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Technology for Commercial Radioactive Waste Management

Volume 5 of 5

May 1979

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10.0 WASTE MANAGEMENT SYSTEM ANALYSIS

10.0 WASTE MANAGEMENT SYSTEM

An analysis of the complete waste management system was developed to assess the total impact of managing radioactive wastes generated over the entire lifetime of a nuclear power system. The analysis considers the treatment and disposal of all post-fission TRU,* gaseous and airborne and decommissioning wastes. Each radioactive waste stream is tracked each year from its origin through treatment, storage, transport and accumulation in a geologic repository.

The reference system (see Section 3.10) is based on 400 GWe of nuclear power installed in the year 2000 and produces approximately 10,000 GWe-years of electric energy. An alternative low-growth projection based on 255 GWe in the year 2000 is also considered, but for fewer cases. This system produces approximately 6400 GWe year of electric energy. Capacity additions beyond the year 2000 are not considered a part of this system. After 40 years of operation each nuclear power plant is shut down and decommissioned. Thus, the last nuclear power plant is shut down in the year 2040. The last fuel reprocessing plant is shut down in the year 2044 and dismantled in the year 2075. Thus, the system operation encompasses a 101-year period from 1975 through 2075. In addition, the decay of radioactivity in the final repositories is followed over a million year period. The fuel cycle cases include:

Reference Projection

Case 1	Once-through cycle - repository available in 1985
Case 2a	Uranium-only recycle with plutonium in the SHLW - repository available in 1985
Case 2b	Uranium only recycle with plutonium stored as PuO_2 - repository available in 1985
Case 3a	Uranium and plutonium recycle - repository available in 1985
Case 3b	Uranium and plutonium recycle - repository available in 2000
Case 4a**	Once-through cycle - repository available in 2000
Case 4a**	Defer decision to implement once-through fuel cycle to 2000
Case 4b	Defer decision to implement uranium and plutonium recycle to 2000.

Low-Growth Projection

Case 1	Once-through cycle - repository available in 1985
Case 3a	Uranium and plutonium recycle - repository available in 1985

Further descriptions of these cases are presented in Section 3.1.

Results of calculations reported here for each fuel cycle case include:

- quantities of all treated wastes
- radioactivity and heat generation rates of each treated waste component
- radioactivity and heat accumulations in repositories by nuclide, waste type and totals
- costs for each major waste management function, and
- unit power and fuel costs for the total waste management system.

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* The term TRU wastes is used here in the broad sense that includes spent fuel in the once-through cycle and high-level waste in the reprocessing cycles.

** Case 4a serves a dual purpose.

Summary results are presented in the text of this section with detailed results tabulated in the Appendices. Whereas costs in previous sections of this report have been presented as 1976 constant dollar costs, all costs in this waste management system section have been converted to 1978 constant dollars.

Radioactivity releases from each waste management operation and resulting population radiation doses were also calculated for the entire system for each fuel cycle case. These results are presented in DOE/ET-0029.

10.1 SYSTEM SIMULATION

10.1 SYSTEM SIMULATION

A fundamental requirement for analyzing the complete waste management system was the development of a computer simulation of the system. A computer model consisting of four major modules was developed for this purpose. The four modules are:

- fuel irradiation calculations
- fuel cycle logistics calculations
- waste processing logistics calculations
- waste management impact calculations.

The information flow for this computer simulation is presented in Figure 10.1.1.

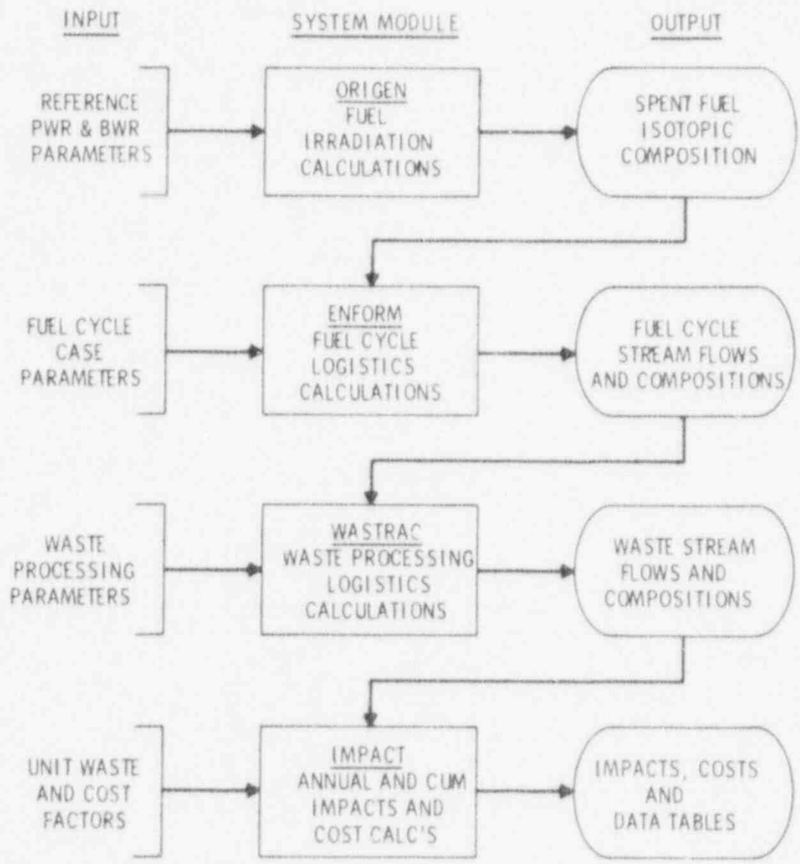

FIGURE 10.1.1. System Simulation Information Flow

10.1.1 Fuel Irradiation Calculations

Development of the data base for the system simulation starts with preparation of a series of ORIGEN[1] code runs to define the isotopic composition of the spent fuel. The ORIGEN code calculates the average composition of the spent fuel discharged from a reactor core or core region based on a set of input parameters that characterize the irradiation conditions. It calculates a complete composition including all fission products, actinides and activation products. The specific list of isotopes to be calculated can be selected as an input variable. A set of

neutron cross sections and spectral indices were used that had been calibrated to match results of empirically measured spent fuel compositions. Isotopic data were calculated for 175 nuclides, including all significant fission products, activation products and actinides.

Twenty-eight ORIGEN cases representing both PWR and BWR fuel irradiations describe the spent fuel compositions for all of the fuel cycle alternatives. These cases are identified in Table 10.1.1 and include separate cases for each enrichment zone of the initial cores, a first reload and equilibrium reload fuel batch and three recycle fuel batches for both uranium and plutonium recycle. In addition, the low exposure fuel batches remaining when a plant is shut down for decommissioning are described. Whether recycling or not, all plants start up and shut down without recycle fuel in the core. Recycle of either uranium or plutonium is limited to equilibrium fuel reloads and the amount of either recycle fuel in any year is limited to 50% of the equilibrium reload fuel.

TABLE 10.1.1. ORIGEN Cases[(a)]

	PWR Plants				BWR Plants			
	Once-Through Cases	U-Only Recycle Cases	U & Pu Recycle Cases	Fuel Exposure MWD/MTHM	Once-Through Cases	U-Only Recycle Cases	U & Pu Recycle Cases	Fuel Exposure MWD/MTHM
1st Discharge	1	1	1	15,000	6	6	6	10,000
2nd Discharge	2	2	2	25,000	7	7	7	17,000
3rd Discharge	3	3	3	33,000	8	8	8	20,000
4th Discharge	NA	NA	NA	NA	9	9	9	21,000
1st Reload	4	4	4	33,000	10	10	10	26,000
Equil. Reload	5	5	5	33,000	11	11	11	27,000
1st U Recycle	NA	12	12	33,000	NA	15	15	27,000
2nd U Recycle	NA	13	13	33,000	NA	16	16	27,000
3rd U Recycle	NA	14	14	33,000	NA	17	17	27,000
1st Pu Recycle	NA	NA	18	33,000	NA	NA	21	27,000
2nd Pu Recycle	NA	NA	19	33,000	NA	NA	22	27,000
3rd Pu Recycle	NA	NA	20	33,000	NA	NA	23	27,000
Shutdown Zone 1	24	24	24	11,000	26	26	26	7,000
Shutdown Zone 2	25	25	25	22,000	27	27	27	13,000
Shutdown Zone 3	NA	NA	NA	NA	28	28	28	20,000

NA = Not Applicable

a. These ORIGEN case numbers should not be confused with the fuel cycle system case numbers used elsewhere.

By combining these data in appropriate combinations to match the operating status of all plants in the system and the amount of uranium and plutonium available for recycle, the spent fuel composition in any year can be determined. This one set of ORIGEN data is used to describe the spent fuel composition without recycle or when recycling either uranium or plutonium or both.

The number of recycles for either uranium or plutonium is limited to three. However, the amount of third recycle uranium and plutonium is small. In addition, the accumulation of ^{242}Pu in the third recycle plutonium discharge reduces its value substantially. Thus, to simplify the calculation, the discharge from third recycle fuel is discarded.

This method of using a relatively small number of fuel irradiation (burnup) calculations to characterize a large number of spent fuel combinations provides an efficient and reasonably accurate representation of spent fuel compositions year by year for the entire system.

10.1.2 Fuel Cycle Logistics

A computer code (ENFORM), developed prior to this study, was used to analyze fuel cycle logistics. ENFORM was developed to evaluate environmental impacts of the entire fuel cycle. However, only the fuel cycle logistics capabilities were used here as input to a separate module, developed during this study, to determine waste management impacts in detail. The ENFORM code has a capability to produce detailed material and isotopic flows in a nuclear fuel cycle as a function of time. A more complete description of the code's capabilities can be found in reference 2.

Essential ENFORM input information includes:

- a nuclear power growth projection
- an operating schedule for the nuclear power plants
- recycle assumptions, i.e., once-through cycle, U-only recycle or Pu & U recycle
- a fuel reprocessing schedule
- inventory and timing assumptions for the entire fuel cycle
- spent fuel compositions as calculated by ORIGEN.

The output of the fuel cycle logistics calculation is the detailed year by year mass and isotopic flow for each operation in the fuel cycle considered. The fuel cycle, as used in ENFORM, is displayed in Figure 10.1.2. Each operation in the fuel cycle (mining, milling, conversion, enrichment, irradiation, and reprocessing) has been generically modeled by ENFORM. Reprocessing is optional in the fuel cycle model, so scenarios with no recycle, with only uranium recycle, or with both uranium and plutonium recycle can be modeled. The timing for each process in the fuel cycle is an input variable.

The reference nuclear power growth projection, the electric energy generated, and the annual and cumulative total spent fuel discharges are shown in Table 3.10.1. Each nuclear power plant is assumed to start up at 40% of capacity, increase to 70% in the fourth year, operate at 70% for 22 years and then decline linearly until the plant shuts down at 40% of capacity in the fortieth year. The resulting average system capacity factor was also shown in Table 3.10.1. The low-growth projection is shown in Table 3.10.2. The system is composed of one-third BWRs and two-thirds PWRs.

10.1.3 Waste Processing Logistics

The fuel cycle logistics information produced by ENFORM describes the various waste streams. The computer code WASTRAC was developed for this analysis to model the storage, treatment, packaging, shipment and disposal of each waste stream. Figure 10.1.3 illustrates the waste management steps and the items calculated in a typical WASTRAC subsystem. Waste management steps can be added or deleted as required to model a specific subsystem. Thirty-nine different waste categories are used and the management of each of these categories is represented by a generic waste management subsystem similar to that displayed in Figure 10.1.3.

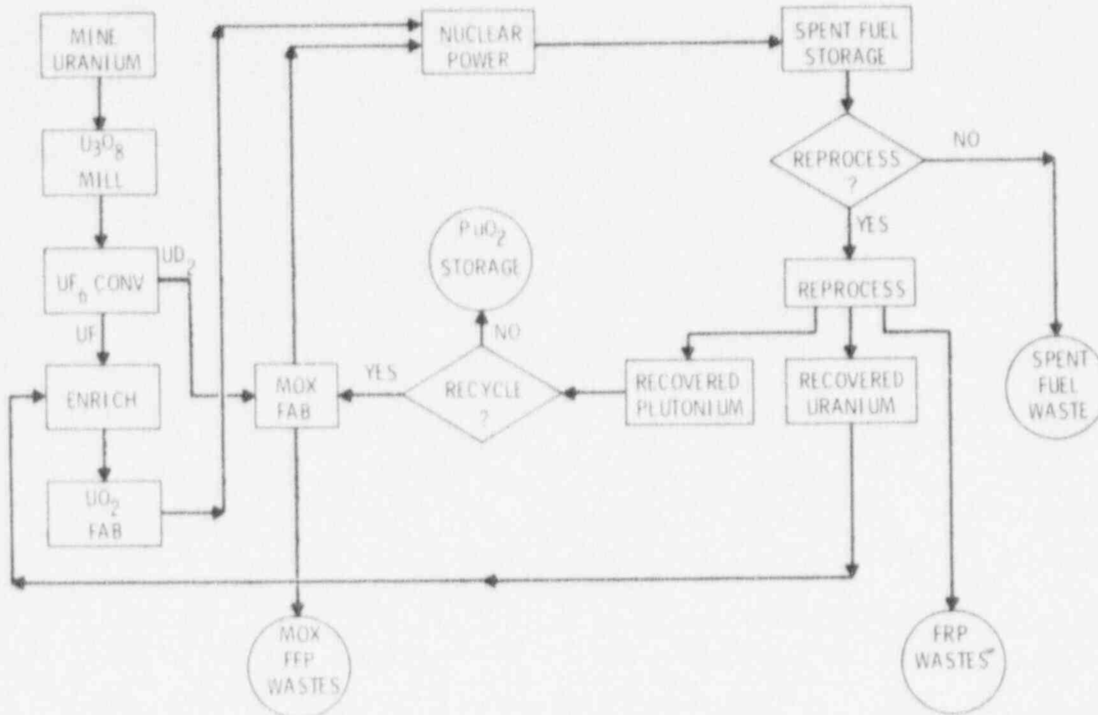

TABLE 10.1.2. Fuel Cycle Mode

FIGURE 10.1.3. WASTRAC Calculations

WASTRAC computes waste volume and waste isotopics (quantity of each radionuclide). Waste volume is a function of year, waste type, and waste management step. To illustrate WASTRAC operational steps, let:

Y = system year

N = waste type

F = fuel cycle process, i.e., spent fuel packaging, fuel reprocessing, etc.

The Untreated Waste Volume is computed as

$$(\text{Untreated Waste Volume})_{Y,F,N} = (\text{MT Fuel})_{Y,F} \left(\frac{\text{Untreated Waste Volume}}{\text{MT Fuel}}\right)_{F,N} \quad (1)$$

The treated waste volume is

$$(\text{Treated Waste Volume})_{Y,F,N} = (\text{Untreated Waste Volume})_{Y,F,N} \bullet \left(\frac{\text{Treated Volume}}{\text{Untreated Volume}}\right)_{F,N} \quad (2)$$

In equations (1) and (2) above the (MT Fuel) variable is a function of system year and fuel cycle process and is obtained from ENFORM. The $\left(\frac{\text{Untreated Waste Volume}}{\text{MT Fuel}}\right)$ variable is a function of waste type and fuel cycle process while the $\left(\frac{\text{Treated Volume}}{\text{Untreated Volume}}\right)$ ratio is a function of waste type, and fuel cycle process and reflects the selection of a specific waste treatment alternative.

The waste isotopics, or quantity of each radionuclide contained in each waste type, is dependent on system year, fuel cycle process, waste type, and waste management step. Thus, for each isotope (I), its quantity in each waste stream is

$$(\text{Waste Curies})_{I,Y,F,N,M} = (\text{Fuel Curies})_{I,Y,F} \bullet \left(\frac{\text{Waste Curies}}{\text{Fuel Curies}}\right)_{I,F,N} \bullet (\text{Decay Factor})_{I,\Delta Y} \quad (3)$$

Where M = waste management step

ΔY = time difference between time of fuel cycle process and time of accounting at step M.

In equation (3) above, the (Fuel Curies) variable is the quantity of a radionuclide in the fuel when processed and is a function of isotope, system year, and fuel process. It is obtained from the fuel cycle logistics data and is corrected in ENFORM for decay between discharge and process. The $\left(\frac{\text{Waste Curies}}{\text{Fuel Curies}}\right)$ fraction is dependent on isotope, fuel cycle process and waste type. The decay term in equation (3) accounts for radioactive decay or buildup during the waste management process or after waste is placed in the repository.

The output of WASTRAC is the waste volume and curies of each isotope in each waste stream at each step in the waste management system. Each treated waste stream is classified by container type and by the surface dose class for the treated waste containers.

10.1.4 Waste Management Impact and Cost Calculations

The final step in the system simulation uses the time dependent waste logistics data from WASTRAC to calculate the waste management impact and costs and to compile results in a series of tables. The computer code IMPACT has been developed to perform these functions.

IMPACT calculates isotopic releases and 70-year population radiation doses for each waste type, and waste management step. As before, let

I = isotope
Y = year
N = waste type
M = waste management step
F = fuel cycle process

Then

$$(\text{Curies Released})_{I,Y,F,N,M} = (\text{Waste Curies})_{I,Y,F,N,M} \bullet \left(\frac{\text{Curies Released}}{\text{Waste Curies}}\right)_{I,F,N,M} \tag{4}$$

The (Waste Curies) variable is obtained from the waste processing logistics calculation (WASTRAC). The isotope release fraction, $\left(\frac{\text{Curies Released}}{\text{Waste Curies}}\right)$ is dependent on isotope, fuel cycle process, waste type, and waste management step.

IMPACT calculates regional dose commitment to whole body, bone, lungs, and thyroid. IMPACT also calculates worldwide dose commitment for release of ^{3}H, ^{14}C, and ^{85}Kr. To illustrate the dose calculation, let D = dose type then dose is calculated as

$$(\text{Dose})_{I,Y,F,N,M,D} = (\text{Curies Released})_{I,Y,F,N,M} \bullet \left(\frac{\text{Radiation Dose}}{\text{Ci Released}}\right)_{I,F,D} \tag{5}$$

Results of the radiation dose calculations are presented in DOE/ET-0029.

Four types of waste management costs are computed by IMPACT; treatment costs, interim waste storage costs, transportation costs, and repository costs.

The treatment costs are based on the fuel cycle process throughput.

$$(\text{Treatment Cost})_{Y,F,N} = (\text{MT Fuel})_{Y,F} \bullet \left(\frac{\text{Treatment \$}}{\text{MT Fuel}}\right)_{F,N} \tag{6}$$

The unit cost $\left(\frac{\text{Treatment \$}}{\text{MT Fuel}}\right)$ is a function of process and waste type and is assumed fixed over time.

Transportation and repository costs are based on the number of waste containers shipped to repository.

$$(\text{Transportation Cost})_{Y,F,N} = \frac{(\text{Treated Waste Volume})_{Y,F,N}}{\left(\frac{\text{Treated Waste Volume}}{\text{Container}}\right)_{Y,F,N}} \bullet \left(\frac{\text{Transportation \$}}{\text{Container}}\right)_{F,N} \tag{7}$$

$$(\text{Repository Cost})_{Y,F,N} = \frac{(\text{Treated Waste Volume})_{Y,F,N}}{\left(\frac{\text{Treated Waste Volume}}{\text{Container}}\right)_{Y,F,N}} \bullet \left(\frac{\text{Transportation \$}}{\text{Container}}\right)_{F,N} \tag{8}$$

The volume per container variable $\left(\frac{\text{Treated Waste Volume}}{\text{Container}}\right)$ is a function of process and waste type, and in the case of high-level waste it is also a function of system year. The high-level waste volume per container varies over time because it is limited by the thermal criteria at the geologic repository. The unit repository and transportation cost, $\left(\frac{\text{Transportation \$}}{\text{Container}}\right)$ and $\left(\frac{\text{Repository \$}}{\text{Container}}\right)$, are dependent on fuel cycle process and waste type.

The interim waste storage cost is computed as

$$(\text{Interim Waste Storage Cost})_{Y,F,N} = \frac{(\text{Treated Waste Volume})_{Y,F,N}}{\left(\frac{\text{Treated Waste Volume}}{\text{Container}}\right)_{Y,F,N}} \bullet \left(\frac{\text{Interim Storage \$}}{\text{Container}}\right)_{F,N} \tag{8}$$

The unit interim waste storage costs $\left(\frac{\text{Interim Storage \$}}{\text{Container}}\right)$ is a function of waste type and, if stored at its origin, fuel cycle process. They are based on the cost for an average period.

The IMPACT program also organizes the results of the calculations, sums up annual and cumulative totals at 5-year intervals and prepares a series of tables to display the results. Both undiscounted and present worth* costs are calculated. Levelized unit power costs and levelized unit fuel costs of waste management are also calculated.

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* Present worth discounting is a method of allowing for the time value of money. The present worth may be thought of as a present sum of money equivalent to a specified future payment or receipt or to a series of future payments or receipts. The present worth of a series of payments is obtained by summing the product of each annual payment times the quantity

$$\frac{i}{(1 + i)n}$$

where i equals the interest rate or discount rate and n is the number of years from the present to the time of the payment.

Figure 10.1.4 schematically illustrates the relationship between the cash flow of the individual waste management system components and the discounting procedures. There are two similar but distinctly different applications of discounting techniques used in the development of the equivalent electric power and fuel cost of waste management. First a present worth levelizing technique is used to develop unit costs, i.e., cost per unit of spent fuel, for each waste management function. Second, a separate present worth levelizing technique is used to convert waste management costs to equivalent electric power and fuel costs.

The boxes in the lower part of Figure 10.1.4 illustrate the functions that contribute to the total waste management system costs. The additional detail under the treatment unit costs box indicate the flow of dollars and materials that are factored into the development of unit costs. For any single waste management function all of the cash flows are present worth discounted to a common starting point. The levelized unit cost for that function is then calculated by the relationship

$$\text{Unit Cost} = \frac{\text{(Sum of present worth costs)}}{\text{(Sum of present worth throughput)}}$$

which is derived from the fundamental relationship for a profitable venture.

(Sum of present worth revenues) = (Sum of present worth costs)

by solving for unit cost where

(Sum of present worth revenue) = (unit cost) x (Sum of present worth throughput)

The unit cost developed by this procedure represents the single charge that can be assessed for the waste management function over the life of the facility that will recover all expenditures plus a return (the discount rate) on any unrecovered investment during the life of the facility. The sum of all of the separate waste management system unit costs represents the total waste management system unit costs.

The accumulation of the waste management costs over a period of time following generation of power is also illustrated in Figure 10.1.4. It is assumed that all waste management costs whether the services are provided by private industry or by the government, will be borne by the consumers of the electric energy generated by the nuclear power facility. Thus, the waste management costs will be reflected as an increase in cost of power. The equivalent power costs of waste management can be obtained by discounting the costs of the individual waste management functions to the time of power generation, summing them all and dividing by the kilowatt hours of electric energy produced during the generation of waste. In other words, money is collected from the rate payers to cover the cost of waste management at the time the electricity is generated. The amount collected is somewhat less, depending on the discount rate, than the costs of waste management will be when it is actually incurred. This allows the utility to earn a return on this money during this period so that a sufficient fund accumulates to pay for the

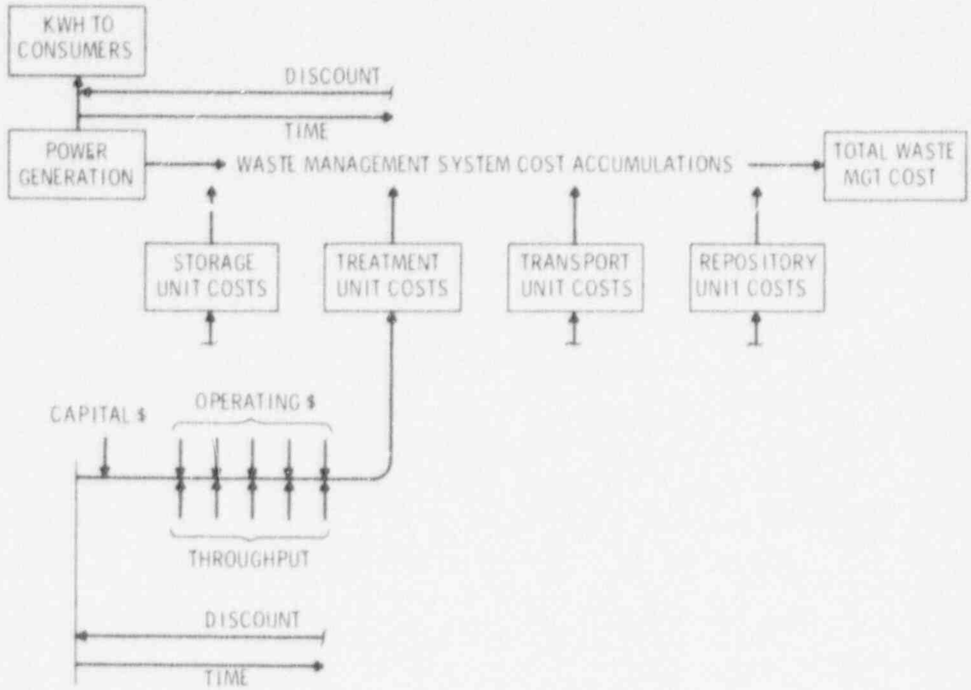

FIGURE 10.1.4. Time and Discounting Relationships of Waste Management Functions of Cost

waste management costs at the time the costs are incurred. At any interest rate (discount rate) greater than 0%, fewer dollars need be collected from the rate payers than will be required to pay later waste management costs at the time they are incurred. The higher the utility discount rate, the lower the waste management costs become.

REFERENCES FOR SECTION 10.1

1. M. V. Bell, "ORIGEN - The ORNL Isotope Generation and Depletion Code," ORNL-4628, May 1973.

2. C. M. Heeb, W. L. Purcell, B. M. Cole, "ENFORM: An ENergy InFORMation System," BNWL-2195/UC-11, March 1977.

10.2 INPUT DATA FOR SYSTEM

10.2 INPUT DATA FOR THE SYSTEM

The input data for the waste management system calculations in the WASTRAC and IMPACT computer programs were derived from waste management technology analyses presented in Sections 4 through 8. The essential data for these calculatons have been consolidated and classified in four series of tables referred to as data sheets in Appendix 10.A. These four series of tables include

- Waste Treatment Data Sheets
- Waste Storage Data Sheets
- Decommissioning Data Sheets
- Unit Cost Data Sheets.

10.2.1 Waste Treatment Data Sheets

The waste treatment data is compiled in a series of 33 data sheets in Appendix 10.A. An index at the front of these data sheets provides a guide to their application indicating the fuel cycle option that the data apply to and whether the treatment is a reference process or one of the alternatives. The data sheets are classified by waste type, treatment alternative and fuel cycle case.

The Waste Treatment Data Sheets provide the following information:

- the fraction of spent fuel radionuclides in each waste component
- the fraction of radionuclides released to the atmosphere during treatment
- volume of untreated and treated waste/MTHM including secondary wastes
- the type of container used and its volume
- the number of treated waste containers/MTHM classified by surface dose category.

The data relating to treated waste quantities contained in the Waste Treatment Data Sheets are summarized on Tables 10.2.1 through 10.2.4. Table 10.2.1 shows the container type, the number of containers/2000 MTHM and the average surface dose rate for all treatment processes in the reference system. Table 10.2.2 compares similar data for the alternative treatment with the reference treatment for high-level waste and fuel residue (hulls and hardware). Table 10.2.3 compares treated waste quantities produced by minimum treatment of combustibles with incineration of combustibles and compares cement immobilization with bitumen immobilization of wet wastes and incineration products. Table 10.2.4 compares the same processes for the MOX-FFP wastes.

10.2.2 Waste Storage Data Sheets

The waste storage data are tabulated on a series of 10 data sheets. An index in the front of these tables provides a guide to the fuel cycle case to which they apply and indicates whether the storage option is in the reference system or one of the alternatives. The information on these Waste Storage Data Sheets inlcudes

- the total radionuclide content of the waste being stored
- the radionuclide release fraction to the atmosphere during storage.

TABLE 10.2.1. Packaged Wastes from Reference U and Pu Recycle System (Wastes from Off-Gas Treatment as Well as TRU Wastes)

Treated Waste	Container[a]	Surface Dose, R/hr[b]	Container/ 2000 MTHM[c]
From FRP			
Vitrified HLW	Canister[d]	Very high	660
Fuel residue	Canister	High	480
Failed equipment	Canister	4	4
	Drum	2	26
	Canister	0.7	67
	Drum	0.7	446
	Box	0.1	50
	Box[e]	6×10^{-4}	10
Noncombustible waste	Drum	310	400
	Drum	7	1,940
	Drum[e]	0.6	6
	Drum	0.5	1,500
	Drum	0.1	430
	Drum[e]	0.01	52
Dissolver off-gas			
Krypton	Gas cylinder	700	145
Silica gel	Drum	265	2.4
Silver zeolite	Drum	3×10^{-5}	32
Calcium carbonate	Drum	$<1 \times 10^{-5}$	10
Cement immobilized			
Wet waste	Drum	280	2,526
Incinerator ash	Drum	11	830
Incinerator scrub solution	Drum	0.05	2,230
Filter media	Drum	130	400
From MOX FFP			
Failed equipment	Box	5×10^{-5}	20
Noncombustible waste	Drum	1×10^{-3}	394
Cement immobilized			
Incinerator ash and scrub solution	Drum	2×10^{-2}	1,070
Wet waste	Drum	1×10^{-4}	584
Filter media	Drum	0.01	50

a. Unless specified otherwise, canister is 75 cm x 3 m, box is 1.2 x 1.8 x 1.8 m, drum is a standard 55-gal drum.
b. Average surface dose rate of the containers within the given grouping. The groupings are based on type of waste, on the container used to contain the waste, on the location at which the waste is generated and on the dose class. The dose classes used in this study are <0.2, 0.2-1, 1-10 and >10 R/hr.
c. Based on MTHM reprocessed. The listed numbers therefore correspond to the estimated annual outputs of a 2000 MTHM/yr FRP and a 400 MTHM/yr MOX FFP respectively.
d. 30 cm x 3 m canister.
e. Contains waste originating in the PuO_2 conversion facility.

TABLE 10.2.2. Packaged Wastes Resulting from Alternative HLW and Fuel Residue Treatment Processes

Treated Waste	Canister dia, cm[a]	Container/ 2000 MTHM
Vitrified HLW	30	660
Calcined HLW	20	684
Fuel hulls and hardware together	75	480
Fuel hardware alone	75	84
Compacted hulls	75	198
Melted hulls	75	109

a. Canister length of 13 m in all cases

10.2.3 Decommissioning Waste Data Sheets

The Decommissioning Waste Data Sheets are similar to the Waste Treatment Data Sheets and provide information on the TRU wastes resulting from decommissioning an FRP and a MOX-FFP. The radionuclide content in the waste is expressed as a fraction of the amount present in the facility at the time of decommissioning rather than a fraction of the activity in the spent fuel, and the number of containers is expressed as the number per decommissioned facility rather than per MTHM.

10.2.4 Waste Management System Unit Costs

The unit costs for all of the waste management functions are tabulated in a series of 7 Unit Costs Data Sheets. It should be noted that all cost data in this system has been escalated from mid-1976 dollar values used in the previous sections of this report to mid-1978 dollar values using a factor of 1.17.

Each Unit Cost Data Sheet is identified by the applicable waste management step and fuel cycle. The data sheets for waste treatment costs include information on:

- waste type
- source of the waste
- treatment alternative
- container description
- unit cost in $/kgHM and $/container for both reference and alternative treatments.

For the waste storage costs, similar data are provided. Geologic repository cost data are also similar but, in addition, geologic medium is specified.

The waste transportation costs are provided in somewhat different format. This information inlcudes:

- waste type
- container description
- origin and destination
- distance shipped

TABLE 10.2.3. Packaged Wastes Resulting from Alternative Wet Waste and Combustible Waste Treatment Processes at an FRP

Treated Waste	Surface Dose, R/hr[a]	Container/ 2000 MTHM[b]
Cement Immobilization with Incineration of Combustibles		
Immobilized		
Wet waste	280	2,526
Incinerator ash	11	830
Incinerator scrub solution	0.05	2,230
Filter media	130	400
Cement Immobilization with Minimum Treatment of Combustibles		
Immobilized wet waste	280	2,600
Filters	140	2,900[c]
Combustible waste	6	6,480
	0.6	720
	3×10^{-3}	12,000
Bitumen Immobilization with Incineration of Combustibles		
Immobilized		
Wet waste	1370	686
Incinerator ash	50	294
Wet waste	0.35	660
Incinerator scrub solution	0.24	830
Wet waste	0.13	42
Filter media	130	400
Bitumen Immobilization with Minimum Treatment of Combustibles		
Immobilized wet waste	1370	728
	0.35	660
	0.13	42
Filters	140	2,900[c]
Combustible waste	6	6,480
	0.6	720
	3×10^{-3}	12,000

a. Average surface dose rate of the containers within the given grouping.
b. Container is 55-gal drum unless indicated otherwise.
c. Container is 80-gal drum.

- transportation mode, i.e., truck or rail
- unit costs in $/kgHM and $/container.

A consolidated summary of the reference system unit cost data for the four basic fuel cycle cases is presented in Table 10.2.5.

TABLE 10.2.4. Packaged Wastes Resulting from Alternative Wet Waste and Combustible Waste Treatment Processes at a MOX FFP

Treated Waste	Surface Dose, R/hr[a]	Container/ 2000 MTHM[b,c]
Cement Immobilization with Incineration of Combustibles		
Immobilized		
[illegible]rator ash and [illegible]olution	2×10^{-4}	1,070
[illegible]	1×10^{-4}	584
Fi[illegible]ia	0.01	50
Cement Immobilization with Minimum Treatment of Combustibles		
Immobilized wet waste	1×10^{-4}	584
Filters	1×10^{-3}	350[d]
Combustible waste	1×10^{-3}	1,050
Bitumen Immobilization with Incineration of Combustibles		
Immobilized		
Incinerator ash and scrub solution	4×10^{-3}	70
Wet waste	2×10^{-4}	460
Filter media	0.01	50
Bitumen Immobilization with Minimum Treatment of Combustibles		
Immobilized wet waste	2×10^{-4}	460
Filters	1×10^{-3}	350[d]
Combustible waste	1×10^{-3}	1,050

a. Average surface dose rate of the containers within the given grouping.
b. Based on MTHM reprocessed. 2000 MTHM reprocessed corresponds to 400 MTHM MOX fuel fabricated in the reference system.
c. Container is 55-gal drum unless indicated otherwise.
d. Container is 80-gal drum.

TABLE 10.2.5. Waste Management Unit Cost Data Summary, $/kgHM

	Fuel Cycle			
	Once-through (case 1)	U-Only Recycle: Pu to HLW (case 2a)	U-Only Recycle: Pu stored (case 2b)	U and Pu Recycle (case 3)
One year storage of spent fuel at FRP	-	12	12	12
Six-year cooling of spent fuel[a]	44	-	-	-
Spent fuel packaging	17	-	-	-
All spent fuel shipping	51	19	19	19
Waste treatment at FRP[b]	-	67	67	67
Interim waste storage at FRP[c]	-	18	18	18
Waste treatment at MOX-FFP	-	-	-	4
Interim waste storage at MOX-FFP[c]	-	-	-	1
FRP waste shipment to repository	-	9	9	9
MOX-FFP waste shipment to repository	-	-	-	<1
PuO_2 shipment to interim storage	-	-	1	-
Independent site PuO_2 storage	-	-	19	-
Repository	52	56	42	48
Total	164	181	187	178

a. Comprised of 75% storage at reactor and 25% storage at ISFSF.
b. Includes 5-year SHLW storage and 50-year ^{85}Kr storage at the FRP.
c. Required only when geologic repository is not available.

Unit costs are summed together in this table for major categories of storage, treatment, transportation, and final repository for each of four cases; Case 1, 2A, 2B, and 3. Total unit co[illegible] in the system calculation will vary from the total unit costs shown here, primarily because [illegible] differences in storage requirements and differences that result when discount rates are employed.

Three different interest or discount rates are used in the waste management system cost analysis. All values in the cost analysi[illegible]e in 1978 constant dollars and the rates are intended to represent constant dollar or [illegible] interest rates. The rates are based on recent average rates after consideration of the e[illegible] of inflation and risk premiums suitable for investments in nuclear power waste manageme[illegible]ilities. The three rates are:

1. Cost of money to the private fuel cycle [illegible]stry, 10 ±4%. This rate was used in development of unit costs for waste treatment, transpo[illegible]tion, and some storage facilities.
2. Cost of money to the federal government, 7 [illegible]7%. This rate was used to develop the unit costs for a final repository and some storage facilities.
3. Cost of money to the electric utility industry. This rate was used to calculate the waste management equivalent power cost and equivalent fuel cost. Waste management costs are assumed to be recovered from the consumers of the electricity at the time the electric power is generated. The waste management costs to the utility are not incurred, however, until some time later, and the money collected at the time of power sales can earn a return for the utility, thus reducing power costs. The appropriate interest or discount

rate to be used here is the average real return to the utility after inflation and excluding any additional risk premium. This rate is believed to lie between 0 and 7%, but costs are also calculated using a 10% rate to show the effect of higher discount rates.

The uncertainty range in these discount rates was factored into the uncertainty range estimates for the individual unit cost components. For a further discussion of the derivation of these interest rates see Section 3.8.

10.3 TOTAL SYSTEM WASTE QUANTITIES AND RADIOACTIVITY

10.3 TOTAL SYSTEM WASTE QUANTITIES AND RADIOACTIVITY

This section describes the spent fuel logistics and total quantities of TRU waste processed in the entire waste management system including the number of containers of each type of waste, average radioactivity and heat generation rates. In addition, the total accumulation of radioactivity in all repositories is identified and its decay is tracked over a million-year period.

10.3.1 Spent Fuel Logistics

Spent fuel logistics, i.e., movement and inventory accumulations are detailed in a series of six tables in Appendix 10B.

Table 10.B.1 describes the spent fuel logistics for Case 1, the once-through fuel cycle. It is assumed that 75% of the unpackaged spent fuel storage requirements can be accommodated in existing nuclear power plant storage basins with 25% stored in large independent storage facilities. A geologic repository is assumed to be available in 1985, at which time fuel that is at least 6.5 years old is packaged and shipped to the repository. Initially the shipments to the repository are restricted to the production from a single 2000-MTHM/yr packaging facility. In the first and second years the packaging facility operates at one-third and two-thirds of capacity, respectively. A second packaging facility is started up in 1990, after which deliveries to repositories are limited by availability of 6.5-year-old fuel. The last nuclear power plant is shut down in 2040 and the last fuel is delivered to a repository in the year 2047.

Table 10.B.2 describes the spent fuel logistics for the Case 2 and 3 reprocessing fuel cycles. Spent fuel logistics are identical for Cases 2A, 2B, 3A and 3B. Reprocessing is assumed to start in 1981 with a 1500-MTHM/yr plant operating at one-third and two-thirds capacity in the first and second years respectively. A second reprocessing plant with a 2000-MTHM/yr capacity starts up in 1985 at one-third and two-thirds capacity in the first and second years. Three additional plants are started up, as spent fuel becomes available to sustain their operation, in 1990, 1997, an 2020. Replacement plants are started in 2013, 2015, and 2032 as earlier plants shut down after a 30-year operating period. No more than five plants are ever operating at the same time. The storage requirement for spent fuel is less than half the spent fuel storage requirement in Case 1 and it is assumed that the spent fuel storage can all be accommodated in nuclear power plant basins.

Table 10.B.3 describes the spent fuel logistics for Case 4A where the decision to implement the once-through cycle is deferred until the year 2000. Spent fuel packaging is initiated at the same time as in Case 1 but the packaged spent fuel is sent to an extended storage facility such as air-cooled vault or dry caisson facility rather than to a geologic repository. It is assumed that a geologic repository becomes available some time prior to the year 2000 and that following a decision to dispose of the spent fuel in the year 2000 the spent fuel can begin moving immediately to the repository. Deliveries to the repository are restricted to 3,000 MT the first year and reach a maximum handling rate of 12,000 MT/yr four years later. To avoid adding additional interim storage capacity, preference for delivery to repository is given to the freshly packaged fuel; thus, the accumulated storage inventory of packaged spent fuel is reduced only

slowly at first but is fully depleted by 2016. After this, repository deliveries match the rate of spent fuel packaging. As in Case 1 the last fuel is delivered to repository in the year 2047.

Table 10.B.4 describes the spent fuel logistics for Case 4B where the decision to implement the uranium and plutonium reyccle fuel cycle is deferred until the year 2000. In this case, although a repository may be ready in the year 2000, it is assumed that an additional 10 years is required to construct and license a fuel reprocessing plant and begin deliveries of processing TRU waste to the repository. As in Case 4A, it was assumed that spent fuel packaging would begin in 1985 with packaged fuel placed in an extended storage facility for packaged spent fuel. Following a decision in the year 2000 to allow reprocessing, very large inventories of spent fuel would accumulate before sufficient reprocessing capacity could be developed to reduce the accumulated inventory. Because of an indicated cost advantage for some of the packaged storage concepts, spent fuel packaging and storage as packaged spent fuel was assumed to continue for 20 years after the decision to reprocess in the year 2000. Starting in the year 2010, 2000-MTHM/yr reprocessing plants were assumed to start up at 2-year intervals until seven plants were operating in the year 2022. Spent fuel is processed on a first-in, first-out, basis from the packaged spent fuel inventory. The packaged spent fuel inventory is depleted in the year 2032. Following termination of a packaging operation in the year 2020, the inventory of unpackaged spent fuel increases. It peaks in the year 2032, after which it is rapidly processed through the reprocessing facilities, with the last fuel reprocessed in the year 2045. There are clearly many options to choose from in handling the storage and processing requirements in a scenario such as this one, in Case 4B. It is unlikely that this particular scenario is the optimum one but it serves to illustrate the impact of deferred reprocessing.

In the case of delayed availability of a repository to the year 2000 with an early decision to dispose of spent fuel as a waste, the spent fuel logistics are identical to those described for Case 4A in Table 10.B.3. In the case of a delayed repository with an early decision to permit reprocessing, Case 3B, the spent fuel logistics are identical to the reprocessing case described in Table 10.B.2.

Table 10.B.5 describes the spent fuel logistics for the once-through cycle with the low-growth nuclear power projection. This is similar to the Case 1 fuel cycle with the reference nuclear growth projection except that spent fuel storage requirements and delivery rates to the repository are reduced.

Table 10.B.6 describes the spent fuel logistics for the uranium and plutonium recycle with the low-growth nuclear power projection. As in the reference reprocessing case, reprocessing starts in the year 1981. However, the second reprocessing plant is delayed to 1986 and the third reprocessing plant is delayed to 1997. The fourth plant is started up in the year 2008. There is only a brief period of 2 years when four plants are operating, compared with a period of 11 years when five plants are operating (2003-2014) in the reference reprocessing case.

10.3.2 Waste Containers to Repositories

The number of waste containers, the average activity in these containers, and the average heat generation rate of these containers are described in a series of 52 tables in Appendix 10C. The tables are grouped by fuel cycle case and show annual quantities at 5-year intervals. For each fuel cycle case, one table shows annual and cumulative numbers of containers being sent to the repository. A second table shows average radioactivity in these containers and a third table shows average heat generation rates for these containers. A fourth table for the reprocessing cases shows the number and type of TRU waste containers held in interim storage.

In the reprocessing cases four additional tables are provided to describe the high-level waste container sizes, the number of containers, radioactivity, and heat generation rates, after adjustment of container sizes to meet the thermal criteria limits in each of the four alternative geologic repository media. To meet the thermal criteria limit on high-level waste containers placed in geologic repositories (see Section 7.3), the quantity of high-level waste in any one container is controlled by adjusting the size of the canisters.

Table 10.3.1 shows the total number of TRU waste containers, excluding the high-level waste containers, sent to repositories in all nine fuel cycle cases. For the once-through cases with the reference nuclear power growth projection (Cases 1 and 4A), the total number of spent fuel canisters is the same for both cases although the time of delivery is different. In the low-growth once-through cycle case, the number of spent fuel canisters is proportional to the total electric power generated or approximately 64% of the reference case. In the reprocessing cases, except for the low growth case, there are only small differences between cases in the number of non-high-level waste containers. The differences arise because:

- in Case 2A, uranium only recycle with PuO_2 in HLW, there is no conversion of $Pu(NO_3)_4$ to PuO_2 and the quantity of low-activity waste from that process is eliminated.
- in Case 2B, uranium-only recycle with PuO_2 stored, there is a small amount of additional low activity waste for the Pu conversion operation but still less than in the plutonium recycle case because there are no MOX FFP plant wastes.
- Cases 3A and 3B produce identical quantities of waste. Only the timing of delivery to the repositories is different.
- in Case 4B, deferred U and Pu recycle low-level wastes are reduced because the total amount of plutonium recycle is reduced since the nuclear power plants are shut down before the plutonium can be recycled in quantities equivalent to Case 3A or 3B.
- the wastes produced in Case 3LG are proportional to the relative electrical energy generated or approximately 64% of the wastes in Case 3A.

Table 10.3.2 compares the total number of high-level waste containers sent to repositories in the six reprocessing cases for each of the geologic medium alternatives. The number of high-level waste containers is roughly inversely proportional to the thermal limit on high-level waste canisters in each geologic medium. This relationship is not exact, however, because the canister sizes were varied in 2-inch increments, and generally, the adjusted heat rates with reduced canister sizes were well below the thermal limits (See Table 7.3.3 for canister thermal load limits).

TABLE 10.3.1. Total TRU-Waste Containers Sent to Repositories (Excluding HLW)

Case	Spent Fuel Canister		Canister			55 Gal Drum				80 Gal Drums	Box
	BWR	PWR	FRW	1-10 R/hr	0.2-1 R/hr	10+ R/hr	1-10 R/hr	0.2-1 R/hr	0-0.2 R/hr	0-0.2 R/hr	0-0.2 R/hr
1	7.77×10^5	5.04×10^5									
2A			9.07×10^4	7.59×10^2	1.27×10^4	7.95×10^5	3.73×10^5	3.66×10^5	6.82×10^5	2.69×10^4	1.13×10^4
2B			9.07×10^4	7.59×10^2	1.27×10^4	8.03×10^5	3.73×10^5	3.67×10^5	6.96×10^5	2.69×10^4	1.32×10^4
3A			9.07×10^4	7.59×10^2	1.27×10^4	8.03×10^5	3.73×10^5	3.67×10^5	1.21×10^6	2.69×10^4	1.80×10^4
3B			9.07×10^4	7.59×10^2	1.27×10^4	8.03×10^5	3.73×10^5	3.67×10^5	1.21×10^6	2.69×10^4	1.80×10^4
4A	7.77×10^5	5.04×10^5									
4B			9.07×10^4	7.59×10^2	1.27×10^4	8.03×10^5	3.73×10^5	3.67×10^5	8.49×10^5	2.61×10^4	1.44×10^4
1LG	4.95×10^5	3.22×10^5									
3LG			5.78×10^4	4.84×10^2	8.11×10^3	5.12×10^5	2.38×10^5	2.34×10^5	8.25×10^5	2.69×10^4	1.21×10^4

Note: Case 1 = Once-Through
Case 2A = U-Only Recycle, Pu in HLW
Case 2B = U-Only Recycle, Pu Stored
Case 3A = U & Pu Recycle
Case 3B = U & Pu Recycle, Delayed Repository
Case 4A = Once-Through, Delayed Repository or Deferred Decision
Case 4B = U & Pu Recycle, Deferred Decision
Case 1LG = Low-Growth, Once-Through
Case 3LG = Low-Growth, U & Pu Recycle

TABLE 10.3.2. Comparison of Total HLW Containers Sent to Repositories for Four Different Geologic Media

Case	Geologic Medium			
	Salt	Granite	Shale	Basalt
2A	1.77×10^5	4.10×10^5	4.97×10^5	4.96×10^5
2B	1.55×10^5	2.79×10^5	4.84×10^5	4.71×10^5
3A	1.93×10^5	4.29×10^5	5.06×10^5	4.92×10^5
3B	1.96×10^5	3.77×10^5	5.10×10^5	5.00×10^5
4B	1.25×10^5	2.04×10^5	3.06×10^5	2.74×10^5
3LG	1.12×10^5			

Note: Case 1 = Once-Through
Case 2A = U-Only Recycle, Pu in HLLW
Case 2B = U-Only Recycle, Pu Stored
Case 3A = U & Pu Recycle
Case 3B = U & Pu Recycle, Delayed Repository
Case 4A = Once-Through, Delayed Repository or Deferred Decision
Case 4B = U & Pu Recycle, Deferred Decision
Case 1LG = Low-Growth, Once-Through
Case 3LG = Low-Growth, U & Pu Recycle

10.3.3 Radioactivity in Repositories

Detailed tabulations of radioactivity accumulation in all repositories for the entire waste management system and the decay of these accumulations over a million-year period are shown in a series of 90 tables in Appendix 10D. The tables are grouped by fuel-cycle case and there are 10 tables for each case. The first five tables detail the radioactivity by fission and activation products, by actinide nuclides, and by waste classifications. The next five tables in each set detail similar information on heat generation from these radionuclides.

Tables 10.3.3 and 10.3.4 summarize the total fission and activation product and actinide radioactivity in year 2000, 2050, and at increasing intervals thereafter to one million years. Tables 10.3.5 and 10.3.6 show parallel data on total heat accumulations in the repositories. For the seven cases employing the reference nuclear power growth projection, there are only very minor differences in total fission and activation product activity except in year 2000 where the effect of the delays in cases 3B, 4A, and 4B reduces the activity. This is because there are only very small differences in fission product and activation product yields from uranium or plutonium fissioning. The activity for the two low-growth cases is proportional to the energy generated or approximately 64% of the activity in the reference cases.

TABLE 10.3.3. Total Fission and Activation Product Radioactivity Accumulations in All Repositories, Ci

Case	Year 2000	Year 2050	Geologic Time (Years Beyond 1975) 1,000	10,000	100,000	1,000,000
1	1.24×10^{10}	5.04×10^{10}	8.24×10^{6}	7.58×10^{6}	5.51×10^{6}	1.09×10^{6}
2A	1.04×10^{10}	4.95×10^{10}	8.44×10^{6}	7.65×10^{6}	5.52×10^{6}	1.13×10^{6}
2B	1.04×10^{10}	4.95×10^{10}	8.44×10^{6}	7.65×10^{6}	5.52×10^{6}	1.13×10^{6}
3A	1.03×10^{10}	4.74×10^{10}	8.29×10^{6}	7.53×10^{6}	5.46×10^{6}	1.11×10^{6}
3B	1.63×10^{9}	4.74×10^{10}	8.29×10^{6}	7.53×10^{6}	5.46×10^{6}	1.11×10^{6}
4A	1.79×10^{9}	5.04×10^{10}	8.24×10^{6}	7.58×10^{6}	5.51×10^{6}	1.09×10^{6}
4B	---	4.85×10^{10}	8.41×10^{6}	7.63×10^{6}	5.51×10^{6}	1.12×10^{6}
1LG	1.02×10^{10}	3.07×10^{10}	5.25×10^{6}	4.83×10^{6}	3.51×10^{6}	6.93×10^{5}
3LG	8.32×10^{9}	2.90×10^{10}	5.29×10^{6}	4.80×10^{6}	3.48×10^{6}	7.06×10^{5}

Note: Case 1 = Once-Through
Case 2A = U-Only Recycle, Pu in HLW
Case 2B = U-Only Recycle, Pu Stored
Case 3A = U & Pu Recycle
Case 3B = U & Pu Recycle, Delayed Repository
Case 4A = Once-Through, Delayed Repository or Deferred Decision
Case 4B = U & Pu Recycle, Deferred Decision
Case 1LG = Low-Growth, Once-Through
Case 3LG = Low-Growth, U & Pu Recycle

TABLE 10.3.4. Total Actinide Radioactivity Accumulations in all Repositories, Ci

Case	Year 2000	Year 2050	Geologic Time (Years Beyond 1975) 1,000	10,000	100,000	1,000,000
1	3.27×10^{9}	9.90×10^{9}	5.97×10^{8}	1.52×10^{8}	1.35×10^{7}	5.99×10^{6}
2A	2.79×10^{9}	1.05×10^{10}	5.97×10^{8}	1.53×10^{8}	1.32×10^{7}	5.24×10^{6}
2B	9.73×10^{7}	4.34×10^{8}	6.33×10^{7}	7.11×10^{6}	1.63×10^{6}	2.42×10^{6}
3A	2.07×10^{8}	2.30×10^{9}	1.99×10^{8}	3.49×10^{7}	2.58×10^{6}	2.79×10^{6}
3B	4.21×10^{7}	2.30×10^{9}	1.99×10^{8}	3.49×10^{7}	2.58×10^{6}	2.79×10^{6}
4A	4.63×10^{8}	9.91×10^{9}	5.97×10^{8}	1.52×10^{8}	1.35×10^{7}	5.99×10^{6}
4B	---	1.81×10^{9}	2.68×10^{8}	1.38×10^{7}	2.21×10^{6}	3.16×10^{6}
1LG	2.68×10^{9}	5.94×10^{9}	3.80×10^{8}	9.68×10^{7}	8.60×10^{6}	3.82×10^{6}
3LG	1.59×10^{8}	1.40×10^{9}	1.34×10^{8}	2.15×10^{7}	1.66×10^{6}	1.84×10^{6}

Note: Case 1 = Once-Through
Case 2A = U-Only Recycle, Pu in HLW
Case 2B = U-Only Recycle, Pu Stored
Case 3A = U & Pu Recycle
Case 3B = U & Pu Recycle, Delayed Repository
Case 4A = Once-Through, Delayed Repository or Deferred Decision
Case 4B = U & Pu Recycle, Deferred Decision
Case 1LG = Low-Growth, Once-Through
Case 3LG = Low-Growth, U & Pu Recycle

TABLE 10.3.5. Total Fission and Activation Product Heat Accumulations in all Repositories, Watts

Case	Year		Geologic Time (Years Beyond 1975)			
	2000	2050	1,000	10,000	100,000	1,000,000
1	4.10×10^7	1.57×10^8	1.93×10^4	1.79×10^4	1.09×10^4	5.43×10^2
2A	3.50×10^7	1.55×10^8	1.91×10^4	1.77×10^4	1.08×10^4	5.50×10^2
2B	3.50×10^7	1.55×10^8	1.91×10^4	1.77×10^4	1.08×10^4	5.50×10^2
3A	3.46×10^7	1.48×10^8	1.88×10^4	1.74×10^4	1.07×10^4	5.50×10^2
3B	5.78×10^7	1.48×10^8	1.88×10^4	1.74×10^4	1.07×10^4	5.50×10^2
4A	6.32×10^6	1.57×10^8	1.93×10^4	1.79×10^4	1.09×10^4	5.43×10^2
4B	---	1.52×10^8	1.91×10^4	1.77×10^4	1.08×10^4	5.49×10^2
1LG	3.37×10^7	9.59×10^7	1.23×10^4	1.14×10^4	6.94×10^3	3.46×10^2
3LG	2.78×10^7	9.03×10^7	1.20×10^4	1.11×10^4	6.81×10^3	3.51×10^2

Note: Case 1 = Once-Through
Case 2B = U-Only Recycle, Pu Stored
Case 3A = U & Pu Recycle
Case 3B = U & Pu Recycle, Delayed Repository
Case 4A = Once-Through, Delayed Repository or Deferred Decision
Case 4B = U & Pu Recycle, Deferred Decision
Case 1LG = Low-Growth, Once-Through
Case 3LG = Low-Growth, U & Pu Recycle

TABLE 10.3.6. Total Actinide Heat Accumulations in all Repositories, Watts

Case	Year		Geologic Time (Years Beyond 1975)			
	2000	2050	1,000	10,000	100,000	1,000,000
1	8.38×10^6	7.13×10^7	1.92×10^7	4.64×10^6	3.59×10^5	1.36×10^5
2A	7.93×10^6	9.34×10^7	1.92×10^7	4.68×10^6	3.57×10^5	1.24×10^5
2B	2.09×10^6	1.19×10^7	1.96×10^6	1.64×10^5	3.69×10^4	5.75×10^4
3A	4.93×10^6	6.97×10^7	5.81×10^6	7.93×10^5	6.36×10^4	6.63×10^4
3B	1.09×10^6	6.97×10^7	5.81×10^6	7.93×10^5	6.36×10^4	6.63×10^4
4A	8.84×10^5	7.13×10^7	1.92×10^7	4.64×10^6	3.59×10^5	1.36×10^5
4B	---	5.63×10^7	8.63×10^6	3.12×10^5	5.09×10^4	7.50×10^4
1LG	7.05×10^6	4.54×10^7	1.22×10^7	2.96×10^6	2.29×10^5	8.70×10^4
3LG	3.79×10^6	4.25×10^7	3.98×10^6	4.88×10^5	4.06×10^4	4.36×10^4

Note: Case 1 = Once-Through
Case 2B = U-Only Recycle, Pu Stored
Case 3A = U & Pu Recycle
Case 3B = U & Pu Recycle, Delayed Repository
Case 4A = Once-Through, Delayed Repository or Deferred Decision
Case 4B = U & Pu Recycle, Deferred Decision
Case 1LG = Low-Growth, Once-Through
Case 3LG = Low-Growth, U & Pu Recycle

More differences show up in the tabulation of total actinide radioactivity in Table 10.3.4. The explanation of the differences between cases in the year 2000 totals is complicated by the fact that wastes from equivalent quantities of spent fuel have not been delivered to the repositories by that year in all cases. However, by the year 2050, essentially all wastes, except for minor amounts of activity in the decommissioning wastes, have been emplaced in the repositories.

In Cases 1 and 2A all of the plutonium in the spent fuel is included with the wastes and the actinide activities in these two cases are closely similar. In Case 2B the plutonium is stored separately, and the total actinide activity is down by a factor of approximately ten to twenty relative to Cases 1 and 2A.

Except for the time at which the wastes are placed in the repositories, the actinide activities in Cases 3A and 3B are identical. Plutonium recycle in these cases increases the amount of higher actinides in the wastes and the total actinide activity is only a factor of 3 or 4 less than in Case 1, although the initial plutonium content of the waste was approximately a factor of 100 less than in Case 1 and 2A.

Except for time of delivery of the waste to the repository, Case 4A actinide activity is identical to Case 1. However, in Case 4B, because reprocessing starts much later than in Case 3, there is not time to recycle as much plutonium in the system as there was in Cases 3A and 3B, and the actinide activity is somewhat lower.

Actinide activity in Cases 1LG and 3LG relative to Cases 1 and 3A reflect the differences in energy production for these cases.

Tables 10.3.5 and 10.3.6 show total heat accumulations in the repositories for fission activation products and actinide elements respectively. The relative quantities of heat accumulations in these cases are roughly comparable to the radioactivity accumulations shown in Tables 10.3.3 and 10.3.4. The initial heat generation rates are dominated by the fission and activation product heat. After 1,000 years, however, the heat generation rates are down by a factor of 10 to 100, and heat generation is primarily actinide heat. After this 1,000-year period, the no-recycle cases generate about 2 to 5 times as much heat as the plutonium recycle cases.

To more clearly illustrate the differences between no-recycle and recycle radioactivity in these wastes, the ratio of radioactivity in the U and Pu recycle wastes relative to the radioactivity in the once-through cycle wastes are shown in Tables 10.3.7 and 10.3.8, for fission and activation product nuclides and actinide nuclides, respectively. Except for tritium, and krypton-85, the activity ratios for the fission and activation product nuclides are close to one, and reflect differences in fission yields for uranium and plutonium fission. In Case 3, most of the tritium is released to the atmosphere during reprocessing, and only the tritium retained in the cladding hulls is sent to the repositories, while krypton-85 is recovered and stored separately. The data in Tables 10.3.7 and 10.3.8 shows how the higher activity of the higher actinides compensates for the low activity of plutonium and the plutonium daughters. In addition, the higher actinides decay to form plutonium isotopes so that after a time the plutonium activity ratios are substantially higher than when the wastes were initially placed in the repository.

TABLE 10.3.7. Ratio of Fission and Activation Product Radioactivity in U and Pu Recycle Wastes to Similar Radioactivity in Once-Through Cycle Wastes

Actinides And Daughters	Year 2070	Geologic Time (Years Beyond 1975)			
		1,000	10,000	100,000	1,000,000
^{3}H	.161	.160	--	--	--
^{14}C	0.94	0.94	0.94	0.94	--
^{54}Mn	1.04	--	--	--	--
^{55}Fe	.801	--	--	--	--
^{60}Co	.913	--	--	--	--
^{59}Ni	.860	.861	.865	.863	.864
^{63}Ni	.863	.862	.861	--	--
^{79}Se	.947	.946	.949	.947	.948
^{85}Kr	--	--	--	--	--
^{87}Rb	.884	.884	.884	.884	.884
^{90}Sr, ^{90}Y	.870	.872	--	--	--
^{93}Zr, ^{93m}Nb	.992	.992	.984	.983	.987
^{99}Tc	.990	.992	.991	.991	.989
^{106}Ru, ^{106}Rh	1.13	--	--	--	--
^{107}Pd	1.26	1.26	1.26	1.26	1.26
^{110m}Ag	1.36	--	--	--	--
^{113m}Cd	1.96	1.96	--	--	--
^{125}Sb, ^{125m}Te	1.20	--	--	--	--
^{126}Sn, ^{126}Sb	1.17	1.18	1.17	1.17	1.18
^{129}I	1.07	1.07	1.08	1.07	1.07
^{134}Cs	.981	--	--	--	--
^{135}Cs	1.28	1.27	1.27	1.28	1.27
^{137}Cs, ^{137}Ba	.994	.994	--	--	--
^{144}Ce, ^{144}Pr	.994	--	--	--	--
^{147}Pm	.981	--	--	--	--
^{151}Sm	1.07	1.07	1.07	--	--
^{152}Eu	1.71	1.71	--	--	--
^{154}Eu	1.18	1.18	--	--	--
^{155}Eu	1.17	--	--	--	--
Other	.824	--	--	--	--
Overall Ratio	.945	.976	.982	.991	1.02

TABLE 10.3.8. Ratio of Actinide Radioactivity in U and Pu Recycle Wastes to Activide Radioactivity in Once-Through Cycle Wastes

Actinides And Daughters	Year 2070	Geologic Time (Years Beyond 1975) 1,000	10,000	100,000	1,000,000
^{245}Cm	19.1	19.2	19.3	19.2	--
^{244}Cm	11.4	11.5	--	--	--
^{243}Cm	2.66	2.64	--	--	--
^{242}Cm	8.17	8.18	8.17	--	--
^{243}Am, ^{239}Np	5.29	5.27	5.28	5.26	--
^{242m}Am, ^{242}Am	8.18	8.17	8.18	--	--
^{241}Am	.428	.398	19.1	19.2	--
^{242}Pu	.0379	.0408	.0408	.0408	.0408
^{241}Pu	.0266	19.30	19.22	19.2	19.6
^{240}Pu	.0750	.0851	.0851	.0851	--
^{239}Pu	.0149	.0210	.0655	.123	.124
^{238}Pu	.0575	1.46	8.16	--	--
^{236}Pu	6.38	--	--	--	--
^{237}Np, ^{233}Pa	1.57	.855	.785	.790	.789
^{238}U, ^{234}Th, ^{234m}Pa	.00822	.00822	.00822	.00825	.00825
^{236}U	.0116	.0151	.0310	.0381	.0380
^{235}U, ^{231}Th	.00784	.00794	.0119	.0358	.0378
^{234}U	.0175	.0469	.0477	.0457	.0186
^{233}U	.847	.981	.799	.787	.789
^{232}U	7.14	7.15	7.16	--	--
^{231}Pa	.663	.0876	.0165	.0314	.0377
^{230}Th	.111	.0428	.0474	.0468	.0221
^{229}Th, 7 Daughters	.607	1.05	.056	.787	.788
^{228}Th, 6 Daughters	7.14	7.10	.0131	.0146	.0149
^{227}Ac, 7 Daughters	.775	.088	.0165	.0314	.0377
^{232}Th, 2 Daughters	.0122	.0118	.0131	.0146	.0149
^{226}Ra, 5 Daughters	.188	.0425	.0474	.0466	.0220
^{210}Pb, 2 Daughters	.230	.0423	.0471	.0466	.0221
Overall Ratio	.277	.333	.230	.191	.466

10.4 COMPARISON OF SUBSYSTEM COSTS OF WASTE MANAGEMENT ALTERNATIVES

10.4 COMPARISON OF SUBSYSTEM COSTS OF WASTE MANAGEMENT ALTERNATIVES

This section compares the costs of waste management alternatives on the basis of complete subsystem costs. Subsystem costs are defined here as all of the costs incurred in the management of a specific type of waste from treatment through final disposal. Cost comparisons on a subsystem basis allow a more comprehensive comparison of the cost differences between alternative treatment processes.

Subsystem unit cost calculations are developed for management of spent fuel as a waste in the once-through cycle and for management of the TRU wastes produced in the uranium-plutonium recycle fuel cycle. The subsystem costs take into account the differences in treatment costs and the effect that differing waste volumes resulting from treatment have on transportation costs, interim storage costs, and final repository costs. All transportation costs of waste requiring shipping casks or overpacks are calculated on a roundtrip basis. All subsystem costs are calculated here assuming final isolation in a salt formation repository.

The subsystem costs are developed here on a steady-state basis and, for major subsystem alternatives, as average unit costs over the life of the entire nuclear power system. In the latter case, costs are presented both as average costs at a 0% discount rate and a levelized cost using 7% discount rate. The discount effect becomes quite significant in the delayed repository cases because of the long delay between generation of power and expenditure for some of the interim storage costs and the transportation to the repository and the final repository charge itself.

10.4.1 Waste Management Costs for Once-Through Fuel Cycle Systems

If spent fuel is treated as a waste instead of being reprocessed, the only waste requiring geologic isolation is the spent fuel itself. Therefore, the subsystem cost is identical to the system cost for the once-through fuel cycle. The waste management system for the reference once-through fuel cycle (Case 1) includes the following steps:

- truck and rail transportation for spent fuel from the reactor to an interim spent fuel storage basin
- interim storage for six years for decay cooling (75% storage in reactor basins and 25% storage in federally owned ISFSFs is assumed)
- packaging of spent fuel assemblies in canisters (federal facility assumed for reference case)
- rail transportation to a geologic repository
- isolation in a federal repository in salt.

A delayed repository scenario (Case 4A) assumes the same steps as above except that extended storage in a dry caisson storage facility until the year 2000 is provided after packaging.

An alternative in both scenarios is private industry ownership of the interim storage and packaging facilities. Sections 5.7, 6.2 and 7.4 contain descriptions of spent fuel storage, packaging, transportation and geologic repository facilities, respectively.

Table 10.4.1 shows the steady-state system costs for two ownership alternatives for the two cases:

- once-through cycle (Case 1) with 1) private or 2) federal ownership of storage basins and packaging facilities
- delayed repository (Case 4A) with 1) private or 2) federal ownership of the independent storage basins and the packaging facilities.

TABLE 10.4.1. Steady-State System Unit Costs for Once-Through Fuel Cycle Alternatives, $/kgHM

	Case 1 Early Repository		Case 4A Delayed Repository	
	Private[(a)]	Federal[(b)]	Private[(a)]	Federal[(b)]
6-yr Decay Cooling Storage of Unpackaged Spent Fuel[(c)]	56	39	56	39
Spent Fuel Packaging	29	18	29	18
Rail Transport to Offsite Extended Federal Storage	--	--	23	--
Independent Site Receiving Facility[(d)]	--	--	10	--
Dry Caisson Extended Storage	--	--	22	22
All Other Transportation[(e)]	51	51	51	51
Federal Repository	52	52	52	52
Total	188 ±25%	160 ±25%	243 ±20%	182 ±20%

a. Private industry receiving and packaging at one site and federal receiving and storage (or repository) at another site.
b. All federal facilities located at one site separate from the repository site (Reference assumptions).
c. Assumes 75% storage in reactor basins and 25% storage in ISFSFs.
d. A separate federally owned receiving facility at the extended storage site is required to receive offsite shipments of packaged spent fuel from a private packaging facility.
e. Consists of: transportation to decay cooling storage assuming 90% rail and 10% truck shipment and packaged fuel transportation from interim storage to repository.

The system costs of private storage and packaging are larger than those of federally owned facilities due to tax costs, the assumed higher costs of capital, and in the case of a delayed repository, the extra transportation and receiving steps. Delaying disposal of the spent fuel until the year 2000 increases the costs 22-55 $/kg or from 10 to 20%, depending on ownership of the facilities.

Table 10.4.2 shows average and levelized unit costs over the entire system life for the once-through fuel cycle alternative. The unit costs are shown both as equivalent power costs in mills/kW-hr and unit fuel costs $/kgHM. The unit fuel cost at 0% discount rate is a little

TABLE 10.4.2. Average and Levelized Unit Cost Over System Life for Once-Through Fuel Cycle Alternatives

	Power Cost, mills/kWh		Fuel Cost, $/kgHM	
	0% Discount Rate	7% Discount Rate	0% Discount Rate	7% Discount Rate
Early Repository (Case 1)				
Federal Alternative	0.73	0.45	170	117
Private Alternative	0.88	0.55	206	143
Delayed Repository (Case 4A)				
Federal Alternative	0.74	0.42	172	110
Private Alternative	0.97	0.57	227	149
Maximum Variation for Extended Storage Alternatives	+0.01	+0.01	+2	+4

higher than in the steady-state case shown in the previous table. This is because there is a small increase in storage requirements beyond the required 6 years required for cooling because of the early limitation on spent fuel packaging rates. The 7% discount rate reduces both the total unit costs and the difference between private and federal ownership of packaging and storage facilities.

In the delayed repository cases the average unit cost at 0% discount rate is a little less than in the steady-state system cost calculation. This is because not all of the spent fuel must incur the extended storage costs. The last item on Table 10.4.2 shows the maximum variation resulting from use of other storage alternatives besides the dry-caisson concept. These other alternatives include packaged fuel storage in water basins, air-cooled vault or sealed cask facilities. Use of any of these alternatives results in only a small increase in the total system unit cost.

10.4.2 Waste Management Costs for Reprocessing Systems

The following section compares subsystem costs for waste management alternatives in the uranium-plutonium recycle fuel cycle. In addition, costs are shown for the interim plutonium storage subsystem that would be required for a uranium-only recycle fuel cycle with plutonium storage.

The high-level waste subsystem is further divided into two components: cooling and solidification. Alternatives for each of these components are analyzed separately.

HLW Decay Cooling Costs. The alternatives for high-level waste decay cooling are tank storage of liquid waste and water basin storage of solidified waste discussed in Sections 5.1 and 5.4.1, respectively. The unit costs for these alternatives for 5-year storage are shown in Table 10.4.3.

TABLE 10.4.3. Cost Comparison of Alternatives for 5-Year HLW Decay Storage

Alternative	$/kg HM Processed
Tank Storage of Liquid Waste	42.10 ± 30%
Water Basin Storage of Solidified Waste	9.10 ± 40%

The cost of cooling the waste as a liquid is about four and a half times that of cooling it as a solid, mainly because of the high capital costs associated with liquid waste tanks. Because of the substantial cost advantage for solidified HLW storage, this method of storage is assumed for the HLW management system cost analysis.

HLW Solidification Subsystem Costs. The HLW solidification alternatives considered in this study are vitrification and calcination. These alternatives are discussed in detail in Sections 4.1.1 and 4.1.2, respectively. After solidification, the HLW is assumed to be shipped 1500 mi by rail in HLW shipping casks to a federal geologic repository for disposal. Ta le 10.4.4 compares the steady-state subsystem costs for the two treatment alternatives.

TABLE 10.4.4. Steady-State Subsystem Cost Comparison of HLW Solidification Alternatives, $/kg HM Processed

	Solidification Alternative	
Cost Element	Vitrification	Calcination
Treatment	10.40	13.00
Decay Storage	9.10	9.10
Loadout Facility	4.70	4.70
Shipping	3.30	3.30
Repository	23.90	23.90
Total	51.40 ± 25%	54.00 ± 25%

The higher calcination treatment costs are a..ributable primarily to larger equipment required to handle the larger volume of off-gases produced in the fluid bed calcination process.

To accommodate the allowable heat limits at the repository HLW canisters with diameters ranging from 6 to 12 inches were used to control the amount of solidified HLW in each canister. For the reference salt repository and U-Pu recycle, vitrification treatment costs are based on 25% 12-in. diameter canisters and 75% 10-in. diameter canisters. Treatment costs for 10-in. diameter canisters are estimated to be 1.25 times higher than for 12-in. canisters (see Section 4.1.10). Calcination treatment costs are based on 25% 8-in. diameter canisters and 75% 7-in. diameter canisters. Treatment costs for the smaller diameter calcination canisters are estimated to be 1.16 times higher than for the reference 8-in. canisters based on the cost re tionship in Section 4.1.10 and a factor for k of 0.4. The repository cost for disposing of vitrified HLW is based on the cost given in Section 7.5.10. The disposal cost for calcined HLW assumes the same disposal cost per canister as for vitrified waste. The 5% higher system cost for calcination is not too significant considering the 25% overall uncertainty.

The container sizes and costs per kg HM will vary depending on repository thermal limits and this may result in some variation in the relative costs for the two processes.

Fuel Residue Waste Subsystem Costs

Fuel residue waste consists of cladding hulls and fuel assembly hardware. The alternative treatment processes for treating cladding hulls are packaging without compaction, mechanical compaction and melting. These alternatives are described in Section 4.2.

The compaction and melting alternatives reduce the waste volume to about 50% and 23% of the untreated volume, respectively. The assembly hardware is packaged without compaction and has no alternative treatment. Following treatment, the waste containers are assumed to be shipped 1500 mi by rail to a federal geologic repository for disposal.

The total numbers of fuel residue waste containers generated per metric ton of heavy metal processed are:

Treatment Option	
Packing without compaction	470
Mechanical compaction	282
Melting	174

The steady-state subsystem costs for these three alternatives are shown in Table 10.4.5.

TABLE 10.4.5. Steady-State Subsystem Costs of Fuel Residue Waste Management, \$/kg HM

	Treatment Alternatives		
Cost Element	Packaging Without Compaction	Mechanical Compaction	Melting
Facility Cost	4.90	4.60	5.10
Shipping Cost	3.50	2.00	1.40
Repository Cost	2.80	1.60	1.20
Total	11.20 $\pm$ 25%	8.20 $\pm$ 25%	7.70 $\pm$ 25%

The mechanical compaction and melting alternatives cost approximately the same on a systems basis. The lower shipping and repository costs of the melting alternative, which results from greater volume reduction in the melting process, make up for the higher facility costs of the melting alternative. Both mechanical compaction and melting appear to have a 3-4 \$/kg HM cost advantage over packaging without compaction because of savings in transportation and disposal costs.

Failed Equipment and Noncombustible Waste Subsystem Costs

Treatment of failed equipment and noncombustible TRU waste consists of decontamination, disassembly and packaging of equipment, and packaging of noncombustible wastes. The treatment is described in detail in Section 4.3. These wastes are assumed to be shipped by both rail and truck in appropriate containers to a federal geologic repository for disposal. The unit costs of this subsystem are shown in Table 10.4.6 for wastes generated at both the FRP and the MOX-FFP facilities.

TABLE 10.4.6. Steady-State Subsystem Unit Costs of Failed Equipment and Noncombustible Waste Management, $/kg HM Processed

Cost Element	FRP (2,000 MTHM/yr)	MOX-FFP (400 MTHM/yr)[a]
Facility	4.20	2.90
Shipping	1.20	.10
Repository	10.50	1.40
Total	15.90 ± 35%	4.40 ± 40%

a. To convert to $/kg HM reprocessed, divide by 5.

Combustible and Compactable Waste Treatment Subsystem Costs

Alternative TRU combustible waste treatments consist of packaging only (minimum treatment), or incineration with subsequent immobilization of the ash and concentrated scrubber solutions. These treatments are described in detail in Sections 4.4 and 4.7. Following treatment, the wastes are shipped by truck to a federal geologic repository for disposal.

Because the choice of immobilization process also affects the volume of immobilized waste (bitumenization evaporates excess water thus reducing the immobilized waste volume), and consequently affects transportation and storage costs, three alternatives are shown: 1) incineration followed by cementation (reference), 2) incineration followed by bitumenization and 3) packaging only (minimum treatment). Immobilization subsystems are compared in the next section.

Combustible and compactable wastes are generated at both the FRP and MOX FFP. The subsystem costs for the above alternatives are presented first for the FRP and then for the MOX FFP.

The number of containers of waste generated at the FRP for the three alternatives above are shown in Table 10.4.7. Subsystem unit costs for the alternatives are presented in Table 10.4.8.

TABLE 10.4.7. Number of Waste Containers Generated Annually at a 2000 MT/yr FRP for Alternative Treatments of TRU Combustible Waste

	Treatment Alternative		
Container Type	Incineration and Cementation	Incineration and Bitumenization	Packaging Without Treatment
55-gal Drums	3,460	1,520	19,200
80-gal Drums	--	--	2,900

TABLE 10.4.8. Steady-State Subsystem Unit Costs of Combustible and Compactable TRU Waste Management Alternatives at a 2000 MT/yr FRP, $/kg HM Processed

	Treatment Alternative		
Cost Element	Incineration and Cementation	Incineration and Bitumenization	Packaging Without Treatment
Treatment	3.40	3.40	3.30
Solvent Incineration[a]	-	-	1.40
Immobilization[b]	1.30	1.10	-
Shipping	0.60	0.40	2.70
Repository	3.70	3.40	27.50
Total	9.00 ± 25%	8.30 ± 25%	34.90 ± 40%

a. The packaging without treatment alternative requires an incinerator to burn the degraded solvent.
b. Allocated portion of immobilization cost. See Table 10.4.11, footnote (a).

The subsystem cost for packaging without treatment is about four times more than the subsystem costs for incineration because of the large number of drums that must be shipped and isolated in a repository. Even with an uncertainty range of $14.00 in the packaging without treatment alternative, the incineration alternatives have a clear cost advantage over packaging without treatment at a 2000-MT/yr reprocessing plant.

Tables 10.4.9 and 10.4.10 tabulate the number of containers and the subsystem unit costs for combustible and compactable waste treatment alternatives at a 400-MT/yr MOX-FFP.

TABLE 10.4.9. Number of Waste Containers Generated Annually at a 400 MT/yr MOX-FFP for Alternative Treatments of Combustible Waste

	Treatment Alternative		
Container Type	Incineration and Cementation	Incineration and Bitumenization	Packaging Without Treatment
55-gal Drums	1,120	120	1,050
80-gal Drums	--	--	350

TABLE 10.4.10. Steady-State Subsystem Unit Costs of Combustible and Compactable Waste Treatment Alternatives at a 400-MT/yr MOX-FFP, $/kg HM Processed[a]

	Treatment Alternative		
Cost Element	Incineration and Cementation	Incineration and Bitumenization	Packaging Without Treatment
Treatment	5.00	5.00	2.10
Immobilization	6.10	1.20	-
Shipping	.20	.02	.20
Repository	2.60	.23	3.30
Total	13.90 ± 20%	6.45 ± 30%	5.60 ± 30%

a. To convert to cost per kg HM reprocessed, divide by 5.

The conclusions regarding cost effectiveness of incineration at a MOX FFP are substantially different from those at an FRP. The number of waste drums generated in the packaging without treatment alternative is much smaller at a MOX FFP than at an FRP; therefore, the shipping and repository costs for MOX FFP combustible and compactable waste are small relative to the treatment costs. Taking into account the uncertainties shown, packaging without treatment and bitumen immobilization have comparable costs and appear to have a cost advantage over the cement incineration alternative. Equipment to concentrate the incinerator solution could be added to the MOX FFP facility to further reduce the number of waste drums generated in the incineration process. However, this would not alter the present conclusions (and may even be disadvantageous depending on the equipment cost) since shipping and repository costs are already quite small and further reduction in these costs would have little effect on the overall cost differences.

Immobilization of TRU Wet Waste and Incinerated TRU Waste Residue Subsystem Costs

Wet wastes, incineration ashes and scrubber solution (if combustibles are incinerated) are immobilized at the FRP and MOX FFP before truck shipment to a repository. The alternative treatments are cement or bitumen immobilization. The treatments are described in detail in Section 4.7. In this section, subsystems at an FRP are discussed first, followed by subsystems at a MOX FFP.

The number of immobilized waste containers generated and subsystem unit costs of immobilization at a 2000-MT/yr FRP are presented in Tables 10.4.11 and 10.4.12, respectively.

TABLE 10.4.11. Number of 55-gal Drums of Waste Immobilized Annually at a 2000-MT/yr FRP

	Immobilization Alternative					
	Cementation			Bitumenization		
Treatment Option	Incinerated Waste Residue	Wet Waste	Total	Incinerated Waste Residue	Wet Waste	Total
Incineration of Combustibles	3,060	2,530	5,590	1,120	1,390	2,510
Packaging of Combustibles Without Treatment	--	2,530	2,530	--	1,390	1,390

As shown in Table 10.4.11, the bitumen process generates only half as many waste drums as the cement process because of volume reduction via evaporation. The corresponding reductions in transportation and repository costs for incineration amount to \$3.70 kg/HM or about 30% of the total cementation subsystem cost. The bitumen process at the FRP has a cost advantage over cementation, but the ranges of uncertainty overlap. If combustibles are packaged without treatment, fewer drums are treated in the immobilization facility and the shipping and repository cost differential inherent in the bitumen process is reduced, but not enough to significantly alter the probable advantage for bitumenization.

TABLE 10.4.12. Steady-State Subsystem Unit Costs of Immobilization Treatment Alternatives at a 2000-MT/yr FRP, $/kg HM Processed

Cost Element	Immobilization Alternative: Cementation, Incinerated Waste	Cementation, Wet Waste	Cementation, Total	Bitumenization, Incinerated Waste	Bitumenization, Wet Waste	Bitumenization, Total
Incineration of Combustibles						
Treatment	1.30[a]	1.00[a]	2.30	1.00[a]	1.30[a]	2.30
Shipping	0.40	0.90	1.30	.10	.40	.50
Repository	2.80	5.50	8.30	2.50	2.90	5.40
Total	4.50	7.40	11.90 ± 35%	3.60	4.60	8.20 ± 35%
Packaging of Combustibles Without Treatment						
Treatment	--	2.30	2.30	--	2.30	2.30
Shipping	--	1.10	1.10	--	.40	.40
Repository	--	5.60	5.60	--	3.00	3.00
Total		9.00	9.00 ± 35%		5.70	5.70 ± 30%

a. Treatment costs are allocated to waste type according to the number of drums of waste produced.

The number of waste drums produced annually and the subsystem unit costs of immobilization alternatives at a 400-MT/yr MOX FFP are given in Tables 10.4.13 and 10.4.14.

TABLE 10.4.13. Number of 55-gal Drums of Waste Immobilized Annually at a 400-MT/yr MOX-FFP

Treatment Option	Immobilization Alternative: Cementation, Incinerated Waste	Cementation, Wet Waste	Cementation, Total	Bitumenization, Incinerated Waste	Bitumenization, Wet Waste	Bitumenization, Total
Incineration of Combustibles	1,070	580	1,650	70	460	530
Packaging of Combustibles Without Treatment	--	580	580	--	460	460

As shown in Table 10.4.13, the bitumenization process substantially reduces the number of waste containers of incinerated waste residue but has a lesser effect on reduction of wet waste volume. Table 10.4.14 shows the effect on transportation and repository costs. The reductions in transportation and repository costs amount to $2.15/kg HM or 20% of the total cementation subsystem cost. However, since the uncertainty is about $3.00/kg HM, the cost advantage for bitumenization is not clear cut. If combustibles are packaged instead of incinerated, the volume reduction effect of bitumenization is negligible and immobilization costs for both alternatives are the same.

TABLE 10.4.14. Steady-State Subsystem Unit Costs of Immobilization Treatment Alternatives at a 400-MT/yr MOX FFP, \$/kg HM Processed[a]

	Immobilization Alternative					
	Cementation			Bitumenization		
Cost Element	Incinerated Waste	Wet Waste	Total	Incinerated Waste	Wet Waste	Total
Incineration of Combustibles						
Treatment	6.10[b]	3.30[b]	9.40	1.20[b]	8.20[b]	9.40
Shipping	.20	.10	.30	.02	.10	.12
Repository	2.50	.20	2.70	.13	.20	.33
Total	8.80	3.60	12.40 ± 30%	1.35	8.50	9.85 ± 30%
Packaging of Combustibles Without Treatment						
Treatment	--	9.40	9.40	--	9.40	9.40
Shipping	--	.10	.10	--	.10	.10
Repository	--	.20	.20	--	.20	.20
Total		9.70	9.70 ± 35%		9.70	9.70 ± 35%

a. To convert to cost per kg HM reprocessed, divide by 5.
b. Treatment costs are allocated to waste type according to the number of drums of treated waste produced.

Dissolver Off-Gas Treatment Alternative Subsystem Costs

The dissolver off-gas treatment alternatives are sequential treatments to remove specific gaseous elements. Four alternatives are considered:

- removal of iodine and ruthenium
- removal of iodine, ruthenium and carbon-14
- removal of iodine, ruthenium and krypton
- removal of iodine, ruthenium, carbon-14 and krypton.

For the first two alternatives, the system consists of separation and packaging, transportation by truck and disposal in a federal repository. The system for the other two alternatives is similar except that the krypton gas is bottled and stored in a special storage facility at the FRP. A detailed discussion of the treatment alternatives is found in Section 4.9. Section 5.6 describes the krypton storage facilities.

The subsystem costs of the treatment alternatives are given in Table 10.4.15.

The waste shipment and repository costs are negligible compared to the treatment costs for all of the systems. The alternatives that recover krypton are much more expensive, mainly because of the cost of the bottled gas storage facility. However. if krypton recovery is elected, the added cost for recovery of the carbon-14 is insignificant.

TABLE 10.4.15. Steady-State Subsystem Unit Costs of Dissolver Off-Gas Treatment Alternatives, $/kg HM

	Treatment Alternatives			
Cost Element	Ru, I Recovery	Ru, I, ^{14}C Recovery	Ru, I, Kr Recovery	Ru, I, ^{14}C, Kr Recovery
Treatment	2.00	3.20	6.00	6.10
Kr Storage	--	--	16.40	16.40
Waste Shipment	.002	.002	.002	.002
Repository	.017	.0210	.017	.0210
Total	2.02 $\pm$ 40%	3.22 $\pm$ 40%	22.42 $\pm$ 30%	22.52 $\pm$ 30%

Plutonium Oxide Management Subsystem Costs

If spent fuel is reprocessed and plutonium is recovered without immediate recycle, the plutonium may be stored in onsite facilities or shipped offsite and stored in federally owned facilities. For this study, costs were based on storage of PuO_2 in the FRP-related facilities for 10 years or storage of the total system PuO_2 in a central federal facility until the year 2000. Since most of the unit cost is attributable to capital charges storage for longer periods would not significantly increase the unit storage cost. Material flows for FRP-related storage were based on a 2000-MT/yr FRP. Material flows for a central facility were based on the reference nuclear power projection of 400 GWe in the year 2000. Additional details on the facilities and material flows are given in Section 5.5.

The subsystem unit costs for the above facilities are shown in Table 10.4.16. Unit costs for centrally located, federally owned facilities are lower than onsite storage costs because of a lower cost of money and no tax costs. The additional cost of transportation to an offsite facility is small compared with the differences in basic storage cost.

TABLE 10.4.16. Subsystem Unit Costs of Plutonium Storage Alternatives, $/kg Uranium Processed

	30-MT Facilities Adjacent to FRP	200-MT Facilities Adjacent to FRP	200-MT Central Federal Facilities
Shipping (1500 Mi)	--	--	0.80
Storage	33.70	46.40	22.50
Total	33.70 $\pm$ 20%	46.40 $\pm$ 30%	23.30 $\pm$ 25%

The 200-MT facility at an FRP is not cost effective relative to a 30-MT facility because too much storage capacity is unused for some time after construction. It is more cost effective to construct storage capacity as it is needed.

Levelized Subsystem Unit Costs Over Entire System Life

The average unit costs and the levelized unit costs employing a 7% discount rate over the life of the entire nuclear power system are presented here for major subsystem alternatives and alternative combinations in the uranium and plutonium recycle fuel cycle. The system computer simulation was used to develop the comparisons. Comparisons are presented for four categories of wastes:

- high-level waste
- fuel residue waste
- intermediate and low-level TRU waste
- gaseous wastes.

The system calculations do not include the treatment or management of any decommissioning wastes, which would have only a very minor impact on the results shown here. Table 10.4.17 shows the alternatives considered for the four waste types and the total number of containers sent to repositories in each of the alternatives. The intermediate- and low-level TRU waste category includes all of the wastes from failed equipment and noncombustible wastes as well as the immobilized combustible and wet wastes. The gaseous waste treatment includes dissolver off-gas treatment and the vessel off-gas and the atmospheric protection systems.

Table 10.4.18 shows the average subsystem unit costs and levelized unit costs using a 7% discount rate for the major waste management alternatives in the uranium and plutonium recycle fuel cycle. The high-level waste treatment unit costs are somewhat higher than those shown previously because in the total system the HLW waste canisters average somewhat smaller size than was assumed in the previous calculation. This increases both treatment costs and final repository costs. The table shows both fuel costs in \$/kg and unit power costs in mills/kW-hr. It can be seen from comparison of the equivalent power costs for the alternatives that:

- selection of either HLW treatment alternative does not affect power costs by more than 0.01 mills/kW-hr
- the variation between the fuel residue treatment alternatives does not affect power costs by more than 0.02 mills/kW-hr
- the largest impact of alternative waste treatment alternative selection is in the management of intermediate- and low-level TRU wastes where differences as large as 0.1 and 0.15 mills/kW-hr can be observed.
- selection of the gaseous waste treatment alternative can affect the power costs by up to 0.1 mills/kW-hr.

TABLE 10.4.17. Total Containers Sent to Repository for Waste Management Alternatives in the Uranium and Plutonium Recycle Fuel Cycle

Alternative	High-Level Waste Canisters	Fuel Residue Canisters	Intermediate Level Waste Canisters	Intermediate Level Waste Drums	Low-Level Waste Drums	Low-Level Waste Boxes
High-Level Waste						
Vitrification (Reference)	1.93×10^5	--	--	--	--	--
Calcination	1.93×10^5	--	--	--	--	--
Fuel Residue						
Minimum Treatment(Reference)	--	9.07×10^4	--	--	--	--
Compaction	--	5.34×10^4	--	--	--	--
Melting	--	3.66×10^4	--	--	--	--
Intermediate and Low-Level TRU Wastes						
Incinerate-Cement(Reference)	--	--	1.35×10^4	1.54×10^6	1.02×10^6	1.62×10^4
Incinerate-Bitumen	--	--	1.35×10^4	1.22×10^6	7.70×10^5	1.62×10^4
Minimum Treatment-Cement	--	--	1.35×10^4	3.48×10^6	2.93×10^6	1.62×10^4
Minimum Treatment-Bitumen	--	--	1.35×10^4	3.25×10^6	2.96×10^6	1.62×10^4
Gaseous Waste Treatment						
APS + I, Ru, Kr, C-14 Removal (Reference)	--	--	--	4.52×10^2	7.77×10^3	--
APS + I, Ru, Kr removal	--	--	--	4.52×10^2	5.96×10^3	--
APS + I, Ru, C-14 removal	--	--	--	4.52×10^2	7.77×10^3	--
APS + I, Ru removal	--	--	--	4.52×10^2	5.96×10^3	--
APS only	--	--	--	--	--	--
Complete Reference System	1.93×10^5	9.07×10^4	1.35×10^4	1.54×10^6	1.03×10^6	1.62×10^4

TABLE 10.4.18. Average Subsystem Unit Cost of Waste Management Alternatives in the Uranium and Plutonium Recycle Fuel Cycle

	Unit Fuel Cost, $/kg Discharged		Unit Power Cost, mills/kW-hr	
	0% Discount Rate	7% Discount Rate	0% Discount Rate	7% Discount Rate
High-Level Waste				
Vitrified (Reference	59	38	.25	.14
Calcified	61	40	.26	.15
Fuel Residue				
Minimum Treatment (Reference)	11	9	.05	.04
Compaction	8	7	.03	.03
Melting	8	6	.03	.02
Intermediate and Low-Level TRU Wastes				
Incineration-cementation (Reference)	38	31	.16	.12
Incineration-bitumenization	33	27	.14	.10
Minimum treatment-cementation	72	57	.31	.21
Minimum treatment-bitumenization	68	55	.29	.21
Gaseous Waste Treatment				
APS + I, Ru, Kr, C-14 Removal (Reference)	28	23	.12	.09
APS + I, Ru, Kr removal	28	22	.12	.09
APS + I, Ru, C-14 removal	9	7	.04	.03
APS + I, Ru, removal	10	8	.04	.03
APS only	2	1	.01	.01

10.5 TOTAL SYSTEM COSTS

10.5 TOTAL SYSTEM COSTS

This section compares the costs of the entire waste management system for the 9 fuel cycle cases on the basis of reference alternatives. All spent fuel, high-level, and other TRU waste management costs covering treatment, interim storage, transportation, and disposal in geologic repositories are included. Costs for decommissioning the ISFSFs, FRPs, and MOX FFPs and management of the decommissioning TRU waste in the reprocessing cases are also included. Nuclear power plant decommissioning costs are not included.

In the fuel reprocessing cases, storage of spent fuel prior to reprocessing, except for the initial 6 months at the power plant basins, and shipment of unpackaged spent fuel to reprocessing are included as waste management costs although these are not necessarily exclusively waste management costs. However, to provide comparability between the once-through cases and the reprocessing cases, and because the radioactivity in the reprocessing wastes originates in the spent fuel, costs for these functions are conservatively included in waste management. Alternatively these costs could either be shared with or borne entirely by reprocessing.

The total system costs for the 9 fuel cycle cases are detailed in a series of 195 tables in Appendix 10E. These tables are grouped by fuel cycle cases and show waste managmeent system costs at 5-year intervals over the entire life of the system. Appendix 10E tables provide the following information for each fuel cycle case:

- A series of four tables show total waste management costs in mills/kW-hr at 0%, 7% and 10% discount rates for repositories in four geologic media.
- A second series of four tables show the costs/kilogram of spent fuel at 0%, 7%, and 10% discount rates for repositories in four geologic media.
- A third series of tables show total waste management costs in dollars at 0% discount rate. For the once-through cycle cases there are four tables that detail costs for all of the major cost components in waste management systems, one table for each geologic repository medium. For the reprocessing cases, there are ten tables for each fuel cycle case: one table shows TRU waste transportation costs, one table shows spent fuel management costs, eight tables in four sets of two tables each show respectively, repository costs and non-spent-fuel system waste management costs as affected by each geologic repository medium. For each geologic media, the totals from the spent fuel and non-spent-fuel waste management cost tables must be summed to obtain total waste management costs.
- A fourth series of tables shows total present worth system waste management costs in dollars at a 7% discount rate. This series of tables is similar to the 0% discount rate series except that the tables showing transportation and repository cost details are deleted. The series consists of four tables in the once-through cases and five tables in the reprocessing cases.
- A fifth and final series of tables shows total present worth system waste management costs in dollars at a 10% discount rate. This series of tables is identical to the 7% discount rate series.

Table 10.5.1 summarizes overall system unit power costs for TRU waste management in mills/kWh at 0%, 7% and 10% discount rates. At a 0% discount rate the costs all lie within the range of 0.7 to 1.2 mills per kW-hr. There are only minor differences between the different fuel cycle cases except for Case 4B, the delayed decision to reprocess, where the costs are 0.2 to 0.3 mills/kWhr higher than Case 3A, the prompt reprocessing case. Granite and basalt repositories increase the cost about 0.1-0.2 mills/kW-hr and shale increases the cost somewhat less relative to the salt repository cases.

TABLE 10.5.1. Total Unit Power Cost for Tru-Waste Management Including Spent Fuel Handling and Storage, Mills/kWh

	0% Discount Rate				7% Discount Rate				10% Discount Rate			
Case	Salt	Granite	Shale	Basalt	Salt	Granite	Shale	Basalt	Salt	Granite	Shale	Basalt
1	0.73	0.84	0.75	0.88	0.45	0.51	0.46	0.53	0.38	0.42	0.39	0.44
2A	0.76	0.96	0.88	0.97	0.52	0.61	0.59	0.65	0.45	0.52	0.51	0.56
2B	0.81	0.97	0.99	1.07	0.56	0.66	0.67	0.72	0.49	0.57	0.58	0.62
3A	0.74	0.97	0.89	0.98	0.50	0.61	0.60	0.65	0.44	0.52	0.52	0.55
3B	0.76	0.98	0.89	0.98	0.49	0.57	0.55	0.58	0.42	0.46	0.45	0.48
4A	0.74	0.85	0.76	0.89	0.42	0.47	0.43	0.48	0.33	0.36	0.34	0.38
4B	1.04	1.19	1.14	1.16	0.40	0.42	0.41	0.41	0.30	0.31	0.30	0.31
1LG	0.73				0.45				0.37			
3LG	0.74				0.49				0.43			

Note: Case 1 = Once-Through
Case 2A = U-Only Recycle, Pu in HLW
Case 2B = U-Only Recycle, Pu Stored
Case 3A = U & Pu Recycle
Case 3B = U & Pu Recycle, Delayed Repository
Case 4A = Once-Through, Delayed Repository or Deferred Decision
Case 4B = U & Pu Recycle, Deferred Decision
Case 1LG = Low-Growth, Once-Through
Case 3LG = Low-Growth, U & Pu Recycle

At the 7% discount rate the power cost of waste management is reduced by 0.3-0.6 mills/kW-hr. In this instance, Case 4B shows the lowest cost of all the cases because of the long time period between the production of electric energy and placement in the final repository. The granite, shale, and basalt repositories increase total waste management costs here on the order of 0.05-0.15 mills/kW-hr relative to the salt repository cases.

At a 10% discount rate the relationship between costs for the different fuel cycle cases is similar to the comparable cases at the 7% discount rate. However, all costs now are on the order of 0.07-0.1 mills/kW-hr lower.

Table 10.5.2 shows total overall system unit fuel costs for TRU waste management at 0%, 7%, and 10% discount rates. At a 0% discount rate the costs range from $170-279/kgHM. At a 7% discount rate the costs range from $104-$187 per kgHM. At a 10% discount rate the costs range from $79-$164 per kgHM. The relative differences between cases bear the same relationships as in the previous series of tables showing equivalent power costs of waste management.

TABLE 10.5.2. Total Unit Fuel Cost for TRU-Waste Management Including Spent Fuel Handling and Storage, $/kg

	0% Discount Rate				7% Discount Rate				10% Discount Rate			
Case	Salt	Granite	Shale	Basalt	Salt	Granite	Shale	Basalt	Salt	Granite	Shale	Basalt
1	170	195	175	205	117	133	120	139	100	113	102	118
2A	178	224	206	227	136	160	155	169	120	139	136	148
2B	188	225	230	251	145	172	174	187	130	152	154	164
3A	172	226	208	229	131	160	156	169	116	139	137	147
3B	177	229	209	229	128	149	143	152	111	123	120	127
4A	172	198	177	208	110	122	112	126	89	97	91	100
4B	243	270	266	279	104	108	107	109	79	81	81	82
1LG	170				116				98			
3LG	173				129				114			

Note: Case 1 = Once-Through
Case 2A = U-Only Recycle, Pu in HLW
Case 2B = U-Only Recycle, Pu Stored
Case 3A = U & Pu Recycle
Case 3B = U & Pu Recycle, Delayed Repository
Case 4A = Once-Through, Delayed Repository or Deferred Decision
Case 4B = U & Pu Recycle, Deferred Decision
Case 1LG = Low-Growth, Once-Through
Case 3LG = Low-Growth, U & Pu Recycle

The total system waste management cost components can be classified by those that are affected by final repository costs and those that are not. Table 10.5.3 shows total system waste management costs in billions of dollars at a 0% discount rate for cost components that are not affected by repository media selection. The cost components include spent fuel packaging, all transportation costs, all storage costs and the decommissioning costs at the FRP and MOX FFPs. Table 10.5.4 carries over the subtotal from the previous table and shows the waste treatment and repository costs for each of the four geologic media alternatives. For the two low growth cases, however, only the salt repository alternative was evaluated. The waste treatment costs are affected by repository selection because of the canister size variations used to adjust the heat generation rate of high level waste containers. Repository costs account for 25-40% of the total system costs. Waste treatment costs also account for about 25-40% of total system costs. In the once-through cycle cases where TRU waste treatment costs are not incurred, spent fuel packaging and additional spent fuel transportation and storage requirements provide offsetting cost components. Decommissioning costs for the FRP and MOX FFP only account for about 0.5% of the total.

Tables 10.5.5 and 10.5.6 show total system costs using a 7% discount rate in a format that is parallel to that used in the previous two tables. The discounting effect results in total costs that are on the order of 10% of those at a 0% discount rate. A similar set of data but at a 10% discount rate is provided in Table 10.5.7 and 10.5.8. Total costs are reduced by about a factor of 2 relative to the 7% discount cases.

Because of the long time period involved in this system calculation and because of the uncertainty regarding selection of an appropriate discount rate, the present worth total system costs are not thought to be particularly significant in themselves. However, the present

TABLE 10.5.3. System Waste Management Costs Other than Repository and Treatment Costs - $ Billions at 0% Discount Rate

Case	Spent Fuel Packaging	Transportation: Spent Fuel	Transportation: Treated Waste	Transportation: PuO_2	Storage: Spent Fuel	Storage: Treated Waste	Storage: PuO_2	Dismantling FRP-MOX	Subtotal
1	6.9	19.5	NA	NA	18.2	NA	NA	NA	44.7
2A	NA	7.3	3.6	NA	5.7	0.11	NA	0.40	17.1
2B	NA	7.3	3.6	0.32	5.7	0.11	8.7	0.40	26.1
3A	NA	7.3	3.6	NA	5.7	0.11	NA	0.40	17.1
3B	NA	7.3	3.9	NA	5.7	1.6	NA	0.40	18.8
4A	6.9	19.5	NA	NA	19.3	NA	NA	NA	45.8
4B	4.1	13.1	3.6	NA	29.4	NA	NA	0.30	50.4
1LG	4.4	12.4	NA	NA	11.7	NA	NA	NA	28.5
3LG	NA	4.6	2.3	NA	4.5	0.11	NA	0.40	12.0

TABLE 10.5.4. System Waste Management Costs Including Spent Fuel Handling and Storage - $ Billions at 0% Discount Rate

Case	Sub-Total[a]	Waste Treatment: Salt	Waste Treatment: Granite	Waste Treatment: Shale	Waste Treatment: Basalt	Repository: Salt	Repository: Granite	Repository: Shale	Repository: Basalt	Total System: Salt	Total System: Granite	Total System: Shale	Total System: Basalt
1	44.7	NA	NA	NA	NA	19.6	29.5	21.6	33.0	64.3	74.1	66.3	77.7
2A	17.1	26.2	29.2	30.4	30.4	22.8	36.2	28.7	36.2	66.1	82.4	76.2	83.7
2B	26.1	25.8	27.8	30.4	30.2	18.0	29.3	28.9	36.3	69.9	83.1	85.3	92.5
3A	17.1	28.1	31.1	32.2	32.0	20.0	37.7	29.9	37.8	65.2	85.9	79.2	85.9
3B	18.8	28.2	30.9	31.6	31.5	20.2	37.3	28.9	36.7	67.2	87.0	70.3	87.1
4A	45.8	NA	NA	NA	NA	19.6	29.5	21.6	33.0	65.4	75.2	67.3	78.7
4B	50.4	26.0	26.9	28.1	27.8	15.9	25.3	22.5	27.7	92.3	102.6	101.0	106.0
1LG	28.5	NA				12.5				41.1			
3LG	12.0	17.7				12.2				41.9			

a. System waste management costs other than repository and treatment costs.

TABLE 10.5.5. System Waste Management Costs Other than Repository and Treatment Costs - $ Billions at 7% Discount Rate

Case	Spent Fuel Packaging	Transportation			Storage			Dismantling FRP-MOX	Subtotal
		Spent Fuel	Treated Waste	PuO_2	Spent Fuel	Treated Waste	PuO_2		
1	0.72	2.1	NA	NA	2.5	NA	NA	NA	5.4
2A	NA	0.97	0.42	NA	0.95	0.07	NA	0.01	2.4
2B	NA	0.97	0.42	0.04	0.95	0.07	1.1	0.01	3.6
3A	NA	0.97	0.43	NA	0.95	0.07	NA	0.01	2.4
3B	NA	0.97	0.32	NA	0.95	0.54	NA	0.01	2.8
4A	0.72	1.8	NA	NA	2.9	NA	NA	NA	5.4
4B	0.64	1.0	0.11	NA	3.4	NA	NA	--	5.2
1LG	0.52	1.5	NA	NA	1.9	NA	NA	NA	3.9
3LG	NA	0.69	0.30	NA	0.81	0.07	NA	0.01	1.9

TABLE 10.5.6. System Waste Management Costs Including Spent Fuel Handling and Storage - $ Billions at 7% Discount Rate

Case	Sub-total[a]	Waste Treatment				Repository				Total System			
		Salt	Granite	Shale	Basalt	Salt	Granite	Shale	Basalt	Salt	Granite	Shale	Basalt
1	5.4	NA	NA	NA	NA	2.0	3.1	2.2	3.4	7.4	8.4	7.6	8.7
2A	2.4	3.5	3.7	4.0	4.0	2.4	3.6	3.1	3.9	8.3	9.7	9.4	10.2
2B	3.6	3.4	3.7	4.0	3.9	1.9	3.2	3.1	3.9	8.9	10.5	10.7	11.4
3A	2.4	3.7	4.0	4.2	4.2	2.1	3.7	3.2	4.0	8.2	10.1	9.8	10.6
3B	2.8	3.7	3.9	4.0	4.0	1.5	2.6	2.2	2.8	8.0	9.3	8.9	9.6
4A	5.4	NA	NA	NA	NA	1.5	2.3	1.7	2.6	6.9	7.6	7.0	7.9
4B	5.2	.87	.89	.92	.91	.46	.70	.61	.77	6.5	6.8	6.7	6.9
1LG	3.9	NA				1.5				5.4			
3LG	1.9	2.6				1.5				5.9			

a. System waste management costs other than repository and treatment costs.

TABLE 10.5.7. System Waste Management Costs Other than Repository and Treatment Costs - $ Billions at 10% Discount Rate

Case	Spent Fuel Packaging	Transportation: Spent Fuel	Transportation: Treated Waste	Transportation: PuO_2	Storage: Spent Fuel	Storage: Treated Waste	Storage: PuO_2	Dismantling FRP-MOX	Subtotal
1	.35	1.1	NA	NA	1.4	NA	NA	NA	2.8
2A	NA	.53	.22	NA	.60	.06	NA	--	1.4
2B	NA	.53	.22	.02	.60	.06	.62	--	2.1
3A	NA	.53	.22	NA	.60	.06	NA	--	1.4
3B	NA	.53	.13	NA	.60	.36	NA	--	1.6
4A	.35	.81	NA	NA	1.6	NA	NA	NA	2.8
4B	.33	.48	.03	NA	1.8	NA	NA	--	2.6
1LG	.27	.80	NA	NA	1.1	NA	NA	NA	2.2
3LG	NA	.39	.16	NA	.54	.06	NA	--	1.2

TABLE 10.5.8. System Waste Management Costs Including Spent Fuel Handling and Storage - $ Billions at 10% Discount Rate

Case	Sub-total[a]	Waste Treatment: Salt	Waste Treatment: Granite	Waste Treatment: Shale	Waste Treatment: Basalt	Repository: Salt	Repository: Granite	Repository: Shale	Repository: Basalt	Total System: Salt	Total System: Granite	Total System: Shale	Total System: Basalt
1	2.8	NA	NA	NA	NA	1.0	1.5	1.1	1.7	3.8	4.3	3.9	4.5
2A	1.4	1.9	2.0	2.1	2.1	1.2	1.7	1.5	1.9	4.5	5.2	5.1	5.5
2B	2.1	1.9	2.0	2.1	2.1	1.0	1.6	1.6	1.9	4.9	5.7	5.7	6.1
3A	1.4	2.0	2.1	2.3	2.2	1.0	1.8	1.6	2.0	4.5	5.3	5.3	5.6
3B	1.6	2.0	2.1	2.1	2.1	.59	1.0	.85	1.1	4.2	4.7	4.6	4.9
4A	2.8	NA	NA	NA	NA	.61	.91	.67	1.0	3.4	3.7	3.5	3.8
4B	2.6	.24	.24	.25	.25	.12	.18	.16	.20	3.0	3.1	3.1	3.1
1LG	2.2	NA				.76				2.9			
3LG		1.5				.75				3.4			

a. System waste management costs other than repository and treatment costs.

worth of the system components show the effect of discounting on relative importance of major components in the waste management costs. These data can also be used to determine the contribution of the system components to total system power or fuel costs that were shown in Tables 10.5.1 and 10.5.2. For example, total unit power costs for Case 1, with a repository in a salt formation, are shown to be 0.45 mills/kW-hr at a 7% discount rate in Table 10.5.1. In Table 10.5.6 the discounted repository costs at 7% are \$2 billion and the total system cost is \$7.4 billion. The equivalent power cost for the repository can be determined as (2/7.4)(0.45) = 0.12 mills/kWhr. The cost for any of the components listed in Table 10.5.3 through 10.5.8 can be similarly converted to either mills/kW-hr or \$/kgHM.

The results of this cost analysis indicates that the total system unit costs for management of spent fuel, high-level and TRU wastes (1) are relatively insensitive to fuel cycle selection and (2) are likely to fall within the range of 0.5 to 1 mill/kWh in equivalent 1978 constant dollar power costs.

10.6 TOTAL SYSTEM PLUTONIUM DISPOSITION

10.6 TOTAL SYSTEM PLUTONIUM DISPOSITION

An important waste management consideration for the different fuel cycle options is the disposition of plutonium. For the reference 10,000 GWe-yr system described here, the quantities of plutonium in the spent fuel and the quantities recovered and recycled in the principal fuel cycle options are compared in Table 10.6.1.

TABLE 10.6.1. Plutonium Disposition in Four Fuel Cycles (metric tons)

	Once-Through Cycle	U-Only Recycle	U & Pu Recycle	Delayed Reprocessing
Total Pu in spent fuel	3,090	3,170	5,760	3,660
Pu recycled	0	0	4,400	1,350
Pu recovered but not recycled	0	0	1,300	2,270
Pu in wastes sent to repositories	3,100	3,170	60	38

In the once-through cycle and the uranium-only recycle options, a total of 3,090 and 3,170 MT of plutonium, respectively, are produced. This plutonium is sent to a repository in the once-through cycle and in the U-only recycle case it is separated but is either added to the solidified high-level waste for disposal in geologic repositories or stored for later use.

In the uranium-plutonium recycle option, a total of 5,700 metric tons of plutonium is recoverd (1.04% loss to wastes), 4,400 tons are recycled in MOX fuel, leaving 1,300 MT that are not recycled. Of this 1,300 MT, however, 600 MT are not recycled as a calculational simplification and because of the low fissile plutonium content (this is plutonium recovered from the third plutonium recycle and is 47% fissile) leaving 700 MT available for recycle but not used in this system. It is assumed that other nuclear power plants not in the reference system would be permitted to use this 700 MT of plutonium. In a real system the plutonium from the third recycle probably would be mixed with other plutonium and would not be separable. The 600 MT of third recycle plutonium would continue to be recycled and ultimately reduced to approximately 200 MT of non-fissile ^{242}Pu.

In the delayed (year 2000) reprocessing option, only 3,620 MT of plutonium is recovered, of which 1,350 is recycled, leaving 2,270 MT to be used in other nuclear power plant systems. No third recycle plutonium is involved here.

Table 10.6.2 compares the calculated quantities of plutonium residing in repositories in the year 2050 for the same four fuel cycles. Quantities of each plutonium isotope are shown. By the year 2050 all reprocessing has been completed and all of the wastes generated in the 10,000 GWe-yr system have been placed in repositories. The difference between plutonium quantities sent to repositories in Table 10.6.1 and plutonium quantities in repositories in the year 2050 in Table 10.6.2 is the result of 15-year ^{241}Pu decay to ^{241}Am and 18-year ^{244}Cm decay forming additonal ^{242}Pu. In the plutonium recycle cases the ^{244}Cm decay after reprocessing substantially alters the ratio of $^{240}Pu/^{239}Pu$ in the plutonium remaining in the wastes.

TABLE 10.6.2. Total Plutonium in Repositories in Year 2050 (metric tons)

	Once-Through Cycle	U-Only Recycle[a]	U & Pu Recycle	Delayed Reprocessing
^{242}Pu	150	145	6	2
^{241}Pu	77	77	2	0.5
^{240}Pu	770	760	48	18
^{239}Pu	1,790	1,840	17	20
^{238}Pu	35	75	2	0.6
^{236}Pu	0.5	3	3×10^{-6}	1×10^{-10}
Total Pu	2,822	2,900	75	41

If the nuclear power sytem is an isolated system and no other reactors are available to use the excess plutonium from this system, the reprocessing and recycle could be planned to eliminate any excess plutonium at the end of system life. In this case the reprocessing would be discontinued well before the last nuclear power plant is shut down, all recovered plutonium would be recycled as MOX fuel and the system would be converted to a once-through cycle mode of operation in the last years of its life.

10A WASTE MANAGEMENT SYSTEM DATA SHEETS

TRU-WASTE TREATMENT DATA SHEETS

WASTE STORAGE DATA SHEETS

TRU DECOMMISSIONING DATA SHEETS

WASTE MANAGEMENT UNIT COST DATA SHEETS

APPENDIX 10A

WASTE MANAGEMENT SYSTEM DATA SHEETS

The data sheets in this appendix consolidate the essential data from all of the previous sections that are required for the system simulations. Separate data sheet sets summarize pertinent data regarding waste treatment, waste storage, and wastes generated during facility decommissioning. The wastes considered here include those generated during treatment of the gaseous wastes at facilities which generate TRU-wastes as well as the TRU-wastes themselves. There are four sets of data sheets.

1. The waste treatment data sheets tabulate the following information for the various waste fractions:

- the radionuclide content of the waste component expressed as the fraction of the amounts present in spent fuel for the FRP wastes and as a fraction of the amounts present in the fabricated fuel for the MOX FFP wastes
- the radionuclide nuclide release (to the atmosphere) during treatment of the waste expressed as the fraction of the amount present in the waste being treated
- the volumes of the waste fractions both before and after the treatment given per MTHM reprocessed (FRP) or fabricated (MOX FFP)
- the type and volume of the containers used to contain the treated wastes
- the number of containers per MTHM reprocessed (FRP) or fabricated (MOX FFP) for each of four surface dose rate ranges; <0.2 R/hr, 0.2-1 R/hr, 1-10 R/hr, and >10 R/hr

2. The waste storage data sheets contain information on:

- the total radionuclide content of a given class of waste being stored generally the sum of the contents of many of the individual waste components
- the radionuclide release (to the atmosphere) during storage of the waste.

3. The decommissioning waste data sheets contain the same kinds of information as do the waste treatment data sheets. However, the bases are different in two respects:

- The radionuclide content of a waste component is expressed as a fraction of the amounts present in the facility at the time of decommissioning (rather than as a fraction of that present in the fuel).
- The number of containers is expressed per decommissioned facility (rather than per MTHM).

4. The waste management unit cost data sheets contain the unit costs developed in previous sections of this report for use in the waste management system cost calculations. All cost data for the system calculations have been escalated from mid-1976 to mid-1978 dollar value using a factor of 1.17. The data sheets contain unit costs and related information for waste treatment, interim storage, transportation, and placement in a final geologic repository.

APPENDIX 10A

INDEX TO WASTE MANAGEMENT SYSTEM DATA SHEETS

SECTION 10 - APPENDIX A

TRU-WASTE TREATMENT DATA SHEET INDEX

Sheet No.	Waste Type	Alternative	Fuel Cycle Options(a,b) Case 1	Case 2a	Case 2b	Case 3
1	Irradiated Spent Fuel	Package in Canisters	R	--	--	--
2	FRP High-Level Waste	Vitrification	--	R	R	R
3	FRP High-Level Waste	Calcination	--	A	A	A
4	Hulls and Hardware (Fuel Residue)	Package without Compaction	--	R	R	R
5	Hulls and Hardware (Fuel Residue)	Compaction of Hulls	--	A	A	A
6	Hulls and Hardware (Fuel Residue)	Melting of Hulls	--	A	A	A
7	FRP Combustible and Compactable Waste	Minimum Treatment	--	A	--	--
8	FRP Combustible and Compactable Waste	Minimum Treatment	--	--	A	A
9	FRP Combustible and Compactable Waste	Incinerate	--	R	--	--
10	FRP Combustible and Compactable Waste	Incinerate	--	--	R	R
11	FRP Wet Waste, Incinerator Ash and Scrub Solution	Cement Immobilization (Incineration of Combustibles)	--	R	--	--
12	FRP Wet Waste, Incinerator Ash and Scrub Solution	Cement Immobilization (Incineration of Combustibles)	--	--	R	R
13	FRP Wet Waste, Incinerator Ash and Scrub Solution	Bitumen Immobilization (Incineration of Combustibles)	--	A	--	--
14	FRP Wet Waste, Incinerator Ash and Scrub Solution	Bitumen Immobilization (Incineration of Combustibles)	--	--	A	A
15	FRP Wet Waste, Solvent Burner Scrub Solution & Main Plant Ion Exchange Resin	Cement Immobilization (Minimum Treatment of Combustibles)	--	A	A	A
16	FRP Wet Waste, Solvent Burner Scrub Solution & Main Plant Ion Exchange Resin	Bitumen Immobilization (Minimum Treatment of Combustibles)	--	A	A	A
17	FRP Noncombustible and Noncompactable Trash	Package with Minimum Treatment	--	R	--	--
18	FRP Noncombustible and Noncompactable Trash	Package with Minimum Treatment	--	--	R	R

a. Case 1 Once Through
Case 2a U only Recycle - Pu to HLLW
Case 2b U only Recycle - Pu to Storage
Case 3 U and Pu Recycle

b. R = Reference Waste Treatment System
A = Alternative Treatment
B = For Comparison Only

TRU-WASTE TREATMENT DATA SHEET INDEX (Continued)

Sheet No.	Waste Type	Alternative	Fuel Cycle Options(a,b) Case 1	Case 2a	Case 2b	Case 3
19	FRP Failed Equipment	Decontaminate, Disassemble & Package	--	R	--	--
20	FRP Failed Equipment	Decontaminate, Disassemble & Package	--	--	R	R
21a, b	FRP Gaseous Wastes	APS Only	--	B	B	B
22a, b	FRP Gaseous Wastes	APS Plus I and Ru Removal	--	A	A	A
23a, b	FRP Gaseous Wastes	APS Plus I, Ru and C-14 Removal	--	A	A	A
24a, b	FRP Gaseous Wastes	APS Plus I, Ru and Kr Removal, C-14 Release	--	A	A	A
25a, b	FRP Gaseous Wastes	APS Plus I, Ru, Kr and C-14 Removal	--	R	R	R
26	MOX FFP Combustible and Compactable Waste	Minimum Treatment	--	--	--	A
27	MOX FFP Combustible and Compactable Waste	Incinerate	--	--	--	R
28	MOX FFP Wet Waste, Incinerator Ash and Scrub Solution	Cement Immobilization (Incineration of Combustibles)	--	--	--	R
29	MOX FFP Wet Waste, Incinerator Ash and Scrub Solution	Bitumen Immobilization (Incineration of Combustibles)	--	--	--	A
30	MOX FFP Wet Waste	Cement Immobilization (Minimum Treatment of Combustibles)	--	--	--	A
31	MOX FFP Wet Waste	Bitumen Immobilization (Minimum Treatment of Combustibles	--	--	--	A
32	MOX FFP Failed Equipment and Noncombustible, Noncompactable Trash	Decontaminate, Disassemble & Package	--	--	--	R
33	MOX FFP Gaseous Waste	Filtration	--	--	--	R

a. Case 1 Once Through
Case 2a U only Recycle - Pu to HLLW
Case 2b U only Recycle - Pu to Storage
Case 3 U and Pu Recycle

b. R = Reference Waste Treatment System
A = Alternative Treatment
B = For Comparison Only

WASTE TREATMENT DATA SHEET NO. 1.

Waste Type: Irradiated Spent Fuel
Alternative: Package in Canisters
Fuel Cycles: Case 1

Waste Component	Isotopic Content in Waste, Fraction of Fuel Inventory[a]	Isotopic Release During Treatment, Fraction to Atmosphere[b]	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: <0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
BWR Spent Fuel	Fission Products									
	All = 1.0	$^{3}H = 2 \times 10^{-6}$	0.462 m^3	0.705 m^3	6.5" sq x 16' canister	0.133 m^3				5.30[c]
		$^{14}C = 6 \times 10^{-6}$								
		$^{85}Kr = 6 \times 10^{-5}$								
		$^{129}I = 2 \times 10^{-5}$								
		$Cs = 4 \times 10^{-11}$								
		$Other = 1 \times 10^{-12}$								
	Actinides	Actinides								
	All = 1.0	Negligible								
	Activation Products	Activation Products								
	All = 1.0	All = 1×10^{-10}								
PWR Spent Fuel	Fission Products									
	All = 1.0	$^{3}H = 2 \times 10^{-6}$	0.406 m^3	0.615 m^3	9.5" sq x 16' canister	0.284 m^3				2.17[c]
		$^{14}C = 6 \times 10^{-6}$								
		$^{85}Kr = 6 \times 10^{-5}$								
		$^{129}I = 2 \times 10^{-5}$								
		$Cs = 4 \times 10^{-11}$								
		$Others = 1 \times 10^{-12}$								
	Actinides	Actinides								
	All = 1.0	Negligible								
	Activation Products	Activation Products								
	All = 1.0	All = 1×10^{-10}								

a. Fraction of components listed in Table 3.3.8 for fission products; in Table 3.3.10 for actinides; and in Tables 3.3.6 and 3.3.7 for activation products.
b. From Table 5.7.34.
c. For Composite Number of Containers per ton of heavy metal:
BWRs = (0.38) (5.302) = 2.0148 containers/MTHM Composite
PWRs = (0.62) (2.167) = 1.3435 containers/MTHM Composite
3.3583 containers/MTHM Composite

WASTE TREATMENT DATA SHEET NO. 2.

Waste Type: FRP High-Level Waste
Alternative: Vitrification
Fuel Cycle: Case 2a[d], 2b and 3

Waste Component	Isotopic Content in Untreated Waste, Fraction[a] of Spent Fuel Inventory[b]	Isotopic Release During Treatment, Fraction to Atmosphere[c]	Waste Volume Untreated per MTHM	Waste Volume Packaged per MTHM	Container Type	Container Volume	Containers per MTHM by Surface Dose Class <0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
HLLW	Fission Products	Fission Products								
	^{3}H = 0.08	^{3}H = 1.0	0.567 m^3	0.0729 m^3	12" x 10' canister	0.22 m^3				0.33
	^{85}Kr = 0	^{129}I = 1×10^{-3}								
	^{129}I = 0.005	Ru = 1×10^{-10}								
	Others = 0.99+	Others = 2×10^{-15}								
	Actinides	Actinides								
	Pu = 0.005[d]	All = 2×10^{-15}								
	U = 0.005									
	Others = 0.99+									

a. From Table 3.3.29.
b. Fraction of components listed in Tables 3.3.8 (Fuel Cycles 2a and 2b) and 3.3.9 (Fuel Cycle 3) for fission products; and in Table 3.3.11 (Fuel Cycles 2a and 2b) and Table 3.3.15 (Fuel Cycle 3) for actinides.
c. From Table 4.1.10.
d. In Fuel Cycle 2a all Pu is added to the HLLW.

WASTE TREATMENT DATA SHEET NO. 3.

Waste Type: FRP High-Level Waste
Alternative: Calcination
Fuel Cycle: Case 2a[(d)], 2b and 3

Waste Component	Isotopic Content in Untreated Waste, Fraction[(a)] of Spent Fuel Inventory[(b)]	Isotopic Release During Treatment, Fraction to Atmosphere[(c)]	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: <0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
	Fission Products	Fission Products								
HLLW	^{3}H = 0.08	^{3}H = 1.0	0.567 m^3	0.0337 m^3	8" x 10' canister	0.0987 m^3				0.342
	^{85}Kr = 0	Ru = 5×10^{-12}								
	^{129}I = 0.005	^{129}I = 1×10^{-3}								
	Others = 0.99+	Others = 2×10^{-15}								
	Actinides	Actinides								
	Pu = 0.005[(d)]	All = 2×10^{-15}								
	U = 0.005									
	Others = 0.99+									

a. From Table 3.3.29.
b. Fraction of components listed in Tables 3.3.8 (Fuel Cycles 2a and 2b) and 3.3.9 (Fuel Cycle 3) for fission products; and in Tables 3.3.11 (Fuel Cycles 2a and 2b) and 3.3.15 (Fuel Cycle 3) for actinides.
c. From Table 4.1.22.
d. In fuel cycle 2a all Pu is added to the HLLW.

WASTE TREATMENT DATA SHEET NO. 4.

Waste Type: Hulls and Hardware (Fuels Residue)
Alternative: Package without Compaction
Fuel Cycles: Case 2a, 2b and 3

Waste Component	Isotopic Content in Waste, Fraction[a] of Spent Fuel Inventory[b]	Isotopic Release During Treatment, Fraction to Atmosphere[c]	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: <0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
Fuel Assembly Hardware and Hulls	Fission Products ^{3}H = 0.15 ^{85}Kr = 0 ^{129}I = 0 Others = 5×10^{-4} Actinides All = 5×10^{-4} Activation Products All = 1.0	All = 5×10^{-13}	0.322 m^3	0.334 m^3	30" x 10' canister	1.39 m^3				0.240

a. From Table 3.3.28.
b. Fraction of components listed in Tables 3.3.8 (Fuel Cycles 2a and 2b) and 3.3.9 (Fuel Cycle 3) for fission products; in Table 3.3.11 (Fuel Cycles 2a and 2b) and Table 3.3.15 (Fuel Cycle 3) for actinides; and in Tables 3.3.6 and 3.3.7 (Fuel Cycles 2a, 2b and 3) for activation products.
c. From Table 4.2.6.

WASTE TREATMEMT DATA SHEET NO. 5.

Waste Type: Hulls and Hardware (Fuels Residue)
Alternative: Compaction of Hulls
Fuel Cycles: Case 2a, 2b and 3

Waste Component	Isotopic Content in Untreated Waste, Fraction[a] of Spent Fuel Inventory[b]	Isotopic Release During Treatment, Fraction to Atmosphere[c]	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: <0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
Fuel Assembly Hardware	Fission Products									
	None	All = 5×10^{-13}	0.056 m^3	0.0584 m^3	30" x 10' canister	1.39 m^3				0.042
	Actinides									
	None									
	Activation Products[d]									
	^{14}C = 0.5									
	^{35}S, ^{181}W = 0.3									
	^{51}Cr, ^{58}Co, ^{60}Co = 0.96									
	^{55}Fe = 0.98									
	^{54}Mn, ^{59}Ni, ^{63}Ni = 0.99									
	^{45}Ca, ^{46}Sc, ^{65}Zn, ^{90}Sr, ^{90}Y, ^{94}Nb, ^{93}Mo, ^{99}Tc, ^{125}Sb, ^{125m}Te = 1.0									
	^{113m}Cd = 0.998									
Hulls	Fission Products									
	^{3}H = 0.15	All = 5×10^{-13}	0.266 m^3	0.1376 m^3	30" x 10' canister	1.39 m^3				0.099
	^{85}Kr = 0									
	^{129}I = 0									
	Others = 5×10^{-4}									
	Actinides									
	All = 5×10^{-4}									
	Activation Products[d]									
	^{14}C = 0.5									
	^{35}S, ^{181}W = 0.7									
	^{51}Cr, ^{58}Co, ^{60}Co = 0.04									
	^{55}Fe = 0.02									
	^{54}Mn, ^{59}Ni, ^{63}Ni = 0.01									
	^{93}Zr, ^{95}Zr, ^{95}Nb, ^{119m}Sn, ^{121m}Sn, ^{123}Sn = 1.0									
	^{113m}Cd = 0.002									

a. From Table 3.3.28.
b. Fraction of components listed in Tables 3.3.8 (Fuel Cycles 2a and 2b) and 3.3.9 (Fuel Cycle 3) for fission products; in Tables 3.3.11 (Fuel Cycles 2a and 2b) and 3.3.15 (Fuel Cycle 3) for actinides.
c. From Table 4.2.17.
d. Activation product fractions here are for use when combined Hulls and Hardware source data is used. When separate Hulls and Hardware data (Tables 3.3.6 and 3.3.7) are used, activation product fractions are 1.0 for both hulls and hardware.

WASTE TREATMENT DATA SHEET NO. 6.

Waste Type: Hulls and Hardware (Fuels Residue)
Alternative: Melting of Hulls
Fuel Cycles: Case 2a, 2b and 3

Waste Component	Isotopic Content in Waste, Fraction[a] of Spent Fuel Inventory[b]	Isotopic Release During Treatment, Fraction to Atmosphere[c]	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: <0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
Fuel Assembly Hardware	Fission Products None Actinides None Activation Products[d] ^{14}C = 0.5 ^{35}S, ^{181}W = 0.3 ^{51}Cr, ^{58}Co, ^{60}Co = 0.96 ^{55}Fe = 0.98 ^{54}Mn, ^{59}Ni, ^{63}Ni = 0.99 ^{45}Ca, ^{46}Sc, ^{65}Zn, ^{90}Sr, ^{90}Y, ^{94}Nb, ^{93}Mo, ^{99}Tc, ^{125}Sb, ^{125m}Te = 1.0 ^{113m}Cd = 0.998	All = 5×10^{-13}	0.056 m^3	0.0584 m^3	30" x 10' canister	1.39 m^3				0.042
Hulls	Fission Products ^{3}H = 0.15 ^{85}Kr = 0 ^{129}I = 0 Others = 5×10^{-4} Actinides All = 5×10^{-4} Activation Products[d] ^{14}C = 0.5 ^{35}S, ^{181}W = 0.7 ^{51}Cr, ^{58}Co, ^{60}Co = 0.04 ^{55}Fe = 0.02 ^{54}Mn, ^{59}Ni, ^{63}Ni = 0.01 ^{93}Zr, ^{95}Zr, ^{93m}Nb, ^{95}Nb, ^{119m}Sn, ^{121m}Sn, ^{123}Sn = 1.0 ^{113m}Cd = 0.002	^{3}H = 1.0 Others = 5×10^{-13}	0.266 m^3	0.0758 m^3	30" x 10' canister	1.39 m^3				0.0545

a. From Table 3.3.28.
b. Fraction of components listed in Tables 3.3.8 (Fuel Cycles 2a and 2b) and 3.3.9 (Fuel Cycle 3) for fission products; in Tables 3.3.11 (Fuel Cycles 2a and 2b) and 3.3.15 (Fuel Cycle 3) for actinides.
c. From Table 4.2.28.
d. Activation product fractions here are for use when combined Hulls and Hardware source data is used. When separate Hulls and Hardware data (Tables 3.3.6 and 3.3.7) are used, activation product fractions are 1.0 for both hulls and hardware.

WASTE TREATMENT DATA SHEET NO. 7. (Page 1 of 2)

Waste Type: FRP Combustible and Compactable Waste
Alternative: Package without Treatment, except Incinerate Degraded Extractant
Fuel Cycles: Case 2a

Waste Component	Isotopic Content in Waste, Fraction(a) of Spent Fuel Inventory(b)	Isotopic Release During Treatment, Fraction to Atmosphere(c)	Waste Volume Untreated per MTHM	Waste Volume Packaged per MTHM	Container Type	Container Volume	Containers per MTHM by Surface Dose Class <0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
LLW	Fission Products	All = 3×10^{-14}	1.2 m^3	1.26 m^3	55 gal drum	0.21 m^3	6.0			
	^{3}H = 0									
	^{85}Kr = 0									
	^{129}I = 0									
	Others = 1×10^{-9}									
	Actinides									
	All = 1×10^{-9}									
ILW (low activity fraction)	Fission Products	All = 6×10^{-15}	0.041 m^3	0.044 m^3	55 gal drum	0.21 m^3		0.208		
	^{3}H = 5.0×10^{-8}									
	^{85}Kr = 0									
	^{129}I = 6×10^{-7}									
	Others = 1×10^{-8}									
	Actinides									
	U, Pu = 6×10^{-8}									
	Others = 8×10^{-8}									
	Activation Products									
	All = 1×10^{-6}									
ILW (high activity fraction)	Fission Products	All = 6×10^{-15}	0.639 m^3	0.680 m^3	55 gal drum	0.21 m^3			3.24	
	^{3}H = 7×10^{-7}									
	^{85}Kr = 0									
	^{129}I = 1×10^{-5}									
	Others = 1.2×10^{-6}									
	Actinides									
	U & Pu = 1×10^{-6}									
	Others = 1.2×10^{-6}									
	Activation Products									
	All = 1×10^{-8}									

WASTE TREATMENT DATA SHEET NO. 7. (Page 2 of 2)

Waste Type: FRP Combustible and Compactable Waste
Alternative: Package without Treatment, except Incinerate Degraded Extractant
Fuel Cycles: Case 2a

Waste Component	Isotopic Content in Waste, Fraction[a] of Spent Fuel Inventory[b]	Isotopic Release During Treatment, Fraction to Atmosphere[c]	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: <0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
Filters (Main Plant)	Fission Products	All = 6×10^{-15}	0.140 m^3	0.383 m^3	80 gal drum	0.302 m^3				1.27
	^{3}H = 0									
	^{85}Kr = 0									
	Others = 1×10^{-5}									
	Actinides									
	All									
Degraded Extractant	Fission Products	Fission Products								
	^{3}H = 0	^{29}I = 1×10^{-3}								
	^{85}Kr = 0	Other = 1×10^{-13}								
	^{129}I = 1×10^{-4}									
	Zr, Nb, Ru, Rh = 1×10^{-6}									
	Other = 1×10^{-10}									
	Actinides	Actinides								
	Pu = 1×10^{-4}	All = 1×10^{-13}								
	Other = 1×10^{-6}									

a. From Table 3.3.34 (Low Level Waste), Table 3.3.33 (Main plant combustible trash, filters and degraded extractant), and Table 3.5.1 (Secondary Combustible Waste).
b. Fraction of Components listed in Table 3.3.8 for fission products, in Table 3.3.11 for actinides; and in Tables 3.3.6 and 3.3.7 for activation products.
c. From Tables 4.4.51, 4.4.41 (LLW and ILW), and Table 4.5.3 (Incineration of degraded extractant).

WASTE TREATMENT DATA SHEET NO. 8. (Page 1 of 2)

Waste Type: FRP Combustible and Compactable Waste
Alternative: Package without Treatment, except Incinerate Degraded Extractant
Fuel Cycles: Case 2b and 3

Waste Component	Isotopic Content in Waste, Fraction[a] of Spent Fuel Inventory[b]	Isotopic Release During Treatment, Fraction to Atmosphere[c]	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: <0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
LLW	Fission Products	All = 3×10^{-14}								
	^{3}H = 0		1.2 m^3	1.26 m^3	55 gal drum	0.21 m^3	6.0			
	^{85}Kr = 0									
	All Others = 1×10^{-9}									
	Actinides									
	All = 1×10^{-9}									
ILW	Fission Products	All = 6×10^{-15}	0.071 m^3	0.0756 m^3	55 gal drum	0.21 m^3		0.36		
(low activity fraction)	^{3}H = 5.0×10^{-8}									
	^{129}I = 6×10^{-7}									
	All Others = 8×10^{-8}									
	Actinides									
	U = 6×10^{-8}									
	Pu = 5×10^{-4}									
	All Others = 1×10^{-8}									
	Activation Products									
	All = 1×10^{-6}									
ILW	Fission Products	All = 6×10^{-15}	0.639 m^3	0.680 m^3	55 gal drum	0.21 m^3			3.24	
(high activity fraction)	^{3}H = 7×10^{-7}									
	^{129}I = 1×10^{-5}									
	All Others = 1.2×10^{-6}									
	Actinides									
	U = 1 x 10-6									
	Pu = 1×10^{-6}									
	All Others = 1.2×10^{-6}									
	Activation Products									
	All = 1×10^{-8}									

WASTE TREATMENT DATA SHEET NO. 8. (Page 2 of 2)

Waste Type: FRP Combustible and Compactable Waste
Alternative: Package without Treatment, except Incinerate Degraded Extractant
Fuel Cycles: Case 2b and 3

Waste Component	Isotopic Content in Waste, Fraction(a) of Spent Fuel Inventory(b)	Isotopic Release During Treatment, Fraction to Atmosphere(c)	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: <0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
Main Plant and PuO_2 Conversion Filters	Fission Products	All = 5×10^{-15}	0.160 m^3	0.438 m^3	80 gal drum	0.302 m^3				1.45
	^3H = 0									
	^{85}Kr = 0									
	Others = 1×10^{-5}									
	Actinides									
	Pu = 2×10^{-3}									
	Others = 1×10^{-5}									
Degraded Extractant	Fission Products	Fission Products								
	^3H = 0	^{129}I = 1×10^{-3}								
	^{45}Kr = 0									
	^{129}I = 1×10^{-4}	Others = 1×10^{-13}								
	Zr,Nb,Ru,Rh = 1×10^{-6}									
	Other = 1×10^{-10}									
	Actinides	Actinides								
	Pu = 1×10^{-4}	All = 1×10^{-13}								
	Other = 1×10^{-6}									

a. From Table 3.3.34 (Low Level Waste), Table 3.3.33 (Main plant combustible trash, main plant and PuO_2 conversion filters, and degraded extractant), and Table 3.5.1 (Secondary Combustible Trash).
b. Fraction of components listed in Tables 3.3.8 (Fuel Cycle 2b) and 3.3.9 (Fuel Cycle 3) for fission products; in Tables 3.3.11 (Fuel Cycle 2b) and 3.3.15 (Fuel Cycle 3) for actinides; and in Tables 3.3.6 and 3.3.7 (Fuel Cycles 2b and 3) for activation products.
c. From Tables 4.4.41 and 4.4.51 (ILW and LLW), and Table 4.5.3 (Incineration of degraded extractant).

WASTE TREATMENT DATA SHEET NO. 9 (Page 1 of 3)

Waste Type : FRP Combustible and Compactable Waste
Alternative: Incinerate
Fuel Cycles: Case 2a

Waste Component	Isotopic Content in Waste, Fraction[a] of Spent Fuel Inventory[b]	Isotopic Release During Treatment, Fraction to Atmosphere[c]	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: <0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
LLW	Fission Products	Fission Products								
	^{3}H = 0	All = 2.6×10^{-12}	1.2 m^3	(d)						
	^{85}Kr = 0									
	^{129}I = 0									
	Other = 1×10^{-9}									
	Actinides	Actinides								
	All = 1×10^{-9}	All = 2.6×10^{-12}								
ILW and Secondary Wastes	Fission Products	Fission Products								
	^{3}H = 7×10^{-7}	^{3}H = 0.8	0.68 m^3	(d)						
	^{85}Kr = 0									
	^{129}I = 1×10^{-5}	^{129}I = 0.95								
		Zr, Nb = 1.2×10^{-11}								
		Ru, Rh = 1.2×10^{-11}								
	Other = 1.2×10^{-6}	Other = 2.6×10^{-12}								
	Actinides	Actinides								
	Pu = 1×10^{-6}	Pu = 1×10^{-11}								
	U = 1×10^{-6}	U = 1×10^{-11}								
	Other = 1.2×10^{-6}	Other = 2×10^{-11}								
	Activation Products	Activation Products								
	All = 1.0×10^{-6}	All = 1×10^{-12}								

WASTE TREATMENT DATA SHEET NO. 9 (Page 2 of 3)
Waste Type : FRP Combustible and Compactable Waste
Alternative: Incinerate
Fuel Cycles: Case 2a

Waste Component	Isotopic Content in Waste, Fraction[a] of Spent Fuel Inventory[b]	Isotopic Release During Treatment, Fraction to Atmosphere[c]	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: <0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
Main Plant Filters	Fission Products	Fission Products								
	^{3}H = 0		0.140 m^3	0.037 m^3	55 gal drum	0.21 m^3				0.18
	^{85}Kr = 0									
	^{129}I = 0									
	Other = 1×10^{-5}	Zr, Nb = 1.2×10^{-11}								
		Ru, Rh = 1.2×10^{-11}								
		Other = 2.6×10^{-12}								
	Actinides	Actinides								
	All = 1×10^{-5}	Pu = 1×10^{-11}								
		U = 1×10^{-11}								
		Other = 2×10^{-11}								
Ion Exchange Resin	Fission Products	Fission Products								
	^{3}H = 0		0.005 m^3	(d)						
	^{85}Kr = 0									
	^{129}I = 2×10^{-3}	^{129}I = 0.95								
	Zr, Nb = 1×10^{-5}	Zr, Nb = 1.2×10^{-11}								
	Ru, Rh = 1×10^{-5}	Ru, Rh = 1.2×10^{-11}								
	Other = 1×10^{-7}	Other = 2.6×10^{-12}								
	Actinides	Actinides								
	Pu = 1×10^{-5}	Pu = 1×10^{-11}								
	U = 1×10^{-5}	U 1×10^{-11}								
	Other = 1×10^{-7}	Other = 2×10^{-11}								

WASTE TREATMENT DATA SHEET NO. 9 (Page 3 of 3)

Waste Type : FRP Combustible and Compactable Waste
Alternative: Incinerate
Fuel Cycles: Case 2a

Waste Component	Isotopic Content in Waste, Fraction[a] of Spent Fuel Inventory[b]	Isotopic Release During Treatment, Fraction to Atmosphere[c]	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: ≤0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
Degraded Extractant	Fission Products	Fission Products								
	^{3}H = 0		0.008 m^3	(d)						
	^{85}Kr = 0									
	^{129}I = 1×10^{-4}	^{129}I = 0.95								
	Zr, Nb = 1×10^{-6}	Zr, Nb = 1.2×10^{-11}								
	Ru, Rh = 1×10^{-6}	Ru, Rh = 1.2×10^{-11}								
	Other = 1×10^{-10}	Other = 2.6×10^{-12}								
	Actinides	Actinides								
	Pu = 1×10^{-4}	Pu = 1×10^{-11}								
		U = 1×10^{-11}								
	Other = 1×10^{-6}	Other = 2×10^{-11}								

a. From Table 3.3.34 (Low level waste), Table 3.3.33 (Main plant combustible trash, filters, ion exchange resins and degraded extractant) and Table 3.5.1 (Seconcary Combustible Waste).
b. Fraction of components listed in Table 3.3.8 (Fuel Cycle 2a) for fission products; in Table 3.3.11 (Fuel Cycle 2a) for actinides; and in Tables 3.3.6 and 3.3.7 (Fuel Cycle 2a) for activation products.
c. From Tables 4.4.29 and 4.4.14.
d. Except for filter media, the outputs of this facility are incinerator ash and scrubber solution which are immobilized in concrete before packaging, as described in Data Sheets No. 11 and 12.

WASTE TREATMENT DATA SHEET NO. 10 (Page 1 of 3)

Waste Type : FRP Combustible and Compactable Waste
Alternative: Incinerate
Fuel Cycles: Case 2b and 3

Waste Component	Isotopic Content in Waste, Fraction(a) of Spent Fuel Inventory(b)	Isotopic Release During Treatment, Fraction to Atmosphere(c)	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: <0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
LLW	Fission Products	Fission Products								
	^{3}H = 0	All = 2.6×10^{-12}	1.2 m^3	(d)						
	^{85}Kr = 0									
	^{129}I = 0									
	Other = 1×10^{-9}									
	Actinides	Actinides								
	All = 1×10^{-9}	All = 2.6×10^{-12}								
LLW and Secondary Wastes	Fission Products	Fission Products								
	^{3}H = 7×10^{-7}	^{3}H = 0.8	0.71 m^3	(d)						
	^{85}Kr = 0									
	^{129}I = 1×10^{-5}	^{129}I = 0.95								
		Zr, Nb = 1.2×10^{-11}								
		Ru, Rh = 1.2×10^{-11}								
	Other = 1.2×10^{-6}	Other = 2.6×10^{-12}								
	Actinides	Actinides								
	Pu = 5.0×10^{-4}	Pu = 1×10^{-11}								
	U = 1×10^{-6}	U = 1×10^{-11}								
	Other = 1.2×10^{-6}	Other = 2×10^{-11}								
	Activation Products	Activation Products								
	All = 1.0×10^{-6}	All = 1×10^{-12}								

WASTE TREATMENT DATA SHEET NO. 10 (Page 2 of 3)

Waste Type : FRP Combustible and Compactable Waste
Alternative: Incinerate
Fuel Cycles: Case 2b and 3

Waste Component	Isotopic Content in Waste, Fraction[a] of Spent Fuel Inventory[b]	Isotopic Release During Treatment, Fraction to Atmosphere[c]	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: <0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
Main	Fission Products	Fission Products								
Plant	^{3}H = 0		0.160 m^3	0.04 m^3	55 gal drum	0.21 m^3				0.200
and	^{85}Kr = 0									
PuO_2	^{129}I = 0									
Conversion		Zr, Nb = 1.2×10^{-11}								
Filters		Ru, Rh = 1.2×10^{-11}								
	Other = 1×10^{-5}	Other = 2.6×10^{-12}								
	Actinides	Actinides								
	Pu = 2×10^{-3}	Pu = 1×10^{-11}								
	U = 1×10^{-5}	U = 1×10^{-11}								
	Other = 1×10^{-5}	Other = 2×10^{-11}								
Ion	Fission Products	Fission Products								
Exchange	^{3}H = 0		0.005 m^3	(d)						
Resin	^{85}Kr = 0	*								
	^{129}I = 2×10^{-3}	^{129}I = 0.95								
	Zr, Nb = 1×10^{-5}	Zr, Nb = 1.2×10^{-11}								
	Ru, Rh = 1×10^{-5}	Ru, Rh = 1.2×10^{-11}								
	Other = 1×10^{-7}	Other = 2.6×10^{-12}								
	Actinides	Actinides								
	Pu = 1×10^{-5}	Pu = 1×10^{-11}								
	U = 1×10^{-5}	U = 1×10^{-11}								
	Other = 1×10^{-7}	Other = 2×10^{-11}								

WASTE TREATMENT DATA SHEET NO. 10 (Page 3 of 3)
Waste Type : FRP Combustible and Compactable Waste
Alternative: Incinerate
Fuel Cycles: Case 2b and 3

Waste Component	Isotopic Content in Waste, Fraction[a] of Spent Fuel Inventory[b]	Isotopic Release During Treatment, Fraction to Atmosphere[c]	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: <0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
Degraded Extractant	Fission Products	Fission Products	$0.084\ m^3$	(d)						
	^{3}H = 0									
	^{85}Kr = 0									
	^{129}I = 1×10^{-4}	^{129}I = 0.95								
	Zr, Nb = 1×10^{-6}	Zr, Nb = 1×10^{-11}								
	Ru, Rh = 1×10^{-6}	Ru, Rh = 1×10^{-11}								
	Other = 1×10^{-10}	Other = 2×10^{-12}								
	Actinides	Actinides								
	Pu = 1×10^{-4}	Pu = 1×10^{-11}								
		U = 1×10^{-11}								
	Other = 1×10^{-6}	Other = 2×10^{-11}								

a. From Table 3.3.34 (Low Level Waste), Table 3.3.33 (Main Plant and PuO_2 conversion combustible trash, main plant and PuO_2 conversion filters, ion exchange resins, and degradant extractant) and Table 3.5.1 (Secondary Waste).
b. Fraction of components listed in Tables 3.3.8 (Fuel Cycle 2b) and 3.3.9 (Fuel Cycle 3) for fission products; in Tables 3.3.11 (Fuel Cycle 2b) and 3.3.15 (Fuel Cycle 3) for actinides; and in Tables 3.3.6 and 3.3.7 (Fuel Cycles 2b and 3) for activation products.
c. From Tables 4.4.29 and 4.4.14.
d. Except for filter media, the outputs of this facility are incinerator ash and scrubber solution which are immobilized in concrete before packaging, as described in Data Sheets No. 11 and 12.

WASTE TREATMENT DATA SHEET NO. 11 (Page 1 of 2)

Waste Type : FRP Wet Waste, Incinerator Ash and Scrub Solution
Alternative: Cement Immobilization (Incineration of Combustibles)
Fuel Cycles: Case 2a

Component	Isotopic Content in Waste Waste, Fraction[a] of Spent Fuel Inventory[b]	Isotopic Release During Treatment, Fraction to Atmosphere[c]	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: <0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
Wet Waste plus misc. Secondary Waste	Fission Products	Fission Products								
	^{3}H = 1×10^{-3}	^{3}H = 1×10^{-3}	0.166 m^3	0.265 m^3	55 gal drum	0.21 m^3				1.263
	^{85}Kr 0	^{129}I = 1×10^{-4}								
	Zr, Nb = 1×10^{-3}	Others = 3×10^{-12}								
	Ru, Rh = 1×10^{-3}									
	^{129}I = 3×10^{-3}									
	Others = 1×10^{-5}									
	Actinides									
	U = 2.5×10^{-3}									
	Pu = 1×10^{-3}									
	Others = 1×10^{-5}									
	Activation Products									
	All = 1×10^{-4}									
Ash	Fission Products									
	^{3}H = 0		0.084 m^3	0.086 m^3	55 gal drum	0.21 m^3				0.409
	^{85}Kr = 0	^{129}I = 1×10^{-4}								
	^{129}I = 2×10^{-6}	Others = 3×10^{-12}								
	Zr, Nb = 1×10^{-5}									
	Ru, Rh = 1×10^{-5}									
	Others = 1.5×10^{-6}									
	Actinides									
	U = 1×10^{-5}									
	Pu = 1.1×10^{-4}									
	Others = 2.2×10^{-6}									
	Activation Products									
	All = 1.0×10^{-6}									

WASTE TREATMENT DATA SHEET NO. 11 (Page 2 of 2)

Waste Type : FRP Wet Waste, Incinerator Ash and Scrub Solution
Alternative: Cement Immobilization (Incineration of Combustibles)
Fuel Cycles: Case 2a

Waste Component	Isotopic Content in Waste, Fraction[a] of Spent Fuel Inventory[b]	Isotopic Release During Treatment, Fraction to Atmosphere[c]	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: <0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
	Fission Products									
Concen-	^{3}H = 1×10^{-7}	^{3}H = 1×10^{-3}	0.182 m^3	0.231 m^3	55 gal drum	0.21 m^3	1.10			
trator	^{85}Kr = 0	^{129}I = 1×10^{-4}								
Scrubber	^{129}I = 1×10^{-4}	Others = 3×10^{-12}								
Solution	Zr, Nb = 2.5×10^{-7}									
	Ru, Rh = 2.5×10^{-7}									
	Others = 2.5×10^{-8}									
	Actinides									
	Pu = 2.5×10^{-5}									
	Others = 2.5×10^{-7}									
	Activation Products									
	All = 1×10^{-9}									

a. From Tables 3.3.31 and 3.3.32 (Wet Wastes) and Table 3.5.1 (Secondary Wastes).
b. Fraction of components listed in Table 3.3.8 for fission products; in Table 3.3.11 for actinides; and in Tables 3.3.6 and 3.3.7 for activation products.
c. From Table 4.7.23.

WASTE TREATMENT DATA SHEET NO. 12 (Page 1 of 2)

Waste Type : FRP Wet Waste, Incinerator Ash and Scrub Solution
Alternative: Cement Immobilization (Incineration of Combustibles)
Fuel Cycles: Case 2b and 3

Waste Component	Isotopic Content in Waste, Fraction(a) of Spent Fuel Inventory(b)	Isotopic Release During Treatment, Fraction to Atmosphere(c)	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: <0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
Wet Waste and Misc. Secondary Wastes	Fission Products									
	^{3}H = 1×10^{-3}	^{3}H = 1×10^{-3}	0.166 m^3	0.265 m^3	55 gal drum	0.21 m^3				1.263
	^{85}Kr = 0	^{129}I = 1×10^{-4}								
	Zr, Nb = 1×10^{-3}	Others = 3×10^{-12}								
	Ru, Rh = 1×10^{-3}									
	^{129}I = 3×10^{-3}									
	Others = 1×10^{-5}									
	Actinides									
	U = 2.5×10^{-3}									
	Pu = 1×10^{-3}									
	Others = 1×10^{-5}									
	Activation Products									
	All = 1×10^{-4}									

WASTE TREATMENT DATA SHEET NO. 12 (Page 2 of 2)

Waste Type : FRP Wet Waste, Incinerator Ash and Scrub Solution
Alternative: Cement Immobilization (Incineration of Combustibles)
Fuel Cycles: Case 2b and 3

Waste Component	Isotopic Content in Waste, Fraction[a] of Spent Fuel Inventory[b]	Isotopic Release During Treatment, Fraction to Atmosphere[c]	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: <0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
Ash	Fission Products									
	^{3}H = 0	^{3}H = 1×10^{-3}	0.085 m^3	0.0871 m^3	55 gal drum	0.21 m^3				0.415
	^{85}Kr = 0	^{129}I = 1×10^{-4}								
	^{129}I = 2×10^{-6}	Others = 3×10^{-12}								
	Zr, Nb = 1×10^{-5}									
	Ru, Rh = 1×10^{-5}									
	Others = 1.5×10^{-6}									
	Actinides									
	U = 1×10^{-5}									
	Pu = 5.8×10^{-4}									
	Others = 2.2×10^{-6}									
	Activation Products									
	All = 1.0×10^{-6}									
Concentrated Scrubber Solution	Fission Products									
	^{3}H = 1×10^{-7}	^{3}H = 1×10^{-3}	0.185 m^3	0.234 m^3	55 gal drum	0.21 m^3	1.115			
	^{85}Kr = 0	^{129}I = 1×10^{-4}								
	^{129}I = 1×10^{-4}	Others = 3×10^{-12}								
	Zr, Nb = 2.5×10^{-7}									
	Ru, Rh = 2.5×10^{-7}									
	Others = 2.5×10^{-8}									
	Actinides									
	Pu = 2.5×10^{-5}									
	Others = 2.5×10^{-7}									
	Activation Products									
	All = 1×10^{-9}									

a. From Tables 3.3.31 and 3.3.32 (Wet Wastes), and Table 3.5.1 (Secondary Wastes).
b. Fraction of components listed in Tables 3.3.8 (Fuel Cycle 2b) and 3.3.9 (Fuel Cycle 3) for fission products; in Tables 3.3.11 (Fuel Cycle 2b) and 3.3.15 (Fuel Cycle 3) for actinides; and in Tables 3.3.6 and 3.3.7 for activation products.
c. From Table 4.7.23.

WASTE TREATMENT DATA SHEET NO. 13 (Page 1 of 2)

Waste Type : FRP Wet Waste, Incinerator Ash and Scrub Solution
Alternative: Bitumen Immobilization (Incineration of Combustibles)
Fuel Cycles: Case 2a

Waste Component	Isotopic Content in Waste, Fraction[a] of Spent Fuel Inventory[b]	Isotopic Release During Treatment, Fraction to Atmosphere[c]	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: < 0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
Wet Waste										
<0.2 R/hr Waste	Fission Products	Fission Products								
	Zr, Nb = 1×10^{-7}		$0.005\ m^3$	$0.0044\ m^3$	55 gal drum	$0.21\ m^3$	0.021			
	Others = 0	All = 3×10^{-12}								
	Actinides	Actinides								
	Pu = 1×10^{-7}	All = 3×10^{-12}								
	Others = 0									
0.2-1 R/hr Waste	Fission Products	Fission Products								
	Zr, Nb = 1.1×10^{-7}		$0.034\ m^3$	$0.0692\ m^3$	55 gal drum	$0.21\ m^3$		0.330		
	Ru, Rh = 1.1×10^{-6}	All = 3×10^{-12}								
	Others = 0									
	Actinides	Actinides								
	U = 1.5×10^{-3}	All = 3×10^{-12}								
	Pu = 1.2×10^{-6}									
	Others = 0									
>10 R/hr Waste	Fission Products	Fission Products								
	^{3}H = 1×10^{-3}	^{3}H = 1.0	$0.127\ m^3$	$0.0719\ m^3$	55 gal drum	$0.21\ m^3$				0.343
	^{85}Kr = 0	^{129}I = 1×10^{-4}								
	^{129}I = 3×10^{-3}	Others = 3×10^{-12}								
	Zr,Nb,Ru,Rh = 1×10^{-3}									
	Others = 1.1×10^{-5}									
	Actinides	Actinides								
	U = 1.1×10^{-3}	All = 3×10^{-12}								
	Pu = 1.1×10^{-3}									
	Others = 1.1×10^{-5}									
	Activation Products	Activation Products								
	All = 1×10^{-4}	All = 3×10^{-12}								

WASTE TREATMENT DATA SHEET NO. 13 (Page 2 of 2)

Waste Type : FRP Wet Waste, Incinerator Ash and Scrub Solution
Alternative: Bitumen Immobilization (Incineration of Combustibles)
Fuel Cycles: Case 2a

Waste Component	Isotopic Content in Waste, Fraction[a] of Spent Fuel Inventory[b]	Isotopic Release During Treatment, Fraction to Atmosphere[c]	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: <0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
Ash	Fission Products	Fission Products								
	^{3}H = 0		0.084 m^3	0.0309 m^3	55 gal drum	0.21 m^3				0.147
	^{85}Kr = 0	^{129}I = 1×10^{-4}								
	^{129}I = 2×10^{-6}	Others = 3×10^{-12}								
	Zr, Nb - 1×10^{-5}									
	Ru, Rh = 1×10^{-5}									
	Others = 1.5×10^{-6}									
	Actinides	Actinides								
	U = 1×10^{-5}	All = 3×10^{-12}								
	Pu = 1.1×10^{-4}									
	Others = 2.2×10^{-6}									
	Activation Products									
	All = 1.0×10^{-6}									
Concentrated Scrubber Solution	Fission Products	Fission Products								
	^{3}H = 1×10^{-7}	^{3}H = 1.0	0.182 m^3	0.0872 m^3	55 gal drum	0.21 m^3		0.415		
	^{85}Kr = 0	^{129}I = 1×10^{-4}								
	^{129}I = 1×10^{-4}	Others = 3×10^{-12}								
	Zr, Nb = 2.5×10^{-7}									
	Ru, Rh = 2.5×10^{-7}									
	Others = 2.5×10^{-8}									
	Actinides	Actinides								
	Pu = 2.5×10^{-5}	All = 3×10^{-12}								
	Others = 2.5×10^{-7}									
	Activation Products	Activation Products								
	All = 1×10^{-9}	All = 3×10^{-12}								

a. From Tables 3.3.31 and 3.3.32 (Wet Wastes) and Table 3.5.1 (Secondary Wastes) with allocation of components to indicate dose classifications.
b. Fraction of components listed in Table 3.3.8 for fission products, in Table 3.3.11 for actinides; and in Tables 3.3.6 and 3.3.7 for activation products.
c. From Table 4.7.9.

WASTE TREATMENT DATA SHEET NO. 14 (Page 1 of 2)

Waste Type : FRP Wet Waste, Incinerator Ash and Scrub Solution
Alternative: Bitumen Immobilization (Incineration of Combustibles)
Fuel Cycles: Case 2b and 3

Waste Component	Isotopic Content in Waste, Fraction[a] of Spent Fuel Inventory[b]	Isotopic Release During Treatment, Fraction to Atmosphere[c]	Waste Volume Untreated per MTHM	Waste Volume Packaged per MTHM	Container Type	Container Volume	Containers per MTHM by Surface Dose Class <0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
Wet Waste										
<0.2 R/hr Waste	Fission Products	Fission Products	$0.005\ m^3$	$0.0044\ m^3$	55 gal drum	$0.21\ m^3$	0.021			
	Zr, Nb $= 1 \times 10^{-7}$									
	Others $= 0$	All $= 3 \times 10^{-12}$								
	Actinides	Actinides								
	Pu $= 1 \times 10^{-7}$	All $= 3 \times 10^{-12}$								
	Others $= 0$									
0.2-1 R/hr Waste	Fission Products	Fission Products	$0.034\ m^3$	$0.0692\ m^3$	55 gal drum	$0.21\ m^3$		0.330		
	Zr, Nb $= 1.1 \times 10^{-7}$	All $= 3 \times 10^{-12}$								
	Ru, Rh $= 1.1 \times 10^{-6}$									
	Others $= 0$									
	Actinides	Actinides								
	U $= 1.5 \times 10^{-3}$	All $= 3 \times 10^{-12}$								
	Pu $= 1.2 \times 10^{-6}$									
	Others $= 0$									
>10 R/hr Waste	Fission Products	Fission Products	$0.127\ m^3$	$0.0719\ m^3$	55 gal drum	$0.21\ m^3$				0.343
	^{3}H $= 1 \times 10^{-3}$	^{3}H $= 1.0$								
	^{85}Kr $= 0$	^{129}I $= 1 \times 10^{-4}$								
	^{129}I $= 3 \times 10^{-3}$	Others $= 3 \times 10^{-12}$								
	Zr, Nb, Ru, Rh $= 1 \times 10^{-3}$									
	Others $= 1.1 \times 10^{-5}$									
	Actinides	Actinides								
	U $= 1.1 \times 10^{-3}$	All $= 3 \times 10^{-12}$								
	Pu $= 1.1 \times 10^{-3}$									
	Others $= 1.1 \times 10^{-5}$									
	Activation Products	Activation Products								
	All $= 1 \times 10^{-4}$	All $= 3 \times 10^{-12}$								

WASTE TREATMENT DATA SHEET NO. 14 (Page 2 of 2)

Waste Type : FRP Wet Waste, Incinerator Ash and Scrub Solution
Alternative: Bitumen Immobilization (Incineration of Combustibles)
Fuel Cycles: Case 2b and 3

Waste Component	Isotopic Content in Waste, Fraction[a] of Spent Fuel Inventory[b]	Isotopic Release During Treatment, Fraction to Atmosphere[c]	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: <0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
Ash	Fission Products	Fission Products								
	^{3}H = 0		0.085 m^3	0.0313 m^3	55 gal drum	0.21 m^3				0.149
	^{85}Kr = 0	^{129}I = 1×10^{-4}								
	^{129}I = 2×10^{-6}	Others = 3×10^{-12}								
	Zr, Nb = 1×10^{-5}									
	Ru, Rh = 1×10^{-5}									
	Others = 1.5×10^{-6}									
	Actinides	Actinides								
	U = 1×10^{-5}	All = 3×10^{-12}								
	Pu = 5.8×10^{-4}									
	Others = 2.2×10^{-6}									
	Activation Products	Activation Products								
	All = 1.0×10^{-6}	All = 3×10^{-12}								
Concentrated Scrubber Solution	Fission Products	Fission Products								
	^{3}H = 1×10^{-7}	^{3}H = 1.0	0.185 m^3	0.0886 m^3	55 gal drum	0.21 m^3		0.422		
	^{85}Kr = 0	^{129}I = 1×10^{-4}								
	^{129}I = 1×10^{-4}	Others = 3×10^{-12}								
	Zr, Nb = 2.5×10^{-7}									
	Ru, Rh = 2.5×10^{-7}									
	Others = 2.5×10^{-8}									
	Actinides	Actinides								
	Pu = 2.5×10^{-5}	All = 3×10^{-12}								
	Others = 2.5×10^{-7}									
	Activation Products	Activation Products								
	All = 1×10^{-9}	All = 3×10^{-12}								

a. From Tables 3.3.31 and 3.3.32 (Wet Wastes) and Table 3.5.1 (Secondary Wastes) with allocation of components to indicated dose classifications.
b. Fraction of components listed in Tables 3.3.8 (Fuel Cycle 2b) and 3.3.9 (Fuel Cycle 3) for fission products; in Tables 3.3.1 (Fuel Cycle 2b) and 3.3.15 (Fuel Cycle 3) for actinides; and in Tables 3.3.6 and 3.3.7 for activation products.
c. From Table 4.7.9.

DATA TREATMENT DATA SHEET NO. 15
Waste Type : FRP Wet Waste, Solvent Burner Scrub Solution and Main Plant Ion Exchange Resins
Alternative: Cement Immobilization (Minimum Treatment of Combustibles)
Fuel Cycles: Case 2a, 2b and 3

Waste Component	Isotopic Content in Waste, Fraction[a] of Spent Fuel Inventory[b]	Isotopic Release During Treatment, Fraction to Atmosphere[c]	Waste Volume		Container		Containers per MTHM by Surface Dose Class			
			Untreated per MTHM	Packaged per MTHM	Type	Volume	<0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
	Fission Products									
Primary	^{3}H = 1×10^{-3}	^{3}H = 1×10^{-3}	0.171 m^3	0.273 m^3	55 gal drum	0.21 m^3				1.30
and	^{85}Kr = 0	^{129}I = 1×10^{-4}								
Secondary	^{129}I = 5×10^{-3}	Others = 3×10^{-12}								
Waste	Ru, Rh = 1×10^{-3}									
	Zr, Nb = 1×10^{-3}									
	Others = 1.1×10^{-5}									
	Actinides									
	U = 2.5×10^{-3}									
	Pu = 1.1×10^{-3}									
	Others = 1.1×10^{-5}									
	Activation Products									
	All = 1×10^{-4}									

a. From Tables 3.3.31 and 3.3.32 (Wet wastes); Table 3.3.33 (Degraded solvent burner scrub solution and ion exchange resin); and Table 3.5.1 (Secondary Waste).
b. Fraction of components listed in Tables 3.3.8 (Fuel Cycles 2a and 2b) and 3.3.9 (Fuel Cycle 3) for fission products; in Tables 3.3.11 (Fuel Cycles 2a and 2b) and 3.3.15 (Fuel Cycle 3) for actinides, and in Tables 3.3.6 and 3.3.7 for activation products.
c. From Table 4.7.23.

