**ISOTOPE PRODUCTION AND AVAILABILITY
FROM POWER REACTORS**

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ABSTRACT

This report presents the projected availability of radioactive and stable isotopes from U.S. nuclear power reactors through the year 1990. The availability projections are for total spent fuel, U-235, U-236, total plutonium, Np-237, Pu-238, Am-241, Am-243, Cm-242, Cm-244, Pm-147, Ce-144, Cs-137, Sr-90, Kr-85, Ru-106, H-3, Tc-99, Rh-103, stable palladium, stable xenon, stable krypton, and stable ruthenium. Also included in this report is a complete print-out of the ISOPRO computer program for the eight different cases that were evaluated.

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ISOTOPE PRODUCTION AND AVAILABILITY FROM POWER REACTORS

I. Introduction

This report presents projections through the year 1990 of quantities of various isotopes recoverable from spent fuel to be discharged from U.S. nuclear power reactors. Secondary irradiation of recovered neptunium and americium to supplement the production of Pu-238 and Cm-244 is also considered.

The recovery of certain transuranium and fission product isotopes from spent nuclear fuels is of interest because these various radioactive and stable isotopes have uses as heat sources, radiation sources, rare elements, and target isotopes. Some of these isotopes, because they are difficult to contain, are potential contaminants to our environment.

To evaluate the possible useful applications or hazards of these isotopes, as well as the economics of their recovery, estimates are needed of the quantities of these isotopes that are potentially available. The projections presented here were developed to meet this need. The work was sponsored by the U.S. Atomic Energy Commission, Division of Isotopes Development.

An earlier and less detailed version of these projections was published as BNWL-SA-1529.⁽¹⁾ This report represents a complete revision and updating, but the results for similar cases are generally comparable in most respects.

II. Method and Procedure

Estimating the potentially available quantities of these isotopes required us to consider the number and type of reactors that would be operating, the method and schedule of their operation, and the detailed spent-fuel composition data for both startup and equilibrium fuel cycles. The secondary irradiation of neptunium and americium target isotopes to produce Pu-238 and Cm-244 was also considered.

Spent fuel composition data were obtained by the burnup code ALTHAEA⁽²⁾ developed at Battelle-Northwest for fuel-cycle analysis studies. This code has been well calibrated with actual light water reactor burnup and critical data, and is capable of providing good estimates of the transuranium and fission-product isotope content in spent fuels.

Separate burnup calculations for each reactor type considered were made for each of the different fuel exposures involved in the startup and equilibrium cycles. With this information a complete schedule of fuel discharges and compositions could be defined for the 30-year operating life of a reactor. Because the ALTHAEA program provides detailed spent-fuel composition data for 11 standard isotopes, plus up to 9 other isotopes, and because some 40 different fission product or transuranium isotopes were involved in these projections, it was necessary to run the program several times for each set of conditions to obtain the complete information required.

This procedure worked very well for the initial projections that were developed, but as the systems under consideration became more complex it proved too cumbersome. For the uranium and transuranium fuel components, the PACTOLUS program,⁽³⁾ developed for systems analysis studies of the U.S. power economy, was adapted to convert the ALTHAEA output into 30-year fuel discharge and composition histories. To avoid the necessity of repetitive ALTHAEA runs, capability was added to the ISOPRO program (discussed below), to calculate the quantities of the fission-product components in the spent fuel. These calculations utilized composite fission yields based on relative number of fissions in each of the fissile isotopes, as calculated by ALTHAEA. The results are not as theoretically precise as they could be had these fission-product compositions been calculated by ALTHAEA, but the results did closely agree with the ALTHAEA results where comparisons could be made.

Fuel discharge histories were developed both for a 1970 1000 MW_e boiling water reactor (BWR) based on the TVA Brown's Ferry design and for a 1970 1000 MW_e pressurized water reactor (PWR) based on the Diablo Canyon design. Separate histories for uranium and plutonium recycle

operation were also prepared. A more advanced design in which the specific power was increased approximately 15% was assumed to be available in 1980 both for the BWR and the PWR. Because of the limitations on the number of different reactor types that could be considered in ISOPRO and because such a small amount of nuclear capacity is scheduled for operation prior to 1970, the 1970 design-reactor histories were also used for the pre-1970 installations. A fast breeder reactor history was prepared, based on a Westinghouse 1000 MW_e LMFBR design study.⁽⁴⁾

For projecting total isotope availability, the information on individual reactor discharge schedules and fuel compositions was combined with nuclear power growth projections by using a new computer program, ISOPRO, developed specifically for this purpose. This program combines the detailed fuel composition histories from up to 15 different reactor types with specified nuclear growth projections to produce both annual and cumulative projections of discharged fuel quantities for up to 30 fuel components, including target irradiation products, both at the time of reactor discharge and at the time of recovery. In this study, projections were developed for eight uranium and transuranium isotopes, total plutonium and 13 fission product isotopes or combinations of isotopes. A complete printout of the ISOPRO program for eight cases evaluated in this study constitutes the Appendix to this report.

One major advantage of this calculational procedure, compared with simplified methods based on average or equilibrium conditions, is that it accurately reflects the effects of the low-fuel-exposure conditions during startup cycles. In a period of rapid growth, such as is predicted for the next two decades, the startup-cycle effects are quite significant, since new capacity additions for each year range from over 100% to no less than 10% of the previously existing capacity through the year 1990. Thus there is always a significant fraction of capacity in the startup phase during this period.

Another advantage of this procedure is the capability to account for time delays and inventory requirements for fuel reprocessing, target irradiations, and fuel recycle operations

The projection of isotope production and availability from power reactors depends more than anything else on the assumed nuclear power growth projection, there being, of course, a substantial uncertainty in any nuclear power growth projection. The current AEC projection is for 120 to 180 GW_e installed nuclear capacity in 1980, with the best estimate at 150 GW_e (150,000 MW_e). The base projection used in this study predicts that the 150 GW_e installed at the end of 1980 will increase to 500 GW_e installed at the end of 1990. Also included in this report are projections based on upper limits of 180 GW_e in 1980 increasing to 600 GW_e in 1990 and lower limits of 120 GW_e in 1980 increasing to 400 GW_e in 1990. In effect, an uncertainty of $\pm 20\%$ is assumed in the nuclear power growth projections, and this is probably the major uncertainty involved in the isotope availability projections presented here.

In addition to the nuclear power growth projection, certain other assumptions and ground rules were required for this study. These are summarized in Table I.

Two secondary target irradiation cycles are involved in these projections: neptunium irradiation to produce Pu-238 and americium irradiation to produce both Pu-238 and Cm-244.

The basic nuclear reactions involved in the Np-237 target irradiation are shown in Figure 1. Other reactions involve formation of plutonium isotopes by neutron capture in Pu-239 and Pu-236 formation by a Np-237 n-2n reaction. A small amount of Pu-238 fission also occurs.

The neptunium target irradiation production cycle used for these projections is illustrated schematically in Figure 2. This cycle is representative of target irradiation in power reactors having a neutron flux of about 2×10^{13} n/cm²/sec. It was further assumed that before the year 1981 neptunium would be irradiated in AEC reactors having a flux of about 1×10^{14} n/cm²/sec. For the period prior to 1981, a one-year neptunium irradiation and recovery cycle was assumed with a 21% conversion to Pu-238 and a 70% recovery of neptunium for recycle. After 1980, the power-reactor irradiation cycle that was assumed is that shown in Figure 2.

TABLE I

GROUND RULES
FOR ISOTOPE PRODUCTION PROJECTIONS

1. Installed nuclear capacity and isotope production and availability are always stated as of the end of year shown.
2. Yearly capacity additions startup at mid-year.
3. Nuclear power plant life is 30 years.
4. Nuclear power plant capacity factors are 85% for 15 years, declining linearly to 50% at 30 years.
5. Light Water Reactors (LWRs) are 67% PWRs and 33% BWRs after 1971. Contract commitments and operating reactors are used for the earlier years.
6. One year is allowed between the reactor discharge and isotope recovery. Isotope recovery is corrected for decay losses.
7. Plutonium and uranium recovery is 98%.
8. All other by-product recovery is 90%.
9. Pm-147 recovery is delayed 3 years after fuel discharge to allow for Pm-148 decay.
10. Cm-244 recovery is delayed 3 years after fuel discharge to allow for Cm-242 decay.
11. Pu-238 formed by Cm-242 decay, except for first year decay prior to separations, is available with the Cm-244.

FIGURE 1. Neptunium-237 Target Irradiation Reaction

FIGURE 2. Neptunium-237 Target Irradiation Cycle in Power Reactors

The principal nuclear reactions involved in the target irradiation of the mixed americium isotopes (Am-241 and Am-242) are shown in Figure 3 with the ultimate products being Pu-238 and Cm-244. Production of high purity Pu-238 is difficult because of the partial decay of Am-242 to Pu-242, but there is no Pu-236 formation as in Np-237 irradiation. Product recovery is delayed by the 163-day half-life Cm-242. In this study a two-year period was allowed between target irradiation and recovery of the products. This decay period is required to reduce the activity of the curium product enough for processing and to stabilize the heat output of the curium product by allowing the Cm-242 component to decay to the point where the heat output of the Cm-242 is no greater than the heat output of the Cm-244. A two-year decay period also allows for maximum Pu-238 recovery. It has been suggested that during this period the material might be used as a high intensity heat source to take advantage of the decay heat from Cm-242. However, this concept has not attracted great interest.

The americium target irradiation production cycle used for these projections is illustrated schematically in Figure 4, and is based on power reactor target irradiations. No consideration is given here to high flux irradiation of the americium, although it is certainly a possibility.

III. Cases Considered

The light-water-reactor concept, both BWR and PWR, is now so well established that it will undoubtedly dominate the power reactor industry for at least the next 5 to 10 years. However, the extent to which plutonium or uranium recycle will be used is uncertain. Also uncertain is the extent to which some other type of reactor, advanced converter or fast breeder, may enter the picture in the late 1970s or 1980s.

To encompass these uncertainties as well as the uncertainties previously discussed relating to nuclear power growth projections, the eight cases in Table II were defined for evaluation.

Case 1 assumed that the installed nuclear capacity in 1980 would be 150 GW_e, that Light Water Reactors (LWRs) would be the only type of reactor installed, and that there would be no uranium or plutonium recycle.

FIGURE 3. Americium Target Irradiation Reactions

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FIGURE 4. Americium Target Irradiation Cycle
in Power Reactors

TABLE II
DESCRIPTION OF CASES

<u>Case</u>	<u>Description</u>	<u>Abbreviation</u>
1	Light Water Reactors (LWRs) fueled with slightly enriched uranium without plutonium or uranium (U-236) recycle. 150 GW _e nuclear capacity in 1980.	LWRs
2	LWRs as in Case 1, except for 50% of the U-236 production being recycled.	LWRs-U
3	LWRs as in Case 1, except for plutonium being recycled.	LWRs-Pu
4	LWRs as in Case 1, except for both plutonium and 50% of U-236 being recycled.	LWRs-U/Pu
5	LWRs with 50% U-236 recycle and maximum Fast-Breeder-Reactor (FBR) additions beginning in 1980.	LWRs-U and FBRs
6	LWRs with 50% U-236 recycle, limited plutonium recycle, and maximum FBR additions beginning in 1980.	LWRs-U/Pu and FBRs
7	Same as Case 6, except for 180 GW _e nuclear capacity in 1980.	Case 6 but 180 GW _e -1980
8	Same as Case 6, except for 120 GW _e nuclear capacity in 1980.	Case 6 but 120 GW _e -1980

Case 2 is identical to Case 1, except for recycling 50% of the U-236 present in the discharged spent fuel. This recycle is based on calculations showing that approximately 50% of the U-236 returned with the spent fuel uranium to the diffusion cascade for re-enrichment will appear in the enriched uranium product. To simplify the calculations, it was assumed that each reactor would recycle its own U-236 after a delay of one charging cycle. Of course it is not likely that each reactor would recycle its own U-236 in such a recycle situation, but the result of the calculation is an accurate reflection of the recycle effects on Np-237 production, and these effects are what we want to identify.

Case 3 is the same as Case 1, except that plutonium is recycled. For plutonium recycle it was assumed that separate plutonium burning reactors would be fueled with natural uranium enriched with plutonium. Separate fueling histories were prepared for LWRs enriched with plutonium for their entire 30-year life. These were substituted for uranium enriched LWRs in the ISOPRO calculation by a trial and error procedure until the out-of-reactor plutonium stockpile was reduced to less than 3% of the plutonium recovered. It was assumed that one year after fuel discharge, the plutonium would be recovered and available for reactor charging as fabricated plutonium enriched fuel.

Case 4 combines both plutonium recycle and 50% U-236 recycle. The U-236 produced in the plutonium recycle reactors was not recycled and this may result in some understatement of Np-237 availability. However the magnitude of this understatement is less than 5% because the concentration of U-236 in this portion of the spent fuel is so very low (about one-fifth the concentration of U-236 in uranium enriched fuel) and because less than one-third of the reactors are ever-operating or plutonium recycle. Actually, the final U-235 content is so low (0.35 to 0.40%) that the justification for returning it to the cascade for re-enrichment is questionable.

Case 5 is like Case 2 with LWRs and 50% U-236 recycle, except that plutonium-enriched Fast Breeder Reactors (FBRs) are introduced starting in 1980. The introduction rate of FBRs was limited to 4 (at

1000 MW_e each) in the first two years and was allowed to double every two years after that until limited by plutonium availability. In terms of annual FBR additions, the limiting sequence was 2, 2, 3, 5, 7, 9, 13, 19, etc. This was assumed to be the maximum rate that the nuclear industry could gear-up for FBR additions, and is essentially the same limit as that adopted in the Systems Analysis Task Force studies for the current AEC Civilian Nuclear Power Study.

Case 6 combines both plutonium and U-236 recycle with FBR additions starting in 1980, and is considered the most plausible case evaluated. In this case, a combination of 4-year and 10-year plutonium recycle reactors were added to minimize plutonium stockpile accululation and yet allow a high rate of plutonium-enriched FBR additions. The 4-year and 10-year plutonium recycle reactors as opposed to 30-year recycle in Case 3, are fueled with plutonium-enriched natural uranium for approximately 4 or 10 years and with enriched uranium for the balance of their lives. The combination of reactors here was obtained by a trial and error process and represents an effort to combine maximum plutonium utilization with maximum FBR additions. Since plutonium is burned in the LWR recycle fuel, the total FBR additions are necessarily less than in Case 5.

Case 7 is like Case 6, except that the total nuclear capacity is increased to 180 GW_e in 1980 rather than 150 GW_e.

Case 8 is like Case 6, except that the total nuclear capacity is reduced to 120 GW_e in 1980.

IV. Results

A complete computer printout of the ISOPRO program for all eight cases is included in the Appendix. A summary and discussion of the results is presented in this section.

The annual rate of spent fuel discharges is shown at five-year intervals in Table III. This is the amount of fuel that must be reprocessed to recover the isotopes tabulated in subsequent tables. The main factors in this study that affect the fuel discharge rates are the total installed nuclear power generating capacity and the proportion that is FBR capacity. The fuel

TABLE III

ANNUAL POWER REACTOR FUEL DISCHARGES, MT/yr*

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7 Case 6 but 180 GW _e - 1980	Case 8 Case 6 but 120 GW _e - 1980
	<u>LWRs</u>	<u>LWRs-U</u>	<u>LWRs-Pu</u>	<u>LWRs-U/Pu</u>	<u>LWRs-U & FBRs</u>	<u>LWRs-U/Pu & FBRs</u>		
1970	100	100	100	100	100	100	100	100
1975	1, 830	1, 830	1, 860	1, 850	1, 830	1, 850	2, 010	1, 640
1980	4, 280	4, 240	4, 270	4, 230	4, 240	4, 270	5, 040	3, 580
1985	10, 700	10, 500	10, 700	10, 500	10, 100	10, 100	12, 200	8, 090
1990	20, 700	20, 200	20, 400	20, 100	17, 400	17, 700	21, 600	14, 200

*Rounded to three significant figures

discharge rate is reduced by introducing FBRs, because of the high fuel exposures in the FBR core fuel and the higher thermal efficiency of FBRs.

A comparison of the amount and types of reactor capacity installed in each of the eight cases is shown in Table IV. Case 6 has less FBR capacity than Case 5 because some of the plutonium was consumed as recycle fuel in the LWRs. Case 7 has more FBR capacity than Case 6 because of more total capacity, but because of recycle, still not as much as Case 5. Case 8 has the least FBR capacity because of the reduced total capacity.

The amount of reactor capacity devoted to plutonium recycle is compared in Table V. In Cases 3 and 4, recycle was limited only by available plutonium. In Cases 6, 7, and 8, the mix of 4-year and 10-year recycle LWRs and FBRs was adjusted to minimize the plutonium stockpile accumulation and to maximize the FBR additions.

Reference to these two tables, as well as the plutonium stockpile and U-236 production tables that follow, will assist in understanding the variations or lack of variations in the isotope availability tabulations.

The accumulation of total plutonium in an unused stockpile is compared for the eight cases in Table VI. This table shows that efficient use of plutonium was achieved in all of the LWR plutonium recycle cases (Cases 3, 4, 6, 7, and 8). The plutonium stockpile reaches 900 MT in 1990 without recycle or FBR additions. With FBR additions, but without LWR plutonium recycle (Case 5), the stockpile accumulation is reduced to less than 200 MT and peaks about 1985. In all of the LWR plutonium recycle cases, the stockpile accumulation is held to 15 MT or less. Plutonium utilization is of interest here primarily because plutonium is the source of the americium and curium isotopes, and efficient utilization means increased availability of these isotopes.

The annual availability rate of U-236 is shown in Table VII. This is not available as a separate isotope, but is a component of the total uranium recovered. The effects of recycling 50% of this U-236 (Cases 2, 4, 5, 6, 7, and 8) are small prior to 1980 but become significant by 1985.

TABLE IV

COMPARISON OF INSTALLED CAPACITY IN EACH CASE BY REACTOR TYPE

	<u>Cases 1-4</u>	<u>Case 5</u>			<u>Case 6</u>			<u>Case 7</u>			<u>Case 8</u>		
	<u>LWR and</u> <u>Total</u>	<u>LWR</u>	<u>FBR</u>	<u>Total</u>	<u>LWR</u>	<u>FBR</u>	<u>Total</u>	<u>LWR</u>	<u>FBR</u>	<u>Total</u>	<u>LWR</u>	<u>FBR</u>	<u>Total</u>
1970	12	12	0	12	12	0	12	12	0	12	12	0	12
1975	70	70	0	70	70	0	70	79	0	79	60	0	60
1980	150	148	2	150	148	2	150	178	2	180	119	1	120
1985	296	268	28	296	268	28	296	327	28	355	216	21	237
1990	500	369	131	500	390	110	500	477	123	600	311	89	400

TABLE V
COMPARISON OF PLUTONIUM RECYCLE CAPACITY
INSTALLED IN PLUTONIUM RECYCLE CASES
(Gigawatts electrical)

	<u>Case 3</u>	<u>Case 4</u>	<u>Case 6</u>			<u>Case 7</u>			<u>Case 8</u>		
	<u>LWR</u> <u>30 Pu</u>	<u>LWR</u> <u>30 Pu</u>	<u>LWR</u> <u>4 Pu</u>	<u>LWR</u> <u>10 Pu</u>	<u>FBR</u>	<u>LWR</u> <u>4 Pu</u>	<u>LWR</u> <u>10 Pu</u>	<u>FBR</u>	<u>LWR</u> <u>4 Pu</u>	<u>LWR</u> <u>10 Pu</u>	<u>FBR</u>
1970	0	0	0	0	0	0	0	0	0	0	0
1975	6	5	0	5	0	0	5	0	0	5	0
1980	26	26	8	13	2	13	13	2	8	11	1
1985	68	67	14	13	28	33	13	28	14	11	21
1990	144	142	16	13	110	42	13	123	14	11	89

Notes: 30 Pu denotes reactors operating on Pu recycle for their entire 30-year life.

4 Pu denotes reactors operating on Pu recycle for 4 years.

10 Pu denotes reactors operating on Pu recycle for 10 years.

TABLE VI

CUMULATIVE PLUTONIUM STOCKPILE, MT

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7 Case 6 but 180 MW _e - 1980	Case 8 Case 6 but 120 GW _e - 1980
	<u>LWRs</u>	<u>LWRs-U</u>	<u>LWRs-Pu</u>	<u>LWRs-U/Pu</u>	<u>LWRs-U & FBRs</u>	<u>LWRs-U/Pu & FBRs</u>		
1970	2	2	2	2	2	2	2	2
1975	25	25	5	8	25	8	9	7
1980	130	127	5	5	115	2	2	7
1985	383	375	3	4	191	15	14	14
1990	907	892	4	3	5	1	8	4

Note: Plutonium includes Pu-239, Pu-240, Pu-241, and Pu-242.

TABLE VII

ANNUAL AVAILABILITY OF U-236, MT/yr

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Case 8
	<u>LWRs</u>	<u>LWRs-U</u>	<u>LWRs-Pu</u>	<u>LWRs-U/Pu</u>	<u>LWRs-U</u> <u>& FBRs</u>	<u>LWRs-U/Pu</u> <u>& FBRs</u>	<u>Case 6 but</u> <u>180 MW_e-</u> <u>1980</u>	<u>Case 6 but</u> <u>120 GW_e-</u> <u>1980</u>
1970	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
1975	3.6	3.7	3.6	3.7	3.7	3.7	3.9	3.5
1980	11.0	12.9	9.9	11.8	12.9	11.8	13.7	10.0
1985	24.6	33.3	20.7	28.3	32.2	29.2	34.5	23.3
1990	46.4	68.9	36.8	54.4	59.4	57.2	68.3	45.4

This is because the recycle effects are overshadowed at first by the growth effects in a rapidly expanding industry. Plutonium recycle reduces U-236 formation since it displaces U-235 which is the precursor of U-236. (Compare Case 3 with Case 1, and Case 4 with Case 2). The U-236 availability is of interest because it is the precursor of Np-237 which is the main source for Pu-238 production.

Annual neptunium availability is shown in Table VIII, and follows, with some lag, the same pattern as U-236 availability.

The principal source of Pu-238 is Np-237 target irradiation. The Pu-238 availability from that source, based on the assumptions of this study, is shown in Table IX. There is a marked discontinuity in the rate of change in availability between 1980 and 1985 because of the assumed shift from a high flux (1×10^{14} n/cm²/sec) target irradiation to a lower power reactor flux irradiation (2×10^{13} n/cm²/sec) in 1980, as previously discussed. Such an abrupt shift is unlikely to occur and some smoothing of the data could be justified. It does demonstrate, however, the high sensitivity of Pu-238 availability to the target irradiation flux used.

Plutonium-238 will also be available from Cm-242 decay and from target irradiation of the mixed americium isotopes. Availability from these sources is summarized in Tables X and XI. Total Pu-238 availability from all these sources is shown in Table XII.

Only about 1 to 4% of the total Pu-238 is available from Cm-242 decay. This quantity could be increased, possibly doubled, since it was rather conservatively assumed that the first year's decay of Cm-242 would not be recoverable (lost to other plutonium isotopes). If it is assumed that the curium isotopes are isolated from the plutonium isotopes within six months of reactor discharge, the Pu-238 from this source is approximately doubled, but it would still be a relatively small source of Pu-238. However, it may be a very important source because of this low radioactivity of the recovered Pu-238, there being no Pu-236 content as in the Pu-238 produced by Np-237 irradiation.

TABLE VIII

ANNUAL AVAILABILITY OF Np-237, kg/yr*

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7 Case 6 but 180 MW _e - 1980	Case 8 Case 6 but 120 GW _e - 1980
	<u>LWRs</u>	<u>LWRs-U</u>	<u>LWRs-Pu</u>	<u>LWRs-U/Pu</u>	<u>LWRs-U & FBRs</u>	<u>LWRs-U/Pu & FBRs</u>		
1970	15	15	15	15	15	15	15	15
1975	376	358	376	358	358	358	370	340
1980	1,220	1,260	1,130	1,190	1,260	1,180	1,370	1,010
1985	2,580	3,040	2,290	2,700	2,960	2,720	3,240	2,180
1990	4,520	5,810	3,860	4,880	5,100	4,970	5,970	3,950

* Rounded to three significant figures.

