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ENGINEERING DESIGN FILE

Evaluation of Contaminated Soil Site CPP-31 Activity

By

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Title: **Evaluation of Contaminated Soil Site CPP-31 Activity**

Summary: This summary briefly defines the problem or activity to be addressed in the EDF, gives a summary of the activities performed in addressing the problem and states the conclusions, recommendations, or results arrived at from this task.

A leak occurred in the ICPP Tank Farm in 1972 during a transfer from Tank WM-181. Sample analyses of the tank in 1971 and the contaminated soil in 1975 did not identify all of the radionuclides present, particularly the long lived activity which is of concern as it migrates from the original leak site in the future. Calculations were made to determine the relative quantities of all radionuclides that should have present when the leak occurred. The calculated quantities of the radionuclides are presented in two formats: 1) in D/s/mL for the liquid released to the soil and 2) normalized to a total quantity of 1 Ci. Activities are provided for the year 1972 as well as decay times of 1.E+2, 1.E+3, 1.E4 and 1.E+5 years.

Distribution (complete package): **Distribution of the results of this calculation have been made in a letter to R. E. Greenwell, Wen-10-97, "Evaluation of Contaminated Soil Site CPP-31 Activity," May 20, 1997. No further distribution is necessary.**

Distribution (summary package only): **See Above**

Author	Dept.	Reviewed	Date	Approved	Date
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		LMITCO Review	Date	LMITCO Approval	Date

See Management Control Procedure (MCP) 6 for instructions on use of this form.

Discussion

WM-181 contained wastes primarily from 2nd and 3rd cycle processing. The volume of waste in the tank as a function of year is shown in Figure 1 and in Attachment A. While various fuels were processed, the dominate processing was of MTR and ETR fuels. Subsequent calculations are based on a pseudo Al-clad fuel with an initial U-235 enrichment of 93%. While the burnup of the processed fuel varied somewhat, it was typically in the range of 18%. It has been assumed that the activity in the tank at the time of the leak would be proportional to the number of kg of fuel processed each year, provided the yearly activity discharged to the tank is decay corrected between the time of processing and the leak in 1972.

The fuel from MTR Cycle No. 198 (Dykes, 1963) was taken as typical for the fuel processed at the ICPP. The reactor contained 4842 g U-235 and had 684 MWd of operation over a 417 day period. For calculational purposes, inventories were normalized to the activity in a typical 200 g element. The inputs for ORIGEN2 (RSIC, 1991) runs used to decay the inventory for an MTR element from the early 1950's through 1975 and the calculated relative radionuclide activities are presented in Attachment B. An ORIGEN2 cross section library developed in recent years for ATR (Schnitzler, 1991) was determined to be the best library available for calculating inventories for MTR type fuels.

Several FORTRAN programs were written to reduce and manipulate data. One of these programs is called REDUCE1 (see Attachment C), a program used to extract the radionuclide data from the ORIGEN2 run to a simple table form without page headings and radionuclides with zero inventories. The outputs from REDUCE1 for the ORIGEN2 runs were carefully adjusted to be sure that they all contained the same number of radionuclides in the same order.

Tank WM-181 was sampled in 1971 (Rhodes, 1972) a year before the leak. The next step in the evaluation was to calculate the inventory in 1971 and compare the results with the measured results. Another FORTRAN program, REDUCE71 (see Attachment D), was written to calculate a projected radionuclide concentration from the accumulation of wastes over a period of years as anticipated to have been present in 1971. REDUCE71 corrects for transfers from the tank which occurred in 1962, 1963, 1965 and 1970 as shown in Figure 1 and Attachment A. It was assumed that fuel was removed from the reactor two years prior to its processing at the ICPP. Also, a normalization factor was put into REDUCE71 to normalize the calculated radionuclide concentrations to the 1971 measured Cs-137 concentration. Those radionuclides with zero inventory (completely decayed at the time of the 1972 leak) were eliminated to reduce the length of the list. The calculated and normalized radionuclide concentrations for 1971 are presented in Attachment E. The progney of all radionuclides are included in the calculated inventories.

Table 1 compares the calculated radionuclide concentrations with those measured in 1971 (see Attachment F). When compared to the 1971 measurements, only the Sr-90/Cs-137 and the Cs-134/Cs-137 ratios are in good agreement. This was disturbing and led to further search into the data reported in the Rhodes letter. Fortunately, copies of the original analytical data sheets used to compile the Rhodes data were found (see Attachment G). What was learned was that the results for Zr-95, Nb-95, Ru-106 and Sb-125 were all "less than values" which can not be used. This left two remaining fission products, Ce-144 and Eu-154. The calculated Ce-144/Cs-137 ratio is a factor of 2.3 higher than that measured. This really should not be too disturbing as accurate measurements of Ce-144 using NaI(Tl) detection technology were really quite poor because of the low

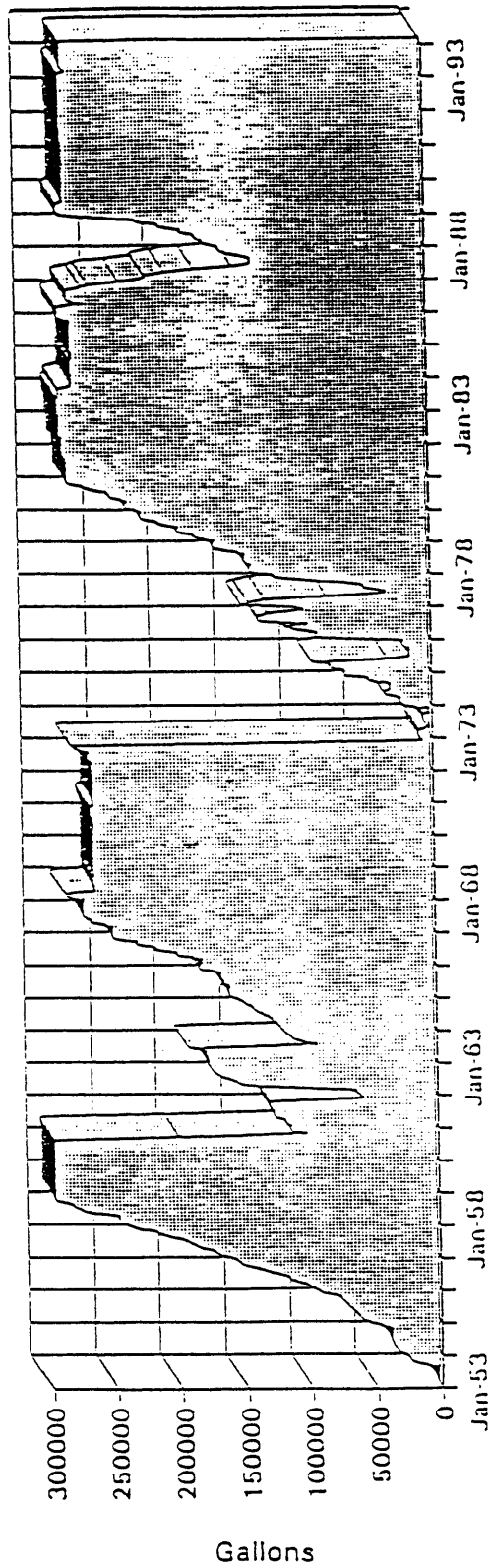

Figure 1: ICPP Tank WM-181 Volume

Table 1: Comparison of Calculated and Normalized Concentrations of Radionuclides to those Measured in 1971

	Calculated		Measured		Ratio of
Radionuclide	D/s/mL	Normalized to Cs-137	D/s/mL	Normalized to Cs-137	Calculated to Measured
Sr-90	8.416E+6	9.55E-01	7.91E+6	8.98E-1	1.06
Zr-95	2.165E-3	2.46E-10	<8.65E+3	<9.82E-4	-
Nb-95	4.980E-3	5.65E-10	<3.77E+3	<4.28E-4	-
Ru-106	1.950E+4	2.22E-03	<1.23E+5	<1.40E-2	-
Sb-125	4.645E+4	5.28E-03	<1.11E+5	<1.26E-2	-
Cs-134	3.744E+4	4.25E-03	3.74E+4	4.25E-3	1.00E+0
Cs-137	8.810E+6	1.00E+00	8.81E+6	1.00E+0	1.00E+0
Ce-144	6.442E+4	7.31E-03	2.81E+4	3.19E-3	2.29E+0
Eu-154	4.007E+4	4.55E-03	2.59E+4	2.94E-3	1.55E+0

energy of the gamma ray. The calculated Eu-154/Cs-137 ratio is a factor of 1.6 higher than that measured. No immediate explanation for the Eu-154 difference could be found at this time.

The Rhodes letter contained Pu concentrations expressed in total g/L and wt% for Pu-239, Pu-240, Pu-241 and Pu-242. Table 2 compares the measured Pu values with the calculated values.

From Table 2, it can be seen that the calculated total mass of Pu agrees quite well with the measured value, differing only by 11%. Except for the Pu-239 and the Pu-240, the wt% of the other Pu isotopes do not agree very well. The analysis did not identify the amount of Pu-238 present as the separation technique to resolve the Pu-238 from Pu-239 had not yet been developed.

Table 2: Comparison of Calculated Pu to Measured Pu for 1971

	Calculated				Measured	
Pu Isotope	D/s/mL	Ci/g	g/L	wt%	g/L	wt%
236	2.551E-2	5.313E+2	1.30E-12	-	-	-
238	3.675E+3	1.712E+1	5.80E-06	0.66	-	-
239	1.882E+3	6.216E-2	8.18E-04	92.7	8.08E-4	86.1
240	4.247E+2	2.279E-1	5.04E-05	5.71	8.07E-5	8.6
241	3.032E+4	1.030E+2	7.96E-06	.90	4.60E-5	4.9
242	6.809E-2	3.818E-3	4.82E-07	0.05	3.75E-6	0.4
Total			8.83E-04		9.38E-04	

The Rhodes letter also contained measurements of the amount of U present. At this stage of the calculations, no correction has been made for the removal of U by the extraction process. In the process, the majority of the U remains in the product stream rather than the waste stream which eventually ended up in WM-181. Table 3 compares the measured U values with the calculated values.

Next the ratios of the calculated concentrations of the U isotopes to the measured concentrations were calculated and are presented in Table 4. As can be seen, the ratios for the different U isotopes differ. First it should be

Table 3: Comparison of Calculated U to Measured U for 1971

	Calculated				Measured	
U Isotope	D/s/mL	Ci/g	g/L	wt%	g/L	wt%
232	1.672E-1	2.140E+1	2.11E-10	1.3E-8	-	-
233	6.704E-3	9.680E-3	1.87E-08	3.0E-6	-	-
234	1.699E+3	6.248E-3	7.35E-03	1.16	1.50E-4	.65
235	4.552E+1	2.161E-6	5.69E-01	90.0	1.01E-2	43.70
236	5.722E+1	6.469E-5	2.39E-02	3.78	4.80E-4	2.08
238	4.849E-1	3.362E-7	3.90E-02	6.17	1.24E-2	53.57
Total			6.32E-01		2.31E-02	

Table 4: Comparison of Calculated U Concentrations to U Concentrations measured in 1971

	g/L		Calculated /
U Isotope	Calculated	Measured	Measured
234	7.35E-03	1.50E-4	4.90E+1
235	5.69E-01	1.01E-2	5.63E+1
236	2.39E-02	4.81E-4	4.98E+2
238	3.90E-2	1.24E-2	3.15

noted that the calculated concentration for U-238 should not be expected to correlate with the measured concentration as considerable processing development with depleted U has been done at the ICPP. Uncertainty should also be expected for U-234 and U-236 because of the varying amounts of these isotopes in depleted U. Because of the uncertainty caused by the process development with depleted U, the concentrations for each of the U isotopes was adjusted in subsequent ORIGEN2 runs to correspond to the relative concentration of the U isotopes measured in 1971. No attempt was made to adjust the amounts of the daughter products of the U isotopes. Initially the amounts of the daughter products will be somewhat higher than they should be; however, as the decay time increases, the daughter products calculated by ORIGEN2 will approach the correct concentration.

The above analysis is for the year of 1971. The leak occurred in 1972. The next thing that was done was to slightly modify the program REDUCE71 to decay the results for an additional year and to modify the process history slightly during the years 1970 and 1972. These adjustments were made to better fit the results of soil samples analyzed in 1975. The modified FORTRAN program is called REDUCE72 and is presented in Attachment H. The calculated radionuclide concentrations for 1972 are presented in Attachment I. Attachment I also contains the calculated radionuclide concentrations decayed to 1975, the time that soil samples from the Tank Farm were analyzed. Attachment J contains the results of analysis of soil samples taken from the Tank Farm in 1975 (Wenzel, 1975). Table 5 contains ratios of the various radionuclide activities to Cs-137 from the soil samples taken at the release site in 1975. This data was used to validate and refine the calculated concentrations based on the 1971 sample from WM-181. Table 6 presents a comparison of the average activity ratios from the 1975 sample data to the ratios calculated for 1975 using ORIGEN2 as described above.

As noted before, the 1971 sample results did not report any activity for Co-60. From the soil samples taken in 1975, it is obvious that Co-60 should have been present. To alleviate concerns over the amount of activation products that may have been present, sufficient stainless steel was assumed to be present in the original fuel to account for the relative amount of Co-60 present in the average of the 1975 samples. Thus the ratio of 1.0 in

Table 5: Radionuclide Ratios from 1975 Soil Samples

	Activity Ratio of Radionuclide to Cs-137				
Sample	Sr-90	Co-60	Cs-134	Eu-154	Pu-239
A53	7.73E-2	9.75E-4	2.23E-3	9.92E-4	4.63E-4
A53-1	-	1.49E-4	2.25E-3	3.45E-3	-
A53-2	1.35E+0	1.14E-3	3.09E-3	3.94E-3	4.12E-4
A53-3	-	5.93E-4	1.85E-3	7.74E-4	-
A53-4	2.32E+0	5.65E-4	2.24E-3	5.31E-3	5.82E-4
A53-5	-	1.27E-3	2.24E-3	2.58E-3	-
A53-6	-	9.72E-4	2.25E-3	4.78E-3	-
A53-10	6.66E-1	3.39E-4	2.00E-3	4.18E-3	3.81E-4
A53-15	-	3.10E-4	2.28E-3	5.04E-3	-
A55	1.41E+0	1.78E-3	5.04E-3	4.55E-4	4.55E-4
Average	1.16E+0	8.09E-4	2.55E-3	3.15E-3	4.59E-4

Table 6: Ratios of Calculated Activity to 1975 Soil Samples

	Activity Ratio of Radionuclide to Cs-137		
Radionuclide	Calculated	75 Sample Average	Calculated / 75 Sample
Co-60	8.09E-4	8.09E-4	1.00
Sr-90	9.52E-1	1.16E+0	0.821
Cs-134	1.38E-3	2.55E-3	0.541
Eu-154	3.61E-3	3.15E-3	1.15
Pu-239	2.83E-4	4.59E-4	0.617

Table 6 for Co-60 is somewhat misleading. A conclusion reached is that any activation products that may have been present at the time of the leak are of little consequence.

While the Cs-134 and Pu-239 activities calculated for 1971 agreed very well with the Rhodes data, it can be seen from Table 6 that the calculated Cs-134 and Pu-239 activity for 1975 are both smaller than the average sample activity by a factor of 1.6. No attempt was made to resolve why the Cs-134 and Pu-239 activities calculated for 1975 are somewhat lower than the sample average. While the Eu-154 activity calculated for 1971 was a factor of 1.5 higher than that in the Rhodes data, the 1975 calculated Eu-154 activity agrees very well with the average Eu-154 activity measured ratio in the 1975 soil samples.

The activities in D/s/mL for each of the radionuclides calculated for the time of the 1972 release were converted to mass and entered into ORIGEN2 run MTR5 (see Attachment K) to calculate activities for 1972 and at decay times of 1.E2, 1.E3, 1.E4 and 1.E5 years. Radionuclides with zero inventories and less than one atom have been deleted yielding the inventory presented in Table 7.

The data presented in Table 7 was next normalized to give a total of 1 Ci of activity for each of the decay times. The normalized activities for each of the radionuclides is presented in Table 8. The ORIGEN2 output lists

activity for some of the radionuclides as both an activation product and a fission product. When this is the case, the activities were combined in the fission product section of the tables to eliminate redundancy. An uncertainty analysis was not done for these calculations; however, the best judgment is that the calculated concentrations are within a factor of 2 for the majority of the radionuclides.

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Table 7: Calculated Radionuclide Activities in Released Liquid for Site CPP-31 in D/s/mL as a Function of Decay Time

Nuclide	Half Life		Decay Time (yr) 1972	1E2	1E3	1E4	1E5
(Activation Products)							
Si 32	4.500E+02	yr	2.1E-06	1.9E-06	7.1E-07	4.8E-11	
P 32	1.429E+01	d	2.1E-06	1.9E-06	7.1E-07	4.8E-11	
Cl 36	3.010E+05	yr	5.6E-06	5.6E-06	5.6E-06	5.4E-06	4.4E-06
V 50	4.000E+16	yr	1.2E-13	1.2E-13	1.2E-13	1.2E-13	1.2E-13
Co 60	5.271E+00	yr	1.0E+04	1.9E-02			
Ni 63	1.001E+02	yr	5.1E-07	2.4E-07	2.8E-10		
(Actinides and Daughters)							
Tl207	4.770E+00	m	2.8E-03	1.5E-02	3.1E-02	1.7E-01	8.0E-01
Tl208	3.053E+00	m	4.2E-02	4.3E-04	8.1E-07	7.2E-07	8.7E-07
Tl209	2.200E+00	m	1.4E-07	9.4E-07	6.1E-05	4.6E-03	1.1E-01
Pb209	3.253E+00	h	6.6E-06	4.3E-05	2.8E-03	2.1E-01	4.9E+00
Pb210	2.226E+01	yr	6.4E-05	4.8E-03	9.0E-02	1.8E+00	1.3E+01
Pb211	3.610E+01	m	2.8E-03	1.5E-02	3.1E-02	1.7E-01	8.0E-01
Pb212	1.064E+01	h	1.2E-01	1.2E-03	2.2E-06	2.0E-06	2.4E-06
Pb214	2.680E+01	m	4.4E-04	6.8E-03	9.0E-02	1.8E+00	1.3E+01
Bi210	5.013E+00	d	6.4E-05	4.8E-03	9.0E-02	1.8E+00	1.3E+01
Bi211	2.130E+00	m	2.8E-03	1.5E-02	3.1E-02	1.7E-01	8.0E-01
Bi212	6.055E+01	m	1.2E-01	1.2E-03	2.2E-06	2.0E-06	2.4E-06
Bi213	4.565E+01	m	6.6E-06	4.3E-05	2.8E-03	2.1E-01	4.9E+00
Bi214	1.990E+01	m	4.4E-04	6.8E-03	9.0E-02	1.8E+00	1.3E+01
Po210	1.384E+02	d	5.7E-05	4.8E-03	9.0E-02	1.8E+00	1.3E+01
Po211	5.160E-01	s	7.7E-06	4.1E-05	8.7E-05	4.9E-04	2.2E-03
PO212	3.000E-07	s	7.6E-02	7.7E-04	1.4E-06	1.3E-06	1.6E-06
Po213	4.200E-06	s	6.4E-06	4.3E-05	2.8E-03	2.1E-01	4.8E+00
Po214	1.637E-04	s	4.4E-04	6.8E-03	9.0E-02	1.8E+00	1.3E+01
Po215	1.778E-03	s	2.8E-03	1.5E-02	3.1E-02	1.7E-01	8.0E-01
Po216	1.460E-01	s	1.2E-01	1.2E-03	2.2E-06	2.0E-06	2.4E-06
Po218	3.050E+00	m	4.4E-04	6.8E-03	9.0E-02	1.8E+00	1.3E+01
At217	3.230E-02	s	6.6E-06	4.3E-05	2.8E-03	2.1E-01	4.9E+00
Rn219	3.960E+00	s	2.8E-03	1.5E-02	3.1E-02	1.7E-01	8.0E-01
Rn220	5.561E+01	s	1.2E-01	1.2E-03	2.2E-06	2.0E-06	2.4E-06
Rn222	3.824E+00	d	4.4E-04	6.8E-03	9.0E-02	1.8E+00	1.3E+01
Fr221	4.800E+00	m	6.6E-06	4.3E-05	2.8E-03	2.1E-01	4.9E+00
Fr223	2.180E+01	m	3.8E-05	2.0E-04	4.3E-04	2.4E-03	1.1E-02
Ra223	1.143E+01	d	2.8E-03	1.5E-02	3.1E-02	1.7E-01	8.0E-01
Ra224	3.620E+00	d	1.2E-01	1.2E-03	2.2E-06	2.0E-06	2.4E-06
Ra225	1.480E+01	d	6.6E-06	4.3E-05	2.8E-03	2.1E-01	4.9E+00
Ra226	1.600E+03	yr	4.4E-04	6.8E-03	9.0E-02	1.8E+00	1.3E+01
Ra228	5.750E+00	yr	2.0E-08	4.2E-08	4.8E-08	1.3E-07	1.3E-06
Ac225	1.000E+01	d	6.6E-06	4.3E-05	2.8E-03	2.1E-01	4.9E+00
Ac227	2.177E+01	yr	2.8E-03	1.5E-02	3.1E-02	1.7E-01	8.0E-01
Ac228	6.130E+00	h	2.0E-08	4.2E-08	4.8E-08	1.3E-07	1.3E-06
Th227	1.872E+01	d	2.7E-03	1.4E-02	3.1E-02	1.7E-01	7.9E-01
Th228	1.913E+00	yr	1.2E-01	1.2E-03	2.2E-06	2.0E-06	2.4E-06
Th229	7.340E+03	yr	6.6E-06	4.3E-05	2.8E-03	2.1E-01	4.9E+00
Th230	7.700E+04	yr	1.4E-01	1.6E-01	3.6E-01	2.2E+00	1.3E+01
Th231	2.552E+01	h	4.7E+01	8.4E-01	8.5E-01	8.6E-01	9.2E-01
Th232	1.405E+10	yr	4.1E-08	4.2E-08	4.8E-08	1.3E-07	1.3E-06
Th234	2.410E+01	d	6.1E-01	1.9E-01	1.9E-01	1.9E-01	1.9E-01
Pa231	3.726E+04	yr	1.4E-02	1.6E-02	3.1E-02	1.7E-01	8.0E-01
Pa233	2.700E+01	d	1.3E+01	1.4E+01	1.4E+01	1.4E+01	1.4E+01

Table 7: Calculated Radionuclide Activities in Released Liquid for Site CPP-31 in D/s/mL as a Function of Decay Time (Continued)

Nuclide	Half Life		Decay Time (yr) 1972	1E2	1E3	1E4	1E5
(Actinides and Daughters continued)							
Pa234M	1.170E+00	m	6.1E-01	1.9E-01	1.9E-01	1.9E-01	1.9E-01
Pa234	6.700E+00	h	7.9E-04	2.5E-04	2.5E-04	2.5E-04	2.5E-04
U232	7.200E+01	yr	2.1E-03	1.2E-03	2.2E-06	1.9E-06	1.1E-06
U233	1.592E+05	yr	9.7E-04	6.9E-03	6.1E-02	6.0E-01	4.9E+00
U234	2.445E+05	yr	2.3E+01	2.4E+01	2.5E+01	2.4E+01	1.9E+01
U235	7.038E+08	yr	8.4E-01	8.4E-01	8.5E-01	8.6E-01	9.2E-01
U236	2.342E+07	yr	1.2E-01	1.2E-01	1.4E-01	2.2E-01	2.7E-01
U237	6.750E+00	d	1.6E-02	7.2E-03	6.5E-10	3.1E-10	2.0E-13
U238	4.470E+09	yr	1.9E-01	1.9E-01	1.9E-01	1.9E-01	1.9E-01
U240	1.410E+01	h	1.6E-10	9.0E-09	9.0E-09	9.0E-09	9.0E-09
Np236	1.150E+05	yr	2.2E-05	2.2E-05	2.2E-05	2.1E-05	1.2E-05
Np237	2.140E+06	yr	1.3E+01	1.4E+01	1.4E+01	1.4E+01	1.4E+01
Np238	2.117E+00	d	8.4E-05	5.3E-05	8.8E-07	1.3E-24	
Np239	2.355E+00	d	1.2E-01	1.2E-01	1.1E-01	4.7E-02	9.9E-06
Np240M	7.400E+00	m	9.0E-09	9.0E-09	9.0E-09	9.0E-09	9.0E-09
Pu236	2.851E+00	yr	2.4E-02	2.0E-06	2.0E-06	1.9E-06	1.1E-06
Pu238	8.775E+01	yr	4.1E+03	1.9E+03	1.5E+00	5.2E-22	
Pu239	2.413E+04	yr	2.4E+03	2.4E+03	2.3E+03	1.8E+03	1.3E+02
Pu240	6.569E+03	yr	5.3E+02	5.3E+02	4.8E+02	1.9E+02	1.3E-02
Pu241	1.440E+01	yr	3.6E+04	2.9E+02	2.6E-05	1.3E-05	8.2E-09
Pu242	3.758E+05	yr	8.6E-02	8.6E-02	8.6E-02	8.4E-02	7.2E-02
Pu243	4.956E+00	h	2.3E-13	2.3E-13	2.3E-13	2.3E-13	2.3E-13
Pu244	8.260E+07	yr	9.1E-09	9.1E-09	9.1E-09	9.0E-09	9.0E-09
Am241	4.322E+02	yr	1.1E+03	2.0E+03	4.7E+02	2.6E-04	8.6E-09
Am242M	1.520E+02	yr	1.7E-02	1.1E-02	1.8E-04	2.7E-22	
Am242	1.602E+01	h	1.7E-02	1.1E-02	1.8E-04	2.6E-22	
Am243	7.380E+03	yr	1.2E-01	1.2E-01	1.1E-01	4.7E-02	9.9E-06
Cm242	1.628E+02	d	1.4E-02	8.8E-03	1.5E-04	2.2E-22	
Cm243	2.850E+01	yr	1.6E-03	1.4E-04	4.4E-14		
Cm244	1.811E+01	yr	9.3E-01	2.0E-02	2.2E-17		
Cm245	8.500E+03	yr	2.9E-05	2.8E-05	2.6E-05	1.3E-05	8.2E-09
Cm246	4.750E+03	yr	6.4E-07	6.3E-07	5.5E-07	1.5E-07	2.8E-13
Cm247	1.560E+07	yr	2.3E-13	2.3E-13	2.3E-13	2.3E-13	2.3E-13
Cm248	3.390E+05	yr	7.0E-14	7.0E-14	7.0E-14	6.8E-14	5.7E-14
Cm250	6.900E+03	yr	2.0E-22	2.0E-22	1.9E-22	1.3E-22	2.7E-24
Cf249	3.506E+02	yr	1.5E-13	1.2E-13	2.1E-14	3.9E-22	
Cf250	1.308E+01	yr	1.2E-13	6.2E-16	2.7E-23	1.9E-23	5.2E-25
Cf251	9.000E+02	yr	3.5E-16	3.2E-16	1.6E-16	1.5E-19	
CF252	2.638E_01	yr	1.0E-15	4.0E-27			
(Fission Products)							
H 3	1.228E+01	yr	2.5E+04	9.3E+01			
Be 10	1.600E+06	yr	3.4E-04	3.4E-04	3.4E-04	3.4E-04	3.2E-04
C 14	5.730E+03	yr	1.4E-02	1.3E-02	1.2E-02	4.1E-03	7.6E-08
Se 79	6.500E+04	yr	4.9E+01	4.9E+01	4.8E+01	4.4E+01	1.7E+01
Rb 87	4.730E+10	yr	3.3E-03	3.3E-03	3.3E-03	3.3E-03	3.3E-03
Sr 90	2.912E+01	yr	8.6E+06	7.9E+05	3.9E-04		
Y 90	6.410E+01	h	8.6E+06	7.9E+05	3.9E-04		
Zr 93	1.530E+06	yr	2.5E+02	2.5E+02	2.5E+02	2.5E+02	2.4E+02
Nb 93M	1.360E+01	yr	1.2E+02	2.4E+02	2.4E+02	2.4E+02	2.3E+02
Nb 94	2.030E+04	yr	8.0E+01	8.0E+01	7.8E+01	5.7E+01	2.6E+00
Tc 98	4.200E+06	yr	5.2E-05	5.2E-05	5.2E-05	5.2E-05	5.1E-05
Tc 99	2.130E+05	yr	1.7E+03	1.7E+03	1.7E+03	1.6E+03	1.2E+03

Table 7: Calculated Radionuclide Activities in Released Liquid for Site CPP-31 in D/s/mL as a Function of Decay Time (Continued)

Nuclide	Half Life		Decay Time (yr) 1972	1E2	1E3	1E4	1E5
(Fission Products Continued)							
Rh102	2.900E+00	yr	1.1E-01	4.6E-12			
Pd107	6.500E+06	yr	1.8E+00	1.8E+00	1.8E+00	1.8E+00	1.8E+00
Ag108	2.370E+00	m	1.3E-06	7.4E-07	5.5E-09	2.5E-30	
Ag108m	1.270E+02	yr	1.4E-05	8.3E-06	6.1E-08	2.9E-29	
Cd113m	1.360E+01	yr	8.1E+02	7.0E+00	1.9E-18		
In115	5.100E+15	yr	1.7E-09	1.7E-09	1.7E-09	1.7E-09	1.7E-09
Sn121m	5.000E+01	yr	8.8E+00	2.2E+00	8.3E-06		
Te123	1.000E+13	yr	1.3E-12	1.3E-12	1.3E-12	1.3E-12	1.3E-12
Sb125	2.770E+00	yr	4.0E+04	5.4E-07			
Te125m	5.800E+01	d	9.7E+03	1.3E-07			
Sn126	1.000E+05	yr	4.4E+01	4.4E+01	4.3E+01	4.1E+01	2.2E+01
Sb126	1.240E+01	d	6.1E+00	6.1E+00	6.1E+00	5.7E+00	3.0E+00
Sb126m	1.900E+01	m	4.4E+01	4.4E+01	4.3E+01	4.1E+01	2.2E+01
I129	1.570E+07	yr	2.7E+00	2.7E+00	2.7E+00	2.7E+00	2.7E+00
Cs134	2.062E+00	yr	3.2E+04	7.9E-11			
Cs135	2.300E+06	yr	1.1E+01	1.1E+01	1.1E+01	1.1E+01	1.0E+01
Cs137	3.000E+01	yr	9.0E+06	8.9E+05	8.3E-04		
Ba137m	2.552E+00	m	8.5E+06	8.4E+05	7.8E-04		
La138	1.350E+11	yr	2.5E-08	2.5E-08	2.5E-08	2.5E-08	2.5E-08
Ce142	1.050E+11	yr	3.4E-03	3.4E-03	3.4E-03	3.4E-03	3.4E-03
Nd144	2.100E+15	yr	1.6E-07	1.6E-07	1.6E-07	1.6E-07	1.6E-07
Pm146	2.020E+03	d	6.0E+00	2.0E-05			
Sm146	1.030E+08	yr	7.4E-07	9.1E-07	9.1E-07	9.1E-07	9.1E-07
Pm147	2.623E+00	yr	1.9E+06	6.5E-06			
Sm147	1.070E+11	yr	1.2E-03	1.2E-03	1.2E-03	1.2E-03	1.2E-03
Sm148	8.000E+15	yr	3.0E-10	3.0E-10	3.0E-10	3.0E-10	3.0E-10
Sm149	1.000E+15	yr	1.5E-09	1.5E-09	1.5E-09	1.5E-09	1.5E-09
Eu150	3.600E+01	yr	8.5E-05	1.2E-05	3.7E-13		
Sm151	9.000E+01	yr	1.1E+05	5.0E+04	4.8E+01		
Eu152	1.360E+01	yr	6.4E+01	3.9E-01	4.7E-21		
Gd152	1.080E+14	yr	7.2E-12	9.4E-12	9.4E-12	9.4E-12	9.4E-12
Eu154	8.600E+00	yr	3.8E+04	1.2E+01			
Eu155	4.960E+00	yr	4.5E+04	3.9E-02			
Ho166m	1.200E+03	yr	8.1E-04	7.7E-04	4.6E-04	2.5E-06	
TM171	1.920E+00	yr	2.7E-08	5.7E-24			

Table 8: Calculated Radionuclide Activities in Released Liquid for Site CPP-31 Normalized to a Total of 1 Ci for Each of the Decay Times

Nuclide	Half Life		1972	Decay Time (yr) 1E2	1E3	1E4	1E5
(Activation Products)							
Si 32	4.500E+02	yr	5.6E-14	5.5E-13	1.2E-10	1.1E-14	
P 32	1.429E+01	d	5.6E-14	5.5E-13	1.2E-10	1.1E-14	
Cl 36	3.010E+05	yr	1.5E-13	1.7E-12	9.6E-10	1.2E-09	2.1E-09
V 50	4.000E+16	yr	3.2E-21	3.5E-20	2.0E-17	2.7E-17	5.5E-17
Co 60	5.271E+00	yr	2.7E-04	5.8E-09			
Ni 63	1.001E+02	yr	1.4E-14	7.2E-14	4.8E-14		
(Actinides and Daughters)							
Tl207	4.770E+00	m	7.5E-11	4.3E-09	5.4E-06	4.0E-05	3.7E-04
Tl208	3.053E+00	m	1.2E-09	1.3E-10	1.4E-10	1.7E-10	4.1E-10
Tl209	2.200E+00	m	3.9E-15	2.8E-13	1.1E-08	1.0E-06	4.9E-05
Pb209	3.253E+00	h	1.8E-13	1.3E-11	4.9E-07	4.8E-05	2.3E-03
Pb210	2.226E+01	yr	1.7E-12	1.4E-09	1.6E-05	4.0E-04	5.9E-03
Pb211	3.610E+01	m	7.5E-11	4.3E-09	5.4E-06	4.0E-05	3.7E-04
Pb212	1.064E+01	h	3.2E-09	3.6E-10	3.9E-10	4.6E-10	1.1E-09
Pb214	2.680E+01	m	1.2E-11	2.0E-09	1.6E-05	4.0E-04	5.9E-03
Bi210	5.013E+00	d	1.7E-12	1.4E-09	1.6E-05	4.0E-04	5.9E-03
Bi211	2.130E+00	m	7.5E-11	4.3E-09	5.4E-06	4.0E-05	3.7E-04
Bi212	6.055E+01	m	3.2E-09	3.6E-10	3.9E-10	4.6E-10	1.1E-09
Bi213	4.565E+01	m	1.8E-13	1.3E-11	4.9E-07	4.8E-05	2.3E-03
Bi214	1.990E+01	m	1.2E-11	2.0E-09	1.6E-05	4.0E-04	5.9E-03
Po210	1.384E+02	d	1.5E-12	1.4E-09	1.6E-05	4.0E-04	5.9E-03
Po211	5.160E-01	s	2.1E-13	1.2E-11	1.5E-08	1.1E-07	1.0E-06
PO212	3.000E-07	s	2.1E-09	2.3E-10	2.5E-10	2.9E-10	7.3E-10
Po213	4.200E-06	s	1.7E-13	1.3E-11	4.8E-07	4.7E-05	2.2E-03
Po214	1.637E-04	s	1.2E-11	2.0E-09	1.6E-05	4.0E-04	5.9E-03
Po215	1.778E-03	s	7.5E-11	4.3E-09	5.4E-06	4.0E-05	3.7E-04
Po216	1.460E-01	s	3.2E-09	3.6E-10	3.9E-10	4.6E-10	1.1E-09
Po218	3.050E+00	m	1.2E-11	2.0E-09	1.6E-05	4.0E-04	5.9E-03
At217	3.230E-02	s	1.8E-13	1.3E-11	4.9E-07	4.8E-05	2.3E-03
Rn219	3.960E+00	s	7.5E-11	4.3E-09	5.4E-06	4.0E-05	3.7E-04
Rn220	5.561E+01	s	3.2E-09	3.6E-10	3.9E-10	4.6E-10	1.1E-09
Rn222	3.824E+00	d	1.2E-11	2.0E-09	1.6E-05	4.0E-04	5.9E-03
Fr221	4.800E+00	m	1.8E-13	1.3E-11	4.9E-07	4.8E-05	2.3E-03
Fr223	2.180E+01	m	1.0E-12	6.0E-11	7.5E-08	5.5E-07	5.2E-06
Ra223	1.143E+01	d	7.5E-11	4.3E-09	5.4E-06	4.0E-05	3.7E-04
Ra224	3.620E+00	d	3.2E-09	3.6E-10	3.9E-10	4.6E-10	1.1E-09
Ra225	1.480E+01	d	1.8E-13	1.3E-11	4.9E-07	4.8E-05	2.3E-03
Ra226	1.600E+03	yr	1.2E-11	2.0E-09	1.6E-05	4.0E-04	5.9E-03
Ra228	5.750E+00	yr	5.3E-16	1.2E-14	8.3E-12	3.0E-11	6.3E-10
Ac225	1.000E+01	d	1.8E-13	1.3E-11	4.9E-07	4.8E-05	2.3E-03
Ac227	2.177E+01	yr	7.5E-11	4.3E-09	5.4E-06	4.0E-05	3.7E-04
Ac228	6.130E+00	h	5.3E-16	1.2E-14	8.3E-12	3.0E-11	6.3E-10
Th227	1.872E+01	d	7.4E-11	4.3E-09	5.3E-06	3.9E-05	3.7E-04
Th228	1.913E+00	yr	3.2E-09	3.6E-10	3.9E-10	4.6E-10	1.1E-09
Th229	7.340E+03	yr	1.8E-13	1.3E-11	4.9E-07	4.8E-05	2.3E-03
Th230	7.700E+04	yr	3.8E-09	4.8E-08	6.2E-05	5.1E-04	5.8E-03
Th231	2.552E+01	h	1.3E-06	2.5E-07	1.5E-04	2.0E-04	4.3E-04
Th232	1.405E+10	yr	1.1E-15	1.2E-14	8.3E-12	3.0E-11	6.3E-10
Th234	2.410E+01	d	1.7E-08	5.7E-08	3.4E-05	4.4E-05	9.1E-05
Pa231	3.726E+04	yr	3.7E-10	4.6E-09	5.4E-06	4.0E-05	3.7E-04
Pa233	2.700E+01	d	3.7E-07	4.0E-06	2.4E-03	3.2E-03	6.3E-03