WASTE TREATMENT DATA SHEET No. 16
Waste Type : FRP Wet Waste, Solvent Burner Scrub Solution and Main Plant Ion Exchange Resins
Alternative: Bitumen Immobilization (Minimum Treatment of Combustibles)
Fuel Cycles: Case 2a, 2b and 3

Waste Component	Isotopic Content in Waste, Fraction(a) of Spent Fuel Inventory(b)	Isotopic Release During Treatment, Fraction to Atmosphere(c)	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: <0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
Wet Waste										
<0.2 R/hr Waste	Fission Products	Fission Products								
	Zr, Nb = 1×10^{-7}		0.005 m^3	0.0044 m^3	55 gal drum	0.21 m^3	0.021			
	Others = 0	All = 3×10^{-12}								
	Actinides	Actinides								
	Pu = 1×10^{-7}	All = 3×10^{-12}								
	Others = 0									
1.2-1 R/hr Waste	Fission Products	Fission Products								
	Zr, Nb = 1.1×10^{-7}		0.034 m^3	0.0692 m^3	55 gal drum	0.21 m^3		0.330		
	Ru, Rh = 1.1×10^{-6}	All = 3×10^{-12}								
	Others = 0									
	Actinides	Actinides								
	U = 1.5×10^{-3}	All = 3×10^{-12}								
	Pu = 1.2×10^{-6}									
	Others = 0									
>10 R/hr Waste	Fission Products	Fission Products								
	^{3}H = 1×10^{-3}	^{3}H = 1.0	0.132 m^3	0.0764 m^3	55 gal drum	0.21 m^3				0.364
	^{85}Kr = 0	^{129}I = 1×10^{-4}								
	^{129}I = 5×10^{-3}	Others = 3×10^{-12}								
	Zr, Nb = 1×10^{-3}									
	Ru, Rh = 1×10^{-3}									
	Others = 1.1×10^{-5}									
	Actinides	Actinides								
	U = 1.1×10^{-3}	All = 3×10^{-12}								
	Pu = 1×10^{-3}									
	Others = 1.1×10^{-5}									
	Activation Products	Activation Products								
	All = 1×10^{-4}	All = 3×10^{-12}								

a. From Tables 3.3.31 and 3.3.32 (Wet Wastes) with allocation of components to indicated dose classifications; Table 3.3.33 (Degraded Solvent burner blowdown solution; and Ion exchange resin); Table 3.5.1 (Secondary wastes) with allocation of components to indicated dose classification.
b. Fraction of components listed in Tables 3.3.8 (Fuel Cycles 2a and 2b) and 3.3.9 (Fuel Cycle 3) for fission products; Tables 3.3.11 (Fuel Cycles 2a and 2b) and 3.3.15 (Fuel cycle 3) for actinides, and in Tables 3.3.6 and 3.3.7 for activation products.
c. From Table 4.7.9.

WASTE TREATMENT WASTE TREATMENT DATA SHEET NO. 17 (Page 1 of 2)

Waste Type : FRP Noncumbustible and Noncompactable Trash
Alternative: Package with Minimum Treatment
Fuel Cycles: Case 2a

Waste Component	Isotopic Content in Waste, Fraction(a) of Spent Fuel Inventory(b)	Isotopic Release During Treatment, Fraction to Atmosphere(c)	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: <0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
<0.2 R/hr Wastes	Fission Products									
	^{3}H = 4×10^{-9}	All = 1×10^{-15}	0.0469 m^3	0.0453 m^3	55 gal drum	0.21 m^3	0.215			
	^{85}Kr = 0									
	^{129}I = 0									
	Others = 2.5×10^{-9}									
	Actinides									
	All = 2.5×10^{-9}									
0.2-1.0 R/hr Wastes	Fission Products									
	^{3}H = 3×10^{-7}	All = 1×10^{-15}	0.162 m^3	0.156 m^3	55 gal drum	0.21 m^3		0.750		
	^{85}Kr = 0									
	^{129}I = 0									
	Others = 5×10^{-8}									
	Actinides									
	Pu = 5.1×10^{-8}									
	Others = 5×10^{-8}									
1.0-10 R/hr Wastes	Fission Products									
	^{3}H = 9×10^{-7}	All = 1×10^{-15}	0.212 m^3	0.204 m^3	55 gal drum	0.21 m^3			0.970	
	^{85}Kr = 0									
	^{129}I = 0									
	Others = 9 x 10-7									
	Actinides									
	Pu = 9.2×10^{-7}									
	Others = 9×10^{-7}									

WASTE TREATMENT DATA SHEET NO. 17 (Page 2 of 2)

Waste Type : FRP Noncombustible and Noncompactable Trash
Alternative: Package with Minimum Treatment
Fuel Cycles: Case 2a

Waste Component	Isotopic Content in Waste, Fraction(a) of Spent Fuel Inventory(b)	Isotopic Release During Treatment, Fraction to Atmosphere(c)	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: <0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
>10 R/hr	Fission Products									
	^{3}H = 1.4×10^{-5}	All ~ 1×10^{-15}	0.054 m^3	0.052 m^3	55 gal drum	0.21 m^3				0.25
	^{85}Kr = 0									
	^{129}I = 3×10^{-8}									
	Others = 1.0×10^{-5}									
	Actinides									
	U and Pu = 5×10^{-8}									
	Others = 1×10^{-5}									
	Activation Products									
	All = 1×10^{-4}									

a. From Tables 3.3.35 and 3.5.1 with allocation of components to indicated dose classifications.
b. Fraction of components listed in Table 3.3.8 for fission products; in Table 3.3.11 for actinides; and in Tables 3.3.6 and 3.3.7 for activation products.
c. From Table 4.3.6.

WASTE TREATMENT DATA SHEET NO. 18 (Page 1 of 2)
Waste Type : FRP Noncumbustible, Noncompactable Trash
Alternative: Package with Minimum Treatment
Fuel Cycles: Case 2b and 3

Waste Component	Isotopic Content in Waste, Fraction[a] of Spent Fuel Inventory[b]		Isotopic Release During Treatment, Fraction to Atmosphere[c]	Waste Volume		Container		Containers per MTHM by Surface Dose Class			
				Untreated per MTHM	Packaged per MTHM	Type	Volume	<0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
<0.2 R/hr	Fission Products										
	^{3}H	$= 4 \times 10^{-9}$	All $= 1 \times 10^{-15}$	0.0469 m^3	0.0453 m^3	55 gal drum	0.21 m^3	0.215			
	^{85}Kr	= 0									
	^{129}I	= 0									
	Others	$= 2.5 \times 10^{-9}$									
	Actinides										
	All	$= 2.5 \times 10^{-9}$									
0.2 - 1.0 R/hr Wastes	Fission Products										
	^{3}H	$= 3 \times 10^{7}$	All $= 1 \times 10^{-15}$	0.162 m^3	0.156 m^3	55 gal drum	0.21 m^3		0.750		
	^{85}Kr	= 0									
	^{129}I	= 0									
	Others	$= 5 \times 10^{-8}$									
	Actinides										
	Pu	$= 5.1 \times 10^{-8}$									
	Others	$= 5 \times 10^{-8}$									
1.0 - 10 R/hr Wastes	Fission Products										
	^{3}H	$= 9 \times 10^{-7}$	All $= 1 \times 10^{-15}$	0.212 m^3	0.204 m^3	55 gal drum	0.21 m^3			0.970	
	^{85}Kr	= 0									
	^{129}I	= 0									
	Others	$= 9 \times 10^{-7}$									
	Actinides										
	Pu	$= 9.2 \times 10^{-7}$									
	Other	$= 9 \times 10^{-7}$									

WASTE TREATMENT DATA SHEET NO. 18 (Page 2 of 2)

Waste Type: FRP Noncombustible, Noncompactable Trash
Alternative: Package with Minimum Treatment
Fuel Cycles: Case 2b, and 3

Waste Component	Isotopic Content in Waste, Fraction[a] of Spent Fuel Inventory[b]	Isotopic Release During Treatment, Fraction to Atmosphere[c]	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: <0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
>10 R/hr Waste	Fission Products ^{3}H = 1.4×10^{-5} ^{85}Kr = 0 ^{129}I = 6.1×10^{-8} Others = 1.0×10^{-5} Actinides U & Pu = 5×10^{-8} Others = 1×10^{-5} Activation Products All = 1×10^{-4}	All = 1×10^{-15}	0.054 m^3	0.052 m^3	55 gal drum	0.21 m^3				0.25
PuO_2 Conversion Wastes (<0.2R/hr)	Actinides[d] All = 5.91×10^{-5}	All = 1×10^{-15}	0.0055 m^3	0.0055 m^3	55 gal drum	0.21 m^3	0.026			
PuO_2 Conversion Wastes (0.2-1 R/hr)	Actinides[d] All = 4.09×10^{-5}	All = 1×10^{-15}	0.0006 m^3	0.0006 m^3	55 gal drum	0.21 m^3	0.003			

a. From Tables 3.3.35 and 3.5.1 with allocation of components to indicated dose classifications.

b. Fraction of components listed in Tables 3.3.8 (Fuel Cycle 2b) and 3.3.9 (Fuel Cycle 3) for fission products; in Tables 3.3.11 (Fuel Cycle 2b) and 3.3.15 (Fuel Cycle 3) for actinides; and Tables 3.3.6 and 3.3.7 for activation products.

c. From Table 4.3.6.

d. Fraction of components listed in Table 3.3.17.

WASTE TREATMENT DATA SHEET NO. 19 (Page 1 of 2)

Waste Type: FRP Failed Equipment
Alternative: Decontaminate, Disassemble and Package
Fuel Cycles: Case 2a

Waste Component	Isotopic Content in Waste, Fraction[a] of Spent Fuel Inventory[b]	Isotopic Release During Treatment, Fraction to Atmosphere[c]	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: <0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
<0.2 R/hr Waste	Fission Products ^{3}H, ^{129}I = 0 ^{85}Kr = 0 Others = 1.32×10^{-9} Actinides All = 1.32×10^{-9}	All = 4×10^{-8}	0.102 m^3	0.102 m^3	4'x6'x6' boxes	4.08 m^3	0.025			
0.2-1 R/hr Waste	Fission Products ^{3}H, ^{129}I = 0 ^{85}Kr = 0 Others = 1.65×10^{-8} Actinides All = 1.65×10^{-8}	All = 4×10^{-8}	0.0466 m^3	0.0466m^3	30" x 10' canister	1.39 m^3		0.0335		
0.2-1 R/hr Waste	Fission Products ^{3}H, ^{129}I = 0 ^{85}Kr = 0 Others = 1.65×10^{-8} Actinides All = 1.65×10^{-8}	All = 4×10^{-8}	0.0467 m^3	0.0467 m^3	55 gal drum	0.21 m^3		0.223		
1-10 R/hr Waste	Fission Products ^{3}H, ^{129}I = 0 ^{85}Kr = 0 Others = 7.93×10^{-9} Actinides All = 7.93×10^{-9}	All = 4×10^{-8}	0.00278 m^3	0.00278 m^3	30" x 10' canister	1.39 m^3			0.002	

WASTE TREATMENT DATA SHEET NO. 19 (Page 2 of 2)

Waste Type: FRP Failed Equipment
Alternative: Decontaminate, Disassemble and Package
Fuel Cycles: Case 2a

Waste Component	Isotopic Content in Waste, Fraction[a] of Spent Fuel Inventory[b]	Isotopic Release During Treatment, Fraction to Atmosphere[c]	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: <0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
1-10 R/hr Waste	Fission Products									
	^{3}H, ^{129}I = 0	All = 4×10^{-8}	0.00273 m^3	0.00273 m^3	55 gal drum	0.21 m^3			0.013	
	^{85}Kr = 0									
	Others = 7.78×10^{-9}									
	Actinides									
	All = 7.78×10^{-9}									

a. From Table 3.3.35 (Main plant failed equipment) with allocation of components to indicate dose classifications, and after a decontamination factor of 20 has been applied to primary waste values.
b. Fractions of components listed in Table 3.3.8 (Fuel Cycle 2a) for fission products; in Table 3.3.11 (Fuel Cycle 2a) for actinides; and in Tables 3.3.6 and 3.3.7 for activation products.
c. From Table 4.3.6 ($2 \times 10^{-9} \times 20$) adjusted to correspond with the input values.

WASTE TREATMENT DATA SHEET NO. 20 (Page 1 of 2)

Waste Type : FRP Failed Equipment
Alternative: Decontaminate, Disassemble and Package
Fuel Cycles: Case 2b and 3

Waste Component	Isotopic Content in Waste, Fraction(a) of Spent Fuel Inventory(b)	Isotopic Release During Treatment, Fraction to Atmosphere(c)	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: <0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
<0.2 R/hr Waste	Fission Products ^{3}H, ^{129}I = 0 ^{85}Kr = 0 Others = 1.32×10^{-9} Actinides All = 1.32×10^{-9}	All = 4×10^{-8}	0.102 m^3	0.102 m^3	4'x6'x6' boxes	4.08 m^3	0.025			
0.2-1.0 R/hr Waste	Fission Products ^{3}H, ^{129}I = 0 ^{85}Kr = 0 Others = 1.65×10^{-8} Actinides All = 1.65×10^{-8}	All = 4×10^{-8}	0.0466 m^3	0.0466 m^3	30"x10' canister	1.39 m^3		0.0335		
0.2-1.0 R/hr Waste	Fission Products ^{3}H, ^{129}I = 0 ^{129}I = 0 ^{85}Kr = 0 Others = 1.65×10^{-8} Actinides All = 1.65×10^{-8}	All = 4×10^{-8}	0.0467 m^3	0.0467 m^3	55 gal drum	0.21 m^3		0.223		
1-10 R/hr Waste	Fission Products ^{3}H = 0 ^{129}I = 0 ^{85}Kr = 0 Others = 7.93×10^{-9} Actinides All = 7.93×10^{-9}	All = 4×10^{-8}	0.00278 m^3	0.00278 m^3	30"x10' canister	1.39 m^3			0.002	

WASTE TREATMENT DATA SHEET NO. 20 (Page 2 of 2)

Waste Type : FRP Failed Equipment
Alternative: Decontaminate, Disassemble and Package
Fuel Cycles: Case 2b and 3

Waste Component	Isotopic Content in Waste, Fraction[a] of Spent Fuel Inventory[b]	Isotopic Release During Treatment, Fraction to Atmosphere[c]	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: <0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
1-10 R/hr Waste	Fission Products	All = 4×10^{-8}	0.00273 m^3	0.00273 m^3	55 gal drum	0.21 m^3			0.013	
	^3H = 0									
	^{129}I = 0									
	^{85}Kr = 0									
	Others = 7.78×10^{-9}									
	Actinides									
	All = 7.78×10^{-9}									
<0.2 R/hr PuO_2 Conversion Waste	Fission Products									
	None	All = 4×10^{-8}	0.02 m^3	0.0204 m^3	4'x4'x6' boxes	4.08 m^3	0.005			
	Actinides									
	All = 5×10^{-6}									

a. From Table 3.3.35 (Main plant and PuO_2 conversion failed equipment) after a decontamination factor of 20 has been applied to the waste values, with allocation of components to indicate dose classifications.
b. Fraction of components listed in Tables 3.3.8 (Fuel Cycle 2b) and 3.3.9 (Fuel Cycle 3) for fission products; in Tables 3.3.11 (Fuel Cycles 2b), and 3.3.15 (Fuel Cycle 3) for Main Plant failed equipment actinides; and in Tables 3.3.16 (Fuel Cycle 2b) and 3.3.17 (Fuel Cycle 3) for PuO_2 conversion actinides.
c. From Table 4.3.6 ($2 \times 10^{-9} \times 20$) adjusted to correspond with the input values.

WASTE TREATMENT DATA SHEET NO. 21a (Page 1 of 2)

Waste Type : FRP Gaseous Wastes
Alternative: APS Only
Fuel Cycles: Case 2a 2b, and 3

Waste Component	Isotopic Content in Waste, Fraction(a) of Spent Fuel Inventory(b)	Isotopic Release During Treatment, Fraction to Atmosphere(c)	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: <0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
DOG	Fission Products	Fission Products	No solid wastes are produced in this alternative other than HEPA filters which are accounted for as "FRP Compactable Waste."							
	^{3}H = 5×10^{-2}	^{3}H = 1.0								
	^{14}C = 1.0	^{14}C = 1.0								
	^{85}Kr = 1.0	^{85}Kr = 1.0								
	$^{106}Ru\text{-}Rh$ = 2×10^{-4}	$^{106}Ru\text{-}Rh$ = 0.5								
	^{129}I = 9.9×10^{-1}	^{129}I = 1.0								
	All Others = 1×10^{-7}	All Others = 1×10^{-4}								
	Actinides	Actinides								
	All = 1×10^{-7}	All = 1×10^{-4}								
VOG	Fission Products	Fission Products								
	^{3}H = 1×10^{-3}	^{3}H = 1.0								
	^{85}Kr = 1×10^{-6}	^{85}Kr = 1.0								
		$^{106}Ru\text{-}Rh$ = 0.5								
	^{129}I = 5×10^{-3}	^{129}I = 1.0								
	All Others = 1×10^{-7}	All Others = 1×10^{-4}								
	Actinides	Actinides								
	All = 1×10^{-7}	All = 1×10^{-4}								
Ventilation System (HVAC)	Fission Products	Fission Products								
	All = 1×10^{-11}	^{3}H = 1.0								
		^{85}Kr = 1.0								
		$^{106}Ru\text{-}Rh$ = 0.5								
		^{129}I = 1.0								
		All Others = 1×10^{-4}								
	Actinides	Actinides								
	All = 1×10^{-11}	All = 1×10^{-4}								

WASTE TREATMENT DATA SHEET NO. 21a (Page 2 of 2)

Waste Type : FRP Gaseous Waste Streams
Alternative: APS Only
Fuel Cycles: Case 2a 2b, and 3

Waste Component	Isotopic Content in Waste, Fraction(a) of Spent Fuel Inventory(b)		Isotopic Release During Treatment, Fraction to Atmosphere(c)	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: <0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
Vaporized	Fission Products										
Excess	^{3}H	= 7.2×10^{-1}	All = 1.0								
Water(d)	^{106}Ru-Rh	= 1×10^{-10}									
(VEW)	^{129}I	= 1×10^{-5}									
	^{95}Zr	= 1×10^{-11}									
	^{95}Nb	= 1×10^{-12}									
	All Others	= 1×10^{-16}									
	Actinides										
	U	= 1×10^{-11}									
	Pu	= 1×10^{-11}									
	All Others	= 1×10^{-16}									
UF_6	Fission Products										
Process	^{95}Zr	= 3×10^{-12}	All = 1.0								
Off-	^{95}Nb	= 3×10^{-12}									
Gas(d)	^{106}Ru-Rh	= 4×10^{-12}									
	All Others	= 0									
	Actinides										
	U	= 1×10^{-5}									
	Pu	= 1×10^{-11}									
	All Others	= 0									

a. From Table 3.3.27.
b. Fraction of components listed in Tables 3.3.8 (Fuel Cycles 2a and 2b) and 3.3.9 (Fuel Cycle 3) for fission products; Tables 3.3.11 (Fuel Cycles 2a and 2b) and 3.3.15 (Fuel Cycle 3) for actinides.
c. Assuming 10^4 decontamination factor for particulates through the APS and that 50% of the Ru is volatile.
d. These components do not pass through the APS.

WASTE TREATMENT DATA SHEET NO. 21b: Net Release Fractions From Primary FRP Off-gases

Alternative: APS Only
Fuel Cycles: Case 2a 2b, and 3

Component	Controlling Source	Fraction of Fuel Content Released: Untreated	Fraction of Fuel Content Released: Treated
^{3}H	VEW and DOG	7.7×10^{-1}	7.7×10^{-1}
^{14}C	DOG	1.0	1.0
^{85}Kr	DOG	1.0	1.0
^{129}I	DOG, VOG	9.95×10^{-1}	9.95×10^{-1}
$^{106}Ru\text{-}Rh$	DOG	2×10^{-4}	1×10^{-4}
^{95}Zr	VEW, UF_6, DOG, and VOG	2×10^{-7}	3.3×10^{-11}
^{95}Nb	VEW, UF_6, DOG, and VOG	2×10^{-7}	2.4×10^{-11}
Other FPs	DOG and VOG	2×10^{-7}	2×10^{-11}
U	UF_6	1×10^{-5}	1×10^{-5}
Pu	DOG, VOG, VEW, UF_6	2×10^{-7}	4×10^{-11}
Other Actinides	DOG and VOG	2×10^{-7}	2×10^{-11}

WASTE TREATMENT DATA SHEET NO. 22a

Waste Type : FRP Gaseous Waste Streams
Alternative: APS plus I and Ru Removal
Fuel Cycles: Case 2a, 2b, and 3

Waste Component	Isotopic Content in Waste, Fraction[a] of Spent Fuel Inventory[b]	Isotopic Release During Treatment, Fraction to Atmosphere[c]	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: <0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
DOG	Fission Products	Fission Products								
	^{3}H = 5×10^{-2}	^{3}H = 1.0								
	^{14}C = 1.0	^{14}C = 1.0								
	^{85}Kr = 1.0	^{85}Kr = 1.0								
	$^{106}Ru\text{-}Rh$ = 2×10^{-4}	$^{106}Ru\text{-}Rh$ = 5×10^{-5}		0.00025 m^3 Ru on Silica Gel[d]	55 gal drum	0.21 m^3				0.00119
	^{129}I = 9.9×10^{-1}	^{129}I = 1×10^{-3}								
	All Others = 1×10^{-7}	All Others = 1×10^{-9}								
	Actinides	Actinides								
	All = 1×10^{-7}	All = 1×10^{-9}		0.0033 m^3 I on Ag Zeolite[e]	55 gal drum	0.21 m^3	0.0159			
VOG	Fission Products	Fission Products								
	^{3}H = 1×10^{-3}	^{3}H = 1.0								
	^{85}Kr = 1×10^{-6}	^{85}Kr = 1.0								
		$^{106}Ru\text{-}Rh$ = 5×10^{-2}	Ru on package filter is backwashed to HLLW or remains until decommissioning							
	^{129}I = 5×10^{-3}	^{129}I = 1×10^{-3}								
	All Others = 1×10^{-7}	All Others = 1×10^{-7}	I on Ag Zeolite remains until decommissioning							
	Actinides	Actinides								
	All = 1×10^{-7}	All = 1×10^{-7}								
HVAC	See Data Sheet No. 21a									
VEW	See Data Sheet No. 21a			There are no other solid wastes than HEPA filters which are accounted for as "FRP Compactable Waste"						
UF_6 Process Off-Gas	See Data Sheet No. 21a									

a. From Table 3.3.27.
b. Fraction of components listed in Tables 3.3.8 (Fuel Cycles 2a and 2b) and 3.3.9 (Fuel Cycle 3) for fission products; and Tables 3.3.11 (Fuel Cycle 2a and 2b) and 3.3.15 (Fuel Cycle 3) for actinides.
c. From Table 4.9.8 (DOG) and Table 4.10.8 (VOG).
d. Contains only 5% of the input Ru and 1% of the other non-volatile nuclides. The remaining non-volatile nuclides are removed by the scrubber and sent to the HLLW.
e. Contains only the indicated nuclide.

WASTE TREATMENT DATA SHEET NO. 22b: Net Release Fractions for FRP Off-gases

Alternative: APS Plus I and Ru Removal
Fuel Cycles: Case 2a, 2b, and 3

Component	Controlling Source	Fraction of Fuel Content Released: Untreated	Fraction of Fuel Content Released: Treated
^{3}H	VEW and DOG	7.7×10^{-1}	7.7×10^{-1}
^{14}C	DOG	1.0	1.0
^{85}Kr	DOG	1.0	1.0
^{129}I	DOG,	9.95×10^{-1}	1×10^{-3}
$^{106}Ru\text{-}Rh$	DOG	2×10^{-4}	1.5×10^{-8}
^{95}Zr	UF_6 and VEW	2×10^{-7}	1.3×10^{-11}
^{95}Nb	UF_6 and VEW	2×10^{-7}	4×10^{-12}
Other FPs	VOG and HVAC	2×10^{-7}	1.1×10^{-14}
U	UF_6	1×10^{-5}	1×10^{-5}
Pu	UF_6 and VEW	2×10^{-7}	2×10^{-11}
Other Actinides	VOG and HVAC	2×10^{-7}	1.1×10^{-14}

WASTE TREATMENT DATA SHEET NO. 23a

Waste Type : FRP Gaseous Waste Streams
Alternative: APS Plus I, Ru, C-14 Removal
Fuel Cycles: Case 2a, 2b and 3

Waste Component	Isotopic Content in Waste, Fraction[a] of Spent Fuel Inventory[b]	Isotopic Release During Treatment, Fraction to Atmosphere[c]	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: < 0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
DOG	Fission Products	Fission Products								
	^{3}H = 5×10^{-2}	^{3}H = 1.0								
	^{14}C = 1.0	^{14}C = 1×10^{-2}		$0.001\ m^3$ of $CaCO_3$ with G-14[e]	55 gal drum	$0.21\ m^3$	0.0048			
	^{85}Kr = 1.0	^{85}Kr = 1.0								
	$^{106}Ru\text{-}Rh$ = 2×10^{-4}	$^{106}Ru\text{-}Rh$ = 5×10^{-5}		$0.00025\ m^3$ Ru on Silica Gel[d]	55 gal drum	$0.21\ m^3$				0.00119
	^{129}I = 9.9×10^{-1}	^{129}I = 1×10^{-3}		$0.0033\ m^3$ I on Ag Zeolite[e]	55 gal drum	$0.21\ m^3$	0.0159			
	All Others = 1×10^{-7}	All Others = 1×10^{-9}								
	Actinides	Actinides								
	All = 1×10^{-7}	All = 1×10^{-9}		There are no other solid wastes than HEPA filters which are accounted for as "FRP Compactable Waste"						
VOG	See Data Sheet No. 22a									
HVAC	See Data Sheet No. 21a									
VEW	See Data Sheet No. 21a									
UF_6 Process Off-Gas	See Data Sheet No. 21a									

a. From Table 3.3.27.
b. Fraction of components listed in Tables 3.3.8 (Fuel Cycles 2a and 2b) and 3.3.9 (Fuel Cycle 3) for fission products; and in Tables 3.3.11 (Fuel Cycle 2a and 2b) and 3.3.15 (Fuel Cycle 3) for actinides.
c. From Table 4.9.24 (DOG) and Table 4.10.8 (VOG).
d. Contains only 5% of the input Ru and 1% of the other non-volatile nuclides. The remaining non-volatile nuclides are removed by the scrubber and sent to the HLLW.
e. Contains only the indicated nuclide.

WASTE TREATMENT DATA SHEET NO. 23b: Net Release Fractions for FRP Off-gases
Alternative: APS + I, Ru, and C-14 Removal
Fuel Cycles: Cases 2a, 2b, and 3

Component	Controlling Source	Fraction of Fuel Content Released: Untreated	Fraction of Fuel Content Released: Treated
^{3}H	VEW and DOG	7.7×10^{-1}	7.7×10^{-1}
^{14}C	DOG	1.0	1×10^{-2}
^{85}Kr	DOG	1.0	1.0
^{129}I	DOG	9.95×10^{-1}	1×10^{-3}
^{106}Ru-Rh	DOG	2×10^{-4}	1.5×10^{-8}
^{95}Zr	UF_6 and VEW	2×10^{-7}	1.3×10^{-11}
^{95}Nb	UF_6 and VEW	2×10^{-7}	4×10^{-12}
Other FPs	VOG and HVAC	2×10^{-7}	1.1×10^{-14}
U	UF_6	1×10^{-5}	1×10^{-5}
Pu	UF_6 and VEW	2×10^{-7}	2×10^{-11}
Other Actinides	VOG and HVAC	2×10^{-7}	1.1×10^{-14}

WASTE TREATMENT DATA SHEET NO. 24a

Waste Type : FRP Gaseous Waste Streams
Alternative: APS, Plus I, Ru, and Kr Removal, C-14 Release
Fuel Cycles: Case 2a, 2b and 3

Waste Component	Isotopic Content in Waste, Fraction[a] of Spent Fuel Inventory[b]	Isotopic Release During Treatment, Fraction to Atmosphere[c]	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: < 0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
DOG	Fission Products	Fission Products								
	^{3}H = 5×10^{-2}	^{3}H = 1.0								
	^{14}C = 1.0	^{14}C = 1.0		0.0031 m^3 Krypton[e]	Gas cylinder	0.0425 m^3				0.0725
	^{85}Kr = 1.0	^{85}Kr = 1×10^{-1}								
	$^{106}Ru\text{-}Rh$ = 2×10^{-4}	$^{106}Ru\text{-}Rh$ = 5×10^{-5}		0.00025 m^3 Ru on Silica (d)	55 gal drum	0.21 m^3				0.00119
	^{129}I = 9.9×10^{-1}	^{129}I = 1×10^{-3}								
	All Others = 1×10^{-7}	All Others 1×10^{-9}		0.0033 m^3 I on Ag Zeolite[e]	55 gal drum	0.21 m^3	0.0159			
	Actinides	Actinides								
	All = 1×10^{-7}	All = 1×10^{-9}								
VOG	See Data Sheet No. 22a			There are no other solid wastes than HEPA filters which are accounted for as "FRP Compactable Waste"						
HVAC	See Data Sheet No. 21a									
VEW	See Data Sheet No. 21a									
UF_6 Process Off-Gas	See Data Sheet No. 21a									

a. From Table 3.3.27.
b. Fraction of components listed in Tables 3.3.8 (Fuel Cycles 2a and 2b) and 3.3.9 (Fuel Cycle 3) for fission products; and in Tables 3.3.11 (Fuel cycle 2a and 2b) and 3.3.15 (Fuel Cycle 3) for actinides.
c. From Table 4.9.36 (DOG).
d. Contains only 5% of the input Ru and 1% of the other non-volatile nuclides. The remaining non-volatile nuclides are removed by the scrubber and sent to the HLLW.
e. Contains only the indicated nuclides.

WASTE TREATMENT DATA SHEET NO. 24b: Net Release Fractions for FRP Off-gases
Alternative: APS + I, Ru, and Kr-Removal, C-14 Release
Fuel Cycles: Cases 2a, 2b, and 3

Component	Controlling Source	Fraction of Fuel Content Released: Untreated	Fraction of Fuel Content Released: Treated
^{3}H	DOG, and VEW	7.7×10^{-1}	7.7×10^{-1}
^{14}C	DOG	1.0	1.0
^{85}Kr	DOG	1.0	1×10^{-1}
^{129}I	DOG	9.95×10^{-1}	1×10^{-3}
$^{106}Ru\text{-}Rh$	DOG	2×10^{-4}	1.5×10^{-8}
^{95}Zr	VEW and UF_6	2×10^{-7}	1.3×10^{-11}
^{95}Nb	VEW and UF_6	2×10^{-7}	4×10^{-12}
Other FPs	VOG and HVAC	2×10^{-7}	1.1×10^{-14}
U	UF_6	1×10^{-5}	1×10^{-5}
Pu	UF_6 and VEW	2×10^{-7}	2×10^{-11}
Other Actinides	VOG and HVAC	2×10^{-7}	1.1×10^{-14}

WASTE TREATMENT DATA SHEET NO. 25a

Waste Type : FRP Gaseous Waste Streams
Alternative: APS, Plus I, Ru, Kr, and C-14 Removal
Fuel Cycles: Case 2a, 2b and 3

Waste Component	Isotopic Content in Waste, Fraction[a] of Spent Fuel Inventory[b]	Isotopic Release During Treatment, Fraction to Atmosphere[c]	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: < 0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
DOG	Fission Products	Fission Products								
	^{3}H = 5×10^{-2}	^{3}H = 1.0								
	^{14}C = 1.0	^{14}C = 1×10^{-2}		0.001 m^3 of CaCO with C-14[e]	55 gal drum	0.21 m^3	0.0048			
	^{85}Kr = 1.0	^{85}Kr = 1×10^{-1}		0.0031 m^3 Krypton[e]	Gas cylinder	0.0425 m^3				0.0725
	$^{106}Ru\text{-}Rh$ = 2×10^{-4}	$^{106}Ru\text{-}Rh$ = 5×10^{-5}		0.00025 m^3 Ru on Silica Gel[d]	55 gal drum	0.21 m^3				0.00119
	^{129}I = 9.9×10^{-1}	^{129}I = 1×10^{-3}		0.0033 m^3 I on Ag Zeolite[e]	55 gal drum	0.21 m^3	0.0159			
	All Others = 1×10^{-7}	All Others = 1×10^{-9}								
	Actinides	Actinides								
	All = 1×10^{-7}	All = 1×10^{-9}								
VOG	See Data Sheet No. 22a									
HVAC	See Data Sheet No. 21a			There are no other solid wastes than HEPA filters which are accounted for as "FRP Compactable Wastes"						
VEW	See Data Sheet No. 21a									
UF_6 Process Off-Gas	See Data Sheet No. 21a									

a. From Table 3.3.27.
b. Fraction of components listed in Tables 3.3.8 (Fuel Cycles 2a and 2b) and 3.3.9 (Fuel Cycle 3) for fission products; and in Tables 3.3.11 (Fuel Cycle 2a and 2b) and in 3.3.15 (Fuel Cycle 3) for actinides.
c. From Table 4.9.47 (DOG).
d. Contains only 5% of the input Ru and 1% of the other non-volatile nuclides. The remaining non-volatile nuclides are removed by the scrubber and sent to the HLLW.
e. Contains only the indicated nuclide.

WASTE TREATMENT DATA SHEET NO. 25b: Net Release Fractions for FRP Off-gases
Alternative: APS + I, Ru, Kr and C-14 Removal
Fuel Cycles: Cases 2a, 2b, and 3

Component	Controlling Source	Fraction of Fuel Content Released: Untreated	Fraction of Fuel Content Released: Treated
^{3}H	DOG and VEW	7.7×10^{-1}	7.7×10^{-1}
^{14}C	DOG	1.0	1×10^{-2}
^{85}Kr	DOG	1.0	1×10^{-1}
^{129}I	DOG	9.95×10^{-1}	1×10^{-3}
^{106}Ru-Rh	DOG	2×10^{-4}	1.5×10^{-8}
^{95}Zr	UF_6 and VEW	2×10^{-7}	1.3×10^{-11}
^{95}Nb	UF_6 and VEW	2×10^{-7}	4×10^{-12}
Other FPs	VOG and HVAC	2×10^{-7}	1.1×10^{-14}
U	UF_6	1×10^{-5}	1×10^{-5}
Pu	UF_6 and VEW	2×10^{-7}	2×10^{-11}
Other Actinides	VOG and HVAC	2×10^{-7}	1.1×10^{-14}

WASTE TREATMENT DATA SHEET NO. 26
Waste Type : MOX FFP Combustible and Compactable Waste
Alternative: Minimum Treatment
Fuel Cycles: Case 3

Waste Component	Isotopic Content in Waste, Fraction[a] of Fuel Inventory[b]	Isotopic Release During Treatment, Fraction to Atmosphere[c]		Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: <0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
Primary & Secondary Trash		All	$\approx 1.1 \times 10^{-17}$	0.53 m^3	0.55 m^3	55 gal drum	0.21 m^3	2.625			
	Actinides										
	All $\approx 3 \times 10^{-4}$										
Filters		All	$\approx 1.1 \times 10^{-17}$	0.1 m^3	0.266 m^3	80 gal drum	0.303 m^3	0.875			
	Actinides										
	All $\approx 7 \times 10^{-4}$										

a. From Table 3.3.38 (Main Plant Combustible Trash and Filters) and Table 3.5.2 (Secondary Waste).
b. Fraction of components listed in Table 3.3.18.
c. From Table 4.4.78.

WASTE TREATMENT DATA SHEET NO. 27
Waste Type : MOX FFP Combustible and Compactable Waste
Alternative: Incinerate
Fuel Cycles: Case 3

Waste Component	Isotopic Content in Waste, Fraction[a] of Fuel Inventory[b]	Isotopic Release During Treatment, Fraction to Atmosphere[c]	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: <0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
Primary & Secondary Trash			0.53 m^3	(d)						
	Actinides									
	All = 3×10^{-4}	All = 2.6×10^{-16}								
Filters			0.1 m^3	0.026 m^3	55 gal drum	0.21 m^3	0.125			
	Actinides									
	All = 7×10^{-4}	All = 2.6×10^{-16}								

a. From Table 3.3.28 (Primary Trash and Filters) and Table 3.5.2 (Secondary Waste).
b. Fraction of components listed in Table 3.3.18.
c. From Table 4.4.67.
d. Except for filter media, the outputs of this facility are incinerator ash and scrubber solution which are immobilized in concrete before packaging, as described in Data Sheet No.28.

WASTE TREATMENT DATA SHEET NO. 28
Waste Type : MOX FFP Wet Waste, Incinerator Ash and Scrub Solution
Alternative: Cement Immobilization (Incineration of Combustibles)
Fuel Cycles: Case 3

Waste Component	Isotopic Content in Waste, Fraction[a] of Fuel Inventory[b]	Isotopic Release During Treatment, Fraction to Atmosphere[c]	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: <0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
Ash and Scrubber Solution			$0.34 m^3$	$0.562\ m^3$	55 gal drum	$0.21\ m^3$	2.68			
	Actinides									
	All $= 3 \times 10^{-4}$	All $= 3 \times 10^{-12}$								
Primary and Secondary Wet Waste	Actinides	All $= 3 \times 10^{-12}$	$0.374\ m^3$	$0.307\ m^3$	55 gal drum	$0.21\ m^3$	1.46			
	Am $= 2 \times 10^{-2}$									
	Others $= 1.1 \times 10^{-4}$									

a. From Table 3.3.39 (Primary Wet Waste) and Table 3.5.2 (Secondary Wet Waste).
b. Fraction of components listed in Table 3.3.18.
c. From Table 4.7.51.

WASTE TREATMENT DATA SHEET NO. 29
Waste Type : MOX FFP Wet Waste, Incinerator Ash and Scrub Solution
Alternative: Bitumen Immobilization (Incineration of Combustibles)
Fuel Cycles: Case 3

Waste Component	Isotopic Content in Waste, Fraction[a] of Spent Fuel Inventory[b]	Isotopic Release During Treatment, Fraction to Atmosphere[c]	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: < 0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
Ash and Scrubber Solution										
	Actinides	Actinides								
	All $= 3 \times 10^{-4}$	All $= 3 \times 10^{-12}$	0.34 m^3	0.0369 m^3	55 gal drum	0.21 m^3	0.175			
Primary and Secondary Wet Waste										
	Actinides	Actinides								
	Am $= 2 \times 10^{-2}$	All $= 3 \times 10^{-12}$	0.374 m^3	0.242 m^3	55 gal drum	0.21 m^3	1.15			
	Other $= 1.1 \times 10^{-4}$									

a. From Table 3.3.39 (Primary wet waste) and Table 3.5.2 (Secondary Wet Waste).
b. Fraction of components listed in Table 3.3.18.
c. From Table 4.7.40.

WASTE TREATMENT DATA SHEET NO. 30
Waste Type : MOX FFP Wet Waste
Alternative: Cement Immobilization (Minimum Treatment of Combustibles)
Fuel Cycles: Case 3

Waste Component	Isotopic Content in Waste, Fraction[a] of Fuel Inventory[b]	Isotopic Release During Treatment, Fraction to Atmosphere[c]	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: < 0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
Wet Waste and Secondary Waste	Actinides Am = 2×10^{-2} Others = 1.1×10^{-4}	All = 3×10^{-12}	0.374 m^3	0.307 m^3	55 gal drum	0.21 m^3	1.46			

a. From Table 3.3.39 (Wet Waste) and Table 3.5.2 (Secondary Waste).
b. Fraction of components listed in table 3.3.18.
c. From Table 4.7.51.

WASTE TREATMENT DATA SHEET NO. 31
Waste Type : MOX FFP Wet Waste
Alternative: Bitumen Immobilization (Minimum Treatment of Combustibles)
Fuel Cycles: Case 3

Waste Component	Isotopic Content in Waste, Fraction[a] of Fuel Inventory[b]	Isotopic Release During Treatment, Fraction to Atmosphere[c]	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: < 0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
Wet Waste and Secondary Waste	Actinides Am = 2×10^{-2} Other = 1.1×10^{-4}	All = 3×10^{-12}	0.374 m^3	0.242 m^3	55 gal drum	0.21 m^3	1.15			

a. From Table 3.3.39 (Wet Waste) and Table 3.5.2 (Secondary Waste).
b. Fraction of components listed in Table 3.3.18.
c. From Table 4.7.40.

WASTE TREATMENT DATA SHEET NO. 32
Waste Type : MOX FFP Failed Equipment and Noncumbustible, Noncompactable Trash
Alternative: Decontaminate, Disassemble and Package
Fuel Cycles: Case 3

Waste Component	Isotopic Content in Waste, Fraction[a] of Fuel Inventory[b]	Isotopic Release During Treatment, Fraction to Atmosphere[c]	Waste Volume		Container		Containers per MTHM by Surface Dose Class			
			Untreated per MTHM	Packaged per MTHM	Type	Volume	< 0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
Noncombustible Trash	Actinides / All = 1×10^{-4}	All = 1×10^{-15}	0.205 m^3	0.207 m^3	55 gal drum	0.21 m^3	0.985			
Failed Equipment	Actinides / All = 5×10^{-7}	All = 4×10^{-8}	0.20 m^3	0.204 m^3	4'x6'x6' boxes	4.08 m^3	0.05			

a. From Table 3.3.40 (after applying a decontamination factor of 20 in the failed equipment case).
b. Fraction of components listed in Table 3.3.18.
c. From Table 4.3.16 (failed equipment value adjusted for the input value).

WASTE TREATMENT DATA SHEET NO. 33

Waste Type : MOX FFP Gaseous Waste

Alternative: Filtration

Fuel Cycles: Case 3

Waste Component	Isotopic Content in Waste, Fraction[a] of Fuel Inventory[b]	Isotopic Release During Treatment, Fraction to Atmosphere[c]	Waste Volume: Untreated per MTHM	Waste Volume: Packaged per MTHM	Container: Type	Container: Volume	Containers per MTHM by Surface Dose Class: <0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
IAFS[e]	Actinides									
	All = 3×10^{-7}	All = 1×10^{-7}								
VEW[d]	Actinides									
	Am = 1×10^{-10}	All = 1.0								
	All Others = 1×10^{-12}									

No other solid wastes than HEPA filters which are accounted for as "MOX FFP Compactable Waste."

a. From Table 3.3.37.

b. Fraction of components listed in Table 3.3.18.

c. Assuming 10^7 decontamination factor for particulates in the APS.

d. This component does not pass through the APS.

e. IAFS = Influent to air filtration system.

WASTE STORAGE DATA SHEET INDEX

Sheet No.	Waste Type	Alternative	Fuel Cycle Options[a,b] Case 1	Case 2a	Case 2b	Case 3
1	Irradiated spent fuel	Water basin storage of unpackaged fuel	R	--	--	--
2	Irradiated spent fuel	Packaged fuel receiving and shipping	R	--	--	--
3	Irradiated spent fuel	Storage of packaged fuel	A	--	--	--
4	FRP liquid high-level waste	Tank storage	--	--	A	A
5	FRP vitrified high-level waste	Water basin storage	--	R	R	R
6	FRP vitrified high-level waste	Sealed cask storage	--	D	D	D
7	Krypton-85	Gas cylinder storage	--	R	R	R
8	FRP fuel residue	Storage of packaged residue	--	D	D	D
9	FRP non-high-level solid waste	Storage of packaged waste	--	D	D	D
10	FRP plutonium oxide	Storage of packaged material	--	--	R	--

a. Case 1 = Once-through
Case 2a = U only recycle - Pu to HLW
Case 2b = U only recycle - Pu to storage
Case 3 = U and Pu recycle

b. R = Included in reference system for the fuel cycle
D = Added to reference in case of deferred repository availability
A = Alternative to reference system

Waste Storage Data Sheet No. 1

Waste Type: Irradiated Spent Fuel

Alternative: Water Basin Storage of Unpackaged Fuel

Fuel Cycle: Case 1

Isotopic Content in Waste, Fraction of Spent Fuel Inventory[(a)]	Isotopic Release Fraction to Atmosphere During Receiving[(b)]	Annual Isotopic Release Fraction to Atmosphere During Storage[(b)]
Fission Products		
All = 1.0	$^{3}H = 2 \times 10^{-6}$	$^{3}H = 1 \times 10^{-6}$
	$^{14}C = 3 \times 10^{-6}$	$^{14}C = 1 \times 10^{-8}$
	$^{85}Kr = 6 \times 10^{-5}$	$^{85}Kr = 7 \times 10^{-7}$
	$^{129}I = 1 \times 10^{-7}$	$^{129}I = 9 \times 10^{-9}$
	Cs = 7×10^{-11}	Cs = 9×10^{-12}
	Other = 2×10^{-12}	Other = 2×10^{-13}
Actinides		
All = 1.0	negligible	negligible
Activation Products		
All = 1.0	All = 2×10^{-10}	All = 2×10^{-11}

a. Fraction of components listed in Tables 3.3.6, 3.3.7, 3.3.8, and 3.3.10. Use 0.5 year age for shipping and 3.5 year age for average during storage.
b. From Table 5.7.12.

Waste Storage Data Sheet No. 2

Waste Type: Irradiated Spent Fuel

Alternative: Packaged Fuel Receiving and Shipping

Fuel Cycle: Case 1

Isotopic Content in Waste, Fraction of Spent Fuel Inventory[(a)]	Annual Isotopic Release Fraction to Atmosphere During Storage[(b)]
Fission Products	
All = 1.0	negligible
Actinides	
All = 1.0	negligible
Activation Products	
All = 1.0	negligible

a. Fraction of components listed in Tables 3.3.6, 3.3.7, 3.3.8 and 3.3.10.
b. From Table 5.7.45.

Waste Storage Data Sheet No. 3

Waste Type: Irradiated Spent Fuel

Alternative: Storage of Packaged Fuel

Fuel Cycle: Case 1

Isotopic Content in Waste, Fraction of Spent Fuel Inventory[a]	Annual Isotopic Release Fraction to Atmosphere During Storage[b]
Fission Products	
All = 1.0	negligible
Actinides	
All = 1.0	negligible
Activation Products	
All = 1.0	negligible

a. Fraction of components listed in Tables 3.3.6, 3.3.7, 3.3.8 and 3.3.10.
b. From Tables 5.7.54, 5.7.66, 5.7.79, and 5.7.91.

Waste Storage Data Sheet No. 4

Waste Type: FRP Liquid High-Level Waste

Alternative: Tank Storage

Fuel Cycle: Case 2b and 3

Isotopic Content in Waste, Fraction of Spent Fuel Inventory[a]	Annual Isotopic Release Fraction to Atmosphere During Storage[b]
Fission Products	
^{3}H = 0.08	^{3}H = 0.1
^{85}Kr = 0	^{129}I = 1×10^{-4}
^{129}I = 5×10^{-3}	Ru = 1×10^{-12}
Others = 1.0	Others = 1×10^{-13}
Actinides	
Pu = 5×10^{-3}	All = 1×10^{-13}
U = 5×10^{-3}	
Others = 1.0	

a. Fraction of components listed in Table 3.3.8 (Fuel cycle 2b) or Table 3.3.9 (Fuel Cycle 3) for fission products, and in Table 3.3.11 (Fuel Cycle 2b) or Table 3.3.15 (Fuel Cycle 3) for actinides.
b. From Table 5.1.15.

Waste Storage Data Sheet No. 5

Waste Type: FRP Vitrified High-Level Waste

Alternative: Water Basin Storage

Fuel Cycle: Case 2a, 2b and 3

Isotopic Content in Waste, Fraction of Spent Fuel Inventory(a)	Annual Isotopic Release Fraction to Atmosphere During Storage(b)
Fission Products	
^{3}H = 0	Cs = 2×10^{-13}
^{85}Kr = 0	Others = 2×10^{-14}
^{129}I = 0	
Others = 1.0	
Actinides	
Pu = 5×10^{-3}(c)	All = 2×10^{-14}
U = 5×10^{-3}	
Others = 1.0	

a. Fraction of components listed in Table 3.3.8 (Fuel cycle 2a and 2b) or Table 3.3.9 (Fuel Cycle 3) for fission products, and in Table 3.3.11 (Fuel Cycles 2a and 2b) or Table 3.3.15 (Fuel Cycle 3) for actinides.

b. From Table 5.4.7.

c. In Fuel Cycle 2a, Pu fraction = 1.0.

Waste Storage Data Sheet No. 6

Waste Type: FRP Vitrified High-Level Waste

Alternative: Sealed Cask Storage

Fuel Cycle: Case 2a, 2b and 3

Isotopic Content in Waste, Fraction of Spent Fuel Inventory(a)	Annual Isotopic Release Fraction to Atmosphere During Storage(b)
Fission Products	
^{3}H = 0	All = 1×10^{-16}
^{85}Kr = 0	
^{129}I = 0	
Others = 1.0	
Actinides	
Pu = 5×10^{-3}(c)	All = 1×10^{-16}
U = 5×10^{-3}	
Others = 1.0	

a. Fraction of components listed in Table 3.3.8 (Fuel Cycles 2a and 2b) or Table 3.3.9 (Fuel Cycle 3) for fission products, and in Table 3.3.11 (Fuel Cycles 2a and 2b) or Table 3.3.15 (Fuel Cycle 3) for actinides.

b. From Table 5.4.19.

c. In Fuel Cycle 2a, Pu fraction = 1.0.

Waste Storage Data Sheet No. 7

Waste Type: Krypton-85

Alternative: Gas Cylinder Storage

Fuel Cycle: Case 2a, 2b, and 3

Isotopic Content in Waste, Fraction of Spent Fuel Inventory[a]	Annual Isotopic Release Fraction to Atmosphere During Storage[b]
^{85}Kr = 0.9	1-50 years 1×10^{-3} of inventory 51-80 years 1×10^{-3} of inventory plus 4×10^{-2} of the amount stored during the year (n-50)

a. Fraction of component listed in Table 3.3.8 (Fuel Cycles 2a and 2b) or Table 3.3.9 (Fuel Cycle 3).
b. From Figure 5.6.10.

Waste Storage Data Sheet No. 8

Waste Type: FRP Fuel Residue

Alternative: Storage of Packaged Residue

Fuel Cycle: Case 2a, 2b, and 3

Isotopic Content in Waste, Fraction of Spent Fuel Inventory[a]	Annual Isotopic Release Fraction to Atmosphere During Storage[b]
Fission Products	
^{3}H = 0.15	negligible
^{85}Kr = 0	
^{129}I = 0	
Others = 5×10^{-4}	
Actinides	
All = 5×10^{-4}	negligible
Activation Products	
All = 1.0	negligible

a. Fraction of components listed in Table 3.3.8 (Fuel Cycles 2a and 2b) or Table 3.3.9 (Fuel Cycle 3) for fission products, Table 3.3.11 (Fuel Cycles 2a and 2b) or Table 3.3.15 (Fuel Cycle 3) for actinides and Tables 3.3.6 and 3.3.7 for activation products.
b. From Sections 5.2.1.7 and 5.2.2.7.

Waste Storage Data Sheet No. 9

Waste Type: FRP Non-High-Level Solid Waste

Alternative: Storage of Packaged Waste

Fuel Cycle: Case 2b and 3

Isotopic Content in Waste, Fraction of Spent Fuel Inventory[a]	Annual Isotopic Release Fraction to Atmosphere During Storage[b]
Fission Products	
^{3}H = 1.5×10^{-5}	negligible
^{85}Kr = 0	
^{129}I = 6×10^{-8}	
Others = 1.1×10^{-5}	
Actinides	
U = 1×10^{-6}	negligible
Pu = 1×10^{-4}	
Others = 1×10^{-5}	
Activation Products	
All = 1×10^{-4}	negligible

a. Fraction of components listed in Table 3.3.8 (Fuel Cycle 2b) or Table 3.3.9 (Fuel Cycle 3) for fission products, Table 3.3.11 (Fuel Cycle 2b) or Table 3.3.15 (Fuel Cycle 3) for actinides. and Tables 3.3.6 and 3.3.7 for activation products.

b. From Sections 5.3.1.7, 5.3.2.7, 5.3.3.7, and 5.3.4.7.

Waste Storage Data Sheet No. 10

Waste Type: FRP Plutonium Oxide

Alternative: Storage of Packaged Material

Fuel Cycle: Case 2b

Isotopic Content in Waste, Fraction of Spent Fuel Inventory[a]	Annual Isotopic Release Fraction to Atmosphere During Storage[b]
Actinides	
Pu = 1.0	All = 4×10^{-17}
Others = 1.0[c]	

a. Fraction of values listed in Table 3.3.11.

b. From Table 5.5.6.

c. Fraction of components listed in Table 3.3.16.

TRU DECOMMISSIONING WASTE DATA SHEET INDEX

Sheet No.	Waste Type	Decommissioning Mode
1	TRU from FRP	Dismantlement after passive safe storage for 30 years
2	TRU from MOX FFP	Immediate dismantlement

Decommissioning Waste Data Sheet No. 1

Waste Type: TRU from FRP[a]

Waste Component	Isotopic Content In Decommissioning Waste, Fraction of Total[b]	Isotopic Content During Dismantlement, Fraction to Atmosphere	Waste Volume		Container		Containers by Surface Dose Class[c]			
			Untreated	Packaged	Type	Volume	<0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
HEPA filters	Fission Products 0.14 Actinides 0.14	All $< 1 \times 10^{-15}$	170 m^3	450 m^3	80 gal drum	.302 m^3	1500			
HEPA filters	Fission Products None Actinides 0.20	All $< 1 \times 10^{-15}$	30 m^3	82 m^3	80 gal drum	.302 m^3	270			
HEPA filters	Fission Products 0.01 Actinides 0.01	All $< 1 \times 10^{-15}$	170 m^3	455 m^3	80 gal drum	.302 m^3	1500			
HEPA filters	Fission Products None Actinides 0.02	All $< 1 \times 10^{-15}$	30 m^3	82 m^3	80 gal drum	.302 m^3	270			
Combustible waste	Fission Products 2×10^{-4} Actinides 2×10^{-4}	Fission Products All $< 5 \times 10^{-13}$ Actinides U $< 1 \times 10^{-11}$ Others $< 1 \times 10^{-11}$	100 m^3	16 m^3	55 gal drum	.21 m^3	76 (.014)			
Combustible waste	Fission Products 4×10^{-4} Actinides 4×10^{-4}	Fission Products All $< 5 \times 10^{-13}$ Actinides U $< 1 \times 10^{-13}$ Others $< 1 \times 10^{-11}$	130 m^3	22 m^3	55 gal drum	.21 m^3	100 (.017)			
Equipment and structural material	Fission Products 0.33 Actinides 0.30	All $< 1 \times 10^{-15}$	180 m^3	180 m^3	4' x 6' x 6' box	4.08 m^3	45			
Equipment and structural material	Fission Products 0.16 Actinides 0.13	All $< 1 \times 10^{-15}$	780 m^3	780 m^3	55 gal drum	.21 m^3	3720			
Equipment and structural material	Fission Products 0.10 Actinides 0.10	All $< 1 \times 10^{-15}$	1200 m^3	1200 m^3	55 gal drum	.21 m^3	5720			
Wet waste	Fission Products 0.10 Actinides 0.10	All $< 1 \times 10^{-15}$	230 m^3	368 m^3	55 gal drum	.21 m^3	1752			

a. Decommissioning mode: dismantlement after passive safe storage for 30 years.
b. Fraction of components listed in Table 8.5.1.
c. Calculated surface dose rate shown in parentheses.

Decommissioning Waste Data Sheet No. 2

Waste Type: TRU from MOX FFP[a]

Waste Component	Isotopic Content In Decommissioning Waste, Fraction of Total[b]	Isotopic Content During Dismantlement, Fraction to Atmosphere	Waste Volume Untreated	Waste Volume Packaged	Container Type	Container Volume	Containers by Surface Dose Class[c] <0.2 R/hr	0.2-1 R/hr	1-10 R/hr	>10 R/hr
HEPA filters	Actinides 0.4	All = 1×10^{-15}	24 m^3	65 m^3	80 gal drum	.302 m^3	215 (.027)			
Combustible waste	Actinides 0.01	U = 1×10^{-13} Others = 1×10^{-11}	90 m^3	14 m^3	55 gal drum	.21 m^3	69			
Combustible waste	Actinides 0.001	U = 1×10^{-13} Others = 1×10^{-11}	10 m^3	1.6 m^3	55 gal drum	.21 m^3	8			
Equipment and structural material	Actinides 0.20	All = 1×10^{-15}	300 m^3	300 m^3	4' x 6' x 6' box	4.08 m^3	74 (2.4×10^{-4})			
Equipment and structural material	Actinides 0.21	All = 1×10^{-15}	1800 m^3	1800 m^3	55 gal drum	.21 m^3	8510 (1.3×10^{-5})			
Equipment and structural material	Actinides 0.020	All = 1×10^{-15}	300 m^3	300 m^3	4' x 6' x 6' box	4.08 m^3	74 (1.2×10^{-4})			
Wet wastes	Actinides 0.16	U = 1×10^{-13} Others = 1×10^{-11}	200 m^3	32 m^3	55 gal drum	.21 m^3	155 (2.41×10^{-3})			
Wet wastes	Actinides 0.001	All = 1×10^{-15}	100 m^3	160 m^3	55 gal drum	.21 m^3	760 (3×10^{-6})			

a. Decommissioning mode: immediate dismantlement.
b. Fraction of components listed in Table 8.6.1.
c. Calculated surface dose rate shown in parentheses.

Waste Management Unit Cost Data Sheet Index

Sheet No.	Waste Management Step	Fuel Cycle
1	Spent Fuel Storage and Packaging Costs	1
2	FRP Waste Treatment Costs	2a
3	FRP Waste Treatment Costs	2b, 3
4	MOX-FFP Waste Treatment Costs	3
5	Storage Costs	2a, 2b, 3
6	Transportation Costs	1, 2a, 2b, 3
7	Repository Disposal Costs	1, 2a, 2b, 3

Waste Management Unit Cost Data Sheet No. 1
Waste Management Step: Spent Fuel Storage and Packaging Costs
Fuel Cycle: Case 1, 4A and 4B

			Unit Costs (1978 $)			
			Reference Treatment		Alternatives	
Waste Type	Treatment	Containers	$/kg HM	$/container	$/kg HM	$/container
Spent Fuel	6-yr reactor storage	Fuel Assembly[a]	6.00/yr	2,100/yr	--	--
	6-yr ISFSF storage	Fuel Assembly[a]	14.00/yr	5,000/yr	31.00/yr[c]	11,100/yr[c]
	Extended ISFSF storage	Fuel Assembly[a]	9.00/yr[b]	3,200/yr[b]	24.00/yr[c]	8,600/yr[c]
	Packaging	Square canister[a]	18.30	6,500	29.60[c]	10,600[c]
		Additional Extended Storage Costs for Packaged Spent Fuel for the Once-Through Fuel Cycle with Delayed Repository				
Spent Fuel	Water basin	Stainless steel canister(a)	--	--	38.40	13,700
	Air-cooled vault	Carbon steel canister(a)	--	--	34.90	12,500
	Dry-caisson	Carbon steel canister(a)	22.20	7,900		
	Sealed cask	Carbon steel canister(a)	--	--	30.20	10,800

a. The costs are based on averaging PWR and BWR fuel assemblies assuming 62 wt% PWR assemblies containing 461 kg HM per assembly and 38 wt% BWR assemblies containing 189 kg HM per assembly. Thus the average container would hold 358 kg HM.
b. Annual costs for extended storage are based on 20-year storage.
c. This alternative assumes private ownership of the facility.

Waste Management Unit Cost Data Sheet No. 2
Waste Management Step: FRP Waste Treatment Costs
Fuel Cycle: Case 2a

Waste Type	Source	Treatment	Containers	Unit Costs (1978 $) Reference Treatment $/kg HM	$/container	Alternatives $/kg HM	$/container
High-level waste	FRP	Vitrification	30 cm dia x 3.0 m canister[a]	10.40	31,700	-	-
		Calcination	20 cm dia x 3.0 m canister[a]	-	-	13.00	38,100
Fuel assembly hull and hardware	FRP	Package with sand	76 cm dia x 3.0 m canister	4.90	20,400	-	-
		Mech. compaction	76 cm dia x 3.0 m canister	-	-	4.60	19,200
		Melting	76 cm dia x 3.0 m canister	-	-	5.10	21,300
Non-combustibles and failed equipment	FRP	Package	76 cm dia x 3 m canisters	4.20	4,400	-	-
			55 gal drums	4.20	1,500	-	-
			1.8 x 1.8 x 1.2 m boxes	4.20	12,800	-	-
TRU combustible	FRP	Package	55 ga. drums	-	-	3.30	260
			80 gal drums (ILW)	-	-	2.20	620
		Incinerate (cement immobilization)	55 gal drums	3.40	2,000	-	-
		Incinerate (bitumen immobilization)	55 gal drums	-	-	3.40	3,000
Wet waste	FRP	Cementation					
		with incineration of comb.	55 gal drums	2.30	1,800	-	-
		with package-only of comb.	55 gal drums	-	-	2.30	1,800
		Bitumenization					
		with incineration of comb.	55 gal drums	-	-	2.30	3,300
		with package-only of comb.	55 gal drums	-	-	2.30	3,200
Gaseous waste	FRP	Vessel-Off-gas		3.90	NA	-	-
		DOG I and Ru removal	55 gal drums	-	-	2.00	NA
		DOG I, Ru and C-14 removal	55 gal drums	-	-	3.20	NA
		DOG I, Ru, and Kr removal	55 gal drums	-	-	6.00	NA
		DOG I, Ru, C-14 and Kr removal	55 gal drums	6.10	NA	-	-
		APS Prefilter		1.00	NA	-	-
		APS Sand Filter		-	-	3.70	NA
		APS Deep Bed Filter		-	-	2.60	NA

a. Heat limits at the repository may require packaging in smaller diameter canisters and/or dilution. The approximate solidification costs are given below.

Treatment	Canister Diameter	$/kg HM	$/container
Vitrification	25 cm	13.00	27,500
	20 cm	17.10	23,100
	15 cm	24.20	18,400
Calcination	17.5 cm	14.40	32,300
	15 cm	16.40	27,000
	12.5 cm	19.00	21,700

Waste Management Unit Cost Data Sheet No. 3
Waste Management Step: FRP Waste Treatment Costs
Fuel Cycle: Case 2b, 3

Waste Type	Source	Treatment	Containers	Unit Costs (1978 $) Reference Treatment $/Kg HM	$/container	Alternatives $/Kg HM	$/container
High-level waste	FRP	Same as Data Sheet No. 2	(a)				
Fuels residue waste	FRP	Same as Data Sheet No. 2					
Non-combustibles and failed equipment	FRP	Package	76 cm dia x 3.0 in canisters	4.20	4,300	-	-
			55 gal drums	4.20	1,400	-	-
			1.8 x 1.8 x 1.2 m boxes	4.20	17,300	-	-
TRU combustible	FRP	Package	55 gal drums	-	-	3.30	260
			80 gal drums	-	-	2.20	570
		Incinerate (cement immobilization)	55 gal drums	3.40	2,000	-	-
		Incinerate (bitumen immobilization)	55 gal drums	-	-	3.40	2,900
Wet waste	FRP	Cementation					
		with incineration of comb.	55 gal drums	2.30	1,800	-	-
		with package-only of comb.	55 gal drums	-	-	2.30	1,800
		bitumenization					
		with incineration of comb.	55 gal drums	-	-	.30	1,800
		with package-only of comb.	55 gal drums	-	-	2.30	3,200
Gaseous waste	FRP	Same as Data Sheet No. 2					
Plutonium oxide[(b)]	FRP	Storage at:					
		30 MT facility at FRP (10 yr)	16 cm dia x 1.4 m pressure vessel	-	-	28.80	102,000
		200 MT facility at FRP (10 yr)	16 cm dia x 1.4 m pressure vessel	-	-	39.70	141,000
		200 MT Federal Facility (to year 2000)	16 cm dia x 1.4 m pressure vessel	19.20	66,000	-	-

a. Deleting the Plutonium from the HLW will decrease the heat content and increase the diameter of the canister thus decreasing the number of canisters processed. The treatment costs per canister for the various diameter HLW canisters given in Data Sheet No. 2 would still be the same.
b. Applies only in case 2b.

Waste Management Unit Cost Data Sheet No. 4
Waste Management Step: MOX-FFP Waste Treatment Costs
Fuel Cycle: Case 3

				Unit Costs (1978 $)			
				Reference Treatment		Alternatives	
Waste Type	Source	Treatment	Containers	$/Kg HM[a]	$/container	$/Kg HM[a]	$/container
Failed equipment and noncombustibles	MOX FFP	Package	55 gal drums	2.90	1,800	-	-
			.5 m x 1.8 m x 1.8 m boxes	2.90	22,000	-	-
TRU combustibles	MOX FFP	Package	55 gal drums	-	-	2.10	530
			80 gal drums	-	-	2.10	800
		Incinerate (cement immobilization)	55 gal drums	5.00	1,800	-	-
		Incinerate (bitumen immobilization)	55 gal drums	-	-	5.00	16,700
Wet waste	MOX FFP	Cementation					
		with incineration of comb.	55 gal drums	9.40	6,400	-	-
		with package-only of comb.	55 gal drums	-	-	9.40	8,200
		Bitumenization					
		with incineration of comb.	55 gal drums	-	-	9.40	6,400
		with package-only of comb.	55 gal drums	-	-	9.40	8,200

a. Dollars per kilogram heavy metal fabricated. To convert to dollars per kilogram heavy metal reprocessed, divide by 5.

Waste Management Unit Cost Data Sheet No. 5
Waste Management Step: Storage Costs
Fuel Cycle: Case 2a, 2b, 3

Waste Type	Source	Treatment	Containers	Unit Costs (1978 $) $/kg HM	Unit Costs (1978 $) $/container
High-Level Waste	FRP	5-yr FRP storage	30 cm dia x 3 m canister	13.80	42,000[a]
		Federal interim storage	50 cm dia steel cask	12.90	39,200[a]
Fuels Residue	FRP	5-yr FRP storage	76 cm dia canisters	10.79	44,700
		Federal interim storage	76 cm dia canisters	6.20	25,800
Intermediate-Level Waste	FRP	5-yr FRP storage	76 cm dia canisters	1.60	44,700
		5-yr FRP storage	55 gal drums	5.00	1,200
		Federal interim storage	76 cm dia canisters	0.90	25,800
		Federal interim storage	55 gal drums	2.80	700
Low-Level Waste	FRP	5-yr FRP storage	55 gal drums	0.40	(b)
			1.8 x 1.8 x 1.2 m boxes	0.40	(b)
		Federal interim storage	55 gal drums	0.30	(b)
			1.8 x 1.8 x .2 m boxes	0.30	(b)
Kr-85	FRP	Interim storage at FRP	42.5 l gas cylinder	16.40	226,000

a. Cost is based on 30 cm diameter canister sizes. Cost of other canister diameters has not been evaluated.
b. Costs per container are fuel cycle dependent owing to different numbers of containers of waste generated. The table below gives the unit container costs by fuel cycle.

Storage Option	Container	Case 2a	Case 2b	Case 3a	Case 3b
5-yr FRP storage	55 gal drums	300	290	290	--
	boxes	16,000	13,300	13,300	--
Federal interim storage	55 gal drums	--	--	--	120
	boxes	--	--	--	3,750

Waste Management Unit Cost Data Sheet No. 6 (1978 Dollars)
Waste Management Step: Transportation Costs
Fuel Cycle: Case 1, 2a, 2b, 3

Waste Type	Container	Origin and Destination	Distance mi	Transport mode	Unit Cost (1978 $) $/kg HM	Unit Cost (1978 $) $/container
Unpackaged Spent Fuel from PWR	PWR fuel assembly	From FRP to interim storage and/or packaging	1,000	Rail and truck	19.30	8,900
Unpackaged Spent Fuel from BWR	BWR fuel assembly	From FRP to interim storage and/or packaging	1,000	Rail and truck	19.30	3,650
Packaged Spent PWR Fuel	24 cm sq x 4.9 m canister	From packaging to extended Federal storage	1,000	Rail	22.90	10,600
		From packaging to repository	1,500	rail	31.90	14,700
Packaged Spent BWR Fuel	16 cm sq x 4.9 m canister	From packaging to extended Federal storage	1,000	Rail	23.20	4,400
		From packaging to repository	1,500	Rail	32.30	6,100
High-Level Waste	All HLW canisters[a]	From FRP to interim storage or repository	1,500	Rail	3.30	(a)
Fuels Residue Waste	76 cm dia x 3.0 m canister	From FRP to interim storage or repository	1,500	Rail	3.50	14,600
Intermediate-Level Waste <(0.2 R/hr)	76 cm dia x 3.0 m canister	From FRP to interim storage or repository	1,500	Rail	3.50	14,600
	55 gal drum	From FRP to interim storage or repository	1,500	Truck	(b)	(b)
Low-Level Waste >(0.2 R/hr)	55 gal drum	From FRP to interim storage or repository	1,500	Truck	0.20	70
	.6 m x 1.8 m x 1.8 m box	From FRP to interim storage or repository	1,500	Truck	0.04	890
PuO_2	16 cm dia x 1.35 m pressure vessel	From FRP to interim storage	1,500	Truck	0.80	3,000

a. The cost per container varies with canister diameter as given below:

Canister Diameter	$/container
30 cm	10,000
25 cm	7 000
20 cm	4,500
15 cm	2,500

b. The transportation cost varies with the container surface dose rate as follows:

Dose Rate	$/kg HM	$/container
0.2 - 1.0 R/hr	0.60	130
1 - 10 R/hr	0.40	320
> 10 R/hr	1.60	780

Waste Management Unit Cost Data Sheet No. 7 (1978 Dollars)
Waste Management Step: Repository Disposal Costs
Fuel Cycle: All

Geologic Media	Waste Type	Container Type	Once-Through Cycle		Uranium Only Recycles				U-Pu Recycle	
					Pu to HLW		Pu Stored			
			$/kg HM	$/container	$/kg HM	$/container	$/kg HM	$/container	$/kg HM	$/container
Salt	PWR Spent Fuel	24 cm sq x 4.9 m canister	49.40	22,800	--	--	--	--	--	--
	BWR Spent Fuel	16 cm sq x 4.9 m canister	55.60	10,500	--	--	--	--	--	--
	HLW	All HLW canisters[(a)]	--	--	32.10	75,100	20.00	61,000	23.90	55,800
	FRW	76 cm dia canister	--	--	2.70	11,200	2.70	11,200	2.80	11,700
	ILW	76 cm dia canister	--	--	19.00	13,700	17.20	12,300	18.40	13,100
		55 gal drum	--	--	19.00	4,600	17.20	4,100	18.40	4,300
	LLW	55 gal drum	--	--	2.60	1,500	2.10	1,200	2.50	900
		1.8 x 1.8 x 1.2 m box	--	--	2.60	18,600	2.10	14,400	2.50	10,500
Granite	PWR Spent Fuel	24 cm sq x 4.9 m canister	74.90	34,500	--	--	--	--	--	--
	BWR Spent Fuel	16 cm sq x 4.9 m canister	82.00	15,500	--	--	--	--	--	--
	HLW	All HLW canisters[(a)]	--	--	38.40	52,500	38.10	52,300	38.50	52,800
	FRW	76 cm dia canister	--	--	4.70	19,500	4.70	19,500	4.80	20,000
	ILW	76 cm dia canister	--	--	28.80	20,700	29.10	20,800	29.60	21,200
		55 gal drum	--	--	28.80	6,900	29.10	6,900	29.60	7,000
	LLW	55 gal drum	--	--	3.70	2,300	3.70	2,200	4.20	1,400
		1.8 x 1.8 x 1.2 m box	--	--	3.70	27,800	3.70	26,300	4.20	17,400
Shale	PWR Spent Fuel	24 cm sq x 4.9 m canister	50.80	23,400	--	--	--	--	--	--
	BWR Spent Fuel	16 cm sq x 4.9 m canister	66.70	12,600	--	--	--	--	--	--
	HLW	All HLW canisters[(a)]	--	--	41.10	33,300	40.80	34,300	41.00	34,400
	FRW	76 cm dia canister	--	--	3.50	14,600	3.50	14,600	3.60	15,100
	ILW	76 cm dia canister	--	--	23.80	17,100	24.30	17,400	24.30	17,400
		55 gal drum	--	--	23.80	5,700	24.30	5,900	24.30	5,900
	LLW	55 gal drum	--	--	3.50	2,100	3.50	2,000	3.90	1,300
		1.8 x 1.8 x 1.2 m box	--	--	3.50	25,700	3.50	24,300	3.90	16,100
Basalt	PWR Spent Fuel	24 cm sq x 4.9 m canister	84.40	38,900	--	--	--	--	--	--
	BWR Spent Fuel	16 cm sq x 4.9 m canister	91.00	17,200	--	--	--	--	--	--
	HLW	All HLW canisters[(a)]	--	--	50.80	40,600	48.80	42,800	50.40	42,800
	FRW	76 cm dia canister	--	--	4.90	20,500	5.10	21,400	5.10	21,400
	ILW	76 cm dia canister	--	--	31.20	22,500	31.50	22,600	32.40	23,200
		55 gal drum	--	--	31.20	7,500	31.60	7,500	32.40	7,700
	LLW	55 gal drum	--	--	4.70	2,800	4.60	2,700	5.00	1,800
		1.8 x 1.8 x 1.2 m box	--	--	4.70	34,300	4.60	31,800	5.00	20,800

a. Due to possible heat limits at the repository, HLW canister diameters may vary from 15 to 30 cm. However, since all canisters are placed in the same configuration, the cost per canister is the same for different diameter canisters. The cost per kilogram of heavy metal calculated above is an average for all HLW canister sizes in the first repository.

APPENDIX 10B

SPENT FUEL LOGISTICS TABLES

APPENDIX 10B

SPENT FUEL LOGISTICS TABLES

The six tables in Appendix 10B describe the movement and location of the spent fuel from the time it is discharged from the nuclear power plants until it is either reprocessed or disposed of in a geologic repository. Only six tables are required to show the spent fuel logistics for nine fuel cycle cases because the spent fuel logistics for four cases (2A, 2B, 3A, and 3B) are all identical. These tables show:

- annual spent fuel discharges
- annual inventories of spent fuel stored in nuclear power plant (reactor) basins and independent basins
- annual spent fuel packaging rates
- annual cumulative quantity of spent fuel that has been packaged
- annual spent fuel inventory in extended storage facilities
- annual rate at which the fuel is delivered to a final repository or fuel reprocessing facility
- annual cumulative quantity of spent fuel in the repository or reprocessed.

APPENDIX 10B

INDEX TO SPENT FUEL LOGISTICS TABLES

TABLE 10.B.1 Spent Fuel Logistics for Case 1 - Once Through Fuel Cycle - MTHM

Year	Reactor Discharge	Water Basin Storage Reactor	Water Basin Storage ISFSF	Packaging Annual	Packaging Cumulative	Extended Storage Input	Extended Storage Inventory	Geologic Repository Input	Geologic Repository Inventory	Year
1975	699.	1428.	0.	0.	0.	0.	0.	0.	0.	1975
1976	775.	2165.	0.	0.	0.	0.	0.	0.	0.	1976
1977	859.	2982.	0.	0.	0.	0.	0.	0.	0.	1977
1978	1101.	3962.	0.	0.	0.	0.	0.	0.	0.	1978
1979	1150.	5087.	0.	0.	0.	0.	0.	0.	0.	1979
1980	1268.	6296.	0.	0.	0.	0.	0.	0.	0.	1980
1981	1444.	7652.	0.	0.	0.	0.	0.	0.	0.	1981
1982	1597.	9153.	0.	0.	0.	0.	0.	0.	0.	1982
1983	1795.	10410.	419.	0.	0.	0.	0.	0.	0.	1983
1984	2137.	11884.	911.	0.	0.	0.	0.	0.	0.	1984
1985	2483.	12917.	1488.	700.	700.	0.	0.	700.	700.	1985
1986	2785.	13592.	2147.	1300.	2000.	0.	0.	1300.	2000.	1986
1987	3201.	13837.	2895.	2000.	4000.	0.	0.	2000.	4000.	1987
1988	3504.	14351.	3733.	2000.	6000.	0.	0.	2000.	6000.	1988
1989	3770.	15079.	4642.	2000.	8000.	0.	0.	2000.	8000.	1989
1990	4071.	15706.	5235.	2700.	10700.	0.	0.	2700.	10700.	1990
1991	4495.	16443.	5481.	3300.	14000.	0.	0.	3300.	14000.	1991
1992	4826.	17464.	5821.	3300.	17300.	0.	0.	3300.	17300.	1992
1993	5250.	18693.	6231.	3399.	20699.	0.	0.	3399.	20699.	1993
1994	5710.	20264.	6755.	3386.	24085.	0.	0.	3386.	24085.	1994
1995	6207.	21992.	7331.	3654.	27739.	0.	0.	3654.	27739.	1995
1996	6600.	23901.	7967.	3858.	31597.	0.	0.	3858.	31597.	1996
1997	7225.	25451.	8617.	4313.	35910.	0.	0.	4313.	35910.	1997
1998	7720.	27962.	9321.	4657.	40567.	0.	0.	4657.	40567.	1998
1999	8118.	30205.	10068.	4929.	45496.	0.	0.	4929.	45496.	1999
2000	8736.	32360.	10790.	5541.	51037.	0.	0.	5541.	51037.	2000
2001	9169.	34426.	11542.	5943.	56980.	0.	0.	5943.	56980.	2001
2002	9173.	36705.	12235.	6400.	63380.	0.	0.	6400.	63380.	2002
2003	9233.	38415.	12805.	6922.	70302.	0.	0.	6922.	70302.	2003
2004	9237.	39727.	13242.	7486.	77788.	0.	0.	7486.	77788.	2004
2005	9089.	40676.	13559.	7898.	85686.	0.	0.	7898.	85686.	2005
2006	9133.	41178.	13726.	8442.	94128.	0.	0.	8442.	94128.	2006
2007	9124.	41285.	13762.	8986.	103114.	0.	0.	8986.	103114.	2007
2008	9173.	41161.	13720.	9313.	112427.	0.	0.	9313.	112427.	2008
2009	8902.	41093.	13498.	9128.	121555.	0.	0.	9128.	121555.	2009
2010	9243.	40986.	13662.	9215.	130770.	0.	0.	9215.	130770.	2010
2011	9040.	40943.	13648.	9199.	139969.	0.	0.	9199.	139969.	2011
2012	9232.	41087.	13696.	8945.	148914.	0.	0.	8945.	148914.	2012
2013	9038.	41006.	13669.	9242.	158156.	0.	0.	9242.	158156.	2013
2014	9226.	41038.	13679.	9090.	167246.	0.	0.	9090.	167246.	2014
2015	8597.	40933.	13644.	9051.	176297.	0.	0.	9051.	176297.	2015
2016	8308.	40440.	13480.	9110.	185407.	0.	0.	9110.	185407.	2016
2017	8406.	39824.	13275.	9179.	194586.	0.	0.	9179.	194586.	2017
2018	7963.	39087.	13029.	9167.	203753.	0.	0.	9167.	203753.	2018
2019	7917.	38225.	12742.	9089.	212842.	0.	0.	9089.	212842.	2019
2020	7720.	37157.	12386.	9243.	222085.	0.	0.	9243.	222085.	2020
2021	8019.	36327.	12109.	8976.	231061.	0.	0.	8976.	231061.	2021
2022	7822.	36153.	12051.	8152.	239213.	0.	0.	8152.	239213.	2022
2023	7635.	35929.	11843.	8561.	247774.	0.	0.	8561.	247774.	2023
2024	7511.	35112.	11704.	8128.	255902.	0.	0.	8128.	255902.	2024

TABLE 10.B.1 Spent Fuel Logistics for Case 1 - Once Through Fuel Cycle - MTHM (contd)

Year	Reactor Discharge	Water Basin Storage Reactor	Water Basin Storage ISFSF	Packaging Annual	Packaging Cumulative	Extended Storage Input	Extended Storage Inventory	Geologic Repository Input	Geologic Repository Inventory	Year
2025	7150.	34672.	11557.	7918.	263820.	0.	0.	7918.	263820.	2025
2026	6647.	34040.	11347.	7741.	271561.	0.	0.	7741.	271561.	2026
2027	6088.	32905.	10968.	7881.	279442.	0.	0.	7881.	279442.	2027
2028	5757.	31365.	10455.	7976.	287418.	0.	0.	7976.	287418.	2028
2029	5618.	29864.	9955.	7689.	295107.	0.	0.	7689.	295107.	2029
2030	5314.	28242.	9414.	7628.	302735.	0.	0.	7628.	302735.	2030
2031	5214.	26442.	8881.	7398.	310133.	0.	0.	7398.	310133.	2031
2032	4816.	25232.	8411.	6894.	317027.	0.	0.	6894.	317027.	2032
2033	4603.	23976.	7992.	6384.	323411.	0.	0.	6384.	323411.	2033
2034	4231.	22860.	7620.	5906.	329317.	0.	0.	5906.	329317.	2034
2035	3961.	21725.	7242.	5609.	334926.	0.	0.	5609.	334926.	2035
2036	3541.	20406.	6802.	5510.	340436.	0.	0.	5510.	340436.	2036
2037	3352.	19067.	6356.	5231.	345667.	0.	0.	5231.	345667.	2037
2038	2740.	17882.	5961.	5027.	350694.	0.	0.	5027.	350694.	2038
2039	2312.	15933.	5311.	4724.	355418.	0.	0.	4724.	355418.	2039
2040	1534.	14039.	4680.	4449.	359867.	0.	0.	4449.	359867.	2040
2041	0.	11573.	3858.	4054.	363921.	0.	0.	4054.	363921.	2041
2042	0.	8762.	2921.	3749.	367670.	0.	0.	3749.	367670.	2042
2043	0.	6193.	2064.	3425.	371095.	0.	0.	3425.	371095.	2043
2044	0.	3880.	1293.	3084.	374179.	0.	0.	3084.	374179.	2044
2045	0.	1981.	660.	2532.	376711.	0.	0.	2532.	376711.	2045
2046	0.	343.	114.	2184.	378895.	0.	0.	2184.	378895.	2046
2047	0.	0.	0.	460.	379355.	0.	0.	460.	379355.	2047
2048	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2048
2049	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2049
2050	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2050
2051	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2051
2052	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2052
2053	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2053
2054	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2054
2055	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2055
2056	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2056
2057	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2057
2058	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2058
2059	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2059
2060	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2060
2061	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2061
2062	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2062
2063	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2063
2064	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2064
2065	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2065
2066	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2066
2067	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2067
2068	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2068
2069	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2069
2070	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2070
2071	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2071
2072	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2072
2073	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2073
2074	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2074

TABLE 10.B.2 Spent Fuel Logistics for Cases 2 and 3 - Reprocessing Fuel Cycles - MTHM

Year	Reactor Discharge	Water Basin Storage- Reactor	ISFSF	------Packaging-------- Annual	Cumulative	---Extended Storage---- Input	Inventory	-----------Reprocessing------- Input	Cumulative	Year
1975	699.	1428.	0.	0.	0.	0.	0.	0.	0.	1975
1976	775.	2165.	0.	0.	0.	0.	0.	0.	0.	1976
1977	859.	2482.	0.	0.	0.	0.	0.	0.	0.	1977
1978	1101.	3962.	0.	0.	0.	0.	0.	0.	0.	1978
1979	1150.	5087.	0.	0.	0.	0.	0.	0.	0.	1979
1980	1268.	6296.	0.	0.	0.	0.	0.	0.	0.	1980
1981	1444.	7192.	0.	0.	0.	0.	0.	500.	500.	1981
1982	1557.	7459.	0.	0.	0.	0.	0.	1000.	1500.	1982
1983	1795.	7829.	0.	0.	0.	0.	0.	1500.	3000.	1983
1984	2137.	8295.	0.	0.	0.	0.	0.	1500.	4500.	1984
1985	2483.	8437.	0.	0.	0.	0.	0.	2167.	6667.	1985
1986	2785.	8239.	0.	0.	0.	0.	0.	2833.	9500.	1986
1987	3201.	7732.	0.	0.	0.	0.	0.	3500.	13000.	1987
1988	3504.	7884.	0.	0.	0.	0.	0.	3500.	16500.	1988
1989	3770.	7721.	0.	0.	0.	0.	0.	3500.	20000.	1989
1990	4071.	8142.	0.	0.	0.	0.	0.	3500.	23500.	1990
1991	4495.	8925.	0.	0.	0.	0.	0.	3500.	27000.	1991
1992	4826.	10085.	0.	0.	0.	0.	0.	3500.	30500.	1992
1993	5250.	10456.	0.	0.	0.	0.	0.	4167.	34667.	1993
1994	5710.	11603.	0.	0.	0.	0.	0.	4833.	39500.	1994
1995	6207.	12062.	0.	0.	0.	0.	0.	5500.	45000.	1995
1996	6600.	12065.	0.	0.	0.	0.	0.	5500.	50500.	1996
1997	7225.	14378.	0.	0.	0.	0.	0.	5500.	56000.	1997
1998	7720.	15683.	0.	0.	0.	0.	0.	6167.	62167.	1998
1999	8118.	16769.	0.	0.	0.	0.	0.	6833.	69000.	1999
2000	8736.	17696.	0.	0.	0.	0.	0.	7500.	76500.	2000
2001	9169.	19149.	0.	0.	0.	0.	0.	7500.	84000.	2001
2002	9173.	20820.	0.	0.	0.	0.	0.	7500.	91500.	2002
2003	9233.	21856.	0.	0.	0.	0.	0.	8167.	99667.	2003
2004	9237.	22258.	0.	0.	0.	0.	0.	8833.	108500.	2004
2005	9089.	21921.	0.	0.	0.	0.	0.	9500.	118000.	2005
2006	9133.	21532.	0.	0.	0.	0.	0.	9500.	127500.	2006
2007	9124.	21160.	0.	0.	0.	0.	0.	9500.	137000.	2007
2008	9173.	20809.	0.	0.	0.	0.	0.	9500.	146500.	2008
2009	8902.	20346.	0.	0.	0.	0.	0.	9500.	156000.	2009
2010	9243.	19919.	0.	0.	0.	0.	0.	9500.	165500.	2010
2011	9040.	21060.	0.	0.	0.	0.	0.	8000.	173500.	2011
2012	9252.	21529.	0.	0.	0.	0.	0.	8667.	182167.	2012
2013	9038.	21331.	0.	0.	0.	0.	0.	9333.	191500.	2013
2014	9226.	20463.	0.	0.	0.	0.	0.	10000.	201500.	2014
2015	8597.	21375.	0.	0.	0.	0.	0.	8000.	209500.	2015
2016	8308.	21827.	0.	0.	0.	0.	0.	8000.	217500.	2016
2017	8406.	22184.	0.	0.	0.	0.	0.	8000.	225500.	2017
2018	7963.	22369.	0.	0.	0.	0.	0.	8000.	233500.	2018
2019	7917.	22309.	0.	0.	0.	0.	0.	8000.	241500.	2019
2020	7720.	21627.	0.	0.	0.	0.	0.	8500.	250000.	2020
2021	8019.	20497.	0.	0.	0.	0.	0.	9000.	259000.	2021
2022	7822.	18417.	0.	0.	0.	0.	0.	10000.	269000.	2022
2023	7635.	18146.	0.	0.	0.	0.	0.	8000.	277000.	2023
2024	7511.	17719.	0.	0.	0.	0.	0.	8000.	285000.	2024

TABLE 10.B.2 Spent Fuel Logistics for Cases 2 and 3 - Reprocessing Fuel Cycles - MTHM (contd)

Year	Reactor Discharge	Water Basin Storage- Reactor	ISFSF	------Packaging-------- Annual	Cumulative	---Extended Storage---- Input	Inventory	-----------Reprocessing------- Input	Cumulative	Year
2025	7150.	17049.	0.	0.	0.	0.	0.	8000.	293000.	2025
2026	6647.	15948.	0.	0.	0.	0.	0.	8000.	301000.	2026
2027	6088.	14315.	0.	0.	0.	0.	0.	8000.	309000.	2027
2028	5757.	14238.	0.	0.	0.	0.	0.	6000.	315000.	2028
2029	5618.	13025.	0.	0.	0.	0.	0.	6000.	321000.	2029
2030	5314.	13391.	0.	0.	0.	0.	0.	6000.	327000.	2030
2031	5218.	12655.	0.	0.	0.	0.	0.	6000.	333000.	2031
2032	4816.	11670.	0.	0.	0.	0.	0.	6000.	339000.	2032
2033	4603.	12380.	0.	0.	0.	0.	0.	4000.	343000.	2033
2034	4231.	12797.	0.	0.	0.	0.	0.	4000.	347000.	2034
2035	3961.	12893.	0.	0.	0.	0.	0.	4000.	351000.	2035
2036	3541.	12644.	0.	0.	0.	0.	0.	4000.	355000.	2036
2037	3352.	12090.	0.	0.	0.	0.	0.	4000.	359000.	2037
2038	2740.	11136.	0.	0.	0.	0.	0.	4000.	363000.	2038
2039	2312.	9662.	0.	0.	0.	0.	0.	4000.	367000.	2039
2040	1534.	7545.	0.	0.	0.	0.	0.	4000.	371000.	2040
2041	0.	4352.	0.	0.	0.	0.	0.	4000.	375000.	2041
2042	0.	2352.	0.	0.	0.	0.	0.	2000.	377000.	2042
2043	0.	352.	0.	0.	0.	0.	0.	2000.	379000.	2043
2044	0.	0.	0.	0.	0.	0.	0.	355.	379355.	2044
2045	0.	0.	0.	0.	0.	0.	0.	0.	379355.	2045
2046	0.	0.	0.	0.	0.	0.	0.	0.	379355.	2046
2047	0.	0.	0.	0.	0.	0.	0.	0.	379355.	2047
2048	0.	0.	0.	0.	0.	0.	0.	0.	379355.	2048
2049	0.	0.	0.	0.	0.	0.	0.	0.	379355.	2049
2050	0.	0.	0.	0.	0.	0.	0.	0.	379355.	2050
2051	0.	0.	0.	0.	0.	0.	0.	0.	379355.	2051
2052	0.	0.	0.	0.	0.	0.	0.	0.	379355.	2052
2053	0.	0.	0.	0.	0.	0.	0.	0.	379355.	2053
2054	0.	0.	0.	0.	0.	0.	0.	0.	379355.	2054
2055	0.	0.	0.	0.	0.	0.	0.	0.	379355.	2055
2056	0.	0.	0.	0.	0.	0.	0.	0.	379355.	2056
2057	0.	0.	0.	0.	0.	0.	0.	0.	379355.	2057
2058	0.	0.	0.	0.	0.	0.	0.	0.	379355.	2058
2059	0.	0.	0.	0.	0.	0.	0.	0.	379355.	2059
2060	0.	0.	0.	0.	0.	0.	0.	0.	379355.	2060
2061	0.	0.	0.	0.	0.	0.	0.	0.	379355.	2061
2062	0.	0.	0.	0.	0.	0.	0.	0.	379355.	2062
2063	0.	0.	0.	0.	0.	0.	0.	0.	379355.	2063
2064	0.	0.	0.	0.	0.	0.	0.	0.	379355.	2064
2065	0.	0.	0.	0.	0.	0.	0.	0.	379355.	2065
2066	0.	0.	0.	0.	0.	0.	0.	0.	379355.	2066
2067	0.	0.	0.	0.	0.	0.	0.	0.	379355.	2067
2068	0.	0.	0.	0.	0.	0.	0.	0.	379355.	2068
2069	0.	0.	0.	0.	0.	0.	0.	0.	379355.	2069
2070	0.	0.	0.	0.	0.	0.	0.	0.	379355.	2070
2071	0.	0.	0.	0.	0.	0.	0.	0.	379355.	2071
2072	0.	0.	0.	0.	0.	0.	0.	0.	379355.	2072
2073	0.	0.	0.	0.	0.	0.	0.	0.	379355.	2073
2074	0.	0.	0.	0.	0.	0.	0.	0.	379355.	2074

TABLE 10.B.3 Spent Fuel Logistics for Case 4A - Deferred Decision for Once Through Cycle - MTHM

Year	Reactor Discharge	Water Basin Storage Reactor	Water Basin Storage ISFSF	Packaging Annual	Packaging Cumulative	Extended Storage Input	Extended Storage Inventory	Geologic Repository Input	Geologic Repository Inventory	Year
1975	699.	1028.	0.	0.	0.	0.	0.	0.	0.	1975
1976	775.	2165.	0.	0.	0.	0.	0.	0.	0.	1976
1977	869.	2982.	0.	0.	0.	0.	0.	0.	0.	1977
1978	1101.	3962.	0.	0.	0.	0.	0.	0.	0.	1978
1979	1150.	5087.	0.	0.	0.	0.	0.	0.	0.	1979
1980	1268.	6296.	0.	0.	0.	0.	0.	0.	0.	1980
1981	1444.	7652.	0.	0.	0.	0.	0.	0.	0.	1981
1982	1557.	9152.	0.	0.	0.	0.	0.	0.	0.	1982
1983	1795.	10810.	919.	0.	0.	0.	0.	0.	0.	1983
1984	2137.	11884.	911.	0.	0.	0.	0.	0.	0.	1984
1985	2483.	12917.	1638.	700.	700.	700.	700.	0.	0.	1985
1986	2745.	13592.	2147.	1300.	2000.	1300.	2000.	0.	0.	1986
1987	3201.	13837.	2895.	2000.	4000.	2000.	4000.	0.	0.	1987
1988	3504.	14351.	3733.	2000.	6000.	2000.	6000.	0.	0.	1988
1989	3773.	15070.	4642.	2000.	8000.	2000.	8000.	0.	0.	1989
1990	4071.	15706.	5235.	2700.	10700.	2700.	10700.	0.	0.	1990
1991	4405.	16643.	5841.	3300.	14000.	3300.	14000.	0.	0.	1991
1992	4626.	17468.	5821.	3300.	17300.	3300.	17300.	0.	0.	1992
1993	5250.	18603.	6231.	3399.	20699.	3399.	20699.	0.	0.	1993
1994	5710.	20264.	6755.	3386.	24085.	3386.	24085.	0.	0.	1994
1995	6207.	21092.	7331.	3654.	27739.	3654.	27739.	0.	0.	1995
1996	6600.	23001.	7067.	3858.	31597.	3858.	31597.	0.	0.	1996
1997	7225.	25851.	8617.	4313.	35910.	4313.	35910.	0.	0.	1997
1998	7720.	27062.	9321.	4657.	40567.	4657.	40567.	0.	0.	1998
1999	8118.	30305.	10068.	4929.	45496.	4929.	45496.	0.	0.	1999
2000	8736.	32369.	10790.	5541.	51037.	2541.	48037.	3000.	3000.	2000
2001	9149.	34626.	11542.	5943.	56980.	0.	47980.	6000.	9000.	2001
2002	9173.	36705.	12235.	6400.	63380.	0.	45380.	9000.	18000.	2002
2003	9233.	38615.	12805.	6922.	70302.	0.	40302.	12000.	30000.	2003
2004	9237.	39727.	13242.	7486.	77788.	0.	35788.	12000.	42000.	2004
2005	9049.	40676.	13550.	7898.	85686.	0.	31686.	12000.	54000.	2005
2006	9133.	41179.	13726.	8442.	94128.	0.	28128.	12000.	66000.	2006
2007	9124.	41285.	13762.	8986.	103114.	0.	25114.	12000.	78000.	2007
2008	9173.	41161.	13720.	9313.	112427.	0.	22427.	12000.	90000.	2008
2009	8992.	41093.	13695.	9128.	121555.	0.	19555.	12000.	102000.	2009
2010	9243.	40966.	13662.	9215.	130770.	0.	16770.	12000.	114000.	2010
2011	9040.	40383.	13604.	9199.	139969.	0.	13969.	12000.	126000.	2011
2012	9232.	41087.	13696.	8945.	148914.	0.	10914.	12000.	138000.	2012
2013	9038.	41076.	13669.	9242.	158156.	0.	8156.	12000.	150000.	2013
2014	9220.	41038.	13679.	9090.	167246.	0.	5246.	12000.	162000.	2014
2015	8597.	40933.	13644.	9051.	176297.	0.	2297.	12000.	174000.	2015
2016	8306.	40440.	13480.	9110.	185407.	0.	0.	11407.	185407.	2016
2017	8406.	39824.	13275.	9179.	194586.	0.	0.	9179.	194586.	2017
2018	7963.	39087.	13029.	9167.	203753.	0.	0.	9167.	203753.	2018
2019	7917.	38225.	12742.	9089.	212842.	0.	0.	9089.	212842.	2019
2020	7720.	37157.	12346.	9243.	222085.	0.	0.	9243.	222085.	2020
2021	8019.	36327.	12109.	8976.	231061.	0.	0.	8976.	231061.	2021
2022	7832.	36153.	12091.	8152.	239213.	0.	0.	8152.	239213.	2022
2023	7635.	35529.	11883.	8561.	247774.	0.	0.	8561.	247774.	2023
2024	7511.	35112.	11700.	8128.	255902.	0.	0.	8128.	255902.	2024

TABLE 10.B.3 Spent Fuel Logistics for Case 4A - Deferred Decision for Once Through Cycle - MTHM (contd) Page 2 of 2

Year	Reactor Discharge	Water Basin Storage Reactor	Water Basin Storage ISFSF	Packaging Annual	Packaging Cumulative	Extended Storage Input	Extended Storage Inventory	Geologic Repository Input	Geologic Repository Inventory	Year
2025	7153.	34472.	11557.	7918.	263820.	0.	0.	7918.	263820.	2025
2026	6647.	35040.	11347.	7741.	271561.	0.	0.	7741.	271561.	2026
2027	6088.	32005.	10968.	7881.	279442.	0.	0.	7881.	279442.	2027
2028	5757.	31365.	10455.	7976.	287418.	0.	0.	7976.	287418.	2028
2029	5618.	29864.	9958.	7689.	295107.	0.	0.	7689.	295107.	2029
2030	5314.	28242.	9414.	7628.	302735.	0.	0.	7628.	302735.	2030
2031	5214.	26642.	8881.	7398.	310133.	0.	0.	7398.	310133.	2031
2032	4816.	25232.	8411.	6894.	317027.	0.	0.	6894.	317027.	2032
2033	4673.	23076.	7092.	6384.	323411.	0.	0.	6384.	323411.	2033
2034	4231.	22860.	7620.	5906.	329317.	0.	0.	5906.	329317.	2034
2035	3941.	21725.	7242.	5609.	334926.	0.	0.	5609.	334926.	2035
2036	3561.	20606.	6602.	5510.	340436.	0.	0.	5510.	340436.	2036
2037	3352.	19067.	6356.	5231.	345667.	0.	0.	5231.	345667.	2037
2038	2740.	17582.	5861.	5027.	350694.	0.	0.	5027.	350694.	2038
2039	2312.	15033.	5311.	4724.	355418.	0.	0.	4724.	355418.	2039
2040	1534.	14039.	4680.	4449.	359867.	0.	0.	4449.	359867.	2040
2041	0.	11573.	3858.	4054.	363921.	0.	0.	4054.	363921.	2041
2042	0.	8762.	2921.	3749.	367670.	0.	0.	3749.	367670.	2042
2043	0.	6193.	2064.	3425.	371095.	0.	0.	3425.	371095.	2043
2044	0.	3850.	1233.	3084.	374179.	0.	0.	3084.	374179.	2044
2045	0.	1081.	660.	2532.	376711.	0.	0.	2532.	376711.	2045
2046	0.	343.	114.	2184.	378895.	0.	0.	2184.	378895.	2046
2047	0.	0.	0.	460.	379355.	0.	0.	460.	379355.	2047
2048	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2048
2049	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2049
2050	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2050
2051	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2051
2052	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2052
2053	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2053
2054	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2054
2055	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2055
2056	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2056
2057	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2057
2058	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2058
2059	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2059
2060	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2060
2061	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	3061
2062	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2062
2063	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2063
2064	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2064
2065	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2065
2066	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2066
2067	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2067
2068	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2068
2069	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2069
2070	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2070
2071	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2071
2072	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2072
2073	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2073
2074	0.	0.	0.	0.	379355.	0.	0.	0.	379355.	2074

TABLE 10.B.4 Spent Fuel Logistics for Case 4B - Deferred Decision for U and Pu Recycle - MTHM

Year	Reactor Discharge	Water Basin Storage- Reactor	ISFSF	------Packaging-------- Annual	Cumulative	---Extended Storage---- Input	Inventory	-----------Reprocessing------- Input	Cumulative	Year
1975	699.	1428.	0.	0.	0.	0.	0.	0.	0.	1975
1976	775.	2165.	0.	0.	0.	0.	0.	0.	0.	1976
1977	859.	2082.	0.	0.	0.	0.	0.	0.	0.	1977
1978	1101.	3962.	0.	0.	0.	0.	0.	0.	0.	1978
1979	1150.	5087.	0.	0.	0.	0.	0.	0.	0.	1979
1980	1268.	6296.	0.	0.	0.	0.	0.	0.	0.	1980
1981	1444.	7452.	0.	0.	0.	0.	0.	0.	0.	1981
1982	1557.	9153.	0.	0.	0.	0.	0.	0.	0.	1982
1983	1795.	10410.	419.	0.	0.	0.	0.	0.	0.	1983
1984	2137.	11484.	911.	0.	0.	0.	0.	0.	0.	1984
1985	2483.	12917.	1488.	700.	700.	700.	700.	0.	0.	1985
1986	2785.	13992.	2147.	1300.	2000.	1300.	2000.	0.	0.	1986
1987	3201.	13837.	2895.	2000.	4000.	2000.	4000.	0.	0.	1987
1988	3504.	14351.	3733.	2000.	6000.	2000.	6000.	0.	0.	1988
1989	3770.	15079.	4642.	2000.	8000.	2000.	8000.	0.	0.	1989
1990	4071.	15706.	5235.	2700.	10700.	2700.	10700.	0.	0.	1990
1991	4495.	16443.	5481.	3300.	14000.	3300.	14000.	0.	0.	1991
1992	4826.	17464.	5821.	3300.	17300.	3300.	17300.	0.	0.	1992
1993	5250.	18693.	6231.	3399.	20699.	3399.	20699.	0.	0.	1993
1994	5710.	20264.	6755.	3386.	24085.	3386.	24085.	0.	0.	1994
1995	6207.	21092.	7331.	3654.	27739.	3654.	27739.	0.	0.	1995
1996	6600.	23901.	7967.	3858.	31597.	3858.	31597.	0.	0.	1996
1997	7225.	2589[illegible].	8617.	4313.	35910.	4313.	35910.	0.	0.	1997
1998	7720.	27962.	9321.	4657.	40567.	4657.	40567.	0.	0.	1998
1999	8118.	30205.	10068.	4929.	45496.	4929.	45496.	0.	0.	1999
2000	8736.	32369.	10790.	5541.	51037.	5541.	51037.	0.	0.	2000
2001	9169.	34626.	11542.	5943.	56980.	5943.	56980.	0.	0.	2001
2002	9173.	36705.	12235.	6400.	63380.	6400.	63380.	0.	0.	2002
2003	9233.	38415.	12805.	6922.	70302.	6922.	70302.	0.	0.	2003
2004	9237.	39727.	13242.	7486.	77788.	7486.	77788.	0.	0.	2004
2005	9059.	40676.	13559.	7898.	85686.	7898.	85686.	0.	0.	2005
2006	9133.	41178.	13726.	8442.	94128.	8442.	94128.	0.	0.	2006
2007	9124.	41285.	13762.	8986.	103114.	8986.	103114.	0.	0.	2007
2008	9173.	41161.	13720.	9313.	112427.	9313.	112427.	0.	0.	2008
2009	8902.	41093.	13698.	9128.	121555.	9128.	121555.	0.	0.	2009
2010	9243.	40986.	13662.	9215.	130770.	8548.	130103.	667.	667.	2010
2011	9040.	40943.	13648.	9199.	139969.	7866.	137969.	1333.	2000.	2011
2012	9232.	41087.	13696.	8945.	148914.	6278.	144247.	2667.	4667.	2012
2013	9038.	41006.	13669.	9242.	158156.	5909.	150156.	3333.	8000.	2013
2014	9226.	41038.	13679.	9090.	167246.	4423.	154579.	4667.	12667.	2014
2015	8597.	40933.	13644.	9051.	176297.	3718.	158297.	5333.	18000.	2015
2016	8308.	40440.	13480.	9110.	185407.	2443.	160740.	6667.	24667.	2016
2017	8406.	39824.	13275.	9179.	194586.	1846.	162586.	7333.	32000.	2017
2018	7963.	39087.	13029.	9167.	203753.	500.	163086.	8667.	40667.	2018
2019	7917.	38225.	12742.	9089.	212842.	0.	162842.	9333.	50000.	2019
2020	7720.	37157.	12386.	9243.	222085.	0.	161418.	10667.	60667.	2020
2021	8019.	43059.	14353.	0.	222085.	0.	150085.	11333.	72000.	2021
2022	7822.	48090.	16333.	0.	222085.	0.	137418.	12667.	84667.	2022
2023	7635.	54795.	18265.	0.	222085.	0.	124085.	13333.	98000.	2023
2024	7511.	60475.	20158.	0.	222085.	0.	110085.	14000.	112000.	2024

TABLE 10.B.5 Spent Fuel Logistics for Low-Growth Case 1 - Once Through Cycle - MTHM

Year	Reactor Discharge	Water Basin Storage Reactor	Water Basin Storage ISFSF	Packaging Annual	Packaging Cumulative	Extended Storage Input	Extended Storage Inventory	Geologic Repository Input	Geologic Repository Inventory	Year
1975	699.	1428.	0.	0.	0.	0.	0.	0.	0.	1975
1976	775.	2165.	0.	0.	0.	0.	0.	0.	0.	1976
1977	859.	2082.	0.	0.	0.	0.	0.	0.	0.	1977
1978	1101.	3062.	0.	0.	0.	0.	0.	0.	0.	1978
1979	1150.	5087.	0.	0.	0.	0.	0.	0.	0.	1979
1980	1268.	6296.	0.	0.	0.	0.	0.	0.	0.	1980
1981	1444.	7652.	0.	0.	0.	0.	0.	0.	0.	1981
1982	1453.	9101.	0.	0.	0.	0.	0.	0.	0.	1982
1983	1551.	10227.	376.	0.	0.	0.	0.	0.	0.	1983
1984	1872.	11511.	803.	0.	0.	0.	0.	0.	0.	1984
1985	2056.	12284.	1294.	700.	700.	0.	0.	700.	700.	1985
1986	2191.	12376.	1825.	1300.	2000.	0.	0.	1300.	2000.	1986
1987	2556.	12356.	2419.	2000.	4000.	0.	0.	2000.	4000.	1987
1988	2670.	12316.	3072.	2000.	6000.	0.	0.	2000.	6000.	1988
1989	2822.	12376.	3758.	2000.	8000.	0.	0.	2000.	8000.	1989
1990	3264.	12883.	4294.	2000.	10000.	0.	0.	2000.	10000.	1990
1991	3574.	13947.	4649.	2000.	12000.	0.	0.	2000.	12000.	1991
1992	3683.	14418.	4806.	3000.	15000.	0.	0.	3000.	15000.	1992
1993	4091.	15084.	5028.	3000.	18000.	0.	0.	3000.	18000.	1993
1994	4216.	15949.	5316.	3000.	21000.	0.	0.	3000.	21000.	1994
1995	4327.	16902.	5634.	3000.	24000.	0.	0.	3000.	24000.	1995
1996	4609.	18003.	6001.	3000.	27000.	0.	0.	3000.	27000.	1996
1997	4929.	18024.	6308.	3541.	30541.	0.	0.	3541.	30541.	1997
1998	5023.	19897.	6632.	3679.	34220.	0.	0.	3679.	34220.	1998
1999	5298.	20863.	6954.	3873.	38093.	0.	0.	3873.	38093.	1999
2000	5688.	21848.	7283.	4180.	42273.	0.	0.	4180.	42273.	2000
2001	5776.	22971.	7657.	4234.	46507.	0.	0.	4234.	46507.	2001
2002	5796.	23981.	7994.	4440.	50947.	0.	0.	4440.	50947.	2002
2003	5976.	24797.	8266.	4797.	55744.	0.	0.	4797.	55744.	2003
2004	5775.	25510.	8503.	4927.	60671.	0.	0.	4927.	60671.	2004
2005	5657.	25947.	8649.	5134.	65805.	0.	0.	5134.	65805.	2005
2006	5889.	26085.	8695.	5590.	71395.	0.	0.	5590.	71395.	2006
2007	5748.	26160.	8720.	5718.	77113.	0.	0.	5718.	77113.	2007
2008	5728.	26081.	8690.	5844.	82957.	0.	0.	5844.	82957.	2008
2009	5636.	25934.	8645.	5878.	88835.	0.	0.	5878.	88835.	2009
2010	5907.	25835.	8612.	5903.	94738.	0.	0.	5903.	94738.	2010
2011	5654.	25883.	8628.	5716.	100454.	0.	0.	5716.	100454.	2011
2012	5962.	25993.	8664.	5662.	106116.	0.	0.	5662.	106116.	2012
2013	5715.	25933.	8644.	5918.	112034.	0.	0.	5918.	112034.	2013
2014	5881.	26031.	8677.	5668.	117702.	0.	0.	5668.	117702.	2014
2015	5302.	25983.	8661.	5655.	123357.	0.	0.	5655.	123357.	2015
2016	5159.	25534.	8511.	5829.	129186.	0.	0.	5829.	129186.	2016
2017	5159.	25074.	8358.	5773.	134959.	0.	0.	5773.	134959.	2017
2018	4745.	24444.	8148.	5791.	140750.	0.	0.	5791.	140750.	2018
2019	4674.	23866.	7855.	5881.	146631.	0.	0.	5881.	146631.	2019
2020	4570.	22634.	7585.	5865.	152496.	0.	0.	5865.	152496.	2020
2021	4437.	21813.	7271.	5598.	158094.	0.	0.	5598.	158094.	2021
2022	4374.	21341.	7114.	5034.	163128.	0.	0.	5034.	163128.	2022
2023	4631.	20668.	6889.	5400.	168528.	0.	0.	5400.	168528.	2023
2024	4261.	20395.	6798.	4810.	173338.	0.	0.	4810.	173338.	2024

TABLE 10.B.6 Spent Fuel Logistics for Low-Growth Case 3 - U and Pu Recycle - MTHM

Year	Reactor Discharge	Water Basin Storage- Reactor	ISFSF	------Packaging-------- Annual	Cumulative	---Extended Storage---- Input	Inventory	-----------Reprocessing------- Input	Cumulative	Year
1975	699.	1428.	0.	0.	0.	0.	0.	0.	0.	1975
1976	775.	2165.	0.	0.	0.	0.	0.	0.	0.	1976
1977	859.	2982.	0.	0.	0.	0.	0.	0.	0.	1977
1978	1101.	3962.	0.	0.	0.	0.	0.	0.	0.	1978
1979	1150.	5087.	0.	0.	0.	0.	0.	0.	0.	1979
1980	1268.	6296.	0.	0.	0.	0.	0.	0.	0.	1980
1981	1444.	7152.	0.	0.	0.	0.	0.	500.	500.	1981
1982	1453.	7407.	0.	0.	0.	0.	0.	1000.	1500.	1982
1983	1551.	7603.	0.	0.	0.	0.	0.	1500.	3000.	1983
1984	1872.	7814.	0.	0.	0.	0.	0.	1500.	4500.	1984
1985	2056.	8278.	0.	0.	0.	0.	0.	1500.	6000.	1985
1986	2191.	8802.	0.	0.	0.	0.	0.	1500.	7500.	1986
1987	2556.	9108.	0.	0.	0.	0.	0.	2167.	9667.	1987
1988	2670.	8888.	0.	0.	0.	0.	0.	2833.	12500.	1988
1989	2822.	8134.	0.	0.	0.	0.	0.	3500.	16000.	1989
1990	3264.	7677.	0.	0.	0.	0.	0.	3500.	19500.	1990
1991	3574.	7596.	0.	0.	0.	0.	0.	3500.	23000.	1991
1992	3683.	7725.	0.	0.	0.	0.	0.	3500.	26500.	1992
1993	4091.	8112.	0.	0.	0.	0.	0.	3500.	30000.	1993
1994	4216.	8765.	0.	0.	0.	0.	0.	3500.	33500.	1994
1995	4327.	9537.	0.	0.	0.	0.	0.	3500.	37000.	1995
1996	4609.	10805.	0.	0.	0.	0.	0.	3500.	40500.	1996
1997	4929.	11774.	0.	0.	0.	0.	0.	3500.	44000.	1997
1998	5023.	12583.	0.	0.	0.	0.	0.	4167.	48167.	1998
1999	5298.	12910.	0.	0.	0.	0.	0.	4833.	53000.	1999
2000	5688.	12903.	0.	0.	0.	0.	0.	5500.	58500.	2000
2001	5776.	13135.	0.	0.	0.	0.	0.	5500.	64000.	2001
2002	5796.	13421.	0.	0.	0.	0.	0.	5500.	69500.	2002
2003	5976.	13807.	0.	0.	0.	0.	0.	5500.	75000.	2003
2004	5778.	14184.	0.	0.	0.	0.	0.	5500.	80500.	2004
2005	5657.	14402.	0.	0.	0.	0.	0.	5500.	86000.	2005
2006	5889.	14675.	0.	0.	0.	0.	0.	5500.	91500.	2006
2007	5748.	14993.	0.	0.	0.	0.	0.	5500.	97000.	2007
2008	5728.	15231.	0.	0.	0.	0.	0.	5500.	102500.	2008
2009	5636.	14746.	0.	0.	0.	0.	0.	6167.	108667.	2009
2010	5907.	13685.	0.	0.	0.	0.	0.	6833.	115500.	2010
2011	5654.	13465.	0.	0.	0.	0.	0.	6000.	121500.	2011
2012	5962.	13273.	0.	0.	0.	0.	0.	6000.	127500.	2012
2013	5715.	13112.	0.	0.	0.	0.	0.	6000.	133500.	2013
2014	5881.	12910.	0.	0.	0.	0.	0.	6000.	139500.	2014
2015	5302.	12801.	0.	0.	0.	0.	0.	6000.	145500.	2015
2016	5159.	11732.	0.	0.	0.	0.	0.	6000.	151500.	2016
2017	5159.	12891.	0.	0.	0.	0.	0.	4000.	155500.	2017
2018	4745.	13803.	0.	0.	0.	0.	0.	4000.	159500.	2018
2019	4674.	14552.	0.	0.	0.	0.	0.	4000.	163500.	2019
2020	4570.	15174.	0.	0.	0.	0.	0.	4000.	167500.	2020
2021	4437.	15678.	0.	0.	0.	0.	0.	4000.	171500.	2021
2022	4374.	16083.	0.	0.	0.	0.	0.	4000.	175500.	2022
2023	4631.	16586.	0.	0.	0.	0.	0.	4000.	179500.	2023
2024	4261.	17032.	0.	0.	0.	0.	0.	4000.	183500.	2024

APPENDIX 10C

WASTE SHIPMENTS TO REPOSITORIES

APPENDIX 10C

WASTE SHIPMENTS SENT TO REPOSITORIES

Appendix 10C consists of 52 tables that describe the number of containers sent to repositories, the average activity in the containers and the average heat generation rate at 5-year intervals of these containers. The tables are grouped by fuel cycle case.

- The first table in each group shows annual and cumulative number of containers that are being sent to a repository.
- The second table in each case describes the average radioactivity in all types of containers.
- The third table in each case shows the average heat generation rate of these containers.
- A fourth table in the reprocessing cases shows the number and type of TRU waste containers held in interim storage.
- Four additional tables in the reprocessing cases describe the high-level waste container sizes, number of containers, radioactivity and heat generation rates after adjustment of container sizes to meet thermal criteria limits in each of the four geologic repository media.

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APPENDIX 10C

INDEX TO WASTE SHIPMENT TABLES

APPENDIX 10C (contd)

TABLE 10.C.1. Case 1 - Once-Through Cycle - Reference Treatment - TRU Waste Containers Sent to Repository

YEAR	BWR CANISTERS ANNUAL	BWR CANISTERS CUMULATIVE	PWR CANISTERS ANNUAL	PWR CANISTERS CUMULATIVE	TOTAL CANISTERS ANNUAL	TOTAL CANISTERS CUMULATIVE	YEAR
1985	1.68E+03	1.68E+03	8.29E+02	8.29E+02	2.51E+03	2.51E+03	1985
1990	5.46E+03	2.31E+04	3.62E+03	1.37E+04	9.08E+03	3.69E+04	1990
1995	7.20E+03	5.70E+04	4.97E+03	3.68E+04	1.22E+04	9.38E+04	1995
2000	1.11E+04	1.04E+05	7.48E+03	6.82E+04	1.86E+04	1.72E+05	2000
2005	1.60E+04	1.74E+05	1.06E+04	1.15E+05	2.66E+04	2.88E+05	2005
2010	1.87E+04	2.65E+05	1.23E+04	1.75E+05	3.10E+04	4.40E+05	2010
2015	1.89E+04	3.58E+05	1.19E+04	2.36E+05	3.08E+04	5.94E+05	2015
2020	1.91E+04	4.52E+05	1.22E+04	2.96E+05	3.13E+04	7.48E+05	2020
2025	1.55E+04	5.35E+05	1.08E+04	3.53E+05	2.63E+04	8.88E+05	2025
2030	1.48E+04	6.15E+05	1.05E+04	4.04E+05	2.53E+04	1.02E+06	2030
2035	1.18E+04	6.83E+05	7.32E+03	4.46E+05	1.92E+04	1.13E+06	2035
2040	9.11E+03	7.35E+05	5.91E+03	4.79E+05	1.50E+04	1.21E+06	2040
2045	5.52E+03	7.71E+05	3.23E+03	5.01E+05	8.75E+03	1.27E+06	2045
2050	0.	7.77E+05	0.	5.04E+05	0.	1.28E+06	2050

TABLE 10.C.2. Case 1 - Once-Through Cycle - Reference Treatment - Radioactivity in TRU Waste Containers

	CURIES/CONTAINER				CURIES		
	BWR CANISTERS		PWR CANISTERS		CUMULATIVE		
YEAR	FP+AP	ACTINIDES	FP+AP	ACTINIDES	FP+AP	ACTINIDES	YEAR
1985	2.57E+04	6.41E+03	9.68E+04	2.64E+04	1.20E+08	3.20E+07	1985
1990	4.64E+04	1.15E+04	1.51E+05	4.10E+04	2.52E+09	6.82E+08	1990
1995	5.11E+04	1.25E+04	1.71E+05	4.43E+04	6.81E+09	1.81E+09	1995
2000	5.26E+04	1.28E+04	1.72E+05	4.44E+04	1.24E+10	3.27E+09	2000
2005	5.34E+04	1.30E+04	1.74E+05	4.49E+04	2.05E+10	5.35E+09	2005
2010	5.78E+04	1.41E+04	1.84E+05	4.73E+04	3.09E+10	7.95E+09	2010
2015	5.80E+04	1.42E+04	1.84E+05	4.72E+04	4.05E+10	1.02E+10	2015
2020	5.72E+04	1.36E+04	1.80E+05	4.57E+04	4.88E+10	1.20E+10	2020
2025	5.96E+04	1.43E+04	1.80E+05	4.57E+04	5.49E+10	1.32E+10	2025
2030	5.68E+04	1.34E+04	1.73E+05	4.33E+04	5.92E+10	1.38E+10	2030
2035	5.45E+04	1.27E+04	1.73E+05	4.32E+04	6.08E+10	1.37E+10	2035
2040	4.90E+04	1.10E+04	1.62E+05	3.95E+04	5.99E+10	1.31E+10	2040
2045	4.16E+04	8.32E+03	1.41E+05	3.22E+04	5.67E+10	1.18E+10	2045
2050	0.	0.	0.	0.	5.04E+10	9.90E+09	2050

TABLE 10.C.3. Case 1 - Once-Through Cycle - Reference Treatment - Heat Generation Rate in TRU Waste Containers

WATTS/CONTAINER

YEAR	BWR CANISTERS FP+AP	BWR CANISTERS ACTINIDES	PWR CANISTERS FP+AP	PWR CANISTERS ACTINIDES	YEAR
1985	8.12E+01	1.51E+01	3.02E+02	6.72E+01	1985
1990	1.57E+02	2.25E+01	5.23E+02	8.30E+01	1990
1995	1.79E+02	2.19E+01	6.24E+02	8.44E+01	1995
2000	1.85E+02	2.28E+01	6.27E+02	9.48E+01	2000
2005	1.88E+02	2.34E+01	6.35E+02	9.63E+01	2005
2010	2.04E+02	2.61E+01	6.74E+02	9.38E+01	2010
2015	2.09E+02	2.67E+01	6.74E+02	9.30E+01	2015
2020	2.02E+02	2.55E+01	6.87E+02	9.02E+01	2020
2025	2.11E+02	2.71E+01	6.57E+02	9.02E+01	2025
2030	2.01E+02	2.52E+01	6.30E+02	8.47E+01	2030
2035	1.92E+02	2.36E+01	6.28E+02	8.03E+01	2035
2040	1.72E+02	2.00E+01	5.86E+02	7.59E+01	2040
2045	1.42E+02	1.45E+01	5.02E+02	5.91E+01	2045
2050	0.	0.	0.	0.	2050

TABLE 10.C.4 Case 2A - U Only Recycle - Pu to SHLW - Reference Treatment
TRU Waste Containers Sent to Repository

YEAR	SOLID HIGH LEVEL CANISTERS ANNUAL	SOLID HIGH LEVEL CANISTERS CUMULATIVE	HULLS AND ASSEMBLY HARDWARE CANISTERS ANNUAL	HULLS AND ASSEMBLY HARDWARE CANISTERS CUMULATIVE	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR ANNUAL	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR CUMULATIVE	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR ANNUAL	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR CUMULATIVE	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR ANNUAL	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR CUMULATIVE	YEAR
1985	0.	0.	5.66E+02	5.66E+02	4.96E+03	4.96E+03	4.73E+00	4.73E+00	2.33E+03	2.33E+03	1985
1990	7.14E+02	2.20E+03	9.80E+02	5.04E+03	8.60E+03	4.42E+04	8.20E+00	4.22E+01	4.04E+03	2.08E+04	1990
1995	1.15E+03	7.74E+03	1.31E+03	1.08E+04	1.15E+04	9.44E+04	1.10E+01	9.00E+01	5.81E+03	4.43E+04	1995
2000	1.81E+03	1.48E+04	1.79E+03	1.83E+04	1.57E+04	1.60E+05	1.50E+01	1.53E+02	7.38E+03	7.53E+04	2000
2005	2.47E+03	2.52E+04	2.27E+03	2.82E+04	1.99E+04	2.47E+05	1.90E+01	2.36E+02	9.35E+03	1.16E+05	2005
2010	3.13E+03	3.89E+04	2.27E+03	3.94E+04	1.99E+04	3.47E+05	1.90E+01	3.31E+02	9.35E+03	1.63E+05	2010
2015	3.13E+03	5.45E+04	1.91E+03	5.01E+04	1.68E+04	4.39E+05	1.60E+01	4.19E+02	7.87E+03	2.06E+05	2015
2020	2.64E+03	6.90E+04	2.03E+03	5.98E+04	1.78E+04	5.24E+05	1.70E+01	5.00E+02	8.37E+03	2.46E+05	2020
2025	2.80E+03	8.24E+04	1.91E+03	7.00E+04	1.68E+04	6.14E+05	1.60E+01	5.86E+02	7.87E+03	2.88E+05	2025
2030	2.64E+03	9.65E+04	1.43E+03	7.82E+04	1.26E+04	6.86E+05	1.20E+01	6.54E+02	5.90E+03	3.22E+05	2030
2035	1.94E+03	1.08E+05	9.56E+02	8.39E+04	8.39E+03	7.36E+05	8.00E+00	7.02E+02	3.94E+03	3.45E+05	2035
2040	1.32E+03	1.16E+05	9.96E+02	8.87E+04	8.39E+03	7.78E+05	8.00E+00	7.42E+02	3.94E+03	3.65E+05	2040
2045	1.32E+03	1.22E+05	0.	9.07E+04	0.	7.95E+05	0.	7.59E+02	0.	3.73E+05	2045
2050	0.	1.25E+05	0.	9.07E+04	0.	7.95E+05	0.	7.59E+02	0.	3.73E+05	2050
2055	0.	1.25E+05	0.	9.07E+04	0.	7.95E+05	0.	7.59E+02	0.	3.73E+05	2055
2060	0.	1.25E+05	0.	9.07E+04	0.	7.95E+05	0.	7.59E+02	0.	3.73E+05	2060
2065	0.	1.25E+05	0.	9.07E+04	0.	7.95E+05	0.	7.59E+02	0.	3.73E+05	2065
2070	0.	1.25E+05	0.	9.07E+04	0.	7.95E+05	0.	7.59E+02	0.	3.73E+05	2070
2075	0.	1.25E+05	0.	9.07E+04	0.	7.95E+05	0.	7.59E+02	0.	3.73E+05	2075

TABLE 10.C.4 Case 2A - U Only Recycle - Pu to SHLW - Reference Treatment
TRU Waste Containers Sent to Repository

	INTERMEDIATE LEVEL CANISTERS .2-1 R/HR		INTERMEDIATE LEVEL DRUMS(55) .2-1 R/HR		LOW LEVEL DRUMS(55) 0-.2 R/HR		LOW LEVEL BOXES 0-.2 R/HR		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1985	7.94E+01	7.94E+01	2.28E+03	2.28E+03	3.16E+03	3.16E+03	5.92E+01	5.92E+01	1985
1990	1.37E+02	7.07E+02	3.96E+03	2.04E+04	5.48E+03	2.82E+04	1.07E+02	5.27E+02	1990
1995	1.84E+02	1.51E+03	5.31E+03	4.34E+04	7.35E+03	6.02E+04	1.38E+02	1.13E+03	1995
2000	2.51E+02	2.56E+03	7.29E+03	7.38E+04	1.00E+04	1.02E+05	1.87E+02	1.91E+03	2000
2005	3.18E+02	3.96E+03	9.17E+03	1.14E+05	1.27E+04	1.58E+05	2.37E+02	2.95E+03	2005
2010	3.18E+02	5.55E+03	9.17E+03	1.60E+05	1.27E+04	2.21E+05	2.37E+02	4.14E+03	2010
2015	2.68E+02	7.02E+03	7.72E+03	2.02E+05	1.39E+04	2.93E+05	2.49E+02	5.43E+03	2015
2020	2.85E+02	8.38E+03	8.20E+03	2.41E+05	1.46E+04	3.60E+05	2.61E+02	6.64E+03	2020
2025	2.68E+02	9.82E+03	7.72E+03	2.83E+05	1.39E+04	4.27E+05	2.49E+02	7.86E+03	2025
2030	2.01E+02	1.10E+04	5.79E+03	3.16E+05	1.12E+04	4.85E+05	1.99E+02	8.91E+03	2030
2035	1.30E+02	1.18E+04	3.86E+03	3.30E+05	8.53E+03	5.30E+05	1.49E+02	9.71E+03	2035
2040	1.34E+02	1.24E+04	3.86E+03	3.58E+05	1.49E+04	5.92E+05	2.47E+02	1.07E+04	2040
2045	0.	1.27E+04	0.	3.66E+05	3.79E+03	6.18E+05	1.50E+01	1.10E+04	2045
2050	0.	1.27E+04	0.	3.66E+05	0.	6.25E+05	0.	1.10E+04	2050
2055	0.	1.27E+04	0.	3.66E+05	3.79E+03	6.37E+05	1.50E+01	1.11E+04	2055
2060	0.	1.27E+04	0.	3.66E+05	3.79E+03	6.48E+05	1.50E+01	1.11E+04	2060
2065	0.	1.27E+04	0.	3.66E+05	3.79E+03	6.60E+05	1.50E+01	1.12E+04	2065
2070	0.	1.27E+04	0.	3.66E+05	0.	6.60E+05	0.	1.12E+04	2070
2075	0.	1.27E+04	0.	3.66E+05	1.14E+04	6.82E+05	4.50E+01	1.13E+04	2075

TABLE 10.C.4 Case 2A - U Only Recycle - Pu to SHLW - Reference Treatment
TRU Waste Containers Sent to Repository

YEAR	INTERMEDIATE LEVEL DRUMS(80) ANNUAL	1-10 R/HR CUMULATIVE	INTERMEDIATE LEVEL DRUMS(80) ANNUAL	.2-1 R/HR CUMULATIVE	LOW LEVEL DRUMS(80) ANNUAL	0-.2 R/HR CUMULATIVE	YEAR
1985	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	1995
2000	0.	0.	0.	0.	0.	0.	2000
2005	0.	0.	0.	0.	0.	0.	2005
2010	0.	0.	0.	0.	0.	0.	2010
2015	0.	0.	0.	0.	7.20E+01	2.88E+02	2015
2020	0.	0.	0.	0.	7.20E+01	5.76E+02	2020
2025	0.	0.	0.	0.	7.20E+01	7.92E+02	2025
2030	0.	0.	0.	0.	7.20E+01	1.08E+03	2030
2035	0.	0.	0.	0.	7.20E+01	1.37E+03	2035
2040	0.	0.	0.	0.	2.16E+02	2.16E+03	2040
2045	0.	0.	0.	0.	1.18E+03	6.88E+03	2045
2050	0.	0.	0.	0.	0.	9.24E+03	2050
2055	0.	0.	0.	0.	1.18E+03	1.28E+04	2055
2060	0.	0.	0.	0.	1.18E+03	1.63E+04	2060
2065	0.	0.	0.	0.	1.18E+03	1.99E+04	2065
2070	0.	0.	0.	0.	0.	1.99E+04	2070
2075	0.	0.	0.	0.	3.54E+03	2.69E+04	2075

TABLE 10.C.5 Case 2A - U Only Recycle Pu to SHLW - Reference Treatment
Radioactivity in TRU Waste Containers

(CURIES/CONTAINER)

YEAR	SOLID HIGH LEVEL CANISTERS FP+AP	ACTINIDES	HULLS AND ASSEMBLY HARDWARE CANISTERS FP+AP	ACTINIDES	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR FP+AP	ACTINIDES	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR FP+AP	ACTINIDES	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR FP+AP	ACTINIDES	YEAR
1985	0.	0.	1.90E+04	1.73E+02	1.57E+01	4.32E+01	1.31E+00	3.28E-01	3.06E-01	7.79E-02	1985
1990	7.31E+05	2.10E+05	3.04E+04	1.93E+02	8.16E+01	4.83E+01	2.60E+00	3.66E-01	5.06E-01	8.70E-02	1990
1995	8.66E+05	2.41E+05	3.52E+04	2.13E+02	9.68E+01	5.33E+01	2.90E+00	4.04E-01	6.97E-01	9.61E-02	1955
2000	8.91E+05	2.48E+05	3.53E+04	2.16E+02	9.66E+01	5.39E+01	3.00E+00	4.09E-01	6.99E-01	9.71E-02	2000
2005	9.01E+05	2.51E+05	3.44E+04	2.23E+02	8.47E+01	5.58E+01	2.83E+00	4.23E-01	6.58E-01	1.01E-01	2005
2010	9.28E+05	2.60E+05	3.62E+04	2.32E+02	9.69E+01	5.79E+01	3.11E+00	4.39E-01	7.24E-01	1.04E-01	2010
2015	9.72E+05	2.70E+05	3.49E+04	2.26E+02	8.95E+01	5.66E+01	2.96E+00	4.29E-01	6.89E-01	1.02E-01	2015
2020	9.50E+05	2.64E+05	3.17E+04	2.21E+02	6.76E+01	5.53E+01	2.54E+00	4.19E-01	5.91E-01	9.96E-02	2020
2025	9.24E+05	2.59E+05	3.39E+04	2.18E+02	8.65E+01	5.46E+01	2.88E+00	4.14E-01	6.71E-01	9.83E-02	2025
2030	9.23E+05	2.55E+05	3.23E+04	2.14E+02	7.85E+01	5.36E+01	2.72E+00	4.06E-01	6.33E-01	9.64E-02	2030
2035	8.98E+05	2.51E+05	2.79E+04	1.95E+02	5.55E+01	4.90E+01	2.22E+00	3.70E-01	5.17E-01	8.79E-02	2035
2040	8.27E+05	2.30E+05	2.39E+04	1.72E+02	4.19E+01	4.32E+01	1.88E+00	3.26E-01	4.37E-01	7.75E-02	2040
2045	7.44E+05	2.04E+05	0.	0.	0.	0.	0.	0.	0.	0.	2045
2050	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2050
2055	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2055
2060	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2060
2065	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2065
2070	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2070
2075	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2075

TABLE 10.C.5 Case 2A - U Only Recycle Pu to SHLW - Reference Treatment
Radioactivity in TRU Waste Containers

(CURIES/CONTAINER)

YEAR	INTERMEDIATE LEVEL CANISTERS FP+AP	.2-1 R/HR ACTINIDES	INTERMEDIATE LEVEL DRUMS(55) FP+AP	.2-1 R/HR ACTINIDES	LOW LEVEL DRUMS(55) FP+AP	0-.2 R/HR ACTINIDES	LOW LEVEL BOXES FP+AP	0-.2 R/HR ACTINIDES	YEAR
1985	1.63E-01	4.07E-02	2.29E-02	5.78E-03	6.35E-01	1.51E+00	1.75E-02	4.36E-03	1985
1990	3.23E-01	4.55E-02	4.53E-02	6.46E-03	6.72E-01	1.69E+00	3.47E-02	4.88E-03	1990
1995	3.72E-01	5.02E-02	5.21E-02	7.13E-03	7.03E-01	1.87E+00	3.98E-02	5.39E-03	1995
2000	3.73E-01	5.07E-02	5.23E-02	7.21E-03	7.11E-01	1.88E+00	4.00E-02	5.44E-03	2000
2005	3.51E-01	5.25E-02	4.92E-02	7.46E-03	7.28E-01	1.95E+00	3.76E-02	5.63E-03	2005
2010	3.86E-01	5.45E-02	5.43E-02	7.78E-03	7.49E-01	2.02E+00	4.14E-02	5.85E-03	2010
2015	3.67E-01	5.32E-02	5.15E-02	7.56E-03	5.61E-01	3.73E+00	3.16E-02	7.07E+01	2015
2020	3.15E-01	5.20E-02	4.42E-02	7.39E-03	5.59E-01	3.61E+00	2.75E-02	6.73E+01	2020
2025	3.58E-01	5.14E-02	5.02E-02	7.29E-03	5.41E-01	3.67E+00	3.08E-02	7.07E+01	2025
2030	3.38E-01	5.04E-02	4.74E-02	7.15E-03	4.80E-01	4.07E+00	2.73E-02	8.88E+01	2030
2035	2.76E-01	4.59E-02	3.87E-02	6.52E-03	3.82E-01	4.65E+00	1.98E-02	1.18E+02	2035
2040	2.33E-01	4.05E-02	3.27E-02	5.75E-03	1.91E-01	6.69E+00	1.01E-02	2.14E+02	2040
2045	0.	0.	0.	0.	2.03E-01	5.52E-02	4.69E+01	1.27E+01	2045
2050	0.	0.	0.	0.	0.	0.	0.	0.	2050
2055	0.	0.	0.	0.	2.03E-01	5.52E-02	4.69E+01	1.27E+01	2055
2060	0.	0.	0.	0.	2.03E-01	5.52E-02	4.69E+01	1.27E+01	2060
2065	0.	0.	0.	0.	2.03E-01	5.52E-02	4.69E+01	1.27E+01	2065
2070	0.	0.	0.	0.	0.	0.	0.	0.	2070
2075	0.	0.	0.	0.	2.03E-01	5.52E-02	4.69E+01	1.27E+01	2075

TABLE 10.C.5 Case 2A - U Only Recycle Pu to SHLW - Reference Treatment
Radioactivity in TRU Waste Containers

	CURIES/CONTAINER						CURIES ANNUAL TOTAL		CUMULATIVE CURIES		
	INTERMEDIATE LEVEL DRUMS(80) 1-10 R/HR		INTERMEDIATE LEVEL DRUMS(80) .2-1 R/HR		LOW LEVEL DRUMS(80) 0-.2 R/HR						
YEAR	FP+AP	ACTINIDES	FP+AP	ACTINIDES	FP+AP	ACTINIDES	FP+AP	ACTINIDES	FP+AP	ACTINIDES	YEAR
1985	0.	0.	0.	0.	0.	0.	1.08E+07	3.17E+05	9.97E+06	3.10E+05	1985
1990	0.	0.	0.	0.	0.	0.	5.52E+08	1.31E+08	1.43E+09	3.77E+08	1990
1995	0.	0.	0.	0.	0.	0.	1.05E+09	2.79E+08	5.44E+09	1.47E+09	1995
2000	0.	0.	0.	0.	0.	0.	1.68E+09	4.51E+08	1.04E+10	2.79E+09	2000
2005	0.	0.	0.	0.	0.	0.	2.31E+09	6.21E+08	1.73E+10	4.62E+09	2005
2010	0.	0.	0.	0.	0.	0.	2.90E+09	8.16E+08	2.61E+10	6.92E+09	2010
2015	0.	0.	0.	0.	0.	4.44E+02	3.11E+09	8.46E+08	3.61E+10	9.42E+09	2015
2020	0.	0.	0.	0.	0.	4.44E+02	2.57E+09	6.98E+08	4.37E+10	1.12E+10	2020
2025	0.	0.	0.	0.	0.	4.44E+02	2.65E+09	7.26E+08	4.93E+10	1.23E+10	2025
2030	0.	0.	0.	0.	0.	4.44E+02	2.48E+09	6.73E+08	5.49E+10	1.34E+10	2030
2035	0.	0.	0.	0.	0.	4.44E+02	1.80E+09	4.97E+08	5.71E+10	1.36E+10	2035
2040	0.	0.	0.	0.	0.	4.44E+02	1.11E+09	3.04E+08	5.63E+10	1.29E+10	2040
2045	0.	0.	0.	0.	2.71E-01	1.98E-01	9.80E+08	2.68E+08	5.42E+10	1.21E+10	2045
2050	0.	0.	0.	0.	0.	0.	0.	0.	4.99E+10	1.05E+10	2050
2055	0.	0.	0.	0.	2.71E-01	1.98E-01	1.79E+03	6.33E+02	4.38E+10	8.81E+09	2055
2060	0.	0.	0.	0.	2.71E-01	1.98E-01	1.79E+03	6.33E+02	3.89E+10	7.60E+09	2060
2065	0.	0.	0.	0.	2.71E-01	1.98E-01	1.70E+03	6.33E+02	3.46E+10	6.56E+09	2065
2070	0.	0.	0.	0.	0.	0.	0.	0.	3.07E+10	5.73E+09	2070
2075	0.	0.	0.	0.	2.71E-01	1.98E-01	5.38E+03	1.90E+03	2.79E+10	5.18E+09	2075

TABLE 10.C.6 Case 2A - U Only Recycle Pu to SHLW - Reference Treatment
Heat Generation Rate in TRU Waste Containers

(WATTS/CONTAINER)

YEAR	SOLID HIGH LEVEL CANISTERS FP+AP	ACTINIDES	HULLS AND ASSEMBLY HARDWARE CANISTERS FP+AP	ACTINIDES	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR FP+AP	ACTINIDES	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR FP+AP	ACTINIDES	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR FP+AP	ACTINIDES	YEAR
1985	0.	0.	1.62E+02	3.03E-01	7.60E-02	4.54E-02	4.85E-03	5.74E-04	1.13E-03	1.35E-04	1985
1990	2.38E+03	4.76E+02	2.29E+02	3.50E-01	4.23E-01	5.34E-02	1.13E-02	6.63E-04	2.64E-03	1.56E-04	1990
1995	2.91E+03	5.04E+02	2.66E+02	4.16E-01	5.03E-01	6.66E-02	1.32E-02	7.88E-04	3.07E-03	1.86E-04	1995
2000	3.04E+03	5.76E+02	2.68E+02	4.19E-01	5.02E-01	6.53E-02	1.32E-02	7.84E-04	3.08E-03	1.85E-04	2000
2005	3.10E+03	5.73E+02	2.69E+02	4.50E-01	4.39E-01	7.48E-02	1.24E-02	8.54E-04	2.87E-03	2.01E-04	2005
2010	3.18E+03	6.40E+02	2.81E+02	5.10E-01	5.03E-01	8.56E-02	1.38E-02	9.66E-04	3.20E-03	2.28E-04	2010
2015	3.35E+03	7.06E+02	2.72E+02	5.30E-01	4.64E-01	9.38E-02	1.30E-02	1.01E-03	3.02E-03	2.37E-04	2015
2020	3.27E+03	7.44E+02	2.51E+02	5.16E-01	3.49E-01	9.41E-02	1.09E-02	9.76E-04	2.53E-03	2.31E-04	2020
2025	3.14E+03	7.49E+02	2.48E+02	5.43E-01	4.48E-01	9.99E-02	1.26E-02	1.03E-03	2.93E-03	2.44E-04	2025
2030	3.16E+03	7.65E+02	2.52E+02	6.46E-01	4.06E-01	1.29E-01	1.18E-02	1.23E-03	2.75E-03	2.90E-04	2030
2035	3.07E+03	9.15E+02	2.27E+02	6.32E-01	2.85E-01	1.32E-01	9.32E-03	1.20E-03	2.17E-03	2.84E-04	2035
2040	2.78E+03	9.13E+02	1.92E+02	6.74E-01	2.14E-01	1.49E-01	7.64E-03	1.28E-03	1.78E-03	3.03E-04	2040
2045	2.47E+03	9.75E+02	0.	0.	0.	0.	0.	0.	0.	0.	2045
2050	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2050
2055	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2055
2060	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2060
2065	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2065
2070	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2070
2075	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2075

TABLE 10.C.6 Case 2A - U Only Recycle Pu to SHLW - Reference Treatment
Heat Generation Rate in TRU Waste Containers

(WATTS/CONTAINER)

YEAR	INTERMEDIATE LEVEL CANISTERS FP+AP	INTERMEDIATE LEVEL CANISTERS .2-1 R/HR ACTINIDES	INTERMEDIATE LEVEL DRUMS(55) FP+AP	INTERMEDIATE LEVEL DRUMS(55) .2-1 R/HR ACTINIDES	LOW LEVEL DRUMS(55) FP+AP	LOW LEVEL DRUMS(55) 0-.2 R/HR ACTINIDES	LOW LEVEL BOXES FP+AP	LOW LEVEL BOXES 0-.2 R/HR ACTINIDES	YEAR
1985	6.03E-04	7.12E-05	8.42E-05	1.01E-05	3.12E-04	1.97E-03	6.45E-05	7.64E-06	1985
1990	1.41E-03	8.22E-05	1.97E-04	1.16E-05	5.19E-04	1.85E-03	1.51E-04	8.82E-06	1990
1995	1.64E-03	9.78E-05	2.29E-04	1.38E-05	5.82E-04	2.31E-03	1.78E-04	1.05E-05	1995
2000	1.64E-03	9.73E-05	2.30E-04	1.31E-03	5.85E-04	2.26E-03	1.76E-04	1.04E-05	2000
2005	1.53E-03	1.06E-04	2.15E-04	1.50E-0	5.61E-04	2.39E-03	1.65E-04	1.14E-05	2005
2010	1.71E-03	1.20E-04	2.39E-04	1.69E-05	6.09E-04	2.97E-03	1.83E-04	1.29E-05	2010
2015	1.61E-03	1.25E-04	2.28E-04	1.78E-05	4.46E-04	7.51E-02	1.39E-04	2.33E+00	2015
2020	1.35E-03	1.21E-04	1.89E-04	1.72E-05	3.98E-04	7.18E-02	1.18E-04	2.22E+00	2020
2025	1.58E-03	1.28E-04	2.19E-04	1.81E-05	4.32E-04	7.53E-02	1.35E-04	2.33E+00	2025
2030	1.48E-03	1.52E-04	2.05E-04	2.15E-05	3.77E-04	9.32E-02	1.18E-04	2.92E+00	2030
2035	1.18E-03	1.49E-04	1.62E-04	2.11E-05	2.72E-04	1.21E-01	8.33E-05	3.90E+00	2035
2040	9.88E-04	1.59E-04	1.33E-04	2.25E-05	1.30E-04	2.05E-01	4.12E-05	7.06E+00	2040
2045	0.	0.	0.	0.	9.16E-04	6.15E-04	2.11E-01	1.40E-01	2045
2050	0.	0.	0.	0.	0.	0.	0.	0.	2050
2055	0.	0.	0.	0.	9.16E-04	6.15E-04	2.11E-01	1.40E-01	2055
2060	0.	0.	0.	0.	9.16E-04	6.15E-04	2.11E-01	1.40E-01	2060
2065	0.	0.	0.	0.	9.16E-04	6.15E-04	2.11E-01	1.40E-01	2065
2070	0.	0.	0.	0.	0.	0.	0.	0.	2070
2075	0.	0.	0.	0.	9.16E-04	6.15E-04	2.11E-01	1.40E-01	2075

TABLE 10.C.6 Case 2A - U Only Recycle Pu to SHLW - Reference Treatment
Heat Generation Rate in TRU Waste Containers

(WATTS/CONTAINER)

YEAR	INTERMEDIATE LEVEL DRUMS(80) FP+AP	1-10 R/HR ACTINIDES	INTERMEDIATE LEVEL DRUMS(80) FP+AP	.2-1 R/HR ACTINIDES	LOW LEVEL DRUMS(80) FP+AP	0-.2 R/HR ACTINIDES	YEAR
1985	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	1995
2000	0.	0.	0.	0.	0.	0.	2000
2005	0.	0.	0.	0.	0.	0.	2005
2010	0.	0.	0.	0.	0.	0.	2010
2015	0.	0.	0.	0.	0.	1.47E+01	2015
2020	0.	0.	0.	0.	0.	1.47E+01	2020
2025	0.	0.	0.	0.	0.	1.47E+01	2025
2030	0.	0.	0.	0.	0.	1.47E+01	2030
2035	0.	0.	0.	0.	0.	1.47E+01	2035
2040	0.	0.	0.	0.	0.	1.47E+01	2040
2045	0.	0.	0.	0.	1.21E-03	2.20E-03	2045
2050	0.	0.	0.	0.	0.	0.	2050
2055	0.	0.	0.	0.	1.21E-03	2.20E-03	2055
2060	0.	0.	0.	0.	1.21E-03	2.20E-03	2060
2065	0.	0.	0.	0.	1.21E-03	2.20E-03	2065
2070	0.	0.	0.	0.	0.	0.	2070
2075	0.	0.	0.	0.	1.21E-03	2.20E-03	2075

TABLE 10.C.7 Case 2A - U Only Recycle Pu to SHLW - Reference Treatment
TRU Waste Containers in Interim Storage

YEAR	SOLID HIGH LEVEL CANISTERS ANNUAL	SOLID HIGH LEVEL CANISTERS CUMULATIVE	HULLS AND ASSEMBLY HARDWARE CANISTERS ANNUAL	HULLS AND ASSEMBLY HARDWARE CANISTERS CUMULATIVE	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR ANNUAL	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR CUMULATIVE	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR ANNUAL	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR CUMULATIVE	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR ANNUAL	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR CUMULATIVE	YEAR
1976	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1976
1977	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1977
1978	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1978
1979	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1979
1980	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1980
1981	0.	0.	1.20E+02	1.20E+02	1.05E+03	1.05E+03	1.00E+00	1.00E+00	4.92E+02	4.92E+02	1981
1982	0.	0.	2.39E+02	3.59E+02	2.10E+03	3.15E+03	2.00E+00	3.00E+00	9.84E+02	1.48E+03	1982
1983	0.	0.	3.59E+02	7.17E+02	3.15E+03	6.29E+03	3.00E+00	6.00E+00	1.48E+03	2.95E+03	1983
1984	0.	0.	3.59E+02	1.08E+03	3.15E+03	9.44E+03	3.00E+00	9.00E+00	1.48E+03	4.43E+03	1984
1985	0.	0.	-4.78E+01	1.03E+03	-4.19E+02	9.02E+03	-4.00E-01	8.60E+00	-1.97E+02	4.23E+03	1985
1986	0.	0.	-4.78E+01	9.80E+02	-4.19E+02	8.60E+03	-4.00E-01	8.20E+00	-1.97E+02	4.04E+03	1986
1987	0.	0.	-7.17E+01	9.08E+02	-6.29E+02	7.97E+03	-6.00E-01	7.60E+00	-2.95E+02	3.74E+03	1987
1988	0.	0.	-9.56E+01	8.13E+02	-8.39E+02	7.13E+03	-8.00E-01	6.80E+00	-3.94E+02	3.35E+03	1988
1989	0.	0.	-9.56E+01	7.17E+02	-8.39E+02	6.29E+03	-8.00E-01	6.00E+00	-3.94E+02	2.95E+03	1989
1990	0.	0.	-1.43E+02	5.74E+02	-1.26E+03	5.03E+03	-1.20E+00	4.80E+00	-5.90E+02	2.36E+03	1990
1991	0.	0.	-1.43E+02	4.30E+02	-1.26E+03	3.77E+03	-1.20E+00	3.60E+00	-5.90E+02	1.77E+03	1991
1992	0.	0.	-1.43E+02	2.87E+02	-1.26E+03	2.52E+03	-1.20E+00	2.40E+00	-5.90E+02	1.18E+03	1992
1993	0.	0.	-1.43E+02	1.43E+02	-1.26E+03	1.26E+03	-1.20E+00	1.20E+00	-5.90E+02	5.90E+02	1993
1994	0.	0.	-1.43E+02	5.23E-12	-1.26E+03	5.20E-11	-1.20E+00	4.09E-14	-5.90E+02	1.76E-11	1994
1995	0.	0.	-5.23E-12	0.	-5.20E-11	0.	-4.09E-14	0.	-1.76E-11	0.	1995
1996	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1996
1997	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1997
1998	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1998
1999	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1999

TABLE 10.C.7 Case 2A - U Only Recycle Pu to SHLW - Reference Treatment
TRU Waste Containers in Interim Storage

YEAR	INTERMEDIATE LEVEL CANISTERS .2-1 R/HR ANNUAL	INTERMEDIATE LEVEL CANISTERS .2-1 R/HR CUMULATIVE	INTERMEDIATE LEVEL DRUMS(55) .2-1 R/HR ANNUAL	INTERMEDIATE LEVEL DRUMS(55) .2-1 R/HR CUMULATIVE	LOW LEVEL DRUMS(55) 0-.2 R/HR ANNUAL	LOW LEVEL DRUMS(55) 0-.2 R/HR CUMULATIVE	LOW LEVEL BOXES 0-.2 R/HR ANNUAL	LOW LEVEL BOXES 0-.2 R/HR CUMULATIVE	YEAR
1976	0.	0.	0.	0.	0.	0.	0.	0.	1976
1977	0.	0.	0.	0.	0.	0.	0.	0.	1977
1978	0.	0.	0.	0.	0.	0.	0.	0.	1978
1979	0.	0.	0.	0.	0.	0.	0.	0.	1979
1980	0.	0.	0.	0.	0.	0.	0.	0.	1980
1981	1.68E+01	1.68E+01	4.83E+02	4.83E+02	6.68E+02	6.68E+02	1.25E+01	1.25E+01	1981
1982	3.35E+01	5.03E+01	9.65E+02	1.45E+03	1.34E+03	2.01E+03	2.50E+01	3.75E+01	1982
1983	5.03E+01	1.01E+02	1.45E+03	2.90E+03	2.01E+03	4.01E+03	3.75E+01	7.50E+01	1983
1984	5.03E+01	1.51E+02	1.45E+03	4.34E+03	2.01E+03	6.02E+03	3.75E+01	1.13E+02	1984
1985	-6.71E+00	1.44E+02	-1.93E+02	4.15E+03	-2.67E+02	5.75E+03	-5.00E+00	1.08E+02	1985
1986	-6.71E+00	1.37E+02	-1.93E+02	3.96E+03	-2.67E+02	5.48E+03	-5.00E+00	1.03E+02	1986
1987	-1.01E+01	1.27E+02	-2.90E+02	3.67E+03	-4.01E+02	5.08E+03	-7.50E+00	9.50E+01	1987
1988	-1.34E+01	1.14E+02	-3.86E+02	3.28E+03	-5.35E+02	4.55E+03	-1.00E+01	8.50E+01	1988
1989	-1.34E+01	1.01E+02	-3.86E+02	2.90E+03	-5.35E+02	4.01E+03	-1.00E+01	7.50E+01	1989
1990	-2.01E+01	8.05E+01	-5.79E+02	2.32E+03	-8.02E+02	3.21E+03	-1.50E+01	6.00E+01	1990
1991	-2.01E+01	6.03E+01	-5.79E+02	1.74E+03	-8.02E+02	2.41E+03	-1.50E+01	4.50E+01	1991
1992	-2.01E+01	4.02E+01	-5.79E+02	1.16E+03	-8.02E+02	1.60E+03	-1.50E+01	3.00E+01	1992
1993	-2.01E+01	2.01E+01	-5.79E+02	5.79E+02	-8.02E+02	8.02E+02	-1.50E+01	1.50E+01	1993
1994	-2.01E+01	6.54E-13	-5.79E+02	2.17E-11	-8.02E+02	4.87E-12	-1.50E+01	4.46E-13	1994
1995	-6.54E-13	0.	-2.17E-11	0.	-4.87E-12	0.	-4.46E-13	0.	1995
1996	0.	0.	0.	0.	0.	0.	0.	0.	1996
1997	0.	0.	0.	0.	0.	0.	0.	0.	1997
1998	0.	0.	0.	0.	0.	0.	0.	0.	1998

TABLE 10.C.8. Case 2A - U Only Recycle Pu to SHLW - Reference Treatment - Revised Solid High Level Waste Container Sizes for Each Geologic Medium

Salt 3.2 kW/Can.		Granite 1.7 kW/Can.		Shale 1.2 kW/Can.		Basalt 1.3 kW/Can.	
Year	Dia.	Year	Dia.	Year	Dia.	Year	Dia.
1986	12.	1986	10.	1986	8.	1986	8.
1987	12.	1987	10.	1987	8.	1987	8.
1988	12.	1988	10.	1988	8.	1988	8.
1989	12.	1989	8.	1989	8.	1989	8.
1990	12.	1990	8.	1990	6.	1990	8.
1991	12.	1991	8.	1991	6.	1991	6.
1992	12.	1992	8.	1992	6.	1992	6.
1993	10.	1993	8.	1993	6.	1993	6.
1994	10.	1994	8.	1994	6.	1994	6.
1995	10.	1995	8.	1995	6.	1995	6.
1996	10.	1996	8.	1996	6.	1996	6.
1997	10.	1997	8.	1997	6.	1997	6.
1998	10.	1998	8.	1998	6.	1998	6.
1999	10.	1999	8.	1999	6.	1999	6.
2000	10.	2000	8.	2000	6.	2000	6.
2001	10.	2001	8.	2001	6.	2001	6.
2002	10.	2002	8.	2002	6.	2002	6.
2003	10.	2003	8.	2003	6.	2003	6.
2004	10.	2004	8.	2004	6.	2004	6.
2005	10.	2005	8.	2005	6.	2005	6.
2006	10.	2006	8.	2006	6.	2006	6.
2007	10.	2007	8.	2007	6.	2007	6.
2008	10.	2008	8.	2008	6.	2008	6.
2009	10.	2009	8.	2009	6.	2009	6.
2010	10.	2010	8.	2010	6.	2010	6.
2011	10.	2011	6.	2011	6.	2011	6.
2012	10.	2012	6.	2012	6.	2012	6.
2013	10.	2013	6.	2013	6.	2013	6.
2014	10.	2014	6.	2014	6.	2014	6.
2015	10.	2015	6.	2015	6.	2015	6.
2016	10.	2016	6.	2016	6.	2016	6.
2017	10.	2017	6.	2017	6.	2017	6.
2018	10.	2018	6.	2018	6.	2018	6.
2019	10.	2019	6.	2019	6.	2019	6.
2020	10.	2020	6.	2020	6.	2020	6.
2021	10.	2021	6.	2021	6.	2021	6.
2022	10.	2022	6.	2022	6.	2022	6.
2023	10.	2023	6.	2023	6.	2023	6.
2024	10.	2024	6.	2024	6.	2024	6.
2025	10.	2025	6.	2025	6.	2025	6.
2026	10.	2026	6.	2026	6.	2026	6.
2027	10.	2027	6.	2027	6.	2027	6.
2028	10.	2028	6.	2028	6.	2028	6.
2029	10.	2029	6.	2029	6.	2029	6.
2030	10.	2030	6.	2030	6.	2030	6.
2031	10.	2031	6.	2031	6.	2031	6.
2032	10.	2032	6.	2032	6.	2032	6.
2033	10.	2033	6.	2033	6.	2033	6.
2034	10.	2034	6.	2034	6.	2034	6.
2035	10.	2035	6.	2035	6.	2035	6.
2036	10.	2036	6.	2036	6.	2036	6.
2037	10.	2037	6.	2037	6.	2037	6.
2038	10.	2038	6.	2038	6.	2038	6.
2039	10.	2039	8.	2039	6.	2039	6.
2040	10.	2040	8.	2040	6.	2040	6.
2041	10.	2041	8.	2041	6.	2041	6.
2042	10.	2042	8.	2042	6.	2042	6.
2043	10.	2043	8.	2043	6.	2043	6.
2044	10.	2044	8.	2044	6.	2044	6.
2045	10.	2045	8.	2045	6.	2045	6.
2046	10.	2046	8.	2046	6.	2046	6.
2047	12.	2047	8.	2047	6.	2047	6.
2048	12.	2048	8.	2048	6.	2048	6.
2049	12.	2049	8.	2049	6.	2049	8.