TABLE IX
ANNUAL Pu-238 AVAILABILITY
FROM Np-237 TARGET IRRADIATION, kg/yr

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7 Case 6 but 180 MW _e - 1980	Case 8 Case 6 but 120 GW _e - 1980
	<u>LWRs</u>	<u>LWRs-U</u>	<u>LWRs-Pu</u>	<u>LWRs-U/Pu</u>	<u>LWRs-U & FBRs</u>	<u>LWRs-U/Pu & FBRs</u>		
1970	6	6	6	6	6	6	6	6
1975	75	72	75	72	72	72	73	71
1980	482	472	465	460	472	460	514	493
1985	583	631	534	587	628	588	687	491
1990	1, 190	1, 450	1, 050	1, 270	1, 380	1, 300	1, 550	1, 040

TABLE X

ANNUAL Pu-238 AVAILABILITY
FROM Cm-242 DECAY, kg/yr

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7 Case 6 but 180 MW _e - 1980	Case 8 Case 6 but 120 GW _e - 1980
	<u>LWRs</u>	<u>LWRs-U</u>	<u>LWRs-Pu</u>	<u>LWRs-U/Pu</u>	<u>LWRs-U & FBRs</u>	<u>LWRs-U/Pu & FBRs</u>		
1970	0	0	0	0	0	0	0	0
1975	1	1	1	1	1	1	1	1
1980	5	5	7	6	5	6	7	6
1985	11	11	25	25	11	24	28	20
1990	16	17	59	59	21	31	39	24

TABLE XI
ANNUAL Pu-238 AVAILABILITY FROM
TARGET IRRADIATION OF MIXED AMERICIUM ISOTOPES, kg/yr

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7 Case 6 but 180 MW _e - 1980	Case 8 Case 6 but 120 GW _e - 1980
	<u>LWRs</u>	<u>LWRs-U</u>	<u>LWRs-Pu</u>	<u>LWRs-U/Pu</u>	<u>LWRs-U & FBRs</u>	<u>LWRs-U/Pu & FBRs</u>		
1970	0	0	0	0	0	0	0	0
1975	2	2	2	2	2	2	2	2
1980	29	29	36	35	29	35	37	32
1985	81	81	186	177	82	180	202	155
1990	157	157	536	530	192	364	445	310

TABLE XII

TOTAL ANNUAL Pu-238 AVAILABILITY FROM ALL SOURCES, kg/yr

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7 Case 6 but 180 MW _e - 1980	Case 8 Case 6 but 120 GW _e - 1980
	<u>LWRs</u>	<u>LWRs-U</u>	<u>LWRs-Pu</u>	<u>LWRs-U/Pu</u>	<u>LWRs-U & FBRs</u>	<u>LWRs-U/Pu & FBRs</u>		
1970	6	6	6	6	6	6	6	6
1975	78	75	78	75	75	75	75	73
1980	515	506	507	501	506	500	712	438
1985	675	722	746	789	721	791	917	666
1990	1,370	1,620	1,650	1,860	1,590	1,690	2,040	1,370

As much as 10 to 30% of the Pu-238 is available from americium irradiation. The higher proportions are the result of plutonium recycle and are not achieved until the late 1980s. This would also be high-quality Pu-238 from the standpoint of Pu-236 content but would be diluted with Pu-242 resulting from the partial decay of Am-242 to Pu-242.

The cumulative availability of Pu-238 from all three sources is shown in Table XIII. Since Pu-238 availability is of interest primarily as a heat source isotope, the availability in terms of theoretical thermal kilowatts is also shown in Table XIII. The differences between the eight cases in the cumulative tabulation turn out to be surprisingly small.

Annual Am-241 and Am-243 availability is shown in Tables XIV and XV. The effect of plutonium recycle on americium availability is significant (compare Case 3 with Case 1, for example). For a single batch of fuel, the Am-241 concentration in the spent fuel with plutonium enrichment is 10 to 20 times that for U-235 enrichment, while the Am-243 concentration is as much as 50 times higher with plutonium enrichment. The result is that by 1990, plutonium recycle increases Am-241 availability more than fourfold and Am-243 about eightfold. Use of the plutonium for fueling FBRs reduces americium availability relative to that with plutonium recycle in LWRs, particularly the Am-243. This is because production of the higher transuranium isotopes is reduced in a fast neutron spectrum (where the probability of fission is significantly increased for all transuranium isotopes) and because less fuel is burned as a result of the higher thermal efficiency of the FBRs.

Americium-241 is the daughter of Pu-241 decay. One means of increasing Am-241 availability would be to periodically process the plutonium stockpile for recovery of the accumulated Am-241. The increase in Am-241 annual availability that could be realized by annual processing of the plutonium stockpile is shown in Table XVI. In the cases where there is no plutonium recycle or no utilization in FBRs (Cases 1, 2, and 5), the potential Am-241 availability from this source is very large. In every case there is potentially more Am-241 available from this source until 1975 than is available directly from the spent fuel.

TABLE XIII

CUMULATIVE AVAILABILITY OF Pu-238 FROM ALL SOURCES

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Case 8
	<u>LWRs</u>	<u>LWRs-U</u>	<u>LWRs-Pu</u>	<u>LWRs-U/Pu</u>	<u>LWRs-U & FBRs</u>	<u>LWRs-U/Pu & FBRs</u>	<u>Case 6 but 180 MW_e- 1980</u>	<u>Case 6 but 120 GW_e- 1980</u>
	<u>Kilograms</u>							
1970	22	22	22	22	22	22	22	22
1975	176	171	176	171	171	171	172	170
1980	1,720	1,670	1,710	1,670	1,670	1,670	1,790	1,520
1985	4,460	4,510	4,580	4,630	4,510	4,650	5,200	4,060
1990	9,460	10,300	10,500	11,200	10,200	10,900	12,600	9,140
	<u>Kilowatts (thermal)</u>							
1970	12	12	12	12	12	12	12	12
1975	99	96	99	96	96	96	96	95
1980	964	935	958	935	935	935	1,000	851
1985	2,500	2,530	2,560	2,540	2,530	2,600	2,910	2,270
1990	5,300	5,770	5,880	6,260	5,710	6,070	7,060	5,120

TABLE XIV
ANNUAL AVAILABILITY
OF Am-241 IN AMERICIUM MIXTURE, kg/yr

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Case 8
	<u>LWRs</u>	<u>LWRs-U</u>	<u>LWRs-Pu</u>	<u>LWRs-U/Pu</u>	<u>LWRs-U & FBRs</u>	<u>LWRs-U/Pu & FBRs</u>	<u>Case 6 but 180 MW_e- 1980</u>	<u>Case 6 but 120 GW_e- 1980</u>
1970	1	1	1	1	1	1	1	1
1975	38	39	38	39	39	39	40	38
1980	122	119	231	220	119	225	247	192
1985	237	237	753	745	271	568	695	497
1990	377	372	1,670	1,650	643	695	916	526

TABLE XV
ANNUAL AVAILABILITY
OF Am-243 IN AMERICIUM MIXTURE, kg/yr

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7 Case 6 but 180 MW _e - 1980	Case 8 Case 6 but 120 GW _e - 1980
	<u>LWRs</u>	<u>LWRs-U</u>	<u>LWRs-Pu</u>	<u>LWRs-U/Pu</u>	<u>LWRs-U & FBRs</u>	<u>LWRs-U/Pu & FBRs</u>		
1970	2	2	2	2	2	2	2	2
1975	50	53	50	53	53	53	54	52
1980	167	169	387	373	169	384	418	325
1985	312	323	1,410	1,400	323	913	1,160	836
1990	462	473	3,660	3,620	477	645	1,080	427

TABLE XVI
ANNUAL AVAILABILITY
OF Am-241 FROM PROCESSING PLUTONIUM STOCKPILE, kg/yr

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7 Case 6 but 180 MW _e - 1980	Case 8 Case 6 but 120 GW _e - 1980
	<u>LWRs</u>	<u>LWRs-U</u>	<u>LWRs-Pu</u>	<u>LWRs-U/Pu</u>	<u>LWRs-U & FBRs</u>	<u>LWRs-U/Pu & FBRs</u>		
1970	10	10	10	10	10	10	10	10
1975	118	119	35	64	119	64	65	61
1980	823	806	25	47	806	17	46	77
1985	2,560	2,510	14	34	1,500	100	115	89
1990	6,290	6,210	34	45	529	29	50	60

Calculation of Am-241 availability from the plutonium stockpile is based on the assumption that the average Pu-241 content is 17%. The calculation is based on annual processing of the entire plutonium stockpile, but annual processing is not essential to the recovery because the Am-241 will be there, accumulating at the same annual rate, whether the stockpile is processed at one-year or five-year intervals.

The possibility of Am-241 recovery from plutonium stockpile processing was not considered in the Pu-238 availability calculations previously discussed on Page 32.

Annual availability of Cm-244 recovered directly from spent fuel is shown in Table XVII and availability from target irradiation of americium is shown in Table XVIII. The total annual availability from both sources is shown in Table XIX. The two sources are shown to be of about equal importance. Direct recovery is the largest source up through 1980 particularly in the plutonium recycle cases. Beyond that time direct recovery continues to be the largest source in the cases with plutonium recycle, but Am-243 target irradiation is more important otherwise. With FBRs in the system target irradiation becomes the major source of Cm-244.

The cumulative availability of Cm-244 from both sources is shown in Table XX. As in the case of Pu-238, the principal interest in Cm-244 is as a heat-source isotope and availability is shown in terms of both kilograms and thermal kilowatts. The significance of the Cm-244 quantities relative to Pu-238 is more apparent when their projected availabilities are compared on the basis of theoretical heat output rather than kilogram quantities because the theoretical specific heat of Cm-244 is 2.8 W/g compared with 0.56 W/g for Pu-238. Comparing Table XX with Table XIII, Pu-238 is shown to be the major source of heat energy relative to Cm-244 up through 1980, and on through 1990 for the nonplutonium-recycle cases. With plutonium recycle, however, with or without FBRs, substantially more heat is potentially available from Cm-244 in the 1980s.

Availability calculations have been made for several of the major radioactive fission products. The ones selected are of interest because they have possible application as heat or radiation sources or because

TABLE XVII
ANNUAL AVAILABILITY
OF Cm-244 RECOVERED DIRECTLY FROM FUEL, kg/yr*

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Case 8
	<u>LWRs</u>	<u>LWRs-U</u>	<u>LWRs-Pu</u>	<u>LWRs-U/Pu</u>	<u>LWRs-U & FBRs</u>	<u>LWRs-U/Pu & FBRs</u>	<u>Case 6 but 180 MW_e- 1980</u>	<u>Case 6 but 120 GW_e- 1980</u>
1970	0	0	0	0	0	0	0	0
1975	3	3	3	3	3	3	3	3
1980	24	25	52	52	25	48	51	43
1985	53	56	281	282	55	264	301	223
1990	66	73	722	722	67	227	316	173

*Availability after three-year delay to reduce Cm-242 content.

TABLE XVIII
ANNUAL AVAILABILITY OF Cm-244
FROM TARGET IRRADIATION OF MIXED AMERICIUM ISOTOPES, kg/yr*

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Case 8
	<u>LWRs</u>	<u>LWRs-U</u>	<u>LWRs-Pu</u>	<u>LWRs-U/Pu</u>	<u>LWRs-U & FBRs</u>	<u>LWRs-U/Pu & FBRs</u>	<u>Case 6 but 180 MW_e - 1980</u>	<u>Case 6 but 120 GW_e - 1980</u>
1970	0	0	0	0	0	0	0	0
1975	1	1	1	1	1	1	1	1
1980	19	20	27	26	20	26	28	24
1985	64	66	173	166	66	164	184	145
1990	136	140	601	597	141	377	469	334

*Availability after two-year delay to reduce Cm-242 content.

TABLE XIX
TOTAL ANNUAL AVAILABILITY
OF Cm-244 FROM BOTH SPENT FUEL AND AMERICIUM TARGET IRRADIATION, kg/yr

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7 Case 6 but 180 MW _e - 1980	Case 8 Case 6 but 120 GW _e - 1980
	<u>LWRs</u>	<u>LWRs-U</u>	<u>LWRs-Pu</u>	<u>LWRs-U/Pu</u>	<u>LWRs-U & FBRs</u>	<u>LWRs-U/Pu & FBRs</u>		
1970	1	1	1	1	1	1	1	1
1975	4	4	4	4	4	4	4	4
1980	44	45	78	73	45	74	78	67
1985	117	122	455	446	122	428	485	368
1990	203	213	1,323	1,314	207	603	785	508

TABLE XX
CUMULATIVE AVAILABILITY OF Cm-244
FROM BOTH SPENT FUEL AND AMERICIUM TARGET IRRADIATION

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7 Case 6 but 180 MW _e - 1980	Case 8 Case 6 but 120 GW _e - 1980
	<u>LWRs</u>	<u>LWRs-U</u>	<u>LWRs-Pu</u>	<u>LWRs-U/Pu</u>	<u>LWRs-U & FBRs</u>	<u>LWRs-U/Pu & FBRs</u>		
	<u>Kilograms</u>							
1970	2	2	2	2	2	2	2	2
1975	9	10	9	10	10	10	10	10
1980	127	134	178	173	134	174	182	162
1985	503	523	1,400	1,350	523	1,380	1,510	1,200
1990	1,210	1,250	5,530	5,440	1,240	3,780	4,550	3,340
	<u>Kilowatts (thermal)</u>							
1970	6	6	6	6	6	6	6	6
1975	24	30	25	30	30	30	30	30
1980	356	375	498	484	375	487	510	454
1985	1,410	1,460	3,920	3,780	1,464	3,860	4,230	3,360
1990	3,390	3,500	15,500	15,200	3,470	10,600	12,700	9,350

they are difficult to contain during fuel reprocessing. Annual availability summaries for Pm-147, Ce-144, Cs-137, Sr-90, Kr-85, Ru-106, and H-3 are shown in Tables XXI, XXII, XXIII, XXIV, XXV, XXVI, and XXVII respectively.

Even though there are variations in fission yields between uranium and plutonium, the differences in availability with or without plutonium recycle are relatively small compared with the differences in fission yield. For example, there is more than a tenfold difference in fission yield for Ru-106 from U-235 at 0.38% and Pu-239 at 4.6%, whereas maximum plutonium recycle (Case 3) increases Ru-106 availability less than 30%. Except for the variations resulting from nuclear power growth rates in Cases 7 and 8, fission product availability is closely similar in almost all cases. The principal reasons for this similarity are (1) a significant number of the total fissions are plutonium fissions (on the order of 30%) even without plutonium recycle, and (2) because of a steep nuclear growth rate and a low conversion ratio during the period under study, recycle fuel is always outweighed by nonrecycle fuel.

In the case of H-3, a uniform fission yield of one H-3 atom/ 1.25×10^4 fissions⁽⁵⁾ was assumed from all fissions. Thus the results in Table XXVII do not represent a measure of fueling effects. The differences in H-3 availability are due to thermal efficiency differences.

The cumulative availability of these radioactive fission products is summarized for Case 6 in Table XXVIII. To give a better measure of their relative importance, their quantities are converted to thermal kilowatts, except that Kr-85 and H-3 (isotopes difficult to contain during reprocessing) are shown in terms of cumulative kilocuries.

Availability calculations were made for another group of fission product isotopes which have attracted interest^(6, 7) as a possible source of valuable rare materials. These isotopes are all stable or nearly stable and their associated radioactivity is believed to be low. However, two of them, stable krypton and stable ruthenium, can only be recovered with significant amounts of a radioactive component, Kr-85 and Ru-106 respectively, and so are certain to have significant radioactivity. It seems probable that some radioactivity would be associated with all of them, but the levels have not yet been established.

TABLE XXI

ANNUAL AVAILABILITY OF Pm-147, kg/yr

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7 Case 6 but 180 MW _e - 1980	Case 8 Case 6 but 120 GW _e - 1980
	<u>LWRs</u>	<u>LWRs-U</u>	<u>LWRs-Pu</u>	<u>LWRs-U/Pu</u>	<u>LWRs-U & FBRs</u>	<u>LWRs-U/Pu & FBRs</u>		
1970	2	2	2	2	2	2	2	2
1975	36	36	36	36	36	36	36	36
1980	193	180	192	180	180	180	206	153
1985	492	461	480	456	460	457	542	363
1990	1,020	942	1,000	944	907	900	1,080	729

TABLE XXII

ANNUAL AVAILABILITY OF Ce-144, kg/yr

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Case 8
	<u>LWRs</u>	<u>LWRs-U</u>	<u>LWRs-Pu</u>	<u>LWRs-U/Pu</u>	<u>LWRs-U & FBRs</u>	<u>LWRs-U/Pu & FBRs</u>	<u>Case 6 but 180 MW_e- 1980</u>	<u>Case 6 but 120 GW_e- 1980</u>
1970	7	7	7	7	7	7	7	7
1975	171	172	171	172	172	172	180	161
1980	462	447	447	434	447	432	509	365
1985	1, 130	1, 120	1, 080	1, 080	1, 110	1, 080	1, 290	863
1990	2, 330	2, 260	2, 180	2, 120	2, 070	2, 050	2, 460	1, 630

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TABLE XXIII

ANNUAL AVAILABILITY OF Cs-137, kg/yr

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7 Case 6 but 180 MW _e - 1980	Case 8 Case 6 but 120 GW _e - 1980
	<u>LWRs</u>	<u>LWRs-U</u>	<u>LWRs-Pu</u>	<u>LWRs-U/Pu</u>	<u>LWRs-U & FBRs</u>	<u>LWRs-U/Pu & FBRs</u>		
1970	42	42	42	42	42	42	42	42
1975	1, 160	1, 180	1, 160	1, 180	1, 180	1, 180	1, 220	1, 120
1980	3, 190	3, 130	3, 150	3, 080	3, 130	3, 070	3, 610	2, 600
1985	6, 930	6, 950	6, 940	6, 950	6, 780	6, 730	8, 090	5, 420
1990	12, 840	12, 600	12, 800	12, 600	11, 500	11, 600	14, 100	9, 240

TABLE XXIV

ANNUAL AVAILABILITY OF Sr-90, kg/yr

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7 Case 6 but 180 MW _e - 1980	Case 8 Case 6 but 120 GW _e - 1980
	<u>LWRs</u>	<u>LWRs-U</u>	<u>LWRs-Pu</u>	<u>LWRs-U/Pu</u>	<u>LWRs-U & FBRs</u>	<u>LWRs-U/Pu & FBRs</u>		
1970	19	19	19	19	19	19	19	19
1975	522	532	522	532	532	532	551	505
1980	1,450	1,420	1,360	1,330	1,420	1,320	1,570	1,120
1985	3,180	3,190	2,910	2,920	3,080	2,940	3,510	2,340
1990	5,890	5,780	5,210	5,110	5,040	4,930	5,890	3,900

TABLE XXV

ANNUAL AVAILABILITY OF Kr-85, kg/yr

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Case 8
	<u>LWRs</u>	<u>LWRs-U</u>	<u>LWRs-Pu</u>	<u>LWRs-U/Pu</u>	<u>LWRs-U & FBRs</u>	<u>LWRs-U/Pu & FBRs</u>	<u>Case 6 but 180 MW_e- 1980</u>	<u>Case 6 but 120 GW_e- 1980</u>
1970	1	1	1	1	1	1	1	1
1975	23	23	23	23	23	23	24	22
1980	63	62	60	58	62	58	68	58
1985	140	141	128	128	137	130	155	104
1990	262	257	230	225	229	223	266	177

TABLE XXVI

ANNUAL AVAILABILITY OF Ru-106, kg/yr

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7 Case 6 but 180 MW _e - 1980	Case 8 Case 6 but 120 GW _e - 1980
	<u>LWRs</u>	<u>LWRs-U</u>	<u>LWRs-Pu</u>	<u>LWRs-U/Pu</u>	<u>LWRs-U & FBRs</u>	<u>LWRs-U/Pu & FBRs</u>		
1970	3	3	3	3	3	3	3	3
1975	68	69	68	69	69	69	72	65
1980	185	180	207	201	180	202	234	169
1985	433	430	528	523	456	488	590	404
1990	882	857	1,130	1,100	1,090	1,150	1,390	927

TABLE XXVII

ANNUAL AVAILABILITY OF H-3, g/yr

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Case 8
	<u>LWRs</u>	<u>LWRs-U</u>	<u>LWRs-Pu</u>	<u>LWRs-U/Pu</u>	<u>LWRs-U</u> <u>& FBRs</u>	<u>LWRs-U/Pu</u> <u>& FBRs</u>	<u>Case 6 but</u> <u>180 MW_e-</u> <u>1980</u>	<u>Case 6 but</u> <u>120 GW_e-</u> <u>1980</u>
1970	1	1	1	1	1	1	1	1
1975	32	33	32	33	33	33	34	31
1980	90	88	88	86	88	86	101	73
1985	194	194	193	193	190	188	226	151
1990	357	351	354	347	321	324	392	257

TABLE XXVIII
CUMULATIVE AVAILABILITY
OF PRINCIPAL RADIOACTIVE FISSION PRODUCTS
(Case 6 Basis)

	<u>Kilowatts (thermal)</u>		
	<u>1970</u>	<u>1980</u>	<u>1990</u>
Kr-85	2	125	698
Pm-147	2	151	906
Cs-137	71	5,590	33,700
Sr-90	73	5,550	32,600
Ru-106	132	9,660	54,200
Ce-144	256	17,000	83,600
 <u>Kilocuries</u>			
Kr-85	1,200	92,000	514,000
H-3	39	3,400	19,000

Annual availability summaries for Tc-99, Rh-103, the stable palladium isotopes, the stable xenon isotopes, the stable krypton isotopes and the stable ruthenium isotopes are shown in Tables XXIX, XXX, XXXI, XXXII, XXXIII, and XXIV. Again, as with the radioactive fission products, there are increases in availability with plutonium recycle, but not nearly as large as one might think just by comparing the uranium and plutonium fission yields.

The cumulative availability for these stable fission products is summarized for Case 6 in Table XXXV.

TABLE XXIX

ANNUAL AVAILABILITY OF Tc-99, kg/yr

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Case 8
	<u>LWRs</u>	<u>LWRs-U</u>	<u>LWRs-Pu</u>	<u>LWRs-U/Pu</u>	<u>LWRs-U & FBRs</u>	<u>LWRs-U/Pu & FBRs</u>	<u>Case 6 but 180 MW_e- 1980</u>	<u>Case 6 but 120 GW_e- 1980</u>
1970	29	29	29	29	29	29	29	29
1975	798	809	798	809	809	809	836	768
1980	2,200	2,140	2,170	2,100	2,140	2,090	2,460	1,770
1985	4,800	4,770	4,770	4,740	4,660	4,600	5,530	3,710
1990	8,940	8,670	8,820	8,590	7,920	7,980	9,670	6,340

TABLE XXX

ANNUAL AVAILABILITY OF STABLE Rh-103, kg/yr

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7 Case 6 but 180 MW _e - 1980	Case 8 Case 6 but 120 GW _e - 1980
	<u>LWRs</u>	<u>LWRs-U</u>	<u>LWRs-Pu</u>	<u>LWRs-U/Pu</u>	<u>LWRs-U & FBRs</u>	<u>LWRs-U/Pu & FBRs</u>		
1970	16	16	16	16	16	16	16	16
1975	424	419	424	419	419	419	433	397
1980	1, 150	1, 080	1, 180	1, 120	1, 080	1, 110	1, 300	936
1985	2, 600	2, 460	2, 780	2, 670	2, 390	2, 440	2, 950	1, 990
1990	5, 040	4, 640	5, 460	5, 150	4, 110	4, 280	5, 300	3, 410

TABLE XXXI

ANNUAL AVAILABILITY OF STABLE PALLADIUM, kg/yr

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7 Case 6 but 180 MW _e - 1980	Case 8 Case 6 but 120 GW _e - 1980
	<u>LWRs</u>	<u>LWRs-U</u>	<u>LWRs-Pu</u>	<u>LWRs-U/Pu</u>	<u>LWRs-U & FBRs</u>	<u>LWRs-U/Pu & FBRs</u>		
1970	24	24	24	24	24	24	24	24
1975	695	706	695	706	706	706	727	674
1980	1,910	1,860	2,060	2,010	1,860	2,010	2,340	1,700
1985	4,030	4,040	4,770	4,760	4,070	4,340	5,280	3,580
1990	7,450	7,300	9,210	9,050	7,780	8,300	10,200	6,660

TABLE XXXII

ANNUAL AVAILABILITY OF STABLE XENON, kg/yr

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7 Case 6 but 180 MW _e - 1980	Case 8 Case 6 but 120 GW _e - 1980
	<u>LWRs</u>	<u>LWRs-U</u>	<u>LWRs-Pu</u>	<u>LWRs-U/Pu</u>	<u>LWRs-U & FBRs</u>	<u>LWRs-U/Pu & FBRs</u>		
1970	167	167	167	167	167	167	167	167
1975	4,560	4,640	4,560	4,640	4,640	4,640	4,800	4,400
1980	12,600	12,300	21,400	12,100	12,300	12,100	14,200	10,200
1985	27,600	27,700	27,600	27,700	27,000	26,800	32,200	21,600
1990	51,700	50,800	51,500	50,700	46,700	47,200	57,200	37,500

TABLE XXXIII

ANNUAL AVAILABILITY OF STABLE KRYPTON, kg/yr

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7 Case 6 but 180 MW _e - 1980	Case 8 Case 6 but 120 GW _e - 1980
	<u>LWRs</u>	<u>LWRs-U</u>	<u>LWRs-Pu</u>	<u>LWRs-U/Pu</u>	<u>LWRs-U & FBRs</u>	<u>LWRs-U/Pu & FBRs</u>		
1970	12	12	12	12	12	12	12	12
1975	334	339	334	339	339	339	351	322
1980	923	902	867	846	902	841	995	712
1985	2,020	2,020	1,840	1,840	1,970	1,880	2,240	1,490
1990	3,720	3,650	3,270	3,200	3,330	3,240	3,850	2,570

TABLE XXXIV

ANNUAL AVAILABILITY OF STABLE RUTHENIUM, kg/yr

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Case 8
	<u>LWRs</u>	<u>LWRs-U</u>	<u>LWRs-Pu</u>	<u>LWRs-U/Pu</u>	<u>LWRs-U & FBRs</u>	<u>LWRs-U/Pu & FBRs</u>	<u>Case 6 but 180 MW_e- 1980</u>	<u>Case 6 but 120 GW_e- 1980</u>
1970	70	70	70	70	70	70	70	70
1975	1,970	2,000	1,970	2,000	2,000	2,000	2,070	1,910
1980	5,430	5,310	5,480	5,340	5,310	5,330	6,250	4,510
1985	11,700	11,700	12,200	12,200	11,500	11,600	14,000	9,400
1990	21,600	21,100	22,700	22,300	19,900	20,400	24,900	16,300

TABLE XXXV
CUMULATIVE AVAILABILITY OF
PRINCIPAL STABLE FISSION PRODUCTS
(Case 6 Basis)

	Metric Tons		
	<u>1970</u>	<u>1980</u>	<u>1990</u>
Technetium-99	0.1	9.6	61
Rhodium-103	0.06	5.1	33
Stable Palladium (104, 105, 106, 107, 108, and 110)	0.1	8.8	60
Stable Xenon (131, 132, 134, 136)	0.7	56	358
Stable Krypton* (83, 84, and 86)	0.05	4.0	25
Stable Ruthenium** (99, 100, 101, 102, and 104)	0.3	24	156

*Contaminated with radioactive Kr-85.

