United States
Environmental Protection
Agency

Office of
Radiation Programs
Washington DC 20460

EPA 520/4-79-007A

Radiation

EPA

Technical Support of Standards for High-Level Radioactive Waste Management

Volume A
Source Term Characterization

TECHNICAL SUPPORT OF STANDARDS FOR HIGH-LEVEL RADIOACTIVE WASTE MANAGEMENT

TASK A REPORT

SOURCE TERM CHARACTERIZATION/DEFINITION

EPA Contract No. 68-01-4470

Prepared by

Arthur D. Little, Inc.
Cambridge, Massachusetts 02140
March-July 1977

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ACKNOWLEDGMENTS

Many individuals contributed to the work done under the direction of Arthur D. Little, Inc., for the U.S. Environmental Protection Agency under Contract No. 68-01-4470. John L. Russell and Daniel Egan of the Office of Radiation Programs at EPA served as constant guides in the process of our work. Dr. Bruce S. Old, James I. Stevens, and David I. Hellstrom of Arthur D. Little, Inc., were Program Director, Program Manager, and Assistant Program Manager, respectively, of the overall project. Key individuals involved in each of the reports prepared under the four tasks were:

TASK A	Donald Korn Arthur D. Little, Inc. Task Director
	Robert McWhorter, Michael Raudenbush, and Lester Goldstein S.M. Stoller Corp.
TASK B	Edwin L. Field Arthur D. Little, Inc. Task Director
	Robert McWhorter and Michael Raudenbush S.M. Stoller Corp.
TASK C	P.J. O'Brien Arthur D. Little, Inc. Task Director
	Dr. Ronald B. Lantz Intera Environmental Consultants, Inc.
	Dr. John Gormley D'Appolonia Consulting Engineers, Inc.
TASK D	Donald S. Allan Arthur D. Little, Inc. Task Director
	Ajit Bhattacharyya and Charles R. Hadlock Arthur D. Little, Inc.

FOREWORD

A major Federal effort is underway to develop methods for disposal of high-level radioactive waste in deep geologic repositories. An important element of this program is the development and promulgation by the U.S. Environmental Protection Agency (EPA) of environmental standards for the management of these wastes.

In anticipation of its efforts to develop these standards, EPA recognized that it would be necessary to estimate the expected and potential environmental impacts from potential geologic repositories using modeling techniques based upon as thorough an understanding as possible of the uncertainties involved in the quantities and characteristics of the wastes to be managed, the effectiveness of engineering controls, and the potential migration and accidental pathways that might result in radioactive materials entering the biosphere. Consequently, in March 1977, the EPA contracted with Arthur D. Little, Inc., for a study to provide technical support for its development of environmental regulations for high-level radioactive wastes. This study was divided into the following four tasks:

Task A - Source Term Characterization/Definition

Task B - Effectiveness of Engineering Controls

Task C - Assessment of Migration Pathways

Task D - Assessment of Accidental Pathways

The information presented in the reports on these tasks was developed principally during the period March 1977 to February 1978. In the case of this report, Task A, the information contained in it was prepared during the period March-July 1977. There are many national and international programs underway to develop additional data, especially in the fields of waste forms, knowledge of geology and geohydrology, and risk assessment. The information presented in these reports has been developed on conceptual bases and is not intended to be specific to particular conditions at geologic repositories.

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A-1.0 INTRODUCTION

A-1.1 BACKGROUND AND PURPOSE OF STUDY

In March 1977, the Environmental Protection Agency (EPA) issued a contract to Arthur D. Little, Inc., covering technical support for development of generally applicable environmental standards for the management of high-level radioactive waste (HLW). For the purposes of this study, HLW sources include (1) throwaway wastes: irradiated or "spent" nuclear fuel elements discharged from a nuclear reactor for disposal as a waste form; (2) reprocessed wastes: aqueous wastes resulting from solvent extraction, or the equivalent, in a facility where spent fuel is chemically reprocessed for recovery and recycle of uranium and plutonium; (3) non-aqueous wastes: fuel cladding and structural materials associated with the fuel elements and separated from them during reprocessing. In addition, specific isotopes produced as a result of nuclear reactions associated with irradiated fuel may constitute source terms of special interest from the viewpoint of environmental protection because of a combination of the quantity produced, half life, specific radiotoxicity, and ease of entering the biosphere. Highly radioactive waste must be isolated from the biosphere and managed in a fashion that ensures that any detrimental environmental effects will be acceptably small.

Existing HLW, from both government programs and from commercial nuclear power generation, has already caused concern because of the relatively large volumes of waste that are currently stored (mainly as liquids in tanks, but also as calcine granules in bins and as spent fuel in pools). The lack of fully demonstrated processes and technologies for long-term disposal of these wastes is a primary concern.

As part of the newly expanded Federal radioactive waste management program, several potential alternative approaches are being developed for the long-term management of HLW. The top priority of the Federal program is permanent disposal and there is only one generic method considered capable of being reduced to practice in a time frame of a decade or so. This is the emplacement of the waste in deep, stable geologic formations that can be reached by conventional mining methods. In conjunction with this generic method, a number of studies are in progress. These include a variety of engineering controls, such as the development of matrices (e.g., glass), hydrogeological and geochemical investigations to gain better understanding of potential pathways to the environment, and a detailed terminal storage design program leading to construction and operation of a disposal facility in at least two deep geologic formations.

EPA has already agreed to publish proposed generally applicable environmental standards for the storage and ultimate disposal of radioactive waste. EPA has embarked on this technical support project to help quantify potential

long-term environmental impacts and to help establish the technical bases for HLW standards. This technical information will be used by EPA in evaluating the environmental acceptability of various HLW disposal options. The technical support effort under this contract is divided into four tasks:

Task A - Source Term Characterization/Definition
Task B - Effectiveness of Engineering Controls
Task C - Assessment of Migration Pathways
Task D - Assessment of Accidental Pathways

This report represents the results of the work done under Task A above.

A-1.2 SCOPE OF TASK A EFFORT

The scope of work for Task A involves three major steps:

- Characterization of commercial high-level waste, including comparisons of source terms from various fuel cycles and fuel mixes.
- Characterization of government high-level waste, and comparison with commercial waste.
- Estimation of existing and projected quantities of high-level waste.

For commercial high-level waste, emphasis has been placed on the light-water reactor (LWR) nuclear fuel cycle, which is expected to be the major source of commercial radioactive waste for at least the next few decades. Reprocessing and non-reprocessing (throwaway) options are considered in detail. In addition, there is some discussion of the alternative fuel cycles that are currently being considered, in order to provide perspective as to how waste characteristics might change in the event of changes in the current LWR fuel cycle. Lower-level, transuranic (TRU)-contaminated waste from reprocessing plant trash has been considered, although in a much less quantitative fashion. The purpose of this brief review of TRU waste is to relate the characteristics and quantities of such waste to those for higher-level waste, and thereby provide some insight into the problems that might arise if all TRU-containing waste were placed in deep geologic disposal facilities along with high-level waste.

For estimates of the total quantities of commercial HLW, a number of alternative projections for domestic nuclear power growth have been considered. For purposes of this study, a range of

nuclear generating capacity was investigated. For the year 2000 this range was assumed to be 380 GW to 480 GW, with 450 GW selected as a reference case. For the year 2010, a value of 700 GW was assumed. A precise value for the total waste burden is not critical to this assessment, and the waste quantities may be scaled up or down to accommodate differing projections of nuclear power growth. The question of foreign waste that might conceivably be shipped to the United States for ultimate disposal is discussed briefly in the body of the report.

For government waste, a single static reference case has been assumed. This reference case assumes quantities in the late 1980's to 1990's based on present government plant operating plans. Whether or to what extent government requirements will add waste beyond 1990 is speculative and has not been addressed because the indications are that commercial waste may represent a much larger source term than government waste.

Data on waste characteristics are presented in several formats and on a specific basis (per unit of fuel used or energy generated), as well as on a total basis for a given number of nuclear power plants.

A-1.3 GUIDE TO SUBJECT MATTER AND TECHNOLOGY

For those readers who are not familiar with the terminology of the subject, a Glossary and List of Abbreviations are given in Appendix A-1. Other Appendices give more detailed information concerning sources of radioactivity and nuclear power, as well as the calculated source term data for the fuel cycle cases referred to throughout this report.

A-2.0 SUMMARY AND CONCLUSIONS

The purpose of Task A is quantification and characterization of existing and potential high-level radioactive waste. These data are the starting point for assessing the environmental impact of radioactive waste disposal.

A significant inventory of high-level radioactive waste has resulted from utilization of nuclear energy in U. S. government programs. This waste has been generated principally as a result of the chemical processing of material from plutonium production reactors and naval submarine propulsion reactors. The waste is stored at three isolated sites--the Hanford, Savannah River, and Idaho government reservations. (A small volume of such waste is stored at the West Valley, New York site of the now shut-down Nuclear Fuel Services [NFS] commercial reprocessing plant. Most of the West Valley waste came from the government and R&D programs, and the rest from limited reprocessing of electric utilities' power reactor fuel prior to shutdown of the NFS plant.)

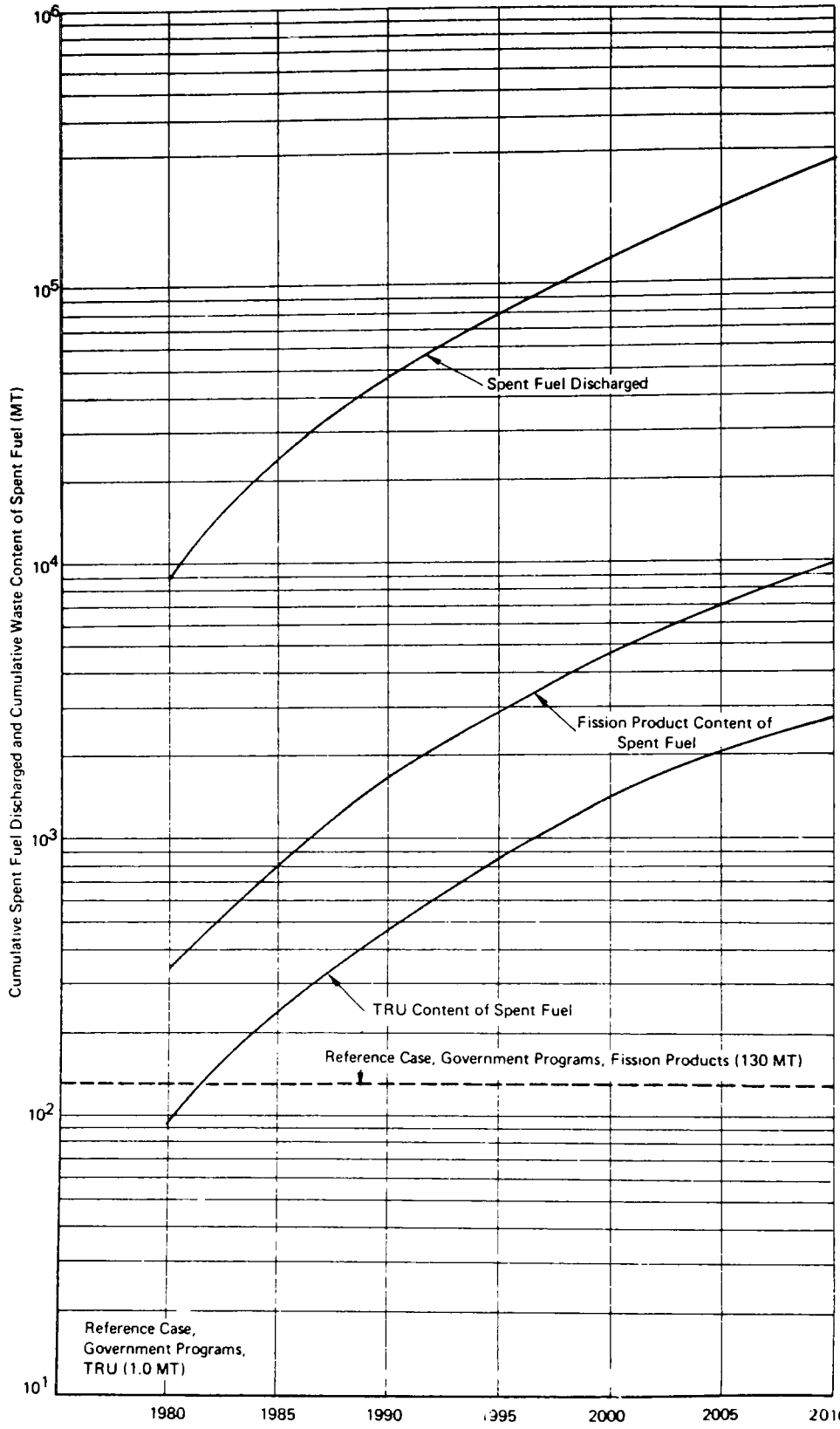
The reference case for high-level government waste comprises about 130 metric tons (MT) of fission products contained in a volume of approximately 300,000 cubic meters (m^3) (78 million gallons) of solids, sludges, salts, and liquids.

The existing volume of HLW from commercial nuclear power is modest compared with that of government waste, but the radioactivity content of commercial spent fuel already exceeds that of government waste, and this difference will increase substantially over the next 10-15 years as presently-committed nuclear power plants come on line. In light of the Administration's current policy deferring reprocessing, the waste form of commercial HLW over the next 10-15 years may be throwaway waste as opposed to reprocessed waste.

If nuclear power growth occurs at assumed reference rates, by the turn of the century some 12,000 MT of spent fuel will be discharged annually, containing about 500 MT of HLW nuclides excluding uranium isotopes. The cumulative burden (all waste associated with 30-year operating life of each reactor) may reach 34,000 MT of fission products and other associated waste.

A perspective on the build-up of spent fuel and associated waste from commercial nuclear power, through the year 2010, is presented in Figure A-1. Also shown is the reference government waste case, for comparison. Most high-level radioactive waste in the United States is and will be from commercial nuclear power reactors, fueled with uranium enriched to about 3% in the fissionable isotope U-235, and moderated and cooled with ordinary (light) water.

In light-water reactors, approximately 240 million kilowatt hours



Note: Waste Content Based on Ten Year Decay Time.

FIGURE A–1 PERSPECTIVE ON THE BUILDUP OF SPENT FUEL AND ASSOCIATED HIGH LEVEL WASTE VS. TIME (NOMINAL GROWTH CASE, THROWAWAY CYCLE – 450 GW BY THE YEAR 2000)

(kWh) of electric energy are generated per MT of fuel, i.e., per metric ton of heavy metal (MTHM) charged. (In nuclear industry parlance, such fuel has a "burnup" of approximately 30,000 megawatt (MW)-days thermal energy release per ton.) Under steady-state operations, about 26 MT of fuel will be removed from a typical 1000 MW reactor and replaced with fresh fuel each year.

After ten years of cooling, assuming this fuel was chemically processed for recycling by separating the uranium and plutonium from the fission products and the transplutonic actinides and actinide daughters, there would be about 36 kilograms (kg) (79 pounds) of total high-level waste per MT of fuel discharged and 3×10^5 curies of associated radioactivity. If the fuel were not reprocessed, but disposed of as spent fuel, there would be in addition nearly all of the U-238 originally in the fresh fuel, constituting most of its mass. Thus, total waste generated in this latter, or "throwaway" case, would simply be one MT per MT charged.

The estimated range of annual commercial waste disposal requirements in the years 2000 and 2010 are presented in Tables A-1 and A-2, respectively. The estimated combined cumulative commercial and government waste burden circa 2010 is indicated in Table A-3.

The U. S. government chose to store most of its waste in alkaline form, which resulted in its being associated with a relatively high quantity of sodium nitrate. Further processing of this waste for permanent disposal will probably be much more complex and expensive than the treatment envisioned for commercial waste.

The physical and chemical characteristics of commercial high-level waste are still not fully specified, primarily because of uncertainties as to whether fuel reprocessing will be permitted. With reprocessing, waste would be in soluble form (acid solution) for concentration and solidification prior to final disposal. In addition, the fuel hulls (structure and cladding) would require disposal. Alternatively, if a decision is made to forego reprocessing, the high-level waste would remain in the spent fuel assemblies, which would presumably be the ultimate form of disposal.

In determining the quantities and characteristics of high-level radioactive wastes, detailed nuclide buildup and decay calculations have been carried out for several alternative nuclear power fuel cycles:

1. No reprocessing or "throwaway" cycle. Low-enriched uranium as UO_2 in a light water reactor (LWR), with direct disposal of the spent fuel as waste;

2. Uranium only recycle. Low-enriched uranium in an LWR with reprocessing of irradiated fuel and recycle of recovered uranium as UO_2;

TABLE A-1

ESTIMATED RANGE OF ANNUAL DISPOSAL REQUIREMENTS FOR COMMERCIAL WASTE*
(CIRCA 2000)

Category of Waste	High-Level Waste				Other Associated Waste		
	Spent Fuel (MTHM)	Total Radioactivity (Ci)	Fission Products (MT)	TRU (MT)	Iodine-129 (Ci)	Carbon-14+ (Ci)	Miscellaneous‡ (Ci)
1. Commercial Waste (throwaway fuel cycle)							
Range	$9.7\text{-}12.2 \times 10^3$	$4\text{-}5 \times 10^9$	340-430	97-122	(Contained in Spent Fuel)		
Reference	11.5×10^3	5×10^9	400	115			
2. Commercial Waste (from reprocessing of mixed-oxide recycle fuel cycle assemblies)							
Range	$9.7\text{-}12.2 \times 10^3$	$3.1\text{-}3.9 \times 10^9$	280-350	21-26	400-500	$4.4\text{-}5.6 \times 10^3$	$2.9\text{-}3.7 \times 10^7$
Reference	11.5×10^3	3.6×10^9	330	25	500	5.2×10^3	3.5×10^7

Note: Assumes 26 MTHM/GW-yr.

*Commercial quantities based on range of installed nuclear capacity of 380 GW - 480 GW in 2000, (450 GW reference) for ten-year-old waste.

+Based on 10-20 ppm N-14 initially in fuel.

‡"Miscellaneous" consists of: Fuel assembly structure and cladding activation products, plus entrapped fission products and actinides in the cladding.

TABLE A-2

ESTIMATED ANNUAL DISPOSAL REQUIREMENTS FOR COMMERCIAL WASTE, YEAR 2010*

Category of Waste	High-Level Waste				Other Associated Waste		
	Spent Fuel (MTHM)	Total Radioactivity (Ci)	Fission Products (MT)	TRU (MT)	Iodine-129 (Ci)	Carbon-14+ (Ci)	Miscellaneous‡ (Ci)
1. Commercial Waste (throwaway fuel cycle)	17.8×10^3	7×10^9	625	180	(Contained in Spent Fuel)		
2. Commercial Waste (from reprocessing of mixed-oxide recycle fuel cycle assemblies)	17.8×10^3	5.6×10^9	515	38	700	8.1×10^3	5.4×10^7

Note: Assumes 26 MTHM/GW-yr.

*Commercial quantities based on reference case installed nuclear capacity of 700 GW with 10-year aging period assumed prior to reprocessing and/or disposal.

+Based on 10-20 ppm N-14 initially in fuel.

‡"Miscellaneous" consists of: Fuel assembly structure and cladding activation products, plus entrapped fission products and actinides in the cladding.

TABLE A-3

ESTIMATED TOTAL DOMESTIC HIGH-LEVEL WASTE BURDEN*

Category of Waste	High-Level Waste				Other Associated Waste		
	Spent Fuel (MTHM)	Total Radioactivity (Ci)	Fission Products (MT)	TRU (MT)	Iodine-129 (Ci)	Carbon-14+ (Ci)	Miscellaneous‡ (Ci)
1a. Commercial Waste (throwaway fuel cycle)	5.5×10^5	2.3×10^{11}	19,000	5,400	(Contained in Spent Fuel)		
1b. Commercial Waste (from reprocessing of mixed oxide recycle fuel cycle assemblies)	5.4×10^5	1.8×10^{11}	16,000	1,200	2.3×10^4	2.5×10^5	1.6×10^9
2. Waste from Government* Programs		6.7×10^8	130	1.0	-	-	-

*Quantities of commercial waste based on lifetime production for reference nuclear capacity in the year 2010 (700 GW) keyed to LWR generation. Data are for 10-year-old waste . Quantities and characteristics of government waste keyed to existing inventory in the late 1980's - early 1990's.

+Based on 10-20 ppm N-14 initially in fuel.

‡"Miscellaneous" consists of: Fuel assembly structure and cladding activation products, plus entrapped fission products and actinides in the cladding.

Note: For projections (p) of total LWR capacity other than 700 GW in the year 2010, approximate values may be obtained from the ratio $\frac{p}{700}$ times the values on the table.

3. Uranium and plutonium ("mixed oxide") recycle. Mixed low enriched uranium and plutonium oxide in an LWR with reprocessing of irradiated fuel and recycle of recovered uranium and plutonium as UO_2 and PuO_2;

4. Low-enriched uranium used first in an LWR, further burned in a heavy water reactor (HWR), then thrown away (tandem cycle); and

5. Uraniums-233 and -235 as the fissile material, with thorium as fertile fuel in a representative LWR, with reprocessing of irradiated fuel and recycle of recovered uranium isotopes (and possibly thorium).

Although for this study detailed calculations have not been performed for any of the other fuel cycles that could prove commercially feasible, these other cycles can be considered to produce essentially the same results as one of the five cases, or some combination of two cases. The more important nuclides sent to waste result either from fission or from neutron capture in actinide isotopes. Those nuclides generated in the fission process are fixed in their number and type primarily by the particular fissile nuclides burned and their degree of burnup, with only modest influence of specifically nuclear considerations, such as neutron spectrum and degrees of self-shielding. Therefore, any fission-product waste resulting from equal fissions in U-235 and fissile plutonium will have the same nuclide composition, within perhaps 10-15%, regardless of which reactor produced it. Since the fissile mixtures covered by the five cases above are representative of all those considered, the results obtained using their fission product spectra should be reasonably comprehensive. Previous studies of other fuel cycles, e.g., representative liquid metal fast breeder reactor (LMFBR) and high-temperature gas-cooled reactor (HTGR) design, bear out these observations. However, the quantities of uranium and transuranic isotopes in waste may vary widely according to the fuel cycle selected.

There are also significant quantities of transuranic isotopes (TRU) in the relatively large volume of low-specific-activity general process trash generated from materials handling during reprocessing and mixed-oxide fuel fabrication operations. An estimate of the Pu content of waste with such low specific activity has been made for the purpose of this study. The resulting source term depends upon the fuel mix being reprocessed (with subsequent fabrication into mixed-oxide assemblies). For a mix consisting solely of UO_2 assemblies, the source term is approximately 2-3 kg Pu/GW-yr of energy production. For a mix consisting of the discharge of an equilibrium fuel cycle employing uranium plus plutonium assemblies ("mixed oxide" recycle), the source term is about 7 kg Pu/GW-yr of energy production. These values are based upon an assumed loss of plutonium during reprocessing and fabrication of approximately 1%. These source term numbers may be characterized as being approximately one-tenth the value of the TRU content of high-level waste,

which is approximately 20 kg TRU/GW-yr from processed UO_2 assemblies and 65 kg TRU/GW-yr from processing of assemblies from mixed oxide fuel operations. Hence, in terms of TRU content and based on current estimates of process losses, low-specific-activity TRU waste represents a potential source about one-tenth that from the high-level TRU waste. In addition, the low-specific-activity TRU waste is in much less concentrated form than the TRU content of high-level waste. Furthermore, the potential radiotoxicity from these low-specific-activity TRU wastes is significantly less than 10% of that for high-level TRU wastes because, per unit weight, the latter have a much higher content of transplutonium elements. About 94% of the high-level waste TRU component is transplutonium waste.

In this report, the source terms displayed in all figures are normalized to a unit of fuel charged to the reactor; to convert to units of electricity produced, e.g., per GW-yr, the source terms should be multiplied by 26 MTHM per GW-yr.*

Some source term data are presented as untreated dilution index. The untreated dilution index (UDI) is defined in this study as the volumetric quantity of water, or air, required to dilute a quantity of radionuclides to the concentration specified under the Standards for Protection Against Radiation in non-occupational exposure, published in the Code of Federal Regulations (10 CFR 20, Appendix B) and given in Table 2 of Appendix A-III of this report. The untreated dilution index gives a gross indication of the comparative risks of radionuclides, were these nuclides actually released to the environment. UDI does not consider waste disposal methods (packaging or geologic isolation), or their resultant environmental pathways to man. The term "radiotoxicity" is defined as the base-10 lagarithm of the untreated dilution index.

The total associated radioactivity per metric ton of commercial fuel as a function of time is shown in Figure A-2 for reference Cases 1, 2, and 3. Figure A-2 shows the total high-level waste radioactivity from the actinides and daughters, fission products, and structural materials. Detailed data on quantities and characteristics of the high-level radioactive waste source terms are tabulated in the Appendices to this report.

A number of important observations can be made by comparing the source term data (isotopic sources responsible for radioactivity, decay

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*The value of 26 MTHM/GW-yr was developed on the following bases:

(a) Net electrical conversion efficienty (EF) = 33%
(b) Reactor core specific power (SP) = 38.4 MWt/MTHM
(c) Average number of cycles resident (in-core) per reload batch (ACR) = 3
(d) Fuel cycle length, Y = 1

For other bases, the following conversion factor should be employed:

$$\frac{\text{Source Term}}{\text{GW-yr}} = \frac{\text{Source Term}}{\text{MTHM}} (10^3)\left(\frac{1}{EF}\right)\left(\frac{1}{SP}\right)\left(\frac{1}{ACR}\right)\left(\frac{1}{Y}\right)$$

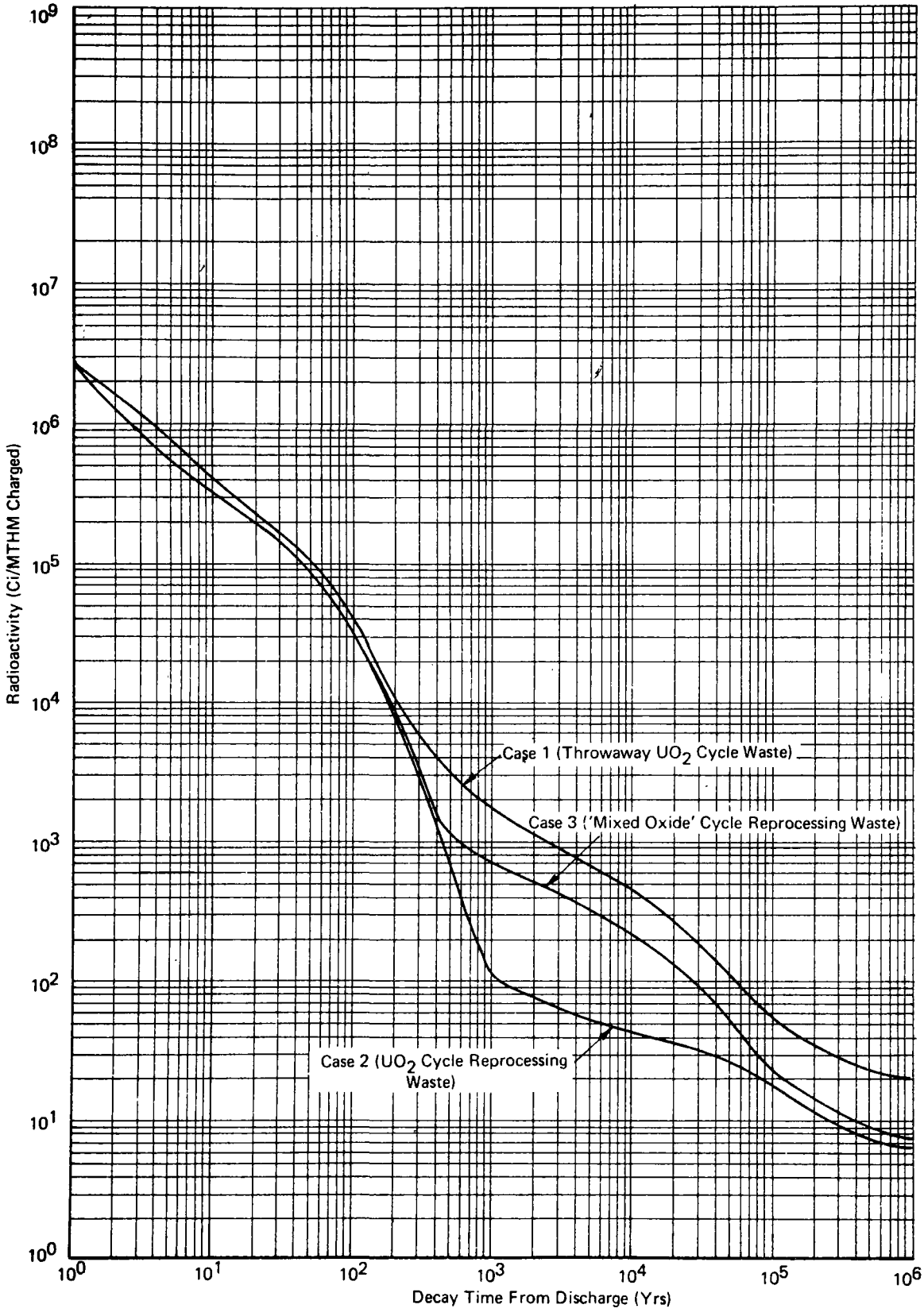

FIGURE A–2 TOTAL COMMERCIAL SPENT FUEL RADIOACTIVITY, FOR THE THREE REFERENCE CASES

heat generation, etc., as a function of time) shown for Cases 1, 2, and 3, the three reference nuclear fuel cycle cases for this study:

- In all cycles, for the first few hundred years of decay, the fission product activity is the primary contributor to the total radioactivity. The fission product activity is primarily that associated with Sr-90 and Cs-137. After a few hundred years, the long-lived heavy radioisotopes known as the trans-uranic actinides (especially americium, plutonium, and curium) are the major contributors to the radioactivity level.

- Because fission product activity per unit energy produced (or per MT of fuel charged at the same discharge exposure) is largely independent of fuel mix, the radioactivity levels, decay heat generation, and untreated dilution indices are similar for all three cases (1, 2, 3) for the first few hundred years.*

- After the first few hundred years, actinides become the dominant isotopes controlling source terms. Differences in actinide content among the three fuel cycles (Case 1, 2, 3) then create significant differences in radioactivity, decay heat generation, and untreated dilution index. The throwaway case has the highest value, followed by the mixed-oxide cycle, then UO_2 recycle.

- The source terms for the hulls+ are comparable for the waste from reprocessed mixed-oxide fuel and for the waste from reprocessed UO_2 fuel. For these non-throwaway cases, the amount of actinides associated with residue in hulls is sensitive to the effectiveness of the leaching/dissolving operation during reprocessing. The U, Pu content of hulls (0.1% of fuel) is comparable to the U, Pu content of the HLW (at 99.9% efficient reprocessing) for the recycle cases, but the HLW has substantially more transplutonium elements.

- The low-specific-activity TRU waste, which includes general process trash generated from materials handling during re-processing and mixed-oxide fuel fabrication, results in

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*Throwaway cycle activity is shown in Figure A-2 as higher than in the other two cases, based on the assumption for Cases 2 and 3 that some volatiles escape from HLW at the reprocessing step (see Table A-8).

+Hulls are defined in this report as fuel assembly structure and cladding, plus 0.2% of fuel fission products and 0.1% of fuel actinides and daughters entrapped in the cladding. The hull source term includes activation products plus the sources from the entrapped fission products, actinides, and their daughters.

source terms significantly lower (by an order of magnitude) than the TRU content of HLW.

- There is a greater volume of government high-level radioactive waste at present than commercial nuclear power waste, although total weight of fission products and actinides and total radioactivity is less than for commercial waste. As time goes on, commercial waste quantities will probably grow much faster than government waste and will dominate the HLW disposal question.

A-3.0 CHARACTERIZATION OF COMMERCIAL HIGH-LEVEL WASTE

A-3.1 FUEL CYCLES ANALYZED

For light water reactors (LWRs), there are three reference cases for handling irradiated fuel removed from the reactor:

Case 1 No reprocessing, or "throwaway," cycle (applicable solely to uranium (UO_2) fuel assemblies).

Case 2 Uranium-only recycle (applicable solely to UO_2 fuel assemblies). During reprocessing, the bulk of the uranium is separated from the high-level waste and is eventually returned to a reactor. In this study it was assumed that the extracted plutonium was not a waste source term. Subsequent disposal of the plutonium would increase the Case 2 source terms somewhat, especially at longer decay times, when actinides dominate the source term.*

Case 3 Uranium and plutonium recycle (applicable to UO_2 fuel assemblies in early fuel cycles, and to UO_2 plus PuO_2 fuel assemblies in later cycles). During reprocessing, the bulk of the uranium and plutonium are separated from the high-level waste and are eventually returned to a reactor. In this report, this will be termed "mixed-oxide" recycle.+

In the United States, a number of possible alternatives to the above are under investigation. A goal of many of these studies is to develop fuel cycles that preclude reprocessing while maintaining reasonable fuel cycle costs. An important factor in considering these alternatives is their impact on waste disposal. For this study, several cycles were investigated, particularly with regard to the amount of their high-level

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*The assumption that the extracted plutonium is not part of the waste stream is made in order to provide perspective and differentiate it from the mixed-oxide case. If the plutonium is recycled in a LWR, the source term is equivalent to a first-generation mixed-oxide recycle case which is not as great as that for the equilibrium mixed-oxide recycle.

+In the conventional flowsheet of reprocessing, uranium and plutonium are extracted separately from each other. However, in view of the current anti-proliferation concern, research and development is directed to modifying the flowsheet so that uranium and plutonium will be extracted together.

waste relative to the major cases. These alternative fuel cycles are:

Case 4 Tandem cycle. Irradiated UO_2 fuel discharged from an LWR is further "burned" in a heavy-water reactor after reconfiguration and reassembly.

Case 5 LWR thorium (ThO_2) cycle. Fully enriched uranium (93% U-235) is used as initial fissile charge and makeup fuel, with reprocessing and recycle of uranium isotopes (U-233, U-235, and various minor isotopes). The irradiated thorium separated during reprocessing can be either disposed of or stored for about 15 years by which time sufficient radioactive decay of the primary heat-producing and radiologically hazardous component, Th-228, will have occurred to allow re-use.

Each of the Cases, 1-5, is characterized by different high-level wastes as shown in Table A-4. Reprocessing for the recycle cases removes a small amount of fission products (some percentage of gases, volatiles, and tritium) from HLW. More importantly, in the uranium or mixed-oxide cases, reprocessing removes high percentages of plutonium and uranium from the main waste stream. In particular, removal of plutonium lowers significantly the decay heat rate and the potential radiotoxicity for times beyond several hundred years.

In the analysis performed to obtain the source term data for this report, Cases 1, 2, and 3 with equilibrium cycle fuel are considered the reference cases. For an equilibrium mixed-oxide cycle in a pressurized water reactor (PWR), the core is composed of about two-thirds uranium assemblies and one-third mixed-oxide assemblies (MO_2 is defined as PuO_2 and natural UO_2). Thus, each discharge batch has a UO_2:MO_2 assembly ratio of 2:1. The source terms for the high-level waste from discharged fuel from an equilibrium mixed-oxide cycle, as developed herein, are weighted by the 2:1 UO_2:MO_2 assembly ratio.

There are numerically significant differences among the cases, particularly in discharged concentrations of transuranic actinides, depending on how many generations the MO_2 plutonium has been in the core. Use of equilibrium-cycle plutonium (the assumption made in this study) is conservative in that it produces higher decay heat rates and potential radiotoxicity than any earlier-generation plutonium.

For Cases 2 and 3, involving reprocessing, nominal and augmented uranium and plutonium removal were considered. Nominal reprocessing

TABLE A-4

HIGH-LEVEL WASTE CHARACTERIZATION

Case	Fission Product Characterization	Actinide Characterization	Comments
(1) Throwaway Cycle	All fission products and daughters	All actinides and daughters	1. Potentially most radiotoxic* high-level waste per unit fuel weight of any LWR UO_2 or mixed oxide cases (1-3). 2. Decay heat rate per unit fuel weight highest of any of the LWR UO_2 or mixed oxide cases (1-3).
(2) Uranium Only Recycle	All fission products and daughters Less Some percentage of 1. Gaseous Elements (Xe, Kr) 2. Volatile Elements (I, Br) 3. Tritium	All actinides and daughters Less bulk of U and Pu. U recycled. Pu separated and stored for future use (may be stored contaminated with fission products), or may be made part of high-level wastes.	Least radiotoxic* and least heat-producing waste of cases (1-3).
(3) Mixed-Oxide Recycle	Same as (2)	Same as (2), except bulk of Pu as well as U is recycled.	1. Waste produced from reprocessed UO_2 assemblies different (and less radiotoxic* at longer cooling times) than that produced from reprocessed mixed-oxide assemblies.+ 2. Potential radiotoxicity* at longer cooling times from equilibrium mixed-oxide cycle waste per unit fuel weight+ approaches that of case 1.
(4) Tandem Cycle	All fission products and daughters discharged after the heavy water reactor irradiation portion of the total burnup.	All actinides and daughters discharged after the heavy water reactor radiation portion of the total burnup.	1. Tandem Cycle is a throwaway cycle. 2. Produces more fission products and transplutonic actinides‡ than throwaway cycle (case 1). 3. Decay heat rate and Untreated Dilution Index‡ higher than throwaway cycle (case 1).
(5) LWR Thorium - Uranium Recycle Cycle	Same as (2)	All actinides and daughters less bulk of Th and U. U recycled. Th separated and stored for approximately 15 years prior to recycle.	1. Thorium cycle is a recycle fuel cycle where in the equilibrium core about 65% of the assemblies are recycle assemblies and 35% makeup assemblies. 2. Except for the decay time period between about 500 and 10,000 years, the thorium cycle decay heat rate and Untreated Dilution Index are higher than for the mixed-oxide recycle case (case 3).

*Radiotoxicity as measured by the Untreated Dilution Index. (Toxicity is the base 10 logarithm of the Index.)

+For an equilibrium mixed-oxide cycle in a PWR, the core is composed of about two-thirds UO_2 assemblies and one-third MO_2 assemblies (MO_2 is defined as $PuO_2 + UO_2$). Thus, each discharge batch has a UO_2:MO_2 assembly ratio of 2:1. The source terms for HLW from discharged fuel from equilibrium mixed-oxide cycles, as developed herein, are weighted by the 2:1, UO_2:MO_2 assembly ratio.

‡The production of more fission products, transplutonic actinides, decay heat and a higher Untreated Dilution Index in the tandem cycle are accompanied by more energy produced per unit of fuel.

includes removal of 99.5% of uranium and plutonium isotopes. Augmented removal is considered to be 99.9% removal of uranium and plutonium isotopes.

Burnup perturbation runs were made based on these reference cases, primarily to examine the impact on decay heat range of average fuel burnups in the range of 25,000-40,000 MWd/MTHM.

The source term characterizations for the three reference cases and their variants, and for the alternative fuel cycle cases have been made using the S. M. Stoller Corporation version of the ORIGEN computer program for isotope generation and depletion calculations.(1) Table A-5 gives a summary of all the ORIGEN analyses performed to develop the source term data displayed herein. This chart also cross references those runs used for the specific cases described in this section. Detailed results of base-case ORIGEN runs are given in Appendix A-IV.

The Oak Ridge National Laboratory is comparing ORIGEN results with measurements made on irradiated PWR fuel. Early in this study it was learned that ORNL personnel had made important modifications to the actinide cross sections supplied with the publicly-available version of ORIGEN prior to making their comparisons. These modifications were based upon extensive depletion analysis of both UO_2 and MO_2 LWR fuels. This "best set" of actinide cross sections has been incorporated into this version of ORIGEN. Thus, any comments and conclusions about ORIGEN predictive capability drawn from examination of ORNL comparisons of their ORIGEN work and measurements would be applicable to the ORIGEN work performed for this study. In order to accomplish this task, the revised actinide cross section libraries were obtained from ORNL and made part of the S. M. Stoller Corporation version of ORIGEN. Even with the revised actinide cross sections, significant differences were found at ORNL between ORIGEN predictions and actual measurements. A discussion of the potential impact of these differences on the source terms reported herein is given in Section A-6.1.

To determine most accurately long decay time actinide source terms from ORIGEN, the naturally-occurring uranium isotope U-234 was incorporated in the fresh fuel. The U-234 concentrations used were based upon the known value of 0.0055 atom percent U-234 in natural uranium. During the enriching process U-234 atoms, being lighter than U-235 atoms, enrich at a higher rate than U-235. An enriching ratio, U-234 relative to U-235,

TABLE A-5

SUMMARY OF ORIGEN ANALYSES

Run No.	Reactor Type	Fuel Type	Reprocessing And Other Comments	% Fissile Initially	Specific Power During Operation kW/kgHM	Discharge Burnup MWd/MTHM	Time To Reprocessing (Days)	Used For Case No.	Cross-Reference To Computer Output Tables Supplied
A. RUNS FOR BASE CASES:									
1	PWR	UO_2	Throwaway	3.2	38.4	33,000	-	1	Table A-IV-1
2	PWR	UO_2	Reprocessed	3.2	38.4	33,000	183	2,3	Table A-IV-2
3	PWR	MO_2	Reprocessed	5.09	38.4	33,000	183	2	Table A-IV-3
B. RUNS FOR ALTERNATIVE FUEL CYCLE CASES:									
4	PWR Portion*	UO_2	Tandem Cycle	3.07	37.0	30,363		4	
5	HWR Portion	UO_2		1.55		46,363		4	
6+	PWR	ThO_2-UO_2		3.7/4.0‡	38.4	33,400	183	5	
C. RUNS FOR PERTURBATION OFF BASE CASES									
	(1) AUGMENTED ACTINIDE REMOVAL DURING REPROCESSING:								
7	PWR	UO_2	Reprocessed 99.9% Removal of U and Pu	3.2	38.4	33,000	183	2 augmented	
8	PWR	MO_2	Reprocessed 99.9% Removal of U and Pu	5.09	38.4	33,000	183	3 augmented	
	(2) CHANGES IN DISCHARGE BURNUPS:								
9	PWR	UO_2	Throwaway	2.56	38.4	25,000		1 Low BU	
10	PWR	UO_2	Reprocessed	2.56	38.4	25,000	183	2 Low BU	
11	PWR	MO_2	Reprocessed	3.96	38.4	25,000	183	3 Low BU	
12	PWR	UO_2	Throwaway	3.76	38.4	40,000		1 High BU	
13	PWR	UO_2	Reprocessed	3.76	38.4	40,000	183	2 High BU	
14	PWR	MO_2	Reprocessed	6.07	38.4	40,000	183	3 High BU	
	(3) TO DETERMINE C-14 SOURCE TERMS:								
15	PWR	UO_2	10 ppm N-14	3.2	38.4	33,000			
16	PWR	UO_2	20 ppm N-14	3.`	38.4	33,000	-		

*For the Tandem cycle, the estimates are based on actinide and daughter concentrations for a typical PWR discharged fuel (approximately 30,000 MWd/MTHM burnup) and at the end of a continued burnup of this fuel in a HWR (16,000 MWd/MTHM additional burnup). (N.L. Shapiro, Combustion Engineering Power Systems, personal communication to obtain CE actinide data associated with their study given in Reference 14.)

+For the Thorium cycle analysis, the Th-232 and U-235 resonance cross sections were modified in ORIGEN in order to account for self-shielding and isotope resonance interference effects. Minor adjustments to the ORIGEN spectral indices were made in order to achieve the best match with the major discharge Thorium and Uranium isotopes reported in Reference 15.

‡3.7% is the fissile enrichment of ThO_2 (Recycle U) assemblies and 4.0% is the fissile enrichment of ThO_2 (U 235) makeup assemblies.

of 1.336 was evaluated by using the cascade equations[2].* U-234 was included to permit more accurate evaluation of the actinide and daughter activity at long decay times (more than 10,000 years). At these times Ra-226 is a key isotope controlling the total radiotoxicity. Ra-226 is produced via two alpha decays from U-234 (as well as from four alpha decays from Cm-242). Omission of U-234 would have led to underprediction of the potential radiotoxicity at decay times beyond 10,000 years, particularly in the throwaway-cycle case.

Source term characterization is given for the three reference cases. All data are on the basis of metric tons of heavy metal charged to the reactor and can be readily converted to an electrical energy output on a GW-yr basis, by multiplying by 26. For each case the data are plotted as follows:

(a) Curies vs. Decay Time
(b) Heat Rate (Watts) vs. Decay Time
(c) Untreated Dilution Index (UDI) vs. Decay Time
(d) Fission Product UDI by Isotope vs. Decay Time
(e) Actinides and Daughters UDI by Element vs. Decay Time
(f) Hull Curies and Heat Rate (Watts) vs. Decay Time

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*The cascade equations allow determination of the number of separation stages and the interstage flowrate for a desired fuel enrichment for the gaseous diffusion separation process. An important quantity in these equations is the enrichment factor, α-1, where α is the separation factor between two UF_6 gases, e.g., $U_{235}F_6$ and $U_{238}F_6$ or $U_{234}F_6$ and $U_{238}F_6$.

For separation of U_{235} from U_{238}

$$\alpha \simeq \sqrt{\frac{\upsilon U_{235}F_6}{\upsilon U_{238}F_6}} \qquad \sqrt{\frac{M_{u238}F_6}{M_{u235}F_6}}$$

For separation of U_{234} from U_{238}

$$\alpha \simeq \sqrt{\frac{\upsilon U_{234}F_6}{\upsilon U_{238}F_6}} \qquad \sqrt{\frac{M_{u238}F_6}{M_{u235}F_6}}$$

where υ = velocity of gas molecules
M = molecular weight

Thus: $\alpha_{U235} = 1.004289$
$\alpha_{U234} = 1.005731$

and the enriching ratio U_{234} to U_{235} is: $\dfrac{(\alpha-1)_{U234}}{(\alpha-1)_{U235}} = 1.336$

In addition, for each of the reference cases a supplementary plot is included showing the impact of burnup perturbations to the reference case on heat rate (watts) vs. decay time.

A supplementary plot of carbon-14 (C-14) untreated dilution indices as determined by ORIGEN is presented as Figure A-3. C-14 is released from the fuel during reprocessing and is of interest because of its potential radiotoxicity, being a beta emitter with a relatively long half-life. Because C-14 would be completely off-gased during reprocessing, it will not be part of the high-level waste. Therefore, C-14 does not appear on subsequent source term characterization plots.

C-14 is formed during irradiation primarily from N-14 initially present in the fuel and from O-17 which is 0.039 atom percent of the oxygen present. For the determination of the C-14 untreated dilution indices, two values of N-14 initially present were assumed: 10 and 20 ppm.*+ It was also conservatively assumed that the C-14 produced from O-17 initially present in both the fuel and water was available for release during reprocessing.

Figure A-3 shows the C-14 ingestion and inhalation untreated dilution indices vs. decay time for conditions with 10 and 20 ppm N-14 initially present. The C-14 activity persists for about 10,000 years. In this range, doubling the initial N-14 concentration increases the C-14 activity by a factor of approximately 1.6. Similarly, for the suggested value of 25 ppm as initial N-14 concentration, the C-14 activity would increase by a factor of approximately 2.4 times the activity for 10 ppm N-14 concentration.

Comparison of Figure A-3 with Figures A-6, -12, and -19 shows that

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*The average value found by ORNL in measurements on Robinson fuel was 6.9 ppm[3].

+Davis, in his paper, "Carbon 14 Production in Nuclear Reactors," presents a survey of the nitrogen content of fuels made at five fuel fabrication plants[4]. The average nitrogen content in LWR fuels varies from 3 to 50 ppm by weight, depending on the plant, and the standard duration of each plant's average is in the range of 40 to 70%. Davis suggests a value for LWR fuel from all plants of 25 ppm nitrogen.

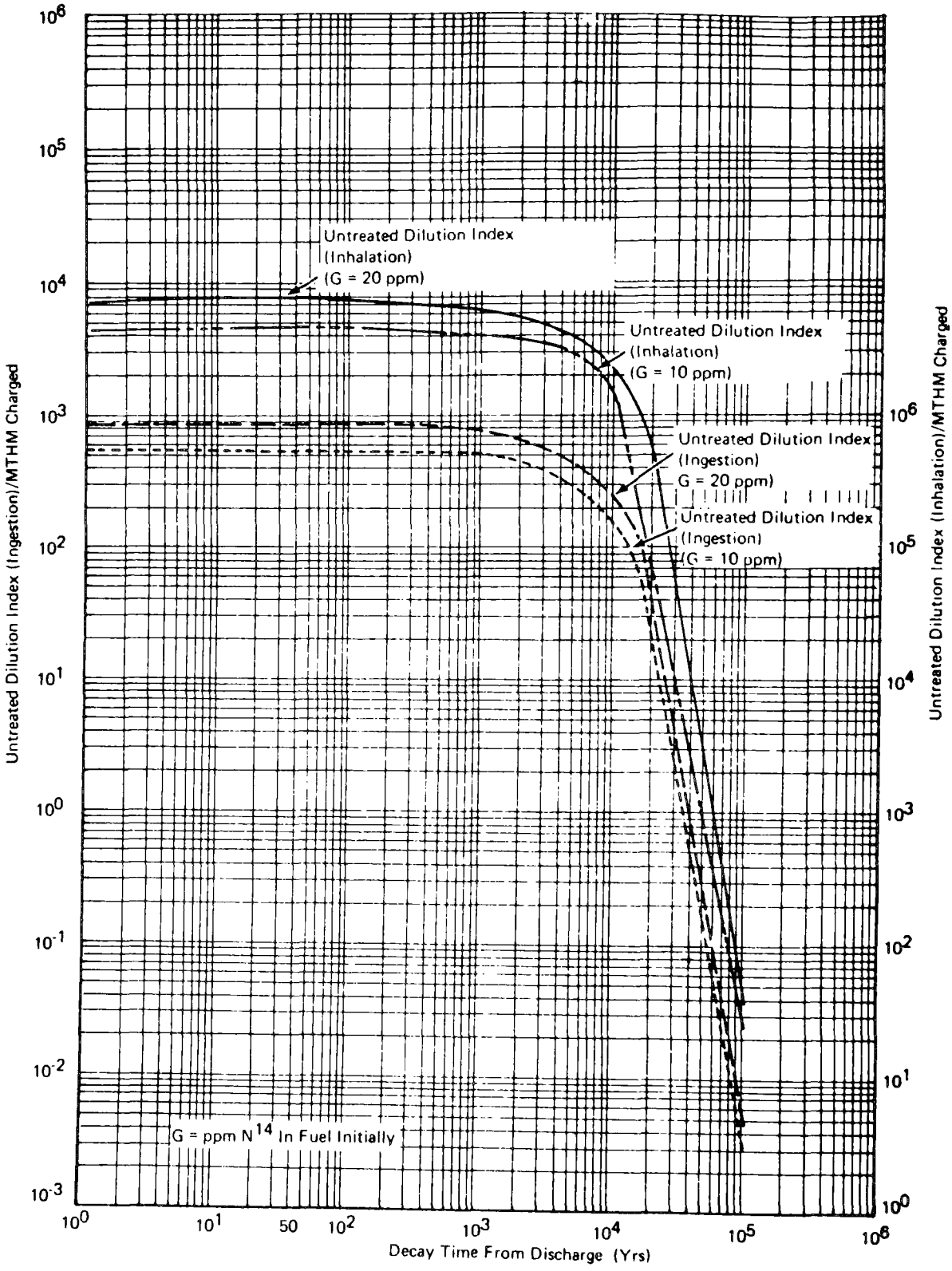

FIGURE A–3 UNTREATED DILUTION INDICES FOR C-14 RELEASES DURING REPROCESSING OF PWR FUEL BASIS: MTHM CHARGED (CASE 1)

the C-14 source term is small compared with totals in the HLW. However, the relative availability of C-14 in the environment will, of course, be higher in the recycle cases than for those waste components retained as liquids or solids.

The analysis for Cases 4 and 5 was not as definitive as that for Cases 1, 2, and 3. The main objective was to develop sufficient information to make a reasonable assessment of the impact of these cycles on high-level waste compared with those from the major cases.

The waste characteristics of these five cases span a broad enough range that they can be used to infer the waste characteristics for other fuel cycles that may be developed commercially, e.g., breeder reactor fuel cycles.

Fission product partitioning was not considered in the current study, although it is being performed on some government high-level waste. Partitioning during reprocessing removes from the main waste stream slated for disposal selected fission products that generate high heat or are radiotoxic, e.g., Sr-90, Cs-137. These isotopes have much shorter half lives than the actinides and would be substantially reduced after containment for several hundred years.

A-3.2 REFERENCE CASES - LWR

For the development of the source terms, the ORIGEN computer program was used to perform calculations on a typical pressurized water reactor (PWR) fuel assembly.[1] The characteristics of the PWR assembly are presented in Table A-6. This table gives the assembly dimensions and the weights of fuel and structural components. The latter were required as one input in developing source terms for the hulls. In addition to the PWR assembly characteristics given in Table A-6, data for this assembly are presented in Tables A-7, A-8, and A-9. Table A-7 presents the assumptions made as to the isotopic content of the plutonium in an equilibrium recycle assembly. Table A-8 presents the removal assumptions used for the reprocessed waste Cases 2 and 3. Table A-9 presents the assumptions and compositions of structural components used for developing the hull source terms.

The primary reasons for selecting the PWR fuel assembly design rather than a boiling water reactor (BWR) design are twofold: (1) to be more consistent with the ORIGEN analyses performed at Oak Ridge National Laboratory (ORNL) in relation to hot cell examination of PWR high-burnup fuel[3,5-7]; and (2) to develop source terms for fuel that nominally achieves the highest LWR burnups at the highest specific powers and thus yields higher decay heat rates.

TABLE A-6

CHARACTERISTICS OF PWR FUEL ASSEMBLY

Fuel Assembly Parameters	
Total assembly weight	666.8 kg
Zr-4 fuel cladding/assembly	110.5 kg
Zr-4 end plugs/assembly	3.4 kg
Zr-4 in control rod and instrument tubes/assembly	17.9 kg
Total Zr-4/assembly	131.8 kg
Total effective Zr-4/assembly(*)	122.8 kg
Total inconel 718/assembly	6.2 kg
Total 304SS/assembly	5.3 kg
Total effective 304SS/assembly(*)	2.0 kg
Fuel weight/assembly, heavy metal oxide	523.5 kg
Fuel weight/assembly, heavy metal	0.4614 MT
Weight of total assembly structure(+)/ weight of fuel, MT structure/MT heavy metal	0.3107
Overall assembly length	4.1 m
Overall assembly length with rod cluster control assembly in place	4.2 m
Fuel rod length	3.9 m
Active fuel length	3.7 m
Assembly cross section	0.21 x 0.21 m
Specific power	38.4 kW/kgMM

*Weights corrected so that effective weight is consistent with the average axial flux. This is the value used in the ORIGEN analysis for structure activation. Correction based upon Westinghouse data for the axial flux profile for a 3.66 m active core.

+All non-fuel assembly components.

TABLE A-7

ISOTOPIC CONTENT OF PLUTONIUM IN EQUILIBRIUM RECYCLE ASSEMBLY*

Isotope	Wt. %
Pu 238	2.49
Pu 239	41.8
Pu 240	26.9
Pu 241	15.9
Pu 242	12.9
Total Fissile	57.7

*All analyses for mixed oxide assembly source terms assumed equilibrium cycle plutonium makeup. This yields the highest decay heat rates and hazards due to the largest amount of transplutonic actinides produced during irradiation.

TABLE A-8

REMOVAL ASSUMPTIONS* FOR REFERENCE REPROCESSED WASTE CASES

Element	Fraction Removed
Xenon, Krypton+	1.0
Iodine+, Bromine	0.999
Tritium	0.92
Uranium, Plutonium	0.995
Neptunium, Americium, Curium	0

*Time from reactor shutdown to reprocessing, 0.5 yr. This is consistent with the assumption in EPA-520/3-75-006.[8]

+The analysis for the reprocessed waste cases used the indicated removal fractions for gaseous Kr-85 and volatile I-129, both of which will be off-gased during reprocessing and captured from the stack gas. Since it has not yet been determined how these two fission products will be treated subsequently, i.e., whether they will be returned to the high-level waste or treated separately, they have been shown in Figure Nos. A-13, A-20 as part of the HLW. This is approximately correct for I-129, since its removal efficiency from stack gas is quite high, and is conservative for Kr-85. Present regulations (40 CFR 190) allow release of about 20% of the Kr-85.

TABLE A-9

HULL CHARACTERISTICS

Hull Assumptions

1. Composition

   (a) All non-fuel components of assembly (fuel assembly structure plus cladding)
   (b) 0.2% fission products associated with fuel cladding*
   (c) 0.10% actinides and daughters associated with fuel cladding+

2. Elemental Composition of Hull Structural Components(‡)

Component	Element	Wt. %	Component Weight (Effective), kg(#)
Zr-4	Zr	98.5	122.8
	Sn	1.5	
304SS	C	0.08	2.0
	Mn	2.00	
	P	0.045	
	Si	1.00	
	S	0.03	
	Cr	19.00	
	Ni	10.00	
	Fe	67.845	
	Co	0.2	
Inconel 718	Ni	52.5	6.2
	Cr	19.0	
	Fe	16.7	
	Nb	5.2	
	Mo	3.2	
	Al	0.5	
	Ti	0.9	
	Co	1.0	
	Mn	0.35	
	Si	0.35	
	Cu	0.30	

*Assumptions based on measured data described in ORNL/TM-5760, LWR Fuel Reprocessing and Recycle Program Quarterly Report Period October 1 - December 31, 1976, p. 23

+Based on NFS experience(9) times a factor of 2 conservatism. 0.1% corresponds to the value used in the AGNS FSAR(10) and ORNL studies.(11)

‡Isotopic composition of elements for ORIGEN input developed after Chart of Nuclides, Knolls Atomic Power Laboratory, Eleventh Edition - Revised to April 1972.(12)

#Weights corrected so that effective weight is consistent with the average axial flux. This is the value used in the ORIGEN analysis for structure activation. Correction based upon data for the axial flux profile for a 3.7m active core.

For the purpose of this report, the untreated dilution index has been derived by a method generally used to compare the biological potency of different mixtures of radionuclides. Some source term data are presented in terms of the untreated dilution index. The untreated dilution index (UDI) is defined in this study as the volumetric quantity of water, or air, required to dilute a quantity of radionuclides to the concentration specified under the Standards for Protection Against Radiation in non-occupational exposure, published in the Code of Federal Regulations (10 CFR 20, Appendix B) and given in Table 2 of Appendix A-III of this report. The untreated dilution index gives a gross indication of the comparative risks of radionuclides, were these nuclides actually released to the environment. UDI does not consider waste disposal methods (packaging or geologic isolation), or their resultant environmental pathways to man. The term "radiotoxicity" is defined as the base-10 logarithm of the untreated dilution index.

Untreated dilution indices are presented in order to gain an understanding of the relative radiotoxicity of waste isotopes (normalized to a metric ton of fuel). This is a useful perspective from which to examine various fuel cycle options from the standpoint of waste management.

On all of the UDI plots, a dashed line has been drawn at the level of 10^8 m^3 water/MTHM, which is representative of the UDI of the uranium ore used to make the fuel (or to make the fuel for an equivalent UO_2 cycle in the equilibrium mixed-oxide cycle case). This line is included because it seems reasonable to compare the activity resulting from reprocessing or burial of a given amount of fuel with the activity originally present in the ore used to manufacture that amount of fuel in the first place. For 1 MT of enriched uranium, at the typical ore grade of 1.8 kg U_3O_8 per MT of ore, about 1920 m^3 of ore would have to be mined. This amount of ore contains about 2 curies (Ci) of U-238. Since the U-238 chain contains 14 radioactive decay steps (see Appendix A-II), total activity will be about 28 Ci, including all daughter products. Two of these daughter products, Ra-226 and Pb-210, are extremely potent biologically. In fact, the former, if ingested in water, is orders of magnitude more radiotoxic than plutonium.

This discussion assumes equilibrium between U-238 and all its daughter products. In the strictest sense, since U-238 decays without being replaced in nature, a true equilibrium situation cannot exist. However, since the half-life of U-238 is 4.5 billion years and the longest half-life of any of its daughters (U-234) is 0.24 million years, less time than has elapsed since formation of most uranium ore bodies, it is appropriate to assume that the U-238 concentration is constant over the period considered by this study and all daughters are in equilibrium with it.[13]

About 10^8 m^3 of water would be required to dilute the 28 Ci in the ore mined to produce 1 MT of fuel to permissible levels of concentration, i.e., the untreated dilution index would equal 10^8. (Nearly three-fourths of this volume of water is needed just to dilute the Ra-226 and most of the rest is for the Pb-210.)

It should be noted that in the decay time frame of the data presented in this report (to a million years), decay of U-238 in the fuel assembly is insignificant, because the half-life of this isotope is 4.5 billion years. Thus, essentially no Ra-226 or Pb-210 is produced through decay of U-238 from the fuel assembly over a million years.

This reference UDI so developed is thus implicitly a function of both the uranium ore grade and the required fuel enrichment, both of which determine the quantity of natural uranium ore mined per metric ton of reactor fuel, or per unit of energy generation associated with nuclear fuel. Different reactor concepts would produce differing ore references; reference to the plotted figures indicates that a difference by a factor of two or three in the UDI for ore does not significantly alter any conclusions drawn from the comparison with the source terms and the natural uranium ore reference. If the ore reference is shifted up or down on the plots, one can readily determine the sensitivity of, say, the actinide decay crossover point to such a change in the value of the ore reference.

For the hull source term data (presented as curies and heat rate in watts), the hull composition and other assumptions used to develop the source terms are shown in Table A-9.

All source term data were generated to a maximum decay time from discharge of one million (10^6) years. On the figures representing the actinide and daughters untreated dilution indices (Figures A-8, A-14, and A-21), the activity of several of the actinides (Th, U, Ra, Ac, Pa) is shown to be monotonically increasing to 10^6 years. In order to ascertain that the actinides in question do not continue to increase in activity beyond 10^6 years of decay, information from EPA-520/3-75-006 was examined.[8] Activity data were developed in 10^8 years of decay for cases similar to the cases investigated in this study.* Figures 5 and 35 of EPA-520/3-75-006 (LWR equilibrium uranium cycle; LWR second plutonium cycle) display a decrease in activity beyond 10^6 years decay of all actinides in question.[8]

A-3.2.1 Throwaway Cycle (Case 1)

Source term data for the reference throwaway cycle (Case 1) are plotted in Figures A-4 to A-9. Figure A-9 gives the decay heat rate (watts) for the burnup perturbations for this case. The ordering of the data presentation is as indicated previously. All source term data are presented per unit MTHM charged to the reactor. To convert these data to a per unit electric energy generated (e.g., GW-yr), the plotted data should be multiplied by 26.

A-3.2.2 Fuel Recycle (Cases 2 and 3)

As noted previously, two recycle cases were considered (Cases 2 and 3): reprocessed waste from equilibrium cycle UO_2 assemblies, and

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*A 60%-40% PWR to BWR fuel mix was used to develop the activity data.[8] The current work considers only PWR fuel.

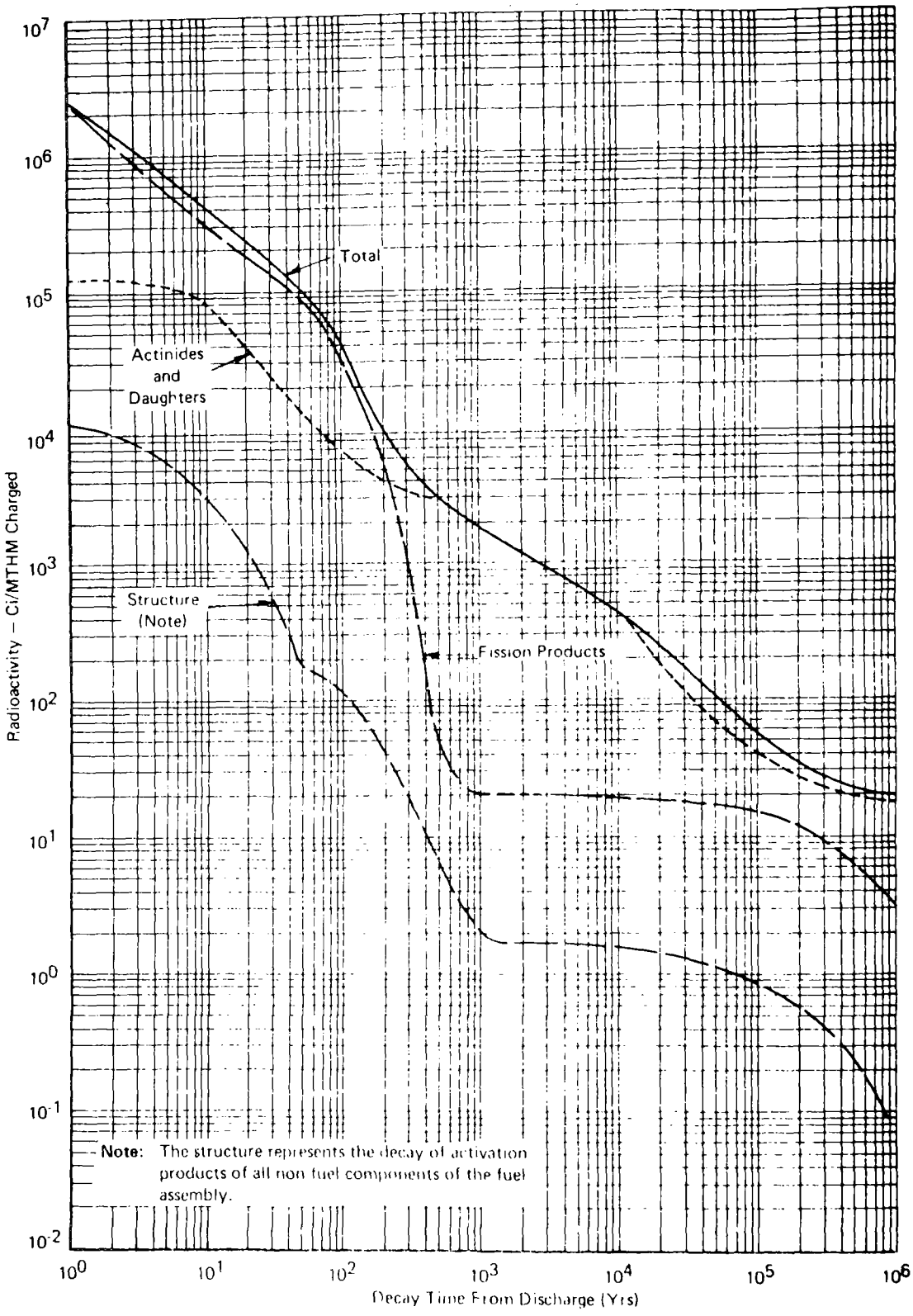

FIGURE A–4 PWR THROWAWAY CYCLE (CASE 1) RADIOACTIVITY

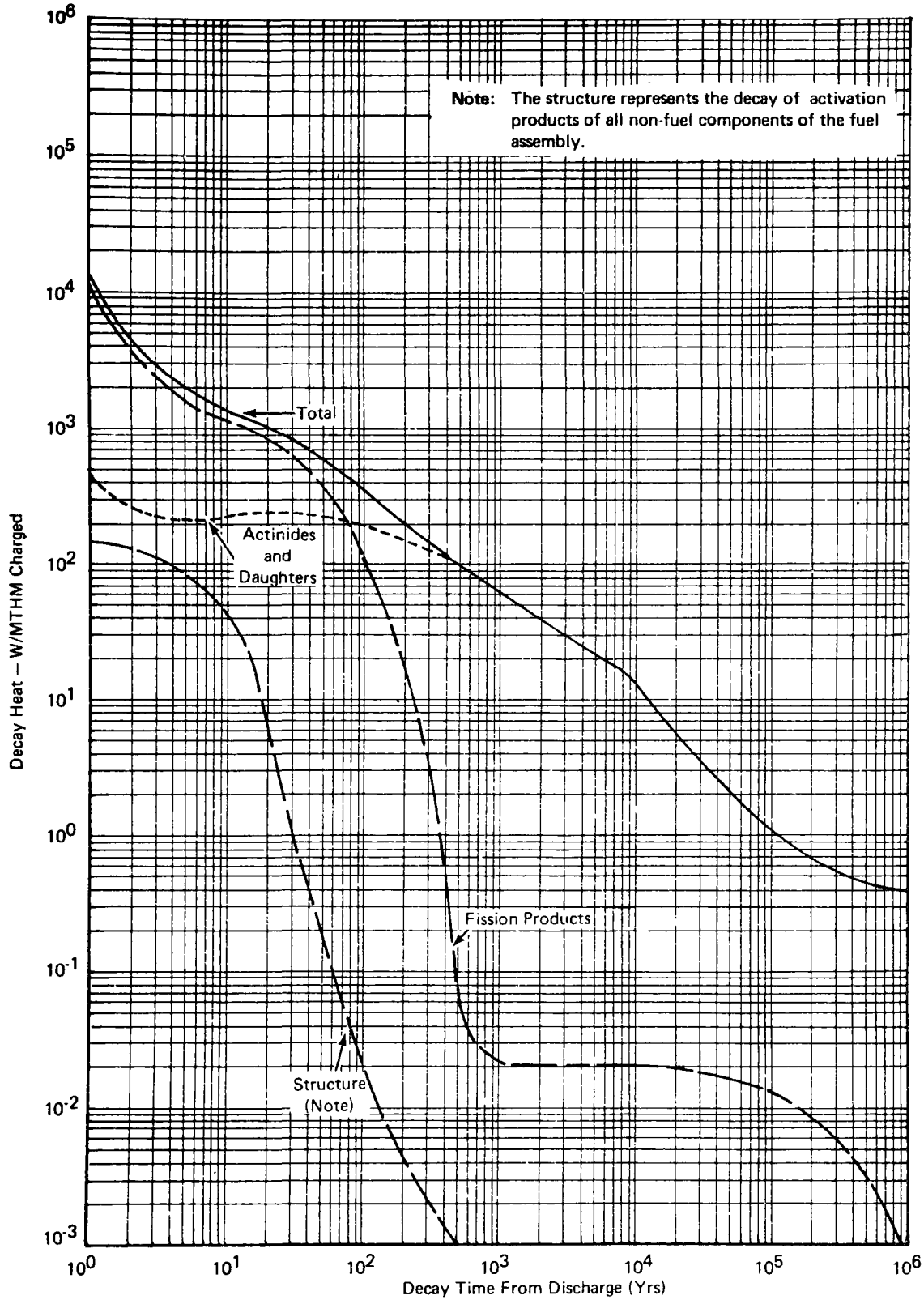

FIGURE A–5 PWR THROWAWAY CYCLE (CASE 1) – DECAY HEAT GENERATION

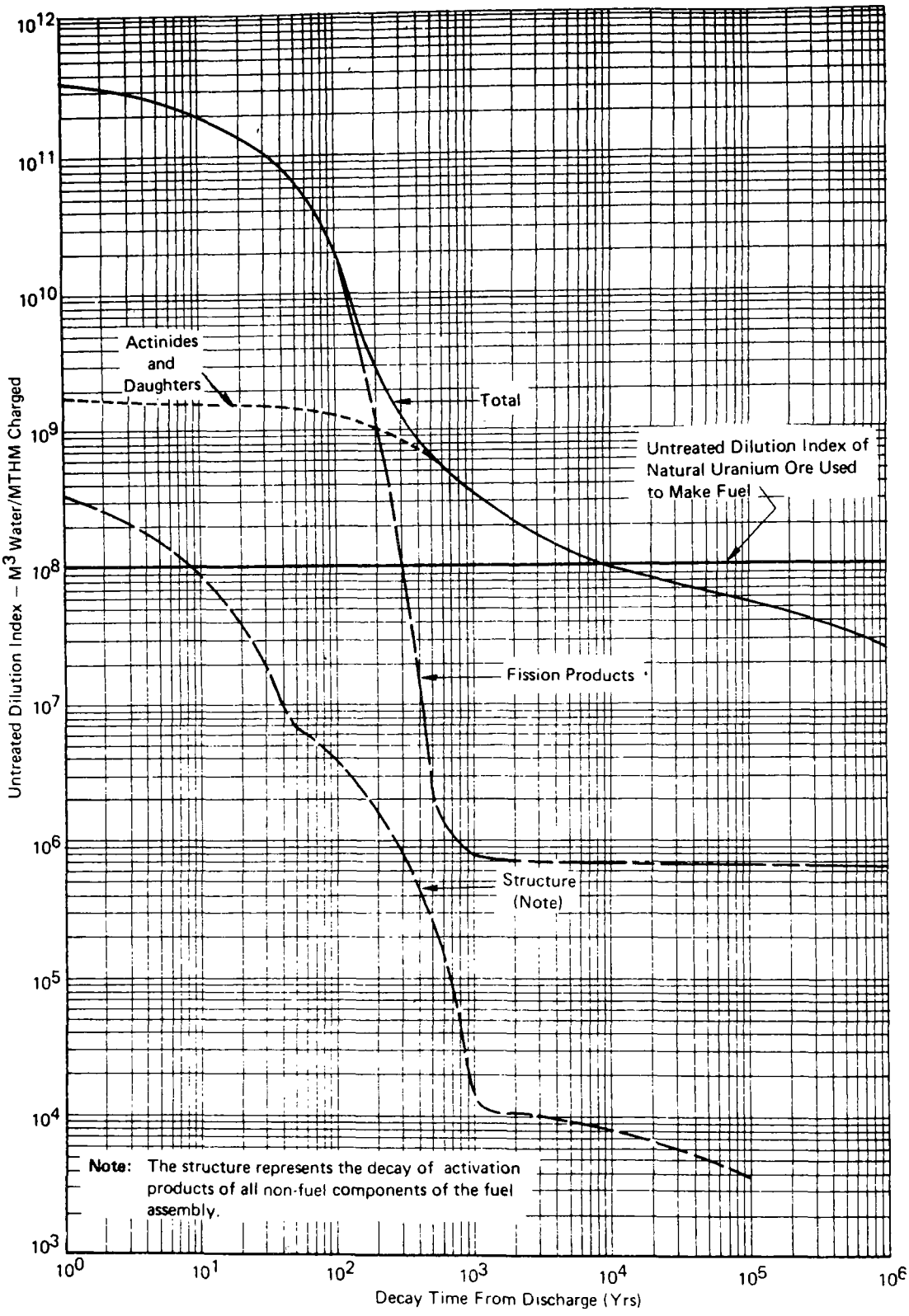

FIGURE A–6 PWR THROWAWAY CYCLE (CASE 1) – UNTREATED DILUTION INDEX (ALL SOURCES)

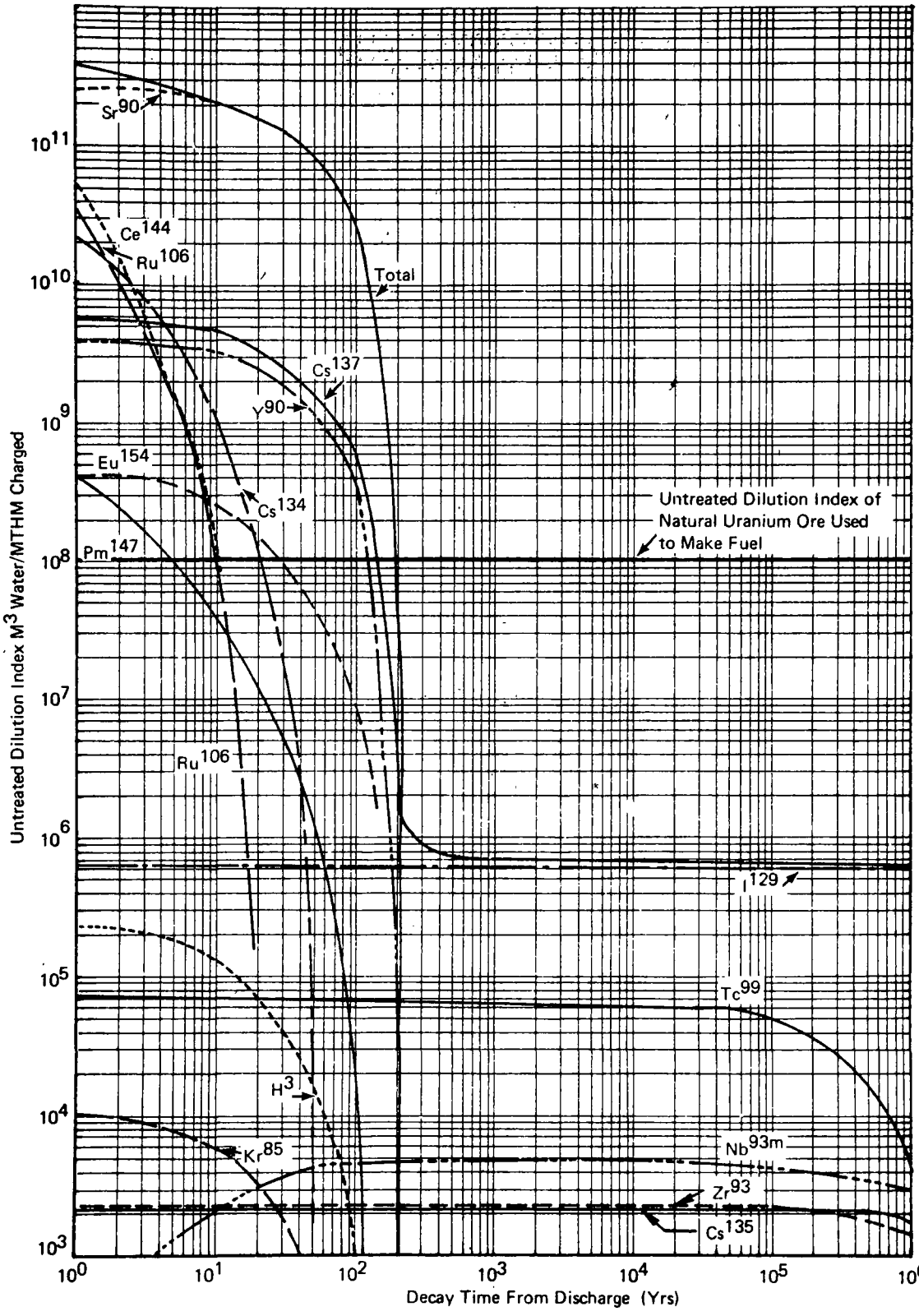

FIGURE A–7 PWR THROWAWAY CYCLE (CASE 1) – UNTREATED DILUTION INDEX – FISSION PRODUCTS

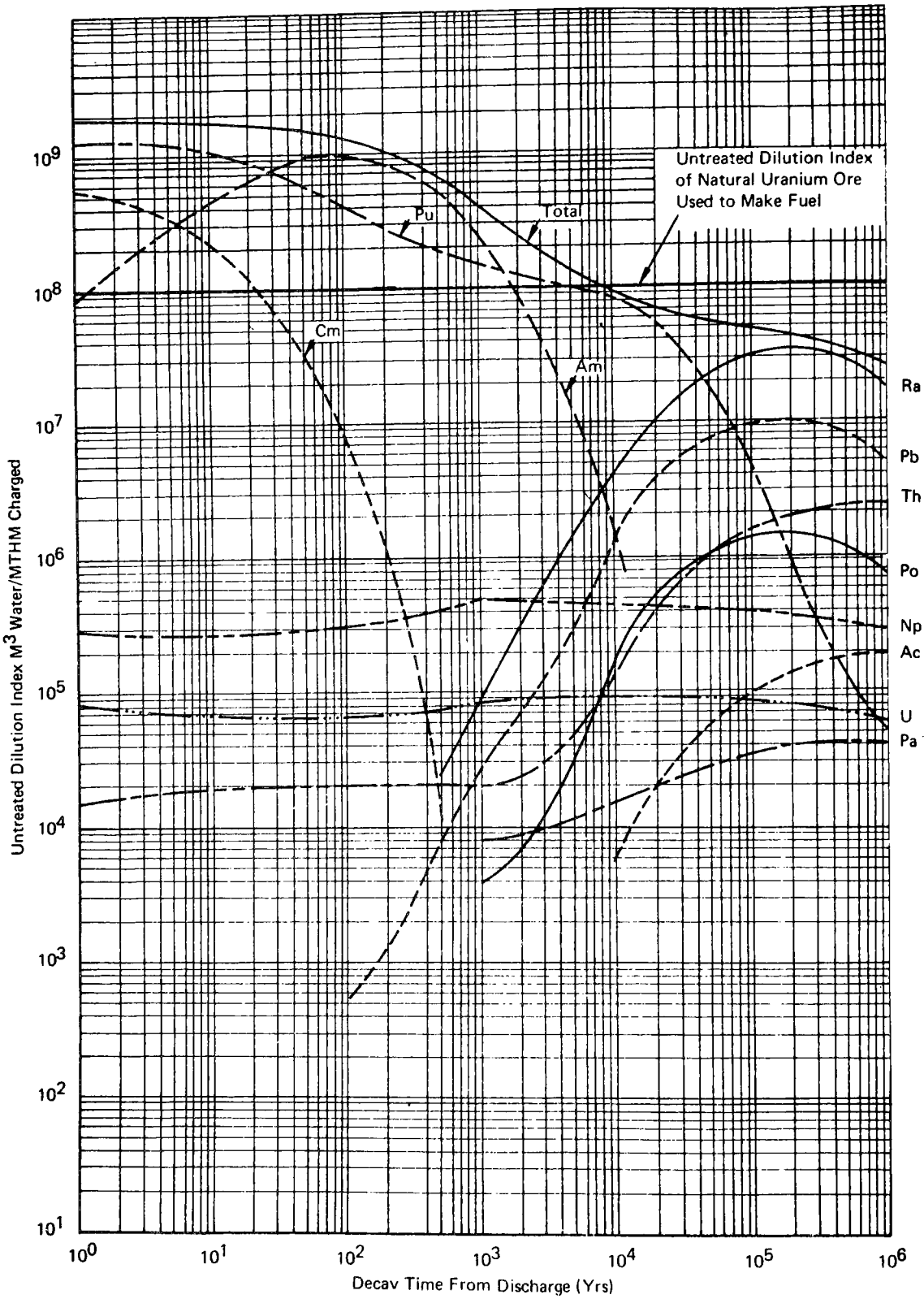

FIGURE A–8 PWR THROWAWAY CYCLE (CASE 1) – UNTREATED DILUTION INDEX – ACTINIDES AND DAUGHTERS

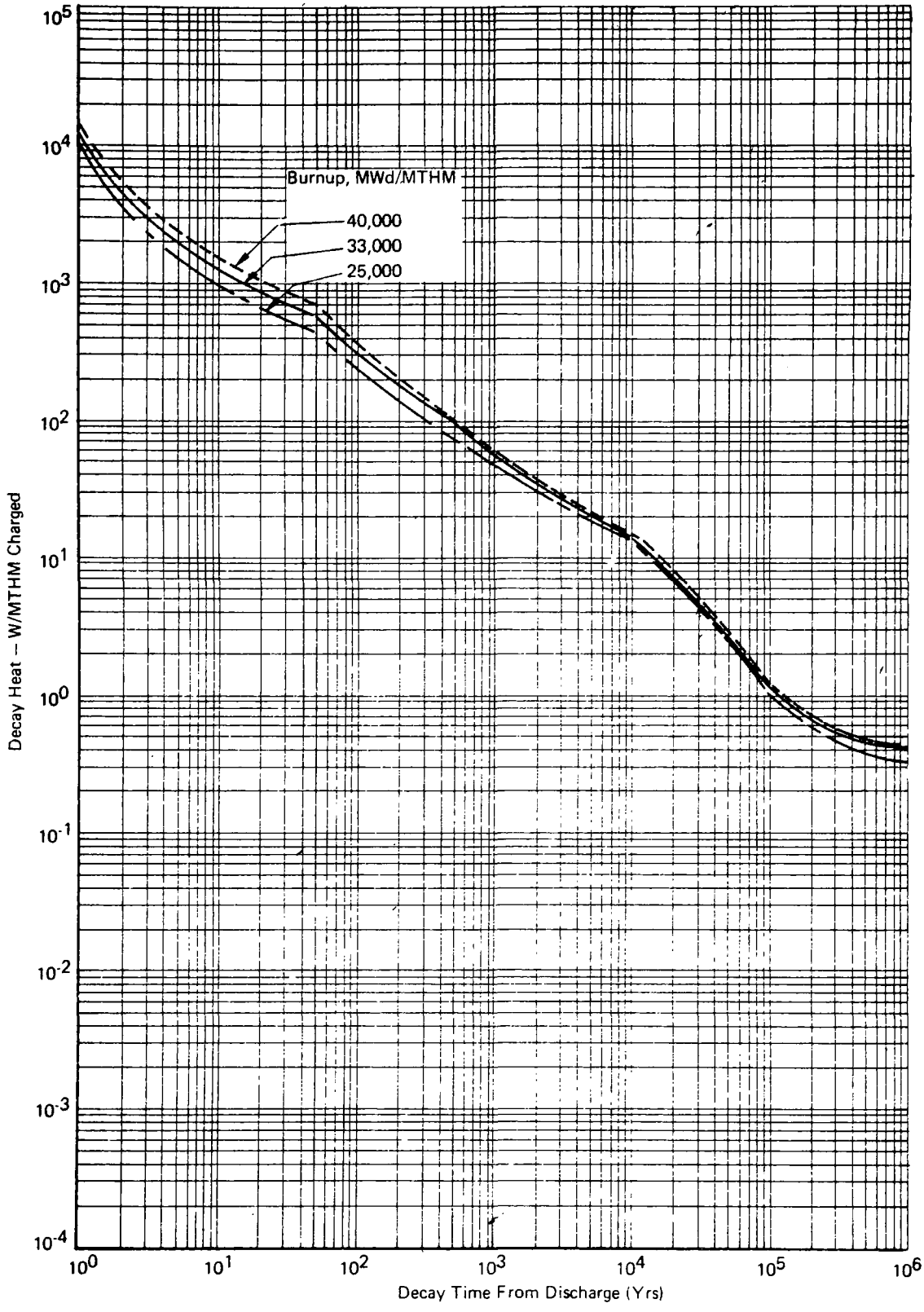

FIGURE A–9 PWR THROWAWAY CYCLE (CASE 1) – DECAY HEAT GENERATION – FISSION PRODUCTS AND ACTINIDES

from equilibrium mixed-oxide cycle assemblies. The latter source terms are a weighted average, taking into account the 2:1 discharge ratio of uranium:mixed-oxide assemblies in the PWR equilibrium mixed-oxide cycle. Different wastes are derived from these two cases, primarily because the amount of transplutonic isotopes produced in UO_2 differ from those produced in mixed-oxide fuel assemblies.

Information on the high-level waste from reprocessed equilibrium cycle discharged UO_2 assemblies (Case 2) is given in Figures A-10 to A-16. Figure A-15 gives the decay heat rate (watts) for the burnup perturbations for Case 2. Figure A-16 gives the hull source term data for this case.

Information on the HLW from reprocessed equilibrium mixed-oxide cycle discharge assemblies (Case 3) is given in Figures A-17 to A-23. Figure A-22 gives the decay heat rate (watts) for the burnup perturbations for Case 3. The hull source term data for reference Case 3 is given in Figure A-23.

A-3.2.3 Comments on Source Terms from the Three Reference LWR Cases

Some important conclusions can be drawn from a comparison of the source term data for the three reference cases.

1. Radioactivity (curies) --

In all three cases, fission products (mainly Sr-90 and Cs-137) dominate the total radioactivity for the first few hundred years; the source terms are about equal for the three cases for this decay period, indicating that there is no large difference between fission products from U-235 fission (UO_2 fuel) and Pu-239, -241 fission (mixed-oxide).* Later in decay time, actinides dominate and throwaway waste has higher radioactivity than MO_2 recycle, which in turn has higher radioactivity than UO_2 recycle.

2. Decay Heat Generation (watts) --

The wastes from throwaway-cycle assemblies have the highest decay heat rate of all three reference cases for a million years. The reprocessed waste from equilibrium mixed-oxide cycle has a decay heat rate about 20-30% of that from the throwaway-cycle waste at decay times when actinides control the decay heat level. Except for the first several hundred years, when fission products are the determining factor, the reprocessed equilibrium-cycle UO_2 assembly waste has a significantly lower rate of decay heat generation than either of the other two cases.

The contribution of fission products to the decay heat rate is about the same in all three cases.*

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*The figures as presented show throwaway fission product source terms somewhat higher than for the other two cases, reflecting the assumption that certain volatile species escape from the HLW at the reprocessing plant (Table A-8).

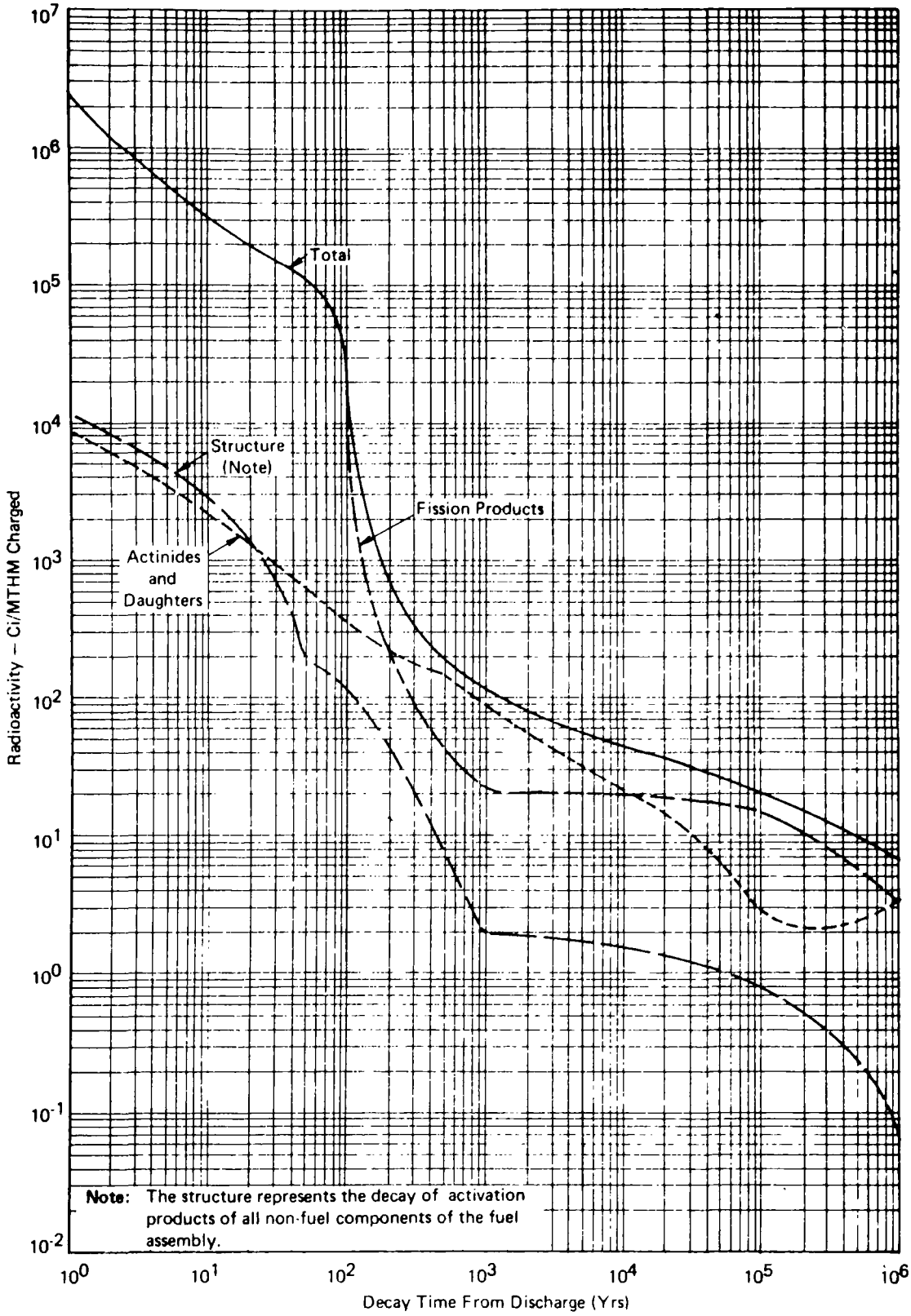


FIGURE A–10 PWR UO_2 CYCLE (CASE 2) – REPROCESSED WASTE – RADIOACTIVITY

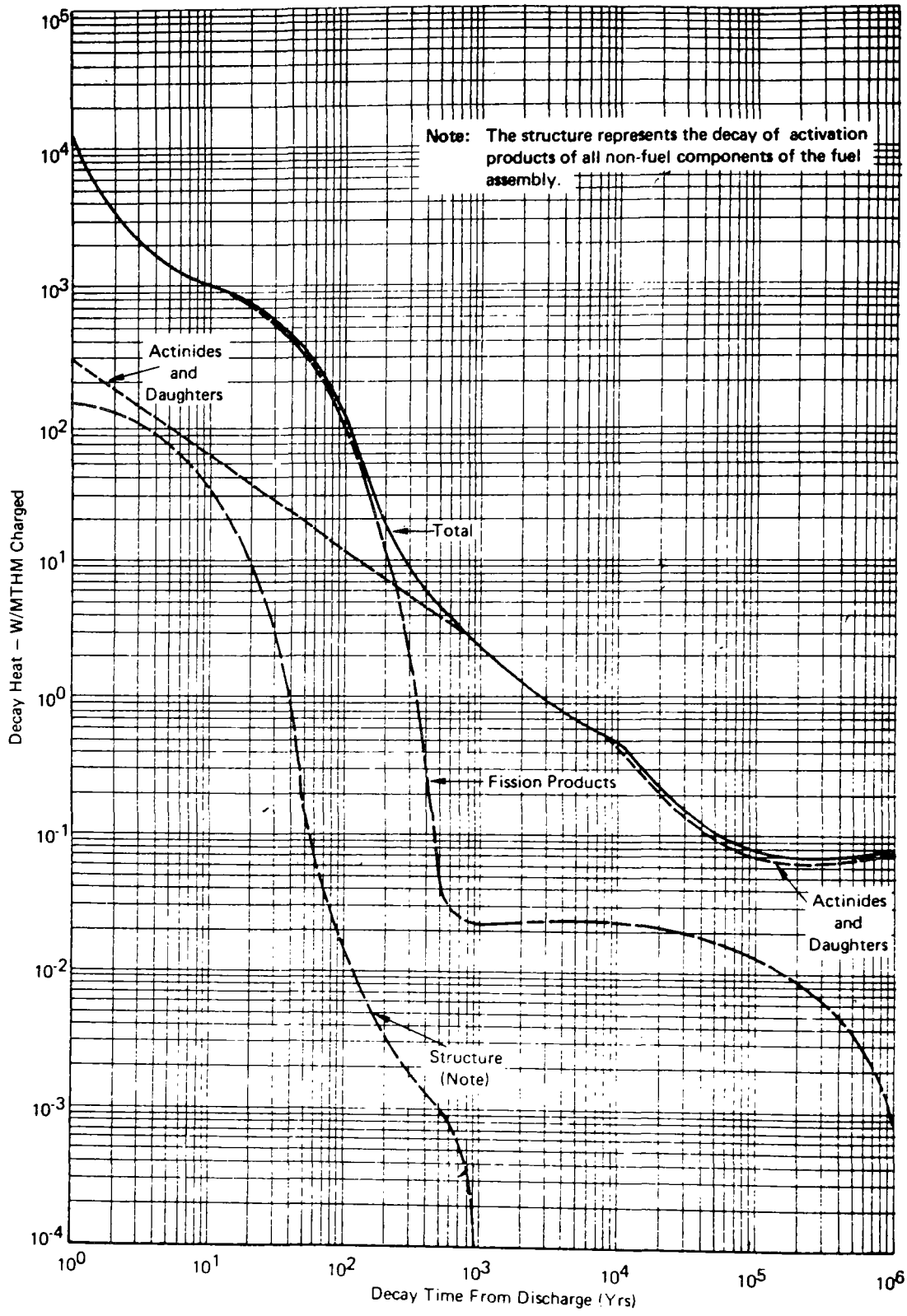


FIGURE A–11 PWR UO_2 CYCLE (CASE 2) – REPROCESSED WASTE – DECAY HEAT GENERATION

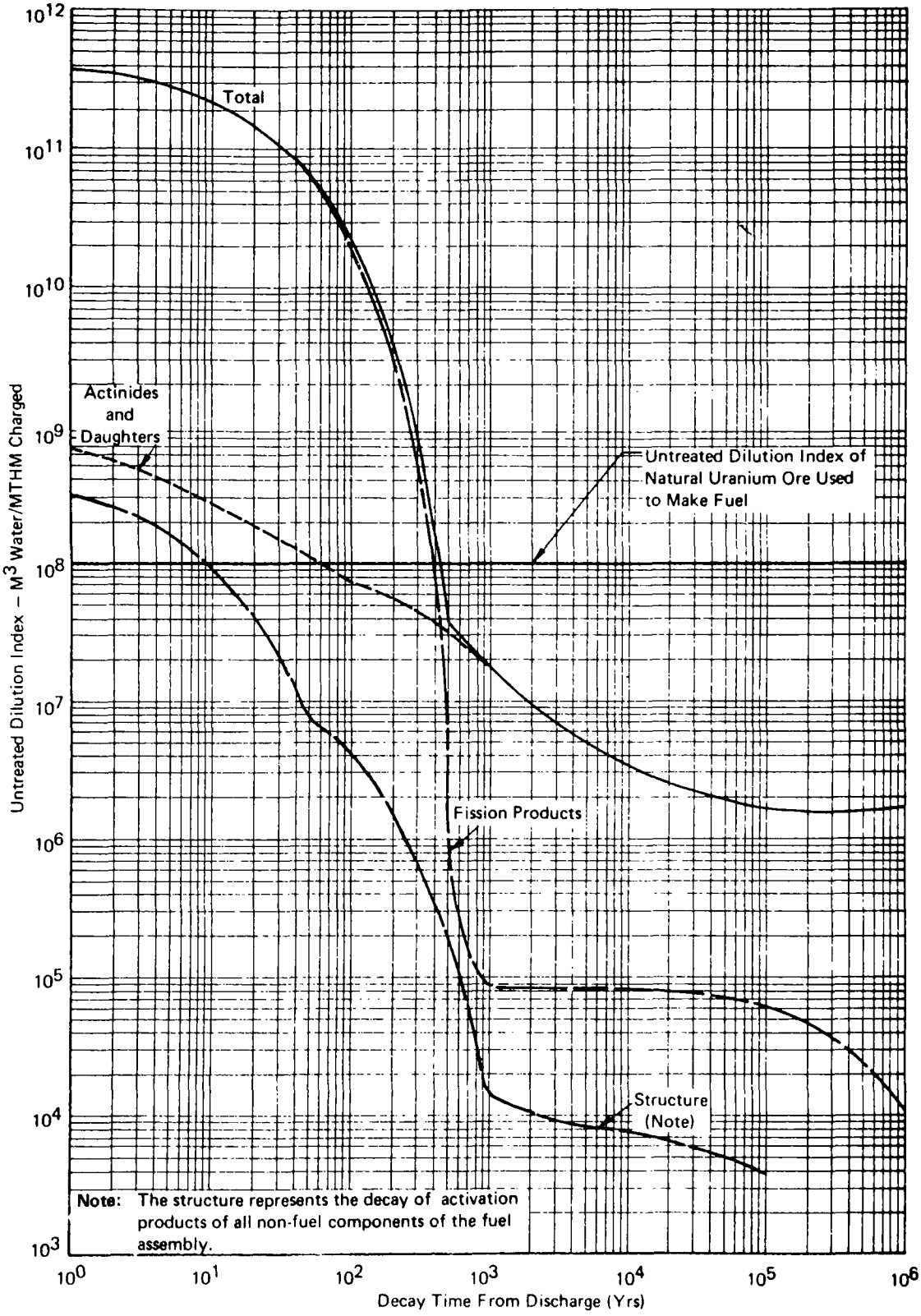
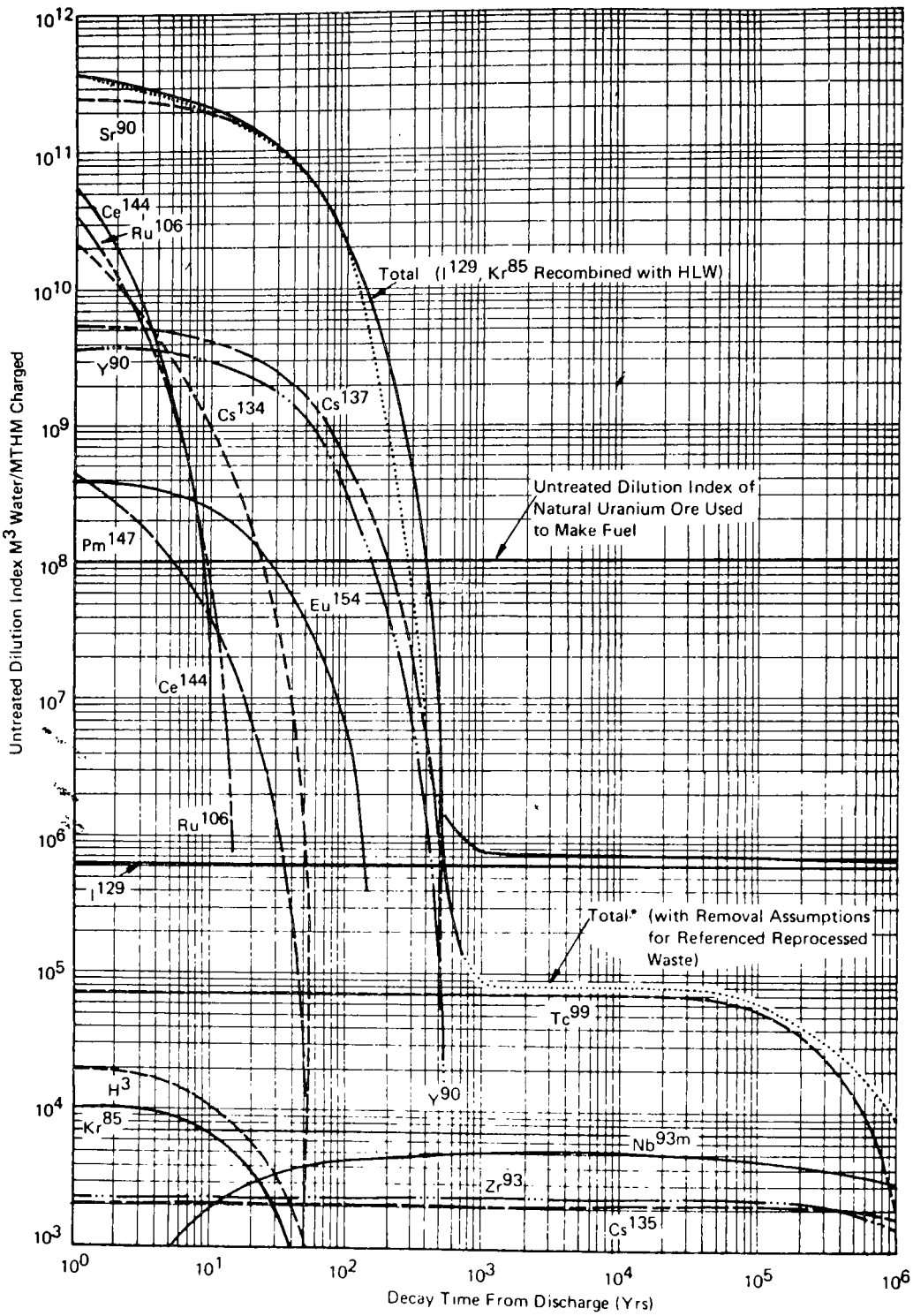


FIGURE A–12 PWR UO_2 CYCLE (CASE 2) – REPROCESSED WASTE – UNTREATED DILUTION INDEX – (ALL SOURCES)



Note: *Although in the calculations 99.9% of the I–129 and 100% of the Kr–85 were assumed to be removed from the main high-level waste stream during reprocessing, these isotopes could be subsequently recombined into the main waste stream. 100% of these sources are displayed on this plot. Two total curves are shown. The lower one considers the removal assumptions shown in Table A–8, the higher one assumes recombination of the I–129 and Kr–85 with the main waste stream after reprocessing. Refer to Table A–8 for further details.

FIGURE A–13 PWR UO_2 CYCLE (CASE 2) – REPROCESSED WASTE – UNTREATED DILUTION INDEX – FISSION PRODUCTS

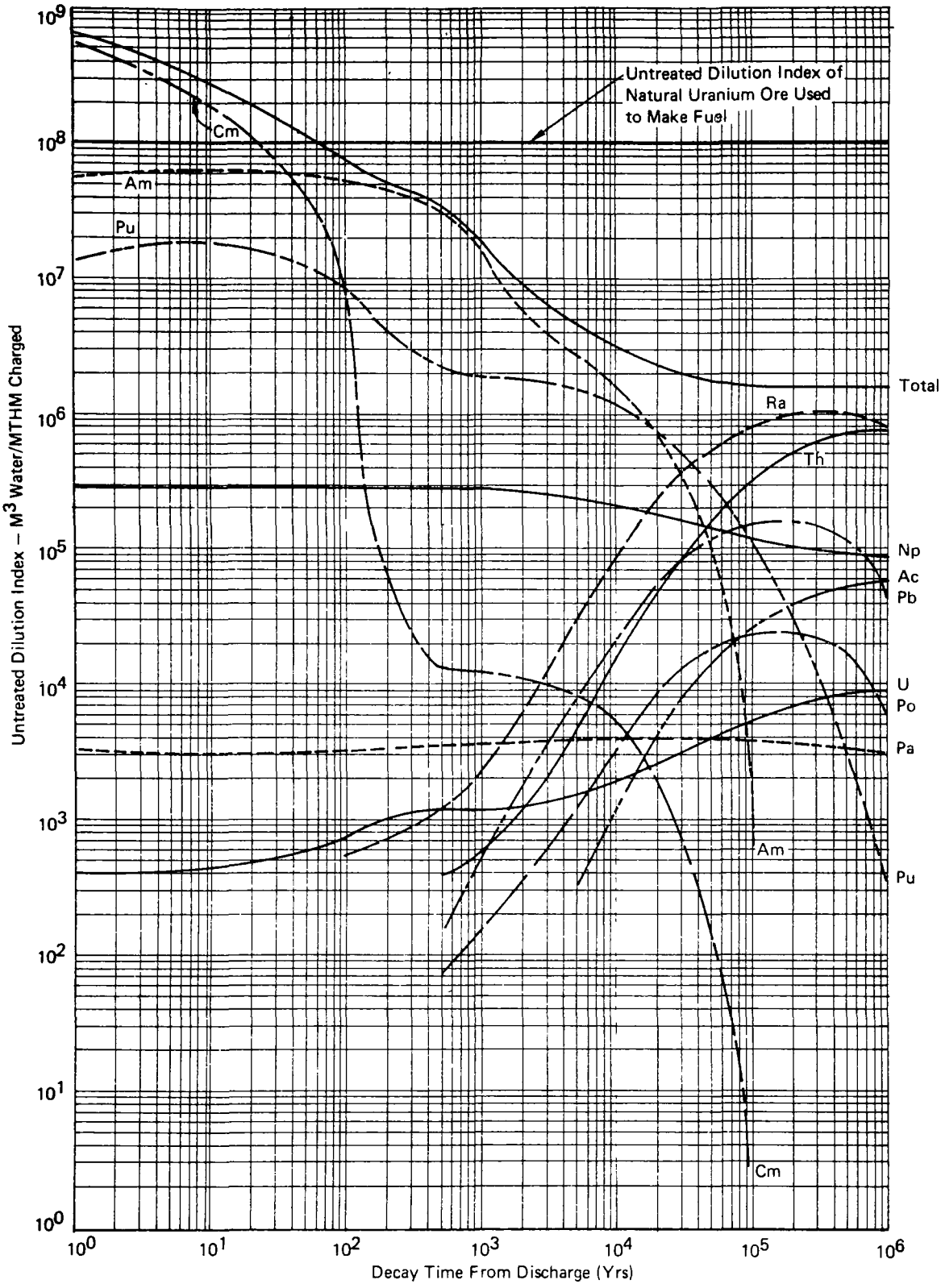


FIGURE A–14 PWR UO_2 CYCLE (CASE 2) – REPROCESSED WASTE – UNTREATED DILUTION INDEX–ACTINIDES AND DAUGHTERS

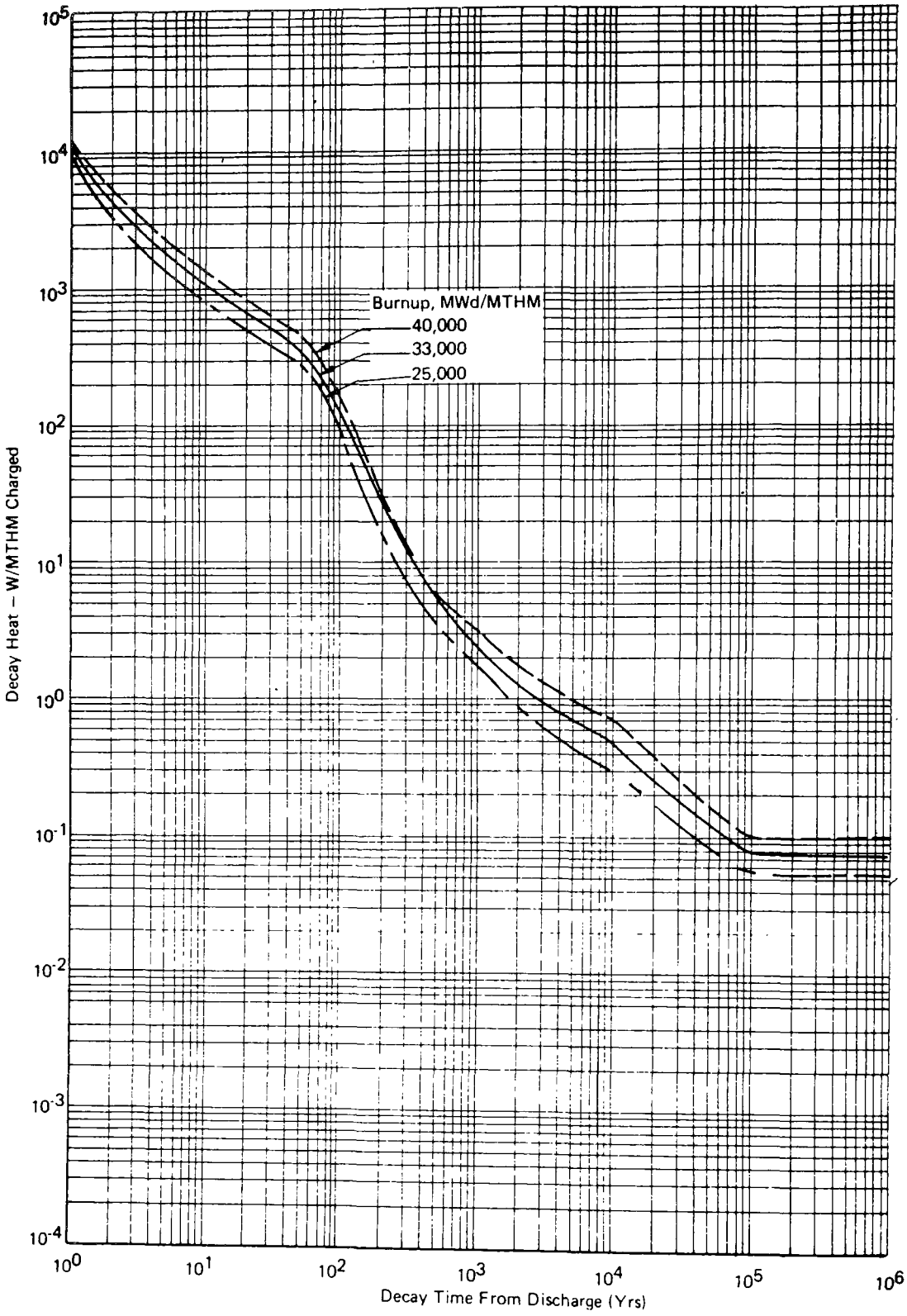


FIGURE A–15 PWR UO_2 CYCLE (CASE 2) – REPROCESSED WASTE – DECAY HEAT GENERATION-FISSION PRODUCTS AND ACTINIDES

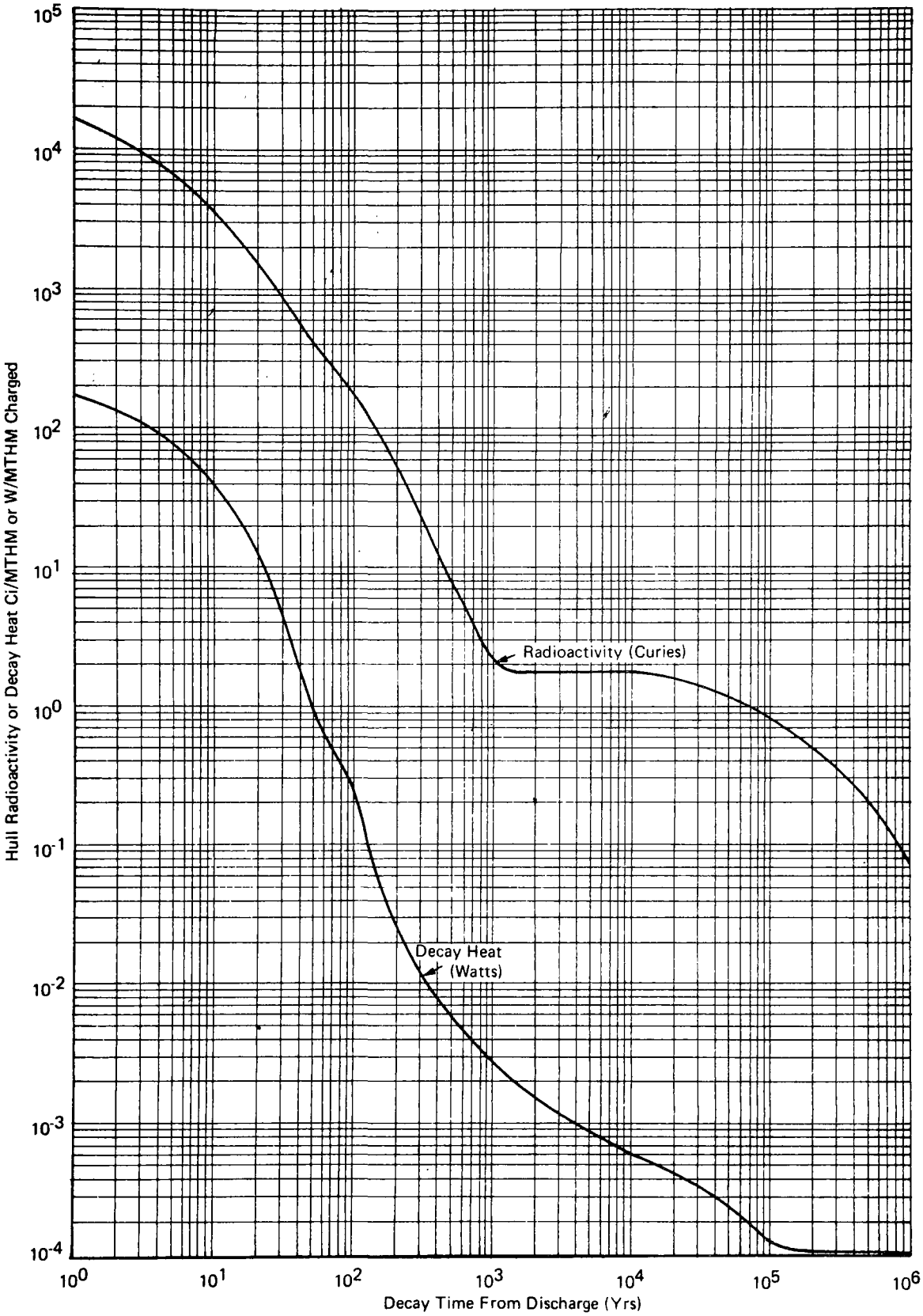


FIGURE A–16 PWR UO_2 CYCLE (CASE 2) – HULL RADIOACTIVITY AND DECAY HEAT GENERATION

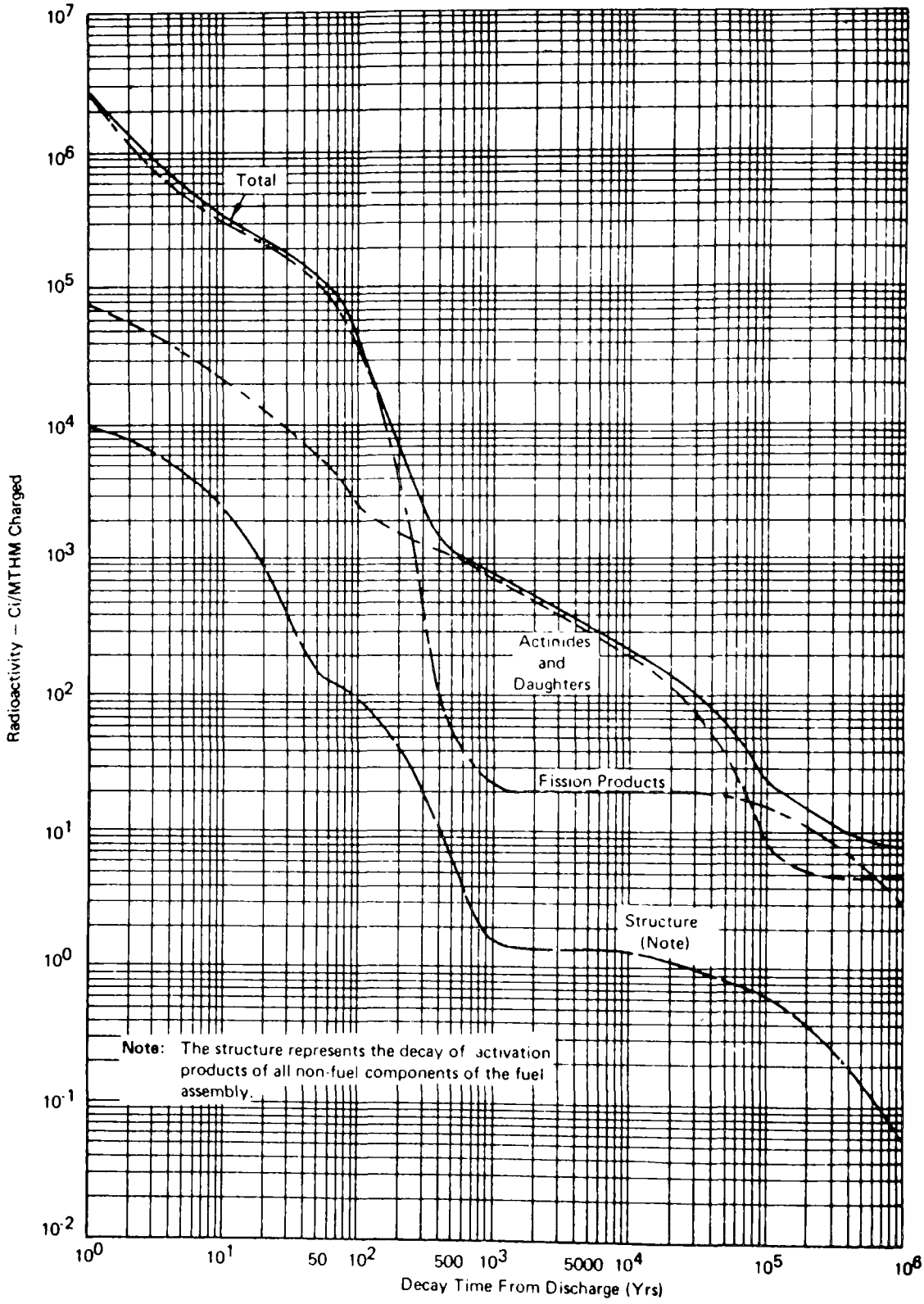


FIGURE A–17 MIXED OXIDE CYCLE (CASE 3) – REPROCESSED WASTE – RADIOACTIVITY

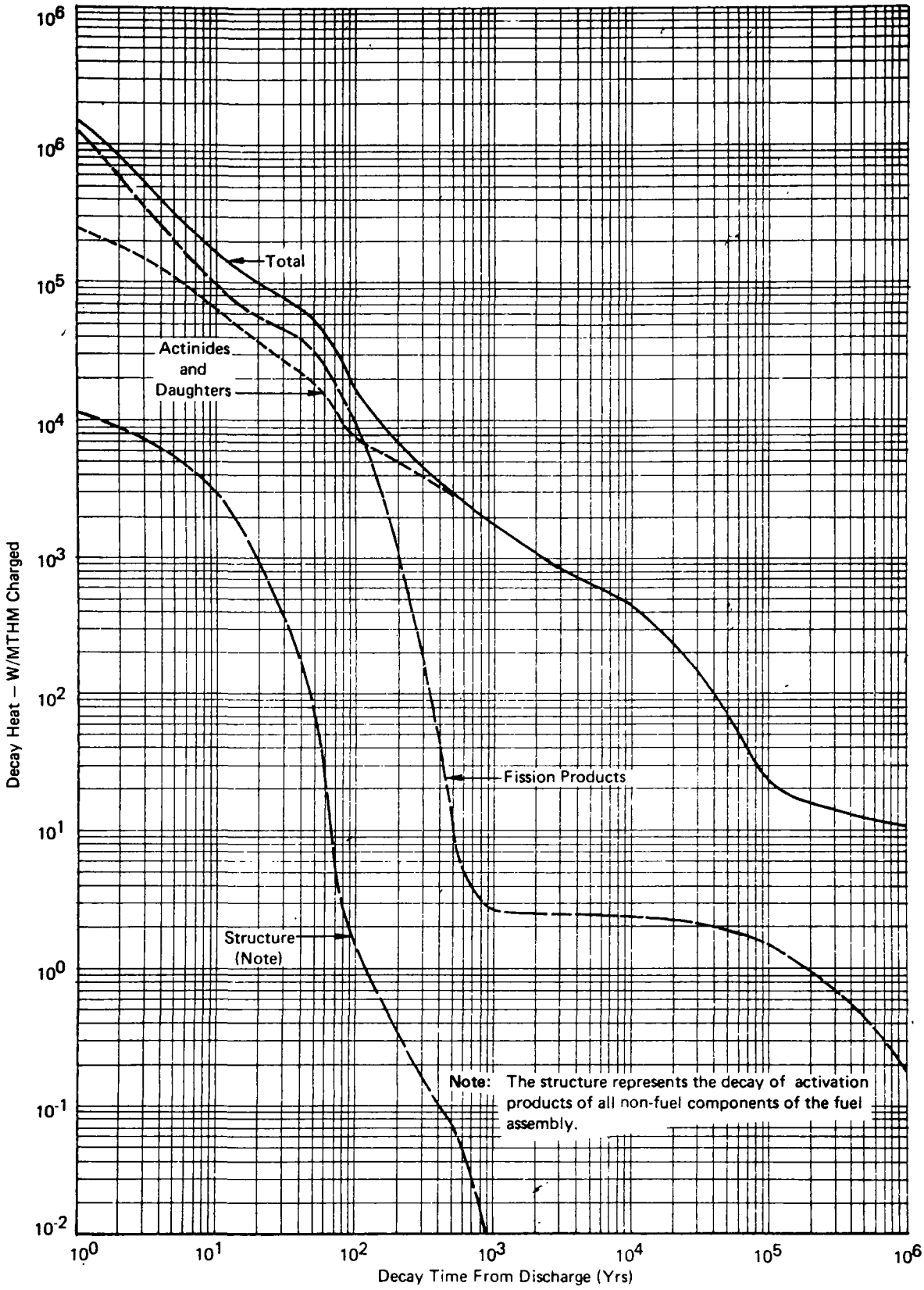


FIGURE A–18 MIXED OXIDE CYCLE (CASE 3) – REPROCESSED WASTE – DECAY HEAT GENERATION

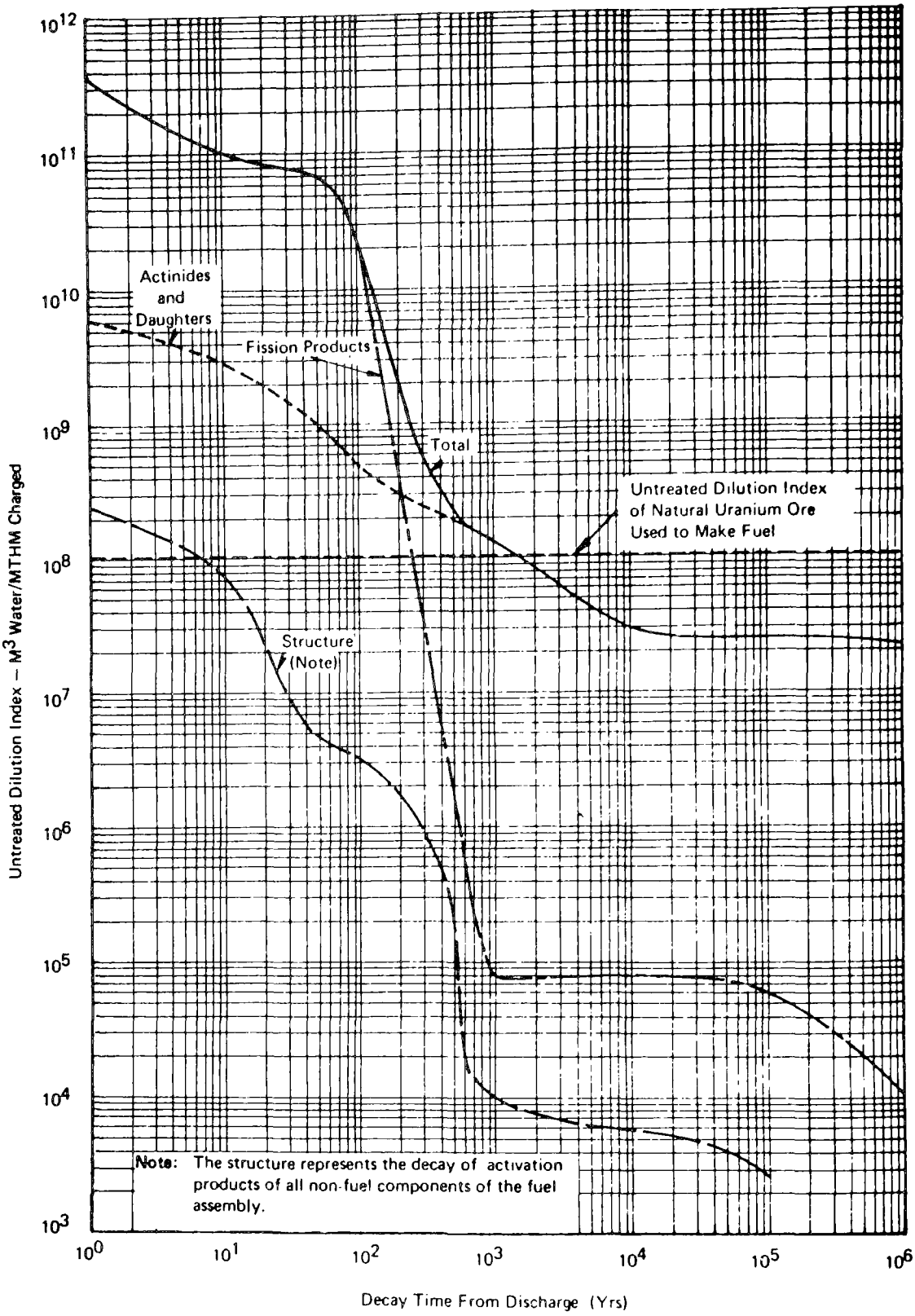
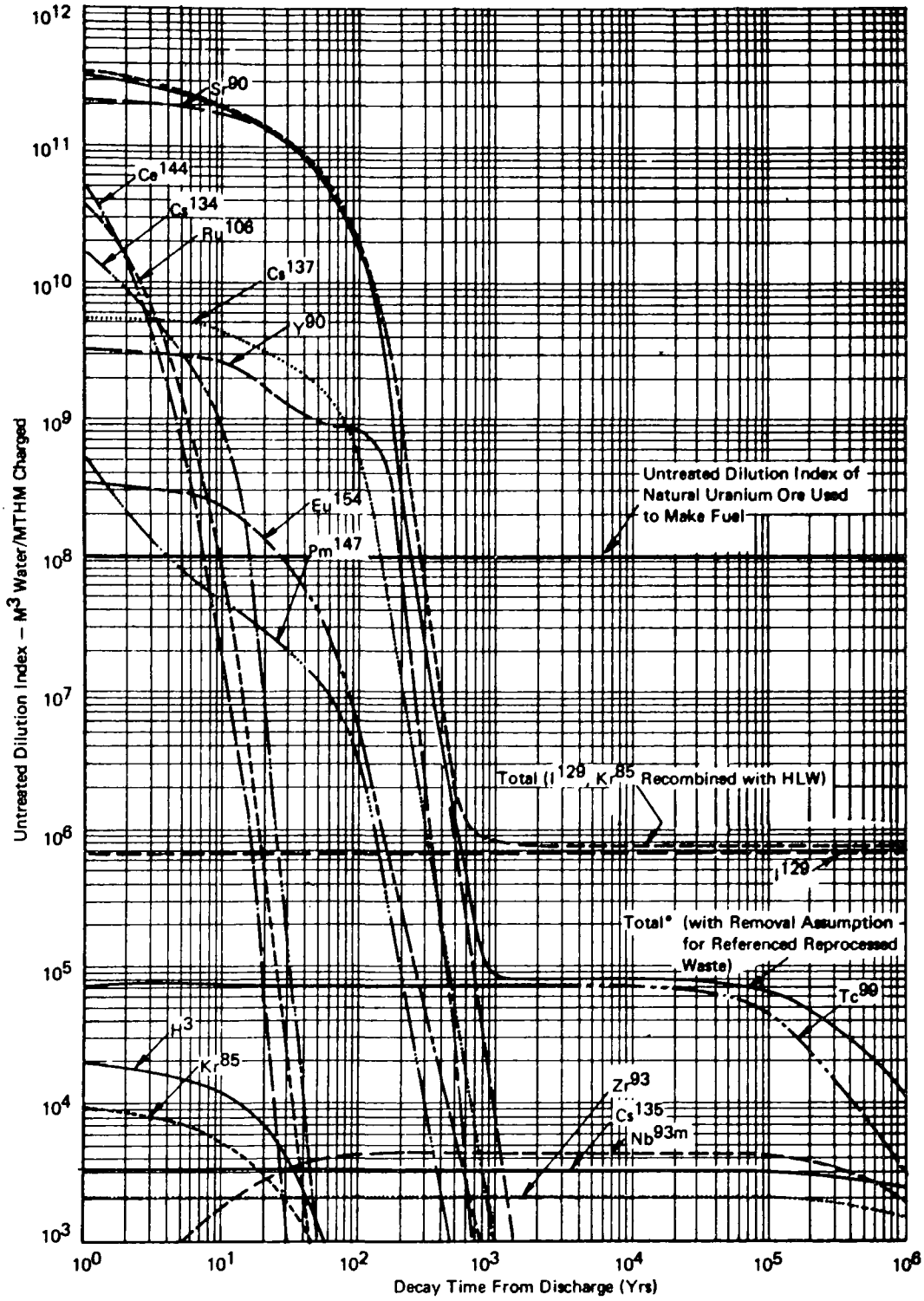


FIGURE A–19 MIXED OXIDE CYCLE (CASE 3) – REPROCESSED WASTE – UNTREATED DILUTION INDEX – (ALL SOURCES)



Note: *Although in the calculations 99.9% of the I–129 and 100% of the Kr–85 were assumed to be removed from the main high-level waste stream during reprocessing, these isotopes could be subsequently recombined into the main waste stream. 100% of these sources are displayed on this plot. Two total curves are shown. The lower one considers the removal assumptions shown in Table A–8, the higher one assumes recombination of the I–129 and Kr–85 with the main waste stream after reprocessing. Refer to Table A–8 for further details.

