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

the sum of the fractions of material 1 was 7.483182E-02

material number — component nuclide, atom fraction

1	92233,	.00000	92234,	.00001	92235,	.00053	92236,	.00015
	92238,	.02875	93237,	.00003	94238,	.00000	94239,	.00003
	94240,	.00000	1001,	.21460	8016,	.54338	11023,	.00526
	12000,	.00309	13027,	.03484	14000,	.15242	19000,	.00743
	20000,	.00761	26000,	.00188				
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	92233,	.00000	92234,	.00009	92235,	.00567	92236,	.00156
	92238,	.31045	93237,	.00035	94238,	.00000	94239,	.00029
	94240,	.00001	1001,	.00981	8016,	.39427	11023,	.00549
	12000,	.00341	13027,	.04264	14000,	.19420	19000,	.01318
	20000,	.01384	26000,	.00475				
2	1001,	.02326	8016,	.57779	11023,	.00789	12000,	.00490
	13027,	.06130	14000,	.27919	19000,	.01894	20000,	.01989
	26000,	.00683						

warning. 1 of the materials had unnormalized fractions.

1cell volumes and masses print table 50

cell		atom density	gram density	input volume	calculated volume	mass	pieces	reason volume not calculated
1	1	7.48330E-02	2.73928E+00	.00000E+00	1.14940E+07	3.14854E+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.

+ 08/29/96 21:26:32

Far-Field Consequence Study - 32% H2O/ 8% UO2 (sp40g1y) 10000 Years 600K probid = 08/29/96 19:39:01

0

neutron creation	tracks	weight (per source particle)	energy	neutron loss	tracks	weight (per source particle)	energy

source	520281	9.9946E-01	2.0382E+00
weight window	0	0.	0.
cell importance	0	0.	0.
weight cutoff	0	6.1396E-02	3.5204E-05
energy importance	0	0.	0.
dxtran	0	0.	0.
forced collisions	0	0.	0.
exp. transform	0	0.	0.
upscattering	0	0.	2.9787E-07
(n,xn)	615	9.0114E-04	6.0068E-04
fission	0	0.	0.
total	520896	1.0618E+00	2.0388E+00

escape	149	1.6730E-04	1.4604E-04
energy cutoff	0	0.	0.
time cutoff	0	0.	0.
weight window	0	0.	0.
cell importance	0	0.	0.
weight cutoff	520441	6.1227E-02	2.4254E-05
energy importance	0	0.	0.
dxtran	0	0.	0.
forced collisions	0	0.	0.
exp. transform	0	0.	0.
downscattering	0	0.	1.9292E+00
capture	0	6.1647E-01	6.3851E-02
loss to (n,xn)	306	4.4829E-04	3.7092E-03
loss to fission	0	3.8345E-01	4.1915E-02
total	520896	1.0618E+00	2.0388E+00

number of neutrons banked	309
neutron tracks per source particle	1.0012E+00
neutron collisions per source particle	7.4518E+01
total neutron collisions	38770499
net multiplication	1.0005E+00 .0000

average lifetime, shakes	
escape	3.2217E+04
capture	8.5808E+03
capture or escape	8.5847E+03
any termination	9.3585E+03

cutoffs	
tco	1.0000E+34
eco	.0000E+00
wc1	-5.0000E-01
wc2	-2.5000E-01

computer time so far in this run	107.38 minutes
computer time in mcrun	107.32 minutes
source particles per minute	4.8477E+03
random numbers generated	451369347

maximum number ever in bank	2
bank overflows to backup file	0
field length	0
most random numbers used was	13557 in history 65329

range of sampled source weights = 9.2357E-01 to 1.0675E+00 print table 126

1neutron activity in each cell

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	601228	520590	31280058	4.4781E+01	3.6133E-04	5.2618E-01	8.1350E-01	2.5733E+00
2	2	104805	51172	7490441	7.6401E+00	4.7485E-05	2.0377E-01	5.8027E-01	1.3246E+00
total		706033	571762	38770499	5.2421E+01				

1keff results for: Far-Field Consequence Study - 32% H2O/ 8% UO2 (sp40g1y) 10000 Years 600K probid = 08/29/96 19:39:01

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 119593 neutron histories and 100 active cycles with 400688 neutron histories.