**Contaminated with radioactive Ru-106.

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7. L. W. Lang, D. E. Deonigi, and C. A. Rohrmann, "Power Cost Reduction from Isotope Revenues," Nuclear Applications, vol. 3, p. 665, November 1967.

APPENDIX

ISOPRO RESULTS

A complete printout of the ISOPRO program for the eight cases evaluated in this study is presented in this Appendix.

ISOTOPE PRODUCTION AND
AVAILABILITY REPORT

JULY 1, 1968

IT IS THE OBJECTIVE OF THIS REPORT TO PROVIDE ANNUAL AND CUMULATIVE LISTINGS OF ISOTOPES OF INTEREST FOR DIFFERENT REACTOR COMBINATIONS AND REACTOR FUELING STRATEGIES FROM 1960 THROUGH 1990. THROUGHOUT THIS INTERVAL, VARIOUS ENERGY DEMAND CURVES CAN BE SATISFIED. THE REACTOR COMBINATIONS AND ENERGY DEMANDS MET ARE REPORTED AT THE BEGINNING OF EACH CASE.

THIS REPORT IS ARRANGED IN THE FOLLOWING ORDER--

	PAGE
DESCRIPTION OF CASES.....	2
GROUND RULES.....	3
ISOTOPE DEFINITIONS AND HALF LIFE TABLE.....	6
REACTOR TYPE DESCRIPTION.....	7
DISCHARGE SCHEDULE FOR EACH REACTOR AND ITS FUELING MODE.....	8

TABLES OF OUTPUT

ISOTOPE PRODUCTION TABLES (ANNUAL AND CUMULATIVE)

- INDICATES ISOTOPE PRODUCTION AT DISCHARGE WITH NO REPROCESSING TIME OR LOSSES, EXCEPT CUMULATIVE TABLES INCLUDE DECAY LOSSES.

ISOTOPE AVAILABILITY TABLES (ANNUAL AND CUMULATIVE)

- INDICATE ISOTOPE AVAILABILITY ALLOWING FOR REPROCESSING TIME AND LOSSES DUE TO DECAY AND REPROCESSING.

DESCRIPTION OF CASES

CASE	DESCRIPTION	PAGE
---	-----	---
1	LIGHT WATER REACTORS (LWR'S) FUELED WITH SLIGHTLY..... ENRICHED URANIUM WITHOUT PLUTONIUM OR URANIUM RECYCLE. 150 GWE NUCLEAR CAPACITY IN 1980.	36
2	LWR'S AS IN CASE 1 EXCEPT 50% OF U-236 PRODUCTION..... IS RECYCLED.	50
3	LWR'S AS IN CASE 1 EXCEPT PLUTONIUM IS RECYCLED.....	64
4	LWR'S AS IN CASE 1 EXCEPT PLUTONIUM AND 50% OF U-236..... IS RECYCLED.	78
5	LWR'S WITH 50% U-236 RECYCLE AND MAXIMUM FAST BREEDER..... REACTOR (FBR) ADDITIONS BEGINNING IN 1980.	92
6	LWR'S WITH 50% U-236 RECYCLE, LIMITED PLUTONIUM RECYCLE... AND MAXIMUM FBR ADDITIONS BEGINNING IN 1980.	106
7	CASE 6 EXCEPT 180 GWE NUCLEAR CAPACITY IN 1980.....	120
8	CASE 6 EXCEPT 120 GWE NUCLEAR CAPACITY IN 1980.....	134

GROUND RULES FOR CALCULATING
ISOTOPE AVAILABILITY
AND PRODUCTION

1. INSTALLED NUCLEAR CAPACITY AND ISOTOPE PRODUCTION AND AVAILABILITY ARE ALWAYS STATED AS OF END OF YEAR SHOWN.
2. YEARLY CAPACITY ADDITIONS STARTUP AT MID-YEAR.
3. NUCLEAR POWER PLANT LIFE IS 30 YEARS.
4. NUCLEAR POWER PLANT CAPACITY FACTORS ARE 85% FOR 15 YEARS, DECLINING LINEARLY TO 50% AT 30 YEARS.
5. LIGHT WATER REACTORS (LWR'S) ARE 67% PWR'S AND 33% BWR'S AFTER 1971. CONTRACT COMMITMENTS AND OPERATING REACTORS ARE USED FOR PRIOR YEARS.
6. ONE YEAR BETWEEN REACTOR DISCHARGE AND RECOVERY OF ANY ISOTOPE. RECOVERY CORRECTED FOR DECAY LOSSES.
7. 98% RECOVERY OF PLUTONIUM AND URANIUM.
8. 90% RECOVERY OF ALL OTHER BY-PRODUCTS.
9. PM-147 RECOVERY DELAYED 3 YEARS AFTER FUEL DISCHARGE TO ALLOW FOR PM-148 DECAY.
10. CM-244 RECOVERY DELAYED 3 YEARS AFTER FUEL DISCHARGE TO ALLOW FOR CM-242 DECAY.
11. PU-238 FORMED BY CM-242 DECAY, EXCEPT FOR FIRST YEAR PRIOR TO SEPARATIONS, IS AVAILABLE WITH THE CM-244.

THE FOLLOWING DEFINED ISOTOPES ARE REPORTED.

ISOTOPE -----	DESCRIPTION -----
PU-RP	TOTAL PU-239, PU-240, PU-241 AND PU-242 REPROCESSED. (SEE NOTE BELOW).
PU-SP	TOTAL PU-239, PU-240, PU-241 AND PU-242 IN STOCKPILE (REDUCED BY PU-241 DECAY TO AM-241).
NP237	NP-237 FROM SPENT FUEL.
AM241	AM-241 FROM SPENT FUEL.
AM243	AM-243 FROM SPENT FUEL.
CM242	CM-242 FROM SPENT FUEL.
CM244	CM-244 FROM SPENT FUEL.
CM244 AM3	CM-244 PRODUCED FROM TARGET IRRADIATION OF AM-243.
CM244 SUM	TOTAL CM-244 FROM SPENT FUEL AND TARGET IRRADIATION.
PU238 NP	PU-238 PRODUCED FROM TARGET IRRADIATION OF NP-237.
PU238 CM	PU-238 PRODUCED FROM DECAY OF CM-242 DURING THE CM-244 AGING PROCESS.
PU238 AM	PU-238 PRODUCED FROM TARGET IRRADIATION OF AM-241.
PU238 SUM	TOTAL PU-238 FROM TARGET IRRADIATION AND AGING OF CM-244.

ISOTOPE -----	DESCRIPTION -----
U-235	U-235 REPROCESSED (SEE NOTE BELOW).
U-236	U-236 REPROCESSED (SEE NOTE BELOW).
PM147	PM147 FROM SPENT FUEL.
CE144	CE-144 FROM SPENT FUEL.
CS137	CS-137 FROM SPENT FUEL.
SR-90	SR-90 FROM SPENT FUEL.
KR-85	KR-85 FROM SPENT FUEL.
TC-99	TC-99 FROM SPENT FUEL.
RH103 SUM	TOTAL RH-103 FROM SPENT FUEL PLUS 90 PCT. OF DECAYED RU-103.
RU106	RU-106 FROM SPENT FUEL.
PD STABL	INCLUDES STABLE PD ISOTOPES, PD-104, PD-105, PD-106, PD-107, PD-108, PD-110.
XE STABL	INCLUDES STABLE XE ISOTOPES, XE-131, XE-132, XE-134, XE-136.
CM242 AM1	CM-242 PRODUCED FROM TARGET IRRADIATION OF AM-241.
AM241 PU1	AM-241 PRODUCED FROM DECAY OF PU-241 IN PU STOCKPILE (PU-SP).
KR STABL	INCLUDES STABLE KR ISOTOPES, KR-83, KR-84, KR-86.
RU STABL	INCLUDES STABLE RU ISOTOPES, RU-99, RU-100, RU-101, RU-102, RU-104.
H-3 GRAMS	GRAMS OF TRITIUM PRODUCED AS A FISSION PRODUCT.

NOTE: CUMULATIVE TABLES FOR PU-RP, U-235 AND U-236 DO NOT REPRESENT A TRUE ACCUMULATION--RATHER, TOTALS THAT HAVE BEEN PROCESSED.

ISOTOPE HALF-LIFE TABLE

ISOTOPE	HALF-LIFE	FRACTION DECAYED/YEAR
PU-RP	STABLE	.00000000
PU-SP	STABLE	.00000000
NP237	2140000.00 YRS.	.00000033
AM241	458.00 YRS.	.00151229
AM243	7650.00 YRS.	.00009061
CM242	163.00 DAYS	.78848198
CM244	18.10 YRS.	.03757143
PU238	89.00 YRS.	.00775793
U-235	STABLE	.00000000
U-236	23900000.00 YRS.	.00000004
PM147	2.70 YRS.	.22641613
CE144	285.01 DAYS	.58869590
CS137	30.00 YRS.	.02284004
SR-90	28.00 YRS.	.02445138
KR-85	10.76 YRS.	.06238784
TC-99	210000.00 YRS.	.00000331
RH103	SUM STABLE	.00000000
RU106	1.00 YRS.	.50000000
PD	STABL STABLE	.00000000
XE	STABL STABLE	.00000000
KR	STABL STABLE	.00000000
RU	STABL STABLE	.00000000
H-3	12.26 YRS.	.05496876

R E A C T O R T Y P E D E S C R I P T I O N S

ABBREVIATION	DESCRIPTION
PWR70	PRESSURIZED WATER REACTOR FUELED WITH SLIGHTLY ENRICHED URANIUM (DIABLO CANYON DESIGN).
BWR70	BOILING WATER REACTOR FUELED WITH SLIGHTLY ENRICHED URANIUM (BROWN'S FERRY-TVA DESIGN).
PWR80	PRESSURIZED WATER REACTOR FUELED WITH SLIGHTLY ENRICHED URANIUM (ADVANCED PWR DESIGN).
BWR80	BOILING WATER REACTOR FUELED WITH SLIGHTLY ENRICHED URANIUM (ADVANCED BWR DESIGN).
PWR70-30U	PWR70 FUELED WITH SLIGHTLY ENRICHED URANIUM AND RECYCLING U-236
BWR70-30U	BWR70 FUELED WITH SLIGHTLY ENRICHED URANIUM AND RECYCLING U-236
PWR80-30U	PWR80 FUELED WITH SLIGHTLY ENRICHED URANIUM AND RECYCLING U-236
BWR80-30U	BWR80 FUELED WITH SLIGHTLY ENRICHED URANIUM AND RECYCLING U-236
LWR70-4PU	LWR WITH PWR70 CHARACTERISTICS FUELED WITH PLUTONIUM ENRICHED NATURAL URANIUM FOR FIRST 4 YEARS THEN, SWITCHING TO SLIGHTLY ENRICHED URANIUM FOR REMAINDER OF REACTOR LIFE.
LWR80-4PU	LWR WITH PWR80 CHARACTERISTICS FUELED WITH PLUTONIUM ENRICHED NATURAL URANIUM FOR FIRST 4 YEARS THEN, SWITCHING TO SLIGHTLY ENRICHED URANIUM FOR REMAINDER OF REACTOR LIFE.
LWR70-10PU	LWR WITH PWR70 CHARACTERISTICS FUELED WITH PLUTONIUM ENRICHED NATURAL URANIUM FOR FIRST 10 YEARS THEN, SWITCHING TO SLIGHTLY ENRICHED URANIUM FOR REMAINDER OF REACTOR LIFE.
LWR70-30PU	LWR WITH PWR70 CHARACTERISTICS FUELED WITH PLUTONIUM ENRICHED NATURAL URANIUM.
LWR80-30PU	LWR WITH PWR80 CHARACTERISTICS FUELED WITH PLUTONIUM ENRICHED NATURAL URANIUM.
LMFBR	LMFBR - CARBIDE FUEL - WESTINGHOUSE 1000 MWE DESIGN (EQUILIBRIUM CORE EXPOSURE - 110,000 MWD/TONNE).

CYCLE NUMBER	DISCHARGE			ISOTOPE PRODUCTION: GRAMS/TONNE												
	DATE	TONNE	EXPOS MWD/T	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	PM147	CE144	CS137	SR-90	U-235	U-236
1	1.2	29.4	12418.	5609.	5609.	138.	7.	5.	1.	1.	125.	268.	468.	231.	11744.	1766.
2	1.9	29.4	20042.	7411.	7411.	269.	22.	24.	5.	4.	160.	327.	752.	347.	9393.	2520.
3	2.8	29.4	27656.	8669.	8669.	416.	41.	62.	12.	14.	181.	363.	1029.	475.	7391.	3141.
4	3.8	29.4	28968.	8771.	8771.	454.	39.	54.	11.	12.	184.	367.	1077.	496.	10040.	3614.
5	4.7	29.4	30116.	8941.	8941.	478.	43.	62.	12.	15.	186.	371.	1118.	515.	9538.	3682.
6	5.7	29.4	30524.	9009.	9009.	487.	44.	65.	12.	16.	187.	372.	1133.	522.	9356.	3707.
7	6.6	29.4	29940.	8941.	8941.	474.	42.	61.	12.	14.	186.	370.	1112.	512.	9619.	3673.
8	7.5	29.4	29675.	8873.	8873.	468.	41.	59.	11.	14.	185.	369.	1102.	508.	9717.	3656.
9	8.3	29.4	28795.	8737.	8737.	448.	39.	55.	11.	12.	184.	367.	1070.	493.	9696.	3555.
10	9.2	29.4	27764.	8601.	8601.	425.	37.	50.	10.	11.	182.	363.	1033.	476.	9748.	3446.
11	10.0	29.4	26965.	8465.	8465.	408.	35.	47.	10.	10.	180.	361.	1004.	463.	9715.	3352.
12	10.8	29.4	26071.	8329.	8329.	388.	33.	43.	9.	9.	178.	357.	972.	448.	9735.	3254.
13	11.5	29.4	25220.	8193.	8193.	370.	31.	40.	8.	8.	176.	354.	941.	434.	9744.	3160.
14	12.2	29.4	24310.	8023.	8023.	351.	29.	36.	8.	7.	173.	350.	908.	419.	9796.	3062.
15	12.9	29.4	23516.	7887.	7887.	335.	27.	33.	7.	6.	171.	346.	879.	405.	9812.	2972.
16	13.6	29.4	22768.	7751.	7751.	319.	26.	31.	7.	6.	169.	342.	852.	393.	9813.	2888.
17	14.3	29.4	22054.	7615.	7615.	305.	24.	28.	6.	5.	167.	339.	826.	381.	9806.	2806.
18	14.9	29.4	21392.	7513.	7513.	291.	23.	26.	6.	4.	165.	335.	801.	370.	9788.	2730.
19	15.5	29.4	20748.	7411.	7411.	279.	22.	24.	5.	4.	162.	330.	778.	359.	9774.	2655.
20	16.2	29.4	20424.	7343.	7343.	273.	21.	23.	5.	4.	159.	324.	766.	353.	9683.	2609.
21	16.8	29.4	20408.	7343.	7343.	272.	21.	23.	5.	4.	158.	320.	765.	353.	9687.	2608.
22	17.5	29.4	20497.	7343.	7343.	274.	21.	24.	5.	4.	156.	317.	768.	354.	9639.	2615.
23	18.2	29.4	20431.	7343.	7343.	273.	21.	23.	5.	4.	154.	313.	765.	353.	9677.	2609.
24	18.9	29.4	20446.	7343.	7343.	273.	21.	24.	5.	4.	152.	308.	765.	353.	9666.	2611.
25	19.6	29.4	20453.	7343.	7343.	273.	21.	24.	5.	4.	150.	304.	765.	353.	9661.	2611.
26	20.3	29.4	20428.	7343.	7343.	273.	21.	23.	5.	4.	148.	299.	764.	352.	9678.	2609.
27	21.1	29.4	20436.	7343.	7343.	273.	21.	24.	5.	4.	146.	295.	763.	352.	9672.	2610.
28	21.9	29.4	20441.	7343.	7343.	273.	21.	24.	5.	4.	144.	290.	763.	352.	9667.	2611.
29	22.6	29.4	20425.	7343.	7343.	273.	21.	23.	5.	4.	141.	284.	762.	351.	9677.	2609.
30	23.5	29.4	20436.	7343.	7343.	273.	21.	23.	5.	4.	139.	279.	762.	351.	9672.	2610.
31	24.3	29.4	20439.	7343.	7343.	273.	21.	24.	5.	4.	136.	273.	761.	351.	9668.	2610.
32	25.1	29.4	20400.	7343.	7343.	272.	21.	23.	5.	4.	133.	266.	759.	350.	9689.	2608.
33	26.0	29.4	20411.	7343.	7343.	272.	21.	23.	5.	4.	130.	260.	759.	350.	9686.	2608.
34	27.0	29.4	20422.	7343.	7343.	272.	21.	23.	5.	4.	127.	253.	758.	350.	9678.	2609.
35	27.9	29.4	20398.	7343.	7343.	272.	21.	23.	5.	4.	123.	246.	757.	349.	9690.	2607.
36	28.9	29.4	20398.	7343.	7343.	272.	21.	23.	5.	4.	120.	238.	756.	348.	9692.	2607.
37	30.0	29.4	20411.	7343.	7343.	272.	21.	23.	5.	4.	116.	229.	755.	348.	9684.	2608.
38	30.0	29.4	14680.	5950.	5950.	170.	9.	7.	2.	1.	103.	207.	548.	253.	12877.	2124.
39	30.0	29.4	7890.	3774.	3774.	67.	2.	1.	0.	0.	76.	159.	298.	138.	17682.	1332.
40	30.0	29.4	165.	102.	102.	1.	0.	0.	0.	0.	2.	5.	6.	3.	25104.	33.

DISCHARGE SCHEDULE FOR 1000 MW (E)

PWR70-

PAGE 9

CYCLE NUMBER	DISCHARGE		ISOTOPE PRODUCTION, GRAMS/TONNE							
	DATE	TONNE	KR-85	KR STABL	TC-99	RH103 SUM	RU106	RU STABL	PD STABL	XE STABL
1	1.2	29.4	11.	143.	323.	185.	63.	742.	224.	1969.
2	1.9	29.4	16.	214.	510.	283.	101.	1233.	423.	2967.
3	2.8	29.4	22.	294.	692.	353.	116.	1693.	581.	3956.
4	3.8	29.4	23.	308.	722.	364.	118.	1775.	609.	4130.
5	4.7	29.4	23.	320.	749.	373.	119.	1842.	632.	4276.
6	5.7	29.4	24.	324.	758.	376.	120.	1869.	641.	4334.
7	6.6	29.4	23.	317.	745.	372.	119.	1829.	627.	4247.
8	7.5	29.4	23.	315.	739.	369.	119.	1815.	623.	4217.
9	8.3	29.4	22.	306.	718.	363.	118.	1761.	604.	4101.
10	9.2	29.4	22.	294.	694.	354.	116.	1693.	581.	3956.
11	10.0	29.4	21.	287.	676.	348.	115.	1653.	567.	3868.
12	10.8	29.4	21.	277.	655.	340.	113.	1598.	548.	3752.
13	11.5	29.4	20.	268.	634.	333.	112.	1544.	530.	3636.
14	12.2	29.4	19.	259.	613.	325.	110.	1490.	511.	3519.
15	12.9	29.4	19.	249.	594.	317.	109.	1436.	493.	3403.
16	13.6	29.4	18.	242.	576.	310.	107.	1395.	479.	3316.
17	14.3	29.4	18.	235.	559.	304.	106.	1355.	465.	3228.
18	14.9	29.4	17.	228.	543.	297.	104.	1314.	451.	3141.
19	15.5	29.4	17.	220.	527.	290.	102.	1266.	434.	3036.
20	16.2	29.4	16.	218.	519.	285.	101.	1257.	431.	3011.
21	16.8	29.4	16.	216.	518.	284.	100.	1247.	428.	2983.
22	17.5	29.4	16.	219.	520.	283.	99.	1261.	433.	3008.
23	18.2	29.4	16.	217.	518.	281.	98.	1249.	428.	2976.
24	18.9	29.4	16.	216.	517.	279.	97.	1247.	428.	2967.
25	19.6	29.4	16.	218.	517.	277.	95.	1256.	431.	2979.
26	20.3	29.4	16.	217.	516.	275.	94.	1251.	429.	2963.
27	21.1	29.4	16.	218.	515.	273.	93.	1256.	431.	2967.
28	21.9	29.4	16.	216.	515.	271.	92.	1247.	428.	2941.
29	22.6	29.4	16.	217.	513.	268.	90.	1247.	428.	2934.
30	23.5	29.4	16.	218.	513.	266.	89.	1256.	431.	2945.
31	24.3	29.4	16.	217.	512.	263.	87.	1250.	429.	2925.
32	25.1	29.4	16.	217.	510.	260.	85.	1251.	429.	2921.
33	26.0	29.4	16.	217.	509.	257.	83.	1249.	428.	2908.
34	27.0	29.4	16.	217.	508.	254.	81.	1251.	429.	2904.
35	27.9	29.4	16.	217.	506.	250.	79.	1248.	428.	2891.
36	28.9	29.4	16.	217.	505.	246.	77.	1249.	429.	2884.
37	30.0	29.4	16.	217.	503.	241.	75.	1250.	429.	2877.
38	30.0	29.4	12.	156.	370.	194.	66.	901.	309.	2123.
39	30.0	29.4	6.	84.	204.	122.	47.	486.	167.	1232.
40	30.0	29.4	0.	3.	4.	3.	1.	16.	5.	222.