Table 8: Calculated Radionuclide Activities in Released Liquid for Site CPP-31 Normalized to a Total of 1 Ci for Each of the Decay Times (Continued)

Nuclide	Half Life		1972	Decay Time (yr) 1E2	1E3	1E4	1E5
(Actinides and Daughters continued)							
Pa234m	1.170E+00	m	1.7E-08	5.7E-08	3.4E-05	4.4E-05	9.1E-05
Pa234	6.700E+00	h	2.2E-11	7.5E-11	4.4E-08	5.8E-08	1.2E-07
U232	7.200E+01	yr	5.7E-11	3.5E-10	3.8E-10	4.3E-10	5.1E-10
U233	1.592E+05	yr	2.6E-11	2.0E-09	1.1E-05	1.4E-04	2.3E-03
U234	2.445E+05	yr	6.3E-07	7.1E-06	4.2E-03	5.5E-03	8.7E-03
U235	7.038E+08	yr	2.3E-08	2.5E-07	1.5E-04	2.0E-04	4.3E-04
U236	2.342E+07	yr	3.3E-09	3.7E-08	2.4E-05	5.0E-05	1.3E-04
U237	6.750E+00	d	4.3E-10	2.1E-09	1.1E-13	7.1E-14	9.4E-17
U238	4.470E+09	yr	5.3E-09	5.7E-08	3.4E-05	4.4E-05	9.1E-05
U240	1.410E+01	h	4.4E-18	2.7E-15	1.6E-12	2.1E-12	4.2E-12
Np236	1.150E+05	yr	6.0E-13	6.6E-12	3.8E-09	4.8E-09	5.7E-09
Np237	2.140E+06	yr	3.7E-07	4.0E-06	2.4E-03	3.2E-03	6.3E-03
Np238	2.117E+00	d	2.3E-12	1.6E-11	1.5E-10		
Np239	2.355E+00	d	3.2E-09	3.5E-08	1.9E-05	1.1E-05	4.6E-09
Np240m	7.400E+00	m	2.5E-16	2.7E-15	1.6E-12	2.1E-12	4.2E-12
Pu236	2.851E+00	yr	6.4E-10	5.9E-13	3.4E-10	4.3E-10	5.1E-10
Pu238	8.775E+01	yr	1.1E-04	5.5E-04	2.6E-04		
Pu239	2.413E+04	yr	6.4E-05	7.0E-04	4.0E-01	4.1E-01	6.2E-02
Pu240	6.569E+03	yr	1.5E-05	1.6E-04	8.3E-02	4.2E-02	6.2E-06
Pu241	1.440E+01	yr	9.8E-04	8.7E-05	4.6E-09	2.9E-09	3.8E-12
Pu242	3.758E+05	yr	2.3E-09	2.5E-08	1.5E-05	1.9E-05	3.3E-05
Pu243	4.956E+00	h	6.2E-21	6.8E-20	3.9E-17	5.2E-17	1.1E-16
Pu244	8.260E+07	yr	2.5E-16	2.7E-15	1.6E-12	2.1E-12	4.2E-12
Am241	4.322E+02	yr	2.9E-05	5.8E-04	8.1E-02	6.0E-08	4.0E-12
Am242m	1.520E+02	yr	4.6E-10	3.2E-09	3.1E-08		
Am242	1.602E+01	h	4.6E-10	3.2E-09	3.0E-08		
Am243	7.380E+03	yr	3.2E-09	3.5E-08	1.9E-05	1.1E-05	4.6E-09
Cm242	1.628E+02	d	3.9E-10	2.6E-09	2.5E-08		
Cm243	2.850E+01	yr	4.3E-11	4.2E-11	7.6E-18		
Cm244	1.811E+01	yr	2.5E-08	6.0E-09	3.8E-21		
Cm245	8.500E+03	yr	7.7E-13	8.4E-12	4.5E-09	2.9E-09	3.8E-12
Cm246	4.750E+03	yr	1.7E-14	1.9E-13	9.5E-11	3.4E-11	1.3E-16
Cm247	1.560E+07	yr	6.2E-21	6.8E-20	3.9E-17	5.2E-17	1.1E-16
Cm248	3.390E+05	yr	1.9E-21	2.1E-20	1.2E-17	1.6E-17	2.7E-17
Cm250	6.900E+03	yr	5.4E-30	5.9E-29	3.3E-26	3.1E-26	
Cf249	3.506E+02	yr	4.1E-21	3.6E-20	3.6E-18		
Cf250	1.308E+01	yr	3.4E-21	1.8E-22			
Cf251	9.000E+02	yr	9.4E-24	9.5E-23	2.8E-20	3.5E-23	
CF252	2.638E_01	yr	2.8E-23	1.2E-33			
(Fission Products)							
H 3	1.228E+01	yr	6.9E-04	2.7E-05			
Be 10	1.600E+06	yr	9.2E-12	1.0E-10	5.8E-08	7.7E-08	1.5E-07
C 14	5.730E+03	yr	3.7E-10	4.0E-09	2.1E-06	9.3E-07	3.5E-11
Se 79	6.500E+04	yr	1.3E-06	1.5E-05	8.4E-03	1.0E-02	7.9E-03
Rb 87	4.730E+10	yr	8.9E-11	9.8E-10	5.7E-07	7.5E-07	1.5E-06
Sr 90	2.912E+01	yr	2.3E-01	2.3E-01	6.8E-08		
Y 90	6.410E+01	h	2.3E-01	2.3E-01	6.8E-08		
Zr 93	1.530E+06	yr	6.9E-06	7.5E-05	4.4E-02	5.8E-02	1.1E-01
Nb 93m	1.360E+01	yr	3.2E-06	7.1E-05	4.2E-02	5.5E-02	1.1E-01
Nb 94	2.030E+04	yr	2.2E-06	2.4E-05	1.3E-02	1.3E-02	1.2E-03
Tc 98	4.200E+06	yr	1.4E-12	1.5E-11	9.0E-09	1.2E-08	2.4E-08
Tc 99	2.130E+05	yr	4.6E-05	5.0E-04	2.9E-01	3.8E-01	5.7E-01

Table 8: Calculated Radionuclide Activities in Released Liquid for Site CPP-31 Normalized to a Total of 1 Ci for Each of the Decay Times (Continued)

				Decay Time (yr)			
Nuclide	Half Life		1972	1E2	1E3	1E4	1E5
(Fission Products continued)							
Rh102	2.900E+00	yr	3.0E-09	1.4E-18			
Pd107	6.500E+06	yr	4.9E-08	5.4E-07	3.1E-04	4.1E-04	8.4E-04
Ag108	2.370E+00	m	3.5E-14	2.2E-13	9.4E-13		
Ag108m	1.270E+02	yr	3.9E-13	2.5E-12	1.1E-11		
Cd113m	1.360E+01	yr	2.2E-05	2.1E-06	3.3E-22		
In115	5.100E+15	yr	4.6E-17	5.1E-16	3.0E-13	3.9E-13	8.0E-13
Sn121m	5.000E+01	yr	2.4E-07	6.5E-07	1.4E-09		
Te123	1.000E+13	yr	3.6E-20	4.0E-19	2.3E-16	3.1E-16	6.2E-16
Sb125	2.770E+00	yr	1.1E-03	1.6E-13			
Te125m	5.800E+01	d	2.6E-04	3.9E-14			
Sn126	1.000E+05	yr	1.2E-06	1.3E-05	7.5E-03	9.3E-03	1.0E-02
Sb126	1.240E+01	d	1.7E-07	1.8E-06	1.0E-03	1.3E-03	1.4E-03
Sb126m	1.900E+01	m	1.2E-06	1.3E-05	7.5E-03	9.3E-03	1.0E-02
I129	1.570E+07	yr	7.4E-08	8.1E-07	4.7E-04	6.2E-04	1.3E-03
Cs134	2.062E+00	yr	8.6E-04	2.4E-17			
Cs135	2.300E+06	yr	2.9E-07	3.1E-06	1.8E-03	2.4E-03	4.8E-03
Cs137	3.000E+01	yr	2.4E-01	2.6E-01	1.4E-07		
Ba137m	2.552E+00	m	2.3E-01	2.5E-01	1.4E-07		
La138	1.350E+11	yr	6.7E-16	7.3E-15	4.2E-12	5.6E-12	1.1E-11
Ce142	1.050E+11	yr	9.2E-11	1.0E-09	5.8E-07	7.7E-07	1.6E-06
Nd144	2.100E+15	yr	4.3E-15	4.7E-14	2.7E-11	3.6E-11	7.4E-11
Pm146	2.020E+03	d	1.6E-07	6.0E-12			
Sm146	1.030E+08	yr	2.0E-14	2.7E-13	1.6E-10	2.1E-10	4.3E-10
Pm147	2.623E+00	yr	5.3E-02	1.9E-12			
Sm147	1.070E+11	yr	3.1E-11	3.6E-10	2.1E-07	2.8E-07	5.6E-07
Sm148	8.000E+15	yr	8.1E-18	8.8E-17	5.2E-14	6.8E-14	1.4E-13
Sm149	1.000E+15	yr	4.1E-17	4.5E-16	2.6E-13	3.5E-13	7.1E-13
Eu150	3.600E+01	yr	2.3E-12	3.7E-12	6.4E-17		
Sm151	9.000E+01	yr	2.9E-03	1.5E-02	8.4E-03		
Eu152	1.360E+01	yr	1.7E-06	1.2E-07			
Gd152	1.080E+14	yr	2.0E-19	2.8E-18	1.6E-15	2.2E-15	4.4E-15
Eu154	8.600E+00	yr	1.0E-03	3.6E-06			
Eu155	4.960E+00	yr	1.2E-03	1.1E-08			
Ho166m	1.200E+03	yr	2.2E-11	2.3E-10	7.9E-08	5.7E-10	
TM171	1.920E+00	yr	7.4E-16				
	Total		1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00

Attachment A

Attachment A: ICPP Tank Volumes as a Function of Time

			1st Cycl Monthly Report	TANK_VOL		WM-180	WM-181	WM-182	WM-183
Jan-53	Jan-53	Jan-53		0	0	0	0	0	0
Feb-53	Feb-53	Feb-53		0	0	0	0	0	0
Mar-53	Mar-53	Mar-53		4700	4700	0	0	0	0
Apr-53	Apr-53	Apr-53		4800	9500	0	0	0	0
May-53	May-53	May-53		4700	14200	0	0	0	0
Jun-53	Jun-53	Jun-53		4700	18900	0	0	0	0
Jul-53	Jul-53	Jul-53		4700	23600	0	0	0	0
Aug-53	Aug-53	Aug-53		22800	46400	0	17500	0	0
Sep-53	Sep-53	Sep-53		8800	55200	0	21600	0	0
Oct-53	Oct-53	Oct-53		0	55200	0	21600	0	0
Nov-53	Nov-53	Nov-53		9800	65000	0	24400	0	0
Dec-53	Dec-53	Dec-53		8000	73000	0	28800	0	0
Jan-54	Jan-54	Jan-54		2700	75700	0	31500	0	0
Feb-54	Feb-54	Feb-54	44605	4400	80100	0	33200	0	0
Mar-54	Mar-54	Mar-54		3200	83300	0	34400	0	0
Apr-54	Apr-54	Apr-54		600	83900	0	35000	0	0
May-54	May-54	May-54		400	84300	0	35400	0	0
Jun-54	Jun-54	Jun-54		0	84300	0	35400	0	0
Jul-54	Jul-54	Jul-54		0	84300	0	35400	0	0
Aug-54	Aug-54	Aug-54		0	84300	0	35400	0	0
Sep-54	Sep-54	Sep-54		200	84500	0	35600	0	0
Oct-54	Oct-54	Oct-54		7700	92200	32500	38600	0	0
Nov-54	Nov-54	Nov-54		31200	123400	51900	51700	0	0
Dec-54	Dec-54	Dec-54		25200	148600	51900	55900	0	0
Jan-55	Jan-55	Jan-55		28000	176600	105800	59500	0	0
Feb-55	Feb-55	Feb-55		20300	196900	105800	61400	0	0
Mar-55	Mar-55	Mar-55		1800	198700	105800	62700	0	0
Apr-55	Apr-55	Apr-55		15900	214600	105800	65200	0	0
May-55	May-55	May-55		16400	231000	151600	68200	0	0
Jun-55	Jun-55	Jun-55		16500	247500	151600	70400	0	0
Jul-55	Jul-55	Jul-55		10300	257800	151600	72200	0	0
Aug-55	Aug-55	Aug-55		2000	259800	151600	74200	0	0
Sep-55	Sep-55	Sep-55		1300	261100	151600	75500	0	0
Oct-55	Oct-55	Oct-55		13000	274100	151600	88500	0	0
Nov-55	Nov-55	Nov-55		4100	278200	151600	92600	0	0
Dec-55	Dec-55	Dec-55		5500	283700	171600	95900	0	0
Jan-56	Jan-56	Jan-56		22600	306300	196400	100100	0	0
Feb-56	Feb-56	Feb-56		42000	348300	196400	107800	32600	0
Mar-56	Mar-56	Mar-56		26600	374900	196400	114000	60400	0
Apr-56	Apr-56	Apr-56		4400	379300	196400	114300	60400	0
May-56	May-56	May-56		17600	396900	196400	122100	65300	0
Jun-56	Jun-56	Jun-56		25600	422500	196400	130500	65300	0
Jul-56	Jul-56	Jul-56		21200	443700	196400	136500	65300	0
Aug-56	Aug-56	Aug-56		38600	482300	224200	147400	94700	0
Sep-56	Sep-56	Sep-56		22300	504600	224200	151900	94700	0
Oct-56	Oct-56	Oct-56		21800	526400	254600	154300	94700	0

Attachment A: ICPP Tank Volumes as a Function of Time (Continued)

TANK_VOL

Nov-56	Nov-56	Nov-56	2800	529200	254600	157100	94700	0
Dec-56	Dec-56	Dec-56	13700	542900	254600	163800	94700	0
Jan-57	Jan-57	Jan-57	27800	570700	284000	169400	94700	0
Feb-57	Feb-57	Feb-57	11200	581900	284000	172800	94700	0
Mar-57	Mar-57	Mar-57	11100	593000	284000	182600	94700	0
Apr-57	Apr-57	Apr-57	4200	597200	284000	186400	94700	0
May-57	May-57	May-57	4600	601800	284000	191000	94700	0
Jun-57	Jun-57	Jun-57	4000	605800	284000	195000	94700	0
Jul-57	Jul-57	Jul-57	11500	617300	284000	206500	94700	0
Aug-57	Aug-57	Aug-57	5900	623200	284000	212400	94700	0
Sep-57	Sep-57	Sep-57	4300	627500	284000	216300	94700	0
Oct-57	Oct-57	Oct-57	37400	664900	284000	229900	117700	0
Nov-57	Nov-57	Nov-57	51600	716500	284000	236100	163100	0
Dec-57	Dec-57	Dec-57	29200	745700	284000	240800	179400	0
Jan-58	Jan-58	Jan-58	13000	758700	283500	244100	185100	0
Feb-58	Feb-58	Feb-58	19800	778500	283500	244100	204900	0
Mar-58	Mar-58	Mar-58	3800	782300	283000	244000	209300	0
Apr-58	Apr-58	Apr-58	26200	808500	282500	270200	209800	0
May-58	May-58	May-58	25000	833500	282500	274200	230800	0
Jun-58	Jun-58	Jun-58	44700	878200	282500	280400	269300	0
Jul-58	Jul-58	Jul-58	42700	920900	281000	280500	245100	68300
Aug-58	Aug-58	Aug-58	61600	982500	280000	293600	269900	113300
Sep-58	Sep-58	Sep-58	45400	1027900	275700	293600	269900	154800
Oct-58	Oct-58	Oct-58	73900	1101800	274200	293600	269900	221600
Nov-58	Nov-58	Nov-58	33400	1135200	274200	293600	269900	244600
Dec-58	Dec-58	Dec-58	16400	1151600	274200	293600	269900	255000
Jan-59	Jan-59	Jan-59	33300	1184900	274200	293600	269900	268300
Feb-59	Feb-59	Feb-59	42400	1227300	274200	293600	269900	268300
Mar-59	Mar-59	Mar-59	18700	1246000	274200	293600	269900	268300
Apr-59	Apr-59	Apr-59	26000	1272000	274200	293600	269900	268300
May-59	May-59	May-59	60900	1332900	274200	293600	269900	268300
Jun-59	Jun-59	Jun-59	53500	1386400	274200	293600	269900	268300
Jul-59	Jul-59	Jul-59	24400	1410800	271400	293600	269900	268300
Aug-59	Aug-59	Aug-59	63900	1474700	269900	293600	269900	268300
Sep-59	Sep-59	Sep-59	5000	1479700	269900	293600	269900	268300
Oct-59	Oct-59	Oct-59	11000	1490700	269900	293600	269900	268300
Nov-59	Nov-59	Nov-59	6900	1497600	269900	293600	269900	268300
Dec-59	Dec-59	Dec-59	88800	1586400	269900	293600	269900	268300
Jan-60	Jan-60	Jan-60	37100	1623500	268700	293600	269900	270000
Feb-60	Feb-60	Feb-60	19700	1643200	267500	293600	269900	270000
Mar-60	Mar-60	Mar-60	17500	1660700	267500	293600	269900	270000
Apr-60	Apr-60	Apr-60	16700	1677400	267500	293600	269900	270000
May-60	May-60	May-60	2500	1679900	267500	293600	269900	270000
Jun-60	Jun-60	Jun-60	1000	1680900	267500	293600	269900	270000
Jul-60	Jul-60	Jul-60	2300	1683200	267500	293600	269900	270000
Aug-60	Aug-60	Aug-60	-43500	1639700	267500	197100	269900	270000
Sep-60	Sep-60	Sep-60	-52200	1587500	267500	100600	269900	270000
Oct-60	Oct-60	Oct-60	10900	1598400	267500	111500	269900	270000
Nov-60	Nov-60	Nov-60	500	1598900	267500	112000	269900	270000

Attachment A: ICPP Tank Volumes as a Function of Time (Continued)

			TANK_VOL					
Dec-60	Dec-60	Dec-60	0	1598900	267500	112000	269900	270000
Jan-61	Jan-61	Jan-61	8400	1607300	267500	115400	269900	270000
Feb-61	Feb-61	Feb-61	2000	1609300	267500	115400	269900	270000
Mar-61	Mar-61	Mar-61	15100	1624400	267500	123600	269900	270000
Apr-61	Apr-61	Apr-61	1000	1625400	267500	124600	269900	270000
May-61	May-61	May-61	0	1625400	267500	124600	269900	270000
Jun-61	Jun-61	Jun-61	800	1626200	267500	125400	269900	270000
Jul-61	Jul-61	Jul-61	800	1627000	267500	126200	269900	270000
Aug-61	Aug-61	Aug-61	1300	1628300	267500	127500	269900	270000
Sep-61	Sep-61	Sep-61	0	1628300	267500	127500	269900	270000
Oct-61	Oct-61	Oct-61	-71500	1556800	267500	56000	269900	270000
Nov-61	Nov-61	Nov-61	0	1556800	267500	56000	269900	270000
Dec-61	Dec-61	Dec-61	46800	1603600	267500	59600	269900	270000
Jan-62	Jan-62	Jan-62	40700	1644300	267500	63000	269900	270000
Feb-62	Feb-62	Feb-62	53700	1698000	267500	115400	269900	270000
Mar-62	Mar-62	Mar-62	-11000	1687000	267500	149400	269900	270000
Apr-62	Apr-62	Apr-62	80400	1767400	267500	151800	269900	270000
May-62	May-62	May-62	6600	1774000	267500	157200	269900	270000
Jun-62	Jun-62	Jun-62	6200	1780200	267500	163400	269900	270000
Jul-62	Jul-62	Jul-62	4100	1784300	267500	167500	269900	270000
Aug-62	Aug-62	Aug-62	2900	1787200	267500	170400	269900	270000
Sep-62	Sep-62	Sep-62	1000	1788200	267500	171400	269900	270000
Oct-62	Oct-62	Oct-62	2500	1790700	267500	173400	269900	270000
Nov-62	Nov-62	Nov-62	0	1790700	267500	173400	269900	270000
Dec-62	Dec-62	Dec-62	300	1791000	267500	173700	269900	270000
Jan-63	Jan-63	Jan-63	0	1791000	267500	173700	269900	270000
Feb-63	Feb-63	Feb-63	700	1791700	267500	174300	269900	270000
Mar-63	Mar-63	Mar-63	1400	1793100	267500	175700	269900	270000
Apr-63	Apr-63	Apr-63	400	1793500	267500	176100	269900	270000
May-63	May-63	May-63	12600	1806100	267500	188700	269900	270000
Jun-63	Jun-63	Jun-63	-74900	1731200	267500	90000	275000	270000
Jul-63	Jul-63	Jul-63	-22200	1709000	267500	100000	275000	270000
Aug-63	Aug-63	Aug-63	25000	1734000	267500	109000	275000	270000
Sep-63	Sep-63	Sep-63	1000	1735000	267500	110000	275000	270000
Oct-63	Oct-63	Oct-63	4000	1739000	267500	114000	275000	270000
Nov-63	Nov-63	Nov-63	34900	1773900	267500	116000	275000	270000
Dec-63	Dec-63	Dec-63	-11600	1762300	267500	118000	275000	270000
Jan-64	Jan-64	Jan-64	-48000	1714300	267500	120000	275000	270000
Feb-64	Feb-64	Feb-64	-48000	1666300	267500	122000	275000	270000
Mar-64	Mar-64	Mar-64	-50000	1616300	267500	124000	275000	270000
Apr-64	Apr-64	Apr-64	-48900	1567400	267500	126000	275000	270000
May-64	May-64	May-64	-36800	1530600	267500	131000	275000	270000
Jun-64	Jun-64	Jun-64	-52700	1477900	267500	135000	275000	270000
Jul-64	Jul-64	Jul-64	-35200	1442700	267500	139000	275000	270000
Aug-64	Aug-64	Aug-64	-29000	1413700	267500	140000	275000	240000
Sep-64	Sep-64	Sep-64	-30700	1383000	266900	145000	275000	200000
Oct-64	Oct-64	Oct-64	-45000	1338000	266900	147000	275000	145000
Nov-64	Nov-64	Nov-64	37700	1375700	266900	152000	275000	124100
Dec-64	Dec-64	Dec-64	13700	1389400	266900	157000	275000	124100

Attachment A: ICPP Tank Volumes as a Function of Time (Continued)

TANK_VOL

Jan-65	Jan-65	Jan-65	15800	1405200	266900	157000	275000	124100
Feb-65	Feb-65	Feb-65	12400	1417600	266900	157000	275000	124100
Mar-65	Mar-65	Mar-65	15100	1432700	266900	157000	275000	124100
Apr-65	Apr-65	Apr-65	7300	1440000	266900	157000	275000	124100
May-65	May-65	May-65	41340	1481340	266900	161000	275000	124100
Jun-65	Jun-65	Jun-65	-4500	1476840	266900	161000	275000	124100
Jul-65	Jul-65	Jul-65	67260	1544100	265700	163500	273100	124100
Aug-65	Aug-65	Aug-65	47300	1591400	265500	162500	272800	124100
Sep-65	Sep-65	Sep-65	136200	1727600	265300	179900	273000	124100
Oct-65	Oct-65	Oct-65	104300	1831900	265300	179900	272700	124100
Nov-65	Nov-65	Nov-65	21800	1853700	265300	179500	272900	124100
Dec-65	Dec-65	Dec-65	63700	1917400	265300	178600	272200	124100
Jan-66	Jan-66	Jan-66	81300	1998700	286100	178600	272500	124100
Feb-66	Feb-66	Feb-66	54900	2053600	286100	178500	272500	124100
Mar-66	Mar-66	Mar-66	24200	2077800	284800	197000	274100	130100
Apr-66	Apr-66	Apr-66	-48300	2029500	285100	197000	275100	79500
May-66	May-66	May-66	-35700	1993800	284600	212700	285700	28800
Jun-66	Jun-66	Jun-66	-52900	1940900	254200	212800	260800	28800
Jul-66	Jul-66	Jul-66	-38200	1902700	239500	228500	221000	28800
Aug-66	Aug-66	Aug-66	-44700	1858000	228600	228100	186300	28800
Sep-66	Sep-66	Sep-66	1500	1859500	218900	246500	174100	28800
Oct-66	Oct-66	Oct-66	3700	1863200	220200	246500	176500	28800
Nov-66	Nov-66	Nov-66	-16800	1846400	210000	246500	165700	32800
Dec-66	Dec-66	Dec-66	-48700	1797700	181700	246500	146800	32700
Jan-67	Jan-67	Jan-67	-50700	1747000	149100	246500	128900	32000
Feb-67	Feb-67	Feb-67	-57500	1689500	113000	246500	106600	32000
Mar-67	Mar-67	Mar-67	6000	1695500	106700	263200	98300	33400
Apr-67	Apr-67	Apr-67	-43500	1652000	1500	262600	214900	16900
May-67	May-67	May-67	-21500	1630500	13400	269400	168300	16600
Jun-67	Jun-67	Jun-67	-54000	1576500	16600	269400	108500	16600
Jul-67	Jul-67	Jul-67	-40800	1535700	16900	269400	191100	16600
Aug-67	Aug-67	Aug-67	-56600	1479100	16900	269400	133100	16600
Sep-67	Sep-67	Sep-67	-51800	1427300	16900	269400	101400	16600
Oct-67	Oct-67	Oct-67	-69300	1358000	16900	269400	33500	16200
Nov-67	Nov-67	Nov-67	-18800	1339200	16900	269400	26900	16200
Dec-67	Dec-67	Dec-67	300	1339500	16900	269400	27300	16200
Jan-68	Jan-68	Jan-68	-17100	1322400	16900	283200	27300	16200
Feb-68	Feb-68	Feb-68	-29100	1293300	16900	283500	28500	16200
Mar-68	Mar-68	Mar-68	-27600	1265700	16900	260400	4900	5600
Apr-68	Apr-68	Apr-68	52600	1318300	16900	260400	4900	45200
May-68	May-68	May-68	36700	1355000	16900	260400	5800	81000
Jun-68	Jun-68	Jun-68	57600	1412600	16900	261000	5800	112900
Jul-68	Jul-68	Jul-68	2500	1415100	16900	261500	5800	114900
Aug-68	Aug-68	Aug-68	-15000	1400100	16900	261500	5800	115900
Sep-68	Sep-68	Sep-68	-30400	1369700	16900	260900	5800	116500
Oct-68	Oct-68	Oct-68	-39600	1330100	16900	261500	5800	116500
Nov-68	Nov-68	Nov-68	-2500	1327600	16900	261500	5800	117100
Dec-68	Dec-68	Dec-68	-5800	1321800	16900	261500	5800	117100
Jan-69	Jan-69	Jan-69	-39700	1282100	16900	261500	5800	116500

Attachment A: ICPP Tank Volumes as a Function of Time (Continued)

TANK_VOL

Feb-69	Feb-69	Feb-69	-23000	1259100	16900	261500	5800	117100
Mar-69	Mar-69	Mar-69	-1300	1257800	9500	261500	5800	117700
Apr-69	Apr-69	Apr-69	-36300	1221500	9500	261500	5800	117700
May-69	May-69	May-69	-40000	1181500	9500	261500	5800	117700
Jun-69	Jun-69	Jun-69	23000	1204500	9500	261500	5800	117100
Jul-69	Jul-69	Jul-69	17200	1221700	9500	261500	5800	118600
Aug-69	Aug-69	Aug-69	53400	1275100	9500	261500	5800	118600
Sep-69	Sep-69	Sep-69	104100	1379200	9500	261500	5800	117700
Oct-69	Oct-69	Oct-69	76000	1455200	9500	261500	5800	117700
Nov-69	Nov-69	Nov-69	-9900	1445300	9500	261500	5800	119500
Dec-69	Dec-69	Dec-69	0	1445300	9500	261500	5800	119500
Jan-70	Jan-70	Jan-70	4000	1449300	9500	261500	5800	120100
Feb-70	Feb-70	Feb-70	62200	1511500	9500	260800	5800	155200
Mar-70	Mar-70	Mar-70	108300	1619800	9500	260800	5800	155200
Apr-70	Apr-70	Apr-70	110500	1730300	9500	260800	5800	162000
May-70	May-70	May-70	8300	1738600	9500	261700	5800	168000
Jun-70	Jun-70	Jun-70	1200	1739800	9500	261900	5800	168500
Jul-70	Jul-70	Jul-70	18900	1758700	9500	263000	5800	170100
Aug-70	Aug-70	Aug-70	-34500	1724200	9500	263000	5800	170700
Sep-70	Sep-70	Sep-70	-37000	1687200	9500	263000	5800	163300
Oct-70	Oct-70	Oct-70	-47400	1639800	9500	263000	5800	163300
Nov-70	Nov-70	Nov-70	-45700	1594100	9500	260500	5800	163900
Dec-70	Dec-70	Dec-70	-45800	1548300	9500	260500	5800	163900
Jan-71	Jan-71	Jan-71	7800	1556100	9500	260500	5800	163900
Feb-71	Feb-71	Feb-71	60000	1616100	9500	260500	5800	163900
Mar-71	Mar-71	Mar-71	87800	1703900	9500	261200	5800	163900
Apr-71	Apr-71	Apr-71	122600	1826500	9500	260500	5800	163900
May-71	May-71	May-71	88900	1915400	9500	260500	5800	164500
Jun-71	Jun-71	Jun-71	120100	2035500	9500	260500	5800	163900
Jul-71	Jul-71	Jul-71	43400	2078900	9500	260500	20400	163900
Aug-71	Aug-71	Aug-71	12700	2091600	9500	260500	23600	162600
Sep-71	Sep-71	Sep-71	1568	2093168	9500	260500	23600	162600
Oct-71	Oct-71	Oct-71	-46560	2046608	9500	260500	27668	162600
Nov-71	Nov-71	Nov-71	-57308	1989300	9500	262000	27700	162600
Dec-71	Dec-71	Dec-71	-57200	1932100	9500	262000	27700	162600
Jan-72	Jan-72	Jan-72	5400	1937500	9500	262000	27700	162600
Feb-72	Feb-72	Feb-72	13700	1951200	45000	262000	27700	158600
Mar-72	Mar-72	Mar-72	-18200	1933000	73800	262000	27700	108100
Apr-72	Apr-72	Apr-72	-5900	1927100	77500	265100	27700	106600
May-72	May-72	May-72	27200	1954300	77600	265100	30900	113500
Jun-72	Jun-72	Jun-72	77900	2032200	77600	265100	101000	114400
Jul-72	Jul-72	Jul-72	14200	2046400	77600	265100	114600	114400
Aug-72	Aug-72	Aug-72	-27925	2018475	27500	276800	118400	115300
Sep-72	Sep-72	Sep-72	-19575	1998900	0	277700	134000	114000
Oct-72	Oct-72	Oct-72	-300	1998600	265000	6400	137400	116000
Nov-72	Nov-72	Nov-72	-300	1998300	265000	6400	137400	116000
Dec-72	Dec-72	Dec-72	5860	2004160	265000	7560	137400	116000
Jan-73	Jan-73	Jan-73	-8660	1995500	265000	7000	137400	116000
Feb-73	Feb-73	Feb-73	29500	2025000	265000	7000	137400	128500

Attachment A: ICPP Tank Volumes as a Function of Time (Continued)

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Attachment B

Attachment B: ORIGEN2 Inputs and Outputs for Calculating MTR Element Inventories as a Function of Decay

```
echo off
echo **                                                                  **
echo **                          O R I G E N 2                           **
echo **                                                                  **
copy mtr1.INP tape5.inp >nul
REM  (NOT USED IN THIS CASE) copy mtr1.u3 tape3.inp >nul
copy \origen2\libs\decay.lib+\origen2\libs\atr.lib tape9.inp >nul
copy \origen2\libs\gxuo2brm.lib tape10.inp >nul
\origen2\code\origen2
echo finished with origen2 calculation
rem  combine and save files from run
copy tape12.out+tape6.out mtr1.u6 >nul
copy tape13.out+tape11.out mtr1.u11 >nul
ren tape7.out mtr1.pch
ren tape15.out mtr1.dbg
ren tape16.out mtr1.vxs
ren tape50.out mtr1.ech
rem  cleanup files
del tape*.inp
del tape*.out
echo ***********************************************************************
echo ******************* O R I G E N 2 - Version 2.1 **********************
echo ********************** Execution Completed ***************************
echo ***********************************************************************
echo on
```

Attachment B: ORIGEN2 Inputs and Outputs for Calculating MTR Element Inventories as a Function of Decay (Continued)

```
-1
-1
-1
  RDA     ORIGEN2, VERSION 2.1 (8-1-91) MTR
  BAS     ONE MTR ELEMENT
  CUT     -1
  LIP     0 0 0
  LIB     0  1 2 3  204  908  909   9   50  0  4  0
  TIT     ONE CYCLE FOR ONE MTR ELEMENT
  INP     -1   1  -1  -1  1  1
  MOV     -1   1   0   1.0
  HED      1                                                ELEMENT
  BUP
  IRP      50.0   1.626  1   2   3 2
  IRP     100.0   1.626  2   3   3 0
  IRP     200.0   1.626  3   4   3 0
  IRP     300.0   1.626  4   5   3 0
  IRP     400.0   1.626  5   6   3 0
  IRP     417.0   1.626  6   7   3 0
  BUP
  OPTL    8 8 8 8 8   8 5 8 8 8   8 8 8 8 8   8 8 8 8 8   8 8 8 8
  OPTA    8 8 8 8 5   8 5 8 8 8   8 8 8 8 8   8 8 8 8 8   8 8 8 8
  OPTF    8 8 8 8 5   8 5 8 8 8   8 8 8 8 8   8 8 8 8 8   8 8 8 8
  MOV      7    1    0   1.0
  DEC      1.0    1   2   5   4
  DEC      2.0    2   3   5   0
  DEC      3.0    3   4   5   0
  DEC      4.0    4   5   5   0
  DEC      5.0    5   6   5   0
  DEC      6.0    6   7   5   0
  DEC      7.0    7   8   5   0
  DEC      8.0    8   9   5   0
  OUT      -9    1     -1    0
  OUT       9    1     -1    0
  END
  2   922340  2.317 922350   200. 922360  .4343  922380  11.53 FUEL 93.3%
  0
```

Attachment B: ORIGEN2 Inputs and Outputs for Calculating MTR Element Inventories as a Function of Decay (Continued)