this calculation has completed the requested number of keff cycles using a total of 520281 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 99 percent confidence level, but not at 95 percent
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 = .95562 with an estimated standard deviation of .00095

the estimated 68, 95, & 99 percent keff confidence intervals are .95467 to .95657, .95373 to .95751, and .95311 to .95813

the estimated collision/absorption neutron removal lifetime = 8.59E-05 seconds with an estimated standard deviation of 1.92E-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	.95629	.00141	.95488 to .95770	.95348 to .95910	.95257 to .96001	
absorption	.95516	.00113	.95403 to .95630	.95290 to .95742	.95217 to .95816	
track length	.95613	.00147	.95466 to .95761	.95321 to .95906	.95225 to .96002	
col/absorp	.95559	.00094	.95464 to .95653	.95371 to .95747	.95310 to .95808	.1287
abs/trk len	.95551	.00095	.95456 to .95646	.95361 to .95741	.95299 to .95803	.1162
col/trk len	.95641	.00140	.95501 to .95782	.95362 to .95921	.95270 to .96012	.9841
col/abs/trk len	.95562	.00095	.95467 to .95657	.95373 to .95751	.95311 to .95813	

```
1mcnp     version 4a    ld=10/01/93                          08/29/96 15:14:43
 ******************************************************************************                    probid =   08/29/96 15:14:43
 inp=sp40g1z outp=sp40g1z0

    1-       Far-Field Consequence Study - 32% H2O/ 8% UO2 (sp40g1z) 10000 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 no pu239,u233
    4-       C     CELL SPECIFICATIONS
    5-       C     INNER WATER REGION
    6-       1     1  7.48323-2   -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-       c       10000 yr critical
   23-       m1    62149.50c   2.8219E-09
   24-             63151.55c   9.6170E-09
   25-             60143.50c   1.9432E-07
   26-             45103.50c   1.1304E-07
   27-             54131.50c   9.9667E-08
   28-             55133.50c   2.2906E-07
   29-             62147.50c   7.6323E-08
   30-             43099.50c   2.0502E-07
   31-             64155.50c   2.9053E-10
   32-             60145.50c   1.3161E-07
   33-             62152.50c   1.3106E-08
   34-             42095.50c   2.1753E-07
   35-             48000.50c   4.2020E-09
   36-             62150.50c   2.3522E-08
   37-             36083.50c   1.7568E-08
   38-             92234.50c   6.0552E-07
   39-             92235.53c   3.9787E-05
   40-             92236.50c   1.0899E-05
   41-             92238.53c   2.1513E-03
   42-             93237.50c   2.4587E-06
   43-             94240.50c   7.0065E-08
   44-                1001.53c 1.6059-2
   45-                8016.53c 4.0662-2
   46-               11023.50c 3.9366-4
   47-               12000.50c 2.3128-4  13027.50c 2.6070-3  14000.50c 1.1406-2
   48-               19000.50c 5.5591-4  20000.50c 5.6949-4  26000.55c 1.4037-4
   49-       mt1     lwtr.03t
   50-       c        40 (x .99 at 50 C) vol% water in calico Hills tuff
   51-       m2       1001.53c 2.6477-2   8016.53c 4.1448-2  11023.50c 3.9366-4
   52-               12000.50c 2.3128-4  13027.50c 2.6070-3  14000.50c 1.1406-2
   53-               19000.50c 5.5591-4  20000.50c 5.6949-4  26000.55c 1.4037-4
   54-       mt2     lwtr.02t
   55-       PRINT
1     initial source from file   srctp
```

original number of points		3929
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		3929
points after expansion or contraction		3996
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

the sum of the fractions of material 1 was 7.483117E-02

material number	component nuclide, atom fraction							
1	62149,	.00000	63151,	.00000	60143,	.00000	45103,	.00000
	54131,	.00000	55133,	.00000	62147,	.00000	43099,	.00000
	64155,	.00000	60145,	.00000	62152,	.00000	42095,	.00000
	48000,	.00000	62150,	.00000	36083,	.00000	92234,	.00001
	92235,	.00053	92236,	.00015	92238,	.02875	93237,	.00003
	94240,	.00000	1001,	.21460	8016,	.54338	11023,	.00526
	12000,	.00309	13027,	.03484	14000,	.15242	19000,	.00743
	20000,	.00761	26000,	.00188				
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	62149,	.00000	63151,	.00000	60143,	.00002	45103,	.00001
	54131,	.00001	55133,	.00002	62147,	.00001	43099,	.00001
	64155,	.00000	60145,	.00001	62152,	.00000	42095,	.00001
	48000,	.00000	62150,	.00000	36083,	.00000	92234,	.00009
	92235,	.00567	92236,	.00156	92238,	.31051	93237,	.00035
	94240,	.00001	1001,	.00981	8016,	.39435	11023,	.00549
	12000,	.00341	13027,	.04265	14000,	.19423	19000,	.01318
	20000,	.01384	26000,	.00475				
2	1001,	.02326	8016,	.57779	11023,	.00789	12000,	.00490
	13027,	.06130	14000,	.27919	19000,	.01894	20000,	.01989
	26000,	.00683						

warning. 1 of the materials had unnormalized fractions.

1cell volumes and masses print table 50

cell		atom density	gram density	input volume	calculated volume	mass	pieces	reason volume not calculated
1	1	7.48323E-02	2.73877E+00	.00000E+00	1.14940E+07	3.14795E+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.