CYCLE NUMBER	DISCHARGE			ISOTOPE PRODUCTION, GRAMS/TONNE												
	DATE	TONNE	EXPOS MWD/T	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	PM147	CE144	CS137	SR-90	U-235	U-236
1	2.6	67.8	32037.	6457.	6457.	192.	20.	16.	4.	3.	187.	328.	1186.	521.	9737.	2095.
2	3.5	33.9	23546.	8020.	8020.	313.	42.	55.	11.	13.	169.	307.	881.	387.	6346.	2596.
3	4.4	33.9	28564.	8816.	8816.	393.	58.	99.	16.	29.	181.	321.	1062.	467.	4670.	2806.
4	5.5	33.9	25692.	8226.	8226.	353.	45.	57.	11.	13.	175.	314.	958.	421.	7568.	3015.
5	6.4	33.9	26902.	8403.	8403.	373.	49.	66.	13.	17.	177.	317.	1002.	440.	7094.	3080.
6	7.3	33.9	27603.	8521.	8521.	385.	51.	72.	14.	19.	179.	319.	1027.	452.	6845.	3116.
7	8.2	33.9	27222.	8433.	8433.	378.	50.	68.	13.	17.	178.	318.	1014.	446.	6993.	3098.
8	9.1	33.9	25795.	8226.	8226.	353.	45.	59.	12.	14.	175.	314.	962.	423.	7263.	2982.
9	9.9	33.9	25127.	8138.	8138.	340.	44.	56.	11.	13.	173.	312.	938.	412.	7195.	2900.
10	10.8	33.9	24259.	7991.	7991.	324.	41.	52.	11.	12.	171.	310.	906.	399.	7198.	2807.
11	11.5	33.9	23379.	7843.	7843.	309.	39.	47.	10.	10.	169.	307.	875.	385.	7209.	2714.
12	12.3	33.9	22394.	7696.	7696.	291.	36.	43.	9.	9.	166.	303.	839.	369.	7270.	2615.
13	13.0	33.9	21598.	7548.	7548.	277.	34.	39.	9.	8.	164.	300.	810.	356.	7275.	2530.
14	13.7	33.9	20804.	7401.	7401.	264.	32.	36.	8.	7.	161.	296.	781.	343.	7290.	2446.
15	14.4	33.9	19973.	7253.	7253.	249.	29.	32.	7.	6.	158.	292.	750.	330.	7326.	2360.
16	15.0	33.9	19203.	7106.	7106.	237.	28.	29.	7.	5.	155.	288.	722.	318.	7355.	2280.
17	15.6	33.9	18593.	7018.	7018.	227.	26.	27.	6.	5.	152.	283.	699.	308.	7327.	2210.
18	16.3	33.9	18127.	6929.	6929.	219.	25.	25.	6.	4.	149.	278.	682.	300.	7246.	2151.
19	17.0	33.9	17843.	6870.	6870.	214.	24.	25.	6.	4.	146.	273.	671.	295.	7197.	2116.
20	17.6	33.9	17832.	6870.	6870.	214.	24.	25.	6.	4.	145.	269.	671.	295.	7199.	2115.
21	18.3	33.9	17814.	6870.	6870.	214.	24.	24.	6.	4.	143.	266.	670.	295.	7204.	2114.
22	19.0	33.9	17789.	6870.	6870.	213.	24.	24.	6.	4.	142.	262.	668.	294.	7212.	2112.
23	19.7	33.9	17821.	6870.	6870.	214.	24.	24.	6.	4.	140.	258.	669.	294.	7200.	2115.
24	20.5	33.9	17820.	6870.	6870.	214.	24.	24.	6.	4.	138.	254.	669.	294.	7201.	2114.
25	21.2	33.9	17779.	6870.	6870.	213.	24.	24.	6.	4.	136.	250.	667.	293.	7217.	2112.
26	22.0	33.9	17819.	6870.	6870.	214.	24.	24.	6.	4.	134.	246.	668.	294.	7201.	2114.
27	22.8	33.9	17818.	6870.	6870.	214.	24.	24.	6.	4.	132.	241.	667.	294.	7202.	2114.
28	23.6	33.9	17775.	6870.	6870.	213.	24.	24.	6.	4.	130.	236.	665.	293.	7219.	2112.
29	24.4	33.9	17817.	6870.	6870.	214.	24.	24.	6.	4.	128.	232.	666.	293.	7202.	2114.
30	25.3	33.9	17817.	6870.	6870.	214.	24.	24.	6.	4.	125.	226.	666.	293.	7202.	2114.
31	26.2	33.9	17811.	6870.	6870.	214.	24.	24.	6.	4.	122.	220.	665.	292.	7203.	2114.
32	27.1	33.9	17822.	6870.	6870.	214.	24.	24.	6.	4.	120.	215.	664.	292.	7199.	2114.
33	28.1	33.9	17825.	6870.	6870.	214.	24.	24.	6.	4.	117.	208.	664.	292.	7199.	2115.
34	29.1	33.9	17819.	6870.	6870.	214.	24.	24.	6.	4.	113.	201.	662.	291.	7199.	2114.
35	30.0	33.9	17225.	6723.	6723.	205.	23.	22.	5.	4.	109.	193.	640.	281.	7467.	2075.
36	30.0	33.9	13018.	5691.	5691.	142.	12.	8.	2.	1.	97.	178.	488.	215.	9567.	1750.
37	30.0	33.9	8527.	4305.	4305.	81.	4.	2.	1.	0.	79.	151.	322.	142.	12313.	1300.
38	30.0	33.9	3943.	2359.	2359.	28.	0.	0.	0.	0.	47.	95.	151.	66.	15830.	695.

DISCHARGE SCHEDULE FOR 1000 MW (E)

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CYCLE NUMBER	DISCHARGE		ISOTOPE PRODUCTION, GRAMS/TONNE							
	DATE	TONNE	KR-85	KR STABL	TC-99	RH103 SUM	RU106	RU STABL	PD STABL	XE STABL
1	2.6	67.8	23.	328.	797.	412.	122.	2024.	745.	4493.
2	3.5	33.9	18.	240.	597.	337.	111.	1482.	545.	3359.
3	4.4	33.9	21.	293.	716.	384.	119.	1804.	664.	4033.
4	5.5	33.9	19.	264.	648.	358.	115.	1628.	599.	3666.
5	6.4	33.9	20.	276.	677.	369.	116.	1702.	626.	3819.
6	7.3	33.9	20.	283.	693.	375.	117.	1746.	643.	3911.
7	8.2	33.9	20.	278.	684.	372.	117.	1716.	632.	3850.
8	9.1	33.9	19.	264.	651.	359.	115.	1628.	599.	3666.
9	9.9	33.9	19.	257.	635.	352.	114.	1584.	583.	3574.
10	10.8	33.9	18.	247.	614.	344.	112.	1526.	562.	3451.
11	11.5	33.9	18.	240.	593.	335.	111.	1482.	545.	3359.
12	12.3	33.9	17.	228.	569.	325.	109.	1408.	518.	3206.
13	13.0	33.9	16.	221.	550.	317.	108.	1364.	502.	3114.
14	13.7	33.9	16.	214.	531.	308.	106.	1320.	486.	3022.
15	14.4	33.9	15.	205.	510.	299.	104.	1262.	464.	2900.
16	15.0	33.9	15.	197.	491.	291.	102.	1218.	448.	2808.
17	15.6	33.9	14.	191.	476.	283.	100.	1178.	433.	2722.
18	16.3	33.9	14.	185.	464.	276.	98.	1142.	420.	2644.
19	17.0	33.9	14.	184.	457.	272.	96.	1135.	418.	2625.
20	17.6	33.9	14.	183.	457.	270.	95.	1127.	415.	2603.
21	18.3	33.9	14.	184.	456.	269.	94.	1132.	417.	2607.
22	19.0	33.9	14.	182.	455.	267.	93.	1121.	413.	2581.
23	19.7	33.9	14.	182.	455.	266.	92.	1123.	413.	2579.
24	20.5	33.9	14.	182.	455.	264.	91.	1123.	413.	2573.
25	21.2	33.9	13.	182.	453.	262.	90.	1121.	413.	2563.
26	22.0	33.9	13.	183.	453.	261.	88.	1129.	416.	2575.
27	22.8	33.9	13.	182.	453.	259.	87.	1123.	413.	2556.
28	23.6	33.9	13.	183.	451.	256.	85.	1126.	414.	2557.
29	24.4	33.9	13.	183.	451.	255.	84.	1126.	415.	2552.
30	25.3	33.9	13.	182.	451.	252.	82.	1123.	413.	2539.
31	26.2	33.9	13.	183.	450.	249.	80.	1127.	415.	2541.
32	27.1	33.9	13.	183.	449.	247.	79.	1127.	415.	2534.
33	28.1	33.9	13.	182.	448.	243.	76.	1122.	413.	2518.
34	29.1	33.9	13.	182.	447.	240.	74.	1122.	413.	2509.
35	30.0	33.9	13.	176.	432.	231.	71.	1084.	399.	2422.
36	30.0	33.9	10.	133.	331.	190.	64.	820.	302.	1868.
37	30.0	33.9	7.	88.	221.	137.	52.	544.	200.	1291.
38	30.0	33.9	3.	41.	104.	71.	31.	250.	92.	678.

CYCLE NUMBER	DISCHARGE		ISOTOPE PRODUCTION, GRAMS/TONNE													
	DATE	TONNE	EXPOS MWD/T	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	PM147	CE144	CS137	SR-90	U-235	U-236
1	0.8	25.7	9977.	4857.	4857.	100.	4.	2.	1.	0.	113.	245.	377.	186.	11980.	1469.
2	1.4	25.7	16070.	6527.	6527.	196.	12.	13.	3.	2.	155.	328.	604.	298.	9621.	2090.
3	2.0	25.7	22631.	7851.	7851.	313.	25.	37.	7.	7.	182.	372.	849.	392.	7789.	2666.
4	2.7	25.7	23914.	7929.	7929.	344.	24.	33.	7.	6.	186.	380.	896.	414.	10451.	3080.
5	3.3	25.7	24368.	8046.	8046.	353.	26.	36.	7.	7.	188.	382.	913.	421.	9924.	3080.
6	3.9	25.7	23700.	7929.	7929.	339.	24.	34.	7.	6.	186.	378.	889.	410.	9870.	2999.
7	4.5	25.7	22516.	7696.	7696.	315.	22.	29.	6.	5.	181.	371.	845.	390.	10019.	2877.
8	5.1	25.7	21773.	7579.	7579.	300.	21.	27.	6.	5.	179.	366.	818.	377.	10005.	2791.
9	5.6	25.7	21082.	7463.	7463.	286.	20.	25.	5.	4.	176.	361.	792.	366.	9978.	2709.
10	6.2	25.7	20513.	7346.	7346.	275.	19.	23.	5.	4.	174.	357.	771.	356.	9893.	2636.
11	6.7	25.7	20340.	7307.	7307.	272.	18.	23.	5.	4.	173.	355.	765.	353.	9866.	2614.
12	7.3	25.7	20311.	7307.	7307.	271.	18.	23.	5.	4.	173.	355.	764.	353.	9874.	2612.
13	7.8	25.7	20323.	7307.	7307.	271.	18.	23.	5.	4.	173.	355.	764.	353.	9873.	2613.
14	8.4	25.7	20332.	7307.	7307.	271.	18.	23.	5.	4.	173.	355.	765.	353.	9869.	2613.
15	8.9	25.7	20318.	7307.	7307.	271.	18.	23.	5.	4.	173.	355.	764.	353.	9871.	2613.
16	9.5	25.7	20324.	7307.	7307.	271.	18.	23.	5.	4.	173.	355.	764.	353.	9873.	2613.
17	10.0	25.7	20333.	7307.	7307.	271.	18.	23.	5.	4.	173.	355.	765.	353.	9869.	2613.
18	10.6	25.7	20312.	7307.	7307.	271.	18.	23.	5.	4.	173.	355.	764.	353.	9874.	2612.
19	11.1	25.7	20321.	7307.	7307.	271.	18.	23.	5.	4.	173.	355.	764.	353.	9874.	2612.
20	11.7	25.7	20329.	7307.	7307.	271.	18.	23.	5.	4.	173.	355.	765.	353.	9871.	2613.
21	12.2	25.7	20308.	7307.	7307.	271.	18.	23.	5.	4.	173.	355.	764.	353.	9875.	2612.
22	12.8	25.7	20318.	7307.	7307.	271.	18.	23.	5.	4.	173.	355.	764.	353.	9876.	2612.
23	13.3	25.7	20340.	7307.	7307.	272.	18.	23.	5.	4.	173.	355.	765.	353.	9865.	2614.
24	13.9	25.7	20407.	7346.	7346.	273.	19.	23.	5.	4.	173.	356.	767.	354.	9825.	2619.
25	14.4	25.7	20350.	7307.	7307.	272.	19.	23.	5.	4.	173.	355.	765.	353.	9859.	2614.
26	15.0	25.7	20349.	7307.	7307.	272.	18.	23.	5.	4.	173.	355.	765.	353.	9859.	2615.
27	15.5	25.7	20372.	7346.	7346.	272.	18.	23.	5.	4.	172.	354.	766.	354.	9842.	2617.
28	16.1	25.7	20350.	7307.	7307.	272.	18.	23.	5.	4.	171.	351.	765.	353.	9860.	2614.
29	16.7	25.7	20350.	7307.	7307.	272.	18.	23.	5.	4.	169.	348.	765.	353.	9858.	2615.
30	17.3	25.7	20361.	7307.	7307.	272.	18.	23.	5.	4.	168.	344.	765.	353.	9848.	2616.
31	17.9	25.7	20348.	7307.	7307.	272.	18.	23.	5.	4.	166.	341.	764.	353.	9861.	2614.
32	18.5	25.7	20362.	7307.	7307.	272.	18.	23.	5.	4.	165.	337.	764.	353.	9851.	2616.
33	19.1	25.7	20361.	7307.	7307.	272.	18.	23.	5.	4.	163.	334.	764.	353.	9849.	2616.
34	19.7	25.7	20353.	7307.	7307.	272.	18.	23.	5.	4.	162.	330.	764.	352.	9859.	2615.
35	20.3	25.7	20350.	7307.	7307.	272.	18.	23.	5.	4.	160.	326.	763.	352.	9857.	2615.
36	21.0	25.7	20358.	7307.	7307.	272.	18.	23.	5.	4.	158.	322.	763.	352.	9850.	2616.
37	21.7	25.7	20354.	7307.	7307.	272.	18.	23.	5.	4.	156.	317.	762.	352.	9858.	2615.
38	22.3	25.7	20347.	7307.	7307.	272.	18.	23.	5.	4.	154.	313.	762.	351.	9858.	2615.
39	23.0	25.7	20349.	7307.	7307.	272.	18.	23.	5.	4.	152.	308.	761.	351.	9855.	2615.
40	23.8	25.7	20346.	7307.	7307.	272.	18.	23.	5.	4.	150.	303.	761.	351.	9862.	2614.

DISCHARGE SCHEDULE FOR 1000 MW (E)

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CYCLE NUMBER	DISCHARGE		ISOTOPE PRODUCTION, GRAMS/TONNE							
	DATE	TONNE	KR-85	KR STABL	TC-99	RH103 SUM	RU106	RU STABL	PD STABL	XE STABL
1	.8	25.7	9.	115.	262.	157.	57.	595.	179.	1688.
2	1.4	25.7	14.	183.	416.	234.	78.	953.	287.	2484.
3	2.0	25.7	18.	242.	577.	321.	115.	1394.	478.	3358.
4	2.7	25.7	19.	255.	608.	334.	118.	1471.	505.	3525.
5	3.3	25.7	19.	258.	619.	339.	119.	1487.	510.	3558.
6	3.9	25.7	19.	253.	602.	332.	117.	1456.	499.	3491.
7	4.5	25.7	18.	239.	574.	320.	114.	1378.	473.	3325.
8	5.1	25.7	18.	231.	556.	312.	113.	1332.	457.	3225.
9	5.6	25.7	17.	226.	539.	305.	111.	1301.	446.	3159.
10	6.2	25.7	17.	218.	525.	299.	109.	1254.	430.	3059.
11	6.7	25.7	16.	218.	521.	297.	109.	1254.	430.	3059.
12	7.3	25.7	16.	218.	520.	296.	109.	1254.	430.	3059.
13	7.8	25.7	16.	218.	520.	296.	109.	1254.	430.	3059.
14	8.4	25.7	16.	218.	520.	297.	109.	1254.	430.	3059.
15	8.9	25.7	16.	218.	520.	296.	109.	1254.	430.	3059.
16	9.5	25.7	16.	218.	520.	296.	109.	1254.	430.	3059.
17	10.0	25.7	16.	218.	520.	297.	109.	1254.	430.	3059.
18	10.6	25.7	16.	218.	520.	296.	109.	1254.	430.	3059.
19	11.1	25.7	16.	218.	520.	296.	109.	1254.	430.	3059.
20	11.7	25.7	16.	218.	520.	297.	109.	1254.	430.	3059.
21	12.2	25.7	16.	218.	520.	296.	109.	1254.	430.	3059.
22	12.8	25.7	16.	218.	520.	296.	109.	1254.	430.	3059.
23	13.3	25.7	16.	218.	521.	297.	109.	1254.	430.	3059.
24	13.9	25.7	16.	218.	522.	297.	109.	1254.	430.	3059.
25	14.4	25.7	16.	218.	521.	297.	109.	1254.	430.	3059.
26	15.0	25.7	16.	218.	521.	297.	109.	1254.	430.	3059.
27	15.5	25.7	16.	216.	521.	296.	108.	1245.	427.	3036.
28	16.1	25.7	16.	218.	520.	295.	107.	1256.	431.	3054.
29	16.7	25.7	16.	217.	520.	294.	107.	1251.	429.	3038.
30	17.3	25.7	16.	216.	520.	293.	106.	1245.	427.	3019.
31	17.9	25.7	16.	217.	519.	291.	105.	1253.	430.	3029.
32	18.5	25.7	16.	216.	519.	290.	104.	1245.	427.	3006.
33	19.1	25.7	16.	217.	519.	289.	103.	1250.	429.	3011.
34	19.7	25.7	16.	218.	518.	287.	102.	1253.	430.	3012.
35	20.3	25.7	16.	216.	517.	285.	101.	1242.	426.	2982.
36	21.0	25.7	16.	216.	517.	284.	100.	1242.	426.	2976.
37	21.7	25.7	16.	218.	516.	282.	99.	1254.	430.	2995.
38	22.3	25.7	16.	217.	516.	280.	98.	1251.	429.	2982.
39	23.0	25.7	16.	216.	515.	278.	96.	1246.	428.	2964.
40	23.8	25.7	16.	217.	514.	276.	95.	1251.	429.	2967.

CYCLE NUMBER	DISCHARGE		ISOTOPE PRODUCTION, GRAMS/TONNE													
	DATE	TONNE	EXPOS MWD/T	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	PM147	CE144	CS137	SR-90	U-235	U-236
1	1.8	58.5	25898.	5713.	5713.	144.	11.	9.	2.	1.	196.	366.	964.	462.	9872.	1746.
2	2.3	29.2	18808.	7116.	7116.	232.	24.	30.	6.	5.	168.	327.	705.	339.	6996.	2189.
3	2.9	29.3	22548.	7844.	7844.	289.	34.	53.	10.	12.	181.	338.	846.	379.	5536.	2390.
4	3.6	29.3	18920.	7026.	7026.	234.	23.	26.	6.	5.	166.	316.	712.	320.	8103.	2327.
5	4.1	29.3	19437.	7128.	7128.	241.	24.	29.	6.	5.	168.	320.	732.	328.	7696.	2343.
6	4.7	29.3	19617.	7196.	7196.	244.	25.	30.	7.	6.	169.	321.	738.	331.	7420.	2331.
7	5.2	29.3	19055.	7094.	7094.	234.	24.	28.	6.	5.	167.	317.	717.	322.	7419.	2270.
8	5.8	29.3	17861.	6855.	6855.	215.	21.	23.	5.	4.	161.	308.	673.	302.	7651.	2162.
9	6.3	29.3	17677.	6821.	6821.	212.	21.	23.	5.	4.	160.	307.	667.	299.	7506.	2128.
10	6.8	29.3	17424.	6787.	6787.	208.	20.	23.	5.	4.	159.	305.	657.	295.	7385.	2088.
11	7.4	29.3	17337.	6753.	6753.	207.	20.	22.	5.	4.	158.	304.	654.	293.	7418.	2082.
12	7.9	29.3	17276.	6753.	6753.	206.	20.	22.	5.	4.	158.	304.	652.	292.	7443.	2078.
13	8.4	29.3	17307.	6753.	6753.	206.	20.	22.	5.	4.	158.	304.	653.	293.	7425.	2081.
14	9.0	29.3	17317.	6753.	6753.	206.	20.	22.	5.	4.	158.	304.	653.	293.	7420.	2081.
15	9.5	29.3	17307.	6753.	6753.	206.	20.	22.	5.	4.	158.	304.	653.	293.	7427.	2080.
16	10.0	29.3	17305.	6753.	6753.	206.	20.	22.	5.	4.	158.	304.	653.	293.	7429.	2080.
17	10.5	29.3	17306.	6753.	6753.	206.	20.	22.	5.	4.	158.	304.	653.	293.	7426.	2080.
18	11.1	29.3	17311.	6753.	6753.	206.	20.	22.	5.	4.	158.	304.	653.	293.	7422.	2081.
19	11.6	29.3	17307.	6753.	6753.	206.	20.	22.	5.	4.	158.	304.	653.	293.	7427.	2080.
20	12.1	29.3	17310.	6753.	6753.	206.	20.	22.	5.	4.	158.	304.	653.	293.	7427.	2080.
21	12.7	29.3	17305.	6753.	6753.	206.	20.	22.	5.	4.	158.	304.	653.	293.	7426.	2080.
22	13.2	29.3	17309.	6753.	6753.	206.	20.	22.	5.	4.	158.	304.	653.	293.	7423.	2081.
23	13.7	29.3	17308.	6753.	6753.	206.	20.	22.	5.	4.	158.	304.	653.	293.	7427.	2080.
24	14.2	29.3	17311.	6753.	6753.	206.	20.	22.	5.	4.	158.	304.	653.	293.	7427.	2080.
25	14.8	29.3	17306.	6753.	6753.	206.	20.	22.	5.	4.	158.	304.	653.	293.	7426.	2080.
26	15.3	29.3	17311.	6753.	6753.	206.	20.	22.	5.	4.	158.	304.	653.	293.	7422.	2081.
27	15.8	29.3	17309.	6753.	6753.	206.	20.	22.	5.	4.	157.	302.	653.	293.	7426.	2080.
28	16.4	29.3	17311.	6753.	6753.	206.	20.	22.	5.	4.	156.	299.	653.	293.	7427.	2080.
29	16.9	29.3	17306.	6753.	6753.	206.	20.	22.	5.	4.	155.	296.	652.	293.	7426.	2080.
30	17.5	29.3	17308.	6753.	6753.	206.	20.	22.	5.	4.	154.	294.	652.	293.	7423.	2081.
31	18.1	29.3	17309.	6753.	6753.	206.	20.	22.	5.	4.	153.	291.	652.	292.	7427.	2080.
32	18.7	29.3	17312.	6753.	6753.	206.	20.	22.	5.	4.	151.	288.	652.	292.	7426.	2081.
33	19.3	29.3	17306.	6753.	6753.	206.	20.	22.	5.	4.	150.	285.	651.	292.	7425.	2080.
34	19.9	29.3	17310.	6753.	6753.	206.	20.	22.	5.	4.	149.	282.	651.	292.	7423.	2081.
35	20.5	29.3	17308.	6753.	6753.	206.	20.	22.	5.	4.	147.	278.	651.	292.	7427.	2080.
36	21.1	29.3	17312.	6753.	6753.	206.	20.	22.	5.	4.	146.	275.	651.	292.	7426.	2081.
37	21.8	29.3	17307.	6753.	6753.	206.	20.	22.	5.	4.	144.	272.	650.	292.	7426.	2080.
38	22.4	29.3	17307.	6753.	6753.	206.	20.	22.	5.	4.	143.	268.	650.	292.	7423.	2081.
39	23.1	29.3	17309.	6753.	6753.	206.	20.	22.	5.	4.	141.	264.	650.	291.	7427.	2080.
40	23.8	29.3	17311.	6753.	6753.	206.	20.	22.	5.	4.	139.	260.	649.	291.	7427.	2080.