MTR1
ORIGEN2 V2.1 (8-1-91), Run on 05/19/97 at 17:05:44

	417.0HR	1.0YR	2.0YR	3.0YR	4.0YR	5.0YR	6.0YR	7.0YR	8.0YR
TL207	5.784E-14	1.471E-10	5.251E-10	1.128E-09	1.947E-09	2.977E-09	4.212E-09	5.643E-09	7.266E-09
TL208	2.111E-09	1.505E-07	2.543E-07	3.272E-07	3.782E-07	4.135E-07	4.377E-07	4.539E-07	4.643E-07
TL209	8.058E-15	1.125E-13	2.096E-13	3.076E-13	4.066E-13	5.065E-13	6.073E-13	7.091E-13	8.118E-13
PB209	3.345E-13	5.210E-12	9.705E-12	1.424E-11	1.882E-11	2.345E-11	2.812E-11	3.283E-11	3.758E-11
PB210	1.182E-14	3.713E-13	2.309E-12	7.415E-12	1.717E-11	3.302E-11	5.634E-11	8.849E-11	1.308E-10
PB211	5.800E-14	1.475E-10	5.266E-10	1.131E-09	1.953E-09	2.986E-09	4.223E-09	5.659E-09	7.287E-09
PB212	5.698E-09	4.188E-07	7.077E-07	9.106E-07	1.053E-06	1.151E-06	1.218E-06	1.263E-06	1.292E-06
PB214	3.381E-14	2.836E-11	1.083E-10	2.399E-10	4.231E-10	6.579E-10	9.442E-10	1.282E-09	1.672E-09
BI210	4.723E-15	3.713E-13	2.309E-12	7.416E-12	1.718E-11	3.303E-11	5.636E-11	8.852E-11	1.308E-10
BI211	5.800E-14	1.475E-10	5.266E-10	1.131E-09	1.953E-09	2.986E-09	4.223E-09	5.659E-09	7.287E-09
BI212	5.876E-09	4.188E-07	7.077E-07	9.106E-07	1.053E-06	1.151E-06	1.218E-06	1.263E-06	1.292E-06
BI213	3.730E-13	5.210E-12	9.705E-12	1.424E-11	1.882E-11	2.345E-11	2.812E-11	3.283E-11	3.758E-11
BI214	3.381E-14	2.836E-11	1.083E-10	2.399E-10	4.231E-10	6.579E-10	9.442E-10	1.282E-09	1.672E-09
PO210	8.648E-17	1.595E-13	1.207E-12	4.577E-12	1.174E-11	2.415E-11	4.319E-11	7.022E-11	1.066E-10
PO211	1.624E-16	4.130E-13	1.474E-12	3.166E-12	5.468E-12	8.360E-12	1.183E-11	1.585E-11	2.040E-11
PO212	3.765E-09	2.683E-07	4.534E-07	5.834E-07	6.743E-07	7.374E-07	7.805E-07	8.094E-07	8.280E-07
PO213	3.650E-13	5.098E-12	9.495E-12	1.393E-11	1.842E-11	2.294E-11	2.751E-11	3.212E-11	3.677E-11
PO214	2.386E-11	2.835E-11	1.083E-10	2.399E-10	4.230E-10	6.578E-10	9.440E-10	1.282E-09	1.671E-09
PO215	5.656E-14	1.475E-10	5.266E-10	1.131E-09	1.953E-09	2.986E-09	4.223E-09	5.659E-09	7.287E-09
PO216	6.236E-09	4.188E-07	7.077E-07	9.106E-07	1.053E-06	1.151E-06	1.218E-06	1.263E-06	1.292E-06
PO218	3.382E-14	2.836E-11	1.083E-10	2.400E-10	4.232E-10	6.580E-10	9.444E-10	1.282E-09	1.672E-09
AT217	3.730E-13	5.210E-12	9.705E-12	1.424E-11	1.882E-11	2.345E-11	2.812E-11	3.283E-11	3.758E-11
RN218	2.383E-11	1.233E-16	6.382E-22	3.302E-27	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
RN219	5.656E-14	1.475E-10	5.266E-10	1.131E-09	1.953E-09	2.986E-09	4.223E-09	5.659E-09	7.287E-09
RN220	6.236E-09	4.188E-07	7.077E-07	9.106E-07	1.053E-06	1.151E-06	1.218E-06	1.263E-06	1.292E-06
RN222	3.380E-14	2.836E-11	1.083E-10	2.400E-10	4.232E-10	6.580E-10	9.444E-10	1.282E-09	1.672E-09
FR221	3.730E-13	5.210E-12	9.705E-12	1.424E-11	1.882E-11	2.345E-11	2.812E-11	3.283E-11	3.758E-11
FR223	6.043E-15	2.035E-12	7.262E-12	1.559E-11	2.691E-11	4.114E-11	5.819E-11	7.796E-11	1.004E-10
RA222	2.383E-11	1.233E-16	6.382E-22	3.302E-27	1.706E-32	0.000E+00	0.000E+00	0.000E+00	0.000E+00
RA223	5.655E-14	1.475E-10	5.266E-10	1.131E-09	1.953E-09	2.986E-09	4.223E-09	5.659E-09	7.287E-09
RA224	6.235E-09	4.188E-07	7.077E-07	9.106E-07	1.053E-06	1.151E-06	1.218E-06	1.263E-06	1.292E-06
RA225	1.709E-12	5.210E-12	9.705E-12	1.424E-11	1.882E-11	2.345E-11	2.812E-11	3.283E-11	3.758E-11
RA226	5.993E-14	2.836E-11	1.083E-10	2.399E-10	4.232E-10	6.580E-10	9.444E-10	1.282E-09	1.672E-09
RA228	9.619E-19	1.157E-15	4.363E-15	9.418E-15	1.614E-14	2.437E-14	3.395E-14	4.475E-14	5.666E-14
AC225	3.729E-13	5.210E-12	9.705E-12	1.424E-11	1.882E-11	2.345E-11	2.812E-11	3.283E-11	3.758E-11

Attachment B: ORIGEN2 Inputs and Outputs for Calculating MTR Element Inventories as a Function of Decay (Continued)

MTR1
ORIGEN2 V2.1 (8-1-91), Run on 05/19/97 at 17:05:44

	417.0HR	1.0YR	2.0YR	3.0YR	4.0YR	5.0YR	6.0YR	7.0YR	8.0YR
AC227	4.378E-13	1.475E-10	5.263E-10	1.129E-09	1.950E-09	2.981E-09	4.217E-09	5.650E-09	7.274E-09
AC228	5.139E-11	1.157E-15	4.363E-15	9.418E-15	1.614E-14	2.437E-14	3.395E-14	4.475E-14	5.666E-14
TH226	2.383E-11	1.233E-16	6.382E-22	3.302E-27	1.709E-32	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TH227	2.428E-13	1.455E-10	5.193E-10	1.115E-09	1.926E-09	2.945E-09	4.165E-09	5.581E-09	7.186E-09
TH228	1.088E-08	4.187E-07	7.061E-07	9.080E-07	1.049E-06	1.147E-06	1.214E-06	1.259E-06	1.288E-06
TH229	7.593E-13	5.210E-12	9.705E-12	1.424E-11	1.882E-11	2.345E-11	2.812E-11	3.283E-11	3.758E-11
TH230	5.688E-09	1.250E-07	2.443E-07	3.636E-07	4.829E-07	6.022E-07	7.215E-07	8.408E-07	9.602E-07
TH231	1.472E-03	3.550E-04	3.550E-04	3.550E-04	3.550E-04	3.550E-04	3.550E-04	3.550E-04	3.550E-04
TH232	5.589E-16	2.258E-14	4.460E-14	6.662E-14	8.864E-14	1.107E-13	1.327E-13	1.547E-13	1.767E-13
TH234	1.505E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06
PA231	7.872E-10	8.429E-09	1.597E-08	2.351E-08	3.106E-08	3.860E-08	4.614E-08	5.368E-08	6.122E-08
PA233	5.346E-06	9.607E-05	9.608E-05	9.608E-05	9.608E-05	9.608E-05	9.608E-05	9.608E-05	9.609E-05
PA234M	2.089E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06
PA234	5.270E-07	4.917E-09	4.917E-09	4.917E-09	4.917E-09	4.917E-09	4.917E-09	4.917E-09	4.917E-09
U230	2.381E-11	1.232E-16	6.375E-22	3.299E-27	1.707E-32	8.801E-38	0.000E+00	0.000E+00	0.000E+00
U232	1.336E-06	1.359E-06	1.368E-06	1.372E-06	1.372E-06	1.370E-06	1.365E-06	1.358E-06	1.350E-06
U233	4.692E-08	4.734E-08	4.780E-08	4.827E-08	4.873E-08	4.920E-08	4.966E-08	5.013E-08	5.059E-08
U234	1.325E-02	1.325E-02	1.325E-02	1.325E-02	1.325E-02	1.325E-02	1.325E-02	1.325E-02	1.325E-02
U235	3.550E-04	3.550E-04	3.550E-04	3.550E-04	3.550E-04	3.550E-04	3.550E-04	3.550E-04	3.550E-04
U236	4.463E-04	4.463E-04	4.463E-04	4.463E-04	4.463E-04	4.463E-04	4.463E-04	4.463E-04	4.463E-04
U237	6.653E+03	9.971E-06	9.502E-06	9.055E-06	8.630E-06	8.224E-06	7.838E-06	7.469E-06	7.118E-06
U238	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06
U240	2.718E-01	5.600E-14	5.600E-14	5.600E-14	5.600E-14	5.600E-14	5.600E-14	5.600E-14	5.600E-14
NP235	3.633E-07	1.917E-07	1.012E-07	5.339E-08	2.818E-08	1.487E-08	7.846E-09	4.140E-09	2.185E-09
NP236	1.535E-10	1.535E-10	1.535E-10	1.535E-10	1.535E-10	1.535E-10	1.535E-10	1.535E-10	1.535E-10
NP237	3.861E-05	9.607E-05	9.607E-05	9.607E-05	9.607E-05	9.607E-05	9.607E-05	9.608E-05	9.608E-05
NP238	2.028E+02	5.535E-10	5.510E-10	5.485E-10	5.460E-10	5.435E-10	5.410E-10	5.386E-10	5.361E-10
NP239	1.338E+04	7.385E-07	7.385E-07	7.384E-07	7.383E-07	7.383E-07	7.382E-07	7.381E-07	7.381E-07
NP240M	2.975E+01	5.600E-14	5.600E-14	5.600E-14	5.600E-14	5.600E-14	5.600E-14	5.600E-14	5.600E-14
PU236	2.492E-06	2.568E-06	2.014E-06	1.579E-06	1.238E-06	9.711E-07	7.615E-07	5.972E-07	4.683E-07
PU237	1.675E-05	6.501E-08	2.524E-10	9.796E-13	3.803E-15	1.469E-17	1.995E-19	1.094E-19	0.000E+00
PU238	1.823E-02	3.138E-02	3.113E-02	3.089E-02	3.064E-02	3.040E-02	3.016E-02	2.993E-02	2.969E-02
PU239	1.107E-02	1.468E-02	1.468E-02	1.468E-02	1.468E-02	1.468E-02	1.468E-02	1.468E-02	1.468E-02
PU240	3.315E-03	3.317E-03	3.316E-03	3.316E-03	3.315E-03	3.315E-03	3.315E-03	3.314E-03	3.314E-03
PU241	4.265E-01	4.064E-01	3.873E-01	3.691E-01	3.518E-01	3.353E-01	3.195E-01	3.045E-01	2.902E-01

Attachment B: ORIGEN2 Inputs and Outputs for Calculating MTR Element Inventories as a Function of Decay (Continued)

MTR1
ORIGEN2 V2.1 (8-1-91), Run on 05/19/97 at 17:05:44

	417.0HR	1.0YR	2.0YR	3.0YR	4.0YR	5.0YR	6.0YR	7.0YR	8.0YR
PU242	5.311E-07	5.311E-07	5.311E-07	5.311E-07	5.311E-07	5.311E-07	5.311E-07	5.311E-07	5.311E-07
PU243	8.326E-01	1.414E-18	1.414E-18	1.414E-18	1.414E-18	1.414E-18	1.414E-18	1.414E-18	1.414E-18
PU244	5.607E-14	5.608E-14	5.608E-14	5.608E-14	5.608E-14	5.608E-14	5.608E-14	5.608E-14	5.608E-14
PU246	4.516E-10	3.319E-20	3.082E-28	3.058E-28	3.058E-28	3.058E-28	3.058E-28	3.058E-28	3.058E-28
AM241	7.331E-06	6.745E-04	1.309E-03	1.913E-03	2.487E-03	3.034E-03	3.553E-03	4.048E-03	4.517E-03
AM242M	1.112E-07	1.107E-07	1.102E-07	1.097E-07	1.092E-07	1.087E-07	1.082E-07	1.077E-07	1.072E-07
AM242	2.574E-02	1.101E-07	1.096E-07	1.091E-07	1.086E-07	1.082E-07	1.077E-07	1.072E-07	1.067E-07
AM243	6.748E-07	7.385E-07	7.385E-07	7.384E-07	7.383E-07	7.383E-07	7.382E-07	7.381E-07	7.381E-07
AM245	1.221E-06	2.495E-21	1.131E-21	5.128E-22	2.323E-22	1.052E-22	4.792E-23	2.183E-23	9.898E-24
AM246	4.521E-10	3.324E-20	3.082E-28	3.058E-28	3.058E-28	3.058E-28	3.058E-28	3.058E-28	3.058E-28
CM241	4.148E-11	3.661E-14	3.231E-17	2.852E-20	2.518E-23	2.222E-26	1.962E-29	1.731E-32	1.528E-35
CM242	2.806E-04	7.808E-05	1.662E-05	3.594E-06	8.326E-07	2.470E-07	1.225E-07	9.583E-08	8.985E-08
CM243	1.372E-08	1.339E-08	1.307E-08	1.275E-08	1.244E-08	1.215E-08	1.185E-08	1.157E-08	1.129E-08
CM244	9.409E-06	9.228E-06	8.882E-06	8.548E-06	8.227E-06	7.918E-06	7.621E-06	7.335E-06	7.059E-06
CM245	1.767E-10	1.769E-10	1.769E-10	1.769E-10	1.769E-10	1.769E-10	1.769E-10	1.768E-10	1.768E-10
CM246	3.960E-12	3.962E-12	3.962E-12	3.961E-12	3.960E-12	3.960E-12	3.959E-12	3.959E-12	3.958E-12
CM247	1.414E-18	1.414E-18	1.414E-18	1.414E-18	1.414E-18	1.414E-18	1.414E-18	1.414E-18	1.414E-18
CM248	4.315E-19	4.315E-19	4.315E-19	4.315E-19	4.315E-19	4.315E-19	4.315E-19	4.315E-19	4.315E-19
CM250	1.223E-27	1.223E-27	1.223E-27	1.223E-27	1.223E-27	1.223E-27	1.223E-27	1.223E-27	1.223E-27
BK249	3.616E-16	1.720E-16	7.799E-17	3.533E-17	1.601E-17	7.252E-18	3.304E-18	1.505E-18	6.613E-19
BK250	7.667E-15	1.712E-28	1.712E-28	1.712E-28	1.712E-28	1.712E-28	1.712E-28	1.712E-28	1.712E-28
CF249	2.334E-21	5.202E-19	7.540E-19	8.590E-19	9.056E-19	9.257E-19	9.337E-19	9.364E-19	9.366E-19
CF250	1.359E-18	1.491E-18	1.412E-18	1.337E-18	1.266E-18	1.199E-18	1.135E-18	1.075E-18	1.018E-18
CF251	2.130E-21	2.134E-21	2.134E-21	2.134E-21	2.134E-21	2.134E-21	2.134E-21	2.134E-21	2.134E-21
CF252	1.597E-20	1.597E-20	1.597E-20	1.597E-20	1.597E-20	1.597E-20	1.597E-20	1.597E-20	1.597E-20
H 3	3.995E-01	3.777E-01	3.571E-01	3.376E-01	3.192E-01	3.017E-01	2.853E-01	2.697E-01	2.550E-01
BE 10	2.523E-09	2.523E-09	2.523E-09	2.523E-09	2.523E-09	2.523E-09	2.523E-09	2.523E-09	2.523E-09
C 14	1.018E-07	1.017E-07	1.017E-07	1.017E-07	1.017E-07	1.017E-07	1.017E-07	1.017E-07	1.017E-07
SE 79	3.658E-04	3.661E-04	3.661E-04	3.660E-04	3.660E-04	3.660E-04	3.660E-04	3.660E-04	3.660E-04
KR 81	1.174E-11	1.174E-11	1.174E-11	1.174E-11	1.174E-11	1.174E-11	1.174E-11	1.174E-11	1.174E-11
KR 85	1.114E+01	1.060E+01	9.938E+00	9.316E+00	8.733E+00	8.186E+00	7.673E+00	7.193E+00	6.743E+00
RB 86	3.696E+00	4.727E-06	6.045E-12	7.731E-18	9.888E-24	1.265E-29	1.617E-35	0.000E+00	0.000E+00
RB 87	2.447E-08	2.458E-08	2.458E-08	2.458E-08	2.458E-08	2.458E-08	2.458E-08	2.458E-08	2.458E-08
SR 89	1.380E+04	9.183E+01	6.105E-01	4.058E-03	2.698E-05	1.794E-07	1.192E-09	7.923E-12	5.267E-14
SR 90	8.809E+01	8.603E+01	8.401E+01	8.203E+01	8.010E+01	7.822E+01	7.638E+01	7.458E+01	7.283E+01

Attachment B: ORIGEN2 Inputs and Outputs for Calculating MTR Element Inventories as a Function of Decay (Continued)

MTR1
ORIGEN2 V2.1 (8-1-91), Run on 05/19/97 at 17:05:44

	417.0HR	1.0YR	2.0YR	3.0YR	4.0YR	5.0YR	6.0YR	7.0YR	8.0YR
Y 90	7.441E+01	8.606E+01	8.403E+01	8.206E+01	8.013E+01	7.824E+01	7.640E+01	7.460E+01	7.285E+01
Y 91	1.435E+04	1.970E+02	2.601E+00	3.434E-02	4.534E-04	5.987E-06	7.906E-08	1.044E-09	1.378E-11
NB 92	9.289E-11	1.400E-21	2.109E-32	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ZR 93	1.825E-03	1.891E-03	1.891E-03	1.891E-03	1.891E-03	1.891E-03	1.891E-03	1.891E-03	1.891E-03
NB 93M	2.351E-06	9.149E-05	1.762E-04	2.567E-04	3.332E-04	4.059E-04	4.750E-04	5.407E-04	6.030E-04
NB 94	1.952E-08	1.952E-08	1.952E-08	1.952E-08	1.952E-08	1.952E-08	1.952E-08	1.952E-08	1.952E-08
ZR 95	1.495E+04	2.860E+02	5.469E+00	1.046E-01	2.000E-03	3.824E-05	7.311E-07	1.398E-08	2.673E-10
NB 95	2.355E+03	6.342E+02	1.256E+01	2.406E-01	4.600E-03	8.797E-05	1.682E-06	3.216E-08	6.150E-10
NB 95M	7.755E+01	2.122E+00	4.057E-02	7.758E-04	1.483E-05	2.836E-07	5.424E-09	1.037E-10	1.983E-12
TC 98	3.903E-10	3.903E-10	3.903E-10	3.903E-10	3.903E-10	3.903E-10	3.903E-10	3.903E-10	3.903E-10
TC 99	9.667E-03	1.273E-02	1.273E-02	1.273E-02	1.273E-02	1.273E-02	1.273E-02	1.273E-02	1.273E-02
RH102	1.595E-05	1.256E-05	9.892E-06	7.789E-06	6.133E-06	4.829E-06	3.802E-06	2.994E-06	2.358E-06
RU103	1.129E+04	1.797E+01	2.848E-02	4.519E-05	7.206E-08	1.144E-10	1.814E-13	2.884E-16	3.309E-19
RH103M	1.017E+04	1.620E+01	2.573E-02	4.079E-05	6.496E-08	1.032E-10	1.638E-13	2.600E-16	4.130E-19
RU106	1.846E+02	9.283E+01	4.667E+01	2.346E+01	1.180E+01	5.931E+00	2.982E+00	1.499E+00	7.537E-01
RH106	3.065E+03	9.283E+01	4.667E+01	2.346E+01	1.180E+01	5.931E+00	2.982E+00	1.499E+00	7.537E-01
AG106	3.450E-12	4.003E-25	4.307E-38	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
PD107	1.348E-05	1.350E-05	1.350E-05	1.350E-05	1.350E-05	1.350E-05	1.350E-05	1.350E-05	1.350E-05
AG108	9.308E-04	8.796E-12	8.748E-12	8.700E-12	8.653E-12	8.606E-12	8.559E-12	8.512E-12	8.466E-12
AG108M	9.937E-11	9.883E-11	9.829E-11	9.775E-11	9.722E-11	9.669E-11	9.617E-11	9.564E-11	9.512E-11
AG109M	6.810E+02	1.768E-09	1.025E-09	5.938E-10	3.441E-10	1.994E-10	1.155E-10	6.696E-11	3.880E-11
CD109	3.052E-09	1.768E-09	1.025E-09	5.938E-10	3.441E-10	1.994E-10	1.155E-10	6.696E-11	3.880E-11
AG110	1.004E+02	5.485E-04	1.991E-04	7.230E-05	2.625E-05	9.531E-06	3.460E-06	1.256E-06	4.561E-07
AG110M	1.136E-01	4.124E-02	1.497E-02	5.436E-03	1.974E-03	7.166E-04	2.602E-04	9.446E-05	3.430E-05
AG111	2.899E+02	5.077E-13	8.862E-28	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CD113M	1.129E-02	1.088E-02	1.037E-02	9.893E-03	9.434E-03	8.996E-03	8.579E-03	8.181E-03	7.801E-03
IN114	9.984E-05	2.931E-08	1.764E-10	1.061E-12	6.385E-15	3.848E-17	3.254E-19	1.958E-21	0.000E+00
IN114M	5.090E-06	3.063E-08	1.843E-10	1.109E-12	6.671E-15	4.021E-17	3.400E-19	0.000E+00	0.000E+00
CD115M	4.596E+00	1.574E-02	5.390E-05	1.846E-07	6.318E-10	2.165E-12	7.407E-15	2.514E-17	0.000E+00
IN115	9.095E-15	1.275E-14	1.275E-14	1.275E-14	1.275E-14	1.275E-14	1.275E-14	1.275E-14	1.275E-14
IN115M	1.991E+02	1.106E-06	3.789E-09	1.297E-11	4.441E-14	1.522E-16	5.209E-19	1.782E-21	6.049E-24
SN117M	3.262E-03	4.596E-11	6.477E-19	9.126E-27	1.286E-34	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SN119M	1.650E-01	5.873E-02	2.090E-02	7.436E-03	2.646E-03	9.416E-04	3.351E-04	1.192E-04	4.243E-05
SN121M	7.926E-05	7.817E-05	7.709E-05	7.603E-05	7.498E-05	7.395E-05	7.293E-05	7.192E-05	7.093E-05
SN123	6.894E+00	9.711E-01	1.368E-01	1.927E-02	2.714E-03	3.822E-04	5.384E-05	7.583E-06	1.068E-06

Attachment B: ORIGEN2 Inputs and Outputs for Calculating MTR Element Inventories as a Function of Decay (Continued)

MTR1
ORIGEN2 V2.1 (8-1-91), Run on 05/19/97 at 17:05:44

	417.0HR	1.0YR	2.0YR	3.0YR	4.0YR	5.0YR	6.0YR	7.0YR	8.0YR
TE123	7.151E-18	9.638E-18	9.937E-18	9.973E-18	9.978E-18	9.978E-18	9.978E-18	9.978E-18	9.978E-18
TE123M	8.629E-05	1.040E-05	1.254E-06	1.513E-07	1.824E-08	2.199E-09	2.652E-10	3.197E-11	3.855E-12
SB124	4.570E-01	6.814E-03	1.016E-04	1.515E-06	2.258E-08	3.367E-10	5.020E-12	7.485E-14	1.116E-15
SN125	1.508E+02	5.924E-10	2.328E-21	9.147E-33	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SB125	4.987E+00	5.014E+00	3.904E+00	3.040E+00	2.367E+00	1.843E+00	1.435E+00	1.117E+00	8.698E-01
TE125M	1.057E-01	1.205E+00	9.523E-01	7.416E-01	5.774E-01	4.496E-01	3.501E-01	2.726E-01	2.122E-01
SN126	3.253E-04	3.253E-04	3.253E-04	3.253E-04	3.253E-04	3.253E-04	3.253E-04	3.253E-04	3.253E-04
SB126	8.989E+00	4.555E-05	4.554E-05	4.554E-05	4.554E-05	4.554E-05	4.554E-05	4.554E-05	4.554E-05
SB126M	6.993E+00	3.253E-04	3.253E-04	3.253E-04	3.253E-04	3.253E-04	3.253E-04	3.253E-04	3.253E-04
TE127	1.820E+03	3.160E+00	3.098E-01	3.036E-02	2.976E-03	2.917E-04	2.860E-05	2.803E-06	2.748E-07
TE127M	2.223E+01	3.226E+00	3.163E-01	3.100E-02	3.039E-03	2.978E-04	2.920E-05	2.862E-06	2.805E-07
XE127	9.634E-06	9.208E-09	8.801E-12	8.412E-15	8.040E-18	7.685E-21	7.345E-24	7.020E-27	6.710E-30
TE129	8.774E+03	1.458E-01	7.788E-05	4.159E-08	2.221E-11	1.186E-14	6.336E-18	3.384E-21	1.807E-24
TE129M	4.128E+02	2.240E-01	1.196E-04	6.390E-08	3.413E-11	1.823E-14	9.734E-18	5.198E-21	2.776E-24
I129	1.764E-05	2.042E-05	2.043E-05	2.043E-05	2.043E-05	2.043E-05	2.043E-05	2.043E-05	2.043E-05
XE129M	6.019E-03	1.085E-16	1.958E-30	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I131	3.014E+04	6.598E-10	1.396E-23	2.960E-37	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE131M	1.477E+02	4.984E-07	2.861E-16	1.643E-25	9.429E-35	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CS132	5.146E-02	5.363E-19	5.598E-36	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE133	7.820E+04	1.080E-16	1.047E-37	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CS134	1.281E+01	9.180E+00	6.559E+00	4.686E+00	3.348E+00	2.393E+00	1.709E+00	1.221E+00	8.727E-01
CS135	4.949E-05	7.902E-05	7.902E-05	7.902E-05	7.902E-05	7.902E-05	7.902E-05	7.902E-05	7.902E-05
CS136	6.882E+01	2.791E-07	1.132E-15	4.588E-24	1.860E-32	0.000E+00	0.000E+00	0.000E+00	0.000E+00
BA136M	1.134E+01	4.599E-08	1.865E-16	7.561E-25	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CS137	9.143E+01	8.936E+01	8.732E+01	8.532E+01	8.338E+01	8.147E+01	7.961E+01	7.779E+01	7.601E+01
BA137M	9.002E+01	8.453E+01	8.260E+01	8.072E+01	7.887E+01	7.707E+01	7.531E+01	7.359E+01	7.191E+01
LA138	1.836E-13	1.836E-13	1.836E-13	1.836E-13	1.836E-13	1.836E-13	1.836E-13	1.836E-13	1.836E-13
BA140	5.146E+04	1.301E-04	3.291E-13	8.322E-22	2.104E-30	0.000E+00	0.000E+00	0.000E+00	0.000E+00
LA140	4.689E+04	1.498E-04	3.787E-13	9.577E-22	2.422E-30	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CE141	2.439E+04	1.030E+01	4.276E-03	1.775E-06	7.365E-10	3.057E-13	1.269E-16	5.266E-20	2.185E-23
CE142	2.510E-08	2.525E-08	2.525E-08	2.525E-08	2.525E-08	2.525E-08	2.525E-08	2.525E-08	2.525E-08
PR143	4.283E+04	4.069E-04	3.190E-12	2.501E-20	1.961E-28	1.538E-36	0.000E+00	0.000E+00	0.000E+00
CE144	3.057E+03	1.255E+03	5.149E+02	2.113E+02	8.671E+01	3.559E+01	1.460E+01	5.994E+00	2.460E+00
PR144	5.354E+03	1.255E+03	5.149E+02	2.113E+02	8.672E+01	3.559E+01	1.461E+01	5.994E+00	2.460E+00
PR144M	3.715E+01	1.505E+01	6.178E+00	2.536E+00	1.041E+00	4.270E-01	1.753E-01	7.193E-02	2.952E-02

Attachment B: ORIGEN2 Inputs and Outputs for Calculating MTR Element Inventories as a Function of Decay (Continued)

MTR1
ORIGEN2 V2.1 (8-1-91), Run on 05/19/97 at 17:05:44

	417.0HR	1.0YR	2.0YR	3.0YR	4.0YR	5.0YR	6.0YR	7.0YR	8.0YR
ND144	5.267E-14	7.211E-13	9.954E-13	1.108E-12	1.154E-12	1.173E-12	1.181E-12	1.184E-12	1.185E-12
PM146	2.290E-04	2.019E-04	1.780E-04	1.569E-04	1.383E-04	1.219E-04	1.075E-04	9.476E-05	8.354E-05
SM146	1.511E-13	9.393E-13	1.634E-12	2.247E-12	2.787E-12	3.263E-12	3.683E-12	4.053E-12	4.379E-12
ND147	1.990E+04	2.282E-06	2.613E-16	2.992E-26	3.426E-36	0.000E+00	0.000E+00	0.000E+00	0.000E+00
PM147	1.341E+02	2.816E+02	2.162E+02	1.660E+02	1.275E+02	9.788E+01	7.515E+01	5.770E+01	4.431E+01
SM147	1.511E-11	2.103E-09	3.706E-09	4.937E-09	5.882E-09	6.608E-09	7.165E-09	7.593E-09	7.921E-09
PM148	5.566E+02	3.689E-03	8.026E-06	1.747E-08	3.800E-11	8.264E-14	1.799E-16	3.975E-19	8.666E-22
PM148M	3.009E+01	6.551E-02	1.425E-04	3.102E-07	6.744E-10	1.467E-12	3.195E-15	7.073E-18	0.000E+00
SM148	7.786E-16	2.226E-15	2.227E-15	2.227E-15	2.227E-15	2.227E-15	2.227E-15	2.227E-15	2.227E-15
SM149	2.068E-15	1.130E-14	1.130E-14	1.130E-14	1.130E-14	1.130E-14	1.130E-14	1.130E-14	1.130E-14
EU150	8.210E-10	8.054E-10	7.900E-10	7.750E-10	7.602E-10	7.457E-10	7.315E-10	7.175E-10	7.038E-10
SM151	6.898E-01	8.822E-01	8.755E-01	8.688E-01	8.621E-01	8.555E-01	8.489E-01	8.424E-01	8.359E-01
EU152	9.365E-04	8.900E-04	8.457E-04	8.037E-04	7.638E-04	7.258E-04	6.898E-04	6.555E-04	6.229E-04
GD152	3.527E-17	3.938E-17	4.093E-17	4.240E-17	4.381E-17	4.514E-17	4.640E-17	4.761E-17	4.875E-17
GD153	1.293E-03	4.542E-04	1.596E-04	5.605E-05	1.969E-05	6.918E-06	2.430E-06	8.538E-07	2.999E-07
EU154	8.288E-01	7.646E-01	7.054E-01	6.508E-01	6.004E-01	5.539E-01	5.110E-01	4.714E-01	4.349E-01
EU155	2.027E+00	1.766E+00	1.536E+00	1.336E+00	1.161E+00	1.010E+00	8.782E-01	7.637E-01	6.640E-01
EU156	2.253E+02	1.326E-05	7.617E-13	4.376E-20	2.514E-27	1.444E-34	0.000E+00	0.000E+00	0.000E+00
TB160	6.547E-02	1.974E-03	5.952E-05	1.795E-06	5.411E-08	1.632E-09	4.919E-11	1.483E-12	4.472E-14
TB161	1.750E+00	2.263E-16	2.925E-32	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
HO166M	6.037E-09	6.034E-09	6.031E-09	6.027E-09	6.024E-09	6.020E-09	6.017E-09	6.013E-09	6.010E-09
ER169	7.095E-06	1.426E-17	2.865E-29	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TM170	6.444E-09	8.996E-10	1.256E-10	1.754E-11	2.448E-12	3.418E-13	4.772E-14	6.663E-15	9.302E-16
TM171	1.418E-11	9.883E-12	6.888E-12	4.801E-12	3.346E-12	2.332E-12	1.625E-12	1.133E-12	7.895E-13

Attachment B: ORIGEN2 Inputs and Outputs for Calculating MTR Element Inventories as a Function of Decay (Continued)

```
echo off
echo **                                                                  **
echo **                              O R I G E N 2                       **
echo **                                                                  **
copy mtr2.INP tape5.inp >nul
REM  (NOT USED IN THIS CASE) copy mtr2.u3 tape3.inp >nul
copy \origen2\libs\decay.lib+\origen2\libs\atr.lib tape9.inp >nul
copy \origen2\libs\gxuo2brm.lib tape10.inp >nul
\origen2\code\origen2
echo finished with origen2 calculation
rem  combine and save files from run
copy tape12.out+tape6.out mtr2.u6 >nul
copy tape13.out+tape11.out mtr2.u11 >nul
ren tape7.out mtr2.pch
ren tape15.out mtr2.dbg
ren tape16.out mtr2.vxs
ren tape50.out mtr2.ech
rem  cleanup files
del tape*.inp
del tape*.out
echo ************************************************************************
echo ******************* O R I G E N 2 - Version 2.1 ***********************
echo ********************** Execution Completed ****************************
echo ************************************************************************
echo on
```

Attachment B: ORIGEN2 Inputs and Outputs for Calculating MTR Element Inventories as a Function of Decay (Continued)

```
-1
-1
-1
  RDA     ORIGEN2, VERSION 2.1 (8-1-91) MTR
  BAS     ONE MTR ELEMENT
  CUT     -1
  LIP     0 0 0
  LIB     0  1 2 3  204  908  909   9   50  0  4  0
  TIT     ONE CYCLE FOR ONE MTR ELEMENT
  INP     -1   1  -1  -1  1  1
  MOV     -1   1   0   1.0
  HED      1                                                    ELEMENT
  BUP
  IRP      50.0   1.626  1   2   3 2
  IRP     100.0   1.626  2   3   3 0
  IRP     200.0   1.626  3   4   3 0
  IRP     300.0   1.626  4   5   3 0
  IRP     400.0   1.626  5   6   3 0
  IRP     417.0   1.626  6   7   3 0
  BUP
  OPTL    8 8 8 8 8   8 5 8 8 8   8 8 8 8 8   8 8 8 8 8   8 8 8 8
  OPTA    8 8 8 8 5   8 5 8 8 8   8 8 8 8 8   8 8 8 8 8   8 8 8 8
  OPTF    8 8 8 8 5   8 5 8 8 8   8 8 8 8 8   8 8 8 8 8   8 8 8 8
  MOV      7    1    0   1.0
  DEC       1.    1   2   5   4
  DEC       9.    2   3   5   0
  DEC      10.    3   4   5   0
  DEC      11.    4   5   5   0
  DEC      12.    5   6   5   0
  DEC      13.    6   7   5   0
  DEC      14.    7   8   5   0
  DEC      15.    8   9   5   0
  OUT      -9    1     -1    0
  OUT       9    1     -1    0
  END
  2   922340  2.317 922350   200. 922360  .4343  922380  11.53 FUEL 93.3%
  0
```

