5.32E-18	5.32E-18
pr142	3.90E-18	4.28E-18	4.63E-18	4.98E-18	5.33E-18	5.28E-18
nb 93	2.48E-18	2.76E-18	3.04E-18	3.35E-18	3.67E-18	3.67E-18
sn116	2.19E-18	2.42E-18	2.64E-18	2.88E-18	3.12E-18	3.12E-18
te123	2.01E-18	2.25E-18	2.49E-18	2.74E-18	2.99E-18	2.99E-18
li 7	1.63E-18	1.77E-18	1.90E-18	2.04E-18	2.18E-18	2.18E-18
er167	6.55E-19	7.09E-19	7.63E-19	8.17E-19	8.74E-19	8.74E-19
in119	3.41E-19	2.37E-18	2.37E-18	2.37E-18	2.37E-18	1.65E-19
cd109	5.06E-20	5.74E-20	6.07E-20	6.41E-20	6.75E-20	6.75E-20
cd108	3.37E-20	3.71E-20	3.71E-20	4.05E-20	4.39E-20	4.39E-20

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 32

0 fraction of total absorption rate
 power= .00mw, burnup= 1.mwd, flux= 2.71E+08n/cm**2-sec
 0 initial 237.4 d 255.7 d 274.0 d 292.2 d 292.2 d

cs134m	3.04E-20	3.37E-20	3.71E-20	4.05E-20	4.39E-20	4.05E-20
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1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 33

0 power= 4.000E-03mw, burnup=1.1688E+00mwd, flux= 2.71E+08n/cm**2-sec
 nuclide concentrations, gram atoms
 basis = single reactor assembly

h 1	charge	237.4 d	255.7 d	274.0 d	292.2 d	292.2 d
h 2	5.18E-08	5.61E-08	6.03E-08	6.46E-08	6.88E-08	6.88E-08
h 3	1.54E-10	1.66E-10	1.79E-10	1.92E-10	2.04E-10	2.04E-10
h 4	1.11E-12	1.20E-12	1.29E-12	1.38E-12	1.46E-12	1.46E-12
he 3	.00E+00	4.87E-36	5.24E-36	5.60E-36	5.96E-36	.00E+00
he 4	1.89E-14	2.22E-14	2.57E-14	2.94E-14	3.34E-14	3.34E-14
he 6	8.57E-09	9.27E-09	9.97E-09	1.07E-08	1.14E-08	1.14E-08
ne 20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ne 21	1.03E-09	1.11E-09	1.20E-09	1.28E-09	1.37E-09	1.37E-09
ne 22	2.12E-17	2.46E-17	2.82E-17	3.21E-17	3.62E-17	3.62E-17
ne 23	5.14E-13	6.00E-13	6.92E-13	7.90E-13	8.94E-13	8.94E-13
na 22	5.25E-21	7.03E-15	7.03E-15	7.03E-15	7.03E-15	4.64E-23
na 23	6.22E-12	6.68E-12	7.14E-12	7.60E-12	8.04E-12	8.04E-12
na 24	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 25	2.82E-08	2.77E-08	2.77E-08	2.77E-08	2.77E-08	2.73E-08
na 24m	4.68E-30	4.55E-15	4.55E-15	4.55E-15	4.55E-15	4.55E-30
na 25	4.81E-33	3.49E-29	3.75E-29	4.02E-29	4.28E-29	3.31E-34
mg 24	8.29E-06	8.89E-06	9.49E-06	1.01E-05	1.07E-05	1.07E-05
mg 25	1.13E-12	1.22E-12	1.32E-12	1.41E-12	1.50E-12	1.50E-12
mg 26	1.54E-10	1.66E-10	1.79E-10	1.92E-10	2.04E-10	2.04E-10
mg 27	8.34E-13	2.10E-12	2.10E-12	2.10E-12	2.10E-12	6.11E-13
mg 28	4.26E-24	4.29E-24	4.29E-24	4.29E-24	4.29E-24	4.25E-24
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	4.24E-12	2.05E-10	2.05E-10	2.05E-10	2.05E-10	1.11E-12
al 29	1.27E-30	5.60E-30	6.44E-30	7.34E-30	8.29E-30	1.40E-30
al 30	.00E+00	7.29E-44	8.69E-44	1.02E-43	1.23E-43	.00E+00

	si 28	2.31E-05	2.48E-05	2.64E-05	2.81E-05	2.98E-05	2.98E-05
	si 29	1.88E-14	2.19E-14	2.52E-14	2.87E-14	3.25E-14	3.25E-14
	si 30	1.61E-23	2.03E-23	2.52E-23	3.08E-23	3.71E-23	3.71E-23
	si 31	1.09E-35	1.46E-35	1.81E-35	2.21E-35	2.67E-35	2.48E-35
	si 32	1.12E-44	1.54E-44	2.10E-44	2.80E-44	3.64E-44	3.64E-44
0	totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
1	flux		2.71E+08	2.71E+08	2.71E+08	2.71E+08	2.71E-07

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 power= 4.000E-03mw, burnup=1.1688E+00mwd, flux= 2.71E+08n/cm**2-sec

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0 nuclide concentrations, gram atoms
 1 basis = single reactor assembly

	charge	237.4 d	255.7 d	274.0 d	292.2 d	292.2 d
he 4	3.07E-05	3.33E-05	3.59E-05	3.85E-05	4.11E-05	4.11E-05
ra222	2.97E-30	3.45E-30	4.01E-30	4.62E-30	5.28E-30	5.35E-30
ra223	2.81E-15	3.40E-15	4.05E-15	4.76E-15	5.53E-15	5.53E-15
ra224	1.33E-16	1.67E-16	2.06E-16	2.51E-16	3.01E-16	3.01E-16
ra225	3.11E-17	3.82E-17	4.60E-17	5.46E-17	6.39E-17	6.39E-17
ra226	4.23E-11	4.96E-11	5.76E-11	6.61E-11	7.52E-11	7.52E-11
ra228	4.48E-17	5.24E-17	6.07E-17	6.95E-17	7.90E-17	7.90E-17
th226	1.43E-28	1.68E-28	1.96E-28	2.26E-28	2.58E-28	2.57E-28
th227	5.34E-15	6.38E-15	7.51E-15	8.74E-15	1.01E-14	1.01E-14
th228	2.72E-14	3.39E-14	4.17E-14	5.05E-14	6.05E-14	6.05E-14
th229	7.57E-12	9.11E-12	1.08E-11	1.26E-11	1.46E-11	1.46E-11
th230	1.53E-05	1.66E-05	1.79E-05	1.92E-05	2.04E-05	2.04E-05
th231	3.02E-09	3.02E-09	3.02E-09	3.02E-09	3.02E-09	3.02E-09
th232	3.10E-06	3.36E-06	3.61E-06	3.87E-06	4.13E-06	4.13E-06
th233	1.92E-17	3.08E-17	3.31E-17	3.55E-17	3.79E-17	2.24E-17
th234	5.36E-07	5.36E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	4.65E-07	5.04E-07	5.43E-07	5.82E-07	6.21E-07	6.21E-07
pa232	7.96E-15	8.66E-15	9.33E-15	1.00E-14	1.07E-14	1.06E-14
pa233	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.46E-06	1.46E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.07E-12	8.08E-12	8.08E-12	8.09E-12	8.09E-12	8.09E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	1.38E-25	1.63E-25	1.90E-25	2.19E-25	2.49E-25	2.49E-25
u231	4.94E-21	5.43E-21	5.94E-21	6.46E-21	6.97E-21	6.96E-21
u232	1.37E-11	1.59E-11	1.82E-11	2.07E-11	2.33E-11	2.33E-11
u233	6.74E-06	7.42E-06	8.10E-06	8.79E-06	9.47E-06	9.47E-06
u234	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00
u235	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02
u236	1.74E+02	1.74E+02	1.74E+02	1.74E+02	1.74E+02	1.74E+02
u237	3.11E-06	3.10E-06	3.10E-06	3.10E-06	3.10E-06	3.09E-06
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04
u239	2.19E-07	3.18E-07	3.18E-07	3.18E-07	3.18E-07	1.93E-07
u240	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	2.81E-12	2.99E-12	3.17E-12	3.34E-12	3.51E-12	3.51E-12
np236m	2.05E-12	2.05E-12	2.05E-12	2.05E-12	2.05E-12	2.03E-12
np236	1.20E-10	1.29E-10	1.39E-10	1.49E-10	1.59E-10	1.59E-10
np237	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.22E+01
np238	1.55E-06	1.55E-06	1.55E-06	1.55E-06	1.55E-06	1.55E-06
np239	4.61E-05	4.59E-05	4.59E-05	4.59E-05	4.59E-05	4.59E-05
np240m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np240	8.14E-15	9.33E-15	9.33E-15	9.33E-15	9.33E-15	7.73E-15
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	1.63E-10	1.75E-10	1.87E-10	1.99E-10	2.11E-10	2.11E-10
pu237	7.82E-16	8.69E-16	9.57E-16	1.05E-15	1.14E-15	1.14E-15
pu238	1.11E-04	1.20E-04	1.29E-04	1.38E-04	1.48E-04	1.48E-04
pu239	2.97E-03	3.22E-03	3.46E-03	3.71E-03	3.96E-03	3.96E-03

pu240	8.69E-09	1.02E-08	1.18E-08	1.36E-08	1.55E-08	1.55E-08
pu241	3.42E-14	4.35E-14	5.43E-14	6.68E-14	8.10E-14	8.10E-14
pu242	3.99E-20	5.50E-20	7.41E-20	9.77E-20	1.27E-19	1.27E-19

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
power= 4.000E-03mw, burnup=1.1688E+00mwd, flux= 2.71E+08n/cm**2-sec

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nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	237.4 d	255.7 d	274.0 d	292.2 d	292.2 d
pu243	8.19E-29	1.16E-28	1.56E-28	2.06E-28	2.66E-28	2.56E-28
pu244	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu245	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
totals	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04
flux		2.71E+08	2.71E+08	2.71E+08	2.71E+08	2.71E+07

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 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 5
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 densities
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 densities
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 8/28/1996 date library was produced
0 1697 total number of nuclides in library
0 689 number of light-element nuclides
0 129 number of actinide nuclides
0 879 number of fission product nuclides
0 7993 number of nonzero off-diagonal matrix elements
0 *****

```

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 page 36
 power= .00mw, burnup= 1.mwd, flux= 2.70E+08n/cm**2-sec

0 (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)

	initial	310.5 d	328.8 d	347.0 d	365.3 d
productions	1.138348E+06	1.138348E+06	1.138348E+06	1.138349E+06	1.138349E+06
absorptions	9.268934E+05	9.268941E+05	9.268948E+05	9.268954E+05	9.268959E+05
k infinity	1.228132E+00	1.228132E+00	1.228131E+00	1.228131E+00	1.228130E+00

	initial	310.5 d	328.8 d	347.0 d	365.3 d
actinide absorptions	9.237305E+05	9.237308E+05	9.237310E+05	9.237313E+05	9.237315E+05
non-actinide abs. fracs.	3.412426E-03	3.412783E-03	3.413260E-03	3.413677E-03	3.414035E-03

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 page 37
 fraction of total absorption rate

0 power= .00mw, burnup= 1.mwd, flux= 2.70E+08n/cm**2-sec
 initial 310.5 d 328.8 d 347.0 d 365.3 d

sm149	5.94E-06	6.31E-06	6.69E-06	7.06E-06	7.44E-06
xe135	2.33E-06	2.34E-06	2.34E-06	2.34E-06	2.34E-06
sm151	2.73E-07	2.90E-07	3.07E-07	3.24E-07	3.41E-07
nd143	1.24E-07	1.33E-07	1.41E-07	1.49E-07	1.58E-07
gd157	6.38E-08	6.77E-08	7.17E-08	7.57E-08	7.97E-08
cd113	5.27E-08	5.60E-08	5.93E-08	6.26E-08	6.59E-08
pm147	4.93E-08	5.22E-08	5.51E-08	5.79E-08	6.07E-08
rh103	4.45E-08	4.79E-08	5.14E-08	5.48E-08	5.82E-08
xe131	3.64E-08	3.88E-08	4.11E-08	4.35E-08	4.59E-08
cs133	3.05E-08	3.25E-08	3.45E-08	3.64E-08	3.84E-08
tc 99	2.14E-08	2.28E-08	2.41E-08	2.55E-08	2.68E-08
eu155	1.77E-08	1.87E-08	1.98E-08	2.08E-08	2.18E-08
nd145	1.69E-08	1.80E-08	1.91E-08	2.01E-08	2.12E-08
sm152	8.74E-09	9.29E-09	9.84E-09	1.04E-08	1.09E-08
kr 83	7.28E-09	7.74E-09	8.19E-09	8.65E-09	9.10E-09
mo 95	6.22E-09	6.88E-09	7.55E-09	8.23E-09	8.92E-09
cs135	6.73E-09	7.15E-09	7.57E-09	8.00E-09	8.42E-09
rh105	8.37E-09	8.37E-09	8.37E-09	8.37E-09	8.37E-09
gd155	4.59E-09	5.17E-09	5.78E-09	6.42E-09	7.10E-09
ru101	5.07E-09	5.38E-09	5.70E-09	6.02E-09	6.33E-09
eu153	4.40E-09	4.68E-09	4.96E-09	5.24E-09	5.51E-09
pr141	4.18E-09	4.49E-09	4.81E-09	5.12E-09	5.43E-09
la139	4.04E-09	4.29E-09	4.55E-09	4.80E-09	5.05E-09
sm147	1.92E-09	2.17E-09	2.44E-09	2.72E-09	3.01E-09
pr143	2.88E-09	2.88E-09	2.88E-09	2.88E-09	2.88E-09
pd105	1.87E-09	1.99E-09	2.11E-09	2.23E-09	2.34E-09
zr 93	1.67E-09	1.78E-09	1.88E-09	1.99E-09	2.09E-09
xe133	2.07E-09	2.07E-09	2.07E-09	2.07E-09	2.07E-09
ce141	1.62E-09	1.62E-09	1.62E-09	1.63E-09	1.63E-09
i129	1.22E-09	1.30E-09	1.37E-09	1.45E-09	1.53E-09
mo 97	9.12E-10	9.69E-10	1.03E-09	1.08E-09	1.14E-09
pm149	9.82E-10	9.82E-10	9.82E-10	9.82E-10	9.82E-10

eu151	6.22E-10	7.03E-10	7.88E-10	8.78E-10	9.73E-10
nd147	9.31E-10	9.31E-10	9.31E-10	9.31E-10	9.31E-10
ag109	6.28E-10	6.67E-10	7.07E-10	7.46E-10	7.85E-10
nd144	3.44E-10	3.83E-10	4.24E-10	4.66E-10	5.10E-10
ru102	3.71E-10	3.95E-10	4.18E-10	4.41E-10	4.64E-10
ce142	3.37E-10	3.58E-10	3.79E-10	4.00E-10	4.21E-10
zr 91	3.14E-10	3.40E-10	3.67E-10	3.94E-10	4.21E-10
sr 90	3.37E-10	3.58E-10	3.79E-10	4.00E-10	4.20E-10
y 89	3.12E-10	3.37E-10	3.63E-10	3.89E-10	4.14E-10
nd148	3.21E-10	3.42E-10	3.62E-10	3.82E-10	4.02E-10
ru103	3.56E-10	3.57E-10	3.57E-10	3.57E-10	3.58E-10
ce144	3.07E-10	3.20E-10	3.33E-10	3.45E-10	3.56E-10
nd146	2.70E-10	2.87E-10	3.04E-10	3.21E-10	3.38E-10
ba138	2.31E-10	2.46E-10	2.60E-10	2.75E-10	2.89E-10
in115	2.20E-10	2.34E-10	2.48E-10	2.62E-10	2.76E-10
ce140	2.12E-10	2.26E-10	2.40E-10	2.55E-10	2.69E-10
pd108	2.14E-10	2.27E-10	2.41E-10	2.54E-10	2.67E-10

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 0 fraction of total absorption rate
 0 power= .00mw, burnup= 1.mwd, flux= 2.70E+08n/cm**2-sec
 initial 310.5 d 328.8 d 347.0 d 365.3 d

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xe132	1.91E-10	2.03E-10	2.15E-10	2.28E-10	2.40E-10
mo 98	1.33E-10	1.41E-10	1.49E-10	1.58E-10	1.66E-10
zr 95	1.58E-10	1.60E-10	1.61E-10	1.61E-10	1.62E-10
mo100	1.29E-10	1.37E-10	1.45E-10	1.53E-10	1.61E-10
xe134	1.28E-10	1.36E-10	1.44E-10	1.52E-10	1.60E-10
pd107	1.28E-10	1.36E-10	1.44E-10	1.52E-10	1.60E-10
nb 95	1.40E-10	1.42E-10	1.44E-10	1.46E-10	1.47E-10
y 91	1.42E-10	1.43E-10	1.43E-10	1.44E-10	1.44E-10
zr 92	1.05E-10	1.11E-10	1.18E-10	1.24E-10	1.31E-10
pm151	1.10E-10	1.11E-10	1.11E-10	1.11E-10	1.11E-10
zr 96	8.05E-11	8.56E-11	9.06E-11	9.56E-11	1.01E-10
ru104	7.92E-11	8.42E-11	8.91E-11	9.41E-11	9.90E-11
i127	7.70E-11	8.22E-11	8.75E-11	9.27E-11	9.79E-11
nd150	7.10E-11	7.55E-11	7.99E-11	8.44E-11	8.88E-11
cs137	6.92E-11	7.35E-11	7.78E-11	8.20E-11	8.63E-11
xe136	6.89E-11	7.32E-11	7.76E-11	8.19E-11	8.62E-11
br 81	5.16E-11	5.48E-11	5.80E-11	6.12E-11	6.45E-11
zr 94	4.36E-11	4.63E-11	4.91E-11	5.18E-11	5.45E-11
rb 85	4.04E-11	4.30E-11	4.55E-11	4.81E-11	5.06E-11
ba140	4.75E-11	4.76E-11	4.76E-11	4.76E-11	4.76E-11
cd111	3.22E-11	3.42E-11	3.63E-11	3.84E-11	4.05E-11
te130	3.14E-11	3.33E-11	3.53E-11	3.72E-11	3.92E-11
sm153	3.82E-11	3.83E-11	3.83E-11	3.83E-11	3.83E-11
sm154	3.03E-11	3.22E-11	3.41E-11	3.60E-11	3.79E-11
kr 85	2.95E-11	3.13E-11	3.31E-11	3.49E-11	3.67E-11
rb 87	2.92E-11	3.11E-11	3.29E-11	3.47E-11	3.66E-11
eu156	3.48E-11	3.48E-11	3.48E-11	3.48E-11	3.48E-11
sr 89	3.04E-11	3.06E-11	3.07E-11	3.07E-11	3.08E-11
se 77	2.33E-11	2.47E-11	2.62E-11	2.77E-11	2.91E-11
ba137	1.80E-11	2.03E-11	2.27E-11	2.53E-11	2.80E-11
kr 87	2.01E-11	2.32E-11	2.32E-11	2.32E-11	2.32E-11
ce143	1.76E-11	1.76E-11	1.76E-11	1.76E-11	1.76E-11
kr 84	1.37E-11	1.46E-11	1.54E-11	1.63E-11	1.71E-11
la140	1.62E-11	1.62E-11	1.62E-11	1.62E-11	1.62E-11
sb121	1.08E-11	1.15E-11	1.22E-11	1.29E-11	1.35E-11
se 79	1.07E-11	1.13E-11	1.20E-11	1.27E-11	1.33E-11
mo 99	1.31E-11	1.32E-11	1.32E-11	1.32E-11	1.32E-11
ru106	1.06E-11	1.11E-11	1.15E-11	1.20E-11	1.24E-11

sb123	7.76E-12	8.26E-12	8.76E-12	9.27E-12	9.77E-12
kr 86	7.70E-12	8.18E-12	8.66E-12	9.15E-12	9.63E-12
te128	6.84E-12	7.27E-12	7.70E-12	8.12E-12	8.55E-12
sm150	5.15E-12	5.81E-12	6.50E-12	7.24E-12	8.01E-12
i131	6.81E-12	6.81E-12	6.81E-12	6.81E-12	6.81E-12
te127m	6.27E-12	6.40E-12	6.52E-12	6.63E-12	6.72E-12
gd156	4.92E-12	5.25E-12	5.58E-12	5.91E-12	6.24E-12
se 80	4.97E-12	5.28E-12	5.59E-12	5.90E-12	6.21E-12
dy161	4.13E-12	4.39E-12	4.66E-12	4.92E-12	5.19E-12
pd106	3.35E-12	3.75E-12	4.16E-12	4.58E-12	5.03E-12
tb159	3.06E-12	3.26E-12	3.45E-12	3.64E-12	3.83E-12

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 0 fraction of total absorption rate
 0 power= .00mw, burnup= 1.mwd, flux= 2.70E+08n/cm**2-sec
 initial 310.5 d 328.8 d 347.0 d 365.3 d

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li 6	2.83E-12	3.00E-12	3.18E-12	3.36E-12	3.53E-12
cd112	2.82E-12	2.99E-12	3.17E-12	3.35E-12	3.52E-12
sb125	2.71E-12	2.86E-12	3.01E-12	3.16E-12	3.31E-12
sn117	2.23E-12	2.37E-12	2.51E-12	2.65E-12	2.78E-12
sn119	1.83E-12	1.95E-12	2.06E-12	2.17E-12	2.29E-12
sn115	1.69E-12	1.79E-12	1.90E-12	2.01E-12	2.11E-12
te129m	1.82E-12	1.82E-12	1.82E-12	1.82E-12	1.82E-12
pm148m	1.39E-12	1.49E-12	1.60E-12	1.70E-12	1.80E-12
sr 88	1.41E-12	1.50E-12	1.59E-12	1.68E-12	1.77E-12
pd110	9.94E-13	1.06E-12	1.12E-12	1.18E-12	1.24E-12
cd114	9.64E-13	1.02E-12	1.08E-12	1.15E-12	1.21E-12
se 82	9.60E-13	1.02E-12	1.08E-12	1.14E-12	1.20E-12
gd158	9.05E-13	9.62E-13	1.02E-12	1.08E-12	1.13E-12
sn126	7.69E-13	8.17E-13	8.65E-13	9.14E-13	9.62E-13
se 78	7.28E-13	7.74E-13	8.19E-13	8.65E-13	9.11E-13
sn124	5.79E-13	6.15E-13	6.51E-13	6.87E-13	7.23E-13
dy162	5.53E-13	5.88E-13	6.22E-13	6.56E-13	6.90E-13
dy164	5.04E-13	5.36E-13	5.67E-13	5.98E-13	6.30E-13
eu154	4.89E-13	5.23E-13	5.58E-13	5.93E-13	6.29E-13
zr 90	3.88E-13	4.39E-13	4.92E-13	5.49E-13	6.09E-13
te125	3.61E-13	4.08E-13	4.58E-13	5.11E-13	5.66E-13
as 75	4.34E-13	4.61E-13	4.88E-13	5.15E-13	5.43E-13
y 90	3.17E-13	3.36E-13	3.56E-13	3.76E-13	3.96E-13
ag111	3.15E-13	3.15E-13	3.15E-13	3.15E-13	3.15E-13
eu157	2.95E-13	2.97E-13	2.97E-13	2.97E-13	2.97E-13
sn118	2.36E-13	2.50E-13	2.65E-13	2.80E-13	2.95E-13
ba136	2.15E-13	2.29E-13	2.43E-13	2.58E-13	2.72E-13
sn122	2.01E-13	2.14E-13	2.26E-13	2.39E-13	2.52E-13
cd116	2.01E-13	2.13E-13	2.26E-13	2.38E-13	2.51E-13
cd115m	2.35E-13	2.36E-13	2.36E-13	2.36E-13	2.37E-13
sn120	1.50E-13	1.60E-13	1.69E-13	1.78E-13	1.88E-13
kr 82	1.40E-13	1.49E-13	1.58E-13	1.67E-13	1.75E-13
cs134	1.36E-13	1.45E-13	1.54E-13	1.64E-13	1.73E-13
dy163	1.22E-13	1.30E-13	1.38E-13	1.45E-13	1.53E-13
ge 73	1.18E-13	1.25E-13	1.33E-13	1.40E-13	1.48E-13
ru 99	1.14E-13	1.22E-13	1.30E-13	1.37E-13	1.45E-13
xe130	8.07E-14	8.57E-14	9.08E-14	9.59E-14	1.01E-13
pm148	6.44E-14	6.84E-14	7.23E-14	7.62E-14	8.00E-14
mo 96	5.84E-14	6.21E-14	6.58E-14	6.94E-14	7.31E-14
cs136	5.54E-14	5.54E-14	5.54E-14	5.54E-14	5.54E-14
ge 76	4.29E-14	4.55E-14	4.82E-14	5.09E-14	5.36E-14
gd160	2.69E-14	2.85E-14	3.02E-14	3.19E-14	3.36E-14
ru105	2.88E-14	2.94E-14	2.94E-14	2.94E-14	2.94E-14
sn125	2.91E-14	2.91E-14	2.92E-14	2.92E-14	2.92E-14

	te126	2.02E-14	2.15E-14	2.29E-14	2.42E-14	2.55E-14			
	ru100	1.13E-14	1.21E-14	1.28E-14	1.36E-14	1.44E-14			
	rb 88	1.27E-14	1.30E-14	1.30E-14	1.30E-14	1.30E-14			
	ho165	8.46E-15	8.99E-15	9.51E-15	1.00E-14	1.06E-14			
	i135	9.93E-15	1.02E-14	1.02E-14	1.02E-14	1.02E-14			
1	sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2						fission products	page	40
0		fraction of total absorption rate							
	power=	.00mw,	burnup=	1.mwd,	flux=	2.70E+08n/cm**2-sec			
0		initial	310.5 d	328.8 d	347.0 d	365.3 d			

	in113	6.38E-15	7.19E-15	8.06E-15	8.97E-15	9.93E-15			
	te132	9.59E-15	9.61E-15	9.61E-15	9.61E-15	9.61E-15			
	sn123	7.97E-15	8.17E-15	8.35E-15	8.51E-15	8.66E-15			
	sr 87	4.94E-15	5.24E-15	5.55E-15	5.86E-15	6.17E-15			
	eu152	3.51E-15	4.03E-15	4.61E-15	5.25E-15	5.94E-15			
	te134	4.47E-15	5.90E-15	5.90E-15	5.90E-15	5.90E-15			
	te124	3.66E-15	3.96E-15	4.27E-15	4.57E-15	4.88E-15			
	nb 94	2.78E-15	2.96E-15	3.13E-15	3.31E-15	3.48E-15			
	sb126	3.02E-15	3.02E-15	3.02E-15	3.02E-15	3.02E-15			
	ge 74	2.39E-15	2.54E-15	2.69E-15	2.84E-15	2.99E-15			
	in117m	2.10E-15	2.11E-15	2.11E-15	2.11E-15	2.11E-15			
	ge 72	1.66E-15	1.76E-15	1.87E-15	1.97E-15	2.08E-15			
	sb124	2.03E-15	2.04E-15	2.06E-15	2.07E-15	2.07E-15			
	sr 86	1.27E-15	1.36E-15	1.45E-15	1.53E-15	1.62E-15			
	sm148	8.99E-16	1.03E-15	1.17E-15	1.32E-15	1.47E-15			
	ba135	9.69E-16	1.06E-15	1.15E-15	1.25E-15	1.35E-15			
	se 76	1.01E-15	1.07E-15	1.13E-15	1.20E-15	1.26E-15			
	nd142	5.46E-16	6.18E-16	6.93E-16	7.73E-16	8.58E-16			
	gd154	5.00E-16	5.68E-16	6.39E-16	7.16E-16	7.97E-16			
	i130	7.08E-16	7.17E-16	7.18E-16	7.18E-16	7.18E-16			
	in117	6.17E-16	6.19E-16	6.19E-16	6.19E-16	6.19E-16			
	ba134	3.14E-16	3.56E-16	4.01E-16	4.49E-16	4.99E-16			
	pd104	2.47E-16	2.85E-16	3.25E-16	3.67E-16	4.13E-16			
	gd152	2.36E-16	2.66E-16	2.99E-16	3.35E-16	3.74E-16			
	tb160	2.88E-16	2.91E-16	2.94E-16	2.97E-16	2.99E-16			
	er166	2.34E-16	2.49E-16	2.64E-16	2.79E-16	2.93E-16			
	xe128	2.23E-16	2.38E-16	2.52E-16	2.66E-16	2.80E-16			
	rb 86	2.43E-16	2.43E-16	2.43E-16	2.43E-16	2.43E-16			
	dy165	1.99E-16	2.10E-16	2.10E-16	2.10E-16	2.10E-16			
	cd110	1.39E-16	1.52E-16	1.66E-16	1.81E-16	1.96E-16			
	dy160	1.21E-16	1.32E-16	1.42E-16	1.54E-16	1.65E-16			
	cd118	9.62E-17	1.21E-16	1.21E-16	1.21E-16	1.21E-16			
	ge 75	7.78E-17	8.72E-17	8.72E-17	8.72E-17	8.72E-17			
	kr 80	6.69E-17	7.11E-17	7.53E-17	7.94E-17	8.36E-17			
	br 79	3.85E-17	4.32E-17	4.82E-17	5.35E-17	5.90E-17			
	in119m	1.86E-17	3.03E-17	3.03E-17	3.03E-17	3.03E-17			
	xe129	1.93E-17	2.18E-17	2.45E-17	2.73E-17	3.03E-17			
	ag107	1.83E-17	2.07E-17	2.32E-17	2.58E-17	2.86E-17			
	te122	8.80E-18	9.38E-18	9.96E-18	1.05E-17	1.11E-17			
	pr142	5.28E-18	5.68E-18	6.04E-18	6.39E-18	6.74E-18			
	be 9	5.31E-18	5.64E-18	5.98E-18	6.31E-18	6.64E-18			
	nb 93	3.67E-18	4.01E-18	4.37E-18	4.75E-18	5.16E-18			
	sn116	3.11E-18	3.36E-18	3.61E-18	3.86E-18	4.12E-18			
	te123	2.99E-18	3.25E-18	3.51E-18	3.78E-18	4.05E-18			
	li 7	2.18E-18	2.31E-18	2.45E-18	2.59E-18	2.72E-18			
	in119	1.65E-19	2.37E-18	2.37E-18	2.37E-18	2.37E-18			
	er167	8.74E-19	9.29E-19	9.84E-19	1.04E-18	1.09E-18			
	cd109	6.62E-20	6.95E-20	7.26E-20	7.57E-20	7.88E-20			
	cd108	4.40E-20	4.68E-20	4.96E-20	5.23E-20	5.51E-20			
1	sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2						fission products	page	41

0 fraction of total absorption rate
 0 power= .00mw, burnup= 1.mwd, flux= 2.70E+08n/cm**2-sec
 initial 310.5 d 328.8 d 347.0 d 365.3 d

cs134m	4.02E-20	4.57E-20	4.84E-20	5.12E-20	5.40E-20
ag110	9.08E-24	1.40E-21	1.45E-21	1.50E-21	1.55E-21
sn114	5.77E-22	6.18E-22	6.59E-22	7.00E-22	7.42E-22
in120	4.33E-28	3.98E-22	3.98E-22	3.98E-22	3.98E-22
in120m	1.09E-29	4.28E-23	4.28E-23	4.28E-23	4.28E-23

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 0 power= 4.000E-03mw, burnup=1.4610E+00mwd, flux= 2.79E+08n/cm**2-sec

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nuclide concentrations, gram atoms
 basis = single reactor assembly

	charge	310.5 d	328.8 d	347.0 d	365.3 d
h 1	6.88E-08	7.31E-08	7.74E-08	8.16E-08	8.59E-08
h 2	2.04E-10	2.17E-10	2.29E-10	2.42E-10	2.55E-10
h 3	1.46E-12	1.55E-12	1.64E-12	1.73E-12	1.82E-12
h 4	.00E+00	6.32E-36	6.68E-36	7.03E-36	7.39E-36
he 3	3.34E-14	3.76E-14	4.21E-14	4.69E-14	5.18E-14
he 4	1.14E-08	1.21E-08	1.28E-08	1.35E-08	1.42E-08
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ne 20	1.37E-09	1.45E-09	1.54E-09	1.62E-09	1.70E-09
ne 21	3.62E-17	4.06E-17	4.52E-17	5.00E-17	5.51E-17
ne 22	8.94E-13	1.00E-12	1.12E-12	1.24E-12	1.37E-12
ne 23	4.64E-23	7.03E-15	7.03E-15	7.03E-15	7.03E-15
na 22	8.04E-12	8.49E-12	8.92E-12	9.35E-12	9.78E-12
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	2.73E-08	2.74E-08	2.74E-08	2.74E-08	2.74E-08
na 24m	4.55E-30	4.51E-15	4.51E-15	4.51E-15	4.51E-15
na 25	3.31E-34	4.54E-29	4.80E-29	5.07E-29	5.33E-29
mg 24	1.07E-05	1.13E-05	1.19E-05	1.25E-05	1.31E-05
mg 25	1.50E-12	1.59E-12	1.69E-12	1.78E-12	1.87E-12
mg 26	2.04E-10	2.17E-10	2.29E-10	2.42E-10	2.55E-10
mg 27	6.11E-13	2.10E-12	2.10E-12	2.10E-12	2.10E-12
mg 28	4.25E-24	4.29E-24	4.29E-24	4.29E-24	4.29E-24
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	1.11E-12	2.03E-10	2.03E-10	2.03E-10	2.03E-10
al 29	1.40E-30	9.29E-30	1.03E-29	1.15E-29	1.26E-29
al 30	.00E+00	1.53E-43	1.75E-43	2.12E-43	2.40E-43
si 28	2.98E-05	3.14E-05	3.31E-05	3.47E-05	3.64E-05
si 29	3.25E-14	3.64E-14	4.06E-14	4.49E-14	4.95E-14
si 30	3.71E-23	4.43E-23	5.23E-23	6.12E-23	7.10E-23
si 31	2.48E-35	3.18E-35	3.76E-35	4.40E-35	5.10E-35
si 32	3.64E-44	4.62E-44	5.89E-44	7.29E-44	8.97E-44
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		2.70E+08	2.70E+08	2.70E+08	2.70E+08

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 0 power= 4.000E-03mw, burnup=1.4610E+00mwd, flux= 2.79E+08n/cm**2-sec

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nuclide concentrations, gram atoms
 basis = single reactor assembly

	charge	310.5 d	328.8 d	347.0 d	365.3 d
he 4	4.11E-05	4.37E-05	4.63E-05	4.89E-05	5.15E-05
ra222	5.35E-30	5.97E-30	6.70E-30	7.47E-30	8.28E-30
ra223	5.53E-15	6.36E-15	7.25E-15	8.19E-15	9.19E-15
ra224	3.01E-16	3.58E-16	4.20E-16	4.89E-16	5.65E-16
ra225	6.39E-17	7.40E-17	8.48E-17	9.64E-17	1.09E-16
ra226	7.52E-11	8.49E-11	9.51E-11	1.06E-10	1.17E-10
ra228	7.90E-17	8.90E-17	9.95E-17	1.11E-16	1.22E-16

th226	2.57E-28	2.91E-28	3.27E-28	3.65E-28	4.04E-28
th227	1.01E-14	1.15E-14	1.30E-14	1.46E-14	1.63E-14
th228	6.05E-14	7.15E-14	8.38E-14	9.74E-14	1.12E-13
th229	1.46E-11	1.68E-11	1.90E-11	2.15E-11	2.41E-11
th230	2.04E-05	2.17E-05	2.30E-05	2.43E-05	2.55E-05
th231	3.02E-09	3.02E-09	3.02E-09	3.02E-09	3.02E-09
th232	4.13E-06	4.39E-06	4.65E-06	4.91E-06	5.16E-06
th233	2.24E-17	4.02E-17	4.26E-17	4.50E-17	4.73E-17
th234	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	6.21E-07	6.60E-07	6.99E-07	7.38E-07	7.77E-07
pa232	1.06E-14	1.13E-14	1.20E-14	1.27E-14	1.34E-14
pa233	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	2.49E-25	2.82E-25	3.17E-25	3.53E-25	3.92E-25
u231	6.96E-21	7.48E-21	7.99E-21	8.51E-21	9.02E-21
u232	2.33E-11	2.61E-11	2.90E-11	3.21E-11	3.53E-11
u233	9.47E-06	1.02E-05	1.08E-05	1.15E-05	1.22E-05
u234	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00
u235	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02
u236	1.74E+02	1.74E+02	1.74E+02	1.74E+02	1.74E+02
u237	3.09E-06	3.09E-06	3.09E-06	3.09E-06	3.09E-06
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04
u239	1.93E-07	3.17E-07	3.17E-07	3.17E-07	3.17E-07
u240	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	3.51E-12	3.67E-12	3.82E-12	3.97E-12	4.12E-12
np236m	2.03E-12	2.05E-12	2.05E-12	2.05E-12	2.05E-12
np236	1.59E-10	1.68E-10	1.78E-10	1.88E-10	1.97E-10
np237	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.22E+01
np238	1.55E-06	1.55E-06	1.55E-06	1.55E-06	1.55E-06
np239	4.59E-05	4.59E-05	4.59E-05	4.59E-05	4.59E-05
np240m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np240	7.73E-15	9.32E-15	9.32E-15	9.32E-15	9.32E-15
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	2.11E-10	2.22E-10	2.34E-10	2.45E-10	2.57E-10
pu237	1.14E-15	1.22E-15	1.31E-15	1.40E-15	1.49E-15
pu238	1.48E-04	1.57E-04	1.66E-04	1.75E-04	1.84E-04
pu239	3.96E-03	4.20E-03	4.45E-03	4.70E-03	4.94E-03
pu240	1.55E-08	1.75E-08	1.96E-08	2.18E-08	2.42E-08
pu241	8.10E-14	9.72E-14	1.15E-13	1.36E-13	1.58E-13
pu242	1.27E-19	1.61E-19	2.03E-19	2.52E-19	3.09E-19

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 power= 4.000E-03mw, burnup=1.4610E+00mwd, flux= 2.79E+08n/cm**2-sec
 nuclide concentrations, gram atoms
 basis = single reactor assembly

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0

	charge	310.5 d	328.8 d	347.0 d	365.3 d
pu243	2.56E-28	3.39E-28	4.26E-28	5.29E-28	6.50E-28
pu244	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu245	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
totals	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04
flux		2.70E+08	2.70E+08	2.70E+08	2.70E+08

0

.results on logical unit no. 71, position 1, for time step 4, subcase 6. (run position 1, case position 1)
 title: sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+00mwd, flux= 2.79E+08n/cm**2-sec

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0 nuclide concentrations, grams
basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
na 23	1.73E+05	1.73E+05	1.73E+05	1.73E+05	1.73E+05	1.73E+05	1.73E+05
mg 24	3.14E-04	3.14E-04	3.14E-04	3.14E-04	3.14E-04	3.14E-04	3.14E-04
al 27	1.35E+06	1.35E+06	1.35E+06	1.35E+06	1.35E+06	1.35E+06	1.35E+06
si 28	1.02E-03	1.02E-03	1.02E-03	1.02E-03	1.02E-03	1.02E-03	1.02E-03
total	1.52E+06	1.52E+06	1.52E+06	1.52E+06	1.52E+06	1.52E+06	1.52E+06

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 46
0 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+00mwd, flux= 2.79E+08n/cm**2-sec

0 element radioactivity, curies
basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
totals	2.55E+01	1.13E-06	9.10E-07	7.36E-07	5.97E-07	4.85E-07	3.95E-07

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 47
0 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+00mwd, flux= 2.79E+08n/cm**2-sec

0 element thermal power, watts
basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
na	1.70E-01	1.52E-08	1.22E-08	9.77E-09	7.83E-09	6.27E-09	5.02E-09
totals	4.76E-01	1.52E-08	1.22E-08	9.77E-09	7.83E-09	6.27E-09	5.02E-09

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 48
0 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+00mwd, flux= 2.79E+08n/cm**2-sec

0 nuclide gamma power, watts
basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
na 22	1.75E-08	1.40E-08	1.12E-08	8.98E-09	7.19E-09	5.76E-09	4.61E-09
total	3.31E-01	1.40E-08	1.12E-08	8.98E-09	7.19E-09	5.76E-09	4.61E-09

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 49
0 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+00mwd, flux= 2.79E+08n/cm**2-sec

0 nuclide concentrations, gram atoms
basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
he 4	5.15E-05	9.51E-05	1.39E-04	1.82E-04	2.26E-04	2.70E-04	3.13E-04
th230	2.55E-05	4.68E-05	6.81E-05	8.94E-05	1.11E-04	1.32E-04	1.53E-04
th232	5.16E-06	9.47E-06	1.38E-05	1.81E-05	2.24E-05	2.67E-05	3.10E-05
th234	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	7.77E-07	1.38E-06	1.98E-06	2.58E-06	3.19E-06	3.79E-06	4.39E-06
pa233	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06
u233	1.22E-05	2.50E-05	3.79E-05	5.07E-05	6.35E-05	7.64E-05	8.92E-05
u234	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00
u235	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02
u236	1.74E+02	1.74E+02	1.74E+02	1.74E+02	1.74E+02	1.74E+02	1.74E+02
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04
np237	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.22E+01
pu238	1.84E-04	1.85E-04	1.84E-04	1.82E-04	1.81E-04	1.80E-04	1.79E-04
pu239	4.94E-03	4.99E-03	4.99E-03	4.99E-03	4.99E-03	4.99E-03	4.99E-03
total	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 50
0 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+00mwd, flux= 2.79E+08n/cm**2-sec

0 element concentrations, gram atoms
basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
he	5.15E-05	9.51E-05	1.39E-04	1.82E-04	2.26E-04	2.70E-04	3.13E-04
th	3.13E-05	5.68E-05	8.24E-05	1.08E-04	1.34E-04	1.59E-04	1.85E-04

pa	2.23E-06	2.84E-06	3.44E-06	4.04E-06	4.64E-06	5.25E-06	5.85E-06
u	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04
np	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.22E+01
pu	5.13E-03	5.17E-03	5.17E-03	5.17E-03	5.17E-03	5.17E-03	5.17E-03
totals	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 51
 0 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+00mwd, flux= 2.79E+08n/cm**2-sec

nuclide concentrations, grams
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
he 4	2.06E-04	3.81E-04	5.55E-04	7.29E-04	9.04E-04	1.08E-03	1.25E-03
ra226	2.65E-08	8.92E-08	1.89E-07	3.25E-07	4.98E-07	7.08E-07	9.55E-07
th230	5.88E-03	1.08E-02	1.57E-02	2.06E-02	2.55E-02	3.04E-02	3.53E-02
th231	6.98E-07	6.98E-07	6.98E-07	6.98E-07	6.98E-07	6.98E-07	6.98E-07
th232	1.20E-03	2.20E-03	3.19E-03	4.19E-03	5.19E-03	6.19E-03	7.19E-03
th234	1.26E-04	1.26E-04	1.26E-04	1.26E-04	1.26E-04	1.26E-04	1.26E-04
pa231	1.79E-04	3.19E-04	4.58E-04	5.97E-04	7.36E-04	8.75E-04	1.01E-03
pa233	3.39E-04	3.39E-04	3.39E-04	3.39E-04	3.39E-04	3.39E-04	3.39E-04
u233	2.84E-03	5.83E-03	8.82E-03	1.18E-02	1.48E-02	1.78E-02	2.08E-02
u234	2.12E+03	2.12E+03	2.12E+03	2.12E+03	2.12E+03	2.12E+03	2.12E+03
u235	1.72E+05	1.72E+05	1.72E+05	1.72E+05	1.72E+05	1.72E+05	1.72E+05
u236	4.12E+04	4.12E+04	4.12E+04	4.12E+04	4.12E+04	4.12E+04	4.12E+04
u238	8.66E+06	8.66E+06	8.66E+06	8.66E+06	8.66E+06	8.66E+06	8.66E+06
np237	9.99E+03	9.99E+03	9.99E+03	9.99E+03	9.99E+03	9.99E+03	9.99E+03
pu238	4.39E-02	4.40E-02	4.37E-02	4.34E-02	4.31E-02	4.28E-02	4.26E-02
pu239	1.18E+00	1.19E+00	1.19E+00	1.19E+00	1.19E+00	1.19E+00	1.19E+00
pu240	5.81E-06	5.81E-06	5.81E-06	5.81E-06	5.81E-06	5.80E-06	5.80E-06
total	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 52
 0 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+00mwd, flux= 2.79E+08n/cm**2-sec

element concentrations, grams
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
he	2.06E-04	3.81E-04	5.55E-04	7.29E-04	9.04E-04	1.08E-03	1.25E-03
ra	2.65E-08	8.92E-08	1.89E-07	3.25E-07	4.98E-07	7.08E-07	9.55E-07
th	7.20E-03	1.31E-02	1.90E-02	2.49E-02	3.08E-02	3.67E-02	4.26E-02
pa	5.19E-04	6.58E-04	7.97E-04	9.36E-04	1.08E-03	1.21E-03	1.35E-03
u	8.87E+06	8.87E+06	8.87E+06	8.87E+06	8.87E+06	8.87E+06	8.87E+06
np	9.99E+03	9.99E+03	9.99E+03	9.99E+03	9.99E+03	9.99E+03	9.99E+03
pu	1.23E+00	1.24E+00	1.24E+00	1.24E+00	1.24E+00	1.24E+00	1.23E+00
totals	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 53
 0 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+00mwd, flux= 2.79E+08n/cm**2-sec

nuclide radioactivity, curies
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
tl207	1.05E-07	4.38E-07	9.07E-07	1.54E-06	2.32E-06	3.26E-06	4.34E-06
pb211	1.05E-07	4.39E-07	9.10E-07	1.54E-06	2.33E-06	3.27E-06	4.35E-06
pb212	2.02E-08	9.61E-08	2.07E-07	3.34E-07	4.64E-07	5.89E-07	7.05E-07
pb214	2.55E-08	8.82E-08	1.87E-07	3.21E-07	4.93E-07	7.00E-07	9.44E-07
bi211	1.05E-07	4.39E-07	9.10E-07	1.54E-06	2.33E-06	3.27E-06	4.35E-06
bi212	2.02E-08	9.61E-08	2.07E-07	3.34E-07	4.64E-07	5.89E-07	7.05E-07
bi214	2.55E-08	8.82E-08	1.87E-07	3.21E-07	4.93E-07	7.00E-07	9.44E-07
po214	2.55E-08	8.82E-08	1.87E-07	3.21E-07	4.93E-07	7.00E-07	9.44E-07
po215	1.05E-07	4.39E-07	9.10E-07	1.54E-06	2.33E-06	3.27E-06	4.35E-06
po216	2.02E-08	9.61E-08	2.07E-07	3.34E-07	4.64E-07	5.89E-07	7.05E-07
po218	2.55E-08	8.82E-08	1.87E-07	3.21E-07	4.93E-07	7.00E-07	9.44E-07

sm154	7.86E-04	7.86E-04	7.86E-04	7.86E-04	7.86E-04	7.86E-04	7.86E-04
eu155	3.33E-04	2.94E-04	2.60E-04	2.30E-04	2.03E-04	1.80E-04	1.59E-04
gd155	2.53E-05	6.40E-05	9.81E-05	1.28E-04	1.55E-04	1.79E-04	2.00E-04
gd156	1.48E-04	1.57E-04	1.57E-04	1.57E-04	1.57E-04	1.57E-04	1.57E-04

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 58
 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+00mwd, flux= 2.79E+08n/cm**2-sec
 0 nuclide concentrations, grams

basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
gd157	7.73E-05	7.75E-05	7.75E-05	7.75E-05	7.75E-05	7.75E-05	7.75E-05
gd158	3.51E-05	3.51E-05	3.51E-05	3.51E-05	3.51E-05	3.51E-05	3.51E-05
tb159	1.35E-05	1.36E-05	1.36E-05	1.36E-05	1.36E-05	1.36E-05	1.36E-05
gd160	4.28E-06	4.28E-06	4.28E-06	4.28E-06	4.28E-06	4.28E-06	4.28E-06
dy161	1.26E-06	1.30E-06	1.30E-06	1.30E-06	1.30E-06	1.30E-06	1.30E-06
total	1.54E+00	1.54E+00	1.54E+00	1.54E+00	1.54E+00	1.54E+00	1.54E+00

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 59
 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+00mwd, flux= 2.79E+08n/cm**2-sec
 0 nuclide radioactivity, curies

basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
h 3	2.03E-02	1.93E-02	1.84E-02	1.76E-02	1.68E-02	1.60E-02	1.53E-02
se 79	3.13E-06	3.13E-06	3.13E-06	3.13E-06	3.13E-06	3.13E-06	3.13E-06
kr 85	5.62E-01	5.33E-01	5.05E-01	4.78E-01	4.53E-01	4.29E-01	4.07E-01
sr 90	4.78E+00	4.69E+00	4.59E+00	4.50E+00	4.41E+00	4.32E+00	4.23E+00
y 90	4.74E+00	4.69E+00	4.59E+00	4.50E+00	4.41E+00	4.32E+00	4.23E+00
y 91	1.99E+02	5.43E+00	1.48E-01	4.01E-03	1.09E-04	2.96E-06	8.03E-08
zr 93	6.63E-05	6.64E-05	6.64E-05	6.64E-05	6.64E-05	6.64E-05	6.64E-05
nb 93m	1.42E-06	3.70E-06	5.91E-06	8.04E-06	1.01E-05	1.21E-05	1.40E-05
zr 95	2.14E+02	7.94E+00	2.94E-01	1.09E-02	4.03E-04	1.49E-05	5.54E-07
nb 95	2.09E+02	1.69E+01	6.46E-01	2.40E-02	8.88E-04	3.29E-05	1.22E-06
tc 99	6.81E-04	6.89E-04	6.89E-04	6.89E-04	6.89E-04	6.89E-04	6.89E-04
rh102	1.69E-06	1.38E-06	1.13E-06	9.27E-07	7.60E-07	6.23E-07	5.10E-07
ru106	7.83E+00	4.44E+00	2.52E+00	1.43E+00	8.08E-01	4.58E-01	2.60E-01
rh106	7.83E+00	4.44E+00	2.52E+00	1.43E+00	8.08E-01	4.58E-01	2.60E-01
pd107	6.39E-07	6.39E-07	6.39E-07	6.39E-07	6.39E-07	6.39E-07	6.39E-07
cd113m	4.72E-04	4.54E-04	4.35E-04	4.18E-04	4.01E-04	3.85E-04	3.70E-04
sn119m	8.83E-04	4.30E-04	2.09E-04	1.02E-04	4.96E-05	2.42E-05	1.18E-05
sn121	4.68E-01	2.74E-05	2.71E-05	2.69E-05	2.66E-05	2.63E-05	2.60E-05
sn121m	3.57E-05	3.54E-05	3.50E-05	3.46E-05	3.43E-05	3.39E-05	3.35E-05
sn123	4.99E-02	9.75E-03	1.90E-03	3.72E-04	7.26E-05	1.42E-05	2.77E-06
sb125	2.26E-01	1.85E-01	1.50E-01	1.21E-01	9.83E-02	7.96E-02	6.44E-02
te125m	4.10E-02	4.49E-02	3.66E-02	2.97E-02	2.40E-02	1.94E-02	1.57E-02
sn126	1.01E-05	1.01E-05	1.01E-05	1.01E-05	1.01E-05	1.01E-05	1.01E-05
sb126	3.85E-03	1.41E-06	1.41E-06	1.41E-06	1.41E-06	1.41E-06	1.41E-06
sb126m	5.29E-03	1.01E-05	1.01E-05	1.01E-05	1.01E-05	1.01E-05	1.01E-05
te127	4.14E+00	9.77E-02	1.41E-02	2.04E-03	2.94E-04	4.24E-05	6.13E-06
te127m	6.64E-01	9.98E-02	1.44E-02	2.08E-03	3.00E-04	4.33E-05	6.25E-06
i129	1.11E-06	1.14E-06	1.14E-06	1.14E-06	1.14E-06	1.14E-06	1.14E-06
cs134	1.57E-04	1.19E-04	8.99E-05	6.80E-05	5.14E-05	3.88E-05	2.93E-05
cs135	6.85E-05	6.87E-05	6.87E-05	6.87E-05	6.87E-05	6.87E-05	6.87E-05
cs137	4.85E+00	4.76E+00	4.67E+00	4.58E+00	4.49E+00	4.41E+00	4.32E+00
ba137m	4.60E+00	4.49E+00	4.41E+00	4.32E+00	4.24E+00	4.16E+00	4.08E+00
ce144	1.08E+02	5.17E+01	2.47E+01	1.18E+01	5.61E+00	2.68E+00	1.28E+00
pr144	1.08E+02	5.17E+01	2.47E+01	1.18E+01	5.61E+00	2.68E+00	1.28E+00
pr144m	1.52E+00	7.24E-01	3.45E-01	1.65E-01	7.86E-02	3.75E-02	1.79E-02
pm147	1.71E+01	1.44E+01	1.16E+01	9.30E+00	7.46E+00	5.98E+00	4.80E+00
sm151	1.22E-01	1.21E-01	1.21E-01	1.20E-01	1.19E-01	1.18E-01	1.18E-01
eu154	8.29E-06	7.75E-06	7.25E-06	6.78E-06	6.34E-06	5.92E-06	5.54E-06

eu155	1.64E-01	1.45E-01	1.28E-01	1.13E-01	1.00E-01	8.86E-02	7.83E-02
total	1.97E+04	1.81E+02	8.67E+01	5.47E+01	3.87E+01	3.02E+01	2.55E+01

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 60
 0 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+00mwd, flux= 2.79E+08n/cm**2-sec

0 element thermal power, watts
 basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
h	6.83E-07	6.52E-07	6.22E-07	5.93E-07	5.66E-07	5.40E-07	5.16E-07
kr	1.29E+01	7.99E-04	7.57E-04	7.17E-04	6.80E-04	6.44E-04	6.10E-04
sr	2.00E+01	1.41E-02	5.47E-03	5.23E-03	5.12E-03	5.01E-03	4.91E-03
y	2.72E+01	4.55E-02	2.60E-02	2.49E-02	2.44E-02	2.39E-02	2.34E-02
zr	1.20E+01	4.00E-02	1.48E-03	5.49E-05	2.04E-06	8.28E-08	1.03E-08
nb	2.14E+01	8.09E-02	3.10E-03	1.15E-04	4.27E-06	1.60E-07	8.28E-09
tc	6.47E+00	3.46E-07	3.46E-07	3.46E-07	3.46E-07	3.46E-07	3.46E-07
ru	7.06E-01	1.90E-03	1.57E-04	8.48E-05	4.81E-05	2.72E-05	1.54E-05
rh	3.00E-01	4.27E-02	2.41E-02	1.37E-02	7.75E-03	4.39E-03	2.49E-03
cd	6.84E-02	1.04E-06	4.78E-07	4.55E-07	4.36E-07	4.19E-07	4.02E-07
sn	1.87E+00	3.07E-05	6.10E-06	1.26E-06	2.94E-07	9.83E-08	5.59E-08
sb	7.51E+00	5.87E-04	4.75E-04	3.84E-04	3.11E-04	2.52E-04	2.04E-04
te	9.30E+00	2.61E-04	5.78E-05	2.89E-05	2.08E-05	1.64E-05	1.32E-05
cs	1.81E+01	5.29E-03	5.19E-03	5.09E-03	4.99E-03	4.90E-03	4.80E-03
ba	1.12E+01	1.77E-02	1.73E-02	1.70E-02	1.67E-02	1.63E-02	1.60E-02
ce	4.36E+00	3.43E-02	1.61E-02	7.70E-03	3.67E-03	1.75E-03	8.35E-04
pr	5.72E+00	3.80E-01	1.81E-01	8.64E-02	4.12E-02	1.97E-02	9.37E-03
pm	3.18E-01	5.30E-03	4.25E-03	3.41E-03	2.74E-03	2.20E-03	1.76E-03
sm	2.00E-02	1.43E-05	1.42E-05	1.41E-05	1.40E-05	1.39E-05	1.38E-05
eu	8.23E-03	1.13E-04	9.97E-05	8.82E-05	7.79E-05	6.89E-05	6.09E-05
totals	2.58E+02	6.69E-01	2.86E-01	1.65E-01	1.08E-01	7.92E-02	6.46E-02

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 61
 0 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+00mwd, flux= 2.79E+08n/cm**2-sec

0 nuclide gamma power, watts
 basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr 85	7.43E-06	7.04E-06	6.67E-06	6.32E-06	5.99E-06	5.68E-06	5.38E-06
y 90	4.77E-08	4.72E-08	4.63E-08	4.53E-08	4.44E-08	4.35E-08	4.26E-08
zr 95	9.30E-01	3.44E-02	1.28E-03	4.73E-05	1.75E-06	6.48E-08	2.40E-09
nb 95	9.48E-01	7.63E-02	2.93E-03	1.09E-04	4.03E-06	1.49E-07	5.52E-09
rh102	2.16E-08	1.77E-08	1.45E-08	1.19E-08	9.73E-09	7.97E-09	6.53E-09
rh106	9.56E-03	5.42E-03	3.07E-03	1.74E-03	9.87E-04	5.60E-04	3.17E-04
sb125	5.82E-04	4.77E-04	3.86E-04	3.13E-04	2.53E-04	2.05E-04	1.66E-04
te125m	8.64E-06	9.48E-06	7.73E-06	6.26E-06	5.07E-06	4.10E-06	3.32E-06
sn126	7.78E-09	7.78E-09	7.78E-09	7.78E-09	7.78E-09	7.78E-09	7.78E-09
sb126	6.28E-05	2.30E-08	2.30E-08	2.30E-08	2.30E-08	2.30E-08	2.30E-08
sb126m	4.88E-05	9.27E-08	9.27E-08	9.27E-08	9.27E-08	9.27E-08	9.26E-08
cs134	1.45E-06	1.10E-06	8.29E-07	6.26E-07	4.73E-07	3.58E-07	2.70E-07
ba137m	1.63E-02	1.60E-02	1.57E-02	1.54E-02	1.51E-02	1.48E-02	1.45E-02
ce144	1.22E-02	5.83E-03	2.78E-03	1.32E-03	6.32E-04	3.01E-04	1.44E-04
pr144	1.86E-02	8.86E-03	4.23E-03	2.02E-03	9.61E-04	4.59E-04	2.19E-04
pr144m	1.13E-04	5.37E-05	2.56E-05	1.22E-05	5.82E-06	2.78E-06	1.32E-06
pm147	4.44E-07	3.75E-07	3.01E-07	2.41E-07	1.94E-07	1.55E-07	1.25E-07
sm151	1.02E-08	1.02E-08	1.01E-08	1.01E-08	1.00E-08	9.96E-09	9.89E-09
eu154	6.16E-08	5.76E-08	5.39E-08	5.04E-08	4.71E-08	4.40E-08	4.12E-08
eu155	6.30E-05	5.57E-05	4.92E-05	4.35E-05	3.84E-05	3.40E-05	3.00E-05
total	1.28E+02	1.49E-01	3.04E-02	2.10E-02	1.80E-02	1.63E-02	1.54E-02

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 62
 0 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+00mwd, flux= 2.79E+08n/cm**2-sec
 0 element gamma power, watts

basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr	6.74E+00	7.04E-06	6.67E-06	6.32E-06	5.99E-06	5.68E-06	5.38E-06
y	9.80E+00	1.17E-04	3.21E-06	1.31E-07	4.68E-08	4.36E-08	4.26E-08
zr	4.79E+00	3.44E-02	1.28E-03	4.73E-05	1.75E-06	6.48E-08	2.40E-09
nb	9.09E+00	7.64E-02	2.93E-03	1.09E-04	4.03E-06	1.49E-07	5.70E-09
rh	9.50E-02	5.43E-03	3.07E-03	1.74E-03	9.87E-04	5.60E-04	3.17E-04
sn	1.23E+00	4.37E-07	1.01E-07	3.09E-08	1.51E-08	1.10E-08	9.69E-09
sb	5.15E+00	4.77E-04	3.86E-04	3.13E-04	2.53E-04	2.05E-04	1.66E-04
te	5.57E+00	2.30E-05	9.10E-06	6.46E-06	5.10E-06	4.10E-06	3.32E-06
cs	8.75E+00	1.10E-06	8.29E-07	6.26E-07	4.73E-07	3.58E-07	2.70E-07
ba	4.72E+00	1.60E-02	1.57E-02	1.54E-02	1.51E-02	1.48E-02	1.45E-02
ce	2.08E+00	5.96E-03	2.78E-03	1.32E-03	6.32E-04	3.01E-04	1.44E-04
pr	1.79E+00	8.92E-03	4.25E-03	2.03E-03	9.67E-04	4.61E-04	2.20E-04
pm	8.53E-02	3.87E-07	3.01E-07	2.41E-07	1.94E-07	1.55E-07	1.25E-07
sm	4.44E-03	1.02E-08	1.01E-08	1.01E-08	1.00E-08	9.96E-09	9.89E-09
eu	5.17E-03	5.57E-05	4.92E-05	4.35E-05	3.85E-05	3.40E-05	3.01E-05
totals	1.28E+02	1.49E-01	3.04E-02	2.10E-02	1.80E-02	1.63E-02	1.54E-02

1 photon spectrum as a function of time for light elements, cladding and structural materials

0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 0 power= .00 mw, burnup= 1.mwd, flux= 2.79E+08 n**2-sec
 0 spectrum of photon release rates, photons/sec
 0 basis = single reactor assembly

e-mean (mev)	time after discharge						
	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
1.00E-02	5.14E+11	1.31E+04	1.05E+04	8.41E+03	6.73E+03	5.39E+03	4.32E+03
3.00E-02	1.69E+11	4.17E+03	3.34E+03	2.68E+03	2.14E+03	1.72E+03	1.37E+03
5.50E-02	1.18E+11	2.82E+03	2.26E+03	1.81E+03	1.45E+03	1.16E+03	9.29E+02
8.50E-02	6.89E+10	1.59E+03	1.27E+03	1.02E+03	8.15E+02	6.52E+02	5.23E+02
1.20E-01	4.90E+10	1.08E+03	8.68E+02	6.95E+02	5.57E+02	4.46E+02	3.57E+02
1.70E-01	5.12E+10	1.06E+03	8.53E+02	6.83E+02	5.47E+02	4.38E+02	3.51E+02
3.00E-01	5.87E+10	1.06E+03	8.48E+02	6.79E+02	5.44E+02	4.36E+02	3.49E+02
6.50E-01	2.89E+10	5.66E+04	4.53E+04	3.63E+04	2.91E+04	2.33E+04	1.87E+04
1.13E+00	4.96E+09	4.51E+04	3.61E+04	2.89E+04	2.32E+04	1.86E+04	1.49E+04
1.58E+00	9.03E+11	1.13E-01	9.05E-02	7.25E-02	5.80E-02	4.65E-02	3.72E-02
2.00E+00	1.79E+08	1.00E-02	8.05E-03	6.44E-03	5.16E-03	4.13E-03	3.31E-03
2.40E+00	3.62E+07	2.25E-03	1.80E-03	1.44E-03	1.16E-03	9.27E-04	7.42E-04
2.80E+00	2.13E+11	3.53E-05	2.82E-05	2.26E-05	1.81E-05	1.45E-05	1.16E-05
3.25E+00	1.35E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
3.75E+00	1.39E+08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.25E+00	1.82E+06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	6.61E-22	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	1.15E-22	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
total	2.18E+12	1.27E+05	1.01E+05	8.12E+04	6.50E+04	5.21E+04	4.17E+04
mev/sec	2.10E+12	8.87E+04	7.10E+04	5.69E+04	4.56E+04	3.65E+04	2.92E+04

0 spectrum of energy release rates, mev/watt-sec
 0 basis = single reactor assembly

e-mean (mev)	time after discharge						
	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
1.00E-02	1.29E+06	3.28E-02	2.62E-02	2.10E-02	1.68E-02	1.35E-02	1.08E-02
3.00E-02	1.27E+06	3.13E-02	2.51E-02	2.01E-02	1.61E-02	1.29E-02	1.03E-02
5.50E-02	1.62E+06	3.87E-02	3.10E-02	2.49E-02	1.99E-02	1.59E-02	1.28E-02
8.50E-02	1.46E+06	3.37E-02	2.70E-02	2.16E-02	1.73E-02	1.39E-02	1.11E-02
1.20E-01	1.47E+06	3.25E-02	2.60E-02	2.09E-02	1.67E-02	1.34E-02	1.07E-02
1.70E-01	2.18E+06	4.52E-02	3.62E-02	2.90E-02	2.32E-02	1.86E-02	1.49E-02
3.00E-01	4.41E+06	7.94E-02	6.36E-02	5.10E-02	4.08E-02	3.27E-02	2.62E-02

6.50E-01	4.70E+06	9.20E+00	7.37E+00	5.90E+00	4.72E+00	3.78E+00	3.03E+00
1.13E+00	1.40E+06	1.27E+01	1.02E+01	8.14E+00	6.52E+00	5.22E+00	4.18E+00
1.58E+00	3.56E+08	4.45E-05	3.56E-05	2.85E-05	2.29E-05	1.83E-05	1.47E-05
2.00E+00	8.95E+04	5.02E-06	4.02E-06	3.22E-06	2.58E-06	2.07E-06	1.66E-06
2.40E+00	2.17E+04	1.35E-06	1.08E-06	8.67E-07	6.94E-07	5.56E-07	4.45E-07
2.80E+00	1.49E+08	2.47E-08	1.98E-08	1.58E-08	1.27E-08	1.02E-08	8.13E-09
3.25E+00	1.10E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
3.75E+00	1.30E+05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.25E+00	1.93E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	7.85E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	1.58E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
total	5.25E+08	2.22E+01	1.78E+01	1.42E+01	1.14E+01	9.12E+00	7.31E+00
gamma watts	3.37E-01	1.42E-08	1.14E-08	9.12E-09	7.30E-09	5.85E-09	4.69E-09

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photon spectrum as a function of time for fission products

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 power= .00 mw, burnup= 1.mwd, flux= 2.79E+08 n**2-sec
 spectrum of photon release rates, photons/sec
 basis = single reactor assembly

e-mean (mev)	initial	time after discharge					
		304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
1.00E-02	2.53E+14	1.84E+12	9.01E+11	5.05E+11	3.13E+11	2.17E+11	1.69E+11
3.00E-02	1.11E+14	8.29E+11	4.10E+11	2.27E+11	1.38E+11	9.41E+10	7.20E+10
5.50E-02	5.92E+13	4.27E+11	2.10E+11	1.16E+11	7.01E+10	4.75E+10	3.62E+10
8.50E-02	4.11E+13	2.77E+11	1.36E+11	7.40E+10	4.38E+10	2.90E+10	2.15E+10
1.20E-01	3.34E+13	3.94E+11	1.91E+11	9.71E+10	5.20E+10	3.02E+10	1.96E+10
1.70E-01	5.44E+13	1.75E+11	8.40E+10	4.58E+10	2.73E+10	1.81E+10	1.35E+10
3.00E-01	1.10E+14	1.96E+11	9.67E+10	5.21E+10	3.04E+10	1.98E+10	1.45E+10
6.50E-01	2.23E+14	1.41E+12	2.80E+11	1.97E+11	1.71E+11	1.58E+11	1.49E+11
1.13E+00	7.81E+13	2.02E+10	1.00E+10	5.30E+09	2.93E+09	1.74E+09	1.13E+09
1.58E+00	4.08E+13	9.69E+09	4.74E+09	2.34E+09	1.18E+09	6.10E+08	3.32E+08
2.00E+00	1.23E+13	1.71E+10	8.21E+09	3.93E+09	1.89E+09	9.06E+08	4.37E+08
2.40E+00	1.06E+13	3.30E+08	1.73E+08	9.11E+07	4.84E+07	2.59E+07	1.39E+07
2.80E+00	4.23E+12	4.16E+07	2.25E+07	1.22E+07	6.64E+06	3.64E+06	2.00E+06
3.25E+00	2.48E+12	4.96E+06	2.81E+06	1.59E+06	9.03E+05	5.12E+05	2.90E+05
3.75E+00	1.26E+12	2.19E+03	1.24E+03	7.02E+02	3.98E+02	2.26E+02	1.28E+02
4.25E+00	1.40E+12	1.63E-09	1.71E-09	1.77E-09	1.82E-09	1.86E-09	1.89E-09
4.75E+00	4.09E+11	8.17E-10	8.56E-10	8.88E-10	9.13E-10	9.34E-10	9.50E-10
5.50E+00	3.04E+11	6.06E-10	6.35E-10	6.59E-10	6.78E-10	6.93E-10	7.05E-10
total	1.04E+15	5.60E+12	2.33E+12	1.33E+12	8.52E+11	6.17E+11	4.97E+11
mev/sec	4.40E+14	1.21E+12	3.28E+11	2.05E+11	1.55E+11	1.30E+11	1.16E+11

spectrum of energy release rates, mev/watt-sec
 basis = single reactor assembly

e-mean (mev)	initial	time after discharge					
		304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
1.00E-02	6.34E+08	4.61E+06	2.25E+06	1.26E+06	7.82E+05	5.43E+05	4.22E+05
3.00E-02	8.32E+08	6.22E+06	3.08E+06	1.70E+06	1.03E+06	7.05E+05	5.40E+05
5.50E-02	8.14E+08	5.88E+06	2.89E+06	1.59E+06	9.64E+05	6.53E+05	4.97E+05
8.50E-02	8.74E+08	5.88E+06	2.89E+06	1.57E+06	9.31E+05	6.16E+05	4.58E+05
1.20E-01	1.00E+09	1.18E+07	5.73E+06	2.91E+06	1.56E+06	9.07E+05	5.87E+05
1.70E-01	2.31E+09	7.43E+06	3.57E+06	1.95E+06	1.16E+06	7.69E+05	5.75E+05
3.00E-01	8.21E+09	1.47E+07	7.25E+06	3.91E+06	2.28E+06	1.48E+06	1.08E+06
6.50E-01	3.62E+10	2.29E+08	4.55E+07	3.20E+07	2.79E+07	2.56E+07	2.43E+07
1.13E+00	2.20E+10	5.69E+06	2.82E+06	1.49E+06	8.25E+05	4.89E+05	3.17E+05
1.58E+00	1.61E+10	3.82E+06	1.87E+06	9.23E+05	4.64E+05	2.40E+05	1.31E+05
2.00E+00	6.13E+09	8.57E+06	4.10E+06	1.97E+06	9.43E+05	4.53E+05	2.19E+05
2.40E+00	6.38E+09	1.98E+05	1.04E+05	5.47E+04	2.90E+04	1.55E+04	8.36E+03

	2.80E+00	2.96E+09	2.92E+04	1.57E+04	8.53E+03	4.65E+03	2.55E+03	1.40E+03
	3.25E+00	2.01E+09	4.03E+03	2.28E+03	1.29E+03	7.34E+02	4.16E+02	2.36E+02
	3.75E+00	1.18E+09	2.05E+00	1.16E+00	6.59E-01	3.73E-01	2.12E-01	1.20E-01
	4.25E+00	1.48E+09	1.73E-12	1.81E-12	1.88E-12	1.93E-12	1.98E-12	2.01E-12
	4.75E+00	4.85E+08	9.70E-13	1.02E-12	1.05E-12	1.08E-12	1.11E-12	1.13E-12
	5.50E+00	4.18E+08	8.33E-13	8.73E-13	9.06E-13	9.32E-13	9.52E-13	9.69E-13
0	total	1.10E+11	3.04E+08	8.20E+07	5.13E+07	3.88E+07	3.25E+07	2.91E+07
0	gamma watts	7.05E+01	1.95E-01	5.26E-02	3.29E-02	2.49E-02	2.08E-02	1.87E-02

principal photon sources in group 1, photons/sec
 mean energy = .0100 mev. nuclides exceeding 1.0E-03 of total group release rate (2.17E+11) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr 85	2.96E+09	2.81E+09	2.66E+09	2.52E+09	2.39E+09	2.27E+09	2.15E+09
sr 90	1.95E+10	1.91E+10	1.87E+10	1.83E+10	1.80E+10	1.76E+10	1.72E+10
y 90	9.48E+10	9.39E+10	9.20E+10	9.01E+10	8.83E+10	8.65E+10	8.47E+10
rh106	2.33E+11	1.32E+11	7.49E+10	4.24E+10	2.41E+10	1.36E+10	7.73E+09
cs137	1.71E+10	1.68E+10	1.65E+10	1.62E+10	1.59E+10	1.55E+10	1.53E+10
ba137m	8.07E+08	7.88E+08	7.73E+08	7.58E+08	7.43E+08	7.29E+08	7.15E+08
ce144	2.09E+11	9.96E+10	4.75E+10	2.26E+10	1.08E+10	5.15E+09	2.46E+09
pr144	2.77E+12	1.32E+12	6.29E+11	3.00E+11	1.43E+11	6.83E+10	3.26E+10
pm147	1.99E+10	1.68E+10	1.35E+10	1.08E+10	8.67E+09	6.95E+09	5.58E+09
eu155	4.34E+08	3.84E+08	3.39E+08	3.00E+08	2.65E+08	2.34E+08	2.07E+08

principal photon sources in group 2, photons/sec
 mean energy = .0300 mev. nuclides exceeding 1.0E-03 of total group release rate (9.41E+10) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr 85	8.64E+08	8.19E+08	7.76E+08	7.35E+08	6.97E+08	6.60E+08	6.26E+08
sr 90	5.51E+09	5.40E+09	5.29E+09	5.18E+09	5.08E+09	4.97E+09	4.87E+09
y 90	3.09E+10	3.06E+10	3.00E+10	2.93E+10	2.87E+10	2.82E+10	2.76E+10
rh106	7.78E+10	4.41E+10	2.50E+10	1.42E+10	8.03E+09	4.55E+09	2.58E+09
sb125	4.15E+09	3.40E+09	2.75E+09	2.23E+09	1.80E+09	1.46E+09	1.18E+09
te125m	1.75E+09	1.92E+09	1.57E+09	1.27E+09	1.03E+09	8.32E+08	6.73E+08
cs137	4.77E+09	4.68E+09	4.59E+09	4.50E+09	4.42E+09	4.33E+09	4.25E+09
ba137m	1.39E+10	1.35E+10	1.33E+10	1.30E+10	1.28E+10	1.25E+10	1.23E+10
ce144	4.85E+11	2.31E+11	1.10E+11	5.26E+10	2.51E+10	1.20E+10	5.70E+09
pr144	9.15E+11	4.37E+11	2.08E+11	9.93E+10	4.74E+10	2.26E+10	1.08E+10
pr144m	1.87E+10	8.91E+09	4.25E+09	2.03E+09	9.67E+08	4.61E+08	2.20E+08
pm147	4.37E+09	3.69E+09	2.96E+09	2.37E+09	1.91E+09	1.53E+09	1.23E+09

principal photon sources in group 3, photons/sec
 mean energy = .0550 mev. nuclides exceeding 1.0E-03 of total group release rate (4.75E+10) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr 85	5.30E+08	5.02E+08	4.76E+08	4.51E+08	4.27E+08	4.05E+08	3.84E+08
sr 90	3.26E+09	3.19E+09	3.13E+09	3.06E+09	3.00E+09	2.94E+09	2.88E+09
y 90	2.13E+10	2.11E+10	2.07E+10	2.03E+10	1.99E+10	1.95E+10	1.91E+10
rh106	5.51E+10	3.12E+10	1.77E+10	1.00E+10	5.69E+09	3.23E+09	1.83E+09
cs137	2.78E+09	2.72E+09	2.67E+09	2.62E+09	2.57E+09	2.52E+09	2.47E+09
ce144	7.01E+10	3.34E+10	1.60E+10	7.61E+09	3.63E+09	1.73E+09	8.25E+08
pr144	6.43E+11	3.06E+11	1.46E+11	6.97E+10	3.32E+10	1.59E+10	7.56E+09
pm147	1.84E+09	1.55E+09	1.24E+09	9.98E+08	8.01E+08	6.42E+08	5.15E+08
eu155	1.27E+09	1.12E+09	9.89E+08	8.74E+08	7.73E+08	6.83E+08	6.04E+08

principal photon sources in group 4, photons/sec
 mean energy = .0850 mev. nuclides exceeding 1.0E-03 of total group release rate (2.90E+10) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr 85	2.65E+08	2.51E+08	2.38E+08	2.26E+08	2.14E+08	2.03E+08	1.92E+08
sr 90	1.55E+09	1.52E+09	1.49E+09	1.46E+09	1.43E+09	1.40E+09	1.37E+09
y 90	1.24E+10	1.22E+10	1.20E+10	1.17E+10	1.15E+10	1.13E+10	1.10E+10

rh106	3.28E+10	1.86E+10	1.05E+10	5.97E+09	3.38E+09	1.92E+09	1.09E+09
cs137	1.30E+09	1.28E+09	1.25E+09	1.23E+09	1.20E+09	1.18E+09	1.16E+09
ce144	9.90E+10	4.72E+10	2.25E+10	1.07E+10	5.12E+09	2.44E+09	1.17E+09
pr144	3.78E+11	1.80E+11	8.60E+10	4.10E+10	1.96E+10	9.33E+09	4.45E+09
pm147	5.22E+08	4.41E+08	3.54E+08	2.84E+08	2.28E+08	1.83E+08	1.47E+08
eu155	1.92E+09	1.70E+09	1.50E+09	1.33E+09	1.17E+09	1.04E+09	9.17E+08

0 principal photon sources in group 5, photons/sec
 mean energy = .1200 mev. nuclides exceeding 1.0E-03 of total group release rate (3.02E+10) at 1521.9 d
 nuclide

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr 85	1.60E+08	1.52E+08	1.44E+08	1.36E+08	1.29E+08	1.22E+08	1.16E+08
sr 90	8.84E+08	8.66E+08	8.48E+08	8.31E+08	8.14E+08	7.97E+08	7.81E+08
y 90	8.69E+09	8.61E+09	8.43E+09	8.26E+09	8.09E+09	7.93E+09	7.77E+09
rh106	2.37E+10	1.34E+10	7.60E+09	4.31E+09	2.44E+09	1.38E+09	7.85E+08
cs137	7.29E+08	7.15E+08	7.01E+08	6.88E+08	6.75E+08	6.62E+08	6.49E+08
ce144	4.86E+11	2.32E+11	1.10E+11	5.27E+10	2.51E+10	1.20E+10	5.71E+09
pr144	2.71E+11	1.29E+11	6.16E+10	2.94E+10	1.40E+10	6.68E+09	3.18E+09
pm147	1.66E+08	1.40E+08	1.12E+08	9.00E+07	7.22E+07	5.80E+07	4.65E+07
eu155	1.10E+09	9.70E+08	8.57E+08	7.58E+08	6.70E+08	5.92E+08	5.23E+08

0 principal photon sources in group 6, photons/sec
 mean energy = .1700 mev. nuclides exceeding 1.0E-03 of total group release rate (1.81E+10) at 1521.9 d
 nuclide

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr 85	1.27E+08	1.20E+08	1.14E+08	1.08E+08	1.02E+08	9.71E+07	9.20E+07
sr 90	6.30E+08	6.17E+08	6.05E+08	5.93E+08	5.81E+08	5.69E+08	5.57E+08
y 90	8.96E+09	8.87E+09	8.69E+09	8.51E+09	8.34E+09	8.17E+09	8.00E+09
rh106	2.54E+10	1.44E+10	8.15E+09	4.62E+09	2.62E+09	1.48E+09	8.42E+08
sb125	6.25E+08	5.12E+08	4.15E+08	3.36E+08	2.72E+08	2.20E+08	1.78E+08
cs137	5.15E+08	5.05E+08	4.95E+08	4.86E+08	4.76E+08	4.67E+08	4.58E+08
ce144	1.04E+09	4.98E+08	2.38E+08	1.13E+08	5.41E+07	2.58E+07	1.23E+07
pr144	2.86E+11	1.36E+11	6.51E+10	3.10E+10	1.48E+10	7.06E+09	3.37E+09

1 principal photon sources in group 7, photons/sec
 mean energy = .3000 mev. nuclides exceeding 1.0E-03 of total group release rate (1.98E+10) at 1521.9 d
 nuclide

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr 85	7.67E+07	7.27E+07	6.89E+07	6.53E+07	6.19E+07	5.86E+07	5.55E+07
sr 90	2.86E+08	2.80E+08	2.74E+08	2.69E+08	2.63E+08	2.58E+08	2.53E+08
y 90	9.95E+09	9.85E+09	9.65E+09	9.45E+09	9.26E+09	9.07E+09	8.89E+09
rh106	3.06E+10	1.73E+10	9.83E+09	5.57E+09	3.16E+09	1.79E+09	1.02E+09
sb125	2.37E+08	1.94E+08	1.57E+08	1.27E+08	1.03E+08	8.33E+07	6.74E+07
cs137	2.60E+08	2.55E+08	2.51E+08	2.46E+08	2.41E+08	2.37E+08	2.32E+08
pr144	3.35E+11	1.60E+11	7.62E+10	3.63E+10	1.73E+10	8.27E+09	3.94E+09

0 principal photon sources in group 8, photons/sec
 mean energy = .6500 mev. nuclides exceeding 1.0E-03 of total group release rate (1.58E+11) at 1521.9 d
 nuclide

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
y 90	4.21E+09	4.16E+09	4.08E+09	4.00E+09	3.91E+09	3.83E+09	3.76E+09
rh106	9.45E+10	5.36E+10	3.04E+10	1.72E+10	9.75E+09	5.53E+09	3.13E+09
sb125	5.08E+09	4.16E+09	3.37E+09	2.73E+09	2.21E+09	1.79E+09	1.45E+09
ba137m	1.56E+11	1.52E+11	1.49E+11	1.46E+11	1.44E+11	1.41E+11	1.38E+11
pr144	2.29E+11	1.09E+11	5.20E+10	2.48E+10	1.18E+10	5.64E+09	2.69E+09

0 principal photon sources in group 9, photons/sec
 mean energy = 1.1250 mev. nuclides exceeding 1.0E-03 of total group release rate (1.74E+09) at 1521.9 d
 nuclide

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
y 90	5.48E+08	5.43E+08	5.32E+08	5.21E+08	5.11E+08	5.00E+08	4.90E+08
rh106	8.80E+09	4.99E+09	2.83E+09	1.60E+09	9.09E+08	5.15E+08	2.92E+08
pr144	2.93E+10	1.40E+10	6.65E+09	3.17E+09	1.51E+09	7.22E+08	3.44E+08

0 principal photon sources in group 10, photons/sec

mean energy = 1.5750 mev. nuclides exceeding 1.0E-03 of total group release rate (6.10E+08) at 1521.9 d
 nuclide time after discharge
 initial 304.4 d 608.8 d 913.1 d 1217.5 d 1521.9 d 1826.3 d
 y 90 7.00E+07 6.93E+07 6.79E+07 6.65E+07 6.52E+07 6.39E+07 6.26E+07
 rh106 1.66E+09 9.41E+08 5.33E+08 3.02E+08 1.71E+08 9.71E+07 5.51E+07
 pr144 1.82E+10 8.68E+09 4.14E+09 1.97E+09 9.42E+08 4.49E+08 2.14E+08

0 principal photon sources in group 11, photons/sec
 mean energy = 2.0000 mev. nuclides exceeding 1.0E-03 of total group release rate (9.06E+08) at 1521.9 d
 nuclide time after discharge
 initial 304.4 d 608.8 d 913.1 d 1217.5 d 1521.9 d 1826.3 d
 y 90 4.19E+06 4.15E+06 4.06E+06 3.98E+06 3.90E+06 3.82E+06 3.74E+06
 rh106 5.39E+08 3.06E+08 1.73E+08 9.82E+07 5.57E+07 3.16E+07 1.79E+07
 pr144 3.53E+10 1.68E+10 8.03E+09 3.83E+09 1.83E+09 8.71E+08 4.15E+08

1 0 principal photon sources in group 12, photons/sec
 mean energy = 2.4000 mev. nuclides exceeding 1.0E-03 of total group release rate (2.59E+07) at 1521.9 d
 nuclide time after discharge
 initial 304.4 d 608.8 d 913.1 d 1217.5 d 1521.9 d 1826.3 d
 rh106 3.01E+08 1.71E+08 9.69E+07 5.49E+07 3.11E+07 1.76E+07 1.00E+07
 pr144 3.34E+08 1.59E+08 7.59E+07 3.62E+07 1.73E+07 8.23E+06 3.92E+06

0 principal photon sources in group 13, photons/sec
 mean energy = 2.8000 mev. nuclides exceeding 1.0E-03 of total group release rate (3.64E+06) at 1521.9 d
 nuclide time after discharge
 initial 304.4 d 608.8 d 913.1 d 1217.5 d 1521.9 d 1826.3 d
 rh106 5.09E+07 2.88E+07 1.63E+07 9.27E+06 5.25E+06 2.98E+06 1.69E+06
 pr144 2.69E+07 1.28E+07 6.11E+06 2.91E+06 1.39E+06 6.63E+05 3.16E+05

0 principal photon sources in group 14, photons/sec
 mean energy = 3.2500 mev. nuclides exceeding 1.0E-03 of total group release rate (5.12E+05) at 1521.9 d
 nuclide time after discharge
 initial 304.4 d 608.8 d 913.1 d 1217.5 d 1521.9 d 1826.3 d
 rh106 8.75E+06 4.96E+06 2.81E+06 1.59E+06 9.03E+05 5.12E+05 2.90E+05

0 principal photon sources in group 15, photons/sec
 mean energy = 3.7500 mev. nuclides exceeding 1.0E-03 of total group release rate (2.26E+02) at 1521.9 d
 nuclide time after discharge
 initial 304.4 d 608.8 d 913.1 d 1217.5 d 1521.9 d 1826.3 d
 rh106 3.86E+03 2.19E+03 1.24E+03 7.02E+02 3.98E+02 2.26E+02 1.28E+02

0 principal photon sources in group 16, photons/sec
 mean energy = 4.2500 mev. nuclides exceeding 1.0E-03 of total group release rate (1.86E-09) at 1521.9 d
 nuclide time after discharge
 initial 304.4 d 608.8 d 913.1 d 1217.5 d 1521.9 d 1826.3 d
 ce142 1.47E-09 1.47E-09 1.47E-09 1.47E-09 1.47E-09 1.47E-09 1.47E-09
 sm147 6.24E-11 1.61E-10 2.40E-10 3.03E-10 3.54E-10 3.95E-10 4.27E-10

0 principal photon sources in group 17, photons/sec
 mean energy = 4.7500 mev. nuclides exceeding 1.0E-03 of total group release rate (9.34E-10) at 1521.9 d
 nuclide time after discharge
 initial 304.4 d 608.8 d 913.1 d 1217.5 d 1521.9 d 1826.3 d
 ce142 7.36E-10 7.36E-10 7.36E-10 7.36E-10 7.36E-10 7.36E-10 7.36E-10
 sm147 3.13E-11 8.07E-11 1.20E-10 1.52E-10 1.77E-10 1.98E-10 2.14E-10

0 principal photon sources in group 18, photons/sec
 mean energy = 5.5000 mev. nuclides exceeding 1.0E-03 of total group release rate (6.93E-10) at 1521.9 d
 nuclide time after discharge
 initial 304.4 d 608.8 d 913.1 d 1217.5 d 1521.9 d 1826.3 d
 ce142 5.46E-10 5.46E-10 5.46E-10 5.46E-10 5.46E-10 5.46E-10 5.46E-10
 sm147 2.32E-11 5.98E-11 8.92E-11 1.13E-10 1.32E-10 1.47E-10 1.59E-10

1 photon spectrum as a function of time for heavy metals and their daughters
 0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 0 power= .00 mw, burnup= 1.mwd, flux= 2.79E+08 n**2-sec
 actinide photon release rates, photons/sec

basis = single reactor assembly

0

e mean (mev)	initial	time after discharge					
		304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
1.00E-02	1.33E+14	5.50E+11	5.50E+11	5.50E+11	5.50E+11	5.50E+11	5.50E+11
3.00E-02	8.46E+12	4.62E+10	4.62E+10	4.62E+10	4.62E+10	4.62E+10	4.62E+10
5.50E-02	1.09E+13	2.01E+10	2.01E+10	2.01E+10	2.01E+10	2.01E+10	2.01E+10
8.50E-02	5.26E+13	1.51E+11	1.51E+11	1.51E+11	1.51E+11	1.51E+11	1.51E+11
1.20E-01	5.42E+13	2.90E+10	2.90E+10	2.90E+10	2.90E+10	2.90E+10	2.90E+10
1.70E-01	1.72E+12	1.90E+10	1.90E+10	1.90E+10	1.90E+10	1.90E+10	1.90E+10
3.00E-01	2.87E+13	1.30E+11	1.30E+11	1.30E+11	1.30E+11	1.30E+11	1.30E+11
6.50E-01	1.45E+12	6.30E+09	6.30E+09	6.30E+09	6.30E+09	6.30E+09	6.30E+09
1.13E+00	1.86E+12	9.16E+08	9.16E+08	9.16E+08	9.16E+08	9.16E+08	9.16E+08
1.58E+00	1.07E+08	1.07E+08	1.07E+08	1.07E+08	1.07E+08	1.07E+08	1.07E+08
2.00E+00	3.65E+07	3.65E+07	3.65E+07	3.65E+07	3.65E+07	3.65E+07	3.65E+07
2.40E+00	2.90E+04	2.91E+04	2.93E+04	2.95E+04	2.97E+04	3.01E+04	3.05E+04
2.80E+00	1.75E+04	1.85E+04	1.98E+04	2.14E+04	2.30E+04	2.46E+04	2.60E+04
3.25E+00	1.02E+04	1.02E+04	1.02E+04	1.02E+04	1.02E+04	1.02E+04	1.02E+04
3.75E+00	5.89E+03	5.89E+03	5.89E+03	5.89E+03	5.89E+03	5.89E+03	5.89E+03
4.25E+00	3.41E+03	3.41E+03	3.41E+03	3.41E+03	3.41E+03	3.41E+03	3.41E+03
4.75E+00	1.97E+03	1.97E+03	1.97E+03	1.97E+03	1.97E+03	1.97E+03	1.97E+03
5.50E+00	1.78E+03	1.78E+03	1.78E+03	1.78E+03	1.78E+03	1.78E+03	1.78E+03
total	2.93E+14	9.52E+11	9.52E+11	9.52E+11	9.52E+11	9.52E+11	9.52E+11
mev/sec	2.51E+13	7.20E+10	7.20E+10	7.20E+10	7.20E+10	7.20E+10	7.20E+10

actinide energy release rates, mev/watt-sec

basis = single reactor assembly

0

0

0

e mean (mev)	initial	time after discharge					
		304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
1.00E-02	3.33E+08	1.37E+06	1.37E+06	1.37E+06	1.37E+06	1.37E+06	1.37E+06
3.00E-02	6.34E+07	3.46E+05	3.46E+05	3.46E+05	3.46E+05	3.46E+05	3.46E+05
5.50E-02	1.50E+08	2.77E+05	2.77E+05	2.77E+05	2.77E+05	2.77E+05	2.77E+05
8.50E-02	1.12E+09	3.20E+06	3.20E+06	3.20E+06	3.20E+06	3.20E+06	3.20E+06
1.20E-01	1.63E+09	8.69E+05	8.69E+05	8.69E+05	8.69E+05	8.69E+05	8.69E+05
1.70E-01	7.31E+07	8.07E+05	8.07E+05	8.07E+05	8.07E+05	8.07E+05	8.07E+05
3.00E-01	2.15E+09	9.77E+06	9.77E+06	9.77E+06	9.77E+06	9.77E+06	9.77E+06
6.50E-01	2.36E+08	1.02E+06	1.02E+06	1.02E+06	1.02E+06	1.02E+06	1.02E+06
1.13E+00	5.24E+08	2.58E+05	2.58E+05	2.58E+05	2.58E+05	2.58E+05	2.58E+05
1.58E+00	4.20E+04	4.21E+04	4.21E+04	4.21E+04	4.21E+04	4.21E+04	4.21E+04
2.00E+00	1.82E+04	1.82E+04	1.82E+04	1.82E+04	1.82E+04	1.82E+04	1.82E+04
2.40E+00	1.74E+01	1.75E+01	1.76E+01	1.77E+01	1.78E+01	1.80E+01	1.83E+01
2.80E+00	1.23E+01	1.29E+01	1.39E+01	1.50E+01	1.61E+01	1.72E+01	1.82E+01
3.25E+00	8.26E+00	8.26E+00	8.27E+00	8.27E+00	8.27E+00	8.27E+00	8.27E+00
3.75E+00	5.52E+00	5.52E+00	5.52E+00	5.52E+00	5.52E+00	5.52E+00	5.52E+00
4.25E+00	3.62E+00	3.62E+00	3.62E+00	3.62E+00	3.62E+00	3.62E+00	3.62E+00
4.75E+00	2.34E+00	2.34E+00	2.34E+00	2.34E+00	2.34E+00	2.34E+00	2.34E+00
5.50E+00	2.45E+00	2.45E+00	2.45E+00	2.45E+00	2.45E+00	2.45E+00	2.45E+00
total	6.27E+09	1.80E+07	1.80E+07	1.80E+07	1.80E+07	1.80E+07	1.80E+07
gamma watts	4.02E+00	1.15E-02	1.15E-02	1.15E-02	1.15E-02	1.15E-02	1.15E-02

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neutron source intensity as a function of time

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
alpha-n neutron source, neutrons/sec/basis
basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
pb210	6.26E-16	3.94E-15	1.21E-14	2.73E-14	5.15E-14	8.68E-14	1.35E-13
bi210	1.50E-13	1.00E-12	3.09E-12	6.96E-12	1.31E-11	2.22E-11	3.45E-11

am240	2.16E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am241	1.36E-09	5.80E-09	1.00E-08	1.41E-08	1.80E-08	2.18E-08	2.54E-08
am242m	7.95E-18	7.92E-18	7.88E-18	7.85E-18	7.82E-18	7.79E-18	7.76E-18
am243	6.04E-21	6.06E-21	6.06E-21	6.06E-21	6.06E-21	6.06E-21	6.06E-21
cm241	2.51E-26	4.04E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm242	3.17E-12	8.85E-13	2.44E-13	6.87E-14	2.06E-14	7.39E-15	3.77E-15
cm243	4.24E-21	4.16E-21	4.07E-21	3.99E-21	3.91E-21	3.83E-21	3.76E-21
cm244	2.61E-24	2.55E-24	2.47E-24	2.39E-24	2.32E-24	2.25E-24	2.18E-24
total	1.27E+04	1.27E+04	1.27E+04	1.27E+04	1.27E+04	1.27E+04	1.27E+04

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neutron source intensity as a function of time

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
spontaneous fission neutron source, neutrons/sec/basis
basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
th230	1.45E-06	2.67E-06	3.88E-06	5.09E-06	6.30E-06	7.52E-06	8.73E-06
pa231	6.45E-07	1.14E-06	1.65E-06	2.15E-06	2.65E-06	3.15E-06	3.65E-06
u232	8.58E-09	1.98E-08	2.88E-08	3.61E-08	4.20E-08	4.67E-08	5.05E-08
u234	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01
u235	1.68E+00	1.68E+00	1.68E+00	1.68E+00	1.68E+00	1.68E+00	1.68E+00
u236	1.57E+02	1.57E+02	1.57E+02	1.57E+02	1.57E+02	1.57E+02	1.57E+02
u237	1.22E-09	3.42E-23	1.77E-24	1.70E-24	1.63E-24	1.57E-24	1.50E-24
u238	1.17E+05	1.17E+05	1.17E+05	1.17E+05	1.17E+05	1.17E+05	1.17E+05
u239	9.66E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np236	7.39E-12	7.39E-12	7.39E-12	7.39E-12	7.39E-12	7.39E-12	7.39E-12
np238	2.02E-08	2.32E-30	2.31E-30	2.30E-30	2.29E-30	2.29E-30	2.28E-30
np239	1.98E-05	6.28E-32	6.28E-32	6.28E-32	6.28E-32	6.28E-32	6.28E-32
pu236	2.21E-03	1.82E-03	1.49E-03	1.22E-03	1.00E-03	8.19E-04	6.71E-04
pu238	1.20E+02	1.21E+02	1.20E+02	1.19E+02	1.18E+02	1.18E+02	1.17E+02
pu239	2.67E-02	2.70E-02	2.70E-02	2.70E-02	2.70E-02	2.70E-02	2.70E-02
pu240	6.01E-03	6.01E-03	6.01E-03	6.01E-03	6.01E-03	6.01E-03	6.01E-03
pu241	1.88E-12	1.81E-12	1.74E-12	1.67E-12	1.60E-12	1.54E-12	1.48E-12
pu242	1.29E-13	1.29E-13	1.29E-13	1.29E-13	1.29E-13	1.29E-13	1.29E-13
pu243	1.04E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am241	5.23E-13	2.23E-12	3.87E-12	5.44E-12	6.94E-12	8.39E-12	9.77E-12
am242m	3.78E-17	3.76E-17	3.75E-17	3.73E-17	3.72E-17	3.70E-17	3.69E-17
am242	2.17E-16	4.09E-20	4.07E-20	4.05E-20	4.04E-20	4.02E-20	4.00E-20
am243	2.78E-23	2.79E-23	2.79E-23	2.79E-23	2.79E-23	2.79E-23	2.79E-23
am244	5.61E-31	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm242	1.58E-11	4.42E-12	1.22E-12	3.43E-13	1.03E-13	3.69E-14	1.88E-14
cm243	9.21E-23	9.03E-23	8.85E-23	8.67E-23	8.49E-23	8.32E-23	8.16E-23
cm244	3.40E-22	3.33E-22	3.22E-22	3.12E-22	3.02E-22	2.93E-22	2.84E-22
cm245	1.80E-34	1.80E-34	1.80E-34	1.80E-34	1.80E-34	1.80E-34	1.80E-34
cm246	2.77E-35	2.77E-35	2.77E-35	2.77E-35	2.77E-35	2.77E-35	2.77E-35
total	1.18E+05	1.18E+05	1.18E+05	1.18E+05	1.18E+05	1.18E+05	1.18E+05

0
1

alpha-n neutron source spectrum as a function of time
(using reaction spectra for uranium dioxide)

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
alpha-n neutron spectra, neutrons/sec/basis
basis = single reactor assembly

boundaries, mev	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
-----------------	---------	---------	---------	---------	----------	----------	----------

24	5.00E-08	- 1.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
25	3.00E-08	- 5.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26	1.00E-08	- 3.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
27	1.00E-11	- 1.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
0			1.176E+05	1.176E+05	1.176E+05	1.176E+05	1.176E+05	1.176E+05	1.176E+05	1.176E+05	1.176E+05

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total (alpha-n plus spon. fission) neutron source spectrum as a function of time
(using reaction spectra for uranium dioxide)

0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
neutron spectra, neutrons/sec/basis
basis = single reactor assembly

	boundaries, mev	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
1	6.43E+00 - 2.00E+01	2.215E+03	2.214E+03	2.214E+03	2.214E+03	2.214E+03	2.214E+03	2.214E+03
2	3.00E+00 - 6.43E+00	2.711E+04	2.711E+04	2.711E+04	2.711E+04	2.711E+04	2.711E+04	2.711E+04
3	1.85E+00 - 3.00E+00	3.362E+04	3.362E+04	3.362E+04	3.361E+04	3.361E+04	3.361E+04	3.361E+04
4	1.40E+00 - 1.85E+00	1.725E+04	1.726E+04	1.726E+04	1.726E+04	1.726E+04	1.726E+04	1.726E+04
5	9.00E-01 - 1.40E+00	2.212E+04	2.213E+04	2.213E+04	2.213E+04	2.213E+04	2.213E+04	2.213E+04
6	4.00E-01 - 9.00E-01	2.343E+04	2.343E+04	2.343E+04	2.343E+04	2.343E+04	2.343E+04	2.343E+04
7	1.00E-01 - 4.00E-01	4.578E+03	4.576E+03	4.576E+03	4.575E+03	4.575E+03	4.575E+03	4.575E+03
8	1.70E-02 - 1.00E-01	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
9	3.00E-03 - 1.70E-02	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
10	5.50E-04 - 3.00E-03	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
11	1.00E-04 - 5.50E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
12	3.00E-05 - 1.00E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
13	1.00E-05 - 3.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
14	3.05E-06 - 1.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
15	1.77E-06 - 3.05E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
16	1.30E-06 - 1.77E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
17	1.13E-06 - 1.30E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
18	1.00E-06 - 1.13E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
19	8.00E-07 - 1.00E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
20	4.00E-07 - 8.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
21	3.25E-07 - 4.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
22	2.25E-07 - 3.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
23	1.00E-07 - 2.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24	5.00E-08 - 1.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
25	3.00E-08 - 5.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26	1.00E-08 - 3.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
27	1.00E-11 - 1.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
0		1.303E+05	1.303E+05	1.303E+05	1.303E+05	1.303E+05	1.303E+05	1.303E+05

* gamma sources determined *

0 case applies the following photon data base
master photon library
in binary mode
0 the sources include photons of nuclides for...

light elements
actinides
fission products

	energy interval	in mev	photons / second	mev / second
1	1.0000E-02 to	5.0000E-02	3.6132E+11	1.0840E+10
0	5.0000E-02 to	1.0000E-01	2.2149E+11	1.6612E+10
0	1.0000E-01 to	2.0000E-01	7.5224E+10	1.1284E+10

2.0000E-01 to	3.0000E-01	2.4711E+10	6.1779E+09
3.0000E-01 to	4.0000E-01	1.0664E+11	3.7325E+10
4.0000E-01 to	6.0000E-01	1.3796E+10	6.8981E+09
6.0000E-01 to	8.0000E-01	1.3357E+11	9.3496E+10
8.0000E-01 to	1.0000E+00	1.7698E+09	1.5928E+09
1.0000E+00 to	1.3300E+00	1.2218E+09	1.4234E+09
1.3300E+00 to	1.6600E+00	3.8588E+08	5.7690E+08
1.6600E+00 to	2.0000E+00	1.3192E+08	2.4142E+08
2.0000E+00 to	2.5000E+00	3.7967E+08	8.5425E+08
2.5000E+00 to	3.0000E+00	2.4432E+06	6.7187E+06
3.0000E+00 to	4.0000E+00	2.8191E+05	9.8669E+05
4.0000E+00 to	5.0000E+00	5.3042E+03	2.3869E+04
5.0000E+00 to	6.5000E+00	2.1242E+03	1.2214E+04
6.5000E+00 to	8.0000E+00	4.1589E+02	3.0152E+03
8.0000E+00 to	1.0000E+01	8.8185E+01	7.9367E+02
totals		9.4065E+11	1.8733E+11

0
0
0
0
1
0
0
1

total energy from nuclides with spectrum data = 1.8733E+11
total energy from nuclides with no spectrum data = 4.6955E+04

.results on logical unit no. 71, position 2, for time step 6, subcase 7. (run position 1, case position 2)
title: sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
.terminated logical unit no. 71 with zero flag record.
* normal termination of execution *

1 primary module access and input record (scale driver - 95/03/29 - 09:06:37)

- module sas2h will be called
 SAS2H: Far-Field Crit based on B&W 15x15, 3.00wt%, 20gwd/mtu 40% H2O/ 8% UO2
 44group latticecell

' mixtures of tuff infinite slabs:

arbm-ftuff 2.6344 14 0 0 0 1001 1.055 8016 40.755 11023 0.570 12000 0.354
 13027 4.434 14000 20.193 19000 1.370 20000 1.439
 26000 0.494 92235 0.567 92234 0.007 92236 0.136
 92238 28.593 93237 0.033 1 1.0 538 end

- kr-83 1 0 1-20 538 end
- kr-85 1 0 1-20 538 end
- sr-90 1 0 1-20 538 end
- y-89 1 0 1-20 538 end
- mo-95 1 0 1-20 538 end
- zr-93 1 0 1-20 538 end
- zr-94 1 0 1-20 538 end
- zr-95 1 0 1-20 538 end
- nb-94 1 0 1-20 538 end
- tc-99 1 0 1-20 538 end
- rh-103 1 0 1-20 538 end
- rh-105 1 0 1-20 538 end
- ru-101 1 0 1-20 538 end
- ru-106 1 0 1-20 538 end
- pd-105 1 0 1-20 538 end
- pd-108 1 0 1-20 538 end
- ag-109 1 0 1-20 538 end
- sb-124 1 0 1-20 538 end
- xe-131 1 0 1-20 538 end
- xe-132 1 0 1-20 538 end
- xe-135 1 0 1-20 538 end
- xe-136 1 0 1-20 538 end
- cs-134 1 0 1-20 538 end
- cs-135 1 0 1-20 538 end
- cs-137 1 0 1-20 538 end
- ba-136 1 0 1-20 538 end
- la-139 1 0 1-20 538 end
- pr-141 1 0 1-20 538 end
- pr-143 1 0 1-20 538 end
- ce-144 1 0 1-20 538 end
- nd-143 1 0 1-20 538 end
- nd-145 1 0 1-20 538 end
- pm-147 1 0 1-20 538 end
- pm-148 1 0 1-20 538 end
- nd-147 1 0 1-20 538 end
- sm-147 1 0 1-20 538 end
- sm-149 1 0 1-20 538 end
- sm-150 1 0 1-20 538 end
- sm-151 1 0 1-20 538 end
- sm-152 1 0 1-20 538 end
- gd-155 1 0 1-20 538 end
- eu-153 1 0 1-20 538 end
- eu-154 1 0 1-20 538 end
- eu-155 1 0 1-20 538 end

arbm-tuff1 1.90533 9 0 0 0 1001 2.326 8016 57.779 11023 0.789 12000 0.490
 13027 6.130 14000 27.919 19000 1.894 20000 1.989
 26000 0.683 2 1.0 323. end

arbm-tuff2 1.90533 9 0 0 0 1001 2.326 8016 57.779 11023 0.789 12000 0.490
 13027 6.130 14000 27.919 19000 1.894 20000 1.989
 26000 0.683 3 1.0 323. end