DISCHARGE SCHEDULE FOR 1000 MW(E)

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CYCLE NUMBER	DISCHARGE		ISOTOPE PRODUCTION, GRAMS/TONNE							
	DATE	TONNE	KR-85	KR STABL	TC-99	RH103 SUM	RU106	RU STABL	PD STABL	XE STABL
1	1.8	58.5	21.	286.	660.	352.	102.	1552.	495.	3695.
2	2.3	29.2	16.	209.	486.	277.	88.	1132.	361.	2776.
3	2.9	29.3	18.	235.	576.	334.	114.	1410.	505.	3284.
4	3.6	29.3	15.	199.	487.	292.	105.	1192.	427.	2824.
5	4.1	29.3	15.	201.	500.	298.	107.	1209.	433.	2859.
6	4.7	29.3	15.	204.	504.	301.	107.	1226.	439.	2894.
7	5.2	29.3	15.	199.	490.	294.	105.	1192.	427.	2824.
8	5.8	29.3	14.	187.	461.	279.	102.	1125.	403.	2682.
9	6.3	29.3	14.	185.	456.	277.	101.	1108.	397.	2646.
10	6.8	29.3	14.	182.	450.	274.	101.	1091.	391.	2611.
11	7.4	29.3	14.	182.	448.	273.	100.	1091.	391.	2611.
12	7.9	29.3	14.	179.	446.	272.	100.	1075.	385.	2575.
13	8.4	29.3	14.	182.	447.	272.	100.	1091.	391.	2611.
14	9.0	29.3	14.	182.	447.	272.	100.	1091.	391.	2611.
15	9.5	29.3	14.	182.	447.	272.	100.	1091.	391.	2611.
16	10.0	29.3	14.	182.	447.	272.	100.	1091.	391.	2611.
17	10.5	29.3	14.	182.	447.	272.	100.	1091.	391.	2611.
18	11.1	29.3	14.	182.	447.	272.	100.	1091.	391.	2611.
19	11.6	29.3	14.	182.	447.	272.	100.	1091.	391.	2611.
20	12.1	29.3	14.	182.	447.	272.	100.	1091.	391.	2611.
21	12.7	29.3	14.	182.	447.	272.	100.	1091.	391.	2611.
22	13.2	29.3	14.	182.	447.	272.	100.	1091.	391.	2611.
23	13.7	29.3	14.	182.	447.	272.	100.	1091.	391.	2611.
24	14.2	29.3	14.	182.	447.	272.	100.	1091.	391.	2611.
25	14.8	29.3	14.	182.	447.	272.	100.	1091.	391.	2611.
26	15.3	29.3	14.	182.	447.	272.	100.	1090.	391.	2608.
27	15.8	29.3	14.	182.	447.	271.	99.	1091.	391.	2604.
28	16.4	29.3	14.	182.	447.	271.	99.	1091.	391.	2600.
29	16.9	29.3	14.	182.	446.	270.	98.	1090.	390.	2593.
30	17.5	29.3	14.	181.	446.	269.	97.	1088.	390.	2584.
31	18.1	29.3	14.	181.	446.	268.	97.	1085.	389.	2574.
32	18.7	29.3	14.	180.	445.	267.	96.	1082.	388.	2562.
33	19.3	29.3	14.	179.	445.	266.	95.	1078.	386.	2548.
34	19.9	29.3	14.	181.	445.	265.	94.	1067.	390.	2563.
35	20.5	29.3	14.	180.	444.	264.	93.	1081.	387.	2545.
36	21.1	29.3	14.	181.	444.	262.	92.	1087.	390.	2554.
37	21.8	29.3	14.	180.	444.	261.	91.	1079.	387.	2530.
38	22.4	29.3	13.	180.	443.	260.	90.	1062.	388.	2532.
39	23.1	29.3	13.	181.	443.	258.	89.	1084.	389.	2530.
40	23.8	29.3	13.	181.	443.	257.	88.	1084.	389.	2525.

CYCLE NUMBER	DISCHARGE			ISOTOPE PRODUCTION, GRAMS/TONNE												
	DATE	TONNE	EXPOS MWD/T	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	PM147	CE144	CS137	SR-90	U-235	U-236
1	1.3	29.4	13078.	5745.	5745.	132.	8.	6.	2.	1.	125.	276.	492.	243.	11249.	1854.
2	2.0	29.4	20958.	7513.	7513.	247.	24.	29.	6.	5.	154.	332.	786.	362.	8799.	2631.
3	3.0	29.4	28779.	8737.	8737.	368.	43.	71.	13.	18.	171.	367.	1070.	493.	6793.	3266.
4	4.0	29.4	30018.	8771.	8771.	397.	41.	61.	12.	14.	173.	370.	1114.	514.	9414.	3772.
5	4.9	29.4	31041.	8941.	8941.	497.	44.	68.	13.	17.	175.	373.	1151.	530.	9025.	4639.
6	5.9	29.4	31231.	8975.	8975.	532.	44.	70.	13.	17.	175.	374.	1158.	534.	9001.	4994.
7	6.8	29.4	30660.	8873.	8873.	547.	43.	65.	12.	16.	174.	372.	1138.	524.	9304.	5249.
8	7.7	29.4	30316.	8839.	8839.	559.	42.	63.	12.	15.	174.	371.	1125.	519.	9405.	5447.
9	8.6	29.4	29365.	8703.	8703.	572.	40.	59.	11.	13.	172.	368.	1091.	503.	9417.	5728.
10	9.4	29.4	28365.	8533.	8533.	565.	37.	54.	10.	12.	171.	365.	1055.	486.	9457.	5783.
11	10.3	29.4	27464.	8431.	8431.	556.	35.	50.	10.	11.	169.	362.	1022.	471.	9474.	5801.
12	11.0	29.4	26516.	8261.	8261.	544.	33.	46.	9.	9.	167.	359.	988.	456.	9524.	5792.
13	11.8	29.4	25672.	8125.	8125.	536.	31.	42.	9.	8.	166.	356.	958.	441.	9531.	5829.
14	12.6	29.4	24850.	7989.	7989.	521.	30.	39.	8.	8.	164.	352.	928.	428.	9550.	5767.
15	13.3	29.4	24074.	7887.	7887.	506.	28.	36.	8.	7.	162.	349.	899.	415.	9551.	5693.
16	14.0	29.4	23248.	7751.	7751.	489.	26.	33.	7.	6.	160.	345.	869.	401.	9589.	5604.
17	14.6	29.4	22506.	7615.	7615.	475.	25.	30.	6.	5.	159.	341.	842.	388.	9603.	5542.
18	15.3	29.4	21793.	7479.	7479.	459.	23.	28.	6.	5.	157.	337.	816.	376.	9616.	5436.
19	16.0	29.4	21309.	7411.	7411.	448.	23.	27.	6.	5.	154.	331.	798.	368.	9527.	5341.
20	16.6	29.4	21198.	7377.	7377.	443.	22.	26.	6.	4.	152.	326.	794.	366.	9506.	5286.
21	17.3	29.4	21261.	7411.	7411.	442.	22.	27.	6.	4.	150.	322.	796.	367.	9470.	5263.
22	18.1	29.4	21292.	7411.	7411.	440.	23.	27.	6.	5.	148.	318.	796.	367.	9456.	5216.
23	18.8	29.4	21237.	7411.	7411.	436.	22.	26.	6.	4.	146.	313.	794.	366.	9486.	5168.
24	19.5	29.4	21243.	7411.	7411.	435.	22.	26.	6.	4.	144.	309.	794.	366.	9483.	5143.
25	20.3	29.4	21246.	7411.	7411.	434.	22.	27.	6.	5.	141.	304.	793.	366.	9479.	5132.
26	21.1	29.4	21304.	7411.	7411.	434.	23.	27.	6.	5.	139.	299.	795.	367.	9449.	5115.
27	21.9	29.4	21325.	7411.	7411.	433.	23.	27.	6.	5.	137.	293.	795.	367.	9440.	5095.
28	22.7	29.4	21258.	7411.	7411.	431.	22.	26.	6.	4.	134.	287.	792.	365.	9476.	5079.
29	23.5	29.4	21258.	7411.	7411.	431.	23.	27.	6.	4.	131.	281.	791.	365.	9476.	5073.
30	24.4	29.4	21259.	7411.	7411.	430.	22.	27.	6.	5.	128.	275.	791.	365.	9473.	5066.
31	25.3	29.4	21315.	7411.	7411.	430.	23.	27.	6.	5.	126.	268.	792.	365.	9444.	5060.
32	26.3	29.4	21338.	7411.	7411.	430.	23.	27.	6.	5.	122.	261.	792.	365.	9434.	5054.
33	27.2	29.4	21259.	7411.	7411.	429.	22.	26.	6.	4.	119.	253.	788.	363.	9475.	5046.
34	28.2	29.4	21262.	7411.	7411.	429.	23.	27.	6.	5.	115.	245.	787.	363.	9474.	5043.
35	29.3	29.4	21262.	7411.	7411.	428.	22.	27.	6.	5.	111.	237.	786.	362.	9472.	5040.
36	30.0	29.4	19104.	6969.	6969.	385.	18.	18.	4.	3.	105.	224.	708.	326.	10602.	4890.
37	30.0	29.4	12596.	5304.	5304.	249.	6.	4.	1.	0.	92.	197.	472.	218.	14587.	4320.
38	30.0	29.4	5151.	2618.	2618.	97.	0.	0.	0.	0.	56.	122.	196.	90.	20508.	3396.

DISCHARGE SCHEDULE FOR 1000 MW (E)

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CYCLE NUMBER	DISCHARGE		ISOTOPE PRODUCTION: GRAMS/TONNE							
	DATE	TONNE	KR-85	KR STABL	TC-99	RH103 SUM	RU106	RU STABL	PD STABL	XE STABL
1	1.3	29.4	11.	148.	338.	188.	66.	768.	232.	2039.
2	2.0	29.4	17.	222.	529.	281.	103.	1282.	440.	3083.
3	3.0	29.4	22.	306.	711.	343.	118.	1764.	605.	4118.
4	4.0	29.4	23.	318.	739.	351.	119.	1834.	629.	4269.
5	4.9	29.4	24.	329.	762.	358.	121.	1893.	649.	4395.
6	5.9	29.4	24.	331.	766.	359.	121.	1905.	654.	4421.
7	6.8	29.4	24.	324.	753.	355.	120.	1869.	641.	4345.
8	7.7	29.4	24.	322.	746.	353.	120.	1858.	637.	4320.
9	8.6	29.4	23.	312.	724.	347.	118.	1799.	617.	4193.
10	9.4	29.4	22.	302.	701.	340.	117.	1740.	597.	4067.
11	10.3	29.4	22.	292.	681.	333.	116.	1681.	577.	3941.
12	11.0	29.4	21.	282.	659.	326.	114.	1623.	557.	3815.
13	11.8	29.4	20.	273.	639.	320.	113.	1575.	541.	3714.
14	12.6	29.4	20.	263.	620.	314.	111.	1517.	520.	3587.
15	13.3	29.4	19.	255.	602.	307.	110.	1470.	504.	3486.
16	14.0	29.4	18.	247.	583.	301.	108.	1423.	488.	3385.
17	14.6	29.4	18.	239.	565.	294.	107.	1376.	472.	3284.
18	15.3	29.4	17.	233.	548.	288.	105.	1340.	460.	3209.
19	16.0	29.4	17.	227.	536.	282.	103.	1306.	448.	3129.
20	16.6	29.4	17.	224.	533.	279.	102.	1293.	443.	3094.
21	17.3	29.4	17.	226.	534.	278.	101.	1300.	446.	3105.
22	18.1	29.4	17.	227.	534.	276.	100.	1307.	448.	3112.
23	18.8	29.4	17.	226.	532.	274.	98.	1300.	446.	3091.
24	19.5	29.4	17.	226.	531.	272.	97.	1302.	447.	3090.
25	20.3	29.4	17.	226.	531.	269.	96.	1303.	447.	3083.
26	21.1	29.4	17.	226.	531.	267.	95.	1300.	446.	3072.
27	21.9	29.4	17.	227.	531.	265.	93.	1306.	448.	3075.
28	22.7	29.4	17.	225.	528.	262.	91.	1298.	446.	3053.
29	23.5	29.4	17.	225.	527.	259.	90.	1298.	445.	3044.
30	24.4	29.4	17.	226.	526.	255.	88.	1303.	447.	3047.
31	25.3	29.4	17.	226.	526.	252.	86.	1303.	447.	3040.
32	26.3	29.4	17.	227.	525.	249.	84.	1308.	449.	3041.
33	27.2	29.4	16.	225.	521.	244.	82.	1299.	446.	3014.
34	28.2	29.4	16.	226.	520.	239.	80.	1301.	446.	3008.
35	29.3	29.4	16.	226.	518.	234.	77.	1302.	447.	3002.
36	30.0	29.4	15.	203.	468.	217.	73.	1167.	400.	2704.
37	30.0	29.4	10.	134.	317.	167.	61.	775.	266.	1858.
38	30.0	29.4	4.	55.	134.	84.	35.	318.	109.	877.

CYCLE NUMBER	DISCHARGE			ISOTOPE PRODUCTION, GRAMS/TONNE												
	DATE	TONNE	EXPOS MWD/T	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	PM147	CE144	CS137	SR-90	U-235	U-236
1	2.6	67.8	32056.	6457.	6457.	193.	20.	16.	4.	3.	184.	328.	1187.	521.	9733.	2095.
2	3.5	33.9	23534.	8020.	8020.	313.	42.	55.	11.	13.	168.	307.	880.	387.	6351.	2595.
3	4.4	33.9	28503.	8816.	8816.	392.	58.	99.	16.	29.	179.	321.	1060.	466.	4689.	2804.
4	5.5	33.9	25597.	8197.	8197.	351.	45.	56.	11.	13.	173.	314.	955.	420.	7656.	3016.
5	6.4	33.9	26681.	8374.	8374.	460.	48.	64.	13.	16.	175.	317.	994.	437.	7247.	3904.
6	7.3	33.9	27303.	8462.	8462.	488.	50.	69.	13.	17.	176.	318.	1016.	447.	7044.	4097.
7	8.2	33.9	26947.	8403.	8403.	494.	49.	66.	13.	16.	176.	317.	1004.	441.	7211.	4223.
8	9.1	33.9	25504.	8167.	8167.	474.	44.	56.	11.	13.	172.	313.	952.	418.	7518.	4208.
9	9.9	33.9	24813.	8079.	8079.	469.	43.	53.	11.	12.	171.	311.	927.	407.	7477.	4224.
10	10.7	33.9	24035.	7961.	7961.	486.	41.	49.	10.	11.	169.	309.	898.	395.	7465.	4538.
11	11.4	33.9	23079.	7784.	7784.	474.	38.	45.	10.	10.	166.	306.	864.	380.	7522.	4535.
12	12.2	33.9	22115.	7637.	7637.	458.	35.	40.	9.	8.	164.	302.	829.	364.	7595.	4503.
13	12.9	33.9	21370.	7489.	7489.	442.	33.	37.	8.	7.	161.	299.	801.	352.	7597.	4421.
14	13.6	33.9	20552.	7342.	7342.	426.	31.	33.	8.	6.	159.	295.	771.	339.	7638.	4350.
15	14.2	33.9	19784.	7224.	7224.	420.	29.	30.	7.	6.	156.	291.	743.	327.	7671.	4420.
16	14.9	33.9	19074.	7077.	7077.	405.	27.	27.	7.	5.	153.	288.	717.	316.	7688.	4349.
17	15.5	33.9	18456.	6959.	6959.	391.	26.	25.	6.	4.	151.	283.	694.	306.	7678.	4271.
18	16.2	33.9	18000.	6870.	6870.	379.	25.	24.	6.	4.	148.	277.	677.	298.	7608.	4180.
19	16.8	33.9	17720.	6841.	6841.	372.	24.	23.	6.	4.	145.	273.	667.	293.	7520.	4110.
20	17.5	33.9	17644.	6811.	6811.	372.	24.	23.	6.	4.	143.	269.	664.	292.	7547.	4138.
21	18.2	33.9	17680.	6811.	6811.	371.	24.	23.	6.	4.	142.	266.	665.	292.	7529.	4107.
22	18.9	33.9	17690.	6811.	6811.	368.	24.	23.	6.	4.	140.	262.	665.	292.	7525.	4072.
23	19.6	33.9	17665.	6811.	6811.	365.	24.	23.	6.	4.	139.	259.	664.	292.	7534.	4029.
24	20.3	33.9	17709.	6841.	6841.	364.	24.	23.	6.	4.	137.	255.	665.	292.	7515.	3999.
25	21.0	33.9	17709.	6841.	6841.	365.	24.	23.	6.	4.	135.	251.	664.	292.	7515.	4012.
26	21.8	33.9	17675.	6811.	6811.	363.	24.	23.	6.	4.	133.	246.	663.	292.	7530.	3996.
27	22.6	33.9	17722.	6841.	6841.	363.	24.	23.	6.	4.	131.	242.	664.	292.	7509.	3982.
28	23.4	33.9	17723.	6841.	6841.	362.	24.	23.	6.	4.	129.	237.	663.	292.	7509.	3962.
29	24.2	33.9	17686.	6811.	6811.	360.	24.	23.	6.	4.	127.	232.	662.	291.	7525.	3947.
30	25.1	33.9	17729.	6841.	6841.	361.	24.	23.	6.	4.	124.	227.	663.	291.	7506.	3955.
31	25.9	33.9	17728.	6841.	6841.	361.	24.	23.	6.	4.	122.	222.	662.	291.	7507.	3948.
32	26.9	33.9	17691.	6811.	6811.	359.	24.	23.	6.	4.	119.	216.	660.	290.	7522.	3939.
33	27.8	33.9	17734.	6841.	6841.	360.	24.	23.	6.	4.	116.	210.	661.	290.	7504.	3933.
34	28.8	33.9	17732.	6841.	6841.	359.	24.	23.	6.	4.	113.	203.	660.	290.	7505.	3925.
35	29.8	33.9	17694.	6811.	6811.	359.	24.	23.	6.	4.	109.	196.	657.	289.	7521.	3927.
36	30.0	33.9	14250.	6015.	6015.	288.	15.	11.	3.	1.	100.	183.	533.	234.	9206.	3698.
37	30.0	33.9	9851.	4718.	4718.	196.	6.	3.	1.	0.	85.	161.	371.	164.	11782.	3320.
38	30.0	33.9	5310.	2978.	2978.	102.	1.	0.	0.	0.	58.	116.	202.	89.	15063.	2806.
39	30.0	33.9	758.	501.	501.	14.	0.	0.	0.	0.	11.	23.	29.	13.	19328.	2106.

DISCHARGE SCHEDULE FOR 1000 MW (E)

BWR70-30U

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CYCLE NUMBER	DISCHARGE		ISOTOPE PRODUCTION, GRAMS/TONNE							
	DATE	TONNE	KR-85	KR STABL	TC-99	RH103 SUM	RU106	RU STABL	PD STABL	XE STABL
1	2.6	67.8	23.	327.	796.	408.	122.	2015.	742.	4476.
2	3.5	33.9	18.	241.	596.	334.	111.	1487.	547.	3372.
3	4.4	33.9	21.	292.	713.	380.	119.	1801.	663.	4028.
4	5.5	33.9	19.	262.	645.	354.	115.	1615.	594.	3640.
5	6.4	33.9	20.	274.	671.	364.	116.	1687.	621.	3790.
6	7.3	33.9	20.	278.	685.	369.	117.	1715.	631.	3849.
7	8.2	33.9	20.	276.	677.	366.	116.	1701.	626.	3819.
8	9.1	33.9	19.	262.	643.	353.	114.	1615.	594.	3640.
9	9.9	33.9	19.	255.	626.	346.	113.	1572.	579.	3551.
10	10.7	33.9	18.	246.	608.	339.	112.	1515.	558.	3431.
11	11.4	33.9	17.	236.	585.	330.	110.	1458.	537.	3312.
12	12.2	33.9	17.	227.	562.	320.	109.	1401.	516.	3192.
13	12.9	33.9	16.	218.	544.	312.	107.	1344.	495.	3073.
14	13.6	33.9	16.	211.	524.	303.	105.	1301.	479.	2984.
15	14.2	33.9	15.	204.	505.	295.	104.	1258.	463.	2894.
16	14.9	33.9	15.	195.	488.	287.	102.	1201.	442.	2775.
17	15.5	33.9	14.	189.	472.	280.	100.	1165.	429.	2700.
18	16.2	33.9	14.	186.	461.	273.	98.	1145.	421.	2652.
19	16.9	33.9	14.	182.	454.	269.	96.	1124.	414.	2604.
20	17.5	33.9	13.	181.	452.	267.	95.	1117.	411.	2583.
21	18.2	33.9	14.	182.	452.	266.	94.	1121.	413.	2587.
22	18.9	33.9	13.	182.	452.	265.	93.	1124.	414.	2589.
23	19.6	33.9	13.	180.	451.	263.	92.	1113.	410.	2560.
24	20.3	33.9	13.	182.	451.	262.	91.	1125.	414.	2580.
25	21.0	33.9	13.	182.	451.	260.	90.	1123.	413.	2570.
26	21.8	33.9	13.	181.	450.	258.	88.	1119.	412.	2557.
27	22.6	33.9	13.	182.	450.	256.	87.	1125.	414.	2563.
28	23.4	33.9	13.	181.	449.	254.	86.	1116.	411.	2540.
29	24.2	33.9	13.	181.	448.	252.	84.	1117.	411.	2535.
30	25.1	33.9	13.	181.	448.	250.	83.	1115.	410.	2524.
31	25.9	33.9	13.	181.	447.	247.	81.	1119.	412.	2527.
32	26.9	33.9	13.	182.	446.	244.	79.	1120.	412.	2522.
33	27.8	33.9	13.	181.	446.	241.	77.	1116.	411.	2507.
34	28.8	33.9	13.	181.	444.	238.	75.	1116.	411.	2500.
35	29.8	33.9	13.	182.	442.	234.	72.	1119.	412.	2500.
36	30.0	33.9	11.	146.	360.	201.	66.	903.	332.	2044.
37	30.0	33.9	8.	101.	253.	153.	56.	622.	229.	1456.
38	30.0	33.9	4.	55.	139.	92.	39.	336.	124.	859.
39	30.0	33.9	1.	8.	20.	15.	7.	50.	19.	262.

CYCLE NUMBER	DISCHARGE			ISOTOPE PRODUCTION, GRAMS/TONNE												
	DATE	TONNE	EXPOS MWD/T	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	PM147	CE144	CS137	SR-90	U-235	U-236
1	.9	25.7	10572.	5012.	5012.	98.	4.	3.	1.	0.	111.	255.	399.	197.	11518.	1549.
2	1.4	25.7	17037.	6722.	6722.	187.	14.	16.	4.	2.	146.	338.	640.	316.	9003.	2198.
3	2.1	25.7	23576.	7929.	7929.	284.	27.	43.	8.	9.	165.	378.	884.	408.	7260.	2769.
4	2.8	25.7	24797.	7968.	7968.	309.	25.	38.	7.	7.	168.	385.	929.	428.	9869.	3202.
5	3.5	25.7	25029.	8046.	8046.	377.	26.	40.	8.	8.	168.	386.	937.	432.	9481.	3865.
6	4.1	25.7	24496.	7968.	7968.	392.	25.	38.	7.	7.	167.	383.	918.	423.	9395.	4082.
7	4.7	25.7	23127.	7735.	7735.	388.	23.	32.	6.	6.	164.	375.	868.	400.	9659.	4209.
8	5.3	25.7	22479.	7618.	7618.	391.	22.	30.	6.	5.	162.	371.	844.	389.	9635.	4328.
9	5.8	25.7	21699.	7463.	7463.	399.	20.	28.	6.	5.	160.	365.	815.	376.	9673.	4543.
10	6.4	25.7	21306.	7424.	7424.	399.	20.	27.	5.	5.	159.	362.	801.	369.	9536.	4585.
11	7.0	25.7	21152.	7385.	7385.	400.	20.	26.	5.	4.	158.	361.	795.	367.	9606.	4632.
12	7.6	25.7	21250.	7424.	7424.	405.	20.	26.	5.	4.	158.	362.	799.	368.	9558.	4693.
13	8.1	25.7	21170.	7385.	7385.	410.	20.	26.	5.	4.	158.	361.	796.	367.	9604.	4786.
14	8.7	25.7	21262.	7424.	7424.	413.	20.	26.	5.	5.	158.	362.	799.	369.	9562.	4812.
15	9.3	25.7	21194.	7385.	7385.	413.	20.	26.	5.	4.	158.	362.	796.	367.	9599.	4829.
16	9.9	25.7	21181.	7385.	7385.	415.	20.	26.	5.	4.	158.	362.	796.	367.	9612.	4856.
17	10.4	25.7	21187.	7385.	7385.	418.	20.	26.	5.	4.	158.	362.	796.	367.	9610.	4900.
18	11.0	25.7	21141.	7385.	7385.	418.	19.	26.	5.	4.	158.	361.	795.	367.	9641.	4909.
19	11.6	25.7	21234.	7385.	7385.	420.	20.	26.	5.	4.	158.	362.	798.	368.	9594.	4923.
20	12.2	25.7	21153.	7385.	7385.	419.	19.	26.	5.	4.	158.	361.	795.	367.	9642.	4931.
21	12.8	25.7	21270.	7424.	7424.	423.	20.	26.	5.	4.	158.	362.	799.	369.	9587.	4958.
22	13.3	25.7	21199.	7385.	7385.	422.	20.	26.	5.	4.	158.	362.	797.	368.	9627.	4958.
23	13.9	25.7	21300.	7424.	7424.	424.	20.	27.	5.	5.	158.	362.	800.	369.	9582.	4971.
24	14.5	25.7	21238.	7385.	7385.	423.	20.	26.	5.	4.	158.	362.	798.	368.	9615.	4971.
25	15.0	25.7	21230.	7385.	7385.	424.	20.	26.	5.	4.	158.	362.	798.	368.	9626.	4984.
26	15.6	25.7	21238.	7385.	7385.	424.	20.	26.	5.	4.	157.	360.	798.	368.	9622.	4985.
27	16.2	25.7	21197.	7385.	7385.	424.	20.	26.	5.	4.	156.	356.	796.	367.	9648.	4988.
28	16.8	25.7	21273.	7424.	7424.	425.	20.	26.	5.	4.	154.	353.	799.	368.	9606.	4993.
29	17.4	25.7	21188.	7385.	7385.	424.	20.	26.	5.	4.	153.	349.	795.	367.	9652.	4993.
30	18.1	25.7	21298.	7424.	7424.	426.	20.	26.	5.	5.	151.	346.	799.	369.	9595.	5001.
31	18.7	25.7	21214.	7385.	7385.	424.	20.	26.	5.	4.	149.	341.	796.	367.	9638.	4997.
32	19.3	25.7	21314.	7424.	7424.	427.	20.	27.	5.	5.	147.	338.	799.	369.	9588.	5006.
33	20.0	25.7	21241.	7385.	7385.	425.	20.	26.	5.	4.	145.	333.	796.	367.	9624.	5001.
34	20.7	25.7	21231.	7385.	7385.	425.	20.	26.	5.	4.	143.	329.	795.	367.	9632.	5004.
35	21.4	25.7	21231.	7385.	7385.	425.	20.	26.	5.	4.	141.	324.	795.	367.	9628.	5002.
36	22.1	25.7	21205.	7385.	7385.	425.	20.	26.	5.	4.	139.	319.	793.	366.	9645.	5004.
37	22.8	25.7	21269.	7424.	7424.	426.	20.	26.	5.	4.	137.	314.	795.	367.	9608.	5007.
38	23.5	25.7	21184.	7385.	7385.	424.	20.	26.	5.	4.	134.	308.	792.	365.	9654.	5002.
39	24.3	25.7	21289.	7424.	7424.	426.	20.	26.	5.	4.	132.	303.	795.	366.	9600.	5008.
40	25.1	25.7	21214.	7385.	7385.	425.	20.	26.	5.	4.	129.	297.	792.	365.	9638.	5004.