+ 08/29/96 17:52:51

Far-Field Consequence Study - 32% H2O/ 8% UO2 (sp40g1z) 10000 Years 600K probid = 08/29/96 15:14:43

0

neutron creation	tracks	weight (per source	energy particle)	neutron loss	tracks	weight (per source	energy particle)
source	520709	9.9864E-01	2.0320E+00	escape	126	1.4674E-04	1.8263E-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	6.5427E-02	3.9852E-05	weight cutoff	520897	6.5405E-02	4.4389E-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.	3.1466E-07	downscattering	0	0.	1.9232E+00
				capture	0	6.2837E-01	6.3662E-02
(n,xn)	626	9.0213E-04	6.7489E-04	loss to (n,xn)	312	4.4990E-04	3.8210E-03
fission	0	0.	0.	loss to fission	0	3.7060E-01	4.1847E-02
total	521335	1.0650E+00	2.0327E+00	total	521335	1.0650E+00	2.0327E+00

number of neutrons banked	314	average lifetime, shakes	cutoffs
neutron tracks per source particle	1.0012E+00	escape 2.2585E+04	tco 1.0000E+34
neutron collisions per source particle	7.7377E+01	capture 9.0354E+03	eco .0000E+00
total neutron collisions	40290887	capture or escape 9.0374E+03	wc1 -5.0000E-01
net multiplication	1.0005E+00 .0000	any termination 9.8759E+03	wc2 -2.5000E-01

computer time so far in this run	158.10 minutes	maximum number ever in bank	2
computer time in mcrun	158.04 minutes	bank overflows to backup file	0
source particles per minute	3.2948E+03	field length	0
random numbers generated	468265673	most random numbers used was	12747 in history 380287

range of sampled source weights = 9.4719E-01 to 1.1001E+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	604960	521023	32711757	4.6078E+01	3.3838E-04	5.1509E-01	8.0376E-01	2.5463E+00
2	2	108819	52131	7579130	7.7076E+00	4.6983E-05	2.0137E-01	5.7908E-01	1.3195E+00
total		713779	573154	40290887	5.3786E+01				

1keff results for: Far-Field Consequence Study - 32% H2O/ 8% UO2 (sp40g1z) 10000 Years 600K probid = 08/29/96 15:14:43

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 120373 neutron histories and 100 active cycles with 400336 neutron histories.

this calculation has completed the requested number of keff cycles using a total of 520709 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 99 percent confidence level, but not at 95 percent
the k(absorption) cycle values appear normally distributed at the 95 percent confidence level
warning. the k(trk length) cycle values do not appear normally distributed at the 99 percent confidence level

---

the final estimated combined collision/absorption/track-length keff = .90902 with an estimated standard deviation of .00090

the estimated 68, 95, & 99 percent keff confidence intervals are .90813 to .90992, .90724 to .91081, and .90665 to .91140