FIGURE A–20 MIXED OXIDE CYCLE (CASE 3) – REPROCESSED WASTE – UNTREATED DILUTION INDEX – FISSION PRODUCTS

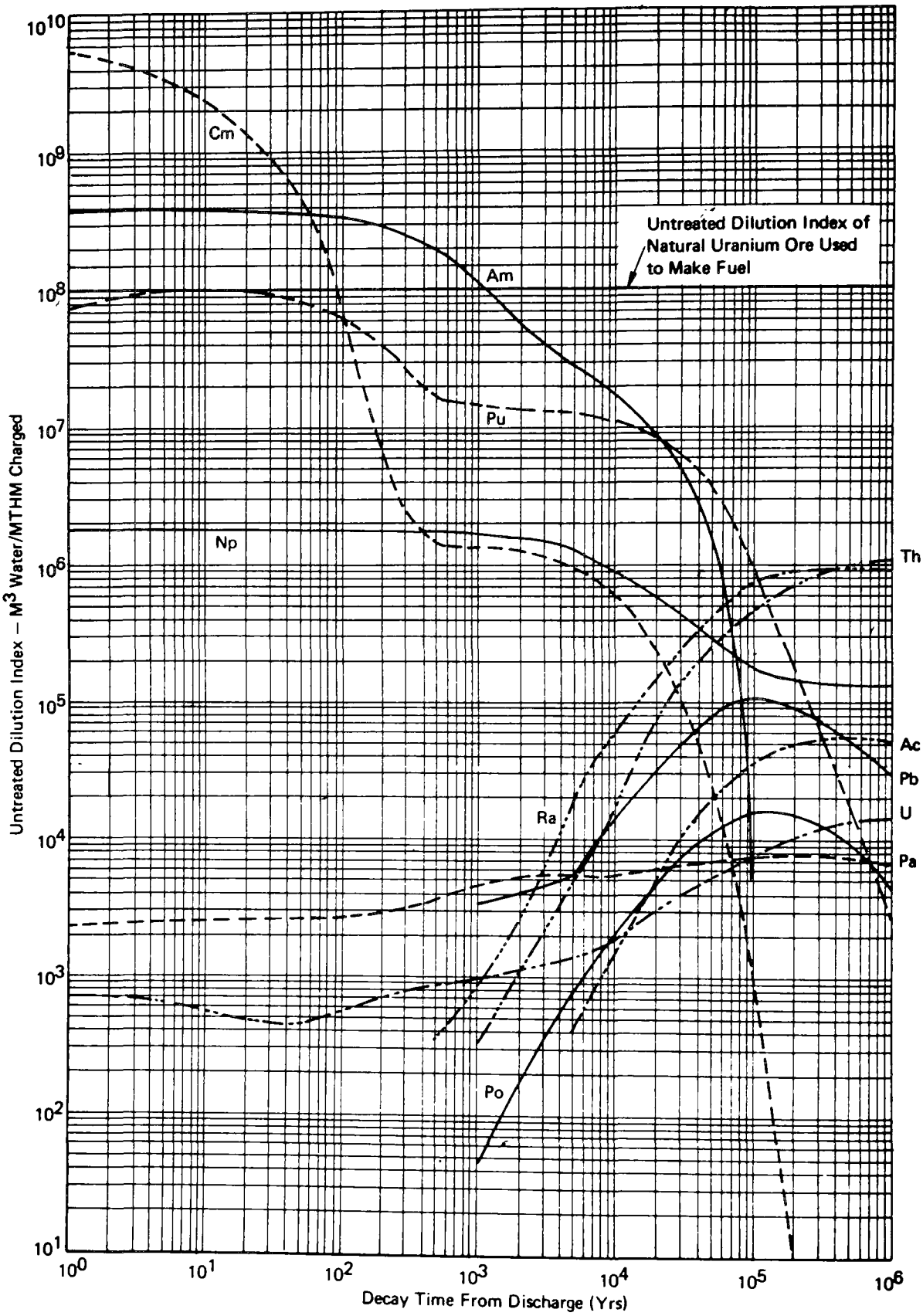


FIGURE A–21 MIXED OXIDE CYCLE (CASE 3) – REPROCESSED WASTE – UNTREATED DILUTION INDEX – ACTINIDES AND DAUGHTERS

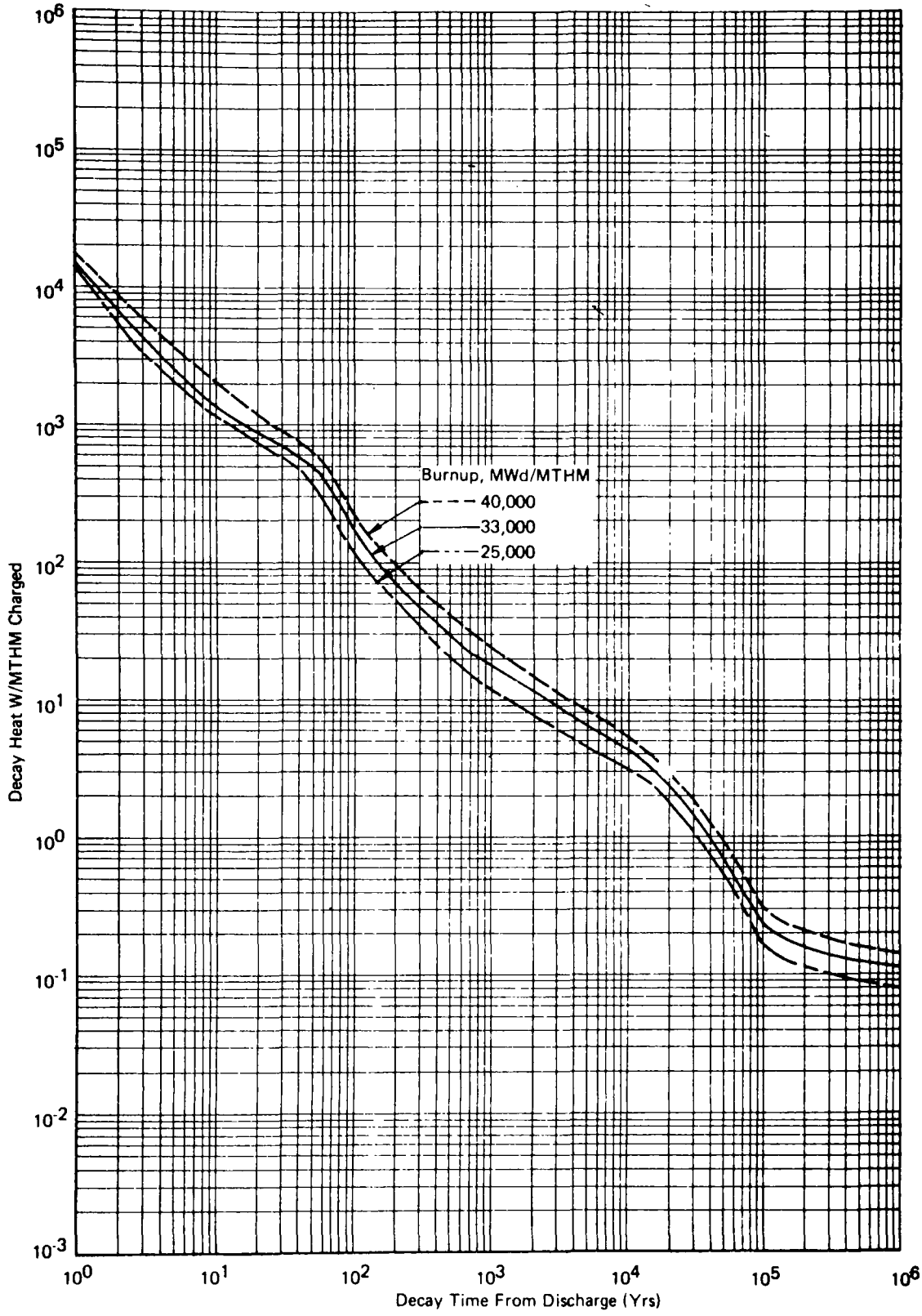


FIGURE A–22 MIXED OXIDE CYCLE (CASE 3) – REPROCESSED WASTE – DECAY HEAT GENERATION – FISSION PRODUCTS AND ACTINIDES

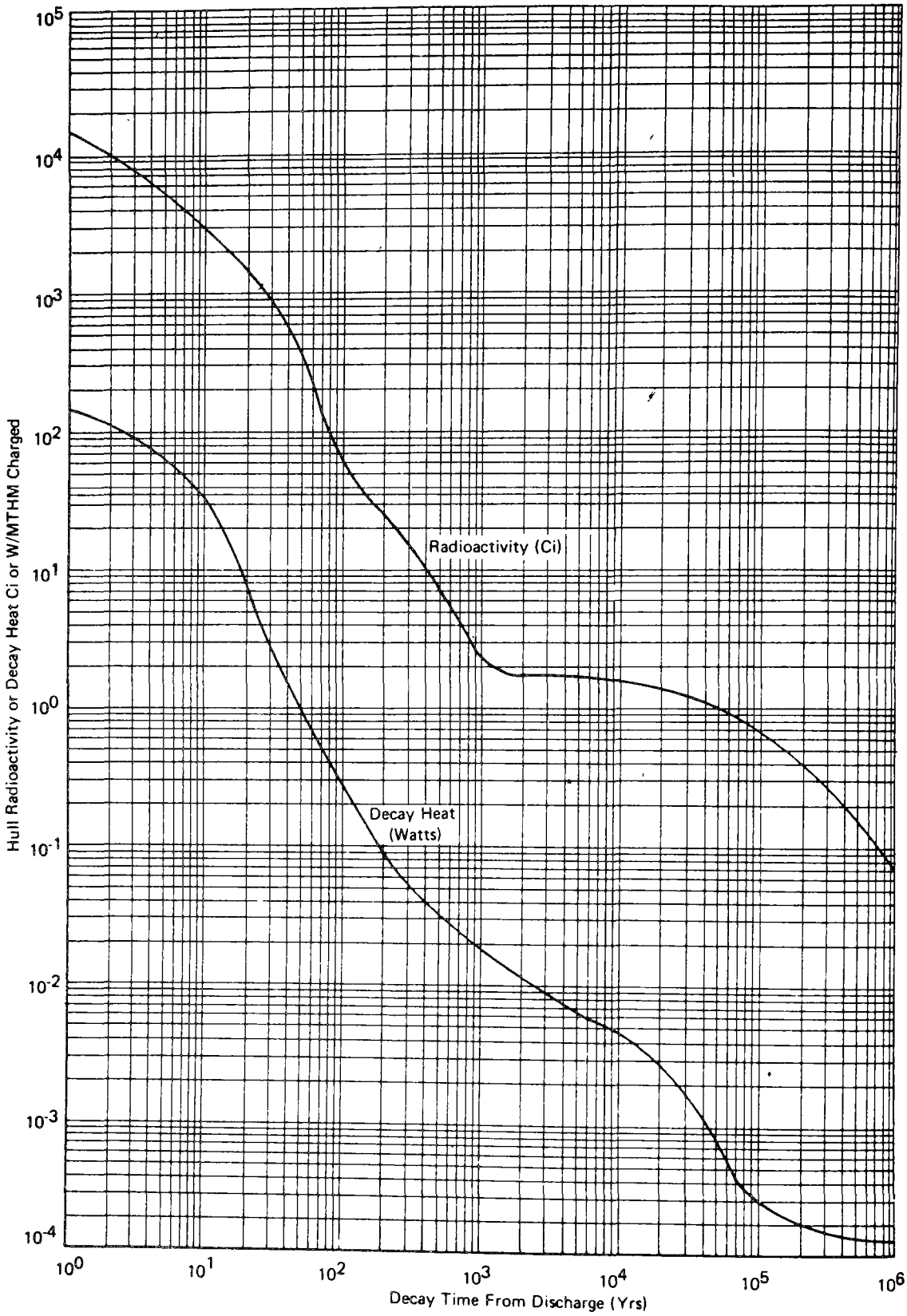


FIGURE A–23 MIXED OXIDE CYCLE (CASE 3) – REPROCESSED WASTE – HULL RADIOACTIVITY AND DECAY HEAT GENERATION

3. Untreated Dilution Index --

The contribution of fission products is about the same for all reference cases for those decay times when fission products control the total untreated dilution index (to several hundred years' decay time).* In this range, essentially all of the activity associated with the waste is from Sr-90 and (to a lesser extent) Cs-137. Sr-90 and perhaps Cs-137 separation and interim storage (for several hundred years) should be evaluated in connection with the overall disposal problem for the reprocessing Cases 2 and 3.

After the first few hundred years, when actinides become the dominant source terms, the total UDI of the throwaway case is the highest of the three reference cases. The UDI for the reprocessed waste from equilibrium mixed-oxide cycles increases from 30% of that for the throwaway case at 1000 years to 90% at a million years. Although the total UDI is controlled by different actinides in the two cases, the impact on the total UDI at long decay times is almost the same from the standpoint of radioactivity alone. The UO_2 recycle case has the lowest UDI at longer decay times, but this is at least partly because of the assumption that recovered plutonium is stored for this case (i.e., is not part of the waste stream).

For the reprocessed equilibrium cycle UO_2, the actinide and daughter UDI is below that of the natural activity of the original uranium ore (10^8 m^3 water) starting at about fifty years. It is questionable, therefore, whether removal of any of the actinides or their destruction by transmutation may be warranted for this case.

4. Hulls

The source terms for the hulls are comparable for Cases 2 and 3. Waste characterization of the hulls is dependent upon assumptions made concerning actinide residue in the cladding. An actinide level of 0.1% of the actinides in the fuel is typically assumed. With 99.9% reprocessing efficiency for U and Pu, this would result in approximately equivalent U, Pu levels in the hulls as in the HLW for Cases 2 and 3 (though transplutonium levels would be much higher in HLW than in hulls). With highly effective removal of hull residues, or with lower reprocessing efficiencies, the uranium and plutonium in clad hulls could be as much as a factor of 100 lower than in HLW (99% reprocessing efficiency, 0.01% U, Pu in hulls).

A-3.2.4 Special Reprocessing Options

Removal of 99.9% of the uranium and plutonium isotopes during reprocessing is feasible with current technology. The reference cases involving reprocessing were run with the assumption that 99.5% of the

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*The figures as presented show throwaway fission product source terms somewhat higher than for the other two cases, reflecting the assumption that certain volatile species escape from the HLW at the reprocessing plant (Table A-8).

uranium and plutonium isotopes would be removed. In order to investigate the effect of augmenting the removal to 99.9% (a five-fold reduction in the uranium and plutonium in the high-level waste), two additional ORIGEN runs were made (see Appendix A-IV). Figure A-24 shows the impact of augmented U, Pu removal on decay heat generation rate, and Figure A-25 displays the impact on UDI, for Case 2. The data in these figures are presented as percentage changes from the reference case. Similar figures for Case 3 with augmented removal are not shown, but the important results of the Case 3 augmented removal study are discussed.

These figures show a maximum percentage decrease for the UO_2 cycle of approximately 10-11% in both the heat generation rate and UDI. This maximum occurs at about 10,000 years; beyond this time the difference decreases to 1-2% at a million years.

For the equilibrium mixed-oxide cycle waste, there is a maximum percentage decrease of about 7% in both heat generation rate and UDI. The maximum occurs at about 1000 years. This maximum value is lower than in the UO_2 cycle waste case since the importance of Pu isotopes on waste sources, relative to the transplutonic actinides, is less for mixed oxide than for UO_2 fuel assemblies.

These data suggest that the increased costs of reprocessing associated with a fivefold reduction in the U and Pu are probably not warranted, considering the rather minimal gains achieved from the viewpoint of radioactivity alone.

It should be noted that significant reductions in waste source terms can be achieved if americium (an actinide) is extracted from the waste stream. Americium extraction, however, leads to the problem of what to do with a relatively long-lived, radioactive substance that generates large amounts of heat. Indeed, this is a common problem with all proposed schemes for enhanced actinide removal. The only answer seems to be destruction of these materials through irradiation in nuclear reactors or accelerators. While this route is theoretically possible, there are many practical problems that would have to be thoroughly probed in an extensive R&D program before the economic feasibility of such an approach could be determined.

A-3.3 OTHER FUEL CYCLES

A-3.3.1 Tandem Cycle

The tandem cycle is one in which discharged LWR UO_2 fuel is reconfigured and/or refabricated for further depletion in a heavy water reactor (HWR) (e.g., CANDU type). After depletion in the HWR, the fuel is not used again. Estimates were made of the impact of the tandem cycle on waste compared with that from throwaway-cycle fuel. These

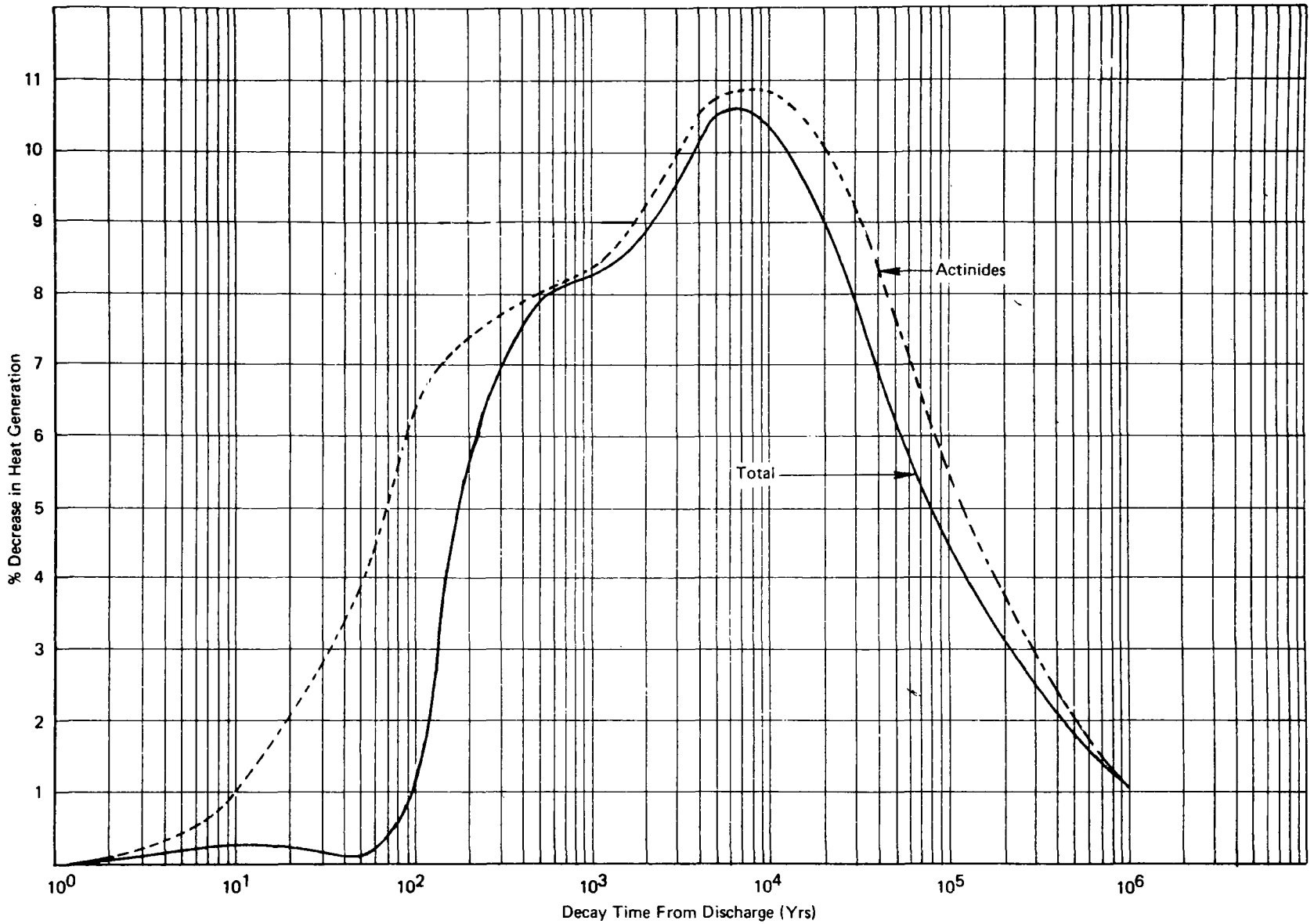

FIGURE A–24 PWR – UO_2 CYCLE (CASE 2) – REPROCESSED WASTE – IMPACT OF AUGMENTED U, Pu REMOVAL DURING REPROCESSING (99.9%) ON DECAY HEAT GENERATION

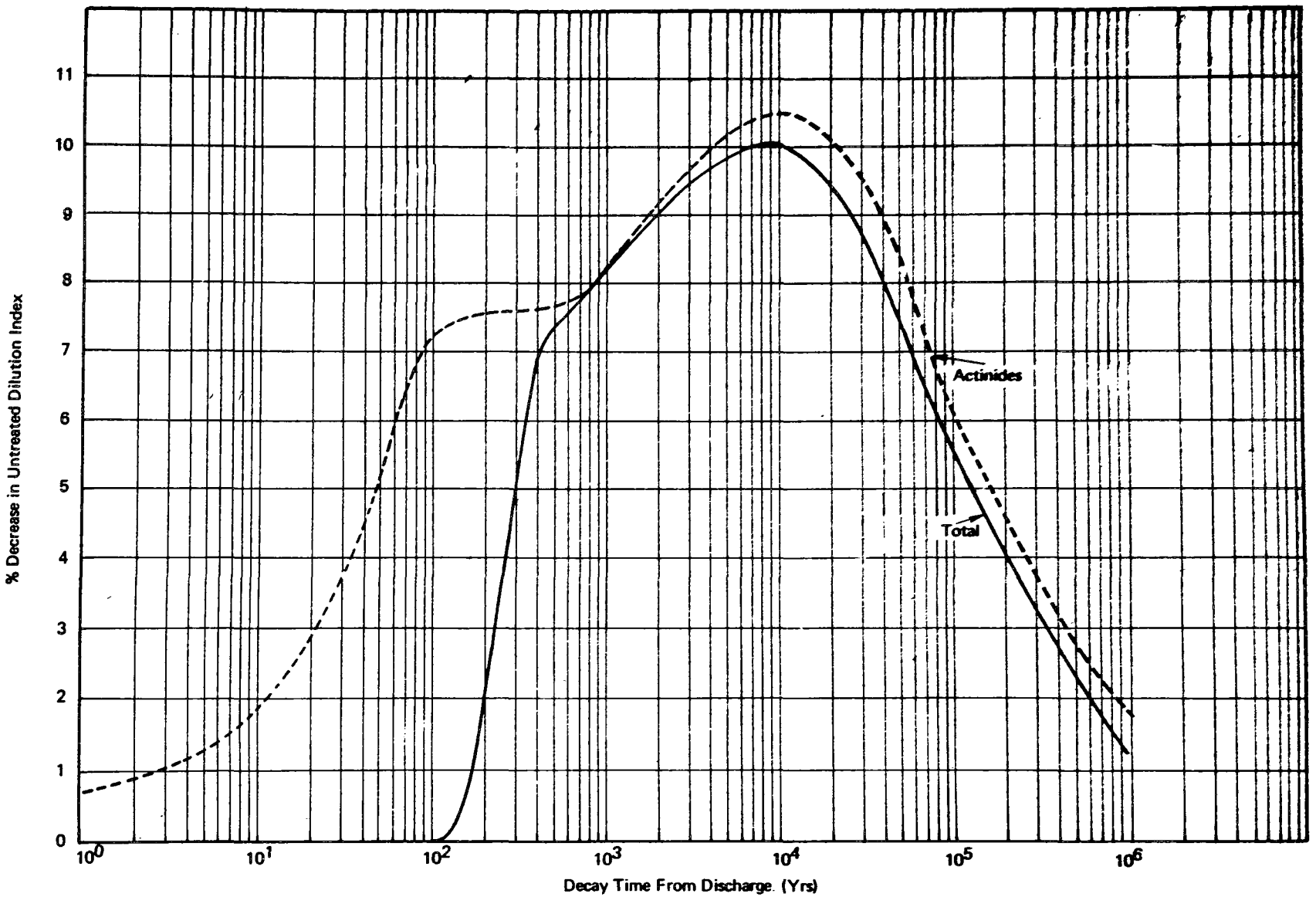

FIGURE A–25 PWR–UO_2 CYCLE (CASE 2) – REPROCESSED WASTE – IMPACT OF AUGMENTED U, Pu REMOVAL DURING REPROCESSING (99.9%) ON UNTREATED DILUTION INDEX

estimates are based on actinide and daughter concentrations for a typical PWR discharged fuel (approximately 30,000 MWd/MTHM burnup), and at the end of a continued burnup of this fuel in an HWR (16,000 MWd/MTHM additional burnup). (N. L. Shapiro, Combustion Engineering Power Systems, (CE) personal communication to obtain CE actinide data associated with their study.)[14] The data developed during this study for the throwaway cycle at various burnup levels were used to evaluate the impact of the higher tandem cycle fuel burnup on fission product wastes.

Figures A-26 and A-27 show the estimated relative decay heat generation and relative UDI, tandem cycle to throwaway cycle, for the actinides and daughters and fission products. These figures were developed from ORIGEN runs utilizing the input data base described above, i.e., ORIGEN decay of CE data on actinide and daughter concentration after both the PWR and HWR depletions, as well as ORIGEN-developed fission product decay data.

In interpreting Figures A-26 and A-27, it is important to note that the tandem cycle yields approximately 50% more burnup per metric ton of fuel than the throwaway (46,000/30,000 MWd/MTHM). Thus, the almost constant fission product ratio of 1:5 is simply reflecting the increased number of fissions, and the net fission product source term per unit of produced energy is almost identical for the tandem and the throwaway cycles.

In the first 40-60 years the actinide source term for the tandem cycle is considerably higher than that for the throwaway cycle. However, fission products dominate the throwaway cycle source terms out to several hundred years; at 50 years the fission product UDI term is about 60 times greater than the actinide UDI term for the throwaway case (Figure A-6). Thus, this higher actinide source term at short decay times is of only minor significance. At longer decay times when actinides dominate, the tandem cycle actinide terms are less (per energy produced) than for the throwaway cycle.

Keeping in mind that the results are per metric ton of fuel, it is clear that for the higher burnup fuel, the source activity per unit of energy delivered is actually lower than the reference case.

The actinide behavior, like fission product behavior, is primarily a function of burnup as opposed to neutron spectrum. It is more complicated than the fission product behavior because different actinide components control the source terms during different decay time intervals. Up to approximately 500 years, the controlling actinides are those not at equilibrium concentrations at typical LWR discharge burnups. These isotopes reach higher concentrations with the additional burnup in the HWR portion of the tandem cycle. The two most important actinide isotopes up to approximately 500 years are Cm-244 and Pu-238.

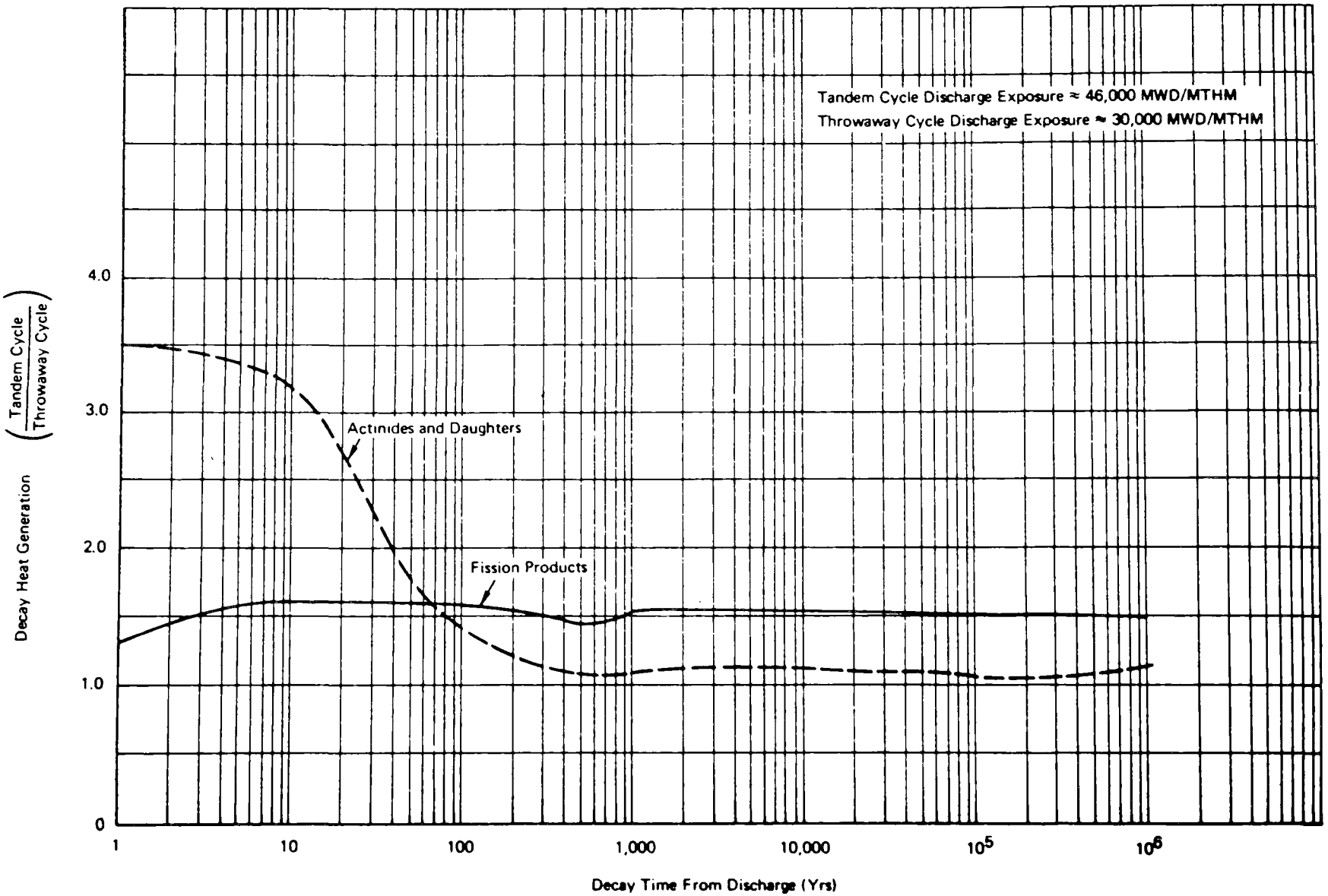

FIGURE A–26 TANDEM CYCLE (CASE 4)/THROWAWAY CYCLE (PWR) (CASE 1) – RELATIVE DECAY HEAT GENERATION

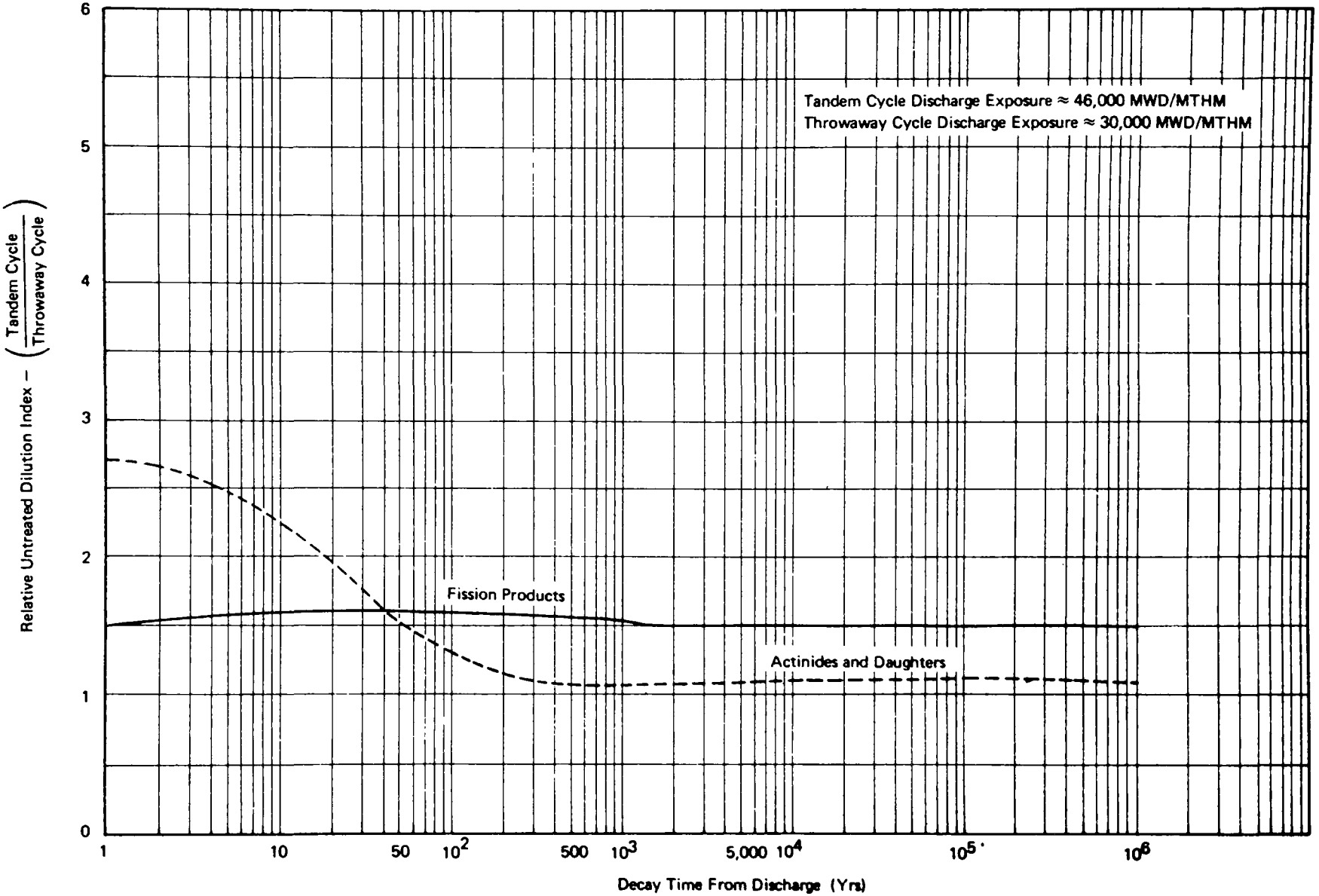

FIGURE A–27 TANDEM CYCLE (CASE 4)/THROWAWAY CYCLE (PWR) (CASE 1) – RELATIVE UNTREATED DILUTION INDEX

For example, after ten years, the decay heat rate from Cm-244 after the tandem burn is approximately eight times that after LWR burn. After the HWR burn, the Cm-244 contributes approximately 57% of the total actinide decay heat. The other major actinide contributor, up to approximately 500 years, is Pu-238. At the 10-year decay time after the tandem burn, the Pu-238 decay heat is 2.5 times that after the LWR burn, and contributes approximately 28% of the total actinide decay heat.

Beyond approximately 500 years, the Cm-244 and Pu-238 contributions to the actinide source terms are unimportant, since these isotopes have decayed away. Up to approximately 10,000 years, three actinide isotopes control the source terms. In descending order of importance these are Am-241, Pu-240, and Pu-239. Of these, Am-241 and Pu-239 change only slightly in concentration during the HWR burn. The third actinide isotope, Pu-240, slowly increases in concentration during the HWR burn and is primarily responsible for the approximate 10% increase in source terms relative to throwaway up to approximately 10,000 years. Beyond this, the actinide daughter products, particularly Ra-226, control the source terms.

A-3.3.2 Thorium Cycle

A prior study included average initial and discharge inventories for thorium/recycle uranium assemblies through five generations, as well as equivalent data for makeup assemblies composed of ThO_2 and fully enriched UO_2.[15] For equilibrium cycles, there is a mix of approximately 65% ThO_2/recycle U assemblies and approximately 35% makeup assemblies. The data are based on an analysis of the thorium cycle in a current Combustion Engineering System 80 PWR design,* with no modifications other than the fuel. These data are representative of a thorium cycle in an LWR.

For the current analysis of the impact of the thorium cycle on waste, fifth generation recycle assemblies mixed with makeup assemblies in the 65% to 35% ratio were selected as representative of an equilibrium thorium cycle. The Th-232 and U-235 resonance cross sections were modified in ORIGEN in order to account for self-shielding and isotope resonance interference effects, and minor adjustments to the ORIGEN spectral indices were made in order to achieve the best match with the major discharge thorium and uranium isotopes reported by Combustion Engineering.[15]

The results of the equilibrium thorium cycle analysis compared with the equilibrium mixed-oxide cycle data presented previously for decay heat rate and total UDI are given in Figures A-28 and A-29 respectively.

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*Combustion Engineering Company's standardized PWR design.

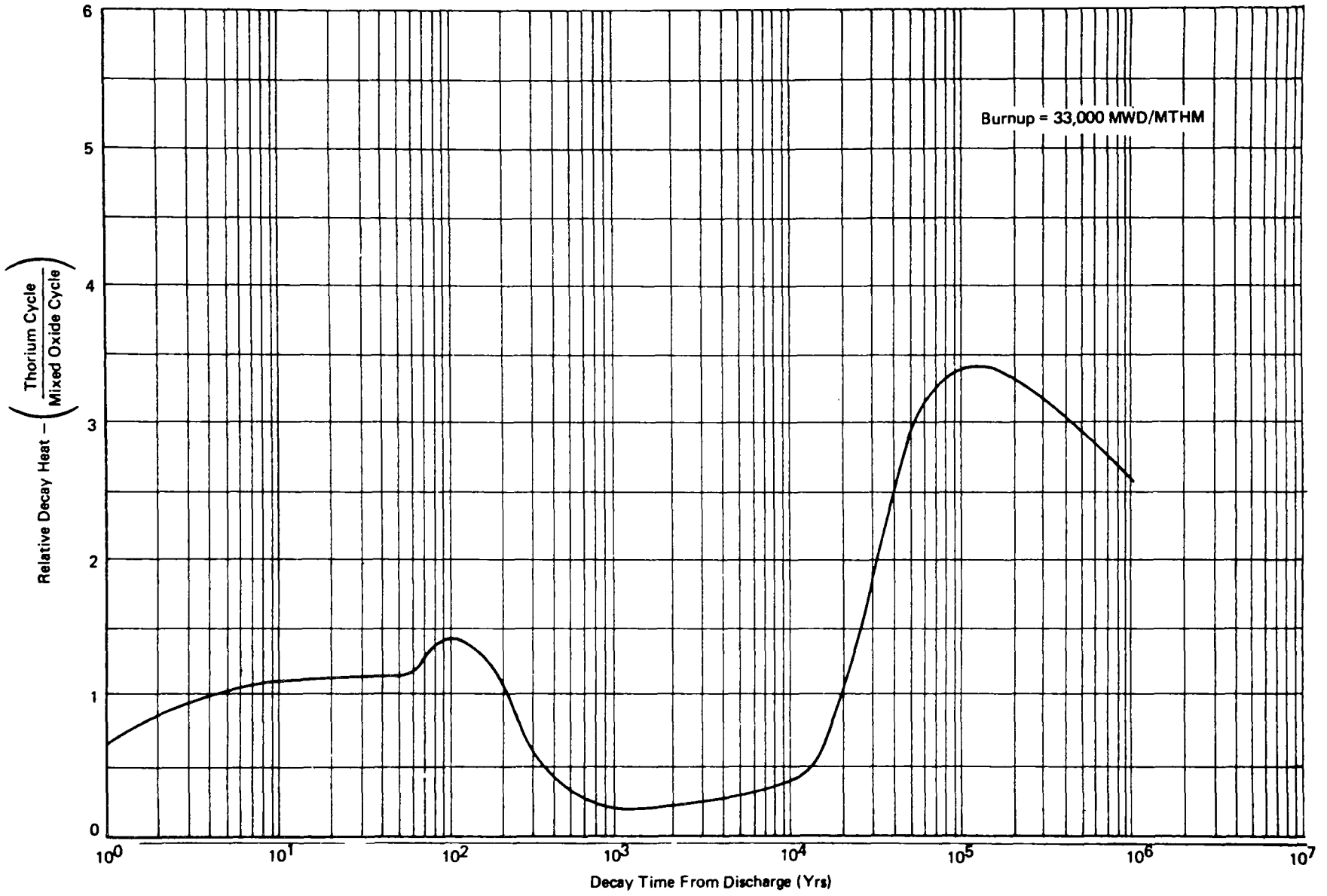

FIGURE A–28 LWR THORIUM CYCLE (CASE 5)/MIXED OXIDE CYCLE (CASE 3) – RELATIVE DECAY HEAT GENERATION

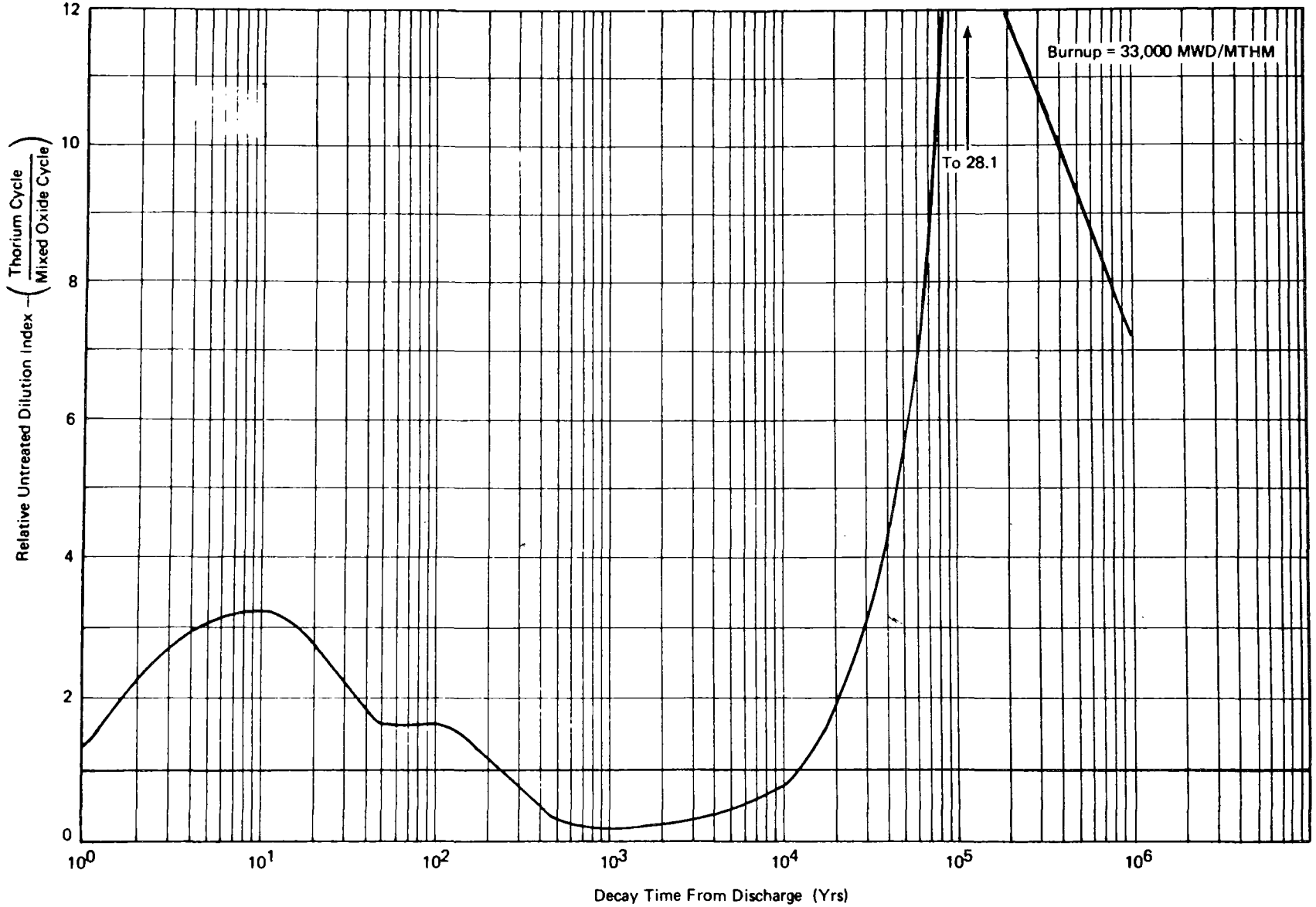

FIGURE A–29 LWR THORIUM CYCLE (CASE 5)/MIXED OXIDE CYCLE CASE (3) – RELATIVE UNTREATED DILUTION INDEX

For the thorium cycle reprocessing, 99.5% of the thorium and 0% of the plutonium was assumed to be removed from the main high-level waste stream. The other reprocessing removal assumptions were equivalent to the standard set previously used (see Table A-8). The thorium removed during reprocessing can be stored for approximately 15 years to allow sufficient decay of Th-228, after which time it can be recycled.

Figures A-28 and A-29 show that for most of the decay time up to a million years both the decay heat rate and UDI are higher from thorium cycle waste than from the mixed-oxide cycle waste. Over the first several hundred years, when fission products are the controlling factor, the thorium cycle yields generally higher source terms because of the large amount of U-233 fissions, which produce larger quantities of the controlling isotope, Sr-90, relative to U-235 fissions. When the transuranic actinides start controlling (from several hundred up to approximately 20,000 years) the source terms for the thorium cycle are lower. This is because relatively small quantities of americium are produced in the thorium cycle. Americium controls the actinide source terms in the equilibrium mixed-oxide cycle in this range. Beyond approximately 20,000 years, the source terms are considerably higher for the thorium cycle and are controlled primarily by Ra-226, produced by alpha decay from U-234 (and Cm-242 in the mixed-oxide cycle). The thorium cycle feed fuel has substantially higher U-234 concentrations than the equilibrium mixed-oxide cycle (and the LWR UO_2 cycles), and hence the larger Ra-226 impact at long decay times.

A-3.3.3 Comments on Alternative LWR Fuel Cycles and Other Reactor Concepts

Although detailed calculations have not been performed for fuel cycles other than in Cases 1-5, other cycles could prove to be commercially feasible and for the purpose of this study may be sufficiently well bounded by one of the five cases given above, or by a suitable combination of two cases. This premise is based upon the mode of formation of the more important nuclides sent to waste -- which result either from fission or from higher-order neutron capture.*

Those products generated in the fission process are primarily fixed in their number and type by the particular fissile nuclides burned and their degree of burnup, with only modest influence of specifically nuclear considerations, such as neutron spectrum and degrees of self-shielding. Any fission product waste resulting from equal fissions in U-235 and fissile plutonium will therefore have nearly the same nuclide composition, within perhaps 10 or 15%, regardless of which reactor produced it. Since the fissile mixtures covered by the five cases above

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*Nuclides such as Sr-90 and Cm-244. Clearly there will be a significant dependence upon the specifics of the fuel cycle for such nuclides as Fe-55 (much higher for steel-clad fuel than Zircaloy-clad fuel) or C-14, which would depend to a great extent on the fuel design and fabrication procedure.

are representative of all those considered, the results obtained with use of their fission product spectra should be reasonably comprehensive.

The trans-fertile nuclides (e.g., Pu-239, Cm-242, U-233) are somewhat more dependent upon the nuclear specifics, but even in their case the primary considerations are starting fissile composition and burnup, particularly the latter, since a number of the most important nuclides are produced by fifth- or sixth-order neutron capture and are still far from equilibrium at the burnups considered realistically achievable.

Previous studies of the other fuel cycles confirm these observations.*[16,17] For example, representative LMFBR and HTGR designs show fuel waste characteristics comparable to, but smaller than, those obtained in Cases 3 and 5, respectively. Similarly, the Light Water Breeder is comparable to Case 5.

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*The HTGR (High Temperature Gas Cooled Reactor) fuel cycle has a potential for producing more C-14 than in LWR fuel cycles. With HTGR fuel, as distinct from the graphite blocks, C-14 will be produced via the N-14 and O-17 reactions as in LWR fuel from nitrogen and oxygen contained in UC_2 and ThO_2, with the N-14 contribution the most important. C-14 can also be made via two (n,γ) reactions starting with C-12 which is 98.98 atom percent of carbon $^{12}C(n,\gamma)^{13}C(n,\gamma)^{14}C$ or by $^{13}C(n,\gamma)^{14}C$ with the naturally occurring C-13 (1.11 atom percent of carbon). Since the $^{13}C(n,\gamma)^{14}C$ cross section is extremely low, about 1 millibarn, and the amount of carbon/MTHM is relatively small compared with that in the graphite blocks, these (n,γ) reactions with carbon in the fuel (both carbon in UC_2 and pyrolitic coatings) are unimportant in the production of C-14. Davis does not even address the production of C-14 from (n,γ) reactions in the fuel, but does make the following statement:

> "There are limited data concerning the quantities of nitrogen in potential HTGR fuel since this fuel is not made on a routine basis. It is therefore assumed that all forms of UC_2 and ThO_2 contain the same quantity of nitrogen (i.e., 25 ppm) used in this report as an industry consensus for LWR fuels. On this basis about 0.96 Ci of C-14/MTHM or about 9.7 Ci/GW-yr will be formed from the $^{14}N(n,p)^{14}C$ reaction."[4]

This compares with about 0.9 Ci of C-14/MTHM or about 24 Ci/GW-yr for the LWR.

Davis also estimates the C-14 produced in the graphite blocks, which ultimately will require disposal, as follows:[4]

	Curies/MTHM	Curies/GW-yr
From Carbon (n,γ) reactions	<4.3	<43
From 30 ppm N-14 graphite blocks (upper bound estimate based on several measurements)	12.6	127
Total	<16.9	<170

One class of reactors for which the use of Cases 1-5 may be overly conservative would be the homogeneous reactors. Here, some of the precursors leading to higher-order nuclides can be removed continuously. In this event, the precursor concentration would be somewhat higher, but the higher-order nuclides would be substantially reduced. For example, if the americiums were removed continuously, the curium levels might become almost insignificant.

A-3.4 CHEMICAL CHARACTERISTICS OF COMMERCIAL HIGH-LEVEL WASTE

The assumed high-level waste solution expected to be the result of the reprocessing of commercial irradiated reactor fuels is shown in Table A-10.[18] It is a nitric acid solution containing almost all of the non-volatile fission products (and their decay products), as well as essentially all of the transplutonium elements and other activation products formed during irradiation. The amount of uranium and plutonium present is dictated by the separation efficiency of the reprocessing plant. The "inerts" result from the dissolution of non-radioactive structural materials and the processing chemicals, such as salting agents (e.g., aluminum nitrate), or valence adjustment chemicals (e.g., sodium nitrite). In addition, the presence of a gadolinium salt as an inert results from its addition to the dissolver solution to act as a "neutron poison" in preventing an accidental nuclear incident through maloperation of the dissolver.

The solution is primarily a collection of the nitrates of all of the above materials in a nitric acid solution. It would, therefore, have to be stored in stainless steel tanks unless neutralized. Calciners are typically designed to accept nitric acid feed,[18] though this results in NO_x in the offgas.

TABLE A-10

COMPOSITION OF HLLW

	Concentration, moles/ℓ @ 378c/MTU			Kilograms Nonvolatile Oxide/MTU	
	Constituent	Possible Range	Reference for this Document[a]	Constituent	Reference for this Document
Inerts (Reprocessing Chemicals)	H^+	1-7	2.0	---	---
	Na	0-3.0	0.01	Na_2O	0.12
	Fe	0.05-1.4	0.054	Fe_2O_3	1.6
	Cr	0.01-0.04	0.0096	Cr_2O_3	0.28
	Ni	0.005-0.02	0.0034	NiO	0.19
	$PO_4^{\equiv}$	0.025-0.30	0.042	P_2O_5	1.1
	$SO_4^{\equiv}$	0-0.90	0	$SO_4^{\equiv}$	0
	NO_3^-	2.7-20	3.6	---	---
	F^-	0-0.25	0	F^-	0
	Gd[b]	0-0.2	0.150	Gd_2O_3	10.0
	B[b]	0-5.0	0	B_2O_3	0
	Cd[b]	0-1.5	0	CdO	0
				Subtotal	13.0
Fission Products	Rb	(c)	0.0095	Rb_2O	0.34
	Sr	(c)	0.017	SrO	0.68
	Y	(c)	0.0095	Y_2O_3	0.41
	Zr	(c)	0.074	ZrO_2	3.5
	Mo	(c)	0.071	MoO_3	3.9
	Tc	(c)	0.017	Tc_2O_7	1.0
	Ru	(c)	0.044	RuO_2	2.2
	Rh	(c)	0.011	Rh_2O_3	0.53
	Pd	(c)	0.030	PdO	1.4
	Ag	(c)	0.0015	Ag_2O	0.067
	Cd	(c)	0.0016	CdO	0.078
	Sn	(c)	0.0009	SnO_2	0.052
	Sb	(c)	0.0002	Sb_2O_3	0.013
	Te	(c)	0.0078	TeO_2	0.47
	Cs	(c)	0.039	Cs_2O	2.2
	Ba	(c)	0.023	BaO	1.3
	La	(c)	0.018	La_2O_3	1.1
	Ce	(c)	0.034	CeO_2	2.2
	Pr	(c)	0.016	Pr_6O_{11}	1.1
	Nd	(c)	0.055	Nd_2O_3	3.5
	Pm	(c)	0.0005	Pm_2O_3	0.035
	Sm	(c)	0.012	Sm_2O_3	0.80
	Eu	(c)	0.002	Eu_2O_3	0.13
	Gd	(c)	0.001	Gd_2O_3	0.076
				Subtotal	27.0
Actinides	U	0.011-0.22	0.053	U_3O_8	5.7
	Np	(c)	0.003	NpO_2	0.31
	Pu	0.0001-0.006	0.002	PuO_2	0.17
	Am	(c)	0.009	Am_2O_3	0.96
	Cm	(c)	0.003	Cm_2O_3	0.26
				Subtotal	7.4
				Total	47.0

a. The reference HLLW is representative of a large state-of-the art commercial reprocessing plant such as BNFP.

b. Potential soluble poisons which may be used during fuel dissolution.

c. Depends upon burnup of the fuel being reprocessed, should not vary over a factor of two from the reference waste composition (burnup=25,000 MWd/MTU).

Source: ERDA-76-43, UC-70, "Alternatives for Managing Wastes from Reactors and Post-Fission Operations in the LWR Fuel Cycle," U.S. Energy Research and Development Administration, May 1976.

A-4.0 CHARACTERISTICS OF GOVERNMENT HIGH-LEVEL WASTE

A-4.1 GENERAL

Besides the projected commercial waste discussed in Section A-3.0, substantial quantities of high-level waste have been generated over the past 30 years or so at U.S. government-owned sites. This report terms these "government high-level waste," meaning that they were generated during the processing of materials discharged from government-owned nuclear reactors as part of the defense and R&D programs. This waste is presently stored in near-surface tanks at three sites:

- At Richland, Washington, the waste from the Hanford Works. The Hanford reprocessing plants, which were built in the early 1940's to produce plutonium from reactor-irradiated materials, did not recover uranium. The uranium was sent to HLW tanks. This uranium was recovered in the early 1950's. The Redox plant (operational 1951) and the Purex plant (operational 1955) recovered both uranium and plutonium. All Hanford reprocessing plants are now excess except Purex, which is on standby for reprocessing of spent fuel from the Hanford "N" reactor.

- At Aiken, South Carolina, the waste from the Savannah River Plant, built in the early 1950's to recover uranium and to produce plutonium and tritium from reactor-irradiated materials. (Operations at a reduced level are assumed to continue through 1985.)

- At the Idaho National Engineering Laboratory, near Idaho Falls, Idaho, the waste from the Idaho Chemical Processing Plant, built in the early 1950's to recover uranium from enriched-uranium fuel elements after their use in naval propulsion reactors and in various experimental/test reactors. (This operation is assumed to continue at least to 1990.)

The HLW at Hanford and at Savannah River had their nitric acid content neutralized with sodium hydroxide (NaOH) prior to storage. This permitted the use of less expensive carbon steel tanks and resulted in formation of: (1) an alkaline sludge layer containing most of the radionuclides; and (2) a large quantity of dissolved sodium nitrate ($NaNO_3$) that will complicate any scheme to solidify the waste. The waste at Idaho, on the other hand, was stored in the acid form in stainless steel tanks, and a substantial volume has been converted to granular solids by calcination, a program which is continuing.

Programs are in progress to concentrate further the alkaline waste at Hanford and Savannah River to the point where large amounts of the $NaNO_3$ will crystallize out in the waste tanks. This crystalline mass is commonly called "salt cake." In addition, at Hanford a simultaneous effort is under way to remove much of the Cs-137 and Sr-90 from the waste and to encapsulate them in double-walled cans as the chloride and fluoride, respectively. A discussion of the present and projected inventories of the high-activity wastes at these sites is given below.

A-4.2 HANFORD WASTE

The Hanford "N" reactor has accumulated a backlog of 1800 MT of spent fuel, and will be producing additional amounts at the rate of 400-900 MT/yr. ERDA has announced a planned reactivation of the Purex reprocessing plant at Hanford, which has a capacity of 900 MT/yr, for the latter part of FY 1978. Waste will be stored temporarily as liquid, with cesium and strontium subsequently removed; the remaining waste will be neutralized and stored like the other Hanford waste. (Professor Manson Benedict, MIT, personal communication May 20, 1977 with Hanford personnel.)

By the early 1980's when the current fractionation and concentration program at Hanford will be complete, the HLW inventory will consist of approximately:

94,500 m^3 (25 million gallons) of damp salt cake,
41,600 m^3 (11 million gallons) of damp sludge,
52,900 m^3 (14 million gallons) of residual liquor and liquid waste,
2,900 capsules (6.7 cm dia x 53 cm long) containing Cs-137 in chloride form, and Sr-90 in fluoride form.[19]

Continued operation of the "N" reactor and subsequent reprocessing will add by 1990 approximately 4900 m^3 (1.3 million gal) of salt cake, 760 m^3 (0.2 million gal) of sludge, 3800 m^3 (1.0 million gal) of residual liquor, and 1100 capsules.

The chemical composition of these materials will be approximately as given in Table A-11.[20] Distribution and amounts of the major fission products and actinides (1990 basis) are given in Table A-12.[20] N-reactor waste will add approximately 10% to the radioactivity levels given in Table A-12. Present plutonium content of Hanford waste is estimated at 330 kg.[21]

A-4.3 SAVANNAH RIVER PLANT WASTE

The Savannah River program for concentrating the waste to precipitate a "salt cake" is under way and, as at Hanford, should be complete by the early 1980's. Here, however, the Cs-137 and Sr-90 will not be removed for separate encapsulation. By 1985, the waste

TABLE A-11

AVERAGE CHEMICAL COMPOSITION OF HANFORD HIGH-LEVEL WASTE

Chemical	Salt Cake Wt.%	Sludge Wt.%	Residual Liquor Wt.%	Total Wt.%
$NaNO_3$	84.5	17.2	12.1	50.9
H_2O	10.3	35.8	47.1	25.1
Na_3PO_4	0.1	22.6	--	5.9
NaOH	1.5	3.2	14.3	4.8
$NaNO_2$	1.7	3.7	12.3	4.6
$NaAlO_2$	1.4	3.1	11.7	4.1
Na_2CO_3	0.5	2.2	0.8	1.0
Na_2SiO_3	--	2.9	--	0.7
Al_2O_3	--	2.3	--	0.6
$Fe(OH)_3$	--	1.8	--	0.5
Na_2SO_4	--	1.1	0.5	0.4
Other	--	4.1	1.2	1.4
Totals	100.0	100.0	100.0	100.0

Source: Alternatives for Long-Term Management of Defense High-Level Radioactive Waste--Hanford Reservations. ERDA 77-44, U.S. Energy Research and Development Administration, Richland, Washington, September 1977.

TABLE A-12

INVENTORY OF MAJOR FISSION PRODUCTS AND ACTINIDES IN HANFORD HIGH-LEVEL WASTE DECAYED TO 1990

Radionuclide	Radioactivity (Ci)				
	Salt Cake	Sludge	Residual Liquor	Capsules	Total
Fission Products:					
H-3	*	*	1.1×10^{4}	-	1.1×10^{4}
C-14					$<1.6 \times 10^{4}$
Sr-90	2.0×10^{6}	4.5×10^{7}	6.0×10^{5}	5.8×10^{7}	1.06×10^{8}
Zr-93	*	6.9×10^{3}	*	-	6.9×10^{3}
Tc-99	*	*	3.1×10^{4}	-	3.1×10^{4}
Cd-113m	*	5.0×10^{3}	*	-	5.0×10^{3}
Sb-125	*	2.0×10^{4}	*	-	2.0×10^{4}
Sb-126	*	9.6×10^{6}	*	-	9.6×10^{0}
I-129	*	*	4.7×10^{1}	-	4.7×10^{1}
Cs-137	5.0×10^{6}	5.0×10^{6}	1.8×10^{7}	1.0×10^{8}	1.3×10^{8}
Ce-144	*	9.9×10^{6}	*	-	9.9×10^{6}
Pm-147	*	1.0×10^{6}	*	-	1.0×10^{6}
Sm-151	*	1.4×10^{6}	*	-	1.4×10^{6}
Eu-152	*	1.5×10^{3}	*	-	1.5×10^{3}
Eu-154	*	7.3×10^{4}	*	-	7.3×10^{4}
Eu-155	*	7.4×10^{4}	*	-	7.4×10^{4}
TOTAL	7×10^{6}	72×10^{6}	19×10^{6}	158×10^{6}	250×10^{6}
Actinides:					
U-233	*	4.0×10^{2}	*	-	4.0×10^{2}
U-235	*	1.3×10^{1}	*	-	1.3×10^{1}
U-238	*	3.0×10^{2}	*	-	3.0×10^{2}
Np-237	*	1.0×10^{2}	*	-	1.0×10^{2}
Pu-238	*	4.0×10^{2}	*	-	4.0×10^{2}
Pu-239	*	2.1×10^{4}	*	-	2.1×10^{4}
Pu-240	*	5.2×10^{3}	*	-	5.2×10^{3}
Pu-241	*	6.0×10^{4}	*	-	6.0×10^{4}
Am-241	*	5.0×10^{4}	*	-	5.0×10^{4}
TOTAL		0.14×10^{6}			0.14×10^{6}

*Contains trace quantities of these isotopes.

Note: Daughter nuclides not listed; curie values are for parent nuclide only.

Source: Alternatives for Long-Term Management of Defense High-Level Radioactive Waste--Hanford Reservations. ERDA 77-44, U.S. Energy Research and Development Administration, Richland, Washington, September 1977.

will consist of:

49,100 m^3 (13 million gallons) of damp salt cake,
11,300 m^3 (3 million gallons) of damp sludge, and
22,600 m^3 (6 million gallons) of residual liquid.[19]

The overall composition is given in Table A-13 (with 25% H_2O assumed as in the Hanford case).[22] The total radionuclide content (1985 basis) is given in Table A-14.[22] The split among the three waste forms ought to be similar to that shown in Table A-12. The amount of plutonium in the Savannah River waste is estimated at 225 kg.[21]

The presence of higher proportions of Pu-238 and Cm-244 than at Hanford reflects the results of past programs to make these materials at Savannah River. A part of this effort involved setting up Np-237 extraction facilities, which accounts for the lack of Np-237 in the actinide mix in the waste at Savannah River.

A-4.4 IDAHO WASTE

Much of the acid high-level waste at Idaho has been converted to solid form in a fluid bed calciner. About 11,700 m^3 (3.1 million gallons) of liquid has been converted to granular solids, containing 5.2×10^7 Ci of radioactivity.

The present inventory of high-activity waste includes:

1,500 m^3 (about 0.4 million gallons) of calcine, and
8,700 m^3 (about 2.3 million gallons) of liquid.[23]

The calcine is of two types, as given in Table A-15.[23] For the purposes of this report, about 60% of the calcine is assumed to be non-fluoride. Plutonium content of Idaho waste is estimated at 20 kg.[21]

The liquid waste is about evenly split between the two types shown in Table A-15.[23]

Projection for 1990 calls for 6000 m^3 (1.6 million gal) of liquid and 5400 m^3 (1.4 million gal) of calcine. This would result in a very approximate fission product content of 10^8 Ci, and a plutonium content of 50 kg.[19]

A-4.5 SUMMARY OF GOVERNMENT WASTE QUANTITIES

The preceding section discussed present and projected government waste. Because the government waste originated from many different programs and chemical processing methods, and future waste generation is subject to unpredictable political decisions, a basic reference

TABLE A-13

AVERAGE CHEMICAL COMPOSITION -
SAVANNAH RIVER HIGH-LEVEL WASTE

Chemical	Composition, Wt. (%)
$NaNO_3$	31.6
H_2O	25.0
$NaNO_2$	12.8
$NaAl(OH)_4$	10.0
Na_2SO_4	7.2
Na_2CO_3	5.4
NaOH	5.1
$Fe(OH)_3$	1.3
MnO_2	0.3
$Hg(OH)_2$	0.08
Other	1.2
	100.0

Based on: Alternatives for Long-Term Management of Defense High-Level Radioactive Waste--Savannah River Plant. ERDA 77-42, U.S. Energy Research and Development Administration, September 1977.

TABLE A-14

RADIONUCLIDE CONTENT*
SAVANNAH RIVER HIGH-LEVEL WASTE (1985)

Radionuclide*	Total Activity (Ci)
Fission Products:	
Sr-90	1.3×10^8
Ru-106	1.8×10^6
Cs-137	1.3×10^8
Ce-144	1.1×10^7
Pm-147	4.6×10^7
Sm-151	4.2×10^6
	323×10^6
Actinides:	
Pu-238	6.0×10^5
Pu-239	2.4×10^4
Am-241	6.0×10^4
Cm-244	6.0×10^4
	0.74×10^6

*Daughter nuclides in decay chains are not listed. Curie values are of important nuclides only.

Source: Alternatives for Long-Term Management of Defense High-Level Radioactive Waste--Savannah River Plant. ERDA 77-42, U.S. Energy Research and Development Administration, September 1977.

TABLE A-15

TYPICAL COMPOSITION OF CALCINED SOLIDS
IDAHO CHEMICAL PROCESSING PLANT

	Composition, Wt. (%)	
	Aluminum (Non-fluoride)	Zirconium (Fluoride)
	Waste	Waste
Al_2O_3	85	8
ZrO_2	0	34
HgO	1	0
B_2O_3	0.3	0.9
NaOH	2.4	0.1
Ca as CaF_2	0	54
Fission product and other oxides, fluorides	4.8	0.5
Nitrogen as N_2O_5	4	<1
H_2O	<2	<1
Bulk Density	1,100 kg/m^3	1,600 kg/m^3

Based on: Alternatives for Long-Term Management of High-Level Defense Waste--Idaho Chemical Processing Plant. ERDA 77-43, September 1977.

TABLE A-16

AVERAGE COMPOSITION OF HIGH-LEVEL LIQUID WASTE
IDAHO CHEMICAL PROCESSING PLANT

Component	Composition, Wt. (%)	
	Aluminum Waste	Zirconium Waste
$Al(NO_3)_3$	24.1	--
AlF_3	--	4.1
ZrF_4	--	4.4
$NaNO_3$	0.3	0.02
$Hg(NO_3)_2$	0.3	--
$Ca(NO_3)_2$	--	13.8
H_3BO_3	0.1	0.9
HNO_3	4.5	6.6
H_2O	70.7	70.2
	100.0	100.0
Total Activity:	24 Ci/gal	3 Ci/gal

Based on: Alternatives for Long-Term Management of High-Level Defense Waste--Idaho Chemical Processing Plant. ERDA 77-43, September 1977.

waste case for each plant has been selected, based where possible on knowledge of planned future operations, but assuming no major addition to government waste from new programs. For Hanford, this reference case assumes the 1990 waste projection, including additions from the N-reactor reprocessing. For Savannah River, the reference case is the 1985 SRP projection. For Idaho, the reference case is taken to be the 1990 projection of 5400 m^3 of calcine and 6000 m^3 (1.6 million gal) of liquid waste.[19] Table A-17 presents a summary of the reference government waste quantities.

If it were decided to convert government waste to a glass, the sodium content of the waste at Hanford and at Savannah River would necessitate production of about one million MT of glass (in order to keep the sodium concentration in the glass below 10%), unless the sodium is removed. After removal of the sodium, other non-fission-product components will be limiting, e.g., uranium, especially at Hanford, and iron and aluminum. Therefore, treatment of the waste prior to vitrification in order to remove sodium and possibly uranium, aluminum, and iron can influence the quantity of glass. A cost trade-off is involved in the decision whether to make and dispose of very large quantities of glass or to first remove the sodium (and possibly other interfering constituents) from the waste prior to solidification.

TABLE A-17

SUMMARY OF REFERENCE GOVERNMENT WASTE QUANTITIES

Site	Volumes Thousands of Cubic Meters	Radioactivity, Ci				Wt. (MT)			
		Sr-90 Plus Cs-137	Total FPs	Uranium	TRU	Total FPs	Uranium	TRU	Na Content
Hanford	200	2.4×10^8	2.5×10^8	7.1×10^2	1.4×10^5	60	900	.52	66,000
Savannah River	83	2.6×10^8	3.2×10^8	~ 48	7.4×10^5	57	$\sim$50	.44	30,000
Idaho	11	7.0×10^7	1.0×10^8	~ 2	1.0×10^3	12	~ 2	.05	30
TOTALS	294	5.7×10^8	6.7×10^8	7.6×10^2	8.8×10^5	129	952	1.01	96,000

A-5.0 TOTAL QUANTITIES OF HIGH-LEVEL WASTE

A-5.1 ESTIMATED RANGE OF U.S. INSTALLED NUCLEAR CAPACITY

In order to estimate the total amount of high-level waste that might be produced over the next several decades, it is necessary to consider the long-term outlook for nuclear power growth in the United States--a subject on which there is disagreement. Fortunately, this study need not be precise in developing such forecasts, since the source terms (radioactivity, heat generation) associated with any given quantity of waste can be readily scaled upward or downward to accomodate changes in future patterns of nuclear energy generation. Therefore, the purpose of this section is to estimate approximately a range of future possibilities for domestic use of nuclear energy in the production of electricity and to select a reference case that tends for the sake of conservatism, toward the high side of reasonable estimates. Before presenting these estimates, however, it is worthwhile to summarize briefly current nuclear growth projections.

Recent years have seen a steady reduction in nuclear power growth projections. The Arab oil embargo substantially increased costs of oil and substitute fuels such as coal, causing price resistance by energy consumers, which in turn decreased electric load growth projections. As recently as 1974, the Atomic Energy Commission (AEC) projected installed nuclear capacities of 110 GW in 1980, 220-260 GW in 1985, 400-560 GW in 1990, and 830-1370 GW in 2000.[24] In the National Energy Plan of 1976, nuclear power growth projections estimated 70-76 GW in 1980, 160-185 GW in 1985, 265-340 GW in 1990, and 450-800 GW in 2000.[25] In testimony before a committee of the House of Representatives, President Carter's chief energy advisor, Dr. James Schlesinger, estimated that 380 GW of nuclear capcity will need to be in service by the year 2000; this figure was subsequently reported by Bown and Williamson.[26]

The 380 GW estimate for the year 2000 rests on two expectations: (1) that through conservation, cut-backs, and efficiency gains, the rate of growth in electric power consumption, which in recent decades has averaged 7% annually, will be held to 5% over the next decade, and to 3.5% over the balance of the century; and (2) a doubling of the present level of coal production by 1985.

Several other projections for nuclear power growth provide a frame of reference for estimating future production of high-level waste through the year 2000, given in Figure A-30.

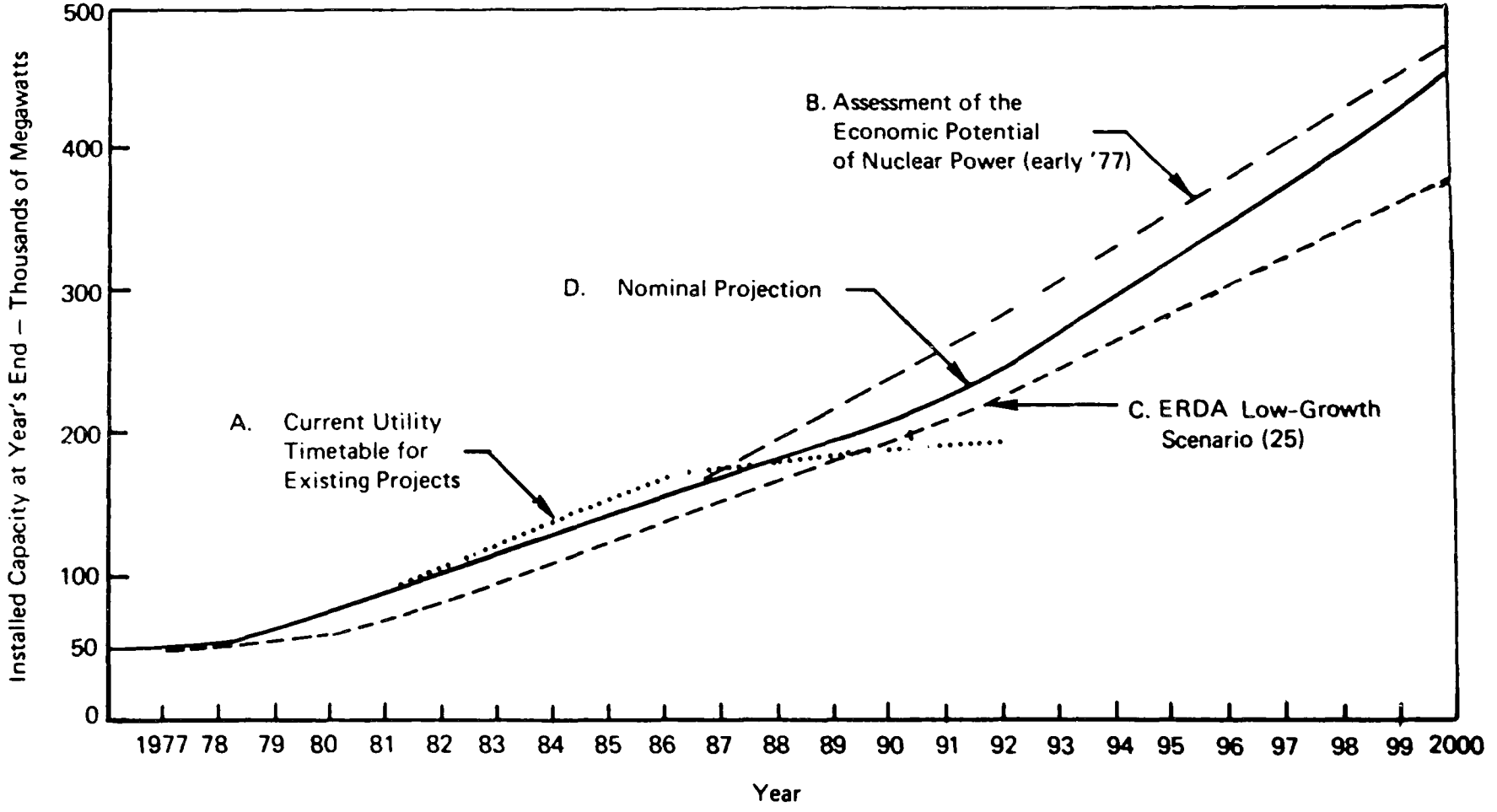

FIGURE A–30 1977 U.S. NUCLEAR POWER PROJECTIONS FOR WASTE MANAGEMENT ANALYSIS

1. Curve A reflects the current utility timetable for bringing into operation all presently-committed nuclear power capacity, except for those projects now earmarked for cancellation. The data plotted here were taken principally from a survey conducted by the staff of the American Nuclear Society.[27] In cases where scheduled changes have been announced since the survey was made, the new dates were used.

2. Curve B reflects an S. M. Stoller Corporation projection (early 1977) of U.S. nuclear power growth if (a) U.S. electrical consumption increases at an average rate of about 4.5% per year over the next several decades and (b) utility decisions in regard to additions to base load generating capacity are made on straight economic grounds. In developing this projection, a region-by-region analysis of utility needs for new base-load additions and of the competitive economics of nuclear power vs. coal was made. This analysis has led to the conclusion that if economics were governing, nuclear power would account for approximately half of estimated base-load additions.

3. Curve C is ERDA's most recent low-growth scenario for nuclear power. As previously noted, Dr. Schlesinger's estimate of 380 GW for the year 2000 lies on this curve.

4. Curve D is the nominal projection for this study, based on three assumptions:

   (a) The actual rate of installation of committed capacity will lag behind the present utility timetable. The observed difference between Curves D and A in the period 1977 through 1986 represents an allowance for further slippage in construction schedules and also for some further project cancellations.

   (b) Over the next several years, little net increase will occur in U.S. utilities' commitments to nuclear power, in part because of current uncertainties concerning nuclear power and in part because of present constraints on utility financing of new capital commitments, whether for nuclear or fossil-fuel plants.

   (c) The rate of new nuclear commitments will eventually rise and follow approximately the same slope as Curve B.

In short, installed nuclear capacity may be in the neighborhood of 450 GW by the end of this century, approximately 20% higher than in the lowest ERDA scenario (Curve C). This would appear to meet the criterion of an estimate which is reasonable but tending toward the high (conservative) side for purposes of waste projections.

Growth beyond the year 2000 will be at a rate that depends upon the overall growth in consumption of electric energy, as well as upon the availability of suitable alternative forms of energy. Projection of these parameters becomes ever more speculative as one looks beyond the turn of the century.

Recognizing the uncertainties associated with all long-term projections of nuclear energy generation, it seems reasonable to use a figure of 700 GW of LWR plant capacity for the time period through approximately the year 2010 as a basis for assessing LWR high-level waste generation.

A population of 700 GW of LWRs represents a reasonable benchmark for the purpose of carrying out risk studies on radioactive waste disposal. If the breeder reactor is developed and exploited in the United States over a period of at least several decades, projected quantities of radioactive waste would be changed. The nature of the change would depend on whether breeders were built in addition to the assumed LWR population or as a substitute for later LWRs. In any event, given today's (1977) climate on the use of plutonium in the nuclear fuel cycle, it is pointless to speculate on the future prospects and timing for breeder reactors. As pointed out in other sections of this report, the HLW source term characterization is, qualitatively, primarily a function of the intensity of nuclear energy generation, i.e., the amount of uranium and plutonium actually fissioned per ton of fuel charged, rather than of the reactor type or fuel cycle employed. Hence, an LWR economy has been used as the framework for developing estimates of potential radioactive waste production.

A-5.2 HIGH-LEVEL WASTE FROM U.S. COMMERCIAL NUCLEAR POWER PLANTS

Section A-3.0 discusses the characteristics of high-level waste (either from a reprocessing plant or contained in spent fuel) on a specific basis for the LWR fuel cycle -- i.e., per unit of energy generated or per unit-mass of charged fuel. In order to obtain the total quantity of waste associated with any given level of LWR nuclear capacity, the following equation may be used:

$$\text{(Total quantity of waste)} = \text{(capacity in GW)} \times \text{(lifetime production of waste per GW)}$$

Quantities of waste can be specified in arbitrary units; this report uses metric tons of heavy metal (MTHM) charged to the reactor, a unit that is nearly equal to an MTHM discharged from the reactor.

Based on 26 MT/GW-yr, the total quantity of spent fuel produced by 700 GW of nuclear capacity over 30 years would be 5.5×10^5 MTHM. The corresponding waste quantities (throwaway cycle) are 1.87×10^{10}g fission products (FP) and 5.36×10^9g TRU. The specific quantities per unit of energy generation are 8.9×10^5g FP/GW-yr, and 2.55×10^5g TRU/GW-yr.

Figure A-1 shows the cumulative buildup of spent fuel, fission products, and TRU content of spent fuel for the nominal growth projection. It is generally believed that waste from spent fuel will be at least ten years old before disposal. The waste quantities are keyed to this ten-year-old fuel with the assumption that it would be disposed of as spent fuel, the worst case from the standpoint of TRU content.

A-5.3 POTENTIAL TRANSFER OF FOREIGN HIGH-LEVEL WASTE TO THE UNITED STATES

One of the cornerstones of current U.S. non-proliferation nuclear fuel strategy is that nations having access to recycle technology ("have" countries) would guarantee adequate supplies of enriched uranium to countries without recycle capacity ("have-not" countries), provided that such "have-not" countries agree to forego reprocessing and to return spent fuel to some form of national or international control. This approach raises questions about the ultimate fate of radioactive waste from spent fuel returned to a supplier country -- e.g., the United States -- or to some repository or reprocessing center under international control, but located in one of the "have" countries.

Indeed, it has been suggested that countries like the United States, with substantial uranium resources, enrichment capability, and recycle capability, might serve as repositories for collection, storage, and ultimately, perhaps, reprocessing of spent fuel from other nations. Under those conditions, would the United States also end up as the repository for the radioactive waste from these foreign fuels? The answer to this question depends to a great extent on the quantity of foreign waste materials. Review of projected nuclear power growth in the non-communist world over the next 25 years performed by the Organization for Economic Cooperation and Development (OECD), ERDA, and other agencies indicates that most of this growth is concentrated in the developed countries -- primarily the United States, Canada, Japan and the countries of Western Europe.[28] Most of these countries either now have or ultimately plan to have fuel storage and/or reprocessing facilities. The projected amount of growth through the year 2000 in "have-not" countries is less than 20% of the total and would represent well under 20% of the total installed nuclear capacity. (Even this fraction may be an overstatement in the context of the current thrust of U.S. non-proliferation policies, as well as the financing difficulties associated with nuclear projects.) If spent fuel and/or radioactive waste from "have-not" countries is shared in some reasonable way among the various "have" countries, the burden could be considered relatively modest compared with

the projected radioactive waste burden from domestic nuclear plants. Whether it would be so viewed is not clear at this time. Substantial importation of foreign waste could encounter serious political opposition in the United States and probably in other countries as well.

In any case, the quantities are not likely to be more than a modest fraction of existing and projected government and commercial U.S. waste. Disposal strategies and technologies for this foreign waste would certainly be similar or identical to those for domestic waste.

A-5.4 ADDITIONAL WASTE FROM U.S. GOVERNMENT PROGRAMS

The characteristics of waste from government sources in the United States have been described in Section A-4.0. Some of the important properties of government waste were summarized in Table A-17. The summary presented in Section A-2 shows that the fission product activity of government waste is modest compared with that projected for commercial waste through the year 2000. Transuranic content of government waste is inherently low, for a number of reasons. The form of government waste will greatly complicate conversion to vitrified form in reasonable volumes. (See Section A-4.)

A-5.5 GENERAL PROCESS TRASH TRU-CONTAMINATED WASTE

There are currently an estimated 33,000 m^3 of low-specific activity TRU-contaminated waste at ERDA sites, with a total plutonium content in excess of 200 kg.[29] This waste is subject to an existing requirement (ERDA Manual Chapter 0511) for special handling.

For commercial wastes, proposed regulations (39 FR 32921, published 9/12/74) would require that non-high-level waste contaminated to greater than 10 nCi/g in transuranics be treated at the point of origin in a manner substantially identical to HLW (solidify, package, and transfer to a Federal repository). The regulations are not clear whether geologic disposal would be required, but that appears to be the intent of current disposal programs.

The commercial power reactor throwaway fuel cycle would generate little low-specific-activity TRU-contaminated waste, because spent fuel would not be reprocessed and plutonium would not be recycled. For the recycle options, as indicated previously, the Pu content of this TRU waste may amount to 2-7 kg/GW-yr, depending upon the mix of UO_2 and mixed-oxide assemblies being reprocessed. Volumes, curies, and heat content per unit of energy production are shown in Table A-18.

Low-specific-activity general process trash waste represents a potential TRU source less than a tenth of the TRU source in high-level waste. Furthermore, the TRU waste is in much less concentrated form. It should also be pointed out that, per unit weight, the radiotoxicity

TABLE A-18

LOW/INTERMEDIATE LEVEL TRU WASTE CURIE AND HEAT CONTENT
(per GW-yr)

	Range of Volume (m^3)	Pu g/m^3	Ci/m^3	W/m^3
Full Recycle (Uranium and Plutonium)*				
Uncompacted	37-384	73-7	730-70	22-2
Minimum compaction	163	17	170	5
Maximum compaction	48	56	560	17
Uranium recycle only				
Uncompacted	29-108	93-26	930-260	28-8
Minimum compaction	74	36	360	11
Maximum compaction	21	129	1290	39

*Data assume processing of early generation Pu recycle assemblies. This results, in the full recycle case, in somewhat lower values than used for reference in the discussion in Section A-2.

for TRU waste is significantly lower than for HLW because the latter has a much higher content of transplutonium elements. Indded, the UDI for total trash TRU waste per metric ton of spent fuel never exceeds the UDI for the natural uranium ore used to make the fuel.

A more extensive discussion is presented in Appendix V.

A-5.6 SUMMARY QUANTITIES AND SOURCE TERMS

The estimated range of annual commercial waste disposal requirements in the years 2000 and 2010 are presented in Tables A-1 and A-2, respectively. The estimated combined cumulative commercial and government waste burden circa 2010 is indicated in Table A-3.

TABLE A-1

ESTIMATED RANGE OF ANNUAL DISPOSAL REQUIREMENTS FOR COMMERCIAL WASTE*
(CIRCA 2000)

Category of Waste	High-Level Waste				Other Associated Waste		
	Spent Fuel (MTHM)	Total Radioactivity (Ci)	Fission Products (MT)	TRU (MT)	Iodine-129 (Ci)	Carbon-14+ (Ci)	Miscellaneous‡ (Ci)
1. Commercial Waste (throwaway fuel cycle)							
Range	$9.7\text{-}12.2 \times 10^3$	$4\text{-}5 \times 10^9$	340-430	97-122	(Contained in Spent Fuel)		
Reference	11.5×10^3	5×10^9	400	115			
2. Commercial Waste (from reprocessing of mixed-oxide recycle fuel cycle assemblies)							
Range	$9.7\text{-}12.2 \times 10^3$	$3.1\text{-}3.9 \times 10^9$	280-350	21-26	400-500	$4.4\text{-}5.6 \times 10^3$	$2.9\text{-}3.7 \times 10^7$
Reference	11.5×10^3	3.6×10^9	330	25	500	5.2×10^3	3.5×10^7

Note: Assumes 26 MTHM/GW-yr.

*Commercial quantities based on range of installed nuclear capacity of 380 GW - 480 GW in 2000, (450 GW reference) for ten-year-old waste.

+Based on 10-20 ppm N-14 initially in fuel.

‡"Miscellaneous" consists of: Fuel assembly structure and cladding activation products, plus entrapped fission products and actinides in the cladding.

TABLE A-2

ESTIMATED ANNUAL DISPOSAL REQUIREMENTS FOR COMMERCIAL WASTE, YEAR 2010*

		High-Level Waste				Other Associated Waste		
	Category of Waste	Spent Fuel (MTHM)	Total Radioactivity (Ci)	Fission Products (MT)	TRU (MT)	Iodine-129 (Ci)	Carbon-14+ (Ci)	Miscellaneous‡ (Ci)
1.	Commercial Waste (throwaway fuel cycle)	17.8×10^3	7×10^9	625	180	(Contained in Spent Fuel)		
2.	Commercial Waste (from reprocessing of mixed-oxide recycle fuel cycle assemblies)	17.8×10^3	5.6×10^9	515	38	700	8.1×10^3	5.4×10^7

Note: Assumes 26 MTHM/GW-yr.

*Commercial quantities based on reference case installed nuclear capacity of 700 GW with 10-year aging period assumed prior to reprocessing and/or disposal.

+Based on 10-20 ppm N-14 initially in fuel.

‡"Miscellaneous" consists of: Fuel assembly structure and cladding activation products, plus entrapped fission products and actinides in the cladding.

TABLE A-3

ESTIMATED TOTAL DOMESTIC HIGH-LEVEL WASTE BURDEN*

Category of Waste	High-Level Waste				Other Associated Waste		
	Spent Fuel (MTHM)	Total Radioactivity (Ci)	Fission Products (MT)	TRU (MT)	Iodine-129 (Ci)	Carbon-14+ (Ci)	Miscellaneous‡ (Ci)
1a. Commercial Waste (throwaway fuel cycle)	5.5×10^5	2.3×10^{11}	19,000	5,400	(Contained in Spent Fuel)		
1b. Commercial Waste (from reprocessing of mixed oxide recycle fuel cycle assemblies)	5.4×10^5	1.8×10^{11}	16,000	1,200	2.3×10^4	2.5×10^5	1.6×10^9
2. Waste from Government* Programs	-	6.7×10^8	130	1.0	-	-	-

*Quantities of commercial waste based on lifetime production for reference nuclear capacity in the year 2010 (700 GW) keyed to LWR generation. Data are for 10-year-old waste . Quantities and characteristics of government waste keyed to existing inventory in the late 1980's - early 1990's.

+Based on 10-20 ppm N-14 initially in fuel.

‡"Miscellaneous" consists of: Fuel assembly structure and cladding activation products, plus entrapped fission products and actinides in the cladding.

Note: For projections (p) of total LWR capacity other than 700 GW in the year 2010, approximate values may be obtained from the ratio $\frac{p}{700}$ times the values on the table.

A-6.0 LIMITS TO THE ANALYSIS (ACCURACY OF CALCULATIONS)

A-6.1 REFERENCE CASES - LWR

As noted in Section A-3.2, ORNL has compared ORIGEN results with measurements on PWR fuel.[3,5,6,7] It appears that ORIGEN overpredicts radioactivity of those fission products measured. The overpredictions range from several percent to about one hundred percent (i.e., a factor of 2 high). For the actinides, ORIGEN underpredicts Pu-238 by approximately 20%, predicts Pu-239 and -240 approximately correctly, overpredicts Am-241 by approximately 150-350%, and underpredicts Cm-242 by approximately 35%. ORNL Chemical Technology Division indicates that an error was uncovered in the reduction of experimental data, which, when corrected, will improve the agreement of measured data with ORIGEN, particularly for the fission products. ORNL believes that even with the correction, not too much weight should be placed on the magnitude of the difference because the multichannel analyses used to obtain the measured data (Ci/MTU) are not very accurate. There are some deficiencies in the ORIGEN treatment of the higher actinides (Am and Cm), even with the revised cross sections, since accurate mass analysis yields a significantly different isotopic makeup of these two elements than that calculated by ORIGEN.

Under the assumption that the differences found by ORNL between ORIGEN predictions of actinide concentrations and actual measurements are real and about the right order of magnitude, an evaluation was made in order to determine the impact of the inadequacies of the calculations with respect to heat rate, and UDI. (The impact of actinide misprediction on gamma dose rate would be insignificant, because actinides are primarily alpha emitters; the gamma dose is determined by the fission products for several hundred years.)

The ORIGEN "mispredictions" concerning the Am isotopes lead to conservative values of the heat generation rate and UDI up to the decay time when they become unimportant. The underprediction of Pu-238 and Cm-242, however, will have an adverse effect on some of the source terms. Underprediction of Pu-238 will have a somewhat adverse effect on prediction of actinide thermal power for several hundred years; e.g., at 100-year decay time there would be an underprediction of actinide thermal power of approximately 4%. Pu-238 is a major contributor to the Pu UDI (approximately 40-50%) for several hundred years. Therefore, a 20% underprediction in Pu-238 could lead to an underestimate of the Pu UDI by approximately 10%. This underprediction is relatively unimportant, except in the unlikely event that Pu leaches at a very much higher rate than other waste elements. Except for the throwaway cycle, Pu is not the controlling actinide element from the viewpoint of radiotoxicity for the first several hundred years; within this time range, the total actinide radiotoxicity is at least an order of magnitude lower than the total radiotoxicity from fission products.

In the case of the underprediction of Cm-242, the major impact is in relation to ingestion radiotoxocity at decay times longer than 10,000 years. The key contributor to the ingestion radiotoxicity at these long decay times is Ra-226, which is produced via several alpha decays of U-234 and Cm-242: Cm-242 via two alpha decays produces U-234, which via two additional alpha decays, produces Ra-226. In reprocessed waste with a low uranium content (high degree of uranium removal) Cm-242 is the primary source of Ra-226. Therefore, for reprocessed waste, a 35% underprediction of Cm-242 would produce nearly a 35% underprediction of the Ra-226 radiotoxicity. In the throwaway cycle case, the impact of the Cm-242 underprediction is small with the Ra-226 concentration controlled primarily by decay of U-234. Nevertheless, in the reprocessed-waste case, even when the Ra-226 UDI is increased by more than 35%, the total ingestion radiotoxicity is still substantially below that of the natural uranium are used to make the equivalent UO_2 fuel. Although it is true that Cm controls the total actinide ingestion radiotoxicity for the first several hundred years in the reprocessed-waste cases, again the actinide radiotoxicity in this decay time range is at least an order of magnitude lower than the fission product radiotoxicity.

In summary, it appears that ORIGEN calculations produce conservative (higher) values than actual measurements for fission product sources. In the case of actinides, ORIGEN may underpredict Pu-238 and Cm-242. Nevertheless, the impact of these underpredictions appears relatively unimportant.

A-6.2 OTHER FUEL CYCLES

A-6.2.1 Tandem Cycle

The actinide source terms from the tandem cycle analysis are subject to more uncertainty than those from the reference cases. The method of treating the fission product contributions, as described previously, is reasonably accurate (primarily burnup-dependent and spectrum-independent).

A-6.2.2 Thorium Cycle

The ORIGEN thorium cycle fission product contributions are probably somewhat less accurate than the reference cases, primarily because the fissile mix as evaluated by ORIGEN with depletion is somewhat different than if computed by more exact methods. In addition, although ORIGEN does treat U-233 fission yields, there might be more uncertainty in this yield data than equivalent data for U-235 fissions.

The actinide treatment is reasonable; what helps the situation in the thorium cycle is that the TRU actinide concentrations are low compared with UO_2/MO_2 cycles, so errors in the cross sections associated with these isotopes are relatively unimportant.

REFERENCES

1. Bell, M.J. ORIGEN, the ORNL Isotope Generation and Depletion Code. ORNL - 4628, Oak Ridge National Laboratory, May 1973. Revised by S. M. Stoller Corporation, June 1977. The revision consists of the updated actinide cross-sections for UO_2 and MO_2 fuels as developed by ORNL and obtained at ORNL, A. Croff, May 1977.

2. Benedict, M. and T. Pigford, Nuclear Chemical Engineering. McGraw-Hill Book Co., N.Y., 1957.

3. LWR Fuel Reprocessing and Recycle Program Quarterly Report for Period October 1 to December 31, 1976. ORNL/TM - 5760, Oak Ridge National Laboratory, 1976.

4. Davis, W., Jr., Carbon-14 Production In Nuclear Reactors. ORNL NUREG/TM-12, 1977.

5. LWR Fuel Reprocessing and Recycle Program Quarterly Report for Period January 1 to March 31, 1976. ORNL/TM - 5447. Oak Ridge National Laboratory, 1976.

6. LWR Fuel Reprocessing and Recycle Program Quarterly Report for Period April 1 to June 30, 1976. ORNL/TM - 5647, Oak Ridge National Laboratory, 1976.

7. LWR Fuel Reprocessing and Recycle Program Quarterly Report for Period July 1 to September 30, 1976. ORNL/TM - 5660, Oak Ridge National Laboratory, 1976.

8. Significant Actinide Activities in the LWR and LMFBR Nuclear Fuel Cycles. EPA-520/3-75-006, October 1974.

9. North, E.D., Solid Waste Generation in Reprocessing Nuclear Fuel. In: Radioactive Wastes from the Nuclear Fuel Cycle, AIChE Symposium Series 154:72, 1976.

10. Barnwell Nuclear Fuel Plant Separations Facility Final Safety Analysis Report. Allied General Nuclear Services, 1974.

11. Blomeke, J.O., et al. Projections of Radioactive Wastes to be Generated by the U. S. Nuclear Power Industry, ORNL/TM - 3965, Oak Ridge National Laboratory, 1974.

12. Chart of Nuclides, Knolls Atomic Power Laboratory. 11th ed., Revised to April 1972. Schenectady, N.Y.

13. Rosholt, J.N., B.R. Doe, and M. Tatsumoto. Evaluation of the Isotopic Composition of Uranium and Thorium in Soil Profiles. U. S. Geological Survey. Geo. Soc. Amer. Bulletin, 77:987-1004, September 1966.

14. Frankel, A.J. and N.L. Shapiro. Appraisal of PWR-HWR Tandem Fuel Cycles. NPSD - 45, February 1977.

15. Shapiro, N. L.,J. R. Rec, and R. A. Matzie. Assessment of Thorium Fuel Cycles in Pressurized Water Reactors. EPRI NP-359, February 1977.

16. High-Level Radioactive Waste Management Alternatives. Vol. 1 BNWL-1900, Battelle Pacific Northwest Laboratories, Richland, Washington, May 1974.

17. Environmental Statement, Light Water Breeder Reactor Program. Vol. IV. ERDA-1541, U. S. Energy Research and Development Administration, July 1975.

18. Alternatives for Managing Wastes from Reactors and Post-Fission Operations in the LWR Fuel Cycle. ERDA 76-43, UC-70, U. S. Energy Research and Development Administration, May 1976.

19. Crandall, J. L. and H. J. Clark, ed. Integrated High-Level Waste Immobilization Plans (Draft). Coordinated by Savannah River Laboratory.

20. Alternatives for Long-Term Management of Defense High-Level Radioactive Waste--Hanford Reservations, Richland, Washington. ERDA 77-44, U. S. Energy Research and Development Administration, September 1977.*

21. Lieberman, J. A. et al. High-Level Waste Management (Testimony prepared for presentation before the California Energy Commission). March 1977.

22. Alternatives for Long-Term Management of Defense High-Level Radioactive Waste--Savannah River Plant. ERDA 77-42, U. S. Energy Research and Development Administration, September 1977.*

23. Alternatives for Long-Term Management of Defense High-Level Radioactive Waste--Idaho Chemical Processing Plant, Idaho Falls, Idaho. ERDA 77-43, U.S. Energy Research and Development Administration, September 1977.*

24. Nuclear Power Growth 1974-2000. WASH 1139, U. S. Atomic Energy Commission, February 1974.

25. A National Plan for Energy Research, Development and Demonstration: Creating Energy Choices for the Future. ERDA 76-1, U. S. Energy Research and Development Administration, April 15, 1976.

* Inserted subsequent to preparation of the draft report.

26. Bown, R. W. and R. H. Williamson. Domestic Uranium Requirements. Policy and Evaluation Division, U. S. Dept. of Energy. Paper presented at Uranium Industry Seminar, Grand Junction, Colorado, October 26, 1977.*

27. Nuclear News Buyers Guide. 20:(3), mid-February 1977.

28. Raudenbush, M., W. Krebs et al. Nuclear Waste Management Options for Environmentally Sound International Solutions. Prepared by S. M. Stoller Corp. and Arthur D. Little, Inc., for U.S. Dept. of State, May 1, 1978.*

29. Daly, G. H. and O. P. Gormley. Handling, Storage, and Disposition of Solid Low Level Waste. In: Radioactive Wastes from the Nuclear Fuel Cycle. AIChE Symposium Series 154:72, 1976.

*Inserted subsequent to preparation of the draft report.

APPENDIX A-I

GLOSSARY AND LIST OF ABBREVIATIONS

GLOSSARY*

Actinides: A series of elements in the periodic table, beginning with actinium (element No. 89) and continuing through lawrencium (element No. 103). The series includes uranium (element No. 92) and all of the man-made transuranium elements. All the actinides are radioactive.

Activation product: Radioactive isotope formed by a neutron capture reaction.

Alpha particle: A positively charged particle emitted by certain radioactive materials. It is made up of two neutrons and two protons bound together. It is the least penetrating of the three common types of radiation (alpha, beta, gamma) emitted by radioactive material, being stopped by a sheet of paper. It is dangerous to plants, animals, or man only if the alpha-emitting substance has entered the body.

Background radiation: The radiation in man's natural environment, including cosmic rays and radiation from the naturally radioactive elements, both outside and inside the bodies of men and animals. It is also called natural radiation.

Beta radiation: See Decay, radioactive.

Boiling water reactor (BWR): A type of nuclear power reactor that employs ordinary water (H_2O) as coolant and moderator and allows bulk boiling in the core so that steam is generated in the primary reactor vessel.

Breeder reactor: A reactor that produces fissionable fuel as well as consuming it, especially one that creates more than it consumes. The new fissionable material is created by capture (in "fertile" materials) of neutrons from fission. The process by which this occurs is known as breeding.

Burnup: The thermal energy produced per quantity of nuclear fuel, usually expressed as megawatt-days per metric ton.

Burnup perturbations: Changes in the nuclear fuel as the result of alternative burnups.

Calcine: The solid product of a roasting treatment under oxidizing conditions.

Chopper: Device for cutting spent fuel elements into smaller lengths.

Cladding: The outer jacket of nuclear fuel elements. It prevents corrosion of the fuel and the release of fission products into the coolant. Stainless steel and zirconium alloys are common cladding materials. Synonym: hull.

*These definitions are intended to provide guidance for this study and are not to be construed as having been supplied or adopted by EPA.

Curie: The basic unit to describe the intensity of radioactivity in a material. The curie is equal to 37 billion disintegrations per second, which is approximately the rate of decay of 1 gram of radium. A curie is also a quantity of any nuclide having 1 curie of radioactivity. Named for Marie and Pierre Curie, who discovered radium in 1898. The prefixes milli-, micro- and nano- are frequently used and indicate quantities of 10^{-3} curie, 10^{-6} curie and 10^{-9} curie, respectively.

Daughter: The nuclide remaining after the radioactive decay of an atomic nucleus.

Decay heat: The energy released when radioactive nuclides change to their daughter nuclides.

Decay, radioactive: The spontaneous transformation of one nuclide into a different nuclide (or into a different energy state of the same nuclide). The process results in a decrease, with time, of the number of the original radioactive atoms in a sample. It involves the emission from the nucleus of alpha particles, beta particles (electrons) or gamma rays (electromagnetic radiation); or the nuclear capture or ejection of orbital electrons. Also called radioactive disintegration.

Decontamination factor: The ratio of the amount of a given type of radioactive material entering a process (or process step) to that which leaves the process (or process step).

Disposal: Isolating the radioactive waste permanently in a form and manner with no intent to retrieve it.

Element: One of the 103 known chemical substances that cannot be divided into simpler substances by chemical means. A substance whose atoms all have the same atomic number. Examples: hydrogen, lead, uranium. (Not to be confused with fuel element.)

Fertile material: Material in which fissile isotopes can be produced by neutron capture.

Fertile nuclide: A nuclide capable of being transformed, directly or indirectly, into a fissile nuclide by neutron capture.

Fissile nuclide: A nuclide capable of undergoing fission by interaction with slow neutrons.

Fission: The splitting of a heavy nucleus into two approximately equal parts (which are nuclei of lighter elements), accompanied by the release of a relatively large amount of energy and generally two or more neutrons. Fission can occur spontaneously, but usually is caused by nuclear absorption of neutrons.

Fission products: The nuclei (fission fragments) formed by the fission of heavy elements, plus the nuclides formed by the fission fragments' radioactive decay.

Fractionization: For the purpose of this document, fractionization refers to separation of the cesium and strontium components of the waste for separate storage.

Fuel: Fissionable material used or usable to produce energy in a reactor. Also applied to a mixture, such as natural uranium, in which only part of the atoms are readily fissionable, if the mixture can be made to sustain a chain reaction.

Fuel assembly: A unit containing clad pieces of nuclear fuel for insertion into the core of a nuclear reactor. An integral part of the fuel element is the cladding provided to protect the fuel from corrosion by the reactor coolant and to contain the fission products formed during irradiation.

Fuel bundle: Same as Fuel assembly (q.v.).

Fuel cycle: The series of steps involved in supplying fuel for nuclear power reactors. It includes mining, refining, the original fabrication of fuel elements, their use in a reactor, chemical processing to recover the fissionable material remaining in the spent fuel, re-enrichment of the fuel material, and refabrication into new fuel elements.

Fuel element: Same as Fuel assembly (q.v.).

Fuel reprocessing: The processing of reactor fuel to recover the unused fertile and fissile material.

Fuel rod: A tube containing UO_2 or mixed oxide fuel; part of a fuel assembly.

Gamma radiation: See Decay, radioactive.

Glassification: Incorporation into glass.

Half-life: The time in which half the atoms of a particular radioactive substance disintegrate to another nuclear form. Measured half-lives vary from millionths of a second to billions of years.

Half-life effective: The time required for a radionuclide contained in a biological system, such as a man or an animal to reduce its activity by half as a combined result of radioactive decay and biological elimination.

High-level waste: The highly radioactive waste resulting from the reprocessing of spent fuel to separate uranium and plutonium from the fission products. The term includes the high-level liquid wastes (HLLW) produced directly in reprocessing, and the solid high-level wastes (HLW) which can be made therefrom.

Hull: Fuel assembly structure (q.v.) and cladding (q.v.).

Ion: An atom or molecule that has lost or gained one or more electrons. By this ionization it becomes electrically charged. Examples: an alpha particle, which is a helium atom minus two electrons; a proton, which is a hydrogen atom minus its electron.

Isotope: One of two or more atoms with the same atomic number (the same chemical element) but with different atomic weights. Isotopes have very nearly the same chemical properties, but different nuclear (radioactive-decay) properties. Thus, for the element carbon, for example, the isotope of atomic weight 12 (C-12) and the isotope of atomic weight 14 (C-14) behave identically in chemical reactions; but whereas C-12 is not radioactive, C-14 is radioactive, decaying with a 5730-year half-life to stable nitrogen (N-14) with release of a beta particle.

Leaching: Extracting material from a solid by contacting it with water or with a solution.

Light water reactor: A reactor in which ordinary water (H_2O) is used as the coolant and moderator. In such reactors the water is either allowed to boil (boiling water reactor or BWR) or pressurized to prevent boiling (pressurized water reactor or PWR).

Loading: Amount of waste contained per unit of volume.

Low-level waste: Waste containing types and concentrations of radioactivity such that shielding to prevent personnel exposure is not required.

Millibarn: 10^{-27} square centimeter.

Mixed-oxide fuel cycle: A fuel cycle (q.v.) in which fuel containing both uranium oxide and plutonium oxide is fed to the reactor. Such a cycle requires reprocessing of spent fuel to recover the residual uranium and the plutonium for fabrication of fuel elements.

Natural uranium: Uranium as found in nature, containing 0.7% of U-235, 99.3% of U-238, and a trace of U-234. It is also called normal uranium.

Neutron: An uncharged elementary particle that has a mass nearly equal to that of the proton and is present in all known atomic nuclei except the hydrogen nucleus.

Nuclide: A general term applicable to all atomic forms of the elements. The term is often used erroneously as a synonym for "isotope," which properly has a more limited definition. Whereas isotopes are the various forms of a single element (hence are a family of nuclides) and all have the same atomic number and number of protons, nuclides comprise all the isotopic forms of all the elements.

Off-gas: The gas given off in any process step.

Plutonium: A heavy, radioactive, man-made metallic element with atomic number 94. Its most important isotope is fissionable plutonium-239, produced by neutron irradiation of uranium-238. It is used for reactor fuel and in weapons.

Pressurized water reactor (PWR): A type of power reactor that employs ordinary water (H_2O) as coolant and moderator and is pressurized to keep the exit coolant stream from boiling.

Rad: A measure, applicable to any form of ionizing radiation, of actual energy absorption, being defined as the amount of energy imparted to matter by ionizing radiation per unit mass of irradiated material at the place of interest. One rad corresponds to the absorption of 100 ergs of energy per gram (100 ergs = 6.24×10^7 million electron volts, Mev). In interpreting standards of radiation protection, it is generally permissible to consider 1-roentgen exposure to gamma or x-rays as roughly equivalent to a dose of 1 rad in soft tissue.

Radiation: The emission and propagation of energy through matter or space by means of electromagnetic disturbances which display both wave-like and particle-like behavior; in this context, the "particles" are known as photons. Also, the energy so propagated. The term has been extended to include streams of fast-moving particles (alpha and beta particles, free neutrons, cosmic radiation, etc.). Nuclear radiation is that emitted from atomic nuclei in various nuclear reactions, including alpha, beta, and gamma radiation and neutrons.

Radioactivity: The spontaneous decay or disintegration of an unstable atomic nucleus, usually accompanied by the emission of ionizing radiation.

Radioisotope: A radioactive isotope. An unstable isotope of an element that decays or disintegrates spontaneously, emitting radiation. More than 1300 natural and artificial radioisotopes have been identified.

Radionuclide: A radioactive nuclide. Thus, carbon-14 (C-14) is a radionuclide because it decays radioactively to nitrogen-14 (N-14).

Radwaste: A contraction of the term "radioactive waste."

Recycle: The returning of uranium and plutonium (recovered in spent fuel reprocessing) for reuse in new reactor fuel elements.

Rem: A dose unit which takes into account the relative biological effectiveness (RBE) of the radiation. The rem ("roentgen equivalent man") is defined as the dose of a particular type of radiation required to produce the same biological effect as one roentgen of (0.25 Mev) gamma radiation. A 1-rad dose of alpha particles is approximately equivalent in its biological effects to 10 rads of gamma radiation, and hence may be expressed as 10 rems. A millirem (mrem) is one thousandth of a rem.

Roentgen (R): A measure of the ability of gamma or X rays to produce ionization in air. One roentgen corresponds to the absorption of about 86 ergs (100 ergs = 6.24×10^7 million electron volts, Mev) of energy from X- or gamma radiation, per gram of air. The corresponding absorption of energy in tissue may be from one-half to two times as great, depending on the energy of the radiation and the chemical composition of the tissue. The roentgen is thus more useful as a measure of the amount of gamma or X rays to which one is exposed than as a measure of the dose of such radiation actually received.

Salt cake: The solid residue resulting from a concentration of high-level liquid waste in underground waste storage tanks.

Spent fuel: Fuel after its use in a nuclear reactor. It then contains fission products, activation products and actinides, many of which are radioactive. Synonym: irradiated fuel.

Structure: All parts of a fuel assembly, except for fuel and cladding.

Thorium: A naturally radioactive element with atomic number 90 and, as found in nature, an atomic weight of approximately 232. The fertile thorium 232 isotope is abundant and can be transmuted to fissile uranium 233 by neutron irradiation.

Throwaway fuel cycle: One in which the spent fuel is disposed of directly rather than reprocessed.

Transplutonic elements: Elements with mass number greater than 94. They include americium and curium.

Transuranic elements: Elements with atomic numbers greater than 92. They include neptunium, plutonium, americium, curium, and others.

Transuranic waste: Any waste material measured or assumed to contain more than a specified concentration of transuranic elements.

Tritium: A radioactive isotope of hydrogen, of atomic weight 3. Tritium (H-3) has a half-life of 12.3 years.

Untreated Dilution Index: The volumetric quantity of water, or air, required to dilute a quantity of radionuclides to the concentration specified under the Standards for Protection Against Radiation in non-occupational exposure, published in the Code of Federal Regulations (10 CFR 20, Appendix B) and given in Table 2 of Appendix A-III of this report. The untreated dilution index gives a gross indication of the comparative risks of radionuclides, were these nuclides actually released to the environment. UDI does not consider waste disposal methods (packaging or geologic isolation), or their resultant environmental pathways to man.

Uranium: A radioactive element with the atomic number 92 and, as found in natural ores, an average atomic weight of approximately 238. The two principal natural isotopes are uranium-235 (0.7% of natural uranium) which is fissionable, and uranium-238 (99.3% of natural uranium) which is fertile. Natural uranium also includes a minute amount of uranium-234. Uranium is the basic raw material of nuclear energy.

Waste, radioactive: Equipment and materials (from nuclear operations) that are radioactive and for which there is no further use.

ABBREVIATIONS

AEC	Atomic Energy Commission
BNWL	Battelle Northwest Laboratories
BWR	Boiling Water Reactor
CANDU	Canadian Deuterium (Heavy Water) Reactor
ERDA	Energy Research and Development Administration
EPA	Environmental Protection Agency
FP	Fission Product
HLW	High-Level Waste (Solid)
HM	Heavy Metal (Uranium and Plutonium)
HTGR	High Temperature Gas-Cooled Reactor
HWR	Heavy Water Reactor
IAEA	International Atomic Energy Agency
LMFBR	Liquid Metal Fast Breeder Reactor
LWR	Light Water Reactor
MTHM	Metric Ton of Heavy Metal
MTU	Metric Ton of Uranium
NRC	Nuclear Regulatory Commission
ORNL	Oak Ridge National Laboratory
PWR	Pressurized Water Reactor
TRU	Transuranic
UDI	Untreated Dilution Index

Ci	Curie
GW	Gigawatts (electrical) (1 GW = 10^6 kW)
GW-yr	Gigawatt-year (electrical)
kg	kilogram
kW	kilowatt
MW	Megawatt (electrical)
MW_t	Megawatt (thermal)
m	Meter
mCi	Millicurie
MCi	Megacurie
μCi	Microcurie
mR	milliRoentgen
mrem	millirem
MT	Metric ton
nCi	Nanocurie

APPENDIX A-II

PERTINENT NUCLEAR TECHNOLOGY AND SOURCES OF RADIOACTIVITY

APPENDIX A-II

PERTINENT NUCLEAR TECHNOLOGY AND SOURCES OF RADIOACTIVITY

High-level radioactive waste management is concerned with containing radioactivity and its effects. This Appendix presents some background information on pertinent aspects of nuclear technology and radioactivity.

Radioactivity is the process whereby certain species of atoms (nuclides) undergo spontaneous disintegration and liberate energy, which generally results in the formation of new nuclides. The process is accompanied by the emission of one or more types of radiation, such as alpha particles, beta particles, and gamma photons(1). Such radiation is capable of producing ions in passing through matter, and is thus termed ionizing radiation.

There are more than fifty naturally-occurring isotopes, or natural radionuclides, exhibiting radioactivity. Indeed, natural radioactivity is "widely recognized as the largest source of human exposure to ionizing radiation"(2). Natural radiation is generally considered to contribute a dose equivalent of 80-200 mrem (millirem) per year, compared with the genetically-significant dose equivalent average of 55 mrem/year from medical radiation; and of less than 5 mrem/year from all other man-made sources(2).

In utilizing nuclear energy through the controlled fission (splitting) of uranium and plutonium nuclei in the fuel elements of power reactors, new radioactivity is produced in the form of unstable fission products, plus heavy elements, e.g., transuranic isotopes resulting from nuclear reactions.

Table A-II-1 lists the important heavy-element and fission-product isotopes in irradiated nuclear fuel. Tables A-II-2 and A-II-3 present important alpha-, beta- and gamma-emitting radioactive nuclides.

Tables A-II-4 through A-II-7 show the radioactive decay chains, or sequences, for uranium, plutonium, and thorium, the heavy radioactive elements that are important in nuclear fuel applications.

Figure A-II-1 indicates the fission yield, or per cent distribution of the atomic mass numbers of nuclides produced in the slow-neutron fission of U-235, Pu-239, and U-233, and the fast fission of U-238 and Th-232.

TABLE A-II-1

IMPORTANT ISOTOPES IN IRRADIATED URANIUM

Heavy Elements	
Uranium	234, 235, 236, 238
Plutonium	239, 240, 241
Americium	241, 243
Curium	242, 244
Long-Lived Radioactive Fission Products	
Krypton	85
Strontium	89, 90
Yttrium	90, 91
Zirconium	95
Niobium	95
Molybdenum	99
Technetium	99
Ruthenium	103, 106
Rhodium	106
Tellurium	129
Iodine	129, 131
Xenon	133
Cesium	137
Barium	140
Lanthanum	140
Cerium	141, 144
Praseodymium	143, 144
Neodymium	147
Promethium	147

Source: Benedict, M. and T. Pigford, Nuclear Chemical Engineering, McGraw-Hill Book Co., N.Y., 1957. Modified by S. M. Stoller Corp.(3)

TABLE A-II-2

FERTILE OR FISSIONABLE
MATERIALS AS ALPHA EMITTERS

Nuclide	Alpha Energy, Mev	Half-Life, Years
Thorium 232	3.98	1.39×10^{10}
Uranium 238	4.18	4.49×10^{9}
Uranium 235	4.20, 4.40, 4.58	7.13×10^{8}
Uranium 233	4.82	1.62×10^{5}
Plutonium 239	5.15	2.436×10^{4}

Source: Benedict, M. and T. Pigford. Nuclear Chemical Engineering. McGraw-Hill, N.Y., 1957.(3)

TABLE A-II-3

NUCLIDE RADIOACTIVITY FROM REACTOR OPERATIONS

Beta-Emitting Radioactive Nuclides

Nuclide	Maximum Energy, Mev	Half-Life	Source
$_1H^3$	0.0189	12.5 years	Ternary Fission* $_0n^1 + {}_5B^{10} \rightarrow {}_2He^4 + {}_1H^3$
			$\begin{cases} {}_0n^1 + {}_5B^{10} \rightarrow {}_2He^4 + {}_3Li^7 \\ {}_0n^1 + {}_3Li^7 \rightarrow {}_0n^1 + {}_2He^4 + {}_1H^3 \end{cases}$
$_6C^{14}$	0.155	5,370 years	$_7N^{14} + {}_0n^1 \rightarrow {}_6C^{14} + {}_1H^1$
			$_8O^{17} + {}_0n^1 \rightarrow {}_6C^{14} + {}_2He^4$
$_{15}P^{32}$	1.704	14.59 days	$_0n^1 + {}_{15}P^{31}$
$_{16}S^{35}$	0.167	87.1 days	$_0n^1 + {}_{17}Cl^{35} \rightarrow {}_{16}S^{35} + {}_1H^1$
$_{36}Kr^{85m}$	81% 0.817 6% 0.300	4.36 hr	Fission Product
$_{36}Kr^{85}$	0.72	10 years	Fission product
$_{38}Sr^{89}$	1.463	54.5 days	Fission Product
$_{38}Sr^{90}$	0.537	19.9 years	Fission Product
$_{53}I^{131}$	84% 0.606 15% 0.255 1% 0.810	8.141 days	Fission Product
$_{90}Th^{233}$	1.23	23.5 min	$_{90}Th^{232} + {}_0n^1$
$_{91}Pa^{233}$	0.23	27.4 days	Decay of $_{90}Th^{233}$
$_{92}U^{237}$	0.25	6.63 days	$_{92}U^{235} + {}_2{}_0n^1$
$_{92}U^{239}$	1.12	23.54 min	$_{92}U^{238} + {}_0n^1$
$_{93}Np^{239}$	0.676 0.403 0.288	2.33 days	Decay of U^{239}

*For tritium present in fuel waste.

TABLE A-II-3
(continued)

Long-Lived Gamma-Emitting Radioactive Nuclides

	Nuclide	Energy, Mev	Half-Life	Source of Nuclide
	$_{27}Co^{60m}$	0.059	10.7 min	$Co^{59} + {}_0n^1$
	$_{35}Br^{80m}$	0.049, 0.037	4.4 hr	$Br^{79} + {}_0n^1$
Fission Products	$_{39}Y^{91m}$	0.61	51 min	Decay of $_{38}Sr^{91}$
	$_{43}Tc^{99m}$	0.14	5.9 hr	Decay of $_{42}Mo^{99}$
	$_{52}Te^{127m}$	0.088	90 days	Decay of $_{51}Sb^{127}$
	$_{54}Xe^{135m}$	0.52	15.3 min	Decay of $_{53}I^{135}$
	$_{56}Ba^{137m}$	0.66	2.6 min	Decay of $_{55}Cs^{137}$
	$_{52}Te^{129m}$	0.106	33.5 days	Decay of $_{51}Sb^{129}$
	$_{52}Te^{131m}$	0.177	30 hr	Decay of $_{51}Sb^{131}$

Based on: Benedict, M. and T. Pigford. Nuclear Chemical Engineering. Mc-Graw-Hill, N.Y., 1957. Modified by S. M. Stoller Corp. (3)

TABLE A-II-4

URANIUM DECAY SERIES
(4n + 2)*

Radioelement	Historical Name	Symbol	Half Life	Radiation Emitted
Uranium	Uranium I	$_{92}U^{238}$ (UI)	4.49×10^{9} y	α, γ
↓				
Thorium	Uranium X_1	$_{90}Th^{234}$ (UX_1)	24.10d	β, γ
↓				
Protactinium	Uranium X_2	$_{91}Pa^{234}$ (UX_2)	1.175m	β, γ
↓				
Uranium	Uranium II	$_{92}U^{234}$ (UII)	2.48×10^{5} y	α, γ
↓				
Thorium	Ionium	$_{90}Th^{230}$ (Io)	8.0×10^{4} y	α, γ
↓				
Radium	Radium	$_{88}Ra^{226}$	1622y	α, γ
↓				
Radon	Ra Emanation	$_{86}Rn^{222}$	3.825d	α
↓				
Polonium 99.97% | 0.03%	Radium A	$_{84}Po^{218}$ (RaA)	3.05m	α, β
↓ ↓				
Lead	Radium B	$_{82}Pb^{214}$ (RaB)	26.8m	β, γ
↓ Astatine-218	Astatine	$_{85}At^{218}$	1.5-2s	α (β ?)
↓				
Bismuth 99.96% | 0.04%	Radium C	$_{83}Bi^{214}$ (RaC)	19.7m	α, β, γ
↓ ↓				
Polonium	Radium C'	$_{84}Po^{214}$ (RaC')	1.637×10^{-4} s	α
↓ Thallium	Radium C''	$_{81}Tl^{210}$ (RaC'')	1.32m	β
↓				
Lead	Radium D	$_{82}Pb^{210}$ (RaD)	22y	β, γ
↓				
Bismuth ~100% | $\sim 10^{-5}$%	Radium E	$_{83}Bi^{210}$ (RaE)	5.02d	α, β
↓ ↓				
Polonium	Radium F	$_{84}Po^{210}$ (RaF)	138.3d	α, γ
↓ Thallium-206	Thallium	$_{81}Tl^{206}$	4.19m	β
↓				
Lead (End Product)	Radium G	$_{82}Pb^{206}$ (RaG)	Stable 23.6% abundance	None

* An expression in which "n" is an integer; the expression describes the mass number of any member within that series. Example:

$_{82}Pb^{206}$ (4n + 2) 4(51) + 2 206

Source: Radiological Health Handbook, U.S. Dept. of Health, Education and Welfare, PB-121784, rev. 1970. (1a)

TABLE A-II-5

ACTINIUM DECAY SERIES
(4n + 3)*

Radioelement	Historical Name	Symbol	Half Life	Radiation Emitted
Uranium	Actinouranium	$_{92}U^{235}$ (AcU)	7.13×10^{8} y	α,γ
↓				
Thorium	Actinium Y	$_{90}Th^{231}$ (UY)	25.64h	β,γ
↓				
Protactinium	Protoactinium	$_{91}Pa^{231}$	3.43×10^{4} y	α,γ
↓				
Actinium 98.8% | 1.2%	Actinium	$_{89}Ac^{227}$	22.0y	α,β,γ
↓ ↓				
Thorium	Radioactinium	$_{90}Th^{227}$ (RdAc)	18.6d	α,γ
Francium	Actinium K	$_{87}Fr^{223}$	21m	β,γ
↓				
Radium	Actinium X	$_{88}Ra^{223}$ (AcX)	11.2d	α,γ
↓				
Radon	Actinon (Em)	$_{86}Rn^{219}$ (An)	3.92s	α,γ
↓				
Polonium ~100% | ~5 x 10^{-4}%	Actinium A	$_{84}Po^{215}$ (AcA)	1.83×10^{-3}s	α,β
↓ ↓				
Lead	Actinium B	$_{82}Pb^{211}$ (AcB)	36.1m	β,γ
Astatine-215	Astatine	$_{85}At^{215}$	~10^{-4}s	α
↓				
Bismuth 99.68% | 0.32%	Actinium C	$_{83}Bi^{211}$ (AcC)	2.16m	α,β,γ
↓ ↓				
Polonium	Actinium C'	$_{84}Po^{211}$ (AcC')	0.52s	α
Thallium	Actinium C''	$_{81}Tl^{207}$ (AcC'')	4.79m	β,γ
↓				
Lead (End Product)	Actinium D	$_{82}Pb^{207}$ (AcD)	Stable (22.6% abundance)	None

*An expression in which "n" is an integer; the expression describes the mass number of any member within that series. Example:

$_{82}Pb^{207}$ (4n + 3) . . . . . 4(51) + 3 = 207

Source: Radiological Health Handbook, U.S. Dept. of Health, Education and Welfare, PB-121784, rev. 1970. (1a)

TABLE A-II-6

NEPTUNIUM DECAY SERIES
(4n + 1)*

Radioelement	Symbol	Half Life	Energy of Radiation (Mev) α	β	γ
Plutonium ~100% | ~10^{-3}%	$_{94}Pu^{241}$	14y	4.91	0.021	0.145**
Americium	$_{95}Am^{241}$	470y	5.546**	.....	0.0597**
Uranium	$_{92}U^{237}$	6.75d	.....	0.245	0.207
Neptunium	$_{93}Np^{237}$	2.20×10^{6}y	4.77	.....	soft
Protactinium	$_{91}Pa^{233}$	27.4d	.....	0.530	0.416**
Uranium	$_{92}U^{233}$	1.62×10^{5}y	4.823	.....	0.36**
Thorium	$_{90}Th^{229}$	7340y	5.02**	.....	.....
Radium	$_{88}Ra^{225}$	14.8d	.....	0.31	.....
Actinium	$_{89}Ac^{225}$	10.0d	5.80	.....	.....
Francium	$_{87}Fr^{221}$	4.8m	6.30**	.....	0.220
Astatine	$_{85}At^{217}$	0.018s	7.02	.....	.....
Bismuth 98% | 2%	$_{83}Bi^{213}$	47m	5.86	1.39**	0.434
Polonium	$_{84}Po^{213}$	4.2×10^{-6}s	8.336	.....	.....
Thallium	$_{81}Tl^{209}$	2.2m	.....	1.99	0.12
Lead	$_{82}Pb^{209}$	3.22h	.....	0.635	.....
Bismuth (End Product)	$_{83}Bi^{209}$	Stable (100% abundance)	.....	.....	.....

*An expression in which "n" is an integer; the expression describes the mass number of any member within that series. Example:

$_{90}Th^{229}$ (4n + 1) . . . . . 4(57) + 1 = 229

**Maximum energy given when others are present.

Source: Radiological Health Handbook, U.S. Dept. of Health, Education and Welfare. PB-121784 rev. 1970 (1a)

TABLE A-II-7

THORIUM DECAY SERIES

(4n)*

Radioelement	Historical Name	Symbol	Half Life	Radiation Emitted
Thorium	Thorium	$_{90}Th^{232}$	1.39×10^{10} y	α, γ
↓				
Radium	Mesothorium I	$_{88}Ra^{228}$ ($MsTh_1$)	6.7y	β, γ
↓				
Actinium	Mesothorium II	$_{89}Ac^{228}$ ($MsTh_2$)	6.13h	β, γ
↓				
Thorium	Radiothorium	$_{90}Th^{228}$ (RdTh)	1.90y	α, γ
↓				
Radium	Thorium X	$_{88}Ra^{224}$ (ThX)	3.64d	α, γ
↓				
Radon	Thoron (Em)	$_{86}Rn^{220}$ (Tn)	54.5s	α
↓				
Polonium	Thorium A	$_{84}Po^{216}$ (ThA)	0.158s	α, β
~100% | 0.014%(?)				
↓ | ↓				
Lead	Thorium B	$_{82}Pb^{212}$ (ThB)	10.6h	β, γ
↓				
Astatine-216	Astatine	$_{85}At^{216}$	~3×10^{-4} s	α
↓				
Bismuth	Thorium C	$_{83}Bi^{212}$ (ThC)	60.5m	α, β, γ
66 3% | 33.7%				
↓ | ↓				
Polonium	Thorium C'	$_{84}Po^{212}$ (ThC')	3.04×10^{-7} s	α
Thallium	Thorium C''	$_{81}Tl^{208}$ (ThC'')	3.1m	β, γ
↓				
Lead (End Product)	Thorium D	$_{82}Pb^{208}$ (ThD)	Stable (52.3% abundance)	None

* An expression in which "n" is an integer; the expression describes the mass number of any number within that series. Example:

$_{90}Th^{232}$ (4n) . . . . . 4(58) = 232

Source: Radiological Health Handbook, U.S. Dept. of Health, Education and Welfare, PB-121784, rev. 1970.(1a)

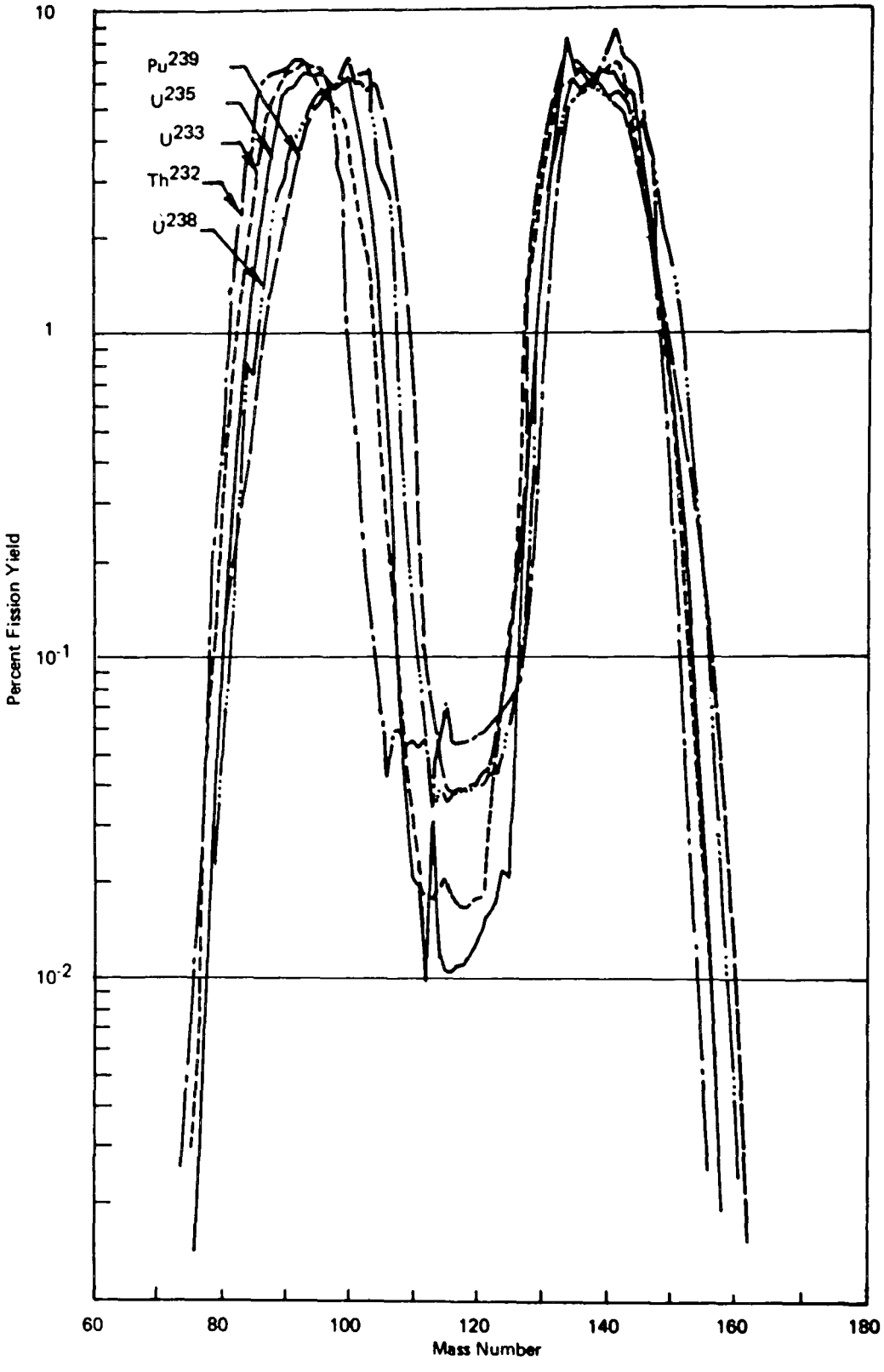

FIGURE A-II-1 FISSION YIELDS FOR SLOW-NEUTRON FISSION OF U-233, U-235, AND PU-239; AND FAST FISSION OF Th-232 AND U-238

Source: Benedict, M., T. Pigford and H. Levi, Nuclear Chemical Engineering, Second Edition (in preparation). McGraw-Hill Book Co., N.Y.(5)

Most contemporary nuclear power reactors utilize uranium fuel slightly enriched in the fissionable isotope U-235. The fuel is in the form of ceramic pellets of UO_2 encased in tubes (cladding) of a zirconium alloy (Zircaloy), which are placed in the reactor in a configuration of tube bundles (assemblies). A portion of the fuel (so-called spent fuel) must be removed periodically, because of depletion of fissile material and fission product buildup during reactor operation, and must be replaced with fresh fuel.

The reactor is cooled, and the neutrons emitted in fission (and necessary for a continuation of fission) are slowed down or moderated with ordinary (light) water. That is, heat is removed from the reactor using water as the coolant; and the fission chain reaction is facilitated by the substantilly enhanced reaction probabilities associated with the resulting slower or moderated spectrum of neutrons.

Typically, over 50% of the fissions in fuel near the end of its life in the reactor come from plutonium that has built up in the fuel.

The spent fuel may be chemically reprocessed to recover remaining "unburned" uranium and plutonium, separating it from the still intensely radioactive cladding and fission products. The standard process would involve the spent fuel "cooling down" for about six months, and then performing solvent extraction operations for recovery. The radioactive liquid waste from the first cycle of such reprocessing is known as high-level liquid waste, or HLLW.

To facilitate the characterization of the high-level radioactive source terms, it is important to note: (1) the basic unit of radioactivity, which is the curie (3.7×10^{10} nuclear disintegrations per second); (2) the specific energy of emitted radiation, usually measured in Mev (4.45×10^{-20} kWhr); and (3) the decay heat or rate of energy release, usually measured in watts.

In the context of environmental protection and health effects, discussed in subsequent Task reports, it becomes necessary to introduce the concepts and terminology of radiation dose and dosimetry, particularly the term "rem".