TABLE 10.C.9 Case 2A - U Only Recycle Pu to SHLW - Reference Treatment-
TRU Waste Containers Sent to Repository
Revised Solid High Level Waste Containers

	Salt 3.2 kW/Can.		Granite 1.7 kW/Can.		Shale 1.2 kW/Can.		Basalt 1.3 kW/Can.		
	SOLID HIGH LEVEL WASTE		SOLID HIGH LEVEL WASTE		SOLID HIGH LEVEL WASTE		SOLID HIGH LEVEL WASTE		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	1985
1990	7.14E+02	3.20E+03	1.61E+03	4.14E+03	2.86E+03	6.19E+03	1.61E+03	4.94E+03	1990
1995	1.66E+03	9.26E+03	2.59E+03	1.66E+04	4.61E+03	2.84E+04	4.61E+03	2.71E+04	1995
2000	2.61E+03	1.95E+04	4.03E+03	3.26E+04	7.25E+03	5.67E+04	7.25E+03	5.55E+04	2000
2005	3.56E+03	3.44E+04	5.54E+03	5.59E+04	9.88E+03	9.82E+04	9.88E+03	9.70E+04	2005
2010	4.51E+03	5.41E+04	7.04E+03	8.67E+04	1.25E+04	1.53E+05	1.25E+04	1.52E+05	2010
2015	4.51E+03	7.66E+04	1.25E+04	1.49E+05	1.25E+04	2.16E+05	1.25E+04	2.14E+05	2015
2020	3.80E+03	9.75E+04	1.05E+04	2.07E+05	1.05E+04	2.74E+05	1.05E+04	2.72E+05	2020
2025	4.03E+03	1.17E+05	1.12E+04	2.61E+05	1.12E+04	3.27E+05	1.12E+04	3.26E+05	2025
2030	3.80E+03	1.37E+05	1.05E+04	3.17E+05	1.05E+04	3.84E+05	1.05E+04	3.82E+05	2030
2035	2.85E+03	1.53E+05	7.91E+03	3.62E+05	7.91E+03	4.28E+05	7.91E+03	4.27E+05	2035
2040	1.90E+03	1.65E+05	2.97E+03	3.89E+05	5.27E+03	4.60E+05	5.27E+03	4.59E+05	2040
2045	1.90E+03	1.74E+05	2.97E+03	4.04E+05	5.27E+03	4.86E+05	5.27E+03	4.85E+05	2045
2050	0.	1.77E+05	0.	4.10E+05	0.	4.97E+05	0.	4.96E+05	2050
2055	0.	1.77E+05	0.	4.10E+05	0.	4.97E+05	0.	4.96E+05	2055
2060	0.	1.77E+05	0.	4.10E+05	0.	4.97E+05	0.	4.96E+05	2060
2065	0.	1.77E+05	0.	4.10E+05	0.	4.97E+05	0.	4.96E+05	2065
2070	0.	1.77E+05	0.	4.10E+05	0.	4.97E+05	0.	4.96E+05	2070
2075	0.	1.77E+05	0.	4.10E+05	0.	4.97E+05	0.	4.96E+05	2075

TABLE 10.C.10. Case 2A - U Only Recycle Pu to SHLW - Reference Treatment
Radioactivity in TRU Waste Containers, Curies/Container
Revised Solid High Level Waste Containers

YEAR	Salt 3.2 kW/Can. SOLID HIGH LEVEL CANISTERS FP+AP	Salt 3.2 kW/Can. ACTINIDES	Granite 1.7 kW/Can. SOLID HIGH LEVEL CANISTERS FP+AP	Granite 1.7 kW/Can. ACTINIDES	Shale 1.2 kW/Can. SOLID HIGH LEVEL CANISTERS FP+AP	Shale 1.2 kW/Can. ACTINIDES	Basalt 1.3 kW/Can. SOLID HIGH LEVEL CANISTERS FP+AP	Basalt 1.3 kW/Can. ACTINIDES	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	1985
1990	7.31E+05	2.10E+05	3.29E+05	9.34E+04	1.83E+05	5.25E+04	3.29E+05	9.34E+04	1990
1995	6.01E+05	1.68E+05	3.85E+05	1.07E+05	2.16E+05	6.03E+04	2.16E+05	6.03E+04	1995
2000	6.14E+05	1.72E+05	3.96E+05	1.10E+05	2.23E+05	6.20E+04	2.23E+05	6.20E+04	2000
2005	6.26E+05	1.74E+05	4.00E+05	1.11E+05	2.25E+05	6.27E+04	2.25E+05	6.27E+04	2005
2010	6.48E+05	1.81E+05	4.12E+05	1.16E+05	2.32E+05	6.50E+04	2.32E+05	6.50E+04	2010
2015	6.74E+05	1.87E+05	2.43E+05	6.75E+04	2.43E+05	6.75E+04	2.43E+05	6.75E+04	2015
2020	6.60E+05	1.83E+05	2.38E+05	6.60E+04	2.38E+05	6.60E+04	2.38E+05	6.60E+04	2020
2025	6.42E+05	1.80E+05	2.31E+05	6.47E+04	2.31E+05	6.47E+04	2.31E+05	6.47E+04	2025
2030	6.41E+05	1.77E+05	2.31E+05	6.37E+04	2.31E+05	6.37E+04	2.31E+05	6.37E+04	2030
2035	6.24E+05	1.74E+05	2.25E+05	6.28E+04	2.25E+05	6.28E+04	2.25E+05	6.28E+04	2035
2040	5.74E+05	1.60E+05	3.66E+05	1.02E+05	2.07E+05	5.74E+04	2.07E+05	5.74E+04	2040
2045	5.17E+05	1.41E+05	3.31E+05	9.05E+04	1.86E+05	5.09E+04	1.86E+05	5.09E+04	2045
2050	0.	0.	0.	0.	0.	0.	0.	0.	2050
2055	0.	0.	0.	0.	0.	0.	0.	0.	2055
2060	0.	0.	0.	0.	0.	0.	0.	0.	2060
2065	0.	0.	0.	0.	0.	0.	0.	0.	2065
2070	0.	0.	0.	0.	0.	0.	0.	0.	2070
2075	0.	0.	0.	0.	0.	0.	0.	0.	2075

TABLE 10.C.11. Case 2A - U Only Recycle Pu to SHLW - Reference Treatment
Heat Generation Rate in TRU Waste Containers, Watts/Container
Revised Solid High Level Waste Containers

	Salt 3.2 kW/Can.		Granite 1.7 kW/Can.		Shale 1.2 kW/Can.		Basalt 1.3 kW/Can.		
	SOLID HIGH LEVEL CANISTERS		SOLID HIGH LEVEL CANISTERS		SOLID HIGH LEVEL CANISTERS		SOLID HIGH LEVEL CANISTERS		
YEAR	FP+AP	ACTINIDES	FP+AP	ACTINIDES	FP+AP	ACTINIDES	FP+AP	ACTINIDES	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	1985
1990	2.38E+03	4.76E+02	1.06E+03	2.12E+02	5.94E+02	1.19E+02	1.06E+03	2.12E+02	1990
1995	2.04E+03	5.50E+02	1.32E+03	2.24E+02	7.43E+02	1.26E+02	7.43E+02	1.26E+02	1995
2000	2.13E+03	4.00E+02	1.36E+03	2.56E+02	7.66E+02	1.44E+02	7.66E+02	1.44E+02	2000
2005	2.15E+03	3.98E+02	1.38E+03	2.55E+02	7.78E+02	1.43E+02	7.78E+02	1.43E+02	2005
2010	2.21E+03	4.45E+02	1.41E+03	2.85E+02	7.99E+02	1.60E+02	7.99E+02	1.60E+02	2010
2015	2.34E+03	4.91E+02	5.38E+02	1.77E+02	8.38E+02	1.77E+02	8.38E+02	1.77E+02	2015
2020	2.27E+03	5.17E+02	8.16E+02	1.86E+02	8.16E+02	1.86E+02	8.16E+02	1.86E+02	2020
2025	2.18E+03	5.20E+02	7.89E+02	1.87E+02	7.89E+02	1.87E+02	7.89E+02	1.87E+02	2025
2030	2.20E+03	5.31E+02	7.91E+02	1.91E+02	7.91E+02	1.91E+02	7.91E+02	1.91E+02	2030
2035	2.13E+03	6.36E+02	7.67E+02	2.29E+02	7.67E+02	2.29E+02	7.67E+02	2.29E+02	2035
2040	1.93E+03	6.34E+02	1.24E+03	4.06E+02	6.99E+02	2.28E+02	6.99E+02	2.28E+02	2040
2045	1.72E+03	6.77E+02	1.10E+03	4.33E+02	6.18E+02	2.44E+02	6.18E+02	2.44E+02	2045
2050	0.	0.	0.	0.	0.	0.	0.	0.	2050
2055	0.	0.	0.	0.	0.	0.	0.	0.	2055
2060	0.	0.	0.	0.	0.	0.	0.	0.	2060
2065	0.	0.	0.	0.	0.	0.	0.	0.	2065
2070	0.	0.	0.	0.	0.	0.	0.	0.	2070
2075	0.	0.	0.	0.	0.	0.	0.	0.	2075

TABLE 10.C.12 Case 2B - U Only Recycle - Stored Pu - Reference Treatment
TRU Waste Containers Sent to Repository

YEAR	SOLID HIGH LEVEL CANISTERS ANNUAL	SOLID HIGH LEVEL CANISTERS CUMULATIVE	HULLS AND ASSEMBLY HARDWARE CANISTERS ANNUAL	HULLS AND ASSEMBLY HARDWARE CANISTERS CUMULATIVE	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR ANNUAL	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR CUMULATIVE	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR ANNUAL	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR CUMULATIVE	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR ANNUAL	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR CUMULATIVE	YEAR
1985	0.	0.	5.66E+02	5.66E+02	5.01E+03	5.01E+03	4.73E+00	4.73E+00	2.33E+03	2.33E+03	1985
1990	7.14E+02	2.20E+03	9.80E+02	5.04E+03	8.68E+03	4.47E+04	8.20E+00	4.22E+01	4.04E+03	2.08E+04	1990
1995	1.19E+03	7.74E+03	1.31E+03	1.04E+04	1.16E+04	9.53E+04	1.10E+01	9.00E+01	5.41E+03	4.43E+04	1995
2000	1.81E+03	1.48E+04	1.79E+03	1.83E+04	1.59E+04	1.62E+05	1.50E+01	1.53E+02	7.38E+03	7.53E+04	2000
2005	2.47E+03	2.52E+04	2.27E+03	2.82E+04	2.01E+04	2.50E+05	1.90E+01	2.36E+02	9.35E+03	1.16E+05	2005
2010	3.13E+03	3.89E+04	2.27E+03	3.96E+04	2.01E+04	3.50E+05	1.90E+01	3.31E+02	9.35E+03	1.63E+05	2010
2015	3.13E+03	5.45E+04	1.91E+03	5.01E+04	1.69E+04	4.43E+05	1.60E+01	4.19E+02	7.87E+03	2.06E+05	2015
2020	2.64E+03	6.90E+04	2.03E+03	5.98E+04	1.80E+04	5.29E+05	1.70E+01	5.00E+02	8.37E+03	2.46E+05	2020
2025	2.80E+03	8.24E+04	1.91E+03	7.00E+04	1.69E+04	6.20E+05	1.60E+01	5.86E+02	7.87E+03	2.88E+05	2025
2030	2.64E+03	9.65E+04	1.43E+03	7.82E+04	1.27E+04	6.92E+05	1.20E+01	6.54E+02	5.90E+03	3.22E+05	2030
2035	1.98E+03	1.08E+05	9.56E+02	8.39E+04	8.47E+05	7.43E+05	8.00E+00	7.02E+02	3.94E+03	3.45E+05	2035
2040	1.32E+03	1.16E+05	9.56E+02	8.87E+04	8.47E+03	7.85E+05	8.00E+00	7.42E+02	3.94E+03	3.65E+05	2040
2045	1.32E+03	1.22E+05	0.	9.07E+04	0.	8.03E+05	0.	7.59E+02	0.	3.73E+05	2045
2050	0.	1.25E+05	0.	9.07E+04	0.	8.03E+05	0.	7.59E+02	0.	3.73E+05	2050
2055	0.	1.25E+05	0.	9.07E+04	0.	8.03E+05	0.	7.59E+02	0.	3.73E+05	2055
2060	0.	1.25E+05	0.	9.07E+04	0.	8.03E+05	0.	7.59E+02	0.	3.73E+05	2060
2065	0.	1.25E+05	0.	9.07E+04	0.	8.03E+05	0.	7.59E+02	0.	3.73E+05	2065
2070	0.	1.25E+05	0.	9.07E+04	0.	8.03E+05	0.	7.59E+02	0.	3.73E+05	2070
2075	0.	1.25E+05	0.	9.07E+04	0.	8.03E+05	0.	7.59E+02	0.	3.73E+05	2075

TABLE 10.C.12 Case 2B - U Only Recycle - Stored Pu - Reference Treatment
TRU Waste Containers Sent to Repository

YEAR	INTERMEDIATE LEVEL CANISTERS .2-1 R/HR ANNUAL	CUMULATIVE	INTERMEDIATE LEVEL DRUMS(55) .2-1 R/HR ANNUAL	CUMULATIVE	LOW LEVEL DRUMS(55) 0-.2 R/HR ANNUAL	CUMULATIVE	LOW LEVEL BOXES 0-.2 R/HR ANNUAL	CUMULATIVE	YEAR
1985	7.94E+01	7.94E+01	2.29E+03	2.29E+03	3.25E+03	3.25E+03	7.10E+01	7.10E+01	1985
1990	1.37E+02	7.07E+02	3.97E+03	2.04E+04	5.63E+03	2.90E+04	1.23E+02	6.33E+02	1990
1995	1.84E+02	1.51E+03	5.32E+03	4.36E+04	7.59E+03	6.18E+04	1.65E+02	1.35E+03	1995
2000	2.51E+02	2.56E+03	7.26E+03	7.41E+04	1.03E+04	1.05E+05	2.25E+02	2.29E+03	2000
2005	3.18E+02	3.96E+03	9.20E+03	1.14E+05	1.30E+04	1.62E+05	2.85E+02	3.54E+03	2005
2010	3.18E+02	5.55E+03	9.20E+03	1.60E+05	1.30E+04	2.27E+05	2.85E+02	4.96E+03	2010
2015	2.68E+02	7.02E+03	7.74E+03	2.03E+05	1.42E+04	3.00E+05	2.80E+02	6.48E+03	2015
2020	2.85E+02	8.38E+03	8.23E+03	2.42E+05	1.49E+04	3.69E+05	3.04E+02	7.89E+03	2020
2025	2.68E+02	9.82E+03	7.74E+03	2.80E+05	1.42E+04	4.37E+05	2.89E+02	9.33E+03	2025
2030	2.01E+02	1.10E+04	5.81E+03	3.17E+05	1.14E+04	4.97E+05	2.29E+02	1.05E+04	2030
2035	1.34E+02	1.18E+04	3.87E+03	3.40E+05	8.68E+03	5.42E+05	1.69E+02	1.15E+04	2035
2040	1.34E+02	[illegible]	3.87E+03	3.59E+05	1.51E+04	6.05E+05	2.67E+02	1.26E+04	2040
2045	0.	1.27E+04	0.	3.67E+05	3.79E+03	6.31E+05	1.50E+01	1.29E+04	2045
2050	0.	1.27E+04	0.	3.67E+05	0.	6.39E+05	0.	1.29E+04	2050
2055	0.	1.27E+04	0.	3.67E+05	3.79E+03	6.50E+05	1.50E+01	1.30E+04	2055
2060	0.	1.27E+04	0.	3.67E+05	3.79E+03	6.62E+05	1.50E+01	1.30E+04	2060
2065	0.	1.27E+04	0.	3.67E+05	3.79E+03	6.73E+05	1.50E+01	1.31E+04	2065
2070	0.	1.27E+04	0.	3.67E+05	0.	6.73E+05	0.	1.31E+04	2070
2075	0.	1.27E+04	0.	3.67E+05	1.14E+04	6.96E+05	4.50E+01	1.32E+04	2075

TABLE 10.C.12 Case 2B - U Only Recycle - Stored Pu - Reference Treatment
TRU Waste Containers Sent to Repository

YEAR	INTERMEDIATE LEVEL DRUMS(80) 1-10 R/HR ANNUAL	INTERMEDIATE LEVEL DRUMS(80) 1-10 R/HR CUMULATIVE	INTERMEDIATE LEVEL DRUMS(80) .2-1 R/HR ANNUAL	INTERMEDIATE LEVEL DRUMS(80) .2-1 R/HR CUMULATIVE	LOW LEVEL DRUMS(80) 0-.2 R/HR ANNUAL	LOW LEVEL DRUMS(80) 0-.2 R/HR CUMULATIVE	YEAR
1985	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	1995
2000	0.	0.	0.	0.	0.	0.	2000
2005	0.	0.	0.	0.	0.	0.	2005
2010	0.	0.	0.	0.	0.	0.	2010
2015	0.	0.	0.	0.	7.20E+01	2.88E+02	2015
2020	0.	0.	0.	0.	7.20E+01	5.76E+02	2020
2025	0.	0.	0.	0.	7.20E+01	7.92E+02	2025
2030	0.	0.	0.	0.	7.20E+01	1.08E+03	2030
2035	0.	0.	0.	0.	7.20E+01	1.37E+03	2035
2040	0.	0.	0.	0.	2.16E+02	2.16E+03	2040
2045	0.	0.	0.	0.	1.18E+03	6.88E+03	2045
2050	0.	0.	0.	0.	0.	9.24E+03	2050
2055	0.	0.	0.	0.	1.18E+03	1.28E+04	2055
2060	0.	0.	0.	0.	1.18E+03	1.63E+04	2060
2065	0.	0.	0.	0.	1.18E+03	1.99E+04	2065
2070	0.	0.	0.	0.	0.	1.99E+04	2070
2075	0.	0.	0.	0.	3.54E+03	2.69E+04	2075

TABLE 10.C.13 Case 2B - U Only Recycle - Stored Pu - Reference Treatment
Radioactivity in TRU Waste Containers

(CURIES/CONTAINER)

YEAR	SOLID HIGH LEVEL CANISTERS FP+AP	SOLID HIGH LEVEL CANISTERS ACTINIDES	HULLS AND ASSEMBLY HARDWARE CANISTERS FP+AP	HULLS AND ASSEMBLY HARDWARE CANISTERS ACTINIDES	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR FP+AP	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR ACTINIDES	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR FP+AP	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR ACTINIDES	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR FP+AP	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR ACTINIDES	YEAR
1985	0.	0.	1.90E+04	1.73E+02	1.56E+01	1.37E+02	1.31E+00	3.28E-01	3.06E-01	7.79E-02	1985
1990	7.31E+05	6.11E+03	3.04E+04	1.93E+02	8.08E+01	1.53E+02	2.60E+00	3.66E-01	6.06E-01	8.70E-02	1990
1995	8.66E+05	5.47E+03	3.52E+04	2.13E+02	9.59E+01	1.69E+02	2.99E+00	4.04E-01	6.97E-01	9.61E-02	1995
2000	8.91E+05	5.63E+03	3.53E+04	2.16E+02	9.57E+01	1.71E+02	3.00E+00	4.09E-01	6.99E-01	9.71E-02	2000
2005	9.01E+05	5.76E+03	3.44E+04	2.23E+02	8.39E+01	1.77E+02	2.83E+00	4.23E-01	6.58E-01	1.01E-01	2005
2010	9.28E+05	6.20E+03	3.62E+04	2.32E+02	9.60E+01	1.83E+02	3.11E+00	4.39E-01	7.24E-01	1.04E-01	2010
2015	9.72E+05	6.40E+03	3.49E+04	2.26E+02	8.86E+01	1.79E+02	2.96E+00	4.29E-01	6.89E-01	1.02E-01	2015
2020	9.50E+05	6.21E+03	3.17E+04	2.21E+02	6.70E+01	1.75E+02	2.54E+00	4.19E-01	5.91E-01	9.96E-02	2020
2025	9.24E+05	6.32E+03	3.39E+04	2.18E+02	8.57E+01	1.73E+02	2.88E+00	4.14E-01	6.71E-01	9.83E-02	2025
2030	9.23E+05	5.89E+03	3.23E+04	2.10E+02	7.77E+01	1.70E+02	2.72E+00	4.06E-01	6.33E-01	9.64E-02	2030
2035	8.98E+05	5.60E+03	2.79E+04	1.95E+02	5.50E+01	1.55E+02	2.22E+00	3.70E-01	5.17E-01	8.79E-02	2035
2040	8.27E+05	5.12E+03	2.39E+04	1.72E+02	4.15E+01	1.37E+02	1.88E+00	3.26E-01	4.37E-01	7.75E-02	2040
2045	7.44E+05	4.29E+03	0.	0.	0.	0.	0.	0.	0.	0.	2045
2050	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2050
2055	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2055
2060	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2060
2065	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2065
2070	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2070
2075	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2075

TABLE 10.C.13 Case 2B - U Only Recycle - Stored Pu - Reference Treatment
Radioactivity in TRU Waste Containers

(CURIES/CONTAINER)

YEAR	INTERMEDIATE LEVEL CANISTERS FP+AP	.2-1 R/HR ACTINIDES	INTERMEDIATE LEVEL DRUMS(55) FP+AP	.2-1 R/HR ACTINIDES	LOW LEVEL DRUMS(55) FP+AP	0-.2 R/HR ACTINIDES	LOW LEVEL BOXES FP+AP	0-.2 R/HR ACTINIDES	YEAR
1985	1.63E-01	4.07E-02	2.28E-02	3.40E+00	6.18E-01	4.93E+00	1.46E-02	1.34E+01	1985
1990	3.23E-01	4.55E--	4.52E-02	3.80E+00	6.55E-01	5.52E+00	2.89E-02	1.50E+01	1990
1995	3.79E-01	5.02E-02	5.20E-02	4.20E+00	6.85E-01	6.09E+00	3.32E-02	1.66E+01	1995
2000	3.73E-01	5.07E-02	5.21E-02	4.25E+00	6.93E-01	6.16E+00	3.33E-02	1.67E+01	2000
2005	3.51E-01	5.25E-02	4.91E-02	4.40E+00	7.09E-01	6.37E+00	3.14E-02	1.73E+01	2005
2010	3.84E-01	5.45E-02	5.40E-02	4.56E+00	7.30E-01	6.61E+00	3.45E-02	1.80E+01	2010
2015	3.67E-01	5.32E-02	5.14E-02	4.46E+00	5.49E-01	7.17E+00	2.73E-02	7.55E+01	2015
2020	3.13E-01	5.20E-02	4.41E-02	4.36E+00	5.43E-01	7.02E+00	2.36E-02	7.23E+01	2020
2025	3.58E-01	5.14E-02	5.00E-02	4.30E+00	5.30E-01	6.99E+00	2.66E-02	7.50E+01	2025
2030	3.38E-01	5.04E-02	4.73E-02	4.22E+00	4.71E-01	7.09E+00	2.37E-02	8.99E+01	2030
2035	2.74E-01	4.59E-02	3.86E-02	3.86E+00	3.76E-01	7.06E+00	1.75E-02	1.15E+02	2035
2040	2.33E-01	4.05E-02	3.26E-02	3.41E+00	1.89E-01	7.89E+00	9.36E-03	2.04E+02	2040
2045	0.	0.	0.	0.	2.03E-01	5.52E-02	4.69E+01	1.27E+01	2045
2050	0.	0.	0.	0.	0.	0.	0.	0.	2050
2055	0.	0.	0.	0.	2.03E-01	5.52E-02	4.69E+01	1.27E+01	2055
2060	0.	0.	0.	0.	2.03E-01	5.52E-02	4.69E+01	1.27E+01	2060
2065	0.	0.	0.	0.	2.03E-01	5.52E-02	4.69E+01	1.27E+01	2065
2070	0.	0.	0.	0.	0.	0.	0.	0.	2070
2075	0.	0.	0.	0.	2.03E-01	5.52E-02	4.69E+01	1.27E+01	2075

TABLE 10.C.13 Case 2B - U Only Recycle - Stored Pu - Reference Treatment - Radioactivity in TRU-Waste Containers

YEAR	CURIES/CONTAINER: INTERMEDIATE LEVEL DRUMS(80) 1-10 R/HR FP+AP	CURIES/CONTAINER: INTERMEDIATE LEVEL DRUMS(80) 1-10 R/HR ACTINIDES	CURIES/CONTAINER: INTERMEDIATE LEVEL DRUMS(80) .2-1 R/HR FP+AP	CURIES/CONTAINER: INTERMEDIATE LEVEL DRUMS(80) .2-1 R/HR ACTINIDES	CURIES/CONTAINER: LOW LEVEL DRUMS(80) 0-.2 R/HR FP+AP	CURIES/CONTAINER: LOW LEVEL DRUMS(80) 0-.2 R/HR ACTINIDES	CURIES ANNUAL TOTAL FP+AP	CURIES ANNUAL TOTAL ACTINIDES	CUMULATIVE CURIES FP+AP	CUMULATIVE CURIES ACTINIDES	YEAR
1985	0.	0.	0.	0.	0.	0.	1.08E+07	8.08E+03	9.07E+06	7.90E+05	1985
1990	0.	0.	0.	0.	0.	0.	5.52E+08	5.92E+06	1.43E+09	1.88E+07	1990
1995	0.	0.	0.	0.	0.	0.	1.05E+09	8.63E+06	5.44E+09	5.43E+07	1995
2000	0.	0.	0.	0.	0.	0.	1.68E+09	1.34E+07	1.04E+10	9.73E+07	2000
2005	0.	0.	0.	0.	0.	0.	2.31E+09	1.84E+07	1.73E+10	1.56E+08	2005
2010	0.	0.	0.	0.	0.	0.	2.99E+09	2.37E+07	2.61E+10	2.32E+08	2010
2015	0.	0.	0.	0.	0.	4.44E+02	3.11E+09	2.37E+07	3.61E+10	3.14E+08	2015
2020	0.	0.	0.	0.	0.	4.44E+02	2.57E+09	2.02E+07	4.37E+10	3.77E+08	2020
2025	0.	0.	0.	0.	0.	4.44E+02	2.65E+09	2.12E+07	4.93E+10	4.28E+08	2025
2030	0.	0.	0.	0.	0.	4.44E+02	2.48E+09	1.81E+07	5.49E+10	4.72E+08	2030
2035	0.	0.	0.	0.	0.	4.44E+02	1.80E+09	1.27E+07	5.71E+10	4.88E+08	2035
2040	0.	0.	0.	0.	0.	4.44E+02	1.11E+09	8.36E+06	5.63E+10	4.83E+08	2040
2045	0.	0.	0.	0.	2.71E-01	1.98E-01	9.80E+08	5.66E+06	5.42E+10	4.67E+08	2045
2050	0.	0.	0.	0.	0.	0.	0.	0.	4.95E+10	4.34E+08	2050
2055	0.	0.	0.	0.	2.71E-01	1.98E-01	1.79E+03	6.33E+02	4.38E+10	3.96E+08	2055
2060	0.	0.	0.	0.	2.7[illegible]-01	1.98E-01	1.79E+03	6.33E+02	3.89E+10	3.69E+08	2060
2065	0.	0.	0.	0.	2.71E-01	1.98E-01	1.79E+03	6.33E+02	3.46E+10	3.44E+08	2065
2070	0.	0.	0.	0.	0.	0.	0.	0.	3.07E+10	3.24E+08	2070
2075	0.	0.	0.	0.	2.71E-01	1.98E-01	5.38E+03	1.90E+03	2.79E+10	3.11E+08	2075

TABLE 10.C.14 Case 2B - U Only Recycle - Stored Pu - Reference Treatment
Heat Generation Rate in TRU Waste Containers

(WATTS/CONTAINER)

YEAR	SOLID HIGH LEVEL CANISTERS FP+AP	SOLID HIGH LEVEL CANISTERS ACTINIDES	HULLS AND ASSEMBLY HARDWARE CANISTERS FP+AP	HULLS AND ASSEMBLY HARDWARE CANISTERS ACTINIDES	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR FP+AP	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR ACTINIDES	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR FP+AP	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR ACTINIDES	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR FP+AP	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR ACTINIDES	YEAR
1985	0.	0.	1.62E+02	3.03E-01	7.53E-02	1.42E-01	4.85E-03	5.74E-04	1.13E-03	1.35E-04	1985
1990	2.38E+03	1.72E+02	2.29E+02	3.50E-01	4.10E-01	1.66E-01	1.13E-02	6.63E-04	2.64E-03	1.56E-04	1990
1995	2.97E+03	1.46E+02	2.66E+02	4.16E-01	4.98E-01	2.08E-01	1.32E-02	7.88E-04	3.07E-03	1.86E-04	1995
2000	3.04E+03	1.51E+02	2.68E+02	4.14E-01	4.97E-01	2.04E-01	1.32E-02	7.84E-04	3.08E-03	1.85E-04	2000
2005	3.10E+03	1.55E+02	2.68E+02	4.30E-01	4.35E-01	2.34E-01	1.24E-02	8.54E-04	2.87E-03	2.01E-04	2005
2010	3.18E+03	1.68E+02	2.81E+02	5.10E-01	4.98E-01	2.68E-01	1.38E-02	9.66E-04	3.20E-03	2.28E-04	2010
2015	3.35E+03	1.74E+02	2.72E+02	5.30E-01	4.59E-01	2.94E-01	1.30E-02	1.01E-03	3.02E-03	2.37E-04	2015
2020	3.27E+03	1.68E+02	2.51E+02	5.16E-01	3.46E-01	2.95E-01	1.09E-02	9.78E-04	2.53E-03	2.31E-04	2020
2025	3.14E+03	1.73E+02	2.64E+02	5.45E-01	4.44E-01	3.13E-01	1.26E-02	1.03E-03	2.93E-03	2.44E-04	2025
2030	3.14E+03	1.59E+02	2.52E+02	6.46E-01	4.02E-01	4.07E-01	1.18E-02	1.23E-03	2.75E-03	2.90E-04	2030
2035	3.07E+03	1.51E+02	2.22E+02	6.38E-01	2.83E-01	4.17E-01	9.32E-03	1.20E-03	2.17E-03	2.84E-04	2035
2040	2.78E+03	1.38E+02	1.02E+02	6.74E-01	2.12E-01	4.71E-01	7.64E-03	1.28E-03	1.78E-03	3.03E-04	2040
2045	2.47E+03	1.14E+02	0.	0.	0.	0.	0.	0.	0.	0.	2045
2050	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2050
2055	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2055
2060	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2060
2065	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2065
2070	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2070
2075	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2075

TABLE 10.C.14 Case 2B - U Only Recycle - Stored Pu - Reference Treatment
Heat Generation Rate in TRU Waste Containers

(WATTS/CONTAINER)

YEAR	INTERMEDIATE LEVEL CANISTERS FP+AP	.2-1 R/HR ACTINIDES	INTERMEDIATE LEVEL DRUMS(55) FP+AP	.2-1 R/HR ACTINIDES	LOW LEVEL DRUMS(55) FP+AP	0-.2 R/HR ACTINIDES	LOW LEVEL BOXES FP+AP	0-.2 R/HR ACTINIDES	YEAR
1985	6.02E-04	7.12E-05	8.40E-05	3.50E-03	3.04E-04	5.09E-03	5.38E-05	1.38E-02	1985
1990	1.41E-03	8.22E-05	1.96E-04	4.12E-03	5.06E-04	5.99E-03	1.26E-04	1.62E-02	1990
1995	1.64E-03	9.78E-05	2.29E-04	5.16E-03	5.67E-04	7.49E-03	1.47E-04	2.03E-02	1995
2000	1.64E-03	9.73E-05	2.30E-04	5.05E-03	5.70E-04	7.34E-03	1.47E-04	1.99E-02	2000
2005	1.53E-03	1.06E-04	2.14E-04	5.80E-03	5.47E-04	8.43E-03	1.37E-04	2.29E-02	2005
2010	1.71E-03	1.20E-04	2.38E-04	6.65E-03	5.93E-04	9.65E-03	1.53E-04	2.62E-02	2010
2015	1.61E-03	1.25E-04	2.25E-04	7.30E-03	4.37E-04	7.94E-02	1.20E-04	2.03E+00	2015
2020	1.35E-03	1.21E-04	1.88E-04	7.33E-03	3.90E-04	7.62E-02	1.01E-04	1.94E+00	2020
2025	1.56E-03	1.29E-04	2.18E-04	7.78E-03	4.23E-04	7.99E-02	1.16E-04	2.04E+00	2025
2030	1.46E-03	1.52E-04	2.08E-04	1.01E-02	3.70E-04	9.88E-02	1.03E-04	2.57E+00	2030
2035	1.16E-03	1.49E-04	1.61E-04	1.04E-02	2.68E-04	1.26E-01	7.34E-05	3.47E+00	2035
2040	9.48E-04	1.59E-04	1.32E-04	1.17E-02	1.29E-04	2.07E-01	3.81E-05	6.55E+00	2040
2045	0.	0.	0.	0.	9.16E-04	6.15E-04	2.11E-01	1.40E-01	2045
2050	0.	0.	0.	0.	0.	0.	0.	0.	2050
2055	0.	0.	0.	0.	9.16E-04	6.15E-04	2.11E-01	1.40E-01	2055
2060	0.	0.	0.	0.	9.16E-04	6.15E-04	2.11E-01	1.40E-01	2060
2065	0.	0.	0.	0.	9.16E-04	6.15E-04	2.11E-01	1.40E-01	2065
2070	0.	0.	0.	0.	0.	0.	0.	0.	2070
2075	0.	0.	0.	0.	9.16E-04	6.15E-04	2.11E-01	1.40E-01	2073

TABLE 10.C.14 Case 2B - U Only Recycle - Stored Pu - Reference Treatment
Heat Generation Rate in TRU Waste Containers

(WATTS/CONTAINER)

YEAR	INTERMEDIATE LEVEL DRUMS(80) 1-10 R/HR FP+AP	INTERMEDIATE LEVEL DRUMS(80) 1-10 R/HR ACTINIDES	INTERMEDIATE LEVEL DRUMS(80) .2-1 R/HR FP+AP	INTERMEDIATE LEVEL DRUMS(80) .2-1 R/HR ACTINIDES	LOW LEVEL DRUMS(80) 0-.2 R/HR FP+AP	LOW LEVEL DRUMS(80) 0-.2 R/HR ACTINIDES	YEAR
1985	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	1995
2000	0.	0.	0.	0.	0.	0.	2000
2005	0.	0.	0.	0.	0.	0.	2005
2010	0.	0.	0.	0.	0.	0.	2010
2015	0.	0.	0.	0.	0.	1.47E+01	2015
2020	0.	0.	0.	0.	0.	1.47E+01	2020
2025	0.	0.	0.	0.	0.	1.47E+01	2025
2030	0.	0.	0.	0.	0.	1.47E+01	2030
2035	0.	0.	0.	0.	0.	1.47E+01	2035
2040	0.	0.	0.	0.	0.	1.47E+01	2040
2045	0.	0.	0.	0.	1.21E-03	2.20E-03	2045
2050	0.	0.	0.	0.	0.	0.	2050
2055	0.	0.	0.	0.	1.21E-03	2.20E-03	2055
2060	0.	0.	0.	0.	1.21E-03	2.20E-03	2060
2065	0.	0.	0.	0.	1.21E-03	2.20E-03	2065
2070	0.	0.	0.	0.	0.	0.	2070
2075	0.	0.	0.	0.	1.21E-03	2.20E-03	2075

TABLE 10.C.15 Case 2B - U Only Recycle - Stored Pu - Reference Treatment
TRU Waste Containers in Interim Storage

YEAR	SOLID HIGH LEVEL CANISTERS ANNUAL	SOLID HIGH LEVEL CANISTERS CUMULATIVE	HULLS AND ASSEMBLY HARDWARE CANISTERS ANNUAL	HULLS AND ASSEMBLY HARDWARE CANISTERS CUMULATIVE	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR ANNUAL	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR CUMULATIVE	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR ANNUAL	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR CUMULATIVE	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR ANNUAL	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR CUMULATIVE	YEAR
1976	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1976
1977	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1977
1978	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1978
1979	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1979
1980	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1980
1981	0.	0.	1.20E+02	1.20E+02	1.06E+03	1.06E+03	1.00E+00	1.00E+00	4.92E+02	4.92E+02	1981
1982	0.	0.	2.39E+02	3.59E+02	2.12E+03	3.18E+03	2.00E+00	3.00E+00	9.84E+02	1.48E+03	1982
1983	0.	0.	3.59E+02	7.17E+02	3.18E+03	6.35E+03	3.00E+00	6.00E+00	1.48E+03	2.95E+03	1983
1984	0.	0.	3.59E+02	1.08E+03	3.18E+03	9.53E+03	3.00E+00	9.00E+00	1.48E+03	4.43E+03	1984
1985	0.	0.	-4.78E+01	1.03E+03	-4.23E+02	9.10E+03	-4.00E-01	8.60E+00	-1.97E+02	4.23E+03	1985
1986	0.	0.	-4.78E+01	9.80E+02	-4.23E+02	8.68E+03	-4.00E-01	8.20E+00	-1.97E+02	4.04E+03	1986
1987	0.	0.	-7.17E+01	9.08E+02	-6.35E+02	8.04E+03	-6.00E-01	7.60E+00	-2.95E+02	3.74E+03	1987
1988	0.	0.	-9.56E+01	8.13E+02	-8.47E+02	7.20E+03	-8.00E-01	6.80E+00	-3.94E+02	3.35E+03	1988
1989	0.	0.	-9.56E+01	7.17E+02	-8.47E+02	6.35E+03	-6.00E-01	6.00E+00	-3.94E+02	2.95E+03	1989
1990	0.	0.	-1.43E+02	5.74E+02	-1.27E+03	5.08E+03	-1.20E+00	4.80E+00	-5.90E+02	2.36E+03	1990
1991	0.	0.	-1.43E+02	4.30E+02	-1.27E+03	3.81E+03	-1.20E+00	3.60E+00	-5.90E+02	1.77E+03	1991
1992	0.	0.	-1.43E+02	2.87E+02	-1.27E+03	2.54E+03	-1.20E+00	2.40E+00	-5.90E+02	1.18E+03	1992
1993	0.	0.	-1.43E+02	1.43E+02	-1.27E+03	1.27E+03	-1.20E+00	1.20E+00	-5.90E+02	5.90E+02	1993
1994	0.	0.	-1.43E+02	5.23E-12	-1.27E+03	5.20E-11	-1.20E+00	4.09E-14	-5.90E+02	1.76E-11	1994
1995	0.	0.	-5.23E-12	0.	-5.20E-11	0.	-4.09E-14	0.	-1.76E-11	0.	1995
1996	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1996
1997	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1997
1998	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1998

TABLE 10.C.15 Case 2B - U Only Recycle - Stored Pu - Reference Treatment
TRU Waste Containers in Interim Storage

YEAR	INTERMEDIATE LEVEL CANISTERS .2-1 R/HR ANNUAL	INTERMEDIATE LEVEL CANISTERS .2-1 R/HR CUMULATIVE	INTERMEDIATE LEVEL DRUMS(55) .2-1 R/HR ANNUAL	INTERMEDIATE LEVEL DRUMS(55) .2-1 R/HR CUMULATIVE	LOW LEVEL DRUMS(55) 0-.2 R/HR ANNUAL	LOW LEVEL DRUMS(55) 0-.2 R/HR CUMULATIVE	LOW LEVEL BOXES 0-.2 R/HR ANNUAL	LOW LEVEL BOXES 0-.2 R/HR CUMULATIVE	YEAR
1976	0.	0.	0.	0.	0.	0.	0.	0.	1976
1977	0.	0.	0.	0.	0.	0.	0.	0.	1977
1978	0.	0.	0.	0.	0.	0.	0.	0.	1978
1979	0.	0.	0.	0.	0.	0.	0.	0.	1979
1980	0.	0.	0.	0.	0.	0.	0.	0.	1980
1981	1.68E+01	1.68E+01	4.84E+02	4.84E+02	6.86E+02	6.86E+02	1.50E+01	1.50E+01	1981
1982	3.35E+01	5.03E+01	9.68E+02	1.45E+03	1.37E+03	2.06E+03	3.00E+01	4.50E+01	1982
1983	5.03E+01	1.01E+02	1.45E+03	2.90E+03	2.06E+03	4.12E+03	4.50E+01	9.00E+01	1983
1984	5.03E+01	1.51E+02	1.45E+03	4.36E+03	2.06E+03	6.18E+03	4.50E+01	1.35E+02	1984
1985	-6.71E+00	1.44E+02	-1.94E+02	4.16E+03	-2.74E+02	5.90E+03	-6.00E+00	1.29E+02	1985
1986	-6.71E+00	1.37E+02	-1.94E+02	3.97E+03	-2.74E+02	5.63E+03	-6.00E+00	1.23E+02	1986
1987	-1.01E+01	1.27E+02	-2.90E+02	3.68E+03	-4.12E+02	5.22E+03	-9.00E+00	1.14E+02	1987
1988	-1.34E+01	1.14E+02	-3.87E+02	3.29E+03	-5.49E+02	4.67E+03	-1.20E+01	1.02E+02	1988
1989	-1.34E+01	1.01E+02	-3.87E+02	2.90E+03	-5.49E+02	4.12E+03	-1.20E+01	9.00E+01	1989
1990	-2.01E+01	8.05E+01	-5.81E+02	2.32E+03	-8.23E+02	3.29E+03	-1.80E+01	7.20E+01	1990
1991	-2.01E+01	6.03E+01	-5.81E+02	1.74E+03	-8.23E+02	2.47E+03	-1.80E+01	5.40E+01	1991
1992	-2.01E+01	4.02E+01	-5.81E+02	1.16E+03	-8.23E+02	1.65E+03	-1.80E+01	3.60E+01	1992
1993	-2.01E+01	2.01E+01	-5.81E+02	5.81E+02	-8.23E+02	8.23E+02	-1.80E+01	1.80E+01	1993
1994	-2.01E+01	6.54E-13	-5.81E+02	2.17E-11	-8.23E+02	5.41E-12	-1.80E+01	5.57E-13	1994
1995	-6.54E-13	0.	-2.17E-11	0.	-5.41E-12	0.	-5.57E-13	0.	1995
1996	0.	0.	0.	0.	0.	0.	0.	0.	1996
1997	0.	0.	0.	0.	0.	0.	0.	0.	1997
1998	0.	0.	0.	0.	0.	0.	0.	0.	1998

TABLE 10.C.16 Case 2B - U Only Recycle - Stored Pu - Reference Treatment
Revised Solid High Level Waste Container Sizes for Each
Geologic Medium

Salt 3.2 kW/Can.		Granite 1.7 kW/Can.		Shale 1.2 kW/Can.		Basalt 1.3 kW/Can.	
Year	Dia.	Year	Dia.	Year	Dia.	Year	Dia.
1986	12.	1986	10.	1986	8.	1986	10.
1987	12.	1987	10.	1987	8.	1987	10.
1988	12.	1988	10.	1988	8.	1988	8.
1989	12.	1989	10.	1989	8.	1989	8.
1990	12.	1990	8.	1990	8.	1990	8.
1991	12.	1991	8.	1991	6.	1991	8.
1992	12.	1992	8.	1992	6.	1992	8.
1993	12.	1993	8.	1993	6.	1993	8.
1994	12.	1994	8.	1994	6.	1994	6.
1995	12.	1995	8.	1995	6.	1995	6.
1996	12.	1996	8.	1996	6.	1996	6.
1997	12.	1997	8.	1997	6.	1997	6.
1998	12.	1998	8.	1998	6.	1998	6.
1999	12.	1999	8.	1999	6.	1999	6.
2000	12.	2000	8.	2000	6.	2000	6.
2001	12.	2001	8.	2001	6.	2001	6.
2002	12.	2002	8.	2002	6.	2002	6.
2003	12.	2003	8.	2003	6.	2003	6.
2004	12.	2004	8.	2004	6.	2004	6.
2005	12.	2005	8.	2005	6.	2005	6.
2006	10.	2006	8.	2006	6.	2006	6.
2007	12.	2007	8.	2007	6.	2007	6.
2008	12.	2008	8.	2008	6.	2008	6.
2009	12.	2009	8.	2009	6.	2009	6.
2010	10.	2010	8.	2010	6.	2010	6.
2011	10.	2011	8.	2011	6.	2011	6.
2012	10.	2012	8.	2012	6.	2012	6.
2013	10.	2013	8.	2013	6.	2013	6.
2014	10.	2014	8.	2014	6.	2014	6.
2015	10.	2015	8.	2015	6.	2015	6.
2016	10.	2016	8.	2016	6.	2016	6.
2017	10.	2017	8.	2017	6.	2017	6.
2018	10.	2018	8.	2018	6.	2018	6.
2019	10.	2019	8.	2019	6.	2019	6.
2020	10.	2020	8.	2020	6.	2020	6.
2021	10.	2021	8.	2021	6.	2021	6.
2022	10.	2022	8.	2022	6.	2022	6.
2023	10.	2023	8.	2023	6.	2023	6.
2024	10.	2024	8.	2024	6.	2024	6.
2025	10.	2025	8.	2025	6.	2025	6.
2026	10.	2026	8.	2026	6.	2026	6.
2027	10.	2027	8.	2027	6.	2027	6.
2028	10.	2028	8.	2028	6.	2028	6.
2029	10.	2029	8.	2029	6.	2029	6.
2030	10.	2030	8.	2030	6.	2030	6.
2031	10.	2031	8.	2031	6.	2031	6.
2032	10.	2032	8.	2032	6.	2032	6.
2033	12.	2033	8.	2033	6.	2033	6.
2034	12.	2034	8.	2034	6.	2034	6.
2035	12.	2035	8.	2035	6.	2035	6.
2036	12.	2036	8.	2036	6.	2036	6.
2037	12.	2037	8.	2037	6.	2037	6.
2038	12.	2038	8.	2038	6.	2038	6.
2039	12.	2039	8.	2039	6.	2039	6.
2040	12.	2040	8.	2040	6.	2040	8.
2041	12.	2041	8.	2041	6.	2041	8.
2042	12.	2042	8.	2042	6.	2042	8.
2043	12.	2043	8.	2043	8.	2043	8.
2044	12.	2044	8.	2044	8.	2044	8.
2045	12.	2045	8.	2045	8.	2045	8.
2046	12.	2046	8.	2046	8.	2046	8.
2047	12.	2047	10.	2047	8.	2047	8.
2048	12.	2048	10.	2048	8.	2048	8.
2049	12.	2049	10.	2049	8.	2049	8.

TABLE 10.C.17 Case 2B - U Only Recycle - Stored Pu - Reference Treatment
TRU Waste Containers Sent to Repository
Revised Solid High Level Waste Containers

	Salt 3.2 kW/Can.		Granite 1.7 kW/Can.		Shale 1.2 kW/Can.		Basalt 1.3 kW/Can.		
	SOLID HIGH LEVEL WASTE		SOLID HIGH LEVEL WASTE		SOLID HIGH LEVEL WASTE		SOLID HIGH LEVEL WASTE		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	1985
1990	7.14E+02	2.20E+03	1.61E+03	3.74E+03	1.61E+03	4.94E+03	1.61E+03	4.54E+03	1990
1995	1.14E+03	7.74E+03	2.59E+03	1.62E+04	4.61E+03	2.71E+04	4.61E+03	2.11E+04	1995
2000	1.81E+03	1.48E+04	4.08E+03	3.22E+04	7.25E+03	5.55E+04	7.25E+03	4.94E+04	2000
2005	2.47E+03	2.52E+04	5.54E+03	5.55E+04	9.88E+03	9.70E+04	9.88E+03	9.09E+04	2005
2010	4.51E+03	4.13E+04	7.04E+03	8.63E+04	1.25E+04	1.52E+05	1.25E+04	1.46E+05	2010
2015	4.51E+03	6.39E+04	7.04E+03	1.21E+05	1.25E+04	2.14E+05	1.25E+04	2.08E+05	2015
2020	3.80E+03	8.68E+04	5.93E+03	1.54E+05	1.05E+04	2.72E+05	1.05E+04	2.66E+05	2020
2025	4.09E+03	1.04E+05	6.30E+03	1.84E+05	1.12E+04	3.26E+05	1.12E+04	3.20E+05	2025
2030	3.80E+03	1.24E+05	5.93E+03	2.16E+05	1.05E+04	3.82E+05	1.05E+04	3.76E+05	2030
2035	1.98E+03	1.38E+05	4.45E+03	2.41E+05	7.91E+03	4.27E+05	7.91E+03	4.21E+05	2035
2040	1.32E+03	1.46E+05	2.97E+03	2.59E+05	5.27E+03	4.59E+05	2.97E+03	4.50E+05	2040
2045	1.32E+03	1.52E+05	2.97E+03	2.74E+05	2.97E+03	4.78E+05	2.97E+03	4.65E+05	2045
2050	0.	1.55E+05	0.	2.79E+05	0.	4.84E+05	0.	4.71E+05	2050
2055	0.	1.55E+05	0.	2.79E+05	0.	4.84E+05	0.	4.71E+05	2055
2060	0.	1.55E+05	0.	2.79E+05	0.	4.84E+05	0.	4.71E+05	2060
2065	0.	1.55E+05	0.	[illegible]	0.	4.84E+05	0.	4.71E+05	2065
2070	0.	1.55E+05	0.	2.79E+05	0.	4.84E+05	0.	4.71E+05	2070
2075	0.	1.55E+05	0.	2.79E+05	0.	4.84E+05	0.	4.71E+05	2075

TABLE 10.C.18. Case 2B - U Only Recycle - Stored Pu - Reference Treatment - Radioactivity in TRU Waste Containers, Curies/container - Revised Solid High Level Waste Containers

	Salt 3.2 kW/Can.		Granite 1.7 kW/Can.		Shale 1.2 kW/Can.		Basalt 1.3 kW/Can.		
	SOLID HIGH LEVEL CANISTERS		SOLID HIGH LEVEL CANISTERS		SOLID HIGH LEVEL CANISTERS		SOLID HIGH LEVEL CANISTERS		
YEAR	FP+AP	ACTINIDES	FP+AP	ACTINIDES	FP+AP	ACTINIDES	FP+AP	ACTINIDES	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	1985
1990	7.31E+05	6.11E+03	3.29E+05	2.71E+03	3.28E+05	2.71E+03	3.25E+05	2.71E+03	1990
1995	8.66E+05	5.47E+03	3.88E+05	2.43E+03	2.14E+05	1.37E+03	2.14E+05	1.37E+03	1995
2000	8.91E+05	5.63E+03	3.96E+05	2.50E+03	2.23E+05	1.41E+03	2.23E+05	1.41E+03	2000
2005	9.01E+05	5.76E+03	4.00E+05	2.56E+03	2.25E+05	1.44E+03	2.28E+05	1.44E+03	2005
2010	6.44E+05	4.30E+03	4.12E+05	2.75E+03	2.32E+05	1.55E+03	2.39E+05	1.55E+03	2010
2015	6.79E+05	4.45E+03	4.32E+05	2.85E+03	2.43E+05	1.60E+03	2.43E+05	1.60E+03	2015
2020	6.60E+05	4.31E+03	4.22E+05	2.76E+03	2.38E+05	1.55E+03	2.34E+05	1.55E+03	2020
2025	6.42E+05	4.39E+03	4.11E+05	2.81E+03	2.31E+05	1.58E+03	2.31E+05	1.48E+03	2025
2030	6.41E+05	4.09E+03	4.10E+05	2.62E+03	2.31E+05	1.47E+03	2.31E+05	1.47E+03	2030
2035	8.98E+05	5.60E+03	3.90E+05	2.49E+03	2.29E+05	1.40E+03	2.28E+05	1.40E+03	2035
2040	8.27E+05	5.12E+03	3.68E+05	2.28E+03	2.07E+05	1.28E+03	3.68E+05	2.28E+03	2040
2045	7.44E+05	4.29E+03	3.31E+05	1.91E+03	3.31E+05	1.91E+03	3.31E+05	1.91E+03	2045
2050	0.	0.	0.	0.	0.	0.	0.	0.	2050
2055	0.	0.	0.	0.	0.	0.	0.	0.	2055
2060	0.	0.	0.	0.	0.	0.	0.	0.	2060
2065	0.	0.	0.	0.	0.	0.	0.	0.	2065
2070	0.	0.	0.	0.	0.	0.	0.	0.	2070
2075	0.	0.	0.	0.	0.	0.	0.	0.	2075

TABLE 10.C.19. Case 2B - U Only Recycle - Stored Pu - Reference Treatment
Heat Generation Rate in TRU Waste Containers, Watts/Container
Revised Solid High Level Waste Containers

	Salt 3.2 kW/Can.		Granite 1.7 kW/Can.		Shale 1.2 kW/Can.		Basalt 1.3 kW/Can.		
YEAR	SOLID HIGH LEVEL CANISTERS FP+AP	ACTINIDES	SOLID HIGH LEVEL CANISTERS FP+AP	ACTINIDES	SOLID HIGH LEVEL CANISTERS FP+AP	ACTINIDES	SOLID HIGH LEVEL CANISTERS FP+AP	ACTINIDES	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	1985
1990	2.36E+03	1.72E+02	1.06E+03	7.64E+01	1.06E+03	7.64E+01	1.06E+03	7.64E+01	1990
1995	2.97E+03	1.46E+02	1.39E+03	6.49E+01	7.43E+02	3.65E+01	7.43E+02	3.65E+01	1995
2000	3.06E+03	1.51E+02	1.36E+03	6.70E+01	7.66E+02	3.77E+01	7.66E+02	3.77E+01	2000
2005	3.10E+03	1.55E+02	1.38E+03	6.87E+01	7.78E+02	3.87E+01	7.78E+02	3.87E+01	2005
2010	2.21E+03	1.17E+02	1.41E+03	7.47E+01	7.95E+02	4.20E+01	7.95E+02	4.20E+01	2010
2015	2.33E+03	1.21E+02	1.44E+03	7.72E+01	8.36E+02	4.34E+01	8.36E+02	4.34E+01	2015
2020	2.27E+03	1.17E+02	1.45E+03	7.49E+01	8.16E+02	4.21E+01	8.16E+02	4.21E+01	2020
2025	2.18E+03	1.20E+02	1.40E+03	7.68E+01	7.85E+02	4.32E+01	7.85E+02	4.32E+01	2025
2030	2.20E+03	1.10E+02	1.41E+03	7.07E+01	7.91E+02	3.98E+01	7.91E+02	3.98E+01	2030
2035	3.07E+03	1.51E+02	1.36E+03	6.69E+01	7.67E+02	3.76E+01	7.67E+02	3.76E+01	2035
2040	2.78E+03	1.38E+02	1.24E+03	6.13E+01	6.95E+02	3.45E+01	1.24E+03	6.13E+01	2040
2045	2.47E+03	1.14E+02	1.10E+03	5.09E+01	1.10E+03	5.09E+01	1.10E+03	5.09E+01	2045
2050	0.	0.	0.	0.	0.	0.	0.	0.	2050
2055	0.	0.	0.	0.	0.	0.	0.	0.	2055
2060	0.	0.	0.	0.	0.	0.	0.	0.	2060
2065	0.	0.	0.	0.	0.	0.	0.	0.	2065
2070	0.	0.	0.	0.	0.	0.	0.	0.	2070
2075	0.	0.	0.	0.	0.	0.	0.	0.	2075

TABLE 10.C.20. Case 3A - U and Pu Recycle - Repository in 1985 - Reference Treatment - TRU Waste Containers Sent to Repository

YEAR	SOLID HIGH LEVEL CANISTERS ANNUAL	SOLID HIGH LEVEL CANISTERS CUMULATIVE	HULLS AND ASSEMBLY HARDWARE CANISTERS ANNUAL	HULLS AND ASSEMBLY HARDWARE CANISTERS CUMULATIVE	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR ANNUAL	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR CUMULATIVE	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR ANNUAL	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR CUMULATIVE	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR ANNUAL	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR CUMULATIVE	YEAR
1985	0.	0.	5.66E+02	5.66E+02	5.01E+03	5.01E+03	4.73E+00	4.73E+00	2.33E+03	2.33E+03	1985
1990	7.14E+02	2.29E+03	9.80E+02	5.04E+03	8.68E+03	4.47E+04	8.20E+00	4.22E+01	4.04E+03	2.08E+04	1990
1995	1.15E+03	7.74E+03	1.31E+03	1.08E+04	1.16E+04	9.53E+04	1.10E+01	9.00E+01	5.41E+03	4.43E+04	1995
2000	1.81E+03	1.48E+04	1.79E+03	1.83E+04	1.59E+04	1.62E+05	1.50E+01	1.53E+02	7.38E+03	7.53E+04	2000
2005	2.47E+03	2.52E+04	2.27E+03	2.82E+04	2.01E+04	2.50E+05	1.90E+01	2.36E+02	9.35E+03	1.16E+05	2005
2010	3.13E+03	3.89E+04	2.27E+03	3.96E+04	2.01E+04	3.50E+05	1.90E+01	3.31E+02	9.35E+03	1.63E+05	2010
2015	3.13E+03	5.45E+04	1.91E+03	5.01E+04	1.69E+04	4.43E+05	1.60E+01	4.19E+02	7.87E+03	2.06E+05	2015
2020	2.64E+03	6.90E+04	2.03E+03	5.98E+04	1.80E+04	5.29E+05	1.70E+01	5.00E+02	8.37E+03	2.46E+05	2020
2025	2.80E+03	8.24E+04	1.91E+03	7.00E+04	1.69E+04	6.20E+05	1.60E+01	5.86E+02	7.87E+03	2.88E+05	2025
2030	2.64E+03	9.65E+04	1.43E+03	7.82E+04	1.27E+04	6.92E+05	1.20E+01	6.54E+02	5.90E+03	3.22E+05	2030
2035	1.32E+03	1.08E+05	8.56E+02	8.39E+04	8.47E+03	7.43E+05	8.00E+00	7.02E+02	3.94E+03	3.45E+05	2035
2040	1.32E+03	1.16E+05	8.56E+02	8.87E+04	8.47E+03	7.85E+05	8.00E+00	7.42E+02	3.94E+03	3.65E+05	2040
2045	1.32E+03	1.22E+05	0.	9.07E+04	0.	8.03E+05	0.	7.59E+02	0.	3.73E+05	2045
2050	0.	1.25E+05	0.	9.07E+04	0.	8.03E+05	0.	7.59E+02	0.	3.73E+05	2050
2055	0.	1.25E+05	0.	9.07E+04	0.	8.03E+05	0.	7.59E+02	0.	3.73E+05	2055
2060	0.	1.25E+05	0.	9.07E+04	0.	8.03E+05	0.	7.59E+02	0.	3.73E+05	2060
2065	0.	1.25E+05	0.	9.07E+04	0.	8.03E+05	0.	7.59E+02	0.	3.73E+05	2065
2070	0.	1.25E+05	0.	9.07E+04	0.	8.03E+05	0.	7.59E+02	0.	3.73E+05	2070
2075	0.	1.25E+05	0.	9.07E+04	0.	8.03E+05	0.	7.59E+02	0.	3.73E+05	2075

TABLE 10.C.20. Case 3A - U and Pu Recycle - Repository in 1985 - Reference Treatment - TRU Waste Containers Sent to Repository

YEAR	INTERMEDIATE LEVEL CANISTERS .2-1 R/HR ANNUAL	INTERMEDIATE LEVEL CANISTERS .2-1 R/HR CUMULATIVE	INTERMEDIATE LEVEL DRUMS(55) .2-1 R/HR ANNUAL	INTERMEDIATE LEVEL DRUMS(55) .2-1 R/HR CUMULATIVE	LOW LEVEL DRUMS(55) 0-.2 R/HR ANNUAL	LOW LEVEL DRUMS(55) 0-.2 R/HR CUMULATIVE	LOW LEVEL BOXES 0-.2 R/HR ANNUAL	LOW LEVEL BOXES 0-.2 R/HR CUMULATIVE	YEAR
1985	7.94E+01	7.94E+01	2.29E+03	2.29E+03	5.45E+03	5.45E+03	9.20E+01	9.20E+01	1985
1990	1.37E+02	7.07E+02	3.97E+03	2.04E+04	1.07E+04	5.21E+04	1.71E+02	8.54E+02	1990
1995	1.84E+02	1.51E+03	5.32E+03	4.36E+04	1.52E+04	1.17E+05	2.38E+02	1.87E+03	1995
2000	2.51E+02	2.56E+03	7.26E+03	7.41E+04	2.06E+04	2.04E+05	3.24E+02	3.24E+03	2000
2005	3.14E+02	3.96E+03	9.20E+03	1.14E+05	2.65E+04	3.21E+05	4.14E+02	5.05E+03	2005
2010	3.14E+02	5.55E+03	9.20E+03	1.60E+05	2.80E+04	4.59E+05	4.27E+02	7.18E+03	2010
2015	2.68E+02	7.02E+03	7.74E+03	2.03E+05	2.90E+04	6.05E+05	4.30E+02	9.39E+03	2015
2020	2.85E+02	8.38E+03	8.23E+03	2.42E+05	2.82E+04	7.40E+05	4.31E+02	1.14E+04	2020
2025	2.64E+02	9.82E+03	7.74E+03	2.84E+05	2.59E+04	8.75E+05	4.01E+02	1.35E+04	2025
2030	2.01E+02	1.10E+04	5.81E+03	3.17E+05	1.92E+04	9.82E+05	3.03E+02	1.52E+04	2030
2035	1.34E+02	1.18E+04	3.87E+03	3.40E+05	1.11E+04	1.05E+06	1.93E+02	1.63E+04	2035
2040	1.34E+02	1.24E+04	3.87E+03	3.50E+05	1.51E+04	1.11E+06	2.67E+02	1.75E+04	2040
2045	0.	1.27E+04	0.	3.67E+05	3.79E+03	1.14E+06	1.50E+01	1.78E+04	2045
2050	0.	1.27E+04	0.	3.67E+05	0.	1.15E+06	0.	1.78E+04	2050
2055	0.	1.27E+04	0.	3.67E+05	3.79E+03	1.16E+06	1.50E+01	1.79E+04	2055
2060	0.	1.27E+04	0.	3.67E+05	3.79E+03	1.17E+06	1.50E+01	1.79E+04	2060
2065	0.	1.27E+04	0.	3.67E+05	3.79E+03	1.18E+06	1.50E+01	1.79E+04	2065
2070	0.	1.27E+04	0.	3.67E+05	0.	1.18E+06	0.	1.79E+04	2070
2075	0.	1.27E+04	0.	3.67E+05	1.14E+04	1.21E+06	4.50E+01	1.80E+04	2075

TABLE 10.C.20. Case 3A - U and Pu Recycle - Repository in 1985 - Reference Treatment - TRU Waste Containers Sent to Repository

YEAR	INTERMEDIATE LEVEL DRUMS(80) 1-10 R/HR ANNUAL	INTERMEDIATE LEVEL DRUMS(80) 1-10 R/HR CUMULATIVE	INTERMEDIATE LEVEL DRUMS(80) .2-1 R/HR ANNUAL	INTERMEDIATE LEVEL DRUMS(80) .2-1 R/HR CUMULATIVE	LOW LEVEL DRUMS(80) 0-.2 R/HR ANNUAL	LOW LEVEL DRUMS(80) 0-.2 R/HR CUMULATIVE	YEAR
1985	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	1995
2000	0.	0.	0.	0.	0.	0.	2000
2005	0.	0.	0.	0.	0.	0.	2005
2010	0.	0.	0.	0.	0.	0.	2010
2015	0.	0.	0.	0.	7.20E+01	2.88E+02	2015
2020	0.	0.	0.	0.	7.20E+01	5.76E+02	2020
2025	0.	0.	0.	0.	7.20E+01	7.92E+02	2025
2030	0.	0.	0.	0.	7.20E+01	1.08E+03	2030
2035	0.	0.	0.	0.	7.20E+01	1.37E+03	2035
2040	0.	0.	0.	0.	2.16E+02	2.16E+03	2040
2045	0.	0.	0.	0.	1.18E+03	6.88E+03	2045
2050	0.	0.	0.	0.	0.	9.24E+03	2050
2055	0.	0.	0.	0.	1.18E+03	1.28E+04	2055
2060	0.	0.	0.	0.	1.18E+03	1.63E+04	2060
2065	0.	0.	0.	0.	1.18E+03	1.99E+04	2065
2070	0.	0.	0.	0.	0.	1.99E+04	2070
2075	0.	0.	0.	0.	3.54E+03	2.69E+04	2075

TABLE 10.C.21. Case 3A - U and Pu Recycle - Repository in 1985 - Reference Treatment - Radioactivity in TRU Waste Containers

(CURIES/CONTAINER)

YEAR	SOLID HIGH LEVEL CANISTERS FP+AP	SOLID HIGH LEVEL CANISTERS ACTINIDES	HULLS AND ASSEMBLY HARDWARE CANISTERS FP+AP	HULLS AND ASSEMBLY HARDWARE CANISTERS ACTINIDES	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR FP+AP	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR ACTINIDES	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR FP+AP	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR ACTINIDES	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR FP+AP	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR ACTINIDES	YEAR
1985	0.	0.	1.90E+04	1.73E+02	1.56E+01	1.37E+02	1.31E+00	3.28E-01	3.06E+01	7.79E-02	1985
1990	7.31E+05	6.11E+03	2.98E+04	2.49E+02	8.45E+01	1.94E+02	2.61E+00	4.71E-01	6.09E-01	1.12E-01	1990
1995	8.58E+05	1.16E+04	3.39E+04	3.58E+02	1.05E+02	2.76E+02	3.02E+00	6.79E-01	7.03E-01	1.61E-01	1995
2000	8.74E+05	1.95E+04	3.40E+04	3.66E+02	1.04E+02	2.81E+02	3.03E+00	6.94E-01	7.04E-01	1.65E-01	2000
2005	8.85E+05	2.08E+04	3.29E+04	4.03E+02	9.24E+01	3.09E+02	2.85E+00	7.62E-01	6.62E-01	1.81E-01	2005
2010	9.04E+05	2.42E+04	3.39E+04	4.94E+02	1.10E+02	3.77E+02	3.15E+00	9.37E-01	7.32E-01	2.22E-01	2010
2015	9.46E+05	3.26E+04	3.20E+04	5.59E+02	1.04E+02	4.24E+02	3.00E+00	1.06E+00	6.97E-01	2.52E-01	2015
2020	9.18E+05	3.98E+04	2.88E+04	5.84E+02	7.92E+01	4.43E+02	2.55E+00	1.11E+00	5.95E-01	2.63E-01	2020
2025	8.89E+05	4.41E+04	3.06E+04	5.96E+02	1.02E+02	4.51E+02	2.92E+00	1.13E+00	6.79E-01	2.68E-01	2025
2030	8.80E+05	4.42E+04	2.79E+04	7.34E+02	9.77E+01	5.54E+02	2.76E+00	1.39E+00	6.43E-01	3.40E-01	2030
2035	8.54E+05	5.88E+04	2.42E+04	6.89E+02	6.87E+01	5.19E+02	2.23E+00	1.31E+00	5.20E-01	3.10E-01	2035
2040	7.85E+05	5.75E+04	2.17E+04	4.96E+02	5.06E+01	3.77E+02	1.88E+00	9.41E-01	4.38E-01	2.23E-01	2040
2045	7.11E+05	5.91E+04	0.	0.	0.	0.	0.	0.	0.	0.	2045
2050	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2050
2055	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2055
2060	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2060
2065	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2065
2070	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2070
2075	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2075

TABLE 10.C.21. Case 3A - U and Pu Recycle - Repository in 1985 - Reference Treatment - Radioactivity in TRU Waste Containers

(CURIES/CONTAINER)

YEAR	INTERMEDIATE LEVEL CANISTERS FP+AP	INTERMEDIATE LEVEL CANISTERS .2-1 R/HR ACTINIDES	INTERMEDIATE LEVEL DRUMS(55) FP+AP	INTERMEDIATE LEVEL DRUMS(55) .2-1 R/HR ACTINIDES	LOW LEVEL DRUMS(55) FP+AP	LOW LEVEL DRUMS(55) 0-.2 R/HR ACTINIDES	LOW LEVEL BOXES FP+AP	LOW LEVEL BOXES 0-.2 R/HR ACTINIDES	YEAR
1985	1.63E-01	4.07E-02	2.28E-02	3.40E+00	3.69E-01	5.00E+01	1.12E-02	1.15E+01	1985
1990	3.29E-01	5.85E-02	4.54E-02	4.83E+00	3.36E-01	6.64E+01	2.08E-02	1.33E+01	1990
1995	3.75E-01	5.42E-02	5.24E-02	5.86E+00	3.18E-01	8.40E+01	2.33E-02	2.08E+01	1995
2000	3.74E-01	8.61E-02	5.25E-02	7.00E+00	3.28E-01	8.50E+01	2.33E-02	2.13E+01	2000
2005	3.53E-01	9.46E-02	4.90E-02	7.64E+00	3.24E-01	8.75E+01	2.18E-02	2.30E+01	2005
2010	3.91E-01	1.16E-01	5.65E-02	9.37E+00	3.08E-01	9.81E+01	2.33E-02	2.71E+01	2010
2015	3.72E-01	1.32E-01	5.20E-02	1.06E+01	2.35E-01	1.01E+02	1.85E-02	6.67E+01	2015
2020	3.17E-01	1.37E-01	4.44E-02	1.10E+01	2.47E-01	9.64E+01	1.68E-02	6.89E+01	2020
2025	3.62E-01	1.40E-01	5.07E-02	1.12E+01	2.51E-01	9.48E+01	1.94E-02	7.27E+01	2025
2030	3.43E-01	1.73E-01	4.80E-02	1.38E+01	2.28E-01	1.03E+02	1.82E-02	9.27E+01	2030
2035	2.77E-01	1.62E-01	5.88E-02	1.29E+01	2.37E-01	5.23E+01	1.55E-02	1.24E+02	2035
2040	2.34E-01	1.17E-01	3.27E-02	9.37E+00	1.60E-01	1.10E+01	9.38E-03	2.14E+02	2040
2045	0.	0.	0.	0.	2.03E-01	5.52E-02	4.69E+01	1.27E+01	2045
2050	0.	0.	0.	0.	0.	0.	0.	0.	2050
2055	0.	0.	0.	0.	2.03E-01	5.52E-02	4.69E+01	1.27E+01	2055
2060	0.	0.	0.	0.	2.03E-01	5.52E-02	4.69E+01	1.27E+01	2060
2065	0.	0.	0.	0.	2.03E-01	5.52E-02	4.69E+01	1.27E+01	2065
2070	0.	0.	0.	0.	0.	0.	0.	0.	2070
2075	0.	0.	0.	0.	2.03E-01	5.52E-02	4.69E+01	1.27E+01	2075

TABLE 10.C.21 Case 3A - U and Pu Recycle - Repository in 1985 - Reference Treatment
Radioactivity in TRU Waste Containers

	CURIES/CONTAINED						CURIES ANNUAL TOTAL		CUMULATIVE CURIES		
	INTERMEDIATE LEVEL DRUMS(80) 1-10 R/HR		INTERMEDIATE LEVEL DRUMS(80) .2-1 R/HR		LOW LEVEL DRUMS(80) 0-.2 R/HR						
YEAR	FP+AP	ACTINIDES	FP+AP	ACTINIDES	FP+AP	ACTINIDES	FP+AP	ACTINIDES	FP+AP	ACTINIDES	YEAR
1985	0.	0.	0.	0.	0.	0.	1.08E+07	1.06E+06	9.97E+06	1.04E+06	1985
1990	0.	0.	0.	0.	0.	0.	5.52E+08	7.02E+06	1.43E+09	2.22E+07	1990
1995	0.	0.	0.	0.	0.	0.	1.03E+09	1.84E+07	5.42E+09	7.95E+07	1995
2000	0.	0.	0.	0.	0.	0.	1.65E+09	4.22E+07	1.03E+10	2.07E+08	2000
2005	0.	0.	0.	0.	0.	0.	2.26E+09	6.09E+07	1.70E+10	4.00E+08	2005
2010	0.	0.	0.	0.	0.	0.	2.92E+09	8.74E+07	2.56E+10	6.87E+08	2010
2015	0.	0.	0.	0.	0.	4.44E+02	3.02E+09	1.13E+08	3.52E+10	1.08E+09	2015
2020	0.	0.	0.	0.	0.	4.44E+02	2.48E+09	1.17E+08	4.25E+10	1.49E+09	2020
2025	0.	0.	0.	0.	0.	4.44E+02	2.55E+09	1.35E+08	4.77E+10	1.84E+09	2025
2030	0.	0.	0.	0.	0.	4.44E+02	2.38E+09	1.27E+08	5.30E+10	2.23E+09	2030
2035	0.	0.	0.	0.	0.	4.44E+02	1.71E+09	1.22E+08	5.49E+10	2.51E+09	2035
2040	0.	0.	0.	0.	0.	4.44E+02	1.06E+09	7.98E+07	5.43E+10	2.60E+09	2040
2045	0.	0.	0.	0.	2.71E-01	1.98E-01	9.37E+08	5.15E+07	5.19E+10	2.57E+09	2045
2050	0.	0.	0.	0.	0.	0.	0.	0.	4.74E+10	2.30E+09	2050
2055	0.	0.	0.	0.	2.71E-01	1.98E-01	1.79E+03	6.33E+02	4.20E+10	2.02E+09	2055
2060	0.	0.	0.	0.	2.71E-01	1.98E-01	1.79E+03	6.33E+02	3.73E+10	1.78E+09	2060
2065	0.	0.	0.	0.	2.71E-01	1.98E-01	1.79E+03	6.33E+02	3.31E+10	1.59E+09	2065
2070	0.	0.	0.	0.	0.	0.	0.	0.	2.94E+10	1.43E+09	2070
2075	0.	0.	0.	0.	2.71E-01	1.98E-01	5.38E+03	1.90E+03	2.64E+10	1.32E+09	2075

TABLE 10.C.22. Case 3A - U and Pu Recycle - Repository in 1985 - Reference Treatment - Heat Generation Rate in TRU Waste Containers, Watts/container

(WATTS/CONTAINER)

YEAR	SOLID HIGH LEVEL CANISTERS FP+AP	SOLID HIGH LEVEL CANISTERS ACTINIDES	HULLS AND ASSEMBLY HARDWARE CANISTERS FP+AP	HULLS AND ASSEMBLY HARDWARE CANISTERS ACTINIDES	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR FP+AP	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR ACTINIDES	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR FP+AP	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR ACTINIDES	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR FP+AP	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR ACTINIDES	YEAR
1985	0.	0.	1.62E+02	3.03E-01	7.53E-02	1.42E-01	4.85E-03	5.74E-04	1.13E-03	1.35E-04	1985
1990	2.38E+03	1.72E+02	2.28E+02	5.69E-01	4.38E-01	2.13E-01	1.14E-02	1.08E-03	2.66E-03	2.53E-04	1990
1995	2.95E+03	3.44E+02	2.62E+02	9.97E-01	5.47E-01	3.31E-01	1.34E-02	1.89E-03	3.13E-03	4.43E-04	1995
2000	3.01E+03	5.98E+02	2.64E+02	1.04E+00	5.43E-01	3.33E-01	1.35E-02	1.96E-03	3.13E-03	4.61E-04	2000
2005	3.05E+03	6.42E+02	2.63E+02	1.18E+00	4.80E-01	3.92E-01	1.25E-02	2.23E-03	2.92E-03	5.24E-04	2005
2010	3.12E+03	7.52E+02	2.72E+02	1.60E+00	5.70E-01	4.99E-01	1.41E-02	3.02E-03	3.27E-03	7.09E-04	2010
2015	3.27E+03	1.02E+03	2.59E+02	1.90E+00	5.42E-01	5.89E-01	1.33E-02	3.61E-03	3.10E-03	8.46E-04	2015
2020	3.16E+03	1.26E+03	2.38E+02	1.99E+00	4.11E-01	6.26E-01	1.11E-02	3.78E-03	2.58E-03	8.87E-04	2020
2025	3.03E+03	1.40E+03	2.48E+02	2.11E+00	5.31E-01	6.50E-01	1.29E-02	4.00E-03	3.01E-03	9.37E-04	2025
2030	3.05E+03	1.40E+03	2.31E+02	2.70E+00	5.08E-01	8.72E-01	1.22E-02	5.29E-03	2.83E-03	1.24E-03	2030
2035	2.92E+03	1.87E+03	2.04E+02	2.66E+00	3.55E-01	8.66E-01	9.52E-03	5.04E-03	2.21E-03	1.18E-03	2035
2040	2.64E+03	1.84E+03	1.84E+02	1.91E+00	2.60E-01	6.99E-01	7.78E-03	3.62E-03	1.81E-03	8.51E-04	2040
2045	2.36E+03	1.24E+03	0.	0.	0.	0.	0.	0.	0.	0.	2045
2050	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2050
2055	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2055
2060	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2060
2065	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2065
2070	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2070
2075	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2075

TABLE 10.C.22. Case 3A - U and Pu Recycle - Repository in 1985 - Reference Treatment - Heat Generation Rate in TRU Waste Containers, Watts/container

(WATTS/CONTAINER)

YEAR	INTERMEDIATE LEVEL CANISTERS FP+AP	INTERMEDIATE LEVEL CANISTERS .2-1 R/HR ACTINIDES	INTERMEDIATE LEVEL DRUMS(55) FP+AP	INTERMEDIATE LEVEL DRUMS(55) .2-1 R/HR ACTINIDES	LOW LEVEL DRUMS(55) FP+AP	LOW LEVEL DRUMS(55) 0-.2 R/HR ACTINIDES	LOW LEVEL BOXES FP+AP	LOW LEVEL BOXES 0-.2 R/HR ACTINIDES	YEAR
1985	6.02E-04	7.12E-05	8.40E-05	3.50E-03	1.81E-04	4.29E-02	9.15E-05	1.16E-02	1985
1990	1.42E-03	1.34E-04	1.98E-04	5.26E-03	2.66E-04	5.70E-02	9.10E-05	1.62E-02	1990
1995	1.67E-03	2.35E-04	2.33E-04	8.16E-03	2.82E-04	6.81E-02	1.09E-04	2.39E-02	1995
2000	1.67E-03	2.44E-04	2.33E-04	8.20E-03	2.84E-04	7.34E-02	1.04E-04	2.42E-02	2000
2005	1.54E-03	2.77E-04	2.17E-04	9.64E-03	2.67E-04	7.59E-02	9.59E-05	2.79E-02	2005
2010	1.75E-03	3.75E-04	2.44E-04	1.23E-02	2.76E-04	8.55E-02	1.04E-04	3.43E-02	2010
2015	1.66E-03	4.48E-04	2.31E-04	1.45E-02	2.12E-04	1.23E-01	8.25E-05	1.38E+00	2015
2020	1.34E-03	4.69E-04	1.92E-04	1.54E-02	2.00E-04	1.23E-01	7.24E-05	1.38E+00	2020
2025	1.61E-03	4.96E-04	2.24E-04	1.60E-02	2.29E-04	1.25E-01	8.60E-05	1.49E+00	2025
2030	1.51E-03	6.56E-04	2.11E-04	2.14E-02	2.16E-04	1.51E-01	8.03E-05	1.97E+00	2030
2035	1.18E-03	6.26E-04	1.63E-04	2.13E-02	2.00E-04	1.37E-01	6.58E-05	3.07E+00	2035
2040	9.64E-04	4.50E-04	1.35E-04	1.72E-02	1.29E-04	2.10E-01	3.84E-05	6.56E+00	2040
2045	0.	0.	0.	0.	9.16E-04	6.15E-04	2.11E-01	1.40E-01	2045
2050	0.	0.	0.	0.	0.	0.	0.	0.	2050
2055	0.	0.	0.	0.	9.16E-04	6.15E-04	2.11E-01	1.40E-01	2055
2060	0.	0.	0.	0.	9.16E-04	6.15E-04	2.11E-01	1.40E-01	2060
2065	0.	0.	0.	0.	9.16E-04	6.15E-04	2.11E-01	1.40E-01	2065
2070	0.	0.	0.	0.	0.	0.	0.	0.	2070
2075	0.	0.	0.	0.	9.16E-04	6.15E-04	2.11E-01	1.40E-01	2075

TABLE 10.C.22. Case 3A - U and Pu Recycle - Repository in 1985 - Reference Treatment - Heat Generation Rate in TRU Waste Containers, Watts/container

YEAR	INTERMEDIATE LEVEL DRUMS(80) FP+AP	INTERMEDIATE LEVEL 1-10 R/HR ACTINIDES	INTERMEDIATE LEVEL DRUMS(80) FP+AP	INTERMEDIATE LEVEL .2-1 R/HR ACTINIDES	LOW LEVEL DRUMS(80) FP+AP	LOW LEVEL 0-.2 R/HR ACTINIDES	YEAR
1985	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	1995
2000	0.	0.	0.	0.	0.	0.	2000
2005	0.	0.	0.	0.	0.	0.	2005
2010	0.	0.	0.	0.	0.	0.	2010
2015	0.	0.	0.	0.	0.	1.47E+01	2015
2020	0.	0.	0.	0.	0.	1.47E+01	2020
2025	0.	0.	0.	0.	0.	1.47E+01	2025
2030	0.	0.	0.	0.	0.	1.47E+01	2030
2035	0.	0.	0.	0.	0.	1.47E+01	2035
2040	0.	0.	0.	0.	0.	1.47E+01	2040
2045	0.	0.	0.	0.	1.21E-03	2.20E-03	2045
2050	0.	0.	0.	0.	0.	0.	2050
2055	0.	0.	0.	0.	1.21E-03	2.20E-03	2055
2060	0.	0.	0.	0.	1.21E-03	2.20E-03	2060
2065	0.	0.	0.	0.	1.21E-03	2.20E-03	2065
2070	0.	0.	0.	0.	0.	0.	2070
2075	0.	0.	0.	0.	1.21E-03	2.20E-03	2075

TABLE 10.C.23 Case 3A - U and Pu Recycle - Repository in 1985 - Reference Treatment
TRU Waste Containers in Interim Storage

YEAR	SOLID HIGH LEVEL CANISTERS ANNUAL	SOLID HIGH LEVEL CANISTERS CUMULATIVE	HULLS AND ASSEMBLY HARDWARE CANISTERS ANNUAL	HULLS AND ASSEMBLY HARDWARE CANISTERS CUMULATIVE	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR ANNUAL	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR CUMULATIVE	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR ANNUAL	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR CUMULATIVE	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR ANNUAL	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR CUMULATIVE	YEAR
1976	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1976
1977	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1977
1978	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1978
1979	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1979
1980	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1980
1981	0.	0.	1.20E+02	1.20E+02	1.06E+03	1.06E+03	1.00E+00	1.00E+00	4.92E+02	4.92E+02	1981
1982	0.	0.	2.39E+02	3.59E+02	2.12E+03	3.18E+03	2.00E+00	3.00E+00	9.84E+02	1.48E+03	1982
1983	0.	0.	3.59E+02	7.17E+02	3.18E+03	6.35E+03	3.00E+00	6.00E+00	1.48E+03	2.95E+03	1983
1984	0.	0.	3.59E+02	1.08E+03	3.18E+03	9.53E+03	3.00E+00	9.00E+00	1.48E+03	4.43E+03	1984
1985	0.	0.	-4.78E+01	1.03E+03	-4.23E+02	9.10E+03	-4.00E-01	8.60E+00	-1.97E+02	4.23E+03	1985
1986	0.	0.	-4.78E+01	9.80E+02	-4.23E+02	8.68E+03	-4.00E-01	8.20E+00	-1.97E+02	4.04E+03	1986
1987	0.	0.	-7.17E+01	9.08E+02	-6.35E+02	8.04E+03	-6.00E-01	7.60E+00	-2.95E+02	3.74E+03	1987
1988	0.	0.	-9.56E+01	8.13E+02	-8.47E+02	7.20E+03	-8.00E-01	6.80E+00	-3.94E+02	3.35E+03	1988
1989	0.	0.	-9.56E+01	7.17E+02	-8.47E+02	6.35E+03	-8.00E-01	6.00E+00	-3.94E+02	2.95E+03	1989
1990	0.	0.	-1.43E+02	5.74E+02	-1.27E+03	5.08E+03	-1.20E+00	4.80E+00	-5.90E+02	2.36E+03	1990
1991	0.	0.	-1.43E+02	4.30E+02	-1.27E+03	3.81E+03	-1.20E+00	3.60E+00	-5.90E+02	1.77E+03	1991
1992	0.	0.	-1.43E+02	2.87E+02	-1.27E+03	2.54E+03	-1.20E+00	2.40E+00	-5.90E+02	1.18E+03	1992
1993	0.	0.	-1.43E+02	1.43E+02	-1.27E+03	1.27E+03	-1.20E+00	1.20E+00	-5.90E+02	5.90E+02	1993
1994	0.	0.	-1.43E+02	5.23E-12	-1.27E+03	5.20E-11	-1.20E+00	4.09E-14	-5.90E+02	1.76E-11	1994
1995	0.	0.	-5.23E-12	0.	-5.20E-11	0.	-4.09E-14	0.	-1.76E-11	0.	1995
1996	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1996
1997	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1997
1998	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1998
1999	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1999

TABLE 10.C.23 Case 3A - U and Pu Recycle - Repository in 1985 - Reference Treatment
TRU Waste Containers in Interim Storage

YEAR	INTERMEDIATE LEVEL CANISTERS .2-1 R/HR ANNUAL	CUMULATIVE	INTERMEDIATE LEVEL DRUMS(55) .2-1 R/HR ANNUAL	CUMULATIVE	LOW LEVEL DRUMS(55) 0-.2 R/HR ANNUAL	CUMULATIVE	LOW LEVEL BOXES 0-.2 R/HR ANNUAL	CUMULATIVE	YEAR
1976	0.	0.	0.	0.	0.	0.	0.	0.	1976
1977	0.	0.	0.	0.	0.	0.	0.	0.	1977
1978	0.	0.	0.	0.	0.	0.	0.	0.	1978
1979	0.	0.	0.	0.	0.	0.	0.	0.	1979
1980	0.	0.	0.	0.	0.	0.	0.	0.	1980
1981	1.68E+01	1.68E+01	4.84E+02	4.84E+02	9.51E+02	9.51E+02	1.75E+01	1.75E+01	1981
1982	3.35E+01	5.03E+01	9.68E+02	1.45E+03	2.17E+03	3.12E+03	3.76E+01	5.52E+01	1982
1983	5.03E+01	1.01E+02	1.45E+03	2.90E+03	3.42E+03	6.55E+03	5.80E+01	1.13E+02	1983
1984	5.03E+01	1.51E+02	1.45E+03	4.36E+03	3.76E+03	1.03E+04	6.12E+01	1.74E+02	1984
1985	-6.71E+00	1.44E+02	-1.94E+02	4.16E+03	-3.80E+02	9.92E+03	-7.01E+00	1.67E+02	1985
1986	-6.71E+00	1.37E+02	-1.94E+02	3.97E+03	-3.80E+02	9.54E+03	-7.01E+00	1.60E+02	1986
1987	-1.01E+01	1.27E+02	-2.90E+02	3.68E+03	-6.25E+02	8.92E+03	-1.10E+01	1.49E+02	1987
1988	-1.34E+01	1.14E+02	-3.87E+02	3.29E+03	-8.69E+02	8.05E+03	-1.51E+01	1.34E+02	1988
1989	-1.34E+01	1.01E+02	-3.87E+02	2.90E+03	-8.69E+02	7.18E+03	-1.51E+01	1.19E+02	1989
1990	-2.01E+01	8.05E+01	-5.81E+02	2.32E+03	-1.37E+03	5.81E+03	-2.32E+01	9.60E+01	1990
1991	-2.01E+01	6.03E+01	-5.81E+02	1.74E+03	-1.37E+03	4.44E+03	-2.32E+01	7.28E+01	1991
1992	-2.01E+01	4.02E+01	-5.81E+02	1.16E+03	-1.44E+03	3.01E+03	-2.38E+01	4.90E+01	1992
1993	-2.01E+01	2.01E+01	-5.81E+02	5.81E+02	-1.50E+03	1.50E+03	-2.45E+01	2.45E+01	1993
1994	-2.01E+01	6.54E-13	-5.81E+02	2.17E-11	-1.50E+03	1.41E-11	-2.45E+01	7.80E-13	1994
1995	-6.54E-13	0.	-2.17E-11	0.	-1.41E-11	0.	-7.80E-13	0.	1995
1996	0.	0.	0.	0.	0.	0.	0.	0.	1996
1997	0.	0.	0.	0.	0.	0.	0.	0.	1997
1998	0.	0.	0.	0.	0.	0.	0.	0.	1998

TABLE 10.C.24. Case 3A - U and Pu Recycle - Repository in 1985 - Reference Treatment - Revised Solid High Level Waste Container Sizes for Each Geologic Medium

Salt 3.2 kW/Can. Year	Dia.	Granite 1.7 kW/Can. Year	Dia.	Shale 1.2 kW/Can. Year	Dia.	Basalt 1.3 kW/Can. Year	Dia.
1986	12.	1986	10.	1986	8.	1986	10.
1987	12.	1987	10.	1987	8.	1987	10.
1988	12.	1988	10.	1988	8.	1988	8.
1989	12.	1989	10.	1989	8.	1989	8.
1990	12.	1990	8.	1990	8.	1990	8.
1991	12.	1991	8.	1991	6.	1991	8.
1992	12.	1992	8.	1992	6.	1992	8.
1993	12.	1993	8.	1993	6.	1993	6.
1994	12.	1994	8.	1994	6.	1994	6.
1995	10.	1995	8.	1995	6.	1995	6.
1996	10.	1996	8.	1996	6.	1996	6.
1997	10.	1997	8.	1997	6.	1997	6.
1998	10.	1998	8.	1998	6.	1998	6.
1999	10.	1999	8.	1999	6.	1999	6.
2000	10.	2000	8.	2000	6.	2000	6.
2001	10.	2001	8.	2001	6.	2001	6.
2002	10.	2002	8.	2002	6.	2002	6.
2003	10.	2003	8.	2003	6.	2003	6.
2004	10.	2004	8.	2004	6.	2004	6.
2005	10.	2005	8.	2005	6.	2005	6.
2006	10.	2006	8.	2006	6.	2006	6.
2007	10.	2007	8.	2007	6.	2007	6.
2008	10.	2008	8.	2008	6.	2008	6.
2009	10.	2009	8.	2009	6.	2009	6.
2010	10.	2010	6.	2010	6.	2010	6.
2011	10.	2011	6.	2011	6.	2011	6.
2012	10.	2012	6.	2012	6.	2012	6.
2013	10.	2013	6.	2013	6.	2013	6.
2014	10.	2014	6.	2014	6.	2014	6.
2015	10.	2015	6.	2015	6.	2015	6.
2016	10.	2016	6.	2016	6.	2016	6.
2017	10.	2017	6.	2017	6.	2017	6.
2018	10.	2018	6.	2018	6.	2018	6.
2019	10.	2019	6.	2019	6.	2019	6.
2020	10.	2020	6.	2020	6.	2020	6.
2021	10.	2021	6.	2021	6.	2021	6.
2022	10.	2022	6.	2022	6.	2022	6.
2023	10.	2023	6.	2023	6.	2023	6.
2024	10.	2024	6.	2024	6.	2024	6.
2025	10.	2025	6.	2025	6.	2025	6.
2026	8.	2026	6.	2026	6.	2026	6.
2027	8.	2027	6.	2027	6.	2027	6.
2028	10.	2028	6.	2028	6.	2028	6.
2029	10.	2029	6.	2029	6.	2029	6.
2030	10.	2030	6.	2030	6.	2030	6.
2031	10.	2031	6.	2031	6.	2031	6.
2032	8.	2032	6.	2032	6.	2032	6.
2033	8.	2033	6.	2033	6.	2033	6.
2034	8.	2034	6.	2034	6.	2034	6.
2035	8.	2035	6.	2035	6.	2035	6.
2036	8.	2036	6.	2036	6.	2036	6.
2037	8.	2037	6.	2037	6.	2037	6.
2038	8.	2038	6.	2038	6.	2038	6.
2039	10.	2039	6.	2039	6.	2039	6.
2040	10.	2040	6.	2040	6.	2040	6.
2041	10.	2041	6.	2041	6.	2041	6.
2042	10.	2042	6.	2042	6.	2042	6.
2043	10.	2043	6.	2043	6.	2043	6.
2044	10.	2044	6.	2044	6.	2044	6.
2045	10.	2045	8.	2045	6.	2045	6.
2046	10.	2046	8.	2046	6.	2046	6.
2047	12.	2047	8.	2047	6.	2047	6.
2048	12.	2048	8.	2048	6.	2048	6.
2049	12.	2049	10.	2049	6.	2049	8.

TABLE 10.C.25. Case 3A - U and Pu Recycle - Repository in 1985 - Reference Treatment - TRU Waste Containers Sent to Repository - Revised Solid High Level Waste Containers

	Salt 3.2 kW/Can.		Granite 1.7 kW/Can.		Shale 1.2 kW/Can.		Basalt 1.3 kW/Can.		
	SOLID HIGH LEVEL WASTE		SOLID HIGH LEVEL WASTE		SOLID HIGH LEVEL WASTE		SOLID HIGH LEVEL WASTE		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	1985
1990	7.14E+02	2.20E+03	1.61E+03	3.74E+03	1.61E+03	4.94E+03	1.61E+03	4.54E+03	1990
1995	1.66E+03	8.25E+03	2.50E+03	1.42E+04	4.61E+03	2.71E+04	4.61E+03	2.31E+04	1995
2000	2.61E+03	1.85E+04	4.08E+03	3.22E+04	7.25E+03	5.55E+04	7.25E+03	5.14E+04	2000
2005	3.56E+03	3.34E+04	5.56E+03	5.55E+04	9.86E+03	9.70E+04	9.86E+03	9.29E+04	2005
2010	4.51E+03	5.31E+04	1.25E+04	9.18E+04	1.25E+04	1.52E+05	1.25E+04	1.48E+05	2010
2015	4.51E+03	7.56E+04	1.25E+04	1.54E+05	1.25E+04	2.14E+05	1.25E+04	2.10E+05	2015
2020	3.80E+03	9.65E+04	1.05E+04	2.12E+05	1.05E+04	2.72E+05	1.05E+04	2.68E+05	2020
2025	4.03E+03	1.16E+05	1.12E+04	2.66E+05	1.12E+04	3.26E+05	1.12E+04	3.22E+05	2025
2030	3.80E+03	1.41E+05	1.05E+04	3.22E+05	1.05E+04	3.82E+05	1.05E+04	3.78E+05	2030
2035	4.45E+03	1.64E+05	7.91E+03	3.67E+05	7.91E+03	4.37E+05	7.91E+03	4.23E+05	2035
2040	1.90E+03	1.80E+05	5.27E+03	3.99E+05	5.27E+03	4.69E+05	5.27E+03	4.55E+05	2040
2045	1.90E+03	1.89E+05	2.97E+03	4.23E+05	5.27E+03	4.95E+05	5.27E+03	4.81E+05	2045
2050	0.	1.93E+05	0.	4.29E+05	0.	5.06E+05	0.	4.92E+05	2050
2055	0.	1.93E+05	0.	4.29E+05	0.	5.06E+05	0.	4.92E+05	2055
2060	0.	1.93E+05	0.	4.29E+05	0.	5.06E+05	0.	4.92E+05	2060
2065	0.	1.93E+05	0.	4.29E+05	0.	5.06E+05	0.	4.92E+05	2065
2070	0.	1.93E+05	0.	4.29E+05	0.	5.06E+05	0.	4.92E+05	2070
2075	0.	1.93E+05	0.	4.29E+05	0.	5.06E+05	0.	4.92E+05	2075

TABLE 10.C.26. Case 3A - U and Pu Recycle - Repository in 1985 - Reference Treatment - Radioactivity in TRU Waste Containers, Curies/Container Revised Solid High Level Waste Containers

	Salt 3.2 kW/Can.		Granite 1.7 kW/Can.		Shale 1.2 kW/Can.		Basalt 1.3 kW/Can.		
YEAR	SOLID HIGH LEVEL CANISTERS FP+AP	ACTINIDES	SOLID HIGH LEVEL CANISTERS FP+AP	ACTINIDES	SOLID HIGH LEVEL CANISTERS FP+AP	ACTINIDES	SOLID HIGH LEVEL CANISTERS FP+AP	ACTINIDES	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	1985
1990	7.31E+05	6.11E+03	3.29E+05	2.71E+03	3.25E+05	2.71E+03	3.25E+05	2.71E+03	1990
1995	5.96E+05	8.06E+03	3.81E+05	5.16E+03	2.14E+05	2.90E+03	2.14E+05	2.90E+03	1995
2000	6.07E+05	1.35E+04	3.86E+05	8.65E+03	2.16E+05	4.87E+03	2.16E+05	4.87E+03	2000
2005	6.14E+05	1.44E+04	3.93E+05	9.24E+03	2.21E+05	5.20E+03	2.21E+05	5.20E+03	2005
2010	6.31E+05	1.68E+04	2.27E+05	6.06E+03	2.27E+05	6.06E+03	2.27E+05	6.06E+03	2010
2015	6.57E+05	2.27E+04	2.36E+05	8.16E+03	2.36E+05	8.16E+03	2.36E+05	8.16E+03	2015
2020	6.37E+05	2.77E+04	2.29E+05	9.96E+03	2.29E+05	9.96E+03	2.29E+05	9.96E+03	2020
2025	6.17E+05	3.06E+04	2.22E+05	1.10E+04	2.22E+05	1.10E+04	2.22E+05	1.10E+04	2025
2030	6.17E+05	3.07E+04	2.22E+05	1.11E+04	2.22E+05	1.11E+04	2.22E+05	1.11E+04	2030
2035	3.79E+05	2.61E+04	2.13E+05	1.47E+04	2.13E+05	1.47E+04	2.13E+05	1.47E+04	2035
2040	5.49E+05	3.99E+04	1.96E+05	1.44E+04	1.96E+05	1.44E+04	1.96E+05	1.44E+04	2040
2045	4.94E+05	2.71E+04	3.16E+05	1.74E+04	1.76E+05	9.77E+03	1.76E+05	9.77E+03	2045
2050	0.	0.	0.	0.	0.	0.	0.	0.	2050
2055	0.	0.	0.	0.	0.	0.	0.	0.	2055
2060	0.	0.	0.	0.	0.	0.	0.	0.	2060
2065	0.	0.	0.	0.	0.	0.	0.	0.	2065
2070	0.	0.	0.	0.	0.	0.	0.	0.	2070
2075	0.	0.	0.	0.	0.	0.	0.	0.	2075

TABLE 10.C.27. Case 3A - U and Pu Recycle - Repository in 1985 - Reference Treatment - Heat Generation Rate in TRU Waste Containers, Watts/container - Revised Solid High Level Waste Containers

	Salt 3.2 kW/Can.		Granite 1.7 kW/Can.		Shale 1.2 kW/Can.		Basalt 1.3 kW/Can.		
YEAR	SOLID HIGH LEVEL CANISTERS FP+AP	ACTINIDES	SOLID HIGH LEVEL CANISTERS FP+AP	ACTINIDES	SOLID HIGH LEVEL CANISTERS FP+AP	ACTINIDES	SOLID HIGH LEVEL CANISTERS FP+AP	ACTINIDES	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	1985
1990	2.38E+03	1.72E+02	1.06E+03	7.64E+01	1.06E+03	7.64E+01	1.06E+03	7.64E+01	1990
1995	2.05E+03	2.39E+02	1.31E+03	1.53E+02	7.37E+02	8.61E+01	7.37E+02	8.61E+01	1995
2000	2.04E+03	4.15E+02	1.34E+03	2.66E+02	7.53E+02	1.50E+02	7.53E+02	1.50E+02	2000
2005	2.12E+03	4.46E+02	1.36E+03	2.85E+02	7.63E+02	1.60E+02	7.63E+02	1.60E+02	2005
2010	2.17E+03	5.22E+02	7.80E+02	1.88E+02	7.80E+02	1.88E+02	7.80E+02	1.88E+02	2010
2015	2.27E+03	7.11E+02	8.18E+02	2.56E+02	8.18E+02	2.56E+02	8.18E+02	2.56E+02	2015
2020	2.20E+03	8.73E+02	7.91E+02	3.14E+02	7.91E+02	3.14E+02	7.91E+02	3.14E+02	2020
2025	2.10E+03	9.72E+02	7.57E+02	3.50E+02	7.57E+02	3.50E+02	7.57E+02	3.50E+02	2025
2030	2.12E+03	9.72E+02	7.64E+02	3.50E+02	7.64E+02	3.50E+02	7.64E+02	3.50E+02	2030
2035	1.30E+03	8.32E+02	7.30E+02	4.68E+02	7.30E+02	4.68E+02	7.30E+02	4.68E+02	2035
2040	1.83E+03	1.28E+03	6.60E+02	4.59E+02	6.60E+02	4.59E+02	6.60E+02	4.59E+02	2040
2045	1.64E+03	8.64E+02	1.05E+03	5.53E+02	5.91E+02	3.11E+02	5.91E+02	3.11E+02	2045
2050	0.	0.	0.	0.	0.	0.	0.	0.	2050
2055	0.	0.	0.	0.	0.	0.	0.	0.	2055
2060	0.	0.	0.	0.	0.	0.	0.	0.	2060
2065	0.	0.	0.	0.	0.	0.	0.	0.	2065
2070	0.	0.	0.	0.	0.	0.	0.	0.	2070
2075	0.	0.	0.	0.	0.	0.	0.	0.	2075

TABLE 10.C.28 Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment
TRU Waste Containers Sent to Repository

YEAR	SOLID HIGH LEVEL CANISTERS ANNUAL	SOLID HIGH LEVEL CANISTERS CUMULATIVE	HULLS AND ASSEMBLY HARDWARE CANISTERS ANNUAL	HULLS AND ASSEMBLY HARDWARE CANISTERS CUMULATIVE	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR ANNUAL	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR CUMULATIVE	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR ANNUAL	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR CUMULATIVE	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR ANNUAL	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR CUMULATIVE	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1995
2000	1.93E+03	1.93E+03	1.91E+03	1.91E+03	1.69E+04	1.69E+04	1.59E+01	1.59E+01	7.85E+03	7.85E+03	2000
2005	2.86E+03	1.38E+04	2.87E+03	1.38E+04	2.55E+04	1.22E+05	2.40E+01	1.15E+02	1.18E+04	5.67E+04	2005
2010	3.94E+03	3.10E+04	3.07E+03	2.91E+04	2.71E+04	2.57E+05	2.56E+01	2.43E+02	1.26E+04	1.20E+05	2010
2015	3.94E+03	5.06E+04	3.16E+03	4.48E+04	2.80E+04	3.95E+05	2.64E+01	3.73E+02	1.30E+04	1.84E+05	2015
2020	2.64E+03	6.90E+04	2.03E+03	5.98E+04	1.80E+04	5.29E+05	1.70E+01	5.00E+02	8.37E+03	2.46E+05	2020
2025	2.80E+03	8.24E+04	1.91E+03	7.00E+04	1.69E+04	6.20E+05	1.60E+01	5.86E+02	7.87E+03	2.88E+05	2025
2030	2.64E+03	9.65E+04	1.43E+03	7.82E+04	1.27E+04	6.92E+05	1.20E+01	6.54E+02	5.90E+03	3.22E+05	2030
2035	1.94E+03	1.08E+05	9.56E+02	8.39E+04	8.47E+03	7.43E+05	8.00E+00	7.02E+02	3.94E+03	3.45E+05	2035
2040	1.32E+03	1.16E+05	9.94E+02	8.87E+04	8.47E+03	7.85E+05	8.00E+00	7.42E+02	3.94E+03	3.65E+05	2040
2045	1.32E+03	1.22E+05	0.	9.07E+04	0.	8.03E+05	0.	7.59E+02	0.	3.73E+05	2045
2050	0.	1.25E+05	0.	9.07E+04	0.	8.03E+05	0.	7.59E+02	0.	3.73E+05	2050
2055	0.	1.25E+05	0.	9.07E+04	0.	8.03E+05	0.	7.59E+02	0.	3.73E+05	2055
2060	0.	1.25E+05	0.	9.07E+04	0.	8.03E+05	0.	7.59E+02	0.	3.73E+05	2060
2065	0.	1.25E+05	0.	9.07E+04	0.	6.03E+05	0.	7.59E+02	0.	3.73E+05	2065
2070	0.	1.25E+05	0.	9.07E+04	0.	8.03E+05	0.	7.59E+02	0.	3.73E+05	2070
2075	0.	1.25E+05	0.	9.07E+04	0.	8.03E+05	0.	7.59E+02	0.	3.73E+05	2075

TABLE 10.C.28 Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment
TRU Waste Containers Sent to Repository

YEAR	INTERMEDIATE LEVEL CANISTERS .2-1 R/HR ANNUAL	INTERMEDIATE LEVEL CANISTERS .2-1 R/HR CUMULATIVE	INTERMEDIATE LEVEL DRUMS(55) .2-1 R/HR ANNUAL	INTERMEDIATE LEVEL DRUMS(55) .2-1 R/HR CUMULATIVE	LOW LEVEL DRUMS(55) 0-.2 R/HR ANNUAL	LOW LEVEL DRUMS(55) 0-.2 R/HR CUMULATIVE	LOW LEVEL BOXES 0-.2 R/HR ANNUAL	LOW LEVEL BOXES 0-.2 R/HR CUMULATIVE	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	0.	0.	1995
2000	2.67E+02	2.67E+02	7.72E+03	7.72E+03	2.15E+04	2.15E+04	3.40E+02	3.40E+02	2000
2005	4.03E+02	1.93E+03	1.16E+04	5.58E+04	3.26E+04	1.57E+05	5.14E+02	2.48E+03	2005
2010	4.30E+02	4.08E+03	1.24E+04	1.18E+05	3.69E+04	3.38E+05	5.69E+02	5.28E+03	2010
2015	4.43E+02	6.26E+03	1.28E+04	1.81E+05	4.35E+04	5.42E+05	6.57E+02	8.40E+03	2015
2020	2.89E+02	8.38E+03	8.23E+03	2.42E+05	2.82E+04	7.40E+05	4.31E+02	1.14E+04	2020
2025	2.68E+02	9.82E+03	7.74E+03	2.84E+05	2.59E+04	8.75E+05	4.01E+02	1.35E+04	2025
2030	2.01E+02	1.10E+04	5.81E+03	3.17E+05	1.92E+04	9.82E+05	3.03E+02	1.52E+04	2030
2035	1.34E+02	1.18E+04	3.47E+03	3.40E+05	1.11E+04	1.05E+06	1.93E+02	1.63E+04	2035
2040	1.34E+02	1.24E+04	3.87E+03	3.59E+05	1.51E+04	1.11E+06	2.67E+02	1.75E+04	2040
2045	0.	1.27E+04	0.	3.67E+05	3.79E+03	1.14E+06	1.50E+01	1.78E+04	2045
2050	0.	1.27E+04	0.	3.67E+05	0.	1.15E+06	0.	1.78E+04	2050
2055	0.	1.27E+04	0.	3.67E+05	3.79E+03	1.16E+06	1.50E+01	1.78E+04	2055
2060	0.	1.27E+04	0.	3.67E+05	3.79E+03	1.17E+06	1.50E+01	1.79E+04	2060
2065	0.	1.27E+04	0.	3.67E+05	3.79E+03	1.18E+06	1.50E+01	1.79E+04	2065
2070	0.	1.27E+04	0.	3.67E+05	0.	1.18E+06	0.	1.79E+04	2070
2075	0.	1.27E+04	0.	3.67E+05	1.14E+04	1.21E+06	4.50E+01	1.80E+04	2075

TABLE 10.C.28 Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment
TRU Waste Containers Sent to Repository

YEAR	INTERMEDIATE LEVEL DRUMS(80) 1-10 R/HR ANNUAL	CUMULATIVE	INTERMEDIATE LEVEL DRUMS(80) .2-1 R/HR ANNUAL	CUMULATIVE	LOW LEVEL DRUMS(80) 0-.2 R/HR ANNUAL	CUMULATIVE	YEAR
1985	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	1995
2000	0.	0.	0.	0.	0.	0.	2000
2005	0.	0.	0.	0.	0.	0.	2005
2010	0.	0.	0.	0.	0.	0.	2010
2015	0.	0.	0.	0.	7.20E+01	2.88E+02	2015
2020	0.	0.	0.	0.	7.20E+01	5.76E+02	2020
2025	0.	0.	0.	0.	7.20E+01	7.92E+02	2025
2030	0.	0.	0.	0.	7.20E+01	1.08E+03	2030
2035	0.	0.	0.	0.	7.20E+01	1.37E+03	2035
2040	0.	0.	0.	0.	2.16E+02	2.16E+03	2040
2045	0.	0.	0.	0.	1.18E+03	6.88E+03	2045
2050	0.	0.	0.	0.	0.	9.24E+03	2050
2055	0.	0.	0.	0.	1.15E+03	1.28E+04	2055
2060	0.	0.	0.	0.	1.18E+03	1.63E+04	2060
2065	0.	0.	0.	0.	1.18E+03	1.99E+04	2065
2070	0.	0.	0.	0.	0.	1.99E+04	2070
2075	0.	0.	0.	0.	3.54E+03	2.69E+04	2075

TABLE 10.C.29 Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment
Radioactivity in TRU Waste Containers

(CURIES/CONTAINER)

YEAR	SOLID HIGH LEVEL CANISTERS FP+AP	SOLID HIGH LEVEL CANISTERS ACTINIDES	HULLS AND ASSEMBLY HARDWARE CANISTERS FP+AP	HULLS AND ASSEMBLY HARDWARE CANISTERS ACTINIDES	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR FP+AP	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR ACTINIDES	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR FP+AP	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR ACTINIDES	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR FP+AP	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR ACTINIDES	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1995
2000	8.43E+05	1.86E+04	3.21E+04	3.47E+02	9.83E+01	2.67E+02	2.87E+00	6.58E-01	6.69E-01	1.56E-01	2000
2005	8.27E+05	1.86E+04	2.66E+04	3.36E+02	7.36E+01	2.58E+02	2.39E+00	6.36E-01	5.57E-01	1.51E-01	2005
2010	8.22E+05	2.02E+04	2.60E+04	[illegible]	[illegible]	3.04E+02	2.51E+00	7.55E-01	5.85E-01	1.79E-01	2010
2015	8.52E+05	2.76E+04	2.06E+04	3.99E+02	6.41E+01	3.04E+02	2.09E+00	7.57E-01	4.87E-01	1.80E-01	2015
2020	9.14E+05	3.98E+04	2.88E+04	5.84E+02	7.92E+01	4.43E+02	2.55E+00	1.11E+00	5.95E-01	2.63E-01	2020
2025	8.89E+05	4.41E+04	3.06E+04	5.96E+02	1.02E+02	4.51E+02	2.92E+00	1.13E+00	6.79E-01	2.68E-01	2025
2030	8.89E+05	4.42E+04	2.79E+04	7.34E+02	9.77E+01	5.54E+02	2.76E+00	1.39E+00	6.43E-01	3.30E-01	2030
2035	8.54E+05	5.88E+04	2.42E+04	6.89E+02	6.87E+01	5.19E+02	2.23E+00	1.31E+00	5.20E-01	3.10E-01	2035
2040	7.88E+05	5.75E+04	2.17E+04	4.96E+02	5.06E+01	3.77E+02	1.88E+00	9.41E-01	4.38E-01	2.23E-01	2040
2045	7.11E+05	5.91E+04	0.	0.	0.	0.	0.	0.	0.	0.	2045
2050	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2050
2055	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2055
2060	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2060
2065	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2065
2070	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2070
2075	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2075

TABLE 10.C.29 Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment
Radioactivity in TRU Waste Containers

(CURIES/CONTAINER)

YEAR	INTERMEDIATE LEVEL CANISTERS FP+AP	INTERMEDIATE LEVEL CANISTERS .2-1 R/HR ACTINIDES	INTERMEDIATE LEVEL DRUMS(55) FP+AP	INTERMEDIATE LEVEL DRUMS(55) .2-1 R/HR ACTINIDES	LOW LEVEL DRUMS(55) FP+AP	LOW LEVEL DRUMS(55) 0-.2 R/HR ACTINIDES	LOW LEVEL BOXES FP+AP	LOW LEVEL BOXES 0-.2 R/HR ACTINIDES	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	0.	0.	1995
2000	3.57E-01	8.17E-02	4.99E-02	6.64E+00	3.26E-01	8.21E+01	2.24E-02	2.04E+01	2000
2005	2.97E-01	7.89E-02	4.16E-02	6.42E+00	3.30E-01	7.57E+01	1.87E-02	1.96E+01	2005
2010	3.12E-01	9.37E-02	4.36E-02	7.56E+00	3.06E-01	8.19E+01	1.84E-02	2.22E+01	2010
2015	2.60E-01	9.40E-02	3.63E-02	7.56E+00	2.51E-01	7.91E+01	1.40E-02	4.68E+01	2015
2020	3.17E-01	1.37E-01	4.44E-02	1.10E+01	2.47E-01	9.64E+01	1.68E-02	6.89E+01	2020
2025	3.62E-01	1.40E-01	5.07E-02	1.12E+01	2.51E-01	9.48E+01	1.94E-02	7.27E+01	2025
2030	3.43E-01	1.73E-01	4.80E-02	1.34E+01	2.28E-01	1.03E+02	1.82E-02	9.27E+01	2030
2035	2.77E-01	1.62E-01	3.88E-02	1.29E+01	2.37E-01	5.23E+01	1.55E-02	1.24E+02	2035
2040	2.34E-01	1.17E-01	3.27E-02	9.37E+00	1.60E-01	1.10E+01	9.38E-03	2.14E+02	2040
2045	0.	0.	0.	0.	2.03E-01	5.52E-02	4.69E+01	1.27E+01	2045
2050	0.	0.	0.	0.	0.	0.	0.	0.	2050
2055	0.	0.	0.	0.	2.03E-01	5.52E-02	4.69E+01	1.27E+01	2055
2060	0.	0.	0.	0.	2.03E-01	5.52E-02	4.69E+01	1.27E+01	2060
2065	0.	0.	0.	0.	2.03E-01	5.52E-02	4.69E+01	1.27E+01	2065
2070	0.	0.	0.	0.	0.	0.	0.	0.	2070
2075	0.	0.	0.	0.	2.03E-01	5.52E-02	4.69E+01	1.27E+01	2075

TABLE 10.C.29 Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment
Radioactivity in TRU Waste Containers

	CURIES/CONTAINER						CURIES ANNUAL TOTAL		CUMULATIVE CURIES		
	INTERMEDIATE LEVEL DRUMS(80) 1-10 R/HR		INTERMEDIATE LEVEL DRUMS(80) .2-1 R/HR		LOW LEVEL DRUMS(80) 0-.2 R/HR						
YEAR	FP+AP	ACTINIDES	FP+AP	ACTINIDES	FP+AP	ACTINIDES	FP+AP	ACTINIDES	FP+AP	ACTINIDES	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1995
2000	0.	0.	0.	0.	0.	0.	1.69E+09	4.28E+07	1.63E+09	4.21E+07	2000
2005	0.	0.	0.	0.	0.	0.	2.44E+09	6.32E+07	1.03E+10	2.67E+08	2005
2010	0.	0.	0.	0.	0.	0.	3.32E+09	9.21E+07	2.13E+10	5.41E+08	2010
2015	0.	0.	0.	0.	0.	4.44E+02	3.42E+09	1.22E+08	3.33E+10	1.03E+09	2015
2020	0.	0.	0.	0.	0.	4.44E+02	2.48E+09	1.17E+08	4.25E+10	1.48E+09	2020
2025	0.	0.	0.	0.	0.	4.44E+02	2.55E+09	1.33E+08	4.78E+10	1.84E+09	2025
2030	0.	0.	0.	0.	0.	4.44E+02	2.38E+09	1.27E+08	5.31E+10	2.23E+09	2030
2035	0.	0.	0.	0.	0.	4.44E+02	1.71E+09	1.22E+08	5.50E+10	2.51E+09	2035
2040	0.	0.	0.	0.	0.	4.44E+02	1.06E+09	7.98E+07	5.40E+10	2.60E+09	2040
2045	0.	0.	0.	0.	2.71E-01	1.98E-01	9.37E+08	5.15E+07	5.19E+10	2.57E+09	2045
2050	0.	0.	0.	0.	0.	0.	0.	0.	4.74E+10	2.30E+09	2050
2055	0.	0.	0.	0.	2.71E-01	1.98E-01	1.79E+03	6.33E+02	4.20E+10	2.02E+09	2055
2060	0.	0.	0.	0.	2.71E-01	1.98E-01	1.79E+03	6.33E+02	3.73E+10	1.78E+09	2060
2065	0.	0.	0.	0.	2.71E-01	1.98E-01	1.79E+03	6.33E+02	3.31E+10	1.59E+09	2065
2070	0.	0.	0.	0.	0.	0.	0.	0.	2.94E+10	1.43E+09	2070
2075	0.	0.	0.	0.	2.71E-01	1.98E-01	5.38E+03	1.90E+03	2.68E+10	1.32E+09	2075

TABLE 10.C.30 Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment
Heat Generation Rate in TRU Waste Containers

(WATTS/CONTAINER)

YEAR	SOLID HIGH LEVEL CANISTERS FP+AP	SOLID HIGH LEVEL CANISTERS ACTINIDES	HULLS AND ASSEMBLY HARDWARE CANISTERS FP+AP	HULLS AND ASSEMBLY HARDWARE CANISTERS ACTINIDES	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR FP+AP	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR ACTINIDES	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR FP+AP	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR ACTINIDES	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR FP+AP	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR ACTINIDES	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1995
2000	2.90E+03	5.71E+02	2.49E+02	9.91E-01	5.11E-01	3.22E-01	1.27E-02	1.88E-03	2.96E-03	4.81E-04	2000
2005	2.83E+03	5.73E+02	2.11E+02	1.01E+00	5.81E-01	3.58E-01	1.04E-02	1.91E-03	2.41E-03	4.49E-04	2005
2010	2.79E+03	6.26E+02	2.06E+02	1.34E+00	4.25E-01	4.60E-01	1.10E-02	2.53E-03	2.56E-03	5.95E-04	2010
2015	2.92E+03	8.65E+02	1.64E+02	1.48E+00	3.32E-01	5.40E-01	8.95E-03	2.81E-03	2.08E-03	6.50E-04	2015
2020	3.14E+03	1.26E+03	2.38E+02	1.49E+00	4.11E-01	6.26E-01	1.11E-02	3.78E-03	2.58E-03	8.87E-04	2020
2025	3.03E+03	1.40E+03	2.48E+02	2.11E+00	5.31E-01	6.50E-01	1.29E-02	4.00E-03	3.01E-03	9.37E-04	2025
2030	3.05E+03	1.40E+03	2.31E+02	2.79E+00	5.08E-01	8.72E-01	1.22E-02	5.29E-03	2.83E-03	1.24E-03	2030
2035	2.92E+03	1.87E+03	2.04E+02	2.66E+00	3.55E-01	8.68E-01	9.52E-03	5.04E-03	2.21E-03	1.18E-03	2035
2040	2.64E+03	1.84E+03	1.84E+02	1.91E+00	2.60E-01	6.99E-01	7.78E-03	3.62E-03	1.81E-03	8.51E-04	2040
2045	2.36E+03	1.24E+03	0.	0.	0.	0.	0.	0.	0.	0.	2045
2050	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2050
2055	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2055
2060	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2060
2065	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2065
2070	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2070
2075	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2075

TABLE 10.C.30 Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment
Heat Generation Rate in TRU Waste Containers

(WATTS/CONTAINER)

YEAR	INTERMEDIATE LEVEL CANISTERS FP+AP	INTERMEDIATE LEVEL CANISTERS .2-1 R/HR ACTINIDES	INTERMEDIATE LEVEL DRUMS(55) FP+AP	INTERMEDIATE LEVEL DRUMS(55) .2-1 R/HR ACTINIDES	LOW LEVEL DRUMS(55) FP+AP	LOW LEVEL DRUMS(55) 0-.2 R/HR ACTINIDES	LOW LEVEL BOXES FP+AP	LOW LEVEL BOXES 0-.2 R/HR ACTINIDES	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	0.	0.	1995
2000	1.54E-03	2.33E-04	2.21E-04	7.93E-03	2.74E-04	7.24E-02	9.94E-05	2.37E-02	2000
2005	1.29E-03	2.36E-04	1.80E-04	9.82E-03	2.43E-04	7.54E-02	8.08E-05	2.62E-02	2005
2010	1.37E-03	3.15E-04	1.91E-04	1.13E-02	2.37E-04	8.86E-02	8.26E-05	3.23E-02	2010
2015	1.11E-03	3.48E-04	1.55E-04	1.33E-02	1.78E-04	1.21E-01	5.99E-05	9.18E-01	2015
2020	1.38E-03	4.69E-04	1.92E-04	1.54E-02	2.00E-04	1.23E-01	7.28E-05	1.38E+00	2020
2025	1.61E-03	4.96E-04	2.24E-04	1.60E-02	2.29E-04	1.25E-01	8.60E-05	1.49E+00	2025
2030	1.51E-03	6.56E-04	2.11E-04	2.14E-02	2.16E-04	1.51E-01	8.03E-05	1.97E+00	2030
2035	1.18E-03	6.26E-04	1.65E-04	2.13E-02	2.00E-04	1.37E-01	6.58E-05	3.07E+00	2035
2040	9.66E-04	4.50E-04	1.35E-04	1.72E-02	1.25E-04	2.10E-01	3.88E-05	6.56E+00	2040
2045	0.	0.	0.	0.	9.16E-04	6.15E-04	2.11E-01	1.40E-01	2045
2050	0.	0.	0.	0.	0.	0.	0.	0.	2050
2055	0.	0.	0.	0.	9.16E-04	6.15E-04	2.11E-01	1.40E-01	2055
2060	0.	0.	0.	0.	9.16E-04	6.15E-04	2.11E-01	1.40E-01	2060
2065	0.	0.	0.	0.	9.16E-04	6.15E-04	2.11E-01	1.40E-01	2065
2070	0.	0.	0.	0.	0.	0.	0.	0.	2070
2075	0.	0.	0.	0.	9.16E-04	6.15E-04	2.11E-01	1.40E-01	2075

TABLE 10.C.30 Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment
Heat Generation Rate in TRU Waste Containers

(WATTS/CONTAINER)

YEAR	INTERMEDIATE LEVEL DRUMS(80) FP+AP	INTERMEDIATE LEVEL 1-10 R/HR ACTINIDES	INTERMEDIATE LEVEL DRUMS(80) FP+AP	INTERMEDIATE LEVEL .2-1 R/HR ACTINIDES	LOW LEVEL DRUMS(80) FP+AP	LOW LEVEL 0-.2 R/HR ACTINIDES	YEAR
1985	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	1995
2000	0.	0.	0.	0.	0.	0.	2000
2005	0.	0.	0.	0.	0.	0.	2005
2010	0.	0.	0.	0.	0.	0.	2010
2015	0.	0.	0.	0.	0.	1.47E+01	2015
2020	0.	0.	0.	0.	0.	1.47E+01	2020
2025	0.	0.	0.	0.	0.	1.47E+01	2025
2030	0.	0.	0.	0.	0.	1.47E+01	2030
2035	0.	0.	0.	0.	0.	1.47E+01	2035
2040	0.	0.	0.	0.	0.	1.47E+01	2040
2045	0.	0.	0.	0.	1.21E-03	2.20E-03	2045
2050	0.	0.	0.	0.	0.	0.	2050
2055	0.	0.	0.	0.	1.21E-03	2.20E-03	2055
2060	0.	0.	0.	0.	1.21E-03	2.20E-03	2060
2065	0.	0.	0.	0.	1.21E-03	2.20E-03	2065
2070	0.	0.	0.	0.	0.	0.	2070
2075	0.	0.	0.	0.	1.21E-03	2.20E-03	2075

TABLE 10.C.31 Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment
TRU Waste Containers in Interim Storage

YEAR	SOLID HIGH LEVEL CANISTERS ANNUAL	SOLID HIGH LEVEL CANISTERS CUMULATIVE	HULLS AND ASSEMBLY HARDWARE CANISTERS ANNUAL	HULLS AND ASSEMBLY HARDWARE CANISTERS CUMULATIVE	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR ANNUAL	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR CUMULATIVE	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR ANNUAL	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR CUMULATIVE	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR ANNUAL	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR CUMULATIVE	YEAR
1976	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1976
1977	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1977
1978	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1978
1979	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1979
1980	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1980
1981	0.	0.	1.20E+02	1.20E+02	1.06E+03	1.06E+03	1.00E+00	1.00E+00	4.92E+02	4.92E+02	1981
1982	0.	0.	2.39E+02	3.59E+02	2.12E+03	3.18E+03	2.00E+00	3.00E+00	9.84E+02	1.48E+03	1982
1983	0.	0.	3.59E+02	7.17E+02	3.18E+03	6.35E+03	3.00E+00	6.00E+00	1.48E+03	2.95E+03	1983
1984	0.	0.	3.59E+02	1.08E+03	3.18E+03	9.53E+03	3.00E+00	9.00E+00	1.48E+03	4.43E+03	1984
1985	0.	0.	5.18E+02	1.59E+03	4.59E+03	1.41E+04	4.33E+00	1.33E+01	2.13E+03	6.56E+03	1985
1986	2.37E+02	2.37E+02	6.77E+02	2.27E+03	6.00E+03	2.01E+04	5.67E+00	1.90E+01	2.79E+03	9.35E+03	1986
1987	4.74E+02	7.12E+02	8.37E+02	3.11E+03	7.41E+03	2.75E+04	7.00E+00	2.60E+01	3.44E+03	1.28E+04	1987
1988	7.12E+02	1.42E+03	8.37E+02	3.94E+03	7.41E+03	3.49E+04	7.00E+00	3.30E+01	3.44E+03	1.62E+04	1988
1989	7.12E+02	2.13E+03	8.37E+02	4.78E+03	7.41E+03	4.23E+04	7.00E+00	4.00E+01	3.44E+03	1.97E+04	1989
1990	1.03E+03	3.16E+03	8.37E+02	5.62E+03	7.41E+03	4.97E+04	7.00E+00	4.70E+01	3.44E+03	2.31E+04	1990
1991	1.34E+03	4.51E+03	8.37E+02	6.45E+03	7.41E+03	5.72E+04	7.00E+00	5.40E+01	3.44E+03	2.66E+04	1991
1992	1.66E+03	6.17E+03	8.37E+02	7.29E+03	7.41E+03	6.46E+04	7.00E+00	6.10E+01	3.44E+03	3.00E+04	1992
1993	1.66E+03	7.83E+03	9.96E+02	8.29E+03	8.82E+03	7.34E+04	8.33E+00	6.93E+01	4.10E+03	3.41E+04	1993
1994	1.66E+03	9.49E+03	1.16E+03	9.44E+03	1.02E+04	8.36E+04	9.67E+00	7.90E+01	4.76E+03	3.89E+04	1994
1995	1.66E+03	1.11E+04	1.31E+03	1.08E+04	1.16E+04	9.53E+04	1.10E+01	9.00E+01	5.41E+03	4.43E+04	1995
1996	1.66E+03	1.28E+04	1.31E+03	1.21E+04	1.16E+04	1.07E+05	1.10E+01	1.01E+02	5.41E+03	4.97E+04	1996
1997	1.66E+03	1.45E+04	1.31E+03	1.34E+04	1.16E+04	1.19E+05	1.10E+01	1.12E+02	5.41E+03	5.51E+04	1997
1998	1.98E+03	1.64E+04	1.47E+03	1.49E+04	1.31E+04	1.32E+05	1.23E+01	1.24E+02	6.07E+03	6.12E+04	1998

TABLE 10.C.31 Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment
TRU Waste Containers in Interim Storage

YEAR	SOLID HIGH LEVEL CANISTERS ANNUAL	SOLID HIGH LEVEL CANISTERS CUMULATIVE	HULLS AND ASSEMBLY HARDWARE CANISTERS ANNUAL	HULLS AND ASSEMBLY HARDWARE CANISTERS CUMULATIVE	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR ANNUAL	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR CUMULATIVE	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR ANNUAL	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR CUMULATIVE	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR ANNUAL	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR CUMULATIVE	YEAR
1999	2.29E+03	1.87E+04	1.63E+03	1.65E+04	1.45E+04	1.46E+05	1.37E+01	1.38E+02	6.78E+03	6.79E+04	1999
2000	-1.66E+02	1.86E+04	-1.14E+02	1.64E+04	-1.01E+03	1.45E+05	-9.50E-01	1.37E+02	-4.67E+02	6.74E+04	2000
2001	-2.61E+02	1.83E+04	-2.21E+02	1.62E+04	-1.96E+03	1.43E+05	-1.85E+00	1.35E+02	-9.10E+02	6.65E+04	2001
2002	-3.54E+02	1.80E+04	-3.29E+02	1.58E+04	-2.91E+03	1.40E+05	-2.75E+00	1.32E+02	-1.35E+03	6.52E+04	2002
2003	-4.98E+02	1.75E+04	-3.41E+02	1.55E+04	-3.02E+03	1.37E+05	-2.85E+00	1.30E+02	-1.40E+03	6.38E+04	2003
2004	-4.98E+02	1.70E+04	-4.60E+02	1.50E+04	-4.08E+03	1.33E+05	-3.85E+00	1.26E+02	-1.89E+03	6.19E+04	2004
2005	-5.61E+02	1.64E+04	-6.03E+02	1.44E+04	-5.34E+03	1.28E+05	-5.05E+00	1.21E+02	-2.48E+03	5.94E+04	2005
2006	-7.20E+02	1.57E+04	-7.47E+02	1.37E+04	-6.62E+03	1.21E+05	-6.25E+00	1.14E+02	-3.08E+03	5.63E+04	2006
2007	-9.09E+02	1.48E+04	-7.95E+02	1.29E+04	-7.04E+03	1.14E+05	-6.65E+00	1.08E+02	-3.27E+03	5.30E+04	2007
2008	-1.04E+03	1.37E+04	-7.95E+02	1.21E+04	-7.04E+03	1.07E+05	-6.65E+00	1.01E+02	-3.27E+03	4.98E+04	2008
2009	-1.16E+03	1.26E+04	-7.95E+02	1.13E+04	-7.04E+03	1.00E+05	-6.65E+00	9.45E+01	-3.27E+03	4.65E+04	2009
2010	-1.16E+03	1.14E+04	-7.95E+02	1.05E+04	-7.04E+03	9.30E+04	-6.65E+00	8.78E+01	-3.27E+03	4.32E+04	2010
2011	-1.16E+03	1.02E+04	-7.95E+02	9.70E+03	-7.04E+03	8.59E+04	-6.65E+00	8.12E+01	-3.27E+03	4.00E+04	2011
2012	-1.16E+03	9.09E+03	-8.50E+02	8.85E+03	-7.53E+03	7.84E+04	-7.12E+00	7.41E+01	-3.50E+03	3.65E+04	2012
2013	-1.16E+03	7.92E+03	-9.94E+02	7.86E+03	-8.80E+03	6.96E+04	-8.32E+00	6.58E+01	-4.09E+03	3.24E+04	2013
2014	-1.16E+03	6.76E+03	-1.14E+03	6.72E+03	-1.01E+04	5.95E+04	-9.52E+00	5.62E+01	-4.68E+03	2.77E+04	2014
2015	-1.16E+03	5.60E+03	-1.25E+03	5.47E+03	-1.11E+04	4.85E+04	-1.05E+01	4.58E+01	-5.14E+03	2.25E+04	2015
2016	-1.16E+03	4.44E+03	-1.25E+03	4.22E+03	-1.11E+04	3.74E+04	-1.00E+01	3.53E+01	-5.14E+03	1.74E+04	2016
2017	-1.35E+03	3.08E+03	-1.26E+03	2.96E+03	-1.12E+04	2.62E+04	-1.06E+01	2.48E+01	-5.21E+03	1.22E+04	2017
2018	-1.48E+03	1.61E+03	-1.41E+03	1.55E+03	-1.25E+04	1.37E+04	-1.18E+01	1.30E+01	-5.80E+03	6.39E+03	2018
2019	-1.61E+03	9.44E-11	-1.55E+03	7.72E-11	-1.37E+04	7.02E-10	-1.30E+01	6.54E-13	-6.39E+03	3.16E-10	2019
2020	-9.44E-11	0.	-7.72E-11	0.	-7.02E-10	0.	-6.54E-13	0.	-3.16E-10	0.	2020
2021	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2021
2022	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2022
2023	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2023
2024	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2024

TABLE 10.C.31 Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment
TRU Waste Containers in Interim Storage

YEAR	INTERMEDIATE LEVEL CANISTERS .2-1 R/HR ANNUAL	INTERMEDIATE LEVEL CANISTERS .2-1 R/HR CUMULATIVE	INTERMEDIATE LEVEL DRUMS(55) .2-1 R/HR ANNUAL	INTERMEDIATE LEVEL DRUMS(55) .2-1 R/HR CUMULATIVE	LOW LEVEL DRUMS(55) 0-.2 R/HR ANNUAL	LOW LEVEL DRUMS(55) 0-.2 R/HR CUMULATIVE	LOW LEVEL BOXES 0-.2 R/HR ANNUAL	LOW LEVEL BOXES 0-.2 R/HR CUMULATIVE	YEAR
1976	0.	0.	0.	0.	0.	0.	0.	0.	1976
1977	0.	0.	0.	0.	0.	0.	0.	0.	1977
1978	0.	0.	0.	0.	0.	0.	0.	0.	1978
1979	0.	0.	0.	0.	0.	0.	0.	0.	1979
1980	0.	0.	0.	0.	0.	0.	0.	0.	1980
1981	1.68E+01	1.68E+01	4.84E+02	4.84E+02	9.51E+02	9.51E+02	1.75E+01	1.75E+01	1981
1982	3.35E+01	5.03E+01	9.68E+02	1.45E+03	2.17E+03	3.12E+03	3.76E+01	5.52E+01	1982
1983	5.03E+01	1.01E+02	1.45E+03	2.90E+03	3.42E+03	6.55E+03	5.80E+01	1.13E+02	1983
1984	5.03E+01	1.51E+02	1.45E+03	4.36E+03	3.76E+03	1.03E+04	6.12E+01	1.74E+02	1984
1985	7.26E+01	2.24E+02	2.10E+03	6.45E+03	5.07E+03	1.54E+04	8.50E+01	2.59E+02	1985
1986	9.50E+01	3.18E+02	2.74E+03	9.20E+03	6.78E+03	2.21E+04	1.13E+02	3.72E+02	1986
1987	1.17E+02	4.36E+02	3.39E+03	1.26E+04	8.45E+03	3.06E+04	1.40E+02	5.12E+02	1987
1988	1.17E+02	5.53E+02	3.39E+03	1.60E+04	8.89E+03	3.95E+04	1.44E+02	6.56E+02	1988
1989	1.17E+02	6.71E+02	3.39E+03	1.94E+04	9.09E+03	4.86E+04	1.46E+02	8.01E+02	1989
1990	1.17E+02	7.88E+02	3.39E+03	2.28E+04	9.32E+03	5.79E+04	1.48E+02	9.50E+02	1990
1991	1.17E+02	9.05E+02	3.39E+03	2.61E+04	9.49E+03	6.74E+04	1.50E+02	1.10E+03	1991
1992	1.17E+02	1.02E+03	3.39E+03	2.95E+04	9.65E+03	7.70E+04	1.51E+02	1.25E+03	1992
1993	1.40E+02	1.16E+03	4.03E+03	3.36E+04	1.12E+04	8.82E+04	1.77E+02	1.43E+03	1993
1994	1.62E+02	1.32E+03	4.68E+03	3.82E+04	1.32E+04	1.01E+05	2.07E+02	1.64E+03	1994
1995	1.84E+02	1.51E+03	5.32E+03	4.36E+04	1.52E+04	1.17E+05	2.38E+02	1.87E+03	1995
1996	1.84E+02	1.69E+03	5.32E+03	4.89E+04	1.57E+04	1.32E+05	2.42E+02	2.12E+03	1996
1997	1.84E+02	1.88E+03	5.32E+03	5.42E+04	1.56E+04	1.48E+05	2.41E+02	2.36E+03	1997
1998	2.07E+02	2.08E+03	5.97E+03	6.02E+04	1.69E+04	1.65E+05	2.65E+02	2.62E+03	1998
1999	2.29E+02	2.31E+03	6.62E+03	6.68E+04	1.87E+04	1.83E+05	2.94E+02	2.92E+03	1999

TABLE 10.C.31 - Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment
TRU Waste Containers in Interim Storage

YEAR	INTERMEDIATE LEVEL CANISTERS .2-1 R/HR ANNUAL	INTERMEDIATE LEVEL CANISTERS .2-1 R/HR CUMULATIVE	INTERMEDIATE LEVEL DRUMS(55) .2-1 R/HR ANNUAL	INTERMEDIATE LEVEL DRUMS(55) .2-1 R/HR CUMULATIVE	LOW LEVEL DRUMS(55) 0-.2 R/HR ANNUAL	LOW LEVEL DRUMS(55) 0-.2 R/HR CUMULATIVE	LOW LEVEL BOXES 0-.2 R/HR ANNUAL	LOW LEVEL BOXES 0-.2 R/HR CUMULATIVE	YEAR
2000	-1.39E+01	2.30E+03	-4.60E+02	6.63E+04	-9.04E+02	1.88E+05	-1.67E+01	2.90E+03	2000
2001	-3.10E+01	2.27E+03	-8.96E+02	6.54E+04	-2.00E+03	1.80E+05	-3.47E+01	2.86E+03	2001
2002	-4.61E+01	2.22E+03	-1.33E+03	6.41E+04	-3.13E+03	1.77E+05	-5.31E+01	2.81E+03	2002
2003	-4.78E+01	2.17E+03	-1.38E+03	6.27E+04	-3.52E+03	1.74E+05	-5.77E+01	2.75E+03	2003
2004	-6.49E+01	2.11E+03	-1.86E+03	6.09E+04	-4.55E+03	1.69E+05	-7.60E+01	2.68E+03	2004
2005	-8.46E+01	2.02E+03	-2.44E+03	5.80E+04	-6.01E+03	1.63E+05	-1.00E+02	2.58E+03	2005
2006	-1.09E+02	1.92E+03	-3.03E+03	5.54E+04	-7.52E+03	1.56E+05	-1.29E+02	2.45E+03	2006
2007	-1.11E+02	1.81E+03	-3.22E+03	5.22E+04	-8.29E+03	1.47E+05	-1.35E+02	2.32E+03	2007
2008	-1.11E+02	1.70E+03	-3.22E+03	4.90E+04	-8.56E+03	1.39E+05	-1.38E+02	2.18E+03	2008
2009	-1.11E+02	1.58E+03	-3.22E+03	4.57E+04	-8.75E+03	1.30E+05	-1.40E+02	2.04E+03	2009
2010	-1.11E+02	1.47E+03	-3.22E+03	4.25E+04	-8.93E+03	1.21E+05	-1.41E+02	1.90E+03	2010
2011	-1.11E+02	1.36E+03	-3.22E+03	3.93E+04	-9.08E+03	1.12E+05	-1.43E+02	1.76E+03	2011
2012	-1.19E+02	1.24E+03	-3.45E+03	3.59E+04	-9.71E+03	1.08E+05	-1.53E+02	1.60E+03	2012
2013	-1.39E+02	1.10E+03	-4.03E+03	3.18E+04	-1.12E+04	9.12E+04	-1.77E+02	1.43E+03	2013
2014	-1.60E+02	9.43E+02	-4.61E+03	2.72E+04	-1.30E+04	7.82E+04	-2.05E+02	1.22E+03	2014
2015	-1.75E+02	7.68E+02	-5.06E+03	2.22E+04	-1.45E+04	6.37E+04	-2.27E+02	9.94E+02	2015
2016	-1.75E+02	5.93E+02	-5.06E+03	1.71E+04	-1.49E+04	4.88E+04	-2.30E+02	7.64E+02	2016
2017	-1.77E+02	4.15E+02	-5.12E+03	1.20E+04	-1.49E+04	3.39E+04	-2.32E+02	5.32E+02	2017
2018	-1.98E+02	2.18E+02	-5.70E+03	6.28E+03	-1.61E+04	1.78E+04	-2.53E+02	2.79E+02	2018
2019	-2.18E+02	1.18E-11	-6.28E+03	3.21E-10	-1.78E+04	8.92E-10	-2.79E+02	1.43E-11	2019
2020	-1.18E-11	0.	-3.21E-10	0.	-8.92E-10	0.	-1.43E-11	0.	2020
2021	0.	0.	0.	0.	0.	0.	0.	0.	2021
2022	0.	0.	0.	0.	0.	0.	0.	0.	2022
2023	0.	0.	0.	0.	0.	0.	0.	0.	2023
2024	0.	0.	0.	0.	0.	0.	0.	0.	2024

TABLE 10.C.32 - Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment - Revised Solid High Level Waste Container Sizes for Each Geologic Medium

Salt 3.2 kW/Can. Year	Dia.	Granite 1.7 kW/Can. Year	Dia.	Shale 1.2 kW/Can. Year	Dia.	Basalt 1.3 kW/Can. Year	Dia.
2000	10.	2000	8.	2000	6.	2000	6.
2001	10.	2001	8.	2001	6.	2001	6.
2002	10.	2002	8.	2002	6.	2002	6.
2003	10.	2003	8.	2003	6.	2003	6.
2004	10.	2004	8.	2004	6.	2004	6.
2005	10.	2005	8.	2005	6.	2005	6.
2006	10.	2006	8.	2006	6.	2006	6.
2007	10.	2007	8.	2007	6.	2007	6.
2008	10.	2008	8.	2008	6.	2008	6.
2009	10.	2009	8.	2009	6.	2009	6.
2010	10.	2010	8.	2010	6.	2010	6.
2011	10.	2011	8.	2011	6.	2011	6.
2012	10.	2012	8.	2012	6.	2012	6.
2013	10.	2013	8.	2013	6.	2013	6.
2014	10.	2014	8.	2014	6.	2014	6.
2015	10.	2015	8.	2015	6.	2015	6.
2016	10.	2016	8.	2016	6.	2016	6.
2017	10.	2017	8.	2017	6.	2017	6.
2018	10.	2018	8.	2018	6.	2018	6.
2019	10.	2019	8.	2019	6.	2019	6.
2020	10.	2020	6.	2020	6.	2020	6.
2021	10.	2021	6.	2021	6.	2021	6.
2022	10.	2022	6.	2022	6.	2022	6.
2023	10.	2023	6.	2023	6.	2023	6.
2024	10.	2024	6.	2024	6.	2024	6.
2025	10.	2025	6.	2025	6.	2025	6.
2026	8.	2026	6.	2026	6.	2026	6.
2027	8.	2027	6.	2027	6.	2027	6.
2028	10.	2028	6.	2028	6.	2028	6.
2029	10.	2029	6.	2029	6.	2029	6.
2030	10.	2030	6.	2030	6.	2030	6.
2031	10.	2031	6.	2031	6.	2031	6.
2032	8.	2032	6.	2032	6.	2032	6.
2033	8.	2033	6.	2033	6.	2033	6.
2034	8.	2034	6.	2034	6.	2034	6.
2035	8.	2035	6.	2035	6.	2035	6.
2036	8.	2036	6.	2036	6.	2036	6.
2037	8.	2037	6.	2037	6.	2037	6.
2038	8.	2038	6.	2038	6.	2038	6.
2039	10.	2039	6.	2039	6.	2039	6.
2040	10.	2040	6.	2040	6.	2040	6.
2041	10.	2041	6.	2041	6.	2041	6.
2042	10.	2042	6.	2042	6.	2042	6.
2043	10.	2043	6.	2043	6.	2043	6.
2044	10.	2044	6.	2044	6.	2044	6.
2045	10.	2045	8.	2045	6.	2045	6.
2046	10.	2046	8.	2046	6.	2046	6.
2047	12.	2047	8.	2047	6.	2047	6.
2048	12.	2048	8.	2048	6.	2048	6.
2049	12.	2049	10.	2049	8.	2049	8.

TABLE 10.C.33 Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment - TRU Waste Containers Sent to Repository Revised Solid High Level Waste Containers

	Salt 3.2 kW/Can.		Granite 1.7 kW/Can.		Shale 1.2 kW/Can.		Basalt 1.3 kW/Can.		
	SOLID HIGH LEVEL WASTE		SOLID HIGH LEVEL WASTE		SOLID HIGH LEVEL WASTE		SOLID HIGH LEVEL WASTE		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	0.	0.	1995
2000	2.78E+03	2.78E+03	4.34E+03	4.34E+03	7.71E+03	7.71E+03	7.71E+03	7.71E+03	2000
2005	4.12E+03	1.99E+04	6.44E+03	3.11E+04	1.14E+04	5.53E+04	1.14E+04	5.53E+04	2005
2010	5.67E+03	4.46E+04	8.86E+03	6.96E+04	1.57E+04	1.24E+05	1.57E+04	1.24E+05	2010
2015	5.67E+03	7.29E+04	8.86E+03	1.14E+05	1.57E+04	2.03E+05	1.57E+04	2.03E+05	2015
2020	3.80E+03	9.94E+04	1.05E+04	1.60E+05	1.05E+04	2.76E+05	1.05E+04	2.76E+05	2020
2025	4.05E+03	1.19E+05	1.12E+04	2.13E+05	1.12E+04	3.29E+05	1.12E+04	3.29E+05	2025
2030	3.80E+03	1.44E+05	1.05E+04	2.70E+05	1.05E+04	3.86E+05	1.05E+04	3.86E+05	2030
2035	4.45E+03	1.67E+05	7.91E+03	3.15E+05	7.91E+03	4.41E+05	7.91E+03	4.31E+05	2035
2040	1.90E+03	1.83E+05	5.27E+03	3.46E+05	5.27E+03	4.72E+05	5.27E+03	4.63E+05	2040
2045	1.90E+03	1.92E+05	2.97E+03	3.70E+05	5.27E+03	4.99E+05	5.27E+03	4.89E+05	2045
2050	0.	1.96E+05	0.	3.77E+05	0.	5.10E+05	0.	5.00E+05	2050
2055	0.	1.96E+05	0.	3.77E+05	0.	5.10E+05	0.	5.00E+05	2055
2060	0.	1.96E+05	0.	3.77E+05	0.	5.10E+05	0.	5.00E+05	2060
2065	0.	1.96E+05	0.	3.77E+05	0.	5.10E+05	0.	5.00E+05	2065
2070	0.	1.96E+05	0.	3.77E+05	0.	5.10E+05	0.	5.00E+05	2070
2075	0.	1.96E+05	0.	3.77E+05	0.	5.10E+05	0.	5.00E+05	2075

TABLE 10.C.34. Case 33 - U and Pu Recycle - Repository in 2000 - Reference Treatment - Radioactivity in TRU Waste Containers, Curies/Container
Revised Solid High Level Waste Containers

	Salt 3.2 kW/Can.		Granite 1.7 kW/Can.		Shale 1.2 kW/Can.		Basalt 1.3 kW/Can.		
	SOLID HIGH LEVEL CANISTERS		SOLID HIGH LEVEL CANISTERS		SOLID HIGH LEVEL CANISTERS		SOLID HIGH LEVEL CANISTERS		
YEAR	FP+AP	ACTINIDES	FP+AP	ACTINIDES	FP+AP	ACTINIDES	FP+AP	ACTINIDES	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	0.	0.	1995
2000	5.85E+05	1.29E+04	3.74E+05	8.25E+03	2.11E+05	4.54E+03	2.11E+05	4.64E+03	2000
2005	5.74E+05	1.29E+04	3.68E+05	8.25E+03	2.07E+05	4.64E+03	2.07E+05	4.64E+03	2005
2010	5.71E+05	1.40E+04	3.68E+05	8.97E+03	2.04E+05	5.05E+03	2.04E+05	5.05E+03	2010
2015	5.91E+05	1.92E+04	3.70E+05	1.23E+04	2.13E+05	6.90E+03	2.13E+05	6.90E+03	2015
2020	6.37E+05	2.77E+04	2.29E+05	9.96E+03	2.29E+05	9.96E+03	2.29E+05	9.96E+03	2020
2025	6.17E+05	3.06E+04	2.22E+05	1.10E+04	2.22E+05	1.10E+04	2.22E+05	1.10E+04	2025
2030	6.17E+05	3.07E+04	2.22E+05	1.11E+04	2.22E+05	1.11E+04	2.22E+05	1.11E+04	2030
2035	3.79E+05	2.61E+04	2.13E+05	1.47E+04	2.13E+05	1.47E+04	2.13E+05	1.47E+04	2035
2040	5.39E+05	3.89E+04	1.96E+05	1.44E+04	1.96E+05	1.44E+04	1.96E+05	1.44E+04	2040
2045	4.94E+05	2.71E+04	3.16E+05	1.74E+04	1.78E+05	9.77E+03	1.78E+05	9.77E+03	2045
2050	0.	0.	0.	0.	0.	0.	0.	0.	2050
2055	0.	0.	0.	0.	0.	0.	0.	0.	2055
2060	0.	0.	0.	0.	0.	0.	0.	0.	2060
2065	0.	0.	0.	0.	0.	0.	0.	0.	2065
2070	0.	0.	0.	0.	0.	0.	0.	0.	2070
2075	0.	0.	0.	0.	0.	0.	0.	0.	2075

TABLE 10.C.35. Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment - Heat Generation Rate in TRU Waste Containers, Watts/Container Revised Solid High Level Waste Containers

	Salt 3.2 kW/Can.		Granite 1.7 kW/Can.		Shale 1.2 kW/Can.		Basalt 1.3 kW/Can.		
	SOLID HIGH LEVEL CANISTERS		SOLID HIGH LEVEL CANISTERS		SOLID HIGH LEVEL CANISTERS		INTERMEDIATE LEVEL CANISTERS .2=1 R/HR		
YEAR	FP+AP	ACTINIDES	FP+AP	ACTINIDES	FP+AP	ACTINIDES	FP+AP	ACTINIDES	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	0.	0.	1995
2000	2.01E+03	3.96E+02	1.24E+03	2.54E+02	7.29E+02	1.43E+02	1.58E-03	2.33E-04	2000
2005	1.97E+03	3.98E+02	1.26E+03	2.55E+02	7.04E+02	1.43E+02	1.29E-03	2.38E-04	2005
2010	1.94E+03	4.34E+02	1.24E+03	2.78E+02	6.94E+02	1.56E+02	1.37E-03	3.15E-04	2010
2015	2.02E+03	6.00E+02	1.30E+03	3.84E+02	7.29E+02	2.16E+02	1.11E-03	3.48E-04	2015
2020	2.20E+03	8.73E+02	7.91E+02	3.14E+02	7.91E+02	3.14E+02	1.38E-03	4.69E-04	2020
2025	2.10E+03	9.72E+02	7.57E+02	3.30E+02	7.57E+02	3.30E+02	1.61E-03	4.96E-04	2025
2030	2.12E+03	9.72E+02	7.64E+02	3.50E+02	7.64E+02	3.50E+02	1.51E-03	6.56E-04	2030
2035	1.30E+03	8.32E+02	7.30E+02	4.68E+02	7.30E+02	4.68E+02	1.18E-03	6.26E-04	2035
2040	1.83E+03	1.28E+03	6.60E+02	4.59E+02	6.60E+02	4.59E+02	9.66E-04	4.50E-04	2040
2045	1.64E+03	8.64E+02	1.04E+03	5.53E+02	5.91E+02	3.11E+02	0.	0.	2045
2050	0.	0.	0.	0.	0.	0.	0.	0.	2050
2055	0.	0.	0.	0.	0.	0.	0.	0.	2055
2060	0.	0.	0.	0.	0.	0.	0.	0.	2060
2065	0.	0.	0.	0.	0.	0.	0.	0.	2065
2070	0.	0.	0.	0.	0.	0.	0.	0.	2070
2075	0.	0.	0.	0.	0.	0.	0.	0.	2075

TABLE 10.C.36. Case 4A - Deferred Decision for Once-Through Cycle - Reference Treatment - TRU Waste Containers Sent to Repository

	BWR CANISTERS		PWR CANISTERS		TOTAL CANISTERS		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1985	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	1995
2000	1.11E+04	1.11E+04	7.49E+03	7.48E+03	1.86E+04	1.86E+04	2000
2005	2.43E+04	1.11E+05	1.61E+04	7.18E+04	4.04E+04	1.82E+05	2005
2010	2.43E+04	2.32E+05	1.61E+04	1.52E+05	4.04E+04	3.84E+05	2010
2015	2.49E+04	3.53E+05	1.58E+04	2.33E+05	4.07E+04	5.86E+05	2015
2020	1.91E+04	4.52E+05	1.22E+04	2.96E+05	3.13E+04	7.48E+05	2020
2025	1.55E+04	5.35E+05	1.08E+04	3.53E+05	2.63E+04	8.88E+05	2025
2030	1.48E+04	6.15E+05	1.05E+04	4.04E+05	2.53E+04	1.02E+06	2030
2035	1.18E+04	6.83E+05	7.32E+03	4.46E+05	1.92E+04	1.13E+06	2035
2040	9.11E+03	7.35E+05	5.91E+03	4.79E+05	1.50E+04	1.21E+06	2040
2045	5.52E+03	7.71E+05	3.23E+03	5.01E+05	8.75E+03	1.27E+06	2045
2050	0.	7.77E+05	0.	5.04E+05	0.	1.28E+06	2050

TABLE 10.C.37. Case 4A - Deferred Decision for Once-Through Cycle - Reference Treatment - Radioactivity in TRU Waste Containers

	CURIES/CONTAINER				CURIES		
	BWR CANISTERS		PWR CANISTERS		CUMULATIVE		
YEAR	FP+AP	ACTINIDES	FP+AP	ACTINIDES	FP+AP	ACTINIDES	YEAR
1985	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	1995
2000	5.24E+04	1.28E+04	1.72E+05	4.40E+04	1.79E+09	4.53E+08	2000
2005	4.42E+04	1.07E+04	1.46E+05	3.73E+04	1.37E+10	3.58E+09	2005
2010	5.13E+04	1.24E+04	1.64E+05	4.18E+04	2.76E+10	7.14E+09	2010
2015	5.18E+04	1.23E+04	1.62E+05	4.10E+04	4.02E+10	1.02E+10	2015
2020	5.72E+04	1.36E+04	1.80E+05	4.57E+04	4.89E+10	1.21E+10	2020
2025	5.95E+04	1.43E+04	1.80E+05	4.57E+04	5.49E+10	1.32E+10	2025
2030	5.68E+04	1.34E+04	1.73E+05	4.33E+04	5.93E+10	1.39E+10	2030
2035	5.45E+04	1.27E+04	1.73E+05	4.32E+04	6.08E+10	1.38E+10	2035
2040	4.94E+04	1.10E+04	1.62E+05	3.95E+04	6.00E+10	1.31E+10	2040
2045	4.16E+04	8.32E+03	1.41E+05	3.22E+04	5.67E+10	1.18E+10	2045
2050	0.	0.	0.	0.	5.04E+10	9.91E+09	2050

TABLE 10.C.38. Case 4A - Deferred Decision for Once-Through Cycle - Reference Treatment - Heat Generation Rate in TRU Waste Containers

WATTS/CONTAINER

YEAR	BWR CANISTERS FP+AP	BWR CANISTERS ACTINIDES	PWR CANISTERS FP+AP	PWR CANISTERS ACTINIDES	YEAR
1985	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	1995
2000	1.85E+02	2.28E+01	6.27E+02	8.48E+01	2000
2005	1.54E+02	2.39E+01	5.18E+02	8.80E+01	2005
2010	1.79E+02	2.61E+01	5.89E+02	9.40E+01	2010
2015	1.81E+02	2.67E+01	5.79E+02	9.39E+01	2015
2020	2.02E+02	2.55E+01	6.57E+02	9.02E+01	2020
2025	2.11E+02	2.71E+01	6.57E+02	9.02E+01	2025
2030	2.01E+02	2.52E+01	6.30E+02	8.47E+01	2030
2035	1.92E+02	2.36E+01	6.28E+02	8.48E+01	2035
2040	1.72E+02	2.00E+01	5.86E+02	7.59E+01	2040
2045	1.42E+02	1.85E+01	5.02E+02	9.91E+01	2045
2050	0.	0.	0.	0.	2050

TABLE 10.C.39. Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment - TRU Waste Containers Sent to Repository

YEAR	SOLID HIGH LEVEL CANISTERS ANNUAL	SOLID HIGH LEVEL CANISTERS CUMULATIVE	HULLS AND ASSEMBLY HARDWARE CANISTERS ANNUAL	HULLS AND ASSEMBLY HARDWARE CANISTERS CUMULATIVE	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR ANNUAL	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR CUMULATIVE	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR ANNUAL	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR CUMULATIVE	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR ANNUAL	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR CUMULATIVE	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1995
2000	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2000
2005	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2005
2010	0.	0.	1.59E+02	1.59E+02	1.41E+03	1.41E+03	1.33E+00	1.33E+00	6.56E+02	6.56E+02	2010
2015	2.20E+02	2.20E+02	1.27E+03	4.30E+03	1.13E+04	3.81E+04	1.07E+01	3.60E+01	5.25E+03	1.77E+04	2015
2020	1.76E+03	5.93E+03	2.55E+03	1.45E+04	2.26E+04	1.28E+05	2.13E+01	1.21E+02	1.05E+04	5.97E+04	2020
2025	3.51E+03	2.00E+04	3.35E+03	3.01E+04	2.96E+04	2.67E+05	2.80E+01	2.52E+02	1.38E+04	1.24E+05	2025
2030	4.61E+03	4.15E+04	3.35E+03	4.68E+04	2.96E+04	4.15E+05	2.80E+01	3.92E+02	1.38E+04	1.93E+05	2030
2035	4.61E+03	6.46E+04	3.35E+03	6.36E+04	2.96E+04	5.63E+05	2.80E+01	5.32E+02	1.38E+04	2.62E+05	2035
2040	4.61E+03	8.76E+04	2.87E+03	7.98E+04	2.58E+04	7.07E+05	2.40E+01	6.68E+02	1.18E+04	3.29E+05	2040
2045	3.95E+03	1.10E+05	1.28E+03	9.07E+04	1.13E+04	8.03E+05	1.07E+01	7.59E+02	5.27E+03	3.73E+05	2045
2050	1.76E+03	1.25E+05	0.	9.07E+04	0.	8.03E+05	0.	7.59E+02	0.	3.73E+05	2050
2055	0.	1.25E+05	0.	9.07E+04	0.	8.03E+05	0.	7.59E+02	0.	3.73E+05	2055
2060	0.	1.25E+05	0.	9.07E+04	0.	8.03E+05	0.	7.59E+02	0.	3.73E+05	2060
2065	0.	1.25E+05	0.	9.07E+04	0.	8.03E+05	0.	7.59E+02	0.	3.73E+05	2065
2070	0.	1.25E+05	0.	9.07E+04	0.	8.03E+05	0.	7.59E+02	0.	3.73E+05	2070
2075	0.	1.25E+05	0.	9.07E+04	0.	8.03E+05	0.	7.59E+02	0.	3.73E+05	2075

TABLE 10.C.39. Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment - TRU Waste Containers Sent to Repository

YEAR	INTERMEDIATE LEVEL CANISTERS .2-1 R/HR ANNUAL	INTERMEDIATE LEVEL CANISTERS .2-1 R/HR CUMULATIVE	INTERMEDIATE LEVEL DRUMS(55) .2-1 R/HR ANNUAL	INTERMEDIATE LEVEL DRUMS(55) .2-1 R/HR CUMULATIVE	LOW LEVEL DRUMS(55) 0-.2 R/HR ANNUAL	LOW LEVEL DRUMS(55) 0-.2 R/HR CUMULATIVE	LOW LEVEL BOXES 0-.2 R/HR ANNUAL	LOW LEVEL BOXES 0-.2 R/HR CUMULATIVE	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	0.	0.	1995
2000	0.	0.	0.	0.	0.	0.	0.	0.	2000
2005	0.	0.	0.	0.	0.	0.	0.	0.	2005
2010	2.24E+01	2.24E+01	6.46E+02	6.46E+02	1.24E+03	1.24E+03	2.31E+01	2.31E+01	2010
2015	1.74E+02	6.03E+02	5.16E+03	1.74E+04	1.24E+04	4.03E+04	2.09E+02	6.89E+02	2015
2020	3.58E+02	2.03E+03	1.03E+04	5.87E+04	2.51E+04	1.40E+05	4.20E+02	2.37E+03	2020
2025	4.60E+02	4.22E+03	1.36E+04	1.22E+05	3.13E+04	2.92E+05	5.35E+02	4.92E+03	2025
2030	4.68E+02	6.57E+03	1.36E+04	1.90E+05	2.70E+04	4.36E+05	4.94E+02	7.47E+03	2030
2035	4.60E+02	8.92E+03	1.36E+04	2.58E+05	2.17E+04	5.55E+05	4.44E+02	9.79E+03	2035
2040	4.02E+02	1.12E+04	1.16E+04	3.23E+05	3.56E+04	7.08E+05	6.54E+02	1.27E+04	2040
2045	1.80E+02	1.27E+04	5.18E+03	3.67E+05	7.35E+03	7.70E+05	1.61E+02	1.41E+04	2045
2050	0.	1.27E+04	0.	3.67E+05	0.	7.70E+05	0.	1.41E+04	2050
2055	0.	1.27E+04	0.	3.67E+05	0.	7.70E+05	0.	1.41E+04	2055
2060	0.	1.27E+04	0.	3.67E+05	0.	7.70E+05	0.	1.41E+04	2060
2065	0.	1.27E+04	0.	3.67E+05	0.	7.70E+05	0.	1.41E+04	2065
2070	0.	1.27E+04	0.	3.67E+05	3.79E+03	7.74E+05	1.50E+01	1.41E+04	2070
2075	0.	1.27E+04	0.	3.67E+05	6.06E+04	8.49E+05	2.40E+02	1.44E+04	2075

TABLE 10.C.39. Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment - TRU Waste Containers Sent to Repository

YEAR	INTERMEDIATE LEVEL DRUMS(80) 1-10 R/HR ANNUAL	INTERMEDIATE LEVEL DRUMS(80) 1-10 R/HR CUMULATIVE	INTERMEDIATE LEVEL DRUMS(80) .2-1 R/HR ANNUAL	INTERMEDIATE LEVEL DRUMS(80) .2-1 R/HR CUMULATIVE	LOW LEVEL DRUMS(80) 0-.2 R/HR ANNUAL	LOW LEVEL DRUMS(80) 0-.2 R/HR CUMULATIVE	YEAR
1985	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	1995
2000	0.	0.	0.	0.	0.	0.	2000
2005	0.	0.	0.	0.	0.	0.	2005
2010	0.	0.	0.	0.	0.	0.	2010
2015	0.	0.	0.	0.	0.	0.	2015
2020	0.	0.	0.	0.	0.	0.	2020
2025	0.	0.	0.	0.	0.	0.	2025
2030	0.	0.	0.	0.	0.	0.	2030
2035	0.	0.	0.	0.	0.	0.	2035
2040	0.	0.	0.	0.	4.32E+02	1.30E+03	2040
2045	0.	0.	0.	0.	0.	1.30E+03	2045
2050	0.	0.	0.	0.	0.	1.30E+03	2050
2055	0.	0.	0.	0.	0.	1.30E+03	2055
2060	0.	0.	0.	0.	0.	1.30E+03	2060
2065	0.	0.	0.	0.	0.	1.30E+03	2065
2070	0.	0.	0.	0.	1.18E+03	2.48E+03	2070
2075	0.	0.	0.	0.	1.89E+04	2.61E+04	2075

TABLE 10.C.40. Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment - Radioactivity in TRU Waste Containers

(CURIES/CONTAINER)

YEAR	SOLID HIGH LEVEL CANISTERS FP+AP	SOLID HIGH LEVEL CANISTERS ACTINIDES	HULLS AND ASSEMBLY HARDWARE CANISTERS FP+AP	HULLS AND ASSEMBLY HARDWARE CANISTERS ACTINIDES	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR FP+AP	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR ACTINIDES	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR FP+AP	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR ACTINIDES	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR FP+AP	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR ACTINIDES	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1995
2000	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2000
2005	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2005
2010	0.	0.	1.44E+03	3.64E+01	1.40E+00	2.53E+01	3.62E-01	6.90E-02	8.42E-02	1.64E-02	2010
2015	2.43E+05	7.54E+03	2.30E+03	6.45E+01	2.21E+00	4.70E+01	5.69E-01	1.22E-01	1.32E-01	2.90E-02	2015
2020	3.83E+05	9.34E+03	2.91E+03	8.19E+01	2.65E+00	6.09E+01	6.80E-01	1.55E-01	1.58E-01	3.68E-02	2020
2025	4.57E+05	9.62E+03	3.60E+03	9.81E+01	3.06E+00	7.38E+01	7.81E-01	1.86E-01	1.82E-01	4.42E-02	2025
2030	5.24E+05	1.00E+04	4.30E+03	1.10E+02	3.33E+00	8.34E+01	8.47E-01	2.08E-01	1.97E-01	4.94E-02	2030
2035	5.68E+05	9.80E+03	5.29E+03	1.75E+02	3.56E+00	1.32E+02	8.96E-01	3.31E-01	2.09E-01	7.87E-02	2035
2040	5.98E+05	1.67E+04	7.19E+03	3.75E+02	3.85E+00	2.81E+02	9.20E-01	7.11E-01	2.14E-01	1.69E-01	2040
2045	6.02E+05	3.72E+04	1.43E+04	2.94E+02	1.28E+01	2.24E+02	1.08E+00	5.57E-01	2.52E-01	1.32E-01	2045
2050	5.79E+05	2.24E+04	0.	0.	0.	0.	0.	0.	0.	0.	2050
2055	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2055
2060	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2060
2065	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2065
2070	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2070
2075	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2075

TABLE 10.C.40. Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment - Radioactivity in TRU Waste Containers

(CURIES/CONTAINER)

YEAR	INTERMEDIATE LEVEL CANISTERS .2-1 R/HR FP+AP	INTERMEDIATE LEVEL CANISTERS .2-1 R/HR ACTINIDES	INTERMEDIATE LEVEL DRUMS(55) .2-1 R/HR FP+AP	INTERMEDIATE LEVEL DRUMS(55) .2-1 R/HR ACTINIDES	LOW LEVEL DRUMS(55) 0-.2 R/HR FP+AP	LOW LEVEL DRUMS(55) 0-.2 R/HR ACTINIDES	LOW LEVEL BOXES 0-.2 R/HR FP+AP	LOW LEVEL BOXES 0-.2 R/HR ACTINIDES	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	0.	0.	1995
2000	0.	0.	0.	0.	0.	0.	0.	0.	2000
2005	0.	0.	0.	0.	0.	0.	0.	0.	2005
2010	4.49E-02	8.57E-03	6.28E-03	6.28E-01	3.59E-01	3.14E+01	3.47E-03	2.82E+00	2010
2015	7.07E-02	1.52E-02	9.88E-03	1.17E+00	3.49E-01	4.98E+01	4.84E-03	4.73E+00	2015
2020	8.44E-02	1.93E-02	1.18E-02	1.51E+00	3.63E-01	5.07E+01	5.75E-03	5.77E+00	2020
2025	9.60E-02	2.31E-02	1.36E-02	1.84E+00	4.08E-01	4.79E+01	6.80E-03	6.80E+00	2025
2030	1.05E-01	2.58E-02	1.47E-02	2.07E+00	4.76E-01	3.73E+01	7.90E-03	7.74E+00	2030
2035	1.11E-01	4.11E-02	1.56E-02	3.28E+00	5.59E-01	2.34E+01	9.48E-03	1.26E+01	2035
2040	1.19E-01	8.83E-02	1.60E-02	7.00E+00	2.23E-01	9.85E+00	5.62E-03	1.77E+02	2040
2045	1.34E-01	6.92E-02	1.88E-02	5.58E+00	3.98E-01	8.09E+00	1.20E-02	2.20E+01	2045
2050	0.	0.	0.	0.	0.	0.	0.	0.	2050
2055	0.	0.	0.	0.	0.	0.	0.	0.	2055
2060	0.	0.	0.	0.	0.	0.	0.	0.	2060
2065	0.	0.	0.	0.	0.	0.	0.	0.	2065
2070	0.	0.	0.	0.	2.03E-01	5.52E-02	4.69E+01	1.27E+01	2070
2075	0.	0.	0.	0.	2.03E-01	5.52E-02	4.69E+01	1.27E+01	2075

TABLE 10.C.40. Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment - Radioactivity in TRU Waste Containers

	CURIES/CONTAINER						CURIES ANNUAL TOTAL			CUMULATIVE CURIES		
	INTERMEDIATE LEVEL DRUMS(80) FP+AP	1-10 R/HR ACTINIDES	INTERMEDIATE LEVEL DRUMS(80) FP+AP	.2-1 R/HR ACTINIDES	LOW LEVEL DRUMS(80) FP+AP	0-.2 R/HR ACTINIDES						
YEAR	FP+AP	ACTINIDES	FP+AP	ACTINIDES	FP+AP	ACTINIDES	FP+AP	ACTINIDES	YEAR	FP+AP	ACTINIDES	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	1985	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	0.	0.	1990	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	0.	0.	1995	0.	0.	1995
2000	0.	0.	0.	0.	0.	0.	0.	0.	2000	0.	0.	2000
2005	0.	0.	0.	0.	0.	0.	0.	0.	2005	0.	0.	2005
2010	0.	0.	0.	0.	0.	0.	2.33E+05	8.09E+04	2010	2.30E+05	7.92E+04	2010
2015	0.	0.	0.	0.	0.	0.	5.65E+07	2.90E+06	2015	6.16E+07	5.12E+06	2015
2020	0.	0.	0.	0.	0.	0.	6.80E+08	1.93E+07	2020	2.06E+09	6.74E+07	2020
2025	0.	0.	0.	0.	0.	0.	1.62E+09	3.79E+07	2025	7.71E+09	2.14E+08	2025
2030	0.	0.	0.	0.	0.	0.	2.43E+09	5.01E+07	2030	1.69E+10	4.26E+08	2030
2035	0.	0.	0.	0.	0.	0.	2.60E+09	5.02E+07	2035	2.71E+10	6.50E+08	2035
2040	0.	0.	0.	0.	0.	0.	2.78E+09	8.56E+07	2040	3.68E+10	9.24E+08	2040
2045	0.	0.	0.	0.	0.	0.	2.40E+09	1.50E+08	2045	4.53E+10	1.48E+09	2045
2050	0.	0.	0.	0.	0.	0.	1.02E+09	3.95E+07	2050	4.85E+10	1.81E+09	2050
2055	0.	0.	0.	0.	0.	0.	0.	0.	2055	4.29E+10	1.68E+09	2055
2060	0.	0.	0.	0.	0.	0.	0.	0.	2060	3.81E+10	1.57E+09	2060
2065	0.	0.	0.	0.	0.	0.	0.	0.	2065	3.38E+10	1.48E+09	2065
2070	0.	0.	0.	0.	2.71E-01	0.	1.74E+03	3.99E+02	2070	3.01E+10	1.40E+09	2070
2075	0.	0.	0.	0.	2.71E-01	0.	2.87E+04	6.38E+03	2075	2.74E+10	1.35E+09	2075

TABLE 10.C.41. Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment - Heat Generation Rate in TRU Waste Containers

(WATTS/CONTAINER)

YEAR	SOLID HIGH LEVEL CANISTERS FP+AP	SOLID HIGH LEVEL CANISTERS ACTINIDES	HULLS AND ASSEMBLY HARDWARE CANISTERS FP+AP	HULLS AND ASSEMBLY HARDWARE CANISTERS ACTINIDES	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR FP+AP	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR ACTINIDES	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR FP+AP	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR ACTINIDES	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR FP+AP	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR ACTINIDES	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1995
2000	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2000
2005	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2005
2010	0.	0.	2.39E+00	2.77E-01	4.28E-03	8.53E-02	1.13E-03	5.29E-04	2.63E-04	1.23E-04	2010
2015	7.58E+02	2.45E+02	7.53E+00	3.63E-01	6.85E-03	1.22E-01	1.79E-03	6.88E-04	4.15E-04	1.62E-04	2015
2020	1.20E+03	3.00E+02	1.35E+01	3.86E-01	8.31E-03	1.36E-01	2.18E-03	7.32E-04	4.97E-04	1.72E-04	2020
2025	1.43E+03	3.07E+02	2.08E+01	4.13E-01	9.68E-03	1.50E-01	2.46E-03	7.82E-04	5.73E-04	1.84E-04	2025
2030	1.65E+03	3.17E+02	2.91E+01	4.13E-01	1.07E-02	1.55E-01	2.67E-03	7.83E-04	6.22E-04	1.84E-04	2030
2035	1.78E+03	4.08E+02	4.20E+01	7.11E-01	1.16E-02	2.55E-01	2.84E-03	1.35E-03	6.60E-04	3.17E-04	2035
2040	1.88E+03	5.28E+02	6.74E+01	1.65E+00	1.33E-02	5.86E-01	2.96E-03	3.12E-03	6.88E-04	7.34E-04	2040
2045	1.90E+03	1.19E+03	1.28E+02	1.04E+00	6.15E-02	3.86E-01	3.88E-03	1.98E-03	9.04E-04	4.64E-04	2045
2050	1.84E+03	7.08E+02	0.	0.	0.	0.	0.	0.	0.	0.	2050
2055	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2055
2060	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2060
2065	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2065
2070	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2070
2075	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2075

TABLE 10.C.41. Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment - Heat Generation Rate in TRU Waste Containers

(WATTS/CONTAINER)

YEAR	INTERMEDIATE LEVEL CANISTERS FP+AP	INTERMEDIATE LEVEL CANISTERS .2-1 R/HR ACTINIDES	INTERMEDIATE LEVEL DRUMS(55) FP+AP	INTERMEDIATE LEVEL DRUMS(55) .2-1 R/HR ACTINIDES	LOW LEVEL DRUMS(55) FP+AP	LOW LEVEL DRUMS(55) 0-.2 R/HR ACTINIDES	LOW LEVEL BOXES FP+AP	LOW LEVEL BOXES 0-.2 R/HR ACTINIDES	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	0.	0.	1995
2000	0.	0.	0.	0.	0.	0.	0.	0.	2000
2005	0.	0.	0.	0.	0.	0.	0.	0.	2005
2010	1.40E-04	6.52E-05	1.96E-05	2.10E-03	1.29E-04	2.75E-02	1.08E-05	7.69E-03	2010
2015	2.22E-04	8.54E-05	3.09E-05	3.00E-03	1.30E-04	4.28E-02	1.52E-05	1.00E-02	2015
2020	2.65E-04	9.09E-05	3.70E-05	3.39E-03	1.40E-04	4.36E-02	1.81E-05	1.11E-02	2020
2025	3.06E-04	9.71E-05	4.27E-05	3.71E-03	1.58E-04	4.14E-02	2.14E-05	1.29E-02	2025
2030	3.32E-04	9.72E-05	4.63E-05	3.83E-03	1.88E-04	3.29E-02	2.52E-05	1.35E-02	2030
2035	3.52E-04	1.67E-04	4.92E-05	6.30E-03	2.27E-04	2.30E-02	2.98E-05	2.38E-02	2035
2040	3.67E-04	3.98E-04	5.12E-05	1.44E-02	9.96E-05	1.80E-01	1.81E-05	5.36E+00	2040
2045	4.82E-04	2.45E-04	6.73E-05	3.52E-03	2.15E-04	1.38E-02	4.31E-05	3.74E-02	2045
2050	0.	0.	0.	0.	0.	0.	0.	0.	2050
2055	0.	0.	0.	0.	0.	0.	0.	0.	2055
2060	0.	0.	0.	0.	0.	0.	0.	0.	2060
2065	0.	0.	0.	0.	0.	0.	0.	0.	2065
2070	0.	0.	0.	0.	9.16E-04	6.15E-04	2.11E-01	1.40E-01	2070
2075	0.	0.	0.	0.	9.16E-04	6.15E-04	2.11E-01	1.40E-01	2075

TABLE 10.C.41. Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment - Heat Generation Rate in TRU Waste Containers, Watts/container

	INTERMEDIATE LEVEL DRUMS(80)	1-10 R/HR	INTERMEDIATE LEVEL DRUMS(80)	.2-1 R/HR	LOW LEVEL DRUMS(80)	0-.2 R/HR	
YEAR	FP+AP	ACTINIDES	FP+AP	ACTINIDES	FP+AP	ACTINIDES	YEAR
1985	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	1995
2000	0.	0.	0.	0.	0.	0.	2000
2005	0.	0.	0.	0.	0.	0.	2005
2010	0.	0.	0.	0.	0.	0.	2010
2015	0.	0.	0.	0.	0.	0.	2015
2020	0.	0.	0.	0.	0.	0.	2020
2025	0.	0.	0.	0.	0.	0.	2025
2030	0.	0.	0.	0.	0.	0.	2030
2035	0.	0.	0.	0.	0.	0.	2035
2040	0.	0.	0.	0.	0.	1.47E+01	2040
2045	0.	0.	0.	0.	0.	0.	2045
2050	0.	0.	0.	0.	0.	0.	2050
2055	0.	0.	0.	0.	0.	0.	2055
2060	0.	0.	0.	0.	0.	0.	2060
2065	0.	0.	0.	0.	0.	0.	2065
2070	0.	0.	0.	0.	1.21E-03	2.20E-03	2070
2075	0.	0.	0.	0.	1.21E-03	2.20E-03	2075

TABLE 10.C.42. Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment - REvised Solid High Level Waste Container Sizes for Each Geologic Medium

Salt 3.2 kW/Can.		Granite 1.7 kW/Can.		Shale 1.2 kW/Can.		Basalt 1.3 kW/Can.	
Year	Dia.	Year	Dia.	Year	Dia.	Year	Dia.
2015	12.	2015	12.	2015	12.	2015	12.
2016	12.	2016	12.	2016	12.	2016	12.
2017	12.	2017	12.	2017	10.	2017	12.
2018	12.	2018	12.	2018	10.	2018	10.
2019	12.	2019	12.	2019	10.	2019	10.
2020	12.	2020	12.	2020	10.	2020	10.
2021	12.	2021	12.	2021	10.	2021	10.
2022	12.	2022	12.	2022	10.	2022	10.
2023	12.	2023	12.	2023	10.	2023	10.
2024	12.	2024	10.	2024	10.	2024	10.
2025	12.	2025	10.	2025	8.	2025	10.
2026	12.	2026	10.	2026	8.	2026	10.
2027	12.	2027	10.	2027	8.	2027	10.
2028	12.	2028	10.	2028	8.	2028	10.
2029	12.	2029	10.	2029	8.	2029	8.
2030	12.	2030	10.	2030	8.	2030	8.
2031	12.	2031	10.	2031	8.	2031	8.
2032	12.	2032	10.	2032	8.	2032	8.
2033	12.	2033	10.	2033	8.	2033	8.
2034	12.	2034	10.	2034	8.	2034	8.
2035	12.	2035	10.	2035	8.	2035	6.
2036	12.	2036	10.	2036	6.	2036	8.
2037	12.	2037	10.	2037	8.	2037	8.
2038	12.	2038	10.	2038	8.	2038	8.
2039	12.	2039	10.	2039	8.	2039	8.
2040	12.	2040	10.	2040	8.	2040	8.
2041	12.	2041	8.	2041	8.	2041	8.
2042	12.	2042	8.	2042	8.	2042	8.
2043	12.	2043	8.	2043	8.	2043	8.
2044	12.	2044	8.	2044	6.	2044	8.
2045	12.	2045	8.	2045	6.	2045	6.
2046	12.	2046	8.	2046	6.	2046	8.
2047	12.	2047	8.	2047	6.	2047	6.
2048	12.	2048	8.	2048	6.	2048	8.
2049	12.	2049	8.	2049	6.	2049	8.
2050	12.	2050	8.	2050	8.	2050	8.