the estimated collision/absorption neutron removal lifetime = 9.04E-05 seconds with an estimated standard deviation of 2.10E-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	.90969	.00123	.90846 to .91092	.90724 to .91214	.90645 to .91293	
absorption	.90829	.00115	.90714 to .90944	.90600 to .91058	.90526 to .91132	
track length	.90945	.00128	.90816 to .91073	.90689 to .91200	.90605 to .91284	
col/absorp	.90894	.00089	.90805 to .90983	.90716 to .91071	.90658 to .91129	.1073
abs/trk len	.90880	.00091	.90789 to .90970	.90699 to .91060	.90640 to .91119	.1026
col/trk len	.90986	.00123	.90863 to .91109	.90741 to .91231	.90662 to .91311	.9827
col/abs/trk len	.90902	.00090	.90813 to .90992	.90724 to .91081	.90665 to .91140	

```
1mcnp     version 4a    ld=10/01/93                          08/29/96 13:42:02
 ***************************************************************************          probid =   08/29/96 13:42:02
 inp=sp40g1x outp=sp40g1x0

     1-        Far-Field Consequence Study - 32% H2O/ 8% UO2 (sp40g1x) 10000 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 / extended iso
     4-        C     CELL SPECIFICATIONS
     5-        C     INNER WATER REGION
     6-        1     1  7.48351-2   -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-        c       10000 yr critical
    23-        m1    62149.50c   2.8219E-09
    24-              63151.55c   9.6170E-09
    25-              60143.50c   1.9432E-07
    26-              45103.50c   1.1304E-07
    27-              54131.50c   9.9667E-08
    28-              55133.50c   2.2906E-07
    29-              62147.50c   7.6323E-08
    30-              43099.50c   2.0502E-07
    31-              64155.50c   2.9053E-10
    32-              60145.50c   1.3161E-07
    33-              62152.50c   1.3106E-08
    34-              42095.50c   2.1753E-07
    35-              48000.50c   4.2020E-09
    36-              62150.50c   3.4356E-08
    37-              36083.50c   1.7568E-08
    38-              55135.50c   2.2566E-07
    39-              64157.50c   2.3440E-11
    40-              44101.50c   1.7655E-07
    41-              63153.55c   6.5102E-09
    42-              59141.50c   1.9708E-07
    43-              62151.50c   2.1282E-10
    44-              47109.50c   5.0513E-09
    45-              46105.50c   4.5152E-08
    46-              40093.50c   1.4043E-07
    47-              64152.50c   2.4488E-09
    48-              46108.50c   7.0411E-09
    49-              92233.50c   6.6328E-09
    50-              92234.50c   6.0552E-07
    51-              92235.53c   3.9787E-05
    52-              92236.50c   1.0899E-05
    53-              92238.53c   2.1513E-03
    54-              93237.50c   2.4587E-06
    55-              94238.50c   1.1952E-09
    56-              94239.55c   1.9793E-06
```

```
   57-              94240.50c   7.0065E-08
   58-                 1001.53c 1.6059-2
   59-                 8016.53c 4.0662-2
   60-                11023.50c 3.9366-4
   61-                12000.50c 2.3128-4  13027.50c 2.6070-3  14000.50c 1.1406-2
   62-                19000.50c 5.5591-4  20000.50c 5.6949-4  26000.55c 1.4037-4
   63-        mt1     lwtr.03t
   64-        c        40 (x .99 at 50 C) vol% water in calico Hills tuff
   65-        m2       1001.53c 2.6477-2   8016.53c 4.1448-2  11023.50c 3.9366-4
   66-                12000.50c 2.3128-4  13027.50c 2.6070-3  14000.50c 1.1406-2
   67-                19000.50c 5.5591-4  20000.50c 5.6949-4  26000.55c 1.4037-4
   68-        mt2     lwtr.02t
   69-        PRINT
1     initial source from file   srctp

 original number of points                                    3974
    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                                           3974
 points after expansion or contraction                      3996
 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.                                  print table 40
1material composition

 the sum of the fractions of material     1 was 7.483397E-02

 material
  number      component nuclide, atom fraction

     1          62149,   .00000      63151,   .00000      60143,   .00000      45103,   .00000
                54131,   .00000      55133,   .00000      62147,   .00000      43099,   .00000
                64155,   .00000      60145,   .00000      62152,   .00000      42095,   .00000
                48000,   .00000      62150,   .00000      36083,   .00000      55135,   .00000
                64157,   .00000      44101,   .00000      63153,   .00000      59141,   .00000
                62151,   .00000      47109,   .00000      46105,   .00000      40093,   .00000
                64152,   .00000      46108,   .00000      92233,   .00000      92234,   .00001
                92235,   .00053      92236,   .00015      92238,   .02875      93237,   .00003
                94238,   .00000      94239,   .00003      94240,   .00000       1001,   .21460
                 8016,   .54336      11023,   .00526      12000,   .00309      13027,   .03484
                14000,   .15242      19000,   .00743      20000,   .00761      26000,   .00188
 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	62149,	.00000	63151,	.00000	60143,	.00002	45103,	.00001
	54131,	.00001	55133,	.00002	62147,	.00001	43099,	.00001
	64155,	.00000	60145,	.00001	62152,	.00000	42095,	.00001
	48000,	.00000	62150,	.00000	36083,	.00000	55135,	.00002
	64157,	.00000	44101,	.00001	63153,	.00000	59141,	.00002
	62151,	.00000	47109,	.00000	46105,	.00000	40093,	.00001
	64152,	.00000	46108,	.00000	92233,	.00000	92234,	.00009
	92235,	.00567	92236,	.00156	92238,	.31040	93237,	.00035
	94238,	.00000	94239,	.00029	94240,	.00001	1001,	.00981
	8016,	.39421	11023,	.00549	12000,	.00341	13027,	.04263
	14000,	.19417	19000,	.01317	20000,	.01383	26000,	.00475
2	1001,	.02326	8016,	.57779	11023,	.00789	12000,	.00490
	13027,	.06130	14000,	.27919	19000,	.01894	20000,	.01989
	26000,	.00683						

warning. 1 of the materials had unnormalized fractions.

print table 50

1cell volumes and masses

cell		atom density	gram density	input volume	calculated volume	mass	pieces	reason volume not calculated
1	1	7.48351E-02	2.73972E+00	.00000E+00	1.14940E+07	3.14904E+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.

08/29/96 16:44:36

\+ Far-Field Consequence Study - 32% H2O/ 8% UO2 (sp40g1x) 10000 Years 600K

probid = 08/29/96 13:42:02

0

neutron creation	tracks	weight (per source)	energy particle)
source	520005	9.9999E-01	2.0413E+00
weight window	0	0.	0.
cell importance	0	0.	0.
weight cutoff	0	6.0598E-02	4.5024E-05
energy importance	0	0.	0.
dxtran	0	0.	0.
forced collisions	0	0.	0.
exp. transform	0	0.	0.
upscattering	0	0.	2.9393E-07
(n,xn)	675	9.8269E-04	7.2896E-04
fission	0	0.	0.
total	520680	1.0616E+00	2.0420E+00

neutron loss	tracks	weight (per source)	energy particle)
escape	129	1.3901E-04	8.1805E-05
energy cutoff	0	0.	0.
time cutoff	0	0.	0.
weight window	0	0.	0.
cell importance	0	0.	0.
weight cutoff	520214	6.0835E-02	4.5386E-05
energy importance	0	0.	0.
dxtran	0	0.	0.
forced collisions	0	0.	0.
exp. transform	0	0.	0.
downscattering	0	0.	1.9316E+00
capture	0	6.2071E-01	6.4198E-02
loss to (n,xn)	337	4.9053E-04	4.1077E-03
loss to fission	0	3.7940E-01	4.1973E-02
total	520680	1.0616E+00	2.0420E+00

number of neutrons banked	338	
neutron tracks per source particle	1.0013E+00	
neutron collisions per source particle	7.3819E+01	
total neutron collisions	38386204	
net multiplication	1.0005E+00	.0000

average lifetime, shakes	
escape	3.0649E+04
capture	8.4525E+03
capture or escape	8.4556E+03
any termination	9.2083E+03

cutoffs	
tco	1.0000E+34
eco	.0000E+00
wc1	-5.0000E-01
wc2	-2.5000E-01

computer time so far in this run 182.24 minutes
computer time in mcrun 182.15 minutes
source particles per minute 2.8548E+03
random numbers generated 447516742

maximum number ever in bank 2
bank overflows to backup file 0
field length 0
most random numbers used was 11451 in history 377872

range of sampled source weights = 9.2421E-01 to 1.0616E+00

print table 126

1neutron activity in each cell

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	599533	520343	31039933	4.4569E+01	3.6657E-04	5.2925E-01	8.1518E-01	2.5788E+00
2	2	102910	50260	7346271	7.5177E+00	4.7754E-05	2.0354E-01	5.8211E-01	1.3261E+00
total		702443	570603	38386204	5.2086E+01				

1keff results for: Far-Field Consequence Study - 32% H2O/ 8% UO2 (sp40g1x) 10000 Years 600K probid = 08/29/96 13:42:02

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 119677 neutron histories and 100 active cycles with 400328 neutron histories.

this calculation has completed the requested number of keff cycles using a total of 520005 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 = .94482 with an estimated standard deviation of .00089

the estimated 68, 95, & 99 percent keff confidence intervals are .94393 to .94571, .94305 to .94659, and .94247 to .94717

the estimated collision/absorption neutron removal lifetime = 8.46E-05 seconds with an estimated standard deviation of 1.79E-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	.94541	.00142	.94399 to .94683	.94259 to .94824	.94166 to .94916	
absorption	.94460	.00111	.94349 to .94571	.94239 to .94682	.94167 to .94754	
track length	.94528	.00138	.94390 to .94666	.94254 to .94802	.94164 to .94892	
col/absorp	.94490	.00091	.94400 to .94581	.94310 to .94671	.94251 to .94730	.0616
abs/trk len	.94487	.00089	.94398 to .94576	.94309 to .94664	.94252 to .94721	.0455
col/trk len	.94524	.00138	.94385 to .94662	.94248 to .94799	.94158 to .94889	.9818
col/abs/trk len	.94482	.00089	.94393 to .94571	.94305 to .94659	.94247 to .94717	