```

/-----/
end comp
/-----/
/ fuel-pin-cell geometry:
symmslabcell 340. 280. 1 3 281. 2 end
/-----/
/ assembly and cycle parameters:
npin/assm=1 fuelngth=280. ncycles=1 nlib/cyc=5 volfueltot=1.1494E7
printlevel=6 inplevel=0 end
power=0.004 burn=3.6525e3 down=1.82625e3
end

```

```

1  oooooooooo  rrrrrrrrrrr  iiiiiiiiiii  ggggggggggg  eeeeeeeeeee  nn      nn  sssssssssss
   oooooooooo  rrrrrrrrrrr  iiiiiiiiiii  ggggggggggg  eeeeeeeeeee  nnn     nn  sssssssssss
   oo      oo  rr      rr  ii      ii  gg      gg  ee      ee  nnnn    nn  ss      ss
   oo      oo  rr      rr  ii      ii  gg      gg  ee      ee  nn  nn   nn  ss      ss
   oo      oo  rr      rr  ii      ii  gg      gg  ee      ee  nn  nn   nn  ss      ss
   oo      oo  rrrrrrrrrrr  ii      ii  gg      gg  eeeeeeee  nn  nn   nn  sssssssssss
   oo      oo  rrrrrrrrrrr  ii      ii  gg      gg  eeeeeeee  nn  nn   nn  sssssssssss
   oo      oo  rr      rr  ii      ii  gg      gg  ee      ee  nn  nn   nn  ss      ss
   oo      oo  rr      rr  ii      ii  gg      gg  ee      ee  nn  nn   nn  ss      ss
   oo      oo  rr      rr  ii      ii  gg      gg  ee      ee  nn  nnnn  ss      ss
   oooooooooo  rr      rr  iiiiiiiiiii  ggggggggggg  eeeeeeeeeee  nn      nn  sssssssssss
   oooooooooo  rr      rr  iiiiiiiiiii  ggggggggggg  eeeeeeeeeee  nn      nn  sssssssssss
0

```

```

   ddddddddddd  aaaaaaaaa  vv      vv  iiiiiiiiiii  sssssssssss
   ddddddddddd  aaaaaaaaa  vv      vv  iiiiiiiiiii  sssssssssss
   dd      dd  aa      aa  vv      vv  ii      ii  ss      ss
   dd      dd  aa      aa  vv      vv  ii      ii  ss      ss
   dd      dd  aaaaaaaaa  vv      vv  ii      ii  sssssssssss
   dd      dd  aaaaaaaaa  vv      vv  ii      ii  sssssssssss
   dd      dd  aa      aa  vv      vv  ii      ii  ss      ss
   dd      dd  aa      aa  vv      vv  ii      ii  ss      ss
   dd      dd  aa      aa  vv      vv  ii      ii  ss      ss
   ddddddddddd  aa      aa  vvv      vvv  iiiiiiiiiii  sssssssssss
   ddddddddddd  aa      aa  v      v  iiiiiiiiiii  sssssssssss
0

```

```

   0000000  8888888888  //  2222222222  8888888888  //  9999999999  6666666666
   00000000 8888888888  2222222222 8888888888 9999999999 6666666666
   00      00 88      88  22      22 88      88  99      99 66      66
   00      00 88      88  22      22 88      88  99      99 66      66
   00      00 88      88  22      22 88      88  99      99 66      66
   00      00 8888888888  22      22 8888888888 9999999999 6666666666
   00      00 8888888888  22      22 8888888888 9999999999 6666666666
   00      00 88      88  22      22 88      88  99      99 66      66
   00      00 88      88  22      22 88      88  99      99 66      66
   00      00 88      88  22      22 88      88  99      99 66      66
   00000000 8888888888  2222222222 8888888888 9999999999 6666666666
   0000000  8888888888  2222222222 8888888888 9999999999 6666666666

```

0

```

11      8888888888      000000      9999999999      44      3333333333
111     888888888888     000000000      999999999999     444     333333333333
1111    88      88      :::    00      00    99      99      :::    4444     33      33
11      88      88      :::    00     00    99      99      :::    44 44     33      33
11      88      88      :::    00     00    99      99      :::    44 44     33      33
11      88888888888     00      00    999999999999     44 44     333     333
11      88888888888     00     00    999999999999     44 44     333     333
11      88      88      :::    00     00    99      99      :::    44444444444444 33      33
11      88      88      :::    00     00    99      99      :::    44444444444444 33      33
11      88      88      :::    00     00    99      99      :::    44444444444444 33      33
11111111 8888888888888     000000000      999999999999     44      333333333333
11111111 88888888888     00000000      999999999999     44      333333333333
  
```

1
0

```

SSSSSSSSSS      CCCCCCCCCCC      aaaaaaaaa      ll      eeeeeeeeeee
SSSSSSSSSSSSSS CCCCCCCCCCCCC      aa            ll      eeeeeeeeeee
SS      SS      CC      CC      aa      aa      ll      ee
SS      SS      CC      CC      aa      aa      ll      ee
SS      SS      CC      CC      aa      aa      ll      ee
SSSSSSSSSSSS      CC      aaaaaaaaaa      ll      eeeeeeee
SSSSSSSSSSSSSS      CC      aaaaaaaaaa      ll      eeeeeeee
      SS      CC      aa      aa      ll      ee
      SS      CC      aa      aa      ll      ee
SS      SS      CC      CC      aa      aa      ll      ee
SSSSSSSSSSSSSS      CCCCCCCCCCCC      aa      aa      ll      eeeeeeeeeee
SSSSSSSSSSSS      CCCCCCCCCCCC      aa      aa      ll      eeeeeeeeeee
  
```

```

*****
*****
*****
*****          program verification information          *****
*****          code system:    scale version:    4.3          *****
*****
*****
*****          program:    o0o004          *****
*****
*****          creation date:    03/13/96          *****
*****
*****          library:    /usr1/ornl/Scale/bin          *****
*****
*****          test codes:    origins          *****
*****
*****          version:    3.0          *****
*****
*****          jobname:    davis          *****
*****
*****          date of execution:    08/28/96          *****
*****
*****          time of execution:    18:09:43          *****
*****
  
```


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 densities
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 densities
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 8/28/1996 date library was produced
0 1697 total number of nuclides in library
0 689 number of light-element nuclides
0 129 number of actinide nuclides
0 879 number of fission product nuclides
0 7993 number of nonzero off-diagonal matrix elements
0 *****

```

```

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 1
0 nuclide concentrations, grams
basis =single reactor assembly

```

```

initial 1E-18 d
na 23 1.73E+05 1.73E+05
al 27 1.35E+06 1.35E+06
total 1.52E+06 1.52E+06

```

```

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 2
0 nuclide concentrations, grams
basis =single reactor assembly

```

```

initial 1E-18 d
u234 2.12E+03 2.12E+03
u235 1.72E+05 1.72E+05
u236 4.12E+04 4.12E+04
u238 8.66E+06 8.66E+06
np237 9.99E+03 9.99E+03
total 8.88E+06 8.88E+06

```

```

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 page 3
0 power= .00mw, burnup= 3.mwd, flux= 3.00E+08n/cm**2-sec
basis =

```

(note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)

```

initial 182.6 d 365.3 d 547.9 d 730.5 d 730.5 d
productions 1.023181E+06 1.023184E+06 1.023188E+06 1.023192E+06 1.023196E+06 1.023196E+06
absorptions 8.460839E+05 8.460914E+05 8.460971E+05 8.461029E+05 8.461086E+05 8.461086E+05
k infinity 1.209313E+00 1.209307E+00 1.209303E+00 1.209300E+00 1.209296E+00 1.209296E+00
initial 182.6 d 365.3 d 547.9 d 730.5 d 730.5 d

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actinide
absorptions 8.423189E+05 8.423211E+05 8.423233E+05 8.423256E+05 8.423276E+05 8.423276E+05
non-actinide
abs. fracs. 4.449964E-03 4.456222E-03 4.460275E-03 4.464388E-03 4.468620E-03 4.468620E-03

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1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 4
0 fraction of total absorption rate

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power= .00mw, burnup= 3.mwd, flux= 3.00E+08n/cm**2-sec
initial 182.6 d 365.3 d 547.9 d 730.5 d 730.5 d

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sm149 .00E+00 3.59E-06 7.24E-06 1.09E-05 1.45E-05 1.45E-05
xe135 .00E+00 2.28E-06 2.28E-06 2.28E-06 2.28E-06 2.27E-06
sm151 .00E+00 1.52E-07 3.06E-07 4.58E-07 6.10E-07 6.10E-07
nd143 .00E+00 6.47E-08 1.38E-07 2.11E-07 2.85E-07 2.85E-07
gd157 .00E+00 3.73E-08 7.47E-08 1.12E-07 1.49E-07 1.49E-07
rh103 .00E+00 2.43E-08 5.85E-08 9.31E-08 1.28E-07 1.28E-07
cd113 .00E+00 3.18E-08 6.36E-08 9.53E-08 1.27E-07 1.27E-07
pm147 .00E+00 3.12E-08 6.13E-08 8.78E-08 1.11E-07 1.11E-07
xe131 .00E+00 2.22E-08 4.59E-08 6.97E-08 9.34E-08 9.34E-08
cs133 .00E+00 1.75E-08 3.59E-08 5.43E-08 7.28E-08 7.28E-08
tc 99 .00E+00 1.33E-08 2.69E-08 4.04E-08 5.40E-08 5.40E-08
nd145 .00E+00 1.04E-08 2.08E-08 3.12E-08 4.16E-08 4.16E-08
eu155 .00E+00 1.14E-08 2.19E-08 3.17E-08 4.08E-08 4.08E-08

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gd155	.00E+00	1.78E-09	6.93E-09	1.52E-08	2.64E-08	2.64E-08
mo 95	.00E+00	2.64E-09	8.99E-09	1.61E-08	2.34E-08	2.34E-08
sm152	.00E+00	5.54E-09	1.11E-08	1.66E-08	2.22E-08	2.22E-08
kr 83	.00E+00	4.45E-09	8.90E-09	1.34E-08	1.78E-08	1.78E-08
cs135	.00E+00	4.10E-09	8.23E-09	1.24E-08	1.65E-08	1.65E-08
ru101	.00E+00	3.25E-09	6.50E-09	9.74E-09	1.30E-08	1.30E-08
sm147	.00E+00	7.92E-10	3.19E-09	6.98E-09	1.20E-08	1.20E-08
pr141	.00E+00	2.27E-09	5.30E-09	8.34E-09	1.14E-08	1.14E-08
eu153	.00E+00	2.75E-09	5.54E-09	8.32E-09	1.11E-08	1.11E-08
la139	.00E+00	2.48E-09	4.96E-09	7.45E-09	9.93E-09	9.93E-09
rh105	.00E+00	8.28E-09	8.28E-09	8.28E-09	8.28E-09	8.27E-09
pd105	.00E+00	1.05E-09	2.12E-09	3.19E-09	4.25E-09	4.25E-09
zr 93	.00E+00	1.02E-09	2.05E-09	3.08E-09	4.11E-09	4.11E-09
eu151	.00E+00	2.17E-10	8.73E-10	1.96E-09	3.49E-09	3.49E-09
i129	.00E+00	7.29E-10	1.49E-09	2.26E-09	3.03E-09	3.03E-09
pr143	.00E+00	2.66E-09	2.66E-09	2.66E-09	2.66E-09	2.66E-09
mo 97	.00E+00	5.61E-10	1.13E-09	1.69E-09	2.26E-09	2.26E-09
xe133	.00E+00	1.99E-09	1.99E-09	1.99E-09	1.99E-09	1.99E-09
ag109	.00E+00	4.00E-10	8.03E-10	1.20E-09	1.61E-09	1.61E-09
nd144	.00E+00	1.43E-10	5.01E-10	9.97E-10	1.58E-09	1.58E-09
ce141	.00E+00	1.54E-09	1.57E-09	1.57E-09	1.57E-09	1.57E-09
pm149	.00E+00	9.62E-10	9.62E-10	9.62E-10	9.62E-10	9.61E-10
nd147	.00E+00	9.44E-10	9.44E-10	9.44E-10	9.44E-10	9.43E-10
zr 91	.00E+00	1.57E-10	4.10E-10	6.74E-10	9.40E-10	9.40E-10
ru102	.00E+00	2.29E-10	4.58E-10	6.87E-10	9.16E-10	9.16E-10
y 89	.00E+00	1.61E-10	4.07E-10	6.61E-10	9.15E-10	9.15E-10
ce142	.00E+00	2.05E-10	4.11E-10	6.16E-10	8.22E-10	8.22E-10
sr 90	.00E+00	2.08E-10	4.13E-10	6.16E-10	8.16E-10	8.16E-10
nd148	.00E+00	1.99E-10	3.99E-10	5.98E-10	7.98E-10	7.98E-10
nd146	.00E+00	1.66E-10	3.32E-10	4.99E-10	6.65E-10	6.65E-10
ba138	.00E+00	1.42E-10	2.83E-10	4.25E-10	5.66E-10	5.66E-10
pd108	.00E+00	1.37E-10	2.75E-10	4.12E-10	5.50E-10	5.50E-10
in115	.00E+00	1.34E-10	2.72E-10	4.10E-10	5.49E-10	5.49E-10
ce140	.00E+00	1.18E-10	2.50E-10	3.83E-10	5.15E-10	5.15E-10
ce144	.00E+00	2.15E-10	3.53E-10	4.42E-10	4.98E-10	4.98E-10
xe132	.00E+00	1.18E-10	2.39E-10	3.60E-10	4.81E-10	4.81E-10

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 5
 0 fraction of total absorption rate
 power= .00mw, burnup= 3.mwd, flux= 3.00E+08n/cm**2-sec
 0 initial 182.6 d 365.3 d 547.9 d 730.5 d 730.5 d

ru103	.00E+00	3.42E-10	3.56E-10	3.56E-10	3.56E-10	3.56E-10
mo 98	.00E+00	8.46E-11	1.69E-10	2.54E-10	3.38E-10	3.38E-10
mo100	.00E+00	8.09E-11	1.62E-10	2.43E-10	3.24E-10	3.24E-10
pd107	.00E+00	7.96E-11	1.59E-10	2.39E-10	3.19E-10	3.19E-10
xe134	.00E+00	7.85E-11	1.57E-10	2.35E-10	3.14E-10	3.14E-10
zr 92	.00E+00	6.37E-11	1.28E-10	1.91E-10	2.55E-10	2.55E-10
zr 96	.00E+00	5.21E-11	1.04E-10	1.56E-10	2.08E-10	2.08E-10
i127	.00E+00	4.54E-11	9.61E-11	1.48E-10	2.00E-10	2.00E-10
ru104	.00E+00	4.96E-11	9.93E-11	1.49E-10	1.99E-10	1.99E-10
nd150	.00E+00	4.44E-11	8.88E-11	1.33E-10	1.78E-10	1.78E-10
cs137	.00E+00	4.35E-11	8.65E-11	1.29E-10	1.71E-10	1.71E-10
xe136	.00E+00	4.25E-11	8.49E-11	1.27E-10	1.70E-10	1.70E-10
zr 95	.00E+00	1.45E-10	1.65E-10	1.67E-10	1.68E-10	1.68E-10
nb 95	.00E+00	1.12E-10	1.47E-10	1.52E-10	1.53E-10	1.53E-10
y 91	.00E+00	1.25E-10	1.40E-10	1.41E-10	1.42E-10	1.42E-10
br 81	.00E+00	3.23E-11	6.46E-11	9.69E-11	1.29E-10	1.29E-10
zr 94	.00E+00	2.75E-11	5.51E-11	8.27E-11	1.10E-10	1.10E-10
ba137	.00E+00	6.96E-12	2.74E-11	6.12E-11	1.08E-10	1.08E-10
pm151	.00E+00	1.09E-10	1.09E-10	1.09E-10	1.09E-10	1.08E-10

rb 85	.00E+00	2.48E-11	4.98E-11	7.51E-11	1.01E-10	1.01E-10
cd111	.00E+00	1.95E-11	4.02E-11	6.09E-11	8.16E-11	8.16E-11
te130	.00E+00	1.92E-11	3.85E-11	5.77E-11	7.69E-11	7.69E-11
sm154	.00E+00	1.88E-11	3.75E-11	5.63E-11	7.50E-11	7.50E-11
rb 87	.00E+00	1.82E-11	3.65E-11	5.47E-11	7.29E-11	7.29E-11
kr 85	.00E+00	1.81E-11	3.56E-11	5.26E-11	6.90E-11	6.90E-11
se 77	.00E+00	1.26E-11	2.53E-11	3.80E-11	5.07E-11	5.08E-11
ba140	.00E+00	4.72E-11	4.72E-11	4.72E-11	4.72E-11	4.71E-11
sm153	.00E+00	3.79E-11	3.79E-11	3.79E-11	3.79E-11	3.76E-11
kr 84	.00E+00	8.70E-12	1.74E-11	2.61E-11	3.48E-11	3.48E-11
eu156	.00E+00	3.38E-11	3.38E-11	3.38E-11	3.38E-11	3.38E-11
sm150	.00E+00	2.05E-12	7.95E-12	1.77E-11	3.13E-11	3.13E-11
sr 89	.00E+00	2.79E-11	3.02E-11	3.04E-11	3.04E-11	3.04E-11
se 79	.00E+00	6.52E-12	1.30E-11	1.96E-11	2.61E-11	2.61E-11
sb121	.00E+00	6.26E-12	1.26E-11	1.89E-11	2.52E-11	2.52E-11
sb123	.00E+00	4.82E-12	9.84E-12	1.50E-11	2.01E-11	2.01E-11
ru106	.00E+00	7.45E-12	1.27E-11	1.65E-11	1.92E-11	1.92E-11
kr 86	.00E+00	4.73E-12	9.47E-12	1.42E-11	1.89E-11	1.89E-11
ce143	.00E+00	1.74E-11	1.74E-11	1.74E-11	1.74E-11	1.73E-11
te128	.00E+00	4.26E-12	8.53E-12	1.28E-11	1.71E-11	1.71E-11
pd106	.00E+00	1.42E-12	5.11E-12	1.04E-11	1.69E-11	1.69E-11
kr 87	.00E+00	2.26E-11	2.26E-11	2.26E-11	2.26E-11	1.56E-11
la140	.00E+00	1.54E-11	1.54E-11	1.54E-11	1.54E-11	1.54E-11
gd156	.00E+00	2.96E-12	6.33E-12	9.71E-12	1.31E-11	1.31E-11
mo 99	.00E+00	1.32E-11	1.32E-11	1.32E-11	1.32E-11	1.31E-11
se 80	.00E+00	3.05E-12	6.10E-12	9.15E-12	1.22E-11	1.22E-11
dy161	.00E+00	2.55E-12	5.25E-12	7.95E-12	1.06E-11	1.06E-11
tb159	.00E+00	1.81E-12	3.64E-12	5.47E-12	7.29E-12	7.29E-12
te127m	.00E+00	4.91E-12	6.53E-12	7.03E-12	7.19E-12	7.19E-12
cd112	.00E+00	1.72E-12	3.46E-12	5.20E-12	6.94E-12	6.94E-12

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 0 fraction of total absorption rate
 power=.00mw, burnup= 3.mwd, flux= 3.00E+08n/cm**2-sec
 0 initial 182.6 d 365.3 d 547.9 d 730.5 d 730.5 d

fission products page 6

li 6	.00E+00	1.73E-12	3.46E-12	5.19E-12	6.92E-12	6.92E-12
i131	.00E+00	6.77E-12	6.77E-12	6.77E-12	6.77E-12	6.76E-12
sb125	.00E+00	1.75E-12	3.32E-12	4.71E-12	5.94E-12	5.94E-12
sn117	.00E+00	1.38E-12	2.75E-12	4.13E-12	5.51E-12	5.51E-12
sn119	.00E+00	1.12E-12	2.25E-12	3.38E-12	4.50E-12	4.50E-12
sn115	.00E+00	1.01E-12	2.04E-12	3.07E-12	4.10E-12	4.10E-12
pm148m	.00E+00	7.65E-13	1.84E-12	2.81E-12	3.66E-12	3.65E-12
sr 88	.00E+00	8.71E-13	1.74E-12	2.61E-12	3.49E-12	3.49E-12
pd110	.00E+00	6.31E-13	1.26E-12	1.89E-12	2.53E-12	2.53E-12
cd114	.00E+00	6.16E-13	1.23E-12	1.85E-12	2.47E-12	2.47E-12
zr 90	.00E+00	1.51E-13	6.08E-13	1.37E-12	2.42E-12	2.42E-12
se 82	.00E+00	5.91E-13	1.18E-12	1.77E-12	2.36E-12	2.36E-12
gd158	.00E+00	5.70E-13	1.14E-12	1.71E-12	2.29E-12	2.29E-12
te125	.00E+00	1.40E-13	5.73E-13	1.27E-12	2.21E-12	2.21E-12
sn126	.00E+00	4.71E-13	9.42E-13	1.41E-12	1.88E-12	1.88E-12
se 78	.00E+00	4.51E-13	9.03E-13	1.35E-12	1.81E-12	1.81E-12
te129m	.00E+00	1.74E-12	1.78E-12	1.78E-12	1.78E-12	1.78E-12
sn124	.00E+00	3.68E-13	7.37E-13	1.11E-12	1.47E-12	1.47E-12
eu154	.00E+00	2.88E-13	6.21E-13	9.97E-13	1.42E-12	1.42E-12
dy162	.00E+00	3.49E-13	6.97E-13	1.05E-12	1.40E-12	1.40E-12
dy164	.00E+00	3.12E-13	6.23E-13	9.36E-13	1.25E-12	1.25E-12
as 75	.00E+00	2.69E-13	5.39E-13	8.08E-13	1.08E-12	1.08E-12
y 90	.00E+00	1.97E-13	3.92E-13	5.85E-13	7.75E-13	7.75E-13
sn118	.00E+00	1.51E-13	3.03E-13	4.54E-13	6.05E-13	6.05E-13
ba136	.00E+00	1.29E-13	2.73E-13	4.17E-13	5.61E-13	5.61E-13

cd116	.00E+00	1.28E-13	2.55E-13	3.83E-13	5.10E-13	5.10E-13
sn122	.00E+00	1.25E-13	2.49E-13	3.74E-13	4.98E-13	4.98E-13
sn120	.00E+00	9.38E-14	1.88E-13	2.81E-13	3.75E-13	3.75E-13
cs134	.00E+00	8.05E-14	1.70E-13	2.67E-13	3.70E-13	3.70E-13
ag111	.00E+00	3.20E-13	3.20E-13	3.20E-13	3.20E-13	3.20E-13
kr 82	.00E+00	7.71E-14	1.55E-13	2.33E-13	3.11E-13	3.11E-13
dy163	.00E+00	7.67E-14	1.53E-13	2.30E-13	3.07E-13	3.07E-13
ru 99	.00E+00	6.90E-14	1.43E-13	2.21E-13	3.02E-13	3.02E-13
ge 73	.00E+00	7.27E-14	1.46E-13	2.18E-13	2.91E-13	2.91E-13
eu157	.00E+00	2.95E-13	2.95E-13	2.95E-13	2.95E-13	2.89E-13
cd115m	.00E+00	2.22E-13	2.35E-13	2.35E-13	2.35E-13	2.35E-13
xe130	.00E+00	4.74E-14	9.51E-14	1.43E-13	1.90E-13	1.90E-13
pm148	.00E+00	4.32E-14	8.57E-14	1.23E-13	1.56E-13	1.55E-13
mo 96	.00E+00	3.39E-14	6.81E-14	1.02E-13	1.37E-13	1.37E-13
ge 76	.00E+00	2.66E-14	5.33E-14	7.99E-14	1.07E-13	1.07E-13
gd160	.00E+00	1.69E-14	3.38E-14	5.06E-14	6.75E-14	6.75E-14
cs136	.00E+00	5.59E-14	5.59E-14	5.59E-14	5.59E-14	5.58E-14
te126	.00E+00	1.24E-14	2.53E-14	3.82E-14	5.12E-14	5.12E-14
in113	.00E+00	2.47E-15	9.79E-15	2.19E-14	3.86E-14	3.86E-14
eu152	.00E+00	1.29E-15	5.50E-15	1.55E-14	3.40E-14	3.40E-14
ru100	.00E+00	6.77E-15	1.41E-14	2.21E-14	3.07E-14	3.07E-14
sn125	.00E+00	2.94E-14	2.94E-14	2.94E-14	2.94E-14	2.93E-14
ru105	.00E+00	3.00E-14	3.00E-14	3.00E-14	3.00E-14	2.77E-14
ho165	.00E+00	5.26E-15	1.05E-14	1.58E-14	2.11E-14	2.11E-14

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 0 fraction of total absorption rate
 power= .00mw, burnup= 3.mwd, flux= 3.00E+08n/cm**2-sec
 0 initial 182.6 d 365.3 d 547.9 d 730.5 d 730.5 d

fission products page 7

sr 87	.00E+00	3.04E-15	6.08E-15	9.12E-15	1.22E-14	1.22E-14
rb 88	.00E+00	1.27E-14	1.27E-14	1.27E-14	1.27E-14	1.15E-14
te124	.00E+00	1.86E-15	4.78E-15	7.83E-15	1.09E-14	1.09E-14
sn123	.00E+00	6.46E-15	8.88E-15	9.79E-15	1.01E-14	1.01E-14
te132	.00E+00	9.49E-15	9.49E-15	9.49E-15	9.49E-15	9.44E-15
i135	.00E+00	1.00E-14	1.00E-14	1.00E-14	1.00E-14	9.31E-15
nb 94	.00E+00	1.75E-15	3.51E-15	5.26E-15	7.01E-15	7.01E-15
sm148	.00E+00	3.49E-16	1.60E-15	3.74E-15	6.71E-15	6.71E-15
ge 74	.00E+00	1.47E-15	2.93E-15	4.40E-15	5.86E-15	5.86E-15
ba135	.00E+00	4.99E-16	1.33E-15	2.49E-15	3.98E-15	3.98E-15
ge 72	.00E+00	9.64E-16	1.95E-15	2.93E-15	3.91E-15	3.91E-15
gd154	.00E+00	1.88E-16	7.86E-16	1.85E-15	3.45E-15	3.45E-15
sr 86	.00E+00	7.33E-16	1.59E-15	2.45E-15	3.31E-15	3.31E-15
nd142	.00E+00	1.98E-16	7.89E-16	1.80E-15	3.23E-15	3.23E-15
sb126	.00E+00	2.99E-15	2.99E-15	2.99E-15	2.99E-15	2.98E-15
te134	.00E+00	5.77E-15	5.77E-15	5.77E-15	5.77E-15	2.87E-15
se 76	.00E+00	5.64E-16	1.13E-15	1.70E-15	2.27E-15	2.27E-15
ba134	.00E+00	1.20E-16	4.95E-16	1.15E-15	2.11E-15	2.11E-15
sb124	.00E+00	1.84E-15	2.07E-15	2.10E-15	2.10E-15	2.10E-15
in117m	.00E+00	2.07E-15	2.07E-15	2.07E-15	2.07E-15	2.03E-15
pd104	.00E+00	8.36E-17	4.28E-16	1.06E-15	1.97E-15	1.97E-15
gd152	.00E+00	9.86E-17	3.46E-16	8.94E-16	1.89E-15	1.89E-15
i130	.00E+00	7.11E-16	7.12E-16	7.12E-16	7.13E-16	6.88E-16
cd110	.00E+00	6.76E-17	1.95E-16	3.74E-16	5.98E-16	5.98E-16
in117	.00E+00	6.07E-16	6.07E-16	6.07E-16	6.07E-16	5.96E-16
xe128	.00E+00	1.37E-16	2.75E-16	4.15E-16	5.56E-16	5.56E-16
er166	.00E+00	1.32E-16	2.68E-16	4.05E-16	5.42E-16	5.42E-16
dy160	.00E+00	6.00E-17	1.65E-16	2.81E-16	3.99E-16	3.99E-16
tb160	.00E+00	2.46E-16	2.93E-16	3.06E-16	3.12E-16	3.12E-16
rb 86	.00E+00	2.39E-16	2.40E-16	2.40E-16	2.40E-16	2.40E-16
br 79	.00E+00	1.59E-17	5.87E-17	1.28E-16	2.25E-16	2.25E-16

dy165	.00E+00	2.08E-16	2.09E-16	2.09E-16	2.09E-16	1.74E-16
kr 80	.00E+00	4.11E-17	8.23E-17	1.24E-16	1.65E-16	1.65E-16
xe129	.00E+00	7.46E-18	3.00E-17	6.77E-17	1.21E-16	1.21E-16
ag107	.00E+00	7.08E-18	2.83E-17	6.37E-17	1.13E-16	1.13E-16
cd118	.00E+00	1.19E-16	1.19E-16	1.19E-16	1.19E-16	6.67E-17
ge 75	.00E+00	8.51E-17	8.51E-17	8.51E-17	8.51E-17	6.16E-17
te122	.00E+00	5.41E-18	1.12E-17	1.72E-17	2.35E-17	2.35E-17
nb 93	.00E+00	1.96E-18	5.07E-18	1.04E-17	1.91E-17	1.91E-17
be 9	.00E+00	3.42E-18	6.84E-18	1.03E-17	1.37E-17	1.37E-17
pr142	.00E+00	3.17E-18	6.63E-18	1.01E-17	1.36E-17	1.32E-17
sn116	.00E+00	1.82E-18	4.23E-18	7.25E-18	1.09E-17	1.09E-17
te123	.00E+00	1.55E-18	4.03E-18	6.83E-18	9.73E-18	9.74E-18
in119m	.00E+00	2.97E-17	2.97E-17	2.97E-17	2.97E-17	6.93E-18
li 7	.00E+00	1.33E-18	2.66E-18	4.00E-18	5.33E-18	5.33E-18
er167	.00E+00	5.36E-19	1.07E-18	1.62E-18	2.17E-18	2.17E-18
cd109	.00E+00	4.32E-20	7.65E-20	1.03E-19	1.23E-19	1.23E-19
cd108	.00E+00	2.66E-20	5.32E-20	8.32E-20	1.10E-19	1.10E-19
cs134m	.00E+00	2.33E-20	4.99E-20	7.65E-20	1.03E-19	8.65E-20

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 0 fraction of total absorption rate
 power= .00mw, burnup= 3.mwd, flux= 3.00E+08n/cm**2-sec
 0 initial 182.6 d 365.3 d 547.9 d 730.5 d 730.5 d

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in119	.00E+00	2.32E-18	2.32E-18	2.32E-18	2.32E-18	2.66E-20
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1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 0 power= 4.000E-03mw, burnup=2.9220E+00mwd, flux= 3.00E+08n/cm**2-sec
 nuclide concentrations, gram atoms
 basis = single reactor assembly

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	charge	182.6 d	365.3 d	547.9 d	730.5 d	730.5 d
h 1	.00E+00	4.40E-08	8.81E-08	1.32E-07	1.76E-07	1.76E-07
h 2	.00E+00	1.31E-10	2.61E-10	3.92E-10	5.22E-10	5.22E-10
h 3	.00E+00	9.44E-13	1.86E-12	2.76E-12	3.62E-12	3.62E-12
h 4	.00E+00	3.82E-36	7.53E-36	1.11E-35	1.47E-35	.00E+00
he 3	.00E+00	1.33E-14	5.28E-14	1.18E-13	2.08E-13	2.08E-13
he 4	.00E+00	7.28E-09	1.46E-08	2.18E-08	2.91E-08	2.91E-08
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ne 20	.00E+00	8.74E-10	1.75E-09	2.62E-09	3.50E-09	3.50E-09
ne 21	.00E+00	1.58E-17	6.33E-17	1.43E-16	2.54E-16	2.54E-16
ne 22	.00E+00	3.64E-13	1.40E-12	3.01E-12	5.14E-12	5.14E-12
ne 23	.00E+00	7.28E-15	7.28E-15	7.28E-15	7.28E-15	7.28E-30
na 22	.00E+00	5.35E-12	1.00E-11	1.41E-11	1.77E-11	1.77E-11
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	.00E+00	3.64E-08	3.64E-08	3.64E-08	3.64E-08	3.52E-08
na 24m	.00E+00	5.99E-15	5.99E-15	5.99E-15	5.99E-15	5.99E-30
na 25	.00E+00	2.88E-29	5.78E-29	8.68E-29	1.16E-28	2.08E-41
mg 24	.00E+00	7.55E-06	1.51E-05	2.27E-05	3.03E-05	3.03E-05
mg 25	.00E+00	9.59E-13	1.92E-12	2.89E-12	3.86E-12	3.86E-12
mg 26	.00E+00	1.31E-10	2.61E-10	3.92E-10	5.22E-10	5.22E-10
mg 27	.00E+00	2.18E-12	2.18E-12	2.18E-12	2.18E-12	9.98E-14
mg 28	.00E+00	4.41E-24	4.41E-24	4.41E-24	4.41E-24	4.31E-24
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	.00E+00	2.70E-10	2.70E-10	2.70E-10	2.70E-10	6.00E-16
al 29	.00E+00	3.80E-30	1.52E-29	3.42E-29	6.08E-29	7.17E-31
al 30	.00E+00	3.64E-44	2.76E-43	9.39E-43	2.23E-42	.00E+00
si 28	.00E+00	2.20E-05	4.40E-05	6.59E-05	8.79E-05	8.79E-05
si 29	.00E+00	1.41E-14	5.64E-14	1.27E-13	2.26E-13	2.26E-13
si 30	.00E+00	9.70E-24	7.76E-23	2.62E-22	6.21E-22	6.21E-22
si 31	.00E+00	6.95E-36	5.56E-35	1.88E-34	4.45E-34	3.69E-34
si 32	.00E+00	5.61E-45	9.81E-44	4.97E-43	1.57E-42	1.57E-42

0 totals 5.75E+04 5.75E+04 5.75E+04 5.75E+04 5.75E+04 5.75E+04
 1 flux 3.00E+08 3.00E+08 3.00E+08 3.00E+08 3.00E+08 3.00E+07

0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 power= 4.000E-03mw, burnup=2.9220E+00mwd, flux= 3.00E+08n/cm**2-sec

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0 nuclide concentrations, gram atoms
 basis = single reactor assembly

	charge	182.6 d	365.3 d	547.9 d	730.5 d	730.5 d
he 4	.00E+00	2.56E-05	5.15E-05	7.79E-05	1.05E-04	1.05E-04
ra222	.00E+00	1.97E-30	8.37E-30	1.88E-29	3.27E-29	3.30E-29
ra223	.00E+00	2.03E-15	9.33E-15	2.20E-14	3.98E-14	3.98E-14
ra224	.00E+00	8.13E-17	5.62E-16	1.72E-15	3.75E-15	3.75E-15
ra225	.00E+00	2.54E-17	1.24E-16	2.99E-16	5.50E-16	5.50E-16
ra226	.00E+00	2.94E-11	1.17E-10	2.64E-10	4.70E-10	4.70E-10
ra228	.00E+00	3.12E-17	1.22E-16	2.70E-16	4.71E-16	4.71E-16
th226	.00E+00	9.63E-29	4.09E-28	9.16E-28	1.60E-27	1.60E-27
th227	.00E+00	3.26E-15	1.50E-14	3.54E-14	6.42E-14	6.42E-14
th228	.00E+00	1.55E-14	1.07E-13	3.28E-13	7.15E-13	7.15E-13
th229	.00E+00	4.93E-12	2.41E-11	5.80E-11	1.07E-10	1.07E-10
th230	.00E+00	1.28E-05	2.55E-05	3.83E-05	5.11E-05	5.11E-05
th231	.00E+00	3.02E-09	3.02E-09	3.02E-09	3.02E-09	3.02E-09
th232	.00E+00	2.58E-06	5.16E-06	7.74E-06	1.03E-05	1.03E-05
th233	.00E+00	2.39E-17	4.78E-17	7.17E-17	9.57E-17	2.59E-17
th234	.00E+00	5.34E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	.00E+00	3.57E-07	7.16E-07	1.08E-06	1.44E-06	1.44E-06
pa232	.00E+00	6.13E-15	1.23E-14	1.85E-14	2.47E-14	2.43E-14
pa233	.00E+00	1.44E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06
pa234m	.00E+00	1.80E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	.00E+00	8.05E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	.00E+00	9.34E-26	3.96E-25	8.88E-25	1.55E-24	1.55E-24
u231	.00E+00	4.28E-21	9.70E-21	1.51E-20	2.06E-20	2.05E-20
u232	.00E+00	9.25E-12	3.39E-11	7.21E-11	1.22E-10	1.22E-10
u233	.00E+00	5.38E-06	1.22E-05	1.90E-05	2.59E-05	2.59E-05
u234	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00
u235	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02
u236	1.74E+02	1.74E+02	1.74E+02	1.74E+02	1.74E+02	1.74E+02
u237	.00E+00	3.24E-06	3.24E-06	3.24E-06	3.24E-06	3.23E-06
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04
u239	.00E+00	3.29E-07	3.29E-07	3.29E-07	3.29E-07	9.48E-08
u240	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	.00E+00	2.48E-12	4.29E-12	5.60E-12	6.55E-12	6.55E-12
np236m	.00E+00	2.16E-12	2.16E-12	2.16E-12	2.16E-12	2.11E-12
np236	.00E+00	1.02E-10	2.05E-10	3.07E-10	4.10E-10	4.10E-10
np237	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.22E+01
np238	.00E+00	1.58E-06	1.58E-06	1.58E-06	1.58E-06	1.56E-06
np239	.00E+00	4.75E-05	4.75E-05	4.75E-05	4.75E-05	4.73E-05
np240m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np240	.00E+00	9.74E-15	9.74E-15	9.74E-15	9.74E-15	6.08E-15
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	.00E+00	1.31E-10	2.48E-10	3.52E-10	4.44E-10	4.44E-10
pu237	.00E+00	6.41E-16	1.60E-15	2.57E-15	3.54E-15	3.54E-15
pu238	.00E+00	9.27E-05	1.87E-04	2.80E-04	3.73E-04	3.73E-04
pu239	.00E+00	2.55E-03	5.15E-03	7.75E-03	1.03E-02	1.04E-02
pu240	.00E+00	6.28E-09	2.54E-08	5.72E-08	1.02E-07	1.02E-07
pu241	.00E+00	2.14E-14	1.71E-13	5.77E-13	1.36E-12	1.36E-12
pu242	.00E+00	2.09E-20	3.35E-19	1.70E-18	5.36E-18	5.36E-18

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2

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```

0      power= 4.000E-03mw, burnup=2.9220E+00mwd, flux= 3.00E+08n/cm**2-sec
      nuclide concentrations, gram atoms
      basis = single reactor assembly
      charge 182.6 d 365.3 d 547.9 d 730.5 d 730.5 d
pu243 .00E+00 4.59E-29 7.36E-28 3.73E-27 1.18E-26 1.07E-26
pu244 .00E+00 .00E+00 .00E+00 .00E+00 .00E+00 .00E+00
pu245 .00E+00 .00E+00 .00E+00 .00E+00 .00E+00 .00E+00
pu246 .00E+00 .00E+00 .00E+00 .00E+00 .00E+00 .00E+00
totals 3.73E+04 3.73E+04 3.73E+04 3.73E+04 3.73E+04 3.73E+04
0      flux 3.00E+08 3.00E+08 3.00E+08 3.00E+08 3.00E+08 3.00E+07

```

```

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      4q array has 1 entries.
0      54q array has 12 entries.
1library information...