TABLE 10.C.43 Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment - TRU-Waste Containers Sent to Repository - Revised Solid High Level Waste

	Salt 3.2 kW/Can.		Granite 1.7 kW/Can.		Shale 1.2 kW/Can.		Basalt 1.3 kW/Can.		
	SOLID HIGH LEVEL WASTE		SOLID HIGH LEVEL WASTE		SOLID HIGH LEVEL WASTE		SOLID HIGH LEVEL WASTE		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	0.	0.	1995
2000	0.	0.	0.	0.	0.	0.	0.	0.	2000
2005	0.	0.	0.	0.	0.	0.	0.	0.	2005
2010	0.	0.	0.	0.	0.	0.	0.	0.	2010
2015	2.20E+02	2.20E+02	2.20E+02	2.20E+02	2.20E+02	2.20E+02	2.20E+02	2.20E+02	2015
2020	1.76E+03	5.93E+03	1.76E+03	5.93E+03	2.53E+03	8.25E+03	2.53E+03	7.86E+03	2020
2025	3.51E+03	2.00E+04	5.04E+03	2.29E+04	7.91E+03	3.13E+04	5.04E+03	2.81E+04	2025
2030	4.61E+03	4.15E+04	6.64E+03	5.39E+04	1.04E+04	7.98E+04	1.04E+04	6.66E+04	2030
2035	4.61E+03	6.46E+04	6.64E+03	8.71E+04	1.04E+04	1.32E+05	1.04E+04	1.18E+05	2035
2040	4.61E+03	8.76E+04	6.64E+03	1.20E+05	1.04E+04	1.84E+05	1.04E+04	1.70E+05	2040
2045	3.99E+03	1.10E+05	8.90E+03	1.71E+05	1.58E+04	2.49E+05	1.58E+04	2.28E+05	2045
2050	1.76E+03	1.25E+05	3.97E+03	2.04E+05	3.97E+03	3.06E+05	3.97E+03	2.74E+05	2050
2055	0.	1.25E+05	0.	2.04E+05	0.	3.06E+05	0.	2.74E+05	2055
2060	0.	1.25E+05	0.	2.04E+05	0.	3.06E+05	0.	2.74E+05	2060
2065	0.	1.25E+05	0.	2.04E+05	0.	3.06E+05	0.	2.74E+05	2065
2070	0.	1.25E+05	0.	2.04E+05	0.	3.06E+05	0.	2.74E+05	2070
2075	0.	1.25E+05	0.	2.04E+05	0.	3.06E+05	0.	2.74E+05	2075

TABLE 10.C.44. Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment - Radioactivity in TRU-Waste Containers - Curies/Container Revised Solid High Level Waste Containers

YEAR	Salt 3.2 kW/Can. SOLID HIGH LEVEL CANISTERS FP+AP	Salt ACTINIDES	Granite 1.7 kW/Can. SOLID HIGH LEVEL CANISTERS FP+AP	Granite ACTINIDES	Shale 1.2 kW/Can. SOLID HIGH LEVEL CANISTERS FP+AP	Shale ACTINIDES	Basalt 1.3 kW/Can. SOLID HIGH LEVEL CANISTERS FP+AP	Basalt ACTINIDES	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	0.	0.	1995
2000	0.	0.	0.	0.	0.	0.	0.	0.	2000
2005	0.	0.	0.	0.	0.	0.	0.	0.	2005
2010	0.	0.	0.	0.	0.	0.	0.	0.	2010
2015	2.43E+05	7.54E+03	2.43E+05	7.54E+03	2.43E+05	7.54E+03	2.43E+05	7.54E+03	2015
2020	3.84E+05	9.34E+03	3.83E+05	9.34E+03	2.66E+05	6.49E+03	2.66E+05	6.49E+03	2020
2025	4.57E+05	9.62E+03	3.17E+05	6.68E+03	2.03E+05	4.28E+03	3.17E+05	6.68E+03	2025
2030	5.24E+05	1.00E+04	3.64E+05	6.96E+03	2.33E+05	4.46E+03	2.33E+05	4.46E+03	2030
2035	5.68E+05	9.80E+03	3.94E+05	6.80E+03	2.52E+05	4.35E+03	2.52E+05	4.35E+03	2035
2040	5.94E+05	1.67E+04	4.15E+05	1.16E+04	2.64E+05	7.41E+03	2.64E+05	7.41E+03	2040
2045	6.03E+05	3.72E+04	2.68E+05	1.65E+04	1.51E+05	9.29E+03	1.51E+05	9.29E+03	2045
2050	5.70E+05	2.84E+04	2.57E+05	9.95E+03	2.57E+05	9.95E+03	2.57E+05	9.95E+03	2050
2055	0.	0.	0.	0.	0.	0.	0.	0.	2055
2060	0.	0.	0.	0.	0.	0.	0.	0.	2060
2065	0.	0.	0.	0.	0.	0.	0.	0.	2065
2070	0.	0.	0.	0.	0.	0.	0.	0.	2070
2075	0.	0.	0.	0.	0.	0.	0.	0.	2075

TABLE 10.C.45. Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment - Heat Generation Rate in TRU-Waste Containers - Watts/Container Revised Solid High Level Waste Containers

	Salt 3.2 kW/Can.		Granite 1.7 kW/Can.		Shale 1.2 kW/Can.		Basalt 1.3 kW/Can.		
	SOLID HIGH LEVEL CANISTERS		SOLID HIGH LEVEL CANISTERS		SOLID HIGH LEVEL CANISTERS		SOLID HIGH LEVEL CANISTERS		
YEAR	FP+AP	ACTINIDES	FP+AP	ACTINIDES	FP+AP	ACTINIDES	FP+AP	ACTINIDES	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	0.	0.	1995
2000	0.	0.	0.	0.	0.	0.	0.	0.	2000
2005	0.	0.	0.	0.	0.	0.	0.	0.	2005
2010	0.	0.	0.	0.	0.	0.	0.	0.	2010
2015	7.58E+02	2.45E+02	7.58E+02	2.45E+02	7.58E+02	2.45E+02	7.58E+02	2.45E+02	2015
2020	1.20E+03	3.00E+02	1.20E+03	3.00E+02	8.32E+02	2.09E+02	8.32E+02	2.09E+02	2020
2025	1.43E+03	3.07E+02	9.96E+02	2.13E+02	6.37E+02	1.36E+02	9.96E+02	2.13E+02	2025
2030	1.65E+03	3.17E+02	1.14E+03	2.20E+02	7.33E+02	1.41E+02	7.33E+02	1.41E+02	2030
2035	1.79E+03	3.08E+02	1.24E+03	2.14E+02	7.94E+02	1.37E+02	7.94E+02	1.37E+02	2035
2040	1.88E+03	3.28E+02	1.31E+03	3.67E+02	8.37E+02	2.35E+02	8.37E+02	2.35E+02	2040
2045	1.90E+03	1.19E+03	8.44E+02	5.29E+02	4.75E+02	2.97E+02	4.75E+02	2.97E+02	2045
2050	1.86E+03	7.08E+02	8.27E+02	3.15E+02	8.27E+02	3.15E+02	8.27E+02	3.15E+02	2050
2055	0.	0.	0.	0.	0.	0.	0.	0.	2055
2060	0.	0.	0.	0.	0.	0.	0.	0.	2060
2065	0.	0.	0.	0.	0.	0.	0.	0.	2065
2070	0.	0.	0.	0.	0.	0.	0.	0.	2070
2075	0.	0.	0.	0.	0.	0.	0.	0.	2075

TABLE 10.C.46. Case 1 - Low Growth - Once Through Cycle - Reference Treatment - TRU Waste Containers Sent to Repository

YEAR	BWR CANISTERS ANNUAL	BWR CANISTERS CUMULATIVE	PWR CANISTERS ANNUAL	PWR CANISTERS CUMULATIVE	TOTAL CANISTERS ANNUAL	TOTAL CANISTERS CUMULATIVE	YEAR
1985	1.68E+03	1.68E+03	8.29E+02	8.29E+02	2.51E+03	2.51E+03	1985
1990	4.03E+03	2.17E+04	2.69E+03	1.28E+04	6.72E+03	3.45E+04	1990
1995	6.11E+03	5.00E+04	4.00E+03	3.16E+04	1.01E+04	8.16E+04	1995
2000	8.43E+03	8.70E+04	5.61E+03	5.60E+04	1.40E+04	1.43E+05	2000
2005	1.04E+04	1.35E+05	6.79E+03	8.74E+04	1.74E+04	2.22E+05	2005
2010	1.19E+04	1.93E+05	7.94E+03	1.26E+05	1.98E+04	3.20E+05	2010
2015	1.20E+04	2.52E+05	7.36E+03	1.60E+05	1.93E+04	4.16E+05	2015
2020	1.22E+04	3.12E+05	7.73E+03	2.03E+05	1.99E+04	5.15E+05	2020
2025	9.03E+03	3.62E+05	6.59E+03	2.38E+05	1.56E+04	6.00E+05	2025
2030	9.05E+03	4.09E+05	5.93E+03	2.68E+05	1.50E+04	6.76E+05	2030
2035	7.59E+03	4.48E+05	4.70E+03	2.92E+05	1.23E+04	7.40E+05	2035
2040	4.13E+03	4.75E+05	2.76E+03	3.09E+05	6.88E+03	7.84E+05	2040
2045	2.77E+03	4.92E+05	1.66E+03	3.20E+05	4.43E+03	8.12E+05	2045
2050	0.	4.95E+05	0.	3.22E+05	0.	8.17E+05	2050

TABLE 10.C.47. Case 1 - Low Growth - Once-Through Cycle - Reference Treatment - Radioactivity in TRU Waste Containers

	CURIES/CONTAINER				CURIES		
	BWR CANISTERS		PWR CANISTERS		CUMULATIVE		
YEAR	FP+AP	ACTINIDES	FP+AP	ACTINIDES	FP+AP	ACTINIDES	YEAR
1985	2.57E+04	6.41E+03	9.09E+04	2.68E+04	1.20E+08	3.20E+07	1985
1990	4.78E+04	1.20E+04	1.53E+05	4.19E+04	2.34E+09	6.32E+08	1990
1995	5.19E+04	1.28E+04	1.72E+05	4.45E+04	5.88E+09	1.56E+09	1995
2000	5.38E+04	1.32E+04	1.77E+05	4.55E+04	1.02E+10	2.68E+09	2000
2005	5.52E+04	1.34E+04	1.76E+05	4.54E+04	1.56E+10	4.04E+09	2005
2010	5.61E+04	1.42E+04	1.84E+05	4.73E+04	2.21E+10	5.62E+09	2010
2015	5.65E+04	1.40E+04	1.84E+05	4.71E+04	2.77E+10	6.94E+09	2015
2020	5.58E+04	1.31E+04	1.78E+05	4.40E+04	3.27E+10	7.98E+09	2020
2025	5.53E+04	1.43E+04	1.77E+05	4.48E+04	3.60E+10	8.55E+09	2025
2030	5.47E+04	1.27E+04	1.73E+05	4.34E+04	3.79E+10	8.75E+09	2030
2035	5.14E+04	1.16E+04	1.65E+05	4.06E+04	3.84E+10	8.54E+09	2035
2040	5.01E+04	1.12E+04	1.64E+05	4.03E+04	3.70E+10	7.92E+09	2040
2045	4.18E+04	8.43E+03	1.42E+05	3.23E+04	3.46E+10	7.06E+09	2045
2050	0.	0.	0.	0.	3.07E+10	5.94E+09	2050

TABLE 10.C.48. Case 1 - Low Growth - Once-Through Cycle - Reference Treatment - Heat Generation Rate in TRU Waste Containers

WATTS/CONTAINER

YEAR	BWR CANISTERS FP+AP	BWR CANISTERS ACTINIDES	PWR CANISTERS FP+AP	PWR CANISTERS ACTINIDES	YEAR
1985	8.12E+01	1.51E+01	3.02E+02	6.72E+01	1985
1990	1.61E+02	2.39E+01	5.30E+02	8.76E+01	1990
1995	1.82E+02	2.28E+01	6.23E+02	8.57E+01	1995
2000	1.90E+02	2.37E+01	6.45E+02	8.83E+01	2000
2005	1.95E+02	2.45E+01	6.43E+02	8.78E+01	2005
2010	2.04E+02	2.63E+01	6.74E+02	9.37E+01	2010
2015	2.07E+02	2.64E+01	6.73E+02	9.33E+01	2015
2020	1.97E+02	2.45E+01	6.48E+02	8.82E+01	2020
2025	2.10E+02	2.70E+01	6.66E+02	8.80E+01	2025
2030	1.92E+02	2.37E+01	6.31E+02	8.49E+01	2030
2035	1.80E+02	2.14E+01	5.98E+02	7.84E+01	2035
2040	1.75E+02	2.05E+01	5.95E+02	7.76E+01	2040
2045	1.44E+02	1.47E+01	5.03E+02	5.93E+01	2045
2050	0.	0.	0.	0.	2050

TABLE 10.C.49. Case 3 - Low Growth - U and Pu Recycle - Reference Treatment - TRU Waste Containers Sent to Salt Repository

REVISED SOLID HIGH LEVEL WASTE CONTAINERS

DESIGN HEAT RATE LIMIT =3.20 KW/CANISTER

YEAR	SOLID HIGH LEVEL CANISTERS ANNUAL	SOLID HIGH LEVEL CANISTERS CUMULATIVE	HULLS AND ASSEMBLY HARDWARE CANISTERS ANNUAL	HULLS AND ASSEMBLY HARDWARE CANISTERS CUMULATIVE	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR ANNUAL	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR CUMULATIVE	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR ANNUAL	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR CUMULATIVE	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR ANNUAL	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR CUMULATIVE	YEAR
1985	0.	0.	4.06E+02	4.06E+02	3.60E+03	3.60E+03	3.40E+00	3.40E+00	1.67E+03	1.67E+03	1985
1990	4.90E+02	1.98E+03	9.80E+02	4.09E+03	8.68E+03	3.62E+04	8.20E+00	3.42E+01	4.04E+03	1.68E+04	1990
1995	1.15E+03	6.42E+03	8.37E+02	8.84E+03	7.41E+03	7.83E+04	7.00E+00	7.40E+01	3.44E+03	3.64E+04	1995
2000	1.64E+03	1.47E+04	1.31E+03	1.40E+04	1.16E+04	1.24E+05	1.10E+01	1.17E+02	5.41E+03	5.76E+04	2000
2005	2.61E+03	2.49E+04	1.31E+03	2.06E+04	1.16E+04	1.82E+05	1.10E+01	1.72E+02	5.41E+03	8.46E+04	2005
2010	2.61E+03	3.80E+04	1.43E+03	2.76E+04	1.45E+04	2.45E+05	1.37E+01	2.31E+02	6.72E+03	1.14E+05	2010
2015	3.24E+03	5.20E+04	1.43E+03	3.48E+04	1.27E+04	3.08E+05	1.20E+01	2.91E+02	5.90E+03	1.43E+05	2015
2020	2.85E+03	6.62E+04	9.56E+02	4.00E+04	8.47E+03	3.55E+05	8.00E+00	3.35E+02	3.94E+03	1.65E+05	2020
2025	1.90E+03	7.66E+04	9.56E+02	4.48E+04	8.47E+03	3.97E+05	8.00E+00	3.75E+02	3.94E+03	1.85E+05	2025
2030	1.90E+03	8.61E+04	7.97E+02	4.86E+04	7.06E+03	4.31E+05	6.67E+00	4.07E+02	3.28E+03	2.00E+05	2030
2035	1.58E+03	9.37E+04	9.56E+02	5.34E+04	8.47E+03	4.73E+05	8.00E+00	4.47E+02	3.94E+03	2.20E+05	2035
2040	1.90E+03	1.03E+05	4.78E+02	5.72E+04	4.23E+03	5.07E+05	4.00E+00	4.79E+02	1.97E+03	2.36E+05	2040
2045	9.44E+02	1.11E+05	0.	5.78E+04	0.	5.12E+05	0.	4.84E+02	0.	2.38E+05	2045
2050	0.	1.12E+05	0.	5.78E+04	0.	5.12E+05	0.	4.84E+02	0.	2.38E+05	2050
2055	0.	1.12E+05	0.	5.78E+04	0.	5.12E+05	0.	4.84E+02	0.	2.38E+05	2055
2060	0.	1.12E+05	0.	5.78E+04	0.	5.12E+05	0.	4.84E+02	0.	2.38E+05	2060
2065	0.	1.12E+05	0.	5.78E+04	0.	5.12E+05	0.	4.84E+02	0.	2.38E+05	2065
2070	0.	1.12E+05	0.	5.78E+04	0.	5.12E+05	0.	4.84E+02	0.	2.38E+05	2070
2075	0.	1.12E+05	0.	5.78E+04	0.	5.12E+05	0.	4.84E+02	0.	2.38E+05	2075

TABLE 10.C.49. Case 3 - Low Growth - U and Pu Recycle - Reference Treatment - TRU Waste Containers Sent to Salt Repository

YEAR	INTERMEDIATE LEVEL CANISTERS .2-1 R/HR ANNUAL	INTERMEDIATE LEVEL CANISTERS .2-1 R/HR CUMULATIVE	INTERMEDIATE LEVEL DRUMS(55) .2-1 R/HR ANNUAL	INTERMEDIATE LEVEL DRUMS(55) .2-1 R/HR CUMULATIVE	LOW LEVEL DRUMS(55) 0-.2 R/HR ANNUAL	LOW LEVEL DRUMS(55) 0-.2 R/HR CUMULATIVE	LOW LEVEL BOXES 0-.2 R/HR ANNUAL	LOW LEVEL BOXES 0-.2 R/HR CUMULATIVE	YEAR
1985	5.70E+01	5.70E+01	1.65E+03	1.65E+03	4.15E+03	4.15E+03	6.83E+01	6.83E+01	1985
1990	1.37E+02	5.73E+02	3.97E+03	1.66E+04	1.06E+04	4.16E+04	1.70E+02	6.86E+02	1990
1995	1.17E+02	1.24E+03	3.39E+03	3.58E+04	9.83E+03	9.59E+04	1.53E+02	1.54E+03	1995
2000	1.84E+02	1.96E+03	5.32E+03	5.66E+04	1.55E+04	1.57E+05	2.41E+02	2.49E+03	2000
2005	1.84E+02	2.88E+03	5.32E+03	8.33E+04	1.57E+04	2.36E+05	2.43E+02	3.70E+03	2005
2010	2.29E+02	3.87E+03	6.62E+03	1.12E+05	1.98E+04	3.22E+05	3.04E+02	5.02E+03	2010
2015	2.01E+02	4.88E+03	5.81E+03	1.41E+05	2.09E+04	4.25E+05	3.19E+02	6.59E+03	2015
2020	1.34E+02	5.62E+03	3.87E+03	1.62E+05	1.54E+04	5.06E+05	2.33E+02	7.81E+03	2020
2025	1.34E+02	6.29E+03	3.87E+03	1.82E+05	1.48E+04	5.76E+05	2.28E+02	8.86E+03	2025
2030	1.12E+02	6.82E+03	3.23E+03	1.97E+05	1.14E+04	6.32E+05	1.84E+02	9.75E+03	2030
2035	1.34E+02	7.49E+03	3.87E+03	2.16E+05	9.97E+03	6.84E+05	1.81E+02	1.07E+04	2035
2040	6.71E+01	8.03E+03	1.94E+03	2.32E+05	1.23E+04	7.42E+05	2.07E+02	1.17E+04	2040
2045	0.	8.11E+03	0.	2.34E+05	3.79E+03	7.60E+05	1.50E+01	1.18E+04	2045
2050	0.	8.11E+03	0.	2.34E+05	0.	7.68E+05	0.	1.18E+04	2050
2055	0.	8.11E+03	0.	2.34E+05	3.79E+03	7.79E+05	1.50E+01	1.19E+04	2055
2060	0.	8.11E+03	0.	2.34E+05	3.79E+03	7.91E+05	1.50E+01	1.19E+04	2060
2065	0.	8.11E+03	0.	2.34E+05	3.79E+03	8.02E+05	1.50E+01	1.20E+04	2065
2070	0.	8.11E+03	0.	2.34E+05	0.	8.02E+05	0.	1.20E+04	2070
2075	0.	8.11E+03	0.	2.34E+05	1.14E+04	8.25E+05	4.50E+01	1.21E+04	2075

TABLE 10.C.49. Case 3 - Low Growth - U and Pu Recycle - Reference Treatment - TRU Waste Containers Sent to Salt Repository

YEAR	INTERMEDIATE LEVEL DRUMS(80) 1-10 R/HR ANNUAL	CUMULATIVE	INTERMEDIATE LEVEL DRUMS(80) .2-1 R/HR ANNUAL	CUMULATIVE	LOW LEVEL DRUMS(80) 0-.2 R/HR ANNUAL	CUMULATIVE	YEAR
1985	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	1995
2000	0.	0.	0.	0.	0.	0.	2000
2005	0.	0.	0.	0.	0.	0.	2005
2010	0.	0.	0.	0.	0.	0.	2010
2015	0.	0.	0.	0.	7.20E+01	2.88E+02	2015
2020	0.	0.	0.	0.	7.20E+01	5.76E+02	2020
2025	0.	0.	0.	0.	7.20E+01	7.92E+02	2025
2030	0.	0.	0.	0.	7.20E+01	1.08E+03	2030
2035	0.	0.	0.	0.	7.20E+01	1.37E+03	2035
2040	0.	0.	0.	0.	2.16E+02	2.16E+03	2040
2045	0.	0.	0.	0.	1.18E+03	6.88E+03	2045
2050	0.	0.	0.	0.	0.	9.24E+03	2050
2055	0.	0.	0.	0.	1.18E+03	1.28E+04	2055
2060	0.	0.	0.	0.	1.18E+03	1.63E+04	2060
2065	0.	0.	0.	0.	1.18E+03	1.99E+04	2065
2070	0.	0.	0.	0.	0.	1.99E+04	2070
2075	0.	0.	0.	0.	3.34E+03	2.69E+04	2075

TABLE 10.C.50. Case 3 - Low Growth - U and Pu Recycle - Reference Treatment - Radioactivity in TRU Waste Containers Sent to Salt Repository

(CURIES/CONTAINER)

YEAR	SOLID HIGH LEVEL CANISTERS FP+AP	SOLID HIGH LEVEL CANISTERS ACTINIDES	HULLS AND ASSEMBLY HARDWARE CANISTERS FP+AP	HULLS AND ASSEMBLY HARDWARE CANISTERS ACTINIDES	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR FP+AP	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR ACTINIDES	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR FP+AP	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR ACTINIDES	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR FP+AP	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR ACTINIDES	YEAR
1985	0.	0.	1.76E+04	1.68E+02	1.31E+01	1.33E+02	1.24E+00	3.18E-01	2.88E-01	7.56E-02	1985
1990	7.18E+05	6.15E+03	2.99E+04	2.47E+02	5.35E+01	1.93E+02	2.04E+00	4.68E-01	4.74E-01	1.11E-01	1990
1995	8.25E+05	1.26E+04	3.38E+04	3.47E+02	1.01E+02	2.68E+02	2.95E+00	6.58E-01	6.88E-01	1.56E-01	1995
2000	6.11E+05	1.28E+04	3.16E+04	3.99E+02	8.63E+01	3.07E+02	2.71E+00	7.57E-01	6.31E-01	1.80E-01	2000
2005	6.16E+05	1.67E+04	3.25E+04	4.32E+02	9.07E+01	3.31E+02	2.80E+00	8.20E-01	6.53E-01	1.95E-01	2005
2010	6.31E+05	1.93E+04	3.18E+04	5.14E+02	9.23E+01	3.92E+02	2.83E+00	9.75E-01	6.59E-01	2.31E-01	2010
2015	6.43E+05	2.45E+04	3.24E+04	5.55E+02	1.10E+02	4.21E+02	3.09E+00	1.05E+00	7.20E-01	2.50E-01	2015
2020	6.38E+05	2.75E+04	2.64E+04	5.90E+02	6.50E+01	4.48E+02	2.30E+00	1.12E+00	5.36E-01	2.66E-01	2020
2025	6.02E+05	3.13E+04	2.25E+04	6.07E+02	3.84E+01	4.60E+02	1.81E+00	1.15E+00	4.22E-01	2.73E-01	2025
2030	5.64E+05	3.43E+04	1.76E+04	5.23E+02	1.76E+01	3.96E+02	1.39E+00	9.92E-01	3.23E-01	2.35E-01	2030
2035	5.15E+05	3.06E+04	1.72E+04	5.14E+02	1.97E+01	3.89E+02	1.36E+00	9.74E-01	3.17E-01	2.31E-01	2035
2040	4.86E+05	3.02E+04	2.71E+04	4.89E+02	1.07E+02	3.68E+02	2.93E+00	9.27E-01	6.82E-01	2.20E-01	2040
2045	5.20E+05	2.54E+04	0.	0.	0.	0.	0.	0.	0.	0.	2045
2050	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2050
2055	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2055
2060	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2060
2065	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2065
2070	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2070
2075	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2075

TABLE 10.C.50. Case 3 - Low Growth - U and Pu Recycle - Reference Treatment - Radioactivity in TRU Waste Containers

(CURIES/CONTAINER)

YEAR	INTERMEDIATE LEVEL CANISTERS FP+AP	INTERMEDIATE LEVEL CANISTERS .2-1 R/HR ACTINIDES	INTERMEDIATE LEVEL DRUMS(55) FP+AP	INTERMEDIATE LEVEL DRUMS(55) .2-1 R/HR ACTINIDES	LOW LEVEL DRUMS(55) FP+AP	LOW LEVEL DRUMS(55) 0-.2 R/HR ACTINIDES	LOW LEVEL BOXES FP+AP	LOW LEVEL BOXES 0-.2 R/HR ACTINIDES	YEAR
1985	1.54E-01	3.95E-02	2.13E-02	3.30E+00	3.43E-01	5.34E+01	1.03E-02	1.10E+01	1985
1990	2.53E-01	5.81E-02	3.54E-02	4.80E+00	3.31E-01	6.43E+01	1.83E-02	1.52E+01	1990
1995	3.67E-01	8.16E-02	5.13E-02	6.67E+00	3.18E-01	8.30E+01	2.25E-02	2.01E+01	1995
2000	3.36E-01	9.39E-02	4.71E-02	7.64E+00	3.11E-01	9.12E+01	2.06E-02	2.29E+01	2000
2005	3.48E-01	1.02E-01	4.87E-02	8.24E+00	3.13E-01	9.17E+01	2.11E-02	2.43E+01	2005
2010	3.51E-01	1.21E-01	4.92E-02	9.76E+00	3.03E-01	9.96E+01	2.12E-02	2.84E+01	2010
2015	3.84E-01	1.31E-01	5.37E-02	1.05E+01	2.46E-01	8.90E+01	1.94E-02	8.06E+01	2015
2020	2.86E-01	1.39E-01	4.00E-02	1.12E+01	2.05E-01	9.20E+01	1.32E-02	1.00E+02	2020
2025	2.25E-01	1.43E-01	3.15E-02	1.14E+01	2.01E-01	9.37E+01	1.06E-02	1.03E+02	2025
2030	1.72E-01	1.23E-01	2.42E-02	9.86E+00	2.09E-01	7.41E+01	8.40E-03	1.19E+02	2030
2035	1.69E-01	1.21E-01	2.37E-02	9.67E+00	2.60E-01	3.01E+01	1.00E-02	1.23E+02	2035
2040	3.64E-01	1.15E-01	5.09E-02	9.16E+00	1.03E-01	1.04E+01	9.43E-03	2.66E+02	2040
2045	0.	0.	0.	0.	2.03E-01	5.52E-02	4.69E+01	1.27E+01	2045
2050	0.	0.	0.	0.	0.	0.	0.	0.	2050
2055	0.	0.	0.	0.	2.03E-01	5.52E-02	4.69E+01	1.27E+01	2055
2060	0.	0.	0.	0.	2.03E-01	5.52E-02	4.69E+01	1.27E+01	2060
2065	0.	0.	0.	0.	2.03E-01	5.52E-02	4.69E+01	1.27E+01	2065
2070	0.	0.	0.	0.	0.	0.	0.	0.	2070
2075	0.	0.	0.	0.	2.03E-01	5.52E-02	4.69E+01	1.27E+01	2075

TABLE 10.C.50. Case 3 - Low Growth - U and Pu Recycle - Reference Treatment - Radioactivity in TRU Waste Containers Sent to Salt Repository

	CURIES/CONTAINER						CURIES ANNUAL TOTAL		CUMULATIVE CURIES		
	INTERMEDIATE LEVEL DRUMS(RD) 1-10 R/HR		INTERMEDIATE LEVEL DRUMS(RD) .2-1 R/HR		LOW LEVEL DRUMS(RD) 0-.2 R/HR						
YEAR	FP+AP	ACTINIDES	FP+AP	ACTINIDES	FP+AP	ACTINIDES	FP+AP	ACTINIDES	FP+AP	ACTINIDES	YEAR
1985	0.	0.	0.	0.	0.	0.	7.20E+06	7.73E+05	6.65E+06	7.87E+05	1985
1990	0.	0.	0.	0.	0.	0.	3.81E+08	5.66E+06	1.24E+09	1.87E+07	1990
1995	0.	0.	0.	0.	0.	0.	9.80E+08	1.76E+07	4.44E+09	6.60E+07	1995
2000	0.	0.	0.	0.	0.	0.	1.06E+09	2.67E+07	8.32E+09	1.49E+08	2000
2005	0.	0.	0.	0.	0.	0.	1.65E+09	4.94E+07	1.28E+10	3.18E+08	2005
2010	0.	0.	0.	0.	0.	0.	1.70E+09	5.59E+07	1.84E+10	5.14E+08	2010
2015	0.	0.	0.	0.	0.	4.88E+02	2.13E+09	8.75E+07	2.40E+10	7.88E+08	2015
2020	0.	0.	0.	0.	0.	4.88E+02	1.86E+09	8.41E+07	2.89E+10	1.05E+09	2020
2025	0.	0.	0.	0.	0.	4.88E+02	1.16E+09	6.54E+07	3.08E+10	1.23E+09	2025
2030	0.	0.	0.	0.	0.	4.88E+02	1.09E+09	6.92E+07	3.20E+10	1.39E+09	2030
2035	0.	0.	0.	0.	0.	4.88E+02	8.31E+08	5.26E+07	3.19E+10	1.43E+09	2035
2040	0.	0.	0.	0.	0.	4.88E+02	9.35E+08	5.94E+07	3.26E+10	1.55E+09	2040
2045	0.	0.	0.	0.	2.71E-01	1.98E-01	4.97E+08	2.41E+07	3.23E+10	1.58E+09	2045
2050	0.	0.	0.	0.	0.	0.	0.	0.	2.90E+10	1.40E+09	2050
2055	0.	0.	0.	0.	2.71E-01	1.98E-01	1.79E+03	6.33E+02	2.57E+10	1.24E+09	2055
2060	0.	0.	0.	0.	2.71E-01	1.98E-01	1.79E+03	6.33E+02	2.28E+10	1.10E+09	2060
2065	0.	0.	0.	0.	2.71E-01	1.98E-01	1.79E+03	6.33E+02	2.02E+10	9.91E+08	2065
2070	0.	0.	0.	0.	0.	0.	0.	0.	1.83E+10	8.98E+08	2070
2075	0.	0.	0.	0.	2.71E-01	1.98E-01	5.38E+03	1.90E+03	1.64E+10	8.36E+08	2075

TABLE 10.C.51. Case 3 - Low Growth - U and Pu Recycle - Reference Treatment - Heat Generation Rate in TRU Waste Containers Sent to Salt Repository

(WATTS/CONTAINER)

YEAR	SOLID HIGH LEVEL CANISTERS FP+AP	SOLID HIGH LEVEL CANISTERS ACTINIDES	HULLS AND ASSEMBLY HARDWARE CANISTERS FP+AP	HULLS AND ASSEMBLY HARDWARE CANISTERS ACTINIDES	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR FP+AP	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR ACTINIDES	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR FP+AP	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR ACTINIDES	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR FP+AP	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR ACTINIDES	YEAR
1985	0.	0.	1.51E+02	3.01E-01	6.23E-02	1.40E-01	4.49E-03	5.70E-04	1.05E-03	1.34E-04	1985
1990	2.33E+03	1.74E+02	2.05E+02	5.53E-01	2.75E-01	2.13E-01	8.54E-03	1.05E-03	1.99E-03	2.46E-04	1990
1995	2.78E+03	3.77E+02	2.65E+02	9.25E-01	5.24E-01	3.10E-01	1.31E-02	1.75E-03	3.05E-03	4.12E-04	1995
2000	2.10E+03	3.91E+02	2.51E+02	1.16E+00	4.48E-01	3.91E-01	1.19E-02	2.19E-03	2.77E-03	5.14E-04	2000
2005	2.11E+03	5.17E+02	2.61E+02	1.31E+00	4.71E-01	4.21E-01	1.23E-02	2.49E-03	2.87E-03	5.83E-04	2005
2010	2.14E+03	6.03E+02	2.58E+02	1.67E+00	4.80E-01	5.42E-01	1.25E-02	3.17E-03	2.91E-03	7.45E-04	2010
2015	2.21E+03	7.70E+02	2.60E+02	1.90E+00	5.71E-01	5.78E-01	1.38E-02	3.61E-03	3.22E-03	8.46E-04	2015
2020	2.20E+03	8.68E+02	2.21E+02	2.03E+00	3.36E-01	6.62E-01	9.83E-03	3.85E-03	2.29E-03	9.04E-04	2020
2025	2.04E+03	9.93E+02	1.96E+02	2.20E+00	1.96E-01	7.37E-01	7.32E-03	4.17E-03	1.70E-03	9.79E-04	2025
2030	1.87E+03	1.09E+03	1.58E+02	1.93E+00	8.56E-02	6.43E-01	5.17E-03	3.66E-03	1.20E-03	8.59E-04	2030
2035	1.67E+03	9.76E+02	1.53E+02	1.92E+00	9.69E-02	6.47E-01	5.12E-03	3.65E-03	1.19E-03	8.56E-04	2035
2040	1.58E+03	9.63E+02	2.16E+02	2.03E+00	5.58E-01	6.89E-01	1.24E-02	3.65E-03	3.01E-03	9.05E-04	2040
2045	1.79E+03	8.07E+02	0.	0.	0.	0.	0.	0.	0.	0.	2045
2050	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2050
2055	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2055
2060	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2060
2065	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2065
2070	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2070
2075	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2075

TABLE 10.C.51. Case 3 - Low Growth - U and Pu Recycle - Reference Treatment - Heat Generation Rate in TRU Waste Containers Sent to Salt Repository

(WATTS/CONTAINER)

YEAR	INTERMEDIATE LEVEL CANISTERS .2-1 R/HR FP+AP	INTERMEDIATE LEVEL CANISTERS .2-1 R/HR ACTINIDES	INTERMEDIATE LEVEL DRUMS(55) .2-1 R/HR FP+AP	INTERMEDIATE LEVEL DRUMS(55) .2-1 R/HR ACTINIDES	LOW LEVEL DRUMS(55) 0-.2 R/HR FP+AP	LOW LEVEL DRUMS(55) 0-.2 R/HR ACTINIDES	LOW LEVEL BOXES 0-.2 R/HR FP+AP	LOW LEVEL BOXES 0-.2 R/HR ACTINIDES	YEAR
1985	5.58E-04	7.07E-05	7.79E-05	3.45E-03	1.64E-04	8.55E-02	3.72E-05	1.12E-02	1985
1990	1.06E-03	1.30E-04	1.48E-04	5.24E-03	2.21E-04	5.56E-02	6.85E-05	1.63E-02	1990
1995	1.63E-03	2.18E-04	2.27E-04	7.64E-03	2.73E-04	6.67E-02	9.98E-05	2.23E-02	1995
2000	1.44E-03	2.72E-04	2.06E-04	9.63E-03	2.53E-04	7.87E-02	9.04E-05	2.79E-02	2000
2005	1.53E-03	3.09E-04	2.14E-04	1.04E-02	2.57E-04	8.09E-02	9.30E-05	2.96E-02	2005
2010	1.55E-03	3.94E-04	2.16E-04	1.33E-02	2.54E-04	8.77E-02	9.33E-05	3.74E-02	2010
2015	1.72E-03	4.48E-04	2.39E-04	1.42E-02	2.27E-04	1.27E-01	8.65E-05	1.65E+00	2015
2020	1.22E-03	4.78E-04	1.70E-04	1.63E-02	1.56E-04	1.48E-01	5.62E-05	2.53E+00	2020
2025	9.09E-04	5.18E-04	1.27E-04	1.81E-02	1.31E-04	1.54E-01	4.28E-05	2.59E+00	2025
2030	6.42E-04	4.54E-04	8.96E-05	1.58E-02	1.14E-04	1.57E-01	3.13E-05	3.20E+00	2030
2035	6.35E-04	4.53E-04	8.87E-05	1.59E-02	1.49E-04	1.29E-01	3.76E-05	3.25E+00	2035
2040	1.60E-03	4.78E-04	2.24E-04	1.70E-02	1.12E-04	2.51E-01	4.16E-05	8.44E+00	2040
2045	0.	0.	0.	0.	9.16E-04	6.15E-04	2.11E-01	1.40E-01	2045
2050	0.	0.	0.	0.	0.	0.	0.	0.	2050
2055	0.	0.	0.	0.	9.16E-04	6.15E-04	2.11E-01	1.40E-01	2055
2060	0.	0.	0.	0.	9.16E-04	6.15E-04	2.11E-01	1.40E-01	2060
2065	0.	0.	0.	0.	9.16E-04	6.15E-04	2.11E-01	1.40E-01	2065
2070	0.	0.	0.	0.	0.	0.	0.	0.	2070
2075	0.	0.	0.	0.	9.16E-04	6.15E-04	2.11E-01	1.40E-01	2075

TABLE 10.C.51. Case 3 - Low Growth - U and Pu Recycle - Reference Treatment - Heat Generation Rate in TRU Waste Containers Sent to Salt Repository

(WATTS/CONTAINER)

YEAR	INTERMEDIATE LEVEL DRUMS(80) FP+AP	INTERMEDIATE LEVEL DRUMS(80) 1-10 R/HR ACTINIDES	INTERMEDIATE LEVEL DRUMS(80) FP+AP	INTERMEDIATE LEVEL DRUMS(80) .2-1 R/HR ACTINIDES	LOW LEVEL DRUMS(80) FP+AP	LOW LEVEL DRUMS(80) 0-.2 R/HR ACTINIDES	YEAR
1985	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	1995
2000	0.	0.	0.	0.	0.	0.	2000
2005	0.	0.	0.	0.	0.	0.	2005
2010	0.	0.	0.	0.	0.	0.	2010
2015	0.	0.	0.	0.	0.	1.47E+01	2015
2020	0.	0.	0.	0.	0.	1.47E+01	2020
2025	0.	0.	0.	0.	0.	1.47E+01	2025
2030	0.	0.	0.	0.	0.	1.47E+01	2030
2035	0.	0.	0.	0.	0.	1.47E+01	2035
2040	0.	0.	0.	0.	0.	1.47E+01	2040
2045	0.	0.	0.	0.	1.21E-03	2.20E-03	2045
2050	0.	0.	0.	0.	0.	0.	2050
2055	0.	0.	0.	0.	1.21E-03	2.20E-03	2055
2060	0.	0.	0.	0.	1.21E-03	2.20E-03	2060
2065	0.	0.	0.	0.	1.21E-03	2.20E-03	2065
2070	0.	0.	0.	0.	0.	0.	2070
2075	0.	0.	0.	0.	1.21E-03	2.20E-03	2075

TABLE 10.C.52. Case 3 - Low Growth - U and Pu Recycle - Reference Treatment - TRU Waste Containers in Interim Storage Sent to Salt Repository

YEAR	SOLID HIGH LEVEL CANISTERS ANNUAL	SOLID HIGH LEVEL CANISTERS CUMULATIVE	HULLS AND ASSEMBLY HARDWARE CANISTERS ANNUAL	HULLS AND ASSEMBLY HARDWARE CANISTERS CUMULATIVE	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR ANNUAL	INTERMEDIATE LEVEL DRUMS(55) 10+ R/HR CUMULATIVE	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR ANNUAL	INTERMEDIATE LEVEL CANISTERS 1-10 R/HR CUMULATIVE	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR ANNUAL	INTERMEDIATE LEVEL DRUMS(55) 1-10 R/HR CUMULATIVE	YEAR
1976	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1976
1977	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1977
1978	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1978
1979	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1979
1980	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1980
1981	0.	0.	1.20E+02	1.20E+02	1.06E+03	1.06E+03	1.00E+00	1.00E+00	4.92E+02	4.92E+02	1981
1982	0.	0.	2.39E+02	3.59E+02	2.12E+03	3.18E+03	2.00E+00	3.00E+00	9.84E+02	1.48E+03	1982
1983	0.	0.	3.59E+02	7.17E+02	3.18E+03	6.35E+03	3.00E+00	6.00E+00	1.48E+03	2.95E+03	1983
1984	0.	0.	3.59E+02	1.08E+03	3.18E+03	9.53E+03	3.00E+00	9.00E+00	1.48E+03	4.43E+03	1984
1985	0.	0.	-4.78E+01	1.03E+03	-4.23E+02	9.10E+03	-4.00E-01	8.60E+00	-1.97E+02	4.23E+03	1985
1986	0.	0.	-4.78E+01	9.80E+02	-4.23E+02	8.68E+03	-4.00E-01	8.20E+00	-1.97E+02	4.04E+03	1986
1987	0.	0.	-7.17E+01	9.08E+02	-6.35E+02	8.04E+03	-6.00E-01	7.60E+00	-2.95E+02	3.74E+03	1987
1988	0.	0.	-9.56E+01	8.13E+02	-8.47E+02	7.20E+03	-8.00E-01	6.80E+00	-3.94E+02	3.35E+03	1988
1989	0.	0.	-9.56E+01	7.17E+02	-8.47E+02	6.35E+03	-8.00E-01	6.00E+00	-3.94E+02	2.95E+03	1989
1990	0.	0.	-1.43E+02	5.74E+02	-1.27E+03	5.08E+03	-1.20E+00	4.80E+00	-5.90E+02	2.36E+03	1990
1991	0.	0.	-1.43E+02	4.30E+02	-1.27E+03	3.81E+03	-1.20E+00	3.60E+00	-5.90E+02	1.77E+03	1991
1992	0.	0.	-1.43E+02	2.87E+02	-1.27E+03	2.54E+03	-1.20E+00	2.40E+00	-5.90E+02	1.18E+03	1992
1993	0.	0.	-1.43E+02	1.43E+02	-1.27E+03	1.27E+03	-1.20E+00	1.20E+00	-5.90E+02	5.90E+02	1993
1994	0.	0.	-1.43E+02	5.89E-12	-1.27E+03	5.20E-11	-1.20E+00	4.09E-14	-5.90E+02	1.76E-11	1994
1995	0.	0.	-5.89E-12	0.	-5.20E-11	0.	-4.09E-14	0.	-1.76E-11	0.	1995
1996	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1996
1997	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1997
1998	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1998
1999	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1999
2000	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2000
2001	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2001

TABLE 10.C.52. Case 3 - Low Growth - U and Pu Recycle - Reference Treatment - TRU Waste Containers in Interim Storage Sent to Salt Repository

YEAR	INTERMEDIATE LEVEL CONTSTERS .2-1 R/HR ANNUAL	CUMULATIVE	INTERMEDIATE LEVEL DRUMS(55) .2-1 R/HR ANNUAL	CUMULATIVE	LOW LEVEL DRUMS(55) 0-.2 R/HR ANNUAL	CUMULATIVE	LOW LEVEL BOXES 0-.2 R/HR ANNUAL	CUMULATIVE	YEAR
1976	0.	0.	0.	0.	0.	0.	0.	0.	1976
1977	0.	0.	0.	0.	0.	0.	0.	0.	1977
1978	0.	0.	0.	0.	0.	0.	0.	0.	1978
1979	0.	0.	0.	0.	0.	0.	0.	0.	1979
1980	0.	0.	0.	0.	0.	0.	0.	0.	1980
1981	1.68E+01	1.68E+01	4.84E+02	4.84E+02	9.51E+02	9.51E+02	1.75E+01	1.75E+01	1981
1982	3.35E+01	5.03E+01	9.68E+02	1.45E+03	2.17E+03	3.12E+03	3.76E+01	5.52E+01	1982
1983	5.03E+01	1.01E+02	1.45E+03	2.90E+03	3.42E+03	6.55E+03	5.80E+01	1.13E+02	1983
1984	5.03E+01	1.51E+02	1.45E+03	4.36E+03	3.76E+03	1.03E+04	6.12E+01	1.74E+02	1984
1985	-6.71E+00	1.44E+02	-1.94E+02	4.16E+03	-3.80E+02	9.92E+03	-7.01E+00	1.67E+02	1985
1986	-6.71E+00	1.37E+02	-1.94E+02	3.97E+03	-3.80E+02	9.54E+03	-7.01E+00	1.60E+02	1986
1987	-1.01E+01	1.27E+02	-2.90E+02	3.68E+03	-6.25E+02	8.92E+03	-1.10E+01	1.49E+02	1987
1988	-1.34E+01	1.14E+02	-3.87E+02	3.29E+03	-8.69E+02	8.05E+03	-1.51E+01	1.34E+02	1988
1989	-1.34E+01	1.01E+02	-3.87E+02	2.90E+03	-8.69E+02	7.18E+03	-1.51E+01	1.19E+02	1989
1990	-2.01E+01	8.05E+01	-5.81E+02	2.32E+03	-1.37E+03	5.81E+03	-2.32E+01	9.60E+01	1990
1991	-2.01E+01	6.03E+01	-5.81E+02	1.74E+03	-1.37E+03	4.44E+03	-2.32E+01	7.28E+01	1991
1992	-2.01E+01	4.02E+01	-5.81E+02	1.16E+03	-1.44E+03	3.01E+03	-2.38E+01	4.90E+01	1992
1993	-2.01E+01	2.01E+01	-5.81E+02	5.81E+02	-1.50E+03	1.30E+03	-2.45E+01	2.45E+01	1993
1994	-2.01E+01	6.58E-13	-5.81E+02	2.17E-11	-1.50E+03	3.63E-11	-2.45E+01	7.80E-13	1994
1995	-6.58E-13	0.	-2.17E-11	0.	-3.63E-11	0.	-7.80E-13	0.	1995
1996	0.	0.	0.	0.	0.	0.	0.	0.	1996
1997	0.	0.	0.	0.	0.	0.	0.	0.	1997
1998	0.	0.	0.	0.	0.	0.	0.	0.	1998
1999	0.	0.	0.	0.	0.	0.	0.	0.	1999
2000	0.	0.	0.	0.	0.	0.	0.	0.	2000

APPENDIX 10D

RADIOACTIVITY ACCUMULATIONS IN REPOSITORIES

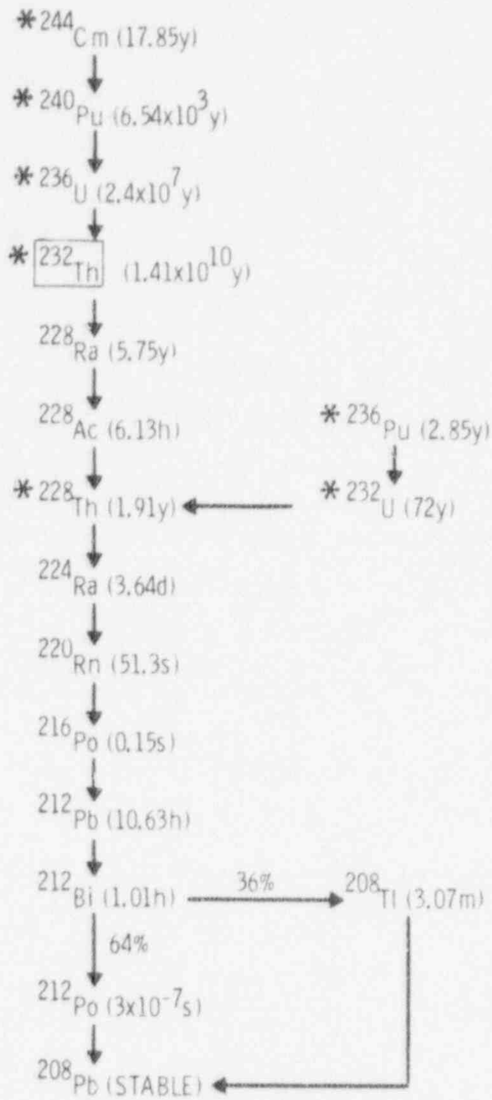
APPENDIX 10D

RADIOACTIVITY ACCUMULATIONS IN REPOSITORIES

Appendix 10D consists of 90 tables grouped by fuel cycle case that provide a detailed description of the radioactivity and heat accumulation in all repositories for the entire waste management system. There are 10 tables for each fuel cycle case.

- The first table for each case summarizes the radioactivity by major fission product nuclides and by actinide elements at intervals to one million years.
- The second table for each case shows the radioactivity of the individual actinide nuclides including daughter nuclide activity. Eleven of the actinide nuclides have one or more short-lived daughter nuclides that are present in secular equilibrium with the parent nuclide. The activity of each daughter nuclide is essentially equal to the activity of the parent nuclide. Rather than showing the activity of each daughter nuclide, the tables are simplified by including the daughter nuclide activity with the parent activity. For example, if a nuclide has two short-lived daughter nuclides, the activity of the parent or either of the daughters can be obtained by dividing the total activity shown in the table by three. The short-lived daughter nuclides are identified in the four actinide decay chains illustrated in Figures 10.D.1 through 10.D.4. A different representation of these decay chains where they are charted by mass number and atomic number can be found in Figures 9B-1 through 9B-4 in Appendix 9B.
- The third table for each case shows the activity of the medium and long-lived fission and activation product nuclides.
- The fourth table shows the activity of the short-lived fission and activation product nuclides.
- The fifth table classifies total fission and activation product activity and total actinide activity by waste type.
- The second series of five tables for each case is organized the same way as the first five tables but instead of radioactivity the tables show the heat generation rates.

  Any values less than 10^{-10} curies or watts in these tables have been set equal to zero.



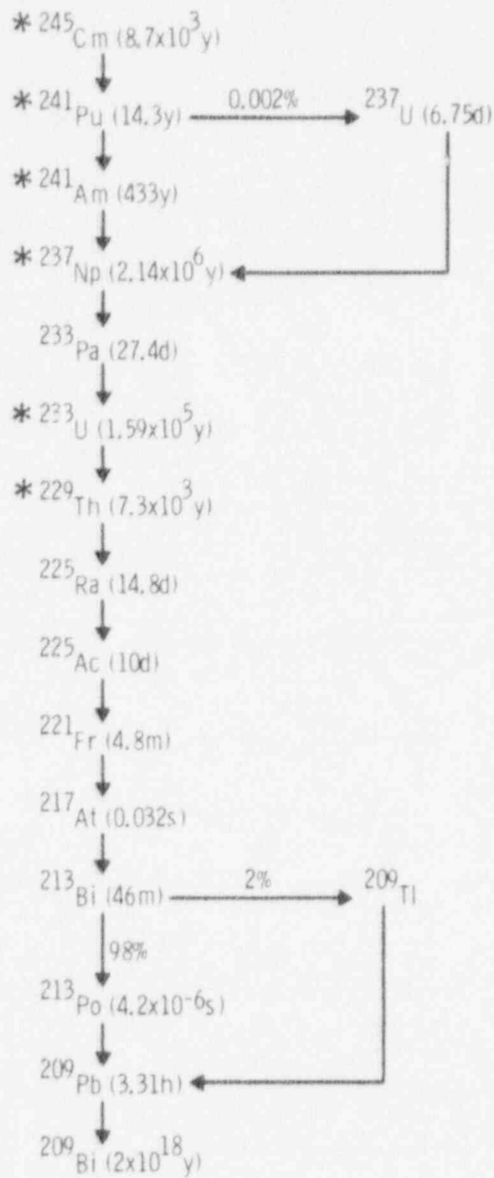
NOTES: 1. ▭ DENOTES NUCLIDE FOUND IN NATURE

2. * DENOTES NUCLIDES SHOWN IN APPENDIX 10.D TABLES

3. ACTIVITY SUMMATIONS IN APPENDIX 10.D TABLES

NUCLIDE	PARENT+DAUGHTER CURIES PER PARENT CURIE
^{232}Th	3
^{228}Th	7

FIGURE 10.D.1. The Thorium (4n) Series



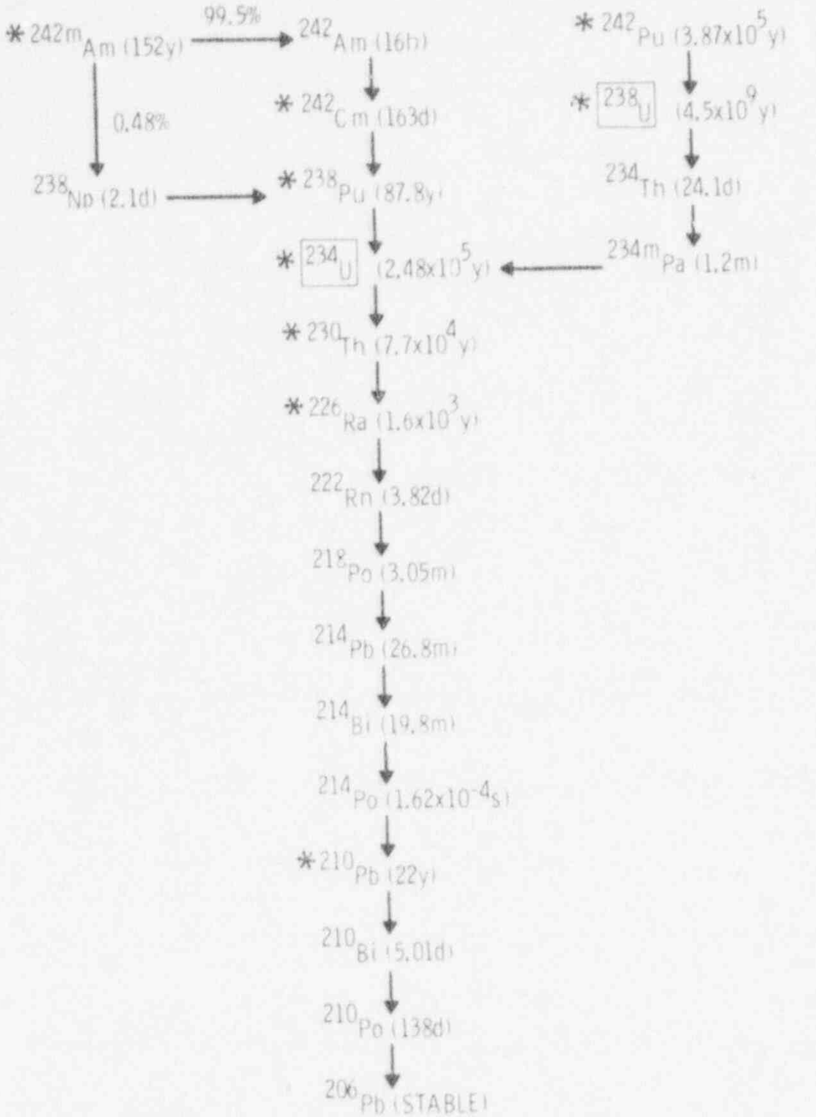
NOTES: 1. NONE OF THE NUCLIDES IN THIS SERIES ARE FOUND IN NATURE

2. * DENOTES NUCLIDES SHOWN IN APPENDIX 10.D TABLES

3. ACTIVITY SUMMATIONS IN APPENDIX 10.D TABLES

NUCLIDE	PARENT+DAUGHTER CURIES PER PARENT CURIES
^{237}Np	2
^{229}Th	8

FIGURE 10.D.2. The Neptunium (4n + 1) Series



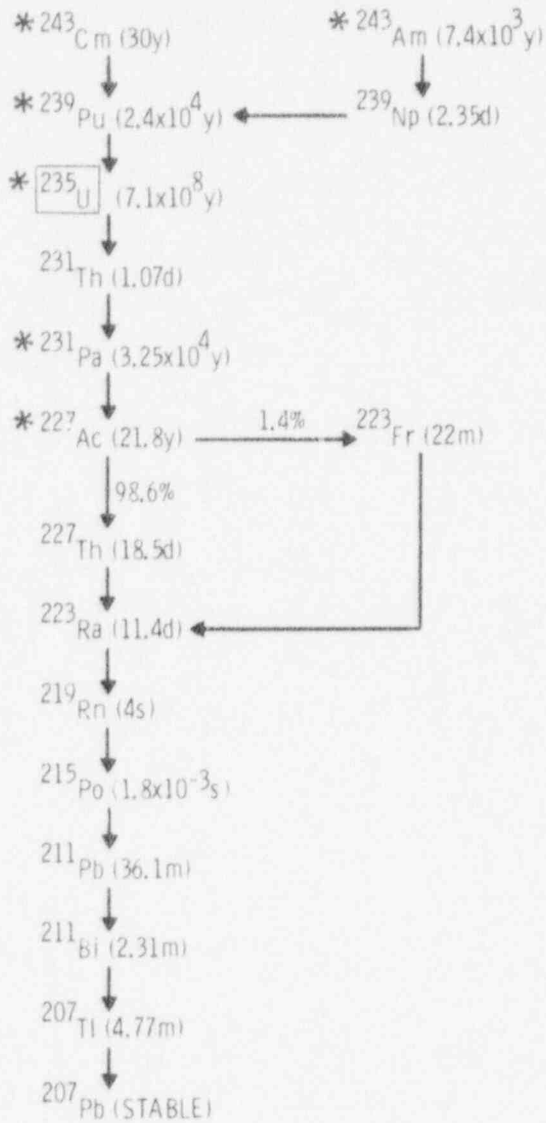
NOTES: 1. ▭ DENOTES NUCLIDE FOUND IN NATURE

2. * DENOTES NUCLIDES SHOWN IN APPENDIX 10.D TABLES

3. ACTIVITY SUMMATIONS IN APPENDIX 10.D TABLES:

NUCLIDE	PARENT+DAUGHTER CURIES PER PARENT CURIE
^{242m}Am	2
^{238}U	3
^{226}Ra	6
^{210}Pb	3

FIGURE 10.D.3. The Uranium (4n + 2) Series



NOTES: 1. ☐ DENOTES NUCLIDE FOUND IN NATURE

2. * DENOTES NUCLIDES SHOWN IN APPENDIX 10.D TABLES

3. ACTIVITY SUMMATIONS IN APPENDIX 10.D TABLES:

NUCLIDE	PARENT+DAUGHTER CURIES PER PARENT CURIE
^{243}Am	2
^{235}U	2
^{227}Ac	8

FIGURE 10.D.4. The Actinium (4n + 3) Series

APPENDIX 10D

INDEX TO RADIOACTIVITY ACCUMULATIONS TABLES

TABLE 10.D.1 Case 1 - Once Through Cycle - Reference Treatment
Summary Radioactivity Inventory in Repositories by
Major Radionuclides (Curies)

FISSION AND ACTIVATION	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
C-14	4.17E+04	3.15E+05	3.15E+05	3.01E+05	2.83E+05	1.74E+05	9.53E+04	7.57E+02	1.79E+00	0.	0.
NI-59	1.48E+05	1.15E+06	1.15E+06	1.14E+06	1.14E+06	1.10E+06	1.05E+06	7.45E+05	4.83E+05	1.51E+04	1.99E+02
SR-90,Y-90	4.67E+09	2.01E+10	1.23E+10	5.61E+05	2.58E+00	0.	0.	0.	0.	0.	0.
ZR-93,NB-93M	1.57E+05	1.24E+06	1.24E+06	1.24E+06	1.24E+06	1.24E+06	1.24E+06	1.22E+06	1.19E+06	9.88E+05	7.84E+05
TC-99	6.10E+05	4.82E+06	4.82E+06	4.81E+06	4.80E+06	4.74E+06	4.66E+06	4.09E+06	3.46E+06	9.26E+05	1.78E+05
PD-107	4.69E+03	3.65E+04	3.65E+04	3.66E+04	3.66E+04	3.66E+04	3.66E+04	3.64E+04	3.63E+04	3.49E+04	3.32E+04
I-129	1.57E+03	1.24E+04	1.24E+04	1.24E+04	1.24E+04	1.24E+04	1.23E+04	1.23E+04	1.23E+04	1.21E+04	1.19E+04
CS-135	1.22E+04	1.00E+05	1.00E+05	1.00E+05	1.00E+05	1.00E+05	9.99E+04	9.90E+04	9.79E+04	8.92E+04	7.95E+04
CS-137,BA-137M	6.49E+09	2.87E+10	1.81E+10	1.61E+06	1.56E+01	0.	0.	0.	0.	0.	0.
ALL OTHERS	1.25E+09	1.53E+09	7.04E+08	1.69E+07	6.15E+05	4.67E+05	4.49E+05	3.28E+05	2.23E+05	1.18E+04	3.58E+02
TOTAL	1.24E+10	5.04E+10	3.11E+10	2.68E+07	8.43E+06	7.87E+06	7.65E+06	6.52E+06	5.51E+06	2.08E+06	1.09E+06
ACTINIDES AND DAUGHTERS											
CM	3.69E+07	1.23E+08	5.84E+07	4.60E+05	1.01E+05	4.29E+04	2.82E+04	9.85E+02	1.49E+01	0.	0.
AM	6.72E+07	1.16E+09	1.24E+09	7.27E+08	3.29E+08	3.83E+06	2.09E+06	5.60E+04	6.08E+02	0.	0.
PU	3.14E+09	8.61E+09	3.82E+09	2.43E+08	2.62E+08	1.98E+08	1.45E+08	2.86E+07	7.05E+06	2.37E+05	9.50E+04
NP	6.36E+05	5.20E+06	5.20E+06	5.14E+06	5.01E+06	3.66E+06	2.48E+06	4.61E+05	4.00E+05	3.51E+05	2.98E+05
U	1.51E+05	8.50E+05	7.62E+05	8.44E+05	8.68E+05	8.84E+05	8.97E+05	9.23E+05	9.26E+05	8.39E+05	7.28E+05
PA	3.08E+04	2.46E+05	2.54E+05	3.73E+05	4.64E+05	5.32E+05	5.33E+05	5.32E+05	5.28E+05	4.81E+05	4.29E+05
TH	1.77E+04	1.32E+05	1.31E+05	1.29E+05	1.32E+05	1.56E+05	1.88E+05	4.14E+05	6.00E+05	7.71E+05	6.27E+05
RA	6.89E+02	5.19E+03	4.32E+03	3.54E+02	1.05E+03	1.78E+04	4.82E+04	2.85E+05	4.73E+05	6.41E+05	4.97E+05
OTHER DAUGHTERS*	3.45E+03	2.60E+04	2.16E+04	2.23E+03	6.05E+03	1.38E+05	3.72E+05	2.14E+06	3.51E+06	4.45E+06	3.31E+06
TOTAL	3.27E+09	9.90E+09	5.16E+09	1.03E+09	5.97E+08	2.08E+08	1.52E+08	3.34E+07	1.35E+07	7.77E+06	5.99E+06

* FR+RN+A+PO+BI+PB+TE

TABLE 10.D.2 Case 1 - Once Through Cycle - Reference Treatment
Actinide Radioactivity Inventory in Repositories
(Curies)

ACTINIDES AND DAUGHTERS	YEAR 2000	YEAR 2050	YEAR 2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
CM-245	7.79E+03	6.49E+04	6.49E+04	6.26E+04	6.00E+04	4.29E+04	2.82E+04	9.85E+02	1.49E+01	0.	0.
CM-244	3.64E+07	1.19E+08	5.54E+07	1.06E+01	5.09E-08	0.	0.	0.	0.	0.	0.
CM-243	1.36E+05	6.49E+05	4.21E+05	6.65E+01	1.32E-03	0.	0.	0.	0.	0.	0.
CM-242	3.63E+05	2.75E+06	2.51E+06	3.97E+05	4.06E+04	4.86E-04	0.	0.	0.	0.	0.
AM-243,NP-239	1.24E+06	1.02E+07	1.01E+07	9.77E+06	9.34E+06	6.50E+06	4.13E+06	1.10E+05	1.19E+03	0.	0.
AM-242M,AM-242	9.29E+05	6.69E+06	6.11E+06	9.68E+05	9.90E+04	1.18E-03	0.	0.	0.	0.	0.
AM-241	8.57E+07	1.15E+09	1.27E+09	7.21E+08	3.24E+08	5.81E+05	2.85E+04	9.87E+02	1.49E+01	0.	0.
PU-242	7.39E+04	5.91E+05	5.91E+05	5.91E+05	5.90E+05	5.86E+05	5.81E+05	5.40E+05	4.93E+05	2.37E+05	9.50E+04
PU-241	3.02E+09	7.25E+09	3.04E+09	6.27E+04	6.01E+04	4.30E+04	2.83E+04	9.87E+02	1.49E+01	0.	0.
PU-240	2.23E+07	1.69E+08	1.68E+08	1.62E+08	1.54E+08	1.02E+08	6.11E+07	1.01E+06	5.99E+03	0.	0.
PU-239	1.48E+07	1.10E+08	1.10E+08	1.08E+08	1.07E+08	9.58E+07	8.35E+07	2.71E+07	6.55E+06	7.60E+01	5.15E-05
PU-238	8.81E+07	5.87E+08	5.03E+08	2.23E+07	5.32E+05	1.17E-03	0.	0.	0.	0.	0.
PU-236	1.08E+03	2.86E+02	2.21E+00	0.	0.	0.	0.	0.	0.	0.	0.
NP-237,PA-233	2.92E+04	2.52E+05	2.69E+05	5.06E+05	6.87E+05	8.22E+05	8.22E+05	8.12E+05	7.99E+05	7.02E+05	5.97E+05
U-238,TH-234, PA-234M	4.86E+04	3.60E+05	3.60E+05	3.60E+05	3.60E+05	3.60E+05	3.60E+05	3.60E+05	3.60E+05	3.60E+05	3.60E+05
U-236	1.06E+04	8.46E+04	8.47E+04	8.64E+04	8.88E+04	1.03E+05	1.15E+05	1.32E+05	1.32E+05	1.30E+05	1.29E+05
U-235,TH-231	1.70E+03	1.34E+04	1.34E+04	1.35E+04	1.36E+04	1.44E+04	1.53E+04	1.92E+04	2.06E+04	2.10E+04	2.10E+04
U-234	4.68E+04	4.60E+05	4.70E+05	6.30E+05	6.51E+05	6.46E+05	6.39E+05	5.83E+05	5.23E+05	2.51E+05	1.52E+05
U-233	4.00E+00	4.66E+01	5.77E+01	3.72E+02	1.06E+03	7.79E+03	1.64E+04	7.80E+04	1.41E+05	3.27E+05	3.17E+05
U-232	7.46E+02	5.06E+03	4.19E+03	8.56E+01	6.95E-01	0.	0.	0.	0.	0.	0.
PA-231	1.35E+00	1.52E+01	1.81E+01	7.07E+01	1.45E+02	7.02E+02	1.39E+03	5.71E+03	8.58E+03	1.05E+04	1.05E+04
TH-230	6.09E+00	1.07E+02	2.25E+02	2.09E+03	5.02E+03	2.68E+04	5.30E+04	2.16E+05	3.33E+05	3.02E+05	1.67E+05
TH-229,7 DAUGHTERS	1.77E-02	9.87E-01	1.73E+00	5.68E+01	3.26E+02	1.17E+04	4.51E+04	5.01E+05	1.03E+06	2.63E+06	2.55E+06
TH-228,6 DAUGHTERS	4.82E+03	3.63E+04	3.01E+04	6.16E+02	5.03E+00	1.60E-01	3.50E-01	2.11E+00	4.38E+00	2.24E+01	4.46E+01
AC-227,7 DAUGHTERS	1.74E+00	6.79E+01	9.96E+01	5.47E+02	1.16E+03	5.61E+03	1.11E+04	4.57E+04	6.87E+04	8.42E+04	8.41E+04
TH-232,2 DAUGHTERS	5.77E-06	3.07E-04	5.45E-04	5.26E-03	1.20E-02	6.86E-02	1.50E-01	9.03E-01	1.88E+00	9.60E+00	1.91E+01
RA-226,5 DAUGHTERS	1.37E-01	8.57E+00	1.81E+01	1.02E+03	5.20E+03	9.40E+04	2.47E+05	1.30E+06	2.02E+06	1.81E+06	1.01E+06
PB-210,2 DAUGHTERS	1.23E-02	1.61E+00	4.10E+00	4.81E+02	2.60E+03	4.70E+04	1.24E+05	6.49E+05	1.01E+06	9.06E+05	5.03E+05
TOTAL ACTINIDES	3.27E+09	9.00E+09	5.15E+09	1.03E+09	5.97E+08	2.08E+08	1.52E+08	3.34E+07	1.35E+07	7.77E+06	5.99E+06

TABLE 10.D.3 Case 1- Once Through Cycle - Reference Treatment
Fission and Activation Product Radioactivity Inventory in
Repositories (Curies)

FISSION AND ACTIVATION	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
H-3	9.89E+06	2.19E+07	7.09E+06	4.33E-04	0.	0.	0.	0.	0.	0.	0.
C-14	4.17E+04	3.16E+05	3.16E+05	3.01E+05	2.83E+05	1.74E+05	9.53E+04	7.57E+02	1.79E+00	0.	0.
MN-54	1.51E+06	2.40E+02	1.34E-05	0.	0.	0.	0.	0.	0.	0.	0.
FE-55	2.19E+07	5.27E+06	2.58E+04	0.	0.	0.	0.	0.	0.	0.	0.
CO-60	5.46E+07	4.17E+07	2.99E+06	0.	0.	0.	0.	0.	0.	0.	0.
NI-59	1.48E+05	1.15E+06	1.15E+06	1.14E+06	1.14E+06	1.10E+06	1.05E+06	7.45E+05	4.53E+05	1.51E+04	1.99E+02
NI-63	2.16E+07	1.36E+08	1.17E+08	5.60E+06	1.30E+03	1.08E-08	0.	0.	0.	0.	0.
SE-79	1.65E+04	1.31E+05	1.31E+05	1.30E+05	1.30E+05	1.24E+05	1.18E+05	7.70E+04	4.52E+04	6.56E+02	3.09E+00
KR-85	2.11E+08	4.18E+08	1.15E+08	6.41E-04	0.	0.	0.	0.	0.	0.	0.
RB-87	8.14E-01	6.47E+00	6.47E+00	6.47E+00	6.47E+00	6.47E+00	6.47E+00	6.47E+00	6.47E+00	6.47E+00	6.47E+00
SR-90,Y-90	4.67E+09	2.01E+10	1.23E+10	5.81E-05	2.58E+00	0.	0.	0.	0.	0.	0.
ZR-93,NB-93M	1.57E+05	1.24E+06	1.24E+06	1.24E+06	1.24E+06	1.24E+06	1.24E+06	1.22E+06	1.19E+06	9.88E+05	7.84E+05
TC-99	6.10E+05	4.82E+06	4.82E+06	4.81E+06	4.80E+06	4.74E+06	4.66E+06	4.09E+06	3.46E+06	9.26E+05	1.78E+05
RU-106,RH-106	7.57E+07	2.15E+06	2.21E+00	0.	0.	0.	0.	0.	0.	0.	0.
PD-107	4.69E+03	3.66E+04	3.66E+04	3.66E+04	3.66E+04	3.66E+04	3.66E+04	3.64E+04	3.63E+04	3.49E+04	3.32E+04
AG-110M	2.13E+04	1.46E+02	3.02E-07	0.	0.	0.	0.	0.	0.	0.	0.
CD-113M	2.19E+05	5.52E+05	2.03E+05	4.27E-04	0.	0.	0.	0.	0.	0.	0.
SB-125,TE-125M	4.66E+07	1.17E+07	6.94E+04	0.	0.	0.	0.	0.	0.	0.	0.
SN-126,SB-126	4.52E+04	3.55E+05	3.55E+05	3.54E+05	3.52E+05	3.43E+05	3.31E+05	2.51E+05	1.78E+05	1.11E+04	3.44E+02
I-129	1.57E+03	1.24E+04	1.24E+04	1.24E+04	1.24E+04	1.24E+04	1.23E+04	1.23E+04	1.23E+04	1.21E+04	1.19E+04
CS-134	2.77E+08	4.07E+07	4.73E+04	0.	0.	0.	0.	0.	0.	0.	0.
CS-135	1.22E+04	1.00E+05	1.00E+05	1.00E+05	1.00E+05	1.00E+05	9.99E+04	9.90E+04	4.79E+04	8.92E+04	7.95E+04
CS-137,BA-137	6.49E+09	2.87E+10	1.81E+10	1.61E+06	1.56E+01	0.	0.	0.	0.	0.	0.
CE-144,PR-144	3.24E+07	4.99E+05	9.13E-03	0.	0.	0.	0.	0.	0.	0.	0.
PM-147	2.94E+08	8.33E+07	4.21E+05	0.	0.	0.	0.	0.	0.	0.	0.
SM-151	5.06E+07	3.18E+08	2.71E+08	1.09E+07	2.03E+05	2.99E-09	0.	0.	0.	0.	0.
EU-152	2.97E+05	6.66E+05	2.10E+05	1.36E-05	0.	0.	0.	0.	0.	0.	0.
EU-154	1.57E+08	4.51E+08	1.90E+08	4.61E+00	1.91E-09	0.	0.	0.	0.	0.	0.
EU-155	6.49E+06	7.50E+05	3.55E+02	0.	0.	0.	0.	0.	0.	0.	0.
OTHER[a]	1.85E+03	1.48E+01	1.25E-08	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	1.24E+10	5.04E+10	3.11E+10	2.68E+07	8.43E+06	7.87E+06	7.65E+06	6.52E+06	5.51E+06	2.08E+06	1.09E+06

a. Nuclides included in "other" category are all short-lived and are detailed in the next table.

TABLE 10.D.4 Case 1 - Once Through Cycle - Reference Treatment
Short-Lived Fission and Activation Product Radioactivity
Inventory in Repositories (Curies)

FISSION AND ACTIVATION	YEAR 2000	YEAR 2050	YEAR 2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
SC-46	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR-51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO-58	1.13E-02	1.75E-09	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE-59	2.85E-07	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN-65	1.70E+02	1.11E+00	1.19E-09	0.	0.	0.	0.	0.	0.	0.	0.
SR-89	5.71E-06	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y-91	3.83E-04	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR-95	7.79E-06	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB-95M	4.56E-04	9.30E-10	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB-95	3.90E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU-103	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN-123	3.33E+01	7.76E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB-124	2.65E-07	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE-127M,TE-127	1.45E+01	1.26E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE-141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM-148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD-153	1.63E+03	1.36E+01	1.13E-08	0.	0.	0.	0.	0.	0.	0.	0.
TB-160	3.76E-04	6.08E-10	0.	0.	0.	0.	0.	0.	0.	0.	0.
W-181	8.20E-05	4.17E-08	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	1.85E+03	1.48E+01	1.25E-08	0.	0.	0.	0.	0.	0.	0.	0.

TABLE 10.D.5 Case 1 - Once Through Cycle - Reference Treatment
Total Radioactivity in Repositories by Waste
Classification (Curies)

FISSION AND ACTIVATION	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
BWR CANISTERS	3.92E+09	1.67E+10	1.03E+10	8.19E+06	2.60E+06	2.47E+06	2.42E+06	2.11E+06	1.79E+06	6.94E+05	3.65E+05
PWR CANISTERS	8.50E+09	3.37E+10	2.08E+10	1.84E+07	5.64E+06	5.29E+06	5.16E+06	4.41E+06	3.71E+06	1.38E+06	7.22E+05
TOTAL	1.24E+10	5.04E+10	3.11E+10	2.66E+07	8.24E+06	7.75E+06	7.58E+06	6.52E+06	5.51E+06	2.08E+06	1.09E+06
ACTINIDES											
BWR CANISTERS	9.83E+08	3.10E+09	1.62E+09	3.32E+08	1.97E+08	7.22E+07	5.26E+07	1.14E+07	4.49E+06	2.55E+06	2.00E+06
PWR CANISTERS	2.29E+09	6.80E+09	3.54E+09	6.95E+08	4.00E+08	1.36E+08	9.92E+07	2.21E+07	8.99E+06	5.22E+06	3.99E+06
TOTAL	3.27E+09	9.90E+09	5.16E+09	1.03E+09	5.97E+08	2.08E+08	1.52E+08	3.34E+07	1.35E+07	7.77E+06	5.99E+06

TABLE 10.D.6 Case 1 - Once Through Cycle - Reference Treatment
Summary Heat Generation Rate in Repositories by
Major Radionuclides (Watts)

FISSION AND ACTIVATION	YEAR 2000	YEAR 2050	YEAR 2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
C-14	1.24E+01	9.38E+01	9.35E+01	8.91E+01	8.38E+01	5.17E+01	2.82E+01	2.24E-01	5.32E-04	0.	0.
NI-59	9.44E+02	7.30E+03	7.30E+03	7.27E+03	7.24E+03	6.99E+03	6.70E+03	4.74E+03	3.07E+03	9.62E+01	1.27E+00
SR-90,Y-90	1.68E+07	7.23E+07	4.42E+07	2.09E+03	9.27E-03	0.	0.	0.	0.	0.	0.
Z[illegible]3,NB-93M	3.67E+01	2.91E+02	2.91E+02	2.91E+02	2.91E+02	2.91E+02	2.90E+02	2.85E+02	2.78E+02	2.31E+02	1.84E+02
[illegible]	1.05E+03	8.28E+03	8.28E+03	8.27E+03	8.26E+03	8.15E+03	8.02E+03	7.02E+03	5.96E+03	1.59E+03	3.06E+02
PD	3.89E-01	3.04E+00	3.04E+00	3.04E+00	3.04E+00	3.04E+00	3.04E+00	3.02E+00	3.01E+00	2.89E+00	2.75E+00
I-1[illegible]	1.03E+00	8.13E+00	8.13E+00	8.13E+00	8.13E+00	8.13E+00	8.13E+00	8.11E+00	8.10E+00	7.96E+00	7.80E+00
CS-135	5.95E+00	4.87E+01	4.87E+01	4.87E+01	4.87E+01	4.86E+01	4.86E+01	4.81E+01	4.76E+01	4.34E+01	3.86E+01
CS-137,BA-137M	1.78E+07	7.88E+07	4.97E+07	4.42E+03	4.28E-02	0.	0.	0.	0.	0.	0.
ALL OTHERS	6.36E+06	6.14E+06	2.29E+06	2.29E+04	3.39E+03	2.93E+03	2.83E+03	2.14E+03	1.51E+03	9.39E+01	2.94E+00
TOTAL	4.10E+07	1.57E+08	9.61E+07	4.33E+04	1.93E+04	1.85E+04	1.79E+04	1.42E+04	1.09E+04	2.07E+03	5.43E+02
ACTINIDES AND DAUGHTERS											
CM	1.29E+06	4.29E+06	2.05E+06	1.66E+04	3.38E+03	1.35E+03	8.86E+02	3.09E+01	4.67E-01	0.	0.
AM	2.88E+06	3.85E+07	4.26E+07	2.42E+07	1.10E+07	1.38E+05	7.63E+04	2.04E+03	2.21E+01	0.	0.
PU	4.20E+06	2.84E+07	2.55E+07	9.16E+06	8.14E+06	6.17E+06	4.51E+06	8.89E+05	2.18E+05	7.00E+03	2.80E+03
NP	1.27E+03	1.06E+04	1.08E+04	1.40E+04	1.64E+04	1.65E+04	1.49E+04	1.20E+04	1.17E+04	1.03E+04	8.77E+03
U	2.09E+03	1.83E+04	1.92E+04	2.37E+04	2.44E+04	2.49E+04	2.52E+04	2.59E+04	2.60E+04	2.36E+04	2.04E+04
PA	1.03E+02	7.90E+02	8.00E+02	9.63E+02	1.09E+03	1.20E+03	1.22E+03	1.34E+03	1.42E+03	1.41E+03	1.34E+03
TH	2.92E+01	2.22E+02	1.96E+02	1.12E+02	1.96E+02	8.74E+02	1.76E+03	8.23E+03	1.36E+04	1.89E+04	1.48E+04
RA	2.36E+01	1.78E+02	1.48E+02	1.02E+01	2.96E+01	4.69E+02	1.22E+03	6.37E+03	9.90E+03	9.13E+03	5.32E+03
OTHER DAUGHTERS*	9.64E+01	7.26E+02	6.04E+02	5.02E+01	1.69E+02	2.92E+03	7.93E+03	4.71E+04	7.83E+04	1.07E+05	8.30E+04
TOTAL	8.38E+06	7.13E+07	7.01E+07	3.35E+07	1.92E+07	6.36E+06	4.64E+06	9.92E+05	3.59E+05	1.77E+05	1.36E+05

* FR+RN+A+PO+BI+PB+TE

TABLE 10.D.7 Case 1 - Once Through Cycle - Reference Treatment
Actinide Heat Generation Rate in Repositories
(Watts)

ACTINIDES AND DAUGHTERS	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
CM-245	2.45E+02	2.04E+03	2.03E+03	1.97E+03	1.88E+03	1.35E+03	8.86E+02	3.09E+01	4.67E-01	0.	0.
CM-244	1.27E+06	4.17E+06	1.94E+06	3.69E-01	1.78E-09	0.	0.	0.	0.	0.	0.
CM-243	4.99E+03	2.38E+04	1.55E+04	2.49E+00	4.83E-05	0.	0.	0.	0.	0.	0.
CM-242	1.34E+04	1.01E+05	9.24E+04	1.46E+04	1.50E+03	1.79E-05	0.	0.	0.	0.	0.
AM-243, NP-239	2.35E+04	1.92E+05	1.92E+05	1.85E+05	1.77E+05	1.23E+05	7.82E+04	2.08E+03	2.25E+01	0.	0.
AM-242M, AM-242	7.52E+02	5.42E+03	4.94E+03	7.83E+02	8.01E+01	9.57E-07	0.	0.	0.	0.	0.
AM-241	2.86E+06	3.83E+07	4.24E+07	2.41E+07	1.08E+07	1.94E+04	9.50E+02	3.29E+01	4.97E-01	0.	0.
PU-242	2.18E+03	1.75E+04	1.75E+04	1.74E+04	1.74E+04	1.73E+04	1.71E+04	1.59E+04	1.45E+04	7.00E+03	2.80E+03
PU-241	1.25E+05	3.21E+05	1.26E+05	2.60E+00	2.50E+00	1.79E+00	1.17E+00	4.10E-02	6.18E-04	0.	0.
PU-240	6.95E+05	5.29E+06	5.29E+06	5.04E+06	4.79E+06	3.18E+06	1.90E+06	3.15E+04	1.87E+02	0.	0.
PU-239	4.60E+05	3.41E+06	3.40E+06	3.37E+06	3.32E+06	2.99E+06	2.59E+06	4.41E+05	2.03E+05	2.36E+00	1.60E-06
PU-238	2.92E+06	1.94E+07	1.67E+07	7.37E+05	1.76E+04	3.88E-05	0.	0.	0.	0.	0.
PU-236	3.74E+01	9.96E+00	7.69E-02	0.	0.	0.	0.	0.	0.	0.	0.
NP-237, PA-233	4.49E+02	3.88E+03	4.12E+03	7.78E+03	1.06E+04	1.26E+04	1.26E+04	1.25E+04	1.23E+04	1.08E+04	9.17E+03
U-238, TH-234, PA-234M	4.99E+02	3.70E+03	3.70E+03	3.70E+03	3.70E+03	3.70E+03	3.70E+03	3.70E+03	3.70E+03	3.70E+03	3.70E+03
U-236	2.87E+02	2.29E+03	2.30E+03	2.34E+03	2.41E+03	2.80E+03	3.12E+03	3.57E+03	3.58E+03	3.54E+03	3.49E+03
U-235, TH-231	2.43E+01	1.91E+02	1.91E+02	1.93E+02	1.94E+02	2.05E+02	2.18E+02	2.74E+02	2.94E+02	3.00E+02	3.00E+02
U-234	1.38E+03	1.27E+04	1.39E+04	1.81E+04	1.87E+04	1.86E+04	1.84E+04	1.68E+04	1.50E+04	7.23E+03	4.38E+03
U-233	1.16E-01	1.36E+00	1.69E+00	1.08E+01	3.07E+01	2.27E+02	4.77E+02	2.27E+03	4.09E+03	9.52E+03	9.22E+03
U-232	2.39E+01	1.63E+02	1.34E+02	2.75E+00	2.23E-02	0.	0.	0.	0.	0.	0.
PA-231	4.13E-02	4.65E-01	5.54E-01	2.16E+00	4.42E+00	2.14E+01	4.23E+01	1.74E+02	2.62E+02	3.21E+02	3.21E+02
TH-230	1.72E-01	4.14E+00	6.37E+00	5.89E+01	1.42E+02	7.57E+02	1.50E+03	6.10E+03	9.42E+03	8.53E+03	4.73E+03
TH-229,7 DAUGHTERS	4.43E-03	2.47E-02	4.45E-02	1.42E+00	8.16E+00	2.94E+02	1.13E+03	1.26E+04	2.57E+04	6.58E+04	6.39E+04
TH-228,6 DAUGHTERS	1.43E+02	1.07E+03	8.90E+02	1.82E+01	1.49E-01	4.73E-03	1.03E-02	6.23E-02	1.29E-01	6.62E-01	1.32E+00
AC-227,7 DAUGHTERS	4.35E-02	1.69E+00	2.48E+00	1.36E+01	2.89E+01	1.40E+02	2.76E+02	1.14E+03	1.71E+03	2.10E+03	2.10E+03
TH-232,2 DAUGHTERS	8.68E-08	3.02E-06	5.37E-06	5.18E-05	1.19E-04	6.76E-04	1.48E-03	8.90E-03	1.85E-02	9.46E-02	1.89E-01
RA-226,5 DAUGHTERS	3.62E-03	2.27E-01	4.60E-01	2.71E+01	1.38E+02	2.49E+03	6.55E+03	3.44E+04	5.35E+04	4.80E+04	2.66E+04
PB-210,2 DAUGHTERS	1.40E-04	1.83E-02	4.67E-02	5.49E+00	2.96E+01	5.36E+02	1.41E+03	7.40E+03	1.15E+04	1.03E+04	5.73E+03
TOTAL ACTINIDES	8.38E+06	7.13E+07	7.01E+07	3.35E+07	1.92E+07	6.36E+06	4.64E+06	9.92E+05	3.59E+05	1.77E+05	1.36E+05

TABLE 10.D.8 Case 1 - Once Through Cycle - Reference Treatment
Fission and Activation Product Heat Generation Rate in Repositories (Watts)

FISSION AND ACTIVATION PRODUCTS	YEAR 2000	YEAR 2050	YEAR 2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
H-3	3.52E+02	7.78E+02	2.52E+02	3.32E-08	0.	0.	0.	0.	0.	0.	0.
C-14	1.24E+01	8.34E+01	8.33E+01	8.41E+01	8.38E+01	5.17E+01	2.82E+01	2.24E-01	5.32E-04	0.	0.
NB-94	1.23E+02	1.94E+00	1.09E-07	0.	0.	0.	0.	0.	0.	0.	0.
FE-55	2.82E+04	6.47E+03	4.34E+01	0.	0.	0.	0.	0.	0.	0.	0.
CO-60	4.53E+05	6.51E+05	4.69E+04	0.	0.	0.	0.	0.	0.	0.	0.
NI-59	9.44E+02	7.30E+03	7.31E+03	7.27E+03	7.24E+03	6.99E+03	6.70E+03	4.74E+03	3.07E+03	9.62E+01	1.27E+00
NI-63	3.45E+03	2.15E+04	1.88E+04	8.47E+02	4.08E+01	0.	0.	0.	0.	0.	0.
SE-79	4.27E+00	4.97E+01	4.97E+01	4.95E+01	4.92E+01	4.72E+01	4.47E+01	2.92E+01	1.71E+01	2.41E-01	1.17E-03
KR-85	3.43E+05	6.72E+05	1.86E+05	1.04E-08	0.	0.	0.	0.	0.	0.	0.
RB-87	5.39E-04	4.22E-03	4.22E-03	4.22E-03	4.22E-03	4.22E-03	4.22E-03	4.22E-03	4.22E-03	4.22E-03	4.22E-03
SR-90,Y-90	1.68E+07	7.23E+07	4.42E+07	2.09E+03	4.27E-03	0.	0.	0.	0.	0.	0.
ZR-93,NB-93M	3.67E+01	2.91E+02	2.91E+02	2.91E+02	2.91E+02	2.91E+02	2.90E+02	2.85E+02	2.78E+02	2.31E+02	1.84E+02
TC-99	1.09E+03	8.23E+03	8.28E+03	8.27E+03	8.26E+03	8.15E+03	8.02E+03	7.02E+03	5.96E+03	1.59E+03	3.06E+02
RU-106,RH-106	4.00E+05	1.14E+04	1.17E-02	0.	0.	0.	0.	0.	0.	0.	0.
PD-107	3.09E-01	3.04E+00	3.04E+00	3.04E+00	3.04E+00	3.04E+00	3.04E+00	3.02E+00	3.01E+00	2.84E+00	2.75E+00
AG-110M	3.60E+02	2.47E+00	5.10E-09	0.	0.	0.	0.	0.	0.	0.	0.
CD-113M	2.93E+02	7.29E+02	2.71E+02	5.65E-07	0.	0.	0.	0.	0.	0.	0.
SB-125,TE-125M	1.14E+05	2.89E+04	1.71E+02	0.	0.	0.	0.	0.	0.	0.	0.
SN-126,SB-126	4.01E+02	2.94E+03	2.94E+03	2.98E+03	2.97E+03	2.84E+03	2.79E+03	2.11E+03	1.50E+03	9.37E+01	2.94E+00
I-129	1.07E+00	8.13E+00	8.13E+00	8.13E+00	8.13E+00	8.13E+00	8.13E+00	8.11E+00	8.10E+00	7.96E+00	7.80E+00
CS-134	2.93E+06	4.32E+05	5.01E+02	0.	0.	0.	0.	0.	0.	0.	0.
CS-135	5.95E+00	4.87E+01	4.87E+01	4.87E+01	4.87E+01	4.86E+01	4.86E+01	4.81E+01	4.76E+01	4.34E+01	3.86E+01
CS-137,BA-137	1.78E+07	7.88E+07	4.97E+07	4.42E+03	4.28E-02	0.	0.	0.	0.	0.	0.
CE-144,PR-144	1.39E+05	2.14E+03	3.92E-05	0.	0.	0.	0.	0.	0.	0.	0.
PM-147	1.52E+05	4.30E+04	2.17E+02	0.	0.	0.	0.	0.	0.	0.	0.
SM-151	8.82E+04	5.56E+05	4.72E+05	1.69E+04	3.53E+02	0.	0.	0.	0.	0.	0.
EU-152	5.32E+03	1.19E+04	3.75E+03	2.80E-07	0.	0.	0.	0.	0.	0.	0.
EU-154	1.29E+06	3.70E+06	1.50E+06	3.95E-02	0.	0.	0.	0.	0.	0.	0.
EU-155	5.47E+03	6.31E+02	2.99E+01	0.	0.	0.	0.	0.	0.	0.	0.
OTHER[a]	3.83E+00	2.85E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	4.10E+07	1.57E+08	9.61E+07	4.53E+04	1.93E+04	1.85E+04	1.79E+04	1.42E+04	1.09E+04	2.07E+03	5.83E+02

a. Nuclides included in "other" category are all short-lived and are detailed in the next table.

TABLE 10.D.9 Case 1 - Once Through Cycle - Reference Treatment
Short-Lived Fission and Activation Product Heat Generation
Rate in Repositories (Watts)

FISSION AND ACTIVATION	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
SC-46	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR-51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO-58	1.54E-04	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE-59	2.22E-09	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN-65	1.35E+00	8.81E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR-89	2.06E-08	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y-91	1.48E-06	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR-95	1.08E-08	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB-95M	2.19E-06	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB-95	1.92E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU-103	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN-123	1.13E-01	2.64E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB-124	3.71E-09	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE-127M,TE-127	1.56E-02	1.36E-06	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE-141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM-148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD-153	2.34E+00	1.97E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB-160	3.19E-06	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W-181	8.27E-08	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	3.83E+00	2.85E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.

TABLE 10.D.10 Case 1 - Once Through Cycle - Reference Treatment
Total Heat Generation Rate in Repositories by
Waste Classification (Watts)

FISSION AND ACTIVATION	YEAR 2000	2050	2170	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
BWR CANISTERS	1.29E+07	5.20E+07	3.13E+07	1.43E+04	5.73E+03	5.49E+03	5.34E+03	4.31E+03	3.34E+03	6.82E+02	1.82E+02
PWR CANISTERS	2.82E+07	1.05E+08	6.49E+07	3.09E+04	1.35E+04	1.30E+04	1.26E+04	9.94E+03	7.54E+03	1.39E+03	3.61E+02
TOTAL CANISTERS	4.10E+07	1.57E+08	9.61E+07	4.53E+04	1.93E+04	1.84E+04	1.79E+04	1.42E+04	1.09E+04	2.07E+03	5.43E+02
ACTINIDES											
CANISTERS	2.45E+06	2.22E+07	2.20E+07	1.08E+07	6.32E+06	2.21E+06	1.61E+06	3.37E+05	1.20E+05	5.79E+04	4.52E+04
PWR CANISTERS	5.93E+06	4.91E+07	4.81E+07	2.26E+07	1.29E+07	4.14E+06	3.03E+06	6.55E+05	2.39E+05	1.19E+05	9.12E+04
TOTAL	8.38E+06	7.13E+07	7.01E+07	3.35E+07	1.92E+07	6.36E+06	4.64E+06	9.92E+05	3.59E+05	1.77E+05	1.36E+05

TABLE 10.D.11 Case 2A - U Only Recycle Pu to SHLW - Reference Treatment Summary Radioactivity Inventory in Repositories by Major Radionuclides (Curies)

FISSION AND ACTIVATION	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
C-14	6.85E+04	3.40E+05	3.40E+05	3.23E+05	3.04E+05	1.88E+05	1.03E+05	8.15E+02	1.93E+00	0.	0.
NI-59	2.24E+05	1.13E+06	1.13E+06	1.13E+06	1.12E+06	1.08E+06	1.04E+06	7.34E+05	4.76E+05	1.49E+04	1.96E+02
SR-90,Y-90	3.98E+09	2.00E+10	1.22E+10	5.79E+05	2.37E+00	0.	0.	0.	0.	0.	0.
ZR-93,NB-93M	1.50E+05	1.31E+06	1.31E+06	1.31E+06	1.31E+06	1.30E+06	1.30E+06	1.28E+06	1.25E+06	1.04E+06	8.24E+05
TC-99	5.31E+05	4.77E+06	4.77E+06	4.76E+06	4.75E+06	4.69E+06	4.62E+06	4.04E+06	3.43E+06	9.17E+05	1.76E+05
PD-107	4.07E+03	3.55E+04	3.55E+04	3.55E+04	3.55E+04	3.55E+04	3.55E+04	3.54E+04	3.52E+04	3.38E+04	3.22E+04
I-129	2.37E+03	1.23E+04	1.23E+04	1.23E+04	1.23E+04	1.23E+04	1.23E+04	1.22E+04	1.22E+04	1.20E+04	1.18E+04
CS-135	1.07E+04	1.02E+05	1.02E+05	1.02E+05	1.02E+05	1.02E+05	1.02E+05	1.01E+05	9.96E+04	9.09E+04	8.09E+04
CS-137,BA-137M	5.53E+09	2.84E+10	1.79E+10	1.59E+06	1.54E+01	0.	0.	0.	0.	0.	0.
ALL OTHERS	8.75E+08	1.08E+09	5.76E+08	1.68E+07	8.02E+05	4.58E+05	4.40E+05	3.21E+05	2.18E+05	1.15E+04	3.50E+02
TOTAL	1.04E+10	4.95E+10	3.07E+10	2.66E+07	8.44E+06	7.87E+06	7.65E+06	6.53E+06	5.52E+06	2.12E+06	1.13E+06
ACTINIDES AND DAUGHTERS											
CM	3.05E+07	1.12E+08	5.36E+07	4.59E+05	9.73E+04	4.03E+04	2.65E+04	9.26E+02	1.40E+01	0.	0.
AM	4.03E+07	1.16E+09	1.28E+09	7.24E+08	3.28E+08	3.64E+06	1.97E+06	5.28E+04	5.73E+02	0.	0.
PU	2.64E+09	9.27E+09	4.39E+09	3.19E+08	2.63E+08	2.00E+08	1.41E+08	2.93E+07	7.19E+06	2.27E+05	9.11E+04
NP	5.48E+05	5.03E+06	5.03E+06	4.98E+06	4.87E+06	3.60E+06	2.48E+06	5.77E+05	5.17E+05	4.54E+05	3.86E+05
U	6.74E+04	3.32E+05	2.60E+05	5.47E+05	5.97E+05	6.15E+05	6.30E+05	6.48E+05	6.82E+05	6.22E+05	4.99E+05
PA	1.52E+04	2.49E+05	2.57E+05	3.77E+05	4.66E+05	5.33E+05	5.33E+05	5.28E+05	5.21E+05	4.59E+05	3.91E+05
TH	3.80E+02	5.80E+03	4.88E+03	2.66E+03	3.36E+03	2.74E+04	5.71E+04	2.79E+05	4.66E+05	6.38E+05	4.75E+05
RA	2.25E+02	4.43E+03	3.78E+03	2.11E+02	7.49E+02	1.59E+04	4.44E+04	2.76E+05	4.64E+05	6.33E+05	4.70E+05
OTHER DAUGHTERS*	1.13E+03	2.22E+04	1.89E+04	1.38E+03	5.84E+03	1.23E+05	3.40E+05	2.04E+06	3.38E+06	4.21E+06	2.93E+06
TOTAL	2.79E+09	1.05E+10	5.73E+09	1.05E+09	5.97E+08	2.08E+08	1.53E+08	3.37E+07	1.32E+07	7.24E+06	5.24E+06

* FR+RN+A+PO+BI+PB+TE

TABLE 10.D.12 Case 2A - U Only Recycle Pu to SHLW - Reference Treatment
Actinide Radioactivity Inventory in Repositories (Curies)

ACTINIDES AND DAUGHTERS	YEAR 2000	YEAR 2050	YEAR 2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
CM-245	6.66E+03	6.10E+04	6.09E+04	5.88E+04	5.64E+04	4.03E+04	2.65E+04	9.26E+02	1.40E+01	0.	0.
CM-244	3.00E+07	1.09E+08	5.06E+07	9.66E+00	4.66E-08	0.	0.	0.	0.	0.	0.
CM-243	1.18E+05	6.01E+05	3.90E+05	6.16E+01	1.22E-03	0.	0.	0.	0.	0.	0.
CM-242	3.33E+05	2.77E+06	2.53E+06	4.00E+05	4.09E+04	4.90E-04	0.	0.	0.	0.	0.
AM-243,NP-239	1.07E+06	9.57E+06	9.55E+06	9.21E+06	8.80E+06	6.13E+06	3.89E+06	1.04E+05	1.12E+03	0.	0.
AM-242M,AM-242	8.06E+05	6.75E+06	6.16E+06	9.75E+05	9.97E+04	1.19E-03	0.	0.	0.	0.	0.
AM-241	7.89E+07	1.14E+09	1.27E+09	7.19E+08	3.23E+08	5.77E+05	2.68E+04	9.27E+02	1.40E+01	0.	0.
PU-242	6.43E+04	5.67E+05	5.67E+05	5.67E+05	5.66E+05	5.62E+05	5.57E+05	5.18E+05	4.72E+05	2.27E+05	9.11E+04
PU-241	2.55E+09	7.72E+09	3.02E+09	5.89E+04	5.65E+04	4.04E+04	2.66E+04	9.28E+02	1.40E+01	0.	0.
PU-240	1.97E+07	1.67E+08	1.67E+08	1.60E+08	1.52E+08	1.01E+08	6.04E+07	9.99E+05	5.93E+03	0.	0.
PU-239	1.31E+07	1.12E+08	1.12E+08	1.11E+08	1.10E+08	9.83E+07	8.56E+07	2.77E+07	6.71E+06	7.78E+01	5.27E-05
PU-238	9.29E+07	1.27E+09	1.09E+09	4.74E+07	1.04E+06	1.18E-03	0.	0.	0.	0.	0.
PU-236	1.08E+03	1.63E+03	1.26E+01	0.	0.	0.	0.	0.	0.	0.	0.
NP-237,PA-233	3.02E+04	4.07E+05	5.13E+05	7.52E+05	9.30E+05	1.06E+06	1.06E+06	1.05E+06	1.03E+06	9.08E+05	7.72E+05
U-238,TH-234, PA-234M	4.34E+02	2.87E+03	2.87E+03	2.87E+03	2.87E+03	2.88E+03	2.88E+03	2.89E+03	2.90E+03	2.96E+03	2.99E+03
U-236	1.18E+02	1.40E+03	1.49E+03	3.25E+03	5.61E+03	2.00E+04	3.15E+04	4.83E+04	4.85E+04	4.80E+04	4.73E+04
U-235,TH-231	1.58E+01	1.29E+02	1.30E+02	2.11E+02	3.23E+02	1.13E+03	2.03E+03	6.05E+03	7.50E+03	7.96E+03	7.95E+03
U-234	3.08E+03	1.32E+05	1.98E+05	5.42E+05	5.89E+05	5.83E+05	5.75E+05	5.14E+05	4.47E+05	1.46E+05	3.67E+04
U-233	6.61E-01	3.38E+01	5.54E+01	3.62E+02	1.32E+0[illegible]	[illegible]3E+04	2.14E+04	1.01E+05	1.82E+05	4.23E+05	4.10E+05
U-232	2.53E+02	4.38E+03	3.67E+03	7.50E+01	6.09E[illegible]	0.	0.	0.	0.	0.	0.
PA-231	1.12E+00	1.55E+01	1.56E+01	1.61E+01	1.78E+01	4.60E+01	1.23E+02	1.39E+03	2.80E+03	3.98E+03	3.98E+03
TH-230	2.32E+00	5.12E+01	7.99E+01	1.49E+03	4.16E+03	2.39E+04	4.76E+04	1.92E+05	2.93E+05	2.04E+05	5.36E+04
TH-229,7 DAUGHTERS	2.86E-03	4.89E-01	1.15E+00	8.22E+01	4.76E+02	1.57E+04	5.93E+04	6.50E+05	1.33E+06	3.40E+06	3.30E+06
TH-228,6 DAUGHTERS	1.58E+03	3.10E+04	2.64E+04	5.40E+02	4.38E+00	1.92E-02	6.43E-02	6.73E-01	1.50E+00	8.10E+00	1.62E+01
AC-227,7 DAUGHTERS	2.44E+00	7.73E+01	9.96E+01	1.28E+02	1.39E+02	3.68E+02	9.81E+02	1.12E+04	2.24E+04	3.18E+04	3.18E+04
TH-232,2 DAUGHTERS	7.60E-07	7.57E-06	9.03E-06	1.38E-04	4.79E-04	8.22E-03	2.76E-02	2.88E-01	6.44E-01	3.47E+00	6.96E+00
RA-226,5 DAUGHTERS	8.18E-02	3.49E+00	6.80E+00	6.45E+02	4.03E+03	8.30E+04	2.21E+05	1.16E+06	1.77E+06	1.23E+06	3.22E+05
PB-210,2 DAUGHTERS	8.92E-03	7.09E-01	1.62E+00	3.00E+02	2.01E+03	4.15E+04	1.11E+05	5.79E+05	8.86E+05	6.13E+05	1.61E+05
TOTAL ACTINIDES	2.79E+09	1.05E+10	5.73E+09	1.05E+09	5.97E+08	2.08E+08	1.33E+08	3.37E+07	1.32E+07	7.24E+06	5.24E+06

TABLE 10.D.13 Case 2A - U Only Recycle Pu to SHLW - Reference Treatment Fission and Activation Product Radioactivity Inventory in Repositories (Curies)

FISSION AND ACTIVATION	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
H-3	2.70E+06	3.27E+06	1.06E+06	1.40E-04	0.	0.	0.	0.	0.	0.	0.
C-14	6.85E+04	3.40E+05	3.40E+05	3.23E+05	3.04E+05	1.88E+05	1.03E+05	8.15E+02	1.93E+00	0.	0.
MN-54	4.98E+05	2.95E+02	1.26E-05	0.	0.	0.	0.	0.	0.	0.	0.
FE-55	8.31E+07	5.00E+06	2.43E+04	0.	0.	0.	0.	0.	0.	0.	0.
CO-60	1.27E+08	4.00E+07	2.87E+06	0.	0.	0.	0.	0.	0.	0.	0.
NI-59	2.26E+05	1.13E+06	1.13E+06	1.13E+06	1.12E+06	1.08E+06	1.04E+06	7.34E+05	4.76E+05	1.49E+04	1.96E+02
NI-63	3.33E+07	1.74E+08	1.15E+08	5.51E+06	1.28E+05	1.06E-08	0.	0.	0.	0.	0.
SE-79	1.44E+04	1.30E+05	1.30E+05	1.29E+05	1.29E+05	1.23E+05	1.17E+05	7.64E+04	4.48E+04	6.31E+02	3.06E+00
KR-85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB-87	7.08E-01	6.44E+00	6.44E+00	6.44E+00	6.44E+00	6.44E+00	6.44E+00	6.44E+00	6.44E+00	6.04E+00	6.44E+00
SR-90,Y-90	3.98E+09	2.00E+10	1.22E+10	5.79E+05	2.57E+00	0.	0.	0.	0.	0.	0.
ZR-93,NB-93M	1.50E+05	1.31E+06	1.31E+06	1.31E+06	1.31E+06	1.30E+06	1.30E+06	1.28E+06	1.25E+06	1.04E+06	8.24E+05
TC-99	5.31E+05	4.77E+06	4.77E+06	4.76E+06	4.75E+06	4.69E+06	4.62E+06	4.04E+06	3.43E+06	4.17E+05	1.76E+05
RU-106,RH-106	3.42E+07	1.96E+06	2.02E+00	0.	0.	0.	0.	0.	0.	0.	0.
PD-107	4.07E+03	3.55E+04	3.55E+04	3.55E+04	3.55E+04	3.55E+04	3.55E+04	3.54E+04	3.52E+04	3.38E+04	3.22E+04
AG-110M	7.00E+03	1.75E-02	2.57E-07	0.	0.	0.	0.	0.	0.	0.	0.
CD-113M	3.18E+05	7.10E+05	2.64E+05	5.50E-04	0.	0.	0.	0.	0.	0.	0.
SB-125,TE-125M	3.25E+07	1.12E+07	6.59E+04	0.	0.	0.	0.	0.	0.	0.	0.
SN-126,SB-126	3.92E+04	3.46E+05	3.46E+05	3.45E+05	3.44E+05	3.35E+05	3.23E+05	2.45E+05	1.73E+05	1.09E+04	3.40E+02
I-129	2.37E+03	1.23E+04	1.23E+04	1.23E+04	1.23E+04	1.23E+04	1.23E+04	1.22E+04	1.22E+04	1.20E+04	1.18E+04
CS-134	1.72E+08	3.95E+07	4.59E+04	0.	0.	0.	0.	0.	0.	0.	0.
CS-135	1.07E+04	1.02E+05	1.02E+05	1.02E+05	1.02E+05	1.02E+05	1.02E+05	1.01E+05	9.96E+04	9.09E+04	8.09E+04
CS-137,BA-137	4.53E+09	2.84E+10	1.79E+10	1.59E+06	1.54E+01	0.	0.	0.	0.	0.	0.
CE-144,PR-144	1.17E+07	4.88E+03	8.92E-03	0.	0.	0.	0.	0.	0.	0.	0.
PM-147	1.94E+08	8.30E+07	4.19E+05	0.	0.	0.	0.	0.	0.	0.	0.
SM-151	4.38E+07	3.16E+08	2.69E+08	1.08E+07	2.02E+05	2.57E-09	0.	0.	0.	0.	0.
EU-152	2.48E+05	7.08E+05	2.23E+05	1.66E-05	0.	0.	0.	0.	0.	0.	0.
EU-154	1.31E+08	4.43E+08	1.86E+08	4.72E+00	1.88E-09	0.	0.	0.	0.	0.	0.
EU-155	3.82E+06	7.07E+05	3.35E+02	0.	0.	0.	0.	0.	0.	0.	0.
OTHER(a)	2.78E+04	1.30E+01	1.10E-08	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	1.08E+10	4.95E+10	3.07E+10	2.66E+07	8.44E+06	7.87E+06	7.65E+06	6.53E+06	5.52E+06	2.12E+06	1.13E+06

a. Nuclides included "other" category are all short-lived and are detailed in the next table.

TABLE 10.D.14 Case 2A - U Only Recycle Pu to SHLW - Reference Treatment
Short-Lived Fission and Activation Product Radioactivity
Inventory in Repositories (Curies)

FISSION AND ACTIVATION	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
SC-46	1.99E+00	1.17E-10	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR-51	2.72E+03	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO-58	1.20E+04	1.44E-09	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE-59	1.97E-01	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN-65	1.21E+04	9.28E-01	4.95E-10	0.	0.	0.	0.	0.	0.	0.	0.
SR-89	6.16E-01	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y-91	4.67E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR-95	9.33E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB-95M	5.47E+00	2.43E-10	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB-95	4.04E+02	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU-103	2.65E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN-123	1.31E+01	6.89E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB-124	2.47E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE-127M,TE-127	7.97E+01	1.10E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE-141	1.36E-04	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM-148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD-153	5.25E+02	1.21E+01	1.00E-08	0.	0.	0.	0.	0.	0.	0.	0.
TB-160	2.07E-01	4.74E-10	0.	0.	0.	0.	0.	0.	0.	0.	0.
W-181	1.14E-01	3.73E-08	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	2.78E+04	1.30E+01	1.10E-08	0.	0.	0.	0.	0.	0.	0.	0.

TABLE 10.D.15 Case 2A - U O[illegible]ecycle Pu to SHLW - Reference Treatment
Total Ra[illegible] in Repositories by Waste Classification
(Curie[illegible]

FISSION AND ACTIVATION	YEAR 2000	YEAR 2020	YEAR 2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
HLW	1.01E+10	4.93E+10	3.06E+10	1.96E+07	6.80E+06	6.52E+06	6.42E+06	5.71E+06	4.96E+06	2.03E+06	1.07E+06
FRW	2.60E+08	2.08E+08	1.36E+08	6.73E+06	1.36E+06	1.18E+06	1.12E+06	8.05E+05	5.46E+05	7.31E+04	4.60E+04
ILW	2.58E+06	1.68E+06	1.03E+06	2.03E+03	5.32E+02	4.81E+02	4.62E+02	3.71E+02	2.95E+02	1.06E+02	7.05E+01
LLW	6.64E+04	3.18E+05	3.15E+05	2.97E+05	2.80E+05	1.77E+05	1.02E+05	1.29E+04	1.21E+04	1.19E+04	1.17E+04
TOTAL	1.04E+10	4.95E+10	3.07E+10	2.66E+07	8.44E+06	7.87E+06	7.65E+06	6.53E+06	5.52E+06	2.12E+06	1.13E+06
ACTINIDES											
HLW	2.78E+09	1.05E+10	5.72E+09	1.05E+09	5.96E+08	2.08E+08	1.52E+08	3.36E+07	1.32E+07	7.22E+06	5.22E+06
FRW	2.85E+06	5.26E+06	2.86E+06	5.25E+05	2.99E+05	1.05E+05	7.70E+04	1.83E+04	8.62E+03	5.41E+03	3.79E+03
ILW	6.27E+06	1.14E+07	6.12E+06	1.05E+06	6.08E+05	2.28E+05	1.68E+05	4.36E+04	2.34E+04	1.44E+04	9.16E+03
LLW	1.40E+05	2.50E+05	1.36E+05	2.33E+04	1.35E+04	5.00E+03	3.67E+03	8.01E+02	2.93E+02	1.19E+02	7.26E+01
TOTAL	2.79E+09	1.05E+10	5.73E+09	1.05E+09	5.97E+08	2.08E+08	1.53E+08	3.37E+07	1.32E+07	7.24E+06	5.24E+06

TABLE 10.D.16 Case 2A - U Only Recycle Pu to SHLW - Reference Treatment Summary Heat Generation Rate in Repositories by Major Radionuclides (Watts)

FISSION AND ACTIVATION	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
C-14	2.03E+01	1.01E+02	1.01E+02	9.59E+01	9.02E+01	5.56E+01	3.04E+01	2.41E-01	5.73E-04	0.	0.
NI-59	1.43E+03	7.19E+03	7.19E+03	7.16E+03	7.13E+03	6.89E+03	6.60E+03	4.67E+03	3.03E+03	9.48E+01	1.25E+00
SR-90,Y-90	1.43E+07	7.21E+07	4.40E+07	2.08E+03	9.24E-03	0.	0.	0.	0.	0.	0.
ZR-93,NB-93M	3.52E+01	3.06E+02	3.06E+02	3.06E+02	3.06E+02	3.05E+02	3.05E+02	2.99E+02	2.92E+02	2.43E+02	1.93E+02
TC-99	9.13E+02	8.20E+03	8.20E+03	8.19E+03	8.17E+03	8.07E+03	7.93E+03	6.95E+03	5.90E+03	1.58E+03	3.03E+02
PD-107	3.37E-01	2.95E+00	2.95E+00	2.95E+00	2.95E+00	2.95E+00	2.95E+00	2.93E+00	2.92E+00	2.81E+00	2.67E+00
I-129	1.36E+00	8.07E+00	8.07E+00	8.07E+00	8.07E+00	8.06E+00	8.06E+00	8.05E+00	8.03E+00	7.90E+00	7.74E+00
CS-135	8.19E+00	4.96E+01	4.96E+01	4.96E+01	4.96E+01	4.95E+01	4.95E+01	4.90E+01	4.84E+01	4.42E+01	3.93E+01
CS-137,BA-137M	1.52E+07	7.79E+07	4.91E+07	4.36E+03	4.22E-02	0.	0.	0.	0.	0.	0.
ALL OTHERS	8.50E+06	5.36E+06	2.07E+06	2.26E+04	3.32E+03	2.86E+03	2.77E+03	2.09E+03	1.48E+03	9.17E+01	2.87E+00
TOTAL	3.50E+07	1.55E+08	9.52E+07	4.49E+04	1.91E+04	1.82E+04	1.77E+04	1.41E+04	1.08E+04	2.06E+03	5.50E+02
ACTINIDES AND DAUGHTERS											
CM	1.07E+06	3.94E+06	1.88E+06	1.66E+04	3.28E+03	1.27E+03	8.32E+02	2.91E+01	4.39E-01	0.	0.
AM	2.65E+06	3.84E+07	4.24E+07	2.41E+07	1.09E+07	1.31E+05	7.20E+04	1.93E+03	2.09E+01	0.	0.
PU	4.20E+06	5.11E+07	4.48E+07	1.00E+07	8.19E+06	6.21E+06	4.56E+06	9.09E+05	2.23E+05	6.71E+03	2.69E+03
NP	1.14E+03	1.38E+04	1.40E+04	1.73E+04	1.96E+04	1.98E+04	1.83E+04	1.55E+04	1.52E+04	1.33E+04	1.13E+04
U	1.07E+02	4.01E+03	5.89E+03	1.57E+04	1.72E+04	1.77E+04	1.81E+04	1.92E+04	1.96E+04	1.80E+04	1.44E+04
PA	2.12E+01	3.41E+02	3.52E+02	5.13E+02	6.34E+02	7.25E+02	7.28E+02	7.57E+02	7.89E+02	7.40E+02	6.48E+02
TH	7.50E+00	1.47E+02	1.26E+02	4.59E+01	1.20E+02	7.36E+02	1.57E+03	7.94E+03	1.36E+04	1.87E+04	1.41E+04
RA	7.71E+00	1.82E+02	1.29E+02	6.24E+00	1.97E+01	3.95E+02	1.05E+03	5.57E+03	8.56E+03	6.20E+03	1.93E+03
OTHER DAUGHTERS*	3.15E+01	6.20E+02	5.29E+02	3.21E+01	1.23E+02	2.62E+03	7.35E+03	4.58E+04	7.72E+04	1.06E+05	7.93E+04
TOTAL	7.93E+06	9.34E+07	8.92E+07	3.42E+07	1.92E+07	6.39E+06	4.68E+06	1.01E+06	3.57E+05	1.70E+05	1.24E+05

* FR+RN+A+PO+BI+PB+TE

TABLE 10.D.17 Case 2A - U Only Recycle Pu to SHLW - Reference Treatment
Actinide Heat Generation Rate in Repositories (Watts)

ACTINIDES AND DAUGHTERS	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
CM-245	2.09E+02	1.91E+03	1.91E+03	1.85E+03	1.77E+03	1.27E+03	8.32E+02	2.91E+01	4.39E-01	0.	0.
CM-244	1.05E+06	3.81E+06	1.77E+06	3.38E-01	1.63E-09	0.	0.	0.	0.	0.	0.
CM-243	4.18E+03	2.21E+04	1.43E+04	2.27E+00	4.48E-05	0.	0.	0.	0.	0.	0.
CM-242	1.23E+04	1.02E+05	9.31E+04	1.47E+04	1.51E+03	1.81E-05	0.	0.	0.	0.	0.
AM-243,NP-239	2.02E+04	1.81E+05	1.81E+05	1.74E+05	1.67E+05	1.16E+05	7.37E+04	1.96E+03	2.12E+01	0.	0.
AM-242M,AM-242	6.58E+02	5.46E+03	4.98E+03	7.89E+02	8.07E+01	9.64E-07	0.	0.	0.	0.	0.
AM-241	2.63E+06	3.82E+07	4.23E+07	2.40E+07	1.08E+07	1.93E+04	8.93E+02	3.10E+01	4.67E-01	0.	0.
PU-242	1.90E+03	1.67E+04	1.67E+04	1.67E+04	1.67E+04	1.66E+04	1.64E+04	1.53E+04	1.39E+04	6.71E+03	2.69E+03
PU-241	1.06E+05	3.20E+05	1.25E+05	2.44E+00	2.35E+00	1.68E+00	1.10E+00	3.85E-02	5.81E-04	0.	0.
PU-240	6.12E+05	5.20E+06	5.19E+06	4.98E+06	4.73E+06	3.14E+06	1.88E+06	3.11E+04	1.85E+02	0.	0.
PU-239	4.09E+05	3.50E+06	3.49E+06	3.46E+06	3.41E+06	3.06E+06	2.66E+06	8.62E+05	2.08E+05	2.42E+00	1.64E-06
PU-238	3.08E+06	4.21E+07	3.60E+07	1.57E+06	3.46E+04	3.91E-05	0.	0.	0.	0.	0.
PU-236	3.74E+01	5.69E+01	4.39E-01	0.	0.	0.	0.	0.	0.	0.	0.
NP-237,PA-233	4.60E+02	7.64E+03	7.88E+03	1.15E+04	1.43E+04	1.64E+04	1.63E+04	1.61E+04	1.59E+04	1.40E+04	1.19E+04
U-238,TH-234, PA-234M	4.45E+00	2.95E+01	2.95E+01	2.95E+01	2.95E+01	2.95E+01	2.95E+01	2.96E+01	2.98E+01	3.04E+01	3.07E+01
U-236	3.20E+00	3.79E+01	4.05E+01	8.82E+01	1.52E+02	5.42E+02	8.55E+02	1.31E+03	1.32E+03	1.30E+03	1.28E+03
U-235,TH-231	2.25E-01	1.79E+00	1.85E+00	3.01E+00	4.61E+00	1.61E+01	2.90E+01	8.63E+01	1.07E+02	1.14E+02	1.13E+02
U-234	8.87E+01	3.80E+03	5.70E+03	1.56E+04	1.69E+04	1.68E+04	1.66E+04	1.48E+04	1.29E+04	4.21E+03	1.06E+03
U-233	1.93E-02	9.83E-01	1.61E+00	1.64E+01	4.42E+01	2.99E+02	6.23E+02	2.94E+03	5.30E+03	1.23E+04	1.19E+04
U-232	8.11E+00	1.41E+02	1.18E+02	2.41E+00	1.95E-02	0.	0.	0.	0.	0.	0.
PA-231	3.43E-02	4.74E-01	4.75E-01	4.91E-01	5.31E-01	1.40E+00	3.74E+00	4.26E+01	8.53E+01	1.21E+02	1.21E+02
TH-230	6.56E-02	1.45E+00	2.26E+00	4.21E+01	1.18E+02	6.74E+02	1.34E+03	5.44E+03	8.27E+03	5.77E+03	1.51E+03
TH-229,7 DAUGHTERS	7.18E-05	1.23E-02	2.92E-02	2.06E+00	1.19E+01	3.94E+02	1.49E+03	1.63E+04	3.33E+04	8.52E+04	8.26E+04
TH-228,6 DAUGHTERS	4.66E+01	9.13E+02	7.79E+02	1.59E+01	1.29E-01	5.57E-04	1.90E-03	1.99E-02	4.44E-02	2.39E-01	4.80E-01
AC-227,7 DAUGHTERS	6.07E-02	1.93E+00	2.48E+00	3.19E+00	3.47E+00	9.18E+00	2.44E+01	2.78E+02	5.57E+02	7.93E+02	7.93E+02
TH-232,2 DAUGHTERS	7.49E-09	7.46E-08	8.90E-08	1.36E-06	4.72E-06	8.11E-05	2.72E-04	2.84E-03	6.35E-03	3.42E-02	6.86E-02
RA-226,5 DAUGHTERS	2.17E-03	9.24E-02	1.80E-01	1.71E+01	1.07E+02	2.20E+03	5.86E+03	3.07E+04	4.70E+04	3.25E+04	8.53E+03
PB-210,2 DAUGHTERS	1.02E-04	8.08E-03	1.85E-02	3.42E+00	2.30E+01	4.73E+02	1.26E+03	6.60E+03	1.01E+04	6.99E+03	1.83E+03
TOTAL ACTINIDES	7.93E+06	9.34E+07	8.92E+07	3.42E+07	1.92E+07	6.39E+06	4.68E+06	1.01E+06	3.57E+05	1.70E+05	1.24E+05

TABLE 10.D.18 Case 2A - U Only Recycle Pu to SHLW - Reference Treatment Fission and Activation Product Heat Generation Rate in Repositories (Watts)

FISSION AND ACTIVATION	YEAR 2000	YEAR 2050	YEAR 2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
H-3	9.60E+01	1.16E+02	3.78E+01	4.97E-09	0.	0.	0.	0.	0.	0.	0.
C-14	8.03E+01	1.01E+02	1.01E+02	9.59E+01	9.02E+01	5.56E+01	3.04E+01	2.41E+01	5.73E-04	0.	0.
MN-54	4.04E+03	1.42E-06	1.02E-07	0.	0.	0.	0.	0.	0.	0.	0.
FE-55	1.08E+05	4.52E+03	3.16E+01	0.	0.	0.	0.	0.	0.	0.	0.
CO-60	1.94E+06	6.29E+05	4.09E+04	0.	0.	0.	0.	0.	0.	0.	0.
NI-59	1.43E+03	7.19E+03	7.19E+03	7.16E+03	7.13E+03	6.89E+03	6.60E+03	4.67E+03	3.03E+03	9.48E+01	1.25E+00
NI-63	5.33E+03	2.15E+04	1.85E+04	8.82E+02	2.04E+01	0.	0.	0.	0.	0.	0.
SE-79	5.46E+00	4.93E+01	4.93E+01	4.91E+01	4.88E+01	4.88E+01	4.44E+01	2.90E+01	1.70E+01	2.39E-01	1.16E-03
KR-85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB-87	4.62E-04	4.20E-03	4.20E-03	4.20E-03	4.20E-03	4.20E-03	4.20E-03	4.20E-03	4.20E-03	4.20E-03	4.20E-03
SR-90,Y-90	1.43E+07	7.21E+07	4.40E+07	2.08E+03	9.24E-03	0.	0.	0.	0.	0.	0.
ZR-93,NB-93M	3.52E+01	3.06E+02	3.06E+02	3.06E+02	3.06E+02	3.05E+02	3.05E+02	2.99E+02	2.92E+02	2.43E+02	1.93E+02
TC-99	9.13E+02	8.20E+03	8.20E+03	8.19E+03	8.17E+03	8.07E+03	7.93E+03	6.95E+03	5.90E+03	1.58E+03	3.03E+02
RU-106,RH-106	1.61E+05	1.04E+04	1.07E+02	0.	0.	0.	0.	0.	0.	0.	0.
PD-107	3.37E-01	2.95E+00	2.95E+00	2.95E+00	2.95E+00	2.95E+00	2.95E+00	2.93E+00	2.92E+00	2.81E+00	2.67E+00
AG-110M	1.18E+02	2.11E+00	4.35E-09	0.	0.	0.	0.	0.	0.	0.	0.
CD-113M	4.20E+02	9.38E+02	3.49E+02	7.27E-07	0.	0.	0.	0.	0.	0.	0.
SB-125,TE-125M	7.97E+04	2.74E+04	1.62E+02	0.	0.	0.	0.	0.	0.	0.	0.
SN-126,SB-126	3.30E+02	2.92E+03	2.91E+03	2.91E+03	2.90E+03	2.88E+03	2.78E+03	2.06E+03	1.46E+03	9.14E+01	2.87E+00
I-129	1.56E+00	8.07E+00	8.07E+00	8.07E+00	8.07E+00	8.06E+00	8.06E+00	8.05E+00	8.03E+00	7.90E+00	7.76E+00
CS-134	1.82E+06	4.19E+05	4.86E+02	0.	0.	0.	0.	0.	0.	0.	0.
CS-135	5.19E+00	4.96E+01	4.96E+01	4.96E+01	4.96E+01	4.95E+01	4.95E+01	4.93E+01	4.84E+01	4.42E+01	3.93E+01
CS-137,BA-137	1.52E+07	7.79E+07	4.91E+07	4.36E+03	4.22E+02	0.	0.	0.	0.	0.	0.
CE-144,PR-144	9.01E+04	2.09E+03	3.83E-05	0.	0.	0.	0.	0.	0.	0.	0.
PM-147	1.03E+05	4.28E+04	2.16E+02	0.	0.	0.	0.	0.	0.	0.	0.
SM-151	7.64E+04	5.90E+05	4.69E+05	1.88E+04	3.91E-02	0.	0.	0.	0.	0.	0.
EU-152	4.40E+03	1.27E+04	4.00E+03	2.98E-07	0.	0.	0.	0.	0.	0.	0.
EU-154	1.08E+06	3.64E+06	1.53E+06	3.88E+02	0.	0.	0.	0.	0.	0.	0.
EU-155	3.22E+03	5.95E+02	2.82E-01	0.	0.	0.	0.	0.	0.	0.	0.
OTHER[a]	2.74E+02	2.48E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	3.50E+07	1.55E+08	9.58E+07	4.49E+04	1.91E+04	1.82E+04	1.77E+04	1.41E+04	1.08E+04	2.06E+03	5.50E+02

a. Nuclides included in "other" category are all short-lived and are detailed in the next table.

TABLE 10.D.19 Case 2A - U Only Recycle Pu to SHLW - Reference Treatment
Short-Lived Fission and Activation Product Heat Generation
Rate in Repositories (Watts)

FISSION AND ACTIVATION	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
SC-46	2.74E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR-51	1.20E+01	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO-58	1.63E+02	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE-59	1.53E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN-65	9.58E+01	7.37E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR-89	2.22E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y-91	1.78E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR-95	1.30E-04	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB-95M	2.63E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB-95	1.94E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU-103	8.72E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN-123	4.47E-02	2.35E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB-124	3.22E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE-127M,TE-127	8.63E-02	1.19E-06	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE-141	2.68E-07	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM-148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD-153	7.56E-01	1.74E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB-160	1.76E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W-181	1.15E-04	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	2.74E+02	2.48E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.

TABLE 10.D.20 Case 2A - U Only Recycle Pu to SHLW - Reference Treatment
Total Heat Generation Rate in Repositories by Waste
Classification (Watts)

FISSION AND ACTIVATION	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
HLW	3.28E+07	1.55E+08	9.51E+07	3.68E+04	1.18E+04	1.13E+04	1.11E+04	9.39E+03	7.71E+03	1.94E+03	5.30E+02
RHW	2.16E+06	7.38E+05	1.19E+05	8.06E+03	7.16E+03	6.89E+03	6.60E+03	4.67E+03	3.03E+03	1.09E+02	1.22E+01
ILW	1.24E+04	5.22E+03	3.14E+03	2.85E+00	1.85E+00	1.78E+00	1.71E+00	1.27E+00	8.82E-01	1.07E-01	4.09E-02
LLW	3.41E+01	1.17E+02	1.09E+02	9.24E+01	8.74E+01	5.70E+01	3.48E+01	8.20E+00	7.97E+00	7.84E+00	7.68E+00
TOTAL	3.50E+07	1.55E+08	9.52E+07	4.49E+04	1.91E+04	1.82E+04	1.77E+04	1.41E+04	1.08E+04	2.06E+03	5.50E+02
ACTINIDES											
HLW	7.91E+06	9.33E+07	8.90E+07	3.42E+07	1.91E+07	6.38E+06	4.67E+06	1.00E+06	3.57E+05	1.70E+05	1.24E+05
RHW	6.90E+03	4.67E+04	4.46E+04	1.71E+04	9.60E+03	3.20E+03	2.35E+03	5.35E+02	2.23E+02	1.24E+02	8.69E+01
ILW	1.13E+04	9.25E+04	9.02E+04	3.43E+04	1.96E+04	7.04E+03	5.19E+03	1.25E+03	5.89E+02	3.21E+02	2.02E+02
LLW	2.51E+02	2.06E+03	2.01E+03	7.60E+02	4.34E+02	1.55E+02	1.14E+02	2.42E+01	8.11E+00	2.79E+00	1.72E+00
TOTAL	7.93E+06	9.34E+07	8.92E+07	3.42E+07	1.92E+07	6.39E+06	4.68E+06	1.01E+06	3.57E+05	1.70E+05	1.24E+05

TABLE 10.D.21 Case 2B - U Only Recycle - Stored Pu - Reference Treatment
Summary Radioactivity Inventory in Repositories by Major
Radionuclides (Curies)

FISSION AND ACTIVATION	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
C-14	6.85E+04	3.40E+05	3.40E+05	3.23E+05	3.04E+05	1.88E+05	1.03E+05	8.15E+02	1.93E+00	0.	0.
NI-59	2.24E+05	1.13E+06	1.13E+06	1.13E+06	1.12E+06	1.08E+06	1.04E+06	7.34E+05	4.76E+05	1.49E+04	1.96E+02
SR-90,Y-90	3.98E+09	2.00E+10	1.22E+10	5.79E+09	2.57E+00	0.	0.	0.	0.	0.	0.
ZR-93,NB-93M	1.50E+05	1.31E+06	1.31E+06	1.31E+06	1.31E+06	1.30E+06	1.30E+06	1.28E+06	1.25E+06	1.04E+06	8.24E+05
TC-99	8.31E+05	4.77E+06	4.77E+06	4.76E+06	4.75E+06	4.69E+06	4.62E+06	4.04E+06	3.43E+06	9.17E+05	1.76E+05
PD-107	4.07E+03	3.55E+04	3.55E+04	3.55E+04	3.55E+04	3.55E+04	3.55E+04	3.54E+04	3.52E+04	3.38E+04	3.22E+04
I-129	2.37E+03	1.23E+04	1.23E+04	1.23E+04	1.23E+04	1.23E+04	1.23E+04	1.22E+04	1.22E+04	1.20E+04	1.18E+04
CS-135	1.07E+04	1.02E+05	1.02E+05	1.02E+05	1.02E+05	1.02E+05	1.02E+05	1.01E+05	9.96E+04	9.09E+04	8.09E+04
CS-137,BA-137M	5.53E+09	2.84E+10	1.79E+10	1.59E+06	1.54E+01	0.	0.	0.	0.	0.	0.
ALL OTHERS	8.75E+08	1.08E+09	5.76E+08	1.68E+07	8.02E+05	4.58E+05	4.40E+05	3.21E+05	2.16E+05	1.15E+04	3.50E+02
TOTAL	1.04E+10	4.95E+10	3.07E+10	2.66E+07	8.44E+06	7.87E+06	7.65E+06	6.53E+06	5.52E+06	2.12E+06	1.13E+06
ACTINIDES AND DAUGHTERS											
CM	3.05E+07	1.12E+08	5.36E+07	4.59E+05	9.73E+04	4.03E+04	2.65E+04	9.26E+02	1.40E+01	0.	0.
AM	2.95E+07	2.29E+08	2.23E+08	1.17E+08	5.46E+07	3.19E+06	1.97E+06	5.28E+04	5.73E+02	0.	0.
PU	3.68E+07	8.73E+07	4.29E+07	4.79E+06	3.67E+06	3.03E+06	2.52E+06	7.79E+05	1.93E+05	2.21E+03	8.83E+02
NP	5.48E+05	5.03E+06	5.02E+06	4.87E+06	4.63E+06	3.35E+06	2.23E+06	3.32E+05	2.77E+05	2.43E+05	2.06E+05
U	1.63E+03	1.01E+04	9.72E+03	1.39E+04	1.56E+04	2.05E+04	2.65E+04	6.82E+04	1.10E+05	2.33E+05	2.24E+05
PA	1.51E+04	2.41E+05	2.43E+05	2.62E+05	2.75E+05	2.85E+05	2.85E+05	2.82E+05	2.77E+05	2.44E+05	2.07E+05
TH	1.80E+02	1.18E+03	1.15E+03	1.10E+03	1.19E+03	2.72E+03	6.21E+03	4.69E+04	9.64E+04	2.33E+05	2.23E+05
RA	2.51E+01	1.37E+02	1.01E+02	3.36E+01	8.48E+01	1.48E+03	4.96E+03	4.78E+04	9.53E+04	2.32E+05	2.22E+05
OTHER DAUGHTERS*	1.26E+02	6.94E+02	5.18E+02	2.14E+02	5.57E+02	9.34E+03	3.13E+04	2.95E+05	5.84E+05	1.40E+06	1.34E+06
TOTAL	9.73E+07	4.34E+08	3.24E+08	1.27E+08	6.33E+07	9.92E+06	7.11E+06	1.91E+06	1.63E+06	2.59E+06	2.42E+06

* FR+RN+A+PO+BI+PB+TE

TABLE 10.D.22 Case 2B - U Only Recycle - Stored Pu - Reference Treatment
Actinide Radioactivity Inventory in Repositories (Curies)

ACTINIDES AND DAUGHTERS	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
CM-245	8.66E+03	6.10E+04	6.07E+04	5.88E+04	5.64E+04	4.03E+04	2.65E+04	9.26E+02	1.40E+01	0.	0.
CM-244	3.00E+07	1.09E+08	5.06E+07	9.66E+00	4.46E-08	0.	0.	0.	0.	0.	0.
CM-243	1.14E+05	6.01E+03	3.90E+03	6.16E+01	1.22E-03	0.	0.	0.	0.	0.	0.
CM-242	3.33E+05	2.77E+06	2.53E+06	4.00E+05	4.09E+04	4.90E+04	0.	0.	0.	0.	0.
AM-243, NP-239	1.07E+06	9.57E+06	9.59E+06	9.21E+06	8.80E+06	6.13E+06	3.84E+06	1.04E+05	1.12E+03	0.	0.
AM-242M, AM-242	8.06E+05	6.75E+06	6.16E+06	9.75E+05	9.97E+04	1.19E+03	0.	0.	0.	0.	0.
AM-241	2.82E+07	2.17E+08	2.12E+08	1.11E+08	5.01E+07	1.25E+05	2.66E+04	9.27E+02	1.40E+01	0.	0.
PU-242	7.90E+02	5.26E+03	5.28E+03	5.45E+03	5.49E+03	5.45E+03	5.40E+03	5.02E+03	4.58E+03	2.20E+03	8.83E+02
PU-241	3.50E+07	7.10E+07	2.79E+07	5.39E+04	5.65E+04	4.04E+04	2.66E+04	9.28E+02	1.40E+01	0.	0.
PU-240	2.76E+05	2.32E+06	2.47E+06	2.50E+06	2.38E+06	1.58E+06	9.45E+05	1.56E+04	9.27E+01	0.	0.
PU-239	1.60E+05	1.00E+06	1.04E+06	1.08E+06	1.13E+06	1.40E+06	1.34E+06	7.57E+05	1.88E+05	2.19E+00	1.48E+06
PU-238	1.32E+06	1.30E+07	1.15E+07	1.15E+06	1.03E+05	1.18E-03	0.	0.	0.	0.	0.
PU-236	3.00E+01	1.80E+01	1.16E+01	0.	0.	0.	0.	0.	0.	0.	0.
NP-237, PA-233	3.00E+04	4.81E+05	4.84E+05	5.21E+05	5.49E+05	5.69E+05	5.68E+05	5.61E+05	5.52E+05	4.85E+05	4.13E+05
U-238, TH-234, PA-234M	4.34E+02	2.87E+03	2.87E+03	2.87E+03	2.87E+03	2.87E+03	2.87E+03	2.87E+03	2.87E+03	2.87E+03	2.87E+03
U-236	1.12E+02	1.22E+03	1.22E+03	1.25E+03	1.28E+03	1.51E+03	1.69E+03	1.95E+03	1.95E+03	1.93E+03	1.90E+03
U-235, TH-231	1.55E+01	1.17E+02	1.17E+02	1.18E+02	1.19E+02	1.29E+02	1.44E+02	2.39E+02	2.79E+02	2.92E+02	2.92E+02
U-234	4.79E+02	5.97E+03	6.65E+03	1.12E+04	1.22E+04	1.22E+04	1.20E+04	1.09E+04	9.56E+03	3.76E+03	1.65E+03
U-233	8.60E+01	3.32E+01	3.35E+01	4.30E+02	1.05E+03	5.80E+03	1.17E+04	5.43E+04	9.74E+04	2.26E+05	2.19E+05
U-232	8.88E+00	1.03E+02	8.52E+01	1.74E+00	1.41E+02	0.	0.	0.	0.	0.	0.
PA-231	1.12E+00	1.55E+01	1.56E+01	1.59E+01	1.64E+01	2.01E+01	2.50E+01	6.91E+01	1.11E+02	1.46E+02	1.46E+02
TH-230	2.20E+00	2.95E+01	3.06E+01	6.14E+01	1.16E+02	5.26E+02	1.02E+03	4.06E+03	6.20E+03	4.87E+03	1.97E+03
TH-229,7 DAUGHTERS	2.86E-03	4.83E-01	1.14E+00	7.01E+01	3.56E+02	9.21E+03	3.31E+04	3.49E+05	7.12E+05	1.81E+06	1.76E+06
TH-228,6 DAUGHTERS	1.74E+02	8.86E+02	6.13E+02	1.25E+01	1.02E-01	2.21E-03	4.71E-03	2.69E-02	5.52E-02	2.80E-01	5.58E-01
AC-227,7 DAUGHTERS	2.44E+00	7.73E+01	9.96E+01	1.27E+02	1.31E+02	1.61E+02	2.00E+02	5.53E+02	8.90E+02	1.17E+03	1.17E+03
TH-232,2 DAUGHTERS	7.58E-07	7.20E-06	8.12E-06	7.53E-05	1.72E-04	9.49E-04	2.02E-03	1.15E-02	2.37E-02	1.20E-01	2.39E-01
RA-226,5 DAUGHTERS	8.04E-02	2.67E+00	4.20E+00	4.38E+01	1.43E+02	1.88E+03	4.78E+03	2.44E+04	3.75E+04	2.92E+04	1.18E+04
PB-210,2 DAUGHTERS	8.85E-03	5.91E-01	1.19E+00	2.07E+01	7.17E+01	9.42E+02	2.39E+03	1.22E+04	1.88E+04	1.46E+04	5.92E+03
TOTAL ACTINIDES	9.73E+07	4.38E+08	3.24E+08	1.27E+08	6.33E+07	9.92E+06	7.11E+06	1.91E+06	1.63E+06	2.59E+06	2.42E+06

TABLE 10.D.23 Case 2B - U Only Recycle - Stored Pu - Reference Treatment Fission and Activation Product Radioactivity Inventory in Repositories (Curies)

FISSION AND ACTIVATION	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
H-3	2.70E+06	3.87E+06	1.06E+06	1.40E-04	0.	0.	0.	0.	0.	0.	0.
C-14	6.85E+04	3.40E+05	3.40E+05	3.23E+05	3.04E+05	1.88E+05	1.03E+04	8.15E+02	1.93E+00	0.	0.
MN-54	8.98E+08	2.85E+02	1.26E-08	0.	0.	0.	0.	0.	0.	0.	0.
FE-55	8.31E+07	5.00E+06	2.43E+04	0.	0.	0.	0.	0.	0.	0.	0.
CO-60	1.27E+08	4.00E+07	2.87E+06	0.	0.	0.	0.	0.	0.	0.	0.
NI-59	2.24E+05	1.13E+06	1.13E+06	1.13E+06	1.12E+06	1.08E+06	1.04E+06	7.34E+05	4.76E+05	1.49E+04	1.96E+02
NI-63	3.33E+07	1.54E+08	1.15E+08	5.51E+06	1.28E+05	1.06E-08	0.	0.	0.	0.	0.
SE-79	1.48E+04	1.30E+05	1.30E+05	1.29E+05	1.29E+05	1.23E+05	1.17E+05	7.64E+04	4.48E+04	6.31E+02	3.06E+00
KR-85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB-87	7.08E-01	6.44E+00	6.44E+00	6.44E+00	6.44E+00	6.44E+00	6.44E+00	6.44E+00	6.44E+00	6.44E+00	6.44E+00
SR-90,Y-90	3.98E+09	2.00E+10	1.22E+10	5.79E+05	2.57E+00	0.	0.	0.	0.	0.	0.
ZR-93,NB-93M	1.50E+05	1.31E+06	1.31E+06	1.31E+06	1.31E+06	1.30E+06	1.30E+06	1.28E+06	1.25E+06	1.04E+06	8.24E+05
TC-99	5.31E+05	4.77E+06	4.77E+06	4.76E+06	4.75E+06	4.69E+06	4.62E+06	4.04E+06	3.43E+06	9.17E+05	1.76E+05
RU-106,RH-106	3.42E+07	1.96E+06	2.02E+00	0.	0.	0.	0.	0.	0.	0.	0.
PD-107	4.07E+03	3.55E+04	3.55E+04	3.55E+04	3.55E+04	3.55E+04	3.55E+04	3.54E+04	3.52E+04	3.38E+04	3.22E+04
AG-110M	7.00E+03	1.25E+02	2.57E-07	0.	0.	0.	0.	0.	0.	0.	0.
CD-113M	3.18E+05	7.10E+05	2.64E+05	5.50E-04	0.	0.	0.	0.	0.	0.	0.
SB-125,TE-125M	3.28E+07	1.12E+07	6.59E+04	0.	0.	0.	0.	0.	0.	0.	0.
SN-126,SB-126	3.92E+04	3.46E+05	3.46E+05	3.45E+05	3.44E+05	3.35E+05	3.23E+05	2.45E+05	1.73E+05	1.09E+04	3.40E+02
I-129	2.37E+03	1.23E+04	1.23E+04	1.23E+04	1.23E+04	1.23E+04	1.23E+04	1.22E+04	1.22E+04	1.20E+04	1.18E+04
CS-134	1.72E+08	3.99E+07	4.59E+04	0.	0.	0.	0.	0.	0.	0.	0.
CS-135	1.07E+04	1.02E+05	1.02E+05	1.02E+05	1.02E+05	1.02E+05	1.02E+05	1.01E+05	9.96E+04	9.09E+04	8.08E+04
CS-137,BA-137	4.53E+09	2.84E+10	1.79E+10	1.59E+06	1.94E+01	0.	0.	0.	0.	0.	0.
CE-144,PR-144	1.17E+07	4.88E+05	8.92E-03	0.	0.	0.	0.	0.	0.	0.	0.
PM-147	1.94E+08	8.30E+07	8.19E+05	0.	0.	0.	0.	0.	0.	0.	0.
SM-151	4.38E+07	3.16E+08	2.69E+08	1.08E+07	2.02E+05	2.97E-04	0.	0.	0.	0.	0.
EU-152	2.48E+05	7.08E+05	2.23E+05	1.66E-05	0.	0.	0.	0.	0.	0.	0.
EU-154	1.31E+08	4.43E+08	1.86E+08	4.72E+00	1.88E-04	0.	0.	0.	0.	0.	0.
EU-155	3.82E+06	7.07E+05	3.35E+02	0.	0.	0.	0.	0.	0.	0.	0.
OTHER[a]	2.74E+04	1.30E+01	1.10E-04	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	1.04E+10	4.95E+10	3.07E+10	2.06E+07	8.44E+06	7.87E+06	7.65E+06	6.53E+06	5.52E+06	2.12E+06	1.13E+06

a. Nuclides included in "other" category are all short-lived and are detailed in the next table.

TABLE 10.D.24 Case 2B - U Only Recycle - Stored Pu - Reference Treatment
Short-Lived Fission and Activation Product Radioactivity
Inventory in Repositories (Curies)

FISSION AND ACTIVATION	YEAR 2000	YEAR 2050	YEAR 2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
SC-46	1.95E+00	1.17E-10	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR-51	2.72E+03	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO-58	1.20E+04	1.44E-09	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE-59	1.97E-01	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN-65	1.21E+04	9.28E-01	9.95E-10	0.	0.	0.	0.	0.	0.	0.	0.
SR-89	6.16E-01	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y-91	4.67E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR-95	9.33E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB-95M	5.47E+00	2.43E-10	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB-95	4.04E+02	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU-103	2.65E+02	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN-123	1.31E+01	6.89E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB-124	2.47E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE-127M,TE-127	7.97E+01	1.10E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE-141	1.36E-04	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM-148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD-153	5.25E+02	1.21E+01	1.00E-08	0.	0.	0.	0.	0.	0.	0.	0.
TB-160	2.02E-01	4.74E-10	0.	0.	0.	0.	0.	0.	0.	0.	0.
W-181	1.15E-01	4.96E-07	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	2.74E+04	1.30E+01	1.10E-08	0.	0.	0.	0.	0.	0.	0.	0.

TABLE 10.D.25 Case 2B - U Only Recycle - Stored Pu - Reference Treatment
Total Radioactivity in Repositories by Waste Classification
(Curies)

	YEAR			GEOLOGIC TIME (YEARS BEYOND 1975)							
FISSION AND ACTIVATION	2000	2050	2070	500	1000	5000	10000	50000	100000	500000	1000000
HLW	1.01E+10	4.93E+10	3.06E+10	1.96E+07	6.80E+06	6.32E+06	6.42E+06	5.71E+06	4.96E+06	2.03E+06	1.07E+06
FRW	2.60E+08	2.08E+08	1.36E+08	6.73E+06	1.36E+06	1.18E+06	1.12E+06	8.05E+05	5.46E+05	7.31E+04	4.60E+04
ILW	2.58E+06	1.68E+06	1.03E+06	2.03E+03	5.32E+02	4.81E+02	4.62E+02	3.71E+02	2.95E+02	1.06E+02	7.05E+01
LLW	6.64E+04	3.18E+05	3.15E+05	2.97E+05	2.80E+05	1.77E+05	1.02E+05	1.29E+04	1.21E+04	1.19E+04	1.17E+04
TOTAL	1.04E+10	4.95E+10	3.07E+10	2.66E+07	8.44E+06	7.87E+06	7.65E+06	6.53E+06	5.52E+06	2.12E+06	1.13E+06
ACTINIDES											
HLW	7.37E+07	3.90E+08	3.01E+08	1.23E+08	6.10E+07	9.07E+06	6.48E+06	1.76E+06	1.57E+06	2.56E+06	2.40E+06
FRW	2.83E+06	5.26E+06	2.86E+06	5.25E+05	2.99E+05	1.05E+05	7.70E+04	1.83E+04	8.62E+03	5.41E+03	3.79E+03
ILW	2.05E+07	3.69E+07	1.97E+07	3.37E+06	1.95E+06	7.28E+05	5.35E+05	1.24E+05	5.26E+04	2.61E+04	1.63E+04
LLW	4.96E+05	9.04E+05	4.83E+05	8.25E+04	4.77E+04	1.77E+04	1.30E+04	2.84E+03	1.04E+03	4.18E+02	2.54E+02
TOTAL	9.73E+07	4.34E+08	3.24E+08	1.27E+08	6.33E+07	9.92E+06	7.11E+06	1.91E+06	1.63E+06	2.59E+06	2.42E+06

TABLE 10.D.26 Case 2B - U Only Recycle - Stored Pu - Reference Treatment Summary Heat Generation Rate in Repositories by Major Radionuclides (Watts)

FISSION AND ACTIVATION	YEAR 2000	YEAR 2050	YEAR 2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
C-14	2.03E+01	1.01E+02	1.01E+02	9.59E+01	9.02E+01	5.56E+01	3.04E+01	2.41E+01	5.73E-04	0.	0.
NI-59	1.43E+03	7.19E+03	7.19E+03	7.16E+03	7.13E+03	6.89E+03	6.60E+03	4.67E+03	3.03E+03	9.48E+01	1.25E+00
SR-90,Y-90	1.43E+07	7.21E+07	4.40E+07	2.08E+03	9.28E-03	0.	0.	0.	0.	0.	0.
ZR-93,NB-93M	3.52E+01	3.06E+02	3.06E+02	3.06E+02	3.06E+02	3.05E+02	3.05E+02	2.99E+02	2.92E+02	2.43E+02	1.93E+02
TC-99	9.13E+02	8.20E+03	8.20E+03	8.19E+03	8.17E+03	8.07E+03	7.93E+03	6.95E+03	5.90E+03	1.56E+03	3.03E+02
PD-107	3.37E-01	2.93E+00	2.95E+00	2.95E+00	2.95E+00	2.95E+00	2.95E+00	2.93E+00	2.92E+00	2.81E+00	2.67E+00
I-129	1.54E+00	8.07E+00	8.07E+00	8.07E+00	8.07E+00	8.06E+00	8.06E+00	8.05E+00	8.03E+00	7.90E+00	7.74E+00
CS-135	5.19E+00	4.94E+01	4.96E+01	4.96E+01	4.96E+01	4.95E+01	4.95E+01	4.90E+01	4.84E+01	4.42E+01	3.93E+01
CS-137,BA-137M	1.52E+07	7.79E+07	4.91E+07	4.36E+03	4.22E-02	0.	0.	0.	0.	0.	0.
ALL OTHERS	5.50E+06	5.36E+06	2.07E+06	2.26E+04	3.32E+03	2.86E+03	2.77E+03	2.09E+03	1.48E+03	9.17E+01	2.87E+00
TOTAL	3.50E+07	1.55E+08	9.52E+07	4.49E+04	1.91E+04	1.82E+04	1.77E+04	1.41E+04	1.06E+04	2.06E+03	5.50E+02
ACTINIDES AND DAUGHTERS											
CM	1.07E+06	3.94E+06	1.88E+06	1.66E+04	3.28E+03	1.27E+03	8.32E+02	2.91E+01	4.39E-01	0.	0.
AM	9.60E+05	7.42E+06	7.24E+06	3.89E+06	1.83E+06	1.16E+05	7.20E+04	1.93E+03	2.09E+01	0.	0.
PU	3.88E+04	5.37E+05	4.91E+05	1.50E+05	1.13E+05	9.29E+04	7.76E+04	2.42E+04	6.00E+03	6.51E+01	2.61E+01
NP	1.14E+03	1.35E+04	1.36E+04	1.39E+04	1.40E+04	1.25E+04	1.10E+04	8.31E+03	8.11E+03	7.12E+03	6.06E+03
U	2.10E+01	2.35E+02	2.55E+02	3.94E+02	4.43E+02	5.87E+02	7.60E+02	1.97E+03	3.19E+03	6.77E+03	6.50E+03
PA	2.10E+01	3.30E+02	3.32E+02	3.58E+02	3.76E+02	3.90E+02	3.90E+02	3.86E+02	3.81E+02	3.37E+02	2.88E+02
TH	9.42E-01	5.70E+00	4.55E+00	2.98E+00	5.56E+00	5.07E+01	1.55E+02	1.44E+03	2.87E+03	7.00E+03	6.72E+03
RA	8.59E-01	4.68E+00	3.45E+00	8.21E-01	1.28E+00	1.03E+01	2.61E+01	1.46E+02	2.39E+02	2.92E+02	2.06E+02
OTHER DAUGHTERS*	3.51E+00	1.91E+01	1.40E+01	4.98E+00	1.36E+01	2.50E+02	8.36E+02	8.09E+03	1.61E+04	3.93E+04	3.77E+04
TOTAL	2.09E+06	1.19E+07	9.63E+06	4.07E+06	1.96E+06	2.24E+05	1.64E+05	4.69E+04	3.69E+04	6.09E+04	5.75E+04

* FR+RN+A+PO+BI+PB+TE

TABLE 10.D.27 Case 2B - U Only Recycle - Stored Pu - Reference Treatment
Actinide Heat Generation Rate in Repositories (Watts)

ACTINIDES AND DAUGHTERS	YEAR			GEOLOGIC TIME (YEARS BEYOND 1975)							
	2000	2050	2070	500	1000	5000	10000	50000	100000	500000	1000000
CM-245	2.09E-02	1.91E+03	1.91E+03	1.85E+03	1.77E+03	1.27E+03	8.32E+02	2.91E+01	4.39E-01	0.	0.
CM-244	1.09E+06	3.81E+06	1.77E+06	3.38E-01	1.63E-09	0.	0.	0.	0.	0.	0.
CM-243	4.18E+03	2.21E+04	1.43E+04	2.27E+00	4.48E-05	0.	0.	0.	0.	0.	0.
CM-242	1.23E+04	1.02E+05	9.31E+04	1.47E+04	1.51E+03	1.81E-05	0.	0.	0.	0.	0.
AM-243,NP-239	2.02E+04	1.81E+05	1.81E+05	1.74E+05	1.67E+05	1.16E+05	7.37E+04	1.96E+03	2.12E+01	0.	0.
AM-242M,AM-242	6.52E+02	5.46E+03	4.98E+03	7.89E+02	8.07E+01	9.64E-07	0.	0.	0.	0.	0.
AM-241	9.40E+05	7.24E+06	7.06E+06	3.72E+06	1.67E+06	4.17E+03	8.88E+02	3.10E+01	4.67E-01	0.	0.
PU-242	2.33E+01	1.55E+02	1.56E+02	1.6[illegible]E+02	1.62E+02	1.61E+02	1.59E+02	1.48E+02	1.35E+02	6.51E+01	2.61E+01
PU-241	1.45E+03	2.99E+03	1.16E+03	2.44E+00	2.35E+00	1.68E+00	1.10E+00	3.85E-02	5.81E-04	0.	0.
PU-240	8.60E+03	7.23E+04	7.70E+04	7.79E+04	7.41E+04	4.91E+04	2.94E+04	4.87E+02	2.89E+00	0.	0.
PU-239	4.97E+03	3.23E+04	3.24E+04	3.36E+04	3.52E+04	4.36E+04	4.80E+04	2.35E+04	5.86E+03	6.81E-02	4.61E-08
PU-238	4.38E+04	4.29E+05	3.80E+05	3.79E+04	3.40E+03	3.91E-08	0.	0.	0.	0.	0.
PU-236	1.04E+00	5.23E-01	4.04E-03	0.	0.	0.	0.	0.	0.	0.	0.
NP-237,PA-233	4.61E+02	7.39E+03	7.43E+03	8.01E+03	8.43E+03	8.74E+03	8.73E+03	8.62E+03	8.48E+03	7.[illegible]5E+03	6.34E+03
U-238,TH-234, PA-234M	4.45E+00	2.95E+01	2.95E+01	2.95E+01	2.95E+01	2.95E+01	2.95E+01	2.95E+01	2.95E+01	2.95E+01	2.95E+01
U-236	3.03E+00	3.30E+01	3.31E+01	3.38E+01	3.48E+01	4.09E+01	4.58E+01	5.29E+01	5.29E+01	5.23E+01	5.16E+01
U-235,TH-231	2.21E-01	1.67E+00	1.67E+00	1.69E+00	1.70E+00	1.84E+00	2.05E+00	3.41E+00	3.98E+00	4.16E+00	4.16E+00
U-234	1.38E+01	1.72E+02	1.91E+02	3.22E+02	3.52E+02	3.51E+02	3.46E+02	3.13E+02	2.73E+02	1.08E+02	4.74E+01
U-233	1.92E-02	9.66E-01	1.57E+00	1.31E+01	3.05E+01	1.69E+02	3.41E+02	1.58E+03	2.84E+03	6.58E+03	6.37E+03
U-232	2.85E-01	3.29E+00	2.73E+00	5.59E-02	4.54E-04	0.	0.	0.	0.	0.	0.
PA-231	3.43E-02	4.74E-01	4.73E-01	4.65E-01	5.00E-01	6.13E-01	7.62E-01	2.11E+00	3.39E+00	4.45E+00	4.45E+00
TH-230	6.21E-02	8.35E-01	8.66E-01	1.73E+00	3.27E+00	1.49E+01	2.88E+01	1.15E+02	1.75E+02	1.37E+02	5.57E+01
TH-229,7 DAUGHTERS	7.17E-05	1.21E-02	2.85E-02	1.76E+00	8.93E+00	2.31E+02	8.29E+02	8.75E+03	1.78E+04	4.55E+04	4.41E+04
TH-228,6 DAUGHTERS	5.13E+00	2.62E+01	1.81E+01	3.70E-01	3.02E-03	6.54E-05	1.39E-04	7.94E-04	1.63E-03	8.29E-03	1.65E-02
AC-227,7 DAUGHTERS	6.07E-02	1.93E+00	2.48E+00	3.15E+00	3.27E+00	4.01E+00	4.98E+00	1.38E+01	2.22E+01	2.91E+01	2.91E+01
TH-232,2 DAUGHTERS	7.47E-09	7.10E-08	8.00E-08	7.42E-07	1.69E-06	9.35E-06	1.99E-05	1.13E-04	2.33E-04	1.18E-03	2.36E-03
RA-226,5 DAUGHTERS	2.13E-03	7.08E-02	1.11E-01	1.15E+00	3.80E+00	4.99E+01	1.27E+02	6.48E+02	9.95E+02	7.74E+02	3.14E+02
PB-210,2 DAUGHTERS	1.01E-04	6.73E-03	1.32E-02	2.36E-01	8.17E-01	1.07E+01	2.72E+01	1.39E+02	2.14E+02	1.46E+02	6.75E+01
TOTAL ACTINIDES	2.09E+06	1.19E+07	9.63E+06	4.07E+06	1.96E+06	2.24E+05	1.64E+05	4.65E+04	3.69E+04	6.09E+04	5.75E+04

TABLE 10.D.28 Case 2B - U Only Recycle - Stored Pu - Reference Treatment Fission and Activation Product Heat Generation Rate in Repositories (Watts)

FISSION AND ACTIVATION	YEAR 2000	YEAR 2050	YEAR 2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
H-3	9.60E+01	1.16E+02	3.75E+01	4.97E-04	0.	0.	0.	0.	0.	0.	0.
C-14	2.03E+01	1.01E+02	1.01E+02	9.54E+01	9.02E+01	5.56E+01	3.04E+01	2.91E-01	5.73E-04	0.	0.
MN-54	4.06E+03	1.82E+00	1.02E-07	0.	0.	0.	0.	0.	0.	0.	0.
FE-55	1.04E+05	6.82E+03	3.16E+01	0.	0.	0.	0.	0.	0.	0.	0.
CO-60	1.90E+06	6.25E+05	4.49E+04	0.	0.	0.	0.	0.	0.	0.	0.
NI-59	1.43E+03	7.19E+03	7.19E+03	7.16E+03	7.13E+03	6.89E+03	6.60E+03	4.67E+03	3.03E+03	9.48E+01	1.25E+00
NI-63	5.37E+03	2.15E+04	1.85E+04	8.82E+02	2.04E+01	0.	0.	0.	0.	0.	0.
SE-79	5.44E+00	4.93E+01	4.93E+01	4.91E+01	4.88E+01	4.68E+01	4.44E+01	2.90E+01	1.70E+01	2.39E-01	1.16E-03
KR-85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB-87	4.62E-04	4.20E-03	4.20E-03	4.20E-03	4.20E-03	4.20E-03	4.20E-03	4.20E-03	4.20E-03	4.20E-03	4.20E-03
SR-90,Y-90	1.43E+07	7.21E+07	4.40E+07	2.08E+03	9.24E-03	0.	0.	0.	0.	0.	0.
ZR-93,NB-93M	3.52E+01	3.06E+02	3.06E+02	3.06E+02	3.06E+02	3.05E+02	3.05E+02	2.99E+02	2.92E+02	2.43E+02	1.93E+02
TC-99	9.13E+02	8.20E+03	8.20E+03	8.19E+03	8.17E+03	8.07E+03	7.93E+03	6.95E+03	5.90E+03	1.58E+03	3.03E+02
RU-106,RH-106	1.81E+05	1.04E+04	1.07E-02	0.	0.	0.	0.	0.	0.	0.	0.
PD-107	3.37E-01	2.95E+00	2.95E+00	2.95E+00	2.95E+00	2.95E+00	2.95E+00	2.93E+00	2.92E+00	2.81E+00	2.67E+00
AG-110M	1.18E+02	2.11E+00	4.35E-09	0.	0.	0.	0.	0.	0.	0.	0.
CD-113M	4.20E+02	9.38E+02	3.49E+02	7.27E-07	0.	0.	0.	0.	0.	0.	0.
SB-125,TE-125M	7.97E+04	2.78E+04	1.62E+02	0.	0.	0.	0.	0.	0.	0.	0.
SN-126,SB-126	3.30E+02	2.92E+03	2.91E+03	2.91E+03	2.90E+03	2.82E+03	2.72E+03	2.06E+03	1.46E+03	9.14E+01	2.87E+00
I-129	1.56E+00	8.07E+00	8.07E+00	8.07E+00	8.07E+00	8.06E+00	8.06E+00	8.05E+00	8.03E+00	7.90E+00	7.74E+00
CS-134	1.82E+06	4.19E+05	4.86E+02	0.	0.	0.	0.	0.	0.	0.	0.
CS-135	5.19E+00	4.96E+01	4.96E+01	4.95E+01	4.96E+01	4.95E+01	4.95E+01	4.90E+01	4.84E+01	4.42E+01	3.93E+01
CS-137,BA-137	1.52E+07	7.79E+07	4.91E+07	4.36E+03	4.22E-02	0.	0.	0.	0.	0.	0.
CE-144,PR-144	5.01E+04	2.09E+03	3.83E-05	0.	0.	0.	0.	0.	0.	0.	0.
PM-147	1.03E+05	4.74E+04	2.16E+02	0.	0.	0.	0.	0.	0.	0.	0.
SM-151	7.64E+04	5.50E+05	4.69E+05	1.88E+04	3.51E+02	0.	0.	0.	0.	0.	0.
EU-152	4.44E+03	1.27E+04	4.00E+03	2.48E-07	0.	0.	0.	0.	0.	0.	0.
EU-154	1.08E+06	3.64E+06	1.53E+06	3.88E-02	0.	0.	0.	0.	0.	0.	0.
EU-155	5.22E+03	5.89E+02	2.82E-01	0.	0.	0.	0.	0.	0.	0.	0.
OTHER[(a)]	2.74E+02	2.24E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	3.30E+07	1.55E+08	9.52E+07	4.44E+04	1.91E+04	1.82E+04	1.77E+04	1.41E+04	1.08E+04	2.06E+03	5.50E+02

a. Nuclides included in "other" category are all short-lived and are detailed in the next table.

TABLE 10.D.29 Case 2B - U Only Recycle - Stored Pu - Reference Treatment
Short-Lived Fission and Activation Product Heat Generation Rate
In Repositories (Watts)

FISSION AND ACTIVATION	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
SC-46	2.74E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR-51	1.20E+01	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO-58	1.63E+02	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE-59	1.53E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN-65	9.58E+01	7.37E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR-89	2.22E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y-91	1.78E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR-95	1.30E-04	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB-95M	2.63E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB-95	1.94E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU-103	8.72E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN-123	4.47E-02	2.35E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB-124	3.22E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE-127M,TE-127	8.63E-02	1.19E-06	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE-141	2.68E-07	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM-148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD-153	7.56E-01	1.74E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB-160	1.76E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W-181	1.16E-04	5.00E-10	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	2.74E+02	2.48E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.