```
1mcnp     version 4a    ld=10/01/93                          08/29/96 13:28:41
 ******************************************************************************                probid =   08/29/96 13:28:41
 inp=sp40l outp=sp40l0

     1-        Far-Field Consequence Study - 32% H2O/ 8% UO2 (sp40l) 100000 Year Cycle  350K
     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 @ 300k
     4-        C     CELL SPECIFICATIONS
     5-        C     INNER WATER REGION
     6-        1     1  8.03881-2   -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-        c       10000 yr critical
    23-        m1    62149.50c   3.0928E-09
    24-              62150.50c   3.4659E-8
    25-              60143.50c   3.4941E-07
    26-              45103.50c   2.0316E-07
    27-              63151.55c   1.3054E-08
    28-              36083.50c   3.1787E-08
    29-              64155.50c   2.2525E-10
    30-              55135.50c   4.0782E-07
    31-              54131.50c   1.8012E-07
    32-              55133.50c   4.1790E-07
    33-              43099.50c   3.2898E-07
    34-              62147.50c   1.3874E-07
    35-              62152.50c   2.6109E-8
    36-              60145.50c   2.4081E-07
    37-              42095.50c   3.9916E-07
    38-              92233.50c   4.2045E-08
    39-              92234.50c   8.4027E-07
    40-              92235.50c   5.9382E-05
    41-              92236.50c   1.6250E-05
    42-              92238.50c   3.1474E-03
    43-              93237.50c   3.5361E-06
    44-              94239.55c   1.2735E-06
    45-              94240.50c   1.2813E-08
    46-                 1001.50c 1.7714-2
    47-                 8016.50c 4.3539-2
    48-                11023.50c 3.9366-4
    49-                12000.50c 2.3128-4  13027.50c 2.6070-3  14000.50c 1.1406-2
    50-                19000.50c 5.5591-4  20000.50c 5.6949-4  26000.55c 1.4037-4
    51-        mt1     lwtr.01t
    52-        c        40 (x .99 at 50 C) vol% water in calico Hills tuff
    53-        m2       1001.53c 2.6477-2   8016.53c 4.1448-2  11023.50c 3.9366-4
    54-              12000.50c 2.3128-4  13027.50c 2.6070-3  14000.50c 1.1406-2
    55-              19000.50c 5.5591-4  20000.50c 5.6949-4  26000.55c 1.4037-4
    56-        mt2     lwtr.01t
```