```

cross-section data taken from position number 2 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 densities
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 densities
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      .other identification and sizes of library.
0      data set name: ft33f001
0      8/28/1996 date library was produced
0      1697 total number of nuclides in library
0      689 number of light-element nuclides

```

129 number of actinide nuclides
 879 number of fission product nuclides
 7993 number of nonzero off-diagonal matrix elements

 1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 page 12
 power= .00mw, burnup= 6.mwd, flux= 2.81E+08n/cm**2-sec
 basis =
 (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
 initial 913.2 d 1095.8 d 1278.4 d 1461.0 d 1461.1 d
 productions 1.090712E+06 1.090715E+06 1.090719E+06 1.090723E+06 1.090727E+06 1.090727E+06
 absorptions 8.934652E+05 8.934711E+05 8.934772E+05 8.934830E+05 8.934893E+05 8.934893E+05
 k infinity 1.220765E+00 1.220762E+00 1.220758E+00 1.220754E+00 1.220750E+00 1.220750E+00
 initial 913.2 d 1095.8 d 1278.4 d 1461.0 d 1461.1 d
 actinide
 absorptions 8.900642E+05 8.900665E+05 8.900688E+05 8.900710E+05 8.900733E+05 8.900733E+05
 non-actinide
 abs. fracs. 3.806531E-03 3.810465E-03 3.814757E-03 3.818750E-03 3.823161E-03 3.823161E-03

1 0 13
 0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 13
 fraction of total absorption rate
 power= .00mw, burnup= 6.mwd, flux= 2.81E+08n/cm**2-sec
 initial 913.2 d 1095.8 d 1278.4 d 1461.0 d 1461.1 d

sm149	1.47E-05	1.84E-05	2.21E-05	2.58E-05	2.95E-05	2.95E-05
xe135	2.31E-06	2.31E-06	2.31E-06	2.31E-06	2.31E-06	2.29E-06
sm151	6.18E-07	7.72E-07	9.25E-07	1.08E-06	1.23E-06	1.23E-06
nd143	2.88E-07	3.62E-07	4.36E-07	5.10E-07	5.85E-07	5.85E-07
gd157	1.51E-07	1.89E-07	2.27E-07	2.64E-07	3.02E-07	3.02E-07
rh103	1.27E-07	1.62E-07	1.96E-07	2.31E-07	2.65E-07	2.65E-07
cd113	1.29E-07	1.61E-07	1.93E-07	2.25E-07	2.57E-07	2.57E-07
xe131	9.27E-08	1.16E-07	1.40E-07	1.63E-07	1.87E-07	1.87E-07
pm147	1.10E-07	1.30E-07	1.48E-07	1.63E-07	1.77E-07	1.77E-07
cs133	7.22E-08	9.04E-08	1.09E-07	1.27E-07	1.45E-07	1.45E-07
tc 99	5.35E-08	6.69E-08	8.04E-08	9.38E-08	1.07E-07	1.07E-07
gd155	2.68E-08	4.10E-08	5.76E-08	7.67E-08	9.79E-08	9.79E-08
nd145	4.16E-08	5.20E-08	6.24E-08	7.28E-08	8.32E-08	8.32E-08
eu155	4.07E-08	4.92E-08	5.70E-08	6.42E-08	7.09E-08	7.09E-08
mo 95	2.32E-08	3.04E-08	3.77E-08	4.49E-08	5.21E-08	5.21E-08
sm152	2.20E-08	2.75E-08	3.30E-08	3.85E-08	4.40E-08	4.40E-08
sm147	1.19E-08	1.80E-08	2.49E-08	3.28E-08	4.13E-08	4.13E-08
kr 83	1.80E-08	2.25E-08	2.70E-08	3.15E-08	3.60E-08	3.60E-08
cs135	1.64E-08	2.05E-08	2.46E-08	2.87E-08	3.28E-08	3.28E-08
ru101	1.28E-08	1.60E-08	1.92E-08	2.24E-08	2.56E-08	2.56E-08
pr141	1.15E-08	1.45E-08	1.76E-08	2.06E-08	2.37E-08	2.37E-08
eu153	1.11E-08	1.39E-08	1.67E-08	1.94E-08	2.22E-08	2.22E-08
la139	1.00E-08	1.25E-08	1.50E-08	1.75E-08	2.00E-08	2.00E-08
eu151	3.53E-09	5.51E-09	7.93E-09	1.08E-08	1.41E-08	1.41E-08
pd105	4.24E-09	5.30E-09	6.36E-09	7.42E-09	8.48E-09	8.48E-09
rh105	8.35E-09	8.33E-09	8.33E-09	8.33E-09	8.33E-09	8.32E-09
zr 93	4.07E-09	5.09E-09	6.11E-09	7.13E-09	8.15E-09	8.15E-09
i129	3.06E-09	3.84E-09	4.61E-09	5.39E-09	6.16E-09	6.16E-09
mo 97	2.27E-09	2.83E-09	3.40E-09	3.97E-09	4.54E-09	4.54E-09
nd144	1.60E-09	2.25E-09	2.93E-09	3.64E-09	4.36E-09	4.36E-09
ag109	1.59E-09	1.99E-09	2.39E-09	2.78E-09	3.18E-09	3.18E-09
pr143	2.67E-09	2.67E-09	2.67E-09	2.67E-09	2.67E-09	2.67E-09
zr 91	9.46E-10	1.21E-09	1.48E-09	1.75E-09	2.02E-09	2.02E-09
xe133	2.01E-09	2.01E-09	2.01E-09	2.01E-09	2.01E-09	2.01E-09
y 89	9.23E-10	1.18E-09	1.44E-09	1.69E-09	1.95E-09	1.95E-09
ru102	9.24E-10	1.15E-09	1.39E-09	1.62E-09	1.85E-09	1.85E-09
ce142	8.31E-10	1.04E-09	1.25E-09	1.46E-09	1.66E-09	1.66E-09
sr 90	8.24E-10	1.02E-09	1.22E-09	1.42E-09	1.61E-09	1.61E-09

nd148	8.01E-10	1.00E-09	1.20E-09	1.40E-09	1.60E-09	1.60E-09
ce141	1.59E-09	1.59E-09	1.59E-09	1.59E-09	1.59E-09	1.59E-09
nd146	6.71E-10	8.39E-10	1.01E-09	1.17E-09	1.34E-09	1.34E-09
ba138	5.73E-10	7.16E-10	8.60E-10	1.00E-09	1.15E-09	1.15E-09
in115	5.49E-10	6.88E-10	8.26E-10	9.64E-10	1.10E-09	1.10E-09
pd108	5.43E-10	6.78E-10	8.13E-10	9.48E-10	1.08E-09	1.08E-09
ce140	5.22E-10	6.56E-10	7.90E-10	9.24E-10	1.06E-09	1.06E-09
pm149	9.74E-10	9.75E-10	9.74E-10	9.74E-10	9.74E-10	9.71E-10
xe132	4.80E-10	6.00E-10	7.21E-10	8.42E-10	9.63E-10	9.63E-10
nd147	9.35E-10	9.36E-10	9.36E-10	9.36E-10	9.36E-10	9.34E-10
mo 98	3.34E-10	4.18E-10	5.02E-10	5.85E-10	6.69E-10	6.69E-10

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 0 fraction of total absorption rate
 0 power= .00mw, burnup= 6. mwd, flux= 2.81E+08n/cm**2-sec
 initial 913.2 d 1095.8 d 1278.4 d 1461.0 d 1461.1 d

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mo100	3.23E-10	4.03E-10	4.84E-10	5.65E-10	6.45E-10	6.45E-10
pd107	3.20E-10	4.00E-10	4.80E-10	5.59E-10	6.39E-10	6.39E-10
xe134	3.17E-10	3.96E-10	4.75E-10	5.54E-10	6.34E-10	6.34E-10
ce144	5.00E-10	5.37E-10	5.61E-10	5.76E-10	5.85E-10	5.85E-10
zr 92	2.57E-10	3.22E-10	3.86E-10	4.51E-10	5.15E-10	5.15E-10
ba137	1.09E-10	1.70E-10	2.44E-10	3.30E-10	4.30E-10	4.30E-10
i127	1.99E-10	2.52E-10	3.04E-10	3.56E-10	4.08E-10	4.08E-10
zr 96	2.04E-10	2.55E-10	3.06E-10	3.57E-10	4.08E-10	4.08E-10
ru104	1.98E-10	2.48E-10	2.97E-10	3.47E-10	3.96E-10	3.96E-10
ru103	3.57E-10	3.57E-10	3.57E-10	3.57E-10	3.57E-10	3.57E-10
nd150	1.78E-10	2.22E-10	2.66E-10	3.11E-10	3.55E-10	3.55E-10
xe136	1.71E-10	2.14E-10	2.57E-10	3.00E-10	3.43E-10	3.43E-10
cs137	1.71E-10	2.12E-10	2.53E-10	2.94E-10	3.34E-10	3.34E-10
br 81	1.29E-10	1.61E-10	1.93E-10	2.26E-10	2.58E-10	2.58E-10
zr 94	1.09E-10	1.37E-10	1.64E-10	1.91E-10	2.19E-10	2.19E-10
rb 85	1.01E-10	1.26E-10	1.52E-10	1.78E-10	2.04E-10	2.04E-10
zr 95	1.66E-10	1.66E-10	1.66E-10	1.66E-10	1.66E-10	1.66E-10
cd111	8.24E-11	1.03E-10	1.24E-10	1.45E-10	1.66E-10	1.66E-10
te130	7.78E-11	9.72E-11	1.17E-10	1.36E-10	1.56E-10	1.56E-10
nb 95	1.53E-10	1.53E-10	1.53E-10	1.53E-10	1.53E-10	1.53E-10
sm154	7.55E-11	9.44E-11	1.13E-10	1.32E-10	1.51E-10	1.51E-10
rb 87	7.28E-11	9.10E-11	1.09E-10	1.27E-10	1.46E-10	1.46E-10
y 91	1.43E-10	1.43E-10	1.43E-10	1.43E-10	1.43E-10	1.43E-10
kr 85	6.96E-11	8.56E-11	1.01E-10	1.16E-10	1.31E-10	1.31E-10
sm150	3.14E-11	4.90E-11	7.04E-11	9.57E-11	1.25E-10	1.25E-10
pm151	1.09E-10	1.10E-10	1.10E-10	1.10E-10	1.10E-10	1.07E-10
se 77	5.14E-11	6.43E-11	7.72E-11	9.01E-11	1.03E-10	1.03E-10
kr 84	3.44E-11	4.31E-11	5.17E-11	6.03E-11	6.89E-11	6.89E-11
se 79	2.64E-11	3.30E-11	3.96E-11	4.62E-11	5.28E-11	5.28E-11
sb121	2.51E-11	3.14E-11	3.76E-11	4.39E-11	5.02E-11	5.02E-11
pd106	1.67E-11	2.40E-11	3.17E-11	3.99E-11	4.84E-11	4.84E-11
ba140	4.73E-11	4.74E-11	4.74E-11	4.74E-11	4.74E-11	4.73E-11
sb123	2.00E-11	2.51E-11	3.02E-11	3.54E-11	4.05E-11	4.05E-11
kr 86	1.91E-11	2.39E-11	2.87E-11	3.35E-11	3.82E-11	3.82E-11
sm153	3.79E-11	3.81E-11	3.81E-11	3.81E-11	3.81E-11	3.74E-11
te128	1.71E-11	2.13E-11	2.56E-11	2.99E-11	3.41E-11	3.41E-11
eu156	3.41E-11	3.40E-11	3.40E-11	3.40E-11	3.40E-11	3.40E-11
sr 89	3.07E-11	3.07E-11	3.07E-11	3.07E-11	3.07E-11	3.07E-11
gd156	1.29E-11	1.62E-11	1.95E-11	2.28E-11	2.62E-11	2.62E-11
se 80	1.23E-11	1.54E-11	1.85E-11	2.16E-11	2.47E-11	2.47E-11
ru106	1.90E-11	2.08E-11	2.21E-11	2.31E-11	2.37E-11	2.37E-11
dy161	1.08E-11	1.35E-11	1.62E-11	1.89E-11	2.16E-11	2.16E-11
ce143	1.74E-11	1.75E-11	1.75E-11	1.75E-11	1.75E-11	1.71E-11
la140	1.54E-11	1.54E-11	1.54E-11	1.54E-11	1.54E-11	1.54E-11

tb159	7.29E-12	9.10E-12	1.09E-11	1.27E-11	1.46E-11	1.46E-11		
li 6	7.01E-12	8.76E-12	1.05E-11	1.23E-11	1.40E-11	1.40E-11		
cd112	6.98E-12	8.72E-12	1.05E-11	1.22E-11	1.40E-11	1.40E-11		
mo 99	1.31E-11	1.32E-11	1.32E-11	1.32E-11	1.32E-11	1.30E-11		
sn117	5.54E-12	6.93E-12	8.31E-12	9.69E-12	1.11E-11	1.11E-11		
1	sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2						fission products	page 15
0	fraction of total absorption rate							
0	power=	.00mw, burnup=	6.mwd, flux=	2.81E+08n/cm**2-sec				
	initial	913.2 d	1095.8 d	1278.4 d	1461.0 d	1461.1 d		

kr 87	1.58E-11	2.30E-11	2.30E-11	2.30E-11	2.30E-11	1.08E-11		
zr 90	2.44E-12	3.80E-12	5.45E-12	7.40E-12	9.63E-12	9.63E-12		
sb125	5.92E-12	7.00E-12	7.94E-12	8.78E-12	9.51E-12	9.51E-12		
sn119	4.55E-12	5.69E-12	6.83E-12	7.97E-12	9.11E-12	9.11E-12		
sn115	4.15E-12	5.20E-12	6.24E-12	7.28E-12	8.32E-12	8.32E-12		
te125	2.21E-12	3.36E-12	4.69E-12	6.19E-12	7.82E-12	7.82E-12		
te127m	7.25E-12	7.30E-12	7.32E-12	7.32E-12	7.33E-12	7.33E-12		
sr 88	3.51E-12	4.39E-12	5.27E-12	6.15E-12	7.03E-12	7.03E-12		
i 131	6.77E-12	6.78E-12	6.78E-12	6.78E-12	6.78E-12	6.77E-12		
pm148m	3.70E-12	4.38E-12	5.02E-12	5.59E-12	6.08E-12	6.08E-12		
pd110	2.51E-12	3.13E-12	3.76E-12	4.38E-12	5.01E-12	5.01E-12		
cd114	2.44E-12	3.04E-12	3.65E-12	4.26E-12	4.87E-12	4.87E-12		
se 82	2.38E-12	2.98E-12	3.58E-12	4.17E-12	4.77E-12	4.77E-12		
gd158	2.28E-12	2.85E-12	3.42E-12	4.00E-12	4.57E-12	4.57E-12		
sn126	1.91E-12	2.38E-12	2.86E-12	3.34E-12	3.81E-12	3.81E-12		
se 78	1.81E-12	2.26E-12	2.71E-12	3.17E-12	3.62E-12	3.62E-12		
eu154	1.43E-12	1.89E-12	2.39E-12	2.92E-12	3.49E-12	3.49E-12		
sn124	1.46E-12	1.82E-12	2.19E-12	2.55E-12	2.91E-12	2.91E-12		
dy162	1.40E-12	1.75E-12	2.09E-12	2.44E-12	2.78E-12	2.78E-12		
dy164	1.26E-12	1.58E-12	1.89E-12	2.21E-12	2.52E-12	2.52E-12		
as 75	1.08E-12	1.35E-12	1.62E-12	1.89E-12	2.16E-12	2.16E-12		
te129m	1.79E-12	1.79E-12	1.79E-12	1.79E-12	1.79E-12	1.79E-12		
y 90	7.84E-13	9.74E-13	1.16E-12	1.35E-12	1.53E-12	1.53E-12		
sn118	5.96E-13	7.45E-13	8.94E-13	1.04E-12	1.19E-12	1.19E-12		
ba136	5.59E-13	7.03E-13	8.47E-13	9.91E-13	1.14E-12	1.14E-12		
cd116	5.05E-13	6.32E-13	7.58E-13	8.84E-13	1.01E-12	1.01E-12		
sn122	5.02E-13	6.27E-13	7.52E-13	8.77E-13	1.00E-12	1.00E-12		
cs134	3.72E-13	4.80E-13	5.92E-13	7.08E-13	8.28E-13	8.27E-13		
sn120	3.76E-13	4.70E-13	5.63E-13	6.57E-13	7.51E-13	7.51E-13		
ru 99	3.01E-13	3.85E-13	4.72E-13	5.64E-13	6.58E-13	6.58E-13		
kr 82	3.14E-13	3.92E-13	4.71E-13	5.50E-13	6.29E-13	6.29E-13		
dy163	3.08E-13	3.85E-13	4.61E-13	5.38E-13	6.14E-13	6.14E-13		
ge 73	2.93E-13	3.67E-13	4.40E-13	5.14E-13	5.87E-13	5.87E-13		
xe130	1.93E-13	2.41E-13	2.90E-13	3.38E-13	3.87E-13	3.87E-13		
ag111	3.17E-13	3.17E-13	3.17E-13	3.17E-13	3.17E-13	3.16E-13		
eu157	2.91E-13	2.96E-13	2.96E-13	2.96E-13	2.96E-13	2.80E-13		
mo 96	1.36E-13	1.71E-13	2.05E-13	2.40E-13	2.75E-13	2.75E-13		
eu152	3.44E-14	6.45E-14	1.09E-13	1.70E-13	2.50E-13	2.50E-13		
pm148	1.53E-13	1.79E-13	2.03E-13	2.25E-13	2.43E-13	2.42E-13		
cd115m	2.37E-13	2.37E-13	2.37E-13	2.37E-13	2.37E-13	2.36E-13		
ge 76	1.07E-13	1.34E-13	1.60E-13	1.87E-13	2.14E-13	2.14E-13		
in113	3.85E-14	5.97E-14	8.53E-14	1.15E-13	1.49E-13	1.49E-13		
gd160	6.76E-14	8.44E-14	1.01E-13	1.18E-13	1.35E-13	1.35E-13		
te126	5.13E-14	6.43E-14	7.74E-14	9.04E-14	1.03E-13	1.03E-13		
ru100	3.10E-14	4.03E-14	5.02E-14	6.06E-14	7.17E-14	7.17E-14		
cs136	5.55E-14	5.57E-14	5.57E-14	5.57E-14	5.57E-14	5.55E-14		
ho165	2.12E-14	2.64E-14	3.17E-14	3.69E-14	4.22E-14	4.22E-14		
sn125	2.92E-14	2.93E-14	2.93E-14	2.93E-14	2.93E-14	2.91E-14		
sm148	6.73E-15	1.04E-14	1.48E-14	1.99E-14	2.56E-14	2.56E-14		
1	sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2						fission products	page 16

0 fraction of total absorption rate
 0 power= .00mw, burnup= 6.mwd, flux= 2.81E+08n/cm**2-sec
 initial 913.2 d 1095.8 d 1278.4 d 1461.0 d 1461.1 d

ru105	2.75E-14	2.97E-14	2.97E-14	2.97E-14	2.97E-14	2.46E-14
sr 87	1.22E-14	1.53E-14	1.84E-14	2.14E-14	2.45E-14	2.45E-14
te124	1.10E-14	1.41E-14	1.72E-14	2.03E-14	2.35E-14	2.35E-14
gd154	3.48E-15	5.67E-15	8.50E-15	1.20E-14	1.63E-14	1.63E-14
nb 94	6.97E-15	8.72E-15	1.05E-14	1.22E-14	1.40E-14	1.40E-14
gd152	1.92E-15	3.55E-15	5.96E-15	9.31E-15	1.38E-14	1.38E-14
nd142	3.27E-15	5.14E-15	7.43E-15	1.02E-14	1.33E-14	1.33E-14
ba135	3.98E-15	5.80E-15	7.95E-15	1.04E-14	1.32E-14	1.32E-14
ge 74	5.92E-15	7.41E-15	8.89E-15	1.04E-14	1.19E-14	1.19E-14
sn123	9.97E-15	1.01E-14	1.01E-14	1.02E-14	1.02E-14	1.02E-14
rb 88	1.17E-14	1.29E-14	1.29E-14	1.29E-14	1.29E-14	9.98E-15
te132	9.51E-15	9.56E-15	9.56E-15	9.56E-15	9.56E-15	9.45E-15
ba134	2.11E-15	3.39E-15	4.99E-15	6.94E-15	9.23E-15	9.24E-15
i135	9.42E-15	1.01E-14	1.01E-14	1.01E-14	1.01E-14	8.75E-15
pd104	1.95E-15	3.12E-15	4.58E-15	6.31E-15	8.32E-15	8.32E-15
ge 72	3.96E-15	4.95E-15	5.95E-15	6.95E-15	7.94E-15	7.94E-15
sr 86	3.34E-15	4.21E-15	5.08E-15	5.96E-15	6.83E-15	6.83E-15
se 76	2.30E-15	2.88E-15	3.45E-15	4.03E-15	4.61E-15	4.61E-15
sb126	3.00E-15	3.01E-15	3.01E-15	3.01E-15	3.01E-15	3.00E-15
sb124	2.10E-15	2.10E-15	2.10E-15	2.10E-15	2.10E-15	2.10E-15
in117m	2.05E-15	2.09E-15	2.09E-15	2.09E-15	2.09E-15	1.94E-15
cd110	6.03E-16	8.68E-16	1.17E-15	1.51E-15	1.89E-15	1.89E-15
te134	2.91E-15	5.85E-15	5.85E-15	5.85E-15	5.85E-15	1.45E-15
xe128	5.61E-16	7.05E-16	8.51E-16	9.98E-16	1.15E-15	1.15E-15
er166	5.47E-16	6.86E-16	8.24E-16	9.64E-16	1.10E-15	1.10E-15
dy160	3.97E-16	5.17E-16	6.39E-16	7.64E-16	8.90E-16	8.90E-16
br 79	2.26E-16	3.50E-16	5.01E-16	6.78E-16	8.83E-16	8.83E-16
i130	6.90E-16	7.17E-16	7.18E-16	7.19E-16	7.19E-16	6.67E-16
in117	6.04E-16	6.14E-16	6.14E-16	6.14E-16	6.14E-16	5.74E-16
xe129	1.21E-16	1.89E-16	2.73E-16	3.72E-16	4.86E-16	4.86E-16
ag107	1.14E-16	1.79E-16	2.57E-16	3.50E-16	4.57E-16	4.57E-16
tb160	3.15E-16	3.21E-16	3.26E-16	3.31E-16	3.37E-16	3.36E-16
kr 80	1.66E-16	2.08E-16	2.49E-16	2.91E-16	3.32E-16	3.32E-16
rb 86	2.41E-16	2.42E-16	2.42E-16	2.42E-16	2.43E-16	2.42E-16
dy165	1.76E-16	2.10E-16	2.10E-16	2.10E-16	2.10E-16	1.42E-16
nb 93	1.92E-17	3.24E-17	5.10E-17	7.61E-17	1.09E-16	1.09E-16
te122	2.34E-17	2.99E-17	3.66E-17	4.36E-17	5.09E-17	5.09E-17
ge 75	6.24E-17	8.64E-17	8.64E-17	8.64E-17	8.64E-17	4.39E-17
cd118	6.76E-17	1.20E-16	1.20E-16	1.20E-16	1.20E-16	3.77E-17
sn116	1.07E-17	1.48E-17	1.96E-17	2.49E-17	3.08E-17	3.08E-17
be 9	1.34E-17	1.68E-17	2.01E-17	2.35E-17	2.69E-17	2.69E-17
pr142	1.33E-17	1.71E-17	2.06E-17	2.40E-17	2.75E-17	2.62E-17
te123	9.75E-18	1.27E-17	1.57E-17	1.87E-17	2.16E-17	2.16E-17
li 7	5.40E-18	6.75E-18	8.10E-18	9.45E-18	1.08E-17	1.08E-17
er167	2.19E-18	2.74E-18	3.30E-18	3.86E-18	4.43E-18	4.43E-18
in119m	7.02E-18	3.01E-17	3.01E-17	3.01E-17	3.01E-17	1.38E-18
cd108	1.11E-19	1.38E-19	1.64E-19	1.91E-19	2.22E-19	2.22E-19
cd109	1.24E-19	1.41E-19	1.51E-19	1.61E-19	1.68E-19	1.68E-19
cs134m	8.73E-20	1.28E-19	1.51E-19	1.78E-19	2.05E-19	1.44E-19

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2

fission products

page 17

0 fraction of total absorption rate
 0 power= .00mw, burnup= 6.mwd, flux= 2.81E+08n/cm**2-sec
 initial 913.2 d 1095.8 d 1278.4 d 1461.0 d 1461.1 d

in119	2.69E-20	2.35E-18	2.35E-18	2.35E-18	2.35E-18	6.71E-21
sn114	.00E+00	3.36E-21	3.36E-21	3.36E-21	3.36E-21	3.36E-21

th232	1.03E-05	1.29E-05	1.55E-05	1.81E-05	2.07E-05	2.07E-05
th233	2.59E-17	1.19E-16	1.43E-16	1.66E-16	1.90E-16	1.38E-17
th234	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	1.44E-06	1.80E-06	2.16E-06	2.51E-06	2.87E-06	2.87E-06
pa232	2.43E-14	3.09E-14	3.71E-14	4.32E-14	4.94E-14	4.79E-14
pa233	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	1.55E-24	2.28E-24	3.18E-24	4.19E-24	5.29E-24	5.28E-24
u231	2.05E-20	2.52E-20	3.04E-20	3.57E-20	4.10E-20	4.06E-20
u232	1.22E-10	1.83E-10	2.53E-10	3.31E-10	4.16E-10	4.16E-10
u233	2.59E-05	3.27E-05	3.95E-05	4.63E-05	5.32E-05	5.32E-05
u234	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00
u235	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02
u236	1.74E+02	1.74E+02	1.74E+02	1.74E+02	1.74E+02	1.74E+02
u237	3.23E-06	3.15E-06	3.15E-06	3.15E-06	3.15E-06	3.13E-06
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04
u239	9.48E-08	3.22E-07	3.22E-07	3.22E-07	3.22E-07	2.67E-08
u240	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	6.55E-12	7.16E-12	7.61E-12	7.93E-12	8.16E-12	8.16E-12
np236m	2.11E-12	2.09E-12	2.09E-12	2.09E-12	2.09E-12	2.00E-12
np236	4.10E-10	5.09E-10	6.08E-10	7.07E-10	8.06E-10	8.06E-10
np237	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.22E+01
np238	1.56E-06	1.56E-06	1.56E-06	1.56E-06	1.56E-06	1.53E-06
np239	4.73E-05	4.65E-05	4.65E-05	4.65E-05	4.65E-05	4.60E-05
np240m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np240	6.08E-15	9.48E-15	9.48E-15	9.48E-15	9.48E-15	3.69E-15
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	4.44E-10	5.22E-10	5.90E-10	6.52E-10	7.06E-10	7.06E-10
pu237	3.54E-15	4.36E-15	5.28E-15	6.20E-15	7.11E-15	7.11E-15
pu238	3.73E-04	4.65E-04	5.56E-04	6.48E-04	7.38E-04	7.38E-04
pu239	1.04E-02	1.29E-02	1.54E-02	1.80E-02	2.05E-02	2.05E-02

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0

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
power= 4.000E-03mw, burnup=5.8440E+00mwd, flux= 2.81E+08n/cm**2-sec

actinides page 20

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	913.2 d	1095.8 d	1278.4 d	1461.0 d	1461.1 d
pu240	1.02E-07	1.59E-07	2.29E-07	3.11E-07	4.05E-07	4.05E-07
pu241	1.36E-12	2.62E-12	4.47E-12	7.04E-12	1.04E-11	1.04E-11
pu242	5.36E-18	1.30E-17	2.67E-17	4.92E-17	8.34E-17	8.34E-17
pu243	1.07E-26	2.78E-26	5.72E-26	1.05E-25	1.78E-25	1.47E-25
pu244	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu245	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
totals	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04
flux		2.81E+08	2.81E+08	2.81E+08	2.81E+08	2.81E-07

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 4q array has 1 entries.
0 54q array has 12 entries.
1library information...

cross-section data taken from position number 3 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 densities
  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 densities
  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      8/28/1996      date library was produced
0      1697      total number of nuclides in library
0      689      number of light-element nuclides
0      129      number of actinide nuclides
0      879      number of fission product nuclides
0      7993      number of nonzero off-diagonal matrix elements
0      *****
1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2      page 21
0 power= .00mw, burnup= 9.mwd, flux= 2.74E+08n/cm**2-sec
0 basis =
0 (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0      initial      1643.7 d      1826.3 d      2009.0 d      2191.6 d      2191.7 d
0 productions      1.122459E+06      1.122463E+06      1.122467E+06      1.122471E+06      1.122474E+06      1.122474E+06
0 absorptions      9.158321E+05      9.158383E+05      9.158444E+05      9.158505E+05      9.158566E+05      9.158566E+05
0 k infinity      1.225616E+00      1.225612E+00      1.225608E+00      1.225605E+00      1.225601E+00      1.225601E+00
0      initial      1643.7 d      1826.3 d      2009.0 d      2191.6 d      2191.7 d
0 actinide
0 absorptions      9.125684E+05      9.125708E+05      9.125731E+05      9.125754E+05      9.125776E+05      9.125776E+05
0 non-actinide
0 abs. fracs.      3.563583E-03      3.567815E-03      3.571987E-03      3.576040E-03      3.580332E-03      3.580332E-03
1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2      page 22
0 fraction of total absorption rate
0 power= .00mw, burnup= 9.mwd, flux= 2.74E+08n/cm**2-sec
0      initial 1643.7 d 1826.3 d 2009.0 d 2191.6 d 2191.7 d

```

sm149	2.96E-05	3.33E-05	3.70E-05	4.07E-05	4.44E-05	4.44E-05
xe135	2.31E-06	2.33E-06	2.33E-06	2.33E-06	2.33E-06	2.29E-06
sm151	1.24E-06	1.39E-06	1.54E-06	1.69E-06	1.84E-06	1.84E-06
nd143	5.87E-07	6.62E-07	7.36E-07	8.11E-07	8.86E-07	8.86E-07
gd157	3.03E-07	3.41E-07	3.79E-07	4.16E-07	4.54E-07	4.54E-07
rh103	2.65E-07	3.00E-07	3.34E-07	3.68E-07	4.03E-07	4.03E-07
cd113	2.59E-07	2.91E-07	3.23E-07	3.55E-07	3.88E-07	3.88E-07
xe131	1.86E-07	2.10E-07	2.33E-07	2.57E-07	2.80E-07	2.80E-07
cs133	1.45E-07	1.63E-07	1.81E-07	1.99E-07	2.18E-07	2.18E-07
pm147	1.76E-07	1.88E-07	1.98E-07	2.07E-07	2.15E-07	2.15E-07
gd155	9.85E-08	1.22E-07	1.47E-07	1.74E-07	2.03E-07	2.03E-07
tc 99	1.07E-07	1.20E-07	1.34E-07	1.47E-07	1.60E-07	1.60E-07
nd145	8.31E-08	9.35E-08	1.04E-07	1.14E-07	1.25E-07	1.25E-07
eu155	7.09E-08	7.71E-08	8.29E-08	8.83E-08	9.33E-08	9.33E-08
mo 95	5.20E-08	5.92E-08	6.64E-08	7.36E-08	8.08E-08	8.08E-08
sm147	4.11E-08	5.02E-08	5.99E-08	7.01E-08	8.06E-08	8.06E-08
sm152	4.38E-08	4.93E-08	5.48E-08	6.02E-08	6.57E-08	6.57E-08
kr 83	3.61E-08	4.06E-08	4.52E-08	4.97E-08	5.42E-08	5.42E-08
cs135	3.28E-08	3.69E-08	4.10E-08	4.51E-08	4.92E-08	4.92E-08
ru101	2.54E-08	2.86E-08	3.17E-08	3.49E-08	3.81E-08	3.81E-08
pr141	2.38E-08	2.68E-08	2.99E-08	3.30E-08	3.61E-08	3.61E-08
eu153	2.22E-08	2.50E-08	2.78E-08	3.06E-08	3.33E-08	3.33E-08
eu151	1.41E-08	1.79E-08	2.20E-08	2.66E-08	3.17E-08	3.17E-08
la139	2.01E-08	2.26E-08	2.51E-08	2.76E-08	3.01E-08	3.01E-08
pd105	8.46E-09	9.52E-09	1.06E-08	1.16E-08	1.27E-08	1.27E-08
zr 93	8.12E-09	9.14E-09	1.02E-08	1.12E-08	1.22E-08	1.22E-08
i129	6.19E-09	6.97E-09	7.75E-09	8.53E-09	9.31E-09	9.31E-09
rh105	8.35E-09	8.36E-09	8.36E-09	8.36E-09	8.36E-09	8.32E-09
nd144	4.38E-09	5.12E-09	5.86E-09	6.61E-09	7.36E-09	7.36E-09
mo 97	4.55E-09	5.12E-09	5.68E-09	6.25E-09	6.82E-09	6.82E-09
ag109	3.17E-09	3.56E-09	3.96E-09	4.35E-09	4.75E-09	4.75E-09
zr 91	2.02E-09	2.29E-09	2.56E-09	2.83E-09	3.10E-09	3.10E-09
y 89	1.96E-09	2.21E-09	2.47E-09	2.73E-09	2.99E-09	2.99E-09
ru102	1.85E-09	2.09E-09	2.32E-09	2.55E-09	2.78E-09	2.78E-09
pr143	2.68E-09	2.68E-09	2.68E-09	2.68E-09	2.68E-09	2.68E-09
ce142	1.67E-09	1.88E-09	2.09E-09	2.30E-09	2.51E-09	2.51E-09
nd148	1.61E-09	1.81E-09	2.01E-09	2.21E-09	2.41E-09	2.41E-09
sr 90	1.62E-09	1.81E-09	2.00E-09	2.18E-09	2.37E-09	2.37E-09
xe133	2.02E-09	2.02E-09	2.02E-09	2.02E-09	2.02E-09	2.02E-09
nd146	1.35E-09	1.52E-09	1.68E-09	1.85E-09	2.02E-09	2.02E-09
ba138	1.15E-09	1.30E-09	1.44E-09	1.58E-09	1.73E-09	1.73E-09
in115	1.10E-09	1.24E-09	1.38E-09	1.52E-09	1.66E-09	1.66E-09
pd108	1.08E-09	1.21E-09	1.35E-09	1.48E-09	1.61E-09	1.61E-09
ce140	1.06E-09	1.20E-09	1.33E-09	1.47E-09	1.60E-09	1.60E-09
ce141	1.60E-09	1.60E-09	1.60E-09	1.60E-09	1.60E-09	1.60E-09
xe132	9.62E-10	1.08E-09	1.20E-09	1.32E-09	1.44E-09	1.44E-09
mo 98	6.65E-10	7.49E-10	8.32E-10	9.15E-10	9.98E-10	9.98E-10
pm149	9.76E-10	9.80E-10	9.80E-10	9.80E-10	9.80E-10	9.73E-10
mo100	6.44E-10	7.25E-10	8.05E-10	8.86E-10	9.67E-10	9.67E-10

1
0
0
sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
fraction of total absorption rate
power= .00mw, burnup= 9.9mwd, flux= 2.74E+08n/cm**2-sec
initial 1643.7 d 1826.3 d 2009.0 d 2191.6 d 2191.7 d

pd107	6.41E-10	7.20E-10	8.00E-10	8.79E-10	9.59E-10	9.59E-10
ba137	4.32E-10	5.44E-10	6.69E-10	8.07E-10	9.56E-10	9.56E-10
xe134	6.36E-10	7.16E-10	7.95E-10	8.75E-10	9.54E-10	9.54E-10
nd147	9.30E-10	9.33E-10	9.33E-10	9.33E-10	9.33E-10	9.29E-10
zr 92	5.17E-10	5.81E-10	6.46E-10	7.11E-10	7.75E-10	7.75E-10

i127	4.08E-10	4.60E-10	5.12E-10	5.64E-10	6.16E-10	6.16E-10
zr 96	4.04E-10	4.55E-10	5.05E-10	5.56E-10	6.07E-10	6.07E-10
ce144	5.86E-10	5.93E-10	5.97E-10	5.99E-10	6.01E-10	6.01E-10
ru104	3.96E-10	4.46E-10	4.95E-10	5.45E-10	5.94E-10	5.94E-10
nd150	3.55E-10	4.00E-10	4.44E-10	4.88E-10	5.33E-10	5.33E-10
xe136	3.44E-10	3.87E-10	4.30E-10	4.73E-10	5.16E-10	5.16E-10
cs137	3.33E-10	3.73E-10	4.12E-10	4.51E-10	4.89E-10	4.89E-10
br 81	2.58E-10	2.90E-10	3.22E-10	3.54E-10	3.87E-10	3.87E-10
ru103	3.58E-10	3.58E-10	3.58E-10	3.58E-10	3.58E-10	3.57E-10
zr 94	2.18E-10	2.45E-10	2.73E-10	3.00E-10	3.27E-10	3.27E-10
rb 85	2.04E-10	2.31E-10	2.57E-10	2.84E-10	3.11E-10	3.11E-10
sm150	1.25E-10	1.58E-10	1.95E-10	2.36E-10	2.81E-10	2.81E-10
cd111	1.67E-10	1.88E-10	2.08E-10	2.29E-10	2.50E-10	2.50E-10
te130	1.56E-10	1.76E-10	1.95E-10	2.15E-10	2.35E-10	2.35E-10
sm154	1.51E-10	1.70E-10	1.89E-10	2.08E-10	2.27E-10	2.27E-10
rb 87	1.46E-10	1.64E-10	1.82E-10	2.00E-10	2.18E-10	2.18E-10
kr 85	1.31E-10	1.45E-10	1.59E-10	1.72E-10	1.85E-10	1.85E-10
zr 95	1.65E-10	1.66E-10	1.66E-10	1.66E-10	1.66E-10	1.65E-10
se 77	1.03E-10	1.16E-10	1.29E-10	1.42E-10	1.55E-10	1.55E-10
nb 95	1.53E-10	1.53E-10	1.53E-10	1.53E-10	1.53E-10	1.53E-10
y 91	1.44E-10	1.44E-10	1.44E-10	1.44E-10	1.44E-10	1.44E-10
pm151	1.07E-10	1.10E-10	1.10E-10	1.10E-10	1.10E-10	1.06E-10
kr 84	6.86E-11	7.72E-11	8.58E-11	9.43E-11	1.03E-10	1.03E-10
pd106	4.82E-11	5.69E-11	6.57E-11	7.46E-11	8.35E-11	8.35E-11
se 79	5.31E-11	5.98E-11	6.64E-11	7.31E-11	7.97E-11	7.97E-11
sb121	5.01E-11	5.63E-11	6.26E-11	6.88E-11	7.51E-11	7.51E-11
sb123	4.04E-11	4.55E-11	5.06E-11	5.57E-11	6.08E-11	6.08E-11
kr 86	3.84E-11	4.32E-11	4.80E-11	5.28E-11	5.76E-11	5.76E-11
te128	3.41E-11	3.84E-11	4.27E-11	4.69E-11	5.12E-11	5.12E-11
ba140	4.74E-11	4.75E-11	4.75E-11	4.75E-11	4.75E-11	4.73E-11
gd156	2.60E-11	2.93E-11	3.26E-11	3.59E-11	3.92E-11	3.92E-11
sm153	3.75E-11	3.82E-11	3.82E-11	3.82E-11	3.82E-11	3.72E-11
se 80	2.48E-11	2.79E-11	3.10E-11	3.41E-11	3.71E-11	3.71E-11
eu156	3.42E-11	3.41E-11	3.42E-11	3.42E-11	3.42E-11	3.42E-11
dy161	2.17E-11	2.44E-11	2.71E-11	2.98E-11	3.25E-11	3.25E-11
sr 89	3.09E-11	3.09E-11	3.09E-11	3.09E-11	3.09E-11	3.09E-11
ru106	2.36E-11	2.41E-11	2.44E-11	2.46E-11	2.48E-11	2.48E-11
tb159	1.45E-11	1.64E-11	1.82E-11	2.00E-11	2.18E-11	2.18E-11
zr 90	9.65E-12	1.22E-11	1.50E-11	1.80E-11	2.14E-11	2.14E-11
li 6	1.41E-11	1.59E-11	1.76E-11	1.94E-11	2.11E-11	2.11E-11
cd112	1.40E-11	1.57E-11	1.75E-11	1.92E-11	2.10E-11	2.10E-11
ce143	1.72E-11	1.76E-11	1.76E-11	1.76E-11	1.76E-11	1.70E-11
sn117	1.11E-11	1.25E-11	1.39E-11	1.53E-11	1.66E-11	1.66E-11
te125	7.82E-12	9.58E-12	1.15E-11	1.34E-11	1.55E-11	1.55E-11

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
fraction of total absorption rate
power= .00mw, burnup= 9.mwd, flux= 2.74E+08n/cm**2-sec
initial 1643.7 d 1826.3 d 2009.0 d 2191.6 d 2191.7 d

fission products page 24

la140	1.53E-11	1.53E-11	1.53E-11	1.53E-11	1.53E-11	1.53E-11
sn119	9.15E-12	1.03E-11	1.14E-11	1.26E-11	1.37E-11	1.37E-11
mo 99	1.30E-11	1.32E-11	1.32E-11	1.32E-11	1.32E-11	1.29E-11
sn115	8.37E-12	9.41E-12	1.05E-11	1.15E-11	1.26E-11	1.26E-11
sb125	9.50E-12	1.01E-11	1.07E-11	1.12E-11	1.17E-11	1.17E-11
sr 88	7.05E-12	7.94E-12	8.82E-12	9.70E-12	1.06E-11	1.06E-11
kr 87	1.09E-11	2.31E-11	2.31E-11	2.31E-11	2.31E-11	8.20E-12
pm148m	6.11E-12	6.50E-12	6.88E-12	7.21E-12	7.51E-12	7.50E-12
pd110	4.99E-12	5.61E-12	6.23E-12	6.86E-12	7.48E-12	7.48E-12
te127m	7.35E-12	7.35E-12	7.35E-12	7.35E-12	7.35E-12	7.35E-12
cd114	4.85E-12	5.45E-12	6.06E-12	6.66E-12	7.27E-12	7.27E-12

se 82	4.79E-12	5.39E-12	5.99E-12	6.58E-12	7.18E-12	7.18E-12
gd158	4.56E-12	5.14E-12	5.71E-12	6.29E-12	6.87E-12	6.87E-12
i131	6.77E-12	6.78E-12	6.78E-12	6.78E-12	6.78E-12	6.76E-12
eu154	3.51E-12	4.11E-12	4.75E-12	5.42E-12	6.12E-12	6.12E-12
sn126	3.83E-12	4.31E-12	4.79E-12	5.27E-12	5.75E-12	5.75E-12
se 78	3.62E-12	4.08E-12	4.53E-12	4.98E-12	5.44E-12	5.44E-12
sn124	2.90E-12	3.26E-12	3.63E-12	3.99E-12	4.35E-12	4.35E-12
dy162	2.79E-12	3.13E-12	3.48E-12	3.82E-12	4.17E-12	4.17E-12
dy164	2.53E-12	2.85E-12	3.16E-12	3.48E-12	3.79E-12	3.79E-12
as 75	2.16E-12	2.43E-12	2.70E-12	2.97E-12	3.24E-12	3.24E-12
y 90	1.54E-12	1.72E-12	1.90E-12	2.08E-12	2.25E-12	2.25E-12
te129m	1.79E-12	1.79E-12	1.79E-12	1.79E-12	1.79E-12	1.79E-12
sn118	1.18E-12	1.33E-12	1.48E-12	1.63E-12	1.77E-12	1.77E-12
ba136	1.13E-12	1.28E-12	1.42E-12	1.57E-12	1.71E-12	1.71E-12
cd116	1.01E-12	1.13E-12	1.26E-12	1.38E-12	1.51E-12	1.51E-12
sn122	1.01E-12	1.13E-12	1.26E-12	1.38E-12	1.51E-12	1.51E-12
cs134	8.30E-13	9.51E-13	1.07E-12	1.20E-12	1.33E-12	1.33E-12
sn120	7.52E-13	8.45E-13	9.39E-13	1.03E-12	1.13E-12	1.13E-12
ru 99	6.57E-13	7.55E-13	8.56E-13	9.61E-13	1.07E-12	1.07E-12
kr 82	6.31E-13	7.10E-13	7.90E-13	8.69E-13	9.48E-13	9.48E-13
dy163	6.15E-13	6.91E-13	7.68E-13	8.44E-13	9.21E-13	9.21E-13
ge 73	5.89E-13	6.63E-13	7.37E-13	8.10E-13	8.84E-13	8.84E-13
eu152	2.51E-13	3.53E-13	4.79E-13	6.31E-13	8.12E-13	8.12E-13
xe130	3.89E-13	4.38E-13	4.87E-13	5.36E-13	5.85E-13	5.85E-13
mo 96	2.74E-13	3.09E-13	3.44E-13	3.79E-13	4.14E-13	4.14E-13
in113	1.49E-13	1.87E-13	2.29E-13	2.75E-13	3.25E-13	3.25E-13
ge 76	2.14E-13	2.41E-13	2.68E-13	2.94E-13	3.21E-13	3.21E-13
ag111	3.15E-13	3.16E-13	3.16E-13	3.16E-13	3.16E-13	3.14E-13
pm148	2.40E-13	2.56E-13	2.71E-13	2.83E-13	2.94E-13	2.91E-13
eu157	2.81E-13	2.97E-13	2.97E-13	2.97E-13	2.97E-13	2.74E-13
cd115m	2.37E-13	2.37E-13	2.37E-13	2.37E-13	2.37E-13	2.37E-13
gd160	1.35E-13	1.52E-13	1.68E-13	1.85E-13	2.02E-13	2.02E-13
te126	1.04E-13	1.17E-13	1.30E-13	1.43E-13	1.56E-13	1.56E-13
ru100	7.20E-14	8.37E-14	9.60E-14	1.09E-13	1.22E-13	1.22E-13
ho165	4.23E-14	4.75E-14	5.28E-14	5.80E-14	6.33E-14	6.33E-14
cs136	5.54E-14	5.56E-14	5.56E-14	5.56E-14	5.56E-14	5.54E-14
sm148	2.56E-14	3.19E-14	3.87E-14	4.61E-14	5.40E-14	5.40E-14
gd152	1.38E-14	1.96E-14	2.68E-14	3.56E-14	4.61E-14	4.61E-14

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
fraction of total absorption rate
power= .00mw, burnup= 9. mwd, flux= 2.74E+08n/cm**2-sec
initial 1643.7 d 1826.3 d 2009.0 d 2191.6 d 2191.7 d

fission products page 25

gd154	1.63E-14	2.14E-14	2.72E-14	3.39E-14	4.16E-14	4.16E-14
sr 87	2.46E-14	2.77E-14	3.07E-14	3.38E-14	3.69E-14	3.69E-14
te124	2.36E-14	2.67E-14	2.98E-14	3.30E-14	3.61E-14	3.61E-14
nd142	1.34E-14	1.69E-14	2.10E-14	2.54E-14	3.02E-14	3.02E-14
sn125	2.91E-14	2.92E-14	2.92E-14	2.92E-14	2.92E-14	2.90E-14
ba135	1.32E-14	1.64E-14	1.99E-14	2.37E-14	2.78E-14	2.78E-14
ru105	2.45E-14	2.95E-14	2.95E-14	2.95E-14	2.95E-14	2.25E-14
ba134	9.24E-15	1.19E-14	1.49E-14	1.83E-14	2.21E-14	2.21E-14
nb 94	1.39E-14	1.57E-14	1.74E-14	1.92E-14	2.09E-14	2.09E-14
pd104	8.28E-15	1.05E-14	1.31E-14	1.59E-14	1.90E-14	1.90E-14
ge 74	1.19E-14	1.34E-14	1.49E-14	1.64E-14	1.79E-14	1.79E-14
ge 72	7.98E-15	8.98E-15	9.98E-15	1.10E-14	1.20E-14	1.20E-14
sr 86	6.86E-15	7.74E-15	8.61E-15	9.49E-15	1.04E-14	1.04E-14
sn123	1.01E-14	1.01E-14	1.01E-14	1.01E-14	1.01E-14	1.01E-14
te132	9.48E-15	9.59E-15	9.59E-15	9.59E-15	9.59E-15	9.44E-15
rb 88	1.00E-14	1.30E-14	1.30E-14	1.30E-14	1.30E-14	8.88E-15
i135	8.79E-15	1.02E-14	1.02E-14	1.02E-14	1.02E-14	8.33E-15

se 76	4.63E-15	5.21E-15	5.80E-15	6.38E-15	6.96E-15	6.96E-15
cd110	1.90E-15	2.32E-15	2.77E-15	3.26E-15	3.78E-15	3.78E-15
sb126	3.01E-15	3.02E-15	3.02E-15	3.02E-15	3.02E-15	3.01E-15
sb124	2.10E-15	2.11E-15	2.11E-15	2.11E-15	2.11E-15	2.10E-15
br 79	8.84E-16	1.12E-15	1.38E-15	1.66E-15	1.98E-15	1.98E-15
in117m	1.95E-15	2.10E-15	2.10E-15	2.10E-15	2.10E-15	1.85E-15
xe128	1.15E-15	1.30E-15	1.45E-15	1.61E-15	1.76E-15	1.76E-15
er166	1.11E-15	1.25E-15	1.39E-15	1.53E-15	1.67E-15	1.67E-15
dy160	8.88E-16	1.02E-15	1.15E-15	1.28E-15	1.41E-15	1.41E-15
xe129	4.87E-16	6.17E-16	7.62E-16	9.22E-16	1.10E-15	1.10E-15
ag107	4.58E-16	5.80E-16	7.16E-16	8.66E-16	1.03E-15	1.03E-15
te134	1.46E-15	5.89E-15	5.89E-15	5.89E-15	5.89E-15	8.72E-16
i130	6.68E-16	7.21E-16	7.22E-16	7.23E-16	7.23E-16	6.52E-16
in117	5.78E-16	6.17E-16	6.17E-16	6.17E-16	6.17E-16	5.49E-16
kr 80	3.34E-16	3.75E-16	4.17E-16	4.59E-16	5.01E-16	5.01E-16
tb160	3.38E-16	3.43E-16	3.48E-16	3.54E-16	3.59E-16	3.59E-16
nb 93	1.09E-16	1.50E-16	2.01E-16	2.62E-16	3.34E-16	3.34E-16
rb 86	2.43E-16	2.44E-16	2.44E-16	2.44E-16	2.44E-16	2.43E-16
dy165	1.43E-16	2.11E-16	2.11E-16	2.11E-16	2.11E-16	1.23E-16
te122	5.08E-17	5.82E-17	6.59E-17	7.39E-17	8.21E-17	8.21E-17
sn116	3.06E-17	3.70E-17	4.40E-17	5.16E-17	5.97E-17	5.97E-17
be 9	2.67E-17	3.00E-17	3.33E-17	3.67E-17	4.00E-17	4.00E-17
pr142	2.62E-17	3.10E-17	3.45E-17	3.80E-17	4.15E-17	3.87E-17
ge 75	4.41E-17	8.69E-17	8.69E-17	8.69E-17	8.69E-17	3.41E-17
te123	2.17E-17	2.46E-17	2.76E-17	3.06E-17	3.36E-17	3.36E-17
cd118	3.79E-17	1.21E-16	1.21E-16	1.21E-16	1.21E-16	2.48E-17
li 7	1.09E-17	1.22E-17	1.36E-17	1.49E-17	1.63E-17	1.63E-17
er167	4.44E-18	5.02E-18	5.59E-18	6.17E-18	6.75E-18	6.75E-18
in119m	1.39E-18	3.02E-17	3.02E-17	3.02E-17	3.02E-17	4.21E-19
cd108	2.22E-19	2.49E-19	2.76E-19	3.07E-19	3.34E-19	3.34E-19
cs134m	1.45E-19	2.29E-19	2.53E-19	2.80E-19	3.07E-19	1.92E-19
cd109	1.68E-19	1.75E-19	1.79E-19	1.82E-19	1.85E-19	1.85E-19

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 26

0 fraction of total absorption rate
 power= .00mw, burnup= 9.mwd, flux= 2.74E+08n/cm**2-sec
 0 initial 1643.7 d 1826.3 d 2009.0 d 2191.6 d 2191.7 d

sn114	3.37E-21	3.37E-21	3.37E-21	6.74E-21	6.74E-21	6.74E-21
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1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 27

0 power= 4.000E-03mw, burnup=8.7659E+00mwd, flux= 2.74E+08n/cm**2-sec
 nuclide concentrations, gram atoms
 basis = single reactor assembly

	charge	1643.7 d	1826.3 d	2009.0 d	2191.6 d	2191.7 d
h 1	3.48E-07	3.91E-07	4.33E-07	4.76E-07	5.18E-07	5.18E-07
h 2	1.03E-09	1.16E-09	1.28E-09	1.41E-09	1.54E-09	1.54E-09
h 3	6.77E-12	7.50E-12	8.20E-12	8.89E-12	9.56E-12	9.56E-12
h 4	.00E+00	3.05E-35	3.34E-35	3.62E-35	3.89E-35	.00E+00
he 3	7.95E-13	9.96E-13	1.22E-12	1.46E-12	1.72E-12	1.72E-12
he 4	5.75E-08	6.45E-08	7.16E-08	7.86E-08	8.57E-08	8.57E-08
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ne 20	6.91E-09	7.75E-09	8.60E-09	9.44E-09	1.03E-08	1.03E-08
ne 21	9.52E-16	1.19E-15	1.45E-15	1.73E-15	2.04E-15	2.04E-15
ne 22	1.75E-11	2.13E-11	2.53E-11	2.95E-11	3.38E-11	3.38E-11
ne 23	7.10E-30	7.04E-15	7.04E-15	7.04E-15	7.04E-15	7.04E-30
na 22	2.77E-11	2.94E-11	3.09E-11	3.22E-11	3.33E-11	3.33E-11
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	2.87E-08	2.85E-08	2.85E-08	2.85E-08	2.85E-08	2.60E-08
na 24m	5.05E-30	4.68E-15	4.68E-15	4.68E-15	4.68E-15	4.68E-30
na 25	2.41E-43	2.47E-28	2.74E-28	3.02E-28	3.29E-28	3.62E-43

mg 24	5.59E-05	6.19E-05	6.78E-05	7.37E-05	7.97E-05	7.97E-05
mg 25	7.66E-12	8.61E-12	9.56E-12	1.05E-11	1.15E-11	1.15E-11
mg 26	1.03E-09	1.16E-09	1.28E-09	1.41E-09	1.54E-09	1.54E-09
mg 27	4.42E-15	2.10E-12	2.10E-12	2.10E-12	2.10E-12	4.55E-16
mg 28	4.12E-24	4.29E-24	4.29E-24	4.29E-24	4.29E-24	4.03E-24
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	1.08E-21	2.11E-10	2.11E-10	2.11E-10	2.11E-10	2.88E-25
al 29	3.11E-32	2.80E-28	3.42E-28	4.10E-28	4.84E-28	2.53E-33
al 30	.00E+00	2.38E-41	3.24E-41	4.28E-41	5.52E-41	.00E+00
si 28	1.62E-04	1.79E-04	1.96E-04	2.14E-04	2.31E-04	2.31E-04
si 29	8.69E-13	1.09E-12	1.33E-12	1.60E-12	1.88E-12	1.88E-12
si 30	4.90E-21	6.92E-21	9.43E-21	1.25E-20	1.61E-20	1.61E-20
si 31	2.42E-33	4.98E-33	6.78E-33	8.96E-33	1.16E-32	6.95E-33
si 32	2.51E-41	4.00E-41	6.07E-41	8.85E-41	1.25E-40	1.25E-40
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		2.74E+08	2.74E+08	2.74E+08	2.74E+08	2.74E+07

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
power= 4.000E-03mw, burnup=8.7659E+00mwd, flux= 2.74E+08n/cm**2-sec

actinides page 28

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nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	1643.7 d	1826.3 d	2009.0 d	2191.6 d	2191.7 d
he 4	2.16E-04	2.45E-04	2.74E-04	3.03E-04	3.33E-04	3.33E-04
ra222	1.12E-28	1.35E-28	1.61E-28	1.89E-28	2.18E-28	2.18E-28
ra223	1.62E-13	2.05E-13	2.52E-13	3.05E-13	3.62E-13	3.62E-13
ra224	2.23E-14	2.96E-14	3.80E-14	4.73E-14	5.76E-14	5.76E-14
ra225	2.32E-15	2.95E-15	3.66E-15	4.45E-15	5.31E-15	5.31E-15
ra226	1.88E-09	2.38E-09	2.93E-09	3.55E-09	4.22E-09	4.22E-09
ra228	1.75E-15	2.17E-15	2.63E-15	3.13E-15	3.65E-15	3.65E-15
ac225	1.57E-15	2.00E-15	2.47E-15	3.01E-15	3.59E-15	3.59E-15
ac227	1.17E-10	1.47E-10	1.80E-10	2.17E-10	2.57E-10	2.57E-10
ac228	2.13E-19	2.65E-19	3.21E-19	3.81E-19	4.46E-19	4.46E-19
th226	5.46E-27	6.59E-27	7.87E-27	9.22E-27	1.06E-26	1.06E-26
th227	2.61E-13	3.30E-13	4.07E-13	4.91E-13	5.83E-13	5.83E-13
th228	4.25E-12	5.64E-12	7.23E-12	9.00E-12	1.10E-11	1.10E-11
th229	4.51E-10	5.74E-10	7.12E-10	8.65E-10	1.03E-09	1.03E-09
th230	1.02E-04	1.15E-04	1.28E-04	1.41E-04	1.53E-04	1.53E-04
th231	3.02E-09	3.02E-09	3.02E-09	3.02E-09	3.02E-09	3.02E-09
th232	2.07E-05	2.32E-05	2.58E-05	2.84E-05	3.10E-05	3.10E-05
th233	1.38E-17	2.13E-16	2.37E-16	2.61E-16	2.84E-16	7.92E-18
th234	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	2.87E-06	3.23E-06	3.59E-06	3.95E-06	4.31E-06	4.31E-06
pa232	4.79E-14	5.56E-14	6.18E-14	6.80E-14	7.42E-14	7.11E-14
pa233	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	5.28E-24	6.39E-24	7.63E-24	8.93E-24	1.03E-23	1.03E-23
u231	4.06E-20	4.56E-20	5.08E-20	5.60E-20	6.12E-20	6.04E-20
u232	4.16E-10	5.07E-10	6.03E-10	7.04E-10	8.09E-10	8.09E-10
u233	5.32E-05	6.00E-05	6.68E-05	7.36E-05	8.05E-05	8.05E-05
u234	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00
u235	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02
u236	1.74E+02	1.74E+02	1.74E+02	1.74E+02	1.74E+02	1.74E+02
u237	3.13E-06	3.11E-06	3.11E-06	3.11E-06	3.11E-06	3.09E-06
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04
u239	2.67E-08	3.19E-07	3.19E-07	3.19E-07	3.19E-07	1.06E-08
u240	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	8.16E-12	8.30E-12	8.40E-12	8.47E-12	8.53E-12	8.53E-12

np236m	2.00E-12	2.06E-12	2.06E-12	2.06E-12	2.06E-12	1.94E-12
np236	8.06E-10	9.04E-10	1.00E-09	1.10E-09	1.20E-09	1.20E-09
np237	4.22E+01	4.22E+01	4.22E+01	4.22E+01	4.21E+01	4.21E+01
np238	1.53E-06	1.56E-06	1.56E-06	1.56E-06	1.56E-06	1.52E-06
np239	4.60E-05	4.61E-05	4.61E-05	4.61E-05	4.61E-05	4.53E-05
np240m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np240	3.69E-15	9.37E-15	9.37E-15	9.37E-15	9.37E-15	2.58E-15
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	7.06E-10	7.52E-10	7.93E-10	8.30E-10	8.62E-10	8.62E-10
pu237	7.11E-15	7.92E-15	8.80E-15	9.69E-15	1.06E-14	1.06E-14
pu238	7.38E-04	8.28E-04	9.18E-04	1.01E-03	1.10E-03	1.10E-03
pu239	2.05E-02	2.31E-02	2.56E-02	2.81E-02	3.06E-02	3.06E-02

1
0

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
power= 4.000E-03mw, burnup=8.7659E+00mwd, flux= 2.74E+08n/cm**2-sec

actinides page 29

nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	1643.7 d	1826.3 d	2009.0 d	2191.6 d	2191.7 d
pu240	4.05E-07	5.12E-07	6.31E-07	7.63E-07	9.06E-07	9.06E-07
pu241	1.04E-11	1.47E-11	2.00E-11	2.63E-11	3.39E-11	3.39E-11
pu242	8.34E-17	1.33E-16	2.01E-16	2.93E-16	4.12E-16	4.12E-16
pu243	1.47E-25	2.81E-25	4.25E-25	6.19E-25	8.71E-25	6.66E-25
pu244	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu245	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
totals	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04
flux		2.74E+08	2.74E+08	2.74E+08	2.74E+08	2.74E+07

0
0
0
0
0
0
0

1q array has 20 entries.
3q array has 1 entries.
3q array has 1 entries.
3q array has 1 entries.
4q array has 1 entries.
54q array has 12 entries.

1library information...

cross-section data taken from position number 4 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 densities
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 densities
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      8/28/1996      date library was produced
0      1697      total number of nuclides in library
0      689      number of light-element nuclides
0      129      number of actinide nuclides
0      879      number of fission product nuclides
0      7993     number of nonzero off-diagonal matrix elements
0
*****

```

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 page 30
 power= .00mw, burnup= 12.mwd, flux= 2.71E+08n/cm**2-sec
 basis =

(note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)

	initial	2374.3 d	2556.9 d	2739.5 d	2922.2 d	2922.2 d
productions	1.134728E+06	1.134732E+06	1.134735E+06	1.134739E+06	1.134743E+06	1.134743E+06
absorptions	9.244198E+05	9.244260E+05	9.244325E+05	9.244386E+05	9.244447E+05	9.244446E+05
k infinity	1.227502E+00	1.227498E+00	1.227494E+00	1.227490E+00	1.227486E+00	1.227486E+00
	initial	2374.3 d	2556.9 d	2739.5 d	2922.2 d	2922.2 d

actinide absorptions	9.212016E+05	9.212040E+05	9.212063E+05	9.212086E+05	9.212108E+05	9.212108E+05
non-actinide abs. fracs.	3.481328E-03	3.485382E-03	3.489971E-03	3.493965E-03	3.498256E-03	3.498197E-03

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 page 31
 fraction of total absorption rate
 power= .00mw, burnup= 12.mwd, flux= 2.71E+08n/cm**2-sec
 initial 2374.3 d 2556.9 d 2739.5 d 2922.2 d 2922.2 d

sm149	4.45E-05	4.82E-05	5.19E-05	5.56E-05	5.93E-05	5.93E-05
sm151	1.84E-06	1.99E-06	2.14E-06	2.29E-06	2.44E-06	2.44E-06
xe135	2.30E-06	2.33E-06	2.33E-06	2.33E-06	2.33E-06	2.30E-06
nd143	8.87E-07	9.62E-07	1.04E-06	1.11E-06	1.19E-06	1.19E-06
gd157	4.55E-07	4.92E-07	5.30E-07	5.67E-07	6.05E-07	6.05E-07
rh103	4.03E-07	4.37E-07	4.72E-07	5.06E-07	5.40E-07	5.40E-07
cd113	3.88E-07	4.21E-07	4.53E-07	4.85E-07	5.17E-07	5.17E-07
xe131	2.80E-07	3.03E-07	3.27E-07	3.50E-07	3.74E-07	3.74E-07
gd155	2.03E-07	2.33E-07	2.65E-07	2.98E-07	3.32E-07	3.32E-07
cs133	2.17E-07	2.35E-07	2.54E-07	2.72E-07	2.90E-07	2.90E-07
pm147	2.15E-07	2.22E-07	2.28E-07	2.34E-07	2.38E-07	2.38E-07
tc 99	1.60E-07	1.73E-07	1.87E-07	2.00E-07	2.13E-07	2.13E-07
nd145	1.25E-07	1.35E-07	1.45E-07	1.56E-07	1.66E-07	1.66E-07
sm147	8.05E-08	9.15E-08	1.03E-07	1.14E-07	1.26E-07	1.26E-07
eu155	9.32E-08	9.79E-08	1.02E-07	1.06E-07	1.10E-07	1.10E-07
mo 95	8.07E-08	8.79E-08	9.51E-08	1.02E-07	1.10E-07	1.10E-07
sm152	6.56E-08	7.11E-08	7.66E-08	8.20E-08	8.75E-08	8.75E-08
kr 83	5.43E-08	5.88E-08	6.33E-08	6.79E-08	7.24E-08	7.24E-08
cs135	4.91E-08	5.32E-08	5.73E-08	6.14E-08	6.55E-08	6.55E-08
eu151	3.17E-08	3.72E-08	4.31E-08	4.94E-08	5.61E-08	5.61E-08
ru101	3.80E-08	4.12E-08	4.43E-08	4.75E-08	5.07E-08	5.07E-08

pr141	3.61E-08	3.92E-08	4.22E-08	4.53E-08	4.84E-08	4.84E-08
eu153	3.33E-08	3.61E-08	3.89E-08	4.17E-08	4.45E-08	4.45E-08
la139	3.02E-08	3.27E-08	3.52E-08	3.77E-08	4.02E-08	4.02E-08
pd105	1.27E-08	1.37E-08	1.48E-08	1.59E-08	1.69E-08	1.69E-08
zr 93	1.22E-08	1.32E-08	1.42E-08	1.52E-08	1.62E-08	1.62E-08
i129	9.33E-09	1.01E-08	1.09E-08	1.17E-08	1.24E-08	1.25E-08
nd144	7.37E-09	8.13E-09	8.88E-09	9.64E-09	1.04E-08	1.04E-08
mo 97	6.83E-09	7.40E-09	7.97E-09	8.54E-09	9.11E-09	9.11E-09
rh105	8.33E-09	8.37E-09	8.37E-09	8.37E-09	8.37E-09	8.33E-09
ag109	4.74E-09	5.13E-09	5.53E-09	5.92E-09	6.31E-09	6.31E-09
zr 91	3.10E-09	3.37E-09	3.64E-09	3.91E-09	4.17E-09	4.17E-09
y 89	2.99E-09	3.25E-09	3.51E-09	3.77E-09	4.03E-09	4.03E-09
ru102	2.78E-09	3.02E-09	3.25E-09	3.48E-09	3.71E-09	3.71E-09
ce142	2.51E-09	2.72E-09	2.93E-09	3.14E-09	3.35E-09	3.35E-09
nd148	2.41E-09	2.61E-09	2.81E-09	3.01E-09	3.21E-09	3.21E-09
sr 90	2.37E-09	2.55E-09	2.73E-09	2.91E-09	3.09E-09	3.09E-09
nd146	2.02E-09	2.19E-09	2.36E-09	2.53E-09	2.70E-09	2.70E-09
pr143	2.68E-09	2.68E-09	2.68E-09	2.68E-09	2.68E-09	2.68E-09
ba138	1.73E-09	1.88E-09	2.02E-09	2.16E-09	2.31E-09	2.31E-09
in115	1.66E-09	1.79E-09	1.93E-09	2.07E-09	2.21E-09	2.21E-09
ce140	1.61E-09	1.74E-09	1.88E-09	2.01E-09	2.15E-09	2.15E-09
pd108	1.61E-09	1.74E-09	1.88E-09	2.01E-09	2.14E-09	2.14E-09
xe133	2.03E-09	2.03E-09	2.03E-09	2.03E-09	2.03E-09	2.03E-09
xe132	1.44E-09	1.56E-09	1.69E-09	1.81E-09	1.93E-09	1.93E-09
ba137	9.58E-10	1.12E-09	1.29E-09	1.48E-09	1.68E-09	1.68E-09
ce141	1.61E-09	1.61E-09	1.61E-09	1.61E-09	1.61E-09	1.61E-09
mo 98	9.96E-10	1.08E-09	1.16E-09	1.25E-09	1.33E-09	1.33E-09
mo100	9.66E-10	1.05E-09	1.13E-09	1.21E-09	1.29E-09	1.29E-09

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2

fission products

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0 fraction of total absorption rate
 power= .00mw, burnup= 12.mwd, flux= 2.71E+08n/cm**2-sec
 0 initial 2374.3 d 2556.9 d 2739.5 d 2922.2 d 2922.2 d

pd107	9.60E-10	1.04E-09	1.12E-09	1.20E-09	1.28E-09	1.28E-09
xe134	9.56E-10	1.04E-09	1.12E-09	1.19E-09	1.27E-09	1.27E-09
zr 92	7.76E-10	8.41E-10	9.06E-10	9.71E-10	1.04E-09	1.04E-09
pm149	9.75E-10	9.82E-10	9.82E-10	9.82E-10	9.82E-10	9.75E-10
nd147	9.27E-10	9.31E-10	9.31E-10	9.31E-10	9.31E-10	9.27E-10
i127	6.16E-10	6.68E-10	7.20E-10	7.72E-10	8.25E-10	8.25E-10
zr 96	6.04E-10	6.55E-10	7.05E-10	7.56E-10	8.06E-10	8.06E-10
ru104	5.94E-10	6.43E-10	6.93E-10	7.42E-10	7.92E-10	7.92E-10
nd150	5.33E-10	5.77E-10	6.22E-10	6.66E-10	7.10E-10	7.10E-10
xe136	5.17E-10	5.60E-10	6.03E-10	6.46E-10	6.89E-10	6.89E-10
cs137	4.89E-10	5.27E-10	5.64E-10	6.01E-10	6.37E-10	6.37E-10
ce144	6.01E-10	6.02E-10	6.03E-10	6.04E-10	6.04E-10	6.04E-10
br 81	3.86E-10	4.19E-10	4.51E-10	4.83E-10	5.15E-10	5.15E-10
sm150	2.81E-10	3.30E-10	3.82E-10	4.38E-10	4.99E-10	4.99E-10
zr 94	3.27E-10	3.54E-10	3.81E-10	4.09E-10	4.36E-10	4.36E-10
rb 85	3.11E-10	3.38E-10	3.65E-10	3.92E-10	4.20E-10	4.20E-10
ru103	3.58E-10	3.58E-10	3.58E-10	3.58E-10	3.58E-10	3.58E-10
cd111	2.51E-10	2.72E-10	2.93E-10	3.14E-10	3.35E-10	3.35E-10
te130	2.35E-10	2.55E-10	2.74E-10	2.94E-10	3.13E-10	3.13E-10
sm154	2.27E-10	2.46E-10	2.65E-10	2.84E-10	3.03E-10	3.03E-10
rb 87	2.18E-10	2.37E-10	2.55E-10	2.73E-10	2.91E-10	2.91E-10
kr 85	1.86E-10	1.98E-10	2.10E-10	2.22E-10	2.33E-10	2.33E-10
se 77	1.56E-10	1.69E-10	1.82E-10	1.95E-10	2.08E-10	2.08E-10
zr 95	1.65E-10	1.65E-10	1.65E-10	1.65E-10	1.65E-10	1.65E-10
nb 95	1.53E-10	1.53E-10	1.53E-10	1.53E-10	1.53E-10	1.53E-10
y 91	1.44E-10	1.44E-10	1.44E-10	1.44E-10	1.44E-10	1.44E-10
kr 84	1.03E-10	1.11E-10	1.20E-10	1.28E-10	1.37E-10	1.37E-10

pd106	8.34E-11	9.24E-11	1.01E-10	1.11E-10	1.20E-10	1.20E-10
se 79	7.99E-11	8.65E-11	9.32E-11	9.98E-11	1.07E-10	1.07E-10
pm151	1.06E-10	1.11E-10	1.11E-10	1.11E-10	1.11E-10	1.06E-10
sb121	7.50E-11	8.13E-11	8.75E-11	9.38E-11	1.00E-10	1.00E-10
sb123	6.08E-11	6.59E-11	7.10E-11	7.61E-11	8.12E-11	8.12E-11
kr 86	5.77E-11	6.25E-11	6.73E-11	7.21E-11	7.70E-11	7.70E-11
te128	5.12E-11	5.55E-11	5.97E-11	6.40E-11	6.83E-11	6.83E-11
gd156	3.91E-11	4.24E-11	4.56E-11	4.89E-11	5.22E-11	5.22E-11
se 80	3.72E-11	4.03E-11	4.34E-11	4.65E-11	4.96E-11	4.96E-11
ba140	4.74E-11	4.76E-11	4.76E-11	4.76E-11	4.76E-11	4.74E-11
dy161	3.26E-11	3.53E-11	3.80E-11	4.07E-11	4.34E-11	4.34E-11
zr 90	2.14E-11	2.50E-11	2.89E-11	3.31E-11	3.75E-11	3.75E-11
sm153	3.73E-11	3.82E-11	3.82E-11	3.82E-11	3.82E-11	3.72E-11
eu156	3.42E-11	3.42E-11	3.42E-11	3.42E-11	3.42E-11	3.42E-11
sr 89	3.09E-11	3.10E-11	3.10E-11	3.10E-11	3.10E-11	3.09E-11
tb159	2.18E-11	2.36E-11	2.54E-11	2.72E-11	2.90E-11	2.90E-11
li 6	2.12E-11	2.30E-11	2.47E-11	2.65E-11	2.83E-11	2.83E-11
cd112	2.10E-11	2.27E-11	2.45E-11	2.62E-11	2.80E-11	2.80E-11
ru106	2.48E-11	2.49E-11	2.49E-11	2.50E-11	2.50E-11	2.50E-11
te125	1.55E-11	1.76E-11	1.98E-11	2.21E-11	2.44E-11	2.44E-11
sn117	1.67E-11	1.80E-11	1.94E-11	2.08E-11	2.22E-11	2.22E-11
sn119	1.37E-11	1.49E-11	1.60E-11	1.72E-11	1.83E-11	1.83E-11

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 0 fraction of total absorption rate
 power= .00mw, burnup= 12.mwd, flux= 2.71E+08n/cm**2-sec
 0 initial 2374.3 d 2556.9 d 2739.5 d 2922.2 d 2922.2 d

fission products

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ce143	1.70E-11	1.76E-11	1.76E-11	1.76E-11	1.76E-11	1.70E-11
sn115	1.26E-11	1.36E-11	1.47E-11	1.57E-11	1.68E-11	1.68E-11
la140	1.53E-11	1.53E-11	1.53E-11	1.53E-11	1.53E-11	1.53E-11
sr 88	1.06E-11	1.15E-11	1.24E-11	1.32E-11	1.41E-11	1.41E-11
sb125	1.17E-11	1.20E-11	1.24E-11	1.27E-11	1.30E-11	1.29E-11
mo 99	1.29E-11	1.32E-11	1.32E-11	1.32E-11	1.32E-11	1.29E-11
pd110	7.47E-12	8.09E-12	8.71E-12	9.33E-12	9.95E-12	9.95E-12
cd114	7.26E-12	7.86E-12	8.47E-12	9.07E-12	9.68E-12	9.68E-12
se 82	7.19E-12	7.79E-12	8.39E-12	8.99E-12	9.59E-12	9.59E-12
eu154	6.12E-12	6.85E-12	7.61E-12	8.39E-12	9.19E-12	9.19E-12
gd158	6.86E-12	7.44E-12	8.02E-12	8.60E-12	9.18E-12	9.18E-12
pm148m	7.51E-12	7.75E-12	7.98E-12	8.17E-12	8.35E-12	8.34E-12
kr 87	8.22E-12	2.32E-11	2.32E-11	2.32E-11	2.32E-11	8.22E-12
sn126	5.76E-12	6.25E-12	6.73E-12	7.21E-12	7.69E-12	7.69E-12
te127m	7.36E-12	7.36E-12	7.36E-12	7.36E-12	7.36E-12	7.36E-12
se 78	5.44E-12	5.89E-12	6.34E-12	6.80E-12	7.25E-12	7.25E-12
i131	6.77E-12	6.79E-12	6.79E-12	6.79E-12	6.79E-12	6.77E-12
sn124	4.34E-12	4.70E-12	5.07E-12	5.43E-12	5.79E-12	5.79E-12
dy162	4.17E-12	4.51E-12	4.86E-12	5.20E-12	5.55E-12	5.55E-12
dy164	3.80E-12	4.12E-12	4.43E-12	4.75E-12	5.07E-12	5.07E-12
as 75	3.24E-12	3.51E-12	3.78E-12	4.05E-12	4.32E-12	4.32E-12
y 90	2.26E-12	2.43E-12	2.60E-12	2.77E-12	2.94E-12	2.94E-12
sn118	1.77E-12	1.92E-12	2.06E-12	2.21E-12	2.36E-12	2.36E-12
ba136	1.71E-12	1.85E-12	2.00E-12	2.14E-12	2.29E-12	2.29E-12
sn122	1.51E-12	1.64E-12	1.76E-12	1.89E-12	2.01E-12	2.01E-12
cd116	1.51E-12	1.63E-12	1.76E-12	1.88E-12	2.01E-12	2.01E-12
eu152	8.13E-13	1.03E-12	1.27E-12	1.55E-12	1.87E-12	1.87E-12
cs134	1.33E-12	1.46E-12	1.58E-12	1.71E-12	1.84E-12	1.84E-12
te129m	1.80E-12	1.80E-12	1.80E-12	1.80E-12	1.80E-12	1.80E-12
ru 99	1.07E-12	1.18E-12	1.30E-12	1.41E-12	1.54E-12	1.54E-12
sn120	1.13E-12	1.22E-12	1.31E-12	1.41E-12	1.50E-12	1.50E-12
kr 82	9.49E-13	1.03E-12	1.11E-12	1.19E-12	1.27E-12	1.27E-12
dy163	9.21E-13	9.98E-13	1.07E-12	1.15E-12	1.23E-12	1.23E-12

ge 73	8.85E-13	9.59E-13	1.03E-12	1.11E-12	1.18E-12	1.18E-12
xe130	5.86E-13	6.35E-13	6.84E-13	7.33E-13	7.83E-13	7.83E-13
in113	3.25E-13	3.78E-13	4.35E-13	4.96E-13	5.60E-13	5.60E-13
mo 96	4.14E-13	4.49E-13	4.84E-13	5.19E-13	5.55E-13	5.55E-13
ge 76	3.21E-13	3.48E-13	3.75E-13	4.02E-13	4.28E-13	4.28E-13
pm148	2.90E-13	3.02E-13	3.10E-13	3.18E-13	3.24E-13	3.21E-13
ag111	3.14E-13	3.15E-13	3.15E-13	3.15E-13	3.15E-13	3.14E-13
eu157	2.75E-13	2.97E-13	2.97E-13	2.97E-13	2.97E-13	2.74E-13
gd160	2.02E-13	2.19E-13	2.35E-13	2.52E-13	2.69E-13	2.69E-13
cd115m	2.37E-13	2.37E-13	2.37E-13	2.37E-13	2.37E-13	2.37E-13
te126	1.56E-13	1.69E-13	1.82E-13	1.95E-13	2.09E-13	2.09E-13
ru100	1.23E-13	1.37E-13	1.51E-13	1.67E-13	1.83E-13	1.83E-13
gd152	4.62E-14	5.88E-14	7.35E-14	9.05E-14	1.10E-13	1.10E-13
sm148	5.41E-14	6.25E-14	7.14E-14	8.07E-14	9.05E-14	9.05E-14
ho165	6.33E-14	6.86E-14	7.39E-14	7.91E-14	8.44E-14	8.44E-14
gd154	4.16E-14	5.02E-14	5.98E-14	7.04E-14	8.20E-14	8.20E-14

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2

fission products

page 34

0 fraction of total absorption rate
 power= .00mw, burnup= 12.mwd, flux= 2.71E+08n/cm**2-sec
 0 initial 2374.3 d 2556.9 d 2739.5 d 2922.2 d 2922.2 d

cs136	5.53E-14	5.56E-14	5.56E-14	5.56E-14	5.56E-14	5.54E-14
nd142	3.03E-14	3.56E-14	4.13E-14	4.75E-14	5.40E-14	5.40E-14
sr 87	3.69E-14	4.00E-14	4.31E-14	4.62E-14	4.93E-14	4.93E-14
te124	3.61E-14	3.93E-14	4.24E-14	4.56E-14	4.87E-14	4.87E-14
ba135	2.78E-14	3.23E-14	3.71E-14	4.22E-14	4.76E-14	4.76E-14
ba134	2.21E-14	2.62E-14	3.08E-14	3.57E-14	4.10E-14	4.10E-14
pd104	1.90E-14	2.23E-14	2.60E-14	2.99E-14	3.41E-14	3.41E-14
sn125	2.90E-14	2.92E-14	2.92E-14	2.92E-14	2.92E-14	2.90E-14
nb 94	2.09E-14	2.26E-14	2.44E-14	2.61E-14	2.78E-14	2.78E-14
ge 74	1.79E-14	1.94E-14	2.09E-14	2.24E-14	2.39E-14	2.39E-14
ru105	2.25E-14	2.94E-14	2.94E-14	2.94E-14	2.94E-14	2.25E-14
ge 72	1.20E-14	1.30E-14	1.40E-14	1.50E-14	1.60E-14	1.60E-14
sr 86	1.04E-14	1.13E-14	1.22E-14	1.30E-14	1.39E-14	1.39E-14
sn123	1.01E-14	1.01E-14	1.01E-14	1.01E-14	1.01E-14	1.01E-14
te132	9.45E-15	9.60E-15	9.60E-15	9.60E-15	9.60E-15	9.45E-15
se 76	6.97E-15	7.56E-15	8.14E-15	8.73E-15	9.31E-15	9.31E-15
rb 88	8.90E-15	1.30E-14	1.30E-14	1.30E-14	1.30E-14	8.90E-15
i135	8.34E-15	1.02E-14	1.02E-14	1.02E-14	1.02E-14	8.35E-15
cd110	3.79E-15	4.35E-15	4.95E-15	5.58E-15	6.25E-15	6.25E-15
br 79	1.98E-15	2.32E-15	2.68E-15	3.08E-15	3.50E-15	3.50E-15
sb126	3.01E-15	3.03E-15	3.03E-15	3.03E-15	3.03E-15	3.02E-15
xe128	1.76E-15	1.92E-15	2.08E-15	2.24E-15	2.40E-15	2.40E-15
er166	1.67E-15	1.81E-15	1.95E-15	2.10E-15	2.24E-15	2.24E-15
sb124	2.10E-15	2.11E-15	2.11E-15	2.11E-15	2.11E-15	2.11E-15
dy160	1.41E-15	1.54E-15	1.68E-15	1.82E-15	1.96E-15	1.96E-15
xe129	1.10E-15	1.29E-15	1.50E-15	1.72E-15	1.95E-15	1.95E-15
in117m	1.85E-15	2.11E-15	2.11E-15	2.11E-15	2.11E-15	1.85E-15
ag107	1.03E-15	1.21E-15	1.40E-15	1.61E-15	1.83E-15	1.83E-15
te134	8.74E-16	5.90E-15	5.90E-15	5.90E-15	5.90E-15	8.74E-16
nb 93	3.34E-16	4.19E-16	5.17E-16	6.29E-16	7.55E-16	7.55E-16
kr 80	5.01E-16	5.43E-16	5.85E-16	6.27E-16	6.69E-16	6.69E-16
i130	6.52E-16	7.25E-16	7.25E-16	7.26E-16	7.26E-16	6.54E-16
in117	5.50E-16	6.19E-16	6.19E-16	6.19E-16	6.19E-16	5.50E-16
tb160	3.59E-16	3.65E-16	3.70E-16	3.75E-16	3.80E-16	3.80E-16
rb 86	2.44E-16	2.45E-16	2.45E-16	2.45E-16	2.45E-16	2.45E-16
dy165	1.23E-16	2.12E-16	2.12E-16	2.12E-16	2.12E-16	1.23E-16
te122	8.20E-17	9.05E-17	9.91E-17	1.08E-16	1.17E-16	1.17E-16
sn116	5.96E-17	6.83E-17	7.76E-17	8.75E-17	9.79E-17	9.79E-17
be 9	3.99E-17	4.32E-17	4.65E-17	4.98E-17	5.32E-17	5.32E-17