TABLE 10.D.30 Case 2B - U Only Recycle - Stored Pu - Reference Treatment
Total Heat Generation Rate in Repositories by Waste
Classification (Watts)

FISSION AND ACTIVATION	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
HLW	3.28E+07	1.55E+08	9.51E+07	3.68E+04	1.18E+04	1.13E+04	1.11E+04	9.39E+03	7.71E+03	1.94E+03	5.30E+02
FRW	2.16E+06	7.38E+05	1.19E+05	8.06E+03	7.16E+03	6.89E+03	6.60E+03	4.67E+03	3.03E+03	1.09E+02	1.22E+01
ILW	1.24E+04	5.22E+03	3.19E+03	2.85E+00	1.85E+00	1.78E+00	1.71E+00	1.27E+00	8.82E-01	1.07E-01	4.09E-02
LLW	3.41E+01	1.17E+02	1.09E+02	9.24E+01	8.74E+01	5.70E+01	3.48E+01	8.20E+00	7.97E+00	7.84E+00	7.68E+00
TOTAL	3.50E+07	1.55E+08	9.52E+07	4.49E+04	1.91E+04	1.82E+04	1.77E+04	1.41E+04	1.06E+04	2.06E+03	5.50E+02
ACTINIDES											
HLW	2.04E+06	1.16E+07	9.29E+06	3.94E+06	1.89E+06	1.98E+05	1.44E+05	4.22E+04	3.53E+04	6.02E+04	5.70E+04
FRW	6.90E+03	4.67E+04	4.45E+04	1.71E+04	9.60E+03	3.20E+03	2.35E+03	5.35E+02	2.23E+02	1.24E+02	8.69E+01
ILW	3.63E+04	2.08E+05	2.91E+05	1.10E+05	6.29E+04	2.26E+04	1.66E+04	3.67E+03	1.40E+03	5.96E+02	3.71E+02
LLW	8.88E+02	7.29E+03	7.12E+03	2.70E+03	1.54E+03	5.51E+02	4.04E+02	8.58E+01	2.87E+01	9.80E+00	6.02E+00
TOTAL	2.09E+06	1.19E+07	9.63E+06	4.07E+06	1.96E+06	2.24E+05	1.64E+05	4.65E+04	3.69E+04	6.09E+04	5.75E+04

TABLE 10.D.31 Case 3 - U and Pu Recycle - Repository in 1985 - Reference Treatment Summary Radioactivity Inventory in Repositories by Major Radionuclides (Curies)

FISSION AND ACTIVATION	YEAR 2000	YEAR 2050	YEAR 2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
C-14	6.51E+04	2.99E+05	2.98E+05	2.84E+05	2.67E+05	1.65E+05	9.00E+04	7.15E+02	1.70E+00	0.	0.
NI-59	2.13E+05	9.90E+05	9.89E+05	9.86E+05	9.82E+05	9.48E+05	9.08E+05	6.42E+05	4.17E+05	1.30E+04	1.72E+02
SR-90,Y-90	3.82E+09	1.76E+10	1.07E+10	5.08E+05	2.25E+00	0.	0.	0.	0.	0.	0.
ZR-93,NB-93M	1.48E+05	1.23E+06	1.23E+06	1.23E+06	1.23E+06	1.23E+06	1.22E+06	1.20E+06	1.17E+06	9.75E+05	7.74E+05
TC-99	5.31E+05	4.78E+06	4.77E+06	4.77E+06	4.76E+06	4.70E+06	4.62E+06	4.05E+06	3.43E+06	9.18E+05	1.76E+05
PD-107	4.44E+03	4.61E+04	4.61E+04	4.61E+04	4.61E+04	4.61E+04	4.60E+04	4.59E+04	4.56E+04	4.39E+04	4.17E+04
I-129	2.44E+03	1.32E+04	1.32E+04	1.32E+04	1.32E+04	1.32E+04	1.32E+04	1.32E+04	1.32E+04	1.29E+04	1.27E+04
CS-135	1.15E+04	1.28E+05	1.28E+05	1.28E+05	1.27E+05	1.27E+05	1.27E+05	1.26E+05	1.25E+05	1.14E+05	1.01E+05
CS-137,BA-137M	5.55E+09	2.86E+10	1.80E+10	1.60E+06	1.55E+01	0.	0.	0.	0.	0.	0.
ALL OTHERS	8.84E+08	1.18E+09	6.21E+08	1.70E+07	8.66E+05	5.20E+05	5.01E+05	3.68E+05	2.51E+05	1.37E+04	4.18E+02
TOTAL	1.03E+10	4.74E+10	2.94E+10	2.66E+07	8.29E+06	7.74E+06	7.53E+06	6.45E+06	5.46E+06	2.09E+06	1.11E+06
ACTINIDES AND DAUGHTERS											
CM	1.02E+08	1.39E+09	6.57E+08	4.45E+06	1.49E+06	8.25E+05	5.43E+05	1.89E+04	2.86E+02	0.	0.
AM	4.00E+07	6.38E+08	6.20E+08	3.20E+08	1.55E+08	1.82E+07	1.14E+07	3.09E+05	3.41E+03	0.	0.
PU	6.40E+07	2.48E+08	1.25E+08	2.34E+07	1.73E+07	1.37E+07	1.12E+07	3.35E+06	8.30E+05	9.74E+03	3.90E+03
NP	1.07E+06	2.70E+07	2.69E+07	2.60E+07	2.49E+07	1.75E+07	1.12E+07	6.11E+05	3.19E+05	2.77E+05	2.36E+05
U	2.26E+03	5.00E+04	4.23E+04	2.78E+04	3.40E+04	4.09E+04	4.83E+04	9.54E+04	1.41E+05	2.73E+05	2.59E+05
PA	1.46E+04	2.08E+05	2.12E+05	2.59E+05	2.95E+05	3.23E+05	3.24E+05	3.22E+05	3.17E+05	2.79E+05	2.37E+05
TH	1.89E+02	4.35E+04	3.18E+04	1.77E+03	1.32E+03	3.57E+03	8.19E+03	6.12E+04	1.19E+05	2.72E+05	2.57E+05
RA	2.78E+01	4.24E+04	3.08E+04	6.57E+02	9.76E+01	1.99E+03	6.54E+03	5.99E+04	1.17E+05	2.71E+05	2.56E+05
OTHER DAUGHTERS*	1.38E+02	2.12E+05	1.54E+05	3.33E+03	6.54E+02	1.34E+04	4.32E+04	3.80E+05	7.36E+05	1.65E+06	1.54E+06
TOTAL	2.07E+08	2.30E+09	1.43E+09	3.74E+08	1.99E+08	5.06E+07	3.49E+07	5.21E+06	2.58E+06	3.03E+06	2.79E+06

* FR+RN+A+PO+BI+PB+TE

TABLE 10.D.32 Case 3 - U and Pu Recycle - Repository in 1985 - Reference Treatment
Actinide Radioactivity Inventory in Repositories (Curies)

ACTINIDES AND DAUGHTERS	YEAR 2000	YEAR 2030	YEAR 2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
CM-245	3.82E+04	1.25E+06	1.24E+06	1.20E+06	1.15E+06	8.25E+05	5.43E+05	1.89E+04	2.86E+02	0.	0.
CM-244	1.01E+08	1.36E+09	6.34E+08	1.21E+02	5.83E-07	0.	0.	0.	0.	0.	0.
CM-243	1.69E+05	1.72E+06	1.12E+06	1.77E+02	3.49E-03	0.	0.	0.	0.	0.	0.
CM-242	8.51E+05	2.25E+07	2.05E+07	3.25E+06	3.32E+05	3.98E-03	0.	0.	0.	0.	0.
AM-243,NP-239	2.10E+06	5.35E+07	5.34E+07	5.15E+07	4.92E+07	3.43E+07	2.18E+07	5.81E+05	6.26E+03	0.	0.
AM-242M,AM-242	2.06E+06	5.47E+07	5.00E+07	7.92E+06	8.09E+05	9.67E-03	0.	0.	0.	0.	0.
AM-241	3.68E+07	5.96E+08	3.43E+08	2.86E+08	1.29E+08	1.08E+06	5.44E+05	1.90E+04	2.86E+02	0.	0.
PU-242	1.61E+03	2.23E+04	2.25E+04	2.38E+04	2.42E+04	2.41E+04	2.38E+04	2.22E+04	2.02E+04	9.73E+03	3.90E+03
PU-241	6.11E+07	2.06E+08	8.14E+07	1.20E+06	1.16E+06	8.27E+05	5.43E+05	1.90E+04	2.86E+02	0.	0.
PU-240	4.68E+05	1.07E+07	1.26E+07	1.37E+07	1.31E+07	8.68E+06	5.20E+06	8.60E+04	5.10E+02	0.	0.
PU-239	2.11E+05	1.63E+06	1.65E+06	1.90E+06	2.25E+06	4.20E+06	5.48E+06	3.22E+06	8.04E+05	9.41E+00	6.37E-06
PU-238	2.22E+06	3.02E+07	2.89E+07	6.48E+06	7.75E+05	9.59E-03	0.	0.	0.	0.	0.
PU-236	4.05E+01	1.83E+03	1.41E+01	0.	0.	0.	0.	0.	0.	0.	0.
NP-237,PA-233	2.90E+04	4.14E+05	4.21E+05	5.17E+05	5.88E+05	6.43E+05	6.45E+05	6.41E+05	6.31E+05	5.54E+05	4.72E+05
U-238,TH-234, PA-234M	4.55E+02	2.97E+03	2.97E+03	2.97E+03	2.97E+03	2.97E+03	2.97E+03	2.97E+03	2.97E+03	2.97E+03	2.98E+03
U-236	1.04E+02	9.80E+02	9.87E+02	1.13E+03	1.34E+03	2.58E+03	3.57E+03	5.01E+03	5.03E+03	4.97E+03	4.90E+03
U-235,TH-231	1.54E+01	1.05E+02	1.05E+02	1.06E+02	1.08E+02	1.34E+02	1.82E+02	5.66E+02	7.38E+02	7.94E+02	7.93E+02
U-234	4.58E+02	6.60E+03	8.26E+03	2.45E+04	3.05E+04	3.09E+04	3.05E+04	2.74E+04	2.39E+04	8.45E+03	2.83E+03
U-233	6.40E-01	3.11E+01	4.89E+01	4.22E+02	1.04E+03	6.37E+03	1.31E+04	6.17E+04	1.11E+05	2.58E+05	2.50E+05
U-232	9.89E+00	3.62E+04	2.99E+04	6.12E+02	4.97E+00	0.	0.	0.	0.	0.	0.
PA-231	1.03E+00	1.19E+01	1.20E+01	1.23E+01	1.27E+01	1.66E+01	2.29E+01	1.30E+02	2.70E+02	3.97E+02	3.97E+02
TH-230	2.04E+00	2.36E+01	2.49E+01	8.28E+01	2.15E+02	1.26E+03	2.52E+03	1.02E+04	1.56E+04	1.14E+04	3.70E+03
TH-229,7 DAUGHTERS	2.80E-03	4.71E-01	1.08E+00	6.45E+01	3.43E+02	9.92E+03	3.66E+04	3.96E+05	8.11E+05	2.07E+06	2.01E+06
TH-228,6 DAUGHTERS	1.90E+02	2.97E+05	2.15E+05	4.40E+03	3.57E+01	2.01E-03	4.59E-03	3.04E-02	6.42E-02	3.33E-01	6.64E-01
AC-227,7 DAUGHTERS	2.27E+00	6.05E+01	7.72E+01	9.77E+01	1.02E+02	1.33E+02	1.83E+02	1.04E+03	2.16E+03	3.18E+03	3.17E+03
TH-232,2 DAUGHTERS	7.09E-07	5.74E-06	6.64E-06	6.13E-05	1.42E-04	8.59E-04	1.97E-03	1.30E-02	2.75E-02	1.43E-01	2.85E-01
RA-226,5 DAUGHTERS	7.61E-02	2.17E+00	3.41E+00	4.73E+01	2.21E+02	4.37E+03	1.17E+04	6.15E+04	9.43E+04	6.86E+04	2.22E+04
PB-210,2 DAUGHTERS	8.49E-03	4.88E-01	9.41E-01	2.24E+01	1.10E+02	2.19E+03	5.85E+03	3.08E+04	4.72E+04	3.43E+04	1.11E+04
TOTAL ACTINIDES	2.07E+08	2.30E+09	1.43E+09	3.74E+08	1.99E+08	5.06E+07	3.49E+07	5.21E+06	2.58E+06	3.03E+06	2.79E+06

TABLE 10.D.33 Case 3 - U and Pu Recycle - Repository in 1985 - Reference Treatment Fission and Activation Product Radioactivity Inventory in Repositories (Curies)

FISSION AND ACTIVATION PRODUCT	YEAR 2000	YEAR 2040	YEAR 2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
H-3	2.78E+06	3.81E+06	1.14E+06	1.50E-04	0.	0.	0.	0.	0.	0.	0.
C-14	6.51E+04	2.09E+05	2.98E+05	2.84E+05	2.67E+05	1.63E+05	9.00E+04	7.15E+02	1.70E+00	0.	0.
MN-54	5.22E+05	2.04E+02	1.39E-05	0.	0.	0.	0.	0.	0.	0.	0.
FE-55	7.82E+07	4.23E+06	2.05E+04	0.	0.	0.	0.	0.	0.	0.	0.
CO-60	1.26E+08	3.80E+07	2.73E+06	0.	0.	0.	0.	0.	0.	0.	0.
NI-59	2.13E+05	9.90E+05	9.89E+05	9.86E+05	9.82E+05	9.48E+05	9.08E+05	6.42E+05	4.17E+05	1.30E+04	1.72E+02
NI-63	3.17E+07	1.17E+08	1.01E+08	4.82E+06	1.12E+05	9.30E+04	0.	0.	0.	0.	0.
SE-79	1.42E+04	1.24E+05	1.24E+05	1.24E+05	1.23E+05	1.18E+05	1.12E+05	7.30E+04	4.28E+04	6.03E+02	2.93E+00
KR-85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB-87	6.82E-01	5.72E+00	5.72E+00	5.72E+00	5.72E+00	5.72E+00	5.72E+00	5.72E+00	5.72E+00	5.72E+00	5.72E+00
SR-90,Y-90	3.82E+09	1.76E+10	1.07E+10	5.08E+05	2.25E+00	0.	0.	0.	0.	0.	0.
ZR-93,NB-93M	1.48E+05	1.23E+06	1.23E+06	1.23E+06	1.23E+06	1.23E+06	1.22E+06	1.20E+06	1.17E+06	9.75E+05	7.74E+05
TC-99	5.31E+05	4.78E+06	4.77E+06	4.77E+06	4.76E+06	4.70E+06	4.62E+06	4.05E+06	3.43E+06	9.18E+05	1.76E+05
RU-106,RH-106	3.77E+07	2.43E+06	2.50E+00	0.	0.	0.	0.	0.	0.	0.	0.
PD-107	4.40E+03	4.61E+04	4.61E+04	4.61E+04	4.61E+04	4.61E+04	4.60E+04	4.59E+04	4.56E+04	4.39E+04	4.17E+04
AG-110M	8.73E+03	1.99E+02	4.11E-07	0.	0.	0.	0.	0.	0.	0.	0.
CD-113M	3.77E+05	1.08E+06	4.01E+05	8.35E-04	0.	0.	0.	0.	0.	0.	0.
SB-125,TE-125M	3.55E+07	1.41E+07	8.33E+02	0.	0.	0.	0.	0.	0.	0.	0.
SN-126,SB-126	4.17E+04	4.17E+05	4.16E+05	4.15E+05	4.14E+05	4.03E+05	3.89E+05	2.95E+05	2.09E+05	1.31E+04	4.09E+02
I-129	2.48E+03	1.32E+04	1.32E+04	1.32E+04	1.32E+04	1.32E+04	1.32E+04	1.32E+04	1.32E+04	1.29E+04	1.27E+04
CS-134	1.72E+08	3.99E+07	4.64E+04	0.	0.	0.	0.	0.	0.	0.	0.
CS-135	1.15E+04	1.28E+05	1.28E+05	1.28E+05	1.27E+05	1.27E+05	1.27E+05	1.26E+05	1.25E+05	1.18E+05	1.01E+05
CS-137,BA-137	5.55E+09	2.86E+10	1.80E+10	1.60E+06	1.55E+01	0.	0.	0.	0.	0.	0.
CE-144,PR-144	1.18E+07	4.72E+05	4.62E-03	0.	0.	0.	0.	0.	0.	0.	0.
PM-147	1.97E+08	8.16E+07	4.13E+05	0.	0.	0.	0.	0.	0.	0.	0.
SM-151	4.48E+07	3.40E+08	2.90E+08	1.16E+07	2.17E+05	3.20E-09	0.	0.	0.	0.	0.
EU-152	2.93E+05	1.14E+06	3.59E+05	2.68E-05	0.	0.	0.	0.	0.	0.	0.
EU-154	1.41E+08	5.33E+08	2.24E+08	5.60E+00	2.26E-09	0.	0.	0.	0.	0.	0.
EU-155	4.20E+06	5.79E+05	4.17E+02	0.	0.	0.	0.	0.	0.	0.	0.
OTHER(a)	2.81E+04	1.21E+01	1.03E-08	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	1.03E+10	4.78E+10	2.94E+10	2.66E+07	8.29E+06	7.74E+06	7.53E+06	6.45E+06	5.46E+06	2.09E+06	1.11E+06

a. Nuclides included in "other" category are all short-lived and are detailed in the next table.

TABLE 10.D.34 Case 3 - U and Pu Recycle - Repository in 1985 - Reference Treatment Short-Lived Fission and Activation Product Radioactivity Inventory in Repositories (Curies)

FISSION AND ACTIVATION	YEAR 2000	YEAR 2050	YEAR 2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
SC-46	2.08E+00	1.28E-10	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR-51	2.72E+03	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO-58	1.21E+04	1.64E-09	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE-59	1.97E+01	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN-65	1.23E+04	1.01E+00	1.09E-09	0.	0.	0.	0.	0.	0.	0.	0.
SR-89	5.90E-01	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y-91	4.50E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR-95	8.99E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB-95M	5.27E+00	2.33E-10	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB-95	4.16E+02	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU-103	2.71E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN-123	1.31E+01	7.03E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB-124	2.72E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE-127M,TE-127	8.31E+01	1.18E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE-141	1.35E-04	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM-148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD-153	4.79E+02	1.11E+01	9.23E-09	0.	0.	0.	0.	0.	0.	0.	0.
TB-160	2.21E-01	5.08E-10	0.	0.	0.	0.	0.	0.	0.	0.	0.
W-181	1.08E-01	3.48E-08	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	2.81E+04	1.21E+01	1.03E-08	0.	0.	0.	0.	0.	0.	0.	0.

TABLE 10.D.35 Case 3 - U and Pu Recycle - Repository in 1985 - Reference Treatment
Total Radioactivity in Repositories by Waste Classification (Curies)

FISSION AND ACTIVATION	YEAR 2000	YEAR 2050	YEAR 2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
HLW	1.00E+10	4.72E+10	2.93E+10	2.04E+07	6.85E+06	6.55E+06	6.45E+06	5.72E+06	4.96E+06	2.01E+06	1.05E+06
FHW	2.52E+08	1.88E+08	1.20E+08	5.90E+06	1.20E+06	1.04E+06	9.91E+05	7.12E+05	4.85E+05	6.97E+04	4.46E+04
ILW	2.75E+06	1.41E+06	9.90E+05	1.89E+03	5.04E+02	4.57E+02	4.40E+02	3.56E+02	2.86E+02	1.07E+02	7.26E+01
LLW	6.32E+04	2.79E+05	2.76E+05	2.60E+05	2.45E+05	1.56E+05	9.13E+04	1.37E+04	1.30E+04	1.28E+04	1.26E+04
TOTAL	1.03E+10	4.74E+10	2.94E+10	2.66E+07	8.29E+06	7.74E+06	7.53E+06	6.45E+06	5.46E+06	2.09E+06	1.11E+06
ACTINIDES											
HLW	1.60E+08	2.17E+09	1.36E+09	3.64E+08	1.93E+08	4.88E+07	3.36E+07	4.95E+06	2.47E+06	2.97E+06	2.74E+06
FHW	4.31E+06	1.37E+07	7.11E+06	1.17E+06	6.52E+05	2.04E+05	1.44E+05	2.82E+04	1.30E+04	8.06E+03	5.62E+03
ILW	3.00E+07	9.15E+07	4.68E+07	7.21E+06	4.05E+06	1.31E+06	9.26E+05	1.84E+05	6.16E+04	4.44E+04	2.85E+04
LLW	1.20E+07	2.40E+07	1.22E+07	2.06E+06	1.10E+06	2.88E+05	2.11E+05	4.76E+04	1.89E+04	1.00E+04	7.23E+03
TOTAL	2.07E+08	2.30E+09	1.43E+09	3.74E+08	1.99E+08	5.06E+07	3.49E+07	5.21E+06	2.58E+06	3.03E+06	2.79E+06

TABLE 10.D.36 Case 3 - U and Pu Recycle - Repository in 1985 - Reference Treatment
Summary Heat Generation Rate in Repositories by Major Radionuclides (Watts)

FISSION AND ACTIVATION	YEAR			GEOLOGIC TIME (YEARS BEYOND 1975)							
	2000	2050	2070	500	1000	5000	10000	50000	100000	500000	1000000
C-14	1.93E+01	8.85E+01	8.83E+01	8.41E+01	7.92E+01	4.88E+01	2.67E+01	2.12E-01	5.02E-04	0.	0.
NI-59	1.36E+03	6.29E+03	6.29E+03	6.27E+03	6.24E+03	6.03E+03	5.78E+03	4.08E+03	2.65E+03	8.30E+01	1.09E+00
SR-90,Y-90	1.38E+07	6.32E+07	3.86E+07	1.83E+03	8.10E-03	0.	0.	0.	0.	0.	0.
ZR-93,NB-93M	3.44E+01	2.88E+02	2.88E+02	2.88E+02	2.88E+02	2.87E+02	2.86E+02	2.81E+02	2.75E+02	2.28E+02	1.81E+02
TC-99	9.13E+02	8.21E+03	8.21E+03	8.20E+03	8.18E+03	8.08E+03	7.94E+03	6.96E+03	5.90E+03	1.58E+03	3.03E+02
PD-107	3.69E-01	3.82E+00	3.82E+00	3.82E+00	3.82E+00	3.82E+00	3.82E+00	3.81E+00	3.79E+00	3.64E+00	3.46E+00
I-129	1.61E+00	8.69E+00	8.69E+00	8.69E+00	8.69E+00	8.69E+00	8.69E+00	8.67E+00	8.65E+00	8.51E+00	8.34E+00
CS-135	5.60E+00	6.20E+01	6.20E+01	6.20E+01	6.20E+01	6.19E+01	6.18E+01	6.13E+01	6.06E+01	5.52E+01	4.92E+01
CS-137,BA-137M	1.52E+07	7.86E+07	4.95E+07	4.40E+03	4.26E-02	0.	0.	0.	0.	0.	0.
ALL OTHERS	8.60E+06	6.13E+06	2.42E+06	2.46E+04	3.93E+03	3.43E+03	3.32E+03	2.51E+03	1.77E+03	1.10E+02	3.45E+00
TOTAL	3.46E+07	1.48E+08	9.06E+07	4.57E+04	1.88E+04	1.80E+04	1.74E+04	1.39E+04	1.07E+04	2.07E+03	5.50E+02
ACTINIDES AND DAUGHTERS											
CM	3.56E+06	4.86E+07	2.30E+07	1.57E+05	4.85E+04	2.59E+04	1.70E+04	5.94E+02	8.97E+00	0.	0.
AM	1.27E+06	1.96E+07	1.91E+07	1.05E+07	5.21E+06	6.61E+05	4.16E+05	1.12E+04	1.24E+02	0.	0.
PU	9.72E+04	1.39E+06	1.41E+06	7.03E+05	5.04E+05	4.02E+05	3.33E+05	1.03E+05	2.58E+04	2.87E+02	1.15E+02
NP	1.85E+03	4.23E+04	4.23E+04	4.24E+04	4.19E+04	3.26E+04	2.42E+04	9.31E+03	9.28E+03	8.14E+03	6.93E+03
U	2.04E+01	1.41E+03	1.29E+03	7.95E+02	9.73E+02	1.17E+03	1.38E+03	2.75E+03	4.09E+03	7.93E+03	7.53E+03
PA	2.09E+01	2.85E+02	2.90E+02	3.55E+02	4.03E+02	4.40E+02	4.42E+02	4.42E+02	4.40E+02	3.92E+02	3.36E+02
TH	1.02E+00	1.39E+03	1.01E+03	2.40E+01	8.37E+00	7.40E+01	2.11E+02	1.79E+03	3.52E+03	8.18E+03	7.73E+03
RA	9.39E-01	1.09E+03	1.05E+03	2.22E+01	1.69E+00	2.20E+01	5.90E+01	3.27E+02	5.21E+02	5.08E+02	2.84E+02
OTHER DAUGHTERS*	3.84E+00	5.93E+03	4.30E+03	9.22E+01	1.57E+01	3.33E+02	1.10E+03	1.01E+04	1.98E+04	4.59E+04	4.30E+04
TOTAL	4.93E+06	6.97E+07	4.36E+07	1.14E+07	5.81E+06	1.12E+06	7.93E+05	1.41E+05	6.36E+04	7.14E+04	6.63E+04

* FR+RN+AT+PO+BI+PB+TL

TABLE 10.D.37 Case 3 - U and Pu Recycle - Repository in 1985 - Reference Treatment
Actinide Heat Generation Rate in Repositories (Watts)

ACTINIDES AND DAUGHTERS	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
CM-245	1.20E+03	3.91E+04	3.91E+04	3.78E+04	3.62E+04	2.59E+04	1.70E+04	5.94E+02	8.97E+00	0.	0.
CM-244	3.52E+06	4.77E+07	2.22E+07	4.23E+00	2.04E-08	0.	0.	0.	0.	0.	0.
CM-243	6.22E+03	6.33E+04	4.10E+04	6.49E+00	1.28E-04	0.	0.	0.	0.	0.	0.
CM-242	3.14E+04	8.28E+05	7.56E+05	1.20E+05	1.22E+04	1.47E-04	0.	0.	0.	0.	0.
AM-243,NP-239	3.98E+04	1.01E+06	1.01E+06	9.75E+05	9.32E+05	6.49E+05	4.12E+05	1.10E+04	1.16E+02	0.	0.
AM-242M,AM-242	1.67E+03	4.03E+04	4.04E+04	6.41E+03	6.55E+02	7.83E-06	0.	0.	0.	0.	0.
AM-241	1.23E+06	1.86E+07	1.81E+07	9.56E+06	4.31E+06	3.59E+04	1.82E+04	6.33E+02	9.56E+00	0.	0.
PU-242	4.74E+01	6.58E+02	6.63E+02	7.03E+02	7.14E+02	7.10E+02	7.04E+02	6.54E+02	5.97E+02	2.97E+02	1.15E+02
PU-241	2.54E+03	6.54E+03	3.34E+03	5.00E+01	4.80E+01	3.43E+01	2.26E+01	7.87E-01	1.19E-02	0.	0.
PU-240	1.46E+04	3.34E+05	3.94E+05	4.28E+05	4.07E+05	2.70E+05	1.62E+05	2.68E+03	1.59E+01	0.	0.
PU-239	6.57E+03	5.08E+04	5.12E+04	5.92E+04	6.99E+04	1.31E+05	1.70E+05	1.00E+05	2.52E+04	2.92E-01	1.98E-07
PU-238	7.34E+04	1.00E+06	9.58E+05	2.15E+05	2.57E+04	3.18E-04	0.	0.	0.	0.	0.
PU-236	1.41E+00	6.36E+01	4.91E-01	0.	0.	0.	0.	0.	0.	0.	0.
NP-237,PA-233	4.45E+02	6.36E+03	6.47E+03	7.94E+03	9.03E+03	9.89E+03	9.92E+03	9.85E+03	9.70E+03	8.52E+03	7.25E+03
U-238,TH-234, PA-234M	4.67E+00	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.06E+01
U-236	2.81E+00	2.66E+01	2.67E+01	3.07E+01	3.63E+01	6.98E+01	9.68E+01	1.36E+02	1.36E+02	1.35E+02	1.33E+02
U-235,TH-231	2.19E-01	1.49E+00	1.50E+00	1.51E+00	1.54E+00	1.91E+00	2.60E+00	8.07E+00	1.05E+01	1.13E+01	1.13E+01
U-234	1.32E+01	1.90E+02	2.38E+02	7.06E+02	8.79E+02	8.90E+02	8.78E+02	7.88E+02	6.49E+02	2.43E+02	8.13E+01
U-233	1.86E-02	9.04E-01	1.42E+00	1.23E+01	3.04E+01	1.85E+02	3.81E+02	1.80E+03	3.23E+03	7.52E+03	7.28E+03
U-232	3.17E-01	1.16E+03	9.60E+02	1.96E+01	1.59E-01	0.	0.	0.	0.	0.	0.
PA-231	3.13E-02	3.64E-01	3.65E-01	3.75E-01	3.89E-01	5.06E-01	6.99E-01	3.97E+00	8.23E+00	1.21E+01	1.21E+01
TH-230	5.77E-02	6.67E-01	7.04E-01	2.34E+00	6.08E+00	3.56E+01	7.11E+01	2.89E+02	4.41E+02	3.23E+02	1.04E+02
TH-229,7 DAUGHTERS	7.01E-05	1.18E-02	2.70E-02	1.62E+00	8.60E+00	2.49E+02	9.17E+02	9.94E+03	2.03E+04	5.20E+04	5.05E+04
TH-228,6 DAUGHTERS	3.62E+00	8.77E+03	6.36E+03	1.30E+02	1.06E+00	5.93E-05	1.36E-04	9.00E-04	1.90E-03	9.83E-03	1.96E-02
AC-227,7 DAUGHTERS	3.65E-02	1.51E+00	1.92E+00	2.44E+00	2.54E+00	3.31E+00	4.57E+00	2.60E+01	5.38E+01	7.91E+01	7.91E+01
TH-232,2 DAUGHTERS	6.99E-09	5.66E-08	6.54E-08	6.04E-07	1.40E-06	8.47E-06	1.94E-05	1.29E-04	2.71E-04	1.41E-03	2.80E-03
RA-226,5 DAUGHTERS	2.02E-03	3.76E-02	9.03E-02	1.25E+00	5.86E+00	1.16E+02	3.10E+02	1.63E+03	2.50E+03	1.82E+03	5.88E+02
PB-210,2 DAUGHTERS	9.68E-05	5.56E-03	1.07E-02	2.55E-01	1.26E+00	2.49E+01	6.66E+01	3.50E+02	5.38E+02	3.91E+02	1.26E+02
TOTAL ACTINIDES	4.93E+06	6.97E+07	4.36E+07	1.14E+07	5.81E+06	1.12E+06	7.93E+05	1.41E+05	6.36E+04	7.14E+04	6.63E+04

TABLE 10.D.38 Case 3 - U and Pu Recycle - Repository in 1985 - Reference Treatment
Fission and Activation Product Heat Generation Rate in Repositories (Watts)

FISSION AND ACTIVATION	YEAR 2000	YEAR 2050	YEAR 2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
H-3	9.87E+01	1.25E+02	4.05E+01	5.33E-09	0.	0.	0.	0.	0.	0.	0.
C-14	1.93E+01	6.83E+01	6.83E+01	6.41E+01	7.92E+01	4.88E+01	2.67E+01	2.12E-01	5.02E-04	0.	0.
MN-54	4.22E+03	2.01E+00	1.12E-07	0.	0.	0.	0.	0.	0.	0.	0.
FE-55	1.02E+05	5.52E+03	2.68E+01	0.	0.	0.	0.	0.	0.	0.	0.
CO-60	1.97E+06	5.03E+05	8.25E+04	0.	0.	0.	0.	0.	0.	0.	0.
NI-59	1.36E+03	6.29E+03	6.29E+03	6.27E+03	6.24E+03	6.03E+03	5.78E+03	4.09E+03	2.65E+03	8.30E+01	1.09E+00
NI-63	5.08E+03	1.88E+04	1.62E+04	7.72E+02	1.79E+01	0.	0.	0.	0.	0.	0.
SE-79	5.38E+00	4.71E+01	4.71E+01	4.69E+01	4.67E+01	4.47E+01	4.24E+01	2.77E+01	1.63E+01	2.29E-01	1.11E-03
KR-85	0.		0.	0.	0.	0.	0.	0.	0.	0.	0.
RB-87	8.49E-04	3.73E-03	3.73E-03	3.73E-03	3.73E-03	3.73E-03	3.73E-03	3.73E-03	3.73E-03	3.73E-03	3.73E-03
SR-90,Y-90	1.38E+07	6.32E+07	3.86E+07	1.83E+03	8.10E-03	0.	0.	0.	0.	0.	0.
ZR-93,NB-93M	3.46E+01	2.88E+02	2.89E+02	2.88E+02	2.88E+02	2.87E+02	2.86E+02	2.81E+02	2.75E+02	2.28E+02	1.81E+02
TC-99	9.13E+02	8.21E+03	8.21E+03	8.20E+03	8.18E+03	8.08E+03	7.94E+03	6.96E+03	5.90E+03	1.58E+03	3.03E+02
RU-106,RH-106	1.99E+05	1.24E+04	1.32E-02	0.	0.	0.	0.	0.	0.	0.	0.
PD-107	3.69E-01	3.82E+00	3.82E+00	3.82E+00	3.82E+00	3.82E+00	3.82E+00	3.81E+00	3.79E+00	3.64E+00	3.46E+00
AG-110M	1.48E+02	3.37E+00	6.94E-09	0.	0.	0.	0.	0.	0.	0.	0.
CD-113M	2.98E+02	1.43E+03	5.30E+02	1.10E-06	0.	0.	0.	0.	0.	0.	0.
SB-125,TE-125M	8.66E+04	3.46E+04	2.05E+02	0.	0.	0.	0.	0.	0.	0.	0.
SN-126,SB-126	3.51E+02	3.51E+03	3.51E+03	3.50E+03	3.48E+03	3.39E+03	3.27E+03	2.48E+03	1.76E+03	1.10E+02	3.45E+00
I-129	1.61E+00	8.69E+00	8.69E+00	8.69E+00	8.69E+00	8.69E+00	8.69E+00	8.67E+00	8.65E+00	8.51E+00	8.34E+00
CS-134	1.84E+06	4.73E+03	4.91E+02	0.	0.	0.	0.	0.	0.	0.	0.
CS-135	5.60E+00	6.20E+01	6.20E+01	6.20E+01	6.20E+01	6.19E+01	6.18E+01	6.13E+01	6.06E+01	5.52E+01	4.92E+01
CS-137,BA-137	1.52E+07	7.86E+07	4.95E+07	4.40E+03	4.26E+02	0.	0.	0.	0.	0.	0.
CE-144,PR-144	4.90E+08	2.02E+03	3.70E-05	0.	0.	0.	0.	0.	0.	0.	0.
PM-147	1.01E+05	4.21E+04	2.13E+02	0.	0.	0.	0.	0.	0.	0.	0.
SM-151	7.80E+04	5.03E+05	5.06E+05	2.03E+04	3.76E+02	0.	0.	0.	0.	0.	0.
EU-152	5.25E+03	2.04E+04	6.44E+03	4.74E-07	0.	0.	0.	0.	0.	0.	0.
EU-154	1.16E+06	4.38E+06	1.84E+06	4.67E-02	0.	0.	0.	0.	0.	0.	0.
EU-155	3.53E+03	7.40E+02	3.91E+01	0.	0.	0.	0.	0.	0.	0.	0.
OTHER[a]	2.78E+02	2.40E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	3.46E+07	1.48E+08	9.06E+07	4.37E+04	1.88E+04	1.80E+04	1.74E+04	1.39E+04	1.07E+04	2.77E+03	5.50E+02

a. Nuclides included in "other" category are all short-lived and are detailed in the next table.

TABLE 10.D.39 Case 3 - U and Pu Recycle - Repository in 1985 - Reference Treatment Short-Lived Fission and Activation Product Heat Generation Rate in Repositories (Watts)

FISSION AND ACTIVATION	YEAR 2000	YEAR 2090	YEAR 2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
SC-46	2.92E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR-51	1.20E+01	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO-58	1.65E+02	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE-59	1.53E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN-65	9.79E+01	7.99E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR-89	2.12E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y-91	1.71E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR-95	1.25E-04	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB-95M	2.54E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB-95	2.00E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU-103	6.92E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN-123	4.47E-02	2.53E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB-124	3.55E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE-127M,TE-127	8.99E-02	1.27E-06	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE-141	2.66E-07	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM-148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD-153	6.90E-01	1.60E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB-160	1.68E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W-181	1.09E-04	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	2.78E+02	2.40E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.

TABLE 10.D.40 Case 3 - U and Pu Recycle - Repository in 1985 - Reference Treatment
Total Heat Generation Rate in Repositories by Waste Classification (Watts)

FISSION AND ACTIVATION	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
HLW	3.25E+07	1.07E+08	9.05E+07	3.86E+04	1.24E+04	1.19E+04	1.16E+04	9.81E+03	8.00E+03	1.96E+03	5.30E+02
FRW	2.13E+06	6.99E+05	1.11E+05	7.06E+03	6.27E+03	6.04E+03	5.78E+03	4.09E+03	2.66E+03	9.73E+01	1.19E+01
ILW	1.33E+04	4.98E+03	2.94E+03	2.71E+00	1.69E+00	1.63E+00	1.56E+00	1.17E+00	8.19E-01	1.07E-01	4.27E-02
LLW	3.32E+01	1.05E+02	9.71E+01	8.17E+01	7.74E+01	5.10E+01	3.18E+01	8.79E+00	8.59E+00	8.45E+00	8.28E+00
TOTAL	3.46E+07	1.08E+08	9.06E+07	4.57E+04	1.88E+04	1.80E+04	1.74E+04	1.39E+04	1.07E+04	2.07E+03	5.50E+02
ACTINIDES											
HLW	4.85E+06	6.88E+07	4.28E+07	1.11E+07	5.62E+06	1.07E+06	7.53E+05	1.33E+05	6.06E+04	6.99E+04	6.53E+04
FRW	1.30E+04	1.16E+05	1.03E+05	3.80E+04	2.08E+04	6.11E+03	4.32E+03	8.24E+02	3.39E+02	1.87E+02	1.31E+02
ILW	5.16E+04	5.94E+05	5.92E+05	2.36E+05	1.31E+05	4.06E+04	2.87E+04	5.45E+03	2.17E+03	1.04E+03	6.65E+02
LLW	1.62E+04	1.31E+05	1.53E+05	6.79E+04	3.59E+04	8.92E+03	6.53E+03	1.43E+03	5.15E+02	2.37E+02	1.71E+02
TOTAL	4.93E+06	6.97E+07	4.35E+07	1.14E+07	5.81E+06	1.12E+06	7.93E+05	1.41E+05	6.36E+04	7.14E+04	6.63E+04

TABLE 10.D.41 Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment
Summary Radioactivity Inventory in Repositories by Major Radionuclides (Curies)

FISSION AND ACTIVATION	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
C-14	6.74E+03	2.99E+05	2.98E+05	2.86E+05	2.67E+05	1.65E+05	9.00E+04	7.15E+02	1.70E+00	0.	0.
NI-59	2.20E+04	9.90E+05	9.89E+05	9.86E+05	9.82E+05	9.48E+05	9.08E+05	6.42E+05	4.17E+05	1.30E+04	1.72E+02
SR-90,Y-90	5.52E+08	1.76E+10	1.07E+10	5.08E+05	2.25E+00	0.	0.	0.	0.	0.	0.
ZR-93,NB-93M	1.89E+04	1.23E+06	1.23E+06	1.23E+06	1.23E+06	1.23E+06	1.22E+06	1.20E+06	1.17E+06	9.75E+05	7.74E+05
TC-99	7.04E+04	4.78E+06	4.77E+06	4.77E+06	4.76E+06	4.70E+06	4.62E+06	4.05E+06	3.43E+06	9.18E+05	1.76E+05
PD-107	6.32E+02	4.61E+04	4.61E+04	4.61E+04	4.61E+04	4.61E+04	4.60E+04	4.59E+04	4.56E+04	4.39E+04	4.17E+04
I-129	2.62E+02	1.32E+04	1.32E+04	1.32E+04	1.32E+04	1.32E+04	1.32E+04	1.32E+04	1.32E+04	1.29E+04	1.27E+04
CS-135	1.66E+03	1.28E+05	1.28E+05	1.28E+05	1.27E+05	1.27E+05	1.27E+05	1.26E+05	1.25E+05	1.14E+05	1.01E+05
CS-137,BA-137M	8.22E+08	2.86E+10	1.81E+10	1.60E+06	1.59E+01	0.	0.	0.	0.	0.	0.
ALL OTHERS	2.54E+08	1.18E+09	6.22E+08	1.70E+07	8.66E+05	5.20E+05	5.01E+05	3.68E+05	2.51E+05	1.37E+04	4.18E+02
TOTAL	1.63E+09	4.74E+10	2.94E+10	2.66E+07	8.29E+06	7.74E+06	7.53E+06	6.45E+06	5.46E+06	2.09E+06	1.11E+06
ACTINIDES AND DAUGHTERS											
CM	2.53E+07	1.39E+09	6.57E+08	4.45E+06	1.49E+06	8.25E+05	5.43E+05	1.89E+04	2.86E+02	0.	0.
AM	6.17E+06	6.38E+08	6.20E+08	3.20E+08	1.55E+08	1.82E+07	1.14E+07	3.09E+05	3.41E+03	0.	0.
PU	1.04E+07	2.48E+08	1.25E+08	2.34E+07	1.73E+07	1.37E+07	1.12E+07	3.35E+06	8.30E+05	9.74E+03	3.90E+03
NP	2.11E+05	2.70E+07	2.69E+07	2.60E+07	2.49E+07	1.75E+07	1.12E+07	6.11E+05	3.19E+05	2.77E+05	2.36E+05
U	3.35E+02	5.00E+04	4.23E+04	2.78E+04	3.40E+04	4.09E+04	4.83E+04	9.54E+04	1.41E+05	2.73E+05	2.59E+05
PA	2.28E+03	2.08E+05	2.12E+05	2.59E+05	2.95E+05	3.23E+05	3.24E+05	3.22E+05	3.17E+05	2.79E+05	2.37E+05
TH	2.71E+01	4.35E+04	3.18E+04	1.77E+03	1.32E+03	3.57E+03	8.19E+03	6.12E+04	1.19E+05	2.72E+05	2.57E+05
RA	8.35E+00	4.24E+04	3.08E+04	6.57E+02	9.76E+01	1.99E+03	6.54E+03	5.99E+04	1.17E+05	2.71E+05	2.56E+05
OTHER DAUGHTERS*	4.18E+01	2.12E+05	1.54E+05	3.33E+03	6.34E+02	1.34E+04	4.32E+04	3.80E+05	7.36E+05	1.65E+06	1.54E+06
TOTAL	4.21E+07	2.30E+09	1.43E+09	3.74E+08	1.99E+08	5.06E+07	3.49E+07	5.21E+06	2.58E+06	3.03E+06	2.79E+06

* FR+RN+A+PO+BI+PB+TE

TABLE 10.D.42 Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment
Actinide Radioactivity Inventory in Repositories (Curies)

ACTINIDES AND DAUGHTERS	YEAR 2000	YEAR 2050	YEAR 2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
CM-245	9.23E+03	1.25E+06	1.25E+06	1.20E+06	1.15E+06	8.25E+05	5.43E+05	1.89E+04	2.86E+02	0.	0.
CM-244	2.51E+07	1.36E+09	6.38E+08	1.21E+02	5.83E-07	0.	0.	0.	0.	0.	0.
CM-243	3.17E+04	1.72E+06	1.12E+06	1.77E+02	3.49E-03	0.	0.	0.	0.	0.	0.
CM-242	1.90E+05	2.25E+07	2.05E+07	3.25E+06	3.32E+05	3.98E-03	0.	0.	0.	0.	0.
AM-243,NP-239	4.17E+05	5.35E+07	5.34E+07	5.15E+07	4.92E+07	3.43E+07	2.18E+07	5.81E+05	6.26E+03	0.	0.
AM-242M,AM-242	4.50E+05	5.07E+07	5.00E+07	7.92E+06	8.10E+05	9.67E-03	0.	0.	0.	0.	0.
AM-241	5.51E+06	5.56E+08	5.43E+08	2.86E+08	1.29E+08	1.08E+06	5.44E+05	1.90E+04	2.86E+02	0.	0.
PU-242	2.35E+02	2.23E+04	2.25E+04	2.38E+04	2.42E+04	2.41E+04	2.38E+04	2.22E+04	2.02E+04	9.73E+03	3.90E+03
PU-241	9.96E+06	2.06E+08	8.15E+07	1.20E+06	1.16E+06	8.27E+05	5.43E+05	1.90E+04	2.86E+02	0.	0.
PU-240	6.39E+04	1.07E+07	1.26E+07	1.37E+07	1.31E+07	8.68E+06	5.20E+06	8.60E+04	5.10E+02	0.	0.
PU-239	2.57E+04	1.63E+06	1.65E+06	1.90E+06	2.25E+06	4.20E+06	5.48E+06	3.22E+06	8.09E+05	9.41E+00	6.37E-06
PU-238	3.49E+05	3.02E+07	2.89E+07	6.49E+06	7.75E+05	9.59E-03	0.	0.	0.	0.	0.
PU-236	1.16E+01	1.83E+03	1.41E+01	0.	0.	0.	0.	0.	0.	0.	0.
NP-237,PA-233	4.52E+03	4.14E+05	4.21E+05	5.17E+05	5.88E+05	6.43E+05	6.45E+05	6.41E+05	6.31E+05	5.54E+05	4.72E+05
U-238,TH-234, PA-234M	5.29E+01	2.97E+03	2.97E+03	2.97E+03	2.97E+03	2.97E+03	2.97E+03	2.97E+03	2.97E+03	2.97E+03	2.98E+03
U-236	1.30E+01	9.80E+02	9.87E+02	1.13E+03	1.34E+03	2.58E+03	3.57E+03	5.01E+03	5.03E+03	4.97E+03	4.90E+03
U-235,TH-231	1.75E+00	1.05E+02	1.05E+02	1.06E+02	1.08E+02	1.34E+02	1.82E+02	5.66E+02	7.38E+02	7.94E+02	7.93E+02
U-234	5.37E+01	6.60E+03	[illegible].26E+03	2.45E+04	3.05E+04	3.09E+04	3.05E+04	2.74E+04	2.39E+04	8.45E+03	2.83E+03
U-233	3.98E-02	3.10E+01	4.89E+01	4.22E+02	1.08E+03	6.37E+03	1.31E+04	6.17E+04	1.11E+05	2.58E+05	2.50E+05
U-232	1.10E+00	3.62E+04	2.99E+04	6.12E+02	4.97E+00	0.	0.	0.	0.	0.	0.
PA-231	1.44E-01	1.19E+01	1.20E+01	1.23E+01	1.27E+01	1.66E+01	2.29E+01	1.30E+02	2.70E+02	3.97E+02	3.97E+02
TH-230	2.62E-01	2.36E+01	2.49E+01	8.28E+01	2.15E+02	1.26E+03	2.52E+03	1.02E+04	1.56E+04	1.14E+04	3.70E+03
TH-229,7 DAUGHTERS	1.55E-04	4.70E-01	1.08E+00	6.45E+01	3.43E+02	9.92E+03	3.66E+04	3.96E+05	8.11E+05	2.07E+06	2.01E+06
TH-228,6 DAUGHTERS	5.82E+01	2.97E+05	2.15E+05	4.40E+03	3.57E+01	2.00E-03	4.59E-03	3.04E-02	6.42E-02	3.33E-01	6.64E-01
AC-227,7 DAUGHTERS	1.99E-01	6.05E+01	7.71E+01	9.77E+01	1.02E+02	1.33E+02	1.83E+02	1.04E+03	2.16E+03	3.18E+03	3.17E+03
TH-232,2 DAUGHTERS	1.36E-07	5.74E-06	6.63E-06	6.13E-05	1.42E-04	8.59E-04	1.97E-03	1.30E-02	2.75E-02	1.43E-01	2.85E-01
RA-226,5 DAUGHTERS	6.89E-03	2.17E+00	3.41E+00	4.73E+01	2.21E+02	4.37E+03	1.17E+04	6.15E+04	9.43E+04	6.86E+04	2.22E+04
PB-210,2 DAUGHTERS	6.24E-04	4.87E-01	9.40E-01	2.24E+01	1.10E+02	2.19E+03	5.85E+03	3.08E+04	4.72E+04	3.43E+04	1.11E+04
TOTAL ACTINIDES	4.21E+07	2.30E+09	1.43E+09	3.74E+08	1.99E+08	5.06E+07	3.49E+07	5.21E+06	2.58E+06	3.03E+06	2.79E+06

TABLE 10.D.43 Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment
Fission and Activation Product Radioactivity Inventory in Repositories (Curies)

FISSION AND ACTIVATION	YEAR 2000	YEAR 2050	YEAR 2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
H-3	4.02E+05	3.92E+06	1.14E+06	1.50E-04	0.	0.	0.	0.	0.	0.	0.
C-14	6.73E+03	2.09E+05	2.88E+05	2.84E+05	2.67E+05	1.65E+05	9.00E+04	7.15E+02	1.70E+00	0.	0.
MN-54	5.15E+05	2.48E+02	1.39E-05	0.	0.	0.	0.	0.	0.	0.	0.
FE-55	2.32E+07	4.23E+06	2.05E+04	0.	0.	0.	0.	0.	0.	0.	0.
CO-60	2.51E+07	3.80E+07	2.73E+06	0.	0.	0.	0.	0.	0.	0.	0.
NI-59	2.20E+04	9.90E+05	9.89E+05	9.86E+05	9.82E+05	9.48E+05	9.08E+05	6.42E+05	4.17E+05	1.30E+04	1.72E+02
NI-63	5.42E+06	1.17E+08	1.01E+08	4.82E+06	1.12E+05	9.31E-09	0.	0.	0.	0.	0.
SE-79	1.86E+03	1.24E+05	1.24E+05	1.24E+05	1.23E+05	1.18E+05	1.12E+05	7.30E+04	4.28E+04	6.03E+02	2.93E+00
KR-85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB-87	6.75E-02	5.72E+00	5.72E+00	5.72E+00	5.72E+00	5.72E+00	5.72E+00	5.72E+00	5.72E+00	5.72E+00	5.72E+00
SR-90,Y-90	9.32E+08	1.76E+10	1.07E+10	5.08E+05	2.25E+00	0.	0.	0.	0.	0.	0.
ZR-93,NB-93M	1.89E+04	1.23E+06	1.23E+06	1.23E+06	1.23E+06	1.23E+06	1.22E+06	1.20E+06	1.17E+06	9.75E+05	7.74E+05
TC-99	7.04E+04	4.78E+06	4.77E+06	4.77E+06	4.76E+06	4.70E+06	4.62E+06	4.05E+06	3.43E+06	9.18E+05	1.76E+05
RU-106,RH-106	2.17E+07	2.43E+06	2.50E+00	0.	0.	0.	0.	0.	0.	0.	0.
PD-107	6.32E-02	4.61E+04	4.61E+04	4.61E+04	4.61E+04	4.61E+04	4.60E+04	4.59E+04	4.56E+04	4.39E+04	4.17E+04
AG-110M	6.09E+03	1.49E+02	4.11E-07	0.	0.	0.	0.	0.	0.	0.	0.
CD-113M	6.30E+04	1.08E+06	4.01E+05	8.36E-04	0.	0.	0.	0.	0.	0.	0.
SB-125,TE-125M	1.14E+07	1.81E+07	8.33E+04	0.	0.	0.	0.	0.	0.	0.	0.
SN-126,SB-126	9.82E+03	4.17E+05	4.16E+05	4.15E+05	4.14E+05	4.03E+05	3.89E+05	2.95E+05	2.09E+05	1.31E+04	4.08E+02
I-129	2.62E-02	1.32E+04	1.32E+04	1.32E+04	1.32E+04	1.32E+04	1.32E+04	1.32E+04	1.32E+04	1.29E+04	1.27E+04
CS-134	6.55E+07	3.99E+07	4.64E+04	0.	0.	0.	0.	0.	0.	0.	0.
CS-135	1.66E+03	1.28E+05	1.28E+05	1.28E+05	1.27E+05	1.27E+05	1.27E+05	1.26E+05	1.25E+05	1.14E+05	1.01E+05
CS-137,BA-137	8.22E+08	2.86E+10	1.81E+10	1.60E+06	1.55E+01	0.	0.	0.	0.	0.	0.
CE-144,PR-144	7.50E+06	4.72E+05	8.62E-01	0.	0.	0.	0.	0.	0.	0.	0.
PM-147	6.37E+07	8.15E+07	4.13E+05	0.	0.	0.	0.	0.	0.	0.	0.
SM-151	6.24E+06	3.40E+08	2.90E+08	1.16E+07	2.17E+05	3.20E-09	0.	0.	0.	0.	0.
EU-152	5.65E+04	1.14E+03	3.59E+03	2.68E-05	0.	0.	0.	0.	0.	0.	0.
EU-154	2.41E+07	5.34E+08	2.25E+08	5.69E+00	2.26E-09	0.	0.	0.	0.	0.	0.
EU-155	1.72E+06	8.79E+05	4.17E+02	0.	0.	0.	0.	0.	0.	0.	0.
OTHER(a)	2.37E+04	1.21E+01	1.03E+08	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	1.63E+09	4.74E+10	2.94E+10	2.66E+07	8.29E+06	7.74E+06	7.53E+06	[illegible]	5.26E+06	2.09E+06	1.11E+06

a. Nuclides included in "other" category are all short-lived and are detailed in the next table.

TABLE 10.D.44 Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment Short-Lived Fission and Activation Product Radioactivity Inventory in Repositories (Curies)

FISSION AND ACTIVATION	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
SC-46	1.99E+00	1.28E-10	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR-51	2.72E+03	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO-58	1.18E+04	1.64E-09	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE-59	1.97E-01	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN-65	8.36E+03	1.01E+00	1.08E-09	0.	0.	0.	0.	0.	0.	0.	0.
SR-89	5.86E-01	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y-91	4.44E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR-95	8.88E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB-95M	5.11E+00	2.33E-10	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB-95	4.15E+02	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU-103	2.70E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN-123	1.16E+01	7.43E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB-124	2.69E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE-127M,TE-127	7.58E+01	1.18E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE-141	1.35E-04	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM-148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD-153	3.39E+02	1.11E+01	9.23E-09	0.	0.	0.	0.	0.	0.	0.	0.
TB-160	2.15E-01	5.44E-10	0.	0.	0.	0.	0.	0.	0.	0.	0.
W-181	9.23E+02	3.48E-08	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	2.37E+04	1.21E+01	1.03E-08	0.	0.	0.	0.	0.	0.	0.	0.

TABLE 10.D.45 Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment
Total Radioactivity in Repositories by Waste Classification (Curies)

FISSION AND ACTIVATION	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
HLW	1.57E+09	4.72E+10	2.93E+10	2.04E+07	6.85E+06	6.55E+06	6.45E+06	5.78E+06	4.96E+06	2.01E+06	1.05E+06
FHW	5.51E+07	1.88E+08	1.20E+08	9.90E+06	1.20E+06	1.04E+06	9.91E+05	7.12E+05	4.85E+05	6.97E+04	4.46E+04
ILW	1.21E+06	1.61E+06	9.91E+05	1.89E+03	5.04E+02	4.57E+02	4.40E+02	3.56E+02	2.86E+02	1.07E+02	7.26E+01
LLW	7.32E+03	2.79E+05	2.76E+05	2.60E+05	2.45E+05	1.56E+05	9.13E+04	1.37E+04	1.30E+04	1.28E+04	1.26E+04
TOTAL	1.63E+09	4.74E+10	2.94E+10	2.66E+07	8.29E+06	7.74E+06	7.53E+06	6.45E+06	5.46E+06	2.09E+06	1.11E+06
ACTINIDES											
HLW	3.52E+07	2.17E+09	1.36E+09	3.64E+08	1.43E+08	4.88E+07	3.36E+07	4.95E+06	2.47E+06	2.97E+06	2.75E+06
FHW	6.35E+05	1.37E+07	7.11E+06	1.17E+06	6.52E+05	2.04E+05	1.44E+05	2.82E+04	1.30E+04	8.06E+03	5.62E+03
ILW	4.46E+06	9.16E+07	4.68E+07	7.21E+06	4.05E+06	1.31E+06	9.26E+05	1.84E+05	8.16E+04	4.44E+04	2.85E+04
LLW	1.74E+06	2.40E+07	1.23E+07	2.06E+06	1.10E+06	2.88E+05	2.11E+05	4.76E+04	1.89E+04	1.00E+04	7.23E+03
TOTAL	4.21E+07	2.30E+09	1.43E+09	3.74E+08	1.99E+08	5.06E+07	3.49E+07	5.21E+06	2.58E+06	3.03E+06	2.79E+06

TABLE 10.D.46 Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment
Summary Heat Generation Rate in Repositories by Major Radionuclides (Watts)

FISSION AND ACTIVATION	YEAR 2000	YEAR 2050	YEAR 2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
C-14	1.99E+00	8.89E+01	8.83E+01	8.41E+01	7.92E+01	4.88E+01	2.67E+01	2.12E-01	5.02E-04	0.	0.
NI-59	1.40E+02	6.29E+03	6.29E+03	6.27E+03	6.24E+03	6.03E+03	5.78E+03	4.08E+03	2.65E+03	8.30E+01	1.09E+00
SR-90,Y-90	1.99E+06	6.33E+07	3.86E+07	1.83E+03	8.11E-03	0.	0.	0.	0.	0.	0.
ZR-93,NB-93M	4.42E+00	2.88E+02	2.88E+02	2.88E+02	2.88E+02	2.87E+02	2.86E+02	2.81E+02	2.75E+02	2.28E+02	1.81E+02
TC-99	1.21E+02	8.21E+03	8.21E+03	8.20E+03	8.18E+03	8.08E+03	7.94E+03	6.96E+03	5.90E+03	1.55E+03	3.03E+02
PD-107	8.24E-02	3.82E+00	3.82E+00	3.82E+00	3.82E+00	3.82E+00	3.82E+00	3.81E+00	3.79E+00	3.64E+00	3.46E+00
I-129	1.72E-01	8.69E+00	8.69E+00	8.69E+00	8.69E+00	8.69E+00	8.69E+00	8.67E+00	8.65E+00	8.51E+00	8.34E+00
CS-135	8.05E-01	6.20E+01	6.20E+01	6.20E+01	6.20E+01	6.19E+01	6.18E+01	6.13E+01	6.06E+01	5.52E+01	4.92E+01
CS-137,BA-137M	2.24E+06	7.86E+07	4.96E+07	4.40E+03	4.27E-02	0.	0.	0.	0.	0.	0.
ALL OTHERS	1.54E+06	6.13E+06	2.42E+06	2.46E+04	3.93E+03	3.43E+03	3.32E+03	2.51E+03	1.77E+03	1.10E+02	3.45E+00
TOTAL	5.78E+06	1.48E+08	9.05E+07	4.57E+04	1.88E+04	1.80E+04	1.74E+04	1.39E+04	1.07E+04	2.07E+03	5.50E+02
ACTINIDES AND DAUGHTERS											
CM	8.85E+05	4.87E+07	2.30E+07	1.57E+05	4.85E+04	2.59E+04	1.70E+04	5.94E+02	8.97E+00	0.	0.
AM	1.92E+05	1.96E+07	1.91E+07	1.05E+07	5.21E+06	6.61E+05	4.16E+05	1.12E+04	1.24E+02	0.	0.
PU	1.48E+04	1.39E+06	1.41E+06	7.03E+05	5.04E+05	4.02E+05	3.33E+05	1.03E+05	2.58E+04	2.87E+02	1.15E+02
NP	3.48E+02	4.23E+04	4.23E+04	4.24E+04	4.19E+04	3.26E+04	2.42E+04	9.81E+03	9.28E+03	8.14E+03	6.93E+03
U	2.42E+00	1.41E+03	1.25E+03	7.95E+02	9.73E+02	1.17E+03	1.38E+03	2.75E+03	4.09E+03	7.93E+03	7.53E+03
PA	3.15E+00	2.85E+02	2.90E+02	3.35E+02	4.03E[illegible]	4.40E+02	4.42E+02	4.42E+02	4.40E+02	3.92E+02	3.36E+02
TH	2.88E-01	1.39E+03	1.01E+03	2.40E+01	8.37E+00	7.40E+01	2.11E+02	1.79E+03	3.52E+03	8.18E+03	7.73E+03
RA	2.86E-01	1.45E+03	1.05E+03	2.22E+01	1.69E+00	2.20E+01	5.90E+01	3.27E+02	5.21E+02	5.08E+02	2.84E+02
OTHER DAUGHTERS*	1.17E+00	5.93E+03	4.30E+03	9.22E+01	1.57E+01	3.33E+02	1.10E+03	1.01E+04	1.98E+04	4.59E+04	4.34E+04
TOTAL	1.09E+06	6.97E+07	4.36E+07	1.14E+07	5.81E+06	1.12E+06	7.93E+05	1.41E+05	6.36E+04	7.14E+04	6.63E+04

* FR+RN+A+PO+BI+PB+TE

TABLE 10.D.47 Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment
Actinide Heat Generation Rate in Repositories (Watts)

ACTINIDES AND DAUGHTERS	YEAR 2000	YEAR 2050	YEAR 2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
CM-245	2.90E-02	3.91E+04	3.91E+04	3.78E+04	3.62E+04	2.59E+04	1.70E+04	5.94E+02	8.97E+00	0.	0.
CM-244	8.76E+05	4.77E+07	2.22E+07	4.23E+00	2.04E-08	0.	0.	0.	0.	0.	0.
CM-243	1.17E+03	6.33E+04	4.10E+04	6.49E+00	1.28E-04	0.	0.	0.	0.	0.	0.
CM-242	7.01E+03	8.28E+05	7.56E+05	1.20E+05	1.22E+04	1.47E-04	0.	0.	0.	0.	0.
AM-243,NP-239	7.90E+03	1.01E+06	1.01E+06	9.75E+05	9.32E+05	6.49E+05	4.12E+05	1.10E+04	1.18E+02	0.	0.
AM-242M,AM-242	3.67E+02	4.03E+04	4.04E+04	6.41E+03	6.55E+02	7.83E-06	0.	0.	0.	0.	0.
AM-241	1.84E+05	1.86E+07	1.81E+07	9.56E+06	4.31E+06	3.59E+04	1.82E+04	6.33E+02	9.56E+00	0.	0.
PU-242	6.94E+00	6.58E+02	6.63E+02	7.03E+02	7.14E+02	7.10E+02	7.04E+02	6.54E+02	5.97E+02	2.87E+02	1.15E+02
PU-241	4.13E+02	8.54E+03	3.38E+03	5.00E+01	4.80E+01	3.43E+01	2.26E+01	7.87E-01	1.19E-02	0.	0.
PU-240	1.99E+03	3.34E+05	3.94E+05	4.28E+05	4.07E+05	2.70E+05	1.62E+05	2.68E+03	1.59E+01	0.	0.
PU-239	8.00E+02	5.08E+04	5.12E+04	5.92E+04	6.99E+04	1.31E+05	1.70E+05	1.00E+05	2.52E+04	2.92E-01	1.98E-07
PU-238	1.16E+04	1.00E+06	9.58E+05	2.15E+05	2.57E+04	3.18E-04	0.	0.	0.	0.	0.
PU-236	4.05E-01	6.36E+01	4.91E+01	0.	0.	0.	0.	0.	0.	0.	0.
NP-237,PA-233	6.95E+01	6.36E+03	6.47E+03	7.94E+03	9.03E+03	9.89E+03	9.92E+03	9.85E+03	9.70E+03	8.52E+03	7.29E+03
U-238,TH-234, PA-234M	5.42E-01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.06E+01
U-236	3.53E-01	2.66E+01	2.67E+01	3.07E+01	3.63E+01	6.98E+01	9.88E+01	1.36E+02	1.36E+02	1.35E+02	1.33E+02
U-235,TH-231	2.50E-02	1.49E+00	1.50E+00	1.51E+00	1.54E+00	1.91E+00	2.60E+00	8.07E+00	1.05E+01	1.13E+01	1.13E+01
U-234	1.55E+00	1.90E+02	2.38E+02	7.06E+02	8.79E+02	8.90E+02	8.78E+02	7.88E+02	6.89E+02	2.43E+02	8.13E+01
U-233	1.74E-03	9.03E-01	1.42E+00	1.23E+01	3.04E+01	1.85E+02	3.81E+02	1.80E+03	3.23E+03	7.52E+03	7.28E+03
U-232	3.51E-02	1.16E+03	9.60E+02	1.96E+01	1.59E-01	0.	0.	0.	0.	0.	0.
PA-231	4.30E-03	3.64E-01	3.65E-01	3.75E-01	3.89E-01	5.06E-01	6.99E-01	3.97E+00	8.23E+00	1.21E+01	1.21E+01
TH-230	7.40E-03	6.67E-01	7.04E-01	2.34E+00	6.08E+00	3.56E+01	7.11E+01	2.89E+02	4.41E+02	3.23E+02	1.04E+02
TH-229,7 DAUGHTERS	3.89E-06	1.18E-02	2.70E-02	1.62E+00	8.60E+00	2.49E+02	9.17E+02	9.94E+03	2.03E+04	5.20E+04	5.05E+04
TH-228,6 DAUGHTERS	1.72E+00	8.77E+03	6.36E+03	1.30E+02	1.06E+00	5.93E-05	1.36E-04	9.00E-04	1.90E-03	9.83E-03	1.96E-02
AC-227,7 DAUGHTERS	4.96E-03	1.51E+00	1.92E+00	2.44E+00	2.54E+00	3.30E+00	4.57E+00	2.60E+01	5.38E+01	7.91E+01	7.91E+01
TH-232,2 DAUGHTERS	1.34E-09	5.65E-08	6.53E-08	6.04E-07	1.40E-06	8.47E-06	1.94E-05	1.29E-04	2.71E-04	1.41E-03	2.80E-03
RA-226,5 DAUGHTERS	1.83E-04	3.75E-02	9.03E-02	1.25E+00	5.86E+00	1.16E+02	3.10E+02	1.63E+03	2.50E+03	1.92E+03	5.88E+02
PB-210,2 DAUGHTERS	7.11E-06	5.55E-03	1.07E-02	2.55E-01	1.26E+00	2.49E+01	6.66E+01	3.50E+02	5.38E+02	3.91E+02	1.26E+02
TOTAL ACTINIDES	1.09E+06	6.97E+07	4.36E+07	1.14E+07	5.81E+06	1.12E+06	7.93E+05	1.41E+05	6.36E+04	7.14E+04	6.63E+04

TABLE 10.D.48 Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment
Fission and Activation Product Heat Generation Rate in Repositories (Watts)

FISSION AND ACTIVATION	YEAR 2000	2030	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
H-3	1.43E+01	1.29E+02	4.05E+01	5.33E-09	0.	0.	0.	0.	0.	0.	0.
C-14	1.79E+00	8.85E+01	8.83E+01	8.41E+01	7.92E+01	6.88E+01	2.67E+01	2.12E-01	5.02E-04	0.	0.
MN-54	2.55E+03	2.01E+00	1.12E-07	0.	0.	0.	0.	0.	0.	0.	0.
FE-55	3.02E+04	5.42E+03	2.68E+01	0.	0.	0.	0.	0.	0.	0.	0.
CO-60	3.92E+05	5.44E+05	4.26E+04	0.	0.	0.	0.	0.	0.	0.	0.
NI-59	1.40E+02	6.29E+03	6.29E+03	6.27E+03	6.24E+03	6.03E+03	5.78E+03	4.08E+03	2.65E+03	8.30E+01	1.09E+00
NI-63	9.47E+02	1.88E+04	1.62E+04	7.72E+02	1.79E+01	0.	0.	0.	0.	0.	0.
SE-79	7.05E-01	4.71E+01	4.71E+01	4.69E+01	4.67E+01	4.47E+01	4.26E+01	2.77E+01	1.63E+01	2.29E-01	1.11E-03
KR-85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB-87	5.71E-05	3.73E-03	3.73E-03	3.73E-03	3.73E-03	3.73E-03	3.73E-03	3.73E-03	3.73E-03	3.73E-03	3.73E-03
SR-90,Y-90	1.99E+06	6.33E+07	3.84E+07	1.83E+03	8.11E-03	0.	0.	0.	0.	0.	0.
ZR-93,NB-93M	4.42E+00	2.89E+02	2.88E+02	2.88E+02	2.88E+02	2.87E+02	2.86E+02	2.81E+02	2.75E+02	2.28E+02	1.81E+02
TC-99	1.21E+02	8.21E+03	8.21E+03	8.20E+03	8.18E+03	8.08E+03	7.94E+03	6.96E+03	5.90E+03	1.98E+03	3.03E+02
RU-106,RH-106	1.14E+05	1.28E+04	1.32E-02	0.	0.	0.	0.	0.	0.	0.	0.
PD-107	9.28E-02	3.82E+00	3.82E+00	3.82E+00	3.82E+00	3.82E+00	3.82E+00	3.81E+00	3.79E+00	3.64E+00	3.46E+00
AG-110M	1.03E+02	3.37E+00	6.94E-09	0.	0.	0.	0.	0.	0.	0.	0.
CD-113M	8.33E+01	1.43E+03	5.30E+02	1.11E-06	0.	0.	0.	0.	0.	0.	0.
SB-125,TE-125M	2.81E+04	3.46E+04	2.05E+02	0.	0.	0.	0.	0.	0.	0.	0.
SN-126,SB-126	4.90E+01	3.91E+03	3.91E+03	3.90E+03	3.88E+03	3.79E+03	3.27E+03	2.48E+03	1.76E+03	1.10E+02	3.49E+00
I-129	1.72E-01	8.69E+00	8.69E+00	8.69E+00	8.69E+00	8.69E+00	8.69E+00	8.67E+00	8.65E+00	8.51E+00	8.36E+00
CS-134	6.94E+05	4.93E+05	4.91E+02	0.	0.	0.	0.	0.	0.	0.	0.
CS-135	8.05E-01	6.20E+01	6.20E+01	6.20E+01	6.20E+01	6.19E+01	6.18E+01	6.13E+01	6.06E+01	5.52E+01	4.92E+01
CS-137,BA-137	2.26E+06	7.86E+07	6.96E+07	4.40E+03	4.27E-02	0.	0.	0.	0.	0.	0.
CE-144,PR-144	3.22E+04	2.02E+03	3.70E-05	0.	0.	0.	0.	0.	0.	0.	0.
PM-147	3.24E+04	4.21E+04	2.13E+02	0.	0.	0.	0.	0.	0.	0.	0.
SM-151	1.09E+04	5.93E+05	5.06E+05	2.03E+04	3.79E+02	0.	0.	0.	0.	0.	0.
EU-152	1.01E+03	8.04E+04	6.44E+03	4.80E-07	0.	0.	0.	0.	0.	0.	0.
EU-154	1.98E+05	4.38E+06	1.84E+06	4.67E-02	0.	0.	0.	0.	0.	0.	0.
EU-155	1.45E+03	7.40E+02	3.31E-01	0.	0.	0.	0.	0.	0.	0.	0.
OTHER[a]	2.42E+02	2.40E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	5.78E+06	1.88E+08	9.06E+07	4.57E+04	1.88E+04	1.80E+04	1.74E+04	1.39E+04	1.07E+04	2.07E+03	5.50E+02

a. Nuclides included in "other" category are all short-lived and are detailed in the next table.

TABLE 10.D.49 Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment Short-Lived Fission and Activation Product Heat Generation Rate in Repositories (Watts)

FISSION AND ACTIVATION	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
SC-46	2.80E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR-51	1.20E+01	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO-58	1.61E+02	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE-59	1.53E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN-65	6.64E+01	7.99E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR-89	2.11E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y-91	1.69E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR-95	1.24E-04	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB-95M	2.46E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB-95	2.00E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU-103	8.91E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN-123	3.96E-02	2.53E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB-124	3.51E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE-127M,TE-127	8.20E-02	1.27E-06	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE-141	2.66E-07	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM-148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD-153	4.88E-01	1.60E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB-160	1.83E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W-181	9.30E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	2.42E+02	2.40E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.

TABLE 10.D.50 Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment
Total Heat Generation Rate in Repositories by Waste Classification (Watts)

FISSION AND ACTIVATION	YEAR 2000	YEAR 2050	YEAR 2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
HLW	5.34E+06	1.47E+08	9.05E+07	3.86E+04	1.24E+04	1.19E+04	1.16E+04	9.81E+03	8.00E+03	1.96E+03	5.30E+02
FRW	4.37E+05	6.99E+05	1.11E+05	7.06E+03	6.27E+03	6.04E+03	5.78E+03	4.09E+03	2.66E+03	9.73E+01	1.18E+01
ILW	6.23E+03	4.98E+03	2.99E+03	2.71E+00	1.69E+00	1.63E+00	1.56E+00	1.17E+00	8.19E-01	1.07E-01	4.27E-02
LLW	7.38E+00	1.05E+02	9.71E+01	8.17E+01	7.74E+01	5.10E+01	3.18E+01	8.79E+00	8.59E+00	8.45E+00	8.28E+00
TOTAL	5.78E+06	1.48E+08	9.06E+07	4.57E+04	1.88E+04	1.80E+04	1.74E+04	1.39E+04	1.07E+04	2.07E+03	5.50E+02
ACTINIDES											
HLW	1.08E+06	6.88E+07	4.28E+07	1.11E+07	5.62E+06	1.07E+06	7.53E+05	1.33E+05	6.06E+04	6.99E+04	6.53E+04
FRW	1.77E+03	1.16E+05	1.03E+05	3.80E+04	2.08E+04	6.11E+03	4.32E+03	8.24E+02	3.39E+02	1.87E+02	1.31E+02
ILW	5.50E+03	5.94E+05	5.93E+05	2.36E+05	1.31E+05	4.06E+04	2.87E+04	5.49E+03	2.17E+03	1.04E+03	6.65E+02
LLW	1.57E+03	1.51E+05	1.53E+05	6.79E+04	3.59E+04	8.92E+03	6.53E+03	1.43E+03	5.15E+02	2.37E+02	1.71E+02
TOTAL	1.09E+06	6.97E+07	4.36E+07	1.14E+07	5.81E+06	1.12E+06	7.93E+05	1.41E+05	6.36E+04	7.14E+04	6.63E+04

TABLE 10.D.51. Case 4A - Once-Through Cycle - Deferred Decision - Reference Treatment - Summary Radioactivity Inventory in Repositories by Major Radionuclides (Curies)

FISSION AND ACTIVATION	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
C-14	4.67E+03	3.16E+05	3.16E+05	3.01E+05	2.83E+05	1.74E+05	9.53E+04	7.57E+02	1.79E+00	0.	0.
NI-59	1.66E+04	1.15E+06	1.15E+06	1.14E+06	1.14E+06	1.10E+06	1.05E+06	7.45E+05	4.83E+05	1.51E+04	1.99E+02
SR-90,Y-90	6.05E+08	2.01E+10	1.23E+10	5.61E+05	2.58E+00	0.	0.	0.	0.	0.	0.
ZR-93,NB-93M	1.76E+04	1.24E+06	1.24E+06	1.24E+06	1.24E+06	1.24E+06	1.24E+06	1.22E+06	1.19E+06	9.88E+05	7.84E+05
TC-99	6.86E+04	4.82E+06	4.82E+06	4.81E+06	4.80E+06	4.74E+06	4.66E+06	4.09E+06	3.46E+06	9.26E+05	1.78E+05
PD-107	5.27E+02	3.66E+04	3.66E+04	3.66E+04	3.66E+04	3.66E+04	3.66E+04	3.64E+04	3.63E+04	3.49E+04	3.32E+04
I-129	1.76E+02	1.24E+04	1.24E+04	1.24E+04	1.24E+04	1.24E+04	1.23E+04	1.23E+04	1.23E+04	1.21E+04	1.19E+04
CS-135	1.39E+03	1.00E+05	1.00E+05	1.00E+05	1.00E+05	1.00E+05	9.99E+04	9.90E+04	9.79E+04	8.92E+04	7.95E+04
CS-137,BA-137M	8.33E+08	2.87E+10	1.81E+10	1.61E+06	1.56E+01	0.	0.	0.	0.	0.	0.
ALL OTHERS	3.48E+08	1.53E+09	7.05E+08	1.70E+07	8.15E+05	4.67E+05	4.49E+05	3.28E+05	2.23E+05	1.18E+04	3.58E+02
TOTAL	1.79E+09	5.04E+10	3.11E+10	2.68E+07	8.43E+06	7.87E+06	7.65E+06	6.52E+06	5.51E+06	2.08E+06	1.09E+06
ACTINIDES AND DAUGHTERS											
CM	5.25E+06	1.23E+08	5.84E+07	4.60E+05	1.01E+05	4.29E+04	2.82E+04	9.85E+02	1.49E+01	0.	0.
AM	6.21E+06	1.16E+09	1.28E+09	7.27E+08	3.29E+08	3.83E+06	2.09E+06	5.60E+04	6.08E+02	0.	0.
PU	4.52E+08	8.62E+09	3.82E+09	2.93E+08	2.62E+08	1.98E+08	1.45E+08	2.86E+07	7.05E+06	2.37E+05	9.50E+04
NP	7.33E+04	5.20E+06	5.20E+06	5.14E+06	5.01E+06	3.66E+06	2.48E+06	4.61E+05	4.00E+05	3.51E+05	2.98E+05
U	1.91E+04	8.50E+05	7.62E+05	8.44E+05	8.68E+05	8.84E+05	8.97E+05	9.23E+05	9.26E+05	8.39E+05	7.28E+05
PA	3.40E+03	2.46E+05	2.54E+05	3.73E+05	4.64E+05	5.32E+05	5.33E+05	5.32E+05	5.28E+05	4.81E+05	4.29E+05
TH	1.91E+03	1.32E+05	1.31E+05	1.29E+05	1.32E+05	1.56E+05	1.88E+05	4.14E+05	6.00E+05	7.71E+05	6.27E+05
RA	5.81E+01	5.19E+03	4.32E+03	3.34E+02	1.05E+03	1.78E+04	4.82E+04	2.85E+05	4.73E+05	6.41E+05	4.97E+05
OTHER DAUGHTERS*	2.90E+02	2.60E+04	2.16E+04	2.23E+03	8.05E+03	1.38E+05	3.72E+05	2.14E+06	3.51E+06	4.45E+06	3.31E+06
TOTAL	4.63E+08	9.91E+09	5.17E+09	1.03E+09	5.97E+08	2.08E+08	1.52E+08	3.34E+07	1.35E+07	7.77E+06	5.99E+06

* FR+RN+A+PO+BI+PB+TE

TABLE 10.D.52. Case 4A - Once-Through Cycle - Deferred Decision - Reference Treatment - Actinide Radioactivity Inventory in Repositories (Curies)

ACTINIDES AND DAUGHTERS	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
CM-245	9.08E+02	6.49E+04	6.48E+04	6.26E+04	6.00E+04	4.29E+04	2.82E+04	9.85E+02	1.49E+01	0.	0.
CM-244	5.20E+06	1.19E+08	3.54E+07	1.06E+01	5.10E-05	0.	0.	0.	0.	0.	0.
CM-243	1.77E+04	6.49E+05	4.21E+05	6.66E+01	1.32E-03	0.	0.	0.	0.	0.	0.
CM-242	2.77E+04	2.75E+06	2.51E+06	3.97E+05	4.06E+04	4.86E-04	0.	0.	0.	0.	0.
AM-243,NP-239	1.43E+05	1.02E+07	1.01E+07	9.77E+06	9.34E+06	6.50E+06	4.13E+06	1.10E+05	1.19E+03	0.	0.
AM-242M,AM-242	1.09E+05	6.70E+06	6.11E+06	9.68E+05	9.90E+04	1.18E-03	0.	0.	0.	0.	0.
AM-241	6.03E+06	1.15E+09	1.27E+09	7.21E+08	3.24E+08	5.81E+05	2.85E+04	9.87E+02	1.49E+01	0.	0.
PU-242	8.41E+03	5.91E+05	5.91E+05	5.91E+05	5.90E+05	5.86E+05	5.81E+05	5.40E+05	4.93E+05	2.37E+05	9.50E+04
PU-241	4.37E+08	7.75E+09	3.04E+09	6.27E+04	6.01E+04	4.30E+04	2.83E+04	9.87E+02	1.49E+01	0.	0.
PU-240	2.46E+06	1.69E+08	1.68E+08	1.62E+08	1.54E+08	1.02E+08	6.11E+07	1.01E+06	5.99E+03	0.	0.
PU-239	1.61E+06	1.10E+08	1.10E+08	1.08E+08	1.07E+08	9.58E+07	8.35E+07	2.71E+07	6.55E+06	7.60E+01	5.15E-05
PU-238	1.06E+07	5.87E+08	5.03E+08	2.23E+07	5.32E+05	1.17E-03	0.	0.	0.	0.	0.
PU-236	3.13E+02	2.86E+02	2.21E+00	0.	0.	0.	0.	0.	0.	0.	0.
NP-237,PA-233	3.28E+03	2.52E+05	2.68E+05	5.06E+05	6.87E+05	8.22E+05	8.22E+05	8.12E+05	7.99E+05	7.02E+05	5.97E+05
U-238,TH-234, PA-234M	5.27E+03	3.60E+05	3.60E+05	3.60E+05	3.60E+05	3.60E+05	3.60E+05	3.60E+05	3.60E+05	3.60E+05	3.60E+05
U-236	1.19E+03	8.46E+04	8.47E+04	8.64E+04	8.88E+04	1.03E+05	1.15E+05	1.32E+05	1.32E+05	1.30E+05	1.29E+05
U-235,TH-231	1.84E+02	1.34E+04	1.34E+04	1.35E+04	1.36E+04	1.44E+04	1.53E+04	1.92E+04	2.06E+04	2.10E+04	2.10E+04
U-234	5.09E+03	4.40E+05	4.70E+05	6.30E+05	6.51E+05	6.46E+05	6.39E+05	5.83E+05	5.23E+05	2.51E+05	1.52E+05
U-233	4.07E-01	4.66E+01	5.77E+01	3.72E+02	1.06E+03	7.79E+03	1.64E+04	7.80E+04	1.41E+05	3.27E+05	3.17E+05
U-232	8.24E+01	5.07E+03	4.19E+03	8.57E+01	6.95E-01	0.	0.	0.	0.	0.	0.
PA-231	1.42E-01	1.52E+01	1.81E+01	7.07E+01	1.45E+02	7.02E+02	1.39E+03	5.71E+03	8.58E+03	1.05E+04	1.05E+04
TH-230	3.95E-01	1.46E+02	2.25E+02	2.08E+03	5.02E+03	2.68E+04	5.30E+04	2.16E+05	3.33E+05	3.02E+05	1.67E+05
TH-229,7 DAUGHTERS	3.11E-05	9.85E-01	1.77E+00	5.68E+01	3.25E+02	1.17E+04	4.51E+04	5.01E+05	1.03E+06	2.63E+06	2.59E+06
TH-228,6 DAUGHTERS	4.07E+02	3.63E+04	3.01E+04	6.16E+02	5.03E+00	1.60E-01	3.50E-01	2.11E+00	4.38E+00	2.24E+01	4.46E+01
AC-227,7 DAUGHTERS	3.62E-03	6.78E+01	9.93E+01	5.47E+02	1.16E+03	5.61E+03	1.11E+04	4.57E+04	6.87E+04	8.42E+04	8.41E+04
TH-232,2 DAUGHTERS	4.65E-07	3.06E-04	5.45E-04	5.26E-03	1.20E-02	6.86E-02	1.50E-01	9.03E-01	1.88E+00	9.60E+00	1.91E+01
RA-226,5 DAUGHTERS	4.93E-03	8.54E+00	1.81E+01	1.02E+03	3.20E+03	9.40E+04	2.47E+05	1.30E+06	2.02E+06	1.81E+06	1.01E+06
PB-210,2 DAUGHTERS	2.46E-04	1.60E+00	4.08E+00	4.81E+02	2.60E+03	4.70E+04	1.24E+05	6.49E+05	1.01E+06	9.06E+05	5.03E+05
TOTAL ACTINIDES	4.63E+08	9.91E+09	5.17E+09	1.03E+09	5.97E+08	2.08E+08	1.52E+08	3.34E+07	1.35E+07	7.77E+06	5.99E+06

TABLE 10.D.53. Case 4A - Once-Through Cycle - Deferred Decision - Reference Treatment - Fission and Activation Product Radioactivity Inventory in Repositories (Curies)

FISSION AND ACTIVATION	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
H-3	1.50E+06	2.19E+07	7.10E+06	9.34E-04	0.	0.	0.	0.	0.	0.	0.
C-14	4.87E+03	3.16E+05	3.16E+05	3.01E+05	2.83E+05	1.74E+05	9.53E+04	7.57E+02	1.79E+00	0.	0.
MN-54	9.17E+03	2.40E+02	1.34E-05	0.	0.	0.	0.	0.	0.	0.	0.
FE-55	6.59E+06	5.27E+06	2.56E+04	0.	0.	0.	0.	0.	0.	0.	0.
CO-60	1.13E+07	4.17E+07	2.99E+06	0.	0.	0.	0.	0.	0.	0.	0.
NI-59	1.66E+04	1.15E+06	1.15E+06	1.14E+06	1.14E+06	1.10E+06	1.05E+06	7.45E+05	4.83E+05	1.51E+04	1.99E+02
NI-63	2.52E+06	1.36E+08	1.17E+08	5.60E+06	1.30E+05	1.08E-08	0.	0.	0.	0.	0.
SE-79	1.86E+03	1.31E+05	1.31E+05	1.30E+05	1.30E+05	1.29E+05	1.18E+05	7.70E+04	4.52E+04	6.36E+02	3.09E+00
KR-85	3.34E+07	4.14E+08	1.15E+08	6.41E-04	0.	0.	0.	0.	0.	0.	0.
RB-87	9.15E-02	6.47E+00	6.47E+00	6.47E+00	6.47E+00	6.47E+00	6.47E+00	6.47E+00	6.47E+00	6.47E+00	6.47E+00
SR-90,Y-90	6.05E+09	2.01E+10	1.23E+10	5.01E+05	2.58E+00	0.	0.	0.	0.	0.	0.
ZR-93,NB-93M	1.76E+04	1.24E+06	1.24E+06	1.24E+06	1.24E+06	1.24E+06	1.24E+06	1.22E+06	1.19E+06	9.88E+05	7.84E+05
TC-99	6.86E+04	4.82E+06	4.82E+06	4.81E+06	4.80E+06	4.74E+06	4.66E+06	4.09E+06	3.46E+06	9.26E+05	1.78E+05
RU-106,RH-106	4.12E+07	2.15E+06	2.21E+00	0.	0.	0.	0.	0.	0.	0.	0.
PD-107	5.27E+02	3.66E+04	3.66E+04	3.66E+04	3.66E+04	3.66E+04	3.66E+04	3.64E+04	3.63E+04	3.49E+04	3.32E+04
AG-110M	1.43E+04	1.46E+02	3.02E-07	0.	0.	0.	0.	0.	0.	0.	0.
CD-113M	3.26E+04	5.52E+05	2.03E+05	4.28E-04	0.	0.	0.	0.	0.	0.	0.
SB-125,TE-125M	1.38E+07	1.17E+07	6.94E+04	0.	0.	0.	0.	0.	0.	0.	0.
SN-126,SB-126	5.08E+03	3.55E+05	3.55E+05	3.54E+05	3.52E+05	3.43E+05	3.31E+05	2.51E+05	1.78E+05	1.11E+04	3.49E+02
I-129	1.76E+02	1.24E+04	1.24E+04	1.24E+04	1.24E+04	1.24E+04	1.23E+04	1.23E+04	1.23E+04	1.21E+04	1.19E+04
CS-134	9.74E+07	4.07E+07	4.74E+04	0.	0.	0.	0.	0.	0.	0.	0.
CS-135	1.39E+03	1.00E+05	1.00E+05	1.00E+05	1.00E+05	1.00E+05	9.99E+04	9.90E+04	9.79E+04	8.92E+04	7.95E+04
CS-137,BA-137M	8.33E+08	2.87E+10	1.81E+10	1.61E+06	1.56E+01	0.	0.	0.	0.	0.	0.
CE-144,PR-144	2.04E+07	4.99E+05	9.13E-03	0.	0.	0.	0.	0.	0.	0.	0.
PM-147	8.89E+07	8.33E+07	4.21E+05	0.	0.	0.	0.	0.	0.	0.	0.
SM-151	5.90E+06	3.18E+08	2.71E+08	1.09E+07	2.03E+05	2.99E-09	0.	0.	0.	0.	0.
EU-152	4.56E+04	6.67E+05	2.10E+05	1.57E-05	0.	0.	0.	0.	0.	0.	0.
EU-154	2.27E+07	4.51E+08	1.90E+08	4.62E+00	1.91E-09	0.	0.	0.	0.	0.	0.
EU-155	2.47E+06	7.50E+05	3.55E+02	0.	0.	0.	0.	0.	0.	0.	0.
OTHER[a]	1.27E+03	1.48E+01	1.25E-06	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	1.79E+09	5.04E+10	3.11E+10	2.6[illegible]E+07	8.43E+06	7.87E+06	7.65E+06	6.52E+06	5.51E+06	2.08E+06	1.09E+06

a. Nuclides included in "other" category are all short-lived and are detailed in the next table.

TABLE 10.D.54. Case 4A - Once-Through Cycle - Deferred Decision - Reference Treatment - Short-lived Fission and Activation Product Radioactivity Inventory in Repositories (Curies)

FISSION AND ACTIVATION	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
SC-46	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR-51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO-58	1.09E-02	1.25E-09	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE-59	2.84E-07	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN-65	1.14E+02	1.11E+00	1.19E-09	0.	0.	0.	0.	0.	0.	0.	0.
SR-89	5.47E-06	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y-91	3.84E-08	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR-95	7.69E-06	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB-95M	8.42E-09	9.30E-10	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB-95	3.99E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU-103	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN-123	2.93E+01	7.76E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB-124	2.81E-07	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE-127M,TE-127	1.32E+01	1.24E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE-141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM-148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD-153	1.11E+03	1.36E+01	1.13E-08	0.	0.	0.	0.	0.	0.	0.	0.
TB-160	3.66E-04	6.08E-10	0.	0.	0.	0.	0.	0.	0.	0.	0.
W-181	7.00E-05	4.17E-08	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	1.27E+03	1.48E+01	1.25E-08	0.	0.	0.	0.	0.	0.	0.	0.

TABLE 10.D.55. Case 4A - Once-Through Cycle - Deferred Decision - Reference Treatment - Total Radioactivity in Repositories by Waste Classification (Curies)

FISSION AND ACTIVATION	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
BWR CANISTERS	5.59E+08	1.67E+10	1.03E+10	8.19E+06	2.60E+06	2.47E+06	2.42E+06	2.11E+06	1.[illegible]E+06	6.94E+05	3.65E+05
PWR CANISTERS	1.23E+09	3.37E+10	2.08E+10	1.84E+07	5.64E+06	5.29E+06	5.16E+06	4.41E+06	3.71E+06	1.38E+06	7.22E+05
TOTAL	1.79E+09	5.04E+10	3.11E+10	2.66E+07	8.24E+06	7.75E+06	7.58E+06	6.52E+06	5.51E+06	2.08E+06	1.09E+06
ACTINIDES											
BWR CANISTERS	1.38E+08	3.10E+09	1.62E+09	3.32E+08	1.97E+08	7.22E+07	5.26E+07	1.14E+07	4.49E+06	2.55E+06	2.00E+06
PWR CANISTERS	3.25E+08	6.81E+09	3.55E+09	6.95E+08	4.00E+08	1.36E+08	9.92E+07	2.21E+07	8.99E+06	5.22E+06	3.99E+06
TOTAL	4.63E+08	9.91E+09	5.17E+09	1.03E+09	5.97E+08	2.08E+08	1.52E+08	3.34E+07	1.35E+07	7.77E+06	5.99E+06

TABLE 10.D.56. Case 4A - Once-Through Cycle - Deferred Decision - Reference Treatment - Summary Heat Generation Rate in Repositories by Major Radionuclides (Watts)

FISSION AND ACTIVATION	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
C-14	1.39E+00	9.38E+01	9.35E+01	8.91E+01	8.38E+01	5.17E+01	2.82E+01	2.24E-01	5.32E-04	0.	0.
NI-59	1.06E+02	7.30E+03	7.30E+03	7.27E+03	7.24E+03	6.99E+03	6.70E+03	4.74E+03	3.07E+03	9.62E+01	1.27E+00
SR-90,Y-90	2.18E+06	7.24E+07	4.42E+07	2.09E+03	9.28E-03	0.	0.	0.	0.	0.	0.
ZR-93,NB-93M	4.13E+00	2.91E+02	2.91E+02	2.91E+02	2.91E+02	2.71E+02	2.90E+02	2.85E+02	2.78E+02	2.31E+02	1.84E+02
TC-99	1.18E+02	8.28E+03	8.28E+03	8.27E+03	8.26E+03	8.15E+03	8.02E+03	7.02E+03	5.96E+03	1.59E+03	3.06E+02
PD-107	4.37E-02	3.04E+00	3.04E+00	3.04E+00	3.04E+00	3.04E+00	3.04E+00	3.02E+00	3.01E+00	2.89E+00	2.75E+00
I-129	1.16E-01	8.13E+00	8.13E+00	8.13E+00	8.13E+00	8.13E+00	8.13E+00	8.11E+00	8.10E+00	7.96E+00	7.80E+00
CS-135	6.76E-01	4.87E+01	4.87E+01	4.87E+01	4.87E+01	4.86E+01	4.86E+01	4.81E+01	4.76E+01	4.34E+01	3.86E+01
CS-137,BA-137M	2.29E+06	7.89E+07	4.97E+07	4.42E+03	4.28E-02	0.	0.	0.	0.	0.	0.
ALL OTHERS	1.86E+06	6.15E+06	2.29E+06	2.29E+04	3.39E+03	2.93E+03	2.83E+03	2.14E+03	1.51E+03	9.39E+01	2.94E+00
TOTAL	6.32E+06	1.57E+08	9.62E+07	4.53E+04	1.93E+04	1.85E+04	1.79E+04	1.42E+04	1.09E+04	2.07E+03	5.43E+02
ACTINIDES AND DAUGHTERS											
CM	1.84E+05	4.30E+06	2.05E+06	1.66E+04	3.38E+03	1.35E+03	8.86E+02	3.09E+01	4.67E-01	0.	0.
AM	2.04E+05	3.85E+07	4.26E+07	2.42E+07	1.10E+07	1.38E+05	7.63E+04	2.04E+03	2.21E+01	0.	0.
PU	4.96E+05	2.85E+07	2.55E+07	9.16E+06	8.14E+06	6.17E+06	4.51E+06	8.89E+05	2.18E+05	7.00E+03	2.80E+03
NP	1.45E+02	1.06E+04	1.08E+04	1.40E+04	1.64E+04	1.65E+04	1.49E+04	1.20E+04	1.17E+04	1.03E+04	[illegible]
U	2.29E+02	1.83E+04	1.92E+04	2.37E+04	2.44E+04	2.49E+04	2.52E+04	2.59E+04	2.60E+04	2.36E+04	2.04E+04
PA	1.13E+01	7.90E+02	8.00E+02	9.63E+02	1.09E+03	1.20E+03	1.22E+03	1.34E+03	1.42E+03	1.41E+03	1.34E+03
TH	2.61E+00	2.22E+02	1.96E+02	1.12E+02	1.96E+02	8.74E+02	1.76E+03	8.23E+03	1.36E+04	1.89E+04	1.48E+04
RA	1.99E+00	1.78E+02	1.46E+02	1.02E+01	2.96E+01	4.69E+02	1.22E+03	6.37E+03	9.90E+03	9.13E+03	5.32E+03
OTHER DAUGHTERS*	8.13E+00	7.27E+02	6.04E+02	5.02E+01	1.69E+02	2.92E+03	7.93E+03	4.71E+04	7.83E+04	1.07E+05	8.30E+04
TOTAL	8.84E+05	7.13E+07	7.01E+07	3.35E+07	1.92E+07	6.36E+06	4.64E+06	9.92E+05	3.59E+05	1.77E+05	1.36E+05

* FR+RN+A+PO+BI+PB+TE

TABLE 10.D.57. Case 4A - Once-Through Cycle - Deferred Decision - Reference Treatment - Actinide Heat Generation Rate in Repositories (Watts)

ACTINIDES AND DAUGHTERS	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
CM-245	2.85E+01	2.04E+03	2.03E+03	1.97E+03	1.88E+03	1.35E+03	8.86E+02	3.09E+01	4.67E-01	0.	0.
CM-244	1.82E+05	4.17E+06	1.94E+06	3.70E+01	1.78E-09	0.	0.	0.	0.	0.	0.
CM-243	6.51E+02	2.39E+04	1.55E+04	2.45E+00	4.84E-05	0.	0.	0.	0.	0.	0.
CM-242	1.02E+03	1.01E+03	4.29E+04	1.46E+04	1.50E+03	1.79E-05	0.	0.	0.	0.	0.
AM-243,NP-239	2.71E+03	1.92E+03	1.92E+03	1.85E+03	1.77E+03	1.23E+03	7.82E+02	2.08E+01	2.25E-01	0.	0.
AM-242M,AM-242	8.83E+01	5.42E+03	4.95E+03	7.83E+02	8.01E+01	4.57E-07	0.	0.	0.	0.	0.
AM-241	2.01E+05	3.83E+07	4.24E+07	2.41E+07	1.08E+07	1.94E+04	9.50E+02	3.29E+01	4.97E-01	0.	0.
PU-242	2.44E+02	1.75E+04	1.75E+04	1.74E+04	1.74E+04	1.73E+04	1.71E+04	1.59E+04	1.45E+04	7.00E+03	2.80E+03
PU-241	1.81E+04	3.22E+05	1.26E+05	2.60E+00	2.50E+00	1.78E+00	1.17E+00	4.10E-02	6.18E-04	0.	0.
PU-240	7.67E+04	5.25E+06	5.29E+06	5.04E+06	4.79E+06	3.18E+06	1.90E+06	3.15E+04	1.87E+02	0.	0.
PU-239	5.02E+04	3.41E+06	3.40E+06	3.37E+06	3.32E+06	2.98E+06	2.59E+06	8.41E+05	2.03E+05	2.36E+00	1.60E-06
PU-238	3.50E+05	1.95E+07	1.67E+07	7.38E+05	1.76E+04	3.89E-05	0.	0.	0.	0.	0.
PU-236	1.09E+01	9.96E+00	7.49E-02	0.	0.	0.	0.	0.	0.	0.	0.
NP-237,PA-233	5.04E+01	3.88E+03	4.12E+03	7.78E+03	1.06E+04	1.26E+04	1.26E+04	1.25E+04	1.23E+04	1.08E+04	9.17E+03
U-238,TH-234, PA-234M	5.41E+01	3.70E+03	3.70E+03	3.70E+03	3.70E+03	3.70E+03	3.70E+03	3.70E+03	3.70E+03	3.70E+03	3.70E+03
U-234	3.22E+01	2.29E+03	2.30E+03	2.34E+03	2.41E+03	2.80E+03	3.12E+03	3.57E+03	3.58E+03	3.54E+03	3.49E+03
U-235,TH-231	2.63E+00	1.91E+02	1.91E+02	1.93E+02	1.94E+02	2.05E+02	2.18E+02	2.74E+02	2.94E+02	3.00E+02	3.00E+02
U-236	1.46E+02	1.27E+04	1.33E+04	1.81E+04	1.87E+04	1.86E+04	1.84E+04	1.68E+04	1.50E+04	7.23E+03	4.38E+03
U-233	1.14E-02	1.36E+00	1.64E+00	1.08E+01	3.07E+01	2.27E+02	4.77E+02	2.27E+03	4.09E+03	9.52E+03	9.22E+03
U-232	2.64E+00	1.63E+02	1.34E+02	2.73E+00	2.23E-02	0.	0.	0.	0.	0.	0.
PA-231	4.35E-03	9.65E-01	5.53E-01	2.16E+00	4.02E+00	2.14E+01	4.23E+01	1.74E+02	2.62E+02	3.21E+02	3.21E+02
TH-230	1.12E-02	4.14E+00	6.36E+00	5.69E+01	1.42E+02	7.57E+02	1.50E+03	6.10E+03	9.42E+03	8.53E+03	4.73E+03
TH-229,7 DAUGHTERS	7.79E-07	2.07E-02	4.43E-02	1.42E+00	8.15E+00	2.94E+02	1.13E+03	1.26E+04	2.57E+04	6.58E+04	6.39E+04
TH-228,6 DAUGHTERS	1.20E+01	1.07E+03	6.90E+02	1.82E+01	1.49E+01	4.73E-03	1.03E-02	6.23E-02	1.29E-01	6.62E-01	1.32E+00
AC-227,7 DAUGHTERS	9.02E-05	1.69E+00	2.48E+00	1.36E+01	2.89E+01	1.40E+02	2.76E+02	1.14E+03	1.71E+03	2.10E+03	2.10E+03
TH-232,2 DAUGHTERS	4.58E-09	3.01E-06	5.37E-06	5.18E-05	1.19E-04	6.76E-04	1.48E-03	8.90E-03	1.85E-02	9.46E-02	1.89E-01
RA-226,5 DAUGHTERS	1.31E-04	2.24E-01	4.79E-01	3.71E+01	1.38E+02	2.49E+03	6.55E+03	3.44E+04	5.35E+04	4.40E+04	2.66E+04
PB-210,2 DAUGHTERS	2.80E-06	1.82E-02	4.65E-02	5.48E+00	2.96E+01	5.36E+02	1.41E+03	7.40E+03	1.15E+04	1.03E+04	5.73E+03
TOTAL ACTINIDES	8.84E+05	7.13E+07	7.01E+07	3.35E+07	1.92E+07	6.36E+06	4.64E+06	9.92E+05	3.59E+05	1.77E+05	1.36E+05

TABLE 10.D.58. Case 4A - Once-Through Cycle - Deferred Decision - Reference Treatment - Fission and Activation Product Heat Generation Rate in Repositories (Watts)

FISSION AND ACTIVATION	YEAR 2000	2040	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
H-3	5.35E+01	7.79E+02	2.52E+02	3.32E-08	0.	0.	0.	0.	0.	0.	0.
C-14	1.34E+00	9.38E+01	9.35E+01	8.91E+01	8.38E+01	5.17E+01	2.82E+01	2.24E-01	3.32E-04	0.	0.
MN-54	7.42E+01	1.94E+00	1.04E-07	0.	0.	0.	0.	0.	0.	0.	0.
FE-55	4.59E+03	6.87E+03	3.34E+01	0.	0.	0.	0.	0.	0.	0.	0.
CO-60	1.76E+05	6.52E+05	4.66E+04	0.	0.	0.	0.	0.	0.	0.	0.
NI-59	1.08E+02	7.30E+03	7.30E+03	7.27E+03	7.24E+03	6.99E+03	6.70E+03	4.74E+03	3.07E+03	9.82E+01	1.27E+00
NI-63	4.04E+02	2.18E+04	1.84E+04	8.97E+02	2.08E+01	0.	0.	0.	0.	0.	0.
SE-79	7.36E-01	4.97E+01	4.97E+01	4.95E+01	4.92E+01	4.72E+01	4.47E+01	2.92E+01	1.71E+01	2.41E-01	1.17E-03
KR-85	5.42E+04	6.73E+05	1.87E+05	1.04E-06	0.	0.	0.	0.	0.	0.	0.
RB-87	5.97E-05	4.22E-03	4.22E-03	4.22E-03	4.22E-03	4.22E-03	4.22E-03	4.22E-03	4.22E-03	4.22E-03	4.22E-03
SR-90,Y-90	2.14E+06	7.24E+07	4.42E+07	2.09E+03	9.28E-03	0.	0.	0.	0.	0.	0.
ZR-93,NB-93M	4.13E+00	2.91E+02	2.91E+02	2.91E+02	2.91E+02	2.91E+02	2.90E+02	2.85E+02	2.78E+02	2.31E+02	1.84E+02
TC-99	1.18E+02	8.28E+03	8.28E+03	8.27E+03	8.26E+03	8.15E+03	8.02E+03	7.02E+03	5.98E+03	1.59E+03	3.06E+02
RU-106,RH-106	2.18E+05	1.14E+04	1.17E+02	0.	0.	0.	0.	0.	0.	0.	0.
PD-107	4.37E-02	3.04E+00	3.04E+00	3.04E+00	3.04E+00	3.04E+00	3.04E+00	3.02E+00	3.01E+00	2.89E+00	2.75E+00
AG-110M	2.41E+02	2.47E+00	5.10E-04	0.	0.	0.	0.	0.	0.	0.	0.
CD-113M	4.31E+01	7.30E+02	2.71E+02	5.96E-07	0.	0.	0.	0.	0.	0.	0.
SB-125,TE-125M	7.30E+04	2.89E+04	1.71E+02	0.	0.	0.	0.	0.	0.	0.	0.
SN-126,SB-126	4.28E+01	2.99E+03	2.99E+03	2.96E+03	2.97E+03	2.89E+03	2.79E+03	2.11E+03	1.50E+03	9.37E+01	2.94E+00
I-129	1.16E-01	8.13E+00	8.13E+00	8.13E+00	8.13E+00	8.13E+00	8.13E+00	8.11E+00	8.10E+00	7.96E+00	7.80E+00
CS-134	1.09E+06	4.32E+05	5.01E+02	0.	0.	0.	0.	0.	0.	0.	0.
CS-135	6.74E-01	4.87E+01	4.87E+01	4.87E+01	4.87E+01	4.86E+01	4.86E+01	4.81E+01	4.76E+01	4.34E+01	3.86E+01
CS-137,BA-137	2.29E+06	7.89E+07	4.97E+07	4.42E+03	4.28E-02	0.	0.	0.	0.	0.	0.
CE-144,PR-144	3.74E+04	2.14E+03	3.92E-05	0.	0.	0.	0.	0.	0.	0.	0.
PM-147	4.59E+04	4.30E+04	2.17E+02	0.	0.	0.	0.	0.	0.	0.	0.
SM-151	1.03E+04	5.54E+05	4.72E+05	1.89E+04	3.53E+02	0.	0.	0.	0.	0.	0.
EU-152	4.18E+02	1.19E+04	3.77E+03	2.80E-07	0.	0.	0.	0.	0.	0.	0.
EU-154	1.86E+05	3.71E+06	1.56E+06	3.95E-02	0.	0.	0.	0.	0.	0.	0.
EU-155	2.08E+03	6.31E+02	2.99E-01	0.	0.	0.	0.	0.	0.	0.	0.
OTHER[a]	2.63E+00	2.85E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	6.72E+06	1.57E+08	9.62E+07	4.53E+04	1.93E+04	1.85E+04	1.79E+04	1.42E+04	1.09E+04	2.07E+03	5.83E+02

a. Nuclides included in "other" category are all short-lived and are detailed in the next table.

TABLE 10.D.59. Case 4A - Once-Through Cycle - Deferred Decision - Reference Treatment - Short-lived Fission and Activation Product Heat Generation Rate in Repositories (Watts)

FISSION AND ACTIVATION	YEAR 2000	YEAR 2050	YEAR 2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
SC-46	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR-51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO-58	1.49E-04	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE-59	2.21E-09	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN-65	9.18E-01	8.81E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR-89	2.04E-08	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y-91	1.44E-06	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR-95	1.07E-08	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB-95M	2.13E-06	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB-95	1.92E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR-143	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB-125	1.00E-01	2.64E-09	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN-123	3.66E-09	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE-127M,TE-127	1.43E-02	1.34E-06	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE-141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM-148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD-153	1.60E+00	1.97E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB-160	3.11E-06	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W-181	7.06E-08	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	2.63E+00	2.85E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.

TABLE 10.D.60. Case 4A - Once-Through Cycle - Deferred Decision - Reference Treatment - Total Heat Generation Rate in Repositories by Waste Classification (Watts)

	YEAR			GEOLOGIC TIME (YEARS BEYOND 1975)							
FISSION AND ACTIVATION	2000	2050	2070	500	1000	5000	10000	50000	100000	500000	1000000
BWR CANISTERS	1.93E+06	5.20E+07	3.18E+07	1.43E+04	5.73E+03	5.49E+03	5.34E+03	4.31E+03	3.34E+03	6.82E+02	1.82E+02
PWR CANISTERS	4.39E+06	1.05E+08	6.44E+07	3.10E+04	1.35E+04	1.30E+04	1.26E+04	9.94E+03	7.54E+03	1.39E+03	3.61E+02
TOTAL CANISTERS	6.32E+06	1.57E+08	9.62E+07	4.53E+04	1.93E+04	1.84E+04	1.79E+04	1.42E+04	1.09E+04	2.07E+03	5.43E+02
ACTINIDES											
BWR CANISTERS	2.52E+05	2.22E+07	2.20E+07	1.08E+07	6.32E+06	2.21E+06	1.61E+06	3.37E+05	1.20E+05	5.79E+04	4.52E+04
PWR CANISTERS	6.32E+05	4.91E+07	4.82E+07	2.26E+07	1.29E+07	4.14E+06	3.03E+06	6.55E+05	2.39E+05	1.19E+05	9.12E+04
TOTAL	8.84E+05	7.13E+07	7.01E+07	3.35E+07	1.92E+07	6.36E+06	4.64E+06	9.92E+05	3.59E+05	1.77E+05	1.36E+05

TABLE 10.D.61. Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment - Summary Radioactivity Inventory in Repositories by Major Radionuclides (Curies)

		YEAR		GEOLOGIC TIME (YEARS BEYOND 1975)							
FISSION AND ACTIVATION	2000	2050	2070	500	1000	5000	10000	50000	100000	500000	1000000
C-14	0.	3.32E+03	3.31E+03	3.15E+03	2.97E+03	1.83E+03	1.00E+03	7.94E+02	1.88E+00	0.	0.
NI-59	0.	1.10E+06	1.10E+06	1.09E+06	1.09E+06	1.05E+06	1.01E+06	7.13E+05	4.62E+05	1.45E+04	1.91E+02
SR-90,Y-90	0.	1.88E+10	1.13E+10	5.43E+05	2.41E+00	0.	0.	0.	0.	0.	0.
ZR-93,NB-93M	0.	1.28E+06	1.28E+06	1.28E+06	1.28E+06	1.27E+06	1.27E+06	1.25E+06	1.22E+06	1.01E+06	8.05E+05
TC-99	0.	4.77E+06	4.77E+06	4.77E+06	4.76E+06	4.70E+06	4.62E+06	4.05E+06	3.43E+06	9.18E+05	1.76E+05
PD-107	0.	3.99E+04	3.99E+04	3.99E+04	3.99E+04	3.99E+04	3.99E+04	3.97E+04	3.95E+04	3.80E+04	3.61E+04
I-129	0.	1.27E+04	1.27E+04	1.27E+04	1.27E+04	1.26E+04	1.26E+04	1.26E+04	1.26E+04	1.24E+04	1.21E+04
CS-135	0.	1.09E+05	1.09E+05	1.09E+05	1.09E+05	1.09E+05	1.08E+05	1.07E+05	1.06E+05	9.68E+04	8.63E+04
CS-137,BA-137M	0.	2.85E+10	1.80E+10	1.60E+06	1.55E+01	0.	0.	0.	0.	0.	0.
ALL OTHERS	0.	1.15E+09	6.06E+08	1.69E+07	8.30E+05	4.84E+05	4.65E+05	3.41E+05	2.32E+05	1.24E+04	3.78E+02
TOTAL	0.	4.85E+10	3.01E+10	2.67E+07	8.41E+06	7.85E+06	7.63E+06	6.51E+06	5.51E+06	2.11E+06	1.12E+06
ACTINIDES AND DAUGHTERS											
CM	0.	5.76E+08	2.71E+08	1.48E+06	4.66E+05	2.52E+05	1.66E+05	5.78E+03	8.72E+01	0.	0.
AM	0.	1.08E+09	1.05E+09	5.50E+08	2.51E+08	7.18E+06	4.31E+06	1.16E+05	1.28E+03	0.	0.
PU	0.	1.43E+08	6.59E+07	8.30E+06	6.24E+06	5.15E+06	4.37E+06	1.41E+06	3.32E+05	3.92E+03	1.57E+03
NP	0.	1.03E+07	1.03E+07	1.00E+07	9.68E+06	6.89E+06	4.51E+06	4.77E+05	3.62E+05	3.17E+05	2.70E+05
U	0.	9.21E+03	7.93E+03	1.27E+04	1.57E+04	2.23E+04	3.03E+04	8.52E+04	1.40E+05	3.03E+05	2.91E+05
PA	0.	1.98E+05	1.65E+05	2.52E+05	3.20E+05	3.71E+05	3.72E+05	3.68E+05	3.62E+05	3.18E+05	2.71E+05
TH	0.	1.30E+03	1.17E+03	1.19E+03	1.24E+03	2.98E+03	7.31E+03	6.21E+04	1.24E+05	3.03E+05	2.91E+05
RA	0.	2.00E+02	6.46E+01	3.43E+01	9.00E+01	1.72E+03	6.03E+03	6.10E+04	1.23E+05	3.02E+05	2.90E+05
OTHER DAUGHTERS*	0.	1.01E+03	3.35E+02	2.31E+02	6.16E+02	1.10E+04	3.79E+04	3.73E+05	7.30E+05	1.82E+06	1.74E+06
TOTAL	0.	1.81E+09	1.40E+09	5.70E+08	2.68E+08	1.99E+07	1.36E+07	2.96E+06	2.21E+06	3.37E+06	3.16E+06

* FR+RN+A+PO+BI+PB+TE

TABLE 10.D.62. Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment - Actinide Radioactivity Inventory in Repositories (Curies)

ACTINIDES AND DAUGHTERS	YEAR 2000	YEAR 2050	YEAR 2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
CM-245	0.	3.81E+05	3.80E+05	3.67E+05	3.58E+05	2.58E+05	1.66E+05	5.78E+03	8.72E+01	0.	0.
CM-244	0.	5.66E+08	2.63E+08	5.02E+01	2.42E-07	0.	0.	0.	0.	0.	0.
CM-243	0.	1.06E+06	6.86E+05	1.08E+02	2.14E-03	0.	0.	0.	0.	0.	0.
CM-242	0.	7.72E+06	7.05E+06	1.12E+06	1.14E+05	1.37E-03	0.	0.	0.	0.	0.
AM-243,NP-239	0.	2.04E+07	2.03E+07	1.96E+07	1.87E+07	1.30E+07	8.29E+06	2.21E+05	2.38E+03	0.	0.
AM-242M,AM-242	0.	1.88E+07	1.72E+07	2.72E+06	2.78E+05	3.32E-03	0.	0.	0.	0.	0.
AM-241	0.	1.06E+09	1.02E+09	5.38E+08	2.42E+08	6.63E+05	1.66E+05	5.79E+03	8.74E+01	0.	0.
PU-242	0.	9.09E+03	9.14E+03	9.60E+03	9.73E+03	9.68E+03	9.59E+03	8.91E+03	8.13E+03	3.91E+03	1.57E+03
PU-241	0.	1.27E+08	4.99E+07	3.67E+05	3.53E+05	2.58E+05	1.66E+05	5.79E+03	8.74E+01	0.	0.
PU-240	0.	3.06E+06	3.87E+06	4.38E+06	4.17E+06	2.77E+06	1.66E+06	2.74E+04	1.63E+02	0.	0.
PU-239	0.	1.23E+06	1.23E+06	1.32E+06	1.44E+06	2.12E+06	2.54E+06	1.37E+06	3.43E+05	3.99E+00	2.70E-06
PU-238	0.	1.15E+07	1.09E+07	2.22E+06	2.66E+03	3.30E-03	0.	0.	0.	0.	0.
PU-236	0.	8.10E+00	6.25E-02	0.	0.	0.	0.	0.	0.	0.	0.
NP-237,PA-233	0.	3.14E+05	3.27E+05	5.03E+05	6.39E+05	7.41E+05	7.42E+05	7.34E+05	7.22E+05	6.34E+05	5.39E+05
U-238,TH-234, PA-234M	0.	2.92E+03	2.92E+03	2.92E+03	2.92E+03	2.92E+03	2.92E+03	2.92E+03	2.92E+03	2.92E+03	2.92E+03
U-236	0.	7.57E+02	7.89E+02	8.34E+02	9.01E+02	1.29E+03	1.61E+03	2.07E+03	2.08E+03	2.05E+03	2.02E+03
U-235,TH-231	0.	1.06E+02	1.06E+02	1.07E+02	1.08E+02	1.22E+02	1.46E+02	3.13E+02	3.86E+02	4.10E+02	4.10E+02
U-234	0.	4.15E+03	4.79E+03	1.[illegible]E+04	1.28E+04	1.29E+04	1.27E+04	1.15E+04	1.01E+04	3.95E+03	1.71E+03
U-233	0.	1.25E+01	2.62E+01	3.51E+02	1.01E+03	7.08E+03	1.49E+04	7.05E+04	1.27E+05	2.95E+05	2.86E+05
U-232	0.	6.28E+01	5.21E+01	1.07E+00	8.65E-03	0.	0.	0.	0.	0.	0.
PA-231	0.	1.28E+01	1.29E+01	1.32E+01	1.36E+01	1.72E+01	2.23E+01	8.12E+01	1.47E+02	2.05E+02	2.05E+02
TH-230	0.	7.59E+01	7.66E+01	1.02E+02	1.58E+02	5.90E+02	1.11E+03	4.32E+03	6.58E+03	5.13E+03	2.05E+03
TH-229,7 DAUGHTERS	0.	1.07E-0[illegible]	4.00E-01	4.82E+01	3.07E+02	1.07E+04	4.10E+04	4.53E+05	9.27E+05	2.37E+06	2.30E+06
TH-228,6 DAUGHTERS	0.	1.35E+03	3.75E+02	7.66E+00	6.24E-02	1.56E-03	3.47E-03	2.20E-02	4.61E-02	2.38E-01	4.74E-01
AC-227,7 DAUGHTERS	0.	4.79E+01	7.37E+01	1.05E+02	1.09E+02	1.37E+02	1.78E+02	6.50E+02	1.18E+03	1.64E+03	1.64E+03
TH-232,2 DAUGHTERS	0.	5.52E-05	6.47E-06	4.62E-05	1.11E-04	6.61E-04	1.89E-03	9.63E-03	1.98E-02	1.02E-01	2.03E-01
RA-226,5 DAUGHTERS	0.	6.43E+00	1.03E+01	8.46E+01	2.2[illegible]E+02	2.17E+03	5.26E+03	2.60E+04	3.98E+04	3.08E+04	1.23E+04
PB-210,2 DAUGHTERS	0.	1.35E+00	2.77E+00	4.02E+01	1.1[illegible]E+02	1.08E+03	2.63E+03	1.30E+04	1.99E+04	1.54E+04	6.16E+03
TOTAL ACTINIDES	0.	1.81E+09	1.40E+09	5.70E+08	2.68E+08	1.[illegible]E+07	1.38E+07	2.96E+06	2.21E+06	3.37E+06	3.16E+06

TABLE 10.D.63. Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment - Fission and Activation Product Radioactivity Inventory in Repositories (Curies)

FISSION AND ACTIVATION	2000	YEAR 2050	2070	500	1000	GEOLOGIC TIME (YEARS BEYOND 1975) 5000	10000	50000	100000	500000	1000000
H-3	0.	3.43E+06	1.11E+06	1.46E-04	0.	0.	0.	0.	0.	0.	0.
C-14	0.	3.32E+05	3.31E+05	3.15E+05	2.97E+05	1.83E+05	1.00E+05	7.94E+02	1.88E+00	0.	0.
MN-54	0.	2.60E+02	1.46E-05	0.	0.	0.	0.	0.	0.	0.	0.
FE-55	0.	4.51E+06	2.19E+04	0.	0.	0.	0.	0.	0.	0.	0.
CO-60	0.	4.00E+07	2.87E+06	0.	0.	0.	0.	0.	0.	0.	0.
NI-59	0.	1.10E+06	1.10E+06	1.09E+06	1.09E+06	1.05E+06	1.01E+06	7.13E+05	4.62E+05	1.45E+04	1.91E+02
NI-63	0.	1.30E+08	1.18E+08	5.34E+06	1.24E+05	1.03E-08	0.	0.	0.	0.	0.
SE-79	0.	1.28E+05	1.28E+05	1.27E+05	1.27E+05	1.21E+05	1.15E+05	7.31E+04	4.41E+04	6.20E+02	3.01E+00
KR-85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB-87	0.	6.15E+00	6.15E+00	6.15E+00	6.15E+00	6.15E+00	6.15E+00	6.15E+00	6.15E+00	6.15E+00	6.15E+00
SR-90,Y-90	0.	1.88E+10	1.15E+10	5.43E+05	2.41E+00	0.	0.	0.	0.	0.	0.
ZR-93,NB-93M	0.	1.28E+06	1.28E+06	1.28E+06	1.28E+06	1.27E+06	1.27E+06	1.25E+06	1.22E+06	1.01E+06	8.05E+05
TC-99	0.	4.77E+06	4.77E+06	4.77E+06	4.76E+06	4.70E+06	4.62E+06	4.05E+06	3.03E+06	9.18E+05	1.76E+05
RU-106,RH-106	0.	2.50E+06	2.57E+00	0.	0.	0.	0.	0.	0.	0.	0.
PD-107	0.	3.49E+04	3.49E+04	3.49E+04	3.49E+04	3.49E+04	3.49E+04	3.47E+04	3.45E+04	3.30E+04	3.61E+04
AG-110M	0.	2.09E+02	4.30E-07	0.	0.	0.	0.	0.	0.	0.	0.
CD-113M	0.	9.70E+05	3.61E+05	7.52E-04	0.	0.	0.	0.	0.	0.	0.
SB-125,TE-125M	0.	1.41E+07	8.36E+04	0.	0.	0.	0.	0.	0.	0.	0.
SN-126,SB-126	0.	3.75E+05	3.75E+05	3.74E+05	3.73E+05	3.63E+05	3.50E+05	2.66E+05	1.88E+05	1.18E+04	3.60E+02
I-129	0.	1.27E+04	1.27E+04	1.27E+04	1.27E+04	1.26E+04	1.26E+04	1.26E+04	1.26E+04	1.24E+04	1.21E+04
CS-134	0.	4.12E+07	4.78E+04	0.	0.	0.	0.	0.	0.	0.	0.
CS-135	0.	1.09E+05	1.09E+05	1.09E+05	1.09E+05	1.09E+05	1.08E+05	1.07E+05	1.06E+05	9.68E+04	8.63E+04
CS-137,BA-137	0.	2.85E+10	1.80E+10	1.40E+06	1.55E+01	0.	0.	0.	0.	0.	0.
CE-144,PR-144	0.	4.75E+05	8.68E-03	0.	0.	0.	0.	0.	0.	0.	0.
PM-147	0.	8.07E+07	4.08E+05	0.	0.	0.	0.	0.	0.	0.	0.
SM-151	0.	3.94E+08	2.76E+08	1.11E+07	2.07E+05	3.05E-09	0.	0.	0.	0.	0.
EU-152	0.	9.16E+05	2.89E+05	2.15E-09	0.	0.	0.	0.	0.	0.	0.
EU-154	0.	5.05E+08	2.12E+08	5.36E+00	2.14E-09	0.	0.	0.	0.	0.	0.
EU-155	0.	8.94E+05	6.24E+02	0.	0.	0.	0.	0.	0.	0.	0.
OTHER[a]	0.	1.24E+01	1.06E-08	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	0.	4.45E+10	3.01E+10	2.67E+07	8.41E+06	7.85E+06	7.63E+06	6.51E+06	5.51E+06	2.11E+06	1.12E+06

a. Nuclides included in "other" category are all short-lived and are detailed in the next table.

TABLE 10.D.64. Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment - Short-lived Fission and Activation Product Radioactivity Inventory in Repositories (Curies)

FISSION AND ACTIVATION	YEAR 2000	YEAR 2050	YEAR 2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
SC-46	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR-51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO-58	0.	6.41E-10	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE-59	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN-65	0.	1.09E+00	1.17E-09	0.	0.	0.	0.	0.	0.	0.	0.
SR-89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y-91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR-95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB-95M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB-95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU-103	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN-123	0.	5.98E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB-124	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE-127M,TE-127	0.	8.44E-04	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE-141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM-148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD-153	0.	1.13E+01	9.42E-09	0.	0.	0.	0.	0.	0.	0.	0.
TB-160	0.	2.14E-10	0.	0.	0.	0.	0.	0.	0.	0.	0.
W-181	0.	3.08E-08	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	0.	1.24E+01	1.06E-08	0.	0.	0.	0.	0.	0.	0.	0.

TABLE 10.D.65. Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment - Total Radioactivity in Repositories by Waste Classification (Curies)

				GEOLOGIC TIME (YEARS BEYOND 1975)							
FISSION AND ACTIVATION	2000	[illegible]	2070	500	1000	5000	10000	50000	100000	500000	1000000
HLW	0.	4.83E+10	2.99E+10	1.98E+07	6.82E+06	6.53E+06	6.43E+06	5.71E+06	4.96E+06	2.02E+06	1.06E+06
FRW	0.	2.03E+08	1.32E+08	6.53E+06	1.32E+06	1.15E+06	1.09E+06	7.85E+05	5.33E+05	7.33E+04	4.64E+04
ILW	0.	1.65E+06	1.01E+06	2.00E+03	5.27E+02	4.77E+02	4.58E+02	3.68E+02	2.93E+02	1.07E+02	7.13E+01
LLW	0.	3.10E+05	3.07E+05	2.89E+05	2.73E+05	1.73E+05	1.00E+05	1.32E+04	1.25E+04	1.23E+04	1.20E+04
TOTAL	0.	4.85E+10	3.01E+10	2.67E+07	8.41E+06	7.85E+06	7.63E+06	6.51E+06	5.51E+06	2.11E+06	1.12E+06
ACTINIDES											
HLW	0.	1.74E+09	1.37E+09	5.66E+08	2.65E+08	1.87E+07	1.30E+07	2.79E+06	2.15E+06	3.34E+06	3.14E+06
FRW	0.	8.30E+06	4.22E+06	7.03E+05	4.01E+05	1.34E+05	9.65E+04	2.03E+04	8.57E+03	5.08E+03	3.75E+03
ILW	0.	5.41E+07	2.57E+07	3.05E+06	1.95E+06	9.06E+05	6.54E+05	1.35E+05	5.10E+04	2.14E+04	1.35E+04
LLW	0.	9.15E+06	4.39E+06	6.18E+05	3.58E+05	1.24E+05	9.00E+04	1.85E+04	6.26E+03	2.62E+03	1.96E+03
TOTAL	0.	1.81E+09	1.40E+09	5.70E+08	2.68E+08	1.99E+07	1.38E+07	2.96E+06	2.21E+06	3.37E+06	3.16E+06

TABLE 10.D.66. Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment - Summary Heat Generation Rate in Repositories by Major Radionuclides (Watts)

		YEAR		GEOLOGIC TIME (YEARS BEYOND 1975)							
FISSION AND ACTIVATION	2000	2050	2070	500	1000	5000	10000	50000	100000	500000	1000000
C-14	0.	9.84E+01	9.81E+01	9.34E+01	8.80E+01	5.42E+01	2.96E+01	2.35E-01	5.58E-04	0.	0.
NI-59	0.	6.99E+03	6.98E+03	6.96E+03	6.93E+03	6.69E+03	6.41E+03	4.53E+03	2.94E+03	9.21E+01	1.21E+00
SR-90,Y-90	0.	6.76E+07	4.13E+07	1.95E+03	8.66E-03	0.	0.	0.	0.	0.	0.
ZR-93,NB-93M	0.	2.99E+02	2.99E+02	2.99E+02	2.99E+02	2.98E+02	2.98E+02	2.92E+02	2.86E+02	2.37E+02	1.89E+02
TC-99	0.	8.21E+03	8.21E+03	8.20E+03	8.18E+03	8.07E+03	7.96E+03	6.96E+03	5.90E+03	1.58E+03	3.03E+02
PD-107	0.	3.31E+00	3.31E+00	3.31E+00	3.31E+00	3.31E+00	3.31E+00	3.29E+00	3.28E+00	3.15E+00	3.00E+00
I-129	0.	8.32E+00	8.32E+00	8.32E+00	8.32E+00	8.32E+00	8.32E+00	8.31E+00	8.29E+00	8.16E+00	7.99E+00
CS-135	0.	5.28E+01	5.28E+01	5.28E+01	5.28E+01	5.28E+01	5.27E+01	5.22E+01	5.16E+01	4.71E+01	4.19E+01
CS-137,BA-137M	0.	7.83E+07	4.94E+07	4.39E+03	4.25E-02	0.	0.	0.	0.	0.	0.
ALL OTHERS	0.	5.91E+06	2.30E+06	2.33E+04	3.57E+03	3.10E+03	2.99E+03	2.27E+03	1.60E+03	9.94E+01	3.11E+00
TOTAL	0.	1.52E+08	9.29E+07	4.53E+04	1.91E+04	1.83E+04	1.77E+04	1.41E+04	1.08E+04	2.07E+03	5.49E+02
ACTINIDES AND DAUGHTERS											
CM	0.	2.02E+07	9.51E+06	5.26E+04	1.53E+04	7.90E+03	5.20E+03	1.81E+02	2.74E+00	0.	0.
AM	0.	3.56E+07	3.46E+07	1.83E+07	8.41E+06	2.60E+05	1.57E+05	4.22E+03	4.63E+01	0.	0.
PU	0.	5.21E+05	5.23E+05	2.51E+05	1.84E+05	1.52E+05	1.31E+05	4.38E+04	1.09E+04	1.16E+02	4.63E+01
NP	0.	1.84E+04	1.85E+04	2.06E+04	2.20E+04	1.97E+04	1.65E+04	1.09E+04	1.06E+04	9.31E+03	7.92E+03
U	0.	1.70E+02	1.88E+02	3.61E+02	4.48E+02	6.39E+02	8.70E+02	2.47E+03	4.07E+03	8.80E+03	8.46E+03
PA	0.	2.17E+02	2.26E+02	3.49E+02	4.37E+02	5.06E+02	5.07E+02	5.03E+02	4.97E+02	4.40E+02	3.76E+02
TH	0.	9.05E+00	4.62E+00	3.93E+00	6.48E+00	5.82E+01	1.88E+02	1.84E+03	3.70E+03	9.12E+03	8.76E+03
RA	0.	6.83E+00	2.20E+00	8.95E-01	1.57E+00	1.17E+01	2.90E+01	1.63E+02	2.69E+02	3.47E+02	2.55E+02
OTHER DAUGHTERS*	0.	2.79E+01	8.97E+00	5.18E+00	1.46E+01	2.89E+02	1.02E+03	1.03E+04	2.08E+04	5.12E+04	4.92E+04
TOTAL	0.	5.63E+07	4.46E+07	1.86E+07	8.63E+06	4.42E+05	3.12E+05	7.44E+04	5.09E+04	7.93E+04	7.50E+04

* FR+RN+A+PO+BI+PB+TE

TABLE 10.D.67. Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment - Actinide Heat Generation Rate in Repositories (Watts)

ACTINIDES AND DAUGHTERS	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 900	1000	5000	10000	50000	100000	500000	1000000
CM-245	0.	1.19E+04	1.19E+04	1.15E+04	1.11E+04	7.90E+03	5.20E+03	1.81E+02	2.74E+00	0.	0.
CM-244	0.	1.98E+07	9.21E+06	1.76E+00	8.48E-09	0.	0.	0.	0.	0.	0.
CM-243	0.	3.89E+04	2.52E+04	3.99E+00	7.88E-05	0.	0.	0.	0.	0.	0.
CM-242	0.	2.84E+05	2.60E+05	4.11E+04	4.20E+03	5.04E-05	0.	0.	0.	0.	0.
AM-243, NP-239	0.	3.89E+05	3.89E+05	3.71E+05	3.54E+05	2.47E+05	1.57E+05	4.18E+03	4.50E+01	0.	0.
AM-242M, AM-242	0.	1.52E+04	1.39E+04	2.20E+03	2.25E+02	2.69E-06	0.	0.	0.	0.	0.
AM-241	0.	3.52E+07	3.42E+07	1.79E+07	8.07E+06	2.21E+04	5.55E+03	1.93E+02	2.92E+00	0.	0.
PU-242	0.	2.68E+02	2.70E+02	2.83E+02	2.87E+02	2.86E+02	2.83E+02	2.63E+02	2.40E+02	1.16E+02	4.63E+01
PU-241	0.	5.26E+03	2.07E+03	1.52E+01	1.46E+01	1.05E+01	6.88E+00	2.40E-01	3.63E-03	0.	0.
PU-240	0.	9.54E+04	1.20E+05	1.36E+05	1.30E+05	8.62E+04	5.16E+04	8.54E+02	5.06E+00	0.	0.
PU-239	0.	3.81E+04	3.83E+04	4.10E+04	4.49E+04	6.60E+04	7.39E+04	4.26E+04	1.07E+04	1.24E-01	8.40E-08
PU-238	0.	3.82E+05	3.62E+05	7.36E+04	8.82E+03	1.09E-04	0.	0.	0.	0.	0.
PU-236	0.	2.82E-01	2.18E-03	0.	0.	0.	0.	0.	0.	0.	0.
NP-237, PA-233	0.	4.82E+03	5.03E+03	7.72E+03	9.81E+03	1.14E+04	1.14E+04	1.13E+04	1.11E+04	9.74E+03	8.29E+03
U-238, TH-234, PA-234M	0.	3.00E+01	3.00E+01	3.00E+01	3.00E+01	3.00E+01	3.00E+01	3.00E+01	3.00E+01	3.00E+01	3.00E+01
U-236	0.	2.13E+01	2.14E+01	2.26E+01	2.44E+01	3.51E+01	4.37E+01	5.61E+01	5.63E+01	5.56E+01	5.48E+01
U-235, TH-231	0.	1.51E+00	1.51E+00	1.53E+00	1.55E+00	1.75E+00	2.08E+00	4.46E+00	5.51E+00	5.85E+00	5.84E+00
U-234	0.	1.20E+02	1.38E+02	3.02E+02	3.68E+02	3.72E+02	3.67E+02	3.31E+02	2.91E+02	1.14E+02	4.91E+01
U-233	0.	3.63E-01	7.62E-01	1.02E+01	2.93E+01	2.06E+02	4.32E+02	2.05E+03	3.70E+03	8.60E+03	8.33E+03
U-232	0.	2.02E+00	1.67E+00	3.42E-02	2.78E-04	0.	0.	0.	0.	0.	0.
PA-231	0.	3.92E-01	3.93E-01	4.02E-01	4.16E-01	5.24E-01	6.79E-01	2.48E+00	4.50E+00	6.25E+00	6.25E+00
TH-230	0.	2.14E+00	2.17E+00	2.88E+00	4.47E+00	1.67E+01	3.15E+01	1.22E+02	1.86E+02	1.45E+02	5.80E+01
TH-229,7 DAUGHTERS	0.	2.69E-03	1.00E-02	1.21E+00	7.71E+00	2.69E+02	1.03E+03	1.14E+04	2.32E+04	5.95E+04	5.77E+04
TH-228,6 DAUGHTERS	0.	3.99E+01	1.11E+01	2.26E-01	1.85E-03	4.56E-05	1.02E-04	6.50E-04	1.36E-03	7.02E-03	1.40E-02
AC-227,7 DAUGHTERS	0.	1.18E+00	1.84E+00	2.61E+00	2.72E+00	3.43E+00	4.44E+00	1.62E+01	2.94E+01	4.09E+01	4.08E+01
TH-232,2 DAUGHTERS	0.	2.49E-07	6.37E-08	4.55E-07	1.09E-06	6.51E-06	1.46E-05	9.29E-05	1.93E-04	1.00E-03	2.00E-03
RA-226,5 DAUGHTERS	0.	1.71E-01	2.74E-01	2.24E+00	6.03E+00	5.74E+01	1.39E+02	6.89E+02	1.06E+03	8.16E+02	3.27E+02
PB-210,2 DAUGHTERS	0.	1.54E-02	3.16E-02	4.58E-01	1.30E+00	1.23E+01	3.00E+01	1.48E+02	2.27E+02	1.75E+02	7.02E+01
TOTAL ACTINIDES	0.	5.63E+07	4.46E+07	1.86E+07	8.63E+06	4.42E+05	3.12E+05	7.44E+04	5.09E+04	7.93E+04	7.50E+04

TABLE 10.D.68. Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment - Fission and Activation Product Heat Generation Rate in Repositories (Watts)

FISSION AND ACTIVATION	YEAR 2000	YEAR 2050	YEAR 2070	GEOLOGIC TIME (YEARS BEYOND 1979) 500	1000	5000	10000	50000	100000	500000	1000000
H-3	0.	1.22E+02	3.96E+01	3.21E-09	0.	0.	0.	0.	0.	0.	0.
C-14	0.	9.84E-01	9.81E-01	9.34E-01	8.80E-01	5.42E-01	2.96E-01	2.35E-01	5.58E-04	0.	0.
MN-54	0.	2.11E+00	1.18E-07	0.	0.	0.	0.	0.	0.	0.	0.
FE-55	0.	5.88E+03	2.85E+01	0.	0.	0.	0.	0.	0.	0.	0.
CO-60	0.	6.76E+05	4.49E+04	0.	0.	0.	0.	0.	0.	0.	0.
NI-59	0.	6.99E-03	6.98E-03	6.96E-03	6.93E-03	6.69E-03	6.41E-03	4.53E-03	2.94E-03	9.21E-01	1.21E+00
NI-63	0.	2.08E+04	1.79E+04	8.54E+02	1.98E+01	0.	0.	0.	0.	0.	0.
SE-79	0.	4.85E-01	4.85E-01	4.83E-01	4.80E-01	4.60E-01	4.36E-01	2.85E-01	1.67E-01	2.35E-01	1.14E-03
KR-85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB-87	0.	4.01E-03	4.01E-03	4.01E-03	4.01E-03	4.01E-03	4.01E-03	4.01E-03	4.01E-03	4.01E-03	4.01E-03
SR-90,Y-90	0.	6.76E+07	4.13E+07	1.95E+03	8.66E-03	0.	0.	0.	0.	0.	0.
ZR-93,NB-93M	0.	2.99E+02	2.99E+02	2.99E+02	2.99E+02	2.98E+02	2.98E+02	2.92E+02	2.86E+02	2.37E+02	1.89E+02
TC-99	0.	8.21E+03	8.21E+03	8.20E+03	8.18E+03	8.07E+03	7.94E+03	6.96E+03	5.90E+03	1.58E+03	3.03E+02
RU-106,RH-106	0.	1.32E+04	1.36E-02	0.	0.	0.	0.	0.	0.	0.	0.
PD-107	0.	3.31E+00	3.31E+00	3.31E+00	3.31E+00	3.31E+00	3.31E+00	3.29E+00	3.28E+00	3.15E+00	3.00E+00
AG-110M	0.	3.92E+00	7.26E-09	0.	0.	0.	0.	0.	0.	0.	0.
CD-113M	0.	1.29E+03	4.77E+02	9.94E-07	0.	0.	0.	0.	0.	0.	0.
SB-125,TE-125M	0.	3.48E+04	2.05E+02	0.	0.	0.	0.	0.	0.	0.	0.
SN-126,SB-126	0.	3.16E+03	3.16E+03	3.15E+03	3.14E+03	3.06E+03	2.95E+03	2.24E+03	1.58E+03	9.91E+01	3.11E+00
I-129	0.	8.32E+00	8.32E+00	8.32E+00	8.32E+00	8.32E+00	8.32E+00	8.31E+00	8.29E+00	8.16E+00	7.99E+00
CS-134	0.	4.36E+05	5.07E+02	0.	0.	0.	0.	0.	0.	0.	0.
CS-135	0.	5.28E+01	5.28E+01	5.28E+01	5.28E+01	5.28E+01	5.27E+01	5.22E+01	5.16E+01	4.71E+01	4.19E+01
CS-137,BA-137	0.	7.83E+07	4.98E+07	4.39E+03	4.25E-02	0.	0.	0.	0.	0.	0.
CE-144,PR-144	0.	2.04E+03	3.73E-05	0.	0.	0.	0.	0.	0.	0.	0.
PM-147	0.	4.16E+04	2.10E+02	0.	0.	0.	0.	0.	0.	0.	0.
SM-151	0.	5.64E+05	4.81E+05	1.93E+04	3.60E+02	0.	0.	0.	0.	0.	0.
EU-152	0.	1.60E+04	5.17E+03	3.89E-07	0.	0.	0.	0.	0.	0.	0.
EU-154	0.	4.18E+06	1.74E+06	4.42E-02	0.	0.	0.	0.	0.	0.	0.
EU-155	0.	7.53E+02	3.57E-01	0.	0.	0.	0.	0.	0.	0.	0.
OTHER[a]	0.	2.50E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	0.	1.92E+08	9.29E+07	4.53E+04	1.91E+04	1.83E+04	1.77E+04	1.41E+04	1.08E+04	2.07E+03	5.09E+02

a. Nuclides included in "other" category are all short-lived and are detailed in the next table.

TABLE 10.D.69. Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment - Short-lived Fission and Activation Product Heat Generation Rate in Repositories (Watts)

FISSION AND ACTIVATION	YEAR 2000	YEAR 2050	YEAR 2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
SC-46	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR-51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO-58	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE-59	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN-65	0.	8.47E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR-89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y-91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR-95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB-95M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB-95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU-103	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN-123	0.	2.08E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB-124	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE-127M,TE-127	0.	9.13E-07	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE-141	0.	0.	0.	0	0.	0.	0.	0.	0.	0.	0.
PM-148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD-153	0.	1.63E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB-160	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
HF-181	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	0.	2.50E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.

TABLE 10.D.70. Case 4B - Deferred Decision for U and Pu Recycle - Referenct Treatment - Total Heat Generation Rate in Repositories by Waste Classification (Watts)

FISSION AND ACTIVATION	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
HLW	0.	1.51E+08	9.28E+07	3.74E+04	1.21E+04	1.15E+04	1.13E+04	9.37E+03	7.83E+03	1.95E+03	5.29E+02
FRW	0.	7.36E+05	1.17E+05	7.83E+03	6.95E+03	6.70E+03	6.41E+03	4.54E+03	2.95E+03	1.07E+02	1.23E+01
ILW	0.	5.11E+03	3.06E+03	2.82E+00	1.82E+00	1.75E+00	1.68E+00	1.23E+00	8.70E-01	1.07E-01	4.16E-02
LLW	0.	1.14E+02	1.06E+02	9.02E+01	8.84E+01	5.58E+01	3.42E+01	8.45E+00	8.22E+00	8.09E+00	7.93E+00
TOTAL	0.	1.52E+08	9.29E+07	4.53E+04	1.91E+04	1.83E+04	1.77E+04	1.41E+04	1.08E+04	2.07E+03	5.49E+02
ACTINIDES											
HLW	0.	5.60E+07	4.43E+07	1.85E+07	8.54E+06	4.05E+05	2.86E+05	6.92E+04	4.91E+04	7.86E+04	7.46E+04
FRW	0.	5.98E+04	5.52E+04	2.28E+04	1.28E+04	4.07E+03	2.93E+03	5.98E+02	2.27E+02	1.17E+02	8.63E+01
ILW	0.	2.31E+05	2.40E+05	9.89E+04	6.23E+04	2.81E+04	2.03E+04	4.05E+03	1.39E+03	4.91E+02	3.07E+02
LLW	0.	3.94E+04	4.19E+04	2.02E+04	1.16E+04	3.85E+03	2.79E+03	5.61E+02	1.76E+02	6.15E+01	4.60E+01
TOTAL	0.	5.63E+07	4.46E+07	1.86E+07	8.63E+06	4.42E+05	3.12E+05	7.44E+04	5.09E+04	7.93E+04	7.50E+04

TABLE 10.D.71. Case 1 - Low Growth - Once-Through Cycle - Reference Treatment - Summary Radioactivity Inventory in Repositories by Major Radionuclides (Curies)

FISSION AND ACTIVATION	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
C-14	3.45E+04	2.02E+05	2.01E+05	1.92E+05	1.80E+05	1.11E+05	6.08E+04	4.83E+02	1.14E+00	0.	0.
NI-59	1.24E+05	7.32E+05	7.31E+05	7.29E+05	7.26E+05	7.01E+05	6.71E+05	4.75E+05	3.08E+05	9.65E+03	1.27E+02
SR-90,Y-90	3.86E+09	1.23E+10	7.44E+09	3.54E+05	1.57E+00	0.	0.	0.	0.	0.	0.
ZR-93,NB-93M	1.31E+05	7.93E+05	7.93E+05	7.93E+05	7.93E+05	7.92E+05	7.90E+05	7.75E+05	7.58E+05	6.30E+05	5.00E+05
TC-99	5.10E+05	3.07E+06	3.07E+06	3.07E+06	3.06E+06	3.02E+06	2.97E+06	2.61E+06	2.21E+06	5.91E+05	1.13E+05
PD-107	3.93E+03	2.33E+04	2.33E+04	2.33E+04	2.33E+04	2.33E+04	2.33E+04	2.32E+04	2.31E+04	2.22E+04	2.11E+04
I-129	1.31E+03	7.88E+03	7.88E+03	7.88E+03	7.88E+03	7.87E+03	7.87E+03	7.86E+03	7.84E+03	7.72E+03	7.56E+03
CS-135	1.03E+04	6.38E+04	6.38E+04	6.38E+04	6.38E+04	6.38E+04	6.37E+04	6.31E+04	6.24E+04	5.69E+04	5.07E+04
CS-137,BA-137M	5.37E+09	1.76E+10	1.11E+10	9.84E+05	4.53E+00	0.	0.	0.	0.	0.	0.
ALL OTHERS	1.01E+09	9.02E+08	4.29E+08	1.07E+07	5.16E+05	2.98E+05	2.86E+05	2.09E+05	1.42E+05	7.50E+03	2.28E+02
TOTAL	1.02E+10	3.07E+10	1.90E+10	1.69E+07	5.37E+06	5.02E+06	4.88E+06	4.16E+06	3.51E+06	1.32E+06	6.93E+05
ACTINIDES AND DAUGHTERS											
CM	3.07E+07	7.33E+07	3.49E+07	2.91E+05	6.39E+04	2.74E+04	1.80E+04	6.28E+02	4.48E+00	0.	0.
AM	7.45E+07	7.50E+08	8.20E+08	4.62E+06	2.09E+06	2.44E+06	1.33E+06	3.57E+04	3.88E+02	0.	0.
PU	2.58E+09	5.11E+09	2.28E+09	1.87E+08	1.67E+08	1.26E+08	9.25E+07	1.82E+07	4.49E+06	1.51E+05	6.06E+04
NP	5.36E+05	3.32E+06	3.32E+06	3.28E+06	3.20E+06	2.33E+06	1.58E+06	[illegible]	2.55E+05	2.24E+05	1.90E+05
U	1.25E+05	5.34E+05	4.84E+05	5.38E+05	5.53E+05	5.64E+05	5.72E+05	5.88E+05	5.90E+05	5.35E+05	4.64E+05
PA	2.57E+04	1.57E+05	1.63E+05	2.39E+05	2.96E+05	3.39E+05	3.40E+05	3.39E+05	3.37E+05	3.07E+05	2.74E+05
TH	1.47E+04	8.41E+04	8.36E+04	8.22E+04	8.41E+04	9.95E+04	1.20E+05	2.64E+05	3.83E+05	4.91E+05	4.00E+05
RA	5.83E+02	3.25E+03	2.70E+03	2.14E+02	6.75E+02	1.14E+04	3.07E+04	1.82E+05	3.02E+05	4.09E+05	3.17E+05
OTHER DAUGHTERS*	2.92E+03	1.63E+04	1.35E+04	1.43E+03	5.16E+03	8.83E+04	2.37E+05	1.37E+06	2.24E+06	2.84E+06	2.11E+06
TOTAL	2.68E+09	5.94E+09	3.14E+09	6.53E+08	3.80E+08	1.32E+08	9.68E+07	2.13E+07	8.60E+06	4.95E+06	3.82E+06

* FR+RN+A+PO+BI+PB+TE

TABLE 10.D.72. Case 1 - Low Growth - Once-Through Cycle - Reference Treatment - Actinide Radioactivity Inventory in Repositories (Curies)

ACTINIDES AND DAUGHTERS	YEAR 2000	YEAR 2050	YEAR 2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
CM-245	6.37E+03	4.18E+04	4.13E+04	3.99E+04	3.83E+04	2.74E+04	[illegible]	6.28E+02	9.48E+00	0.	0.
CM-244	3.02E+07	7.11E+07	3.31E+07	6.30E+00	3.04E-08	0.	0.	0.	0.	0.	0.
CM-243	1.14E+05	3.98E+03	2.58E+03	4.08E+01	8.06E-04	0.	0.	0.	0.	0.	0.
CM-242	3.06E+05	1.74E+06	1.59E+06	2.51E+05	2.57E+04	3.07E-04	0.	0.	0.	0.	0.
AM-243,NP-239	1.05E+06	6.47E+06	6.46E+06	6.23E+06	5.95E+06	4.14E+06	2.63E+06	7.02E+04	7.56E+02	0.	0.
AM-242M,AM-242	7.81E+05	4.23E+06	3.86E+06	6.12E+05	6.26E+04	7.48E-04	0.	0.	0.	0.	0.
AM-241	7.32E+07	7.43E+08	8.12E+08	4.58E+08	2.06E+08	3.70E+05	1.82E+04	6.29E+02	9.50E+00	0.	0.
PU-242	6.20E+04	3.77E+05	3.77E+05	3.77E+05	3.76E+05	3.74E+05	3.70E+05	3.44E+05	3.14E+05	1.51E+05	6.06E+04
PU-241	2.47E+09	4.57E+09	1.79E+09	4.00E+04	3.83E+04	2.74E+04	1.80E+04	6.29E+02	9.50E+00	0.	0.
PU-240	1.86E+07	1.07E+08	1.07E+08	1.03E+08	9.79E+07	6.50E+07	3.89E+07	6.44E+05	3.82E+03	0.	0.
PU-239	1.23E+07	6.99E+07	6.98E+07	6.91E+07	6.82E+07	6.11E+07	5.32E+07	1.73E+07	4.17E+06	4.84E+01	3.28E-05
PU-238	7.38E+07	3.69E+08	3.16E+08	1.40E+07	3.35E+05	7.41E-04	0.	0.	0.	0.	0.
PU-236	8.58E+02	1.48E+02	1.19E+00	0.	0.	0.	0.	0.	0.	0.	0.
NP-237,PA-233	2.45E+04	1.62E+05	1.72E+05	3.24E+05	4.38E+05	5.24E+05	5.24E+05	5.18E+05	5.09E+05	4.67E+05	3.81E+05
U-238,TH-234, PA-234M	4.02E+04	2.29E+05	2.29E+05	2.29E+05	2.29E+05	2.29E+05	2.29E+05	2.29E+05	2.29E+05	2.29E+05	2.30E+05
U-236	8.84E+03	5.39E+04	5.40E+04	5.51E+04	5.66E+04	6.59E+04	7.33E+04	8.41E+04	8.42E+04	8.32E+04	8.20E+04
U-235,TH-231	1.41E+03	8.55E+03	8.55E+03	8.60E+03	8.67E+03	9.17E+03	9.73E+03	1.22E+04	1.31E+04	1.34E+04	1.34E+04
U-234	3.92E+04	2.82E+05	3.02E+05	4.02E+05	4.15E+05	4.12E+05	4.07E+05	3.72E+05	3.33E+05	1.60E+05	9.70E+04
U-233	3.37E+00	3.04E+01	3.75E+01	2.39E+02	6.76E+02	4.97E+03	1.05E+04	4.98E+04	8.96E+04	2.06E+05	2.02E+05
U-232	6.27E+02	3.17E+03	2.62E+03	5.36E+01	4.35E-01	0.	0.	0.	0.	0.	0.
PA-231	1.15E+00	9.89E+00	1.17E+01	4.54E+01	9.25E+01	4.48E+02	8.83E+02	3.64E+03	5.47E+03	6.71E+03	6.71E+03
TH-230	5.26E+00	9.82E+01	1.09E+02	1.34E+03	3.21E+03	1.71E+04	3.38E+04	1.38E+05	2.13E+05	1.92E+05	1.07E+05
TH-229,7 DAUGHTERS	1.55E-02	6.73E-01	1.19E+00	3.68E+01	2.09E+02	7.49E+03	2.88E+04	3.20E+05	6.54E+05	1.67E+06	1.62E+06
TH-228,6 DAUGHTERS	4.08E+03	2.27E+04	1.89E+04	3.86E+02	3.15E+00	1.02E-01	2.23E-01	1.34E+00	2.79E+00	1.43E+01	2.85E+01
AC-227,7 DAUGHTERS	1.54E+00	4.53E+01	6.52E+01	3.52E+02	7.41E+02	3.58E+03	7.07E+03	2.91E+04	4.38E+04	5.37E+04	5.36E+04
TH-232,2 DAUGHTERS	5.01E-06	2.09E-04	3.62E-03	3.38E-03	7.70E-03	4.38E-02	9.55E-02	3.76E-01	1.20E+00	6.12E+00	1.22E+01
RA-226,5 DAUGHTERS	1.22E-01	5.96E+00	1.23E+01	6.63E+02	3.33E+03	6.00E+04	1.58E+05	8.28E+05	1.29E+06	1.16E+06	6.41E+05
PB-210,2 DAUGHTERS	1.13E+02	1.15E+00	2.83E+00	3.13E+02	1.67E+03	3.00E+04	7.88E+04	4.14E+05	6.43E+05	5.78E+05	3.20E+05
TOTAL ACTINIDES	2.68E+09	5.04E+09	3.14E+09	6.53E+08	3.80E+08	1.32E+08	9.68E+07	2.13E+07	8.60E+06	4.95E+06	3.82E+06

TABLE 10.D.73. Case 1 - Low Growth - Once-Through Cycle - Reference Treatment - Fission and Activation Product Radioactivity Inventory in Repositories (Curies)

FISSION AND ACTIVATION PRODUCTS	2000	YEAR 2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
H-3	4.74E+06	1.27E+07	4.17E+06	5.43E+04	0.	0.	0.	0.	0.	0.	0.
C-14	7.35E+04	2.02E+05	2.01E+05	1.92E+05	1.80E+05	1.11E+05	6.08E+04	4.43E+02	1.14E+00	0.	0.
MN-54	1.12E+04	1.27E+02	7.14E-06	0.	0.	0.	0.	0.	0.	0.	0.
FE-55	1.71E+07	2.72E+06	1.32E+04	0.	0.	0.	0.	0.	0.	0.	0.
CO-60	4.34E+07	2.75E+07	1.61E+06	0.	0.	0.	0.	0.	0.	0.	0.
NI-59	1.24E+05	7.32E+05	7.31E+05	7.24E+05	7.26E+05	7.01E+05	6.71E+05	4.75E+05	3.05E+05	4.65E+03	1.27E+02
NI-63	1.73E+07	7.54E+07	7.34E+07	3.52E+06	6.16E+04	6.80E-14	0.	0.	0.	0.	0.
SE-79	1.44E+04	8.36E+04	8.33E+04	8.32E+04	8.27E+04	7.93E+04	7.52E+04	4.91E+04	2.90E+04	4.06E+02	1.47E+00
KR-85	1.73E+08	2.39E+08	4.61E+07	3.64E+04	0.	0.	0.	0.	0.	0.	0.
RB-87	[illegible]	4.12E+00	4.12E+00	4.12E+00	4.12E+00	4.12E+00	4.12E+00	4.12E+00	4.12E+00	4.12E+00	4.12E+00
SR-90,Y-90	5.66E+09	1.24E+10	7.44E+09	3.34E+05	1.57E+00	0.	0.	0.	0.	0.	0.
ZR-93,NB-93M	1.31E+05	7.93E+05	7.93E+05	7.93E+05	7.93E+05	7.92E+05	7.90E+05	7.75E+05	7.58E+05	6.30E+05	5.00E+05
TC-99	4.71E+05	3.07E+06	3.07E+06	3.07E+06	3.06E+06	3.02E+06	2.97E+06	2.61E+06	2.21E+06	5.41E+05	1.13E+05
RU-106,RH-106	4.27E+07	1.14E+06	1.19E+00	0.	0.	0.	0.	0.	0.	0.	0.
PD-107	4.94E+03	2.33E+04	2.33E+04	2.33E+04	2.33E+04	2.33E+04	2.33E+04	2.32E+04	2.31E+04	2.22E+04	2.11E+04
AG-110M	1.67E+04	1.81E+01	1.61E-17	0.	0.	0.	0.	0.	0.	0.	0.
CD-113M	1.47E+04	3.24E+05	1.23E+05	2.51E+04	0.	0.	0.	0.	0.	0.	0.
SB-125,TE-125M	3.47E+07	6.07E+06	3.54E+04	0.	0.	0.	0.	0.	0.	0.	0.
SN-126,SB-126M	3.70E+04	2.26E+05	2.26E+05	2.26E+05	2.25E+05	2.19E+05	2.11E+05	1.60E+05	1.13E+05	7.04E+03	2.22E+02
I-129	1.31E+03	7.88E+03	7.88E+03	7.88E+03	7.88E+03	7.87E+03	7.87E+03	7.86E+03	7.84E+03	7.72E+03	7.58E+03
CS-134	2.14E+08	2.10E+07	2.44E+04	0.	0.	0.	0.	0.	0.	0.	0.
CS-135	1.03E+04	6.34E+04	6.34E+04	6.38E+04	6.38E+04	6.38E+04	6.37E+04	6.31E+04	6.24E+04	5.69E+04	5.07E+04
CS-137,BA-137M	5.37E+09	1.76E+10	1.11E+10	9.84E+05	9.53E+00	0.	0.	0.	0.	0.	0.
CE-144,PR-144	2.49E+07	2.65E+05	4.84E-03	0.	0.	0.	0.	0.	0.	0.	0.
PM-147	2.31E+08	4.33E+07	2.17E+05	0.	0.	0.	0.	0.	0.	0.	0.
SM-151	4.20E+07	2.00E+08	1.70E+08	6.02E+06	1.27E+03	1.88E-04	0.	0.	0.	0.	0.
EU-152	2.43E+03	3.87E+05	1.22E+05	9.06E-06	0.	0.	0.	0.	0.	0.	0.
EU-154	1.30E+06	2.67E+08	1.12E+08	2.65E+00	1.13E-04	0.	0.	0.	0.	0.	0.
EU-155	5.11E+06	5.84E+05	1.83E+02	0.	0.	0.	0.	0.	0.	0.	0.
OTHER[a]	1.41E+03	7.89E+00	6.64E-09	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	3.02E+10	3.01E+10	1.90E+10	1.69E+07	5.37E+06	5.02E+06	4.88E+06	4.18E+06	3.51E+06	1.32E+06	6.93E+05

a. Nuclides included in "other" category are all short-lived and are detailed in the next table.

TABLE 10.D.74. Case 1 - Low Growth - Once-Through Cycle - Reference Treatment - Short-lived Fission and Activation Product Radioactivity Inventory in Repositories (Curies)

FISSION AND ACTIVATION	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
SC-46	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR-51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO-58	5.45E-03	9.61E-10	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE-59	1.32E-07	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN-65	1.32E+02	5.02E-01	6.35E-10	0.	0.	0.	0.	0.	0.	0.	0.
SR-89	8.18E-06	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y-91	2.85E-04	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR-95	5.70E-06	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB-95M	3.35E-04	5.12E-10	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB-95	2.94E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU-103	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN-123	2.50E+01	4.23E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB-124	2.22E-07	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE-127M,TE-127	1.08E-01	6.88E-04	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE-141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM-148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD-153	1.25E+03	7.29E+00	6.06E-09	0.	0.	0.	0.	0.	0.	0.	0.
TB-160	2.89E-04	3.38E-10	0.	0.	0.	0.	0.	0.	0.	0.	0.
W-181	6.11E-05	2.26E-08	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	1.41E+03	7.80E+00	6.69E-09	0.	0.	0.	0.	0.	0.	0.	0.