Attachment B: ORIGEN2 Inputs and Outputs for Calculating MTR Element Inventories as a Function of Decay (Continued)

mtr2
ORIGEN2 V2.1 (8-1-91), Run on 05/19/97 at 17:06:17

	417.0HR	1.0YR	9.0YR	10.0YR	11.0YR	12.0YR	13.0YR	14.0YR	15.0YR
TL207	5.784E-14	1.471E-10	9.032E-09	1.103E-08	1.319E-08	1.551E-08	1.800E-08	2.064E-08	2.344E-08
TL208	2.111E-09	1.505E-07	4.690E-07	4.741E-07	4.754E-07	4.751E-07	4.737E-07	4.715E-07	4.687E-07
TL209	8.058E-15	1.125E-13	9.125E-13	1.016E-12	1.121E-12	1.227E-12	1.334E-12	1.441E-12	1.550E-12
PB209	3.345E-13	5.210E-12	4.225E-11	4.706E-11	5.191E-11	5.680E-11	6.174E-11	6.672E-11	7.175E-11
PB210	1.182E-14	3.713E-13	1.846E-10	2.509E-10	3.310E-10	4.261E-10	5.373E-10	6.656E-10	8.121E-10
PB211	5.800E-14	1.475E-10	9.058E-09	1.106E-08	1.322E-08	1.555E-08	1.805E-08	2.070E-08	2.351E-08
PB212	5.698E-09	4.188E-07	1.305E-06	1.319E-06	1.323E-06	1.322E-06	1.318E-06	1.312E-06	1.305E-06
PB214	3.381E-14	2.836E-11	2.112E-09	2.605E-09	3.149E-09	3.744E-09	4.391E-09	5.089E-09	5.838E-09
BI210	4.723E-15	3.713E-13	1.846E-10	2.510E-10	3.312E-10	4.263E-10	5.375E-10	6.659E-10	8.125E-10
BI211	5.800E-14	1.475E-10	9.058E-09	1.106E-08	1.322E-08	1.555E-08	1.805E-08	2.070E-08	2.351E-08
BI212	5.876E-09	4.188E-07	1.305E-06	1.319E-06	1.323E-06	1.322E-06	1.318E-06	1.312E-06	1.305E-06
BI213	3.730E-13	5.210E-12	4.225E-11	4.706E-11	5.191E-11	5.680E-11	6.174E-11	6.672E-11	7.175E-11
BI214	3.381E-14	2.836E-11	2.112E-09	2.605E-09	3.149E-09	3.744E-09	4.391E-09	5.089E-09	5.838E-09
PO210	8.648E-17	1.595E-13	1.846E-10	2.173E-10	2.848E-10	3.701E-10	4.711E-10	5.886E-10	7.236E-10
PO211	1.624E-16	4.130E-13	2.536E-11	3.097E-11	3.702E-11	4.355E-11	5.053E-11	5.796E-11	6.582E-11
PO212	3.765E-09	2.683E-07	8.364E-07	8.454E-07	8.476E-07	8.472E-07	8.447E-07	8.408E-07	8.358E-07
PO213	3.650E-13	5.098E-12	4.133E-11	4.604E-11	5.079E-11	5.557E-11	6.041E-11	6.528E-11	7.020E-11
PO214	2.386E-11	2.835E-11	2.112E-09	2.604E-09	3.148E-09	3.743E-09	4.390E-09	5.088E-09	5.837E-09
PO215	5.656E-14	1.475E-10	9.058E-09	1.106E-08	1.322E-08	1.555E-08	1.805E-08	2.070E-08	2.351E-08
PO216	6.236E-09	4.188E-07	1.305E-06	1.319E-06	1.323E-06	1.322E-06	1.318E-06	1.312E-06	1.305E-06
PO218	3.382E-14	2.836E-11	2.113E-09	2.605E-09	3.149E-09	3.745E-09	4.392E-09	5.090E-09	5.839E-09
AT217	3.730E-13	5.210E-12	4.225E-11	4.706E-11	5.191E-11	5.680E-11	6.174E-11	6.672E-11	7.175E-11
RN218	2.383E-11	1.233E-16	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
RN219	5.656E-14	1.475E-10	9.058E-09	1.106E-08	1.322E-08	1.555E-08	1.805E-08	2.070E-08	2.351E-08
RN220	6.236E-09	4.188E-07	1.305E-06	1.319E-06	1.323E-06	1.322E-06	1.318E-06	1.312E-06	1.305E-06
RN222	3.380E-14	2.836E-11	2.113E-09	2.605E-09	3.149E-09	3.745E-09	4.392E-09	5.090E-09	5.839E-09
FR221	3.730E-13	5.210E-12	4.225E-11	4.706E-11	5.191E-11	5.680E-11	6.174E-11	6.672E-11	7.175E-11
FR223	6.043E-15	2.035E-12	1.250E-10	1.524E-10	1.821E-10	2.142E-10	2.486E-10	2.851E-10	3.238E-10
RA222	2.383E-11	1.233E-16	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
RA223	5.655E-14	1.475E-10	9.058E-09	1.106E-08	1.322E-08	1.555E-08	1.805E-08	2.070E-08	2.351E-08
RA224	6.235E-09	4.188E-07	1.305E-06	1.319E-06	1.323E-06	1.322E-06	1.318E-06	1.312E-06	1.305E-06
RA225	1.709E-12	5.210E-12	4.225E-11	4.706E-11	5.191E-11	5.680E-11	6.174E-11	6.672E-11	7.175E-11
RA226	5.993E-14	2.836E-11	2.113E-09	2.605E-09	3.149E-09	3.745E-09	4.392E-09	5.090E-09	5.839E-09
RA228	9.619E-19	1.157E-15	6.956E-14	8.335E-14	9.796E-14	1.133E-13	1.293E-13	1.459E-13	1.630E-13
AC225	3.729E-13	5.210E-12	4.225E-11	4.706E-11	5.191E-11	5.680E-11	6.174E-11	6.672E-11	7.175E-11

Attachment B: ORIGEN2 Inputs and Outputs for Calculating MTR Element Inventories as a Function of Decay (Continued)

mtr2
ORIGEN2 V2.1 (8-1-91), Run on 05/19/97 at 17:06:17

	417.0HR	1.0YR	9.0YR	10.0YR	11.0YR	12.0YR	13.0YR	14.0YR	15.0YR
AC227	4.378E-13	1.475E-10	9.057E-09	1.104E-08	1.320E-08	1.552E-08	1.801E-08	2.066E-08	2.346E-08
AC228	5.139E-11	1.157E-15	6.956E-14	8.336E-14	9.797E-14	1.133E-13	1.293E-13	1.459E-13	1.630E-13
TH226	2.383E-11	1.233E-16	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TH227	2.428E-13	1.455E-10	8.933E-09	1.091E-08	1.304E-08	1.534E-08	1.780E-08	2.042E-08	2.318E-08
TH228	1.088E-08	4.187E-07	1.305E-06	1.315E-06	1.318E-06	1.317E-06	1.314E-06	1.307E-06	1.300E-06
TH229	7.593E-13	5.210E-12	4.225E-11	4.705E-11	5.191E-11	5.680E-11	6.174E-11	6.672E-11	7.175E-11
TH230	5.688E-09	1.250E-07	1.079E-06	1.199E-06	1.318E-06	1.437E-06	1.557E-06	1.676E-06	1.795E-06
TH231	1.472E-03	3.550E-04	3.550E-04	3.550E-04	3.550E-04	3.550E-04	3.550E-04	3.550E-04	3.550E-04
TH232	5.589E-16	2.258E-14	1.987E-13	2.208E-13	2.428E-13	2.648E-13	2.868E-13	3.088E-13	3.308E-13
TH234	1.505E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06
PA231	7.872E-10	8.429E-09	6.854E-08	7.608E-08	8.362E-08	9.116E-08	9.871E-08	1.062E-07	1.138E-07
PA233	5.346E-06	9.607E-05	9.608E-05	9.609E-05	9.609E-05	9.609E-05	9.609E-05	9.610E-05	9.610E-05
PA234M	2.089E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06
PA234	5.270E-07	4.917E-09	4.917E-09	4.917E-09	4.917E-09	4.917E-09	4.917E-09	4.917E-09	4.917E-09
U230	2.381E-11	1.232E-16	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U232	1.336E-06	1.359E-06	1.341E-06	1.332E-06	1.321E-06	1.311E-06	1.299E-06	1.288E-06	1.277E-06
U233	4.692E-08	4.734E-08	5.070E-08	5.116E-08	5.163E-08	5.209E-08	5.256E-08	5.302E-08	5.349E-08
U234	1.325E-02	1.325E-02	1.325E-02	1.325E-02	1.325E-02	1.325E-02	1.325E-02	1.325E-02	1.326E-02
U235	3.550E-04	3.550E-04	3.550E-04	3.550E-04	3.550E-04	3.550E-04	3.550E-04	3.550E-04	3.550E-04
U236	4.463E-04	4.463E-04	4.463E-04	4.463E-04	4.463E-04	4.463E-04	4.463E-04	4.463E-04	4.463E-04
U237	6.653E+03	9.971E-06	6.784E-06	6.465E-06	6.161E-06	5.872E-06	5.596E-06	5.333E-06	5.082E-06
U238	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06
U240	2.718E-01	5.600E-14	5.600E-14	5.600E-14	5.600E-14	5.600E-14	5.600E-14	5.600E-14	5.600E-14
NP235	3.633E-07	1.917E-07	1.153E-09	6.083E-10	3.210E-10	1.694E-10	8.939E-11	4.717E-11	2.489E-11
NP236	1.535E-10	1.535E-10	1.535E-10	1.535E-10	1.535E-10	1.535E-10	1.535E-10	1.535E-10	1.535E-10
NP237	3.861E-05	9.607E-05	9.608E-05	9.608E-05	9.608E-05	9.608E-05	9.609E-05	9.609E-05	9.609E-05
NP238	2.028E+02	5.535E-10	5.337E-10	5.312E-10	5.288E-10	5.264E-10	5.240E-10	5.216E-10	5.193E-10
NP239	1.338E+04	7.385E-07	7.380E-07	7.379E-07	7.378E-07	7.378E-07	7.377E-07	7.376E-07	7.376E-07
NP240M	2.975E+01	5.600E-14	5.600E-14	5.600E-14	5.600E-14	5.600E-14	5.600E-14	5.600E-14	5.600E-14
PU236	2.492E-06	2.568E-06	3.672E-07	2.880E-07	2.258E-07	1.771E-07	1.389E-07	1.089E-07	8.540E-08
PU237	1.675E-05	6.501E-08	3.337E-27	3.337E-27	3.337E-27	3.337E-27	3.337E-27	3.337E-27	3.337E-27
PU238	1.823E-02	3.138E-02	2.946E-02	2.922E-02	2.899E-02	2.877E-02	2.854E-02	2.832E-02	2.809E-02
PU239	1.107E-02	1.468E-02	1.468E-02	1.468E-02	1.468E-02	1.468E-02	1.468E-02	1.468E-02	1.468E-02
PU240	3.315E-03	3.317E-03	3.314E-03	3.313E-03	3.313E-03	3.313E-03	3.312E-03	3.312E-03	3.312E-03
PU241	4.265E-01	4.064E-01	2.765E-01	2.635E-01	2.512E-01	2.393E-01	2.281E-01	2.174E-01	2.072E-01

Attachment B: ORIGEN2 Inputs and Outputs for Calculating MTR Element Inventories as a Function of Decay (Continued)

mtr2
ORIGEN2 V2.1 (8-1-91), Run on 05/19/97 at 17:06:17

	417.0HR	1.0YR	9.0YR	10.0YR	11.0YR	12.0YR	13.0YR	14.0YR	15.0YR
PU242	5.311E-07	5.311E-07	5.311E-07	5.311E-07	5.311E-07	5.311E-07	5.311E-07	5.311E-07	5.311E-07
PU243	8.326E-01	1.414E-18	1.414E-18	1.414E-18	1.414E-18	1.414E-18	1.414E-18	1.414E-18	1.414E-18
PU244	5.607E-14	5.608E-14	5.608E-14	5.608E-14	5.608E-14	5.608E-14	5.608E-14	5.608E-14	5.608E-14
PU246	4.516E-10	3.319E-20	3.058E-28	3.058E-28	3.058E-28	3.058E-28	3.058E-28	3.058E-28	3.058E-28
AM241	7.331E-06	6.745E-04	4.964E-03	5.389E-03	5.792E-03	6.176E-03	6.541E-03	6.887E-03	7.216E-03
AM242M	1.112E-07	1.107E-07	1.067E-07	1.062E-07	1.058E-07	1.053E-07	1.048E-07	1.043E-07	1.038E-07
AM242	2.574E-02	1.101E-07	1.062E-07	1.057E-07	1.052E-07	1.048E-07	1.043E-07	1.038E-07	1.033E-07
AM243	6.748E-07	7.385E-07	7.380E-07	7.379E-07	7.378E-07	7.378E-07	7.377E-07	7.376E-07	7.376E-07
AM245	1.221E-06	2.495E-21	4.659E-24	2.431E-24	1.269E-24	5.751E-25	2.650E-25	2.650E-25	2.650E-25
AM246	4.521E-10	3.324E-20	3.058E-28	3.058E-28	3.058E-28	3.058E-28	3.058E-28	3.058E-28	3.058E-28
CM241	4.148E-11	3.661E-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CM242	2.806E-04	7.808E-05	8.814E-08	8.759E-08	8.716E-08	8.675E-08	8.636E-08	8.597E-08	8.557E-08
CM243	1.372E-08	1.339E-08	1.102E-08	1.076E-08	1.050E-08	1.024E-08	9.998E-09	9.758E-09	9.524E-09
CM244	9.409E-06	9.228E-06	6.794E-06	6.539E-06	6.294E-06	6.057E-06	5.830E-06	5.611E-06	5.400E-06
CM245	1.767E-10	1.769E-10	1.768E-10	1.768E-10	1.768E-10	1.768E-10	1.767E-10	1.767E-10	1.767E-10
CM246	3.960E-12	3.962E-12	3.958E-12	3.957E-12	3.956E-12	3.956E-12	3.955E-12	3.955E-12	3.954E-12
CM247	1.414E-18	1.414E-18	1.414E-18	1.414E-18	1.414E-18	1.414E-18	1.414E-18	1.414E-18	1.414E-18
CM248	4.315E-19	4.315E-19	4.315E-19	4.315E-19	4.315E-19	4.315E-19	4.315E-19	4.315E-19	4.315E-19
CM250	1.223E-27	1.223E-27	1.223E-27	1.223E-27	1.223E-27	1.223E-27	1.223E-27	1.223E-27	1.223E-27
BK249	3.616E-16	1.720E-16	3.212E-19	1.676E-19	8.747E-20	1.827E-20	1.827E-20	1.827E-20	1.827E-20
BK250	7.667E-15	1.712E-28	1.712E-28	1.712E-28	1.712E-28	1.712E-28	1.712E-28	1.712E-28	1.712E-28
CF249	2.334E-21	5.202E-19	9.356E-19	9.342E-19	9.325E-19	9.308E-19	9.290E-19	9.272E-19	9.254E-19
CF250	1.359E-18	1.491E-18	9.738E-19	9.222E-19	8.734E-19	8.271E-19	7.832E-19	7.417E-19	7.024E-19
CF251	2.130E-21	2.134E-21	2.134E-21	2.134E-21	2.134E-21	2.134E-21	2.134E-21	2.134E-21	2.134E-21
CF252	1.597E-20	1.597E-20	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
H 3	3.995E-01	3.777E-01	2.411E-01	2.279E-01	2.155E-01	2.037E-01	1.926E-01	1.821E-01	1.721E-01
BE 10	2.523E-09	2.523E-09	2.523E-09	2.523E-09	2.523E-09	2.523E-09	2.523E-09	2.523E-09	2.523E-09
C 14	1.018E-07	1.017E-07	1.016E-07	1.016E-07	1.016E-07	1.016E-07	1.016E-07	1.016E-07	1.016E-07
SE 79	3.658E-04	3.661E-04	3.660E-04	3.660E-04	3.660E-04	3.660E-04	3.660E-04	3.660E-04	3.660E-04
KR 81	1.174E-11	1.174E-11	1.174E-11	1.174E-11	1.174E-11	1.174E-11	1.174E-11	1.174E-11	1.174E-11
KR 85	1.114E+01	1.060E+01	6.320E+00	5.925E+00	5.554E+00	5.206E+00	4.880E+00	4.574E+00	4.288E+00
RB 86	3.696E+00	4.727E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
RB 87	2.447E-08	2.458E-08	2.458E-08	2.458E-08	2.458E-08	2.458E-08	2.458E-08	2.458E-08	2.458E-08
SR 89	1.380E+04	9.183E+01	3.501E-16	2.154E-18	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SR 90	8.809E+01	8.603E+01	7.112E+01	6.944E+01	6.781E+01	6.622E+01	6.466E+01	6.314E+01	6.165E+01

Attachment B: ORIGEN2 Inputs and Outputs for Calculating MTR Element Inventories as a Function of Decay (Continued)

mtr2
ORIGEN2 V2.1 (8-1-91), Run on 05/19/97 at 17:06:17

	417.0HR	1.0YR	9.0YR	10.0YR	11.0YR	12.0YR	13.0YR	14.0YR	15.0YR
Y 90	7.441E+01	8.606E+01	7.113E+01	6.946E+01	6.783E+01	6.623E+01	6.467E+01	6.315E+01	6.167E+01
Y 91	1.435E+04	1.970E+02	1.820E-13	2.403E-15	3.165E-17	4.842E-19	9.469E-20	9.726E-20	9.990E-20
NB 92	9.289E-11	1.400E-21	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ZR 93	1.825E-03	1.891E-03	1.891E-03	1.891E-03	1.891E-03	1.891E-03	1.891E-03	1.891E-03	1.891E-03
NB 93M	2.351E-06	9.149E-05	6.623E-04	7.187E-04	7.722E-04	8.231E-04	8.715E-04	9.174E-04	9.611E-04
NB 94	1.952E-08	1.952E-08	1.952E-08	1.952E-08	1.952E-08	1.952E-08	1.952E-08	1.952E-08	1.952E-08
ZR 95	1.495E+04	2.860E+02	5.111E-12	9.773E-14	1.869E-15	3.580E-17	6.097E-19	0.000E+00	0.000E+00
NB 95	2.355E+03	6.342E+02	1.135E-11	2.245E-13	4.299E-15	8.228E-17	1.575E-18	2.695E-20	2.008E-23
NB 95M	7.755E+01	2.122E+00	3.792E-14	7.250E-16	1.386E-17	2.655E-19	5.078E-21	8.649E-23	0.000E+00
TC 98	3.903E-10	3.903E-10	3.903E-10	3.903E-10	3.903E-10	3.903E-10	3.903E-10	3.903E-10	3.903E-10
TC 99	9.667E-03	1.273E-02	1.273E-02	1.273E-02	1.273E-02	1.273E-02	1.273E-02	1.273E-02	1.273E-02
RH102	1.595E-05	1.256E-05	1.856E-06	1.462E-06	1.151E-06	9.062E-07	7.136E-07	5.619E-07	4.424E-07
RU103	1.129E+04	1.797E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
RH103M	1.017E+04	1.620E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
RU106	1.846E+02	9.283E+01	3.791E-01	1.906E-01	9.581E-02	4.817E-02	2.422E-02	1.218E-02	6.122E-03
RH106	3.065E+03	9.283E+01	3.791E-01	1.906E-01	9.581E-02	4.817E-02	2.422E-02	1.218E-02	6.122E-03
AG106	3.450E-12	4.003E-25	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
PD107	1.348E-05	1.350E-05	1.350E-05	1.350E-05	1.350E-05	1.350E-05	1.350E-05	1.350E-05	1.350E-05
AG108	9.308E-04	8.796E-12	8.420E-12	8.374E-12	8.328E-12	8.283E-12	8.238E-12	8.193E-12	8.149E-12
AG108M	9.937E-11	9.883E-11	9.460E-11	9.409E-11	9.358E-11	9.307E-11	9.256E-11	9.206E-11	9.156E-11
AG109M	6.810E+02	1.768E-09	2.248E-11	1.303E-11	7.550E-12	4.375E-12	2.535E-12	1.469E-12	8.514E-13
CD109	3.052E-09	1.768E-09	2.248E-11	1.303E-11	7.550E-12	4.375E-12	2.535E-12	1.469E-12	8.514E-13
AG110	1.004E+02	5.485E-04	1.656E-07	6.013E-08	2.183E-08	7.926E-09	2.878E-09	1.045E-09	3.793E-10
AG110M	1.136E-01	4.124E-02	1.245E-05	4.521E-06	1.641E-06	5.959E-07	2.164E-07	7.856E-08	2.852E-08
AG111	2.899E+02	5.077E-13	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CD113M	1.129E-02	1.088E-02	7.439E-03	7.094E-03	6.765E-03	6.451E-03	6.152E-03	5.866E-03	5.594E-03
IN114	9.984E-05	2.931E-08	5.037E-26	5.037E-26	5.037E-26	5.037E-26	5.037E-26	5.037E-26	5.037E-26
IN114M	5.090E-06	3.063E-08	5.263E-26	5.263E-26	5.263E-26	5.263E-26	5.263E-26	5.263E-26	5.263E-26
CD115M	4.596E+00	1.574E-02	2.968E-22	2.968E-22	2.968E-22	2.968E-22	2.968E-22	2.968E-22	2.968E-22
IN115	9.095E-15	1.275E-14	1.275E-14	1.275E-14	1.275E-14	1.275E-14	1.275E-14	1.275E-14	1.275E-14
IN115M	1.991E+02	1.106E-06	2.086E-26	2.078E-26	2.078E-26	2.078E-26	2.078E-26	2.078E-26	2.078E-26
SN117M	3.262E-03	4.596E-11	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SN119M	1.650E-01	5.873E-02	1.510E-05	5.373E-06	1.912E-06	6.803E-07	2.421E-07	8.615E-08	3.066E-08
SN121M	7.926E-05	7.817E-05	6.996E-05	6.899E-05	6.804E-05	6.711E-05	6.618E-05	6.527E-05	6.437E-05
SN123	6.894E+00	9.711E-01	1.504E-07	2.119E-08	2.985E-09	4.204E-10	5.922E-11	8.341E-12	1.175E-12
TE123	7.151E-18	9.638E-18	9.978E-18	9.978E-18	9.978E-18	9.978E-18	9.978E-18	9.978E-18	9.978E-18

Attachment B: ORIGEN2 Inputs and Outputs for Calculating MTR Element Inventories as a Function of Decay (Continued)

mtr2
ORIGEN2 V2.1 (8-1-91), Run on 05/19/97 at 17:06:17

	417.0HR	1.0YR	9.0YR	10.0YR	11.0YR	12.0YR	13.0YR	14.0YR	15.0YR
TE123M	8.629E-05	1.040E-05	4.648E-13	5.604E-14	6.758E-15	8.148E-16	9.831E-17	1.181E-17	1.447E-18
SB124	4.570E-01	6.814E-03	1.664E-17	1.676E-19	1.352E-19	1.090E-19	8.796E-20	0.000E+00	0.000E+00
SN125	1.508E+02	5.924E-10	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SB125	4.987E+00	5.014E+00	6.772E-01	5.273E-01	4.106E-01	3.197E-01	2.489E-01	1.938E-01	1.509E-01
TE125M	1.057E-01	1.205E+00	1.652E-01	1.287E-01	1.002E-01	7.799E-02	6.073E-02	4.728E-02	3.681E-02
SN126	3.253E-04	3.253E-04	3.253E-04	3.252E-04	3.252E-04	3.252E-04	3.252E-04	3.252E-04	3.252E-04
SB126	8.989E+00	4.555E-05	4.554E-05	4.553E-05	4.553E-05	4.553E-05	4.553E-05	4.553E-05	4.553E-05
SB126M	6.993E+00	3.253E-04	3.253E-04	3.252E-04	3.252E-04	3.252E-04	3.252E-04	3.252E-04	3.252E-04
TE127	1.820E+03	3.160E+00	2.693E-08	2.640E-09	2.588E-10	2.536E-11	2.486E-12	2.437E-13	2.389E-14
TE127M	2.223E+01	3.226E+00	2.750E-08	2.695E-09	2.642E-10	2.589E-11	2.538E-12	2.488E-13	2.439E-14
XE127	9.634E-06	9.208E-09	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TE129	8.774E+03	1.458E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TE129M	4.128E+02	2.240E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I129	1.764E-05	2.042E-05	2.043E-05	2.043E-05	2.043E-05	2.043E-05	2.043E-05	2.043E-05	2.043E-05
XE129M	6.019E-03	1.085E-16	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I131	3.014E+04	6.598E-10	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE131M	1.477E+02	4.984E-07	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CS132	5.146E-02	5.363E-19	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE133	7.820E+04	1.080E-16	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CS134	1.281E+01	9.180E+00	6.236E-01	4.455E-01	3.183E-01	2.275E-01	1.625E-01	1.161E-01	8.297E-02
CS135	4.949E-05	7.902E-05	7.902E-05	7.902E-05	7.902E-05	7.902E-05	7.902E-05	7.902E-05	7.902E-05
CS136	6.882E+01	2.791E-07	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
BA136M	1.134E+01	4.599E-08	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CS137	9.143E+01	8.936E+01	7.428E+01	7.258E+01	7.092E+01	6.930E+01	6.772E+01	6.617E+01	6.466E+01
BA137M	9.002E+01	8.453E+01	7.027E+01	6.866E+01	6.709E+01	6.556E+01	6.406E+01	6.260E+01	6.117E+01
LA138	1.836E-13	1.836E-13	1.836E-13	1.836E-13	1.836E-13	1.836E-13	1.836E-13	1.836E-13	1.836E-13
BA140	5.146E+04	1.301E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
LA140	4.689E+04	1.498E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CE141	2.439E+04	1.030E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CE142	2.510E-08	2.525E-08	2.525E-08	2.525E-08	2.525E-08	2.525E-08	2.525E-08	2.525E-08	2.525E-08
PR143	4.283E+04	4.069E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CE144	3.057E+03	1.255E+03	1.009E+00	4.143E-01	1.700E-01	6.977E-02	2.863E-02	1.175E-02	4.823E-03
PR144	5.354E+03	1.255E+03	1.010E+00	4.143E-01	1.700E-01	6.978E-02	2.864E-02	1.175E-02	4.823E-03
PR144M	3.715E+01	1.505E+01	1.211E-02	4.971E-03	2.040E-03	8.373E-04	3.436E-04	1.410E-04	5.787E-05
ND144	5.267E-14	7.211E-13	1.186E-12	1.186E-12	1.186E-12	1.186E-12	1.186E-12	1.186E-12	1.186E-12
PM146	2.290E-04	2.019E-04	7.365E-05	6.493E-05	5.724E-05	5.046E-05	4.449E-05	3.922E-05	3.458E-05

Attachment B: ORIGEN2 Inputs and Outputs for Calculating MTR Element Inventories as a Function of Decay (Continued)

mtr2
ORIGEN2 V2.1 (8-1-91), Run on 05/19/97 at 17:06:17

	417.0HR	1.0YR	9.0YR	10.0YR	11.0YR	12.0YR	13.0YR	14.0YR	15.0YR
SM146	1.511E-13	9.393E-13	4.666E-12	4.920E-12	5.143E-12	5.341E-12	5.514E-12	5.667E-12	5.802E-12
ND147	1.990E+04	2.282E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
PM147	1.341E+02	2.816E+02	3.402E+01	2.612E+01	2.005E+01	1.540E+01	1.182E+01	9.078E+00	6.970E+00
SM147	1.511E-11	2.103E-09	8.173E-09	8.367E-09	8.516E-09	8.630E-09	8.717E-09	8.785E-09	8.836E-09
PM148	5.566E+02	3.689E-03	1.849E-24	1.609E-24	1.609E-24	1.609E-24	1.609E-24	1.609E-24	1.609E-24
PM148M	3.009E+01	6.551E-02	3.283E-23	3.283E-23	3.283E-23	3.283E-23	3.283E-23	3.283E-23	3.283E-23
SM148	7.786E-16	2.226E-15	2.227E-15	2.227E-15	2.227E-15	2.227E-15	2.227E-15	2.227E-15	2.227E-15
SM149	2.068E-15	1.130E-14	1.130E-14	1.130E-14	1.130E-14	1.130E-14	1.130E-14	1.130E-14	1.130E-14
EU150	8.210E-10	8.054E-10	6.904E-10	6.772E-10	6.643E-10	6.517E-10	6.392E-10	6.270E-10	6.151E-10
SM151	6.898E-01	8.822E-01	8.295E-01	8.232E-01	8.168E-01	8.106E-01	8.044E-01	7.982E-01	7.921E-01
EU152	9.365E-04	8.900E-04	5.920E-04	5.626E-04	5.346E-04	5.080E-04	4.828E-04	4.588E-04	4.360E-04
GD152	3.527E-17	3.938E-17	4.983E-17	5.087E-17	5.185E-17	5.278E-17	5.366E-17	5.451E-17	5.531E-17
GD153	1.293E-03	4.542E-04	1.054E-07	3.702E-08	1.300E-08	4.568E-09	1.605E-09	5.638E-10	1.981E-10
EU154	8.288E-01	7.646E-01	4.013E-01	3.702E-01	3.415E-01	3.151E-01	2.907E-01	2.682E-01	2.474E-01
EU155	2.027E+00	1.766E+00	5.774E-01	5.021E-01	4.366E-01	3.797E-01	3.301E-01	2.871E-01	2.496E-01
EU156	2.253E+02	1.326E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TB160	6.547E-02	1.974E-03	1.348E-15	4.078E-17	1.292E-18	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TB161	1.750E+00	2.263E-16	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
HO166M	6.037E-09	6.034E-09	6.006E-09	6.003E-09	5.999E-09	5.996E-09	5.992E-09	5.989E-09	5.985E-09
ER169	7.095E-06	1.426E-17	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TM170	6.444E-09	8.996E-10	1.299E-16	1.811E-17	2.445E-18	3.858E-19	1.248E-19	0.000E+00	0.000E+00
TM171	1.418E-11	9.883E-12	5.503E-13	3.835E-13	2.673E-13	1.863E-13	1.298E-13	9.050E-14	6.307E-14

Attachment B: ORIGEN2 Inputs and Outputs for Calculating MTR Element Inventories as a Function of Decay (Continued)

```
echo off
echo **                                                                  **
echo **                          O R I G E N 2                           **
echo **                                                                  **
copy mtr3.INP tape5.inp >nul
REM  (NOT USED IN THIS CASE) copy mtr3.u3 tape3.inp >nul
copy \origen2\libs\decay.lib+\origen2\libs\atr.lib tape9.inp >nul
copy \origen2\libs\gxuo2brm.lib tape10.inp >nul
\origen2\code\origen2
echo finished with origen2 calculation
rem  combine and save files from run
copy tape12.out+tape6.out mtr3.u6 >nul
copy tape13.out+tape11.out mtr3.u11 >nul
ren tape7.out mtr3.pch
ren tape15.out mtr3.dbg
ren tape16.out mtr3.vxs
ren tape50.out mtr3.ech
rem  cleanup files
del tape*.inp
del tape*.out
echo ************************************************************************
echo ****************** O R I G E N 2 - Version 2.1 **********************
echo ********************** Execution Completed **************************
echo ************************************************************************
echo on
```