```

pr142 3.87E-17 4.50E-17 4.85E-17 5.20E-17 5.55E-17 5.17E-17
te123 3.36E-17 3.66E-17 3.96E-17 4.26E-17 4.56E-17 4.56E-17
ge 75 3.41E-17 8.71E-17 8.71E-17 8.71E-17 8.71E-17 3.41E-17
cd118 2.48E-17 1.21E-16 1.21E-16 1.21E-16 1.21E-16 2.48E-17
li 7 1.63E-17 1.77E-17 1.90E-17 2.04E-17 2.18E-17 2.18E-17
er167 6.76E-18 7.35E-18 7.94E-18 8.53E-18 9.13E-18 9.13E-18
cd108 3.34E-19 3.61E-19 3.91E-19 4.18E-19 4.49E-19 4.49E-19
in119m 4.22E-19 3.03E-17 3.03E-17 3.03E-17 3.03E-17 4.22E-19
cs134m 1.92E-19 3.31E-19 3.58E-19 3.81E-19 4.08E-19 2.56E-19
cd109 1.86E-19 1.89E-19 1.92E-19 1.92E-19 1.96E-19 1.96E-19

```

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 35
0 fraction of total absorption rate
power= .00mw, burnup= 12.mwd, flux= 2.71E+08n/cm**2-sec
initial 2374.3 d 2556.9 d 2739.5 d 2922.2 d 2922.2 d

```

sn114 6.75E-21 6.75E-21 6.75E-21 6.75E-21 1.01E-20 1.01E-20

```

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 36
0 power= 4.000E-03mw, burnup=1.1688E+01mwd, flux= 2.71E+08n/cm**2-sec
nuclide concentrations, gram atoms
basis = single reactor assembly

	charge	2374.3 d	2556.9 d	2739.5 d	2922.2 d	2922.2 d
h 1	5.18E-07	5.61E-07	6.03E-07	6.46E-07	6.89E-07	6.89E-07
h 2	1.54E-09	1.66E-09	1.79E-09	1.92E-09	2.04E-09	2.04E-09
h 3	9.56E-12	1.02E-11	1.08E-11	1.14E-11	1.20E-11	1.20E-11
h 4	.00E+00	4.15E-35	4.41E-35	4.66E-35	4.90E-35	.00E+00
he 3	1.72E-12	1.99E-12	2.29E-12	2.60E-12	2.93E-12	2.93E-12
he 4	8.57E-08	9.27E-08	9.97E-08	1.07E-07	1.14E-07	1.14E-07
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ne 20	1.03E-08	1.11E-08	1.20E-08	1.28E-08	1.37E-08	1.37E-08
ne 21	2.04E-15	2.36E-15	2.71E-15	3.09E-15	3.48E-15	3.48E-15
ne 22	3.38E-11	3.84E-11	4.30E-11	4.77E-11	5.26E-11	5.26E-11
ne 23	7.04E-30	7.03E-15	7.03E-15	7.03E-15	7.03E-15	7.03E-30
na 22	3.33E-11	3.43E-11	3.52E-11	3.60E-11	3.66E-11	3.66E-11
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	2.60E-08	2.77E-08	2.77E-08	2.77E-08	2.77E-08	2.53E-08
na 24m	4.68E-30	4.55E-15	4.55E-15	4.55E-15	4.55E-15	4.55E-30
na 25	3.62E-43	3.55E-28	3.82E-28	4.10E-28	4.37E-28	4.82E-43
mg 24	7.97E-05	8.54E-05	9.12E-05	9.70E-05	1.03E-04	1.03E-04
mg 25	1.15E-11	1.24E-11	1.34E-11	1.44E-11	1.53E-11	1.53E-11
mg 26	1.54E-09	1.66E-09	1.79E-09	1.92E-09	2.04E-09	2.04E-09
mg 27	4.55E-16	2.10E-12	2.10E-12	2.10E-12	2.10E-12	4.54E-16
mg 28	4.03E-24	4.29E-24	4.29E-24	4.29E-24	4.29E-24	4.03E-24
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	2.88E-25	2.05E-10	2.05E-10	2.05E-10	2.05E-10	2.80E-25
al 29	2.53E-33	5.60E-28	6.44E-28	7.34E-28	8.29E-28	4.34E-33
al 30	.00E+00	6.93E-41	8.60E-41	1.05E-40	1.27E-40	.00E+00
si 28	2.31E-04	2.48E-04	2.64E-04	2.81E-04	2.98E-04	2.98E-04
si 29	1.88E-12	2.19E-12	2.52E-12	2.87E-12	3.25E-12	3.25E-12
si 30	1.61E-20	2.03E-20	2.52E-20	3.08E-20	3.71E-20	3.71E-20
si 31	6.95E-33	1.46E-32	1.81E-32	2.21E-32	2.67E-32	1.61E-32
si 32	1.25E-40	1.71E-40	2.28E-40	2.99E-40	3.85E-40	3.85E-40
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		2.71E+08	2.71E+08	2.71E+08	2.71E+08	2.71E-07

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 37
0 power= 4.000E-03mw, burnup=1.1688E+01mwd, flux= 2.71E+08n/cm**2-sec
nuclide concentrations, gram atoms
basis = single reactor assembly
charge 2374.3 d 2556.9 d 2739.5 d 2922.2 d 2922.2 d

pu236	8.62E-10	8.90E-10	9.15E-10	9.37E-10	9.57E-10	9.57E-10
pu237	1.06E-14	1.14E-14	1.23E-14	1.31E-14	1.40E-14	1.40E-14
pu238	1.10E-03	1.18E-03	1.27E-03	1.36E-03	1.45E-03	1.45E-03
pu239	3.06E-02	3.31E-02	3.56E-02	3.82E-02	4.07E-02	4.07E-02
pu240	9.06E-07	1.06E-06	1.23E-06	1.41E-06	1.60E-06	1.60E-06
pu241	3.39E-11	4.28E-11	5.30E-11	6.47E-11	7.79E-11	7.79E-11
pu242	4.12E-16	5.64E-16	7.55E-16	9.90E-16	1.27E-15	1.27E-15
pu243	6.66E-25	1.19E-24	1.59E-24	2.08E-24	2.68E-24	2.05E-24
pu244	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu245	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
totals	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04
0 flux		2.71E+08	2.71E+08	2.71E+08	2.71E+08	2.71E-07
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 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 5
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 densities
  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 densities
  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 8/28/1996 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 7993 number of nonzero off-diagonal matrix elements
0 *****

```

```

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 page 39
power= .00mw, burnup= 15.mwd, flux= 2.70E+08n/cm**2-sec
basis =

```

```

0 (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0 initial 3104.9 d 3287.5 d 3470.1 d 3652.7 d
productions 1.138387E+06 1.138390E+06 1.138394E+06 1.138398E+06 1.138402E+06
absorptions 9.269936E+05 9.269998E+05 9.270060E+05 9.270122E+05 9.270183E+05
k infinity 1.228041E+00 1.228037E+00 1.228033E+00 1.228029E+00 1.228025E+00
0 initial 3104.9 d 3287.5 d 3470.1 d 3652.7 d

```

```

actinide
absorptions 9.237744E+05 9.237767E+05 9.237790E+05 9.237813E+05 9.237836E+05
non-actinide
abs. fracs. 3.472745E-03 3.476918E-03 3.481090E-03 3.485322E-03 3.489256E-03

```

```

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 40
0 fraction of total absorption rate
power= .00mw, burnup= 15.mwd, flux= 2.70E+08n/cm**2-sec
0 initial 3104.9 d 3287.5 d 3470.1 d 3652.7 d

```

sm149	5.94E-05	6.31E-05	6.67E-05	7.04E-05	7.41E-05
sm151	2.44E-06	2.59E-06	2.73E-06	2.88E-06	3.03E-06
xe135	2.30E-06	2.34E-06	2.34E-06	2.34E-06	2.34E-06
nd143	1.19E-06	1.26E-06	1.34E-06	1.41E-06	1.49E-06
gd157	6.05E-07	6.42E-07	6.80E-07	7.17E-07	7.54E-07
rh103	5.40E-07	5.75E-07	6.09E-07	6.44E-07	6.78E-07
cd113	5.18E-07	5.50E-07	5.82E-07	6.14E-07	6.47E-07
gd155	3.32E-07	3.68E-07	4.04E-07	4.41E-07	4.80E-07
xe131	3.74E-07	3.97E-07	4.20E-07	4.44E-07	4.67E-07
cs133	2.90E-07	3.08E-07	3.26E-07	3.44E-07	3.63E-07
tc 99	2.13E-07	2.27E-07	2.40E-07	2.53E-07	2.67E-07
pm147	2.38E-07	2.42E-07	2.46E-07	2.49E-07	2.52E-07
nd145	1.66E-07	1.77E-07	1.87E-07	1.97E-07	2.08E-07
sm147	1.26E-07	1.38E-07	1.50E-07	1.63E-07	1.75E-07
mo 95	1.09E-07	1.17E-07	1.24E-07	1.31E-07	1.38E-07
eu155	1.10E-07	1.13E-07	1.16E-07	1.19E-07	1.22E-07
sm152	8.75E-08	9.29E-08	9.84E-08	1.04E-07	1.09E-07
kr 83	7.24E-08	7.69E-08	8.15E-08	8.60E-08	9.05E-08
eu151	5.61E-08	6.33E-08	7.09E-08	7.89E-08	8.73E-08
cs135	6.55E-08	6.96E-08	7.37E-08	7.78E-08	8.19E-08
ru101	5.06E-08	5.38E-08	5.70E-08	6.01E-08	6.33E-08
pr141	4.84E-08	5.15E-08	5.45E-08	5.76E-08	6.07E-08
eu153	4.45E-08	4.72E-08	5.00E-08	5.28E-08	5.56E-08
la139	4.02E-08	4.27E-08	4.53E-08	4.78E-08	5.03E-08
pd105	1.69E-08	1.80E-08	1.90E-08	2.01E-08	2.11E-08
zr 93	1.62E-08	1.72E-08	1.82E-08	1.93E-08	2.03E-08
i129	1.25E-08	1.32E-08	1.40E-08	1.48E-08	1.56E-08
nd144	1.04E-08	1.12E-08	1.19E-08	1.27E-08	1.34E-08
mo 97	9.11E-09	9.68E-09	1.02E-08	1.08E-08	1.14E-08
rh105	8.34E-09	8.37E-09	8.37E-09	8.37E-09	8.37E-09
ag109	6.31E-09	6.71E-09	7.10E-09	7.49E-09	7.89E-09
zr 91	4.18E-09	4.44E-09	4.71E-09	4.98E-09	5.25E-09
y 89	4.03E-09	4.29E-09	4.54E-09	4.80E-09	5.06E-09
ru102	3.71E-09	3.95E-09	4.18E-09	4.41E-09	4.64E-09

ce142	3.35E-09	3.56E-09	3.77E-09	3.98E-09	4.19E-09
nd148	3.21E-09	3.41E-09	3.62E-09	3.82E-09	4.02E-09
sr 90	3.09E-09	3.26E-09	3.43E-09	3.60E-09	3.77E-09
nd146	2.70E-09	2.87E-09	3.04E-09	3.21E-09	3.38E-09
ba138	2.31E-09	2.45E-09	2.60E-09	2.74E-09	2.89E-09
in115	2.21E-09	2.35E-09	2.49E-09	2.62E-09	2.76E-09
ce140	2.15E-09	2.28E-09	2.42E-09	2.55E-09	2.69E-09
pr143	2.68E-09	2.68E-09	2.68E-09	2.68E-09	2.68E-09
pd108	2.14E-09	2.28E-09	2.41E-09	2.54E-09	2.68E-09
ba137	1.68E-09	1.89E-09	2.11E-09	2.34E-09	2.58E-09
xe132	1.93E-09	2.05E-09	2.17E-09	2.29E-09	2.41E-09
xe133	2.03E-09	2.03E-09	2.03E-09	2.03E-09	2.03E-09
mo 98	1.33E-09	1.41E-09	1.49E-09	1.58E-09	1.66E-09
mo100	1.29E-09	1.37E-09	1.45E-09	1.53E-09	1.61E-09
ce141	1.61E-09	1.61E-09	1.61E-09	1.61E-09	1.61E-09

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2

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0 fraction of total absorption rate
 power= .00mw, burnup= 15.mwd, flux= 2.70E+08n/cm**2-sec
 0 initial 3104.9 d 3287.5 d 3470.1 d 3652.7 d

pd107	1.28E-09	1.36E-09	1.44E-09	1.52E-09	1.60E-09
xe134	1.28E-09	1.35E-09	1.43E-09	1.51E-09	1.59E-09
zr 92	1.04E-09	1.10E-09	1.17E-09	1.23E-09	1.29E-09
i127	8.24E-10	8.76E-10	9.29E-10	9.81E-10	1.03E-09
zr 96	8.05E-10	8.56E-10	9.06E-10	9.56E-10	1.01E-09
ru104	7.92E-10	8.41E-10	8.91E-10	9.40E-10	9.90E-10
pm149	9.75E-10	9.82E-10	9.82E-10	9.82E-10	9.82E-10
nd147	9.27E-10	9.31E-10	9.31E-10	9.31E-10	9.31E-10
nd150	7.10E-10	7.55E-10	7.99E-10	8.44E-10	8.88E-10
xe136	6.89E-10	7.32E-10	7.75E-10	8.18E-10	8.62E-10
cs137	6.37E-10	6.73E-10	7.09E-10	7.44E-10	7.79E-10
sm150	4.99E-10	5.63E-10	6.31E-10	7.03E-10	7.78E-10
br 81	5.15E-10	5.47E-10	5.80E-10	6.12E-10	6.44E-10
ce144	6.04E-10	6.04E-10	6.04E-10	6.04E-10	6.04E-10
zr 94	4.36E-10	4.63E-10	4.90E-10	5.17E-10	5.45E-10
rb 85	4.20E-10	4.47E-10	4.75E-10	5.03E-10	5.31E-10
cd111	3.35E-10	3.56E-10	3.77E-10	3.98E-10	4.19E-10
te130	3.13E-10	3.33E-10	3.53E-10	3.72E-10	3.92E-10
sm154	3.03E-10	3.22E-10	3.41E-10	3.60E-10	3.79E-10
rb 87	2.91E-10	3.09E-10	3.28E-10	3.46E-10	3.64E-10
ru103	3.58E-10	3.58E-10	3.58E-10	3.58E-10	3.58E-10
kr 85	2.33E-10	2.44E-10	2.55E-10	2.65E-10	2.75E-10
se 77	2.08E-10	2.21E-10	2.34E-10	2.47E-10	2.60E-10
kr 84	1.37E-10	1.46E-10	1.54E-10	1.63E-10	1.71E-10
zr 95	1.65E-10	1.65E-10	1.65E-10	1.65E-10	1.65E-10
pd106	1.20E-10	1.29E-10	1.38E-10	1.47E-10	1.56E-10
nb 95	1.53E-10	1.53E-10	1.53E-10	1.53E-10	1.53E-10
y 91	1.44E-10	1.44E-10	1.44E-10	1.44E-10	1.44E-10
se 79	1.07E-10	1.13E-10	1.20E-10	1.27E-10	1.33E-10
sb121	1.00E-10	1.06E-10	1.12E-10	1.19E-10	1.25E-10
pm151	1.06E-10	1.11E-10	1.11E-10	1.11E-10	1.11E-10
sb123	8.12E-11	8.63E-11	9.14E-11	9.65E-11	1.02E-10
kr 86	7.70E-11	8.18E-11	8.66E-11	9.14E-11	9.62E-11
te128	6.83E-11	7.25E-11	7.68E-11	8.11E-11	8.53E-11
gd156	5.22E-11	5.55E-11	5.88E-11	6.21E-11	6.54E-11
se 80	4.96E-11	5.28E-11	5.59E-11	5.90E-11	6.21E-11
zr 90	3.75E-11	4.22E-11	4.71E-11	5.23E-11	5.77E-11
dy161	4.34E-11	4.61E-11	4.88E-11	5.16E-11	5.43E-11
ba140	4.74E-11	4.76E-11	4.76E-11	4.76E-11	4.76E-11
sm153	3.73E-11	3.83E-11	3.83E-11	3.83E-11	3.83E-11

tb159	2.90E-11	3.08E-11	3.27E-11	3.45E-11	3.63E-11
li 6	2.83E-11	3.00E-11	3.18E-11	3.36E-11	3.53E-11
cd112	2.80E-11	2.98E-11	3.15E-11	3.32E-11	3.50E-11
eu156	3.42E-11	3.42E-11	3.42E-11	3.42E-11	3.42E-11
te125	2.44E-11	2.67E-11	2.91E-11	3.16E-11	3.40E-11
sr 89	3.10E-11	3.10E-11	3.10E-11	3.10E-11	3.10E-11
sn117	2.22E-11	2.36E-11	2.50E-11	2.64E-11	2.78E-11
ru106	2.50E-11	2.51E-11	2.51E-11	2.51E-11	2.51E-11
kr 87	8.22E-12	2.32E-11	2.32E-11	2.32E-11	2.32E-11

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 0 fraction of total absorption rate

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0 power= .00mw, burnup= 15.mwd, flux= 2.70E+08n/cm**2-sec
 initial 3104.9 d 3287.5 d 3470.1 d 3652.7 d

sn119	1.83E-11	1.95E-11	2.06E-11	2.18E-11	2.29E-11
sn115	1.68E-11	1.78E-11	1.89E-11	1.99E-11	2.10E-11
sr 88	1.41E-11	1.50E-11	1.59E-11	1.68E-11	1.77E-11
ce143	1.70E-11	1.76E-11	1.76E-11	1.76E-11	1.76E-11
la140	1.53E-11	1.53E-11	1.53E-11	1.53E-11	1.53E-11
sb125	1.29E-11	1.32E-11	1.34E-11	1.36E-11	1.37E-11
mo 99	1.29E-11	1.32E-11	1.32E-11	1.32E-11	1.32E-11
eu154	9.20E-12	1.00E-11	1.09E-11	1.18E-11	1.27E-11
pd110	9.95E-12	1.06E-11	1.12E-11	1.18E-11	1.24E-11
cd114	9.68E-12	1.03E-11	1.09E-11	1.15E-11	1.21E-11
se 82	9.60E-12	1.02E-11	1.08E-11	1.14E-11	1.20E-11
gd158	9.18E-12	9.77E-12	1.04E-11	1.09E-11	1.15E-11
sn126	7.69E-12	8.17E-12	8.65E-12	9.14E-12	9.62E-12
se 78	7.25E-12	7.70E-12	8.16E-12	8.61E-12	9.06E-12
pm148m	8.34E-12	8.49E-12	8.63E-12	8.74E-12	8.84E-12
te127m	7.37E-12	7.36E-12	7.37E-12	7.37E-12	7.37E-12
sn124	5.79E-12	6.15E-12	6.51E-12	6.87E-12	7.23E-12
dy162	5.55E-12	5.90E-12	6.24E-12	6.59E-12	6.93E-12
i131	6.77E-12	6.79E-12	6.79E-12	6.79E-12	6.79E-12
dy164	5.07E-12	5.39E-12	5.70E-12	6.02E-12	6.34E-12
as 75	4.32E-12	4.59E-12	4.86E-12	5.13E-12	5.40E-12
y 90	2.94E-12	3.10E-12	3.27E-12	3.43E-12	3.59E-12
eu152	1.87E-12	2.22E-12	2.62E-12	3.06E-12	3.54E-12
sn118	2.36E-12	2.50E-12	2.65E-12	2.80E-12	2.95E-12
ba136	2.29E-12	2.43E-12	2.57E-12	2.72E-12	2.86E-12
sn122	2.01E-12	2.14E-12	2.26E-12	2.39E-12	2.52E-12
cd116	2.01E-12	2.13E-12	2.26E-12	2.38E-12	2.51E-12
cs134	1.85E-12	1.98E-12	2.11E-12	2.24E-12	2.37E-12
ru 99	1.54E-12	1.66E-12	1.79E-12	1.92E-12	2.06E-12
sn120	1.50E-12	1.60E-12	1.69E-12	1.78E-12	1.88E-12
te129m	1.80E-12	1.80E-12	1.80E-12	1.80E-12	1.80E-12
kr 82	1.27E-12	1.35E-12	1.43E-12	1.51E-12	1.59E-12
dy163	1.23E-12	1.30E-12	1.38E-12	1.46E-12	1.53E-12
ge 73	1.18E-12	1.25E-12	1.33E-12	1.40E-12	1.48E-12
xe130	7.83E-13	8.33E-13	8.82E-13	9.32E-13	9.81E-13
in113	5.60E-13	6.27E-13	6.98E-13	7.71E-13	8.48E-13
mo 96	5.55E-13	5.90E-13	6.26E-13	6.62E-13	6.97E-13
ge 76	4.29E-13	4.55E-13	4.82E-13	5.09E-13	5.36E-13
pm148	3.21E-13	3.29E-13	3.34E-13	3.38E-13	3.42E-13
gd160	2.69E-13	2.86E-13	3.02E-13	3.19E-13	3.36E-13
ag111	3.14E-13	3.15E-13	3.15E-13	3.15E-13	3.15E-13
eu157	2.75E-13	2.97E-13	2.97E-13	2.97E-13	2.97E-13
te126	2.09E-13	2.22E-13	2.35E-13	2.48E-13	2.61E-13
ru100	1.83E-13	1.99E-13	2.16E-13	2.34E-13	2.52E-13
cd115m	2.37E-13	2.37E-13	2.37E-13	2.37E-13	2.37E-13
gd152	1.10E-13	1.32E-13	1.57E-13	1.85E-13	2.16E-13

gd154	8.21E-14	9.48E-14	1.09E-13	1.24E-13	1.40E-13		
sm148	9.06E-14	1.01E-13	1.12E-13	1.23E-13	1.34E-13		
ho165	8.44E-14	8.97E-14	9.50E-14	1.00E-13	1.06E-13		
1 sas2h:	far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2					fission products	page 43
0	fraction of total absorption rate						
	power=	.00mw, burnup=	15.mwd, flux=	2.70E+08n/cm**2-sec			
0	initial	3104.9 d	3287.5 d	3470.1 d	3652.7 d		

nd142	5.41E-14	6.11E-14	6.85E-14	7.64E-14	8.46E-14		
ba135	4.76E-14	5.34E-14	5.95E-14	6.60E-14	7.28E-14		
ba134	4.10E-14	4.67E-14	5.28E-14	5.93E-14	6.62E-14		
sr 87	4.93E-14	5.24E-14	5.54E-14	5.85E-14	6.16E-14		
te124	4.87E-14	5.19E-14	5.50E-14	5.81E-14	6.13E-14		
cs136	5.54E-14	5.56E-14	5.56E-14	5.57E-14	5.57E-14		
pd104	3.41E-14	3.85E-14	4.32E-14	4.82E-14	5.35E-14		
nb 94	2.78E-14	2.96E-14	3.13E-14	3.31E-14	3.48E-14		
ge 74	2.39E-14	2.54E-14	2.69E-14	2.84E-14	2.99E-14		
ru105	2.25E-14	2.94E-14	2.94E-14	2.94E-14	2.94E-14		
sn125	2.90E-14	2.92E-14	2.92E-14	2.92E-14	2.92E-14		
ge 72	1.60E-14	1.70E-14	1.80E-14	1.90E-14	2.00E-14		
sr 86	1.39E-14	1.48E-14	1.57E-14	1.66E-14	1.75E-14		
rb 88	8.90E-15	1.30E-14	1.30E-14	1.30E-14	1.30E-14		
se 76	9.32E-15	9.90E-15	1.05E-14	1.11E-14	1.17E-14		
i135	8.35E-15	1.02E-14	1.02E-14	1.02E-14	1.02E-14		
sn123	1.01E-14	1.01E-14	1.01E-14	1.01E-14	1.01E-14		
te132	9.45E-15	9.61E-15	9.61E-15	9.61E-15	9.61E-15		
cd110	6.25E-15	6.96E-15	7.70E-15	8.47E-15	9.29E-15		
te134	8.74E-16	5.90E-15	5.90E-15	5.90E-15	5.90E-15		
br 79	3.50E-15	3.95E-15	4.43E-15	4.93E-15	5.46E-15		
xe128	2.40E-15	2.56E-15	2.73E-15	2.89E-15	3.06E-15		
xe129	1.95E-15	2.21E-15	2.47E-15	2.76E-15	3.05E-15		
sb126	3.02E-15	3.03E-15	3.03E-15	3.03E-15	3.03E-15		
ag107	1.83E-15	2.07E-15	2.32E-15	2.58E-15	2.86E-15		
er166	2.24E-15	2.38E-15	2.52E-15	2.67E-15	2.81E-15		
dy160	1.96E-15	2.11E-15	2.25E-15	2.40E-15	2.55E-15		
sb124	2.11E-15	2.11E-15	2.11E-15	2.11E-15	2.11E-15		
in117m	1.85E-15	2.11E-15	2.11E-15	2.11E-15	2.11E-15		
nb 93	7.56E-16	8.98E-16	1.06E-15	1.23E-15	1.43E-15		
kr 80	6.69E-16	7.11E-16	7.53E-16	7.95E-16	8.37E-16		
i130	6.55E-16	7.27E-16	7.28E-16	7.29E-16	7.29E-16		
in117	5.50E-16	6.19E-16	6.19E-16	6.19E-16	6.19E-16		
tb160	3.80E-16	3.85E-16	3.90E-16	3.96E-16	4.01E-16		
rb 86	2.45E-16	2.46E-16	2.46E-16	2.46E-16	2.46E-16		
dy165	1.23E-16	2.12E-16	2.12E-16	2.13E-16	2.13E-16		
te122	1.17E-16	1.27E-16	1.36E-16	1.46E-16	1.56E-16		
sn116	9.79E-17	1.09E-16	1.20E-16	1.33E-16	1.45E-16		
cd118	2.48E-17	1.21E-16	1.21E-16	1.21E-16	1.21E-16		
ge 75	3.42E-17	8.72E-17	8.72E-17	8.72E-17	8.72E-17		
pr142	5.17E-17	5.90E-17	6.24E-17	6.59E-17	6.94E-17		
be 9	5.31E-17	5.64E-17	5.98E-17	6.31E-17	6.64E-17		
te123	4.56E-17	4.86E-17	5.16E-17	5.46E-17	5.76E-17		
in119m	4.22E-19	3.03E-17	3.03E-17	3.03E-17	3.03E-17		
li 7	2.18E-17	2.31E-17	2.45E-17	2.59E-17	2.72E-17		
er167	9.13E-18	9.74E-18	1.03E-17	1.09E-17	1.16E-17		
in119	1.62E-21	2.37E-18	2.37E-18	2.37E-18	2.37E-18		
cd108	4.48E-19	4.77E-19	5.06E-19	5.35E-19	5.63E-19		
cs134m	2.58E-19	4.33E-19	4.58E-19	4.84E-19	5.09E-19		
1 sas2h:	far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2					fission products	page 44
0	fraction of total absorption rate						
	power=	.00mw, burnup=	15.mwd, flux=	2.70E+08n/cm**2-sec			

0 initial 3104.9 d 3287.5 d 3470.1 d 3652.7 d
 cd109 1.95E-19 1.96E-19 1.98E-19 1.99E-19 2.00E-19
 sn114 8.58E-21 9.40E-21 1.03E-20 1.12E-20 1.22E-20
 ag110 2.03E-23 9.36E-21 9.88E-21 1.04E-20 1.09E-20
 in120 .00E+00 3.98E-22 3.98E-22 3.98E-22 3.98E-22
 in120m .00E+00 4.28E-23 4.28E-23 4.28E-23 4.29E-23

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 power= 4.000E-03mw, burnup=1.4610E+01mwd, flux= 2.79E+08n/cm**2-sec

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0 nuclide concentrations, gram atoms
 basis = single reactor assembly

	charge	3104.9 d	3287.5 d	3470.1 d	3652.7 d
h 1	6.89E-07	7.31E-07	7.74E-07	8.16E-07	8.59E-07
h 2	2.04E-09	2.17E-09	2.29E-09	2.42E-09	2.55E-09
h 3	1.20E-11	1.26E-11	1.32E-11	1.37E-11	1.43E-11
h 4	.00E+00	5.14E-35	5.37E-35	5.59E-35	5.81E-35
he 3	2.93E-12	3.28E-12	3.64E-12	4.02E-12	4.41E-12
he 4	1.14E-07	1.21E-07	1.28E-07	1.35E-07	1.42E-07
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ne 20	1.37E-08	1.45E-08	1.54E-08	1.62E-08	1.70E-08
ne 21	3.48E-15	3.90E-15	4.35E-15	4.81E-15	5.30E-15
ne 22	5.26E-11	5.75E-11	6.25E-11	6.75E-11	7.27E-11
ne 23	7.03E-30	7.03E-15	7.03E-15	7.03E-15	7.03E-15
na 22	3.66E-11	3.72E-11	3.77E-11	3.82E-11	3.86E-11
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	2.53E-08	2.74E-08	2.74E-08	2.74E-08	2.74E-08
na 24m	4.55E-30	4.51E-15	4.51E-15	4.51E-15	4.51E-15
na 25	4.82E-43	4.64E-28	4.92E-28	5.19E-28	5.47E-28
mg 24	1.03E-04	1.08E-04	1.14E-04	1.20E-04	1.26E-04
mg 25	1.53E-11	1.63E-11	1.73E-11	1.82E-11	1.92E-11
mg 26	2.04E-09	2.17E-09	2.29E-09	2.42E-09	2.55E-09
mg 27	4.54E-16	2.10E-12	2.10E-12	2.10E-12	2.10E-12
mg 28	4.03E-24	4.29E-24	4.29E-24	4.29E-24	4.29E-24
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	2.80E-25	2.03E-10	2.03E-10	2.03E-10	2.03E-10
al 29	4.34E-33	9.29E-28	1.03E-27	1.15E-27	1.26E-27
al 30	.00E+00	1.51E-40	1.78E-40	2.08E-40	2.42E-40
si 28	2.98E-04	3.14E-04	3.31E-04	3.47E-04	3.64E-04
si 29	3.25E-12	3.64E-12	4.06E-12	4.49E-12	4.95E-12
si 30	3.71E-20	4.43E-20	5.23E-20	6.12E-20	7.10E-20
si 31	1.61E-32	3.18E-32	3.76E-32	4.40E-32	5.10E-32
si 32	3.85E-40	4.89E-40	6.11E-40	7.55E-40	9.22E-40
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		2.70E+08	2.70E+08	2.70E+08	2.70E+08

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 power= 4.000E-03mw, burnup=1.4610E+01mwd, flux= 2.79E+08n/cm**2-sec

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0 nuclide concentrations, gram atoms
 basis = single reactor assembly

	charge	3104.9 d	3287.5 d	3470.1 d	3652.7 d
he 4	4.57E-04	4.89E-04	5.21E-04	5.54E-04	5.87E-04
pb206	4.00E-13	5.15E-13	6.53E-13	8.18E-13	1.01E-12
pb207	4.08E-11	4.89E-11	5.79E-11	6.79E-11	7.90E-11
pb208	1.82E-11	2.22E-11	2.66E-11	3.15E-11	3.69E-11
pb209	8.78E-17	9.86E-17	1.11E-16	1.24E-16	1.37E-16
pb210	8.14E-12	9.72E-12	1.15E-11	1.35E-11	1.57E-11
pb211	1.39E-15	1.56E-15	1.75E-15	1.94E-15	2.14E-15
pb212	1.29E-14	1.46E-14	1.64E-14	1.82E-14	2.01E-14
pb214	2.32E-16	2.70E-16	3.03E-16	3.37E-16	3.73E-16

ra222	3.40E-28	3.72E-28	4.05E-28	4.39E-28	4.73E-28
ra223	6.34E-13	7.13E-13	7.96E-13	8.83E-13	9.74E-13
ra224	1.07E-13	1.21E-13	1.35E-13	1.50E-13	1.66E-13
ra225	9.53E-15	1.08E-14	1.21E-14	1.35E-14	1.50E-14
ra226	7.51E-09	8.48E-09	9.50E-09	1.06E-08	1.17E-08
ra228	6.06E-15	6.72E-15	7.41E-15	8.12E-15	8.85E-15
ac225	6.44E-15	7.28E-15	8.17E-15	9.12E-15	1.01E-14
ac227	4.48E-10	5.03E-10	5.61E-10	6.22E-10	6.86E-10
ac228	7.39E-19	8.21E-19	9.05E-19	9.91E-19	1.08E-18
th226	1.66E-26	1.82E-26	1.98E-26	2.14E-26	2.31E-26
th227	1.02E-12	1.15E-12	1.28E-12	1.42E-12	1.57E-12
th228	2.03E-11	2.29E-11	2.57E-11	2.86E-11	3.15E-11
th229	1.85E-09	2.09E-09	2.35E-09	2.62E-09	2.91E-09
th230	2.04E-04	2.17E-04	2.30E-04	2.43E-04	2.55E-04
th231	3.02E-09	3.02E-09	3.02E-09	3.02E-09	3.02E-09
th232	4.13E-05	4.39E-05	4.65E-05	4.91E-05	5.16E-05
th233	1.05E-17	4.02E-16	4.26E-16	4.50E-16	4.73E-16
th234	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	5.75E-06	6.11E-06	6.47E-06	6.83E-06	7.19E-06
pa232	9.48E-14	1.05E-13	1.11E-13	1.17E-13	1.24E-13
pa233	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	1.60E-23	1.76E-23	1.92E-23	2.08E-23	2.24E-23
u231	8.05E-20	8.66E-20	9.18E-20	9.69E-20	1.02E-19
u232	1.26E-09	1.38E-09	1.50E-09	1.63E-09	1.75E-09
u233	1.08E-04	1.15E-04	1.21E-04	1.28E-04	1.35E-04
u234	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00
u235	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02
u236	1.74E+02	1.74E+02	1.74E+02	1.74E+02	1.74E+02
u237	3.07E-06	3.09E-06	3.09E-06	3.09E-06	3.09E-06
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04
u239	1.06E-08	3.17E-07	3.17E-07	3.17E-07	3.17E-07
u240	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	8.59E-12	8.60E-12	8.60E-12	8.60E-12	8.60E-12
np236m	1.93E-12	2.05E-12	2.05E-12	2.05E-12	2.05E-12
np236	1.59E-09	1.68E-09	1.78E-09	1.88E-09	1.97E-09
np237	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01
np238	1.51E-06	1.55E-06	1.55E-06	1.55E-06	1.55E-06

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0

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 power= 4.000E-03mw, burnup=1.4610E+01mwd, flux= 2.79E+08n/cm**2-sec
 nuclide concentrations, gram atoms
 basis = single reactor assembly

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	charge	3104.9 d	3287.5 d	3470.1 d	3652.7 d
np239	4.51E-05	4.59E-05	4.59E-05	4.59E-05	4.59E-05
np240m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np240	2.57E-15	9.32E-15	9.32E-15	9.32E-15	9.32E-15
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	9.57E-10	9.74E-10	9.89E-10	1.00E-09	1.01E-09
pu237	1.40E-14	1.48E-14	1.57E-14	1.65E-14	1.74E-14
pu238	1.45E-03	1.53E-03	1.62E-03	1.71E-03	1.79E-03
pu239	4.07E-02	4.32E-02	4.57E-02	4.82E-02	5.07E-02
pu240	1.60E-06	1.81E-06	2.03E-06	2.26E-06	2.50E-06
pu241	7.79E-11	9.28E-11	1.09E-10	1.28E-10	1.48E-10
pu242	1.27E-15	1.62E-15	2.02E-15	2.50E-15	3.05E-15
pu243	2.05E-24	3.40E-24	4.25E-24	5.25E-24	6.42E-24
pu244	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

np237	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01
pu238	1.79E-03	1.78E-03	1.77E-03	1.76E-03	1.75E-03	1.74E-03	1.73E-03
pu239	5.07E-02	5.07E-02	5.07E-02	5.07E-02	5.07E-02	5.07E-02	5.07E-02
pu240	2.50E-06	2.50E-06	2.50E-06	2.50E-06	2.50E-06	2.50E-06	2.50E-06
total	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 53
 0 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+01mwd, flux= 2.79E+08n/cm**2-sec
 element concentrations, gram atoms

basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
he	5.87E-04	6.42E-04	6.97E-04	7.52E-04	8.07E-04	8.62E-04	9.17E-04
th	3.08E-04	3.33E-04	3.59E-04	3.84E-04	4.10E-04	4.36E-04	4.61E-04
pa	8.65E-06	9.25E-06	9.85E-06	1.05E-05	1.11E-05	1.17E-05	1.23E-05
u	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04
np	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01
pu	5.25E-02	5.25E-02	5.25E-02	5.25E-02	5.25E-02	5.25E-02	5.25E-02
totals	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 54
 0 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+01mwd, flux= 2.79E+08n/cm**2-sec
 nuclide concentrations, grams

basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
he 4	2.35E-03	2.57E-03	2.79E-03	3.01E-03	3.23E-03	3.45E-03	3.67E-03
ra226	2.65E-06	3.11E-06	3.61E-06	4.14E-06	4.71E-06	5.32E-06	5.96E-06
th229	6.66E-07	7.84E-07	9.13E-07	1.05E-06	1.20E-06	1.36E-06	1.53E-06
th230	5.88E-02	6.37E-02	6.85E-02	7.34E-02	7.83E-02	8.32E-02	8.81E-02
th231	6.98E-07	6.98E-07	6.98E-07	6.98E-07	6.98E-07	6.98E-07	6.98E-07
th232	1.20E-02	1.30E-02	1.40E-02	1.50E-02	1.60E-02	1.70E-02	1.80E-02
th234	1.26E-04	1.26E-04	1.26E-04	1.26E-04	1.26E-04	1.26E-04	1.26E-04
pa231	1.66E-03	1.80E-03	1.94E-03	2.08E-03	2.22E-03	2.36E-03	2.50E-03
pa233	3.39E-04	3.39E-04	3.39E-04	3.39E-04	3.39E-04	3.39E-04	3.39E-04
u232	4.07E-07	4.46E-07	4.77E-07	5.01E-07	5.20E-07	5.35E-07	5.46E-07
u233	3.15E-02	3.45E-02	3.75E-02	4.04E-02	4.34E-02	4.64E-02	4.94E-02
u234	2.12E+03	2.12E+03	2.12E+03	2.12E+03	2.12E+03	2.12E+03	2.12E+03
u235	1.72E+05	1.72E+05	1.72E+05	1.72E+05	1.72E+05	1.72E+05	1.72E+05
u236	4.12E+04	4.12E+04	4.12E+04	4.12E+04	4.12E+04	4.12E+04	4.12E+04
u238	8.66E+06	8.66E+06	8.66E+06	8.66E+06	8.66E+06	8.66E+06	8.66E+06
np237	9.99E+03	9.99E+03	9.99E+03	9.99E+03	9.99E+03	9.99E+03	9.99E+03
pu238	4.27E-01	4.24E-01	4.22E-01	4.19E-01	4.16E-01	4.13E-01	4.11E-01
pu239	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01
pu240	6.00E-04	6.00E-04	5.99E-04	5.99E-04	5.99E-04	5.99E-04	5.99E-04
total	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 55
 0 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+01mwd, flux= 2.79E+08n/cm**2-sec
 element concentrations, grams

basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
he	2.35E-03	2.57E-03	2.79E-03	3.01E-03	3.23E-03	3.45E-03	3.67E-03
ra	2.65E-06	3.11E-06	3.61E-06	4.14E-06	4.71E-06	5.32E-06	5.96E-06
th	7.09E-02	7.68E-02	8.27E-02	8.85E-02	9.44E-02	1.00E-01	1.06E-01
pa	2.00E-03	2.14E-03	2.28E-03	2.42E-03	2.56E-03	2.70E-03	2.84E-03
u	8.87E+06	8.87E+06	8.87E+06	8.87E+06	8.87E+06	8.87E+06	8.87E+06
np	9.99E+03	9.99E+03	9.99E+03	9.99E+03	9.99E+03	9.99E+03	9.99E+03
pu	1.25E+01	1.26E+01	1.26E+01	1.25E+01	1.25E+01	1.25E+01	1.25E+01
totals	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 56

decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+01mwd, flux= 2.79E+08n/cm**2-sec

0 nuclide radioactivity, curies
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
tl207	1.11E-05	1.31E-05	1.51E-05	1.72E-05	1.94E-05	2.17E-05	2.41E-05
tl208	2.13E-06	2.46E-06	2.78E-06	3.07E-06	3.33E-06	3.56E-06	3.76E-06
pb210	2.51E-07	3.17E-07	3.94E-07	4.82E-07	5.81E-07	6.93E-07	8.17E-07
pb211	1.11E-05	1.31E-05	1.51E-05	1.72E-05	1.94E-05	2.18E-05	2.42E-05
pb212	5.91E-06	6.84E-06	7.73E-06	8.55E-06	9.27E-06	9.91E-06	1.05E-05
pb214	2.62E-06	3.08E-06	3.57E-06	4.09E-06	4.66E-06	5.26E-06	5.89E-06
bi210	2.51E-07	3.18E-07	3.94E-07	4.82E-07	5.81E-07	6.93E-07	8.18E-07
bi211	1.11E-05	1.31E-05	1.51E-05	1.72E-05	1.94E-05	2.18E-05	2.42E-05
bi212	5.91E-06	6.84E-06	7.73E-06	8.55E-06	9.27E-06	9.91E-06	1.05E-05
bi214	2.62E-06	3.08E-06	3.57E-06	4.09E-06	4.66E-06	5.26E-06	5.89E-06
po210	2.12E-07	2.71E-07	3.40E-07	4.20E-07	5.10E-07	6.13E-07	7.27E-07
po212	3.79E-06	4.38E-06	4.95E-06	5.47E-06	5.94E-06	6.35E-06	6.70E-06
po214	2.62E-06	3.08E-06	3.57E-06	4.09E-06	4.66E-06	5.26E-06	5.89E-06
po215	1.11E-05	1.31E-05	1.51E-05	1.72E-05	1.94E-05	2.18E-05	2.42E-05
po216	5.91E-06	6.84E-06	7.73E-06	8.55E-06	9.27E-06	9.91E-06	1.05E-05
po218	2.62E-06	3.08E-06	3.57E-06	4.10E-06	4.66E-06	5.26E-06	5.89E-06
rn219	1.11E-05	1.31E-05	1.51E-05	1.72E-05	1.94E-05	2.18E-05	2.42E-05
rn220	5.91E-06	6.84E-06	7.73E-06	8.55E-06	9.27E-06	9.91E-06	1.05E-05
rn222	2.62E-06	3.08E-06	3.57E-06	4.10E-06	4.66E-06	5.26E-06	5.89E-06
ra223	1.11E-05	1.31E-05	1.51E-05	1.72E-05	1.94E-05	2.18E-05	2.42E-05
ra224	5.91E-06	6.84E-06	7.73E-06	8.55E-06	9.27E-06	9.91E-06	1.05E-05
ra226	2.62E-06	3.08E-06	3.57E-06	4.10E-06	4.66E-06	5.26E-06	5.89E-06
ac227	1.13E-05	1.31E-05	1.51E-05	1.72E-05	1.94E-05	2.17E-05	2.41E-05
th227	1.10E-05	1.30E-05	1.49E-05	1.70E-05	1.92E-05	2.15E-05	2.39E-05
th228	5.89E-06	6.82E-06	7.70E-06	8.52E-06	9.24E-06	9.87E-06	1.04E-05
th230	1.21E-03	1.31E-03	1.41E-03	1.51E-03	1.62E-03	1.72E-03	1.82E-03
th231	3.71E-01	3.71E-01	3.71E-01	3.71E-01	3.71E-01	3.71E-01	3.71E-01
th234	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00
pa231	7.85E-05	8.51E-05	9.16E-05	9.82E-05	1.05E-04	1.11E-04	1.18E-04
pa233	7.04E+00	7.05E+00	7.05E+00	7.05E+00	7.05E+00	7.05E+00	7.05E+00
pa234m	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00
pa234	3.78E-03	3.79E-03	3.79E-03	3.79E-03	3.79E-03	3.79E-03	3.79E-03
u232	8.98E-06	9.84E-06	1.05E-05	1.11E-05	1.15E-05	1.18E-05	1.21E-05
u233	3.03E-04	3.32E-04	3.61E-04	3.90E-04	4.19E-04	4.48E-04	4.76E-04
u234	1.32E+01	1.32E+01	1.32E+01	1.32E+01	1.32E+01	1.32E+01	1.32E+01
u235	3.71E-01	3.71E-01	3.71E-01	3.71E-01	3.71E-01	3.71E-01	3.71E-01
u236	2.66E+00	2.66E+00	2.66E+00	2.66E+00	2.66E+00	2.66E+00	2.66E+00
u238	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00
np237	7.04E+00	7.04E+00	7.04E+00	7.04E+00	7.04E+00	7.04E+00	7.04E+00
pu236	1.25E-04	1.03E-04	8.41E-05	6.89E-05	5.65E-05	4.63E-05	3.79E-05
pu238	7.31E+00	7.27E+00	7.22E+00	7.18E+00	7.13E+00	7.08E+00	7.04E+00
pu239	7.52E-01	7.53E-01	7.53E-01	7.53E-01	7.53E-01	7.53E-01	7.53E-01
pu240	1.36E-04	1.36E-04	1.36E-04	1.36E-04	1.36E-04	1.36E-04	1.36E-04
pu241	3.69E-06	3.54E-06	3.40E-06	3.27E-06	3.14E-06	3.02E-06	2.90E-06
total	5.29E+03	4.74E+01	4.74E+01	4.73E+01	4.73E+01	4.73E+01	4.72E+01

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 57

decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+01mwd, flux= 2.79E+08n/cm**2-sec

0 element thermal power, watts
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
tl	8.25E-08	9.62E-08	1.09E-07	1.23E-07	1.35E-07	1.47E-07	1.59E-07
pb	5.42E-08	6.37E-08	7.31E-08	8.29E-08	9.30E-08	1.03E-07	1.14E-07
bi	5.78E-07	6.80E-07	7.80E-07	8.85E-07	9.93E-07	1.10E-06	1.22E-06
po	1.17E-06	1.37E-06	1.57E-06	1.77E-06	1.98E-06	2.18E-06	2.39E-06
at	5.64E-09	6.63E-09	7.72E-09	8.90E-09	1.02E-08	1.15E-08	1.30E-08

dy161	1.32E-05	1.32E-05	1.32E-05	1.32E-05	1.32E-05	1.32E-05	1.32E-05
dy162	3.64E-06	3.64E-06	3.64E-06	3.64E-06	3.64E-06	3.64E-06	3.64E-06
dy163	1.21E-06	1.21E-06	1.21E-06	1.21E-06	1.21E-06	1.21E-06	1.21E-06
total	1.52E+01	1.52E+01	1.52E+01	1.52E+01	1.52E+01	1.52E+01	1.52E+01

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 62
 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+01mwd, flux= 2.79E+08n/cm**2-sec

0

nuclide radioactivity, curies
 basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
h 3	1.59E-01	1.52E-01	1.45E-01	1.38E-01	1.32E-01	1.26E-01	1.20E-01
se 79	3.13E-05	3.13E-05	3.13E-05	3.13E-05	3.13E-05	3.13E-05	3.13E-05
kr 85	4.22E+00	3.99E+00	3.78E+00	3.59E+00	3.40E+00	3.22E+00	3.05E+00
sr 90	4.29E+01	4.21E+01	4.12E+01	4.04E+01	3.95E+01	3.87E+01	3.80E+01
y 90	4.29E+01	4.21E+01	4.12E+01	4.04E+01	3.96E+01	3.88E+01	3.80E+01
y 91	1.98E+02	5.43E+00	1.47E-01	4.00E-03	1.09E-04	2.95E-06	8.02E-08
zr 93	6.43E-04	6.43E-04	6.43E-04	6.43E-04	6.43E-04	6.43E-04	6.43E-04
nb 93m	1.20E-04	1.39E-04	1.57E-04	1.74E-04	1.90E-04	2.06E-04	2.21E-04
zr 95	2.18E+02	8.09E+00	3.00E-01	1.11E-02	4.11E-04	1.52E-05	5.64E-07
nb 95	2.18E+02	1.72E+01	6.58E-01	2.44E-02	9.05E-04	3.35E-05	1.24E-06
tc 99	6.77E-03	6.78E-03	6.78E-03	6.78E-03	6.78E-03	6.78E-03	6.78E-03
rh102	7.21E-06	5.91E-06	4.84E-06	3.97E-06	3.25E-06	2.66E-06	2.18E-06
ru106	1.58E+01	8.97E+00	5.08E+00	2.88E+00	1.63E+00	9.26E-01	5.25E-01
rh106	1.58E+01	8.97E+00	5.08E+00	2.88E+00	1.63E+00	9.26E-01	5.25E-01
pd107	6.39E-06	6.39E-06	6.39E-06	6.39E-06	6.39E-06	6.39E-06	6.39E-06
cd113m	3.76E-03	3.61E-03	3.46E-03	3.32E-03	3.19E-03	3.06E-03	2.94E-03
sn119m	1.53E-03	7.43E-04	3.62E-04	1.76E-04	8.57E-05	4.17E-05	2.03E-05
sn121	4.68E-01	2.60E-04	2.57E-04	2.54E-04	2.51E-04	2.49E-04	2.46E-04
sn121m	3.38E-04	3.34E-04	3.31E-04	3.27E-04	3.24E-04	3.21E-04	3.17E-04
sn123	5.81E-02	1.14E-02	2.22E-03	4.33E-04	8.45E-05	1.65E-05	3.22E-06
sb125	9.37E-01	7.61E-01	6.16E-01	4.98E-01	4.03E-01	3.26E-01	2.64E-01
te125m	2.15E-01	1.85E-01	1.50E-01	1.22E-01	9.85E-02	7.97E-02	6.45E-02
sn126	1.01E-04	1.01E-04	1.01E-04	1.01E-04	1.01E-04	1.01E-04	1.01E-04
sb126	3.87E-03	1.41E-05	1.41E-05	1.41E-05	1.41E-05	1.41E-05	1.41E-05
sb126m	5.40E-03	1.01E-04	1.01E-04	1.01E-04	1.01E-04	1.01E-04	1.01E-04
te127	4.19E+00	1.07E-01	1.54E-02	2.23E-03	3.21E-04	4.64E-05	6.69E-06
te127m	7.28E-01	1.09E-01	1.57E-02	2.27E-03	3.28E-04	4.73E-05	6.83E-06
i129	1.13E-05	1.13E-05	1.13E-05	1.13E-05	1.13E-05	1.13E-05	1.13E-05
cs134	2.16E-03	1.63E-03	1.23E-03	9.30E-04	7.03E-04	5.31E-04	4.01E-04
cs135	6.67E-04	6.67E-04	6.67E-04	6.67E-04	6.67E-04	6.67E-04	6.67E-04
cs137	4.38E+01	4.30E+01	4.22E+01	4.14E+01	4.06E+01	3.98E+01	3.90E+01
ba137m	4.14E+01	4.06E+01	3.98E+01	3.91E+01	3.83E+01	3.76E+01	3.69E+01
ce144	1.84E+02	8.79E+01	4.19E+01	2.00E+01	9.53E+00	4.55E+00	2.17E+00
pr144	1.84E+02	8.79E+01	4.19E+01	2.00E+01	9.53E+00	4.55E+00	2.17E+00
pr144m	2.58E+00	1.23E+00	5.87E-01	2.80E-01	1.33E-01	6.36E-02	3.04E-02
pm147	7.09E+01	5.76E+01	4.62E+01	3.71E+01	2.98E+01	2.39E+01	1.92E+01
sm151	1.08E+00	1.07E+00	1.07E+00	1.06E+00	1.05E+00	1.05E+00	1.04E+00
eu152	5.90E-05	5.65E-05	5.41E-05	5.18E-05	4.96E-05	4.75E-05	4.55E-05
eu154	1.67E-04	1.56E-04	1.46E-04	1.36E-04	1.28E-04	1.19E-04	1.12E-04
eu155	9.20E-01	8.13E-01	7.19E-01	6.35E-01	5.61E-01	4.96E-01	4.39E-01
total	2.01E+04	4.62E+02	3.13E+02	2.50E+02	2.16E+02	1.95E+02	1.81E+02

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 63
 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+01mwd, flux= 2.79E+08n/cm**2-sec

0

element thermal power, watts
 basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
h	5.37E-06	5.13E-06	4.89E-06	4.67E-06	4.45E-06	4.25E-06	4.06E-06
se	3.33E+00	9.80E-09	9.80E-09	9.80E-09	9.80E-09	9.80E-09	9.80E-09
kr	1.30E+01	5.99E-03	5.68E-03	5.38E-03	5.10E-03	4.83E-03	4.58E-03

sr	2.00E+01	5.75E-02	4.80E-02	4.69E-02	4.59E-02	4.50E-02	4.41E-02
y	2.74E+01	2.52E-01	2.29E-01	2.24E-01	2.19E-01	2.15E-01	2.10E-01
zr	1.20E+01	4.08E-02	1.51E-03	5.60E-05	2.14E-06	1.49E-07	7.53E-08
nb	2.15E+01	8.25E-02	3.16E-03	1.17E-04	4.38E-06	1.97E-07	4.42E-08
tc	6.47E+00	3.40E-06	3.40E-06	3.40E-06	3.40E-06	3.40E-06	3.40E-06
ru	7.07E-01	2.17E-03	3.10E-04	1.71E-04	9.71E-05	5.51E-05	3.12E-05
rh	3.77E-01	8.61E-02	4.87E-02	2.76E-02	1.57E-02	8.88E-03	5.03E-03
cd	6.85E-02	4.48E-06	3.77E-06	3.62E-06	3.47E-06	3.33E-06	3.20E-06
sn	1.87E+00	3.63E-05	7.52E-06	1.85E-06	7.12E-07	4.74E-07	4.19E-07
sb	7.51E+00	2.41E-03	1.95E-03	1.58E-03	1.28E-03	1.03E-03	8.37E-04
te	9.30E+00	3.96E-04	1.56E-04	1.07E-04	8.35E-05	6.72E-05	5.43E-05
i	2.08E+01	5.31E-09	5.31E-09	5.31E-09	5.31E-09	5.31E-09	5.31E-09
cs	1.81E+01	4.78E-02	4.69E-02	4.60E-02	4.51E-02	4.42E-02	4.34E-02
ba	1.14E+01	1.59E-01	1.56E-01	1.53E-01	1.50E-01	1.48E-01	1.45E-01
ce	4.41E+00	5.79E-02	2.74E-02	1.31E-02	6.24E-03	2.97E-03	1.42E-03
pr	6.24E+00	6.45E-01	3.08E-01	1.47E-01	7.00E-02	3.34E-02	1.59E-02
pm	3.37E-01	2.11E-02	1.70E-02	1.36E-02	1.09E-02	8.77E-03	7.03E-03
sm	2.01E-02	1.26E-04	1.25E-04	1.25E-04	1.24E-04	1.23E-04	1.22E-04
eu	8.73E-03	6.34E-04	5.60E-04	4.95E-04	4.38E-04	3.87E-04	3.42E-04
totals	2.59E+02	1.46E+00	8.94E-01	6.79E-01	5.70E-01	5.12E-01	4.78E-01

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 64
 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+01mwd, flux= 2.79E+08n/cm**2-sec
 0 nuclide gamma power, watts

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr 85	5.57E-05	5.28E-05	5.00E-05	4.74E-05	4.49E-05	4.26E-05	4.03E-05
y 90	4.33E-07	4.24E-07	4.15E-07	4.07E-07	3.99E-07	3.90E-07	3.83E-07
zr 95	9.47E-01	3.51E-02	1.30E-03	4.82E-05	1.78E-06	6.61E-08	2.45E-09
nb 95	9.89E-01	7.79E-02	2.98E-03	1.11E-04	4.10E-06	1.52E-07	5.63E-09
rh102	9.23E-08	7.56E-08	6.20E-08	5.08E-08	4.16E-08	3.41E-08	2.79E-08
rh106	1.93E-02	1.10E-02	6.21E-03	3.52E-03	1.99E-03	1.13E-03	6.41E-04
sn121m	1.00E-08	9.91E-09	9.81E-09	9.70E-09	9.60E-09	9.50E-09	9.40E-09
sb125	2.41E-03	1.96E-03	1.58E-03	1.28E-03	1.04E-03	8.40E-04	6.80E-04
te125m	4.53E-05	3.91E-05	3.17E-05	2.57E-05	2.08E-05	1.68E-05	1.36E-05
sn126	7.78E-08	7.78E-08	7.78E-08	7.78E-08	7.78E-08	7.78E-08	7.78E-08
sb126	6.31E-05	2.30E-07	2.30E-07	2.30E-07	2.30E-07	2.30E-07	2.30E-07
sb126m	4.97E-05	9.27E-07	9.27E-07	9.27E-07	9.27E-07	9.27E-07	9.27E-07
cs134	1.99E-05	1.50E-05	1.13E-05	8.58E-06	6.48E-06	4.90E-06	3.70E-06
ba137m	1.47E-01	1.44E-01	1.41E-01	1.39E-01	1.36E-01	1.33E-01	1.31E-01
ce144	2.07E-02	9.89E-03	4.72E-03	2.25E-03	1.07E-03	5.12E-04	2.44E-04
pr144	3.16E-02	1.51E-02	7.18E-03	3.42E-03	1.63E-03	7.79E-04	3.71E-04
pr144m	1.91E-04	9.11E-05	4.35E-05	2.07E-05	9.89E-06	4.72E-06	2.25E-06
pm147	1.84E-06	1.50E-06	1.20E-06	9.63E-07	7.73E-07	6.20E-07	4.97E-07
sm151	9.08E-08	9.03E-08	8.97E-08	8.91E-08	8.85E-08	8.80E-08	8.74E-08
eu152	4.06E-07	3.89E-07	3.73E-07	3.57E-07	3.42E-07	3.27E-07	3.13E-07
eu154	1.24E-06	1.16E-06	1.08E-06	1.01E-06	9.48E-07	8.87E-07	8.29E-07
eu155	3.53E-04	3.12E-04	2.76E-04	2.44E-04	2.15E-04	1.90E-04	1.68E-04
total	1.28E+02	2.97E-01	1.66E-01	1.50E-01	1.42E-01	1.37E-01	1.33E-01

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 65
 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+01mwd, flux= 2.79E+08n/cm**2-sec
 0 element gamma power, watts

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr	6.74E+00	5.28E-05	5.00E-05	4.74E-05	4.49E-05	4.26E-05	4.03E-05
y	9.80E+00	1.18E-04	3.58E-06	4.93E-07	4.01E-07	3.91E-07	3.83E-07
zr	4.81E+00	3.51E-02	1.30E-03	4.82E-05	1.78E-06	6.61E-08	2.45E-09
nb	9.13E+00	7.79E-02	2.98E-03	1.11E-04	4.11E-06	1.55E-07	8.28E-09
rh	1.05E-01	1.10E-02	6.21E-03	3.52E-03	1.99E-03	1.13E-03	6.41E-04

	3.75E+00	1.30E+05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
	4.25E+00	1.93E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
	4.75E+00	7.87E-22	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
	5.50E+00	1.51E-22	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
0	total	5.25E+08	8.75E+01	7.01E+01	5.61E+01	4.50E+01	3.60E+01	2.88E+01
0	gamma watts	3.37E-01	5.61E-08	4.49E-08	3.60E-08	2.88E-08	2.31E-08	1.85E-08
1								

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photon spectrum as a function of time for fission products

0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 0 power= .00 mw, burnup= 15.mwd, flux= 2.79E+08 n**2-sec
 0 spectrum of photon release rates, photons/sec
 0 basis = single reactor assembly

emEAN (meV)	time after discharge							
	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d	
1.00E-02	2.57E+14	4.09E+12	2.53E+12	1.83E+12	1.47E+12	1.28E+12	1.17E+12	
3.00E-02	1.12E+14	1.81E+12	1.11E+12	7.88E+11	6.24E+11	5.39E+11	4.92E+11	
5.50E-02	5.99E+13	9.26E+11	5.64E+11	3.97E+11	3.14E+11	2.70E+11	2.46E+11	
8.50E-02	4.15E+13	5.86E+11	3.50E+11	2.40E+11	1.85E+11	1.56E+11	1.41E+11	
1.20E-01	3.41E+13	7.47E+11	4.04E+11	2.42E+11	1.62E+11	1.23E+11	1.03E+11	
1.70E-01	5.47E+13	3.67E+11	2.18E+11	1.51E+11	1.17E+11	9.93E+10	8.98E+10	
3.00E-01	1.10E+14	4.10E+11	2.42E+11	1.63E+11	1.24E+11	1.04E+11	9.36E+10	
6.50E-01	2.25E+14	2.83E+12	1.59E+12	1.45E+12	1.38E+12	1.34E+12	1.30E+12	
1.13E+00	7.81E+13	3.94E+10	2.18E+10	1.33E+10	8.99E+09	6.76E+09	5.58E+09	
1.58E+00	4.04E+13	1.73E+10	8.72E+09	4.56E+09	2.53E+09	1.53E+09	1.04E+09	
2.00E+00	1.23E+13	2.93E+10	1.40E+10	6.74E+09	3.25E+09	1.58E+09	7.75E+08	
2.40E+00	1.06E+13	6.16E+08	3.25E+08	1.72E+08	9.22E+07	4.96E+07	2.69E+07	
2.80E+00	4.23E+12	8.00E+07	4.34E+07	2.37E+07	1.30E+07	7.14E+06	3.95E+06	
3.25E+00	2.48E+12	1.00E+07	5.68E+06	3.22E+06	1.82E+06	1.03E+06	5.86E+05	
3.75E+00	1.26E+12	4.42E+03	2.50E+03	1.42E+03	8.05E+02	4.56E+02	2.59E+02	
4.25E+00	1.40E+12	1.86E-08	1.89E-08	1.92E-08	1.94E-08	1.96E-08	1.97E-08	
4.75E+00	4.09E+11	9.34E-09	9.50E-09	9.63E-09	9.73E-09	9.81E-09	9.87E-09	
5.50E+00	3.04E+11	6.93E-09	7.05E-09	7.14E-09	7.22E-09	7.28E-09	7.32E-09	
0	total	1.04E+15	1.18E+13	7.06E+12	5.28E+12	4.39E+12	3.92E+12	3.65E+12
0	meV/sec	4.41E+14	2.44E+12	1.38E+12	1.17E+12	1.06E+12	1.00E+12	9.61E+11

spectrum of energy release rates, meV/watt-sec
 basis = single reactor assembly

emEAN (meV)	time after discharge							
	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d	
1.00E-02	6.42E+08	1.02E+07	6.33E+06	4.56E+06	3.67E+06	3.20E+06	2.94E+06	
3.00E-02	8.42E+08	1.36E+07	8.35E+06	5.91E+06	4.68E+06	4.04E+06	3.69E+06	
5.50E-02	8.24E+08	1.27E+07	7.76E+06	5.46E+06	4.31E+06	3.71E+06	3.38E+06	
8.50E-02	8.82E+08	1.24E+07	7.43E+06	5.10E+06	3.93E+06	3.32E+06	2.99E+06	
1.20E-01	1.02E+09	2.24E+07	1.21E+07	7.25E+06	4.87E+06	3.70E+06	3.10E+06	
1.70E-01	2.32E+09	1.56E+07	9.27E+06	6.40E+06	4.96E+06	4.22E+06	3.82E+06	
3.00E-01	8.23E+09	3.07E+07	1.82E+07	1.23E+07	9.33E+06	7.82E+06	7.02E+06	
6.50E-01	3.65E+10	4.59E+08	2.58E+08	2.35E+08	2.24E+08	2.17E+08	2.11E+08	
1.13E+00	2.20E+10	1.11E+07	6.14E+06	3.74E+06	2.53E+06	1.90E+06	1.57E+06	
1.58E+00	1.59E+10	6.80E+06	3.43E+06	1.80E+06	9.97E+05	6.04E+05	4.08E+05	
2.00E+00	6.14E+09	1.46E+07	7.01E+06	3.37E+06	1.62E+06	7.89E+05	3.88E+05	
2.40E+00	6.37E+09	3.69E+05	1.95E+05	1.03E+05	5.53E+04	2.98E+04	1.61E+04	
2.80E+00	2.96E+09	5.60E+04	3.04E+04	1.66E+04	9.08E+03	5.00E+03	2.76E+03	
3.25E+00	2.01E+09	8.14E+03	4.61E+03	2.62E+03	1.48E+03	8.40E+02	4.76E+02	
3.75E+00	1.18E+09	4.14E+00	2.35E+00	1.33E+00	7.54E-01	4.28E-01	2.42E-01	
4.25E+00	1.48E+09	1.98E-11	2.01E-11	2.04E-11	2.06E-11	2.08E-11	2.09E-11	
4.75E+00	4.85E+08	1.11E-11	1.13E-11	1.14E-11	1.16E-11	1.16E-11	1.17E-11	
5.50E+00	4.18E+08	9.53E-12	9.69E-12	9.82E-12	9.92E-12	1.00E-11	1.01E-11	
0	total	1.10E+11	6.10E+08	3.45E+08	2.91E+08	2.65E+08	2.50E+08	2.40E+08

0 gamma watts 7.07E+01 3.91E-01 2.21E-01 1.87E-01 1.70E-01 1.60E-01 1.54E-01

1
0 principal photon sources in group 1, photons/sec
mean energy = .0100 mev. nuclides exceeding 1.0E-03 of total group release rate (1.28E+12) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr 85	2.22E+10	2.11E+10	2.00E+10	1.89E+10	1.79E+10	1.70E+10	1.61E+10
sr 90	1.75E+11	1.71E+11	1.68E+11	1.64E+11	1.61E+11	1.58E+11	1.55E+11
y 90	8.60E+11	8.42E+11	8.25E+11	8.08E+11	7.92E+11	7.76E+11	7.60E+11
rh106	4.71E+11	2.67E+11	1.51E+11	8.58E+10	4.86E+10	2.76E+10	1.56E+10
cs137	1.55E+11	1.52E+11	1.49E+11	1.46E+11	1.43E+11	1.40E+11	1.38E+11
ba137m	7.25E+09	7.11E+09	6.98E+09	6.84E+09	6.71E+09	6.59E+09	6.46E+09
ce144	3.55E+11	1.69E+11	8.07E+10	3.85E+10	1.83E+10	8.75E+09	4.17E+09
pr144	4.70E+12	2.24E+12	1.07E+12	5.10E+11	2.43E+11	1.16E+11	5.53E+10
pm147	8.24E+10	6.69E+10	5.37E+10	4.31E+10	3.46E+10	2.77E+10	2.23E+10
eu155	2.43E+09	2.15E+09	1.90E+09	1.68E+09	1.49E+09	1.31E+09	1.16E+09

0 principal photon sources in group 2, photons/sec
mean energy = .0300 mev. nuclides exceeding 1.0E-03 of total group release rate (5.39E+11) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr 85	6.48E+09	6.14E+09	5.82E+09	5.51E+09	5.23E+09	4.95E+09	4.69E+09
sr 90	4.94E+10	4.84E+10	4.74E+10	4.65E+10	4.55E+10	4.46E+10	4.37E+10
y 90	2.80E+11	2.74E+11	2.69E+11	2.63E+11	2.58E+11	2.53E+11	2.48E+11
rh106	1.57E+11	8.91E+10	5.05E+10	2.86E+10	1.62E+10	9.20E+09	5.22E+09
sb125	1.72E+10	1.40E+10	1.13E+10	9.15E+09	7.40E+09	5.99E+09	4.85E+09
te125m	9.19E+09	7.94E+09	6.44E+09	5.21E+09	4.22E+09	3.41E+09	2.76E+09
cs137	4.31E+10	4.23E+10	4.14E+10	4.07E+10	3.99E+10	3.91E+10	3.84E+10
ba137m	1.25E+11	1.22E+11	1.20E+11	1.18E+11	1.15E+11	1.13E+11	1.11E+11
ce144	8.23E+11	3.93E+11	1.87E+11	8.93E+10	4.26E+10	2.03E+10	9.69E+09
pr144	1.55E+12	7.42E+11	3.54E+11	1.69E+11	8.04E+10	3.84E+10	1.83E+10
pr144m	3.18E+10	1.51E+10	7.22E+09	3.44E+09	1.64E+09	7.83E+08	3.74E+08
pm147	1.81E+10	1.47E+10	1.18E+10	9.48E+09	7.60E+09	6.10E+09	4.90E+09

0 principal photon sources in group 3, photons/sec
mean energy = .0550 mev. nuclides exceeding 1.0E-03 of total group release rate (2.70E+11) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr 85	3.97E+09	3.77E+09	3.57E+09	3.38E+09	3.20E+09	3.04E+09	2.88E+09
sr 90	2.92E+10	2.86E+10	2.80E+10	2.75E+10	2.69E+10	2.64E+10	2.58E+10
y 90	1.94E+11	1.90E+11	1.86E+11	1.82E+11	1.78E+11	1.75E+11	1.71E+11
rh106	1.11E+11	6.31E+10	3.58E+10	2.03E+10	1.15E+10	6.52E+09	3.69E+09
cs137	2.51E+10	2.46E+10	2.41E+10	2.37E+10	2.32E+10	2.28E+10	2.23E+10
ce144	1.19E+11	5.68E+10	2.71E+10	1.29E+10	6.16E+09	2.94E+09	1.40E+09
pr144	1.09E+12	5.21E+11	2.48E+11	1.18E+11	5.65E+10	2.69E+10	1.28E+10
pm147	7.61E+09	6.18E+09	4.96E+09	3.98E+09	3.19E+09	2.56E+09	2.06E+09
eu155	7.09E+09	6.27E+09	5.56E+09	4.90E+09	4.33E+09	3.83E+09	3.38E+09