Table A-II-8 indicates the specific activity, in curies per gram, of important isotopes. The specific activity of high level waste is typically of the order of 10 curies per gram, which is many orders of magnitude greater that that for natural uranium ore. The maximum permissible concentrations (MPC's) of various radioisotopes in air and

TABLE A-II-8

ACTIVITY MASS RELATIONSHIP - SPECIFIC ACTIVITY

Isotope	Half Life		Curies Per Gram
Th-232	1.39×10^{10}	Years	1.11×10^{-7}
U-238	4.49×10^{9}		3.36×10^{-7}
U-235	7.13×10^{8}		2.14×10^{-6}
Cl-36	4.4×10^{5}		2.27×10^{-2}
U-233	1.62×10^{5}		9.51×10^{-3}
Ni-59	8×10^{4}		7.61×10^{-2}
Pu-239	2.436×10^{4}		6.17×10^{-2}
C-14	5568		4.61
Ra-226	1622		0.98 or 1
Cs-137	33		79.4
Sr-90	19.9		2.00×10^{2}
H-3	12.46		9.60×10^{3}
Co-60	5.27		1.14×10^{3}
Tl-204	3.5		5.03×10^{2}
Fe-55	2.94		2.22×10^{3}
Pm-147	2.6		9.39×10^{2}
Cs-134	2.3		1.16×10^{3}
Ru-106	1.0		3.39×10^{3}
Ce-144	282	Days	3.22×10^{3}
Zr-65	250		8.05×10^{3}
Ca-45	152		1.91×10^{4}
Po-210	138.3		4.50×10^{3}
Ta-182	111		6.47×10^{3}
S-35	87.1		4.28×10^{4}
W-185	73.2		9.66×10^{3}

Source: Radiological Health Handbook. U.S. Department of Health, Education and Welfare, PB-121784, rev. 1970.(1a)

TABLE A-II-9

SUMMARY OF ESTIMATES OF WHOLE-BODY ENVIRONMENTAL RADIATION DOSES

Source	Annual Man-Rem (millions) for Years				
	1960	1970	1980	1990	2000
Natural					
Cosmic	8.2	9.2	10.7	12.5	14.5
External Gamma	11.0	12.3	14.2	16.6	19.3
Internal	4.6	5.1	5.9	6.9	8.0
Subtotal	23.8	26.6	30.8	36.0	41.8
Fallout					
External Gamma	1.1[a]	0.18	0.21	0.25	0.29
Inhalation	0.27[a]	0.008	0.009	0.11	0.013
Ingestion	1.0[a]	0.63	0.83	1.0	1.3
Subtotal	2.4[a]	0.82	1.1	1.3	1.6
Other					
Reactors	0.000016	0.00043	0.0061	0.023	0.056
Fuel Reprocessing	-	0.00017	0.0050	0.025	0.065
Worldwide ^{3}H	0.0055	0.015	0.013	0.012	0.014
Worldwide ^{85}Kr	0.00002	0.00008	0.0007	0.004	0.012
PNE Tests	0.00003[b]	-	-	-	-
Nevada Test Site	0.0088[c]	-	-	-	-
Other AEC Installations	0.0026	0.0025	0.0027	0.0033	0.0038
Subtotal	0.017	0.018	0.028	0.067	0.15
TOTAL	24.8	27.4	31.9	37.4	43.6
Population (millions)	183	205	237	277	321
Man-rem/10^{6} people	136,000	134,000	135,000	135,000	136,000

a. 1963 value. A 1960 total fallout value of 1.0 was used in the TOTAL of all environmental radiation.

b. 1962 dose; not used in the totals.

c. Sept. 15, 1961 to Sept. 15, 1962 dose. This value was used in the 1960 totals.

Source: Estimates of Ionizing Radiation Doses in the United States, 1960-2000. Special Studies Group, Division of Criteria and Standards, Office of Radiation Programs, Environmental Protection Agency. June 1971.(4)

water, as published in the Code of Federal Regulations, are given in Appendix III. The MPC values are a function of many variables, including the specific activity and relative biological effectiveness of the radiation in question.

Tables A-II-9 and A-II-10 indicate the type of projections that nave been made of whole-body radiation doses to the year 2000. Table A-II-9 indicates the environmental sources alone, and Table A-II-10 indicates the significance of the environmental contribution in the estimated total from all sources.

TABLE A-II-10

SUMMARY OF WHOLE-BODY ANNUAL RADIATION DOSES IN THE UNITED STATES

1960 to 2000

Radiation Source	Man-Rem (millions) for Years 1960	1970	1980	1990	2000
ENVIRONMENTAL					
Natural	23.8	26.6	30.8	36.0	41.8
Global Fallout	1	0.82	1.1	1.3	1.6
All Other	0.017	0.018	0.028	0.067	0.15
Sub-total	26.2	27.4	31.9	37.4	43.6
MEDICAL					
Diagnostic	13.6	18.7	25.2	34.5	44.7
Radiopharmaceuticals	0.07	0.4	3.3	4	5
Therapeutic	0.9	1.0	1.2	1.4	1.6
Sub-total	14.6	20.1	29.7	39.9	51.3
OCCUPATIONAL	0.14	0.16	0.19	0.24	0.28
MISCELLANEOUS	0.30	0.44	0.22	0.05	0.06
TOTAL	39.9	48.1	62.0	77.6	95.2

Source: Estimates of Ionizing Radiation Doses in the United States, 1960-2000. Special Studies Group, Division of Criteria and Standards, Office of Radiation Programs, Environmental Protection Agency, June 1971.(4)

REFERENCES - APPENDIX A-II

1. Radiological Health Handbook. U.S. Department of Health, Education, and Welfare, PB-121784, 1957.

1.a Ibid. Revised January 1970.

2. Yeates, D., A. Goldin and D. Moeller. Natural Radiation in the Urban Environment. Nuclear Safety, 13:4, July-August 1972.

3. Benedict, M. and T. Pigford, Nuclear Chemical Engineering. McGraw-Hill Book Co., N.Y., 1957.

4. Estimates of Ionizing Radiation Doses in the United States 1960-2000. Special Studies Group, Division of Criteria and Standards, Office of Radiation Programs, Environmental Protection Agency, June 1971.

5. Benedict, M., T. Pigford and H. Levi, Nuclear Chemical Engineering, Second Edition (in preparation). McGraw-Hill Book Co., N.Y.

APPENDIX A - III

MAXIMUM PERMISSIBLE CONCENTRATIONS OF RADIOACTIVE ISOTOPES (FEDERAL REGISTER)

Concentrations in Air and Water Above Natural Background

(See footnotes)

Element (atomic number)	Isotope [1]	†	Table I Column 1 Air (μCi/ml)	Table I Column 2 Water (μCi/ml)	Table II Column 1 Air (μCi/ml)	Table II Column 2 Water (μCi/ml)
Actinium (89)	Ac 227	S	2×10^{-12}	6×10^{-5}	8×10^{-14}	2×10^{-6}
		I	3×10^{-11}	9×10^{-3}	9×10^{-13}	3×10^{-4}
	Ac 228	S	8×10^{-8}	3×10^{-3}	3×10^{-9}	9×10^{-5}
		I	2×10^{-8}	3×10^{-3}	6×10^{-10}	9×10^{-5}
Americium (95)	Am 241	S	6×10^{-12}	1×10^{-4}	2×10^{-13}	4×10^{-6}
		* I	1×10^{-10}	8×10^{-4}	4×10^{-12}	3×10^{-5}
	Am 242m	S	6×10^{-12}	1×10^{-4}	2×10^{-13}	4×10^{-6}
		I	3×10^{-10}	3×10^{-3}	9×10^{-12}	9×10^{-5}
	Am 242	S	4×10^{-8}	4×10^{-3}	1×10^{-9}	1×10^{-4}
		I	5×10^{-8}	4×10^{-3}	2×10^{-9}	1×10^{-4}
	Am 243	S	6×10^{-12}	1×10^{-4}	2×10^{-13}	4×10^{-6}
		I	1×10^{-10}	8×10^{-4}	4×10^{-12}	3×10^{-5}
	Am 244	S	4×10^{-6}	1×10^{-1}	1×10^{-7}	5×10^{-3}
		I	2×10^{-5}	1×10^{-1}	8×10^{-7}	5×10^{-3}
Antimony (51)	Sb 122	S	2×10^{-7}	8×10^{-4}	6×10^{-9}	3×10^{-5}
		I	1×10^{-7}	8×10^{-4}	5×10^{-9}	3×10^{-5}
	Sb 124	S	2×10^{-7}	7×10^{-4}	5×10^{-9}	2×10^{-5}
		I	2×10^{-8}	7×10^{-4}	7×10^{-10}	2×10^{-5}
	Sb 125	S	5×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
		I	3×10^{-8}	3×10^{-3}	9×10^{-10}	1×10^{-4}
Argon (18)	A 37	Sub[2]	6×10^{-3}	----------	1×10^{-4}	----------
	A 41	Sub	2×10^{-6}	----------	4×10^{-8}	----------
Arsenic (33)	As 73	S	2×10^{-6}	1×10^{-2}	7×10^{-8}	5×10^{-4}
		I	4×10^{-7}	1×10^{-2}	1×10^{-8}	5×10^{-4}
	As 74	S	3×10^{-7}	2×10^{-3}	1×10^{-8}	5×10^{-5}
		I	1×10^{-7}	2×10^{-3}	4×10^{-9}	5×10^{-5}
	As 76	S	1×10^{-7}	6×10^{-4}	4×10^{-9}	2×10^{-5}
		I	1×10^{-7}	6×10^{-4}	3×10^{-9}	2×10^{-5}
	As 77	S	5×10^{-7}	2×10^{-3}	2×10^{-8}	8×10^{-5}
		I	4×10^{-7}	2×10^{-3}	1×10^{-8}	8×10^{-5}
Astatine (85)	At 211	S	7×10^{-9}	5×10^{-3}	2×10^{-10}	2×10^{-6}
		I	3×10^{-8}	2×10^{-3}	1×10^{-9}	7×10^{-5}
Barium (56)	Ba 131	S	1×10^{-6}	5×10^{-3}	4×10^{-8}	2×10^{-4}
		I	4×10^{-7}	5×10^{-3}	1×10^{-8}	2×10^{-4}
	Ba 140	S	1×10^{-7}	8×10^{-4}	4×10^{-9}	3×10^{-5}
		I	4×10^{-8}	7×10^{-4}	1×10^{-9}	2×10^{-5}
Berkelium (97)	Bk 249	S	9×10^{-10}	2×10^{-2}	3×10^{-11}	6×10^{-4}
		I	1×10^{-7}	2×10^{-2}	4×10^{-9}	6×10^{-4}
	Bk 250	S	1×10^{-7}	6×10^{-3}	5×10^{-9}	2×10^{-4}
		I	1×10^{-6}	6×10^{-3}	4×10^{-8}	2×10^{-4}
Beryllium (4)	Be 7	S	6×10^{-6}	5×10^{-2}	2×10^{-7}	2×10^{-3}
		I	1×10^{-6}	5×10^{-2}	4×10^{-8}	2×10^{-3}
Bismuth (83)	Bi 206	S	2×10^{-7}	1×10^{-3}	6×10^{-9}	4×10^{-5}
		I	1×10^{-7}	1×10^{-3}	5×10^{-9}	4×10^{-5}
	Bi 207	S	2×10^{-7}	2×10^{-3}	6×10^{-9}	6×10^{-5}
		I	1×10^{-8}	2×10^{-3}	5×10^{-10}	6×10^{-5}
	Bi 210	S	6×10^{-9}	1×10^{-3}	2×10^{-10}	4×10^{-5}
		I	6×10^{-9}	1×10^{-3}	2×10^{-10}	4×10^{-5}
	Bi 212	S	1×10^{-7}	1×10^{-2}	3×10^{-9}	4×10^{-4}
		I	2×10^{-7}	1×10^{-2}	7×10^{-9}	4×10^{-4}

Concentrations in Air and Water Above Natural Background—Continued

(See footnotes)

Element (atomic number)	Isotope [1]	†	Table I Column 1 Air (μCi/ml)	Table I Column 2 Water (μCi/ml)	Table II Column 1 Air (μCi/ml)	Table II Column 2 Water (μCi/ml)
Bromine (35)	Br 82	S	1×10^{-6}	8×10^{-3}	4×10^{-8}	3×10^{-4}
		I	2×10^{-7}	1×10^{-3}	6×10^{-9}	4×10^{-5}
Cadmium (48)	Cd 109	S	5×10^{-8}	5×10^{-3}	2×10^{-9}	2×10^{-4}
		I	7×10^{-8}	5×10^{-3}	3×10^{-9}	2×10^{-4}
	Cd 115m	S	4×10^{-8}	7×10^{-4}	1×10^{-9}	3×10^{-5}
		I	4×10^{-8}	7×10^{-4}	1×10^{-9}	3×10^{-5}
	Cd 115	S	2×10^{-7}	1×10^{-3}	8×10^{-9}	3×10^{-5}
		I	2×10^{-7}	1×10^{-3}	6×10^{-9}	4×10^{-5}
Calcium (20)	Ca 45	S	3×10^{-8}	3×10^{-4}	1×10^{-9}	9×10^{-6}
		I	1×10^{-7}	5×10^{-3}	4×10^{-9}	2×10^{-4}
	Ca 47	S	2×10^{-7}	1×10^{-3}	6×10^{-9}	5×10^{-5}
		I	2×10^{-7}	1×10^{-3}	6×10^{-9}	3×10^{-5}
Californium (98)	Cf 249	S	2×10^{-12}	1×10^{-4}	5×10^{-14}	4×10^{-6}
		I	1×10^{-10}	7×10^{-4}	3×10^{-12}	2×10^{-5}
	Cf 250	S	5×10^{-12}	4×10^{-4}	2×10^{-13}	1×10^{-5}
		I	1×10^{-10}	7×10^{-4}	3×10^{-12}	3×10^{-5}
	Cf 251	S	2×10^{-12}	1×10^{-4}	6×10^{-14}	4×10^{-6}
		I	1×10^{-10}	8×10^{-4}	3×10^{-12}	3×10^{-5}
	Cf 252	* S	6×10^{-12}	2×10^{-4}	2×10^{-13}	7×10^{-6}
		* I	3×10^{-11}	2×10^{-4}	1×10^{-12}	7×10^{-6}
	Cf 253	S	8×10^{-10}	4×10^{-3}	3×10^{-11}	1×10^{-4}
		I	8×10^{-10}	4×10^{-3}	3×10^{-11}	1×10^{-4}
	Cf 254	S	5×10^{-12}	4×10^{-6}	2×10^{-13}	1×10^{-7}
		I	5×10^{-12}	4×10^{-6}	2×10^{-13}	1×10^{-7}
Carbon (6)	C 14	S	4×10^{-6}	2×10^{-2}	1×10^{-7}	8×10^{-4}
	(CO_2)	Sub	5×10^{-5}	----------	1×10^{-6}	----------
Cerium (58)	Ce 141	S	4×10^{-7}	3×10^{-3}	2×10^{-8}	9×10^{-5}
		I	2×10^{-7}	3×10^{-3}	5×10^{-9}	9×10^{-5}
	Ce 143	S	3×10^{-7}	1×10^{-3}	9×10^{-9}	4×10^{-5}
		I	2×10^{-7}	1×10^{-3}	7×10^{-9}	4×10^{-5}
	Ce 144	S	1×10^{-8}	3×10^{-4}	3×10^{-10}	1×10^{-5}
		I	6×10^{-9}	3×10^{-4}	2×10^{-10}	1×10^{-5}
Cesium (55)	Cs 131	S	1×10^{-5}	7×10^{-2}	4×10^{-7}	2×10^{-3}
		I	3×10^{-6}	3×10^{-2}	1×10^{-7}	9×10^{-4}
	Cs 134m	S	4×10^{-5}	2×10^{-1}	1×10^{-6}	6×10^{-3}
		I	6×10^{-6}	3×10^{-2}	2×10^{-7}	1×10^{-3}
	Cs 134	S	4×10^{-8}	3×10^{-4}	1×10^{-9}	9×10^{-6}
		I	1×10^{-8}	1×10^{-3}	4×10^{-10}	4×10^{-5}
	Cs 135	S	5×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
		I	9×10^{-8}	7×10^{-3}	3×10^{-9}	2×10^{-4}
	Cs 136	S	4×10^{-7}	2×10^{-3}	1×10^{-8}	9×10^{-5}
		I	2×10^{-7}	2×10^{-3}	6×10^{-9}	6×10^{-5}
	Cs 137	S	6×10^{-8}	4×10^{-4}	2×10^{-9}	2×10^{-5}
		I	1×10^{-8}	1×10^{-3}	5×10^{-10}	4×10^{-5}
Chlorine (17)	Cl 36	S	4×10^{-7}	2×10^{-3}	1×10^{-8}	8×10^{-5}
		I	2×10^{-8}	2×10^{-3}	8×10^{-10}	6×10^{-5}
	Cl 38	S	3×10^{-6}	1×10^{-2}	9×10^{-8}	4×10^{-4}
		I	2×10^{-6}	1×10^{-2}	7×10^{-8}	4×10^{-4}
Chromium (24)	Cr 51	S	1×10^{-5}	5×10^{-2}	4×10^{-7}	2×10^{-3}
		I	2×10^{-6}	5×10^{-2}	8×10^{-8}	2×10^{-3}

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Concentrations in Air and Water Above Natural Background—Continued

(See footnotes)

Element (atomic number)	Isotope [1]	†	Table I Column 1 Air (μCi/ml)	Table I Column 2 Water (μCi/ml)	Table II Column 1 Air (μCi/ml)	Table II Column 2 Water (μCi/ml)
Fermium (100)	Fm 254	S	6×10^{-8}	4×10^{-3}	2×10^{-9}	1×10^{-4}
		I	7×10^{-8}	4×10^{-3}	2×10^{-9}	1×10^{-4}
	Fm 255	S	2×10^{-8}	1×10^{-3}	6×10^{-10}	3×10^{-5}
		I	1×10^{-8}	1×10^{-3}	4×10^{-10}	3×10^{-5}
	Fm 256	S	3×10^{-9}	3×10^{-5}	1×10^{-10}	9×10^{-7}
		I	2×10^{-9}	3×10^{-5}	6×10^{-11}	9×10^{-7}
Fluorine (9)	F 18	S	5×10^{-6}	2×10^{-2}	2×10^{-7}	8×10^{-4}
		I	3×10^{-6}	1×10^{-2}	9×10^{-8}	5×10^{-4}
Gadolinium (64)	Gd 153	S	2×10^{-7}	6×10^{-3}	8×10^{-9}	2×10^{-4}
		I	9×10^{-8}	6×10^{-3}	3×10^{-9}	2×10^{-4}
	Gd 159	S	5×10^{-7}	2×10^{-3}	2×10^{-8}	8×10^{-5}
		I	4×10^{-7}	2×10^{-3}	1×10^{-8}	8×10^{-5}
Gallium (31)	Ga 72	S	2×10^{-7}	1×10^{-3}	8×10^{-9}	4×10^{-5}
		I	2×10^{-7}	1×10^{-3}	6×10^{-9}	4×10^{-5}
Germanium (32)	Ge 71	S	1×10^{-5}	5×10^{-2}	4×10^{-7}	2×10^{-3}
		I	6×10^{-6}	5×10^{-2}	2×10^{-7}	2×10^{-3}
Gold (79)	Au 196	S	1×10^{-6}	5×10^{-3}	4×10^{-8}	2×10^{-4}
		I	6×10^{-7}	4×10^{-3}	2×10^{-8}	1×10^{-4}
	Au 198	S	3×10^{-7}	2×10^{-3}	1×10^{-8}	5×10^{-5}
		I	2×10^{-7}	1×10^{-3}	8×10^{-9}	5×10^{-5}
	Au 199	S	1×10^{-6}	5×10^{-3}	4×10^{-8}	2×10^{-4}
		I	8×10^{-7}	4×10^{-3}	3×10^{-8}	2×10^{-4}
Hafnium (72)	Hf 181	S	4×10^{-8}	2×10^{-3}	1×10^{-9}	7×10^{-5}
		I	7×10^{-8}	2×10^{-3}	3×10^{-9}	7×10^{-5}
Holmium (67)	Ho 166	S	2×10^{-7}	9×10^{-4}	7×10^{-9}	3×10^{-5}
		I	2×10^{-7}	9×10^{-4}	6×10^{-9}	3×10^{-5}
Hydrogen (1)	H3	S	5×10^{-6}	1×10^{-1}	2×10^{-7}	3×10^{-3}
		I	5×10^{-6}	1×10^{-1}	2×10^{-7}	3×10^{-3}
		Sub	2×10^{-3}		4×10^{-5}	
Indium (49)	In 113m	S	8×10^{-6}	4×10^{-2}	3×10^{-7}	1×10^{-3}
		I	7×10^{-6}	4×10^{-2}	2×10^{-7}	1×10^{-3}
	In 114m	S	1×10^{-7}	5×10^{-4}	4×10^{-9}	2×10^{-5}
		I	2×10^{-8}	5×10^{-4}	7×10^{-10}	2×10^{-5}
	In 115m	S	2×10^{-6}	1×10^{-2}	8×10^{-8}	4×10^{-4}
		I	2×10^{-6}	1×10^{-2}	6×10^{-8}	4×10^{-4}
	In 115	S	2×10^{-7}	3×10^{-3}	9×10^{-9}	9×10^{-5}
		I	3×10^{-8}	3×10^{-3}	1×10^{-9}	9×10^{-5}
Iodine (53)	I 125	S	5×10^{-9}	4×10^{-5}	8×10^{-11}	2×10^{-7}
		I	2×10^{-7}	6×10^{-3}	6×10^{-9}	2×10^{-4}
	I 126	S	8×10^{-9}	5×10^{-5}	9×10^{-11}	3×10^{-7}
		I	3×10^{-7}	3×10^{-3}	1×10^{-8}	9×10^{-5}
	I 129	S	2×10^{-9}	1×10^{-5}	2×10^{-11}	6×10^{-8}
		I	7×10^{-8}	6×10^{-3}	2×10^{-9}	2×10^{-4}
	I 131	S	9×10^{-9}	6×10^{-5}	1×10^{-10}	3×10^{-7}
		I	3×10^{-7}	2×10^{-3}	1×10^{-8}	6×10^{-5}
	I 132	S	2×10^{-7}	2×10^{-3}	3×10^{-9}	8×10^{-6}
		I	9×10^{-7}	5×10^{-3}	3×10^{-8}	2×10^{-4}
	I 133	S	3×10^{-8}	2×10^{-4}	4×10^{-10}	1×10^{-6}
		I	2×10^{-7}	1×10^{-3}	7×10^{-9}	4×10^{-5}
	I 134	S	5×10^{-7}	4×10^{-3}	6×10^{-9}	2×10^{-5}

Concentrations in Air and Water Above Natural Background—Continued

(See footnotes)

Element (atomic number)	Isotope [1]	†	Table I Column 1 Air (μCi/ml)	Table I Column 2 Water (μCi/ml)	Table II Column 1 Air (μCi/ml)	Table II Column 2 Water (μCi/ml)
Cobalt (27)	Co 57	S	3×10^{-6}	2×10^{-2}	1×10^{-7}	5×10^{-4}
		I	2×10^{-7}	1×10^{-2}	6×10^{-9}	4×10^{-4}
	Co 58m	S	2×10^{-5}	8×10^{-2}	6×10^{-7}	3×10^{-3}
		I	9×10^{-6}	6×10^{-2}	3×10^{-7}	2×10^{-3}
	Co 58	S	8×10^{-7}	4×10^{-3}	3×10^{-8}	1×10^{-4}
		I	5×10^{-8}	3×10^{-3}	2×10^{-9}	9×10^{-5}
	Co 60	S	3×10^{-7}	1×10^{-3}	1×10^{-8}	5×10^{-5}
		I	9×10^{-9}	1×10^{-3}	3×10^{-10}	3×10^{-5}
Copper (29)	Cu 64	S	2×10^{-6}	1×10^{-2}	7×10^{-8}	3×10^{-4}
		I	1×10^{-6}	6×10^{-3}	4×10^{-8}	2×10^{-4}
Curium (96)	Cm 242	S	1×10^{-10}	7×10^{-4}	4×10^{-12}	2×10^{-5}
		* I	2×10^{-10}	7×10^{-4}	6×10^{-12}	2×10^{-5}
	Cm 243	S	6×10^{-12}	1×10^{-4}	2×10^{-13}	5×10^{-6}
		I	1×10^{-10}	7×10^{-4}	3×10^{-12}	2×10^{-5}
	Cm 244	S	9×10^{-12}	2×10^{-4}	3×10^{-13}	7×10^{-6}
		I	1×10^{-10}	8×10^{-4}	3×10^{-12}	3×10^{-5}
	Cm 245	S	5×10^{-12}	1×10^{-4}	2×10^{-13}	4×10^{-6}
		I	1×10^{-10}	8×10^{-4}	4×10^{-12}	3×10^{-5}
	Cm 246	S	5×10^{-12}	1×10^{-4}	2×10^{-13}	4×10^{-6}
		I	1×10^{-10}	8×10^{-4}	4×10^{-12}	3×10^{-5}
	Cm 247	S	5×10^{-12}	1×10^{-4}	2×10^{-13}	4×10^{-6}
		I	1×10^{-10}	6×10^{-4}	4×10^{-12}	2×10^{-5}
	Cm 248	S	6×10^{-13}	1×10^{-5}	2×10^{-14}	4×10^{-7}
		I	1×10^{-11}	4×10^{-5}	4×10^{-13}	1×10^{-6}
	Cm 249	S	1×10^{-5}	6×10^{-2}	4×10^{-7}	2×10^{-3}
		I	1×10^{-5}	6×10^{-2}	4×10^{-7}	2×10^{-3}
Dysprosium (66)	Dy 165	S	3×10^{-6}	1×10^{-2}	9×10^{-8}	4×10^{-4}
		I	2×10^{-6}	1×10^{-2}	7×10^{-8}	4×10^{-4}
	Dy 166	S	2×10^{-7}	1×10^{-3}	8×10^{-9}	4×10^{-5}
		I	2×10^{-7}	1×10^{-3}	7×10^{-9}	4×10^{-5}
Einsteinium (99)	Es 253	S	8×10^{-10}	7×10^{-4}	3×10^{-11}	2×10^{-5}
		I	6×10^{-10}	7×10^{-4}	2×10^{-11}	2×10^{-5}
	Es 254m	S	5×10^{-9}	5×10^{-4}	2×10^{-10}	2×10^{-5}
		I	6×10^{-9}	5×10^{-4}	2×10^{-10}	2×10^{-5}
	Es 254	S	2×10^{-11}	4×10^{-4}	6×10^{-13}	1×10^{-5}
		I	1×10^{-10}	4×10^{-4}	4×10^{-12}	1×10^{-5}
	Es 255	S	5×10^{-10}	8×10^{-4}	2×10^{-11}	3×10^{-5}
		I	4×10^{-10}	8×10^{-4}	1×10^{-11}	3×10^{-5}
Erbium (68)	Er 169	S	6×10^{-7}	3×10^{-3}	2×10^{-8}	9×10^{-5}
		I	4×10^{-7}	3×10^{-3}	1×10^{-8}	9×10^{-5}
	Er 171	S	7×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
		I	6×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
Europium (63)	Eu 152	S	4×10^{-7}	2×10^{-3}	1×10^{-8}	6×10^{-5}
	(T/2 = 9.2 hrs)	I	3×10^{-7}	2×10^{-3}	1×10^{-8}	6×10^{-5}
	Eu 152	S	1×10^{-8}	2×10^{-3}	4×10^{-10}	8×10^{-5}
	(T/2 = 13 yrs)	I	2×10^{-8}	2×10^{-3}	6×10^{-10}	8×10^{-5}
	Eu 154	S	4×10^{-9}	6×10^{-4}	1×10^{-10}	2×10^{-5}
		I	7×10^{-9}	6×10^{-4}	2×10^{-10}	2×10^{-5}
	Eu 155	S	9×10^{-8}	6×10^{-3}	3×10^{-9}	2×10^{-4}
		I	7×10^{-8}	6×10^{-3}	3×10^{-9}	2×10^{-4}

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Concentrations in Air and Water Above Natural Background—Continued

(See footnotes)

Element (atomic number)	Isotope [1]	†	Table I Column 1 Air (μCi/ml)	Table I Column 2 Water (μCi/ml)	Table II Column 1 Air (μCi/ml)	Table II Column 2 Water (μCi/ml)
Iodine (53)	I 134	I	3×10^{-6}	2×10^{-2}	1×10^{-7}	6×10^{-4}
	I 135	S	1×10^{-7}	7×10^{-4}	1×10^{-9}	4×10^{-6}
		I	4×10^{-7}	2×10^{-3}	1×10^{-8}	7×10^{-5}
Iridium (77)	Ir 190	S	1×10^{-6}	6×10^{-3}	4×10^{-8}	2×10^{-4}
		I	4×10^{-7}	5×10^{-3}	1×10^{-8}	2×10^{-4}
	Ir 192	S	1×10^{-7}	1×10^{-3}	4×10^{-9}	4×10^{-5}
		I	3×10^{-8}	1×10^{-3}	9×10^{-10}	4×10^{-5}
	Ir 194	S	2×10^{-7}	1×10^{-3}	8×10^{-9}	3×10^{-5}
		I	2×10^{-7}	9×10^{-4}	5×10^{-9}	3×10^{-5}
Iron (26)	Fe 55	S	9×10^{-7}	2×10^{-2}	3×10^{-8}	8×10^{-4}
		I	1×10^{-6}	7×10^{-2}	3×10^{-8}	2×10^{-3}
	Fe 59	S	1×10^{-7}	2×10^{-3}	5×10^{-9}	6×10^{-5}
		I	5×10^{-8}	2×10^{-3}	2×10^{-9}	5×10^{-5}
Krypton (36)	Kr 85m	Sub	6×10^{-6}	----------	1×10^{-7}	----------
	Kr 85	Sub	1×10^{-5}	----------	3×10^{-7}	----------
	Kr 87	Sub	1×10^{-6}	----------	2×10^{-8}	----------
	Kr 88	Sub	1×10^{-6}	----------	2×10^{-8}	----------
Lanthanum (57)	La 140	S	2×10^{-7}	7×10^{-4}	5×10^{-9}	2×10^{-5}
		I	1×10^{-7}	7×10^{-4}	4×10^{-9}	2×10^{-5}
Lead (82)	Pb 203	S	3×10^{-6}	1×10^{-2}	9×10^{-8}	4×10^{-4}
		I	2×10^{-6}	1×10^{-2}	6×10^{-8}	4×10^{-4}
	Pb 210	S	1×10^{-10}	4×10^{-6}	4×10^{-12}	1×10^{-7}
		I	2×10^{-10}	5×10^{-3}	8×10^{-12}	2×10^{-4}
	Pb 212	S	2×10^{-8}	6×10^{-4}	6×10^{-10}	2×10^{-5}
		I	2×10^{-8}	5×10^{-4}	7×10^{-10}	2×10^{-5}
Lutetium (71)	Lu 177	S	6×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
		I	5×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
Manganese (25)	Mn 52	S	2×10^{-7}	1×10^{-3}	7×10^{-9}	3×10^{-5}
		I	1×10^{-7}	9×10^{-4}	5×10^{-9}	3×10^{-5}
	Mn 54	* S	4×10^{-7}	4×10^{-3}	1×10^{-8}	1×10^{-4}
		I	4×10^{-8}	3×10^{-3}	1×10^{-9}	1×10^{-4}
	Mn 56	S	8×10^{-7}	4×10^{-3}	3×10^{-8}	1×10^{-4}
		I	5×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
Mercury (80)	Hg 197m	S	7×10^{-7}	6×10^{-3}	3×10^{-8}	2×10^{-4}
		I	8×10^{-7}	5×10^{-3}	3×10^{-8}	2×10^{-4}
	Hg 197	S	1×10^{-6}	9×10^{-3}	4×10^{-8}	3×10^{-4}
		I	3×10^{-6}	1×10^{-2}	9×10^{-8}	5×10^{-4}
	Hg 203	S	7×10^{-8}	5×10^{-4}	2×10^{-9}	2×10^{-5}
		I	1×10^{-7}	3×10^{-3}	4×10^{-9}	1×10^{-4}
Molybdenum (42)	Mo 99	S	7×10^{-7}	5×10^{-3}	3×10^{-8}	2×10^{-4}
		I	2×10^{-7}	1×10^{-3}	7×10^{-9}	4×10^{-5}
Neodymium (60)	Nd 144	S	8×10^{-11}	2×10^{-3}	3×10^{-12}	7×10^{-5}
		I	3×10^{-10}	2×10^{-3}	1×10^{-11}	8×10^{-5}
	Nd 147	S	4×10^{-7}	2×10^{-3}	1×10^{-8}	6×10^{-5}
		I	2×10^{-7}	2×10^{-3}	8×10^{-9}	6×10^{-5}
	Nd 149	S	2×10^{-6}	8×10^{-3}	6×10^{-8}	3×10^{-4}
		I	1×10^{-6}	8×10^{-3}	5×10^{-8}	3×10^{-4}

Concentrations in Air and Water Above Natural Background—Continued

(See footnotes)

Element (atomic number)	Isotope [1]	†	Table I Column 1 Air (μCi/ml)	Table I Column 2 Water (μCi/ml)	Table II Column 1 Air (μCi/ml)	Table II Column 2 Water (μCi/ml)
Neptunium (93)	Np 237	S	4×10^{-12}	9×10^{-5}	1×10^{-13}	3×10^{-6}
		I	1×10^{-10}	9×10^{-4}	4×10^{-12}	3×10^{-5}
	Np 239	S	8×10^{-7}	4×10^{-3}	3×10^{-8}	1×10^{-4}
		I	7×10^{-7}	4×10^{-3}	2×10^{-8}	1×10^{-4}
Nickel (28)	Ni 59	S	5×10^{-7}	6×10^{-3}	2×10^{-8}	2×10^{-4}
		I	8×10^{-7}	6×10^{-2}	3×10^{-8}	2×10^{-3}
	Ni 63	S	6×10^{-8}	8×10^{-4}	2×10^{-9}	3×10^{-5}
		I	3×10^{-7}	2×10^{-2}	1×10^{-8}	7×10^{-4}
	Ni 65	S	9×10^{-7}	4×10^{-3}	3×10^{-8}	1×10^{-4}
		I	5×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
Niobium (Columbium) (41)	Nb 93m	S	1×10^{-7}	1×10^{-2}	4×10^{-9}	4×10^{-4}
		I	2×10^{-7}	1×10^{-2}	5×10^{-9}	4×10^{-4}
	Nb 95	S	5×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
		I	1×10^{-7}	3×10^{-3}	3×10^{-9}	1×10^{-4}
	Nb 97	S	6×10^{-6}	3×10^{-2}	2×10^{-7}	9×10^{-4}
		I	5×10^{-6}	3×10^{-2}	2×10^{-7}	9×10^{-4}
Osmium (76)	Os 185	S	5×10^{-7}	2×10^{-3}	2×10^{-8}	7×10^{-5}
		I	5×10^{-8}	2×10^{-3}	2×10^{-9}	7×10^{-5}
	Os 191m	S	2×10^{-5}	7×10^{-2}	6×10^{-7}	3×10^{-3}
		I	9×10^{-6}	7×10^{-2}	3×10^{-7}	2×10^{-3}
	Os 191	S	1×10^{-6}	5×10^{-3}	4×10^{-8}	2×10^{-4}
		I	4×10^{-7}	5×10^{-3}	1×10^{-8}	2×10^{-4}
	Os 193	S	4×10^{-7}	2×10^{-3}	1×10^{-8}	6×10^{-5}
		I	3×10^{-7}	2×10^{-3}	9×10^{-9}	5×10^{-5}
Palladium (46)	Pd 103	S	1×10^{-6}	1×10^{-2}	5×10^{-8}	3×10^{-4}
		I	7×10^{-7}	8×10^{-3}	3×10^{-8}	3×10^{-4}
	Pd 109	S	6×10^{-7}	3×10^{-3}	2×10^{-8}	9×10^{-5}
		I	4×10^{-7}	2×10^{-3}	1×10^{-8}	7×10^{-5}
Phosphorus (15)	P 32	S	7×10^{-8}	5×10^{-4}	2×10^{-9}	2×10^{-5}
		I	8×10^{-8}	7×10^{-4}	3×10^{-9}	2×10^{-5}
Platinum (78)	Pt 191	S	8×10^{-7}	4×10^{-3}	3×10^{-8}	1×10^{-4}
		I	6×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
	Pt 193m	S	7×10^{-6}	3×10^{-2}	2×10^{-7}	1×10^{-3}
		I	5×10^{-6}	3×10^{-2}	2×10^{-7}	1×10^{-3}
	* Pt 193	S	1×10^{-6}	3×10^{-2}	4×10^{-8}	9×10^{-4}
		I	3×10^{-7}	5×10^{-2}	1×10^{-8}	2×10^{-3}
	Pt 197m	S	6×10^{-6}	3×10^{-2}	2×10^{-7}	1×10^{-3}
		I	5×10^{-6}	3×10^{-2}	2×10^{-7}	9×10^{-4}
	Pt 197	S	8×10^{-7}	4×10^{-3}	3×10^{-8}	1×10^{-4}
		I	6×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
Plutonium (94)	Pu 238	S	2×10^{-12}	1×10^{-4}	7×10^{-14}	5×10^{-6}
		I	3×10^{-11}	8×10^{-4}	1×10^{-12}	3×10^{-5}
	Pu 239	S	2×10^{-12}	1×10^{-4}	6×10^{-14}	5×10^{-6}
		I	4×10^{-11}	8×10^{-4}	1×10^{-12}	3×10^{-5}
	Pu 240	S	2×10^{-12}	1×10^{-4}	6×10^{-14}	5×10^{-6}
		I	4×10^{-11}	8×10^{-4}	1×10^{-12}	3×10^{-5}
	Pu 241	S	9×10^{-11}	7×10^{-3}	3×10^{-12}	2×10^{-4}
		I	4×10^{-8}	4×10^{-2}	1×10^{-9}	1×10^{-3}

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Concentrations in Air and Water Above Natural Background—Continued

(See footnotes)

Element (atomic number)	Isotope [1]	†	Table I Column 1 Air (μCi/ml)	Table I Column 2 Water (μCi/ml)	Table II Column 1 Air (μCi/ml)	Table II Column 2 Water (μCi/ml)
Plutonium (94)	Pu 242	S	2×10^{-12}	1×10^{-4}	6×10^{-14}	5×10^{-6}
		I	4×10^{-11}	9×10^{-4}	1×10^{-12}	3×10^{-5}
	Pu 243	S	2×10^{-6}	1×10^{-2}	6×10^{-8}	3×10^{-4}
		I	2×10^{-6}	1×10^{-2}	8×10^{-8}	3×10^{-4}
	Pu 244	S	2×10^{-12}	1×10^{-4}	6×10^{-14}	4×10^{-6}
		I	3×10^{-11}	3×10^{-4}	1×10^{-12}	1×10^{-5}
Polonium (84)	Po 210	S	5×10^{-10}	2×10^{-3}	2×10^{-11}	7×10^{-7}
		I	2×10^{-10}	8×10^{-4}	7×10^{-12}	3×10^{-5}
Potassium (19)	K 42	S	2×10^{-6}	9×10^{-3}	7×10^{-8}	3×10^{-4}
		I	1×10^{-7}	6×10^{-4}	4×10^{-9}	2×10^{-5}
Praseodymium (59)	Pr 142	S	2×10^{-7}	9×10^{-4}	7×10^{-9}	3×10^{-5}
		I	2×10^{-7}	9×10^{-4}	5×10^{-9}	3×10^{-5}
	Pr 143	S	3×10^{-7}	1×10^{-3}	1×10^{-8}	5×10^{-5}
		I	2×10^{-7}	1×10^{-3}	6×10^{-9}	5×10^{-5}
Promethium (61)	Pm 147	S	6×10^{-8}	6×10^{-3}	2×10^{-9}	2×10^{-4}
		I	1×10^{-7}	6×10^{-3}	3×10^{-9}	2×10^{-4}
	Pm 149	S	3×10^{-7}	1×10^{-3}	1×10^{-8}	4×10^{-5}
		I	2×10^{-7}	1×10^{-3}	8×10^{-9}	4×10^{-5}
Protoactinium (91)	Pa 230	S	2×10^{-9}	7×10^{-3}	6×10^{-11}	2×10^{-4}
		I	8×10^{-10}	7×10^{-3}	3×10^{-11}	2×10^{-4}
	Pa 231	S	1×10^{-12}	3×10^{-5}	4×10^{-14}	9×10^{-7}
		I	1×10^{-10}	8×10^{-4}	4×10^{-12}	2×10^{-5}
	Pa 233	S	6×10^{-7}	4×10^{-3}	2×10^{-8}	1×10^{-4}
		I	2×10^{-7}	3×10^{-3}	6×10^{-9}	1×10^{-4}
Radium (88)	Ra 223	S	2×10^{-9}	2×10^{-5}	6×10^{-11}	7×10^{-7}
		I	2×10^{-10}	1×10^{-4}	8×10^{-12}	4×10^{-6}
	Ra 224	S	5×10^{-9}	7×10^{-5}	2×10^{-10}	2×10^{-6}
		I	7×10^{-10}	2×10^{-4}	2×10^{-11}	5×10^{-6}
	Ra 226	S	3×10^{-11}	4×10^{-7}	3×10^{-12}	3×10^{-8}
		I	5×10^{-11}	9×10^{-4}	2×10^{-12}	3×10^{-5}
	Ra 228	S	7×10^{-11}	8×10^{-7}	2×10^{-12}	3×10^{-8}
		I	4×10^{-11}	7×10^{-4}	1×10^{-12}	3×10^{-5}
Radon (86)	Rn 220	S	3×10^{-7}	----------	1×10^{-8}	----------
	Rn 222 [3]	S	*** 3×10^{-8}	----------	3×10^{-9}	----------
Rhenium (75)	Re 183	S	3×10^{-6}	2×10^{-2}	9×10^{-8}	6×10^{-4}
		I	2×10^{-7}	8×10^{-3}	5×10^{-9}	3×10^{-4}
	Re 186	S	6×10^{-7}	3×10^{-3}	2×10^{-8}	9×10^{-5}
		I	2×10^{-7}	1×10^{-3}	8×10^{-9}	5×10^{-5}
	Re 187	S	9×10^{-6}	7×10^{-2}	3×10^{-7}	3×10^{-3}
		I	5×10^{-7}	4×10^{-3}	2×10^{-8}	2×10^{-3}
	Re 188	S	4×10^{-7}	2×10^{-3}	1×10^{-8}	6×10^{-5}
		I	2×10^{-7}	9×10^{-4}	6×10^{-9}	3×10^{-5}
Rhodium (45)	Rh 103m	S	8×10^{-5}	4×10^{-1}	3×10^{-6}	1×10^{-2}
		I	6×10^{-5}	3×10^{-1}	2×10^{-6}	1×10^{-2}
	Rh 105	S	8×10^{-7}	4×10^{-3}	3×10^{-8}	1×10^{-4}
		I	5×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
Rubidium (37)	Rb 86	S	3×10^{-7}	2×10^{-3}	1×10^{-8}	7×10^{-5}
		I	7×10^{-8}	7×10^{-4}	2×10^{-9}	2×10^{-5}
	Rb 87	S	5×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
		I	7×10^{-8}	5×10^{-3}	2×10^{-9}	2×10^{-4}

Concentrations in Air and Water Above Natural Background—Continued

(See)

Element (atomic number)	Isotope [1]	†	Table I Column 1 Air (μCi/ml)	Table I Column 2 Water (μCi/ml)	Table II Column 1 Air (μCi/ml)	Table II Column 2 Water (μCi/ml)
Ruthenium (44)	Ru 97	S	2×10^{-6}	1×10^{-2}	8×10^{-8}	4×10^{-4}
		I	2×10^{-6}	1×10^{-2}	6×10^{-8}	3×10^{-4}
	Ru 103	S	5×10^{-7}	2×10^{-3}	2×10^{-8}	8×10^{-5}
		I	8×10^{-8}	2×10^{-3}	3×10^{-9}	8×10^{-5}
	Ru 105	S	7×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
		I	5×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
	Ru 106	S	8×10^{-8}	4×10^{-4}	3×10^{-9}	1×10^{-5}
		I	6×10^{-9}	3×10^{-4}	2×10^{-10}	1×10^{-5}
Samarium (62)	Sm 147	S	7×10^{-11}	2×10^{-3}	2×10^{-12}	6×10^{-5}
		I	3×10^{-10}	2×10^{-3}	9×10^{-12}	7×10^{-5}
	Sm 151	S	6×10^{-8}	1×10^{-2}	2×10^{-9}	4×10^{-4}
		I	1×10^{-7}	1×10^{-2}	5×10^{-9}	4×10^{-4}
	Sm 153	S	5×10^{-7}	2×10^{-3}	2×10^{-8}	8×10^{-5}
		I	4×10^{-7}	2×10^{-3}	1×10^{-8}	8×10^{-5}
Scandium (21)	Sc 46	S	2×10^{-7}	1×10^{-3}	8×10^{-9}	4×10^{-5}
		I	2×10^{-8}	1×10^{-3}	8×10^{-10}	4×10^{-5}
	Sc 47	S	6×10^{-7}	3×10^{-3}	2×10^{-8}	9×10^{-5}
		I	5×10^{-7}	3×10^{-3}	2×10^{-8}	9×10^{-5}
	Sc 48	S	2×10^{-7}	8×10^{-4}	6×10^{-9}	3×10^{-5}
		I	1×10^{-7}	8×10^{-4}	5×10^{-9}	3×10^{-5}
Selenium (34)	Se 75	S	1×10^{-6}	9×10^{-3}	4×10^{-8}	3×10^{-4}
		I	1×10^{-7}	8×10^{-3}	4×10^{-9}	3×10^{-4}
Silicon (14)	Si 31	S	6×10^{-6}	3×10^{-2}	2×10^{-7}	9×10^{-4}
		I	1×10^{-6}	6×10^{-3}	3×10^{-8}	2×10^{-4}
Silver (47)	Ag 105	S	6×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
		I	8×10^{-8}	3×10^{-3}	3×10^{-9}	1×10^{-4}
	Ag 110m	S	2×10^{-7}	9×10^{-4}	7×10^{-9}	3×10^{-5}
		I	1×10^{-8}	9×10^{-4}	3×10^{-10}	3×10^{-5}
	Ag 111	S	3×10^{-7}	1×10^{-3}	1×10^{-8}	4×10^{-5}
		I	2×10^{-7}	1×10^{-3}	8×10^{-9}	4×10^{-5}
Sodium (11)	Na 22	S	2×10^{-7}	1×10^{-3}	6×10^{-9}	4×10^{-5}
		I	9×10^{-9}	9×10^{-4}	3×10^{-10}	3×10^{-5}
	Na 24	S	1×10^{-6}	6×10^{-3}	4×10^{-8}	2×10^{-4}
		I	1×10^{-7}	8×10^{-4}	5×10^{-9}	3×10^{-5}
Strontium (38)	Sr 85m	S	4×10^{-5}	2×10^{-1}	1×10^{-6}	7×10^{-3}
		I	3×10^{-5}	2×10^{-1}	1×10^{-6}	7×10^{-3}
	Sr 85	S	2×10^{-7}	3×10^{-3}	8×10^{-9}	1×10^{-4}
		I	1×10^{-7}	5×10^{-3}	4×10^{-9}	2×10^{-4}
	Sr 89	S	3×10^{-8}	3×10^{-4}	3×10^{-10}	3×10^{-6}
		I	4×10^{-8}	8×10^{-4}	1×10^{-9}	3×10^{-5}
	Sr 90	S	1×10^{-9}	1×10^{-3}	3×10^{-11}	3×10^{-7}
		I	5×10^{-9}	1×10^{-3}	2×10^{-10}	4×10^{-5}
	Sr 91	S	4×10^{-7}	2×10^{-3}	2×10^{-8}	7×10^{-5}
		I	3×10^{-7}	1×10^{-3}	9×10^{-9}	5×10^{-5}
	Sr 92	S	4×10^{-7}	2×10^{-3}	2×10^{-8}	7×10^{-5}
		I	3×10^{-7}	2×10^{-3}	1×10^{-8}	6×10^{-5}
Sulfur (16)	S 35	S	3×10^{-7}	2×10^{-3}	9×10^{-9}	6×10^{-5}
		I	3×10^{-7}	8×10^{-3}	9×10^{-9}	3×10^{-4}
Tantalum (73)	Ta 182	S	4×10^{-8}	1×10^{-3}	1×10^{-9}	4×10^{-6}
		I	2×10^{-8}	1×10^{-3}	7×10^{-10}	4×10^{-6}

Concentrations in Air and Water Above Natural Background—Continued

(See footnotes)

Element (atomic number)	Isotope [1] †		Table I Column 1 Air (μCi/ml)	Table I Column 2 Water (μCi/ml)	Table II Column 1 Air (μCi/ml)	Table II Column 2 Water (μCi/ml)
Technetium (43)	Tc 96m	S	8×10^{-5}	4×10^{-1}	3×10^{-6}	1×10^{-2}
		I	3×10^{-5}	3×10^{-1}	1×10^{-6}	1×10^{-2}
	Tc 96	S	6×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
		I	2×10^{-7}	1×10^{-3}	8×10^{-9}	5×10^{-5}
	Tc 97m	S	2×10^{-6}	1×10^{-2}	8×10^{-8}	4×10^{-4}
		I	2×10^{-7}	5×10^{-3}	5×10^{-9}	2×10^{-4}
	Tc 97	S	1×10^{-5}	5×10^{-2}	4×10^{-7}	2×10^{-3}
		I	3×10^{-7}	2×10^{-2}	1×10^{-8}	8×10^{-4}
	Tc 99m	S	4×10^{-5}	2×10^{-1}	1×10^{-6}	6×10^{-3}
		I	1×10^{-5}	8×10^{-2}	5×10^{-7}	3×10^{-3}
	Tc 99	S	2×10^{-6}	1×10^{-2}	7×10^{-8}	3×10^{-4}
		I	6×10^{-8}	5×10^{-3}	2×10^{-9}	2×10^{-4}
Tellurium (52)	Te 125m	S	4×10^{-7}	5×10^{-3}	1×10^{-8}	2×10^{-4}
		I	1×10^{-7}	3×10^{-3}	4×10^{-9}	1×10^{-4}
	Te 127m	S	1×10^{-7}	2×10^{-3}	5×10^{-9}	6×10^{-5}
		I	4×10^{-8}	2×10^{-3}	1×10^{-9}	5×10^{-5}
	Te 127	S	2×10^{-6}	8×10^{-3}	6×10^{-8}	3×10^{-4}
		I	9×10^{-7}	5×10^{-3}	3×10^{-8}	2×10^{-4}
	Te 129m	S	8×10^{-8}	1×10^{-3}	3×10^{-9}	3×10^{-5}
		I	3×10^{-8}	6×10^{-4}	1×10^{-9}	2×10^{-5}
	Te 129	S	5×10^{-6}	2×10^{-2}	2×10^{-7}	8×10^{-4}
		I	4×10^{-6}	2×10^{-2}	1×10^{-7}	8×10^{-4}
	Te 131m	S	4×10^{-7}	2×10^{-3}	1×10^{-8}	6×10^{-5}
		I	2×10^{-7}	1×10^{-3}	6×10^{-9}	4×10^{-5}
	Te 132	S	2×10^{-7}	9×10^{-4}	7×10^{-9}	3×10^{-5}
		I	1×10^{-7}	6×10^{-4}	4×10^{-9}	2×10^{-5}
Terbium (65)	Tb 160	S	1×10^{-7}	1×10^{-3}	3×10^{-9}	4×10^{-5}
		I	3×10^{-8}	1×10^{-3}	1×10^{-9}	4×10^{-5}
Thallium (81)	Tl 200	S	3×10^{-6}	1×10^{-2}	9×10^{-8}	4×10^{-4}
		I	1×10^{-6}	7×10^{-3}	4×10^{-8}	$\times10^{-4}$
	Tl 201	S	2×10^{-6}	9×10^{-3}	7×10^{-8}	3×10^{-4}
		I	9×10^{-7}	5×10^{-3}	3×10^{-8}	2×10^{-4}
	Tl 202	S	8×10^{-7}	4×10^{-3}	3×10^{-8}	1×10^{-4}
		I	2×10^{-7}	2×10^{-3}	8×10^{-9}	7×10^{-5}
	Tl 204	S	6×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
		I	3×10^{-8}	2×10^{-3}	9×10^{-10}	6×10^{-5}
Thorium (90) *	Th 227	S	3×10^{-10}	5×10^{-6}	1×10^{-11}	2×10^{-5}
		I	2×10^{-10}	5×10^{-6}	6×10^{-12}	2×10^{-5}
	Th 228	S	9×10^{-12}	2×10^{-6}	3×10^{-13}	7×10^{-6}
		I	6×10^{-12}	4×10^{-6}	2×10^{-13}	1×10^{-5}
	Th 230	S	2×10^{-12}	5×10^{-5}	8×10^{-14}	2×10^{-6}
		I	1×10^{-11}	9×10^{-6}	3×10^{-13}	3×10^{-5}
*	Th 231	S	1×10^{-6}	7×10^{-3}	5×10^{-8}	2×10^{-4}
		I	1×10^{-6}	7×10^{-3}	4×10^{-8}	2×10^{-4}
	Th 232	S	3×10^{-11}	5×10^{-5}	1×10^{-12}	2×10^{-6}
		I	3×10^{-11}	1×10^{-3}	1×10^{-12}	4×10^{-5}
**	Th natural	S	6×10^{-11}	6×10^{-5}	2×10^{-12}	2×10^{-6}
			6×10^{-11}	6×10^{-4}	2×10^{-12}	2×10^{-5}

Concentrations in Air and Water Above Natural Background—Continued

(See footnotes)

Element (atomic number)	Isotope [1] †		Table I Column 1 Air (μCi/ml)	Table I Column 2 Water (μCi/ml)	Table II Column 1 Air (μCi/ml)	Table II Column 2 Water (μCi/ml)
Thorium (90)	Th 234	S	6×10^{-8}	3×10^{-4}	2×10^{-9}	2×10^{-5}
		I	3×10^{-8}	3×10^{-4}	1×10^{-9}	2×10^{-5}
Thulium (69)	Tm 170	S	4×10^{-6}	1×10^{-3}	1×10^{-9}	5×10^{-5}
		I	3×10^{-6}	1×10^{-3}	1×10^{-9}	5×10^{-5}
	Tm 171	S	1×10^{-7}	1×10^{-2}	4×10^{-9}	5×10^{-4}
		I	2×10^{-7}	1×10^{-2}	8×10^{-9}	5×10^{-4}
Tin (50)	Sn 113	S	4×10^{-7}	2×10^{-3}	1×10^{-8}	9×10^{-5}
		I	5×10^{-6}	2×10^{-3}	2×10^{-9}	8×10^{-5}
	Sn 125	S	1×10^{-7}	5×10^{-4}	4×10^{-9}	2×10^{-5}
		I	8×10^{-8}	5×10^{-4}	3×10^{-9}	2×10^{-5}
Tungsten (Wolfram) (74)	W 181	S	2×10^{-6}	1×10^{-2}	8×10^{-8}	4×10^{-4}
		I	1×10^{-7}	1×10^{-2}	4×10^{-9}	3×10^{-4}
	W 185	S	8×10^{-7}	4×10^{-3}	3×10^{-8}	1×10^{-4}
		I	1×10^{-7}	3×10^{-3}	4×10^{-9}	1×10^{-4}
	W 187	S	4×10^{-7}	2×10^{-3}	2×10^{-8}	7×10^{-5}
		I	3×10^{-7}	2×10^{-3}	1×10^{-8}	6×10^{-5}
Uranium (92)	U 230	S	3×10^{-10}	1×10^{-4}	1×10^{-11}	5×10^{-6}
		I	1×10^{-10}	1×10^{-4}	4×10^{-12}	5×10^{-6}
	U 232	S	1×10^{-10}	8×10^{-4}	3×10^{-12}	3×10^{-5}
		I	3×10^{-11}	8×10^{-4}	9×10^{-13}	3×10^{-5}
	U 233	S	5×10^{-10}	9×10^{-4}	2×10^{-11}	3×10^{-5}
		I	1×10^{-10}	9×10^{-4}	4×10^{-12}	3×10^{-5}
**	U 234	S[4]	6×10^{-10}	9×10^{-4}	2×10^{-11}	3×10^{-5}
		I	1×10^{-10}	9×10^{-4}	4×10^{-12}	3×10^{-5}
**	U 235	S[4]	5×10^{-10}	8×10^{-4}	2×10^{-11}	3×10^{-5}
		I	1×10^{-10}	8×10^{-4}	4×10^{-12}	3×10^{-5}
	U 236	S	6×10^{-10}	1×10^{-3}	2×10^{-11}	$\times10^{-5}$
		I	1×10^{-10}	1×10^{-3}	4×10^{-12}	3×10^{-5}
**	U 238	S[4]	7×10^{-11}	1×10^{-3}	3×10^{-12}	4×10^{-5}
		I	1×10^{-10}	1×10^{-3}	5×10^{-12}	4×10^{-5}
	U 240	S	2×10^{-7}	1×10^{-3}	8×10^{-9}	3×10^{-5}
		I	2×10^{-7}	1×10^{-3}	6×10^{-9}	3×10^{-5}
**	U-natural	S[4]	1×10^{-10}	1×10^{-3}	5×10^{-12}	3×10^{-5}
		I	1×10^{-10}	1×10^{-3}	5×10^{-12}	3×10^{-5}
Vanadium (23)	V 48	S	2×10^{-7}	9×10^{-4}	6×10^{-9}	3×10^{-5}
		I	6×10^{-8}	8×10^{-4}	2×10^{-9}	3×10^{-5}
Xenon (54)	Xe 131m	Sub	2×10^{-5}	----------	4×10^{-7}	----------
	Xe 133	Sub	1×10^{-5}	----------	3×10^{-7}	----------
	Xe 133m	Sub	1×10^{-5}	----------	3×10^{-7}	----------
	Xe 135	Sub	4×10^{-6}	----------	1×10^{-7}	----------
Ytterbium (70)	Yb 175	S	7×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
		I	6×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
Yttrium (39)	Y 90	S	1×10^{-7}	6×10^{-4}	4×10^{-9}	2×10^{-5}
		I	1×10^{-7}	6×10^{-4}	3×10^{-9}	2×10^{-5}
	Y 91m	S	2×10^{-5}	1×10^{-1}	8×10^{-7}	3×10^{-3}
		I	2×10^{-5}	1×10^{-1}	6×10^{-7}	3×10^{-3}
	Y 91	S	4×10^{-8}	8×10^{-4}	1×10^{-9}	3×10^{-5}
		I	3×10^{-8}	8×10^{-4}	1×10^{-9}	3×10^{-5}
	Y 92	S	4×10^{-7}	2×10^{-3}	1×10^{-8}	6×10^{-5}
		I	3×10^{-7}	2×10^{-3}	1×10^{-8}	6×10^{-5}
	Y 93	S	2×10^{-7}	8×10^{-4}	6×10^{-9}	3×10^{-5}
		I	1×10^{-7}	8×10^{-4}	5×10^{-9}	3×10^{-5}

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Concentrations in Air and Water Above Natural Background—Continued

(See footnotes)

Element (atomic number)	Isotope [1]		Table I, Column 1 Air (μCi/ml)	Table I, Column 2 Water (μCi/ml)	Table II, Column 1 Air (μCi/ml)	Table II, Column 2 Water (μCi/ml)
Zinc (30)	Zn 65	S	1×10^{-7}	3×10^{-3}	4×10^{-9}	1×10^{-4}
		I	6×10^{-8}	5×10^{-3}	2×10^{-9}	2×10^{-4}
	Zn 69m	S	4×10^{-7}	2×10^{-3}	1×10^{-8}	7×10^{-5}
		I	3×10^{-7}	2×10^{-3}	1×10^{-8}	6×10^{-5}
	Zn 69	S	7×10^{-6}	5×10^{-2}	2×10^{-7}	2×10^{-3}
		I	9×10^{-6}	5×10^{-2}	3×10^{-7}	2×10^{-3}
Zirconium (40)	Zr 93	S	1×10^{-7}	2×10^{-2}	4×10^{-9}	8×10^{-4}
		I	3×10^{-7}	2×10^{-2}	1×10^{-8}	8×10^{-4}
	Zr 95	S	1×10^{-7}	2×10^{-3}	4×10^{-9}	6×10^{-5}
		I	3×10^{-8}	2×10^{-3}	1×10^{-9}	6×10^{-5}
	Zr 97	S	1×10^{-7}	5×10^{-4}	4×10^{-9}	2×10^{-5}
		I	9×10^{-8}	5×10^{-4}	3×10^{-9}	2×10^{-5}
Any single radionuclide not listed above with decay mode other than alpha emission or spontaneous fission and with radioactive half-life less than 2 hours.	.....	Sub	1×10^{-6}	.....	3×10^{-8}	.....
Any single radionuclide not listed above with decay mode other than alpha emission or spontaneous fission and with radioactive half-life greater than 2 hours.	.....		3×10^{-9}	9×10^{-3}	1×10^{-10}	3×10^{-6}
Any single radionuclide not listed above, which decays by alpha emission or spontaneous fission.	.....		6×10^{-13}	4×10^{-7}	2×10^{-14}	3×10^{-8}

[1] Soluble (S); Insoluble (I).

[2] "Sub" means that values given are for submersion in a semispherical infinite cloud of airborne material.

[3] These radon concentrations are appropriate for protection from radon-222 combined with its short-lived daughters. Alternatively, the value in Table I may be replaced by one-third (⅓) "working level." (A "working level" is defined as any combination of short-lived radon-222 daughters, polonium-218, lead-214, bismuth-214 and polonium-214, in one liter of air, without regard to the degree of equilibrium, that will result in the ultimate emission of 1.3×10^{5} MeV of alpha particle energy.) The Table II value may be replaced by one-thirtieth (1/30) of a "working level." The limit on radon-222 concentrations in restricted areas may be based on an annual average.

40 FR 50704

‡4. For soluble mixtures of U-238, U-234 and U-235 in air chemical toxicity may be the limiting factor. If the percent by weight (enrichment) of U-235 is less than 5, the concentration value for a 40-hour workweek, Table I, is 0.2 milligrams uranium per cubic meter of air average. For any enrichment, the product of the average concentration and time of exposure during a 40-hour workweek shall not exceed 8×10^{-3} SA μCi-hr/ml, where SA is the specific activity of the uranium inhaled. The concentration value for Table II is 0.007 milligrams uranium per cubic meter of air. The specific activity for natural uranium is 6.77×10^{-7} curies per gram U. The specific activity for other mixtures of U-238, U-235 and U-234, if not known, shall be:

39 FR 23990

$SA = 3.6\times10^{-7}$ curies/gram U (U-depleted E > 0.72)

$SA = (0.4 + 0.38\,E + 0.0034\,E^2)\,10^{-6}$

where E is the percentage by weight of U-235, expressed as percent.

*Amended 37 FR 23319.

**Amended 39 FR 23990; footnote redesignated 40 FR 50704.

***Amended 40 FR 50704.

†Amended 38 FR 29314.

‡Amended 39 FR 25463; redesignated 40 FR 50704

25 FR 10914

NOTE:

NOTE: In any case where there is a mixture in air or water of more than one radionuclide, the limiting values for purposes of this Appendix should be determined as follows:

1. If the identity and concentration of each radionuclide in the mixture are known, the limiting values should be derived as follows: Determine, for each radionuclide in the mixture, the ratio between the quantity present in the mixture and the limit otherwise established in Appendix B for the specific radionuclide when not in a mixture. The sum of such ratios for all the radionuclides in the mixture may not exceed "1" (i.e., "unity").

EXAMPLE: If radionuclides A, B, and C are present in concentrations C_A, C_B, and C_C, and if the applicable MPC's, are MPC_A, and MPC_B, and MPC_C respectively, then the concentrations shall be limited so that the following relationship exists:

$$\frac{C_A}{MPC_A}+\frac{C_B}{MPC_B}+\frac{C_C}{MPC_C}\leq 1$$

2. If either the identity or the concentration of any radionuclide in the mixture is not known, the limiting values for purposes of Appendix B shall be:

a. For purposes of Table I, Col. 1—6×10^{-12}

b. For purposes of Table I, Col. 2—4×10^{-7}

c. For purposes of Table II, Col. 1—2×10^{-10}

d. For purposes of Table II, Col. 2—3×10^{-6}

3. If any of the conditions specified below are met, the corresponding values specified below may be used in lieu of those specified in paragraph 2 above.

a. If the identity of each radionuclide in the mixture is known but the concentration of one or more of the radionuclides in the mixture is not known, the concentration limit for the mixture is the limit specified in Appendix "B" for the radionuclide in the mixture having the lowest concentration limit; or

b. If the identity of each radionuclide in the mixture is not known, but it is known that certain radionuclides specified in Appendix "B" are not present in the mixture, the concentration limit for the mixture is the lowest concentration limit specified in Appendix "B" for any radionuclide which is not known to be absent from the mixture; or

[illegible] (atomic number) and isotope	Table I		Table II	
	Column 1 Air (μCi/ml)	Column 2 Water (μCi/ml)	Column 1 Air (μCi/ml)	Column 2 Water (μCi/ml)
If it is known that Sr 90, I 125, I 126, I 129, I 131, (I 133, table II only), Pb 210, Po 210, At 211, Ra 223, Ra 224, Ra 226, Ac 227, Ra 228, Th 230, Pa 231, Th 232, Th-nat, Cm 248, Cf 254, and Fm 256 are not present	----------	9×10^{-8}	----------	3×10^{-6}
If it is known that Sr 90, I 125, I 126, I 129, (I 131, I 133, [illegible] Po 210, Ra 223, Ra 226, Ra 228, [illegible] 248, Cf 254, and Fm 256 are not present	----------	6×10^{-8}	----------	2×10^{-6}
If it is known that [illegible] 90, I 129, (I 125, I 126, I 131, table II only), [illegible] 226, Ra 228, Cm 248, and Cf 254 are not present	----------	2×10^{-8}	----------	6×10^{-7}
If it is known that (I 129, table II only), Ra 226, and Ra 228 are not present	----------	3×10^{-8}	----------	1×10^{-7}
If it is known that alpha-emitters and Sr 90, I 129, Pb 210, Ac 227, Ra 228, Pa 230, Pu 241, and Bk 249 are not present	3×10^{-9}	----------	1×10^{-10}	----------
If it is known that alpha-emitters and Pb 210, Ac 227, Ra 228, and Pu 241 are not present	3×10^{-10}	----------	1×10^{-11}	----------
If it is known that alpha-emitters and Ac 227 are not present	3×10^{-11}	----------	1×10^{-12}	----------
If it is known that Ac 227, Th 230, Pa 231, Pu 238, Pu 239, Pu 240, Pu 242, Pu 244, Cm 248, Cf 249 and Cf 251 are not present	3×10^{-12}	----------	1×10^{-13}	----------

4. If a mixture of radionuclides consists of uranium and its daughters in ore dust prior to chemical separation of the uranium from the ore, the values specified below may be used for uranium and its daughters through radium-226, instead of those from paragraphs 1, 2, or 3 above.

a. For purposes of Table I, Col. 1—1×10^{-10} μCi/ml gross alpha activity; or 5×10^{-12} μCi/ml natural uranium; or 75 micrograms per cubic meter of air natural uranium.

b. For purposes of Table II, Col. 1—3×10^{-12} μCi/ml gross alpha activity; or 2×10^{-13} μCi/ml natural uranium; or 3 micrograms per cubic meter of air natural uranium.

5. For purposes of this note, a radionuclide may be considered as not present in a mixture if (a) the ratio of the concentration of that radionuclide in the mixture (C_A) to the concentration limit for that radionuclide specified in Table II of Appendix B (MPC_A) does not exceed 1/10 (i.e. $\frac{C_A}{MPC_A}\leq\frac{1}{10}$) and (b) the sum of such ratios for all the radionuclides considered as not present in the mixture does not exceed 1/4 (i.e. $\frac{C_A}{MPC_A}+\frac{C_B}{MPC_B}+\cdots\leq\frac{1}{4}$).

Material	Microcuries
Americium-241	.01
Antimony-122	100
Antimony-124	10
Antimony-125	10
Arsenic-73	100
Arsenic-74	10
Arsenic-76	10
Arsenic-77	100
Barium-131	10
*Barium-133	10
Barium-140	10
Bismuth-210	1
Bromine-82	10
Cadmium-109	10
Cadmium-115m	10
Cadmium-115	100
Calcium-45	10
Calcium-47	10
Carbon-14	100
Cerium-141	100
Cerium-143	100
Cerium-144	1
Cesium-131	1,000
Cesium-134m	100
Cesium-134	1
Cesium-135	10
Cesium-136	10
Cesium-137	10
Chlorine-36	10
Chlorine-38	1
Chromium-51	1,000
Cobalt-58m	10
Cobalt-58	10
Cobalt-60	1
Copper-64	100
Dysprosium-165	[illegible]
Dysprosium-166	[illegible]
Erbium-169	[illegible]
Erbium-171	[illegible]
Europium-152 9.2 h	100
Europium-152 13 yr	1
Europium-154	1
Europium-155	10
Fluorine-18	1,000
Gadolinium-153	10
Gadolinium-159	100
Gallium-72	10
Germanium-71	100
Gold-198	100
Gold-199	100
Hafnium-181	10
Holmium-166	100
Hydrogen-3	1,000
Indium-113m	100
Indium-114m	10
Indium-115m	[illegible]
Indium-115	10
Iodine-125	1
Iodine-126	1
Iodine-129	0.1
Iodine-131	1
Iodine-132	10
Iodine-133	1
Iodine-134	10
Iodine-135	10
Iridium-192	10
Iridium-194	100
Iron-55	100
Iron-59	10
Krypton-85	100
Krypton-87	10
Lanthanum-140	[illegible]
Lutetium-177	[illegible]
Manganese-52	10
Manganese-54	10
Manganese-56	[illegible]
Mercury-197m	[illegible]
Mercury-197	[illegible]
Mercury-203	[illegible]
Molybdenum-99	100
Neodymium-147	100
Neodymium-149	100
Nickel-59	100
Nickel-63	10
Nickel-65	[illegible]
Niobium-93m	10
Niobium-95	[illegible]
Niobium-97	10
Osmium-185	10
Osmium-191m*	100
Osmium-191	100
Osmium-193	100
Palladium-103	100
Palladium-109	100
Phosphorus-32	10
Platinum-191	100
Platinum-193m	100
Platinum-193	100
Platinum-197m	100
Platinum-197	100
Plutonium-239	.01
Polonium-210	0.1
Potassium-42	10
Praseodymium-142	100
Praseodymium-143	100
Promethium-147	10
Promethium-149	10
Radium-226	.01
Rhenium-186	100
Rhenium-188	100
Rhodium-103m	100
Rhodium-105	100
Rubidium-86	10
Rubidium-87	10
Ruthenium-97	100
Ruthenium-103	10
Ruthenium-105	10
Ruthenium-106	1
Samarium-151	10
Samarium-153	100
Scandium-46	10
Scandium-47	100
Scandium-48	10
Selenium-75	10
Silicon-31	100
Silver-105	10
Silver-110m	1
Silver-111	100
Sodium-24	10
Strontium-85	10
Strontium-89	1
Strontium-90	0.1
Strontium-91	10
Strontium-92	10
Sulphur-35	100
Tantalum-182	10
Technetium-96	10
Technetium-97m	100
Technetium-97	100
Technetium-99m	100
Technetium-99	10
Tellurium-125m	10
Tellurium-127m	10
Tellurium-127	100
Tellurium-129m	10
Tellurium-129	100
Tellurium-131m	10
Tellurium-132	10
Terbium-160	10
Thallium-200	100
Thallium-201	100
Thallium-202	100
Thallium-204	10
**Thorium (natural)[1]	100
Thulium-170	10
Thulium-171	10
Tin-113	10
Tin-125	10
Tungsten-181	10
Tungsten-185	10
Tungsten-187	100
**Uranium (natural)[2]	100
Uranium-233	.01
Uranium-234—Uranium-235	.01
Vanadium-48	10
Xenon-131m	1,000
Xenon-133	100
Xenon-135	100
Ytterbium-175	100
Yttrium-90	10
Yttrium-91	10
Yttrium-92	100
Yttrium-93	100
Zinc-65	10
Zinc-69m	100
Zinc-69	1,000
Zirconium-93	10
Zirconium-95	10
Zirconium-97	10

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Any alpha emitting radionuclide not listed above or mixtures of alpha emitters of unknown composition ..... .01

Any radionuclide other than alpha emitting radionuclides, not listed above or mixtures of beta emitters of unknown composition 1

NOTE: For purposes of §§ 20.203 and 20.304, where there is involved a combination of isotopes in known amounts the limit for the combination should be derived as follows: Determine, for each isotope in the combination, the ratio between the quantity present in the combination and the limit otherwise established for the specific isotope when not in combination. The sum of such ratios for all the isotopes in the combination may not exceed "1" (i.e., "unity"). Example: For purposes of § 20.304, if a particular batch contains 20,000 μCi† of Au^{198} and 50,000 μCi† of C^{14}, it may also include not more than 300 μCi† of I^{131}. This limit was determined as follows:

† $\frac{20{,}000\ \mu Ci\ Au^{198}}{100{,}000\ \mu Ci} + \frac{50{,}000\ \mu Ci\ C^{14}}{100{,}000\ \mu Ci} + \frac{300\ \mu Ci\ I^{131}}{1{,}000\ \mu Ci} = 1$

The denominator in each of the above ratios was obtained by multiplying the figure in the table by 1,000 as provided in § 20.304.

[1] Based on alpha disintegration rate of Th-232, Th-230 and their daughter products.

[2] Based on alpha disintegration rate of U-238, U-234, and U-235.

* Amended 36 FR 16898.

** Amended 39 FR 23990.

† Amended 38 FR 29314.

APPENDIX A-IV

ADDITIONAL DATA FROM ORIGEN RUNS

APPENDIX A-IV

ADDITIONAL DATA FROM ORIGEN RUNS

The principal results of our three base case runs (throwaway, UO_2 recycle, and mixed-oxide recycle assembly runs) are given in Tables A-IV-1 through A-IV-3. In each case, the curies, grams, and watts (thermal) are shown (all per metric ton of heavy metal charged to the reactor) in the order: 1) cladding, 2) actinides and heavy elements, and 3) fission products. In the first portion of each table the data are summarized by element; in the second portion of each table the data are detailed as to each isotope of each element. (The gamma photon energy distribution is also shown in the first portion of the table.) Note that source term data developed for the mixed-oxide assembly recycle and mixed-oxide assembly recycle run in the ratio 2:1.

Table A-IV-i summarizes the ORIGEN analyses.

TABLE A-IV-i

SUMMARY OF ORIGEN ANALYSES

Run No.	Reactor Type	Fuel Type	Reprocessing And Other Comments	% Fissile Initially	Specific Power During Operation kW/kgHM	Discharge Burnup MWd/MTHM	Time To Reprocessing (Days)	Used For Case No.	Cross-Reference To Computer Output Tables Supplied
A. RUNS FOR BASE CASES:									
1	PWR	UO_2	Throwaway	3.2	38.4	33,000	-	1	Table A-IV-1
2	PWR	UO_2	Reprocessed	3.2	38.4	33,000	183	2,3	Table A-IV-2
3	PWR	MO_2	Reprocessed	5.09	38.4	33,000	183	2	Table A-IV-3
B. RUNS FOR ALTERNATIVE FUEL CYCLE CASES:									
4	* PWR Portion	UO_2	Tandem Cycle	3.07	37.0	30,363	-	4	
5	HWR Portion	UO_2	Tandem Cycle	1.55		46,363	-	4	
6	+ PWR	ThO_2-UO_2		3.7/4.0‡	38.4	33,400	183	5	
C. RUNS FOR PERTURBATION OFF BASE CASES									
(1) AUGMENTED ACTINIDE REMOVAL DURING REPROCESSING:									
7	PWR	UO_2	Reprocessed. 99.9% Removal of U and Pu	3.2	38.4	33,000	183	2 augmented	
8	PWR	MO_2	Reprocessed 99.9% Removal of U and Pu	5.09	38.4	33,000	183	3 augmented	
(2) CHANGES IN DISCHARGE BURNUPS:									
9	PWR	UO_2	Throwaway	2.56	38.4	25,000		1 Low BU	
10	PWR	UO_2	Reprocessed	2.56	38.4	25,000	183	2 Low BU	
11	PWR	MO_2	Reprocessed	3.96	38.4	25,000	183	3 Low BU	
12	PWR	UO_2	Throwaway	3.76	38.4	40,000	-	1 High BU	
13	PWR	UO_2	Reprocessed	3.76	38.4	40,000	183	2 High BU	
14	PWR	MO_2	Reprocessed	6.07	38.4	40,000	183	3 High BU	
(3) TO DETERMINE C-14 SOURCE TERMS:									
15	PWR	UO_2	10 ppm N-14	3.2	38.4	33,000			
16	PWR	UO_2	20 ppm N-14	3.2	38.4	33,000			

*For the Tandem cycle, the estimates are based on actinide and daughter concentrations for a typical PWR discharged fuel (approximately 30,000 MWd/MTHM burnup) and at the end of a continued burnup of this fuel in a HWR (16,000 MWd/MTHM additional burnup). (N.L. Shapiro, Combustion Engineering Power Systems, personal communication to obtain CE actinide data associated with their study given in Reference 14.)

+For the Thorium cycle analysis, the Th-232 and U-235 resonance cross sections were modified in ORIGEN in order to account for self-shielding and isotope resonance interference effects. Minor adjustments to the ORIGEN spectral indices were made in order to achieve the best match with the major discharge Thorium and Uranium isotopes reported in Reference 15.

‡3.7% is the fissile enrichment of ThO_2 (Recycle U) assemblies and 4.0% is the fissile enrichment of ThO_2 (U 235) makeup assemblies.

PWR = BU = 33,000 FUEL DECAY TIMES(2) CASE E-1 Clad

TABLE A-IV-1
ORIGEN Data
Throwaway Cycle

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

ELEMENTAL ACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	Y******** Y
H	0.	1.83E-01	1.82E-01	1.77E-01	1.07E-01	1.12E-02	6.69E-04	1.08E-13	6.26E-26	0.	0.	0.
BE	0.	6.40E-07	6.40E-07	6.40E-07	6.40E-07	6.40E-07	6.40E-07	6.40E-07	6.40E-07	6.38E-07	6.22E-07	4.85E-07
C	0.	1.52E-02	1.52E-02	1.52E-02	1.52E-02	1.51E-02	1.50E-02	1.43E-02	1.35E-02	4.54E-03	8.48E-08	0.
NA	0.	6.37E-73	9.34E-89	0.	0.	0.	0.	0.	0.	0.	0.	0.
P	0.	3.15E-01	1.25E-01	7.82E-04	0.	0.	0.	0.	0.	0.	0.	0.
S	0.	7.92E-02	6.12E-02	1.45E-02	8.24E-14	0.	0.	0.	0.	0.	0.	0.
CL	0.	3.65E-08	3.65E-08	3.65E-08	3.65E-08	3.65E-08	3.65E-08	3.65E-08	3.64E-08	3.57E-08	2.92E-08	3.90E-09
AR	0.	5.89E-12	3.13E-12	1.93E-13	1.09E-13	9.85E-14	8.66E-14	3.09E-14	8.51E-15	7.20E-25	0.	0.
K	0.	1.21E-26	1.21E-26	1.21E-26	1.21E-26	1.21E-26	1.21E-26	1.21E-26	1.21E-26	1.21E-26	1.21E-26	1.21E-26
CA	0.	6.77E-03	5.90E-03	2.74E-03	2.75E-09	0.	0.	0.	0.	0.	0.	0.
SC	0.	4.97E-01	3.79E-01	8.38E-02	1.34E-13	0.	0.	0.	0.	0.	0.	0.
CR	0.	3.24E+02	1.43E+02	1.50E+00	0.	0.	0.	0.	0.	0.	0.	0.
MN	0.	2.24E+02	2.08E+02	1.37E+02	7.42E-02	2.26E-16	1.62E-34	0.	0.	0.	0.	0.
FE	0.	2.20E+03	2.14E+03	1.87E+03	1.69E+02	3.95E-03	6.42E-09	0.	0.	0.	0.	0.
CO	0.	9.91E+03	9.53E+03	8.38E+03	2.52E+03	1.30E+01	1.78E-02	0.	0.	0.	0.	0.
NI	0.	2.55E+02	2.55E+02	2.54E+02	2.38E+02	1.76E+02	1.21E+02	7.53E+00	1.78E+00	1.52E+00	6.97E-01	2.86E-04
CU	0.	1.51E-82	4.20-101	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN	0.	1.78E-01	1.62E-01	9.68E-02	8.84E-06	9.86E-24	0.	0.	0.	0.	0.	0.
SR	0.	3.35E+00	2.16E+00	1.90E-01	4.26E-04	1.59E-04	4.63E-05	2.40E-09	1.05E-14	0.	0.	0.
Y	0.	1.11E+01	7.50E+00	8.72E-01	4.27E-04	1.59E-04	4.63E-05	2.40E-09	1.05E-14	0.	0.	0.
ZR	0.	3.97E+03	2.80E+03	3.99E+02	5.53E-02	5.53E-02	5.53E-02	5.53E-02	5.52E-02	5.50E-02	5.28E-02	3.48E-02
NB	0.	7.27E+03	5.33E+03	8.31E+02	2.67E-02	5.70E-02	6.11E-02	6.13E-02	6.11E-02	5.80E-02	5.29E-02	3.49E-02
MO	0.	7.20E+03	7.20E+03	7.20E+03	7.20E+03	7.18E-03	7.15E-03	6.93E-03	6.67E-03	3.33E-03	3.25E-06	0.
TC	0.	5.53E-03	5.53E-03	5.53E-03	5.53E-03	5.53E-03	5.53E-03	5.53E-03	5.52E-03	5.35E-03	3.98E-03	2.04E-04
CD	0.	6.39E-24	2.32E-28	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN	0.	1.51E+01	1.05E+01	5.85E+00	1.64E-01	1.13E-01	7.18E-02	1.87E-03	1.95E-05	0.	0.	0.
SB	0.	2.45E+01	2.38E+01	2.07E+01	2.05E+00	7.09E-05	1.89E-10	0.	0.	0.	0.	0.
TE	0.	9.66E+00	9.53E+00	8.52E+00	8.47E-01	2.94E-05	7.81E-11	0.	0.	0.	0.	0.
TOTALS	0.	2.42E+04	2.05E+04	1.19E+04	2.93E+03	1.89E+02	1.22E+02	7.67E+00	1.92E+00	1.65E+00	8.06E-01	7.03E-02

PWR - BU = 33,000 FUEL DECAY TIMES(2) CASE E-1 HE's

TABLE A-IV-1
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

ELEMENTAL ACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	******* Y
TL	0.	7.42E-04	8.09E-04	1.21E-03	6.24E-03	5.15E-03	3.21E-03	2.75E-04	3.93E-04	3.99E-03	3.25E-02	4.94E-02
PB	0.	2.06E-03	2.24E-03	3.36E-03	1.73E-02	1.43E-02	8.87E-03	1.82E-03	6.20E-03	2.65E-01	2.40E+00	1.91E+00
BI	0.	2.06E-03	2.24E-03	3.36E-03	1.73E-02	1.43E-02	8.87E-03	1.82E-03	6.20E-03	2.65E-01	2.40E+00	1.91E+00
PO	0.	3.38E-03	3.68E-03	5.52E-03	2.84E-02	2.34E-02	1.45E-02	2.65E-03	9.03E-03	3.87E-01	3.37E+00	2.36E+00
AT	0.	3.42E-08	3.43E-08	3.73E-08	8.99E-08	4.58E-07	1.26E-06	2.78E-05	1.32E-04	1.71E-02	4.19E-01	9.40E-01
RN	0.	2.06E-03	2.24E-03	3.36E-03	1.73E-02	1.42E-02	8.86E-03	1.10E-03	3.23E-03	1.26E-01	1.00E+00	4.99E-01
FR	0.	4.89E-08	4.99E-08	5.82E-08	1.98E-07	8.59E-07	1.94E-06	3.07E-05	1.38E-04	1.72E-02	4.20E-01	9.41E-01
RA	0.	2.06E-03	2.24E-03	3.36E-03	1.73E-02	1.43E-02	8.86E-03	1.12E-03	3.36E-03	1.43E-01	1.42E+00	1.44E+00
AC	0.	1.08E-06	1.15E-06	1.52E-06	7.78E-06	2.91E-05	5.02E-05	2.35E-04	5.23E-04	2.08E-02	4.43E-01	9.69E-01
TH	0.	3.34E-01	3.34E-01	3.35E-01	3.49E-01	3.46E-01	3.41E-01	3.39E-01	3.48E-01	5.12E-01	1.76E+00	1.78E+00
PA	0.	6.42E-01	6.42E-01	6.42E-01	6.45E-01	6.86E-01	7.49E-01	1.12E+00	1.35E+00	1.54E+00	1.52E+00	1.23E+00
U	2.35E+00	4.97E+00	4.68E+00	4.60E+00	3.65E+00	2.23E+00	2.16E+00	2.50E+00	2.53E+00	2.61E+00	2.69E+00	2.08E+00
NP	0.	1.75E+01	1.75E+01	1.75E+01	1.75E+01	1.75E+01	1.75E+01	1.72E+01	1.67E+01	8.16E+00	1.19E+00	8.86E-01
PU	0.	1.28E+05	1.28E+05	1.25E+05	8.25E+04	1.43E+04	3.02E+03	8.44E+02	7.69E+02	4.30E+02	2.12E+01	2.80E-01
AM	0.	2.20E+02	2.38E+02	3.36E+02	1.75E+03	3.83E+03	3.88E+03	2.07E+03	9.39E+02	6.96E+00	2.00E-03	3.36E-08
CM	0.	1.71E+04	1.51E+04	7.98E+03	1.36E+03	2.94E+02	4.36E+01	5.13E-02	4.86E-02	2.12E-02	1.02E-05	4.97E-08
BK	0.	1.89E-14	1.88E-14	1.88E-14	1.88E-14	1.85E-14	1.81E-14	1.54E-14	1.27E-14	3.51E-16	9.40E-32	0.
CF	0.	1.32E-04	1.29E-04	1.16E-04	1.81E-05	1.73E-08	1.02E-08	7.47E-09	5.08E-09	4.96E-12	9.40E-32	0.
TOTALS	2.35E+00	1.46E+05	1.43E+05	1.33E+05	8.56E+04	1.85E+04	6.96E+03	2.94E+03	1.73E+03	4.51E+02	4.03E+01	1.73E+01

PWR = BU = 33,000 FUEL DECAY TIMES(2) CASE E=1 FP's

TABLE A-IV-1
(continued)

POWER= 38,40MW, BURNUP= 33000,MWD, FLUX= 3,98E+13N/CM**2=SEC

ELEMENTAL ACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0, Y	1, Y	10, Y	50, Y	100, Y	500, Y	1000, Y	10000, Y	100000, Y	Y******* Y
H	0,	7,15E+02	7,11E+02	6,91E+02	4,16E+02	4,37E+01	2,61E+00	4,23E-10	2,44E-22	0,	0,	0,
ZN	0,	1,32E-22	1,03E-27	0,	0,	0,	0,	0,	0,	0,	0,	0,
GA	0,	1,90E-22	1,48E-27	0,	0,	0,	0,	0,	0,	0,	0,	0,
GE	0,	1,40E-93	1,34-114	0,	0,	0,	0,	0,	0,	0,	0,	0,
AS	0,	3,37E-25	2,46E-31	0,	0,	0,	0,	0,	0,	0,	0,	0,
SE	0,	3,95E-01	3,95E-01	3,95E-01	3,95E-01	3,95E-01	3,95E-01	3,93E-01	3,91E-01	3,55E-01	1,36E-01	9,23E-06
BR	0,	6,33E-28	1,18E-34	0,	0,	0,	0,	0,	0,	0,	0,	0,
KR	0,	1,11E+04	1,10E+04	1,06E+04	5,98E+03	4,59E+02	1,85E+01	1,31E-10	1,51E-24	0,	0,	0,
RB	0,	2,54E+00	7,51E-01	8,81E-04	1,93E-05	1,93E-05	1,93E-05	1,93E-05	1,93E-05	1,93E-05	1,93E-05	1,93E-05
SR	0,	2,00E+05	1,56E+05	8,19E+04	6,00E+04	2,24E+04	6,52E+03	3,38E-01	1,48E-06	0,	0,	0,
Y	0,	2,81E+05	2,15E+05	9,11E+04	6,00E+04	2,24E+04	6,52E+03	3,38E-01	1,48E-06	0,	0,	0,
ZR	0,	3,55E+05	2,50E+05	3,57E+04	1,87E+00	1,87E+00	1,87E+00	1,87E+00	1,86E+00	1,86E+00	1,78E+00	1,18E+00
NB	0,	6,73E+05	4,93E+05	7,66E+04	8,13E-01	1,73E+00	1,86E+00	1,87E+00	1,86E+00	1,86E+00	1,78E+00	1,18E+00
MO	0,	1,32E-10	3,76E-14	7,59E-34	0,	0,	0,	0,	0,	0,	0,	0,
TC	0,	1,43E+01	1,43E+01	1,43E+01	1,43E+01	1,43E+01	1,43E+01	1,43E+01	1,43E+01	1,38E+01	1,03E+01	5,44E-01
RU	0,	5,99E+05	5,20E+05	3,26E+05	6,50E+02	6,73E-10	7,03E-25	0,	0,	0,	0,	0,
RH	0,	5,99E+05	5,20E+05	3,26E+05	6,50E+02	6,73E-10	7,03E-25	0,	0,	0,	0,	0,
PD	0,	1,16E-01	1,16E-01	1,16E-01	1,16E-01	1,16E-01	1,16E-01	1,16E-01	1,16E-01	1,16E-01	1,14E-01	1,05E-01
AG	0,	3,39E+03	3,10E+03	1,88E+03	2,30E-01	4,31E-18	2,45E-30	0,	0,	0,	0,	0,
CD	0,	7,54E+01	4,91E+01	1,32E+01	7,17E+00	9,90E-01	8,33E-02	2,08E-10	3,69E-21	0,	0,	0,
IN	0,	4,21E-01	2,67E-01	2,12E-02	3,42E-22	0,	0,	0,	0,	0,	0,	0,
SN	0,	4,93E+03	4,11E+03	1,50E+03	5,66E-01	5,64E-01	5,64E-01	5,62E-01	5,60E-01	5,26E-01	2,82E-01	5,51E-04
SB	0,	3,74E+03	8,52E+03	7,45E+03	7,40E+02	1,15E+00	1,12E+00	1,12E+00	1,11E+00	1,05E+00	5,61E-01	1,10E-03
TE	0,	2,49E+04	1,91E+04	7,12E+03	3,06E+02	1,06E-02	2,82E-08	0,	0,	0,	0,	0,
I	0,	2,87E+00	2,05E-01	3,77E-02	3,77E-02	3,77E-02	3,77E-02	3,77E-02	3,77E-02	3,77E-02	3,76E-02	3,62E-02
XE	0,	4,25E+00	6,20E-01	1,36E-05	0,	0,	0,	0,	0,	0,	0,	0,
CS	0,	3,43E+05	3,36E+05	2,99E+05	9,55E+04	3,43E+04	1,08E+04	1,27E+00	2,23E-01	2,23E-01	2,18E-01	1,77E-01
BA	0,	1,01E+05	1,01E+05	9,94E+04	8,08E+04	3,20E+04	1,01E+04	9,77E-01	9,38E-06	0,	0,	0,
LA	0,	6,40E+02	1,08E+02	5,47E-03	0,	0,	0,	0,	0,	0,	0,	0,
CE	0,	1,00E+06	8,93E+05	5,50E+05	1,80E+02	5,85E-14	2,56E-33	0,	0,	0,	0,	0,
PR	0,	9,30E+05	8,57E+05	5,49E+05	1,80E+02	5,85E-14	2,56E-33	0,	0,	0,	0,	0,
ND	0,	6,52E+01	8,37E+00	9,33E-05	0,	0,	0,	0,	0,	0,	0,	0,
PM	0,	1,03E+05	9,93E+04	8,53E+04	7,87E+03	1,99E-01	3,58E-07	0,	0,	0,	0,	0,
SM	0,	1,26E+03	1,26E+03	1,25E+03	1,16E+03	8,46E+02	5,68E+02	2,35E+01	4,37E-01	0,	0,	0,
EU	0,	1,58E+04	1,52E+04	1,37E+04	5,37E+03	9,15E+02	1,05E+02	3,12E-06	1,22E-15	0,	0,	0,
GD	0,	2,20E+01	2,00E+01	1,19E+01	9,65E-04	6,45E-22	0,	0,	0,	0,	0,	0,
TB	0,	4,05E+02	2,95E+02	5,10E+01	9,59E-13	0,	0,	0,	0,	0,	0,	0,
DY	0,	7,36E-13	8,98E-16	5,79E-32	0,	0,	0,	0,	0,	0,	0,	0,
HO	0,	8,57E-04	8,57E-04	8,57E-04	8,53E-04	8,33E-04	8,09E-04	6,42E-04	4,81E-04	2,66E-06	0,	0,
TOTALS	0,	5,26E+06	4,50E+06	2,56E+06	3,20E+05	1,13E+05	3,46E+04	8,66E+01	2,09E+01	1,99E+01	1,52E+01	3,21E+00

PWR = BU = 33,000 FUEL DECAY TIMES(2) CASE E-1 Clad

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

TABLE A-IV-1

(continued)

ELEMENT CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	******* Y
H	1.62E+04	1.62E+04	1.62E+04	1.62E+04	1.62E+04	1.62E+04	1.62E+04	1.62E+04	1.62E+04	1.62E+04	1.62E+04	1.62E+04
HE	0.	2.33E+00	2.33E+00	2.33E+00	2.33E+00	2.33E+00	2.33E+00	2.33E+00	2.33E+00	2.33E+00	2.33E+00	2.33E+00
LI	0.	9.22E-10	9.22E-10	9.22E-10	9.22E-10	9.22E-10	9.22E-10	9.22E-10	9.22E-10	9.22E-10	9.22E-10	9.22E-10
BE	0.	5.15E-05	5.15E-05	5.15E-05	5.15E-05	5.15E-05	5.15E-05	5.15E-05	5.14E-05	5.03E-05	4.07E-05	
B	0.	2.25E-11	2.37E-11	2.99E-11	1.41E-10	6.38E-10	1.26E-09	6.22E-09	1.24E-08	1.24E-07	1.22E-06	1.08E-05
C	3.45E+00	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01
N	0.	4.70E-07	5.07E-07	7.14E-07	4.43E-06	2.09E-05	4.14E-05	2.01E-04	3.89E-04	2.40E-03	3.41E-03	3.41E-03
O	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05
F	0.	2.98E-19	2.98E-19	2.98E-19	2.98E-19	2.98E-19	2.98E-19	2.98E-19	2.98E-19	2.98E-19	2.98E-19	2.98E-19
NE	0.	1.07E-08	1.07E-08	1.07E-08	1.07E-08	1.07E-08	1.07E-08	1.07E-08	1.07E-08	1.07E-08	1.07E-08	1.07E-08
NA	0.	8.34E-10	8.34E-10	8.34E-10	8.34E-10	8.34E-10	8.34E-10	8.34E-10	8.34E-10	8.34E-10	8.34E-10	8.34E-10
MG	0.	4.46E-04	4.46E-04	4.46E-04	4.46E-04	4.46E-04	4.46E-04	4.46E-04	4.46E-04	4.46E-04	4.46E-04	4.46E-04
AL	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01
SI	6.51E+01	6.51E+01	6.51E+01	6.51E+01	6.51E+01	6.51E+01	6.51E+01	6.51E+01	6.51E+01	6.51E+01	6.51E+01	6.51E+01
P	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00
S	1.29E+00	1.29E+00	1.29E+00	1.29E+00	1.29E+00	1.29E+00	1.29E+00	1.29E+00	1.29E+00	1.29E+00	1.29E+00	1.29E+00
CL	0.	3.54E-05	3.58E-05	3.69E-05	3.72E-05	3.72E-05	3.72E-05	3.72E-05	3.72E-05	3.72E-05	3.70E-05	3.62E-05
AR	0.	3.78E-10	3.78E-10	3.80E-10	4.02E-10	5.02E-10	6.27E-10	1.63E-09	2.87E-09	2.51E-08	2.24E-07	9.99E-07
K	0.	1.20E-11	1.20E-11	1.20E-11	1.20E-11	1.20E-11	1.20E-11	1.20E-11	1.20E-11	1.20E-11	1.20E-11	1.20E-11
CA	0.	1.56E-04	1.56E-04	1.56E-04	1.56E-04	1.56E-04	1.56E-04	1.56E-04	1.56E-04	1.56E-04	1.56E-04	1.56E-04
SC	0.	1.68E-05	1.33E-05	4.78E-06	2.46E-06	2.46E-06	2.46E-06	2.46E-06	2.46E-06	2.46E-06	2.46E-06	2.46E-06
TI	5.58E+01	5.59E+01	5.59E+01	5.59E+01	5.59E+01	5.59E+01	5.59E+01	5.59E+01	5.59E+01	5.59E+01	5.59E+01	5.59E+01
V	0.	2.81E+00	2.82E+00	2.82E+00	2.82E+00	2.82E+00	2.82E+00	2.82E+00	2.82E+00	2.82E+00	2.82E+00	2.82E+00
CR	2.00E+03	2.00E+03	2.00E+03	2.00E+03	2.00E+03	2.00E+03	2.00E+03	2.00E+03	2.00E+03	2.00E+03	2.00E+03	2.00E+03
MN	1.08E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02
FE	3.97E+03	3.97E+03	3.97E+03	3.97E+03	3.97E+03	3.97E+03	3.97E+03	3.97E+03	3.97E+03	3.97E+03	3.97E+03	3.97E+03
CO	7.09E+01	6.97E+01	6.96E+01	6.90E+01	6.40E+01	6.18E+01	6.18E+01	6.18E+01	6.19E+01	6.36E+01	7.44E+01	8.36E+01
NI	3.70E+03	3.70E+03	3.70E+03	3.70E+03	3.70E+03	3.71E+03	3.70E+03	3.70E+03	3.70E+03	3.70E+03	3.69E+03	3.68E+03
CU	1.86E+01	1.86E+01	1.86E+01	1.86E+01	1.89E+01	1.99E+01	2.07E+01	2.26E+01	2.27E+01	2.27E+01	2.27E+01	2.27E+01
ZN	0.	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01
SR	0.	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01
Y	0.	4.53E-04	3.07E-04	3.57E-05	7.84E-10	2.92E-10	8.51E-11	4.41E-15	1.94E-20	0.	0.	0.
ZR	1.21E+05	1.21E+05	1.21E+05	1.21E+05	1.21E+05	1.21E+05	1.21E+05	1.21E+05	1.21E+05	1.21E+05	1.21E+05	1.21E+05
NB	3.23E+02	3.23E+02	3.23E+02	3.23E+02	3.23E+02	3.23E+02	3.23E+02	3.23E+02	3.23E+02	3.23E+02	3.24E+02	3.31E+02
MO	1.99E+02	2.06E+02	2.06E+02	2.06E+02	2.06E+02	2.06E+02	2.06E+02	2.06E+02	2.06E+02	2.06E+02	2.06E+02	2.06E+02
TC	0.	3.22E-01	3.22E-01	3.22E-01	3.22E-01	3.22E-01	3.22E-01	3.21E-01	3.21E-01	3.11E-01	2.31E-01	1.19E-02
RU	0.	9.75E-02	9.75E-02	9.75E-02	9.75E-02	9.75E-02	9.75E-02	9.75E-02	9.75E-02	9.75E-02	9.75E-02	9.75E-02
CD	6.18E-03	7.67E-08	7.67E-08	7.67E-08	7.67E-08	7.67E-08	7.67E-08	7.67E-08	7.67E-08	7.67E-08	7.67E-08	7.67E-08
IN	6.33E-03	2.20E-03	2.20E-03	2.20E-03	2.20E-03	2.20E-03	2.20E-03	2.20E-03	2.20E-03	2.20E-03	2.20E-03	2.20E-03
SN	1.83E+03	1.83E+03	1.83E+03	1.83E+03	1.83E+03	1.83E+03	1.83E+03	1.83E+03	1.83E+03	1.83E+03	1.83E+03	1.83E+03
SB	0.	6.62E-01	6.62E-01	6.59E-01	6.42E-01	6.41E-01	6.42E-01	6.44E-01	6.44E-01	6.44E-01	6.44E-01	6.44E-01
TE	0.	1.11E-02	1.17E-02	1.44E-02	3.19E-02	3.38E-02	3.38E-02	3.38E-02	3.38E-02	3.38E-02	3.38E-02	3.38E-02
TOTALS	4.09E+05	4.09E+05	4.09E+05	4.09E+05	4.09E+05	4.09E+05	4.09E+05	4.09E+05	4.09E+05	4.09E+05	4.09E+05	4.09E+05

PWR - BU = 33,000 FUEL DECAY TIMES(2) CASE E-1 HE's

TABLE A-IV-1
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

ELEMENT CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	******* Y
HE	0.	2.34E-01	2.48E-01	3.04E-01	7.40E-01	2.77E+00	5.18E+00	1.77E+01	2.64E+01	7.22E+01	1.58E+02	2.60E+02
TL	0.	2.55E-12	2.77E-12	4.16E-12	2.14E-11	1.77E-11	1.11E-11	1.32E-12	2.06E-12	2.00E-11	1.45E-10	2.02E-10
PB	0.	4.08E-07	6.87E-07	1.25E-06	4.42E-05	3.20E-04	5.49E-04	9.80E-04	1.39E-03	2.14E-01	2.36E+01	3.40E+02
BI	0.	2.05E-10	2.19E-10	3.03E-10	1.48E-09	5.42E-09	2.18E-08	1.83E-06	1.65E-05	2.41E-02	8.18E+00	3.35E+02
PO	0.	7.91E-14	8.71E-14	1.40E-13	7.94E-12	4.99E-10	3.00E-09	1.56E-07	6.29E-07	2.71E-05	2.17E-04	1.04E-04
AT	0.	2.11E-20	2.11E-20	2.30E-20	5.53E-20	2.82E-19	7.75E-19	1.71E-17	8.13E-17	1.05E-14	2.58E-13	5.78E-13
RN	0.	2.35E-12	2.56E-12	3.81E-12	2.08E-11	5.34E-11	1.65E-10	4.55E-09	1.84E-08	7.92E-07	6.36E-06	3.05E-06
FR	0.	5.76E-16	6.01E-16	7.54E-16	3.32E-15	1.30E-14	2.50E-14	2.32E-13	8.88E-13	9.80E-11	2.37E-09	5.31E-09
RA	0.	2.88E-08	3.08E-08	4.32E-08	4.04E-07	5.99E-06	2.42E-05	7.09E-04	2.87E-03	1.23E-01	9.91E-01	4.76E-01
AC	0.	1.44E-08	1.53E-08	2.04E-08	1.05E-07	3.93E-07	6.70E-07	2.85E-06	5.36E-06	5.00E-05	3.27E-04	4.11E-04
TH	0.	1.33E-03	1.39E-03	1.69E-03	7.18E-03	3.40E-02	7.20E-02	4.40E-01	9.25E-01	9.55E+00	6.98E+01	2.05E+02
PA	0.	5.25E-04	5.26E-04	5.30E-04	5.99E-04	9.10E-04	1.30E-03	4.40E-03	8.25E-03	7.61E-02	4.89E-01	6.05E-01
U	1.00E+06	9.55E+05	9.55E+05	9.55E+05	9.55E+05	9.55E+05	9.55E+05	9.55E+05	9.56E+05	9.58E+05	9.63E+05	9.63E+05
NP	0.	4.65E+02	4.65E+02	4.65E+02	4.69E+02	5.27E+02	6.16E+02	1.15E+03	1.47E+03	1.73E+03	1.68E+03	1.26E+03
PU	0.	9.42E+03	9.42E+03	9.39E+03	8.97E+03	8.27E+03	8.12E+03	7.90E+03	7.72E+03	5.35E+03	6.95E+02	7.18E+01
AM	0.	1.48E+02	1.54E+02	1.82E+02	5.95E+02	1.20E+03	1.22E+03	6.85E+02	3.51E+02	3.61E+01	1.04E-02	1.75E-07
CM	0.	2.91E+01	2.84E+01	2.58E+01	1.71E+01	3.92E+00	8.20E-01	2.68E-01	2.56E-01	1.15E-01	4.76E-04	3.85E-04
BK	0.	4.96E-21	4.84E-21	4.84E-21	4.82E-21	4.75E-21	4.65E-21	3.97E-21	3.25E-21	9.01E-23	2.41E-38	0.
CF	0.	3.11E-07	3.05E-07	2.75E-07	5.09E-08	6.69E-09	6.42E-09	4.72E-09	3.21E-09	3.13E-12	8.60E-35	0.
TOTALS	1.00E+06	9.65E+05	9.65E+05	9.65E+05	9.65E+05	9.65E+05	9.65E+05	9.65E+05	9.65E+05	9.65E+05	9.65E+05	9.65E+05

PWR = BU = 33.000 FUEL DECAY TIMES(2) CASE E-1 FP's

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

ELEMENT CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	Y******* Y
H	0.	7.38E-02	7.34E-02	7.13E-02	4.30E-02	4.51E-03	2.69E-04	4.36E-14	2.52E-26	0.	0.	0.
ZN	0.	1.41E-28	1.10E-33	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA	0.	6.15E-29	4.80E-34	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE	0.	3.73E-01	3.73E-01	3.73E-01	3.73E-01	3.73E-01	3.73E-01	3.73E-01	3.73E-01	3.73E-01	3.73E-01	3.73E-01
AS	0.	8.44E-02	8.44E-02	8.44E-02	8.44E-02	8.44E-02	8.44E-02	8.44E-02	8.44E-02	8.44E-02	8.44E-02	8.44E-02
SE	0.	5.16E+01	5.16E+01	5.16E+01	5.16E+01	5.16E+01	5.16E+01	5.16E+01	5.15E+01	5.10E+01	4.79E+01	4.59E+01
BR	0.	1.53E+01	1.53E+01	1.53E+01	1.53E+01	1.53E+01	1.53E+01	1.53E+01	1.53E+01	1.58E+01	1.90E+01	2.09E+01
KR	0.	3.69E+02	3.69E+02	3.68E+02	3.56E+02	3.41E+02	3.40E+02	3.40E+02	3.40E+02	3.40E+02	3.40E+02	3.40E+02
RB	0.	3.27E+02	3.27E+02	3.28E+02	3.40E+02	3.55E+02	3.56E+02	3.56E+02	3.56E+02	3.56E+02	3.56E+02	3.56E+02
SR	0.	8.85E+02	8.83E+02	8.73E+02	7.68E+02	5.02E+02	3.89E+02	3.43E+02	3.43E+02	3.43E+02	3.43E+02	3.43E+02
Y	0.	4.62E+02	4.61E+02	4.58E+02	4.58E+02	4.58E+02	4.58E+02	4.58E+02	4.58E+02	4.58E+02	4.58E+02	4.58E+02
ZR	0.	3.63E+03	3.63E+03	3.63E+03	3.73E+03	4.00E+03	4.11E+03	4.16E+03	4.16E+03	4.16E+03	4.13E+03	3.89E+03
NB	0.	1.70E+01	1.24E+01	1.93E+00	3.78E-03	1.72E-02	3.40E-02	1.69E-01	3.37E-01	3.36E+00	3.29E+01	2.69E+02
MO	0.	3.43E+03	3.44E+03	3.46E+03	3.46E+03	3.46E+03	3.46E+03	3.46E+03	3.46E+03	3.46E+03	3.46E+03	3.46E+03
TC	0.	8.39E+02	8.39E+02	8.39E+02	8.39E+02	8.39E+02	8.39E+02	8.38E+02	8.36E+02	8.12E+02	6.05E+02	3.19E+01
RU	0.	2.32E+03	2.31E+03	2.27E+03	2.17E+03	2.17E+03	2.17E+03	2.18E+03	2.18E+03	2.20E+03	2.41E+03	2.98E+03
RH	0.	3.87E+02	3.88E+02	3.90E+02	3.90E+02	3.90E+02	3.90E+02	3.90E+02	3.90E+02	3.90E+02	3.90E+02	3.90E+02
PD	0.	1.32E+03	1.33E+03	1.37E+03	1.47E+03	1.47E+03	1.47E+03	1.47E+03	1.47E+03	1.47E+03	1.47E+03	1.45E+03
AG	0.	6.22E+01	6.21E+01	6.19E+01	6.15E+01	6.15E+01	6.15E+01	6.15E+01	6.15E+01	6.18E+01	6.39E+01	8.44E+01
CD	0.	8.95E+01	8.95E+01	8.98E+01	9.01E+01	9.01E+01	9.01E+01	9.01E+01	9.01E+01	9.01E+01	9.01E+01	9.01E+01
IN	0.	1.22E+00	1.22E+00	1.22E+00	1.24E+00	1.27E+00	1.27E+00	1.27E+00	1.27E+00	1.27E+00	1.27E+00	1.27E+00
SN	0.	5.32E+01	5.31E+01	5.28E+01	5.26E+01	5.26E+01	5.26E+01	5.25E+01	5.24E+01	5.12E+01	4.26E+01	3.27E+01
SB	0.	1.79E+01	1.78E+01	1.72E+01	1.10E+01	1.03E+01	1.03E+01	1.03E+01	1.03E+01	1.03E+01	1.03E+01	1.03E+01
TE	0.	5.69E+02	5.69E+02	5.70E+02	5.76E+02	5.77E+02	5.77E+02	5.77E+02	5.77E+02	5.78E+02	5.87E+02	5.97E+02
I	0.	2.72E+02	2.72E+02	2.72E+02	2.72E+02	2.72E+02	2.72E+02	2.72E+02	2.72E+02	2.72E+02	2.72E+02	2.63E+02
XE	0.	5.52E+03	5.52E+03	5.52E+03	5.52E+03	5.52E+03	5.52E+03	5.52E+03	5.52E+03	5.52E+03	5.53E+03	5.53E+03
CS	0.	2.67E+03	2.66E+03	2.62E+03	2.25E+03	1.65E+03	1.38E+03	1.25E+03	1.25E+03	1.25E+03	1.25E+03	1.20E+03
BA	0.	1.37E+03	1.38E+03	1.42E+03	1.79E+03	2.40E+03	2.67E+03	2.79E+03	2.79E+03	2.79E+03	2.80E+03	2.84E+03
LA	0.	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03
CE	0.	2.77E+03	2.75E+03	2.65E+03	2.48E+03	2.48E+03	2.48E+03	2.48E+03	2.48E+03	2.48E+03	2.48E+03	2.48E+03
PR	0.	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03
ND	0.	3.81E+03	3.83E+03	3.93E+03	4.10E+03	4.10E+03	4.10E+03	4.10E+03	4.10E+03	4.10E+03	4.10E+03	4.10E+03
PM	0.	1.07E+02	1.05E+02	9.17E+01	8.48E+00	2.15E-04	3.86E-10	0.	0.	0.	0.	0.
SM	0.	8.04E+02	8.06E+02	8.19E+02	8.99E+02	8.96E+02	8.86E+02	8.66E+02	8.65E+02	8.65E+02	8.65E+02	8.65E+02
EU	0.	1.79E+02	1.78E+02	1.76E+02	1.58E+02	1.40E+02	1.45E+02	1.64E+02	1.65E+02	1.65E+02	1.65E+02	1.65E+02
GD	0.	1.24E+02	1.24E+02	1.26E+02	1.48E+02	1.77E+02	1.83E+02	1.84E+02	1.84E+02	1.84E+02	1.84E+02	1.84E+02
TB	0.	1.88E+00	1.87E+00	1.85E+00	1.85E+00	1.85E+00	1.85E+00	1.85E+00	1.85E+00	1.85E+00	1.85E+00	1.85E+00
DY	0.	1.14E+00	1.15E+00	1.18E+00	1.18E+00	1.18E+00	1.18E+00	1.18E+00	1.18E+00	1.18E+00	1.18E+00	1.18E+00
HO	0.	1.17E-01	1.17E-01	1.17E-01	1.17E-01	1.17E-01	1.17E-01	1.17E-01	1.17E-01	1.16E-01	1.16E-01	1.16E-01
ER	0.	3.67E-02	3.67E-02	3.67E-02	3.67E-02	3.67E-02	3.67E-02	3.68E-02	3.69E-02	3.72E-02	3.72E-02	3.72E-02
TOTALS	0.	3.49E+04	3.49E+04	3.49E+04	3.49E+04	3.49E+04	3.49E+04	3.49E+04	3.49E+04	3.49E+04	3.49E+04	3.49E+04

TABLE A-IV-1
(continued)

PWR = BU = 33,000 FUEL DECAY TIMES(2) CASE E-1 Clad

POWER= 38.40MW, BURNUP= 33000,MWD, FLUX= 3.98E+13N/CM**2-SEC

ELEMENT THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	******* Y
H	0.	6.52E-06	6.48E-06	6.30E-06	3.80E-06	3.98E-07	2.38E-08	3.85E-18	2.23E-30	0.	0.	0.
C	0.	4.51E-06	4.51E-06	4.51E-06	4.51E-06	4.48E-06	4.46E-06	4.25E-06	4.00E-06	1.35E-06	2.51E-11	0.
NA	0.	1.79E-74	2.62E-90	0.	0.	0.	0.	0.	0.	0.	0.	0.
P	0.	1.70E-04	6.20E-05	3.53E-07	0.	0.	0.	0.	0.	0.	0.	0.
S	0.	2.25E-05	1.74E-05	4.13E-06	2.34E-17	0.	0.	0.	0.	0.	0.	0.
CL	0.	6.80E-11	6.80E-11	6.80E-11	6.80E-11	6.80E-11	6.79E-11	6.79E-11	6.78E-11	6.65E-11	5.43E-11	7.26E-12
AR	0.	2.81E-14	1.47E-14	5.46E-16	1.51E-16	1.37E-16	1.20E-16	4.28E-17	1.18E-17	9.98E-28	0.	0.
K	0.	1.16E-29	1.16E-29	1.16E-29	1.16E-29	1.16E-29	1.16E-29	1.16E-29	1.16E-29	1.16E-29	1.16E-29	1.16E-29
CA	0.	4.14E-06	3.60E-06	1.67E-06	1.68E-12	0.	0.	0.	0.	0.	0.	0.
SC	0.	6.98E-03	5.32E-03	1.18E-03	1.88E-15	0.	0.	0.	0.	0.	0.	0.
CR	0.	1.43E+00	6.31E-01	6.65E-03	0.	0.	0.	0.	0.	0.	0.	0.
MN	0.	1.81E+00	1.68E+00	1.11E+00	6.01E-04	1.83E-18	1.31E-36	0.	0.	0.	0.	0.
FE	0.	3.01E+00	2.88E+00	2.44E+00	2.21E-01	5.16E-06	8.37E-12	0.	0.	0.	0.	0.
CO	0.	1.53E+02	1.48E+02	1.31E+02	3.94E+01	2.02E-01	2.78E-04	0.	0.	0.	0.	0.
NI	0.	4.06E-02	4.06E-02	4.04E-02	3.78E-02	2.79E-02	1.92E-02	9.41E-04	2.17E-05	0.	0.	0.
CU	0.	9.26E-85	2.58-103	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN	0.	1.42E-03	1.29E-03	7.69E-04	7.02E-08	7.83E-26	0.	0.	0.	0.	0.	0.
SR	0.	1.20E-02	7.77E-03	6.81E-04	5.59E-07	2.08E-07	6.07E-08	3.18E-12	1.38E-17	0.	0.	0.
Y	0.	4.21E-02	2.85E-02	3.32E-03	2.51E-06	9.36E-07	2.73E-07	1.41E-11	6.21E-17	0.	0.	0.
ZR	0.	2.08E+01	1.46E+01	2.09E+00	6.55E-06	6.55E-06	6.55E-06	6.55E-06	6.55E-06	6.52E-06	6.26E-06	4.13E-06
NB	0.	3.50E+01	2.57E+01	4.00E+00	1.08E-05	2.14E-05	2.29E-05	2.29E-05	2.29E-05	2.18E-05	2.00E-05	1.37E-05
MO	0.	1.79E-05	1.79E-05	1.79E-05	1.79E-05	1.79E-05	1.78E-05	1.73E-05	1.66E-05	8.30E-06	8.10E-09	0.
TC	0.	9.51E-06	9.51E-06	9.51E-06	9.51E-06	9.51E-06	9.51E-06	9.50E-06	9.48E-06	9.20E-06	6.84E-06	3.51E-07
CD	0.	2.14E-26	7.76E-31	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN	0.	1.46E-02	7.18E-03	3.29E-03	1.71E-04	1.19E-04	7.53E-05	1.96E-06	2.05E-08	0.	0.	0.
SB	0.	1.04E-01	9.96E-02	8.41E-02	8.29E-03	2.87E-07	7.64E-13	0.	0.	0.	0.	0.
TE	0.	8.31E-03	8.19E-03	7.32E-03	7.28E-04	2.52E-08	6.71E-14	0.	0.	0.	0.	0.
TOTALS	0.	2.15E+02	1.93E+02	1.41E+02	3.97E+01	2.31E-01	1.96E-02	1.00E-03	8.13E-05	4.72E-05	3.31E-05	1.82E-05

TABLE A-IV-1
(continued)

PWR - BU = 33,000 FUEL DECAY TIMES(2) CASE E-1 HE's

POWER= 38.40MW, BURNUP= 33000,MWD, FLUX= 3.98E+13N/CM**2-SEC

ELEMENT THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	******* Y
TL	0.	1.73E-05	1.88E-05	2.82E-05	1.45E-04	1.19E-04	7.38E-05	2.20E-06	1.24E-06	1.71E-05	2.21E-04	4.25E-04
PB	0.	2.96E-06	3.22E-06	4.83E-06	2.49E-05	2.05E-05	1.28E-05	2.73E-06	8.49E-06	3.34E-04	2.99E-03	2.34E-03
BI	0.	3.58E-05	3.90E-05	5.84E-05	3.01E-04	2.48E-04	1.55E-04	2.31E-05	6.30E-05	2.27E-03	1.97E-02	1.47E-02
PO	0.	1.54E-04	1.68E-04	2.52E-04	1.30E-03	1.07E-03	6.62E-04	1.04E-04	3.45E-04	1.48E-02	1.32E-01	1.00E-01
AT	0.	1.43E-09	1.44E-09	1.56E-09	3.77E-09	1.92E-08	5.28E-08	1.16E-06	5.54E-06	7.18E-04	1.76E-02	3.94E-02
RN	0.	7.81E-05	8.51E-05	1.28E-04	6.57E-04	5.40E-04	3.36E-04	3.83E-05	1.08E-04	4.12E-03	3.29E-02	1.65E-02
FR	0.	1.31E-09	1.31E-09	1.44E-09	3.60E-09	1.80E-08	4.85E-08	1.04E-06	4.93E-06	6.38E-04	1.56E-02	3.50E-02
RA	0.	7.05E-05	7.68E-05	1.15E-04	5.93E-04	4.87E-04	3.03E-04	3.35E-05	9.40E-05	3.59E-03	2.88E-02	1.49E-02
AC	0.	1.70E-09	1.74E-09	2.03E-09	6.96E-09	3.02E-08	6.79E-08	1.06E-06	4.73E-06	5.90E-04	1.44E-02	3.23E-02
TH	0.	1.94E-04	2.00E-04	2.36E-04	6.96E-04	6.07E-04	4.48E-04	3.48E-04	5.85E-04	5.20E-03	4.12E-02	4.28E-02
PA	0.	2.06E-03	2.06E-03	2.06E-03	2.07E-03	2.12E-03	2.21E-03	2.72E-03	3.03E-03	3.38E-03	3.93E-03	3.70E-03
U	6.65E-02	4.87E-02	4.85E-02	4.86E-02	4.99E-02	5.48E-02	5.98E-02	7.05E-02	7.11E-02	7.35E-02	7.57E-02	5.44E-02
NP	0.	3.28E-02	3.28E-02	3.28E-02	3.29E-02	3.40E-02	3.58E-02	4.59E-02	5.17E-02	4.52E-02	3.48E-02	2.60E-02
PU	0.	1.07E+02	1.07E+02	1.08E+02	1.02E+02	7.93E+01	6.16E+01	2.64E+01	2.39E+01	1.34E+01	6.58E-01	8.27E-03
AM	0.	7.39E+00	7.99E+00	1.13E+01	5.84E+01	1.28E+02	1.30E+02	6.92E+01	3.14E+01	2.54E-01	7.31E-05	1.23E-09
CM	0.	6.27E+02	5.54E+02	2.90E+02	4.75E+01	1.03E+01	1.53E+00	1.63E-03	1.54E-03	6.68E-04	3.29E-07	3.10E-09
BK	0.	1.68E-16	1.68E-16	1.68E-16	1.68E-16	1.65E-16	1.62E-16	1.38E-16	1.13E-16	3.13E-18	8.39E-34	0.
CF	0.	5.24E-06	5.14E-06	4.59E-06	7.16E-07	6.44E-10	3.64E-10	2.67E-10	1.82E-10	1.78E-13	3.51E-33	0.
TOTALS	6.65E-02	7.41E+02	6.69E+02	4.09E+02	2.08E+02	2.17E+02	1.93E+02	9.57E+01	5.55E+01	1.38E+01	1.08E+00	3.95E-01

PWR • BU = 33,000 FUEL DECAY TIMES(2) CASE E-1 FP's

TABLE A-IV-1
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

ELEMENT THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	Y******** Y
H	0.	2.54E-02	2.53E-02	2.46E-02	1.48E-02	1.55E-03	9.28E-05	1.50E-14	8.69E-27	0.	0.	0.
ZN	0.	1.77E-25	1.38E-30	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA	0.	4.10E-24	3.20E-29	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE	0.	1.43E-95	1.37-116	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS	0.	4.79E-28	3.50E-34	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE	0.	1.50E-04	1.50E-04	1.50E-04	1.50E-04	1.50E-04	1.50E-04	1.49E-04	1.48E-04	1.35E-04	5.16E-05	3.50E-09
BR	0.	1.04E-29	1.95E-36	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR	0.	1.80E+01	1.79E+01	1.73E+01	9.71E+00	7.45E-01	3.01E-02	2.13E-13	2.45E-27	0.	0.	0.
RB	0.	1.20E-02	3.55E-03	4.08E-06	1.26E-08	1.26E-08	1.26E-08	1.26E-08	1.26E-08	1.26E-08	1.26E-08	1.26E-08
SR	0.	5.44E+02	3.86E+02	1.23E+02	7.86E+01	2.93E+01	8.54E+00	4.42E-04	1.94E-09	0.	0.	0.
Y	0.	1.23E+03	9.77E+02	5.03E+02	3.53E+02	1.32E+02	3.84E+01	1.99E-03	8.74E-09	0.	0.	0.
ZR	0.	1.86E+03	1.31E+03	1.87E+02	2.21E-04	2.21E-04	2.21E-04	2.21E-04	2.21E-04	2.20E-04	2.11E-04	1.39E-04
NB	0.	3.21E+03	2.35E+03	3.66E+02	1.45E-04	3.07E-04	3.30E-04	3.32E-04	3.32E-04	3.30E-04	3.17E-04	2.09E-04
MO	0.	5.36E-13	1.53E-16	3.09E-36	0.	0.	0.	0.	0.	0.	0.	0.
TC	0.	9.66E-03	9.66E-03	9.66E-03	9.66E-03	9.66E-03	9.66E-03	9.65E-03	9.63E-03	9.35E-03	6.97E-03	3.67E-04
RU	0.	4.05E+02	2.39E+02	2.78E+01	3.85E-02	3.99E-14	4.17E-29	0.	0.	0.	0.	0.
RH	0.	5.15E+03	4.82E+03	3.40E+03	6.83E+00	7.07E-12	7.39E-27	0.	0.	0.	0.	0.
PD	0.	9.60E-06	9.60E-06	9.60E-06	9.60E-06	9.60E-06	9.60E-06	9.60E-06	9.60E-06	9.59E-06	9.50E-06	8.69E-06
AG	0.	5.35E+01	4.89E+01	2.97E+01	3.64E-03	1.85E-20	2.55E-33	0.	0.	0.	0.	0.
CD	0.	2.49E-01	1.53E-01	2.20E-02	9.48E-03	1.31E-03	1.10E-04	2.75E-13	4.87E-24	0.	0.	0.
IN	0.	1.21E-03	7.65E-04	6.08E-05	9.79E-25	0.	0.	0.	0.	0.	0.	0.
SN	0.	1.74E+01	1.45E+01	5.28E+00	6.10E-04	6.09E-04	6.09E-04	6.07E-04	6.04E-04	5.68E-04	3.04E-04	5.94E-07
SB	0.	3.62E+01	3.50E+01	3.03E+01	3.01E+00	1.12E-02	1.11E-02	1.10E-02	1.10E-02	1.03E-02	5.54E-03	1.08E-05
TE	0.	3.80E+01	2.73E+01	9.76E+00	5.26E-01	1.82E-05	1.85E-11	0.	0.	0.	0.	0.
I	0.	9.91E-03	6.08E-04	2.48E-05	2.48E-05	2.48E-05	2.48E-05	2.48E-05	2.48E-05	2.48E-05	2.47E-05	2.38E-05
XE	0.	8.26E-03	1.20E-03	2.65E-08	0.	0.	0.	0.	0.	0.	0.	0.
CS	0.	2.67E+03	2.59E+03	2.21E+03	2.38E+02	5.61E+01	1.77E+01	1.82E-03	1.09E-04	1.08E-04	1.06E-04	8.61E-05
BA	0.	3.98E+02	3.96E+02	3.91E+02	3.17E+02	1.26E+02	3.97E+01	3.84E-03	3.69E-08	0.	0.	0.
LA	0.	1.13E+01	1.90E+00	9.64E-05	0.	0.	0.	0.	0.	0.	0.	0.
CE	0.	9.02E+02	7.72E+02	4.50E+02	1.47E-01	4.79E-17	2.09E-36	0.	0.	0.	0.	0.
PR	0.	7.20E+03	6.64E+03	4.25E+03	1.39E+00	4.55E-16	1.98E-35	0.	0.	0.	0.	0.
ND	0.	2.12E-01	2.72E-02	3.03E-07	0.	0.	0.	0.	0.	0.	0.	0.
PM	0.	9.35E+01	7.47E+01	4.51E+01	4.06E+00	1.03E-04	4.85E-10	0.	0.	0.	0.	0.
SM	0.	2.19E+00	2.19E+00	2.18E+00	2.03E+00	1.47E+00	9.90E-01	4.09E-02	7.61E-04	0.	0.	0.
EU	0.	7.44E+01	7.12E+01	6.80E+01	4.27E+01	7.52E+00	1.61E-01	2.56E-08	1.00E-17	0.	0.	0.
GD	0.	3.17E-02	2.88E-02	1.71E-02	1.39E-06	9.29E-25	0.	0.	0.	0.	0.	0.
TB	0.	3.44E+00	2.51E+00	4.33E-01	8.14E-15	0.	0.	0.	0.	0.	0.	0.
DY	0.	6.41E-16	7.82E-19	5.05E-35	0.	0.	0.	0.	0.	0.	0.	0.
HO	0.	9.22E-06	9.22E-06	9.21E-06	9.17E-06	8.96E-06	1.70E-06	6.91E-06	5.17E-06	2.86E-08	0.	0.
TOTALS	0.	2.39E+04	2.08E+04	1.21E+04	1.06E+03	3.53E+02	.06E+02	7.10E-02	2.28E-02	2.11E-02	1.35E-02	8.46E-04

PHOTON SPECTRUM AS A FUNCTION OF TIME FOR LIGHT ELEMENTS, CLADDING AND STRUCTURAL MATERIALS

TABLE A-IV-1
(continued)

Clad

PWR - BU = 33,000 FUEL DECAY TIMES(2) CASE E-1
POWER= 38.40 MW, BURNUP= 33000.4WD, FLUX= 3.98E+13 N**2-SEC

TWELVE GROUP PHOTON RELEASE RATES, PHOTONS/SEC
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

EMEAN (MEV)	INITIAL	TIME AFTER DISCHARGE 0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	******* Y
3.00E-01	1.22E+12	5.62E+11	3.74E+10	3.20E+09	2.04E+08	2.18E+08	2.19E+08	2.18E+08	2.07E+08	1.89E+08	1.25E+08
6.30E-01	5.64E+14	4.10E+14	6.85E+13	5.37E+10	1.41E+07	1.23E+07	1.23E+07	1.23E+07	1.23E+07	1.22E+07	1.18E+07
1.10E+00	7.53E+14	7.44E+14	6.96E+14	2.13E+14	1.09E+12	1.50E+09	2.20E-01	9.68E-07	0.	0.	0.
1.55E+00	2.46E+11	1.78E+11	2.99E+10	7.07E+03	2.63E+03	7.67E+02	3.98E-02	1.75E-07	4.65E-17	4.65E-17	4.65E-17
1.99E+00	1.24E+09	8.47E+08	1.03E+08	2.15E+02	8.00E+01	2.33E+01	1.21E-03	5.31E-09	0.	0.	0.
2.38E+00	7.29E+02	6.46E+01	9.14E-05	0.	0.	0.	0.	0.	0.	0.	0.
2.75E+00	2.36E-62	3.46E-78	0.	0.	0.	0.	0.	0.	0.	0.	0.
3.25E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3.70E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4.22E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4.70E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
5.25E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	1.32E+15	1.15E+15	7.64E+14	2.13E+14	1.09E+12	1.73E+09	2.31E+08	2.30E+08	2.19E+08	2.01E+08	1.36E+08
MEV/SEC	1.18E+15	1.08E+15	8.09E+14	2.34E+14	1.20E+12	1.72E+09	7.34E+07	7.31E+07	6.98E+07	6.43E+07	4.48E+07

TWELVE GROUP ENERGY RELEASE RATES, MEV/WATT-SEC
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

EMEAN (MEV)	INITIAL	TIME AFTER DISCHARGE 0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	******* Y
3.00E-01	9.56E+03	4.39E+03	2.93E+02	2.50E+01	1.59E+00	1.71E+00	1.71E+00	1.70E+00	1.62E+00	1.47E+00	9.73E-01
6.30E-01	9.25E+06	6.73E+06	1.12E+06	8.81E+02	2.31E-01	2.02E-01	2.01E-01	2.01E-01	2.01E-01	2.01E-01	1.94E-01
1.10E+00	2.16E+07	2.13E+07	1.99E+07	6.09E+06	3.13E+04	4.30E+01	6.31E-09	2.77E-14	0.	0.	0.
1.55E+00	9.94E+03	7.20E+03	1.21E+03	2.85E-04	1.06E-04	3.10E-05	1.61E-09	7.06E-15	1.88E-24	1.88E-24	1.88E-24
1.99E+00	6.42E+01	4.39E+01	5.32E+00	1.11E-05	4.14E-06	1.21E-06	6.26E-11	2.75E-16	0.	0.	0.
2.38E+00	4.52E-05	4.00E-06	5.67E-12	0.	0.	0.	0.	0.	0.	0.	0.
2.75E+00	1.69E-69	2.48E-85	0.	0.	0.	0.	0.	0.	0.	0.	0.
3.25E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3.70E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4.22E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4.70E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
5.25E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	3.08E+07	2.80E+07	2.11E+07	6.09E+06	3.13E+04	4.49E+01	1.91E+00	1.90E+00	1.82E+00	1.68E+00	1.17E+00
GAMMA WATTS	1.90E+02	1.73E+02	1.30E+02	3.75E+01	1.92E-01	2.76E-04	1.18E-05	1.17E-05	1.12E-05	1.03E-05	7.19E-06

PHOTON SPECTRUM AS A FUNCTION OF TIME FOR HEAVY METALS AND THEIR DAUGHTERS

TABLE A-IV-1
(continued)

HE's

PWR - BU = 33,000 FUEL DECAY TIMES(2) CASE E-1
POWER= 38.40 MW, BURNUP= 33000.MWD, FLUX= 3.98E+13 N**2-SEC

ACTINIDE PHOTON RELEASE RATES, PHOTONS/SEC
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

EMEAN (MEV)	INITIAL	TIME AFTER DISCHARGE 0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	******* Y
3.00E-01	1.83E+12	1.87E+12	2.12E+12	5.99E+12	1.17E+13	1.18E+13	6.78E+12	3.60E+12	4.62E+11	6.66E+10	5.50E+10
6.30E-01	6.12E+11	5.99E+11	5.52E+11	5.12E+11	5.10E+11	5.08E+11	4.89E+11	4.67E+11	2.10E+11	3.40E+10	3.56E+10
1.10E+00	1.31E+11	1.31E+11	1.31E+11	1.30E+11	1.30E+11	1.29E+11	1.25E+11	1.19E+11	5.41E+10	1.14E+10	5.52E+09
1.55E+00	1.71E+08	1.65E+08	1.43E+08	9.69E+07	2.85E+07	1.03E+07	1.24E+07	4.18E+07	1.70E+09	1.39E+10	7.26E+09
1.99E+00	8.99E+07	8.67E+07	7.48E+07	5.03E+07	1.42E+07	4.61E+06	2.14E+06	5.49E+06	1.96E+08	1.57E+09	7.55E+08
2.38E+00	4.46E+07	4.30E+07	3.69E+07	2.30E+07	5.40E+06	1.28E+06	2.40E+06	8.39E+06	3.43E+08	2.75E+09	1.32E+09
2.75E+00	4.69E+07	4.85E+07	5.98E+07	2.30E+08	1.83E+08	1.12E+08	2.61E+06	3.84E+05	7.56E+06	5.99E+07	2.90E+07
3.25E+00	1.29E+07	1.24E+07	1.07E+07	6.65E+06	1.55E+06	3.42E+05	1.34E+05	1.59E+05	1.77E+06	1.37E+07	6.58E+06
3.70E+00	8.29E+06	7.98E+06	6.86E+06	4.27E+06	9.92E+05	2.20E+05	7.97E+04	7.65E+04	4.23E+04	1.79E+04	3.45E+03
4.22E+00	5.23E+06	5.04E+06	4.33E+06	2.69E+06	6.26E+05	1.39E+05	5.03E+04	4.83E+04	2.67E+04	1.13E+04	2.18E+03
4.70E+00	2.47E+06	2.38E+06	2.05E+06	1.28E+06	2.96E+05	6.56E+04	2.38E+04	2.28E+04	1.26E+04	5.34E+03	1.03E+03
5.25E+00	1.56E+06	1.50E+06	1.29E+06	8.02E+05	1.86E+05	4.12E+04	1.50E+04	1.44E+04	7.95E+03	3.36E+03	6.48E+02
TOTAL	2.58E+12	2.60E+12	2.80E+12	6.63E+12	1.23E+13	1.24E+13	7.39E+12	4.19E+12	7.29E+11	1.30E+11	1.05E+11
MEV/SEC	1.08E+12	1.08E+12	1.13E+12	2.26E+12	3.97E+12	4.00E+12	2.48E+12	1.51E+12	3.34E+11	8.54E+10	6.10E+10

ACTINIDE ENERGY RELEASE RATES, MEV/WATT-SEC
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

EMEAN (MEV)	INITIAL	TIME AFTER DISCHARGE 0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	******* Y
3.00E-01	1.43E+04	1.46E+04	1.66E+04	4.68E+04	9.13E+(4	9.22E+04	5.27E+04	2.81E+04	3.61E+03	5.20E+02	4.30E+02
6.30E-01	1.00E+04	9.83E+03	9.06E+03	8.40E+03	8.37E+(3	8.33E+03	8.02E+03	7.66E+03	3.45E+03	5.58E+02	5.84E+02
1.10E+00	3.74E+03	3.74E+03	3.74E+03	3.73E+03	3.72E+(3	3.70E+03	3.57E+03	3.41E+03	1.55E+03	3.27E+02	1.58E+02
1.55E+00	6.92E+00	6.67E+00	5.77E+00	3.91E+00	1.15E+(0	4.15E-01	5.01E-01	1.69E+00	6.86E+01	5.60E+02	2.93E+02
1.99E+00	4.66E+00	4.49E+00	3.88E+00	2.60E+00	7.36E-(1	2.39E-01	1.11E-01	2.84E-01	1.02E+01	8.15E+01	3.91E+01
2.38E+00	2.77E+00	2.66E+00	2.29E+00	1.43E+00	3.34E-(1	7.92E-02	1.49E-01	5.20E-01	2.13E+01	1.71E+02	8.20E+01
2.75E+00	3.36E+00	3.47E+00	4.28E+00	1.65E+01	1.31E+(1	8.01E+00	1.87E-01	2.75E-02	5.41E-01	4.29E+00	2.07E+00
3.25E+00	1.09E+00	1.05E+00	9.04E-01	5.63E-01	1.31E-(1	2.90E-02	1.13E-02	1.34E-02	1.50E-01	1.16E+00	5.57E-01
3.70E+00	7.98E-01	7.69E-01	6.61E-01	4.12E-01	9.56E-(2	2.12E-02	7.68E-03	7.37E-03	4.08E-03	1.72E-03	3.32E-04
4.22E+00	5.74E-01	5.53E-01	4.75E-01	2.96E-01	6.88E-(2	1.52E-02	5.53E-03	5.30E-03	2.94E-03	1.24E-03	2.39E-04
4.70E+00	3.03E-01	2.92E-01	2.51E-01	1.56E-01	3.63E-(2	8.02E-03	2.91E-03	2.80E-03	1.55E-03	6.54E-04	1.26E-04
5.25E+00	2.13E-01	2.05E-01	1.76E-01	1.10E-01	2.55E-(2	5.64E-03	2.05E-03	1.96E-03	1.09E-03	4.59E-04	8.86E-05
TOTAL	2.81E+04	2.82E+04	2.94E+04	5.89E+04	1.03E+(5	1.04E+05	6.45E+04	3.92E+04	8.71E+03	2.22E+03	1.59E+03
GAMMA WATTS	1.73E-01	1.74E-01	1.81E-01	3.63E-01	6.36E-(1	6.42E-01	3.97E-01	2.41E-01	5.36E-02	1.37E-02	9.78E-03

NOW IN PHASE OUTPUT

PHOTON SPECTRUM AS A FUNCTION OF TIME FOR FISSION PRODUCTS

FP's

TABLE A-IV-1
(continued)

PWR - BU = 33,000 FUEL DECAY TIMES(2) CASE E-1
POWER= 38.40 MW, BURNUP= 33000. MWD, FLUX= 3.98E+13 N**2-SEC

TWELVE GROUP PHOTON RELEASE RATES, PHOTONS/SEC
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

EMEAN (MEV)	INITIAL	TIME AFTER DISCHARGE 0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	******* Y
3.00E-01	9.90E+15	8.93E+15	5.70E+15	1.78E+14	5.98E+13	1.73E+13	8.68E+09	6.56E+09	6.15E+09	3.38E+09	1.76E+08
6.30E-01	8.18E+16	6.66E+16	3.15E+16	4.12E+15	1.28E+15	3.99E+14	1.16E+11	7.76E+10	7.28E+10	3.90E+10	7.62E+07
1.10E+00	1.84E+15	1.71E+15	1.25E+15	1.54E+14	2.62E+13	3.36E+12	3.26E+07	1.17E+06	6.47E+03	0.	0.
1.55E+00	6.18E+14	5.64E+14	4.15E+14	1.14E+13	3.76E+11	1.10E+11	1.71E+09	1.70E+09	1.60E+09	8.57E+08	1.67E+06
1.99E+00	3.29E+14	3.03E+14	1.96E+14	1.41E+11	1.13E+10	3.28E+09	1.70E+05	7.47E-01	0.	0.	0.
2.38E+00	3.26E+13	3.01E+13	2.11E+13	4.11E+10	4.23E-02	4.42E-17	0.	0.	0.	0.	0.
2.75E+00	2.42E+12	2.27E+12	1.61E+12	3.22E+09	3.33E-03	3.48E-18	0.	0.	0.	0.	0.
3.25E+00	7.63E+10	7.17E+10	5.08E+10	1.02E+08	1.06E-04	1.10E-19	0.	0.	0.	0.	0.
3.70E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4.22E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4.70E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
5.25E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	9.45E+16	7.81E+16	3.91E+16	4.46E+15	1.36E+15	4.19E+14	1.26E+11	8.58E+10	8.06E+10	4.33E+10	2.54E+08
MEV/SEC	5.82E+16	4.81E+16	2.40E+16	2.84E+15	8.52E+14	2.60E+14	7.84E+10	5.35E+10	5.02E+10	2.69E+10	1.03E+08

TWELVE GROUP ENERGY RELEASE RATES, MEV/WATT-SEC
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

EMEAN (MEV)	INITIAL	TIME AFTER DISCHARGE 0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	******* Y
3.00E-01	7.74E+07	6.98E+07	4.45E+07	1.39E+06	4.67E+05	1.35E+05	6.78E+01	5.13E+01	4.80E+01	2.64E+01	1.38E+00
6.30E-01	1.34E+09	1.09E+09	5.16E+08	6.76E+07	2.10E+07	6.54E+06	1.90E+03	1.27E+03	1.19E+03	6.40E+02	1.25E+00
1.10E+00	5.26E+07	4.89E+07	3.58E+07	4.40E+06	7.49E+05	9.62E+04	9.35E-01	3.36E-02	1.85E-04	0.	0.
1.55E+00	2.49E+07	2.28E+07	1.68E+07	4.61E+05	1.52E+04	4.44E+03	6.92E+01	6.87E+01	6.46E+01	3.46E+01	6.76E-02
1.99E+00	1.71E+07	1.57E+07	1.02E+07	7.29E+03	5.83E+02	1.70E+02	8.80E-03	3.87E-08	0.	0.	0.
2.38E+00	2.02E+06	1.86E+06	1.31E+06	2.55E+03	2.62E-09	2.74E-24	0.	0.	0.	0.	0.
2.75E+00	1.73E+05	1.63E+05	1.15E+05	2.31E+02	2.39E- 0	2.49E-25	0.	0.	0.	0.	0.
3.25E+00	6.46E+03	6.07E+03	4.30E+03	8.64E+00	8.95E- 2	9.35E-27	0.	0.	0.	0.	0.
3.70E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4.22E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4.70E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
5.25E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	1.52E+09	1.25E+09	6.25E+08	7.39E+07	2.22E+07	6.78E+06	2.04E+03	1.39E+03	1.31E+03	7.01E+02	2.69E+00
GAMMA WATTS	9.33E+03	7.70E+03	3.85E+03	4.55E+02	1.37E+02	4.17E+01	1.26E-02	8.57E-03	8.05E-03	4.32E-03	1.66E-05

PWR • BU = 33,000 FUEL DECAY TIMES(2) CASE E-1 Clad

TABLE A-IV-1
(continued)

POWER= 38.40MW, BURNUP= 33000,MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	Y******* Y
H 1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
H 2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
H 3	0.	1.83E-01	1.82E-01	1.77E-01	1.07E-01	1.12E-02	6.69E-04	1.08E-13	6.26E-26	0.	0.	0.
H 4	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
HE 3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
HE 4	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
HE 6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LI 6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LI 7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LI 8	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BE 8	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BE 9	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BE 10	0.	6.40E-07	6.40E-07	6.40E-07	6.40E-07	6.40E-07	6.40E-07	6.40E-07	6.40E-07	6.38E-07	6.22E-07	4.85E-07
BE 11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
B 10	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
B 11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
B 12	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
C 12	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
C 13	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
C 14	0.	1.52E-02	1.52E-02	1.52E-02	1.52E-02	1.51E-02	1.50E-02	1.43E-02	1.35E-02	4.54E-03	8.48E-08	0.
N 13	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
N 14	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
N 15	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
N 16	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
O 16	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
O 17	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
O 18	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
O 19	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
F 19	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
F 20	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE 20	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE 21	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE 22	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE 23	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NA 22	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NA 23	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NA 24	0.	6.37E-73	9.34E-89	0.	0.	0.	0.	0.	0.	0.	0.	0.
NA 25	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MG 24	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MG 25	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MG 26	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MG 27	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AL 27	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AL 28	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AL 29	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SI 28	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SI 29	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SI 30	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SI 31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
P 31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
P 32	0.	7.49E-03	1.52E-03	2.18E-07	0.	0.	0.	0.	0.	0.	0.	0.
P 33	0.	3.08E-01	1.24E-01	7.82E-04	0.	0.	0.	0.	0.	0.	0.	0.