Attachment B: ORIGEN2 Inputs and Outputs for Calculating MTR Element Inventories as a Function of Decay (Continued)

```
-1
-1
-1
  RDA     ORIGEN2, VERSION 2.1 (8-1-91) MTR
  BAS     ONE MTR ELEMENT
  CUT     -1
  LIP     0 0 0
  LIB     0  1 2 3  204  908  909   9   50  0  4  0
  TIT     ONE CYCLE FOR ONE MTR ELEMENT
  PHO     101  102  103  10
  INP     -1   1  -1  -1  1  1
  MOV     -1   1   0   1.0
  HED      1                                                ELEMENT
  BUP
  IRP      50.0   1.626  1   2   3 2
  IRP     100.0   1.626  2   3   3 0
  IRP     200.0   1.626  3   4   3 0
  IRP     300.0   1.626  4   5   3 0
  IRP     400.0   1.626  5   6   3 0
  IRP     417.0   1.626  6   7   3 0
  BUP
  OPTL    8 8 8 8 8   8 5 8 8 8   8 8 8 8 8   8 8 8 8 8   8 8 8 8
  OPTA    8 8 8 8 5   8 5 8 8 8   8 8 8 8 8   8 8 8 8 8   8 8 8 8
  OPTF    8 8 8 8 5   8 5 8 8 8   8 8 8 8 8   8 8 8 8 8   8 8 8 8
  MOV      7    1    0   1.0
  DEC       1.    1   2   5   4
  DEC      16.    2   3   5   0
  DEC      17.    3   4   5   0
  DEC      18.    4   5   5   0
  DEC      19.    5   6   5   0
  DEC      20.    6   7   5   0
  DEC      21.    7   8   5   0
  DEC      22.    8   9   5   0
  OUT      -9    1     -1    0
  OUT       9    1     -1    0
  END
  2   922340  2.317 922350   200. 922360  .4343  922380  11.53 FUEL 93.3%
  0
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Attachment B: ORIGEN2 Inputs and Outputs for Calculating MTR Element Inventories as a Function of Decay (Continued)

mtr3
ORIGEN2 V2.1 (8-1-91), Run on 05/19/97 at 17:06:51

	417.0HR	1.0YR	16.0YR	17.0YR	18.0YR	19.0YR	20.0YR	21.0YR	22.0YR
TL207	5.784E-14	1.471E-10	2.631E-08	2.945E-08	3.267E-08	3.603E-08	3.952E-08	4.314E-08	4.688E-08
TL208	2.111E-09	1.505E-07	4.638E-07	4.621E-07	4.584E-07	4.545E-07	4.506E-07	4.466E-07	4.426E-07
TL209	8.058E-15	1.125E-13	1.657E-12	1.767E-12	1.878E-12	1.989E-12	2.102E-12	2.215E-12	2.330E-12
PB209	3.345E-13	5.210E-12	7.671E-11	8.180E-11	8.692E-11	9.209E-11	9.730E-11	1.026E-10	1.079E-10
PB210	1.182E-14	3.713E-13	9.783E-10	1.164E-09	1.371E-09	1.600E-09	1.853E-09	2.129E-09	2.429E-09
PB211	5.800E-14	1.475E-10	2.639E-08	2.953E-08	3.277E-08	3.613E-08	3.964E-08	4.326E-08	4.701E-08
PB212	5.698E-09	4.188E-07	1.291E-06	1.286E-06	1.276E-06	1.265E-06	1.254E-06	1.243E-06	1.232E-06
PB214	3.381E-14	2.836E-11	6.639E-09	7.491E-09	8.394E-09	9.349E-09	1.035E-08	1.141E-08	1.252E-08
BI210	4.723E-15	3.713E-13	9.783E-10	1.165E-09	1.372E-09	1.601E-09	1.854E-09	2.130E-09	2.430E-09
BI211	5.800E-14	1.475E-10	2.639E-08	2.953E-08	3.277E-08	3.613E-08	3.964E-08	4.326E-08	4.701E-08
BI212	5.876E-09	4.188E-07	1.291E-06	1.286E-06	1.276E-06	1.265E-06	1.254E-06	1.243E-06	1.232E-06
BI213	3.730E-13	5.210E-12	7.671E-11	8.180E-11	8.692E-11	9.209E-11	9.730E-11	1.026E-10	1.079E-10
BI214	3.381E-14	2.836E-11	6.639E-09	7.491E-09	8.394E-09	9.349E-09	1.035E-08	1.141E-08	1.252E-08
PO210	8.648E-17	1.595E-13	9.783E-10	1.066E-09	1.246E-09	1.458E-09	1.695E-09	1.954E-09	2.238E-09
PO211	1.624E-16	4.130E-13	7.388E-11	8.269E-11	9.174E-11	1.012E-10	1.110E-10	1.211E-10	1.316E-10
PO212	3.765E-09	2.683E-07	8.271E-07	8.239E-07	8.174E-07	8.105E-07	8.035E-07	7.964E-07	7.892E-07
PO213	3.650E-13	5.098E-12	7.506E-11	8.003E-11	8.504E-11	9.010E-11	9.520E-11	1.003E-10	1.055E-10
PO214	2.386E-11	2.835E-11	6.637E-09	7.489E-09	8.393E-09	9.347E-09	1.035E-08	1.141E-08	1.252E-08
PO215	5.656E-14	1.475E-10	2.639E-08	2.953E-08	3.277E-08	3.613E-08	3.964E-08	4.326E-08	4.701E-08
PO216	6.236E-09	4.188E-07	1.291E-06	1.286E-06	1.276E-06	1.265E-06	1.254E-06	1.243E-06	1.232E-06
PO218	3.382E-14	2.836E-11	6.640E-09	7.492E-09	8.396E-09	9.351E-09	1.036E-08	1.141E-08	1.252E-08
AT217	3.730E-13	5.210E-12	7.671E-11	8.180E-11	8.692E-11	9.209E-11	9.730E-11	1.026E-10	1.079E-10
RN218	2.383E-11	1.233E-16	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
RN219	5.656E-14	1.475E-10	2.639E-08	2.953E-08	3.277E-08	3.613E-08	3.964E-08	4.326E-08	4.701E-08
RN220	6.236E-09	4.188E-07	1.291E-06	1.286E-06	1.276E-06	1.265E-06	1.254E-06	1.243E-06	1.232E-06
RN222	3.380E-14	2.836E-11	6.640E-09	7.492E-09	8.396E-09	9.351E-09	1.036E-08	1.141E-08	1.252E-08
FR221	3.730E-13	5.210E-12	7.671E-11	8.180E-11	8.692E-11	9.209E-11	9.730E-11	1.026E-10	1.079E-10
FR223	6.043E-15	2.035E-12	3.641E-10	4.067E-10	4.512E-10	4.976E-10	5.458E-10	5.958E-10	6.474E-10
RA222	2.383E-11	1.233E-16	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
RA223	5.655E-14	1.475E-10	2.639E-08	2.953E-08	3.277E-08	3.613E-08	3.964E-08	4.326E-08	4.701E-08
RA224	6.235E-09	4.188E-07	1.291E-06	1.286E-06	1.276E-06	1.265E-06	1.254E-06	1.243E-06	1.232E-06
RA225	1.709E-12	5.210E-12	7.671E-11	8.180E-11	8.692E-11	9.209E-11	9.730E-11	1.026E-10	1.079E-10
RA226	5.993E-14	2.836E-11	6.640E-09	7.492E-09	8.396E-09	9.351E-09	1.036E-08	1.141E-08	1.252E-08
RA228	9.619E-19	1.157E-15	1.806E-13	1.986E-13	2.170E-13	2.358E-13	2.549E-13	2.743E-13	2.939E-13
AC225	3.729E-13	5.210E-12	7.671E-11	8.180E-11	8.692E-11	9.209E-11	9.730E-11	1.026E-10	1.079E-10

Attachment B: ORIGEN2 Inputs and Outputs for Calculating MTR Element Inventories as a Function of Decay (Continued)

mtr3
ORIGEN2 V2.1 (8-1-91), Run on 05/19/97 at 17:06:51

	417.0HR	1.0YR	16.0YR	17.0YR	18.0YR	19.0YR	20.0YR	21.0YR	22.0YR
AC227	4.378E-13	1.475E-10	2.639E-08	2.947E-08	3.270E-08	3.606E-08	3.955E-08	4.317E-08	4.692E-08
AC228	5.139E-11	1.157E-15	1.806E-13	1.986E-13	2.171E-13	2.358E-13	2.549E-13	2.743E-13	2.940E-13
TH226	2.383E-11	1.233E-16	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TH227	2.428E-13	1.455E-10	2.602E-08	2.913E-08	3.231E-08	3.564E-08	3.909E-08	4.267E-08	4.637E-08
TH228	1.088E-08	4.187E-07	1.291E-06	1.281E-06	1.271E-06	1.260E-06	1.249E-06	1.238E-06	1.227E-06
TH229	7.593E-13	5.210E-12	7.671E-11	8.180E-11	8.692E-11	9.209E-11	9.730E-11	1.026E-10	1.079E-10
TH230	5.688E-09	1.250E-07	1.915E-06	2.034E-06	2.153E-06	2.272E-06	2.392E-06	2.511E-06	2.630E-06
TH231	1.472E-03	3.550E-04	3.550E-04	3.550E-04	3.550E-04	3.550E-04	3.550E-04	3.550E-04	3.550E-04
TH232	5.589E-16	2.258E-14	3.529E-13	3.749E-13	3.969E-13	4.189E-13	4.409E-13	4.630E-13	4.850E-13
TH234	1.505E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06
PA231	7.872E-10	8.429E-09	1.211E-07	1.286E-07	1.362E-07	1.437E-07	1.513E-07	1.588E-07	1.663E-07
PA233	5.346E-06	9.607E-05	9.609E-05	9.610E-05	9.611E-05	9.611E-05	9.611E-05	9.611E-05	9.612E-05
PA234M	2.089E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06
PA234	5.270E-07	4.917E-09	4.917E-09	4.917E-09	4.917E-09	4.917E-09	4.917E-09	4.917E-09	4.917E-09
U230	2.381E-11	1.232E-16	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U232	1.336E-06	1.359E-06	1.265E-06	1.254E-06	1.242E-06	1.231E-06	1.219E-06	1.208E-06	1.196E-06
U233	4.692E-08	4.734E-08	5.364E-08	5.410E-08	5.457E-08	5.503E-08	5.550E-08	5.596E-08	5.643E-08
U234	1.325E-02	1.325E-02	1.326E-02	1.326E-02	1.326E-02	1.326E-02	1.326E-02	1.326E-02	1.326E-02
U235	3.550E-04	3.550E-04	3.550E-04	3.550E-04	3.550E-04	3.550E-04	3.550E-04	3.550E-04	3.550E-04
U236	4.463E-04	4.463E-04	4.463E-04	4.463E-04	4.463E-04	4.463E-04	4.463E-04	4.463E-04	4.463E-04
U237	6.653E+03	9.971E-06	4.843E-06	4.616E-06	4.399E-06	4.192E-06	3.995E-06	3.807E-06	3.628E-06
U238	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06
U240	2.718E-01	5.600E-14	5.600E-14	5.600E-14	5.600E-14	5.600E-14	5.600E-14	5.600E-14	5.600E-14
NP235	3.633E-07	1.917E-07	1.314E-11	6.933E-12	3.659E-12	1.931E-12	1.019E-12	5.377E-13	2.837E-13
NP236	1.535E-10	1.535E-10	1.535E-10	1.535E-10	1.535E-10	1.535E-10	1.535E-10	1.535E-10	1.535E-10
NP237	3.861E-05	9.607E-05	9.609E-05	9.610E-05	9.610E-05	9.610E-05	9.610E-05	9.611E-05	9.611E-05
NP238	2.028E+02	5.535E-10	5.169E-10	5.145E-10	5.122E-10	5.099E-10	5.076E-10	5.052E-10	5.029E-10
NP239	1.338E+04	7.385E-07	7.375E-07	7.374E-07	7.374E-07	7.373E-07	7.372E-07	7.372E-07	7.371E-07
NP240M	2.975E+01	5.600E-14	5.600E-14	5.600E-14	5.600E-14	5.600E-14	5.600E-14	5.600E-14	5.600E-14
PU236	2.492E-06	2.568E-06	6.697E-08	5.252E-08	4.119E-08	3.230E-08	2.533E-08	1.987E-08	1.558E-08
PU237	1.675E-05	6.501E-08	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
PU238	1.823E-02	3.138E-02	2.787E-02	2.765E-02	2.744E-02	2.722E-02	2.700E-02	2.679E-02	2.658E-02
PU239	1.107E-02	1.468E-02	1.468E-02	1.468E-02	1.468E-02	1.468E-02	1.468E-02	1.467E-02	1.467E-02
PU240	3.315E-03	3.317E-03	3.311E-03	3.311E-03	3.311E-03	3.310E-03	3.310E-03	3.310E-03	3.309E-03
PU241	4.265E-01	4.064E-01	1.974E-01	1.881E-01	1.793E-01	1.709E-01	1.628E-01	1.552E-01	1.479E-01

Attachment B: ORIGEN2 Inputs and Outputs for Calculating MTR Element Inventories as a Function of Decay (Continued)

mtr3
ORIGEN2 V2.1 (8-1-91), Run on 05/19/97 at 17:06:51

	417.0HR	1.0YR	16.0YR	17.0YR	18.0YR	19.0YR	20.0YR	21.0YR	22.0YR
PU242	5.311E-07	5.311E-07	5.311E-07	5.311E-07	5.311E-07	5.311E-07	5.311E-07	5.311E-07	5.311E-07
PU243	8.326E-01	1.414E-18	1.414E-18	1.414E-18	1.414E-18	1.414E-18	1.414E-18	1.414E-18	1.414E-18
PU244	5.607E-14	5.608E-14	5.608E-14	5.608E-14	5.608E-14	5.608E-14	5.608E-14	5.608E-14	5.608E-14
PU246	4.516E-10	3.319E-20	3.058E-28	3.058E-28	3.058E-28	3.058E-28	3.058E-28	3.058E-28	3.058E-28
AM241	7.331E-06	6.745E-04	7.528E-03	7.825E-03	8.107E-03	8.375E-03	8.628E-03	8.869E-03	9.098E-03
AM242M	1.112E-07	1.107E-07	1.034E-07	1.029E-07	1.024E-07	1.020E-07	1.015E-07	1.010E-07	1.006E-07
AM242	2.574E-02	1.101E-07	1.029E-07	1.024E-07	1.019E-07	1.015E-07	1.010E-07	1.005E-07	1.001E-07
AM243	6.748E-07	7.385E-07	7.375E-07	7.374E-07	7.374E-07	7.373E-07	7.372E-07	7.371E-07	7.371E-07
AM245	1.221E-06	2.495E-21	1.752E-26	1.751E-26	1.751E-26	1.751E-26	1.751E-26	1.751E-26	1.751E-26
AM246	4.521E-10	3.324E-20	3.058E-28	3.058E-28	3.058E-28	3.058E-28	3.058E-28	3.058E-28	3.058E-28
CM241	4.148E-11	3.661E-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CM242	2.806E-04	7.808E-05	8.507E-08	8.477E-08	8.441E-08	8.403E-08	8.364E-08	8.326E-08	8.289E-08
CM243	1.372E-08	1.339E-08	9.295E-09	9.072E-09	8.854E-09	8.641E-09	8.433E-09	8.231E-09	8.033E-09
CM244	9.409E-06	9.228E-06	5.197E-06	5.002E-06	4.814E-06	4.634E-06	4.460E-06	4.292E-06	4.131E-06
CM245	1.767E-10	1.769E-10	1.767E-10	1.767E-10	1.767E-10	1.767E-10	1.766E-10	1.766E-10	1.766E-10
CM246	3.960E-12	3.962E-12	3.953E-12	3.953E-12	3.952E-12	3.952E-12	3.951E-12	3.951E-12	3.950E-12
CM247	1.414E-18	1.414E-18	1.414E-18	1.414E-18	1.414E-18	1.414E-18	1.414E-18	1.414E-18	1.414E-18
CM248	4.315E-19	4.315E-19	4.315E-19	4.315E-19	4.315E-19	4.315E-19	4.315E-19	4.315E-19	4.315E-19
CM250	1.223E-27	1.223E-27	1.223E-27	1.223E-27	1.223E-27	1.223E-27	1.223E-27	1.223E-27	1.223E-27
BK249	3.616E-16	1.720E-16	1.208E-21	1.208E-21	1.208E-21	1.208E-21	1.208E-21	1.208E-21	1.208E-21
BK250	7.667E-15	1.712E-28	1.712E-28	1.712E-28	1.712E-28	1.712E-28	1.712E-28	1.712E-28	1.712E-28
CF249	2.334E-21	5.202E-19	9.235E-19	9.217E-19	9.199E-19	9.181E-19	9.163E-19	9.145E-19	9.127E-19
CF250	1.359E-18	1.491E-18	6.728E-19	6.372E-19	6.034E-19	5.714E-19	5.412E-19	5.125E-19	4.853E-19
CF251	2.130E-21	2.134E-21	2.134E-21	2.134E-21	2.134E-21	2.134E-21	2.134E-21	2.134E-21	2.134E-21
CF252	1.597E-20	1.597E-20	7.497E-21	7.497E-21	7.497E-21	7.497E-21	7.497E-21	7.497E-21	7.497E-21
H 3	3.995E-01	3.777E-01	1.627E-01	1.539E-01	1.455E-01	1.375E-01	1.300E-01	1.229E-01	1.162E-01
BE 10	2.523E-09	2.523E-09	2.523E-09	2.523E-09	2.523E-09	2.523E-09	2.523E-09	2.523E-09	2.523E-09
C 14	1.018E-07	1.017E-07	1.016E-07	1.015E-07	1.015E-07	1.015E-07	1.015E-07	1.015E-07	1.015E-07
SE 79	3.658E-04	3.661E-04	3.660E-04	3.660E-04	3.660E-04	3.660E-04	3.660E-04	3.660E-04	3.660E-04
KR 81	1.174E-11	1.174E-11	1.174E-11	1.174E-11	1.174E-11	1.174E-11	1.174E-11	1.174E-11	1.174E-11
KR 85	1.114E+01	1.060E+01	4.020E+00	3.768E+00	3.532E+00	3.311E+00	3.103E+00	2.909E+00	2.727E+00
RB 86	3.696E+00	4.727E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
RB 87	2.447E-08	2.458E-08	2.458E-08	2.458E-08	2.458E-08	2.458E-08	2.458E-08	2.458E-08	2.458E-08
SR 89	1.380E+04	9.183E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SR 90	8.809E+01	8.603E+01	6.020E+01	5.879E+01	5.740E+01	5.605E+01	5.474E+01	5.345E+01	5.219E+01

Attachment B: ORIGEN2 Inputs and Outputs for Calculating MTR Element Inventories as a Function of Decay (Continued)

mtr3
ORIGEN2 V2.1 (8-1-91), Run on 05/19/97 at 17:06:51

	417.0HR	1.0YR	16.0YR	17.0YR	18.0YR	19.0YR	20.0YR	21.0YR	22.0YR
Y 90	7.441E+01	8.606E+01	6.022E+01	5.880E+01	5.742E+01	5.607E+01	5.475E+01	5.346E+01	5.220E+01
Y 91	1.435E+04	1.970E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NB 92	9.289E-11	1.400E-21	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ZR 93	1.825E-03	1.891E-03	1.891E-03	1.891E-03	1.891E-03	1.891E-03	1.891E-03	1.891E-03	1.891E-03
NB 93M	2.351E-06	9.149E-05	1.003E-03	1.042E-03	1.080E-03	1.115E-03	1.149E-03	1.181E-03	1.212E-03
NB 94	1.952E-08	1.952E-08	1.951E-08	1.951E-08	1.951E-08	1.951E-08	1.951E-08	1.951E-08	1.951E-08
ZR 95	1.495E+04	2.860E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NB 95	2.355E+03	6.342E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NB 95M	7.755E+01	2.122E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TC 98	3.903E-10	3.903E-10	3.903E-10	3.903E-10	3.903E-10	3.903E-10	3.903E-10	3.903E-10	3.903E-10
TC 99	9.667E-03	1.273E-02	1.273E-02	1.273E-02	1.273E-02	1.273E-02	1.273E-02	1.273E-02	1.273E-02
RH102	1.595E-05	1.256E-05	3.484E-07	2.743E-07	2.160E-07	1.701E-07	1.339E-07	1.054E-07	8.302E-08
RU103	1.129E+04	1.797E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
RH103M	1.017E+04	1.620E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
RU106	1.846E+02	9.283E+01	3.077E-03	1.547E-03	7.777E-04	3.910E-04	1.966E-04	9.883E-05	4.969E-05
RH106	3.065E+03	9.283E+01	3.077E-03	1.547E-03	7.777E-04	3.910E-04	1.966E-04	9.883E-05	4.969E-05
AG106	3.450E-12	4.003E-25	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
PD107	1.348E-05	1.350E-05	1.350E-05	1.350E-05	1.350E-05	1.350E-05	1.350E-05	1.350E-05	1.350E-05
AG108	9.308E-04	8.796E-12	8.104E-12	8.060E-12	8.016E-12	7.973E-12	7.929E-12	7.886E-12	7.843E-12
AG108M	9.937E-11	9.883E-11	9.106E-11	9.056E-11	9.007E-11	8.958E-11	8.909E-11	8.861E-11	8.812E-11
AG109M	6.810E+02	1.768E-09	4.933E-13	2.859E-13	1.657E-13	9.599E-14	5.563E-14	3.223E-14	1.868E-14
CD109	3.052E-09	1.768E-09	4.933E-13	2.859E-13	1.657E-13	9.599E-14	5.563E-14	3.223E-14	1.868E-14
AG110	1.004E+02	5.485E-04	1.377E-10	5.001E-11	1.816E-11	6.592E-12	2.393E-12	8.689E-13	3.155E-13
AG110M	1.136E-01	4.124E-02	1.036E-08	3.760E-09	1.365E-09	4.956E-10	1.799E-10	6.533E-11	2.372E-11
AG111	2.899E+02	5.077E-13	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CD113M	1.129E-02	1.088E-02	5.335E-03	5.087E-03	4.851E-03	4.626E-03	4.411E-03	4.207E-03	4.011E-03
IN114	9.984E-05	2.931E-08	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
IN114M	5.090E-06	3.063E-08	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CD115M	4.596E+00	1.574E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
IN115	9.095E-15	1.275E-14	1.275E-14	1.275E-14	1.275E-14	1.275E-14	1.275E-14	1.275E-14	1.275E-14
IN115M	1.991E+02	1.106E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SN117M	3.262E-03	4.596E-11	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SN119M	1.650E-01	5.873E-02	1.091E-08	3.882E-09	1.381E-09	4.915E-10	1.749E-10	6.224E-11	2.215E-11
SN121M	7.926E-05	7.817E-05	6.348E-05	6.261E-05	6.175E-05	6.090E-05	6.006E-05	5.923E-05	5.841E-05
SN123	6.894E+00	9.711E-01	1.655E-13	2.331E-14	3.283E-15	4.624E-16	6.514E-17	9.240E-18	1.261E-18

Attachment B: ORIGEN2 Inputs and Outputs for Calculating MTR Element Inventories as a Function of Decay (Continued)

mtr3
ORIGEN2 V2.1 (8-1-91), Run on 05/19/97 at 17:06:51

	417.0HR	1.0YR	16.0YR	17.0YR	18.0YR	19.0YR	20.0YR	21.0YR	22.0YR
TE123	7.151E-18	9.638E-18	9.978E-18	9.978E-18	9.978E-18	9.978E-18	9.978E-18	9.978E-18	9.978E-18
TE123M	8.629E-05	1.040E-05	1.722E-19	6.523E-20	7.320E-20	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SB124	4.570E-01	6.814E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SN125	1.508E+02	5.924E-10	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SB125	4.987E+00	5.014E+00	1.175E-01	9.147E-02	7.122E-02	5.545E-02	4.318E-02	3.362E-02	2.617E-02
TE125M	1.057E-01	1.205E+00	2.866E-02	2.232E-02	1.738E-02	1.353E-02	1.053E-02	8.202E-03	6.386E-03
SN126	3.253E-04	3.253E-04	3.252E-04	3.252E-04	3.252E-04	3.252E-04	3.252E-04	3.252E-04	3.252E-04
SB126	8.989E+00	4.555E-05	4.553E-05	4.553E-05	4.553E-05	4.553E-05	4.553E-05	4.553E-05	4.553E-05
SB126M	6.993E+00	3.253E-04	3.252E-04	3.252E-04	3.252E-04	3.252E-04	3.252E-04	3.252E-04	3.252E-04
TE127	1.820E+03	3.160E+00	2.341E-15	2.295E-16	2.255E-17	2.210E-18	2.144E-19	8.856E-20	8.706E-21
TE127M	2.223E+01	3.226E+00	2.390E-15	2.343E-16	2.302E-17	2.233E-18	1.817E-19	9.068E-20	0.000E+00
XE127	9.634E-06	9.208E-09	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TE129	8.774E+03	1.458E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TE129M	4.128E+02	2.240E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I129	1.764E-05	2.042E-05	2.043E-05	2.043E-05	2.043E-05	2.043E-05	2.043E-05	2.043E-05	2.043E-05
XE129M	6.019E-03	1.085E-16	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I131	3.014E+04	6.598E-10	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE131M	1.477E+02	4.984E-07	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CS132	5.146E-02	5.363E-19	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE133	7.820E+04	1.080E-16	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CS134	1.281E+01	9.180E+00	5.928E-02	4.236E-02	3.026E-02	2.162E-02	1.545E-02	1.104E-02	7.888E-03
CS135	4.949E-05	7.902E-05	7.902E-05	7.902E-05	7.902E-05	7.902E-05	7.902E-05	7.902E-05	7.902E-05
CS136	6.882E+01	2.791E-07	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
BA136M	1.134E+01	4.599E-08	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CS137	9.143E+01	8.936E+01	6.319E+01	6.174E+01	6.033E+01	5.895E+01	5.761E+01	5.629E+01	5.501E+01
BA137M	9.002E+01	8.453E+01	5.977E+01	5.841E+01	5.707E+01	5.577E+01	5.450E+01	5.325E+01	5.204E+01
LA138	1.836E-13	1.836E-13	1.836E-13	1.836E-13	1.836E-13	1.836E-13	1.836E-13	1.836E-13	1.836E-13
BA140	5.146E+04	1.301E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
LA140	4.689E+04	1.498E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CE141	2.439E+04	1.030E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CE142	2.510E-08	2.525E-08	2.525E-08	2.525E-08	2.525E-08	2.525E-08	2.525E-08	2.525E-08	2.525E-08
PR143	4.283E+04	4.069E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CE144	3.057E+03	1.255E+03	1.979E-03	8.123E-04	3.334E-04	1.368E-04	5.614E-05	2.304E-05	9.456E-06
PR144	5.354E+03	1.255E+03	1.979E-03	8.123E-04	3.334E-04	1.368E-04	5.615E-05	2.304E-05	9.456E-06
PR144M	3.715E+01	1.505E+01	2.375E-05	9.747E-06	4.000E-06	1.642E-06	6.737E-07	2.765E-07	1.135E-07
ND144	5.267E-14	7.211E-13	1.186E-12	1.186E-12	1.186E-12	1.186E-12	1.186E-12	1.186E-12	1.186E-12

Attachment B: ORIGEN2 Inputs and Outputs for Calculating MTR Element Inventories as a Function of Decay (Continued)

mtr3
ORIGEN2 V2.1 (8-1-91), Run on 05/19/97 at 17:06:51

	417.0HR	1.0YR	16.0YR	17.0YR	18.0YR	19.0YR	20.0YR	21.0YR	22.0YR
PM146	2.290E-04	2.019E-04	3.048E-05	2.687E-05	2.369E-05	2.089E-05	1.841E-05	1.623E-05	1.431E-05
SM146	1.511E-13	9.393E-13	5.921E-12	6.026E-12	6.119E-12	6.200E-12	6.272E-12	6.336E-12	6.392E-12
ND147	1.990E+04	2.282E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
PM147	1.341E+02	2.816E+02	5.352E+00	4.109E+00	3.155E+00	2.422E+00	1.860E+00	1.428E+00	1.097E+00
SM147	1.511E-11	2.103E-09	8.876E-09	8.907E-09	8.930E-09	8.948E-09	8.962E-09	8.972E-09	8.980E-09
PM148	5.566E+02	3.689E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
PM148M	3.009E+01	6.551E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SM148	7.786E-16	2.226E-15	2.227E-15	2.227E-15	2.227E-15	2.227E-15	2.227E-15	2.227E-15	2.227E-15
SM149	2.068E-15	1.130E-14	1.130E-14	1.130E-14	1.130E-14	1.130E-14	1.130E-14	1.130E-14	1.130E-14
EU150	8.210E-10	8.054E-10	6.034E-10	5.918E-10	5.806E-10	5.695E-10	5.586E-10	5.480E-10	5.375E-10
SM151	6.898E-01	8.822E-01	7.860E-01	7.800E-01	7.740E-01	7.680E-01	7.621E-01	7.563E-01	7.505E-01
EU152	9.365E-04	8.900E-04	4.143E-04	3.938E-04	3.742E-04	3.556E-04	3.379E-04	3.211E-04	3.052E-04
GD152	3.527E-17	3.938E-17	5.607E-17	5.679E-17	5.748E-17	5.813E-17	5.875E-17	5.934E-17	5.990E-17
GD153	1.293E-03	4.542E-04	6.958E-11	2.444E-11	8.587E-12	3.017E-12	1.060E-12	3.723E-13	1.308E-13
EU154	8.288E-01	7.646E-01	2.282E-01	2.106E-01	1.943E-01	1.792E-01	1.653E-01	1.525E-01	1.407E-01
EU155	2.027E+00	1.766E+00	2.171E-01	1.888E-01	1.641E-01	1.427E-01	1.241E-01	1.079E-01	9.384E-02
EU156	2.253E+02	1.326E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TB160	6.547E-02	1.974E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TB161	1.750E+00	2.263E-16	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
HO166M	6.037E-09	6.034E-09	5.982E-09	5.978E-09	5.975E-09	5.972E-09	5.968E-09	5.965E-09	5.961E-09
ER169	7.095E-06	1.426E-17	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TM170	6.444E-09	8.996E-10	1.343E-22	1.343E-22	1.343E-22	1.343E-22	1.343E-22	1.343E-22	1.343E-22
TM171	1.418E-11	9.883E-12	4.395E-14	3.063E-14	2.135E-14	1.488E-14	1.037E-14	7.227E-15	5.037E-15

Attachment B: ORIGEN2 Inputs and Outputs for Calculating MTR Element Inventories as a Function of Decay (Continued)

```
echo off
echo **                                                                  **
echo **                          O R I G E N 2                           **
echo **                                                                  **
copy mtr4.INP tape5.inp >nul
REM  (NOT USED IN THIS CASE) copy mtr4.u3 tape3.inp >nul
copy \origen2\libs\decay.lib+\origen2\libs\atr.lib tape9.inp >nul
copy \origen2\libs\gxuo2brm.lib tape10.inp >nul
\origen2\code\origen2
echo finished with origen2 calculation
rem  combine and save files from run
copy tape12.out+tape6.out mtr4.u6 >nul
copy tape13.out+tape11.out mtr4.u11 >nul
ren tape7.out mtr4.pch
ren tape15.out mtr4.dbg
ren tape16.out mtr4.vxs
ren tape50.out mtr4.ech
rem  cleanup files
del tape*.inp
del tape*.out
echo ************************************************************************
echo ******************* O R I G E N 2 - Version 2.1 ************************
echo ************************ Execution Completed ***************************
echo ************************************************************************
echo on
```

Attachment B: ORIGEN2 Inputs and Outputs for Calculating MTR Element Inventories as a Function of Decay (Continued)