1
0 principal photon sources in group 4, photons/sec
mean energy = .0850 mev. nuclides exceeding 1.0E-03 of total group release rate (1.56E+11) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr 85	1.99E+09	1.89E+09	1.79E+09	1.69E+09	1.60E+09	1.52E+09	1.44E+09
sr 90	1.39E+10	1.36E+10	1.34E+10	1.31E+10	1.28E+10	1.26E+10	1.23E+10
y 90	1.12E+11	1.10E+11	1.07E+11	1.05E+11	1.03E+11	1.01E+11	9.90E+10
rh106	6.62E+10	3.75E+10	2.13E+10	1.21E+10	6.83E+09	3.87E+09	2.20E+09
cs137	1.17E+10	1.15E+10	1.13E+10	1.11E+10	1.09E+10	1.07E+10	1.05E+10
ce144	1.68E+11	8.02E+10	3.83E+10	1.82E+10	8.70E+09	4.15E+09	1.98E+09
pr144	6.42E+11	3.06E+11	1.46E+11	6.97E+10	3.32E+10	1.59E+10	7.56E+09
pm147	2.17E+09	1.76E+09	1.41E+09	1.13E+09	9.09E+08	7.29E+08	5.85E+08
eu155	1.08E+10	9.52E+09	8.41E+09	7.44E+09	6.57E+09	5.81E+09	5.14E+09

0 principal photon sources in group 5, photons/sec

mean energy = .1200 mev. nuclides exceeding 1.0E-03 of total group release rate (1.23E+11) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr 85	1.20E+09	1.14E+09	1.08E+09	1.02E+09	9.67E+08	9.16E+08	8.68E+08
sr 90	7.93E+09	7.77E+09	7.61E+09	7.45E+09	7.30E+09	7.15E+09	7.01E+09
y 90	7.88E+10	7.72E+10	7.56E+10	7.41E+10	7.26E+10	7.11E+10	6.97E+10
rh106	4.78E+10	2.71E+10	1.54E+10	8.71E+09	4.94E+09	2.80E+09	1.59E+09
cs137	6.58E+09	6.45E+09	6.33E+09	6.21E+09	6.09E+09	5.98E+09	5.86E+09
ce144	8.25E+11	3.93E+11	1.88E+11	8.95E+10	4.27E+10	2.04E+10	9.71E+09
pr144	4.60E+11	2.19E+11	1.05E+11	4.99E+10	2.38E+10	1.13E+10	5.41E+09
pm147	6.87E+08	5.58E+08	4.48E+08	3.59E+08	2.88E+08	2.31E+08	1.86E+08
eu155	6.15E+09	5.43E+09	4.80E+09	4.25E+09	3.75E+09	3.32E+09	2.93E+09

0 principal photon sources in group 6, photons/sec

mean energy = .1700 mev. nuclides exceeding 1.0E-03 of total group release rate (9.93E+10) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr 85	9.53E+08	9.03E+08	8.56E+08	8.11E+08	7.68E+08	7.28E+08	6.90E+08
sr 90	5.65E+09	5.54E+09	5.43E+09	5.32E+09	5.21E+09	5.10E+09	5.00E+09
y 90	8.12E+10	7.96E+10	7.80E+10	7.64E+10	7.48E+10	7.33E+10	7.18E+10
rh106	5.13E+10	2.91E+10	1.65E+10	9.34E+09	5.29E+09	3.00E+09	1.70E+09
sb125	2.59E+09	2.10E+09	1.70E+09	1.38E+09	1.11E+09	9.02E+08	7.30E+08
cs137	4.65E+09	4.56E+09	4.47E+09	4.39E+09	4.30E+09	4.22E+09	4.14E+09
pr144	4.86E+11	2.32E+11	1.11E+11	5.27E+10	2.51E+10	1.20E+10	5.72E+09

0 principal photon sources in group 7, photons/sec

mean energy = .3000 mev. nuclides exceeding 1.0E-03 of total group release rate (1.04E+11) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr 85	5.75E+08	5.45E+08	5.17E+08	4.89E+08	4.64E+08	4.39E+08	4.16E+08
sr 90	2.56E+09	2.51E+09	2.46E+09	2.41E+09	2.36E+09	2.31E+09	2.27E+09
y 90	9.02E+10	8.84E+10	8.66E+10	8.48E+10	8.31E+10	8.14E+10	7.98E+10
rh106	6.18E+10	3.51E+10	1.99E+10	1.13E+10	6.38E+09	3.62E+09	2.05E+09
sb125	9.81E+08	7.96E+08	6.44E+08	5.22E+08	4.22E+08	3.42E+08	2.76E+08
cs137	2.35E+09	2.31E+09	2.26E+09	2.22E+09	2.18E+09	2.14E+09	2.10E+09
pr144	5.69E+11	2.71E+11	1.29E+11	6.17E+10	2.94E+10	1.40E+10	6.70E+09

1 principal photon sources in group 8, photons/sec

0 mean energy = .6500 mev. nuclides exceeding 1.0E-03 of total group release rate (1.34E+12) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
y 90	3.81E+10	3.74E+10	3.66E+10	3.58E+10	3.51E+10	3.44E+10	3.37E+10
rh106	1.91E+11	1.08E+11	6.13E+10	3.48E+10	1.97E+10	1.12E+10	6.33E+09
sb125	2.10E+10	1.71E+10	1.38E+10	1.12E+10	9.06E+09	7.33E+09	5.93E+09
ba137m	1.40E+12	1.37E+12	1.35E+12	1.32E+12	1.30E+12	1.27E+12	1.25E+12
pr144	3.88E+11	1.85E+11	8.83E+10	4.21E+10	2.01E+10	9.58E+09	4.57E+09

0 principal photon sources in group 9, photons/sec

mean energy = 1.1250 mev. nuclides exceeding 1.0E-03 of total group release rate (6.76E+09) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
y 90	4.97E+09	4.87E+09	4.77E+09	4.68E+09	4.58E+09	4.49E+09	4.40E+09
rh106	1.78E+10	1.01E+10	5.71E+09	3.24E+09	1.84E+09	1.04E+09	5.90E+08
pr144	4.97E+10	2.37E+10	1.13E+10	5.39E+09	2.57E+09	1.23E+09	5.85E+08

0 principal photon sources in group 10, photons/sec

mean energy = 1.5750 mev. nuclides exceeding 1.0E-03 of total group release rate (1.53E+09) at 1521.9 d

nuclide	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
y 90	6.35E+08	6.22E+08	6.09E+08	5.97E+08	5.85E+08	5.73E+08	5.61E+08
rh106	3.35E+09	1.90E+09	1.08E+09	6.11E+08	3.46E+08	1.96E+08	1.11E+08
pr144	3.09E+10	1.47E+10	7.03E+09	3.35E+09	1.60E+09	7.63E+08	3.64E+08

0 principal photon sources in group 11, photons/sec

mean energy = 2.0000 mev. nuclides exceeding 1.0E-03 of total group release rate (1.58E+09) at 1521.9 d

	1.20E-01	5.42E+13	2.90E+10	2.90E+10	2.90E+10	2.90E+10	2.90E+10	2.90E+10	2.90E+10
	1.70E-01	1.72E+12	1.90E+10	1.90E+10	1.90E+10	1.90E+10	1.90E+10	1.90E+10	1.90E+10
	3.00E-01	2.87E+13	1.30E+11	1.30E+11	1.30E+11	1.30E+11	1.30E+11	1.30E+11	1.30E+11
	6.50E-01	1.45E+12	6.30E+09	6.30E+09	6.30E+09	6.30E+09	6.30E+09	6.30E+09	6.30E+09
	1.13E+00	1.86E+12	9.16E+08	9.16E+08	9.16E+08	9.16E+08	9.16E+08	9.16E+08	9.16E+08
	1.58E+00	1.07E+08	1.07E+08	1.07E+08	1.07E+08	1.07E+08	1.07E+08	1.07E+08	1.07E+08
	2.00E+00	3.65E+07	3.65E+07	3.65E+07	3.65E+07	3.65E+07	3.65E+07	3.65E+07	3.65E+07
	2.40E+00	3.35E+04	3.42E+04	3.50E+04	3.58E+04	3.67E+04	3.77E+04	3.87E+04	3.87E+04
	2.80E+00	9.08E+04	1.02E+05	1.13E+05	1.24E+05	1.33E+05	1.40E+05	1.47E+05	1.47E+05
	3.25E+00	1.03E+04	1.03E+04	1.03E+04	1.03E+04	1.03E+04	1.03E+04	1.04E+04	1.04E+04
	3.75E+00	5.95E+03	5.95E+03	5.95E+03	5.95E+03	5.95E+03	5.95E+03	5.95E+03	5.95E+03
	4.25E+00	3.45E+03	3.44E+03	3.44E+03	3.44E+03	3.44E+03	3.44E+03	3.44E+03	3.44E+03
	4.75E+00	1.99E+03	1.99E+03	1.99E+03	1.99E+03	1.99E+03	1.99E+03	1.99E+03	1.99E+03
	5.50E+00	1.80E+03	1.80E+03	1.80E+03	1.80E+03	1.80E+03	1.80E+03	1.80E+03	1.80E+03
0	total	2.93E+14	9.92E+11	9.92E+11	9.91E+11	9.91E+11	9.91E+11	9.91E+11	9.91E+11
0	mev/sec	2.51E+13	7.24E+10	7.24E+10	7.24E+10	7.24E+10	7.24E+10	7.24E+10	7.24E+10

actinide energy release rates, mev/watt-sec
basis = single reactor assembly

e mean		time after discharge							
(mev)	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d		
1.00E-02	3.33E+08	1.47E+06	1.47E+06	1.47E+06	1.47E+06	1.47E+06	1.47E+06	1.47E+06	1.47E+06
3.00E-02	6.34E+07	3.46E+05	3.46E+05	3.46E+05	3.46E+05	3.46E+05	3.46E+05	3.46E+05	3.46E+05
5.50E-02	1.50E+08	2.78E+05	2.78E+05	2.78E+05	2.78E+05	2.78E+05	2.78E+05	2.78E+05	2.78E+05
8.50E-02	1.12E+09	3.20E+06	3.20E+06	3.20E+06	3.20E+06	3.20E+06	3.20E+06	3.20E+06	3.20E+06
1.20E-01	1.63E+09	8.70E+05	8.70E+05	8.70E+05	8.70E+05	8.70E+05	8.70E+05	8.70E+05	8.70E+05
1.70E-01	7.31E+07	8.07E+05	8.07E+05	8.07E+05	8.07E+05	8.07E+05	8.07E+05	8.07E+05	8.07E+05
3.00E-01	2.15E+09	9.77E+06	9.77E+06	9.77E+06	9.77E+06	9.77E+06	9.77E+06	9.77E+06	9.77E+06
6.50E-01	2.36E+08	1.02E+06	1.02E+06	1.02E+06	1.02E+06	1.02E+06	1.02E+06	1.02E+06	1.02E+06
1.13E+00	5.24E+08	2.58E+05	2.58E+05	2.58E+05	2.58E+05	2.58E+05	2.58E+05	2.58E+05	2.58E+05
1.58E+00	4.21E+04	4.21E+04	4.21E+04	4.21E+04	4.21E+04	4.21E+04	4.21E+04	4.21E+04	4.21E+04
2.00E+00	1.82E+04	1.82E+04	1.82E+04	1.82E+04	1.82E+04	1.82E+04	1.82E+04	1.82E+04	1.82E+04
2.40E+00	2.01E+01	2.05E+01	2.10E+01	2.15E+01	2.20E+01	2.26E+01	2.32E+01	2.32E+01	2.32E+01
2.80E+00	6.36E+01	7.16E+01	7.94E+01	8.65E+01	9.28E+01	9.83E+01	1.03E+02	1.03E+02	1.03E+02
3.25E+00	8.38E+00	8.39E+00	8.39E+00	8.40E+00	8.40E+00	8.41E+00	8.41E+00	8.41E+00	8.41E+00
3.75E+00	5.58E+00	5.58E+00	5.58E+00	5.58E+00	5.58E+00	5.58E+00	5.58E+00	5.58E+00	5.58E+00
4.25E+00	3.66E+00	3.66E+00	3.66E+00	3.66E+00	3.66E+00	3.66E+00	3.66E+00	3.66E+00	3.66E+00
4.75E+00	2.37E+00	2.37E+00	2.37E+00	2.37E+00	2.37E+00	2.37E+00	2.37E+00	2.37E+00	2.37E+00
5.50E+00	2.48E+00	2.48E+00	2.48E+00	2.48E+00	2.48E+00	2.48E+00	2.48E+00	2.48E+00	2.48E+00
0	total	6.27E+09	1.81E+07	1.81E+07	1.81E+07	1.81E+07	1.81E+07	1.81E+07	1.81E+07
0	gamma watts	4.02E+00	1.16E-02	1.16E-02	1.16E-02	1.16E-02	1.16E-02	1.16E-02	1.16E-02

neutron source intensity as a function of time

0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
alpha-n neutron source, neutrons/sec/basis
basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d		
pb210	6.08E-13	7.68E-13	9.54E-13	1.17E-12	1.41E-12	1.68E-12	1.98E-12		
bi210	1.55E-10	1.96E-10	2.43E-10	2.98E-10	3.59E-10	4.28E-10	5.05E-10		
bi211	1.77E-02	2.08E-02	2.40E-02	2.73E-02	3.08E-02	3.45E-02	3.84E-02		
bi212	2.59E-03	3.00E-03	3.39E-03	3.75E-03	4.06E-03	4.34E-03	4.58E-03		
bi213	3.06E-06	3.60E-06	4.19E-06	4.83E-06	5.51E-06	6.25E-06	7.04E-06		
bi214	7.34E-07	8.62E-07	9.99E-07	1.15E-06	1.31E-06	1.47E-06	1.65E-06		
po210	1.61E-04	2.06E-04	2.59E-04	3.19E-04	3.88E-04	4.66E-04	5.53E-04		
po211	6.99E-05	8.25E-05	9.49E-05	1.08E-04	1.22E-04	1.37E-04	1.52E-04		
po212	1.33E-02	1.54E-02	1.73E-02	1.92E-02	2.08E-02	2.22E-02	2.35E-02		
po213	4.03E-04	4.75E-04	5.53E-04	6.37E-04	7.28E-04	8.25E-04	9.29E-04		

po214	6.54E-03	7.68E-03	8.90E-03	1.02E-02	1.16E-02	1.31E-02	1.47E-02
po215	2.50E-02	2.95E-02	3.39E-02	3.86E-02	4.35E-02	4.88E-02	5.42E-02
po216	1.04E-02	1.20E-02	1.35E-02	1.50E-02	1.62E-02	1.74E-02	1.83E-02
po218	3.11E-03	3.65E-03	4.24E-03	4.86E-03	5.53E-03	6.24E-03	7.00E-03
at217	2.61E-04	3.08E-04	3.58E-04	4.13E-04	4.72E-04	5.35E-04	6.02E-04
rn218	2.85E-13	1.12E-17	4.41E-22	1.74E-26	.00E+00	.00E+00	.00E+00
rn219	1.98E-02	2.34E-02	2.69E-02	3.07E-02	3.46E-02	3.88E-02	4.31E-02
rn220	8.20E-03	9.49E-03	1.07E-02	1.19E-02	1.29E-02	1.37E-02	1.45E-02
rn222	2.27E-03	2.67E-03	3.09E-03	3.55E-03	4.04E-03	4.56E-03	5.11E-03
fr221	1.91E-04	2.24E-04	2.61E-04	3.01E-04	3.44E-04	3.90E-04	4.39E-04
fr223	7.61E-09	8.86E-09	1.02E-08	1.16E-08	1.31E-08	1.47E-08	1.63E-08
ra222	2.20E-13	8.67E-18	3.41E-22	1.34E-26	.00E+00	.00E+00	.00E+00
ra223	1.15E-02	1.36E-02	1.56E-02	1.78E-02	2.00E-02	2.24E-02	2.50E-02
ra224	5.80E-03	6.71E-03	7.58E-03	8.38E-03	9.09E-03	9.72E-03	1.03E-02
ra226	1.33E-03	1.56E-03	1.81E-03	2.08E-03	2.36E-03	2.67E-03	2.99E-03
ac225	1.37E-04	1.61E-04	1.88E-04	2.17E-04	2.47E-04	2.80E-04	3.16E-04
ac227	8.57E-05	9.97E-05	1.15E-04	1.31E-04	1.47E-04	1.65E-04	1.84E-04
ac228	9.62E-15	1.10E-14	1.24E-14	1.39E-14	1.54E-14	1.69E-14	1.85E-14
th226	1.99E-13	7.82E-18	3.08E-22	1.21E-26	.00E+00	.00E+00	.00E+00
th227	1.26E-02	1.50E-02	1.72E-02	1.96E-02	2.21E-02	2.48E-02	2.75E-02
th228	4.87E-03	5.64E-03	6.37E-03	7.04E-03	7.64E-03	8.17E-03	8.62E-03
th229	8.01E-05	9.43E-05	1.10E-04	1.27E-04	1.45E-04	1.64E-04	1.84E-04
th230	5.67E-01	6.14E-01	6.61E-01	7.09E-01	7.56E-01	8.03E-01	8.50E-01
th232	2.92E-07	3.17E-07	3.41E-07	3.66E-07	3.90E-07	4.14E-07	4.39E-07
pa231	4.76E-02	5.16E-02	5.56E-02	5.96E-02	6.36E-02	6.76E-02	7.15E-02
u230	1.57E-13	6.16E-18	2.42E-22	9.52E-27	.00E+00	.00E+00	.00E+00
u231	1.47E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u232	6.93E-03	7.59E-03	8.12E-03	8.54E-03	8.87E-03	9.12E-03	9.31E-03
u233	1.60E-01	1.76E-01	1.91E-01	2.06E-01	2.21E-01	2.37E-01	2.52E-01
u234	6.63E+03	6.63E+03	6.63E+03	6.63E+03	6.63E+03	6.63E+03	6.63E+03
u235	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02
u236	1.04E+03	1.04E+03	1.04E+03	1.04E+03	1.04E+03	1.04E+03	1.04E+03
u238	8.32E+02	8.32E+02	8.32E+02	8.32E+02	8.32E+02	8.32E+02	8.32E+02
np235	2.41E-08	1.41E-08	8.30E-09	4.88E-09	2.86E-09	1.68E-09	9.87E-10
np237	3.35E+03	3.35E+03	3.35E+03	3.35E+03	3.35E+03	3.35E+03	3.35E+03
pu236	1.29E-01	1.06E-01	8.68E-02	7.11E-02	5.83E-02	4.78E-02	3.91E-02
pu237	1.70E-09	1.59E-11	1.49E-13	1.40E-15	1.31E-17	1.23E-19	1.15E-21
pu238	6.34E+03	6.31E+03	6.26E+03	6.22E+03	6.18E+03	6.14E+03	6.10E+03

neutron source intensity as a function of time

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 alpha-n neutron source, neutrons/sec/basis
 basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
pu239	5.12E+02	5.12E+02	5.12E+02	5.12E+02	5.12E+02	5.12E+02	5.12E+02
pu240	9.34E-02	9.34E-02	9.34E-02	9.33E-02	9.33E-02	9.33E-02	9.33E-02
pu241	4.90E-08	4.70E-08	4.52E-08	4.34E-08	4.17E-08	4.00E-08	3.85E-08
pu242	1.64E-12	1.64E-12	1.64E-12	1.64E-12	1.64E-12	1.64E-12	1.64E-12
am239	1.36E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am240	2.14E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am241	1.31E-05	1.72E-05	2.12E-05	2.50E-05	2.86E-05	3.21E-05	3.55E-05
am242m	7.75E-13	7.71E-13	7.68E-13	7.65E-13	7.62E-13	7.59E-13	7.56E-13
am243	7.43E-16	7.43E-16	7.43E-16	7.43E-16	7.43E-16	7.43E-16	7.42E-16
cm241	1.24E-21	1.99E-24	3.21E-27	5.12E-30	.00E+00	.00E+00	.00E+00
cm242	9.90E-08	2.74E-08	7.69E-09	2.28E-09	7.96E-10	3.89E-10	2.77E-10
cm243	1.43E-15	1.41E-15	1.38E-15	1.35E-15	1.32E-15	1.30E-15	1.27E-15
cm244	3.03E-18	2.94E-18	2.84E-18	2.76E-18	2.67E-18	2.58E-18	2.50E-18

0 cm245 7.66E-27 7.66E-27 7.66E-27 7.66E-27 7.66E-27 7.66E-27 7.66E-27
 1 total 1.88E+04 1.88E+04 1.88E+04 1.87E+04 1.87E+04 1.86E+04 1.86E+04

neutron source intensity as a function of time

0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 spontaneous fission neutron source, neutrons/sec/basis
 basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
th230	1.45E-05	1.58E-05	1.70E-05	1.82E-05	1.94E-05	2.06E-05	2.18E-05
pa231	5.97E-06	6.47E-06	6.97E-06	7.47E-06	7.97E-06	8.47E-06	8.97E-06
u232	4.25E-07	4.66E-07	4.99E-07	5.25E-07	5.45E-07	5.60E-07	5.72E-07
u234	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01
u235	1.68E+00	1.68E+00	1.68E+00	1.68E+00	1.68E+00	1.68E+00	1.68E+00
u236	1.57E+02	1.57E+02	1.57E+02	1.57E+02	1.57E+02	1.57E+02	1.57E+02
u237	1.22E-09	1.75E-21	1.65E-21	1.59E-21	1.53E-21	1.47E-21	1.41E-21
u238	1.17E+05	1.17E+05	1.17E+05	1.17E+05	1.17E+05	1.17E+05	1.17E+05
u239	9.66E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np236	7.39E-11	7.39E-11	7.39E-11	7.39E-11	7.39E-11	7.39E-11	7.39E-11
np238	2.02E-08	2.26E-25	2.25E-25	2.25E-25	2.24E-25	2.23E-25	2.22E-25
np239	1.98E-05	7.70E-27	7.70E-27	7.70E-27	7.70E-27	7.70E-27	7.69E-27
pu236	8.74E-03	7.17E-03	5.87E-03	4.81E-03	3.94E-03	3.23E-03	2.65E-03
pu238	1.17E+03	1.16E+03	1.16E+03	1.15E+03	1.14E+03	1.13E+03	1.13E+03
pu239	2.74E-01	2.74E-01	2.74E-01	2.74E-01	2.74E-01	2.74E-01	2.74E-01
pu240	6.21E-01	6.21E-01	6.21E-01	6.21E-01	6.21E-01	6.20E-01	6.20E-01
pu241	1.76E-09	1.69E-09	1.63E-09	1.56E-09	1.50E-09	1.44E-09	1.38E-09
pu242	1.28E-09	1.28E-09	1.28E-09	1.28E-09	1.28E-09	1.28E-09	1.28E-09
pu243	1.03E-22	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am241	5.03E-09	6.62E-09	8.15E-09	9.61E-09	1.10E-08	1.24E-08	1.37E-08
am242m	3.68E-12	3.67E-12	3.65E-12	3.64E-12	3.62E-12	3.61E-12	3.59E-12
am242	2.09E-12	3.98E-15	3.97E-15	3.95E-15	3.93E-15	3.92E-15	3.90E-15
am243	3.42E-18	3.42E-18	3.42E-18	3.42E-18	3.42E-18	3.42E-18	3.42E-18
am244	6.89E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm242	4.94E-07	1.37E-07	3.84E-08	1.14E-08	3.97E-09	1.94E-09	1.38E-09
cm243	3.12E-17	3.05E-17	2.99E-17	2.93E-17	2.87E-17	2.82E-17	2.76E-17
cm244	3.95E-16	3.83E-16	3.71E-16	3.59E-16	3.48E-16	3.37E-16	3.27E-16
cm245	2.08E-27	2.08E-27	2.08E-27	2.08E-27	2.08E-27	2.08E-27	2.08E-27
cm246	3.47E-27	3.47E-27	3.47E-27	3.47E-27	3.47E-27	3.47E-27	3.47E-27
0 total	1.19E+05	1.19E+05	1.19E+05	1.19E+05	1.19E+05	1.19E+05	1.19E+05
0 total	1.38E+05	1.37E+05	1.37E+05	1.37E+05	1.37E+05	1.37E+05	1.37E+05

alpha-n neutron source spectrum as a function of time
 (using reaction spectra for uranium dioxide)

0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 alpha-n neutron spectra, neutrons/sec/basis
 basis = single reactor assembly

boundaries, mev	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
1	6.43E+00 - 2.00E+01	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	3.00E+00 - 6.43E+00	3.649E+03	3.642E+03	3.634E+03	3.626E+03	3.618E+03	3.610E+03
3	1.85E+00 - 3.00E+00	1.034E+04	1.032E+04	1.029E+04	1.027E+04	1.025E+04	1.023E+04
4	1.40E+00 - 1.85E+00	2.776E+03	2.771E+03	2.765E+03	2.759E+03	2.753E+03	2.747E+03
5	9.00E-01 - 1.40E+00	1.562E+03	1.559E+03	1.555E+03	1.552E+03	1.549E+03	1.545E+03
6	4.00E-01 - 9.00E-01	4.536E+02	4.528E+02	4.518E+02	4.508E+02	4.498E+02	4.488E+02
7	1.00E-01 - 4.00E-01	7.090E+01	7.076E+01	7.061E+01	7.045E+01	7.030E+01	7.015E+01

8	1.70E-02	- 1.00E-01	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
9	3.00E-03	- 1.70E-02	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
10	5.50E-04	- 3.00E-03	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
11	1.00E-04	- 5.50E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
12	3.00E-05	- 1.00E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
13	1.00E-05	- 3.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
14	3.05E-06	- 1.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
15	1.77E-06	- 3.05E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
16	1.30E-06	- 1.77E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
17	1.13E-06	- 1.30E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
18	1.00E-06	- 1.13E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
19	8.00E-07	- 1.00E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
20	4.00E-07	- 8.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
21	3.25E-07	- 4.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
22	2.25E-07	- 3.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
23	1.00E-07	- 2.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24	5.00E-08	- 1.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
25	3.00E-08	- 5.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26	1.00E-08	- 3.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
27	1.00E-11	- 1.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
0			1.885E+04	1.881E+04	1.877E+04	1.873E+04	1.869E+04	1.865E+04	1.861E+04			

spontaneous fission neutron source spectrum as a function of time

0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 spontaneous fission neutron spectra, neutrons/sec/basis
 basis = single reactor assembly

boundaries, mev	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d		
1	6.43E+00	- 2.00E+01	2.267E+03	2.267E+03	2.266E+03	2.265E+03	2.263E+03	2.261E+03	2.259E+03
2	3.00E+00	- 6.43E+00	2.485E+04	2.484E+04	2.484E+04	2.484E+04	2.484E+04	2.484E+04	2.484E+04
3	1.85E+00	- 3.00E+00	2.708E+04	2.707E+04	2.707E+04	2.706E+04	2.705E+04	2.704E+04	2.703E+04
4	1.40E+00	- 1.85E+00	1.534E+04	1.534E+04	1.534E+04	1.535E+04	1.536E+04	1.537E+04	1.538E+04
5	9.00E-01	- 1.40E+00	2.106E+04	2.106E+04	2.106E+04	2.106E+04	2.107E+04	2.109E+04	2.110E+04
6	4.00E-01	- 9.00E-01	2.347E+04	2.346E+04	2.346E+04	2.346E+04	2.345E+04	2.344E+04	2.343E+04
7	1.00E-01	- 4.00E-01	4.633E+03	4.633E+03	4.632E+03	4.630E+03	4.626E+03	4.621E+03	4.617E+03
8	1.70E-02	- 1.00E-01	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
9	3.00E-03	- 1.70E-02	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
10	5.50E-04	- 3.00E-03	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
11	1.00E-04	- 5.50E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
12	3.00E-05	- 1.00E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
13	1.00E-05	- 3.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
14	3.05E-06	- 1.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
15	1.77E-06	- 3.05E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
16	1.30E-06	- 1.77E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
17	1.13E-06	- 1.30E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
18	1.00E-06	- 1.13E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
19	8.00E-07	- 1.00E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
20	4.00E-07	- 8.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
21	3.25E-07	- 4.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
22	2.25E-07	- 3.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
23	1.00E-07	- 2.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24	5.00E-08	- 1.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
25	3.00E-08	- 5.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26	1.00E-08	- 3.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
27	1.00E-11	- 1.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
0			1.187E+05	1.187E+05	1.187E+05	1.187E+05	1.187E+05	1.187E+05	1.186E+05

total (alpha-n plus spon. fission) neutron source spectrum as a function of time

(using reaction spectra for uranium dioxide)

0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 neutron spectra, neutrons/sec/basis
 basis = single reactor assembly

boundaries, mev	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
1 6.43E+00 - 2.00E+01	2.267E+03	2.267E+03	2.266E+03	2.265E+03	2.263E+03	2.261E+03	2.259E+03
2 3.00E+00 - 6.43E+00	2.849E+04	2.849E+04	2.848E+04	2.847E+04	2.846E+04	2.845E+04	2.845E+04
3 1.85E+00 - 3.00E+00	3.741E+04	3.739E+04	3.737E+04	3.734E+04	3.730E+04	3.726E+04	3.723E+04
4 1.40E+00 - 1.85E+00	1.812E+04	1.811E+04	1.811E+04	1.811E+04	1.811E+04	1.812E+04	1.812E+04
5 9.00E-01 - 1.40E+00	2.262E+04	2.262E+04	2.261E+04	2.261E+04	2.262E+04	2.263E+04	2.264E+04
6 4.00E-01 - 9.00E-01	2.392E+04	2.392E+04	2.391E+04	2.391E+04	2.390E+04	2.388E+04	2.388E+04
7 1.00E-01 - 4.00E-01	4.704E+03	4.703E+03	4.702E+03	4.700E+03	4.696E+03	4.691E+03	4.687E+03
8 1.70E-02 - 1.00E-01	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
9 3.00E-03 - 1.70E-02	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
10 5.50E-04 - 3.00E-03	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
11 1.00E-04 - 5.50E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
12 3.00E-05 - 1.00E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
13 1.00E-05 - 3.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
14 3.05E-06 - 1.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
15 1.77E-06 - 3.05E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
16 1.30E-06 - 1.77E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
17 1.13E-06 - 1.30E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
18 1.00E-06 - 1.13E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
19 8.00E-07 - 1.00E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
20 4.00E-07 - 8.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
21 3.25E-07 - 4.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
22 2.25E-07 - 3.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
23 1.00E-07 - 2.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24 5.00E-08 - 1.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
25 3.00E-08 - 5.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26 1.00E-08 - 3.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
27 1.00E-11 - 1.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
0	1.375E+05	1.375E+05	1.374E+05	1.374E+05	1.374E+05	1.373E+05	1.373E+05

1 * gamma sources determined *
 0 case applies the following photon data base
 master photon library
 in binary mode
 0 the sources include photons of nuclides for...

light elements
 actinides
 fission products

1 gamma source spectrum for gamma lines (sas2)
 0 1826.25 day time of the requested nuclides
 0 energy interval in mev photons / second mev / second
 0

1.0000E-02 to	5.0000E-02	1.1389E+12	3.4166E+10
5.0000E-02 to	1.0000E-01	4.4703E+11	3.3528E+10
1.0000E-01 to	2.0000E-01	2.2869E+11	3.4304E+10
2.0000E-01 to	3.0000E-01	7.1950E+10	1.7988E+10
3.0000E-01 to	4.0000E-01	1.4071E+11	4.9249E+10
4.0000E-01 to	6.0000E-01	4.2383E+10	2.1191E+10
6.0000E-01 to	8.0000E-01	1.1773E+12	8.2409E+11
8.0000E-01 to	1.0000E+00	6.2471E+09	5.6224E+09
1.0000E+00 to	1.3300E+00	4.0598E+09	4.7297E+09
1.3300E+00 to	1.6600E+00	1.0379E+09	1.5517E+09

1.6600E+00 to	2.0000E+00	2.5559E+08	4.6772E+08
2.0000E+00 to	2.5000E+00	6.5386E+08	1.4712E+09
2.5000E+00 to	3.0000E+00	4.9296E+06	1.3556E+07
3.0000E+00 to	4.0000E+00	5.5379E+05	1.9383E+06
4.0000E+00 to	5.0000E+00	5.3567E+03	2.4105E+04
5.0000E+00 to	6.5000E+00	2.1440E+03	1.2328E+04
6.5000E+00 to	8.0000E+00	4.1954E+02	3.0417E+03
8.0000E+00 to	1.0000E+01	8.8927E+01	8.0034E+02
totals		3.2592E+12	1.0284E+12

0
0
0
0
1
0
0
1

total energy from nuclides with spectrum data = 1.0284E+12
total energy from nuclides with no spectrum data = 2.3297E+05

.results on logical unit no. 71, position 2, for time step 6, subcase 7. (run position 1, case position 2)
title: sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2

.terminated logical unit no. 71 with zero flag record.

* normal termination of execution *

1 primary module access and input record (scale driver - 95/03/29 - 09:06:37)

- module sas2h will be called
 SAS2H: Far-Field Crit based on B&W 15x15, 3.00wt%, 20gwd/mtu 40% H2O/ 8% UO2
 44group latticecell

' mixtures of tuff infinite slabs:

arbm-ftuff 2.6344 14 0 0 0 1001 1.055 8016 40.755 11023 0.570 12000 0.354
 13027 4.434 14000 20.193 19000 1.370 20000 1.439
 26000 0.494 92235 0.567 92234 0.007 92236 0.136
 92238 28.593 93237 0.033 1 1.0 538 end

kr-83 1 0 1-20 538 end
 kr-85 1 0 1-20 538 end
 sr-90 1 0 1-20 538 end
 y-89 1 0 1-20 538 end
 mo-95 1 0 1-20 538 end
 zr-93 1 0 1-20 538 end
 zr-94 1 0 1-20 538 end
 zr-95 1 0 1-20 538 end
 nb-94 1 0 1-20 538 end
 tc-99 1 0 1-20 538 end
 rh-103 1 0 1-20 538 end
 rh-105 1 0 1-20 538 end
 ru-101 1 0 1-20 538 end
 ru-106 1 0 1-20 538 end
 pd-105 1 0 1-20 538 end
 pd-108 1 0 1-20 538 end
 ag-109 1 0 1-20 538 end
 sb-124 1 0 1-20 538 end
 xe-131 1 0 1-20 538 end
 xe-132 1 0 1-20 538 end
 xe-135 1 0 1-20 538 end
 xe-136 1 0 1-20 538 end
 cs-134 1 0 1-20 538 end
 cs-135 1 0 1-20 538 end
 cs-137 1 0 1-20 538 end
 ba-136 1 0 1-20 538 end
 la-139 1 0 1-20 538 end
 pr-141 1 0 1-20 538 end
 pr-143 1 0 1-20 538 end
 ce-144 1 0 1-20 538 end
 nd-143 1 0 1-20 538 end
 nd-145 1 0 1-20 538 end
 pm-147 1 0 1-20 538 end
 pm-148 1 0 1-20 538 end
 nd-147 1 0 1-20 538 end
 sm-147 1 0 1-20 538 end
 sm-149 1 0 1-20 538 end
 sm-150 1 0 1-20 538 end
 sm-151 1 0 1-20 538 end
 sm-152 1 0 1-20 538 end
 gd-155 1 0 1-20 538 end
 eu-153 1 0 1-20 538 end
 eu-154 1 0 1-20 538 end
 eu-155 1 0 1-20 538 end

arbm-tuff1 1.90533 9 0 0 0 1001 2.326 8016 57.779 11023 0.789 12000 0.490
 13027 6.130 14000 27.919 19000 1.894 20000 1.989
 26000 0.683 2 1.0 323. end
 arbm-tuff2 1.90533 9 0 0 0 1001 2.326 8016 57.779 11023 0.789 12000 0.490
 13027 6.130 14000 27.919 19000 1.894 20000 1.989
 26000 0.683 3 1.0 323. end

end comp

fuel-pin-cell geometry:

symmslabcell 340. 280. 1 3 281. 2 end

assembly and cycle parameters:

npin/assm=1 fuelngth=280. ncycles=1 nlib/cyc=5 volfueltot=1.1494E7
printlevel=6 inplevel=0 end
power=0.004 burn=3.6525e4 down=1.82625e3
end

```

1  oooooooooo  rrrrrrrrrrr  iiiiiiiiiii  ggggggggggg  eeeeeeeeeee  nn          nn  sssssssssss
   oooooooooo  rrrrrrrrrrr  iiiiiiiiiii  ggggggggggg  eeeeeeeeeee  nnn        nn  sssssssssss
   oo         oo  rr         rr  ii            gg         gg  ee            nnnn       nn  ss          ss
   oo         oo  rr         rr  ii            gg         gg  ee            nn nn      nn  ss          ss
   oo         oo  rr         rr  ii            gg         gg  ee            nn   nn   nn  ss          ss
   oo         oo  rrrrrrrrrrr  ii            gg         ggggggg  eeeeeeeee  nn   nn   nn  sssssssssss
   oo         oo  rrrrrrrrrrr  ii            gg         ggggggg  eeeeeeeee  nn   nn   nn  sssssssssss
   oo         oo  rr         rr  ii            gg         gg  ee            nn   nn   nn  ss          ss
   oo         oo  rr         rr  ii            gg         gg  ee            nn   nn   nn  ss          ss
   oo         oo  rr         rr  ii            gg         gg  ee            nn   nnnn  ss          ss
   oooooooooo  rr         rr  iiiiiiiiiii  ggggggggggg  eeeeeeeeeee  nn          nnn  sssssssssss
   oooooooooo  rr         rr  iiiiiiiiiii  ggggggggggg  eeeeeeeeeee  nn          nn  sssssssssss
0

```

```

   ddddddddddd  aaaaaaaaa  vv          vv  iiiiiiiiiii  sssssssssss
   ddddddddddd  aaaaaaaaa  vv          vv  iiiiiiiiiii  sssssssssss
   dd         dd  aa         aa  vv          vv  ii            ss          ss
   dd         dd  aa         aa  vv          vv  ii            ss
   dd         dd  aa         aa  vv          vv  ii            ss
   dd         dd  aaaaaaaaa  vv          vv  ii            sssssssssss
   dd         dd  aaaaaaaaa  vv          vv  ii            sssssssssss
   dd         dd  aa         aa  vv          vv  ii            ss
   dd         dd  aa         aa  vv          vv  ii            ss
   dd         dd  aa         aa  vv          vv  ii            ss
   dd         dd  aa         aa  vv          vv  ii            ss
   ddddddddddd  aa         aa  vv          vv  iiiiiiiiiii  sssssssssss
   ddddddddddd  aa         aa  v          iiiiiiiiiii  sssssssssss
0

```

```

   0000000  8888888888  //  2222222222  8888888888  //  9999999999  6666666666
   00000000 888888888888 222222222222 888888888888 999999999999 666666666666
   00         00 88         88 22         22 88         88 99         99 66
   00         00 88         88 22         22 88         88 99         99 66
   00         00 88         88 22         22 88         88 99         99 66
   00         00 8888888888 22         22 8888888888 999999999999 666666666666
   00         00 8888888888 22         22 8888888888 999999999999 666666666666
   00         00 88         88 22         22 88         88 99         99 66         66
   00         00 88         88 22         22 88         88 99         99 66         66
   00         00 88         88 22         22 88         88 99         99 66         66
   00000000 888888888888 //  222222222222 888888888888 //  999999999999 666666666666
   00000000 888888888888 222222222222 888888888888 999999999999 666666666666

```


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 densities
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 densities
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 8/28/1996 date library was produced
0 1697 total number of nuclides in library
0 689 number of light-element nuclides
0 129 number of actinide nuclides
0 879 number of fission product nuclides
0 7993 number of nonzero off-diagonal matrix elements
0 *****
1

```

```

0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 1
0 nuclide concentrations, grams
0 basis =single reactor assembly

```

	initial	1E-18 d
na 23	1.73E+05	1.73E+05
al 27	1.35E+06	1.35E+06
total	1.52E+06	1.52E+06

```

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 2
0 nuclide concentrations, grams
0 basis =single reactor assembly

```

	initial	1E-18 d
u234	2.12E+03	2.12E+03
u235	1.72E+05	1.72E+05
u236	4.12E+04	4.12E+04
u238	8.66E+06	8.66E+06
np237	9.99E+03	9.99E+03
total	8.88E+06	8.88E+06

```

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 page 3
0 power= .00mw, burnup= 29.mwd, flux= 3.00E+08n/cm**2-sec
0 basis =

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(note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)

	initial	1826.3 d	3652.5 d	5478.8 d	7305.0 d	7305.1 d
productions	1.023168E+06	1.023204E+06	1.023241E+06	1.023278E+06	1.023315E+06	1.023315E+06
absorptions	8.460999E+05	8.461583E+05	8.462148E+05	8.462709E+05	8.463270E+05	8.463269E+05
k infinity	1.209275E+00	1.209235E+00	1.209198E+00	1.209161E+00	1.209125E+00	1.209125E+00
actinide						
absorptions	8.423347E+05	8.423564E+05	8.423781E+05	8.423998E+05	8.424216E+05	8.424216E+05
non-actinide						
abs. fracs.	4.450142E-03	4.493117E-03	4.533887E-03	4.574358E-03	4.614592E-03	4.614472E-03

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1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 4
0 fraction of total absorption rate
0 power= .00mw, burnup= 29.mwd, flux= 3.00E+08n/cm**2-sec
0 initial 1826.3 d 3652.5 d 5478.8 d 7305.0 d 7305.1 d

```

sm149	.00E+00	3.63E-05	7.24E-05	1.08E-04	1.44E-04	1.44E-04
sm151	.00E+00	1.51E-06	2.96E-06	4.36E-06	5.70E-06	5.70E-06
nd143	.00E+00	7.23E-07	1.45E-06	2.19E-06	2.92E-06	2.92E-06
xe135	.00E+00	2.28E-06	2.28E-06	2.28E-06	2.28E-06	2.24E-06
gd157	.00E+00	3.72E-07	7.41E-07	1.11E-06	1.47E-06	1.47E-06
rh103	.00E+00	3.35E-07	6.81E-07	1.03E-06	1.37E-06	1.37E-06
gd155	.00E+00	1.44E-07	4.69E-07	8.80E-07	1.33E-06	1.33E-06
cd113	.00E+00	3.17E-07	6.34E-07	9.49E-07	1.26E-06	1.26E-06
xe131	.00E+00	2.35E-07	4.72E-07	7.09E-07	9.46E-07	9.46E-07
cs133	.00E+00	1.83E-07	3.67E-07	5.51E-07	7.35E-07	7.35E-07
tc 99	.00E+00	1.36E-07	2.71E-07	4.07E-07	5.43E-07	5.43E-07
sm147	.00E+00	6.04E-08	1.77E-07	3.08E-07	4.43E-07	4.43E-07
nd145	.00E+00	1.04E-07	2.08E-07	3.12E-07	4.16E-07	4.16E-07

eu151	.00E+00	2.17E-08	8.55E-08	1.90E-07	3.33E-07	3.33E-07
mo 95	.00E+00	6.69E-08	1.39E-07	2.12E-07	2.85E-07	2.85E-07
pm147	.00E+00	2.00E-07	2.54E-07	2.69E-07	2.73E-07	2.73E-07
sm152	.00E+00	5.55E-08	1.11E-07	1.67E-07	2.22E-07	2.22E-07
kr 83	.00E+00	4.45E-08	8.91E-08	1.34E-07	1.78E-07	1.78E-07
cs135	.00E+00	4.12E-08	8.24E-08	1.24E-07	1.65E-07	1.65E-07
eu155	.00E+00	8.33E-08	1.23E-07	1.42E-07	1.51E-07	1.51E-07
ru101	.00E+00	3.25E-08	6.50E-08	9.74E-08	1.30E-07	1.30E-07
pr141	.00E+00	2.97E-08	6.01E-08	9.05E-08	1.21E-07	1.21E-07
eu153	.00E+00	2.78E-08	5.57E-08	8.35E-08	1.11E-07	1.11E-07
la139	.00E+00	2.48E-08	4.96E-08	7.45E-08	9.93E-08	9.93E-08
pd105	.00E+00	1.06E-08	2.13E-08	3.20E-08	4.26E-08	4.26E-08
zr 93	.00E+00	1.03E-08	2.06E-08	3.08E-08	4.11E-08	4.11E-08
i129	.00E+00	7.63E-09	1.53E-08	2.30E-08	3.06E-08	3.06E-08
nd144	.00E+00	5.77E-09	1.32E-08	2.06E-08	2.80E-08	2.80E-08
mo 97	.00E+00	5.64E-09	1.13E-08	1.69E-08	2.26E-08	2.26E-08
ag109	.00E+00	4.03E-09	8.06E-09	1.21E-08	1.62E-08	1.62E-08
zr 91	.00E+00	2.54E-09	5.20E-09	7.86E-09	1.05E-08	1.05E-08
y 89	.00E+00	2.44E-09	4.98E-09	7.52E-09	1.01E-08	1.01E-08
ba137	.00E+00	6.58E-10	2.53E-09	5.49E-09	9.41E-09	9.41E-09
ru102	.00E+00	2.29E-09	4.58E-09	6.87E-09	9.16E-09	9.16E-09
rh105	.00E+00	8.28E-09	8.28E-09	8.28E-09	8.28E-09	8.25E-09
ce142	.00E+00	2.05E-09	4.11E-09	6.16E-09	8.21E-09	8.21E-09
nd148	.00E+00	1.99E-09	3.99E-09	5.98E-09	7.98E-09	7.98E-09
nd146	.00E+00	1.66E-09	3.32E-09	4.98E-09	6.65E-09	6.65E-09
sr 90	.00E+00	1.97E-09	3.71E-09	5.24E-09	6.60E-09	6.60E-09
ba138	.00E+00	1.42E-09	2.83E-09	4.25E-09	5.66E-09	5.66E-09
in115	.00E+00	1.38E-09	2.76E-09	4.15E-09	5.53E-09	5.53E-09
pd108	.00E+00	1.38E-09	2.75E-09	4.13E-09	5.51E-09	5.51E-09
ce140	.00E+00	1.31E-09	2.64E-09	3.96E-09	5.29E-09	5.29E-09
xe132	.00E+00	1.21E-09	2.42E-09	3.62E-09	4.83E-09	4.83E-09
mo 98	.00E+00	8.46E-10	1.69E-09	2.54E-09	3.38E-09	3.38E-09
mo100	.00E+00	8.09E-10	1.62E-09	2.43E-09	3.24E-09	3.24E-09
pd107	.00E+00	7.97E-10	1.59E-09	2.39E-09	3.19E-09	3.19E-09
xe134	.00E+00	7.85E-10	1.57E-09	2.35E-09	3.14E-09	3.14E-09
sm150	.00E+00	1.93E-10	7.70E-10	1.73E-09	3.06E-09	3.06E-09

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 0 fraction of total absorption rate
 0 power= .00mw, burnup= 29.mwd, flux= 3.00E+08n/cm**2-sec
 initial 1826.3 d 3652.5 d 5478.8 d 7305.0 d 7305.1 d

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pr143	.00E+00	2.66E-09	2.66E-09	2.66E-09	2.66E-09	2.66E-09
zr 92	.00E+00	6.38E-10	1.28E-09	1.91E-09	2.55E-09	2.55E-09
i127	.00E+00	5.14E-10	1.04E-09	1.56E-09	2.09E-09	2.09E-09
zr 96	.00E+00	5.21E-10	1.04E-09	1.56E-09	2.08E-09	2.08E-09
xe133	.00E+00	1.99E-09	1.99E-09	1.99E-09	1.99E-09	1.99E-09
ru104	.00E+00	4.96E-10	9.93E-10	1.49E-09	1.99E-09	1.99E-09
nd150	.00E+00	4.44E-10	8.88E-10	1.33E-09	1.78E-09	1.78E-09
xe136	.00E+00	4.25E-10	8.49E-10	1.27E-09	1.70E-09	1.70E-09
ce141	.00E+00	1.58E-09	1.58E-09	1.58E-09	1.58E-09	1.58E-09
cs137	.00E+00	4.13E-10	7.81E-10	1.11E-09	1.40E-09	1.40E-09
br 81	.00E+00	3.23E-10	6.46E-10	9.68E-10	1.29E-09	1.29E-09
rb 85	.00E+00	2.57E-10	5.30E-10	8.14E-10	1.11E-09	1.11E-09
zr 94	.00E+00	2.76E-10	5.51E-10	8.26E-10	1.10E-09	1.10E-09
pm149	.00E+00	9.62E-10	9.62E-10	9.62E-10	9.62E-10	9.55E-10
nd147	.00E+00	9.44E-10	9.44E-10	9.44E-10	9.44E-10	9.40E-10
cd111	.00E+00	2.04E-10	4.10E-10	6.16E-10	8.23E-10	8.23E-10
te130	.00E+00	1.92E-10	3.85E-10	5.77E-10	7.69E-10	7.69E-10
sm154	.00E+00	1.88E-10	3.75E-10	5.63E-10	7.50E-10	7.50E-10
rb 87	.00E+00	1.82E-10	3.65E-10	5.47E-10	7.29E-10	7.29E-10

ce144	.00E+00	5.93E-10	6.00E-10	6.00E-10	6.00E-10	5.99E-10
se 77	.00E+00	1.27E-10	2.54E-10	3.82E-10	5.09E-10	5.09E-10
kr 85	.00E+00	1.57E-10	2.71E-10	3.53E-10	4.13E-10	4.13E-10
ru103	.00E+00	3.56E-10	3.56E-10	3.56E-10	3.56E-10	3.56E-10
kr 84	.00E+00	8.70E-11	1.74E-10	2.61E-10	3.48E-10	3.48E-10
pd106	.00E+00	6.65E-11	1.59E-10	2.52E-10	3.45E-10	3.45E-10
se 79	.00E+00	6.52E-11	1.30E-10	1.96E-10	2.61E-10	2.61E-10
sb121	.00E+00	6.31E-11	1.26E-10	1.89E-10	2.53E-10	2.53E-10
zr 90	.00E+00	1.48E-11	5.70E-11	1.23E-10	2.11E-10	2.11E-10
sb123	.00E+00	5.10E-11	1.03E-10	1.54E-10	2.06E-10	2.06E-10
kr 86	.00E+00	4.73E-11	9.47E-11	1.42E-10	1.89E-10	1.89E-10
te128	.00E+00	4.26E-11	8.53E-11	1.28E-10	1.71E-10	1.71E-10
zr 95	.00E+00	1.68E-10	1.68E-10	1.68E-10	1.68E-10	1.68E-10
nb 95	.00E+00	1.53E-10	1.53E-10	1.53E-10	1.53E-10	1.53E-10
y 91	.00E+00	1.42E-10	1.42E-10	1.42E-10	1.42E-10	1.42E-10
gd156	.00E+00	3.28E-11	6.62E-11	9.98E-11	1.34E-10	1.34E-10
se 80	.00E+00	3.05E-11	6.10E-11	9.14E-11	1.22E-10	1.22E-10
dy161	.00E+00	2.64E-11	5.31E-11	7.98E-11	1.07E-10	1.07E-10
pm151	.00E+00	1.09E-10	1.09E-10	1.09E-10	1.09E-10	1.05E-10
te125	.00E+00	1.16E-11	3.43E-11	6.02E-11	8.69E-11	8.69E-11
tb159	.00E+00	1.82E-11	3.65E-11	5.48E-11	7.31E-11	7.31E-11
cd112	.00E+00	1.74E-11	3.48E-11	5.22E-11	6.96E-11	6.96E-11
li 6	.00E+00	1.73E-11	3.46E-11	5.19E-11	6.92E-11	6.92E-11
sn117	.00E+00	1.38E-11	2.76E-11	4.14E-11	5.52E-11	5.52E-11
ba140	.00E+00	4.72E-11	4.72E-11	4.72E-11	4.72E-11	4.70E-11
sn119	.00E+00	1.13E-11	2.25E-11	3.38E-11	4.51E-11	4.51E-11
sn115	.00E+00	1.03E-11	2.06E-11	3.09E-11	4.12E-11	4.12E-11
sm153	.00E+00	3.80E-11	3.80E-11	3.80E-11	3.80E-11	3.70E-11
sr 88	.00E+00	8.72E-12	1.74E-11	2.61E-11	3.49E-11	3.49E-11
eu154	.00E+00	4.71E-12	1.26E-11	2.26E-11	3.40E-11	3.40E-11

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2

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0 power= .00mw, burnup= fraction of total absorption rate
 0 initial 1826.3 d 3652.5 d 5478.8 d 7305.0 d 7305.1 d

eu156	.00E+00	3.38E-11	3.39E-11	3.39E-11	3.39E-11	3.39E-11
sr 89	.00E+00	3.04E-11	3.04E-11	3.04E-11	3.04E-11	3.03E-11
ru106	.00E+00	2.50E-11	2.58E-11	2.58E-11	2.59E-11	2.58E-11
pd110	.00E+00	6.32E-12	1.26E-11	1.90E-11	2.53E-11	2.53E-11
cd114	.00E+00	6.18E-12	1.24E-11	1.86E-11	2.49E-11	2.49E-11
eu152	.00E+00	4.70E-13	3.46E-12	1.09E-11	2.41E-11	2.41E-11
gd158	.00E+00	5.76E-12	1.16E-11	1.77E-11	2.38E-11	2.38E-11
se 82	.00E+00	5.91E-12	1.18E-11	1.77E-11	2.36E-11	2.36E-11
sn126	.00E+00	4.71E-12	9.42E-12	1.41E-11	1.88E-11	1.88E-11
se 78	.00E+00	4.52E-12	9.03E-12	1.35E-11	1.81E-11	1.81E-11
ce143	.00E+00	1.74E-11	1.74E-11	1.74E-11	1.74E-11	1.68E-11
la140	.00E+00	1.54E-11	1.54E-11	1.54E-11	1.54E-11	1.54E-11
sb125	.00E+00	1.08E-11	1.38E-11	1.46E-11	1.49E-11	1.49E-11
sn124	.00E+00	3.68E-12	7.37E-12	1.11E-11	1.47E-11	1.47E-11
dy162	.00E+00	3.49E-12	7.01E-12	1.05E-11	1.41E-11	1.41E-11
mo 99	.00E+00	1.32E-11	1.32E-11	1.32E-11	1.32E-11	1.29E-11
dy164	.00E+00	3.13E-12	6.27E-12	9.44E-12	1.26E-11	1.26E-11
as 75	.00E+00	2.69E-12	5.39E-12	8.08E-12	1.08E-11	1.08E-11
pm148m	.00E+00	7.01E-12	8.99E-12	9.52E-12	9.66E-12	9.65E-12
kr 87	.00E+00	2.26E-11	2.26E-11	2.26E-11	2.26E-11	8.03E-12
te127m	.00E+00	7.36E-12	7.36E-12	7.36E-12	7.36E-12	7.36E-12
i131	.00E+00	6.77E-12	6.77E-12	6.77E-12	6.77E-12	6.75E-12
y 90	.00E+00	1.87E-12	3.52E-12	4.98E-12	6.27E-12	6.27E-12
sn118	.00E+00	1.51E-12	3.03E-12	4.54E-12	6.05E-12	6.05E-12
ba136	.00E+00	1.42E-12	2.87E-12	4.32E-12	5.77E-12	5.77E-12

ru 99	.00E+00	8.61E-13	2.07E-12	3.63E-12	5.54E-12	5.54E-12
cs134	.00E+00	1.07E-12	2.39E-12	3.76E-12	5.13E-12	5.13E-12
cd116	.00E+00	1.28E-12	2.55E-12	3.83E-12	5.10E-12	5.10E-12
sn122	.00E+00	1.25E-12	2.49E-12	3.74E-12	4.98E-12	4.98E-12
sn120	.00E+00	9.38E-13	1.88E-12	2.81E-12	3.75E-12	3.75E-12
kr 82	.00E+00	7.81E-13	1.57E-12	2.36E-12	3.15E-12	3.15E-12
dy163	.00E+00	7.69E-13	1.54E-12	2.32E-12	3.11E-12	3.11E-12
in113	.00E+00	2.30E-13	8.51E-13	1.78E-12	2.95E-12	2.95E-12
ge 73	.00E+00	7.28E-13	1.46E-12	2.18E-12	2.91E-12	2.91E-12
xe130	.00E+00	4.78E-13	9.60E-13	1.45E-12	1.94E-12	1.94E-12
te129m	.00E+00	1.78E-12	1.78E-12	1.78E-12	1.78E-12	1.78E-12
gd152	.00E+00	2.62E-14	2.11E-13	7.25E-13	1.75E-12	1.75E-12
mo 96	.00E+00	3.45E-13	7.00E-13	1.06E-12	1.44E-12	1.44E-12
ge 76	.00E+00	2.66E-13	5.32E-13	7.99E-13	1.06E-12	1.06E-12
ru100	.00E+00	9.50E-14	2.51E-13	4.67E-13	7.45E-13	7.45E-13
gd154	.00E+00	2.69E-14	1.39E-13	3.69E-13	7.43E-13	7.43E-13
gd160	.00E+00	1.69E-13	3.38E-13	5.07E-13	6.77E-13	6.77E-13
te126	.00E+00	1.29E-13	2.60E-13	3.91E-13	5.24E-13	5.24E-13
sm148	.00E+00	3.96E-14	1.37E-13	2.79E-13	4.60E-13	4.60E-13
pm148	.00E+00	2.80E-13	3.56E-13	3.77E-13	3.82E-13	3.78E-13
nd142	.00E+00	2.10E-14	8.38E-14	1.88E-13	3.35E-13	3.35E-13
ag111	.00E+00	3.20E-13	3.21E-13	3.21E-13	3.21E-13	3.20E-13
ba134	.00E+00	1.50E-14	6.69E-14	1.59E-13	2.93E-13	2.93E-13
ba135	.00E+00	1.99E-14	7.28E-14	1.59E-13	2.78E-13	2.78E-13

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fraction of total absorption rate

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0 power= .00mw, burnup= 29.mwd, flux= 3.00E+08n/cm**2-sec

0 initial 1826.3 d 3652.5 d 5478.8 d 7305.0 d 7305.1 d

eu157	.00E+00	2.95E-13	2.96E-13	2.96E-13	2.96E-13	2.74E-13
cd115m	.00E+00	2.35E-13	2.35E-13	2.35E-13	2.35E-13	2.35E-13
pd104	.00E+00	1.39E-14	5.63E-14	1.27E-13	2.27E-13	2.27E-13
ho165	.00E+00	5.28E-14	1.06E-13	1.59E-13	2.13E-13	2.13E-13
te124	.00E+00	2.93E-14	6.00E-14	9.08E-14	1.22E-13	1.22E-13
sr 87	.00E+00	3.04E-14	6.08E-14	9.12E-14	1.22E-13	1.22E-13
nb 94	.00E+00	1.75E-14	3.51E-14	5.26E-14	7.01E-14	7.01E-14
ge 74	.00E+00	1.47E-14	2.93E-14	4.40E-14	5.86E-14	5.86E-14
cs136	.00E+00	5.60E-14	5.61E-14	5.63E-14	5.64E-14	5.62E-14
ge 72	.00E+00	9.81E-15	1.96E-14	2.95E-14	3.93E-14	3.93E-14
sr 86	.00E+00	8.48E-15	1.71E-14	2.59E-14	3.47E-14	3.47E-14
cd110	.00E+00	2.77E-15	9.38E-15	1.97E-14	3.37E-14	3.37E-14
sn125	.00E+00	2.94E-14	2.94E-14	2.94E-14	2.94E-14	2.92E-14
ru105	.00E+00	3.00E-14	3.00E-14	3.00E-14	3.00E-14	2.30E-14
se 76	.00E+00	5.69E-15	1.14E-14	1.71E-14	2.29E-14	2.29E-14
br 79	.00E+00	1.37E-15	5.44E-15	1.22E-14	2.16E-14	2.16E-14
xe129	.00E+00	7.62E-16	3.05E-15	6.86E-15	1.22E-14	1.22E-14
ag107	.00E+00	7.08E-16	2.83E-15	6.37E-15	1.13E-14	1.13E-14
sn123	.00E+00	1.03E-14	1.03E-14	1.03E-14	1.03E-14	1.03E-14
nb 93	.00E+00	2.00E-16	1.42E-15	4.49E-15	1.01E-14	1.01E-14
te132	.00E+00	9.49E-15	9.49E-15	9.49E-15	9.49E-15	9.34E-15
rb 88	.00E+00	1.27E-14	1.27E-14	1.27E-14	1.27E-14	8.70E-15
i135	.00E+00	1.00E-14	1.00E-14	1.00E-14	1.00E-14	8.18E-15
xe128	.00E+00	1.43E-15	3.02E-15	4.75E-15	6.63E-15	6.63E-15
dy160	.00E+00	1.16E-15	2.58E-15	4.19E-15	6.01E-15	6.01E-15
er166	.00E+00	1.37E-15	2.77E-15	4.19E-15	5.64E-15	5.64E-15
sb126	.00E+00	2.99E-15	3.00E-15	3.01E-15	3.02E-15	3.01E-15
sb124	.00E+00	2.10E-15	2.11E-15	2.11E-15	2.11E-15	2.11E-15
in117m	.00E+00	2.07E-15	2.07E-15	2.07E-15	2.07E-15	1.82E-15
kr 80	.00E+00	4.12E-16	8.25E-16	1.24E-15	1.65E-15	1.65E-15
te134	.00E+00	5.77E-15	5.77E-15	5.77E-15	5.77E-15	8.55E-16

	i130	.00E+00	7.17E-16	7.23E-16	7.30E-16	7.36E-16	6.63E-16			
	sn116	.00E+00	4.53E-17	1.51E-16	3.17E-16	5.43E-16	5.43E-16			
	in117	.00E+00	6.07E-16	6.07E-16	6.08E-16	6.08E-16	5.40E-16			
	tb160	.00E+00	3.46E-16	3.98E-16	4.49E-16	5.01E-16	5.01E-16			
	te122	.00E+00	6.63E-17	1.57E-16	2.73E-16	4.14E-16	4.14E-16			
	rb 86	.00E+00	2.41E-16	2.43E-16	2.45E-16	2.47E-16	2.46E-16			
	be 9	.00E+00	3.42E-17	6.84E-17	1.03E-16	1.37E-16	1.37E-16			
	pr142	.00E+00	3.44E-17	6.91E-17	1.04E-16	1.38E-16	1.29E-16			
	dy165	.00E+00	2.10E-16	2.11E-16	2.12E-16	2.14E-16	1.24E-16			
	te123	.00E+00	2.75E-17	5.73E-17	8.73E-17	1.17E-16	1.17E-16			
	li 7	.00E+00	1.33E-17	2.66E-17	4.00E-17	5.33E-17	5.33E-17			
	ge 75	.00E+00	8.51E-17	8.51E-17	8.51E-17	8.51E-17	3.34E-17			
	cd118	.00E+00	1.19E-16	1.19E-16	1.19E-16	1.19E-16	2.44E-17			
	er167	.00E+00	5.52E-18	1.14E-17	1.76E-17	2.41E-17	2.41E-17			
	cd108	.00E+00	2.76E-19	5.55E-19	8.45E-19	1.14E-18	1.14E-18			
	cs134m	.00E+00	2.56E-19	5.12E-19	7.68E-19	1.02E-18	6.49E-19			
	in119m	.00E+00	2.97E-17	2.97E-17	2.97E-17	2.97E-17	4.16E-19			
	cd109	.00E+00	1.76E-19	1.96E-19	2.06E-19	2.13E-19	2.13E-19			
1	sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2							fission products	page	8
0	fraction of total absorption rate									
	power=	.00mw,	burnup=	29.mwd,	flux=	3.00E+08n/cm**2-sec				
0	initial	1826.3 d	3652.5 d	5478.8 d	7305.0 d	7305.1 d				
	sn114	.00E+00	3.33E-21	1.33E-20	2.66E-20	4.66E-20	4.66E-20			
1	sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2							light elements	page	9
0	power= 4.000E-03mw, burnup=2.9220E+01mwd, flux= 3.00E+08n/cm**2-sec									
	nuclide concentrations, gram atoms									
	basis = single reactor assembly									
	charge	1826.3 d	3652.5 d	5478.8 d	7305.0 d	7305.1 d				
	h 1	.00E+00	4.41E-07	8.81E-07	1.32E-06	1.76E-06	1.76E-06			
	h 2	.00E+00	1.31E-09	2.61E-09	3.92E-09	5.22E-09	5.22E-09			
	h 3	.00E+00	8.35E-12	1.47E-11	1.94E-11	2.30E-11	2.30E-11			
	h 4	.00E+00	3.38E-35	5.93E-35	7.85E-35	9.30E-35	.00E+00			
	he 3	.00E+00	1.23E-12	4.50E-12	9.32E-12	1.53E-11	1.53E-11			
	he 4	.00E+00	7.28E-08	1.46E-07	2.18E-07	2.91E-07	2.91E-07			
	he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00			
	ne 20	.00E+00	8.74E-09	1.75E-08	2.62E-08	3.50E-08	3.50E-08			
	ne 21	.00E+00	1.58E-15	6.32E-15	1.42E-14	2.53E-14	2.53E-14			
	ne 22	.00E+00	2.56E-11	7.43E-11	1.29E-10	1.85E-10	1.86E-10			
	ne 23	.00E+00	7.28E-15	7.28E-15	7.28E-15	7.28E-15	7.28E-30			
	na 22	.00E+00	3.15E-11	3.98E-11	4.20E-11	4.26E-11	4.26E-11			
	na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03			
	na 24	.00E+00	3.64E-08	3.64E-08	3.64E-08	3.64E-08	3.33E-08			
	na 24m	.00E+00	5.99E-15	5.99E-15	5.99E-15	5.99E-15	5.99E-30			
	na 25	.00E+00	2.93E-28	5.94E-28	9.05E-28	1.22E-27	1.21E-42			
	mg 24	.00E+00	7.55E-05	1.51E-04	2.27E-04	3.02E-04	3.02E-04			
	mg 25	.00E+00	9.73E-12	1.98E-11	3.01E-11	4.07E-11	4.07E-11			
	mg 26	.00E+00	1.31E-09	2.61E-09	3.92E-09	5.22E-09	5.22E-09			
	mg 27	.00E+00	2.18E-12	2.18E-12	2.18E-12	2.18E-12	4.70E-16			
	mg 28	.00E+00	4.41E-24	4.41E-24	4.41E-24	4.41E-24	4.14E-24			
	al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04			
	al 28	.00E+00	2.70E-10	2.70E-10	2.70E-10	2.70E-10	3.67E-25			
	al 29	.00E+00	3.80E-28	1.52E-27	3.42E-27	6.08E-27	3.18E-32			
	al 30	.00E+00	3.49E-41	2.79E-40	9.42E-40	2.23E-39	.00E+00			
	si 28	.00E+00	2.20E-04	4.40E-04	6.59E-04	8.79E-04	8.79E-04			
	si 29	.00E+00	1.41E-12	5.64E-12	1.27E-11	2.26E-11	2.26E-11			
	si 30	.00E+00	9.70E-21	7.76E-20	2.62E-19	6.21E-19	6.21E-19			
	si 31	.00E+00	6.95E-33	5.56E-32	1.88E-31	4.45E-31	2.68E-31			
	si 32	.00E+00	6.12E-41	9.75E-40	4.92E-39	1.55E-38	1.55E-38			

0 totals 5.75E+04 5.75E+04 5.75E+04 5.75E+04 5.75E+04 5.75E+04
 1 flux 3.00E+08 3.00E+08 3.00E+08 3.00E+08 3.00E+08 3.00E+07

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 0 power= 4.000E-03mw, burnup=2.9220E+01mwd, flux= 3.00E+08n/cm**2-sec

actinides page 10

nuclide concentrations, gram atoms
 basis = single reactor assembly

	charge	1826.3 d	3652.5 d	5478.8 d	7305.0 d	7305.1 d
he 4	.00E+00	2.74E-04	5.87E-04	9.39E-04	1.33E-03	1.33E-03
pb206	.00E+00	7.11E-14	1.14E-12	5.75E-12	1.79E-11	1.79E-11
pb207	.00E+00	9.49E-12	7.37E-11	2.41E-10	5.52E-10	5.52E-10
pb208	.00E+00	3.81E-12	3.76E-11	1.26E-10	2.81E-10	2.81E-10
pb209	.00E+00	3.42E-17	1.38E-16	3.12E-16	5.56E-16	5.60E-16
pb210	.00E+00	2.03E-12	1.57E-11	5.10E-11	1.17E-10	1.17E-10
pb211	.00E+00	5.69E-16	2.16E-15	4.64E-15	7.85E-15	7.85E-15
pb212	.00E+00	4.63E-15	2.05E-14	4.22E-14	6.61E-14	6.61E-14
pb214	.00E+00	9.34E-17	3.73E-16	8.40E-16	1.49E-15	1.45E-15
ra222	.00E+00	1.76E-28	5.20E-28	9.13E-28	1.32E-27	1.32E-27
ra223	.00E+00	2.59E-13	9.87E-13	2.11E-12	3.58E-12	3.58E-12
ra224	.00E+00	3.82E-14	1.69E-13	3.49E-13	5.46E-13	5.46E-13
ra225	.00E+00	3.74E-15	1.51E-14	3.41E-14	6.08E-14	6.08E-14
ra226	.00E+00	2.93E-09	1.17E-08	2.64E-08	4.68E-08	4.68E-08
ra228	.00E+00	2.63E-15	8.85E-15	1.70E-14	2.63E-14	2.63E-14
ac225	.00E+00	2.53E-15	1.02E-14	2.31E-14	4.11E-14	4.11E-14
ac227	.00E+00	1.80E-10	6.86E-10	1.47E-09	2.49E-09	2.49E-09
ac228	.00E+00	3.21E-19	1.08E-18	2.08E-18	3.21E-18	3.21E-18
th226	.00E+00	8.59E-27	2.54E-26	4.45E-26	6.43E-26	6.42E-26
th227	.00E+00	4.19E-13	1.59E-12	3.41E-12	5.78E-12	5.78E-12
th228	.00E+00	7.29E-12	3.23E-11	6.66E-11	1.04E-10	1.04E-10
th229	.00E+00	7.27E-10	2.94E-09	6.64E-09	1.18E-08	1.18E-08
th230	.00E+00	1.28E-04	2.55E-04	3.83E-04	5.11E-04	5.11E-04
th231	.00E+00	3.02E-09	3.02E-09	3.02E-09	3.02E-09	3.02E-09
th232	.00E+00	2.58E-05	5.16E-05	7.74E-05	1.03E-04	1.03E-04
th233	.00E+00	2.39E-16	4.78E-16	7.17E-16	9.57E-16	2.66E-17
th234	.00E+00	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	.00E+00	3.59E-06	7.19E-06	1.08E-05	1.44E-05	1.44E-05
pa232	.00E+00	6.18E-14	1.24E-13	1.85E-13	2.47E-13	2.37E-13
pa233	.00E+00	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06
pa234m	.00E+00	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	.00E+00	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	.00E+00	8.33E-24	2.46E-23	4.32E-23	6.23E-23	6.21E-23
u231	.00E+00	5.33E-20	1.08E-19	1.62E-19	2.17E-19	2.14E-19
u232	.00E+00	6.11E-10	1.80E-09	3.16E-09	4.57E-09	4.57E-09
u233	.00E+00	6.68E-05	1.35E-04	2.03E-04	2.72E-04	2.72E-04
u234	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00
u235	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02
u236	1.74E+02	1.74E+02	1.74E+02	1.74E+02	1.74E+02	1.74E+02
u237	.00E+00	3.24E-06	3.24E-06	3.24E-06	3.24E-06	3.21E-06
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04
u239	.00E+00	3.29E-07	3.29E-07	3.29E-07	3.29E-07	1.09E-08
u240	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	.00E+00	8.71E-12	9.06E-12	9.08E-12	9.08E-12	9.07E-12
np236m	.00E+00	2.16E-12	2.16E-12	2.16E-12	2.16E-12	2.03E-12
np236	.00E+00	1.02E-09	2.05E-09	3.07E-09	4.10E-09	4.10E-09
np237	4.22E+01	4.22E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01
np238	.00E+00	1.58E-06	1.58E-06	1.58E-06	1.58E-06	1.54E-06

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2

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```

power= 4.000E-03mw, burnup=2.9220E+01mwd, flux= 3.00E+08n/cm**2-sec
0
nuclide concentrations, gram atoms
basis = single reactor assembly
charge 1826.3 d 3652.5 d 5478.8 d 7305.0 d 7305.1 d
np239 .00E+00 4.75E-05 4.75E-05 4.75E-05 4.75E-05 4.67E-05
np240m .00E+00 .00E+00 .00E+00 .00E+00 .00E+00 .00E+00
np240 .00E+00 9.74E-15 9.74E-15 9.74E-15 9.74E-15 2.68E-15
np241 .00E+00 .00E+00 .00E+00 .00E+00 .00E+00 .00E+00
pu236 .00E+00 8.16E-10 1.06E-09 1.14E-09 1.16E-09 1.16E-09
pu237 .00E+00 9.61E-15 1.89E-14 2.78E-14 3.64E-14 3.63E-14
pu238 .00E+00 9.24E-04 1.81E-03 2.67E-03 3.49E-03 3.49E-03
pu239 .00E+00 2.55E-02 5.11E-02 7.66E-02 1.02E-01 1.02E-01
pu240 .00E+00 6.28E-07 2.51E-06 5.66E-06 1.01E-05 1.01E-05
pu241 .00E+00 2.03E-11 1.53E-10 4.90E-10 1.10E-09 1.10E-09
pu242 .00E+00 2.03E-16 3.15E-15 1.55E-14 4.75E-14 4.75E-14
pu243 .00E+00 4.46E-25 6.91E-24 3.39E-23 1.04E-22 7.97E-23
pu244 .00E+00 .00E+00 .00E+00 .00E+00 .00E+00 .00E+00
pu245 .00E+00 .00E+00 .00E+00 .00E+00 .00E+00 .00E+00
pu246 .00E+00 .00E+00 .00E+00 .00E+00 .00E+00 .00E+00
am239 .00E+00 3.56E-28 5.43E-27 2.63E-26 7.94E-26 7.10E-26
am240 .00E+00 1.63E-25 2.49E-24 1.20E-23 3.64E-23 3.54E-23
am241 .00E+00 1.24E-12 1.89E-11 9.13E-11 2.76E-10 2.76E-10
am242m .00E+00 3.20E-18 9.80E-17 7.13E-16 2.88E-15 2.88E-15
am242 .00E+00 4.35E-20 6.65E-19 3.22E-18 9.73E-18 8.96E-18
am243 .00E+00 6.23E-22 2.16E-20 1.76E-19 7.89E-19 7.89E-19
am244m .00E+00 .00E+00 .00E+00 .00E+00 .00E+00 .00E+00
am244 .00E+00 4.90E-30 1.70E-28 1.39E-27 6.21E-27 5.44E-27
am245 .00E+00 .00E+00 .00E+00 .00E+00 .00E+00 .00E+00
am246 .00E+00 .00E+00 .00E+00 .00E+00 .00E+00 .00E+00
totals 3.73E+04 3.73E+04 3.73E+04 3.73E+04 3.73E+04 3.73E+04
flux 3.00E+08 3.00E+08 3.00E+08 3.00E+08 3.00E+08 3.00E-07

```

```

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 4q array has 1 entries.
0 54q array has 12 entries.
1library information...