TABLE A-IV-1
(continued)

PWR - BU - 33,000 FUEL DECAY TIMES(2) CASE E-1 Clad

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	Y******* Y
P 34	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S 32	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S 33	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S 34	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S 35	0.	7.92E-02	6.12E-02	1.45E-02	8.24E-14	0.	0.	0.	0.	0.	0.	0.
S 36	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S 37	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CL 35	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CL 36	0.	3.65E-08	3.65E-08	3.65E-08	3.65E-08	3.65E-08	3.65E-08	3.65E-08	3.64E-08	3.57E-08	2.92E-08	3.90E-09
CL 37	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CL 38	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AR 36	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AR 37	0.	5.78E-12	3.02E-12	8.10E-14	0.	0.	0.	0.	0.	0.	0.	0.
AR 38	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AR 39	0.	1.12E-13	1.12E-13	1.12E-13	1.09E-13	9.85E-14	8.66E-14	3.09E-14	8.51E-15	7.20E-25	0.	0.
AR 40	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AR 41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
K 39	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
K 40	0.	1.21E-26	1.21E-26	1.21E-26	1.21E-26	1.21E-26	1.21E-26	1.21E-26	1.21E-26	1.21E-26	1.21E-26	1.21E-26
K 41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
K 42	0.	9.29E-97	6.51-116	0.	0.	0.	0.	0.	0.	0.	0.	0.
K 43	0.	7.71E-55	1.92E-65	0.	0.	0.	0.	0.	0.	0.	0.	0.
K 44	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 40	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 42	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 43	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 44	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 45	0.	6.77E-03	5.90E-03	2.74E-03	2.75E-09	0.	0.	0.	0.	0.	0.	0.
CA 46	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 47	0.	9.49E-15	6.33E-17	4.62E-29	0.	0.	0.	0.	0.	0.	0.	0.
CA 48	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 49	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SC 45	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SC 46	0.	4.97E-01	3.79E-01	8.38E-02	1.34E-13	0.	0.	0.	0.	0.	0.	0.
SC 47	0.	2.35E-13	5.09E-16	1.90E-28	0.	0.	0.	0.	0.	0.	0.	0.
SC 48	0.	5.63E-26	2.20E-31	0.	0.	0.	0.	0.	0.	0.	0.	0.
SC 49	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SC 50	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TI 46	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TI 47	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TI 48	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TI 49	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TI 50	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TI 51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 49	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 50	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 52	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 53	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 54	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR 50	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 FUEL DECAY TIMES(2) CASE E-1 Clad

TABLE A-IV-1
(continued)

POWER= 38.40MW, BURNUP= 33000,MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	******* Y
CR 51	0.	3.24E+02	1.43E+02	1.50E+00	0.	0.	0.	0.	0.	0.	0.	0.
CR 52	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR 53	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR 54	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR 55	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MN 54	0.	2.24E+02	2.08E+02	1.37E+02	7.42E-02	2.26E-16	1.62E-34	0.	0.	0.	0.	0.
MN 55	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MN 56	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MN 57	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MN 58	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE 54	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE 55	0.	2.18E+03	2.13E+03	1.87E+03	1.69E+02	3.95E-03	6.42E-09	0.	0.	0.	0.	0.
FE 56	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE 57	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE 58	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE 59	0.	2.10E+01	1.26E+01	7.59E-01	0.	0.	0.	0.	0.	0.	0.	0.
CO 58M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO 58	0.	9.77E+02	7.10E+02	1.20E+02	1.59E-12	0.	0.	0.	0.	0.	0.	0.
CO 59	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO 60M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO 60	0.	8.93E+03	8.82E+03	8.26E+03	2.52E+03	1.30E+01	1.78E-02	0.	0.	0.	0.	0.
CO 61	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO 62	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NI 58	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NI 59	0.	1.66E+00	1.66E+00	1.66E+00	1.66E+00	1.66E+00	1.66E+00	1.65E+00	1.64E+00	1.52E+00	6.97E-01	2.86E-04
NI 60	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NI 61	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NI 62	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NI 63	0.	2.54E+02	2.53E+02	2.52E+02	2.36E+02	1.75E+02	1.20E+02	5.88E+00	1.36E-01	0.	0.	0.
NI 64	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NI 65	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CU 62	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CU 63	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CU 64	0.	1.51E-82	4.20-101	0.	0.	0.	0.	0.	0.	0.	0.	0.
CU 65	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CU 66	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 63	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 64	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 65	0.	1.78E-01	1.62E-01	9.68E-02	8.84E-06	9.86E-24	0.	0.	0.	0.	0.	0.
ZN 66	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 67	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 68	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 69M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 69	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 70	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 71M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 71	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 69	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 70	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 71	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 70	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 88	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR - BU = 33,000 FUEL DECAY TIMES(2) CASE E-1

Clad

TABLE A-IV-1
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	******* Y
SR 89	0.	3.35E+00	2.16E+00	1.89E-01	1.76E-20	0.	0.	0.	0.	0.	0.	0.
SR 90	0.	5.40E-04	5.39E-04	5.32E-04	4.26E-04	1.59E-04	4.63E-05	2.40E-09	1.05E-14	0.	0.	0.
SR 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 90M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 90	0.	5.41E-04	5.39E-04	5.33E-04	4.27E-04	1.59E-04	4.63E-05	2.40E-09	1.05E-14	0.	0.	0.
Y 91M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 91	0.	1.10E+01	7.50E+00	8.71E-01	1.29E-17	0.	0.	0.	0.	0.	0.	0.
ZR 90	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 93	0.	5.53E-02	5.53E-02	5.53E-02	5.53E-02	5.53E-02	5.53E-02	5.53E-02	5.52E-02	5.50E-02	5.28E-02	3.48E-02
ZR 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 95	0.	3.97E+03	2.80E+03	3.99E+02	2.38E-13	0.	0.	0.	0.	0.	0.	0.
ZR 96	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 92	0.	1.06E-04	1.14E-05	4.64E-11	0.	0.	0.	0.	0.	0.	0.	0.
NB 93M	0.	4.59E-03	4.85E-03	6.28E-03	2.66E-02	5.68E-02	6.10E-02	6.12E-02	6.09E-02	5.79E-02	5.28E-02	3.48E-02
NB 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 94	0.	1.33E-04	1.33E-04	1.33E-04	1.33E-04	1.33E-04	1.33E-04	1.33E-04	1.33E-04	1.32E-04	1.32E-04	1.28E-04
NB 95	0.	7.27E+03	5.33E+03	8.31E+02	5.04E-13	0.	0.	0.	0.	0.	0.	0.
NB 96	0.	9.84E-47	4.64E-57	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 97	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 93	0.	7.20E-03	7.20E-03	7.20E-03	7.20E-03	7.18E-03	7.15E-03	6.93E-03	6.67E-03	3.33E-03	3.25E-06	0.
MO 93M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 96	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 97	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 98	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 99	0.	5.86E-14	1.67E-17	3.38E-37	0.	0.	0.	0.	0.	0.	0.	0.
MO100	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC 99M	0.	5.60E-14	1.60E-17	3.23E-37	0.	0.	0.	0.	0.	0.	0.	0.
TC 99	0.	5.53E-03	5.53E-03	5.53E-03	5.53E-03	5.53E-03	5.53E-03	5.53E-03	5.52E-03	5.35E-03	3.98E-03	2.04E-04
TC101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD113M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD113	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD115M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD115	0.	6.39E-24	2.32E-28	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD119M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN113	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN119M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN121M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN114	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN115	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN116	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN117M	0.	4.57E+00	8.98E-01	1.06E-04	0.	0.	0.	0.	0.	0.	0.	0.

PWR • BU • 33,000 FUEL DECAY TIMES(2) CASE E-1 Clad

POWER= 38,40MW, BURNUP= 33000,MWD, FLUX= 3,98E+13N/CM**2-SEC

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0, Y	1, Y	10, Y	50, Y	100, Y	500, Y	1000, Y	10000, Y	100000, Y	Y******* Y
SN117	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
SN118	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
SN119M	0,	1,02E+01	9,34E+00	5,63E+00	6,19E-04	1,58E-21	0,	0,	0,	0,	0,	0,
SN119	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
SN120	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
SN121M	0,	1,78E-01	1,78E-01	1,77E-01	1,63E-01	1,13E-01	7,18E-02	1,87E-03	1,95E-05	0,	0,	0,
SN121	0,	1,01E-37	1,61E-46	0,	0,	0,	0,	0,	0,	0,	0,	0,
SN122	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
SN123M	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
SN123	0,	1,33E-01	1,11E-01	4,04E-02	4,89E-10	0,	0,	0,	0,	0,	0,	0,
SN124	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
SN125M	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
SN125	0,	3,94E-05	3,49E-06	4,94E-12	0,	0,	0,	0,	0,	0,	0,	0,
SB121	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
SB123	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
SB124M	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
SB124	0,	5,06E-01	3,46E-01	4,19E-02	1,34E-18	0,	0,	0,	0,	0,	0,	0,
SB125	0,	2,40E+01	2,34E+01	2,06E+01	2,05E+00	7,09E-05	1,89E-10	0,	0,	0,	0,	0,
SB126M	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
SB126	0,	4,45E-05	7,19E-06	2,87E-10	0,	0,	0,	0,	0,	0,	0,	0,
TE124	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
TE125M	0,	9,66E+00	9,53E+00	8,52E+00	8,47E-01	2,94E-05	7,81E-11	0,	0,	0,	0,	0,
TE125	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
TE126	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
TA180	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
TA181	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
TA182M	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
TA182	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
W180	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
W181	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
W182	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
W183M	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
W183	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
W184	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
W185M	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
W185	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
W186	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
W187	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
TOTAL	0,	2,42E+04	2,05E+04	1,19E+04	2,93E+03	1,89E+02	1,22E+02	7,67E+00	1,92E+00	1,65E+00	8,06E-01	7,03E-02

TABLE A-IV-1
(continued)

PWR = BU = 33,000 FUEL DECAY TIMES(2) CASE E-1 HE's

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	******* Y
HE 4	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TL207	0.	9.61E-07	1.03E-06	1.49E-06	7.67E-06	2.86E-05	4.88E-05	2.07E-04	3.90E-04	3.61E-03	2.32E-02	2.87E-02
TL208	0.	7.41E-04	8.07E-04	1.21E-03	6.23E-03	5.12E-03	3.16E-03	6.72E-05	5.50E-07	5.52E-08	6.90E-07	6.94E-06
TL209	0.	7.53E-10	7.55E-10	8.21E-10	1.98E-09	1.01E-08	2.77E-08	6.11E-07	2.91E-06	3.77E-04	9.22E-03	2.07E-02
PB206	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PB207	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PB208	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PB209	0.	3.42E-08	3.43E-08	3.73E-08	8.99E-08	4.58E-07	1.26E-06	2.78E-05	1.32E-04	1.71E-02	4.19E-01	9.40E-01
PB210	0.	5.35E-10	5.81E-10	8.84E-10	3.56E-08	2.25E-06	1.35E-05	7.01E-04	2.84E-03	1.22E-01	9.80E-01	4.70E-01
PB211	0.	9.64E-07	1.03E-06	1.49E-06	7.69E-06	2.86E-05	4.89E-05	2.08E-04	3.91E-04	3.62E-03	2.33E-02	2.88E-02
PB212	0.	2.06E-03	2.24E-03	3.36E-03	1.73E-02	1.42E-02	8.78E-03	1.87E-04	1.53E-06	1.53E-07	1.92E-06	1.93E-05
PB214	0.	1.56E-08	1.64E-08	2.19E-08	2.92E-07	5.83E-06	2.39E-05	7.01E-04	2.84E-03	1.22E-01	9.80E-01	4.70E-01
BI209	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BI210	0.	5.26E-10	5.71E-10	8.84E-10	3.56E-08	2.25E-06	1.35E-05	7.01E-04	2.84E-03	1.22E-01	9.80E-01	4.70E-01
BI211	0.	9.64E-07	1.03E-06	1.49E-06	7.69E-06	2.86E-05	4.89E-05	2.08E-04	3.91E-04	3.62E-03	2.33E-02	2.88E-02
BI212	0.	2.06E-03	2.24E-03	3.36E-03	1.73E-02	1.42E-02	8.78E-03	1.87E-04	1.53E-06	1.53E-07	1.92E-06	1.93E-05
BI213	0.	3.42E-08	3.43E-08	3.73E-08	8.99E-08	4.58E-07	1.26E-06	2.78E-05	1.32E-04	1.71E-02	4.19E-01	9.40E-01
BI214	0.	1.56E-08	1.64E-08	2.19E-08	2.92E-07	5.83E-06	2.39E-05	7.01E-04	2.84E-03	1.22E-01	9.80E-01	4.70E-01
PO210	0.	3.30E-10	3.63E-10	5.88E-10	3.56E-08	2.25E-06	1.35E-05	7.01E-04	2.84E-03	1.22E-01	9.80E-01	4.70E-01
PO211	0.	2.89E-09	3.09E-09	4.48E-09	2.31E-08	8.59E-08	1.47E-07	6.23E-07	1.17E-06	1.09E-05	6.99E-05	8.64E-05
PO212	0.	1.32E-03	1.44E-03	2.15E-03	1.11E-02	9.10E-03	5.62E-03	1.19E-04	9.78E-07	9.81E-08	1.23E-06	1.23E-05
PO213	0.	3.35E-08	3.36E-08	3.65E-08	8.80E-08	4.48E-07	1.23E-06	2.72E-05	1.29E-04	1.68E-02	4.10E-01	9.20E-01
PO214	0.	1.56E-08	1.64E-08	2.19E-08	2.92E-07	5.83E-06	2.39E-05	7.01E-04	2.84E-03	1.22E-01	9.80E-01	4.70E-01
PO215	0.	9.64E-07	1.03E-06	1.49E-06	7.69E-06	2.86E-05	4.89E-05	2.08E-04	3.91E-04	3.62E-03	2.33E-02	2.88E-02
PO216	0.	2.06E-03	2.24E-03	3.36E-03	1.73E-02	1.42E-02	8.78E-03	1.87E-04	1.53E-06	1.53E-07	1.92E-06	1.93E-05
PO218	0.	1.56E-08	1.64E-08	2.19E-08	2.92E-07	5.83E-06	2.39E-05	7.01E-04	2.84E-03	1.22E-01	9.80E-01	4.70E-01
AT217	0.	3.42E-08	3.43E-08	3.73E-08	8.99E-08	4.58E-07	1.26E-06	2.78E-05	1.32E-04	1.71E-02	4.19E-01	9.40E-01
RN219	0.	9.64E-07	1.03E-06	1.49E-06	7.69E-06	2.86E-05	4.89E-05	2.08E-04	3.91E-04	3.62E-03	2.33E-02	2.88E-02
RN220	0.	2.06E-03	2.24E-03	3.36E-03	1.73E-02	1.42E-02	8.78E-03	1.87E-04	1.53E-06	1.53E-07	1.92E-06	1.93E-05
RN222	0.	1.56E-08	1.64E-08	2.19E-08	2.92E-07	5.83E-06	2.39E-05	7.01E-04	2.84E-03	1.22E-01	9.80E-01	4.70E-01
FR221	0.	3.42E-08	3.43E-08	3.73E-08	8.99E-08	4.58E-07	1.26E-06	2.78E-05	1.32E-04	1.71E-02	4.19E-01	9.40E-01
FR223	0.	1.47E-08	1.56E-08	2.08E-08	1.08E-07	4.01E-07	6.85E-07	2.91E-06	5.47E-06	5.07E-05	3.26E-04	4.03E-04
RA223	0.	9.64E-07	1.03E-06	1.49E-06	7.69E-06	2.86E-05	4.89E-05	2.08E-04	3.91E-04	3.62E-03	2.33E-02	2.88E-02
RA224	0.	2.06E-03	2.24E-03	3.36E-03	1.73E-02	1.42E-02	8.78E-03	1.87E-04	1.53E-06	1.53E-07	1.92E-06	1.93E-05
RA225	0.	3.41E-08	3.44E-08	3.73E-08	8.99E-08	4.58E-07	1.26E-06	2.78E-05	1.32E-04	1.71E-02	4.19E-01	9.40E-01
RA226	0.	1.57E-08	1.66E-08	2.19E-08	2.92E-07	5.83E-06	2.39E-05	7.01E-04	2.84E-03	1.22E-01	9.80E-01	4.70E-01
RA228	0.	2.40E-12	2.61E-12	3.89E-12	6.06E-11	5.35E-10	1.17E-09	6.49E-09	1.31E-08	1.53E-07	1.92E-06	1.93E-05
AC225	0.	3.42E-08	3.43E-08	3.73E-08	8.99E-08	4.58E-07	1.26E-06	2.78E-05	1.32E-04	1.71E-02	4.19E-01	9.40E-01
AC227	0.	1.05E-06	1.12E-06	1.49E-06	7.69E-06	2.86E-05	4.89E-05	2.08E-04	3.91E-04	3.62E-03	2.33E-02	2.88E-02
AC228	0.	2.40E-12	2.61E-12	3.89E-12	6.06E-11	5.35E-10	1.17E-09	6.49E-09	1.31E-08	1.53E-07	1.92E-06	1.93E-05
TH227	0.	9.82E-07	1.05E-06	1.47E-06	7.59E-06	2.82E-05	4.82E-05	2.05E-04	3.85E-04	3.57E-03	2.30E-02	2.84E-02
TH228	0.	2.09E-03	2.27E-03	3.35E-03	1.73E-02	1.42E-02	8.78E-03	1.87E-04	1.53E-06	1.53E-07	1.92E-06	1.93E-05
TH229	0.	3.42E-08	3.47E-08	3.73E-08	8.99E-08	4.58E-07	1.26E-06	2.78E-05	1.32E-04	1.71E-02	4.19E-01	9.40E-01
TH230	0.	2.14E-05	2.22E-05	2.69E-05	1.13E-04	5.43E-04	1.17E-03	7.39E-03	1.56E-02	1.57E-01	9.78E-01	4.70E-01
TH231	0.	1.72E-02	1.72E-02	1.72E-02	1.72E-02	1.73E-02	1.73E-02	1.74E-02	1.76E-02	2.01E-02	2.81E-02	2.88E-02
TH232	0.	2.37E-11	2.49E-11	3.12E-11	1.46E-10	6.58E-10	1.30E-09	6.49E-09	1.31E-08	1.53E-07	1.92E-06	1.93E-05
TH233	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TH234	0.	3.14E-01	3.14E-01	3.14E-01	3.14E-01	3.14E-01	3.14E-01	3.14E-01	3.14E-01	3.14E-01	3.14E-01	3.14E-01
PA231	0.	2.43E-05	2.43E-05	2.45E-05	2.78E-05	4.25E-05	6.08E-05	2.08E-04	3.91E-04	3.62E-03	2.33E-02	2.88E-02
PA232	0.	2.97E-35	9.44E-43	0.	0.	0.	0.	0.	0.	0.	0.	0.
PA233	0.	3.27E-01	3.27E-01	3.28E-01	3.31E-01	3.71E-01	4.35E-01	8.08E-01	1.04E+00	1.22E+00	1.19E+00	8.86E-01
PA234M	0.	3.14E-01	3.14E-01	3.14E-01	3.14E-01	3.14E-01	3.14E-01	3.14E-01	3.14E-01	3.14E-01	3.14E-01	3.14E-01

PWR = BU = 33,000 FUEL DECAY TIMES(2) CASE E-1 HE's

TABLE A-IV-1
(continued)

POWER= 38.40MW, BURNUP= 33000,MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	Y******* Y
PA234	0.	3.14E-04	3.14E-04	3.14E-04	3.14E-04	3.14E-04	3.14E-04	3.14E-04	3.14E-04	3.14E-04	3.14E-04	3.14E-04
U232	0.	7.67E-03	7.97E-03	9.50E-03	1.89E-02	1.38E-02	8.55E-03	1.82E-04	1.47E-06	0.	0.	0.
U233	0.	5.44E-05	5.45E-05	5.52E-05	6.79E-05	1.28E-04	2.14E-04	1.31E-03	3.31E-03	4.94E-02	4.18E-01	9.40E-01
U234	1.96E+00	1.07E+00	1.07E+00	1.07E+00	1.13E+00	1.34E+00	1.53E+00	1.90E+00	1.92E+00	1.88E+00	1.53E+00	4.11E-01
U235	6.86E-02	1.72E-02	1.72E-02	1.72E-02	1.72E-02	1.73E-02	1.73E-02	1.74E-02	1.76E-02	2.01E-02	2.81E-02	2.88E-02
U236	0.	2.60E-01	2.60E-01	2.60E-01	2.60E-01	2.60E-01	2.61E-01	2.67E-01	2.73E-01	3.49E-01	3.98E-01	3.88E-01
U237	0.	3.30E+00	3.01E+00	2.93E+00	1.91E+00	2.86E-01	2.66E-02	1.02E-06	9.76E-07	4.59E-07	2.42E-10	0.
U238	3.22E-01	3.14E-01	3.14E-01	3.14E-01	3.14E-01	3.14E-01	3.14E-01	3.14E-01	3.14E-01	3.14E-01	3.14E-01	3.14E-01
U239	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
U240	0.	5.56E-15	6.36E-15	1.08E-14	9.03E-14	4.44E-13	8.86E-13	4.42E-12	8.83E-12	8.75E-11	7.99E-10	3.66E-09
NP236	0.	2.01E-49	3.22E-60	0.	0.	0.	0.	0.	0.	0.	0.	0.
NP237	0.	3.28E-01	3.28E-01	3.28E-01	3.31E-01	3.71E-01	4.35E-01	8.08E-01	1.04E+00	1.22E+00	1.19E+00	8.86E-01
NP238	0.	3.09E-16	5.99E-21	0.	0.	0.	0.	0.	0.	0.	0.	0.
NP239	0.	1.72E+01	1.72E+01	1.72E+01	1.72E+01	1.71E+01	1.70E+01	1.64E+01	1.57E+01	6.94E+00	1.99E-03	3.36E-08
NP240M	0.	5.56E-15	6.36E-15	1.08E-14	9.03E-14	4.44E-13	8.86E-13	4.42E-12	8.83E-12	8.75E-11	7.99E-10	3.66E-09
NP240	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PU236	0.	3.55E-01	3.47E-01	3.08E-01	3.45E-02	2.05E-06	1.07E-11	0.	0.	0.	0.	0.
PU238	0.	2.29E+03	2.30E+03	2.32E+03	2.19E+03	1.61E+03	1.09E+03	4.83E+01	9.83E-01	1.42E-22	0.	0.
PU239	0.	3.31E+02	3.31E+02	3.31E+02	3.31E+02	3.31E+02	3.30E+02	3.27E+02	3.22E+02	2.52E+02	1.98E+01	3.38E-08
PU240	0.	4.87E+02	4.87E+02	4.87E+02	4.88E+02	4.89E+02	4.87E+02	4.68E+02	4.44E+02	1.77E+02	1.73E-02	3.66E-09
PU241	0.	1.25E+05	1.25E+05	1.22E+05	7.95E+04	1.19E+04	1.11E+03	4.24E-02	4.07E-02	1.91E-02	1.01E-05	0.
PU242	0.	1.74E+00	1.74E+00	1.74E+00	1.74E+00	1.74E+00	1.74E+00	1.74E+00	1.74E+00	1.71E+00	1.45E+00	2.80E-01
PU243	0.	3.51E-08	3.51E-08	3.51E-08	3.51E-08	3.51E-08	3.51E-08	3.51E-08	3.51E-08	3.50E-08	3.49E-08	3.36E-08
PU244	0.	5.57E-15	6.36E-15	1.08E-14	9.04E-14	4.44E-13	8.87E-13	4.43E-12	8.84E-12	8.76E-11	8.00E-10	3.66E-09
PU245	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AM241	0.	2.03E+02	2.21E+02	3.19E+02	1.73E+03	3.81E+03	3.86E+03	2.06E+03	9.24E+02	1.96E-02	1.06E-05	0.
AM242M	0.	4.59E-03	4.59E-03	4.58E-03	4.40E-03	3.66E-03	2.92E-03	4.71E-04	4.81E-05	7.17E-23	0.	0.
AM242	0.	4.59E-03	4.59E-03	4.58E-03	4.40E-03	3.66E-03	2.92E-03	4.71E-04	4.81E-05	7.17E-23	0.	0.
AM243	0.	1.72E+01	1.72E+01	1.72E+01	1.72E+01	1.71E+01	1.70E+01	1.64E+01	1.57E+01	6.94E+00	1.99E-03	3.36E-08
AM244	0.	7.24E-18	8.27E-18	1.40E-17	1.18E-16	5.78E-16	1.15E-15	5.75E-15	1.15E-14	1.14E-13	1.04E-12	4.76E-12
AM245	0.	3.14E-22	2.11E-25	6.52E-43	0.	0.	0.	0.	0.	0.	0.	0.
CM242	0.	1.52E+04	1.32E+04	6.06E+03	8.75E-03	3.00E-03	2.39E-03	3.86E-04	3.95E-05	5.90E-23	0.	0.
CM243	0.	4.07E+00	4.06E+00	4.02E+00	3.31E+00	1.39E+00	1.70E-01	8.12E-05	1.60E-09	0.	0.	0.
CM244	0.	1.95E+03	1.95E+03	1.91E+03	1.35E+03	2.93E+02	4.31E+01	9.58E-06	5.77E-14	1.14E-13	1.04E-12	4.76E-12
CM245	0.	4.42E-02	4.42E-02	4.42E-02	4.41E-02	4.40E-02	4.38E-02	4.24E-02	4.06E-02	1.91E-02	1.01E-05	0.
CM246	0.	9.16E-03	9.16E-03	9.16E-03	9.15E-03	9.10E-03	9.03E-03	8.51E-03	7.91E-03	2.10E-03	3.73E-09	0.
CM247	0.	3.51E-08	3.51E-08	3.51E-08	3.51E-08	3.51E-08	3.51E-08	3.51E-08	3.51E-08	3.50E-08	3.49E-08	3.36E-08
CM248	0.	1.15E-07	1.15E-07	1.15E-07	1.15E-07	1.15E-07	1.15E-07	1.15E-07	1.15E-07	1.13E-07	9.47E-08	1.61E-08
CM249	0.	4.57E-35	1.27E-40	0.	0.	0.	0.	0.	0.	0.	0.	0.
CM250	0.	1.88E-14	1.88E-14	1.88E-14	1.88E-14	1.85E-14	1.81E-14	1.54E-14	1.27E-14	3.51E-16	9.40E-32	0.
BK249	0.	1.94E-17	1.37E-20	4.23E-38	0.	0.	0.	0.	0.	0.	0.	0.
BK250	0.	1.88E-14	1.88E-14	1.88E-14	1.88E-14	1.85E-14	1.81E-14	1.54E-14	1.27E-14	3.51E-16	9.40E-32	0.
CF249	0.	1.18E-04	1.16E-04	1.05E-04	1.78E-05	6.76E-09	1.58E-13	0.	0.	0.	0.	0.
CF250	0.	1.24E-05	1.18E-05	9.04E-06	7.67E-08	1.85E-14	1.81E-14	1.54E-14	1.27E-14	3.51E-16	9.40E-32	0.
CF251	0.	1.10E-08	1.10E-08	1.10E-08	1.09E-08	1.06E-08	1.02E-08	7.47E-09	5.08E-09	4.96E-12	0.	0.
CF252	0.	2.00E-06	1.95E-06	1.71E-06	1.62E-07	4.55E-12	1.32E-18	0.	0.	0.	0.	0.
CF253	0.	1.47E-32	4.09E-38	0.	0.	0.	0.	0.	0.	0.	0.	0.
CF254	0.	-3.93E-19	-3.93E-19	-3.21E-28	0.	0.	0.	0.	0.	0.	0.	0.
ES253	0.	-2.74E-27	-4.64E-32	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	2.35E+00	1.46E+05	1.43E+05	1.33E+05	8.56E+04	1.85E+04	6.96E+03	2.94E+03	1.73E+03	8.51E+02	4.03E+01	1.73E+01

PWR - BU = 33,000 FUEL DECAY TIMES(2) CASE E-1

POWER= 38.40MW, BURNUP= 33000,MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	Y******* Y
H 3	0.	7.15E+02	7.11E+02	6.91E+02	4.16E+02	4.37E+01	2.61E+00	4.23E-10	2.44E-22	0.	0.	0.
ZN 72	0.	1.32E-22	1.03E-27	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 72	0.	1.90E-22	1.48E-27	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 72	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 73	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 73	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 74	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 74	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 75	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 75M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 75	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 75	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 76	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 76	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 76	0.	1.65E-40	1.80E-49	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 76	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 77M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 77	0.	1.40E-93	1.34-114	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 77	0.	3.37E-25	2.46E-31	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 77M	0.	1.01E-27	7.37E-34	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 77	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 78	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 78M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 78	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 78	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 79	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 79M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 79	0.	3.95E-01	3.95E-01	3.95E-01	3.95E-01	3.95E-01	3.95E-01	3.93E-01	3.91E-01	3.55E-01	1.36E-01	9.23E-06
BR 79	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 80	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 80	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 80M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 80	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 80	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 81M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 81M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 82	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 82M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 82	0.	6.33E-28	1.18E-34	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 82	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 83M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 83	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 83	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 83M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 83	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 84	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 84M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR ??	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR • BU = 33,000 FUEL DECAY TIMES(2) CASE E-1 FP's

TABLE A-IV-1
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY META. CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	******* Y
KR 84	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 85M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 85	0.	1.11E+04	1.10E+04	1.06E+04	5.98E+03	4.59E+02	1.85E+01	1.31E-10	1.51E-20	0.	0.	0.
RB 85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 86	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 86	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 86M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 86	0.	2.54E+00	7.51E-01	8.62E-04	0.	0.	0.	0.	0.	0.	0.	0.
SR 86	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 87	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 87	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 87	0.	1.93E-05	1.93E-05	1.93E-05	1.93E-05	1.93E-05	1.93E-05	1.93E-05	1.93E-05	1.93E-05	1.93E-05	1.93E-05
SR 87M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 87	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 88	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 88	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 88	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 88	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 89	0.	1.24E+05	7.97E+04	6.99E+03	6.50E-16	0.	0.	0.	0.	0.	0.	0.
Y 89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 90	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 90	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 90	0.	7.60E+04	7.59E+04	7.49E+04	6.00E+04	2.24E+04	3.52E+03	3.38E-01	1.48E-06	0.	0.	0.
Y 90M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 90	0.	7.61E+04	7.59E+04	7.49E+04	6.00E+04	2.24E+04	3.52E+03	3.38E-01	1.48E-06	0.	0.	0.
ZR 90	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 91M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 91	0.	2.05E+05	1.39E+05	1.62E+04	2.39E-13	0.	0.	0.	0.	0.	0.	0.
ZR 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 93	0.	8.32-101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 93	0.	1.87E+00	1.87E+00	1.87E+00	1.87E+00	1.87E+00	1.87E+00	1.87E+00	1.86E+00	1.86E+00	1.78E+00	1.18E+00
NB 93M	0.	1.49E-01	1.57E-01	2.00E-01	8.13E-01	1.73E+00	1.86E+00	1.87E+00	1.86E+00	1.86E+00	1.78E+00	1.18E+00
NB 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

TABLE A-IV-1
(continued)

PWR - BU = 33,000 FUEL DECAY TIMES(2) CASE E-1

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	Y******* Y
Y 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 95	0.	3.55E+05	2.50E+05	3.57E+04	2.12E-11	0.	0.	0.	0.	0.	0.	0.
NB 95M	0.	7.53E+03	5.31E+03	7.57E+02	4.50E-13	0.	0.	0.	0.	0.	0.	0.
NB 95	0.	6.65E+05	4.88E+05	7.58E+04	4.60E-11	0.	0.	0.	0.	0.	0.	0.
MO 95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 96	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 96	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 96	0.	1.52E-44	7.18E-55	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 96	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 97	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 97	0.	3.19E-58	3.41E-72	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 97M	0.	3.07E-58	3.28E-72	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 97	0.	3.44E-58	3.68E-72	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 97	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 98	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 98M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 98	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 98	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 99	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 99	0.	1.32E-10	3.76E-14	7.59E-34	0.	0.	0.	0.	0.	0.	0.	0.
TC 99M	0.	1.26E-10	3.59E-14	7.26E-34	0.	0.	0.	0.	0.	0.	0.	0.
TC 99	0.	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.38E+01	1.03E+01	5.44E-01
RU 99	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB100	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO100	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC100	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU100	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO102	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC102M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC102	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU102	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO103	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC103	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU103	0.	1.14E+05	6.42E+04	2.62E+03	0.	0.	0.	0.	0.	0.	0.	0.
RH103M	0.	1.14E+05	6.43E+04	2.63E+03	0.	0.	0.	0.	0.	0.	0.	0.
RH103	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO104	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC104	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU104	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH104M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH104	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD104	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO105	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC105	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 FUEL DECAY TIMES(2) CASE E=1 FP's

POWER= 38,40MW, BURNUP= 33000,MWD, FLUX= 3,98E+13N/CM**2-SEC

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0, Y	1, Y	10, Y	50, Y	100, Y	500, Y	1000, Y	10000, Y	100000, Y	******* Y
RU105	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
RH105M	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
RH105	0,	6,29E-25	1,52E-31	0,	0,	0,	0,	0,	0,	0,	0,	0,
PD105	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
TC106	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
RU106	0,	4,85E+05	4,56E+05	3,23E+05	6,50E+02	6,73E-10	7,03E-25	0,	0,	0,	0,	0,
RH106M	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
RH106	0,	4,85E+05	4,56E+05	3,23E+05	6,50E+02	6,73E-10	7,03E-25	0,	0,	0,	0,	0,
PD106	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
RU107	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
RH107	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
PD107M	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
PD107	0,	1,16E-01	1,16E-01	1,16E-01	1,16E-01	1,16E-01	1,16E-01	1,16E-01	1,16E-01	1,14E-01	1,05E-01	
AG107	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
RU108	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
RH108	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
PD108	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
AG108	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
CD108	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
RH109	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
PD109M	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
PD109	0,	1,93E-75	4,93E-03	0,	0,	0,	0,	0,	0,	0,	0,	0,
AG109M	0,	3,66E-06	3,48E-06	2,63E-06	1,72E-08	3,36E-18	2,45E-30	0,	0,	0,	0,	0,
AG109	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
CD109	0,	3,66E-06	3,48E-06	2,63E-06	1,72E-08	3,36E-18	2,45E-30	0,	0,	0,	0,	0,
RH110	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
PD110	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
AG110M	0,	3,00E+03	2,74E+03	1,66E+03	2,04E-01	8,40E-19	0,	0,	0,	0,	0,	0,
AG110	0,	3,90E+02	3,57E+02	2,16E+02	2,65E-02	1,09E-19	0,	0,	0,	0,	0,	0,
CD110	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
PD111M	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
PD111	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
AG111M	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
AG111	0,	5,00E-02	2,40E-03	1,12E-10	0,	0,	0,	0,	0,	0,	0,	0,
CD111M	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
CD111	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
PD112	0,	6,72E-08	3,29E-59	0,	0,	0,	0,	0,	0,	0,	0,	0,
AG112	0,	7,93E-08	3,88E-59	0,	0,	0,	0,	0,	0,	0,	0,	0,
CD112	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
PD113	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
AG113M	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
AG113	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
CD113M	0,	1,15E+01	1,15E+01	1,12E+01	7,17E+00	9,90E-01	8,33E-02	2,08E-10	3,69E-21	0,	0,	0,
CD113	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
IN113	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
PD114	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
AG114	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
CD114	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
IN114M	0,	2,14E-01	1,36E-01	1,08E-02	1,74E-22	0,	0,	0,	0,	0,	0,	0,
IN114	0,	2,07E-01	1,31E-01	1,04E-02	1,68E-22	0,	0,	0,	0,	0,	0,	0,
SN114	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
PD115	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,

PWR = BU = 33,000 FUEL DECAY TIMES(2) CASE E-1 FP's

TABLE A-IV-1
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	******* Y
AG115M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG115	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD115M	0.	6.39E+01	3.76E+01	1.98E+00	0.	0.	0.	0.	0.	0.	0.	0.
CD115	0.	5.65E-17	2.06E-21	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN115M	0.	6.17E-17	2.24E-21	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN115	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN115	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG116	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD116	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN116M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN116	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN116	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG117	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD117M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD117	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN117M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN117	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN117M	0.	4.93E-02	9.69E-03	1.15E-06	0.	0.	0.	0.	0.	0.	0.	0.
SN117	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD118	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN118M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN118	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN118	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD119M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN119M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN119M	0.	1.32E+01	1.21E+01	7.27E+00	8.00E-04	2.04E-21	0.	0.	0.	0.	0.	0.
SN119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD120	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN120M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN120	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN120	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN121M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN121M	0.	6.04E-04	6.04E-04	6.01E-04	5.54E-04	3.84E-04	2.44E-04	6.34E-06	6.63E-08	0.	0.	0.
SN121	0.	8.15E-37	1.30E-45	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN122	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN122	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB122M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB122	0.	1.10E-13	3.22E-17	7.44E-37	0.	0.	0.	0.	0.	0.	0.	0.
TE122	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN123M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN123	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN123M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN123	0.	4.92E+03	4.10E+03	1.49E+03	1.80E-05	0.	0.	0.	0.	0.	0.	0.
SB123	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE123M	0.	3.49E-01	2.87E-01	9.72E-02	3.38E-10	0.	0.	0.	0.	0.	0.	0.
TE123	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN124	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 FUEL DECAY TIMES(2) CASE E-1

FP's

TABLE A-IV-1
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE RADIOACTIVITY CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	******* Y
SN124	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB124M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB124	0.	7.58E+01	5.18E+01	6.28E+00	2.01E-16	0.	0.	0.	0.	0.	0.	0.
TE124	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN125M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN125	0.	2.70E-01	2.39E-02	3.38E-08	0.	0.	0.	0.	0.	0.	0.	0.
SB125	0.	8.66E+03	8.47E+03	7.45E+03	7.39E+02	2.56E-02	6.81E-08	0.	0.	0.	0.	0.
TE125M	0.	3.47E+03	3.43E+03	3.08E+03	3.06E+02	1.06E-02	2.82E-08	0.	0.	0.	0.	0.
TE125	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN126	0.	5.64E-01	5.64E-01	5.64E-01	5.64E-01	5.64E-01	5.64E-01	5.62E-01	5.60E-01	5.26E-01	2.82E-01	5.51E-04
SB126M	0.	5.64E-01	5.64E-01	5.64E-01	5.64E-01	5.64E-01	5.64E-01	5.62E-01	5.60E-01	5.26E-01	2.82E-01	5.51E-04
SB126	0.	5.79E-01	5.62E-01	5.59E-01	5.59E-01	5.58E-01	5.58E-01	5.57E-01	5.55E-01	5.21E-01	2.79E-01	5.45E-04
TE126	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN127M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN127	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB127	0.	2.17E-07	6.06E-10	3.93E-24	0.	0.	0.	0.	0.	0.	0.	0.
TE127M	0.	7.87E+03	6.39E+03	2.00E+03	1.67E-06	0.	0.	0.	0.	0.	0.	0.
TE127	0.	7.78E+03	6.32E+03	1.98E+03	1.65E-06	0.	0.	0.	0.	0.	0.	0.
I127	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB128M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN129M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN129	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB129	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE129M	0.	3.50E+03	1.79E+03	4.33E+01	0.	0.	0.	0.	0.	0.	0.	0.
TE129	0.	2.24E+03	1.15E+03	2.77E+01	0.	0.	0.	0.	0.	0.	0.	0.
I129	0.	3.77E-02	3.77E-02	3.77E-02	3.77E-02	3.77E-02	3.77E-02	3.77E-02	3.77E-02	3.77E-02	3.76E-02	3.62E-02
XE129M	0.	4.11E-05	2.38E-06	3.19E-13	0.	0.	0.	0.	0.	0.	0.	0.
XE129	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN130	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB130M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB130	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE130	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I130M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I130	0.	1.92E-83	1.34-102	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE130	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN131	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB131	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE131M	0.	1.28E-31	1.54E-39	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE131	0.	2.33E-32	2.82E-40	0.	0.	0.	0.	0.	0.	0.	0.	0.
I131	0.	2.83E+00	1.67E-01	2.47E-08	0.	0.	0.	0.	0.	0.	0.	0.
XE131M	0.	4.24E+00	6.19E-01	1.36E-05	0.	0.	0.	0.	0.	0.	0.	0.
XE131	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN132	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB132M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB132	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE132	0.	1.96E-08	1.77E-11	2.14E+28	0.	0.	0.	0.	0.	0.	0.	0.
I132	0.	2.02E-08	1.82E-11	2.21E-28	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 FUEL DECAY TIMES(2) CASE E=1

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2=SEC

FP's

TABLE A-IV-1
(continued)

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	******* Y
XE132	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB133	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE133M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE133	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I133	0.	5.35E-46	2.62E-57	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	8.69E-16	3.63E-20	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE133	0.	6.77E-03	8.96E-05	3.31E-15	0.	0.	0.	0.	0.	0.	0.	0.
CS133	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB134	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE134	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I134	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE134	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS134M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS134	0.	2.35E+05	2.28E+05	1.92E+05	9.18E+03	1.23E-02	5.56E-10	0.	0.	0.	0.	0.
BA134	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE135	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I135	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE135	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS135M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS135	0.	2.23E-01	2.23E-01	2.23E-01	2.23E-01	2.23E-01	2.23E-01	2.23E-01	2.23E-01	2.23E-01	2.18E-01	1.77E-01
BA135M	0.	6.15E-37	3.26E-45	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA135	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I136	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE136	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS136	0.	2.30E+01	3.98E+00	2.35E-04	0.	0.	0.	0.	0.	0.	0.	0.
BA136	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I137	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE137	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS137	0.	1.08E+05	1.08E+05	1.06E+05	8.64E+04	3.43E+04	1.08E+04	1.04E+00	1.00E-05	0.	0.	0.
BA137M	0.	1.01E+05	1.01E+05	9.94E+04	8.08E+04	3.20E+04	1.01E+04	9.77E-01	9.38E-06	0.	0.	0.
BA137	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I138	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE138	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS138	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA138	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I139	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE139	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS139	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA139	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA139	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE140	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS140	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA140	0.	5.56E+02	9.38E+01	4.75E-03	0.	0.	0.	0.	0.	0.	0.	0.
LA140	0.	6.40E+02	1.08E+02	5.47E-03	0.	0.	0.	0.	0.	0.	0.	0.
CE140	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE141	0.	7.23E+04	3.58E+04	7.19E+02	0.	0.	0.	0.	0.	0.	0.	0.
PR141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 FUEL DECAY TIMES(2) CASE E-1 FP's

TABLE A-IV-1
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	Y******* Y
XE142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR142	0.	2.78E-52	1.19E-64	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE143	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS143	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA143	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA143	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE143	0.	2.29E-27	1.45E-34	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR143	0.	8.63E+02	1.64E+02	1.59E-02	0.	0.	0.	0.	0.	0.	0.	0.
ND143	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA144	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE144	0.	9.29E+05	8.57E+05	5.49E+05	1.80E+02	5.85E-14	2.56E-33	0.	0.	0.	0.	0.
PR144	0.	9.29E+05	8.57E+05	5.49E+05	1.80E+02	5.85E-14	2.56E-33	0.	0.	0.	0.	0.
ND144	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE145	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR145	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND145	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE146	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR146	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND146	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE147	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR147	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND147	0.	6.52E+01	8.37E+00	9.33E-05	0.	0.	0.	0.	0.	0.	0.	0.
PM147	0.	9.96E+04	9.72E+04	8.52E+04	7.87E+03	1.99E-01	3.58E-07	0.	0.	0.	0.	0.
SM147	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM148M	0.	3.23E+03	1.88E+03	9.23E+01	0.	0.	0.	0.	0.	0.	0.	0.
PM148	0.	2.60E+02	1.51E+02	7.41E+00	0.	0.	0.	0.	0.	0.	0.	0.
SM148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR149	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND149	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM149	0.	3.34E-15	1.12E-19	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM149	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND150	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM150	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM150	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND151	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM151	0.	4.58E-34	1.51E-42	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM151	0.	1.26E+03	1.26E+03	1.25E+03	1.16E+03	8.46E+02	5.68E+02	2.35E+01	4.37E-01	0.	0.	0.
EU151	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM152	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM152	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU152M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU152	0.	8.83E+00	8.78E+00	8.53E+00	5.07E+00	5.03E-01	2.80E-02	2.58E-12	7.38E-25	0.	0.	0.
GD152	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM153	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR - BU = 33,000 FUEL DECAY TIMES(2) CASE E-1

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

FP's

TABLE A-IV-1
(continued)

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	Y******* Y
SM153	0.	5.77E-18	5.10E-23	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU153	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD153	0.	2.20E+01	2.00E+01	1.19E+01	9.65E-04	6.45E-22	0.	0.	0.	0.	0.	0.
PM154	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM154	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU154	0.	7.84E+03	7.81E+03	7.64E+03	5.18E+03	9.15E+02	1.05E+02	3.12E-06	1.22E-15	0.	0.	0.
GD154	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM155	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU155	0.	7.55E+03	7.29E+03	6.02E+03	1.92E+02	4.26E-05	2.06E-13	0.	0.	0.	0.	0.
GD155	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM156	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU156	0.	3.54E+02	7.75E+01	1.68E-02	0.	0.	0.	0.	0.	0.	0.	0.
GD156	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM157	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU157	0.	9.08E-68	2.15E-83	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD157	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU158	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD158	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU159	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD159	0.	3.41E-57	2.18E-70	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB159	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU160	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD160	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB160	0.	4.05E+02	2.95E+02	5.10E+01	9.59E-13	0.	0.	0.	0.	0.	0.	0.
DY160	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD161	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB161	0.	2.81E-04	8.88E-06	9.56E-14	0.	0.	0.	0.	0.	0.	0.	0.
DY161	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD162	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB162M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB162	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY162	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB163M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB163	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY163	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB164	0.	4.79E-46	2.26E-56	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY164	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY165M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY165	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
HO165	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY166	0.	7.36E-13	8.98E-16	5.79E-32	0.	0.	0.	0.	0.	0.	0.	0.
HO166M	0.	8.57E-04	8.57E-04	8.57E-04	8.53E-04	8.33E-04	8.09E-04	6.42E-04	4.81E-04	2.66E-06	0.	0.
HO166	0.	1.10E-12	1.34E-15	8.65E-32	0.	0.	0.	0.	0.	0.	0.	0.
ER166	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ER167	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	0.	5.26E+06	4.50E+06	2.56E+06	3.20E+05	1.13E+05	3.46E+04	4.66E+01	2.09E+01	1.99E+01	1.52E+01	3.21E+00

PWR = BU = 33,000 FUEL DECAY TIMES(2) CASE E-1 Clad

TABLE A-IV-1
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	******* Y
H 1	1.62E+04	1.62E+04	1.62E+04	1.62E+04	1.62E+04	1.62E+04	1.62E+04	1.62E+04	1.62E+04	1.62E+04	1.62E+04	1.62E+04
H 2	0.	2.64E+01	2.64E+01	2.64E+01	2.64E+01	2.64E+01	2.64E+01	2.64E+01	2.64E+01	2.64E+01	2.64E+01	2.64E+01
H 3	0.	1.89E-05	1.88E-05	1.83E-05	1.10E-05	1.16E-06	6.90E-08	1.12E-17	6.46E-30	0.	0.	0.
H 4	0.	7.17E-25	7.17E-25	7.17E-25	7.17E-25	7.17E-25	7.17E-25	7.17E-25	7.17E-25	7.17E-25	7.17E-25	7.17E-25
HE 3	0.	6.21E-07	7.16E-07	1.24E-06	8.51E-06	1.84E-05	1.95E-05	1.95E-05	1.95E-05	1.95E-05	1.95E-05	1.95E-05
HE 4	0.	2.33E+00	2.33E+00	2.33E+00	2.33E+00	2.33E+00	2.33E+00	2.33E+00	2.33E+00	2.33E+00	2.33E+00	2.33E+00
HE 6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LI 6	0.	9.17E-10	9.17E-10	9.17E-10	9.17E-10	9.17E-10	9.17E-10	9.17E-10	9.17E-10	9.17E-10	9.17E-10	9.17E-10
LI 7	0.	4.81E-12	4.81E-12	4.81E-12	4.81E-12	4.81E-12	4.81E-12	4.81E-12	4.81E-12	4.81E-12	4.81E-12	4.81E-12
LI 8	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BE 8	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BE 9	0.	6.79E-06	6.79E-06	6.79E-06	6.79E-06	6.79E-06	6.79E-06	6.79E-06	6.79E-06	6.79E-06	6.79E-06	6.79E-06
BE 10	0.	4.47E-05	4.47E-05	4.47E-05	4.47E-05	4.47E-05	4.47E-05	4.47E-05	4.47E-05	4.46E-05	4.35E-05	3.39E-05
BE 11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
B 10	0.	7.31E-12	8.42E-12	1.46E-11	1.26E-10	6.22E-10	1.24E-09	6.20E-09	1.24E-08	1.24E-07	1.22E-06	1.08E-05
B 11	0.	1.52E-11	1.52E-11	1.52E-11	1.52E-11	1.52E-11	1.52E-11	1.52E-11	1.52E-11	1.52E-11	1.52E-11	1.52E-11
B 12	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
C 12	3.41E+00	3.41E+00	3.41E+00	3.41E+00	3.41E+00	3.41E+00	3.41E+00	3.41E+00	3.41E+00	3.41E+00	3.41E+00	3.41E+00
C 13	3.90E-02	7.53E+00	7.53E+00	7.53E+00	7.53E+00	7.53E+00	7.53E+00	7.53E+00	7.53E+00	7.53E+00	7.53E+00	7.53E+00
C 14	0.	3.41E-03	3.41E-03	3.41E-03	3.41E-03	3.39E-03	3.37E-03	3.21E-03	3.02E-03	1.02E-03	1.90E-08	0.
N 13	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
N 14	0.	4.70E-07	5.07E-07	7.14E-07	4.43E-06	2.09E-05	4.14E-05	2.01E-04	3.89E-04	2.40E-03	3.41E-03	3.41E-03
N 15	0.	1.25E-11	1.25E-11	1.25E-11	1.25E-11	1.25E-11	1.25E-11	1.25E-11	1.25E-11	1.25E-11	1.25E-11	1.25E-11
N 16	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
O 16	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05
O 17	0.	1.79E+01	1.79E+01	1.79E+01	1.79E+01	1.79E+01	1.79E+01	1.79E+01	1.79E+01	1.79E+01	1.79E+01	1.79E+01
O 18	0.	2.87E-12	2.87E-12	2.87E-12	2.87E-12	2.87E-12	2.87E-12	2.87E-12	2.87E-12	2.87E-12	2.87E-12	2.87E-12
O 19	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
F 19	0.	2.98E-19	2.98E-19	2.98E-19	2.98E-19	2.98E-19	2.98E-19	2.98E-19	2.98E-19	2.98E-19	2.98E-19	2.98E-19
F 20	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE 20	0.	7.86E-16	7.86E-16	7.86E-16	7.86E-16	7.86E-16	7.86E-16	7.86E-16	7.86E-16	7.86E-16	7.86E-16	7.86E-16
NE 21	0.	4.11E-10	4.11E-10	4.11E-10	4.11E-10	4.11E-10	4.11E-10	4.11E-10	4.11E-10	4.11E-10	4.11E-10	4.11E-10
NE 22	0.	1.03E-08	1.03E-08	1.03E-08	1.03E-08	1.03E-08	1.03E-08	1.03E-08	1.03E-08	1.03E-08	1.03E-08	1.03E-08
NE 23	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NA 22	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NA 23	0.	8.34E-10	8.34E-10	8.34E-10	8.34E-10	8.34E-10	8.34E-10	8.34E-10	8.34E-10	8.34E-10	8.34E-10	8.34E-10
NA 24	0.	7.32E-80	1.07E-95	0.	0.	0.	0.	0.	0.	0.	0.	0.
NA 25	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MG 24	0.	1.07E-04	1.07E-04	1.07E-04	1.07E-04	1.07E-04	1.07E-04	1.07E-04	1.07E-04	1.07E-04	1.07E-04	1.07E-04
MG 25	0.	2.33E-04	2.33E-04	2.33E-04	2.33E-04	2.33E-04	2.33E-04	2.33E-04	2.33E-04	2.33E-04	2.33E-04	2.33E-04
MG 26	0.	1.06E-04	1.06E-04	1.06E-04	1.06E-04	1.06E-04	1.06E-04	1.06E-04	1.06E-04	1.06E-04	1.06E-04	1.06E-04
MG 27	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AL 27	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01
AL 28	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AL 29	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SI 28	5.98E+01	5.98E+01	5.98E+01	5.98E+01	5.98E+01	5.98E+01	5.98E+01	5.98E+01	5.98E+01	5.98E+01	5.98E+01	5.98E+01
SI 29	3.13E+00	3.14E+00	3.14E+00	3.14E+00	3.14E+00	3.14E+00	3.14E+00	3.14E+00	3.14E+00	3.14E+00	3.14E+00	3.14E+00
SI 30	2.16E+00	2.16E+00	2.16E+00	2.16E+00	2.16E+00	2.16E+00	2.16E+00	2.16E+00	2.16E+00	2.16E+00	2.16E+00	2.16E+00
SI 31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
P 31	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00
P 32	0.	2.62E-08	5.33E-09	7.62E-13	0.	0.	0.	0.	0.	0.	0.	0.
P 33	0.	1.94E-06	7.82E-07	4.94E-09	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 FUEL DECAY TIMES(2) CASE E-1 Clad

POWER= 38,40MW, BURNUP= 33000,MWD, FLUX= 3,98E+13N/CM**2-SEC

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0, Y	1, Y	10, Y	50, Y	100, Y	500, Y	1000, Y	10000, Y	100000, Y	******* Y
P 34	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
S 32	1,22E+00	1,22E+00	1,22E+00	1,22E+00	1,22E+00	1,22E+00	1,22E+00	1,22E+00	1,22E+00	1,22E+00	1,22E+00	1,22E+00
S 33	9,90E-03	6,74E-03	6,74E-03	6,74E-03	6,74E-03	6,74E-03	6,74E-03	6,74E-03	6,74E-03	6,74E-03	6,74E-03	6,74E-03
S 34	6,80E-02	6,80E-02	6,80E-02	6,80E-02	6,80E-02	6,80E-02	6,80E-02	6,80E-02	6,80E-02	6,80E-02	6,80E-02	6,80E-02
S 35	0,	1,87E-06	1,44E-06	3,42E-07	1,94E-18	0,	0,	0,	0,	0,	0,	0,
S 36	0,	5,23E-14	5,67E-14	8,09E-14	5,17E-13	2,45E-12	4,87E-12	2,42E-11	4,84E-11	4,79E-10	4,34E-09	1,93E-08
S 37	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
CL 35	0,	3,42E-05	3,46E-05	3,57E-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
CL 36	0,	1,14E-06	1,14E-06	1,14E-06	1,14E-06	1,14E-06	1,14E-06	1,14E-06	1,14E-06	1,11E-06	9,11E-07	1,22E-07
CL 37	0,	7,11E-08	7,11E-08	7,11E-08	7,11E-08	7,11E-08	7,11E-08	7,11E-08	7,11E-08	7,11E-08	7,11E-08	7,11E-08
CL 38	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
AR 36	0,	2,70E-12	2,92E-12	4,17E-12	2,67E-11	1,27E-10	2,52E-10	1,25E-09	2,50E-09	2,47E-08	2,24E-07	9,98E-07
AR 37	0,	5,73E-17	2,99E-17	8,03E-19	0,	0,	0,	0,	0,	0,	0,	0,
AR 38	0,	1,44E-11	1,44E-11	1,44E-11	1,44E-11	1,44E-11	1,44E-11	1,44E-11	1,44E-11	1,44E-11	1,44E-11	1,44E-11
AR 39	0,	3,28E-15	3,28E-15	3,28E-15	3,20E-15	2,89E-15	2,54E-15	9,06E-16	2,50E-16	2,11E-26	0,	0,
AR 40	0,	3,61E-10	3,61E-10	3,61E-10	3,61E-10	3,61E-10	3,61E-10	3,61E-10	3,61E-10	3,61E-10	3,61E-10	3,61E-10
AR 41	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
K 39	0,	6,35E-18	7,12E-18	1,13E-17	8,65E-17	4,00E-16	7,49E-16	2,38E-15	3,04E-15	3,29E-15	3,29E-15	3,29E-15
K 40	0,	1,77E-21	1,77E-21	1,77E-21	1,77E-21	1,77E-21	1,77E-21	1,77E-21	1,77E-21	1,77E-21	1,77E-21	1,77E-21
K 41	0,	1,20E-11	1,20E-11	1,20E-11	1,20E-11	1,20E-11	1,20E-11	1,20E-11	1,20E-11	1,20E-11	1,20E-11	1,20E-11
K 42	0,	1,54-103	1,08-122	0,	0,	0,	0,	0,	0,	0,	0,	0,
K 43	0,	2,37E-61	5,91E-72	0,	0,	0,	0,	0,	0,	0,	0,	0,
K 44	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
CA 40	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
CA 41	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
CA 42	0,	1,60E-13	1,60E-13	1,60E-13	1,60E-13	1,60E-13	1,60E-13	1,60E-13	1,60E-13	1,60E-13	1,60E-13	1,60E-13
CA 43	0,	1,56E-05	1,56E-05	1,56E-05	1,56E-05	1,56E-05	1,56E-05	1,56E-05	1,56E-05	1,56E-05	1,56E-05	1,56E-05
CA 44	0,	1,24E-04	1,24E-04	1,24E-04	1,24E-04	1,24E-04	1,24E-04	1,24E-04	1,24E-04	1,24E-04	1,24E-04	1,24E-04
CA 45	0,	3,85E-07	3,35E-07	1,56E-07	1,56E-13	0,	0,	0,	0,	0,	0,	0,
CA 46	0,	1,55E-05	1,55E-05	1,55E-05	1,55E-05	1,55E-05	1,55E-05	1,55E-05	1,55E-05	1,55E-05	1,55E-05	1,55E-05
CA 47	0,	1,55E-20	1,03E-22	7,53E-35	0,	0,	0,	0,	0,	0,	0,	0,
CA 48	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
CA 49	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
SC 45	0,	2,08E-06	2,13E-06	2,31E-06	2,46E-06	2,46E-06	2,46E-06	2,46E-06	2,46E-06	2,46E-06	2,46E-06	2,46E-06
SC 46	0,	1,47E-05	1,12E-05	2,48E-06	3,97E-18	0,	0,	0,	0,	0,	0,	0,
SC 47	0,	2,90E-19	6,29E-22	2,35E-34	0,	0,	0,	0,	0,	0,	0,	0,
SC 48	0,	3,78E-32	1,48E-37	0,	0,	0,	0,	0,	0,	0,	0,	0,
SC 49	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
SC 50	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
TI 46	4,28E+00	4,27E+00	4,27E+00	4,27E+00	4,27E+00	4,27E+00	4,27E+00	4,27E+00	4,27E+00	4,27E+00	4,27E+00	4,27E+00
TI 47	4,09E+00	4,08E+00	4,08E+00	4,08E+00	4,08E+00	4,08E+00	4,08E+00	4,08E+00	4,08E+00	4,08E+00	4,08E+00	4,08E+00
TI 48	4,12E+01	4,06E+01	4,06E+01	4,06E+01	4,06E+01	4,06E+01	4,06E+01	4,06E+01	4,06E+01	4,06E+01	4,06E+01	4,06E+01
TI 49	3,14E+00	3,78E+00	3,78E+00	3,78E+00	3,78E+00	3,78E+00	3,78E+00	3,78E+00	3,78E+00	3,78E+00	3,78E+00	3,78E+00
TI 50	3,10E+00	3,12E+00	3,12E+00	3,12E+00	3,12E+00	3,12E+00	3,12E+00	3,12E+00	3,12E+00	3,12E+00	3,12E+00	3,12E+00
TI 51	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
V 49	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
V 50	0,	1,14E-02	1,14E-02	1,14E-02	1,14E-02	1,14E-02	1,14E-02	1,14E-02	1,14E-02	1,14E-02	1,14E-02	1,14E-02
V 51	0,	2,80E+00	2,80E+00	2,81E+00	2,81E+00	2,81E+00	2,81E+00	2,81E+00	2,81E+00	2,81E+00	2,81E+00	2,81E+00
V 52	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
V 53	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
V 54	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
CR 50	8,38E+01	8,10E+01	8,10E+01	8,10E+01	8,10E+01	8,10E+01	8,10E+01	8,10E+01	8,10E+01	8,10E+01	8,10E+01	8,10E+01

PWR = BU = 33,000 FUEL DECAY TIMES(2) CASE E=1 Clad

TABLE A-IV-1
(continued)

POWER= 36,40MW, BURNUP= 33000,MWD, FLUX= 3,98E+13N/CM**2=SEC

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0, Y	1, Y	10, Y	50, Y	100, Y	500, Y	1000, Y	10000, Y	100000, Y	******* Y
CR 51	0,	3,52E-03	1,55E-03	1,63E-05	0,	0,	0,	0,	0,	0,	0,	0,
CR 52	1,68E+03	1,68E+03	1,68E+03	1,68E+03	1,68E+03	1,68E+03	1,68E+03	1,68E+03	1,68E+03	1,68E+03	1,68E+03	1,68E+03
CR 53	1,94E+02	1,90E+02	1,90E+02	1,90E+02	1,90E+02	1,90E+02	1,90E+02	1,90E+02	1,90E+02	1,90E+02	1,90E+02	1,90E+02
CR 54	4,91E+01	5,60E+01	5,60E+01	5,60E+01	5,61E+01	5,61E+01	5,61E+01	5,61E+01	5,61E+01	5,61E+01	5,61E+01	5,61E+01
CR 55	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
MN 54	0,	2,81E-02	2,60E-02	1,71E-02	9,29E-06	2,83E-20	2,03E-38	0,	0,	0,	0,	0,
MN 55	1,08E+02	1,05E+02	1,05E+02	1,05E+02	1,05E+02	1,05E+02	1,05E+02	1,05E+02	1,05E+02	1,05E+02	1,05E+02	1,05E+02
MN 56	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
MN 57	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
MN 58	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
FE 54	2,22E+02	2,21E+02	2,21E+02	2,21E+02	2,21E+02	2,21E+02	2,21E+02	2,21E+02	2,21E+02	2,21E+02	2,21E+02	2,21E+02
FE 55	0,	8,73E-01	8,52E-01	7,46E-01	6,77E-02	1,58E-06	2,57E-12	0,	0,	0,	0,	0,
FE 56	3,65E+03	3,63E+03	3,63E+03	3,63E+03	3,63E+03	3,63E+03	3,63E+03	3,63E+03	3,63E+03	3,63E+03	3,63E+03	3,63E+03
FE 57	8,66E+01	1,04E+02	1,04E+02	1,04E+02	1,04E+02	1,04E+02	1,04E+02	1,04E+02	1,04E+02	1,04E+02	1,04E+02	1,04E+02
FE 58	1,28E+01	1,43E+01	1,43E+01	1,43E+01	1,43E+01	1,43E+01	1,43E+01	1,43E+01	1,43E+01	1,43E+01	1,43E+01	1,43E+01
FE 59	0,	4,27E-04	2,57E-04	1,54E-05	0,	0,	0,	0,	0,	0,	0,	0,
CO 58M	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
CO 58	0,	3,09E-02	2,25E-02	3,81E-03	5,02E-17	0,	0,	0,	0,	0,	0,	0,
CO 59	7,09E+01	6,17E+01	6,17E+01	6,17E+01	6,17E+01	6,18E+01	6,18E+01	6,18E+01	6,19E+01	6,36E+01	7,44E+01	8,36E+01
CO 60M	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
CO 60	0,	7,88E+00	7,79E+00	7,29E+00	2,23E+00	1,14E-02	1,57E-05	0,	0,	0,	0,	0,
CO 61	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
CO 62	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
NI 58	2,49E+03	2,47E+03	2,47E+03	2,47E+03	2,47E+03	2,47E+03	2,47E+03	2,47E+03	2,47E+03	2,47E+03	2,47E+03	2,47E+03
NI 59	0,	2,19E+01	2,19E+01	2,19E+01	2,19E+01	2,19E+01	2,19E+01	2,18E+01	2,17E+01	2,01E+01	9,19E+00	3,77E-03
NI 60	9,86E+02	9,82E+02	9,82E+02	9,83E+02	9,88E+02	9,90E+02	9,90E+02	9,90E+02	9,90E+02	9,90E+02	9,90E+02	9,90E+02
NI 61	4,22E+01	4,72E+01	4,72E+01	4,72E+01	4,72E+01	4,72E+01	4,72E+01	4,72E+01	4,72E+01	4,72E+01	4,72E+01	4,72E+01
NI 62	1,40E+02	1,37E+02	1,37E+02	1,37E+02	1,37E+02	1,37E+02	1,37E+02	1,37E+02	1,37E+02	1,37E+02	1,37E+02	1,37E+02
NI 63	0,	4,11E+00	4,11E+00	4,09E+00	3,82E+00	2,83E+00	1,94E+00	9,53E-02	2,20E-03	0,	0,	0,
NI 64	3,62E+01	3,62E+01	3,62E+01	3,62E+01	3,62E+01	3,62E+01	3,62E+01	3,62E+01	3,62E+01	3,62E+01	3,62E+01	3,62E+01
NI 65	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
CU 62	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
CU 63	1,27E+01	1,26E+01	1,26E+01	1,26E+01	1,29E+01	1,39E+01	1,48E+01	1,66E+01	1,67E+01	1,67E+01	1,67E+01	1,67E+01
CU 64	0,	3,95E-89	1,10-107	0,	0,	0,	0,	0,	0,	0,	0,	0,
CU 65	5,92E+00	5,98E+00	5,98E+00	5,98E+00	5,98E+00	5,98E+00	5,98E+00	5,98E+00	5,98E+00	5,98E+00	5,98E+00	5,98E+00
CU 66	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
ZN 63	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
ZN 64	0,	6,73E-02	6,73E-02	6,73E-02	6,73E-02	6,73E-02	6,73E-02	6,73E-02	6,73E-02	6,73E-02	6,73E-02	6,73E-02
ZN 65	0,	2,17E-05	1,98E-05	1,18E-05	1,08E-09	1,20E-27	0,	0,	0,	0,	0,	0,
ZN 66	0,	4,28E-02	4,28E-02	4,28E-02	4,28E-02	4,28E-02	4,28E-02	4,28E-02	4,28E-02	4,28E-02	4,28E-02	4,28E-02
ZN 67	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
ZN 68	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
ZN 69M	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
ZN 69	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
ZN 70	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
ZN 71M	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
ZN 71	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
GA 69	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
GA 70	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
GA 71	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
GE 70	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
SR 88	0,	1,15E-01	1,15E-01	1,15E-01	1,15E-01	1,15E-01	1,15E-01	1,15E-01	1,15E-01	1,15E-01	1,15E-01	1,15E-01

PWR - BU = 33,000 FUEL DECAY TIMES(2) CASE E-1 Clad

TABLE A-IV-1
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	******* Y
SR 89	0.	1.19E-04	7.65E-05	6.70E-06	6.23E-25	0.	0.	0.	0.	0.	0.	0.
SR 90	0.	3.82E-06	3.81E-06	3.76E-06	3.02E-06	1.12E-06	3.27E-07	1.70E-11	7.46E-17	0.	0.	0.
SR 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 90M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 90	0.	9.93E-10	9.91E-10	9.78E-10	7.84E-10	2.92E-10	8.51E-11	4.41E-15	1.94E-20	0.	0.	0.
Y 91M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 91	0.	4.53E-04	3.07E-04	3.57E-05	5.27E-22	0.	0.	0.	0.	0.	0.	0.
ZR 90	6.14E+04	6.13E+04	6.13E+04	6.13E+04	6.13E+04	6.13E+04	6.13E+04	6.13E+04	6.13E+04	6.13E+04	6.13E+04	6.13E+04
ZR 91	1.35E+04	1.34E+04	1.34E+04	1.34E+04	1.34E+04	1.34E+04	1.34E+04	1.34E+04	1.34E+04	1.34E+04	1.34E+04	1.34E+04
ZR 92	2.09E+04	2.10E+04	2.10E+04	2.10E+04	2.10E+04	2.10E+04	2.10E+04	2.10E+04	2.10E+04	2.10E+04	2.10E+04	2.10E+04
ZR 93	0.	2.16E+01	2.16E+01	2.16E+01	2.16E+01	2.16E+01	2.16E+01	2.16E+01	2.15E+01	2.15E+01	2.06E+01	1.36E+01
ZR 94	2.18E+04	2.18E+04	2.18E+04	2.18E+04	2.18E+04	2.18E+04	2.18E+04	2.18E+04	2.18E+04	2.18E+04	2.18E+04	2.18E+04
ZR 95	0.	1.88E-01	1.32E-01	1.89E-02	1.12E-17	0.	0.	0.	0.	0.	0.	0.
ZR 96	3.57E+03	3.56E+03	3.56E+03	3.56E+03	3.56E+03	3.56E+03	3.56E+03	3.56E+03	3.56E+03	3.56E+03	3.56E+03	3.56E+03
NB 92	0.	7.64E-10	8.19E-11	3.33E-16	0.	0.	0.	0.	0.	0.	0.	0.
NB 93M	0.	1.62E-05	1.72E-05	2.22E-05	9.39E-05	2.01E-04	2.16E-04	2.16E-04	2.15E-04	2.05E-04	1.87E-04	1.23E-04
NB 93	3.23E+02	3.23E+02	3.23E+02	3.23E+02	3.23E+02	3.23E+02	3.23E+02	3.23E+02	3.23E+02	3.23E+02	3.24E+02	3.31E+02
NB 94	0.	6.97E-01	6.97E-01	6.97E-01	6.97E-01	6.97E-01	6.97E-01	6.97E-01	6.97E-01	6.96E-01	6.94E-01	6.73E-01
NB 95	0.	1.85E-01	1.36E-01	2.11E-02	1.28E-17	0.	0.	0.	0.	0.	0.	0.
NB 96	0.	6.93E-53	3.27E-63	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 97	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 92	2.82E+01	2.82E+01	2.82E+01	2.82E+01	2.82E+01	2.82E+01	2.82E+01	2.82E+01	2.82E+01	2.82E+01	2.82E+01	2.82E+01
MO 93	0.	1.69E-02	1.69E-02	1.69E-02	1.68E-02	1.68E-02	1.67E-02	1.62E-02	1.56E-02	7.80E-03	7.62E-06	0.
MO 93M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 94	1.77E+01	1.77E+01	1.77E+01	1.77E+01	1.77E+01	1.77E+01	1.77E+01	1.77E+01	1.77E+01	1.77E+01	1.77E+01	1.77E+01
MO 95	3.13E+01	3.43E+01	3.44E+01	3.46E+01	3.46E+01	3.46E+01	3.46E+01	3.46E+01	3.46E+01	3.46E+01	3.46E+01	3.46E+01
MO 96	3.32E+01	3.73E+01	3.73E+01	3.73E+01	3.73E+01	3.73E+01	3.73E+01	3.73E+01	3.73E+01	3.73E+01	3.73E+01	3.73E+01
MO 97	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01
MO 98	4.95E+01	4.92E+01	4.92E+01	4.92E+01	4.92E+01	4.92E+01	4.92E+01	4.92E+01	4.92E+01	4.92E+01	4.92E+01	4.92E+01
MO 99	0.	1.24E-19	3.54E-23	7.15E-43	0.	0.	0.	0.	0.	0.	0.	0.
MO100	1.99E+01	1.98E+01	1.98E+01	1.98E+01	1.98E+01	1.98E+01	1.98E+01	1.98E+01	1.98E+01	1.98E+01	1.98E+01	1.98E+01
MO101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC 99M	0.	1.06E-20	3.03E-24	6.12E-44	0.	0.	0.	0.	0.	0.	0.	0.
TC 99	0.	3.22E-01	3.22E-01	3.22E-01	3.22E-01	3.22E-01	3.22E-01	3.21E-01	3.21E-01	3.11E-01	2.31E-01	1.19E-02
TC101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU101	0.	9.75E-02	9.75E-02	9.75E-02	9.75E-02	9.75E-02	9.75E-02	9.75E-02	9.75E-02	9.75E-02	9.75E-02	9.75E-02
CD113M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD113	6.18E-03	7.67E-08	7.67E-08	7.67E-08	7.67E-08	7.67E-08	7.67E-08	7.67E-08	7.67E-08	7.67E-08	7.67E-08	7.67E-08
CD115M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD115	0.	1.25E-29	4.56E-34	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD119M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN113	6.33E-03	2.20E-03	2.20E-03	2.20E-03	2.20E-03	2.20E-03	2.20E-03	2.20E-03	2.20E-03	2.20E-03	2.20E-03	2.20E-03
IN119M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN121M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN114	1.16E+01	1.16E+01	1.16E+01	1.16E+01	1.16E+01	1.16E+01	1.16E+01	1.16E+01	1.16E+01	1.16E+01	1.16E+01	1.16E+01
SN115	6.21E+00	6.21E+00	6.21E+00	6.21E+00	6.21E+00	6.21E+00	6.21E+00	6.21E+00	6.21E+00	6.21E+00	6.21E+00	6.21E+00
SN116	2.59E+02	2.56E+02	2.56E+02	2.56E+02	2.56E+02	2.56E+02	2.56E+02	2.56E+02	2.56E+02	2.56E+02	2.56E+02	2.56E+02
SN117M	0.	5.73E-05	1.13E-05	1.33E-09	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 FUEL DECAY TIMES(2) CASE E=1 Clad

TABLE A-IV-1
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2=SEC

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	******* Y
SN117	1.38E+02	1.39E+02	1.39E+02	1.39E+02	1.39E+02	1.39E+02	1.39E+02	1.39E+02	1.39E+02	1.39E+02	1.39E+02	1.39E+02
SN118	4.41E+02	4.44E+02	4.44E+02	4.44E+02	4.44E+02	4.44E+02	4.44E+02	4.44E+02	4.44E+02	4.44E+02	4.44E+02	4.44E+02
SN119M	0.	2.33E-03	2.13E-03	1.28E-03	1.41E-07	3.59E-25	0.	0.	0.	0.	0.	0.
SN119	1.59E+02	1.57E+02	1.57E+02	1.57E+02	1.57E+02	1.57E+02	1.57E+02	1.57E+02	1.57E+02	1.57E+02	1.57E+02	1.57E+02
SN120	6.11E+02	6.12E+02	6.12E+02	6.12E+02	6.12E+02	6.12E+02	6.12E+02	6.12E+02	6.12E+02	6.12E+02	6.12E+02	6.12E+02
SN121M	0.	4.58E-03	4.57E-03	4.55E-03	4.19E-03	2.91E-03	1.85E-03	4.80E-05	5.02E-07	0.	0.	0.
SN121	0.	1.05E-43	1.67E-52	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN122	8.91E+01	8.90E+01	8.90E+01	8.90E+01	8.90E+01	8.90E+01	8.90E+01	8.90E+01	8.90E+01	8.90E+01	8.90E+01	8.90E+01
SN123M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN123	0.	1.57E-05	1.31E-05	4.75E-06	5.75E-14	0.	0.	0.	0.	0.	0.	0.
SN124	1.12E+02	1.12E+02	1.12E+02	1.12E+02	1.12E+02	1.12E+02	1.12E+02	1.12E+02	1.12E+02	1.12E+02	1.12E+02	1.12E+02
SN125M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN125	0.	3.55E-10	3.14E-11	4.45E-17	0.	0.	0.	0.	0.	0.	0.	0.
SB121	0.	6.10E-01	6.10E-01	6.10E-01	6.11E-01	6.12E-01	6.13E-01	6.15E-01	6.15E-01	6.15E-01	6.15E-01	6.15E-01
SB123	0.	2.90E-02	2.90E-02	2.90E-02	2.90E-02	2.90E-02	2.90E-02	2.90E-02	2.90E-02	2.90E-02	2.90E-02	2.90E-02
SB124M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB124	0.	2.88E-05	1.97E-05	2.39E-06	7.65E-23	0.	0.	0.	0.	0.	0.	0.
SB125	0.	2.26E-02	2.21E-02	1.95E-02	1.93E-03	6.69E-08	1.78E-13	0.	0.	0.	0.	0.
SB126M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB126	0.	5.37E-10	8.67E-11	3.46E-15	0.	0.	0.	0.	0.	0.	0.	0.
TE124	0.	8.87E-04	8.96E-04	9.14E-04	9.16E-04	9.16E-04	9.16E-04	9.16E-04	9.16E-04	9.16E-04	9.16E-04	9.16E-04
TE125M	0.	5.36E-04	5.29E-04	4.73E-04	4.70E-05	1.63E-09	1.34E-15	0.	0.	0.	0.	0.
TE125	0.	9.61E-03	1.01E-02	1.29E-02	3.08E-02	3.28E-02	3.28E-02	3.28E-02	3.28E-02	3.28E-02	3.28E-02	3.28E-02
TE126	0.	1.17E-04	1.17E-04	1.17E-04	1.17E-04	1.17E-04	1.17E-04	1.17E-04	1.17E-04	1.17E-04	1.17E-04	1.17E-04
TA180	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TA181	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TA182M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TA182	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W180	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W181	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W182	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W183M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W183	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W184	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W185M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W185	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W186	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W187	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	4.09E+05	4.09E+05	4.09E+05	4.09E+05	4.09E+05	4.09E+05	4.09E+05	4.09E+05	4.09E+05	4.09E+05	4.09E+05	4.09E+05

PWR = BU = 33,000 FUEL DECAY TIMES(2) CASE E-1 HE's

TABLE A-IV-1
(continued)

POWER= 38.40MW, BURNUP= 33000,MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	******* Y
HE 4	0.	2.34E-01	2.48E-01	3.04E-01	7.40E-01	2.77E+00	5.18E+00	1.77E+01	2.64E+01	7.22E+01	1.58E+02	2.60E+02
TL207	0.	5.06E-15	5.42E-15	7.84E-15	4.04E-14	1.51E-13	2.57E-13	1.09E-12	2.05E-12	1.90E-11	1.22E-10	1.51E-10
TL208	0.	2.54E-12	2.77E-12	4.15E-12	2.14E-11	1.75E-11	1.08E-11	2.30E-13	1.89E-15	1.89E-16	2.36E-15	2.38E-14
TL209	0.	1.84E-18	1.84E-18	2.01E-18	4.84E-18	2.47E-17	6.78E-17	1.49E-15	7.11E-15	9.22E-13	2.25E-11	5.06E-11
PB206	0.	8.86E-14	1.01E-13	1.97E-13	4.24E-11	1.23E-08	1.51E-07	4.21E-05	3.63E-04	2.05E-01	2.30E+01	3.29E+02
PB207	0.	3.05E-10	3.41E-10	5.91E-10	1.73E-08	3.19E-07	1.10E-06	2.16E-05	8.05E-05	7.35E-03	5.64E-01	1.09E+01
PB208	0.	6.06E-07	6.85E-07	1.25E-06	4.42E-05	3.20E-04	5.47E-04	9.07E-04	9.15E-04	9.15E-04	9.53E-04	4.81E-03
PB209	0.	7.53E-15	7.55E-15	8.21E-15	1.98E-14	1.01E-13	2.77E-13	6.11E-12	2.91E-11	3.77E-09	9.22E-08	2.07E-07
PB210	0.	6.60E-12	7.17E-12	1.09E-11	4.38E-10	2.77E-08	1.67E-07	8.65E-06	3.50E-05	1.50E-03	1.21E-02	5.80E-03
PB211	0.	3.90E-14	4.17E-14	6.04E-14	3.12E-13	1.16E-12	1.98E-12	8.41E-12	1.58E-11	1.47E-10	9.44E-10	1.17E-09
PB212	0.	1.48E-09	1.61E-09	2.41E-09	1.24E-08	1.02E-08	6.30E-09	1.34E-10	1.10E-12	1.10E-13	1.37E-12	1.38E-11
PB214	0.	4.75E-16	5.01E-16	6.68E-16	8.91E-15	1.78E-13	7.30E-13	2.14E-11	8.65E-11	3.72E-09	2.99E-08	1.43E-08
BI209	0.	6.45E-11	6.58E-11	7.30E-11	3.01E-10	4.43E-09	2.11E-08	1.82E-06	1.65E-05	2.41E-02	8.18E+00	3.35E+02
BI210	0.	4.23E-15	4.60E-15	7.12E-15	2.86E-13	1.81E-11	1.09E-10	5.65E-09	2.28E-08	9.83E-07	7.89E-06	3.79E-06
BI211	0.	2.32E-15	2.49E-15	3.60E-15	1.86E-14	6.91E-14	1.18E-13	5.01E-13	9.43E-13	8.74E-12	5.62E-11	6.95E-11
BI212	0.	1.41E-10	1.53E-10	2.30E-10	1.18E-09	9.71E-10	6.00E-10	1.28E-11	1.04E-13	1.05E-14	1.31E-13	1.32E-12
BI213	0.	1.82E-15	1.83E-15	1.99E-15	4.79E-15	2.44E-14	6.71E-14	1.48E-12	7.03E-12	9.12E-10	2.23E-08	5.00E-08
BI214	0.	3.50E-16	3.68E-16	4.91E-16	6.55E-15	1.31E-13	5.36E-13	1.57E-11	6.36E-11	2.74E-09	2.20E-08	1.05E-08
PO210	0.	7.32E-14	8.06E-14	1.30E-13	7.89E-12	4.99E-10	3.00E-09	1.56E-07	6.29E-07	2.71E-05	2.17E-04	1.04E-04
PO211	0.	2.81E-20	3.01E-20	4.35E-20	2.24E-19	8.35E-19	1.43E-18	6.05E-18	1.14E-17	1.06E-16	6.80E-16	8.40E-16
PO212	0.	7.43E-21	8.09E-21	1.21E-20	6.24E-20	5.13E-20	3.17E-20	6.73E-22	5.51E-24	5.53E-25	6.91E-24	6.96E-23
PO213	0.	2.65E-24	2.66E-24	2.89E-24	6.97E-24	3.55E-23	9.77E-23	2.15E-21	1.02E-20	1.33E-18	3.25E-17	7.29E-17
PO214	0.	5.91E-23	6.23E-23	8.30E-23	1.11E-21	2.21E-20	9.07E-20	2.66E-18	1.08E-17	4.63E-16	3.72E-15	1.78E-15
PO215	0.	3.30E-20	3.53E-20	5.12E-20	2.64E-19	9.82E-19	1.68E-18	7.12E-18	1.34E-17	1.24E-16	7.99E-16	9.88E-16
PO216	0.	5.91E-15	6.44E-15	9.65E-15	4.97E-14	4.08E-14	2.52E-14	5.36E-16	4.39E-18	4.40E-19	5.50E-18	5.54E-17
PO218	0.	5.51E-17	5.81E-17	7.74E-17	1.03E-15	2.06E-14	8.46E-14	2.48E-12	1.00E-11	4.31E-10	3.46E-09	1.66E-09
AT217	0.	2.11E-20	2.11E-20	2.30E-20	5.53E-20	2.82E-19	7.75E-19	1.71E-17	8.13E-17	1.05E-14	2.58E-13	5.78E-13
RN219	0.	7.48E-17	8.00E-17	1.16E-16	5.97E-16	2.22E-15	3.80E-15	1.61E-14	3.03E-14	2.81E-13	1.81E-12	2.24E-12
RN220	0.	2.25E-12	2.45E-12	3.67E-12	1.89E-11	1.55E-11	9.59E-12	2.04E-13	1.67E-15	1.67E-16	2.09E-15	2.11E-14
RN222	0.	1.01E-13	1.07E-13	1.42E-13	1.90E-12	3.79E-11	1.55E-10	4.55E-09	1.84E-08	7.92E-07	6.36E-06	3.05E-06
FR221	0.	1.93E-16	1.93E-16	2.11E-16	5.07E-16	2.59E-15	7.11E-15	1.57E-13	7.45E-13	9.67E-11	2.36E-09	5.30E-09
FR223	0.	3.83E-16	4.08E-16	5.43E-16	2.81E-15	1.05E-14	1.79E-14	7.58E-14	1.43E-13	1.32E-12	8.51E-12	1.05E-11
RA223	0.	1.88E-11	2.01E-11	2.90E-11	1.50E-10	5.57E-10	9.52E-10	4.04E-09	7.61E-09	7.05E-08	4.54E-07	5.61E-07
RA224	0.	1.29E-08	1.40E-08	2.10E-08	1.08E-07	8.87E-08	5.48E-08	1.17E-09	9.54E-12	9.57E-13	1.20E-11	1.20E-10
RA225	0.	8.69E-13	8.78E-13	9.51E-13	2.29E-12	1.17E-11	3.21E-11	7.08E-10	3.37E-09	4.37E-07	1.07E-05	2.40E-05
RA226	0.	1.59E-08	1.68E-08	2.21E-08	2.96E-07	5.90E-06	2.42E-05	7.09E-04	2.87E-03	1.23E-01	9.91E-01	4.76E-01
RA228	0.	1.03E-14	1.11E-14	1.66E-14	2.59E-13	2.28E-12	5.02E-12	2.77E-11	5.61E-11	6.55E-10	8.18E-09	8.24E-08
AC225	0.	5.90E-13	5.91E-13	6.43E-13	1.55E-12	7.90E-12	2.17E-11	4.78E-10	2.28E-09	2.95E-07	7.22E-06	1.62E-05
AC227	0.	1.44E-08	1.53E-08	2.04E-08	1.05E-07	3.93E-07	6.70E-07	2.85E-06	5.36E-06	4.97E-05	3.20E-04	3.95E-04
AC228	0.	1.07E-18	1.16E-18	1.73E-18	2.70E-17	2.38E-16	5.24E-16	2.89E-15	5.85E-15	6.83E-14	8.54E-13	8.60E-12
TH227	0.	3.11E-11	3.32E-11	4.65E-11	2.40E-10	8.93E-10	1.53E-09	6.47E-09	1.22E-08	1.13E-07	7.27E-07	8.98E-07
TH228	0.	2.54E-06	2.77E-06	4.08E-06	2.11E-05	1.73E-05	1.07E-05	2.27E-07	1.86E-09	1.87E-10	2.33E-09	2.35E-08
TH229	0.	1.60E-07	1.62E-07	1.74E-07	4.20E-07	2.14E-06	5.89E-06	1.30E-04	6.18E-04	8.01E-02	1.96E+00	4.39E+00
TH230	0.	1.10E-03	1.14E-03	1.38E-03	5.81E-03	2.80E-02	6.01E-02	3.80E-01	8.05E-01	8.07E+00	5.03E+01	2.42E+01
TH231	0.	3.25E-08	3.25E-08	3.25E-08	3.25E-08	3.25E-08	3.26E-08	3.28E-08	3.31E-08	3.78E-08	5.31E-08	5.43E-08
TH232	0.	2.17E-04	2.27E-04	2.86E-04	1.34E-03	6.01E-03	1.19E-02	5.93E-02	1.20E-01	1.40E+00	1.75E+01	1.76E+02
TH233	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TH234	0.	1.36E-05	1.36E-05	1.36E-05	1.36E-05	1.36E-05	1.36E-05	1.36E-05	1.36E-05	1.36E-05	1.36E-05	1.36E-05
PA231	0.	5.09E-04	5.10E-04	5.14E-04	5.83E-04	8.91E-04	1.28E-03	4.36E-03	8.20E-03	7.61E-02	4.89E-01	6.05E-01
PA232	0.	6.96E-41	2.21E-48	0.	0.	0.	0.	0.	0.	0.	0.	0.
PA233	0.	1.60E-05	1.60E-05	1.60E-05	1.62E-05	1.82E-05	2.12E-05	3.95E-05	5.07E-05	5.96E-05	5.79E-05	4.33E-05
PA234M	0.	4.57E-10	4.57E-10	4.57E-10	4.57E-10	4.57E-10	4.57E-10	4.57E-10	4.57E-10	4.57E-10	4.57E-10	4.57E-10

PWR - BU = 33,000 FUEL DECAY TIMES(2) CASE E-1 HE's

TABLE A-IV-1
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	******* Y
PA234	0.	1.58E-10	1.58E-10	1.58E-10	1.58E-10	1.58E-10	1.58E-10	1.58E-10	1.58E-10	1.58E-10	1.58E-10	1.58E-10
U232	0.	3.58E-04	3.72E-04	4.44E-04	8.84E-04	6.46E-04	3.99E-04	8.49E-06	6.89E-08	0.	0.	0.
U233	0.	5.74E-03	5.76E-03	5.83E-03	7.17E-03	1.35E-02	2.26E-02	1.38E-01	3.49E-01	5.21E+00	4.41E+01	9.92E+01
U234	3.17E+02	1.73E+02	1.73E+02	1.74E+02	1.83E+02	2.17E+02	2.47E+02	3.07E+02	3.10E+02	3.03E+02	2.47E+02	6.65E+01
U235	3.20E+04	8.04E+03	8.04E+03	8.04E+03	8.04E+03	8.05E+03	8.05E+03	8.11E+03	8.19E+03	9.36E+03	1.31E+04	1.34E+04
U236	0.	4.10E+03	4.10E+03	4.10E+03	4.10E+03	4.11E+03	4.12E+03	4.20E+03	4.31E+03	5.50E+03	6.27E+03	6.11E+03
U237	0.	4.04E-05	3.68E-05	3.59E-05	2.34E-05	3.50E-06	3.26E-07	1.25E-11	1.20E-11	5.62E-12	2.96E-15	0.
U238	9.68E+05	9.43E+05	9.43E+05	9.43E+05	9.43E+05	9.43E+05	9.43E+05	9.43E+05	9.43E+05	9.43E+05	9.43E+05	9.43E+05
U239	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
U240	0.	6.00E-22	6.86E-22	1.16E-21	9.75E-21	4.79E-20	9.56E-20	4.77E-19	9.53E-19	9.45E-18	8.62E-17	3.95E-16
NP236	0.	3.33E-55	5.33E-66	0.	0.	0.	0.	0.	0.	0.	0.	0.
NP237	0.	4.65E+02	4.65E+02	4.65E+02	4.69E+02	5.27E+02	6.16E+02	1.15E+03	1.47E+03	1.73E+03	1.68E+03	1.26E+03
NP238	0.	1.18E-21	2.29E-26	0.	0.	0.	0.	0.	0.	0.	0.	0.
NP239	0.	7.39E-05	7.38E-05	7.38E-05	7.38E-05	7.35E-05	7.32E-05	7.06E-05	6.75E-05	2.98E-05	8.57E-09	1.45E-13
NP240M	0.	5.18E-23	5.92E-23	1.00E-22	8.41E-22	4.13E-21	8.25E-21	4.12E-20	8.23E-20	8.15E-19	7.44E-18	3.41E-17
NP240	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PU236	0.	6.68E-04	6.53E-04	5.78E-04	6.48E-05	3.86E-09	2.02E-14	0.	0.	0.	0.	0.
PU238	0.	1.36E+02	1.38E+02	1.38E+02	1.30E+02	9.52E+01	6.45E+01	2.86E+00	5.82E-02	8.43E-24	0.	0.
PU239	0.	5.40E+03	5.40E+03	5.40E+03	5.40E+03	5.39E+03	5.38E+03	5.33E+03	5.25E+03	4.11E+03	3.23E+02	5.51E-07
PU240	0.	2.21E+03	2.21E+03	2.21E+03	2.21E+03	2.22E+03	2.21E+03	2.12E+03	2.02E+03	8.01E+02	7.86E-02	1.66E-08
PU241	0.	1.23E+03	1.23E+03	1.20E+03	7.82E+02	1.17E+02	1.09E+01	4.17E-04	4.00E-04	1.88E-04	9.91E-08	0.
PU242	0.	4.47E+02	4.47E+02	4.47E+02	4.47E+02	4.47E+02	4.47E+02	4.47E+02	4.46E+02	4.39E+02	3.73E+02	7.18E+01
PU243	0.	1.35E-14	1.35E-14	1.35E-14	1.35E-14	1.35E-14	1.35E-14	1.35E-14	1.35E-14	1.35E-14	1.35E-14	1.30E-14
PU244	0.	3.15E-11	3.60E-11	6.10E-11	5.11E-10	2.51E-09	5.01E-09	2.50E-08	5.00E-08	4.95E-07	4.52E-06	2.07E-05
PU245	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AM241	0.	5.91E+01	6.44E+01	9.31E+01	5.06E+02	1.11E+03	1.13E+03	6.00E+02	2.70E+02	5.73E-03	3.10E-06	0.
AM242M	0.	4.72E-04	4.72E-04	4.71E-04	4.52E-04	3.77E-04	3.00E-04	4.84E-05	4.95E-06	7.37E-24	0.	0.
AM242	0.	5.67E-09	5.67E-09	5.66E-09	5.43E-09	4.52E-09	3.60E-09	5.81E-10	5.94E-11	8.86E-29	0.	0.
AM243	0.	8.93E+01	8.93E+01	8.93E+01	8.92E+01	8.89E+01	8.85E+01	8.53E+01	8.15E+01	3.61E+01	1.04E-02	1.75E-07
AM244	0.	2.44E-25	2.79E-25	4.73E-25	3.97E-24	1.95E-23	3.89E-23	1.94E-22	3.88E-22	3.84E-21	3.51E-20	1.61E-19
AM245	0.	5.08E-29	3.41E-32	1.06E-49	0.	0.	0.	0.	0.	0.	0.	0.
CM242	0.	4.58E+00	3.98E+00	1.83E+00	2.64E-06	9.07E-07	7.22E-07	1.17E-07	1.19E-08	1.78E-26	0.	0.
CM243	0.	8.85E-02	8.83E-02	8.73E-02	7.19E-02	3.02E-02	1.02E-02	1.76E-06	3.49E-11	0.	0.	0.
CM244	0.	2.41E+01	2.41E+01	2.36E+01	1.67E+01	3.61E+00	5.32E-01	1.18E-07	7.13E-16	1.41E-15	1.28E-14	5.88E-14
CM245	0.	2.50E-01	2.50E-01	2.50E-01	2.50E-01	2.49E-01	2.48E-01	2.40E-01	2.30E-01	1.08E-01	5.69E-05	0.
CM246	0.	2.97E-02	2.97E-02	2.97E-02	2.96E-02	2.95E-02	2.93E-02	2.76E-02	2.56E-02	6.82E-03	1.21E-08	0.
CM247	0.	3.97E-04	3.97E-04	3.97E-04	3.97E-04	3.97E-04	3.97E-04	3.97E-04	3.97E-04	3.97E-04	3.95E-04	3.81E-04
CM248	0.	2.81E-05	2.81E-05	2.81E-05	2.81E-05	2.81E-05	2.81E-05	2.81E-05	2.81E-05	2.76E-05	2.31E-05	3.93E-06
CM249	0.	3.88E-43	1.08E-48	0.	0.	0.	0.	0.	0.	0.	0.	0.
CM250	0.	2.29E-14	2.29E-14	2.29E-14	2.28E-14	2.25E-14	2.20E-14	1.88E-14	1.54E-14	4.27E-16	1.14E-31	0.
BK249	0.	1.16E-22	8.18E-26	2.53E-43	0.	0.	0.	0.	0.	0.	0.	0.
BK250	0.	4.84E-21	4.84E-21	4.84E-21	4.82E-21	4.75E-21	4.65E-21	3.97E-21	3.25E-21	9.01E-23	2.41E-38	0.
CF249	0.	2.89E-07	2.84E-07	2.57E-07	4.37E-08	1.66E-11	8.76E-16	0.	0.	0.	0.	0.
CF250	0.	1.13E-08	1.08E-08	8.27E-09	7.01E-11	1.69E-17	1.66E-17	1.41E-17	1.16E-17	3.21E-19	8.60E-35	0.
CF251	0.	6.93E-09	6.93E-09	6.93E-09	6.88E-09	6.67E-09	6.42E-09	4.72E-09	3.21E-09	3.13E-12	0.	0.
CF252	0.	3.73E-09	3.64E-09	3.19E-09	3.02E-10	8.49E-19	1.74E-20	0.	0.	0.	0.	0.
CF253	0.	5.08E-38	1.41E-43	0.	0.	0.	0.	0.	0.	0.	0.	0.
CF254	0.	-4.62E-24	-4.62E-24	-3.78E-33	0.	0.	0.	0.	0.	0.	0.	0.
ES253	0.	-1.10E-32	-1.86E-37	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	1.00E+06	9.65E+05	9.65E+05	9.65E+05	9.65E+05	9.65E+05	9.65E+05	9.65E+05	9.65E+05	9.65E+05	9.65E+05	9.65E+05

PWR - BU = 33,000 FUEL DECAY TIME8(2) CASE E-1

POWER= 38.40MW, BURNUP= 33000,MWD, FLUX= 3.98E+13N/CM**2-SEC

FP's

TABLE A-IV-1
(continued)

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	Y******* Y
H 3	0.	7.38E-02	7.34E-02	7.13E-02	4.30E-02	4.51E-03	2.69E-04	4.36E-14	2.52E-26	0.	0.	0.
ZN 72	0.	1.41E-28	1.10E-33	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 72	0.	6.15E-29	4.80E-34	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 72	0.	6.09E-03	6.09E-03	6.09E-03	6.09E-03	6.09E-03	6.09E-03	6.09E-03	6.09E-03	6.09E-03	6.09E-03	6.09E-03
GA 73	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 73	0.	1.53E-02	1.53E-02	1.53E-02	1.53E-02	1.53E-02	1.53E-02	1.53E-02	1.53E-02	1.53E-02	1.53E-02	1.53E-02
GA 74	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 74	0.	5.68E-02	5.68E-02	5.68E-02	5.68E-02	5.68E-02	5.68E-02	5.68E-02	5.68E-02	5.68E-02	5.68E-02	5.68E-02
GA 75	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 75M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 75	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 75	0.	8.44E-02	8.44E-02	8.44E-02	8.44E-02	8.44E-02	8.44E-02	8.44E-02	8.44E-02	8.44E-02	8.44E-02	8.44E-02
GA 76	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 76	0.	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	2.95E-01
AS 76	0.	1.06E-46	1.16E-55	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 76	0.	1.95E-03	1.95E-03	1.95E-03	1.95E-03	1.95E-03	1.95E-03	1.95E-03	1.95E-03	1.95E-03	1.95E-03	1.95E-03
GE 77M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 77	0.	3.89-100	3.72-121	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 77	0.	3.20E-31	2.34E-37	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 77M	0.	1.21E-37	8.80E-44	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 77	0.	9.46E-01	9.46E-01	9.46E-01	9.46E-01	9.46E-01	9.46E-01	9.46E-01	9.46E-01	9.46E-01	9.46E-01	9.46E-01
GE 78	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 78M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 78	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 78	0.	2.56E+00	2.56E+00	2.56E+00	2.56E+00	2.56E+00	2.56E+00	2.56E+00	2.56E+00	2.56E+00	2.56E+00	2.56E+00
AS 79	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 79M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 79	0.	5.67E+00	5.67E+00	5.67E+00	5.67E+00	5.67E+00	5.67E+00	5.64E+00	5.61E+00	5.10E+00	1.95E+00	1.33E-04
BR 79	0.	5.59E-04	5.64E-04	5.94E-04	1.14E-03	3.56E-03	6.58E-03	3.07E-02	6.07E-02	5.75E-01	3.72E+00	5.68E+00
AS 80	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 80	0.	9.89E+00	9.89E+00	9.89E+00	9.89E+00	9.89E+00	9.89E+00	9.89E+00	9.89E+00	9.89E+00	9.89E+00	9.89E+00
BR 80M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 80	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 80	0.	2.88E-01	2.88E-01	2.88E-01	2.88E-01	2.88E-01	2.88E-01	2.88E-01	2.88E-01	2.88E-01	2.88E-01	2.88E-01
AS 81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 81M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 81	0.	1.53E+01	1.53E+01	1.53E+01	1.53E+01	1.53E+01	1.53E+01	1.53E+01	1.53E+01	1.53E+01	1.53E+01	1.53E+01
KR 81M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 81	0.	1.68E-01	1.68E-01	1.68E-01	1.68E-01	1.68E-01	1.68E-01	1.68E-01	1.68E-01	1.68E-01	1.68E-01	1.68E-01
SE 82	0.	3.25E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01
BR 82M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 82	0.	5.85E-34	1.09E-40	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 82	0.	5.05E-01	5.05E-01	5.05E-01	5.05E-01	5.05E-01	5.05E-01	5.05E-01	5.05E-01	5.05E-01	5.05E-01	5.05E-01
SE 83M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 83	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 83	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 83M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 83	0.	3.92E+01	3.92E+01	3.92E+01	3.92E+01	3.92E+01	3.92E+01	3.92E+01	3.92E+01	3.92E+01	3.92E+01	3.92E+01
SE 84	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 84M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 84	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 FUEL DECAY TIMES(2) CASE E-1

FP's

TABLE A-IV-1
(continued)

POWER= 38.40MW, BURNUP= 33000,MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	******* Y
KR 84	0.	1.11E+02	1.11E+02	1.11E+02	1.11E+02	1.11E+02	1.11E+02	1.11E+02	1.11E+02	1.11E+02	1.11E+02	1.11E+02
SE 85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 85M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 85	0.	2.84E+01	2.82E+01	2.73E+01	1.53E+01	1.18E+00	4.75E-02	3.36E-13	3.88E-27	0.	0.	0.
RB 85	0.	9.29E+01	9.31E+01	9.40E+01	1.06E+02	1.20E+02	1.21E+02	1.21E+02	1.21E+02	1.21E+02	1.21E+02	1.21E+02
BR 86	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 86	0.	1.89E+02	1.89E+02	1.89E+02	1.89E+02	1.89E+02	1.89E+02	1.89E+02	1.89E+02	1.89E+02	1.89E+02	1.89E+02
RB 86M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 86	0.	3.13E-05	9.24E-06	1.06E-08	0.	0.	0.	0.	0.	0.	0.	0.
SR 86	0.	1.30E-01	1.30E-01	1.30E-01	1.30E-01	1.30E-01	1.30E-01	1.30E-01	1.30E-01	1.30E-01	1.30E-01	1.30E-01
BR 87	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 87	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 87	0.	2.34E+02	2.34E+02	2.34E+02	2.34E+02	2.34E+02	2.34E+02	2.34E+02	2.34E+02	2.34E+02	2.34E+02	2.34E+02
SR 87M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 87	0.	6.70E-05	6.70E-05	6.70E-05	6.70E-05	6.72E-05	6.73E-05	6.86E-05	7.02E-05	9.95E-05	3.92E-04	3.32E-03
BR 88	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 88	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 88	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 88	0.	3.43E+02	3.43E+02	3.43E+02	3.43E+02	3.43E+02	3.43E+02	3.43E+02	3.43E+02	3.43E+02	3.43E+02	3.43E+02
BR 89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 89	0.	4.38E+00	2.83E+00	2.48E-01	2.30E-20	0.	0.	0.	0.	0.	0.	0.
Y 89	0.	4.53E+02	4.55E+02	4.57E+02	4.58E+02	4.58E+02	4.58E+02	4.58E+02	4.58E+02	4.58E+02	4.58E+02	4.58E+02
KR 90	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 90	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 90	0.	5.38E+02	5.36E+02	5.30E+02	4.24E+02	1.58E+02	4.61E+01	2.39E-03	1.05E-08	0.	0.	0.
Y 90M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 90	0.	1.40E-01	1.39E-01	1.38E-01	1.10E-01	4.11E-02	1.20E-02	6.20E-07	2.73E-12	0.	0.	0.
ZR 90	0.	2.34E+01	2.46E+01	3.12E+01	1.37E+02	4.03E+02	5.15E+02	5.61E+02	5.61E+02	5.61E+02	5.61E+02	5.61E+02
KR 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 91M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 91	0.	8.41E+00	5.71E+00	6.63E-01	9.79E-18	0.	0.	0.	0.	0.	0.	0.
ZR 91	0.	5.93E+02	5.96E+02	6.01E+02	6.01E+02	6.01E+02	6.01E+02	6.01E+02	6.01E+02	6.01E+02	6.01E+02	6.01E+02
KR 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 92	0.	6.55E+02	6.55E+02	6.55E+02	6.55E+02	6.55E+02	6.55E+02	6.55E+02	6.55E+02	6.55E+02	6.55E+02	6.55E+02
KR 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 93	0.	2.52-107	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 93	0.	7.28E+02	7.28E+02	7.28E+02	7.28E+02	7.28E+02	7.28E+02	7.28E+02	7.27E+02	7.24E+02	6.95E+02	4.58E+02
NB 93M	0.	5.28E-04	5.55E-04	7.08E-04	2.87E-03	6.11E-03	6.56E-03	6.60E-03	6.60E-03	6.57E-03	6.30E-03	4.16E-03
NB 93	0.	2.63E-05	2.87E-05	4.48E-05	9.04E-04	1.11E-02	2.75E-02	1.62E-01	3.30E-01	3.35E+00	3.29E+01	2.69E+02
KR 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR • BU = 33,000 FUEL DECAY TIMES(2) CASE E-1

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

FP's

TABLE A-IV-1
(continued)

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	******** Y
Y 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 94	0.	7.86E+02	7.86E+02	7.86E+02	7.86E+02	7.86E+02	7.86E+02	7.86E+02	7.86E+02	7.86E+02	7.86E+02	7.86E+02
RB 95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 95	0.	1.68E+01	1.18E+01	1.69E+00	1.00E-15	0.	0.	0.	0.	0.	0.	0.
NB 95M	0.	2.05E-02	1.45E-02	2.06E-03	1.23E-18	0.	0.	0.	0.	0.	0.	0.
NB 95	0.	1.69E+01	1.24E+01	1.93E+00	1.17E-15	0.	0.	0.	0.	0.	0.	0.
MO 95	0.	7.35E+02	7.44E+02	7.65E+02	7.68E+02	7.68E+02	7.68E+02	7.68E+02	7.68E+02	7.68E+02	7.68E+02	7.68E+02
Y 96	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 96	0.	8.28E+02	8.28E+02	8.28E+02	8.28E+02	8.28E+02	8.28E+02	8.28E+02	8.28E+02	8.28E+02	8.28E+02	8.28E+02
NB 96	0.	1.07E-50	5.06E-61	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 96	0.	3.91E+01	3.91E+01	3.91E+01	3.91E+01	3.91E+01	3.91E+01	3.91E+01	3.91E+01	3.91E+01	3.91E+01	3.91E+01
Y 97	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 97	0.	1.68E-64	1.80E-78	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 97M	0.	1.58E-67	1.69E-81	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 97	0.	1.28E-65	1.36E-79	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 97	0.	8.31E+02	8.31E+02	8.31E+02	8.31E+02	8.31E+02	8.31E+02	8.31E+02	8.31E+02	8.31E+02	8.31E+02	8.31E+02
ZR 98	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 98M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 98	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 98	0.	8.50E+02	8.50E+02	8.50E+02	8.50E+02	8.50E+02	8.50E+02	8.50E+02	8.50E+02	8.50E+02	8.50E+02	8.50E+02
NB 99	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 99	0.	2.79E-16	7.95E-20	1.61E-39	0.	0.	0.	0.	0.	0.	0.	0.
TC 99M	0.	2.38E-17	6.80E-21	1.38E-40	0.	0.	0.	0.	0.	0.	0.	0.
TC 99	0.	8.39E+02	8.39E+02	8.39E+02	8.39E+02	8.39E+02	8.39E+02	8.38E+02	8.36E+02	8.12E+02	6.05E+02	3.19E+01
RU 99	0.	4.39E-03	4.63E-03	6.01E-03	3.07E-02	1.40E-01	2.78E-01	1.37E+00	2.74E+00	2.70E+01	2.34E+02	8.07E+02
NB100	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO100	0.	9.75E+02	9.75E+02	9.75E+02	9.75E+02	9.75E+02	9.75E+02	9.75E+02	9.75E+02	9.75E+02	9.75E+02	9.75E+02
TC100	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU100	0.	5.97E+01	5.97E+01	5.97E+01	5.97E+01	5.97E+01	5.97E+01	5.97E+01	5.97E+01	5.97E+01	5.97E+01	5.97E+01
NB101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU101	0.	7.78E+02	7.78E+02	7.78E+02	7.78E+02	7.78E+02	7.78E+02	7.78E+02	7.78E+02	7.78E+02	7.78E+02	7.78E+02
MO102	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC102M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC102	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU102	0.	7.77E+02	7.77E+02	7.77E+02	7.77E+02	7.77E+02	7.77E+02	7.77E+02	7.77E+02	7.77E+02	7.77E+02	7.77E+02
MO103	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC103	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU103	0.	3.56E+00	2.00E+00	8.20E-02	0.	0.	0.	0.	0.	0.	0.	0.
RH103M	0.	3.57E-03	2.01E-03	8.20E-05	0.	0.	0.	0.	0.	0.	0.	0.
RH103	0.	3.87E+02	3.88E+02	3.90E+02	3.90E+02	3.90E+02	3.90E+02	3.90E+02	3.90E+02	3.90E+02	3.90E+02	3.90E+02
MO104	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC104	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU104	0.	5.60E+02	5.60E+02	5.60E+02	5.60E+02	5.60E+02	5.60E+02	5.60E+02	5.60E+02	5.60E+02	5.60E+02	5.60E+02
RH104M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH104	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD104	0.	2.52E+02	2.52E+02	2.52E+02	2.52E+02	2.52E+02	2.52E+02	2.52E+02	2.52E+02	2.52E+02	2.52E+02	2.52E+02
MO105	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC105	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 FUEL DECAY TIMES(2) CASE E=1 FP's

TABLE A-IV-1
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2=SEC

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	Y******* Y
RU105	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH105M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH105	0.	7.56E-31	1.83E-37	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD105	0.	2.78E+02	2.78E+02	2.78E+02	2.78E+02	2.78E+02	2.78E+02	2.78E+02	2.78E+02	2.78E+02	2.78E+02	2.78E+02
TC106	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU106	0.	1.45E+02	1.36E+02	9.62E+01	1.93E-01	2.00E-13	2.09E-28	0.	0.	0.	0.	0.
RH106M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH106	0.	1.37E-04	1.28E-04	9.10E-05	1.83E-07	1.90E-19	1.98E-34	0.	0.	0.	0.	0.
PD106	0.	3.53E+02	3.62E+02	4.01E+02	4.97E+02	4.97E+02	4.97E+02	4.97E+02	4.97E+02	4.97E+02	4.97E+02	4.97E+02
RU107	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH107	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD107M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD107	0.	2.42E+02	2.42E+02	2.42E+02	2.42E+02	2.42E+02	2.42E+02	2.42E+02	2.42E+02	2.42E+02	2.40E+02	2.19E+02
AG107	0.	3.19E-05	3.40E-05	4.60E-05	2.62E-04	1.22E-03	2.42E-03	1.20E-02	2.40E-02	2.40E-01	2.39E+00	2.28E+01
RU108	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH108	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD108	0.	1.64E+02	1.64E+02	1.64E+02	1.64E+02	1.64E+02	1.64E+02	1.64E+02	1.64E+02	1.64E+02	1.64E+02	1.64E+02
AG108	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD108	0.	4.61E-07	4.61E-07	4.61E-07	4.61E-07	4.61E-07	4.61E-07	4.61E-07	4.61E-07	4.61E-07	4.61E-07	4.61E-07
RH109	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD109M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD109	0.	9.07E-82	2.31E-99	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG109M	0.	1.41E-15	1.34E-15	1.02E-15	6.64E-18	1.30E-27	9.46E-40	0.	0.	0.	0.	0.
AG109	0.	6.15E+01	6.15E+01	6.15E+01	6.15E+01	6.15E+01	6.15E+01	6.15E+01	6.15E+01	6.15E+01	6.15E+01	6.15E+01
CD109	0.	1.38E-09	1.31E-09	9.94E-10	6.50E-12	1.27E-21	9.26E-34	0.	0.	0.	0.	0.
RH110	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD110	0.	3.52E+01	3.52E+01	3.52E+01	3.52E+01	3.52E+01	3.52E+01	3.52E+01	3.52E+01	3.52E+01	3.52E+01	3.52E+01
AG110M	0.	6.39E-01	5.84E-01	3.54E-01	4.34E-05	1.79E-22	0.	0.	0.	0.	0.	0.
AG110	0.	9.28E-08	8.48E-08	5.14E-08	6.30E-12	2.60E-29	0.	0.	0.	0.	0.	0.
CD110	0.	4.48E+01	4.49E+01	4.51E+01	4.54E+01	4.54E+01	4.54E+01	4.54E+01	4.54E+01	4.54E+01	4.54E+01	4.54E+01
PD111M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD111	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG111M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG111	0.	3.19E-07	1.53E-08	7.13E-16	0.	0.	0.	0.	0.	0.	0.	0.
CD111M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD111	0.	1.82E+01	1.82E+01	1.82E+01	1.82E+01	1.82E+01	1.82E+01	1.82E+01	1.82E+01	1.82E+01	1.82E+01	1.82E+01
PD112	0.	5.04E-54	2.47E-65	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG112	0.	9.06E-55	4.44E-66	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD112	0.	9.80E+00	9.80E+00	9.80E+00	9.80E+00	9.80E+00	9.80E+00	9.80E+00	9.80E+00	9.80E+00	9.80E+00	9.80E+00
PD113	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG113M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG113	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD113M	0.	5.10E-02	5.08E-02	4.96E-02	3.17E-02	4.38E-03	3.68E-04	9.21E-13	1.63E-23	0.	0.	0.
CD113	0.	2.07E-01	2.07E-01	2.07E-01	2.07E-01	2.07E-01	2.07E-01	2.07E-01	2.07E-01	2.07E-01	2.07E-01	2.07E-01
IN113	0.	2.36E-03	2.59E-03	3.83E-03	2.16E-02	4.90E-02	5.30E-02	5.33E-02	5.33E-02	5.33E-02	5.33E-02	5.33E-02
PD114	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG114	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD114	0.	1.26E+01	1.26E+01	1.26E+01	1.26E+01	1.26E+01	1.26E+01	1.26E+01	1.26E+01	1.26E+01	1.26E+01	1.26E+01
IN114M	0.	9.35E-06	5.93E-06	4.71E-07	7.59E-27	0.	0.	0.	0.	0.	0.	0.
IN114	0.	1.50E-10	9.54E-11	7.58E-12	1.22E-31	0.	0.	0.	0.	0.	0.	0.
SN114	0.	3.25E-04	3.28E-04	3.34E-04	3.34E-04	3.34E-04	3.34E-04	3.34E-04	3.34E-04	3.34E-04	3.34E-04	3.34E-04
PD115	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 FUEL DECAY TIMES(2) CASE E=1 FP's

TABLE A-IV-1
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2=SEC

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	******* Y
AG115M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG115	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD115M	0.	2.42E-03	1.42E-03	7.49E-05	0.	0.	0.	0.	0.	0.	0.	0.
CD115	0.	1.11E-22	4.03E-27	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN115M	0.	1.02E-23	3.70E-28	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN115	0.	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00
SN115	0.	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01
AG116	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD116	0.	3.87E+00	3.87E+00	3.87E+00	3.87E+00	3.87E+00	3.87E+00	3.87E+00	3.87E+00	3.87E+00	3.87E+00	3.87E+00
IN116M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN116	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN116	0.	2.88E+00	2.88E+00	2.88E+00	2.88E+00	2.88E+00	2.88E+00	2.88E+00	2.88E+00	2.88E+00	2.88E+00	2.88E+00
AG117	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD117M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD117	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN117M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN117	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN117M	0.	6.18E-07	1.21E-07	1.44E-11	0.	0.	0.	0.	0.	0.	0.	0.
SN117	0.	4.01E+00	4.01E+00	4.01E+00	4.01E+00	4.01E+00	4.01E+00	4.01E+00	4.01E+00	4.01E+00	4.01E+00	4.01E+00
CD118	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN118M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN118	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN118	0.	4.10E+00	4.10E+00	4.10E+00	4.10E+00	4.10E+00	4.10E+00	4.10E+00	4.10E+00	4.10E+00	4.10E+00	4.10E+00
CD119M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN119M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN119M	0.	3.01E-03	2.75E-03	1.66E-03	1.82E-07	4.64E-25	0.	0.	0.	0.	0.	0.
SN119	0.	4.23E+00	4.23E+00	4.23E+00	4.24E+00	4.24E+00	4.24E+00	4.24E+00	4.24E+00	4.24E+00	4.24E+00	4.24E+00
CD120	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN120M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN120	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN120	0.	4.41E+00	4.41E+00	4.41E+00	4.41E+00	4.41E+00	4.41E+00	4.41E+00	4.41E+00	4.41E+00	4.41E+00	4.41E+00
CD121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN121M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN121M	0.	1.55E-05	1.55E-05	1.55E-05	1.42E-05	9.89E-06	6.27E-06	1.63E-07	1.71E-09	0.	0.	0.
SN121	0.	8.49E-43	1.36E-51	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB121	0.	4.60E+00	4.60E+00	4.60E+00	4.60E+00	4.60E+00	4.60E+00	4.60E+00	4.60E+00	4.60E+00	4.60E+00	4.60E+00
IN122	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN122	0.	5.16E+00	5.16E+00	5.16E+00	5.16E+00	5.16E+00	5.16E+00	5.16E+00	5.16E+00	5.16E+00	5.16E+00	5.16E+00
SB122M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB122	0.	2.88E-19	8.41E-23	1.95E-42	0.	0.	0.	0.	0.	0.	0.	0.
TE122	0.	3.33E-01	3.33E-01	3.33E-01	3.33E-01	3.33E-01	3.33E-01	3.33E-01	3.33E-01	3.33E-01	3.33E-01	3.33E-01
IN123M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN123	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN123M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN123	0.	5.79E-01	4.82E-01	1.75E-01	2.12E-09	0.	0.	0.	0.	0.	0.	0.
SB123	0.	5.14E+00	5.24E+00	5.55E+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
TE123M	0.	3.44E-05	3.16E-05	1.07E-05	3.73E-14	0.	0.	0.	0.	0.	0.	0.
TE123	0.	5.09E-04	5.16E-04	5.37E-04	5.48E-04	5.48E-04	5.48E-04	5.48E-04	5.48E-04	5.48E-04	5.48E-04	5.48E-04
IN124	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 FUEL DECAY TIMES(2) CASE E=1 FP's

TABLE A-IV-1
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	******* Y
SN124	0.	7.71E+00	7.71E+00	7.71E+00	7.71E+00	7.71E+00	7.71E+00	7.71E+00	7.71E+00	7.71E+00	7.71E+00	7.71E+00
SB124M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB124	0.	4.32E-03	2.95E-03	3.58E-04	1.15E-20	0.	0.	0.	0.	0.	0.	0.
TE124	0.	1.12E-01	1.13E-01	1.16E-01	1.16E-01	1.16E-01	1.16E-01	1.16E-01	1.16E-01	1.16E-01	1.16E-01	1.16E-01
SN125M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN125	0.	2.43E-06	2.15E-07	3.04E-13	0.	0.	0.	0.	0.	0.	0.	0.
SB125	0.	8.18E+00	7.99E+00	7.03E+00	6.97E-01	2.42E-05	6.42E-11	0.	0.	0.	0.	0.
TE125M	0.	1.92E-01	1.90E-01	1.71E-01	1.70E-02	5.89E-07	1.57E-12	0.	0.	0.	0.	0.
TE125	0.	3.10E+00	3.29E+00	4.27E+00	1.08E+01	1.15E+01	1.15E+01	1.15E+01	1.15E+01	1.15E+01	1.15E+01	1.15E+01
SN126	0.	1.99E+01	1.99E+01	1.99E+01	1.99E+01	1.99E+01	1.99E+01	1.98E+01	1.97E+01	1.85E+01	9.94E+00	1.94E-02
SB126M	0.	7.18E-09	7.18E-09	7.18E-09	7.18E-09	7.18E-09	7.18E-09	7.16E-09	7.13E-09	6.70E-09	3.59E-09	7.01E-12
SB126	0.	6.98E-06	6.77E-06	6.73E-06	6.73E-06	6.73E-06	6.73E-06	6.71E-06	6.69E-06	6.28E-06	3.37E-06	6.57E-09
TE126	0.	4.37E-02	4.38E-02	4.38E-02	4.51E-02	5.06E-02	5.75E-02	1.12E-01	1.81E-01	1.37E+00	9.98E+00	1.99E+01
SN127M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN127	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB127	0.	8.17E-13	2.28E-15	1.48E-29	0.	0.	0.	0.	0.	0.	0.	0.
TE127M	0.	8.34E-01	6.77E-01	2.12E-01	1.77E-10	0.	0.	0.	0.	0.	0.	0.
TE127	0.	2.96E-03	2.40E-03	7.53E-04	6.27E-13	0.	0.	0.	0.	0.	0.	0.
I127	0.	4.02E+01	4.04E+01	4.09E+01	4.11E+01	4.11E+01	4.11E+01	4.11E+01	4.11E+01	4.11E+01	4.11E+01	4.11E+01
SN128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB128M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE128	0.	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02
I128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE128	0.	3.21E+00	3.21E+00	3.21E+00	3.21E+00	3.21E+00	3.21E+00	3.21E+00	3.21E+00	3.21E+00	3.21E+00	3.21E+00
SN129M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN129	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB129	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE129M	0.	1.18E-01	6.01E-02	1.45E-03	0.	0.	0.	0.	0.	0.	0.	0.
TE129	0.	1.06E-04	5.43E-05	1.31E-06	0.	0.	0.	0.	0.	0.	0.	0.
I129	0.	2.31E+02	2.31E+02	2.31E+02	2.31E+02	2.31E+02	2.31E+02	2.31E+02	2.31E+02	2.31E+02	2.30E+02	2.22E+02
XE129M	0.	3.25E-10	1.88E-11	2.52E-18	0.	0.	0.	0.	0.	0.	0.	0.
XE129	0.	9.20E-02	9.20E-02	9.20E-02	9.21E-02	9.25E-02	9.29E-02	9.67E-02	1.01E-01	1.86E-01	1.03E+00	9.34E+00
SN130	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB130M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB130	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE130	0.	4.28E+02	4.28E+02	4.28E+02	4.28E+02	4.28E+02	4.28E+02	4.28E+02	4.28E+02	4.28E+02	4.28E+02	4.28E+02
I130M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I130	0.	9.85E-90	6.90-109	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE130	0.	1.22E+01	1.22E+01	1.22E+01	1.22E+01	1.22E+01	1.22E+01	1.22E+01	1.22E+01	1.22E+01	1.22E+01	1.22E+01
SN131	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB131	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE131M	0.	1.60E-37	1.93E-45	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE131	0.	4.05E-40	4.91E-48	0.	0.	0.	0.	0.	0.	0.	0.	0.
I131	0.	2.29E-05	1.35E-06	1.99E-13	0.	0.	0.	0.	0.	0.	0.	0.
XE131M	0.	5.02E-05	7.33E-06	1.61E-10	0.	0.	0.	0.	0.	0.	0.	0.
XE131	0.	4.03E+02	4.03E+02	4.03E+02	4.03E+02	4.03E+02	4.03E+02	4.03E+02	4.03E+02	4.03E+02	4.03E+02	4.03E+02
SN132	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB132M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB132	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE132	0.	6.44E-14	5.81E-17	7.04E-34	0.	0.	0.	0.	0.	0.	0.	0.
I132	0.	1.96E-15	1.77E-18	2.14E-35	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 FUEL DECAY TIMES(2) CASE E=1 FP's