DISCHARGE SCHEDULE FOR 1000 MW(E)

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CYCLE NUMBER	DISCHARGE		ISOTOPE PRODUCTION, GRAMS/TONNE							
	DATE	TONNE	KR-85	KR STABL	TC-99	RH103 SUM	RU106	RU STABL	PD STABL	XE STABL
1	.9	25.7	9.	121.	275.	158.	59.	629.	189.	1786.
2	1.4	25.7	15.	192.	435.	229.	81.	999.	301.	2611.
3	2.1	25.7	19.	251.	590.	303.	117.	1448.	497.	3499.
4	2.8	25.7	20.	264.	619.	312.	120.	1518.	521.	3650.
5	3.5	25.7	20.	266.	624.	314.	120.	1530.	525.	3675.
6	4.1	25.7	20.	259.	612.	310.	119.	1495.	513.	3600.
7	4.7	25.7	19.	245.	580.	299.	116.	1413.	485.	3424.
8	5.3	25.7	18.	239.	564.	293.	114.	1378.	473.	3349.
9	5.8	25.7	17.	231.	546.	287.	112.	1331.	457.	3248.
10	6.4	25.7	17.	227.	537.	283.	111.	1308.	449.	3198.
11	7.0	25.7	17.	225.	533.	282.	111.	1296.	445.	3173.
12	7.6	25.7	17.	225.	535.	283.	111.	1296.	445.	3173.
13	8.1	25.7	17.	225.	533.	282.	111.	1296.	445.	3173.
14	8.7	25.7	17.	227.	536.	283.	111.	1308.	449.	3198.
15	9.3	25.7	17.	225.	534.	282.	111.	1296.	445.	3173.
16	9.9	25.7	17.	225.	534.	282.	111.	1296.	445.	3173.
17	10.4	25.7	17.	225.	534.	282.	111.	1296.	445.	3173.
18	11.0	25.7	17.	225.	533.	282.	111.	1296.	445.	3173.
19	11.6	25.7	17.	225.	535.	282.	111.	1296.	445.	3173.
20	12.2	25.7	17.	225.	533.	282.	111.	1296.	445.	3173.
21	12.8	25.7	17.	227.	536.	283.	111.	1308.	449.	3198.
22	13.3	25.7	17.	225.	534.	282.	111.	1296.	445.	3173.
23	13.9	25.7	17.	227.	536.	283.	111.	1308.	449.	3198.
24	14.5	25.7	17.	225.	535.	282.	111.	1296.	445.	3173.
25	15.0	25.7	17.	225.	535.	282.	111.	1296.	445.	3173.
26	15.6	25.7	17.	225.	535.	282.	111.	1296.	445.	3168.
27	16.2	25.7	17.	225.	533.	280.	110.	1298.	445.	3166.
28	16.8	25.7	17.	225.	534.	279.	109.	1298.	445.	3161.
29	17.4	25.7	17.	225.	532.	276.	108.	1298.	445.	3153.
30	18.1	25.7	17.	227.	534.	276.	107.	1307.	448.	3166.
31	18.7	25.7	17.	226.	531.	273.	106.	1303.	447.	3152.
32	19.3	25.7	17.	227.	533.	272.	105.	1309.	449.	3158.
33	20.0	25.7	17.	226.	531.	269.	104.	1303.	447.	3136.
34	20.7	25.7	17.	225.	530.	267.	102.	1296.	445.	3115.
35	21.4	25.7	17.	225.	529.	265.	101.	1297.	445.	3110.
36	22.1	25.7	17.	225.	527.	262.	100.	1296.	445.	3100.
37	22.8	25.7	17.	226.	528.	260.	99.	1302.	447.	3105.
38	23.5	25.7	17.	225.	525.	257.	97.	1296.	445.	3085.
39	24.3	25.7	17.	227.	526.	255.	96.	1305.	448.	3097.
40	25.1	25.7	17.	225.	523.	252.	94.	1294.	444.	3065.

CYCLE NUMBER	DISCHARGE			ISOTOPE PRODUCTION, GRAMS/TONNE												
	DATE	TONNE	EXPOS MWD/T	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	PM147	CE144	CS137	SR-90	U-235	U-236
1	1.8	58.5	25923.	5713.	5713.	144.	11.	9.	2.	1.	180.	366.	965.	463.	9866.	1747.
2	2.3	29.2	18818.	7116.	7116.	232.	24.	30.	6.	5.	157.	327.	705.	339.	6992.	2190.
3	2.9	29.3	22532.	7844.	7844.	289.	34.	53.	10.	12.	167.	338.	845.	379.	5542.	2389.
4	3.6	29.3	18911.	7026.	7026.	234.	23.	26.	6.	4.	155.	316.	712.	319.	8175.	2333.
5	4.1	29.3	19346.	7128.	7128.	307.	24.	28.	6.	5.	157.	319.	728.	327.	7824.	3053.
6	4.7	29.3	19524.	7162.	7162.	323.	25.	30.	7.	5.	157.	320.	735.	330.	7571.	3183.
7	5.2	29.3	18995.	7060.	7060.	324.	23.	28.	6.	5.	155.	317.	715.	321.	7586.	3258.
8	5.8	29.3	17819.	6821.	6821.	309.	21.	23.	5.	4.	151.	308.	672.	301.	7852.	3251.
9	6.3	29.3	17672.	6821.	6821.	304.	21.	23.	5.	4.	150.	307.	666.	299.	7718.	3196.
10	6.8	29.3	17418.	6787.	6787.	324.	20.	22.	5.	4.	149.	305.	657.	295.	7625.	3489.
11	7.4	29.3	17318.	6753.	6753.	327.	20.	22.	5.	4.	148.	304.	653.	293.	7665.	3542.
12	7.9	29.3	17245.	6719.	6719.	327.	20.	21.	5.	3.	148.	304.	651.	292.	7700.	3573.
13	8.4	29.3	17272.	6719.	6719.	328.	20.	21.	5.	4.	148.	304.	652.	292.	7686.	3571.
14	8.9	29.3	17289.	6719.	6719.	326.	20.	21.	5.	4.	148.	304.	652.	293.	7680.	3548.
15	9.5	29.3	17264.	6719.	6719.	335.	20.	21.	5.	3.	148.	304.	651.	292.	7698.	3681.
16	10.0	29.3	17263.	6719.	6719.	337.	20.	21.	5.	3.	148.	304.	651.	292.	7703.	3705.
17	10.5	29.3	17262.	6719.	6719.	338.	20.	21.	5.	4.	148.	304.	651.	292.	7703.	3720.
18	11.1	29.3	17278.	6719.	6719.	338.	20.	21.	5.	3.	148.	304.	652.	292.	7697.	3721.
19	11.6	29.3	17278.	6719.	6719.	337.	20.	21.	5.	3.	148.	304.	652.	292.	7704.	3710.
20	12.1	29.3	17275.	6719.	6719.	341.	20.	21.	5.	4.	148.	304.	652.	292.	7709.	3771.
21	12.6	29.3	17270.	6719.	6719.	342.	20.	21.	5.	4.	148.	304.	651.	292.	7712.	3782.
22	13.2	29.3	17284.	6719.	6719.	343.	20.	21.	5.	4.	148.	304.	652.	292.	7708.	3790.
23	13.7	29.3	17286.	6719.	6719.	343.	20.	21.	5.	3.	148.	304.	652.	293.	7712.	3791.
24	14.2	29.3	17301.	6719.	6719.	343.	20.	21.	5.	4.	148.	304.	653.	293.	7709.	3787.
25	14.7	29.3	17300.	6753.	6753.	345.	20.	22.	5.	4.	148.	304.	653.	293.	7711.	3815.
26	15.3	29.3	17303.	6753.	6753.	345.	20.	21.	5.	4.	148.	304.	653.	293.	7711.	3821.
27	15.8	29.3	17309.	6753.	6753.	345.	20.	21.	5.	4.	147.	302.	653.	293.	7713.	3825.
28	16.4	29.3	17310.	6753.	6753.	346.	20.	21.	5.	4.	146.	299.	653.	293.	7717.	3826.
29	16.9	29.3	17315.	6753.	6753.	346.	20.	22.	5.	4.	145.	296.	653.	293.	7713.	3826.
30	17.5	29.3	17312.	6753.	6753.	346.	20.	21.	5.	4.	144.	294.	652.	293.	7712.	3826.
31	18.1	29.3	17308.	6753.	6753.	345.	20.	21.	5.	4.	143.	291.	652.	292.	7716.	3826.
32	18.6	29.3	17313.	6753.	6753.	346.	20.	21.	5.	4.	141.	288.	652.	292.	7715.	3826.
33	19.2	29.3	17316.	6753.	6753.	346.	20.	22.	5.	4.	140.	285.	652.	292.	7712.	3826.
34	19.8	29.3	17311.	6753.	6753.	346.	20.	21.	5.	4.	139.	282.	651.	292.	7714.	3826.
35	20.5	29.3	17310.	6753.	6753.	346.	20.	21.	5.	4.	137.	279.	651.	292.	7715.	3826.
36	21.1	29.3	17305.	6753.	6753.	345.	20.	21.	5.	4.	135.	275.	651.	292.	7719.	3825.
37	21.7	29.3	17313.	6753.	6753.	346.	20.	22.	5.	4.	134.	272.	651.	292.	7714.	3826.
38	22.4	29.3	17308.	6753.	6753.	345.	20.	21.	5.	4.	132.	268.	650.	291.	7715.	3826.
39	23.1	29.3	17313.	6753.	6753.	346.	20.	21.	5.	4.	130.	264.	650.	291.	7714.	3826.
40	23.7	29.3	17309.	6753.	6753.	346.	20.	21.	5.	4.	129.	260.	649.	291.	7717.	3826.

DISCHARGE SCHEDULE FOR 1000 MW(E)

BWR80-30U

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CYCLE NUMBER	DISCHARGE		ISOTOPE PRODUCTION, GRAMS/TONNE							
	DATE	TONNE	KR-85	KR STABL	TC-99	RH103 SUM	RU106	RU STABL	PD STABL	XE STABL
1	1.8	53.5	21.	287.	652.	330.	102.	1556.	496.	3720.
2	2.3	29.2	16.	210.	482.	264.	88.	1138.	362.	2806.
3	2.9	29.3	17.	235.	570.	315.	114.	1412.	506.	3305.
4	3.6	29.3	15.	197.	483.	278.	105.	1181.	423.	2818.
5	4.1	29.3	15.	201.	493.	282.	106.	1208.	433.	2875.
6	4.7	29.3	15.	204.	496.	284.	107.	1222.	438.	2904.
7	5.2	29.3	15.	197.	485.	279.	105.	1181.	423.	2818.
8	5.8	29.3	14.	185.	456.	266.	102.	1113.	399.	2675.
9	6.3	29.3	14.	183.	452.	264.	101.	1100.	394.	2646.
10	6.8	29.3	14.	181.	446.	261.	101.	1086.	389.	2617.
11	7.4	29.3	14.	181.	444.	260.	100.	1086.	389.	2617.
12	7.9	29.3	14.	179.	442.	259.	100.	1072.	384.	2589.
13	8.4	29.3	14.	181.	443.	259.	100.	1086.	389.	2617.
14	8.9	29.3	14.	181.	443.	260.	100.	1086.	389.	2617.
15	9.5	29.3	14.	181.	442.	259.	100.	1086.	389.	2617.
16	10.0	29.3	14.	181.	442.	259.	100.	1086.	389.	2617.
17	10.5	29.3	14.	181.	442.	259.	100.	1086.	389.	2617.
18	11.1	29.3	14.	181.	443.	259.	100.	1086.	389.	2617.
19	11.6	29.3	14.	181.	443.	259.	100.	1086.	389.	2617.
20	12.1	29.3	14.	181.	443.	259.	100.	1086.	389.	2617.
21	12.6	29.3	14.	181.	442.	259.	100.	1086.	389.	2617.
22	13.2	29.3	14.	181.	443.	260.	100.	1086.	389.	2617.
23	13.7	29.3	14.	181.	443.	260.	100.	1086.	389.	2617.
24	14.2	29.3	14.	181.	443.	260.	100.	1086.	389.	2617.
25	14.7	29.3	14.	181.	443.	260.	100.	1086.	389.	2617.
26	15.3	29.3	14.	181.	443.	260.	100.	1085.	389.	2616.
27	15.8	29.3	14.	180.	443.	259.	100.	1083.	388.	2606.
28	16.4	29.3	14.	180.	443.	258.	99.	1080.	387.	2594.
29	16.9	29.3	14.	179.	443.	257.	98.	1076.	386.	2581.
30	17.5	29.3	14.	181.	442.	256.	97.	1084.	389.	2594.
31	18.1	29.3	14.	180.	442.	255.	97.	1079.	387.	2577.
32	18.6	29.3	14.	181.	442.	254.	96.	1085.	389.	2585.
33	19.2	29.3	14.	180.	441.	252.	95.	1078.	386.	2565.
34	19.8	29.3	14.	180.	441.	251.	94.	1082.	388.	2568.
35	20.5	29.3	14.	181.	440.	250.	93.	1084.	388.	2567.
36	21.1	29.3	14.	181.	440.	248.	92.	1085.	389.	2565.
37	21.7	29.3	13.	181.	440.	247.	91.	1085.	389.	2559.
38	22.4	29.3	13.	181.	439.	245.	90.	1084.	388.	2550.
39	23.1	29.3	13.	180.	439.	244.	89.	1080.	387.	2537.
40	23.7	29.3	13.	179.	438.	242.	88.	1076.	386.	2521.

CYCLE NUMBER	DISCHARGE			ISOTOPE PRODUCTION, GRAMS/TONNE												
	DATE	TONNE	EXPOS MWD/T	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	PM147	CE144	CS137	SR-90	U-235	U-236
1	-1.0	117.7	0.	0.	-29293.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	1.1	29.4	11563.	19276.	-25667.	69.	113.	219.	24.	43.	108.	199.	449.	128.	4774.	424.
3	1.8	29.4	18515.	20364.	-26347.	119.	181.	380.	44.	113.	140.	249.	715.	194.	3864.	583.
4	2.7	29.4	26981.	22778.	-21826.	174.	281.	613.	72.	242.	163.	283.	1033.	280.	3155.	694.
5	3.8	29.4	29275.	31550.	31550.	173.	418.	745.	94.	291.	168.	289.	1118.	303.	3573.	633.
6	4.6	29.4	29993.	33453.	33453.	177.	487.	905.	109.	363.	169.	291.	1145.	310.	3564.	635.
7	5.6	29.4	31657.	34133.	34133.	185.	519.	1035.	122.	432.	171.	294.	1206.	326.	3453.	652.
8	6.6	29.4	31075.	32434.	32434.	181.	483.	1115.	121.	463.	171.	293.	1184.	321.	3363.	662.
9	7.5	29.4	29640.	9009.	9009.	475.	43.	60.	12.	14.	168.	290.	1132.	306.	9972.	3645.
10	8.3	29.4	28607.	8771.	8771.	446.	39.	54.	11.	12.	166.	288.	1093.	296.	9884.	3543.
11	9.1	29.4	27431.	8533.	8533.	419.	36.	48.	10.	10.	164.	285.	1050.	284.	9913.	3425.
12	9.9	29.4	26598.	8431.	8431.	401.	34.	45.	9.	9.	162.	282.	1019.	276.	9895.	3329.
13	10.7	29.4	25742.	8261.	8261.	382.	32.	42.	9.	8.	161.	280.	987.	267.	9903.	3233.
14	11.4	29.4	24904.	8125.	8125.	364.	30.	38.	8.	7.	159.	277.	955.	259.	9914.	3140.
15	12.2	29.4	24029.	7989.	7989.	346.	28.	35.	7.	7.	157.	274.	923.	250.	9953.	3045.
16	12.8	29.4	23250.	7853.	7853.	330.	27.	32.	7.	6.	155.	271.	894.	242.	9965.	2957.
17	13.5	29.4	22516.	7717.	7717.	315.	25.	29.	6.	5.	152.	268.	866.	235.	9967.	2873.
18	14.2	29.4	21799.	7581.	7581.	300.	24.	27.	6.	5.	150.	265.	839.	227.	9970.	2791.
19	14.8	29.4	21007.	7445.	7445.	285.	22.	24.	5.	4.	148.	261.	809.	219.	10023.	2705.
20	15.4	29.4	20460.	7343.	7343.	274.	21.	23.	5.	4.	146.	258.	789.	214.	9963.	2637.
21	16.0	29.4	20079.	7275.	7275.	267.	20.	22.	5.	4.	143.	254.	774.	210.	9860.	2584.
22	16.7	29.4	20047.	7275.	7275.	266.	20.	22.	5.	4.	142.	251.	772.	209.	9874.	2581.
23	17.4	29.4	20059.	7275.	7275.	266.	20.	22.	5.	4.	140.	248.	773.	209.	9869.	2582.
24	18.0	29.4	20062.	7275.	7275.	266.	20.	22.	5.	4.	139.	245.	772.	209.	9864.	2582.
25	18.7	29.4	20053.	7275.	7275.	266.	20.	22.	5.	4.	137.	242.	772.	209.	9871.	2582.
26	19.4	29.4	20069.	7275.	7275.	266.	20.	22.	5.	4.	136.	238.	772.	209.	9862.	2583.
27	20.1	29.4	19969.	7241.	7241.	265.	20.	22.	5.	3.	134.	235.	768.	208.	9911.	2576.
28	20.8	29.4	20028.	7275.	7275.	266.	20.	22.	5.	3.	132.	231.	769.	208.	9885.	2580.
29	21.6	29.4	20037.	7275.	7275.	266.	20.	22.	5.	4.	130.	228.	769.	208.	9879.	2581.
30	22.3	29.4	20027.	7275.	7275.	266.	20.	22.	5.	4.	128.	224.	768.	208.	9882.	2580.
31	23.1	29.4	20051.	7275.	7275.	266.	20.	22.	5.	4.	126.	220.	769.	208.	9872.	2582.
32	24.0	29.4	20053.	7275.	7275.	266.	20.	22.	5.	4.	124.	215.	768.	208.	9870.	2582.
33	24.8	29.4	20053.	7275.	7275.	266.	20.	22.	5.	4.	121.	211.	768.	208.	9870.	2582.
34	25.6	29.4	20066.	7275.	7275.	266.	20.	22.	5.	4.	119.	206.	767.	208.	9864.	2583.
35	26.6	29.4	20065.	7275.	7275.	266.	20.	22.	5.	4.	116.	200.	767.	208.	9862.	2583.
36	27.5	29.4	20059.	7275.	7275.	266.	20.	22.	5.	4.	113.	195.	766.	207.	9869.	2582.
37	28.4	29.4	20073.	7275.	7275.	266.	20.	22.	5.	4.	110.	189.	765.	207.	9860.	2583.
38	29.4	29.4	19966.	7241.	7241.	264.	20.	22.	5.	3.	107.	183.	760.	206.	9911.	2576.
39	30.0	29.4	17416.	6663.	6663.	219.	15.	13.	3.	2.	100.	172.	665.	180.	11287.	2371.
40	30.0	29.4	11185.	4930.	4930.	115.	5.	3.	1.	0.	83.	148.	432.	117.	15217.	1745.

DISCHARGE SCHEDULE FOR 1000 MW (E)

LWR70- 4PU

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CYCLE NUMBER	DISCHARGE		ISOTOPE PRODUCTION, GRAMS/TONNE							
	DATE	TONNE	KR-85	KR STABL	TC-99	RH103 SUM	RU106	RU STABL	PD STABL	XE STABL
1	-1.0	117.7	0.	0.	0.	0.	0.	0.	0.	0.
2	1.1	29.4	6.	77.	296.	239.	144.	864.	456.	1885.
3	1.8	29.4	9.	116.	466.	353.	198.	1405.	759.	2833.
4	2.7	29.4	12.	168.	666.	460.	235.	2040.	1101.	3960.
5	3.8	29.4	13.	182.	719.	485.	242.	2211.	1193.	4264.
6	4.6	29.4	14.	187.	735.	492.	244.	2262.	1221.	4355.
7	5.6	29.4	14.	197.	773.	509.	248.	2382.	1286.	4569.
8	6.6	29.4	14.	194.	760.	503.	247.	2348.	1267.	4508.
9	7.5	29.4	14.	184.	727.	488.	243.	2228.	1203.	4295.
10	8.3	29.4	13.	178.	704.	478.	240.	2160.	1166.	4173.
11	9.1	29.4	13.	171.	676.	465.	236.	2074.	1119.	4020.
12	9.9	29.4	12.	165.	657.	456.	234.	2005.	1082.	3899.
13	10.7	29.4	12.	160.	637.	446.	231.	1937.	1045.	3777.
14	11.4	29.4	12.	156.	618.	436.	228.	1885.	1018.	3685.
15	12.2	29.4	11.	150.	597.	425.	224.	1817.	981.	3564.
16	12.8	29.4	11.	144.	579.	416.	221.	1748.	944.	3442.
17	13.5	29.4	11.	140.	561.	407.	218.	1697.	916.	3350.
18	14.2	29.4	10.	136.	544.	397.	215.	1645.	888.	3259.
19	14.8	29.4	10.	132.	526.	387.	211.	1594.	860.	3168.
20	15.4	29.4	10.	127.	513.	379.	208.	1538.	830.	3067.
21	16.0	29.4	9.	125.	503.	372.	205.	1511.	816.	3014.
22	16.7	29.4	9.	125.	502.	370.	203.	1518.	819.	3019.
23	17.4	29.4	9.	126.	502.	368.	201.	1522.	821.	3021.
24	18.0	29.4	9.	124.	501.	366.	199.	1508.	814.	2990.
25	18.7	29.4	9.	125.	501.	364.	196.	1509.	814.	2986.
26	19.4	29.4	9.	126.	500.	362.	194.	1523.	822.	3005.
27	20.1	29.4	9.	124.	497.	358.	191.	1505.	812.	2966.
28	20.8	29.4	9.	125.	498.	357.	189.	1515.	817.	2976.
29	21.6	29.4	9.	124.	498.	354.	187.	1507.	813.	2956.
30	22.3	29.4	9.	125.	497.	351.	184.	1511.	815.	2956.
31	23.1	29.4	9.	125.	497.	348.	181.	1511.	816.	2950.
32	24.0	29.4	9.	124.	496.	345.	178.	1508.	814.	2937.
33	24.8	29.4	9.	125.	495.	342.	175.	1515.	818.	2941.
34	25.6	29.4	9.	125.	494.	338.	171.	1517.	819.	2937.
35	26.6	29.4	9.	125.	493.	334.	167.	1513.	817.	2922.
36	27.5	29.4	9.	125.	492.	329.	163.	1517.	819.	2920.
37	28.4	29.4	9.	125.	491.	325.	159.	1514.	817.	2906.
38	29.4	29.4	9.	124.	487.	318.	154.	1503.	811.	2879.
39	30.0	29.4	8.	109.	428.	289.	144.	1318.	711.	2542.
40	30.0	29.4	5.	70.	281.	212.	118.	847.	457.	1702.