```
   57-       PRINT
1      initial source from file   srctp

 original number of points                                  4244
    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                                           4244
 points after expansion or contraction                      3989
 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.     1001.50c and   1001.53c are both called for.

 warning.     8016.50c and   8016.53c are both called for.                    print table 40
1material composition

 material
  number      component nuclide, atom fraction

     1          62149,   .00000      62150,   .00000      60143,   .00000      45103,   .00000
                63151,   .00000      36083,   .00000      64155,   .00000      55135,   .00001
                54131,   .00000      55133,   .00001      43099,   .00000      62147,   .00000
                62152,   .00000      60145,   .00000      42095,   .00000      92233,   .00000
                92234,   .00001      92235,   .00074      92236,   .00020      92238,   .03915
                93237,   .00004      94239,   .00002      94240,   .00000       1001,   .22036
                 8016,   .54161      11023,   .00490      12000,   .00288      13027,   .03243
                14000,   .14189      19000,   .00692      20000,   .00708      26000,   .00175
  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          62149,   .00000      62150,   .00000      60143,   .00003      45103,   .00001
                63151,   .00000      36083,   .00000      64155,   .00000      55135,   .00003
                54131,   .00001      55133,   .00003      43099,   .00002      62147,   .00001
                62152,   .00000      60145,   .00002      42095,   .00002      92233,   .00001
                92234,   .00010      92235,   .00719      92236,   .00198      92238,   .38606
                93237,   .00043      94239,   .00016      94240,   .00000       1001,   .00920
                 8016,   .35883      11023,   .00466      12000,   .00290      13027,   .03624
                14000,   .16506      19000,   .01120      20000,   .01176      26000,   .00404
     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	8.03881E-02	3.22272E+00	.00000E+00	1.14940E+07	3.70421E+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. 08/29/96 16:52:06

\+ Far-Field Consequence Study - 32% H2O/ 8% UO2 (sp40l) 100000 Year Cycle 350K probid = 08/29/96 13:28:41

0

neutron creation	tracks	weight (per source particle)	energy (per source particle)	neutron loss	tracks	weight (per source particle)	energy (per source particle)
source	519841	1.0003E+00	2.0322E+00	escape	79	9.4926E-05	8.1702E-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	5.6159E-02	5.7333E-05	weight cutoff	520196	5.6046E-02	5.6827E-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.	1.2102E-07	downscattering	0	0.	1.9109E+00
				capture	0	5.9664E-01	6.1951E-02
(n,xn)	865	1.2543E-03	9.5469E-04	loss to (n,xn)	431	6.2505E-04	5.2194E-03
fission	0	0.	0.	loss to fission	0	4.0431E-01	5.5048E-02
total	520706	1.0577E+00	2.0332E+00	total	520706	1.0577E+00	2.0332E+00

number of neutrons banked 434
neutron tracks per source particle 1.0017E+00
neutron collisions per source particle 6.1255E+01
total neutron collisions 31842908
net multiplication 1.0006E+00 .0000

average lifetime, shakes
escape 1.9870E+04
capture 6.3316E+03
capture or escape 6.3329E+03
any termination 6.8682E+03

cutoffs
tco 1.0000E+34
eco .0000E+00
wc1 -5.0000E-01
wc2 -2.5000E-01

computer time so far in this run 133.81 minutes
computer time in mcrun 133.74 minutes
source particles per minute 3.8868E+03
random numbers generated 378177980

maximum number ever in bank 2
bank overflows to backup file 0
field length 0
most random numbers used was 10251 in history 399633

range of sampled source weights = 9.1137E-01 to 1.0585E+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	576696	520274	26313447	3.9104E+01	4.4851E-04	5.7279E-01	8.4039E-01	2.4409E+00
2	2	75645	40265	5529461	5.7291E+00	4.9395E-05	2.2792E-01	5.9752E-01	1.3616E+00
total		652341	560539	31842908	4.4834E+01				

1keff results for: Far-Field Consequence Study - 32% H2O/ 8% UO2 (sp40l) 100000 Year Cycle 350K probid = 08/29/96 13:28:41