```

cross-section data taken from position number 2 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 densities
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 densities
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      8/28/1996 date library was produced
0      1697 total number of nuclides in library
0      689 number of light-element nuclides
0      129 number of actinide nuclides
0      879 number of fission product nuclides
0      7993 number of nonzero off-diagonal matrix elements
0      *****

```

```

1      sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2      page 12
0      power= .00mw, burnup= 58.mwd, flux= 2.81E+08n/cm**2-sec
0      basis =

```

```

0      (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0      initial 9131.3 d 10957.6 d 12783.8 d 14610.1 d 14610.2 d
0      productions 1.090805E+06 1.090842E+06 1.090879E+06 1.090916E+06 1.090953E+06 1.090953E+06
0      absorptions 8.937227E+05 8.937811E+05 8.938394E+05 8.938971E+05 8.939546E+05 8.939546E+05
0      k infinity 1.220518E+00 1.220480E+00 1.220441E+00 1.220404E+00 1.220367E+00 1.220367E+00
0      initial 9131.3 d 10957.6 d 12783.8 d 14610.1 d 14610.2 d
0      actinide
0      absorptions 8.901883E+05 8.902102E+05 8.902321E+05 8.902540E+05 8.902759E+05 8.902759E+05
0      non-actinide
0      abs. fracs. 3.954649E-03 3.995299E-03 4.035652E-03 4.075527E-03 4.115045E-03 4.115045E-03

```

```

1      sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2      page 13
0      fraction of total absorption rate
0      power= .00mw, burnup= 58.mwd, flux= 2.81E+08n/cm**2-sec
0      initial 9131.3 d 10957.6 d 12783.8 d 14610.1 d 14610.2 d

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sm149	1.46E-04	1.82E-04	2.17E-04	2.53E-04	2.88E-04	2.88E-04
sm151	5.78E-06	7.08E-06	8.34E-06	9.55E-06	1.07E-05	1.07E-05
nd143	2.95E-06	3.69E-06	4.43E-06	5.17E-06	5.91E-06	5.91E-06
gd155	1.35E-06	1.83E-06	2.31E-06	2.79E-06	3.28E-06	3.28E-06
gd157	1.49E-06	1.85E-06	2.21E-06	2.56E-06	2.91E-06	2.91E-06
rh103	1.37E-06	1.71E-06	2.06E-06	2.40E-06	2.75E-06	2.75E-06
cd113	1.28E-06	1.60E-06	1.91E-06	2.23E-06	2.54E-06	2.54E-06
xe135	2.27E-06	2.31E-06	2.31E-06	2.31E-06	2.31E-06	2.28E-06
xe131	9.39E-07	1.17E-06	1.41E-06	1.64E-06	1.88E-06	1.88E-06
cs133	7.29E-07	9.11E-07	1.09E-06	1.28E-06	1.46E-06	1.46E-06
eu151	3.37E-07	5.21E-07	7.40E-07	9.94E-07	1.28E-06	1.28E-06
tc 99	5.37E-07	6.72E-07	8.06E-07	9.40E-07	1.07E-06	1.07E-06
sm147	4.40E-07	5.75E-07	7.10E-07	8.46E-07	9.81E-07	9.81E-07
nd145	4.16E-07	5.20E-07	6.24E-07	7.28E-07	8.32E-07	8.32E-07
mo 95	2.83E-07	3.55E-07	4.27E-07	5.00E-07	5.72E-07	5.72E-07
sm152	2.20E-07	2.76E-07	3.31E-07	3.86E-07	4.41E-07	4.41E-07
kr 83	1.80E-07	2.25E-07	2.70E-07	3.15E-07	3.60E-07	3.60E-07

cs135	1.64E-07	2.05E-07	2.46E-07	2.87E-07	3.28E-07	3.28E-07
pm147	2.70E-07	2.72E-07	2.72E-07	2.72E-07	2.72E-07	2.72E-07
ru101	1.28E-07	1.60E-07	1.92E-07	2.24E-07	2.56E-07	2.56E-07
pr141	1.22E-07	1.52E-07	1.83E-07	2.14E-07	2.44E-07	2.44E-07
eu153	1.11E-07	1.39E-07	1.67E-07	1.95E-07	2.22E-07	2.22E-07
la139	1.00E-07	1.25E-07	1.50E-07	1.75E-07	2.00E-07	2.00E-07
eu155	1.51E-07	1.55E-07	1.57E-07	1.58E-07	1.58E-07	1.58E-07
pd105	4.25E-08	5.31E-08	6.37E-08	7.43E-08	8.49E-08	8.49E-08
zr 93	4.07E-08	5.09E-08	6.11E-08	7.13E-08	8.15E-08	8.15E-08
i129	3.10E-08	3.87E-08	4.65E-08	5.42E-08	6.20E-08	6.20E-08
nd144	2.83E-08	3.58E-08	4.33E-08	5.08E-08	5.83E-08	5.83E-08
mo 97	2.27E-08	2.84E-08	3.40E-08	3.97E-08	4.54E-08	4.54E-08
ba137	9.52E-09	1.44E-08	2.00E-08	2.63E-08	3.32E-08	3.32E-08
ag109	1.60E-08	2.00E-08	2.41E-08	2.81E-08	3.22E-08	3.22E-08
zr 91	1.06E-08	1.33E-08	1.59E-08	1.86E-08	2.13E-08	2.13E-08
y 89	1.02E-08	1.27E-08	1.53E-08	1.79E-08	2.04E-08	2.04E-08
ru102	9.23E-09	1.15E-08	1.39E-08	1.62E-08	1.85E-08	1.85E-08
ce142	8.31E-09	1.04E-08	1.25E-08	1.45E-08	1.66E-08	1.66E-08
nd148	8.01E-09	1.00E-08	1.20E-08	1.40E-08	1.60E-08	1.60E-08
nd146	6.71E-09	8.38E-09	1.01E-08	1.17E-08	1.34E-08	1.34E-08
sm150	3.07E-09	4.79E-09	6.88E-09	9.35E-09	1.22E-08	1.22E-08
ba138	5.73E-09	7.16E-09	8.59E-09	1.00E-08	1.15E-08	1.15E-08
in115	5.54E-09	6.92E-09	8.30E-09	9.69E-09	1.11E-08	1.11E-08
pd108	5.45E-09	6.81E-09	8.17E-09	9.53E-09	1.09E-08	1.09E-08
sr 90	6.67E-09	7.88E-09	8.96E-09	9.91E-09	1.07E-08	1.07E-08
ce140	5.35E-09	6.69E-09	8.03E-09	9.37E-09	1.07E-08	1.07E-08
xe132	4.83E-09	6.03E-09	7.24E-09	8.45E-09	9.65E-09	9.65E-09
rh105	8.32E-09	8.34E-09	8.34E-09	8.34E-09	8.34E-09	8.31E-09
mo 98	3.34E-09	4.18E-09	5.01E-09	5.85E-09	6.69E-09	6.69E-09
mo100	3.22E-09	4.03E-09	4.84E-09	5.64E-09	6.45E-09	6.45E-09
pd107	3.21E-09	4.01E-09	4.81E-09	5.61E-09	6.42E-09	6.42E-09
xe134	3.17E-09	3.96E-09	4.75E-09	5.54E-09	6.33E-09	6.33E-09

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0
0
sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
fraction of total absorption rate
power=.00mw, burnup= 58.mwd, flux= 2.81E+08n/cm**2-sec
initial 9131.3 d 10957.6 d 12783.8 d 14610.1 d 14610.2 d

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zr 92	2.57E-09	3.22E-09	3.86E-09	4.50E-09	5.15E-09	5.15E-09
i127	2.08E-09	2.60E-09	3.12E-09	3.65E-09	4.17E-09	4.17E-09
zr 96	2.04E-09	2.55E-09	3.06E-09	3.57E-09	4.08E-09	4.08E-09
ru104	1.98E-09	2.48E-09	2.97E-09	3.47E-09	3.96E-09	3.96E-09
nd150	1.78E-09	2.22E-09	2.66E-09	3.11E-09	3.55E-09	3.55E-09
xe136	1.71E-09	2.14E-09	2.57E-09	3.00E-09	3.42E-09	3.42E-09
pr143	2.67E-09	2.67E-09	2.67E-09	2.67E-09	2.67E-09	2.67E-09
br 81	1.29E-09	1.61E-09	1.93E-09	2.26E-09	2.58E-09	2.58E-09
rb 85	1.11E-09	1.41E-09	1.71E-09	2.02E-09	2.32E-09	2.32E-09
cs137	1.40E-09	1.66E-09	1.89E-09	2.10E-09	2.28E-09	2.28E-09
zr 94	1.09E-09	1.37E-09	1.64E-09	1.91E-09	2.19E-09	2.19E-09
xe133	2.01E-09	2.01E-09	2.01E-09	2.01E-09	2.01E-09	2.01E-09
cd111	8.31E-10	1.04E-09	1.25E-09	1.46E-09	1.66E-09	1.66E-09
ce141	1.59E-09	1.60E-09	1.60E-09	1.60E-09	1.60E-09	1.60E-09
te130	7.77E-10	9.72E-10	1.17E-09	1.36E-09	1.56E-09	1.56E-09
sm154	7.55E-10	9.44E-10	1.13E-09	1.32E-09	1.51E-09	1.51E-09
rb 87	7.28E-10	9.10E-10	1.09E-09	1.27E-09	1.46E-09	1.46E-09
se 77	5.15E-10	6.44E-10	7.73E-10	9.02E-10	1.03E-09	1.03E-09
pm149	9.67E-10	9.74E-10	9.74E-10	9.74E-10	9.74E-10	9.67E-10
nd147	9.32E-10	9.36E-10	9.36E-10	9.36E-10	9.36E-10	9.32E-10
zr 90	2.13E-10	3.20E-10	4.44E-10	5.84E-10	7.36E-10	7.36E-10
pd106	3.42E-10	4.34E-10	5.26E-10	6.18E-10	7.10E-10	7.10E-10
kr 84	3.44E-10	4.30E-10	5.17E-10	6.03E-10	6.89E-10	6.89E-10

ce144	6.02E-10	6.02E-10	6.02E-10	6.02E-10	6.02E-10	6.02E-10
kr 85	4.16E-10	4.60E-10	4.91E-10	5.14E-10	5.31E-10	5.31E-10
se 79	2.64E-10	3.30E-10	3.96E-10	4.62E-10	5.28E-10	5.28E-10
sb121	2.51E-10	3.14E-10	3.77E-10	4.40E-10	5.02E-10	5.02E-10
sb123	2.05E-10	2.56E-10	3.07E-10	3.58E-10	4.10E-10	4.10E-10
kr 86	1.91E-10	2.39E-10	2.87E-10	3.34E-10	3.82E-10	3.82E-10
ru103	3.57E-10	3.57E-10	3.57E-10	3.57E-10	3.57E-10	3.57E-10
te128	1.71E-10	2.13E-10	2.56E-10	2.99E-10	3.41E-10	3.41E-10
gd156	1.32E-10	1.65E-10	1.99E-10	2.33E-10	2.67E-10	2.67E-10
se 80	1.23E-10	1.54E-10	1.85E-10	2.16E-10	2.46E-10	2.46E-10
dy161	1.08E-10	1.35E-10	1.61E-10	1.88E-10	2.16E-10	2.16E-10
te125	8.69E-11	1.14E-10	1.41E-10	1.68E-10	1.95E-10	1.95E-10
zr 95	1.66E-10	1.66E-10	1.66E-10	1.66E-10	1.66E-10	1.66E-10
nb 95	1.53E-10	1.53E-10	1.53E-10	1.53E-10	1.53E-10	1.53E-10
eu152	2.43E-11	4.46E-11	7.23E-11	1.08E-10	1.52E-10	1.52E-10
tb159	7.30E-11	9.13E-11	1.09E-10	1.28E-10	1.46E-10	1.46E-10
y 91	1.43E-10	1.44E-10	1.44E-10	1.44E-10	1.43E-10	1.43E-10
li 6	7.00E-11	8.76E-11	1.05E-10	1.23E-10	1.40E-10	1.40E-10
cd112	7.00E-11	8.74E-11	1.05E-10	1.22E-10	1.40E-10	1.40E-10
sn117	5.54E-11	6.93E-11	8.31E-11	9.70E-11	1.11E-10	1.11E-10
pm151	1.06E-10	1.10E-10	1.10E-10	1.10E-10	1.10E-10	1.06E-10
sn119	4.56E-11	5.70E-11	6.84E-11	7.98E-11	9.11E-11	9.11E-11
eu154	3.43E-11	4.66E-11	5.95E-11	7.29E-11	8.65E-11	8.65E-11
sn115	4.17E-11	5.21E-11	6.26E-11	7.30E-11	8.34E-11	8.34E-11
sr 88	3.51E-11	4.39E-11	5.27E-11	6.15E-11	7.03E-11	7.03E-11
pd110	2.51E-11	3.14E-11	3.77E-11	4.40E-11	5.03E-11	5.03E-11

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 0 fraction of total absorption rate
 power= .00mw, burnup= 58.mwd, flux= 2.81E+08n/cm**2-sec
 0 initial 9131.3 d 10957.6 d 12783.8 d 14610.1 d 14610.2 d

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cd114	2.46E-11	3.07E-11	3.70E-11	4.32E-11	4.95E-11	4.95E-11
gd158	2.37E-11	3.00E-11	3.63E-11	4.28E-11	4.94E-11	4.94E-11
se 82	2.38E-11	2.98E-11	3.58E-11	4.17E-11	4.77E-11	4.77E-11
ba140	4.72E-11	4.74E-11	4.74E-11	4.74E-11	4.74E-11	4.72E-11
sn126	1.91E-11	2.38E-11	2.86E-11	3.34E-11	3.82E-11	3.82E-11
sm153	3.72E-11	3.81E-11	3.82E-11	3.82E-11	3.82E-11	3.72E-11
se 78	1.81E-11	2.26E-11	2.71E-11	3.17E-11	3.62E-11	3.62E-11
eu156	3.42E-11	3.41E-11	3.42E-11	3.42E-11	3.42E-11	3.42E-11
sr 89	3.07E-11	3.07E-11	3.07E-11	3.07E-11	3.07E-11	3.07E-11
sn124	1.46E-11	1.82E-11	2.19E-11	2.55E-11	2.92E-11	2.92E-11
dy162	1.41E-11	1.77E-11	2.12E-11	2.48E-11	2.83E-11	2.83E-11
dy164	1.28E-11	1.60E-11	1.93E-11	2.25E-11	2.58E-11	2.58E-11
ru106	2.55E-11	2.55E-11	2.55E-11	2.55E-11	2.55E-11	2.55E-11
as 75	1.08E-11	1.35E-11	1.62E-11	1.89E-11	2.16E-11	2.16E-11
ce143	1.69E-11	1.75E-11	1.75E-11	1.75E-11	1.75E-11	1.69E-11
ru 99	5.51E-12	7.76E-12	1.03E-11	1.33E-11	1.66E-11	1.66E-11
la140	1.54E-11	1.54E-11	1.54E-11	1.54E-11	1.54E-11	1.54E-11
sb125	1.48E-11	1.49E-11	1.49E-11	1.49E-11	1.49E-11	1.49E-11
gd152	1.77E-12	3.52E-12	6.17E-12	9.91E-12	1.49E-11	1.49E-11
mo 99	1.29E-11	1.32E-11	1.32E-11	1.32E-11	1.32E-11	1.29E-11
sn118	5.96E-12	7.45E-12	8.94E-12	1.04E-11	1.19E-11	1.19E-11
ba136	5.75E-12	7.20E-12	8.66E-12	1.01E-11	1.16E-11	1.16E-11
cs134	5.17E-12	6.47E-12	7.82E-12	9.18E-12	1.05E-11	1.05E-11
y 90	6.34E-12	7.49E-12	8.51E-12	9.41E-12	1.02E-11	1.02E-11
cd116	5.05E-12	6.32E-12	7.58E-12	8.84E-12	1.01E-11	1.01E-11
sn122	5.02E-12	6.27E-12	7.52E-12	8.77E-12	1.00E-11	1.00E-11
pm148m	9.75E-12	9.64E-12	9.65E-12	9.66E-12	9.66E-12	9.64E-12
in113	2.94E-12	4.29E-12	5.79E-12	7.40E-12	9.10E-12	9.10E-12
kr 87	8.14E-12	2.30E-11	2.30E-11	2.29E-11	2.29E-11	8.14E-12

sn120	3.76E-12	4.70E-12	5.63E-12	6.57E-12	7.51E-12	7.51E-12
te127m	7.42E-12	7.43E-12	7.43E-12	7.43E-12	7.43E-12	7.43E-12
i131	6.76E-12	6.78E-12	6.78E-12	6.78E-12	6.78E-12	6.76E-12
kr 82	3.17E-12	3.98E-12	4.78E-12	5.59E-12	6.41E-12	6.41E-12
dy163	3.12E-12	3.90E-12	4.69E-12	5.48E-12	6.27E-12	6.27E-12
ge 73	2.93E-12	3.67E-12	4.40E-12	5.14E-12	5.87E-12	5.87E-12
xe130	1.96E-12	2.46E-12	2.97E-12	3.48E-12	4.00E-12	4.00E-12
gd154	7.50E-13	1.28E-12	1.99E-12	2.86E-12	3.92E-12	3.92E-12
mo 96	1.43E-12	1.82E-12	2.21E-12	2.61E-12	3.02E-12	3.02E-12
ru100	7.53E-13	1.09E-12	1.49E-12	1.94E-12	2.46E-12	2.46E-12
ge 76	1.07E-12	1.33E-12	1.60E-12	1.87E-12	2.14E-12	2.14E-12
te129m	1.79E-12	1.79E-12	1.79E-12	1.79E-12	1.79E-12	1.79E-12
sm148	4.61E-13	6.76E-13	9.30E-13	1.22E-12	1.55E-12	1.55E-12
gd160	6.78E-13	8.47E-13	1.02E-12	1.19E-12	1.36E-12	1.36E-12
nd142	3.39E-13	5.29E-13	7.61E-13	1.03E-12	1.35E-12	1.35E-12
ba134	2.94E-13	4.68E-13	6.81E-13	9.35E-13	1.23E-12	1.23E-12
ba135	2.78E-13	4.30E-13	6.15E-13	8.33E-13	1.08E-12	1.08E-12
te126	5.25E-13	6.59E-13	7.94E-13	9.29E-13	1.07E-12	1.07E-12
pd104	2.24E-13	3.50E-13	5.03E-13	6.84E-13	8.93E-13	8.93E-13
ho165	2.14E-13	2.68E-13	3.22E-13	3.77E-13	4.32E-13	4.32E-13

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0
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power= .00mw, burnup= 58.mwd, flux= 2.81E+08n/cm**2-sec
initial 9131.3 d 10957.6 d 12783.8 d 14610.1 d 14610.2 d

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pm148	3.74E-13	3.73E-13	3.73E-13	3.73E-13	3.73E-13	3.70E-13
ag111	3.17E-13	3.18E-13	3.19E-13	3.19E-13	3.19E-13	3.18E-13
eu157	2.76E-13	2.97E-13	2.97E-13	2.97E-13	2.97E-13	2.75E-13
te124	1.23E-13	1.54E-13	1.85E-13	2.17E-13	2.48E-13	2.48E-13
sr 87	1.22E-13	1.53E-13	1.84E-13	2.14E-13	2.45E-13	2.45E-13
cd115m	2.37E-13	2.37E-13	2.37E-13	2.37E-13	2.37E-13	2.36E-13
nb 94	6.97E-14	8.72E-14	1.05E-13	1.22E-13	1.40E-13	1.40E-13
cd110	3.40E-14	5.16E-14	7.28E-14	9.77E-14	1.26E-13	1.26E-13
ge 74	5.92E-14	7.40E-14	8.89E-14	1.04E-13	1.19E-13	1.19E-13
br 79	2.17E-14	3.39E-14	4.87E-14	6.63E-14	8.65E-14	8.65E-14
ge 72	3.98E-14	4.97E-14	5.97E-14	6.96E-14	7.96E-14	7.96E-14
sr 86	3.50E-14	4.40E-14	5.31E-14	6.22E-14	7.14E-14	7.14E-14
nb 93	1.01E-14	1.88E-14	3.11E-14	4.72E-14	6.75E-14	6.75E-14
cs136	5.58E-14	5.63E-14	5.64E-14	5.66E-14	5.67E-14	5.65E-14
xe129	1.22E-14	1.91E-14	2.75E-14	3.74E-14	4.89E-14	4.89E-14
se 76	2.32E-14	2.90E-14	3.49E-14	4.07E-14	4.66E-14	4.66E-14
ag107	1.14E-14	1.79E-14	2.57E-14	3.50E-14	4.58E-14	4.58E-14
sn125	2.91E-14	2.93E-14	2.93E-14	2.93E-14	2.93E-14	2.91E-14
ru105	2.27E-14	2.97E-14	2.97E-14	2.97E-14	2.97E-14	2.27E-14
xe128	6.69E-15	8.73E-15	1.09E-14	1.33E-14	1.57E-14	1.57E-14
dy160	5.98E-15	7.98E-15	1.02E-14	1.26E-14	1.51E-14	1.51E-14
er166	5.69E-15	7.17E-15	8.68E-15	1.02E-14	1.18E-14	1.18E-14
sn123	1.02E-14	1.02E-14	1.02E-14	1.02E-14	1.02E-14	1.02E-14
te132	9.40E-15	9.56E-15	9.56E-15	9.56E-15	9.56E-15	9.40E-15
rb 88	8.81E-15	1.29E-14	1.29E-14	1.29E-14	1.29E-14	8.82E-15
i135	8.28E-15	1.01E-14	1.01E-14	1.01E-14	1.01E-14	8.28E-15
kr 80	1.66E-15	2.08E-15	2.50E-15	2.92E-15	3.34E-15	3.34E-15
sb126	3.02E-15	3.05E-15	3.06E-15	3.06E-15	3.07E-15	3.06E-15
sb124	2.11E-15	2.12E-15	2.12E-15	2.12E-15	2.12E-15	2.12E-15
sn116	5.34E-16	8.14E-16	1.15E-15	1.55E-15	2.01E-15	2.01E-15
in117m	1.84E-15	2.09E-15	2.09E-15	2.09E-15	2.09E-15	1.84E-15
te122	4.12E-16	5.75E-16	7.63E-16	9.75E-16	1.21E-15	1.21E-15
te134	8.66E-16	5.85E-15	5.85E-15	5.85E-15	5.85E-15	8.66E-16
tb160	5.06E-16	5.57E-16	6.08E-16	6.60E-16	7.11E-16	7.11E-16
1130	6.65E-16	7.46E-16	7.52E-16	7.59E-16	7.65E-16	6.89E-16

in117	5.47E-16	6.15E-16	6.15E-16	6.15E-16	6.15E-16	5.47E-16
be 9	1.34E-16	1.68E-16	2.01E-16	2.35E-16	2.69E-16	2.69E-16
pr142	1.30E-16	1.74E-16	2.08E-16	2.43E-16	2.78E-16	2.59E-16
rb 86	2.48E-16	2.51E-16	2.53E-16	2.55E-16	2.57E-16	2.56E-16
te123	1.18E-16	1.48E-16	1.78E-16	2.09E-16	2.39E-16	2.39E-16
dy165	1.26E-16	2.16E-16	2.18E-16	2.19E-16	2.20E-16	1.28E-16
li 7	5.40E-17	6.74E-17	8.09E-17	9.44E-17	1.08E-16	1.08E-16
er167	2.43E-17	3.13E-17	3.86E-17	4.63E-17	5.43E-17	5.43E-17
ge 75	3.38E-17	8.63E-17	8.63E-17	8.63E-17	8.63E-17	3.38E-17
cd118	2.47E-17	1.20E-16	1.20E-16	1.20E-16	1.20E-16	2.46E-17
cd108	1.15E-18	1.45E-18	1.77E-18	2.09E-18	2.42E-18	2.42E-18
cs134m	6.58E-19	1.28E-18	1.53E-18	1.79E-18	2.04E-18	1.29E-18
in119m	4.20E-19	3.01E-17	3.01E-17	3.01E-17	3.01E-17	4.19E-19
cd109	2.18E-19	2.25E-19	2.35E-19	2.42E-19	2.52E-19	2.52E-19

1 sas2h: far-field crit based on b&w 15x15, 3.00wtX, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 17
 0 fraction of total absorption rate
 0 power= .00mw, burnup= 58.mwd, flux= 2.81E+08n/cm**2-sec
 initial 9131.3 d 10957.6 d 12783.8 d 14610.1 d 14610.2 d

sn114	4.70E-20	7.72E-20	1.17E-19	1.68E-19	2.32E-19	2.32E-19
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1 sas2h: far-field crit based on b&w 15x15, 3.00wtX, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 18
 0 power= 4.000E-03mw, burnup=5.8440E+01mwd, flux= 2.81E+08n/cm**2-sec
 nuclide concentrations, gram atoms
 basis = single reactor assembly

h 1	charge	9131.3 d	10957.6 d	12783.8 d	14610.1 d	14610.2 d
h 1	1.76E-06	2.19E-06	2.62E-06	3.05E-06	3.48E-06	3.48E-06
h 2	5.22E-09	6.50E-09	7.77E-09	9.05E-09	1.03E-08	1.03E-08
h 3	2.30E-11	2.55E-11	2.74E-11	2.89E-11	2.99E-11	2.99E-11
h 4	.00E+00	1.04E-34	1.11E-34	1.17E-34	1.22E-34	.00E+00
he 3	1.53E-11	2.21E-11	2.96E-11	3.75E-11	4.57E-11	4.57E-11
he 4	2.91E-07	3.62E-07	4.33E-07	5.04E-07	5.75E-07	5.75E-07
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ne 20	3.50E-08	4.35E-08	5.20E-08	6.06E-08	6.91E-08	6.91E-08
ne 21	2.53E-14	3.88E-14	5.49E-14	7.36E-14	9.49E-14	9.49E-14
ne 22	1.86E-10	2.42E-10	2.97E-10	3.53E-10	4.09E-10	4.09E-10
ne 23	7.28E-30	7.10E-15	7.10E-15	7.10E-15	7.10E-15	7.10E-30
na 22	4.26E-11	4.19E-11	4.18E-11	4.17E-11	4.17E-11	4.17E-11
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	3.33E-08	3.07E-08	3.07E-08	3.07E-08	3.07E-08	2.81E-08
na 24m	5.99E-30	5.05E-15	5.05E-15	5.05E-15	5.05E-15	5.05E-30
na 25	1.21E-42	1.50E-27	1.81E-27	2.14E-27	2.47E-27	2.53E-42
mg 24	3.02E-04	3.66E-04	4.30E-04	4.93E-04	5.57E-04	5.57E-04
mg 25	4.07E-11	5.14E-11	6.24E-11	7.36E-11	8.50E-11	8.50E-11
mg 26	5.22E-09	6.50E-09	7.77E-09	9.05E-09	1.03E-08	1.03E-08
mg 27	4.70E-16	2.12E-12	2.12E-12	2.12E-12	2.12E-12	4.59E-16
mg 28	4.14E-24	4.32E-24	4.32E-24	4.32E-24	4.32E-24	4.05E-24
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	3.67E-25	2.28E-10	2.28E-10	2.28E-10	2.28E-10	3.10E-25
al 29	3.18E-32	9.14E-27	1.30E-26	1.75E-26	2.27E-26	1.19E-31
al 30	.00E+00	4.23E-39	7.28E-39	1.15E-38	1.70E-38	.00E+00
si 28	8.79E-04	1.06E-03	1.25E-03	1.44E-03	1.62E-03	1.62E-03
si 29	2.26E-11	3.51E-11	5.00E-11	6.73E-11	8.69E-11	8.69E-11
si 30	6.21E-19	1.21E-18	2.09E-18	3.30E-18	4.89E-18	4.89E-18
si 31	2.68E-31	8.71E-31	1.50E-30	2.37E-30	3.51E-30	2.11E-30
si 32	1.55E-38	3.78E-38	7.81E-38	1.44E-37	2.44E-37	2.44E-37
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		2.81E+08	2.81E+08	2.81E+08	2.81E+08	2.81E-07

1 sas2h: far-field crit based on b&w 15x15, 3.00wtX, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 19

power= 4.000E-03mw, burnup=5.8440E+01mwd, flux= 2.81E+08n/cm**2-sec
 nuclide concentrations, gram atoms
 basis = single reactor assembly

	charge	9131.3 d	10957.6 d	12783.8 d	14610.1 d	14610.2 d
he 4	1.33E-03	1.75E-03	2.21E-03	2.70E-03	3.22E-03	3.22E-03
pb206	1.79E-11	4.28E-11	8.69E-11	1.57E-10	2.62E-10	2.62E-10
pb207	5.52E-10	1.04E-09	1.74E-09	2.67E-09	3.86E-09	3.86E-09
pb208	2.81E-10	5.05E-10	7.97E-10	1.16E-09	1.59E-09	1.59E-09
pb209	5.60E-16	8.70E-16	1.25E-15	1.71E-15	2.23E-15	2.24E-15
pb210	1.17E-10	2.20E-10	3.67E-10	5.63E-10	8.13E-10	8.13E-10
pb211	7.85E-15	1.17E-14	1.61E-14	2.10E-14	2.62E-14	2.62E-14
pb212	6.61E-14	9.03E-14	1.14E-13	1.38E-13	1.62E-13	1.62E-13
pb214	1.45E-15	2.33E-15	3.35E-15	4.56E-15	5.95E-15	5.77E-15
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	6.87E-12	1.35E-11	2.33E-11	3.70E-11	5.53E-11	5.53E-11
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	7.17E-14	1.35E-13	2.26E-13	3.46E-13	5.00E-13	5.00E-13
bi211	4.69E-16	6.94E-16	9.55E-16	1.24E-15	1.56E-15	1.56E-15
bi212	6.27E-15	8.57E-15	1.08E-14	1.31E-14	1.53E-14	1.53E-14
bi213	1.26E-16	2.03E-16	2.93E-16	3.99E-16	5.21E-16	5.05E-16
bi214	1.09E-15	1.73E-15	2.49E-15	3.38E-15	4.42E-15	4.34E-15
ra222	1.32E-27	1.66E-27	2.05E-27	2.42E-27	2.80E-27	2.80E-27
ra223	3.58E-12	5.34E-12	7.35E-12	9.57E-12	1.20E-11	1.20E-11
ra224	5.46E-13	7.46E-13	9.44E-13	1.14E-12	1.33E-12	1.33E-12
ra225	6.08E-14	9.51E-14	1.37E-13	1.86E-13	2.44E-13	2.44E-13
ra226	4.68E-08	7.31E-08	1.05E-07	1.43E-07	1.87E-07	1.87E-07
ra228	2.63E-14	3.62E-14	4.63E-14	5.67E-14	6.71E-14	6.71E-14
ac225	4.11E-14	6.42E-14	9.25E-14	1.26E-13	1.65E-13	1.65E-13
ac227	2.49E-09	3.71E-09	5.10E-09	6.64E-09	8.31E-09	8.31E-09
ac228	3.21E-18	4.41E-18	5.65E-18	6.92E-18	8.19E-18	8.19E-18
th226	6.42E-26	8.12E-26	9.98E-26	1.18E-25	1.37E-25	1.36E-25
th227	5.78E-12	8.62E-12	1.19E-11	1.54E-11	1.93E-11	1.93E-11
th228	1.04E-10	1.42E-10	1.80E-10	2.17E-10	2.55E-10	2.55E-10
th229	1.18E-08	1.85E-08	2.66E-08	3.63E-08	4.74E-08	4.74E-08
th230	5.11E-04	6.39E-04	7.66E-04	8.94E-04	1.02E-03	1.02E-03
th231	3.02E-09	3.02E-09	3.02E-09	3.02E-09	3.02E-09	3.02E-09
th232	1.03E-04	1.29E-04	1.55E-04	1.81E-04	2.07E-04	2.07E-04
th233	2.66E-17	1.19E-15	1.43E-15	1.66E-15	1.90E-15	5.29E-17
th234	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	1.44E-05	1.80E-05	2.16E-05	2.52E-05	2.88E-05	2.88E-05
pa232	2.37E-13	3.09E-13	3.71E-13	4.33E-13	4.95E-13	4.74E-13
pa233	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	6.21E-23	7.87E-23	9.67E-23	1.15E-22	1.32E-22	1.32E-22
u231	2.14E-19	2.63E-19	3.16E-19	3.68E-19	4.21E-19	4.16E-19
u232	4.57E-09	5.96E-09	7.33E-09	8.68E-09	1.00E-08	1.00E-08
u233	2.72E-04	3.40E-04	4.08E-04	4.76E-04	5.45E-04	5.45E-04
u234	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00
u235	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02
u236	1.74E+02	1.74E+02	1.74E+02	1.74E+02	1.74E+02	1.74E+02
u237	3.21E-06	3.15E-06	3.15E-06	3.15E-06	3.15E-06	3.12E-06
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2

0 power= 4.000E-03mw, burnup=5.8440E+01mwd, flux= 2.81E+08n/cm**2-sec
 nuclide concentrations, gram atoms
 basis = single reactor assembly

	charge	9131.3 d	10957.6 d	12783.8 d	14610.1 d	14610.2 d
charge	9131.3 d	10957.6 d	12783.8 d	14610.1 d	14610.2 d	

u239	1.09E-08	3.22E-07	3.22E-07	3.22E-07	3.22E-07	1.07E-08
u240	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	9.07E-12	8.80E-12	8.79E-12	8.79E-12	8.79E-12	8.79E-12
np236m	2.03E-12	2.09E-12	2.09E-12	2.09E-12	2.09E-12	1.97E-12
np236	4.10E-09	5.09E-09	6.08E-09	7.07E-09	8.06E-09	8.06E-09
np237	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01
np238	1.54E-06	1.56E-06	1.56E-06	1.56E-06	1.56E-06	1.52E-06
np239	4.67E-05	4.65E-05	4.65E-05	4.65E-05	4.65E-05	4.57E-05
np240m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np240	2.68E-15	9.48E-15	9.48E-15	9.48E-15	9.48E-15	2.61E-15
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	1.16E-09	1.14E-09	1.14E-09	1.13E-09	1.13E-09	1.13E-09
pu237	3.63E-14	4.31E-14	5.08E-14	5.81E-14	6.51E-14	6.50E-14
pu238	3.49E-03	4.27E-03	5.02E-03	5.75E-03	6.44E-03	6.44E-03
pu239	1.02E-01	1.27E-01	1.52E-01	1.77E-01	2.02E-01	2.02E-01
pu240	1.01E-05	1.57E-05	2.25E-05	3.06E-05	3.98E-05	3.98E-05
pu241	1.10E-09	2.02E-09	3.29E-09	4.96E-09	7.05E-09	7.05E-09
pu242	4.75E-14	1.12E-13	2.25E-13	4.04E-13	6.71E-13	6.71E-13
pu243	7.97E-23	2.40E-22	4.81E-22	8.65E-22	1.43E-21	1.10E-21
pu244	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu245	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am239	7.10E-26	1.79E-25	3.53E-25	6.25E-25	1.02E-24	9.12E-25
am240	3.54E-23	8.19E-23	1.62E-22	2.86E-22	4.67E-22	4.55E-22
am241	2.76E-10	6.42E-10	1.27E-09	2.24E-09	3.66E-09	3.66E-09
am242m	2.88E-15	8.38E-15	1.99E-14	4.12E-14	7.70E-14	7.70E-14
am242	8.96E-18	2.25E-17	4.45E-17	7.88E-17	1.29E-16	1.19E-16
am243	7.89E-19	2.51E-18	6.50E-18	1.46E-17	2.94E-17	2.94E-17
am244m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am244	5.44E-27	1.93E-26	5.00E-26	1.12E-25	2.26E-25	1.98E-25
am245	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
totals	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04
flux		2.81E+08	2.81E+08	2.81E+08	2.81E+08	2.81E-07

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 4q array has 1 entries.
 0 54q array has 12 entries.
 1library information...

cross-section data taken from position number 3 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 densities
  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 densities
  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      8/28/1996      date library was produced
0      1697      total number of nuclides in library
0      689      number of light-element nuclides
0      129      number of actinide nuclides
0      879      number of fission product nuclides
0      7993      number of nonzero off-diagonal matrix elements
0
0      *****

```

```

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2      page 21
power= .00mw, burnup= 88.mwd, flux= 2.74E+08n/cm**2-sec
basis =

```

(note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)

	initial	16436.4 d	18262.7 d	20088.9 d	21915.2 d	21915.2 d
productions	1.122645E+06	1.122682E+06	1.122719E+06	1.122756E+06	1.122793E+06	1.122793E+06
absorptions	9.163268E+05	9.163854E+05	9.164438E+05	9.165019E+05	9.165596E+05	9.165596E+05
k infinity	1.225158E+00	1.225120E+00	1.225083E+00	1.225045E+00	1.225009E+00	1.225009E+00
	initial	16436.4 d	18262.7 d	20088.9 d	21915.2 d	21915.2 d
actinide						
absorptions	9.127919E+05	9.128138E+05	9.128357E+05	9.128577E+05	9.128795E+05	9.128795E+05
non-actinide						
abs. frags.	3.857672E-03	3.897429E-03	3.937006E-03	3.976166E-03	4.015088E-03	4.015088E-03

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1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2      page 22
fraction of total absorption rate
power= .00mw, burnup= 88.mwd, flux= 2.74E+08n/cm**2-sec
initial 16436.4 d 18262.7 d 20088.9 d 21915.2 d 21915.2 d

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sm149	2.89E-04	3.25E-04	3.59E-04	3.94E-04	4.28E-04	4.28E-04
sm151	1.08E-05	1.19E-05	1.30E-05	1.40E-05	1.50E-05	1.50E-05
nd143	5.93E-06	6.68E-06	7.42E-06	8.16E-06	8.90E-06	8.90E-06
gd155	3.30E-06	3.79E-06	4.28E-06	4.77E-06	5.25E-06	5.25E-06
gd157	2.93E-06	3.27E-06	3.62E-06	3.96E-06	4.30E-06	4.30E-06
rh103	2.75E-06	3.09E-06	3.43E-06	3.78E-06	4.12E-06	4.12E-06
cd113	2.55E-06	2.87E-06	3.18E-06	3.49E-06	3.80E-06	3.80E-06
xe131	1.87E-06	2.11E-06	2.34E-06	2.58E-06	2.81E-06	2.81E-06
eu151	1.29E-06	1.61E-06	1.96E-06	2.35E-06	2.76E-06	2.76E-06
xe135	2.29E-06	2.33E-06	2.33E-06	2.33E-06	2.33E-06	2.29E-06
cs133	1.45E-06	1.64E-06	1.82E-06	2.00E-06	2.18E-06	2.18E-06
tc 99	1.07E-06	1.20E-06	1.34E-06	1.47E-06	1.60E-06	1.60E-06
sm147	9.78E-07	1.11E-06	1.25E-06	1.38E-06	1.52E-06	1.52E-06

nd145	8.31E-07	9.35E-07	1.04E-06	1.14E-06	1.25E-06	1.25E-06
mo 95	5.70E-07	6.42E-07	7.14E-07	7.86E-07	8.58E-07	8.58E-07
sm152	4.40E-07	4.95E-07	5.50E-07	6.05E-07	6.61E-07	6.61E-07
kr 83	3.61E-07	4.06E-07	4.51E-07	4.96E-07	5.41E-07	5.41E-07
cs135	3.28E-07	3.69E-07	4.10E-07	4.51E-07	4.92E-07	4.92E-07
ru101	2.54E-07	2.86E-07	3.17E-07	3.49E-07	3.81E-07	3.81E-07
pr141	2.45E-07	2.76E-07	3.06E-07	3.37E-07	3.68E-07	3.68E-07
eu153	2.22E-07	2.50E-07	2.78E-07	3.06E-07	3.33E-07	3.33E-07
la139	2.01E-07	2.26E-07	2.51E-07	2.76E-07	3.01E-07	3.01E-07
pm147	2.71E-07	2.71E-07	2.71E-07	2.71E-07	2.71E-07	2.71E-07
eu155	1.58E-07	1.58E-07	1.58E-07	1.58E-07	1.58E-07	1.58E-07
pd105	8.47E-08	9.53E-08	1.06E-07	1.16E-07	1.27E-07	1.27E-07
zr 93	8.12E-08	9.13E-08	1.01E-07	1.12E-07	1.22E-07	1.22E-07
i129	6.23E-08	7.00E-08	7.78E-08	8.56E-08	9.34E-08	9.34E-08
nd144	5.86E-08	6.61E-08	7.37E-08	8.12E-08	8.87E-08	8.87E-08
mo 97	4.55E-08	5.12E-08	5.68E-08	6.25E-08	6.82E-08	6.82E-08
ba137	3.34E-08	4.09E-08	4.88E-08	5.73E-08	6.61E-08	6.61E-08
ag109	3.20E-08	3.61E-08	4.01E-08	4.42E-08	4.82E-08	4.82E-08
zr 91	2.13E-08	2.40E-08	2.67E-08	2.94E-08	3.21E-08	3.21E-08
y 89	2.05E-08	2.31E-08	2.56E-08	2.82E-08	3.08E-08	3.08E-08
ru102	1.85E-08	2.08E-08	2.32E-08	2.55E-08	2.78E-08	2.78E-08
sm150	1.22E-08	1.54E-08	1.90E-08	2.29E-08	2.72E-08	2.72E-08
ce142	1.67E-08	1.88E-08	2.09E-08	2.30E-08	2.51E-08	2.51E-08
nd148	1.60E-08	1.80E-08	2.01E-08	2.21E-08	2.41E-08	2.41E-08
nd146	1.35E-08	1.51E-08	1.68E-08	1.85E-08	2.02E-08	2.02E-08
ba138	1.15E-08	1.30E-08	1.44E-08	1.58E-08	1.73E-08	1.73E-08
in115	1.11E-08	1.25E-08	1.38E-08	1.52E-08	1.66E-08	1.66E-08
pd108	1.08E-08	1.22E-08	1.36E-08	1.49E-08	1.63E-08	1.63E-08
ce140	1.08E-08	1.21E-08	1.35E-08	1.48E-08	1.62E-08	1.62E-08
xe132	9.64E-09	1.09E-08	1.21E-08	1.33E-08	1.45E-08	1.45E-08
sr 90	1.08E-08	1.15E-08	1.22E-08	1.28E-08	1.33E-08	1.33E-08
mo 98	6.65E-09	7.48E-09	8.31E-09	9.15E-09	9.98E-09	9.98E-09
mo100	6.44E-09	7.25E-09	8.05E-09	8.85E-09	9.66E-09	9.66E-09
pd107	6.43E-09	7.24E-09	8.04E-09	8.84E-09	9.65E-09	9.65E-09
xe134	6.36E-09	7.15E-09	7.95E-09	8.74E-09	9.54E-09	9.54E-09
rh105	8.34E-09	8.37E-09	8.37E-09	8.37E-09	8.38E-09	8.34E-09

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 0 fraction of total absorption rate
 power= .00mw, burnup= 88.mwd, flux= 2.74E+08n/cm**2-sec
 0 initial 16436.4 d 18262.7 d 20088.9 d 21915.2 d 21915.2 d

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zr 92	5.16E-09	5.81E-09	6.46E-09	7.10E-09	7.75E-09	7.75E-09
i127	4.16E-09	4.68E-09	5.20E-09	5.73E-09	6.25E-09	6.25E-09
zr 96	4.04E-09	4.55E-09	5.05E-09	5.56E-09	6.06E-09	6.06E-09
ru104	3.96E-09	4.46E-09	4.95E-09	5.45E-09	5.94E-09	5.94E-09
nd150	3.55E-09	4.00E-09	4.44E-09	4.88E-09	5.33E-09	5.33E-09
xe136	3.44E-09	3.87E-09	4.30E-09	4.73E-09	5.15E-09	5.15E-09
br 81	2.57E-09	2.90E-09	3.22E-09	3.54E-09	3.86E-09	3.86E-09
rb 85	2.32E-09	2.64E-09	2.95E-09	3.26E-09	3.57E-09	3.57E-09
zr 94	2.18E-09	2.45E-09	2.73E-09	3.00E-09	3.27E-09	3.27E-09
cs137	2.28E-09	2.44E-09	2.59E-09	2.72E-09	2.83E-09	2.83E-09
pr143	2.68E-09	2.68E-09	2.68E-09	2.68E-09	2.68E-09	2.68E-09
cd111	1.67E-09	1.88E-09	2.09E-09	2.30E-09	2.51E-09	2.51E-09
te130	1.56E-09	1.76E-09	1.95E-09	2.15E-09	2.34E-09	2.34E-09
sm154	1.51E-09	1.70E-09	1.89E-09	2.08E-09	2.27E-09	2.27E-09
rb 87	1.46E-09	1.64E-09	1.82E-09	2.00E-09	2.18E-09	2.18E-09
xe133	2.02E-09	2.02E-09	2.02E-09	2.02E-09	2.02E-09	2.02E-09
ce141	1.60E-09	1.60E-09	1.60E-09	1.60E-09	1.60E-09	1.60E-09
se 77	1.04E-09	1.17E-09	1.29E-09	1.42E-09	1.55E-09	1.55E-09
zr 90	7.38E-10	9.03E-10	1.08E-09	1.26E-09	1.45E-09	1.45E-09

pd106	7.08E-10	8.00E-10	8.92E-10	9.83E-10	1.08E-09	1.08E-09
kr 84	6.86E-10	7.71E-10	8.57E-10	9.43E-10	1.03E-09	1.03E-09
pm149	9.72E-10	9.79E-10	9.79E-10	9.79E-10	9.79E-10	9.72E-10
nd147	9.28E-10	9.32E-10	9.32E-10	9.32E-10	9.32E-10	9.28E-10
se 79	5.31E-10	5.97E-10	6.64E-10	7.30E-10	7.96E-10	7.96E-10
sb121	5.01E-10	5.64E-10	6.27E-10	6.89E-10	7.52E-10	7.52E-10
sb123	4.09E-10	4.60E-10	5.11E-10	5.62E-10	6.13E-10	6.13E-10
ce144	6.03E-10	6.03E-10	6.03E-10	6.03E-10	6.03E-10	6.03E-10
kr 86	3.84E-10	4.32E-10	4.80E-10	5.28E-10	5.76E-10	5.76E-10
kr 85	5.32E-10	5.44E-10	5.53E-10	5.59E-10	5.64E-10	5.64E-10
te128	3.41E-10	3.84E-10	4.26E-10	4.69E-10	5.12E-10	5.12E-10
eu152	1.53E-10	2.05E-10	2.66E-10	3.35E-10	4.12E-10	4.12E-10
gd156	2.65E-10	2.99E-10	3.33E-10	3.68E-10	4.03E-10	4.03E-10
se 80	2.47E-10	2.78E-10	3.09E-10	3.40E-10	3.71E-10	3.71E-10
ru103	3.58E-10	3.58E-10	3.58E-10	3.58E-10	3.58E-10	3.57E-10
dy161	2.17E-10	2.44E-10	2.71E-10	2.98E-10	3.26E-10	3.26E-10
te125	1.95E-10	2.22E-10	2.49E-10	2.76E-10	3.03E-10	3.03E-10
tb159	1.46E-10	1.64E-10	1.82E-10	2.01E-10	2.19E-10	2.19E-10
li 6	1.41E-10	1.58E-10	1.76E-10	1.94E-10	2.11E-10	2.11E-10
cd112	1.40E-10	1.58E-10	1.75E-10	1.93E-10	2.10E-10	2.10E-10
sn117	1.11E-10	1.25E-10	1.39E-10	1.53E-10	1.67E-10	1.67E-10
zr 95	1.65E-10	1.66E-10	1.65E-10	1.65E-10	1.65E-10	1.65E-10
nb 95	1.53E-10	1.53E-10	1.53E-10	1.53E-10	1.53E-10	1.53E-10
y 91	1.44E-10	1.44E-10	1.44E-10	1.44E-10	1.44E-10	1.44E-10
eu154	8.69E-11	1.01E-10	1.14E-10	1.28E-10	1.43E-10	1.43E-10
sn119	9.16E-11	1.03E-10	1.14E-10	1.26E-10	1.37E-10	1.37E-10
sn115	8.38E-11	9.43E-11	1.05E-10	1.15E-10	1.26E-10	1.26E-10
pm151	1.06E-10	1.10E-10	1.10E-10	1.10E-10	1.10E-10	1.06E-10
sr 88	7.05E-11	7.93E-11	8.81E-11	9.69E-11	1.06E-10	1.06E-10
gd158	4.93E-11	5.60E-11	6.28E-11	6.98E-11	7.68E-11	7.68E-11

1
0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
fraction of total absorption rate
power=.00mw, burnup= 88.mwd, flux= 2.74E+08n/cm**2-sec
0 initial 16436.4 d 18262.7 d 20088.9 d 21915.2 d 21915.2 d

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pd110	5.01E-11	5.64E-11	6.26E-11	6.89E-11	7.52E-11	7.52E-11
cd114	4.92E-11	5.55E-11	6.18E-11	6.81E-11	7.44E-11	7.44E-11
se 82	4.78E-11	5.38E-11	5.98E-11	6.58E-11	7.18E-11	7.18E-11
sn126	3.84E-11	4.32E-11	4.80E-11	5.28E-11	5.76E-11	5.76E-11
se 78	3.62E-11	4.07E-11	4.53E-11	4.98E-11	5.43E-11	5.43E-11
gd152	1.50E-11	2.15E-11	2.97E-11	3.98E-11	5.18E-11	5.18E-11
ba140	4.73E-11	4.75E-11	4.75E-11	4.75E-11	4.75E-11	4.73E-11
sn124	2.90E-11	3.26E-11	3.63E-11	3.99E-11	4.35E-11	4.35E-11
dy162	2.84E-11	3.19E-11	3.55E-11	3.92E-11	4.28E-11	4.28E-11
dy164	2.60E-11	2.93E-11	3.26E-11	3.60E-11	3.94E-11	3.94E-11
sm153	3.73E-11	3.82E-11	3.82E-11	3.82E-11	3.82E-11	3.72E-11
eu156	3.43E-11	3.43E-11	3.43E-11	3.43E-11	3.43E-11	3.43E-11
ru 99	1.65E-11	2.02E-11	2.41E-11	2.84E-11	3.31E-11	3.31E-11
as 75	2.16E-11	2.43E-11	2.70E-11	2.97E-11	3.24E-11	3.24E-11
sr 89	3.08E-11	3.09E-11	3.09E-11	3.09E-11	3.09E-11	3.08E-11
ru106	2.54E-11	2.53E-11	2.53E-11	2.53E-11	2.54E-11	2.54E-11
sn118	1.18E-11	1.33E-11	1.48E-11	1.63E-11	1.78E-11	1.78E-11
ba136	1.16E-11	1.30E-11	1.45E-11	1.60E-11	1.75E-11	1.75E-11
ce143	1.70E-11	1.75E-11	1.75E-11	1.75E-11	1.75E-11	1.70E-11
in113	9.10E-12	1.09E-11	1.27E-11	1.46E-11	1.65E-11	1.65E-11
cs134	1.06E-11	1.19E-11	1.32E-11	1.46E-11	1.59E-11	1.59E-11
la140	1.53E-11	1.53E-11	1.53E-11	1.53E-11	1.53E-11	1.53E-11
cd116	1.01E-11	1.13E-11	1.26E-11	1.38E-11	1.51E-11	1.51E-11
sn122	1.01E-11	1.13E-11	1.26E-11	1.38E-11	1.51E-11	1.51E-11
sb125	1.49E-11	1.49E-11	1.49E-11	1.49E-11	1.49E-11	1.49E-11

mo 99	1.29E-11	1.32E-11	1.32E-11	1.32E-11	1.32E-11	1.29E-11
y 90	1.03E-11	1.10E-11	1.16E-11	1.21E-11	1.26E-11	1.26E-11
sn120	7.52E-12	8.45E-12	9.39E-12	1.03E-11	1.13E-11	1.13E-11
gd154	3.93E-12	5.17E-12	6.60E-12	8.20E-12	1.00E-11	1.00E-11
kr 82	6.43E-12	7.25E-12	8.07E-12	8.90E-12	9.74E-12	9.74E-12
pm148m	9.69E-12	9.63E-12	9.64E-12	9.63E-12	9.63E-12	9.62E-12
dy163	6.28E-12	7.08E-12	7.88E-12	8.69E-12	9.51E-12	9.51E-12
ge 73	5.89E-12	6.63E-12	7.36E-12	8.10E-12	8.84E-12	8.84E-12
kr 87	8.19E-12	2.31E-11	2.31E-11	2.31E-11	2.31E-11	8.19E-12
te127m	7.45E-12	7.46E-12	7.46E-12	7.46E-12	7.46E-12	7.46E-12
i131	6.76E-12	6.78E-12	6.78E-12	6.78E-12	6.78E-12	6.76E-12
xe130	4.02E-12	4.54E-12	5.07E-12	5.60E-12	6.13E-12	6.13E-12
ru100	2.47E-12	3.05E-12	3.68E-12	4.38E-12	5.13E-12	5.13E-12
mo 96	3.01E-12	3.43E-12	3.86E-12	4.29E-12	4.74E-12	4.74E-12
sm148	1.55E-12	1.91E-12	2.31E-12	2.75E-12	3.23E-12	3.23E-12
ge 76	2.14E-12	2.41E-12	2.67E-12	2.94E-12	3.21E-12	3.21E-12
nd142	1.36E-12	1.72E-12	2.12E-12	2.56E-12	3.05E-12	3.05E-12
ba134	1.23E-12	1.57E-12	1.94E-12	2.35E-12	2.81E-12	2.81E-12
ba135	1.08E-12	1.37E-12	1.68E-12	2.03E-12	2.42E-12	2.42E-12
gd160	1.36E-12	1.53E-12	1.69E-12	1.86E-12	2.04E-12	2.04E-12
pd104	8.89E-13	1.12E-12	1.39E-12	1.68E-12	1.99E-12	1.99E-12
te129m	1.80E-12	1.80E-12	1.80E-12	1.80E-12	1.80E-12	1.80E-12
te126	1.07E-12	1.20E-12	1.34E-12	1.48E-12	1.62E-12	1.62E-12
ho165	4.32E-13	4.87E-13	5.43E-13	5.99E-13	6.55E-13	6.55E-13

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 0 fraction of total absorption rate
 0 power= .00mw, burnup= 88.mwd, flux= 2.74E+08n/cm**2-sec
 initial 16436.4 d 18262.7 d 20088.9 d 21915.2 d 21915.2 d

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te124	2.49E-13	2.81E-13	3.12E-13	3.44E-13	3.76E-13	3.76E-13
sr 87	2.46E-13	2.77E-13	3.07E-13	3.38E-13	3.69E-13	3.69E-13
pm148	3.68E-13	3.69E-13	3.69E-13	3.69E-13	3.69E-13	3.65E-13
ag111	3.16E-13	3.18E-13	3.18E-13	3.19E-13	3.19E-13	3.17E-13
cd110	1.27E-13	1.59E-13	1.95E-13	2.34E-13	2.78E-13	2.78E-13
eu157	2.76E-13	2.98E-13	2.98E-13	2.98E-13	2.99E-13	2.76E-13
cd115m	2.37E-13	2.37E-13	2.37E-13	2.37E-13	2.37E-13	2.37E-13
nb 94	1.39E-13	1.57E-13	1.74E-13	1.92E-13	2.09E-13	2.09E-13
br 79	8.66E-14	1.10E-13	1.35E-13	1.64E-13	1.95E-13	1.95E-13
nb 93	6.76E-14	9.23E-14	1.22E-13	1.56E-13	1.95E-13	1.95E-13
ge 74	1.19E-13	1.34E-13	1.49E-13	1.64E-13	1.79E-13	1.79E-13
ge 72	8.00E-14	9.00E-14	1.00E-13	1.10E-13	1.20E-13	1.20E-13
xe129	4.89E-14	6.19E-14	7.65E-14	9.25E-14	1.10E-13	1.10E-13
sr 86	7.17E-14	8.10E-14	9.04E-14	9.98E-14	1.09E-13	1.09E-13
ag107	4.60E-14	5.82E-14	7.18E-14	8.69E-14	1.03E-13	1.03E-13
se 76	4.69E-14	5.28E-14	5.88E-14	6.48E-14	7.08E-14	7.08E-14
cs136	5.63E-14	5.67E-14	5.68E-14	5.70E-14	5.71E-14	5.69E-14
sn125	2.90E-14	2.92E-14	2.92E-14	2.92E-14	2.92E-14	2.90E-14
dy160	1.51E-14	1.79E-14	2.08E-14	2.40E-14	2.73E-14	2.73E-14
xe128	1.58E-14	1.84E-14	2.12E-14	2.42E-14	2.72E-14	2.72E-14
ru105	2.26E-14	2.96E-14	2.96E-14	2.96E-14	2.96E-14	2.26E-14
er166	1.18E-14	1.34E-14	1.50E-14	1.66E-14	1.83E-14	1.83E-14
sn123	1.01E-14	1.01E-14	1.01E-14	1.01E-14	1.01E-14	1.01E-14
te132	9.43E-15	9.59E-15	9.59E-15	9.59E-15	9.59E-15	9.43E-15
rb 88	8.86E-15	1.30E-14	1.30E-14	1.30E-14	1.30E-14	8.86E-15
i135	8.32E-15	1.02E-14	1.02E-14	1.02E-14	1.02E-14	8.32E-15
kr 80	3.35E-15	3.77E-15	4.20E-15	4.62E-15	5.04E-15	5.04E-15
sn116	1.99E-15	2.50E-15	3.07E-15	3.69E-15	4.38E-15	4.38E-15
sb126	3.07E-15	3.09E-15	3.10E-15	3.11E-15	3.12E-15	3.10E-15
te122	1.21E-15	1.47E-15	1.75E-15	2.06E-15	2.39E-15	2.39E-15
sb124	2.12E-15	2.13E-15	2.13E-15	2.13E-15	2.13E-15	2.13E-15

in117m	1.85E-15	2.10E-15	2.10E-15	2.10E-15	2.11E-15	1.85E-15
tb160	7.14E-16	7.65E-16	8.16E-16	8.68E-16	9.19E-16	9.19E-16
te134	8.71E-16	5.88E-15	5.88E-15	5.88E-15	5.88E-15	8.71E-16
i130	6.90E-16	7.73E-16	7.79E-16	7.86E-16	7.92E-16	7.14E-16
in117	5.50E-16	6.18E-16	6.18E-16	6.19E-16	6.19E-16	5.50E-16
be 9	2.66E-16	3.00E-16	3.33E-16	3.66E-16	4.00E-16	4.00E-16
pr142	2.60E-16	3.13E-16	3.48E-16	3.83E-16	4.18E-16	3.90E-16
te123	2.40E-16	2.70E-16	3.01E-16	3.32E-16	3.63E-16	3.63E-16
rb 86	2.57E-16	2.59E-16	2.61E-16	2.64E-16	2.66E-16	2.65E-16
li 7	1.08E-16	1.22E-16	1.36E-16	1.49E-16	1.63E-16	1.63E-16
dy165	1.28E-16	2.22E-16	2.23E-16	2.25E-16	2.26E-16	1.31E-16
er167	5.45E-17	6.29E-17	7.16E-17	8.08E-17	9.02E-17	9.02E-17
ge 75	3.40E-17	8.68E-17	8.68E-17	8.68E-17	8.68E-17	3.40E-17
cd118	2.48E-17	1.21E-16	1.21E-16	1.21E-16	1.21E-16	2.48E-17
cd108	2.42E-18	2.76E-18	3.10E-18	3.46E-18	3.82E-18	3.82E-18
cs134m	1.30E-18	2.29E-18	2.55E-18	2.81E-18	3.06E-18	1.94E-18
sn114	2.32E-19	3.07E-19	3.94E-19	4.95E-19	6.10E-19	6.10E-19
in119m	4.21E-19	3.02E-17	3.02E-17	3.02E-17	3.02E-17	4.21E-19

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 0 fraction of total absorption rate
 power= .00mw, burnup= 88.mwd, flux= 2.74E+08n/cm**2-sec
 0 initial 16436.4 d 18262.7 d 20088.9 d 21915.2 d 21915.2 d

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cd109	2.53E-19	2.63E-19	2.69E-19	2.80E-19	2.90E-19	2.90E-19
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1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 0 power= 4.000E-03mw, burnup=8.7659E+01mwd, flux= 2.74E+08n/cm**2-sec
 nuclide concentrations, gram atoms
 basis = single reactor assembly

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charge 16436.4 d 18262.7 d 20088.9 d 21915.2 d 21915.2 d						
h 1	3.48E-06	3.91E-06	4.33E-06	4.76E-06	5.18E-06	5.18E-06
h 2	1.03E-08	1.16E-08	1.28E-08	1.41E-08	1.54E-08	1.54E-08
h 3	2.99E-11	3.07E-11	3.13E-11	3.17E-11	3.21E-11	3.21E-11
h 4	.00E+00	1.25E-34	1.27E-34	1.29E-34	1.30E-34	.00E+00
he 3	4.57E-11	5.42E-11	6.29E-11	7.18E-11	8.07E-11	8.07E-11
he 4	5.75E-07	6.46E-07	7.16E-07	7.86E-07	8.57E-07	8.57E-07
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ne 20	6.91E-08	7.75E-08	8.60E-08	9.45E-08	1.03E-07	1.03E-07
ne 21	9.49E-14	1.18E-13	1.44E-13	1.72E-13	2.03E-13	2.03E-13
ne 22	4.09E-10	4.64E-10	5.19E-10	5.74E-10	6.30E-10	6.30E-10
ne 23	7.10E-30	7.05E-15	7.05E-15	7.05E-15	7.05E-15	7.05E-30
na 22	4.17E-11	4.15E-11	4.14E-11	4.14E-11	4.14E-11	4.14E-11
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	2.81E-08	2.85E-08	2.85E-08	2.85E-08	2.85E-08	2.60E-08
na 24m	5.05E-30	4.68E-15	4.68E-15	4.68E-15	4.68E-15	4.68E-30
na 25	2.53E-42	2.77E-27	3.11E-27	3.46E-27	3.81E-27	3.85E-42
mg 24	5.57E-04	6.16E-04	6.75E-04	7.34E-04	7.94E-04	7.94E-04
mg 25	8.50E-11	9.66E-11	1.09E-10	1.21E-10	1.33E-10	1.33E-10
mg 26	1.03E-08	1.16E-08	1.28E-08	1.41E-08	1.54E-08	1.54E-08
mg 27	4.59E-16	2.10E-12	2.10E-12	2.10E-12	2.10E-12	4.55E-16
mg 28	4.05E-24	4.29E-24	4.29E-24	4.29E-24	4.29E-24	4.03E-24
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	3.10E-25	2.11E-10	2.11E-10	2.11E-10	2.11E-10	2.88E-25
al 29	1.19E-31	2.80E-26	3.42E-26	4.10E-26	4.84E-26	2.53E-31
al 30	.00E+00	2.38E-38	3.24E-38	4.28E-38	5.52E-38	.00E+00
si 28	1.62E-03	1.79E-03	1.96E-03	2.14E-03	2.31E-03	2.31E-03
si 29	8.69E-11	1.09E-10	1.33E-10	1.60E-10	1.88E-10	1.88E-10
si 30	4.89E-18	6.92E-18	9.43E-18	1.25E-17	1.61E-17	1.61E-17
si 31	2.11E-30	4.97E-30	6.77E-30	8.95E-30	1.15E-29	6.95E-30
si 32	2.44E-37	3.87E-37	5.86E-37	8.50E-37	1.19E-36	1.19E-36

0 totals 5.75E+04 5.75E+04 5.75E+04 5.75E+04 5.75E+04 5.75E+04
 1 flux 2.74E+08 2.74E+08 2.74E+08 2.74E+08 2.74E+08 2.74E+07

0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 power= 4.000E-03mw, burnup=8.7659E+01mwd, flux= 2.74E+08n/cm**2-sec

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0 nuclide concentrations, gram atoms
 basis = single reactor assembly

	charge	16436.4 d	18262.7 d	20088.9 d	21915.2 d	21915.2 d
he 4	3.22E-03	3.77E-03	4.35E-03	4.96E-03	5.60E-03	5.60E-03
pb206	2.62E-10	4.10E-10	6.10E-10	8.72E-10	1.21E-09	1.21E-09
pb207	3.86E-09	5.32E-09	7.07E-09	9.13E-09	1.15E-08	1.15E-08
pb208	1.59E-09	2.08E-09	2.64E-09	3.27E-09	3.96E-09	3.96E-09
pb209	2.24E-15	2.82E-15	3.49E-15	4.22E-15	5.02E-15	5.05E-15
pb210	8.13E-10	1.12E-09	1.49E-09	1.92E-09	2.42E-09	2.42E-09
pb211	2.62E-14	3.18E-14	3.77E-14	4.38E-14	5.02E-14	5.02E-14
pb212	1.62E-13	1.85E-13	2.08E-13	2.31E-13	2.54E-13	2.54E-13
pb214	5.77E-15	7.52E-15	9.28E-15	1.12E-14	1.33E-14	1.29E-14
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	5.53E-11	7.88E-11	1.08E-10	1.44E-10	1.87E-10	1.87E-10
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	5.00E-13	6.90E-13	9.16E-13	1.18E-12	1.49E-12	1.49E-12
bi211	1.56E-15	1.89E-15	2.24E-15	2.60E-15	2.97E-15	2.99E-15
bi212	1.53E-14	1.75E-14	1.97E-14	2.19E-14	2.41E-14	2.41E-14
bi213	5.05E-16	6.59E-16	8.14E-16	9.85E-16	1.17E-15	1.14E-15
bi214	4.34E-15	5.59E-15	6.89E-15	8.33E-15	9.91E-15	9.75E-15
ra222	2.80E-27	3.13E-27	3.49E-27	3.85E-27	4.21E-27	4.21E-27
ra223	1.20E-11	1.45E-11	1.72E-11	2.00E-11	2.29E-11	2.29E-11
ra224	1.33E-12	1.53E-12	1.72E-12	1.91E-12	2.09E-12	2.09E-12
ra225	2.44E-13	3.08E-13	3.81E-13	4.61E-13	5.48E-13	5.48E-13
ra226	1.87E-07	2.36E-07	2.91E-07	3.52E-07	4.19E-07	4.19E-07
ra228	6.71E-14	7.76E-14	8.81E-14	9.87E-14	1.09E-13	1.09E-13
ac225	1.65E-13	2.08E-13	2.57E-13	3.11E-13	3.70E-13	3.70E-13
ac227	8.31E-09	1.01E-08	1.19E-08	1.39E-08	1.59E-08	1.59E-08
ac228	8.19E-18	9.47E-18	1.08E-17	1.20E-17	1.33E-17	1.33E-17
th226	1.36E-25	1.53E-25	1.70E-25	1.88E-25	2.06E-25	2.05E-25
th227	1.93E-11	2.34E-11	2.78E-11	3.23E-11	3.69E-11	3.69E-11
th228	2.55E-10	2.91E-10	3.28E-10	3.64E-10	4.00E-10	4.00E-10
th229	4.74E-08	6.00E-08	7.40E-08	8.96E-08	1.07E-07	1.07E-07
th230	1.02E-03	1.15E-03	1.28E-03	1.40E-03	1.53E-03	1.53E-03
th231	3.02E-09	3.03E-09	3.03E-09	3.03E-09	3.03E-09	3.03E-09
th232	2.07E-04	2.32E-04	2.58E-04	2.84E-04	3.10E-04	3.10E-04
th233	5.29E-17	2.13E-15	2.37E-15	2.61E-15	2.84E-15	7.92E-17
th234	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	2.88E-05	3.24E-05	3.60E-05	3.96E-05	4.32E-05	4.32E-05
pa232	4.74E-13	5.56E-13	6.18E-13	6.80E-13	7.42E-13	7.11E-13
pa233	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u230	1.32E-22	1.48E-22	1.65E-22	1.82E-22	1.99E-22	1.99E-22
u231	4.16E-19	4.67E-19	5.19E-19	5.71E-19	6.23E-19	6.15E-19
u232	1.00E-08	1.14E-08	1.27E-08	1.40E-08	1.53E-08	1.53E-08
u233	5.45E-04	6.13E-04	6.81E-04	7.49E-04	8.17E-04	8.17E-04
u234	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00
u235	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02
u236	1.74E+02	1.74E+02	1.75E+02	1.75E+02	1.75E+02	1.75E+02
u237	3.12E-06	3.11E-06	3.11E-06	3.11E-06	3.11E-06	3.09E-06
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2

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```

0      power= 4.000E-03mw, burnup=8.7659E+01mwd, flux= 2.74E+08n/cm**2-sec
      nuclide concentrations, gram atoms
      basis = single reactor assembly
      charge 16436.4 d 18262.7 d 20088.9 d 21915.2 d 21915.2 d
u239  1.07E-08  3.19E-07  3.19E-07  3.19E-07  3.19E-07  1.06E-08
u240   .00E+00  .00E+00  .00E+00  .00E+00  .00E+00  .00E+00
u241   .00E+00  .00E+00  .00E+00  .00E+00  .00E+00  .00E+00
np235  8.79E-12  8.68E-12  8.67E-12  8.67E-12  8.67E-12  8.67E-12
np236m 1.97E-12  2.06E-12  2.06E-12  2.06E-12  2.06E-12  1.94E-12
np236  8.06E-09  9.04E-09  1.00E-08  1.10E-08  1.20E-08  1.20E-08
np237  4.21E+01  4.21E+01  4.21E+01  4.21E+01  4.21E+01  4.21E+01
np238  1.52E-06  1.56E-06  1.56E-06  1.56E-06  1.56E-06  1.52E-06
np239  4.57E-05  4.61E-05  4.61E-05  4.61E-05  4.61E-05  4.53E-05
np240m .00E+00  .00E+00  .00E+00  .00E+00  .00E+00  .00E+00
np240  2.61E-15  9.37E-15  9.37E-15  9.37E-15  9.37E-15  2.58E-15
np241   .00E+00  .00E+00  .00E+00  .00E+00  .00E+00  .00E+00
pu236  1.13E-09  1.12E-09  1.12E-09  1.12E-09  1.12E-09  1.12E-09
pu237  6.50E-14  7.09E-14  7.73E-14  8.34E-14  8.94E-14  8.93E-14
pu238  6.44E-03  7.10E-03  7.74E-03  8.35E-03  8.94E-03  8.94E-03
pu239  2.02E-01  2.27E-01  2.52E-01  2.76E-01  3.01E-01  3.01E-01
pu240  3.98E-05  5.03E-05  6.20E-05  7.49E-05  8.90E-05  8.90E-05
pu241  7.05E-09  9.54E-09  1.25E-08  1.59E-08  1.97E-08  1.97E-08
pu242  6.71E-13  1.05E-12  1.55E-12  2.22E-12  3.06E-12  3.06E-12
pu243  1.10E-21  2.21E-21  3.28E-21  4.69E-21  6.48E-21  4.95E-21
pu244   .00E+00  .00E+00  .00E+00  .00E+00  .00E+00  .00E+00
pu245   .00E+00  .00E+00  .00E+00  .00E+00  .00E+00  .00E+00
pu246   .00E+00  .00E+00  .00E+00  .00E+00  .00E+00  .00E+00
am239  9.12E-25  1.54E-24  2.26E-24  3.17E-24  4.32E-24  3.87E-24
am240  4.55E-22  7.07E-22  1.03E-21  1.45E-21  1.98E-21  1.93E-21
am241  3.66E-09  5.62E-09  8.22E-09  1.16E-08  1.57E-08  1.57E-08
am242m 7.70E-14  1.33E-13  2.16E-13  3.34E-13  4.97E-13  4.97E-13
am242  1.19E-16  1.97E-16  2.88E-16  4.06E-16  5.53E-16  5.10E-16
am243  2.94E-17  5.44E-17  9.46E-17  1.56E-16  2.46E-16  2.46E-16
am244m .00E+00  .00E+00  .00E+00  .00E+00  .00E+00  .00E+00
am244  1.98E-25  4.15E-25  7.21E-25  1.19E-24  1.88E-24  1.64E-24
am245   .00E+00  .00E+00  .00E+00  .00E+00  .00E+00  .00E+00
am246   .00E+00  .00E+00  .00E+00  .00E+00  .00E+00  .00E+00
totals 3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04  3.73E+04
flux   2.74E+08  2.74E+08  2.74E+08  2.74E+08  2.74E+07

```

```

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      4q array has 1 entries.
0      54q array has 12 entries.