TABLE 10.D.75. Case 1 - Low Growth - Once-Through Cycle - Reference Treatment - Total Radioactivity in Repositories by Waste Classification (Curies)

	YEAR			GEOLOGIC TIME (YEARS BEYOND 1975)							
FISSION AND ACTIVATION	2000	2050	2070	500	1000	5000	10000	50000	100000	500000	1000000
BWR CANISTERS	3.29E+09	1.01E+10	6.24E+09	5.15E+06	1.66E+06	1.57E+06	1.54E+06	1.34E+06	1.14E+06	4.42E+05	2.32E+05
PWR CANISTERS	6.95E+09	2.06E+10	1.27E+10	1.16E+07	3.59E+06	3.37E+06	3.29E+06	2.81E+06	2.37E+06	8.82E+05	4.61E+05
TOTAL	1.02E+10	3.07E+10	1.90E+10	1.67E+07	5.25E+06	4.94E+06	4.83E+06	4.16E+06	3.51E+06	1.32E+06	6.93E+05
ACTINIDES											
BWR CANISTERS	8.21E+08	1.85E+09	9.82E+08	2.11E+08	1.25E+08	4.60E+07	3.35E+07	7.23E+06	2.86E+06	1.63E+06	1.27E+06
PWR CANISTERS	1.86E+09	4.09E+09	2.14E+09	4.42E+08	2.55E+08	8.64E+07	6.33E+07	1.41E+07	5.73E+06	3.33E+06	2.54E+06
TOTAL	2.68E+09	5.94E+09	3.14E+09	6.53E+08	3.80E+08	1.32E+08	9.68E+07	2.13E+07	8.60E+06	4.95E+06	3.82E+06

TABLE 10.D.76. Case 1 - Low Growth - Once-Through Cycle - Reference Treatment - Summary Heat Generation Rate in Repositories by Major Radionuclides (Watts)

FISSION AND ACTIVATION	YEAR 2000	YEAR 2050	YEAR 2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
C-14	1.02E+01	5.98E+01	5.96E+01	5.68E+01	5.35E+01	3.30E+01	1.80E+01	1.43E-01	3.39E-04	0.	0.
NI-59	7.87E+02	4.65E+03	4.65E+03	4.64E+03	4.62E+03	4.45E+03	4.27E+03	3.02E+03	1.96E+03	6.13E+01	8.08E-01
SR-90,Y-90	1.39E+07	4.61E+07	2.69E+07	1.27E+03	5.65E-03	0.	0.	0.	0.	0.	0.
ZR-93,NB-93M	3.07E+01	1.86E+02	1.85E+02	1.86E+02	1.86E+02	1.85E+02	1.85E+02	1.82E+02	1.77E+02	1.47E+02	1.17E+02
TC-99	8.78E+02	5.28E+03	5.28E+03	5.27E+03	5.26E+03	5.20E+03	5.11E+03	4.48E+03	3.80E+03	1.02E+03	1.95E+02
PD-107	3.26E-01	1.94E+00	1.94E+00	1.94E+00	1.94E+00	1.94E+00	1.94E+00	1.93E+00	1.92E+00	1.84E+00	1.76E+00
I-129	8.63E-01	5.18E+00	5.18E+00	5.18E+00	5.18E+00	5.18E+00	5.18E+00	5.17E+00	5.16E+00	5.08E+00	4.98E+00
CS-135	5.00E+00	3.10E+01	3.10E+01	3.10E+01	3.10E+01	3.10E+01	3.10E+01	3.07E+01	3.03E+01	2.77E+01	2.46E+01
CS-137,BA-137M	1.47E+07	4.82E+07	3.04E+07	2.70E+03	2.62E-02	0.	0.	0.	0.	0.	0.
ALL OTHERS	5.07E+06	3.57E+06	1.37E+06	1.44E+04	2.16E+03	1.87E+03	1.81E+03	1.37E+03	9.64E+02	5.99E+01	1.88E+00
TOTAL	3.37E+07	9.59E+07	5.87E+07	2.85E+04	1.23E+04	1.18E+04	1.14E+04	9.08E+03	6.94E+03	1.32E+03	3.46E+02
ACTINIDES AND DAUGHTERS											
CM	1.07E+06	2.57E+06	1.23E+06	1.05E+04	2.15E+03	8.59E+02	5.65E+02	1.97E+01	2.98E-01	0.	0.
AM	2.46E+06	2.49E+07	2.72E+07	1.54E+07	6.98E+06	8.79E+04	4.87E+04	1.30E+03	1.41E+01	0.	0.
PU	3.51E+06	1.79E+07	1.61E+07	5.83E+06	5.19E+06	3.93E+06	2.88E+06	5.67E+05	1.39E+05	4.46E+03	1.79E+03
NP	1.07E+03	6.75E+03	6.89E+03	8.97E+03	1.05E+04	1.05E+04	9.48E+03	7.65E+03	7.48E+03	6.57E+03	5.59E+03
U	1.75E+03	1.18E+04	1.23E+04	1.51E+04	1.56E+04	1.58E+04	1.61E+04	1.65E+04	1.66E+04	1.50E+04	1.30E+04
PA	8.57E+01	5.06E+02	5.11E+02	6.15E+02	6.93E+02	7.62E+02	7.76E+02	8.55E+02	9.05E+02	9.01E+02	8.56E+02
TH	2.46E+01	1.40E+02	1.23E+02	7.19E+01	1.25E+02	5.57E+02	1.13E+03	5.25E+03	8.70E+03	1.20E+04	9.42E+03
RA	1.99E+01	1.11E+02	9.25E+01	6.54E+00	1.90E+01	2.99E+02	7.76E+02	4.06E+03	6.31E+03	5.82E+03	3.39E+03
OTHER DAUGHTERS*	8.16E+01	4.55E+02	3.78E+02	3.22E+01	1.08E+02	1.87E+03	5.06E+03	3.00E+04	4.99E+04	6.81E+04	5.29E+04
TOTAL	7.05E+06	4.54E+07	4.45E+07	2.13E+07	1.22E+07	4.05E+06	2.96E+06	6.32E+05	2.29E+05	1.13E+05	8.70E+04

* FR+RN+A+PO+BI+PB+TE

TABLE 10.D.77. Case 1 - Low Growth - Once-Through Cycle - Reference Treatment - Actinide Heat Generation Rate in Repositories (Watts)

ACTINIDES AND DAUGHTERS	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
CM-245	2.06E+02	1.30E+03	1.30E+03	1.25E+03	1.20E+03	8.59E+02	5.65E+02	1.97E+01	2.98E-01	0.	0.
CM-244	1.06E+06	2.09E+06	1.16E+06	2.21E-01	1.06E-09	0.	0.	0.	0.	0.	0.
CM-243	3.17E+03	1.06E+04	9.64E+03	1.50E+00	2.96E-05	0.	0.	0.	0.	0.	0.
CM-242	1.13E+08	6.80E+03	5.89E+04	9.25E+03	9.05E+02	1.13E-05	0.	0.	0.	0.	0.
AM-243,NP-239	1.94E+05	1.23E+05	1.22E+05	1.18E+05	1.13E+05	7.84E+04	4.98E+04	1.33E+03	1.43E+01	0.	0.
AM-242M,AM-242	6.32E+02	3.02E+03	3.13E+03	4.93E+02	5.06E+01	6.05E-07	0.	0.	0.	0.	0.
AM-241	2.04E+06	2.88E+07	2.71E+07	1.53E+07	6.86E+06	1.23E+04	6.06E+02	2.10E+0	3.17E-01	0.	0
PU-242	1.83E+03	1.11E+04	1.11E+04	1.11E+04	1.11E+04	1.10E+04	1.09E+04	1.02E+04	9.27E+03	4.46E+03	1.79E+03
PU-241	1.03E+05	1.49E+05	7.43E+04	1.66E+00	1.59E+00	1.19E+00	7.46E-01	2.61E-02	3.94E-04	0.	0.
PU-240	5.79E+05	3.35E+06	3.34E+06	3.21E+06	3.05E+06	2.02E+06	1.21E+06	2.01E+04	1.19E+02	0.	0.
PU-239	3.01E+05	2.17E+06	2.17E+06	2.15E+06	2.12E+06	1.90E+06	1.65E+06	5.36E+05	1.30E+05	1.51E+00	1.02E-06
PU-238	2.45E+06	1.22E+07	1.05E+07	4.64E+05	1.11E+04	2.46E-05	0.	0.	0.	0.	0.
PU-236	2.90E+01	5.16E+00	3.93E-02	0.	0.	0.	0.	0.	0.	0.	0.
NP-237,PA-233	3.77E+02	2.49E+03	2.61E+03	4.98E+03	6.73E+03	8.05E+03	8.05E+03	7.95E+03	7.43E+03	6.87E+03	5.85E+03
U-238,TH-234, PA-234M	4.13E+02	2.36E+03	2.36E+03	2.36E+03	2.36E+03	2.36E+03	2.36E+03	2.36E+03	2.36E+03	2.36E+03	2.36E+03
U-236	2.40E+02	1.06E+03	1.06E+03	1.49E+03	1.58E+03	1.79E+03	1.99E+03	2.28E+03	2.28E+03	2.25E+03	2.22E+03
U-235,TH-231	2.01E+01	1.22E+02	1.22E+02	1.23E+02	1.24E+02	1.31E+02	1.39E+02	1.75E+02	1.87E+02	1.91E+02	1.91E+02
U-234	1.13E+03	5.13E+03	6.68E+03	1.16E+04	1.20E+04	1.19E+04	1.17E+04	1.07E+04	9.59E+03	4.41E+03	2.74E+03
U-233	9.80E-02	6.44E-01	1.09E+00	6.97E+00	1.97E+01	1.95E+02	3.04E+02	1.45E+03	2.61E+03	6.07E+03	5.84E+03
U-232	2.01E+01	1.02E+02	6.81E+01	1.72E+00	1.40E-02	0.	0.	0.	0.	0.	0.
PA-231	3.51E-02	3.02E-01	3.58E-01	1.34E+00	2.82E+00	1.37E+01	2.70E+01	1.11E+02	1.67E+02	2.05E+02	2.05E+02
TH-230	1.49E-01	2.77E+00	4.20E+00	3.79E+01	9.07E+01	4.83E+02	9.56E+02	3.89E+03	6.01E+03	5.44E+03	3.02E+03
TH-229,7 DAUGHTERS	3.90E-04	1.69E-02	2.97E-02	9.23E-01	5.23E+00	1.88E+02	7.21E+02	8.01E+03	1.64E+04	4.20E+04	4.07E+04
TH-228,6 DAUGHTERS	1.21E+02	6.72E+02	5.57E+02	1.14E+01	9.30E-02	3.02E-03	6.59E-03	3.97E-02	8.25E-02	4.22E-01	6.41E-01
AC-227,7 DAUGHTERS	3.80E-02	1.13E+00	1.63E+00	8.77E+00	1.85E+01	8.93E+01	1.76E+02	7.26E+02	1.09E+03	1.34E+03	1.34E+03
TH-232,2 DAUGHTERS	4.94E-08	2.06E-06	3.57E-06	3.33E-05	7.59E-05	4.31E-04	9.42E-04	5.68E-03	1.18E-02	6.03E-02	1.20E-01
RA-226,5 DAUGHTERS	3.29E-03	1.59E-01	3.24E-01	1.76E+01	8.84E+01	1.59E+03	4.18E+03	2.19E+04	3.01E+04	3.06E+04	1.70E+04
PB-210,2 DAUGHTERS	1.28E-04	1.31E-02	3.22E-02	1.57E+00	1.90E+01	3.42E+02	8.98E+02	4.72E+03	7.33E+03	6.58E+03	3.65E+03
TOTAL ACTINIDES	7.05E+06	4.84E+07	[illegible]	2.13E+07	1.22E+07	4.05E+06	2.96E+06	6.32E+05	2.29E+05	1.13E+05	8.70E+04

TABLE 10.D.78. Case 1 - Low Growth - Once-Through Cycle - Reference Treatment - Fission and Activation Product Heat Generation Rate in Repositories (Watts)

FISSION AND ACTIVATION	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
H-3	2.87E+02	4.53E+02	1.47E+02	1.43E-08	0.	0.	0.	0.	0.	0.	0.
C-14	1.02E+01	5.98E+01	5.98E+01	5.84E+01	5.35E+01	3.30E+01	1.80E+01	1.43E-01	3.39E-04	0.	0.
Mn-54	9.08E+01	1.03E+00	5.79E-08	0.	0.	0.	0.	0.	0.	0.	0.
Fe-55	2.23E+04	3.56E+03	1.72E+01	0.	0.	0.	0.	0.	0.	0.	0.
Co-60	4.84E+05	3.51E+05	2.52E+04	0.	0.	0.	0.	0.	0.	0.	0.
Ni-59	7.87E+02	4.45E+03	4.49E+03	4.84E+03	4.62E+03	4.48E+03	4.27E+03	3.02E+03	1.96E+03	6.13E+01	9.08E+01
Ni-63	2.46E+05	1.37E+04	1.14E+04	3.84E+02	1.31E+01	0.	0.	0.	0.	0.	0.
Se-79	5.29E+00	3.17E+01	3.17E+01	3.16E+01	3.14E+01	3.01E+01	2.85E+01	1.86E+01	1.09E+01	1.54E+01	7.47E-04
Kr-85	2.80E+06	3.47E+05	1.07E+05	5.49E-07	0.	0.	0.	0.	0.	0.	0.
Rb-87	4.44E-04	2.69E-03	2.69E-03	2.69E-03	2.69E-03	2.69E-03	2.69E-03	2.69E-03	2.69E-03	2.69E-03	2.69E-03
Sr-90,Y-90	1.39E+07	4.41E+07	2.69E+07	1.27E-03	5.65E-04	0.	0.	0.	0.	0.	0.
Zr-93,Nb-93M	3.01E+01	1.86E+02	1.86E+02	1.86E+02	1.86E+02	1.85E+02	1.85E+02	1.82E+02	1.77E+02	1.47E+02	1.17E+02
Tc-99	4.78E+02	5.28E+03	5.28E+03	5.27E+03	5.26E+03	5.20E+03	5.11E+03	4.45E+03	3.80E+03	1.02E+03	1.95E+02
Ru-106,Rh-106	3.11E+05	5.97E+04	6.14E+03	0.	0.	0.	0.	0.	0.	0.	0.
Pd-107	3.26E-01	1.94E+00	1.94E+00	1.94E+00	1.94E+00	1.94E+00	1.94E+00	1.93E+00	1.92E+00	1.84E+00	1.76E+00
Ag-110M	2.42E+02	1.32E+00	2.72E-04	0.	0.	0.	0.	0.	0.	0.	0.
Cd-113M	2.39E+02	4.28E+02	1.54E+02	3.32E-07	0.	0.	0.	0.	0.	0.	0.
Sb-125,Te-125M	4.01E+04	1.49E+04	4.81E+01	0.	0.	0.	0.	0.	0.	0.	0.
Sn-126,Sb-126	3.19E+02	1.90E+03	1.90E+03	1.90E+03	1.89E+03	1.84E+03	1.78E+03	1.33E+03	9.53E+02	5.97E+01	1.87E+00
I-129	4.63E-01	5.19E+00	5.19E+00	5.18E+00	5.18E+00	5.18E+00	5.18E+00	5.17E+00	5.16E+00	5.08E+00	4.98E+00
Cs-134	2.31E+06	2.92E+05	2.56E+02	0.	0.	0.	0.	0.	0.	0.	0.
Cs-135	5.02E+00	3.10E+01	3.10E+01	3.10E+01	3.10E+01	3.10E+01	3.10E+01	3.07E+01	3.03E+01	2.77E+01	2.46E+01
Cs-137,Ba-137M	1.47E+07	4.82E+07	3.04E+07	2.70E-03	4.62E-02	0.	0.	0.	0.	0.	0.
Ce-144,Pr-144	1.07E+05	1.14E+03	2.08E-05	0.	0.	0.	0.	0.	0.	0.	0.
Pm-147	1.19E+05	2.22E+04	1.12E+02	0.	0.	0.	0.	0.	0.	0.	0.
Sm-151	7.33E+04	3.48E+05	2.97E+05	1.19E+04	2.22E+02	0.	0.	0.	0.	0.	0.
Eu-152	4.34E+03	9.93E+03	2.14E+03	1.83E-07	0.	0.	0.	0.	0.	0.	0.
Eu-154	1.06E+06	2.19E+06	9.23E+05	2.34E+02	0.	0.	0.	0.	0.	0.	0.
Eu-155	4.30E+03	3.25E+02	1.54E-01	0.	0.	0.	0.	0.	0.	0.	0.
OTHER[a]	2.90E+05	1.52E+02	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	3.37E+07	9.59E+07	5.67E+07	2.85E+04	1.23E+04	1.18E+04	1.14E+04	9.08E+03	6.94E+03	1.32E+03	3.46E+02

a. Nuclides included in "other" category are all short-lived and are detailed in the next table.

TABLE 10.D.79. Case 1 - Low Growth - Once-Through Cycle - Reference Treatment - Short-lived Fission and Activation Product Heat Generation Rate in Repositories (Watts)

FISSION AND ACTIVATION	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
SC-46	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR-51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO-58	7.45E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE-59	1.02E-09	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN-65	1.05E+00	9.70E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR-89	1.50E-08	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y-91	1.09E-06	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR-95	7.95E-09	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB-95M	1.61E-06	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB-95	1.41E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU-103	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN-123	8.58E-02	1.44E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN-120	2.90E-09	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE-127M,TE-127	1.17E-02	7.44E-07	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE-141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM-148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD-153	1.79E+00	1.05E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.
TM-170	2.46E-06	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
HF-181	6.16E-08	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	2.94E+00	1.52E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.

TABLE 10.D.80. Case I - Low Growth - Once-Through Cycle - Reference Treatment - Total Heat Generation Rate in Repositories by Waste Classification (Watts)

FISSION AND ACTIVATION	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
BWR CANISTERS	1.07E+07	3.16E+07	1.94E+07	9.01E+03	3.65E+03	3.50E+03	3.40E+03	2.74E+03	2.13E+03	4.35E+02	1.16E+02
PWR CANISTERS	2.30E+07	6.43E+07	3.93E+07	1.95E+04	8.63E+03	8.26E+03	8.01E+03	6.34E+03	4.81E+03	8.84E+02	2.30E+02
TOTAL CANISTERS	3.37E+07	9.59E+07	5.87E+07	2.85E+04	1.23E+04	1.18E+04	1.14E+04	9.08E+03	6.94E+03	1.32E+03	3.46E+02
ACTINIDES											
BWR CANISTERS	2.10E+06	1.41E+07	1.40E+07	6.87E+06	4.02E+06	1.41E+06	1.03E+06	2.15E+05	7.64E+04	3.69E+04	2.88E+04
PWR CANISTERS	4.95E+06	3.13E+07	3.06E+07	1.44E+07	8.18E+06	2.64E+06	1.93E+06	4.18E+05	1.53E+05	7.61E+04	5.82E+04
TOTAL	7.05E+06	4.54E+07	4.45E+07	2.13E+07	1.22E+07	4.05E+06	2.96E+06	6.32E+05	2.29E+05	1.13E+05	8.70E+04

TABLE 10.D.81. Case 3 - Low Growth - U and Pu Recycle - Reference Treatment - Summary Radioactivity Inventory in Repositories by Major Radionuclides (Curies)

FISSION AND ACTIVATION	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
C-14	5.01E+04	1.91E+05	1.91E+05	1.82E+05	1.71E+05	1.06E+05	5.76E+04	4.58E+02	1.09E+00	0.	0.
NI-59	1.64E+05	6.34E+05	6.34E+05	6.32E+05	6.29E+05	6.08E+05	5.82E+05	4.12E+05	2.67E+05	8.36E+03	1.10E+02
SR-90,Y-90	3.14E+09	1.08E+10	6.57E+09	3.11E+05	1.38E+00	0.	0.	0.	0.	0.	0.
ZR-93,NB-93M	1.22E+05	7.85E+05	7.85E+05	7.84E+05	7.84E+05	7.83E+05	7.81E+05	7.67E+05	7.49E+05	6.23E+05	4.94E+05
TC-99	4.40E+05	3.08E+06	3.04E+06	3.04E+06	3.04E+06	3.00E+06	2.95E+06	2.58E+06	2.19E+06	5.85E+05	1.12E+05
PD-107	3.64E+03	2.92E+04	2.92E+04	2.92E+04	2.92E+04	2.92E+04	2.92E+04	2.91E+04	2.89E+04	2.78E+04	2.65E+04
I-129	1.90E+03	8.41E+03	8.41E+03	8.41E+03	8.41E+03	8.40E+03	8.40E+03	8.39E+03	8.37E+03	8.24E+03	8.07E+03
CS-135	9.48E+03	8.08E+04	8.08E+04	8.08E+04	8.08E+04	8.07E+04	8.06E+04	7.99E+04	7.89E+04	7.20E+04	6.41E+04
CS-137,BA-137M	4.53E+09	1.75E+10	1.10E+10	9.81E+05	9.50E+00	0.	0.	0.	0.	0.	0.
ALL OTHERS	6.51E+08	7.00E+08	3.81E+08	1.07E+07	5.48E+05	3.31E+05	3.18E+05	2.34E+05	1.60E+05	8.68E+03	2.66E+02
TOTAL	8.32E+09	2.90E+10	1.80E+10	1.67E+07	5.29E+06	4.94E+06	4.80E+06	4.11E+06	3.48E+06	1.33E+06	7.06E+05
ACTINIDES AND DAUGHTERS											
CM	7.45E+07	7.93E+08	3.76E+08	2.72E+06	9.12E+05	5.07E+05	3.33E+05	1.16E+04	1.76E+02	0.	0.
AM	3.45E+07	4.46E+08	4.33E+08	2.24E+08	1.07E+08	1.13E+07	7.05E+06	1.91E+05	2.11E+03	0.	0.
PU	4.95E+07	1.23E+08	7.27E+07	1.42E+07	1.05E+07	8.40E+06	6.89E+06	2.07E+06	5.14E+05	6.02E+03	2.41E+03
NP	8.23E+05	1.66E+07	1.66E+07	1.61E+07	1.54E+07	1.08E+07	6.93E+06	3.90E+05	2.10E+05	1.83E+05	1.55E+05
U	1.76E+03	2.97E+04	2.52E+04	1.71E+04	2.04E+04	2.54E+04	3.02E+04	6.13E+04	9.18E+04	1.79E+05	1.71E+05
PA	1.20E+04	1.31E+05	1.34E+05	1.68E+05	1.93E+05	2.13E+05	2.13E+05	2.12E+05	2.09E+05	1.84E+05	1.56E+05
TH	1.49E+02	2.60E+04	1.87E+04	1.10E+03	8.38E+02	2.27E+03	5.25E+03	3.98E+04	7.74E+04	1.79E+05	1.69E+05
RA	2.11E+01	2.53E+04	1.81E+04	3.87E+02	6.22E+01	1.27E+03	4.22E+03	3.90E+04	7.66E+04	1.78E+05	1.68E+05
OTHER DAUGHTERS*	1.06E+02	1.27E+05	9.03E+04	1.97E+03	4.17E+02	8.53E+03	2.77E+04	2.47E+05	4.79E+05	1.08E+06	1.01E+06
TOTAL	1.59E+08	1.40E+09	8.98E+08	2.57E+08	1.34E+08	3.12E+07	2.15E+07	3.26E+06	1.66E+06	1.99E+06	1.84E+06

* FR+RN+A+PO+BI+PB+TE

TABLE 10.D.82. Case 3 - Low Growth - U and Pu Recycle - Reference Treatment - Actinide Radioactivity Inventory in Repositories (Curies)

ACTINIDES AND DAUGHTERS	YEAR 2000	YEAR 2050	YEAR 2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
CM-245	2.78E+04	7.66E+05	7.65E+05	7.40E+05	7.09E+05	5.07E+05	3.33E+05	1.16E+04	1.76E+02	0.	0.
CM-244	7.37E+07	7.78E+08	3.62E+08	6.90E+01	3.33E-07	0.	0.	0.	0.	0.	0.
CM-243	1.33E+09	1.03E+06	6.69E+05	1.06E+02	2.09E-03	0.	0.	0.	0.	0.	0.
CM-242	6.41E+05	1.37E+07	1.29E+07	1.98E+06	2.03E+05	2.43E-03	0.	0.	0.	0.	0.
AM-243,NP-239	1.62E+06	3.30E+07	3.30E+07	3.18E+07	3.04E+07	2.11E+07	1.34E+07	3.58E+05	3.86E+03	0.	0.
AM-242M,AM-242	1.56E+06	3.35E+07	3.05E+07	4.84E+06	4.95E+05	5.91E-03	0.	0.	0.	0.	0.
AM-241	3.21E+07	3.96E+08	3.86E+08	2.03E+08	9.18E+07	6.82E+05	3.34E+05	1.17E+04	1.76E+02	0.	0.
PU-242	1.27E+03	1.38E+04	1.39E+04	1.47E+04	1.49E+04	1.49E+04	1.47E+04	1.37E+04	1.25E+04	6.01E+03	2.41E+03
PU-241	4.72E+07	1.18E+08	4.65E+07	7.40E+05	7.10E+05	5.08E+05	3.34E+05	1.17E+04	1.76E+02	0.	0.
PU-240	3.66E+05	6.62E+06	7.72E+06	8.33E+06	7.93E+06	5.26E+06	3.15E+06	3.21E+04	3.09E+02	0.	0.
PU-239	1.66E+05	1.03E+06	1.04E+06	1.20E+06	1.41E+06	2.61E+06	3.40E+06	1.99E+06	5.01E+05	5.82E+00	3.94E-06
PU-238	1.72E+06	1.81E+07	1.74E+07	3.96E+06	4.74E+05	5.86E-03	0.	0.	0.	0.	0.
PU-236	2.96E+01	9.33E+02	7.20E+00	0.	0.	0.	0.	0.	0.	0.	0.
NP-237,PA-233	2.37E+04	2.62E+05	2.67E+05	3.35E+05	3.85E+05	4.24E+05	4.26E+05	4.23E+05	4.16E+05	3.65E+05	3.11E+05
U-238,TH-234, PA-234M	3.60E+02	1.89E+03	1.89E+03	1.89E+03	1.89E+03	1.89E+03	1.89E+03	1.89E+03	1.89E+03	1.90E+03	1.90E+03
U-236	8.29E+01	6.18E+02	6.22E+02	7.12E+02	8.36E+02	1.59E+03	2.19E+03	3.06E+03	3.07E+03	3.04E+03	2.99E+03
U-235,TH-231	1.21E+01	6.68E+01	6.68E+01	6.77E+01	6.90E+01	8.50E+01	1.15E+02	3.52E+02	4.59E+02	4.93E+02	4.93E+02
U-234	3.67E+02	4.19E+03	5.19E+03	1.51E+04	1.87E+04	1.89E+04	1.87E+04	1.68E+04	1.47E+04	5.19E+03	1.75E+03
U-233	5.34E-01	2.03E+01	3.16E+01	2.72E+02	6.77E+02	4.19E+03	8.63E+03	4.07E+04	7.32E+04	1.70E+05	1.65E+05
U-232	7.91E+00	2.13E+04	1.76E+04	3.59E+02	2.92E+00	0.	0.	0.	0.	0.	0.
PA-231	8.66E-01	7.61E+00	7.62E+00	7.83E+00	8.12E+00	1.06E+01	1.46E+01	8.14E+01	1.68E+02	2.47E+02	2.47E+02
TH-230	1.84E+00	1.66E+01	1.74E+01	5.32E+01	1.34E+02	7.73E+02	1.54E+03	6.26E+03	9.55E+03	7.01E+03	2.29E+03
TH-229,7 DAUGHTERS	2.35E-03	3.19E-01	7.12E-01	4.15E+01	2.22E+02	6.50E+03	2.41E+04	2.61E+05	5.35E+05	1.37E+06	1.33E+06
TH-228,6 DAUGHTERS	1.46E+02	1.77E+05	1.26E+05	2.58E+03	2.10E+01	1.26E-03	2.89E-03	1.92E-02	4.04E-02	2.09E-01	4.18E-01
AC-227,7 DAUGHTERS	1.94E+00	3.03E+01	4.06E+01	6.23E+01	6.50E+01	8.49E+01	1.16E+02	6.52E+02	1.34E+03	1.97E+03	1.97E+03
TH-232,2 DAUGHTERS	6.41E-07	3.95E-06	4.34E-06	3.89E-05	8.96E-05	5.42E-04	1.24E-03	3.21E-03	1.73E-02	8.97E-02	1.79E-01
RA-226,5 DAUGHTERS	7.06E-02	1.37E+00	2.44E+00	3.14E+01	1.40E+02	2.69E+03	7.17E+03	3.77E+04	5.78E+04	4.21E+04	1.37E+04
PB-210,2 DAUGHTERS	8.03E-03	3.90E-01	6.81E-01	1.49E+01	7.01E+01	1.35E+03	3.59E+03	1.88E+04	2.89E+04	2.10E+04	6.86E+03
TOTAL ACTINIDES	1.59E+08	1.40E+09	8.98E+08	2.57E+08	1.34E+08	3.12E+07	2.15E+07	3.26E+06	1.66E+06	1.99E+06	1.84E+06

TABLE 10.D.83. Case 3 - Low Growth - U and Pu Recycle - Reference Treatment - Fission and Activation Product Radioactivity Inventory in Repositories (Curies)

FISSION AND ACTIVATION	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
H-3	2.07E+06	2.09E+06	6.61E+05	4.69E-05	0.	0.	0.	0.	0.	0.	0.
C-14	5.01E+04	1.91E+05	1.91E+05	1.82E+05	1.71E+05	1.06E+05	5.76E+04	4.58E+02	1.09E+00	0.	0.
MN-54	2.60E+05	1.33E+02	7.45E-06	0.	0.	0.	0.	0.	0.	0.	0.
FE-55	5.04E+07	2.20E+06	1.07E+04	0.	0.	0.	0.	0.	0.	0.	0.
CO-60	8.88E+07	2.06E+07	1.88E+06	0.	0.	0.	0.	0.	0.	0.	0.
NI-59	1.60E+05	6.34E+05	6.34E+05	6.32E+05	6.29E+05	6.08E+05	5.82E+05	4.12E+05	2.67E+05	8.36E+03	1.10E+02
NI-63	2.42E+07	7.82E+07	6.39E+07	3.05E+06	7.07E+04	5.88E-09	0.	0.	0.	0.	0.
SE-79	1.14E+04	7.93E+04	7.93E+04	7.90E+04	7.85E+04	7.53E+04	7.14E+04	4.66E+04	2.73E+04	3.85E+02	1.87E+00
KR-85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB-87	5.66E-01	3.66E+00	3.66E+00	3.66E+00	3.66E+00	3.66E+00	3.66E+00	3.66E+00	3.66E+00	3.66E+00	3.65E+00
SR-90,Y-90	3.14E+09	1.08E+10	6.57E+09	3.11E+05	1.38E+00	0.	0.	0.	0.	0.	0.
ZR-93,NB-93M	1.22E+05	7.85E+05	7.85E+05	7.84E+05	7.84E+05	7.83E+05	7.81E+05	7.67E+05	7.49E+05	6.23E+05	4.94E+05
TC-99	4.40E+05	3.04E+06	3.04E+06	3.04E+06	3.04E+06	3.00E+06	2.95E+06	2.58E+06	2.19E+06	5.45E+05	1.12E+05
RU-106,RH-106	2.55E+07	1.27E+06	1.31E+00	0.	0.	0.	0.	0.	0.	0.	0.
PD-107	3.60E+03	2.92E+04	2.92E+04	2.92E+04	2.92E+04	2.92E+04	2.92E+04	2.91E+04	2.89E+04	2.78E+04	2.65E+04
AG-110M	5.56E+03	1.07E+02	2.21E-07	0.	0.	0.	0.	0.	0.	0.	0.
CD-113M	2.92E+05	6.27E+05	2.33E+05	4.86E-04	0.	0.	0.	0.	0.	0.	0.
SB-125,TE-125M	2.60E+07	7.22E+06	4.27E+04	0.	0.	0.	0.	0.	0.	0.	0.
SN-126,SB-126	3.43E+04	2.65E+05	2.64E+05	2.64E+05	2.63E+05	2.56E+05	2.47E+05	1.87E+05	1.32E+05	8.30E+03	2.60E+02
I-129	1.09E+03	8.41E+03	8.41E+03	8.41E+03	8.41E+03	8.40E+03	8.40E+03	8.39E+03	8.37E+03	8.24E+03	8.07E+03
CS-134	1.27E+08	2.06E+07	2.39E+04	0.	0.	0.	0.	0.	0.	0.	0.
CS-135	4.08E+03	8.08E+04	8.08E+04	8.08E+04	8.08E+04	8.07E+04	8.06E+04	7.99E+04	7.89E+04	7.20E+04	6.41E+04
CS-137,BA-137M	4.53E+09	1.13E+10	1.13E+10	9.81E+05	9.50E+00	0.	0.	0.	0.	0.	0.
CE-144,PR-144	7.54E+06	2.53E+05	4.62E-03	0.	0.	0.	0.	0.	0.	0.	0.
PM-147	1.46E+08	4.20E+07	2.12E+05	0.	0.	0.	0.	0.	0.	0.	0.
SM-151	3.67E+07	2.13E+08	1.82E+08	7.29E+06	1.36E+05	2.01E-09	0.	0.	0.	0.	0.
EU-152	2.30E+05	6.50E+05	2.03E+05	1.53E-05	0.	0.	0.	0.	0.	0.	0.
EU-154	1.13E+08	3.15E+08	1.32E+08	3.36E+00	1.33E-09	0.	0.	0.	0.	0.	0.
EU-155	3.01E+06	4.51E+05	2.14E+02	0.	0.	0.	0.	0.	0.	0.	0.
OTHER(a)	8.60E+03	6.65E+00	5.65E-09	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	8.32E+09	2.90E+10	1.80E+10	1.67E+07	5.29E+06	4.94E+06	4.80E+06	4.11E+06	3.48E+06	1.33E+06	7.06E+05

a. Nuclides included in "other" category are all short-lived and are detailed in the next table.

TABLE 10.D.84. Case 3 - Low Growth - U and Pu Recycle - Reference Treatment - Short-lived Fission and Activation Radioactivity Inventory in Repositories (Curies)

FISSION AND ACTIVATION	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
SC-46	5.42E-01	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR-51	6.11E+01	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO-58	1.92E+03	1.14E-09	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE-59	1.88E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN-65	6.28E+03	5.87E-01	5.87E-10	0.	0.	0.	0.	0.	0.	0.	0.
SR-89	7.87E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y-91	7.33E-01	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR-95	1.47E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB-95M	8.54E-01	5.35E-10	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB-95	7.94E+01	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU-103	2.15E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN-123	5.40E+00	4.38E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB-124	4.91E-04	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE-127M,TE-127	2.76E+01	7.19E-04	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE-141	6.44E-06	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM-148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD-153	3.12E+02	6.10E+00	3.06E-09	0.	0.	0.	0.	0.	0.	0.	0.
TB-160	8.97E-02	3.82E-10	0.	0.	0.	0.	0.	0.	0.	0.	0.
W-181	4.19E-02	2.02E-08	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	8.69E+03	6.65E+00	5.68E-09	0.	0.	0.	0.	0.	0.	0.	0.

TABLE 10.D.85. Case 3 - Low Growth - U and Pu Recycle - Reference Treatment - Total Radioactivity in Repositories by Waste Classification (Curies)

FISSION AND ACTIVATION	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
HLW	8.14E+09	2.89E+10	1.79E+10	1.28E+07	4.36E+06	4.17E+06	4.11E+06	3.65E+06	3.16E+06	1.28E+06	6.69E+05
FRW	1.75E+08	1.14E+08	7.55E+07	3.74E+06	7.67E+05	6.67E+05	6.35E+05	4.56E+05	3.11E+05	4.45E+04	2.85E+04
ILW	1.71E+06	9.82E+05	6.06E+05	1.20E+03	3.22E+02	2.92E+02	2.81E+02	2.27E+02	1.82E+02	6.85E+01	4.63E+01
LLW	4.82E+04	1.78E+05	1.76E+05	1.66E+05	1.57E+05	1.00E+05	5.84E+04	8.72E+03	8.31E+03	8.17E+03	8.01E+03
TOTAL	8.32E+09	2.90E+10	1.80E+10	1.67E+07	5.29E+06	4.94E+06	4.80E+06	4.11E+06	3.48E+06	1.33E+06	7.06E+05
ACTINIDES											
HLW	1.24E+08	1.33E+09	8.60E+08	2.51E+08	1.31E+08	3.01E+07	2.07E+07	3.10E+06	1.59E+06	1.95E+06	1.81E+06
FRW	3.32E+06	7.96E+06	4.20E+06	7.31E+05	4.08E+05	1.28E+05	9.05E+04	1.77E+04	8.12E+03	5.04E+03	3.52E+03
ILW	2.31E+07	5.31E+07	2.75E+07	4.41E+06	2.49E+06	8.23E+05	5.83E+05	1.16E+05	5.10E+04	2.74E+04	1.75E+04
LLW	9.34E+06	1.37E+07	7.10E+06	1.26E+06	6.78E+05	1.79E+05	1.31E+05	2.96E+04	1.17E+04	6.16E+03	4.44E+03
TOTAL	1.59E+08	1.40E+09	8.98E+08	2.57E+08	1.38E+08	3.12E+07	2.15E+07	3.26E+06	1.66E+06	1.99E+06	1.84E+06

TABLE 10.D.86. Case 3 - Low Growth - U and Pu Recycle - Reference Treatment - Summary Heat Generation Rate in Repositories by Major Radionuclides (Watts)

FISSION AND ACTIVATION	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
C-14	1.49E+01	5.67E+01	5.66E+01	5.39E+01	5.07E+01	3.13E+01	1.71E+01	1.36E-01	3.22E-04	0.	0.
NI-59	1.04E+03	4.03E+03	4.03E+03	4.02E+03	4.00E+03	3.87E+03	3.70E+03	2.62E+03	1.70E+03	5.32E+01	7.01E-01
SR-90,Y-90	1.13E+07	3.87E+07	2.36E+07	1.12E+03	4.96E-03	0.	0.	0.	0.	0.	0.
ZR-93,NB-93M	2.85E+01	1.84E+02	1.84E+02	1.84E+02	1.84E+02	1.83E+02	1.83E+02	1.80E+02	1.75E+02	1.46E+02	1.16E+02
TC-99	7.56E+02	5.23E+03	5.23E+03	5.23E+03	5.22E+03	5.15E+03	5.07E+03	4.44E+03	3.76E+03	1.01E+03	1.93E+02
PD-107	3.02E-01	2.43E+00	2.43E+00	2.43E+00	2.42E+00	2.42E+00	2.42E+00	2.41E+00	2.40E+00	2.31E+00	2.20E+00
I-129	1.25E+00	5.53E+00	5.53E+00	5.53E+00	5.53E+00	5.53E+00	5.53E+00	5.52E+00	5.51E+00	5.42E+00	5.31E+00
CS-135	4.61E+00	3.93E+01	3.93E+01	3.93E+01	3.93E+01	3.92E+01	3.92E+01	3.88E+01	3.84E+01	3.50E+01	3.12E+01
CS-137,BA-137M	1.24E+07	4.81E+07	3.03E+07	2.69E+03	2.61E-02	0.	0.	0.	0.	0.	0.
ALL OTHERS	4.11E+06	3.57E+06	1.44E+06	1.54E+04	2.49E+03	2.18E+03	2.11E+03	1.59E+03	1.13E+03	7.00E+01	2.19E+00
TOTAL	2.78E+07	9.03E+07	5.54E+07	2.88E+04	1.20E+04	1.15E+04	1.11E+04	8.88E+03	6.81E+03	1.32E+03	3.51E+02
ACTINIDES AND DAUGHTERS											
CM	2.61E+06	2.78E+07	1.32E+07	9.63E+04	2.97E+04	1.59E+04	1.05E+04	3.65E+02	5.51E+00	0.	0.
AM	1.10E+06	1.39E+07	1.35E+07	7.37E+06	3.62E+06	4.09E+05	2.56E+05	6.93E+03	7.63E+01	0.	0.
PU	7.57E+04	8.43E+05	8.51E+05	4.28E+05	3.07E+05	2.46E+05	2.04E+05	6.40E+04	1.59E+04	1.78E+02	7.11E+01
NP	1.44E+03	2.62E+04	2.62E+04	2.64E+04	2.62E+04	2.05E+04	1.53E+04	6.45E+03	6.11E+03	5.37E+03	4.56E+03
U	1.63E+01	8.37E+02	7.48E+02	4.89E+02	5.98E+02	7.27E+02	8.66E+02	1.77E+03	2.66E+03	5.21E+03	4.95E+03
PA	1.67E+01	1.80E+02	1.84E+02	2.30E+02	2.64E+02	2.90E+02	2.91E+02	2.91E+02	2.89E+02	2.58E+02	2.21E+02
TH	7.90E-01	8.31E+02	5.92E+02	1.43E+01	5.25E+00	4.70E+01	1.35E+02	1.17E+03	2.30E+03	5.37E+03	[illegible]
RA	7.22E-01	8.67E+02	6.18E+02	1.31E+01	1.06E+00	1.36E+01	3.63E+01	2.02E+02	3.22E+02	3.20E+02	1.82E+02
OTHER DAUGHTERS*	2.95E+00	3.55E+03	2.53E+03	5.44E+01	1.00E+01	2.13E+02	7.09E+02	6.59E+03	1.29E+04	3.02E+04	2.85E+04
TOTAL	3.79E+06	4.25E+07	2.76E+07	7.93E+06	3.98E+06	6.92E+05	4.88E+05	8.77E+04	4.06E+04	4.69E+04	4.36E+04

* FR+RN+A+PO+BI+PB+TL

TABLE 10.D.87. Case 3 - Low Growth - U and Pu Recycle - Reference Treatment - Actinide Heat Generation Rate in Repositories (Watts)

ACTINIDES AND DAUGHTERS	YEAR 2000	2050	2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
CM-245	4.74E+02	2.41E+04	2.40E+04	2.32E+04	2.23E+04	1.59E+04	1.05E+04	3.65E+02	5.51E+00	0.	0.
CM-244	2.58E+06	2.72E+07	1.27E+07	2.41E+00	1.16E-08	0.	0.	0.	0.	0.	0.
CM-243	4.90E+03	3.79E+04	2.46E+04	3.89E+00	7.69E-05	0.	0.	0.	0.	0.	0.
CM-242	2.36E+04	5.06E+05	4.62E+05	7.31E+04	7.48E+03	8.96E-05	0.	0.	0.	0.	0.
AM-243,NP-239	3.07E+04	6.25E+05	6.24E+05	6.02E+05	5.75E+05	4.00E+05	2.54E+05	6.78E+03	7.30E+01	0.	0.
AM-242M,AM-242	1.26E+03	2.71E+04	2.47E+04	3.92E+03	4.00E+02	4.78E-06	0.	0.	0.	0.	0.
AM-241	1.07E+06	1.32E+07	1.29E+07	6.79E+06	3.06E+06	2.28E+04	1.12E+04	3.89E+02	5.87E+00	0.	0.
PU-242	3.75E+01	4.07E+02	4.10E+02	4.35E+02	4.41E+02	4.39E+02	4.35E+02	4.04E+02	3.69E+02	1.77E+02	7.11E+01
PU-241	1.96E+03	4.88E+03	1.93E+03	3.07E+01	2.99E+01	2.11E+01	1.39E+01	4.84E+01	7.30E-03	0.	0.
PU-240	1.14E+04	2.06E+05	2.41E+05	2.59E+05	2.47E+05	1.64E+05	9.81E+04	1.62E+03	9.63E+00	0.	0.
PU-239	5.17E+03	3.21E+04	3.29E+04	3.72E+04	4.38E+04	8.12E+04	1.06E+05	6.20E+04	1.56E+04	1.81E+01	1.23E-07
PU-238	5.71E+04	6.00E+05	5.76E+05	1.31E+05	1.57E+04	1.94E-04	0.	0.	0.	0.	0.
PU-236	1.03E+00	3.25E+01	2.51E+01	0.	0.	0.	0.	0.	0.	0.	0.
NP-237,PA-233	3.65E+02	4.02E+03	4.10E+03	5.14E+03	5.02E+03	6.52E+03	6.54E+03	6.49E+03	6.39E+03	5.61E+03	4.77E+03
U-238,TH-234, PA-234M	3.70E+00	1.94E+01	1.94E+01	1.94E+01	1.94E+01	1.94E+01	1.94E+01	1.94E+01	1.94E+01	1.95E+01	1.95E+01
U-236	2.25E+00	1.68E+01	1.69E+01	1.93E+01	2.27E+01	4.30E+01	5.93E+01	8.30E+01	8.33E+01	8.23E+01	8.12E+01
U-235,TH-231	1.73E-01	9.53E-01	9.54E-01	9.65E-01	9.88E-01	1.21E+00	1.64E+00	5.03E+00	6.55E+00	7.04E+00	7.04E+00
U-234	1.06E+01	1.21E+02	1.49E+02	4.34E+02	5.38E+02	5.45E+02	5.38E+02	4.83E+02	4.22E+02	1.50E+02	5.05E+01
U-233	1.55E-02	5.80E-01	9.19E-01	7.91E+00	1.97E+01	1.22E+02	2.51E+02	1.18E+03	2.13E+03	4.96E+03	4.80E+03
U-232	2.54E-01	6.82E+02	5.64E+02	1.15E+01	9.36E-02	0.	0.	0.	0.	0.	0.
PA-231	2.64E-02	2.32E-01	2.33E-01	2.39E-01	2.48E-01	3.22E-01	4.44E-01	2.48E+00	5.12E+00	7.53E+00	7.53E+00
TH-230	5.19E-02	4.70E-01	4.93E-01	1.50E+00	3.79E+00	2.18E+01	4.36E+01	1.77E+02	2.70E+02	1.98E+02	6.46E+01
TH-229,7 DAUGHTERS	5.89E-05	8.00E-03	1.78E-02	1.04E+00	5.55E+00	1.63E+02	6.03E+02	6.55E+03	1.34E+04	3.43E+04	3.33E+04
TH-228,6 DAUGHTERS	4.31E+00	3.24E+03	3.74E+03	7.64E+01	6.20E-01	3.74E-05	8.55E-05	5.66E-04	1.19E-03	6.18E-03	1.23E-02
AC-227,7 DAUGHTERS	4.84E-02	[illegible]	1.24E+00	1.55E+00	1.62E+00	2.11E+00	2.90E+00	1.62E+01	3.35E+01	4.92E+01	4.92E+01
TH-232,2 DAUGHTERS	6.32E-09	[illegible]	4.27E-08	3.83E-07	8.83E-07	5.34E-06	1.22E-05	8.09E-05	1.71E-04	8.84E-04	1.76E-03
RA-226,5 DAUGHTERS	1.87E-03	4.17E-02	6.47E-02	8.32E-01	3.71E+00	7.13E+01	1.90E+02	9.98E+02	1.53E+03	1.12E+03	3.64E+02
PB-210,2 DAUGHTERS	9.19E-05	4.09E-03	7.76E-03	1.70E-01	7.48E-01	1.53E+01	4.09E+01	2.15E+02	3.29E+02	2.40E+02	[illegible]
TOTAL ACTINIDES	3.79E+06	4.25E+07	2.76E+07	7.93E+06	3.98E+06	6.92E+05	4.88E+05	8.77E+04	4.06E+04	4.69E+04	4.36E+04

TABLE 10.D.88. Case 3 - Low Growth - U and Pu Recycle - Reference Treatment - Fission and Activation Product Heat Generation Rate in Repositories (Watts)

FISSION AND ACTIVATION	YEAR			GEOLOGIC TIME (YEARS BEYOND 1975)							
	2000	2050	2070	500	1000	5000	10000	50000	100000	500000	1000000
H-3	8.08E+06	1.27E+07	4.13E+06	5.49E-04	0.	0.	0.	0.	0.	0.	0.
C-14	1.36E+04	7.96E+04	7.94E+04	7.56E+04	7.12E+04	4.39E+04	2.40E+04	1.91E+02	4.52E-01	0.	0.
MN-54	1.12E+04	1.27E+02	7.13E-06	0.	0.	0.	0.	0.	0.	0.	0.
FE-55	1.71E+07	2.72E+06	1.32E+04	0.	0.	0.	0.	0.	0.	0.	0.
CO-60	4.38E+07	2.25E+07	1.61E+06	0.	0.	0.	0.	0.	0.	0.	0.
NI-59	1.24E+05	7.32E+05	7.31E+05	7.29E+05	7.26E+05	7.01E+05	6.71E+05	4.75E+05	3.08E+05	[illegible]	1.27E+02
NI-63	1.79E+07	8.58E+07	7.34E+07	3.52E+06	8.16E+04	6.80E-09	0.	0.	0.	0.	0.
SE-79	1.38E+04	8.36E+04	8.35E+04	8.32E+04	8.27E+04	7.93E+04	7.52E+04	4.91E+04	2.88E+04	[illegible]	1.97E+00
KR-85	1.72E+08	2.38E+08	6.61E+07	3.69E-04	0.	0.	0.	0.	0.	0.	0.
RB-87	6.81E-01	4.12E+00	4.12E+00	4.12E+00	4.12E+00	4.12E+00	4.12E+00	4.12E+00	4.12E+00	4.12E+00	4.12E+00
SR-90,Y-90	3.86E+09	1.23E+10	7.49E+09	3.54E+05	1.57E+00	0.	0.	0.	0.	0.	0.
ZR-93,NB-93M	1.31E+05	7.93E+05	7.93E+05	7.93E+05	7.93E+05	7.92E+05	7.90E+05	7.75E+05	7.56E+05	6.30E+05	5.00E+05
TC-99	5.10E+05	3.07E+06	3.07E+06	3.07E+06	3.06E+06	3.02E+06	2.97E+06	2.61E+06	2.21E+06	5.91E+05	1.13E+05
RU-106,RH-106	5.87E+07	1.13E+06	1.16E+00	0.	0.	0.	0.	0.	0.	0.	0.
PD-107	3.98E+03	2.33E+04	2.33E+04	2.33E+04	2.33E+04	2.33E+04	2.33E+04	2.32E+04	2.31E+04	2.22E+04	2.11E+04
AG-110M	1.57E+04	7.81E+01	1.61E-07	0.	0.	0.	0.	0.	0.	0.	0.
CD-113M	1.80E+05	3.24E+05	1.21E+05	2.51E+04	0.	0.	0.	0.	0.	0.	0.
SB-125,TE-125M	3.67E+07	6.07E+06	3.59E+04	0.	0.	0.	0.	0.	0.	0.	0.
SN-126,SB-126	3.78E+04	2.26E+05	2.26E+05	2.26E+05	2.25E+05	2.19E+05	2.11E+05	1.60E+05	1.13E+05	7.09E+03	2.22E+02
I-129	1.31E+03	7.88E+03	7.88E+03	7.88E+03	7.88E+03	7.87E+03	7.87E+03	7.86E+03	7.84E+03	7.72E+03	7.56E+03
CS-134	2.18E+08	2.10E+07	2.69E+04	0.	0.	0.	0.	0.	0.	0.	0.
CS-135	1.03E+04	6.38E+04	6.38E+04	6.38E+04	6.38E+04	6.38E+04	6.37E+04	6.31E+04	6.24E+04	5.69E+04	5.07E+04
CS-137,BA-137	5.37E+09	1.76E+10	1.11E+10	9.84E+05	9.54E+00	0.	0.	0.	0.	0.	0.
CE-144,PR-144	2.09E+07	2.65E+05	4.84E-03	0.	0.	0.	0.	0.	0.	0.	0.
PM-147	2.31E+08	4.30E+07	2.17E+05	0.	0.	0.	0.	0.	0.	0.	0.
SM-151	4.20E+07	2.00E+08	1.70E+08	6.82E+06	1.27E+05	1.88E-09	0.	0.	0.	0.	0.
EU-152	2.43E+05	3.87E+05	1.22E+05	9.04E-06	0.	0.	0.	0.	0.	0.	0.
EU-154	1.30E+08	2.67E+08	1.12E+08	2.85E+00	1.13E-04	0.	0.	0.	0.	0.	0.
EU-155	5.11E+06	3.86E+05	1.83E+02	0.	0.	0.	0.	0.	0.	0.	0.
OTHER[a]	1.41E+03	7.89E+00	6.63E-09	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	1.02E+10	3.07E+10	1.91E+10	1.68E+07	5.26E+06	4.95E+06	4.84E+06	4.16E+06	3.51E+06	1.32E+06	6.94E+05

a. Nuclides included in "other" category are all short-lived and are detailed in the next table.

TABLE 10.D.89. Case 3 - Low Growth - U and Pu Recycle - Reference Treatment - Short-lived Fission and Activation Product Heat Generation Rate in Repositories (Watts)

FISSION AND ACTIVATION	YEAR 2000	YEAR 2050	YEAR 2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
SC-46	7.21E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR-51	2.70E-01	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO-58	2.63E+01	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE-59	1.15E-04	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN-65	4.90E+01	4.34E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR-89	2.83E-04	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y-91	2.79E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR-95	2.04E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB-95M	4.11E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB-95	3.84E-01	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	7.07E-06	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
[illegible]5	1.84E-02	1.49E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB-124	6.41E-06	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE-127M,TE-127	2.99E-02	7.77E-07	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE-141	1.27E-08	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM-148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD-153	4.49E-01	8.76E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB-160	4.23E-04	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W-181	4.17E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	7.73E+01	1.31E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.

TABLE 10.D.90. Case 3 - Low Growth - U and Pu Recycle - Reference Treatment - Total Heat Generation Rate in Repositories by Waste Classification (Watts)

FISSION AND ACTIVATION	YEAR 2000	YEAR 2050	YEAR 2070	GEOLOGIC TIME (YEARS BEYOND 1975) 500	1000	5000	10000	50000	100000	500000	1000000
HLW	2.63E+07	9.00E+07	5.53E+07	2.42E+04	7.92E+03	7.56E+03	7.40E+03	6.25E+03	5.10E+03	1.25E+03	3.38E+02
FMW	1.49E+06	3.86E+05	6.53E+04	4.52E+03	4.02E+03	3.87E+03	3.70E+03	2.62E+03	1.71E+03	6.24E+01	7.52E+00
ILW	8.12E+03	3.03E+03	1.82E+03	1.72E+00	1.08E+00	1.04E+00	1.00E+00	7.45E-01	5.24E-01	6.80E-02	2.72E-02
LLW	2.33E+01	6.64E+01	6.13E+01	5.23E+01	4.95E+01	3.26E+01	2.03E+01	5.59E+00	5.46E+00	5.38E+00	5.27E+00
TOTAL	2.78E+07	9.03E+07	5.54E+07	2.88E+04	1.20E+04	1.15E+04	1.11E+04	8.88E+03	6.81E+03	1.32E+03	3.51E+02
ACTINIDES											
HLW	3.73E+06	4.20E+07	2.70E+07	7.72E+06	3.87E+06	6.57E+05	4.64E+05	8.29E+04	3.88E+04	4.60E+04	4.30E+04
FMW	1.04E+04	7.12E+04	6.33E+04	2.37E+04	1.30E+04	3.84E+03	2.71E+03	5.19E+02	2.13E+02	1.17E+02	8.21E+01
ILW	6.08E+04	3.63E+05	3.62E+05	1.44E+05	8.05E+04	2.55E+04	1.80E+04	3.43E+03	1.36E+03	6.39E+02	4.08E+02
LLW	1.27E+04	9.29E+04	9.37E+04	4.16E+04	2.21E+04	5.56E+03	4.07E+03	8.85E+02	3.18E+02	1.45E+02	1.05E+02
TOTAL	3.79E+06	4.25E+07	2.76E+07	7.93E+06	3.98E+06	6.92E+05	4.88E+05	8.77E+04	4.06E+04	4.69E+04	4.36E+04

APPENDIX 10E

WASTE MANAGEMENT SYSTEM COSTS

APPENDIX 10E

WASTE MANAGEMENT SYSTEM COSTS

Appendix 10E consists of a series of 195 tables delineating total waste management system costs at 5-year intervals over the entire life of the waste management system. These tables are also grouped by the fuel cycle cases and are further subdivided as follows:

- Unit power costs: This is a series of four tables that show total waste management costs in mills/kW-hr for repositories in four different geologic media. Results are shown for 0%, 7%, and 10% discount rates.
- Unit fuel costs: This is a series of four tables that show the costs per kilogram of spent fuel for repositories in four different geologic media. Results are shown for 0%, 7%, and 10% discount rates.
- Total system waste management costs at 0% discount rate. For the once-through cycle cases this set consists of four tables that detail costs for all of the major cost components in the waste management system, one table for each geologic repository medium.

  In the reprocessing cases a series of 10 tables are used to show costs for all of the important components of the total cost of the entire waste management system. Separate tables show TRU waste transportation costs, spent fuel management costs, geologic repository costs for each geologic medium, and the non-spent fuel system waste management costs as affected by each geologic repository medium.
- Total system waste management costs at a 7% discount rate. This is a series of tables similar to the 0% discount series except that a 7% discount rate is used and the detailed tables on transportation and repository costs are deleted. This series consists of four tables in the once-through cases and five tables in the reprocessing cases.
- Total system waste management costs at 10% discount rate. This is a series of tables identical to the 7% series except that a 10% discount rate is used.

APPENDIX 10E

INDEX TO WASTE MANAEMENT SYSTEM COST TABLES

IMAGE EVALUATION
TEST TARGET (MT-3)

6″

MICROCOPY RESOLUTION TEST CHART

TABLE 10.E.1. Case 1 - Once-Through Cycle - Repository in Salt - Reference Treatment - Unit Power Cost for TRU Waste Management Including Spent Fuel Handling and Storage

	POWER GENERATION		UNDISCOUNTED AVERAGE		DISCOUNTED AVERAGE (7 PCT)		DISCOUNTED AVERAGE (10 PCT)		
	KWHR		MILLS/KWHR		MILLS/KWHR		MILLS/KWHR		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	1.78E+11	4.92E+11	.05	.02	.05	.02	.05	.02	1975
1980	3.44E+11	1.86E+12	.11	.07	.11	.07	.11	.06	1980
1985	6.82E+11	4.45E+12	.27	.13	.27	.12	.27	.11	1985
1990	1.11E+12	9.17E+12	.46	.28	.46	.23	.46	.21	1990
1995	1.67E+12	1.63E+13	.41	.35	.41	.29	.41	.27	1995
2000	2.32E+12	2.66E+13	.44	.38	.44	.32	.44	.30	2000
2005	2.40E+12	3.87E+13	.58	.42	.58	.36	.58	.32	2005
2010	2.31E+12	5.04E+13	.67	.48	.67	.39	.67	.34	2010
2015	2.10E+12	6.15E+13	.73	.52	.73	.41	.73	.36	2015
2020	1.82E+12	7.11E+13	.83	.55	.83	.42	.83	.36	2020
2025	1.37E+12	7.89E+13	.97	.59	.97	.43	.97	.37	2025
2030	9.23E+11	8.44E+13	1.32	.62	1.32	.44	1.32	.37	2030
2035	4.50E+11	8.76E+13	2.01	.66	2.01	.44	2.01	.37	2035
2040	2.67E+10	8.85E+13	25.34	.70	25.34	.45	25.34	.38	2040
2045	0.	8.85E+13	0.00	.72	0.00	.45	0.00	.38	2045
2050	0.	8.85E+13	0.00	.73	0.00	.45	0.00	.38	2050
2055	0.	8.85E+13	0.00	.73	0.00	.45	0.00	.38	2055
2060	0.	8.85E+13	0.00	.73	0.00	.45	0.00	.38	2060
2065	0.	8.85E+13	0.00	.73	0.00	.45	0.00	.38	2065
2070	0.	8.85E+13	0.00	.73	0.00	.45	0.00	.38	2070

TABLE 10.E.2. Case 1 - Once-Through Cycle - Repository in Granite - Reference Treatment - Unit Power Cost for TRU Waste Management Including Spent Fuel Handling and Storage

	POWER GENERATION		UNDISCOUNTED AVERAGE		DISCOUNTED AVERAGE (7 PCT)		DISCOUNTED AVERAGE (10 PCT)		
	KWHR		MILLS/KWHR		MILLS/KWHR		MILLS/KWHR		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	1.78E+11	4.92E+11	.05	.02	.05	.02	.05	.02	1975
1980	3.44E+11	1.86E+12	.11	.07	.11	.07	.11	.06	1980
1985	6.82E+11	4.45E+12	.29	.14	.29	.12	.29	.11	1985
1990	1.11E+12	9.17E+12	.52	.31	.52	.26	.52	.23	1990
1995	1.67E+12	1.63E+13	.47	.39	.47	.33	.47	.30	1995
2000	2.32E+12	2.66E+13	.51	.43	.51	.36	.51	.33	2000
2005	2.40E+12	3.87E+13	.67	.48	.67	.40	.67	.36	2005
2010	2.31E+12	5.04E+13	.78	.54	.78	.44	.78	.39	2010
2015	2.10E+12	6.15E+13	.84	.59	.84	.46	.84	.40	2015
2020	1.82E+12	7.11E+13	.96	.63	.96	.48	.96	.41	2020
2025	1.37E+12	7.89E+13	1.12	.67	1.12	.49	1.12	.42	2025
2030	9.23E+11	8.44E+13	1.53	.72	1.53	.50	1.53	.42	2030
2035	4.50E+11	8.76E+13	2.33	.76	2.33	.50	2.33	.42	2035
2040	2.67E+10	8.85E+13	29.65	.80	29.65	.51	29.65	.42	2040
2045	0.	8.85E+13	0.00	.83	0.00	.51	0.00	.42	2045
2050	0.	8.85E+13	0.00	.84	0.00	.51	0.00	.42	2050
2055	0.	8.85E+13	0.00	.84	0.00	.51	0.00	.42	2055
2060	0.	8.85E+13	0.00	.84	0.00	.51	0.00	.42	2060
2065	0.	8.85E+13	0.00	.84	0.00	.51	0.00	.42	2065
2070	0.	8.85E+13	0.00	.84	0.00	.51	0.00	.42	2070

TABLE 10.E.3. Case 1 - Once-Through Cycle - Repository in Shale - Reference Treatment - Unit Power Cost for TRU Waste Management Including Spent Fuel Handling and Storage

	POWER GENERATION		UNDISCOUNTED AVERAGE		DISCOUNTED AVERAGE (7 PCT)		DISCOUNTED AVERAGE (10 PCT)		
	KWHR		MILLS/KWHR		MILLS/KWHR		MILLS/KWHR		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	1.78E+11	4.92E+11	.05	.02	.05	.02	.05	.02	1975
1980	3.44E+11	1.86E+12	.11	.07	.11	.07	.11	.06	1980
1985	6.82E+11	4.45E+12	.27	.13	.27	.12	.27	.11	1985
1990	1.11E+12	9.17E+12	.47	.29	.47	.24	.47	.22	1990
1995	1.67E+12	1.63E+13	.42	.36	.42	.30	.42	.27	1995
2000	2.32E+12	2.66E+13	.46	.39	.46	.33	.46	.30	2000
2005	2.40E+12	3.87E+13	.60	.43	.60	.37	.60	.33	2005
2010	2.31E+12	5.04E+13	.69	.49	.69	.40	.69	.35	2010
2015	2.10E+12	6.15E+13	.75	.53	.75	.42	.75	.36	2015
2020	1.82E+12	7.11E+13	.86	.57	.86	.43	.86	.37	2020
2025	1.37E+12	7.89E+13	1.00	.60	1.00	.44	1.00	.38	2025
2030	9.23E+11	8.44E+13	1.36	.64	1.36	.45	1.36	.38	2030
2035	4.50E+11	8.76E+13	2.07	.68	2.07	.46	2.07	.38	2035
2040	2.67E+10	8.85E+13	26.20	.72	26.20	.46	26.20	.38	2040
2045	0.	8.85E+13	0.00	.74	0.00	.46	0.00	.39	2045
2050	0.	8.85E+13	0.00	.75	0.00	.46	0.00	.39	2050
2055	0.	8.85E+13	0.00	.75	0.00	.46	0.00	.39	2055
2060	0.	8.85E+13	0.00	.75	0.00	.46	0.00	.39	2060
2065	0.	8.85E+13	0.00	.75	0.00	.46	0.00	.39	2065
2070	0.	8.85E+13	0.00	.75	0.00	.46	0.00	.39	2070

TABLE 10.E.4. Case 1 - Once-Through Cycle - Repository in Basalt - Reference Treatment - Unit Power Cost for TRU Waste Management Including Spent Fuel Handling and Storage

	POWER GENERATION		UNDISCOUNTED AVERAGE		DISCOUNTED AVERAGE (7 PCT)		DISCOUNTED AVERAGE (10 PCT)		
	KWHR		MILLS/KWHR		MILLS/KWHR		MILLS/KWHR		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	1.78E+11	4.92E+11	.05	.02	.05	.02	.05	.02	1975
1980	3.44E+11	1.06E+12	.11	.07	.11	.07	.11	.06	1980
1985	6.82E+11	4.45E+12	.30	.14	.30	.12	.30	.11	1985
1990	1.11E+12	9.17E+12	.54	.32	.54	.26	.54	.24	1990
1995	1.67E+12	1.63E+13	.49	.41	.49	.34	.49	.31	1995
2000	2.32E+12	2.66E+13	.53	.45	.53	.38	.53	.34	2000
2005	2.40E+12	3.87E+13	.70	.50	.70	.42	.70	.37	2005
2010	2.31E+12	5.04E+13	.81	.57	.81	.46	.81	.40	2010
2015	2.10E+12	6.15E+13	.88	.62	.88	.48	.88	.42	2015
2020	1.82E+12	7.11E+13	1.01	.66	1.01	.50	1.01	.43	2020
2025	1.37E+12	7.89E+13	1.17	.70	1.17	.51	1.17	.43	2025
2030	9.23E+11	8.44E+13	1.61	.75	1.61	.52	1.61	.44	2030
2035	4.50E+11	8.76E+13	2.45	.79	2.45	.53	2.45	.44	2035
2040	2.67E+10	8.85E+13	31.21	.84	31.21	.53	31.21	.44	2040
2045	0.	8.85E+13	0.00	.87	0.00	.53	0.00	.44	2045
2050	0.	8.85E+13	0.00	.88	0.00	.53	0.00	.44	2050
2055	0.	8.85E+13	0.00	.88	0.00	.53	0.00	.44	2055
2060	0.	8.85E+13	0.00	.88	0.00	.53	0.00	.44	2060
2065	0.	8.85E+13	0.00	.88	0.00	.53	0.00	.44	2065
2070	0.	8.85E+13	0.00	.88	0.00	.53	0.00	.44	2070

TABLE 10.E.5. Case 1 - Once Through Cycle - Repository in Salt - Reference Treatment - Unit Fuel Cost of TRU Waste Management Including Spent Fuel Handling and Storage [(a)]

YEAR	THRUPUT KG DISCHARGED ANNUAL	THRUPUT KG DISCHARGED CUMULATIVE	UNDISCOUNTED AVERAGE DOLLARS/KG DISCHARGED ANNUAL	UNDISCOUNTED AVERAGE DOLLARS/KG DISCHARGED CUMULATIVE	DISCOUNTED AVERAGE (7 PCT) DOLLARS/KG DISCHARGED ANNUAL	DISCOUNTED AVERAGE (7 PCT) DOLLARS/KG DISCHARGED CUMULATIVE	DISCOUNTED AVERAGE (10 PCT) DOLLARS/KG DISCHARGED ANNUAL	DISCOUNTED AVERAGE (10 PCT) DOLLARS/KG DISCHARGED CUMULATIVE	YEAR
1975	6.99E+05	1.78E+06	12.	5.	12.	5.	12.	5.	1975
1980	1.27E+06	6.93E+06	30.	19.	30.	18.	30.	17.	1980
1985	2.48E+06	1.63E+07	73.	36.	73.	32.	73.	30.	1985
1990	4.07E+06	3.37E+07	124.	76.	124.	63.	124.	58.	1990
1995	6.21E+06	6.02E+07	111.	94.	111.	80.	111.	73.	1995
2000	8.74E+06	9.86E+07	118.	102.	118.	88.	118.	80.	2000
2005	9.09E+06	1.44E+08	154.	113.	154.	96.	154.	87.	2005
2010	9.24E+06	1.90E+08	168.	126.	168.	104.	168.	92.	2010
2015	8.60E+06	2.35E+08	178.	135.	178.	108.	178.	95.	2015
2020	7.72E+06	2.75E+08	196.	143.	196.	112.	196.	97.	2020
2025	7.15E+06	3.14E+08	186.	148.	186.	114.	186.	98.	2025
2030	5.31E+06	3.43E+08	229.	153.	229.	115.	229.	99.	2030
2035	3.96E+06	3.66E+08	228.	158.	228.	116.	228.	99.	2035
2040	1.53E+06	3.79E+08	441.	163.	441.	117.	441.	100.	2040
2045	0.	3.79E+08	0.	169.	0.	117.	0.	100.	2045
2050	0.	3.79E+08	0.	170.	0.	117.	0.	100.	2050
2055	0.	3.79E+08	0.	170.	0.	117.	0.	100.	2055
2060	0.	3.79E+08	0.	170.	0.	117.	0.	100.	2060
2065	0.	3.79E+08	0.	170.	0.	117.	0.	100.	2065
2070	0.	3.79E+08	0.	170.	0.	117.	0.	100.	2070

a. Unit cost at time of reactor discharge.

TABLE 10.E.6. Case 1 - Once-Through Cycle - Repository in Granite - Reference Treatment - Unit Fuel Cost of TRU Waste Management Including Spent Fuel Handling and Storage[a]

	THROUGHPUT		UNDISCOUNTED AVERAGE		DISCOUNTED AVERAGE (7 PCT)		DISCOUNTED AVERAGE (10 PCT)		
	KG DISCHARGED		DOLLARS/KG DISCHARGED		DOLLARS/KG DISCHARGED		DOLLARS/KG DISCHARGED		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	6.99E+05	1.78E+06	12.	5.	12.	5.	12.	5.	1975
1980	1.27E+06	6.93E+06	30.	19.	30.	18.	30.	17.	1980
1985	2.98E+06	1.63E+07	80.	37.	80.	32.	80.	31.	1985
1990	4.07E+06	3.37E+07	141.	84.	141.	70.	141.	63.	1990
1995	6.21E+06	6.02E+07	126.	106.	126.	89.	126.	81.	1995
2000	8.74E+06	9.86E+07	135.	116.	135.	99.	135.	90.	2000
2005	9.00E+06	1.44E+08	176.	129.	176.	108.	176.	97.	2005
2010	9.24E+06	1.90E+08	194.	144.	194.	117.	194.	104.	2010
2015	8.60E+06	2.35E+08	206.	154.	206.	123.	206.	108.	2015
2020	7.72E+06	2.75E+08	227.	164.	227.	127.	227.	110.	2020
2025	7.19E+06	3.14E+08	214.	169.	214.	129.	214.	111.	2025
2030	5.31E+06	3.43E+08	266.	176.	266.	131.	266.	112.	2030
2035	3.96E+06	3.66E+08	265.	182.	265.	132.	265.	112.	2035
2040	1.53E+06	3.79E+08	516.	187.	516.	133.	516.	113.	2040
2045	0.	3.79E+08	0.	194.	0.	133.	0.	113.	2045
2050	0.	3.79E+08	0.	195.	0.	133.	0.	113.	2050
2055	0.	3.79E+08	0.	195.	0.	133.	0.	113.	2055
2060	0.	3.79E+08	0.	195.	0.	133.	0.	113.	2060
2065	0.	3.79E+08	0.	195.	0.	133.	0.	113.	2065
2070	0.	3.79E+08	0.	195.	0.	133.	0.	113.	2070

a. Unit cost at time of reactor discharge

TABLE 10.E.7. Case 1 - Once-Through Cycle - Repository in Shale - Reference Treatment - Unit Fuel Cost of TRU Waste Management Including Spent Fuel Handling and Storage[a]

	THRUPUT		UNDISCOUNTED AVERAGE		DISCOUNTED AVERAGE (7 PCT)		DISCOUNTED AVERAGE (10 PCT)		
	KG DISCHARGED		DOLLARS/KG DISCHARGED		DOLLARS/KG DISCHARGED		DOLLARS/KG DISCHARGED		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	6.99E+05	1.78E+06	12.	5.	12.	5.	12.	5.	1975
1980	1.27E+06	6.93E+06	30.	19.	30.	18.	30.	17.	1980
1985	2.48E+06	1.63E+07	74.	36.	74.	32.	74.	30.	1985
1990	4.07E+06	3.37E+07	128.	78.	128.	65.	128.	59.	1990
1995	6.21E+06	6.02E+07	114.	97.	114.	82.	114.	74.	1995
2000	8.74E+06	9.86E+07	121.	105.	121.	90.	121.	82.	2000
2005	9.09E+06	1.44E+08	158.	116.	158.	98.	158.	89.	2005
2010	9.24E+06	1.90E+08	173.	130.	173.	106.	173.	94.	2010
2015	8.60E+06	2.35E+08	184.	139.	184.	111.	184.	98.	2015
2020	7.72E+06	2.75E+08	202.	147.	202.	115.	202.	100.	2020
2025	7.15E+06	3.14E+08	191.	152.	191.	117.	191.	101.	2025
2030	5.31E+06	3.43E+08	236.	158.	236.	118.	236.	102.	2030
2035	3.96E+06	3.66E+08	236.	163.	236.	119.	236.	102.	2035
2040	1.53E+06	3.79E+08	456.	167.	456.	120.	456.	102.	2040
2045	0.	3.79E+08	0.	174.	0.	120.	0.	102.	2045
2050	0.	3.79E+08	0.	175.	0.	120.	0.	102.	2050
2055	0.	3.79E+08	0.	175.	0.	120.	0.	102.	2055
2060	0.	3.79E+08	0.	175.	0.	120.	0.	102.	2060
2065	0.	3.79E+08	0.	175.	0.	120.	0.	102.	2065
2070	0.	3.79E+08	0.	175.	0.	120.	0.	102.	2070

a. Unit cost at time of reactor discharge

TABLE 10.E.8. Case 1 - Once-Through Cycle - Repository in Basalt - Reference Treatment - Unit Fuel Cost of TRU Waste Management Including Spent Fuel Handling and Storage[a]

YEAR	THRUPUT KG DISCHARGED ANNUAL	THRUPUT KG DISCHARGED CUMULATIVE	UNDISCOUNTED AVERAGE DOLLARS/KG DISCHARGED ANNUAL	UNDISCOUNTED AVERAGE DOLLARS/KG DISCHARGED CUMULATIVE	DISCOUNTED AVERAGE (7 PCT) DOLLARS/KG DISCHARGED ANNUAL	DISCOUNTED AVERAGE (7 PCT) DOLLARS/KG DISCHARGED CUMULATIVE	DISCOUNTED AVERAGE (10 PCT) DOLLARS/KG DISCHARGED ANNUAL	DISCOUNTED AVERAGE (10 PCT) DOLLARS/KG DISCHARGED CUMULATIVE	YEAR
1975	6.99E+05	1.78E+06	12.	5.	12.	5.	12.	5.	1975
1980	1.27E+06	6.93E+06	30.	19.	30.	18.	30.	17.	1980
1985	2.48E+06	1.63E+07	83.	37.	83.	33.	83.	31.	1985
1990	4.07E+06	3.37E+07	148.	87.	148.	72.	148.	65.	1990
1995	6.21E+06	6.02E+07	132.	111.	132.	92.	132.	84.	1995
2000	8.74E+06	9.86E+07	140.	120.	140.	103.	140.	93.	2000
2005	9.09E+06	1.44E+08	185.	134.	185.	113.	185.	101.	2005
2010	9.24E+06	1.90E+08	203.	151.	203.	122.	203.	108.	2010
2015	8.60E+06	2.35E+08	216.	161.	216.	128.	216.	112.	2015
2020	7.72E+06	2.75E+08	238.	171.	238.	132.	238.	114.	2020
2025	7.15E+06	3.14E+08	225.	177.	225.	135.	225.	116.	2025
2030	5.31E+06	3.43E+08	279.	185.	279.	137.	279.	117.	2030
2035	3.96E+06	3.66E+08	278.	190.	278.	138.	278.	117.	2035
2040	1.53E+06	3.79E+08	543.	196.	543.	139.	543.	117.	2040
2045	0.	3.79E+08	0.	204.	0.	139.	0.	118.	2045
2050	0.	3.79E+08	0.	205.	0.	139.	0.	118.	2050
2055	0.	3.79E+08	0.	205.	0.	139.	0.	118.	2055
2060	0.	3.79E+08	0.	205.	0.	139.	0.	118.	2060
2065	0.	3.79E+08	0.	205.	0.	139.	0.	118.	2065
2070	0.	3.79E+08	0.	205.	0.	139.	0.	118.	2070

a. Unit cost at time of reactor discharge.

TABLE 10.E.9. Case 1 - Once-Through Cycle - Repository in Salt - Reference Treatment - Total System Waste Management Cost Including Spent Fuel Handling and Storage - $ Millions at 0% Discount Rate

YEAR	REACTOR TO ISFSB	ISFSB STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACK-AGING	ISFSB TO PACK-AGING	PACK-AGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOS-ITORY COST	TOTAL COST	YEAR
1980	0.	0.	132.	0.	0.	0.	0.	0.	0.	0.	0.	132.	1980
1985	39.	39.	444.	0.	0.	13.	0.	0.	0.	23.	36.	583.	1985
1990	108.	298.	879.	195.	0.	195.	0.	0.	0.	345.	554.	2564.	1990
1995	230.	741.	1448.	430.	0.	506.	0.	0.	0.	893.	1437.	5685.	1995
2000	408.	1395.	2290.	765.	0.	931.	0.	0.	0.	1643.	2643.	10077.	2000
2005	628.	2283.	3431.	1264.	0.	1564.	0.	0.	0.	2759.	4438.	16366.	2005
2010	846.	3240.	4665.	1914.	0.	2387.	0.	0.	0.	4211.	6773.	24035.	2010
2015	1068.	4193.	5895.	2549.	0.	3217.	0.	0.	0.	5677.	9131.	31747.	2015
2020	1260.	5097.	7063.	3229.	0.	4053.	0.	0.	0.	7151.	11503.	39355.	2020
2025	1444.	5921.	8130.	3830.	0.	4815.	0.	0.	0.	8495.	13664.	46299.	2025
2030	1590.	6642.	9069.	4390.	0.	5525.	0.	0.	0.	9748.	15680.	52643.	2030
2035	1703.	7187.	9791.	4853.	0.	6112.	0.	0.	0.	10785.	17347.	57788.	2035
2040	1773.	7596.	10313.	5213.	0.	6568.	0.	0.	0.	11588.	18639.	61690.	2040
2045	1777.	7738.	10508.	5495.	0.	6875.	0.	0.	0.	12130.	19511.	63999.	2045
2050	1777.	7739.	10510.	5493.	0.	6923.	0.	0.	0.	12215.	19648.	64305.	2050
2055	1777.	7739.	10510.	5493.	0.	6923.	0.	0.	0.	12215.	19648.	64305.	2055
2060	1777.	7739.	10510.	5493.	0.	6923.	0.	0.	0.	12215.	19648.	64305.	2060
2065	1777.	7739.	10510.	5493.	0.	6923.	0.	0.	0.	12215.	19648.	64305.	2065
2070	1777.	7739.	10510.	5493.	0.	6923.	0.	0.	0.	12215.	19648.	64305.	2070

TABLE 10.E.10. Case 1 - Once-Through Cycle - Repository in Granite - Reference Treatment - Total System Waste Management Costs Including Spent Fuel Handling and Storage - $ Millions at 0% Discount Rate

YEAR	REACTOR TO ISFSB	ISFSB STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACKAGING	ISFSB TO PACKAGING	PACKAGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOSITORY COST	TOTAL COST	YEAR
1980	0.	0.	132.	0.	0.	0.	0.	0.	0.	0.	0.	132.	1980
1985	29.	39.	444.	0.	0.	13.	0.	0.	0.	23.	54.	601.	1985
1990	108.	298.	879.	185.	0.	195.	0.	0.	0.	345.	831.	2840.	1990
1995	230.	741.	1448.	430.	0.	506.	0.	0.	0.	893.	2154.	6402.	1995
2000	408.	1395.	2290.	765.	0.	931.	0.	0.	0.	1643.	3963.	11396.	2000
2005	628.	2283.	3431.	1254.	0.	1564.	0.	0.	0.	2759.	6653.	18581.	2005
2010	846.	3240.	4568.	1914.	0.	2387.	0.	0.	0.	4211.	10153.	27415.	2010
2015	1064.	4193.	5895.	3549.	0.	3217.	0.	0.	0.	5677.	13688.	36303.	2015
2020	1240.	5097.	7063.	3239.	0.	4053.	0.	0.	0.	7151.	17243.	45096.	2020
2025	1444.	5921.	8130.	3829.	0.	4815.	0.	0.	0.	8495.	20483.	53118.	2025
2030	1590.	6642.	9069.	4390.	0.	5525.	0.	0.	0.	9748.	23505.	60468.	2030
2035	1703.	7107.	9791.	4893.	0.	6112.	0.	0.	0.	10785.	26004.	66445.	2035
2040	1773.	7596.	10313.	5213.	0.	6568.	0.	0.	0.	11588.	27940.	70991.	2040
2045	1777.	7738.	10508.	5495.	0.	6875.	0.	0.	0.	12130.	29248.	73731.	2045
2050	1777.	7739.	10510.	5493.	0.	6923.	0.	0.	0.	12215.	29454.	74111.	2050
2055	1777.	7739.	10510.	5493.	0.	6923.	0.	0.	0.	12215.	29454.	74111.	2055
2060	1777.	7739.	10510.	5493.	0.	6923.	0.	0.	0.	12215.	29454.	74111.	2060
2065	1777.	7739.	10510.	5493.	0.	6923.	0.	0.	0.	12215.	29454.	74111.	2065
2070	1777.	7739.	10510.	5493.	0.	6923.	0.	0.	0.	12215.	29454.	74111.	2070

TABLE 10.E.11. Case 1 - Once-Through Cycle - Repository in Shale - Reference Treatment - Total System Waste Management Costs Including Spent Fuel Handling and Storage - $ Millions at 0% Discount Rate

YEAR	REACTOR TO ISFSI	ISFSI STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACKAGING	ISFSI TO PACKAGING	PACKAGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOSITORY COST	TOTAL COST	YEAR
1980	0.	0.	132.	0.	0.	0.	0.	0.	0.	0.	0.	132.	1980
1985	29.	39.	443.	0.	0.	13.	0.	0.	0.	23.	40.	587.	1985
1990	108.	298.	879.	185.	0.	195.	0.	0.	0.	345.	609.	2619.	1990
1995	230.	741.	1448.	430.	0.	506.	0.	0.	0.	893.	1579.	5828.	1995
2000	408.	1395.	2290.	765.	0.	931.	0.	0.	0.	1643.	2908.	10340.	2000
2005	638.	2283.	3431.	1249.	0.	1569.	0.	0.	0.	2759.	4879.	16807.	2005
2010	846.	3280.	4665.	1910.	0.	2387.	0.	0.	0.	4211.	7446.	24768.	2010
2015	1048.	4193.	5895.	2549.	0.	3217.	0.	0.	0.	5677.	10038.	32654.	2015
2020	1260.	5097.	7063.	3229.	0.	4053.	0.	0.	0.	7151.	12645.	40498.	2020
2025	1444.	6021.	8130.	3839.	0.	4815.	0.	0.	0.	8495.	15021.	47656.	2025
2030	1590.	6642.	9069.	4390.	0.	5525.	0.	0.	0.	9748.	17237.	54201.	2030
2035	1703.	7197.	9791.	4853.	0.	6112.	0.	0.	0.	10785.	19070.	59512.	2035
2040	1773.	7596.	10313.	5213.	0.	6568.	0.	0.	0.	11588.	20490.	63541.	2040
2045	1777.	7738.	10508.	5455.	0.	6875.	0.	0.	0.	12130.	21449.	65932.	2045
2050	1777.	7739.	10510.	5493.	0.	6923.	0.	0.	0.	12215.	21600.	66257.	2050
2055	1777.	7739.	10510.	5493.	0.	6923.	0.	0.	0.	12215.	21600.	66257.	2055
2060	1777.	7739.	10510.	5493.	0.	6923.	0.	0.	0.	12215.	21600.	66257.	2060
2065	1777.	7739.	10510.	5493.	0.	6923.	0.	0.	0.	12215.	21600.	66257.	2065
2070	1777.	7739.	10510.	5493.	0.	6923.	0.	0.	0.	12215.	21600.	66257.	2070

TABLE 10.E.12. Case 1 - Once-Through Cycle - Repository in Basalt - Reference Treatment - Total System Waste Management Costs Including Spent Fuel Handling and Storage - $ Millions at 0% Discount Rate

YEAR	REACTOR TO ISFSB	ISFSB STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACKAGING	ISFSB TO PACKAGING	PACKAGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOSITORY COST	TOTAL COST	YEAR
1980	0.	0.	132.	0.	0.	0.	0.	0.	0.	0.	0	132.	1980
1985	39.	39.	444.	0.	0.	13.	0.	0.	0.	23.	61.	608.	1985
1990	108.	298.	870.	135.	0.	195.	0.	0.	0.	365.	931.	2941.	1990
1995	230.	741.	1448.	430.	0.	506.	0.	0.	0.	893.	2414.	6662.	1995
2000	408.	1395.	2290.	745.	0.	931.	0.	0.	0.	1843.	4441.	11879.	2000
2005	628.	2283.	3431.	1244.	0.	1569.	0.	0.	0.	2759.	7455.	19384.	2005
2010	886.	3240.	4665.	1914.	0.	2387.	0.	0.	0.	4211.	11378.	28640.	2010
2015	1064.	4103.	5895.	2569.	0.	3217.	0.	0.	0.	5677.	15339.	37955.	2015
2020	1240.	5097.	7063.	3229.	0.	4053.	0.	0.	0.	7151.	19323.	47176.	2020
2025	1444.	5921.	8130.	3829.	0.	4815.	0.	0.	0.	8495.	22955.	55569.	2025
2030	1590.	6602.	9069.	4390.	0.	5525.	0.	0.	0.	9748.	26341.	63304.	2030
2035	1703.	7197.	9791.	4853.	0.	6112.	0.	0.	0.	10785.	29142.	69583.	2035
2040	1773.	7596.	10313.	5213.	0.	6548.	0.	0.	0.	11588.	31312.	74363.	2040
2045	1777.	7738.	10508.	5435.	0.	6875.	0.	0.	0.	12130.	32777.	77260.	2045
2050	1777.	7739.	10510.	5493.	0.	6923.	0.	0.	0.	12215.	33007.	77665.	2050
2055	1777.	7739.	10510.	5493.	0.	6923.	0.	0.	0.	12215.	33007.	77665.	2055
2060	1777.	7739.	10510.	5493.	0.	6923.	0.	0.	0.	12215.	33007.	77665.	2060
2065	1777.	7739.	10510.	5493.	0.	6923.	0.	0.	0.	12215.	33007.	77665.	2065
2070	1777.	7739.	10510.	5493.	0.	6923.	0.	0.	0.	12215.	33007.	77665.	2070

TABLE 10.E.13. Case 1 - Once-Through Cycle - Repository in Salt - Reference Treatment - Total System Waste Management Costs Including Spent Fuel Handling and Storage - $ Millions at 7% Discount Rate

YEAR	REACTOR TO ISFSB	ISFSB STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACKAGING	ISFSB TO PACKAGING	PACKAGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOSITORY COST	TOTAL COST	YEAR
1980	0.	0.	121.	0.	0.	0.	0.	0.	0.	0.	0.	121.	1980
1985	18.	24.	327.	0.	0.	7.	0.	0.	0.	13.	21.	410.	1985
1990	55.	144.	533.	97.	0.	93.	0.	0.	0.	164.	264.	1340.	1990
1995	96.	293.	728.	170.	0.	198.	0.	0.	0.	350.	563.	2396.	1995
2000	139.	450.	927.	251.	0.	300.	0.	0.	0.	530.	852.	3450.	2000
2005	177.	603.	1124.	336.	0.	409.	0.	0.	0.	721.	1160.	4529.	2005
2010	204.	721.	1276.	416.	0.	510.	0.	0.	0.	900.	1447.	5473.	2010
2015	223.	805.	1384.	474.	0.	583.	0.	0.	0.	1029.	1654.	6151.	2015
2020	235.	862.	1457.	515.	0.	635.	0.	0.	0.	1121.	1803.	6629.	2020
2025	244.	899.	1505.	542.	0.	670.	0.	0.	0.	1181.	1900.	6940.	2025
2030	248.	922.	1535.	560.	0.	692.	0.	0.	0.	1221.	1964.	7143.	2030
2035	251.	934.	1552.	570.	0.	706.	0.	0.	0.	1245.	2003.	7261.	2035
2040	252.	941.	1560.	576.	0.	713.	0.	0.	0.	1258.	2024.	7324.	2040
2045	252.	943.	1563.	579.	0.	717.	0.	0.	0.	1264.	2034.	7352.	2045
2050	252.	943.	1563.	579.	0.	717.	0.	0.	0.	1265.	2035.	7355.	2050
2055	252.	943.	1563.	579.	0.	717.	0.	0.	0.	1265.	2035.	7355.	2055
2060	252.	943.	1563.	579.	0.	717.	0.	0.	0.	1265.	2035.	7355.	2060
2065	252.	943.	1563.	579.	0.	717.	0.	0.	0.	1265.	2035.	7355.	2065
2070	252.	943.	1563.	579.	0.	717.	0.	0.	0.	1265.	2035.	7355.	2070

TABLE 10.E.14. Case 1 - Once-Through Cycle - Repository in Granite - Reference Treatment - Total System Waste Management Costs Including Spent Fuel Handling and Storage - $ Millions at 7% Discount Rate

YEAR	REACTOR TO ISFSB	ISFSB STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACKAGING	ISFSB TO PACKAGING	PACKAGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOSITORY COST	TOTAL COST	YEAR
1980	0.	0.	121.	0.	0.	0.	0.	0.	0.	0.	0.	121.	1980
1985	18.	24.	327.	0.	0.	7.	0.	0.	0.	13.	32.	420.	1985
1990	55.	144.	533.	47.	0.	93.	0.	0.	0.	164.	395.	1471.	1990
1995	86.	293.	725.	170.	0.	198.	0.	0.	0.	350.	844.	2677.	1995
2000	139.	450.	927.	231.	0.	300.	0.	0.	0.	530.	1278.	3875.	2000
2005	177.	603.	1124.	336.	0.	409.	0.	0.	0.	721.	1739.	5108.	2005
2010	204.	721.	1276.	416.	0.	510.	0.	0.	0.	900.	2169.	6195.	2010
2015	223.	805.	1384.	474.	0.	583.	0.	0.	0.	1029.	2480.	6977.	2015
2020	235.	862.	1457.	515.	0.	635.	0.	0.	0.	1121.	2703.	7529.	2020
2025	244.	899.	1505.	542.	0.	670.	0.	0.	0.	1181.	2848.	7888.	2025
2030	248.	922.	1535.	560.	0.	692.	0.	0.	0.	1221.	2945.	8123.	2030
2035	251.	934.	1552.	570.	0.	706.	0.	0.	0.	1245.	3002.	8260.	2035
2040	252.	941.	1560.	576.	0.	713.	0.	0.	0.	1258.	3034.	8334.	2040
2045	252.	943.	1563.	579.	0.	717.	0.	0.	0.	1264.	3049.	8367.	2045
2050	252.	943.	1563.	579.	0.	717.	0.	0.	0.	1265.	3051.	8370.	2050
2055	252.	943.	1563.	579.	0.	717.	0.	0.	0.	1265.	3051.	8370.	2055
2060	252.	943.	1563.	579.	0.	717.	0.	0.	0.	1265.	3051.	8370.	2060
2065	252.	943.	1563.	579.	0.	717.	0.	0.	0.	1265.	3051.	8370.	2065
2070	252.	943.	1563.	579.	0.	717.	0.	0.	0.	1265.	3051.	8370.	2070

TABLE 10.E.15. Case 1 - Once-Through Cycle - Repository in Shale - Reference Treatment - Total System Waste Management Costs Including Spent Fuel Handling and Storage - $ Millions at 7% Discount Rate

YEAR	REACTOR TO ISFSR	ISFSR STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACKAGING	ISFSR TO PACKAGING	PACKAGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOSITORY COST	TOTAL COST	YEAR
1980	0.	0.	121.	0.	0.	0.	0.	0.	0.	0.	0.	121.	1980
1985	18.	24.	327.	0.	0.	7.	0.	0.	0.	13.	23.	412.	1985
1990	55.	144.	533.	47.	0.	93.	0.	0.	0.	169.	290.	1366.	1990
1995	96.	293.	725.	170.	0.	198.	0.	0.	0.	350.	619.	2452.	1995
2000	139.	450.	927.	281.	0.	300.	0.	0.	0.	530.	937.	3534.	2000
2005	177.	603.	1124.	336.	0.	409.	0.	0.	0.	721.	1275.	4644.	2005
2010	204.	721.	1276.	416.	0.	510.	0.	0.	0.	900.	1591.	5617.	2010
2015	223.	805.	1384.	474.	0.	583.	0.	0.	0.	1029.	1819.	6316.	2015
2020	235.	862.	1457.	515.	0.	635.	0.	0.	0.	1121.	1982.	6808.	2020
2025	244.	899.	1505.	542.	0.	670.	0.	0.	0.	1181.	2089.	7129.	2025
2030	248.	922.	1535.	560.	0.	692.	0.	0.	0.	1221.	2159.	7338.	2030
2035	251.	934.	1552.	570.	0.	706.	0.	0.	0.	1245.	2202.	7460.	2035
2040	252.	941.	1560.	576.	0.	713.	0.	0.	0.	1258.	2225.	7525.	2040
2045	252.	943.	1563.	579.	0.	717.	0.	0.	0.	1264.	2236.	7554.	2045
2050	252.	943.	1563.	579.	0.	717.	0.	0.	0.	1265.	2237.	7557.	2050
2055	252.	943.	1563.	579.	0.	717.	0.	0.	0.	1265.	2237.	7557.	2055
2060	252.	943.	1563.	579.	0.	717.	0.	0.	0.	1265.	2237.	7557.	2060
2065	252.	943.	1563.	579.	0.	717.	0.	0.	0.	1265.	2237.	7557.	2065
2070	252.	943.	1563.	579.	0.	717.	0.	0.	0.	1265.	2237.	7557.	2070

TABLE 10.E.16. Case 1 - Once-Through Cycle - Repository in Basalt - Reference Treatment - Total System Waste Management Costs Including Spent Fuel Handling and Storage - $ Millions at 7% Discount Rate

YEAR	REACTOR TO ISFSB	ISFSB STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACKAGING	ISFSB TO PACKAGING	PACKAGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOSITORY COST	TOTAL COST	YEAR
1980	0.	0.	121.	0.	0.	0.	0.	0.	0.	0.	0.	121.	1980
1985	12.	24.	327.	0.	0.	7.	0.	0.	0.	13.	35.	424.	1985
1990	55.	104.	533.	47.	0.	93.	0.	0.	0.	164.	443.	1519.	1990
1995	96.	203.	728.	170.	0.	198.	0.	0.	0.	350.	946.	2779.	1995
2000	139.	450.	927.	251.	0.	300.	0.	0.	0.	530.	1432.	4029.	2000
2005	177.	603.	1124.	336.	0.	409.	0.	0.	0.	721.	1944.	5318.	2005
2010	204.	721.	1276.	416.	0.	510.	0.	0.	0.	900.	2431.	6457.	2010
2015	233.	805.	1384.	478.	0.	583.	0.	0.	0.	1029.	2770.	7276.	2015
2020	235.	862.	1457.	515.	0.	635.	0.	0.	0.	1121.	3029.	7855.	2020
2025	244.	900.	1505.	542.	0.	670.	0.	0.	0.	1181.	3192.	8232.	2025
2030	248.	922.	1535.	560.	0.	692.	0.	0.	0.	1221.	3300.	8478.	2030
2035	251.	934.	1552.	570.	0.	706.	0.	0.	0.	1245.	3364.	8622.	2035
2040	252.	941.	1560.	576.	0.	713.	0.	0.	0.	1258.	3400.	8700.	2040
2045	252.	943.	1563.	579.	0.	717.	0.	0.	0.	1264.	3417.	8735.	2045
2050	252.	943.	1563.	579.	0.	717.	0.	0.	0.	1265.	3419.	8738.	2050
2055	252.	943.	1563.	579.	0.	717.	0.	0.	0.	1265.	3419.	8738.	2055
2060	252.	943.	1563.	579.	0.	717.	0.	0.	0.	1265.	3419.	8738.	2060
2065	252.	943.	1563.	579.	0.	717.	0.	0.	0.	1265.	3419.	8738.	2065
2070	252.	943.	1563.	579.	0.	717.	0.	0.	0.	1265.	3419.	8738.	2070

TABLE 10.E.17. Case 1 - Once-Through Cycle - Repository in Salt - Reference Treatment - Total System Waste Management Costs Including Spent Fuel Handling and Storage - $ Millions at 10% Discount Rate

YEAR	REACTOR TO ISFSB	ISFSB STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACK-AGING	ISFSB TO PACK-AGING	PACK-AGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO DEPOSIT	REPOS-ITORY COST	TOTAL COST	YEAR
1980	0.	0.	118.	0.	0.	0.	0.	0.	0.	0.	0.	118.	1980
1985	15.	20.	291.	0.	0.	6.	0.	0.	0.	11.	17.	359.	1985
1990	42.	108.	440.	68.	0.	69.	0.	0.	0.	121.	195.	1043.	1990
1995	68.	203.	567.	118.	0.	137.	0.	0.	0.	241.	388.	1723.	1995
2000	92.	291.	680.	163.	0.	199.	0.	0.	0.	342.	550.	2313.	2000
2005	111.	366.	776.	204.	0.	247.	0.	0.	0.	435.	700.	2839.	2005
2010	123.	416.	841.	238.	0.	290.	0.	0.	0.	511.	822.	3241.	2010
2015	130.	447.	881.	260.	0.	317.	0.	0.	0.	559.	899.	3493.	2015
2020	134.	466.	905.	273.	0.	334.	0.	0.	0.	589.	947.	3648.	2020
2025	136.	476.	910.	291.	0.	343.	0.	0.	0.	606.	975.	3735.	2025
2030	137.	482.	924.	285.	0.	349.	0.	0.	0.	616.	990.	3785.	2030
2035	138.	485.	930.	287.	0.	352.	0.	0.	0.	621.	999.	3810.	2035
2040	138.	486.	931.	288.	0.	353.	0.	0.	0.	623.	1003.	3822.	2040
2045	138.	486.	932.	289.	0.	354.	0.	0.	0.	624.	1004.	3827.	2045
2050	138.	486.	932.	289.	0.	354.	0.	0.	0.	624.	1004.	3827.	2050
2055	138.	486.	932.	289.	0.	354.	0.	0.	0.	624.	1004.	3827.	2055
2060	138.	486.	932.	289.	0.	354.	0.	0.	0.	624.	1004.	3827.	2060
2065	138.	486.	932.	289.	0.	354.	0.	0.	0.	624.	1004.	3827.	2065
2070	138.	486.	932.	289.	0.	354.	0.	0.	0.	624.	1004.	3827.	2070

TABLE 10.E.18. Case 1 - Once-Through Cycle - Repository in Granite - Reference Treatment - Total System Waste Management Costs Including Spent Fuel Handling and Storage - $ Millions at 10% Discount Rate

YEAR	REACTOR TO ISFSR	ISFSR STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACK-AGING	ISFSR TO PACK-AGING	PACK-AGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOS-ITORY COST	TOTAL COST	YEAR
1980	0.	0.	118.	0.	0.	0.	0.	0.	0.	0.	0.	118.	1980
1985	15.	20.	291.	0.	0.	6.	0.	0.	0.	11.	25.	367.	1985
1990	62.	108.	444.	44.	0.	49.	0.	0.	0.	121.	293.	1140.	1990
1995	68.	203.	567.	118.	.	137.	0.	0.	0.	241.	582.	1917.	1995
2000	92.	291.	680.	163.		198.	0.	0.	0.	302.	825.	2587.	2000
2005	111.	366.	776.	204.	0.	247.	0.	0.	0.	435.	1049.	3189.	2005
2010	123.	416.	841.	238.	0.	290.	0.	0.	0.	511.	1233.	3652.	2010
2015	130.	447.	881.	260.	0.	317.	0.	0.	0.	559.	1348.	3942	2015
2020	134.	466.	905.	273.	0.	334.	0.	0.	0.	589.	1420.	4120.	2020
2025	136.	476.	919.	281.	0.	343.	0.	0.	0.	606.	1461.	4222.	2025
2030	137.	482.	926.	285.	0.	349.	0.	0.	0.	616.	1485.	4279.	2030
2035	138.	485.	930.	287.	0.	352.	0.	0.	0.	621.	1497.	4309.	2035
2040	138.	486.	931.	288.	0.	353.	0.	0.	0.	623.	1503.	4323.	2040
2045	138.	486.	932.	289.	0.	354.	0.	0.	0.	624.	1505.	4326.	2045
2050	138.	486.	932.	289.	0.	354.	0.	0.	0.	624.	1506.	4328.	2050
2055	138.	486.	932.	289.	0.	354.	0.	0.	0.	624.	1506.	4328.	2055
2060	138.	486.	932.	289.	0.	354.	0.	0.	0.	624.	1506.	4328.	2060
2065	138.	486.	932.	289.	0.	354.	0.	0.	0.	624.	1506.	4328.	2065
2070	138.	486.	932.	289.	0.	354.	0.	0.	0.	624.	1506.	4328.	2070

TABLE 10.E.19. Case 1 - Once-Through Cycle - Repository in Shale - Reference Treatment - Total System Waste Management Costs Including Spent Fuel Handling and Storage - $ Millions at 10% Discount Rate

YEAR	REACTOR TO ISFSI	ISFSI STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACKAGING	ISFSI TO PACKAGING	PACKAGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOSITORY COST	TOTAL COST	YEAR
1980	0.	[illegible]	118.	0.	0.	0.	0.	0.	0.	0.	0.	118.	1980
1985	[illegible]	20.	201.	0.	0.	6.	0.	0.	0.	11.	19.	360.	1985
1990	42.	[illegible]	480.	48.	0.	69.	0.	0.	0.	121.	215.	1062.	1990
1995	[illegible]	[illegible]	567.	118.	0.	137.	0.	0.	0.	241.	427.	1762.	1995
2000	92.	291.	680.	143.	0.	199.	0.	0.	0.	362.	605.	2367.	2000
2005	111.	[illegible]	774.	204.	0.	247.	0.	0.	0.	435.	749.	2909.	2005
2010	133.	[illegible]	801.	238.	0.	290.	0.	0.	0.	511.	904.	3323.	2010
2015	130.	417.	881.	260.	0.	317.	0.	0.	0.	559.	980.	3583.	2015
2020	130.	[illegible]	905.	273.	0.	334.	0.	0.	0.	580.	1041.	3762.	2020
2025	134.	[illegible]	919.	281.	0.	343.	0.	0.	0.	606.	1071.	3832.	2025
2030	137.	[illegible]	926.	285.	0.	349.	0.	0.	0.	616.	1089.	3883.	2030
2035	[illegible]	[illegible]	930.	287.	0.	352.	0.	0.	0.	621.	1098.	3910.	2035
2040	[illegible]	[illegible]	931.	288.	0.	353.	0.	0.	0.	623.	1102.	3922.	2040
2045	[illegible]	[illegible]	932.	289.	0.	354.	0.	0.	0.	624.	1104.	3926.	2045
2050	[illegible]	[illegible]	932.	289.	0.	354.	0.	0.	0.	624.	1104.	3927.	2050
2055	[illegible]	[illegible]	932.	289.	0.	354.	0.	0.	0.	624.	1104.	3927.	2055
2060	[illegible]	[illegible]	932.	289.	0.	354.	0.	0.	0.	624.	1104.	3927.	2060
2065	[illegible]	[illegible]	932.	289.	0.	354.	0.	0.	0.	624.	1104.	3927.	2065
2070	[illegible]	[illegible]	932.	289.	0.	354.	0.	0.	0.	624.	1104.	3927.	2070

TABLE 10.E.20. Case 1 - Once-Through Cycle - Repository in Basalt - Reference Treatment - Total System Waste Management Costs Including Spent Fuel Handling and Storage - $ Millions at 10% Discount Rate

YEAR	REACTOR TO ISFSR	ISFSR STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACKAGING	ISFSR TO PACKAGING	PACKAGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOSITORY COST	TOTAL COST	YEAR
1980	0.	0.	118.	0.	0.	0.	0.	0.	0.	0.	0.	118.	1980
1985	15.	20.	201.	5.	0.	6.	0.	0.	0.	11.	28.	370.	1985
1990	42.	104.	440.	64.	0.	69.	0.	0.	0.	121.	328.	1176.	1990
1995	64.	203.	547.	115.	0.	137.	0.	0.	0.	241.	652.	1987.	1995
2000	92.	301.	660.	163.	0.	198.	0.	0.	0.	342.	924.	2687.	2000
2005	111.	366.	776.	208.	0.	247.	0.	0.	0.	435.	1176.	3315.	2005
2010	123.	416.	831.	248.	0.	290.	0.	0.	0.	511.	1381.	3801.	2010
2015	130.	447.	881.	260.	0.	317.	0.	0.	0.	559.	1511.	4105.	2015
2020	134.	466.	905.	273.	0.	334.	0.	0.	0.	584.	1591.	4292.	2020
2025	136.	476.	919.	281.	0.	343.	0.	0.	0.	606.	1637.	4366.	2025
2030	137.	482.	926.	285.	0.	349.	0.	0.	0.	616.	1664.	4459.	2030
2035	136.	485.	930.	287.	0.	352.	0.	0.	0.	621.	1678.	4489.	2035
2040	135.	486.	931.	288.	0.	353.	0.	0.	0.	623.	1684.	4504.	2040
2045	138.	486.	932.	289.	0.	354.	0.	0.	0.	624.	1687.	4510.	2045
2050	138.	486.	932.	289.	0.	354.	0.	0.	0.	624.	1687.	4510.	2050
2055	138.	486.	932.	289.	0.	354.	0.	0.	0.	624.	1687.	4510.	2055
2060	138.	486.	932.	289.	0.	354.	0.	0.	0.	624.	1687.	4510.	2060
2065	138.	486.	932.	289.	0.	354.	0.	0.	0.	624.	1687.	4510.	2065
2070	138.	486.	932.	289.	0.	354.	0.	0.	0.	624.	1687.	4510.	2070

TABLE 10.E.21. Case 2A - U Only Recycle - Repository in Salt - Reference Treatment - Unit Power Cost for TRU Waste Management Including Spent Fuel Handling and Storage

YEAR	POWER GENERATION KWHR ANNUAL	POWER GENERATION CUMULATIVE	UNDISCOUNTED AVERAGE MILLS/KWHR ANNUAL	UNDISCOUNTED AVERAGE CUMULATIVE	DISCOUNTED AVERAGE (7 PCT) MILLS/KWHR ANNUAL	DISCOUNTED AVERAGE (7 PCT) CUMULATIVE	DISCOUNTED AVERAGE (10 PCT) MILLS/KWHR ANNUAL	DISCOUNTED AVERAGE (10 PCT) CUMULATIVE	YEAR
1975	1.78E+11	4.92E+11	.05	.02	.05	.02	.05	.02	1975
1980	3.44E+11	1.86E+12	.11	.07	.11	.07	.11	.06	1980
1985	6.82E+11	4.45E+12	.48	.26	.48	.22	.48	.20	1985
1990	1.11E+12	9.17E+12	.50	.40	.50	.34	.50	.32	1990
1995	1.67E+12	1.63E+13	.53	.45	.53	.39	.53	.36	1995
2000	2.32E+12	2.66E+13	.54	.47	.54	.42	.54	.39	2000
2005	2.40E+12	3.87E+13	.66	.50	.66	.44	.66	.41	2005
2010	2.31E+12	5.04E+13	.72	.55	.72	.47	.72	.43	2010
2015	2.10E+12	6.15E+13	.71	.58	.71	.48	.71	.44	2015
2020	1.82E+12	7.11E+13	.83	.60	.83	.49	.83	.44	2020
2025	1.37E+12	7.89E+13	1.04	.64	1.04	.50	1.04	.45	2025
2030	9.23E+11	8.44E+13	1.24	.67	1.24	.51	1.24	.45	2030
2035	4.50E+11	8.76E+13	1.81	.70	1.81	.51	1.81	.45	2035
2040	2.67E+10	8.85E+13	27.25	.74	27.25	.52	27.25	.45	2040
2045	0.	8.85E+13	0.00	.76	0.00	.52	0.00	.45	2045
2050	0.	8.85E+13	0.00	.76	0.00	.52	0.00	.45	2050
2055	0.	8.85E+13	0.00	.76	0.00	.52	0.00	.45	2055
2060	0.	8.85E+13	0.00	.76	0.00	.52	0.00	.45	2060
2065	0.	8.85E+13	0.00	.76	0.00	.52	0.00	.45	2065
2070	0.	8.85E+13	0.00	.76	0.00	.52	0.00	.45	2070

TABLE 10.E.22. Case 2A - U Only Recycle - Repository in Granite - Reference Treatment - Unit Power Cost for TRU Waste Management Including Spent Fuel Handling and Storage

	POWER GENERATION		UNDISCOUNTED AVERAGE		DISCOUNTED AVERAGE (7 PCT)		DISCOUNTED AVERAGE (10 PCT)		
	KWHR		MILLS/KWHR		MILLS/KWHR		MILLS/KWHR		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	1.78E+11	4.92E+11	.05	.02	.05	.02	.05	.02	1975
1980	3.44E+11	1.86E+12	.11	.07	.11	.07	.11	.06	1980
1985	6.82E+11	4.45E+12	.53	.26	.53	.23	.53	.21	1985
1990	1.11E+12	9.17E+12	.60	.45	.60	.38	.60	.35	1990
1995	1.67E+12	1.63E+13	.60	.51	.60	.44	.60	.41	1995
2000	2.32E+12	2.66E+13	.61	.53	.61	.47	.61	.43	2000
2005	2.40E+12	3.87E+13	.75	.57	.75	.50	.75	.46	2005
2010	2.31E+12	5.04E+13	.81	.62	.81	.53	.81	.48	2010
2015	2.10E+12	6.15E+13	.97	.68	.97	.56	.97	.50	2015
2020	1.82E+12	7.11E+13	1.10	.73	1.10	.57	1.10	.51	2020
2025	1.37E+12	7.89E+13	1.41	.78	1.41	.59	1.41	.52	2025
2030	9.23E+11	8.44E+13	1.70	.84	1.70	.60	1.70	.52	2030
2035	4.50E+11	8.76E+13	2.51	.88	2.51	.61	2.51	.52	2035
2040	2.67E+10	8.85E+13	30.99	.93	30.99	.61	30.99	.52	2040
2045	0.	8.85E+13	0.00	.95	0.00	.61	0.00	.52	2045
2050	0.	8.85E+13	0.00	.96	0.00	.61	0.00	.52	2050
2055	0.	8.85E+13	0.00	.96	0.00	.61	0.00	.52	2055
2060	0.	8.85E+13	0.00	.96	0.00	.61	0.00	.52	2060
2065	0.	8.85E+13	0.00	.96	0.00	.61	0.00	.52	2065
2070	0.	8.85E+13	0.00	.96	0.00	.61	0.00	.52	2070

TABLE 10.E.23. Case 2A - U Only Recycle - Repository in Shale - Reference Treatment - Unit Power Cost for TRU Waste Management Including Spent Fuel Handling and Storage

	POWER GENERATION		UNDISCOUNTED AVERAGE		DISCOUNTED AVERAGE (7 PCT)		DISCOUNTED AVERAGE (10 PCT)		
	KWHR		MILLS/KWHR		MILLS/KWHR		MILLS/KWHR		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	1.78E+11	4.92E+11	.05	.02	.05	.02	.05	.02	1975
1980	3.44E+11	1.86E+12	.11	.07	.11	.07	.11	.06	1980
1985	6.82E+11	4.45E+12	.50	.26	.50	.22	.50	.21	1985
1990	1.11E+12	9.17E+12	.61	.44	.61	.37	.61	.34	1990
1995	1.67E+12	1.63E+13	.61	.51	.61	.44	.61	.40	1995
2000	2.32E+12	2.66E+13	.62	.53	.62	.47	.62	.43	2000
2005	2.40E+12	3.87E+13	.77	.58	.77	.50	.77	.46	2005
2010	2.31E+12	5.04E+13	.83	.63	.83	.53	.83	.48	2010
2015	2.10E+12	6.15E+13	.82	.66	.82	.55	.82	.49	2015
2020	1.82E+12	7.11E+13	.95	.69	.95	.56	.95	.50	2020
2025	1.37E+12	7.89E+13	1.21	.73	1.21	.57	1.21	.51	2025
2030	9.23E+11	8.44E+13	1.43	.77	1.43	.58	1.43	.51	2030
2035	4.50E+11	8.76E+13	2.10	.81	2.10	.59	2.10	.51	2035
2040	2.67E+10	8.85E+13	31.60	.85	31.60	.59	31.60	.51	2040
2045	0.	8.85E+13	0.00	.88	0.00	.59	0.00	.51	2045
2050	0.	8.85E+13	0.00	.88	0.00	.59	0.00	.51	2050
2055	0.	8.85E+13	0.00	.88	0.00	.59	0.00	.51	2055
2060	0.	8.85E+13	0.00	.88	0.00	.59	0.00	.51	2060
2065	0.	8.85E+13	0.00	.88	0.00	.59	0.00	.51	2065
2070	0.	8.85E+13	0.00	.88	0.00	.59	0.00	.51	2070

TABLE 10.E.24. Case 2A - U Only Recycle - Repository in Basalt - Reference Treatment - Unit Power Cost for TRU Waste Management Including Spent Fuel Handling and Storage

	POWER GENERATION		UNDISCOUNTED AVERAGE		DISCOUNTED AVERAGE (7 PCT)		DISCOUNTED AVER[illegible] (10 PCT)		
	KWHR		MILLS/KWHR		MILLS/KWHR		MILLS/KWHR		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMU[illegible]	[illegible]EAR
1975	1.78E+11	4.92E+11	.05	.02	.05	.02	.05	[illegible]	1975
1980	3.44E+11	1.86E+12	.11	.07	.11	.07	.11	.06	1980
1985	6.02E+11	4.45E+12	.54	.27	.54	.23	.54	.21	1985
1990	1.11E+12	9.17E+12	.60	.46	.60	.39	.60	.36	1990
1995	1.67E+12	1.63E+13	.67	.55	.67	.47	.67	.43	1995
2000	2.32E+12	2.66E+13	.68	.58	.68	.51	.68	.46	2000
2005	2.40E+12	3.87E+13	.84	.63	.84	.54	.84	.49	2005
2010	2.31E+12	5.04E+13	.92	.69	.92	.58	.92	.52	2010
2015	2.10E+12	6.15E+13	.91	.73	.91	.60	.91	.53	2015
2020	1.82E+12	7.11E+13	1.05	.76	1.05	.61	1.05	.54	2020
2025	1.37E+12	7.89E+13	1.34	.81	1.34	.63	1.34	.55	2025
2030	9.23E+11	8.44E+13	1.60	.85	1.60	.64	1.60	.55	2030
2035	4.50E+11	8.76E+13	2.34	.89	2.34	.64	2.34	.56	2035
2040	2.67E+10	8.85E+13	35.11	.94	35.11	.65	35.11	.56	2040
2045	0.	8.85E+13	0.00	.97	0.00	.65	0.00	.56	2045
2050	0.	8.85E+13	0.00	.97	0.00	.65	0.00	.56	2050
2055	0.	8.85E+13	0.00	.97	0.00	.65	0.00	.56	2055
2060	0.	8.85E+13	0.00	.97	0.00	.65	0.00	.56	2060
2065	0.	8.85E+13	0.00	.97	0.00	.65	0.00	.56	2065
2070	0.	8.85E+13	0.00	.97	0.00	.65	0.00	.56	2070

TABLE 10.E.25. Case 2A - U Only Recycle - Repository in Salt - Reference Treatment - Unit Fuel Cost for TRU Waste Management Including Spent Fuel Handling and Storage[a]

	THRUPUT		UNDISCOUNTED AVERAGE		DISCOUNTED AVERAGE (7 PCT)		DISCOUNTED AVERAGE (10 PCT)		
	KG DISCHARGED		DOLLARS/KG DISCHARGED		DOLLARS/KG DISCHARGED		DOLLARS/KG DISCHARGED		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	6.99E+05	1.78E+06	12.	5.	12.	5.	12.	5.	1975
1980	1.27E+06	6.93E+06	30.	19.	30.	18.	30.	17.	1980
1985	2.48E+06	1.63E+07	131.	70.	131.	60.	131.	55.	1985
1990	4.07E+06	3.37E+07		109.	136.	93.	136.	86.	1990
1995	6.21E+06	[illegible]		121.	143.	106.	143.	98.	1995
2000	8.74E+06	[illegible]E+07	142.	126.	142.	113.	142.	104.	2000
2005	9.09E+06	1.44E+08	175.	135.	175.	119.	175.	110.	2005
2010	9.24E+06	1.90E+08	180.	145.	180.	125.	180.	114.	2010
2015	8.60E+06	2.35E+08	174.	151.	174.	129.	174.	117.	2015
2020	7.72E+06	2.75E+08	194.	156.	194.	131.	194.	118.	2020
2025	7.15E+06	3.14E+08	200.	161.	200.	133.	200.	119.	2025
2030	5.31E+06	3.43E+08	215.	165.	215.	134.	215.	120.	2030
2035	3.96E+06	3.66E+08	206.	168.	206.	135.	206.	120.	2035
2040	1.53E+06	3.79E+08	474.	172.	474.	135.	474.	120.	2040
2045	0.	3.79E+08	0.	177.	0.	136.	0.	120.	2045
2050	0.	3.79E+08	0.	178.	0.	136.	0.	120.	2050
2055	0.	3.79E+08	0.	178.	0.	136.	0.	120.	2055
2060	0.	3.79E+08	0.	178.	0.	136.	0.	120.	2060
2065	0.	3.79E+08	0.	178.	0.	136.	0.	120.	2065
2070	0.	3.79E+08	0.	178.	0.	136.	0.	120.	2070

a. Unit cost at time of reactor discharge.

TABLE 10.E.26. Case 2A - U Only Recycle - Repository in Granite - Reference Treatment - Unit Fuel Cost for TRU Waste Management Including Spent Fuel Handling and Storage[a]

YEAR	THRUPUT KG DISCHARGED ANNUAL	THRUPUT KG DISCHARGED CUMULATIVE	UNDISCOUNTED AVERAGE DOLLARS/KG DISCHARGED ANNUAL	UNDISCOUNTED AVERAGE DOLLARS/KG DISCHARGED CUMULATIVE	DISCOUNTED AVERAGE (7 PCT) DOLLARS/KG DISCHARGED ANNUAL	DISCOUNTED AVERAGE (7 PCT) DOLLARS/KG DISCHARGED CUMULATIVE	DISCOUNTED AVERAGE (10 PCT) DOLLARS/KG DISCHARGED ANNUAL	DISCOUNTED AVERAGE (10 PCT) DOLLARS/KG DISCHARGED CUMULATIVE	YEAR
1975	6.99E+05	1.78E+06	12.	5.	12.	5.	12.	5.	1975
1980	1.27E+06	6.93E+06	30.	19.	30.	18.	30.	17.	1980
1985	2.48E+06	1.63E+07	145.	72.	145.	61.	145.	57.	1985
1990	4.07E+06	3.37E+07	164.	122.	164.	103.	164.	95.	1990
1995	6.21E+06	6.02E+07	162.	138.	162.	120.	162.	110.	1995
2000	8.74E+06	9.86E+07	161.	144.	161.	127.	161.	118.	2000
2005	9.09E+06	1.44E+08	198.	153.	198.	135.	198.	124.	2005
2010	9.24E+06	1.90E+08	203.	164.	203.	142.	203.	129.	2010
2015	8.60E+06	2.35E+08	237.	178.	237.	148.	237.	133.	2015
2020	7.72E+06	2.75E+08	259.	189.	259.	152.	259.	136.	2020
2025	7.15E+06	3.14E+08	270.	197.	270.	155.	270.	137.	2025
2030	5.31E+06	3.43E+08	296.	206.	296.	158.	296.	138.	2030
2035	3.96E+06	3.66E+08	284.	211.	284.	159.	284.	139.	2035
2040	1.53E+06	3.79E+08	539.	216.	539.	159.	539.	139.	2040
2045	0.	3.79E+08	0.	222.	0.	160.	0.	139.	2045
2050	0.	3.79E+08	0.	223.	0.	160.	0.	139.	2050
2055	0.	3.79E+08	0.	223.	0.	160.	0.	139.	2055
2060	0.	3.79E+08	0.	223.	0.	160.	0.	139.	2060
2065	0.	3.79E+08	0.	224.	0.	160.	0.	139.	2065
2070	0.	3.79E+08	0.	224.	0.	160.	0.	139.	2070

a. Unit cost at time of reactor discharge.

TABLE 10.E.27. Case 2A - U Only Recycle - Repository in Shale - Reference Treatment - Unit Fuel Cost of TRU Waste Management Including Spent Fuel Handling and Storage[(a)]

(BASED ON REACTOR DISCHARGE)

	THRUPUT		UNDISCOUNTED AVERAGE		DISCOUNTED AVERAGE (7 PCT)		DISCOUNTED AVERAGE (10 PCT)		
	KG DISCHARGED		DOLLARS/KG DISCHARGED		DOLLARS/KG DISCHARGED		DOLLARS/KG DISCHARGED		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	6.99E+05	1.78E+06	12.	5.	12.	5.	12.	5.	1975
1980	1.27E+06	6.93E+06	30.	19.	30.	18.	30.	17.	1980
1985	2.48E+06	1.63E+07	138.	71.	138.	60.	138.	56.	1985
1990	4.07E+06	3.37E+07	166.	119.	166.	101.	166.	92.	1990
1995	6.21E+06	6.02E+07	164.	138.	164.	119.	164.	109.	1995
2000	8.74E+06	9.86E+07	164.	144.	164.	127.	164.	117.	2000
2005	9.09E+06	1.44E+08	202.	154.	202.	135.	202.	124.	2005
2010	9.24E+06	1.90E+08	208.	166.	208.	142.	208.	129.	2010
2015	8.60E+06	2.35E+08	201.	173.	201.	146.	201.	132.	2015
2020	7.72E+06	2.75E+08	224.	179.	224.	149.	224.	134.	2020
2025	7.15E+06	3.14E+08	231.	185.	231.	151.	231.	135.	2025
2030	5.31E+06	3.43E+08	249.	190.	249.	153.	249.	136.	2030
2035	3.96E+06	3.66E+08	238.	193.	238.	154.	238.	136.	2035
2040	1.53E+06	3.79E+08	550.	198.	550.	154.	550.	136.	2040
2045	0.	3.79E+08	0.	204.	0.	155.	0.	136.	2045
2050	0.	3.79E+08	0.	205.	0.	155.	0.	136.	2050
2055	0.	3.79E+08	0.	206.	0.	155.	0.	136.	2055
2060	0.	3.79E+08	0.	206.	0.	155.	0.	136.	2060
2065	0.	3.79E+08	0.	206.	0.	155.	0.	136.	2065
2070	0.	3.79E+08	0.	206.	0.	155.	0.	136.	2070

a. Unit cost at time of reactor discharge.

TABLE 10.E.28. Case 2A - U Only Recycle - Repository in Basalt - Reference Treatment - Unit Fuel Cost of TRU Waste Management Including Spent Fuel Handling and Storage[a]

(BASED ON REACTOR DISCHARGE)

YEAR	THRUPUT KG DISCHARGED ANNUAL	CUMULATIVE	UNDISCOUNTED AVERAGE DOLLARS/KG DISCHARGED ANNUAL	CUMULATIVE	DISCOUNTED AVERAGE (7 PCT) DOLLARS/KG DISCHARGED ANNUAL	CUMULATIVE	DISCOUNTED AVERAGE (10 PCT) DOLLARS/KG DISCHARGED ANNUAL	CUMULATIVE	YEAR
1975	6.99E+05	1.78E+06	12.	5.	12.	5.	12.	5.	1975
1980	1.27E+06	6.93E+06	30.	19.	30.	18.	30.	17.	1980
1985	2.48E+06	1.63E+07	149.	73.	149.	62.	149.	57.	1985
1990	4.07E+06	3.37E+07	164.	125.	164.	106.	164.	97.	1990
1995	6.21E+06	6.02E+07	180.	149.	180.	127.	180.	116.	1995
2000	8.74E+06	9.86E+07	180.	157.	180.	137.	180.	126.	2000
2005	9.09E+06	1.44E+08	222.	168.	222.	146.	222.	133.	2005
2010	9.24E+06	1.90E+08	230.	182.	230.	155.	230.	140.	2010
2015	8.60E+06	2.35E+08	223.	190.	223.	154.	223.	143.	2015
2020	7.72E+06	2.75E+08	247.	197.	247.	163.	247.	145.	2020
2025	7.15E+06	3.14E+08	256.	203.	256.	165.	256.	146.	2025
2030	5.31E+06	3.43E+08	277.	210.	277.	167.	277.	147.	2030
2035	3.96E+06	3.66E+08	265.	213.	265.	168.	265.	148.	2035
2040	1.53E+06	3.79E+08	611.	219.	611.	168.	611.	148.	2040
2045	0.	3.79E+08	0.	226.	0.	169.	0.	148.	2045
2050	0.	3.79E+08	0.	227.	0.	169.	0.	148.	2050
2055	0.	3.79E+08	0.	227.	0.	169.	0.	148.	2055
2060	0.	3.79E+08	0.	227.	0.	169.	0.	148.	2060
2065	0.	3.79E+08	0.	227.	0.	169.	0.	148.	2065
2070	0.	3.79E+08	0.	227.	0.	169.	0.	148.	2070

a. Unit cost at time of reactor discharge.

TABLE 10.E.29. Case 2A - U Only Recycle Pu to SHLW - Reference Treatment Costs for TRU Waste Transportation - \$ Millions at 0% Discount Rate

YEAR	SOLID HIGH LEVEL WASTE ANNUAL	SOLID HIGH LEVEL WASTE CUMULATIVE	HULLS AND ASSEMBLY HARDWARE WASTE ANNUAL	HULLS AND ASSEMBLY HARDWARE WASTE CUMULATIVE	TOTAL INTERMEDIATE LEVEL WASTE ANNUAL	TOTAL INTERMEDIATE LEVEL WASTE CUMULATIVE	TOTAL LOW LEVEL WASTE ANNUAL	TOTAL LOW LEVEL WASTE CUMULATIVE	TOTAL FOR ALL CLASSIFICATIONS ANNUAL	TOTAL FOR ALL CLASSIFICATIONS CUMULATIVE	YEAR
1985	0.00	0.00	8.27	8.27	6.15	6.15	.27	.27	14.70	14.70	1985
1990	7.02	21.59	14.33	73.75	10.66	54.84	.47	2.44	32.48	152.63	1990
1995	11.33	76.09	19.23	157.30	14.29	116.96	.64	5.21	45.49	355.56	1995
2000	17.81	145.71	26.22	267.40	19.49	198.83	.87	8.86	64.39	620.80	2000
2005	24.29	247.71	33.21	412.47	24.69	306.69	1.10	13.67	83.28	980.53	2005
2010	30.76	382.09	33.21	578.50	24.69	430.14	1.10	19.17	89.76	1409.90	2010
2015	30.76	535.90	27.96	732.30	20.79	544.50	1.20	25.35	80.72	1838.05	2015
2020	25.90	678.37	29.71	873.87	22.09	649.76	1.26	31.13	78.96	2233.13	2020
2025	27.52	809.52	27.96	1024.18	20.79	761.52	1.20	36.92	77.48	2632.13	2025
2030	25.90	948.75	20.97	1143.02	15.59	849.89	.97	41.94	63.44	2983.61	2030
2035	19.43	1058.85	13.98	1226.91	10.40	912.27	.73	45.81	44.54	3243.84	2035
2040	12.95	1136.56	13.98	1296.82	10.40	964.25	1.28	51.12	38.61	3448.75	2040
2045	12.95	1201.32	0.00	1326.03	0.00	985.96	.36	53.53	13.31	3566.84	2045
2050	0.00	1228.37	0.00	1326.03	0.00	985.96	0.00	54.25	0.00	3594.61	2050
2055	0.00	1228.37	0.00	1326.03	0.00	985.96	.36	55.33	.36	3595.69	2055
2060	0.00	1228.37	0.00	1326.03	0.00	985.96	.36	56.42	.36	3596.78	2060
2065	0.00	1228.37	0.00	1326.03	0.00	985.96	.36	57.50	.36	3597.86	2065
2070	0.00	1228.37	0.00	1326.03	0.00	985.96	0.00	57.50	0.00	3597.86	2070
2075	0.00	1228.37	0.00	1326.03	0.00	985.96	1.08	59.67	1.08	3600.03	2075

TABLE 10.E.30. Case 2A - U Only Recycle Pu to SHLW - Reference Treatment - System Spent Fuel Management Costs - $ Millions at 0% Discount Rate

YEAR	REACTOR TO ISFSR	ISFSE STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACK-AGING	ISFSB TO PACK-AGING	PACK-AGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOS-ITORY COST	TOTAL COST	YEAR
1980	0.	0.	132.	0.	0.	0.	0.	0.	0.	0.	0.	132.	1980
1985	0.	0.	367.	0.	0.	0.	0.	0.	124.	0.	0.	491.	1985
1990	0.	0.	603.	0.	0.	0.	0.	0.	447.	0.	0.	1051.	1990
1995	0.	0.	925.	0.	0.	0.	0.	0.	860.	0.	0.	1785.	1995
2000	0.	0.	1390.	0.	0.	0.	0.	0.	1465.	0.	0.	2855.	2000
2005	0.	0.	2026.	0.	0.	0.	0.	0.	2262.	0.	0.	4288.	2005
2010	0.	0.	2648.	0.	0.	0.	0.	0.	3174.	0.	0.	5822.	2010
2015	0.	0.	3283.	0.	0.	0.	0.	0.	4019.	0.	0.	7302.	2015
2020	0.	0.	3945.	0.	0.	0.	0.	0.	4796.	0.	0.	8741.	2020
2025	0.	0.	4496.	0.	0.	0.	0.	0.	5622.	0.	0.	10118.	2025
2030	0.	0.	4927.	0.	0.	0.	0.	0.	6273.	0.	0.	11201.	2030
2035	0.	0.	5301.	0.	0.	0.	0.	0.	6735.	0.	0.	12037.	2035
2040	0.	0.	5620.	0.	0.	0.	0.	0.	7119.	0.	0.	12739.	2040
2045	0.	0.	5662.	0.	0.	0.	0.	0.	7280.	0.	0.	12942.	2045
2050	0.	0.	5662.	0.	0.	0.	0.	0.	7280.	0.	0.	12942.	2050
2055	0.	0.	5662.	0.	0.	0.	0.	0.	7280.	0.	0.	12942.	2055
2060	0.	0.	5662.	0.	0.	0.	0.	0.	7280.	0.	0.	12942.	2060
2065	0.	0.	5662.	0.	0.	0.	0.	0.	7280.	0.	0.	12942.	2065
2070	0.	0.	5662.	0.	0.	0.	0.	0.	7280.	0.	0.	12942.	2070

TABLE 10.E.31. Case 2A - U Only Recycle Pu to SHLW - Reference Treatment - Costs for Geologic Repository in Salt - $ Millions at 0% Discount Rate

YEAR	SOLID HIGH LEVEL WASTE ANNUAL	SOLID HIGH LEVEL WASTE CUMULATIVE	HULLS AND ASSEMBLY HARDWARE WASTE ANNUAL	HULLS AND ASSEMBLY HARDWARE WASTE CUMULATIVE	TOTAL INTERMEDIATE LEVEL WASTE ANNUAL	TOTAL INTERMEDIATE LEVEL WASTE CUMULATIVE	TOTAL LOW LEVEL WASTE ANNUAL	TOTAL LOW LEVEL WASTE CUMULATIVE	TOTAL FOR ALL CLASSIFICATIONS ANNUAL	TOTAL FOR ALL CLASSIFICATIONS CUMULATIVE	YEAR
1985	0.00	0.00	6.34	6.34	44.72	44.72	6.02	6.02	57.07	57.07	1985
1990	53.63	165.00	10.98	56.53	77.46	398.62	10.42	53.63	152.49	673.77	1990
1995	124.73	695.91	14.73	120.56	103.91	850.13	13.98	114.38	257.35	1780.99	1995
2000	196.00	1462.11	20.09	204.95	141.69	1445.23	19.06	194.45	376.85	3306.74	2000
2005	267.28	2584.68	25.45	316.13	179.47	2229.24	24.15	299.93	496.35	5429.98	2005
2010	338.55	4063.63	25.45	443.38	179.47	3126.61	24.15	420.67	567.62	8054.28	2010
2015	338.55	5756.39	21.43	561.26	151.13	3957.85	26.31	556.40	537.43	10831.90	2015
2020	285.10	7324.43	22.77	669.76	160.58	4722.97	27.58	683.24	496.03	13400.40	2020
2025	302.92	8767.73	21.43	784.96	151.13	5535.32	26.31	810.46	501.79	15898.47	2025
2030	285.10	10300.13	16.07	876.04	113.35	6177.64	21.22	920.78	435.75	18274.60	2030
2035	213.82	11511.79	10.72	940.34	75.57	6631.05	16.14	1005.68	316.25	20088.86	2035
2040	142.55	12367.09	10.72	993.92	75.57	7008.89	28.09	1122.22	256.92	21492.12	2040
2045	142.55	13079.83	0.00	1016.30	0.00	7166.72	8.00	1175.45	150.54	22438.30	2045
2050	0.00	13330.15	0.00	1016.30	0.00	7166.72	0.00	1191.44	0.00	22704.61	2050
2055	0.00	13330.15	0.00	1016.30	0.00	7166.72	8.00	1215.43	8.00	22728.59	2055
2060	0.00	13330.15	0.00	1016.30	0.00	7166.72	8.00	1239.42	8.00	22752.58	2060
2065	0.00	13330.15	0.00	1016.30	0.00	7166.72	8.00	1263.40	8.00	22776.57	2065
2070	0.00	13330.15	0.00	1016.30	0.00	7166.72	0.00	1263.40	0.00	22776.57	2070
2075	0.00	13330.15	0.00	1016.30	0.00	7166.72	23.99	1311.38	23.99	22824.55	2075

TABLE 10.E.32. Case 2A - U Only Recycle Pu to SHLW - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Salt - $ Millions at 0% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP+MOX	TOTAL SYSTEM	YEAR
1985	462.	0.	15.	57.	105.	0.	0.	0.	639.	1985
1990	1585.	0.	153.	674.	105.	0.	0.	0.	2516.	1990
1995	3057.	0.	356.	1781.	105.	0.	0.	0.	5298.	1995
2000	5240.	0.	621.	3307.	105.	0.	0.	0.	9273.	2000
2005	8116.	0.	981.	5430.	105.	0.	0.	0.	14632.	2005
2010	11409.	0.	1410.	8054.	105.	0.	0.	2.	20980.	2010
2015	14459.	0.	1838.	10832.	105.	0.	0.	31.	27265.	2015
2020	17266.	0.	2233.	13400.	105.	0.	0.	51.	33055.	2020
2025	20246.	0.	2632.	15898.	105.	0.	0.	73.	38955.	2025
2030	22603.	0.	2984.	18275.	105.	0.	0.	100.	44066.	2030
2035	24265.	0.	3244.	20089.	105.	0.	0.	129.	47833.	2035
2040	25653.	0.	3449.	21492.	105.	0.	0.	185.	50883.	2040
2045	26232.	0.	3567.	22438.	105.	0.	0.	243.	52584.	2045
2050	26232.	0.	3595.	22705.	105.	0.	0.	257.	52893.	2050
2055	26232.	0.	3596.	22729.	105.	0.	0.	289.	52950.	2055
2060	26232.	0.	3597.	22753.	105.	0.	0.	320.	53006.	2060
2065	26232.	0.	3598.	22777.	105.	0.	0.	348.	53059.	2065
2070	26232.	0.	3598.	22777.	105.	0.	0.	353.	53064.	2070
2075	26232.	0.	3600.	22823.	105.	0.	0.	403.	53164.	2075

TABLE 10.E.33. Case 2A - U Only Recycle Pu to SHLW - Reference Treatment - Costs for Geologic Repository in Granite - $ Millions at 0% Discount Rate

YEAR	SOLID HIGH LEVEL WASTE ANNUAL	SOLID HIGH LEVEL WASTE CUMULATIVE	HULLS AND ASSEMBLY HARDWARE WASTE ANNUAL	HULLS AND ASSEMBLY HARDWARE WASTE CUMULATIVE	TOTAL INTERMEDIATE LEVEL WASTE ANNUAL	TOTAL INTERMEDIATE LEVEL WASTE CUMULATIVE	TOTAL LOW LEVEL WASTE ANNUAL	TOTAL LOW LEVEL WASTE CUMULATIVE	TOTAL FOR ALL CLASSIFICATIONS ANNUAL	TOTAL FOR ALL CLASSIFICATIONS CUMULATIVE	YEAR
1985	0.00	0.00	11.03	11.03	67.86	67.86	8.98	8.98	87.87	87.87	1985
1990	84.46	217.75	19.11	98.36	117.54	604.90	15.56	80.06	236.67	1001.07	1990
1995	136.41	873.81	25.64	209.77	157.68	1290.08	20.87	170.74	340.59	2544.40	1995
2000	214.36	1711.76	34.96	356.61	215.01	2193.13	28.46	290.25	492.79	4551.76	2000
2005	292.31	2939.46	44.29	550.07	272.35	3382.87	36.04	447.71	644.99	7320.11	2005
2010	370.26	4556.91	44.29	771.49	272.35	4744.62	36.04	627.93	722.94	10700.96	2010
2015	658.24	7848.10	57.29	976.60	229.35	6006.03	39.27	830.54	964.15	15661.28	2015
2020	554.31	10896.78	39.62	1165.40	243.68	7187.10	41.17	1019.87	87[illegible].78	20249.15	2020
2025	588.95	13702.95	37.29	1365.85	229.35	8399.84	39.27	1209.77	894.86	24678.41	2025
2030	554.31	16682.34	27.97	1524.34	172.01	9374.57	31.68	1374.44	785.97	28955.69	2030
2035	415.73	19038.14	18.65	1636.22	114.67	10062.61	24.09	1501.17	573.14	32238.14	2035
2040	155.90	20458.54	18.65	1729.45	114.67	10635.98	41.93	1675.14	331.15	34499.12	2040
2045	155.90	21238.04	0.00	1768.40	0.00	10875.49	11.94	1754.58	167.83	35636.51	2045
2050	0.00	21563.65	0.00	1768.40	0.00	10875.49	0.00	1778.45	0.00	35985.94	2050
2055	0.00	21563.65	0.00	1768.40	0.00	10875.49	11.94	1814.26	11.94	36021.80	2055
2060	0.00	21563.65	0.00	1768.40	0.00	10875.49	11.94	1850.06	11.94	36057.60	2060
2065	0.00	21563.65	0.00	1768.40	0.00	10875.49	11.94	1885.87	11.94	36093.41	2065
2070	0.00	2[illegible].65	0.00	1768.40	0.00	10875.49	0.00	1885.87	0.00	36093.41	2070
2075	0.00	21563.65	0.00	1768.40	0.00	10875.49	35.81	1957.48	35.81	36165.02	2075

TABLE 10.E.34. Case 2A - U Only Recycle Pu to SHLW - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Granite - $ Millions at 0% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP+MOX	TOTAL SYSTEM	YEAR
1985	462.	0.	15.	88.	105.	0.	0.	0.	670.	1985
1990	1658.	0.	153.	1001.	105.	0.	0.	0.	2916.	1990
1995	3236.	0.	356.	2544.	105.	0.	0.	C.	6241.	1995
2000	5549.	0.	621.	4552.	105.	0.	0.	0.	10827.	2000
2005	8597.	0.	981.	7320.	105.	0.	0.	0.	17002.	2005
2010	12085.	0.	1410.	10701.	105.	0.	0.	2.	24302.	2010
2015	15635.	0.	1838.	15661.	105.	0.	0.	31.	33270.	2015
2020	18903.	0.	2233.	20249.	105.	0.	0.	51.	41541.	2020
2025	22372.	0.	2632.	24678.	105.	0.	0.	73.	49861.	2025
2030	25116.	0.	2984.	28956.	105.	0.	0.	100.	57260.	2030
2035	27052.	0.	3244.	32238.	105.	0.	0.	129.	62769.	2035
2040	28608.	0.	3449.	34499.	105.	0.	0.	185.	66846.	2040
2045	29222.	0.	3567.	35637.	105.	0.	0.	243.	68772.	2045
2050	29222.	0.	3595.	35986.	105.	0.	0.	257.	69164.	2050
2055	29222.	0.	3596.	36022.	105.	0.	0.	289.	69233.	2055
2060	29222.	0.	3597.	36058.	105.	0.	0.	320.	69301.	2060
2065	29222.	0.	3598.	36093.	105.	0.	0.	348.	69366.	2065
2070	29222.	0.	3598.	36093.	105.	0.	0.	353.	69371.	2070
2075	29222.	0.	3600.	36165.	105.	0.	0.	403.	69495.	2075

TABLE 10.E.35. Case 2A - U Only Recycle Pu to SHLW - Reference Treatment - Costs for Geologic Repository in Shale - $ Millions at 0% Discount Rate

YEAR	SOLID HIGH LEVEL WASTE ANNUAL	SOLID HIGH LEVEL WASTE CUMULATIVE	HULLS AND ASSEMBLY HARDWARE WASTE ANNUAL	HULLS AND ASSEMBLY HARDWARE WASTE CUMULATIVE	TOTAL INTERMEDIATE LEVEL WASTE ANNUAL	TOTAL INTERMEDIATE LEVEL WASTE CUMULATIVE	TOTAL LOW LEVEL WASTE ANNUAL	TOTAL LOW LEVEL WASTE CUMULATIVE	TOTAL FOR ALL CLASSIFICATIONS ANNUAL	TOTAL FOR ALL CLASSIFICATIONS CUMULATIVE	YEAR
1985	0.00	0.00	8.27	8.27	56.01	56.01	8.31	8.31	72.60	72.60	1985
1990	95.13	206.25	14.33	73.75	97.02	499.30	14.40	74.12	220.88	853.42	1990
1995	153.65	945.20	19.23	157.30	130.15	1064.87	19.32	158.07	322.34	2325.43	1995
2000	241.44	1889.03	26.22	267.40	177.48	1810.27	26.35	268.72	471.48	4235.43	2000
2005	329.28	3271.85	33.21	412.47	224.81	2792.32	33.37	414.50	620.63	6891.13	2005
2010	417.04	5093.65	33.21	578.50	224.81	3916.35	33.37	581.35	708.42	10169.85	2010
2015	417.04	7178.85	27.96	732.30	189.31	4957.55	36.36	768.93	670.67	13637.63	2015
2020	351.19	9110.41	29.71	873.87	201.14	5915.93	38.11	944.21	620.16	16844.42	2020
2025	373.14	10888.32	27.96	1024.18	189.31	6933.47	36.36	1120.02	626.77	19965.99	2025
2030	351.19	12775.97	20.97	1143.02	141.98	7738.04	29.33	1272.48	543.48	22929.51	2030
2035	263.39	14268.54	13.98	1226.91	94.65	8305.97	22.31	1389.80	394.34	25191.22	2035
2040	175.60	15322.12	13.98	1296.82	94.65	8779.24	38.82	1550.87	323.05	26949.05	2040
2045	175.60	16200.10	0.00	1326.03	0.00	8976.94	11.05	1624.41	186.65	28127.48	2045
2050	0.00	16566.85	0.00	1326.03	0.00	8976.94	0.00	1646.51	0.00	28516.33	2050
2055	0.00	16566.85	0.00	1326.03	0.00	8976.94	11.05	1679.66	11.05	28549.48	2055
2060	0.00	16566.85	0.00	1326.03	0.00	8976.94	11.05	1712.81	11.05	28582.63	2060
2065	0.00	16566.85	0.00	1326.03	0.00	8976.94	11.05	1745.96	11.05	28615.78	2065
2070	0.00	16566.85	0.00	1326.03	0.00	8976.94	0.00	1745.96	0.00	28615.78	2070
2075	0.00	16566.85	0.00	1326.03	0.00	8976.94	33.15	1812.26	33.15	28682.08	2075

TABLE 10.E.36. Case 2A - U Only Recycle Pu to SHLW - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Shale - $ Millions at 0% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP-MOX	TOTAL SYSTEM	YEAR
1985	462.	0.	15.	73.	105.	0.	0.	0.	654.	1985
1990	1724.	0.	153.	853.	105.	0.	0.	0.	2835.	1990
1995	3458.	0.	356.	2325.	105.	0.	0.	0.	6244.	1995
2000	6000.	0.	621.	4235.	105.	0.	0.	0.	10961.	2000
2005	9349.	0.	981.	6891.	105.	0.	0.	0.	17325.	2005
2010	13181.	0.	1410.	10170.	105.	0.	0.	2.	24868.	2010
2015	16732.	0.	1838.	13638.	105.	0.	0.	31.	32343.	2015
2020	20000.	0.	2233.	16844.	105.	0.	0.	51.	39233.	2020
2025	23469.	0.	2632.	19966.	105.	0.	0.	73.	46246.	2025
2030	26213.	0.	2984.	22930.	105.	0.	0.	100.	52331.	2030
2035	28149.	0.	3244.	25191.	105.	0.	0.	129.	56819.	2035
2040	29763.	0.	3449.	26949.	105.	0.	0.	185.	60450.	2040
2045	30437.	0.	3567.	28127.	105.	0.	0.	243.	62479.	2045
2050	30437.	0.	3595.	28516.	105.	0.	0.	257.	62910.	2050
2055	30437.	0.	3596.	28549.	105.	0.	0.	289.	62976.	2055
2060	30437.	0.	3597.	28583.	105.	0.	0.	320.	63041.	2060
2065	30437.	0.	3598.	28616.	105.	0.	0.	348.	63104.	2065
2070	30437.	0.	3598.	28616.	105.	0.	0.	353.	63109.	2070
2075	30437.	0.	3600.	28682.	105.	0.	0.	403.	63227.	2075

TABLE 10.E.37. Case 2A - U Only Recycle Pu to SHLW - Reference Treatment - Costs for Geologic Repository in Basalt - $ Millions at 0% Discount Rate

YEAR	SOLID HIGH LEVEL WASTE ANNUAL	SOLID HIGH LEVEL WASTE CUMULATIVE	HULLS AND ASSEMBLY HARDWARE WASTE ANNUAL	HULLS AND ASSEMBLY HARDWARE WASTE CUMULATIVE	TOTAL INTERMEDIATE LEVEL WASTE ANNUAL	TOTAL INTERMEDIATE LEVEL WASTE CUMULATIVE	TOTAL LOW LEVEL WASTE ANNUAL	TOTAL LOW LEVEL WASTE CUMULATIVE	TOTAL FOR ALL CLASSIFICATIONS ANNUAL	TOTAL FOR ALL CLASSIFICATIONS CUMULATIVE	YEAR
1985	0.00	0.00	11.58	11.58	73.72	73.72	11.06	11.06	96.37	96.37	1985
1990	65.26	200.77	20.06	103.26	127.70	657.20	19.15	98.57	232.18	1059.79	1990
1995	187.37	1101.93	26.92	220.22	171.31	1401.61	25.69	210.22	411.29	2933.98	1995
2000	294.44	2252.94	36.70	374.37	233.60	2382.73	35.04	357.38	599.79	5367.42	2000
2005	401.52	3939.31	46.49	577.45	295.90	3675.33	44.38	551.25	788.28	8743.34	2005
2010	508.59	6161.02	46.49	809.90	295.90	5154.80	44.38	773.16	895.35	12898.89	2010
2015	508.59	8703.96	39.15	1025.22	249.17	6525.27	48.35	1022.63	845.26	17277.07	2015
2020	428.28	11059.51	41.60	1223.42	264.75	7786.71	50.69	1255.74	785.32	21325.39	2020
2025	455.05	13227.70	39.15	1433.85	249.17	9126.03	48.35	1489.56	791.73	25277.13	2025
2030	428.28	15529.72	29.36	1600.23	186.88	10185.02	39.01	1692.32	683.54	29007.29	2030
2035	321.21	17349.92	19.57	1717.68	124.59	10932.55	29.67	1848.35	495.04	31848.50	2035
2040	214.14	18634.77	19.57	1815.55	124.59	11555.48	51.62	2062.56	409.93	34068.37	2040
2045	214.14	19705.48	0.00	1856.44	0.00	11815.70	14.70	2160.37	228.84	35537.99	2045
2050	0.00	20144.44	0.00	1856.44	0.00	11815.70	0.00	2189.76	0.00	36006.34	2050
2055	0.00	20144.44	0.00	1856.44	0.00	11815.70	14.70	2233.84	14.70	36050.42	2055
2060	0.00	20144.44	0.00	1856.44	0.00	11815.70	14.70	2277.93	14.70	36094.51	2060
2065	0.00	20144.44	0.00	1856.44	0.00	11815.70	14.70	2322.01	14.70	36138.60	2065
2070	0.00	20144.44	0.00	1856.44	0.00	11815.70	0.00	2322.01	0.00	36138.60	2070
2075	0.00	20144.44	0.00	1856.44	0.00	11815.70	44.09	2410.19	44.09	36226.77	2075

TABLE 10.E.38. Case 2A - U Only Recycle Pu to SHLW - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Basalt - $ Millions at 0% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP+MOX	TOTAL SYSTEM	YEAR
1985	462.	0.	15.	96.	105.	0.	0.	0.	678.	1985
1990	1698.	0.	153.	1060.	105.	0.	0.	0.	3016.	1990
1995	3433.	0.	356.	2934.	105.	0.	0.	0.	6828.	1995
2000	5975.	0.	621.	5367.	105.	0.	0.	0.	12068.	2000
2005	9323.	0.	981.	8743.	105.	0.	0.	0.	19152.	2005
2010	13156.	0.	1410.	12899.	105.	0.	0.	2.	27571.	2010
2015	16706.	0.	1838.	17277.	105.	0.	0.	31.	35958.	2015
2020	19974.	0.	2233.	21325.	105.	0.	0.	51.	43689.	2020
2025	23444.	0.	2632.	25277.	105.	0.	0.	73.	51532.	2025
2030	26187.	0.	2984.	29007.	105.	0.	0.	100.	58383.	2030
2035	28124.	0.	3244.	31849.	105.	0.	0.	129.	63450.	2035
2040	29738.	0.	3449.	34068.	105.	0.	0.	185.	67544.	2040
2045	30412.	0.	3567.	35538.	105.	0.	0.	243.	69864.	2045
2050	30412.	0.	3595.	36006.	105.	0.	0.	257.	70374.	2050
2055	30412.	0.	3596.	36050.	105.	0.	0.	289.	70452.	2055
2060	30412.	0.	3597.	36095.	105.	0.	0.	320.	70528.	2060
2065	30412.	0.	3598.	36139.	105.	0.	0.	348.	70601.	2065
2070	30412.	0.	3598.	36139.	105.	0.	0.	353.	70606.	2070
2075	30412.	0.	3600.	36227.	105.	0.	0.	403.	70747.	2075

TABLE 10.E.39. Case 2A - U Only Recycle Pu to SHLW - Reference Treatment - System Spent Fuel Management Costs - $ Millions at 7% Discount Rate

YEAR	REACTOR TO ISFSB	ISFSB STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACK-AGING	ISFSB TO PACK-AGING	PACK-AGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOS-ITORY COST	TOTAL COST	YEAR
1980	0.	0.	121.	0.	0.	0.	0.	0.	0.	0.	0.	121.	1980
1985	0.	0.	278.	0.	0.	0.	0.	0.	80.	0.	0.	358.	1985
1990	0.	0.	391.	0.	0.	0.	0.	0.	233.	0.	0.	624.	1990
1995	0.	0.	499.	0.	0.	0.	0.	0.	371.	0.	0.	870.	1995
2000	0.	0.	611.	0.	0.	0.	0.	0.	516.	0.	0.	1127.	2000
2005	0.	0.	720.	0.	0.	0.	0.	0.	653.	0.	0.	1373.	2005
2010	0.	0.	797.	0.	0.	0.	0.	0.	766.	0.	0.	1563.	2010
2015	0.	0.	853.	0.	0.	0.	0.	0.	840.	0.	0.	1693.	2015
2020	0.	0.	895.	0.	0.	0.	0.	0.	888.	0.	0.	1783.	2020
2025	0.	0.	919.	0.	0.	0.	0.	0.	926.	0.	0.	1845.	2025
2030	0.	0.	933.	0.	0.	0.	0.	0.	947.	0.	0.	1880.	2030
2035	0.	0.	942.	0.	0.	0.	0.	0.	957.	0.	0.	1899.	2035
2040	0.	0.	947.	0.	0.	0.	0.	0.	963.	0.	0.	1910.	2040
2045	0.	0.	947.	0.	0.	0.	0.	0.	965.	0.	0.	1913.	2045
2050	0.	0.	947.	0.	0.	0.	0.	0.	965.	0.	0.	1913.	2050
2055	0.	0.	947.	0.	0.	0.	0.	0.	965.	0.	0.	1913.	2055
2060	0.	0.	947.	0.	0.	0.	0.	0.	965.	0.	0.	1913.	2060
2065	0.	0.	947.	0.	0.	0.	0.	0.	965.	0.	0.	1913.	2065
2070	0.	0.	947.	0.	0.	0.	0.	0.	965.	0.	0.	1913.	2070

TABLE 10.E.40. Case 2A - U Only Recycle Pu to SHLW - Reference Treatment
Non-Spent Fuel System Waste Management Costs for Repository in Salt -
$ Millions at 7% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP+MOX	TOTAL SYSTEM	YEAR
1985	297.	0.	9.	33.	71.	0.	0.	0.	410.	1985
1990	830.	0.	74.	323.	71.	0.	0.	0.	1297.	1990
1995	1322.	0.	142.	694.	71.	0.	0.	0.	2228.	1995
2000	1846.	0.	205.	1059.	71.	0.	0.	0.	3181.	2000
2005	2339.	0.	267.	1422.	71.	0.	0.	0.	4099.	2005
2010	2745.	0.	320.	1744.	71.	0.	0.	0.	4880.	2010
2015	3013.	0.	357.	1988.	71.	0.	0.	3.	5432.	2015
2020	3188.	0.	382.	2149.	71.	0.	0.	4.	5794.	2020
2025	3322.	0.	400.	2261.	71.	0.	0.	5.	6059.	2025
2030	3398.	0.	411.	2337.	71.	0.	0.	6.	6224.	2030
2035	3437.	0.	417.	2379.	71.	0.	0.	6.	6311.	2035
2040	3459.	0.	421.	2402.	71.	0.	0.	7.	6360.	2040
2045	3467.	0.	422.	2413.	71.	0.	0.	8.	6381.	2045
2050	3467.	0.	422.	2416.	71.	0.	0.	8.	6383.	2050
2055	3467.	0.	422.	2416.	71.	0.	0.	8.	6384.	2055
2060	3467.	0.	422.	2416.	71.	0.	0.	8.	6384.	2060
2065	3467.	0.	422.	2416.	71.	0.	0.	9.	6384.	2065
2070	3467.	0.	422.	2416.	71.	0.	0.	9.	6384.	2070
2075	3467.	0.	422.	2416.	71.	0.	0.	9.	6384.	2075

TABLE 10.E.41. Case 2A - U Only Recycle Pu to SHLW - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Granite - $ Millions at 7% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPOR-TATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP-MOX	TOTAL SYSTEM	YEAR
1985	297.	0.	9.	51.	71.	0.	0.	0.	428.	1985
1990	863.	0.	74.	479.	71.	0.	0.	0.	1486.	1990
1995	1392.	0.	142.	999.	71.	0.	0.	0.	2603.	1995
2000	1947.	0.	205.	1479.	71.	0.	0.	0.	3702.	2000
2005	2469.	0.	267.	1954.	71.	0.	0.	0.	4761.	2005
2010	2899.	0.	320.	2369.	71.	0.	0.	0.	5659.	2010
2015	3211.	0.	357.	2805.	71.	0.	0.	3.	6446.	2015
2020	3415.	0.	382.	3092.	71.	0.	0.	4.	6964.	2020
2025	3572.	0.	400.	3290.	71.	0.	0.	5.	7337.	2025
2030	3660.	0.	411.	3427.	71.	0.	0.	6.	7575.	2030
2035	3705.	0.	417.	3503.	71.	0.	0.	6.	7702.	2035
2040	3730.	0.	421.	3540.	71.	0.	0.	7.	7769.	2040
2045	3738.	0.	422.	3554.	71.	0.	0.	8.	7792.	2045
2050	3738.	0.	422.	3557.	71.	0.	0.	8.	7796.	2050
2055	3738.	0.	422.	3557.	71.	0.	0.	8.	7796.	2055
2060	3738.	0.	422.	3557.	71.	0.	0.	8.	7796.	2060
2065	3738.	0.	422.	3557.	71.	0.	0.	9.	7797.	2065
2070	3738.	0.	422.	3557.	71.	0.	0.	9.	7797.	2070
2075	3738.	0.	422.	3557.	71.	0.	0.	9.	7797.	2075

TABLE 10.E.42. Case 2A - U Only Recycle Pu to SHLW - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Shale - $ Millions at 7% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPOR-TATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP-MOX	TOTAL SYSTEM	YEAR
1985	297.	0.	9.	42.	71.	0.	0.	0.	419.	1985
1990	895.	0.	74.	407.	71.	0.	0.	0.	1446.	1990
1995	1475.	0.	142.	904.	71.	0.	0.	0.	2591.	1995
2000	2085.	0.	205.	1361.	71.	0.	0.	0.	3721.	2000
2005	2659.	0.	267.	1815.	71.	0.	0.	0.	4812.	2005
2010	3132.	0.	320.	2218.	71.	0.	0.	0.	5740.	2010
2015	3443.	0.	357.	2522.	71.	0.	0.	3.	6396.	2015
2020	3648.	0.	382.	2723.	71.	0.	0.	4.	6828.	2020
2025	3804.	0.	400.	2863.	71.	0.	0.	5.	7142.	2025
2030	3492.	0.	411.	2958.	71.	0.	0.	6.	7338.	2030
2035	3937.	0.	417.	3010.	71.	0.	0.	6.	7442.	2035
2040	3963.	0.	421.	3039.	71.	0.	0.	7.	7501.	2040
2045	3972.	0.	422.	3053.	71.	0.	0.	8.	7525.	2045
2050	3972.	0.	422.	3056.	71.	0.	0.	8.	7529.	2050
2055	3972.	0.	422.	3056.	71.	0.	0.	8.	7529.	2055
2060	3972.	0.	422.	3056.	71.	0.	0.	8.	7530.	2060
2065	3972.	0.	422.	3057.	71.	0.	0.	9.	7530.	2065
2070	3972.	0.	422.	3057.	71.	0.	0.	9.	7530.	2070
2075	3972.	0.	422.	3057.	71.	0.	0.	9.	7530.	2075

TABLE 10.E.43. Case 2A - U Only Recycle Pu to SHLW - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Basalt - $ Millions at 7% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP-MOX	TOTAL SYSTEM	YEAR
1985	297.	0.	9.	56.	71.	0.	0.	0.	433.	1985
1990	884.	0.	74.	509.	71.	0.	0.	0.	1537.	1990
1995	1465.	0.	142.	1141.	71.	0.	0.	0.	2818.	1995
2000	2074.	0.	205.	1724.	71.	0.	0.	0.	4074.	2000
2005	2649.	0.	267.	2302.	71.	0.	0.	0.	5288.	2005
2010	3121.	0.	320.	2812.	71.	0.	0.	0.	6324.	2010
2015	3433.	0.	357.	3196.	71.	0.	0.	3.	7060.	2015
2020	3637.	0.	382.	3450.	71.	0.	0.	4.	7544.	2020
2025	3793.	0.	400.	3627.	71.	0.	0.	5.	7896.	2025
2030	3882.	0.	411.	3747.	71.	0.	0.	6.	8116.	2030
2035	3927.	0.	417.	3812.	71.	0.	0.	6.	8233.	2035
2040	3953.	0.	421.	3848.	71.	0.	0.	7.	8300.	2040
2045	3961.	0.	422.	3866.	71.	0.	0.	8.	8328.	2045
2050	3961.	0.	422.	3870.	71.	0.	0.	8.	8332.	2050
2055	3961.	0.	422.	3870.	71.	0.	0.	8.	8333.	2055
2060	3961.	0.	422.	3870.	71.	0.	0.	8.	8333.	2060
2065	3961.	0.	422.	3870.	71.	0.	0.	9.	8333.	2065
2070	3961.	0.	422.	3870.	71.	0.	0.	9.	8333.	2070
2075	3961.	0.	422.	3870.	71.	0.	0.	9.	8333.	2075

TABLE 10.E.44. Case 2A - U Only Recycle Pu to SHLW - Reference Treatment - System Spent Fuel Management Costs $ Millions at 10% Discount Rate

YEAR	REACTOR TO ISFSR	ISFSR STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACKAGING	ISFSR TO PACKAGING	PACKAGING	PACKAGED FUEL STORAGE	PACK. FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOSITORY COST	TOTAL COST	YEAR
1980	0.	0.	118.	0.	0.	0.	0.	0.	0.	0.	0.	118.	1980
1985	0.	0.	251.	0.	0.	0.	0.	0.	67.	0.	0.	317.	1985
1990	0.	0.	334.	0.	0.	0.	0.	0.	180.	0.	0.	514.	1990
1995	0.	0.	404.	0.	0.	0.	0.	0.	269.	0.	0.	673.	1995
2000	0.	0.	466.	0.	0.	0.	0.	0.	350.	0.	0.	816.	2000
2005	0.	0.	520.	0.	0.	0.	0.	0.	417.	0.	0.	936.	2005
2010	0.	0.	553.	0.	0.	0.	0.	0.	465.	0.	0.	1017.	2010
2015	0.	0.	573.	0.	0.	0.	0.	0.	492.	0.	0.	1065.	2015
2020	0.	0.	587.	0.	0.	0.	0.	0.	508.	0.	0.	1095.	2020
2025	0.	0.	594.	0.	0.	0.	0.	0.	518.	0.	0.	1112.	2025
2030	0.	0.	597.	0.	0.	0.	0.	0.	523.	0.	0.	1121.	2030
2035	0.	0.	599.	0.	0.	0.	0.	0.	526.	0.	0.	1125.	2035
2040	0.	0.	600.	0.	0.	0.	0.	0.	527.	0.	0.	1127.	2040
2045	0.	0.	600.	0.	0.	0.	0.	0.	527.	0.	0.	1127.	2045
2050	0.	0.	600.	0.	0.	0.	0.	0.	527.	0.	0.	1127.	2050
2055	0.	0.	600.	0.	0.	0.	0.	0.	527.	0.	0.	1127.	2055
2060	0.	0.	600.	0.	0.	0.	0.	0.	527.	0.	0.	1127.	2060
2065	0.	0.	600.	0.	0.	0.	0.	0.	527.	0.	0.	1127.	2065
2070	0.	0.	600.	0.	0.	0.	0.	0.	527.	0.	0.	1127.	2070

TABLE 10.E.45. Case 2A - U Only Recycle Pu to SHLW - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Salt - $ Millions at 10% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP-MOX	TOTAL SYSTEM	YEAR
1985	249.	0.	7.	27.	60.	0.	0.	0.	343.	1985
1990	643.	0.	55.	240.	60.	*	0.	0.	997.	1990
1995	958.	0.	99.	478.	60.	0.	0.	0.	1594.	1995
2000	1251.	0.	134.	682.	60.	0.	0.	0.	2127.	2000
2005	1491.	0.	164.	859.	60.	0.	0.	0.	2575.	2005
2010	1665.	0.	187.	996.	60.	0.	0.	0.	2907.	2010
2015	1764.	0.	201.	1086.	60.	0.	0.	1.	3112.	2015
2020	1821.	0.	209.	1138.	60.	0.	0.	1.	3229.	2020
2025	1858.	0.	214.	1170.	60.	0.	0.	2.	3304.	2025
2030	1877.	0.	217.	1189.	60.	0.	0.	2.	3344.	2030
2035	1885.	0.	218.	1198.	60.	0.	0.	2.	3363.	2035
2040	1890.	0.	218.	1202.	60.	0.	0.	2.	3372.	2040
2045	1891.	0.	219.	1204.	60.	0.	0.	2.	3376.	2045
2050	1891.	0.	219.	1204.	60.	0.	0.	2.	3376.	2050
2055	1891.	0.	219.	1204.	60.	0.	0.	2.	3376.	2055
2060	1891.	0.	219.	1204.	60.	0.	0.	2.	3376.	2060
2065	1891.	0.	219.	1204.	60.	0.	0.	2.	3376.	2065
2070	1891.	0.	219.	1204.	60.	0.	0.	2.	3376.	2070
2075	1891.	0.	219.	1204.	60.	0.	0.	2.	3376.	2075

TABLE 10.E.46. Case 2A - U Only Recycle Pu to SHLW - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Granite - $ Millions at 10% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP-MOX	TOTAL SYSTEM	YEAR
1985	249.	0.	7.	41.	60.	0.	0.	0.	357.	1985
1990	667.	0.	55.	355.	60.	0.	0.	0.	1137.	1990
1995	1006.	0.	99.	690.	60.	0.	0.	0.	1854.	1995
2000	1316.	0.	134.	958.	60.	0.	0.	0.	2469.	2000
2005	1571.	0.	164.	1190.	60.	0.	0.	0.	2985.	2005
2010	1754.	0.	187.	1366.	60.	0.	0.	0.	3368.	2010
2015	1870.	0.	201.	1528.	60.	0.	0.	1.	3660.	2015
2020	1936.	0.	209.	1621.	60.	0.	0.	1.	3827.	2020
2025	1980.	0.	214.	1676.	60.	0.	0.	2.	3932.	2025
2030	2002.	0.	217.	1710.	60.	0.	0.	2.	3991.	2030
2035	2011.	0.	218.	1727.	60.	0.	0.	2.	4018.	2035
2040	2016.	0.	218.	1734.	60.	0.	0.	2.	4030.	2040
2045	2017.	0.	219.	1736.	60.	0.	0.	2.	4034.	2045
2050	2017.	0.	219.	1736.	60.	0.	0.	2.	4035.	2050
2055	2017.	0.	219.	1736.	60.	0.	0.	2.	4035.	2055
2060	2017.	0.	219.	1736.	60.	0.	0.	2.	4035.	2060
2065	2017.	0.	219.	1736.	60.	0.	0.	2.	4035.	2065
2070	2017.	0.	219.	1736.	60.	0.	0.	2.	4035.	2070
2075	2017.	0.	219.	1736.	60.	0.	0.	2.	4035.	2075

TABLE 10.E.47. Case 2A - U Only Recycle Pu to SHLW - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Shale - $ Millions at 10% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPOR-TATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP-MOX	TOTAL SYSTEM	YEAR
1985	249.	0.	7.	34.	60.	0.	0.	0.	350.	1985
1990	690.	0.	55.	302.	60.	0.	0.	0.	1107.	1990
1995	1062.	0.	97	621.	60.	0.	0.	0.	1842.	1995
2000	1403.	0.	134.	877.	60.	0.	0.	0.	2474.	2000
2005	1683.	0.	164.	1098.	60.	0.	0.	0.	3006.	2005
2010	1885.	0.	187.	1269.	60.	0.	0.	0.	3401.	2010
2015	2000.	0.	201.	1382.	60.	0.	0.	1.	3645.	2015
2020	2066.	0.	209.	1447.	60.	0.	0.	1.	3784.	2020
2025	2110.	0.	214.	1487.	60.	0.	0.	2.	3873.	2025
2030	2132.	0.	217.	1510.	60.	0.	0.	2.	3921.	2030
2035	2142.	0.	218.	1521.	60.	0.	0.	2.	3943.	2035
2040	2147.	0.	218.	1527.	60.	0.	0.	2.	3954.	2040
2045	2148.	0.	219.	1529.	60.	0.	0.	2.	3958.	2045
2050	2148.	0.	219.	1529.	60.	0.	0.	2.	3959.	2050
2055	2148.	0.	219.	1529.	60.	0.	0.	2.	3959.	2055
2060	2148.	0.	219.	1529.	60.	0.	0.	2.	3959.	2060
2065	2148.	0.	219.	1529.	60.	0.	0.	2.	3959.	2065
2070	2148.	0.	219.	1529.	60.	0.	0.	2.	3959.	2070
2075	2148.	0.	219.	1529.	60.	0.	0.	2.	3959.	2075

TABLE 10.E.48. Case 2A - U Only Recycle Pu to SHLW - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Basalt - $ Millions at 10% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP-MOX	TOTAL SYSTEM	YEAR
1985	249.	0.	7.	45.	60.	0.	0.	0.	361.	1985
1990	683.	0.	55.	379.	60.	0.	0.	0.	1176.	1990
1995	1055.	0.	99.	785.	60.	0.	[illegible]	0.	1999.	1995
2000	1396.	0.	134.	1111.	60.	0.	0.	0.	2701.	2000
2005	1676.	0.	164.	1392.	60.	0.	0.	0.	3293.	2005
2010	1877.	0.	187.	1610.	60.	0.	0.	0.	3734.	2010
2015	1993.	0.	201.	1752.	60.	0.	0.	1.	4007.	2015
2020	2059.	0.	209.	1834.	60.	0.	0.	1.	4163.	2020
2025	2103.	0.	214.	1884.	60.	0.	0.	2.	4262.	2025
2030	2125.	0.	217.	1913.	60.	0.	0.	2.	4317.	2030
2035	2134.	0.	218.	1927.	60.	0.	0.	2.	4342.	2035
2040	2139.	0.	218.	1934.	60.	0.	0.	2.	4354.	2040
2045	2141.	0.	219.	1937.	60.	0.	0.	2.	4359.	2045
2050	2141.	0.	219.	1938.	60.	0.	0.	2.	4359.	2050
2055	2141.	0.	219.	1938.	60.	0.	0.	2.	4360.	2055
2060	2141.	0.	219.	1938.	60.	0.	0.	2.	4360.	2060
2065	2141.	0.	219.	1938.	60.	0.	0.	2.	4360.	2065
2070	2141.	0.	219.	1938.	60.	0.	0.	2.	4360.	2070
2075	2141.	0.	219.	1938.	60.	0.	0.	2.	4360.	2075

TABLE 10.E.49. Case 2B - U Only Recycle - Repository in Salt - Reference Treatment - Unit Power Cost for TRU Waste Management Including Fuel Handling and Storage

YEAR	POWER GENERATION KWHR ANNUAL	POWER GENERATION CUMULATIVE	UNDISCOUNTED AVERAGE MILLS/KWHR ANNUAL	UNDISCOUNTED AVERAGE CUMULATIVE	DISCOUNTED AVERAGE (7 PCT) MILLS/KWHR ANNUAL	DISCOUNTED AVERAGE (7 PCT) CUMULATIVE	DISCOUNTED AVERAGE (10 PCT) MILLS/KWHR ANNUAL	DISCOUNTED AVERAGE (10 PCT) CUMULATIVE	YEAR
1975	1.78E+11	4.92E+11	.05	.02	.05	.02	.05	.02	1975
1980	3.44E+11	1.86E+12	.11	.07	.11	.07	.11	.06	1980
1985	6.82E+11	4.45E+12	.54	.29	.54	.24	.54	.23	1985
1990	1.11E+12	9.17E+12	.55	.45	.55	.38	.55	.35	1990
1995	1.67E+12	1.63E+13	.56	.49	.56	.43	.56	.40	1995
2000	2.32E+12	2.66E+13	.56	.50	.56	.45	.56	.42	2000
2005	2.40E+12	3.87E+13	.69	.53	.69	.47	.69	.44	2005
2010	2.31E+12	5.04E+13	.78	.58	.78	.50	.78	.46	2010
2015	2.10E+12	6.15E+13	.76	.61	.76	.52	.76	.47	2015
2020	1.82E+12	7.11E+13	.90	.64	.90	.53	.90	.48	2020
2025	1.37E+12	7.89E+13	1.12	.68	1.12	.54	1.12	.48	2025
2030	9.23E+11	8.44E+13	1.31	.72	1.31	.55	1.31	.48	2030
2035	4.50E+11	8.76E+13	1.76	.75	1.76	.55	1.76	.49	2035
2040	2.67E+10	8.85E+13	27.28	.78	27.28	.56	27.28	.49	2040
2045	0.	8.85E+13	0.00	.80	0.00	.56	0.00	.49	2045
2050	0.	8.85E+13	0.00	.80	0.00	.56	0.00	.49	2050
2055	0.	8.85E+13	0.00	.80	0.00	.56	0.00	.49	2055
2060	0.	8.85E+13	0.00	.81	0.00	.56	0.00	.49	2060
2065	0.	8.85E+13	0.00	.81	0.00	.56	0.00	.49	2065
2070	0.	8.85E+13	0.00	.81	0.00	.56	0.00	.49	2070

TABLE 10.E.50. Case 2B - U Only Recycle - Repository in Granite - Reference Treatment - Unit Power Cost for TRU Waste Management Including Spent Fuel Handling and Storage

	POWER GENERATION		UNDISCOUNTED AVERAGE		DISCOUNTED AVERAGE (7 PCT)		DISCOUNTED AVERAGE (10 PCT)		
	KWHR		MILLS/KWHR		MILLS/KWHR		MILLS/KWHR		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	1.78E+11	4.92E+11	.05	.02	.05	.02	.05	.02	1975
1980	3.40E+11	1.86E+12	.11	.07	.11	.07	.11	.06	1980
1985	6.82E+11	4.45E+12	.60	.30	.60	.25	.60	.23	1985
1990	1.11E+12	9.17E+12	.68	.50	.68	.42	.68	.39	1990
1995	1.67E+12	1.63E+13	.68	[illegible]	.68	.49	.68	.45	1995
2000	2.32E+12	2.66E+13	.68	.60	.68	.53	.68	.49	2000
2005	2.40E+12	3.87E+13	.85	.64	.85	.56	.85	.51	2005
2010	2.31E+12	5.08E+13	.91	.70	.91	.59	.91	.54	2010
2015	2.10E+12	6.15E+13	.90	.74	.90	.61	.90	.55	2015
2020	1.82E+12	7.11E+13	1.05	.77	1.05	.63	1.05	.56	2020
2025	1.37E+12	7.89E+13	1.32	.81	1.32	.64	1.32	.57	2025
2030	9.23E+11	8.44E+13	1.55	.85	1.55	.65	1.55	.57	2030
2035	4.50E+11	8.76E+13	2.24	.89	2.24	.65	2.24	.57	2035
2040	2.67E+10	8.85E+13	34.26	.93	34.26	.61	34.26	.57	2040
2045	0.	8.85E+13	0.00	.96	0.00	.66	0.00	.57	2045
2050	0.	8.85E+13	0.00	.96	0.00	.66	0.00	.57	2050
2055	0.	8.85E+13	0.00	.96	0.00	.66	0.00	.57	2055
2060	0.	8.85E+13	0.00	.96	0.00	.66	0.00	.57	2060
2065	0.	8.85E+13	0.00	.97	0.00	.66	0.00	.57	2065
2070	0.	8.85E+13	0.00	.97	0.00	.66	0.00	.57	2070

TABLE 10.E.51. Case 2B - U Only Recycle - Repository in Shale - Reference Treatment - Unit Power Cost for TRU Waste Management Including Spent Fuel Handling and Storage

	POWER GENERATION KWHR		UNDISCOUNTED AVERAGE MILLS/KWHR		DISCOUNTED AVERAGE (7 PCT) MILLS/KWHR		DISCOUNTED AVERAGE (10 PCT) MILLS/KWHR		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	1.78E+11	4.92E+11	.05	.02	.05	.02	.05	.02	1975
1980	3.44E+11	1.86E+12	.11	.07	.11	.07	.11	.06	1980
1985	6.82E+11	4.45E+12	.58	.29	.58	.25	.58	.23	1985
1990	1.11E+12	9.17E+12	.62	.49	.62	.41	.62	.38	1990
1995	1.67E+12	1.63E+13	.69	.57	.69	.49	.69	.45	1995
2000	2.32E+12	2.66E+13	.70	.60	.70	.53	.70	.49	2000
2005	2.40E+12	3.87E+13	.87	.65	.87	.56	.87	.52	2005
2010	2.31E+12	5.04E+13	.94	.71	.94	.60	.94	.54	2010
2015	2.10E+12	6.15E+13	.92	.75	.92	.62	.92	.55	2015
2020	1.82E+12	7.11E+13	1.07	.78	1.07	.63	1.07	.56	2020
2025	1.37E+12	7.89E+13	1.36	.83	1.36	.65	1.36	.57	2025
2030	9.23E+11	8.44E+13	1.60	.87	1.60	.66	1.60	.57	2030
2035	4.50E+11	8.76E+13	2.32	.91	2.32	.66	2.32	.58	2035
2040	2.67E+10	8.85E+13	35.15	.96	35.15	.67	35.15	.58	2040
2045	0.	8.85E+13	0.00	.98	0.00	.67	0.00	.58	2045
2050	0.	8.85E+13	0.00	.98	0.00	.67	0.00	.58	2050
2055	0.	8.85E+13	0.00	.99	0.00	.67	0.00	.58	2055
2060	0.	8.85E+13	0.00	.99	0.00	.67	0.00	.58	2060
2065	0.	8.85E+13	0.00	.99	0.00	.67	0.00	.58	2065
2070	0.	8.85E+13	0.00	.99	0.00	.67	0.00	.58	2070

TABLE 10.E.52. Case 2B - U Only Recycle - Repository in Basalt - Reference Treatment - Unit Power Cost for TRU Waste Management Including Spent Fuel Handling and Storage

	POWER GENERATION		UNDISCOUNTED AVERAGE		DISCOUNTED AVERAGE (7 PCT)		DISCOUNTED AVERAGE (8 PCT)		
	KWHR		MILLS/KWHR		MILLS/KWHR		MILLS/KWHR		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	1.78E+11	4.92E+11	.05	.02	.05	.02	.05	.02	1975
1980	3.04E+11	1.86E+12	.11	.07	.11	.07	.11	.06	1980
1985	6.82E+11	4.45E+12	.62	.30	.62	.25	.62	.23	1985
1990	1.11E+12	9.17E+12	.68	.52	.68	.43	.68	.40	1990
1995	1.67E+12	1.63E+13	.75	.59	.75	.51	.75	.47	1995
2000	2.32E+12	2.66E+13	.76	.64	.76	.56	.76	.51	2000
2005	2.40E+12	3.87E+13	.95	.70	.95	.60	.95	.55	2005
2010	2.31E+12	5.04E+13	1.03	.76	1.03	.64	1.03	.57	2010
2015	2.10E+12	6.15E+13	1.02	.81	1.02	.66	1.02	.59	2015
2020	1.82E+12	7.11E+13	1.18	.85	1.18	.68	1.18	.60	2020
2025	1.37E+12	7.89E+13	1.50	.90	1.50	.69	1.50	.61	2025
2030	9.23E+11	8.44E+13	1.78	.95	1.78	.71	1.78	.61	2030
2035	4.50E+11	8.76E+13	2.58	.99	2.58	.71	2.58	.61	2035
2040	2.67E+10	8.85E+13	34.06	1.04	34.06	.72	34.06	.62	2040
2045	0.	8.85E+13	0.00	1.07	0.00	.72	0.00	.62	2045
2050	0.	8.85E+13	0.00	1.07	0.00	.72	0.00	.62	2050
2055	0.	8.85E+13	0.00	1.07	0.00	.72	0.00	.62	2055
2060	0.	8.85E+13	0.00	1.07	0.00	.72	0.00	.62	2060
2065	0.	8.85E+13	0.00	1.07	0.00	.72	0.00	.62	2065
2070	0.	8.85E+13	0.00	1.07	0.00	.72	0.00	.62	2070

TABLE 10.E.53. Case 2B - U Only Recycle - Repository in Salt - Reference Treatment - Unit Fuel cost for TRU Waste Management Including Spent Fuel Handling and Storage[(a)]

YEAR	THRUPUT KG DISCHARGED ANNUAL	THRUPUT KG DISCHARGED CUMULATIVE	UNDISCOUNTED AVERAGE DOLLARS/KG DISCHARGED ANNUAL	UNDISCOUNTED AVERAGE DOLLARS/KG DISCHARGED CUMULATIVE	DISCOUNTED AVERAGE (7 PCT) DOLLARS/KG DISCHARGED ANNUAL	DISCOUNTED AVERAGE (7 PCT) DOLLARS/KG DISCHARGED CUMULATIVE	DISCOUNTED AVERAGE (10 PCT) DOLLARS/KG DISCHARGED ANNUAL	DISCOUNTED AVERAGE (10 PCT) DOLLARS/KG DISCHARGED CUMULATIVE	YEAR
1975	6.99E+05	1.78E+06	12.	5.	12.	5.	12.	5.	1975
1980	1.27E+06	6.93E+06	30.	19.	30.	18.	30.	17.	1980
1985	2.48E+06	1.63E+07	148.	78.	148.	66.	148.	62.	1985
1990	4.07E+06	3.37E+07	150.	122.	150.	104.	150.	96.	1990
1995	6.21E+06	6.02E+07	150.	132.	150.	116.	150.	107.	1995
2000	8.74E+06	9.86E+07	148.	135.	148.	122.	148.	113.	2000
2005	9.09E+06	1.44E+08	182.	143.	182.	128.	182.	118.	2005
2010	9.24E+06	1.90E+08	195.	153.	195.	134.	195.	123.	2010
2015	8.60E+06	2.35E+08	187.	160.	187.	138.	187.	126.	2015
2020	7.72E+06	2.75E+08	211.	166.	211.	140.	211.	127.	2020
2025	7.15E+06	3.14E+08	215.	172.	215.	142.	215.	128.	2025
2030	5.31E+06	3.43E+08	228.	177.	228.	144.	228.	129.	2030
2035	3.96E+06	3.66E+08	200.	179.	200.	144.	200.	129.	2035
2040	1.53E+06	3.79E+08	475.	182.	475.	145.	475.	129.	2040
2045	0.	3.79E+08	0.	187.	0.	145.	0.	130.	2045
2050	0.	3.79E+08	0.	188.	0.	145.	0.	130.	2050
2055	0.	3.79E+08	0.	188.	0.	145.	0.	130.	2055
2060	0.	3.79E+08	0.	188.	0.	145.	0.	130.	2060
2065	0.	3.79E+08	0.	188.	0.	145.	0.	130.	2065
2070	0.	3.79E+08	0.	188.	0.	145.	0.	130.	2070

a. Unit cost at time of reactor discharge.