TABLE A-IV-1
(continued)

POWER= 38.40MW, BURNUP= 33000,MWD, FLUX= 3.98E+13N/CM**2=SEC

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	******* Y
XE132	0.	1.17E+03	1.17E+03	1.17E+03	1.17E+03	1.17E+03	1.17E+03	1.17E+03	1.17E+03	1.17E+03	1.17E+03	1.17E+03
SB133	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE133M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE133	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I133	0.	4.77E-52	2.33E-63	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	2.00E-21	8.36E-26	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE133	0.	3.63E-08	4.81E-10	1.78E-20	0.	0.	0.	0.	0.	0.	0.	0.
CS133	0.	9.99E+02	9.99E+02	9.99E+02	9.99E+02	9.99E+02	9.99E+02	9.99E+02	9.99E+02	9.99E+02	9.99E+02	9.99E+02
SB134	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE134	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I134	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE134	0.	1.54E+03	1.54E+03	1.54E+03	1.54E+03	1.54E+03	1.54E+03	1.54E+03	1.54E+03	1.54E+03	1.54E+03	1.54E+03
CS134M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS134	0.	1.80E+02	1.75E+02	1.48E+02	7.05E+00	9.41E-06	4.27E-13	0.	0.	0.	0.	0.
BA134	0.	8.63E+01	9.17E+01	1.19E+02	2.60E+02	2.67E+02	2.67E+02	2.67E+02	2.67E+02	2.67E+02	2.67E+02	2.67E+02
TE135	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I135	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE135	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS135M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS135	0.	2.53E+02	2.53E+02	2.53E+02	2.53E+02	2.53E+02	2.53E+02	2.53E+02	2.53E+02	2.52E+02	2.47E+02	2.01E+02
BA135M	0.	7.60E-43	4.03E-51	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA135	0.	3.35E-02	3.35E-02	3.36E-02	3.41E-02	3.64E-02	3.94E-02	6.27E-02	9.19E-02	6.17E-01	5.81E+00	5.22E+01
I136	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE136	0.	2.40E+03	2.40E+03	2.40E+03	2.40E+03	2.40E+03	2.40E+03	2.40E+03	2.40E+03	2.40E+03	2.40E+03	2.40E+03
CS136	0.	3.11E-04	5.38E-05	3.18E-09	0.	0.	0.	0.	0.	0.	0.	0.
BA136	0.	2.25E+01	2.25E+01	2.25E+01	2.25E+01	2.25E+01	2.25E+01	2.25E+01	2.25E+01	2.25E+01	2.25E+01	2.25E+01
I137	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE137	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS137	0.	1.24E+03	1.24E+03	1.22E+03	9.92E+02	3.94E+02	1.24E+02	1.20E-02	1.15E-07	0.	0.	0.
BA137M	0.	1.87E-04	1.87E-04	1.85E-04	1.50E-04	5.95E-05	1.87E-05	1.81E-09	1.74E-14	0.	0.	0.
BA137	0.	4.58E+01	4.84E+01	6.26E+01	2.92E+02	8.91E+02	1.16E+03	1.28E+03	1.28E+03	1.28E+03	1.28E+03	1.28E+03
I138	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE138	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS138	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA138	0.	1.22E+03	1.22E+03	1.22E+03	1.22E+03	1.22E+03	1.22E+03	1.22E+03	1.22E+03	1.22E+03	1.22E+03	1.22E+03
I139	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE139	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS139	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA139	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA139	0.	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03
XE140	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS140	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA140	0.	7.63E-03	1.29E-03	6.52E-08	0.	0.	0.	0.	0.	0.	0.	0.
LA140	0.	1.15E-03	1.94E-04	9.81E-09	0.	0.	0.	0.	0.	0.	0.	0.
CE140	0.	1.31E+03	1.31E+03	1.31E+03	1.31E+03	1.31E+03	1.31E+03	1.31E+03	1.31E+03	1.31E+03	1.31E+03	1.31E+03
XE141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE141	0.	2.53E+00	1.25E+00	2.52E-02	0.	0.	0.	0.	0.	0.	0.	0.
PR141	0.	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03

PWR = BU = 33,000 FUEL DECAY TIMES(2) CASE E=1 FP's

TABLE A-IV-1
(continued)

POWER= 38.40MW, BURNUP= 33000,MWD, FLUX= 3.98E+13N/CM**2=SEC

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	1000000. Y
XE142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE142	0.	1.17E+03	1.17E+03	1.17E+03	1.17E+03	1.17E+03	1.17E+03	1.17E+03	1.17E+03	1.17E+03	1.17E+03	1.17E+03
PR142	0.	2.42E-58	1.03E-70	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND142	0.	2.19E+01	2.19E+01	2.19E+01	2.19E+01	2.19E+01	2.19E+01	2.19E+01	2.19E+01	2.19E+01	2.19E+01	2.19E+01
XE143	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS143	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA143	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA143	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE143	0.	3.45E-33	2.19E-40	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR143	0.	1.29E-02	2.45E-03	2.38E-07	0.	0.	0.	0.	0.	0.	0.	0.
ND143	0.	7.79E+02	7.79E+02	7.79E+02	7.79E+02	7.79E+02	7.79E+02	7.79E+02	7.79E+02	7.79E+02	7.79E+02	7.79E+02
LA144	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE144	0.	2.91E+02	2.68E+02	1.72E+02	5.63E-02	1.83E-17	8.01E-37	0.	0.	0.	0.	0.
PR144	0.	1.23E-02	1.14E-02	7.27E-03	2.38E-06	7.75E-22	3.39E-41	0.	0.	0.	0.	0.
ND144	0.	1.06E+03	1.09E+03	1.18E+03	1.36E+03	1.36E+03	1.36E+03	1.36E+03	1.36E+03	1.36E+03	1.36E+03	1.36E+03
CE145	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR145	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND145	0.	6.87E+02	6.87E+02	6.87E+02	6.87E+02	6.87E+02	6.87E+02	6.87E+02	6.87E+02	6.87E+02	6.87E+02	6.87E+02
CE146	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR146	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND146	0.	7.05E+02	7.05E+02	7.05E+02	7.05E+02	7.05E+02	7.05E+02	7.05E+02	7.05E+02	7.05E+02	7.05E+02	7.05E+02
CE147	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR147	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND147	0.	8.15E-04	1.05E-04	1.16E-09	0.	0.	0.	0.	0.	0.	0.	0.
PM147	0.	1.07E+02	1.05E+02	9.17E+01	8.48E+00	2.15E-04	3.86E-10	0.	0.	0.	0.	0.
SM147	0.	5.13E+01	5.39E+01	6.68E+01	1.50E+02	1.59E+02	1.59E+02	1.59E+02	1.59E+02	1.59E+02	1.59E+02	1.59E+02
CE148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND148	0.	3.73E+02	3.73E+02	3.73E+02	3.73E+02	3.73E+02	3.73E+02	3.73E+02	3.73E+02	3.73E+02	3.73E+02	3.73E+02
PM148M	0.	1.54E-01	8.94E-02	4.39E-03	0.	0.	0.	0.	0.	0.	0.	0.
PM148	0.	1.59E-03	9.24E-04	4.53E-05	0.	0.	0.	0.	0.	0.	0.	0.
SM148	0.	1.57E+02	1.57E+02	1.58E+02	1.58E+02	1.58E+02	1.58E+02	1.58E+02	1.58E+02	1.58E+02	1.58E+02	1.58E+02
PR149	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND149	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM149	0.	8.42E-21	2.83E-25	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM149	0.	7.73E+00	7.73E+00	7.73E+00	7.73E+00	7.73E+00	7.73E+00	7.73E+00	7.73E+00	7.73E+00	7.73E+00	7.73E+00
ND150	0.	1.79E+02	1.79E+02	1.79E+02	1.79E+02	1.79E+02	1.79E+02	1.79E+02	1.79E+02	1.79E+02	1.79E+02	1.79E+02
PM150	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM150	0.	4.06E+02	4.06E+02	4.06E+02	4.06E+02	4.06E+02	4.06E+02	4.06E+02	4.06E+02	4.06E+02	4.06E+02	4.06E+02
ND151	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM151	0.	6.17E-40	2.03E-48	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM151	0.	4.61E+01	4.61E+01	4.59E+01	4.27E+01	3.11E+01	2.09E+01	8.61E-01	1.60E-02	0.	0.	0.
EU151	0.	1.93E-01	2.26E-01	4.10E-01	3.59E+00	1.53E+01	2.55E+01	4.55E+01	4.63E+01	4.63E+01	4.63E+01	4.63E+01
PM152	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM152	0.	9.68E+01	9.68E+01	9.68E+01	9.68E+01	9.68E+01	9.68E+01	9.68E+01	9.68E+01	9.68E+01	9.68E+01	9.68E+01
EU152M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU152	0.	4.50E-02	4.48E-02	4.35E-02	2.59E-02	2.57E-03	1.43E-04	1.32E-14	3.76E-27	0.	0.	0.
GD152	0.	1.16E-01	1.16E-01	1.17E-01	1.22E-01	1.28E-01	1.29E-01	1.29E-01	1.29E-01	1.29E-01	1.29E-01	1.29E-01
PM147	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR - BU = 33,000 FUEL DECAY TIMES(2) CASE E-1 FP's

POWER= 38.40MW, BURNUP= 33000,MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	******* Y
SM153	0.	1.32E-23	1.17E-28	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU153	0.	1.18E+02	1.18E+02	1.18E+02	1.18E+02	1.18E+02	1.18E+02	1.18E+02	1.18E+02	1.18E+02	1.18E+02	1.18E+02
GD153	0.	6.23E-03	5.67E-03	3.36E-03	2.74E-07	1.83E-25	0.	0.	0.	0.	0.	0.
PM154	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM154	0.	3.80E+01	3.80E+01	3.80E+01	3.80E+01	3.80E+01	3.80E+01	3.80E+01	3.80E+01	3.80E+01	3.80E+01	3.80E+01
EU154	0.	5.40E+01	5.38E+01	5.27E+01	3.57E+01	6.30E+00	7.22E-01	2.15E-08	8.40E-18	0.	0.	0.
GD154	0.	2.56E+00	2.77E+00	3.92E+00	2.09E+01	5.03E+01	5.59E+01	5.66E+01	5.66E+01	5.66E+01	5.66E+01	5.66E+01
SM155	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU155	0.	5.92E+00	5.72E+00	4.73E+00	1.50E-01	3.34E-08	1.61E-16	0.	0.	0.	0.	0.
GD155	0.	1.07E+00	1.27E+00	2.27E+00	6.84E+00	6.99E+00	6.99E+00	6.99E+00	6.99E+00	6.99E+00	6.99E+00	6.99E+00
SM156	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU156	0.	6.34E-03	1.39E-03	3.00E-07	0.	0.	0.	0.	0.	0.	0.	0.
GD156	0.	1.05E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02
SM157	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU157	0.	6.91E-74	1.64E-89	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD157	0.	4.48E-02	4.48E-02	4.48E-02	4.48E-02	4.48E-02	4.48E-02	4.48E-02	4.48E-02	4.48E-02	4.48E-02	4.48E-02
EU158	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD158	0.	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01
EU159	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD159	0.	3.12E-63	1.99E-76	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB159	0.	1.85E+00	1.85E+00	1.85E+00	1.85E+00	1.85E+00	1.85E+00	1.85E+00	1.85E+00	1.85E+00	1.85E+00	1.85E+00
EU160	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD160	0.	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
TB160	0.	3.58E-02	2.61E-02	4.50E-03	8.47E-17	0.	0.	0.	0.	0.	0.	0.
DY160	0.	4.30E-01	4.40E-01	4.61E-01	4.66E-01	4.66E-01	4.66E-01	4.66E-01	4.66E-01	4.66E-01	4.66E-01	4.66E-01
GD161	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB161	0.	2.05E-09	7.55E-11	8.13E-19	0.	0.	0.	0.	0.	0.	0.	0.
DY161	0.	2.36E-01	2.36E-01	2.36E-01	2.36E-01	2.36E-01	2.36E-01	2.36E-01	2.36E-01	2.36E-01	2.36E-01	2.36E-01
GD162	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB162M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB162	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY162	0.	1.93E-01	1.93E-01	1.93E-01	1.93E-01	1.93E-01	1.93E-01	1.93E-01	1.93E-01	1.93E-01	1.93E-01	1.93E-01
TB163M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB163	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY163	0.	2.17E-01	2.17E-01	2.17E-01	2.17E-01	2.17E-01	2.17E-01	2.17E-01	2.17E-01	2.17E-01	2.17E-01	2.17E-01
TB164	0.	5.76E-52	2.72E-62	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY164	0.	6.89E-02	6.89E-02	6.89E-02	6.89E-02	6.89E-02	6.89E-02	6.89E-02	6.89E-02	6.89E-02	6.89E-02	6.89E-02
DY165M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY165	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
HO165	0.	1.16E-01	1.16E-01	1.16E-01	1.16E-01	1.16E-01	1.16E-01	1.16E-01	1.16E-01	1.16E-01	1.16E-01	1.16E-01
DY166	0.	3.18E-18	3.87E-21	2.50E-37	0.	0.	0.	0.	0.	0.	0.	0.
HO166M	0.	4.77E-04	4.77E-04	4.77E-04	4.75E-04	4.64E-04	4.51E-04	3.58E-04	2.68E-04	1.48E-06	0.	0.
HO166	0.	1.56E-18	1.91E-21	1.23E-37	0.	0.	0.	0.	0.	0.	0.	0.
ER166	0.	3.12E-02	3.12E-02	3.12E-02	3.12E-02	3.12E-02	3.12E-02	3.13E-02	3.14E-02	3.17E-02	3.17E-02	3.17E-02
ER167	0.	5.54E-03	5.54E-03	5.54E-03	5.54E-03	5.54E-03	5.54E-03	5.54E-03	5.54E-03	5.54E-03	5.54E-03	5.54E-03
TOTAL	0.	3.49E+04	3.49E+04	3.49E+04	3.49E+04	3.49E+04	3.49E+04	3.49E+04	3.49E+04	3.49E+04	3.49E+04	3.49E+04

PWR = BU = 33,000 FUEL DECAY TIMES(2) CASE E-1 Clad

TABLE A-IV-1
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	******* Y
H 1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
H 2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
H 3	0.	6.52E-06	6.48E-06	6.30E-06	3.80E-06	3.98E-07	2.38E-08	3.85E-18	2.23E-30	0.	0.	0.
H 4	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
HE 3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
HE 4	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
HE 6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LI 6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LI 7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LI 8	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BE 8	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BE 9	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BE 10	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BE 11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
B 10	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
B 11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
B 12	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
C 12	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
C 13	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
C 14	0.	4.51E-06	4.51E-06	4.51E-06	4.51E-06	4.48E-06	4.46E-06	4.25E-06	4.00E-06	1.35E-06	2.51E-11	0.
N 13	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
N 14	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
N 15	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
N 16	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
O 16	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
O 17	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
O 18	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
O 19	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
F 19	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
F 20	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE 20	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE 21	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE 22	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE 23	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NA 22	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NA 23	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NA 24	0.	1.79E-74	2.62E-90	0.	0.	0.	0.	0.	0.	0.	0.	0.
NA 25	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MG 24	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MG 25	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MG 26	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MG 27	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AL 27	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AL 28	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AL 29	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SI 28	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SI 29	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SI 30	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SI 31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
P 31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
P 32	0.	3.09E-05	6.27E-06	8.97E-10	0.	0.	0.	0.	0.	0.	0.	0.
P 33	0.	1.39E-04	5.57E-05	3.52E-07	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 FUEL DECAY TIMES(2) CASE E-1 Clad

TABLE A-IV-1
(continued)

POWER= 38.40MW, BURNUP= 33000,MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	******* Y
P 34	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S 32	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S 33	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S 34	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S 35	0.	2.25E-05	1.74E-05	4.13E-06	2.34E-17	0.	0.	0.	0.	0.	0.	0.
S 36	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S 37	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CL 35	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CL 36	0.	6.80E-11	6.80E-11	6.80E-11	6.80E-11	6.80E-11	6.79E-11	6.79E-11	6.78E-11	6.65E-11	5.43E-11	7.26E-12
CL 37	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CL 38	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AR 36	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AR 37	0.	2.79E-14	1.45E-14	3.91E-16	0.	0.	0.	0.	0.	0.	0.	0.
AR 38	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AR 39	0.	1.55E-16	1.55E-16	1.55E-16	1.51E-16	1.37E-16	1.20E-16	4.28E-17	1.18E-17	9.98E-28	0.	0.
AR 40	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AR 41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
K 39	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
K 40	0.	1.16E-29	1.16E-29	1.16E-29	1.16E-29	1.16E-29	1.16E-29	1.16E-29	1.16E-29	1.16E-29	1.16E-29	1.16E-29
K 41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
K 42	0.	9.24E-99	6.48-118	0.	0.	0.	0.	0.	0.	0.	0.	0.
K 43	0.	5.93E-57	1.48E-67	0.	0.	0.	0.	0.	0.	0.	0.	0.
K 44	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 40	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 42	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 43	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 44	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 45	0.	4.14E-06	3.60E-06	1.67E-06	1.68E-12	0.	0.	0.	0.	0.	0.	0.
CA 46	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 47	0.	7.62E-17	5.09E-19	3.71E-31	0.	0.	0.	0.	0.	0.	0.	0.
CA 48	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 49	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SC 45	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SC 46	0.	6.98E-03	5.32E-03	1.18E-03	1.88E-15	0.	0.	0.	0.	0.	0.	0.
SC 47	0.	6.83E-16	1.48E-18	5.54E-31	0.	0.	0.	0.	0.	0.	0.	0.
SC 48	0.	1.19E-27	4.66E-33	0.	0.	0.	0.	0.	0.	0.	0.	0.
SC 49	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SC 50	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TI 46	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TI 47	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TI 48	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TI 49	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TI 50	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TI 51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 49	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 50	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 52	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 53	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 54	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR 50	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 FUEL DECAY TIMES(2) CASE E-1 Clad

TABLE A-IV-1
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	Y******* Y
CR 51	0.	1.43E+00	6.31E-01	6.65E-03	0.	0.	0.	0.	0.	0.	0.	0.
CR 52	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR 53	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR 54	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR 55	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MN 54	0.	1.81E+00	1.68E+00	1.11E+00	6.01E-04	1.83E-18	1.31E-36	0.	0.	0.	0.	0.
MN 55	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MN 56	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MN 57	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MN 58	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE 54	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE 55	0.	2.85E+00	2.78E+00	2.43E+00	2.21E-01	5.16E-06	8.37E-12	0.	0.	0.	0.	0.
FE 56	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE 57	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE 58	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE 59	0.	1.63E-01	9.83E-02	5.90E-03	0.	0.	0.	0.	0.	0.	0.	0.
CO 58M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO 58	0.	1.33E+01	9.70E+00	1.64E+00	2.17E-14	0.	0.	0.	0.	0.	0.	0.
CO 59	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO 60M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO 60	0.	1.40E+02	1.38E+02	1.29E+02	3.94E+01	2.02E-01	2.78E-04	0.	0.	0.	0.	0.
CO 61	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO 62	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NI 58	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NI 59	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NI 60	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NI 61	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NI 62	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NI 63	0.	4.06E-02	4.06E-02	4.04E-02	3.78E-02	2.79E-02	1.92E-02	9.41E-04	2.17E-05	0.	0.	0.
NI 64	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NI 65	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CU 62	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CU 63	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CU 64	0.	9.26E-85	2.58-103	0.	0.	0.	0.	0.	0.	0.	0.	0.
CU 65	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CU 66	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 63	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 64	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 65	0.	1.42E-03	1.29E-03	7.69E-04	7.02E-08	7.83E-26	0.	0.	0.	0.	0.	0.
ZN 66	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 67	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 68	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 69M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 69	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 70	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 71M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 71	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 69	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 70	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 71	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 70	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 88	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 FUEL DECAY TIMES(2) CASE E=1 Clad TABLE A-IV-1

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC (continued)

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	******* Y
SR 89	0.	1.20E-02	7.77E-03	6.81E-04	6.33E-23	0.	0.	0.	0.	0.	0.	0.
SR 90	0.	7.08E-07	7.06E-07	6.97E-07	5.59E-07	2.08E-07	6.07E-08	3.14E-12	1.38E-17	0.	0.	0.
SR 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 90M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 90	0.	3.18E-06	3.17E-06	3.13E-06	2.51E-06	9.36E-07	2.73E-07	1.41E-11	6.21E-17	0.	0.	0.
Y 91M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 91	0.	4.21E-02	2.85E-02	3.31E-03	4.89E-20	0.	0.	0.	0.	0.	0.	0.
ZR 90	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 93	0.	6.55E-06	6.55E-06	6.55E-06	6.55E-06	6.55E-06	6.55E-06	6.55E-06	6.55E-06	6.52E-06	6.26E-06	4.13E-06
ZR 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 95	0.	2.08E+01	1.46E+01	2.09E+00	1.24E-15	0.	0.	0.	0.	0.	0.	0.
ZR 96	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 92	0.	1.28E-06	1.37E-07	5.59E-13	0.	0.	0.	0.	0.	0.	0.	0.
NB 93M	0.	1.61E-06	1.70E-06	2.19E-06	9.29E-06	1.99E-05	2.13E-05	2.14E-05	2.13E-05	2.02E-05	1.85E-05	1.22E-05
NB 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 94	0.	1.55E-06	1.55E-06	1.55E-06	1.55E-06	1.55E-06	1.55E-06	1.55E-06	1.55E-06	1.55E-06	1.54E-06	1.50E-06
NB 95	0.	3.50E+01	2.57E+01	4.00E+00	2.43E-15	0.	0.	0.	0.	0.	0.	0.
NB 96	0.	1.50E-48	7.06E-59	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 97	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 93	0.	1.79E-05	1.79E-05	1.79E-05	1.79E-05	1.79E-05	1.78E-05	1.73E-05	1.66E-05	8.30E-06	8.10E-09	0.
MO 93M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 96	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 97	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 98	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 99	0.	2.30E-16	6.56E-20	1.33E-39	0.	0.	0.	0.	0.	0.	0.	0.
MO100	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC 99M	0.	9.39E-17	2.68E-20	5.42E-40	0.	0.	0.	0.	0.	0.	0.	0.
TC 99	0.	9.51E-06	9.51E-06	9.51E-06	9.51E-06	9.51E-06	9.51E-06	9.50E-06	9.48E-06	9.20E-06	6.84E-06	3.51E-07
TC101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD113M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD113	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD115M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD115	0.	2.14E-26	7.76E-31	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD119M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN113	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN119M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN121M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN114	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN115	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN116	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN117M	0.	8.59E-03	1.69E-03	2.00E-07	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 FUEL DECAY TIMES(2) CASE E-1 Clad

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	******* Y
SN117	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN118	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN119M	0.	5.40E-03	4.93E-03	2.97E-03	3.27E-07	8.33E-25	0.	0.	0.	0.	0.	0.
SN119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN120	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN121M	0.	1.87E-04	1.87E-04	1.86E-04	1.71E-04	1.19E-04	7.53E-05	1.96E-06	2.05E-08	0.	0.	0.
SN121	0.	6.67E-41	1.07E-49	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN122	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN123M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN123	0.	4.55E-04	3.79E-04	1.38E-04	1.67E-12	0.	0.	0.	0.	0.	0.	0.
SN124	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN125M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN125	0.	2.33E-07	2.06E-08	2.92E-14	0.	0.	0.	0.	0.	0.	0.	0.
SB121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB123	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB124M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB124	0.	6.59E-03	4.51E-03	5.47E-04	1.75E-20	0.	0.	0.	0.	0.	0.	0.
SB125	0.	9.73E-02	9.50E-02	8.36E-02	8.29E-03	2.87E-07	7.64E-13	0.	0.	0.	0.	0.
SB126M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB126	0.	5.79E-07	9.35E-08	3.74E-12	0.	0.	0.	0.	0.	0.	0.	0.
TE124	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE125M	0.	8.31E-03	8.19E-03	7.32E-03	7.28E-04	2.52E-08	6.71E-14	0.	0.	0.	0.	0.
TE125	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE126	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TA180	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TA181	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TA182M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TA182	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W180	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W181	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W182	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W183M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W183	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W184	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W185M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W185	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W186	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W187	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	0.	2.15E+02	1.93E+02	1.41E+02	3.97E+01	2.31E-01	1.96E-02	1.00E-03	8.13E-05	4.72E-05	3.31E-05	1.82E-05

PWR - BU = 33,000 FUEL DECAY TIMES(2) CASE E-1

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

TABLE A-IV-1

HE's

(continued)

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	Y******* Y
HE 4	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TL207	0.	2.90E-09	3.11E-09	4.50E-09	2.32E-08	6.63E-08	1.47E-07	6.26E-07	1.18E-06	1.09E-05	7.03E-05	8.68E-05
TL208	0.	1.73E-05	1.88E-05	2.82E-05	1.45E-04	1.19E-04	7.36E-05	1.57E-06	1.28E-08	1.29E-09	1.61E-08	1.62E-07
TL209	0.	1.23E-11	1.23E-11	1.34E-11	3.23E-11	1.65E-10	4.53E-10	9.99E-09	4.75E-08	6.16E-06	1.51E-04	3.38E-04
PB206	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PB207	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PB208	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PB209	0.	3.94E-11	3.94E-11	4.29E-11	1.03E-10	5.27E-10	1.45E-09	3.19E-08	1.52E-07	1.97E-05	4.82E-04	1.08E-03
PB210	0.	2.22E-14	2.41E-14	3.67E-14	1.48E-12	9.33E-11	5.61E-10	2.91E-08	1.18E-07	5.06E-06	4.07E-05	1.95E-05
PB211	0.	3.22E-09	3.45E-09	4.99E-09	2.57E-08	9.57E-08	1.64E-07	6.94E-07	1.31E-06	1.21E-05	7.79E-05	9.63E-05
PB212	0.	2.95E-06	3.22E-06	4.82E-06	2.48E-05	2.04E-05	1.26E-05	2.68E-07	2.19E-09	2.20E-10	2.75E-09	2.77E-08
PB214	0.	3.80E-11	4.00E-11	5.33E-11	7.12E-10	1.42E-08	5.83E-08	1.71E-06	6.91E-06	2.97E-04	2.39E-03	1.15E-03
BI209	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BI210	0.	1.38E-12	1.50E-12	2.33E-12	9.36E-11	5.92E-09	3.56E-08	1.85E-06	7.47E-06	3.21E-04	2.58E-03	1.24E-03
BI211	0.	3.75E-08	4.01E-08	5.81E-08	3.00E-07	1.12E-06	1.91E-06	8.08E-06	1.52E-05	1.41E-04	9.08E-04	1.12E-03
BI212	0.	3.58E-05	3.89E-05	5.84E-05	3.01E-04	2.47E-04	1.53E-04	3.24E-06	2.65E-08	2.66E-09	3.33E-08	3.35E-07
BI213	0.	2.10E-10	2.11E-10	2.29E-10	5.53E-10	2.82E-09	7.75E-09	1.71E-07	8.12E-07	1.05E-04	2.58E-03	5.78E-03
BI214	0.	2.17E-10	2.29E-10	3.05E-10	4.07E-09	8.12E-08	3.33E-07	9.76E-06	3.95E-05	1.70E-03	1.36E-02	6.55E-03
PO210	0.	1.04E-11	1.14E-11	1.85E-11	1.12E-09	7.08E-08	4.26E-07	2.21E-05	8.93E-05	3.84E-03	3.08E-02	1.48E-02
PO211	0.	1.28E-10	1.37E-10	1.98E-10	1.02E-09	3.79E-09	6.48E-09	2.75E-08	5.18E-08	4.80E-07	3.09E-06	3.82E-06
PO212	0.	6.98E-05	7.61E-05	1.14E-04	5.87E-04	4.82E-04	2.98E-04	6.33E-06	5.18E-08	5.20E-09	6.50E-08	6.54E-07
PO213	0.	1.66E-09	1.67E-09	1.81E-09	4.37E-09	2.23E-08	6.12E-08	1.35E-06	6.42E-06	8.32E-04	2.04E-02	4.57E-02
PO214	0.	7.11E-10	7.49E-10	9.98E-10	1.33E-08	2.66E-07	1.09E-06	3.20E-05	1.29E-04	5.56E-03	4.46E-02	2.14E-02
PO215	0.	4.22E-08	4.51E-08	6.54E-08	3.37E-07	1.25E-06	2.14E-06	9.09E-06	1.71E-05	1.59E-04	1.02E-03	1.26E-03
PO216	0.	8.43E-05	9.18E-05	1.38E-04	7.08E-04	5.82E-04	3.59E-04	7.64E-06	6.25E-08	6.27E-09	7.84E-08	7.89E-07
PO218	0.	5.65E-10	5.95E-10	7.93E-10	1.06E-08	2.11E-07	8.67E-07	2.54E-05	1.03E-04	4.42E-03	3.55E-02	1.70E-02
AT217	0.	1.43E-09	1.44E-09	1.56E-09	3.77E-09	1.92E-08	5.28E-08	1.16E-06	5.54E-06	7.18E-04	1.76E-02	3.94E-02
RN219	0.	3.90E-08	4.17E-08	6.04E-08	3.11E-07	1.16E-06	1.98E-06	8.40E-06	1.58E-05	1.47E-04	9.43E-04	1.17E-03
RN220	0.	7.81E-05	8.50E-05	1.27E-04	6.56E-04	5.39E-04	3.33E-04	7.08E-06	5.79E-08	5.81E-09	7.26E-08	7.31E-07
RN222	0.	5.08E-10	5.36E-10	7.13E-10	9.53E-09	1.90E-07	7.80E-07	2.28E-05	9.24E-05	3.98E-03	3.19E-02	1.53E-02
FR221	0.	1.27E-09	1.28E-09	1.39E-09	3.35E-09	1.71E-08	4.69E-08	1.03E-06	4.92E-06	6.38E-04	1.56E-02	3.50E-02
FR223	0.	3.44E-11	3.66E-11	4.88E-11	2.52E-10	9.39E-10	1.60E-09	6.80E-09	1.28E-08	1.19E-07	7.64E-07	9.44E-07
RA223	0.	3.35E-08	3.58E-08	5.18E-08	2.67E-07	9.95E-07	1.70E-06	7.21E-06	1.36E-05	1.26E-04	8.10E-04	1.00E-03
RA224	0.	7.04E-05	7.67E-05	1.15E-04	5.92E-04	4.86E-04	3.00E-04	6.39E-06	5.23E-08	5.24E-09	6.55E-08	6.60E-07
RA225	0.	2.24E-11	2.27E-11	2.46E-11	5.92E-11	3.02E-10	8.29E-10	1.83E-08	8.69E-08	1.13E-05	2.76E-04	6.19E-04
RA226	0.	4.45E-10	4.69E-10	6.20E-10	8.28E-09	1.65E-07	6.77E-07	1.98E-05	8.03E-05	3.45E-03	2.77E-02	1.33E-02
RA228	0.	1.85E-16	2.01E-16	3.00E-16	4.67E-15	4.12E-14	9.05E-14	5.00E-13	1.01E-12	1.18E-11	1.48E-10	1.49E-09
AC225	0.	1.17E-09	1.18E-09	1.28E-09	3.09E-09	1.57E-08	4.33E-08	9.53E-07	4.54E-06	5.88E-04	1.44E-02	3.23E-02
AC227	0.	5.29E-10	5.63E-10	7.49E-10	3.88E-09	1.44E-08	2.46E-08	1.05E-07	1.97E-07	1.83E-06	1.17E-05	1.45E-05
AC228	0.	1.28E-14	1.38E-14	2.06E-14	3.22E-13	2.84E-12	6.23E-12	3.44E-11	6.96E-11	8.13E-10	1.02E-08	1.02E-07
TH227	0.	3.38E-08	3.61E-08	5.06E-08	2.61E-07	9.72E-07	1.66E-06	7.04E-06	1.33E-05	1.23E-04	7.91E-04	9.77E-04
TH228	0.	6.84E-05	7.44E-05	1.10E-04	5.67E-04	4.66E-04	2.88E-04	6.11E-06	5.01E-08	5.02E-09	6.27E-08	6.32E-07
TH229	0.	1.04E-09	1.05E-09	1.13E-09	2.72E-09	1.39E-08	3.81E-08	8.40E-07	3.99E-06	5.18E-04	1.27E-02	2.84E-02
TH230	0.	6.04E-07	6.28E-07	7.59E-07	3.19E-06	1.54E-05	3.30E-05	2.09E-04	4.42E-04	4.43E-03	2.76E-02	1.33E-02
TH231	0.	1.36E-05	1.36E-05	1.36E-05	1.36E-05	1.36E-05	1.36E-05	1.37E-05	1.38E-05	1.58E-05	2.22E-05	2.27E-05
TH232	0.	5.73E-13	6.01E-13	7.55E-13	3.53E-12	1.59E-11	3.14E-11	1.57E-10	3.17E-10	3.71E-09	4.63E-08	4.66E-07
TH233	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TH234	0.	1.12E-04	1.12E-04	1.12E-04	1.12E-04	1.12E-04	1.12E-04	1.12E-04	1.12E-04	1.12E-04	1.12E-04	1.12E-04
PA231	0.	7.40E-07	7.41E-07	7.47E-07	8.48E-07	1.30E-06	1.86E-06	6.33E-06	1.19E-05	1.11E-04	7.11E-04	8.79E-04
PA232	0.	2.27E-37	7.22E-45	0.	0.	0.	0.	0.	0.	0.	0.	0.
PA233	0.	4.42E-04	4.43E-04	4.43E-04	4.47E-04	5.02E-04	5.87E-04	1.09E-03	1.40E-03	1.65E-03	1.60E-03	1.20E-03
PA234M	0.	1.62E-03	1.62E-03	1.62E-03	1.62E-03	1.62E-03	1.62E-03	1.62E-03	1.62E-03	1.62E-03	1.62E-03	1.62E-03

PWR - BU = 33,000 FUEL DECAY TIMES(2) CASE E-1 HE's TABLE A-IV-1

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC (continued)

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	******* Y
PA234	0.	2.85E-06	2.85E-06	2.85E-06	2.85E-06	2.85E-06	2.85E-06	2.85E-06	2.85E-06	2.85E-06	2.85E-06	2.86E-06
U232	0.	2.46E-04	2.56E-04	3.05E-04	6.07E-04	4.44E-04	2.74E-04	5.83E-06	4.73E-08	0.	0.	0.
U233	0.	1.58E-06	1.59E-06	1.61E-06	1.98E-06	3.71E-06	6.22E-06	3.81E-05	9.64E-05	1.44E-03	1.22E-02	2.74E-02
U234	5.65E-02	3.08E-02	3.08E-02	3.09E-02	3.26E-02	3.87E-02	4.40E-02	5.48E-02	5.52E-02	5.41E-02	4.40E-02	1.18E-02
U235	1.90E-03	4.78E-04	4.78E-04	4.78E-04	4.78E-04	4.79E-04	4.79E-04	4.83E-04	4.87E-04	5.57E-04	7.81E-04	7.99E-04
U236	0.	7.04E-03	7.04E-03	7.04E-03	7.04E-03	7.06E-03	7.08E-03	7.23E-03	7.41E-03	9.46E-03	1.08E-02	1.05E-02
U237	0.	2.19E-03	2.00E-03	1.94E-03	1.27E-03	1.90E-04	1.77E-05	6.76E-10	6.48E-10	3.05E-10	1.61E-13	0.
U238	8.16E-03	7.95E-03	7.95E-03	7.95E-03	7.95E-03	7.95E-03	7.95E-03	7.95E-03	7.95E-03	7.95E-03	7.95E-03	7.95E-03
U239	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
U240	0.	6.96E-18	7.95E-18	1.35E-17	1.13E-16	5.55E-16	1.11E-15	5.53E-15	1.10E-14	1.09E-13	9.99E-13	4.57E-12
NP236	0.	5.68E-52	9.08E-63	0.	0.	0.	0.	0.	0.	0.	0.	0.
NP237	0.	9.63E-03	9.63E-03	9.72E-03	1.09E-02	1.28E-02	2.37E-02	3.05E-02	3.59E-02	3.48E-02	2.60E-02	
NP238	0.	1.54E-18	2.98E-23	0.	0.	0.	0.	0.	0.	0.	0.	0.
NP239	0.	2.32E-02	2.32E-02	2.32E-02	2.32E-02	2.31E-02	2.30E-02	2.22E-02	2.12E-02	9.38E-03	2.69E-06	4.54E-11
NP240M	0.	3.51E-17	4.01E-17	6.80E-17	5.70E-16	2.80E-15	5.59E-15	2.79E-14	5.58E-14	5.52E-13	5.04E-12	2.31E-11
NP240	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PU236	0.	1.24E-02	1.21E-02	1.07E-02	1.20E-03	7.13E-08	3.73E-13	0.	0.	0.	0.	0.
PU238	0.	7.58E+01	7.61E+01	7.69E+01	7.27E+01	5.32E+01	3.61E+01	1.60E+00	3.26E-02	4.71E-24	0.	0.
PU239	0.	1.03E+01	1.03E+01	1.03E+01	1.03E+01	1.03E+01	1.03E+01	1.02E+01	1.00E+01	7.83E+00	6.15E-01	1.05E-09
PU240	0.	1.52E+01	1.52E+01	1.52E+01	1.52E+01	1.52E+01	1.52E+01	1.46E+01	1.38E+01	5.50E+00	5.40E-04	1.14E-10
PU241	0.	5.20E+00	5.18E+00	5.06E+00	3.30E+00	4.94E-01	4.60E-02	1.76E-06	1.69E-06	7.94E-07	4.18E-10	0.
PU242	0.	5.15E-02	5.15E-02	5.15E-02	5.15E-02	5.15E-02	5.15E-02	5.14E-02	5.14E-02	5.06E-02	4.29E-02	8.27E-03
PU243	0.	4.97E-11	4.97E-11	4.97E-11	4.97E-11	4.97E-11	4.97E-11	4.97E-11	4.97E-11	4.97E-11	4.95E-11	4.76E-11
PU244	0.	1.54E-16	1.77E-16	2.99E-16	2.51E-15	1.23E-14	2.46E-14	1.23E-13	2.45E-13	2.43E-12	2.22E-11	1.02E-10
PU245	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AM241	0.	6.76E+00	7.36E+00	1.06E+01	5.78E+01	1.27E+02	1.29E+02	6.86E+01	3.08E+01	6.55E-04	3.55E-07	0.
AM242M	0.	1.31E-06	1.31E-06	1.30E-06	1.25E-06	1.04E-06	8.30E-07	1.34E-07	1.37E-08	2.04E-26	0.	0.
AM242	0.	6.13E-06	6.12E-06	6.11E-06	5.86E-06	4.89E-06	3.89E-06	6.28E-07	6.42E-08	9.56E-26	0.	0.
AM243	0.	6.27E-01	6.27E-01	6.27E-01	6.26E-01	6.24E-01	6.21E-01	5.99E-01	5.73E-01	2.53E-01	7.27E-05	1.23E-09
AM244	0.	5.39E-20	6.16E-20	1.04E-19	8.75E-19	4.30E-18	8.58E-18	4.28E-17	8.56E-17	8.48E-16	7.74E-15	3.54E-14
AM245	0.	5.83E-25	3.91E-28	1.21E-45	0.	0.	0.	0.	0.	0.	0.	0.
CM242	0.	5.59E+02	4.86E+02	2.23E+02	3.22E-04	1.11E-04	8.81E-05	1.42E-05	1.45E-06	2.17E-24	0.	0.
CM243	0.	1.50E+01	1.49E+01	1.48E+01	1.22E+01	5.11E+02	1.73E+02	2.98E+06	5.90E-11	0.	0.	0.
CM244	0.	6.84E+01	6.82E+01	6.69E+01	4.74E+01	1.02E+01	1.51E+00	3.35E-07	2.02E-15	3.98E-15	3.64E-14	1.67E-13
CM245	0.	1.39E-03	1.39E-03	1.39E-03	1.39E-03	1.38E-03	1.37E-03	1.33E-03	1.27E-03	5.99E-04	3.16E-07	0.
CM246	0.	3.01E-04	3.01E-04	3.01E-04	3.00E-04	2.98E-04	2.96E-04	2.79E-04	2.60E-04	6.90E-05	1.22E-10	0.
CM247	0.	1.10E-09	1.10E-09	1.10E-09	1.10E-09	1.10E-09	1.10E-09	1.10E-09	1.10E-09	1.10E-09	1.10E-09	1.06E-09
CM248	0.	1.46E-08	1.46E-08	1.46E-08	1.46E-08	1.46E-08	1.46E-08	1.46E-08	1.46E-08	1.44E-08	1.20E-08	2.04E-09
CM249	0.	8.13E-38	2.26E-43	0.	0.	0.	0.	0.	0.	0.	0.	0.
CM250	0.	2.18E-14	2.18E-14	2.18E-14	2.17E-14	2.14E-14	2.09E-14	1.78E-14	1.46E-14	4.05E-16	1.09E-31	0.
BK249	0.	4.83E-21	3.40E-24	1.05E-41	0.	0.	0.	0.	0.	0.	0.	0.
BK250	0.	1.68E-16	1.68E-16	1.68E-16	1.68E-16	1.65E-16	1.62E-16	1.38E-16	1.13E-16	3.13E-18	8.39E-34	0.
CF249	0.	4.64E-06	4.55E-06	4.13E-06	7.01E-07	2.66E-10	1.41E-14	0.	0.	0.	0.	0.
CF250	0.	4.61E-07	4.40E-07	3.37E-07	2.86E-09	6.91E-16	6.75E-16	5.76E-16	4.72E-16	1.31E-17	3.51E-33	0.
CF251	0.	3.93E-10	3.93E-10	3.93E-10	3.90E-10	3.78E-10	3.64E-10	2.67E-10	1.82E-10	1.78E-13	0.	0.
CF252	0.	1.45E-07	1.42E-07	1.24E-07	1.18E-08	3.31E-13	6.77E-19	0.	0.	0.	0.	0.
CF253	0.	9.51E-36	2.64E+41	0.	0.	0.	0.	0.	0.	0.	0.	0.
CF254	0.	-4.53E-19	-4.53E-19	-3.70E-28	0.	0.	0.	0.	0.	0.	0.	0.
ES253	0.	-1.10E-28	-1.86E-33	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	6.65E-02	7.41E+02	6.69E+02	4.09E+02	2.08E+02	2.17E+02	1.93E+02	9.57E+01	5.55E+01	1.38E+01	1.08E+00	3.95E-01

PWR = BU = 33,000 FUEL DECAY TIMES(2) CASE E-1

FP's

TABLE A-IV-1
(continued)

POWER= 38.40MW, BURNUP= 33000,MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	Y******* Y
H 3	0.	2.54E-02	2.53E-02	2.46E-02	1.48E-02	1.55E-03	9.28E-05	1.50E-14	8.69E-27	0.	0.	0.
ZN 72	0.	1.77E-25	1.38E-30	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 72	0.	4.10E-24	3.20E-29	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 72	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 73	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 73	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 74	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 74	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 75	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 75M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 75	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 75	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 76	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 76	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 76	0.	2.28E-42	2.49E-51	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 76	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 77M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 77	0.	1.43E-95	1.37-116	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 77	0.	4.79E-28	3.50E-34	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 77M	0.	9.65E-31	7.03E-37	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 77	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 78	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 78M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 78	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 78	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 79	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 79M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 79	0.	1.50E-04	1.50E-04	1.50E-04	1.50E-04	1.50E-04	1.50E-04	1.49E-04	1.48E-04	1.35E-04	5.16E-05	3.50E-09
BR 79	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 80	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 80	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 80M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 80	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 80	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 81M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 81M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 82	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 82M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 82	0.	1.04E-29	1.95E-36	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 82	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 83M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 83	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 83	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 83M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 83	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 84	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 84M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 84	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33.000 FUEL DECAY TIMES(2) CASE E-1

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

FP's

TABLE A-IV-1
(continued)

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	Y******* Y
KR 84	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 85M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 85	0.	1.80E+01	1.79E+01	1.73E+01	9.71E+00	7.45E-01	3.01E-02	2.13E-13	2.45E-27	0.	0.	0.
RB 85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 86	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 86	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 86M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 86	0.	1.20E-02	3.55E-03	4.07E-06	0.	0.	0.	0.	0.	0.	0.	0.
SR 86	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 87	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 87	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 87	0.	1.26E-08	1.26E-08	1.26E-08	1.26E-08	1.26E-08	1.26E-08	1.26E-08	1.26E-08	1.26E-08	1.26E-08	1.26E-08
SR 87M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 87	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 88	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 88	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 88	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 88	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 89	0.	4.45E+02	2.87E+02	2.51E+01	2.34E-18	0.	0.	0.	0.	0.	0.	0.
Y 89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 90	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 90	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 90	0.	9.96E+01	9.94E+01	9.82E+01	7.86E+01	2.93E+01	8.54E+00	4.42E-04	1.94E-09	0.	0.	0.
Y 90M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 90	0.	4.48E+02	4.47E+02	4.41E+02	3.53E+02	1.32E+02	3.84E+01	1.99E-03	8.74E-09	0.	0.	0.
ZR 90	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 91M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 91	0.	7.82E+02	5.30E+02	6.16E+01	9.10E-16	0.	0.	0.	0.	0.	0.	0.
ZR 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 93	0.	6.16-103	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 93	0.	2.21E-04	2.21E-04	2.21E-04	2.21E-04	2.21E-04	2.21E-04	2.21E-04	2.21E-04	2.20E-04	2.11E-04	1.39E-04
NB 93M	0.	2.65E-05	2.79E-05	3.56E-05	1.45E-04	3.07E-04	3.30E-04	3.32E-04	3.32E-04	3.30E-04	3.17E-04	2.09E-04
NB 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR • BU = 33,000 FUEL DECAY TIMES(2) CASE E=1 FP's TABLE A-IV-1

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2•SEC (continued)

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	******* Y
Y 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 95	0.	1.86E+03	1.31E+03	1.87E+02	1.11E-13	0.	0.	0.	0.	0.	0.	0.
NB 95M	0.	1.05E+01	7.39E+00	1.05E+00	6.27E-16	0.	0.	0.	0.	0.	0.	0.
NB 95	0.	3.20E+03	2.35E+03	3.65E+02	2.22E-13	0.	0.	0.	0.	0.	0.	0.
MO 95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 96	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 96	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 96	0.	2.32E-06	1.09E-56	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 96	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 97	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 97	0.	2.98E-60	3.19E-74	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 97M	0.	1.36E-60	1.46E-74	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 97	0.	2.36E-60	2.53E-74	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 97	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 98	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 98M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 98	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 98	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 99	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 99	0.	5.36E-13	1.53E-16	3.09E-36	0.	0.	0.	0.	0.	0.	0.	0.
TC 99M	0.	1.07E-13	3.04E-17	6.15E-37	0.	0.	0.	0.	0.	0.	0.	0.
TC 99	0.	9.66E-03	9.66E-03	9.66E-03	9.66E-03	9.66E-03	9.66E-03	9.65E-03	9.63E-03	9.35E-03	6.97E-03	3.67E-04
RU 99	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB100	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO100	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC100	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU100	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO102	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC102M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC102	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU102	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO103	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC103	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU103	0.	3.76E+02	2.12E+02	8.65E+00	0.	0.	0.	0.	0.	0.	0.	0.
RH103M	0.	5.42E+01	3.05E+01	1.25E+00	0.	0.	0.	0.	0.	0.	0.	0.
RH103	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO104	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC104	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU104	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH104M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH104	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD104	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO105	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC105	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 FUEL DECAY TIMES(2) CASE E-1 FP's

TABLE A-IV-1
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	******* Y
RU105	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH105M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH105	0.	8.31E-28	2.01E-34	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD105	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC106	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU106	0.	2.88E+01	2.70E+01	1.91E+01	3.85E-02	3.99E-14	4.17E-29	0.	0.	0.	0.	0.
RH106M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH106	0.	5.10E+03	4.79E+03	3.39E+03	6.83E+00	7.07E-12	7.39E-27	0.	0.	0.	0.	0.
PD106	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU107	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH107	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD107M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD107	0.	9.60E-06	9.60E-06	9.60E-06	9.60E-06	9.60E-06	9.60E-06	9.60E-06	9.60E-06	9.59E-06	9.50E-06	8.69E-06
AG107	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU108	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH108	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD108	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG108	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD108	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH109	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD109M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD109	0.	4.73E-78	1.21E-95	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG109M	0.	3.82E-09	3.63E-09	2.74E-09	1.79E-11	3.50E-21	2.55E-33	0.	0.	0.	0.	0.
AG109	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD109	0.	3.64E-09	3.46E-09	2.62E-09	1.71E-11	3.34E-21	2.44E-33	0.	0.	0.	0.	0.
RH110	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD110	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG110M	0.	5.07E+01	4.63E+01	2.81E+01	3.44E-03	1.42E-20	0.	0.	0.	0.	0.	0.
AG110	0.	2.83E+00	2.59E+00	1.57E+00	1.92E-04	7.92E-22	0.	0.	0.	0.	0.	0.
CD110	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD111M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD111	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG111M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG111	0.	1.27E-04	6.08E-06	2.84E-13	0.	0.	0.	0.	0.	0.	0.	0.
CD111M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD111	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD112	0.	4.54E-51	2.22E-62	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG112	0.	8.35E-50	4.09E-61	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD112	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD113	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG113M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG113	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD113M	0.	1.52E-02	1.52E-02	1.48E-02	9.48E-03	1.31E-03	1.10E-04	2.75E-13	4.87E-24	0.	0.	0.
CD113	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN113	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD114	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG114	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD114	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN114M	0.	2.31E-04	1.47E-04	1.17E-05	1.88E-25	0.	0.	0.	0.	0.	0.	0.
IN114	0.	9.75E-04	6.18E-04	4.91E-05	7.92E-25	0.	0.	0.	0.	0.	0.	0.
SN114	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
[illegible]	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

TABLE A-IV-1
(continued)

PWR = BU = 33,000 FUEL DECAY TIMES(2) CASE E=1

FP's

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2=SEC

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY META. CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	******* Y
AG115M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG115	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD115M	0.	2.34E-01	1.37E-01	7.24E-03	0.	0.	0.	0.	0.	0.	0.	0.
CD115	0.	1.89E-19	6.87E-24	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN115M	0.	1.22E-19	4.43E-24	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN115	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN115	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG116	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD116	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN116M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN116	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN116	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG117	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD117M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD117	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN117M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN117	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN117M	0.	1.86E-04	3.66E-05	4.33E-09	0.	0.	0.	0.	0.	0.	0.	0.
SN117	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD118	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN118M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN118	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN118	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD119M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN119M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN119M	0.	1.39E-02	1.27E-02	7.67E-03	8.44E-07	2.15E-24	0.	0.	0.	0.	0.	0.
SN119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD120	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN120M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN120	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN120	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN121M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN121M	0.	7.67E-07	7.66E-07	7.63E-07	7.02E-07	4.88E-07	.09E-07	8.05E-09	8.41E-11	0.	0.	0.
SN121	0.	5.41E-40	8.64E-49	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN122	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN122	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB122M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB122	0.	6.68E-16	1.95E-19	4.51E-39	0.	0.	0.	0.	0.	0.	0.	0.
TE122	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN123M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN123	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN123M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN123	0.	1.74E+01	1.45E+01	5.27E+00	6.38E-08	0.	0.	0.	0.	0.	0.	0.
SB123	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE123M	0.	1.03E-03	8.44E-04	2.86E-04	9.95E-13	0.	0.	0.	0.	0.	0.	0.
TE123	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN124	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 FUEL DECAY TIMES(2) CASE E-1 FP's

POWER= 38.40MW, BURNUP= 33000,MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	Y******* Y
SN124	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB124M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB124	0.	1.04E+00	7.12E-01	8.63E-02	2.77E-18	0.	0.	0.	0.	0.	0.	0.
TE124	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN125M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN125	0.	1.72E-03	1.52E-04	2.15E-10	0.	0.	0.	0.	0.	0.	0.	0.
SB125	0.	3.51E+01	3.43E+01	3.02E+01	2.99E+00	1.04E-04	2.76E-10	0.	0.	0.	0.	0.
TE125M	0.	5.96E+00	5.89E+00	5.29E+00	5.26E-01	1.82E-05	4.85E-11	0.	0.	0.	0.	0.
TE125	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN126	0.	6.09E+04	6.09E+04	6.09E+04	6.09E+04	6.08E+04	6.08E+04	6.07E+04	6.04E+04	5.68E+04	3.04E+04	5.94E-07
SB126M	0.	3.81E+03	3.81E+03	3.81E+03	3.81E+03	3.81E+03	3.81E+03	3.80E+03	3.79E+03	3.56E+03	1.91E+03	3.72E-06
SB126	0.	7.53E+03	7.31E+03	7.27E+03	7.27E+03	7.26E+03	7.26E+03	7.24E+03	7.22E+03	6.78E+03	3.63E+03	7.09E-06
TE126	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN127M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN127	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB127	0.	1.37E-09	3.82E-12	2.48E-26	0.	0.	0.	0.	0.	0.	0.	0.
TE127M	0.	4.34E+00	3.52E+00	1.10E+00	9.19E-10	0.	0.	0.	0.	0.	0.	0.
TE127	0.	1.26E+01	1.02E+01	3.19E+00	2.66E-09	0.	0.	0.	0.	0.	0.	0.
I127	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB128M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN129M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN129	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB129	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE129M	0.	6.95E+00	3.56E+00	8.59E-02	0.	0.	0.	0.	0.	0.	0.	0.
TE129	0.	8.15E+00	4.17E+00	1.01E-01	0.	0.	0.	0.	0.	0.	0.	0.
I129	0.	2.48E-05	2.48E-05	2.48E-05	2.48E-05	2.48E-05	2.48E-05	2.48E-05	2.48E-05	2.48E-05	2.47E-05	2.38E-05
XE129M	0.	1.15E-07	6.66E-09	8.94E-16	0.	0.	0.	0.	0.	0.	0.	0.
XE129	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN130	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB130M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB130	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE130	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I130M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I130	0.	2.74E-85	1.92-104	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE130	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN131	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB131	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE131M	0.	1.81E-33	2.19E-41	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE131	0.	1.76E-34	2.13E-42	0.	0.	0.	0.	0.	0.	0.	0.	0.
I131	0.	9.88E-03	5.83E-04	8.62E-11	0.	0.	0.	0.	0.	0.	0.	0.
XE131M	0.	8.25E-03	1.20E-03	2.65E-08	0.	0.	0.	0.	0.	0.	0.	0.
XE131	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN132	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB132M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB132	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE132	0.	4.46E-11	4.02E-14	4.86E-31	0.	0.	0.	0.	0.	0.	0.	0.
I132	0.	3.48E-10	3.14E-13	3.80E-30	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 FUEL DECAY TIMES(2) CASE E-1

POWER= 38.40MW, BURNUP= 33000,MWD, FLUX= 3.98E+13N/CM**2-SEC

FP's

TABLE A-IV-1
(continued)

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	******* Y
XE132	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB133	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE133M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE133	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I133	0.	3.73E-48	1.83E-59	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	2.40E-18	1.00E-22	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE133	0.	1.06E-05	1.40E-07	5.18E-18	0.	0.	0.	0.	0.	0.	0.	0.
CS133	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB134	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE134	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I134	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE134	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS134M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS134	0.	2.49E+03	2.41E+03	2.04E+03	9.72E+01	1.30E-04	5.89E-12	0.	0.	0.	0.	0.
BA134	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE135	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I135	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE135	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS135M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS135	0.	1.09E-04	1.09E-04	1.09E-04	1.09E-04	1.09E-04	1.09E-04	1.09E-04	1.09E-04	1.08E-04	1.06E-04	8.61E-05
BA135M	0.	1.97E-40	1.04E-48	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA135	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I136	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE136	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS136	0.	3.15E-01	5.46E-02	3.22E-06	0.	0.	0.	0.	0.	0.	0.	0.
BA136	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I137	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE137	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS137	0.	1.76E+02	1.76E+02	1.74E+02	1.41E+02	5.61E+01	1.77E+01	1.71E-03	1.64E-08	0.	0.	0.
BA137M	0.	3.96E+02	3.95E+02	3.91E+02	3.17E+02	1.26E+02	3.97E+01	3.84E-03	3.69E-08	0.	0.	0.
BA137	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I138	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE138	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS138	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA138	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I139	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE139	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS139	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA139	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA139	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE140	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS140	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA140	0.	1.86E+00	3.13E-01	1.59E-05	0.	0.	0.	0.	0.	0.	0.	0.
LA140	0.	1.13E+01	1.90E+00	9.64E-05	0.	0.	0.	0.	0.	0.	0.	0.
CE140	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE141	0.	1.42E+02	7.04E+01	1.42E+00	0.	0.	0.	0.	0.	0.	0.	0.
PR141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR - BU = 33,000 FUEL DECAY TIMES(2) CASE E-1 FP's

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	Y******** Y
XE142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR142	0.	1.51E-54	5.43E-67	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE143	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS143	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA143	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA143	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE143	0.	1.14E-29	7.24E-37	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR143	0.	1.87E+00	3.55E-01	3.44E-05	0.	0.	0.	0.	0.	0.	0.	0.
ND143	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA144	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE144	0.	7.60E+02	7.01E+02	4.49E+02	1.47E-01	4.79E-17	2.09E-36	0.	0.	0.	0.	0.
PR144	0.	7.20E+03	6.64E+03	4.25E+03	1.39E+00	4.53E-16	1.98E-35	0.	0.	0.	0.	0.
ND144	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE145	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR145	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND145	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE146	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR146	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND146	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE147	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR147	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND147	0.	2.12E+01	2.72E+02	3.03E-07	0.	0.	0.	0.	0.	0.	0.	0.
PM147	0.	5.14E+01	5.01E+01	4.39E+01	4.06E+00	1.03E-04	1.85E-10	0.	0.	0.	0.	0.
SM147	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM148M	0.	4.01E+01	2.33E+01	1.14E+00	0.	0.	0.	0.	0.	0.	0.	0.
PM148	0.	2.11E+00	1.22E+00	6.01E-02	0.	0.	0.	0.	0.	0.	0.	0.
SM148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR149	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND149	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM149	0.	8.38E-18	2.82E-22	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM149	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND150	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM150	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM150	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND151	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM151	0.	1.45E-36	4.79E-45	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM151	0.	2.19E+00	2.19E+00	2.18E+00	2.03E+00	1.47E+00	9.90E-01	4.09E-02	7.61E-04	0.	0.	0.
EU151	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM152	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM152	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU152M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU152	0.	1.58E-01	1.57E-01	1.53E-01	9.09E-02	9.02E-03	5.02E-04	4.63E-14	1.32E-26	0.	0.	0.
GD152	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM153	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR - BU = 33,000 FUEL DECAY TIMES(2) CASE E-1 FP's

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	0. Y	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	10000. Y	100000. Y	Y******* Y
SM153	0.	1.28E+20	1.13E+25	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU153	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD153	0.	3.17E+02	2.88E+02	1.71E+02	1.39E+06	9.29E+25	0.	0.	0.	0.	0.	0.
PM154	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM154	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU154	0.	6.44E+01	6.41E+01	6.28E+01	4.25E+01	7.51E+00	8.61E-01	2.56E-08	1.00E-17	0.	0.	0.
GD154	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM155	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU155	0.	6.36E+00	6.14E+00	5.07E+00	1.61E-01	3.59E-08	1.73E-16	0.	0.	0.	0.	0.
GD155	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM156	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU156	0.	3.52E+00	7.71E-01	1.67E-04	0.	0.	0.	0.	0.	0.	0.	0.
GD156	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM157	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU157	0.	3.49E-70	8.26E-86	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD157	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU158	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD158	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU159	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD159	0.	8.70E-60	5.55E-73	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB159	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU160	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD160	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB160	0.	3.44E+00	2.51E+00	4.33E-01	8.14E-15	0.	0.	0.	0.	0.	0.	0.
DY160	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD161	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB161	0.	3.92E+07	1.44E-08	1.55E-16	0.	0.	0.	0.	0.	0.	0.	0.
DY161	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD162	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB162M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB162	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY162	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB163M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB163	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY163	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB164	0.	4.48E-48	2.11E-58	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY164	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY165M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY165	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
HO165	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY166	0.	6.41E-16	7.82E-19	5.05E-35	0.	0.	0.	0.	0.	0.	0.	0.
HO166M	0.	9.22E-06	9.22E-06	9.21E-06	9.17E-06	8.96E-06	8.70E-06	6.91E-06	5.17E-06	2.86E-08	0.	0.
HO166	0.	4.92E-15	6.00E-18	3.88E-34	0.	0.	0.	0.	0.	0.	0.	0.
ER166	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ER167	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	0.	2.39E+04	2.08E+04	1.21E+04	1.06E+03	3.53E+02	1.06E+02	7.10E-02	2.28E-02	2.11E-02	1.35E-02	8.46E-04

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-1 Clad

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

ELEMENTAL ACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
H	0.	1.46E-02	1.42E-02	8.54E-03	8.96E-04	5.35E-05	8.67E-15	5.01E-27	0.	0.	0.	0.
BE	0.	6.40E-07	6.40E-07	6.40E-07	6.40E-07	6.40E-07	6.40E-07	6.40E-07	6.39E-07	6.38E-07	6.22E-07	4.85E-07
C	0.	1.52E-02	1.52E-02	1.52E-02	1.51E-02	1.50E-02	1.43E-02	1.35E-02	8.31E-03	4.54E-03	8.48E-08	0.
P	0.	1.25E-01	7.82E-04	0.	0.	0.	0.	0.	0.	0.	0.	0.
S	0.	6.12E-02	1.45E-02	8.24E-14	0.	0.	0.	0.	0.	0.	0.	0.
CL	0.	3.65E-08	3.65E-08	3.65E-08	3.65E-08	3.65E-08	3.65E-08	3.64E-08	3.61E-08	3.57E-08	2.92E-08	3.90E-09
AR	0.	3.13E-12	1.93E-13	1.09E-13	9.85E-14	8.66E-14	3.09E-14	8.51E-15	2.84E-19	7.19E-25	0.	0.
K	0.	1.21E-26	1.21E-26	1.21E-26	1.21E-26	1.21E-26	1.21E-26	1.21E-26	1.21E-26	1.21E-26	1.21E-26	1.21E-26
CA	0.	5.90E-03	2.74E-03	2.75E-09	0.	0.	0.	0.	0.	0.	0.	0.
SC	0.	3.79E-01	8.38E-02	1.34E-13	0.	0.	0.	0.	0.	0.	0.	0.
CR	0.	1.43E+02	1.50E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.
MN	0.	2.08E+02	1.37E+02	7.42E-02	2.26E-16	1.62E-34	0.	0.	0.	0.	0.	0.
FE	0.	2.14E+03	1.87E+03	1.69E+02	3.95E-03	6.42E-09	0.	0.	0.	0.	0.	0.
CO	0.	9.53E+03	8.38E+03	2.52E+03	1.30E+01	1.78E-02	0.	0.	0.	0.	0.	0.
NI	0.	2.55E+02	2.54E+02	2.38E+02	1.76E+02	1.21E+02	7.53E+00	1.78E+00	1.59E+00	1.52E+00	6.97E-01	2.86E-04
ZN	0.	1.62E-01	9.68E-02	8.84E-06	9.86E-24	0.	0.	0.	0.	0.	0.	0.
SR	0.	2.16E+00	1.90E-01	4.26E-04	1.59E-04	4.63E-05	2.40E-09	1.05E-14	0.	0.	0.	0.
Y	0.	7.50E+00	8.72E-01	4.27E-04	1.59E-04	4.63E-05	2.40E-09	1.05E-14	0.	0.	0.	0.
ZR	0.	2.80E+03	3.99E+02	5.53E-02	5.53E-02	5.53E-02	5.53E-02	5.52E-02	5.51E-02	5.50E-02	5.28E-02	3.48E-02
NB	0.	5.33E+03	8.31E+02	2.67E-02	5.70E-02	6.11E-02	6.13E-02	6.11E-02	5.94E-02	5.80E-02	5.29E-02	3.49E-02
MO	0.	7.20E-03	7.20E-03	7.20E-03	7.18E-03	7.15E-03	6.93E-03	6.67E-03	4.90E-03	3.33E-03	3.25E-06	0.
TC	0.	5.53E-03	5.53E-03	5.53E-03	5.53E-03	5.53E-03	5.53E-03	5.52E-03	5.44E-03	5.35E-03	3.98E-03	2.04E-04
SN	0.	1.05E+01	5.85E+00	1.64E-01	1.13E-01	7.18E-02	1.87E-03	1.95E-05	2.78E-21	4.33E-41	0.	0.
SB	0.	2.38E+01	2.07E+01	2.05E+00	7.09E-05	1.89E-10	0.	0.	0.	0.	0.	0.
TE	0.	9.53E+00	8.52E+00	8.47E-01	2.94E-05	7.81E-11	0.	0.	0.	0.	0.	0.
TOTALS	0.	2.05E+04	1.19E+04	2.93E+03	1.89E+02	1.22E+02	7.67E+00	1.92E+00	1.72E+00	1.65E+00	8.06E-01	7.03E-02

TABLE A-IV-2
(continued

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-1 HE's

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

ELEMENTAL ACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
TL	0.	8.09E-04	6.90E-04	6.44E-05	4.51E-05	3.92E-05	2.56E-05	2.71E-05	6.60E-05	1.61E-04	3.11E-03	6.73E-03
PB	0.	2.24E-03	1.91E-03	1.66E-04	9.17E-05	7.00E-05	7.13E-05	1.98E-04	3.28E-03	9.83E-03	1.63E-01	2.99E-01
BI	0.	2.24E-03	1.91E-03	1.66E-04	9.17E-05	7.00E-05	7.13E-05	1.98E-04	3.28E-03	9.83E-03	1.63E-01	2.99E-01
PO	0.	3.68E-03	3.14E-03	2.68E-04	1.38E-04	9.93E-05	8.58E-05	2.49E-04	4.07E-03	1.18E-02	1.77E-01	2.97E-01
AT	0.	3.43E-08	3.48E-08	4.10E-08	2.00E-07	7.00E-07	1.69E-05	6.80E-05	1.59E-03	5.54E-03	1.29E-01	2.89E-01
RN	0.	2.24E-03	1.91E-03	1.66E-04	9.12E-05	6.85E-05	4.01E-05	7.79E-05	8.60E-04	2.16E-03	1.69E-02	4.84E-03
FR	0.	4.99E-08	5.56E-08	1.42E-07	4.74E-07	1.03E-06	1.73E-05	6.84E-05	1.59E-03	5.54E-03	1.29E-01	2.89E-01
RA	0.	2.24E-03	1.91E-03	1.66E-04	9.14E-05	6.92E-05	5.71E-05	1.46E-04	2.45E-03	7.70E-03	1.46E-01	2.94E-01
AC	0.	1.15E-06	1.52E-06	7.25E-06	1.98E-05	2.41E-05	4.19E-05	9.37E-05	1.62E-03	5.58E-03	1.30E-01	2.90E-01
TH	0.	3.34E-01	5.22E-03	1.85E-03	1.77E-03	1.76E-03	1.84E-03	2.03E-03	4.68E-03	9.99E-03	1.48E-01	2.96E-01
PA	0.	6.42E-01	3.31E-01	3.30E-01	3.33E-01	3.36E-01	3.56E-01	3.68E-01	3.78E-01	3.77E-01	3.67E-01	2.74E-01
U	2.35E+00	2.34E-02	2.30E-02	1.99E-02	1.88E-02	2.37E-02	3.65E-02	3.79E-02	4.46E-02	5.25E-02	1.60E-01	2.98E-01
NP	0.	1.75E+01	1.75E+01	1.75E+01	1.74E+01	1.74E+01	1.68E+01	1.61E+01	1.13E+01	7.32E+00	3.67E-01	2.73E-01
PU	0.	6.40E+02	6.61E+02	4.76E+02	1.21E+02	5.07E+01	1.08E+01	9.07E+00	7.89E+00	6.76E+00	5.61E-01	1.42E-03
AM	0.	2.38E+02	2.38E+02	2.42E+02	2.39E+02	2.23E+02	1.29E+02	6.46E+01	1.10E+01	6.96E+00	2.00E-03	3.36E-08
CM	0.	1.51E+04	7.98E+03	1.36E+03	2.94E+02	4.36E+01	5.13E-02	4.86E-02	3.34E-02	2.12E-02	1.02E-05	4.97E-08
BK	0.	1.88E-14	1.88E-14	1.88E-14	1.85E-14	1.81E-14	1.54E-14	1.27E-14	2.57E-15	3.51E-16	9.40E-32	0.
CF	0.	1.29E-04	1.16E-04	1.81E-05	1.73E-08	1.02E-08	7.47E-09	5.08E-09	2.33E-10	4.96E-12	9.40E-32	0.
TOTALS	2.35E+00	1.60E+04	8.89E+03	2.09E+03	6.72E+02	3.36E+02	1.53E+02	9.02E+01	3.07E+01	2.16E+01	2.66E+00	3.21E+00

PWR = BU = 33,000 WASTE DECAY TIMES CASE E-1 FP's

TABLE A-IV-2
(continued)

POWER= 38.40MW, BURNUP= 33000,MWD, FLUX= 3.98E+13N/CM**2-SEC

ELEMENTAL ACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1, Y	10, Y	50, Y	100, Y	500, Y	1000, Y	5000, Y	10000, Y	100000, Y	Y******* Y
H	0.	5.69E+01	5.53E+01	3.33E+01	3.50E+00	2.09E-01	3.38E-11	1.95E-23	0.	0.	0.	0.
SE	0.	3.95E-01	3.95E-01	3.95E-01	3.95E-01	3.95E-01	3.93E-01	3.91E-01	3.75E-01	3.55E-01	1.36E-01	9.23E-06
RB	0.	7.51E-01	8.81E-04	1.93E-05	1.93E-05	1.93E-05	1.93E-05	1.93E-05	1.93E-05	1.93E-05	1.93E-05	1.93E-05
SR	0.	1.56E+05	8.19E+04	6.00E+04	2.24E+04	6.52E+03	3.38E-01	1.48E-06	0.	0.	0.	0.
Y	0.	2.15E+05	9.11E+04	6.00E+04	2.24E+04	6.52E+03	3.38E-01	1.48E-06	0.	0.	0.	0.
ZR	0.	2.50E+05	3.57E+04	1.87E+00	1.87E+00	1.87E+00	1.87E+00	1.86E+00	1.86E+00	1.86E+00	1.78E+00	1.18E+00
NB	0.	4.93E+05	7.66E+04	8.13E-01	1.73E+00	1.86E+00	1.87E+00	1.86E+00	1.86E+00	1.86E+00	1.78E+00	1.18E+00
MO	0.	3.76E-14	7.59E-34	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC	0.	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.41E+01	1.38E+01	1.03E+01	5.44E-01
RU	0.	5.20E+05	3.26E+05	6.50E+02	6.73E-10	7.03E-25	0.	0.	0.	0.	0.	0.
RH	0.	5.20E+05	3.26E+05	6.50E+02	6.73E-10	7.03E-25	0.	0.	0.	0.	0.	0.
PD	0.	1.16E-01	1.16E-01	1.16E-01	1.16E-01	1.16E-01	1.16E-01	1.16E-01	1.16E-01	1.16E-01	1.14E-01	1.05E-01
AG	0.	3.10E+03	1.88E+03	2.30E-01	4.31E-18	2.45E-30	0.	0.	0.	0.	0.	0.
CD	0.	4.91E+01	1.32E+01	7.17E+00	9.90E-01	8.33E-02	2.08E-10	3.69E-21	0.	0.	0.	0.
IN	0.	2.67E-01	2.12E-02	3.42E-22	0.	0.	0.	0.	0.	0.	0.	0.
SN	0.	4.11E+03	1.50E+03	5.66E-01	5.64E-01	5.64E-01	5.62E-01	5.60E-01	5.45E-01	5.26E-01	2.82E-01	5.51E-04
SB	0.	8.52E+03	7.45E+03	7.40E+02	1.15E+00	1.12E+00	1.12E+00	1.11E+00	1.08E+00	1.05E+00	5.61E-01	1.10E-03
TE	0.	1.91E+04	7.12E+03	3.06E+02	1.06E-02	2.82E-08	0.	0.	0.	0.	0.	0.
I	0.	2.05E-04	4.73E-05	4.75E-05	4.75E-05	4.75E-05	4.75E-05	4.75E-05	4.75E-05	4.75E-05	4.74E-05	4.56E-05
XE	0.	0.	6.24E-11	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS	0.	3.36E+05	2.99E+05	9.55E+04	3.43E+04	1.08E+04	1.27E+00	2.23E-01	2.23E-01	2.23E-01	2.18E-01	1.77E-01
BA	0.	1.01E+05	9.94E+04	8.08E+04	3.20E+04	1.01E+04	9.77E-01	9.38E-06	0.	0.	0.	0.
LA	0.	1.08E+02	5.47E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE	0.	8.93E+05	5.50E+05	1.80E+02	5.85E-14	2.56E-33	0.	0.	0.	0.	0.	0.
PR	0.	8.57E+05	5.49E+05	1.80E+02	5.85E-14	2.56E-33	0.	0.	0.	0.	0.	0.
ND	0.	8.37E+00	9.33E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM	0.	9.93E+04	8.53E+04	7.87E+03	1.99E-01	3.58E-07	0.	0.	0.	0.	0.	0.
SM	0.	1.26E+03	1.25E+03	1.16E+03	8.46E+02	5.68E+02	2.35E+01	4.37E-01	6.26E-15	3.12E-32	0.	0.
EU	0.	1.52E+04	1.37E+04	5.37E+03	9.15E+02	1.05E+02	3.12E-06	1.22E-15	0.	0.	0.	0.
GD	0.	2.00E+01	1.19E+01	9.65E-04	6.45E-22	0.	0.	0.	0.	0.	0.	0.
TB	0.	2.95E+02	5.10E+01	9.59E-13	0.	0.	0.	0.	0.	0.	0.	0.
DY	0.	8.98E-16	5.79E-32	0.	0.	0.	0.	0.	0.	0.	0.	0.
HO	0.	8.57E-04	8.57E-04	8.53E-04	8.33E-04	8.09E-04	6.42E-04	4.81E-04	4.77E-05	2.66E-06	0.	0.
TOTALS	0.	4.49E+06	2.55E+06	3.14E+05	1.13E+05	3.46E+04	4.66E+01	2.08E+01	2.01E+01	1.98E+01	1.52E+01	3.18E+00

PWR = BU = 33,000 WASTE DECAY TIMES CASE E-1

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TABLE A-IV-2
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

ELEMENT CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1, Y	10, Y	50, Y	100, Y	500, Y	1000, Y	5000, Y	10000, Y	100000, Y	******* Y
H	1.62E+04	1.30E+03	1.30E+03	1.30E+03	1.30E+03	1.30E+03	1.30E+03	1.30E+03	1.30E+03	1.30E+03	1.30E+03	1.30E+03
HE	0.	2.33E+00	2.33E+00	2.33E+00	2.33E+00	2.33E+00	2.33E+00	2.33E+00	2.33E+00	2.33E+00	2.33E+00	2.33E+00
LI	0.	9.22E-10	9.22E-10	9.22E-10	9.22E-10	9.22E-10	9.22E-10	9.22E-10	9.22E-10	9.22E-10	9.22E-10	9.22E-10
BE	0.	5.15E-05	5.15E-05	5.15E-05	5.15E-05	5.15E-05	5.15E-05	5.15E-05	5.15E-05	5.14E-05	5.03E-05	4.07E-05
B	0.	2.37E-11	2.99E-11	1.41E-10	6.38E-10	1.26E-09	6.22E-09	1.24E-08	6.20E-08	1.24E-07	1.22E-06	1.08E-05
C	3.45E+00	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01
N	0.	5.07E-07	7.14E-07	4.43E-06	2.09E-05	4.14E-05	2.01E-04	3.89E-04	1.55E-03	2.40E-03	3.41E-03	3.41E-03
O	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05
F	0.	2.98E-19	2.98E-19	2.98E-19	2.98E-19	2.98E-19	2.98E-19	2.98E-19	2.98E-19	2.98E-19	2.98E-19	2.98E-19
NE	0.	1.07E-08	1.07E-08	1.07E-08	1.07E-08	1.07E-08	1.07E-08	1.07E-08	1.07E-08	1.07E-08	1.07E-08	1.07E-08
NA	0.	8.34E-10	8.34E-10	8.34E-10	8.34E-10	8.34E-10	8.34E-10	8.34E-10	8.34E-10	8.34E-10	8.34E-10	8.34E-10
MG	0.	4.46E-04	4.46E-04	4.46E-04	4.46E-04	4.46E-04	4.46E-04	4.46E-04	4.46E-04	4.46E-04	4.46E-04	4.46E-04
AL	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01
SI	6.51E+01	6.51E+01	6.51E+01	6.51E+01	6.51E+01	6.51E+01	6.51E+01	6.51E+01	6.51E+01	6.51E+01	6.51E+01	6.51E+01
P	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00
S	1.29E+00	1.29E+00	1.29E+00	1.29E+00	1.29E+00	1.29E+00	1.29E+00	1.29E+00	1.29E+00	1.29E+00	1.29E+00	1.29E+00
CL	0.	3.58E-05	3.69E-05	3.72E-05	3.72E-05	3.72E-05	3.72E-05	3.72E-05	3.72E-05	3.72E-05	3.70E-05	3.62E-05
AR	0.	3.78E-10	3.80E-10	4.02E-10	5.02E-10	6.27E-10	1.63E-09	2.87E-09	1.28E-08	2.51E-08	2.24E-07	9.99E-07
K	0.	1.20E-11	1.20E-11	1.20E-11	1.20E-11	1.20E-11	1.20E-11	1.20E-11	1.20E-11	1.20E-11	1.20E-11	1.20E-11
CA	0.	1.56E-04	1.56E-04	1.56E-04	1.56E-04	1.56E-04	1.56E-04	1.56E-04	1.56E-04	1.56E-04	1.56E-04	1.56E-04
SC	0.	1.33E-05	4.78E-06	2.46E-06	2.46E-06	2.46E-06	2.46E-06	2.46E-06	2.46E-06	2.46E-06	2.46E-06	2.46E-06
TI	5.58E+01	5.59E+01	5.59E+01	5.59E+01	5.59E+01	5.59E+01	5.59E+01	5.59E+01	5.59E+01	5.59E+01	5.59E+01	5.59E+01
V	0.	2.82E+00	2.82E+00	2.82E+00	2.82E+00	2.82E+00	2.82E+00	2.82E+00	2.82E+00	2.82E+00	2.82E+00	2.82E+00
CR	2.00E+03	2.00E+03	2.00E+03	2.00E+03	2.00E+03	2.00E+03	2.00E+03	2.00E+03	2.00E+03	2.00E+03	2.00E+03	2.00E+03
MN	1.08E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02
FE	3.97E+03	3.97E+03	3.97E+03	3.97E+03	3.97E+03	3.97E+03	3.97E+03	3.97E+03	3.97E+03	3.97E+03	3.97E+03	3.97E+03
CO	7.09E+01	6.96E+01	6.90E+01	6.40E+01	6.18E+01	6.18E+01	6.18E+01	6.19E+01	6.27E+01	6.36E+01	7.44E+01	8.36E+01
NI	3.70E+03	3.70E+03	3.70E+03	3.70E+03	3.71E+03	3.70E+03	3.70E+03	3.70E+03	3.70E+03	3.70E+03	3.69E+03	3.68E+03
CU	1.86E+01	1.86E+01	1.86E+01	1.89E+01	1.99E+01	2.07E+01	2.26E+01	2.27E+01	2.27E+01	2.27E+01	2.27E+01	2.27E+01
ZN	0.	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01
SR	0.	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01
Y	0.	3.07E-04	3.57E-05	7.84E-10	2.92E-10	8.51E-11	4.41E-15	1.94E-20	0.	0.	0.	0.
ZR	1.21E+05	1.21E+05	1.21E+05	1.21E+05	1.21E+05	1.21E+05	1.21E+05	1.21E+05	1.21E+05	1.21E+05	1.21E+05	1.21E+05
NB	3.23E+02	3.23E+02	3.23E+02	3.23E+02	3.23E+02	3.23E+02	3.23E+02	3.23E+02	3.23E+02	3.23E+02	3.24E+02	3.31E+02
MO	1.99E+02	2.06E+02	2.06E+02	2.06E+02	2.06E+02	2.06E+02	2.06E+02	2.06E+02	2.06E+02	2.06E+02	2.06E+02	2.06E+02
TC	0.	3.22E-01	3.22E-01	3.22E-01	3.22E-01	3.22E-01	3.21E-01	3.21E-01	3.16E-01	3.11E-01	2.31E-01	1.19E-02
RU	0.	9.75E-02	9.75E-02	9.75E-02	9.75E-02	9.75E-02	9.75E-02	9.75E-02	9.75E-02	9.75E-02	9.75E-02	9.75E-02
CD	6.18E-03	7.67E-08	7.67E-08	7.67E-08	7.67E-08	7.67E-08	7.67E-08	7.67E-08	7.67E-08	7.67E-08	7.67E-08	7.67E-08
IN	6.33E-03	2.20E-03	2.20E-03	2.20E-03	2.20E-03	2.20E-03	2.20E-03	2.20E-03	2.20E-03	2.20E-03	2.20E-03	2.20E-03
SN	1.83E+03	1.83E+03	1.83E+03	1.83E+03	1.83E+03	1.83E+03	1.83E+03	1.83E+03	1.83E+03	1.83E+03	1.83E+03	1.83E+03
SB	0.	6.62E-01	6.59E-01	6.42E-01	6.41E-01	6.42E-01	6.44E-01	6.44E-01	6.44E-01	6.44E-01	6.44E-01	6.44E-01
TE	0.	1.17E-02	1.44E-02	3.19E-02	3.38E-02	3.38E-02	3.38E-02	3.38E-02	3.38E-02	3.38E-02	3.38E-02	3.38E-02
TOTALS	4.09E+05	3.94E+05	3.94E+05	3.94E+05	3.94E+05	3.94E+05	3.94E+05	3.94E+05	3.94E+05	3.94E+05	3.94E+05	3.94E+05

PWR = BU = 33,000 WASTE DECAY TIMES CASE E-1 — HE's — TABLE A-IV-2 (continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

ELEMENT CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******** Y
HE	0.	2.48E-01	2.92E-01	4.57E-01	7.70E-01	9.31E-01	1.53E+00	1.92E+00	2.84E+00	3.48E+00	6.72E+00	2.13E+01
TL	0.	2.77E-12	2.37E-12	2.34E-13	1.91E-13	1.77E-13	1.33E-13	1.38E-13	2.49E-13	5.02E-13	8.34E-12	1.75E-11
PB	0.	6.87E-07	1.11E-06	3.37E-06	5.07E-06	6.66E-06	1.35E-05	2.52E-05	7.08E-04	3.73E-03	4.01E-01	4.86E+00
BI	0.	2.19E-10	2.03E-10	2.19E-10	1.87E-09	1.04E-08	1.14E-06	9.17E-06	1.10E-03	8.02E-03	2.53E+00	1.03E+02
PO	0.	8.71E-14	1.36E-13	3.97E-12	5.92E-11	1.75E-10	3.16E-09	1.16E-08	1.84E-07	4.71E-07	3.70E-06	9.94E-07
AT	0.	2.11E-20	2.14E-20	2.52E-20	1.23E-19	4.30E-19	1.04E-17	4.19E-17	9.76E-16	3.41E-15	7.96E-14	1.78E-13
RN	0.	2.56E-12	2.23E-12	8.80E-13	3.50E-12	7.58E-12	9.24E-11	3.39E-10	5.38E-09	1.38E-08	1.08E-07	2.91E-08
FR	0.	6.01E-16	7.39E-16	2.86E-15	8.28E-15	1.25E-14	1.05E-13	3.93E-13	8.96E-12	3.13E-11	7.30E-10	1.63E-09
RA	0.	3.08E-08	3.36E-08	1.11E-07	5.33E-07	1.17E-06	1.44E-05	5.28E-05	8.38E-04	2.15E-03	1.69E-02	4.54E-03
AC	0.	1.53E-08	2.04E-08	9.89E-08	2.69E-07	3.21E-07	3.43E-07	3.53E-07	4.54E-07	6.28E-07	5.84E-06	9.94E-06
TH	0.	1.39E-03	1.37E-03	1.40E-03	1.62E-03	2.04E-03	7.59E-03	1.55E-02	8.35E-02	1.76E-01	1.61E+00	3.11E+00
PA	0.	5.26E-04	5.26E-04	5.26E-04	5.28E-04	5.29E-04	5.41E-04	5.56E-04	6.72E-04	8.34E-04	5.55E-03	7.61E-03
U	1.00E+06	4.78E+03	4.78E+03	4.78E+03	4.78E+03	4.78E+03	4.78E+03	4.78E+03	4.80E+03	4.82E+03	4.95E+03	4.97E+03
NP	0.	4.65E+02	4.65E+02	4.66E+02	4.70E+02	4.75E+02	5.03E+02	5.20E+02	5.33E+02	5.33E+02	5.17E+02	3.86E+02
PU	0.	4.71E+01	4.95E+01	5.58E+01	6.44E+01	6.61E+01	6.59E+01	6.74E+01	7.62E+01	7.97E+01	1.09E+01	3.64E+01
AM	0.	1.54E+02	1.54E+02	1.55E+02	1.54E+02	1.49E+02	1.17E+02	9.58E+01	5.68E+01	3.61E+01	1.04E-02	1.75E-07
CM	0.	2.84E+01	2.58E+01	1.71E+01	3.92E+00	8.20E-01	2.68E-01	2.56E-01	1.79E-01	1.15E-01	4.76E-04	3.85E-04
BK	0.	4.84E-21	4.84E-21	4.82E-21	4.75E-21	4.65E-21	3.97E-21	3.25E-21	6.60E-22	9.01E-23	2.41E-38	0.
CF	0.	3.05E-07	2.75E-07	5.09E-08	6.69E-09	6.42E-09	4.72E-09	3.21E-09	1.47E-10	3.13E-12	8.60E-35	0.
TOTALS	1.00E+06	5.47E+03	5.47E+03	5.47E+03	5.47E+03	5.47E+03	5.47E+03	5.47E+03	5.47E+03	5.47E+03	5.49E+03	5.49E+03

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-1 FP's

POWER= 38.40MW, BURNUP= 33000,MWD, FLUX= 3.98E+13N/CM**2-SEC

ELEMENT CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	Y******* Y
H	0.	5.87E-03	5.71E-03	3.44E-03	3.61E-04	2.15E-05	3.49E-15	2.02E-27	0.	0.	0.	0.
GE	0.	3.73E-01	3.73E-01	3.73E-01	3.73E-01	3.73E-01	3.73E-01	3.73E-01	3.73E-01	3.73E-01	3.73E-01	3.73E-01
AS	0.	8.44E-02	8.44E-02	8.44E-02	8.44E-02	8.44E-02	8.44E-02	8.44E-02	8.44E-02	8.44E-02	8.44E-02	8.44E-02
SE	0.	5.16E+01	5.16E+01	5.16E+01	5.16E+01	5.16E+01	5.16E+01	5.15E+01	5.13E+01	5.10E+01	4.79E+01	4.59E+01
BR	0.	1.53E-02	1.53E-02	1.58E-02	1.83E-02	2.13E-02	4.54E-02	7.54E-02	3.10E-01	5.89E-01	3.74E+00	5.69E+00
KR	0.	0.	1.09E-43	1.09E-43	1.09E-43	1.09E-43	1.09E-43	1.09E-43	1.09E-43	1.09E-43	1.09E-43	1.09E-43
RB	0.	3.27E+02	3.27E+02	3.27E+02	3.27E+02	3.27E+02	3.27E+02	3.27E+02	3.27E+02	3.27E+02	3.27E+02	3.27E+02
SR	0.	8.83E+02	8.73E+02	7.68E+02	5.02E+02	3.89E+02	3.43E+02	3.43E+02	3.43E+02	3.43E+02	3.43E+02	3.43E+02
Y	0.	4.61E+02	4.58E+02	4.58E+02	4.58E+02	4.58E+02	4.58E+02	4.58E+02	4.58E+02	4.58E+02	4.58E+02	4.58E+02
ZR	0.	3.63E+03	3.63E+03	3.73E+03	4.00E+03	4.11E+03	4.16E+03	4.16E+03	4.16E+03	4.16E+03	4.13E+03	3.89E+03
NB	0.	1.24E+01	1.93E+00	3.78E-03	1.72E-02	3.40E-02	1.69E-01	3.37E-01	1.68E+00	3.36E+00	3.29E+01	2.69E+02
MO	0.	3.44E+03	3.46E+03	3.46E+03	3.46E+03	3.46E+03	3.46E+03	3.46E+03	3.46E+03	3.46E+03	3.46E+03	3.46E+03
TC	0.	8.39E+02	8.39E+02	8.39E+02	8.39E+02	8.39E+02	8.38E+02	8.36E+02	8.26E+02	8.12E+02	6.05E+02	3.19E+01
RU	0.	2.31E+03	2.27E+03	2.17E+03	2.17E+03	2.17E+03	2.18E+03	2.18E+03	2.19E+03	2.20E+03	2.41E+03	2.98E+03
RH	0.	3.88E+02	3.90E+02	3.90E+02	3.90E+02	3.90E+02	3.90E+02	3.90E+02	3.90E+02	3.90E+02	3.90E+02	3.90E+02
PD	0.	1.33E+03	1.37E+03	1.47E+03	1.47E+03	1.47E+03	1.47E+03	1.47E+03	1.47E+03	1.47E+03	1.47E+03	1.45E+03
AG	0.	6.21E+01	6.19E+01	6.15E+01	6.15E+01	6.15E+01	6.15E+01	6.15E+01	6.16E+01	6.18E+01	6.39E+01	8.44E+01
CD	0.	8.95E+01	8.98E+01	9.01E+01	9.01E+01	9.01E+01	9.01E+01	9.01E+01	9.01E+01	9.01E+01	9.01E+01	9.01E+01
IN	0.	1.22E+00	1.22E+00	1.24E+00	1.27E+00	1.27E+00	1.27E+00	1.27E+00	1.27E+00	1.27E+00	1.27E+00	1.27E+00
SN	0.	5.31E+01	5.28E+01	5.26E+01	5.26E+01	5.26E+01	5.25E+01	5.24E+01	5.19E+01	5.12E+01	4.26E+01	3.27E+01
SB	0.	1.78E+01	1.72E+01	1.10E+01	1.03E+01	1.03E+01	1.03E+01	1.03E+01	1.03E+01	1.03E+01	1.03E+01	1.03E+01
TE	0.	5.69E+02	5.70E+02	5.76E+02	5.77E+02	5.77E+02	5.77E+02	5.77E+02	5.78E+02	5.78E+02	5.87E+02	5.97E+02
I	0.	2.72E-01	7.97E-01	1.01E+00	1.01E+00	1.01E+00	1.01E+00	1.01E+00	1.01E+00	1.01E+00	1.01E+00	1.00E+00
XE	0.	0.	6.97E-09	1.14E-07	5.90E-07	1.18E-06	5.94E-06	1.19E-05	5.94E-05	1.19E-04	1.19E-03	1.16E-02
CS	0.	2.66E+03	2.62E+03	2.25E+03	1.65E+03	1.38E+03	1.25E+03	1.25E+03	1.25E+03	1.25E+03	1.25E+03	1.20E+03
BA	0.	1.38E+03	1.42E+03	1.79E+03	2.40E+03	2.67E+03	2.79E+03	2.79E+03	2.79E+03	2.79E+03	2.80E+03	2.84E+03
LA	0.	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03
CE	0.	2.75E+03	2.65E+03	2.48E+03	2.48E+03	2.48E+03	2.48E+03	2.48E+03	2.48E+03	2.48E+03	2.48E+03	2.48E+03
PR	0.	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03
ND	0.	3.83E+03	3.93E+03	4.10E+03	4.10E+03	4.10E+03	4.10E+03	4.10E+03	4.10E+03	4.10E+03	4.10E+03	4.10E+03
PM	0.	1.05E+02	9.17E+01	8.48E+00	2.15E-04	3.86E-10	0.	0.	0.	0.	0.	0.
SM	0.	8.06E+02	8.19E+02	8.99E+02	8.96E+02	8.86E+02	8.66E+02	8.65E+02	8.65E+02	8.65E+02	8.65E+02	8.65E+02
EU	0.	1.78E+02	1.76E+02	1.58E+02	1.40E+02	1.45E+02	1.64E+02	1.65E+02	1.65E+02	1.65E+02	1.65E+02	1.65E+02
GD	0.	1.24E+02	1.26E+02	1.48E+02	1.77E+02	1.83E+02	1.84E+02	1.84E+02	1.84E+02	1.84E+02	1.84E+02	1.84E+02
TB	0.	1.87E+00	1.85E+00	1.85E+00	1.85E+00	1.85E+00	1.85E+00	1.85E+00	1.85E+00	1.85E+00	1.85E+00	1.85E+00
DY	0.	1.15E+00	1.18E+00	1.18E+00	1.18E+00	1.18E+00	1.18E+00	1.18E+00	1.18E+00	1.18E+00	1.18E+00	1.18E+00
HO	0.	1.17E-01	1.17E-01	1.17E-01	1.17E-01	1.17E-01	1.17E-01	1.17E-01	1.16E-01	1.16E-01	1.16E-01	1.16E-01
ER	0.	3.67E-02	3.67E-02	3.67E-02	3.67E-02	3.67E-02	3.68E-02	3.69E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02
TOTALS	0.	2.88E+04	2.88E+04	2.88E+04	2.88E+04	2.88E+04	2.88E+04	2.88E+04	2.88E+04	2.88E+04	2.88E+04	2.88E+04

PWR = BU = 33,000 WASTE DECAY TIMES CASE E-1 Clad

TABLE A-IV-2
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

ELEMENT THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
H	0.	5.19E-07	5.04E-07	3.04E-07	3.19E-08	1.90E-09	3.08E-19	1.78E-31	0.	0.	0.	0.
C	0.	4.51E-06	4.51E-06	4.51E-06	4.48E-06	4.46E-06	4.25E-06	4.00E-06	2.46E-06	1.35E-06	2.51E-11	0.
P	0.	6.20E-05	3.53E-07	0.	0.	0.	0.	0.	0.	0.	0.	0.
S	0.	1.74E-05	4.13E-06	2.34E-17	0.	0.	0.	0.	0.	0.	0.	0.
CL	0.	6.80E-11	6.80E-11	6.80E-11	6.80E-11	6.79E-11	6.79E-11	6.78E-11	6.72E-11	6.65E-11	5.43E-11	7.26E-12
AR	0.	1.47E-14	5.46E-16	1.51E-16	1.37E-16	1.20E-16	4.28E-17	1.18E-17	3.94E-22	9.98E-28	0.	0.
K	0.	1.16E-29	1.16E-29	1.16E-29	1.16E-29	1.16E-29	1.16E-29	1.16E-29	1.16E-29	1.16E-29	1.16E-29	1.16E-29
CA	0.	3.60E-06	1.67E-06	1.68E-12	0.	0.	0.	0.	0.	0.	0.	0.
SC	0.	5.32E-03	1.18E-03	1.88E-15	0.	0.	0.	0.	0.	0.	0.	0.
CR	0.	6.31E-01	6.65E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
MN	0.	1.68E+00	1.11E+00	6.01E-04	1.83E-18	1.31E-36	0.	0.	0.	0.	0.	0.
FE	0.	2.88E+00	2.44E+00	2.21E-01	5.16E-06	8.37E-12	0.	0.	0.	0.	0.	0.
CO	0.	1.48E+02	1.31E+02	3.94E+01	2.02E-01	2.78E-04	0.	0.	0.	0.	0.	0.
NI	0.	4.06E-02	4.04E-02	3.78E-02	2.79E-02	1.92E-02	9.41E-04	2.17E-05	1.76E-18	7.66E-35	0.	0.
ZN	0.	1.29E-03	7.69E-04	7.02E-08	7.83E-26	0.	0.	0.	0.	0.	0.	0.
SR	0.	7.77E-03	6.81E-04	5.59E-07	2.08E-07	6.07E-08	3.14E-12	1.38E-17	0.	0.	0.	0.
Y	0.	2.85E-02	3.32E-03	2.51E-06	9.36E-07	2.73E-07	1.41E-11	6.21E-17	0.	0.	0.	0.
ZR	0.	1.46E+01	2.09E+00	6.55E-06	6.55E-06	6.55E-06	6.55E-06	6.55E-06	6.54E-06	6.52E-06	6.26E-06	4.13E-06
NB	0.	2.57E+01	4.00E+00	1.08E-05	2.14E-05	2.29E-05	2.29E-05	2.29E-05	2.23E-05	2.18E-05	2.00E-05	1.37E-05
MO	0.	1.79E-05	1.79E-05	1.79E-05	1.79E-05	1.78E-05	1.73E-05	1.66E-05	1.22E-05	8.30E-06	8.10E-09	0.
TC	0.	9.51E-06	9.51E-06	9.51E-06	9.51E-06	9.51E-06	9.50E-06	9.48E-06	9.36E-06	9.20E-06	6.84E-06	3.51E-07
SN	0.	7.18E-03	3.29E-03	1.71E-04	1.19E-04	7.53E-05	1.96E-06	2.05E-08	2.91E-24	4.55E-44	0.	0.
SB	0.	9.96E-02	8.41E-02	8.29E-03	2.87E-07	7.64E-13	0.	0.	0.	0.	0.	0.
TE	0.	8.19E-03	7.32E-03	7.28E-04	2.52E-08	6.71E-14	0.	0.	0.	0.	0.	0.
TOTALS	0.	1.93E+02	1.41E+02	3.97E+01	2.31E-01	1.96E-02	1.00E-03	8.13E-05	5.29E-05	4.72E-05	3.31E-05	1.82E-05

PWR = BU = 33,000 WASTE DECAY TIMES CASE E-1 HE's

TABLE A-IV-2
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

ELEMENT THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
TL	0.	1.88E-05	1.60E-05	1.35E-06	6.55E-07	4.39E-07	8.92E-08	1.02E-07	6.64E-07	2.11E-06	4.73E-05	1.05E-04
PB	0.	3.22E-06	2.75E-06	2.52E-07	1.69E-07	1.45E-07	1.40E-07	2.93E-07	3.98E-06	1.18E-05	1.91E-04	3.45E-04
BI	0.	3.90E-05	3.33E-05	3.04E-06	2.01E-06	1.70E-06	1.33E-06	2.28E-06	2.47E-05	7.07E-05	1.08E-03	1.87E-03
PO	0.	1.68E-04	1.43E-04	1.22E-05	6.24E-06	4.47E-06	3.60E-06	1.04E-05	1.72E-04	5.11E-04	8.18E-03	1.46E-02
AT	0.	1.44E-09	1.46E-09	1.72E-09	8.37E-09	2.93E-08	7.09E-07	2.85E-06	6.65E-05	2.32E-04	5.42E-03	1.21E-02
RN	0.	8.51E-05	7.26E-05	6.32E-06	3.51E-06	2.65E-06	1.51E-06	2.74E-06	2.83E-05	7.07E-05	5.54E-04	1.61E-04
FR	0.	1.31E-09	1.34E-09	1.76E-09	8.07E-09	2.68E-08	6.30E-07	2.53E-06	5.90E-05	2.06E-04	4.81E-03	1.08E-02
RA	0.	7.68E-05	6.55E-05	5.69E-06	3.13E-06	2.35E-06	1.31E-06	2.41E-06	2.56E-05	6.51E-05	5.66E-04	3.30E-04
AC	0.	1.74E-09	1.94E-09	5.04E-09	1.67E-08	3.58E-08	5.94E-07	2.35E-06	5.45E-05	1.90E-04	4.44E-03	9.93E-03
TH	0.	2.00E-04	6.42E-05	6.71E-06	4.38E-06	3.85E-06	5.85E-06	1.14E-05	8.91E-05	2.47E-04	4.39E-03	8.89E-03
PA	0.	2.06E-03	4.60E-04	4.53E-04	4.57E-04	4.61E-04	4.88E-04	5.04E-04	5.17E-04	5.17E-04	5.09E-04	3.87E-04
U	6.65E-02	2.43E-04	2.44E-04	2.97E-04	4.93E-04	6.71E-04	1.04E-03	1.08E-03	1.28E-03	1.51E-03	4.63E-03	8.66E-03
NP	0.	3.28E-02	3.28E-02	3.28E-02	3.28E-02	3.28E-02	3.26E-02	3.20E-02	2.58E-02	2.04E-02	1.07E-02	8.01E-03
PU	0.	5.34E-01	1.71E+00	2.59E+00	2.02E+00	1.47E+00	3.38E-01	2.81E-01	2.45E-01	2.10E-01	1.74E-02	4.19E-05
AM	0.	7.99E+00	8.00E+00	8.13E+00	8.03E+00	7.51E+00	4.24E+00	2.21E+00	4.02E-01	2.54E-01	7.31E-05	1.23E-09
CM	0.	5.54E+02	2.90E+02	4.75E+01	1.03E+01	1.53E+00	1.63E-03	1.54E-03	1.06E-03	6.68E-04	3.29E-07	3.10E-09
BK	0.	1.68E-16	1.68E-16	1.68E-16	1.65E-16	1.62E-16	1.36E-16	1.13E-16	2.30E-17	3.13E-18	8.39E-34	0.
CF	0.	5.14E-06	4.59E-06	7.16E-07	6.44E-10	3.64E-10	2.67E-10	1.82E-10	8.35E-12	1.78E-13	3.51E-33	0.
TOTALS	6.65E-02	5.63E+02	3.00E+02	5.82E+01	2.04E+01	1.05E+01	4.61E+00	2.52E+00	6.76E-01	4.88E-01	6.31E-02	7.62E-02

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-1 FP's

TABLE A-IV-2
(continued)

POWER= 38.40MW, BURNUP= 33000,MWD, FLUX= 3.98E+13N/CM**2-SEC

ELEMENT THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1, Y	10, Y	50, Y	100, Y	500, Y	1000, Y	5000, Y	10000, Y	100000, Y	******* Y
H	0.	2.02E-03	1.97E-03	1.18E-03	1.24E-04	7.43E-06	1.20E-15	6.95E-28	0.	0.	0.	0.
SE	0.	1.50E-04	1.50E-04	1.50E-04	1.50E-04	1.50E-04	1.49E-04	1.48E-04	1.42E-04	1.35E-04	5.16E-05	3.50E-09
RB	0.	3.55E-03	4.08E-06	1.26E-08	1.26E-08	1.26E-08	1.26E-08	1.26E-08	1.26E-08	1.26E-08	1.26E-08	1.26E-08
SR	0.	3.86E+02	1.23E+02	7.86E+01	2.93E+01	8.54E+00	4.42E-04	1.94E-09	0.	0.	0.	0.
Y	0.	9.77E+02	5.03E+02	3.53E+02	1.32E+02	3.84E+01	1.99E-03	8.74E-09	0.	0.	0.	0.
ZR	0.	1.31E+03	1.87E+02	2.21E-04	2.21E-04	2.21E-04	2.21E-04	2.21E-04	2.21E-04	2.20E-04	2.11E-04	1.39E-04
NB	0.	2.35E+03	3.66E+02	1.45E-04	3.07E-04	3.30E-04	3.32E-04	3.32E-04	3.31E-04	3.30E-04	3.17E-04	2.09E-04
MO	0.	1.53E-16	3.09E-36	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC	0.	9.66E-03	9.66E-03	9.66E-03	9.66E-03	9.66E-03	9.65E-03	9.63E-03	9.51E-03	9.35E-03	6.97E-03	3.67E-04
RU	0.	2.39E+02	2.78E+01	3.85E-02	3.99E-14	4.17E-29	0.	0.	0.	0.	0.	0.
RH	0.	4.82E+03	3.40E+03	6.83E+00	7.07E-12	7.39E-27	0.	0.	0.	0.	0.	0.
PD	0.	9.60E-06	9.60E-06	9.60E-06	9.60E-06	9.60E-06	9.60E-06	9.60E-06	9.59E-06	9.59E-06	9.50E-06	8.69E-06
AG	0.	4.89E+01	2.97E+01	3.64E-03	1.85E-20	2.55E-33	0.	0.	0.	0.	0.	0.
CD	0.	1.53E-01	2.20E-02	9.48E-03	1.31E-03	1.10E-04	2.75E-13	4.87E-24	0.	0.	0.	0.
IN	0.	7.65E-04	6.08E-05	9.79E-25	0.	0.	0.	0.	0.	0.	0.	0.
SN	0.	1.45E+01	5.28E+00	6.10E-04	6.09E-04	6.09E-04	6.07E-04	6.04E-04	5.88E-04	5.68E-04	3.04E-04	5.94E-07
SB	0.	3.50E+01	3.03E+01	3.01E+00	1.12E-02	1.11E-02	1.10E-02	1.10E-02	1.07E-02	1.03E-02	5.54E-03	1.08E-05
TE	0.	2.73E+01	9.76E+00	5.26E-01	1.82E-05	4.85E-11	0.	0.	0.	0.	0.	0.
I	0.	6.08E-07	3.11E-08	3.13E-08	3.13E-08	3.13E-08	3.13E-08	3.13E-08	3.13E-08	3.13E-08	3.12E-08	3.00E-08
XE	0.	0.	1.21E-13	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS	0.	2.59E+03	2.21E+03	2.38E+02	5.61E+01	1.77E+01	1.82E-03	1.09E-04	1.08E-04	1.08E-04	1.06E-04	8.61E-05
BA	0.	3.96E+02	3.91E+02	3.17E+02	1.26E+02	3.97E+01	3.84E-03	3.69E-08	0.	0.	0.	0.
LA	0.	1.90E+00	9.64E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE	0.	7.72E+02	4.50E+02	1.47E-01	4.79E-17	2.09E-36	0.	0.	0.	0.	0.	0.
PR	0.	6.64E+03	4.25E+03	1.39E+00	4.53E-16	1.98E-35	0.	0.	0.	0.	0.	0.
ND	0.	2.72E-02	3.03E-07	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM	0.	7.47E+01	4.51E+01	4.06E+00	1.03E-04	1.85E-10	0.	0.	0.	0.	0.	0.
SM	0.	2.19E+00	2.18E+00	2.03E+00	1.47E+00	9.90E-01	4.09E-02	7.61E-04	1.09E-17	5.44E-35	0.	0.
EU	0.	7.12E+01	6.80E+01	4.27E+01	7.52E+00	8.61E-01	2.56E-08	1.00E-17	0.	0.	0.	0.
GD	0.	2.88E-02	1.71E-02	1.39E-06	9.29E-25	0.	0.	0.	0.	0.	0.	0.
TB	0.	2.51E+00	4.33E-01	8.14E-15	0.	0.	0.	0.	0.	0.	0.	0.
DY	0.	7.82E-19	5.05E-35	0.	0.	0.	0.	0.	0.	0.	0.	0.
HO	0.	9.22E-06	9.21E-06	9.17E-06	8.96E-06	8.70E-06	6.91E-06	5.17E-06	5.13E-07	2.86E-08	0.	0.
TOTALS	0.	2.08E+04	1.21E+04	1.05E+03	3.52E+02	1.06E+02	7.10E-02	2.28E-02	2.16E-02	2.11E-02	1.35E-02	8.22E-04

PHOTON SPECTRUM AS A FUNCTION OF TIME FOR LIGHT ELEMENTS, CLADDING AND STRUCTURAL MATERIALS

TABLE A-IV-2
(continued)

PWR - BU = 33,000 WASTE DECAY TIME= CASE E-1 Clad
POWER= 38.40 MW, BURNUP= 3300 MWD, FLUX= 3.98E+13 N**2-SEC

TWELVE GROUP PHOTON RELEASE RATES, PHOTONS/SEC
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

EMEAN (MEV)	INITIAL	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
				TIME AFTER DISCHARGE							
3.00E-01	5.62E+11	3.74E+10	3.20E+09	2.04E+08	2.18E+08	2.19E+08	2.18E+08	2.12E+08	2.07E+08	1.89E+08	1.25E+08
6.30E-01	4.10E+14	6.85E+13	5.37E+10	1.41E+07	1.23E+07	1.23E+07	1.23E+07	1.23E+07	1.23E+07	1.22E+07	1.18E+07
1.10E+00	7.44E+14	6.96E+14	2.13E+14	1.09E+12	1.50E+09	2.20E-01	9.68E-07	0.	0.	0.	0.
1.55E+00	1.78E+11	2.99E+10	7.07E+03	2.63E+03	7.67E+02	3.98E-02	1.75E-07	4.65E-17	4.65E-17	4.65E-17	4.65E-17
1.99E+00	8.47E+08	1.03E+08	2.15E+02	8.00E+01	2.33E+01	1.21E-03	5.31E-09	0.	0.	0.	0.
2.38E+00	6.46E+01	9.14E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.
2.75E+00	3.46E-78	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3.25E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3.70E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4.22E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4.70E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
5.25E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	1.15E+15	7.64E+14	2.13E+14	1.09E+12	1.73E+09	2.31E+08	2.30E+08	2.24E+08	2.19E+08	2.01E+08	1.36E+08
MEV/SEC	1.08E+15	8.09E+14	2.34E+14	1.20E+12	1.72E+09	7.34E+07	7.31E+07	7.14E+07	6.98E+07	6.43E+07	4.48E+07

TWELVE GROUP ENERGY RELEASE RATES, MEV/WATT-SEC
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

EMEAN (MEV)	INITIAL	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
				TIME AFTER DISCHARGE							
3.00E-01	4.39E+03	2.93E+02	2.50E+01	1.59E+00	1.71E+00	1.71E+00	1.70E+00	1.66E+00	1.62E+00	1.47E+00	9.73E-01
6.30E-01	6.73E+06	1.12E+06	8.81E+02	2.31E-01	2.02E-01	2.01E-01	2.01E-01	2.01E-01	2.01E-01	2.01E-01	1.94E-01
1.10E+00	2.13E+07	1.99E+07	6.09E+06	3.13E+04	4.30E+01	6.31E-09	2.77E-14	0.	0.	0.	0.
1.55E+00	7.20E+03	1.21E+03	2.85E-04	1.06E-04	3.10E-05	1.61E-09	7.06E-15	1.88E-24	1.88E-24	1.88E-24	1.88E-24
1.99E+00	4.39E+01	5.32E+00	1.11E-05	4.14E-06	1.21E-06	6.26E-11	2.75E-16	0.	0.	0.	0.
2.38E+00	4.00E-06	5.67E-12	0.	0.	0.	0.	0.	0.	0.	0.	0.
2.75E+00	2.48E-85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3.25E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3.70E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4.22E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4.70E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
5.25E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	2.80E+07	2.11E+07	6.09E+06	3.13E+04	4.49E+01	1.91E+00	1.90E+00	1.86E+00	1.82E+00	1.68E+00	1.17E+00
GAMMA WATTS	1.73E+02	1.30E+02	3.75E+01	1.92E-01	2.76E-04	1.18E-05	1.17E-05	1.14E-05	1.12E-05	1.03E-05	7.19E-06

PHOTON SPECTRUM AS A FUNCTION OF TIME FOR HEAVY METALS AND THEIR DAUGHTERS

HE's

TABLE A-IV-2
(continued)

PWR - BU = 33,000 WASTE DECAY TIME) CASE E-1
POWER= 38,40 MW, BURNUP= 3300),MWD, FLUX= 3,98E+13 N**2-SEC

ACTINIDE PHOTON RELEASE RATES, PHOTONS/SEC
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

EMEAN (MEV)	INITIAL	TIME AFTER DISCHARGE: 1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	Y100000.	Y******* Y
3,00E-01	1,16E+12	1,14E+12	1,13E+12	1,10E+12	1,05E+12	7,58E+11	5,73E+11	3,07E+11	1,98E+11	1,11E+10	1,23E+10
6,30E-01	5,99E+11	5,52E+11	5,11E+11	5,08E+11	5,06E+11	4,88E+11	4,66E+11	3,25E+11	2,06E+11	3,90E+09	7,64E+09
1,10E+00	1,31E+11	1,30E+11	1,30E+11	1,30E+11	1,29E+11	1,24E+11	1,19E+11	8,28E+10	5,27E+10	2,09E+08	5,23E+07
1,55E+00	1,63E+08	1,39E+08	8,55E+07	1,86E+07	2,90E+06	3,40E+05	8,98E+05	1,28E+07	3,39E+07	3,36E+08	3,00E+08
1,99E+00	8,57E+07	7,34E+07	4,51E+07	9,82E+06	1,52E+06	8,93E+04	1,46E+05	1,37E+06	3,43E+06	2,68E+07	7,19E+06
2,38E+00	4,25E+07	3,64E+07	2,25E+07	4,90E+06	7,55E+05	7,29E+04	1,78E+05	2,35E+06	5,97E+06	4,69E+07	1,26E+07
2,75E+00	4,82E+07	4,12E+07	1,25E+07	3,18E+06	9,07E+05	2,80E+04	1,75E+04	5,89E+04	1,34E+05	1,02E+06	2,76E+05
3,25E+00	1,23E+07	1,05E+07	6,52E+06	1,42E+06	2,18E+05	9,70E+03	9,59E+03	1,67E+04	3,23E+04	2,33E+05	6,27E+04
3,70E+00	7,90E+06	6,77E+06	4,19E+06	9,10E+05	1,40E+05	6,10E+03	5,69E+03	3,30E+03	1,71E+03	1,09E+02	2,06E+01
4,22E+00	4,98E+06	4,27E+06	2,64E+06	5,74E+05	8,81E+04	3,85E+03	3,59E+03	2,08E+03	1,08E+03	6,86E+01	1,30E+01
4,70E+00	2,36E+06	2,02E+06	1,25E+06	2,72E+05	4,17E+04	1,82E+03	1,70E+03	9,85E+02	5,10E+02	3,25E+01	6,14E+00
5,25E+00	1,48E+06	1,27E+06	7,86E+05	1,71E+05	2,62E+04	1,15E+03	1,07E+03	6,20E+02	3,21E+02	2,04E+01	3,86E+00
TOTAL	1,89E+12	1,82E+12	1,77E+12	1,74E+12	1,68E+12	1,37E+12	1,16E+12	7,15E+11	4,57E+11	1,57E+10	2,03E+10
MEV/SEC	8,71E+11	8,34E+11	8,04E+11	7,93E+11	7,75E+11	6,72E+11	5,96E+11	3,88E+11	2,48E+11	6,72E+09	9,07E+09

ACTINIDE ENERGY RELEASE RATES, MEV/WATT-SEC
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

EMEAN (MEV)	INITIAL	TIME AFTER DISCHARGE 1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	Y100000.	Y******* Y
3,00E-01	9,09E+03	8,92E+03	8,81E+03	8,61E+03	8,19E+03	5,93E+03	4,48E+03	2,40E+03	1,55E+03	8,70E+01	9,59E+01
6,30E-01	9,83E+03	9,05E+03	8,38E+03	8,34E+03	8,30E+03	8,00E+03	7,65E+03	5,32E+03	3,39E+03	6,40E+01	1,25E+02
1,10E+00	3,74E+03	3,74E+03	3,73E+03	3,71E+03	3,70E+03	3,57E+03	3,41E+03	2,37E+03	1,51E+03	5,98E+00	1,50E+00
1,55E+00	6,58E+00	5,61E+00	3,45E+00	7,51E-01	1,17E-01	1,37E-02	3,62E-02	5,17E-01	1,37E+00	1,36E+01	1,21E+01
1,99E+00	4,40E+00	3,80E+00	2,34E+00	5,09E-01	7,87E-02	4,63E-03	7,55E-03	7,08E-02	1,78E-01	1,39E+00	3,73E-01
2,38E+00	2,63E+00	2,26E+00	1,40E+00	3,04E-01	4,68E-02	4,52E-03	1,10E-02	1,46E-01	3,70E-01	2,91E+00	7,81E-01
2,75E+00	3,45E+00	2,95E+00	8,95E-01	2,28E-01	6,50E-02	2,01E-03	1,26E-03	4,22E-03	9,58E-03	7,29E-02	1,97E-02
3,25E+00	1,04E+00	8,92E-01	5,52E-01	1,20E-01	1,84E-02	8,21E-04	8,11E-04	1,42E-03	2,74E-03	1,98E-02	5,30E-03
3,70E+00	7,61E-01	6,52E-01	4,03E-01	8,77E-02	1,35E-02	5,88E-04	5,48E-04	3,18E-04	1,65E-04	1,05E-05	1,98E-06
4,22E+00	5,48E-01	4,69E-01	2,90E-01	6,31E-02	9,68E-03	4,23E-04	3,94E-04	2,29E-04	1,18E-04	7,54E-06	1,43E-06
4,70E+00	2,89E-01	2,47E-01	1,53E-01	3,33E-02	5,11E-03	2,23E-04	2,08E-04	1,21E-04	6,25E-05	3,97E-06	7,51E-07
5,25E+00	2,03E-01	1,74E-01	1,08E-01	2,34E-02	3,59E-03	1,57E-04	1,46E-04	8,47E-05	4,39E-05	2,79E-06	5,28E-07
TOTAL	2,27E+04	2,17E+04	2,09E+04	2,07E+04	2,02E+04	1,75E+04	1,55E+04	1,01E+04	6,45E+03	1,75E+02	2,36E+02
GAMMA WATTS	1,40E-01	1,34E-01	1,29E-01	1,27E-01	1,24E-01	1,08E-01	9,56E-02	6,22E-02	3,97E-02	1,08E-03	1,45E-03

PHOTON SPECTRUM AS A FUNCTION OF TIME FOR FISSION PRODUCTS

FP's

TABLE A-IV-2
(continued)

PWR - BU = 33,000 WASTE DECAY TIME) CASE E-1
POWER= 38,40 MW, BURNUP= 3300),MWD, FLUX= 3,98E+13 N**2-SEC

TWELVE GROUP PHOTON RELEASE RATES, PHOTONS/SEC
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

EMEAN (MEV)	INITIAL	TIME AFTER DISCHARGE 1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
3,00E-01	8,93E+15	5,70E+15	1,75E+14	5,96E+13	1,73E+13	8,50E+09	6,39E+09	6,18E+09	5,97E+09	3,20E+09	6,46E+06
6,30E-01	6,66E+16	3,15E+16	4,12E+15	1,28E+15	3,99E+14	1,16E+11	7,76E+10	7,54E+10	7,28E+10	3,90E+10	7,62E+07
1,10E+00	1,71E+15	1,25E+15	1,54E+14	2,62E+13	3,36E+12	3,26E+07	1,17E+06	1,16E+05	6,47E+03	0,	0,
1,55E+00	5,64E+14	4,15E+14	1,10E+13	3,76E+11	1,10E+11	1,71E+09	1,70E+09	1,66E+09	1,60E+09	8,57E+08	1,67E+06
1,99E+00	3,03E+14	1,96E+14	1,41E+11	1,13E+10	3,28E+09	1,70E+05	7,47E-01	0,	0,	0,	0,
2,38E+00	3,01E+13	2,11E+13	4,11E+10	4,23E-02	4,42E-17	0,	0,	0,	0,	0,	0,
2,75E+00	2,27E+12	1,61E+12	3,22E+09	3,33E-03	3,48E-18	0,	0,	0,	0,	0,	0,
3,25E+00	7,17E+10	5,08E+10	1,02E+08	1,06E-04	1,10E-19	0,	0,	0,	0,	0,	0,
3,70E+00	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
4,22E+00	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
4,70E+00	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
5,25E+00	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
TOTAL	7,81E+16	3,91E+16	4,46E+15	1,36E+15	4,19E+14	1,26E+11	8,57E+10	8,32E+10	8,04E+10	4,31E+10	8,43E+07
MEV/SEC	4,81E+16	2,40E+16	2,84E+15	8,52E+14	2,60E+14	7,84E+10	5,34E+10	5,19E+10	5,02E+10	2,69E+10	5,25E+07

TWELVE GROUP ENERGY RELEASE RATES, MEV/WATT-SEC
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

EMEAN (MEV)	INITIAL	TIME AFTER DISCHARGE 1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
3,00E-01	6,97E+07	4,45E+07	1,37E+06	4,66E+05	1,35E+05	6,64E+01	4,99E+01	4,83E+01	4,67E+01	2,50E+01	5,05E-02
6,30E-01	1,09E+09	5,16E+08	6,76E+07	2,10E+07	6,54E+06	1,90E+03	1,27E+03	1,24E+03	1,19E+03	6,40E+02	1,25E+00
1,10E+00	4,89E+07	3,58E+07	4,40E+06	7,49E+05	9,62E+04	9,35E-01	3,36E-02	3,33E-03	1,85E-08	0,	0,
1,55E+00	2,28E+07	1,68E+07	4,61E+05	1,52E+04	4,44E+03	6,92E+01	6,87E+01	6,69E+01	6,46E+01	3,46E+01	6,76E-02
1,99E+00	1,57E+07	1,02E+07	7,29E+03	5,83E+02	1,70E+02	8,80E-03	3,87E-08	0,	0,	0,	0,
2,38E+00	1,86E+06	1,31E+06	2,55E+03	2,62E-09	2,74E-24	0,	0,	0,	0,	0,	0,
2,75E+00	1,63E+05	1,15E+05	2,31E+02	2,39E-10	2,49E-25	0,	0,	0,	0,	0,	0,
3,25E+00	6,07E+03	4,30E+03	8,60E+00	8,95E-12	9,35E-27	0,	0,	0,	0,	0,	0,
3,70E+00	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
4,22E+00	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
4,70E+00	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
5,25E+00	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
TOTAL	1,25E+09	6,25E+08	7,38E+07	2,22E+07	6,78E+06	2,04E+03	1,39E+03	1,35E+03	1,31E+03	7,00E+02	1,37E+00
GAMMA WATTS	7,70E+03	3,85E+03	4,54E+02	1,37E+02	4,17E+01	1,26E-02	8,56E-03	8,32E-03	8,04E-03	4,31E-03	8,42E-06

TABLE A-IV-2
(continued)

PWR • BU = 33,000 WASTE DECAY TIMES CASE E-1 Clad

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
H 1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
H 2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
H 3	0.	1.46E-02	1.42E-02	8.54E-03	8.96E-04	5.35E-05	8.57E-15	5.01E-27	0.	0.	0.	0.
H 4	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
HE 3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
HE 4	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
HE 6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LI 6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LI 7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LI 8	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BE 8	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BE 9	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BE 10	0.	6.40E-07	6.40E-07	6.40E-07	6.40E-07	6.40E-07	6.40E-07	6.40E-07	6.39E-07	6.38E-07	6.22E-07	4.85E-07
BE 11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
B 10	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
B 11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
B 12	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
C 12	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
C 13	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
C 14	0.	1.52E-02	1.52E-02	1.52E-02	1.51E-02	1.50E-02	1.43E-02	1.35E-02	8.31E-03	4.54E-03	8.48E-08	0.
N 13	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
N 14	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
N 15	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
N 16	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
O 16	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
O 17	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
O 18	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
O 19	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
F 19	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
F 20	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE 20	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE 21	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE 22	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE 23	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NA 22	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NA 23	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NA 24	0.	9.30E-89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NA 25	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MG 24	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MG 25	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MG 26	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MG 27	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AL 27	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AL 28	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AL 29	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SI 28	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SI 29	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SI 30	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SI 31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
P 31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
P 32	0.	1.52E-03	2.18E-07	0.	0.	0.	0.	0.	0.	0.	0.	0.
P 33	0.	1.28E-01	7.82E-04	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 WASTE DECAY TIMES CASE E-1 Clad

TABLE A-IV-2
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	Y******* Y
P 34	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S 32	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S 33	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S 34	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S 35	0.	6.12E-02	1.05E-02	8.24E-14	0.	0.	0.	0.	0.	0.	0.	0.
S 36	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S 37	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CL 35	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CL 36	0.	3.65E-08	3.65E-08	3.65E-08	3.65E-08	3.65E-08	3.65E-08	3.64E-08	3.61E-08	3.57E-08	2.92E-08	3.90E-09
CL 37	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CL 38	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AR 36	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AR 37	0.	3.02E-12	8.10E-14	0.	0.	0.	0.	0.	0.	0.	0.	0.
AR 38	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AR 39	0.	1.12E-13	1.12E-13	1.09E-13	9.85E-14	8.66E-14	1.09E-14	8.51E-15	2.84E-19	7.19E-25	0.	0.
AR 40	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AR 41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
K 39	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
K 40	0.	1.21E-26	1.21E-26	1.21E-26	1.21E-26	1.21E-26	1.21E-26	1.21E-26	1.21E-26	1.21E-26	1.21E-26	1.21E-26
K 41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
K 42	0.	6.51-116	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
K 43	0.	1.92E-65	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
K 44	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 40	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 42	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 43	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 44	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 45	0.	5.90E-03	2.74E-03	2.75E-09	0.	0.	0.	0.	0.	0.	0.	0.
CA 46	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 47	0.	6.33E-17	4.62E-29	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 48	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 49	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SC 45	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SC 46	0.	3.79E-01	8.38E-02	1.34E-13	0.	0.	0.	0.	0.	0.	0.	0.
SC 47	0.	5.09E-16	1.90E-28	0.	0.	0.	0.	0.	0.	0.	0.	0.
SC 48	0.	2.20E-31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SC 49	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SC 50	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TI 46	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TI 47	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TI 48	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TI 49	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TI 50	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TI 51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 49	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 50	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 52	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 53	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 54	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR 50	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 WASTE DECAY TIMES CASE E=1 Clad

TABLE A-IV-2
(continued)

POWER= 38,40MW, BURNUP= 33000,MWD, FLUX= 3,98E+13N/CM**2=SEC

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1, Y	10, Y	50, Y	100, Y	500, Y	1000, Y	5000, Y	10000, Y	100000, Y	******* Y
CR 51	0,	1,43E+02	1,50E+00	0,	0,	0,	0,	0,	0,	0,	0,	0,
CR 52	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
CR 53	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
CR 54	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
CR 55	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
MN 54	0,	2,08E+02	1,37E+02	7,42E+02	2,26E-16	1,62E-34	0,	0,	0,	0,	0,	0,
MN 55	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
MN 56	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
MN 57	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
MN 58	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
FE 54	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
FE 55	0,	2,13E+03	1,87E+03	1,69E+02	3,95E-03	6,42E-09	0,	0,	0,	0,	0,	0,
FE 56	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
FE 57	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
FE 58	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
FE 59	0,	1,26E+01	7,59E-01	0,	0,	0,	0,	0,	0,	0,	0,	0,
CO 58M	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
CO 58	0,	7,10E+02	1,20E+02	1,59E-12	0,	0,	0,	0,	0,	0,	0,	0,
CO 59	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
CO 60M	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
CO 60	0,	8,82E+03	8,26E+03	2,52E+03	1,30E+01	1,78E-02	0,	0,	0,	0,	0,	0,
CO 61	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
CO 62	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
NI 58	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
NI 59	0,	1,66E+00	1,66E+00	1,66E+00	1,66E+00	1,66E+00	1,65E+00	1,64E+00	1,59E+00	1,52E+00	6,97E-01	2,86E-04
NI 60	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
NI 61	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
NI 62	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
NI 63	0,	2,53E+02	2,52E+02	2,36E+02	1,75E+02	1,20E+02	5,88E+00	1,36E-01	1,10E-18	4,79E-31	0,	0,
NI 64	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
NI 65	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
CU 62	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
CU 63	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
CU 64	0,	4,20-101	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
CU 65	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
CU 66	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
ZN 63	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
ZN 64	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
ZN 65	0,	1,62E-01	9,68E-02	8,84E-06	9,86E-24	0,	0,	0,	0,	0,	0,	0,
ZN 66	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
ZN 67	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
ZN 68	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
ZN 69M	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
ZN 69	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
ZN 70	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
ZN 71M	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
ZN 71	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
GA 69	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
GA 70	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
GA 71	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
GE 70	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
SR 88	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-1 Clad

TABLE A-IV-2
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
SR 89	0.	2.16E+00	1.89E-01	1.76E-20	0.	0.	0.	0.	0.	0.	0.	0.
SR 90	0.	5.39E-04	5.32E-04	4.26E-04	1.59E-04	4.63E-05	2.40E-09	1.05E-14	0.	0.	0.	0.
SR 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 90M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 90	0.	5.39E-04	5.33E-04	4.27E-04	1.59E-04	4.63E-05	2.40E-09	1.05E-14	0.	0.	0.	0.
Y 91M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 91	0.	7.50E+00	8.71E-01	1.29E-17	0.	0.	0.	0.	0.	0.	0.	0.
ZR 90	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 93	0.	5.53E-02	5.53E-02	5.53E-02	5.53E-02	5.53E-02	5.53E-02	5.52E-02	5.51E-02	5.50E-02	5.28E-02	3.48E-02
ZR 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 95	0.	2.80E+03	3.99E+02	2.38E-13	0.	0.	0.	0.	0.	0.	0.	0.
ZR 96	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 92	0.	1.14E-05	4.64E-11	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 93M	0.	4.85E-03	6.28E-03	2.66E-02	5.68E-02	6.10E-02	6.12E-02	6.09E-02	5.93E-02	5.79E-02	5.28E-02	3.48E-02
NB 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 94	0.	1.33E-04	1.33E-04	1.33E-04	1.33E-04	1.33E-04	1.33E-04	1.33E-04	1.33E-04	1.32E-04	1.32E-04	1.28E-04
NB 95	0.	5.33E+03	8.31E+02	5.04E-13	0.	0.	0.	0.	0.	0.	0.	0.
NB 96	0.	4.64E-57	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 97	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 93	0.	7.20E-03	7.20E-03	7.20E-03	7.18E-03	7.15E-03	6.93E-03	6.67E-03	4.90E-03	3.33E-03	3.25E-06	0.
MO 93M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 96	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 97	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 98	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 99	0.	1.67E-17	3.38E-37	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO100	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC 99M	0.	1.60E-17	3.23E-37	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC 99	0.	5.53E-03	5.53E-03	5.53E-03	5.53E-03	5.53E-03	5.53E-03	5.52E-03	5.44E-03	5.35E-03	3.98E-03	2.04E-04
TC101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD113M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD113	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD115M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD115	0.	2.32E-28	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD119M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN113	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN119M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN121M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN114	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN115	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN116	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN117M	0.	8.98E-01	1.06E-04	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33.000 WASTE DECAY TIMES CASE E=1 Clad

TABLE A-IV-2
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	Y******* Y
SN117	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN118	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN119M	0.	9.34E+00	5.63E+00	6.19E-04	1.58E-21	0.	0.	0.	0.	0.	0.	0.
SN119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN120	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN121M	0.	1.78E+01	1.77E+01	1.63E+01	1.13E-01	7.18E-02	1.87E-03	1.95E-05	2.78E-21	4.33E-41	0.	0.
SN121	0.	1.61E-46	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN122	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN123M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN123	0.	1.11E-01	4.04E-02	4.89E-10	0.	0.	0.	0.	0.	0.	0.	0.
SN124	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN125M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN125	0.	3.49E-06	4.94E-12	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB123	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB124M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB124	0.	3.46E-01	4.19E-02	1.34E-18	0.	0.	0.	0.	0.	0.	0.	0.
SB125	0.	2.34E+01	2.06E+01	2.05E+00	7.09E-05	1.89E-10	0.	0.	0.	0.	0.	0.
SB126M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB126	0.	7.19E-06	2.87E-10	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE124	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE125M	0.	9.53E+00	8.52E+00	8.47E-01	2.94E-05	7.81E-11	0.	0.	0.	0.	0.	0.
TE125	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE126	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TA180	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TA181	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TA182M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TA182	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W180	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W181	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W182	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W183M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W183	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W184	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W185M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W185	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W186	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W187	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	0.	2.05E+04	1.19E+04	2.93E+03	1.89E+02	1.22E+02	7.67E+00	1.92E+00	1.72E+00	1.65E+00	8.06E-01	7.03E-02

PWR = BU = 33,000 WASTE DECAY TIMES CASE E-1

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

HE's

TABLE A-IV-2
(continued)