```
-1
-1
-1
  RDA     ORIGEN2, VERSION 2.1 (8-1-91) MTR
  BAS     ONE MTR ELEMENT
  CUT     -1
  LIP     0 0 0
  LIB     0  1 2 3  204  908  909   9   50  0  4  0
  TIT     ONE CYCLE FOR ONE MTR ELEMENT
  PHO     101  102  103  10
  INP     -1   1  -1  -1  1  1
  MOV     -1   1   0   1.0
  HED      1                                                ELEMENT
  BUP
  IRP      50.0   1.626  1   2   3 2
  IRP     100.0   1.626  2   3   3 0
  IRP     200.0   1.626  3   4   3 0
  IRP     300.0   1.626  4   5   3 0
  IRP     400.0   1.626  5   6   3 0
  IRP     417.0   1.626  6   7   3 0
  BUP
  OPTL    8 8 8 8 8   8 5 8 8 8   8 8 8 8 8   8 8 8 8 8   8 8 8 8
  OPTA    8 8 8 8 5   8 5 8 8 8   8 8 8 8 8   8 8 8 8 8   8 8 8 8
  OPTF    8 8 8 8 5   8 5 8 8 8   8 8 8 8 8   8 8 8 8 8   8 8 8 8
  MOV      7    1    0   1.0
  DEC       1.    1   2   5   4
  DEC      23.    2   3   5   0
  DEC      24.    3   4   5   0
  DEC      25.    4   5   5   0
  DEC      26.    5   6   5   0
  DEC      27.    6   7   5   0
  DEC      28.    7   8   5   0
  DEC      29.    8   9   5   0
  OUT      -9    1     -1    0
  OUT       9    1     -1    0
  END
  2   922340  2.317 922350   200. 922360  .4343  922380  11.53 FUEL 93.3%
  0
```

Attachment B: ORIGEN2 Inputs and Outputs for Calculating MTR Element Inventories as a Function of Decay (Continued)

mtr4
ORIGEN2 V2.1 (8-1-91), Run on 05/19/97 at 17:07:27

	417.0HR	1.0YR	23.0YR	24.0YR	25.0YR	26.0YR	27.0YR	28.0YR	29.0YR
TL207	5.784E-14	1.471E-10	5.061E-08	5.468E-08	5.876E-08	6.295E-08	6.724E-08	7.164E-08	7.613E-08
TL208	2.111E-09	1.505E-07	4.366E-07	4.342E-07	4.302E-07	4.262E-07	4.223E-07	4.183E-07	4.143E-07
TL209	8.058E-15	1.125E-13	2.443E-12	2.559E-12	2.675E-12	2.793E-12	2.911E-12	3.031E-12	3.151E-12
PB209	3.345E-13	5.210E-12	1.131E-10	1.185E-10	1.239E-10	1.293E-10	1.348E-10	1.403E-10	1.459E-10
PB210	1.182E-14	3.713E-13	2.756E-09	3.108E-09	3.488E-09	3.895E-09	4.331E-09	4.795E-09	5.290E-09
PB211	5.800E-14	1.475E-10	5.075E-08	5.484E-08	5.893E-08	6.313E-08	6.743E-08	7.184E-08	7.634E-08
PB212	5.698E-09	4.188E-07	1.215E-06	1.209E-06	1.197E-06	1.186E-06	1.175E-06	1.164E-06	1.153E-06
PB214	3.381E-14	2.836E-11	1.368E-08	1.489E-08	1.615E-08	1.747E-08	1.883E-08	2.024E-08	2.171E-08
BI210	4.723E-15	3.713E-13	2.756E-09	3.110E-09	3.490E-09	3.897E-09	4.333E-09	4.798E-09	5.293E-09
BI211	5.800E-14	1.475E-10	5.075E-08	5.484E-08	5.893E-08	6.313E-08	6.743E-08	7.184E-08	7.634E-08
BI212	5.876E-09	4.188E-07	1.215E-06	1.209E-06	1.197E-06	1.186E-06	1.175E-06	1.164E-06	1.153E-06
BI213	3.730E-13	5.210E-12	1.131E-10	1.185E-10	1.239E-10	1.293E-10	1.348E-10	1.403E-10	1.459E-10
BI214	3.381E-14	2.836E-11	1.368E-08	1.489E-08	1.615E-08	1.747E-08	1.883E-08	2.024E-08	2.171E-08
PO210	8.648E-17	1.595E-13	2.756E-09	2.915E-09	3.247E-09	3.630E-09	4.044E-09	4.487E-09	4.960E-09
PO211	1.624E-16	4.130E-13	1.421E-10	1.535E-10	1.650E-10	1.768E-10	1.888E-10	2.011E-10	2.138E-10
PO212	3.765E-09	2.683E-07	7.785E-07	7.743E-07	7.672E-07	7.601E-07	7.530E-07	7.459E-07	7.388E-07
PO213	3.650E-13	5.098E-12	1.107E-10	1.159E-10	1.212E-10	1.265E-10	1.319E-10	1.373E-10	1.427E-10
PO214	2.386E-11	2.835E-11	1.368E-08	1.489E-08	1.615E-08	1.746E-08	1.883E-08	2.024E-08	2.171E-08
PO215	5.656E-14	1.475E-10	5.075E-08	5.484E-08	5.893E-08	6.313E-08	6.743E-08	7.184E-08	7.634E-08
PO216	6.236E-09	4.188E-07	1.215E-06	1.209E-06	1.197E-06	1.186E-06	1.175E-06	1.164E-06	1.153E-06
PO218	3.382E-14	2.836E-11	1.368E-08	1.489E-08	1.616E-08	1.747E-08	1.883E-08	2.025E-08	2.171E-08
AT217	3.730E-13	5.210E-12	1.131E-10	1.185E-10	1.239E-10	1.293E-10	1.348E-10	1.403E-10	1.459E-10
RN218	2.383E-11	1.233E-16	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
RN219	5.656E-14	1.475E-10	5.075E-08	5.484E-08	5.893E-08	6.313E-08	6.743E-08	7.184E-08	7.634E-08
RN220	6.236E-09	4.188E-07	1.215E-06	1.209E-06	1.197E-06	1.186E-06	1.175E-06	1.164E-06	1.153E-06
RN222	3.380E-14	2.836E-11	1.368E-08	1.489E-08	1.616E-08	1.747E-08	1.883E-08	2.025E-08	2.171E-08
FR221	3.730E-13	5.210E-12	1.131E-10	1.185E-10	1.239E-10	1.293E-10	1.348E-10	1.403E-10	1.459E-10
FR223	6.043E-15	2.035E-12	7.004E-10	7.552E-10	8.115E-10	8.693E-10	9.286E-10	9.893E-10	1.051E-09
RA222	2.383E-11	1.233E-16	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
RA223	5.655E-14	1.475E-10	5.075E-08	5.484E-08	5.893E-08	6.313E-08	6.743E-08	7.184E-08	7.634E-08
RA224	6.235E-09	4.188E-07	1.215E-06	1.209E-06	1.197E-06	1.186E-06	1.175E-06	1.164E-06	1.153E-06
RA225	1.709E-12	5.210E-12	1.131E-10	1.185E-10	1.239E-10	1.293E-10	1.348E-10	1.403E-10	1.459E-10
RA226	5.993E-14	2.836E-11	1.368E-08	1.489E-08	1.616E-08	1.747E-08	1.883E-08	2.025E-08	2.171E-08
RA228	9.619E-19	1.157E-15	3.138E-13	3.339E-13	3.542E-13	3.746E-13	3.952E-13	4.160E-13	4.368E-13
AC225	3.729E-13	5.210E-12	1.131E-10	1.185E-10	1.239E-10	1.293E-10	1.348E-10	1.403E-10	1.459E-10

Attachment B: ORIGEN2 Inputs and Outputs for Calculating MTR Element Inventories as a Function of Decay (Continued)

mtr4
ORIGEN2 V2.1 (8-1-91), Run on 05/19/97 at 17:07:27

	417.0HR	1.0YR	23.0YR	24.0YR	25.0YR	26.0YR	27.0YR	28.0YR	29.0YR
AC227	4.378E-13	1.475E-10	5.075E-08	5.472E-08	5.880E-08	6.299E-08	6.729E-08	7.169E-08	7.618E-08
AC228	5.139E-11	1.157E-15	3.138E-13	3.339E-13	3.542E-13	3.747E-13	3.953E-13	4.160E-13	4.369E-13
TH226	2.383E-11	1.233E-16	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TH227	2.428E-13	1.455E-10	5.005E-08	5.408E-08	5.812E-08	6.226E-08	6.650E-08	7.085E-08	7.529E-08
TH228	1.088E-08	4.187E-07	1.215E-06	1.204E-06	1.193E-06	1.182E-06	1.171E-06	1.160E-06	1.149E-06
TH229	7.593E-13	5.210E-12	1.131E-10	1.185E-10	1.239E-10	1.293E-10	1.348E-10	1.403E-10	1.459E-10
TH230	5.688E-09	1.250E-07	2.750E-06	2.869E-06	2.988E-06	3.108E-06	3.227E-06	3.346E-06	3.465E-06
TH231	1.472E-03	3.550E-04	3.550E-04	3.550E-04	3.550E-04	3.550E-04	3.550E-04	3.550E-04	3.550E-04
TH232	5.589E-16	2.258E-14	5.070E-13	5.290E-13	5.510E-13	5.731E-13	5.951E-13	6.171E-13	6.391E-13
TH234	1.505E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06
PA231	7.872E-10	8.429E-09	1.737E-07	1.812E-07	1.887E-07	1.963E-07	2.038E-07	2.114E-07	2.189E-07
PA233	5.346E-06	9.607E-05	9.611E-05	9.612E-05	9.613E-05	9.613E-05	9.613E-05	9.614E-05	9.614E-05
PA234M	2.089E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06
PA234	5.270E-07	4.917E-09	4.917E-09	4.917E-09	4.917E-09	4.917E-09	4.917E-09	4.917E-09	4.917E-09
U230	2.381E-11	1.232E-16	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U232	1.336E-06	1.359E-06	1.185E-06	1.174E-06	1.162E-06	1.151E-06	1.140E-06	1.130E-06	1.119E-06
U233	4.692E-08	4.734E-08	5.658E-08	5.704E-08	5.751E-08	5.797E-08	5.844E-08	5.890E-08	5.937E-08
U234	1.325E-02	1.325E-02	1.326E-02	1.326E-02	1.326E-02	1.326E-02	1.326E-02	1.326E-02	1.326E-02
U235	3.550E-04	3.550E-04	3.550E-04	3.550E-04	3.550E-04	3.550E-04	3.550E-04	3.550E-04	3.550E-04
U236	4.463E-04	4.463E-04	4.463E-04	4.463E-04	4.463E-04	4.463E-04	4.463E-04	4.463E-04	4.463E-04
U237	6.653E+03	9.971E-06	3.458E-06	3.295E-06	3.140E-06	2.993E-06	2.852E-06	2.718E-06	2.590E-06
U238	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06	3.782E-06
U240	2.718E-01	5.600E-14	5.600E-14	5.600E-14	5.600E-14	5.600E-14	5.600E-14	5.600E-14	5.600E-14
NP235	3.633E-07	1.917E-07	1.497E-13	7.901E-14	4.169E-14	2.200E-14	1.161E-14	6.127E-15	3.233E-15
NP236	1.535E-10	1.535E-10	1.535E-10	1.535E-10	1.535E-10	1.535E-10	1.535E-10	1.535E-10	1.535E-10
NP237	3.861E-05	9.607E-05	9.611E-05	9.611E-05	9.612E-05	9.612E-05	9.612E-05	9.613E-05	9.613E-05
NP238	2.028E+02	5.535E-10	5.007E-10	4.984E-10	4.961E-10	4.939E-10	4.916E-10	4.894E-10	4.871E-10
NP239	1.338E+04	7.385E-07	7.370E-07	7.369E-07	7.369E-07	7.368E-07	7.367E-07	7.367E-07	7.366E-07
NP240M	2.975E+01	5.600E-14	5.600E-14	5.600E-14	5.600E-14	5.600E-14	5.600E-14	5.600E-14	5.600E-14
PU236	2.492E-06	2.568E-06	1.222E-08	9.589E-09	7.522E-09	5.902E-09	4.631E-09	3.634E-09	2.853E-09
PU237	1.675E-05	6.501E-08	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
PU238	1.823E-02	3.138E-02	2.637E-02	2.617E-02	2.596E-02	2.575E-02	2.555E-02	2.535E-02	2.515E-02
PU239	1.107E-02	1.468E-02	1.467E-02	1.467E-02	1.467E-02	1.467E-02	1.467E-02	1.467E-02	1.467E-02
PU240	3.315E-03	3.317E-03	3.309E-03	3.308E-03	3.308E-03	3.308E-03	3.307E-03	3.307E-03	3.307E-03
PU241	4.265E-01	4.064E-01	1.409E-01	1.343E-01	1.280E-01	1.220E-01	1.163E-01	1.108E-01	1.056E-01

Attachment B: ORIGEN2 Inputs and Outputs for Calculating MTR Element Inventories as a Function of Decay (Continued)

mtr4
ORIGEN2 V2.1 (8-1-91), Run on 05/19/97 at 17:07:27

	417.0HR	1.0YR	23.0YR	24.0YR	25.0YR	26.0YR	27.0YR	28.0YR	29.0YR
PU242	5.311E-07	5.311E-07	5.311E-07	5.311E-07	5.311E-07	5.311E-07	5.311E-07	5.311E-07	5.310E-07
PU243	8.326E-01	1.414E-18	1.414E-18	1.414E-18	1.414E-18	1.414E-18	1.414E-18	1.414E-18	1.414E-18
PU244	5.607E-14	5.608E-14	5.608E-14	5.608E-14	5.608E-14	5.608E-14	5.608E-14	5.608E-14	5.608E-14
PU246	4.516E-10	3.319E-20	3.058E-28	3.058E-28	3.058E-28	3.058E-28	3.058E-28	3.058E-28	3.058E-28
AM241	7.331E-06	6.745E-04	9.315E-03	9.520E-03	9.715E-03	9.900E-03	1.007E-02	1.024E-02	1.040E-02
AM242M	1.112E-07	1.107E-07	1.001E-07	9.967E-08	9.922E-08	9.877E-08	9.832E-08	9.787E-08	9.743E-08
AM242	2.574E-02	1.101E-07	9.963E-08	9.918E-08	9.872E-08	9.827E-08	9.783E-08	9.738E-08	9.694E-08
AM243	6.748E-07	7.385E-07	7.370E-07	7.369E-07	7.369E-07	7.368E-07	7.367E-07	7.367E-07	7.366E-07
AM245	1.221E-06	2.495E-21	6.894E-29	6.893E-29	6.893E-29	6.893E-29	6.893E-29	6.893E-29	6.893E-29
AM246	4.521E-10	3.324E-20	3.058E-28	3.058E-28	3.058E-28	3.058E-28	3.058E-28	3.058E-28	3.058E-28
CM241	4.148E-11	3.661E-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CM242	2.806E-04	7.808E-05	8.239E-08	8.211E-08	8.175E-08	8.139E-08	8.102E-08	8.065E-08	8.028E-08
CM243	1.372E-08	1.339E-08	7.840E-09	7.651E-09	7.468E-09	7.288E-09	7.113E-09	6.942E-09	6.775E-09
CM244	9.409E-06	9.228E-06	3.976E-06	3.827E-06	3.683E-06	3.545E-06	3.411E-06	3.283E-06	3.160E-06
CM245	1.767E-10	1.769E-10	1.766E-10	1.766E-10	1.766E-10	1.766E-10	1.765E-10	1.765E-10	1.765E-10
CM246	3.960E-12	3.962E-12	3.949E-12	3.949E-12	3.948E-12	3.948E-12	3.947E-12	3.947E-12	3.946E-12
CM247	1.414E-18	1.414E-18	1.414E-18	1.414E-18	1.414E-18	1.414E-18	1.414E-18	1.414E-18	1.414E-18
CM248	4.315E-19	4.315E-19	4.315E-19	4.315E-19	4.315E-19	4.315E-19	4.315E-19	4.315E-19	4.315E-19
CM250	1.223E-27	1.223E-27	1.223E-27	1.223E-27	1.223E-27	1.223E-27	1.223E-27	1.223E-27	1.223E-27
BK249	3.616E-16	1.720E-16	4.753E-24	4.753E-24	4.753E-24	4.753E-24	4.753E-24	4.753E-24	4.753E-24
BK250	7.667E-15	1.712E-28	1.712E-28	1.712E-28	1.712E-28	1.712E-28	1.712E-28	1.712E-28	1.712E-28
CF249	2.334E-21	5.202E-19	9.109E-19	9.091E-19	9.073E-19	9.055E-19	9.037E-19	9.019E-19	9.001E-19
CF250	1.359E-18	1.491E-18	4.654E-19	4.407E-19	4.174E-19	3.953E-19	3.743E-19	3.545E-19	3.357E-19
CF251	2.130E-21	2.134E-21	2.134E-21	2.134E-21	2.134E-21	2.134E-21	2.134E-21	2.134E-21	2.134E-21
CF252	1.597E-20	1.597E-20	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
H 3	3.995E-01	3.777E-01	1.099E-01	1.039E-01	9.819E-02	9.283E-02	8.777E-02	8.298E-02	7.845E-02
BE 10	2.523E-09	2.523E-09	2.523E-09	2.523E-09	2.523E-09	2.523E-09	2.523E-09	2.523E-09	2.523E-09
C 14	1.018E-07	1.017E-07	1.015E-07	1.015E-07	1.014E-07	1.014E-07	1.014E-07	1.014E-07	1.014E-07
SE 79	3.658E-04	3.661E-04	3.660E-04	3.660E-04	3.660E-04	3.660E-04	3.660E-04	3.659E-04	3.659E-04
KR 81	1.174E-11	1.174E-11	1.174E-11	1.174E-11	1.174E-11	1.174E-11	1.174E-11	1.174E-11	1.174E-11
KR 85	1.114E+01	1.060E+01	2.556E+00	2.396E+00	2.246E+00	2.106E+00	1.974E+00	1.850E+00	1.734E+00
RB 86	3.696E+00	4.727E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
RB 87	2.447E-08	2.458E-08	2.458E-08	2.458E-08	2.458E-08	2.458E-08	2.458E-08	2.458E-08	2.458E-08
SR 89	1.380E+04	9.183E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SR 90	8.809E+01	8.603E+01	5.096E+01	4.976E+01	4.859E+01	4.745E+01	4.633E+01	4.524E+01	4.418E+01

Attachment B: ORIGEN2 Inputs and Outputs for Calculating MTR Element Inventories as a Function of Decay (Continued)

mtr4
ORIGEN2 V2.1 (8-1-91), Run on 05/19/97 at 17:07:27

	417.0HR	1.0YR	23.0YR	24.0YR	25.0YR	26.0YR	27.0YR	28.0YR	29.0YR
Y 90	7.441E+01	8.606E+01	5.098E+01	4.978E+01	4.861E+01	4.746E+01	4.635E+01	4.526E+01	4.419E+01
Y 91	1.435E+04	1.970E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NB 92	9.289E-11	1.400E-21	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ZR 93	1.825E-03	1.891E-03	1.891E-03	1.891E-03	1.891E-03	1.891E-03	1.891E-03	1.891E-03	1.891E-03
NB 93M	2.351E-06	9.149E-05	1.241E-03	1.268E-03	1.295E-03	1.320E-03	1.343E-03	1.366E-03	1.387E-03
NB 94	1.952E-08	1.952E-08	1.951E-08	1.951E-08	1.951E-08	1.951E-08	1.951E-08	1.951E-08	1.951E-08
ZR 95	1.495E+04	2.860E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NB 95	2.355E+03	6.342E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NB 95M	7.755E+01	2.122E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TC 98	3.903E-10	3.903E-10	3.903E-10	3.903E-10	3.903E-10	3.903E-10	3.903E-10	3.903E-10	3.903E-10
TC 99	9.667E-03	1.273E-02	1.273E-02	1.273E-02	1.273E-02	1.273E-02	1.273E-02	1.273E-02	1.273E-02
RH102	1.595E-05	1.256E-05	6.536E-08	5.147E-08	4.053E-08	3.191E-08	2.513E-08	1.978E-08	1.558E-08
RU103	1.129E+04	1.797E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
RH103M	1.017E+04	1.620E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
RU106	1.846E+02	9.283E+01	2.498E-05	1.256E-05	6.314E-06	3.174E-06	1.596E-06	8.024E-07	4.034E-07
RH106	3.065E+03	9.283E+01	2.498E-05	1.256E-05	6.314E-06	3.174E-06	1.596E-06	8.024E-07	4.034E-07
AG106	3.450E-12	4.003E-25	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
PD107	1.348E-05	1.350E-05	1.350E-05	1.350E-05	1.350E-05	1.350E-05	1.350E-05	1.350E-05	1.350E-05
AG108	9.308E-04	8.796E-12	7.800E-12	7.758E-12	7.716E-12	7.674E-12	7.632E-12	7.590E-12	7.549E-12
AG108M	9.937E-11	9.883E-11	8.764E-11	8.717E-11	8.669E-11	8.622E-11	8.575E-11	8.529E-11	8.482E-11
AG109M	6.810E+02	1.768E-09	1.082E-14	6.272E-15	3.635E-15	2.106E-15	1.221E-15	7.073E-16	4.099E-16
CD109	3.052E-09	1.768E-09	1.082E-14	6.272E-15	3.635E-15	2.106E-15	1.221E-15	7.073E-16	4.098E-16
AG110	1.004E+02	5.485E-04	1.145E-13	4.159E-14	1.510E-14	5.482E-15	1.990E-15	7.226E-16	2.624E-16
AG110M	1.136E-01	4.124E-02	8.612E-12	3.127E-12	1.135E-12	4.122E-13	1.497E-13	5.433E-14	1.973E-14
AG111	2.899E+02	5.077E-13	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CD113M	1.129E-02	1.088E-02	3.825E-03	3.648E-03	3.478E-03	3.317E-03	3.163E-03	3.016E-03	2.876E-03
IN114	9.984E-05	2.931E-08	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
IN114M	5.090E-06	3.063E-08	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CD115M	4.596E+00	1.574E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
IN115	9.095E-15	1.275E-14	1.275E-14	1.275E-14	1.275E-14	1.275E-14	1.275E-14	1.275E-14	1.275E-14
IN115M	1.991E+02	1.106E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SN117M	3.262E-03	4.596E-11	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SN119M	1.650E-01	5.873E-02	7.881E-12	2.805E-12	9.980E-13	3.551E-13	1.264E-13	4.497E-14	1.600E-14
SN121M	7.926E-05	7.817E-05	5.761E-05	5.682E-05	5.603E-05	5.526E-05	5.450E-05	5.375E-05	5.301E-05
SN123	6.894E+00	9.711E-01	1.820E-19	5.839E-20	5.610E-20	5.390E-20	5.179E-20	0.000E+00	0.000E+00

Attachment B: ORIGEN2 Inputs and Outputs for Calculating MTR Element Inventories as a Function of Decay (Continued)

mtr4
ORIGEN2 V2.1 (8-1-91), Run on 05/19/97 at 17:07:27

	417.0HR	1.0YR	23.0YR	24.0YR	25.0YR	26.0YR	27.0YR	28.0YR	29.0YR
TE123	7.151E-18	9.638E-18	9.978E-18	9.978E-18	9.978E-18	9.978E-18	9.978E-18	9.978E-18	9.978E-18
TE123M	8.629E-05	1.040E-05	6.381E-26	6.381E-26	6.381E-26	6.381E-26	6.381E-26	6.381E-26	6.381E-26
SB124	4.570E-01	6.814E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SN125	1.508E+02	5.924E-10	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SB125	4.987E+00	5.014E+00	2.038E-02	1.587E-02	1.236E-02	9.620E-03	7.490E-03	5.832E-03	4.541E-03
TE125M	1.057E-01	1.205E+00	4.973E-03	3.872E-03	3.015E-03	2.347E-03	1.828E-03	1.423E-03	1.108E-03
SN126	3.253E-04	3.253E-04	3.252E-04	3.252E-04	3.252E-04	3.252E-04	3.252E-04	3.252E-04	3.252E-04
SB126	8.989E+00	4.555E-05	4.553E-05	4.553E-05	4.553E-05	4.553E-05	4.553E-05	4.553E-05	4.553E-05
SB126M	6.993E+00	3.253E-04	3.252E-04	3.252E-04	3.252E-04	3.252E-04	3.252E-04	3.252E-04	3.252E-04
TE127	1.820E+03	3.160E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TE127M	2.223E+01	3.226E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE127	9.634E-06	9.208E-09	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TE129	8.774E+03	1.458E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TE129M	4.128E+02	2.240E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I129	1.764E-05	2.042E-05	2.043E-05	2.043E-05	2.043E-05	2.043E-05	2.043E-05	2.043E-05	2.043E-05
XE129M	6.019E-03	1.085E-16	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I131	3.014E+04	6.598E-10	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE131M	1.477E+02	4.984E-07	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CS132	5.146E-02	5.363E-19	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XE133	7.820E+04	1.080E-16	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CS134	1.281E+01	9.180E+00	5.636E-03	4.027E-03	2.877E-03	2.056E-03	1.469E-03	1.050E-03	7.499E-04
CS135	4.949E-05	7.902E-05	7.902E-05	7.902E-05	7.902E-05	7.902E-05	7.902E-05	7.902E-05	7.902E-05
CS136	6.882E+01	2.791E-07	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
BA136M	1.134E+01	4.599E-08	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CS137	9.143E+01	8.936E+01	5.375E+01	5.252E+01	5.132E+01	5.015E+01	4.901E+01	4.789E+01	4.679E+01
BA137M	9.002E+01	8.453E+01	5.085E+01	4.969E+01	4.855E+01	4.744E+01	4.636E+01	4.530E+01	4.427E+01
LA138	1.836E-13	1.836E-13	1.836E-13	1.836E-13	1.836E-13	1.836E-13	1.836E-13	1.836E-13	1.836E-13
BA140	5.146E+04	1.301E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
LA140	4.689E+04	1.498E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CE141	2.439E+04	1.030E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CE142	2.510E-08	2.525E-08	2.525E-08	2.525E-08	2.525E-08	2.525E-08	2.525E-08	2.525E-08	2.525E-08
PR143	4.283E+04	4.069E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CE144	3.057E+03	1.255E+03	3.881E-06	1.593E-06	6.536E-07	2.682E-07	1.101E-07	4.518E-08	1.854E-08
PR144	5.354E+03	1.255E+03	3.881E-06	1.593E-06	6.536E-07	2.682E-07	1.101E-07	4.518E-08	1.854E-08
PR144M	3.715E+01	1.505E+01	4.657E-08	1.911E-08	7.843E-09	3.219E-09	1.321E-09	5.421E-10	2.225E-10

Attachment B: ORIGEN2 Inputs and Outputs for Calculating MTR Element Inventories as a Function of Decay (Continued)

mtr4
ORIGEN2 V2.1 (8-1-91), Run on 05/19/97 at 17:07:27

	417.0HR	1.0YR	23.0YR	24.0YR	25.0YR	26.0YR	27.0YR	28.0YR	29.0YR
ND144	5.267E-14	7.211E-13	1.186E-12	1.186E-12	1.186E-12	1.186E-12	1.186E-12	1.186E-12	1.186E-12
PM146	2.290E-04	2.019E-04	1.262E-05	1.112E-05	9.805E-06	8.644E-06	7.621E-06	6.718E-06	5.923E-06
SM146	1.511E-13	9.393E-13	6.441E-12	6.484E-12	6.523E-12	6.556E-12	6.586E-12	6.612E-12	6.635E-12
ND147	1.990E+04	2.282E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
PM147	1.341E+02	2.816E+02	8.414E-01	6.461E-01	4.961E-01	3.809E-01	2.924E-01	2.245E-01	1.724E-01
SM147	1.511E-11	2.103E-09	8.987E-09	8.991E-09	8.995E-09	8.998E-09	9.000E-09	9.002E-09	9.003E-09
PM148	5.566E+02	3.689E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
PM148M	3.009E+01	6.551E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SM148	7.786E-16	2.226E-15	2.227E-15	2.227E-15	2.227E-15	2.227E-15	2.227E-15	2.227E-15	2.227E-15
SM149	2.068E-15	1.130E-14	1.130E-14	1.130E-14	1.130E-14	1.130E-14	1.130E-14	1.130E-14	1.130E-14
EU150	8.210E-10	8.054E-10	5.273E-10	5.172E-10	5.074E-10	4.977E-10	4.882E-10	4.789E-10	4.698E-10
SM151	6.898E-01	8.822E-01	7.447E-01	7.390E-01	7.333E-01	7.277E-01	7.221E-01	7.166E-01	7.111E-01
EU152	9.365E-04	8.900E-04	2.900E-04	2.756E-04	2.619E-04	2.489E-04	2.365E-04	2.248E-04	2.136E-04
GD152	3.527E-17	3.938E-17	6.043E-17	6.093E-17	6.141E-17	6.187E-17	6.231E-17	6.272E-17	6.311E-17
GD153	1.293E-03	4.542E-04	4.595E-14	1.614E-14	5.671E-15	1.992E-15	6.998E-16	2.458E-16	8.635E-17
EU154	8.288E-01	7.646E-01	1.298E-01	1.198E-01	1.105E-01	1.019E-01	9.405E-02	8.677E-02	8.005E-02
EU155	2.027E+00	1.766E+00	8.160E-02	7.095E-02	6.170E-02	5.365E-02	4.665E-02	4.057E-02	3.528E-02
EU156	2.253E+02	1.326E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TB160	6.547E-02	1.974E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TB161	1.750E+00	2.263E-16	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
HO166M	6.037E-09	6.034E-09	5.958E-09	5.954E-09	5.951E-09	5.948E-09	5.944E-09	5.941E-09	5.937E-09
ER169	7.095E-06	1.426E-17	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TM170	6.444E-09	8.996E-10	1.389E-28	1.389E-28	1.389E-28	1.389E-28	1.389E-28	1.389E-28	1.389E-28
TM171	1.418E-11	9.883E-12	3.512E-15	2.448E-15	1.706E-15	1.189E-15	8.287E-16	5.776E-16	4.025E-16

Attachment C

Attachment C: Listing of FORTRAN Program REDUCE1

```
      PROGRAM REDUCE1
C
C-------- WRITTEN BY D.R. WENZEL
C
C            TO REDUCE ORIGEN2 OUTPUT
C            FOR CPP TANK FARM LEAK STUDY
C
      CHARACTER * 1 ORGLINE(132), DCYTME(9)
      CHARACTER * 3 PBRK, PBREAK
      CHARACTER * 5 SUM, TOTAL
      CHARACTER * 7 BEGIN, START
      CHARACTER * 9 RUN
      CHARACTER * 12 DESC
      CHARACTER * 132 BUFFER
C
      EQUIVALENCE (DCYTME,ORGLINE(23)), (PBRK,ORGLINE(1)),
     +            (SUM,ORGLINE(2)), (BEGIN,ORGLINE(23))
C
      DATA PBREAK /'1  '/
      DATA TOTAL /'TOTAL'/
      DATA START /'7 NUCLID'/
C
C-------- DETERMINE RUN NAME
C
      CALL GETCL(RUN)
C
C-------- OPEN INPUT AND OUTPUT FILES
C
      OPEN(3,FILE ='REDUCE.IN', STATUS='OLD',FORM='FORMATTED',
     +     ERR = 900)
      OPEN(6,FILE ='REDUCE.OUT', STATUS='UNKNOWN', ERR = 920)
     +
C
      PRINT *,'Working -- have patience.'
C
      IFLAG = 0
      WRITE(6,600) RUN
  600 FORMAT(A9)
      READ(3,300) ORGLINE
  300 FORMAT(132A1)
      READ(3,300) ORGLINE
      WRITE(6,300) ORGLINE
C
C-------- SEARCH FOR BEGINNING OF DESIRED DATA
C
   30 READ(3,300,END=999) ORGLINE
      IF(BEGIN .NE. START) GO TO 30
C
C-------- BEGIN SEARCHING FOR SELECTED RADIONUCLIDES
C       READ(3,300,END=999) ORGLINE
      READ(3,300,END=999) ORGLINE
      IF(IFLAG .EQ. 0) THEN
      WRITE(6,300) ORGLINE
C        WRITE(6,310) DCYTME
C 310    FORMAT(16X,9A1)
         IFLAG = 1
```

Attachment C: Listing of FORTRAN Program REDUCE1 (Continued)

```
      ENDIF
C
   40 READ(3,300,END=999) ORGLINE
      IF(PBRK .EQ. PBREAK) GO TO 50
      IF(SUM .EQ. TOTAL) GO TO 60
      WRITE(BUFFER,300) ORGLINE
      READ(BUFFER,400) DESC, VALUE
  400 FORMAT(A12,10X,E9.4)
      IF(VALUE .LE. 0.) GO TO 40
      WRITE(6,300) ORGLINE
      GO TO 40
C
C-------- SKIP LINES OF PAGE BREAK
C
   50 DO 55 I=1,8
         READ(3,300,END=999) ORGLINE
   55 CONTINUE
C
      GO TO 40
C
C-------- WRITE BLANK LINE FOLLOWING A TOTAL AND THEN SEARCH FOR
C         MORE OUTPUT
C
   60 WRITE(6,420)
  420 FORMAT(' ')
      GO TO 30
C
C-------- ERROR STATEMENTS
C
  900 WRITE(6,9000)
 9000 FORMAT(2X,'ERROR IN OPENING FILE 3')
      GO TO 999
C
  920 WRITE(6,9020)
 9020 FORMAT(2X,'ERROR IN OPENING FILE 6')
      GO TO 999
C
C-------- PROGRAM END
C
  999 CONTINUE
      END
```

Attachment D

Attachment D: Listing of FORTRAN Program REDUCE71

```
      PROGRAM REDUCE71
C
C-------- WRITTEN BY D.R. WENZEL
C
C            TO NORMALIZE AND SUM ORIGEN2 OUTPUTS
C            FOR CPP TANK FARM LEAK STUDY TO THE 1971 SAMPLE ANALYSIS
C
      CHARACTER * 1 ORGLINE1(111), ORGLINE2(111), ORGLINE3(111),
     +              ORGLINE4(111), ORGLINE7(111), ORGLINE8(111),
     +              ORGLINE9(111), ORGLINEA(111)
      CHARACTER * 9 RUN
      CHARACTER * 12 DESC1, DESC2, DESC3, DESC4,
     +               DESC7, DESC8, DESC9, DESCA
      CHARACTER * 111 BUFFER1, BUFFER2, BUFFER3, BUFFER4,
     +                BUFFER7, BUFFER8, BUFFER9, BUFFERA
      REAL      * 4 VALUE1(9), VALUE2(9), VALUE3(9), VALUE4(9),
     +              VALUE7(9), VALUE8(9), VALUE9(9), VALUEA(9)
      REAL      * 4 MTR1(9), MTR2(9), MTR3(9), MTR4(9)
      REAL      * 4 RED1(9), RED2(9), RED3(9), RED4(9)
C
C     AGE OF MTR FUEL   1    2     3     4     5     6     7     8
C     PROCESSING YEAR      73    72    71    70    69    68    67
      DATA MTR1 /0.,   0.,   0.,   0.,   0.,  30.,   0.,   0.,   0./
      DATA RED1 /1.,   1.,   1.,   1.,   1., .92 ,   1.,   1.,   1./
C
C     AGE OF MTR FUEL        9    10    11    12    13    14    15
C     PROCESSING YEAR       66    65    64    63    62    61    60
      DATA MTR2 /0.,   0., 451., 110., 505., 795.,   0.,  45., 420./
      DATA RED2 /1.,   1.,   1., .48 ,   1., .44 , .34 ,   1.,   1./
C
C     AGE OF MTR FUEL       16    17    18    19    20    21    22
C     PROCESSING YEAR       59    58    57    56    55    54    53
      DATA MTR3 /0.,   0.,  91., 292., 505., 712.,1064.,   0., 333./
      DATA RED3 /1.,   1.,   1.,   1.,   1.,   1.,   1.,   1.,   1./
C
C     AGE OF MTR FUEL       23    24    25    26    27    28    29
C     PROCESSING YEAR        0     0     0     0     0     0     0
      DATA MTR4 /0.,   0.,   0.,   0.,   0.,   0.,   0.,   0.,   0./
      DATA RED4 /1.,   1.,   1.,   1.,   1.,   1.,   1.,   1.,   1./
C
C
C-------- DETERMINE RUN NAME
C
      CALL GETCL(RUN)
C
C-------- OPEN INPUT AND OUTPUT FILES
C
      OPEN(1,FILE ='MTR1.OUT', STATUS='OLD',FORM='FORMATTED',
     +     ERR = 900)
      OPEN(2,FILE ='MTR2.OUT', STATUS='OLD',FORM='FORMATTED',

     +     ERR = 900)
      OPEN(3,FILE ='MTR3.OUT', STATUS='OLD',FORM='FORMATTED',
     +     ERR = 900)
      OPEN(4,FILE ='MTR4.OUT', STATUS='OLD',FORM='FORMATTED',
     +     ERR = 900)
```

Attachment D: Listing of FORTRAN Program REDUCE71 (Continued)

```
      OPEN(6,FILE ='REDUCE.OUT', STATUS='UNKNOWN', ERR = 920)
      OPEN(7,FILE ='ACT1.OUT', STATUS='OLD',FORM='FORMATTED',
     +      ERR = 900)
      OPEN(8,FILE ='ACT2.OUT', STATUS='OLD',FORM='FORMATTED',
     +      ERR = 900)
      OPEN(9,FILE ='ACT3.OUT', STATUS='OLD',FORM='FORMATTED',
     +      ERR = 900)
      OPEN(10,FILE ='ACT4.OUT', STATUS='OLD',FORM='FORMATTED',
     +      ERR = 900)
C
      PRINT *,'Working -- have patience.'
C
      CORMTR = 98.689
      CORACT = 78.36
      WRITE(6,600) RUN
  600 FORMAT(A9)
C
C-------- READ PAST FIRST LINE
C
      READ(1,300) ORGLINE1
      READ(2,300) ORGLINE2
      READ(3,300) ORGLINE3
      READ(4,300) ORGLINE4
      READ(7,300) ORGLINE7
      READ(8,300) ORGLINE8
      READ(9,300) ORGLINE9
      READ(10,300) ORGLINEA
  300 FORMAT(111A1)
C
C-------- READ PAST SECOND LINE
C
      READ(1,300) ORGLINE1
      READ(2,300) ORGLINE2
      READ(3,300) ORGLINE3
      READ(4,300) ORGLINE4
      READ(7,300) ORGLINE7
      READ(8,300) ORGLINE8
      READ(9,300) ORGLINE9
      READ(10,300) ORGLINEA
C
C-------- READ PAST THIRD LINE
C
      READ(1,300) ORGLINE1
      READ(2,300) ORGLINE2
      READ(3,300) ORGLINE3
     READ(4,300) ORGLINE4
      READ(7,300) ORGLINE7
      READ(8,300) ORGLINE8
      READ(9,300) ORGLINE9
      READ(10,300) ORGLINEA
C
C-------- START DATA SUMMATION PROCESS
C
   40 READ(1,300,END=999) ORGLINE1
      READ(2,300,END=999) ORGLINE2
      READ(3,300,END=999) ORGLINE3
```

Attachment D: Listing of FORTRAN Program REDUCE71 (Continued)

```
      READ(4,300,END=999) ORGLINE4
      READ(7,300,END=999) ORGLINE7
      READ(8,300,END=999) ORGLINE8
      READ(9,300,END=999) ORGLINE9
      READ(10,300,END=999) ORGLINEA
      WRITE(BUFFER1,300) ORGLINE1
      WRITE(BUFFER2,300) ORGLINE2
      WRITE(BUFFER3,300) ORGLINE3
      WRITE(BUFFER4,300) ORGLINE4
      WRITE(BUFFER7,300) ORGLINE7
      WRITE(BUFFER8,300) ORGLINE8
      WRITE(BUFFER9,300) ORGLINE9
      WRITE(BUFFERA,300) ORGLINEA
      READ(BUFFER1,400) DESC1, (VALUE1(I),I=1,9)
  400 FORMAT(A12,9X,9(1X,E9.4))
      READ(BUFFER2,400) DESC2, (VALUE2(I),I=1,9)
      READ(BUFFER3,400) DESC3, (VALUE3(I),I=1,9)
      READ(BUFFER4,400) DESC4, (VALUE4(I),I=1,9)
      READ(BUFFER7,400) DESC7, (VALUE7(I),I=1,9)
      READ(BUFFER8,400) DESC8, (VALUE8(I),I=1,9)
      READ(BUFFER9,400) DESC9, (VALUE9(I),I=1,9)
      READ(BUFFERA,400) DESCA, (VALUEA(I),I=1,9)
C
C------- CHECK TO BE SURE LISTS ARE IN THE SAME ORDER
C
      NUM = 2
      IF(DESC2 .NE. DESC1) GO TO 930
      NUM = 3
      IF(DESC3 .NE. DESC1) GO TO 931
      NUM = 4
      IF(DESC4 .NE. DESC1) GO TO 932
      NUM = 7
      IF(DESC7 .NE. DESC1) GO TO 933
      NUM = 8
      IF(DESC8 .NE. DESC1) GO TO 934
      NUM = 9
      IF(DESC9 .NE. DESC1) GO TO 935
      NUM = 10
      IF(DESCA .NE. DESC1) GO TO 936
      SUM = 0.
      DO 45, J=1,7
         K = 10 - J
         SUM = SUM * RED4(K)
         SUM = SUM + VALUE4(K) * MTR4(K) * CORMTR
         SUM = SUM + VALUEA(K) * MTR4(K) * CORACT
   45 CONTINUE
C
      DO 46, J=1,7
         K = 10 - J
         SUM = SUM * RED3(K)
         SUM = SUM + VALUE3(K) * MTR3(K) * CORMTR
         SUM = SUM + VALUE9(K) * MTR3(K) * CORACT
   46 CONTINUE
      DO 47, J=1,7
         K = 10 - J
```

Aattachment D: Listing of FORTRAN Program REDUCE71 (Continued)