CYCLE NUMBER	DISCHARGE			ISOTOPE PRODUCTION, GRAMS/TONNE												
	DATE	TONNE	EXPOS MWD/T	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	PM147	CE144	CS137	SR-90	U-235	U-236
1	-1.0	102.9	0.	0.	-25567.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	.8	25.7	10140.	18300.	-18494.	60.	82.	184.	17.	32.	103.	192.	395.	112.	4942.	392.
3	1.3	25.7	15836.	19155.	-18222.	100.	128.	309.	33.	81.	138.	252.	614.	174.	4111.	538.
4	2.0	25.7	22467.	20639.	-17452.	145.	189.	477.	54.	165.	162.	284.	869.	221.	3407.	653.
5	2.7	25.7	23724.	27674.	-6491.	140.	263.	565.	66.	190.	166.	290.	916.	233.	3825.	590.
6	3.3	25.7	24287.	28840.	28840.	145.	305.	693.	78.	241.	167.	292.	938.	238.	3784.	596.
7	3.9	25.7	23212.	29618.	29618.	137.	311.	728.	78.	243.	164.	287.	897.	228.	3903.	576.
8	4.5	25.7	22708.	30239.	30239.	131.	310.	786.	80.	256.	162.	285.	878.	223.	3952.	565.
9	5.1	25.7	21844.	27208.	27208.	127.	279.	776.	79.	249.	159.	280.	845.	215.	3818.	584.
10	5.6	25.7	20777.	7502.	7502.	284.	20.	24.	5.	4.	156.	275.	805.	204.	10303.	2682.
11	6.2	25.7	20265.	7346.	7346.	272.	18.	23.	5.	4.	154.	272.	785.	199.	10082.	2616.
12	6.7	25.7	20071.	7268.	7268.	267.	18.	22.	5.	3.	153.	270.	778.	198.	10010.	2594.
13	7.3	25.7	19939.	7229.	7229.	264.	18.	21.	5.	3.	152.	270.	773.	196.	10069.	2585.
14	7.8	25.7	19995.	7268.	7268.	266.	18.	22.	5.	3.	153.	270.	775.	197.	10043.	2588.
15	8.3	25.7	20017.	7268.	7268.	266.	18.	22.	5.	3.	153.	270.	776.	197.	10036.	2590.
16	8.9	25.7	19987.	7268.	7268.	265.	18.	22.	5.	3.	153.	270.	775.	197.	10046.	2588.
17	9.4	25.7	20004.	7268.	7268.	266.	18.	22.	5.	3.	153.	270.	775.	197.	10035.	2589.
18	10.0	25.7	20009.	7268.	7268.	266.	18.	22.	5.	3.	153.	270.	775.	197.	10040.	2589.
19	10.5	25.7	19998.	7268.	7268.	266.	18.	22.	5.	3.	153.	270.	775.	197.	10042.	2588.
20	11.0	25.7	19920.	7229.	7229.	264.	18.	21.	5.	3.	152.	269.	772.	196.	10076.	2583.
21	11.6	25.7	19977.	7268.	7268.	265.	18.	21.	5.	3.	152.	270.	774.	197.	10054.	2587.
22	12.1	25.7	19993.	7268.	7268.	265.	18.	22.	5.	3.	153.	270.	775.	197.	10047.	2588.
23	12.7	25.7	19976.	7268.	7268.	265.	18.	22.	5.	3.	152.	270.	774.	197.	10050.	2587.
24	13.2	25.7	19992.	7268.	7268.	266.	18.	22.	5.	3.	153.	270.	775.	197.	10044.	2588.
25	13.8	25.7	20013.	7268.	7268.	266.	18.	22.	5.	3.	153.	270.	776.	197.	10038.	2589.
26	14.3	25.7	19978.	7268.	7268.	265.	18.	22.	5.	3.	152.	270.	774.	197.	10050.	2587.
27	14.8	25.7	19995.	7268.	7268.	266.	18.	22.	5.	3.	153.	270.	775.	197.	10041.	2588.
28	15.4	25.7	20006.	7268.	7268.	266.	18.	22.	5.	3.	152.	270.	775.	197.	10041.	2589.
29	15.9	25.7	20007.	7268.	7268.	266.	18.	22.	5.	3.	151.	267.	775.	197.	10038.	2589.
30	16.5	25.7	19919.	7229.	7229.	264.	18.	21.	5.	3.	150.	264.	772.	196.	10077.	2583.
31	17.1	25.7	19980.	7268.	7268.	265.	18.	21.	5.	3.	149.	262.	774.	196.	10052.	2587.
32	17.6	25.7	20001.	7268.	7268.	266.	18.	22.	5.	3.	148.	260.	774.	197.	10043.	2589.
33	18.2	25.7	19985.	7268.	7268.	265.	18.	22.	5.	3.	146.	257.	773.	196.	10046.	2588.
34	18.8	25.7	19997.	7268.	7268.	266.	18.	22.	5.	3.	145.	255.	774.	196.	10041.	2589.
35	19.4	25.7	20006.	7268.	7268.	266.	18.	22.	5.	3.	144.	252.	774.	196.	10041.	2589.
36	20.0	25.7	19982.	7268.	7268.	265.	18.	22.	5.	3.	142.	249.	772.	196.	10048.	2588.
37	20.7	25.7	19904.	7229.	7229.	264.	18.	21.	5.	3.	140.	246.	769.	195.	10087.	2582.
38	21.3	25.7	19975.	7268.	7268.	265.	18.	22.	5.	3.	139.	243.	771.	196.	10057.	2586.
39	22.0	25.7	19984.	7268.	7268.	265.	18.	22.	5.	3.	137.	239.	771.	196.	10051.	2587.
40	22.7	25.7	19952.	7229.	7229.	265.	18.	21.	5.	3.	135.	236.	770.	195.	10061.	2586.

DISCHARGE SCHEDULE FOR 1000 MW (E)

LWR80- 4PU

PAGE 27

CYCLE NUMBER	DISCHARGE		ISOTOPE PRODUCTION, GRAMS/TONNE							
	DATE	TONNE	KR-85	KR STABL	TC-99	RH103 SUM	RU106	RU STABL	PD STABL	XE STABL
1	-1.0	102.9	0.	0.	0.	0.	0.	0.	0.	0.
2	.8	25.7	5.	69.	261.	217.	137.	775.	409.	1772.
3	1.3	25.7	8.	105.	403.	317.	185.	1182.	624.	2502.
4	2.0	25.7	10.	128.	563.	429.	245.	1729.	959.	3421.
5	2.7	25.7	10.	135.	593.	447.	251.	1829.	1014.	3595.
6	3.3	25.7	10.	138.	606.	454.	254.	1868.	1036.	3665.
7	3.9	25.7	10.	132.	580.	440.	249.	1789.	992.	3525.
8	4.5	25.7	10.	129.	568.	433.	246.	1749.	970.	3455.
9	5.1	25.7	9.	123.	548.	420.	241.	1670.	926.	3316.
10	5.6	25.7	9.	118.	522.	405.	235.	1590.	882.	3176.
11	6.2	25.7	9.	115.	510.	397.	232.	1550.	860.	3106.
12	6.7	25.7	9.	115.	505.	394.	231.	1550.	860.	3106.
13	7.3	25.7	9.	113.	502.	392.	230.	1531.	849.	3072.
14	7.8	25.7	9.	113.	503.	393.	230.	1531.	849.	3072.
15	8.3	25.7	9.	113.	504.	394.	230.	1531.	849.	3072.
16	8.9	25.7	9.	113.	503.	393.	230.	1531.	849.	3072.
17	9.4	25.7	9.	113.	503.	393.	230.	1531.	849.	3072.
18	10.0	25.7	9.	113.	504.	394.	230.	1531.	849.	3072.
19	10.5	25.7	9.	113.	503.	393.	230.	1531.	849.	3072.
20	11.0	25.7	9.	113.	501.	392.	230.	1531.	849.	3072.
21	11.6	25.7	9.	113.	503.	393.	230.	1531.	849.	3072.
22	12.1	25.7	9.	113.	503.	393.	230.	1531.	849.	3072.
23	12.7	25.7	9.	113.	503.	393.	230.	1531.	849.	3072.
24	13.2	25.7	9.	113.	503.	393.	230.	1531.	849.	3072.
25	13.8	25.7	9.	113.	504.	394.	230.	1531.	849.	3072.
26	14.3	25.7	9.	113.	503.	393.	230.	1531.	849.	3072.
27	14.8	25.7	9.	113.	503.	393.	230.	1531.	849.	3072.
28	15.4	25.7	9.	113.	503.	393.	230.	1526.	846.	3063.
29	15.9	25.7	9.	114.	503.	392.	228.	1543.	855.	3086.
30	16.5	25.7	9.	114.	501.	389.	226.	1538.	853.	3072.
31	17.1	25.7	9.	113.	502.	388.	225.	1532.	849.	3056.
32	17.6	25.7	9.	114.	502.	387.	223.	1544.	856.	3070.
33	18.2	25.7	9.	114.	501.	385.	221.	1536.	851.	3050.
34	18.8	25.7	9.	113.	501.	384.	219.	1527.	846.	3027.
35	19.4	25.7	9.	113.	501.	382.	217.	1534.	850.	3034.
36	20.0	25.7	9.	114.	500.	380.	215.	1539.	853.	3037.
37	20.7	25.7	9.	113.	498.	377.	213.	1526.	846.	3007.
38	21.3	25.7	9.	113.	499.	375.	211.	1528.	847.	3003.
39	22.0	25.7	9.	113.	498.	373.	208.	1527.	847.	2995.
40	22.7	25.7	9.	113.	497.	370.	206.	1525.	845.	2984.

CYCLE NUMBER	DISCHARGE			ISOTOPE PRODUCTION, GRAMS/TONNE												
	DATE	TONNE	EXPOS MWD/T	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	PM147	CE144	CS137	SR-90	U-235	U-236
1	-1.0	117.7	0.	0.	-29429.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	1.1	29.4	11429.	19310.	-25939.	68.	112.	217.	23.	42.	107.	197.	444.	126.	4688.	413.
3	1.8	29.4	18369.	20364.	-26687.	117.	181.	378.	44.	112.	138.	248.	710.	192.	3782.	567.
4	2.7	29.4	26854.	22948.	-26280.	171.	284.	614.	72.	241.	162.	283.	1028.	278.	3086.	672.
5	3.7	29.4	29221.	31754.	-19345.	170.	420.	746.	94.	291.	166.	289.	1116.	302.	3456.	611.
6	4.6	29.4	30316.	33555.	-18155.	177.	496.	918.	111.	371.	168.	292.	1156.	313.	3415.	617.
7	5.6	29.4	30455.	34949.	-16761.	177.	535.	1012.	117.	411.	168.	292.	1162.	315.	3447.	612.
8	6.5	29.4	29481.	37057.	-14823.	170.	569.	1100.	122.	431.	167.	290.	1126.	305.	3578.	590.
9	7.4	29.4	29342.	38621.	-13327.	168.	618.	1147.	131.	442.	166.	290.	1120.	303.	3632.	581.
10	8.2	29.4	28210.	39539.	-6562.	160.	628.	1212.	131.	451.	164.	287.	1079.	292.	3721.	565.
11	9.0	29.4	27303.	39879.	39879.	155.	625.	1235.	129.	448.	163.	284.	1045.	283.	3785.	554.
12	9.7	29.4	25734.	40627.	40627.	144.	611.	1238.	125.	425.	159.	280.	986.	267.	3910.	531.
13	10.6	29.4	26706.	40117.	40117.	148.	609.	1305.	134.	459.	161.	283.	1023.	277.	3806.	547.
14	11.4	29.4	25922.	35391.	35391.	146.	513.	1328.	125.	469.	160.	280.	993.	269.	3632.	573.
15	12.1	29.4	24425.	8193.	8193.	359.	30.	37.	8.	7.	156.	275.	938.	254.	10056.	3070.
16	12.8	29.4	23522.	7955.	7955.	336.	28.	33.	7.	6.	154.	272.	904.	245.	9948.	2977.
17	13.5	29.4	22692.	7751.	7751.	318.	26.	30.	7.	5.	152.	269.	873.	236.	9908.	2868.
18	14.1	29.4	21806.	7581.	7581.	300.	24.	27.	6.	5.	149.	265.	839.	227.	9983.	2793.
19	14.8	29.4	21079.	7445.	7445.	286.	22.	25.	6.	4.	147.	262.	812.	220.	10005.	2711.
20	15.4	29.4	20522.	7343.	7343.	275.	21.	23.	5.	4.	145.	259.	791.	214.	9948.	2642.
21	16.0	29.4	19986.	7275.	7275.	265.	20.	22.	5.	3.	142.	253.	770.	209.	9906.	2577.
22	16.7	29.4	20030.	7275.	7275.	266.	20.	22.	5.	4.	141.	251.	772.	209.	9886.	2580.
23	17.3	29.4	20030.	7275.	7275.	266.	20.	22.	5.	4.	140.	248.	772.	209.	9883.	2580.
24	18.0	29.4	20014.	7275.	7275.	265.	20.	22.	5.	3.	138.	245.	771.	209.	9888.	2579.
25	18.7	29.4	20036.	7275.	7275.	266.	20.	22.	5.	4.	136.	242.	771.	209.	9881.	2581.
26	19.4	29.4	20043.	7275.	7275.	266.	20.	22.	5.	4.	135.	238.	771.	209.	9876.	2581.
27	20.1	29.4	20047.	7275.	7275.	266.	20.	22.	5.	4.	133.	235.	771.	209.	9873.	2582.
28	20.8	29.4	20064.	7275.	7275.	266.	20.	22.	5.	4.	131.	232.	771.	209.	9867.	2583.
29	21.5	29.4	20055.	7275.	7275.	266.	20.	22.	5.	4.	129.	228.	770.	209.	9869.	2582.
30	22.3	29.4	20063.	7275.	7275.	266.	20.	22.	5.	4.	127.	224.	770.	209.	9867.	2583.
31	23.1	29.4	20070.	7275.	7275.	266.	20.	22.	5.	4.	125.	220.	770.	208.	9862.	2583.
32	23.9	29.4	19968.	7241.	7241.	264.	20.	22.	5.	3.	123.	215.	765.	207.	9911.	2576.
33	24.7	29.4	20038.	7275.	7275.	266.	20.	22.	5.	4.	120.	211.	767.	208.	9881.	2581.
34	25.6	29.4	20038.	7275.	7275.	266.	20.	22.	5.	4.	118.	206.	766.	208.	9879.	2581.
35	26.5	29.4	20018.	7275.	7275.	265.	20.	22.	5.	3.	115.	201.	765.	207.	9887.	2579.
36	27.4	29.4	20043.	7275.	7275.	266.	20.	22.	5.	4.	112.	195.	765.	207.	9878.	2581.
37	28.4	29.4	20046.	7275.	7275.	266.	20.	22.	5.	4.	109.	189.	764.	207.	9874.	2581.
38	29.4	29.4	20060.	7275.	7275.	266.	20.	22.	5.	4.	106.	183.	764.	207.	9867.	2582.
39	30.0	29.4	17751.	6765.	6765.	225.	16.	14.	3.	2.	100.	173.	678.	183.	11101.	2399.
40	30.0	29.4	11560.	5066.	5066.	121.	5.	3.	1.	0.	84.	150.	446.	121.	14952.	1789.

CYCLE NUMBER	DISCHARGE		ISOTOPE PRODUCTION: GRAMS/TONNE							
	DATE	TONNE	KR-85	KR STABL	TC-99	RH103 SUM	RU106	RU STABL	PD STABL	XE STABL
1	-1.0	117.7	0.	0.	0.	0.	0.	0.	0.	0.
2	1.1	29.4	6.	77.	293.	236.	143.	866.	457.	1889.
3	1.8	29.4	9.	115.	462.	349.	198.	1398.	754.	2820.
4	2.7	29.4	12.	167.	662.	456.	235.	2021.	1091.	3927.
5	3.7	29.4	13.	182.	717.	481.	242.	2206.	1191.	4257.
6	4.6	29.4	14.	189.	742.	492.	245.	2290.	1236.	4406.
7	5.6	29.4	14.	189.	745.	493.	245.	2290.	1236.	4406.
8	6.5	29.4	13.	183.	723.	484.	243.	2223.	1200.	4286.
9	7.4	29.4	13.	182.	720.	482.	242.	2206.	1191.	4257.
10	8.2	29.4	13.	175.	694.	470.	239.	2122.	1145.	4107.
11	9.0	29.4	13.	170.	673.	461.	236.	2054.	1109.	3987.
12	9.7	29.4	12.	160.	636.	443.	231.	1936.	1045.	3778.
13	10.6	29.4	12.	167.	659.	454.	234.	2021.	1091.	3927.
14	11.4	29.4	12.	161.	641.	445.	231.	1953.	1054.	3808.
15	12.1	29.4	11.	151.	606.	428.	226.	1835.	991.	3598.
16	12.8	29.4	11.	146.	585.	417.	222.	1768.	954.	3479.
17	13.5	29.4	11.	142.	565.	407.	219.	1718.	927.	3389.
18	14.1	29.4	10.	136.	544.	395.	215.	1650.	891.	3269.
19	14.8	29.4	10.	132.	527.	386.	212.	1600.	863.	3179.
20	15.4	29.4	10.	128.	514.	378.	209.	1546.	834.	3083.
21	16.0	29.4	9.	124.	500.	369.	204.	1503.	811.	3001.
22	16.7	29.4	9.	125.	501.	368.	203.	1509.	814.	3005.
23	17.3	29.4	9.	125.	501.	366.	201.	1512.	816.	3006.
24	18.0	29.4	9.	125.	500.	364.	198.	1515.	817.	3004.
25	18.7	29.4	9.	125.	500.	362.	196.	1515.	818.	2998.
26	19.4	29.4	9.	125.	499.	360.	194.	1513.	817.	2988.
27	20.1	29.4	9.	125.	499.	358.	192.	1510.	815.	2976.
28	20.8	29.4	9.	125.	499.	355.	189.	1519.	820.	2985.
29	21.5	29.4	9.	125.	498.	353.	187.	1510.	815.	2963.
30	22.3	29.4	9.	125.	497.	350.	184.	1514.	817.	2962.
31	23.1	29.4	9.	125.	497.	347.	181.	1513.	817.	2955.
32	23.9	29.4	9.	125.	493.	342.	178.	1510.	815.	2942.
33	24.7	29.4	9.	125.	494.	340.	175.	1516.	818.	2945.
34	25.6	29.4	9.	125.	493.	336.	171.	1517.	819.	2938.
35	26.5	29.4	9.	125.	492.	332.	168.	1514.	817.	2924.
36	27.4	29.4	9.	125.	491.	327.	164.	1517.	819.	2921.
37	28.4	29.4	9.	125.	490.	322.	159.	1512.	816.	2904.
38	29.4	29.4	9.	125.	488.	317.	155.	1512.	816.	2895.
39	30.0	29.4	8.	110.	435.	290.	145.	1337.	721.	2576.
40	30.0	29.4	5.	72.	290.	216.	120.	872.	470.	1747.

CYCLE NUMBER	DISCHARGE			ISOTOPE PRODUCTION, GRAMS/TONNE												
	DATE	TONNE	EXPOS MWD/T	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	PM147	CE144	CS137	SR-90	U-235	U-236
1	-1.0	117.7	0.	0.	-29293.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	1.1	29.4	11524.	19276.	-25667.	69.	114.	219.	24.	43.	111.	198.	448.	127.	4780.	423.
3	1.9	29.4	18469.	20364.	-26381.	119.	182.	380.	45.	113.	147.	248.	713.	193.	3871.	582.
4	2.7	29.4	26943.	22778.	-26144.	174.	281.	612.	72.	242.	175.	283.	1031.	279.	3159.	694.
5	3.8	29.4	29403.	31516.	-19277.	174.	418.	747.	94.	293.	180.	290.	1123.	304.	3564.	636.
6	4.7	29.4	30426.	33317.	-17883.	181.	493.	918.	110.	373.	182.	292.	1161.	314.	3529.	641.
7	5.6	29.4	30563.	34711.	-16353.	181.	532.	1013.	117.	413.	183.	292.	1166.	316.	3562.	636.
8	6.5	29.4	29511.	36853.	-14177.	172.	564.	1097.	121.	431.	180.	290.	1127.	305.	3706.	612.
9	7.4	29.4	29361.	38383.	-12613.	170.	613.	1145.	130.	442.	180.	290.	1121.	304.	3762.	602.
10	8.2	29.4	28128.	39165.	-11729.	162.	620.	1206.	130.	449.	177.	287.	1076.	291.	3856.	586.
11	9.0	29.4	27124.	39437.	-11151.	156.	613.	1225.	128.	443.	175.	284.	1038.	281.	3927.	573.
12	9.8	29.4	26077.	39811.	-10573.	149.	608.	1248.	125.	436.	172.	281.	999.	271.	4005.	559.
13	10.6	29.4	25224.	40117.	-9995.	144.	608.	1256.	124.	425.	170.	278.	967.	262.	4067.	547.
14	11.3	29.4	24463.	40321.	-9553.	139.	600.	1283.	122.	424.	168.	275.	939.	254.	4120.	537.
15	12.0	29.4	23822.	40321.	-9179.	135.	588.	1287.	119.	416.	166.	273.	915.	248.	4163.	530.
16	12.8	29.4	23237.	40355.	-8839.	132.	578.	1298.	117.	411.	164.	271.	893.	242.	4201.	522.
17	13.4	29.4	22561.	40389.	-8465.	128.	567.	1295.	114.	399.	162.	268.	868.	235.	4250.	513.
18	14.1	29.4	21818.	40491.	-8635.	123.	553.	1297.	110.	389.	160.	265.	840.	228.	4306.	503.
19	14.7	29.4	21301.	40355.	-8941.	120.	540.	1290.	107.	379.	158.	263.	820.	222.	4340.	496.
20	15.4	29.4	20834.	40287.	-9247.	117.	528.	1291.	105.	372.	156.	260.	803.	218.	4370.	490.
21	16.0	29.4	20413.	40151.	-9553.	115.	520.	1288.	102.	365.	153.	256.	787.	213.	4397.	485.
22	16.7	29.4	20313.	40423.	-9553.	114.	518.	1306.	102.	368.	151.	252.	782.	212.	4409.	483.
23	17.3	29.4	20286.	40593.	-9587.	114.	518.	1316.	101.	371.	150.	249.	781.	212.	4414.	482.
24	18.0	29.4	20189.	40831.	-9519.	113.	517.	1326.	101.	371.	148.	246.	777.	211.	4426.	479.
25	18.7	29.4	20147.	41001.	-9553.	113.	517.	1335.	100.	373.	146.	242.	775.	210.	4433.	478.
26	19.4	29.4	20137.	41239.	-9519.	112.	518.	1352.	100.	377.	144.	239.	774.	210.	4437.	477.
27	20.1	29.4	20085.	41409.	-9519.	112.	518.	1357.	100.	377.	142.	235.	772.	209.	4444.	476.
28	20.9	29.4	20071.	41579.	-9553.	112.	519.	1368.	100.	380.	140.	231.	771.	209.	4448.	475.
29	21.6	29.4	20079.	41749.	-9587.	112.	520.	1377.	100.	382.	139.	228.	771.	209.	4450.	474.
30	22.4	29.4	20028.	41953.	-9553.	111.	522.	1388.	100.	384.	136.	223.	768.	208.	4457.	473.
31	23.2	29.4	20040.	42089.	-9553.	111.	523.	1394.	100.	385.	134.	219.	768.	208.	4459.	472.
32	24.0	29.4	20042.	42259.	-9587.	111.	524.	1404.	100.	388.	132.	215.	768.	208.	4462.	472.
33	24.8	29.4	20029.	42429.	-9587.	111.	526.	1410.	100.	389.	130.	210.	767.	208.	4465.	471.
34	25.7	29.4	20038.	42599.	-9621.	111.	527.	1421.	100.	391.	127.	205.	766.	208.	4467.	471.
35	26.6	29.4	20069.	42701.	-9621.	111.	529.	1428.	101.	394.	124.	200.	767.	208.	4467.	471.
36	27.5	29.4	20047.	42871.	-9655.	111.	531.	1434.	101.	395.	121.	195.	765.	207.	4471.	470.
37	28.5	29.4	20069.	43007.	-9655.	111.	533.	1440.	101.	396.	118.	189.	765.	207.	4472.	469.
38	29.5	29.4	20092.	43177.	43177.	111.	534.	1451.	101.	399.	115.	182.	765.	207.	4473.	469.
39	30.0	29.4	16767.	44707.	44707.	89.	479.	1252.	83.	290.	106.	170.	641.	174.	4822.	403.
40	30.0	29.4	10386.	47698.	47698.	50.	333.	823.	44.	120.	84.	143.	402.	109.	5520.	263.