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1, Y	10, Y	50, Y	100, Y	500, Y	1000, Y	5000, Y	10000, Y	100000, Y	******* Y
HE 4	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TL207	0.	1.03E+06	1.49E+06	7.19E+06	1.95E+05	2.34E+05	2.49E+05	2.56E+05	3.11E+05	3.88E+05	2.63E+04	3.61E+04
TL208	0.	8.07E+04	6.89E+04	5.72E+05	2.56E+05	1.58E+05	3.36E+07	2.76E+09	1.65E+10	3.82E+10	5.89E+09	6.02E+08
TL209	0.	7.55E+10	7.65E+10	9.02E+10	4.39E+09	1.54E+08	3.72E+07	1.50E+06	3.49E+05	1.22E+04	2.85E+03	6.37E+03
PB206	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PB207	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PB208	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PB209	0.	3.43E+08	3.48E+08	4.10E+08	2.00E+07	7.00E+07	1.69E+05	6.80E+05	1.59E+03	5.54E+03	1.29E+01	2.89E+01
PB210	0.	5.81E+10	8.81E+10	1.79E+08	2.67E+07	7.90E+07	1.42E+05	5.23E+05	8.29E+04	2.12E+03	1.67E+02	4.48E+03
PB211	0.	1.03E+06	1.49E+06	7.21E+06	1.96E+05	2.34E+05	2.50E+05	2.56E+05	3.11E+05	3.89E+05	2.64E+04	3.62E+04
PB212	0.	2.24E+03	1.91E+03	1.59E+04	7.11E+05	4.39E+05	9.34E+07	7.67E+09	4.59E+10	1.06E+09	1.64E+08	1.67E+07
PB214	0.	1.64E+08	2.14E+08	1.09E+07	5.27E+07	1.16E+06	1.42E+05	5.23E+05	8.29E+04	2.12E+03	1.67E+02	4.48E+03
BI209	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BI210	0.	5.71E+10	8.82E+10	1.79E+08	2.67E+07	7.90E+07	1.42E+05	5.23E+05	8.29E+04	2.12E+03	1.67E+02	4.48E+03
BI211	0.	1.03E+06	1.49E+06	7.21E+06	1.96E+05	2.34E+05	2.50E+05	2.56E+05	3.11E+05	3.89E+05	2.64E+04	3.62E+04
BI212	0.	2.24E+03	1.91E+03	1.59E+04	7.11E+05	4.39E+05	9.34E+07	7.67E+09	4.59E+10	1.06E+09	1.64E+08	1.67E+07
BI213	0.	3.43E+08	3.48E+08	4.10E+08	2.00E+07	7.00E+07	1.69E+05	6.80E+05	1.59E+03	5.54E+03	1.29E+01	2.89E+01
BI214	0.	1.64E+08	2.14E+08	1.09E+07	5.27E+07	1.16E+06	1.42E+05	5.23E+05	8.29E+04	2.12E+03	1.67E+02	4.48E+03
PO210	0.	3.63E+10	5.87E+10	1.79E+08	2.67E+07	7.90E+07	1.42E+05	5.23E+05	8.29E+04	2.12E+03	1.67E+02	4.48E+03
PO211	0.	3.09E+09	4.47E+09	2.16E+08	5.88E+08	7.03E+08	7.49E+08	7.69E+08	9.34E+08	1.17E+07	7.91E+07	1.09E+06
PO212	0.	1.44E+03	1.22E+03	1.02E+04	4.55E+05	2.81E+05	5.97E+07	4.91E+09	2.94E+10	6.79E+10	1.05E+08	1.07E+07
PO213	0.	3.36E+08	3.40E+08	4.01E+08	1.95E+07	6.84E+07	1.66E+05	6.65E+05	1.55E+03	5.42E+03	1.26E+01	2.83E+01
PO214	0.	1.64E+08	2.14E+08	1.09E+07	5.27E+07	1.16E+06	1.42E+05	5.23E+05	8.29E+04	2.12E+03	1.67E+02	4.48E+03
PO215	0.	1.03E+06	1.49E+06	7.21E+06	1.96E+05	2.34E+05	2.50E+05	2.56E+05	3.11E+05	3.89E+05	2.64E+04	3.62E+04
PO216	0.	2.24E+03	1.91E+03	1.59E+04	7.11E+05	4.39E+05	9.34E+07	7.67E+09	4.59E+10	1.06E+09	1.64E+08	1.67E+07
PO218	0.	1.64E+08	2.14E+08	1.09E+07	5.27E+07	1.16E+06	1.42E+05	5.23E+05	8.29E+04	2.12E+03	1.67E+02	4.48E+03
AT217	0.	3.43E+08	3.48E+08	4.10E+08	2.00E+07	7.00E+07	1.69E+05	6.80E+05	1.59E+03	5.54E+03	1.29E+01	2.89E+01
RN219	0.	1.03E+06	1.49E+06	7.21E+06	1.96E+05	2.34E+05	2.50E+05	2.56E+05	3.11E+05	3.89E+05	2.64E+04	3.62E+04
RN220	0.	2.24E+03	1.91E+03	1.59E+04	7.11E+05	4.39E+05	9.34E+07	7.67E+09	4.59E+10	1.06E+09	1.64E+08	1.67E+07
RN222	0.	1.64E+08	2.14E+08	1.09E+07	5.27E+07	1.16E+06	1.42E+05	5.23E+05	8.29E+04	2.12E+03	1.67E+02	4.48E+03
FR221	0.	3.43E+08	3.48E+08	4.10E+08	2.00E+07	7.00E+07	1.69E+05	6.80E+05	1.59E+03	5.54E+03	1.29E+01	2.89E+01
FR223	0.	1.56E+08	2.08E+08	1.01E+07	2.74E+07	3.28E+07	3.50E+07	3.59E+07	4.36E+07	5.44E+07	3.69E+06	5.06E+06
RA223	0.	1.03E+06	1.49E+06	7.21E+06	1.96E+05	2.34E+05	2.50E+05	2.56E+05	3.11E+05	3.89E+05	2.64E+04	3.62E+04
RA224	0.	2.24E+03	1.91E+03	1.59E+04	7.11E+05	4.39E+05	9.34E+07	7.67E+09	4.59E+10	1.06E+09	1.64E+08	1.67E+07
RA225	0.	3.44E+08	3.47E+08	4.10E+08	2.00E+07	7.00E+07	1.69E+05	6.80E+05	1.59E+03	5.54E+03	1.29E+01	2.89E+01
RA226	0.	1.66E+08	2.14E+08	1.09E+07	5.27E+07	1.16E+06	1.42E+05	5.23E+05	8.29E+04	2.12E+03	1.67E+02	4.48E+03
RA228	0.	2.61E+12	3.73E+12	1.67E+11	2.73E+11	3.06E+11	5.80E+11	9.37E+11	4.59E+10	1.06E+09	1.64E+08	1.67E+07
AC225	0.	3.43E+08	3.48E+08	4.10E+08	2.00E+07	7.00E+07	1.69E+05	6.80E+05	1.59E+03	5.54E+03	1.29E+01	2.89E+01
AC227	0.	1.12E+06	1.49E+06	7.21E+06	1.96E+05	2.34E+05	2.50E+05	2.56E+05	3.11E+05	3.89E+05	2.64E+04	3.62E+04
AC228	0.	2.61E+12	3.73E+12	1.67E+11	2.73E+11	3.06E+11	5.80E+11	9.37E+11	4.59E+10	1.06E+09	1.64E+08	1.67E+07
TH227	0.	1.05E+06	1.47E+06	7.11E+06	1.93E+05	2.31E+05	2.46E+05	2.53E+05	3.07E+05	3.83E+05	2.60E+04	3.57E+04
TH228	0.	2.27E+03	1.90E+03	1.58E+04	7.11E+05	4.39E+05	9.34E+07	7.67E+09	4.59E+10	1.06E+09	1.64E	1.67E+07
TH229	0.	3.47E+08	3.47E+08	4.10E+08	2.00E+07	7.00E+07	1.69E+05	6.80E+05	1.59E+03	5.54E+03	1.29E+01	2.89E+01
TH230	0.	2.22E+05	2.22E+05	2.27E+05	2.65E+05	3.41E+05	1.36E+04	2.78E+04	1.40E+03	2.72E+03	1.67E+02	4.48E+03
TH231	0.	1.72E+02	8.62E+05	8.62E+05	8.63E+05	8.63E+05	8.70E+05	8.80E+05	9.86E+05	1.17E+04	3.43E+04	3.62E+04
TH232	0.	2.49E+11	2.49E+11	2.55E+11	2.80E+11	3.12E+11	5.80E+11	9.37E+11	4.59E+10	1.06E+09	1.64E+08	1.67E+07
TH233	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TH234	0.	3.14E+01	3.21E+03	1.57E+03	1.57E+03	1.57E+03	1.57E+03	1.57E+03	1.57E+03	1.57E+03	1.57E+03	1.57E+03
PA231	0.	2.43E+05	2.43E+05	2.43E+05	2.44E+05	2.44E+05	2.50E+05	2.56E+05	3.11E+05	3.89E+05	2.64E+04	3.62E+04
PA232	0.	9.44E+43	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PA233	0.	3.27E+01	3.28E+01	3.28E+01	3.31E+01	3.35E+01	3.55E+01	3.67E+01	3.76E+01	3.76E+01	3.65E+01	2.73E+01
PA234M	0.	3.14E+01	3.21E+03	1.57E+03	1.57E+03	1.57E+03	1.57E+03	1.57E+03	1.57E+03	1.57E+03	1.57E+03	1.57E+03

PWR = BU = 33,000 WASTE DECAY TIMES CASE E=1 — HE's

POWER= 38.40MW, BURNUP= 33000,MWD, FLUX= 3.98E+13N/CM**2=SEC

TABLE A-IV-2
(continued)

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1, Y	10, Y	50, Y	100, Y	500, Y	1000, Y	5000, Y	10000, Y	100000, Y	******* Y
PA234	0.	3.14E-04	3.21E-06	1.57E-06	1.57E-06	1.57E-06	1.57E-06	1.57E-06	1.57E-06	1.57E-06	1.57E-06	1.57E-06
U232	0.	3.99E-05	4.75E-05	9.46E-05	6.92E-05	4.28E-05	9.09E-07	7.37E-09	1.38E-25	1.71E-46	0.	0.
U233	0.	2.73E-07	9.74E-07	1.36E-05	7.01E-05	1.41E-04	7.32E-04	1.50E-03	7.84E-03	1.56E-02	1.29E-01	2.89E-01
U234	1.96E+00	5.35E-03	5.40E-03	7.29E-03	1.43E-02	2.04E-02	3.28E-02	3.33E-02	3.29E-02	3.25E-02	2.56E-02	3.49E-03
U235	6.86E-02	8.62E-05	8.62E-05	8.62E-05	8.63E-05	8.63E-05	8.70E-05	8.80E-05	9.86E-05	1.17E-04	3.43E-04	3.62E-04
U236	0.	1.30E-03	1.30E-03	1.30E-03	1.31E-03	1.32E-03	1.40E-03	1.51E-03	2.16E-03	2.68E-03	3.45E-03	3.36E-03
U237	0.	1.50E-02	1.46E-02	9.55E-03	1.43E-03	1.34E-04	1.02E-06	9.76E-07	6.98E-07	4.59E-07	2.42E-10	0.
U238	3.22E+01	1.57E-03	1.57E-03	1.57E-03	1.57E-03	1.57E-03	1.57E-03	1.57E-03	1.57E-03	1.57E-03	1.57E-03	1.57E-03
U239	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
U240	0.	3.18E-17	4.45E-15	8.40E-14	4.38E-13	8.80E-13	4.41E-12	8.83E-12	4.40E-11	8.75E-11	7.99E-10	3.66E-09
NP236	0.	3.22E+60	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NP237	0.	3.28E-01	3.28E-01	3.28E-01	3.31E-01	3.35E-01	3.55E-01	3.67E-01	3.76E-01	3.76E-01	3.65E-01	2.73E-01
NP238	0.	5.99E-21	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NP239	0.	1.72E+01	1.72E+01	1.72E+01	1.71E+01	1.70E+01	1.64E+01	1.57E+01	1.09E+01	6.94E+00	1.99E-03	3.36E-08
NP240M	0.	6.36E-15	4.45E-15	8.40E-14	4.38E-13	8.80E-13	4.41E-12	8.83E-12	4.40E-11	8.75E-11	7.99E-10	3.66E-09
NP240	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PU236	0.	1.74E-03	1.54E-03	1.72E-04	1.03E-08	5.36E-14	0.	0.	0.	0.	0.	0.
PU238	0.	1.15E+01	4.70E+01	7.23E+01	5.30E+01	3.59E+01	1.59E+00	3.25E-02	1.14E-12	1.42E-22	0.	0.
PU239	0.	1.66E+00	1.66E+00	1.66E+00	1.68E+00	1.70E+00	1.87E+00	2.07E+00	3.26E+00	3.98E+00	5.54E-01	3.36E-08
PU240	0.	2.44E+00	2.53E+00	4.02E+00	6.84E+00	7.47E+00	7.28E+00	6.92E+00	4.59E+00	2.75E+00	2.70E-04	3.66E-09
PU241	0.	6.24E+02	6.09E+02	3.97E+02	5.95E+01	5.58E+00	4.24E-02	4.07E-02	2.91E-02	1.91E-02	1.01E-05	0.
PU242	0.	8.72E-03	8.72E-03	8.72E-03	8.72E-03	8.72E-03	8.72E-03	8.72E-03	8.70E-03	8.65E-03	7.36E-03	1.42E-03
PU243	0.	1.75E-10	3.51E-08	3.51E-08	3.51E-08	3.51E-08	3.51E-08	3.51E-08	3.51E-08	3.50E-08	3.49E-08	3.36E-08
PU244	0.	3.18E-17	4.46E-15	8.41E-14	4.38E-13	8.81E-13	4.42E-12	8.84E-12	4.40E-11	8.76E-11	8.00E-10	3.66E-09
PU245	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AM241	0.	2.21E+02	2.21E+02	2.25E+02	2.22E+02	2.06E+02	1.09E+02	4.90E+01	1.11E-01	1.92E-02	1.06E-05	0.
AM242M	0.	4.59E-03	4.58E-03	4.40E-03	3.66E-03	2.92E-03	4.71E-04	4.81E-05	5.74E-13	7.17E-23	0.	0.
AM242	0.	4.59E-03	4.58E-03	4.40E-03	3.66E-03	2.92E-03	4.71E-04	4.81E-05	5.74E-13	7.17E-23	0.	0.
AM243	0.	1.72E+01	1.72E+01	1.72E+01	1.71E+01	1.70E+01	1.64E+01	1.57E+01	1.09E+01	6.94E+00	1.99E-03	3.36E-08
AM244	0.	8.27E-18	5.79E-18	1.09E-16	5.70E-16	1.14E-15	5.74E-15	1.15E-14	5.72E-14	1.14E-13	1.04E-12	4.76E-12
AM245	0.	2.11E-25	6.52E-43	0.	0.	0.	0.	0.	0.	0.	0.	0.
CM242	0.	1.32E+04	6.06E+03	8.75E-03	3.00E-03	2.39E-03	3.86E-04	3.95E-05	4.72E-13	5.89E-23	0.	0.
CM243	0.	4.06E+00	4.02E+00	3.31E+00	1.39E+00	4.70E-01	8.12E-05	1.60E-09	0.	0.	0.	0.
CM244	0.	1.95E+03	1.91E+03	1.35E+03	2.93E+02	4.31E+01	9.58E-06	5.77E-14	5.72E-14	1.14E-13	1.04E-12	4.76E-12
CM245	0.	4.42E+02	4.42E+02	4.41E+02	4.40E+02	4.38E+02	4.24E+02	4.06E+02	2.90E+02	1.91E+02	1.01E+05	0.
CM246	0.	9.16E-03	9.16E-03	9.15E-03	9.10E-03	9.03E-03	8.51E-03	7.91E-03	4.39E-03	2.10E-03	3.73E-09	0.
CM247	0.	3.51E-08	3.51E-08	3.51E-08	3.51E-08	3.51E-08	3.51E-08	3.51E-08	3.51E-08	3.50E-08	3.49E-08	3.36E-08
CM248	0.	1.15E-07	1.15E-07	1.15E-07	1.15E-07	1.15E-07	1.15E-07	1.15E-07	1.14E-07	1.13E-07	9.47E-08	1.61E-08
CM249	0.	1.87E-40	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CM250	0.	1.88E-14	1.88E-14	1.88E-14	1.85E-14	1.81E-14	1.54E-14	1.27E-14	2.57E-15	3.51E-16	9.40E-32	0.
BK249	0.	1.37E-20	4.23E-38	0.	0.	0.	0.	0.	0.	0.	0.	0.
BK250	0.	1.88E-14	1.88E-14	1.88E-14	1.85E-14	1.81E-14	1.54E-14	1.27E-14	2.57E-15	3.51E-16	9.40E-32	0.
CF249	0.	1.16E-04	1.05E-04	1.78E-05	6.76E-09	3.58E-13	0.	0.	0.	0.	0.	0.
CF250	0.	1.18E-05	9.04E-06	7.67E-08	1.85E-14	1.81E-14	1.54E-14	1.27E-14	2.57E-15	3.51E-16	9.40E-32	0.
CF251	0.	1.10E-08	1.10E-08	1.09E-08	1.06E-08	1.02E-08	7.47E-09	5.08E-09	2.33E-10	4.96E-12	0.	0.
CF252	0.	1.95E-06	1.71E-06	1.62E-07	4.55E-12	9.32E-18	0.	0.	0.	0.	0.	0.
CF253	0.	4.09E-38	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CF254	0.	-3.93E-19	-3.21E-28	0.	0.	0.	0.	0.	0.	0.	0.	0.
ES253	0.	-4.64E-32	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	2.35E+00	1.60E+04	8.89E+03	2.09E+03	6.72E+02	3.36E+02	1.53E+02	9.02E+01	3.07E+01	2.16E+01	2.66E+00	3.21E+00

TABLE A-IV-2
(continued)

PWR • BU = 33,000 WASTE DECAY TIMES CASE E-1 FP's

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	Y******* Y
H 3	0.	5.69E+01	5.53E+01	3.33E+01	3.50E+00	2.09E-01	3.38E-11	1.95E-23	0.	0.	0.	0.
ZN 72	0.	1.03E-27	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 72	0.	1.48E-27	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 72	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 73	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 73	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 74	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 74	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 75	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 75M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 75	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 75	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 76	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 76	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 76	0.	1.80E-49	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 76	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 77M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 77	0.	1.34-114	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 77	0.	2.46E-31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 77M	0.	7.37E-34	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 77	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 78	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 78M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 78	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 78	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 79	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 79M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 79	0.	3.95E-01	3.95E-01	3.95E-01	3.95E-01	3.95E-01	3.93E-01	3.91E-01	3.75E-01	3.55E-01	1.36E-01	9.23E-06
BR 79	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 80	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 80	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 80M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 80	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 80	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 81M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 81M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 82	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 82M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 82	0.	1.18E-37	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 82	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 83M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 83	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 83	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 83M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 83	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 84	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 84M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 84	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-1 FP's

TABLE A-IV-2
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
KR 84	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BE 85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 85M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 86	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 86	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 86M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 86	0.	7.51E-01	8.62E-04	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 86	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 87	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 87	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 87	0.	1.93E-05	1.93E-05	1.93E-05	1.93E-05	1.93E-05	1.93E-05	1.93E-05	1.93E-05	1.93E-05	1.93E-05	1.93E-05
SR 87M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 87	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 88	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 88	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 88	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 88	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 89	0.	7.97E+04	6.99E+03	6.50E-16	0.	0.	0.	0.	0.	0.	0.	0.
Y 89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 90	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 90	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 90	0.	7.59E+04	7.49E+04	6.00E+04	2.24E+04	6.52E+03	3.38E-01	1.48E-06	0.	0.	0.	0.
Y 90M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 90	0.	7.59E+04	7.49E+04	6.00E+04	2.24E+04	6.52E+03	3.38E-01	1.48E-06	0.	0.	0.	0.
ZR 90	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 91M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 91	0.	1.39E+05	1.62E+04	2.39E-13	0.	0.	0.	0.	0.	0.	0.	0.
ZR 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 93	0.	1.87E+00	1.87E+00	1.87E+00	1.87E+00	1.87E+00	1.87E+00	1.86E+00	1.86E+00	1.86E+00	1.78E+00	1.18E+00
NB 93M	0.	1.57E-01	2.00E-01	8.13E-01	1.73E+00	1.86E+00	1.87E+00	1.86E+00	1.86E+00	1.86E+00	1.78E+00	1.18E+00
NB 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 WASTE DECAY TIMES CASE E=1 FP's

TABLE A-IV-2
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2=SEC

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	Y******* Y
Y 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 95	0.	2.50E+05	3.57E+04	2.12E-11	0.	0.	0.	0.	0.	0.	0.	0.
NB 95M	0.	5.31E+03	7.57E+02	4.50E-13	0.	0.	0.	0.	0.	0.	0.	0.
NB 95	0.	4.86E+05	7.58E+04	4.60E-11	0.	0.	0.	0.	0.	0.	0.	0.
MO 95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 96	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 96	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 96	0.	7.18E-55	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 96	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 97	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 97	0.	3.41E-72	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 97M	0.	3.28E-72	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 97	0.	3.68E-72	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 97	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 98	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 98M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 98	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 98	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 99	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 99	0.	3.76E-14	7.59E-34	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC 99M	0.	3.59E-14	7.26E-34	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC 99	0.	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.41E+01	1.38E+01	1.03E+01	5.44E-01
RU 99	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB100	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO100	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC100	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU100	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO102	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC102M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC102	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU102	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO103	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC103	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU103	0.	6.42E+04	2.62E+03	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH103M	0.	6.43E+04	2.63E+03	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH103	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO104	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC104	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU104	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH104M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH104	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD104	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO105	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC105	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 WASTE DECAY TIMES CASE E=1 FP's

TABLE A-IV-2
(continued)

POWER= 38.40MW, BURNUP= 33000,MWD, FLUX= 3.98E+13N/CM**2=SEC

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1, Y	10, Y	50, Y	100, Y	500, Y	1000, Y	5000, Y	10000, Y	100000, Y	******* Y
RU105	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH105M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH105	0.	1.82E-31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD105	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC106	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU106	0.	4.56E+05	3.23E+05	6.50E+02	6.73E-10	7.03E-25	0.	0.	0.	0.	0.	0.
RH106M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH106	0.	4.56E+05	3.23E+05	6.50E+02	6.73E-10	7.03E-25	0.	0.	0.	0.	0.	0.
PD106	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU107	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH107	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD107M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD107	0.	1.16E-01	1.16E-01	1.16E-01	1.16E-01	1.16E-01	1.16E-01	1.16E-01	1.16E-01	1.16E-01	1.14E-01	1.05E-01
AG107	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU108	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH108	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD108	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG108	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD108	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH109	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD109M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD109	0.	4.93E-93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG109M	0.	3.48E-06	2.63E-06	1.72E-08	3.36E-18	2.45E-30	0.	0.	0.	0.	0.	0.
AG109	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD109	0.	3.48E-06	2.63E-06	1.72E-08	3.36E-18	2.45E-30	0.	0.	0.	0.	0.	0.
RH110	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD110	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG110M	0.	2.74E+03	1.66E+03	2.04E-01	8.40E-19	0.	0.	0.	0.	0.	0.	0.
AG110	0.	3.57E+02	2.16E+02	2.65E-02	1.09E-19	0.	0.	0.	0.	0.	0.	0.
CD110	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD111M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD111	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG111M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG111	0.	2.40E-03	1.12E-10	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD111M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD111	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD112	0.	3.29E-59	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG112	0.	3.88E-59	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD112	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD113	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG113M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG113	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD113M	0.	1.15E+01	1.12E+01	7.17E+00	9.90E-01	8.33E-02	2.08E-10	3.69E-21	0.	0.	0.	0.
CD113	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN113	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD114	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG114	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD114	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN114M	0.	1.36E-01	1.08E-02	1.74E-22	0.	0.	0.	0.	0.	0.	0.	0.
IN114	0.	1.31E-01	1.04E-02	1.68E-22	0.	0.	0.	0.	0.	0.	0.	0.
SN114	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD115	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR • BU • 33,000 WASTE DECAY TIMES CASE E-1 FP's

TABLE A-IV-2
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	Y******* Y
AG115M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG115	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD115M	0.	3.76E+01	1.98E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD115	0.	2.06E-21	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN115M	0.	2.24E-21	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN115	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN115	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG116	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD116	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN116M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN116	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN116	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG117	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD117M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD117	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN117M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN117	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN117M	0.	9.69E-03	1.15E-06	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN117	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD118	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN118M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN118	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN118	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD119M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN119M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN119M	0.	1.21E+01	7.27E+00	8.00E-04	2.04E-21	0.	0.	0.	0.	0.	0.	0.
SN119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD120	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN120M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN120	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN120	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN121M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN121M	0.	6.04E-04	6.01E-04	5.54E-04	3.84E-04	2.44E-04	6.34E-06	6.63E-08	9.43E-28	1.47E-43	0.	0.
SN121	0.	1.30E-45	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN122	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN122	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB122M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB122	0.	3.22E-17	7.44E-37	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE122	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN123M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN123	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN123M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN123	0.	4.10E+03	1.49E+03	1.80E-05	0.	0.	0.	0.	0.	0.	0.	0.
SB123	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE123M	0.	2.87E+01	9.72E-02	3.38E-10	0.	0.	0.	0.	0.	0.	0.	0.
TE123	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN124	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 WASTE DECAY TIMES CASE E-1 FP's

TABLE A-IV-2
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	********* Y
SN124	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB124M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB124	0.	5.18E+01	6.28E+00	2.01E-16	0.	0.	0.	0.	0.	0.	0.	0.
TE124	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN125M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN125	0.	2.39E-02	3.38E-08	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB125	0.	8.47E+03	7.45E+03	7.39E+02	2.56E-02	6.81E-08	0.	0.	0.	0.	0.	0.
TE125M	0.	3.43E+03	3.08E+03	3.06E+02	1.06E-02	2.82E-08	0.	0.	0.	0.	0.	0.
TE125	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN126	0.	5.64E+01	5.64E+01	5.64E+01	5.64E+01	5.64E+01	5.62E+01	5.60E+01	5.45E+01	5.26E+01	2.82E+01	5.51E-04
SB126M	0.	5.64E+01	5.64E+01	5.64E+01	5.64E+01	5.64E+01	5.62E+01	5.60E+01	5.45E+01	5.26E+01	2.82E+01	5.51E-04
SB126	0.	5.62E+01	5.59E+01	5.59E+01	5.58E+01	5.58E+01	5.57E+01	5.55E+01	5.40E+01	5.21E+01	2.79E+01	5.45E-04
TE126	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN127M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN127	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB127	0.	6.06E+10	3.93E-24	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE127M	0.	6.39E+03	2.00E+03	1.67E-06	0.	0.	0.	0.	0.	0.	0.	0.
TE127	0.	6.32E+03	1.98E+03	1.65E-06	0.	0.	0.	0.	0.	0.	0.	0.
I127	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB128M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN129M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN129	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB129	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE129M	0.	1.79E+03	4.33E+01	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE129	0.	1.15E+03	2.77E+01	0.	0.	0.	0.	0.	0.	0.	0.	0.
I129	0.	3.77E-05	4.73E-05	4.75E-05	4.75E-05	4.75E-05	4.75E-05	4.75E-05	4.75E-05	4.75E-05	4.74E-05	4.56E-05
XE129M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE129	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN130	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB130M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB130	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE130	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I130M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I130	0.	1.34-105	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE130	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN131	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB131	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE131M	0.	1.54E-39	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE131	0.	2.82E-40	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I131	0.	1.67E-04	2.47E-11	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE131M	0.	0.	6.24E-11	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE131	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN132	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB132M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB132	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE132	0.	1.77E-11	2.14E-28	0.	0.	0.	0.	0.	0.	0.	0.	0.
I132	0.	1.82E-14	2.21E-28	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR * BU * 33,000 WASTE DECAY TIMES CASE E=1 FP's

TABLE A-IV-2
(continued)

POWER= 38.40MW, BURNUP= 33000,MWD, FLUX= 3.98E+13N/CM**2=SEC

NUCLIDE RADIOACTIVITY, CURIES
BASIS * MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1, Y	10, Y	50, Y	100, Y	500, Y	1000, Y	5000, Y	10000, Y	100000, Y	Y******* Y
XE132	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB133	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE133M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE133	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I133	0.	2.62E+60	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE133	0.	0.	1.96E+71	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS133	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB134	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE134	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I134	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE134	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS134M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS134	0.	2.28E+05	1.92E+05	9.18E+03	1.23E-02	5.56E-10	0.	0.	0.	0.	0.	0.
BA134	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE135	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I135	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE135	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS135M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS135	0.	2.23E-01	2.23E-01	2.23E-01	2.23E-01	2.23E-01	2.23E-01	2.23E-01	2.23E-01	2.23E-01	2.18E-01	1.77E-01
BA135M	0.	3.26E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA135	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I136	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE136	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS136	0.	3.98E+00	2.35E-04	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA136	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I137	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE137	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS137	0.	1.08E+05	1.06E+05	8.64E+04	3.43E+04	1.08E+04	1.04E+00	1.00E-05	0.	0.	0.	0.
BA137M	0.	1.01E+05	9.94E+04	8.08E+04	3.20E+04	1.01E+04	9.77E-01	9.38E-06	0.	0.	0.	0.
BA137	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I138	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE138	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS138	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA138	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I139	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE139	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS139	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA139	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA139	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE140	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS140	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA140	0.	9.38E+01	4.75E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA140	0.	1.08E+02	5.47E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE140	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE141	0.	3.58E+04	7.19E+02	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 WASTE DECAY TIMES CASE E-1 FP's

TABLE A-IV-2
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******** Y
XE142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR142	0.	1.19E-64	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE143	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS143	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA143	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA143	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE143	0.	1.45E-34	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR143	0.	1.60E+02	1.59E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND143	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA144	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE144	0.	8.57E+05	5.49E+05	1.80E+02	5.85E-14	2.56E-33	0.	0.	0.	0.	0.	0.
PR144	0.	8.57E+05	5.49E+05	1.80E+02	5.85E-14	2.56E-33	0.	0.	0.	0.	0.	0.
ND144	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE145	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR145	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND145	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE146	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR146	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND146	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE147	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR147	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND147	0.	8.37E+00	9.33E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM147	0.	9.72E+04	8.52E+04	7.87E+03	1.99E-01	3.58E-07	0.	0.	0.	0.	0.	0.
SM147	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM148M	0.	1.88E+03	9.23E+01	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM148	0.	1.51E+02	7.41E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR149	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND149	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM149	0.	1.12E-19	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM149	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND150	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM150	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM150	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND151	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM151	0.	1.51E-42	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM151	0.	1.26E+03	1.25E+03	1.16E+03	8.46E+02	5.68E+02	2.35E+01	4.37E-01	6.26E-15	3.12E-32	0.	0.
EU151	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM152	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM152	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU152M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU152	0.	8.78E+00	8.53E+00	5.07E+00	5.03E-01	2.80E-02	2.58E-12	7.38E-25	0.	0.	0.	0.
GD152	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM153	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR • BU = 33,000 WASTE DECAY TIMES CASE E-1 FP's

TABLE A-IV-2
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
SM153	0.	5.10E-23	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU153	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD153	0.	2.00E+01	1.19E+01	9.65E-04	6.45E-22	0.	0.	0.	0.	0.	0.	0.
PM154	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM154	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU154	0.	7.81E+03	7.64E+03	5.18E+03	9.15E+02	1.05E+02	3.12E-06	1.22E-15	0.	0.	0.	0.
GD154	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM155	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU155	0.	7.29E+03	6.02E+03	1.92E+02	4.26E-05	2.06E-13	0.	0.	0.	0.	0.	0.
GD155	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM156	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU156	0.	7.75E+01	1.68E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD156	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM157	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU157	0.	2.15E-83	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD157	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU158	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD158	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU159	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD159	0.	2.18E-70	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB159	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU160	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD160	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB160	0.	2.95E+02	5.10E+01	9.59E-13	0.	0.	0.	0.	0.	0.	0.	0.
DY160	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD161	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB161	0.	8.88E-06	9.56E-14	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY161	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD162	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB162M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB162	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY162	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB163M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB163	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY163	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB164	0.	2.26E-56	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY164	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY165M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY165	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
HO165	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY166	0.	8.98E-16	5.79E-32	0.	0.	0.	0.	0.	0.	0.	0.	0.
HO166M	0.	8.57E-04	8.57E-04	8.53E-04	8.33E-04	8.09E-04	6.42E-04	4.81E-04	4.77E-05	2.66E-06	0.	0.
HO166	0.	1.34E-15	8.65E-32	0.	0.	0.	0.	0.	0.	0.	0.	0.
ER166	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ER167	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	0.	4.49E+06	2.55E+06	3.14E+05	1.13E+05	3.46E+04	4.66E+01	2.08E+01	2.01E+01	1.98E+01	1.52E+01	3.18E+00

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-1

POWER=, 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2*SEC

Clad

TABLE A-IV-2
(continued)

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY META. CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
H 1	1.62E+04	1.29E+03	1.29E+03	1.29E+03	1.29E+03	1.29E+03	1.29E+03	1.29E+03	1.29E+03	1.29E+03	1.29E+03	1.29E+03
H 2	0.	2.11E+00	2.11E+00	2.11E+00	2.11E+00	2.11E+00	2.11E+00	2.11E+00	2.11E+00	2.11E+00	2.11E+00	2.11E+00
H 3	0.	1.50E-06	1.46E-06	8.81E-07	9.24E-08	5.52E-09	3.94E-19	5.17E-31	0.	0.	0.	0.
H 4	0.	5.73E-26	5.73E-26	5.73E-26	5.73E-26	5.73E-26	5.73E-26	5.73E-26	5.73E-26	5.73E-26	5.73E-26	5.73E-26
HE 3	0.	7.16E-07	7.58E-07	1.34E-06	2.13E-06	2.22E-06	2.22E-06	2.22E-06	2.22E-06	2.22E-06	2.22E-06	2.22E-06
HE 4	0.	2.33E+00	2.33E+00	2.33E+00	2.33E+00	2.33E+00	2.33E+00	2.33E+00	2.33E+00	2.33E+00	2.33E+00	2.33E+00
HE 6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LI 6	0.	9.17E-10	9.17E-10	9.17E-10	9.17E-10	9.17E-10	9.17E-10	9.17E-10	9.17E-10	9.17E-10	9.17E-10	9.17E-10
LI 7	0.	4.81E-12	4.81E-12	4.81E-12	4.81E-12	4.81E-12	4.81E-12	4.81E-12	4.81E-12	4.81E-12	4.81E-12	4.81E-12
LI 8	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BE 8	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BE 9	0.	6.79E-06	6.79E-06	6.79E-06	6.79E-06	6.79E-06	6.79E-06	6.79E-06	6.79E-06	6.79E-06	6.79E-06	6.79E-06
BE 10	0.	4.47E-05	4.47E-05	4.47E-05	4.47E-05	4.47E-05	4.47E-05	4.47E-05	4.47E-05	4.46E-05	4.35E-05	3.39E-05
BE 11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
B 10	0.	8.42E-12	1.46E-11	1.26E-10	6.22E-10	1.24E-09	6.20E-09	1.24E-08	6.20E-08	1.24E-07	1.22E-06	1.08E-05
B 11	0.	1.52E-11	1.52E-11	1.52E-11	1.52E-11	1.52E-11	1.52E-11	1.52E-11	1.52E-11	1.52E-11	1.52E-11	1.52E-11
B 12	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
C 12	3.41E+00	3.41E+00	3.41E+00	3.41E+00	3.41E+00	3.41E+00	3.41E+00	3.41E+00	3.41E+00	3.41E+00	3.41E+00	3.41E+00
C 13	3.90E-02	7.53E+00	7.53E+00	7.53E+00	7.53E+00	7.53E+00	7.53E+00	7.53E+00	7.53E+00	7.53E+00	7.53E+00	7.53E+00
C 14	0.	3.41E-03	3.41E-03	3.41E-03	3.39E-03	3.37E-03	3.21E-03	3.02E-03	1.86E-03	1.02E-03	1.90E-08	0.
N 13	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
N 14	0.	5.07E-07	7.14E-07	4.43E-06	2.09E-05	4.14E-05	2.01E-04	3.89E-04	1.55E-03	2.40E-03	3.41E-03	3.41E-03
N 15	0.	1.25E-11	1.25E-11	1.25E-11	1.25E-11	1.25E-11	1.25E-11	1.25E-11	1.25E-11	1.25E-11	1.25E-11	1.25E-11
N 16	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
O 16	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05
O 17	0.	1.79E+01	1.79E+01	1.79E+01	1.79E+01	1.79E+01	1.79E+01	1.79E+01	1.79E+01	1.79E+01	1.79E+01	1.79E+01
O 18	0.	2.87E-12	2.87E-12	2.87E-12	2.87E-12	2.87E-12	2.87E-12	2.87E-12	2.87E-12	2.87E-12	2.87E-12	2.87E-12
O 19	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
F 19	0.	2.98E-19	2.98E-19	2.98E-19	2.98E-19	2.98E-19	2.98E-19	2.98E-19	2.98E-19	2.98E-19	2.98E-19	2.98E-19
F 20	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE 20	0.	7.86E-16	7.86E-16	7.86E-16	7.86E-16	7.86E-16	7.86E-16	7.86E-16	7.86E-16	7.86E-16	7.86E-16	7.86E-16
NE 21	0.	4.11E-10	4.11E-10	4.11E-10	4.11E-10	4.11E-10	4.11E-10	4.11E-10	4.11E-10	4.11E-10	4.11E-10	4.11E-10
NE 22	0.	1.03E-08	1.03E-08	1.03E-08	1.03E-08	1.03E-08	1.03E-08	1.03E-08	1.03E-08	1.03E-08	1.03E-08	1.03E-08
NE 23	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NA 22	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NA 23	0.	8.34E-10	8.34E-10	8.34E-10	8.34E-10	8.34E-10	8.34E-10	8.34E-10	8.34E-10	8.34E-10	8.34E-10	8.34E-10
NA 24	0.	1.07E-95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NA 25	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MG 24	0.	1.07E-04	1.07E-04	1.07E-04	1.07E-04	1.07E-04	1.07E-04	1.07E-04	1.07E-04	1.07E-04	1.07E-04	1.07E-04
MG 25	0.	2.33E-04	2.33E-04	2.33E-04	2.33E-04	2.33E-04	2.33E-04	2.33E-04	2.33E-04	2.33E-04	2.33E-04	2.33E-04
MG 26	0.	1.06E-04	1.06E-04	1.06E-04	1.06E-04	1.06E-04	1.06E-04	1.06E-04	1.06E-04	1.06E-04	1.06E-04	1.06E-04
MG 27	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AL 27	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01
AL 28	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AL 29	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SI 28	5.98E+01	5.98E+01	5.98E+01	5.98E+01	5.98E+01	5.98E+01	5.98E+01	5.98E+01	5.98E+01	5.98E+01	5.98E+01	5.98E+01
SI 29	3.13E+00	3.14E+00	3.14E+00	3.14E+00	3.14E+00	3.14E+00	3.14E+00	3.14E+00	3.14E+00	3.14E+00	3.14E+00	3.14E+00
SI 30	2.16E+00	2.16E+00	2.16E+00	2.16E+00	2.16E+00	2.16E+00	2.16E+00	2.16E+00	2.16E+00	2.16E+00	2.16E+00	2.16E+00
SI 31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
P 31	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00
P 32	0.	5.33E-09	7.62E-13	0.	0.	0.	0.	0.	0.	0.	0.	0.
P 33	0.	7.42E-07	4.94E-09	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 WASTE DECAY TIMES CASE E-1 Clad

TABLE A-IV-2
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******** Y
P 34	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S 32	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00
S 33	9.90E-03	6.74E-03	6.74E-03	6.74E-03	6.74E-03	6.74E-03	6.74E-03	6.74E-03	6.74E-03	6.74E-03	6.74E-03	6.74E-03
S 34	6.80E-02	6.80E-02	6.80E-02	6.80E-02	6.80E-02	6.80E-02	6.80E-02	6.80E-02	6.80E-02	6.80E-02	6.80E-02	6.80E-02
S 35	0.	1.44E+06	3.42E-07	1.94E-18	0.	0.	0.	0.	0.	0.	0.	0.
S 36	0.	5.67E-14	8.09E-14	5.17E-13	2.45E-12	4.87E-12	4.42E-11	4.84E-11	2.41E-10	4.79E-10	4.34E-09	1.93E-08
S 37	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CL 35	0.	3.46E-05	3.57E-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
CL 36	0.	1.14E-06	1.14E-06	1.14E-06	1.14E-06	1.14E-06	1.14E-06	1.14E-06	1.13E-06	1.11E-06	9.11E-07	1.22E-07
CL 37	0.	7.11E-08	7.11E-08	7.11E-08	7.11E-08	7.11E-08	7.11E-08	7.11E-08	7.11E-08	7.11E-08	7.11E-08	7.11E-08
CL 38	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AR 36	0.	2.92E-12	4.17E-12	2.67E-11	1.27E-10	2.52E-10	1.25E-09	2.50E-09	1.24E-08	2.47E-08	2.24E-07	9.98E-07
AR 37	0.	2.99E-17	8.03E-19	0.	0.	0.	0.	0.	0.	0.	0.	0.
AR 38	0.	1.44E-11	1.44E-11	1.44E-11	1.44E-11	1.44E-11	1.44E-11	1.44E-11	1.44E-11	1.44E-11	1.44E-11	1.44E-11
AR 39	0.	3.28E-15	3.28E-15	3.20E-15	2.89E-15	2.54E-15	1.06E-16	2.50E-16	8.32E-21	2.11E-26	0.	0.
AR 40	0.	3.61E-10	3.61E-10	3.61E-10	3.61E-10	3.61E-10	3.61E-10	3.61E-10	3.61E-10	3.61E-10	3.61E-10	3.61E-10
AR 41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
K 39	0.	7.12E-18	1.13E-17	8.65E-17	4.00E-16	7.49E-16	3.38E-15	3.04E-15	3.29E-15	3.29E-15	3.29E-15	3.29E-15
K 40	0.	1.77E-21	1.77E-21	1.77E-21	1.77E-21	1.77E-21	1.77E-21	1.77E-21	1.77E-21	1.77E-21	1.77E-21	1.77E-21
K 41	0.	1.20E-11	1.20E-11	1.20E-11	1.20E-11	1.20E-11	1.20E-11	1.20E-11	1.20E-11	1.20E-11	1.20E-11	1.20E-11
K 42	0.	1.08-122	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
K 43	0.	5.91E-72	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
K 44	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 40	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 42	0.	1.60E-13	1.60E-13	1.60E-13	1.60E-13	1.60E-13	1.60E-13	1.60E-13	1.60E-13	1.60E-13	1.60E-13	1.60E-13
CA 43	0.	1.56E-05	1.56E-05	1.56E-05	1.56E-05	1.56E-05	1.56E-05	1.56E-05	1.56E-05	1.56E-05	1.56E-05	1.56E-05
CA 44	0.	1.24E-04	1.24E-04	1.24E-04	1.24E-04	1.24E-04	1.24E-04	1.24E-04	1.24E-04	1.24E-04	1.24E-04	1.24E-04
CA 45	0.	3.35E-07	1.56E-07	1.56E-13	0.	0.	0.	0.	0.	0.	0.	0.
CA 46	0.	1.55E-05	1.55E-05	1.55E-05	1.55E-05	1.55E-05	1.55E-05	1.55E-05	1.55E-05	1.55E-05	1.55E-05	1.55E-05
CA 47	0.	1.03E-22	7.53E-35	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 48	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 49	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SC 45	0.	2.13E-06	2.31E-06	2.46E-06	2.46E-06	2.46E-06	2.46E-06	2.46E-06	2.46E-06	2.46E-06	2.46E-06	2.46E-06
SC 46	0.	1.12E-05	2.48E-06	3.97E-18	0.	0.	0.	0.	0.	0.	0.	0.
SC 47	0.	6.29E-22	2.35E-34	0.	0.	0.	0.	0.	0.	0.	0.	0.
SC 48	0.	1.48E-37	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SC 49	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SC 50	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TI 46	4.28E+00	4.27E+00	4.27E+00	4.27E+00	4.27E+00	4.27E+00	4.27E+00	4.27E+00	4.27E+00	4.27E+00	4.27E+00	4.27E+00
TI 47	4.09E+00	4.08E+00	4.08E+00	4.08E+00	4.08E+00	4.08E+00	4.08E+00	4.08E+00	4.08E+00	4.08E+00	4.08E+00	4.08E+00
TI 48	4.12E+01	4.06E+01	4.06E+01	4.06E+01	4.06E+01	4.06E+01	4.06E+01	4.06E+01	4.06E+01	4.06E+01	4.06E+01	4.06E+01
TI 49	3.14E+00	3.78E+00	3.78E+00	3.78E+00	3.78E+00	3.78E+00	3.78E+00	3.78E+00	3.78E+00	3.78E+00	3.78E+00	3.78E+00
TI 50	3.10E+00	3.12E+00	3.12E+00	3.12E+00	3.12E+00	3.12E+00	3.12E+00	3.12E+00	3.12E+00	3.12E+00	3.12E+00	3.12E+00
TI 51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 49	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 50	0.	1.14E-02	1.14E-02	1.14E-02	1.14E-02	1.14E-02	1.14E-02	1.14E-02	1.14E-02	1.14E-02	1.14E-02	1.14E-02
V 51	0.	2.80E+00	2.81E+00	2.81E+00	2.81E+00	2.81E+00	2.81E+00	2.81E+00	2.81E+00	2.81E+00	2.81E+00	2.81E+00
V 52	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 53	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 54	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 WASTE DECAY TIMES CASE E-1 Clad

TABLE A-IV-2
(continued)

POWER= 38.40MW, BURNUP= 33000,MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY META. CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	1******* Y
CR 51	0.	1.55E+03	1.63E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR 52	1.68E+03	1.68E+03	1.68E+03	1.68E+03	1.68E+03	1.68E+03	1.68E+03	1.68E+03	1.68E+03	1.68E+03	1.68E+03	1.68E+03
CR 53	1.94E+02	1.90E+02	1.90E+02	1.90E+02	1.90E+02	1.90E+02	1.90E+02	1.90E+02	1.90E+02	1.90E+02	1.90E+02	1.90E+02
CR 54	8.91E+01	5.60E+01	5.60E+01	5.61E+01	5.61E+01	5.61E+01	5.61E+01	5.61E+01	5.61E+01	5.61E+01	5.61E+01	5.61E+01
CR 55	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MN 54	0.	2.60E+02	1.71E-02	9.29E-06	2.83E-20	2.03E-38	0.	0.	0.	0.	0.	0.
MN 55	1.08E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02
MN 56	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MN 57	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MN 58	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE 54	2.22E+02	2.21E+02	2.21E+02	2.21E+02	2.21E+02	2.21E+02	2.21E+02	2.21E+02	2.21E+02	2.21E+02	2.21E+02	2.21E+02
FE 55	0.	8.52E-01	7.46E-02	6.77E-02	1.58E-06	2.57E-12	0.	0.	0.	0.	0.	0.
FE 56	3.65E+03	3.63E+03	3.63E+03	3.63E+03	3.63E+03	3.63E+03	3.63E+03	3.63E+03	3.63E+03	3.63E+03	3.63E+03	3.63E+03
FE 57	8.66E+01	1.04E+02	1.04E+02	1.04E+02	1.04E+02	1.04E+02	1.04E+02	1.04E+02	1.04E+02	1.04E+02	1.04E+02	1.04E+02
FE 58	1.28E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01
FE 59	0.	2.57E-04	1.54E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO 58M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO 58	0.	2.25E-02	3.81E-03	5.02E-17	0.	0.	0.	0.	0.	0.	0.	0.
CO 59	7.09E+01	6.17E+01	6.17E+01	6.17E+01	6.18E+01	6.18E+01	6.18E+01	6.19E+01	6.27E+01	6.36E+01	7.44E+01	8.36E+01
CO 60M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO 60	0.	7.79E+00	7.29E+00	2.23E+00	1.14E-02	1.57E-05	0.	0.	0.	0.	0.	0.
CO 61	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO 62	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NI 58	2.49E+03	2.47E+03	2.47E+03	2.47E+03	2.47E+03	2.47E+03	2.47E+03	2.47E+03	2.47E+03	2.47E+03	2.47E+03	2.47E+03
NI 59	0.	2.19E+01	2.19E+01	2.19E+01	2.19E+01	2.19E+01	2.18E+01	2.17E+01	2.09E+01	2.01E+01	9.19E+00	3.77E-03
NI 60	9.86E+02	9.82E+02	9.83E+02	9.88E+02	9.90E+02	9.90E+02	9.90E+02	9.90E+02	9.90E+02	9.90E+02	9.90E+02	9.90E+02
NI 61	4.22E+01	4.72E+01	4.72E+01	4.72E+01	4.72E+01	4.72E+01	4.72E+01	4.72E+01	4.72E+01	4.72E+01	4.72E+01	4.72E+01
NI 62	1.40E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02
NI 63	0.	4.11E+00	4.09E+00	3.82E+00	2.83E+00	1.94E+00	9.53E-02	2.20E-03	1.78E-16	7.76E-33	0.	0.
NI 64	3.62E+01	3.62E+01	3.62E+01	3.62E+01	3.62E+01	3.62E+01	3.62E+01	3.62E+01	3.62E+01	3.62E+01	3.62E+01	3.62E+01
NI 65	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CU 62	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CU 63	1.27E+01	1.26E+01	1.26E+01	1.29E+01	1.39E+01	1.48E+01	1.66E+01	1.67E+01	1.67E+01	1.67E+01	1.67E+01	1.67E+01
CU 64	0.	1.10-107	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CU 65	5.92E+00	5.98E+00	5.98E+00	5.98E+00	5.98E+00	5.98E+00	5.98E+00	5.98E+00	5.98E+00	5.98E+00	5.98E+00	5.98E+00
CU 66	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 63	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 64	0.	6.73E-02	6.73E-02	6.73E-02	6.73E-02	6.73E-02	6.73E-02	6.73E-02	6.73E-02	6.73E-02	6.73E-02	6.73E-02
ZN 65	0.	1.98E-05	1.18E-05	1.08E-09	1.20E-27	0.	0.	0.	0.	0.	0.	0.
ZN 66	0.	4.28E-02	4.28E-02	4.28E-02	4.28E-02	4.28E-02	4.28E-02	4.28E-02	4.28E-02	4.28E-02	4.28E-02	4.28E-02
ZN 67	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 68	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 69M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 69	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 70	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 71M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 71	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 69	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 70	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 71	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 70	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE AA	0.	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.19E-01	1.19E-01	1.19E-01

PWR • BU = 33,000 WASTE DECAY TIMES CASE E-1

POWER= 38,40MW, BURNUP= 33000,MWD, FLUX= 3,98E+13N/CM**2-SEC

Clad

TABLE A-IV-2
(continued)

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1, Y	10, Y	50, Y	100, Y	500, Y	1000, Y	5000, Y	10000, Y	100000, Y	Y******* Y
SR 89	0,	7,65E-05	6,70E-06	6,23E-25	0,	0,	0,	0,	0,	0,	0,	0,
SR 90	0,	3,81E-06	3,76E-06	3,02E-06	1,12E-06	3,27E-07	3,70E-11	7,46E-17	0,	0,	0,	0,
SR 91	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
Y 90M	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
Y 90	0,	9,91E-10	9,78E-10	7,84E-10	2,92E-10	8,51E-11	3,41E-15	1,94E-20	0,	0,	0,	0,
Y 91M	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
Y 91	0,	3,07E-04	3,57E-05	5,27E-22	0,	0,	0,	0,	0,	0,	0,	0,
ZR 90	6,14E+04	6,13E+04	6,13E+04	6,13E+04	6,13E+04	6,13E+04	6,13E+04	6,13E+04	6,13E+04	6,13E+04	6,13E+04	6,13E+04
ZR 91	1,35E+04	1,34E+04	1,34E+04	1,34E+04	1,34E+04	1,34E+04	1,34E+04	1,34E+04	1,34E+04	1,34E+04	1,34E+04	1,34E+04
ZR 92	2,09E+04	2,10E+04	2,10E+04	2,10E+04	2,10E+04	2,10E+04	2,10E+04	2,10E+04	2,10E+04	2,10E+04	2,10E+04	2,10E+04
ZR 93	0,	2,16E+01	2,16E+01	2,16E+01	2,16E+01	2,16E+01	2,16E+01	2,15E+01	2,15E+01	2,15E+01	2,06E+01	1,36E+01
ZR 94	2,18E+04	2,18E+04	2,18E+04	2,18E+04	2,18E+04	2,18E+04	2,18E+04	2,18E+04	2,18E+04	2,18E+04	2,18E+04	2,18E+04
ZR 95	0,	1,32E-01	1,89E-02	1,12E-17	0,	0,	0,	0,	0,	0,	0,	0,
ZR 96	3,57E+03	3,56E+03	3,56E+03	3,56E+03	3,56E+03	3,56E+03	3,56E+03	3,56E+03	3,56E+03	3,56E+03	3,56E+03	3,56E+03
NB 92	0,	8,19E-11	3,33E-16	0,	0,	0,	0,	0,	0,	0,	0,	0,
NB 93M	0,	1,72E-05	2,22E-05	9,39E-05	2,01E-04	2,16E-04	2,16E-04	2,15E-04	2,10E-04	2,05E-04	1,87E-04	1,23E-04
NB 93	3,23E+02	3,23E+02	3,23E+02	3,23E+02	3,23E+02	3,23E+02	3,23E+02	3,23E+02	3,23E+02	3,23E+02	3,24E+02	3,31E+02
NB 94	0,	6,97E-01	6,97E-01	6,97E-01	6,97E-01	6,97E-01	6,97E-01	6,97E-01	6,97E-01	6,96E-01	6,94E-01	6,73E-01
NB 95	0,	1,36E-01	2,11E-02	1,28E-17	0,	0,	0,	0,	0,	0,	0,	0,
NB 96	0,	3,27E-63	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
NB 97	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
MO 92	2,82E+01	2,82E+01	2,82E+01	2,82E+01	2,82E+01	2,82E+01	2,82E+01	2,82E+01	2,82E+01	2,82E+01	2,82E+01	2,82E+01
MO 93	0,	1,69E-02	1,69E-02	1,68E-02	1,68E-02	1,67E-02	1,62E-02	1,56E-02	1,15E-02	7,80E-03	7,62E-06	0,
MO 93M	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
MO 94	1,77E+01	1,77E+01	1,77E+01	1,77E+01	1,77E+01	1,77E+01	1,77E+01	1,77E+01	1,77E+01	1,77E+01	1,77E+01	1,77E+01
MO 95	3,13E+01	3,44E+01	3,46E+01	3,46E+01	3,46E+01	3,46E+01	3,46E+01	3,46E+01	3,46E+01	3,46E+01	3,46E+01	3,46E+01
MO 96	3,32E+01	3,73E+01	3,73E+01	3,73E+01	3,73E+01	3,73E+01	3,73E+01	3,73E+01	3,73E+01	3,73E+01	3,73E+01	3,73E+01
MO 97	1,91E+01	1,91E+01	1,91E+01	1,91E+01	1,91E+01	1,91E+01	1,91E+01	1,91E+01	1,91E+01	1,91E+01	1,91E+01	1,91E+01
MO 98	4,95E+01	4,92E+01	4,92E+01	4,92E+01	4,92E+01	4,92E+01	4,92E+01	4,92E+01	4,92E+01	4,92E+01	4,92E+01	4,92E+01
MO 99	0,	3,54E-23	7,15E-03	0,	0,	0,	0,	0,	0,	0,	0,	0,
MO100	1,99E+01	1,98E+01	1,98E+01	1,98E+01	1,98E+01	1,98E+01	1,98E+01	1,98E+01	1,98E+01	1,98E+01	1,98E+01	1,98E+01
MO101	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
TC 99M	0,	3,03E-24	6,12E-04	0,	0,	0,	0,	0,	0,	0,	0,	0,
TC 99	0,	3,22E-01	3,22E-01	3,22E-01	3,22E-01	3,22E-01	3,21E-01	3,21E-01	3,16E-01	3,11E-01	2,31E-01	1,19E-02
TC101	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
RU101	0,	9,75E-02	9,75E-02	9,75E-02	9,75E-02	9,75E-02	9,75E-02	9,75E-02	9,75E-02	9,75E-02	9,75E-02	9,75E-02
CD113M	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
CD113	6,18E-03	7,67E-08	7,67E-08	7,67E-08	7,67E-08	7,67E-08	7,67E-08	7,67E-08	7,67E-08	7,67E-08	7,67E-08	7,67E-08
CD115M	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
CD115	0,	4,56E-34	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
CD119M	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
CD119	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
CD121	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
IN113	6,33E-03	2,20E-03	2,20E-03	2,20E-03	2,20E-03	2,20E-03	2,20E-03	2,20E-03	2,20E-03	2,20E-03	2,20E-03	2,20E-03
IN119M	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
IN119	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
IN121M	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
IN121	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
SN114	1,16E+01	1,16E+01	1,16E+01	1,16E+01	1,16E+01	1,16E+01	1,16E+01	1,16E+01	1,16E+01	1,16E+01	1,16E+01	1,16E+01
SN115	6,21E+00	6,21E+00	6,21E+00	6,21E+00	6,21E+00	6,21E+00	6,21E+00	6,21E+00	6,21E+00	6,21E+00	6,21E+00	6,21E+00
SN116	2,59E+02	2,56E+02	2,56E+02	2,56E+02	2,56E+02	2,56E+02	2,56E+02	2,56E+02	2,56E+02	2,56E+02	2,56E+02	2,56E+02
SN117M	0,	1,13E-05	1,33E-09	0,	0,	0,	0,	0,	0,	0,	0,	0,

PWR • BU = 33,000 WASTE DECAY TIMES CASE E-1 Clad

TABLE A-IV-2
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
SN117	1.38E+02	1.39E+02	1.39E+02	1.39E+02	1.39E+02	1.39E+02	1.39E+02	1.39E+02	1.39E+02	1.39E+02	1.39E+02	1.39E+02
SN118	4.41E+02	4.44E+02	4.44E+02	4.44E+02	4.44E+02	4.44E+02	4.44E+02	4.44E+02	4.44E+02	4.44E+02	4.44E+02	4.44E+02
SN119M	0.	2.13E-03	1.28E-03	1.41E-07	3.59E-25	0.	0.	0.	0.	0.	0.	0.
SN119	1.59E+02	1.57E+02	1.57E+02	1.57E+02	1.57E+02	1.57E+02	1.57E+02	1.57E+02	1.57E+02	1.57E+02	1.57E+02	1.57E+02
SN120	6.11E+02	6.12E+02	6.12E+02	6.12E+02	6.12E+02	6.12E+02	6.12E+02	6.12E+02	6.12E+02	6.12E+02	6.12E+02	6.12E+02
SN121M	0.	4.57E-03	4.55E-03	4.19E-03	2.91E-03	1.85E-03	4.80E-05	5.02E-07	7.14E-23	1.11E-42	0.	0.
SN121	0.	1.67E-52	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN122	8.91E+01	8.90E+01	8.90E+01	8.90E+01	8.90E+01	8.90E+01	8.90E+01	8.90E+01	8.90E+01	8.90E+01	8.90E+01	8.90E+01
SN123M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN123	0.	1.31E-05	4.75E-06	5.75E-14	0.	0.	0.	0.	0.	0.	0.	0.
SN124	1.12E+02	1.12E+02	1.12E+02	1.12E+02	1.12E+02	1.12E+02	1.12E+02	1.12E+02	1.12E+02	1.12E+02	1.12E+02	1.12E+02
SN125M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN125	0.	3.14E-11	4.45E-17	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB121	0.	6.10E-01	6.10E-01	6.11E-01	6.12E-01	6.13E-01	6.15E-01	6.15E-01	6.15E-01	6.15E-01	6.15E-01	6.15E-01
SB123	0.	2.90E-02	2.90E-02	2.90E-02	2.90E-02	2.90E-02	2.90E-02	2.90E-02	2.90E-02	2.90E-02	2.90E-02	2.90E-02
SB124M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB124	0.	1.97E-05	2.39E-06	7.65E-23	0.	0.	0.	0.	0.	0.	0.	0.
SB125	0.	2.21E-02	1.95E-02	1.93E-03	6.69E-08	1.78E-13	0.	0.	0.	0.	0.	0.
SB126M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB126	0.	8.67E-11	3.46E-15	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE124	0.	8.96E-04	9.14E-04	9.16E-04	9.16E-04	9.16E-04	9.16E-04	9.16E-04	9.16E-04	9.16E-04	9.16E-04	9.16E-04
TE125M	0.	5.29E-04	4.73E-04	4.70E-05	1.63E-09	4.34E-15	0.	0.	0.	0.	0.	0.
TE125	0.	1.01E-02	1.29E-02	3.08E-02	3.28E-02	3.28E-02	3.28E-02	3.28E-02	3.28E-02	3.28E-02	3.28E-02	3.28E-02
TE126	0.	1.17E-04	1.17E-04	1.17E-04	1.17E-04	1.17E-04	1.17E-04	1.17E-04	1.17E-04	1.17E-04	1.17E-04	1.17E-04
TA180	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TA181	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TA182M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TA182	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W180	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W181	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W182	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W183M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W183	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W184	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W185M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W185	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W186	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W187	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	4.09E+05	3.94E+05	3.94E+05	3.94E+05	3.94E+05	3.94E+05	3.94E+05	3.94E+05	3.94E+05	3.94E+05	3.94E+05	3.94E+05

PWR = BU = 33,000 WASTE DECAY TIMES CASE E-1 HE's

TABLE A-IV-2
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
HE 4	0.	2.48E+01	2.92E+01	4.57E+01	7.70E+01	9.31E+01	1.53E+00	1.92E+00	2.84E+00	3.48E+00	6.72E+00	2.13E+01
TL207	0.	5.42E-15	7.84E-15	3.79E-14	1.03E-13	1.23E-13	1.31E-13	1.35E-13	1.64E-13	2.04E-13	1.38E-12	1.90E-12
TL208	0.	2.77E-12	2.36E-12	1.96E-13	8.77E-14	5.42E-14	1.15E-15	9.46E-18	5.66E-19	1.31E-18	2.02E-17	2.06E-16
TL209	0.	1.84E-18	1.87E-18	2.20E-18	1.07E-17	3.76E-17	9.10E-16	3.66E-15	8.53E-14	2.98E-13	6.96E-12	1.56E-11
PB206	0.	1.01E-13	1.97E-13	2.63E-11	2.00E-09	1.23E-08	9.70E-07	7.05E-06	6.35E-04	3.57E-03	3.95E-01	4.73E+00
PB207	0.	3.41E-10	5.91E-10	1.67E-08	2.52E-07	6.94E-07	4.64E-06	9.71E-06	5.52E-05	1.25E-04	5.77E-03	1.35E-01
PB208	0.	6.85E-07	1.11E-06	3.35E-06	4.81E-06	5.95E-06	7.75E-06	7.78E-06	7.78E-06	7.79E-06	8.10E-06	4.15E-05
PB209	0.	7.55E-15	7.64E-15	9.02E-15	4.39E-14	1.54E-13	3.72E-12	1.50E-11	3.49E-10	1.22E-09	2.85E-08	6.37E-08
PB210	0.	7.17E-12	1.09E-11	2.21E-10	3.29E-09	9.75E-09	1.75E-07	6.44E-07	1.02E-05	2.62E-05	2.06E-04	5.52E-05
PB211	0.	4.17E-14	6.04E-14	2.92E-13	7.94E-13	9.50E-13	1.01E-12	1.04E-12	1.26E-12	1.57E-12	1.07E-11	1.46E-11
PB212	0.	1.61E-09	1.37E-09	1.14E-10	5.09E-11	3.15E-11	6.69E-13	5.50E-15	3.29E-16	7.60E-16	1.17E-14	1.20E-13
PB214	0.	5.01E-16	6.52E-16	3.32E-15	1.61E-14	3.54E-14	4.34E-13	1.59E-12	2.53E-11	6.47E-11	5.09E-10	1.37E-10
BI209	0.	6.58E-11	7.28E-11	2.07E-10	1.87E-09	1.04E-08	1.14E-06	9.17E-06	1.10E-03	8.02E-03	2.53E+00	1.03E+02
BI210	0.	4.60E-15	7.10E-15	1.44E-13	2.15E-12	6.37E-12	1.15E-10	4.21E-10	6.68E-09	1.71E-08	1.34E-07	3.61E-08
BI211	0.	2.49E-15	3.60E-15	1.74E-14	4.73E-14	5.66E-14	6.02E-14	6.18E-14	7.51E-14	9.38E-14	6.36E-13	8.72E-13
BI212	0.	1.53E-10	1.31E-10	1.09E-11	4.85E-12	3.00E-12	6.38E-14	5.24E-16	3.14E-17	7.24E-17	1.12E-15	1.14E-14
BI213	0.	1.83E-15	1.85E-15	2.18E-15	1.06E-14	3.72E-14	9.01E-13	3.62E-12	8.44E-11	2.95E-10	6.88E-09	1.54E-08
BI214	0.	3.68E-16	4.79E-16	2.44E-15	1.18E-14	2.60E-14	3.19E-13	1.17E-12	1.86E-11	4.76E-11	3.74E-10	1.00E-10
PO210	0.	8.06E-14	1.30E-13	3.97E-12	5.92E-11	1.75E-10	3.16E-09	1.16E-08	1.84E-07	4.71E-07	3.70E-06	9.94E-07
PO211	0.	3.01E-20	4.35E-20	2.10E-19	5.72E-19	6.84E-19	7.28E-19	7.48E-19	9.08E-19	1.13E-18	7.69E-18	1.05E-17
PO212	0.	8.09E-21	6.90E-21	5.73E-22	2.56E-22	1.58E-22	3.37E-24	2.77E-26	1.66E-27	3.82E-27	5.90E-26	6.03E-25
PO213	0.	2.66E-24	2.69E-24	3.18E-24	1.55E-23	5.42E-23	1.31E-21	5.27E-21	1.23E-19	4.30E-19	1.00E-17	2.24E-17
PO214	0.	6.23E-23	8.11E-23	4.12E-22	2.00E-21	4.40E-21	5.40E-20	1.98E-19	3.14E-18	8.05E-18	6.33E-17	1.70E-17
PO215	0.	3.53E-20	5.11E-20	2.47E-19	6.72E-19	8.04E-19	8.56E-19	8.79E-19	1.07E-18	1.33E-18	9.04E-18	1.24E-17
PO216	0.	6.44E-15	5.49E-15	4.56E-16	2.04E-16	1.26E-16	2.68E-18	2.20E-20	1.32E-21	3.04E-21	4.70E-20	4.80E-19
PO218	0.	5.81E-17	7.56E-17	3.85E-16	1.86E-15	4.10E-15	5.03E-14	1.85E-13	2.93E-12	7.50E-12	5.90E-11	1.58E-11
AT217	0.	2.11E-20	2.14E-20	2.52E-20	1.23E-19	4.30E-19	1.04E-17	4.19E-17	9.76E-16	3.41E-15	7.96E-14	1.78E-13
RN219	0.	8.00E-17	1.16E-16	5.60E-16	1.52E-15	1.82E-15	1.94E-15	1.99E-15	2.42E-15	3.02E-15	2.05E-14	2.81E-14
RN220	0.	2.45E-12	2.09E-12	1.73E-13	7.76E-14	4.79E-14	1.02E-15	8.37E-18	5.01E-19	1.16E-18	1.79E-17	1.82E-16
RN222	0.	1.07E-13	1.39E-13	7.06E-13	3.42E-12	7.54E-12	9.24E-11	3.39E-10	5.38E-09	1.38E-08	1.08E-07	2.91E-08
FR221	0.	1.93E-16	1.96E-16	2.31E-16	1.13E-15	3.95E-15	9.55E-14	3.84E-13	8.95E-12	3.13E-11	7.29E-10	1.63E-09
FR223	0.	4.08E-16	5.43E-16	2.63E-15	7.16E-15	8.56E-15	9.12E-15	9.36E-15	1.14E-14	1.42E-14	9.62E-14	1.32E-13
RA223	0.	2.01E-11	2.90E-11	1.40E-10	3.81E-10	4.56E-10	4.86E-10	4.99E-10	6.06E-10	7.57E-10	5.13E-09	7.04E-09
RA224	0.	1.40E-08	1.19E-08	9.92E-10	4.44E-10	2.74E-10	5.83E-12	4.79E-14	2.87E-15	6.62E-15	1.02E-13	1.04E-12
RA225	0.	8.78E-13	8.85E-13	1.04E-12	5.09E-12	1.78E-11	4.31E-10	1.73E-09	4.04E-08	1.41E-07	3.30E-06	7.38E-06
RA226	0.	1.68E-08	2.16E-08	1.10E-07	5.33E-07	1.17E-06	1.44E-05	5.28E-05	8.38E-04	2.15E-03	1.69E-02	4.53E-03
RA228	0.	1.11E-14	1.59E-14	7.15E-14	1.16E-13	1.31E-13	2.48E-13	4.00E-13	1.96E-12	4.53E-12	6.99E-11	7.14E-10
AC225	0.	5.91E-13	5.99E-13	7.06E-13	3.44E-12	1.20E-11	2.92E-10	1.17E-09	2.73E-08	9.55E-08	2.23E-06	4.98E-06
AC227	0.	1.53E-08	2.04E-08	9.89E-08	2.69E-07	3.21E-07	3.42E-07	3.51E-07	4.27E-07	5.33E-07	3.61E-06	4.96E-06
AC228	0.	1.16E-18	1.66E-18	7.47E-18	1.22E-17	1.36E-17	2.58E-17	4.18E-17	2.05E-16	4.73E-16	7.29E-15	7.45E-14
TH227	0.	3.32E-11	4.65E-11	2.25E-10	6.11E-10	7.31E-10	7.79E-10	7.99E-10	9.71E-10	1.21E-09	8.22E-09	1.13E-08
TH228	0.	2.77E-06	2.32E-06	1.93E-07	8.65E-08	5.35E-08	1.14E-09	9.34E-12	5.59E-13	1.29E-12	1.99E-11	2.04E-10
TH229	0.	1.62E-07	1.62E-07	1.92E-07	9.33E-07	3.27E-06	7.91E-05	3.18E-04	7.41E-03	2.59E-02	6.05E-01	1.35E+00
TH230	0.	1.14E-03	1.14E-03	1.17E-03	1.36E-03	1.75E-03	6.98E-03	1.43E-02	7.19E-02	1.40E-01	8.57E-01	2.30E-01
TH231	0.	3.25E-08	1.63E-10	1.63E-10	1.63E-10	1.63E-10	1.64E-10	1.66E-10	1.86E-10	2.20E-10	6.47E-10	6.82E-10
TH232	0.	2.27E-04	2.28E-04	2.33E-04	2.56E-04	2.86E-04	5.30E-04	8.57E-04	4.20E-03	9.70E-03	1.50E-01	1.53E+00
TH233	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TH234	0.	1.36E-05	1.38E-07	6.78E-08	6.78E-08	6.78E-08	6.78E-08	6.78E-08	6.78E-08	6.78E-08	6.78E-08	6.78E-08
PA231	0.	5.10E-04	5.10E-04	5.10E-04	5.11E-04	5.13E-04	5.24E-04	5.38E-04	6.54E-04	8.16E-04	5.53E-03	7.59E-03
PA232	0.	2.21E-48	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PA233	0.	1.60E-05	1.60E-05	1.61E-05	1.62E-05	1.64E-05	1.73E-05	1.79E-05	1.84E-05	1.84E-05	1.78E-05	1.33E-05
PA234M	0.	4.57E-10	4.67E-12	2.29E-12	2.29E-12	2.29E-12	2.29E-12	2.29E-12	2.29E-12	2.29E-12	2.29E-12	2.29E-12

PWR = 8U = 33,000 WASTE DECAY TIMES CASE E-1 HE's

TABLE A-IV-2
(continued)

POWER= 38,40MW, BURNUP= 33000,MWD, FLUX= 3,98E+13N/CM**2-SEC

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1, Y	10, Y	50, Y	100, Y	500, Y	1000, Y	5000, Y	10000, Y	100000, Y	******* Y
PA234	0,	1,58E-10	1,62E-12	7,91E-13	7,91E-13	7,91E-13	7,91E-13	7,91E-13	7,91E-13	7,91E-13	7,91E-13	7,92E-13
U232	0,	1,86E-06	2,22E-06	4,42E-06	3,23E-06	2,00E-06	4,24E-08	3,44E-10	6,45E-27	7,99E-48	0,	0,
U233	0,	2,88E-05	1,03E-04	1,44E-03	7,39E-03	1,49E-02	7,73E-02	1,59E-01	8,27E-01	1,65E+00	1,36E+01	3,05E+01
U234	3,17E+02	8,65E-01	8,72E-01	1,18E+00	2,31E+00	3,30E+00	5,29E+00	5,38E+00	5,32E+00	5,25E+00	4,14E+00	5,64E-01
U235	3,20E+04	4,02E+01	4,02E+01	4,02E+01	4,02E+01	4,03E+01	4,06E+01	4,11E+01	4,60E+01	5,44E+01	1,60E+02	1,69E+02
U236	0,	2,05E+01	2,05E+01	2,05E+01	2,06E+01	2,08E+01	2,21E+01	2,37E+01	3,41E+01	4,23E+01	5,45E+01	5,31E+01
U237	0,	1,84E-07	1,79E-07	1,17E-07	1,75E-08	1,64E-09	1,25E-11	1,20E-11	8,55E-12	5,62E-12	2,96E-15	0,
U238	9,68E+05	4,71E+03	4,71E+03	4,71E+03	4,71E+03	4,71E+03	4,71E+03	4,71E+03	4,71E+03	4,71E+03	4,71E+03	4,72E+03
U239	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
U240	0,	3,43E-24	4,80E-22	9,07E-21	4,72E-20	9,49E-20	4,76E-19	9,53E-19	4,75E-18	9,44E-18	8,62E-17	3,95E-16
NP236	0,	5,33E-66	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
NP237	0,	4,65E+02	4,65E+02	4,66E+02	4,70E+02	4,75E+02	5,03E+02	5,20E+02	5,33E+02	5,33E+02	5,17E+02	3,86E+02
NP238	0,	2,29E-26	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
NP239	0,	7,38E-05	7,38E-05	7,38E-05	7,35E-05	7,32E-05	7,06E-05	6,75E-05	4,69E-05	2,98E-05	8,57E-09	1,45E-13
NP240M	0,	5,92E-23	4,15E-23	7,82E-22	4,08E-21	8,19E-21	4,11E-20	8,22E-20	4,10E-19	8,15E-19	7,44E-18	3,41E-17
NP240	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
PU236	0,	3,27E-06	2,89E-06	3,24E-07	1,93E-11	1,01E-16	0,	0,	0,	0,	0,	0,
PU238	0,	6,80E+01	2,79E+00	4,28E+00	3,14E+00	2,13E+00	9,43E-02	1,92E-03	6,75E-14	8,42E-24	0,	0,
PU239	0,	2,70E+01	2,70E+01	2,71E+01	2,74E+01	2,78E+01	3,06E+01	3,38E+01	5,32E+01	6,50E+01	9,03E+00	5,48E-07
PU240	0,	1,10E+01	1,15E+01	1,82E+01	3,10E+01	3,39E+01	3,30E+01	3,14E+01	2,08E+01	1,25E+01	1,22E-03	1,66E-08
PU241	0,	6,14E+00	6,00E+00	3,91E+00	5,86E-01	5,49E-02	4,17E-04	4,00E-04	2,86E-04	1,88E-04	9,91E-08	0,
PU242	0,	2,24E+00	2,24E+00	2,24E+00	2,24E+00	2,24E+00	2,24E+00	2,24E+00	2,23E+00	2,22E+00	1,89E+00	3,64E-01
PU243	0,	6,77E-17	1,35E-14	1,35E-14	1,35E-14	1,35E-14	1,35E-14	1,35E-14	1,35E-14	1,35E-14	1,35E-14	1,30E-14
PU244	0,	1,80E-13	2,52E-11	4,75E-10	2,48E-09	4,97E-09	2,50E-08	4,99E-08	2,49E-07	4,95E-07	4,52E-06	2,07E-05
PU245	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
AM241	0,	6,44E+01	6,44E+01	6,56E+01	6,47E+01	6,02E+01	3,18E+01	1,43E+01	3,25E-02	5,59E-03	3,10E-06	0,
AM242M	0,	4,72E-04	4,71E-04	4,52E-04	3,77E-04	3,00E-04	4,84E-05	4,95E-06	5,90E-14	7,37E-24	0,	0,
AM242	0,	5,67E-09	5,66E-09	5,43E-09	4,52E-09	3,60E-09	5,81E-10	5,94E-11	7,09E-19	8,85E-29	0,	0,
AM243	0,	8,93E+01	8,93E+01	8,92E+01	8,89E+01	8,85E+01	8,53E+01	8,15E+01	5,67E+01	3,61E+01	1,04E-02	1,75E-07
AM244	0,	2,79E-25	1,95E-25	3,69E-24	1,92E-23	3,86E-23	1,94E-22	3,87E-22	1,93E-21	3,84E-21	3,51E-20	1,61E-19
AM245	0,	3,41E-32	1,06E-49	0,	0,	0,	0,	0,	0,	0,	0,	0,
CM242	0,	3,98E+00	1,83E+00	2,64E-06	9,07E-07	7,22E-07	1,17E-07	1,19E-08	1,42E-16	1,78E-26	0,	0,
CM243	0,	8,83E-02	8,73E-02	7,19E-02	3,02E-02	1,02E-02	1,76E-06	3,49E-11	0,	0,	0,	0,
CM244	0,	2,41E+01	2,36E+01	1,67E+01	3,61E+00	5,32E-01	1,18E-07	7,13E-16	7,07E-16	1,41E-15	1,28E-14	5,88E-14
CM245	0,	2,50E-01	2,50E-01	2,50E-01	2,49E-01	2,48E-01	2,40E-01	2,30E-01	1,64E-01	1,08E-01	5,69E-05	0,
CM246	0,	2,97E-02	2,97E-02	2,96E-02	2,95E-02	2,93E-02	2,76E-02	2,56E-02	1,42E-02	6,82E-03	1,21E-08	0,
CM247	0,	3,97E-04	3,97E-04	3,97E-04	3,97E-04	3,97E-04	3,97E-04	3,97E-04	3,97E-04	3,97E-04	3,95E-04	3,81E-04
CM248	0,	2,81E-05	2,81E-05	2,81E-05	2,81E-05	2,81E-05	2,81E-05	2,81E-05	2,79E-05	2,76E-05	2,31E-05	3,93E-06
CM249	0,	1,08E-48	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
CM250	0,	2,29E-14	2,29E-14	2,28E-14	2,25E-14	2,20E-14	1,88E-14	1,54E-14	3,13E-15	4,26E-16	1,14E-31	0,
BK249	0,	8,18E-26	2,53E-43	0,	0,	0,	0,	0,	0,	0,	0,	0,
BK250	0,	4,84E-21	4,84E-21	4,82E-21	4,75E-21	4,65E-21	3,97E-21	3,25E-21	6,60E-22	9,01E-23	2,41E-38	0,
CF249	0,	2,84E-07	2,57E-07	4,37E-08	1,66E-11	8,76E-16	0,	0,	0,	0,	0,	0,
CF250	0,	1,08E-08	8,27E-09	7,01E-11	1,69E-17	1,66E-17	1,41E-17	1,16E-17	2,35E-18	3,21E-19	8,60E-35	0,
CF251	0,	6,93E-09	6,93E-09	6,88E-09	6,67E-09	6,42E-09	4,72E-09	3,21E-09	1,47E-10	3,13E-12	0,	0,
CF252	0,	3,64E-09	3,19E-09	3,02E-10	8,49E-15	1,74E-20	0,	0,	0,	0,	0,	0,
CF253	0,	1,41E-43	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
CF254	0,	-4,62E-24	-3,78E-33	0,	0,	0,	0,	0,	0,	0,	0,	0,
ES253	0,	-1,86E-37	0,	0,	0,	0,	0,	0,	0,	0,	0,	0,
TOTAL	1,00E+06	5,47E+03	5,47E+03	5,47E+03	5,47E+03	5,47E+03	5,47E+03	5,47E+03	5,47E+03	5,47E+03	5,49E+03	5,49E+03

PWR = BU = 33,000 WASTE DECAY TIMES CASE E-1 FP's

TABLE A-IV-2
(continued)

POWER= 38.40MW, BURNUP= 33000,MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
H 3	0.	5.87E-03	5.71E-03	3.44E-03	3.61E-04	2.15E-05	3.49E-15	2.02E-27	0.	0.	0.	0.
ZN 72	0.	1.10E-33	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 72	0.	4.80E-34	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 72	0.	6.09E-03	6.09E-03	6.09E-03	6.09E-03	6.09E-03	6.09E-03	6.09E-03	6.09E-03	6.09E-03	6.09E-03	6.09E-03
GA 73	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 73	0.	1.53E-02	1.53E-02	1.53E-02	1.53E-02	1.53E-02	1.53E-02	1.53E-02	1.53E-02	1.53E-02	1.53E-02	1.53E-02
GA 74	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 74	0.	5.68E-02	5.68E-02	5.68E-02	5.68E-02	5.68E-02	5.68E-02	5.68E-02	5.68E-02	5.68E-02	5.68E-02	5.68E-02
GA 75	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 75M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 75	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 75	0.	8.44E-02	8.44E-02	8.44E-02	8.44E-02	8.44E-02	8.44E-02	8.44E-02	8.44E-02	8.44E-02	8.44E-02	8.44E-02
GA 76	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 76	0.	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	2.95E-01
AS 76	0.	1.16E-55	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 76	0.	1.95E-03	1.95E-03	1.95E-03	1.95E-03	1.95E-03	1.95E-03	1.95E-03	1.95E-03	1.95E-03	1.95E-03	1.95E-03
GE 77M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 77	0.	3.72-121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 77	0.	2.34E-37	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 77M	0.	8.80E-44	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 77	0.	9.46E-01	9.46E-01	9.46E-01	9.46E-01	9.46E-01	9.46E-01	9.46E-01	9.46E-01	9.46E-01	9.46E-01	9.46E-01
GE 78	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 78M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 78	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 78	0.	2.56E+00	2.56E+00	2.56E+00	2.56E+00	2.56E+00	2.56E+00	2.56E+00	2.56E+00	2.56E+00	2.56E+00	2.56E+00
AS 79	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 79M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 79	0.	5.67E+00	5.67E+00	5.67E+00	5.67E+00	5.67E+00	5.64E+00	5.61E+00	5.38E+00	5.10E+00	1.95E+00	1.33E-04
BR 79	0.	5.64E-07	3.08E-05	5.75E-04	3.00E-03	6.02E-03	3.02E-02	6.02E-02	2.95E-01	5.74E-01	3.72E+00	5.67E+00
AS 80	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 80	0.	9.89E+00	9.89E+00	9.89E+00	9.89E+00	9.89E+00	9.89E+00	9.89E+00	9.89E+00	9.89E+00	9.89E+00	9.89E+00
BR 80M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 80	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 80	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 81M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 81	0.	1.53E-02	1.53E-02	1.53E-02	1.53E-02	1.53E-02	1.53E-02	1.53E-02	1.53E-02	1.53E-02	1.53E-02	1.53E-02
KR 81M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 82	0.	3.25E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01
BR 82M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 82	0.	1.09E-43	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 82	0.	0.	1.09E-43	1.09E-43	1.09E-43	1.09E-43	1.09E-43	1.09E-43	1.09E-43	1.09E-43	1.09E-43	1.09E-43
SE 83M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 83	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 83	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 83M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 83	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 84	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 84M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 84	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 WASTE DECAY TIMES CASE E-1 FP's

TABLE A-IV-2
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	Y******* Y
KR 84	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 85M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 85	0.	9.31E+01	9.31E+01	9.31E+01	9.31E+01	9.31E+01	9.31E+01	9.31E+01	9.31E+01	9.31E+01	9.31E+01	9.31E+01
BR 86	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 86	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 86M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 86	0.	9.24E-06	1.06E-08	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 86	0.	1.30E-01	1.30E-01	1.30E-01	1.30E-01	1.30E-01	1.30E-01	1.30E-01	1.30E-01	1.30E-01	1.30E-01	1.30E-01
BR 87	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 87	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 87	0.	2.34E+02	2.34E+02	2.34E+02	2.34E+02	2.34E+02	2.34E+02	2.34E+02	2.34E+02	2.34E+02	2.34E+02	2.34E+02
SR 87M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 87	0.	6.70E-05	6.70E-05	6.70E-05	6.72E-05	6.73E-05	6.86E-05	7.02E-05	8.32E-05	9.95E-05	3.92E-04	3.32E-03
BR 88	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 88	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 88	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 88	0.	3.43E+02	3.43E+02	3.43E+02	3.43E+02	3.43E+02	3.43E+02	3.43E+02	3.43E+02	3.43E+02	3.43E+02	3.43E+02
BR 89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 89	0.	2.83E+00	2.48E-01	2.30E-20	0.	0.	0.	0.	0.	0.	0.	0.
Y 89	0.	4.55E+02	4.57E+02	4.58E+02	4.58E+02	4.58E+02	4.58E+02	4.58E+02	4.58E+02	4.58E+02	4.58E+02	4.58E+02
KR 90	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 90	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 90	0.	5.36E+02	5.30E+02	4.24E+02	1.58E+02	4.61E+01	2.39E-03	1.05E-08	0.	0.	0.	0.
Y 90M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 90	0.	1.39E-01	1.38E-01	1.10E-01	4.11E-02	1.20E-02	6.20E-07	2.73E-12	0.	0.	0.	0.
ZR 90	0.	2.46E+01	3.12E+01	1.37E+02	4.03E+02	5.15E+02	5.61E+02	5.61E+02	5.61E+02	5.61E+02	5.61E+02	5.61E+02
KR 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 91M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 91	0.	5.71E+00	6.63E-01	9.79E-18	0.	0.	0.	0.	0.	0.	0.	0.
ZR 91	0.	5.96E+02	6.01E+02	6.01E+02	6.01E+02	6.01E+02	6.01E+02	6.01E+02	6.01E+02	6.01E+02	6.01E+02	6.01E+02
KR 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 92	0.	6.55E+02	6.55E+02	6.55E+02	6.55E+02	6.55E+02	6.55E+02	6.55E+02	6.55E+02	6.55E+02	6.55E+02	6.55E+02
KR 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 93	0.	7.28E+02	7.28E+02	7.28E+02	7.28E+02	7.28E+02	7.28E+02	7.27E+02	7.26E+02	7.24E+02	6.95E+02	4.58E+02
NB 93M	0.	5.55E-04	7.08E-04	2.87E-03	6.11E-03	6.56E-03	6.60E-03	6.60E-03	6.58E-03	6.57E-03	6.30E-03	4.16E-03
NB 93	0.	2.87E-05	4.48E-05	9.04E-04	1.11E-02	2.75E-02	1.62E-01	3.30E-01	1.67E+00	3.35E+00	3.29E+01	2.69E+02
KR 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 WASTE DECAY TIMES CASE E=1 FP's

TABLE A-IV-2
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2=SEC

NUCLIDE CONCENTRATIONS GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	8000. Y	10000. Y	100000. Y	Y******* Y
Y 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 94	0.	7.86E+02	7.86E+02	7.86E+02	7.86E+02	7.86E+02	7.86E+02	7.86E+02	7.86E+02	7.86E+02	7.86E+02	7.86E+02
RB 95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 95	0.	1.18E+01	1.69E+00	1.00E-15	0.	0.	0.	0.	0.	0.	0.	0.
NB 95M	0.	1.45E-02	2.06E-03	1.23E-18	0.	0.	0.	0.	0.	0.	0.	0.
NB 95	0.	1.24E+01	1.93E+00	1.17E-15	0.	0.	0.	0.	0.	0.	0.	0.
MO 95	0.	7.44E+02	7.65E+02	7.68E+02	7.68E+02	7.68E+02	7.68E+02	7.68E+02	7.68E+02	7.68E+02	7.68E+02	7.68E+02
Y 96	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 96	0.	8.28E+02	8.28E+02	8.28E+02	8.28E+02	8.28E+02	8.28E+02	8.28E+02	8.28E+02	8.28E+02	8.28E+02	8.28E+02
NB 96	0.	5.06E-61	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 96	0.	3.91E+01	3.91E+01	3.91E+01	3.91E+01	3.91E+01	3.91E+01	3.91E+01	3.91E+01	3.91E+01	3.91E+01	3.91E+01
Y 97	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 97	0.	1.80E-78	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 97M	0.	1.69E-81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 97	0.	1.36E-79	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 97	0.	8.31E+02	8.31E+02	8.31E+02	8.31E+02	8.31E+02	8.31E+02	8.31E+02	8.31E+02	8.31E+02	8.31E+02	8.31E+02
ZR 98	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 98M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 98	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 98	0.	8.50E+02	8.50E+02	8.50E+02	8.50E+02	8.50E+02	8.50E+02	8.50E+02	8.50E+02	8.50E+02	8.50E+02	8.50E+02
NB 99	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 99	0.	7.95E-20	1.61E-39	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC 99M	0.	6.80E-21	1.38E-40	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC 99	0.	8.39E+02	8.39E+02	8.39E+02	8.39E+02	8.39E+02	8.38E+02	8.36E+02	8.26E+02	8.12E+02	6.05E+02	3.19E+01
RU 99	0.	4.63E-03	6.01E-03	3.07E-02	1.40E-01	2.78E-01	1.37E+00	2.74E+00	1.36E+01	2.70E+01	2.34E+02	8.07E+02
NB100	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO100	0.	9.75E+02	9.75E+02	9.75E+02	9.75E+02	9.75E+02	9.75E+02	9.75E+02	9.75E+02	9.75E+02	9.75E+02	9.75E+02
TC100	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU100	0.	5.97E+01	5.97E+01	5.97E+01	5.97E+01	5.97E+01	5.97E+01	5.97E+01	5.97E+01	5.97E+01	5.97E+01	5.97E+01
NB101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU101	0.	7.78E+02	7.78E+02	7.78E+02	7.78E+02	7.78E+02	7.78E+02	7.78E+02	7.78E+02	7.78E+02	7.78E+02	7.78E+02
MO102	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC102M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC102	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU102	0.	7.77E+02	7.77E+02	7.77E+02	7.77E+02	7.77E+02	7.77E+02	7.77E+02	7.77E+02	7.77E+02	7.77E+02	7.77E+02
MO103	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC103	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU103	0.	2.00E+00	8.20E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH103M	0.	2.01E-03	8.20E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH103	0.	3.88E+02	3.90E+02	3.90E+02	3.90E+02	3.90E+02	3.90E+02	3.90E+02	3.90E+02	3.90E+02	3.90E+02	3.90E+02
MO104	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC104	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU104	0.	5.60E+02	5.60E+02	5.60E+02	5.60E+02	5.60E+02	5.60E+02	5.60E+02	5.60E+02	5.60E+02	5.60E+02	5.60E+02
RH104M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH104	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD104	0.	2.52E+02	2.52E+02	2.52E+02	2.52E+02	2.52E+02	2.52E+02	2.52E+02	2.52E+02	2.52E+02	2.52E+02	2.52E+02
MO105	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC105	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 WASTE DECAY TIMES CASE E=1 FP's

TABLE A-IV-2
(continued)

POWER= 38.80MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2=SEC

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
RU105	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH105M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH105	0.	1.83E-37	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD105	0.	2.78E+02	2.78E+02	2.78E+02	2.78E+02	2.78E+02	2.78E+02	2.78E+02	2.78E+02	2.78E+02	2.78E+02	2.78E+02
TC106	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU106	0.	1.36E+02	9.62E+01	1.93E-01	2.00E-13	2.09E-28	0.	0.	0.	0.	0.	0.
RH106M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH106	0.	1.28E-04	9.10E-05	1.83E-07	1.90E-19	1.98E-34	0.	0.	0.	0.	0.	0.
PD106	0.	3.62E+02	4.01E+02	4.97E+02	4.97E+02	4.97E+02	4.97E+02	4.97E+02	4.97E+02	4.97E+02	4.97E+02	4.97E+02
RU107	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH107	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD107M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD107	0.	2.42E+02	2.42E+02	2.42E+02	2.42E+02	2.42E+02	2.42E+02	2.42E+02	2.42E+02	2.42E+02	2.40E+02	2.19E+02
AG107	0.	3.40E-05	4.60E-05	2.62E-04	1.22E-03	2.42E-03	1.20E-02	2.40E-02	1.20E-01	2.40E-01	2.39E+00	2.28E+01
RU108	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH108	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD108	0.	1.64E+02	1.64E+02	1.64E+02	1.64E+02	1.64E+02	1.64E+02	1.64E+02	1.64E+02	1.64E+02	1.64E+02	1.64E+02
AG108	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD108	0.	4.61E-07	4.61E-07	4.61E-07	4.61E-07	4.61E-07	4.61E-07	4.61E-07	4.61E-07	4.61E-07	4.61E-07	4.61E-07
RH109	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD109M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD109	0.	2.31E-99	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG109M	0.	1.34E-15	1.02E-15	6.64E-18	1.30E-27	9.46E-40	0.	0.	0.	0.	0.	0.
AG109	0.	6.15E+01	6.15E+01	6.15E+01	6.15E+01	6.15E+01	6.15E+01	6.15E+01	6.15E+01	6.15E+01	6.15E+01	6.15E+01
CD109	0.	1.31E-09	9.94E-10	6.50E-12	1.27E-21	9.26E-34	0.	0.	0.	0.	0.	0.
RH110	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD110	0.	3.52E+01	3.52E+01	3.52E+01	3.52E+01	3.52E+01	3.52E+01	3.52E+01	3.52E+01	3.52E+01	3.52E+01	3.52E+01
AG110M	0.	5.84E-01	3.54E-01	4.34E-05	1.79E-22	0.	0.	0.	0.	0.	0.	0.
AG110	0.	8.48E-08	5.14E-08	6.30E-12	2.60E-29	0.	0.	0.	0.	0.	0.	0.
CD110	0.	4.49E+01	4.51E+01	4.54E+01	4.54E+01	4.54E+01	4.54E+01	4.54E+01	4.54E+01	4.54E+01	4.54E+01	4.54E+01
PD111M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD111	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG111M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG111	0.	1.53E-08	7.13E-16	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD111M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD111	0.	1.82E+01	1.82E+01	1.82E+01	1.82E+01	1.82E+01	1.82E+01	1.82E+01	1.82E+01	1.82E+01	1.82E+01	1.82E+01
PD112	0.	2.47E-65	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG112	0.	4.44E-66	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD112	0.	9.80E+00	9.80E+00	9.80E+00	9.80E+00	9.80E+00	9.80E+00	9.80E+00	9.80E+00	9.80E+00	9.80E+00	9.80E+00
PD113	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG113M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG113	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD113M	0.	5.08E-02	4.96E-02	3.17E-02	4.38E-03	3.68E-04	9.21E-13	1.63E-23	0.	0.	0.	0.
CD113	0.	2.07E-01	2.07E-01	2.07E-01	2.07E-01	2.07E-01	2.07E-01	2.07E-01	2.07E-01	2.07E-01	2.07E-01	2.07E-01
IN113	0.	2.59E-03	3.83E-03	2.16E-02	4.90E-02	5.30E-02	5.33E-02	5.33E-02	5.33E-02	5.33E-02	5.33E-02	5.33E-02
PD114	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG114	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD114	0.	1.26E+01	1.26E+01	1.26E+01	1.26E+01	1.26E+01	1.26E+01	1.26E+01	1.26E+01	1.26E+01	1.26E+01	1.26E+01
IN114M	0.	5.93E-06	4.71E-07	7.59E-27	0.	0.	0.	0.	0.	0.	0.	0.
IN114	0.	9.54E-11	7.58E-12	1.22E-31	0.	0.	0.	0.	0.	0.	0.	0.
SN114	0.	3.28E-04	3.34E-04	3.34E-04	3.34E-04	3.34E-04	3.34E-04	3.34E-04	3.34E-04	3.34E-04	3.34E-04	3.34E-04
PD115	0.	0.	0.	0.	0.	0	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 WASTE DECAY TIMES CASE E-1 FP's

POWER= 38.40MW, BURNUP= 33000,MWD, FLUX= 3.98E+13N/CM**2-SEC

TABLE A-IV-2
(continued)

NUCLIDE CONCENTRATIONS GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1, Y	10, Y	50, Y	100, Y	500, Y	1000, Y	5000, Y	10000, Y	100000, Y	Y******* Y
AG115M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG115	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD115M	0.	1.42E-03	7.49E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD115	0.	4.03E-27	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN115M	0.	3.70E-28	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN115	0.	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00
SN115	0.	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01
AG116	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD116	0.	3.87E+00	3.87E+00	3.87E+00	3.87E+00	3.87E+00	3.87E+00	3.87E+00	3.87E+00	3.87E+00	3.87E+00	3.87E+00
IN116M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN116	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN116	0.	2.88E+00	2.88E+00	2.88E+00	2.88E+00	2.88E+00	2.88E+00	2.88E+00	2.88E+00	2.88E+00	2.88E+00	2.88E+00
AG117	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD117M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD117	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN117M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN117	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN117M	0.	1.21E-07	1.44E-11	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN117	0.	4.01E+00	4.01E+00	4.01E+00	4.01E+00	4.01E+00	4.01E+00	4.01E+00	4.01E+00	4.01E+00	4.01E+00	4.01E+00
CD118	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN118M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN118	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN118	0.	4.10E+00	4.10E+00	4.10E+00	4.10E+00	4.10E+00	4.10E+00	4.10E+00	4.10E+00	4.10E+00	4.10E+00	4.10E+00
CD119M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN119M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN119M	0.	2.75E-03	1.66E-03	1.82E-07	4.64E-25	0.	0.	0.	0.	0.	0.	0.
SN119	0.	4.23E+00	4.23E+00	4.24E+00	4.24E+00	4.24E+00	4.24E+00	4.24E+00	4.24E+00	4.24E+00	4.24E+00	4.24E+00
CD120	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN120M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN120	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN120	0.	4.41E+00	4.41E+00	4.41E+00	4.41E+00	4.41E+00	4.41E+00	4.41E+00	4.41E+00	4.41E+00	4.41E+00	4.41E+00
CD121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN121M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN121M	0.	1.55E-05	1.55E-05	1.42E-05	9.89E-06	6.27E-06	1.63E-07	1.71E-09	2.42E-25	3.78E-45	0.	0.
SN121	0.	1.36E-51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB121	0.	4.60E+00	4.60E+00	4.60E+00	4.60E+00	4.60E+00	4.60E+00	4.60E+00	4.60E+00	4.60E+00	4.60E+00	4.60E+00
IN122	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN122	0.	5.16E+00	5.16E+00	5.16E+00	5.16E+00	5.16E+00	5.16E+00	5.16E+00	5.16E+00	5.16E+00	5.16E+00	5.16E+00
SB122M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB122	0.	8.41E-23	1.95E-42	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE122	0.	3.33E-01	3.33E-01	3.33E-01	3.33E-01	3.33E-01	3.33E-01	3.33E-01	3.33E-01	3.33E-01	3.33E-01	3.33E-01
IN123M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN123	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN123M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN123	0.	4.82E-01	1.75E-01	2.12E-09	0.	0.	0.	0.	0.	0.	0.	0.
SB123	0.	5.24E+00	5.55E+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
TE123M	0.	3.16E-05	1.07E-05	3.73E-14	0.	0.	0.	0.	0.	0.	0.	0.
TE123	0.	5.16E-04	5.37E-04	5.48E-04	5.48E-04	5.48E-04	5.48E-04	5.48E-04	5.48E-04	5.48E-04	5.48E-04	5.48E-04
IN124	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 WASTE DECAY TIMES CASE E-1 FP's

TABLE A-IV-2
(continued)

POWER= 38.40MW, BURNUP= 33000,MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE CONCENTRATIONS GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1, Y	10, Y	50, Y	100, Y	500, Y	1000, Y	5000, Y	10000, Y	100000, Y	******** Y
SN124	0.	7.71E+00	7.71E+00	7.71E+00	7.71E+00	7.71E+00	7.71E+00	7.71E+00	7.71E+00	7.71E+00	7.71E+00	7.71E+00
SB124M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB124	0.	2.95E-03	3.58E-04	1.15E-20	0.	0.	0.	0.	0.	0.	0.	0.
TE124	0.	1.13E-01	1.16E-01	1.16E-01	1.16E-01	1.16E-01	1.16E-01	1.16E-01	1.16E-01	1.16E-01	1.16E-01	1.16E-01
SN125M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN125	0.	2.15E-07	3.04E-13	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB125	0.	7.99E+00	7.03E+00	6.97E-01	2.42E-05	6.42E-11	0.	0.	0.	0.	0.	0.
TE125M	0.	1.90E-01	1.71E-01	1.70E-02	5.89E-07	1.57E-12	0.	0.	0.	0.	0.	0.
TE125	0.	3.29E+00	4.27E+00	1.08E+01	1.15E+01	1.15E+01	1.15E+01	1.15E+01	1.15E+01	1.15E+01	1.15E+01	1.15E+01
SN126	0.	1.99E+01	1.99E+01	1.99E+01	1.99E+01	1.99E+01	1.98E+01	1.97E+01	1.92E+01	1.85E+01	9.94E+00	1.94E-02
SB126M	0.	7.18E-09	7.18E-09	7.18E-09	7.18E-09	7.18E-09	7.16E-09	7.13E-09	6.94E-09	6.70E-09	3.59E-09	7.01E-12
SB126	0.	6.77E-06	6.73E-06	6.73E-06	6.73E-06	6.73E-06	6.71E-06	6.69E-06	6.50E-06	6.28E-06	3.37E-06	6.57E-09
TE126	0.	4.38E-02	4.38E-02	4.51E-02	5.06E-02	5.75E-02	1.12E-01	1.81E-01	7.21E-01	1.37E+00	9.98E+00	1.99E+01
SN127M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN127	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB127	0.	2.28E-15	1.48E-29	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE127M	0.	6.77E-01	2.12E-01	1.77E-10	0.	0.	0.	0.	0.	0.	0.	0.
TE127	0.	2.40E-03	7.53E-04	6.27E-13	0.	0.	0.	0.	0.	0.	0.	0.
I127	0.	4.04E-02	5.07E-01	7.20E-01	7.20E-01	7.20E-01	7.20E-01	7.20E-01	7.20E-01	7.20E-01	7.20E-01	7.20E-01
SN128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB128M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE128	0.	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02	1.37E+02
I128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN129M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN129	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB129	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE129M	0.	6.01E-02	1.45E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE129	0.	5.43E-05	1.31E-06	0.	0.	0.	0.	0.	0.	0.	0.	0.
I129	0.	2.31E-01	2.90E-01	2.92E-01	2.92E-01	2.92E-01	2.92E-01	2.92E-01	2.91E-01	2.91E-01	2.90E-01	2.80E-01
XE129M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE129	0.	0.	5.62E-09	1.13E-07	5.88E-07	1.18E-06	5.94E-06	1.19E-05	5.94E-05	1.19E-04	1.19E-03	1.16E-02
SN130	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB130M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB130	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE130	0.	4.28E+02	4.28E+02	4.28E+02	4.28E+02	4.28E+02	4.28E+02	4.28E+02	4.28E+02	4.28E+02	4.28E+02	4.28E+02
I130M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I130	0.	6.90-112	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE130	0.	0.	6.90-112	6.90-112	6.90-112	6.90-112	6.90-112	6.90-112	6.90-112	6.90-112	6.90-112	6.90-112
SN131	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB131	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE131M	0.	1.93E-45	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE131	0.	4.91E-48	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I131	0.	1.35E-09	1.99E-16	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE131M	0.	0.	7.38E-16	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE131	0.	0.	1.35E-09	1.35E-09	1.35E-09	1.35E-09	1.35E-09	1.35E-09	1.35E-09	1.35E-09	1.35E-09	1.35E-09
SN132	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB132M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB132	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE132	0.	5.81E-17	7.04E-34	0.	0.	0.	0.	0.	0.	0.	0.	0.
I132	0.	1.77E-21	2.14E-35	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-1 — FP's — TABLE A-IV-2 (continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
XE132	0.	0.	5.81E-17	5.81E-17	5.81E-17	5.81E-17	5.81E-17	5.81E-17	5.81E-17	5.81E-17	5.81E-17	5.81E-17
SB133	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE133M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE133	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I133	0.	2.33E-66	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE133	0.	0.	1.05E-76	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS133	0.	9.99E+02	9.99E+02	9.99E+02	9.99E+02	9.99E+02	9.99E+02	9.99E+02	9.99E+02	9.99E+02	9.99E+02	9.99E+02
SB134	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE134	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I134	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE134	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS134M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS134	0.	1.75E+02	1.48E+02	7.05E+00	9.41E-06	4.27E-13	0.	0.	0.	0.	0.	0.
BA134	0.	9.17E+01	1.19E+02	2.60E+02	2.67E+02	2.67E+02	2.67E+02	2.67E+02	2.67E+02	2.67E+02	2.67E+02	2.67E+02
TE135	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I135	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE135	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS135M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS135	0.	2.53E+02	2.53E+02	2.53E+02	2.53E+02	2.53E+02	2.53E+02	2.53E+02	2.53E+02	2.52E+02	2.47E+02	2.01E+02
BA135M	0.	4.03E-51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA135	0.	3.35E-02	3.36E-02	3.41E-02	3.64E-02	3.94E-02	6.27E-02	9.19E-02	3.25E-01	6.17E-01	5.81E+00	5.22E+01
I136	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE136	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS136	0.	5.38E-05	3.18E-09	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA136	0.	2.25E+01	2.25E+01	2.25E+01	2.25E+01	2.25E+01	2.25E+01	2.25E+01	2.25E+01	2.25E+01	2.25E+01	2.25E+01
I137	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE137	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS137	0.	1.24E+03	1.22E+03	9.92E+02	3.94E+02	1.24E+02	1.20E-02	1.15E-07	0.	0.	0.	0.
BA137M	0.	1.87E-04	1.85E-04	1.50E-04	5.95E-05	1.87E-05	1.81E-09	1.74E-14	0.	0.	0.	0.
BA137	0.	4.84E+01	6.26E+01	2.92E+02	8.91E+02	1.16E+03	1.28E+03	1.28E+03	1.28E+03	1.28E+03	1.28E+03	1.28E+03
I138	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE138	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS138	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA138	0.	1.22E+03	1.22E+03	1.22E+03	1.22E+03	1.22E+03	1.22E+03	1.22E+03	1.22E+03	1.22E+03	1.22E+03	1.22E+03
I139	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE139	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS139	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA139	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA139	0.	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03
XE140	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS140	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA140	0.	1.29E-03	6.52E-08	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA140	0.	1.94E-04	9.81E-09	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE140	0.	1.31E+03	1.31E+03	1.31E+03	1.31E+03	1.31E+03	1.31E+03	1.31E+03	1.31E+03	1.31E+03	1.31E+03	1.31E+03
XE141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE141	0.	1.25E+00	2.52E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR141	0.	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03

PWR = BU = 33,000 WASTE DECAY TIMES CASE E-1 FP's

POWER= 38,40MW, BURNUP= 33000,MWD, FLUX= 3,98E+13N/CM**2-SEC

TABLE A-IV-2
(continued)

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1, Y	10, Y	50, Y	100, Y	500, Y	1000, Y	5000, Y	10000, Y	100000, Y	Y******* Y
XE142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE142	0.	1,17E+03	1,17E+03	1,17E+03	1,17E+03	1,17E+03	1,17E+03	1,17E+03	1,17E+03	1,17E+03	1,17E+03	1,17E+03
PR142	0.	1,03E-70	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND142	0.	2,19E+01	2,19E+01	2,19E+01	2,19E+01	2,19E+01	2,19E+01	2,19E+01	2,19E+01	2,19E+01	2,19E+01	2,19E+01
XE143	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS143	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA143	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA143	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE143	0.	2,19E-40	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR143	0.	2,45E-03	2,38E-07	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND143	0.	7,79E+02	7,79E+02	7,79E+02	7,79E+02	7,79E+02	7,79E+02	7,79E+02	7,79E+02	7,79E+02	7,79E+02	7,79E+02
LA144	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE144	0.	2,68E+02	1,72E+02	5,63E-02	1,83E-17	8,01E-37	0.	0.	0.	0.	0.	0.
PR144	0.	1,14E-02	7,27E-03	2,38E-06	7,75E-22	3,39E-41	0.	0.	0.	0.	0.	0.
ND144	0.	1,09E+03	1,18E+03	1,36E+03	1,36E+03	1,36E+03	1,36E+03	1,36E+03	1,36E+03	1,36E+03	1,36E+03	1,36E+03
CE145	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR145	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND145	0.	6,87E+02	6,87E+02	6,87E+02	6,87E+02	6,87E+02	6,87E+02	6,87E+02	6,87E+02	6,87E+02	6,87E+02	6,87E+02
CE146	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR146	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND146	0.	7,05E+02	7,05E+02	7,05E+02	7,05E+02	7,05E+02	7,05E+02	7,05E+02	7,05E+02	7,05E+02	7,05E+02	7,05E+02
CE147	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR147	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND147	0.	1,05E-04	1,16E-09	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM147	0.	1,05E+02	9,17E+01	8,48E+00	2,15E-04	3,86E-10	0.	0.	0.	0.	0.	0.
SM147	0.	5,39E+01	6,68E+01	1,50E+02	1,59E+02	1,59E+02	1,59E+02	1,59E+02	1,59E+02	1,59E+02	1,59E+02	1,59E+02
CE148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND148	0.	3,73E+02	3,73E+02	3,73E+02	3,73E+02	3,73E+02	3,73E+02	3,73E+02	3,73E+02	3,73E+02	3,73E+02	3,73E+02
PM148M	0.	8,94E-02	4,39E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM148	0.	9,24E-04	4,53E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM148	0.	1,57E+02	1,58E+02	1,58E+02	1,58E+02	1,58E+02	1,58E+02	1,58E+02	1,58E+02	1,58E+02	1,58E+02	1,58E+02
PR149	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND149	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM149	0.	2,83E-25	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM149	0.	7,73E+00	7,73E+00	7,73E+00	7,73E+00	7,73E+00	7,73E+00	7,73E+00	7,73E+00	7,73E+00	7,73E+00	7,73E+00
ND150	0.	1,79E+02	1,79E+02	1,79E+02	1,79E+02	1,79E+02	1,79E+02	1,79E+02	1,79E+02	1,79E+02	1,79E+02	1,79E+02
PM150	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM150	0.	4,06E+02	4,06E+02	4,06E+02	4,06E+02	4,06E+02	4,06E+02	4,06E+02	4,06E+02	4,06E+02	4,06E+02	4,06E+02
ND151	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM151	0.	2,03E-48	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM151	0.	4,61E+01	4,59E+01	4,27E+01	3,11E+01	2,09E+01	8,61E-01	1,60E-02	2,30E-16	1,15E-33	0.	0.
EU151	0.	2,26E+01	4,10E+01	3,59E+00	1,53E+01	2,55E+01	4,55E+01	4,63E+01	4,63E+01	4,63E+01	4,63E+01	4,63E+01
PM152	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM152	0.	9,68E+01	9,68E+01	9,68E+01	9,68E+01	9,68E+01	9,68E+01	9,68E+01	9,68E+01	9,68E+01	9,68E+01	9,68E+01
EU152M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU152	0.	4,48E-02	4,35E-02	2,59E-02	2,57E-03	1,43E-04	1,32E-14	3,76E-27	0.	0.	0.	0.
GD152	0.	1,16E-01	1,17E-01	1,22E-01	1,28E-01	1,29E-01	1,29E-01	1,29E-01	1,29E-01	1,29E-01	1,29E-01	1,29E-01
PM153	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR • BU = 33,000 WASTE DECAY TIMES CASE E=1 FP's

TABLE A-IV-2
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	Y******* Y
SM153	0.	1.17E-28	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU153	0.	1.18E+02	1.18E+02	1.18E+02	1.18E+02	1.18E+02	1.18E+02	1.18E+02	1.18E+02	1.18E+02	1.18E+02	1.18E+02
GD153	0.	5.67E-03	3.36E-03	2.74E-07	1.83E-25	0.	0.	0.	0.	0.	0.	0.
PM154	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM154	0.	3.80E+01	3.80E+01	3.80E+01	3.80E+01	3.80E+01	3.80E+01	3.80E+01	3.80E+01	3.80E+01	3.80E+01	3.80E+01
EU154	0.	5.38E+01	5.27E+01	3.57E+01	6.30E+00	7.22E-01	2.15E-08	8.40E-18	0.	0.	0.	0.
GD154	0.	2.77E+00	3.92E+00	2.09E+01	5.03E+01	5.59E+01	5.66E+01	5.66E+01	5.66E+01	5.66E+01	5.66E+01	5.66E+01
SM155	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU155	0.	5.72E+00	4.73E+00	1.50E-01	3.34E-08	1.61E-16	0.	0.	0.	0.	0.	0.
GD155	0.	1.27E+00	2.27E+00	6.84E+00	6.99E+00	6.99E+00	6.99E+00	6.99E+00	6.99E+00	6.99E+00	6.99E+00	6.99E+00
SM156	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU156	0.	1.39E-03	3.00E-07	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD156	0.	1.05E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02	1.05E+02
SM157	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU157	0.	1.64E-89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD157	0.	4.48E-02	4.48E-02	4.48E-02	4.48E-02	4.48E-02	4.48E-02	4.48E-02	4.48E-02	4.48E-02	4.48E-02	4.48E-02
EU158	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD158	0.	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01	1.43E+01
EU159	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD159	0.	1.99E-76	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB159	0.	1.85E+00	1.85E+00	1.85E+00	1.85E+00	1.85E+00	1.85E+00	1.85E+00	1.85E+00	1.85E+00	1.85E+00	1.85E+00
EU160	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD160	0.	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
TB160	0.	2.61E-02	4.50E-03	8.47E-17	0.	0.	0.	0.	0.	0.	0.	0.
DY160	0.	4.40E-01	4.61E-01	4.66E-01	4.66E-01	4.66E-01	4.66E-01	4.66E-01	4.66E-01	4.66E-01	4.66E-01	4.66E-01
GD161	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB161	0.	7.55E-11	8.13E-19	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY161	0.	2.36E-01	2.36E-01	2.36E-01	2.36E-01	2.36E-01	2.36E-01	2.36E-01	2.36E-01	2.36E-01	2.36E-01	2.36E-01
GD162	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB162M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB162	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY162	0.	1.93E-01	1.93E-01	1.93E-01	1.93E-01	1.93E-01	1.93E-01	1.93E-01	1.93E-01	1.93E-01	1.93E-01	1.93E-01
TB163M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB163	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY163	0.	2.17E-01	2.17E-01	2.17E-01	2.17E-01	2.17E-01	2.17E-01	2.17E-01	2.17E-01	2.17E-01	2.17E-01	2.17E-01
TB164	0.	2.72E-62	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY164	0.	6.89E-02	6.89E-02	6.89E-02	6.89E-02	6.89E-02	6.89E-02	6.89E-02	6.89E-02	6.89E-02	6.89E-02	6.89E-02
DY165M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY165	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
HO165	0.	1.16E-01	1.16E-01	1.16E-01	1.16E-01	1.16E-01	1.16E-01	1.16E-01	1.16E-01	1.16E-01	1.16E-01	1.16E-01
DY166	0.	3.87E-21	2.50E-37	0.	0.	0.	0.	0.	0.	0.	0.	0.
HO166M	0.	4.77E-04	4.77E-04	4.75E-04	4.64E-04	4.51E-04	3.58E-04	2.68E-04	2.66E-05	1.48E-06	0.	0.
HO166	0.	1.91E-21	1.23E-37	0.	0.	0.	0.	0.	0.	0.	0.	0.
ER166	0.	3.12E-02	3.12E-02	3.12E-02	3.12E-02	3.12E-02	3.13E-02	3.14E-02	3.16E-02	3.17E-02	3.17E-02	3.17E-02
ER167	0.	5.54E-03	5.54E-03	5.54E-03	5.54E-03	5.54E-03	5.54E-03	5.54E-03	5.54E-03	5.54E-03	5.54E-03	5.54E-03
TOTAL	0.	2.88E+04	2.88E+04	2.88E+04	2.88E+04	2.88E+04	2.88E+04	2.88E+04	2.88E+04	2.88E+04	2.88E+04	2.88E+04

PWR = BU = 33,000 WASTE DECAY TIMES CASE E=1 Clad

TABLE A-IV-2
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******** Y
H 1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
H 2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
H 3	0.	5.19E-07	5.04E-07	3.04E-07	3.49E-08	1.90E-09	3.08E-19	1.78E-31	0.	0.	0.	0.
H 4	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
HE 3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
HE 4	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
HE 6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LI 6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LI 7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LI 8	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BE 8	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BE 9	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BE 10	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BE 11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
B 10	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
B 11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
B 12	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
C 12	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
C 13	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
C 14	0.	4.51E-06	4.51E-06	4.51E-06	4.48E-06	4.46E-06	4.25E-06	4.00E-06	2.46E-06	1.35E-06	2.51E-11	0.
N 13	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
N 14	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
N 15	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
N 16	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
O 16	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
O 17	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
O 18	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
O 19	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
F 19	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
F 20	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE 20	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE 21	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE 22	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE 23	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NA 22	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NA 23	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NA 24	0.	2.62E-90	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NA 25	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MG 24	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MG 25	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MG 26	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MG 27	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AL 27	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AL 28	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AL 29	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SI 28	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SI 29	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SI 30	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SI 31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
P 31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
P 32	0.	6.27E-06	8.97E-10	0.	0.	0.	0.	0.	0.	0.	0.	0.
P 33	0.	5.57E-05	3.52E-07	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 WASTE DECAY TIMES CASE E-1 — Clad

POWER= 38.40MW, BURNUP= 33000,MWD, FLUX= 3.98E+13N/CM**2-SEC

TABLE A-IV-2
(continued)

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
P 34	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S 32	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S 33	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S 34	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S 35	0.	1.74E-05	4.13E-06	2.34E-17	0.	0.	0.	0.	0.	0.	0.	0.
S 36	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S 37	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CL 35	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CL 36	0.	6.80E-11	6.80E-11	6.80E-11	6.80E-11	6.79E-11	6.79E-11	6.78E-11	6.72E-11	6.65E-11	5.43E-11	7.26E-12
CL 37	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CL 38	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AR 36	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AR 37	0.	1.45E-14	3.91E-16	0.	0.	0.	0.	0.	0.	0.	0.	0.
AR 38	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AR 39	0.	1.55E-16	1.55E-16	1.51E-16	1.37E-16	1.20E-16	4.28E-17	1.18E-17	3.94E-22	9.98E-28	0.	0.
AR 40	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AR 41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
K 39	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
K 40	0.	1.16E-29	1.16E-29	1.16E-29	1.16E-29	1.16E-29	1.16E-29	1.16E-29	1.16E-29	1.16E-29	1.16E-29	1.16E-29
K 41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
K 42	0.	6.48-118	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
K 43	0.	1.48E-67	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
K 44	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 40	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 42	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 43	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 44	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 45	0.	3.60E-06	1.67E-06	1.68E-12	0.	0.	0.	0.	0.	0.	0.	0.
CA 46	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 47	0.	5.09E-19	3.71E-31	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 48	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 49	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SC 45	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SC 46	0.	5.32E-03	1.18E-03	1.88E-15	0.	0.	0.	0.	0.	0.	0.	0.
SC 47	0.	1.48E-18	5.54E-31	0.	0.	0.	0.	0.	0.	0.	0.	0.
SC 48	0.	4.66E-33	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SC 49	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SC 50	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TI 46	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TI 47	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TI 48	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TI 49	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TI 50	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TI 51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 49	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 50	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 52	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 53	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 54	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR 50	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 WASTE DECAY TIMES CASE E-1 Clad

TABLE A-IV-2
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
CR 51	0.	6.31E-01	6.65E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR 52	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR 53	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR 54	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR 55	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MN 54	0.	1.68E+00	1.11E+00	6.01E-04	1.83E-18	1.31E-36	0.	0.	0.	0.	0.	0.
MN 55	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MN 56	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MN 57	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MN 58	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE 54	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE 55	0.	2.78E+00	2.43E+00	2.21E-01	5.16E-06	8.37E-12	0.	0.	0.	0.	0.	0.
FE 56	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE 57	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE 58	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE 59	0.	9.83E-02	5.90E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO 58M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO 58	0.	9.70E+00	1.64E+00	2.17E-14	0.	0.	0.	0.	0.	0.	0.	0.
CO 59	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO 60M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO 60	0.	1.38E+02	1.29E+02	3.94E+01	2.02E-01	2.78E-04	0.	0.	0.	0.	0.	0.
CO 61	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO 62	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NI 58	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NI 59	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NI 60	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NI 61	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NI 62	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NI 63	0.	4.06E-02	4.04E-02	3.78E-02	2.79E-02	1.92E-02	9.41E-04	2.17E-05	1.76E-18	7.66E-35	0.	0.
NI 64	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NI 65	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CU 62	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CU 63	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CU 64	0.	2.58-103	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CU 65	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CU 66	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 63	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 64	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 65	0.	1.29E-03	7.69E-04	7.02E-08	7.83E-26	0.	0.	0.	0.	0.	0.	0.
ZN 66	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 67	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 68	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 69M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 69	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 70	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 71M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 71	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 69	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 70	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 71	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 70	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 88	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR • BU • 33,000 WASTE DECAY TIMES CASE E•1 Clad

TABLE A-IV-2
(continued)

POWER• 38.40MW, BURNUP• 33000.MWD, FLUX• 3.98E+13N/CM••2•SEC

NUCLIDE THERMAL POWER, WATTS
BASIS • MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	Y******* Y
SR 89	0.	7.77E•03	6.81E•04	6.33E•23	0.	0.	0.	0.	0.	0.	0.	0.
SR 90	0.	7.06E•07	6.97E•07	5.59E•07	2.08E•07	6.07E•08	3.14E•12	1.38E•17	0.	0.	0.	0.
SR 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 90M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 90	0.	3.17E•06	3.13E•06	2.51E•06	9.36E•07	2.73E•07	1.41E•11	6.21E•17	0.	0.	0.	0.
Y 91M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 91	0.	2.85E•02	3.31E•03	4.89E•20	0.	0.	0.	0.	0.	0.	0.	0.
ZR 90	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 93	0.	6.55E•06	6.55E•06	6.55E•06	6.55E•06	6.55E•06	6.55E•06	6.55E•06	6.54E•06	6.52E•06	6.26E•06	4.13E•06
ZR 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 95	0.	1.46E+01	2.09E+00	1.24E•15	0.	0.	0.	0.	0.	0.	0.	0.
ZR 96	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 92	0.	1.37E•07	5.59E•13	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 93M	0.	1.70E•06	2.19E•06	9.29E•06	1.99E•05	2.13E•05	2.14E•05	2.13E•05	2.07E•05	2.02E•05	1.85E•05	1.22E•05
NB 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 94	0.	1.55E•06	1.55E•06	1.55E•06	1.55E•06	1.55E•06	1.55E•06	1.55E•06	1.55E•06	1.55E•06	1.54E•06	1.50E•06
NB 95	0.	2.57E+01	4.00E+00	2.43E•15	0.	0.	0.	0.	0.	0.	0.	0.
NB 96	0.	7.06E•59	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 97	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 93	0.	1.79E•05	1.79E•05	1.79E•05	1.79E•05	1.78E•05	1.73E•05	1.66E•05	1.22E•05	8.30E•06	8.10E•09	0.
MO 93M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 96	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 97	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 98	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 99	0.	6.56E•20	1.33E•39	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO100	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC 99M	0.	2.68E•20	5.42E•40	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC 99	0.	9.51E•06	9.51E•06	9.51E•06	9.51E•06	9.51E•06	9.50E•06	9.48E•06	9.36E•06	9.20E•06	6.84E•06	3.51E•07
TC101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD113M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD113	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD115M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD115	0.	7.76E•31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD119M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN113	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN119M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN121M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN114	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN115	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN116	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN117M	0.	1.69E•03	2.00E•07	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 WASTE DECAY TIMES CASE E=1 Clad

TABLE A-IV-2
(continued)

POWER= 38.40MW, BURNUP= 33000,MWD, FLUX= 3.98E+13N/CM**2=SEC

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1, Y	10, Y	50, Y	100, Y	500, Y	1000, Y	5000, Y	10000, Y	100000, Y	******** Y
SN117	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN118	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN119M	0.	4.93E-03	2.97E-03	3.27E-07	8.33E-25	0.	0.	0.	0.	0.	0.	0.
SN119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN120	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN121M	0.	1.87E-04	1.86E-04	1.71E-04	1.19E-04	7.53E-05	1.96E-06	2.05E-08	2.91E-24	4.55E-44	0.	0.
SN121	0.	1.07E-49	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN122	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN123M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN123	0.	3.79E-04	1.38E-04	1.67E-12	0.	0.	0.	0.	0.	0.	0.	0.
SN124	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN125M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN125	0.	2.06E-08	2.92E-14	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB123	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB124M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB124	0.	4.51E-03	5.47E-04	1.75E-20	0.	0.	0.	0.	0.	0.	0.	0.
SB125	0.	9.50E-02	8.36E-02	8.29E-03	2.87E-07	7.64E-13	0.	0.	0.	0.	0.	0.
SB126M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB126	0.	9.35E-08	3.74E-12	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE124	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE125M	0.	8.19E-03	7.32E-03	7.28E-04	2.52E-08	6.71E-14	0.	0.	0.	0.	0.	0.
TE125	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE126	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TA180	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TA181	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TA182M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TA182	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W180	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W181	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W182	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W183M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W183	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W184	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W185M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W185	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W186	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W187	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	0.	1.93E+02	1.41E+02	3.97E+01	2.31E-01	1.96E-02	1.00E-03	8.13E-05	5.29E-05	4.72E-05	3.31E-05	1.82E-05

PWR = BU = 33,000. WASTE DECAY TIMES CASE E-1

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

HE's

TABLE A-IV-2
(continued)

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1, Y	10, Y	50, Y	100, Y	500, Y	1000, Y	5000, Y	10000, Y	100000, Y	******* Y
HE 4	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TL207	0.	3.11E-09	4.49E-09	2.17E-08	5.91E-08	7.07E-08	7.53E-08	7.73E-08	9.39E-08	1.17E-07	7.94E-07	1.09E-06
TL208	0.	1.88E-05	1.60E-05	1.33E-06	5.96E-07	3.68E-07	7.83E-09	6.43E-11	3.85E-12	8.89E-12	1.37E-10	1.40E-09
TL209	0.	1.23E-11	1.25E-11	1.47E-11	7.18E-11	2.52E-10	6.09E-09	2.45E-08	5.71E-07	1.99E-06	4.65E-05	1.04E-04
PB206	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PB207	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PB208	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PB209	0.	3.94E-11	4.00E-11	4.71E-11	2.30E-10	8.04E-10	1.95E-08	7.82E-08	1.82E-06	6.37E-06	1.49E-04	3.33E-04
PB210	0.	2.41E-14	3.66E-14	7.42E-13	1.11E-11	3.28E-11	5.91E-10	2.17E-09	3.44E-08	8.80E-08	6.92E-07	1.86E-07
PB211	0.	3.45E-09	4.99E-09	2.41E-08	6.55E-08	7.84E-08	8.35E-08	8.57E-08	1.04E-07	1.30E-07	8.81E-07	1.21E-06
PB212	0.	3.22E-06	2.74E-06	2.28E-07	1.02E-07	6.30E-08	1.34E-09	1.10E-11	6.58E-13	1.52E-12	2.35E-11	2.40E-10
PB214	0.	4.00E-11	5.21E-11	2.65E-10	1.28E-09	2.83E-09	3.47E-08	1.27E-07	2.02E-06	5.17E-06	4.06E-05	1.09E-05
BI209	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BI210	0.	1.50E-12	2.32E-12	4.71E-11	7.02E-10	2.08E-09	3.75E-08	1.38E-07	2.18E-06	5.58E-06	4.39E-05	1.18E-05
BI211	0.	4.01E-08	5.81E-08	2.81E-07	7.63E-07	9.13E-07	9.73E-07	9.98E-07	1.21E-06	1.51E-06	1.03E-05	1.41E-05
BI212	0.	3.89E-05	3.32E-05	2.76E-06	1.23E-06	7.63E-07	1.62E-08	1.33E-10	7.97E-12	1.84E-11	2.84E-10	2.90E-09
BI213	0.	2.11E-10	2.14E-10	2.52E-10	1.23E-09	4.30E-09	1.04E-07	4.18E-07	9.75E-06	3.41E-05	7.95E-04	1.78E-03
BI214	0.	2.29E-10	2.98E-10	1.51E-09	7.33E-09	1.62E-08	1.98E-07	7.28E-07	1.15E-05	2.95E-05	2.32E-04	6.24E-05
PO210	0.	1.14E-11	1.85E-11	5.63E-10	8.40E-09	2.49E-08	4.48E-07	1.65E-06	2.61E-05	6.68E-05	5.25E-04	1.41E-04
PO211	0.	1.37E-10	1.98E-10	9.56E-10	2.60E-09	3.11E-09	3.31E-09	3.40E-09	4.13E-09	5.15E-09	3.49E-08	4.79E-08
PO212	0.	7.61E-05	6.49E-05	5.39E-06	2.41E-06	1.49E-06	3.17E-08	2.60E-10	1.56E-11	3.60E-11	5.55E-10	5.67E-09
PO213	0.	1.67E-09	1.69E-09	1.99E-09	9.70E-09	3.40E-08	8.22E-07	3.30E-06	7.70E-05	2.69E-04	6.28E-03	1.41E-02
PO214	0.	7.49E-10	9.75E-10	4.96E-09	2.40E-08	5.29E-08	6.48E-07	2.38E-06	3.78E-05	9.67E-05	7.60E-04	2.04E-04
PO215	0.	4.51E-08	6.53E-08	3.16E-07	8.58E-07	1.03E-06	1.09E-06	1.12E-06	1.36E-06	1.70E-06	1.15E-05	1.58E-05
PO216	0.	9.18E-05	7.83E-05	6.50E-06	2.91E-06	1.80E-06	3.82E-08	3.14E-10	1.88E-11	4.34E-11	6.69E-10	6.84E-09
PO218	0.	5.95E-10	7.75E-10	3.94E-09	1.91E-08	4.20E-08	5.16E-07	1.89E-06	3.00E-05	7.69E-05	6.04E-04	1.62E-04
AT217	0.	1.44E-09	1.46E-09	1.72E-09	8.37E-09	2.93E-08	7.09E-07	2.85E-06	6.65E-05	2.32E-04	5.42E-03	1.21E-02
RN219	0.	4.17E-08	6.04E-08	2.92E-07	7.93E-07	9.49E-07	1.01E-06	1.04E-06	1.26E-06	1.57E-06	1.07E-05	1.46E-05
RN220	0.	8.50E-05	7.25E-05	6.02E-06	2.69E-06	1.67E-06	3.54E-08	2.91E-10	1.74E-11	4.02E-11	6.20E-10	6.34E-09
RN222	0.	5.36E-10	6.97E-10	3.54E-09	1.72E-08	3.78E-08	4.64E-07	1.70E-06	2.70E-05	6.91E-05	5.44E-04	1.46E-04
FR221	0.	1.28E-09	1.29E-09	1.52E-09	7.43E-09	2.60E-08	6.30E-07	2.53E-06	5.90E-05	2.06E-04	4.81E-03	1.08E-02
FR223	0.	3.66E-11	4.87E-11	2.36E-10	6.42E-10	7.68E-10	8.19E-10	8.40E-10	1.02E-09	1.27E-09	8.64E-09	1.19E-08
RA223	0.	3.58E-08	5.18E-08	2.51E-07	6.81E-07	8.14E-07	8.68E-07	8.91E-07	1.08E-06	1.35E-06	9.15E-06	1.26E-05
RA224	0.	7.67E-05	6.54E-05	5.44E-06	2.43E-06	1.50E-06	3.19E-08	2.62E-10	1.57E-11	3.63E-11	5.60E-10	5.72E-09
RA225	0.	2.27E-11	2.29E-11	2.70E-11	1.31E-10	4.60E-10	1.11E-08	4.48E-08	1.04E-06	3.65E-06	8.51E-05	1.90E-04
RA226	0.	4.69E-10	6.06E-10	3.08E-09	1.49E-08	3.29E-08	4.03E-07	1.48E-06	2.35E-05	6.01E-05	4.72E-04	1.27E-04
RA228	0.	2.01E-16	2.87E-16	1.29E-15	2.10E-15	2.36E-15	4.47E-15	7.22E-15	3.54E-14	8.17E-14	1.26E-12	1.29E-11
AC225	0.	1.18E-09	1.19E-09	1.41E-09	6.85E-09	2.40E-08	5.81E-07	2.34E-06	5.45E-05	1.90E-04	4.44E-03	9.93E-03
AC227	0.	5.63E-10	7.49E-10	3.63E-09	9.87E-09	1.18E-08	1.26E-08	1.29E-08	1.57E-08	1.96E-08	1.33E-07	1.82E-07
AC228	0.	1.38E-14	1.98E-14	8.89E-14	1.45E-13	1.62E-13	3.08E-13	4.97E-13	2.44E-12	5.63E-12	8.68E-11	8.87E-10
TH227	0.	3.61E-08	5.05E-08	2.45E-07	6.65E-07	7.96E-07	8.47E-07	8.70E-07	1.06E-06	1.32E-06	8.94E-06	1.23E-05
TH228	0.	7.44E-05	6.23E-05	5.19E-06	2.33E-06	1.44E-06	3.06E-08	2.51E-10	1.50E-11	3.47E-11	5.36E-10	5.47E-09
TH229	0.	1.05E-09	1.05E-09	1.24E-09	6.04E-09	2.11E-08	5.12E-07	2.06E-06	4.80E-05	1.68E-04	3.91E-03	8.75E-03
TH230	0.	6.28E-07	6.28E-07	6.42E-07	7.50E-07	9.64E-07	3.83E-06	7.87E-06	3.95E-05	7.70E-05	4.71E-04	1.27E-04
TH231	0.	1.36E-05	6.79E-08	6.79E-08	6.80E-08	6.81E-08	6.86E-08	6.94E-08	7.78E-08	9.19E-08	2.70E-07	2.85E-07
TH232	0.	6.01E-13	6.02E-13	6.16E-13	6.78E-13	7.56E-13	1.40E-12	2.27E-12	1.11E-11	2.56E-11	3.96E-10	4.04E-09
TH233	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TH234	0.	1.12E-04	1.14E-06	5.59E-07	5.59E-07	5.59E-07	5.59E-07	5.59E-07	5.59E-07	5.59E-07	5.59E-07	5.59E-07
PA231	0.	7.41E-07	7.41E-07	7.42E-07	7.43E-07	7.45E-07	7.62E-07	7.82E-07	9.50E-07	1.19E-06	8.04E-06	1.10E-05
PA232	0.	7.22E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PA233	0.	4.43E-04	4.43E-04	4.44E-04	4.48E-04	4.52E-04	4.79E-04	4.95E-04	5.08E-04	5.08E-04	4.93E-04	3.68E-04
PA234M	0.	1.62E-03	1.65E-05	8.08E-06	8.08E-06	8.08E-06	8.08E-06	8.08E-06	8.08E-06	8.08E-06	8.08E-06	8.08E-06