```
          SUM = SUM * RED2(K)
          SUM = SUM + VALUE2(K) * MTR2(K) * CORMTR
          SUM = SUM + VALUE8(K) * MTR2(K) * CORACT
   47  CONTINUE
       DO 48, J=1,7
          K = 10 - J
          SUM = SUM * RED1(K)
          SUM = SUM + VALUE1(K) * MTR1(K) * CORMTR
   48  CONTINUE
          SUM = SUM + VALUE7(K) * MTR1(K) * CORACT
       WRITE(6,401) DESC1,SUM
  401  FORMAT(A12,1PE10.3)
       GO TO 40
C
C-------- ERROR STATEMENTS
C
  900  WRITE(6,9000)
 9000  FORMAT(2X,'ERROR IN OPENING FILE ')
       GO TO 999
C
  920  WRITE(6,9020)
 9020  FORMAT(2X,'ERROR IN OPENING FILE 6')
       GO TO 999
C
  930  WRITE(6,9030) DESC1,DESC2,NUM
 9030  FORMAT(2X,2(2X,A2),5X,I1)
       GO TO 940
  931  WRITE(6,9030) DESC1,DESC3,NUM
       GO TO 940
  932  WRITE(6,9030) DESC1,DESC4,NUM
       GO TO 940
  933  WRITE(6,9030) DESC1,DESC7,NUM
       GO TO 940
  934  WRITE(6,9030) DESC1,DESC8,NUM
       GO TO 940
  935  WRITE(6,9030) DESC1,DESC7,NUM
       GO TO 940
  936  WRITE(6,9030) DESC1,DESC8,NUM
  940  WRITE(6,9040)
 9040  FORMAT(2X,'ERROR DETECTED IN THE ORDER OF THE RADIONUCLIDES')
C
C-------- PROGRAM END
C
  999  CONTINUE
       END
```

Attachment E

Attachment E: Initial Radionuclide Concentrations Calculated for 1971

Radionuclide	D/s/mL	
H 3	5.986E-06	Activation Products
BE 10	3.068E-07	
C 14	1.125E-05	
SI 32	1.340E-06	
P 32	1.340E-06	
P 33	0.000E+00	
S 35	4.540E-10	
CL 36	3.628E-06	
AR 37	0.000E+00	
AR 39	8.923E-15	
AR 42	1.469E-21	
K 42	1.469E-21	
CA 45	4.745E-15	
SC 46	4.656E-24	
V 50	7.668E-14	
CR 51	0.000E+00	
FE 59	6.148E-18	
CO 60	7.595E+03	
NI 63	3.363E-07	
SR 89	2.277E-30	
SR 90	3.186E-07	
Y 90	3.187E-07	
Y 91	7.887E-19	
ZR 93	2.970E-04	
ZR 95	3.142E-20	
NB 93M	1.324E-04	
NB 94	5.221E+01	
NB 95	3.218E-20	
NB 95M	2.201E-22	
TC 99	1.841E-16	
TL207	2.249E-03	Actinides and Daughters
TL208	6.030E-02	
TL209	1.646E-07	
PB209	7.620E-06	
PB210	7.392E-05	
PB211	2.255E-03	
PB212	1.678E-01	
PB214	5.556E-04	
BI210	7.395E-05	
BI211	2.255E-03	
BI212	1.678E-01	
BI213	7.620E-06	
BI214	5.556E-04	
PO210	6.578E-05	
PO211	6.314E-06	
PO212	1.075E-01	
PO213	7.454E-06	
PO214	5.554E-04	
PO215	2.255E-03	
PO216	1.678E-01	
PO218	5.557E-04	
AT217	7.620E-06	
RN218	0.000E+00	
RN219	2.255E-03	

Attachment E: Initial Radionuclide Concentrations Calculated for 1971 (Continued)

Radionuclide	D/s/mL	
RN220	1.678E-01	Actinides and Daughters Continued
RN222	5.557E-04	
FR221	7.620E-06	
FR223	3.106E-05	
RA222	0.000E+00	
RA223	2.255E-03	
RA224	1.678E-01	
RA225	7.620E-06	
RA226	5.557E-04	
RA228	1.591E-08	
AC225	7.620E-06	
AC227	2.250E-03	
AC228	1.591E-08	
TH226	0.000E+00	
TH227	2.224E-03	
TH228	1.672E-01	
TH229	7.619E-06	
TH230	1.918E-01	
TH231	4.552E+01	
TH232	3.534E-08	
TH234	4.849E-01	
PA231	1.216E-02	
PA233	1.232E+01	
PA234M	4.849E-01	
PA234	6.304E-04	
U230	0.000E+00	
U232	1.672E-01	
U233	6.704E-03	
U234	1.699E+03	
U235	4.552E+01	
U236	5.722E+01	
U237	7.439E-01	
U238	4.849E-01	
U240	7.180E-09	
NP235	5.820E-05	
NP236	1.968E-05	
NP237	1.232E+01	
NP238	6.735E-05	
NP239	9.459E-02	
NP240M	7.180E-09	
PU236	2.551E-02	
PU237	5.907E-16	
PU238	3.675E+03	
PU239	1.882E+03	
PU240	4.247E+02	
PU241	3.032E+04	
PU242	6.809E-02	
PU243	1.813E-13	
PU244	7.190E-09	
PU246	3.921E-23	
AM241	8.029E+02	
AM242M	1.347E-02	
AM242	1.340E-02	
AM243	9.459E-02	

Attachment E: Initial Radionuclide Concentrations Calculated for 1971 (Continued)

Radionuclide	D/s/mL	
AM245	2.763E-19	Actinides and Daughters Continued
AM246	3.921E-23	
CM241	5.809E-26	
CM242	1.120E-02	
CM243	1.302E-03	
CM244	7.679E-01	
CM245	2.266E-05	
CM246	5.071E-07	
CM247	1.813E-13	
CM248	5.532E-14	
CM250	1.568E-22	
BK249	1.858E-14	
BK250	2.195E-23	
CF249	1.192E-13	
CF250	1.049E-13	
CF251	2.736E-16	
CF252	1.775E-16	
H 3	2.581E+04	Fission Products
BE 10	3.235E-04	
C 14	1.303E-02	
SE 79	4.693E+01	
KR 81	1.505E-06	
KR 85	6.602E+05	
RB 86	4.787E-32	
RB 87	3.151E-03	
SR 89	3.529E-06	
SR 90	8.416E+06	
Y 90	8.418E+06	
Y 91	2.341E-04	
NB 92	0.000E+00	
ZR 93	2.425E+02	
NB 93M	1.070E+02	
NB 94	2.503E-03	
ZR 95	2.165E-03	
NB 95	4.980E-03	
NB 95M	1.606E-05	
TC 98	5.004E-05	
TC 99	1.632E+03	
RH102	1.299E-01	
RU103	5.371E-10	
RH103M	4.850E-10	
RU106	1.950E+04	
RH106	1.950E+04	
AG106	0.000E+00	
PD107	1.731E+00	
AG108	1.059E-06	
AG108M	1.190E-05	
AG109M	1.137E-06	
CD109	1.137E-06	
AG110	1.320E-02	
AG110M	9.925E-01	
AG111	0.000E+00	
CD113M	8.174E+02	
IN114	9.634E-16	

Attachment E: Initial Radionuclide Concentrations Calculated for 1971 (Continued)

Radionuclide	D/s/mL
IN114M	1.007E-15 Fission Products Continued
CD115M	2.193E-11
IN115	1.635E-09
IN115M	1.542E-15
SN117M	0.000E+00
SN119M	1.255E+00
SN121M	8.554E+00
SN123	1.603E-01
TE123	1.279E-12
TE123M	7.876E-07
SB124	1.486E-08
SN125	0.000E+00
SB125	4.645E+04
TE125M	1.134E+04
SN126	4.170E+01
SB126	5.838E+00
SB126M	4.170E+01
TE127	8.479E-02
TE127M	8.657E-02
XE127	2.175E-20
TE129	1.876E-14
TE129M	2.882E-14
I129	2.619E+00
XE129M	0.000E+00
I131	0.000E+00
XE131M	0.000E+00
CS132	0.000E+00
XE133	0.000E+00
CS134	3.744E+04
CS135	1.013E+01
CS136	0.000E+00
BA136M	0.000E+00
CS137	8.810E+06
BA137M	8.334E+06
LA138	2.354E-08
BA140	0.000E+00
LA140	0.000E+00
CE141	3.757E-13
CE142	3.237E-03
PR143	0.000E+00
CE144	6.442E+04
PR144	6.445E+04
PR144M	7.733E+02
ND144	1.520E-07
PM146	6.539E+00
SM146	6.827E-07
ND147	0.000E+00
PM147	2.278E+06
SM147	1.099E-03
PM148	5.326E-13
PM148M	9.459E-12
SM148	2.855E-10
SM149	1.449E-09
EU150	8.293E-05
SM151	1.036E+05

Attachment E: Initial Radionuclide Concentrations Calculated for 1971 **(Continued)**

Radionuclide	D/s/mL
EU152	6.437E+01
GD152	6.794E-12
GD153	8.996E-03
EU154	4.007E+04
EU155	4.961E+04
EU156	0.000E+00
TB160	1.456E-07
TB161	0.000E+00
HO166M	7.685E-04
ER169	0.000E+00
TM170	1.421E-10
TM171	3.201E-08

Attachment E: Initial Radionuclide Concentrations Calculated for 1971 (Continued)

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Attachment F

Attachment F: Results of 1971 WM-181 Sample Analysis

ALLIED CHEMICAL CORPORATION

IDAHO CHEMICAL PROGRAMS - OPERATIONS OFFICE

Allied Chemical

INTEROFFICE CORRESPONDENCE

August 7, 1972

Composition of First- and Second-Cycle Wastes
Rhod-4-72

To: Distribution

The results of analyses of first- and second-cycle waste samples obtained from the 300,000-gal waste tanks approximately September 15, 1971, are attached. These results include all of the analytical analyses that have been requested to date.

DWR:bb

D. W. Rhodes

Attachment

Distribution:

C. B. Amberson
D. E. Black
J. A. Buckham
R. E. Commander
H. S. Cole
S. F. Fairbourne
M. P. Hales
W. F. Holcomb
L. T. Lakey
G. E. Lohse
B. C. Musgrave
B. J. Newby
N. J. Rigstad
K. L. Rohde
J. G. Scott
C. M. Slansky
W. L. Slagle
M. W. Wilding
B. R. Wheeler TRW
M. Young
D. W. Rhodes - 2
File: 6.51

Attachment F: Results of 1971 WM-181 Sample Analysis (Continued)

FIRST-CYCLE WASTE

CHEMICAL ANALYSES

Analysis	WM-185	WM-187	WM-188
H^+, M (± 0.04)	1.51	1.62	1.72
Al^{+3}, M (± 0.02)	0.68	0.64	0.69
Zr^{+4}, M (± 0.01)	0.44	0.44	0.48
F^-, M	3.12	3.00	3.52
B, g/ℓ	2.16	2.08	2.34
NO_3^-, M (± 0.16)	2.36	2.32	2.40
Fe^{+3}, g/ℓ (± 0.012)	0.257	0.225	0.298
Cl^-, mg/ℓ	9	12	37
Na, mg/ℓ	29	60	74
sp gr	1.192	1.185	1.203

FIRST-CYCLE WASTE

PLUTONIUM ANALYSES

Isotope	Tank No. WM-185	WM-187	WM-188
Total, g/ℓ	1.93×10^{-3}	1.19×10^{-3}	1.54×10^{-3}
Pu-239, wt%	72.2	67.1	70.4
Pu-240, wt%	17.6	20.5	18.9
Pu-241, wt%	7.8	9.2	8.2
Pu-242, wt%	2.5	3.4	2.7

FIRST-CYCLE WASTE

URANIUM ANALYSES

Isotope	Tank No. WM-185	WM-187	WM-188
U-234, wt%	1.7	1.2	1.3
U-235, wt%	56.1	72.6	30.8
U-236, wt%	5.9	6.3	3.6
U-238, wt%	36.3	19.9	64.3
Total, g/ℓ	4.7×10^{-4}	913×10^{-4}	2.8×10^{-3}

Attachment F: Results of 1971 WM-181 Sample Analysis (Continued)

FIRST-CYCLE WASTE

RADIOCHEMICAL ANALYSES

	(dis/sec-ml)		
Isotope	Tank No. WM-185	WM-187	WM-188
Co-60	5.64×10^4	3.34×10^4	5.50×10^4
Zr-95	1.60×10^5	3.23×10^5	$< 5.82 \times 10^4$
Nb-95	1.82×10^5	4.84×10^5	$< 3.28 \times 10^4$
Ru-106	4.19×10^6	3.32×10^6	9.26×10^5
Sb-125	1.23×10^6	1.10×10^6	6.53×10^5
Cs-134	7.74×10^6	7.72×10^6	4.32×10^6
Cs-137	3.70×10^7	2.59×10^7	2.97×10^7
Ce-144	3.85×10^7	3.32×10^7	7.22×10^6
Eu-154	5.63×10^5	4.03×10^5	4.73×10^5
Gross β	2.42×10^8	1.76×10^8	1.20×10^8
Sr-90	3.49×10^7	6.98×10^6	1.09×10^7
H^3	3.01×10^4	6.34×10^3	4.49×10^3
	(g/ℓ)		
Np	1.19×10^{-5}	1.57×10^{-5}	9.74×10^{-6}

Distribution
Rhod-4-72
Attachment 1, Page 3

FIRST-CYCLE WASTE

SPECTROCHEMICAL ANALYSES

Element	Tank No.	WM-185	WM-187	WM-188	
Al		M	M	M	
B		T	T	T	
Co		T	T	T	
Cr		T-m	T-m	T-m	
Cu		T	T	T	
Fe		T-m	T-m	T-m	
Mg		T	T	T	
Mn		T	T	T	
Mo		T	T	T	
Na		29	60	74	(µgms/ml)
Ni		T	T	T	
Si		T	T	T	
Sn		m	m	m	
Zr		M	M	M	

M = Major = ≥ 5%
m = minor = < 5% > .1%
T = trace = < .1%

Attachment F: Results of 1971 WM-181 Sample Analysis (Continued)

SECOND-CYCLE WASTE

CHEMICAL ANALYSES

Analyses	Tank No. WM-181	WM-184	WM-186
H^+, M (± 0.04)	1.40	0.14	1.63
Al^{+3}, M	0.56	0.59	0.37
Zr^{+4}, mg/ℓ	<10	<10	<10
Fe^{+3}, g/ℓ	0.62	0.98	1.21
Na^+, g/ℓ	36.6	56.2	36.5
F^-, M	0.00065	0.0048	0.0065
NO_3^-, M	4.38	4.64	5.02
B, g/ℓ	0.062	0.050	0.160
Cl^-, g/ℓ	~~1.123~~ 1.418	1.611	1.100
PO_4^{-3}, g/ℓ	1.88	2.63	0.94
SO_4^{-2}, M	0.035	0.063	0.059
sp gr	1.263	1.280	1.241
Hg, g/ℓ	0.996	0.147	0.567
K, g/ℓ	9.3	5.0	8.8
Mn, g/ℓ	1.29	0.25	1.25
Undissolved Solids, g/ℓ	1.14	0.54	1.21

SECOND-CYCLE WASTE

PLUTONIUM ANALYSES

Isotope	Tank No. WM-181	WM-184	WM-186
Pu-239, wt%	86.1	88.3	—
Pu-240, wt%	8.6	10.3	—
Pu-241, wt%	4.9	1.1	—
Pu-242, wt%	0.4	0.4	—
Total, g/ℓ	0.938×10^{-3}	1.893×10^{-3}	[a]

[a] WM-186 contained some constituent that interferred with the analysis.

Attachment F: Results of 1971 WM-181 Sample Analysis (Continued)

SECOND-CYCLE WASTE

URANIUM ANALYSES

Isotope	Tank No. WM-181	WM-184	WM-186
U-234, wt%	0.65	0.95	0.09
U-235, wt%	43.70	64.39	5.86
U-236, wt%	2.08	3.07	0.52
U-238, wt%	53.57	31.59	93.53
Total, g/ℓ	2.31×10^{-2}	2.01×10^{-2}	0.191

SECOND-CYCLE WASTE

RADIOCHEMICAL ANALYSES

Isotope	(dis/sec-ml) Tank No. WM-186	WM-184	WM-181
Zr-95	2.30×10^{3}	3.81×10^{2}	8.65×10^{3}
Nb-95	1.23×10^{3}	1.57×10^{2}	3.77×10^{3}
Ru-106	3.18×10^{5}	5.52×10^{3}	1.23×10^{5}
Sb-125	2.47×10^{4}	8.77×10^{3}	1.11×10^{5}
Cs-134	3.87×10^{4}	9.61×10^{2}	3.74×10^{4}
Cs-137	2.09×10^{6}	4.49×10^{5}	8.81×10^{6}
Ce-144	1.03×10^{5}	1.49×10^{3}	2.81×10^{4}
Eu-154	9.71×10^{3}	1.07×10^{3}	2.59×10^{4}
Co-60	—	3.71×10^{2}	—
Sr-90	1.74×10^{6}	4.38×10^{5}	7.91×10^{6}
H^3	2.26×10^{3}	3.73×10^{3}	1.25×10^{3}
Gross β	7.70×10^{6}	1.61×10^{6}	2.84×10^{7}

Attachment F: Results of 1971 WM-181 Sample Analysis (Continued)

SECOND-CYCLE WASTE

SPECTROCHEMICAL ANALYSES

Element	Tank No.	WM-181	WM-184	WM-186
Al		M	M	M
B		T	—	T
Co		T	T	M
Cr		T	T	T
Cu		T	T	T
Fe		M	M	M
Mg		T	T	M
Mn		M	M	M
Mo		T	T	T
Na		M	M	M
Ni		T	T	T
Pb		M	T	M
Si		T	T	T
Sn		T	T	T
Ti		T	T	T
V		T	—	T
Zr		T	T	T
Ru		T-m	—	T-m
Rh		T	—	—

M = Major = ≥5%

m = minor = <5% >0.1%

T = trace = <0.1%

Attachment F: Results of 1971 WM-181 Sample Analysis (Continued)

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Attachment G

Attachment G: Original Analytical Analysis Results for 1971 Sample of WM-181

FORM INC - 83
(REV. 7 - 66)

FOR USE ON NON-SS BEARING SAMPLES ONLY
(USE PENCIL OR TYPE ONLY)

IDAHO NUCLEAR CORPORATION

REQUEST FOR ANALYSIS BY ANALYTICAL SECTION

page 2 of 4

Sample Name Second Cycle Waste Anal. Log No. 7455

Description of Sample, Approximate Concentration, etc. Waste directly from storage tanks

Submitted By DW Rhodes Date 12-5-71 Activity

Report Results to DW Rhodes Analytical Representative

Address CPP-637 Charge Number ~~[illegible]~~ 26200-280-201

SAMPLE CODE	ANALYSES DESIRED: Cl	Sr-Gr	Undissolved Solids	Na	Emission Spectrum	PO4	SO4	
WM-181	1123	±.004 1.263	1.14	36.6	attached	±.08 1.88	~~0.424~~	0.035
WM-184	1611	±.005 1.280	0.54	56.2		±.09 2.63	~~0.344~~	0.063
WM-186	1100	±.004 1.241	1.21	36.5		±.07 0.94	~~0.438~~	0.059
	ppm		g/l	g/l		g/l	ml	M

CORRECTED SO4 PER Notegram DOCK TO MPH DATED 1-3-72 MFS 6/30/94

Remarks:

Work Completed Anal. Represent. Results Recorded By Approved Date

Attachment G: Original Analytical Analysis Results for 1971 Sample of WM-181 (Continued)

FORM INC-63
(REV. 7-66)

FOR USE ON NON-SS BEARING SAMPLES ONLY
(USE PENCIL OR TYPE ONLY)

IDAHO NUCLEAR CORPORATION

REQUEST FOR ANALYSIS BY ANALYTICAL SECTION

page 3 of 4

Sample Name Second Cycle Waste Anal. Log No. 7455

Description of Sample, Approximate Concentration, etc. Waste directly from change tanks

Submitted By D. W. Rhodes Date 10-5-71 Activity

Report Results to D. W. Rhodes Analytical Representative

Address CPP-637 Charge Number 262.00-240-201

SAMPLE CODE	527 EDTA	527 Oxalate	C	ANALYSES DESIRED Hg	K	Mn	
WM-181	✓	✓	✓	✓ 445.8 ± 60	7.3	1.29	
WM-184	✓	✓	✓	✓ 147.3 ± 11	5.0	0.25	
WM-186	✓	✓	✓	✓ 266.7 ± 28	8.8	1.25	
				mg/ml	g/l	g/l	

Remarks: Calc 11-29-71

Work Completed Anal. Represent. _____ Results Recorded By _____ Approved _____ Date _____

Attachment G: Original Analytical Analysis Results for 1971 Sample of WM-181 (Continued)

FORM INC – 53
(REV. 7 – 66)

FOR USE ON NON-SS BEARING SAMPLES ONLY
(USE PENCIL OR TYPE ONLY)

IDAHO NUCLEAR CORPORATION

REQUEST FOR ANALYSIS BY ANALYTICAL SECTION

page 4 of 4

Sample Name: Second Cycle Waste Anal. Log No.: 7455

Description of Sample, Approximate Concentration, etc.: Injects directly from waste storage tanks

Submitted By: D. W. Rhodes Date: 10-5-71 Activity:

Report Results to: D. W. Rhodes Analytical Representative:

Address: CPP-627 Charge Number: 26200-240-301

SAMPLE CODE	ANALYSES DESIRED						
	γ-Scan	Sr-90	Np	Isotopic Pu	Isotopic U	H-3	Gross β
WM-181	attached	7.91×10^6	16.9	See attached sheet	see below	1.25×10^3	2.24×10^7
WM-184		11.38×10^5	15.8			3.73×10^3	1.61×10^6
WM-186		1.74×10^6	13.1			2.26×10^3	7.70×10^6
		dps/ml	d/s/ml			dps/ml	Bps/ml
	Uranium						
	conc	Mass analysis					
WM-181	2.31×10^{-2}	234 =	0.65	235 = 43.70	236 = 2.08	238 = 53.57	
WM-184	2.01×10^{-2}	234 =	0.95	235 = 62.39	236 = 3.07	238 = 21.5[illegible]	
WM-186	0.191	234 =	0.09	235 = 5.86	236 = 0.52	238 = 93.53	
	g/l.						
					wt. %	of each	isotope

Gross β cancels

Remarks:

Work Completed Anal. Represent. _____ Results Recorded By _____ Approved _____ Date _____

Attachment G: Original Analytical Analysis Results for 1971 Sample of WM-181 (Continued)

FORM ACC-113 (8-71)

ALLIED CHEMICAL CORPORATION

IDAHO CHEMICAL PROGRAMS - OPERATIONS OFFICE

Allied Chemical

SPECTROCHEMICAL ANALYSIS

DATE: RECEIVED 10-5-71 | LOG NO. 71-7455

RUN | CODE Second Cycle Waste

REPORTED 12-2-71 | ACTIVITY (mR/hr)

RECORD NO. HA-120 | REQUESTED BY D. W. Rhodes

SAMPLE DISPOSAL | REPORT RESULTS TO

RUN BY JW | CHARGE NO. 26200-220-3.1

APPROVED R | DETERMINATIONS Na, K

NUMERALS = mg/ml M = MAJOR = ≥5% m = MINOR = <5% > .1% T = TRACE = <.

	WM-171	WM-184	WM-186							
Ag										
Al	15.00	15.80	9.90							
B										
Be										
Ca										
Cd										
Co										
Cr										
Cu										
Fe										
Mg										
Mn	1.29	.25	1.25							
Mo										
Na										
Ni										
Pb										
Si										
Sn										
Ti										
V										
Zn										
Zr										
K	9.3	5.0	8.8							

Attachment G: Original Analytical Analysis Results for 1971 Sample of WM-181 (Continued)

FORM ACC-118 (8-71)

ALLIED CHEMICAL CORPORATION

IDAHO CHEMICAL PROGRAMS - OPERATIONS OFFICE

Allied Chemical

SPECTROCHEMICAL ANALYSIS

DATE: RECEIVED
RUN 10-12-71
REPORTED "
RECORD NO. ACC-151
SAMPLE DISPOSAL
RUN BY VB
APPROVED K

LOG NO. 71-7455
CODE 2nd Cycle Waste
ACTIVITY (mR/hr) hot
REQUESTED BY
REPORT RESULTS TO D.W. Rhodes
CHARGE NO. 26200-280-301
DETERMINATIONS Na

NUMERALS = gms/liter, M Na M = MAJOR = ≥5% m = MINOR = <5%>.1% T = TRACE = <.1%

	WM-181	WM-134	WM-186							
Ag										
Al										
B										
Be										
Ca										
Cd										
Co										
Cr										
Cu										
Fe										
Mg										
Mn										
Mo										
Na	36.6	56.2	36.5							
Ni										
Pb										
Si										
Sn										
Ti										
V										
Zn										
Zr										
Nd =	1.6	2.7	1.6							

Aattachment G: Original Analytical Analysis Results for 1971 Sample of WM-181 (Continued)

FORM ACC-113 (8-71)

ALLIED CHEMICAL CORPORATION

IDAHO CHEMICAL PROGRAMS - OPERATIONS OFFICE

Allied Chemical

SPECTROCHEMICAL ANALYSIS

DATE: RECEIVED 10-5-71

RUN

REPORTED 10/20/71

RECORD NO. P#554, P#557, P#553

SAMPLE DISPOSAL

RUN BY

APPROVED

LOG NO. 71-7155

CODE Second Cycle Waste

ACTIVITY (mR/hr)

REQUESTED BY D. W. Rhodes

REPORT RESULTS TO

CHARGE NO. [illegible]

DETERMINATIONS Gd, Al, [illegible]

NUMERALS = µg/ml

M = MAJOR = ≥ 5 % m = MINOR = <5%>.1% T = TRACE = <.1%

	WM-181	WM-171	WM-176			WM-171	WM-180	WM-176		
Ag										
Al	Major	Major	Major			15000	15000	9000		
B	T	—	T							
Be										
Ca	T	T	m							
Cd										
Co										
Cr	T	T	T							
C	T	T	T							
Fe	m	m	m							
Mg	T	T	m							
Mn	m	m	m							
Mo	T	T	T							
Na	Major	Major	Major							
Ni	T	T	T							
Pb	m	T	m							
[illegible]	T	T	T							
[illegible]	T	T	T							
[illegible]	T	T	T							
[illegible]	T	—	T							
[illegible]										
[illegible]	T	T	T			<10	<10	<10		
[illegible]	T-m	—	T-m							
[illegible]	T	—	—							

Attachment G: Original Analytical Analysis Results for 1971 Sample of WM-181 (Continued)

FORM ACC-2100 (7-71)

ALLIED CHEMICAL CORPORATION

IDAHO CHEMICAL PROGRAMS - OPERATIONS OFFICE

Allied Chemical

ANALYTICAL CHEMISTRY BRANCH

RADIO AND SPECIAL ANALYSIS GROUP REPORT SHEET

SAMPLE IDENTIFICATION _____ LOG NO. 7455

DATE COMPLETED 10-20-71 ANALYZED BY CW APPROVED BY [illegible]

RESULTS CORRECTED TO: time of test GWA NO. 20260-290-[illegible]

ION OR NUCLIDE	SAMPLE CODE: WM 186	WM 184	WM 181				
Zr^{95}	$< 2.30 \times 10^{3}$	$< 3.81 \times 10^{2}$	$< 8.65 \times 10^{3}$				
Nb^{95}	$< 1.23 \times 10^{3}$	$< 1.57 \times 10^{2}$	$< 3.77 \times 10^{3}$				
Ru^{106}	3.18×10^{5}	$< 5.52 \times 10^{3}$	$< 1.23 \times 10^{5}$				
Sb^{125}	2.47×10^{4}	8.77×10^{3}	$< 1.11 \times 10^{5}$				
Cs^{134}	3.87×10^{4}	9.61×10^{2}	3.74×10^{4}				
Cs^{137}	2.09×10^{6}	4.49×10^{5}	8.81×10^{6}				
Ce^{144}	1.03×10^{5}	$< 1.49 \times 10^{3}$	2.81×10^{4}				
Eu^{154}	9.71×10^{3}	1.07×10^{3}	2.59×10^{4}				
Co^{60}	—	3.71×10^{2}	—				
UNITS DATE/TIME	D/S/ML						

Attachment G: Original Analytical Analysis Results for 1971 Sample of WM-181 (Continued)

FORM INC-656 (9-67) IDAHO NUCLEAR CORPORATION

Second Cycle Waste 71-7455

		Pu					
		Conc. g/l		Isotopic Analysis 239	240	241	242
WM-	181	0.938×10^{-3}		86.1	8.6	4.9	0.4
WM-	184	1.89×10^{-3}		88.3	10.2	1.1	0.4
				88.26	10.28	1.06	0.40
WM-	186	Something in sample [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]					

Attachment H

Attachment H: Listing of FORTRAN Program REDUCE72

```
      PROGRAM REDUCE72
C
C-------- WRITTEN BY D.R. WENZEL
C
C           TO NORMALIZE AND SUM ORIGEN2 OUTPUTS
C           FOR CPP TANK FARM LEAK STUDY TO THE 1972 LEAK TIME
C
      CHARACTER * 1 ORGLINE1(111), ORGLINE2(111), ORGLINE3(111),
     +              ORGLINE4(111), ORGLINE7(111), ORGLINE8(111),
     +              ORGLINE9(111), ORGLINEA(111)
      CHARACTER * 9 RUN
      CHARACTER * 12 DESC1, DESC2, DESC3, DESC4,
     +               DESC7, DESC8, DESC9, DESCA
      CHARACTER * 111 BUFFER1, BUFFER2, BUFFER3, BUFFER4,
     +                BUFFER7, BUFFER8, BUFFER9, BUFFERA
      REAL      * 4 VALUE1(9), VALUE2(9), VALUE3(9), VALUE4(9),
     +              VALUE7(9), VALUE8(9), VALUE9(9), VALUEA(9)
      REAL      * 4 MTR1(9), MTR2(9), MTR3(9), MTR4(9)
      REAL      * 4 RED1(9), RED2(9), RED3(9), RED4(9)
C
C     AGE OF MTR FUEL   1    2     3     4     5     6     7     8
C     PROCESSING YEAR      74    73    72    71    70    69    68
      DATA MTR1 /0.,   0.,   0.,   0.,  30.,   0.,  10.,   0.,   0./
      DATA RED1 /1.,   1.,   1 ,   1.,   1.,   1., .92 ,   1.,   1./
C
C     AGE OF MTR FUEL        9    10    11    12    13    14    15
C     PROCESSING YEAR       67    66    65    64    63    62    61
      DATA MTR2 /0.,   0.,   0., 451., 110., 505., 795.,   0.,  45./
      DATA RED2 /1.,   1.,   1.,   1., .48 ,   1., .44 , .34 ,   1./
C
C     AGE OF MTR FUEL       16    17    18    19    20    21    22
C     PROCESSING YEAR       60    59    58    57    56    55    54
      DATA MTR3 /0.,   0., 420.,  91., 292., 505., 712.,1064.,   0./
      DATA RED3 /1.,   1.,   1.,   1.,   1.,   1.,   1.,   1.,   1./
C
C     AGE OF MTR FUEL       23    24    25    26    27    28    29
C     PROCESSING YEAR       53     0     0     0     0     0     0
      DATA MTR4 /0.,   0., 333.,   0.,   0.,   0.,   0.,   0.,   0./
      DATA RED4 /1.,   1.,   1.,   1.,   1.,   1.,   1.,   1.,   1./
C
C
C-------- DETERMINE RUN NAME
C
      CALL GETCL(RUN)
C
C-------- OPEN INPUT AND OUTPUT FILES
C
      OPEN(1,FILE ='MTR1.OUT', STATUS='OLD',FORM='FORMATTED',
     +     ERR = 900)
      OPEN(2,FILE ='MTR2.OUT', STATUS='OLD',FORM='FORMATTED',
```

Attachment H: Listing of FORTRAN Program REDUCE72 (Continued)

```
     +       ERR = 900)
       OPEN(3,FILE ='MTR3.OUT', STATUS='OLD',FORM='FORMATTED',
     +       ERR = 900)
       OPEN(4,FILE ='MTR4.OUT', STATUS='OLD',FORM='FORMATTED',
     +       ERR = 900)
       OPEN(6,FILE ='REDUCE.OUT', STATUS='UNKNOWN', ERR = 920)
       OPEN(7,FILE ='ACT1.OUT', STATUS='OLD',FORM='FORMATTED',
     +       ERR = 900)
       OPEN(8,FILE ='ACT2.OUT', STATUS='OLD',FORM='FORMATTED',
     +       ERR = 900)
       OPEN(9,FILE ='ACT3.OUT', STATUS='OLD',FORM='FORMATTED',
     +       ERR = 900)
       OPEN(10,FILE ='ACT4.OUT', STATUS='OLD',FORM='FORMATTED',
     +       ERR = 900)
C
       PRINT *,'Working -- have patience.'
C
       CORMTR = 98.689
       CORACT = 70.48
       WRITE(6,600) RUN
  600  FORMAT(A9)
C
C-------- READ PAST FIRST LINE
C
       READ(1,300) ORGLINE1
       READ(2,300) ORGLINE2
       READ(3,300) ORGLINE3
       READ(4,300) ORGLINE4
       READ(7,300) ORGLINE7
       READ(8,300) ORGLINE8
       READ(9,300) ORGLINE9
       READ(10,300) ORGLINEA
  300  FORMAT(111A1)
C
C-------- READ PAST SECOND LINE
C
       READ(1,300) ORGLINE1
       READ(2,300) ORGLINE2
       READ(3,300) ORGLINE3
       READ(4,300) ORGLINE4
       READ(7,300) ORGLINE7
       READ(8,300) ORGLINE8
       READ(9,300) ORGLINE9
       READ(10,300) ORGLINEA
C
C-------- READ PAST THIRD LINE
C
       READ(1,300) ORGLINE1
       READ(2,300) ORGLINE2
       READ(3,300) ORGLINE3
```

Attachment H: Listing of FORTRAN Program REDUCE72 (Continiued)

```
      READ(4,300) ORGLINE4
      READ(7,300) ORGLINE7
      READ(8,300) ORGLINE8
      READ(9,300) ORGLINE9
      READ(10,300) ORGLINEA
C
C-------- START DATA SUMMATION PROCESS
C
   40 READ(1,300,END=999) ORGLINE1
      READ(2,300,END=999) ORGLINE2
      READ(3,300,END=999) ORGLINE3
      READ(4,300,END=999) ORGLINE4
      READ(7,300,END=999) ORGLINE7
      READ(8,300,END=999) ORGLINE8
      READ(9,300,END=999) ORGLINE9
      READ(10,300,END=999) ORGLINEA
      WRITE(BUFFER1,300) ORGLINE1
      WRITE(BUFFER2,300) ORGLINE2
      WRITE(BUFFER3,300) ORGLINE3
      WRITE(BUFFER4,300) ORGLINE4
      WRITE(BUFFER7,300) ORGLINE7
      WRITE(BUFFER8,300) ORGLINE8
      WRITE(BUFFER9,300) ORGLINE9
      WRITE(BUFFERA,300) ORGLINEA
      READ(BUFFER1,400) DESC1, (VALUE1(I),I=1,9)
  400 FORMAT(A12,9X,9(1X,E9.4))
      READ(BUFFER2,400) DESC2, (VALUE2(I),I=1,9)
      READ(BUFFER3,400) DESC3, (VALUE3(I),I=1,9)
      READ(BUFFER4,400) DESC4, (VALUE4(I),I=1,9)
      READ(BUFFER7,400) DESC7, (VALUE7(I),I=1,9)
      READ(BUFFER8,400) DESC8, (VALUE8(I),I=1,9)
      READ(BUFFER9,400) DESC9, (VALUE9(I),I=1,9)
      READ(BUFFERA,400) DESCA, (VALUEA(I),I=1,9)
C
C------- CHECK TO BE SURE LISTS ARE IN THE SAME ORDER
C
      NUM = 2
      IF(DESC2 .NE. DESC1) GO TO 930
      NUM = 3
      IF(DESC3 .NE. DESC1) GO TO 931
      NUM = 4
      IF(DESC4 .NE. DESC1) GO TO 932
      NUM = 7
      IF(DESC7 .NE. DESC1) GO TO 933
      NUM = 8
      IF(DESC8 .NE. DESC1) GO TO 934
      NUM = 9
      IF(DESC9 .NE. DESC1) GO TO 935
      NUM = 10
      IF(DESCA .NE. DESC1) GO TO 936
      SUM = 0.
      DO 45, J=1,7
         K = 10 - J
         SUM = SUM * RED4(K)
         SUM = SUM + VALUE4(K) * MTR4(K) * CORMTR
         SUM = SUM + VALUEA(K) * MTR4(K) * CORACT
```

Attachment H: Listing of FORTRAN Program REDUCE72 (Continued)