TABLE 10.E.54. Case 2B - U Only Recycle - Repository in Granite - Reference Treatment - Unit Fuel Cost for TRU Waste Management Including Spent Fuel handling and Storage[a]

	THRUPUT		UNDISCOUNTED AVERAGE		DISCOUNTED AVERAGE (7 PCT)		DISCOUNTED AVERAGE (10 PCT)		
	KG DISCHARGED		DOLLARS/KG DISCHARGED		DOLLARS/KG DISCHARGED		DOLLARS/KG DISCHARGED		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	6.99E+05	1.78E+06	12.	5.	12.	5.	12.	5.	1975
1980	1.27E+06	6.93E+06	30.	19.	30.	18.	30.	17.	1980
1985	2.43E+06	1.63E+07	165.	81.	165.	68.	165.	63.	1985
1990	4.07E+06	3.37E+07	185.	137.	185.	115.	185.	106.	1990
1995	6.21E+06	6.02E+07	183.	155.	183.	134.	183.	123.	1995
2000	8.74E+06	9.86E+07	182.	162.	182.	143.	182.	132.	2000
2005	9.09E+06	1.44E+08	224.	172.	224.	151.	224.	139.	2005
2010	9.24E+06	1.90E+08	228.	185.	228.	159.	228.	145.	2010
2015	8.60E+06	2.35E+08	219.	192.	219.	163.	219.	148.	2015
2020	7.72E+06	2.75E+08	246.	198.	246.	166.	246.	150.	2020
2025	7.15E+06	3.14E+08	253.	204.	253.	169.	253.	151.	2025
2030	5.31E+06	3.43E+08	269.	210.	269.	170.	269.	152.	2030
2035	3.94E+06	3.66E+08	254.	213.	254.	171.	254.	[illegible]	2035
2040	1.53E+06	3.79E+08	596.	218.	596.	172.	596.	152.	2040
2045	0.	3.79E+08	0.	224.	0.	172.	0.	152.	2045
2050	0.	3.79E+08	0.	225.	0.	172.	0.	152.	2050
2055	0.	3.79E+08	0.	225.	0.	172.	0.	152.	2055
2060	0.	3.79E+08	0.	225.	0.	172.	0.	152.	2060
2065	0.	3.79E+08	0.	225.	0.	172.	0.	152.	2065
2070	0.	3.79E+08	0.	225.	0.	172.	0.	152.	2070

a. Unit cost at time of reactor discharge.

TABLE 10.E.55. Case 2B - U Only Recycle - Repository in Shale - Reference Treatment - Unit Fuel Cost for TRU Waste Management Including Spent Fuel Handling and Storage[a]

	THRUPUT		UNDISCOUNTED AVERAGE		DISCOUNTED AVERAGE (7 PCT)		DISCOUNTED AVERAGE (10 PCT)		
	KG DISCHARGED		DOLLARS/KG DISCHARGED		DOLLARS/KG DISCHARGED		DOLLARS/KG DISCHARGED		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	6.99E+05	1.78E+06	12.	5.	12.	5.	12.	5.	1975
1980	1.27E+06	6.93E+06	30.	19.	30.	18.	30.	17.	1980
1985	2.44E+06	1.63E+07	158.	80.	158.	68.	158.	63.	1985
1990	4.07E+06	3.37E+07	170.	133.	170.	113.	170.	103.	1990
1995	6.21E+06	6.02E+07	186.	155.	186.	133.	186.	122.	1995
2000	8.74E+06	9.86E+07	186.	165.	186.	143.	186.	132.	2000
2005	9.09E+06	1.44E+08	229.	174.	229.	152.	229.	139.	2005
2010	9.24E+06	1.90E+08	235.	188.	235.	160.	235.	145.	2010
2015	8.60E+06	2.35E+08	226.	196.	226.	165.	226.	149.	2015
2020	7.72E+06	2.75E+08	253.	202.	253.	168.	253.	151.	2020
2025	7.15E+06	3.14E+08	260.	209.	260.	171.	260.	152.	2025
2030	5.31E+06	3.43E+08	279.	215.	279.	172.	279.	153.	2030
2035	3.94E+06	3.66E+08	264.	218.	264.	173.	264.	153.	2035
2040	1.53E+06	3.79E+08	612.	223.	612.	174.	612.	153.	2040
2045	0.	3.79E+08	0.	229.	0.	174.	0.	154.	2045
2050	0.	3.79E+08	0.	230.	0.	174.	0.	154.	2050
2055	0.	3.79E+08	0.	230.	0.	174.	0.	154.	2055
2060	0.	3.79E+08	0.	230.	0.	174.	0.	154.	2060
2065	0.	3.79E+08	0.	230.	0.	174.	0.	154.	2065
2070	0.	3.79E+08	0.	230.	0.	174.	0.	154.	2070

a. Unit cost at time of reactor discharge.

TABLE 10.E.56. Case 2B - U Only Recycle - Repository in Basalt - Reference Treatment - Unit Fuel Cost for TRU Waste Management Including Spent Fuel Handling and Storage[a]

	THRUPUT KG DISCHARGED		UNDISCOUNTED AVERAGE DOLLARS/KG DISCHARGED		DISCOUNTED AVERAGE (7 PCT) DOLLARS/KG DISCHARGED		DISCOUNTED AVERAGE (10 PCT) DOLLARS/KG DISCHARGED		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	6.99E+05	1.78E+06	12.	5.	12.	5.	12.	5.	1975
1980	1.27E+06	6.93E+06	30.	19.	30.	18.	30.	17.	1980
1985	2.48E+06	1.63E+07	170.	81.	170.	69.	170.	64.	1985
1990	4.07E+06	3.37E+07	185.	140.	185.	118.	185.	108.	1990
1995	6.21E+06	6.02E+07	203.	161.	203.	138.	203.	127.	1995
2000	8.74E+06	9.86E+07	203.	173.	203.	151.	203.	138.	2000
2005	9.09E+06	1.44E+08	250.	187.	250.	161.	250.	147.	2005
2010	9.24E+06	1.90E+08	258.	203.	258.	171.	258.	154.	2010
2015	8.60E+06	2.35E+08	249.	212.	249.	177.	249.	158.	2015
2020	7.72E+06	2.75E+08	277.	220.	277.	180.	277.	161.	2020
2025	7.15E+06	3.14E+08	287.	227.	287.	183.	287.	162.	2025
2030	5.31E+06	3.43E+08	309.	234.	309.	185.	309.	163.	2030
2035	3.96E+06	3.66E+08	293.	238.	293.	186.	293.	163.	2035
2040	1.53E+06	3.79E+08	593.	243.	593.	187.	593.	164.	2040
2045	0.	3.79E+08	0.	249.	0.	187.	0.	164.	2045
2050	0.	3.79E+08	0.	250.	0.	187.	0.	164.	2050
2055	0.	3.79E+08	0.	250.	0.	187.	0.	164.	2055
2060	0.	3.79E+08	0.	251.	0.	187.	0.	164.	2060
2065	0.	3.79E+08	0.	251.	0.	187.	0.	164.	2065
2070	0.	3.79E+08	0.	251.	0.	187.	0.	164.	2070

a. Unit cost at time of reactor discharge.

TABLE 10.E.57. Case 2B - U Only Recycle - Stored Pu - Reference Treatment - Costs for TRU Waste Transportation - $ Millions at 0% Discount Rate

YEAR	SOLID HIGH LEVEL WASTE ANNUAL	SOLID HIGH LEVEL WASTE CUMULATIVE	HULLS AND ASSEMBLY HARDWARE WASTE ANNUAL	HULLS AND ASSEMBLY HARDWARE WASTE CUMULATIVE	TOTAL INTERMEDIATE LEVEL WASTE ANNUAL	TOTAL INTERMEDIATE LEVEL WASTE CUMULATIVE	TOTAL LOW LEVEL WASTE ANNUAL	TOTAL LOW LEVEL WASTE CUMULATIVE	TOTAL FOR ALL CLASSIFICATIONS ANNUAL	TOTAL FOR ALL CLASSIFICATIONS CUMULATIVE	YEAR
1985	0.00	0.00	8.27	8.27	6.19	6.19	.29	.29	14.75	14.75	1985
1990	7.02	21.59	14.33	73.75	10.72	55.18	.50	2.59	32.57	153.11	1990
1995	11.33	76.09	19.23	157.30	14.38	117.68	.68	5.52	45.62	356.59	1995
2000	17.81	145.71	26.22	267.40	19.61	200.06	.92	9.39	64.56	622.56	2000
2005	24.29	247.71	33.21	412.47	24.84	308.58	1.17	14.48	83.50	983.24	2005
2010	30.76	382.09	33.21	578.50	24.84	432.80	1.17	20.31	89.98	1413.71	2010
2015	30.76	535.90	27.96	732.30	20.92	547.86	1.25	26.80	80.90	1842.87	2015
2020	25.90	678.37	29.71	873.87	22.23	653.77	1.31	32.86	79.16	2234.88	2020
2025	27.52	809.52	27.96	1024.18	20.92	766.22	1.25	38.95	77.66	2638.87	2025
2030	25.90	948.79	20.97	1143.02	15.69	855.14	1.01	44.21	63.58	2991.12	2030
2035	19.43	1058.88	13.98	1226.91	10.46	917.90	.76	48.24	44.63	3251.90	2035
2040	12.95	1136.56	13.98	1296.82	10.46	970.20	1.31	53.69	38.70	3457.27	2040
2045	12.95	1201.32	0.00	1326.03	0.00	992.05	.36	56.16	13.31	3575.55	2045
2050	0.00	1228.37	0.00	1326.03	0.00	992.05	0.00	56.88	0.00	3603.33	2050
2055	0.00	1228.37	0.00	1326.03	0.00	992.05	.36	57.96	.36	3604.41	2055
2060	0.00	1228.37	0.00	1326.03	0.00	992.05	.36	59.05	.36	3605.50	2060
2065	0.00	1228.37	0.00	1326.03	0.00	992.05	.36	60.13	.36	3606.58	2065
2070	0.00	1228.37	0.00	1326.03	0.00	992.05	0.00	60.13	0.00	3606.58	2070
2075	0.00	1228.37	0.00	1326.03	0.00	992.05	1.08	62.30	1.08	3608.75	2075

TABLE 10.E.58. Case 2B - U Only Recycle - Stored Pu - Reference Treatment - System Spent Fuel Management Costs - $ Millions at 0% Discount Rate

YEAR	REACTOR TO ISFSB	ISFSB STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACKAGING	ISFSB TO PACKAGING	PACKAGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOSITORY COST	TOTAL COST	YEAR
1980	0.	0.	132.	0.	0.	0.	0.	0.	0.	0.	0.	132.	1980
1985	0.	0.	367.	0.	0.	0.	0.	0.	124.	0.	0.	491.	1985
1990	0.	0.	603.	0.	0.	0.	0.	0.	447.	0.	0.	1051.	1990
1995	0.	0.	925.	0.	0.	0.	0.	0.	860.	0.	0.	1785.	1995
2000	0.	0.	1390.	0.	0.	0.	0.	0.	1465.	0.	0.	2855.	2000
2005	0.	0.	2026.	0.	0.	0.	0.	0.	2262.	0.	0.	4288.	2005
2010	0.	0.	2648.	0.	0.	0.	0.	0.	3174.	0.	0.	5822.	2010
2015	0.	0.	3283.	0.	0.	0.	0.	0.	4019.	0.	0.	7302.	2015
2020	0.	0.	3945.	0.	0.	0.	0.	0.	4796.	0.	0.	8741.	2020
2025	0.	0.	4496.	0.	0.	0.	0.	0.	5622.	0.	0.	10118.	2025
2030	0.	0.	4927.	0.	0.	0.	0.	0.	6275.	0.	0.	11201.	2030
2035	0.	0.	5301.	0.	0.	0.	0.	0.	6735.	0.	0.	12037.	2035
2040	0.	0.	5620.	0.	0.	0.	0.	0.	7119.	0.	0.	12739.	2040
2045	0.	0.	5662.	0.	0.	0.	0.	0.	7280.	0.	0.	12942.	2045
2050	0.	0.	5662.	0.	0.	0.	0.	0.	7280.	0.	0.	12942.	2050
2055	0.	0.	5662.	0.	0.	0.	0.	0.	7280.	0.	0.	12942.	2055
2060	0.	0.	5662.	0.	0.	0.	0.	0.	7280.	0.	0.	12942.	2060
2065	0.	0.	5662.	0.	0.	0.	0.	0.	7280.	0.	0.	12942.	2065
2070	0.	0.	5662.	0.	0.	0.	0.	0.	7280.	0.	0.	12942.	2070

TABLE 10.E.59. Case 2B - U Only Recycle - Stored Pu - Reference Treatment - Costs for Geologic Repository in Salt - $ Millions at 0% Discount Rate

YEAR	SOLID HIGH LEVEL WASTE ANNUAL	CUMULATIVE	HULLS AND ASSEMBLY HARDWARE WASTE ANNUAL	CUMULATIVE	TOTAL INTERMEDIATE LEVEL WASTE ANNUAL	CUMULATIVE	TOTAL LOW LEVEL WASTE ANNUAL	CUMULATIVE	TOTAL FOR ALL CLASSIFICATIONS ANNUAL	CUMULATIVE	YEAR
1985	0.00	0.00	6.34	6.34	40.48	40.48	4.92	4.92	51.73	51.73	1985
1990	43.48	133.77	10.98	56.53	70.11	360.81	8.52	43.83	133.09	594.94	1990
1995	70.23	471.53	14.73	120.56	94.05	769.51	11.42	93.48	190.44	1455.07	1995
2000	110.36	902.92	20.09	204.45	128.25	1308.17	15.58	158.91	274.28	2574.94	2000
2005	150.49	1534.97	25.45	316.13	162.45	2017.83	19.73	245.11	358.12	4114.03	2005
2010	274.49	2517.70	25.45	443.38	162.45	2830.09	19.73	343.78	482.12	6135.00	2010
2015	274.49	3890.18	21.43	561.26	136.80	3582.50	21.23	453.63	453.95	8487.57	2015
2020	231.15	5161.50	22.77	669.76	145.35	4275.06	22.27	556.21	421.54	10662.52	2020
2025	245.59	6331.68	21.43	784.96	136.80	5010.37	21.23	659.37	425.06	12786.38	2025
2030	231.15	7574.10	16.07	876.04	102.60	5591.77	17.08	748.45	366.90	14790.37	2030
2035	120.39	8450.53	10.72	980.34	68.40	6002.18	12.92	816.75	212.43	16209.81	2035
2040	80.26	8932.04	10.72	993.92	68.40	6344.18	22.15	909.04	181.52	17179.24	2040
2045	80.26	9333.39	0.00	1016.30	0.00	6487.05	6.17	951.09	86.43	17787.83	2045
2050	0.00	9501.02	0.00	1016.30	0.00	6487.05	0.00	963.44	0.00	17967.81	2050
2055	0.00	9501.02	0.00	1016.30	0.00	6487.05	6.17	981.96	6.17	17986.33	2055
2060	0.00	9501.02	0.00	1016.30	0.00	6487.05	6.17	1000.48	6.17	18004.85	2060
2065	0.00	9501.02	0.00	1016.30	0.00	6487.05	6.17	1019.00	6.17	18023.38	2065
2070	0.00	9501.02	0.00	1016.30	0.00	6487.05	0.00	1019.00	0.00	18023.38	2070
2075	0.00	9501.02	0.00	1016.30	0.00	6487.05	18.52	1056.04	18.52	18060.42	2075

TABLE 10.E.60. Case 2B - U Only Recycle - Stored Pu - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Salt - $ Millions at 0% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP-MOX	TOTAL SYSTEM	YEAR
1985	462.	0.	15.	52.	105.	139.	5.	0.	778.	1985
1990	1585.	0.	153.	595.	105.	503.	19.	0.	2965.	1990
1995	3019.	0.	357.	1455.	105.	994.	36.	0.	5965.	1995
2000	5119.	0.	623.	2575.	105.	1707.	62.	0.	10191.	2000
2005	7887.	0.	983.	4119.	105.	2656.	97.	0.	15842.	2005
2010	11105.	0.	1414.	6135.	105.	3770.	137.	2.	22667.	2010
2015	14154.	0.	1843.	8488.	105.	4800.	175.	31.	29596.	2015
2020	16462.	0.	2239.	10663.	105.	5744.	209.	51.	35972.	2020
2025	19942.	0.	2639.	12786.	105.	6746.	246.	73.	42538.	2025
2030	22299.	0.	2991.	14790.	105.	7524.	274.	100.	48083.	2030
2035	23941.	0.	3252.	16210.	105.	8068.	294.	129.	52000.	2035
2040	25275.	0.	3457.	17179.	105.	8502.	310.	185.	55013.	2040
2045	25832.	0.	3576.	17788.	105.	8673.	316.	243.	56532.	2045
2050	25832.	0.	3603.	17968.	105.	8673.	316.	257.	56754.	2050
2055	25832.	0.	3604.	17986.	105.	8673.	316.	289.	56806.	2055
2060	25832.	0.	3605.	18005.	105.	8673.	316.	320.	56856.	2060
2065	25832.	0.	3607.	18023.	105.	8673.	316.	348.	56904.	2065
2070	25832.	0.	3607.	18023.	105.	8673.	316.	353.	56909.	2070
2075	25832.	0.	3609.	18060.	105.	8673.	316.	403.	56998.	2075

TABLE 10.E.61. Case 2B - U Only Recycle - Stored Pu - Reference Treatment - Costs for Geologic Repository in Granite - $ Millions at 0% Discount Rate

YEAR	SOLID HIGH LEVEL WASTE ANNUAL	SOLID HIGH LEVEL WASTE CUMULATIVE	HULLS AND ASSEMBLY HARDWARE WASTE ANNUAL	HULLS AND ASSEMBLY HARDWARE WASTE CUMULATIVE	TOTAL INTERMEDIATE LEVEL WASTE ANNUAL	TOTAL INTERMEDIATE LEVEL WASTE CUMULATIVE	TOTAL LOW LEVEL WASTE ANNUAL	TOTAL LOW LEVEL WASTE CUMULATIVE	TOTAL FOR ALL CLASSIFICATIONS ANNUAL	TOTAL FOR ALL CLASSIFICATIONS CUMULATIVE	YEAR
1985	0,00	0.00	11.03	11.03	68,58	68,58	8,98	8,98	88,59	88.59	1985
1990	83,94	195.50	19.11	98.36	118,79	611,31	15,55	80,02	237,39	985.19	1990
1995	135,57	847,53	25.64	209.77	159,35	1303,74	20,86	170,66	341.42	2531.70	1995
2000	213,04	1680.33	34,96	356,61	217,29	2216,35	26,44	290,12	493,74	4543,42	2000
2005	290,51	2900.49	44,29	550.07	275.23	3418,69	36,03	447,51	646,06	7316.76	2005
2010	367,98	4508.00	44,29	771.49	275,23	4794,86	36,03	627,66	723,53	10702.00	2010
2015	367,98	6347.92	37,29	976.60	231,78	6069,62	38,76	828,21	675,81	14222.36	2015
2020	309,88	8052.26	39,62	1165,40	266,26	7242,99	40,66	1015,49	636,42	17476.14	2020
2025	329,25	9621.04	37.29	1365.85	231,78	8488,78	38,76	1203.83	637,08	20679.50	2025
2030	309,88	11286.65	27,97	1524.34	173,83	9473,83	31,18	1366,46	542,66	23651,28	2030
2035	232,41	12603.64	18,65	1636.22	115,89	10169,16	23,59	1491.17	390,54	25900.19	2035
2040	154,98	13533.29	18,65	1729.45	115,89	10748,60	40,43	1659,65	329,91	27670,99	2040
2045	154,94	14307.99	0,00	1768,40	0,00	10990,64	11,27	1736,42	166,21	28803.45	2045
2050	0,00	14570,88	0,00	1768,40	0,00	10990,64	0,00	1758,97	0,00	29088.89	2050
2055	0,00	14570,88	0,00	1768,40	0,00	10990,64	11,27	1792,78	11,27	29122.70	2055
2060	0,00	14570,88	0,00	1768,40	0,00	10990,64	11,27	1826,59	11,27	29156.52	2060
2065	0,00	14570,88	0,00	1768,40	0,00	10990,68	11,27	1860,41	11,27	29190.33	2065
2070	0,00	14570,88	0,00	1768,40	0,CC	10990,64	0,00	1860,41	0,00	29190.33	2070
2075	0,00	14570,88	0,00	1768,40	0,00	10990,64	33,81	1928,04	33,81	29257,96	2075

TABLE 10.E.62. Case 2B - U Only Recycle - Stored Pu - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Granite - $ Millions at 0% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOx FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP-MOX	TOTAL SYSTEM	YEAR
1985	462.	0.	15.	89.	105.	139.	5.	0.	814.	1985
1990	1643.	0.	153.	985.	105.	509.	19.	0.	3414.	1990
1995	3222.	0.	357.	2532.	105.	994.	36.	0.	7245.	1995
2000	5535.	0.	623.	4543.	105.	1707.	62.	0.	12575.	2000
2005	8582.	0.	983.	7317.	105.	2656.	97.	0.	19740.	2005
2010	12070.	0.	1414.	10702.	105.	3770.	137.	2.	28200.	2010
2015	15301.	0.	1843.	14222.	105.	4800.	175.	31.	36478.	2015
2020	18275.	0.	2239.	17476.	105.	5744.	209.	51.	44099.	2020
2025	21432.	0.	2639.	20679.	105.	6746.	246.	73.	51921.	2025
2030	23929.	0.	2991.	23651.	105.	7529.	274.	100.	58574.	2030
2035	25691.	0.	3252.	25900.	105.	8068.	294.	129.	63440.	2035
2040	27160.	0.	3457.	27671.	105.	8502.	310.	185.	67390.	2040
2045	27773.	0.	3576.	28803.	105.	8673.	316.	243.	69489.	2045
2050	27773.	0.	3603.	29089.	105.	8673.	316.	257.	69816.	2050
2055	27773.	0.	3604.	29123.	105.	8673.	316.	289.	69883.	2055
2060	27773.	0.	3605.	29157.	105.	8673.	316.	320.	69949.	2060
2065	27773.	0.	3607.	29190.	105.	8673.	316.	348.	70012.	2065
2070	27773.	0.	3607.	29190.	105.	8673.	316.	353.	70017.	2070
2075	27773.	0.	3609.	29258.	105.	8673.	316.	403.	70137.	2075

TABLE 10.E.63. Case 2B - U Only Recycle - Stored Pu - Reference Treatment - Costs for Geologic Repository in Shale - $ Millions at 0% Discount Rate

YEAR	SOLID HIGH LEVEL WASTE ANNUAL	SOLID HIGH LEVEL WASTE CUMULATIVE	HULLS AND ASSEMBLY HARDWARE WASTE ANNUAL	HULLS AND ASSEMBLY HARDWARE WASTE CUMULATIVE	TOTAL INTERMEDIATE LEVEL WASTE ANNUAL	TOTAL INTERMEDIATE LEVEL WASTE CUMULATIVE	TOTAL LOW LEVEL WASTE ANNUAL	TOTAL LOW LEVEL WASTE CUMULATIVE	TOTAL FOR ALL CLASSIFICATIONS ANNUAL	TOTAL FOR ALL CLASSIFICATIONS CUMULATIVE	YEAR
1985	0.00	0.00	8.27	8.27	57.36	57.36	8.32	8.32	73.95	73.95	1985
1990	55.03	169.31	14.33	73.75	99.35	511.30	14.40	74.13	183.12	828.50	1990
1995	158.02	929.30	19.23	157.30	133.28	1090.88	19.32	158.10	329.84	2335.13	1995
2000	248.38	1894.99	26.22	267.40	181.74	1853.75	26.35	268.77	482.62	4289.91	2000
2005	338.61	3322.16	33.21	412.47	230.20	2859.38	33.38	414.57	635.40	7008.58	2005
2010	428.91	5195.81	33.21	578.50	230.20	4010.41	33.38	581.45	725.70	10366.17	2010
2015	428.91	7340.36	27.96	732.30	193.86	5076.62	35.91	767.24	686.64	13916.52	2015
2020	361.19	9326.89	29.71	873.87	205.97	6058.02	37.66	940.74	634.54	17199.51	2020
2025	383.76	11155.80	27.96	1024.18	193.86	7099.99	35.91	1115.21	641.49	20394.78	2025
2030	361.19	13096.77	20.97	1143.02	145.39	7923.88	28.88	1265.87	556.43	23429.55	2030
2035	270.89	14631.82	13.98	1226.91	96.93	8505.45	21.85	1381.40	403.66	25745.58	2035
2040	180.59	15719.38	13.98	1296.82	96.93	8990.09	37.46	1537.48	328.96	27539.78	2040
2045	101.58	16381.32	0.00	1326.03	0.00	9192.54	10.44	1608.60	112.03	28508.49	2045
2050	0.00	16593.49	0.00	1326.03	0.00	9192.54	0.00	1629.49	0.00	28741.54	2050
2055	0.00	16593.49	0.00	1326.03	0.00	9192.54	10.44	1660.81	10.44	28772.87	2055
2060	0.00	16593.49	0.00	1326.03	0.00	9192.54	10.44	1692.14	10.44	28804.20	2060
2065	0.00	16593.49	0.00	1326.03	0.00	9192.54	10.44	1723.47	10.44	28835.52	2065
2070	0.00	16593.49	0.00	1326.03	0.00	9192.54	0.00	1723.47	0.00	28835.52	2070
2075	0.00	16593.49	0.00	1326.03	0.00	9192.54	31.33	1786.12	31.33	28898.18	2075

TABLE 9.E.64. Case 2B - U Only Recycle - Stored Pu - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Shale - $ Millions at 0% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP-MOX	TOTAL SYSTEM	YEAR
1985	462.	0.	15.	74.	105.	139.	5.	0.	800.	1985
1990	1698.	0.	153.	828.	105.	509.	19.	0.	3312.	1990
1995	3433.	0.	357.	2335.	105.	994.	36.	0.	7260.	1995
2000	5975.	0.	623.	4290.	105.	1707.	62.	0.	12761.	2000
2005	9323.	0.	983.	7009.	105.	2656.	97.	0.	20173.	2005
2010	13156.	0.	1414.	10366.	105.	3770.	137.	2.	28950.	2010
2015	16706.	0.	1843.	13917.	105.	4800.	175.	31.	37577.	2015
2020	19974.	0.	2239.	17200.	105.	5744.	209.	51.	45522.	2020
2025	23444.	0.	2639.	20395.	105.	6746.	246.	73.	53648.	2025
2030	26187.	0.	2991.	23430.	105.	7529.	274.	100.	60611.	2030
2035	28124.	0.	3252.	25746.	105.	8068.	294.	129.	65718.	2035
2040	29738.	0.	3457.	27540.	105.	8502.	310.	185.	69836.	2040
2045	30395.	0.	3576.	28508.	105.	8673.	316.	243.	71815.	2045
2050	30395.	0.	3603.	28742.	105.	8673.	316.	257.	72090.	2050
2055	30395.	0.	3604.	28773.	105.	8673.	316.	289.	72155.	2055
2060	30395.	0.	3605.	28804.	105.	8673.	316.	320.	72218.	2060
2065	30395.	0.	3607.	28836.	105.	8673.	316.	348.	72279.	2065
2070	30395.	0.	3607.	28836.	105.	8673.	316.	353.	72284.	2070
2075	30395.	0.	3609.	28898.	105.	8673.	316.	403.	72399.	2075

TABLE 10.E.65. Case 2B - U Only Recycle - Stored Pu - Reference Treatment - Costs for Geologic Repository in Basalt - $ Millions at 0% Discount Rate

YEAR	SOLID HIGH LEVEL WASTE ANNUAL	SOLID HIGH LEVEL WASTE CUMULATIVE	HULLS AND ASSEMBLY HARDWARE WASTE ANNUAL	HULLS AND ASSEMBLY HARDWARE WASTE CUMULATIVE	TOTAL INTERMEDIATE LEVEL WASTE ANNUAL	TOTAL INTERMEDIATE LEVEL WASTE CUMULATIVE	TOTAL LOW LEVEL WASTE ANNUAL	TOTAL LOW LEVEL WASTE CUMULATIVE	TOTAL FOR ALL CLASSIFICATIONS ANNUAL	TOTAL FOR ALL CLASSIFICATIONS CUMULATIVE	YEAR
1985	0.00	0.00	12.13	12.13	74.48	74.48	10.89	10.89	97.49	97.49	1985
1990	68.73	194.34	21.02	108.15	129.00	653.89	18.86	97.05	237.61	1063.43	1990
1995	197.36	900.95	28.19	230.66	173.05	1415.88	25.30	206.97	423.90	2754.46	1995
2000	310.14	2113.31	38.44	392.12	235.98	2407.00	34.49	351.85	619.06	5264.27	2000
2005	422.91	3889.55	48.69	604.84	298.91	3712.76	43.69	542.72	814.21	8749.86	2005
2010	535.69	6229.68	48.69	848.31	298.91	5207.30	43.69	761.19	926.99	13046.48	2010
2015	535.69	8908.14	41.01	1073.84	251.71	6591.72	47.01	1004.41	875.42	17578.11	2015
2020	451.11	11389.24	43.57	1281.44	267.44	7866.01	49.31	1231.54	811.43	21768.22	2020
2025	479.30	13672.98	41.01	1501.84	251.71	9218.96	47.01	1459.95	819.03	25853.74	2025
2030	451.11	16097.69	30.75	1676.12	188.78	10288.74	37.81	1657.18	708.46	29719.73	2030
2035	338.33	18014.90	20.50	1799.14	125.86	11043.88	28.61	1808.42	513.30	32666.34	2035
2040	126.87	19170.87	20.50	1901.65	125.86	11673.16	49.04	2012.75	322.27	34758.44	2040
2045	126.87	19805.24	0.00	1944.48	0.00	11936.03	13.67	2105.86	140.54	35791.61	2045
2050	0.00	20070.24	0.00	1944.48	0.00	11936.03	0.00	2133.20	0.00	36083.94	2050
2055	0.00	20070.24	0.00	1944.48	0.00	11936.03	13.67	2174.21	13.67	36124.96	2055
2060	0.00	20070.24	0.00	1944.48	0.00	11936.03	13.67	2215.23	13.67	36165.97	2060
2065	0.00	20070.24	0.00	1944.48	0.00	11936.03	13.67	2256.24	13.67	36206.98	2065
2070	0.00	20070.24	0.00	1944.48	0.00	11936.03	0.00	2256.24	0.00	36206.98	2070
2075	0.00	20070.24	0.00	1944.48	0.00	11936.03	41.01	2338.26	41.01	36289.00	2075

TABLE 10.E.66. Case 2B - U Only Recycle - Stored Pu - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Basalt - $ Millions at 0% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP-MOX	TOTAL SYSTEM	YEAR
1985	462.	0.	15.	97.	105.	139.	5.	0.	823.	1985
1990	1672.	0.	153.	1063.	105.	509.	19.	0.	3521.	1990
1995	3326.	0.	357.	2754.	105.	994.	36.	0.	7572.	1995
2000	5868.	0.	623.	5264.	105.	1707.	62.	0.	13629.	2000
2005	9216.	0.	983.	8750.	105.	2656.	97.	0.	21807.	2005
2010	13049.	0.	1414.	13046.	105.	3770.	137.	2.	31523.	2010
2015	16599.	0.	1843.	17576.	105.	4800.	175.	31.	41132.	2015
2020	19867.	0.	2239.	21768.	105.	5744.	209.	51.	49984.	2020
2025	23337.	0.	2639.	25854.	105.	6746.	246.	73.	59000.	2025
2030	26080.	0.	2991.	29720.	105.	7524.	274.	100.	66794.	2030
2035	28017.	0.	3252.	32666.	105.	8068.	294.	129.	72532.	2035
2040	29572.	0.	3457.	34758.	105.	8502.	310.	185.	76890.	2040
2045	30186.	0.	3576.	35792.	105.	8673.	316.	243.	78890.	2045
2050	30186.	0.	3603.	36084.	105.	8673.	316.	257.	79224.	2050
2055	30186.	0.	3604.	36125.	105.	8673.	316.	289.	79298.	2055
2060	30186.	0.	3605.	36166.	105.	8673.	316.	320.	79371.	2060
2065	30186.	0.	3607.	36207.	105.	8673.	316.	348.	79442.	2065
2070	30186.	0.	3607.	36207.	105.	8673.	316.	353.	79446.	2070
2075	30186.	0.	3609.	36289.	105.	8673.	316.	403.	79581.	2075

TABLE 10.E.67. Case 2B - U Only Recycle - Stored Pu - Reference Treatment - System Spent Fuel Management Costs - $ Millions at 7% Discount Rate

YEAR	REACTOR TO ISFSB	ISFSB STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACK-AGING	ISFSB TO PACK-AGING	PACK-AGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOS-ITORY COST	TOTAL COST	YEAR
1980	0.	0.	121.	0.	0.	0.	0.	0.	0.	0.	0.	121.	1980
1985	0.	0.	278.	0.	0.	0.	0.	0.	80.	0.	0.	358.	1985
1990	0.	0.	391.	0.	0.	0.	0.	0.	233.	0.	0.	624.	1990
1995	0.	0.	499.	0.	0.	0.	0.	0.	371.	0.	0.	870.	1995
2000	0.	0.	611.	0.	0.	0.	0.	0.	516.	0.	0.	1127.	2000
2005	0.	0.	720.	0.	0.	0.	0.	0.	653.	0.	0.	1373.	2005
2010	0.	0.	797.	0.	0.	0.	0.	0.	766.	0.	0.	1563.	2010
2015	0.	0.	853.	0.	0.	0.	0.	0.	840.	0.	0.	1693.	2015
2020	0.	0.	895.	0.	0.	0.	0.	0.	888.	0.	0.	1783.	2020
2025	0.	0.	919.	0.	0.	0.	0.	0.	926.	0.	0.	1845.	2025
2030	0.	0.	933.	0.	0.	0.	0.	0.	947.	0.	0.	1880.	2030
2035	0.	0.	942.	0.	0.	0.	0.	0.	957.	0.	0.	1899.	2035
2040	0.	0.	947.	0.	0.	0.	0.	0.	963.	0.	0.	1910.	2040
2045	0.	0.	947.	0.	0.	0.	0.	0.	965.	0.	0.	1913.	2045
2050	0.	0.	947.	0.	0.	0.	0.	0.	965.	0.	0.	1913.	2050
2055	0.	0.	947.	0.	0.	0.	0.	0.	965.	0.	0.	1913.	2055
2060	0.	0.	947.	0.	0.	0.	0.	0.	965.	0.	0.	1913.	2060
2065	0.	0.	947.	0.	0.	0.	0.	0.	965.	0.	0.	1913.	2065
2070	0.	0.	947.	0.	0.	0.	0.	0.	965.	0.	0.	1913.	2070

TABLE 10.E.68. Case 2B - U Only Recycle - Stored Pu - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Salt - $ Millions at 7% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP-MOX	TOTAL SYSTEM	YEAR
1985	297.	0.	9.	30.	71.	89.	3.	0.	499.	1985
1990	830.	0.	74.	285.	71.	265.	10.	0.	1534.	1990
1995	1310.	0.	142.	575.	71.	427.	16.	0.	2541.	1995
2000	1814.	0.	206.	843.	71.	598.	22.	0.	3554.	2000
2005	2289.	0.	268.	1107.	71.	761.	28.	0.	4522.	2005
2010	2685.	0.	321.	1355.	71.	898.	33.	0.	5363.	2010
2015	2953.	0.	358.	1562.	71.	988.	36.	3.	5971.	2015
2020	3129.	0.	383.	1698.	71.	1047.	38.	4.	6370.	2020
2025	3263.	0.	401.	1793.	71.	1092.	40.	5.	6665.	2025
2030	3339.	0.	413.	1857.	71.	1116.	41.	6.	6843.	2030
2035	3377.	0.	419.	1890.	71.	1130.	41.	6.	6934.	2035
2040	3398.	0.	422.	1906.	71.	1137.	41.	7.	6983.	2040
2045	3405.	0.	423.	1913.	71.	1139.	42.	8.	7001.	2045
2050	3405.	0.	424.	1915.	71.	1139.	42.	8.	7003.	2050
2055	3405.	0.	424.	1915.	71.	1139.	42.	8.	7004.	2055
2060	3405.	0.	424.	1915.	71.	1139.	42.	8.	7004.	2060
2065	3405.	0.	424.	1915.	71.	1139.	42.	9.	7004.	2065
2070	3405.	0.	424.	1915.	71.	1139.	42.	9.	7004.	2070
2075	3405.	0.	424.	1915.	71.	1139.	42.	9.	7004.	2075

TABLE 10.E.69. Case 2B - U Only Recycle - Stored Pu - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Granite - $ Millions at 7% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP-MOX	TOTAL SYSTEM	YEAR
1985	297.	0.	9.	52.	71.	89.	3.	0.	520.	1985
1990	857.	0.	74.	472.	71.	263.	10.	0.	1748.	1990
1995	1385.	0.	142.	993.	71.	427.	16.	0.	3034.	1995
2000	1940.	0.	206.	1475.	71.	598.	22.	0.	4311.	2000
2005	2463.	0.	268.	1950.	71.	761.	28.	0.	5539.	2005
2010	2893.	0.	321.	2366.	71.	898.	33.	0.	6581.	2010
2015	3176.	0.	358.	2675.	71.	988.	36.	3.	7307.	2015
2020	3363.	0.	383.	2878.	71.	1047.	38.	4.	7784.	2020
2025	3505.	0.	401.	3022.	71.	1092.	40.	5.	8136.	2025
2030	3585.	0.	413.	3117.	71.	1118.	41.	6.	8350.	2030
2035	3626.	0.	419.	3169.	71.	1130.	41.	6.	8462.	2035
2040	3650.	0.	422.	3198	71.	1137.	41.	7.	8526.	2040
2045	3657.	0.	423.	3211.	71.	1139.	42.	8.	8552.	2045
2050	3657.	0.	424.	3214.	71.	1139.	42.	8.	8555.	2050
2055	3657.	0.	424.	3214.	71.	1139.	42.	8.	8555.	2055
2060	3657.	0.	424.	3214.	71.	1139.	42.	8.	8555.	2060
2065	3657.	0.	424.	3214.	71.	1139.	42.	9.	8555.	2065
2070	3657.	0.	424.	3214.	71.	1139.	42.	9.	8555.	2070
2075	3657.	0.	424.	3215.	71.	1139.	42.	9.	8556.	2075

TABLE 10.E.70. Case 2B - U Only Recycle - Stored Pu - Reference Treatment - Non-Spent Fuel Waste Management Costs for Repository in Shale - $ Millions at 7% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP-MOX	TOTAL SYSTEM	YEAR
1985	297.	0.	9.	43.	71.	89.	3.	0.	512.	1985
1990	884.	0.	74.	398.	71.	265.	10.	0.	1700.	1990
1995	1465.	0.	142.	906.	71.	427.	16.	0.	3026.	1995
2000	2674.	0.	206.	1374.	71.	598.	22.	0.	4344.	2000
2005	2648.	0.	268.	1839.	71.	761.	28.	0.	5614.	2005
2010	3121.	0.	321.	2251.	71.	898.	33.	0.	6695.	2010
2015	3433.	0.	358.	2563.	71.	988.	36.	3.	7452.	2015
2020	3637.	0.	383.	2769.	71.	1047.	38.	4.	7949.	2020
2025	3793.	0.	401.	2912.	71.	1092.	40.	5.	8314.	2025
2030	3882.	0.	413.	3009.	71.	1118.	41.	6.	8538.	2030
2035	3927.	0.	419.	3063.	71.	1130.	41.	6.	8656.	2035
2040	3953.	0.	422.	3092.	71.	1137.	41.	7.	8723.	2040
2045	3961.	0.	423.	3103.	71.	1139.	42.	8.	8747.	2045
2050	3961.	0.	424.	3106.	71.	1139.	42.	8.	8750.	2050
2055	3961.	0.	424.	3106.	71.	1139.	42.	8.	8750.	2055
2060	3961.	0.	424.	3106.	71.	1139.	42.	8.	8750.	2060
2065	3961.	0.	424.	3106.	71.	1139.	42.	9.	8750.	2065
2070	3961.	0.	424.	3106.	71.	1139.	42.	9.	8750.	2070
2075	3961.	0.	424.	3106.	71.	1139.	42.	9.	8751.	2075

TABLE 10.E.71. Case 2B - U Only Recycle - Stored Pu - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Basalt - $ Millions at 7% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPOR-TATION	R?POSITORY	INTERIM STURAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP-MOX	TOTAL SYSTEM	YEAR
1985	297.	0.	9.	57.	71.	89.	3.	0.	526.	1985
1990	870.	0.	74.	510.	71.	263.	10.	0.	1799.	1990
1995	1422.	0.	142.	1075.	71.	427.	16.	0.	3152.	1995
2000	2031.	0.	206.	1675.	71.	598.	22.	0.	4603.	2000
2005	2606.	0.	268.	2272.	71.	761.	28.	0.	6004.	2005
2010	3078.	0.	321.	2800.	71.	898.	33.	0.	7200.	2010
2015	3390.	0.	358.	3198.	71.	988.	36.	3.	8043.	2015
2020	3594.	0.	383.	3460.	71.	1067.	38.	4.	8597.	2020
2025	3750.	0.	401.	3643.	71.	1092.	40.	5.	9002.	2025
2030	3839.	0.	413.	3767.	71.	1118.	41.	6.	9253.	2030
2035	3884.	0.	419.	3835.	71.	1130.	41.	6.	9385.	2035
2040	3909.	0.	422.	3869.	71.	1137.	41.	7.	9457.	2040
2045	3917.	0.	423.	3882.	71.	1139.	42.	8.	9481.	2045
2050	3917.	0.	424.	3884.	71.	1139.	42.	8.	9484.	2050
2055	3917.	0.	424.	3884.	71.	1139.	42.	8.	9484.	2055
2060	3917.	0.	424.	3885.	71.	1139.	42.	8.	9485.	2060
2065	3917.	0.	424.	3885.	71.	1139.	42.	9.	9485.	2065
2070	3917.	0.	424.	3885.	71.	1139.	42.	9.	9485.	2070
2075	3917.	0.	424.	3885.	71.	1139.	42.	9.	9485.	2075

TABLE 10.E.72. Case 2B - U Only Recycle - Stored Pu - Reference Treatment - System Spent Fuel Management Costs - $ Millions at 10% Discount Rate

YEAR	REACTOR TO ISFSB	ISFSB STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACKAGING	ISFSB TO PACKAGING	PACKAGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOSITORY COST	TOTAL COST	YEAR
1980	0.	0.	118.	0.	0.	0.	0.	0.	0.	0.	0.	118.	1980
1985	0.	0.	251.	0.	0.	0.	0.	0.	67.	0.	0.	317.	1985
1990	0.	0.	339.	0.	0.	0.	0.	0.	180.	0.	0.	519.	1990
1995	0.	0.	404.	0.	0.	0.	0.	0.	269.	0.	0.	673.	1995
2000	0.	0.	466.	0.	0.	0.	0.	0.	350.	0.	0.	816.	2000
2005	0.	0.	520.	0.	0.	0.	0.	0.	417.	0.	0.	936.	2005
2010	0.	0.	553.	0.	0.	0.	0.	0.	463.	0.	0.	1017.	2010
2015	0.	0.	573.	0.	0.	0.	0.	0.	492.	0.	0.	1065.	2015
2020	0.	0.	587.	0.	0.	0.	0.	0.	508.	0.	0.	1095.	2020
2025	0.	0.	594.	0.	0.	0.	0.	0.	518.	0.	0.	1112.	2025
2030	0.	0.	597.	0.	0.	0.	0.	0.	523.	0.	0.	1121.	2030
2035	0.	0.	599.	0.	0.	0.	0.	0.	526.	0.	0.	1125.	2035
2040	0.	0.	600.	0.	0.	0.	0.	0.	527.	0.	0.	1127.	2040
2045	0.	0.	600.	0.	0.	0.	0.	0.	527.	0.	0.	1127.	2045
2050	0.	0.	600.	0.	0.	0.	0.	0.	527.	0.	0.	1127.	2050
2055	0.	0.	600.	0.	0.	0.	0.	0.	527.	0.	0.	1127.	2055
2060	0.	0.	600.	0.	0.	0.	0.	0.	527.	0.	0.	1127.	2060
2065	0.	0.	600.	0.	0.	0.	0.	0.	527.	0.	0.	1127.	2065
2070	0.	0.	600.	0.	0.	0.	0.	0.	527.	0.	0.	1127.	2070

TABLE 10.E.73. Case 2B - U Only Recycle - Stored Pu - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Salt - $ Millions at 10% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPOR-TATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP-MOX	TOTAL SYSTEM	YEAR
1985	249.	0.	7.	24.	60.	74.	3.	0.	417.	1985
1990	643.	0.	55.	212.	60.	204.	7.	0.	1181.	1990
1995	950.	0.	99.	398.	60.	308.	11.	0.	1827.	1995
2000	1232.	0.	135.	548.	60.	404.	15.	0.	2394.	2000
2005	1464.	0.	165.	677.	60.	483.	18.	0.	2866.	2005
2010	1633.	0.	187.	782.	60.	542.	20.	0.	3224.	2010
2015	1732.	0.	201.	859.	60.	575.	21.	1.	3450.	2015
2020	1789.	0.	209.	903.	60.	594.	22.	1.	3579.	2020
2025	1827.	0.	214.	930.	60.	607.	22.	2.	3662.	2025
2030	1845.	0.	217.	946.	60.	613.	22.	2.	3706.	2030
2035	1854.	0.	218.	953.	60.	616.	22.	2.	3725.	2035
2040	1858.	0.	219.	956.	60.	617.	23.	2.	3735.	2040
2045	1859.	0.	219.	957.	60.	618.	23.	2.	3738.	2045
2050	1859.	0.	219.	957.	60.	618.	23.	2.	3738.	2050
2055	1859.	0.	219.	957.	60.	618.	23.	2.	3738.	2055
2060	1859.	0.	219.	957.	60.	618.	23.	2.	3738.	2060
2065	1859.	0.	219.	957.	60.	618.	23.	2.	3738.	2065
2070	1859.	0.	219.	957.	60.	618.	23.	2.	3738.	2070
2075	1859.	0.	219.	957.	60.	618.	23.	2.	3738.	2075

TABLE 10.E.74 Case 2B - U Only Recycle - Stored Pu - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Granite - $ Millions at 10% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP-MOX	TOTAL SYSTEM	YEAR
1985	249.	0.	7.	41.	60.	74.	3.	0.	434.	1985
1990	662.	0.	55.	350.	60.	204.	7.	0.	1340.	1990
1995	1001.	0.	99.	686.	60.	308.	11.	0.	2165.	1995
2000	1311.	0.	135.	955.	60.	404.	15.	0.	2880.	2000
2005	1566.	0.	165.	1186.	60.	483.	18.	0.	3478.	2005
2010	1750.	0.	187.	1363.	60.	542.	20.	0.	3922.	2010
2015	1855.	0.	201.	1478.	60.	575.	21.	1.	4192.	2015
2020	1915.	0.	209.	1544.	60.	594.	22.	1.	4346.	2020
2025	1955.	0.	214.	1584.	60.	607.	22.	2.	4445.	2025
2030	1975.	0.	217.	1608.	60.	613.	22.	2.	4497.	2030
2035	1984.	0.	218.	1619.	60.	616.	22.	2.	4522.	2035
2040	1988.	0.	219.	1624.	60.	617.	23.	2.	4534.	2040
2045	1989.	0.	219.	1626.	60.	618.	23.	2.	4538.	2045
2050	1989.	0.	219.	1627.	60.	618.	23.	2.	4538.	2050
2055	1989.	0.	219.	1627.	60.	618.	23.	2.	4538.	2055
2060	1989.	0.	219.	1627.	60.	618.	23.	2.	4538.	2060
2065	1989.	0.	219.	1627.	60.	618.	23.	2.	4538.	2065
2070	1989.	0.	219.	1627.	60.	618.	23.	2.	4538.	2070
2075	1989.	0.	219.	1627.	60.	618.	23.	2.	4538.	2075

TABLE 10.E.75 Case 2B - U Only Recycle - Stored Pu - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Shale - $ Millions at 10% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP-MOX	TOTAL SYSTEM	YEAR
1985	249.	0.	7.	34.	60.	74.	3.	0.	427.	1985
1990	683.	0.	55.	296.	60.	204.	7.	0.	1305.	1990
1995	1055.	0.	99.	623.	60.	308.	11.	0.	2156.	1995
2000	1396.	0.	135.	884.	60.	404.	15.	0.	2893.	2000
2005	1676.	0.	165.	1111.	60.	483.	18.	0.	3512.	2005
2010	1877.	0.	187.	1286.	60.	542.	20.	0.	3973.	2010
2015	1993.	0.	201.	1402.	60.	575.	21.	1.	4253.	2015
2020	2059.	0.	209.	1468.	60.	594.	22.	1.	4414.	2020
2025	2103.	0.	214.	1509.	60.	607.	22.	2.	4517.	2025
2030	2125.	0.	217.	1533.	60.	613.	22.	2.	4572.	2030
2035	2134.	0.	218.	1544.	60.	616.	22.	2.	4597.	2035
2040	2139.	0.	219.	1549.	60.	617.	23.	2.	4610.	2040
2045	2141.	0.	219.	1551.	60.	618.	23.	2.	4614.	2045
2050	2141.	0.	219.	1552.	60.	618.	23.	2.	4614.	2050
2055	2141.	0.	219.	1552.	60.	618.	23.	2.	4614.	2055
2060	2141.	0.	219.	1552.	60.	618.	23.	2.	4614.	2060
2065	2141.	0.	219.	1552.	60.	618.	23.	2.	4614.	2065
2070	2141.	0.	219.	1552.	60.	618.	23.	2.	4614.	2070
2075	2141.	0.	219.	1552.	60.	618.	23.	2.	4614.	2075

TABLE 10.E.76 Case 2B - U Only Recycle - Stored Pu - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Basalt - $ Millions at 10% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP+MOX	TOTAL SYSTEM	YEAR
1985	249.	0.	7.	45.	60.	74.	3.	0.	438.	1985
1990	672.	0.	55.	379.	60.	204.	7.	0.	1378.	1990
1995	1025.	0.	99.	741.	60.	308.	11.	0.	2284.	1995
2000	1366.	0.	135.	1076.	60.	404.	15.	0.	3056.	2000
2005	1646.	0.	165.	1367.	60.	483.	18.	0.	3739.	2005
2010	1848.	0.	187.	1592.	60.	542.	20.	0.	4248.	2010
2015	1963.	0.	201.	1739.	60.	575.	21.	1.	4561.	2015
2020	2029.	0.	209.	1824.	60.	594.	22.	1.	4740.	2020
2025	2073.	0.	214.	1876.	60.	607.	22.	2.	4854.	2025
2030	2095.	0.	217.	1906.	60.	613.	22.	2.	4916.	2030
2035	2105.	0.	218.	1921.	60.	616.	22.	2.	4944.	2035
2040	2109.	0.	219.	1927.	60.	617.	23.	2.	4958.	2040
2045	2111.	0.	219.	1929.	60.	618.	23.	2.	4962.	2045
2050	2111.	0.	219.	1930.	60.	618.	23.	2.	4962.	2050
2055	2111.	0.	219.	1930.	60.	618.	23.	2.	4962.	2055
2060	2111.	0.	219.	1930.	60.	618.	23.	2.	4962.	2060
2065	2111.	0.	219.	1930.	60.	618.	23.	2.	4962.	2065
2070	2111.	0.	219.	1930.	60.	618.	23.	2.	4962.	2070
2075	2111.	0.	219.	1930.	60.	618.	23.	2.	4962.	2075

TABLE 10.E.77 Case 3A - U and Pu Recycle - Repository in Salt - 1985 - Reference Treatment - Unit Power Cost for TRU-Waste Management Including Spent Fuel Handling and Storage

	POWER GENERATION		UNDISCOUNTED AVERAGE		DISCOUNTED AVERAGE (7 PCT)		DISCOUNTED AVERAGE (10 PCT)		
	KWHR		MILLS/KWHR		MILLS/KWHR		MILLS/KWHR		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	1.76E+11	4.92E+11	.05	.02	.05	.02	.05	.02	1975
1980	3.44E+11	1.86E+12	.11	.07	.11	.07	.11	.06	1980
1985	6.82E+11	4.45E+12	.47	.26	.47	.22	.47	.21	1985
1990	1.11E+12	9.17E+12	.48	.39	.48	.34	.48	.31	1990
1995	1.67E+12	1.63E+13	.51	.43	.51	.38	.51	.35	1995
2000	2.32E+12	2.66E+13	.51	.45	.51	.40	.51	.37	2000
2005	2.40E+12	3.87E+13	.64	.48	.64	.43	.64	.39	2005
2010	2.31E+12	5.04E+13	.68	.52	.68	.45	.68	.41	2010
2015	2.10E+12	6.15E+13	.68	.55	.68	.47	.68	.42	2015
2020	1.82E+12	7.11E+13	.79	.58	.79	.48	.79	.43	2020
2025	1.37E+12	7.89E+13	.99	.61	.99	.48	.99	.43	2025
2030	9.23E+11	8.44E+13	1.15	.65	1.15	.49	1.15	.44	2030
2035	4.50E+11	8.76E+13	1.89	.68	1.89	.50	1.89	.44	2035
2040	2.67E+10	8.85E+13	24.70	.71	24.70	.50	24.70	.44	2040
2045	0.	8.85E+13	0.00	.73	0.00	.50	0.00	.44	2045
2050	0.	8.85E+13	0.00	.73	0.00	.50	0.00	.44	2050
2055	0.	8.85E+13	0.00	.73	0.00	.50	0.00	.44	2055
2060	0.	8.85E+13	0.00	.74	0.00	.50	0.00	.44	2060
2065	0.	8.85E+13	0.00	.74	0.00	.50	0.00	.44	2065
2070	0.	8.85E+13	0.00	.74	0.00	.50	0.00	.44	2070

TABLE 10.E.78 Case 3A - U and Pu Recycle - Repository in Granite - 1985 - Reference Treatment - Unit Power Cost for TRU-Waste Management Including Spent Fuel Handling and Storage

	POWER GENERATION		UNDISCOUNTED AVERAGE		DISCOUNTED AVERAGE (7 PCT)		DISCOUNTED AVERAGE (10 PCT)		
	KWHR		MILLS/KWHR		MILLS/KWHR		MILLS/KWHR		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	1.78E+11	4.92E+11	.05	.02	.05	.02	.05	.02	1975
1980	3.44E+11	1.86E+12	.11	.07	.11	.07	.11	.06	1980
1985	6.82E+11	4.45E+12	.52	.27	.52	.23	.52	.21	1985
1990	1.11E+12	9.17E+12	.60	.44	.60	.37	.60	.34	1990
1995	1.67E+12	1.63E+13	.60	.51	.60	.44	.60	.40	1995
2000	2.32E+12	2.66E+13	.61	.57	.61	.47	.61	.43	2000
2005	2.40E+12	3.87E+13	.75	.57	.75	.50	.75	.46	2005
2010	2.31E+12	5.04E+13	.97	.63	.97	.53	.97	.48	2010
2015	2.10E+12	6.15E+13	.98	.69	.98	.56	.98	.50	2015
2020	1.82E+12	7.11E+13	1.10	.74	1.10	.58	1.10	.51	2020
2025	1.37E+12	7.89E+13	1.41	.79	1.41	.59	1.41	.52	2025
2030	9.23E+11	8.44E+13	1.70	.84	1.70	.60	1.70	.52	2030
2035	4.50E+11	8.76E+13	2.47	.89	2.47	.61	2.47	.52	2035
2040	2.67E+10	8.85E+13	35.22	.93	35.22	.61	35.22	.52	2040
2045	0.	8.85E+13	0.00	.96	0.00	.61	0.00	.52	2045
2050	0.	8.85E+13	0.00	.97	0.00	.61	0.00	.52	2050
2055	0.	8.85E+13	0.00	.97	0.00	.61	0.00	.52	2055
2060	0.	8.85E+13	0.00	.97	0.00	.61	0.00	.52	2060
2065	0.	8.85E+13	0.00	.97	0.00	.61	0.00	.52	2065
2070	0.	8.85E+13	0.00	.97	0.00	.61	0.00	.52	2070

TABLE 10.E.79 Case 3A - U and Pu Recycle - Repository in Shale - 1985 - Reference Treatment - Unit Power Cost for TRU-Waste Management Including Spent Fuel Handling and Storage

	POWER GENERATION		UNDISCOUNTED AVERAGE		DISCOUNTED AVERAGE (7 PCT)		DISCOUNTED AVERAGE (10 PCT)		
	KWHR		MILLS/KWHR		MILLS/KWHR		MILLS/KWHR		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	1.78E+11	4.92E+11	.05	.02	.05	.02	.05	.02	1975
1980	3.44E+11	1.86E+12	.11	.07	.11	.07	.11	.06	1980
1985	6.82E+11	4.45E+12	.50	.26	.50	.22	.50	.21	1985
1990	1.11E+12	9.17E+12	.55	.43	.55	.37	.55	.34	1990
1995	1.67E+12	1.63E+13	.62	.50	.62	.43	.62	.40	1995
2000	2.32E+12	2.66E+13	.62	.54	.62	.47	.62	.43	2000
2005	2.40E+12	3.87E+13	.77	.58	.77	.50	.77	.46	2005
2010	2.31E+12	5.04E+13	.84	.63	.84	.53	.84	.48	2010
2015	2.10E+12	6.15E+13	.84	.67	.84	.55	.84	.49	2015
2020	1.82E+12	7.11E+13	.97	.70	.97	.57	.97	.50	2020
2025	1.37E+12	7.89E+13	1.22	.74	1.22	.58	1.22	.51	2025
2030	9.23E+11	8.44E+13	1.44	.78	1.44	.59	1.44	.51	2030
2035	4.50E+11	8.76E+13	2.08	.82	2.08	.59	2.08	.51	2035
2040	2.67E+10	8.85E+13	30.56	.86	30.56	.60	30.56	.52	2040
2045	0.	8.85E+13	0.00	.89	0.00	.60	0.00	.52	2045
2050	0.	8.85E+13	0.00	.89	0.00	.60	0.00	.52	2050
2055	0.	8.85E+13	0.00	.89	0.00	.60	0.00	.52	2055
2060	0.	8.85E+13	0.00	.89	0.00	.60	0.00	.52	2060
2065	0.	8.85E+13	0.00	.89	0.00	.60	0.00	.52	2065
2070	0.	8.85E+13	0.00	.89	0.00	.60	0.00	.52	2070

TABLE 10.E.80 Case 3A - U and Pu Recycle - Repository in Basalt - 1985 - Reference Treatment - Unit Power Cost for TRU-Waste Management Including Spent Fuel Handling and Storage

	POWER GENERATION		UNDISCOUNTED AVERAGE		DISCOUNTED AVERAGE (7 PCT)		DISCOUNTED AVERAGE (10 PCT)		
	KWHR		MILLS/KWHR		MILLS/KWHR		MILLS/KWHR		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	1.78E+11	4.92E+11	.05	.02	.05	.02	.05	.02	1975
1980	3.44E+11	1.86E+12	.11	.07	.11	.07	.11	.06	1980
1985	6.82E+11	4.45E+12	.53	.27	.53	.23	.53	.21	1985
1990	1.11E+12	5.17E+12	.60	.45	.60	.38	.60	.35	1990
1995	1.67E+12	1.63E+13	.67	.53	.67	.46	.67	.42	1995
2000	2.32E+12	2.66E+13	.68	.57	.68	.50	.68	.46	2000
2005	2.40E+12	3.87E+13	.85	.63	.85	.54	.85	.49	2005
2010	2.31E+12	5.04E+13	.93	.69	.93	.57	.93	.51	2010
2015	2.10E+12	6.15E+13	.93	.73	.93	.60	.93	.53	2015
2020	1.82E+12	7.11E+13	1.07	.77	1.07	.61	1.07	.54	2020
2025	1.37E+12	7.89E+13	1.35	.81	1.35	.63	1.35	.55	2025
2030	9.23E+11	8.44E+13	1.61	.86	1.61	.63	1.61	.55	2030
2035	4.50E+11	8.76E+13	2.33	.90	2.33	.64	2.33	.55	2035
2040	2.67E+10	8.85E+13	33.94	.94	33.94	.64	33.94	.55	2040
2045	0.	8.85E+13	0.00	.97	0.00	.65	0.00	.55	2045
2050	0.	8.85E+13	0.00	.98	0.00	.65	0.00	.55	2050
2055	0.	8.85E+13	0.00	.98	0.00	.65	0.00	.55	2055
2060	0.	8.85E+13	0.00	.98	0.00	.65	0.00	.55	2060
2065	0.	8.85E+13	0.00	.98	0.00	.65	0.00	.55	2065
2070	0.	8.85E+13	0.00	.98	0.00	.65	0.00	.55	2070

TABLE 10.E.81 Case 3A - U and Pu Recycle - Repository in Salt - 1985 - Reference Treatment - Unit Fuel Cost of TRU-Waste Management Including Spent Fuel Handling and Storage[a]

	THRUPUT		UNDISCOUNTED AVERAGE		DISCOUNTED AVERAGE (7 PCT)		DISCOUNTED AVERAGE (10 PCT)		
	KG DISCHARGED		DOLLARS/KG DISCHARGED		DOLLARS/KG DISCHARGED		DOLLARS/KG DISCHARGED		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	6.99E+05	1.78E+06	12.	5.	12.	5.	12.	5.	1975
1980	1.27E+06	6.93E+06	30.	19.	30.	18.	30.	17.	1980
1985	2.44E+06	1.63E+07	129.	70.	129.	60.	129.	56.	1985
1990	4.07E+06	3.37E+07	131.	107.	131.	92.	131.	85.	1990
1995	6.21E+06	6.02E+07	138.	116.	138.	102.	138.	95.	1995
2000	8.74E+06	9.86E+07	137.	122.	137.	109.	137.	101.	2000
2005	9.09E+06	1.44E+08	168.	129.	168.	115.	168.	106.	2005
2010	9.24E+06	1.90E+08	171.	139.	171.	121.	171.	111.	2010
2015	8.60E+06	2.35E+08	166.	145.	166.	124.	166.	113.	2015
2020	7.72E+06	2.75E+08	185.	149.	185.	126.	185.	114.	2020
2025	7.15E+06	3.14E+08	189.	156.	189.	128.	189.	115.	2025
2030	5.31E+06	3.43E+08	200.	159.	200.	129.	200.	116.	2030
2035	3.94E+06	3.66E+08	215.	162.	215.	130.	215.	116.	2035
2040	1.53E+06	3.79E+08	430.	166.	430.	130.	430.	116.	2040
2045	0.	3.79E+08	0.	171.	0.	131.	0.	116.	2045
2050	0.	3.79E+08	0.	171.	0.	131.	0.	116.	2050
2055	0.	3.79E+08	0.	171.	0.	131.	0.	116.	2055
2060	0.	3.79E+08	0.	172.	0.	131.	0.	116.	2060
2065	0.	3.79E+08	0.	172.	0.	131.	0.	116.	2065
2070	0.	3.79E+08	0.	172.	0.	131.	0.	116.	2070

a. Unit cost at time of reactor discharge.

TABLE 10.E.82 Case 3A - U and Pu Recycle - Repository in Granite - 1985 - Reference Treatment - Unit Fuel Cost of TRU-Waste Management Including Spent Fuel Handling and Storage[a]

	THRUPUT		UNDISCOUNTED AVERAGE		DISCOUNTED AVERAGE (7 PCT)		DISCOUNTED AVERAGE (10 PCT)		
	KG DISCHARGED		DOLLARS/KG DISCHARGED		DOLLARS/KG DISCHARGED		DOLLARS/KG DISCHARGED		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	6.99E+05	1.78E+06	12.	5.	12.	5.	12.	5.	1975
1980	1.27E+06	6.93E+06	30.	19.	30.	18.	30.	17.	1980
1985	2.48E+06	1.63E+07	143.	73.	143.	62.	143.	57.	1985
1990	4.07E+06	3.37E+07	163.	120.	163.	102.	163.	94.	1990
1995	6.21E+06	6.02E+07	162.	137.	162.	119.	162.	109.	1995
2000	8.74E+06	9.86E+07	161.	143.	161.	127.	161.	117.	2000
2005	9.09E+06	1.44E+08	199.	152.	199.	134.	199.	123.	2005
2010	9.24E+06	1.90E+08	243.	166.	243.	142.	243.	129.	2010
2015	8.60E+06	2.35E+08	239.	180.	239.	149.	239.	133.	2015
2020	7.72E+06	2.75E+08	260.	190.	260.	153.	260.	136.	2020
2025	7.15E+06	3.14E+08	270.	199.	270.	156.	270.	137.	2025
2030	5.31E+06	3.43E+08	295.	207.	295.	158.	295.	138.	2030
2035	3.96E+06	3.66E+08	280.	212.	280.	159.	280.	139.	2035
2040	1.53E+06	3.79E+08	613.	218.	613.	160.	613.	139.	2040
2045	0.	3.79E+08	0.	225.	0.	160.	0.	139.	2045
2050	0.	3.79E+08	0.	226.	0.	160.	0.	139.	2050
2055	0.	3.79E+08	0.	226.	0.	160.	0.	139.	2055
2060	0.	3.79E+08	0.	226.	0.	160.	0.	139.	2060
2065	0.	3.79E+08	0.	226.	0.	160.	0.	139.	2065
2070	0.	3.79E+08	0.	226.	0.	160.	0.	139.	2070

a. Unit cost at time of reactor discharge.

TABLE 10.E.83 Case 3A - U and Pu Recycle - Repository in Shale - 1985 - Reference Treatment - Unit Fuel Cost of TRU-Waste Management Including Spent Fuel Handling and Storage[a]

	THRUPUT		UNDISCOUNTED AVERAGE		DISCOUNTED AVERAGE (7 PCT)		DISCOUNTED AVERAGE (10 PCT)		
	KG DISCHARGED		DOLLARS/KG DISCHARGED		DOLLARS/KG DISCHARGED		DOLLARS/KG DISCHARGED		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	6.90E+05	1.78E+06	12.	5.	12.	5.	12.	5.	1975
1980	1.27E+06	6.93E+06	30.	19.	30.	18.	30.	17.	1980
1985	2.48E+06	1.63E+07	137.	72.	137.	61.	137.	57.	1985
1990	4.07E+06	3.37E+07	149.	117.	149.	99.	149.	91.	1990
1995	6.21E+06	6.02E+07	166.	137.	166.	118.	166.	108.	1995
2000	8.74E+06	9.86E+07	165.	145.	165.	127.	165.	117.	2000
2005	9.09E+06	1.44E+08	204.	155.	204.	135.	204.	124.	2005
2010	9.24E+06	1.90E+08	211.	168.	211.	143.	211.	129.	2010
2015	8.60E+06	2.35E+08	205.	175.	205.	147.	205.	133.	2015
2020	7.72E+06	2.75E+08	227.	181.	227.	150.	227.	134.	2020
2025	7.15E+06	3.14E+08	234.	187.	234.	152.	234.	136.	2025
2030	5.31E+06	3.43E+08	251.	192.	251.	154.	251.	136.	2030
2035	3.96E+06	3.66E+08	237.	197.	237.	155.	237.	137.	2035
2040	1.53E+06	3.79E+08	532.	201.	532.	155.	532.	137.	2040
2045	0.	3.79E+08	0.	207.	0.	156.	0.	137.	2045
2050	0.	3.79E+08	0.	208.	0.	156.	0.	137.	2050
2055	0.	3.79E+08	0.	208.	0.	156.	0.	137.	2055
2060	0.	3.79E+08	0.	208.	0.	156.	0.	137.	2060
2065	0.	3.79E+08	0.	208.	0.	156.	0.	137.	2065
2070	0.	3.79E+08	0.	208.	0.	156.	0.	137.	2070

a. Unit cost at time of reactor discharge.

TABLE 10.E.84 Case 3A - U and Pu Recycle - Repository in Basalt - 1985 - Reference Treatment - Unit Fuel Cost of TRU-Waste Management Including Spent Fuel Handling and Storage[a]

	THRUPUT		UNDISCOUNTED AVERAGE		DISCOUNTED AVERAGE (7 PCT)		DISCOUNTED AVERAGE (10 PCT)		
	KG DISCHARGED		DOLLARS/KG DISCHARGED		DOLLARS/KG DISCHARGED		DOLLARS/KG DISCHARGED		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	6.99E+05	1.78E+06	12.	5.	12.	5.	12.	5.	1975
1980	1.27E+06	6.93E+06	30.	19.	30.	18.	30.	17.	1980
1985	2.48E+06	1.63E+07	147.	73.	147.	62.	147.	58.	1985
1990	4.07E+06	3.37E+07	163.	124.	163.	104.	163.	96.	1990
1995	6.21E+06	6.02E+07	182.	145.	182.	124.	182.	118.	1995
2000	8.74E+06	9.86E+07	182.	155.	182.	135.	182.	124.	2000
2005	9.09E+06	1.44E+08	225.	168.	225.	145.	225.	132.	2005
2010	9.24E+06	1.90E+08	234.	182.	234.	154.	234.	139.	2010
2015	8.60E+06	2.35E+08	228.	191.	228.	159.	228.	142.	2015
2020	7.72E+06	2.75E+08	251.	198.	251.	162.	251.	144.	2020
2025	7.15E+06	3.14E+08	260.	205.	260.	165.	260.	146.	2025
2030	5.31E+06	3.43E+08	280.	212.	280.	167.	280.	146.	2030
2035	3.96E+06	3.66E+08	264.	215.	264.	168.	264.	147.	2035
2040	1.53E+06	3.79E+08	590.	220.	590.	168.	590.	147.	2040
2045	0.	3.79E+08	0.	227.	0.	169.	0.	147.	2045
2050	0.	3.79E+08	0.	228.	0.	169.	0.	147.	2050
2055	0.	3.79E+08	0.	228.	0.	169.	0.	147.	2055
2060	0.	3.79E+08	0.	229.	0.	169.	0.	147.	2060
2065	0.	3.79E+08	0.	229.	0.	169.	0.	147.	2065
2070	0.	3.79E+08	0.	229.	0.	169.	0.	147.	2070

a. Unit cost at time of reactor discharge.

TABLE 10.E.85 Case 3A - U and Pu Recycle - Repository in 1985 - Reference Treatment - Costs for TRU-Waste Transportation
$ Millions at 0% Discount Rate

YEAR	SOLID HIGH LEVEL WASTE ANNUAL	SOLID HIGH LEVEL WASTE CUMULATIVE	HULLS AND ASSEMBLY HARDWARE WASTE ANNUAL	HULLS AND ASSEMBLY HARDWARE WASTE CUMULATIVE	TOTAL INTERMEDIATE LEVEL WASTE ANNUAL	TOTAL INTERMEDIATE LEVEL WASTE CUMULATIVE	TOTAL LOW LEVEL WASTE ANNUAL	TOTAL LOW LEVEL WASTE CUMULATIVE	TOTAL FOR ALL CLASSIFICATIONS ANNUAL	TOTAL FOR ALL CLASSIFICATIONS CUMULATIVE	YEAR
1985	0.00	0.00	8.27	8.27	6.19	6.19	.46	.46	14.93	14.93	1985
1990	7.02	21.59	14.33	73.75	10.72	55.18	.90	4.40	32.97	154.93	1990
1995	11.33	76.09	19.23	157.30	14.38	117.68	1.27	9.83	46.22	360.90	1995
2000	17.81	145.71	26.22	267.40	19.61	200.06	1.73	17.16	65.37	630.33	2000
2005	24.29	247.71	33.21	412.47	24.84	308.98	2.23	26.94	84.56	995.70	2005
2010	30.76	382.00	33.21	578.50	24.84	432.80	2.34	38.51	91.15	1431.90	2010
2015	30.76	535.90	27.96	732.30	20.92	547.86	2.42	50.75	82.06	1866.82	2015
2020	25.90	678.37	29.71	873.87	22.23	653.77	2.36	61.99	80.21	2268.01	2020
2025	27.52	809.52	27.96	1024.18	20.92	766.22	2.17	73.31	78.58	2673.22	2025
2030	25.90	948.79	20.97	1143.02	13.69	853.14	1.62	82.29	64.19	3029.20	2030
2035	19.43	1058.88	13.98	1226.91	10.46	917.90	.96	88.13	44.83	3291.79	2035
2040	12.95	1136.56	13.98	1296.82	10.46	970.20	1.31	93.72	38.70	3497.30	2040
2045	12.95	1201.32	0.00	1326.03	0.00	992.05	.36	96.19	13.31	3615.58	2045
2050	0.00	1228.37	0.00	1326.03	0.00	992.05	0.00	96.91	0.00	3643.36	2050
2055	0.00	1228.37	0.00	1326.03	0.00	992.05	.36	97.99	.36	3644.44	2055
2060	0.00	1228.37	0.00	1326.03	0.00	992.05	.36	99.08	.36	3645.53	2060
2065	0.00	1228.37	0.00	1326.03	0.00	992.05	.36	100.16	.36	3646.61	2065
2070	0.00	1228.37	0.00	1326.03	0.00	992.05	0.00	100.16	0.00	3646.61	2070
2075	0.00	1228.37	0.00	1326.03	0.00	992.05	1.08	102.33	1.08	3648.78	2075

TABLE 10.E.86 Case 3A - U and Pu Recycle - Repository in 1985 - Reference Treatment - System Spent Fuel Management Costs
$ Millions at 0% Discount Rate

YEAR	REACTOR TO ISFSB	ISFSB STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACKAGING	ISFSB TO PACKAGING	PACKAGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOSITORY COST	TOTAL COST	YEAR
1980	0.	0.	132.	0.	0.	0.	0.	0.	0.	0.	0.	132.	1980
1985	0.	0.	367.	0.	0.	0.	0.	0.	124.	0.	0.	491.	1985
1990	0.	0.	603.	0.	0.	0.	0.	0.	447.	0.	0.	1051.	1990
1995	0.	0.	925.	0.	0.	0.	0.	0.	860.	0.	0.	1785.	1995
2000	0.	0.	1390.	0.	0.	0.	0.	0.	1465.	0.	0.	2855.	2000
2005	0.	0.	2026.	0.	0.	0.	0.	0.	2262.	0.	0.	4288.	2005
2010	0.	0.	2648.	0.	0.	0.	0.	0.	3174.	0.	0.	5822.	2010
2015	0.	0.	3283.	0.	0.	0.	0.	0.	4019.	0.	0.	7302.	2015
2020	0.	0.	3945.	0.	0.	0.	0.	0.	4796.	0.	0.	8741.	2020
2025	0.	0.	4496.	0.	0.	0.	0.	0.	5622.	0.	0.	10118.	2025
2030	0.	0.	4927.	0.	0.	0.	0.	0.	6275.	0.	0.	11201.	2030
2035	0.	0.	5301.	0.	0.	0.	0.	0.	6735.	0.	0.	12037.	2035
2040	0.	0.	5620.	0.	0.	0.	0.	0.	7119.	0.	0.	12739.	2040
2045	0.	0.	5662.	0.	0.	0.	0.	0.	7280.	0.	0.	12942.	2045
2050	0.	0.	5662.	0.	0.	0.	0.	0.	7280.	0.	0.	12942.	2050
2055	0.	0.	5662.	0.	0.	0.	0.	0.	7280.	0.	0.	12942.	2055
2060	0.	0.	5662.	0.	0.	0.	0.	0.	7280.	0.	0.	12942.	2060
2065	0.	0.	5662.	0.	0.	0.	0.	0.	7280.	0.	0.	12942.	2065
2070	0.	0.	5662.	0.	0.	0.	0.	0.	7280.	0.	0.	12942.	2070

TABLE 10.E.87 Case 3A - U and Pu Recycle - Repository in 1985 - Reference Treatment - Costs for Geologic Repository in Salt
$ Millions at 0% Discount Rate

YEAR	SOLID HIGH LEVEL WASTE ANNUAL	CUMULATIVE	HULLS AND ASSEMBLY HARDWARE WASTE ANNUAL	CUMULATIVE	TOTAL INTERMEDIATE LEVEL WASTE ANNUAL	CUMULATIVE	TOTAL LOW LEVEL WASTE ANNUAL	CUMULATIVE	TOTAL FOR ALL CLASSIFICATIONS ANNUAL	CUMULATIVE	YEAR
1985	0.00	0.00	6.62	6.62	43.25	43.25	5.75	5.75	55.62	55.62	1985
1990	39.85	122.59	11.07	59.00	74.92	385.57	11.19	54.72	137.42	621.89	1990
1995	92.67	460.42	15.38	125.84	100.50	822.31	15.84	122.09	224.40	1530.67	1995
2000	145.63	1029.70	20.97	213.92	137.05	1397.93	21.53	213.24	325.18	2854.80	2000
2005	198.59	1863.76	26.57	329.97	173.60	2156.28	27.66	334.74	426.41	4684.76	2005
2010	251.54	2962.60	26.57	462.80	173.60	3024.28	29.04	478.58	480.75	6928.26	2010
2015	251.54	4220.31	22.37	585.84	146.19	3828.32	30.05	630.71	450.15	9265.18	2015
2020	211.82	5385.35	23.77	699.10	155.33	4568.40	29.38	770.45	420.30	11423.29	2020
2025	225.06	6857.71	22.37	819.34	146.19	5354.16	27.02	911.11	420.65	13542.33	2025
2030	211.82	7879.25	16.78	914.42	109.64	5975.46	20.10	1022.75	358.35	15791.89	2030
2035	248.23	9166.75	11.19	981.53	73.09	6414.03	11.87	1095.24	344.39	17657.55	2035
2040	105.91	10040.53	11.19	1037.46	73.09	6779.50	16.22	1164.62	206.41	19022.10	2040
2045	105.91	10570.09	0.00	1060.82	0.00	6932.17	4.52	1195.41	110.43	19758.48	2045
2050	0.00	10756.07	0.00	1060.82	0.00	6932.17	0.00	1204.45	0.00	19953.51	2050
2055	0.00	10756.07	0.00	1060.82	0.00	6932.17	4.52	1218.01	4.52	19967.07	2055
2060	0.00	10756.07	0.00	1060.82	0.00	6932.17	4.52	1231.57	4.52	19980.63	2060
2065	0.00	10756.07	0.00	1060.82	0.00	6932.17	4.52	1245.13	4.52	19994.19	2065
2070	0.00	10756.07	0.00	1060.82	0.00	6932.17	0.00	1245.13	0.00	19994.19	2070
2075	0.00	10756.07	0.00	1060.82	0.00	6932.17	13.56	1272.26	13.56	20021.32	2075

TABLE 10.E.88 Case 3A - U and Pu Recycle - Repository in 1985 - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Salt
$ Millions at 0% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP+MOX	TOTAL SYSTEM	YEAR
1985	462.	21.	15.	56.	108.	0.	0.	0.	662.	1985
1990	1585.	85.	155.	622.	108.	0.	0.	0.	2555.	1990
1995	3033.	181.	361.	1531.	108.	0.	0.	0.	5214.	1995
2000	5216.	327.	630.	2855.	108.	0.	0.	0.	9137.	2000
2005	8093.	524.	996.	4685.	108.	0.	0.	0.	14406.	2005
2010	11385.	766.	1432.	6928.	108.	0.	0.	2.	20621.	2010
2015	14435.	1008.	1867.	9265.	108.	0.	0.	31.	26714.	2015
2020	17242.	1226.	2268.	11423.	108.	0.	0.	51.	32319.	2020
2025	20223.	1446.	2673.	13542.	108.	0.	0.	73.	38066.	2025
2030	22645.	1603.	3029.	15792.	108.	0.	0.	100.	43277.	2030
2035	24383.	1679.	3292.	17656.	108.	0.	0.	129.	47248.	2035
2040	25818.	1685.	3497.	19022.	108.	0.	0.	185.	50316.	2040
2045	26398.	1685.	3616.	19758.	108.	0.	0.	243.	51807.	2045
2050	26398.	1685.	3643.	19954.	108.	0.	0.	257.	52044.	2050
2055	26398.	1685.	3644.	19967.	108.	0.	0.	289.	52091.	2055
2060	26398.	1685.	3646.	19981.	108.	0.	0.	320.	52136.	2060
2065	26398.	1685.	3647.	19994.	108.	0.	0.	348.	52180.	2065
2070	26398.	1685.	3647.	19998.	108.	0.	0.	353.	52184.	2070
2075	26398.	1685.	3649.	20021.	108.	0.	0.	403.	52264.	2075

TABLE 10.E.89 Case 3A - U and Pu Recycle - Repository in 1985 - Reference Treatment - Costs for Geologic Repository in Granite
$ Millions at 0% Discount Rate

	SOLID HIGH LEVEL WASTE		HULLS AND ASSEMBLY HARDWARE WASTE		TOTAL INTERMEDIATE LEVEL WASTE		TOTAL LOW LEVEL WASTE		TOTAL FOR ALL CLASSIFICATIONS		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1985	0.00	0.00	11.31	11.31	69.73	69.73	9.52	9.52	90.56	90.56	1985
1990	84.71	197.20	19.58	100.78	120.79	621.62	18.52	90.56	243.60	1010.25	1990
1995	136.82	855.31	26.27	214.93	162.03	1325.72	26.22	202.07	351.34	2598.04	1995
2000	215.00	1695.77	35.82	365.39	220.95	2253.73	35.63	352.93	507.41	4667.81	2000
2005	293.18	2927.13	45.38	563.61	279.87	3476.34	45.78	554.01	664.21	7521.04	2005
2010	660.20	4838.25	45.38	790.48	279.87	4875.72	48.07	792.07	1033.52	11296.51	2010
2015	660.20	8139.26	38.21	1000.64	235.68	6171.98	49.73	1043.86	983.83	16355.74	2015
2020	555.96	11197.05	40.60	1194.08	250.41	7365.13	48.63	1275.14	895.60	21031.34	2020
2025	590.71	14011.60	38.21	1399.46	235.68	8631.93	44.72	1507.94	909.33	25550.94	2025
2030	555.96	16999.89	28.66	1561.86	176.76	9633.59	33.27	1692.71	794.65	29888.05	2030
2035	416.97	19362.72	19.11	1676.49	117.84	10340.64	19.65	1812.68	573.57	33192.53	2035
2040	277.98	21030.60	19.11	1772.01	117.84	10929.85	26.84	1927.51	441.77	35659.98	2040
2045	156.36	22298.88	0.00	1811.92	0.00	11175.98	7.48	1978.46	163.85	37265.25	2045
2050	0.00	22620.48	0.00	1811.92	0.00	11175.98	0.00	1993.43	0.00	37601.81	2050
2055	0.00	22620.48	0.00	1811.92	0.00	11175.98	7.48	2015.87	7.48	37624.26	2055
2060	0.00	22620.48	0.00	1811.92	0.00	11175.98	7.48	2038.32	7.48	37646.70	2060
2065	0.00	22620.48	0.00	1811.92	0.00	11175.98	7.48	2060.76	7.48	37669.15	2065
2070	0.00	22620.48	0.00	1811.92	0.00	11175.98	0.00	2060.76	0.00	37669.15	2070
2075	0.00	22620.48	0.00	1811.92	0.00	11175.98	22.44	2105.65	22.44	37714.04	2075

TABLE 10.E.90. Case 3A - U and Pu Recycle - Repository in 1985 - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Granite - $ Millions at 0% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP+MOX	TOTAL SYSTEM	YEAR
1985	462.	21.	15.	91.	108.	0.	0.	0.	696.	1985
1990	1643.	85.	155.	1010.	108.	0.	0.	0.	3001.	1990
1995	3222.	181.	361.	2598.	108.	0.	0.	0.	6470.	1995
2000	5533.	327.	630.	4668.	108.	0.	0.	0.	11269.	2000
2005	8582.	524.	996.	7521.	108.	0.	0.	0.	17732.	2005
2010	12139.	766.	1432.	11297.	108.	0.	0.	2.	25743.	2010
2015	15690.	1008.	1867.	16356.	108.	0.	0.	31.	35059.	2015
2020	18957.	1226.	2268.	21031.	108.	0.	0.	51.	43642.	2020
2025	22427.	1446.	2673.	25551.	108.	0.	0.	73.	52279.	2025
2030	25170.	1603.	3029.	29888.	108.	0.	0.	100.	59899.	2030
2035	27107.	1679.	3292.	33193.	108.	0.	0.	129.	65508.	2035
2040	28721.	1685.	3497.	35660.	108.	0.	0.	185.	69856.	2040
2045	29395.	1685.	3616.	37265.	108.	0.	0.	243.	72311.	2045
2050	29395.	1685.	3643.	37602.	108.	0.	0.	257.	72690.	2050
2055	29395.	1685.	3644.	37624.	108.	0.	0.	289.	72746.	2055
2060	29395.	1685.	3646.	37647.	108.	0.	0.	320.	72800.	2060
2065	29395.	1685.	3647.	37669.	108.	0.	0.	348.	72852.	2065
2070	29395.	1685.	3647.	37669.	108.	0.	0.	353.	72857.	2070
2075	29395.	1685.	3649.	37714.	108.	0.	0.	403.	72954.	2075

TABLE 10.E.91. Case 3A - U and Pu Recycle - Repository in 1985 - Reference Treatment - Costs for Geologic Repository in Shale - $ Millions at 0% Discount Rate

YEAR	SOLID HIGH LEVEL WASTE ANNUAL	SOLID HIGH LEVEL WASTE CUMULATIVE	HULLS AND ASSEMBLY HARDWARE WASTE ANNUAL	HULLS AND ASSEMBLY HARDWARE WASTE CUMULATIVE	TOTAL INTERMEDIATE LEVEL WASTE ANNUAL	TOTAL INTERMEDIATE LEVEL WASTE CUMULATIVE	TOTAL LOW LEVEL WASTE ANNUAL	TOTAL LOW LEVEL WASTE CUMULATIVE	TOTAL FOR ALL CLASSIFICATIONS ANNUAL	TOTAL FOR ALL CLASSIFICATIONS CUMULATIVE	YEAR
1985	0.00	0.00	8.55	8.55	57.36	57.36	8.81	8.81	74.71	74.71	1985
1990	55.20	169.83	14.81	76.23	99.35	511.30	17.13	83.78	186.49	841.14	1990
1995	158.50	932.15	19.87	162.58	133.28	1090.49	24.25	186.92	335.90	2372.09	1995
2000	249.08	1905.81	27.10	276.38	181.74	1853.75	32.96	326.47	490.88	4362.41	2000
2005	339.65	3332.34	34.32	426.31	230.20	2859.38	42.35	512.48	646.52	7130.52	2005
2010	430.22	5211.74	34.32	597.92	230.20	4010.41	44.47	732.69	739.22	10552.76	2010
2015	430.22	7362.86	28.90	756.89	193.86	5076.62	46.00	965.60	698.99	14161.96	2015
2020	362.29	9355.47	30.71	903.21	205.97	6058.02	44.98	1179.53	643.96	17496.23	2020
2025	384.94	11189.59	28.90	1058.56	193.86	7099.99	41.37	1394.89	649.07	20743.03	2025
2030	362.29	13136.92	21.68	1181.40	145.39	7923.88	30.78	1565.80	560.14	23808.00	2030
2035	271.72	15016.31	14.45	1268.10	96.93	8505.45	18.18	1676.78	401.28	26466.65	2035
2040	181.15	16103.20	14.45	1340.36	96.93	8990.09	24.83	1783.00	317.35	28216.65	2040
2045	181.15	17008.93	0.00	1370.54	0.00	9192.54	6.92	1830.13	188.07	29402.15	2045
2050	0.00	17380.26	0.00	1370.54	0.00	9192.54	0.00	1843.97	0.00	29787.32	2050
2055	0.00	17380.26	0.00	1370.54	0.00	9192.54	6.92	1864.73	6.92	29808.08	2055
2060	0.00	17380.26	0.00	1370.54	0.00	9192.54	6.92	1885.49	6.92	29828.84	2060
2065	0.00	17380.26	0.00	1370.54	0.00	9192.54	6.92	1906.26	6.92	29849.60	2065
2070	0.00	17380.26	0.00	1370.54	0.00	9192.54	0.00	1906.26	0.00	29849.60	2070
2075	0.00	17380.26	0.00	1370.54	0.00	9192.54	20.76	1947.78	20.76	29891.12	2075

TABLE 10.E.92. Case 3A - U and Pu Recycle - Repository in 1985 - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Shale - $ Millions at 0% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP+MOX	TOTAL SYSTEM	YEAR
1985	462.	21.	15.	75.	108.	0.	0.	0.	681.	1985
1990	1698.	85.	155.	841.	108.	0.	0.	0.	2887.	1990
1995	3433.	181.	361.	2372.	108.	0.	0.	0.	6455.	1995
2000	5975.	327.	630.	4362.	108.	0.	0.	0.	11403.	2000
2005	9323.	524.	996.	7131.	108.	0.	0.	0.	18082.	2005
2010	13156.	766.	1432.	10553.	108.	0.	0.	2.	26017.	2010
2015	16706.	1008.	1867.	14162.	108.	0.	0.	31.	33883.	2015
2020	19974.	1226.	2268.	17496.	108.	0.	0.	51.	41124.	2020
2025	23444.	1446.	2673.	20743.	108.	0.	0.	73.	48488.	2025
2030	26187.	1603.	3029.	23808.	108.	0.	0.	100.	54835.	2030
2035	28187.	1679.	3292.	26467.	108.	0.	0.	129.	59861.	2035
2040	29801.	1685.	3497.	28217.	108.	0.	0.	185.	63492.	2040
2045	30475.	1685.	3616.	29402.	108.	0.	0.	243.	65528.	2045
2050	30475.	1685.	3643.	29787.	108.	0.	0.	257.	65955.	2050
2055	30475.	1685.	3644.	29808.	108.	0.	0.	289.	66009.	2055
2060	30475.	1685.	3646.	29829.	108.	0.	0.	320.	66062.	2060
2065	30475.	1685.	3647.	29850.	108.	0.	0.	348.	66112.	2065
2070	30475.	1685.	3647.	29850.	108.	0.	0.	353.	66117.	2070
2075	30475.	1685.	3649.	29891.	108.	0.	0.	403.	66211.	2075

TABLE 10.E.93. Case 3A - U and Pu Recycle - Repository in 1985 - Reference Treatment - Costs for Geologic Repository in Basalt - $ Millions at 0% Discount Rate

YEAR	SOLID HIGH LEVEL WASTE ANNUAL	SOLID HIGH LEVEL WASTE CUMULATIVE	HULLS AND ASSEMBLY HARDWARE WASTE ANNUAL	HULLS AND ASSEMBLY HARDWARE WASTE CUMULATIVE	TOTAL INTERMEDIATE LEVEL WASTE ANNUAL	TOTAL INTERMEDIATE LEVEL WASTE CUMULATIVE	TOTAL LOW LEVEL WASTE ANNUAL	TOTAL LOW LEVEL WASTE CUMULATIVE	TOTAL FOR ALL CLASSIFICATIONS ANNUAL	TOTAL FOR ALL CLASSIFICATIONS CUMULATIVE	YEAR
1985	0.00	0.00	12.13	12.13	76.33	76.33	11.35	11.35	99.80	99.80	1985
1990	68.87	194.71	21.02	108.15	132.21	680.39	22.07	107.94	244.16	1091.19	1990
1995	197.74	989.19	28.19	230.66	177.35	1451.06	31.25	240.84	434.53	2911.75	1995
2000	310.73	2203.87	38.44	392.12	241.84	2466.80	42.47	420.65	633.49	5483.43	2000
2005	423.73	3983.51	48.69	604.84	306.33	3805.00	54.56	660.32	833.32	9053.67	2005
2010	536.72	6328.13	48.69	848.31	306.33	5336.67	57.29	944.05	949.04	13457.16	2010
2015	536.72	9011.72	41.01	1073.84	257.97	6755.49	59.28	1244.15	894.97	18085.21	2015
2020	451.97	11497.57	43.57	1281.44	274.09	8061.44	57.96	1519.81	827.59	22360.27	2020
2025	480.22	13785.69	41.01	1501.84	257.97	9448.01	53.30	1797.29	832.50	26532.84	2025
2030	451.97	16215.05	30.75	1676.12	193.47	10544.37	39.66	2017.52	715.86	30453.05	2030
2035	338.98	18135.94	20.50	1799.14	128.98	11318.26	23.42	2160.50	511.89	33413.84	2035
2040	225.99	19491.86	20.50	1901.65	128.98	11963.18	31.99	2297.36	407.46	35654.05	2040
2045	225.99	20621.79	0.00	1944.48	0.00	12232.58	8.92	2358.10	234.90	37156.95	2045
2050	0.00	21085.03	0.00	1944.48	0.00	12232.58	0.00	2375.93	0.00	37638.02	2050
2055	0.00	21085.03	0.00	1944.48	0.00	12232.58	8.92	2402.69	8.92	37664.78	2055
2060	0.00	21085.03	0.00	1944.48	0.00	12232.58	8.92	2429.44	8.92	37691.53	2060
2065	0.00	21085.03	0.00	1944.48	0.00	12232.58	8.92	2456.19	8.92	37718.28	2065
2070	0.00	21085.03	0.00	1944.46	0.00	12232.58	0.00	2456.19	0.00	37718.28	2070
2075	0.00	21085.03	0.00	1944.48	0.00	12232.58	26.75	2509.70	26.75	37771.79	2075

TABLE 10.E.94 - Case 3A - U and Pu Recycle - Repository in 1985 - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Basalt - $ Millions at 0% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP+MOX	TOTAL SYSTEM	YEAR
1985	462.	21.	15.	100.	108.	0.	0.	0.	706.	1985
1990	1672.	85.	155.	1091.	108.	0.	0.	0.	3111.	1990
1995	3356.	181.	361.	2912.	108.	0.	0.	0.	6918.	1995
2000	5898.	327.	630.	5483.	108.	0.	0.	0.	12447.	2000
2005	9246.	524.	996.	9054.	108.	0.	0.	0.	19928.	2005
2010	13079.	766.	1432.	13457.	108.	0.	0.	2.	28844.	2010
2015	16630.	1008.	1867.	18085.	108.	0.	0.	31.	37729.	2015
2020	19897.	1226.	2268.	22360.	108.	0.	0.	51.	45911.	2020
2025	23367.	1446.	2673.	26533.	108.	0.	0.	73.	54201.	2025
2030	26111.	1603.	3029.	30453.	108.	0.	0.	100.	61404.	2030
2035	28047.	1679.	3292.	33414.	108.	0.	0.	129.	66669.	2035
2040	29661.	1685.	3497.	35654.	108.	0.	0.	185.	70790.	2040
2045	30335.	1685.	3616.	37157.	108.	0.	0.	243.	73143.	2045
2050	30335.	1685.	3643.	37638.	108.	0.	0.	257.	73666.	2050
2055	30335.	1685.	3644.	37665.	108.	0.	0.	289.	73726.	2055
2060	30335.	1685.	3646.	37692.	108.	0.	0.	320.	73785.	2060
2065	30335.	1685.	3647.	37718.	108.	0.	0.	348.	73841.	2065
2070	30335.	1685.	3647.	37718.	108.	0.	0.	353.	73846.	2070
2075	30335.	1685.	3649.	37772.	108.	0.	0.	403.	73952.	2075

TABLE 10.E.95. Case 3A - U and Pu Recycle - Repository in 1985 - Reference Treatment - System Spent Fuel Management Costs - $ Millions at 7% Discount Rate

YEAR	REACTOR TO ISFSR	ISFSR STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACK-AGING	ISFSR TO PACK-AGING	PACK-AGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOS-ITORY COST	TOTAL COST	YEAR
1980	0.	0.	121.	0.	0.	0.	0.	0.	0.	0.	0.	121.	1980
1985	0.	0.	278.	0.	0.	0.	0.	0.	80.	0.	0.	358.	1985
1990	0.	0.	391.	0.	0.	0.	0.	0.	233.	0.	0.	622.	1990
1995	0.	0.	499.	0.	0.	0.	0.	0.	371.	0.	0.	870.	1995
2000	0.	0.	611.	0.	0.	0.	0.	0.	516.	0.	0.	1127.	2000
2005	0.	0.	720.	0.	0.	0.	0.	0.	653.	0.	0.	1373.	2005
2010	0.	0.	797.	0.	0.	0.	0.	0.	766.	0.	0.	1563.	2010
2015	0.	0.	853.	0.	0.	0.	0.	0.	840.	0.	0.	1693.	2015
2020	0.	0.	895.	0.	0.	0.	0.	0.	888.	0.	0.	1783.	2020
2025	0.	0.	919.	0.	0.	0.	0.	0.	926.	0.	0.	1845.	2025
2030	0.	0.	933.	0.	0.	0.	0.	0.	947.	0.	0.	1880.	2030
2035	0.	0.	942.	0.	0.	0.	0.	0.	957.	0.	0.	1899.	2035
2040	0.	0.	947.	0.	0.	0.	0.	0.	963.	0.	0.	1910.	2040
2045	0.	0.	947.	0.	0.	0.	0.	0.	965.	0.	0.	1913.	2045
2050	0.	0.	947.	0.	0.	0.	0.	0.	965.	0.	0.	1913.	2050
2055	0.	0.	947.	0.	0.	0.	0.	0.	965.	0.	0.	1913.	2055
2060	0.	0.	947.	0.	0.	0.	0.	0.	965.	0.	0.	1913.	2060
2065	0.	0.	947.	0.	0.	0.	0.	0.	965.	0.	0.	1913.	2065
2070	0.	0.	947.	0.	0.	0.	0.	0.	965.	0.	0.	1913.	2070

TABLE 10.E.96. Case 3A - U and Pu Recycle - Repository in 1985 - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Salt - $ Millions at 7% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP+MOX	TOTAL SYSTEM	YEAR
1985	297.	13.	9.	32.	73.	0.	0.	0.	424.	1985
1990	830.	43.	75.	299.	73.	0.	0.	0.	1319.	1990
1995	1314.	76.	144.	604.	73.	0.	0.	0.	2210.	1995
2000	1838.	111.	209.	921.	73.	0.	0.	0.	3151.	2000
2005	2331.	144.	271.	1234.	73.	0.	0.	0.	4054.	2005
2010	2737.	174.	325.	1510.	73.	0.	0.	0.	4819.	2010
2015	3005.	195.	363.	1715.	73.	0.	0.	3.	5354.	2015
2020	3181.	209.	388.	1850.	73.	0.	0.	4.	5705.	2020
2025	3315.	219.	406.	1945.	73.	0.	0.	5.	5983.	2025
2030	3393.	224.	418.	2018.	73.	0.	0.	6.	6131.	2030
2035	3433.	226.	424.	2061.	73.	0.	0.	6.	6223.	2035
2040	3456.	226.	427.	2083.	73.	0.	0.	7.	6273.	2040
2045	3464.	226.	429.	2092.	73.	0.	0.	8.	6291.	2045
2050	3464.	226.	429.	2094.	73.	0.	0.	8.	6293.	2050
2055	3464.	226.	429.	2094.	73.	0.	0.	8.	6293.	2055
2060	3464.	226.	429.	2094.	73.	0.	0.	8.	6293.	2060
2065	3464.	226.	429.	2094.	73.	0.	0.	9.	6294.	2065
2070	3464.	226.	429.	2094.	73.	0.	0.	9.	6294.	2070
2075	3464.	226.	429.	2094.	73.	0.	0.	9.	6294.	2075

TABLE 10.E.97. Case 3A - U and Pu Recycle - Repository in 1985 - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Granite - $ Millions at 7% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP+MOX	TOTAL SYSTEM	YEAR
1985	297.	13.	9.	53.	73.	0.	0.	0.	445.	1985
1990	857.	43.	75.	484.	73.	0.	0.	0.	1532.	1990
1995	1385.	76.	144.	1019.	73.	0.	0.	0.	2697.	1995
2000	1940.	111.	209.	1514.	73.	0.	0.	0.	3847.	2000
2005	2463.	144.	271.	2003.	73.	0.	0.	0.	4955.	2005
2010	2900.	174.	325.	2463.	73.	0.	0.	0.	5935.	2010
2015	3212.	195.	363.	2907.	73.	0.	0.	3.	6753.	2015
2020	3416.	209.	388.	3200.	73.	0.	0.	4.	7290.	2020
2025	3573.	219.	406.	3402.	73.	0.	0.	5.	7677.	2025
2030	3661.	224.	418.	3541.	73.	0.	0.	6.	7923.	2030
2035	3706.	226.	424.	3617.	73.	0.	0.	6.	8052.	2035
2040	3732.	226.	427.	3658.	73.	0.	0.	7.	8123.	2040
2045	3740.	226.	429.	3677.	73.	0.	0.	8.	8152.	2045
2050	3740.	226.	429.	3680.	73.	0.	0.	8.	8156.	2050
2055	3740.	226.	429.	3680.	73.	0.	0.	8.	8156.	2055
2060	3740.	226.	429.	3680.	73.	0.	0.	8.	8156.	2060
2065	3740.	226.	429.	3680.	73.	0.	0.	9.	8156.	2065
2070	3740.	226.	429.	3680.	73.	0.	0.	9.	8156.	2070
2075	3740.	226.	429.	3680.	73.	0.	0.	9.	8157.	2075

TABLE 10.E.98. Case 3A - U and Pu Recycle - Repository in 1985 - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Shale - $ Millions at 7% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPOR-TATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP-MOX	TOTAL SYSTEM	YEAR
1985	297.	13.	9.	43.	73.	0.	0.	0.	435.	1985
1990	889.	43.	75.	404.	73.	0.	0.	0.	1478.	1990
1995	1465.	76.	144.	920.	73.	0.	0.	0.	2677.	1995
2000	2074.	111.	209.	1396.	73.	0.	0.	0.	3863.	2000
2005	2648.	144.	271.	1870.	73.	0.	0.	0.	5007.	2005
2010	3121.	174.	325.	2290.	73.	0.	0.	0.	5984.	2010
2015	3433.	195.	363.	2607.	73.	0.	0.	3.	6674.	2015
2020	3637.	209.	388.	2816.	73.	0.	0.	4.	7127.	2020
2025	3793.	219.	406.	2962.	73.	0.	0.	5.	7458.	2025
2030	3862.	224.	418.	3060.	73.	0.	0.	6.	7662.	2030
2035	3928.	226.	424.	3121.	73.	0.	0.	6.	7777.	2035
2040	3954.	226.	427.	3149.	73.	0.	0.	7.	7837.	2040
2045	3962.	226.	429.	3163.	73.	0.	0.	8.	7861.	2045
2050	3962.	226.	429.	3167.	73.	0.	0.	8.	7865.	2050
2055	3962.	226.	429.	3167.	73.	0.	0.	8.	7865.	2055
2060	3962.	226.	429.	3167.	73.	0.	0.	8.	7865.	2060
2065	3962.	226.	429.	3167.	73.	0.	0.	9.	7865.	2065
2070	3962.	226.	429.	3167.	73.	0.	0.	9.	7865.	2070
2075	3962.	226.	429.	3167.	73.	0.	0.	9.	7866.	2075

TABLE 10.E.99. Case 3A - U and Pu Recycle - Repository in 1985 - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Basalt - $ Millions at 7% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP+MOX	TOTAL SYSTEM	YEAR
1985	297.	13.	9.	58.	73.	0.	0.	0.	450.	1985
1990	870.	43.	75.	523.	73.	0.	0.	0.	1584.	1990
1995	1432.	76.	144.	1132.	73.	0.	0.	0.	2856.	1995
2000	2041.	111.	209.	1747.	73.	0.	0.	0.	4181.	2000
2005	2616.	144.	271.	2359.	73.	0.	0.	0.	5463.	2005
2010	3088.	174.	325.	2899.	73.	0.	0.	0.	6560.	2010
2015	3400.	195.	363.	3306.	73.	0.	0.	3.	7340.	2015
2020	3605.	209.	388.	3573.	73.	0.	0.	4.	7852.	2020
2025	3761.	219.	406.	3760.	73.	0.	0.	5.	8224.	2
2030	3849.	224.	418.	3886.	73.	0.	0.	6.	8456.	2030
2035	3894.	226.	424.	3954.	73.	0.	0.	6.	8577.	2035
2040	3920.	226.	427.	3991.	73.	0.	0.	7.	8644.	2040
2045	3928.	226.	429.	4008.	73.	0.	0.	8.	8672.	2045
2050	3928.	226.	429.	4013.	73.	0.	0.	8.	8677.	2050
2055	3928.	226.	429.	4013.	73.	0.	0.	8.	8677.	2055
2060	3928.	226.	429.	4013.	73.	0.	0.	8.	8677.	2060
2065	3928.	226.	429.	4013.	73.	0.	0.	9.	8678.	2065
2070	3928.	226.	429.	4013.	73.	0.	0.	9.	8678.	2070
2075	3928.	226.	429.	4013.	73.	0.	0.	9.	8678.	2075

TABLE 10.E.100. Case 3A - U and Pu Recycle - Repository in 1985 - Reference Treatment - System Spent Fuel Management Costs - $ Millions at 10% Discount Rate

YEAR	REACTOR TO ISFSB	ISFSB STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACKAGING	ISFSB TO PACKAGING	PACKAGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOSITORY COST	TOTAL COST	YEAR
1980	0.	0.	118.	0.	0.	0.	0.	0.	0.	0.	0.	118.	1980
1985	0.	0.	251.	0.	0.	0.	0.	0.	67.	0.	0.	317.	1985
1990	0.	0.	338.	0.	0.	0.	0.	0.	180.	0.	0.	518.	1990
1995	0.	0.	408.	0.	0.	0.	0.	0.	269.	0.	0.	673.	1995
2000	0.	0.	466.	0.	0.	0.	0.	0.	350.	0.	0.	816.	2000
2005	0.	0.	520.	0.	0.	0.	0.	0.	417.	0.	0.	936.	2005
2010	0.	0.	552.	0.	0.	0.	0.	0.	465.	0.	0.	1017.	2010
2015	0.	0.	573.	0.	0.	0.	0.	0.	492.	0.	0.	1065.	2015
2020	0.	0.	587.	0.	0.	0.	0.	0.	508.	0.	0.	1095.	2020
2025	0.	0.	594.	0.	0.	0.	0.	0.	518.	0.	0.	1112.	2025
2030	0.	0.	597.	0.	0.	0.	0.	0.	523.	0.	0.	1121.	2030
2035	0.	0.	599.	0.	0.	0.	0.	0.	526.	0.	0.	1125.	2035
2040	0.	0.	600.	0.	0.	0.	0.	0.	527.	0.	0.	1127.	2040
2045	0.	0.	600.	0.	0.	0.	0.	0.	527.	0.	0.	1127.	2045
2050	0.	0.	600.	0.	0.	0.	0.	0.	527.	0.	0.	1127.	2050
2055	0.	0.	600.	0.	0.	0.	0.	0.	527.	0.	0.	1127.	2055
2060	0.	0.	600.	0.	0.	0.	0.	0.	527.	0.	0.	1127.	2060
2065	0.	0.	600.	0.	0.	0.	0.	0.	527.	0.	0.	1127.	2065
2070	0.	0.	600.	0.	0.	0.	0.	0.	527.	0.	0.	1127.	2070

TABLE 10.E.101. Case 3A - U and Pu Recycle - Repository in 1985 - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Salt - $ Millions at 10% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP-MOX	TOTAL SYSTEM	YEAR
1985	249.	11.	7.	26.	62.	0.	0.	0.	355.	1985
1990	643.	33.	56.	222.	62.	0.	0.	0.	1015.	1990
1995	953.	54.	100.	418.	62.	0.	0.	0.	1587.	1995
2000	1246.	73.	136.	595.	62.	0.	0.	0.	2113.	2000
2005	1487.	90.	167.	748.	62.	0.	0.	0.	2553.	2005
2010	1660.	103.	190.	865.	62.	0.	0.	0.	2879.	2010
2015	1759.	111.	204.	941.	62.	0.	0.	1.	3077.	2015
2020	1816.	115.	212.	985.	62.	0.	0.	1.	3191.	2020
2025	1853.	118.	217.	1012.	62.	0.	0.	2.	3263.	2025
2030	1873.	119.	220.	1030.	62.	0.	0.	2.	3305.	2030
2035	1881.	119.	221.	1039.	62.	0.	0.	2.	3325.	2035
2040	1886.	119.	222.	1043.	62.	0.	0.	2.	3334.	2040
2045	1887.	119.	222.	1044.	62.	0.	0.	2.	3337.	2045
2050	1887.	119.	222.	1045.	62.	0.	0.	2.	3337.	2050
2055	1887.	119.	222.	1045.	62.	0.	0.	2.	3337.	2055
2060	1887.	119.	222.	1045.	62.	0.	0.	2.	3337.	2060
2065	1887.	119.	222.	1045.	62.	0.	0.	2.	3337.	2065
2070	1887.	119.	222.	1045.	62.	0.	0.	2.	3337.	2070
2075	1887.	119.	222.	1045.	62.	0.	0.	2.	3337.	2075

TABLE 10.E.102. Case 3A - U and Pu Recycle - Repository in 1985 - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Granite - $ Millions at 10% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP-MOX	TOTAL SYSTEM	YEAR
1985	249.	11.	7.	42.	62.	0.	0.	0.	371.	1985
1990	662.	33.	56.	359.	62.	0.	0.	0.	1172.	1990
1995	1001.	54.	100.	703.	62.	0.	0.	0.	1920.	1995
2000	1311.	73.	136.	980.	62.	0.	0.	0.	2564.	2000
2005	1566.	90.	167.	1219.	62.	0.	0.	0.	3104.	2005
2010	1753.	103.	190.	1413.	62.	0.	0.	0.	3520.	2010
2015	1868.	111.	204.	1578.	62.	0.	0.	1.	3824.	2015
2020	1934.	115.	212.	1673.	62.	0.	0.	1.	3997.	2020
2025	1978.	118.	217.	1730.	62.	0.	0.	2.	4107.	2025
2030	2000.	119.	220.	1764.	62.	0.	0.	2.	4167.	2030
2035	2010.	119.	221.	1780.	62.	0.	0.	2.	4195.	2035
2040	2015.	119.	222.	1788.	62.	0.	0.	2.	4208.	2040
2045	2016.	119.	222.	1791.	62.	0.	0.	2.	4213.	2045
2050	2016.	119.	222.	1791.	62.	0.	0.	2.	4213.	2050
2055	2016.	119.	222.	1791.	62.	0.	0.	2.	4213.	2055
2060	2016.	119.	222.	1791.	62.	0.	0.	2.	4213.	2060
2065	2016.	119.	222.	1791.	62.	0.	0.	2.	4213.	2065
2070	2016.	119.	222.	1791.	62.	0.	0.	2.	4213.	2070
2075	2016.	119.	222.	1791.	62.	0.	0.	2.	4213.	2075

TABLE 10.E.103. Case 3A - U and Pu Recycle - Repository in 1985 - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Shale - $ Millions at 10% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP-MOX	TOTAL SYSTEM	YEAR
1985	249.	11.	7.	35.	62.	0.	0.	0.	364.	1985
1990	683.	33.	56.	300.	62.	0.	0.	0.	1133.	1990
1995	1055.	54.	100.	632.	62.	0.	0.	0.	1903.	1995
2000	1396.	73.	136.	898.	62.	0.	0.	0.	2566.	2000
2005	1676.	90.	167.	1129.	62.	0.	0.	0.	3124.	2005
2010	1877.	103.	190.	1308.	62.	0.	0.	0.	3540.	2010
2015	1993.	111.	204.	1426.	62.	0.	0.	1.	3796.	2015
2020	2059.	115.	212.	1493.	62.	0.	0.	1.	3942.	2020
2025	2103.	118.	217.	1534.	62.	0.	0.	2.	4036.	2025
2030	2125.	119.	220.	1558.	62.	0.	0.	2.	4086.	2030
2035	2135.	119.	221.	1571.	62.	0.	0.	2.	4111.	2035
2040	2140.	119.	222.	1577.	62.	0.	0.	2.	4122.	2040
2045	2141.	119.	222.	1579.	62.	0.	0.	2.	4126.	2045
2050	2141.	119.	222.	1579.	62.	0.	0.	2.	4126.	2050
2055	2141.	119.	222.	1579.	62.	0.	0.	2.	4126.	2055
2060	2141.	119.	222.	1579.	62.	0.	0.	2.	4126.	2060
2065	2141.	119.	222.	1579.	62.	0.	0.	2.	4126.	2065
2070	2141.	119.	222.	1579.	62.	0.	0.	2.	4126.	2070
2075	2141.	119.	222.	1579.	62.	0.	0.	2.	4126.	2075

TABLE 10.E.104. Case 3A - U and Pu Recycle - Repository in 1985 - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Basalt - $ Millions at 10% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP+MOX	TOTAL SYSTEM	YEAR
1985	249.	11.	7.	47.	62.	0.	0.	0.	375.	1985
1990	672.	33.	56.	389.	62.	0.	0.	0.	1212.	1990
1995	1031.	54.	100.	779.	62.	0.	0.	0.	2026.	1995
2000	1373.	73.	136.	1122.	62.	0.	0.	0.	2767.	2000
2005	1653.	90.	167.	1421.	62.	0.	0.	0.	3392.	2005
2010	1854.	103.	190.	1651.	62.	0.	0.	0.	3859.	2010
2015	1970.	111.	204.	1801.	62.	0.	0.	1.	4148.	2015
2020	2036.	115.	212.	1888.	62.	0.	0.	1.	4314.	2020
2025	2080.	118.	217.	1940.	62.	0.	0.	2.	4419.	2025
2030	2102.	119.	220.	1971.	62.	0.	0.	2.	4476.	2030
2035	2111.	119.	221.	1986.	62.	0.	0.	2.	4502.	2035
2040	2116.	119.	222.	1993.	62.	0.	0.	2.	4514.	2040
2045	2117.	119.	222.	1996.	62.	0.	0.	2.	4519.	2045
2050	2117.	119.	222.	1996.	62.	0.	0.	2.	4520.	2050
2055	2117.	119.	222.	1996.	62.	0.	0.	2.	4520.	2055
2060	2117.	119.	222.	1996.	62.	0.	0.	2.	4520.	2060
2065	2117.	119.	222.	1996.	62.	0.	0.	2.	4520.	2065
2070	2117.	119.	222.	1996.	62.	0.	0.	2.	4520.	2070
2075	2117.	119.	222.	1996.	62.	0.	0.	2.	4520.	2075

TABLE 10.E.105. Case 3B - U and Pu Recycle - Repository in Salt-2000 - Reference Treatment - Unit Power Cost for TRU Waste Management Including Spent Fuel Handling and Storage

	POWER GENERATION		UNDISCOUNTED AVERAGE		DISCOUNTED AVERAGE (7 PCT)		DISCOUNTED AVERAGE (10 PCT)		
	KWHR		MILLS/KWHR		MILLS/KWHR		MILLS/KWHR		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	1.78E+11	4.92E+11	.05	.02	.05	.02	.05	.02	1975
1980	3.44E+11	1.86E+12	.11	.07	.11	.07	.11	.06	1980
1985	6.82E+11	4.45E+12	.40	.24	.40	.20	.40	.19	1985
1990	1.11E+12	9.17E+12	.41	.35	.41	.30	.41	.28	1990
1995	1.67E+12	1.63E+13	.43	.37	.43	.33	.43	.31	1995
2000	2.32E+12	2.66E+13	.53	.39	.53	.35	.53	.33	2000
2005	2.40E+12	3.87E+13	.69	.45	.69	.39	.69	.36	2005
2010	2.31E+12	5.04E+13	.77	.52	.77	.42	.77	.38	2010
2015	2.10E+12	6.15E+13	.80	.57	.80	.45	.80	.40	2015
2020	1.82E+12	7.11E+13	.79	.61	.79	.46	.79	.41	2020
2025	1.37E+12	7.89E+13	.99	.64	.99	.47	.99	.41	2025
2030	9.23E+11	8.44E+13	1.15	.67	1.15	.48	1.15	.41	2030
2035	4.50E+11	8.76E+13	1.89	.70	1.89	.48	1.89	.42	2035
2040	2.67E+10	8.85E+13	24.70	.73	24.70	.49	24.70	.42	2040
2045	0.	8.85E+13	0.00	.75	0.00	.49	0.00	.42	2045
2050	0.	8.85E+13	0.00	.76	0.00	.49	0.00	.42	2050
2055	0.	8.85E+13	0.00	.76	0.00	.49	0.00	.42	2055
2060	0.	8.85E+13	0.00	.76	0.00	.49	0.00	.42	2060
2065	0.	8.85E+13	0.00	.76	0.00	.49	0.00	.42	2065
2070	0.	8.85E+13	0.00	.76	0.00	.49	0.00	.42	2070

TABLE 10.E.106. Case 3B - U and Pu Recycle - Repository in Granite-2000 - Reference Treatment - Unit Power Cost for TRU Waste Management Including Spent Fuel Handling and Storage

	POWER GENERATION		UNDISCOUNTED AVERAGE		DISCOUNTED AVERAGE (7 PCT)		DISCOUNTED AVERAGE (10 PCT)		
	KWHR		MILLS/KWHR		MILLS/KWHR		MILLS/KWHR		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	1.78E+11	4.92E+11	.05	.02	.05	.02	.05	.02	1975
1980	3.44E+11	1.86E+12	.11	.07	.11	.07	.11	.06	1980
1985	6.82E+11	4.45E+12	.40	.24	.40	.20	.40	.19	1985
1990	1.11E+12	9.17E+12	.41	.35	.41	.30	.41	.28	1990
1995	1.67E+12	1.63E+13	.43	.37	.43	.33	.43	.31	1995
2000	2.32E+12	2.66E+13	.62	.40	.62	.36	.62	.33	2000
2005	2.40E+12	3.87E+13	.82	.49	.82	.41	.82	.37	2005
2010	2.31E+12	5.04E+13	1.07	.59	1.07	.46	1.07	.41	2010
2015	2.10E+12	6.15E+13	1.13	.68	1.13	.50	1.13	.43	2015
2020	1.82E+12	7.11E+13	1.10	.75	1.10	.53	1.10	.45	2020
2025	1.37E+12	7.89E+13	1.41	.80	1.41	.55	1.41	.46	2025
2030	9.23E+11	8.40E+13	1.70	.86	1.70	.56	1.70	.46	2030
2035	4.50E+11	8.76E+13	2.47	.90	2.47	.56	2.47	.46	2035
2040	2.67E+10	8.85E+13	35.22	.98	35.22	.57	35.22	.46	2040
2045	0.	8.85E+13	0.00	.98	0.00	.57	0.00	.46	2045
2050	0.	8.85E+13	0.00	.98	0.00	.57	0.00	.46	2050
2055	0.	8.85E+13	0.00	.98	0.00	.57	0.00	.46	2055
2060	0.	8.85E+13	0.00	.98	0.00	.57	0.00	.46	2060
2065	0.	8.85E+13	0.00	.98	0.00	.57	0.00	.46	2065
2070	0.	8.85E+13	0.00	.98	0.00	.57	0.00	.46	2070

TABLE 10.E.107. Case 3B - U and Pu Recycle - Repository in Shale-2000 - Reference Treatment - Unit Power Cost for TRU Waste Management Including Spent Fuel Handling and Storage

	POWER GENERATION KWHR		UNDISCOUNTED AVERAGE MILLS/KWHR		DISCOUNTED AVERAGE (7 PCT) MILLS/KWHR		DISCOUNTED AVERAGE (10 PCT) MILLS/KWHR		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	1.78E+11	4.92E+11	.05	.02	.05	.02	.05	.02	1975
1980	3.44E+11	1.86E+12	.11	.07	.11	.07	.11	.06	1980
[illegible]	6.82E+11	4.45E+12	.40	.24	.40	.20	.40	.19	1985
1990	1.11E+12	9.17E+12	.41	.35	.41	.30	.41	.28	1990
1995	1.67E+12	1.63E+13	.43	.37	.43	.33	.43	.31	1995
2000	2.32E+12	2.66E+13	.63	.40	.63	.36	.63	.33	2000
2005	2.40E+12	3.87E+13	.83	.50	.83	.41	.83	.37	2005
2010	2.31E+12	5.04E+13	.93	.59	.93	.46	.93	.41	2010
2015	2.10E+12	6.15E+13	.97	.65	.97	.49	.97	.43	2015
2020	1.82E+12	7.11E+13	.97	.70	.97	.51	.97	.44	2020
2025	1.37E+12	7.89E+13	1.22	.74	1.22	.53	1.22	.45	2025
2030	9.23E+11	8.44E+13	1.44	.78	1.44	.53	1.44	.45	2030
2035	4.50E+11	8.76E+13	2.08	.82	2.08	.54	2.08	.45	2035
2040	2.67E+10	8.85E+13	30.56	.86	30.56	.54	30.56	.45	2040
2045	0.	8.85E+13	0.00	.89	0.00	.55	0.00	.45	2045
2050	0.	8.85E+13	0.00	.89	0.00	.55	0.00	.45	2050
2055	0.	8.85E+13	0.00	.89	0.00	.55	0.00	.45	2055
2060	0.	8.85E+13	0.00	.89	0.00	.55	0.00	.45	2060
2065	0.	8.85E+13	0.00	.89	0.00	.55	0.00	.45	2065
2070	0.	8.85E+13	0.00	.89	0.00	.55	0.00	.45	2070

TABLE 10.E.108. Case 3B - U and Pu Recycle - Repository in Basalt-2000 - Reference Treatment - Unit Power Cost for TRU Waste Management Including Spent Fuel Handling and Storage

	POWER GENERATION		UNDISCOUNTED AVERAGE		DISCOUNTED AVERAGE (7 PCT)		DISCOUNTED AVERAGE (10 PCT)		
	KWHR		MILLS/KWHR		MILLS/KWHR		MILLS/KWHR		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	1.78E+11	4.92E+11	.05	.02	.05	.02	.05	.02	1975
1980	3.44E+11	1.86E+12	.11	.07	.11	.07	.11	.06	1980
1985	6.82E+11	4.45E+12	.40	.24	.40	.20	.40	.19	1985
1990	1.11E+12	9.17E+12	.41	.35	.41	.30	.41	.28	1990
1995	1.67E+12	1.63E+13	.43	.37	.43	.33	.43	.31	1995
2000	2.32E+12	2.66E+13	.70	.41	.70	.36	.70	.33	2000
2005	2.40E+12	3.87E+13	.92	.53	.92	.43	.92	.38	2005
2010	2.31E+12	5.04E+13	1.04	.63	1.04	.48	1.04	.42	2010
2015	2.10E+12	6.15E+13	1.09	.71	1.09	.52	1.09	.45	2015
2020	1.82E+12	7.11E+13	1.07	.77	1.07	.55	1.07	.46	2020
2025	1.37E+12	7.89E+13	1.35	.82	1.35	.56	1.35	.47	2025
2030	9.23E+11	8.44E+13	1.61	.86	1.61	.57	1.61	.47	2030
2035	4.50E+11	8.76E+13	2.33	.90	2.33	.58	2.33	.47	2035
2040	2.67E+10	8.85E+13	33.94	.95	33.94	.58	33.94	.48	2040
2045	0.	8.85E+13	0.00	.97	0.00	.58	0.00	.48	2045
2050	0.	8.85E+13	0.00	.98	0.00	.58	0.00	.48	2050
2055	0.	8.85E+13	0.00	.98	0.00	.58	0.00	.48	2055
2060	0.	8.85E+13	0.00	.98	0.00	.58	0.00	.48	2060
2065	0.	8.85E+13	0.00	.98	0.00	.58	0.00	.48	2065
2070	0.	8.85E+13	0.00	.98	0.00	.58	0.00	.48	2070

TABLE 10.E.109. Case 3B - U and Pu Recycle - Repository in Salt-2000 - Reference Treatment - Unit Fuel Cost for TRU Waste Management Including Spent Fuel Handling and Storage[(a)]

	THRUPUT		UNDISCOUNTED AVERAGE		DISCOUNTED AVERAGE (7 PCT)		DISCOUNTED AVERAGE (10 PCT)		
	KG DISCHARGED		DOLLARS/KG DISCHARGED		DOLLARS/KG DISCHARGED		DOLLARS/KG DISCHARGED		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	6.99E+05	1.78E+06	12.	5.	12.	5.	12.	5.	1975
1980	1.27E+06	6.93E+06	30.	19.	30.	18.	30.	17.	1980
1985	2.48E+06	1.63E+07	111.	64.	111.	55.	111.	52.	1985
1990	4.07E+06	3.37E+07	112.	94.	112.	81.	112.	76.	1990
1995	6.21E+06	6.02E+07	115.	101.	115.	90.	115.	84.	1995
2000	8.74E+06	9.86E+07	140.	106.	140.	95.	140.	89.	2000
2005	9.09E+06	1.44E+08	181.	122.	181.	105.	181.	96.	2005
2010	9.24E+06	1.90E+08	192.	138.	192.	114.	192.	103.	2010
2015	8.60E+06	2.35E+08	195.	148.	195.	119.	195.	106.	2015
2020	7.72E+06	2.75E+08	185.	156.	185.	123.	185.	108.	2020
2025	7.19E+06	3.14E+08	189.	160.	189.	125.	189.	109.	2025
2030	5.31E+06	3.43E+08	200.	165.	200.	126.	200.	110.	2030
2035	3.96E+06	3.66E+08	215.	167.	215.	127.	215.	110.	2035
2040	1.53E+06	3.79E+08	430.	171.	430.	127.	430.	111.	2040
2045	0.	3.79E+08	0.	176.	0.	128.	0.	111.	2045
2050	0.	3.79E+08	0.	177.	0.	128.	0.	111.	2050
2055	0.	3.79E+08	0.	177.	0.	128.	0.	111.	2055
2060	0.	3.79E+08	0.	177.	0.	128.	0.	111.	2060
2065	0.	3.79E+08	0.	177.	0.	128.	0.	111.	2065
2070	0.	3.79E+08	0.	177.	0.	128.	0.	111.	2070

a. Unit cost at time of reactor discharge.

TABLE 10.E.110. Case 3B - U and Pu Recycle - Repository in Granite-2000 - Reference Treatment - Unit Fuel Cost for TRU Waste Management Including Spent Fuel Handling and Storage[a]

	THRUPUT		UNDISCOUNTED AVERAGE		DISCOUNTED AVERAGE (7 PCT)		DISCOUNTED AVERAGE (10 PCT)		
	KG DISCHARGED		DOLLARS/KG DISCHARGED		DOLLARS/KG DISCHARGED		DOLLARS/KG DISCHARGED		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1978	6.90E+05	1.78E+06	12.	5.	12.	5.	12.	5.	1978
1980	1.27E+06	6.93E+06	30.	19.	30.	18.	30.	17.	1980
1985	2.48E+06	1.63E+07	111.	64.	111.	55.	111.	52.	1985
1990	4.07E+06	3.37E+07	112.	94.	112.	81.	112.	76.	1990
1995	6.21E+06	6.02E+07	115.	101.	115.	90.	115.	84.	1995
2000	8.74E+06	9.86E+07	165.	108.	165.	96.	165.	90.	2000
2005	9.09E+06	1.44E+08	216.	132.	216.	111.	216.	101.	2005
2010	9.24E+06	1.90E+08	269.	157.	269.	124.	269.	109.	2010
2015	8.60E+06	2.35E+08	277.	178.	277.	134.	277.	116.	2015
2020	7.72E+06	2.75E+08	260.	194.	260.	140.	260.	120.	2020
2025	7.15E+06	3.14E+08	270.	202.	270.	144.	270.	121.	2025
2030	5.31E+06	3.43E+08	295.	210.	295.	146.	295.	122.	2030
2035	3.96E+06	3.66E+08	280.	215.	280.	147.	280.	123.	2035
2040	1.53E+06	3.79E+08	613.	221.	613.	148.	613.	123.	2040
2045	0.	3.79E+08	0.	228.	0.	149.	0.	123.	2045
2050	0.	3.79E+08	0.	229.	0.	149.	0.	123.	2050
2055	0.	3.79E+08	0.	229.	0.	149.	0.	123.	2055
2060	0.	3.79E+08	0.	229.	0.	149.	0.	123.	2060
2065	0.	3.79E+08	0.	229.	0.	149.	0.	123.	2065
2070	0.	3.79E+08	0.	229.	0.	149.	0.	123.	2070

a. Unit Cost at time of reactor discharge.

TABLE 10.E.111. Case 3B - U and Pu Recycle - Repository in Shale-2000 - Reference Treatment - Unit Fuel Cost for TRU Waste Management Including Spent Fuel Handling and Storage[(a)]

	THRUPUT		UNDISCOUNTED AVERAGE		DISCOUNTED AVERAGE (7 PCT)		DISCOUNTED AVERAGE (10 PCT)		
	KG DISCHARGED		DOLLARS/KG DISCHARGED		DOLLARS/KG DISCHARGED		DOLLARS/KG DISCHARGED		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	6.99E+05	1.78E+06	12.	5.	12.	5.	12.	5.	1975
1980	1.27E+06	6.93E+06	30.	19.	30.	18.	30.	17.	1980
1985	2.48E+06	1.63E+07	111.	64.	111.	55.	111.	52.	1985
1990	4.07E+06	3.37E+07	112.	94.	112.	81.	112.	76.	1990
1995	6.21E+06	6.02E+07	115.	101.	115.	90.	115.	84.	1995
2000	8.74E+06	9.86E+07	169.	109.	169.	97.	169.	90.	2000
2005	9.09E+06	1.44E+08	218.	13[illegible].	218.	111.	218.	101.	2005
2010	9.24E+06	1.90E+08	232.	156.	232.	124.	232.	110.	2010
2015	8.60E+06	2.35E+08	237.	171.	237.	131.	237.	114.	2015
2020	7.73E+06	2.75E+08	227.	182.	227.	136.	227.	117.	2020
2025	7.15E+06	3.14E+08	234.	187.	234.	139.	234.	119.	2025
2030	5.31E+06	3.43E+08	251.	193.	251.	140.	251.	120.	2030
2035	3.96E+06	3.66E+08	237.	197.	237.	141.	237.	120.	2035
2040	1.53E+06	3.79E+08	532.	201.	532.	142.	532.	120.	2040
2045	0.	3.79E+08	0.	207.	0.	142.	0.	120.	2045
2050	0.	3.79E+08	0.	208.	0.	143.	0.	120.	2050
2055	0.	3.79E+08	0.	209.	0.	143.	0.	120.	2055
2060	0.	3.79E+08	0.	209.	0.	143.	0.	120.	2060
2065	0.	3.79E+08	0.	209.	0.	143.	0.	120.	2065
2070	0.	3.79E+08	0.	209.	0.	143.	0.	120.	2070

a. Unit cost at time of reactor discharge.

TABLE 10.E.112. Case 3B - U and Pu Recycle - Repository in Basalt-2000 - Reference Treatment - Unit Fuel Cost for TRU Waste Management Including Spent Fuel Handling and Storage[a]

	THRUPUT KG DISCHARGED		UNDISCOUNTED AVERAGE DOLLARS/KG DISCHARGED		DISCOUNTED AVERAGE (7 PCT) DOLLARS/KG DISCHARGED		DISCOUNTED AVERAGE (10 PCT) DOLLARS/KG DISCHARGED		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	6.99E+05	1.78E+06	12.	5.	12.	5.	12.	5.	1975
1980	1.27E+06	6.93E+06	30.	19.	30.	18.	30.	17.	1980
1985	2.48E+06	1.63E+07	111.	68.	111.	55.	111.	52.	1985
1990	4.07E+06	3.37E+07	112.	98.	112.	81.	112.	76.	1990
1995	6.21E+06	6.02E+07	115.	101.	115.	90.	115.	84.	1995
2000	8.74E+06	9.86E+07	186.	110.	186.	97.	186.	90.	2000
2005	9.09E+06	1.44E+08	242.	141.	242.	115.	242.	104.	2005
2010	9.24E+06	1.90E+08	260.	168.	260.	130.	260.	114.	2010
2015	8.60E+06	2.35E+08	267.	184.	267.	139.	267.	120.	2015
2020	7.72E+06	2.75E+08	251.	199.	251.	145.	251.	123.	2020
2025	7.18E+06	3.14E+08	260.	206.	260.	148.	260.	125.	2025
2030	5.31E+06	3.43E+08	280.	212.	280.	150.	280.	126.	2030
2035	3.96E+06	3.66E+08	264.	216.	264.	151.	264.	126.	2035
2040	1.53E+06	3.79E+08	590.	221.	590.	152.	590.	127.	2040
2045	0.	3.79E+08	0.	227.	0.	152.	0.	127.	2045
2050	0.	3.79E+08	0.	229.	0.	152.	0.	127.	2050
2055	0.	3.79E+08	0.	229.	0.	152.	0.	127.	2055
2060	0.	3.79E+08	0.	229.	0.	152.	0.	127.	2060
2065	0.	3.79E+08	0.	229.	0.	152.	0.	127.	2065
2070	0.	3.79E+08	0.	229.	0.	152.	0.	127.	2070

a. Unit cost at time of reactor discharge.