PWR = BU = 33,000 WASTE DECAY TIMES CASE E-1 — HE's

TABLE A-IV-2 (continued)

POWER= 38.40MW, BURNUP= 33000,MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1, Y	10, Y	50, Y	100, Y	500, Y	1000, Y	5000, Y	10000, Y	100000, Y	******* Y
PA234	0.	2.85E-06	2.91E-08	1.43E-08	1.43E-08	1.43E-08	1.43E-08	1.43E-08	1.43E-08	1.43E-08	1.43E-08	1.43E-08
U232	0.	1.28E-06	1.52E-06	3.04E-06	2.22E-06	1.37E-06	2.92E-08	2.37E-10	4.43E-27	5.49E-48	0.	0.
U233	0.	7.94E-09	2.83E-08	3.96E-07	2.04E-06	4.11E-06	2.13E-05	4.37E-05	2.28E-04	4.55E-04	3.75E-03	8.42E-03
U234	5.65E-02	1.54E-04	1.55E-04	2.10E-04	4.11E-04	5.88E-04	9.43E-04	9.58E-04	9.48E-04	9.35E-04	7.37E-04	1.01E-04
U235	1.90E-03	2.39E-06	2.39E-06	2.39E-06	2.39E-06	2.40E-06	2.41E-06	2.44E-06	2.74E-06	3.23E-06	9.52E-06	1.00E-05
U236	0.	3.52E-05	3.52E-05	3.52E-05	3.54E-05	3.57E-05	3.80E-05	4.08E-05	5.87E-05	7.28E-05	9.36E-05	9.12E-05
U237	0.	9.99E-06	9.72E-06	6.34E-06	9.50E-07	8.91E-08	6.76E-10	6.48E-10	4.63E-10	3.05E-10	1.61E-13	0.
U238	8.16E-03	3.97E-05	3.97E-05	3.97E-05	3.97E-05	3.97E-05	3.97E-05	3.97E-05	3.97E-05	3.97E-05	3.97E-05	3.97E-05
U239	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
U240	0.	3.98E-20	5.57E-18	1.05E-16	5.47E-16	1.10E-15	5.52E-15	1.10E-14	5.50E-14	1.09E-13	9.99E-13	4.57E-12
NP236	0.	9.08E-63	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NP237	0.	9.63E-03	9.63E-03	9.65E-03	9.73E-03	9.84E-03	1.04E-02	1.08E-02	1.10E-02	1.10E-02	1.07E-02	8.01E-03
NP238	0.	2.98E-23	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NP239	0.	2.32E-02	2.32E-02	2.32E-02	2.31E-02	2.30E-02	2.22E-02	2.12E-02	1.48E-02	9.38E-03	2.69E-06	4.54E-11
NP240M	0.	4.01E-17	2.81E-17	5.30E-16	2.76E-15	5.55E-15	2.79E-14	5.57E-14	2.78E-13	5.52E-13	5.04E-12	2.31E-11
NP240	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PU236	0.	6.04E-05	5.35E-05	5.99E-06	3.57E-10	1.86E-15	0.	0.	0.	0.	0.	0.
PU238	0.	3.80E-01	1.56E+00	2.40E+00	1.75E+00	1.19E+00	5.27E-02	1.08E-03	3.77E-14	4.71E-24	0.	0.
PU239	0.	5.14E-02	5.15E-02	5.16E-02	5.22E-02	5.29E-02	5.82E-02	6.45E-02	1.01E-01	1.24E-01	1.72E-02	1.04E-09
PU240	0.	7.59E-02	7.89E-02	1.25E-01	2.13E-01	2.33E-01	2.27E-01	2.16E-01	1.43E-01	8.56E-02	8.40E-06	1.14E-10
PU241	0.	2.59E-02	2.53E-02	1.65E-02	2.47E-03	2.32E-04	1.76E-06	1.69E-06	1.21E-06	7.94E-07	4.18E-10	0.
PU242	0.	2.57E-04	2.57E-04	2.57E-04	2.57E-04	2.57E-04	2.57E-04	2.57E-04	2.57E-04	2.55E-04	2.17E-04	4.19E-05
PU243	0.	2.48E-13	4.97E-11	4.97E-11	4.97E-11	4.97E-11	4.97E-11	4.97E-11	4.97E-11	4.97E-11	4.95E-11	4.76E-11
PU244	0.	8.83E-19	1.24E-16	2.33E-15	1.22E-14	2.44E-14	1.23E-13	2.45E-13	1.22E-12	2.43E-12	2.22E-11	1.02E-10
PU245	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AM241	0.	7.36E+00	7.37E+00	7.50E+00	7.40E+00	6.89E+00	3.64E+00	1.63E+00	3.72E-03	6.39E-04	3.55E-07	0.
AM242M	0.	1.31E+06	1.30E+06	1.25E+06	1.04E+06	8.30E+07	1.34E+07	1.37E+08	1.63E+16	2.04E+26	0.	0.
AM242	0.	6.12E+06	6.11E+06	5.86E+06	4.89E+06	3.89E+06	6.28E+07	6.42E+08	7.65E+16	9.56E+26	0.	0.
AM243	0.	6.27E+01	6.27E+01	6.26E+01	6.24E+01	6.21E+01	5.99E+01	5.73E+01	3.99E+01	2.53E+01	7.27E+05	1.23E+09
AM244	0.	6.16E+20	4.31E+20	8.14E+19	4.24E+18	8.52E+18	4.28E+17	8.55E+17	4.26E+16	8.48E+16	7.74E+15	3.54E+14
AM245	0.	3.91E+28	1.21E+45	0.	0.	0.	0.	0.	0.	0.	0.	0.
CM242	0.	4.86E+02	2.23E+02	3.22E-04	1.11E-04	8.81E-05	1.42E-05	1.45E-06	1.74E-14	2.17E-24	0.	0.
CM243	0.	1.49E+01	1.48E+01	1.22E+01	5.11E+02	1.73E-02	2.98E-06	5.90E-11	0.	0.	0.	0.
CM244	0.	6.82E+01	6.69E+01	4.74E+01	1.02E+01	1.51E+00	3.35E-07	2.02E-15	2.00E-15	3.98E-15	3.64E-14	1.67E-13
CM245	0.	1.39E-03	1.39E-03	1.39E-03	1.38E-03	1.37E-03	1.33E-03	1.27E-03	9.11E-04	5.99E-04	3.16E-07	0.
CM246	0.	3.01E-04	3.01E-04	3.00E-04	2.98E-04	2.96E-04	2.79E-04	2.60E-04	1.44E-04	6.90E-05	1.22E-10	0.
CM247	0.	1.10E-09	1.10E-09	1.10E-09	1.10E-09	1.10E-09	1.10E-09	1.10E-09	1.10E-09	1.10E-09	1.10E-09	1.06E-09
CM248	0.	1.46E-08	1.46E-08	1.46E-08	1.46E-08	1.46E-08	1.46E-08	1.46E-08	1.46E-08	1.45E-08	1.44E-08	1.20E-08	2.04E-09
CM249	0.	2.26E-43	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CM250	0.	2.18E-14	2.18E-14	2.17E-14	2.14E-14	2.09E-14	1.78E-14	1.46E-14	2.97E-15	4.05E-16	1.09E-31	0.
BK249	0.	3.40E-24	1.05E-41	0.	0.	0.	0.	0.	0.	0.	0.	0.
BK250	0.	1.68E-16	1.68E-16	1.68E-16	1.65E-16	1.62E-16	1.38E-16	1.13E-16	2.30E-17	3.13E-18	8.39E-34	0.
CF249	0.	4.55E-06	4.13E-06	7.01E-07	2.66E-10	1.41E-14	0.	0.	0.	0.	0.	0.
CF250	0.	4.40E-07	3.37E-07	2.86E-09	6.91E-16	6.75E-16	5.76E-16	4.72E-16	9.58E-17	1.31E-17	3.51E-33	0.
CF251	0.	3.93E-10	3.93E-10	3.90E-10	3.78E-10	3.64E-10	2.67E-10	1.82E-10	8.35E-12	1.78E-13	0.	0.
CF252	0.	1.42E-07	1.24E-07	1.18E-08	3.31E-13	6.77E-19	0.	0.	0.	0.	0.	0.
CF253	0.	2.64E-41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CF254	0.	-4.53E-19	-3.70E-28	0.	0.	0.	0.	0.	0.	0.	0.	0.
ES253	0.	-1.86E-33	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	6.65E-02	5.63E+02	3.00E+02	5.82E+01	2.04E+01	1.05E+01	4.61E+00	2.52E+00	6.76E-01	4.88E-01	6.31E-02	7.62E-02

PWR = BU = 33,000 WASTE DECAY TIMES CASE E-1

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

FP's

TABLE A-IV-2
(continued)

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	Y******* Y
H 3	0.	2.02E-03	1.97E-03	1.18E-03	1.24E-04	7.43E-06	1.20E-15	6.95E-28	0.	0.	0.	0.
ZN 72	0.	1.38E-30	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 72	0.	3.20E-29	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 72	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 73	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 73	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 74	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 74	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 75	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 75M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 75	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 75	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 76	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 76	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 76	0.	2.49E-51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 76	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 77M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 77	0.	1.37-116	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 77	0.	3.50E-34	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 77M	0.	7.03E-37	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 77	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 78	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 78M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 78	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 78	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 79	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 79M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 79	0.	1.50E-04	1.50E-04	1.50E-04	1.50E-04	1.50E-04	1.49E-04	1.48E-04	1.42E-04	1.35E-04	5.16E-05	3.50E-09
BR 79	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 80	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 80	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 80M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 80	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 80	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 81M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 81M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 82	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 82M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 82	0.	1.95E-39	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 82	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 83M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 83	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 83	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 83M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 83	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 84	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 84M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 84	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 WASTE DECAY TIMES CASE E-1 FP's

TABLE A-IV-2
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2=SEC

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	Y******* Y
KR 84	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BE 85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 85M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 86	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 86	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 86M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 86	0.	3.55E-03	4.07E-06	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 86	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 87	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 87	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 87	0.	1.26E-08	1.26E-08	1.26E-08	1.26E-08	1.26E-08	1.26E-08	1.26E-08	1.26E-08	1.26E-08	1.26E-08	1.26E-08
SR 87M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 87	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 88	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 88	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 88	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 88	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 89	0.	2.87E+02	2.51E+01	2.34E-18	0.	0.	0.	0.	0.	0.	0.	0.
Y 89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 90	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 90	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 90	0.	9.94E+01	9.82E+01	7.86E+01	2.93E+01	8.54E+00	4.42E-04	1.94E-09	0.	0.	0.	0.
Y 90M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 90	0.	4.47E+02	4.41E+02	3.53E+02	1.32E+02	3.84E+01	1.99E-03	8.74E-09	0.	0.	0.	0.
ZR 90	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 91M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 91	0.	5.30E+02	6.16E+01	9.10E-16	0.	0.	0.	0.	0.	0.	0.	0.
ZR 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 93	0.	2.21E-04	2.21E-04	2.21E-04	2.21E-04	2.21E-04	2.21E-04	2.21E-04	2.21E-04	2.20E-04	2.11E-04	1.39E-04
NB 93M	0.	2.79E-05	3.56E-05	1.45E-04	3.07E-04	3.30E-04	3.32E-04	3.32E-04	3.31E-04	3.30E-04	3.17E-04	2.09E-04
NB 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 WASTE DECAY TIMES CASE E=1 FP's

TABLE A-IV-2
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2=SEC

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
Y 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 95	0.	1.31E+03	1.87E+02	1.11E-13	0.	0.	0.	0.	0.	0.	0.	0.
NB 95M	0.	7.39E+00	1.05E+00	6.27E-16	0.	0.	0.	0.	0.	0.	0.	0.
NB 95	0.	2.35E+03	3.65E+02	2.22E-13	0.	0.	0.	0.	0.	0.	0.	0.
MO 95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 96	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 96	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 96	0.	1.09E-56	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 96	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 97	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 97	0.	3.19E-74	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 97M	0.	1.46E-74	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 97	0.	2.53E-74	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 97	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 98	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 98M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 98	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 98	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 99	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 99	0.	1.53E-16	3.09E-36	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC 99M	0.	3.04E-17	6.15E-37	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC 99	0.	9.66E-03	9.66E-03	9.66E-03	9.66E-03	9.66E-03	9.65E-03	9.63E-03	9.51E-03	9.35E-03	6.97E-03	3.67E-08
RU 99	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB100	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO100	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC100	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU100	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO102	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC102M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC102	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU102	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO103	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC103	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU103	0.	2.12E+02	8.65E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH103M	0.	3.05E+01	1.25E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH103	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO104	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC104	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU104	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH104M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH104	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD104	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO105	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC105	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 WASTE DECAY TIMES CASE E-1 FP's

TABLE A-IV-2
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	Y******** Y
RU105	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH105M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH105	0.	2.01E-34	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD105	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC106	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU106	0.	2.70E+01	1.91E+01	3.85E-02	3.99E-14	4.17E-29	0.	0.	0.	0.	0.	0.
RH106M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH106	0.	4.79E+03	3.39E+03	6.83E+00	7.07E-12	7.39E-27	0.	0.	0.	0.	0.	0.
PD106	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU107	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH107	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD107M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD107	0.	9.60E-06	9.60E-06	9.60E-06	9.60E-06	9.60E-06	9.60E-06	9.60E-06	9.59E-06	9.59E-06	9.50E-06	8.69E-06
AG107	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU108	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH108	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD108	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG108	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD108	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH109	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD109M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD109	0.	1.21E-95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG109M	0.	3.63E-09	2.74E-09	1.79E-11	3.50E-21	2.55E-33	0.	0.	0.	0.	0.	0.
AG109	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD109	0.	3.46E-09	2.62E-09	1.71E-11	3.34E-21	2.44E-33	0.	0.	0.	0.	0.	0.
RH110	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD110	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG110M	0.	4.63E+01	2.81E+01	3.44E-03	1.42E-20	0.	0.	0.	0.	0.	0.	0.
AG110	0.	2.59E+00	1.57E+00	1.92E-04	7.92E-22	0.	0.	0.	0.	0.	0.	0.
CD110	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD111M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD111	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG111M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG111	0.	6.08E-06	2.84E-13	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD111M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD111	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD112	0.	2.22E-62	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG112	0.	4.09E-61	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD112	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD113	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG113M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG113	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD113M	0.	1.52E-02	1.48E-02	9.48E-03	1.31E-03	1.10E-04	2.75E-13	4.87E-24	0.	0.	0.	0.
CD113	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN113	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD114	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG114	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD114	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN114M	0.	1.47E-04	1.17E-05	1.88E-25	0.	0.	0.	0.	0.	0.	0.	0.
IN114	0.	6.18E-04	4.91E-05	7.92E-25	0.	0.	0.	0.	0.	0.	0.	0.
SN114	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD115	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 WASTE DECAY TIMES CASE E-1 FP's

TABLE A-IV-2
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
AG115M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG115	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD115M	0.	1.37E-01	7.24E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD115	0.	6.87E-24	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN115M	0.	4.43E-24	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN115	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN115	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG116	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD116	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN116M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN116	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN116	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG117	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD117M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD117	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN117M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN117	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN117M	0.	3.66E-05	4.33E-09	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN117	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD118	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN118M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN118	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN118	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD119M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN119M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN119M	0.	1.27E-02	7.67E-03	8.44E-07	2.15E-24	0.	0.	0.	0.	0.	0.	0.
SN119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD120	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN120M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN120	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN120	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN121M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN121M	0.	7.66E-07	7.63E-07	7.02E-07	4.88E-07	3.09E-07	8.05E-09	8.41E-11	1.20E-26	1.87E-46	0.	0.
SN121	0.	8.64E-49	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN122	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN122	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB122M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB122	0.	1.95E-19	4.51E-39	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE122	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN123M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN123	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN123M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN123	0.	1.45E+01	5.27E+00	6.38E-08	0.	0.	0.	0.	0.	0.	0.	0.
SB123	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE123M	0.	8.44E-04	2.86E-04	9.95E-13	0.	0.	0.	0.	0.	0.	0.	0.
TE123	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN124	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 WASTE DECAY TIMES CASE E=1 FP's

TABLE A-IV-2
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	Y******* Y
SN124	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB124M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB124	0.	7.12E-01	8.63E-02	2.77E-18	0.	0.	0.	0.	0.	0.	0.	0.
TE124	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN125M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN125	0.	1.52E-04	2.15E-10	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB125	0.	3.43E+01	3.02E+01	2.99E+00	1.04E-04	2.76E-10	0.	0.	0.	0.	0.	0.
TE125M	0.	5.89E+00	5.29E+00	5.26E-01	1.82E-05	4.85E-11	0.	0.	0.	0.	0.	0.
TE125	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN126	0.	6.09E-04	6.09E-04	6.09E-04	6.08E-04	6.08E-04	6.07E-04	6.04E-04	5.88E-04	5.68E-04	3.04E-04	5.94E-07
SB126M	0.	3.81E-03	3.81E-03	3.81E-03	3.81E-03	3.81E-03	3.80E-03	3.79E-03	3.68E-03	3.56E-03	1.91E-03	3.72E-06
SB126	0.	7.31E-03	7.27E-03	7.27E-03	7.26E-03	7.26E-03	7.24E-03	7.22E-03	7.02E-03	6.78E-03	3.63E-03	7.09E-06
TE126	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN127M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN127	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB127	0.	3.82E-12	2.48E-26	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE127M	0.	3.52E+00	1.10E+00	9.19E-10	0.	0.	0.	0.	0.	0.	0.	0.
TE127	0.	1.02E+01	3.19E+00	2.66E-09	0.	0.	0.	0.	0.	0.	0.	0.
I127	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB128M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN129M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN129	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB129	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE129M	0.	3.56E+00	8.59E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE129	0.	4.17E+00	1.01E-01	0.	0.	0.	0.	0.	0.	0.	0.	0.
I129	0.	2.48E-08	3.11E-08	3.13E-08	3.13E-08	3.13E-08	3.13E-08	3.13E-08	3.13E-08	3.13E-08	3.12E-08	3.00E-08
XE129M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE129	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN130	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB130M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB130	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE130	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I130M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I130	0.	1.92-107	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE130	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN131	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB131	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE131M	0.	2.19E-41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE131	0.	2.13E-42	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I131	0.	5.83E-07	8.62E-14	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE131M	0.	0.	1.21E-13	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE131	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN132	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB132M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB132	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE132	0.	4.02E-14	4.86E-31	0.	0.	0.	0.	0.	0.	0.	0.	0.
I132	0.	3.14E-16	3.80E-30	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-1 FP's

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	Y******* Y
XE132	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB133	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE133M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE133	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I133	0.	1.83E-62	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE133	0.	0.	3.07E-74	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS133	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB134	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE134	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I134	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE134	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS134M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS134	0.	2.41E+03	2.04E+03	9.72E+01	1.30E-04	5.89E-12	0.	0.	0.	0.	0.	0.
BA134	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE135	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I135	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE135	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS135M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS135	0.	1.09E-04	1.09E-04	1.09E-04	1.09E-04	1.09E-04	1.09E-04	1.09E-04	1.08E-04	1.08E-04	1.06E-04	8.61E-05
BA135M	0.	1.04E-48	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA135	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I136	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE136	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS136	0.	5.46E-02	3.22E-06	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA136	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I137	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE137	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS137	0.	1.76E+02	1.74E+02	1.41E+02	5.61E+01	1.77E+01	1.71E-03	1.64E-08	0.	0.	0.	0.
BA137M	0.	3.95E+02	3.91E+02	3.17E+02	1.26E+02	3.97E+01	3.84E-03	3.69E-08	0.	0.	0.	0.
BA137	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I138	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE138	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS138	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA138	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I139	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE139	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS139	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA139	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA139	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE140	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS140	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA140	0.	3.13E-01	1.59E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA140	0.	1.90E+00	9.64E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE140	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE141	0.	7.04E+01	1.42E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-1 FP'S

TABLE A-IV-2
(continued)

POWER= 38.40MW, BURNUP= 33000,MWD, FLUX= 3.98E+13N/CM**2-SEC

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1, Y	10, Y	50, Y	100, Y	500, Y	1000, Y	5000, Y	10000, Y	100000, Y	******* Y
XE142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR142	0.	6.43E-67	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE143	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS143	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA143	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA143	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE143	0.	7.24E-37	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR143	0.	3.55E-01	3.44E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND143	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA144	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE144	0.	7.01E+02	4.49E+02	1.47E-01	4.79E-17	2.09E-36	0.	0.	0.	0.	0.	0.
PR144	0.	6.64E+03	4.25E+03	1.39E+00	4.53E-16	1.98E-35	0.	0.	0.	0.	0.	0.
ND144	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE145	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR145	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND145	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE146	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR146	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND146	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE147	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR147	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND147	0.	2.72E-02	3.03E-07	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM147	0.	5.01E+01	4.39E+01	4.06E+00	1.03E-04	1.85E-10	0.	0.	0.	0.	0.	0.
SM147	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM148M	0.	2.33E+01	1.14E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM148	0.	1.22E+00	6.01E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR149	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND149	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM149	0.	2.82E-22	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM149	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND150	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM150	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM150	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND151	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM151	0.	4.79E-45	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM151	0.	2.19E+00	2.18E+00	2.03E+00	1.47E+00	9.90E-01	4.09E-02	7.61E-04	1.09E-17	5.44E-35	0.	0.
EU151	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM152	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM152	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU152M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU152	0.	1.57E-01	1.53E-01	9.09E-02	9.02E-03	5.02E-04	4.63E-14	1.32E-26	0.	0.	0.	0.
GD152	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM153	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR = BU = 33,000 WASTE DECAY TIMES CASE E-1

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 3.98E+13N/CM**2-SEC

TABLE A-IV-2
(continued)

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	Y******* Y
SM153	0.	1.13E-25	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU153	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD153	0.	2.88E-02	1.71E-02	1.39E-06	9.29E-25	0.	0.	0.	0.	0.	0.	0.
PM154	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM154	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU154	0.	6.41E+01	6.28E+01	4.25E+01	7.51E+00	8.61E-01	2.56E-08	1.00E-17	0.	0.	0.	0.
GD154	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM155	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU155	0.	6.14E+00	5.07E+00	1.61E-01	3.59E-08	1.73E-16	0.	0.	0.	0.	0.	0.
GD155	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM156	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU156	0.	7.71E-01	1.67E-04	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD156	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM157	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU157	0.	8.26E-86	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD157	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU158	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD158	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU159	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD159	0.	5.55E-73	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB159	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU160	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD160	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB160	0.	2.51E+00	4.33E-01	8.14E-15	0.	0.	0.	0.	0.	0.	0.	0.
DY160	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD161	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB161	0.	1.44E-08	1.55E-16	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY161	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD162	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB162M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB162	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY162	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB163M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB163	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY163	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB164	0.	2.11E-58	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY164	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY165M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY165	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
HO165	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY166	0.	7.82E-19	5.05E-35	0.	0.	0.	0.	0.	0.	0.	0.	0.
HO166M	0.	9.22E-06	9.21E-06	9.17E-06	8.96E-06	8.70E-06	6.91E-06	5.17E-06	5.13E-07	2.86E-08	0.	0.
HO166	0.	6.00E-18	3.88E-34	0.	0.	0.	0.	0.	0.	0.	0.	0.
ER166	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ER167	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	0.	2.08E+04	1.21E+04	1.05E+03	3.52E+02	1.06E+02	7.10E-02	2.28E-02	2.16E-02	2.11E-02	1.35E-02	8.22E-04

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

Clad

TABLE A-IV-3
ORIGEN Data
Mixed Oxide Recycle

ELEMENTAL ACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
H	0.	1.83E-03	1.78E-03	1.07E-03	1.12E-04	6.71E-06	1.09E-15	6.28E-28	0.	0.	0.	0.
BE	0.	1.45E-07	1.45E-07	1.45E-07	1.45E-07	1.45E-07	1.45E-07	1.45E-07	1.45E-07	1.45E-07	1.41E-07	1.10E-07
C	0.	1.93E-03	1.93E-03	1.93E-03	1.92E-03	1.91E-03	1.82E-03	1.71E-03	1.05E-03	5.76E-04	1.08E-08	0.
P	0.	7.86E-02	4.93E-04	0.	0.	0.	0.	0.	0.	0.	0.	0.
S	0.	2.33E-02	5.53E-03	3.14E-14	0.	0.	0.	0.	0.	0.	0.	0.
CL	0.	4.85E-09	4.85E-09	4.85E-09	4.85E-09	4.85E-09	4.85E-09	4.84E-09	4.80E-09	4.74E-09	3.88E-09	5.18E-10
AR	0.	1.44E-13	4.67E-15	7.91E-16	7.14E-16	6.27E-16	2.24E-16	6.17E-17	2.06E-21	5.21E-27	0.	0.
CA	0.	2.96E-03	1.38E-03	1.38E-09	0.	0.	0.	0.	0.	0.	0.	0.
SC	0.	1.93E-01	4.26E-02	6.82E-14	0.	0.	0.	0.	0.	0.	0.	0.
CR	0.	5.64E+01	5.94E-01	0.	0.	0.	0.	0.	0.	0.	0.	0.
MN	0.	1.02E+02	6.72E+01	3.64E-02	1.11E-16	7.94E-35	0.	0.	0.	0.	0.	0.
FE	0.	7.74E+02	6.74E+02	6.11E+01	1.43E-03	2.32E-09	0.	0.	0.	0.	0.	0.
CO	0.	3.80E+03	3.19E+03	9.49E+02	4.87E+00	6.70E-03	0.	0.	0.	0.	0.	0.
NI	0.	9.16E+01	9.12E+01	8.53E+01	6.32E+01	4.36E+01	2.70E+00	6.35E-01	5.66E-01	5.42E-01	2.48E-01	1.02E-04
ZN	0.	2.13E-02	1.27E-02	1.16E-06	1.29E-24	0.	0.	0.	0.	0.	0.	0.
SR	0.	1.10E+00	9.65E-02	7.23E-05	2.70E-05	7.85E-06	4.07E-10	1.79E-15	0.	0.	0.	0.
Y	0.	3.85E+00	4.48E-01	7.24E-05	2.70E-05	7.86E-06	4.07E-10	1.79E-15	0.	0.	0.	0.
ZR	0.	1.07E+03	1.53E+02	1.98E-02	1.98E-02	1.98E-02	1.98E-02	1.98E-02	1.98E-02	1.97E-02	1.89E-02	1.25E-02
NB	0.	2.04E+03	3.19E+02	9.52E-03	2.04E-02	2.19E-02	2.19E-02	2.19E-02	2.13E-02	2.08E-02	1.90E-02	1.25E-02
MO	0.	2.56E-03	2.56E-03	2.56E-03	2.55E-03	2.54E-03	2.47E-03	2.37E-03	1.74E-03	1.19E-03	1.16E-06	0.
TC	0.	2.06E-03	2.06E-03	2.06E-03	2.06E-03	2.06E-03	2.05E-03	2.05E-03	2.02E-03	1.99E-03	1.48E-03	7.58E-05
SN	0.	3.90E+00	2.16E+00	5.82E-02	4.03E-02	2.55E-02	5.64E-04	6.94E-06	9.87E-22	1.54E-41	0.	0.
SB	0.	8.13E+00	7.08E+00	7.01E-01	2.43E-05	6.46E-11	0.	0.	0.	0.	0.	0.
TE	0.	3.26E+00	2.92E+00	2.91E-01	1.01E-05	2.68E-11	0.	0.	0.	0.	0.	0.
TOTALS	0.	7.96E+03	4.51E+03	1.10E+03	6.82E+01	4.37E+01	2.75E+00	6.82E-01	6.12E-01	5.86E-01	2.88E-01	2.52E-02

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

HE's

TABLE A-IV-3
(continued)

ELEMENTAL ACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
TL	0.	2.56E-04	2.19E-04	2.33E-05	1.30E-05	8.35E-06	1.45E-06	3.12E-06	7.71E-05	3.03E-04	1.11E-02	2.17E-02
PB	0.	7.11E-04	6.08E-04	6.44E-05	3.53E-05	2.24E-05	1.42E-05	7.47E-05	3.02E-03	1.17E-02	3.14E-01	7.05E-01
BI	0.	7.11E-04	6.08E-04	6.44E-05	3.53E-05	2.24E-05	1.42E-05	7.47E-05	3.02E-03	1.17E-02	3.14E-01	7.05E-01
PO	0.	1.17E-03	9.97E-04	1.05E-04	5.76E-05	3.61E-05	1.42E-05	7.31E-05	2.96E-03	1.15E-02	3.07E-01	6.89E-01
AT	0.	3.99E-09	4.07E-09	5.77E-09	5.69E-08	2.55E-07	1.27E-05	7.32E-05	3.01E-03	1.17E-02	3.10E-01	6.98E-01
RN	0.	7.11E-04	6.08E-04	6.44E-05	3.53E-05	2.21E-05	1.47E-06	1.52E-06	1.08E-05	4.66E-05	4.25E-03	6.40E-03
FR	0.	4.38E-09	4.58E-09	8.14E-09	6.35E-08	2.53E-07	1.27E-05	7.32E-05	3.01E-03	1.17E-02	3.10E-01	6.98E-01
RA	0.	7.11E-04	6.08E-04	6.44E-05	3.53E-05	2.24E-05	1.42E-05	7.47E-05	3.02E-03	1.17E-02	3.14E-01	7.05E-01
AC	0.	3.20E-08	4.06E-08	1.75E-07	5.31E-07	8.55E-07	1.37E-05	7.47E-05	3.02E-03	1.17E-02	3.14E-01	7.05E-01
TH	0.	3.10E-01	3.72E-03	1.61E-03	1.58E-03	1.57E-03	1.56E-03	1.53E-03	4.73E-03	1.38E-02	3.21E-01	7.12E-01
PA	0.	3.87E-01	9.00E-02	9.91E-02	1.45E-01	1.99E-01	5.07E-01	6.98E-01	8.67E-01	8.80E-01	8.86E-01	6.66E-01
U	3.19E-01	1.29E-01	1.26E-01	8.31E-02	1.45E-02	3.76E-03	5.53E-03	9.56E-03	4.13E-02	7.36E-02	3.74E-01	7.62E-01
NP	0.	4.88E+02	4.88E+02	4.87E+02	4.85E+02	4.83E+02	4.66E+02	4.46E+02	3.11E+02	1.98E+02	9.37E-01	6.58E-01
PU	1.28E+06	5.46E+03	5.03E+03	4.77E+03	1.66E+03	9.14E+02	2.49E+02	2.17E+02	1.89E+02	1.61E+02	1.34E+01	3.61E-02
AM	0.	4.07E+03	4.07E+03	4.08E+03	3.95E+03	3.79E+03	2.17E+03	1.22E+03	3.22E+02	2.04E+02	6.04E-02	7.11E-06
CM	0.	3.18E+05	1.82E+05	4.85E+04	1.05E+04	1.57E+03	1.69E+01	1.52E+01	1.13E+01	7.26E+00	3.61E-03	9.90E-06
BK	0.	8.24E-13	8.24E-13	8.21E-13	8.08E-13	7.92E-13	6.75E-13	5.53E-13	1.12E-13	1.53E-14	4.11E-30	0.
CF	0.	2.08E-02	1.88E-02	3.07E-03	2.10E-06	9.08E-07	6.67E-07	4.54E-07	2.08E-08	4.43E-10	4.11E-30	0.
TOTALS	1.28E+06	3.28E+05	1.93E+05	5.78E+04	1.66E+04	6.66E+03	2.90E+03	1.90E+03	8.34E+02	5.71E+02	1.82E+01	7.77E+00

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

FP's

TABLE A-IV-3
(continued)

ELEMENTAL ACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
H	0.	7.50E+01	7.29E+01	4.39E+01	4.61E+00	2.75E-01	4.46E-11	2.58E-23	0.	0.	0.	0.
SE	0.	3.31E-01	3.31E-01	3.31E-01	3.31E-01	3.30E-01	3.29E-01	3.27E-01	3.14E-01	2.97E-01	1.14E-01	7.72E-06
RB	0.	1.81E-01	2.19E-04	1.09E-05	1.09E-05	1.09E-05	1.09E-05	1.09E-05	1.09E-05	1.09E-05	1.09E-05	1.09E-05
SR	0.	9.87E+04	4.82E+04	3.48E+04	1.30E+04	3.78E+03	1.96E-01	8.61E-07	0.	0.	0.	0.
Y	0.	1.45E+05	5.52E+04	3.48E+04	1.30E+04	3.78E+03	1.96E-01	8.61E-07	0.	0.	0.	0.
ZR	0.	2.31E+05	3.30E+04	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.38E+00	9.10E-01
NB	0.	4.56E+05	7.08E+04	6.27E-01	1.34E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.38E+00	9.10E-01
MO	0.	3.70E-14	7.48E-34	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC	0.	1.48E+01	1.48E+01	1.48E+01	1.48E+01	1.48E+01	1.48E+01	1.48E+01	1.46E+01	1.43E+01	1.07E+01	5.63E-01
RU	0.	8.51E+05	5.54E+05	1.11E+03	1.15E-09	1.20E-24	0.	0.	0.	0.	0.	0.
RH	0.	8.51E+05	5.54E+05	1.11E+03	1.15E-09	1.20E-24	0.	0.	0.	0.	0.	0.
PD	0.	2.40E-01	2.40E-01	2.40E-01	2.40E-01	2.40E-01	2.40E-01	2.40E-01	2.40E-01	2.40E-01	2.39E-01	2.17E-01
AG	0.	3.57E+03	2.16E+03	2.65E-01	2.68E-18	1.16E-38	0.	0.	0.	0.	0.	0.
CD	0.	5.47E+01	1.21E+01	6.21E+00	8.57E-01	7.21E-02	1.80E-10	3.19E-21	0.	0.	0.	0.
IN	0.	1.16E-01	9.25E-03	1.49E-22	0.	0.	0.	0.	0.	0.	0.	0.
SN	0.	5.42E+03	1.97E+03	9.79E-01	9.77E-01	9.77E-01	9.74E-01	9.70E-01	9.44E-01	9.12E-01	4.89E-01	9.54E-04
SB	0.	1.41E+04	1.23E+04	1.23E+03	1.99E+00	1.94E+00	1.94E+00	1.93E+00	1.88E+00	1.81E+00	9.72E-01	1.90E-03
TE	0.	2.54E+04	1.03E+04	5.07E+02	1.76E-02	4.68E-08	0.	0.	0.	0.	0.	0.
I	0.	2.25E-04	6.03E-05	6.05E-05	6.05E-05	6.05E-05	6.05E-05	6.05E-05	6.05E-05	6.05E-05	6.03E-05	5.81E-05
XE	0.	0.	6.56E-11	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS	0.	2.11E+05	1.94E+05	8.32E+04	3.54E+04	1.11E+04	1.55E+00	4.69E-01	4.69E-01	4.68E-01	4.59E-01	3.72E-01
BA	0.	1.04E+05	1.03E+05	8.34E+04	3.31E+04	1.04E+04	1.01E+00	9.68E-06	0.	0.	0.	0.
LA	0.	1.03E+02	5.23E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE	0.	7.63E+05	4.68E+05	1.53E+02	4.98E-14	2.18E-33	0.	0.	0.	0.	0.	0.
PR	0.	7.30E+05	4.67E+05	1.53E+02	4.98E-14	2.18E-33	0.	0.	0.	0.	0.	0.
ND	0.	7.62E+00	8.48E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM	0.	1.68E+05	1.45E+05	1.34E+04	3.39E-01	6.09E-07	0.	0.	0.	0.	0.	0.
SM	0.	2.12E+03	2.12E+03	1.97E+03	1.43E+03	9.61E+02	3.97E+01	7.39E-01	1.36E-14	5.28E-32	0.	0.
EU	0.	1.26E+04	1.14E+04	3.82E+03	6.39E+02	7.31E+01	2.17E-06	8.49E-16	0.	0.	0.	0.
GD	0.	1.28E+01	7.60E+00	6.18E-04	4.13E-22	0.	0.	0.	0.	0.	0.	0.
TB	0.	2.67E+12	4.61E+01	8.67E-13	0.	0.	0.	0.	0.	0.	0.	0.
DY	0.	1.21E-15	7.79E-32	0.	0.	0.	0.	0.	0.	0.	0.	0.
HO	0.	4.02E-04	4.02E-04	4.00E-04	3.91E-04	3.79E-04	3.01E-04	2.24E-04	2.24E-05	1.25E-06	0.	0.
TOTALS	0.	4.67E+06	2.73E+06	2.70E+05	9.65E+04	3.02E+04	5.38E+01	2.23E+01	2.13E+01	2.09E+01	1.57E+01	2.98E+00

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

Clad

TABLE A-IV-3
(continued)

ELEMENT CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
H	1.62E+04	1.30E+03	1.30E+03	1.30E+03	1.30E+03	1.30E+03	1.30E+03	1.30E+03	1.30E+03	1.30E+03	1.30E+03	1.30E+03
HE	0.	1.10E+00	1.10E+00	1.10E+00	1.10E+00	1.10E+00	1.10E+00	1.10E+00	1.10E+00	1.10E+00	1.10E+00	1.10E+00
LI	0.	2.95E-10	2.95E-10	2.95E-10	2.95E-10	2.95E-10	2.95E-10	2.95E-10	2.95E-10	2.95E-10	2.95E-10	2.95E-10
BE	0.	1.34E-05	1.34E-05	1.34E-05	1.34E-05	1.34E-05	1.34E-05	1.34E-05	1.33E-05	1.33E-05	1.31E-05	1.09E-05
B	0.	3.24E-12	4.65E-12	3.00E-11	1.42E-10	2.83E-10	1.41E-09	2.81E-09	1.41E-08	2.81E-08	2.77E-07	2.46E-06
C	3.45E+00	7.00E+00	7.00E+00	7.00E+00	7.00E+00	7.00E+00	7.00E+00	7.00E+00	7.00E+00	7.00E+00	7.00E+00	7.00E+00
N	0.	6.22E-08	8.84E-08	5.60E-07	2.65E-06	5.24E-06	2.55E-05	4.94E-05	1.97E-04	3.04E-04	4.33E-04	4.33E-04
O	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05
F	0.	8.45E-21	8.45E-21	8.45E-21	8.45E-21	8.45E-21	8.45E-21	8.45E-21	8.45E-21	8.45E-21	8.45E-21	8.45E-21
NE	0.	2.40E-09	2.40E-09	2.40E-09	2.40E-09	2.40E-09	2.40E-09	2.40E-09	2.40E-09	2.40E-09	2.40E-09	2.40E-09
NA	0.	1.86E-10	1.86E-10	1.86E-10	1.86E-10	1.86E-10	1.86E-10	1.86E-10	1.86E-10	1.86E-10	1.86E-10	1.86E-10
MG	0.	2.11E-04	2.11E-04	2.11E-04	2.11E-04	2.11E-04	2.11E-04	2.11E-04	2.11E-04	2.11E-04	2.11E-04	2.11E-04
AL	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01
SI	6.51E+01	6.51E+01	6.51E+01	6.51E+01	6.51E+01	6.51E+01	6.51E+01	6.51E+01	6.51E+01	6.51E+01	6.51E+01	6.51E+01
P	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00
S	1.29E+00	1.29E+00	1.29E+00	1.29E+00	1.29E+00	1.29E+00	1.29E+00	1.29E+00	1.29E+00	1.29E+00	1.29E+00	1.29E+00
CL	0.	1.27E-05	1.31E-05	1.32E-05	1.32E-05	1.32E-05	1.32E-05	1.32E-05	1.32E-05	1.32E-05	1.32E-05	1.31E-05
AR	0.	8.14E-11	8.16E-11	8.46E-11	9.78E-11	1.14E-10	2.47E-10	4.13E-10	1.73E-09	3.37E-09	2.98E-08	1.33E-07
K	0.	2.69E-12	2.69E-12	2.69E-12	2.69E-12	2.69E-12	2.69E-12	2.69E-12	2.69E-12	2.69E-12	2.69E-12	2.69E-12
CA	0.	7.33E-05	7.32E-05	7.31E-05	7.31E-05	7.31E-05	7.31E-05	7.31E-05	7.31E-05	7.31E-05	7.31E-05	7.31E-05
SC	0.	6.70E-06	2.36E-06	1.18E-06	1.18E-06	1.18E-06	1.18E-06	1.18E-06	1.18E-06	1.18E-06	1.18E-06	1.18E-06
TI	5.58E+01	5.58E+01	5.58E+01	5.58E+01	5.58E+01	5.58E+01	5.58E+01	5.58E+01	5.58E+01	5.58E+01	5.58E+01	5.58E+01
V	0.	1.02E+00	1.02E+00	1.02E+00	1.02E+00	1.02E+00	1.02E+00	1.02E+00	1.02E+00	1.02E+00	1.02E+00	1.02E+00
CR	2.00E+03	2.00E+03	2.00E+03	2.00E+03	2.00E+03	2.00E+03	2.00E+03	2.00E+03	2.00E+03	2.00E+03	2.00E+03	2.00E+03
MN	1.08E+02	1.07E+02	1.07E+02	1.07E+02	1.07E+02	1.07E+02	1.07E+02	1.07E+02	1.07E+02	1.07E+02	1.07E+02	1.07E+02
FE	3.97E+03	3.97E+03	3.97E+03	3.97E+03	3.97E+03	3.97E+03	3.97E+03	3.97E+03	3.97E+03	3.97E+03	3.97E+03	3.97E+03
CO	7.09E+01	7.03E+01	7.01E+01	6.82E+01	6.74E+01	6.74E+01	6.74E+01	6.75E+01	6.77E+01	6.80E+01	7.19E+01	7.52E+01
NI	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	3.69E+03	3.69E+03
CU	1.86E+01	1.86E+01	1.86E+01	1.87E+01	1.91E+01	1.94E+01	2.01E+01	2.01E+01	2.01E+01	2.01E+01	2.01E+01	2.01E+01
ZN	0.	3.92E-02	3.92E-02	3.92E-02	3.92E-02	3.92E-02	3.92E-02	3.92E-02	3.92E-02	3.92E-02	3.92E-02	3.92E-02
SR	0.	5.48E-02	5.47E-02	5.47E-02	5.47E-02	5.47E-02	5.47E-02	5.47E-02	5.47E-02	5.47E-02	5.47E-02	5.47E-02
Y	0.	1.58E-04	1.83E-05	1.33E-10	4.96E-11	1.44E-11	7.48E-16	3.29E-21	0.	0.	0.	0.
ZR	1.21E+05	1.21E+05	1.21E+05	1.21E+05	1.21E+05	1.21E+05	1.21E+05	1.21E+05	1.21E+05	1.21E+05	1.21E+05	1.21E+05
NB	3.23E+02	3.23E+02	3.23E+02	3.23E+02	3.23E+02	3.23E+02	3.23E+02	3.23E+02	3.23E+02	3.23E+02	3.24E+02	3.26E+02
MO	1.99E+02	2.01E+02	2.01E+02	2.01E+02	2.01E+02	2.01E+02	2.01E+02	2.01E+02	2.01E+02	2.01E+02	2.01E+02	2.01E+02
TC	0.	1.20E-01	1.20E-01	1.20E-01	1.20E-01	1.19E-01	1.19E-01	1.19E-01	1.18E-01	1.16E-01	8.59E-02	4.40E-03
RU	0.	3.57E-02	3.57E-02	3.57E-02	3.57E-02	3.57E-02	3.57E-02	3.57E-02	3.57E-02	3.57E-02	3.57E-02	3.57E-02
CD	6.18E-03	1.07E-07	1.07E-07	1.07E-07	1.07E-07	1.07E-07	1.07E-07	1.07E-07	1.07E-07	1.07E-07	1.07E-07	1.07E-07
IN	6.33E-03	4.35E-03	4.35E-03	4.35E-03	4.35E-03	4.35E-03	4.35E-03	4.35E-03	4.35E-03	4.35E-03	4.35E-03	4.35E-03
SN	1.83E+03	1.83E+03	1.83E+03	1.83E+03	1.83E+03	1.83E+03	1.83E+03	1.83E+03	1.83E+03	1.83E+03	1.83E+03	1.83E+03
SB	0.	2.46E-01	2.45E-01	2.39E-01	2.39E-01	2.40E-01	2.40E-01	2.40E-01	2.40E-01	2.40E-01	2.40E-01	2.40E-01
TE	0.	3.80E-03	4.72E-03	1.07E-02	1.14E-02	1.14E-02	1.14E-02	1.14E-02	1.14E-02	1.14E-02	1.14E-02	1.14E-02
TOTALS	4.10E+05	3.95E+05	3.95E+05	3.95E+05	3.95E+05	3.95E+05	3.95E+05	3.95E+05	3.95E+05	3.95E+05	3.95E+05	3.95E+05

PWR - BU = 33.000 WASTE DECAY TIMES CASE E-4 HE's

TABLE A-IV-3
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

ELEMENT CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
HE	0.	7.07E+00	8.02E+00	1.30E+01	2.24E+01	2.60E+01	3.65E+01	4.37E+01	6.57E+01	8.25E+01	1.51E+02	1.89E+02
TL	0.	8.78E-13	7.51E-13	8.01E-14	4.54E-14	2.57E-14	6.56E-15	1.19E-14	2.19E-13	8.73E-13	3.90E-11	7.12E-11
PB	0.	2.04E-07	3.38E-07	1.08E-06	1.78E-06	2.35E-06	3.36E-06	3.63E-06	1.19E-05	6.38E-05	7.59E-02	2.35E+00
BI	0.	5.57E-11	4.95E-11	2.93E-11	4.29E-10	3.29E-09	7.33E-07	8.42E-06	1.93E-03	1.60E-02	6.00E+00	2.49E+02
PO	0.	2.04E-15	1.75E-15	1.84E-16	1.00E-16	6.23E-17	5.05E-18	6.73E-18	1.72E-17	2.13E-17	3.03E-16	4.68E-16
AT	0.	2.46E-21	2.50E-21	3.55E-21	3.50E-20	1.57E-19	7.81E-18	4.50E-17	1.85E-15	7.18E-15	1.91E-13	4.30E-13
RN	0.	7.76E-13	6.64E-13	7.01E-14	3.80E-14	2.35E-14	5.78E-16	1.22E-16	8.44E-16	3.63E-15	3.30E-13	5.00E-13
FR	0.	3.27E-17	3.63E-17	9.44E-17	4.94E-16	1.65E-15	7.20E-14	4.13E-13	1.70E-11	6.59E-11	1.75E-09	3.94E-09
RA	0.	4.44E-09	3.80E-09	4.04E-10	2.28E-10	1.52E-10	3.46E-10	1.90E-09	7.70E-08	2.99E-07	7.98E-06	1.79E-05
AC	0.	3.84E-10	5.01E-10	2.32E-09	6.50E-09	8.24E-09	1.41E-08	2.20E-08	2.00E-07	8.40E-07	6.36E-05	9.98E-05
TH	0.	4.25E-05	2.95E-05	2.95E-05	3.45E-05	4.64E-05	4.26E-04	1.58E-03	4.25E-02	1.52E-01	3.88E+00	2.88E+01
PA	0.	1.60E-05	1.61E-05	1.67E-05	1.97E-05	2.33E-05	4.59E-05	6.58E-05	2.69E-04	1.02E-03	8.93E-02	1.34E-01
U	9.23E+05	4.54E+03	4.54E+03	4.54E+03	4.54E+03	4.54E+03	4.58E+03	4.63E+03	4.98E+03	5.36E+03	8.24E+03	8.51E+03
NP	0.	1.23E+02	1.24E+02	1.38E+02	2.03E+02	2.80E+02	7.17E+02	9.38E+02	1.23E+03	1.25E+03	1.25E+03	9.33E+02
PU	7.68E+04	2.64E+02	3.18E+02	5.73E+02	9.92E+02	1.09E+03	1.12E+03	1.17E+03	1.52E+03	1.71E+03	2.64E+02	9.26E+00
AM	0.	3.58E+03	3.58E+03	3.58E+03	3.53E+03	3.45E+03	2.92E+03	2.54E+03	1.61E+03	1.03E+03	2.95E-01	3.70E-05
CM	0.	1.03E+03	9.75E+02	6.95E+02	2.25E+02	1.14E+02	9.16E+01	8.76E+01	6.18E+01	4.01E+01	1.08E-01	8.12E-02
BK	0.	2.12E-19	2.12E-19	2.11E-19	2.08E-19	2.03E-19	1.73E-19	1.42E-19	2.89E-20	3.94E-21	1.06E-36	0.
CF	0.	5.02E-05	4.54E-05	8.12E-06	5.99E-07	5.74E-07	4.22E-07	2.87E-07	1.32E-08	2.80E-10	3.76E-33	0.
TOTALS	1.00E+06	9.54E+03	9.54E+03	9.54E+03	9.52E+03	9.50E+03	9.46E+03	9.46E+03	9.46E+03	9.46E+03	9.92E+03	9.92E+03

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

TABLE A-IV-3
(continued)

FP's

ELEMENT CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
H	0.	7.74E-03	7.53E-03	4.53E-03	4.76E-04	2.84E-05	1.60E-15	2.56E-27	0.	0.	0.	0.
GE	0.	4.38E-01	4.38E-01	4.38E-01	4.38E-01	4.38E-01	4.38E-01	4.38E-01	4.38E-01	4.38E-01	4.38E-01	4.38E-01
AS	0.	8.60E-02	8.60E-02	8.60E-02	8.60E-02	8.60E-02	8.60E-02	8.60E-02	8.60E-02	8.60E-02	8.60E-02	8.60E-02
SE	0.	4.20E+01	4.20E+01	4.20E+01	4.20E+01	4.20E+01	4.20E+01	4.20E+01	4.18E+01	4.15E+01	3.89E+01	3.73E+01
BR	0.	1.41E-02	1.41E-02	1.46E-02	1.66E-02	1.91E-02	1.93E-02	6.44E-02	2.61E-01	4.94E-01	3.13E+00	4.76E+00
KR	0.	0.	3.94E-44	3.94E-44	3.94E-44	3.94E-44	3.94E-44	3.94E-44	3.94E-44	3.94E-44	3.94E-44	3.94E-44
RB	0.	1.89E+02	1.89E+02	1.89E+02	1.89E+02	1.89E+02	1.89E+02	1.89E+02	1.89E+02	1.89E+02	1.89E+02	1.89E+02
SR	0.	5.16E+02	5.10E+02	4.49E+02	2.95E+02	2.30E+02	2.03E+02	2.03E+02	2.03E+02	2.03E+02	2.03E+02	2.03E+02
Y	0.	2.57E+02	2.55E+02	2.54E+02	2.54E+02	2.54E+02	2.54E+02	2.54E+02	2.54E+02	2.54E+02	2.54E+02	2.54E+02
ZR	0.	2.80E+03	2.80E+03	2.86E+03	3.02E+03	3.08E+03	3.11E+03	3.11E+03	3.11E+03	3.10E+03	3.08E+03	2.90E+03
NB	0.	1.15E+01	1.79E+00	2.91E-03	1.33E-02	2.63E-02	1.30E-01	2.61E-01	1.30E+00	2.60E+00	2.54E+01	2.08E+02
MO	0.	3.38E+03	3.40E+03	3.40E+03	3.40E+03	3.40E+03	3.40E+03	3.40E+03	3.40E+03	3.40E+03	3.40E+03	3.40E+03
TC	0.	8.69E+02	8.69E+02	8.69E+02	8.69E+02	8.69E+02	8.68E+02	8.66E+02	8.55E+02	8.41E+02	6.27E+02	3.30E+01
RU	0.	2.88E+03	2.81E+03	2.64E+03	2.64E+03	2.64E+03	2.65E+03	2.65E+03	2.66E+03	2.67E+03	2.89E+03	3.48E+03
RH	0.	6.71E+02	6.73E+02	6.73E+02	6.73E+02	6.73E+02	6.73E+02	6.73E+02	6.73E+02	6.73E+02	6.73E+02	6.73E+02
PD	0.	2.30E+03	2.37E+03	2.53E+03	2.53E+03	2.53E+03	2.53E+03	2.53E+03	2.53E+03	2.53E+03	2.53E+03	2.49E+03
AG	0.	1.64E+02	1.63E+02	1.63E+02	1.63E+02	1.63E+02	1.63E+02	1.63E+02	1.63E+02	1.63E+02	1.68E+02	2.10E+02
CD	0.	1.34E+02	1.34E+02	1.34E+02	1.34E+02	1.34E+02	1.34E+02	1.34E+02	1.34E+02	1.34E+02	1.34E+02	1.34E+02
IN	0.	3.40E+00	3.40E+00	3.42E+00	3.44E+00	3.44E+00	3.44E+00	3.44E+00	3.44E+00	3.44E+00	3.44E+00	3.44E+00
SN	0.	8.44E+01	8.40E+01	8.38E+01	8.38E+01	8.38E+01	8.37E+01	8.36E+01	8.26E+01	8.15E+01	6.66E+01	4.94E+01
SB	0.	2.91E+01	2.79E+01	1.76E+01	1.65E+01	1.65E+01	1.65E+01	1.65E+01	1.65E+01	1.65E+01	1.65E+01	1.65E+01
TE	0.	7.06E+02	7.07E+02	7.17E+02	7.18E+02	7.18E+02	7.18E+02	7.18E+02	7.19E+02	7.20E+02	7.35E+02	7.52E+02
I	0.	3.69E-01	1.04E+00	1.31E+00	1.31E+00	1.31E+00	1.31E+00	1.31E+00	1.31E+00	1.31E+00	1.31E+00	1.30E+00
XE	0.	0.	8.62E-09	1.45E-07	7.50E-07	1.51E-06	7.56E-06	1.51E-05	7.57E-05	1.51E-04	1.51E-03	1.48E-02
CS	0.	3.04E+03	3.01E+03	2.71E+03	2.09E+03	1.82E+03	1.69E+03	1.69E+03	1.69E+03	1.69E+03	1.67E+03	1.58E+03
BA	0.	1.39E+03	1.42E+03	1.71E+03	2.34E+03	2.61E+03	2.74E+03	2.74E+03	2.74E+03	2.74E+03	2.75E+03	2.85E+03
LA	0.	1.20E+03	1.20E+03	1.20E+03	1.20E+03	1.20E+03	1.20E+03	1.20E+03	1.20E+03	1.20E+03	1.20E+03	1.20E+03
CE	0.	2.50E+03	2.41E+03	2.27E+03	2.27E+03	2.27E+03	2.27E+03	2.27E+03	2.27E+03	2.27E+03	2.27E+03	2.27E+03
PR	0.	1.06E+03	1.07E+03	1.07E+03	1.07E+03	1.07E+03	1.07E+03	1.07E+03	1.07E+03	1.07E+03	1.07E+03	1.07E+03
ND	0.	3.44E+03	3.53E+03	3.67E+03	3.67E+03	3.67E+03	3.67E+03	3.67E+03	3.67E+03	3.67E+03	3.67E+03	3.67E+03
PM	0.	1.78E+02	1.56E+02	1.44E+01	3.65E-04	6.56E-10	0.	0.	0.	0.	0.	0.
SM	0.	8.57E+02	8.79E+02	1.01E+03	1.01E+03	9.92E+02	9.58E+02	9.57E+02	9.57E+02	9.57E+02	9.57E+02	9.57E+02
EU	0.	1.82E+02	1.81E+02	1.69E+02	1.68E+02	1.82E+02	2.15E+02	2.17E+02	2.17E+02	2.17E+02	2.17E+02	2.17E+02
GD	0.	1.15E+02	1.17E+02	1.34E+02	1.54E+02	1.58E+02	1.59E+02	1.59E+02	1.59E+02	1.59E+02	1.59E+02	1.59E+02
TB	0.	4.16E+00	4.14E+00	4.13E+00	4.13E+00	4.13E+00	4.13E+00	4.13E+00	4.13E+00	4.13E+00	4.13E+00	4.13E+00
DY	0.	2.02E+00	2.04E+00	2.05E+00	2.05E+00	2.05E+00	2.05E+00	2.05E+00	2.05E+00	2.05E+00	2.05E+00	2.05E+00
HO	0.	1.12E-01	1.12E-01	1.12E-01	1.12E-01	1.12E-01	1.12E-01	1.12E-01	1.12E-01	1.12E-01	1.12E-01	1.12E-01
ER	0.	2.94E-02	2.94E-02	2.94E-02	2.94E-02	2.94E-02	2.95E-02	2.95E-02	2.96E-02	2.96E-02	2.96E-02	2.96E-02
TOTALS	0.	2.90E+04	2.90E+04	2.90E+04	2.90E+04	2.90E+04	2.90E+04	2.90E+04	2.90E+04	2.90E+04	2.90E+04	2.90E+04

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

Clad

TABLE A-IV-3
(continued)

ELEMENT THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
H	0.	6.50E-08	6.32E-08	3.81E-08	3.99E-09	2.39E-10	3.86E-20	2.23E-32	0.	0.	0.	0.
C	0.	5.72E-07	5.72E-07	5.72E-07	5.69E-07	5.65E-07	5.39E-07	5.07E-07	3.12E-07	1.71E-07	3.19E-12	0.
P	0.	3.78E-05	2.22E-07	0.	0.	0.	0.	0.	0.	0.	0.	0.
S	0.	6.64E-06	1.57E-06	3.94E-18	0.	0.	0.	0.	0.	0.	0.	0.
CL	0.	9.03E-12	9.03E-12	9.03E-12	9.03E-12	9.03E-12	9.02E-12	9.01E-12	8.93E-12	8.83E-12	7.22E-12	9.65E-13
AR	0.	6.94E-16	1.97E-17	1.10E-18	9.90E-19	8.70E-19	3.10E-19	8.56E-20	2.85E-24	7.23E-30	0.	0.
CA	0.	1.81E-06	8.40E-07	8.44E-13	0.	0.	0.	0.	0.	0.	0.	0.
SC	0.	2.70E-03	5.98E-04	9.57E-16	0.	0.	0.	0.	0.	0.	0.	0.
CR	0.	2.50E-01	2.63E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
MN	0.	8.26E-01	5.44E-01	2.95E-04	8.98E-19	6.43E-37	0.	0.	0.	0.	0.	0.
FE	0.	1.04E+02	8.81E-01	7.97E-02	1.86E-06	3.02E-12	0.	0.	0.	0.	0.	0.
CO	0.	5.84E+01	4.97E+01	1.48E+01	7.61E-02	1.05E-04	0.	0.	0.	0.	0.	0.
NI	0.	1.46E-02	1.45E-02	1.36E-02	1.00E-02	6.88E-03	3.38E-04	7.81E-06	6.33E-19	2.75E-35	0.	0.
ZN	0.	1.69E-04	1.01E-04	9.22E-09	1.03E-26	0.	0.	0.	0.	0.	0.	0.
SR	0.	3.96E-03	3.47E-04	9.48E-08	3.53E-08	1.03E-08	5.33E-13	2.34E-18	0.	0.	0.	0.
Y	0.	1.47E-02	1.70E-03	4.26E-07	1.59E-07	4.62E-08	2.40E-12	1.05E-17	0.	0.	0.	0.
ZR	0.	5.62E+00	8.01E-01	2.35E-06	2.35E-06	2.35E-06	2.35E-06	2.35E-06	2.34E-06	2.34E-06	2.24E-06	1.48E-06
NB	0.	9.83E+00	1.53E+00	3.87E-06	7.67E-06	8.19E-06	8.21E-06	8.18E-06	7.98E-06	7.80E-06	7.17E-06	4.90E-06
MO	0.	6.38E-06	6.38E-06	6.37E-06	6.35E-06	6.33E-06	6.14E-06	5.91E-06	4.34E-06	2.95E-06	2.88E-09	0.
TC	0.	3.53E-06	3.53E-06	3.53E-06	3.53E-06	3.53E-06	3.53E-06	3.52E-06	3.48E-06	3.42E-06	2.54E-06	1.30E-07
SN	0.	2.69E-03	1.21E-03	6.10E-05	4.22E-05	2.68E-05	9.97E-07	7.28E-09	1.04E-24	1.62E-44	0.	0.
SB	0.	3.37E-02	2.88E-02	2.84E-03	9.86E-08	2.62E-13	0.	0.	0.	0.	0.	0.
TE	0.	2.81E-03	2.51E-03	2.50E-04	8.66E-09	2.30E-14	0.	0.	0.	0.	0.	0.
TOTALS	0.	7.61E+01	5.35E+01	1.49E+01	8.62E-02	7.03E-03	3.59E-04	2.83E-05	1.85E-05	1.67E-05	1.20E-05	6.51E-06

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

HE's

TABLE A-IV-3
(continued)

ELEMENT THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
TL	0.	5.96E-06	5.10E-06	5.39E-07	2.93E-07	1.82E-07	1.14E-08	3.09E-08	1.12E-06	4.34E-06	1.24E-04	2.70E-04
PB	0.	1.02E-06	8.72E-07	9.27E-08	5.16E-08	3.31E-08	1.86E-08	8.92E-08	3.50E-06	1.36E-05	3.70E-04	8.24E-04
BI	0.	1.23E-05	1.06E-05	1.12E-06	6.23E-07	3.98E-07	1.25E-07	5.09E-07	1.89E-05	7.36E-05	2.07E-03	4.54E-03
PO	0.	5.32E-05	4.55E-05	4.81E-06	2.63E-06	1.65E-06	6.95E-07	3.62E-06	1.47E-04	5.69E-04	1.52E-02	3.42E-02
AT	0.	1.67E-10	1.71E-10	2.42E-10	2.38E-09	1.07E-08	5.32E-07	3.07E-06	1.26E-04	4.89E-04	1.30E-02	2.93E-02
RN	0.	2.70E-05	2.31E-05	2.44E-06	1.34E-06	8.40E-07	5.83E-08	6.14E-08	4.38E-07	1.89E-06	1.72E-04	2.59E-04
FR	0.	1.49E-10	1.53E-10	2.20E-10	2.13E-09	9.49E-09	4.72E-07	2.72E-06	1.12E-04	4.34E-04	1.15E-02	2.60E-02
RA	0.	2.43E-05	2.08E-05	2.20E-06	1.21E-06	7.57E-07	5.91E-08	1.01E-07	2.36E-06	9.30E-06	3.52E-04	6.82E-04
AC	0.	1.51E-10	1.58E-10	2.83E-10	2.19E-09	9.04E-09	4.36E-07	2.51E-06	1.03E-04	4.01E-04	1.06E-02	2.40E-02
TH	0.	1.37E-04	2.09E-05	2.67E-06	1.73E-06	1.30E-06	1.00E-06	2.84E-06	9.21E-05	3.56E-04	9.51E-03	2.13E-02
PA	0.	1.67E-03	1.33E-04	1.40E-04	2.02E-04	2.75E-04	6.92E-04	9.49E-04	1.18E-03	1.20E-03	1.33E-03	1.09E-03
U	8.12E-03	1.29E-04	1.27E-04	1.06E-04	5.89E-05	5.87E-05	1.39E-04	2.52E-04	1.14E-03	2.06E-03	1.07E-02	2.21E-02
NP	0.	6.61E-01	6.61E-01	6.61E-01	6.60E-01	6.59E-01	6.45E-01	6.22E-01	4.44E-01	2.92E-01	2.59E-02	1.93E-02
PU	1.32E+03	6.08E+00	2.83E+01	4.58E+01	3.73E+01	2.78E+01	7.35E+00	6.31E+00	5.55E+00	4.81E+00	4.17E-01	1.07E-03
AM	0.	1.37E+02	1.37E+02	1.38E+02	1.33E+02	1.25E+02	7.39E+01	4.20E+01	1.17E+01	7.42E+00	2.19E-03	2.60E-07
CM	0.	1.16E+04	6.60E+03	1.79E+03	3.67E+02	5.47E+01	5.55E-01	5.11E-01	3.55E-01	2.29E-01	1.15E-04	5.77E-07
BK	0.	7.36E-15	7.36E-15	7.33E-15	7.22E-15	7.07E-15	6.03E-15	4.94E-15	1.00E-15	1.37E-16	3.67E-32	0.
CF	0.	8.21E-04	7.39E-04	1.21E-04	7.94E-08	3.25E-08	2.39E-08	1.63E-08	7.46E-10	1.59E-11	1.53E-31	0.
TOTALS	1.32E+03	1.17E+04	6.76E+03	1.86E+03	5.39E+02	2.08E+02	8.24E+01	4.95E+01	1.61E+01	1.28E+01	5.20E-01	1.85E-01

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

FP's

TABLE A-IV-3
(continued)

ELEMENT THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
H	0.	2.67E-03	2.59E-03	1.56E-03	1.64E-04	9.79E-06	1.59E-15	9.16E-28	0.	0.	0.	0.
SE	0.	1.25E-04	1.25E-04	1.25E-04	1.25E-04	1.25E-04	1.25E-04	1.24E-04	1.19E-04	1.13E-04	4.32E-05	2.93E-09
RB	0.	8.56E-04	9.90E-07	7.12E-09	7.12E-09	7.12E-09	7.12E-09	7.12E-09	7.12E-09	7.12E-09	7.12E-09	7.12E-09
SR	0.	2.54E+02	7.42E+01	4.56E+01	1.70E+01	4.95E+00	2.57E-04	1.13E-09	0.	0.	0.	0.
Y	0.	6.44E+02	3.01E+02	2.05E+02	7.64E+01	2.22E+01	1.15E-03	5.07E-09	0.	0.	0.	0.
ZR	0.	1.21E+03	1.73E+02	1.71E-04	1.71E-04	1.71E-04	1.71E-04	1.71E-04	1.71E-04	1.70E-04	1.63E-04	1.08E-04
NB	0.	2.18E+03	3.38E+02	1.11E-04	2.38E-04	2.55E-04	2.57E-04	2.57E-04	2.56E-04	2.56E-04	2.45E-04	1.62E-04
MO	0.	1.51E-16	3.05E-36	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC	0.	1.00E-02	1.00E-02	1.00E-02	1.00E-02	1.00E-02	9.99E-03	9.97E-03	9.85E-03	9.69E-03	7.22E-03	3.80E-04
RU	0.	2.85E+02	4.24E+01	6.57E-02	6.81E-14	7.11E-25	0.	0.	0.	0.	0.	0.
RH	0.	8.22E+03	5.80E+03	1.17E+01	1.21E-11	1.26E-25	0.	0.	0.	0.	0.	0.
PD	0.	1.99E-05	1.99E-05	1.99E-05	1.99E-05	1.99E-05	1.99E-05	1.99E-05	1.99E-05	1.99E-05	1.97E-05	1.80E-05
AG	0.	5.53E+01	3.42E+01	4.19E-03	1.89E-20	1.21E-33	0.	0.	0.	0.	0.	0.
CD	0.	1.77E-01	2.15E-02	8.21E-03	1.13E-03	9.53E-05	2.38E-13	4.22E-24	0.	0.	0.	0.
IN	0.	3.33E-04	2.65E-05	4.27E-25	0.	0.	0.	0.	0.	0.	0.	0.
SN	0.	1.91E+01	9.96E+00	1.06E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.02E-03	9.84E-04	5.27E-04	1.03E-06
SB	0.	5.77E+01	5.01E+01	4.98E+00	1.94E-02	1.92E-02	1.91E-02	1.91E-02	1.85E-02	1.79E-02	9.59E-03	1.87E-05
TE	0.	3.61E+01	1.45E+01	8.72E-01	3.02E-05	8.04E-11	0.	0.	0.	0.	0.	0.
I	0.	6.45E-07	3.96E-08	3.96E-08	3.98E-08	3.98E-08	3.98E-08	3.98E-08	3.98E-08	3.98E-08	3.97E-08	3.82E-08
XE	0.	0.	1.27E-13	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS	0.	1.24E+03	1.07E+03	1.89E+02	5.79E+01	1.82E+01	1.99E-03	2.28E-04	2.28E-04	2.28E-04	2.23E-04	1.81E-04
BA	0.	4.06E+02	4.05E+02	3.28E+02	1.30E+02	4.09E+01	3.96E-03	3.81E-08	0.	0.	0.	0.
LA	0.	1.82E+00	9.22E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE	0.	6.62E+02	3.83E+02	1.25E-01	4.08E-17	1.78E-36	0.	0.	0.	0.	0.	0.
PR	0.	5.65E+03	3.62E+03	1.19E+00	3.56E-16	1.59E-35	0.	0.	0.	0.	0.	0.
ND	0.	2.47E-02	2.76E-07	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM	0.	1.22E+02	7.64E+01	6.30E+00	1.75E-04	3.14E-10	0.	0.	0.	0.	0.	0.
SM	0.	3.79E+00	3.69E+00	3.43E+00	2.50E+00	1.56E+00	6.92E-02	1.29E-03	1.85E-17	9.20E-35	0.	0.
EU	0.	5.18E+01	4.94E+01	3.01E+01	5.27E+00	6.01E-01	1.78E-08	6.97E-18	0.	0.	0.	0.
GD	0.	1.85E-02	1.09E-02	8.91E-07	5.95E-25	0.	0.	0.	0.	0.	0.	0.
TB	0.	2.27E+00	3.92E-01	7.37E-15	0.	0.	0.	0.	0.	0.	0.	0.
DY	0.	1.05E-18	6.76E-35	0.	0.	0.	0.	0.	0.	0.	0.	0.
HO	0.	4.32E-06	4.32E-06	4.30E-06	4.20E-06	4.08E-06	3.24E-06	2.43E-06	2.41E-07	1.34E-08	0.	0.
TOTALS	0.	2.11E+04	1.24E+04	8.26E+02	2.89E+02	8.87E+01	1.07E-01	3.22E-02	3.02E-02	2.94E-02	1.80E 02	8.69E-04

PHOTON SPECTRUM AS A FUNCTION OF TIME FOR LIGHT ELEMENTS, CLADDING AND STRUCTURAL MATERIALS

TABLE A-IV-3
(continued)

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4
POWER= 38.40 MW, BURNUP= 33000.MWD, FLUX= 1.42E+13 N**2-SEC

Clad

TWELVE GROUP PHOTON RELEASE RATES, PHOTONS/SEC
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

EMEAN (MEV)	INITIAL	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
3.00E-01	2.20E+11	1.31E+10	1.10E+09	7.29E+07	7.81E+07	7.83E+07	7.80E+07	7.60E+07	7.41E+07	6.76E+07	4.46E+07
6.30E-01	1.70E+14	2.90E+13	1.90E+10	5.02E+06	4.41E+06	4.41E+06	4.41E+06	4.40E+06	4.40E+06	4.39E+06	4.26E+06
1.10E+00	2.80E+14	2.62E+14	7.99E+13	4.10E+11	5.64E+08	3.73E-02	1.64E-07	0.	0.	0.	0.
1.55E+00	1.18E+11	1.98E+10	1.20E+03	4.47E+02	1.50E+02	6.75E-03	2.97E-08	0.	0.	0.	0.
1.99E+00	2.16E+08	2.62E+07	3.64E+01	1.36E+01	3.95E+00	2.05E-04	9.00E-10	0.	0.	0.	0.
2.38E+00	2.51E+01	3.55E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.
2.75E+00	1.79E-78	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3.25E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3.70E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4.22E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4.70E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
5.25E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	4.50E+14	2.91E+14	7.99E+13	4.10E+11	6.47E+08	8.27E+07	8.24E+07	8.04E+07	7.85E+07	7.20E+07	4.89E+07
MEV/SEC	4.15E+14	3.06E+14	8.79E+13	4.51E+11	6.47E+08	2.63E+07	2.62E+07	2.56E+07	2.50E+07	2.31E+07	1.61E+07

TWELVE GROUP ENERGY RELEASE RATES, MEV/WATT-SEC
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

EMEAN (MEV)	INITIAL	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
3.00E-01	1.72E+03	1.03E+02	8.59E+00	5.69E-01	6.10E-01	6.12E-01	6.09E-01	5.93E-01	5.79E-01	5.28E-01	3.49E-01
6.30E-01	2.73E+06	4.75E+05	3.11E+02	8.23E-02	7.24E-02	7.23E-02	7.23E-02	7.23E-02	7.22E-02	7.20E-02	6.98E-02
1.10E+00	8.01E+06	7.50E+06	2.29E+06	1.18E+04	1.62E+01	1.07E-09	4.70E-15	0.	0.	0.	0.
1.55E+00	4.75E+03	8.01E+02	4.84E-05	1.80E-05	5.26E-06	2.72E-10	1.20E-15	0.	0.	0.	0.
1.99E+00	1.12E+01	1.36E+00	1.89E-06	7.03E-07	2.05E-07	1.06E-11	4.67E-17	0.	0.	0.	0.
2.38E+00	1.56E-06	2.20E-12	0.	0.	0.	0.	0.	0.	0.	0.	0.
2.75E+00	1.28E-85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3.25E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3.70E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4.22E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4.70E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
5.25E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	1.08E+07	7.97E+06	2.29E+06	1.18E+04	1.63E+01	6.84E-01	6.82E-01	6.66E-01	6.51E-01	6.00E-01	4.18E-01
GAMMA WATTS	6.65E+01	4.91E+01	1.41E+01	7.24E-02	1.04E-04	4.21E-06	4.20E-06	4.10E-06	4.01E-06	3.70E-06	2.58E-06

PHOTON SPECTRUM AS A FUNCTION OF TIME FOR HEAVY METALS AND THEIR DAUGHTERS

HE's

TABLE A-IV-3
(continued)

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4
POWER= 38.40 MW, BURNUP= 33000.4MD, FLUX= 1.42E+13 N**2-SEC

ACTINIDE PHOTON RELEASE RATES, PHOTONS/SEC
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

EMEAN (MEV)	INITIAL	TIME AFTER DISCHARGE 1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
3.00E-01	2.43E+13	2.39E+13	2.35E+13	2.30E+13	2.22E+13	1.75E+13	1.44E+13	8.57E+12	5.44E+12	2.76E+10	2.97E+10
6.30E-01	1.62E+13	1.53E+13	1.45E+13	1.44E+13	1.44E+13	1.38E+13	1.32E+13	9.21E+12	5.85E+12	9.99E+09	1.82E+10
1.10E+00	3.71E+12	3.70E+12	3.70E+12	3.68E+12	3.66E+12	3.53E+12	3.38E+12	2.35E+12	1.49E+12	4.30E+08	1.33E+06
1.55E+00	5.13E+09	4.66E+09	3.07E+09	6.84E+08	1.22E+08	2.30E+07	2.15E+07	1.45E+07	1.54E+07	2.55E+08	5.74E+08
1.99E+00	2.71E+09	2.49E+09	1.62E+09	3.61E+08	6.42E+07	1.22E+07	1.13E+07	6.33E+06	3.09E+05	5.93E+04	1.17E+04
2.38E+00	1.35E+09	1.23E+09	8.11E+08	1.80E+08	3.21E+07	6.07E+06	5.64E+06	3.16E+06	1.54E+06	2.93E+04	5.27E+03
2.75E+00	6.39E+08	5.80E+08	3.78E+08	8.44E+07	1.52E+07	2.83E+06	2.63E+06	1.47E+06	7.16E+05	1.70E+04	3.77E+04
3.25E+00	3.52E+08	3.56E+08	2.35E+08	5.22E+07	9.23E+06	1.76E+06	1.63E+06	9.15E+05	4.46E+05	8.49E+03	1.53E+03
3.70E+00	2.52E+08	2.29E+08	1.51E+08	3.35E+07	5.96E+06	1.13E+06	1.05E+06	5.88E+05	2.87E+05	5.45E+03	9.81E+02
4.22E+00	1.59E+08	1.44E+08	9.51E+07	2.12E+07	3.75E+06	7.12E+05	6.62E+05	3.71E+05	1.81E+05	3.44E+03	6.19E+02
4.70E+00	7.65E+07	6.63E+07	4.59E+07	1.00E+07	1.78E+06	3.37E+05	3.13E+05	1.75E+05	8.55E+04	1.63E+03	2.93E+02
5.25E+00	4.73E+07	4.29E+07	2.83E+07	6.30E+06	1.12E+06	2.12E+05	1.97E+05	1.10E+05	5.38E+04	1.02E+03	1.84E+02
TOTAL	4.42E+13	4.29E+13	4.17E+13	4.11E+13	4.02E+13	3.49E+13	3.10E+13	2.01E+13	1.28E+13	3.82E+10	4.85E+10
MEV/SEC	2.16E+13	2.09E+13	2.03E+13	2.00E+13	1.97E+13	1.79E+13	1.64E+13	1.10E+13	6.96E+12	1.54E+10	2.13E+10

ACTINIDE ENERGY RELEASE RATES, MEV/WATT-SEC
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

EMEAN (MEV)	INITIAL	TIME AFTER DISCHARGE 1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
3.00E-01	1.93E+05	1.87E+05	1.84E+05	1.80E+05	1.74E+05	1.37E+05	1.12E+05	6.69E+04	4.25E+04	2.15E+02	2.32E+02
6.30E-01	2.65E+05	2.51E+05	2.38E+05	2.37E+05	2.35E+05	2.27E+05	2.17E+05	1.51E+05	9.60E+04	1.64E+02	2.99E+02
1.10E+00	1.06E+05	1.06E+05	1.06E+05	1.05E+05	1.05E+05	1.01E+05	9.67E+04	6.73E+04	4.28E+04	1.23E+01	3.82E-02
1.55E+00	2.07E+02	1.88E+02	1.24E+02	2.76E+01	4.91E+00	9.29E-01	8.66E-01	5.84E-01	6.23E-01	1.03E+01	2.32E+01
1.99E+00	1.41E+02	1.28E+02	8.42E+01	1.87E+01	3.33E+00	6.30E-01	5.86E-01	3.28E-01	1.60E-01	3.07E-03	6.09E-04
2.38E+00	8.39E+01	7.62E+01	5.03E+01	1.12E+01	1.99E+00	3.76E-01	3.50E-01	1.96E-01	9.55E-02	1.62E-03	3.27E-04
2.75E+00	4.56E+01	4.15E+01	2.71E+01	6.05E+00	1.08E+00	2.03E-01	1.68E-01	1.05E-01	5.14E-02	1.22E-03	2.70E-03
3.25E+00	3.32E+01	3.01E+01	1.99E+01	4.42E+00	7.86E-01	1.49E-01	1.38E-01	7.74E-02	3.78E-02	7.19E-04	1.29E-04
3.70E+00	2.43E+01	2.20E+01	1.45E+01	3.23E+00	5.74E-01	1.09E-01	1.01E-01	5.66E-02	2.76E-02	5.25E-04	9.45E-05
4.22E+00	1.75E+01	1.59E+01	1.05E+01	2.32E+00	4.13E-01	7.82E-02	7.27E-02	4.07E-02	1.99E-02	3.78E-04	6.80E-05
4.70E+00	9.20E+00	8.35E+00	5.51E+00	1.23E+00	2.19E-01	4.12E-02	3.83E-02	2.15E-02	1.05E-02	1.99E-04	3.56E-05
5.25E+00	6.46E+00	5.87E+00	3.87E+00	8.61E-01	1.53E-01	2.90E-02	2.69E-02	1.51E-02	7.36E-03	1.40E-04	2.52E-05
TOTAL	5.62E+05	5.44E+05	5.28E+05	5.22E+05	5.14E+05	4.65E+05	4.25E+05	2.85E+05	1.81E+05	4.02E+02	5.54E+02
GAMMA WATTS	3.46E+00	3.35E+00	3.25E+00	3.21E+00	3.15E+00	2.86E+00	2.62E+00	1.76E+00	1.12E+00	2.47E-03	3.41E-03

PHOTON SPECTRUM AS A FUNCTION OF TIME FOR FISSION PRODUCTS

FP's

TABLE A-IV-3
(continued)

PWR - 3U = 33,000 WASTE DECAY TIMES CASE E-4
POWER= 38.40 MW. BURNUP= 33000.MWD. FLUX= 1.42E+13 N**2-SEC

TWELVE GROUP PHOTON RELEASE RATES, PHOTONS/SEC
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

EMEAN (MEV)	INITIAL	TIME AFTER DISCHARGE 1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
3.00E-01	9.95E+15	6.44E+15	1.30E+14	4.07E+13	1.19E+13	1.35E+10	1.10E+10	1.07E+10	1.03E+10	5.54E+09	1.11E+07
6.30E-01	5.72E+16	2.45E+16	3.74E+15	1.31E+15	4.09E+14	1.74E+11	1.39E+11	1.31E+11	1.26E+11	6.76E+10	1.32E+08
1.10E+00	2.09E+15	1.48E+15	1.05E+14	1.80E+13	2.27E+12	1.88E+07	5.50E+05	5.45E+04	3.04E+03	0.	0.
1.55E+00	5.05E+14	3.53E+14	5.53E+12	2.33E+11	6.64E+10	2.96E+09	2.95E+09	2.87E+09	2.77E+09	1.48E+09	2.90E+06
1.99E+00	2.91E+14	1.90E+14	1.59E+11	6.55E+09	1.90E+09	9.85E+04	4.33E-01	0.	0.	0.	0.
2.38E+00	5.01E+13	3.54E+13	6.99E+10	7.22E-02	7.54E-17	0.	0.	0.	0.	0.	0.
2.75E+00	3.87E+12	2.74E+12	5.50E+09	5.69E-03	5.93E-18	0.	0.	0.	0.	0.	0.
3.25E+00	1.22E+11	8.67E+10	1.74E+08	1.81E-04	1.89E-19	0.	0.	0.	0.	0.	0.
3.70E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4.22E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4.70E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
5.25E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	7.01E+16	3.30E+16	3.98E+15	1.37E+15	4.23E+14	1.91E+11	1.48E+11	1.44E+11	1.39E+11	7.46E+10	1.46E+08
MEV/SEC	4.29E+16	2.00E+16	2.52E+15	8.56E+14	2.64E+14	1.18E+11	9.25E+10	8.99E+10	8.69E+10	4.65E+10	9.09E+07

TWELVE GROUP ENERGY RELEASE RATES, MEV/WATT-SEC
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

EMEAN (MEV)	INITIAL	TIME AFTER DISCHARGE 1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
3.00E-01	7.77E+07	5.03E+07	1.01E+06	3.18E+05	9.33E+04	1.06E+02	8.63E+01	8.37E+01	8.08E+01	4.33E+01	8.67E-02
6.30E-01	9.39E+08	4.02E+08	6.13E+07	2.15E+07	6.71E+06	2.86E+03	2.20E+03	2.14E+03	2.07E+03	1.11E+03	2.16E+00
1.10E+00	5.98E+07	4.23E+07	3.01E+06	5.15E+05	6.51E+04	5.37E-01	1.58E-02	1.56E-03	8.69E-05	0.	0.
1.55E+00	2.04E+07	1.43E+07	2.23E+05	9.40E+03	2.68E+03	1.20E+02	1.19E+02	1.16E+02	1.12E+02	5.99E+01	1.17E-01
1.99E+00	1.51E+07	9.87E+06	6.23E+03	3.38E+02	9.83E+01	5.11E-03	2.24E-08	0.	0.	0.	0.
2.38E+00	3.11E+06	2.18E+06	4.34E+03	4.48E-09	4.68E-14	0.	0.	0.	0.	0.	0.
2.75E+00	2.77E+05	1.96E+05	3.94E+02	4.08E-10	4.26E-15	0.	0.	0.	0.	0.	0.
3.25E+00	1.04E+04	7.34E+03	1.48E+01	1.53E-11	1.60E-16	0.	0.	0.	0.	0.	0.
3.70E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4.22E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4.70E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
5.25E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	1.11E+09	5.21E+08	6.56E+07	2.23E+07	6.87E+06	3.08E+03	2.41E+03	2.34E+03	2.26E+03	1.21E+03	2.37E+00
GAMMA WATTS	6.86E+03	3.21E+03	4.04E+02	1.37E+02	4.23E+01	1.90E-02	1.48E-02	1.44E-02	1.39E-02	7.46E-03	1.46E-05

PWR - BU = 33.000 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

Clad

TABLE A-IV-3
(continued)

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
H 1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
H 2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
H 3	0.	1.83E-03	1.78E-03	1.07E-03	1.12E-04	6.71E-06	1.09E-15	6.26E-28	0.	0.	0.	0.
H 4	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
HE 3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
HE 4	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
HE 6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LI 6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LI 7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LI 8	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BE 8	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BE 9	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BE 10	0.	1.45E-07	1.45E-07	1.45E-07	1.45E-07	1.45E-07	1.45E-07	1.45E-07	1.45E-07	1.45E-07	1.41E-07	1.10E-07
BE 11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
B 10	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
B 11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
B 12	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
C 12	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
C 13	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
C 14	0.	1.93E-03	1.93E-03	1.93E-03	1.92E-03	1.91E-03	1.82E-03	1.71E-03	1.05E-03	5.76E-04	1.08E-08	0.
N 13	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
N 14	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
N 15	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
N 16	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
O 16	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
O 17	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
O 18	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
O 19	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
F 19	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
F 20	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE 20	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE 21	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE 22	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE 23	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NA 22	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NA 23	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NA 24	0.	4.83E-89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NA 25	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MG 24	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MG 25	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MG 26	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MG 27	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AL 27	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AL 28	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AL 29	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SI 28	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SI 29	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SI 30	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SI 31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
P 31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
P 32	0.	6.53E-04	9.33E-08	0.	0.	0.	0.	0.	0.	0.	0.	0.
P 33	0.	7.80E-02	4.93E-04	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR - BU = 33.000 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC Clad

TABLE A-IV-3
(continued)

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	Y* ***** Y
P 34	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S 32	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S 33	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S 34	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S 35	0.	2.33E-02	5.53E-03	3.14E-14	0.	0.	0.	0.	0.	0.	0.	0.
S 36	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S 37	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CL 35	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CL 36	0.	4.85E-09	4.85E-09	4.85E-09	4.85E-09	4.85E-09	4.85E-09	4.84E-09	4.80E-09	4.74E-09	3.88E-09	5.18E-10
CL 37	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CL 38	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AR 36	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AR 37	0.	1.44E-13	3.86E-15	0.	0.	0.	0.	0.	0.	0.	0.	0.
AR 38	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AR 39	0.	8.11E-16	8.10E-16	7.91E-16	7.14E-16	6.27E-16	2.24E-16	6.17E-17	2.06E-21	5.21E-27	0.	0.
AR 40	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AR 41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
K 39	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
K 40	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
K 41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
K 42	0.	1.53-116	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
K 43	0.	4.70E-66	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
K 44	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 40	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 42	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 43	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 44	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 45	0.	2.96E-03	1.38E-03	1.38E-09	0.	0.	0.	0.	0.	0.	0.	0.
CA 46	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 47	0.	1.82E-17	1.33E-29	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 48	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 49	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SC 45	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SC 46	0.	1.93E-01	4.26E-02	6.82E-14	0.	0.	0.	0.	0.	0.	0.	0.
SC 47	0.	2.15E-16	5.46E-29	0.	0.	0.	0.	0.	0.	0.	0.	0.
SC 48	0.	1.15E-31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SC 49	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SC 50	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TI 46	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TI 47	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TI 48	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TI 49	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TI 50	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TI 51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 49	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 50	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 52	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 53	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 54	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR 50	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

Clad

TABLE A-Iv-3
(continued)

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
CR 51	0.	5.64E+01	5.94E-01	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR 52	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR 53	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR 54	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR 55	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MN 54	0.	1.02E+02	6.72E+01	3.64E-02	1.11E-16	7.94E-35	0.	0.	0.	0.	0.	0.
MN 55	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MN 56	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MN 57	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MN 58	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE 54	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE 55	0.	7.70E+02	6.74E+02	6.11E+01	1.43E-03	2.32E-09	0.	0.	0.	0.	0.	0.
FE 56	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE 57	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE 58	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE 59	0.	4.67E+00	2.80E-01	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO 58M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO 58	0.	4.82E+02	8.16E+01	1.08E-12	0.	0.	0.	0.	0.	0.	0.	0.
CO 59	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO 60M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO 60	0.	3.32E+03	3.11E+03	9.49E+02	4.87E+00	6.70E-03	0.	0.	0.	0.	0.	0.
CO 61	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO 62	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NI 58	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NI 59	0.	5.91E-01	5.91E-01	5.91E-01	5.91E-01	5.90E-01	5.88E-01	5.86E-01	5.66E-01	5.42E-01	2.48E-01	1.02E-04
NI 60	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NI 61	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NI 62	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NI 63	0.	9.10E+01	9.06E+01	8.47E+01	6.27E+01	4.39E+01	2.11E+00	4.86E-02	3.95E-15	1.72E-31	0.	0.
NI 64	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NI 65	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CU 62	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CU 63	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CU 64	0.	1.64-101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CU 65	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CU 66	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 63	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 64	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 65	0.	2.13E-02	1.27E-02	1.16E-06	1.29E-24	0.	0.	0.	0.	0.	0.	0.
ZN 66	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 67	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 68	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 69M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 69	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 70	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 71M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 71	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 69	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 70	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 71	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 70	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 88	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC Clad

TABLE A-IV-3
(continued)

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
SR 89	0.	1.10E+00	9.64E-02	8.97E-21	0.	0.	0.	0.	0.	0.	0.	0.
SR 90	0.	9.14E-05	9.03E-05	7.23E-05	2.70E-05	7.85E-06	4.07E-10	1.79E-15	0.	0.	0.	0.
SR 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 90M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 90	0.	9.15E-05	9.03E-05	7.24E-05	2.70E-05	7.86E-06	4.07E-10	1.79E-15	0.	0.	0.	0.
Y 91M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 91	0.	3.85E+00	4.48E-01	6.61E-18	0.	0.	0.	0.	0.	0.	0.	0.
ZR 90	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 93	0.	1.98E-02	1.98E-02	1.98E-02	1.98E-02	1.98E-02	1.98E-02	1.98E-02	1.98E-02	1.97E-02	1.89E-02	1.25E-02
ZR 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 95	0.	1.07E+03	1.53E+02	9.11E-14	0.	0.	0.	0.	0.	0.	0.	0.
ZR 96	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 92	0.	5.89E-06	2.40E-11	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 93M	0.	1.69E-03	2.20E-03	9.47E-03	2.03E-02	2.18E-02	2.19E-02	2.18E-02	2.12E-02	2.07E-02	1.89E-02	1.25E-02
NB 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 94	0.	4.76E-05	4.76E-05	4.76E-05	4.76E-05	4.76E-05	4.76E-05	4.76E-05	4.76E-05	4.76E-05	4.74E-05	4.60E-05
NB 95	0.	2.04E+03	3.19E+02	1.93E-13	0.	0.	0.	0.	0.	0.	0.	0.
NB 96	0.	6.98E-58	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 97	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 93	0.	2.56E-03	2.56E-03	2.56E-03	2.55E-03	2.54E-03	2.47E-03	2.37E-03	1.74E-03	1.19E-03	1.16E-06	0.
MO 93M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 96	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 97	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 98	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 99	0.	6.52E-18	1.32E-37	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO100	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC 99M	0.	6.23E-18	1.26E-37	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC 99	0.	2.06E-03	2.06E-03	2.06E-03	2.06E-03	2.06E-03	2.05E-03	2.05E-03	2.02E-03	1.99E-03	1.48E-03	7.58E-05
TC101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD113M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD113	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD115M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD115	0.	1.18E-28	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD119M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN113	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN119M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN121M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN114	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN115	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN116	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN117M	0.	3.52E-01	4.16E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

Clad

TABLE A-IV-3
(continued)

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	1000000. Y
SN117	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN118	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN119M	0.	3.45E+00	2.08E+00	2.29E-04	5.82E-22	0.	0.	0.	0.	0.	0.	0.
SN119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN120	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN121M	0.	6.32E-02	6.29E-02	5.80E-02	4.03E-02	2.55E-02	6.64E-04	6.94E-06	9.87E-22	1.54E-41	0.	0.
SN121	0.	6.23E-47	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN122	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN123M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN123	0.	4.20E-02	1.53E-02	1.85E-10	0.	0.	0.	0.	0.	0.	0.	0.
SN124	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN125M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN125	0.	1.36E-06	1.92E-12	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB123	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB124M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB124	0.	8.84E-02	1.07E-02	3.44E-19	0.	0.	0.	0.	0.	0.	0.	0.
SB125	0.	8.04E+00	7.07E+00	7.01E-01	2.43E-05	6.46E-11	0.	0.	0.	0.	0.	0.
SB126M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB126	0.	9.56E-07	3.82E-11	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE124	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE125M	0.	3.26E+00	2.92E+00	2.91E-01	1.01E-05	2.68E-11	0.	0.	0.	0.	0.	0.
TE125	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE126	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TA180	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TA181	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TA182M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TA182	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W180	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W181	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W182	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W183M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W183	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W184	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W185M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W185	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W186	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W187	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	0.	7.96E+03	4.51E+03	1.10E+03	6.82E+01	4.37E+01	2.75E+00	6.82E-01	6.12E-01	5.86E-01	2.88E-01	2.52E-02

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4 HE's TABLE A-IV-3 (continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	1000000. Y
HE 4	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TL207	0.	2.60E-08	3.65E-08	1.69E-07	4.73E-07	5.99E-07	1.01E-06	1.51E-06	1.08E-05	4.65E-05	4.24E-03	6.38E-03
TL208	0.	2.56E-04	2.19E-04	2.31E-05	1.25E-05	7.74E-06	1.55E-07	1.39E-09	1.12E-09	3.84E-09	9.59E-08	1.00E-06
TL209	0.	8.78E-11	8.96E-11	1.27E-10	1.25E-09	5.60E-09	2.79E-07	1.51E-06	6.63E-05	2.57E-04	6.81E-03	1.54E-02
PB206	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PB207	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PB208	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PB209	0.	3.99E-09	4.07E-09	5.77E-09	5.69E-08	2.55E-07	1.27E-05	7.32E-05	3.01E-03	1.17E-02	3.10E-01	6.98E-01
PB210	0.	7.82E-19	1.56E-18	6.06E-17	9.50E-16	2.59E-15	1.66E-14	2.98E-14	7.33E-14	7.86E-14	3.65E-14	1.50E-17
PB211	0.	2.61E-08	3.67E-08	1.69E-07	4.74E-07	6.01E-07	1.01E-06	1.51E-06	1.08E-05	4.66E-05	4.25E-03	6.40E-03
PB212	0.	7.11E-04	6.08E-04	6.42E-05	3.48E-05	2.15E-05	4.57E-07	3.86E-09	3.11E-09	1.07E-08	2.66E-07	2.79E-06
PB214	0.	3.71E-17	5.78E-17	3.89E-16	1.85E-15	3.63E-15	1.66E-14	2.98E-14	7.33E-14	7.86E-14	3.65E-14	1.50E-17
BI209	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BI210	0.	2.20E-19	1.56E-18	6.06E-17	9.50E-16	2.59E-15	1.66E-14	2.98E-14	7.33E-14	7.86E-14	3.65E-14	1.50E-17
BI211	0.	2.61E-08	3.67E-08	1.69E-07	4.74E-07	6.01E-07	1.01E-06	1.51E-06	1.08E-05	4.66E-05	4.25E-03	6.40E-03
BI212	0.	7.11E-04	6.08E-04	6.42E-05	3.48E-05	2.15E-05	4.57E-07	3.86E-09	3.11E-09	1.07E-08	2.66E-07	2.79E-06
BI213	0.	3.99E-09	4.07E-09	5.77E-09	5.69E-08	2.55E-07	1.27E-05	7.32E-05	3.01E-03	1.17E-02	3.10E-01	6.98E-01
BI214	0.	3.71E-17	5.78E-17	3.89E-16	1.85E-15	3.63E-15	1.66E-14	2.98E-14	7.33E-14	7.86E-14	3.65E-14	1.50E-17
PO210	0.	7.67E-21	7.07E-19	6.06E-17	9.50E-16	2.59E-15	1.66E-14	2.98E-14	7.33E-14	7.86E-14	3.65E-14	1.50E-17
PO211	0.	7.83E-11	1.10E-10	5.08E-10	1.42E-09	1.80E-09	3.03E-09	4.54E-09	3.25E-08	1.40E-07	1.28E-05	1.92E-05
PO212	0.	4.55E-04	3.89E-04	4.11E-05	2.23E-05	1.38E-05	2.93E-07	2.47E-09	1.99E-09	6.83E-09	1.70E-07	1.78E-06
PO213	0.	3.99E-09	3.98E-09	5.64E-09	5.56E-08	2.49E-07	1.24E-05	7.16E-05	2.95E-03	1.14E-02	3.03E-01	6.83E-01
PO214	0.	3.71E-17	5.78E-17	3.89E-16	1.85E-15	3.63E-15	1.66E-14	2.98E-14	7.33E-14	7.86E-14	3.65E-14	1.50E-17
PO215	0.	2.61E-08	3.67E-08	1.69E-07	4.74E-07	6.01E-07	1.01E-06	1.51E-06	1.08E-05	4.66E-05	4.25E-03	6.40E-03
PO216	0.	7.11E-04	6.08E-04	6.42E-05	3.48E-05	2.15E-05	4.57E-07	3.86E-09	3.11E-09	1.07E-08	2.66E-07	2.79E-06
PO218	0.	3.71E-17	5.78E-17	3.89E-16	1.85E-15	3.63E-15	1.66E-14	2.98E-14	7.33E-14	7.86E-14	3.65E-14	1.50E-17
AT217	0.	3.99E-09	4.07E-09	5.77E-09	5.69E-08	2.55E-07	1.27E-05	7.32E-05	3.01E-03	1.17E-02	3.10E-01	6.98E-01
RN219	0.	2.61E-08	3.67E-08	1.69E-07	4.74E-07	6.01E-07	1.01E-06	1.51E-06	1.08E-05	4.66E-05	4.25E-03	6.40E-03
RN220	0.	7.11E-04	6.08E-04	6.42E-05	3.48E-05	2.15E-05	4.57E-07	3.86E-09	3.11E-09	1.07E-08	2.66E-07	2.79E-06
RN222	0.	3.71E-17	5.78E-17	3.89E-16	1.85E-15	3.63E-15	1.66E-14	2.98E-14	7.33E-14	7.86E-14	3.65E-14	1.50E-17
FR221	0.	3.99E-09	4.07E-09	5.77E-09	5.69E-08	2.55E-07	1.27E-05	7.32E-05	3.01E-03	1.17E-02	3.10E-01	6.98E-01
FR223	0.	3.92E-10	5.11E-10	2.37E-09	6.64E-09	8.41E-09	1.42E-08	2.12E-08	1.52E-07	6.52E-07	5.95E-05	8.96E-05
RA223	0.	2.61E-08	3.67E-08	1.69E-07	4.74E-07	6.01E-07	1.01E-06	1.51E-06	1.08E-05	4.66E-05	4.25E-03	6.40E-03
RA224	0.	7.11E-04	6.08E-04	6.42E-05	3.48E-05	2.15E-05	4.57E-07	3.86E-09	3.11E-09	1.07E-08	2.66E-07	2.79E-06
RA225	0.	4.02E-09	4.07E-09	5.77E-09	5.69E-08	2.55E-07	1.27E-05	7.32E-05	3.01E-03	1.17E-02	3.10E-01	6.98E-01
RA226	0.	3.94E-17	5.78E-17	3.89E-16	1.85E-15	3.63E-15	1.66E-14	2.98E-14	7.33E-14	7.86E-14	3.65E-14	1.50E-17
RA228	0.	3.02E-13	4.45E-13	2.10E-12	3.57E-12	4.66E-12	4.01E-11	1.46E-10	3.11E-09	1.07E-08	2.66E-07	2.79E-06
AC225	0.	3.99E-09	4.07E-09	5.77E-09	5.69E-08	2.55E-07	1.27E-05	7.32E-05	3.01E-03	1.17E-02	3.10E-01	6.98E-01
AC227	0.	2.80E-08	3.65E-08	1.69E-07	4.74E-07	6.01E-07	1.01E-06	1.51E-06	1.08E-05	4.66E-05	4.25E-03	6.40E-03
AC228	0.	3.02E-13	4.45E-13	2.10E-12	3.57E-12	4.66E-12	4.01E-11	1.46E-10	3.11E-09	1.07E-08	2.66E-07	2.79E-06
TH227	0.	2.64E-08	3.61E-08	1.67E-07	4.68E-07	5.92E-07	9.97E-07	1.49E-06	1.07E-05	4.60E-05	4.19E-03	6.31E-03
TH228	0.	7.22E-04	6.05E-04	6.41E-05	3.48E-05	2.15E-05	4.57E-07	3.86E-09	3.11E-09	1.07E-08	2.66E-07	2.79E-06
TH229	0.	4.06E-09	4.07E-09	5.77E-09	5.69E-08	2.55E-07	1.27E-05	7.32E-05	3.01E-03	1.17E-02	3.10E-01	6.98E-01
TH230	0.	8.52E-14	8.52E-14	8.52E-14	8.51E-14	8.51E-14	8.48E-14	8.44E-14	8.16E-14	7.81E-14	3.58E-14	1.47E-17
TH231	0.	8.26E-03	4.13E-05	4.13E-05	4.15E-05	4.18E-05	4.51E-05	5.21E-05	2.01E-04	5.42E-04	5.95E-03	6.40E-03
TH232	0.	3.12E-12	3.13E-12	3.21E-12	3.73E-12	4.94E-12	4.01E-11	1.46E-10	3.11E-09	1.07E-08	2.66E-07	2.79E-06
TH233	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TH234	0.	3.01E-01	3.07E-03	1.50E-03	1.50E-03	1.50E-03	1.50E-03	1.50E-03	1.50E-03	1.50E-03	1.51E-03	1.52E-03
PA231	0.	5.61E-07	5.62E-07	5.70E-07	6.05E-07	6.49E-07	1.01E-06	1.51E-06	1.08E-05	4.66E-05	4.25E-03	6.40E-03
PA232	0.	7.14E-45	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PA233	0.	8.63E-02	8.70E-02	9.76E-02	1.43E-01	1.98E-01	5.06E-01	6.96E-01	8.65E-01	8.79E-01	8.80E-01	6.58E-01
PA234M	0.	3.01E-01	3.07E-03	1.50E-03	1.50E-03	1.50E-03	1.50E-03	1.50E-03	1.50E-03	1.50E-03	1.51E-03	1.52E-03

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

HE's

TABLE A-IV-3
(continued)

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
PA234	0.	3.01E-04	3.07E-06	1.50E-06	1.50E-06	1.50E-06	1.50E-06	1.50E-06	1.50E-06	1.50E-06	1.51E-06	1.52E-06
U232	0.	1.42E-05	1.85E-05	4.58E-05	3.39E-05	2.09E-05	4.45E-07	3.51E-09	5.76E-25	8.38E-47	0.	0.
U233	0.	4.59E-08	2.31E-07	3.78E-06	2.44E-05	6.10E-05	5.90E-04	2.00E-03	1.61E-02	3.43E-02	3.09E-01	6.98E-01
U235	1.41E-02	4.13E-05	4.13E-05	4.13E-05	4.15E-05	4.18E-05	4.51E-05	5.21E-05	2.01E-04	5.42E-04	5.95E-03	6.40E-03
U236	0.	1.82E-04	1.83E-04	1.95E-04	3.55E-04	6.31E-04	2.93E-03	5.68E-03	2.32E-02	3.71E-02	5.77E-02	5.62E-02
U237	0.	1.27E-01	1.24E-01	8.13E-02	1.25E-02	1.50E-03	3.63E-04	3.48E-04	2.49E-04	1.64E-04	8.63E-08	0.
U238	3.05E-01	1.50E-03	1.50E-03	1.50E-03	1.50E-03	1.50E-03	1.50E-03	1.50E-03	1.50E-03	1.50E-03	1.51E-03	1.52E-03
U239	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
U240	0.	6.12E-15	7.72E-13	1.45E-11	7.58E-11	1.52E-10	7.64E-10	1.53E-09	7.62E-09	1.52E-08	1.38E-07	6.33E-07
NP236	0.	8.83E-61	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NP237	0.	8.65E-02	8.71E-02	9.76E-02	1.43E-01	1.98E-01	5.06E-01	6.96E-01	8.65E-01	8.79E-01	8.80E-01	6.58E-01
NP238	0.	9.84E-29	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NP239	0.	4.86E+02	4.87E+02	4.87E+02	4.85E+02	4.83E+02	4.66E+02	4.45E+02	3.10E+02	1.97E+02	5.66E-02	7.11E-06
NP240M	0.	1.22E-12	7.72E-13	1.45E-11	7.58E-11	1.52E-10	7.64E-10	1.53E-09	7.62E-09	1.52E-08	1.38E-07	6.33E-07
NP240	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PU236	0.	9.79E-04	8.67E-04	9.72E-05	5.78E-09	3.02E-14	0.	0.	0.	0.	0.	0.
PU238	3.23E+04	1.56E+02	8.26E+02	1.31E+03	9.56E+02	6.48E+02	2.87E+01	5.37E-01	2.49E-11	3.11E-21	0.	0.
PU239	1.97E+03	4.46E+00	4.47E+00	4.61E+00	5.18E+00	5.87E+00	1.12E+01	1.74E+01	5.56E+01	8.10E+01	1.32E+01	7.11E-06
PU240	4.55E+03	1.73E+01	2.08E+01	7.41E+01	1.75E+02	1.98E+02	1.94E+02	1.84E+02	1.22E+02	7.33E+01	7.19E-03	6.34E-07
PU241	1.24E+06	5.30E+03	5.18E+03	3.38E+03	5.20E+02	6.26E+01	1.51E+01	1.45E+01	1.04E+01	6.82E+00	3.60E-03	0.
PU242	3.86E+01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.02E-01	2.03E-01	2.11E-01	2.15E-01	1.87E-01	3.61E-02
PU243	0.	3.71E-08	7.42E-06	7.42E-06	7.42E-06	7.42E-06	7.42E-06	7.42E-06	7.42E-06	7.41E-06	7.39E-06	7.11E-06
PU244	0.	6.13E-15	7.73E-13	1.46E-11	7.59E-11	1.53E-10	7.65E-10	1.53E-09	7.63E-09	1.52E-08	1.39E-07	6.34E-07
PU245	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AM241	0.	3.59E+03	3.59E+03	3.60E+03	3.47E+03	3.22E+03	1.70E+03	7.73E+02	1.21E+01	6.83E+00	3.79E-03	0.
AM242M	0.	1.00E-01	1.00E-01	9.62E-02	8.02E-02	6.38E-02	1.03E-02	1.05E-03	1.26E-11	1.57E-21	0.	0.
AM242	0.	1.00E-01	1.00E-01	9.62E-02	8.02E-02	6.38E-02	1.03E-02	1.05E-03	1.26E-11	1.57E-21	0.	0.
AM243	0.	4.87E+02	4.87E+02	4.87E+02	4.85E+02	4.83E+02	4.66E+02	4.45E+02	3.10E+02	1.97E+02	5.66E-02	7.11E-06
AM244	0.	1.59E-15	1.00E-15	1.89E-14	9.86E-14	1.98E-13	9.95E-13	1.99E-12	9.91E-12	1.97E-11	1.80E-10	8.24E-10
AM245	0.	2.45E-23	7.57E-41	0.	0.	0.	0.	0.	0.	0.	0.	0.
CM242	0.	2.48E+05	1.14E+05	1.76E-01	6.57E-02	5.23E-02	8.44E-03	8.53E-04	1.03E-11	1.29E-21	0.	0.
CM243	0.	4.09E+01	4.04E+01	3.33E+01	1.40E+01	4.74E+00	8.17E-04	1.61E-08	0.	0.	0.	0.
CM244	0.	6.97E+04	6.84E+04	4.84E+04	1.05E+04	1.54E+03	3.43E-04	3.54E-12	9.91E-12	1.97E-11	1.80E-10	8.24E-10
CM245	0.	1.58E+01	1.58E+01	1.57E+01	1.57E+01	1.56E+01	1.51E+01	1.45E+01	1.04E+01	6.81E+00	3.59E-03	0.
CM246	0.	1.96E+00	1.96E+00	1.96E+00	1.95E+00	1.93E+00	1.82E+00	1.59E+00	9.40E-01	4.50E-01	7.98E-07	0.
CM247	0.	7.42E-06	7.42E-06	7.42E-06	7.42E-06	7.42E-06	7.42E-06	7.42E-06	7.42E-06	7.41E-06	7.39E-06	7.11E-06
CM248	0.	2.00E-05	2.00E-05	2.00E-05	2.00E-05	2.00E-05	2.00E-05	1.99E-05	1.98E-05	1.96E-05	1.64E-05	2.79E-06
CM249	0.	2.56E-39	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CM250	0.	8.24E-13	8.24E-13	8.21E-13	8.08E-13	7.92E-13	5.75E-13	5.53E-13	1.12E-13	1.53E-14	4.11E-30	0.
BK249	0.	1.59E-18	4.91E-36	0.	0.	0.	0.	0.	0.	0.	0.	0.
BK250	0.	8.24E-13	8.24E-13	8.21E-13	8.08E-13	7.92E-13	5.75E-13	5.53E-13	1.12E-13	1.53E-14	4.11E-30	0.
CF249	0.	1.98E-02	1.80E-02	3.05E-03	1.16E-06	6.13E-11	0.	0.	0.	0.	0.	0.
CF250	0.	9.29E-04	7.13E-04	6.05E-06	8.11E-13	7.92E-13	5.75E-13	5.53E-13	1.12E-13	1.53E-14	4.11E-30	0.
CF251	0.	9.81E-07	9.80E-07	9.73E-07	9.44E-07	9.08E-07	6.67E-07	4.54E-07	2.08E-08	4.43E-10	0.	0.
CF252	0.	8.03E-05	7.04E-05	6.66E-06	1.87E-10	3.83E-16	0.	0.	0.	0.	0.	0.
CF253	0.	8.24E-37	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CF254	0.	1.36E-18	1.11E-27	0.	0.	0.	0.	0.	0.	0.	0.	0.
ES253	0.	3.05E-32	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	1.28E+06	3.28E+05	1.93E+05	5.78E+04	1.66E+04	6.66E+03	2.90E+03	1.90E+03	8.34E+02	5.71E+02	1.82E+01	7.77E+00

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

FP's

TABLE A-IV-3
(continued)

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	1000000. Y
H 3	0.	7.50E+01	7.29E+01	4.39E+01	4.61E+00	2.75E-01	4.46E-11	2.58E-23	0.	0.	0.	0.
ZN 72	0.	1.34E-27	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 72	0.	1.93E-27	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 72	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 73	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 73	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 74	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 74	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 75	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 75M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 75	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 75	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 76	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 76	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 76	0.	7.14E-50	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 76	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 77M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 77	0.	1.40-114	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 77	0.	2.56E-31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 77M	0.	7.68E-34	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 77	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 78	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 78M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 78	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 78	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 79	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 79M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 79	0.	3.31E-01	3.31E-01	3.31E-01	3.31E-01	3.30E-01	3.29E-01	3.27E-01	3.14E-01	2.97E-01	1.14E-01	7.72E-06
BR 79	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 80	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 80	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 80M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 80	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 80	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 81M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 81M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 82	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 82M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 82	0.	4.27E-38	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 82	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 83M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 83	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 83	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 83M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 83	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 84	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 84M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 84	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR - BU = 33.000 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

FP's

TABLE A-IV-3
(continued)

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	Y******* Y
KR 84	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 85M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 86	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 86	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 86M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 86	0.	1.81E-01	2.08E-04	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 86	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 87	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 87	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 87	0.	1.09E-05	1.09E-05	1.09E-05	1.09E-05	1.09E-05	1.09E-05	1.09E-05	1.09E-05	1.09E-05	1.09E-05	1.09E-05
SR 87M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 87	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 88	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 88	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 88	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 88	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 89	0.	5.47E+04	4.79E+03	4.46E-16	0.	0.	0.	0.	0.	0.	0.	0.
Y 89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 90	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 90	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 90	0.	4.40E+04	4.35E+04	3.48E+04	1.30E+04	3.78E+03	1.96E-01	8.51E-07	0.	0.	0.	0.
Y 90M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 90	0.	4.40E+04	4.35E+04	3.48E+04	1.30E+04	3.78E+03	1.96E-01	8.51E-07	0.	0.	0.	0.
ZR 90	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 91M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 91	0.	1.01E+05	1.18E+04	1.74E-13	0.	0.	0.	0.	0.	0.	0.	0.
ZR 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 93	0.	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.38E+00	9.10E-01
NB 93M	0.	1.18E-01	1.51E-01	6.27E-01	1.34E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.38E+00	9.10E-01
NB 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

FP's

TABLE A-IV-3
(continued)

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
Y 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 95	0.	2.31E+05	3.30E+04	1.96E-11	0.	0.	0.	0.	0.	0.	0.	0.
NB 95M	0.	4.91E+03	7.00E+02	4.17E-13	0.	0.	0.	0.	0.	0.	0.	0.
NB 95	0.	4.51E+05	7.91E+04	4.26E-11	0.	0.	0.	0.	0.	0.	0.	0.
MO 95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 96	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 96	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 96	0.	5.27E-55	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 96	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 97	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 97	0.	3.32E-72	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 97M	0.	3.19E-72	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 97	0.	3.58E-72	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 97	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 98	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 98M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 98	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 98	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 99	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 99	0.	3.70E-14	7.48E-34	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC 99M	0.	3.54E-14	7.15E-34	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC 99	0.	1.48E+01	1.48E+01	1.48E+01	1.48E+01	1.48E+01	1.48E+01	1.48E+01	1.46E+01	1.43E+01	1.07E+01	5.63E-01
RU 99	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB100	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO100	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC100	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU100	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO102	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC102M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC102	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU102	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO103	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC103	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU103	0.	7.23E+04	2.96E+03	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH103M	0.	7.24E+04	2.96E+03	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH103	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO104	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC104	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU104	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH104M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH104	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD104	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO105	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC105	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

FP's

TABLE A-IV-3
(continued)

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
RU105	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH105M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH105	0.	2.38E-31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD105	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC106	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU106	0.	7.78E+05	5.51E+05	1.11E+03	1.15E-09	1.20E-24	0.	0.	0.	0.	0.	0.
RH106M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH106	0.	7.78E+05	5.51E+05	1.11E+03	1.15E-09	1.20E-24	0.	0.	0.	0.	0.	0.
PD106	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU107	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH107	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD107M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD107	0.	2.40E-01	2.40E-01	2.40E-01	2.40E-01	2.40E-01	2.40E-01	2.40E-01	2.40E-01	2.40E-01	2.38E-01	2.17E-01
AG107	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU108	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH108	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD108	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG108	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD108	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH109	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD109M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD109	0.	6.24E-33	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG109M	0.	1.65E-06	1.25E-06	8.14E-09	1.59E-18	1.16E-30	0.	0.	0.	0.	0.	0.
AG109	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD109	0.	1.65E-06	1.25E-06	8.14E-09	1.59E-18	1.16E-30	0.	0.	0.	0.	0.	0.
RH110	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD110	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG110M	0.	3.16E+03	1.52E+03	2.35E-01	9.67E-19	0.	0.	0.	0.	0.	0.	0.
AG110	0.	4.11E+02	2.49E+02	3.05E-02	1.26E-19	0.	0.	0.	0.	0.	0.	0.
CD110	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD111M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD111	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG111M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG111	0.	3.15E-03	1.47E-10	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD111M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD111	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD112	0.	4.30E-59	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG112	0.	5.07E-59	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD112	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD113	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG113M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG113	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD113M	0.	9.95E+00	9.70E+00	6.21E+00	8.57E-01	7.21E-02	1.80E-10	3.19E-21	0.	0.	0.	0.
CD113	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN113	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD114	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG114	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD114	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN114M	0.	5.92E-02	4.71E-03	7.59E-23	0.	0.	0.	0.	0.	0.	0.	0.
IN114	0.	5.72E-02	4.54E-03	7.32E-23	0.	0.	0.	0.	0.	0.	0.	0.
SN114	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD115	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

FP's

TABLE A-IV-3
(continued)

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	Y******* Y
AG115M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG115	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD115M	0.	4.46E+01	2.36E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD115	0.	2.43E-21	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN115M	0.	2.65E-21	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN115	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN115	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG116	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD116	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN116M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN116	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN116	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG117	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD117M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD117	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN117M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN117	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN117M	0.	3.97E-03	4.69E-07	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN117	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD118	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN118M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN118	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN118	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD119M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN119M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN119M	0.	1.68E+01	1.01E+01	1.11E-03	2.84E-21	0.	0.	0.	0.	0.	0.	0.
SN119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD120	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN120M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN120	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN120	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN121M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN121M	0.	3.81E-04	3.79E-04	3.49E-04	2.43E-04	1.54E-04	4.00E-06	4.18E-08	5.95E-24	9.28E-44	0.	0.
SN121	0.	1.55E-45	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN122	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN122	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB122M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB122	0.	1.97E-17	4.56E-37	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE122	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN123M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN123	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN123M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN123	0.	5.41E+03	1.96E+03	2.38E-05	0.	0.	0.	0.	0.	0.	0.	0.
SB123	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE123M	0.	7.12E-02	2.41E-02	8.40E-11	0.	0.	0.	0.	0.	0.	0.	0.
TE123	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN124	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR - BU = 33.000 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

FP's

TABLE A-IV-3
(continued)

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	Y******* Y
SN124	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB124M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB124	0.	6.03E+01	7.31E+00	2.34E-16	0.	0.	0.	0.	0.	0.	0.	0.
TE124	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN125M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN125	0.	3.00E-02	4.25E-08	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB125	0.	1.40E+04	1.23E+04	1.22E+03	4.24E-02	1.13E-07	0.	0.	0.	0.	0.	0.
TE125M	0.	5.71E+03	5.10E+03	5.07E+02	1.76E-02	4.68E-08	0.	0.	0.	0.	0.	0.
TE125	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN126	0.	9.77E-01	9.77E-01	9.77E-01	9.77E-01	9.76E-01	9.74E-01	9.70E-01	9.44E-01	9.12E-01	4.89E-01	9.54E-04
SB126M	0.	9.77E-01	9.77E-01	9.77E-01	9.77E-01	9.76E-01	9.74E-01	9.70E-01	9.44E-01	9.12E-01	4.89E-01	9.54E-04
SB126	0.	9.70E-01	9.67E-01	9.67E-01	9.67E-01	9.67E-01	9.64E-01	9.61E-01	9.34E-01	9.03E-01	4.84E-01	9.44E-04
TE126	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN127M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN127	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB127	0.	7.33E-10	4.75E-24	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE127M	0.	8.23E+03	2.58E+03	2.15E-06	0.	0.	0.	0.	0.	0.	0.	0.
TE127	0.	8.13E+03	2.55E+03	2.12E-06	0.	0.	0.	0.	0.	0.	0.	0.
I127	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB128M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN129M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN129	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB129	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE129M	0.	2.01E+03	4.86E+01	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE129	0.	1.29E+03	3.11E+01	0.	0.	0.	0.	0.	0.	0.	0.	0.
I129	0.	4.95E-05	6.03E-05	6.05E-05	6.05E-05	6.05E-05	6.05E-05	6.05E-05	6.05E-05	6.05E-05	6.03E-05	5.81E-05
XE129M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE129	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN130	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB130M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB130	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE130	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I130M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I130	0.	6.88-106	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE130	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN131	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB131	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE131M	0.	1.62E-39	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE131	0.	2.96E-43	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I131	0.	1.75E-04	2.60E-11	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE131M	0.	0.	6.56E-11	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE131	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN132	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB132M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB132	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE132	0.	1.83E-11	2.22E-28	0.	0.	0.	0.	0.	0.	0.	0.	0.
I132	0.	1.89E-14	2.28E-28	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

FP's

TABLE A-IV-3
(continued)

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
XE132	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB133	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE133M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE133	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I133	0.	2.59E-69	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE133	0.	0.	1.94E-71	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS133	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB134	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE134	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I134	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE134	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS134M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS134	0.	9.99E+04	8.44E+04	4.02E+03	5.37E-03	2.44E-10	0.	0.	0.	0.	0.	0.
BA134	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE135	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I135	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE135	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS135M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS135	0.	4.69E-01	4.69E-01	4.69E-01	4.69E-01	4.69E-01	4.69E-01	4.69E-01	4.69E-01	4.68E-01	4.59E-01	3.72E-01
BA135M	0.	5.11E-46	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA135	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I136	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE136	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS136	0.	4.00E+00	2.36E-04	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA136	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I137	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE137	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS137	0.	1.11E+05	1.10E+05	8.92E+04	3.54E+04	1.11E+04	1.08E+00	1.04E-05	0.	0.	0.	0.
BA137M	0.	1.04E+05	1.03E+05	8.34E+04	3.31E+04	1.04E+04	1.01E+00	9.68E-06	0.	0.	0.	0.
BA137	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I138	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE138	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS138	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA138	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I139	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE139	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS139	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA139	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA139	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE140	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS140	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA140	0.	8.97E+01	4.54E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA140	0.	1.03E+02	5.23E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE140	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE141	0.	3.32E+04	6.68E+02	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

FP's

TABLE A-IV-3
(continued)

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	Y******** Y
XE142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR142	0.	4.12E-65	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE143	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS143	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA143	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA143	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE143	0.	1.35E-34	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR143	0.	1.55E+02	1.48E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND143	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA144	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE144	0.	7.30E+05	4.67E+05	1.53E+02	4.98E-14	2.18E-33	0.	0.	0.	0.	0.	0.
PR144	0.	7.30E+05	4.67E+05	1.53E+02	4.98E-14	2.18E-33	0.	0.	0.	0.	0.	0.
ND144	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE145	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR145	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND145	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE146	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR146	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND146	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE147	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR147	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND147	0.	7.62E+00	9.48E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM147	0.	1.65E+05	1.45E+05	1.34E+04	3.39E-01	6.09E-0	0.	0.	0.	0.	0.	0.
SM147	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM148M	0.	2.79E+03	1.37E+02	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM148	0.	2.24E+02	1.10E+01	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR149	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND149	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM149	0.	8.60E-20	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM149	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND150	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM150	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM150	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND151	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM151	0.	1.65E-42	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM151	0.	2.12E+03	2.12E+03	1.97E+03	1.43E+03	9.61E+02	3.97E+01	7.39E-01	1.06E-14	5.28E-32	0.	0.
EU151	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM152	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM152	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU152M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU152	0.	3.53E+01	3.43E+01	2.04E+01	2.02E+00	1.12E-01	1.04E-11	2.96E-24	0.	0.	0.	0.
GD152	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM153	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

POWER= 36.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

FP's

TABLE A-IV-3
(continued)

NUCLIDE RADIOACTIVITY, CURIES
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	Y******* Y
SM153	0.	3.60E-23	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU153	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD153	0.	1.28E+01	7.60E+00	6.18E-04	4.13E-22	0.	0.	0.	0.	0.	0.	0.
PM154	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM154	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU154	0.	5.44E+03	5.32E+03	3.60E+03	6.37E+02	7.30E+01	2.17E-06	8.49E-16	0.	0.	0.	0.
GD154	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM155	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU155	0.	7.34E+03	6.06E+03	1.93E+02	4.29E-05	2.07E-13	0.	0.	0.	0.	0.	0.
GD155	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM156	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU156	0.	3.57E+01	7.71E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD156	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM157	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU157	0.	2.81E-83	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD157	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU158	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD158	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU159	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD159	0.	2.70E-70	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB159	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU160	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD160	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB160	0.	2.67E+02	4.61E+01	8.67E-13	0.	0.	0.	0.	0.	0.	0.	0.
DY160	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD161	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB161	0.	1.20E-05	1.29E-13	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY161	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD162	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB162M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB162	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY162	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB163M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB163	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY163	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB164	0.	3.08E-56	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY164	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY165M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY165	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
HO165	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY166	0.	1.21E-15	7.79E-32	0.	0.	0.	0.	0.	0.	0.	0.	0.
HO166M	0.	4.02E-04	4.02E-04	4.00E-04	3.91E-04	3.79E-04	3.01E-04	2.26E-04	2.24E-05	1.25E-06	0.	0.
HO166	0.	1.80E-15	1.16E-31	0.	0.	0.	0.	0.	0.	0.	0.	0.
ER166	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ER167	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	0.	4.67E+06	2.73E+06	2.70E+05	9.65E+04	3.02E+04	5.38E+01	2.23E+01	2.13E+01	2.09E+01	1.57E+01	2.98E+00

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

Clad

TABLE A-IV-3
(continued)

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

		CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
H	1	1.62E+04	1.29E+03	1.29E+03	1.29E+03	1.29E+03	1.29E+03	1.29E+03	1.29E+03	1.29E+03	1.29E+03	1.29E+03	1.29E+03
H	2	0.	7.52E-01	7.52E-01	7.52E-01	7.52E-01	7.52E-01	7.52E-01	7.52E-01	7.52E-01	7.52E-01	7.52E-01	7.52E-01
H	3	0.	1.89E-07	1.83E-07	1.10E-07	1.16E-08	6.92E-10	1.12E-19	6.48E-32	0.	0.	0.	0.
H	4	0.	8.32E-27	8.32E-27	8.32E-27	8.32E-27	8.32E-27	8.32E-27	8.32E-27	8.32E-27	8.32E-27	8.32E-27	8.32E-27
HE	3	0.	1.11E-07	1.16E-07	1.89E-07	2.88E-07	2.99E-07	3.00E-07	3.00E-07	3.00E-07	3.00E-07	3.00E-07	3.00E-07
HE	4	0.	1.10E+00	1.10E+00	1.10E+00	1.10E+00	1.10E+00	1.10E+00	1.10E+00	1.10E+00	1.10E+00	1.10E+00	1.10E+00
HE	6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LI	6	0.	2.95E-10	2.95E-10	2.95E-10	2.95E-10	2.95E-10	2.95E-10	2.95E-10	2.95E-10	2.95E-10	2.95E-10	2.95E-10
LI	7	0.	6.98E-13	6.98E-13	6.98E-13	6.98E-13	6.98E-13	6.98E-13	6.98E-13	6.98E-13	6.98E-13	6.98E-13	6.98E-13
LI	8	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BE	8	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BE	9	0.	3.21E-06	3.21E-06	3.21E-06	3.21E-06	3.21E-06	3.21E-06	3.21E-06	3.21E-06	3.21E-06	3.21E-06	3.21E-06
BE	10	0.	1.01E-05	1.01E-05	1.01E-05	1.01E-05	1.01E-05	1.01E-05	1.01E-05	1.01E-05	1.01E-05	9.86E-06	7.69E-06
BE	11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
B	10	0.	2.36E-12	3.77E-12	2.91E-11	1.42E-10	2.82E-10	1.41E-09	2.81E-09	1.41E-08	2.81E-08	2.77E-07	2.46E-06
B	11	0.	8.80E-13	8.80E-13	8.80E-13	8.80E-13	8.80E-13	8.80E-13	8.80E-13	8.80E-13	8.80E-13	8.80E-13	8.80E-13
B	12	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
C	12	3.41E+00	3.41E+00	3.41E+00	3.41E+00	3.41E+00	3.41E+00	3.41E+00	3.41E+00	3.41E+00	3.41E+00	3.41E+00	3.41E+00
C	13	3.90E-02	3.59E+00	3.59E+00	3.59E+00	3.59E+00	3.59E+00	3.59E+00	3.59E+00	3.59E+00	3.59E+00	3.59E+00	3.59E+00
C	14	0.	4.33E-04	4.33E-04	4.33E-04	4.30E-04	4.28E-04	4.08E-04	3.84E-04	2.36E-04	1.29E-04	2.41E-09	0.
N	13	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
N	14	0.	6.22E-08	8.84E-08	5.60E-07	2.65E-06	5.24E-06	2.55E-05	4.94E-05	1.97E-04	3.04E-04	4.33E-04	4.33E-04
N	15	0.	5.43E-13	5.43E-13	5.43E-13	5.43E-13	5.43E-13	5.43E-13	5.43E-13	5.43E-13	5.43E-13	5.43E-13	5.43E-13
N	16	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
O	16	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05	2.60E+05
O	17	0.	6.37E+00	6.37E+00	6.37E+00	6.37E+00	6.37E+00	6.37E+00	6.37E+00	6.37E+00	6.37E+00	6.37E+00	6.37E+00
O	18	0.	2.29E-13	2.29E-13	2.29E-13	2.29E-13	2.29E-13	2.29E-13	2.29E-13	2.29E-13	2.29E-13	2.29E-13	2.29E-13
O	19	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
F	19	0.	8.45E-21	8.45E-21	8.45E-21	8.45E-21	8.45E-21	8.45E-21	8.45E-21	8.45E-21	8.45E-21	8.45E-21	8.45E-21
F	20	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE	20	0.	8.31E-17	8.31E-17	8.31E-17	8.31E-17	8.31E-17	8.31E-17	8.31E-17	8.31E-17	8.31E-17	8.31E-17	8.31E-17
NE	21	0.	9.23E-11	9.23E-11	9.23E-11	9.23E-11	9.23E-11	9.23E-11	9.23E-11	9.23E-11	9.23E-11	9.23E-11	9.23E-11
NE	22	0.	2.31E-09	2.31E-09	2.31E-09	2.31E-09	2.31E-09	2.31E-09	2.31E-09	2.31E-09	2.31E-09	2.31E-09	2.31E-09
NE	23	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NA	22	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NA	23	0.	1.86E-10	1.86E-10	1.86E-10	1.86E-10	1.86E-10	1.86E-10	1.86E-10	1.86E-10	1.86E-10	1.86E-10	1.86E-10
NA	24	0.	5.55E-96	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NA	25	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MG	24	0.	5.05E-05	5.05E-05	5.05E-05	5.05E-05	5.05E-05	5.05E-05	5.05E-05	5.05E-05	5.05E-05	5.05E-05	5.05E-05
MG	25	0.	1.10E-04	1.10E-04	1.10E-04	1.10E-04	1.10E-04	1.10E-04	1.10E-04	1.10E-04	1.10E-04	1.10E-04	1.10E-04
MG	26	0.	5.03E-05	5.03E-05	5.03E-05	5.03E-05	5.03E-05	5.03E-05	5.03E-05	5.03E-05	5.03E-05	5.03E-05	5.03E-05
MG	27	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AL	27	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01
AL	28	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AL	29	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SI	28	5.98E+01	5.98E+01	5.98E+01	5.98E+01	5.98E+01	5.98E+01	5.98E+01	5.98E+01	5.98E+01	5.98E+01	5.98E+01	5.98E+01
SI	29	3.13E+00	3.13E+00	3.13E+00	3.13E+00	3.13E+00	3.13E+00	3.13E+00	3.13E+00	3.13E+00	3.13E+00	3.13E+00	3.13E+00
SI	30	2.16E+00	2.16E+00	2.16E+00	2.16E+00	2.16E+00	2.16E+00	2.16E+00	2.16E+00	2.16E+00	2.16E+00	2.16E+00	2.16E+00
SI	31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
P	31	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00	1.95E+00
P	32	0.	2.29E-09	3.27E-13	0.	0.	0.	0.	0.	0.	0.	0.	0.
P	33	0.	4.92E-07	3.11E-09	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

Clad

TABLE A-IV-3
(continued)