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 120152 neutron histories and 100 active cycles with 399689 neutron histories.

this calculation has completed the requested number of keff cycles using a total of 519841 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 = .99942 with an estimated standard deviation of .00093

the estimated 68, 95, & 99 percent keff confidence intervals are .99849 to 1.00035, .99756 to 1.00127, and .99696 to 1.00188

the estimated collision/absorption neutron removal lifetime = 6.32E-05 seconds with an estimated standard deviation of 1.90E-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	1.00228	.00146	1.00082 to 1.00375	.99937 to 1.00520	.99842 to 1.00615	
absorption	.99783	.00111	.99672 to .99894	.99563 to 1.00003	.99491 to 1.00075	
track length	1.00239	.00148	1.00091 to 1.00388	.99944 to 1.00535	.99847 to 1.00631	
col/absorp	.99940	.00095	.99845 to 1.00035	.99752 to 1.00129	.99690 to 1.00190	.0741
abs/trk len	.99944	.00093	.99851 to 1.00037	.99759 to 1.00129	.99699 to 1.00190	.0249
col/trk len	1.00231	.00147	1.00084 to 1.00378	.99938 to 1.00524	.99842 to 1.00619	.9753
col/abs/trk len	.99942	.00093	.99849 to 1.00035	.99756 to 1.00127	.99696 to 1.00188	

```
1mcnp     version 4a    ld=10/01/93                              08/29/96 16:57:28
 ***************************************************************************          probid =   08/29/96 16:57:28
 inp=sp40ln outp=sp40ln0

     1-        Far-Field Consequence Study - 32% H2O/ 8% UO2 (sp40ln) 100000 Year Cycle  350K
     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 @ 300k no UO2 infil
     4-        C     CELL SPECIFICATIONS
     5-        C     INNER WATER REGION
     6-        1     1  8.17479-2   -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-        c     no UO2 infiltration
    23-        c       10000 yr critical
    24-        m1    62149.50c   3.0928E-09
    25-              62150.50c   3.4659E-8
    26-              60143.50c   3.4941E-07
    27-              45103.50c   2.0316E-07
    28-              63151.55c   1.3054E-08
    29-              36083.50c   3.1787E-08
    30-              64155.50c   2.2525E-10
    31-              55135.50c   4.0782E-07
    32-              54131.50c   1.8012E-07
    33-              55133.50c   4.1790E-07
    34-              43099.50c   3.2898E-07
    35-              62147.50c   1.3874E-07
    36-              62152.50c   2.6109E-8
    37-              60145.50c   2.4081E-07
    38-              42095.50c   3.9916E-07
    39-              92233.50c   4.2045E-08
    40-              92234.50c   5.3283E-07
    41-              92235.50c   3.4330E-05
    42-              92236.50c   1.0255E-05
    43-              92238.50c   1.8995E-03
    44-              93237.50c   2.1065E-06
    45-              94239.55c   1.2735E-06
    46-              94240.50c   1.2813E-08
    47-                 1001.50c 2.1182-2
    48-                 8016.50c 4.2711-2
    49-                11023.50c 3.9366-4
    50-                12000.50c 2.3128-4  13027.50c 2.6070-3  14000.50c 1.1406-2
    51-                19000.50c 5.5591-4  20000.50c 5.6949-4  26000.55c 1.4037-4
    52-         mt1    lwtr.01t
    53-         c       40 (x .99 at 50 C) vol% water in calico Hills tuff
    54-         m2       1001.53c 2.6477-2   8016.53c 4.1448-2  11023.50c 3.9366-4
    55-                 12000.50c 2.3128-4  13027.50c 2.6070-3  14000.50c 1.1406-2
    56-                 19000.50c 5.5591-4  20000.50c 5.6949-4  26000.55c 1.4037-4
```

```
   57-       mt2     lwtr.01t
   58-       PRINT
1     initial source from file   srctp

 original number of points                                  4031
    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                                           4031
 points after expansion or contraction                      4003
 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.     1001.50c and    1001.53c are both called for.

 warning.     8016.50c and    8016.53c are both called for.                                  print table 40
1material composition

 material
  number      component nuclide, atom fraction

     1          62149,   .00000      62150,   .00000      60143,   .00000      45103,   .00000
                63151,   .00000      36083,   .00000      64155,   .00000      55135,   .00000
                54131,   .00000      55133,   .00001      43099,   .00000      62147,   .00000
                62152,   .00000      60145,   .00000      42095,   .00000      92233,   .00000
                92234,   .00001      92235,   .00042      92236,   .00013      92238,   .02324
                93237,   .00003      94239,   .00002      94240,   .00000       1001,   .25911
                 8016,   .52247      11023,   .00482      12000,   .00283      13027,   .03189
                14000,   .13953      19000,   .00680      20000,   .00697      26000,   .00172
 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          62149,   .00000      62150,   .00000      60143,   .00003      45103,   .00001
                63151,   .00000      36083,   .00000      64155,   .00000      55135,   .00003
                54131,   .00001      55133,   .00003      43099,   .00002      62147,   .00001
                62152,   .00000      60145,   .00002      42095,   .00002      92233,   .00001
                92234,   .00008      92235,   .00496      92236,   .00149      92238,   .27806
                93237,   .00031      94239,   .00019      94240,   .00000       1001,   .01313
                 8016,   .42009      11023,   .00557      12000,   .00346      13027,   .04325
                14000,   .19699      19000,   .01337      20000,   .01404      26000,   .00482
     2           1001,   .02326       8016,   .57779      11023,   .00789      12000,   .00490
```