TABLE 10.E.113. Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment - Costs for TRU Waste Transportation - $ Millions at 0% Discount Rate

YEAR	SOLID HIGH LEVEL WASTE ANNUAL	SOLID HIGH LEVEL WASTE CUMULATIVE	HULLS AND ASSEMBLY HARDWARE WASTE ANNUAL	HULLS AND ASSEMBLY HARDWARE WASTE CUMULATIVE	TOTAL INTERMEDIATE LEVEL WASTE ANNUAL	TOTAL INTERMEDIATE LEVEL WASTE CUMULATIVE	TOTAL LOW LEVEL WASTE ANNUAL	TOTAL LOW LEVEL WASTE CUMULATIVE	TOTAL FOR ALL CLASSIFICATIONS ANNUAL	TOTAL FOR ALL CLASSIFICATIONS CUMULATIVE	YEAR
1985	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1985
1990	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1990
1995	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1995
2000	21.49	21.49	27.88	27.88	20.86	20.86	1.81	1.81	72.03	72.03	2000
2005	36.71	171.67	42.03	201.51	31.45	150.76	2.74	13.22	112.93	537.12	2005
2010	56.49	416.48	44.83	424.96	33.54	317.93	3.09	28.34	137.95	1187.69	2010
2015	56.49	698.98	46.23	652.26	34.58	487.98	3.64	45.41	140.94	1884.56	2015
2020	25.90	965.33	29.71	873.87	22.23	653.77	2.36	61.99	80.21	2554.96	2020
2025	27.52	1096.47	27.96	1024.18	20.92	766.22	2.17	73.31	78.58	2960.18	2025
2030	25.90	1235.70	20.97	1143.02	15.69	855.14	1.62	82.29	64.19	3316.16	2030
2035	19.43	1345.80	13.98	1226.91	10.46	917.90	.96	88.13	44.83	3578.74	2035
2040	12.95	1423.51	13.98	1296.82	10.46	970.20	1.31	93.72	38.70	3784.25	2040
2045	12.95	1488.27	0.00	1326.03	0.00	992.05	.36	96.19	13.31	3902.54	2045
2050	0.00	1515.33	0.00	1326.03	0.00	992.05	0.00	96.91	0.00	3930.31	2050
2055	0.00	1515.33	0.00	1326.03	0.00	992.05	.36	97.99	.36	3931.39	2055
2060	0.00	1515.33	0.00	1326.03	0.00	992.05	.36	99.08	.36	3932.48	2060
2065	0.00	1515.33	0.00	1326.03	0.00	992.05	.36	100.16	.36	3933.56	2065
2070	0.00	1515.33	0.00	1326.03	0.00	992.05	0.00	100.16	0.00	3933.56	2070
2075	0.00	1515.33	0.00	1326.03	0.00	992.05	1.08	102.33	1.08	3935.73	2075

TABLE 10.E.114. Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment - System Spent Fuel Management Costs - $ Millions at 0% Discount Rate

YEAR	REACTOR TO ISFSS	ISFSS STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACK-AGING	ISFSS TO PACK-AGING	PACK-AGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOS-ITORY COST	TOTAL COST	YEAR
1980	0.	0.	132.	0.	0.	0.	0.	0.	0.	0.	0.	132.	1980
1985	0.	0.	367.	0.	0.	0.	0.	0.	124.	0.	0.	491.	1985
1990	0.	0.	603.	0.	0.	0.	0.	0.	447.	0.	0.	1051.	1990
1995	0.	0.	925.	0.	0.	0.	0.	0.	860.	0.	0.	1785.	1995
2000	0.	0.	1390.	0.	0.	0.	0.	0.	1465.	0.	0.	2855.	2000
2005	0.	0.	2026.	0.	0.	0.	0.	0.	2262.	0.	0.	4288.	2005
2010	0.	0.	2648.	0.	0.	0.	0.	0.	3174.	0.	0.	5822.	2010
2015	0.	0.	3283.	0.	0.	0.	0.	0.	4019.	0.	0.	7302.	2015
2020	0.	0.	3945.	0.	0.	0.	0.	0.	4796.	0.	0.	8741.	2020
2025	0.	0.	4496.	0.	0.	0.	0.	0.	5622.	0.	0.	10118.	2025
2030	0.	0.	4927.	0.	0.	0.	0.	0.	6275.	0.	0.	11201.	2030
2035	0.	0.	53[illegible].	0.	0.	0.	0.	0.	6735.	0.	0.	12037.	2035
2040	0.	0.	5620.	0.	0.	0.	0.	0.	7119.	0.	0.	12739.	2040
2045	0.	0.	5662.	0.	0.	0.	0.	0.	7280.	0.	0.	12942.	2045
2050	0.	0.	5662.	0.	0.	0.	0.	0.	7280.	0.	0.	12942.	2050
2055	0.	0.	5662.	0.	0.	0.	0.	0.	7280.	0.	0.	12942.	2055
2060	0.	0.	5662.	0.	0.	0.	0.	0.	7280.	0.	0.	12942.	2060
2065	0.	0.	5662.	0.	0.	0.	0.	0.	7280.	0.	0.	12942.	2065
2070	0.	0.	5662.	0.	0.	0.	0.	0.	7280.	0.	0.	12942.	2070

TABLE 10.E.115. Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment - Costs for Geologic Repository in Salt - $ Millions at 0% Discount Rate

YEAR	SOLID HIGH LEVEL WASTE ANNUAL	CUMULATIVE	HULLS AND ASSEMBLY HARDWARE WASTE ANNUAL	CUMULATIVE	TOTAL INTERMEDIATE LEVEL WASTE ANNUAL	CUMULATIVE	TOTAL LOW LEVEL WASTE ANNUAL	CUMULATIVE	TOTAL FOR ALL CLASSIFICATIONS ANNUAL	CUMULATIVE	YEAR
1985	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1985
1990	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1990
1995	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1995
2000	154.95	154.95	22.30	22.30	145.73	145.73	22.50	22.50	345.48	345.48	2000
2005	230.10	1111.09	33.63	161.21	219.74	1053.47	33.99	164.25	517.46	2490.02	2005
2010	316.80	2490.03	35.86	339.07	234.36	2221.61	38.37	352.16	625.39	5403.77	2010
2015	316.80	4074.01	36.98	521.81	241.67	3409.85	45.19	564.35	640.64	8570.02	2015
2020	211.82	5553.34	23.77	699.10	155.33	4568.40	29.38	770.45	420.30	11591.28	2020
2025	225.06	6625.70	22.37	819.34	146.19	5354.16	27.02	911.11	420.65	13710.31	2025
2030	211.82	8047.24	16.78	914.42	104.64	5975.46	20.10	1022.75	358.35	15959.87	2030
2035	248.23	9334.74	11.19	981.53	73.09	6414.03	11.87	1095.24	344.39	17825.54	2035
2040	105.91	10208.51	11.19	1037.46	73.09	6779.50	16.22	1164.62	206.41	19190.09	2040
2045	105.91	10738.08	0.00	1060.82	0.00	6932.17	4.52	1195.41	110.43	19926.47	2045
2050	0.00	10924.06	0.00	1060.82	0.00	6932.17	0.00	1204.45	0.00	20121.50	2050
2055	0.00	10924.06	0.00	1060.82	0.00	6932.17	4.52	1218.01	4.52	20135.06	2055
2060	0.00	10924.06	0.00	1060.82	0.00	6932.17	4.52	1231.57	4.52	20148.62	2060
2065	0.00	10924.06	0.00	1060.82	0.00	6932.17	4.52	1245.13	4.52	20162.18	2065
2070	0.00	10924.06	0.00	1060.82	0.00	6932.17	0.00	1245.13	0.00	20162.18	2070
2075	0.00	10924.06	0.00	1060.82	0.00	6932.17	13.56	1272.26	13.56	20189.31	2075

TABLE 10.E.116. Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Salt - $ Millions at 0% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP+MOX	TOTAL SYSTEM	YEAR
1985	462.	21.	0.	0.	80.	0.	0.	0.	563.	1985
1990	1629.	85.	0.	0.	406.	0.	0.	0.	2120.	1990
1995	3120.	181.	0.	0.	978.	0.	0.	0.	4279.	1995
2000	5303.	327.	72.	345.	1565.	0.	0.	0.	7612.	2000
2005	8180.	524.	537.	2490.	1565.	0.	0.	0.	13296.	2005
2010	11472.	766.	1188.	5404.	1565.	0.	0.	2.	20396.	2010
2015	14522.	1008.	1885.	8570.	1565.	0.	0.	31.	27580.	2015
2020	17329.	1226.	2555.	11591.	1565.	0.	0.	51.	34317.	2020
2025	20309.	1446.	2960.	13710.	1565.	0.	0.	73.	40064.	2025
2030	22732.	1603.	3316.	15960.	1565.	0.	0.	100.	45275.	2030
2035	24469.	1679.	3579.	17826.	1565.	0.	0.	129.	49246.	2035
2040	25905.	1685.	3788.	19190.	1565.	0.	0.	185.	52314.	2040
2045	26484.	1685.	3903.	19926.	1565.	0.	0.	243.	53805.	2045
2050	26484.	1685.	3930.	20121.	1565.	0.	0.	257.	54042.	2050
2055	26484.	1685.	3931.	20135.	1565.	0.	0.	289.	54089.	2055
2060	26484.	1685.	3932.	20149.	1565.	0.	0.	320.	54134.	2060
2065	26484.	1685.	3934.	20162.	1565.	0.	0.	348.	54178.	2065
2070	26484.	1685.	3934.	20162.	1565.	0.	0.	353.	54182.	2070
2075	26484.	1685.	3936.	20189.	1565.	0.	0.	403.	54262.	2075

TABLE 10.E.117. Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment - Costs for Geologic Repository in Granite - $ Millions at 0% Discount Rate

YEAR	SOLID HIGH LEVEL WASTE ANNUAL	SOLID HIGH LEVEL WASTE CUMULATIVE	HULLS AND ASSEMBLY HARDWARE WASTE ANNUAL	HULLS AND ASSEMBLY HARDWARE WASTE CUMULATIVE	TOTAL INTERMEDIATE LEVEL WASTE ANNUAL	TOTAL INTERMEDIATE LEVEL WASTE CUMULATIVE	TOTAL LOW LEVEL WASTE ANNUAL	TOTAL LOW LEVEL WASTE CUMULATIVE	TOTAL FOR ALL CLASSIFICATIONS ANNUAL	TOTAL FOR ALL CLASSIFICATIONS CUMULATIVE	YEAR
1985	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1985
1990	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1990
1995	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1995
2000	224.02	224.02	38.09	38.09	234.95	234.95	37.24	37.24	534.29	534.29	2000
2005	323.66	1573.43	57.43	275.36	354.26	1698.40	56.26	271.84	791.61	3819.03	2005
2010	723.31	3755.42	61.26	580.68	377.83	3581.66	63.51	582.84	1225.91	8500.60	2010
2015	723.31	7371.96	63.17	891.26	389.62	5497.33	74.80	934.03	1250.89	14694.59	2015
2020	555.96	10733.67	40.60	1194.08	250.41	7365.13	48.63	1275.14	895.60	20568.02	2020
2025	590.71	13548.22	38.21	1399.46	235.68	8631.93	44.72	1507.94	909.33	25087.56	2025
2030	555.96	16536.51	28.66	1561.86	176.76	9633.59	33.27	1692.71	794.65	29424.67	2030
2035	416.97	18849.34	19.11	1676.49	117.84	10340.64	19.65	1812.68	573.57	32729.16	2035
2040	277.98	20567.23	19.11	1772.01	117.84	10929.85	26.84	1927.51	441.77	35196.60	2040
2045	156.36	21835.51	0.00	1811.92	0.00	11175.98	7.48	1978.46	163.85	36801.88	2045
2050	0.00	22157.11	0.00	1811.92	0.00	11175.98	0.00	1993.43	0.00	37138.44	2050
2055	0.00	22157.11	0.00	1811.92	0.00	11175.98	7.48	2015.87	7.48	37160.88	2055
2060	0.00	22157.11	0.00	1811.92	0.00	11175.98	7.48	2038.32	7.48	37183.33	2060
2065	0.00	22157.11	0.00	1811.92	0.00	11175.98	7.48	2060.76	7.48	37205.77	2065
2070	0.00	22157.11	0.00	1811.92	0.00	11175.98	0.00	2060.76	0.00	37205.77	2070
2075	0.00	22157.11	0.00	1811.92	0.00	11175.98	22.44	2105.65	22.44	37250.66	2075

TABLE 10.E.118. Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Granite - $ Millions at 0% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP+MOX	TOTAL SYSTEM	YEAR
1985	462.	21.	0.	0.	80.	0.	0.	0.	563.	1985
1990	1629.	85.	0.	0.	406.	0.	0.	0.	2120.	1990
1995	3120.	181.	0.	0.	978.	0.	0.	0.	4279.	1995
2000	5334.	327.	72.	* 534.	1565.	0.	0.	0.	7832.	2000
2005	8381.	524.	537.	3819.	1565.	0.	0.	0.	14826.	2005
2010	11938.	766.	1188.	8501.	1565.	0.	0.	2.	23959.	2010
2015	15488.	1008.	1885.	14695.	1565.	0.	0.	31.	34671.	2015
2020	18756.	1226.	2555.	20568.	1565.	0.	0.	51.	44721.	2020
2025	22226.	1446.	2960.	25088.	1565.	0.	0.	73.	53358.	2025
2030	24969.	1603.	3316.	29425.	1565.	0.	0.	100.	60977.	2030
2035	26906.	1679.	3579.	32729.	1565.	0.	0.	129.	66587.	2035
2040	28520.	1685.	3788.	35197.	1565.	0.	0.	165.	70935.	2040
2045	29194.	1685.	3903.	36802.	1565.	0.	0.	243.	73390.	2045
2050	29194.	1685.	3930.	37138.	1565.	0.	0.	257.	73769.	2050
2055	29194.	1685.	3931.	37161.	1565.	0.	0.	289.	73825.	2055
2060	29194.	1685.	3932.	37183.	1565.	0.	0.	320.	73879.	2060
2065	29194.	1685.	3934.	37206.	1565.	0.	0.	348.	73931.	2065
2070	29194.	1685.	3934.	37206.	1565.	0.	0.	353.	73936.	2070
2075	29194.	1685.	3936.	37251.	1565.	0.	0.	403.	74033.	2075

TABLE 10.E.119. Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment - Costs for Geologic Repository in Shale - $ Millions at 0% Discount Rate

YEAR	SOLID HIGH LEVEL WASTE ANNUAL	SOLID HIGH LEVEL WASTE CUMULATIVE	HULLS AND ASSEMBLY HARDWARE WASTE ANNUAL	HULLS AND ASSEMBLY HARDWARE WASTE CUMULATIVE	TOTAL INTERMEDIATE LEVEL WASTE ANNUAL	TOTAL INTERMEDIATE LEVEL WASTE CUMULATIVE	TOTAL LOW LEVEL WASTE ANNUAL	TOTAL LOW LEVEL WASTE CUMULATIVE	TOTAL FOR ALL CLASSIFICATIONS ANNUAL	TOTAL FOR ALL CLASSIFICATIONS CUMULATIVE	YEAR
1985	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1985
1990	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1990
1995	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1995
2000	254.87	254.87	22.81	22.81	193.25	193.25	34.45	34.45	511.38	511.38	2000
2005	359.23	1757.22	43.44	208.28	291.39	1396.98	52.04	251.46	746.10	3613.94	2005
2010	470.75	3810.60	46.33	439.23	310.78	2946.01	58.75	539.14	886.62	7734.98	2010
2015	470.75	6164.37	47.78	674.15	320.47	4521.70	69.19	864.01	908.19	12224.23	2015
2020	362.29	8352.20	30.71	903.21	205.97	6058.02	44.98	1179.53	643.96	16492.95	2020
2025	384.94	10166.31	28.00	1058.56	193.86	7099.99	41.37	1394.89	649.07	19739.75	2025
2030	362.29	12133.60	21.68	1181.40	145.39	7923.88	30.78	1565.80	560.14	22804.72	2030
2035	271.72	14013.04	14.45	1248.10	96.93	8505.45	18.18	1676.78	401.28	25463.37	2035
2040	181.15	15099.93	14.45	1320.36	96.93	8990.09	24.83	1783.00	317.35	27213.37	2040
2045	181.15	16305.65	0.00	1370.54	0.00	9192.54	6.92	1830.13	185.07	28398.87	2045
2050	0.00	16376.98	0.00	1370.54	0.00	9192.54	0.00	1843.97	0.00	28784.04	2050
2055	0.00	16376.98	0.00	1370.54	0.00	9192.54	6.92	1864.73	6.92	28804.80	2055
2060	0.00	16376.98	0.00	1370.54	0.00	9192.54	6.92	1885.49	6.92	28825.56	2060
2065	0.00	16376.98	0.00	1370.54	0.00	9192.54	6.92	1906.26	6.92	28846.32	2065
2070	0.00	16376.98	0.00	1370.54	0.00	9192.54	0.00	1906.26	0.00	28846.32	2070
2075	0.00	16376.98	0.00	1370.54	0.00	9192.54	20.76	1947.78	20.76	28887.84	2075

TABLE 10.E.120. Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Shale - $ Millions at 0% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP+MOX	TOTAL SYSTEM	YEAR
1985	462.	21.	0.	0.	80.	0.	0.	0.	563.	1985
1990	1629.	85.	0.	0.	406.	0.	0.	0.	2120.	1990
1995	3120.	181.	0.	0.	978.	0.	0.	0.	4279.	1995
2000	5388.	327.	72.	511.	1565.	0.	0.	0.	7864.	2000
2005	8737.	524.	537.	3614.	1565.	0.	0.	0.	14977.	2005
2010	12570.	766.	1188.	7735.	1565.	0.	0.	2.	23825.	2010
2015	16120.	1008.	1885.	12224.	1565.	0.	0.	31.	32833.	2015
2020	19388.	1226.	2555.	16493.	1565.	0.	0.	51.	41278.	2020
2025	22858.	1446.	2960.	19740.	1565.	0.	0.	73.	48642.	2025
2030	25601.	1603.	3316.	22805.	1565.	0.	0.	100.	54989.	2030
2035	27600.	1679.	3579.	25463.	1565.	0.	0.	129.	60015.	2035
2040	29214.	1685.	3784.	27213.	1565.	0.	0.	185.	63646.	2040
2045	29888.	1685.	3903.	28399.	1565.	0.	0.	243.	65682.	2045
2050	29888.	1685.	3930.	28784.	1565.	0.	0.	257.	66109.	2050
2055	29888.	1685.	3931.	28805.	1565.	0.	0.	289.	66163.	2055
2060	29888.	1685.	3932.	28825.	1565.	0.	0.	320.	66215.	2060
2065	29888.	1685.	3934.	28846.	1565.	0.	0.	348.	66266.	2065
2070	29888.	1685.	3934.	28846.	1565.	0.	0.	353.	66271.	2070
2075	29888.	1685.	3936.	28888.	1565.	0.	0.	403.	66365.	2075

TABLE 10.E.121. Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment - Costs for Geologic Repository in Basalt - $ Millions at 0% Discount Rate

YEAR	SOLID HIGH LEVEL WASTE ANNUAL	SOLID HIGH LEVEL WASTE CUMULATIVE	HULLS AND ASSEMBLY HARDWARE WASTE ANNUAL	HULLS AND ASSEMBLY HARDWARE WASTE CUMULATIVE	TOTAL INTERMEDIATE LEVEL WASTE ANNUAL	TOTAL INTERMEDIATE LEVEL WASTE CUMULATIVE	TOTAL LOW LEVEL WASTE ANNUAL	TOTAL LOW LEVEL WASTE CUMULATIVE	TOTAL FOR ALL CLASSIFICATIONS ANNUAL	TOTAL FOR ALL CLASSIFICATIONS CUMULATIVE	YEAR
1985	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1985
1990	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1990
1995	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1995
2000	318.12	318.12	40.88	40.88	257.16	257.16	44.38	44.38	660.54	660.54	2000
2005	448.69	2194.46	61.64	295.50	387.75	1858.97	67.05	324.00	965.13	4672.93	2005
2010	588.41	4760.94	65.74	623.16	413.55	3920.28	75.70	694.67	1143.39	9999.05	2010
2015	588.41	7702.97	67.79	956.46	426.45	6017.06	89.15	1113.26	1171.79	15789.76	2015
2020	451.97	10037.77	43.57	1261.44	274.09	8061.49	57.96	1519.81	827.59	21300.46	2020
2025	480.22	12725.89	41.01	1501.88	257.97	9448.01	53.30	1797.29	832.50	25473.04	2025
2030	451.07	15155.25	30.75	1676.12	193.47	10544.37	39.66	2017.52	715.86	29393.25	2030
2035	338.98	17076.10	20.50	1799.14	128.98	11318.26	23.42	2160.50	511.89	33354.04	2035
2040	225.99	18432.06	20.50	1901.45	128.98	11963.18	31.99	2297.36	407.46	34594.25	2040
2045	225.99	19561.99	0.00	1944.48	0.00	12232.58	8.92	2358.10	239.90	36097.14	2045
2050	0.00	20025.23	0.00	1944.48	0.00	12232.58	0.00	2375.93	0.00	36578.22	2050
2055	0.00	20025.23	0.00	1944.48	0.00	12232.58	8.92	2402.69	8.92	36604.97	2055
2060	0.00	20025.23	0.00	1944.48	0.00	12232.58	8.92	2429.44	8.92	36631.73	2060
2065	0.00	20025.23	0.00	1944.48	0.00	12232.58	8.92	2456.19	8.92	36658.48	2065
2070	0.00	20025.23	0.00	1944.48	0.00	12232.58	0.00	2456.19	0.00	36658.48	2070
2075	0.00	20025.23	0.00	1944.48	0.00	12232.58	26.75	2509.70	26.75	36711.99	2075

TABLE 10.E.122. Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Basalt - $ Millions at 0% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP+MOX	TOTAL SYSTEM	YEAR
1985	462.	21.	0.	0.	80.	0.	0.	0.	563.	1985
1990	1629.	85.	0.	0.	406.	0.	0.	0.	2120.	1990
1995	3120.	181.	0.	0.	978.	0.	0.	0.	4279.	1995
2000	5388.	327.	72.	661.	1565.	0.	0.	0.	8013.	2000
2005	8737.	528.	537.	4673.	1565.	0.	0.	0.	16036.	2005
2010	12570.	766.	1188.	9999.	1565.	0.	0.	2.	26089.	2010
2015	16120.	1008.	1885.	15790.	1565.	0.	0.	31.	36308.	2015
2020	19888.	1226.	2555.	21300.	1565.	0.	0.	51.	46085.	2020
2025	22858.	1446.	2960.	25473.	1565.	0.	0.	73.	54375.	2025
2030	25601.	1603.	3316.	29393.	1565.	0.	0.	100.	61578.	2030
2035	27538.	1670.	3579.	32359.	1565.	0.	0.	129.	66843.	2035
2040	29151.	1685.	3784.	34594.	1565.	0.	0.	185.	70964.	2040
2045	29826.	1685.	3903.	36097.	1565.	0.	0.	243.	73317.	2045
2050	29826.	1685.	3930.	36578.	1565.	0.	0.	257.	73840.	2050
2055	29826.	1685.	3931.	36605.	1565.	0.	0.	289.	73900.	2055
2060	29826.	1685.	3932.	36632.	1565.	0.	0.	320.	73959.	2060
2065	29826.	1685.	3934.	36658.	1565.	0.	0.	348.	74015.	2065
2070	29826.	1685.	3934.	36658.	1565.	0.	0.	353.	74020.	2070
2075	29826.	1685.	3936.	36712.	1565.	0.	0.	403.	74126.	2075

TABLE 10.E.123. Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment - System Spent Fuel Management Costs - $ Millions at 7% Discount Rate

YEAR	REACTOR TO ISFSB	ISFSB STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACKAGING	ISFSB TO PACKAGING	PACKAGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOSITORY COST	TOTAL COST	YEAR
1980	0.	0.	121.	0.	0.	0.	0.	0.	0.	0.	0.	121.	1980
1985	0.	0.	278.	0.	0.	0.	0.	0.	80.	0.	0.	358.	1985
1990	0.	0.	391.	0.	0.	0.	0.	0.	233.	0.	0.	624.	1990
1995	0.	0.	499.	0.	0.	0.	0.	0.	371.	0.	0.	870.	1995
2000	0.	0.	611.	0.	0.	0.	0.	0.	516.	0.	0.	1127.	2000
2005	0.	0.	720.	0.	0.	0.	0.	0.	653.	0.	0.	1373.	2005
2010	0.	0.	797.	0.	0.	0.	0.	0.	766.	0.	0.	1563.	2010
2015	0.	0.	853.	0.	0.	0.	0.	0.	840.	0.	0.	1693.	2015
2020	0.	0.	895.	0.	0.	0.	0.	0.	888.	0.	0.	1783.	2020
2025	0.	0.	919.	0.	0.	0.	0.	0.	926.	0.	0.	1845.	2025
2030	0.	0.	933.	0.	0.	0.	0.	0.	947.	0.	0.	1880.	2030
2035	0.	0.	942.	0.	0.	0.	0.	0.	957.	0.	0.	1899.	2035
2040	0.	0.	947.	0.	0.	0.	0.	0.	963.	0.	0.	1910.	2040
2045	0.	0.	947.	0.	0.	0.	0.	0.	965.	0.	0.	1913.	2045
2050	0.	0.	947.	0.	0.	0.	0.	0.	965.	0.	0.	1913.	2050
2055	0.	0.	947.	0.	0.	0.	0.	0.	965.	0.	0.	1913.	2055
2060	0.	0.	947.	0.	0.	0.	0.	0.	965.	0.	0.	1913.	2060
2065	0.	0.	947.	0.	0.	0.	0.	0.	965.	0.	0.	1913.	2065
2070	0.	0.	947.	0.	0.	0.	0.	0.	965.	0.	0.	1913.	2070

TABLE 10.E.124. Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Salt - $ Millions at 7% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP-MOX	TOTAL SYSTEM	YEAR
1985	297.	13.	0.	0.	51.	0.	0.	0.	362.	1985
1990	851.	43.	0.	0.	204.	0.	0.	0.	1099.	1990
1995	1350.	76.	0.	0.	397.	0.	0.	0.	1822.	1995
2000	1874.	111.	15.	73.	543.	0.	0.	0.	2615.	2000
2005	2367.	144.	95.	439.	543.	0.	0.	0.	3588.	2005
2010	2773.	174.	174.	797.	543.	0.	0.	0.	4461.	2010
2015	3041.	195.	235.	1074.	543.	0.	0.	3.	5091.	2015
2020	3216.	209.	278.	1265.	543.	0.	0.	4.	5515.	2020
2025	3350.	219.	296.	1360.	543.	0.	0.	5.	5773.	2025
2030	3429.	224.	308.	1433.	543.	0.	0.	6.	5942.	2030
2035	3469.	226.	314.	1475.	543.	0.	0.	6.	6033.	2035
2040	3492.	226.	317.	1498.	543.	0.	0.	7.	6083.	2040
2045	3499.	226.	318.	1507.	543.	0.	0.	8.	6101.	2045
2050	3499.	226.	319.	1508.	543.	0.	0.	8.	6103.	2050
2055	3499.	226.	319.	1509.	543.	0.	0.	8.	6103.	2055
2060	3499.	226.	319.	1509.	543.	0.	0.	8.	6104.	2060
2065	3499.	226.	319.	1509.	543.	0.	0.	9.	6104.	2065
2070	3499.	226.	319.	1509.	543.	0.	0.	9.	6104.	2070
2075	3499.	226.	319.	1509.	543.	0.	0.	9.	6104.	2075

TABLE 10.E.125. Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Granite - $ Millions at 7% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP-MOX	TOTAL SYSTEM	YEAR
1985	297.	13.	0.	0.	51.	0.	0.	0.	362.	1985
1990	851.	43.	0.	0.	204.	0.	0.	0.	1099.	1990
1995	1350.	74.	0.	0.	397.	0.	0.	0.	1822.	1995
2000	1880.	111.	15.	113.	543.	0.	0.	0.	2661.	2000
2005	2403.	144.	95.	674.	543.	0.	0.	0.	3858.	2005
2010	2840.	174.	174.	1244.	543.	0.	0.	0.	4976.	2010
2015	3152.	195.	235.	1787.	543.	0.	0.	3.	5915.	2015
2020	3356.	209.	278.	2157.	543.	0.	0.	4.	6547.	2020
2025	3513.	219.	296.	2359.	543.	0.	0.	5.	6934.	2025
2030	3601.	224.	308.	2494.	543.	0.	0.	6.	7180.	2030
2035	3645.	226.	314.	2575.	543.	0.	0.	6.	7309.	2035
2040	3672.	226.	317.	2615.	543.	0.	0.	7.	7380.	2040
2045	3680.	226.	318.	2634.	543.	0.	0.	8.	7409.	2045
2050	3680.	226.	319.	2637.	543.	0.	0.	8.	7413.	2050
2055	3680.	226.	319.	2637.	543.	0.	0.	8.	7413.	2055
2060	3680.	226.	319.	2637.	543.	0.	0.	8.	7413.	2060
2065	3680.	226.	319.	2637.	543.	0.	0.	9.	7413.	2065
2070	3680.	226.	319.	2637.	543.	0.	0.	9.	7413.	2070
2075	3680.	226.	319.	2637.	543.	0.	0.	9.	7414.	2075

TABLE 10.E.126. Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Shale - $ Millions at 7% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP+MOX	TOTAL SYSTEM	YEAR
1985	297.	13.	0.	0.	51.	0.	0.	0.	362.	1985
1990	851.	43.	0.	0.	204.	0.	0.	0.	1099.	1990
1995	1350.	76.	0.	0.	397.	0.	0.	0.	1822.	1995
2000	1892.	111.	15.	108.	543.	0.	0.	0.	2668.	2000
2005	2466.	144.	95.	638.	543.	0.	0.	0.	3886.	2005
2010	2939.	174.	174.	1144.	543.	0.	0.	0.	4974.	2010
2015	3250.	195.	235.	1537.	543.	0.	0.	3.	5764.	2015
2020	3455.	209.	278.	1806.	543.	0.	0.	4.	6294.	2020
2025	3611.	219.	296.	1951.	543.	0.	0.	5.	6625.	2025
2030	3699.	224.	308.	2050.	543.	0.	0.	6.	6829.	2030
2035	3745.	226.	314.	2111.	543.	0.	0.	6.	6944.	2035
2040	3772.	226.	317.	2139.	543.	0.	0.	7.	7004.	2040
2045	3780.	226.	318.	2153.	543.	0.	0.	8.	7028.	2045
2050	3780.	226.	319.	2157.	543.	0.	0.	8.	7032.	2050
2055	3780.	226.	319.	2157.	543.	0.	0.	8.	7032.	2055
2060	3780.	226.	319.	2157.	543.	0.	0.	8.	7032.	2060
2065	3780.	226.	319.	2157.	543.	0.	0.	9.	7032.	2065
2070	3780.	226.	319.	2157.	543.	0.	0.	9.	7032.	2070
2075	3780.	226.	319.	2157.	543.	0.	0.	9.	7033.	2075

TABLE 10.E.127. Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Basalt - $ Millions at 7% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP-MOX	TOTAL SYSTEM	YEAR
1985	297.	13.	0.	0.	51.	0.	0.	0.	362.	1985
1990	851.	43.	0.	0.	204.	0.	0.	0.	1099.	1990
1995	1350.	76.	0.	0.	397.	0.	0.	0.	1822.	1995
2000	1892.	111.	15.	139.	543.	0.	0.	0.	2699.	2000
2005	2466.	140.	95.	825.	543.	0.	0.	0.	4073.	2005
2010	2939.	170.	170.	1479.	543.	0.	0.	0.	5309.	2010
2015	3250.	195.	235.	1986.	543.	0.	0.	3.	6213.	2015
2020	3455.	209.	274.	2333.	543.	0.	0.	4.	6822.	2020
2025	3611.	219.	296.	2520.	543.	0.	0.	5.	7194.	2025
2030	3699.	224.	308.	2646.	543.	0.	0.	6.	7425.	2030
2035	3744.	226.	314.	2719.	543.	0.	0.	6.	7547.	2035
2040	3770.	226.	317.	2751.	543.	0.	0.	7.	7619.	2040
2045	3779.	226.	318.	2769.	543.	0.	0.	8.	7642.	2045
2050	3779.	226.	319.	2773.	543.	0.	0.	8.	7647.	2050
2055	3779.	226.	319.	2773.	543.	0.	0.	8.	7647.	2055
2060	3779.	226.	319.	2773.	543.	0.	0.	8.	7647.	2060
2065	3779.	226.	319.	2773.	543.	0.	0.	9.	7648.	2065
2070	3779.	226.	319.	2773.	543.	0.	0.	9.	7648.	2070
2075	3779.	226.	319.	2773.	543.	0.	0.	9.	7648.	2075

TABLE 10.E.128. Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment - System Spent Fuel Management Costs - $ Millions at 10% Discount Rate

YEAR	REACTOR TO ISFSR	ISFSR STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACKAGING	ISFSR TO PACKAGING	PACKAGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOSITORY COST	TOTAL COST	YEAR
1980	0.	0.	118.	0.	0.	0.	0.	0.	0.	0.	0.	118.	1980
1985	0.	0.	251.	0.	0.	0.	0.	0.	67.	0.	0.	317.	1985
1990	0.	0.	338.	0.	0.	0.	0.	0.	180.	0.	0.	518.	1990
1995	0.	0.	404.	0.	0.	0.	0.	0.	269.	0.	0.	673.	1995
2000	0.	0.	466.	0.	0.	0.	0.	0.	350.	0.	0.	816.	2000
2005	0.	0.	520.	0.	0.	0.	0.	0.	417.	0.	0.	936.	2005
2010	0.	0.	553.	0.	0.	0.	0.	0.	465.	0.	0.	1017.	2010
2015	0.	0.	573.	0.	0.	0.	0.	0.	492.	0.	0.	1065.	2015
2020	0.	0.	587.	0.	0.	0.	0.	0.	508.	0.	0.	1095.	2020
2025	0.	0.	598.	0.	0.	0.	0.	0.	518.	0.	0.	1117.	2025
2030	0.	0.	597.	0.	0.	0.	0.	0.	523.	0.	0.	1121.	2030
2035	0.	0.	599.	0.	0.	0.	0.	0.	526.	0.	0.	1125.	2035
2040	0.	0.	600.	0.	0.	0.	0.	0.	527.	0.	0.	1127.	2040
2045	0.	0.	600.	0.	0.	0.	0.	0.	527.	0.	0.	1127.	2045
2050	0.	0.	600.	0.	0.	0.	0.	0.	527.	0.	0.	1127.	2050
2055	0.	0.	600.	0.	0.	0.	0.	0.	527.	0.	0.	1127.	2055
2060	0.	0.	600.	0.	0.	0.	0.	0.	527.	0.	0.	1127.	2060
2065	0.	0.	600.	0.	0.	0.	0.	0.	527.	0.	0.	1127.	2065
2070	0.	0.	600.	0.	0.	0.	0.	0.	527.	0.	0.	1127.	2070

TABLE 10.E.129. Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Salt - $ Millions at 10% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP+MOX	TOTAL SYSTEM	YEAR
1985	249.	11.	0.	0.	43.	0.	0.	0.	303.	1985
1990	658.	33.	0.	0.	155.	0.	0.	0.	847.	1990
1995	978.	54.	0.	0.	279.	0.	0.	0.	1311.	1995
2000	1271.	73.	8.	39.	362.	0.	0.	0.	1753.	2000
2005	1512.	90.	47.	217.	362.	0.	0.	0.	2227.	2005
2010	1685.	103.	81.	369.	362.	0.	0.	0.	2599.	2010
2015	1784.	111.	103.	472.	362.	0.	0.	1.	2832.	2015
2020	1841.	115.	117.	534.	362.	0.	0.	1.	2970.	2020
2025	1879.	118.	122.	560.	362.	0.	0.	2.	3062.	2025
2030	1898.	119.	125.	578.	362.	0.	0.	2.	3084.	2030
2035	1907.	119.	126.	588.	362.	0.	0.	2.	3104.	2035
2040	1911.	119.	127.	592.	362.	0.	0.	2.	3113.	2040
2045	1912.	119.	127.	593.	362.	0.	0.	2.	3116.	2045
2050	1912.	119.	127.	593.	362.	0.	0.	2.	3116.	2050
2055	1912.	119.	127.	594.	362.	0.	0.	2.	3116.	2055
2060	1912.	119.	127.	594.	362.	0.	0.	2.	3116.	2060
2065	1912.	119.	127.	594.	362.	0.	0.	2.	3116.	2065
2070	1912.	119.	127.	594.	362.	0.	0.	2.	3116.	2070
2075	1912.	119.	127.	594.	362.	0.	0.	2.	3116.	2075

TABLE 10.E.130. Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Granite - $ Millions at 10% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP-MOX	TOTAL SYSTEM	YEAR
1985	249.	11.	0.	0.	43.	0.	0.	0.	303.	1985
1990	658.	33.	0.	0.	155.	0.	0.	0.	847.	1990
1995	978.	54.	0.	0.	279.	0.	0.	0.	1311.	1995
2000	1274.	73.	8.	60.	362.	0.	0.	0.	1777.	2000
2005	1529.	90.	47.	333.	362.	0.	0.	0.	2361.	2005
2010	1716.	103.	81.	575.	362.	0.	0.	0.	2836.	2010
2015	1831.	111.	103.	776.	362.	0.	0.	1.	3184.	2015
2020	1897.	115.	117.	896.	362.	0.	0.	1.	3388.	2020
2025	1941.	118.	122.	953.	362.	0.	0.	2.	3498.	2025
2030	1963.	119.	125.	987.	362.	0.	0.	2.	3558.	2030
2035	1973.	119.	126.	1004.	362.	0.	0.	2.	3586.	2035
2040	1978.	119.	127.	1011.	3[illegible]	0.	0.	2.	3599.	2040
2045	1979.	119.	127.	1014.	362.	0.	0.	2.	3604.	2045
2050	1979.	119.	127.	1015.	362.	0.	0.	2.	3604.	2050
2055	1979.	119.	127.	1015.	362.	0.	0.	2.	3604.	2055
2060	1979.	119.	127.	1015.	362.	0.	0.	2.	3604.	2060
2065	1979.	119.	127.	1015.	362.	0.	0.	2.	3604.	2065
2070	1979.	119.	127.	1015.	362.	0.	0.	2.	3604.	2070
2075	1979.	119.	127.	1015.	362.	0.	0.	2.	3604.	2075

TABLE 10.E.131. Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Shale - $ Millions at 10% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP+MOX	TOTAL SYSTEM	YEAR
1985	289.	11.	0.	0.	83.	0.	0.	0.	383.	1985
1990	458.	33.	0.	0.	155.	0.	0.	0.	647.	1990
1995	978.	54.	0.	0.	279.	0.	0.	0.	1311.	1995
2000	1281.	73.	8.	57.	362.	0.	0.	0.	1781.	2000
2005	1561.	90.	47.	315.	362.	0.	0.	0.	2375.	2005
2010	1762.	103.	81.	531.	362.	0.	0.	0.	2838.	2010
2015	1878.	111.	103.	676.	362.	0.	0.	1.	3131.	2015
2020	1944.	115.	117.	763.	362.	0.	0.	1.	3302.	2020
2025	1988.	118.	122.	804.	362.	0.	0.	2.	3396.	2025
2030	2010.	119.	125.	829.	362.	0.	0.	2.	3446.	2030
2035	2020.	119.	126.	842.	362.	0.	0.	2.	3471.	2035
2040	2024.	119.	127.	847.	362.	0.	0.	2.	3482.	2040
2045	2026.	119.	127.	849.	362.	0.	0.	2.	3486.	2045
2050	2026.	119.	127.	850.	362.	0.	0.	2.	3486.	2050
2055	2026.	119.	127.	850.	362.	0.	0.	2.	3486.	2055
2060	2026.	119.	127.	850.	362.	0.	0.	2.	3486.	2060
2065	2026.	119.	127.	850.	362.	0.	0.	2.	3486.	2065
2070	2026.	119.	127.	850.	362.	0.	0.	2.	3486.	2070
2075	2026.	119.	127.	850.	362.	0.	0.	2.	3486.	2075

TABLE 10.E.132. Case 3B - U and Pu Recycle - Repository in 2000 - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Basalt - $ Millions at 10% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP-MOX	TOTAL SYSTEM	YEAR
1985	249.	11.	0.	0.	43.	0.	0.	0.	303.	1985
1990	658.	33.	0.	0.	155.	0.	0.	0.	847.	1990
1995	978.	54.	0.	0.	279.	0.	0.	0.	1311.	1995
2000	1241.	73.	8.	79.	362.	0.	0.	0.	1763.	2000
2005	1561.	90.	47.	408.	362.	0.	0.	0.	2467.	2005
2010	1762.	103.	81.	686.	362.	0.	0.	0.	2993.	2010
2015	1878.	111.	103.	874.	362.	0.	0.	1.	3328.	2015
2020	1944.	115.	117.	986.	362.	0.	0.	1.	3525.	2020
2025	1988.	118.	122.	1039.	362.	0.	0.	2.	3630.	2025
2030	2013.	119.	125.	1070.	362.	0.	0.	2.	3687.	2030
2035	2019.	119.	126.	1085.	362.	0.	0.	2.	3713.	2035
2040	2024.	119.	127.	1091.	362.	0.	0.	2.	3726.	2040
2045	2026.	119.	127.	1094.	362.	0.	0.	2.	3730.	2045
2050	2026.	119.	127.	1095.	362.	0.	0.	2.	3731.	2050
2055	2026.	119.	127.	1095.	362.	0.	0.	2.	3731.	2055
2060	2026.	119.	127.	1095.	362.	0.	0.	2.	3731.	2060
2065	2026.	119.	127.	1095.	362.	0.	0.	2.	3731.	2065
2070	2026.	119.	127.	1095.	362.	0.	0.	2.	3731.	2070
2075	2026.	119.	127.	1095.	362.	0.	0.	2.	3731.	2075

TABLE 10.E.133. Case 4A - Deferred Decision for Once-Through Cycle - Repository in Salt - Reference Treatment - Unit Power Cost for TRU Waste Management Including Spent Fuel Handling and Storage

	POWER GENERATION		UNDISCOUNTED AVERAGE		DISCOUNTED AVERAGE (7 PCT)		DISCOUNTED AVERAGE (10 PCT)		
	KWHR		MILLS/KWHR		MILLS/KWHR		MILLS/KWHR		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	1.78E+11	4.92E+11	.05	.02	.05	.02	.05	.02	1975
1980	3.44E+11	1.86E+12	.11	.07	.11	.07	.11	.06	1980
1985	6.82E+11	4.45E+12	.20	.12	.20	.11	.20	.10	1985
1990	1.11E+12	9.17E+12	.31	.21	.31	.18	.31	.17	1990
1995	1.67E+12	1.83E+13	.28	.24	.28	.21	.28	.20	1995
2000	2.32E+12	2.66E+13	.38	.27	.38	.23	.38	.21	2000
2005	2.40E+12	3.87E+13	.73	.38	.73	.30	.73	.26	2005
2010	2.31E+12	5.04E+13	.77	.47	.77	.34	.77	.29	2010
2015	2.10E+12	6.15E+13	.85	.53	.85	.37	.85	.31	2015
2020	1.82E+12	7.11E+13	.83	.57	.83	.39	.83	.32	2020
2025	1.37E+12	7.89E+13	.97	.60	.97	.40	.97	.33	2025
2030	9.23E+11	8.44E+13	1.32	.64	1.32	.41	1.32	.33	2030
2035	4.50E+11	8.76E+13	2.01	.67	2.01	.41	2.01	.33	2035
2040	2.67E+10	8.85E+13	25.34	.71	25.34	.42	25.34	.33	2040
2045	0.	8.85E+13	0.00	.73	0.00	.42	0.00	.33	2045
2050	0.	8.85E+13	0.00	.74	0.00	.42	0.00	.33	2050
2055	0.	8.85E+13	0.00	.74	0.00	.42	0.00	.33	2055
2060	0.	8.85E+13	0.00	.74	0.00	.42	0.00	.33	2060
2065	0.	8.85E+13	0.00	.74	0.00	.42	0.00	.33	2065
2070	0.	8.85E+13	0.00	.74	0.00	.42	0.00	.33	2070

TABLE 10.E.134. Case 4A - Deferred Decision for Once-Through Cycle - Repository in Granite - Reference Treatment - Unit Power Cost for TRU Waste Management Including Spent Fuel Handling and Storage

	POWER GENERATION KWHR		UNDISCOUNTED AVERAGE MILLS/KWHR		DISCOUNTED AVERAGE (7 PCT) MILLS/KWHR		DISCOUNTED AVERAGE (10 PCT) MILLS/KWHR		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	1.78E+11	4.92E+11	.05	.02	.05	.02	.05	.02	1975
1980	3.44E+11	1.86E+12	.11	.07	.11	.07	.11	.06	1980
1985	6.82E+11	4.45E+12	.20	.12	.20	.1[illegible]	.20	.10	1985
1990	1.11E+12	9.17E+12	.31	.21	.31	.18	.31	.17	1990
1995	1.67E+12	1.63E+13	.28	.24	.28	.21	.28	.20	1995
2000	2.32E+12	2.66E+13	.41	.27	.41	.23	.41	.22	2000
2005	2.40E+12	3.87E+13	.86	.42	.86	.32	.86	.27	2005
2010	2.31E+12	5.04E+13	.91	.53	.91	.37	.91	.31	2010
2015	2.10E+12	6.15E+13	.99	.60	.99	.41	.99	.34	2015
2020	1.82E+12	7.11E+13	.96	.65	.96	.43	.96	.35	2020
2025	1.37E+12	7.89E+13	1.12	.69	1.12	.44	1.12	.36	2025
2030	9.23E+11	8.44E+13	1.53	.73	1.53	.45	1.53		2030
2035	4.50E+11	8.76E+13	2.33	.77	2.33	.46	2.33	.36	2035
2040	2.67E+10	8.85E+13	29.65	.81	29.65	.46	29.65	.36	2040
2045	0.	8.85E+13	0.00	.84	0.00	.47	0.00	.36	2045
2050	0.	8.85E+13	0.00	.85	0.00	.47	0.00	.36	2050
2055	0.	8.85E+13	0.00	.85	0.00	.47	0.00	.36	2055
2060	0.	8.85E+13	0.00	.85	0.00	.47	0.00	.36	2060
2065	0.	8.85E+13	0.00	.85	0.00	.47	0.00	.36	2065
2070	0.	8.85E+13	0.00	.85	0.00	.47	0.00	.36	2070

TABLE 10.E.135. Case 4A - Deferred Decision for Once-Through Cycle - Repository in Shale - Reference Treatment - Unit Power Cost for TRU Waste Management Including Spent Fuel Handling and Storage

YEAR	POWER GENERATION KWHR ANNUAL	POWER GENERATION KWHR CUMULATIVE	UNDISCOUNTED AVERAGE MILLS/KWHR ANNUAL	UNDISCOUNTED AVERAGE MILLS/KWHR CUMULATIVE	DISCOUNTED AVERAGE (7 PCT) MILLS/KWHR ANNUAL	DISCOUNTED AVERAGE (7 PCT) MILLS/KWHR CUMULATIVE	DISCOUNTED AVERAGE (10 PCT) MILLS/KWHR ANNUAL	DISCOUNTED AVERAGE (10 PCT) MILLS/KWHR CUMULATIVE	YEAR
1975	1.74E+11	4.92E+11	.05	.02	.05	.02	.05	.02	1975
1980	3.40E+11	1.86E+12	.11	.07	.11	.07	.11	.06	1980
1985	6.82E+11	4.45E+12	.20	.1[illegible]	.20	.11	.20	.10	1985
1990	1.11E+12	9.17E+12	.31	.21	.31	.18	.31	.17	1990
1995	1.67E+12	1.63E+13	.28	.24	.28	.21	.28	.20	1995
2000	2.32E+12	2.66E+13	.38	.27	.38	.23	.38	.21	2000
2005	2.40E+12	3.87E+13	.75	.39	.75	.30	.75	.26	2005
2010	2.31E+12	5.04E+13	.80	.48	.80	.35	.80	.30	2010
2015	2.10E+12	6.15E+13	.88	.55	.88	.38	.88	.32	2015
2020	1.82E+12	7.11E+13	.86	.58	.86	.40	.86	.33	2020
2025	1.37E+12	7.89E+13	1.00	.62	1.00	.41	1.00	.33	2025
2030	9.23E+11	8.44E+13	1.36	.65	1.36	.42	1.36	.34	2030
2035	4.50E+11	8.76E+13	2.07	.69	2.07	.42	2.07	.34	2035
2040	2.67E+10	8.85E+13	26.20	.73	26.20	.43	26.20	.34	2040
2045	0.	8.85E+13	0.00	.76	0.00	.43	0.00	.34	2045
2050	0.	8.85E+13	0.00	.76	0.00	.43	0.00	.34	2050
2055	0.	8.85E+13	0.00	.76	0.00	.43	0.00	.34	2055
2060	0.	8.85E+13	0.00	.76	0.00	.43	0.00	.34	2060
2065	0.	8.85E+13	0.00	.76	0.00	.43	0.00	.34	2065
2070	0.	8.85E+13	0.00	.76	0.00	.43	0.00	.34	2070

TABLE 10.E.136. Case 4A - Deferred Decision for Once-Through Cycle - Repository in Basalt - Reference Treatment - Unit Power Cost for TRU Waste Management Including Spent Fuel Handling and Storage

YEAR	POWER GENERATION KWHR ANNUAL	POWER GENERATION CUMULATIVE	UNDISCOUNTED AVERAGE MILLS/KWHR ANNUAL	UNDISCOUNTED AVERAGE MILLS/KWHR CUMULATIVE	DISCOUNTED AVERAGE (7 PCT) MILLS/KWHR ANNUAL	DISCOUNTED AVERAGE (7 PCT) MILLS/KWHR CUMULATIVE	DISCOUNTED AVERAGE (10 PCT) MILLS/KWHR ANNUAL	DISCOUNTED AVERAGE (10 PCT) MILLS/KWHR CUMULATIVE	YEAR
1975	1.78E+11	4.92E+11	.05	.02	.05	.02	.05	.02	1975
1980	3.44E+11	1.86E+12	.11	.07	.11	.07	.11	.06	1980
1985	6.82E+11	4.45E+12	.20	.12	.20	.11	.20	.10	1985
1990	1.11E+12	9.17E+12	.31	.21	.31	.18	.31	.17	1990
1995	1.67E+12	1.63E+13	.28	.24	.28	.21	.28	.20	1995
2000	2.32E+12	2.66E+13	.42	.27	.42	.23	.42	.22	2000
2005	2.40E+12	3.87E+13	.90	.43	.90	.32	.90	.28	2005
2010	2.31E+12	5.04E+13	.96	.55	.96	.39	.96	.32	2010
2015	2.10E+12	6.15E+13	1.05	.63	1.05	.42	1.05	.35	2015
2020	1.82E+12	7.11E+13	1.01	.68	1.01	.45	1.01	.36	2020
2025	1.37E+12	7.89E+13	1.17	.72	1.17	.46	1.17	.37	2025
2030	9.23E+11	8.44E+13	1.61	.76	1.61	.47	1.61	.37	2030
2035	4.50E+11	8.76E+13	2.45	.81	2.45	.48	2.45	.37	2035
2040	2.67E+10	8.85E+13	31.21	.85	31.21	.48	31.21	.37	2040
2045	0.	8.85E+13	0.00	.88	0.00	.48	0.00	.38	2045
2050	0.	8.85E+13	0.00	.89	0.00	.48	0.00	.38	2050
2055	0.	8.85E+13	0.00	.89	0.00	.48	0.00	.38	2055
2060	0.	8.85E+13	0.00	.89	0.00	.48	0.00	.38	2060
2065	0.	8.85E+13	0.00	.89	0.00	.48	0.00	.38	2065
2070	0.	8.85E+13	0.00	.89	0.00	.48	0.00	.38	2070

TABLE 10.E.137. Case 4A - Deferred Decision for Once-Through Cycle - Repository in Salt - Reference Treatment - Unit Fuel Cost for TRU Waste Management Including Spent Fuel Handling and Storage[a]

YEAR	THRUPUT KG DISCHARGED ANNUAL	THRUPUT KG DISCHARGED CUMULATIVE	UNDISCOUNTED AVERAGE DOLLARS/KG DISCHARGED ANNUAL	UNDISCOUNTED AVERAGE DOLLARS/KG DISCHARGED CUMULATIVE	DISCOUNTED AVERAGE (7 PCT) DOLLARS/KG DISCHARGED ANNUAL	DISCOUNTED AVERAGE (7 PCT) DOLLARS/KG DISCHARGED CUMULATIVE	DISCOUNTED AVERAGE (10 PCT) DOLLARS/KG DISCHARGED ANNUAL	DISCOUNTED AVERAGE (10 PCT) DOLLARS/KG DISCHARGED CUMULATIVE	YEAR
1975	6.99E+05	1.78E+06	12.	5.	12.	5.	12.	5.	1975
1980	1.27E+06	6.93E+06	30.	19.	30.	18.	30.	17.	1980
1985	2.48E+06	1.63E+07	55.	33.	55.	30.	55.	28.	1985
1990	4.07E+06	3.37E+07	83.	56.	83.	48.	83.	45.	1990
1995	6.21E+06	6.02E+07	75.	66.	75.	57.	75.	53.	1995
2000	8.74E+06	9.86E+07	100.	72.	100.	63.	100.	58.	2000
2005	9.09E+06	1.44E+08	192.	102.	192.	80.	192.	71.	2005
2010	9.24E+06	1.90E+08	194.	125.	194.	92.	194.	79.	2010
2015	8.60E+06	2.35E+08	207.	139.	207.	100.	207.	84.	2015
2020	7.72E+06	2.75E+08	196.	147.	196.	104.	196.	86.	2020
2025	7.15E+06	3.14E+08	186.	151.	186.	106.	186.	87.	2025
2030	5.31E+06	3.43E+08	229.	157.	229.	108.	229.	88.	2030
2035	3.94E+06	3.66E+08	228.	161.	228.	109.	228.	89.	2035
2040	1.53E+06	3.79E+08	441.	165.	441.	109.	441.	89.	2040
2045	0.	3.79E+08	0.	172.	0.	110.	0.	89.	2045
2050	0.	3.79E+08	0.	172.	0.	110.	0.	89.	2050
2055	0.	3.79E+08	0.	172.	0.	110.	0.	89.	2055
2060	0.	3.79E+08	0.	172.	0.	110.	0.	89.	2060
2065	0.	3.79E+08	0.	172.	0.	110.	0.	89.	2065
2070	0.	3.79E+08	0.	172.	0.	110.	0.	89.	2070

a. Unit cost at time of reactor discharge.

TABLE 10.E.138. Case 4A - Deferred Decision for Once-Through Cycle - Repository in Granite - Reference Treatment - Unit Fuel Cost for TRU Waste Management Including Spent Fuel Handling and Storage[a]

	THRUPUT KG DISCHARGED		UNDISCOUNTED AVERAGE DOLLARS/KG DISCHARGED		DISCOUNTED AVERAGE (7 PCT) DOLLARS/KG DISCHARGED		DISCOUNTED AVERAGE (10 PCT) DOLLARS/KG DISCHARGED		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	6.99E+05	1.78E+06	12.	5.	12.	5.	12.	5.	1975
1980	1.27E+06	6.93E+06	30.	19.	30.	18.	30.	17.	1980
1985	2.48E+06	1.63E+07	55.	33.	55.	30.	55.	28.	1985
1990	4.07E+06	3.37E+07	83.	56.	83.	48.	83.	45.	1990
1995	6.21E+06	6.02E+07	75.	66.	75.	57.	75.	53.	1995
2000	8.74E+06	9.86E+07	109.	73.	109.	63.	109.	58.	2000
2005	9.09E+06	1.44E+08	226.	112.	226.	85.	226.	74.	2005
2010	9.24E+06	1.90E+08	227.	140.	227.	100.	227.	85.	2010
2015	8.60E+06	2.35E+08	243.	158.	243.	110.	243.	91.	2015
2020	7.72E+06	2.75E+08	227.	168.	227.	115.	227.	94.	2020
2025	7.18E+06	3.14E+08	214.	173.	214.	117.	214.	95.	2025
2030	5.31E+06	3.43E+08	266.	179.	266.	119.	266.	96.	2030
2035	3.96E+06	3.66E+08	265.	185.	265.	120.	265.	96.	2035
2040	1.58E+06	3.79E+08	516.	190.	516.	121.	516.	97.	2040
2045	0.	3.79E+08	0.	197.	0.	122.	0.	97.	2045
2050	0.	3.79E+08	0.	198.	0.	122.	0.	97.	2050
2055	0.	3.79E+08	0.	198.	0.	122.	0.	97.	2055
2060	0.	3.79E+08	0.	198.	0.	122.	0.	97.	2060
2065	0.	3.79E+08	0.	198.	0.	122.	0.	97.	2065
2070	0.	3.79E+08	0.	198.	0.	122.	0.	97.	2070

a. Unit cost at time of reactor discharge.

TABLE 10.E.139. Case 4A - Deferred Decision for Once-Through Cycle - Repository in Shale - Reference Treatment - Unit Fuel Cost for TRU Waste Management Including Spent Fuel Handling and Storage[a]

YEAR	THRUPUT KG DISCHARGED ANNUAL	THRUPUT KG DISCHARGED CUMULATIVE	UNDISCOUNTED AVERAGE DOLLARS/KG DISCHARGED ANNUAL	UNDISCOUNTED AVERAGE DOLLARS/KG DISCHARGED CUMULATIVE	DISCOUNTED AVERAGE (7 PCT) DOLLARS/KG DISCHARGED ANNUAL	DISCOUNTED AVERAGE (7 PCT) DOLLARS/KG DISCHARGED CUMULATIVE	DISCOUNTED AVERAGE (10 PCT) DOLLARS/KG DISCHARGED ANNUAL	DISCOUNTED AVERAGE (10 PCT) DOLLARS/KG DISCHARGED CUMULATIVE	YEAR
1975	6.90E+05	1.78E+06	12.	5.	12.	5.	12.	5.	1975
1980	1.27E+06	6.93E+06	30.	19.	30.	18.	30.	17.	1980
1985	2.48E+06	1.63E+07	55.	33.	55.	30.	55.	28.	1985
1990	4.07E+06	3.37E+07	83.	56.	83.	48.	83.	45.	1990
1995	6.21E+06	6.02E+07	75.	66.	75.	57.	75.	53.	1995
2000	8.74E+06	9.86E+07	102.	79.	102.	63.	102.	58.	2000
2005	9.09E+06	1.44E+08	199.	104.	199.	81.	199.	71.	2005
2010	9.24E+06	1.90E+08	200.	128.	200.	98.	200.	80.	2010
2015	8.60E+06	2.35E+08	214.	143.	214.	102.	214.	85.	2015
2020	7.72E+06	2.75E+08	202.	151.	202.	106.	202.	88.	2020
2025	7.15E+06	3.14E+08	191.	155.	191.	108.	191.	89.	2025
2030	5.31E+06	3.43E+08	236.	161.	236.	110.	236.	90.	2030
2035	3.96E+06	3.66E+08	236.	166.	236.	111.	236.	90.	2035
2040	1.53E+06	3.79E+08	456.	170.	456.	112.	456.	90.	2040
2045	0.	3.79E+08	0.	177.	0.	112.	0.	91.	2045
2050	0.	3.79E+08	0.	177.	0.	112.	0.	91.	2050
2055	0.	3.79E+08	0.	177.	0.	112.	0.	91.	2055
2060	0.	3.79E+08	0.	177.	0.	112.	0.	91.	2060
2065	0.	3.79E+08	0.	177.	0.	112.	0.	91.	2065
2070	0.	3.79E+08	0.	177.	0.	112.	0.	91.	2070

a. Unit cost at time of reactor discharge.

TABLE 10.E.140. Case 4A - Deferred Decision for Once-Through cycle - Repository in Basalt - Reference Treatment - Unit Fuel Cost for TRU Waste Management Including Spent Fuel Handling and Storage[a]

	THRUPUT		UNDISCOUNTED AVERAGE		DISCOUNTED AVERAGE (7 PCT)		DISCOUNTED AVERAGE (10 PCT)		
	KG DISCHARGED		DOLLARS/KG DISCHARGED		DOLLARS/KG DISCHARGED		DOLLARS/KG DISCHARGED		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	6.99E+05	1.78E+06	12.	5.	12.	5.	12.	5.	1975
1980	1.27E+06	6.93E+06	30.	19.	30.	18.	30.	17.	1980
1985	2.44E+06	1.63E+07	55.	33.	55.	30.	55.	28.	1985
1990	4.07E+06	3.37E+07	83.	56.	83.	48.	83.	45.	1990
1995	6.21E+06	6.02E+07	75.	66.	75.	57.	75.	53.	1995
2000	8.74E+06	9.86E+07	112.	73.	112.	63.	112.	58.	2000
2005	9.09E+06	1.44E+08	238.	115.	238.	87.	238.	75.	2005
2010	9.24E+06	1.90E+08	239.	146.	239.	103.	239.	87.	2010
2015	8.60E+06	2.35E+08	256.	165.	256.	113.	256.	93.	2015
2020	7.72E+06	2.75E+08	238.	175.	238.	119.	238.	96.	2020
2025	7.15E+06	3.14E+08	225.	181.	225.	121.	225.	98.	2025
2030	5.31E+06	3.43E+08	279.	188.	279.	123.	279.	99.	2030
2035	3.94E+06	3.66E+08	27-.	193.	278.	125.	278.	99.	2035
2040	1.53E+06	3.79E+08	543.	199.	543.	126.	543.	100.	2040
2045	0.	3.79E+08	0.	206.	0.	126.	0.	100.	2045
2050	0.	3.79E+08	0.	208.	0.	126.	0.	100.	2050
2055	0.	3.79E+08	0.	208.	0.	126.	0.	100.	2055
2060	0.	3.79E+08	0.	208.	0.	126.	0.	100.	2060
2065	0.	3.79E+08	0.	208.	0.	126.	0.	100.	2065
2070	0.	3.79E+08	0.	208.	0.	126.	0.	100.	2070

a. Unit cost at time of reactor discharge.

TABLE 10.E.141. Case 4A - Deferred Decision for Once-Through Cycle - Repository in Salt - Reference Treatment - Total System Waste Management Costs Including Spent Fuel Handling and Storage - $ Millions at 0% Discount Rate

YEAR	REACTOR TO ISFSR	ISFSR STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACKAGING	ISFSR TO PACKAGING	PACKAGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOSITORY COST	TOTAL COST	YEAR
1980	0.	0.	132.	0.	0.	0.	0.	0.	0.	0.	0.	132.	1980
1985	39.	39.	468.	0.	0.	13.	16.	0.	0.	0.	0.	560.	1985
1990	103.	208.	870.	185.	0.	195.	238.	0.	0.	0.	0.	1803.	1990
1995	230.	781.	1408.	430.	0.	506.	616.	0.	0.	0.	0.	3971.	1995
2000	468.	1305.	2290.	745.	0.	931.	1066.	0.	0.	97.	155.	7109.	2000
2005	629.	2283.	3031.	1258.	0.	1564.	1066.	0.	0.	1739.	2797.	14771.	2005
2010	846.	3290.	4665.	1914.	0.	2387.	1066.	0.	0.	3671.	5904.	23693.	2010
2015	1049.	4193.	5895.	2549.	0.	3217.	1066.	0.	0.	5603.	9012.	32620.	2015
2020	1260.	5097.	7043.	3239.	0.	4053.	1066.	0.	0.	7151.	11503.	40422.	2020
2025	1404.	5921.	8130.	3839.	0.	4815.	1066.	0.	0.	8695.	13664.	47345.	2025
2030	1509.	6602.	9060.	4330.	0.	5525.	1066.	0.	0.	9768.	15660.	53710.	2030
2035	1703.	7107.	9791.	4653.	0.	6112.	1066.	0.	0.	10745.	17347.	58455.	2035
2040	1773.	7596.	10313.	5213.	0.	6568.	1066.	0.	0.	11588.	18639.	62756.	2040
2045	1777.	7738.	10508.	5435.	0.	6875.	1066.	0.	0.	12130.	19511.	65060.	2045
2050	1777.	7739.	10510.	5493.	0.	6923.	1066.	0.	0.	12215.	19648.	65372.	2050
2055	1777.	7739.	10510.	5493.	0.	6923.	1066.	0.	0.	12215.	19648.	65372.	2055
2060	1777.	7739.	10510.	5493.	0.	6923.	1066.	0.	0.	12215.	19648.	65372.	2060
2065	1777.	7739.	10510.	5493.	0.	6923.	1066.	0.	0.	12215.	19648.	65372.	2065
2070	1777.	7739.	10510.	5493.	0.	6923.	1066.	0.	0.	12215.	19648.	65372.	2070

TABLE 10.E.142. Case 4A - Deferred Decision for Once-Through Cycle - Repository in Granite - Reference Treatment - Total System Waste Management Costs Including Spent Fuel Handling and Storage - $ Millions at 0% Discount Rate

YEAR	REACTOR TO ISFSB	ISFSB STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACKAGING	ISFSB TO PACKAGING	PACKAGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOSITORY COST	TOTAL COST	YEAR
1980	0.	0.	132.	0.	0.	0.	0.	0.	0.	0.	0.	132.	1980
1985	29.	39.	444.	0.	0.	13.	16.	0.	0.	0.	0.	540.	1985
1990	108.	298.	879.	195.	0.	195.	238.	0.	0.	0.	0.	1903.	1990
1995	230.	741.	1448.	430.	0.	506.	616.	0.	0.	0.	0.	3971.	1995
2000	408.	1395.	2290.	745.	0.	931.	1066.	0.	0.	97.	233.	7186.	2000
2005	628.	2283.	3431.	1254.	0.	1564.	1066.	0.	0.	1739.	4193.	16167.	2005
2010	846.	3240.	4665.	1914.	0.	2387.	1066.	0.	0.	3671.	8851.	26639.	2010
2015	1064.	4193.	5895.	2559.	0.	3217.	1066.	0.	0.	5603.	13510.	37118.	2015
2020	1260.	5097.	7063.	3229.	0.	4053.	1066.	0.	0.	7151.	17243.	46162.	2020
2025	1444.	5921.	8130.	3329.	0.	4815.	1066.	0.	0.	8495.	20483.	54184.	2025
2030	1590.	6642.	9049.	4390.	0.	5525.	1066.	0.	0.	9748.	23505.	61534.	2030
2035	1753.	7107.	9791.	4893.	0.	6112.	1066.	0.	0.	10785.	26004.	67512.	2035
2040	1773.	7596.	10313.	5213.	0.	6568.	1066.	0.	0.	11588.	27940.	72058.	2040
2045	1777.	7738.	10508.	5455.	0.	6875.	1066.	0.	0.	12130.	29248.	74797.	2045
2050	1777.	7739.	10510.	5493.	0.	6923.	1066.	0.	0.	12215.	29454.	75177.	2050
2055	1777.	7739.	10510.	5493.	0.	6923.	1066.	0.	0.	12215.	29454.	75177.	2055
2060	1777.	7739.	10510.	5493.	0.	6923.	1066.	0.	0.	12215.	29454.	75177.	2060
2065	1777.	7739.	10510.	5493.	0.	6923.	1066.	0.	0.	12215.	29454.	75177.	2065
2070	1777.	7739.	10510.	5493.	0.	6923.	1066.	0.	0.	12215.	29454.	75177.	2070

TABLE 10.E.143. Case 4A - Deferred Decision for Once-Through Cycle - Repository in Shale - Reference Treatment - Total System Waste Management Costs Including Spent Fuel Handling and Storage - $ Millions at 0% Discount Rate

YEAR	REACTOR TO ISFSB	ISFSB STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACKAGING	ISFSB TO PACKAGING	PACKAGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOSITORY COST	TOTAL COST	YEAR
1980	0.	0.	132.	0.	0.	0.	0.	0.	0.	0.	0.	132.	1980
1985	29.	39.	444.	0.	0.	13.	16.	0.	0.	0.	0.	540.	1985
1990	108.	298.	879.	185.	0.	195.	238.	0.	0.	0.	0.	1903.	1990
1995	230.	741.	1448.	430.	0.	506.	616.	0.	0.	0.	0.	3971.	1995
2000	408.	1395.	2290.	765.	0.	931.	1066.	0.	0.	97.	171.	7124.	2000
2005	628.	2283.	3431.	1254.	0.	1564.	1066.	0.	0.	1739.	3075.	15049.	2005
2010	846.	3240.	4655.	1910.	0.	2387.	1066.	0.	0.	3671.	6491.	24279.	2010
2015	1064.	4193.	5895.	2560.	0.	3217.	1066.	0.	0.	5603.	9907.	33515.	2015
2020	1260.	5097.	7063.	3229.	0.	4053.	1066.	0.	0.	7151.	12645.	41564.	2020
2025	1444.	5921.	8130.	3829.	0.	4815.	1066.	0.	0.	8495.	15021.	48722.	2025
2030	1590.	6642.	9069.	4390.	0.	5525.	1066.	0.	0.	9748.	17237.	55267.	2030
2035	1703.	7197.	9791.	4853.	0.	6112.	1066.	0.	0.	10785.	19070.	60578.	2035
2040	1773.	7596.	10313.	5213.	0.	6568.	1066.	0.	0.	11588.	20490.	64608.	2040
2045	1777.	7738.	10508.	5455.	0.	6875.	1066.	0.	0.	12130.	21449.	66998.	2045
2050	1777.	7739.	10510.	5493.	0.	6923.	1066.	0.	0.	12215.	21600.	67323.	2050
2055	1777.	7739.	10510.	5493.	0.	6923.	1066.	0.	0.	12215.	21600.	67323.	2055
2060	1777.	7739.	10510.	5493.	0.	6923.	1066.	0.	0.	12215.	21600.	67323.	2060
2065	1777.	7739.	10510.	5493.	0.	6923.	1066.	0.	0.	12215.	21600.	67323.	2065
2070	1777.	7739.	10510.	5493.	0.	6923.	1066.	0.	0.	12215.	21600.	67323.	2070

TABLE 10.E.144. Case 4A - Deferred Decision for Once-Through Cycle - Repository in Basalt - Reference Treatment - Total System Waste Management Costs Including Spent Fuel Handling and Storage - $ Millions at 0% Discount Rate

YEAR	REACTOR TO ISFSR	ISFSR STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACK-AGING	ISFSR TO PACK-AGING	PACK-AGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOS-ITORY COST	TOTAL COST	YEAR
1980	0.	0.	132.	0.	0.	0.	0.	0.	0.	0.	0.	132.	1980
1985	29.	39.	444.	0.	0.	13.	16.	0.	0.	0.	0.	540.	1985
1990	108.	298.	879.	135.	0.	195.	238.	0.	0.	0.	0.	1903.	1990
1995	230.	741.	1448.	430.	0.	506.	616.	0.	0.	0.	0.	3971.	1995
2000	408.	1395.	2290.	765.	0.	931.	1066.	0.	0.	97.	261.	7214.	2000
2005	628.	2263.	3431.	1244.	0.	1564.	1066.	0.	0.	1739.	4699.	16673.	2005
2010	846.	3240.	4665.	1914.	0.	2387.	1066.	0.	0.	3671.	9919.	27707.	2010
2015	1044.	4193.	5895.	2549.	0.	3217.	1066.	0.	0.	5603.	15140.	38744.	2015
2020	1260.	5097.	7063.	3229.	0.	4053.	1066.	0.	0.	7151.	19323.	48243.	2020
2025	1484.	5921.	8130.	3829.	0.	4815.	1066.	0.	0.	8495.	22955.	56656.	2025
2030	1500.	6642.	9069.	4390.	0.	5525.	1066.	0.	0.	9748.	26341.	64371.	2030
2035	1703.	7197.	9791.	4853.	0.	6112.	1066.	0.	0.	10785.	29142.	70650.	2035
2040	1773.	7596.	10313.	5213.	0.	6568.	1066.	0.	0.	11588.	31312.	75429.	2040
2045	1777.	7738.	10508.	5455.	0.	6875.	1066.	0.	0.	12130.	32777.	78326.	2045
2050	1777.	7739.	10510.	5493.	0.	6923.	1066.	0.	0.	12215.	33007.	78731.	2050
2055	1777.	7739.	10510.	5493.	0.	6923.	1066.	0.	0.	12215.	33007.	78731.	2055
2060	1777.	7739.	10510.	5493.	0.	6923.	1066.	0.	0.	12215.	33007.	78731.	2060
2065	1777.	7739.	10510.	5493.	0.	6923.	1066.	0.	0.	12215.	33007.	78731.	2065
2070	1777.	7739.	10510.	5493.	0.	6923.	1066.	0.	0.	12215.	33007.	78731.	2070

TABLE 10.E.145. Case 4A - Deferred Decision for Once-Through Cycle - Repository in Salt - Reference Treatment - Total System Waste Management Costs Including Spent Fuel Handling and Storage - $ Millions at 7% Discount Rate

YEAR	REACTOR TO ISFSR	ISFSR STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACKAGING	ISFSR TO PACKAGING	PACKAGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOSITORY COST	TOTAL COST	YEAR
1980	0.	0.	121.	0.	0.	0.	0.	0.	0.	0.	0.	121.	1980
1985	18.	24.	327.	0.	0.	7.	9.	0.	0.	0.	0.	385.	1985
1990	55.	184.	533.	37.	0.	93.	113.	0.	0.	0.	0.	1025.	1990
1995	68.	293.	725.	170.	0.	198.	241.	0.	0.	0.	0.	1724.	1995
2000	139.	450.	927.	251.	0.	300.	351.	0.	0.	20.	33.	2472.	2000
2005	177.	603.	1120.	336.	0.	404.	351.	0.	0.	299.	480.	3779.	2005
2010	204.	721.	1274.	416.	0.	510.	351.	0.	0.	537.	864.	4878.	2010
2015	223.	805.	1380.	478.	0.	583.	351.	0.	0.	707.	1137.	5664.	2015
2020	235.	862.	1457.	515.	0.	635.	351.	0.	0.	805.	1294.	6155.	2020
2025	244.	928.	1505.	532.	0.	670.	351.	0.	0.	845.	1391.	6466.	2025
2030	249.	932.	1535.	550.	0.	692.	351.	0.	0.	905.	1455.	6669.	2030
2035	251.	934.	1552.	570.	0.	706.	351.	0.	0.	929.	1494.	6787.	2035
2040	252.	941.	1560.	576.	0.	713.	351.	0.	0.	942.	1515.	6850.	2040
2045	252.	943.	1563.	579.	0.	717.	351.	0.	0.	948.	1525.	6878.	2045
2050	252.	943.	1563.	579.	0.	717.	351.	0.	0.	949.	1526.	6880.	2050
2055	252.	943.	1563.	579.	0.	717.	351.	0.	0.	949.	1526.	6880.	2055
2060	252.	943.	1563.	579.	0.	717.	351.	0.	0.	949.	1526.	6880.	2060
2065	252.	943.	1563.	579.	0.	717.	351.	0.	0.	949.	1526.	6880.	2065
2070	252.	943.	1563.	579.	0.	717.	351.	0.	0.	949.	1526.	6880.	2070

TABLE 10.E.146. Case 4A - Deferred Decision for Once-Through Cycle - Repository in Granite - Reference Treatment - Total System Waste Management Costs Including Spent Fuel Handling and Storage - $ Millions at 7% Discount Rate

YEAR	REACTOR TO ISFSB	ISFSB STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACKAGING	ISFSB TO PACKAGING	PACKAGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOSITORY COST	TOTAL COST	YEAR
1980	0.	0.	121.	0.	0.	0.	0.	0.	0.	0.	0.	121.	1980
1985	18.	24.	327.	0.	0.	7.	9.	0.	0.	0.	0.	385.	1985
1990	55.	144.	533.	87.	0.	93.	113.	0.	0.	0.	0.	1025.	1990
1995	96.	293.	725.	170.	0.	198.	241.	0.	0.	0.	0.	1729.	1995
2000	139.	430.	927.	251.	0.	300.	351.	0.	0.	20.	49.	2468.	2000
2005	177.	603.	1124.	336.	0.	409.	351.	0.	0.	299.	720.	4018.	2005
2010	204.	721.	1276.	416.	0.	510.	351.	0.	0.	537.	1295.	5310.	2010
2015	223.	805.	1380.	478.	0.	583.	351.	0.	0.	707.	1704.	6231.	2015
2020	235.	862.	1457.	515.	0.	635.	351.	0.	0.	805.	1940.	6801.	2020
2025	244.	899.	1505.	542.	0.	670.	351.	0.	0.	865.	2085.	7160.	2025
2030	248.	922.	1535.	560.	0.	692.	351.	0.	0.	905.	2182.	7395.	2030
2035	251.	934.	1552.	570.	0.	706.	351.	0.	0.	929.	2239.	7532.	2035
2040	252.	941.	1560.	576.	0.	713.	351.	0.	0.	942.	2271.	7606.	2040
2045	252.	943.	1563.	579.	0.	717.	351.	0.	0.	948.	2286.	7639.	2045
2050	252.	943.	1563.	579.	0.	717.	351.	0.	0.	949.	2288.	7642.	2050
2055	252.	943.	1563.	579.	0.	717.	351.	0.	0.	949.	2288.	7642.	2055
2060	252.	943.	1563.	579.	0.	717.	351.	0.	0.	949.	2288.	7642.	2060
2065	252.	943.	1563.	579.	0.	717.	351.	0.	0.	949.	2288.	7642.	2065
2070	252.	943.	1563.	579.	0.	717.	351.	0.	0.	949.	2288.	7642.	2070

TABLE 10.E.147. Case 4A - Deferred Decision for Once-Through Cycle - Repository in Shale - Reference Treatment - Total System Waste Management Costs Including Spent Fuel Handling and Storage - $ Millions at 7% Discount Rate

YEAR	REACTOR TO ISFSB	ISFSB STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACKAGING	ISFSB TO PACKAGING	PACKAGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOSITORY COST	TOTAL COST	YEAR
1980	0.	0.	121.	0.	0.	0.	0.	0.	0.	0.	0.	121.	1980
1985	18.	24.	327.	0.	0.	7.	9.	0.	0.	0.	0.	385.	1985
1990	55.	144.	533.	47.	0.	93.	113.	0.	0.	0.	0.	1025.	1990
1995	96.	203.	725.	170.	0.	198.	241.	0.	0.	0.	0.	1724.	1995
2000	139.	450.	927.	281.	0.	300.	351.	0.	0.	20.	36.	2875.	2000
2005	177.	603.	1124.	336.	0.	409.	351.	0.	0.	299.	528.	3826.	2005
2010	204.	721.	1276.	416.	0.	510.	351.	0.	0.	537.	950.	4964.	2010
2015	223.	805.	1344.	474.	0.	583.	351.	0.	0.	707.	1250.	5776.	2015
2020	235.	862.	1457.	515.	0.	635.	351.	0.	0.	805.	1423.	6283.	2020
2025	244.	899.	1505.	542.	0.	670.	351.	0.	0.	865.	1529.	6604.	2025
2030	248.	922.	1535.	560.	0.	692.	351.	0.	0.	905.	1600.	6813.	2030
2035	251.	934.	1552.	570.	0.	706.	351.	0.	0.	929.	1642.	6935.	2035
2040	252.	941.	1560.	576.	0.	713.	351.	0.	0.	942.	1665.	7001.	2040
2045	252.	943.	1563.	579.	0.	717.	351.	0.	0.	946.	1676.	7029.	2045
2050	252.	943.	1563.	579.	0.	717.	351.	0.	0.	949.	1678.	7032.	2050
2055	252.	943.	1563.	579.	0.	717.	351.	0.	0.	949.	1678.	7032.	2055
2060	252.	943.	1563.	579.	0.	717.	351.	0.	0.	949.	1678.	7032.	2060
2065	252.	943.	1563.	579.	0.	717.	351.	0.	0.	949.	1678.	7032.	2065
2070	252.	943.	1563.	579.	0.	717.	351.	0.	0.	949.	1678.	7032.	2070

TABLE 10.E.148. Case 4A - Deferred Decision for Once-Through Cycle - Repository in Basalt - Reference Treatment - Total System Waste Management Costs Including Spent Fuel Handling and Storage - $ Millions at 7% Discount Rate

YEAR	REACTOR TO ISFSR	ISFSR STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACKAGING	ISFSR TO PACKAGING	PACKAGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOSITORY COST	TOTAL COST	YEAR
1980	0.	0.	121.	0.	0.	0.	0.	0.	0.	0.	0.	121.	1980
1985	18.	24.	327.	0.	0.	7.	9.	0.	0.	0.	0.	385.	1985
1990	55.	144.	533.	87.	0.	93.	113.	0.	0.	0.	0.	1025.	1990
1995	96.	283.	725.	170.	0.	198.	241.	0.	0.	0.	0.	1724.	1995
2000	139.	450.	927.	251.	0.	300.	351.	0.	0.	20.	59.	2494.	2000
2005	177.	603.	1124.	336.	0.	409.	351.	0.	0.	299.	807.	4105.	2005
2010	204.	721.	1276.	416.	0.	510.	351.	0.	0.	537.	1451.	5466.	2010
2015	223.	805.	1384.	474.	0.	583.	351.	0.	0.	707.	1910.	6437.	2015
2020	235.	862.	1457.	515.	0.	635.	351.	0.	0.	805.	2174.	7035.	2020
2025	244.	899.	1505.	542.	0.	670.	351.	0.	0.	865.	2337.	7412.	2025
2030	248.	922.	1535.	560.	0.	692.	351.	0.	0.	905.	2445.	7658.	2030
2035	251.	934.	1552.	570.	0.	706.	351.	0.	0.	929.	2509.	7802.	2035
2040	252.	941.	1560.	576.	0.	713.	351.	0.	0.	942.	2545.	7880.	2040
2045	252.	943.	1563.	579.	0.	717.	351.	0.	0.	948.	2562.	7914.	2045
2050	252.	943.	1563.	579.	0.	717.	351.	0.	0.	949.	2564.	7918.	2050
2055	252.	943.	1563.	579.	0.	717.	351.	0.	0.	949.	2564.	7913.	2055
2060	252.	943.	1563.	579.	0.	717.	351.	0.	0.	949.	2564.	7918.	2060
2065	252.	943.	1563.	579.	0.	717.	351.	0.	0.	949.	2564.	7918.	2065
2070	252.	943.	1563.	579.	0.	717.	351.	0.	0.	949.	2564.	7918.	2070

TABLE 10.E.149. Case 4A - Deferred Decision for Once-Through Cycle - Repository in Salt - Reference Treatment - Total System Waste Management Costs Including Spent Fuel Handling and Storage - $ Millions at 10% Discount Rate

YEAR	REACTOR TO ISFSB	ISFSB STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACKAGING	ISFSB TO PACKAGING	PACKAGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOSITORY COST	TOTAL COST	YEAR
1980	0.	0.	118.	0.	0.	0.	0.	0.	0.	0.	0.	118.	1980
1985	15.	20.	291.	0.	0.	6.	7.	0.	0.	0.	0.	339.	1985
1990	42.	108.	444.	64.	0.	69.	84.	0.	0.	0.	0.	810.	1990
1995	68.	203.	567.	118.	0.	137.	166.	0.	0.	0.	0.	1240.	1995
2000	92.	291.	680.	163.	0.	194.	228.	0.	0.	11.	17.	1677.	2000
2005	111.	366.	776.	204.	0.	247.	228.	0.	0.	146.	235.	2313.	2005
2010	123.	416.	841.	238.	0.	290.	228.	0.	0.	247.	398.	2782.	2010
2015	130.	447.	881.	260.	0.	317.	228.	0.	0.	310.	499.	3073.	2015
2020	134.	466.	905.	273.	0.	334.	228.	0.	0.	342.	550.	3232.	2020
2025	136.	476.	910.	281.	0.	343.	228.	0.	0.	359.	578.	3320.	2025
2030	137.	482.	926.	285.	0.	349.	228.	0.	0.	369.	593.	3370.	2030
2035	138.	485.	930.	287.	0.	352.	228.	0.	0.	374.	602.	3395.	2035
2040	138.	486.	931.	288.	0.	353.	228.	0.	0.	376.	606.	3407.	2040
2045	138.	486.	932.	289.	0.	354.	228.	0.	0.	378.	607.	3411.	2045
2050	138.	486.	932.	289.	0.	354.	228.	0.	0.	378.	607.	3412.	2050
2055	138.	486.	932.	289.	0.	354.	228.	0.	0.	378.	607.	3412.	2055
2060	138.	486.	932.	289.	0.	354.	228.	0.	0.	378.	607.	3412.	2060
2065	138.	486.	932.	289.	0.	354.	228.	0.	0.	378.	607.	3412.	2065
2070	138.	486.	932.	289.	0.	354.	228.	0.	0.	378.	607.	3412.	2070

TABLE 10.E.150 Case 4A - Deferred Decision for Once Through Cycle - Repository in Granite - Reference Treatment
Total System Waste Management Costs Including Spent Fuel Handling and Storage
$ Millions at 10% Discount Rate

YEAR	REACTOR TO ISFSB	ISFSB STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACK-AGING	ISFSB TO PACK-AGING	PACK-AGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOS-ITORY COST	TOTAL COST	YEAR
1980	0.	0.	118.	0.	0.	0.	0.	0.	0.	0.	0.	118.	1980
1985	15.	20.	291.	0.	0.	6.	7.	0.	0.	0.	0.	339.	1985
1990	42.	108.	444.	64.	0.	69.	88.	0.	0.	0.	0.	810.	1990
1995	68.	203.	567.	118.	0.	137.	166.	0.	0.	0.	0.	1260.	1995
2000	92.	291.	680.	143.	0.	194.	228.	0.	0.	11.	26.	1666.	2000
2005	111.	366.	776.	204.	0.	247.	228.	0.	0.	10[illegible].	352.	2430.	2005
2010	123.	416.	841.	238.	0.	290.	228.	0.	0.	287.	597.	2980.	2010
2015	130.	447.	881.	260.	0.	317.	228.	0.	0.	310.	749.	3322.	2015
2020	134.	466.	905.	273.	0.	334.	228.	0.	0.	342.	825.	3507.	2020
2025	136.	476.	919.	281.	0.	343.	228.	0.	0.	359.	866.	3606.	2025
2030	137.	482.	926.	285.	0.	349.	228.	0.	0.	369.	890.	3666.	2030
2035	138.	485.	930.	287.	0.	352.	228.	0.	0.	374.	902.	3695.	2035
2040	138.	486.	931.	288.	0.	353.	228.	0.	0.	376.	908.	3709.	2040
2045	138.	486.	932.	289.	0.	354.	228.	0.	0.	378.	910.	3714.	2045
2050	138.	486.	932.	289.	0.	354.	228.	0.	0.	378.	911.	3715.	2050
2055	138.	486.	932.	289.	0.	354.	228.	0.	0.	378.	911.	3715.	2055
2060	138.	486.	932.	289.	0.	354.	228.	0.	0.	378.	911.	3715.	2060
2065	138.	486.	932.	289.	0.	354.	228.	0.	0.	378.	911.	3715.	2065
2070	138.	486.	932.	289.	0.	354.	228.	0.	0.	378.	911.	3715.	2070

TABLE 10.E.151 Case 4A - Deferred Decision for Once Through Cycle - Repository Shale - Reference Treatment
Total System Waste Management Costs Including Spent Fuel Handling and Storage
$ Millions at 10% Discount Rate

YEAR	REACTOR TO ISFSB	ISFSB STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACKAGING	ISFSB TO PACKAGING	PACKAGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOSITORY COST	TOTAL COST	YEAR
1980	0.	0.	118.	0.	0.	0.	0.	0.	0.	0.	0.	118.	1980
1985	15.	20.	291.	0.	0.	6.	7.	0.	0.	0.	0.	339.	1985
1990	42.	105.	444.	44.	0.	69.	44.	0.	0.	0.	0.	810.	1990
1995	68.	203.	567.	118.	0.	137.	166.	0.	0.	0.	0.	1260.	1995
2000	92.	291.	680.	143.	0.	194.	228.	0.	0.	11.	19.	1679.	2000
2005	111.	366.	776.	206.	0.	247.	228.	0.	0.	166.	258.	2336.	2005
2010	123.	416.	841.	238.	0.	290.	228.	0.	0.	267.	437.	2821.	2010
2015	130.	447.	881.	260.	0.	317.	228.	0.	0.	310.	549.	3123.	2015
2020	134.	466.	905.	273.	0.	334.	228.	0.	0.	342.	605.	3287.	2020
2025	136.	476.	919.	231.	0.	343.	228.	0.	0.	359.	635.	3377.	2025
2030	137.	482.	926.	245.	0.	349.	228.	0.	0.	369.	652.	3429.	2030
2035	138.	485.	930.	247.	0.	352.	228.	0.	0.	374.	661.	3455.	2035
2040	138.	486.	931.	248.	0.	353.	228.	0.	0.	376.	666.	3467.	2040
2045	138.	486.	932.	249.	0.	354.	228.	0.	0.	378.	668.	3472.	2045
2050	138.	486.	932.	249.	0.	354.	228.	0.	0.	378.	668.	3472.	2050
2055	138.	486.	932.	249.	0.	354.	228.	0.	0.	378.	668.	3472.	2055
2060	138.	486.	932.	249.	0.	354.	228.	0.	0.	378.	668.	3472.	2060
2065	138.	486.	932.	249.	0.	354.	228.	0.	0.	378.	668.	3472.	2065
2070	138.	486.	932.	249.	0.	354.	228.	0.	0.	378.	668.	3472.	2070

TABLE 10.E.152 Case 4A - Deferred Decision for Once Through Cycle - Repository in Basalt - Reference Treatment
Total System Waste Management Costs Including Spent Fuel Handling and Storage
$ Millions at 10% Discount Rate

YEAR	REACTOR TO ISFSI	ISFSI STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACKAGING	ISFSI TO PACKAGING	PACKAGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOSITORY COST	TOTAL COST	YEAR
1980	0.	0.	118.	0.	0.	0.	0.	0.	0.	0.	0.	118.	1980
1985	15.	20.	291.	0.	0.	6.	7.	0.	0.	0.	0.	339.	1985
1990	42.	100.	488.	48.	0.	69.	64.	0.	0.	0.	0.	810.	1990
1995	63.	203.	567.	118.	0.	137.	166.	0.	0.	0.	0.	1260.	1995
2000	92.	291.	680.	143.	0.	199.	226.	0.	0.	11.	29.	1689.	2000
2005	111.	466.	776.	208.	0.	247.	228.	0.	0.	196.	394.	2672.	2005
2010	123.	516.	841.	236.	0.	290.	228.	0.	0.	247.	669.	3052.	2010
2015	130.	447.	881.	260.	0.	317.	228.	0.	0.	310.	839.	3413.	2015
2020	134.	466.	905.	273.	0.	334.	228.	0.	0.	342.	925.	3606.	2020
2025	136.	476.	919.	231.	0.	343.	228.	0.	0.	359.	970.	3713.	2025
2030	137.	482.	926.	255.	0.	349.	228.	0.	0.	369.	997.	3773.	2030
2035	138.	485.	930.	247.	0.	352.	228.	0.	0.	374.	1011.	3804.	2035
2040	135.	486.	931.	248.	0.	353.	228.	0.	0.	376.	1017.	3819.	2040
2045	133.	486.	932.	249.	0.	354.	228.	0.	0.	378.	1020.	3824.	2045
2050	134.	486.	932.	249.	0.	354.	228.	0.	0.	378.	1020.	3825.	2050
2055	132.	486.	932.	249.	0.	354.	228.	0.	0.	378.	1020.	3825.	2055
2060	138.	486.	932.	249.	0.	354.	228.	0.	0.	378.	1020.	3825.	2060
2065	138.	486.	932.	249.	0.	354.	228.	0.	0.	378.	1020.	3825.	2065
2070	133.	486.	932.	249.	0.	354.	228.	0.	0.	378.	1020.	3825.	2070

TABLE 10.E.153 Case 4B - Deferred Decision for U and Pu Recycle - Repository in Salt - Reference Treatment
Unit Power Cost for TRU-Waste Management Including Spent Fuel Handling and Storage

	POWER GENERATION KWHR		UNDISCOUNTED AVERAGE MILLS/KWHR		DISCOUNTED AVERAGE (7 PCT) MILLS/KWHR		DISCOUNTED AVERAGE (10 PCT) MILLS/KWHR		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	1.78E+11	4.92E+11	.05	.02	.05	.02	.05	.02	1975
1980	3.44E+11	1.86E+12	.11	.07	.11	.07	.11	.06	1980
1985	6.82E+11	4.45E+12	.20	.12	.20	.11	.20	.10	1985
1990	1.11E+12	9.17E+12	.31	.21	.31	.18	.31	.17	1990
1995	1.67E+12	1.63E+13	.28	.24	.28	.21	.28	.20	1995
2000	2.32E+12	2.66E+13	.30	.26	.30	.23	.30	.21	2000
2005	2.40E+12	3.87E+13	.38	.29	.38	.25	.38	.23	2005
2010	2.31E+12	5.04E+13	.46	.32	.46	.26	.46	.24	2010
2015	2.10E+12	6.15E+13	.73	.37	.73	.29	.73	.25	2015
2020	1.82E+12	7.11E+13	1.19	.45	1.19	.31	1.19	.27	2020
2025	1.37E+12	7.89E+13	1.91	.56	1.91	.34	1.91	.28	2025
2030	9.23E+11	8.44E+13	3.11	.69	3.11	.36	3.11	.29	2030
2035	4.50E+11	8.76E+13	5.86	.82	5.86	.38	5.86	.29	2035
2040	2.67E+10	8.85E+13	76.63	.95	76.63	.39	76.63	.30	2040
2045	0.	8.85E+13	0.00	1.03	0.00	.40	0.00	.30	2045
2050	0.	8.85E+13	0.00	1.04	0.00	.40	0.00	.30	2050
2055	0.	8.85E+13	0.00	1.04	0.00	.40	0.00	.30	2055
2060	0.	8.85E+13	0.00	1.04	0.00	.40	0.00	.30	2060
2065	0.	8.85E+13	0.00	1.04	0.00	.40	0.00	.30	2065
2070	0.	8.85E+13	0.00	1.04	0.00	.40	0.00	.30	2070

TABLE 10.E.154 Case 4B - Deferred Decision for U and Pu Recycle - Repository in Granite - Reference Treatment
Unit Power Cost for TRU-Waste Management Including Spent Fuel Handling and Storage

	POWER GENERATION		UNDISCOUNTED AVERAGE		DISCOUNTED AVERAGE (7 PCT)		DISCOUNTED AVERAGE (10 PCT)		
	KWHR		MILLS/KWHR		MILLS/KWHR		MILLS/KWHR		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	1.78E+11	4.92E+11	.05	.02	.05	.02	.05	.02	1975
1980	3.44E+11	1.86E+12	.11	.07	.11	.07	.11	.06	1980
1985	6.82E+11	4.45E+12	.20	.12	.20	.11	.20	.10	1985
1990	1.11E+12	9.17E+12	.31	.21	.31	.18	.31	.17	1990
1995	1.67E+12	1.63E+13	.28	.24	.28	.21	.28	.20	1995
2000	2.32E+12	2.66E+13	.30	.26	.30	.23	.30	.21	2000
2005	2.40E+12	3.87E+13	.38	.29	.38	.25	.38	.23	2005
2010	2.31E+12	5.04E+13	.46	.32	.46	.26	.46	.24	2010
2015	2.10E+12	6.15E+13	.77	.37	.77	.29	.77	.25	2015
2020	1.82E+12	7.11E+13	1.32	.47	1.32	.32	1.32	.27	2020
2025	1.37E+12	7.89E+13	2.15	.59	2.15	.35	2.15	.28	2025
2030	9.23E+11	8.44E+13	3.69	.74	3.69	.37	3.69	.29	2030
2035	4.50E+11	8.76E+13	7.04	.91	7.04	.40	7.04	.30	2035
2040	2.67E+10	8.85E+13	95.42	1.06	95.42	.41	95.42	.31	2040
2045	0.	8.85E+13	0.00	1.17	0.00	.42	0.00	.31	2045
2050	0.	8.85E+13	0.00	1.19	0.00	.42	0.00	.31	2050
2055	0.	8.85E+13	0.00	1.19	0.00	.42	0.00	.31	2055
2060	0.	8.85E+13	0.00	1.19	0.00	.42	0.00	.31	2060
2065	0.	8.85E+13	0.00	1.19	0.00	.42	0.00	.31	2065
2070	0.	8.85E+13	0.00	1.19	0.00	.42	0.00	.31	2070

TABLE 10.E.155 Case 4B - Deferred Decision for U and Pu Recycle - Repository in Shale - Reference Treatment
Unit Power Cost for TRU-Waste Management Including Spent Fuel Handling and Storage

	POWER GENERATION		UNDISCOUNTED AVERAGE		DISCOUNTED AVERAGE (7 PCT)		DISCOUNTED AVERAGE (10 PCT)		
	KWHR		MILLS/KWHR		MILLS/KWHR		MILLS/KWHR		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	1.78E+11	4.92E+11	.05	.02	.05	.02	.05	.02	1975
1980	3.44E+11	1.86E+12	.11	.07	.11	.07	.11	.06	1980
1985	6.82E+11	4.45E+12	.20	.12	.20	.11	.20	.10	1985
1990	1.11E+12	9.17E+12	.31	.21	.31	.18	.31	.17	1990
1995	1.67E+12	1.63E+13	.28	.24	.28	.21	.28	.20	1995
2000	2.32E+12	2.66E+13	.30	.26	.30	.23	.30	.21	2000
2005	2.40E+12	3.87E+13	.38	.29	.38	.25	.38	.23	2005
2010	2.31E+12	5.04E+13	.46	.32	.46	.26	.46	.24	2010
2015	2.10E+12	6.15E+13	.74	.37	.74	.29	.74	.25	2015
2020	1.82E+12	7.11E+13	1.25	.46	1.25	.31	1.25	.27	2020
2025	1.37E+12	7.89E+13	2.12	.57	2.12	.34	2.12	.28	2025
2030	9.23E+11	8.44E+13	3.43	.72	3.43	.37	3.43	.29	2030
2035	4.50E+11	8.76E+13	6.53	.87	6.53	.39	6.53	.30	2035
2040	2.67E+10	8.85E+13	87.19	1.01	87.19	.40	87.19	.30	2040
2045	0.	8.85E+13	0.00	1.11	0.00	.41	0.00	.30	2045
2050	0.	8.85E+13	0.00	1.14	0.00	.41	0.00	.30	2050
2055	0.	8.85E+13	0.00	1.14	0.00	.41	0.00	.30	2055
2060	0.	8.85E+13	0.00	1.14	0.00	.41	0.00	.30	2060
2065	0.	8.85E+13	0.00	1.14	0.00	.41	0.00	.30	2065
2070	0.	8.85E+13	0.00	1.14	0.00	.41	0.00	.30	2070

TABLE 10.E.156 Case 4B - Deferred Decision for U and Pu Recycle - Repository in Basalt - Reference Treatment
Unit Power Cost for TRU-Waste Management Including Spent Fuel Handling and Storage

	POWER GENERATION		UNDISCOUNTED AVERAGE		DISCOUNTED AVERAGE (7 PCT)		DISCOUNTED AVERAGE (10 PCT)		
	KWHR		MILLS/KWHR		MILLS/KWHR		MILLS/KWHR		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	1.78E+11	4.92E+11	.05	.02	.05	.02	.05	.02	1975
1980	3.44E+11	1.86E+12	.11	.07	.11	.07	.11	.06	1980
1985	6.82E+11	4.45E+12	.20	.12	.20	.11	.20	.10	1985
1990	1.11E+12	9.17E+12	.31	.21	.31	.18	.31	.17	1990
1995	1.67E+12	1.63E+13	.28	.24	.28	.21	.28	.20	1995
2000	2.32E+12	2.66E+13	.30	.26	.30	.23	.30	.21	2000
2005	2.40E+12	3.87E+13	.38	.29	.38	.25	.38	.23	2005
2010	2.31E+12	5.04E+13	.46	.32	.46	.26	.46	.24	2010
2015	2.10E+12	6.15E+13	.76	.37	.76	.29	.76	.25	2015
2020	1.82E+12	7.11E+13	1.27	.47	1.27	.32	1.27	.27	2020
2025	1.37E+12	7.89E+13	2.14	.58	2.14	.35	2.14	.28	2025
2030	9.23E+11	8.44E+13	3.47	.73	3.47	.37	3.47	.29	2030
2035	4.50E+11	8.76E+13	6.59	.88	6.59	.39	6.59	.30	2035
2040	2.67E+10	8.85E+13	88.16	1.02	88.16	.41	88.16	.30	2040
2045	0.	8.85E+13	0.00	1.13	0.00	.41	0.00	.30	2045
2050	0.	8.85E+13	0.00	1.16	0.00	.41	0.00	.31	2050
2055	0.	8.85E+13	0.00	1.16	0.00	.41	0.00	.31	2055
2060	0.	8.85E+13	0.00	1.16	0.00	.41	0.00	.31	2060
2065	0.	8.85E+13	0.00	1.16	0.00	.41	0.00	.31	2065
2070	0.	8.85E+13	0.00	1.16	0.00	.41	0.00	.31	2070

TABLE 10.E.157 Case 4B - Deferred Decision for U and Pu Recycle - Repository in Salt - Reference Treatment Unit Fuel Cost of TRU-Waste Management Including Spent Fuel Handling and Storage[a]

	THRUPUT KG DISCHARGED		UNDISCOUNTED AVERAGE DOLLARS/KG DISCHARGED		DISCOUNTED AVERAGE (7 PCT) DOLLARS/KG DISCHARGED		DISCOUNTED AVERAGE (10 PCT) DOLLARS/KG DISCHARGED		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	6.99E+05	1.78E+06	12.	5.	12.	5.	12.	5.	1975
1980	1.27E+06	6.93E+06	30.	19.	30.	18.	30.	17.	1980
1985	2.48E+06	1.63E+07	55.	33.	55.	30.	55.	28.	1985
1990	4.07E+06	3.37E+07	83.	55.	83.	48.	83.	45.	1990
1995	6.21E+06	6.02E+07	75.	66.	75.	57.	75.	53.	1995
2000	8.74E+06	9.86E+07	79.	70.	79.	62.	79.	57.	2000
2005	9.09E+06	1.44E+08	100.	77.	100.	67.	100.	61.	2005
2010	9.24E+06	1.90E+08	114.	84.	114.	71.	114.	64.	2010
2015	8.60E+06	2.35E+08	177.	97.	177.	76.	177.	68.	2015
2020	7.72E+06	2.75E+08	280.	117.	280.	83.	280.	71.	2020
2025	7.15E+06	3.14E+08	367.	140.	367.	89.	367.	74.	2025
2030	5.31E+06	3.43E+08	539.	169.	539.	95.	539.	77.	2030
2035	3.96E+06	3.66E+08	665.	196.	665.	99.	665.	78.	2035
2040	1.53E+06	3.79E+08	1333.	221.	1333.	102.	1333.	79.	2040
2045	0.	3.79E+08	148.	240.	148.	103.	148.	79.	2045
2050	0.	3.79E+08	0.	243.	0.	104.	0.	79.	2050
2055	0.	3.79E+08	0.	243.	0.	104.	0.	79.	2055
2060	0.	3.79E+08	0.	243.	0.	104.	0.	79.	2060
2065	0.	3.79E+08	0.	243.	0.	104.	0.	79.	2065
2070	0.	3.79E+08	0.	243.	0.	104.	0.	79.	2070

a. Unit cost at time of reactor discharge.

TABLE 10.E.158 Case 4B - Deferred Decision for U and Pu Recycle - Repository in Granite - Reference Treatment
Unit Fuel Cost of TRU-Waste Management Including Spent Fuel Handling and Storage[a]

	THRUPUT		UNDISCOUNTED AVERAGE		DISCOUNTED AVERAGE (7 PCT)		DISCOUNTED AVERAGE (10 PCT)		
	KG DISCHARGED		DOLLARS/KG DISCHARGED		DOLLARS/KG DISCHARGED		DOLLARS/KG DISCHARGED		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	6.90E+05	1.78E+06	12.	5.	12.	5.	12.	5.	1975
1980	1.27E+06	6.93E+06	30.	19.	30.	18.	30.	17.	1980
1985	2.48E+06	1.63E+07	55.	33.	55.	30.	55.	28.	1985
1990	4.07E+06	3.37E+07	83.	56.	83.	48.	83.	45.	1990
1995	6.21E+06	6.02E+07	75.	66.	75.	57.	75.	53.	1995
2000	8.74E+06	9.86E+07	79.	70.	79.	62.	79.	57.	2000
2005	9.09E+06	1.44E+08	100.	77.	100.	67.	100.	61.	2005
2010	9.24E+06	1.90E+08	115.	84.	115.	71.	115.	64.	2010
2015	8.60E+06	2.35E+08	186.	98.	186.	77.	186.	68.	2015
2020	7.72E+06	2.75E+08	299.	120.	299.	84.	299.	72.	2020
2025	7.19E+06	3.14E+08	411.	147.	411.	91.	411.	75.	2025
2030	5.31E+06	3.43E+08	602.	180.	602.	98.	602.	78.	2030
2035	3.96E+06	3.66E+08	748.	211.	748.	103.	748.	80.	2035
2040	1.53E+06	3.79E+08	1534.	239.	1534.	106.	1534.	81.	2040
2045	0.	3.79E+08	215.	265.	215.	107.	215.	81.	2045
2050	0.	3.79E+08	0.	270.	0.	108.	0.	81.	2050
2055	0.	3.79E+08	0.	270.	0.	108.	0.	81.	2055
2060	0.	3.79E+08	0.	270.	0.	108.	0.	81.	2060
2065	0.	3.79E+08	0.	270.	0.	108.	0.	81.	2065
2070	0.	3.79E+08	0.	270.	0.	108.	0.	81.	2070

a. Unit cost at time of reactor discharge.

TABLE 10.E.159 Case 4B - Deferred Decision for U and Pu Recycle - Repository in Shale - Reference Treatment Unit Fuel Cost of TRU-Waste Management Including Spent Fuel Handling and Storage[a]

	THRUPUT		UNDISCOUNTED AVERAGE		DISCOUNTED AVERAGE (7 PCT)		DISCOUNTED AVERAGE (10 PCT)		
	KG DISCHARGED		DOLLARS/KG DISCHARGED		DOLLARS/KG DISCHARGED		DOLLARS/KG DISCHARGED		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	6.90E+05	1.78E+06	12.	5.	12.	5.	12.	5.	1975
1980	1.27E+06	6.93E+06	30.	19.	30.	18.	30.	17.	1980
1985	2.48E+06	1.63E+07	55.	33.	55.	30.	55.	28.	1985
1990	4.07E+06	3.37E+07	83.	56.	83.	48.	83.	45.	1990
1995	6.21E+06	6.02E+07	75.	66.	75.	57.	75.	53.	1995
2000	8.74E+06	9.86E+07	79.	70.	79.	62.	79.	57.	2000
2005	9.09E+06	1.44E+08	100.	77.	100.	67.	100.	61.	2005
2010	9.24E+06	1.90E+08	114.	84.	114.	71.	114.	64.	2010
2015	8.60E+06	2.35E+08	182.	97.	182.	77.	182.	68.	2015
2020	7.72E+06	2.75E+08	293.	119.	293.	84.	293.	71.	2020
2025	7.15E+06	3.14E+08	407.	145.	407.	90.	407.	75.	2025
2030	5.31E+06	3.43E+08	596.	177.	596.	97.	596.	77.	2030
2035	3.96E+06	3.66E+08	741.	208.	741.	102.	741.	79.	2035
2040	1.53E+06	3.79E+08	1517.	236.	1517.	105.	1517.	80.	2040
2045	0.	3.79E+08	230.	260.	230.	107.	230.	81.	2045
2050	0.	3.79E+08	0.	265.	0.	107.	0.	81.	2050
2055	0.	3.79E+08	0.	266.	0.	107.	0.	81.	2055
2060	0.	3.79E+08	0.	266.	0.	107.	0.	81.	2060
2065	0.	3.79E+08	0.	266.	0.	107.	0.	81.	2065
2070	0.	3.79E+08	0.	266.	0.	107.	0.	81.	2070

a. Unit cost at time of reactor discharge.

TABLE 10.E.160 Case 4B - Deferred Decision for U and Pu Recycle - Repository in Basalt - Reference Treatment Unit Fuel Cost of TRU-Waste Management Including Spent Fuel Handling and Storage[a]

	THRUPUT KG DISCHARGED		UNDISCOUNTED AVERAGE DOLLARS/KG DISCHARGED		DISCOUNTED AVERAGE (7 PCT) DOLLARS/KG DISCHARGED		DISCOUNTED AVERAGE (10 PCT) DOLLARS/KG DISCHARGED		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	5.99E+05	1.78E+06	12.	5.	12.	5.	12.	5.	1975
1980	1.27E+06	6.93E+06	30.	19.	30.	18.	30.	17.	1980
1985	2.48E+06	1.63E+07	55.	33.	55.	30.	55.	28.	1985
1990	4.07E+06	3.37E+07	83.	56.	83.	48.	83.	45.	1990
1995	6.21E+06	6.02E+07	75.	66.	75.	57.	75.	53.	1995
2000	8.74E+06	9.86E+07	79.	70.	79.	62.	79.	57.	2000
2005	9.09E+06	1.44E+08	100.	77.	100.	67.	100.	61.	2005
2010	9.24E+06	1.90E+08	115.	84.	115.	71.	115.	64.	2010
2015	8.60E+06	2.35E+08	189.	98.	189.	77.	189.	68.	2015
2020	7.72E+06	2.75E+08	310.	121.	310.	84.	310.	72.	2020
2025	7.15E+06	3.19E+08	412.	149.	412.	92.	412.	75.	2025
2030	5.31E+06	3.43E+08	640.	183.	640.	98.	640.	78.	2030
2035	3.96E+06	3.66E+08	800.	217.	800.	104.	800.	80.	2035
2040	1.53E+06	3.79E+08	1660.	247.	1660.	107.	1660.	81.	2040
2045	0.	3.79E+08	265.	273.	265.	109.	265.	82.	2045
2050	0.	3.79E+08	0.	278.	0.	109.	0.	82.	2050
2055	0.	3.79E+08	0.	278.	0.	109.	0.	82.	2055
2060	0.	3.79E+08	0.	278.	0.	109.	0.	82.	2060
2065	0.	3.79E+08	0.	279.	0.	109.	0.	82.	2065
2070	0.	3.79E+08	0.	279.	0.	109.	0.	82.	2070

a. Unit cost at time of reactor discharge.

TABLE 10.E.161 Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment
Costs for TRU-Waste Transportation
$ Millions at 0% Discount Rate

YEAR	SOLID HIGH LEVEL WASTE ANNUAL	SOLID HIGH LEVEL WASTE CUMULATIVE	HULLS AND ASSEMBLY HARDWARE WASTE ANNUAL	HULLS AND ASSEMBLY HARDWARE WASTE CUMULATIVE	TOTAL INTERMEDIATE LEVEL WASTE ANNUAL	TOTAL INTERMEDIATE LEVEL WASTE CUMULATIVE	TOTAL LOW LEVEL WASTE ANNUAL	TOTAL LOW LEVEL WASTE CUMULATIVE	TOTAL FOR ALL CLASSIFICATIONS ANNUAL	TOTAL FOR ALL CLASSIFICATIONS CUMULATIVE	YEAR
1985	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1985
1990	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1990
1995	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1995
2000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2000
2005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2005
2010	0.00	0.00	2.33	2.33	1.74	1.74	.11	.11	4.18	4.18	2010
2015	2.16	2.16	18.64	62.92	13.95	47.07	1.06	3.44	35.80	115.59	2015
2020	17.27	58.20	37.29	212.06	27.90	158.65	2.13	11.94	84.58	440.93	2020
2025	34.54	196.44	48.94	440.43	36.61	329.50	2.67	20.84	122.75	991.22	2025
2030	45.33	408.00	48.94	685.11	36.61	512.56	2.33	37.17	133.21	1642.84	2030
2035	45.33	634.66	48.94	929.80	36.61	695.62	1.91	47.56	132.79	2307.63	2035
2040	45.33	861.37	41.05	1167.49	31.38	873.44	3.10	60.94	121.76	2963.20	2040
2045	38.86	1081.51	18.72	1326.03	14.00	992.05	.66	66.51	72.23	3466.10	2045
2050	17.34	1228.37	0.00	1326.03	0.00	992.05	0.00	66.51	17.34	3612.96	2050
2055	0.00	1228.37	0.00	1326.03	0.00	992.05	0.00	66.51	0.00	3612.96	2055
2060	0.00	1228.37	0.00	1326.03	0.00	992.05	0.00	66.51	0.00	3612.96	2060
2065	0.00	1228.37	0.00	1326.03	0.00	992.05	0.00	66.51	0.00	3612.96	2065
2070	0.00	1228.37	0.00	1326.03	0.00	992.05	.36	66.87	.36	3613.32	2070
2075	0.00	1228.37	0.00	1326.03	0.00	992.05	5.78	74.09	5.78	3620.54	2075

TABLE 10.E.162 Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment
System Spent Fuel Waste Management Costs
$ Millions at 0% Discount Rate

YEAR	REACTOR TO ISFSB	ISFSB STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACKAGING	ISFSB TO PACKAGING	PACKAGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOSITORY COST	TOTAL COST	YEAR
1980	0.	0.	132.	0.	0.	0.	0.	0.	0.	0.	0.	132.	1980
1985	29.	39.	444.	0.	0.	13.	16.	0.	0.	0.	0.	540.	1985
1990	108.	298.	879.	185.	0.	195.	238.	0.	0.	0.	0.	1903.	1990
1995	230.	741.	1468.	430.	0.	506.	616.	0.	0.	0.	0.	3971.	1995
2000	408.	1395.	2290.	765.	0.	931.	1133.	0.	0.	0.	0.	6923.	2000
2005	628.	2283.	3431.	1264.	0.	1564.	1902.	0.	0.	0.	0.	11071.	2005
2010	846.	3240.	4665.	1914.	0.	2387.	2888.	15.	0.	0.	0.	15955.	2010
2015	1044.	4193.	5895.	2559.	0.	3217.	3514.	412.	0.	0.	0.	20865.	2015
2020	1260.	5097.	7063.	3229.	0.	4053.	3621.	1389.	0.	0.	0.	25711.	2020
2025	1444.	6211.	8703.	3229.	0.	4053.	3621.	2885.	0.	0.	0.	30146.	2025
2030	1590.	7668.	11108.	3229.	0.	4053.	3621.	4468.	0.	0.	0.	35757.	2030
2035	1703.	9154.	13688.	3229.	0.	4053.	3621.	5086.	843.	0.	0.	41376.	2035
2040	1773.	10036.	15173.	3229.	0.	4053.	3621.	5086.	2149.	0.	0.	45119.	2040
2045	1777.	10248.	15513.	3229.	0.	4053.	3621.	5086.	3020.	0.	0.	46545.	2045
2050	1777.	10248.	15513.	3229.	0.	4053.	3621.	5086.	3020.	0.	0.	46545.	2050
2055	1777.	10248.	15513.	3229.	0.	4053.	3621.	5086.	3020.	0.	0.	46545.	2055
2060	1777.	10248.	15513.	3229.	0.	4053.	3621.	5086.	3020.	0.	0.	46545.	2060
2065	1777.	10248.	15513.	3229.	0.	4053.	3621.	5086.	3020.	0.	0.	46545.	2065
2070	1777.	10248.	15513.	3229.	0.	4053.	3621.	5086.	3020.	0.	0.	46545.	2070

TABLE 10.E.163 Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment
Costs for Geologic Repository in Salt
$ Millions at 0% Discount Rate

YEAR	SOLID HIGH LEVEL WASTE ANNUAL	SOLID HIGH LEVEL WASTE CUMULATIVE	HULLS AND ASSEMBLY HARDWARE WASTE ANNUAL	HULLS AND ASSEMBLY HARDWARE WASTE CUMULATIVE	TOTAL INTERMEDIATE LEVEL WASTE ANNUAL	TOTAL INTERMEDIATE LEVEL WASTE CUMULATIVE	TOTAL LOW LEVEL WASTE ANNUAL	TOTAL LOW LEVEL WASTE CUMULATIVE	TOTAL FOR ALL CLASSIFICATIONS ANNUAL	TOTAL FOR ALL CLASSIFICATIONS CUMULATIVE	YEAR
1985	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1985
1990	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1990
1995	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1995
2000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2000
2005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2005
2010	0.00	0.00	1.87	1.87	12.19	12.19	1.33	1.33	15.39	15.39	2010
2015	12.26	12.26	14.91	50.33	97.45	328.92	13.12	42.67	137.75	434.19	2015
2020	98.06	330.94	29.83	149.65	194.92	1108.60	26.46	148.20	349.27	1757.47	2020
2025	196.14	1115.52	39.15	352.34	255.83	2302.47	33.10	308.51	524.22	4078.84	2025
2030	257.43	2316.83	39.15	548.09	255.83	3581.62	28.89	461.52	581.30	6908.07	2030
2035	257.43	3603.96	39.15	743.84	255.83	4860.77	23.71	590.46	576.11	9799.03	2035
2040	257.43	4891.09	33.56	933.09	219.28	6103.38	38.51	756.48	548.78	12684.94	2040
2045	220.65	6141.40	14.97	1060.82	97.85	6932.17	8.14	825.46	341.61	14959.69	2045
2050	98.46	6975.40	0.00	1060.82	0.00	6932.17	0.00	825.46	98.46	15793.85	2050
2055	0.00	6975.40	0.00	1060.82	0.00	6932.17	0.00	825.46	0.00	15793.85	2055
2060	0.00	6975.40	0.00	1060.82	0.00	6932.17	0.00	825.46	0.00	15793.85	2060
2065	0.00	6975.40	0.00	1060.82	0.00	6932.17	0.00	825.46	0.00	15793.85	2065
2070	0.00	6975.40	0.00	1060.82	0.00	6932.17	4.52	829.98	4.52	15798.37	2070
2075	0.00	6975.40	0.00	1060.82	0.00	6932.17	72.33	920.39	72.33	15888.78	2075

TABLE 10.E.164 Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment
Non-Spent Fuel System Waste Management Costs for Repository in Salt
$ Millions at 0% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT HOW FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP-HOX	TOTAL SYSTEM	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	0.	0.	0.	1995
2000	0.	0.	0.	0.	0.	0.	0.	0.	0.	2000
2005	0.	0.	0.	0.	0.	0.	0.	0.	0.	2005
2010	46.	1.	4.	15.	0.	0.	0.	0.	67.	2010
2015	1284.	52.	116.	384.	0.	0.	0.	0.	1835.	2015
2020	4079.	190.	441.	1757.	0.	0.	0.	0.	6467.	2020
2025	8436.	396.	991.	4079.	0.	0.	0.	0.	13901.	2025
2030	13105.	552.	1643.	6908.	0.	0.	0.	0.	22207.	2030
2035	17773.	628.	2308.	9799.	0.	0.	0.	0.	30507.	2035
2040	22308.	630.	2963.	12685.	0.	0.	0.	70.	38659.	2040
2045	25333.	630.	3466.	14960.	0.	0.	0.	114.	44506.	2045
2050	25333.	630.	3613.	15794.	0.	0.	0.	134.	45507.	2050
2055	25333.	630.	3613.	15794.	0.	0.	0.	145.	45518.	2055
2060	25333.	630.	3613.	15794.	0.	0.	0.	155.	45528.	2060
2065	25333.	630.	3613.	15794.	0.	0.	0.	166.	45539.	2065
2070	25333.	630.	3613.	15798.	0.	0.	0.	197.	45575.	2070
2075	25333.	630.	3621.	15889.	0.	0.	0.	294.	45770.	2075

TABLE 10.E.165 Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment Costs for Geologic Repository in Granite
$ Millions at 0% Discount Rate

YEAR	SOLID HIGH LEVEL WASTE ANNUAL	SOLID HIGH LEVEL WASTE CUMULATIVE	HULLS AND ASSEMBLY HARDWARE WASTE ANNUAL	HULLS AND ASSEMBLY HARDWARE WASTE CUMULATIVE	TOTAL INTERMEDIATE LEVEL WASTE ANNUAL	TOTAL INTERMEDIATE LEVEL WASTE CUMULATIVE	TOTAL LOW LEVEL WASTE ANNUAL	TOTAL LOW LEVEL WASTE CUMULATIVE	TOTAL FOR ALL CLASSIFICATIONS ANNUAL	TOTAL FOR ALL CLASSIFICATIONS CUMULATIVE	YEAR
1985	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1985
1990	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1990
1995	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1995
2000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2000
2005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2005
2010	0.00	0.00	3.19	3.19	19.65	19.65	2.21	2.21	25.04	25.04	2010
2015	11.59	11.59	25.47	85.97	157.11	530.29	21.72	70.61	215.89	698.47	2015
2020	92.65	312.73	50.95	289.76	314.26	1787.28	43.79	245.35	501.65	2635.13	2020
2025	266.87	1206.90	66.87	601.82	412.45	3712.03	54.78	510.60	800.97	6031.34	2025
2030	350.26	2841.42	66.87	936.16	412.45	5774.26	47.82	763.85	877.39	10315.69	2030
2035	350.26	4592.70	66.87	1270.50	412.45	7836.50	39.24	977.25	868.81	14676.95	2035
2040	350.26	6343.97	57.32	1395.29	353.53	9639.81	63.74	1252.03	824.84	19031.1[illegible]	2040
2045	469.09	9002.16	25.58	1811.92	157.75	11175.98	13.48	1366.20	665.89	23356.26	2045
2050	209.32	10775.11	0.00	1811.92	0.00	11175.98	0.00	1366.20	209.32	25129.21	2050
2055	0.00	10775.11	0.00	1811.92	0.00	11175.98	0.00	1366.20	0.00	25129.21	2055
2060	0.00	10775.11	0.00	1811.92	0.00	11175.98	0.00	1366.20	0.00	25129.21	2060
2065	0.00	10775.11	0.00	1811.92	0.00	11175.98	0.00	1366.20	0.00	25129.21	2065
2070	0.00	10775.11	0.00	1811.92	0.00	11175.98	7.48	1373.68	7.48	25136.69	2070
2075	0.00	10775.11	0.00	1811.92	0.00	11175.98	119.70	1523.31	119.70	25286.32	2075

TABLE 10.E.166 Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment
Non-Spent Fuel System Waste Management Costs for Repository in Granite
$ Millions at 0% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP+MOX	TOTAL SYSTEM	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	0.	0.	0.	1995
2000	0.	0.	0.	0.	0.	0.	0.	0.	0.	2000
2005	0.	0.	0.	0.	0.	0.	0.	0.	0.	2005
2010	45.	1.	4.	25.	0.	0.	0.	0.	77.	2010
2015	1239.	52.	116.	698.	0.	0.	0.	0.	2099.	2015
2020	4079.	189.	441.	2635.	0.	0.	0.	0.	7344.	2020
2025	8510.	395.	991.	6031.	0.	0.	0.	0.	15927.	2025
2030	13362.	552.	1643.	10316.	0.	0.	0.	0.	25872.	2030
2035	18219.	628.	2308.	14677.	0.	0.	0.	0.	35826.	2035
2040	22927.	634.	2963.	19031.	0.	0.	0.	70.	45625.	2040
2045	26257.	634.	3466.	23356.	0.	0.	0.	114.	53827.	2045
2050	26257.	634.	3613.	25129.	0.	0.	0.	134.	55767.	2050
2055	26257.	634.	3613.	25129.	0.	0.	0.	145.	55778.	2055
2060	26257.	634.	3613.	25129.	0.	0.	0.	155.	55789.	2060
2065	26257.	634.	3613.	25129.	0.	0.	0.	166.	55799.	2065
2070	26257.	634.	3613.	25137.	0.	0.	0.	197.	55838.	2070
2075	26257.	634.	3621.	25286.	0.	0.	0.	294.	56092.	2075

TABLE 10.E.167. Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment - Costs for Geologic Repository in Shale - $ Millions at 0% Discount Rate

YEAR	SOLID HIGH LEVEL WASTE ANNUAL	SOLID HIGH LEVEL WASTE CUMULATIVE	HULLS AND ASSEMBLY HARDWARE WASTE ANNUAL	HULLS AND ASSEMBLY HARDWARE WASTE CUMULATIVE	TOTAL INTERMEDIATE LEVEL WASTE ANNUAL	TOTAL INTERMEDIATE LEVEL WASTE CUMULATIVE	TOTAL LOW LEVEL WASTE ANNUAL	TOTAL LOW LEVEL WASTE CUMULATIVE	TOTAL FOR ALL CLASSIFICATIONS ANNUAL	TOTAL FOR ALL CLASSIFICATIONS CUMULATIVE	YEAR
1985	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1985
1990	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1990
1995	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1995
2000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2000
2005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2005
2010	0.00	0.00	2.41	2.41	16.16	16.16	2.04	2.04	20.62	20.62	2010
2015	7.55	7.55	19.27	65.03	129.23	435.18	20.09	65.32	176.14	574.08	2015
2020	86.05	283.49	38.54	219.18	256.88	1470.09	40.51	226.96	424.47	2199.72	2020
2025	271.73	1074.93	50.58	455.22	339.25	3053.24	50.67	472.32	712.23	5057.70	2025
2030	356.63	2791.21	50.58	708.12	339.25	4749.48	44.23	706.59	790.70	8905.39	2030
2035	356.63	4520.37	50.58	961.01	339.25	6445.73	36.29	903.99	782.76	12835.10	2035
2040	356.63	6307.58	93.35	1206.69	290.78	6393.51	58.97	1158.17	749.74	16765.90	2040
2045	543.44	8554.90	19.35	1370.54	129.75	9192.54	12.47	1263.78	705.01	20381.75	2045
2050	136.00	10502.76	0.00	1370.58	0.00	9192.54	0.00	1263.78	136.40	22329.62	2050
2055	0.00	10502.76	0.00	1370.58	0.00	9192.54	0.00	1263.78	0.00	22329.62	2055
2060	0.00	10502.76	0.00	1370.58	0.00	9192.54	0.00	1263.78	0.00	22329.62	2060
2065	0.00	10502.76	0.00	1370.58	0.00	9192.54	0.00	1263.78	0.00	22329.62	2065
2070	0.00	10502.76	0.00	1370.58	0.00	9192.54	6.92	1270.70	6.92	22336.54	2070
2075	0.00	10502.76	0.00	1370.58	0.00	9192.54	110.73	1405.10	110.73	22470.95	2075

TABLE 10.E.168. Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Shale - $ Millions at 0% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP-MOX	TOTAL SYSTEM	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	0.	0.	0.	1995
2000	0.	0.	0.	0.	0.	0.	0.	0.	0.	2000
2005	0.	0.	0.	0.	0.	0.	0.	0.	0.	2005
2010	46.	1.	8.	21.	0.	0.	0.	0.	72.	2010
2015	1234.	52.	116.	579.	0.	0.	0.	0.	1975.	2015
2020	4178.	180.	441.	2200.	0.	0.	0.	0.	7003.	2020
2025	8762.	395.	991.	5058.	0.	0.	0.	0.	15203.	2025
2030	13907.	552.	1663.	8905.	0.	0.	0.	0.	25020.	2030
2035	19040.	624.	2308.	12835.	0.	0.	0.	0.	34810.	2035
2040	24633.	634.	2963.	16766.	0.	0.	0.	70.	45065.	2040
2045	27463.	634.	3466.	20382.	0.	0.	0.	114.	52056.	2045
2050	27460.	634.	3613.	22330.	0.	0.	0.	134.	54170.	2050
2055	27461.	634.	3613.	22330.	0.	0.	0.	145.	54181.	2055
2060	27460.	638.	3613.	22330.	0.	0.	0.	155.	54192.	2060
2065	27463.	634.	3613.	22330.	0.	0.	0.	166.	54203.	2065
2070	27463.	638.	3613.	22337.	0.	0.	0.	197.	54201.	2070
2075	27462.	638.	3621.	22475.	0.	0.	0.	288.	54484.	2075

TABLE 10.E.169. Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment - Costs for Geologic Repository in Basalt - $ Millions at 0% Discount Rate

YEAR	SOLID HIGH LEVEL WASTE ANNUAL	SOLID HIGH LEVEL WASTE CUMULATIVE	HULLS AND ASSEMBLY HARDWARE WASTE ANNUAL	HULLS AND ASSEMBLY HARDWARE WASTE CUMULATIVE	TOTAL INTERMEDIATE LEVEL WASTE ANNUAL	TOTAL INTERMEDIATE LEVEL WASTE CUMULATIVE	TOTAL LOW LEVEL WASTE ANNUAL	TOTAL LOW LEVEL WASTE CUMULATIVE	TOTAL FOR ALL CLASSIFICATIONS ANNUAL	TOTAL FOR ALL CLASSIFICATIONS CUMULATIVE	YEAR
1985	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1985
1990	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1990
1995	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1995
2000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2000
2005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2005
2010	0.00	0.00	3.42	3.42	21.51	21.51	2.63	2.63	27.56	27.56	2010
2015	9.42	9.42	27.34	92.26	171.97	580.42	25.88	84.16	234.61	766.27	2015
2020	108.47	337.09	54.68	310.96	383.97	1956.25	52.19	292.43	559.30	2896.74	2020
2025	216.95	1204.89	71.76	645.84	451.44	4062.97	65.29	608.57	805.45	6522.27	2025
2030	444.91	2854.02	71.76	1004.65	451.44	6320.17	56.99	910.42	1025.11	11089.26	2030
2035	444.91	5078.58	71.76	1363.45	451.44	8577.37	46.76	1164.76	1014.88	16184.16	2035
2040	444.91	7303.14	61.51	1712.00	386.95	10770.09	75.97	1492.25	969.34	21277.48	2040
2045	677.96	9760.75	27.45	1944.48	172.66	12232.58	16.06	1628.32	894.13	25566.12	2045
2050	170.17	11745.87	0.00	1944.48	0.00	12232.58	0.00	1628.32	170.17	27551.24	2050
2055	0.00	11745.87	0.00	1944.48	0.00	12232.58	0.00	1628.32	0.00	27551.24	2055
2060	0.00	11745.87	0.00	1944.48	0.00	12232.58	0.00	1628.32	0.00	27551.24	2060
2065	0.00	11745.87	0.00	1944.48	0.00	12232.58	0.00	1628.32	0.00	27551.24	2065
2070	0.00	11745.87	0.00	1944.48	0.00	12232.58	8.92	1637.24	8.92	27560.16	2070
2075	0.00	11745.87	0.00	1944.48	0.00	12232.58	142.69	1815.59	142.69	27738.52	2075

TABLE 10.E.170. Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Basalt - $ Millions at 0% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP+MOX	TOTAL SYSTEM	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	0.	0.	0.	1995
2000	0.	0.	0.	0.	0.	0.	0.	0.	0.	2000
2005	0.	0.	0.	0.	0.	0.	0.	0.	0.	2005
2010	46.	1.	4.	28.	0.	0.	0.	0.	79.	2010
2015	1234.	52.	116.	766.	0.	0.	0.	0.	2167.	2015
2020	4154.	189.	441.	2897.	0.	0.	0.	0.	7681.	2020
2025	8683.	395.	991.	6522.	0.	0.	0.	0.	16591.	2025
2030	13650.	552.	1643.	11089.	0.	0.	0.	0.	26934.	2030
2035	18790.	628.	2308.	16184.	0.	0.	0.	0.	37909.	2035
2040	23783.	634.	2963.	21277.	0.	0.	0.	70.	48727.	2040
2045	27152.	634.	3466.	25566.	0.	0.	0.	114.	56932.	2045
2050	27152.	634.	3613.	27551.	0.	0.	0.	134.	59084.	2050
2055	27152.	634.	3613.	27551.	0.	0.	0.	145.	59095.	2055
2060	27152.	634.	3613.	27551.	0.	0.	0.	155.	59106.	2060
2065	27152.	634.	3613.	27551.	0.	0.	0.	166.	59117.	2065
2070	27152.	634.	3613.	27560.	0.	0.	0.	197.	59157.	2070
2075	27152.	634.	3621.	27739.	0.	0.	0.	294.	59439.	2075

TABLE 10.E.171. Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment - System Spent Fuel Management Costs - $ Millions at 7% Discount Rate

YEAR	REACTOR TO ISFSB	ISFSB STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACKAGING	ISFSB TO PACKAGING	PACKAGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOSITORY COST	TOTAL COST	YEAR
1980	0.	0.	121.	0.	0.	0.	0.	0.	0.	0.	0.	121.	1980
1985	18.	24.	327.	0.	0.	7.	9.	0.	0.	0.	0.	385.	1985
1990	55.	144.	533.	87.	0.	93.	113.	0.	0.	0.	0.	1025.	1990
1995	96.	293.	725.	170.	0.	198.	241.	0.	0.	0.	0.	1724.	1995
2000	139.	450.	927.	251.	0.	300.	365.	0.	0.	0.	0.	2433.	2000
2005	177.	603.	1124.	336.	0.	409.	497.	0.	0.	0.	0.	3145.	2005
2010	204.	721.	1276.	416.	0.	510.	619.	2.	0.	0.	0.	3747.	2010
2015	223.	805.	1388.	479.	0.	583.	675.	35.	0.	0.	0.	4179.	2015
2020	235.	862.	1457.	515.	0.	635.	682.	95.	0.	0.	0.	4482.	2020
2025	244.	911.	1530.	515.	0.	635.	682.	162.	0.	0.	0.	4679.	2025
2030	248.	957.	1606.	515.	0.	635.	682.	213.	0.	0.	0.	4857.	2030
2035	251.	991.	1668.	515.	0.	635.	682.	228.	18.	0.	0.	4965.	2035
2040	252.	1006.	1689.	515.	0.	635.	682.	228.	39.	0.	0.	5047.	2040
2045	252.	1008.	1694.	515.	0.	635.	682.	228.	49.	0.	0.	5064.	2045
2050	252.	1008.	1694.	515.	0.	635.	682.	228.	49.	0.	0.	5064.	2050
2055	252.	1008.	1694.	515.	0.	635.	682.	228.	49.	0.	0.	5064.	2055
2060	252.	1008.	1694.	515.	0.	635.	682.	228.	49.	0.	0.	5064.	2060
2065	252.	1008.	1694.	515.	0.	635.	682.	228.	49.	0.	0.	5064.	2065
2070	252.	1008.	1694.	515.	0.	635.	682.	228.	49.	0.	0.	5064.	2070

TABLE 10.E.172. Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Salt - $ Millions at 7% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP+MOX	TOTAL SYSTEM	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	0.	0.	0.	1995
2000	0.	0.	0.	0.	0.	0.	0.	0.	0.	2000
2005	0.	0.	0.	0.	0.	0.	0.	0.	0.	2005
2010	5.	0.	0.	2.	0.	0.	0.	0.	7.	2010
2015	105.	4.	10.	37.	0.	0.	0.	0.	157.	2015
2020	281.	13.	30.	118.	0.	0.	0.	0.	442.	2020
2025	474.	22.	54.	221.	0.	0.	0.	0.	772.	2025
2030	623.	27.	75.	311.	0.	0.	0.	0.	1036.	2030
2035	729.	29.	90.	377.	0.	0.	0.	0.	1225.	2035
2040	803.	29.	101.	423.	0.	0.	0.	1.	1357.	2040
2045	839.	29.	107.	450.	0.	0.	0.	2.	1426.	2045
2050	839.	29.	108.	457.	0.	0.	0.	2.	1434.	2050
2055	839.	29.	108.	457.	0.	0.	0.	2.	1434.	2055
2060	839.	29.	108.	457.	0.	0.	0.	2.	1434.	2060
2065	839.	29.	108.	457.	0.	0.	0.	2.	1434.	2065
2070	839.	29.	108.	457.	0.	0.	0.	2.	1434.	2070
2075	839.	29.	108.	457.	0.	0.	0.	2.	1435.	2075

TABLE 10.E.173. Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Granite - $ Millions at 7% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP+MOX	TOTAL SYSTEM	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	0.	0.	0.	1995
2000	0.	0.	0.	0.	0.	0.	0.	0.	0.	2000
2005	0.	0.	0.	0.	0.	0.	0.	0.	0.	2005
2010	5.	0.	0.	3.	0.	0.	0.	0.	8.	2010
2015	105.	4.	10.	59.	0.	0.	0.	0.	179.	2015
2020	281.	13.	30.	179.	0.	0.	0.	0.	502.	2020
2025	477.	22.	54.	328.	0.	0.	0.	0.	882.	2025
2030	632.	27.	75.	465.	0.	0.	0.	0.	1194.	2030
2035	742.	29.	90.	564.	0.	0.	0.	0.	1425.	2035
2040	819.	29.	101.	634.	0.	0.	0.	1.	1584.	2040
2045	858.	29.	107.	685.	0.	0.	0.	2.	1680.	2045
2050	858.	29.	108.	700.	0.	0.	0.	2.	1697.	2050
2055	858.	29.	108.	700.	0.	0.	0.	2.	1697.	2055
2060	858.	29.	108.	700.	0.	0.	0.	2.	1697.	2060
2065	858.	29.	108.	700.	0.	0.	0.	2.	1697.	2065
2070	858.	29.	108.	700.	0.	0.	0.	2.	1697.	2070
2075	858.	29.	108.	700.	0.	0.	0.	2.	1697.	2075

TABLE 10.E.174. Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Shale - $ Millions at 7% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP+MOX	TOTAL SYSTEM	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	0.	0.	0.	1995
2000	0.	0.	0.	0.	0.	0.	0.	0.	0.	2000
2005	0.	0.	0.	0.	0.	0.	0.	0.	0.	2005
2010	5.	0.	0.	2.	0.	0.	0.	0.	8.	2010
2015	105.	4.	10.	49.	0.	0.	0.	0.	169.	2015
2020	287.	13.	30.	149.	0.	0.	0.	0.	478.	2020
2025	490.	22.	54.	275.	0.	0.	0.	0.	841.	2025
2030	654.	27.	75.	397.	0.	0.	0.	0.	1153.	2030
2035	771.	29.	90.	486.	0.	0.	0.	0.	1376.	2035
2040	852.	29.	101.	550.	0.	0.	0.	1.	1533.	2040
2045	892.	29.	107.	592.	0.	0.	0.	2.	1621.	2045
2050	892.	29.	108.	608.	0.	0.	0.	2.	1639.	2050
2055	892.	29.	108.	608.	0.	0.	0.	2.	1639.	2055
2060	892.	29.	108.	608.	0.	0.	0.	2.	1639.	2060
2065	892.	29.	108.	608.	0.	0.	0.	2.	1639.	2065
2070	892.	29.	108.	608.	0.	0.	0.	2.	1639.	2070
2075	892.	29.	108.	609.	0.	0.	0.	2.	1640.	2075

TABLE 10.E.175. Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Basalt - $ Millions at 7% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP+MOX	TOTAL SYSTEM	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	0.	0.	0.	1995
2000	0.	0.	0.	0.	0.	0.	0.	0.	0.	2000
2005	0.	0.	0.	0.	0.	0.	0.	0.	0.	2005
2010	5.	0.	0.	3.	0.	0.	0.	0.	8.	2010
2015	105.	4.	10.	65.	0.	0.	0.	0.	185.	2015
2020	285.	13.	30.	196.	0.	0.	0.	0.	524.	2020
2025	486.	22.	54.	357.	0.	0.	0.	0.	919.	2025
2030	644.	27.	75.	501.	0.	0.	0.	0.	1247.	2030
2035	761.	29.	90.	617.	0.	0.	0.	0.	1497.	2035
2040	842.	29.	101.	699.	0.	0.	0.	1.	1672.	2040
2045	882.	29.	107.	749.	0.	0.	0.	2.	1768.	2045
2050	882.	29.	108.	766.	0.	0.	0.	2.	1787.	2050
2055	882.	29.	108.	766.	0.	0.	0.	2.	1787.	2055
2060	882.	29.	108.	766.	0.	0.	0.	2.	1787.	2060
2065	882.	29.	108.	766.	0.	0.	0.	2.	1787.	2065
2070	882.	29.	108.	766.	0.	0.	0.	2.	1787.	2070
2075	882.	29.	108.	766.	0.	0.	0.	2.	1787.	2075

TABLE 10.E.176. Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment - System Spent Fuel Management Costs - $ Millions at 10% Discount Rate

YEAR	REACTOR TO ISFSR	ISFSR STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACKAGING	ISFSR TO PACKAGING	PACKAGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOSITORY COST	TOTAL COST	YEAR
1980	0.	0.	118.	0.	0.	0.	0.	0.	0.	0.	0.	118.	1980
1985	15.	20.	291.	0.	0.	6.	7.	0.	0.	0.	0.	339.	1985
1990	42.	108.	488.	64.	0.	69.	88.	0.	0.	0.	0.	810.	1990
1995	68.	203.	567.	118.	0.	137.	166.	0.	0.	0.	0.	1260.	1995
2000	92.	291.	680.	153.	0.	198.	236.	0.	0.	0.	0.	1656.	2000
2005	111.	366.	776.	210.	0.	247.	300.	0.	0.	0.	0.	2004.	2005
2010	123.	416.	841.	238.	0.	290.	352.	1.	0.	0.	0.	2260.	2010
2015	130.	447.	881.	260.	0.	317.	373.	13.	0.	0.	0.	2421.	2015
2020	134.	466.	905.	273.	0.	334.	375.	32.	0.	0.	0.	2519.	2020
2025	136.	480.	925.	273.	0.	334.	375.	51.	0.	0.	0.	2574.	2025
2030	137.	491.	944.	273.	0.	334.	375.	63.	0.	0.	0.	2618.	2030
2035	138.	498.	957.	273.	0.	334.	375.	67.	4.	0.	0.	2645.	2035
2040	138.	501.	961.	273.	0.	334.	375.	67.	8.	0.	0.	2657.	2040
2045	138.	501.	962.	273.	0.	334.	375.	67.	9.	0.	0.	2660.	2045
2050	138.	501.	962.	273.	0.	334.	375.	67.	9.	0.	0.	2660.	2050
2055	138.	501.	962.	273.	0.	334.	375.	67.	9.	0.	0.	2660.	2055
2060	138.	501.	962.	273.	0.	334.	375.	67.	9.	0.	0.	2660.	2060
2065	138.	501.	962.	273.	0.	334.	375.	67.	9.	0.	0.	2660.	2065
2070	138.	501.	962.	273.	0.	334.	375.	67.	9.	0.	0.	2660.	2070

TABLE 10.E.177. Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Salt - $ Million at 10% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP+MOX	TOTAL SYSTEM	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	0.	0.	0.	1995
2000	0.	0.	0.	0.	0.	0.	0.	0.	0.	2000
2005	0.	0.	0.	0.	0.	0.	0.	0.	0.	2005
2010	2.	0.	0.	1.	0.	0.	0.	0.	3.	2010
2015	39.	2.	4.	19.	0.	0.	0.	0.	57.	2015
2020	95.	6.	10.	40.	0.	0.	0.	0.	149.	2020
2025	143.	7.	17.	68.	0.	0.	0.	0.	241.	2025
2030	186.	8.	22.	90.	0.	0.	0.	0.	306.	2030
2035	209.	9.	25.	109.	0.	0.	0.	0.	347.	2035
2040	222.	9.	27.	113.	0.	0.	0.	0.	371.	2040
2045	228.	9.	28.	117.	0.	0.	0.	0.	382.	2045
2050	228.	9.	28.	118.	0.	0.	0.	0.	384.	2050
2055	228.	9.	28.	118.	0.	0.	0.	0.	384.	2055
2060	228.	9.	28.	118.	0.	0.	0.	0.	384.	2060
2065	228.	9.	28.	118.	0.	0.	0.	0.	384.	2065
2070	228.	9.	28.	118.	0.	0.	0.	0.	384.	2070
2075	228.	9.	28.	118.	0.	0.	0.	0.	384.	2075

TABLE 10.E.178. Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Granite - $ Millions at 10% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP-MOX	TOTAL SYSTEM	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	0.	0.	0.	1995
2000	0.	0.	0.	0.	0.	0.	0.	0.	0.	2000
2005	0.	0.	0.	0.	0.	0.	0.	0.	0.	2005
2010	2.	0.	0.	1.	0.	0.	0.	0.	3.	2010
2015	39.	2.	4.	22.	0.	0.	0.	0.	66.	2015
2020	95.	4.	10.	60.	0.	0.	0.	0.	169.	2020
2025	150.	7.	17.	102.	0.	0.	0.	0.	276.	2025
2030	188.	8.	22.	135.	0.	0.	0.	0.	353.	2030
2035	212.	9.	25.	156.	0.	0.	0.	0.	402.	2035
2040	226.	9.	27.	170.	0.	0.	0.	0.	431.	2040
2045	232.	9.	28.	178.	0.	0.	0.	0.	447.	2045
2050	232.	9.	28.	180.	0.	0.	0.	0.	449.	2050
2055	232.	9.	28.	180.	0.	0.	0.	0.	449.	2055
2060	232.	9.	28.	180.	0.	0.	0.	0.	449.	2060
2065	232.	9.	28.	180.	0.	0.	0.	0.	449.	2065
2070	232.	9.	28.	180.	0.	0.	0.	0.	449.	2070
2075	232.	9.	28.	180.	0.	0.	0.	0.	449.	2075

<u>TABLE 10.E.179.</u> Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Shale - $ Millions at 10% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORT- TION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP-MOX	TOTAL SYSTEM	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	0.	0.	0.	1995
2000	0.	0.	0.	0.	0.	0.	0.	0.	0.	2000
2005	0.	0.	0.	0.	0.	0.	0.	0.	0.	2005
2010	2.	0.	0.	1.	0.	0.	0.	0.	3.	2010
2015	39.	2.	3.	18.	0.	0.	0.	0.	62.	2015
2020	97.	4.	10.	50.	0.	0.	0.	0.	161.	2020
2025	154.	7.	17.	85.	0.	0.	0.	0.	263.	2025
2030	194.	8.	22.	115.	0.	0.	0.	0.	339.	2030
2035	219.	9.	25.	134.	0.	0.	0.	0.	387.	2035
2040	234.	9.	27.	146.	0.	0.	0.	0.	416.	2040
2045	241.	9.	28.	153.	0.	0.	0.	0.	430.	2045
2050	241.	9.	28.	155.	0.	0.	0.	0.	433.	2050
2055	241.	9.	28.	155.	0.	0.	0.	0.	433.	2055
2060	241.	9.	28.	155.	0.	0.	0.	0.	433.	2060
2065	241.	9.	28.	155.	0.	0.	0.	0.	433.	2065
2070	241.	9.	28.	155.	0.	0.	0.	0.	433.	2070
2075	241.	9.	28.	155.	0.	0.	0.	0.	433.	2075

TABLE 10.E.180. Case 4B - Deferred Decision for U and Pu Recycle - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Basalt - $ Millions at 10% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP+MOX	TOTAL SYSTEM	YEAR
1985	0.	0.	0.	0.	0.	0.	0.	0.	0.	1985
1990	0.	0.	0.	0.	0.	0.	0.	0.	0.	1990
1995	0.	0.	0.	0.	0.	0.	0.	0.	0.	1995
2000	0.	0.	0.	0.	0.	0.	0.	0.	0.	2000
2005	0.	0.	0.	0.	0.	0.	0.	0.	0.	2005
2010	2.	0.	0.	1.	0.	0.	0.	0.	3.	2010
2015	39.	2.	4.	24.	0.	0.	0.	0.	68.	2015
2020	96.	4.	10.	66.	0.	0.	0.	0.	177.	2020
2025	153.	7.	17.	111.	0.	0.	0.	0.	288.	2025
2030	192.	8.	22.	146.	0.	0.	0.	0.	368.	2030
2035	217.	9.	25.	171.	0.	0.	0.	0.	421.	2035
2040	232.	9.	27.	186.	0.	0.	0.	0.	456.	2040
2045	238.	9.	28.	194.	0.	0.	0.	0.	469.	2045
2050	238.	9.	28.	197.	0.	0.	0.	0.	472.	2050
2055	239.	9.	28.	197.	0.	0.	0.	0.	472.	2055
2060	238.	9.	28.	197.	0.	0.	0.	0.	472.	2060
2065	238.	9.	28.	197.	0.	0.	0.	0.	472.	2065
2070	238.	9.	28.	197.	0.	0.	0.	0.	472.	2070
2075	238.	9.	28.	197.	0.	0.	0.	0.	472.	2075

TABLE 10.E.181. Case 1 - Low Growth - Once-Through Cycle - Repository in Salt - Reference Treatment - Unit Power Cost for TRU Waste Management Including Spent Fuel Handling and Storage

	POWER GENERATION		UNDISCOUNTED AVERAGE		DISCOUNTED AVERAGE (7 PCT)		DISCOUNTED AVERAGE (10 PCT)		
	KWHR		MILLS/KWHR		MILLS/KWHR		MILLS/KWHR		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	1.78E+11	4.92E+11	.05	.02	.05	.02	.05	.02	1975
1980	3.44E+11	1.86E+12	.11	.07	.11	.07	.11	.06	1980
1985	5.56E+11	4.13E+12	.31	.14	.31	.12	.31	.11	1985
1990	8.75E+11	7.80E+12	.44	.30	.44	.25	.40	.22	1990
1995	1.18E+12	1.31E+13	.47	.37	.47	.31	.47	.28	1995
2000	1.49E+12	1.99E+13	.50	.41	.50	.34	.50	.31	2000
2005	1.51E+12	2.75E+13	.60	.45	.60	.37	.60	.33	2005
2010	1.44E+12	3.49E+13	.69	.50	.69	.39	.69	.34	2010
2015	1.26E+12	4.16E+13	.77	.53	.77	.41	.77	.36	2015
2020	1.02E+12	4.71E+13	.92	.57	.92	.42	.92	.36	2020
2025	7.61E+11	5.15E+13	1.03	.60	1.03	.43	1.03	.37	2025
2030	4.55E+11	5.45E+13	1.56	.64	1.56	.44	1.56	.37	2030
2035	2.29E+11	5.60E+13	2.39	.67	2.39	.44	2.39	.37	2035
2040	1.47E+10	5.65E+13	21.61	.70	21.61	.45	21.61	.37	2040
2045	0.	5.65E+13	0.00	.72	0.00	.45	0.00	.37	2045
2050	0.	5.65E+13	0.00	.73	0.00	.45	0.00	.37	2050
2055	0.	5.65E+13	0.00	.73	[illegible]	.45	0.00	.37	2055
2060	0.	5.65E+13	0.00	.73	0.00	.45	0.00	.37	2060
2065	0.	5.65E+13	0.00	.73	0.00	.45	0.00	.37	2065
2070	0.	5.65E+13	0.00	.73	0.00	.45	0.00	.37	2070

TABLE 10.E.182. Case 1 - Low Growth - Once-Through Cycle - Repository in Salt - Reference Treatment - Unit Fuel Cost for TRU Waste Management Including Spent Fuel Handling and Storage[a]

	THRUPUT		UNDISCOUNTED AVERAGE		DISCOUNTED AVERAGE (7 PCT)		DISCOUNTED AVERAGE (10 PCT)		
	KG DISCHARGED		DOLLARS/KG DISCHARGED		DOLLARS/KG DISCHARGED		DOLLARS/KG DISCHARGED		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	6.90E+05	1.78E+06	12.	5.	12.	5.	12.	5.	1975
1980	1.27E+06	6.93E+06	30.	19.	30.	18.	30.	17.	1980
1985	2.04E+06	1.53E+07	84.	37.	84.	32.	84.	31.	1985
1990	3.24E+06	2.88E+07	119.	81.	119.	66.	119.	60.	1990
1995	4.33E+06	4.87E+07	127.	100.	127.	82.	127.	74.	1995
2000	5.69E+06	7.42E+07	131.	110.	131.	92.	131.	82.	2000
2005	5.66E+06	1.03E+08	160.	120.	160.	99.	160.	88.	2005
2010	5.91E+06	1.32E+08	168.	131.	168.	105.	168.	92.	2010
2015	5.30E+06	1.61E+08	182.	138.	182.	109.	182.	95.	2015
2020	4.57E+06	1.85E+08	207.	146.	207.	112.	207.	97.	2020
2025	3.95E+06	2.07E+08	198.	151.	198.	114.	198.	97.	2025
2030	3.21E+06	2.24E+08	221.	155.	221.	115.	221.	98.	2030
2035	1.83E+06	2.35E+08	298.	161.	298.	116.	298.	98.	2035
2040	8.48E+05	2.42E+08	375.	164.	375.	116.	375.	98.	2040
2045	0.	2.42E+08	0.	169.	0.	116.	0.	98.	2045
2050	0.	2.42E+08	0.	170.	0.	116.	0.	98.	2050
2055	0.	2.42E+08	0.	170.	0.	116.	0.	98.	2055
2060	0.	2.42E+08	0.	170.	0.	116.	0.	98.	2060
2065	0.	2.42E+08	0.	170.	0.	116.	0.	98.	2065
2070	0.	2.42E+08	0.	170.	0.	116.	0.	98.	2070

a. Unit cost at time of reactor discharge.

TABLE 10.E.183. Case I - Low Growth - Once-Through Cycle - Reference Treatment - Total System Waste Management Costs Including Spent Fuel Handling and Storage - $ Millions at 0% Discount Rate

YEAR	REACTOR TO ISFSB	ISFSB STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACKAGING	ISFSB TO PACKAGING	PACKAGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOSITORY COST	TOTAL COST	YEAR
1980	0.	0.	132.	0.	0.	0.	0.	0.	0.	0.	0.	132.	1980
1985	25.	35.	436.	0.	0.	13.	0.	0.	0.	23.	36.	567.	1985
1990	87.	247.	811.	170.	0.	183.	0.	0.	0.	322.	518.	2341.	1990
1995	180.	600.	1269.	376.	0.	438.	0.	0.	0.	773.	1243.	4878.	1995
2000	299.	1064.	1866.	639.	0.	771.	0.	0.	0.	1361.	2189.	8191.	2000
2005	438.	1639.	2605.	978.	0.	1201.	0.	0.	0.	2119.	3408.	12389.	2005
2010	576.	2244.	3386.	1398.	0.	1729.	0.	0.	0.	3051.	4907.	17287.	2010
2015	715.	2807.	4165.	1807.	0.	2251.	0.	0.	0.	3972.	6389.	22146.	2015
2020	873.	3409.	4892.	2226.	0.	2783.	0.	0.	0.	4910.	7898.	26953.	2020
2025	939.	3890.	5517.	2595.	0.	3250.	0.	0.	0.	5734.	9224.	31149.	2025
2030	1025.	4305.	6058.	2918.	0.	3660.	0.	0.	0.	6458.	10388.	34813.	2030
2035	1079.	4611.	6460.	3186.	0.	4090.	0.	0.	0.	7057.	11352.	37745.	2035
2040	1115.	4802.	6711.	3373.	0.	4237.	0.	0.	0.	7475.	12023.	39736.	2040
2045	1117.	4876.	6812.	3492.	0.	4387.	0.	0.	0.	7741.	12451.	40877.	2045
2050	1117.	4877.	6813.	3513.	0.	4420.	0.	0.	0.	7798.	12543.	41080.	2050
2055	1117.	4877.	6813.	3513.	0.	4420.	0.	0.	0.	7798.	12543.	41080.	2055
2060	1117.	4877.	6813.	3513.	0.	4420.	0.	0.	0.	7798.	12543.	41080.	2060
2065	1117.	4877.	6813.	3513.	0.	4420.	0.	0.	0.	7798.	12543.	41080.	2065
2070	1117.	4877.	6813.	3513.	0.	4420.	0.	0.	0.	7798.	12543.	41080.	2070

TABLE 10.E.184. Case 1 - Low Growth - Once-Through Cycle - Repository in Salt - Reference Treatment - Total System Waste Management Costs Including Spent Fuel Handling and Storage - $ Millions at 7% Discount Rate

YEAR	REACTOR TO ISFSR	ISFSR STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACK-AGING	ISFSB TO PACK-AGING	PACK-AGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOS-ITORY COST	TOTAL COST	YEAR
1980	0.	0.	121.	0.	0.	0.	0.	0.	0.	0.	0.	121.	1980
1985	15.	21.	322.	0.	0.	7.	0.	0.	0.	13.	21.	400.	1985
1990	45.	120.	501.	83.	0.	88.	0.	0.	0.	155.	249.	1238.	1990
1995	76.	239.	656.	150.	0.	174.	0.	0.	0.	306.	493.	2094.	1995
2000	105.	351.	800.	214.	0.	254.	0.	0.	0.	448.	720.	2891.	2000
2005	129.	450.	927.	272.	0.	328.	0.	0.	0.	578.	930.	3613.	2005
2010	146.	525.	1023.	323.	0.	393.	0.	0.	0.	693.	1119.	4216.	2010
2015	158.	576.	1092.	359.	0.	439.	0.	0.	0.	774.	1244.	4644.	2015
2020	166.	613.	1138.	386.	0.	472.	0.	0.	0.	833.	1339.	4945.	2020
2025	170.	634.	1166.	402.	0.	493.	0.	0.	0.	870.	1399.	5134.	2025
2030	173.	648.	1183.	413.	0.	506.	0.	0.	0.	893.	1436.	5251.	2030
2035	174.	655.	1192.	419.	0.	514.	0.	0.	0.	906.	1458.	5318.	2035
2040	175.	658.	1196.	422.	0.	518.	0.	0.	0.	913.	1469.	5351.	2040
2045	175.	659.	1198.	423.	0.	519.	0.	0.	0.	916.	1474.	5364.	2045
2050	175.	659.	1198.	423.	0.	520.	0.	0.	0.	917.	1475.	5366.	2050
2055	175.	659.	1198.	423.	0.	520.	0.	0.	0.	917.	1475.	5366.	2055
2060	175.	659.	1198.	423.	0.	520.	0.	0.	0.	917.	1475.	5366.	2060
2065	175.	659.	1198.	423.	0.	520.	0.	0.	0.	917.	1475.	5366.	2065
2070	175.	659.	1198.	423.	0.	520.	0.	0.	0.	917.	1475.	5366.	2070

TABLE 10.E.185. Case 1 - Low Growth - Once-Through Cycle - Repository in Salt - Reference Treatment - Total System Waste Management Costs Including Spent Fuel Handling and Storage - $ Millions at 10% Discount Rate

YEAR	REACTOR TO ISFSB	ISFSB STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACKAGING	ISFSB TO PACKAGING	PACKAGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOSITORY COST	TOTAL COST	YEAR
1980	0.	0.	118.	0.	0.	0.	0.	0.	0.	0.	0.	118.	1980
1985	13.	17.	287.	0.	0.	3.	0.	0.	0.	11.	17.	351.	1985
1990	34.	89.	420.	61.	0.	65.	0.	0.	0.	115.	185.	969.	1990
1995	54.	166.	520.	105.	0.	120.	0.	0.	0.	212.	342.	1519.	1995
2000	71.	229.	600.	140.	0.	165.	0.	0.	0.	292.	469.	1965.	2000
2005	82.	277.	663.	168.	0.	201.	0.	0.	0.	355.	571.	2318.	2005
2010	90.	309.	704.	190.	0.	229.	0.	0.	0.	408.	650.	2575.	2010
2015	94.	329.	729.	208.	0.	246.	0.	0.	0.	434.	698.	2734.	2015
2020	97.	340.	744.	212.	0.	257.	0.	0.	0.	453.	729.	2831.	2020
2025	98.	346.	752.	217.	0.	263.	0.	0.	0.	463.	746.	2885.	2025
2030	99.	350.	756.	219.	0.	266.	0.	0.	0.	469.	755.	2913.	2030
2035	99.	351.	758.	221.	0.	268.	0.	0.	0.	472.	759.	2928.	2035
2040	99.	352.	759.	221.	0.	268.	0.	0.	0.	473.	761.	2934.	2040
2045	99.	352.	759.	222.	0.	269.	0.	0.	0.	474.	762.	2936.	2045
2050	99.	352.	759.	222.	0.	269.	0.	0.	0.	474.	762.	2936.	2050
2055	99.	352.	759.	222.	0.	269.	0.	0.	0.	474.	762.	2936.	2055
2060	99.	352.	759.	222.	0.	269.	0.	0.	0.	474.	762.	2936.	2060
2065	99.	352.	759.	222.	0.	269.	0.	0.	0.	474.	762.	2936.	2065
2070	99.	352.	759.	222.	0.	269.	0.	0.	0.	474.	762.	2936.	2070

TABLE 10.E.186. Case 3 - Low Growth - U and Pu Recycle - Repository in Salt-1985 - Reference Treatment - Unit Power Cost for TRU Waste Management Including Spent Fuel Handling and Storage

	POWER GENERATION		UNDISCOUNTED AVERAGE		DISCOUNTED AVERAGE (7 PCT)		DISCOUNTED AVERAGE (*)PCT)		
	KWHR		MILLS/KWHR		MILLS/KWHR		MILLS/KWHR		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	1.78E+11	4.92E+11	.05	.02	.05	.02	.05	.02	1975
1980	3.44E+11	1.86E+12	.11	.07	.11	.07	.11	.06	1980
1985	5.56E+11	4.13E+12	.43	.26	.43	.22	.43	.20	1985
1990	8.75E+11	7.80E+12	.59	.40	.59	.33	.59	.31	1990
1995	1.18E+12	1.31E+13	.47	.45	.47	.38	.47	.35	1995
2000	1.44E+12	1.99E+13	.58	.47	.58	.41	.58	.37	2000
2005	1.51E+12	2.75E+13	.62	.50	.62	.43	.62	.39	2005
2010	1.44E+12	3.49E+13	.76	.54	.76	.45	.76	.41	2010
2015	1.26E+12	4.16E+13	.82	.57	.82	.47	.82	.42	2015
2020	1.02E+12	4.71E+13	.76	.59	.76	.47	.76	.42	2020
2025	7.61E+11	5.15E+13	.96	.61	.96	.48	.96	.42	2025
2030	4.55E+11	5.45E+13	1.42	.64	1.42	.49	1.42	.43	2030
2035	2.20E+11	5.60E+13	2.83	.68	2.83	.49	2.83	.43	2035
2040	1.47E+10	5.65E+13	26.57	.72	26.57	.49	26.57	.43	2040
2045	0.	5.65E+13	0.00	.74	0.00	.49	0.00	.43	2045
2050	0.	5.65E+13	0.00	.74	0.00	.49	0.00	.43	2050
2055	0.	5.65E+13	0.00	.74	0.00	.49	0.00	.43	2055
2060	0.	5.65E+13	0.00	.74	0.00	.49	0.00	.43	2060
2065	0.	5.65E+13	0.00	.74	0.00	.49	0.00	.43	2065
2070	0.	5.65E+13	0.00	.74	0.00	.49	0.00	.43	2070

TABLE 10.E.187. Case 3 - Low Growth - U and Pu Recycle - Repository in Salt-1985 - Reference Treatment - Unit Fuel Cost for TRU Waste Management Including Spent Fuel Handling and Storage[a]

	THRUPUT KG DISCHARGED		UNDISCOUNTED AVERAGE DOLLARS/KG DISCHARGED		DISCOUNTED AVERAGE (7 PCT) DOLLARS/KG DISCHARGED		DISCOUNTED AVERAGE (10 PCT) DOLLARS/KG DISCHARGED		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1975	6.99E+05	1.78E+06	12.	5.	12.	5.	12.	5.	1975
1980	1.27E+06	6.93E+06	30.	19.	30.	18.	30.	17.	1980
1985	2.06E+06	1.53E+07	116.	70.	116.	59.	116.	55.	1985
1990	3.26E+06	2.88E+07	158.	108.	158.	90.	158.	83.	1990
1995	4.33E+06	4.87E+07	129.	120.	129.	103.	129.	94.	1995
2000	5.69E+06	7.42E+07	151.	127.	151.	110.	151.	101.	2000
2005	5.66E+06	1.03E+08	165.	134.	165.	116.	165.	105.	2005
2010	5.91E+06	1.32E+08	185.	142.	185.	120.	185.	109.	2010
2015	5.30E+06	1.61E+08	195.	148.	195.	124.	195.	111.	2015
2020	4.57E+06	1.85E+08	170.	151.	170.	125.	170.	112.	2020
2025	3.95E+06	2.07E+08	184.	153.	184.	126.	184.	113.	2025
2030	3.21E+06	2.24E+08	201.	155.	201.	127.	201.	113.	2030
2035	1.83E+06	2.35E+08	353.	162.	353.	128.	353.	113.	2035
2040	8.48E+05	2.42E+08	461.	169.	461.	129.	461.	113.	2040
2045	0.	2.42E+08	0.	172.	0.	129.	0.	114.	2045
2050	0.	2.42E+08	0.	172.	0.	129.	0.	114.	2050
2055	0.	2.42E+08	0.	173.	0.	129.	0.	114.	2055
2060	0.	2.42E+08	0.	173.	0.	129.	0.	114.	2060
2065	0.	2.42E+08	0.	173.	0.	129.	0.	114.	2065
2070	0.	2.42E+08	0.	173.	0.	129.	0.	114.	2070

TABLE 10.E.188. Case 3 - Low Growth - U and Pu Recycle - Repository in 1985 - Reference Treatment - Costs for TRU Waste Transportation - $ Millions at 0% Discount Rate

	SOLID HIGH LEVEL WASTE		HULLS AND ASSEMBLY HARDWARE WASTE		TOTAL INTERMEDIATE LEVEL WASTE		TOTAL LOW LEVEL WASTE		TOTAL FOR ALL CLASSIFICATIONS		
YEAR	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	ANNUAL	CUMULATIVE	YEAR
1985	0.00	0.00	5.94	5.94	4.45	4.45	.35	.35	10.74	10.74	1985
1990	4.86	19.43	14.33	59.77	10.72	44.72	.89	3.52	30.80	127.44	1990
1995	11.33	63.10	12.23	129.33	9.15	96.76	.82	8.08	33.54	297.32	1995
2000	11.33	119.81	19.23	204.49	14.38	152.98	1.30	13.19	46.24	490.47	2000
2005	17.81	189.43	19.23	300.61	14.38	224.90	1.32	19.81	52.74	730.74	2005
2010	17.81	278.47	23.88	403.73	17.87	302.04	1.66	27.01	61.22	1011.26	2010
2015	22.13	374.00	20.07	508.59	15.69	380.50	1.75	35.60	60.54	1294.69	2015
2020	19.43	471.10	13.98	585.49	10.46	438.03	1.29	42.39	45.16	1537.05	2020
2025	12.95	542.38	13.98	655.60	10.46	490.33	1.25	48.23	38.64	1736.34	2025
2030	12.95	607.10	11.65	711.33	8.72	532.17	.96	52.99	34.28	1903.63	2030
2035	10.79	658.95	13.98	781.24	10.46	584.47	.86	57.40	36.10	2082.10	2035
2040	12.95	723.71	6.09	837.17	5.23	626.32	1.06	62.47	26.23	2249.66	2040
2045	6.48	775.52	0.00	845.35	0.00	632.44	.36	64.20	6.84	2317.51	2045
2050	0.00	783.10	0.00	845.35	0.00	632.44	0.00	64.93	0.00	2325.61	2050
2055	0.00	783.10	0.00	845.35	0.00	632.44	.36	66.01	.36	2326.90	2055
2060	0.00	783.10	0.00	845.35	0.00	632.44	.36	67.09	.36	2327.98	2060
2065	0.00	783.10	0.00	845.35	0.00	632.44	.36	68.18	.36	2329.06	2065
2070	0.00	783.10	0.00	845.35	0.00	632.44	0.00	68.18	0.00	2329.06	2070
2075	0.00	783.10	0.00	845.35	0.00	632.44	1.08	70.34	1.08	2331.23	2075

TABLE 10.E.189. Case 3 - Low Growth - U and Pu Recycle - Repository in 1985 - Reference Treatment - System Spent Fuel Management Costs - $ Millions at 0% Discount Rate

YEAR	REACTOR TO ISFSR	ISFSR STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACKAGING	ISFSR TO PACKAGING	PACKAGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOSITORY COST	TOTAL COST	YEAR
1980	0.	0.	132.	0.	0.	0.	0.	0.	0.	0.	0.	132.	1980
1985	0.	0.	361.	0.	0.	0.	0.	0.	111.	0.	0.	473.	1985
1990	0.	0.	617.	0.	0.	0.	0.	0.	371.	0.	0.	988.	1990
1995	0.	0.	868.	0.	0.	0.	0.	0.	707.	0.	0.	1574.	1995
2000	0.	0.	1232.	0.	0.	0.	0.	0.	1119.	0.	0.	2351.	2000
2005	0.	0.	1645.	0.	0.	0.	0.	0.	1647.	0.	0.	3293.	2005
2010	0.	0.	2085.	0.	0.	0.	0.	0.	2214.	0.	0.	4299.	2010
2015	0.	0.	2477.	0.	0.	0.	0.	0.	2790.	0.	0.	5267.	2015
2020	0.	0.	2886.	0.	0.	0.	0.	0.	3212.	0.	0.	6098.	2020
2025	0.	0.	3381.	0.	0.	0.	0.	0.	3596.	0.	0.	6977.	2025
2030	0.	0.	3921.	0.	0.	0.	0.	0.	3903.	0.	0.	7825.	2030
2035	0.	0.	4353.	0.	0.	0.	0.	0.	4287.	0.	0.	8641.	2035
2040	0.	0.	4490.	0.	0.	0.	0.	0.	4595.	0.	0.	9084.	2040
2045	0.	0.	4492.	0.	0.	0.	0.	0.	4636.	0.	0.	9129.	2045
2050	0.	0.	4492.	0.	0.	0.	0.	0.	4636.	0.	0.	9129.	2050
2055	0.	0.	4492.	0.	0.	0.	0.	0.	4636.	0.	0.	9129.	2055
2060	0.	0.	4492.	0.	0.	0.	0.	0.	4636.	0.	0.	9129.	2060
2065	0.	0.	4492.	0.	0.	0.	0.	0.	4636.	0.	0.	9129.	2065
2070	0.	0.	4492.	0.	0.	0.	0.	0.	4636.	0.	0.	9129.	2070

TABLE 10.E.190. Case 3 - Low Growth - U and Pu Recycle - Repository in 1985 - Reference Treatment - Costs for Geologic Repository in Salt - $ Millions at 0% Discount Rate

YEAR	SOLID HIGH LEVEL WASTE ANNUAL	SOLID HIGH LEVEL WASTE CUMULATIVE	HULLS AND ASSEMBLY HARDWARE WASTE ANNUAL	HULLS AND ASSEMBLY HARDWARE WASTE CUMULATIVE	TOTAL INTERMEDIATE LEVEL WASTE ANNUAL	TOTAL INTERMEDIATE LEVEL WASTE CUMULATIVE	TOTAL LOW LEVEL WASTE ANNUAL	TOTAL LOW LEVEL WASTE CUMULATIVE	TOTAL FOR ALL CLASSIFICATIONS ANNUAL	TOTAL FOR ALL CLASSIFICATIONS CUMULATIVE	YEAR
1985	0.00	0.00	4.75	4.75	31.07	31.07	4.36	4.36	40.18	40.18	1985
1990	27.58	110.38	11.47	47.82	74.92	312.48	11.08	43.78	125.05	514.41	1990
1995	64.36	358.56	9.79	103.47	63.96	676.12	10.24	100.43	148.35	1238.57	1995
2000	92.67	821.92	15.38	163.59	100.50	1069.00	16.13	163.93	224.69	2218.45	2000
2005	145.63	1391.20	15.38	240.49	100.50	1571.53	16.38	246.11	277.89	3449.33	2005
2010	145.63	2119.35	19.11	322.98	124.86	2110.60	20.60	335.69	310.20	4888.62	2010
2015	180.92	2900.45	16.78	406.87	109.64	2658.81	21.76	442.49	329.10	6408.62	2015
2020	158.87	3694.80	11.19	468.39	73.09	3060.83	16.03	526.78	259.18	7750.80	2020
2025	105.91	4277.31	11.19	524.32	73.09	3426.30	15.48	599.43	205.67	8827.36	2025
2030	105.91	4806.88	9.32	569.06	60.91	3718.67	11.99	659.56	188.13	9753.17	2030
2035	88.25	5230.52	11.19	624.99	73.09	4084.15	10.72	713.85	183.26	10653.51	2035
2040	105.91	5760.09	5.59	669.73	36.55	4376.52	13.17	776.32	161.23	11582.66	2040
2045	52.96	6183.74	0.00	676.28	0.00	4419.31	4.52	797.96	57.48	12077.29	2045
2050	0.00	6226.78	0.00	676.28	0.00	4419.31	0.00	807.01	0.00	12129.38	2050
2055	0.00	6226.78	0.00	676.28	0.00	4419.31	4.52	820.57	4.52	12142.94	2055
2060	0.00	6226.78	0.00	676.28	0.00	4419.31	4.52	834.13	4.52	12156.50	2060
2065	0.00	6226.78	0.00	676.28	0.00	4419.31	4.52	847.69	4.52	12170.06	2065
2070	0.00	6226.78	0.00	676.28	0.00	4419.31	0.00	847.69	0.00	12170.06	2070
2075	0.00	6226.78	0.00	676.28	0.00	4419.31	13.56	874.82	13.56	12197.19	2075

TABLE 10.E.191. Case 3 - Low Growth - U and Pu Recycle - Repository in 1985 - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repositor, in Salt - $ Millions at 0% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP+MOX	TOTAL SYSTEM	YEAR
1985	416.	19.	11.	40.	108.	0.	0.	0.	594.	1985
1990	1316.	68.	127.	519.	108.	0.	0.	0.	2135.	1990
1995	2083.	149.	297.	1239.	108.	0.	0.	0.	4277.	1995
2000	3974.	253.	440.	2218.	108.	0.	0.	0.	7044.	2000
2005	5880.	389.	735.	3449.	108.	0.	0.	0.	10561.	2005
2010	7924.	540.	1011.	4889.	108.	0.	0.	2.	14474.	2010
2015	10008.	701.	1299.	6409.	108.	0.	0.	31.	18552.	2015
2020	11529.	827.	1537.	7751.	108.	0.	0.	51.	21803.	2020
2025	12915.	936.	1736.	8827.	108.	0.	0.	73.	24596.	2025
2030	14028.	1007.	1904.	9753.	108.	0.	0.	100.	26896.	2030
2035	15410.	1046.	2082.	10654.	108.	0.	0.	129.	29429.	2035
2040	[illegible]	1049.	2250.	11583.	108.	0.	0.	185.	31694.	2040
2045	16682.	1049.	2318.	12077.	108.	0.	0.	243.	32476.	2045
2050	16682.	1049.	2326.	12129.	108.	0.	0.	257.	32551.	2050
2055	16682.	1049.	2327.	12143.	108.	0.	0.	289.	32598.	2055
2060	16682.	1049.	2328.	12157.	108.	0.	0.	320.	32643.	2060
2065	16682.	1049.	2329.	12170.	108.	0.	0.	348.	32686.	2065
2070	16682.	1049.	2329.	12170.	108.	0.	0.	353.	32691.	2070
2075	16682.	1049.	2331.	12197.	108.	0.	0.	403.	32770.	2075

TABLE 10.E.192. Case 3 - Low Growth - U and Pu Recycle - Repository in 1985 - Reference Treatment - System Spent Fuel Management Costs - $ Millions at 7% Discount Rate

YEAR	REACTOR TO ISFSR	ISFSR ST. RAGE	REACTOR BASIN STORAGE	REACTOR TO PACKAGING	ISFSR TO PACKAGING	PACKAGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOSITORY COST	TOTAL COST	YEAR
1980	0.	0.	121.	0.	0.	0.	0.	0.	0.	0.	0.	121.	1980
1985	0.	0.	275.	0.	0.	0.	0.	0.	72.	0.	0.	347.	1985
1990	0.	0.	397.	0.	0.	0.	0.	0.	193.	0.	0.	590.	1990
1995	0.	0.	482.	0.	0.	0.	0.	0.	307.	0.	0.	789.	1995
2000	0.	0.	569.	0.	0.	0.	0.	0.	406.	0.	0.	975.	2000
2005	0.	0.	641.	0.	0.	0.	0.	0.	497.	0.	0.	1138.	2005
2010	0.	0.	695.	0.	0.	0.	0.	0.	566.	0.	0.	1261.	2010
2015	0.	0.	730.	0.	0.	0.	0.	0.	617.	0.	0.	1347.	2015
2020	0.	0.	755.	0.	0.	0.	0.	0.	644.	0.	0.	1399.	2020
2025	0.	0.	777.	0.	0.	0.	0.	0.	661.	0.	0.	1438.	2025
2030	0.	0.	794.	0.	0.	0.	0.	0.	671.	0.	0.	1465.	2030
2035	0.	0.	804.	0.	0.	0.	0.	0.	680.	0.	0.	1488.	2035
2040	0.	0.	807.	0.	0.	0.	0.	0.	685.	0.	0.	1491.	2040
2045	0.	0.	807.	0.	0.	0.	0.	0.	685.	0.	0.	1492.	2045
2050	0.	0.	807.	0.	0.	0.	0.	0.	685.	0.	0.	1492.	2050
2055	0.	0.	807.	0.	0.	0.	0.	0.	685.	0.	0.	1492.	2055
2060	0.	0.	807.	0.	0.	0.	0.	0.	685.	0.	0.	1492.	2060
2065	0.	0.	807.	0.	0.	0.	0.	0.	685.	0.	0.	1492.	2065
2070	0.	0.	807.	0.	0.	0.	0.	0.	685.	0.	0.	1492.	2070

TABLE 10.E.193. Case 3 - Low Growth - U and Pu Recycle - Repository in 1985 - Reference Treatment - Non-Spent Fuel System Waste Management Costs Repository in Salt - $ Millions at 7% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPOR-TATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP-MOX	TOTAL SYSTEM	YEAR
1985	270.	12.	6.	23.	73.	0.	0.	0.	385.	1985
1990	689.	35.	60.	243.	73.	0.	0.	0.	1100.	1990
1995	1086.	62.	118.	488.	73.	0.	0.	0.	1827.	1995
2000	1441.	87.	160.	724.	73.	0.	0.	0.	2490.	2000
2005	1771.	111.	206.	935.	73.	0.	0.	0.	3096.	2005
2010	2021.	129.	240.	1112.	73.	0.	0.	0.	3576.	2010
2015	2204.	140.	265.	1245.	73.	0.	0.	3.	3934.	2015
2020	2301.	152.	281.	1330.	73.	0.	0.	4.	4140.	2020
2025	2363.	156.	289.	1378.	73.	0.	0.	5.	4265.	2025
2030	2399.	159.	295.	1408.	73.	0.	0.	6.	4339.	2030
2035	2430.	160.	299.	1428.	73.	0.	0.	6.	4396.	2035
2040	2449.	160.	302.	1444.	73.	0.	0.	7.	4434.	2040
2045	2451.	160.	303.	1449.	73.	0.	0.	8.	4443.	2045
2050	2451.	160.	303.	1450.	73.	0.	0.	8.	4444.	2050
2055	2451.	160.	303.	1450.	73.	0.	0.	8.	4444.	2055
2060	2451.	160.	303.	1450.	73.	0.	0.	8.	4444.	2060
2065	2451.	160.	303.	1450.	73.	0.	0.	9.	4445.	2065
2070	2451.	160.	303.	1450.	73.	0.	0.	9.	4445.	2070
2075	2451.	160.	303.	1450.	73.	0.	0.	9.	4445.	2075

TABLE 10.E.194. Case 3 - Low Growth - U and Pu Recycle - Repository in 1985 - Reference Treatment - System Spent Fuel Management Costs - $ Millions at 10% Discount Rate

YEAR	REACTOR TO ISFSR	ISFSR STORAGE	REACTOR BASIN STORAGE	REACTOR TO PACKAGING	ISFSR TO PACKAGING	PACKAGING	PACKAGED FUEL STORAGE	PACKAGED FUEL TO FRP	SPENT FUEL TO FRP	PACKAGED FUEL TO REPOSIT	REPOSITORY COST	TOTAL COST	YEAR
1980	0.	0.	118.	0.	0.	0.	0.	0.	0.	0.	0.	118.	1980
1985	0.	0.	248.	0.	0.	0.	0.	0.	61.	0.	0.	308.	1985
1990	0.	0.	339.	0.	0.	0.	0.	0.	149.	0.	0.	488.	1990
1995	0.	0.	393.	0.	0.	0.	0.	0.	223.	0.	0.	616.	1995
2000	0.	0.	442.	0.	0.	0.	0.	0.	278.	0.	0.	720.	2000
2005	0.	0.	477.	0.	0.	0.	0.	0.	323.	0.	0.	800.	2005
2010	0.	0.	501.	0.	0.	0.	0.	0.	352.	0.	0.	853.	2010
2015	0.	0.	513.	0.	0.	0.	0.	0.	371.	0.	0.	884.	2015
2020	0.	0.	522.	0.	0.	0.	0.	0.	380.	0.	0.	901.	2020
2025	0.	0.	528.	0.	0.	0.	0.	0.	384.	0.	0.	912.	2025
2030	0.	0.	532.	0.	0.	0.	0.	0.	387.	0.	0.	919.	2030
2035	0.	0.	534.	0.	0.	0.	0.	0.	389.	0.	0.	923.	2035
2040	0.	0.	535.	0.	0.	0.	0.	0.	390.	0.	0.	924.	2040
2045	0.	0.	535.	0.	0.	0.	0.	0.	390.	0.	0.	924.	2045
2050	0.	0.	535.	0.	0.	0.	0.	0.	390.	0.	0.	924.	2050
2055	0.	0.	535.	0.	0.	0.	0.	0.	390.	0.	0.	924.	2055
2060	0.	0.	535.	0.	0.	0.	0.	0.	390.	0.	0.	924.	2060
2065	0.	0.	535.	0.	0.	0.	0.	0.	390.	0.	0.	924.	2065
2070	0.	0.	535.	0.	0.	0.	0.	0.	390.	0.	0.	924.	2070

TABLE 10.E.195. Case 3 - Low Growth - U and Pu Recycle - Repository in 1985 - Reference Treatment - Non-Spent Fuel System Waste Management Costs for Repository in Salt - $ Millions at 10% Discount Rate

YEAR	TREATMENT AT FRP	TREATMENT AT MOX FFP	TRANSPORTATION	REPOSITORY	INTERIM STORAGE	PUO2 STORAGE	PUO2 SHIPPING	DISMANTLING FRP+MOX	TOTAL SYSTEM	YEAR
1985	227.	10.	5.	19.	62.	0.	0.	0.	323.	1985
1990	534.	27.	45.	180.	62.	0.	0.	0.	847.	1990
1995	790.	48.	82.	337.	62.	0.	0.	0.	1316.	1995
2000	988.	58.	108.	469.	62.	0.	0.	0.	1686.	2000
2005	1150.	70.	128.	572.	62.	0.	0.	0.	1983.	2005
2010	1256.	78.	143.	648.	62.	0.	0.	0.	2187.	2010
2015	1329.	83.	152.	697.	62.	0.	0.	1.	2319.	2015
2020	1356.	86.	157.	729.	62.	0.	0.	1.	2386.	2020
2025	1373.	87.	159.	738.	62.	0.	0.	2.	2421.	2025
2030	1382.	88.	161.	745.	62.	0.	0.	2.	2440.	2030
2035	1389.	88.	162.	750.	62.	0.	0.	2.	2452.	2035
2040	1392.	88.	162.	753.	62.	0.	0.	2.	2459.	2040
2045	1392.	88.	162.	754.	62.	0.	0.	2.	2460.	2045
2050	1392.	88.	162.	754.	62.	0.	0.	2.	2461.	2050
2055	1392.	88.	162.	754.	62.	0.	0.	2.	2461.	2055
2060	1392.	88.	162.	754.	62.	0.	0.	2.	2461.	2060
2065	1392.	88.	162.	754.	62.	0.	0.	2.	2461.	2065
2070	1392.	88.	162.	754.	62.	0.	0.	2.	2461.	2070
2075	1392.	88.	162.	754.	62.	0.	0.	2.	2461.	2075

ACRONYMS LIST

ACRONYMS LIST

A-E	architect-engineer
AAPG	American Association of Petroleum Geologists
ACVSF	air-cooled vault storage facility
AEC	Atomic Energy Commission
AECL	Atomic Energy of Canada, Limited
AFR	away from reactor (spent fuel storage)
AGNS	Allied General Nuclear Services
ALARA	as low as reasonably achievable
AMAD	aerodynamic median activity diameter
AP	activation product
API	American Petroleum Institute
APS	atmospheric protection system
BFRSS	Barnwell Fuel Receiving and Storage Station
BIF	bitumen immobilization facility
BPPF	Barnwell Plutonium Product Facility
BTU	British thermal unit
BWR	boiling water reactor
CANDU	Canadian heavy water reactor
CDC	canister decontamination cell (cubicle)
CFR	Code of Federal Regulations
CIF	cement immobilization facility
CRWM	Committee on Radioactive Waste Management
CUP	cask unloading pool
CVCS	chemical and volume control system
CW	canistered waste
CWMS	Generic Environmental Impact Statement on Commercial Radioactive Waste Management, DOE-1559
CWTF	cask weld test facility
DCSF	dry caisson storage facility
DF	decontamination factor
DOE	Department of Energy
DOG	dissolver off-gas
DOP	dioctyphthalate
DOT	Department of Transportation
DTPA	diethylenetriamine pentaacetic acid
ECWS	essential cooling water system
EPC	engineering, procurement, and construction
ER	environmental report
ERDA	Energy Research and Development Administration
ESFS	engineered safety features systems
ESPS	essential spray pond system
FFTF	Fast Flux Test Facility
FP	fission product
FPF	fuel packaging facility
FRP	fuel reprocessing plant
FRPF	fuel residue packaging facility
FRSSF	fuel residue subsurface storage facility
FRVSF	fuel residue vault storage facility
FRW	fuel residue waste
FSA	fuel storage area
FSAR	Final Safety Analysis Report
FSB	fuel storage basin
FTF	fuel transfer facility
FTP	fuel transfer platform
GEIS	Generic Environmental Impact Statement
HCF	hulls compaction facility
HEPA	high-efficiency particulate air (filter)
HEU	highly enriched uranium
HLLW	high-level liquid waste
HLW	high-level waste
HM	heavy metal
HMA	hot maintenance area
HMF	hulls melting facility
HPF	hulls packaging facility
HTD	hulls transfer device
HTGR	high temperature gas-cooled reactor
HVAC	heating, ventilation, and air conditioning
IAEA	International Atomic Energy Agency
IBC	in-bed combustion
ICPP	Idaho Chemical Processing Plant
IFSF	independent fuel storage facility
IIPSF	independent interim plutonium oxide storage facility

ILLW	intermediate-level liquid waste
ILW	intermediate-level waste
INEL	Idaho National Engineering Laboratory
IPSF	interim plutonium oxide storage facility
ISFS	independent spent fuel storage
ISFSB	independent spent fuel storage basin
ISFSF	independent spent fuel storage facility
LAA	limited access area
LEU	low-enriched uranium
LHD	load-haul-dump
LLW	low-level waste
LN_2	liquid nitrogen
LSA	low specific activity
LWBR	light water breeder reactor
LWR	light water reactor
M&M	men and materials
MFBM	thousand board feet measure
MFRP	General Electric Company's Midwest Fuel Reprocessing Plant
MOX FFP	mixed oxide fuel fabrication plant
MP	mine production
MSRE	molten salt reactor
MTHM	metric ton heavy metal
NAA	normal access area
NAC	Nuclear Assurance Corporation
NAS	National Academy of Sciences
NASA	National Aeronautics and Space Administration
NFS	Nuclear Fuel Services
NHLSW	non-high-level solid waste
NLI	National Lead Industries
NRC	Nuclear Regulatory Commission
NSSS	nuclear steam supply system
NWTS	National Waste Terminal Storage
ORIGEN	a computer program to calculate isotopic composition of irradiated nuclear fuel
ORNL	Oak Ridge National Laboratory
ONWI	Office of Nuclear Waste Isolation
OWI	Office of Waste Isolation
P-T	partioning and transmutation
PCWS	plant cooling water system
PFRF	packaged fuel receiving facility
PNL	Pacific Northwest Laboratory
POG	process off-gas
PSAR	preliminary safety analysis report
PWR	pressurized water reactor
R&D	research and development
RAA	restricted access area
RBOF	receiving basin for offsite fuel, Savannah River Plant
RCS	reactor coolant system
SCRA	storage cask receiving area
SCSF	surface cask storage facility
SF	spent fuel
SFPF	spent fuel packaging facility
SFRSS	spent fuel receiving and storage station
SFSF	spent fuel storage facility
SHLW	solidified high-level waste
SNM	special nuclear material, i.e., enriched uranium and plutonium
SRP	Savannah River Plant
SSC	sealed storage cask
SSCF	sealed storage cask facility
TBP	tributyl phosphate
TD	theoretical density
TN	Transnuclear Inc.
TRU	transuranic
TSA	transuranic storage area
TWCA	Teledyne Wahchang Albany
U-F	urea-formaldehyde
VE	ventilation exhaust
VOG	vessel off-gas
WBS	water basin storage
WBSF	water basin storage facility
WBSF-PF	water basin storage facility for packaged fuel
WCC	waste calcination cell (cubicle)
WCF	waste calcination facility
WIPP	Waste Isolation Pilot Plant
WTEB	waste tank equipment building
WVC	waste vitrification cell
WVF	waste vitrification facility

MEASUREMENT UNITS AND CONVERSIONS

MEASUREMENT UNITS AND CONVERSIONS

This report preferentially uses the metric system of measurements as defined by the International System of Units (SI). Common English units are often also included in parentheses. Prefixes used with the metric units are defined as follows:

Prefix	Abbreviation	Factor
giga	G	10^9
mega	M	10^6
kilo	k	10^3
centi	c	10^{-2}
milli	m	10^{-3}
micro	μ	10^{-6}
nano	n	10^{-9}

The following lists identify the symbols used in this report and the factors for converting between the SI and English units.

Symbols for metric units used in this report are:

Symbol	Name
°C[a]	degree Celsius
d[a]	day
g	gram
h (or hr)	hour
ha	hectare
kWh	Kilowatt-hour
J	joule
ℓ	liter
m	meter
min	minute
M	gram-mole/liter
MT	metric ton
MW-hr (or MWh)	megawatt-hour
s (or sec)	second
W	watt

a. Units which are not strictly SI but which are widely used.

Symbols for other units used in this report are:

Symbol	Name
atm	atmospheric pressure
BTU	British thermal unit
Ci	curie
°F	degree Fahrenheit
ft	feet
gal	gallon
in.	inch
lb	pound
MFBM	thousand board feet measure
psi	pounds/square inch
R	roentgen
rem	roentgen equivalent man
yd	yard
yr	year

To convert metric to English, multiply by:

Metric	English	Factor
°C	°F	(°C x 9/5) + 32
cm	inch	0.3937
ha	acre	2.47
kg	lb	2.205
km	mile	0.6214
ℓ	gal	0.2642
m	ft	3.281
m^2	ft^2	10.76
m^3	MFBM	0.424
m^3	ft^3	35.31
m^3	gal	264.2
m^3	yd^3	1.308
MT	ton	0.9070
W	BTU/hr	3.413
W-s/kg-°C	BTU/lb-°F	2.39×10^{-4}
W/m-°C	BTU/hr-ft-°F	0.576

To convert English to metric, multiply by:

English	Metric	Factor
acre	ha	0.405
BTU	W-hr	0.2931
BTU/lb-°F	W-s/kg-°C	4187
BTU/hr-ft-°F	W/m-°C	1.735
°F	°C	(°F-32) x 5/9
ft	m	0.3048
ft^2	m^2	0.0929
ft^3	m^3	0.0283
gal	ℓ	3.785
gal	m^3	3.785×10^{-3}
inches	cm	2.540
lb	kg	0.4536
mile	km	1.609
MFBM	m^3	2.360
ton	MT	1.103
yd^3	m^3	0.7646