```

1library information...

cross-section data taken from position number 4 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 densities
  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 densities
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
0      .other identification and sizes of library.
0      data set name: ft33f001
0      8/28/1996 date library was produced
0      1697 total number of nuclides in library
0      689 number of light-element nuclides
0      129 number of actinide nuclides
0      879 number of fission product nuclides
0      7993 number of nonzero off-diagonal matrix elements
0
0      *****

```

```

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2      page 30
0 power= .00mw, burnup= 117.mwd, flux= 2.71E+08n/cm**2-sec
0 basis =

```

```

0 (note, k-infinities, clad and moderator absorptions are correct, only, if correctly weighted cross sections are applied.)
0 initial 23741.5 d 25567.7 d 27394.0 d 29220.2 d 29220.3 d
0 productions 1.135003E+06 1.135040E+06 1.135077E+06 1.135114E+06 1.135151E+06 1.135151E+06
0 absorptions 9.251454E+05 9.252036E+05 9.252616E+05 9.253189E+05 9.253764E+05 9.253763E+05
0 k infinity 1.226838E+00 1.226801E+00 1.226764E+00 1.226728E+00 1.226692E+00 1.226692E+00
0 initial 23741.5 d 25567.7 d 27394.0 d 29220.2 d 29220.3 d
0 actinide
0 absorptions 9.215212E+05 9.215431E+05 9.215651E+05 9.215869E+05 9.216088E+05 9.216088E+05
0 non-actinide
0 abs. fracs. 3.917515E-03 3.956497E-03 3.995001E-03 4.033267E-03 4.071355E-03 4.071295E-03

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1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2      page 31
0 fraction of total absorption rate
0 power= .00mw, burnup= 117.mwd, flux= 2.71E+08n/cm**2-sec
0 initial 23741.5 d 25567.7 d 27394.0 d 29220.2 d 29220.3 d

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sm149	4.29E-04	4.63E-04	4.97E-04	5.31E-04	5.64E-04	5.64E-04
sm151	1.50E-05	1.60E-05	1.69E-05	1.78E-05	1.87E-05	1.87E-05
nd143	8.92E-06	9.66E-06	1.04E-05	1.12E-05	1.19E-05	1.19E-05
gd155	5.27E-06	5.75E-06	6.24E-06	6.72E-06	7.20E-06	7.20E-06
gd157	4.31E-06	4.64E-06	4.97E-06	5.30E-06	5.63E-06	5.63E-06
rh103	4.12E-06	4.46E-06	4.81E-06	5.15E-06	5.50E-06	5.50E-06
cd113	3.81E-06	4.12E-06	4.42E-06	4.73E-06	5.04E-06	5.04E-06
eu151	2.76E-06	3.20E-06	3.67E-06	4.16E-06	4.68E-06	4.68E-06
xe131	2.81E-06	3.04E-06	3.27E-06	3.51E-06	3.74E-06	3.74E-06

cs133	2.18E-06	2.36E-06	2.54E-06	2.72E-06	2.90E-06	2.90E-06
xe135	2.29E-06	2.33E-06	2.33E-06	2.33E-06	2.33E-06	2.29E-06
tc 99	1.60E-06	1.74E-06	1.87E-06	2.00E-06	2.14E-06	2.14E-06
sm147	1.52E-06	1.65E-06	1.79E-06	1.92E-06	2.05E-06	2.05E-06
nd145	1.25E-06	1.35E-06	1.45E-06	1.56E-06	1.66E-06	1.66E-06
mo 95	8.58E-07	9.30E-07	1.00E-06	1.07E-06	1.15E-06	1.15E-06
sm152	6.60E-07	7.15E-07	7.70E-07	8.26E-07	8.81E-07	8.81E-07
kr 83	5.42E-07	5.87E-07	6.32E-07	6.78E-07	7.23E-07	7.23E-07
cs135	4.91E-07	5.32E-07	5.73E-07	6.14E-07	6.55E-07	6.55E-07
ru101	3.80E-07	4.12E-07	4.43E-07	4.75E-07	5.06E-07	5.06E-07
pr141	3.68E-07	3.99E-07	4.29E-07	4.60E-07	4.91E-07	4.91E-07
eu153	3.33E-07	3.61E-07	3.89E-07	4.17E-07	4.44E-07	4.44E-07
la139	3.01E-07	3.26E-07	3.52E-07	3.77E-07	4.02E-07	4.02E-07
pm147	2.71E-07	2.71E-07	2.71E-07	2.71E-07	2.71E-07	2.71E-07
pd105	1.27E-07	1.38E-07	1.48E-07	1.59E-07	1.69E-07	1.69E-07
zr 93	1.22E-07	1.32E-07	1.42E-07	1.52E-07	1.62E-07	1.62E-07
eu155	1.58E-07	1.58E-07	1.58E-07	1.58E-07	1.58E-07	1.58E-07
i129	9.36E-08	1.01E-07	1.09E-07	1.17E-07	1.25E-07	1.25E-07
nd144	8.89E-08	9.64E-08	1.04E-07	1.12E-07	1.19E-07	1.19E-07
ba137	6.62E-08	7.54E-08	8.49E-08	9.46E-08	1.05E-07	1.05E-07
mo 97	6.83E-08	7.39E-08	7.96E-08	8.53E-08	9.10E-08	9.10E-08
ag109	4.82E-08	5.22E-08	5.63E-08	6.04E-08	6.45E-08	6.45E-08
sm150	2.72E-08	3.19E-08	3.69E-08	4.23E-08	4.80E-08	4.80E-08
zr 91	3.21E-08	3.48E-08	3.75E-08	4.02E-08	4.28E-08	4.28E-08
y 89	3.08E-08	3.34E-08	3.60E-08	3.86E-08	4.11E-08	4.11E-08
ru102	2.78E-08	3.01E-08	3.25E-08	3.48E-08	3.71E-08	3.71E-08
ce142	2.51E-08	2.72E-08	2.93E-08	3.14E-08	3.35E-08	3.35E-08
nd148	2.41E-08	2.61E-08	2.81E-08	3.01E-08	3.21E-08	3.21E-08
nd146	2.02E-08	2.19E-08	2.36E-08	2.53E-08	2.70E-08	2.70E-08
ba138	1.73E-08	1.87E-08	2.02E-08	2.16E-08	2.31E-08	2.31E-08
in115	1.66E-08	1.80E-08	1.94E-08	2.08E-08	2.21E-08	2.21E-08
pd108	1.62E-08	1.76E-08	1.90E-08	2.03E-08	2.17E-08	2.17E-08
ce140	1.62E-08	1.75E-08	1.89E-08	2.02E-08	2.16E-08	2.16E-08
xe132	1.45E-08	1.57E-08	1.69E-08	1.81E-08	1.93E-08	1.93E-08
sr 90	1.33E-08	1.38E-08	1.42E-08	1.45E-08	1.48E-08	1.48E-08
mo 98	9.96E-09	1.08E-08	1.16E-08	1.24E-08	1.33E-08	1.33E-08
pd107	9.66E-09	1.05E-08	1.13E-08	1.21E-08	1.29E-08	1.29E-08
mo100	9.65E-09	1.05E-08	1.13E-08	1.21E-08	1.29E-08	1.29E-08
xe134	9.55E-09	1.03E-08	1.11E-08	1.19E-08	1.27E-08	1.27E-08
zr 92	7.76E-09	8.40E-09	9.05E-09	9.69E-09	1.03E-08	1.03E-08

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 0 fraction of total absorption rate
 0 power= .00mw, burnup= 117.mwd, flux= 2.71E+08n/cm**2-sec
 initial 23741.5 d 25567.7 d 27394.0 d 29220.2 d 29220.3 d

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rh105	8.35E-09	8.39E-09	8.39E-09	8.39E-09	8.39E-09	8.36E-09
i127	6.24E-09	6.77E-09	7.29E-09	7.81E-09	8.33E-09	8.33E-09
zr 96	6.04E-09	6.55E-09	7.05E-09	7.55E-09	8.06E-09	8.06E-09
ru104	5.94E-09	6.43E-09	6.93E-09	7.42E-09	7.92E-09	7.92E-09
nd150	5.33E-09	5.77E-09	6.21E-09	6.66E-09	7.10E-09	7.10E-09
xe136	5.16E-09	5.59E-09	6.02E-09	6.45E-09	6.88E-09	6.88E-09
br 81	3.86E-09	4.18E-09	4.50E-09	4.83E-09	5.15E-09	5.15E-09
rb 85	3.57E-09	3.89E-09	4.20E-09	4.51E-09	4.83E-09	4.83E-09
zr 94	3.27E-09	3.54E-09	3.81E-09	4.08E-09	4.35E-09	4.35E-09
cd111	2.51E-09	2.72E-09	2.93E-09	3.15E-09	3.36E-09	3.36E-09
cs137	2.83E-09	2.93E-09	3.03E-09	3.11E-09	3.18E-09	3.18E-09
te130	2.35E-09	2.54E-09	2.74E-09	2.93E-09	3.13E-09	3.13E-09
sm154	2.27E-09	2.46E-09	2.65E-09	2.84E-09	3.03E-09	3.03E-09
rb 87	2.18E-09	2.36E-09	2.55E-09	2.73E-09	2.91E-09	2.91E-09
pr143	2.68E-09	2.68E-09	2.68E-09	2.68E-09	2.68E-09	2.68E-09

zr 90	1.45E-09	1.65E-09	1.86E-09	2.07E-09	2.29E-09	2.29E-09
se 77	1.56E-09	1.69E-09	1.82E-09	1.95E-09	2.08E-09	2.08E-09
xe133	2.03E-09	2.03E-09	2.03E-09	2.03E-09	2.03E-09	2.03E-09
ce141	1.61E-09	1.61E-09	1.61E-09	1.61E-09	1.61E-09	1.61E-09
pd106	1.07E-09	1.17E-09	1.26E-09	1.35E-09	1.44E-09	1.44E-09
kr 84	1.03E-09	1.11E-09	1.20E-09	1.28E-09	1.37E-09	1.37E-09
se 79	7.98E-10	8.64E-10	9.31E-10	9.97E-10	1.06E-09	1.06E-09
sb121	7.51E-10	8.14E-10	8.77E-10	9.39E-10	1.00E-09	1.00E-09
pm149	9.74E-10	9.81E-10	9.81E-10	9.81E-10	9.80E-10	9.73E-10
nd147	9.27E-10	9.31E-10	9.31E-10	9.30E-10	9.30E-10	9.27E-10
sb123	6.13E-10	6.64E-10	7.15E-10	7.66E-10	8.17E-10	8.17E-10
eu152	4.13E-10	4.98E-10	5.91E-10	6.91E-10	7.99E-10	7.99E-10
kr 86	5.76E-10	6.24E-10	6.72E-10	7.20E-10	7.68E-10	7.68E-10
te128	5.12E-10	5.54E-10	5.97E-10	6.40E-10	6.82E-10	6.82E-10
ce144	6.04E-10	6.04E-10	6.04E-10	6.04E-10	6.04E-10	6.03E-10
kr 85	5.65E-10	5.68E-10	5.70E-10	5.72E-10	5.73E-10	5.73E-10
gd156	4.02E-10	4.36E-10	4.72E-10	5.07E-10	5.42E-10	5.42E-10
se 80	3.72E-10	4.03E-10	4.34E-10	4.65E-10	4.96E-10	4.96E-10
dy161	3.26E-10	3.54E-10	3.81E-10	4.09E-10	4.36E-10	4.36E-10
te125	3.03E-10	3.30E-10	3.57E-10	3.84E-10	4.11E-10	4.11E-10
ru103	3.58E-10	3.58E-10	3.58E-10	3.58E-10	3.58E-10	3.58E-10
tb159	2.19E-10	2.37E-10	2.56E-10	2.74E-10	2.92E-10	2.92E-10
li 6	2.12E-10	2.29E-10	2.47E-10	2.64E-10	2.82E-10	2.82E-10
cd112	2.10E-10	2.28E-10	2.46E-10	2.63E-10	2.81E-10	2.81E-10
sn117	1.67E-10	1.81E-10	1.94E-10	2.08E-10	2.22E-10	2.22E-10
eu154	1.43E-10	1.57E-10	1.71E-10	1.85E-10	1.99E-10	1.99E-10
sn119	1.38E-10	1.49E-10	1.60E-10	1.72E-10	1.83E-10	1.83E-10
sn115	1.26E-10	1.36E-10	1.47E-10	1.57E-10	1.68E-10	1.68E-10
zr 95	1.65E-10	1.65E-10	1.65E-10	1.65E-10	1.65E-10	1.65E-10
nb 95	1.53E-10	1.53E-10	1.53E-10	1.53E-10	1.53E-10	1.53E-10
y 91	1.44E-10	1.44E-10	1.44E-10	1.44E-10	1.44E-10	1.44E-10
sr 88	1.06E-10	1.15E-10	1.23E-10	1.32E-10	1.41E-10	1.41E-10
gd152	5.19E-11	6.62E-11	8.28E-11	1.02E-10	1.24E-10	1.24E-10
pm151	1.06E-10	1.10E-10	1.10E-10	1.10E-10	1.10E-10	1.06E-10

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 0 fraction of total absorption rate
 0 power= .00mw, burnup= 117.mwd, flux= 2.71E+08n/cm**2-sec
 initial 23741.5 d 25567.7 d 27394.0 d 29220.2 d 29220.3 d

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gd158	7.68E-11	8.39E-11	9.12E-11	9.86E-11	1.06E-10	1.06E-10
pd110	7.51E-11	8.14E-11	8.77E-11	9.40E-11	1.00E-10	1.00E-10
cd114	7.43E-11	8.06E-11	8.70E-11	9.34E-11	9.99E-11	9.99E-11
se 82	7.19E-11	7.78E-11	8.38E-11	8.98E-11	9.58E-11	9.58E-11
sn126	5.77E-11	6.25E-11	6.73E-11	7.21E-11	7.70E-11	7.70E-11
se 78	5.43E-11	5.89E-11	6.34E-11	6.79E-11	7.24E-11	7.24E-11
sn124	4.34E-11	4.71E-11	5.07E-11	5.43E-11	5.79E-11	5.79E-11
dy162	4.28E-11	4.64E-11	5.01E-11	5.38E-11	5.75E-11	5.75E-11
ru 99	3.31E-11	3.81E-11	4.34E-11	4.91E-11	5.51E-11	5.51E-11
dy164	3.94E-11	4.28E-11	4.63E-11	4.97E-11	5.32E-11	5.32E-11
ba140	4.73E-11	4.75E-11	4.75E-11	4.75E-11	4.75E-11	4.73E-11
as 75	3.24E-11	3.51E-11	3.78E-11	4.05E-11	4.32E-11	4.32E-11
sm153	3.73E-11	3.83E-11	3.83E-11	3.83E-11	3.83E-11	3.73E-11
eu156	3.44E-11	3.44E-11	3.44E-11	3.44E-11	3.44E-11	3.44E-11
sr 89	3.09E-11	3.09E-11	3.09E-11	3.09E-11	3.09E-11	3.09E-11
ru106	2.53E-11	2.53E-11	2.53E-11	2.53E-11	2.53E-11	2.53E-11
in113	1.65E-11	1.84E-11	2.03E-11	2.23E-11	2.43E-11	2.43E-11
sn118	1.77E-11	1.92E-11	2.07E-11	2.21E-11	2.36E-11	2.36E-11
ba136	1.74E-11	1.89E-11	2.04E-11	2.19E-11	2.34E-11	2.34E-11
cs134	1.59E-11	1.73E-11	1.86E-11	1.99E-11	2.13E-11	2.13E-11
sn122	1.51E-11	1.64E-11	1.76E-11	1.89E-11	2.01E-11	2.01E-11

cd116	1.51E-11	1.63E-11	1.76E-11	1.88E-11	2.01E-11	2.01E-11
gd154	1.00E-11	1.20E-11	1.42E-11	1.65E-11	1.91E-11	1.91E-11
ce143	1.70E-11	1.76E-11	1.76E-11	1.76E-11	1.76E-11	1.70E-11
la140	1.53E-11	1.53E-11	1.53E-11	1.53E-11	1.53E-11	1.53E-11
sn120	1.13E-11	1.22E-11	1.31E-11	1.41E-11	1.50E-11	1.50E-11
sb125	1.49E-11	1.49E-11	1.49E-11	1.49E-11	1.49E-11	1.49E-11
y 90	1.27E-11	1.31E-11	1.35E-11	1.38E-11	1.41E-11	1.41E-11
kr 82	9.75E-12	1.06E-11	1.14E-11	1.23E-11	1.31E-11	1.31E-11
mo 99	1.29E-11	1.32E-11	1.31E-11	1.31E-11	1.31E-11	1.29E-11
dy163	9.51E-12	1.03E-11	1.11E-11	1.20E-11	1.28E-11	1.28E-11
ge 73	8.85E-12	9.59E-12	1.03E-11	1.11E-11	1.18E-11	1.18E-11
pm148m	9.64E-12	9.63E-12	9.63E-12	9.62E-12	9.62E-12	9.61E-12
ru100	5.14E-12	5.96E-12	6.83E-12	7.77E-12	8.76E-12	8.76E-12
xe130	6.14E-12	6.69E-12	7.23E-12	7.78E-12	8.34E-12	8.34E-12
kr 87	8.20E-12	2.31E-11	2.31E-11	2.31E-11	2.31E-11	8.20E-12
te127m	7.47E-12	7.47E-12	7.47E-12	7.47E-12	7.47E-12	7.47E-12
i131	6.76E-12	6.78E-12	6.78E-12	6.78E-12	6.78E-12	6.76E-12
mo 96	4.74E-12	5.19E-12	5.66E-12	6.13E-12	6.61E-12	6.61E-12
sm148	3.23E-12	3.74E-12	4.28E-12	4.87E-12	5.49E-12	5.49E-12
nd142	3.06E-12	3.59E-12	4.16E-12	4.77E-12	5.43E-12	5.43E-12
ba134	2.81E-12	3.31E-12	3.84E-12	4.41E-12	5.03E-12	5.03E-12
ge 76	3.21E-12	3.48E-12	3.75E-12	4.01E-12	4.28E-12	4.28E-12
ba135	2.42E-12	2.83E-12	3.28E-12	3.76E-12	4.28E-12	4.28E-12
pd104	1.99E-12	2.33E-12	2.70E-12	3.10E-12	3.53E-12	3.53E-12
gd160	2.04E-12	2.21E-12	2.38E-12	2.55E-12	2.72E-12	2.72E-12
te126	1.62E-12	1.77E-12	1.91E-12	2.05E-12	2.20E-12	2.20E-12
te129m	1.80E-12	1.80E-12	1.80E-12	1.80E-12	1.80E-12	1.80E-12
ho165	6.55E-13	7.11E-13	7.68E-13	8.25E-13	8.83E-13	8.83E-13

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gmd/mtu 40% h2o/ 8% uo2
 0 fraction of total absorption rate
 0 power= .00mw, burnup= 117.mwd, flux= 2.71E+08n/cm**2-sec
 initial 23741.5 d 25567.7 d 27394.0 d 29220.2 d 29220.3 d

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te124	3.76E-13	4.08E-13	4.40E-13	4.72E-13	5.04E-13	5.04E-13
sr 87	3.69E-13	4.00E-13	4.31E-13	4.62E-13	4.93E-13	4.93E-13
cd110	2.78E-13	3.25E-13	3.76E-13	4.30E-13	4.88E-13	4.88E-13
nb 93	1.95E-13	2.39E-13	2.88E-13	3.42E-13	4.01E-13	4.01E-13
pm148	3.65E-13	3.67E-13	3.67E-13	3.67E-13	3.67E-13	3.63E-13
br 79	1.95E-13	2.29E-13	2.65E-13	3.04E-13	3.46E-13	3.46E-13
ag111	3.17E-13	3.19E-13	3.19E-13	3.19E-13	3.19E-13	3.18E-13
nb 94	2.09E-13	2.26E-13	2.44E-13	2.61E-13	2.78E-13	2.78E-13
eu157	2.76E-13	2.99E-13	2.99E-13	2.99E-13	2.99E-13	2.77E-13
ge 74	1.79E-13	1.94E-13	2.09E-13	2.24E-13	2.39E-13	2.39E-13
cd115m	2.37E-13	2.37E-13	2.37E-13	2.37E-13	2.38E-13	2.37E-13
xe129	1.10E-13	1.29E-13	1.50E-13	1.72E-13	1.96E-13	1.96E-13
ag107	1.04E-13	1.22E-13	1.41E-13	1.62E-13	1.84E-13	1.84E-13
ge 72	1.20E-13	1.30E-13	1.40E-13	1.50E-13	1.60E-13	1.60E-13
sr 86	1.10E-13	1.19E-13	1.29E-13	1.39E-13	1.48E-13	1.48E-13
se 76	7.09E-14	7.69E-14	8.30E-14	8.90E-14	9.51E-14	9.51E-14
cs136	5.68E-14	5.72E-14	5.73E-14	5.75E-14	5.76E-14	5.74E-14
dy160	2.73E-14	3.08E-14	3.46E-14	3.85E-14	4.26E-14	4.26E-14
xe128	2.73E-14	3.05E-14	3.39E-14	3.74E-14	4.11E-14	4.11E-14
sn125	2.90E-14	2.92E-14	2.92E-14	2.92E-14	2.92E-14	2.90E-14
er166	1.83E-14	2.00E-14	2.17E-14	2.34E-14	2.52E-14	2.52E-14
ru105	2.26E-14	2.95E-14	2.95E-14	2.95E-14	2.95E-14	2.26E-14
sn123	1.01E-14	1.01E-14	1.01E-14	1.01E-14	1.01E-14	1.01E-14
te132	9.44E-15	9.60E-15	9.60E-15	9.60E-15	9.60E-15	9.44E-15
rb 88	8.88E-15	1.30E-14	1.30E-14	1.30E-14	1.30E-14	8.88E-15
i135	8.34E-15	1.02E-14	1.02E-14	1.02E-14	1.02E-14	8.34E-15
sn116	4.37E-15	5.11E-15	5.90E-15	6.76E-15	7.67E-15	7.67E-15

kr 80	5.05E-15	5.48E-15	5.90E-15	6.33E-15	6.75E-15	6.75E-15
te122	2.39E-15	2.74E-15	3.12E-15	3.52E-15	3.95E-15	3.95E-15
sb126	3.10E-15	3.13E-15	3.14E-15	3.14E-15	3.15E-15	3.14E-15
sb124	2.13E-15	2.14E-15	2.14E-15	2.14E-15	2.14E-15	2.14E-15
in117m	1.85E-15	2.11E-15	2.11E-15	2.11E-15	2.11E-15	1.85E-15
tb160	9.20E-16	9.72E-16	1.02E-15	1.08E-15	1.13E-15	1.13E-15
te134	8.72E-16	5.89E-15	5.89E-15	5.89E-15	5.89E-15	8.72E-16
i130	7.14E-16	7.99E-16	8.06E-16	8.12E-16	8.18E-16	7.37E-16
in117	5.51E-16	6.20E-16	6.20E-16	6.20E-16	6.20E-16	5.51E-16
be 9	3.99E-16	4.32E-16	4.65E-16	4.98E-16	5.31E-16	5.31E-16
pr142	3.90E-16	4.53E-16	4.87E-16	5.22E-16	5.57E-16	5.20E-16
te123	3.64E-16	3.95E-16	4.26E-16	4.58E-16	4.90E-16	4.90E-16
rb 86	2.65E-16	2.68E-16	2.70E-16	2.72E-16	2.74E-16	2.73E-16
li 7	1.63E-16	1.77E-16	1.90E-16	2.04E-16	2.17E-16	2.17E-16
dy165	1.31E-16	2.28E-16	2.29E-16	2.30E-16	2.32E-16	1.34E-16
er167	9.04E-17	1.00E-16	1.10E-16	1.21E-16	1.32E-16	1.32E-16
ge 75	3.41E-17	8.70E-17	8.70E-17	8.70E-17	8.70E-17	3.41E-17
cd118	2.48E-17	1.21E-16	1.21E-16	1.21E-16	1.21E-16	2.48E-17
cd108	3.82E-18	4.19E-18	4.57E-18	4.95E-18	5.35E-18	5.35E-18
cs134m	1.94E-18	3.31E-18	3.56E-18	3.82E-18	4.08E-18	2.58E-18
sn114	6.14E-19	7.42E-19	8.84E-19	1.04E-18	1.21E-18	1.21E-18
in119m	4.22E-19	3.03E-17	3.03E-17	3.03E-17	3.03E-17	4.22E-19

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 35
 0 fraction of total absorption rate
 power= .00mw, burnup= 117.mwd, flux= 2.71E+08n/cm**2-sec
 initial 23741.5 d 25567.7 d 27394.0 d 29220.2 d 29220.3 d

cd109	2.90E-19	2.97E-19	3.07E-19	3.14E-19	3.24E-19	3.24E-19
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1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 36
 0 power= 4.000E-03mw, burnup=1.1688E+02mwd, flux= 2.71E+08n/cm**2-sec
 nuclide concentrations, gram atoms
 basis = single reactor assembly
 charge 23741.5 d 25567.7 d 27394.0 d 29220.2 d 29220.3 d

h 1	5.18E-06	5.61E-06	6.04E-06	6.46E-06	6.89E-06	6.89E-06
h 2	1.54E-08	1.66E-08	1.79E-08	1.92E-08	2.04E-08	2.04E-08
h 3	3.21E-11	3.23E-11	3.25E-11	3.26E-11	3.28E-11	3.28E-11
h 4	.00E+00	1.31E-34	1.32E-34	1.33E-34	1.33E-34	.00E+00
he 3	8.07E-11	8.97E-11	9.88E-11	1.08E-10	1.17E-10	1.17E-10
he 4	8.57E-07	9.27E-07	9.98E-07	1.07E-06	1.14E-06	1.14E-06
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ne 20	1.03E-07	1.11E-07	1.20E-07	1.28E-07	1.37E-07	1.37E-07
ne 21	2.03E-13	2.35E-13	2.70E-13	3.08E-13	3.47E-13	3.47E-13
ne 22	6.30E-10	6.85E-10	7.40E-10	7.95E-10	8.50E-10	8.50E-10
ne 23	7.05E-30	7.04E-15	7.04E-15	7.04E-15	7.04E-15	7.04E-30
na 22	4.14E-11	4.14E-11	4.14E-11	4.14E-11	4.14E-11	4.14E-11
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	2.60E-08	2.77E-08	2.77E-08	2.77E-08	2.77E-08	2.53E-08
na 24m	4.68E-30	4.55E-15	4.55E-15	4.55E-15	4.55E-15	4.55E-30
na 25	3.85E-42	4.15E-27	4.52E-27	4.89E-27	5.27E-27	5.30E-42
mg 24	7.94E-04	8.51E-04	9.08E-04	9.66E-04	1.02E-03	1.02E-03
mg 25	1.33E-10	1.46E-10	1.58E-10	1.71E-10	1.85E-10	1.85E-10
mg 26	1.54E-08	1.66E-08	1.79E-08	1.92E-08	2.04E-08	2.04E-08
mg 27	4.55E-16	2.10E-12	2.10E-12	2.10E-12	2.10E-12	4.54E-16
mg 28	4.03E-24	4.29E-24	4.29E-24	4.29E-24	4.29E-24	4.03E-24
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	2.88E-25	2.05E-10	2.05E-10	2.05E-10	2.05E-10	2.80E-25
al 29	2.53E-31	5.60E-26	6.44E-26	7.34E-26	8.29E-26	4.34E-31
al 30	.00E+00	6.93E-38	8.60E-38	1.05E-37	1.27E-37	.00E+00
si 28	2.31E-03	2.48E-03	2.64E-03	2.81E-03	2.98E-03	2.98E-03

pa234 8.09E-12 8.09E-12 8.09E-12 8.09E-12 8.09E-12 8.09E-12
 pa235 .00E+00 .00E+00 .00E+00 .00E+00 .00E+00 .00E+00

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 power= 4.000E-03mw, burnup=1.1688E+02mwd, flux= 2.71E+08n/cm**2-sec

actinides page 38

nuclide concentrations, gram atoms
 basis = single reactor assembly

	charge	23741.5 d	25567.7 d	27394.0 d	29220.2 d	29220.3 d
u230	1.99E-22	2.15E-22	2.32E-22	2.48E-22	2.65E-22	2.64E-22
u231	6.15E-19	6.72E-19	7.24E-19	7.75E-19	8.27E-19	8.16E-19
u232	1.53E-08	1.66E-08	1.79E-08	1.92E-08	2.05E-08	2.05E-08
u233	8.17E-04	8.86E-04	9.54E-04	1.02E-03	1.09E-03	1.09E-03
u234	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00
u235	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02
u236	1.75E+02	1.75E+02	1.75E+02	1.75E+02	1.75E+02	1.75E+02
u237	3.09E-06	3.10E-06	3.10E-06	3.10E-06	3.10E-06	3.07E-06
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04
u239	1.06E-08	3.18E-07	3.18E-07	3.18E-07	3.18E-07	1.06E-08
u240	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	8.67E-12	8.63E-12	8.63E-12	8.62E-12	8.62E-12	8.62E-12
np236m	1.94E-12	2.05E-12	2.05E-12	2.05E-12	2.05E-12	1.93E-12
np236	1.20E-08	1.29E-08	1.39E-08	1.49E-08	1.59E-08	1.59E-08
np237	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01
np238	1.52E-06	1.55E-06	1.55E-06	1.55E-06	1.55E-06	1.51E-06
np239	4.53E-05	4.59E-05	4.59E-05	4.59E-05	4.59E-05	4.51E-05
np240m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np240	2.58E-15	9.33E-15	9.33E-15	9.33E-15	9.33E-15	2.57E-15
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	1.12E-09	1.11E-09	1.11E-09	1.11E-09	1.11E-09	1.11E-09
pu237	8.93E-14	9.46E-14	1.00E-13	1.05E-13	1.10E-13	1.10E-13
pu238	8.94E-03	9.50E-03	1.00E-02	1.06E-02	1.11E-02	1.11E-02
pu239	3.01E-01	3.26E-01	3.50E-01	3.75E-01	4.00E-01	4.00E-01
pu240	8.90E-05	1.04E-04	1.21E-04	1.38E-04	1.57E-04	1.57E-04
pu241	1.97E-08	2.40E-08	2.88E-08	3.41E-08	3.98E-08	3.98E-08
pu242	3.06E-12	4.13E-12	5.43E-12	7.01E-12	8.89E-12	8.89E-12
pu243	4.95E-21	8.69E-21	1.14E-20	1.48E-20	1.87E-20	1.43E-20
pu244	.00E+00	.00E+00	.00E+00	1.40E-45	4.20E-45	4.20E-45
pu245	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am239	3.87E-24	5.70E-24	7.39E-24	9.40E-24	1.18E-23	1.05E-23
am240	1.93E-21	2.61E-21	3.39E-21	4.30E-21	5.38E-21	5.24E-21
am241	1.57E-08	2.09E-08	2.70E-08	3.44E-08	4.30E-08	4.30E-08
am242m	4.97E-13	7.13E-13	9.96E-13	1.36E-12	1.81E-12	1.81E-12
am242	5.10E-16	7.34E-16	9.52E-16	1.21E-15	1.52E-15	1.40E-15
am243	2.46E-16	3.74E-16	5.51E-16	7.91E-16	1.11E-15	1.11E-15
am244m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am244	1.64E-24	2.84E-24	4.19E-24	6.01E-24	8.42E-24	7.38E-24
am245	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
totals	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04
flux		2.71E+08	2.71E+08	2.71E+08	2.71E+08	2.71E-07

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1library information...

1		sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2						fission products		page 40	
0		fraction of total absorption rate									
0		power= .00mw, burnup= 146.mwd, flux= 2.70E+08n/cm**2-sec									
		initial \$1046.6 d 32872.8 d 34699.1 d 36525.3 d									
sm149	5.65E-04	5.98E-04	6.31E-04	6.64E-04	6.96E-04						
sm151	1.87E-05	1.95E-05	2.03E-05	2.10E-05	2.18E-05						
nd143	1.19E-05	1.26E-05	1.34E-05	1.41E-05	1.49E-05						
gd155	7.20E-06	7.69E-06	8.17E-06	8.64E-06	9.12E-06						
eu151	4.68E-06	5.22E-06	5.79E-06	6.37E-06	6.98E-06						
gd157	5.63E-06	5.95E-06	6.27E-06	6.59E-06	6.90E-06						
rh103	5.50E-06	5.84E-06	6.18E-06	6.53E-06	6.87E-06						
cd113	5.04E-06	5.34E-06	5.65E-06	5.95E-06	6.25E-06						
xe131	3.74E-06	3.97E-06	4.21E-06	4.44E-06	4.67E-06						
cs133	2.90E-06	3.08E-06	3.26E-06	3.45E-06	3.63E-06						
tc 99	2.13E-06	2.27E-06	2.40E-06	2.53E-06	2.67E-06						
sm147	2.05E-06	2.19E-06	2.32E-06	2.46E-06	2.59E-06						
xe135	2.29E-06	2.33E-06	2.33E-06	2.33E-06	2.33E-06						
nd145	1.66E-06	1.76E-06	1.87E-06	1.97E-06	2.08E-06						
mo 95	1.14E-06	1.22E-06	1.29E-06	1.36E-06	1.43E-06						
sm152	8.81E-07	9.36E-07	9.91E-07	1.05E-06	1.10E-06						
kr 83	7.23E-07	7.68E-07	8.13E-07	8.58E-07	9.04E-07						
cs135	6.55E-07	6.96E-07	7.37E-07	7.78E-07	8.18E-07						
ru101	5.06E-07	5.38E-07	5.69E-07	6.01E-07	6.32E-07						
pr141	4.91E-07	5.22E-07	5.52E-07	5.83E-07	6.14E-07						
eu153	4.44E-07	4.72E-07	5.00E-07	5.28E-07	5.55E-07						
la139	4.02E-07	4.27E-07	4.52E-07	4.77E-07	5.02E-07						
pm147	2.70E-07	2.70E-07	2.70E-07	2.70E-07	2.70E-07						
pd105	1.69E-07	1.80E-07	1.90E-07	2.01E-07	2.12E-07						
zr 93	1.62E-07	1.72E-07	1.82E-07	1.92E-07	2.03E-07						
eu155	1.58E-07	1.58E-07	1.58E-07	1.59E-07	1.59E-07						
i129	1.25E-07	1.33E-07	1.40E-07	1.48E-07	1.56E-07						
nd144	1.19E-07	1.27E-07	1.34E-07	1.42E-07	1.49E-07						
ba137	1.05E-07	1.15E-07	1.25E-07	1.36E-07	1.47E-07						
mo 97	9.10E-08	9.67E-08	1.02E-07	1.08E-07	1.14E-07						
ag109	6.45E-08	6.86E-08	7.28E-08	7.69E-08	8.11E-08						
sm150	4.80E-08	5.41E-08	6.05E-08	6.72E-08	7.43E-08						
zr 91	4.29E-08	4.55E-08	4.82E-08	5.09E-08	5.36E-08						
y 89	4.12E-08	4.37E-08	4.63E-08	4.89E-08	5.15E-08						
ru102	3.71E-08	3.94E-08	4.17E-08	4.41E-08	4.64E-08						
ce142	3.35E-08	3.56E-08	3.77E-08	3.97E-08	4.18E-08						
nd148	3.21E-08	3.41E-08	3.61E-08	3.81E-08	4.01E-08						
nd146	2.70E-08	2.87E-08	3.03E-08	3.20E-08	3.37E-08						
ba138	2.31E-08	2.45E-08	2.60E-08	2.74E-08	2.88E-08						
in115	2.21E-08	2.35E-08	2.49E-08	2.63E-08	2.77E-08						
pd108	2.17E-08	2.31E-08	2.44E-08	2.58E-08	2.72E-08						
ce140	2.16E-08	2.29E-08	2.43E-08	2.56E-08	2.70E-08						
xe132	1.93E-08	2.05E-08	2.17E-08	2.29E-08	2.41E-08						
mo 98	1.33E-08	1.41E-08	1.49E-08	1.58E-08	1.66E-08						
pd107	1.29E-08	1.37E-08	1.45E-08	1.53E-08	1.61E-08						
mo100	1.29E-08	1.37E-08	1.45E-08	1.53E-08	1.61E-08						
xe134	1.27E-08	1.35E-08	1.43E-08	1.51E-08	1.59E-08						
sr 90	1.48E-08	1.51E-08	1.54E-08	1.56E-08	1.58E-08						
zr 92	1.03E-08	1.10E-08	1.16E-08	1.23E-08	1.29E-08						
1		sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2						fission products		page 41	
0		fraction of total absorption rate									
0		power= .00mw, burnup= 146.mwd, flux= 2.70E+08n/cm**2-sec									
		initial \$1046.6 d 32872.8 d 34699.1 d 36525.3 d									
i127	8.33E-09	8.85E-09	9.37E-09	9.89E-09	1.04E-08						

zr 96	8.05E-09	8.55E-09	9.05E-09	9.56E-09	1.01E-08
ru104	7.92E-09	8.41E-09	8.91E-09	9.40E-09	9.90E-09
nd150	7.10E-09	7.54E-09	7.99E-09	8.43E-09	8.87E-09
xe136	6.88E-09	7.31E-09	7.74E-09	8.17E-09	8.60E-09
rh105	8.36E-09	8.40E-09	8.40E-09	8.40E-09	8.40E-09
br 81	5.15E-09	5.47E-09	5.79E-09	6.11E-09	6.43E-09
rb 85	4.83E-09	5.14E-09	5.46E-09	5.77E-09	6.08E-09
zr 94	4.35E-09	4.62E-09	4.90E-09	5.17E-09	5.44E-09
cd111	3.36E-09	3.57E-09	3.78E-09	3.99E-09	4.20E-09
te130	3.13E-09	3.33E-09	3.52E-09	3.72E-09	3.91E-09
sm154	3.03E-09	3.22E-09	3.41E-09	3.60E-09	3.79E-09
rb 87	2.91E-09	3.09E-09	3.27E-09	3.45E-09	3.64E-09
cs137	3.18E-09	3.24E-09	3.30E-09	3.35E-09	3.40E-09
zr 90	2.29E-09	2.51E-09	2.73E-09	2.96E-09	3.19E-09
pr143	2.68E-09	2.68E-09	2.68E-09	2.68E-09	2.68E-09
se 77	2.08E-09	2.21E-09	2.34E-09	2.47E-09	2.60E-09
xe133	2.03E-09	2.03E-09	2.03E-09	2.03E-09	2.03E-09
pd106	1.44E-09	1.53E-09	1.62E-09	1.72E-09	1.81E-09
kr 84	1.37E-09	1.45E-09	1.54E-09	1.62E-09	1.71E-09
ce141	1.61E-09	1.61E-09	1.61E-09	1.61E-09	1.61E-09
se 79	1.06E-09	1.13E-09	1.20E-09	1.26E-09	1.33E-09
eu152	8.00E-10	9.15E-10	1.04E-09	1.16E-09	1.30E-09
sb121	1.00E-09	1.06E-09	1.13E-09	1.19E-09	1.25E-09
sb123	8.17E-10	8.68E-10	9.19E-10	9.70E-10	1.02E-09
pm149	9.74E-10	9.81E-10	9.81E-10	9.81E-10	9.81E-10
kr 86	7.69E-10	8.17E-10	8.65E-10	9.13E-10	9.61E-10
nd147	9.26E-10	9.30E-10	9.30E-10	9.30E-10	9.30E-10
te128	6.82E-10	7.25E-10	7.68E-10	8.10E-10	8.53E-10
gd156	5.42E-10	5.78E-10	6.14E-10	6.50E-10	6.86E-10
se 80	4.96E-10	5.27E-10	5.58E-10	5.89E-10	6.20E-10
ce144	6.04E-10	6.04E-10	6.04E-10	6.04E-10	6.03E-10
kr 85	5.73E-10	5.74E-10	5.75E-10	5.75E-10	5.76E-10
dy161	4.36E-10	4.64E-10	4.92E-10	5.20E-10	5.48E-10
te125	4.11E-10	4.39E-10	4.66E-10	4.93E-10	5.20E-10
tb159	2.92E-10	3.11E-10	3.29E-10	3.47E-10	3.66E-10
ru103	3.58E-10	3.58E-10	3.58E-10	3.58E-10	3.58E-10
li 6	2.82E-10	3.00E-10	3.17E-10	3.35E-10	3.53E-10
cd112	2.81E-10	2.98E-10	3.16E-10	3.34E-10	3.51E-10
sn117	2.22E-10	2.36E-10	2.50E-10	2.64E-10	2.78E-10
eu154	1.99E-10	2.13E-10	2.28E-10	2.42E-10	2.56E-10
gd152	1.24E-10	1.48E-10	1.76E-10	2.07E-10	2.41E-10
sn119	1.83E-10	1.95E-10	2.06E-10	2.18E-10	2.29E-10
sn115	1.68E-10	1.78E-10	1.89E-10	1.99E-10	2.10E-10
sr 88	1.41E-10	1.50E-10	1.59E-10	1.68E-10	1.76E-10
zr 95	1.65E-10	1.65E-10	1.65E-10	1.65E-10	1.65E-10
nb 95	1.53E-10	1.53E-10	1.53E-10	1.53E-10	1.53E-10
y 91	1.44E-10	1.44E-10	1.44E-10	1.44E-10	1.44E-10
gd158	1.06E-10	1.14E-10	1.21E-10	1.29E-10	1.37E-10

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 0 fraction of total absorption rate
 0 power= .00mw, burnup= 146.mwd, flux= 2.70E+08n/cm**2-sec
 initial 31046.6 d 32872.8 d 34699.1 d 36525.3 d

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cd114	9.98E-11	1.06E-10	1.13E-10	1.19E-10	1.26E-10
pd110	1.00E-10	1.07E-10	1.13E-10	1.19E-10	1.26E-10
se 82	9.58E-11	1.02E-10	1.08E-10	1.14E-10	1.20E-10
pm151	1.06E-10	1.11E-10	1.11E-10	1.11E-10	1.11E-10
sn126	7.70E-11	8.18E-11	8.66E-11	9.15E-11	9.63E-11
se 78	7.24E-11	7.70E-11	8.15E-11	8.60E-11	9.06E-11
ru 99	5.51E-11	6.15E-11	6.82E-11	7.53E-11	8.27E-11

dy162	5.75E-11	6.12E-11	6.49E-11	6.86E-11	7.24E-11
sn124	5.79E-11	6.15E-11	6.51E-11	6.88E-11	7.24E-11
dy164	5.32E-11	5.67E-11	6.02E-11	6.37E-11	6.73E-11
as 75	4.32E-11	4.59E-11	4.86E-11	5.13E-11	5.40E-11
ba140	4.73E-11	4.75E-11	4.75E-11	4.75E-11	4.75E-11
sm153	3.73E-11	3.83E-11	3.83E-11	3.83E-11	3.83E-11
eu156	3.44E-11	3.45E-11	3.45E-11	3.45E-11	3.45E-11
in113	2.43E-11	2.62E-11	2.82E-11	3.02E-11	3.22E-11
gd154	1.91E-11	2.18E-11	2.47E-11	2.78E-11	3.11E-11
sr 89	3.09E-11	3.09E-11	3.09E-11	3.09E-11	3.09E-11
sn118	2.36E-11	2.51E-11	2.65E-11	2.80E-11	2.95E-11
ba136	2.34E-11	2.49E-11	2.64E-11	2.79E-11	2.94E-11
cs134	2.13E-11	2.26E-11	2.40E-11	2.53E-11	2.67E-11
ru106	2.53E-11	2.53E-11	2.54E-11	2.54E-11	2.54E-11
sn122	2.01E-11	2.14E-11	2.26E-11	2.39E-11	2.52E-11
cd116	2.01E-11	2.13E-11	2.26E-11	2.38E-11	2.51E-11
kr 87	8.20E-12	2.31E-11	2.31E-11	2.31E-11	2.31E-11
sn120	1.50E-11	1.60E-11	1.69E-11	1.78E-11	1.88E-11
ce143	1.70E-11	1.76E-11	1.76E-11	1.76E-11	1.76E-11
kr 82	1.31E-11	1.40E-11	1.48E-11	1.57E-11	1.66E-11
dy163	1.28E-11	1.36E-11	1.45E-11	1.53E-11	1.62E-11
la140	1.53E-11	1.53E-11	1.53E-11	1.53E-11	1.53E-11
y 90	1.41E-11	1.44E-11	1.46E-11	1.48E-11	1.50E-11
sb125	1.49E-11	1.49E-11	1.49E-11	1.49E-11	1.49E-11
ge 73	1.18E-11	1.25E-11	1.33E-11	1.40E-11	1.48E-11
ru100	8.76E-12	9.82E-12	1.09E-11	1.21E-11	1.33E-11
mo 99	1.29E-11	1.31E-11	1.31E-11	1.31E-11	1.31E-11
xe130	8.34E-12	8.90E-12	9.46E-12	1.00E-11	1.06E-11
pm148m	9.62E-12	9.62E-12	9.62E-12	9.62E-12	9.62E-12
mo 96	6.61E-12	7.10E-12	7.60E-12	8.11E-12	8.63E-12
nd142	5.43E-12	6.13E-12	6.87E-12	7.66E-12	8.48E-12
sm148	5.49E-12	6.15E-12	6.84E-12	7.58E-12	8.34E-12
ba134	5.03E-12	5.69E-12	6.38E-12	7.12E-12	7.89E-12
te127m	7.48E-12	7.48E-12	7.48E-12	7.48E-12	7.48E-12
i131	6.76E-12	6.78E-12	6.78E-12	6.78E-12	6.78E-12
ba135	4.28E-12	4.83E-12	5.41E-12	6.02E-12	6.67E-12
pd104	3.53E-12	3.98E-12	4.46E-12	4.97E-12	5.50E-12
ge 76	4.28E-12	4.55E-12	4.82E-12	5.08E-12	5.35E-12
gd160	2.72E-12	2.89E-12	3.06E-12	3.23E-12	3.41E-12
te126	2.20E-12	2.34E-12	2.49E-12	2.63E-12	2.78E-12
te129m	1.80E-12	1.80E-12	1.80E-12	1.80E-12	1.80E-12
ho165	8.83E-13	9.40E-13	9.98E-13	1.06E-12	1.12E-12

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
fraction of total absorption rate
power=.00mw, burnup=146.mwd, flux=2.70E+08n/cm**2-sec
initial 31046.6 d 32872.8 d 34699.1 d 36525.3 d

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cd110	4.89E-13	5.50E-13	6.16E-13	6.85E-13	7.59E-13
nb 93	4.01E-13	4.65E-13	5.35E-13	6.10E-13	6.90E-13
te124	5.04E-13	5.36E-13	5.68E-13	6.00E-13	6.32E-13
sr 87	4.93E-13	5.23E-13	5.54E-13	5.85E-13	6.16E-13
br 79	3.46E-13	3.91E-13	4.38E-13	4.88E-13	5.41E-13
pm148	3.63E-13	3.67E-13	3.67E-13	3.67E-13	3.67E-13
nb 94	2.78E-13	2.96E-13	3.13E-13	3.31E-13	3.48E-13
ag111	3.18E-13	3.20E-13	3.20E-13	3.20E-13	3.20E-13
xe129	1.96E-13	2.21E-13	2.48E-13	2.76E-13	3.06E-13
eu157	2.77E-13	3.00E-13	3.00E-13	3.00E-13	3.00E-13
ge 74	2.39E-13	2.54E-13	2.68E-13	2.83E-13	2.98E-13
ag107	1.84E-13	2.08E-13	2.33E-13	2.60E-13	2.88E-13
cd115m	2.37E-13	2.38E-13	2.38E-13	2.38E-13	2.38E-13

ge 72	1.60E-13	1.70E-13	1.81E-13	1.91E-13	2.01E-13
sr 86	1.48E-13	1.58E-13	1.68E-13	1.78E-13	1.89E-13
se 76	9.52E-14	1.01E-13	1.07E-13	1.14E-13	1.20E-13
dy160	4.26E-14	4.69E-14	5.14E-14	5.61E-14	6.09E-14
cs136	5.74E-14	5.77E-14	5.79E-14	5.80E-14	5.81E-14
xe128	4.11E-14	4.49E-14	4.89E-14	5.30E-14	5.72E-14
er166	2.52E-14	2.69E-14	2.87E-14	3.06E-14	3.24E-14
ru105	2.26E-14	2.95E-14	2.95E-14	2.96E-14	2.96E-14
sn125	2.90E-14	2.92E-14	2.92E-14	2.92E-14	2.92E-14
rb 88	8.88E-15	1.30E-14	1.30E-14	1.30E-14	1.30E-14
sn116	7.67E-15	8.63E-15	9.66E-15	1.07E-14	1.19E-14
i135	8.34E-15	1.02E-14	1.02E-14	1.02E-14	1.02E-14
sn123	1.01E-14	1.01E-14	1.01E-14	1.01E-14	1.01E-14
te132	9.44E-15	9.60E-15	9.60E-15	9.60E-15	9.60E-15
kr 80	6.76E-15	7.18E-15	7.61E-15	8.04E-15	8.47E-15
te134	8.73E-16	5.89E-15	5.89E-15	5.89E-15	5.89E-15
te122	3.95E-15	4.40E-15	4.87E-15	5.37E-15	5.89E-15
sb126	3.14E-15	3.16E-15	3.17E-15	3.18E-15	3.19E-15
sb124	2.14E-15	2.15E-15	2.15E-15	2.15E-15	2.15E-15
in117m	1.86E-15	2.11E-15	2.11E-15	2.11E-15	2.11E-15
tb160	1.13E-15	1.18E-15	1.23E-15	1.28E-15	1.33E-15
i130	7.37E-16	8.25E-16	8.31E-16	8.38E-16	8.44E-16
pr142	5.20E-16	5.92E-16	6.27E-16	6.61E-16	6.96E-16
be 9	5.31E-16	5.64E-16	5.97E-16	6.30E-16	6.64E-16
in117	5.52E-16	6.21E-16	6.21E-16	6.21E-16	6.21E-16
te123	4.90E-16	5.22E-16	5.53E-16	5.86E-16	6.18E-16
rb 86	2.73E-16	2.76E-16	2.78E-16	2.80E-16	2.82E-16
li 7	2.17E-16	2.31E-16	2.45E-16	2.58E-16	2.72E-16
dy165	1.34E-16	2.33E-16	2.34E-16	2.36E-16	2.37E-16
er167	1.32E-16	1.43E-16	1.55E-16	1.67E-16	1.80E-16
cd118	2.48E-17	1.21E-16	1.21E-16	1.21E-16	1.21E-16
ge 75	3.41E-17	8.71E-17	8.70E-17	8.70E-17	8.70E-17
in119m	4.23E-19	3.03E-17	3.03E-17	3.03E-17	3.03E-17
cd108	5.35E-18	5.76E-18	6.17E-18	6.59E-18	7.02E-18
cs134m	2.58E-18	4.33E-18	4.58E-18	4.84E-18	5.09E-18
in119	1.63E-21	2.37E-18	2.37E-18	2.37E-18	2.37E-18

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 44
 0 fraction of total absorption rate
 0 power= .00mw, burnup= 146.mwd, flux= 2.70E+08n/cm**2-sec
 initial 31046.6 d 32872.8 d 34699.1 d 36525.3 d

sn114	1.21E-18	1.40E-18	1.60E-18	1.81E-18	2.04E-18
cd109	3.24E-19	3.32E-19	3.41E-19	3.50E-19	3.58E-19
ag110	6.39E-23	9.10E-20	9.64E-20	1.02E-19	1.07E-19
in120	.00E+00	3.99E-22	3.99E-22	3.99E-22	3.99E-22
in120m	.00E+00	4.33E-23	4.33E-23	4.33E-23	4.33E-23

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 45
 0 power= 4.000E-03mw, burnup=1.4610E+02mwd, flux= 2.79E+08n/cm**2-sec
 nuclide concentrations, gram atoms
 basis = single reactor assembly

charge 31046.6 d 32872.8 d 34699.1 d 36525.3 d					
h 1	6.89E-06	7.31E-06	7.74E-06	8.17E-06	8.59E-06
h 2	2.04E-08	2.17E-08	2.30E-08	2.42E-08	2.55E-08
h 3	3.28E-11	3.28E-11	3.29E-11	3.30E-11	3.30E-11
h 4	.00E+00	1.34E-34	1.34E-34	1.34E-34	1.34E-34
he 3	1.17E-10	1.26E-10	1.35E-10	1.45E-10	1.54E-10
he 4	1.14E-06	1.21E-06	1.28E-06	1.35E-06	1.42E-06
he 6	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ne 20	1.37E-07	1.45E-07	1.54E-07	1.62E-07	1.71E-07

ne 21	3.47E-13	3.89E-13	4.33E-13	4.79E-13	5.28E-13
ne 22	8.50E-10	9.05E-10	9.60E-10	1.02E-09	1.07E-09
ne 23	7.04E-30	7.04E-15	7.04E-15	7.04E-15	7.04E-15
na 22	4.14E-11	4.14E-11	4.14E-11	4.14E-11	4.14E-11
na 23	7.53E+03	7.53E+03	7.53E+03	7.53E+03	7.53E+03
na 24	2.53E-08	2.75E-08	2.75E-08	2.75E-08	2.75E-08
na 24m	4.55E-30	4.51E-15	4.51E-15	4.51E-15	4.51E-15
na 25	5.30E-42	5.65E-27	6.04E-27	6.43E-27	6.84E-27
mg 24	1.02E-03	1.08E-03	1.14E-03	1.19E-03	1.25E-03
mg 25	1.85E-10	1.98E-10	2.12E-10	2.26E-10	2.40E-10
mg 26	2.04E-08	2.17E-08	2.30E-08	2.42E-08	2.55E-08
mg 27	4.54E-16	2.10E-12	2.10E-12	2.10E-12	2.10E-12
mg 28	4.03E-24	4.29E-24	4.29E-24	4.29E-24	4.29E-24
al 27	4.99E+04	4.99E+04	4.99E+04	4.99E+04	4.99E+04
al 28	2.80E-25	2.04E-10	2.04E-10	2.04E-10	2.04E-10
al 29	4.34E-31	9.29E-26	1.04E-25	1.15E-25	1.26E-25
al 30	.00E+00	1.51E-37	1.78E-37	2.08E-37	2.42E-37
si 28	2.98E-03	3.14E-03	3.31E-03	3.47E-03	3.64E-03
si 29	3.25E-10	3.64E-10	4.06E-10	4.49E-10	4.95E-10
si 30	3.71E-17	4.43E-17	5.22E-17	6.11E-17	7.09E-17
si 31	1.61E-29	3.18E-29	3.75E-29	4.39E-29	5.10E-29
si 32	3.64E-36	4.59E-36	5.72E-36	7.04E-36	8.57E-36
totals	5.75E+04	5.75E+04	5.75E+04	5.75E+04	5.75E+04
flux		2.70E+08	2.70E+08	2.70E+08	2.70E+08

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 power= 4.000E-03mw, burnup=1.4610E+02mwd flux= 2.79E+08n/cm**2-sec
 nuclide concentrations, gram atoms
 basis = single reactor assembly

actinides page 46

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charge 31046.6 d 32872.8 d 34699.1 d 36525.3 d					
he 4	8.40E-03	9.16E-03	9.95E-03	1.07E-02	1.16E-02
pb206	3.48E-09	4.34E-09	5.33E-09	6.48E-09	7.78E-09
pb207	2.43E-08	2.84E-08	3.28E-08	3.76E-08	4.27E-08
pb208	7.38E-09	8.40E-09	9.47E-09	1.06E-08	1.18E-08
pb209	8.98E-15	1.01E-14	1.13E-14	1.26E-14	1.39E-14
pb210	5.10E-09	5.95E-09	6.88E-09	7.88E-09	8.96E-09
pb211	7.70E-14	8.41E-14	9.12E-14	9.83E-14	1.06E-13
pb212	3.44E-13	3.66E-13	3.88E-13	4.10E-13	4.32E-13
pb214	2.29E-14	2.67E-14	2.99E-14	3.33E-14	3.68E-14
bi208	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi209	4.44E-10	5.32E-10	6.32E-10	7.43E-10	8.66E-10
bi210m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
bi210	3.14E-12	3.67E-12	4.24E-12	4.85E-12	5.51E-12
bi211	4.60E-15	4.98E-15	5.40E-15	5.83E-15	6.26E-15
bi212	3.26E-14	3.47E-14	3.68E-14	3.89E-14	4.10E-14
bi213	2.02E-15	2.35E-15	2.64E-15	2.94E-15	3.25E-15
bi214	1.73E-14	1.98E-14	2.22E-14	2.47E-14	2.74E-14
po210	8.68E-11	1.01E-10	1.17E-10	1.34E-10	1.52E-10
po211m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
po211	5.08E-20	5.51E-20	5.97E-20	6.44E-20	6.91E-20
po212	1.71E-24	1.82E-24	1.93E-24	2.04E-24	2.15E-24
po213	3.04E-24	3.54E-24	3.96E-24	4.42E-24	4.89E-24
po214	2.38E-21	2.73E-21	3.05E-21	3.40E-21	3.76E-21
po215	6.33E-20	6.91E-20	7.49E-20	8.08E-20	8.67E-20
po216	1.30E-18	1.39E-18	1.47E-18	1.55E-18	1.64E-18
po218	2.74E-15	3.09E-15	3.46E-15	3.85E-15	4.26E-15
ra222	5.60E-27	5.94E-27	6.29E-27	6.64E-27	6.98E-27
ra223	3.52E-11	3.83E-11	4.16E-11	4.48E-11	4.81E-11
ra224	2.84E-12	3.02E-12	3.20E-12	3.39E-12	3.57E-12
ra225	9.74E-13	1.10E-12	1.23E-12	1.37E-12	1.52E-12

ra226	7.43E-07	8.38E-07	9.39E-07	1.05E-06	1.16E-06
ra228	1.51E-13	1.62E-13	1.73E-13	1.83E-13	1.94E-13
ac225	6.58E-13	7.43E-13	8.33E-13	9.28E-13	1.03E-12
ac227	2.44E-08	2.66E-08	2.89E-08	3.11E-08	3.34E-08
ac228	1.85E-17	1.98E-17	2.11E-17	2.24E-17	2.37E-17
th226	2.73E-25	2.90E-25	3.07E-25	3.24E-25	3.41E-25
th227	5.67E-11	6.19E-11	6.71E-11	7.24E-11	7.77E-11
th228	5.41E-10	5.76E-10	6.11E-10	6.46E-10	6.81E-10
th229	1.89E-07	2.14E-07	2.40E-07	2.67E-07	2.96E-07
th230	2.04E-03	2.17E-03	2.30E-03	2.43E-03	2.55E-03
th231	3.03E-09	3.03E-09	3.03E-09	3.03E-09	3.03E-09
th232	4.13E-04	4.39E-04	4.65E-04	4.91E-04	5.16E-04
th233	1.05E-16	4.02E-15	4.26E-15	4.50E-15	4.73E-15
th234	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
pa231	5.76E-05	6.12E-05	6.48E-05	6.83E-05	7.19E-05
pa232	9.48E-13	1.05E-12	1.11E-12	1.17E-12	1.24E-12
pa233	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06
pa234m	1.81E-11	1.81E-11	1.81E-11	1.81E-11	1.81E-11
pa234	8.09E-12	8.09E-12	8.09E-12	8.09E-12	8.09E-12
pa235	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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0

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 power= 4.000E-03mw, burnup=1.4610E+02mwd flux= 2.79E+08n/cm**2-sec
 nuclide concentrations, gram atoms
 basis = single reactor assembly

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charge 31046.6 d 32872.8 d 34699.1 d 36525.3 d					
u230	2.64E-22	2.81E-22	2.97E-22	3.14E-22	3.30E-22
u231	8.16E-19	8.78E-19	9.29E-19	9.81E-19	1.03E-18
u232	2.05E-08	2.17E-08	2.30E-08	2.43E-08	2.55E-08
u233	1.09E-03	1.16E-03	1.23E-03	1.29E-03	1.36E-03
u234	9.06E+00	9.06E+00	9.06E+00	9.06E+00	9.06E+00
u235	7.30E+02	7.30E+02	7.30E+02	7.30E+02	7.30E+02
u236	1.75E+02	1.75E+02	1.75E+02	1.75E+02	1.75E+02
u237	3.07E-06	3.10E-06	3.10E-06	3.10E-06	3.10E-06
u238	3.64E+04	3.64E+04	3.64E+04	3.64E+04	3.64E+04
u239	1.06E-08	3.17E-07	3.17E-07	3.17E-07	3.17E-07
u240	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np235	8.62E-12	8.61E-12	8.61E-12	8.61E-12	8.61E-12
np236m	1.93E-12	2.05E-12	2.05E-12	2.05E-12	2.05E-12
np236	1.59E-08	1.68E-08	1.78E-08	1.88E-08	1.97E-08
np237	4.21E+01	4.21E+01	4.21E+01	4.21E+01	4.21E+01
np238	1.51E-06	1.55E-06	1.55E-06	1.55E-06	1.55E-06
np239	4.51E-05	4.59E-05	4.59E-05	4.59E-05	4.59E-05
np240m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np240	2.57E-15	9.32E-15	9.32E-15	9.32E-15	9.32E-15
np241	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu236	1.11E-09	1.11E-09	1.11E-09	1.11E-09	1.11E-09
pu237	1.10E-13	1.15E-13	1.20E-13	1.24E-13	1.29E-13
pu238	1.11E-02	1.16E-02	1.20E-02	1.25E-02	1.29E-02
pu239	4.00E-01	4.24E-01	4.49E-01	4.73E-01	4.98E-01
pu240	1.57E-04	1.77E-04	1.99E-04	2.21E-04	2.45E-04
pu241	3.98E-08	4.61E-08	5.28E-08	5.99E-08	6.76E-08
pu242	8.89E-12	1.11E-11	1.37E-11	1.67E-11	2.02E-11
pu243	1.43E-20	2.34E-20	2.89E-20	3.52E-20	4.25E-20
pu244	4.20E-45	8.41E-45	1.54E-44	2.80E-44	4.90E-44
pu245	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am239	1.05E-23	1.45E-23	1.76E-23	2.11E-23	2.52E-23
am240	5.24E-21	6.62E-21	8.05E-21	9.68E-21	1.15E-20

am241	4.30E-08	5.30E-08	6.44E-08	7.75E-08	9.22E-08
am242m	1.81E-12	2.36E-12	3.04E-12	3.85E-12	4.82E-12
am242	1.40E-15	1.87E-15	2.28E-15	2.74E-15	3.26E-15
am243	1.11E-15	1.52E-15	2.05E-15	2.71E-15	3.54E-15
am244m	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am244	7.38E-24	1.15E-23	1.55E-23	2.06E-23	2.69E-23
am245	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am246	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
totals	3.73E+04	3.73E+04	3.73E+04	3.73E+04	3.73E+04
flux	2.70E+08	2.70E+08	2.70E+08	2.70E+08	2.70E+08

0 results on logical unit no. 71, position 1, for time step 4, subcase 6. (run position 1, case position 1)
 0 title: sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 48
 0 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+02mwd, flux= 2.79E+08n/cm**2-sec

nuclide concentrations, grams
 basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
h	8.59E-06	8.59E-06	8.59E-06	8.59E-06	8.59E-06	8.59E-06	8.59E-06
he 4	5.68E-06	5.68E-06	5.68E-06	5.68E-06	5.68E-06	5.68E-06	5.68E-06
ne 20	3.41E-06	3.41E-06	3.41E-06	3.41E-06	3.41E-06	3.41E-06	3.41E-06
na 23	1.73E+05	1.73E+05	1.73E+05	1.73E+05	1.73E+05	1.73E+05	1.73E+05
mg 24	3.00E-02	3.00E-02	3.00E-02	3.00E-02	3.00E-02	3.00E-02	3.00E-02
mg 26	6.63E-07	6.63E-07	6.63E-07	6.63E-07	6.63E-07	6.63E-07	6.63E-07
al 27	1.35E+06	1.35E+06	1.35E+06	1.35E+06	1.35E+06	1.35E+06	1.35E+06
si 28	1.02E-01	1.02E-01	1.02E-01	1.02E-01	1.02E-01	1.02E-01	1.02E-01
total	1.52E+06	1.52E+06	1.52E+06	1.52E+06	1.52E+06	1.52E+06	1.52E+06

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 49
 0 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+02mwd, flux= 2.79E+08n/cm**2-sec

element radioactivity, curies
 basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
h	9.58E-07	9.14E-07	8.72E-07	8.33E-07	7.94E-07	7.58E-07	7.23E-07
na	8.40E+00	4.56E-06	3.65E-06	2.92E-06	2.34E-06	1.87E-06	1.50E-06
totals	2.55E+01	5.47E-06	4.52E-06	3.75E-06	3.13E-06	2.63E-06	2.22E-06

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 50
 0 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+02mwd, flux= 2.79E+08n/cm**2-sec

element thermal power, watts
 basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
na	1.70E-01	6.45E-08	5.16E-08	4.13E-08	3.31E-08	2.65E-08	2.12E-08
totals	4.76E-01	6.45E-08	5.17E-08	4.14E-08	3.31E-08	2.65E-08	2.13E-08

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 light elements page 51
 0 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+02mwd, flux= 2.79E+08n/cm**2-sec

nuclide gamma power, watts
 basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
na 22	7.39E-08	5.92E-08	4.74E-08	3.80E-08	3.04E-08	2.44E-08	1.95E-08
total	3.31E-01	5.92E-08	4.74E-08	3.80E-08	3.04E-08	2.44E-08	1.95E-08

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 52
 0 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+02mwd, flux= 2.79E+08n/cm**2-sec

nuclide concentrations, gram atoms
 basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
he 4	1.16E-02	1.17E-02	1.19E-02	1.20E-02	1.21E-02	1.23E-02	1.24E-02
ra226	1.16E-06	1.18E-06	1.20E-06	1.22E-06	1.24E-06	1.25E-06	1.27E-06

pu241	1.63E-05	1.57E-05	1.50E-05	1.44E-05	1.39E-05	1.33E-05	1.28E-05
am241	2.22E-05	2.28E-05	2.34E-05	2.40E-05	2.45E-05	2.50E-05	2.55E-05
total	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 55
 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+02mwd, flux= 2.79E+08n/cm**2-sec

0

element concentrations, grams
 basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
he	4.63E-02	4.69E-02	4.74E-02	4.80E-02	4.85E-02	4.91E-02	4.96E-02
pb	1.48E-05	1.51E-05	1.54E-05	1.57E-05	1.61E-05	1.64E-05	1.67E-05
ra	2.62E-04	2.66E-04	2.70E-04	2.75E-04	2.79E-04	2.84E-04	2.88E-04
ac	7.58E-06	7.67E-06	7.76E-06	7.84E-06	7.93E-06	8.02E-06	8.11E-06
th	7.07E-01	7.13E-01	7.19E-01	7.25E-01	7.31E-01	7.37E-01	7.43E-01
pa	1.70E-02	1.71E-02	1.72E-02	1.74E-02	1.75E-02	1.77E-02	1.78E-02
u	8.87E+06	8.87E+06	8.87E+06	8.87E+06	8.87E+06	8.87E+06	8.87E+06
np	9.99E+03	9.99E+03	9.99E+03	9.99E+03	9.99E+03	9.99E+03	9.99E+03
pu	1.22E+02	1.22E+02	1.22E+02	1.22E+02	1.22E+02	1.22E+02	1.22E+02
am	2.22E-05	2.28E-05	2.34E-05	2.40E-05	2.45E-05	2.50E-05	2.55E-05
totals	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06	8.88E+06

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 56
 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+02mwd, flux= 2.79E+08n/cm**2-sec

0

nuclide radioactivity, curies
 basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
tl207	5.48E-04	5.55E-04	5.61E-04	5.67E-04	5.74E-04	5.80E-04	5.86E-04
tl208	4.58E-05	4.63E-05	4.65E-05	4.66E-05	4.67E-05	4.67E-05	4.66E-05
pb209	1.34E-05	1.37E-05	1.39E-05	1.41E-05	1.43E-05	1.46E-05	1.48E-05
pb210	1.44E-04	1.47E-04	1.50E-04	1.53E-04	1.56E-04	1.59E-04	1.62E-04
pb211	5.50E-04	5.56E-04	5.63E-04	5.69E-04	5.75E-04	5.82E-04	5.88E-04
pb212	1.27E-04	1.29E-04	1.29E-04	1.30E-04	1.30E-04	1.30E-04	1.30E-04
pb214	2.59E-04	2.63E-04	2.67E-04	2.72E-04	2.76E-04	2.80E-04	2.85E-04
bi210	1.44E-04	1.47E-04	1.50E-04	1.53E-04	1.56E-04	1.59E-04	1.62E-04
bi211	5.50E-04	5.56E-04	5.63E-04	5.69E-04	5.75E-04	5.82E-04	5.88E-04
bi212	1.27E-04	1.29E-04	1.29E-04	1.30E-04	1.30E-04	1.30E-04	1.30E-04
bi213	1.34E-05	1.37E-05	1.39E-05	1.41E-05	1.43E-05	1.46E-05	1.48E-05
bi214	2.59E-04	2.63E-04	2.67E-04	2.72E-04	2.76E-04	2.80E-04	2.85E-04
po210	1.44E-04	1.44E-04	1.46E-04	1.49E-04	1.52E-04	1.55E-04	1.58E-04
po211	1.51E-06	1.53E-06	1.55E-06	1.56E-06	1.58E-06	1.60E-06	1.62E-06
po212	8.16E-05	8.24E-05	8.29E-05	8.31E-05	8.32E-05	8.32E-05	8.31E-05
po213	1.31E-05	1.34E-05	1.36E-05	1.38E-05	1.40E-05	1.43E-05	1.45E-05
po214	2.59E-04	2.63E-04	2.67E-04	2.72E-04	2.76E-04	2.80E-04	2.85E-04
po215	5.50E-04	5.56E-04	5.63E-04	5.69E-04	5.75E-04	5.82E-04	5.88E-04
po216	1.27E-04	1.29E-04	1.29E-04	1.30E-04	1.30E-04	1.30E-04	1.30E-04
po218	2.59E-04	2.63E-04	2.67E-04	2.72E-04	2.76E-04	2.81E-04	2.85E-04
at217	1.34E-05	1.37E-05	1.39E-05	1.41E-05	1.43E-05	1.46E-05	1.48E-05
rn219	5.50E-04	5.56E-04	5.63E-04	5.69E-04	5.75E-04	5.82E-04	5.88E-04
rn220	1.27E-04	1.29E-04	1.29E-04	1.30E-04	1.30E-04	1.30E-04	1.30E-04
rn222	2.59E-04	2.63E-04	2.67E-04	2.72E-04	2.76E-04	2.81E-04	2.85E-04
fr221	1.34E-05	1.37E-05	1.39E-05	1.41E-05	1.43E-05	1.46E-05	1.48E-05
fr223	7.57E-06	7.66E-06	7.75E-06	7.83E-06	7.92E-06	8.01E-06	8.10E-06
ra223	5.50E-04	5.56E-04	5.63E-04	5.69E-04	5.75E-04	5.82E-04	5.88E-04
ra224	1.27E-04	1.29E-04	1.29E-04	1.30E-04	1.30E-04	1.30E-04	1.30E-04
ra225	1.34E-05	1.37E-05	1.39E-05	1.41E-05	1.43E-05	1.46E-05	1.48E-05
ra226	2.59E-04	2.63E-04	2.67E-04	2.72E-04	2.76E-04	2.81E-04	2.85E-04
ac225	1.34E-05	1.37E-05	1.39E-05	1.41E-05	1.43E-05	1.46E-05	1.48E-05
ac227	5.49E-04	5.55E-04	5.61E-04	5.68E-04	5.74E-04	5.80E-04	5.87E-04
th227	5.42E-04	5.49E-04	5.55E-04	5.61E-04	5.67E-04	5.74E-04	5.80E-04
th228	1.27E-04	1.28E-04	1.29E-04	1.29E-04	1.29E-04	1.29E-04	1.29E-04

th229	1.34E-05	1.37E-05	1.39E-05	1.41E-05	1.43E-05	1.46E-05	1.48E-05
th230	1.21E-02	1.22E-02	1.23E-02	1.24E-02	1.25E-02	1.26E-02	1.27E-02
th231	3.72E-01	3.71E-01	3.71E-01	3.71E-01	3.71E-01	3.71E-01	3.71E-01
th234	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00
pa231	7.85E-04	7.92E-04	7.98E-04	8.05E-04	8.12E-04	8.18E-04	8.25E-04
pa233	7.04E+00	7.05E+00	7.05E+00	7.05E+00	7.05E+00	7.05E+00	7.05E+00
pa234m	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00
pa234	3.78E-03	3.78E-03	3.78E-03	3.78E-03	3.78E-03	3.78E-03	3.78E-03
u232	1.31E-04	1.31E-04	1.31E-04	1.30E-04	1.30E-04	1.29E-04	1.28E-04
u233	3.06E-03	3.09E-03	3.12E-03	3.15E-03	3.18E-03	3.21E-03	3.23E-03
u234	1.32E+01	1.32E+01	1.32E+01	1.32E+01	1.32E+01	1.32E+01	1.32E+01
u235	3.71E-01	3.71E-01	3.71E-01	3.71E-01	3.71E-01	3.71E-01	3.71E-01
u236	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00
u238	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00	2.91E+00
np237	7.04E+00	7.04E+00	7.04E+00	7.04E+00	7.04E+00	7.04E+00	7.04E+00
pu236	1.37E-04	1.12E-04	9.20E-05	7.54E-05	6.18E-05	5.06E-05	4.15E-05
pu238	5.25E+01	5.22E+01	5.19E+01	5.15E+01	5.12E+01	5.08E+01	5.05E+01
pu239	7.39E+00	7.39E+00	7.39E+00	7.39E+00	7.39E+00	7.39E+00	7.39E+00

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 57
 0 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+02mwd, flux= 2.79E+08n/cm**2-sec
 nuclide radioactivity, curies

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
pu240	1.33E-02	1.33E-02	1.33E-02	1.33E-02	1.33E-02	1.33E-02	1.33E-02
pu241	1.69E-03	1.62E-03	1.56E-03	1.49E-03	1.43E-03	1.38E-03	1.32E-03
am241	7.62E-05	7.83E-05	8.03E-05	8.23E-05	8.41E-05	8.59E-05	8.75E-05
total	5.34E+03	9.90E+01	9.87E+01	9.84E+01	9.80E+01	9.77E+01	9.74E+01

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 58
 0 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+02mwd, flux= 2.79E+08n/cm**2-sec
 element thermal power, watts

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
tl	2.69E-06	2.72E-06	2.75E-06	2.77E-06	2.79E-06	2.81E-06	2.82E-06
pb	2.82E-06	2.86E-06	2.90E-06	2.93E-06	2.97E-06	3.00E-06	3.04E-06
bi	2.78E-05	2.81E-05	2.85E-05	2.88E-05	2.91E-05	2.94E-05	2.97E-05
po	6.08E-05	6.16E-05	6.23E-05	6.31E-05	6.39E-05	6.46E-05	6.54E-05
at	5.73E-07	5.83E-07	5.92E-07	6.02E-07	6.12E-07	6.22E-07	6.32E-07
rn	3.62E-05	3.67E-05	3.71E-05	3.75E-05	3.80E-05	3.84E-05	3.88E-05
fr	5.37E-07	5.46E-07	5.55E-07	5.64E-07	5.73E-07	5.82E-07	5.91E-07
ra	3.14E-05	3.18E-05	3.22E-05	3.25E-05	3.29E-05	3.33E-05	3.36E-05
ac	7.34E-07	7.45E-07	7.56E-07	7.67E-07	7.78E-07	7.90E-07	8.01E-07
th	1.98E-03	1.98E-03	1.98E-03	1.98E-03	1.99E-03	1.99E-03	1.99E-03
pa	3.22E-02	3.23E-02	3.23E-02	3.23E-02	3.23E-02	3.23E-02	3.23E-02
u	7.56E+00	5.36E-01	5.36E-01	5.36E-01	5.36E-01	5.36E-01	5.36E-01
np	7.11E+00	2.01E-01	2.01E-01	2.01E-01	2.01E-01	2.01E-01	2.01E-01
pu	1.97E+00	1.96E+00	1.95E+00	1.94E+00	1.93E+00	1.92E+00	1.90E+00
am	2.54E-06	2.61E-06	2.68E-06	2.74E-06	2.81E-06	2.86E-06	2.92E-06
totals	1.67E+01	2.73E+00	2.72E+00	2.71E+00	2.70E+00	2.69E+00	2.68E+00