```
   45  CONTINUE
C
       DO 46, J=1,7
          K = 10 - J
          SUM = SUM * RED3(K)
          SUM = SUM + VALUE3(K) * MTR3(K) * CORMTR
          SUM = SUM + VALUE9(K) * MTR3(K) * CORACT
   46  CONTINUE
       DO 47, J=1,7
          K = 10 - J
          SUM = SUM * RED2(K)
          SUM = SUM + VALUE2(K) * MTR2(K) * CORMTR
          SUM = SUM + VALUE8(K) * MTR2(K) * CORACT
   47  CONTINUE
       DO 48, J=1,7
          K = 10 - J
          SUM = SUM * RED1(K)
          SUM = SUM + VALUE1(K) * MTR1(K) * CORMTR
   48  CONTINUE
          SUM = SUM + VALUE7(K) * MTR1(K) * CORACT
       WRITE(6,401) DESC1,SUM
  401  FORMAT(A12,1PE10.3)
       GO TO 40
C
C-------- ERROR STATEMENTS
C
  900  WRITE(6,9000)
 9000  FORMAT(2X,'ERROR IN OPENING FILE ')
       GO TO 999
C
  920  WRITE(6,9020)
 9020  FORMAT(2X,'ERROR IN OPENING FILE 6')
       GO TO 999
C
  930  WRITE(6,9030) DESC1,DESC2,NUM
 9030  FORMAT(2X,2(2X,A2),5X,I1)
       GO TO 940
  931  WRITE(6,9030) DESC1,DESC3,NUM
       GO TO 940
  932  WRITE(6,9030) DESC1,DESC4,NUM
       GO TO 940
  933  WRITE(6,9030) DESC1,DESC7,NUM
       GO TO 940
  934  WRITE(6,9030) DESC1,DESC8,NUM
       GO TO 940
  935  WRITE(6,9030) DESC1,DESC7,NUM
       GO TO 940
  936  WRITE(6,9030) DESC1,DESC8,NUM
  940  WRITE(6,9040)
 9040  FORMAT(2X,'ERROR DETECTED IN THE ORDER OF THE RADIONUCLIDES')
C
C-------- PROGRAM END
C
  999  CONTINUE
```

Attachment I

Attachment I: Calculated Radionuclide Concentrations (D/s/mL) for 1972 and Decayed to 1975

Radionuclide	1972	1975	
H 3	8.617E-06	7.282E-06	Activation Products
BE 10	4.721E-07	4.721E-07	
C 14	1.731E-05	1.730E-05	
SI 32	2.072E-06	2.065E-06	
P 32	2.072E-06	2.065E-06	
S 35	3.791E-11	6.768E-15	
CL 36	5.575E-06	5.575E-06	
CA 45	5.014E-16	4.761E-18	
V 50	1.182E-13	1.182E-13	
FE 59	9.093E-18	4.252E-25	
CO 60	1.004E+04	6.766E+03	
NI 63	5.127E-07	5.013E-07	
SR 90	4.762E-07	4.434E-07	
Y 90	4.763E-07	4.435E-07	
Y 91	1.167E-18	2.688E-24	
ZR 93	4.570E-04	4.570E-04	
ZR 95	4.651E-20	3.251E-25	
NB 93M	2.174E-04	2.481E-04	
NB 94	8.033E+01	8.033E+01	
NB 95	4.761E-20	7.218E-25	
NB 95M	0.000E+00	2.412E-27	
TC 99	2.834E-16	2.834E-16	
TL207	2.753E-03	3.761E-03	Actinides and Daughters
TL208	4.248E-02	1.492E-02	
TL209	1.422E-07	1.486E-07	
PB209	6.582E-06	6.879E-06	
PB210	6.351E-05	1.053E-04	
PB211	2.761E-03	3.771E-03	
PB212	1.182E-01	4.151E-02	
PB214	4.415E-04	6.225E-04	
BI210	6.354E-05	1.053E-04	
BI211	2.761E-03	3.771E-03	
BI212	1.182E-01	4.151E-02	
BI213	6.581E-06	6.879E-06	
BI214	4.416E-04	6.225E-04	
PO210	5.694E-05	9.637E-05	
PO211	7.730E-06	1.056E-05	
PO212	7.574E-02	2.660E-02	
PO213	6.439E-06	6.731E-06	
PO214	4.414E-04	6.224E-04	
PO215	2.761E-03	3.771E-03	
PO216	1.182E-01	4.151E-02	
PO218	4.416E-04	6.226E-04	
AT217	6.581E-06	6.879E-06	
RN219	2.760E-03	3.771E-03	
RN220	1.182E-01	4.151E-02	
RN222	4.418E-04	6.226E-04	
FR221	6.581E-06	6.879E-06	
FR223	3.802E-05	5.196E-05	
RA223	2.761E-03	3.771E-03	
RA224	1.182E-01	4.151E-02	
RA225	6.581E-06	6.879E-06	
RA226	4.417E-04	6.226E-04	

Attachment I: Calculated Radionuclide Concentrations (D/s/mL) for 1972 and Decayed to 1975 (Continued)

Radionuclide	1972	1975	
RA228	1.967E-08	2.545E-08	Actinides and Daughters Continued
AC225	6.584E-06	6.879E-06	
AC227	2.756E-03	3.765E-03	
AC228	1.967E-08	2.545E-08	
TH227	2.723E-03	3.719E-03	
TH228	1.178E-01	4.130E-02	
TH229	6.580E-06	6.879E-06	
TH230	1.394E-01	1.400E-01	
TH231	4.749E+01	8.436E-01	
TH232	4.133E-08	4.135E-08	
TH234	6.104E-01	1.939E-01	
PA231	1.381E-02	1.387E-02	
PA233	1.349E+01	1.349E+01	
PA234M	6.106E-01	1.939E-01	
PA234	7.937E-04	2.521E-04	
U232	2.089E-03	2.507E-03	
U233	9.682E-04	1.151E-03	
U234	2.310E+01	2.314E+01	
U235	8.436E-01	8.436E-01	
U236	1.232E-01	1.232E-01	
U237	1.579E-02	7.694E-01	
U238	1.939E-01	1.939E-01	
U240	1.606E-10	9.039E-09	
NP235	7.201E-05	1.058E-05	
NP236	2.221E-05	2.221E-05	
NP237	1.349E+01	1.349E+01	
NP238	8.434E-05	8.320E-05	
NP239	1.191E-01	1.190E-01	
NP240M	9.038E-09	9.039E-09	
PU236	2.366E-02	1.141E-02	
PU237	4.929E-14	2.878E-21	
PU238	4.117E+03	4.021E+03	
PU239	2.369E+03	2.369E+03	
PU240	5.346E+02	5.344E+02	
PU241	3.624E+04	3.136E+04	
PU242	8.571E-02	8.571E-02	
PU243	2.283E-13	2.283E-13	
PU244	9.051E-09	9.051E-09	
PU246	0.000E+00	4.935E-23	
AM241	1.074E+03	1.230E+03	
AM242M	1.687E-02	1.664E-02	
AM242	1.679E-02	1.656E-02	
AM243	1.191E-01	1.190E-01	
AM245	0.000E+00	4.526E-20	
AM246	0.000E+00	4.935E-23	
CM242	1.447E-02	1.373E-02	
CM243	1.595E-03	1.483E-03	
CM244	9.267E-01	8.262E-01	
CM245	2.853E-05	2.852E-05	
CM246	6.383E-07	6.380E-07	
CM247	2.283E-13	2.283E-13	
CM248	6.967E-14	6.967E-14	
CM250	1.974E-22	1.974E-22	

Attachment I: Calculated Radionuclide Concentrations (D/s/mL) for 1972 and Decayed to 1975 (Continued)

Radionuclide	1972	1975	
BK249	3.349E-14	3.120E-15	Actinides and Daughters Continued
BK250	0.000E+00	2.764E-23	
CF249	1.497E-13	1.489E-13	
CF250	1.247E-13	1.064E-13	
CF251	3.470E-16	3.462E-16	
CF252	1.044E-15	4.745E-16	
H 3	2.536E+04	2.143E+04	Fission Products
BE 10	3.373E-04	3.373E-04	
C 14	1.360E-02	1.359E-02	
SE 79	4.897E+01	4.897E+01	
RB 87	3.290E-03	3.290E-03	
SR 89	5.307E-04	1.559E-10	
SR 90	8.553E+06	7.964E+06	
Y 90	8.556E+06	7.966E+06	
Y 91	1.772E-02	4.081E-08	
ZR 93	2.531E+02	2.531E+02	
NB 93M	1.186E+02	1.359E+02	
NB 94	2.617E-03	2.616E-03	
ZR 95	1.132E-01	7.915E-07	
NB 95	2.605E-01	1.757E-06	
NB 95M	8.398E-04	5.872E-09	
TC 98	5.224E-05	5.224E-05	
TC 99	1.703E+03	1.703E+03	
RH102	1.114E-01	5.440E-02	
RU103	3.409E-07	1.367E-15	
RH103M	3.074E-07	1.232E-15	
RU106	2.446E+04	3.108E+03	
RH106	2.445E+04	3.108E+03	
PD107	1.814E+00	1.814E+00	
AG108	1.279E-06	1.258E-06	
AG108M	1.436E-05	1.413E-05	
AG109M	1.121E-06	2.181E-07	
CD109	1.121E-06	2.181E-07	
AG110	3.065E-02	1.467E-03	
AG110M	2.305E+00	1.103E-01	
CD113M	8.112E+02	7.034E+02	
IN114	1.141E-13	2.486E-20	
IN114M	1.192E-13	2.597E-20	
CD115M	6.406E-09	2.570E-16	
IN115	1.709E-09	1.709E-09	
IN115M	4.501E-13	1.806E-20	
SN119M	3.002E+00	1.353E-01	
SN121M	8.795E+00	8.437E+00	
SN123	1.140E+00	3.180E-03	
TE123	1.336E-12	1.336E-12	
TE123M	6.545E-06	1.146E-08	
SB124	9.975E-07	3.306E-12	
SB125	3.969E+04	1.873E+04	
TE125M	9.685E+03	4.571E+03	
SN126	4.354E+01	4.354E+01	
SB126	6.096E+00	6.095E+00	
SB126M	4.354E+01	4.354E+01	

Attachment I: Calculated Radionuclide Concentrations (D/s/mL) for 1972 and Decayed to 1975 (Continued)

Radionuclide	1972	1975
TE127	8.665E-01	8.165E-04
TE127M	8.851E-01	8.336E-04
TE129	3.514E-11	5.352E-21
TE129M	5.398E-11	8.223E-21
I129	2.734E+00	2.734E+00
CS134	3.153E+04	1.150E+04
CS135	1.057E+01	1.057E+01
CS137	8.963E+06	8.363E+06
BA137M	8.475E+06	7.911E+06
LA138	2.456E-08	2.456E-08
CE141	9.053E-10	6.473E-20
CE142	3.380E-03	3.380E-03
CE144	1.200E+05	8.292E+03
PR144	1.199E+05	8.292E+03
PR144M	1.440E+03	9.950E+01
ND144	1.587E-07	1.587E-07
PM146	6.026E+00	4.129E+00
SM146	7.356E-07	7.907E-07
PM147	1.935E+06	8.761E+05
SM147	1.158E-03	1.184E-03
PM148	2.446E-10	2.515E-18
PM148M	4.339E-09	4.466E-17
SM148	2.979E-10	2.979E-10
SM149	1.512E-09	1.512E-09
EU150	8.471E-05	7.996E-05
SM151	1.072E+05	1.047E+05
EU152	6.358E+01	5.456E+01
GD152	7.216E-12	7.532E-12
GD153	2.196E-02	9.520E-04
EU154	3.845E+04	3.019E+04
EU155	4.528E+04	2.977E+04
TB160	4.842E-06	1.327E-10
HO166M	8.110E-04	8.096E-04
TM170	1.025E-09	2.790E-12
TM171	2.721E-08	9.213E-09

Attachment J

003725

SAMPLE ACTIVITY (dis/sec/g)

SAMPLE	Co-60	Sr-90	Zr-95	Ru-106	Cs-134	Cs-137	Eu-154	Pu-235	Pu-239-240
A53	1.17(2)[a]	9.27(3)	--	--	2.68(2)	1.20(5)	1.19(2)	3.33(2)	5.56(1)
A53-1	1.68(1)	[b]	--	--	2.54(2)	1.13(5)	3.90(2)	[b]	[b]
A53-2	9.7	1.15(4)	--	--	2.63(1)	8.50(3)	3.26(1)	2.03(1)	3.50
A53-3	1.31(1)	[b]	1.71(1)	--	4.09(1)	2.21(4)	1.71(2)	[b]	[b]
A53-4	8.5	1.54(4)	--	--	1.49(1)	6.65(3)	3.53(1)	2.30(1)	3.87
A53-5	3.25(1)	[b]	--	--	2.00(2)	8.92(4)	2.23(2)	[b]	[b]
A53-6	1.72(1)	[b]	--	--	3.99(1)	1.77(4)	8.46(1)	[b]	[b]
A53-8	--	[b]	--	--	--	2.50(2)	--	[b]	[b]
A53-9	1.16(1)	[b]	--	2.95(2)	--	6.49(1)	--	[b]	[b]
A53-10	2.04(1)	4.00(4)	--	--	1.20(2)	6.01(4)	2.51(2)	1.35(2)	2.29(1)
A53-11	--	[b]	--	--	--	3.00(2)	--	[b]	[b]
A53-12	--	[b]	--	--	--	1.15(2)	--	[b]	[b]
A53-13	--	[b]	--	--	1.10(1)	4.97(3)	2.71(1)	[b]	[b]
A53-14	--	[b]	--	--	--	1.05(2)	--	[b]	[b]
A53-15	1.25(1)	[b]	3.51(1)	--	9.22(1)	4.03(4)	2.03(2)	[b]	[b]
A55	1.47(1)	1.54(4)	--	--	1.94(1)	1.09(4)	3.03(1)	3.02(1)	4.96

[a] $1.17(2) = 1.17 \times 10^2$

[b] No analysis made

Attachment J: Results of 1975 Soil Sample Analyses

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Attachment K

Attachment K: ORIGEN2 Input and Output for Calculating Radionuclide Activity Concentrations for 1972 Release and Subsequent Decay Times

```
echo off
echo **                                                                  **
echo **                              O R I G E N 2                       **
echo **                                                                  **
copy mtr5.INP tape5.inp >nul
REM  (NOT USED IN THIS CASE) copy mtr5.u3 tape3.inp >nul
copy \origen2\libs\decay.lib+\origen2\libs\atr.lib tape9.inp >nul
copy \origen2\libs\gxuo2brm.lib tape10.inp >nul
\origen2\code\origen2
echo finished with origen2 calculation
rem  combine and save files from run
copy tape12.out+tape6.out mtr5.u6 >nul
copy tape13.out+tape11.out mtr5.u11 >nul
ren tape7.out mtr5.pch
ren tape15.out mtr5.dbg
ren tape16.out mtr5.vxs
ren tape50.out mtr5.ech
rem  cleanup files
del tape*.inp
del tape*.out
echo ***********************************************************************
echo ******************* O R I G E N 2 - Version 2.1 **********************
echo ********************** Execution Completed ***************************
echo ***********************************************************************
echo on
```

Attachment K: ORIGEN2 Input and Output for Calculating Radionuclide Activity Concentrations for 1972 Release and Subsequent Decay Times (Continued)

```
-1
-1
-1
  RDA      ORIGEN2, VERSION 2.1 (8-1-91) MTR
  BAS      ONE MTR ELEMENT
  CUT      -1
  LIP      0 0 0
  LIB      0  1 2 3  204  908  909   9   50  0  4  0
  TIT      ONE CYCLE FOR ONE MTR ELEMENT
  PHO      101  102  103  10
  INP      -1   1  -1  -1  1  1
  MOV      -1   1   0   1.0
  HED       1                                                    ELEMENT
  OPTL     8 8 8 8 5   8 5 8 8 8   8 8 8 8 8   8 8 8 8 8   8 8 8 8
  OPTA     8 8 8 8 5   8 5 8 8 8   8 8 8 8 8   8 8 8 8 8   8 8 8 8
  OPTF     8 8 8 8 5   8 5 8 8 8   8 8 8 8 8   8 8 8 8 8   8 8 8 8
  DEC        100.  1   2   5   0
  DEC       1000.  2   3   5   0
  DEC      10000   3   4   5   0
  DEC     100000.  4   5   5   0
  OUT       -5    1     -1    0
  OUT        5    1     -1    0
  END
  1   10010 2.322E-01  10020 2.896E-05  10030 8.926E-10 0 0.
  1   20030 1.022E-09  20040 1.299E-01  30060 3.758E-08 0 0.
  1   30070 1.910E-13  40090 9.045E-04  40100 2.112E-05 0 0.
  1   50100 1.271E-10  50110 3.837E-12  60120 8.636E+02 0 0.
  1   60130 9.596E+00  60140 3.882E-06  70140 6.536E-09 0 0.
  1   70150 7.863E-16  80160 1.268E-28 100200 2.249E-15 0 0.
  1  100210 1.202E-17 100220 1.602E-07 110230 1.256E-08 0 0.
  1  120240 3.017E-11 120250 1.946E-02 120260 8.598E-03 0 0.
  1  130270 9.067E-05 140280 2.679E+04 140290 1.362E+03 0 0.
  1  140300 9.149E+02 140320 1.205E-07 150310 1.307E+03 0 0.
  1  150320 7.257E-12 160320 8.298E+02 160330 6.705E+00 0 0.
  1  160340 3.670E+01 160350 8.939E-16 160360 1.027E-10 0 0.
  1  170350 1.771E-01 170360 1.689E-04 170370 1.963E-07 0 0.
  1  190390 1.472E-17 190410 5.525E-16 190420 3.751E-28 0 0.
  1  200430 7.087E-19 200440 4.575E-08 200450 2.815E-20 0 0.
  1  200460 1.750E-08 210450 5.326E-12 210460 2.050E-28 0 0.
  1  220460 1.653E-16 220470 1.613E-02 220480 5.409E-06 0 0.
  1  220490 4.190E-02 220500 1.639E-01 230500 6.610E-01 0 0.
  1  230510 1.295E+02 240500 2.394E+04 240520 4.612E+05 0 0.
  1  240530 5.274E+04 240540 1.340E+04 250550 1.619E+00 0 0.
  1  260560 1.809E+06 260570 4.324E+04 260580 5.555E+03 0 0.
  1  260590 1.848E-22 270590 2.859E+03 270600 8.875E+00 0 0.
  1  280600 4.216E+01 280610 2.576E-02 280620 7.601E-06 0 0.
  1  280630 8.309E-09 280640 1.440E-11 290630 9.138E-10 0 0.
  1  290650 1.338E-15 300640 6.998E-17 300660 1.697E-21 0 0.
  1  300670 4.435E-27 380870 2.345E-11 380880 5.537E-13 0 0.
  1  380890 1.159E-34 380900 3.490E-09 390890 5.621E-15 0 0.
  1  390900 8.751E-13 390910 4.758E-23 400900 1.873E-02 0 0.
  1  400910 5.658E-06 400920 3.463E-07 400930 1.818E-01 0 0.
  1  400940 3.398E-04 400950 2.164E-24 400960 1.625E-12 0 0.
  1  410930 2.902E+05 410931 7.689E-07 410940 4.286E+02 0 0.
```

Attachment K: ORIGEN2 Input and Output for Calculating Radionuclide Activity Concentrations for 1972 Release and Subsequent Decay Times (Continued)

```
1  410950 1.217E-24 410951 8.552E-28 420940 2.036E-01 0 0.
1  420950 3.339E+00 420960 4.509E-03 420970 2.168E-06 0 0.
1  420980 1.006E-09 421000 3.991E-17 430990 1.671E-14 0 0.
1  441000 2.168E-17      0 0.              0 0.        0 0.
2   20040 9.660E-01 812070 1.445E-11 812080 1.442E-10 0 0.
2  812090 3.475E-16 822060 1.018E-07 822070 5.954E-06 0 0.
2  822080 5.330E-04 822090 1.448E-12 822100 8.315E-07 0 0.
2  822110 1.118E-10 822120 8.505E-08 822140 1.346E-11 0 0.
2  832090 1.905E-08 832100 5.119E-10 832110 6.596E-12 0 0.
2  832120 8.067E-09 832130 3.402E-13 832140 9.998E-12 0 0.
2  842100 1.267E-08 842110 8.093E-17 842120 4.268E-19 0 0.
2  842130 5.104E-22 842140 1.375E-18 842150 9.361E-17 0 0.
2  842160 3.394E-13 842180 1.561E-12 852170 4.087E-18 0 0.
2  862190 2.121E-13 862200 1.281E-10 862220 2.871E-09 0 0.
2  872210 3.711E-14 872230 9.827E-13 882230 5.389E-08 0 0.
2  882240 7.419E-07 882250 1.678E-10 882260 4.466E-04 0 0.
2  882280 8.402E-11 892250 1.134E-10 892270 3.808E-05 0 0.
2  892280 8.771E-15 902270 8.855E-08 902280 1.437E-04 0 0.
2  902290 3.092E-05 902300 6.903E+00 902310 8.930E-05 0 0.
2  902320 3.767E-01 902340 2.635E-05 912310 2.923E-01 0 0.
2  912330 6.498E-04 912341 8.887E-10 912340 3.969E-10 0 0.
2  922300 1.017E-40 922320 9.758E-05 922330 9.998E-02 0 0.
2  922340 3.696E+03 922350 3.901E+05 922360 1.903E+03 0 0.
2  922370 1.934E-07 922380 5.765E+05 922400 1.733E-16 0 0.
2  932350 5.131E-08 932360 1.685E-03 932370 1.913E+04 0 0.
2  932380 3.253E-10 932390 5.131E-07 932401 8.533E-17 0 0.
2  942360 4.451E-05 942370 4.078E-18 942380 2.404E+02 0 0.
2  942390 3.810E+04 942400 2.345E+03 942410 3.516E+02 0 0.
2  942420 2.244E+01 942430 8.768E-20 942440 5.101E-04 0 0.
2  942460 1.008E-27 952410 3.127E+02 952421 1.735E-03 0 0.
2  952420 2.076E-08 952430 5.970E-01 952450 7.923E-26 0 0.
2  952460 1.614E-30 962410 5.270E-27 962420 4.376E-06 0 0.
2  962430 3.089E-05 962440 1.145E-02 962450 1.661E-04 0 0.
2  962460 2.077E-06 962470 2.460E-09 962480 1.638E-11 0 0.
2  962500 2.401E-21 972490 2.043E-17 972500 7.100E-30 0 0.
2  982490 3.652E-14 982500 1.140E-15 982510 2.187E-16 0 0.
2  982520 1.940E-18      0 0.              0 0.        0 0.
3   10030 2.627E+00  30060 4.333E-02  30070 1.175E-03 0 0.
3   40090 2.264E-03  40100 1.509E-02  60140 3.049E-03 0 0.
3  300660 6.004E-06 300670 2.656E-07 300680 5.242E-10 0 0.
3  310690 1.092E-13 320700 4.828E-17 310710 6.825E-05 0 0.
3  320720 8.483E-01 320730 3.032E+00 320740 7.966E+00 0 0.
3  330750 1.950E+01 320760 5.853E+01 340760 8.322E-02 0 0.
3  340770 1.315E+02 340780 2.720E+02 340790 7.027E+02 0 0.
3  350790 1.025E-01 340800 1.690E+03 350810 2.893E+03 0 0.
3  340820 4.577E+03 370850 1.653E+04 370860 4.595E-31 0 0.
3  380860 7.511E+00 370870 3.758E+04 380870 5.217E-02 0 0.
3  380880 5.422E+04 380890 1.826E-08 390890 7.147E+04 0 0.
3  380900 6.268E+04 390900 1.572E+01 400900 2.387E+04 0 0.
3  390910 7.224E-07 400910 8.964E+04 400920 9.264E+04 0 0.
3  400930 1.007E+05 410930 2.037E-01 410931 4.194E-01 0 0.
3  400940 9.858E+04 410940 1.396E-02 400950 5.268E-06 0 0.
3  410950 6.659E-06 410951 2.204E-09 420950 1.022E+05 0 0.
3  400960 1.014E+05 420960 2.271E+01 420970 9.746E+04 0 0.
3  420980 9.625E+04 430980 6.010E-02 430990 1.004E+05 0 0.
```

```
3  440990 4.462E+00 421000 1.057E+05 441000 1.384E+03 0 0.
3  441010 8.575E+04 441020 7.305E+04 451020 9.216E-05 0 0.
3  441030 1.056E-11 451030 5.399E+04 451031 9.445E-15 0 0.
3  441040 3.332E+04 461040 3.824E+02 461050 1.368E+04 0 0.
3  441060 7.307E+00 451060 6.867E-06 461060 1.259E+04 0 0.
3  461070 3.525E+03 471070 5.137E-03 461080 1.709E+03 0 0.
3  471080 1.740E-15 471081 5.509E-07 481080 5.507E-04 0 0.
3  471090 8.085E+02 471091 4.287E-16 481090 4.340E-10 0 0.
3  461100 6.173E+02 471100 7.349E-12 471101 4.850E-04 0 0.
3  481100 6.489E+01 481110 4.959E+02 481120 3.810E+02 0 0.
3  481130 3.352E+01 481131 3.739E+00 491130 3.311E+00 0 0.
3  481140 6.520E+02 491140 8.287E-23 491141 5.152E-18 0 0.
3  501140 6.979E-05 481151 2.515E-13 491150 2.746E+02 0 0.
3  491151 7.100E-20 501150 1.077E+01 481160 3.299E+02 0 0.
3  501160 3.546E+01 501170 3.248E+02 501180 3.610E+02 0 0.
3  501190 3.456E+02 501191 6.701E-04 501200 3.618E+02 0 0.
3  501211 1.487E-01 511210 3.804E+02 501220 4.059E+02 0 0.
3  521220 3.204E+00 501230 1.386E-04 511230 4.827E+02 0 0.
3  521230 4.595E-03 521231 7.375E-10 501240 6.363E+02 0 0.
3  511240 5.700E-11 521240 3.766E+00 511250 3.842E+01 0 0.
3  521250 7.996E+02 521251 5.375E-01 501260 1.534E+03 0 0.
3  511260 7.289E-05 511261 5.541E-07 521260 3.188E+01 0 0.
3  521270 3.282E-07 521271 9.380E-05 531270 3.494E+03 0 0.
3  521280 8.587E+03 521290 1.677E-18 521291 1.791E-15 0 0.
3  531290 1.548E+04 521300 3.299E+04 561320 1.357E-03 0 0.
3  551330 1.463E+05 551340 2.436E+01 561340 1.309E+03 0 0.
3  551350 9.180E+03 561350 5.619E-02 561360 1.891E+02 0 0.
3  551370 1.030E+05 561370 3.773E+04 561371 1.575E-02 0 0.
3  561380 1.575E+05 571380 1.279E+00 571390 1.503E+05 0 0.
3  581400 1.463E+05 581410 3.177E-14 591410 1.390E+05 0 0.
3  581420 1.408E+05 601420 4.211E+01 591430 6.762E-38 0 0.
3  601430 1.386E+05 581440 3.759E+01 591440 1.587E-03 0 0.
3  591441 7.936E-06 601440 1.341E+05 601450 9.348E+04 0 0.
3  601460 7.454E+04 611460 1.353E-02 621460 2.102E-02 0 0.
3  611470 2.087E+03 621470 5.093E+04 601480 9.865E+02 0 0.
3  611480 1.488E-15 611481 2.030E-13 621480 9.865E+02 0 0.
3  621490 6.295E+03 601500 1.637E+04 621500 2.195E+04 0 0.
3  631500 1.279E-06 621510 4.073E+03 631510 4.500E+02 0 0.
3  621520 1.166E+04 631520 3.675E-01 641520 3.312E-01 0 0.
3  631530 5.541E+03 641530 6.224E-06 621540 2.264E+03 0 0.
3  631540 1.424E+02 641540 2.688E+02 631550 9.731E+01 0 0.
3  641550 4.879E+02 631560 7.766E-36 641560 7.712E+02 0 0.
3  641570 2.525E+01 641580 3.711E+02 651590 3.661E+01 0 0.
3  641600 1.453E+01 651600 4.288E-10 661600 8.165E-01 0 0.
3  661610 3.970E+00 661620 1.887E+00 661630 8.844E-01 0 0.
3  661640 2.573E-01 671650 1.972E-01 671661 4.517E-04 0 0.
3  681660 7.780E-02 681670 2.668E-02 681680 1.160E-02 0 0.
3  691690 1.536E-05 681700 2.153E-10 691700 1.716E-13 0 0.
3  701700 1.473E-07 691710 2.498E-11 701710 1.741E-09 0 0.
3  701720 3.201E-12      0 0.              0 0.        0 0.
0
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Attachment K: ORIGEN2 Input and Output for Calculating Radionuclide Activity Concentrations for 1972 Release and Subsequent Decay Times (Continued)

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mtr5
ORIGEN2 V2.1 (8-1-91), Run on 06/18/97    at 12:00:12
            0.0YR       100.0YR  1000.0YR 1.0E+04YR 1.0E+05YR

 H  3       8.617E-06 3.147E-08 0.000E+00 0.000E+00 0.000E+00
BE 10       4.721E-07 4.721E-07 4.719E-07 4.701E-07 4.521E-07
 C 14       1.731E-05 1.710E-05 1.534E-05 5.162E-06 9.638E-11
SI 32       2.072E-06 1.862E-06 7.133E-07 4.843E-11 0.000E+00
 P 32       2.072E-06 1.862E-06 7.133E-07 4.844E-11 0.000E+00
CL 36       5.575E-06 5.573E-06 5.562E-06 5.448E-06 4.428E-06
 V 50       1.182E-13 1.182E-13 1.182E-13 1.182E-13 1.182E-13
CO 60       1.004E+04 1.946E-02 0.000E+00 0.000E+00 0.000E+00
NI 63       5.127E-07 2.414E-07 2.753E-10 0.000E+00 0.000E+00
SR 90       4.762E-07 4.407E-08 2.191E-17 0.000E+00 0.000E+00
 Y 90       4.763E-07 4.408E-08 2.192E-17 0.000E+00 0.000E+00
ZR 93       4.570E-04 4.570E-04 4.568E-04 4.549E-04 4.367E-04
NB 93M      2.174E-04 4.328E-04 4.339E-04 4.322E-04 4.149E-04
NB 94       8.033E+01 8.006E+01 7.764E+01 5.710E+01 2.642E+00
TC 99       2.834E-16 2.833E-16 2.825E-16 2.743E-16 2.047E-16

TL207       2.753E-03 1.454E-02 3.113E-02 1.736E-01 7.980E-01
TL208       4.248E-02 4.324E-04 8.056E-07 7.229E-07 8.738E-07
TL209       1.422E-07 9.386E-07 6.098E-05 4.574E-03 1.053E-01
PB209       6.582E-06 4.345E-05 2.823E-03 2.117E-01 4.877E+00
PB210       6.351E-05 4.769E-03 9.024E-02 1.754E+00 1.253E+01
PB211       2.761E-03 1.458E-02 3.122E-02 1.741E-01 8.003E-01
PB212       1.182E-01 1.203E-03 2.242E-06 2.012E-06 2.432E-06
PB214       4.415E-04 6.779E-03 9.026E-02 1.754E+00 1.253E+01
BI210       6.354E-05 4.769E-03 9.024E-02 1.754E+00 1.253E+01
BI211       2.761E-03 1.458E-02 3.122E-02 1.741E-01 8.003E-01
BI212       1.182E-01 1.203E-03 2.242E-06 2.012E-06 2.432E-06
BI213       6.581E-06 4.345E-05 2.823E-03 2.117E-01 4.877E+00
BI214       4.416E-04 6.779E-03 9.026E-02 1.754E+00 1.253E+01
PO210       5.694E-05 4.769E-03 9.024E-02 1.754E+00 1.253E+01
PO211       7.730E-06 4.084E-05 8.741E-05 4.876E-04 2.241E-03
PO212       7.574E-02 7.711E-04 1.436E-06 1.289E-06 1.558E-06
PO213       6.439E-06 4.251E-05 2.762E-03 2.072E-01 4.771E+00
PO214       4.414E-04 6.778E-03 9.024E-02 1.754E+00 1.253E+01
PO215       2.761E-03 1.458E-02 3.122E-02 1.741E-01 8.003E-01
PO216       1.182E-01 1.203E-03 2.242E-06 2.012E-06 2.432E-06
PO218       4.416E-04 6.781E-03 9.028E-02 1.754E+00 1.253E+01
AT217       6.581E-06 4.345E-05 2.823E-03 2.117E-01 4.877E+00
RN219       2.760E-03 1.458E-02 3.122E-02 1.741E-01 8.003E-01
RN220       1.182E-01 1.203E-03 2.242E-06 2.012E-06 2.432E-06
RN222       4.418E-04 6.781E-03 9.028E-02 1.754E+00 1.253E+01
FR221       6.581E-06 4.345E-05 2.823E-03 2.117E-01 4.877E+00
FR223       3.802E-05 2.013E-04 4.308E-04 2.403E-03 1.104E-02
RA223       2.761E-03 1.458E-02 3.122E-02 1.741E-01 8.003E-01
RA224       1.182E-01 1.203E-03 2.242E-06 2.012E-06 2.432E-06
RA225       6.581E-06 4.345E-05 2.823E-03 2.117E-01 4.877E+00
RA226       4.417E-04 6.781E-03 9.028E-02 1.754E+00 1.253E+01
RA228       1.967E-08 4.194E-08 4.778E-08 1.303E-07 1.338E-06
AC225       6.584E-06 4.345E-05 2.823E-03 2.117E-01 4.877E+00
AC227       2.756E-03 1.458E-02 3.122E-02 1.741E-01 8.003E-01
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Attachment K: ORIGEN2 Input and Output for Calculating Radionuclide Activity Concentrations for 1972 Release and Subsequent Decay Times (Continued)

mtr5
ORIGEN2 V2.1 (8-1-91), Run on 06/18/97 at 12:00:12

	0.0YR	100.0YR	1000.0YR	1.0E+04YR	1.0E+05YR
AC228	1.967E-08	4.194E-08	4.778E-08	1.303E-07	1.338E-06
TH227	2.723E-03	1.438E-02	3.079E-02	1.717E-01	7.892E-01
TH228	1.178E-01	1.203E-03	2.242E-06	2.012E-06	2.432E-06
TH229	6.580E-06	4.345E-05	2.823E-03	2.117E-01	4.877E+00
TH230	1.394E-01	1.605E-01	3.572E-01	2.213E+00	1.251E+01
TH231	4.749E+01	8.438E-01	8.459E-01	8.638E-01	9.199E-01
TH232	4.133E-08	4.194E-08	4.778E-08	1.303E-07	1.338E-06
TH234	6.104E-01	1.939E-01	1.939E-01	1.939E-01	1.939E-01
PA231	1.381E-02	1.557E-02	3.121E-02	1.741E-01	8.003E-01
PA233	1.349E+01	1.355E+01	1.385E+01	1.391E+01	1.351E+01
PA234M	6.106E-01	1.939E-01	1.939E-01	1.939E-01	1.939E-01
PA234	7.937E-04	2.521E-04	2.521E-04	2.521E-04	2.521E-04
U232	2.089E-03	1.171E-03	2.189E-06	1.882E-06	1.094E-06
U233	9.682E-04	6.879E-03	6.081E-02	5.959E-01	4.857E+00
U234	2.310E+01	2.390E+01	2.451E+01	2.390E+01	1.856E+01
U235	8.436E-01	8.438E-01	8.459E-01	8.638E-01	9.199E-01
U236	1.232E-01	1.247E-01	1.382E-01	2.207E-01	2.716E-01
U237	1.579E-02	7.217E-03	6.453E-10	3.097E-10	2.010E-13
U238	1.939E-01	1.939E-01	1.939E-01	1.939E-01	1.939E-01
U240	1.606E-10	9.039E-09	9.039E-09	9.038E-09	9.031E-09
NP236	2.221E-05	2.219E-05	2.207E-05	2.091E-05	1.215E-05
NP237	1.349E+01	1.355E+01	1.385E+01	1.391E+01	1.351E+01
NP238	8.434E-05	5.346E-05	8.825E-07	1.326E-24	0.000E+00
NP239	1.191E-01	1.179E-01	1.084E-01	4.654E-02	9.928E-06
NP240M	9.038E-09	9.039E-09	9.039E-09	9.038E-09	9.031E-09
PU236	2.366E-02	1.997E-06	1.987E-06	1.882E-06	1.094E-06
PU238	4.117E+03	1.869E+03	1.527E+00	5.207E-22	0.000E+00
PU239	2.369E+03	2.362E+03	2.302E+03	1.776E+03	1.329E+02
PU240	5.346E+02	5.289E+02	4.808E+02	1.851E+02	1.328E-02
PU241	3.624E+04	2.942E+02	2.634E-05	1.264E-05	8.203E-09
PU242	8.571E-02	8.570E-02	8.556E-02	8.419E-02	7.166E-02
PU243	2.283E-13	2.283E-13	2.283E-13	2.282E-13	2.273E-13
PU244	9.051E-09	9.051E-09	9.051E-09	9.050E-09	9.043E-09
PU246	0.000E+00	4.935E-23	4.761E-23	3.358E-23	9.312E-25
AM241	1.074E+03	1.968E+03	4.672E+02	2.646E-04	8.643E-09
AM242M	1.687E-02	1.069E-02	1.765E-04	2.651E-22	0.000E+00
AM242	1.679E-02	1.064E-02	1.756E-04	2.638E-22	0.000E+00
AM243	1.191E-01	1.179E-01	1.084E-01	4.654E-02	9.928E-06
AM246	0.000E+00	4.935E-23	4.761E-23	3.358E-23	9.312E-25
CM242	1.447E-02	8.798E-03	1.452E-04	2.188E-22	0.000E+00
CM243	1.595E-03	1.401E-04	4.370E-14	0.000E+00	0.000E+00
CM244	9.267E-01	2.017E-02	2.210E-17	0.000E+00	0.000E+00
CM245	2.853E-05	2.830E-05	2.630E-05	1.262E-05	8.189E-09
CM246	6.383E-07	6.290E-07	5.513E-07	1.475E-07	2.768E-13
CM247	2.283E-13	2.283E-13	2.283E-13	2.282E-13	2.273E-13
CM248	6.967E-14	6.965E-14	6.953E-14	6.826E-14	5.679E-14
CM250	1.974E-22	1.974E-22	1.903E-22	1.343E-22	2.737E-24
BK250	0.000E+00	2.764E-23	2.666E-23	1.881E-23	5.215E-25
CF249	1.497E-13	1.229E-13	2.072E-14	3.855E-22	0.000E+00
CF250	1.247E-13	6.230E-16	2.666E-23	1.881E-23	5.215E-25

Attachment K: ORIGEN2 Input and Output for Calculating Radionuclide Activity Concentrations for 1972 Release and Subsequent Decay Times (Continued)

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mtr5
ORIGEN2 V2.1 (8-1-91), Run on 06/18/97    at 12:00:12
            0.0YR        100.0YR  1000.0YR 1.0E+04YR 1.0E+05YR

CF251       3.470E-16 3.212E-16 1.604E-16 1.543E-19 0.000E+00
CF252       1.044E-15 4.050E-27 0.000E+00 0.000E+00 0.000E+00

 H  3       2.536E+04 9.261E+01 0.000E+00 0.000E+00 0.000E+00
BE 10       3.373E-04 3.373E-04 3.372E-04 3.359E-04 3.230E-04
 C 14       1.360E-02 1.343E-02 1.205E-02 4.055E-03 7.570E-08
SE 79       4.897E+01 4.892E+01 4.845E+01 4.402E+01 1.685E+01
RB 87       3.290E-03 3.290E-03 3.290E-03 3.290E-03 3.290E-03
SR 90       8.553E+06 7.914E+05 3.936E-04 0.000E+00 0.000E+00
 Y 90       8.556E+06 7.916E+05 3.937E-04 0.000E+00 0.000E+00
ZR 93       2.531E+02 2.531E+02 2.530E+02 2.520E+02 2.419E+02
NB 93M      1.186E+02 2.397E+02 2.404E+02 2.394E+02 2.298E+02
NB 94       2.617E-03 2.608E-03 2.529E-03 1.860E-03 8.606E-05
TC 98       5.224E-05 5.224E-05 5.223E-05 5.215E-05 5.138E-05
TC 99       1.703E+03 1.702E+03 1.697E+03 1.648E+03 1.230E+03
RH102       1.114E-01 4.641E-12 0.000E+00 0.000E+00 0.000E+00
PD107       1.814E+00 1.814E+00 1.814E+00 1.812E+00 1.795E+00
AG108       1.279E-06 7.407E-07 5.451E-09 2.539E-30 0.000E+00
AG108M      1.436E-05 8.323E-06 6.124E-08 2.852E-29 0.000E+00
CD113M      8.112E+02 7.011E+00 1.885E-18 0.000E+00 0.000E+00
IN115       1.709E-09 1.709E-09 1.709E-09 1.709E-09 1.709E-09
SN121M      8.795E+00 2.197E+00 8.323E-06 0.000E+00 0.000E+00
TE123       1.336E-12 1.336E-12 1.336E-12 1.336E-12 1.336E-12
SB125       3.969E+04 5.377E-07 0.000E+00 0.000E+00 0.000E+00
TE125M      9.685E+03 1.312E-07 0.000E+00 0.000E+00 0.000E+00
SN126       4.354E+01 4.351E+01 4.324E+01 4.062E+01 2.177E+01
SB126       6.096E+00 6.091E+00 6.053E+00 5.687E+00 3.048E+00
SB126M      4.354E+01 4.351E+01 4.324E+01 4.062E+01 2.177E+01
 I129       2.734E+00 2.734E+00 2.734E+00 2.733E+00 2.722E+00
CS134       3.153E+04 7.933E-11 0.000E+00 0.000E+00 0.000E+00
CS135       1.057E+01 1.057E+01 1.057E+01 1.054E+01 1.026E+01
CS137       8.963E+06 8.892E+05 8.276E-04 0.000E+00 0.000E+00
BA137M      8.475E+06 8.412E+05 7.829E-04 0.000E+00 0.000E+00
LA138       2.456E-08 2.456E-08 2.456E-08 2.456E-08 2.456E-08
CE142       3.380E-03 3.380E-03 3.380E-03 3.380E-03 3.380E-03
ND144       1.587E-07 1.587E-07 1.587E-07 1.587E-07 1.587E-07
PM146       6.026E+00 2.027E-05 0.000E+00 0.000E+00 0.000E+00
SM146       7.356E-07 9.108E-07 9.108E-07 9.107E-07 9.099E-07
PM147       1.935E+06 6.490E-06 0.000E+00 0.000E+00 0.000E+00
SM147       1.158E-03 1.205E-03 1.205E-03 1.205E-03 1.205E-03
SM148       2.979E-10 2.979E-10 2.979E-10 2.979E-10 2.979E-10
SM149       1.512E-09 1.512E-09 1.512E-09 1.512E-09 1.512E-09
EU150       8.471E-05 1.235E-05 3.681E-13 0.000E+00 0.000E+00
SM151       1.072E+05 4.962E+04 4.844E+01 0.000E+00 0.000E+00
EU152       6.358E+01 3.891E-01 4.674E-21 0.000E+00 0.000E+00
GD152       7.216E-12 9.433E-12 9.447E-12 9.447E-12 9.447E-12
EU154       3.845E+04 1.215E+01 0.000E+00 0.000E+00 0.000E+00
EU155       4.528E+04 3.852E-02 0.000E+00 0.000E+00 0.000E+00
HO166M      8.110E-04 7.655E-04 4.551E-04 2.515E-06 0.000E+00
TM171       2.721E-08 5.701E-24 0.000E+00 0.000E+00 0.000E+00
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