13027, .06130 14000, .27919 19000, .01894 20000, .01989
26000, .00683

print table 50

1cell volumes and masses

cell		atom density	gram density	input volume	calculated volume	mass	pieces	reason volume not calculated
1	1	8.17479E-02	2.70045E+00	.00000E+00	1.14940E+07	3.10390E+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. 08/29/96 21:03:46

\+ Far-Field Consequence Study - 32% H2O/ 8% UO2 (sp40ln) 100000 Year Cycle 350K probid = 08/29/96 16:57:28

0

neutron creation	tracks	weight (per source particle)	energy
source	519515	1.0009E+00	2.0355E+00
weight window	0	0.	0.
cell importance	0	0.	0.
weight cutoff	0	5.8365E-02	1.1475E-05
energy importance	0	0.	0.
dxtran	0	0.	0.
forced collisions	0	0.	0.
exp. transform	0	0.	0.
upscattering	0	0.	1.9639E-07
(n,xn)	552	8.3282E-04	6.6934E-04
fission	0	0.	0.
total	520067	1.0601E+00	2.0362E+00

neutron loss	tracks	weight (per source particle)	energy
escape	75	8.9205E-05	7.2207E-05
energy cutoff	0	0.	0.
time cutoff	0	0.	0.
weight window	0	0.	0.
cell importance	0	0.	0.
weight cutoff	519716	5.8677E-02	2.1037E-05
energy importance	0	0.	0.
dxtran	0	0.	0.
forced collisions	0	0.	0.
exp. transform	0	0.	0.
downscattering	0	0.	1.9410E+00
capture	0	6.1661E-01	5.8656E-02
loss to (n,xn)	276	4.1641E-04	3.5466E-03
loss to fission	0	3.8434E-01	3.2951E-02
total	520067	1.0601E+00	2.0362E+00

number of neutrons banked	276
neutron tracks per source particle	1.0011E+00
neutron collisions per source particle	7.7813E+01
total neutron collisions	40425165
net multiplication	1.0004E+00 .0000

average lifetime, shakes	
escape	2.6143E+04
capture	9.3603E+03
capture or escape	9.3618E+03
any termination	1.0133E+04

cutoffs	
tco	1.0000E+34
eco	.0000E+00
wc1	-5.0000E-01
wc2	-2.5000E-01

computer time so far in this run	163.20 minutes
computer time in mcrun	163.13 minutes
source particles per minute	3.1846E+03
random numbers generated	466085512

maximum number ever in bank	1
bank overflows to backup file	0
field length	0
most random numbers used was	13224 in history 48043

range of sampled source weights = 9.3002E-01 to 1.0652E+00

print table 126

1neutron activity in each cell

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	576159	519791	35393076	4.9758E+01	2.6001E-04	5.2591E-01	8.1420E-01	2.2047E+00
2	2	74196	36211	5032089	5.1829E+00	4.6889E-05	2.2497E-01	5.9223E-01	1.3423E+00
total		650355	556002	40425165	5.4941E+01				

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 119683 neutron histories and 100 active cycles with 399832 neutron histories.

this calculation has completed the requested number of keff cycles using a total of 519515 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 = .94767 with an estimated standard deviation of .00087

the estimated 68, 95, & 99 percent keff confidence intervals are .94680 to .94853, .94594 to .94939, and .94537 to .94996

the estimated collision/absorption neutron removal lifetime = 9.36E-05 seconds with an estimated standard deviation of 1.93E-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	.94652	.00131	.94520 to .94783	.94391 to .94912	.94306 to .94998	
absorption	.94858	.00119	.94739 to .94977	.94622 to .95094	.94545 to .95171	
track length	.94636	.00134	.94502 to .94771	.94369 to .94904	.94282 to .94991	
col/absorp	.94764	.00086	.94678 to .94851	.94593 to .94936	.94537 to .94992	-.0602
abs/trk len	.94760	.00087	.94673 to .94848	.94586 to .94934	.94529 to .94991	-.0574
col/trk len	.94656	.00132	.94524 to .94788	.94394 to .94918	.94308 to .95004	.9843
col/abs/trk len	.94767	.00087	.94680 to .94853	.94594 to .94939	.94537 to .94996	