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 actinides page 59
 0 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+02mwd, flux= 2.79E+08n/cm**2-sec
 nuclide gamma power, watts

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
tl207	7.15E-09	7.24E-09	7.32E-09	7.40E-09	7.48E-09	7.57E-09	7.65E-09
tl208	9.12E-07	9.21E-07	9.26E-07	9.29E-07	9.30E-07	9.30E-07	9.29E-07
pb211	2.20E-07	2.23E-07	2.26E-07	2.28E-07	2.31E-07	2.33E-07	2.36E-07
pb212	1.09E-07	1.11E-07	1.11E-07	1.12E-07	1.12E-07	1.12E-07	1.12E-07

sb125	9.74E-04	7.91E-04	6.40E-04	5.18E-04	4.19E-04	3.39E-04	2.75E-04
te125	2.39E-02	2.41E-02	2.42E-02	2.43E-02	2.44E-02	2.45E-02	2.46E-02
te125m	1.33E-05	1.12E-05	9.09E-06	7.36E-06	5.95E-06	4.82E-06	3.90E-06
sn126	3.55E-02	3.55E-02	3.55E-02	3.55E-02	3.55E-02	3.55E-02	3.55E-02
te126	2.20E-04	2.20E-04	2.20E-04	2.20E-04	2.21E-04	2.21E-04	2.21E-04
i127	1.04E-01	1.04E-01	1.04E-01	1.04E-01	1.04E-01	1.04E-01	1.04E-01
te128	2.99E-01	2.99E-01	2.99E-01	2.99E-01	2.99E-01	2.99E-01	2.99E-01
xe128	1.68E-06	1.68E-06	1.68E-06	1.68E-06	1.68E-06	1.68E-06	1.68E-06
i129	6.43E-01	6.43E-01	6.43E-01	6.43E-01	6.43E-01	6.43E-01	6.43E-01
xe129	1.42E-06	1.44E-06	1.47E-06	1.49E-06	1.51E-06	1.54E-06	1.56E-06
te130	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00
xe130	1.96E-04	1.96E-04	1.96E-04	1.96E-04	1.96E-04	1.96E-04	1.96E-04
xe131	2.49E+00	2.49E+00	2.49E+00	2.49E+00	2.49E+00	2.49E+00	2.49E+00
xe132	3.75E+00	3.75E+00	3.75E+00	3.75E+00	3.75E+00	3.75E+00	3.75E+00
cs133	5.84E+00	5.84E+00	5.84E+00	5.84E+00	5.84E+00	5.84E+00	5.84E+00
xe134	6.87E+00	6.87E+00	6.87E+00	6.87E+00	6.87E+00	6.87E+00	6.87E+00
cs134	1.88E-05	1.42E-05	1.07E-05	8.09E-06	6.11E-06	4.62E-06	3.49E-06
ba134	3.12E-04	3.17E-04	3.20E-04	3.23E-04	3.25E-04	3.26E-04	3.28E-04
cs135	5.79E+00	5.79E+00	5.79E+00	5.79E+00	5.79E+00	5.79E+00	5.79E+00
ba135	8.81E-05	8.96E-05	9.10E-05	9.25E-05	9.40E-05	9.54E-05	9.69E-05
xe136	5.63E+00	5.63E+00	5.63E+00	5.63E+00	5.63E+00	5.63E+00	5.63E+00
ba136	4.88E-03	4.88E-03	4.88E-03	4.88E-03	4.88E-03	4.88E-03	4.88E-03
cs137	2.20E+00	2.16E+00	2.12E+00	2.08E+00	2.04E+00	2.00E+00	1.96E+00
ba137	3.44E+00	3.48E+00	3.52E+00	3.56E+00	3.60E+00	3.64E+00	3.68E+00
ba138	6.04E+00	6.04E+00	6.04E+00	6.04E+00	6.04E+00	6.04E+00	6.04E+00

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 62
 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+02mwd, flux= 2.79E+08n/cm**2-sec

0

nuclide concentrations, grams
basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
la138	3.03E-05	3.03E-05	3.03E-05	3.03E-05	3.03E-05	3.03E-05	3.03E-05
la139	5.78E+00	5.78E+00	5.78E+00	5.78E+00	5.78E+00	5.78E+00	5.78E+00
ce140	5.77E+00	5.78E+00	5.78E+00	5.78E+00	5.78E+00	5.78E+00	5.78E+00
pr141	5.34E+00	5.35E+00	5.35E+00	5.35E+00	5.35E+00	5.35E+00	5.35E+00
ce142	5.44E+00	5.44E+00	5.44E+00	5.44E+00	5.44E+00	5.44E+00	5.44E+00
nd142	5.73E-05	5.73E-05	5.73E-05	5.73E-05	5.73E-05	5.73E-05	5.73E-05
nd143	5.52E+00	5.53E+00	5.53E+00	5.53E+00	5.53E+00	5.53E+00	5.53E+00
ce144	5.78E-02	2.76E-02	1.32E-02	6.28E-03	2.99E-03	1.43E-03	6.81E-04
nd144	5.08E+00	5.11E+00	5.13E+00	5.13E+00	5.14E+00	5.14E+00	5.14E+00
nd145	3.72E+00	3.72E+00	3.72E+00	3.72E+00	3.72E+00	3.72E+00	3.72E+00
nd146	2.86E+00	2.86E+00	2.86E+00	2.86E+00	2.86E+00	2.86E+00	2.86E+00
pm147	8.22E-02	6.67E-02	5.35E-02	4.30E-02	3.45E-02	2.77E-02	2.22E-02
sm147	2.10E+00	2.11E+00	2.13E+00	2.14E+00	2.15E+00	2.15E+00	2.16E+00
nd148	1.63E+00	1.63E+00	1.63E+00	1.63E+00	1.63E+00	1.63E+00	1.63E+00
sm148	2.95E-04	2.95E-04	2.95E-04	2.95E-04	2.95E-04	2.95E-04	2.95E-04
sm149	9.89E-01	9.90E-01	9.90E-01	9.90E-01	9.90E-01	9.90E-01	9.90E-01
nd150	6.57E-01	6.57E-01	6.57E-01	6.57E-01	6.57E-01	6.57E-01	6.57E-01
sm150	7.00E-02	7.00E-02	7.00E-02	7.00E-02	7.00E-02	7.00E-02	7.00E-02
sm151	2.95E-01	2.94E-01	2.92E-01	2.90E-01	2.88E-01	2.86E-01	2.84E-01
eu151	1.28E-01	1.30E-01	1.32E-01	1.34E-01	1.36E-01	1.37E-01	1.39E-01
sm152	2.78E-01	2.78E-01	2.78E-01	2.78E-01	2.78E-01	2.78E-01	2.78E-01
eu152	1.23E-04	1.18E-04	1.13E-04	1.08E-04	1.03E-04	9.90E-05	9.48E-05
gd152	1.80E-04	1.81E-04	1.82E-04	1.84E-04	1.85E-04	1.86E-04	1.87E-04
eu153	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01
sm154	7.87E-02	7.87E-02	7.87E-02	7.87E-02	7.87E-02	7.87E-02	7.87E-02
eu154	1.25E-05	1.17E-05	1.09E-05	1.02E-05	9.56E-06	8.94E-06	8.36E-06
gd154	4.63E-05	4.72E-05	4.79E-05	4.86E-05	4.93E-05	4.99E-05	5.05E-05
eu155	2.42E-03	2.14E-03	1.89E-03	1.67E-03	1.48E-03	1.31E-03	1.16E-03
gd155	3.26E-02	3.28E-02	3.31E-02	3.33E-02	3.35E-02	3.37E-02	3.38E-02

gd156	1.62E-02	1.63E-02	1.63E-02	1.63E-02	1.63E-02	1.63E-02	1.63E-02
gd157	6.71E-03	6.71E-03	6.71E-03	6.71E-03	6.71E-03	6.71E-03	6.71E-03
gd158	4.26E-03	4.26E-03	4.26E-03	4.26E-03	4.26E-03	4.26E-03	4.26E-03
tb159	1.29E-03	1.29E-03	1.29E-03	1.29E-03	1.29E-03	1.29E-03	1.29E-03
gd160	4.35E-04	4.35E-04	4.35E-04	4.35E-04	4.35E-04	4.35E-04	4.35E-04
dy161	1.33E-04	1.34E-04	1.34E-04	1.34E-04	1.34E-04	1.34E-04	1.34E-04
dy162	3.81E-05	3.81E-05	3.81E-05	3.81E-05	3.81E-05	3.81E-05	3.81E-05
dy163	1.27E-05	1.27E-05	1.27E-05	1.27E-05	1.27E-05	1.27E-05	1.27E-05
dy164	4.10E-06	4.10E-06	4.10E-06	4.10E-06	4.10E-06	4.10E-06	4.10E-06
ho165	1.85E-06	1.85E-06	1.85E-06	1.85E-06	1.85E-06	1.85E-06	1.85E-06
total	1.52E+02	1.52E+02	1.52E+02	1.52E+02	1.52E+02	1.52E+02	1.52E+02

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 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 63
 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+02mwd, flux= 2.79E+08n/cm**2-sec
 0 nuclide radioactivity, curies
 basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
h 3	3.69E-01	3.52E-01	3.36E-01	3.21E-01	3.06E-01	2.92E-01	2.79E-01
c 14	5.29E-07	5.29E-07	5.29E-07	5.29E-07	5.29E-07	5.29E-07	5.29E-07
se 79	3.13E-04	3.13E-04	3.13E-04	3.13E-04	3.13E-04	3.13E-04	3.12E-04
kr 85	8.84E+00	8.37E+00	7.93E+00	7.52E+00	7.12E+00	6.75E+00	6.40E+00
sr 90	1.80E+02	1.76E+02	1.73E+02	1.69E+02	1.66E+02	1.62E+02	1.59E+02
y 90	1.80E+02	1.76E+02	1.73E+02	1.69E+02	1.66E+02	1.62E+02	1.59E+02
y 91	1.99E+02	5.44E+00	1.48E-01	4.01E-03	1.09E-04	2.96E-06	8.04E-08
zr 93	6.43E-03	6.43E-03	6.43E-03	6.43E-03	6.43E-03	6.43E-03	6.43E-03
nb 93m	4.95E-03	5.00E-03	5.06E-03	5.10E-03	5.15E-03	5.19E-03	5.24E-03
zr 95	2.18E+02	8.09E+00	3.00E-01	1.11E-02	4.11E-04	1.52E-05	5.64E-07
nb 95	2.18E+02	1.72E+01	6.58E-01	2.44E-02	9.05E-04	3.35E-05	1.24E-06
tc 99	6.78E-02	6.78E-02	6.78E-02	6.78E-02	6.78E-02	6.78E-02	6.78E-02
rh102	8.00E-06	6.56E-06	5.37E-06	4.40E-06	3.61E-06	2.96E-06	2.42E-06
ru106	1.60E+01	9.07E+00	5.14E+00	2.92E+00	1.65E+00	9.37E-01	5.31E-01
rh106	1.60E+01	9.07E+00	5.14E+00	2.92E+00	1.65E+00	9.37E-01	5.31E-01
pd107	6.46E-05	6.46E-05	6.46E-05	6.46E-05	6.46E-05	6.46E-05	6.46E-05
cd113m	9.63E-03	9.25E-03	8.88E-03	8.52E-03	8.18E-03	7.85E-03	7.53E-03
sn119m	1.53E-03	7.46E-04	3.63E-04	1.77E-04	8.60E-05	4.19E-05	2.04E-05
sn121	4.70E-01	1.58E-03	1.56E-03	1.55E-03	1.53E-03	1.51E-03	1.50E-03
sn121m	2.05E-03	2.03E-03	2.01E-03	1.99E-03	1.97E-03	1.95E-03	1.93E-03
sn123	5.82E-02	1.14E-02	2.22E-03	4.33E-04	8.46E-05	1.65E-05	3.23E-06
sb125	1.02E+00	8.29E-01	6.71E-01	5.43E-01	4.39E-01	3.56E-01	2.88E-01
te125m	2.39E-01	2.02E-01	1.64E-01	1.33E-01	1.07E-01	8.68E-02	7.03E-02
sn126	1.01E-03	1.01E-03	1.01E-03	1.01E-03	1.01E-03	1.01E-03	1.01E-03
sb126	4.07E-03	1.41E-04	1.41E-04	1.41E-04	1.41E-04	1.41E-04	1.41E-04
sb126m	6.41E-03	1.01E-03	1.01E-03	1.01E-03	1.01E-03	1.01E-03	1.01E-03
te127	4.21E+00	1.09E-01	1.57E-02	2.26E-03	3.26E-04	4.71E-05	6.80E-06
te127m	7.40E-01	1.11E-01	1.60E-02	2.31E-03	3.33E-04	4.81E-05	6.94E-06
i129	1.13E-04	1.14E-04	1.14E-04	1.14E-04	1.14E-04	1.14E-04	1.14E-04
cs134	2.43E-02	1.83E-02	1.39E-02	1.05E-02	7.92E-03	5.98E-03	4.52E-03
cs135	6.67E-03	6.67E-03	6.67E-03	6.67E-03	6.67E-03	6.67E-03	6.67E-03
cs137	1.91E+02	1.88E+02	1.84E+02	1.81E+02	1.77E+02	1.74E+02	1.70E+02
ba137m	1.81E+02	1.77E+02	1.74E+02	1.71E+02	1.67E+02	1.64E+02	1.61E+02
ce144	1.84E+02	8.78E+01	4.19E+01	2.00E+01	9.53E+00	4.54E+00	2.17E+00
pr144	1.84E+02	8.78E+01	4.19E+01	2.00E+01	9.53E+00	4.54E+00	2.17E+00
pr144m	2.58E+00	1.23E+00	5.86E-01	2.80E-01	1.33E-01	6.36E-02	3.03E-02
pm147	7.62E+01	6.19E+01	4.96E+01	3.98E+01	3.20E+01	2.56E+01	2.06E+01
sm151	7.78E+00	7.73E+00	7.68E+00	7.63E+00	7.58E+00	7.53E+00	7.48E+00
eu152	2.17E-02	2.08E-02	1.99E-02	1.91E-02	1.83E-02	1.75E-02	1.67E-02
eu154	3.38E-03	3.16E-03	2.96E-03	2.76E-03	2.59E-03	2.42E-03	2.26E-03
eu155	1.19E+00	1.06E+00	9.33E-01	8.25E-01	7.29E-01	6.45E-01	5.70E-01
total	2.07E+04	1.03E+03	8.67E+02	7.92E+02	7.47E+02	7.15E+02	6.91E+02

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 64
 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+02mwd, flux= 2.79E+08n/cm**2-sec

0

element thermal power, watts
 basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
h	1.25E-05	1.19E-05	1.13E-05	1.08E-05	1.03E-05	9.85E-06	9.40E-06
se	3.33E+00	9.80E-08	9.80E-08	9.80E-08	9.80E-08	9.80E-08	9.80E-08
kr	1.29E+01	1.26E-02	1.19E-02	1.13E-02	1.07E-02	1.01E-02	9.59E-03
sr	2.01E+01	2.13E-01	2.01E-01	1.96E-01	1.92E-01	1.88E-01	1.85E-01
y	2.81E+01	9.95E-01	9.56E-01	9.37E-01	9.17E-01	8.99E-01	8.81E-01
zr	1.20E+01	4.08E-02	1.51E-03	5.67E-05	2.80E-06	8.01E-07	7.27E-07
nb	2.15E+01	8.25E-02	3.16E-03	1.18E-04	5.23E-06	1.06E-06	9.08E-07
tc	6.48E+00	3.40E-05	3.40E-05	3.40E-05	3.40E-05	3.40E-05	3.40E-05
ru	7.12E-01	2.18E-03	3.13E-04	1.73E-04	9.82E-05	5.57E-05	3.16E-05
rh	3.83E-01	8.71E-02	4.93E-02	2.79E-02	1.58E-02	8.98E-03	5.09E-03
ag	7.41E-02	2.00E-07	8.59E-08	3.69E-08	1.59E-08	6.81E-09	2.93E-09
cd	6.86E-02	1.06E-05	9.66E-06	9.27E-06	8.89E-06	8.54E-06	8.19E-06
sn	1.87E+00	3.90E-05	1.02E-05	4.53E-06	3.38E-06	3.13E-06	3.06E-06
sb	7.51E+00	2.64E-03	2.14E-03	1.73E-03	1.40E-03	1.14E-03	9.25E-04
te	9.29E+00	4.13E-04	1.68E-04	1.16E-04	9.09E-05	7.32E-05	5.92E-05
i	2.08E+01	5.31E-08	5.31E-08	5.31E-08	5.31E-08	5.31E-08	5.31E-08
cs	1.83E+01	2.09E-01	2.05E-01	2.01E-01	1.97E-01	1.93E-01	1.89E-01
ba	1.19E+01	6.96E-01	6.83E-01	6.70E-01	6.57E-01	6.45E-01	6.32E-01
ce	4.40E+00	5.79E-02	2.74E-02	1.31E-02	6.24E-03	2.97E-03	1.42E-03
pr	6.24E+00	6.45E-01	3.08E-01	1.47E-01	7.00E-02	3.34E-02	1.59E-02
pm	3.40E-01	2.27E-02	1.82E-02	1.46E-02	1.17E-02	9.41E-03	7.55E-03
sm	2.10E-02	9.09E-04	9.03E-04	8.97E-04	8.91E-04	8.86E-04	8.80E-04
eu	9.31E-03	1.01E-03	9.04E-04	8.12E-04	7.30E-04	6.56E-04	5.91E-04
totals	2.61E+02	3.07E+00	2.47E+00	2.22E+00	2.08E+00	1.99E+00	1.93E+00

1

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 65
 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+02mwd, flux= 2.79E+08n/cm**2-sec

0

nuclide gamma power, watts
 basis =single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr 85	1.17E-04	1.11E-04	1.05E-04	9.94E-05	9.41E-05	8.92E-05	8.45E-05
y 90	1.81E-06	1.78E-06	1.74E-06	1.70E-06	1.67E-06	1.64E-06	1.60E-06
nb 93m	5.52E-08	5.58E-08	5.63E-08	5.69E-08	5.74E-08	5.79E-08	5.84E-08
zr 95	9.47E-01	3.51E-02	1.30E-03	4.81E-05	1.78E-06	6.61E-08	2.45E-09
nb 95	9.88E-01	7.78E-02	2.98E-03	1.11E-04	4.10E-06	1.52E-07	5.63E-09
rh102	1.02E-07	8.39E-08	6.88E-08	5.64E-08	4.62E-08	3.78E-08	3.10E-08
rh106	1.95E-02	1.11E-02	6.28E-03	3.56E-03	2.02E-03	1.14E-03	6.48E-04
ag110m	4.50E-07	1.93E-07	8.31E-08	3.57E-08	1.53E-08	6.59E-09	2.83E-09
sn121m	6.09E-08	6.03E-08	5.96E-08	5.90E-08	5.84E-08	5.78E-08	5.72E-08
sb125	2.63E-03	2.13E-03	1.73E-03	1.40E-03	1.13E-03	9.15E-04	7.40E-04
te125m	5.04E-05	4.27E-05	3.46E-05	2.80E-05	2.26E-05	1.83E-05	1.48E-05
sn126	7.80E-07	7.80E-07	7.80E-07	7.80E-07	7.80E-07	7.80E-07	7.80E-07
sb126	6.64E-05	2.30E-06	2.30E-06	2.30E-06	2.30E-06	2.30E-06	2.30E-06
sb126m	5.90E-05	9.29E-06	9.29E-06	9.29E-06	9.29E-06	9.29E-06	9.29E-06
i129	1.65E-08	1.66E-08	1.66E-08	1.66E-08	1.66E-08	1.66E-08	1.66E-08
cs134	2.24E-04	1.69E-04	1.28E-04	9.65E-05	7.30E-05	5.51E-05	4.17E-05
ba137m	6.42E-01	6.29E-01	6.17E-01	6.05E-01	5.94E-01	5.83E-01	5.71E-01
ce144	2.07E-02	9.89E-03	4.72E-03	2.25E-03	1.07E-03	5.12E-04	2.44E-04
pr144	3.16E-02	1.51E-02	7.18E-03	3.42E-03	1.63E-03	7.79E-04	3.71E-04
pr144m	1.91E-04	9.11E-05	4.35E-05	2.07E-05	9.88E-06	4.71E-06	2.25E-06
pm147	1.98E-06	1.61E-06	1.29E-06	1.03E-06	8.30E-07	6.66E-07	5.34E-07
sm151	6.54E-07	6.50E-07	6.46E-07	6.42E-07	6.38E-07	6.34E-07	6.30E-07
eu152	1.50E-04	1.43E-04	1.37E-04	1.31E-04	1.26E-04	1.20E-04	1.15E-04
eu154	2.51E-05	2.35E-05	2.20E-05	2.06E-05	1.92E-05	1.80E-05	1.68E-05
eu155	4.58E-04	4.05E-04	3.58E-04	3.16E-04	2.80E-04	2.47E-04	2.19E-04

total 1.29E+02 7.83E-01 6.42E-01 6.17E-01 6.00E-01 5.87E-01 5.74E-01

1 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2 fission products page 66
 decay, following reactor irradiation identified by: power= 4.000E-03mw, burnup=1.4610E+02mwd, flux= 2.79E+08n/cm**2-sec

0 element gamma power, watts
 basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
kr	6.74E+00	1.11E-04	1.05E-04	9.94E-05	9.41E-05	8.92E-05	8.45E-05
y	9.80E+00	1.19E-04	4.91E-06	1.79E-06	1.67E-06	1.64E-06	1.60E-06
zr	4.81E+00	3.51E-02	1.30E-03	4.81E-05	1.78E-06	6.61E-08	2.45E-09
nb	9.13E+00	7.79E-02	2.98E-03	1.11E-04	4.16E-06	2.12E-07	6.58E-08
rh	1.07E-01	1.11E-02	6.28E-03	3.56E-03	2.02E-03	1.14E-03	6.48E-04
ag	3.07E-02	1.93E-07	8.31E-08	3.57E-08	1.54E-08	6.60E-09	2.84E-09
sn	1.23E+00	1.36E-06	9.56E-07	8.69E-07	8.48E-07	8.42E-07	8.39E-07
sb	5.16E+00	2.14E-03	1.74E-03	1.41E-03	1.14E-03	9.26E-04	7.52E-04
te	5.57E+00	5.71E-05	3.61E-05	2.82E-05	2.27E-05	1.83E-05	1.48E-05
i	1.36E+01	1.66E-08	1.66E-08	1.66E-08	1.66E-08	1.66E-08	1.66E-08
cs	8.74E+00	1.69E-04	1.28E-04	9.65E-05	7.30E-05	5.51E-05	4.17E-05
ba	5.34E+00	6.29E-01	6.17E-01	6.05E-01	5.94E-01	5.83E-01	5.71E-01
ce	2.08E+00	1.00E-02	4.72E-03	2.25E-03	1.07E-03	5.12E-04	2.44E-04
pr	1.80E+00	1.51E-02	7.22E-03	3.44E-03	1.64E-03	7.83E-04	3.74E-04
pm	8.55E-02	1.67E-06	1.29E-06	1.03E-06	8.30E-07	6.66E-07	5.34E-07
sm	4.47E-03	6.50E-07	6.46E-07	6.42E-07	6.38E-07	6.34E-07	6.30E-07
eu	5.77E-03	5.72E-04	5.17E-04	4.68E-04	4.25E-04	3.86E-04	3.51E-04
totals	1.29E+02	7.83E-01	6.42E-01	6.17E-01	6.00E-01	5.87E-01	5.74E-01

1 photon spectrum as a function of time for light elements, cladding and structural materials page 67

0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 power= .00 mw, burnup= 146.mwd, flux= 2.79E+08 n**2-sec
 0 spectrum of photon release rates, photons/sec
 0 basis = single reactor assembly

e-mean (mev)	time after discharge							
	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d	
1.00E-02	5.15E+11	5.55E+04	4.44E+04	3.56E+04	2.85E+04	2.28E+04	1.83E+04	
3.00E-02	1.69E+11	1.77E+04	1.41E+04	1.13E+04	9.07E+03	7.26E+03	5.82E+03	
5.50E-02	1.18E+11	1.19E+04	9.55E+03	7.65E+03	6.13E+03	4.91E+03	3.93E+03	
8.50E-02	6.90E+10	6.71E+03	5.37E+03	4.30E+03	3.45E+03	2.76E+03	2.21E+03	
1.20E-01	4.90E+10	4.59E+03	3.67E+03	2.94E+03	2.36E+03	1.89E+03	1.51E+03	
1.70E-01	5.13E+10	4.50E+03	3.61E+03	2.89E+03	2.31E+03	1.85E+03	1.48E+03	
3.00E-01	5.88E+10	4.48E+03	3.59E+03	2.88E+03	2.30E+03	1.84E+03	1.48E+03	
6.50E-01	2.89E+10	2.39E+05	1.92E+05	1.54E+05	1.23E+05	9.85E+04	7.89E+04	
1.13E+00	4.97E+09	1.91E+05	1.53E+05	1.22E+05	9.81E+04	7.85E+04	6.29E+04	
1.58E+00	9.04E+11	4.78E-01	3.83E-01	3.07E-01	2.46E-01	1.97E-01	1.58E-01	
2.00E+00	1.79E+08	4.25E-02	3.40E-02	2.73E-02	2.18E-02	1.75E-02	1.40E-02	
2.40E+00	3.63E+07	9.53E-03	7.63E-03	6.11E-03	4.90E-03	3.92E-03	3.14E-03	
2.80E+00	2.13E+11	1.49E-04	1.20E-04	9.57E-05	7.67E-05	6.14E-05	4.92E-05	
3.25E+00	1.36E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	
3.75E+00	1.39E+08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	
4.25E+00	1.82E+06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	
4.75E+00	6.63E-16	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	
5.50E+00	1.09E-16	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	
total	2.18E+12	5.36E+05	4.29E+05	3.44E+05	2.75E+05	2.20E+05	1.77E+05	
mev/sec	2.10E+12	3.75E+05	3.01E+05	2.41E+05	1.93E+05	1.54E+05	1.24E+05	

0 spectrum of energy release rates, mev/watt-sec
 0 basis = single reactor assembly

e-mean (mev)	time after discharge							
	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d	

1.00E-02	1.29E+06	1.39E-01	1.11E-01	8.90E-02	7.13E-02	5.71E-02	4.57E-02
3.00E-02	1.27E+06	1.32E-01	1.06E-01	8.49E-02	6.80E-02	5.45E-02	4.36E-02
5.50E-02	1.62E+06	1.64E-01	1.31E-01	1.05E-01	8.42E-02	6.75E-02	5.40E-02
8.50E-02	1.47E+06	1.43E-01	1.14E-01	9.15E-02	7.33E-02	5.87E-02	4.70E-02
1.20E-01	1.47E+06	1.38E-01	1.10E-01	8.83E-02	7.07E-02	5.66E-02	4.54E-02
1.70E-01	2.18E+06	1.91E-01	1.53E-01	1.23E-01	9.84E-02	7.88E-02	6.31E-02
3.00E-01	4.41E+06	3.36E-01	2.69E-01	2.16E-01	1.73E-01	1.38E-01	1.11E-01
6.50E-01	4.70E+06	3.89E+01	3.12E+01	2.50E+01	2.00E+01	1.60E+01	1.28E+01
1.13E+00	1.40E+06	5.37E+01	4.30E+01	3.44E+01	2.76E+01	2.21E+01	1.77E+01
1.58E+00	3.56E+08	1.88E-04	1.51E-04	1.21E-04	9.67E-05	7.75E-05	6.20E-05
2.00E+00	8.96E+04	2.13E-05	1.70E-05	1.36E-05	1.09E-05	8.75E-06	7.00E-06
2.40E+00	2.18E+04	5.72E-06	4.58E-06	3.67E-06	2.94E-06	2.35E-06	1.88E-06
2.80E+00	1.49E+08	1.04E-07	8.37E-08	6.70E-08	5.37E-08	4.30E-08	3.44E-08
3.25E+00	1.10E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
3.75E+00	1.30E+05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.25E+00	1.93E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	7.87E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	1.50E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
total	5.25E+08	9.38E+01	7.52E+01	6.02E+01	4.82E+01	3.86E+01	3.09E+01
gamma watts	3.37E-01	6.02E-08	4.82E-08	3.86E-08	3.09E-08	2.48E-08	1.98E-08

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photon spectrum as a function of time for fission products

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 power= .00 mw, burnup= 146.mwd, flux= 2.79E+08 n**2-sec
 spectrum of photon release rates, photons/sec
 basis = single reactor assembly

emean (mev)	initial	time after discharge					
		304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
1.00E-02	2.61E+14	7.89E+12	6.25E+12	5.47E+12	5.04E+12	4.78E+12	4.60E+12
3.00E-02	1.14E+14	3.41E+12	2.67E+12	2.32E+12	2.12E+12	2.01E+12	1.93E+12
5.50E-02	6.07E+13	1.71E+12	1.33E+12	1.15E+12	1.05E+12	9.93E+11	9.54E+11
8.50E-02	4.20E+13	1.02E+12	7.78E+11	6.59E+11	5.95E+11	5.58E+11	5.34E+11
1.20E-01	3.44E+13	1.04E+12	6.94E+11	5.25E+11	4.40E+11	3.95E+11	3.70E+11
1.70E-01	5.50E+13	6.56E+11	5.00E+11	4.27E+11	3.88E+11	3.65E+11	3.50E+11
3.00E-01	1.10E+14	7.09E+11	5.35E+11	4.50E+11	4.05E+11	3.79E+11	3.63E+11
6.50E-01	2.29E+14	7.58E+12	6.25E+12	6.02E+12	5.86E+12	5.73E+12	5.61E+12
1.13E+00	7.81E+13	5.55E+10	3.75E+10	2.86E+10	2.40E+10	2.14E+10	1.99E+10
1.58E+00	4.04E+13	1.94E+10	1.08E+10	6.62E+09	4.54E+09	3.49E+09	2.95E+09
2.00E+00	1.23E+13	2.94E+10	1.41E+10	6.85E+09	3.36E+09	1.69E+09	8.83E+08
2.40E+00	1.06E+13	6.19E+08	3.27E+08	1.74E+08	9.30E+07	5.01E+07	2.72E+07
2.80E+00	4.23E+12	8.07E+07	4.38E+07	2.39E+07	1.31E+07	7.21E+06	3.99E+06
3.25E+00	2.48E+12	1.01E+07	5.75E+06	3.26E+06	1.85E+06	1.05E+06	5.93E+05
3.75E+00	1.26E+12	4.47E+03	2.53E+03	1.44E+03	8.14E+02	4.61E+02	2.61E+02
4.25E+00	1.39E+12	2.00E-07	2.01E-07	2.01E-07	2.01E-07	2.01E-07	2.01E-07
4.75E+00	4.08E+11	1.00E-07	1.01E-07	1.01E-07	1.01E-07	1.01E-07	1.01E-07
5.50E+00	3.04E+11	7.45E-08	7.46E-08	7.47E-08	7.48E-08	7.49E-08	7.49E-08
total	1.06E+15	2.41E+13	1.91E+13	1.71E+13	1.59E+13	1.52E+13	1.47E+13
mev/sec	4.44E+14	5.89E+12	4.76E+12	4.48E+12	4.31E+12	4.19E+12	4.09E+12

spectrum of energy release rates, mev/watt-sec
 basis = single reactor assembly

emean (mev)	initial	time after discharge					
		304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
1.00E-02	6.51E+08	1.97E+07	1.56E+07	1.37E+07	1.26E+07	1.19E+07	1.15E+07
3.00E-02	8.54E+08	2.56E+07	2.01E+07	1.74E+07	1.59E+07	1.51E+07	1.45E+07
5.50E-02	8.35E+08	2.35E+07	1.83E+07	1.58E+07	1.45E+07	1.36E+07	1.31E+07
8.50E-02	8.92E+08	2.17E+07	1.65E+07	1.40E+07	1.26E+07	1.19E+07	1.14E+07
1.20E-01	1.03E+09	3.13E+07	2.08E+07	1.58E+07	1.32E+07	1.19E+07	1.11E+07

1.70E-01	2.34E+09	2.79E+07	2.13E+07	1.81E+07	1.65E+07	1.55E+07	1.49E+07
3.00E-01	8.25E+09	5.32E+07	4.01E+07	3.38E+07	3.04E+07	2.85E+07	2.72E+07
6.50E-01	3.73E+10	1.23E+09	1.02E+09	9.78E+08	9.53E+08	9.31E+08	9.12E+08
1.13E+00	2.20E+10	1.56E+07	1.05E+07	8.05E+06	6.74E+06	6.03E+06	5.60E+06
1.58E+00	1.59E+10	7.65E+06	4.26E+06	2.61E+06	1.79E+06	1.38E+06	1.16E+06
2.00E+00	6.14E+09	1.47E+07	7.07E+06	3.43E+06	1.68E+06	8.44E+05	4.41E+05
2.40E+00	6.37E+09	3.72E+05	1.96E+05	1.04E+05	5.58E+04	3.01E+04	1.63E+04
2.80E+00	2.96E+09	5.65E+04	3.07E+04	1.67E+04	9.17E+03	5.05E+03	2.79E+03
3.25E+00	2.01E+09	8.24E+03	4.67E+03	2.65E+03	1.50E+03	8.50E+02	4.82E+02
3.75E+00	1.18E+09	4.19E+00	2.37E+00	1.35E+00	7.63E-01	4.32E-01	2.45E-01
4.25E+00	1.48E+09	2.13E-10	2.13E-10	2.13E-10	2.14E-10	2.14E-10	2.14E-10
4.75E+00	4.85E+08	1.19E-10	1.19E-10	1.20E-10	1.20E-10	1.20E-10	1.20E-10
5.50E+00	4.18E+08	1.02E-10	1.03E-10	1.03E-10	1.03E-10	1.03E-10	1.03E-10
total	1.11E+11	1.47E+09	1.19E+09	1.12E+09	1.08E+09	1.05E+09	1.02E+09
gamma watts	7.12E+01	9.44E-01	7.63E-01	7.18E-01	6.92E-01	6.72E-01	6.56E-01

principal photon sources in group 1, photons/sec
 mean energy = .0100 mev. nuclides exceeding 1.0E-03 of total group release rate (4.78E+12) at 1521.9 d

nuclide	initial	time after discharge						
		304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d	
kr 85	4.66E+10	4.42E+10	4.19E+10	3.97E+10	3.76E+10	3.56E+10	3.37E+10	
sr 90	7.33E+11	7.18E+11	7.03E+11	6.89E+11	6.75E+11	6.61E+11	6.48E+11	
y 90	3.60E+12	3.53E+12	3.46E+12	3.39E+12	3.32E+12	3.25E+12	3.18E+12	
rh106	4.76E+11	2.70E+11	1.53E+11	8.68E+10	4.92E+10	2.79E+10	1.58E+10	
cs137	6.75E+11	6.62E+11	6.50E+11	6.37E+11	6.25E+11	6.13E+11	6.01E+11	
ba137m	3.17E+10	3.11E+10	3.05E+10	2.99E+10	2.93E+10	2.88E+10	2.82E+10	
ce144	3.55E+11	1.69E+11	8.06E+10	3.85E+10	1.83E+10	8.75E+09	4.17E+09	
pr144	4.70E+12	2.24E+12	1.07E+12	5.10E+11	2.43E+11	1.16E+11	5.53E+10	
pm147	8.86E+10	7.19E+10	5.77E+10	4.63E+10	3.71E+10	2.98E+10	2.39E+10	

principal photon sources in group 2, photons/sec
 mean energy = .0300 mev. nuclides exceeding 1.0E-03 of total group release rate (2.01E+12) at 1521.9 d

nuclide	initial	time after discharge						
		304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d	
kr 85	1.36E+10	1.29E+10	1.22E+10	1.16E+10	1.10E+10	1.04E+10	9.83E+09	
sr 90	2.07E+11	2.03E+11	1.99E+11	1.95E+11	1.91E+11	1.87E+11	1.83E+11	
y 90	1.17E+12	1.15E+12	1.13E+12	1.10E+12	1.08E+12	1.06E+12	1.04E+12	
rh106	1.59E+11	9.02E+10	5.11E+10	2.90E+10	1.64E+10	9.31E+09	5.28E+09	
sb125	1.87E+10	1.52E+10	1.23E+10	9.96E+09	8.06E+09	6.52E+09	5.28E+09	
te125m	1.02E+10	8.65E+09	7.01E+09	5.67E+09	4.59E+09	3.72E+09	3.01E+09	
cs137	1.88E+11	1.85E+11	1.81E+11	1.78E+11	1.74E+11	1.71E+11	1.68E+11	
ba137m	5.44E+11	5.34E+11	5.23E+11	5.13E+11	5.04E+11	4.94E+11	4.85E+11	
ce144	8.23E+11	3.93E+11	1.87E+11	8.93E+10	4.26E+10	2.03E+10	9.69E+09	
pr144	1.55E+12	7.41E+11	3.54E+11	1.69E+11	8.04E+10	3.84E+10	1.83E+10	
pm147	1.95E+10	1.58E+10	1.27E+10	1.02E+10	8.17E+09	6.55E+09	5.26E+09	

principal photon sources in group 3, photons/sec
 mean energy = .0550 mev. nuclides exceeding 1.0E-03 of total group release rate (9.93E+11) at 1521.9 d

nuclide	initial	time after discharge						
		304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d	
kr 85	8.33E+09	7.90E+09	7.48E+09	7.09E+09	6.72E+09	6.36E+09	6.03E+09	
sr 90	1.22E+11	1.20E+11	1.17E+11	1.15E+11	1.13E+11	1.10E+11	1.08E+11	
y 90	8.11E+11	7.94E+11	7.78E+11	7.62E+11	7.47E+11	7.32E+11	7.17E+11	
rh106	1.13E+11	6.39E+10	3.62E+10	2.05E+10	1.16E+10	6.59E+09	3.74E+09	
cs137	1.09E+11	1.07E+11	1.05E+11	1.03E+11	1.01E+11	9.94E+10	9.75E+10	
ce144	1.19E+11	5.68E+10	2.71E+10	1.29E+10	6.16E+09	2.94E+09	1.40E+09	
pr144	1.09E+12	5.20E+11	2.48E+11	1.18E+11	5.65E+10	2.69E+10	1.28E+10	
pm147	8.18E+09	6.64E+09	5.33E+09	4.28E+09	3.43E+09	2.75E+09	2.21E+09	
eu155	9.21E+09	8.14E+09	7.20E+09	6.36E+09	5.62E+09	4.97E+09	4.39E+09	

principal photon sources in group 4, photons/sec
 mean energy = .0850 mev. nuclides exceeding 1.0E-03 of total group release rate (5.58E+11) at 1521.9 d

nuclide	time after discharge							
	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d	
kr 85	4.17E+09	3.95E+09	3.74E+09	3.55E+09	3.36E+09	3.19E+09	3.02E+09	
sr 90	5.84E+10	5.72E+10	5.60E+10	5.49E+10	5.38E+10	5.27E+10	5.16E+10	
y 90	4.69E+11	4.60E+11	4.50E+11	4.41E+11	4.32E+11	4.23E+11	4.15E+11	
rh106	6.70E+10	3.80E+10	2.15E+10	1.22E+10	6.91E+09	3.92E+09	2.22E+09	
cs137	5.13E+10	5.03E+10	4.93E+10	4.84E+10	4.75E+10	4.66E+10	4.57E+10	
ce144	1.68E+11	8.02E+10	3.83E+10	1.82E+10	8.70E+09	4.15E+09	1.98E+09	
pr144	6.42E+11	3.06E+11	1.46E+11	6.97E+10	3.32E+10	1.58E+10	7.56E+09	
pm147	2.33E+09	1.89E+09	1.52E+09	1.22E+09	9.76E+08	7.83E+08	6.29E+08	
eu155	1.40E+10	1.24E+10	1.09E+10	9.66E+09	8.54E+09	7.55E+09	6.67E+09	
0 principal photon sources in group 5, photons/sec								
mean energy = .1200 mev. nuclides exceeding 1.0E-03 of total group release rate (3.95E+11) at 1521.9 d								
nuclide	time after discharge							
	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d	
kr 85	2.51E+09	2.38E+09	2.26E+09	2.14E+09	2.03E+09	1.92E+09	1.82E+09	
sr 90	3.32E+10	3.25E+10	3.19E+10	3.12E+10	3.06E+10	3.00E+10	2.94E+10	
y 90	3.30E+11	3.23E+11	3.17E+11	3.10E+11	3.04E+11	2.98E+11	2.92E+11	
rh106	4.84E+10	2.74E+10	1.55E+10	8.81E+09	4.99E+09	2.83E+09	1.60E+09	
cs137	2.87E+10	2.82E+10	2.76E+10	2.71E+10	2.66E+10	2.61E+10	2.56E+10	
ce144	8.25E+11	3.93E+11	1.88E+11	8.95E+10	4.27E+10	2.03E+10	9.70E+09	
pr144	4.60E+11	2.19E+11	1.05E+11	4.98E+10	2.38E+10	1.13E+10	5.41E+09	
eu155	7.99E+09	7.06E+09	6.24E+09	5.51E+09	4.87E+09	4.31E+09	3.81E+09	
0 principal photon sources in group 6, photons/sec								
mean energy = .1700 mev. nuclides exceeding 1.0E-03 of total group release rate (3.65E+11) at 1521.9 d								
nuclide	time after discharge							
	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d	
kr 85	2.00E+09	1.89E+09	1.79E+09	1.70E+09	1.61E+09	1.53E+09	1.45E+09	
sr 90	2.37E+10	2.32E+10	2.27E+10	2.23E+10	2.18E+10	2.14E+10	2.09E+10	
y 90	3.40E+11	3.33E+11	3.27E+11	3.20E+11	3.13E+11	3.07E+11	3.01E+11	
rh106	5.19E+10	2.94E+10	1.67E+10	9.44E+09	5.35E+09	3.03E+09	1.72E+09	
sb125	2.82E+09	2.29E+09	1.85E+09	1.50E+09	1.21E+09	9.82E+08	7.95E+08	
cs137	2.03E+10	1.99E+10	1.95E+10	1.92E+10	1.88E+10	1.84E+10	1.81E+10	
pr144	4.86E+11	2.32E+11	1.11E+11	5.27E+10	2.51E+10	1.20E+10	5.72E+09	
0 principal photon sources in group 7, photons/sec								
mean energy = .3000 mev. nuclides exceeding 1.0E-03 of total group release rate (3.79E+11) at 1521.9 d								
nuclide	time after discharge							
	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d	
kr 85	1.21E+09	1.14E+09	1.08E+09	1.03E+09	9.72E+08	9.21E+08	8.73E+08	
sr 90	1.07E+10	1.05E+10	1.03E+10	1.01E+10	9.89E+09	9.69E+09	9.50E+09	
y 90	3.78E+11	3.70E+11	3.63E+11	3.55E+11	3.48E+11	3.41E+11	3.34E+11	
rh106	6.26E+10	3.55E+10	2.01E+10	1.14E+10	6.46E+09	3.66E+09	2.07E+09	
cs137	1.03E+10	1.01E+10	9.88E+09	9.69E+09	9.51E+09	9.33E+09	9.15E+09	
pr144	5.69E+11	2.71E+11	1.29E+11	6.17E+10	2.94E+10	1.40E+10	6.69E+09	
1 principal photon sources in group 8, photons/sec								
mean energy = .6500 mev. nuclides exceeding 1.0E-03 of total group release rate (5.73E+12) at 1521.9 d								
nuclide	time after discharge							
	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d	
y 90	1.60E+11	1.56E+11	1.53E+11	1.50E+11	1.47E+11	1.44E+11	1.41E+11	
rh106	1.93E+11	1.09E+11	6.21E+10	3.52E+10	1.99E+10	1.13E+10	6.41E+09	
sb125	2.29E+10	1.86E+10	1.51E+10	1.22E+10	9.86E+09	7.98E+09	6.46E+09	
ba137m	6.12E+12	6.00E+12	5.88E+12	5.77E+12	5.66E+12	5.55E+12	5.45E+12	
pr144	3.88E+11	1.85E+11	8.83E+10	4.21E+10	2.01E+10	9.58E+09	4.57E+09	
0 principal photon sources in group 9, photons/sec								
mean energy = 1.1250 mev. nuclides exceeding 1.0E-03 of total group release rate (2.14E+10) at 1521.9 d								
nuclide	time after discharge							
	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d	
y 90	2.08E+10	2.04E+10	2.00E+10	1.96E+10	1.92E+10	1.88E+10	1.84E+10	
rh106	1.80E+10	1.02E+10	5.78E+09	3.28E+09	1.86E+09	1.05E+09	5.97E+08	

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pr144 4.97E+10 2.37E+10 1.13E+10 5.39E+09 2.57E+09 1.23E+09 5.85E+08
eu152 3.37E+08 3.23E+08 3.09E+08 2.96E+08 2.84E+08 2.72E+08 2.60E+08
eu154 8.42E+07 7.87E+07 7.36E+07 6.88E+07 6.44E+07 6.02E+07 5.63E+07
0 principal photon sources in group 10, photons/sec
  mean energy = 1.5750 mev. nuclides exceeding 1.0E-03 of total group release rate (3.49E+09) at 1521.9 d
  nuclide time after discharge
    initial 304.4 d 608.8 d 913.1 d 1217.5 d 1521.9 d 1826.3 d
  y 90 2.66E+09 2.61E+09 2.55E+09 2.50E+09 2.45E+09 2.40E+09 2.35E+09
  rh106 3.39E+09 1.92E+09 1.09E+09 6.18E+08 3.50E+08 1.99E+08 1.13E+08
  cs134 2.37E+07 1.79E+07 1.35E+07 1.02E+07 7.71E+06 5.83E+06 4.41E+06
  pr144 3.09E+10 1.47E+10 7.03E+09 3.35E+09 1.60E+09 7.63E+08 3.64E+08
  eu152 1.55E+08 1.48E+08 1.42E+08 1.36E+08 1.30E+08 1.25E+08 1.19E+08
0 principal photon sources in group 11, photons/sec
  mean energy = 2.0000 mev. nuclides exceeding 1.0E-03 of total group release rate (1.69E+09) at 1521.9 d
  nuclide time after discharge
    initial 304.4 d 608.8 d 913.1 d 1217.5 d 1521.9 d 1826.3 d
  y 90 1.59E+08 1.56E+08 1.53E+08 1.50E+08 1.47E+08 1.44E+08 1.41E+08
  rh106 1.10E+09 6.25E+08 3.54E+08 2.01E+08 1.14E+08 6.45E+07 3.66E+07
  pr144 5.99E+10 2.86E+10 1.36E+10 6.50E+09 3.10E+09 1.48E+09 7.05E+08
0 principal photon sources in group 12, photons/sec
  mean energy = 2.4000 mev. nuclides exceeding 1.0E-03 of total group release rate (5.01E+07) at 1521.9 d
  nuclide time after discharge
    initial 304.4 d 608.8 d 913.1 d 1217.5 d 1521.9 d 1826.3 d
  y 90 9.28E+04 9.10E+04 8.91E+04 8.73E+04 8.55E+04 8.38E+04 8.21E+04
  rh106 6.16E+08 3.49E+08 1.98E+08 1.12E+08 6.36E+07 3.61E+07 2.04E+07
  pr144 5.66E+08 2.70E+08 1.29E+08 6.14E+07 2.93E+07 1.40E+07 6.67E+06
1 principal photon sources in group 13, photons/sec
  mean energy = 2.8000 mev. nuclides exceeding 1.0E-03 of total group release rate (7.21E+06) at 1521.9 d
  nuclide time after discharge
    initial 304.4 d 608.8 d 913.1 d 1217.5 d 1521.9 d 1826.3 d
  rh106 1.04E+08 5.89E+07 3.34E+07 1.89E+07 1.07E+07 6.08E+06 3.45E+06
  pr144 4.56E+07 2.18E+07 1.04E+07 4.95E+06 2.36E+06 1.13E+06 5.37E+05
0 principal photon sources in group 14, photons/sec
  mean energy = 3.2500 mev. nuclides exceeding 1.0E-03 of total group release rate (1.05E+06) at 1521.9 d
  nuclide time after discharge
    initial 304.4 d 608.8 d 913.1 d 1217.5 d 1521.9 d 1826.3 d
  rh106 1.79E+07 1.01E+07 5.75E+06 3.26E+06 1.85E+06 1.05E+06 5.93E+05
0 principal photon sources in group 15, photons/sec
  mean energy = 3.7500 mev. nuclides exceeding 1.0E-03 of total group release rate (4.61E+02) at 1521.9 d
  nuclide time after discharge
    initial 304.4 d 608.8 d 913.1 d 1217.5 d 1521.9 d 1826.3 d
  rh106 7.88E+03 4.47E+03 2.53E+03 1.44E+03 8.14E+02 4.61E+02 2.61E+02
0 principal photon sources in group 16, photons/sec
  mean energy = 4.2500 mev. nuclides exceeding 1.0E-03 of total group release rate (2.01E-07) at 1521.9 d
  nuclide time after discharge
    initial 304.4 d 608.8 d 913.1 d 1217.5 d 1521.9 d 1826.3 d
  ce142 1.46E-07 1.46E-07 1.46E-07 1.46E-07 1.46E-07 1.46E-07 1.46E-07
  sm147 5.38E-08 5.42E-08 5.46E-08 5.49E-08 5.51E-08 5.52E-08 5.54E-08
0 principal photon sources in group 17, photons/sec
  mean energy = 4.7500 mev. nuclides exceeding 1.0E-03 of total group release rate (1.01E-07) at 1521.9 d
  nuclide time after discharge
    initial 304.4 d 608.8 d 913.1 d 1217.5 d 1521.9 d 1826.3 d
  ce142 7.32E-08 7.32E-08 7.32E-08 7.32E-08 7.32E-08 7.32E-08 7.32E-08
  sm147 2.70E-08 2.72E-08 2.74E-08 2.75E-08 2.76E-08 2.77E-08 2.78E-08
0 principal photon sources in group 18, photons/sec
  mean energy = 5.5000 mev. nuclides exceeding 1.0E-03 of total group release rate (7.49E-08) at 1521.9 d
  nuclide time after discharge
    initial 304.4 d 608.8 d 913.1 d 1217.5 d 1521.9 d 1826.3 d
  ce142 5.43E-08 5.43E-08 5.43E-08 5.43E-08 5.43E-08 5.43E-08 5.43E-08

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sm147 2.00E-08 2.02E-08 2.03E-08 2.04E-08 2.05E-08 2.06E-08 2.06E-08

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photon spectrum as a function of time for heavy metals and their daughters

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sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
 power= .00 mw, burnup= 146.mwd, flux= 2.79E+08 n**2-sec
 actinide photon release rates, photons/sec
 basis = single reactor assembly

0

0

e (mev)	initial	time after discharge					
		304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
1.00E-02	1.34E+14	8.65E+11	8.63E+11	8.61E+11	8.59E+11	8.57E+11	8.55E+11
3.00E-02	8.46E+12	4.62E+10	4.62E+10	4.62E+10	4.62E+10	4.62E+10	4.62E+10
5.50E-02	1.09E+13	2.08E+10	2.08E+10	2.08E+10	2.08E+10	2.08E+10	2.08E+10
8.50E-02	5.26E+13	1.51E+11	1.51E+11	1.51E+11	1.51E+11	1.51E+11	1.51E+11
1.20E-01	5.43E+13	2.91E+10	2.91E+10	2.91E+10	2.91E+10	2.91E+10	2.91E+10
1.70E-01	1.72E+12	1.90E+10	1.90E+10	1.90E+10	1.90E+10	1.90E+10	1.90E+10
3.00E-01	2.87E+13	1.30E+11	1.30E+11	1.30E+11	1.30E+11	1.30E+11	1.30E+11
6.50E-01	1.45E+12	6.31E+09	6.31E+09	6.31E+09	6.31E+09	6.31E+09	6.31E+09
1.13E+00	1.86E+12	9.19E+08	9.19E+08	9.19E+08	9.19E+08	9.19E+08	9.19E+08
1.58E+00	1.10E+08	1.10E+08	1.10E+08	1.10E+08	1.11E+08	1.11E+08	1.11E+08
2.00E+00	3.72E+07	3.72E+07	3.72E+07	3.72E+07	3.72E+07	3.72E+07	3.72E+07
2.40E+00	4.45E+05	4.52E+05	4.59E+05	4.66E+05	4.73E+05	4.80E+05	4.87E+05
2.80E+00	1.61E+06	1.63E+06	1.63E+06	1.64E+06	1.64E+06	1.64E+06	1.64E+06
3.25E+00	1.44E+04	1.44E+04	1.45E+04	1.45E+04	1.46E+04	1.46E+04	1.47E+04
3.75E+00	6.40E+03	6.39E+03	6.39E+03	6.39E+03	6.38E+03	6.38E+03	6.38E+03
4.25E+00	3.69E+03	3.69E+03	3.69E+03	3.69E+03	3.69E+03	3.68E+03	3.68E+03
4.75E+00	2.13E+03	2.13E+03	2.13E+03	2.13E+03	2.13E+03	2.13E+03	2.13E+03
5.50E+00	1.92E+03	1.92E+03	1.92E+03	1.92E+03	1.92E+03	1.92E+03	1.92E+03
total	2.93E+14	1.27E+12	1.27E+12	1.26E+12	1.26E+12	1.26E+12	1.26E+12
mev/sec	2.51E+13	7.52E+10	7.52E+10	7.52E+10	7.52E+10	7.51E+10	7.51E+10

actinide energy release rates, mev/watt-sec
 basis = single reactor assembly

0

0

0

e (mev)	initial	time after discharge					
		304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
1.00E-02	3.34E+08	2.16E+06	2.16E+06	2.15E+06	2.15E+06	2.14E+06	2.14E+06
3.00E-02	6.34E+07	3.46E+05	3.46E+05	3.46E+05	3.46E+05	3.46E+05	3.46E+05
5.50E-02	1.50E+08	2.86E+05	2.86E+05	2.86E+05	2.86E+05	2.86E+05	2.86E+05
8.50E-02	1.12E+09	3.21E+06	3.21E+06	3.21E+06	3.21E+06	3.21E+06	3.21E+06
1.20E-01	1.63E+09	8.72E+05	8.72E+05	8.72E+05	8.72E+05	8.72E+05	8.72E+05
1.70E-01	7.31E+07	8.08E+05	8.08E+05	8.08E+05	8.08E+05	8.08E+05	8.08E+05
3.00E-01	2.15E+09	9.78E+06	9.78E+06	9.78E+06	9.78E+06	9.78E+06	9.78E+06
6.50E-01	2.36E+08	1.03E+06	1.03E+06	1.03E+06	1.03E+06	1.03E+06	1.03E+06
1.13E+00	5.23E+08	2.58E+05	2.58E+05	2.58E+05	2.58E+05	2.59E+05	2.59E+05
1.58E+00	4.34E+04	4.35E+04	4.35E+04	4.35E+04	4.35E+04	4.35E+04	4.36E+04
2.00E+00	1.86E+04	1.86E+04	1.86E+04	1.86E+04	1.86E+04	1.86E+04	1.86E+04
2.40E+00	2.67E+02	2.71E+02	2.76E+02	2.80E+02	2.84E+02	2.88E+02	2.92E+02
2.80E+00	1.13E+03	1.14E+03	1.14E+03	1.15E+03	1.15E+03	1.15E+03	1.15E+03
3.25E+00	1.17E+01	1.17E+01	1.18E+01	1.18E+01	1.18E+01	1.19E+01	1.19E+01
3.75E+00	6.00E+00	5.99E+00	5.99E+00	5.99E+00	5.98E+00	5.98E+00	5.98E+00
4.25E+00	3.92E+00	3.92E+00	3.92E+00	3.92E+00	3.92E+00	3.91E+00	3.91E+00
4.75E+00	2.53E+00	2.53E+00	2.53E+00	2.53E+00	2.53E+00	2.53E+00	2.53E+00
5.50E+00	2.64E+00	2.64E+00	2.64E+00	2.64E+00	2.64E+00	2.64E+00	2.64E+00
total	6.28E+09	1.88E+07	1.88E+07	1.88E+07	1.88E+07	1.88E+07	1.88E+07
gamma watts	4.02E+00	1.21E-02	1.21E-02	1.21E-02	1.20E-02	1.20E-02	1.20E-02

0

0

1

neutron source intensity as a function of time

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2

alpha-n neutron source, neutrons/sec/basis
basis = single reactor assembly

	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d
pb210	3.48E-10	3.55E-10	3.62E-10	3.70E-10	3.77E-10	3.85E-10	3.92E-10
bi210	8.87E-08	9.06E-08	9.24E-08	9.43E-08	9.62E-08	9.82E-08	1.00E-07
bi211	8.72E-01	8.82E-01	8.92E-01	9.02E-01	9.12E-01	9.22E-01	9.32E-01
bi212	5.58E-02	5.64E-02	5.67E-02	5.69E-02	5.69E-02	5.69E-02	5.69E-02
bi213	3.11E-04	3.16E-04	3.21E-04	3.26E-04	3.32E-04	3.37E-04	3.43E-04
bi214	7.25E-05	7.37E-05	7.49E-05	7.61E-05	7.73E-05	7.86E-05	7.98E-05
po210	1.09E-01	1.09E-01	1.11E-01	1.13E-01	1.15E-01	1.18E-01	1.20E-01
po211	3.45E-03	3.49E-03	3.53E-03	3.57E-03	3.61E-03	3.65E-03	3.69E-03
po212	2.86E-01	2.89E-01	2.90E-01	2.91E-01	2.92E-01	2.92E-01	2.91E-01
po213	4.10E-02	4.17E-02	4.24E-02	4.31E-02	4.38E-02	4.45E-02	4.52E-02
po214	6.46E-01	6.56E-01	6.67E-01	6.78E-01	6.89E-01	7.00E-01	7.11E-01
po215	1.23E+00	1.25E+00	1.26E+00	1.28E+00	1.29E+00	1.30E+00	1.32E+00
po216	2.23E-01	2.25E-01	2.27E-01	2.27E-01	2.28E-01	2.27E-01	2.27E-01
po218	3.07E-01	3.12E-01	3.17E-01	3.23E-01	3.28E-01	3.33E-01	3.38E-01
at217	2.66E-02	2.70E-02	2.75E-02	2.79E-02	2.84E-02	2.88E-02	2.93E-02
rn218	4.21E-12	1.66E-16	6.51E-21	2.56E-25	.00E+00	.00E+00	.00E+00
rn219	9.80E-01	9.92E-01	1.00E+00	1.01E+00	1.03E+00	1.04E+00	1.05E+00
rn220	1.77E-01	1.79E-01	1.79E-01	1.80E-01	1.80E-01	1.80E-01	1.80E-01
rn222	2.24E-01	2.28E-01	2.32E-01	2.36E-01	2.39E-01	2.43E-01	2.47E-01
fr221	1.94E-02	1.97E-02	2.00E-02	2.04E-02	2.07E-02	2.10E-02	2.14E-02
fr223	3.71E-07	3.75E-07	3.79E-07	3.84E-07	3.88E-07	3.92E-07	3.96E-07
ra222	3.25E-12	1.28E-16	5.03E-21	1.98E-25	.00E+00	.00E+00	.00E+00
ra223	5.67E-01	5.74E-01	5.81E-01	5.87E-01	5.94E-01	6.00E-01	6.07E-01
ra224	1.25E-01	1.26E-01	1.27E-01	1.27E-01	1.27E-01	1.27E-01	1.27E-01
ra226	1.31E-01	1.33E-01	1.36E-01	1.38E-01	1.40E-01	1.42E-01	1.45E-01
ac225	1.39E-02	1.42E-02	1.44E-02	1.46E-02	1.49E-02	1.51E-02	1.54E-02
ac227	4.17E-03	4.22E-03	4.27E-03	4.32E-03	4.36E-03	4.41E-03	4.46E-03
ac228	2.11E-13	2.12E-13	2.14E-13	2.16E-13	2.18E-13	2.20E-13	2.22E-13
th226	2.94E-12	1.16E-16	4.54E-21	1.79E-25	.00E+00	.00E+00	.00E+00
th227	6.26E-01	6.33E-01	6.41E-01	6.48E-01	6.55E-01	6.62E-01	6.69E-01
th228	1.05E-01	1.06E-01	1.07E-01	1.07E-01	1.07E-01	1.07E-01	1.07E-01
th229	8.15E-03	8.28E-03	8.42E-03	8.56E-03	8.70E-03	8.84E-03	8.98E-03
th230	5.67E+00	5.71E+00	5.76E+00	5.81E+00	5.85E+00	5.90E+00	5.95E+00
th232	2.93E-06	2.95E-06	2.97E-06	3.00E-06	3.02E-06	3.05E-06	3.07E-06
pa231	4.76E-01	4.80E-01	4.84E-01	4.88E-01	4.92E-01	4.96E-01	5.00E-01
u230	2.31E-12	9.09E-17	3.58E-21	1.41E-25	.00E+00	.00E+00	.00E+00
u231	1.49E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u232	1.01E-01	1.01E-01	1.01E-01	1.00E-01	1.00E-01	9.96E-02	9.90E-02
u233	1.62E+00	1.63E+00	1.65E+00	1.66E+00	1.68E+00	1.69E+00	1.71E+00
u234	6.63E+03	6.63E+03	6.63E+03	6.63E+03	6.63E+03	6.63E+03	6.63E+03
u235	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02
u236	1.04E+03	1.04E+03	1.04E+03	1.04E+03	1.04E+03	1.04E+03	1.04E+03
u238	8.32E+02	8.32E+02	8.32E+02	8.32E+02	8.32E+02	8.32E+02	8.32E+02
np235	2.41E-08	1.42E-08	8.31E-09	4.88E-09	2.87E-09	1.68E-09	9.88E-10
np237	3.35E+03	3.35E+03	3.35E+03	3.35E+03	3.35E+03	3.35E+03	3.35E+03
pu236	1.41E-01	1.16E-01	9.50E-02	7.78E-02	6.38E-02	5.23E-02	4.28E-02
pu237	1.26E-08	1.18E-10	1.10E-12	1.03E-14	9.68E-17	9.07E-19	8.49E-21
pu238	4.56E+04	4.53E+04	4.50E+04	4.47E+04	4.44E+04	4.41E+04	4.38E+04

neutron source intensity as a function of time

sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
alpha-n neutron source, neutrons/sec/basis
basis = single reactor assembly

12	3.00E-05	- 1.00E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
13	1.00E-05	- 3.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
14	3.05E-06	- 1.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
15	1.77E-06	- 3.05E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
16	1.30E-06	- 1.77E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
17	1.13E-06	- 1.30E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
18	1.00E-06	- 1.13E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
19	8.00E-07	- 1.00E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
20	4.00E-07	- 8.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
21	3.25E-07	- 4.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
22	2.25E-07	- 3.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
23	1.00E-07	- 2.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24	5.00E-08	- 1.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
25	3.00E-08	- 5.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26	1.00E-08	- 3.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
27	1.00E-11	- 1.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
0			1.260E+05	1.259E+05	1.259E+05	1.258E+05	1.258E+05	1.257E+05	1.257E+05		

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total (alpha-n plus spon. fission) neutron source spectrum as a function of time
(using reaction spectra for uranium dioxide)

0 sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
neutron spectra, neutrons/sec/basis
basis = single reactor assembly

boundaries, mev	initial	304.4 d	608.8 d	913.1 d	1217.5 d	1521.9 d	1826.3 d	
1	6.43E+00 - 2.00E+01	2.406E+03	2.405E+03	2.404E+03	2.403E+03	2.402E+03	2.401E+03	2.400E+03
2	3.00E+00 - 6.43E+00	3.850E+04	3.843E+04	3.836E+04	3.829E+04	3.822E+04	3.815E+04	3.809E+04
3	1.85E+00 - 3.00E+00	6.308E+04	6.290E+04	6.273E+04	6.256E+04	6.238E+04	6.221E+04	6.204E+04
4	1.40E+00 - 1.85E+00	2.551E+04	2.546E+04	2.541E+04	2.536E+04	2.531E+04	2.526E+04	2.521E+04
5	9.00E-01 - 1.40E+00	2.754E+04	2.751E+04	2.747E+04	2.744E+04	2.741E+04	2.737E+04	2.734E+04
6	4.00E-01 - 9.00E-01	2.642E+04	2.640E+04	2.638E+04	2.636E+04	2.635E+04	2.633E+04	2.631E+04
7	1.00E-01 - 4.00E-01	5.154E+03	5.150E+03	5.147E+03	5.144E+03	5.141E+03	5.137E+03	5.134E+03
8	1.70E-02 - 1.00E-01	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
9	3.00E-03 - 1.70E-02	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
10	5.50E-04 - 3.00E-03	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
11	1.00E-04 - 5.50E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
12	3.00E-05 - 1.00E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
13	1.00E-05 - 3.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
14	3.05E-06 - 1.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
15	1.77E-06 - 3.05E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
16	1.30E-06 - 1.77E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
17	1.13E-06 - 1.30E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
18	1.00E-06 - 1.13E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
19	8.00E-07 - 1.00E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
20	4.00E-07 - 8.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
21	3.25E-07 - 4.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
22	2.25E-07 - 3.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
23	1.00E-07 - 2.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24	5.00E-08 - 1.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
25	3.00E-08 - 5.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26	1.00E-08 - 3.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
27	1.00E-11 - 1.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
0		1.886E+05	1.883E+05	1.879E+05	1.876E+05	1.872E+05	1.869E+05	1.865E+05

1 * gamma sources determined *
1 Ocase applies the following photon data base
1 master photon library
1 in binary mode

0 the sources include photons of nuclides for...

light elements
actinides
fission products

1
0
0
0

0
0
0
0
1
0
0
1

gamma source spectrum for gamma lines (sas2)
1826.25 day time of the requested nuclides

energy interval	in mev	photons / second	mev / second
1.0000E-02 to	5.0000E-02	3.8302E+12	1.1491E+11
5.0000E-02 to	1.0000E-01	1.2026E+12	9.0196E+10
1.0000E-01 to	2.0000E-01	7.3628E+11	1.1044E+11
2.0000E-01 to	3.0000E-01	2.3336E+11	5.8341E+10
3.0000E-01 to	4.0000E-01	2.5637E+11	8.9730E+10
4.0000E-01 to	6.0000E-01	1.2042E+11	6.0208E+10
6.0000E-01 to	8.0000E-01	5.1131E+12	3.5792E+12
8.0000E-01 to	1.0000E+00	2.1239E+10	1.9115E+10
1.0000E+00 to	1.3300E+00	1.2983E+10	1.5125E+10
1.3300E+00 to	1.6600E+00	2.8176E+09	4.2123E+09
1.6600E+00 to	2.0000E+00	5.5369E+08	1.0133E+09
2.0000E+00 to	2.5000E+00	6.7003E+08	1.5076E+09
2.5000E+00 to	3.0000E+00	6.4986E+06	1.7871E+07
3.0000E+00 to	4.0000E+00	5.6448E+05	1.9757E+06
4.0000E+00 to	5.0000E+00	5.7240E+03	2.5758E+04
5.0000E+00 to	6.5000E+00	2.2820E+03	1.3122E+04
6.5000E+00 to	8.0000E+00	4.4500E+02	3.2262E+03
8.0000E+00 to	1.0000E+01	9.4093E+01	8.4683E+02
totals		1.1531E+13	4.1440E+12

total energy from nuclides with spectrum data = 4.1440E+12
total energy from nuclides with no spectrum data = 5.5050E+05

.results on logical unit no. 71, position 2, for time step 6, subcase 7. (run position 1, case position 2)
title: sas2h: far-field crit based on b&w 15x15, 3.00wt%, 20gwd/mtu 40% h2o/ 8% uo2
.terminated logical unit no. 71 with zero flag record.
* normal termination of execution *

1 primary module access and input record (scale driver - 95/03/29 - 09:06:37)

- module sas2h will be called
 SAS2H: Far-Field Crit based on B&W 15x15, 3.00wt%, 20gwd/mtu 40% H2O/ 8% UO2
 44group latticecell

' mixtures of tuff infinite slabs:

arbm-ftuff 2.6344 14 0 0 0 1001 1.055 8016 40.755 11023 0.570 12000 0.354
 13027 4.434 14000 20.193 19000 1.370 20000 1.439
 26000 0.494 92235 0.567 92234 0.007 92236 0.136
 92238 28.593 93237 0.033 1 1.0 538 end

kr-83 1 0 1-20 538 end
 kr-85 1 0 1-20 538 end
 sr-90 1 0 1-20 538 end
 y-89 1 0 1-20 538 end
 mo-95 1 0 1-20 538 end
 zr-93 1 0 1-20 538 end
 zr-94 1 0 1-20 538 end
 zr-95 1 0 1-20 538 end
 nb-94 1 0 1-20 538 end
 tc-99 1 0 1-20 538 end
 rh-103 1 0 1-20 538 end
 rh-105 1 0 1-20 538 end
 ru-101 1 0 1-20 538 end
 ru-106 1 0 1-20 538 end
 pd-105 1 0 1-20 538 end
 pd-108 1 0 1-20 538 end
 ag-109 1 0 1-20 538 end
 sb-124 1 0 1-20 538 end
 xe-131 1 0 1-20 538 end
 xe-132 1 0 1-20 538 end
 xe-135 1 0 1-20 538 end
 xe-136 1 0 1-20 538 end
 cs-134 1 0 1-20 538 end
 cs-135 1 0 1-20 538 end
 cs-137 1 0 1-20 538 end
 ba-136 1 0 1-20 538 end
 la-139 1 0 1-20 538 end
 pr-141 1 0 1-20 538 end
 pr-143 1 0 1-20 538 end
 ce-144 1 0 1-20 538 end
 nd-143 1 0 1-20 538 end
 nd-145 1 0 1-20 538 end
 pm-147 1 0 1-20 538 end
 pm-148 1 0 1-20 538 end
 nd-147 1 0 1-20 538 end
 sm-147 1 0 1-20 538 end
 sm-149 1 0 1-20 538 end
 sm-150 1 0 1-20 538 end
 sm-151 1 0 1-20 538 end
 sm-152 1 0 1-20 538 end
 gd-155 1 0 1-20 538 end
 eu-153 1 0 1-20 538 end
 eu-154 1 0 1-20 538 end
 eu-155 1 0 1-20 538 end

arbm-tuff1 1.90533 9 0 0 0 1001 2.326 8016 57.779 11023 0.789 12000 0.490
 13027 6.130 14000 27.919 19000 1.894 20000 1.989
 26000 0.683 2 1.0 323. end
 arbm-tuff2 1.90533 9 0 0 0 1001 2.326 8016 57.779 11023 0.789 12000 0.490
 13027 6.130 14000 27.919 19000 1.894 20000 1.989
 26000 0.683 3 1.0 323. end

end comp

fuel-pin-cell geometry:

symmslabcell 340. 280. 1 3 281. 2 end

assembly and cycle parameters:

npin/asm=1 fuelngth=280. ncycles=1 nlib/cyc=10 volfueltot=1.1494E7
printlevel=6 inplevel=0 end
power=0.004 burn=3.6525e5 down=1.82625e3
end

```

1  oooooooooo  rrrrrrrrrrr  iiiiiiiiiii  ggggggggggg  eeeeeeeeeee  nn      nn  sssssssss
   oooooooooo  rrrrrrrrrrr  iiiiiiiiiii  ggggggggggg  eeeeeeeeeee  nnn     nn  sssssssss
   oo      oo  rr      rr  ii      ii  gg      gg  ee      ee  nnnn    nn  ss      ss
   oo      oo  rr      rr  ii      ii  gg      gg  ee      ee  nn  nn   nn  ss      ss
   oo      oo  rr      rr  ii      ii  gg      gg  ee      ee  nn  nn   nn  ss      ss
   oo      oo  rrrrrrrrr  ii      ii  gg      gg  eeeeeeee  nn  nn   nn  sssssssss
   oo      oo  rrrrrrrrr  ii      ii  gg      gg  eeeeeeee  nn  nn   nn  sssssssss
   oo      oo  rr      rr  ii      ii  gg      gg  ee      ee  nn  nn   nn  ss      ss
   oo      oo  rr      rr  ii      ii  gg      gg  ee      ee  nn  nn   nn  ss      ss
   oo      oo  rr      rr  ii      ii  gg      gg  ee      ee  nn  nnnn  ss      ss
   oooooooooo  rr      rr  iiiiiiiii  ggggggggg  eeeeeeeeeee  nn      nn  sssssssss
   oooooooooo  rr      rr  iiiiiiiii  ggggggggg  eeeeeeeeeee  nn      nn  sssssssss
0

```

```

   dddddddddd  aaaaaaaaa  vv      vv  iiiiiiiii  sssssssss
   dddddddddd  aaaaaaaaa  vv      vv  iiiiiiiii  sssssssss
   dd      dd  aa      aa  vv      vv  ii      ii  ss      ss
   dd      dd  aa      aa  vv      vv  ii      ii  ss      ss
   dd      dd  aa      aa  vv      vv  ii      ii  ss      ss
   dd      dd  aaaaaaaaa  vv      vv  ii      ii  sssssssss
   dd      dd  aaaaaaaaa  vv      vv  ii      ii  sssssssss
   dd      dd  aa      aa  vv      vv  ii      ii  ss      ss
   dd      dd  aa      aa  vv      vv  ii      ii  ss      ss
   dd      dd  aa      aa  vv      vv  ii      ii  ss      ss
   dddddddddd  aa      aa  vv      vv  iiiiiiiii  sssssssss
   dddddddddd  aa      aa  vv      vv  iiiiiiiii  sssssssss
0

```

```

   0000000  8888888888  //  222222222  8888888888  //  999999999  6666666666
   00000000 8888888888  2222222222 8888888888 9999999999 6666666666
   00      00 88      88  22      22 88      88  99      99 66      66
   00      00 88      88  22      22 88      88  99      99 66      66
   00      00 88      88  22      22 88      88  99      99 66      66
   00      00 88888888  22      22 88888888 9999999999 6666666666
   00      00 88888888  22      22 88888888 9999999999 6666666666
   00      00 88      88  22      22 88      88  99      99 66      66
   00      00 88      88  22      22 88      88  99      99 66      66
   00      00 88      88  22      22 88      88  99      99 66      66
   00000000 8888888888  2222222222 8888888888 9999999999 6666666666
   0000000  8888888888  2222222222 8888888888 9999999999 6666666666

```