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
P 34	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S 32	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00
S 33	9.90E-03	8.24E-03	8.24E-03	8.24E-03	8.24E-03	8.24E-03	8.24E-03	8.24E-03	8.24E-03	8.24E-03	8.24E-03	8.24E-03
S 34	6.80E-02	6.80E-02	6.80E-02	6.80E-02	6.80E-02	6.80E-02	6.80E-02	6.80E-02	6.80E-02	6.80E-02	6.80E-02	6.80E-02
S 35	0.	5.50E-07	1.30E-07	7.40E-19	0.	0.	0.	0.	0.	0.	0.	0.
S 36	0.	7.25E-15	1.05E-14	6.84E-14	3.26E-13	6.47E-13	3.22E-12	6.43E-12	3.20E-11	6.36E-11	5.76E-10	2.57E-09
S 37	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CL 35	0.	1.25E-05	1.29E-05	1.31E-05	1.31E-05	1.31E-05	1.31E-05	1.31E-05	1.31E-05	1.31E-05	1.31E-05	1.31E-05
CL 36	0.	1.51E-07	1.51E-07	1.51E-07	1.51E-07	1.51E-07	1.51E-07	1.51E-07	1.50E-07	1.48E-07	1.21E-07	1.62E-08
CL 37	0.	3.35E-09	3.35E-09	3.35E-09	3.35E-09	3.35E-09	3.35E-09	3.35E-09	3.35E-09	3.35E-09	3.35E-09	3.35E-09
CL 38	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AR 36	0.	3.74E-13	5.40E-13	3.53E-12	1.68E-11	3.34E-11	1.66E-10	3.32E-10	1.65E-09	3.28E-09	2.98E-08	1.33E-07
AR 37	0.	1.42E-18	3.82E-20	0.	0.	0.	0.	0.	0.	0.	0.	0.
AR 38	0.	2.41E-13	2.41E-13	2.41E-13	2.41E-13	2.41E-13	2.41E-13	2.41E-13	2.41E-13	2.41E-13	2.41E-13	2.41E-13
AR 39	0.	2.38E-17	2.38E-17	2.32E-17	2.09E-17	1.84E-17	6.57E-18	1.81E-18	6.03E-23	1.53E-28	0.	0.
AR 40	0.	8.08E-11	8.08E-11	8.08E-11	8.08E-11	8.08E-11	8.08E-11	8.08E-11	8.08E-11	8.08E-11	8.08E-11	8.08E-11
AR 41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
K 39	0.	4.99E-20	8.05E-20	6.25E-19	2.90E-18	5.43E-18	1.73E-17	2.20E-17	2.38E-17	2.38E-17	2.38E-17	2.38E-17
K 40	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
K 41	0.	2.69E-12	2.69E-12	2.69E-12	2.69E-12	2.69E-12	2.69E-12	2.69E-12	2.69E-12	2.69E-12	2.69E-12	2.69E-12
K 42	0.	2.54-123	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
K 43	0.	1.45E-72	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
K 44	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 40	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 42	0.	3.48E-14	3.48E-14	3.48E-14	3.48E-14	3.48E-14	3.48E-14	3.48E-14	3.48E-14	3.48E-14	3.48E-14	3.48E-14
CA 43	0.	7.39E-06	7.39E-06	7.39E-06	7.39E-06	7.39E-06	7.39E-06	7.39E-06	7.39E-06	7.39E-06	7.39E-06	7.39E-06
CA 44	0.	5.88E-05	5.88E-05	5.88E-05	5.88E-05	5.88E-05	5.88E-05	5.88E-05	5.88E-05	5.88E-05	5.88E-05	5.88E-05
CA 45	0.	1.68E-07	7.82E-08	7.86E-14	0.	0.	0.	0.	0.	0.	0.	0.
CA 46	0.	6.90E-06	6.90E-06	6.90E-06	6.90E-06	6.90E-06	6.90E-06	6.90E-06	6.90E-06	6.90E-06	6.90E-06	6.90E-06
CA 47	0.	2.96E-23	2.16E-35	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 48	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 49	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SC 45	0.	1.02E-06	1.11E-06	1.18E-06	1.18E-06	1.18E-06	1.18E-06	1.18E-06	1.18E-06	1.18E-06	1.18E-06	1.18E-06
SC 46	0.	5.69E-06	1.26E-06	2.01E-18	0.	0.	0.	0.	0.	0.	0.	0.
SC 47	0.	2.65E-22	6.74E-35	0.	0.	0.	0.	0.	0.	0.	0.	0.
SC 48	0.	7.72E-38	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SC 49	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SC 50	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TI 46	4.28E+00	4.28E+00	4.28E+00	4.28E+00	4.28E+00	4.28E+00	4.28E+00	4.28E+00	4.28E+00	4.28E+00	4.28E+00	4.28E+00
TI 47	4.09E+00	4.09E+00	4.09E+00	4.09E+00	4.09E+00	4.09E+00	4.09E+00	4.09E+00	4.09E+00	4.09E+00	4.09E+00	4.09E+00
TI 48	4.12E+01	4.10E+01	4.10E+01	4.10E+01	4.10E+01	4.10E+01	4.10E+01	4.10E+01	4.10E+01	4.10E+01	4.10E+01	4.10E+01
TI 49	3.14E+00	3.37E+00	3.37E+00	3.37E+00	3.37E+00	3.37E+00	3.37E+00	3.37E+00	3.37E+00	3.37E+00	3.37E+00	3.37E+00
TI 50	3.10E+00	3.11E+00	3.11E+00	3.11E+00	3.11E+00	3.11E+00	3.11E+00	3.11E+00	3.11E+00	3.11E+00	3.11E+00	3.11E+00
TI 51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 49	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 50	0.	5.74E-03	5.74E-03	5.74E-03	5.74E-03	5.74E-03	5.74E-03	5.74E-03	5.74E-03	5.74E-03	5.74E-03	5.74E-03
V 51	0.	1.01E+00	1.01E+00	1.01E+00	1.01E+00	1.01E+00	1.01E+00	1.01E+00	1.01E+00	1.01E+00	1.01E+00	1.01E+00
V 52	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 53	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 54	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR 50	8.38E+01	8.28E+01	8.28E+01	8.28E+01	8.28E+01	8.28E+01	8.28E+01	8.28E+01	8.28E+01	8.28E+01	8.28E+01	8.28E+01

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

TABLE A-IV-3
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

Clad

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	Y******* Y
CR 51	0.	6.12E-04	6.45E-06	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR 52	1.68E+03	1.68E+03	1.68E+03	1.68E+03	1.68E+03	1.68E+03	1.68E+03	1.68E+03	1.68E+03	1.68E+03	1.68E+03	1.68E+03
CR 53	1.94E+02	1.92E+02	1.92E+02	1.92E+02	1.92E+02	1.92E+02	1.92E+02	1.92E+02	1.92E+02	1.92E+02	1.92E+02	1.92E+02
CR 54	4.91E+01	5.16E+01	5.16E+01	5.16E+01	5.16E+01	5.16E+01	5.16E+01	5.16E+01	5.16E+01	5.16E+01	5.16E+01	5.16E+01
CR 55	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MN 54	0.	1.28E-02	8.41E-03	4.56E-06	1.39E-20	9.94E-39	0.	0.	0.	0.	0.	0.
MN 55	1.08E+02	1.07E+02	1.07E+02	1.07E+02	1.07E+02	1.07E+02	1.07E+02	1.07E+02	1.07E+02	1.07E+02	1.07E+02	1.07E+02
MN 56	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MN 57	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MN 58	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE 54	2.22E+02	2.22E+02	2.22E+02	2.22E+02	2.22E+02	2.22E+02	2.22E+02	2.22E+02	2.22E+02	2.22E+02	2.22E+02	2.22E+02
FE 55	0.	3.08E-01	2.69E-01	2.44E-02	5.71E-07	9.27E-13	0.	0.	0.	0.	0.	0.
FE 56	3.65E+03	3.64E+03	3.64E+03	3.64E+03	3.64E+03	3.64E+03	3.64E+03	3.64E+03	3.64E+03	3.64E+03	3.64E+03	3.64E+03
FE 57	8.66E+01	9.30E+01	9.30E+01	9.30E+01	9.30E+01	9.30E+01	9.30E+01	9.30E+01	9.30E+01	9.30E+01	9.30E+01	9.30E+01
FE 58	1.28E+01	1.36E+01	1.36E+01	1.36E+01	1.36E+01	1.36E+01	1.36E+01	1.36E+01	1.36E+01	1.36E+01	1.36E+01	1.36E+01
FE 59	0.	9.49E-05	5.69E-06	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO 58M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO 58	0.	1.52E-02	2.58E-03	3.40E-17	0.	0.	0.	0.	0.	0.	0.	0.
CO 59	7.09E+01	6.74E+01	6.74E+01	6.74E+01	6.74E+01	6.74E+01	6.74E+01	6.75E+01	6.77E+01	6.80E+01	7.19E+01	7.52E+01
CO 60M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO 60	0.	2.93E+00	2.74E+00	8.37E-01	4.50E-03	5.91E-06	0.	0.	0.	0.	0.	0.
CO 61	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO 62	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NI 58	2.49E+03	2.48E+03	2.48E+03	2.48E+03	2.48E+03	2.48E+03	2.48E+03	2.48E+03	2.48E+03	2.48E+03	2.48E+03	2.48E+03
NI 59	0.	7.80E+00	7.80E+00	7.80E+00	7.80E+00	7.79E+00	7.77E+00	7.73E+00	7.47E+00	7.15E+00	3.28E+00	1.35E-03
NI 60	9.86E+02	9.85E+02	9.85E+02	9.87E+02	9.87E+02	9.87E+02	9.87E+02	9.87E+02	9.87E+02	9.87E+02	9.87E+02	9.87E+02
NI 61	4.22E+01	4.40E+01	4.40E+01	4.40E+01	4.40E+01	4.40E+01	4.40E+01	4.40E+01	4.40E+01	4.40E+01	4.40E+01	4.40E+01
NI 62	1.40E+02	1.39E+02	1.39E+02	1.39E+02	1.39E+02	1.39E+02	1.39E+02	1.39E+02	1.39E+02	1.39E+02	1.39E+02	1.39E+02
NI 63	0.	1.47E+00	1.47E+00	1.37E+00	1.02E+00	6.97E-01	3.42E-02	7.90E-04	6.41E-17	2.78E-33	0.	0.
NI 64	3.62E+01	3.62E+01	3.62E+01	3.62E+01	3.62E+01	3.62E+01	3.62E+01	3.62E+01	3.62E+01	3.62E+01	3.62E+01	3.62E+01
NI 65	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CU 62	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CU 63	1.27E+01	1.27E+01	1.27E+01	1.28E+01	1.31E+01	1.35E+01	1.41E+01	1.42E+01	1.42E+01	1.42E+01	1.42E+01	1.42E+01
CU 64	0.	4.30-108	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CU 65	5.92E+00	5.94E+00	5.94E+00	5.94E+00	5.94E+00	5.94E+00	5.94E+00	5.94E+00	5.94E+00	5.94E+00	5.94E+00	5.94E+00
CU 66	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 63	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 64	0.	2.40E-02	2.40E-02	2.40E-02	2.40E-02	2.40E-02	2.40E-02	2.40E-02	2.40E-02	2.40E-02	2.40E-02	2.40E-02
ZN 65	0.	2.60E-06	1.55E-06	1.41E-10	1.58E-28	0.	0.	0.	0.	0.	0.	0.
ZN 66	0.	1.52E-02	1.52E-02	1.52E-02	1.52E-02	1.52E-02	1.52E-02	1.52E-02	1.52E-02	1.52E-02	1.52E-02	1.52E-02
ZN 67	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 68	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 69M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 69	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 70	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 71M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 71	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 69	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 70	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 71	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 70	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 88	0.	5.47E-02	5.47E-02	5.47E-02	5.47E-02	5.47E-02	5.47E-02	5.47E-02	5.47E-02	5.47E-02	5.47E-02	5.47E-02

PWR - BU = 33.000 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

Clad

TABLE A-IV-3
(continued)

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
SR 89	0.	3.90E-05	3.42E-06	3.18E-25	0.	0.	0.	0.	0.	0.	0.	0.
SR 90	0.	6.47E-07	6.39E-07	5.12E-07	1.91E-07	5.55E-08	2.88E-12	1.27E-17	0.	0.	0.	0.
SR 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 90M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 90	0.	1.68E-10	1.66E-10	1.33E-10	4.96E-11	1.44E-11	7.48E-16	3.29E-21	0.	0.	0.	0.
Y 91M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 91	0.	1.58E-04	1.83E-05	2.71E-22	0.	0.	0.	0.	0.	0.	0.	0.
ZR 90	6.14E+04	6.14E+04	6.14E+04	6.14E+04	6.14E+04	6.14E+04	6.14E+04	6.14E+04	6.14E+04	6.14E+04	6.14E+04	6.14E+04
ZR 91	1.35E+04	1.35E+04	1.35E+04	1.35E+04	1.35E+04	1.35E+04	1.35E+04	1.35E+04	1.35E+04	1.35E+04	1.35E+04	1.35E+04
ZR 92	2.09E+04	2.09E+04	2.09E+04	2.09E+04	2.09E+04	2.09E+04	2.09E+04	2.09E+04	2.09E+04	2.09E+04	2.09E+04	2.09E+04
ZR 93	0.	7.72E+00	7.72E+00	7.72E+00	7.72E+00	7.72E+00	7.72E+00	7.72E+00	7.70E+00	7.69E+00	7.37E+00	4.86E+00
ZR 94	2.18E+04	2.18E+04	2.18E+04	2.18E+04	2.18E+04	2.18E+04	2.18E+04	2.18E+04	2.18E+04	2.18E+04	2.18E+04	2.18E+04
ZR 95	0.	5.07E-02	7.24E-03	4.31E-18	0.	0.	0.	0.	0.	0.	0.	0.
ZR 96	3.57E+03	3.57E+03	3.57E+03	3.57E+03	3.57E+03	3.57E+03	3.57E+03	3.57E+03	3.57E+03	3.57E+03	3.57E+03	3.57E+03
NB 92	0.	4.23E-11	1.72E-16	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 93M	0.	5.96E-06	7.76E-06	3.35E-05	7.19E-05	7.72E-05	7.74E-05	7.71E-05	7.51E-05	7.33E-05	6.69E-05	4.41E-05
NB 93	3.23E+02	3.23E+02	3.23E+02	3.23E+02	3.23E+02	3.23E+02	3.23E+02	3.23E+02	3.23E+02	3.23E+02	3.23E+02	3.26E+02
NB 94	0.	2.50E-01	2.50E-01	2.50E-01	2.50E-01	2.50E-01	2.50E-01	2.50E-01	2.50E-01	2.50E-01	2.49E-01	2.42E-01
NB 95	0.	5.20E-02	8.11E-03	4.92E-18	0.	0.	0.	0.	0.	0.	0.	0.
NB 96	0.	4.91E-54	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 97	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 92	2.82E+01	2.82E+01	2.82E+01	2.82E+01	2.82E+01	2.82E+01	2.82E+01	2.82E+01	2.82E+01	2.82E+01	2.82E+01	2.82E+01
MO 93	0.	6.00E-03	5.99E-03	5.99E-03	5.97E-03	5.95E-03	5.77E-03	5.55E-03	4.08E-03	2.78E-03	2.71E-06	0.
MO 93M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 94	1.77E+01	1.77E+01	1.77E+01	1.77E+01	1.77E+01	1.77E+01	1.77E+01	1.77E+01	1.77E+01	1.77E+01	1.77E+01	1.77E+01
MO 95	3.13E+01	3.24E+01	3.28E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01
MO 96	3.32E+01	3.46E+01	3.46E+01	3.46E+01	3.46E+01	3.46E+01	3.46E+01	3.46E+01	3.46E+01	3.46E+01	3.46E+01	3.46E+01
MO 97	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01
MO 98	4.95E+01	4.94E+01	4.94E+01	4.94E+01	4.94E+01	4.94E+01	4.94E+01	4.94E+01	4.94E+01	4.94E+01	4.94E+01	4.94E+01
MO 99	0.	1.38E-23	2.79E-43	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO100	1.99E+01	1.99E+01	1.99E+01	1.99E+01	1.99E+01	1.99E+01	1.99E+01	1.99E+01	1.99E+01	1.99E+01	1.99E+01	1.99E+01
MO101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC 99M	0.	1.18E-24	2.39E-44	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC 99	0.	1.20E-01	1.20E-01	1.20E-01	1.20E-01	1.19E-01	1.19E-01	1.19E-01	1.18E-01	1.16E-01	8.59E-02	4.40E-03
TC101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU101	0.	3.57E-02	3.57E-02	3.57E-02	3.57E-02	3.57E-02	3.57E-02	3.57E-02	3.57E-02	3.57E-02	3.57E-02	3.57E-02
CD113M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD113	6.18E-03	1.07E-07	1.07E-07	1.07E-07	1.07E-07	1.07E-07	1.07E-07	1.07E-07	1.07E-07	1.07E-07	1.07E-07	1.07E-07
CD115M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD115	0.	2.32E-34	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD119M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN113	6.33E-03	4.35E-03	4.35E-03	4.35E-03	4.35E-03	4.35E-03	4.35E-03	4.35E-03	4.35E-03	4.35E-03	4.35E-03	4.35E-03
IN119M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN121M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN114	1.16E+01	1.16E+01	1.16E+01	1.16E+01	1.16E+01	1.16E+01	1.16E+01	1.16E+01	1.16E+01	1.16E+01	1.16E+01	1.16E+01
SN115	6.21E+00	6.21E+00	6.21E+00	6.21E+00	6.21E+00	6.21E+00	6.21E+00	6.21E+00	6.21E+00	6.21E+00	6.21E+00	6.21E+00
SN116	2.59E+02	2.58E+02	2.58E+02	2.58E+02	2.58E+02	2.58E+02	2.58E+02	2.58E+02	2.58E+02	2.58E+02	2.58E+02	2.58E+02
SN117M	0.	4.41E-06	5.21E-10	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

Clad

TABLE A-IV-3
(continued)

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
SN117	1.38E+02	1.38E+02	1.38E+02	1.38E+02	1.38E+02	1.38E+02	1.38E+02	1.38E+02	1.38E+02	1.38E+02	1.38E+02	1.38E+02
SN118	4.41E+02	4.42E+02	4.42E+02	4.42E+02	4.42E+02	4.42E+02	4.42E+02	4.42E+02	4.42E+02	4.42E+02	4.42E+02	4.42E+02
SN119M	0.	7.85E-04	4.73E-04	5.20E-08	1.33E-25	0.	0.	0.	0.	0.	0.	0.
SN119	1.59E+02	1.58E+02	1.58E+02	1.58E+02	1.58E+02	1.58E+02	1.58E+02	1.58E+02	1.58E+02	1.58E+02	1.58E+02	1.58E+02
SN120	6.11E+02	6.11E+02	6.11E+02	6.11E+02	6.11E+02	6.11E+02	6.11E+02	6.11E+02	6.11E+02	6.11E+02	6.11E+02	6.11E+02
SN121M	0.	1.63E-03	1.62E-03	1.49E-03	1.04E-03	6.56E-04	1.71E-05	1.79E-07	2.54E-23	3.96E-43	0.	0.
SN121	0.	6.49E-53	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN122	8.91E+01	8.90E+01	8.90E+01	8.90E+01	8.90E+01	8.90E+01	8.90E+01	8.90E+01	8.90E+01	8.90E+01	8.90E+01	8.90E+01
SN123M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN123	0.	4.95E-06	1.80E-06	2.17E-14	0.	0.	0.	0.	0.	0.	0.	0.
SN124	1.12E+02	1.12E+02	1.12E+02	1.12E+02	1.12E+02	1.12E+02	1.12E+02	1.12E+02	1.12E+02	1.12E+02	1.12E+02	1.12E+02
SN125M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN125	0.	1.22E-11	1.73E-17	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB121	0.	2.28E-01	2.28E-01	2.28E-01	2.28E-01	2.29E-01	2.29E-01	2.29E-01	2.29E-01	2.29E-01	2.29E-01	2.29E-01
SB123	0.	1.09E-02	1.09E-02	1.09E-02	1.09E-02	1.09E-02	1.09E-02	1.09E-02	1.09E-02	1.09E-02	1.09E-02	1.09E-02
SB124M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB124	0.	5.03E-06	6.10E-07	1.96E-23	0.	0.	0.	0.	0.	0.	0.	0.
SB125	0.	7.59E-03	6.67E-03	6.62E-04	2.29E-08	6.10E-14	0.	0.	0.	0.	0.	0.
SB126M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB126	0.	1.15E-11	4.60E-16	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE124	0.	2.05E-04	2.09E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04
TE125M	0.	1.81E-04	1.62E-04	1.61E-05	5.59E-10	1.49E-15	0.	0.	0.	0.	0.	0.
TE125	0.	3.40E-03	4.34E-03	1.05E-02	1.12E-02	1.12E-02	1.12E-02	1.12E-02	1.12E-02	1.12E-02	1.12E-02	1.12E-02
TE126	0.	1.43E-05	1.43E-05	1.43E-05	1.43E-05	1.43E-05	1.43E-05	1.43E-05	1.43E-05	1.43E-05	1.43E-05	1.43E-05
TA180	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TA181	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TA182M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TA182	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W180	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W181	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W182	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W183M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W183	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W184	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W185M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W185	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W186	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W187	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	4.10E+05	3.95E+05	3.95E+05	3.95E+05	3.95E+05	3.95E+05	3.95E+05	3.95E+05	3.95E+05	3.95E+05	3.95E+05	3.95E+05

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4 HE's

TABLE A-IV-3
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
HE 4	0.	7.07E+00	8.02E+00	1.30E+01	2.24E+01	2.60E+01	3.65E+01	4.37E+01	6.57E+01	8.25E+01	1.51E+02	1.89E+02
TL207	0.	1.37E-16	1.93E-16	8.91E-16	2.49E-15	3.16E-15	5.32E-15	7.96E-15	5.69E-14	2.45E-13	2.24E-11	3.36E-11
TL208	0.	8.78E-13	7.50E-13	7.92E-14	4.29E-14	2.65E-14	5.64E-16	4.76E-18	3.83E-18	1.32E-17	3.29E-16	3.44E-15
TL209	0.	2.15E-19	2.19E-19	3.10E-19	3.06E-18	1.37E-17	6.83E-16	3.94E-15	1.62E-13	6.28E-13	1.67E-11	3.75E-11
PB206	0.	0.	6.90E-23	8.31E-20	7.16E-18	4.21E-17	1.60E-15	6.22E-15	9.88E-14	2.54E-13	2.24E-12	3.93E-12
PB207	0.	1.04E-11	1.66E-11	3.97E-10	6.01E-09	1.70E-08	1.47E-07	3.96E-07	8.64E-06	6.06E-05	7.59E-02	2.35E+00
PB208	0.	2.04E-07	3.38E-07	1.08E-06	1.78E-06	2.33E-06	3.22E-06	3.24E-06	3.24E-06	3.25E-06	8.28E-06	5.64E-04
PB209	0.	8.78E-16	8.96E-16	1.27E-15	1.25E-14	5.60E-14	2.79E-12	1.61E-11	6.63E-10	2.57E-09	6.81E-08	1.54E-07
PB210	0.	9.64E-21	1.92E-20	7.48E-19	1.17E-17	3.19E-17	2.04E-16	3.58E-16	9.03E-16	9.69E-16	4.51E-16	1.85E-19
PB211	0.	1.06E-15	1.48E-15	6.86E-15	1.92E-14	2.43E-14	4.10E-14	6.13E-14	4.38E-13	1.89E-12	1.72E-10	2.59E-10
PB212	0.	5.10E-10	4.36E-10	4.60E-11	2.49E-11	1.54E-11	3.28E-13	2.76E-15	2.23E-15	7.65E-15	1.91E-13	2.00E-12
PB214	0.	1.13E-24	1.76E-24	1.19E-23	5.63E-23	1.11E-22	5.05E-22	9.09E-22	2.23E-21	2.40E-21	1.11E-21	4.57E-25
BI209	0.	7.12E-12	7.94E-12	2.49E-11	4.26E-10	3.29E-09	7.33E-07	8.42E-06	1.93E-03	1.60E-02	6.00E+00	2.49E+02
BI210	0.	1.77E-24	1.26E-23	4.86E-22	7.66E-21	2.08E-20	1.33E-19	2.40E-19	5.90E-19	6.33E-19	2.94E-19	1.21E-22
BI211	0.	6.29E-17	8.84E-17	4.09E-16	1.14E-15	1.45E-15	2.44E-15	3.55E-15	2.61E-14	1.12E-13	1.03E-11	1.54E-11
BI212	0.	4.86E-11	4.15E-11	4.39E-12	2.38E-12	1.47E-12	3.12E-14	2.53E-16	2.12E-16	7.29E-16	1.82E-14	1.90E-13
BI213	0.	2.12E-16	2.17E-16	3.07E-16	3.03E-15	1.35E-14	5.76E-13	3.90E-12	1.60E-10	6.21E-10	1.65E-08	3.72E-08
BI214	0.	8.32E-25	1.30E-24	8.72E-24	4.14E-23	8.14E-23	3.71E-22	6.58E-22	1.64E-21	1.76E-21	8.19E-22	3.36E-25
PO210	0.	1.70E-24	1.57E-22	1.35E-20	2.11E-19	5.74E-19	3.68E-18	6.52E-18	1.63E-17	1.74E-17	8.11E-18	3.33E-21
PO211	0.	7.61E-22	1.07E-21	4.94E-21	1.38E-20	1.75E-20	2.95E-20	4.42E-20	3.16E-19	1.36E-18	1.24E-16	1.87E-16
PO212	0.	2.56E-21	2.19E-21	2.32E-22	1.25E-22	7.75E-23	1.65E-24	1.39E-26	1.12E-26	3.85E-26	9.61E-25	1.00E-23
PO213	0.	3.09E-25	3.16E-25	4.47E-25	4.41E-24	1.97E-23	9.84E-22	5.57E-21	2.33E-19	9.05E-19	2.40E-17	5.41E-17
PO214	0.	1.41E-31	2.19E-31	1.48E-30	7.00E-30	1.38E-29	6.28E-29	1.13E-28	2.78E-28	2.98E-28	1.39E-28	5.68E-32
PO215	0.	8.95E-22	1.26E-21	5.81E-21	1.63E-20	2.06E-20	3.47E-20	5.19E-20	3.71E-19	1.60E-18	1.46E-16	2.20E-16
PO216	0.	2.04E-15	1.75E-15	1.84E-16	9.99E-17	6.17E-17	1.31E-18	1.11E-20	8.92E-21	3.06E-20	7.65E-19	8.00E-18
PO218	0.	1.31E-25	2.04E-25	1.38E-24	6.52E-24	1.28E-23	5.86E-23	1.05E-22	2.59E-22	2.78E-22	1.29E-22	5.30E-26
AT217	0.	2.46E-21	2.50E-21	3.55E-21	3.50E-20	1.57E-19	7.81E-18	4.50E-17	1.85E-15	7.18E-15	1.91E-13	4.30E-13
RN219	0.	2.03E-18	2.84E-18	1.32E-17	3.68E-17	4.66E-17	7.85E-17	1.18E-16	8.40E-15	3.62E-15	3.30E-13	4.97E-13
RN220	0.	7.76E-13	6.64E-13	7.01E-14	3.80E-14	2.35E-14	4.99E-16	4.21E-18	3.39E-18	1.16E-17	2.91E-16	3.04E-15
RN222	0.	2.41E-22	3.76E-22	2.53E-21	1.20E-20	2.36E-20	1.08E-19	1.94E-19	4.76E-19	5.10E-19	2.37E-19	9.73E-23
FR221	0.	2.25E-17	2.30E-17	3.25E-17	3.21E-16	1.44E-15	7.16E-14	4.13E-13	1.70E-11	6.58E-11	1.75E-09	3.94E-09
FR223	0.	1.02E-17	1.33E-17	6.19E-17	1.73E-16	2.19E-16	3.69E-16	5.53E-16	3.95E-15	1.70E-14	1.55E-12	2.34E-12
RA223	0.	5.08E-13	7.13E-13	3.30E-12	9.23E-12	1.17E-11	1.97E-11	2.95E-11	2.11E-10	9.07E-10	8.28E-08	1.25E-07
RA224	0.	4.44E-09	3.80E-09	4.01E-10	2.17E-10	1.34E-10	2.85E-12	2.41E-14	1.94E-14	6.66E-14	1.66E-12	1.74E-11
RA225	0.	1.02E-13	1.04E-13	1.47E-13	1.45E-12	6.49E-12	3.24E-10	1.87E-09	7.68E-09	2.98E-07	7.89E-06	1.78E-05
RA226	0.	3.98E-17	5.85E-17	3.93E-16	1.87E-15	3.67E-15	1.68E-14	3.02E-14	7.41E-14	7.94E-14	3.69E-14	1.52E-17
RA228	0.	1.29E-15	1.90E-15	8.97E-15	1.52E-14	1.99E-14	1.71E-13	6.24E-13	1.33E-11	4.56E-11	1.14E-09	1.19E-08
AC225	0.	6.57E-14	7.01E-14	9.94E-14	9.79E-13	4.38E-12	2.19E-10	1.26E-09	5.19E-08	2.01E-07	5.33E-06	1.20E-05
AC227	0.	3.84E-10	5.01E-10	2.32E-09	6.50E-09	8.23E-09	1.39E-08	2.08E-08	1.48E-07	6.39E-07	5.83E-05	8.78E-05
AC228	0.	1.35E-19	1.98E-19	9.36E-19	1.59E-18	2.08E-18	1.79E-17	6.52E-17	1.39E-15	4.76E-15	1.19E-13	1.24E-12
TH227	0.	8.36E-13	1.14E-12	5.29E-12	1.48E-11	1.87E-11	3.15E-11	4.72E-11	3.37E-10	1.45E-09	1.33E-07	2.00E-07
TH228	0.	8.79E-07	7.37E-07	7.80E-08	4.24E-08	2.62E-08	5.57E-10	4.59E-12	3.78E-12	1.30E-11	3.24E-10	3.39E-09
TH229	0.	1.50E-08	1.90E-08	2.79E-08	2.66E-07	1.19E-06	5.93E-05	3.42E-04	1.41E-02	5.46E-02	1.45E+00	3.26E+00
TH230	0.	4.38E-12	4.38E-12	4.38E-12	4.38E-12	4.38E-12	4.36E-12	4.34E-12	4.20E-12	4.02E-12	1.84E-12	7.56E-16
TH231	0.	1.56E-08	7.79E-11	7.80E-11	7.83E-11	7.88E-11	8.51E-11	9.83E-11	3.79E-10	1.02E-09	1.12E-08	1.21E-08
TH232	0.	2.86E-05	2.86E-05	2.94E-05	3.42E-05	4.52E-05	3.57E-04	1.34E-03	2.84E-02	9.76E-02	2.44E+00	2.55E+01
TH233	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TH234	0.	1.30E-05	1.33E-07	6.49E-08	6.49E-08	6.49E-08	6.49E-08	6.49E-08	6.49E-08	6.49E-08	6.51E-08	6.56E-08
PA231	0.	1.18E-05	1.18E-05	1.20E-05	1.27E-05	1.36E-05	2.12E-05	3.19E-05	2.27E-04	9.78E-04	8.93E-02	1.34E-01
PA232	0.	1.67E-50	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PA233	0.	4.22E-06	4.25E-06	4.77E-06	7.01E-06	9.56E-06	2.47E-05	3.40E-05	4.23E-05	4.29E-05	4.30E-05	3.21E-05
PA234M	0.	4.38E-10	4.47E-12	2.19E-12	2.19E-12	2.19E-12	2.19E-12	2.19E-12	2.19E-12	2.19E-12	2.19E-12	2.21E-12

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-9 HE's

TABLE A-IV-3
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
PA234	0.	1.52E-12	1.55E-12	7.58E-13	7.58E-13	7.58E-13	7.58E-13	7.58E-13	7.58E-13	7.58E-13	7.59E-13	7.66E-13
U232	0.	6.63E-07	8.66E-07	2.14E-06	1.58E-06	9.78E-07	2.08E-08	1.69E-10	3.16E-27	3.91E-48	0.	0.
U233	0.	4.84E-06	2.44E-05	3.99E-04	2.58E-03	6.43E-03	7.28E-02	2.11E-01	1.70E+00	3.62E+00	3.26E+01	7.37E+01
U235	6.57E+03	1.93E+01	1.93E+01	1.93E+01	1.94E+01	1.95E+01	2.11E+01	2.43E+01	9.38E+01	2.53E+02	2.78E+03	2.99E+03
U236	0.	2.87E+00	2.88E+00	3.08E+00	5.59E+00	9.94E+00	4.62E+01	8.35E+01	3.66E+02	5.85E+02	9.10E+02	8.87E+02
U237	0.	1.56E-06	1.52E-06	9.96E-07	1.53E-07	1.84E-08	4.45E-09	4.27E-09	3.05E-09	2.01E-09	1.06E-12	0.
U238	9.17E+05	4.51E+03	4.51E+03	4.51E+03	4.51E+03	4.51E+03	4.51E+03	4.51E+03	4.51E+03	4.51E+03	4.52E+03	4.56E+03
U239	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
U240	0.	6.61E-22	8.33E-20	1.57E-18	8.18E-18	1.64E-17	8.25E-17	1.65E-16	8.22E-15	1.64E-15	1.49E-14	6.84E-14
NP236	0.	1.46E-66	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NP237	0.	1.23E+02	1.24E+02	1.38E+02	2.03E+02	2.80E+02	7.17E+02	9.86E+02	1.23E+03	1.25E+03	1.25E+03	9.33E+02
NP238	0.	3.77E-27	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NP239	0.	2.10E-03	2.10E-03	2.09E-03	2.09E-03	2.08E-03	2.00E-03	1.91E-03	1.33E-03	8.47E-04	2.43E-07	3.06E-11
NP240M	0.	1.14E-20	7.19E-21	1.36E-19	7.06E-19	1.42E-18	7.12E-18	1.42E-17	7.09E-17	1.41E-16	1.29E-15	5.90E-15
NP240	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PU236	0.	1.84E-06	1.63E-06	1.83E-07	1.09E-11	5.68E-17	0.	0.	0.	0.	0.	0.
PU238	1.91E+03	9.26E+00	4.89E+01	7.73E+01	5.66E+01	3.84E+01	1.70E+00	3.47E-02	1.48E-12	1.84E-22	0.	0.
PU239	3.21E+04	7.28E+01	7.29E+01	7.51E+01	8.44E+01	9.57E+01	1.82E+02	2.84E+02	9.06E+02	1.32E+03	2.16E+02	1.16E-04
PU240	2.07E+04	7.83E+01	9.43E+01	3.36E+02	7.95E+02	8.99E+02	8.81E+02	8.37E+02	5.55E+02	3.33E+02	3.26E-02	2.88E-06
PU241	1.22E+04	5.22E+01	5.10E+01	3.33E+01	5.11E+00	6.16E-01	1.49E-01	1.43E-01	1.02E-01	6.71E-02	3.54E-05	0.
PU242	9.90E+03	5.13E+01	5.13E+01	5.13E+01	5.13E+01	5.14E+01	5.17E+01	5.21E+01	5.41E+01	5.51E+01	4.80E+01	9.25E+00
PU243	0.	1.43E-14	2.86E-12	2.86E-12	2.86E-12	2.86E-12	2.86E-12	2.86E-12	2.86E-12	2.86E-12	2.85E-12	2.74E-12
PU244	0.	3.46E-11	4.36E-09	8.23E-08	4.29E-07	8.62E-07	4.32E-06	8.65E-06	4.31E-05	8.57E-05	7.83E-04	3.58E-03
PU245	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AM241	0.	1.05E+03	1.05E+03	1.05E+03	1.01E+03	9.38E+02	4.97E+02	2.25E+02	3.54E+00	1.99E+00	1.11E-03	0.
AM242M	0.	1.03E-02	1.03E-02	9.89E-03	8.24E-03	6.56E-03	1.06E-03	1.08E-04	1.29E-12	1.61E-22	0.	0.
AM242	0.	1.24E-07	1.24E-07	1.19E-07	9.90E-08	7.58E-08	1.27E-08	1.30E-09	1.55E-17	1.94E-27	0.	0.
AM243	0.	2.53E+03	2.53E+03	2.53E+03	2.52E+03	2.51E+03	2.42E+03	2.31E+03	1.61E+03	1.02E+03	2.94E-01	3.70E-05
AM244	0.	5.37E-23	3.39E-23	6.39E-22	3.33E-21	6.69E-21	3.36E-20	6.71E-20	3.34E-19	6.65E-19	6.07E-18	2.78E-17
AM245	0.	3.96E-30	1.23E-47	0.	0.	0.	0.	0.	0.	0.	0.	0.
CM242	0.	7.49E+01	3.44E+01	5.30E-05	1.98E-05	1.58E-05	2.55E-06	2.61E-07	3.12E-15	3.89E-25	0.	0.
CM243	0.	8.89E-01	8.79E-01	7.23E-01	3.04E-01	1.03E-01	1.78E-05	3.51E-10	0.	0.	0.	0.
CM244	0.	8.61E+02	8.44E+02	5.98E+02	1.29E+02	1.90E+01	4.23E-06	4.50E-14	1.22E-13	2.44E-13	2.22E-12	1.02E-11
CM245	0.	8.92E+01	8.92E+01	8.92E+01	8.89E+01	8.85E+01	8.56E+01	8.21E+01	5.97E+01	3.96E+01	2.03E-02	0.
CM246	0.	6.35E+00	6.35E+00	6.35E+00	6.31E+00	6.26E+00	5.90E+00	5.49E+00	3.04E+00	1.46E+00	2.59E-06	0.
CM247	0.	8.40E-02	8.40E-02	8.40E-02	8.40E-02	8.40E-02	8.40E-02	8.40E-02	8.40E-02	8.40E-02	8.37E-02	8.35E-02
CM248	0.	4.87E-03	4.87E-03	4.87E-03	4.87E-03	4.87E-03	4.87E-03	4.87E-03	4.83E-03	4.78E-03	4.00E-03	6.80E-04
CM249	0.	2.17E-47	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CM250	0.	1.00E-12	1.00E-12	9.98E-13	9.82E-13	9.63E-13	8.21E-13	6.73E-13	1.37E-13	1.86E-14	5.00E-30	0.
BK249	0.	9.50E-24	2.94E-41	0.	0.	0.	0.	0.	0.	0.	0.	0.
BK250	0.	2.12E-19	2.12E-19	2.11E-19	2.08E-19	2.03E-19	1.73E-19	1.42E-19	2.89E-20	3.94E-21	1.06E-36	0.
CF249	0.	4.86E-05	4.40E-05	7.48E-06	2.84E-09	1.50E-13	0.	0.	0.	0.	0.	0.
CF250	0.	8.50E-07	6.52E-07	5.53E-09	7.42E-16	7.24E-16	5.17E-16	5.06E-16	1.03E-16	1.40E-17	3.76E-33	0.
CF251	0.	6.19E-07	6.19E-07	6.15E-07	5.96E-07	5.74E-07	4.22E-07	2.87E-07	1.32E-08	2.80E-10	0.	0.
CF252	0.	1.50E-07	1.31E-07	1.24E-08	3.49E-13	7.15E-19	0.	0.	0.	0.	0.	0.
CF253	0.	2.84E-42	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CF254	0.	1.69E-23	1.31E-32	0.	0.	0.	0.	0.	0.	0.	0.	0.
ES253	0.	1.23E-37	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	1.00E+06	9.54E+03	9.54E+03	9.54E+03	9.52E+03	9.50E+03	9.46E+03	9.46E+03	9.46E+03	9.46E+03	9.92E+03	9.92E+03

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4 FP's TABLE A-IV-3 (continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	Y******* Y
H 3	0.	7.74E-03	7.53E-03	4.53E-03	4.76E-04	2.84E-05	4.60E-15	2.56E-27	0.	0.	0.	0.
ZN 72	0.	1.43E-33	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 72	0.	6.24E-34	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 72	0.	1.16E-02	1.16E-02	1.16E-02	1.16E-02	1.16E-02	1.16E-02	1.16E-02	1.16E-02	1.16E-02	1.16E-02	1.16E-02
GA 73	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 73	0.	2.03E-02	2.03E-02	2.03E-02	2.03E-02	2.03E-02	2.03E-02	2.03E-02	2.03E-02	2.03E-02	2.03E-02	2.03E-02
GA 74	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 74	0.	8.16E-02	8.16E-02	8.16E-02	8.16E-02	8.16E-02	8.16E-02	8.16E-02	8.16E-02	8.16E-02	8.16E-02	8.16E-02
GA 75	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 75M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 75	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 75	0.	8.60E-02	8.60E-02	8.60E-02	8.60E-02	8.60E-02	8.60E-02	8.60E-02	8.60E-02	8.60E-02	8.60E-02	8.60E-02
GA 76	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 76	0.	3.24E-01	3.24E-01	3.24E-01	3.24E-01	3.24E-01	3.24E-01	3.24E-01	3.24E-01	3.24E-01	3.24E-01	3.24E-01
AS 76	0.	4.59E-56	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 76	0.	7.58E-04	7.58E-04	7.58E-04	7.58E-04	7.58E-04	7.58E-04	7.58E-04	7.58E-04	7.58E-04	7.58E-04	7.58E-04
GE 77M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 77	0.	3.68-121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 77	0.	2.43E-37	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 77M	0.	9.17E-44	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 77	0.	1.08E+00	1.08E+00	1.08E+00	1.08E+00	1.08E+00	1.08E+00	1.08E+00	1.08E+00	1.08E+00	1.08E+00	1.08E+00
GE 78	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 78M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 78	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 78	0.	2.81E+00	2.81E+00	2.81E+00	2.81E+00	2.81E+00	2.81E+00	2.81E+00	2.81E+00	2.81E+00	2.81E+00	2.81E+00
AS 79	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 79M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 79	0.	4.75E+00	4.75E+00	4.75E+00	4.75E+00	4.74E+00	4.72E+00	4.70E+00	4.50E+00	4.27E+00	1.63E+00	1.11E-04
BR 79	0.	5.25E-07	2.58E-05	4.82E-04	2.51E-03	5.04E-03	2.52E-02	5.03E-02	2.47E-01	4.80E-01	3.11E+00	4.75E+00
AS 80	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 80	0.	8.20E+00	8.20E+00	8.20E+00	8.20E+00	8.20E+00	8.20E+00	8.20E+00	8.20E+00	8.20E+00	8.20E+00	8.20E+00
BR 80M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 80	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 80	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 81M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 81	0.	1.41E-02	1.41E-02	1.41E-02	1.41E-02	1.41E-02	1.41E-02	1.41E-02	1.41E-02	1.41E-02	1.41E-02	1.41E-02
KR 81M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 82	0.	2.52E+01	2.52E+01	2.52E+01	2.52E+01	2.52E+01	2.52E+01	2.52E+01	2.52E+01	2.52E+01	2.52E+01	2.52E+01
BR 82M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 82	0.	3.94E-44	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 82	0.	0.	3.94E-44	3.94E-44	3.94E-44	3.94E-44	3.94E-44	3.94E-44	3.94E-44	3.94E-44	3.94E-44	3.94E-44
SE 83M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 83	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 83	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 83M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 83	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 84	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 84M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 84	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4 FP's TABLE A-IV-3 (continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
KR 84	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 85M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 85	0.	5.63E+01	5.63E+01	5.63E+01	5.63E+01	5.63E+01	5.63E+01	5.63E+01	5.63E+01	5.63E+01	5.63E+01	5.63E+01
BR 86	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 86	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 86M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 86	0.	2.23E-06	2.56E-09	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 86	0.	2.94E-02	2.94E-02	2.94E-02	2.94E-02	2.94E-02	2.94E-02	2.94E-02	2.94E-02	2.94E-02	2.94E-02	2.94E-02
BR 87	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 87	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 87	0.	1.33E+02	1.33E+02	1.33E+02	1.33E+02	1.33E+02	1.33E+02	1.33E+02	1.33E+02	1.33E+02	1.33E+02	1.33E+02
SR 87M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 87	0.	5.52E-06	5.52E-06	5.54E-06	5.61E-06	5.71E-06	5.44E-06	7.36E-06	1.47E-05	2.39E-05	1.90E-04	1.85E-03
BR 88	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 88	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 88	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 88	0.	2.03E+02	2.03E+02	2.03E+02	2.03E+02	2.03E+02	2.03E+02	2.03E+02	2.03E+02	2.03E+02	2.03E+02	2.03E+02
BR 89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 89	0.	1.94E+00	1.70E-01	1.58E-20	0.	0.	0.	0.	0.	0.	0.	0.
Y 89	0.	2.52E+02	2.54E+02	2.54E+02	2.54E+02	2.54E+02	2.54E+02	2.54E+02	2.54E+02	2.54E+02	2.54E+02	2.54E+02
KR 90	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 90	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 90	0.	3.11E+02	3.07E+02	2.46E+02	9.17E+01	2.67E+01	1.38E-03	6.09E-09	0.	0.	0.	0.
Y 90M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 90	0.	8.09E-02	7.99E-02	6.40E-02	2.38E-02	6.94E-03	3.60E-07	1.58E-12	0.	0.	0.	0.
ZR 90	0.	1.32E+01	1.70E+01	7.82E+01	2.33E+02	2.98E+02	3.24E+02	3.24E+02	3.24E+02	3.24E+02	3.24E+02	3.24E+02
KR 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 91M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 91	0.	4.15E+00	4.82E-01	7.11E-18	0.	0.	0.	0.	0.	0.	0.	0.
ZR 91	0.	3.79E+02	3.82E+02	3.83E+02	3.83E+02	3.83E+02	3.83E+02	3.83E+02	3.83E+02	3.83E+02	3.83E+02	3.83E+02
KR 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 92	0.	4.54E+02	4.54E+02	4.54E+02	4.54E+02	4.54E+02	4.54E+02	4.54E+02	4.54E+02	4.54E+02	4.54E+02	4.54E+02
KR 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 93	0.	5.63E+02	5.63E+02	5.63E+02	5.63E+02	5.63E+02	5.63E+02	5.63E+02	5.62E+02	5.61E+02	5.38E+02	3.55E+02
NB 93M	0.	4.16E-04	5.34E-04	2.22E-03	4.73E-03	5.08E-03	5.11E-03	5.10E-03	5.09E-03	5.08E-03	4.88E-03	3.22E-03
NB 93	0.	2.10E-05	3.31E-05	6.94E-04	8.59E-03	2.13E-02	1.25E-01	2.55E-01	1.30E+00	2.59E+00	2.54E+01	2.08E+02
KR 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

FP's

TABLE A-IV-3
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
Y 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 94	0.	6.41E+02	6.41E+02	6.41E+02	6.41E+02	6.41E+02	6.41E+02	6.41E+02	6.41E+02	6.41E+02	6.41E+02	6.41E+02
RB 95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 95	0.	1.09E+01	1.56E+00	9.28E-16	0.	0.	0.	0.	0.	0.	0.	0.
NB 95M	0.	1.34E-02	1.91E-03	1.14E-18	0.	0.	0.	0.	0.	0.	0.	0.
NB 95	0.	1.15E+01	1.78E+00	1.08E-15	0.	0.	0.	0.	0.	0.	0.	0.
MO 95	0.	6.80E+02	7.00E+02	7.03E+02	7.03E+02	7.03E+02	7.03E+02	7.03E+02	7.03E+02	7.03E+02	7.03E+02	7.03E+02
Y 96	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 96	0.	7.42E+02	7.42E+02	7.42E+02	7.42E+02	7.42E+02	7.42E+02	7.42E+02	7.42E+02	7.42E+02	7.42E+02	7.42E+02
NB 96	0.	3.71E-61	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 96	0.	1.34E+01	1.34E+01	1.34E+01	1.34E+01	1.34E+01	1.34E+01	1.34E+01	1.34E+01	1.34E+01	1.34E+01	1.34E+01
Y 97	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 97	0.	1.75E-78	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 97M	0.	1.65E-81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 97	0.	1.33E-79	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 97	0.	8.03E+02	8.03E+02	8.03E+02	8.03E+02	8.03E+02	8.03E+02	8.03E+02	8.03E+02	8.03E+02	8.03E+02	8.03E+02
ZR 98	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 98M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 98	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 98	0.	8.50E+02	8.50E+02	8.50E+02	8.50E+02	8.50E+02	8.50E+02	8.50E+02	8.50E+02	8.50E+02	8.50E+02	8.50E+02
NB 99	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 99	0.	7.83E-20	1.58E-39	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC 99M	0.	6.70E-21	1.36E-40	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC 99	0.	8.69E+02	8.69E+02	8.69E+02	8.69E+02	8.69E+02	8.68E+02	8.56E+02	8.55E+02	8.41E+02	6.27E+02	3.30E+01
RU 99	0.	4.77E-03	6.20E-03	3.18E-02	1.45E-01	2.87E-01	1.42E+00	2.84E+00	1.41E+01	2.80E+01	2.42E+02	8.36E+02
NB100	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO100	0.	1.03E+03	1.03E+03	1.03E+03	1.03E+03	1.03E+03	1.03E+03	1.03E+03	1.03E+03	1.03E+03	1.03E+03	1.03E+03
TC100	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU100	0.	2.27E+01	2.27E+01	2.27E+01	2.27E+01	2.27E+01	2.27E+01	2.27E+01	2.27E+01	2.27E+01	2.27E+01	2.27E+01
NB101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU101	0.	8.58E+02	8.58E+02	8.58E+02	8.58E+02	8.58E+02	8.58E+02	8.58E+02	8.58E+02	8.58E+02	8.58E+02	8.58E+02
MO102	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC102M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC102	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU102	0.	8.95E+02	8.95E+02	8.95E+02	8.95E+02	8.95E+02	8.95E+02	8.95E+02	8.95E+02	8.95E+02	8.95E+02	8.95E+02
MO103	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC103	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU103	0.	2.26E+00	9.24E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH103M	0.	2.26E-03	9.24E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH103	0.	6.71E+02	6.73E+02	6.73E+02	6.73E+02	6.73E+02	6.73E+02	6.73E+02	6.73E+02	6.73E+02	6.73E+02	6.73E+02
MO104	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC104	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU104	0.	8.68E+02	8.68E+02	8.68E+02	8.68E+02	8.68E+02	8.68E+02	8.68E+02	8.68E+02	8.68E+02	8.68E+02	8.68E+02
RH104M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH104	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD104	0.	1.65E+02	1.65E+02	1.65E+02	1.65E+02	1.65E+02	1.65E+02	1.65E+02	1.65E+02	1.65E+02	1.65E+02	1.65E+02
MO105	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC105	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

FP's

TABLE A-IV-3
(continued)

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	********** Y
RU105	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH105M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH105	0.	2.86E-37	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD105	0.	6.42E+02	6.42E+02	6.42E+02	6.42E+02	6.42E+02	6.42E+02	6.42E+02	6.42E+02	6.42E+02	6.42E+02	6.42E+02
TC106	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU106	0.	2.32E+02	1.64E+02	3.30E-01	3.42E-13	3.57E-28	0.	0.	0.	0.	0.	0.
RH106M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH106	0.	2.19E-04	1.55E-04	3.12E-07	3.24E-19	3.38E-34	0.	0.	0.	0.	0.	0.
PD106	0.	5.60E+02	6.27E+02	7.91E+02	7.91E+02	7.91E+02	7.91E+02	7.91E+02	7.91E+02	7.91E+02	7.91E+02	7.91E+02
RU107	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH107	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD107M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD107	0.	5.03E+02	5.03E+02	5.03E+02	5.03E+02	5.03E+02	5.03E+02	5.03E+02	5.03E+02	5.02E+02	4.98E+02	4.55E+02
AG107	0.	8.34E-05	1.08E-04	5.56E-04	2.55E-03	5.04E-03	2.50E-02	4.98E-02	2.49E-01	4.98E-01	4.95E+00	4.74E+01
RU108	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH108	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD108	0.	3.58E+02	3.58E+02	3.58E+02	3.58E+02	3.58E+02	3.58E+02	3.58E+02	3.58E+02	3.58E+02	3.58E+02	3.58E+02
AG108	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD108	0.	5.34E-07	5.34E-07	5.34E-07	5.34E-07	5.34E-07	5.34E-07	5.34E-07	5.34E-07	5.34E-07	5.34E-07	5.34E-07
RH109	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD109M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD109	0.	2.93E-99	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG109M	0.	6.36E-16	4.81E-16	3.14E-18	6.14E-28	4.48E-40	0.	0.	0.	0.	0.	0.
AG109	0.	1.63E+02	1.63E+02	1.63E+02	1.63E+02	1.63E+02	1.63E+02	1.63E+02	1.63E+02	1.63E+02	1.63E+02	1.63E+02
CD109	0.	6.23E-10	4.71E-10	3.08E-12	6.01E-22	4.38E-34	0.	0.	0.	0.	0.	0.
RH110	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD110	0.	7.41E+01	7.41E+01	7.41E+01	7.41E+01	7.41E+01	7.41E+01	7.41E+01	7.41E+01	7.41E+01	7.41E+01	7.41E+01
AG110M	0.	6.73E-01	4.08E-01	5.09E-05	2.06E-22	0.	0.	0.	0.	0.	0.	0.
AG110	0.	9.77E-08	5.92E-08	7.26E-12	2.99E-29	0.	0.	0.	0.	0.	0.	0.
CD110	0.	5.43E+01	5.46E+01	5.50E+01	5.50E+01	5.50E+01	5.50E+01	5.50E+01	5.50E+01	5.50E+01	5.50E+01	5.50E+01
PD111M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD111	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG111M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG111	0.	2.01E-08	9.37E-16	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD111M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD111	0.	3.51E+01	3.51E+01	3.51E+01	3.51E+01	3.51E+01	3.51E+01	3.51E+01	3.51E+01	3.51E+01	3.51E+01	3.51E+01
PD112	0.	3.23E-65	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG112	0.	5.80E-56	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD112	0.	1.87E+01	1.87E+01	1.87E+01	1.87E+01	1.87E+01	1.87E+01	1.87E+01	1.87E+01	1.87E+01	1.87E+01	1.87E+01
PD113	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG113M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG113	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD113M	0.	4.40E-02	4.29E-02	2.75E-02	3.79E-03	3.19E-04	7.98E-13	1.41E-23	0.	0.	0.	0.
CD113	0.	6.26E-01	6.28E-01	6.28E-01	6.28E-01	6.28E-01	6.28E-01	6.28E-01	6.28E-01	6.28E-01	6.28E-01	6.28E-01
IN113	0.	2.56E-03	3.64E-03	1.91E-02	4.27E-02	4.62E-02	4.65E-02	4.65E-02	4.65E-02	4.65E-02	4.65E-02	4.65E-02
PD114	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG114	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD114	0.	1.87E+01	1.87E+01	1.87E+01	1.87E+01	1.87E+01	1.87E+01	1.87E+01	1.87E+01	1.87E+01	1.87E+01	1.87E+01
IN114M	0.	2.58E-06	2.05E-07	3.51E-27	0.	0.	0.	0.	0.	0.	0.	0.
IN114	0.	4.16E-11	3.31E-12	5.32E-32	0.	0.	0.	0.	0.	0.	0.	0.
SN114	0.	1.47E-04	1.49E-04	1.49E-04	1.49E-04	1.49E-04	1.49E-04	1.49E-04	1.49E-04	1.49E-04	1.49E-04	1.49E-04
PD115	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

FP's

TABLE A-IV-3
(continued)

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
AG115M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG115	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD115M	0.	1.70E-03	8.93E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD115	0.	4.76E-27	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN115M	0.	4.37E-28	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN115	0.	3.40E+00	3.40E+00	3.40E+00	3.40E+00	3.40E+00	3.40E+00	3.40E+00	3.40E+00	3.40E+00	3.40E+00	3.40E+00
SN115	0.	3.15E-01	3.15E-01	3.15E-01	3.15E-01	3.15E-01	3.15E-01	3.15E-01	3.15E-01	3.15E-01	3.15E-01	3.15E-01
AG116	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD116	0.	6.17E+00	6.17E+00	6.17E+00	6.17E+00	6.17E+00	6.17E+00	6.17E+00	6.17E+00	6.17E+00	6.17E+00	6.17E+00
IN116M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN116	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN116	0.	3.04E+00	3.04E+00	3.04E+00	3.04E+00	3.04E+00	3.04E+00	3.04E+00	3.04E+00	3.04E+00	3.04E+00	3.04E+00
AG117	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD117M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD117	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN117M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN117	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN117M	0.	4.98E-08	5.88E-12	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN117	0.	6.38E+00	6.38E+00	6.38E+00	6.38E+00	6.38E+00	6.38E+00	6.38E+00	6.38E+00	6.38E+00	6.38E+00	6.38E+00
CD118	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN118M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN118	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN118	0.	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	6.47E+00
CD119M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN119M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN119M	0.	3.82E-03	2.30E-03	2.54E-07	6.46E-25	0.	0.	0.	0.	0.	0.	0.
SN119	0.	6.65E+00	6.65E+00	6.65E+00	6.65E+00	6.65E+00	6.65E+00	6.65E+00	6.65E+00	6.65E+00	6.65E+00	6.65E+00
CD120	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN120M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN120	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN120	0.	6.75E+00	6.75E+00	6.75E+00	6.75E+00	6.75E+00	6.75E+00	6.75E+00	6.75E+00	6.75E+00	6.75E+00	6.75E+00
CD121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN121M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN121M	0.	9.79E-06	9.75E-06	8.98E-06	6.24E-06	3.95E-06	1.03E-07	1.08E-09	1.53E-25	2.39E-45	0.	0.
SN121	0.	1.62E-51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB121	0.	7.25E+00	7.25E+00	7.25E+00	7.25E+00	7.25E+00	7.25E+00	7.25E+00	7.25E+00	7.25E+00	7.25E+00	7.25E+00
IN122	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN122	0.	7.72E+00	7.72E+00	7.72E+00	7.72E+00	7.72E+00	7.72E+00	7.72E+00	7.72E+00	7.72E+00	7.72E+00	7.72E+00
SB122M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB122	0.	5.16E-23	1.19E-42	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE122	0.	2.13E-01	2.13E-01	2.13E-01	2.13E-01	2.13E-01	2.13E-01	2.13E-01	2.13E-01	2.13E-01	2.13E-01	2.13E-01
IN123M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN123	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN123M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN123	0.	6.36E-01	2.31E-01	2.80E-09	0.	0.	0.	0.	0.	0.	0.	0.
SB123	0.	8.57E+00	8.97E+00	9.20E+00	9.20E+00	9.20E+00	9.20E+00	9.20E+00	9.20E+00	9.20E+00	9.20E+00	9.20E+00
TE123M	0.	7.85E-06	2.66E-06	9.25E-15	0.	0.	0.	0.	0.	0.	0.	0.
TE123	0.	1.40E-04	1.46E-04	1.48E-04	1.48E-04	1.48E-04	1.48E-04	1.48E-04	1.48E-04	1.48E-04	1.48E-04	1.48E-04
IN124	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

FP's

TABLE A-IV-3
(continued)

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
SN124	0.	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01
SB124M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB124	0.	3.44E-03	4.16E-04	1.34E-20	0.	0.	0.	0.	0.	0.	0.	0.
TE124	0.	1.33E-01	1.36E-01	1.37E-01	1.37E-01	1.37E-01	1.37E-01	1.37E-01	1.37E-01	1.37E-01	1.37E-01	1.37E-01
SN125M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN125	0.	2.70E-07	3.82E-13	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB125	0.	1.32E+01	1.16E+01	1.15E+00	4.00E-05	1.06E-10	0.	0.	0.	0.	0.	0.
TE125M	0.	3.17E-01	2.83E-01	2.81E-02	9.76E-07	2.59E-12	0.	0.	0.	0.	0.	0.
TE125	0.	6.37E+00	8.00E+00	1.87E+01	1.99E+01	1.99E+01	1.99E+01	1.99E+01	1.99E+01	1.99E+01	1.99E+01	1.99E+01
SN126	0.	3.44E+01	3.44E+01	3.44E+01	3.44E+01	3.44E+01	3.43E+01	3.42E+01	3.33E+01	3.21E+01	1.72E+01	3.36E-02
SB126M	0.	1.24E-08	1.24E-08	1.24E-08	1.24E-08	1.24E-08	1.24E-08	1.23E-08	1.20E-08	1.16E-08	6.22E-09	1.21E-11
SB126	0.	1.17E-05	1.17E-05	1.17E-05	1.17E-05	1.17E-05	1.16E-05	1.16E-05	1.13E-05	1.09E-05	5.83E-06	1.14E-08
TE126	0.	3.46E-02	3.47E-02	3.69E-02	4.64E-02	5.83E-02	1.54E-01	2.72E-01	1.21E+00	2.34E+00	1.72E+01	3.44E+01
SN127M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN127	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB127	0.	2.76E-15	1.79E-29	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE127M	0.	8.72E-01	2.73E-01	2.27E-10	0.	0.	0.	0.	0.	0.	0.	0.
TE127	0.	3.10E-03	9.69E-04	8.08E-13	0.	0.	0.	0.	0.	0.	0.	0.
I127	0.	6.54E-02	6.66E-01	9.40E-01	9.40E-01	9.40E-01	9.40E-01	9.40E-01	9.40E-01	9.40E-01	9.40E-01	9.40E-01
SN128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB128M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE128	0.	2.13E+02	2.13E+02	2.13E+02	2.13E+02	2.13E+02	2.13E+02	2.13E+02	2.13E+02	2.13E+02	2.13E+02	2.13E+02
I128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN129M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN129	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB129	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE129M	0.	6.75E-02	1.63E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE129	0.	6.10E-05	1.47E-06	0.	0.	0.	0.	0.	0.	0.	0.	0.
I129	0.	3.63E-01	3.69E-01	3.71E-01	3.71E-01	3.71E-01	3.71E-01	3.71E-01	3.71E-01	3.71E-01	3.70E-01	3.56E-01
XE129M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE129	0.	0.	7.21E-09	1.43E-07	7.49E-07	1.51E-06	7.56E-06	1.51E-05	7.57E-05	1.51E-04	1.51E-03	1.48E-02
SN130	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB130M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB130	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE130	0.	4.85E+02	4.85E+02	4.85E+02	4.85E+02	4.85E+02	4.85E+02	4.85E+02	4.85E+02	4.85E+02	4.85E+02	4.85E+02
I130M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I130	0.	3.54-112	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE130	0.	0.	3.54-112	3.54-112	3.54-112	3.54-112	3.54-112	3.54-112	3.54-112	3.54-112	3.54-112	3.54-112
SN131	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB131	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE131M	0.	2.03E-45	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE131	0.	5.15E-48	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I131	0.	1.42E-09	2.10E-16	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE131M	0.	0.	7.76E-16	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE131	0.	0.	1.42E-09	1.42E-09	1.42E-09	1.42E-09	1.42E-09	1.42E-09	1.42E-09	1.42E-09	1.42E-09	1.42E-09
SN132	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB132M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB132	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE132	0.	6.01E-17	7.28E-34	0.	0.	0.	0.	0.	0.	0.	0.	0.
I132	0.	1.83E-21	2.21E-35	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

FP's

TABLE A-IV-3
(continued)

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
XE132	0.	0.	6.01E-17	6.01E-17	6.01E-17	6.01E-17	6.01E-17	6.01E-17	6.01E-17	6.01E-17	6.01E-17	6.01E-17
SB133	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE133M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE133	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I133	0.	2.31E-56	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE133M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE133	0.	0.	1.04E-76	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS133	0.	1.16E+03	1.16E+03	1.16E+03	1.16E+03	1.16E+03	1.16E+03	1.16E+03	1.16E+03	1.16E+03	1.16E+03	1.16E+03
SB134	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE134	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I134	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE134	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS134M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS134	0.	7.68E+01	6.48E+01	3.09E+00	4.13E-06	1.87E-13	0.	0.	0.	0.	0.	0.
BA134	0.	3.81E+01	5.01E+01	1.12E+02	1.15E+02	1.15E+02	1.15E+02	1.15E+02	1.15E+02	1.15E+02	1.15E+02	1.15E+02
TE135	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I135	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE135M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE135	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS135M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS135	0.	5.31E+02	5.31E+02	5.31E+02	5.31E+02	5.31E+02	5.31E+02	5.31E+02	5.31E+02	5.30E+02	5.19E+02	4.22E+02
BA135M	0.	6.32E-52	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA135	0.	5.08E-03	5.14E-03	6.24E-03	1.12E-02	1.73E-02	5.64E-02	1.28E-01	6.19E-01	1.23E+00	1.21E+01	1.10E+02
I136	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE136	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS136	0.	5.41E-95	3.19E-09	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA136	0.	3.07E+01	3.07E+01	3.07E+01	3.07E+01	3.07E+01	3.07E+01	3.07E+01	3.07E+01	3.07E+01	3.07E+01	3.07E+01
I137	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE137	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS137	0.	1.28E+03	1.26E+03	1.02E+03	4.07E+02	1.28E+02	1.24E-02	1.19E-27	0.	0.	0.	0.
BA137M	0.	1.93E-04	1.91E-04	1.55E-04	6.14E-05	1.94E-05	1.87E-09	1.80E-14	0.	0.	0.	0.
BA137	0.	5.03E+01	6.50E+01	3.02E+02	9.20E+02	1.20E+03	1.33E+03	1.33E+03	1.33E+03	1.33E+03	1.33E+03	1.33E+03
I138	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE138	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS138	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA138	0.	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03
I139	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE139	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS139	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA139	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA139	0.	1.20E+03	1.20E+03	1.20E+03	1.20E+03	1.20E+03	1.20E+03	1.20E+03	1.20E+03	1.20E+03	1.20E+03	1.20E+03
XE140	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS140	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA140	0.	1.23E-03	5.23E-08	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA140	0.	1.85E-04	9.38E-09	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE140	0.	1.21E+03	1.21E+03	1.21E+03	1.21E+03	1.21E+03	1.21E+03	1.21E+03	1.21E+03	1.21E+03	1.21E+03	1.21E+03
XE141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE141	0.	1.16E+00	2.33E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR141	0.	1.06E+03	1.07E+03	1.07E+03	1.07E+03	1.07E+03	1.07E+03	1.07E+03	1.07E+03	1.07E+03	1.07E+03	1.07E+03

PWR - BU = 33.000 WASTE DECAY TIMES CASE E-4

POWER= 38.43MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

FP's

TABLE A-IV-3
(continued)

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
XE142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA142	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE142	0.	1.06E+03	1.06E+03	1.06E+03	1.06E+03	1.06E+03	1.06E+03	1.06E+03	1.06E+03	1.06E+03	1.06E+03	1.06E+03
PR142	0.	3.58E-71	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND142	0.	7.14E+00	7.14E+00	7.14E+00	7.14E+00	7.14E+00	7.14E+00	7.14E+00	7.14E+00	7.14E+00	7.14E+00	7.14E+00
XE143	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CS143	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BA143	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LA143	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE143	0.	2.03E-40	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR143	0.	2.29E-03	2.22E-07	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND143	0.	8.54E+02	8.54E+02	8.54E+02	8.54E+02	8.54E+02	8.54E+02	8.54E+02	8.54E+02	8.54E+02	8.54E+02	8.54E+02
LA144	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CE144	0.	2.28E+02	1.46E+02	4.79E-02	1.56E-17	6.82E-37	0.	0.	0.	0.	0.	0.
PR144	0.	9.66E-03	6.19E-03	2.03E-06	6.60E-22	2.99E-41	0.	0.	0.	0.	0.	0.
ND144	0.	7.45E+02	8.27E+02	9.73E+02	9.74E+02	9.74E+02	9.74E+02	9.74E+02	9.74E+02	9.74E+02	9.74E+02	9.74E+02
CE145	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR145	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND145	0.	6.50E+02	6.50E+02	6.50E+02	6.50E+02	6.50E+02	6.50E+02	6.50E+02	6.50E+02	6.50E+02	6.50E+02	6.50E+02
CE146	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR146	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND146	0.	5.96E+02	5.96E+02	5.96E+02	5.96E+02	5.96E+02	5.96E+02	5.96E+02	5.96E+02	5.96E+02	5.96E+02	5.96E+02
CE147	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR147	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND147	0.	9.51E-05	1.06E-09	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM147	0.	1.78E+02	1.56E+02	1.44E+01	3.65E-04	6.36E-10	0.	0.	0.	0.	0.	0.
SM147	0.	9.61E+01	1.18E+02	2.60E+02	2.74E+02	2.74E+02	2.74E+02	2.74E+02	2.74E+02	2.74E+02	2.74E+02	2.74E+02
CE148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PR148	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND148	0.	3.76E+02	3.76E+02	3.76E+02	3.76E+02	3.76E+02	3.76E+02	3.76E+02	3.76E+02	3.76E+02	3.76E+02	3.76E+02
PM148M	0.	1.33E-01	6.52E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM148	0.	1.37E-03	6.73E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM148	0.	1.16E+02	1.16E+02	1.16E+02	1.16E+02	1.16E+02	1.16E+02	1.16E+02	1.16E+02	1.16E+02	1.16E+02	1.16E+02
PR149	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ND149	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM149	0.	2.17E-25	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM149	0.	1.26E+01	1.26E+01	1.26E+01	1.26E+01	1.26E+01	1.26E+01	1.26E+01	1.26E+01	1.26E+01	1.26E+01	1.26E+01
ND150	0.	2.16E+02	2.16E+02	2.16E+02	2.16E+02	2.16E+02	2.16E+02	2.16E+02	2.16E+02	2.16E+02	2.16E+02	2.16E+02
PM150	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM150	0.	3.38E+02	3.38E+02	3.38E+02	3.38E+02	3.38E+02	3.38E+02	3.38E+02	3.38E+02	3.38E+02	3.38E+02	3.38E+02
ND151	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PM151	0.	2.22E-48	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM151	0.	7.80E+01	7.77E+01	7.23E+01	5.26E+01	3.53E+01	1.46E+00	2.71E-02	3.89E-15	1.94E-33	0.	0.
EU151	0.	5.00E-01	8.10E-01	6.19E+00	2.59E+01	4.32E+01	7.71E+01	7.85E+01	7.85E+01	7.85E+01	7.85E+01	7.85E+01
PM152	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM152	0.	1.54E+02	1.54E+02	1.54E+02	1.54E+02	1.54E+02	1.54E+02	1.54E+02	1.54E+02	1.54E+02	1.54E+02	1.54E+02
EU152M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU152	0.	1.80E-01	1.75E-01	1.04E-01	1.03E-02	5.73E-04	5.29E-14	1.31E-26	0.	0.	0.	0.
GD152	0.	2.09E-01	2.11E-01	2.30E-01	2.57E-01	2.59E-01	2.59E-01	2.59E-01	2.59E-01	2.59E-01	2.59E-01	2.59E-01
PM153	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

FP's

TABLE A-IV-3
(continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

NUCLIDE CONCENTRATIONS, GRAMS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
SM153	0.	8.25E-29	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU153	0.	1.38E+02	1.38E+02	1.38E+02	1.38E+02	1.38E+02	1.38E+02	1.38E+02	1.38E+02	1.38E+02	1.38E+02	1.38E+02
GD153	0.	3.63E-03	2.15E-03	1.75E-07	1.17E-25	0.	0.	0.	0.	0.	0.	0.
PM154	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM154	0.	6.20E+01	6.20E+01	6.20E+01	6.20E+01	6.20E+01	6.20E+01	6.20E+01	6.20E+01	6.20E+01	6.20E+01	6.20E+01
EU154	0.	3.75E+01	3.67E+01	2.48E+01	4.39E+00	5.03E-01	1.50E-08	5.85E-18	0.	0.	0.	0.
GD154	0.	1.96E+00	2.77E+01	1.46E+01	3.50E+01	3.89E+01	3.94E+01	3.94E+01	3.94E+01	3.94E+01	3.94E+01	3.94E+01
SM155	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU155	0.	5.75E+03	4.75E+00	1.51E-01	3.36E-08	1.62E-15	0.	0.	0.	0.	0.	0.
GD155	0.	1.35E+00	2.35E+00	6.95E+00	7.10E+00	7.10E+00	7.10E+00	7.10E+00	7.10E+00	7.10E+00	7.10E+00	7.10E+00
SM156	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU156	0.	6.35E-04	1.38E-07	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD156	0.	8.33E+01	8.33E+01	8.33E+01	8.33E+01	8.33E+01	8.33E+01	8.33E+01	8.33E+01	8.33E+01	8.33E+01	8.33E+01
SM157	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU157	0.	2.14E-89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD157	0.	9.99E-02	9.99E-02	9.99E-02	9.99E-02	9.99E-02	9.99E-02	9.99E-02	9.99E-02	9.99E-02	9.99E-02	9.99E-02
EU158	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD158	0.	2.62E+01	2.62E+01	2.62E+01	2.62E+01	2.62E+01	2.62E+01	2.62E+01	2.62E+01	2.62E+01	2.62E+01	2.62E+01
EU159	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD159	0.	2.47E-76	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB159	0.	4.13E+00	4.13E+00	4.13E+00	4.13E+00	4.13E+00	4.13E+00	4.13E+00	4.13E+00	4.13E+00	4.13E+00	4.13E+00
EU160	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD160	0.	2.12E+00	2.12E+00	2.12E+00	2.12E+00	2.12E+00	2.12E+00	2.12E+00	2.12E+00	2.12E+00	2.12E+00	2.12E+00
TB160	0.	2.36E-02	4.08E-03	7.66E-17	0.	0.	0.	0.	0.	0.	0.	0.
DY160	0.	5.07E-01	5.27E-01	5.31E-01	5.31E-01	5.31E-01	5.31E-01	5.31E-01	5.31E-01	5.31E-01	5.31E-01	5.31E-01
GD161	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB161	0.	1.02E-10	1.10E-18	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY161	0.	5.68E-01	5.68E-01	5.68E-01	5.68E-01	5.68E-01	5.68E-01	5.68E-01	5.68E-01	5.68E-01	5.68E-01	5.68E-01
GD162	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB162M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB162	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY162	0.	4.60E-01	4.60E-01	4.60E-01	4.60E-01	4.60E-01	4.60E-01	4.60E-01	4.60E-01	4.60E-01	4.60E-01	4.60E-01
TB163M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB163	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY163	0.	3.84E-01	3.84E-01	3.84E-01	3.84E-01	3.84E-01	3.84E-01	3.84E-01	3.84E-01	3.84E-01	3.84E-01	3.84E-01
TB164	0.	3.71E-62	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY164	0.	1.06E-01	1.06E-01	1.06E-01	1.06E-01	1.06E-01	1.06E-01	1.06E-01	1.06E-01	1.06E-01	1.06E-01	1.06E-01
DY165M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY165	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
HO165	0.	1.12E-01	1.12E-01	1.12E-01	1.12E-01	1.12E-01	1.12E-01	1.12E-01	1.12E-01	1.12E-01	1.12E-01	1.12E-01
DY166	0.	5.21E-21	3.36E-37	0.	0.	0.	0.	0.	0.	0.	0.	0.
HO166M	0.	2.24E-04	2.24E-04	2.23E-04	2.17E-04	2.11E-04	1.68E-04	1.26E-04	1.25E-05	6.94E-07	0.	0.
HO166	0.	2.56E-21	1.66E-37	0.	0.	0.	0.	0.	0.	0.	0.	0.
ER166	0.	2.63E-02	2.63E-02	2.63E-02	2.63E-02	2.63E-02	2.63E-02	2.64E-02	2.65E-02	2.65E-02	2.65E-02	2.65E-02
ER167	0.	3.11E-03	3.11E-03	3.11E-03	3.11E-03	3.11E-03	3.11E-03	3.11E-03	3.11E-03	3.11E-03	3.11E-03	3.11E-03
TOTAL	0.	2.90E+04	2.90E+04	2.90E+04	2.90E+04	2.90E+04	2.90E+04	2.90E+04	2.90E+04	2.90E+04	2.90E+04	2.90E+04

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW- BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

Clad

TABLE A-IV-3
(continued)

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	Y******* Y
H 1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
H 2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
H 3	0.	6.50E-08	6.32E-08	3.81E-08	3.99E-09	2.39E-10	3.86E-20	2.23E-32	0.	0.	0.	0.
H 4	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
HE 3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
HE 4	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
HE 6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LI 6	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LI 7	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LI 8	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BE 8	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BE 9	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BE 10	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BE 11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
B 10	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
B 11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
B 12	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
C 12	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
C 13	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
C 14	0.	5.72E-07	5.72E-07	5.72E-07	5.69E-07	5.65E-07	5.39E-07	5.07E-07	3.12E-07	1.71E-07	3.19E-12	0.
N 13	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
N 14	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
N 15	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
N 16	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
O 16	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
O 17	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
O 18	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
O 19	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
F 19	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
F 20	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE 20	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE 21	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE 22	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE 23	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NA 22	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NA 23	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NA 24	0.	1.35E-90	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NA 25	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MG 24	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MG 25	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MG 26	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MG 27	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AL 27	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AL 28	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AL 29	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SI 28	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SI 29	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SI 30	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SI 31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
P 31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
P 32	0.	2.69E-06	3.84E-10	0.	0.	0.	0.	0.	0.	0.	0.	0.
P 33	0.	3.51E-05	2.22E-07	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

Clad

TABLE A-IV-3
(continued)

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
P 34	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S 32	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S 33	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S 34	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S 35	0.	6.64E-06	1.57E-06	8.94E-18	0.	0.	0.	0.	0.	0.	0.	0.
S 36	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S 37	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CL 35	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CL 36	0.	9.03E-12	9.03E-12	9.03E-12	9.03E-12	9.03E-12	9.02E-12	9.01E-12	8.93E-12	8.83E-12	7.22E-12	9.65E-13
CL 37	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CL 38	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AR 36	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AR 37	0.	6.93E-16	1.86E-17	0.	0.	0.	0.	0.	0.	0.	0.	0.
AR 38	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AR 39	0.	1.12E-18	1.12E-18	1.10E-18	9.90E-19	8.70E-19	3.10E-19	8.56E-20	2.85E-24	7.23E-30	0.	0.
AR 40	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AR 41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
K 39	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
K 40	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
K 41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
K 42	0.	1.52-118	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
K 43	0.	3.51E-58	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
K 44	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 40	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 42	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 43	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 44	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 45	0.	1.81E-06	8.40E-07	8.44E-13	0.	0.	0.	0.	0.	0.	0.	0.
CA 46	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 47	0.	1.46E-19	1.07E-31	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 48	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CA 49	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SC 45	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SC 46	0.	2.70E-03	5.98E-04	9.57E-16	0.	0.	0.	0.	0.	0.	0.	0.
SC 47	0.	6.25E-19	1.59E-31	0.	0.	0.	0.	0.	0.	0.	0.	0.
SC 48	0.	2.43E-33	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SC 49	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SC 50	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TI 46	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TI 47	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TI 48	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TI 49	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TI 50	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TI 51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 49	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 50	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 52	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 53	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
V 54	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR 50	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

Clad

TABLE A-IV-3
(continued)

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	Y******* Y
CR 51	0.	2.50E-01	2.63E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR 52	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR 53	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR 54	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CR 55	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MN 54	0.	8.26E-01	5.44E-01	2.95E-04	8.98E-19	6.43E-37	0.	0.	0.	0.	0.	0.
MN 55	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MN 56	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MN 57	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MN 58	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE 54	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE 55	0.	1.00E+00	8.78E-01	7.97E-02	1.86E-06	3.02E-12	0.	0.	0.	0.	0.	0.
FE 56	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE 57	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE 58	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FE 59	0.	3.63E-02	2.18E-03	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO 58M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO 58	0.	6.58E+00	1.11E+00	1.47E-14	0.	0.	0.	0.	0.	0.	0.	0.
CO 59	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO 60M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO 60	0.	5.19E+01	4.86E+01	1.48E+01	7.61E-02	1.05E-04	0.	0.	0.	0.	0.	0.
CO 61	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CO 62	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NI 58	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NI 59	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NI 60	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NI 61	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NI 62	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NI 63	0.	1.46E-02	1.45E-02	1.36E-02	1.00E-02	6.88E-03	3.38E-04	7.91E-06	6.33E-19	2.75E-35	0.	0.
NI 64	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NI 65	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CU 62	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CU 63	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CU 64	0.	1.01-103	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CU 65	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CU 66	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 63	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 64	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 65	0.	1.69E-04	1.01E-04	9.22E-09	1.03E-26	0.	0.	0.	0.	0.	0.	0.
ZN 66	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 67	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 68	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 69M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 69	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 70	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 71M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZN 71	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 69	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 70	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 71	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 70	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 88	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

Clad

TABLE A-IV-3
(continued)

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
SR 89	0.	3.96E-33	3.47E-04	3.23E-23	0.	0.	0.	0.	0.	0.	0.	0.
SR 90	0.	1.20E-07	1.18E-07	9.48E-08	3.53E-08	1.03E-08	5.33E-13	2.34E-18	0.	0.	0.	0.
SR 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 90M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 90	0.	5.39E-07	5.32E-07	4.26E-07	1.59E-07	4.62E-08	2.40E-12	1.05E-17	0.	0.	0.	0.
Y 91M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 91	0.	1.47E-02	1.70E-03	2.52E-20	0.	0.	0.	0.	0.	0.	0.	0.
ZR 90	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 93	0.	2.35E-06	2.35E-06	2.35E-06	2.35E-06	2.35E-06	2.35E-06	2.35E-06	2.34E-06	2.34E-06	2.24E-06	1.48E-06
ZR 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 95	0.	5.62E+00	8.01E-01	4.77E-16	0.	0.	0.	0.	0.	0.	0.	0.
ZR 96	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 92	0.	7.09E-08	2.89E-13	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 93M	0.	5.89E-07	7.68E-07	3.31E-06	7.11E-06	7.64E-06	7.66E-06	7.63E-06	7.43E-06	7.25E-06	6.61E-06	4.36E-06
NB 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 94	0.	5.57E-07	5.57E-07	5.57E-07	5.57E-07	5.57E-07	5.56E-07	5.56E-07	5.56E-07	5.56E-07	5.55E-07	5.38E-07
NB 95	0.	9.83E+00	1.53E+00	9.31E-16	0.	0.	0.	0.	0.	0.	0.	0.
NB 96	0.	1.06E-59	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 97	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 93	0.	6.38E-06	6.38E-06	6.37E-06	6.35E-06	6.33E-06	6.14E-06	5.91E-06	4.34E-06	2.95E-06	2.88E-09	0.
MO 93M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 96	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 97	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 98	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 99	0.	2.56E-20	5.17E-40	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO100	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC 99M	0.	1.04E-20	2.11E-40	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC 99	0.	3.53E-06	3.53E-06	3.53E-06	3.53E-06	3.53E-06	3.53E-06	3.52E-06	3.48E-06	3.42E-06	2.54E-06	1.30E-07
TC101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD113M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD113	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD115M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD115	0.	3.96E-31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD119M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN113	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN119M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN121M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN114	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN115	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN116	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN117M	0.	6.61E-04	7.81E-08	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

TABLE A-IV-3
(continued)

Clad

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
SN117	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN118	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN119M	0.	1.82E-03	1.10E-03	1.21E-07	3.07E-25	0.	0.	0.	0.	0.	0.	0.
SN119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN120	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN121M	0.	6.63E-05	6.60E-05	6.08E-05	4.22E-05	2.68E-05	6.97E-07	7.28E-09	1.04E-24	1.62E-44	0.	0.
SN121	0.	4.14E-50	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN122	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN123M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN123	0.	1.43E-04	5.20E-05	6.30E-13	0.	0.	0.	0.	0.	0.	0.	0.
SN124	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN125M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN125	0.	8.02E-09	1.14E-14	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB123	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB124M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB124	0.	1.15E-03	1.40E-04	4.48E-21	0.	0.	0.	0.	0.	0.	0.	0.
SB125	0.	3.26E-02	2.87E-02	2.84E-03	9.86E-08	2.62E-13	0.	0.	0.	0.	0.	0.
SB126M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB126	0.	1.24E-08	4.97E-13	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE124	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE125M	0.	2.81E-03	2.51E-03	2.50E-04	8.66E-09	2.30E-14	0.	0.	0.	0.	0.	0.
TE125	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE126	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TA180	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TA181	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TA182M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TA182	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W180	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W181	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W182	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W183M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W183	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W184	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W185M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W185	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W186	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W187	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	0.	7.61E+01	5.35E+01	1.49E+01	8.62E-02	7.03E-03	3.59E-04	2.83E-05	1.85E-05	1.67E-05	1.20E-05	6.51E-06

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

HE's

TABLE A-IV-3
(continued)

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
HE 4	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TL207	0.	7.86E-11	1.10E-10	5.11E-10	1.43E-09	1.81E-09	3.05E-09	4.56E-09	3.26E-08	1.40E-07	1.28E-05	1.93E-05
TL208	0.	5.96E-06	5.10E-06	5.38E-07	2.92E-07	1.80E-07	3.83E-09	3.23E-11	2.60E-11	8.95E-11	2.23E-09	2.34E-08
TL209	0.	1.44E-12	1.46E-12	2.08E-12	2.04E-11	9.15E-11	4.57E-09	2.63E-08	1.08E-06	4.20E-06	1.11E-04	2.51E-04
PB206	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PB207	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PB208	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PB209	0.	4.59E-12	4.68E-12	6.64E-12	6.54E-11	2.93E-10	1.46E-08	8.42E-08	3.46E-06	1.34E-05	3.56E-04	8.03E-04
PB210	0.	3.25E-23	6.48E-23	2.52E-21	3.94E-20	1.07E-19	6.88E-19	1.24E-18	3.04E-18	3.26E-18	1.52E-18	6.22E-22
PB211	0.	8.72E-11	1.23E-10	5.67E-10	1.59E-09	2.01E-09	3.38E-09	5.06E-09	3.62E-08	1.56E-07	1.42E-05	2.14E-05
PB212	0.	1.02E-06	8.72E-07	9.21E-08	4.99E-08	3.08E-08	6.56E-10	5.53E-12	4.46E-12	1.53E-11	3.82E-10	4.00E-09
PB214	0.	9.04E-20	1.41E-19	9.48E-19	4.50E-18	8.84E-18	4.04E-17	7.27E-17	1.79E-16	1.91E-16	8.90E-17	3.65E-20
BI209	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BI210	0.	5.60E-22	4.11E-21	1.60E-19	2.50E-18	6.81E-18	4.36E-17	7.85E-17	1.93E-16	2.07E-16	9.62E-17	3.95E-20
BI211	0.	1.02E-09	1.43E-09	6.60E-09	1.85E-08	2.34E-08	3.94E-08	5.90E-08	4.21E-07	1.82E-06	1.66E-04	2.49E-04
BI212	0.	1.23E-05	1.06E-05	1.11E-06	6.04E-07	3.73E-07	7.94E-09	6.69E-11	5.39E-11	1.85E-10	4.62E-09	4.84E-08
BI213	0.	2.45E-11	2.50E-11	3.55E-11	3.50E-10	1.56E-09	7.80E-08	4.50E-07	1.85E-05	7.18E-05	1.90E-03	4.29E-03
BI214	0.	5.17E-19	8.05E-19	5.42E-18	2.57E-17	5.05E-17	2.31E-16	4.15E-16	1.02E-15	1.09E-15	5.09E-16	2.09E-19
PO210	0.	2.41E-22	2.23E-20	1.91E-18	2.99E-17	8.14E-17	5.22E-16	9.39E-16	2.31E-15	2.47E-15	1.15E-15	4.72E-19
PO211	0.	3.46E-12	4.86E-12	2.25E-11	6.28E-11	7.96E-11	1.34E-10	2.01E-10	1.43E-09	6.17E-09	5.63E-07	8.48E-07
PO212	0.	2.41E-05	2.06E-05	2.18E-06	1.18E-06	7.29E-07	1.55E-08	1.31E-10	1.05E-10	3.62E-10	9.03E-09	9.45E-08
PO213	0.	1.94E-10	1.98E-10	2.80E-10	2.76E-09	1.24E-08	6.17E-07	3.55E-06	1.46E-04	5.67E-04	1.50E-02	3.39E-02
PO214	0.	1.69E-18	2.64E-18	1.77E-17	8.41E-17	1.65E-16	7.55E-16	1.36E-15	3.34E-15	3.58E-15	1.66E-15	6.83E-19
PO215	0.	1.14E-09	1.61E-09	7.42E-09	2.08E-08	2.63E-08	4.43E-08	6.63E-08	4.74E-07	2.04E-06	1.86E-04	2.80E-04
PO216	0.	2.91E-05	2.49E-05	2.63E-06	1.42E-06	8.80E-07	1.87E-08	1.58E-10	1.27E-10	4.37E-10	1.09E-08	1.14E-07
PO218	0.	1.34E-18	2.10E-18	1.41E-17	6.68E-17	1.31E-16	6.00E-16	1.08E-15	2.65E-15	2.85E-15	1.32E-15	5.43E-19
AT217	0.	1.67E-10	1.71E-10	2.42E-10	2.38E-09	1.07E-08	5.32E-07	3.07E-06	1.26E-04	4.89E-04	1.30E-02	2.93E-02
RN219	0.	1.06E-09	1.48E-09	6.86E-09	1.92E-08	2.43E-08	4.09E-08	6.13E-08	4.38E-07	1.89E-06	1.72E-04	2.59E-04
RN220	0.	2.70E-05	2.31E-05	2.43E-06	1.32E-06	8.15E-07	1.73E-08	1.46E-10	1.18E-10	4.05E-10	1.01E-08	1.06E-07
RN222	0.	1.21E-18	1.88E-18	1.27E-17	6.01E-17	1.18E-16	5.40E-16	9.72E-16	2.39E-15	2.56E-15	1.19E-15	4.88E-19
FR221	0.	1.48E-10	1.51E-10	2.15E-10	2.11E-09	9.47E-09	4.72E-07	2.72E-06	1.12E-04	4.34E-04	1.15E-02	2.60E-02
FR223	0.	9.19E-13	1.20E-12	5.55E-12	1.55E-11	1.97E-11	3.32E-11	4.96E-11	3.55E-10	1.53E-09	1.39E-07	2.10E-07
RA223	0.	9.06E-10	1.27E-09	5.89E-09	1.65E-08	2.09E-08	3.51E-08	5.26E-08	3.76E-07	1.62E-06	1.48E-04	2.22E-04
RA224	0.	2.43E-05	2.08E-05	2.20E-06	1.19E-06	7.36E-07	1.56E-08	1.32E-10	1.06E-10	3.65E-10	9.11E-09	9.53E-08
RA225	0.	2.64E-12	2.68E-12	3.80E-12	3.74E-11	1.67E-10	8.35E-09	4.82E-08	1.98E-06	7.68E-06	2.04E-04	4.59E-04
RA226	0.	1.12E-18	1.64E-18	1.10E-17	5.22E-17	1.03E-16	4.69E-16	8.44E-16	2.07E-15	2.22E-15	1.03E-15	4.24E-19
RA228	0.	2.33E-17	3.43E-17	1.62E-16	2.75E-16	3.59E-16	3.09E-15	1.13E-14	2.39E-13	8.22E-13	2.05E-11	2.15E-10
AC225	0.	1.37E-10	1.40E-10	1.98E-10	1.95E-09	8.74E-09	4.36E-07	2.51E-06	1.03E-04	4.01E-04	1.06E-02	2.40E-02
AC227	0.	1.41E-11	1.84E-11	8.54E-11	2.39E-10	3.03E-10	5.10E-10	7.63E-10	5.45E-09	2.35E-08	2.14E-06	3.23E-06
AC228	0.	1.60E-15	2.36E-15	1.11E-14	1.89E-14	2.47E-14	2.13E-13	7.75E-13	1.65E-11	5.66E-11	1.41E-09	1.48E-08
TH227	0.	9.19E-10	1.24E-09	5.75E-09	1.61E-08	2.04E-08	3.43E-08	5.14E-08	3.67E-07	1.58E-06	1.44E-04	2.17E-04
TH228	0.	2.36E-05	1.98E-05	2.10E-06	1.14E-06	7.04E-07	1.50E-08	1.26E-10	1.02E-10	3.49E-10	8.72E-09	9.13E-08
TH229	0.	1.23E-10	1.23E-10	1.74E-10	1.72E-09	7.69E-09	3.84E-07	2.21E-06	9.11E-05	3.53E-04	9.36E-03	2.11E-02
TH230	0.	2.41E-15	2.41E-15	2.41E-15	2.41E-15	2.40E-15	2.40E-15	2.39E-15	2.30E-15	2.21E-15	1.01E-15	4.15E-19
TH231	0.	6.51E-06	3.26E-08	3.26E-08	3.27E-08	3.29E-08	3.56E-08	4.11E-08	1.59E-07	4.28E-07	4.69E-06	5.05E-06
TH232	0.	7.56E-14	7.57E-14	7.77E-14	9.03E-14	1.19E-13	9.70E-13	3.54E-12	7.51E-11	2.58E-10	6.44E-09	6.74E-08
TH233	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TH234	0.	1.07E-04	1.09E-06	5.35E-07	5.35E-07	5.35E-07	5.35E-07	5.35E-07	5.35E-07	5.35E-07	5.36E-07	5.40E-07
PA231	0.	1.71E-08	1.72E-08	1.74E-08	1.85E-08	1.98E-08	3.08E-08	4.52E-08	3.30E-07	1.42E-06	1.30E-04	1.95E-04
PA232	0.	5.46E-47	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PA233	0.	1.17E-04	1.18E-04	1.32E-04	1.94E-04	2.67E-04	5.84E-04	9.41E-04	1.17E-03	1.19E-03	1.19E-03	8.89E-04
PA234M	0.	1.55E-03	1.58E-05	7.74E-06	7.74E-06	7.74E-06	7.74E-06	7.74E-06	7.74E-06	7.74E-06	7.75E-06	7.82E-06

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4 HE's TABLE A-IV-3 (continued)

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
PA234	0.	2.73E-05	2.79E-08	1.37E-08	1.37E-08	1.37E-08	1.37E-08	1.37E-08	1.37E-08	1.37E-08	1.37E-08	1.38E-08
U232	0.	4.55E-07	5.95E-07	1.47E-06	1.09E-06	6.72E-07	1.43E-08	1.16E-10	2.17E-27	2.59E-48	0.	0.
U233	0.	1.34E-09	5.73E-09	1.10E-07	7.11E-07	1.77E-06	2.01E-05	5.92E-05	4.69E-04	9.98E-04	8.98E-03	2.03E-02
U235	3.91E-04	1.15E-06	1.15E-06	1.15E-06	1.15E-06	1.16E-06	1.25E-06	1.45E-06	5.58E-06	1.51E-05	1.65E-04	1.78E-04
U236	0.	4.94E-06	4.95E-06	5.29E-06	9.61E-06	1.71E-05	7.94E-05	1.54E-04	6.30E-04	1.01E-03	1.56E-03	1.52E-03
U237	0.	8.46E-05	8.26E-05	5.40E-05	8.29E-06	9.98E-07	2.41E-07	2.31E-07	1.65E-07	1.09E-07	5.73E-11	0.
U238	7.73E-03	3.81E-05	3.81E-05	3.81E-05	3.81E-05	3.81E-05	3.81E-05	3.81E-05	3.81E-05	3.81E-05	3.81E-05	3.84E-05
U239	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
U240	0.	7.65E-18	9.65E-16	1.82E-14	9.48E-14	1.91E-13	9.56E-13	1.91E-12	9.52E-12	1.90E-11	1.73E-10	7.92E-10
NP236	0.	2.49E-63	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NP237	0.	2.54E-03	2.56E-03	2.87E-03	4.22E-03	5.81E-03	1.49E-02	2.05E-02	2.54E-02	2.58E-02	2.59E-02	1.93E-02
NP238	0.	4.90E-24	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NP239	0.	6.59E-01	6.59E-01	6.58E-01	6.56E-01	6.53E-01	6.30E-01	6.02E-01	4.19E-01	2.66E-01	7.65E-05	9.51E-09
NP240M	0.	7.73E-15	4.87E-15	9.18E-14	4.78E-13	9.52E-13	4.82E-12	9.55E-12	4.81E-11	9.57E-11	8.73E-10	4.00E-09
NP240	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PU236	0.	3.41E-05	3.02E-05	3.38E-06	2.01E-10	1.05E-15	0.	0.	0.	0.	0.	0.
PU238	1.07E+03	5.18E+00	2.73E+01	4.32E+01	3.17E+01	2.14E+01	9.52E-01	1.94E-02	8.25E-13	1.03E-22	0.	0.
PU239	6.12E+01	1.39E-01	1.39E-01	1.43E-01	1.61E-01	1.82E-01	3.47E-01	5.42E-01	1.73E+00	2.52E+00	4.11E-01	2.21E-07
PU240	1.42E+02	5.38E-01	6.48E-01	2.31E+00	5.46E+00	6.17E+00	6.05E+00	5.75E+00	3.81E+00	2.28E+00	2.24E-04	1.98E-08
PU241	5.15E+01	2.20E-01	2.15E-01	1.40E-01	2.16E-02	2.60E-03	5.28E-04	6.02E-04	4.31E-04	2.83E-04	1.49E-07	0.
PU242	1.14E+00	5.90E-03	5.90E-03	5.90E-03	5.91E-03	5.91E-03	5.95E-03	5.99E-03	6.22E-03	6.35E-03	5.52E-03	1.06E-03
PU243	0.	5.25E-11	1.05E-08	1.05E-08	1.05E-08	1.05E-08	1.05E-08	1.05E-08	1.05E-08	1.05E-08	1.05E-08	1.01E-08
PU244	0.	1.70E-16	2.14E-14	4.04E-13	2.11E-12	4.23E-12	2.12E-11	4.25E-11	2.12E-10	4.21E-10	3.84E-09	1.76E-08
PU245	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AM241	0.	1.20E+02	1.20E+02	1.20E+02	1.16E+02	1.07E+02	5.68E+01	2.58E+01	4.05E-01	2.28E-01	1.27E-04	0.
AM242M	0.	2.85E-05	2.85E-05	2.74E-05	2.28E-05	1.82E-05	2.93E-06	3.09E-07	3.57E-15	4.46E-25	0.	0.
AM242	0.	1.34E-04	1.34E-04	1.28E-04	1.07E-04	8.51E-05	1.37E-05	1.40E-06	1.67E-14	2.09E-24	0.	0.
AM243	0.	1.78E+01	1.78E+01	1.78E+01	1.77E+01	1.76E+01	1.70E+01	1.63E+01	1.13E+01	7.19E+00	2.07E-03	2.60E-07
AM244	0.	1.19E-17	7.48E-18	1.41E-16	7.34E-16	1.48E-15	7.41E-15	1.48E-14	7.38E-14	1.47E-13	1.34E-12	6.14E-12
AM245	0.	4.54E-26	1.41E-43	0.	0.	0.	0.	0.	0.	0.	0.	0.
CM242	0.	9.14E+03	4.20E+03	6.47E-03	2.42E-03	1.93E-03	3.11E-04	3.18E-05	3.80E-13	4.75E-23	0.	0.
CM243	0.	1.50E+00	1.49E+00	1.22E+00	5.14E-01	1.74E-01	3.00E-05	5.94E-10	0.	0.	0.	0.
CM244	0.	2.44E+03	2.39E+03	1.69E+03	3.66E+02	5.49E+01	1.20E-05	1.27E-13	3.47E-13	6.90E-13	6.30E-12	2.88E-11
CM245	0.	4.95E-01	4.95E-01	4.94E-01	4.93E-01	4.91E-01	4.74E-01	4.55E-01	3.25E-01	2.14E-01	1.13E-04	0.
CM246	0.	6.44E-02	6.44E-02	6.43E-02	6.39E-02	6.34E-02	5.98E-02	5.56E-02	3.08E-02	1.49E-02	2.62E-08	0.
CM247	0.	2.33E-07	2.33E-07	2.33E-07	2.33E-07	2.33E-07	2.33E-07	2.33E-07	2.33E-07	2.33E-07	2.32E-07	2.23E-07
CM248	0.	2.53E-06	2.53E-06	2.53E-06	2.53E-06	2.53E-06	2.53E-06	2.53E-06	2.51E-06	2.49E-06	2.08E-06	3.54E-07
CM249	0.	4.56E-42	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CM250	0.	9.52E-13	9.52E-13	9.49E-13	9.34E-13	9.15E-13	7.80E-13	6.39E-13	1.30E-13	1.77E-14	4.75E-30	0.
BK249	0.	3.95E-22	1.22E-39	0.	0.	0.	0.	0.	0.	0.	0.	0.
BK250	0.	7.36E-15	7.36E-15	7.33E-15	7.22E-15	7.07E-15	5.03E-15	4.94E-15	1.00E-15	1.37E-16	3.67E-32	0.
CF249	0.	7.80E-04	7.07E-04	1.20E-04	4.56E-08	2.41E-12	0.	0.	0.	0.	0.	0.
CF250	0.	3.47E-05	2.66E-05	2.25E-07	3.03E-14	2.95E-14	2.52E-14	2.06E-14	4.19E-15	5.72E-16	1.53E-31	0.
CF251	0.	3.51E-08	3.51E-08	3.48E-08	3.38E-08	3.25E-08	2.39E-08	1.63E-08	7.46E-10	1.59E-11	0.	0.
CF252	0.	5.83E-06	5.12E-06	4.84E-07	1.36E-11	2.79E-17	0.	0.	0.	0.	0.	0.
CF253	0.	5.33E-40	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CF254	0.	1.56E-18	1.28E-27	0.	0.	0.	0.	0.	0.	0.	0.	0.
ES253	0.	1.22E-33	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	1.32E+03	1.17E+04	6.76E+03	1.88E+03	5.39E+02	2.08E+02	8.24E+01	4.35E+01	1.81E+01	1.28E+01	5.20E-01	1.85E-01

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

POWER= 3R.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

FP's

TABLE A-IV-3
(continued)

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	Y******* Y
H 3	0.	2.67E-03	2.59E-03	1.56E-03	1.64E-04	9.79E-05	1.59E-15	9.16E-28	0.	0.	0.	0.
ZN 72	0.	1.79E-38	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 72	0.	4.16E-2?	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 72	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 73	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 73	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 74	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 74	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 75	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 75M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 75	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 75	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GA 76	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 76	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 76	0.	9.85E-52	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 76	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 77M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 77	0.	1.43-116	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 77	0.	3.64E-34	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 77M	0.	7.33E-37	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 77	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GE 78	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 78M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 78	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 78	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 79	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 79M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 79	0.	1.25E-04	1.25E-04	1.25E-04	1.25E-04	1.25E-04	1.25E-04	1.24E-04	1.19E-04	1.13E-04	4.32E-05	2.93E-09
BR 79	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 80	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 80	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 80M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 80	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 80	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AS 81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 81M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 81M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 82	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 82M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 82	0.	7.02E-40	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 82	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 83M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 83	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 83	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 83M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 83	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 84	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 84M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 84	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

FP's

TABLE A-IV-3
(continued)

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
KR 84	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE 85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 85M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 86	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 86	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 86M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 86	0.	8.56E-04	9.83E-07	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 86	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 87	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 87	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 87	0.	7.12E-09	7.12E-09	7.12E-09	7.12E-09	7.12E-09	7.12E-09	7.12E-09	7.12E-09	7.12E-09	7.12E-09	7.12E-09
SR 87M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 87	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 88	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 88	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 88	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 88	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
BR 89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 89	0.	1.97E+02	1.72E+01	1.60E-18	0.	0.	0.	0.	0.	0.	0.	0.
Y 89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 90	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 90	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 90	0.	5.76E+01	5.69E+01	4.56E+01	1.70E+01	4.95E+00	2.57E-04	1.13E-09	0.	0.	0.	0.
Y 90M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 90	0.	2.59E+02	2.56E+02	2.05E+02	7.64E+01	2.22E+01	1.15E-03	5.07E-09	0.	0.	0.	0.
ZR 90	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 91M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 91	0.	3.85E+02	4.48E+01	6.61E-16	0.	0.	0.	0.	0.	0.	0.	0.
ZR 91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 93	0.	1.71E-04	1.71E-04	1.71E-04	1.71E-04	1.71E-04	1.71E-04	1.71E-04	1.71E-04	1.70E-04	1.63E-04	1.08E-04
NB 93M	0.	2.09E-05	2.69E-05	1.11E-04	2.38E-04	2.55E-04	2.57E-04	2.57E-04	2.56E-04	2.56E-04	2.45E-04	1.62E-04
NB 93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
KR 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

FP's

TABLE A-IV-
(continued)

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	Y******* Y
Y 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RB 95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SR 95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 95	0.	1.21E+03	1.73E+02	1.03E-13	0.	0.	0.	0.	0.	0.	0.	0.
NB 95M	0.	6.84E+00	9.75E-01	5.80E-16	0.	0.	0.	0.	0.	0.	0.	0.
NB 95	0.	2.17E+03	3.38E+02	2.05E-13	0.	0.	0.	0.	0.	0.	0.	0.
MO 95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 96	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 96	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 96	0.	8.02E-57	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 96	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
Y 97	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 97	0.	3.10E-74	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 97M	0.	1.42E-74	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 97	0.	2.46E-74	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 97	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZR 98	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 98M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 98	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 98	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB 99	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO 99	0.	1.51E-16	3.05E-36	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC 99M	0.	3.00E-17	6.06E-37	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC 99	0.	1.00E-02	1.00E-02	1.00E-02	1.00E-02	1.00E-02	9.99E-03	9.97E-03	9.85E-03	9.59E-03	7.22E-03	3.80E-04
RU 99	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB100	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO100	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC100	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU100	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NB101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO102	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC102M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC102	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU102	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO103	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC103	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU103	0.	2.38E+02	9.75E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH103M	0.	3.43E+01	1.40E+00	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH103	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO104	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC104	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU104	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH104M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH104	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD104	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MO105	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC105	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

FP's

TABLE A-IV-3
(continued)

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	********* Y
RU105	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH105M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH105	0.	3.14E-34	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD105	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TC106	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU106	0.	4.61E+01	3.27E+01	6.57E-02	6.81E-14	7.11E-29	0.	0.	0.	0.	0.	0.
RH106M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH106	0.	8.18E+03	5.79E+03	1.17E+01	1.21E-11	1.26E-26	0.	0.	0.	0.	0.	0.
PD106	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU107	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH107	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD107M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD107	0.	1.99E-05	1.99E-05	1.99E-05	1.99E-05	1.99E-05	1.99E-05	1.99E-05	1.99E-05	1.99E-05	1.97E-05	1.80E-05
AG107	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RU108	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH108	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD108	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG108	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD108	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RH109	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD109M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD109	0.	1.53E-95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG109M	0.	1.72E-09	1.30E-09	8.49E-12	1.66E-21	1.21E-33	0.	0.	0.	0.	0.	0.
AG109	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD109	0.	1.64E-09	1.24E-09	8.11E-12	1.58E-21	1.15E-33	0.	0.	0.	0.	0.	0.
RH110	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD110	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG110M	0.	5.34E+01	3.24E+01	3.97E-03	1.63E-20	0.	0.	0.	0.	0.	0.	0.
AG110	0.	2.98E+00	1.81E+00	2.21E-04	9.12E-22	0.	0.	0.	0.	0.	0.	0.
CD110	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD111M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD111	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG111M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG111	0.	7.99E-06	3.73E-13	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD111M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD111	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD112	0.	2.91E-62	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG112	0.	5.34E-61	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD112	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD113	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG113M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG113	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD113M	0.	1.31E-02	1.28E-02	8.21E-03	1.13E-03	9.53E-05	2.38E-13	4.22E-24	0.	0	0.	0.
CD113	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN113	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD114	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG114	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD114	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN114M	0.	6.39E-05	5.08E-06	8.19E-26	0.	0.	0.	0.	0.	0.	0.	0.
IN114	0.	2.69E-04	2.14E-05	3.45E-25	0.	0.	0.	0.	0.	0.	0.	0.
SN114	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PD115	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC FP's

TABLE A-IV-3
(continued)

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	Y******* Y
AG115M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG115	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD115M	0.	1.64E-01	8.62E 03	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD115	0.	8.11E-24	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN115M	0.	5.23E-24	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN115	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN115	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG116	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD116	0.	0.	0.	0.	0.	0.	0.	0	0.	0.	0.	0.
IN116M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN116	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN116	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
AG117	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD117M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD117	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN117M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN117	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN117M	0.	1.50E-05	1.77E-09	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN117	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD118	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN118M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN118	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN118	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD119M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN119M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN119M	0.	1.77E-02	1.07E-02	1.17E-06	2.99E-24	0.	0.	0.	0.	0.	0.	0.
SN119	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD120	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN120M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN120	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN120	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CD121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN121M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN121M	0.	4.83E-07	4.81E-07	4.43E-07	3.08E-07	1.95E-07	5.07E-09	5.31E-11	7.54E-27	1.18E-46	0.	0.
SN121	0.	1.03E-48	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN122	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN122	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB122M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB122	0.	1.20E-19	2.77E-39	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE122	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN123M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN123	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN123M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN123	0.	1.91E+01	6.95E+00	8.41E-08	0.	0.	0.	0.	0.	0.	0.	0.
SB123	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE123M	0.	2.09E-04	7.10E-05	2.47E-13	0.	0.	0.	0.	0.	0.	0.	0.
TE123	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN124	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR - BU = 33,000 WASTE DECAY TIMES CASE E-4

POWER= 36.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

FP's

TABLE A-IV-3
(continued

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY META. CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	Y******* Y
SN124	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB124M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB124	0.	8.29E-01	1.00E-01	3.22E-18	0.	0.	0.	0.	0.	0.	0.	0.
TE124	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN125M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN125	0.	1.91E-04	2.79E-10	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB125	0.	5.69E+01	5.00E+01	4.96E+01	1.72E-04	4.57E-10	0.	0.	0.	0.	0.	0.
TE125M	0.	9.61E+00	8.77E+00	6.72E-01	3.02E-05	8.04E-11	0.	0.	0.	0.	0.	0.
TE125	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN126	0.	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.02E-03	9.84E-04	5.27E-04	1.03E-06
SB126M	0.	6.60E-03	6.60E-03	6.60E-03	6.60E-03	6.60E-03	6.58E-03	6.56E-03	6.38E-03	6.16E-03	3.30E-03	6.44E-06
SB126	0.	1.26E-02	1.26E-02	1.26E-02	1.26E-02	1.26E-02	1.25E-02	1.25E-02	1.22E-02	1.17E-02	6.29E-03	1.23E-05
TE126	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN127M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN127	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB127	0.	4.62E-12	3.00E-26	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE127M	0.	4.54E+00	1.42E+00	1.18E-09	0.	0.	0.	0.	0.	0.	0.	0.
TE127	0.	1.31E+01	4.10E+00	3.42E-09	0.	0.	0.	0.	0.	0.	0.	0.
I127	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB128M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE128	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN129M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN129	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB129	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE129M	0.	3.99E+00	9.65E-02	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE129	0.	4.59E+00	1.13E-01	0.	0.	0.	0.	0.	0.	0.	0.	0.
I129	0.	3.26E-08	3.96E-08	3.98E-08	3.98E-08	3.98E-08	3.98E-08	3.98E-08	3.98E-08	3.98E-08	3.97E-08	3.92E-08
XE129M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE129	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN130	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB130M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB130	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE130	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I130M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I130	0.	9.83-108	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE130	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN131	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB131	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE131M	0.	2.30E-41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE131	0.	2.24E-42	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
I131	0.	6.13E-07	9.06E-14	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE131M	0.	0.	1.27E-13	0.	0.	0.	0.	0.	0.	0.	0.	0.
XE131	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SN132	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB132M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SB132	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TE132	0.	4.15E-14	5.03E-31	0.	0.	0.	0.	0.	0.	0.	0.	0.
I132	0.	3.25E-16	3.93E-30	0.	0.	0.	0.	0.	0.	0.	0.	0.

PWR - BU = 33,030 WASTE DECAY TIMES CASE E-4

POWER= 38.40MW, BURNUP= 33000.MWD, FLUX= 1.42E+13N/CM**2-SEC

FP's

TABLE A-IV-3
(continued)

NUCLIDE THERMAL POWER, WATTS
BASIS = MT OF HEAVY METAL CHARGED TO REACTOR

	CHARGE	DISCHARGE	1. Y	10. Y	50. Y	100. Y	500. Y	1000. Y	5000. Y	10000. Y	100000. Y	******* Y
SM153	0.	8.00E-26	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU153	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD153	0.	1.85E-02	1.09E-02	8.91E-07	5.95E-25	0.	0.	0.	0.	0.	0.	0.
PM154	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM154	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU154	0.	4.47E+01	4.37E+01	2.96E+01	5.23E+00	5.99E-01	1.78E-08	6.97E-18	0.	0.	0.	0.
GD154	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM155	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU155	0.	6.17E+00	5.10E+00	1.62E-01	3.61E-08	1.74E-16	0.	0.	0.	0.	0.	0.
GD155	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM156	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU156	0.	3.55E-01	7.67E-05	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD156	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SM157	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU157	0.	1.08E-95	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD157	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU158	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD158	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU159	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD159	0.	6.89E-73	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB159	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
EU160	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD160	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB160	0.	2.27E+00	3.92E-01	7.37E-15	0.	0.	0.	0.	0.	0.	0.	0.
DY160	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD161	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB161	0.	1.95E-08	2.10E-16	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY161	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GD162	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB162M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB162	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY162	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB163M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB163	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY163	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TB164	0.	2.89E-58	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY164	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY165M	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY165	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
HO165	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DY166	0.	1.05E-18	5.78E-35	0.	0.	0.	0.	0.	0.	0.	0.	0.
HO166M	0.	4.32E-06	4.32E-06	4.30E-06	4.20E-06	4.08E-06	3.24E-06	2.43E-06	2.41E-07	1.34E-08	0.	0.
HO166	0.	8.07E-18	5.21E-34	0.	0.	0.	0.	0.	0.	0.	0.	0.
ER166	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ER167	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	0.	2.11E+04	1.24E+04	8.26E+02	2.89E+02	8.87E+01	1.07E-01	3.22E-02	3.02E-02	2.94E-02	1.80E-02	8.69E-04

APPENDIX A-V

TRANSURANIC-CONTAMINATED WASTE

OF LOW SPECIFIC ACTIVITY

APPENDIX V

TRANSURANIC-CONTAMINATED WASTE OF LOW SPECIFIC ACTIVITY*

A-V.1 BACKGROUND

In addition to the waste disposal requirements for fuel element cladding and end pieces that contain significant quantities of transuranic elements (included in the earlier discussion of high-level waste), there is also a disposal problem from the large volumes of waste generated at reprocessing and mixed-oxide fabrication plants. This has low- to intermediate-level specific activity with small, but significant, quantities of transuranic elements. For this Appendix "TRU waste" will designate this relatively low-specific-activity waste. Included are such items as failed or expended equipment, cleanup expendables (paper, clothing, plastic, rubber), filters, and liquid/sludge residue.

Defining the nature and quantity of this waste is difficult for two reasons. First, the quantities generated, by their nature as process expendables, vary with process design and administrative controls. Second, there is still substantial uncertainty regarding the final content of regulations for determining what levels of contamination define TRU waste.

Accordingly, in the following discussion this waste is characterized only in broad terms of overall volume and amount of transuranic content. The numerical values are as reported in the literature.

A-V.2 REGULATIONS

On September 12, 1974 the AEC gave notice (39 FR 32921) that it was proposing rules to require that any wastes contaminated to greater than 10^{-8} curies/gram (10 nanocuries/gram) with transuranics be treated as "transuranic-contaminated" and sent to a Federal repository. The original intent of this rule was to establish a reasonable level at which TRU waste would be held in retrievable storage pending future decisions.(1) It was not specified that such waste would necessarily go into deep geologic disposal. 10 CFR 20 306, as proposed in the September 12, 1974 notice, would require that waste material containing transuranic elements (undefined in the regulation but defined in the notice as greater than 10 nCi/g) be treated at the license site in a manner substantially identical to that for high-level waste (solidify, package, transfer to Federal custody within 5 years). Whether deep-geologic burial would then be used is not clear; it certainly seems to be one possible result of the proposed regulation, since changes to 10 CFR 20.304, proposed at the same time, forbid burial of transuranic

*Department of Transportation definition of "low specific activity" is not intended here.

waste in soil by a licensee. As yet, no action has been taken on these proposed rules. For planning purposes, ERDA has assumed that permanent geologic disposal is the intent of the cited proposed rules. NRC has stated that it will replace the rule with a new proposed rule, supported by an environmental statement. NRC has also stated that this will not be done until after completion of the ERDA study on possible modification of the 10 nCi/g number. The "task force" draft report on this subject is still under review.

The presently-accepted definition of "transuranic waste" as that contaminated to greater than 10 nCi/g derives from the criterion for setting aside higher activity waste for presumed geologic disposal, with lower-activity waste continuing to be buried at properly established and controlled radioactive waste burial grounds.

Because 10 nCi/g appears to be conservative and because the regulations may require a costly disposal option (geologic disposal), the 10 nCi rule has been vigorously debated as overly conservative.[2] Exploring these arguments is not germane to this study, except to take note that substantial arguments have been made for relaxing the 10 nCi rule for deep geologic disposal (though few would disagree that at greater than 10 nCi/g some form of control is necessary), and that the cost/benefits of applying 10 nCi/g for deep geologic disposal may be an important subject of study in the future.

A-V.3 QUANTITY ESTIMATES

Assuming that the 10 nCi/g rule goes into effect, a difficulty still arises in predicting the quantity of TRU waste to be generated from nuclear fuel cycle activities. Not only are the original quantities difficult to predict because of their origin, but it is also difficult to anticipate the degree of compaction that can be achieved. Certainly, implementation of the 10 nCi/g rule would provide strong economic incentives toward reduction in waste volume (both process changes to reduce quantities, and disposal/packaging techniques to reduce volume, of the waste generated). Because of the wide variety of the waste, it is difficult to predict what specific process facilities will be needed for treatment. Although discussion of waste control technologies properly belongs in Task B of this report, there is clearly an interface between estimates of waste quantities and the technology of volume reduction, the latter having significant effect upon the former.

ERDA 76-43 has estimated that low-level beta/gamma TRU waste generation, prior to volume reduction, would amount to (1) 283, (2) 566, and (3) 113 m^3 of waste per MT of plutonium processed in fuel preparation, fabrication, and reprocessing plants, respectively.[3] These numbers originate from earlier estimates by ORNL, derived from experience at the Rocky Flats weapons facility.[4,5] Intermediate-level beta/gamma TRU waste would add another 293 m^3/MT of plutonium recovered at a

reprocessing plant. Intermediate-level TRU waste is TRU-contaminated waste that has external beta/gamma radiation levels in the range of 10-1000 mrem/hr and therefore may require some degree of shielding during handling. For the early generation plutonium recycle case, assuming that 1 MT of discharge fuel contains 12 kg of plutonium (GESMO[6] IV E 1.2.1.1) and 1 GW-yr requires 26 MT of fuel, then the quantity of TRU waste produced per GW-yr at a reprocessing plant is·

$$(26\ \text{MT/GW-yr})(12\ \text{kg/MT})(0.001\ \text{MT/kg})\ (113 + 293)\text{m}^3/\text{MT}$$

$$= 127\ \text{m}^3. \qquad (1)$$

This assumes that plutonium conversion to PuO_2 is done at the mixed-oxide fabrication plant, which may not be the case.

At a mixed-oxide fuel fabrication plant, assuming all the plutonium is recycled, the TRU would be:

$$(26)(12)(0.001)(283 + 566) = 265\ \text{m}^3. \qquad (2)$$

In a uranium-only recycle case, using 9.5 kg Pu per MT of UO_2 and assuming that TRU waste will only arise at reprocessing, the quantity becomes:

$$(26)(9.5)(0.001)(406) = 100\ \text{m}^3. \qquad (3)$$

In the throwaway case very little TRU waste would be generated.

These volume estimates were further clarified and a volume reduction by a factor of 10 estimated.[7]

For comparison, NUREG 116 estimates that 29 m^3/GW-yr TRU waste (uncompacted) will originate at the reprocessing plant (irrespective of fuel cycle option) and 8 m^3/GW-yr at the mixed-oxide plant.[8]

Argonne has made estimates of fuel cycle TRU waste and has concluded that a reprocessing operation would yield 50 m^3 of combustible trash, 50 m^3 of noncombustibles, 7 m^3 of filters, and 0.5 m^3 of slurries, sludges, and resins per GW-yr.[9] For a mixed-oxide fabrication facility, the respective estimates are 60 m^3, 9.7 m^3, 3.8 m^3, and 1.5 m^3.

NFS has generated waste quantity estimates based on actual operating experience, and the results are summarized in Table A-V-1, which shows pre-compaction TRU of 500 ft^3 HEPA filters and 17,000 ft^3 alpha combustibles per 750 MT.[10] This equates to about 0.5 m^3 and 16 m^3 per GW-yr. NFS further estimates that volume reduction factors of 4 and 4.6 may be achieved for this waste, resulting in 0.1 m^3 and 3.5 m^3, respectively. NFS estimates 4.5 m^3/GW-yr of salt slurry production dried to 4.1 m^3, contaminated to "less than 0.1 g" plutonium per ft^3. This information is not sufficient to determine whether these slurries are contaminated to greater than 10 nCi/g in transuranics, although it

TABLE A-V-1

RADIOACTIVE WASTES GENERATED ANNUALLY AT NFS DESIGN RATE (750 TONNES/YR)

	1	2	3	4	5	6	7	8	9	10	11	12	
			Intermediate Level Waste								Low Specific Activity Waste		
	High Level Waste	Leached Hulls	Salts	Slurry	Resin	Equipment	HEPA Filters	Solvent	Alpha Waste Combustible	Combustible	Slurry	Salts	Total Volume
Original quantity ($ft.^3$)	1,400	9,200	4,800	1,635	730	10,360	2,000	200	17,000	35,000	23,300	5,500	111,125
Percent of total	1.3	8.3	4.3	1.5	0.6	9.3	1.8	0.2	15.3	31.5	21.0	4.9	
Physical form	Solid	Solid	Slurry	Slurry	Solid	Solid	Solid	Liquid	Solid	Solid	Slurry	Slurry	
Chemical form	Calcine oxide of MFP and added inerts	Zr alloy or stainless steel	Sodium nitrate 40% solution + mercuric iodate	Filter aid	Organic and mineral resins	Metal	General dust on glass filter	Diluent TBP	Paper, cloth, rubber, plastic, miscellaneous	Same	Water treatment, sludge, CaF_2	Sodium nitrate 40% solution	
Radioactivity ($ft.^3$/final volume)	99.95% of activity in fuel. ~1 X 10^5 Ci of mixed FP/$ft.^3$	0.05% of activity in fuel. 500 Ci $^{60}Co/ft.^3$	20-40 Ci of mixed FP. 0.01 Ci ^{129}I. <0.1 g Pu/$ft.^3$	1-10 Ci/ $ft.^3$ MFP. <10 ηCi Pu/g	1-10 Ci/ $ft.^3$ MFP. <10 ηCi Pu/g.	<1,000 mr/hr. <10 ηCi Pu/g.	1-500 mr/hr. < 0.5 Ci β/$ft.^3$ 75% <10 ηCi, 25% ~5 mCi Pu/g.	>100 Ci $ft.^3$ MFP. <10 ~Ci Pu/g.	~500 mr/hr. ~3 g Pu/$ft.^3$	<200 mr/hr. <10 ηCi Pu/g.	<200 mr/hr. <10 ηCi Pu/g.	<200 mr/liter <10 ηCi Pu/g.	
Process	Calcine	—	Dry	Dry	Concrete	Decon-concrete as necessary	Compaction	Burn or distill	Compaction	Compaction or incineration	—	Dry or absorb	
Shipping container	1 ½' X 15' canisters	Steel canisters	Steel canisters	55-gal. drums	55-gal. drums	Special container as required	Special container or drum	Mix with ILW waste	55-gal. drums	55-gal. drums	55-gal. drums	55-gal. drums	
Final volumes ($ft.^3$)	2,800	9,200	4,300	1,470	1,460	15,500	500	10	3,700	7,000	20,700	5,000	71,640
Percent of total	3.9	12.8	6.0	2.0	2.0	21.6	0.7	0.01	5.2	9.8	28.9	7.0	

Source: North, E.D., Solid Waste Generation in Reprocessing Nuclear Fuel. In Radioactive Wastes from the Nuclear Fuel Cycle. AIChE Symposium Series 154:72, 1976.

appears to be the case (0.1 g/ft^3, ρ = 5, 10 Ci/g of plutonium is equivalent to 7000 nCi/g).

The IAEA regional fuel cycle study was published too late to include final figures in this report. Working document estimates for TRU waste generation were (per GW-yr) for reprocessing: 26 m^3 combustibles uncompacted, 0.9 m^3 compacted; 4.1 m^3 filters uncompacted, 2.0 compacted; 28 m^3 non-combustibles unpackaged, 56 m^3 packaged (to allow for void space); 0.3 m^3 slurries, sludges and resins unstabilized, 0.6 stabilized. IAEA estimates for mixed-oxide facilities were (respectively): 5.6 m^3 (0.2 m^3); 0.3 m^3 (0.1 m^3); 0.9 m^3 (1.8 m^3); 0.4 m^3 (0.8 m^3).

Table A-V.2 summarizes these results. Considering the difficulty associated with quantitative estimates, the wide variance is not surprising.

In order to give a range of the TRU wastes, it is necessary to make some assumptions about compaction efficiency. As pointed out above, the degree of compaction will be strongly dependent on the ultimate disposal method; geologic disposal, with its attendant high costs, would provide strong incentives for volume reduction. For example, at least one study shows strong cost incentives associated with incineration of TRU combustibles (despite the fact that TRU waste incinerators may cost about $30 million for a typical reprocessing plant.[11] The following general observations may be made regarding TRU waste volume reduction:

The IAEA volume reduction factor of 30 for combustible waste, using an incinerator, is a reasonable assumption. Los Alamos Scientific Laboratory (LASL) has estimated a net volume reduction of 30-35 at its incinerator facility. With only a mechanical compactor, the reduction would probably be considerably less, depending on the form of the wastes. NFS and LASL gave identical estimates of 4.5:1. Filter volume reduction would probably be achieved by mechanical compaction, and a volume reduction factor of 2-4 (the range between NFS and IAEA estimates) is reasonable. Non-combustible solid volume reduction would be possible using mechanical compaction and/or cutting, or smelting. Another volume reduction technique could be to mix combustible residues with non-combustible to utilize volume better, although it appears that this would gain only slight advantage. A range of volume reduction for non-combustibles is estimated to be from 2:1 (LASL) to 0.5:1 (IAEA). Liquids/slurries would be dried and either packaged in metal containers (NFS) or mixed into a stabilizing medium (cement, for example). In this case, however, the result might be a volume increase ranging from 1 to 2.

Analyzing these observations, assuming reasonable breakdowns of waste types where they are not given, and using an average non-combustible quantity for the NFS data, estimates of waste quantities are given below. In addition, it should be noted that there are currently about 33,000 m^3 of TRU wastes stored at ERDA sites, with a total plutonium content in excess of 200 kg.[1]

TABLE A-V-2

COMPARISON OF ESTIMATES OF TRU SOURCES M^3/GW-YR

		ERDA 76-43	NUREG 116*	Argonne	NFS	IAEA
Reprocessing Plant	Combustibles	124 (12) full recycle	15 (0.7)	50	16 (3.5)	26 (0.9)
	Filters		2.1 (0.5)	7.0	0.5 (0.1)	4.1 (2.0)
	Non-Combustibles	98 (10) uranium recycle	7.2 (5.3)	50	--	28 (56)
	Liquids/Slurries		4.9 (7.4)	0.5	4.5 (4.1)	0.3 (0.6)
MOX Fabricators	Combustibles	260 (26)	3.3 (0.2)	60	--	5.6 (0.2)
	Filters		0.6 (0.2)	3.8	--	0.3 (0.1)
	Non-Combustibles		2.9 (2.5)	9.7	--	0.9 (1.8)
	Liquids/Slurries		0.8 (1.5)	1.5	--	0.4 (0.8)

NOTE: Numbers in parenthesis are the estimate of compacted values.

*Table 4.5.

Full Recycle:

Uncompacted 37-384 m^3/GW-yr.
Minimum compaction 163 m^3/GW-yr (applying minimum compaction factors to averages of Table A-V.2).
Maximum compaction 48 m^3/GW-yr (applying maximum compaction factors to averages of Table A-V.2).

Uranium Recycle only:

Uncompacted 29-108 m^3/GW-yr.
Minimum compaction 74 m^3/GW-yr (as above).
Maximum compaction 21 m^3/GW-yr (as above).

The uranium recycle-only case assumes that TRU waste appears only at the reprocessing plant; there is close to zero TRU waste arising from the throwaway case or from the tandem fuel cycle.

A-V.4 TRU WASTE RADIOACTIVITY AND HEAT CONTENT

The work of Blomeke et al on TRU waste quantities, which was used in ERDA 76-43, gave the estimated TRU waste generation of 283, 566, and 113 m^3/MT of plutonium processed in fuel preparation, fabrication and reprocessing, plus 293 m^3/MT of intermediate level beta/gamma TRU waste at the reprocessing plant.[4] This work assumed plutonium loss to TRU waste of 0.25%, 0.5%, 0.1% and 0.025% in each of these processes, for a total Pu loss of 0.88%.[4] If 12 kg Pu/MT of fuel is processed, then total Pu content of waste/GW-yr is:

$$(0.0088)(12\ \text{kg/MT})(26\ \text{MT/GW-yr}) = 2.7\ \text{kg/GW-yr} \qquad (4)$$

This quantity of plutonium loss may then be divided by estimated waste volume to give Pu content in waste (Table A-V.3)(Table A-18).

Blomeke also estimated the curie content of a gram of plutonium waste to be: 12.5 Ci at initial production, 0.17 Ci at 1000 yrs, and 8.1×10^{-4} Ci at 1 million years.[4] Using 10 Ci/g as an estimated activity level, then 2.7 kg would represent 27,000 curies of activity.

If one alpha decay is assumed to release 5 MeV of energy, the heat rate of 1 curie of transuranics is 0.03 watts. The resultant specific heat is shown in Table A-V.3.

The highest specific heat in Table A-V.3, 39 watt/m^3, is so small a heat load it would not create any handling or temporary storage problems. Certain components might have higher than average heat rates, however. For example, NUREG 116 shows ventilation filters (uncompacted) at 560 g/m^3.[8] A maximum volume reduction of 1:4, could result in a heat rate of 672 watt/m^3, a small but not insignificant number. The specific heat could be reduced, if necessary, by mixing waste types.

TABLE A-V.3

LOW/INTERMEDIATE LEVEL TRU WASTE
CURIE AND HEAT CONTENT (PER GW-YR)*

	Range of Volume (m^3)	Pu g/m^3	Ci/m^3	W/m^3
Full Recycle				
Uncompacted	37-384	73-7	730-70	22-2
Minimum compaction	163	17	170	5
Maximum compaction	48	56	560	17
Uranium Recycle Only				
Uncompacted	29-108	93-26	930-260	28-8
Minimum compaction	74	36	360	11
Maximum compaction	21	129	1290	39

*Data assumes processing of early generation Pu recycle assemblies.

A-V.5 COMPARISON OF SOURCE TERMS FOR TRU WASTE AND TRU CONTENT OF HIGH-LEVEL WASTE

In the previous section, an estimate of the Pu content of TRU waste was developed and keyed to total recycle loss of just under 1%. The resulting source term is approximately 2.7 kg Pu/GW-yr of energy production.* Since this number may be reduced somewhat, depending upon process loss assumption, it may be characterized as being approximately one-tenth the TRU content of high-level waste. This is approximately 20 kg TRU/GW-yr from processed UO_2 assemblies and 65 kg TRU/GW-yr from processing of assemblies from mixed-oxide fuel operation (equilibrium cycle). Hence, in terms of TRU content and based on current estimates of process losses, TRU waste represents a potential source of about one-tenth that from high-level TRU waste. In addition, the TRU waste is in much less concentrated form. Furthermore, it should be pointed out that the potential radiotoxicity from trash TRU waste is significantly less than 10% of that for high-level TRU waste, because the latter have a much higher content of transplutonium elements per unit weight. Indeed, the untreated dilution index for total trash TRU waste/MT of spent fuel never exceeds that for natural uranium ore required to make the fuel.

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* Data used to generate Table A-V.3 assumed early generation plutonium recycle, giving a lower plutonium content for mixed-oxide cases than the equilibrium case. The equilibrium case is about 7 kg Pu/GW-yr.

REFERENCES -- APPENDIX A-V

1. Daly, G.H., and O.P. Gormley. Handling, Storage, and Disposition of Solid Low Level Wastes. In: Radioactive Wastes from the Nuclear Fuel Cycle. AIChE Symposium Series 154:72, 1976.

2. Rodger, W.A. Critical Evaluation of the Limit of Transuranic Contamination of Low Level Waste. In: Radioactive Wastes from the Nuclear Fuel Cycle. AIChE Symposium Series 154:72, 1976.

3. Alternatives for Managing Wastes from Reactors and Post-Fission Operations in the LWR Fuel Cycle. ERDA 76 - 43, U.S. Energy Research and Development Administration, 1976.

4. Blomeke, J.O., et al. Projections of Radioactive Wastes to be Generated by the U.S. Nuclear Power Industry. ORNL-TM-3965, Oak Ridge National Laboratory, 1974.

5. Blomeke, J.O., et al. Shipments in the Nuclear Fuel Cycle Projected to the Year 2000. Nuclear News 18:8, June 1975.

6. Final Generic Environmental Statement on the Use of Recycle Plutonium in Mixed Oxide Fuel in Light Water Cooled Reactors ("GESMO"). U.S. Nuclear Regulatory Commission, 1976.

7. Blomeke, J.O., and C.W. Kee. Projections of Wastes to be Generated. In: Proceedings of the International Symposium on the Management of the LWR Fuel Cycle. CONF 76-0701, Denver, Colorado, July 1976.

8. Environmental Survey of the Reprocessing and Waste Management Positions of the LWR Fuel Cycle. NUREG 116, U.S. Nuclear Regulatory Commission, 1976.

9. Steindler, M.J. and L.E. Trevorrow. Wastes from the Light Water Fuel Cycle. In: Proceedings of the Symposium on Waste Management. CONF 76-1020, Tucson, Arizona, October 3-6, 1976.

10. North, E.D. Solid Waste Generation in Reprocessing Nuclear Fuel. In: Radioactive Wastes from the Nuclear Fuel Cycle. AIChE Symposium Series 154:72, 1976.

11. Raudenbush, M.H. Estimated Costs for Waste Treatment from a 1500 Tonne/Yr. Reprocessing Plant. S.M. Stoller Corporation, New York, 1976.

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