CYCLE NUMBER	DISCHARGE		ISOTOPE PRODUCTION, GRAMS/TONNE							
	DATE	TONNE	KR-85	KR STABL	TC-99	RH103 SUM	RU106	RU STABL	PD STABL	XE STABL
1	-1.0	117.7	0.	0.	0.	0.	0.	0.	0.	0.
2	1.1	29.4	6.	76.	296.	244.	144.	859.	454.	1861.
3	1.9	29.4	9.	115.	468.	365.	198.	1394.	753.	2798.
4	2.7	29.4	12.	168.	671.	484.	235.	2041.	1102.	3947.
5	3.8	29.4	13.	183.	729.	515.	242.	2223.	1200.	4270.
6	4.7	29.4	14.	190.	753.	526.	245.	2304.	1243.	4414.
7	5.6	29.4	14.	190.	756.	528.	245.	2304.	1243.	4414.
8	6.5	29.4	13.	183.	732.	516.	243.	2223.	1200.	4270.
9	7.4	29.4	13.	183.	728.	514.	242.	2223.	1200.	4270.
10	8.2	29.4	13.	175.	699.	499.	239.	2122.	1145.	4091.
11	9.0	29.4	12.	168.	676.	487.	235.	2041.	1102.	3947.
12	9.8	29.4	12.	162.	651.	473.	232.	1960.	1058.	3803.
13	10.6	29.4	12.	157.	631.	462.	229.	1899.	1025.	3696.
14	11.3	29.4	11.	153.	612.	452.	226.	1859.	1003.	3624.
15	12.0	29.4	11.	148.	597.	443.	224.	1798.	971.	3516.
16	12.8	29.4	11.	145.	583.	435.	221.	1758.	949.	3444.
17	13.4	29.4	11.	140.	567.	426.	218.	1697.	916.	3337.
18	14.1	29.4	10.	137.	549.	415.	215.	1657.	894.	3265.
19	14.7	29.4	10.	133.	537.	408.	213.	1617.	872.	3193.
20	15.4	29.4	10.	130.	525.	401.	210.	1574.	850.	3117.
21	16.0	29.4	10.	128.	515.	393.	206.	1546.	835.	3062.
22	16.7	29.4	10.	127.	512.	390.	204.	1538.	830.	3041.
23	17.3	29.4	10.	126.	511.	388.	202.	1528.	824.	3017.
24	18.0	29.4	9.	127.	508.	385.	199.	1535.	829.	3026.
25	18.7	29.4	9.	126.	507.	382.	197.	1523.	822.	2997.
26	19.4	29.4	9.	126.	506.	380.	194.	1526.	824.	2997.
27	20.1	29.4	9.	125.	504.	377.	192.	1510.	815.	2963.
28	20.9	29.4	9.	125.	503.	374.	189.	1510.	815.	2956.
29	21.6	29.4	9.	126.	503.	372.	187.	1524.	822.	2973.
30	22.4	29.4	9.	125.	501.	369.	184.	1518.	819.	2957.
31	23.2	29.4	9.	125.	501.	366.	181.	1510.	815.	2935.
32	24.0	29.4	9.	125.	500.	363.	178.	1513.	817.	2933.
33	24.8	29.4	9.	125.	499.	360.	174.	1513.	817.	2926.
34	25.7	29.4	9.	125.	498.	356.	171.	1509.	814.	2912.
35	26.6	29.4	9.	125.	498.	353.	167.	1513.	817.	2912.
36	27.5	29.4	9.	125.	497.	349.	163.	1513.	816.	2902.
37	28.5	29.4	9.	125.	496.	344.	159.	1519.	820.	2904.
38	29.5	29.4	9.	125.	495.	339.	154.	1516.	818.	2891.
39	30.0	29.4	8.	104.	417.	297.	142.	1261.	681.	2432.
40	30.0	29.4	5.	65.	263.	207.	114.	784.	423.	1583.

CYCLE NUMBER	DISCHARGE			ISOTOPE PRODUCTION, GRAMS/TONNE												
	DATE	TONNE	EXPOS MWD/T	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	PM147	CE144	CS137	SR-90	U-235	U-236
1	-1.0	102.9	0.	0.	-25616.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	.9	25.7	10134.	18300.	-18533.	60.	83.	184.	18.	32.	106.	192.	395.	112.	4943.	392.
3	1.4	25.7	15833.	19155.	-18222.	100.	129.	309.	33.	81.	144.	252.	613.	174.	4117.	539.
4	2.0	25.7	22543.	20678.	-17452.	144.	191.	482.	54.	167.	171.	284.	872.	221.	3362.	646.
5	2.7	25.7	23802.	27713.	-11000.	140.	265.	570.	67.	193.	175.	290.	919.	233.	3777.	584.
6	3.4	25.7	24395.	28840.	-10572.	145.	306.	695.	78.	242.	178.	293.	942.	239.	3732.	591.
7	4.0	25.7	23819.	29462.	-10106.	141.	317.	745.	80.	255.	176.	290.	920.	234.	3795.	580.
8	4.6	25.7	22517.	30473.	-9600.	132.	322.	788.	79.	257.	171.	284.	871.	221.	3937.	556.
9	5.1	25.7	21997.	31095.	-9562.	128.	338.	804.	83.	256.	169.	281.	851.	216.	3998.	545.
10	5.7	25.7	21478.	31833.	-9562.	125.	347.	867.	84.	270.	167.	278.	831.	211.	4052.	535.
11	6.3	25.7	20925.	32144.	-9639.	121.	346.	884.	83.	269.	164.	275.	810.	206.	4107.	525.
12	6.8	25.7	20817.	32610.	-9678.	120.	352.	924.	84.	280.	164.	275.	806.	205.	4125.	522.
13	7.4	25.7	20624.	33155.	-9562.	119.	360.	942.	85.	282.	163.	274.	799.	203.	4160.	515.
14	8.0	25.7	20355.	33854.	-9406.	117.	366.	984.	85.	290.	162.	272.	789.	200.	4200.	508.
15	8.5	25.7	20373.	34165.	-9445.	117.	369.	1006.	85.	297.	162.	272.	789.	200.	4206.	507.
16	9.1	25.7	20239.	34670.	-9367.	116.	373.	1032.	86.	302.	161.	271.	784.	199.	4229.	502.
17	9.6	25.7	20167.	35020.	-9367.	115.	378.	1047.	86.	305.	161.	271.	782.	198.	4245.	499.
18	10.2	25.7	20120.	35525.	-9367.	114.	383.	1082.	87.	313.	161.	271.	780.	198.	4259.	497.
19	10.7	25.7	20097.	35836.	-9328.	114.	386.	1098.	87.	317.	161.	271.	779.	198.	4270.	495.
20	11.3	25.7	20045.	36186.	-9367.	114.	390.	1117.	87.	321.	160.	270.	777.	197.	4282.	492.
21	11.8	25.7	20076.	36497.	-9406.	114.	394.	1133.	88.	326.	161.	270.	778.	198.	4287.	491.
22	12.3	25.7	20038.	36925.	-9367.	113.	397.	1159.	89.	332.	160.	270.	777.	197.	4298.	489.
23	12.9	25.7	20042.	37158.	-9445.	113.	401.	1171.	89.	335.	160.	270.	777.	197.	4304.	488.
24	13.4	25.7	20081.	37469.	-9484.	113.	404.	1190.	89.	340.	161.	270.	778.	198.	4308.	487.
25	14.0	25.7	20101.	37780.	-9367.	113.	408.	1202.	90.	344.	161.	271.	779.	198.	4313.	486.
26	14.5	25.7	20087.	38091.	-9328.	113.	412.	1222.	90.	348.	161.	270.	778.	198.	4321.	485.
27	15.1	25.7	20155.	38363.	-9289.	113.	415.	1235.	91.	352.	161.	271.	781.	198.	4321.	484.
28	15.6	25.7	20155.	38635.	-9251.	113.	418.	1248.	91.	356.	160.	269.	781.	198.	4328.	483.
29	16.2	25.7	20131.	38829.	-9251.	113.	420.	1256.	91.	357.	159.	267.	780.	198.	4334.	482.
30	16.8	25.7	20139.	39063.	-9251.	113.	423.	1273.	92.	361.	158.	264.	780.	198.	4337.	481.
31	17.4	25.7	20124.	39257.	-9212.	113.	425.	1280.	92.	363.	157.	262.	779.	198.	4343.	480.
32	17.9	25.7	20097.	39451.	-9212.	112.	427.	1289.	92.	364.	155.	259.	778.	197.	4349.	479.
33	18.6	25.7	20134.	39607.	-9212.	113.	429.	1298.	92.	367.	154.	257.	779.	198.	4349.	479.
34	19.2	25.7	20113.	39840.	-9212.	112.	430.	1310.	93.	370.	152.	254.	778.	197.	4355.	478.
35	19.8	25.7	20109.	39956.	-9251.	112.	432.	1316.	93.	371.	151.	251.	777.	197.	4358.	477.
36	20.4	25.7	20146.	40112.	-9289.	112.	435.	1326.	93.	374.	150.	248.	778.	198.	4358.	477.
37	21.1	25.7	20150.	40267.	-9328.	112.	436.	1332.	94.	376.	148.	245.	778.	198.	4362.	476.
38	21.8	25.7	20140.	40462.	-9328.	112.	438.	1341.	94.	378.	146.	241.	777.	197.	4366.	475.
39	22.5	25.7	20191.	40578.	-9328.	113.	440.	1349.	94.	380.	145.	238.	779.	198.	4364.	476.
40	23.1	25.7	20200.	40734.	-9367.	113.	442.	1356.	94.	382.	143.	234.	779.	198.	4367.	475.

CYCLE NUMBER	DISCHARGE		ISOTOPE PRODUCTION, GRAMS/TONNE							
	DATE	TONNE	KR-85	KR STABL	TC-99	RH103 SUM	RU106	RU STABL	PD STABL	XE STABL
1	-1.0	102.9	0.	0.	0.	0.	0.	0.	0.	0.
2	.9	25.7	5.	69.	262.	221.	136.	777.	410.	1758.
3	1.4	25.7	8.	105.	405.	326.	185.	1188.	627.	2496.
4	2.0	25.7	10.	128.	568.	448.	245.	1734.	961.	3412.
5	2.7	25.7	10.	135.	599.	467.	252.	1828.	1013.	3577.
6	3.4	25.7	10.	139.	613.	476.	255.	1875.	1039.	3659.
7	4.0	25.7	10.	135.	599.	467.	252.	1828.	1013.	3577.
8	4.6	25.7	10.	128.	568.	448.	245.	1734.	961.	3412.
9	5.1	25.7	9.	125.	555.	440.	242.	1687.	935.	3330.
10	5.7	25.7	9.	121.	542.	431.	239.	1640.	909.	3247.
11	6.3	25.7	9.	120.	529.	423.	236.	1617.	896.	3206.
12	6.8	25.7	9.	118.	526.	421.	235.	1594.	883.	3165.
13	7.4	25.7	9.	118.	522.	418.	234.	1594.	883.	3165.
14	8.0	25.7	9.	116.	515.	414.	232.	1570.	870.	3124.
15	8.5	25.7	9.	116.	515.	414.	232.	1570.	870.	3124.
16	9.1	25.7	9.	114.	512.	412.	232.	1547.	857.	3083.
17	9.6	25.7	9.	114.	510.	411.	231.	1547.	857.	3083.
18	10.2	25.7	9.	114.	509.	410.	231.	1547.	857.	3083.
19	10.7	25.7	9.	114.	509.	409.	231.	1547.	857.	3083.
20	11.3	25.7	9.	114.	507.	409.	230.	1547.	857.	3083.
21	11.8	25.7	9.	114.	508.	409.	231.	1547.	857.	3083.
22	12.3	25.7	9.	114.	507.	408.	230.	1547.	857.	3083.
23	12.9	25.7	9.	114.	507.	408.	230.	1547.	857.	3083.
24	13.4	25.7	9.	114.	508.	409.	231.	1547.	857.	3083.
25	14.0	25.7	9.	114.	509.	409.	231.	1547.	857.	3083.
26	14.5	25.7	9.	114.	508.	409.	231.	1547.	857.	3083.
27	15.1	25.7	9.	114.	510.	410.	231.	1547.	857.	3083.
28	15.6	25.7	9.	115.	510.	409.	230.	1554.	862.	3092.
29	16.2	25.7	9.	115.	509.	408.	228.	1553.	861.	3085.
30	16.8	25.7	9.	115.	509.	406.	227.	1551.	860.	3075.
31	17.4	25.7	9.	114.	508.	405.	225.	1547.	858.	3062.
32	17.9	25.7	9.	114.	507.	403.	223.	1542.	855.	3048.
33	18.6	25.7	9.	114.	508.	402.	221.	1536.	852.	3032.
34	19.2	25.7	9.	115.	507.	400.	219.	1550.	859.	3049.
35	19.8	25.7	9.	114.	507.	398.	217.	1541.	854.	3028.
36	20.4	25.7	9.	115.	507.	397.	215.	1551.	860.	3039.
37	21.1	25.7	9.	114.	507.	395.	212.	1538.	853.	3010.
38	21.8	25.7	9.	114.	506.	393.	210.	1544.	856.	3014.
39	22.5	25.7	9.	114.	507.	391.	208.	1547.	858.	3012.
40	23.1	25.7	9.	114.	506.	389.	205.	1547.	858.	3005.

CYCLE NUMBER	DISCHARGE			ISOTOPE PRODUCTION, GRAMS/TONNE												
	DATE	TONNE	EXPOS MWD/T	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	PM147	CE144	CS137	SR-90	U-235	U-236
1	-1.0	32.8	0.	0.	-199000.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.
2	.9	12.1	604.	9700.	9700.	7.	-0.	-0.	-0.	-0.	15.	30.	20.	7.	2738.	82.
3	.9	8.2	27563.	200900.	-24900.	102.	335.	66.	33.	0.	689.	1387.	998.	272.	1957.	97.
4	2.1	12.1	2427.	22600.	22600.	25.	0.	-0.	-0.	-0.	25.	50.	88.	30.	2410.	174.
5	2.1	8.2	60643.	199700.	-25900.	209.	697.	157.	104.	1.	624.	1256.	2224.	656.	1550.	184.
6	3.4	12.1	5981.	36100.	36100.	58.	2.	-0.	0.	-0.	38.	76.	219.	70.	2086.	254.
7	3.4	8.2	89453.	198900.	-26900.	281.	944.	258.	165.	3.	560.	1128.	3280.	910.	1261.	246.
8	5.0	12.1	12919.	51900.	52000.	115.	8.	0.	0.	-0.	56.	112.	478.	142.	1722.	332.
9	5.0	8.2	102326.	195300.	-30300.	314.	1105.	307.	184.	4.	441.	888.	3724.	1014.	1142.	271.
10	6.7	12.1	17254.	59200.	59300.	146.	13.	0.	1.	-0.	56.	112.	635.	183.	1560.	363.
11	6.7	8.2	109880.	193200.	-32300.	333.	1165.	337.	194.	5.	355.	714.	3980.	1080.	1078.	285.
12	8.3	12.1	17254.	59200.	59300.	146.	13.	0.	1.	-0.	56.	112.	635.	183.	1560.	363.
13	8.3	8.2	109880.	193200.	-32300.	333.	1165.	337.	194.	5.	355.	714.	3980.	1080.	1078.	285.
14	10.0	12.1	17254.	59200.	59300.	146.	13.	0.	1.	-0.	56.	112.	635.	183.	1560.	363.
15	10.0	8.2	109880.	193200.	-32300.	333.	1165.	337.	194.	5.	355.	714.	3980.	1080.	1078.	285.

DISCHARGE SCHEDULE FOR 1000 MW(E)

LMFBR-

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CYCLE NUMBER	DISCHARGE		ISOTOPE PRODUCTION, GRAMS/TONNE							
	DATE	TONNE	KR-85	KR STABL	TC-99	RH103 SUM	RU106	RU STABL	PD STABL	XE STABL
1	-1.0	32.8	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.
2	.9	12.1	0.	10.	14.	7.	13.	36.	8.	90.
3	.9	8.2	17.	276.	670.	245.	649.	2242.	1760.	4340.
4	2.1	12.1	1.	33.	64.	25.	46.	166.	48.	380.
5	2.1	8.2	42.	676.	1528.	586.	1419.	4007.	2640.	9360.
6	3.4	12.1	4.	73.	154.	59.	119.	426.	168.	925.
7	3.4	8.2	56.	936.	2216.	821.	2099.	7092.	4920.	13940.
8	5.0	12.1	8.	147.	330.	126.	299.	972.	520.	2002.
9	5.0	8.2	63.	1040.	2500.	919.	2399.	8215.	6144.	16000.
10	6.7	12.1	11.	189.	434.	164.	406.	1336.	810.	2675.
11	6.7	8.2	68.	1104.	2672.	976.	2579.	8891.	6944.	17240.
12	8.3	12.1	11.	189.	434.	164.	406.	1336.	810.	2675.
13	8.3	8.2	68.	1104.	2672.	976.	2579.	8891.	6944.	17240.
14	10.0	12.1	11.	189.	434.	164.	406.	1336.	810.	2675.
15	10.0	8.2	68.	1104.	2672.	976.	2579.	8891.	6944.	17240.

I S O T O P E P R O D U C T I O N

L W R ' S - - N O R E C Y C L E

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L W R ' S -- NO RECYCLE

CASE 1

[illegible]

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CASE 1

YEAR ENDING	TOTAL	NEWLY	CUMULATIVE INSTALLED CAPACITY BY REACTOR TYPE, GIGAWATTS ELECTRICAL													
	INSTALLED	INSTALLED														
	CAPACITY	CAPACITY														
	GW(E)	GW(E)	PWR70	BWR70	PWR80	BWR80	PWR70	BWR70	PWR80	BWR80	LWR70	LWR80	LWR70	LWR70	LWR80	LMFBR
							30U	30U	30U	30U	4PU	4PU	10PU	30PU	30PU	
1960.	.3	.3	.1	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1961.	.5	.2	.2	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1962.	.5	.0	.2	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1963.	.6	.1	.2	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1964.	.6	.0	.3	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1965.	.6	.0	.3	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1966.	1.0	.4	.6	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1967.	1.0	.0	.6	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1968.	3.0	2.0	1.5	1.5	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1969.	5.7	2.7	2.9	2.8	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1970.	12.0	6.3	6.0	6.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1971.	22.7	10.7	12.3	10.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1972.	33.7	11.0	19.6	14.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1973.	45.2	11.5	27.3	17.9	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1974.	57.2	12.0	35.3	21.9	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1975.	69.7	12.5	43.6	26.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1976.	82.7	13.0	52.3	30.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1977.	96.7	14.0	61.6	35.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1978.	112.2	15.5	71.9	40.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1979.	129.7	17.5	83.6	46.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1980.	150.0	20.3	83.6	46.1	13.5	6.8	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1981.	173.7	23.7	83.6	46.1	29.3	14.7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1982.	200.2	26.5	83.6	46.1	47.0	23.5	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1983.	229.5	29.3	83.6	46.1	66.5	33.3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1984.	261.4	31.9	83.6	46.1	87.8	43.9	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1985.	295.7	34.3	83.6	46.1	110.7	55.3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1986.	332.2	36.5	83.6	46.1	135.0	67.5	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1987.	370.7	38.5	83.6	46.1	160.7	80.3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1988.	411.2	40.5	83.6	46.1	187.7	93.8	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1989.	454.1	42.9	83.6	46.1	216.3	108.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1990.	500.0	45.9	83.6	46.1	246.9	123.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

ANNUAL ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSS BASIS)

L W R ' S -- NO RECYCLE

CASE 1

DURING PERIOD ENDING	TOTAL INSTALLED CAPACITY		ISOTOPE PRODUCTION, KILOGRAMS/YEAR												
	GW(E)	TONNE	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	CM244 AM3	CM244 SUM	PU238 NP	PU238 CM	PU238 AM	PU238 SUM
1960.	.3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.5	2.	10.	10.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1962.	.5	7.	44.	44.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1963.	.6	21.	147.	147.	5.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1964.	.6	21.	181.	181.	8.	1.	2.	0.	0.	0.	0.	0.	0.	0.	0.
1965.	.6	16.	125.	125.	6.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.
1966.	1.0	25.	192.	192.	8.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.
1967.	1.0	36.	276.	276.	12.	1.	2.	0.	0.	0.	0.	0.	0.	0.	0.
1968.	3.0	34.	278.	278.	13.	1.	2.	0.	0.	0.	0.	0.	0.	0.	0.
1969.	5.7	61.	418.	418.	16.	2.	2.	0.	0.	0.	0.	0.	0.	0.	0.
1970.	12.0	101.	697.	697.	26.	2.	3.	1.	1.	0.	1.	0.	0.	0.	0.
1971.	22.7	265.	1784.	1784.	63.	6.	6.	1.	1.	0.	1.	0.	0.	0.	0.
1972.	33.7	551.	3826.	3826.	139.	13.	16.	3.	4.	0.	4.	0.	0.	0.	0.
1973.	45.2	944.	6697.	6697.	251.	24.	30.	6.	6.	0.	6.	0.	0.	0.	0.
1974.	57.2	1423.	10498.	10498.	417.	42.	55.	11.	13.	0.	13.	0.	0.	0.	0.
1975.	69.7	1829.	13965.	13965.	592.	61.	82.	16.	19.	0.	19.	0.	0.	0.	0.
1976.	82.7	2195.	16957.	16957.	746.	76.	102.	20.	24.	0.	24.	0.	0.	0.	0.
1977.	96.7	2657.	20764.	20764.	941.	95.	130.	25.	31.	0.	31.	0.	0.	0.	0.
1978.	112.2	3174.	24966.	24966.	1154.	116.	159.	31.	37.	0.	37.	0.	0.	0.	0.
1979.	129.7	3689.	29000.	29000.	1351.	136.	185.	36.	43.	0.	43.	0.	0.	0.	0.
1980.	150.0	4278.	33454.	33454.	1558.	156.	212.	42.	49.	0.	49.	0.	0.	0.	0.
1981.	173.7	5236.	40104.	40104.	1832.	181.	243.	48.	56.	0.	56.	0.	0.	0.	0.
1982.	200.2	6767.	50809.	50809.	2252.	220.	294.	58.	66.	0.	66.	0.	0.	0.	0.
1983.	229.5	7837.	58866.	58866.	2614.	249.	335.	67.	75.	0.	75.	0.	0.	0.	0.
1984.	261.4	8958.	65967.	65967.	2867.	264.	347.	70.	74.	0.	74.	0.	0.	0.	0.
1985.	295.7	10699.	77759.	77759.	3298.	297.	386.	79.	80.	0.	80.	0.	0.	0.	0.
1986.	332.2	12650.	90577.	90577.	3741.	329.	421.	87.	84.	0.	84.	0.	0.	0.	0.
1987.	370.7	14321.	100466.	100466.	4018.	346.	433.	91.	83.	0.	83.	0.	0.	0.	0.
1988.	411.2	16493.	114454.	114454.	4498.	381.	470.	100.	87.	0.	87.	0.	0.	0.	0.
1989.	454.1	18787.	129261.	129261.	5020.	419.	513.	109.	93.	0.	93.	0.	0.	0.	0.
1990.	500.0	20664.	140873.	140873.	5436.	450.	547.	117.	98.	0.	98.	0.	0.	0.	0.

ANNUAL ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSS BASIS)

L W R ' S -- NO RECYCLE

CASE 1

DURING PERIOD ENDING	ISOTOPE PRODUCTION, KILOGRAMS/YEAR														
	GW-YR	U-235	U-236	PM147	CE144	CS137	SR-90	KR-85	TC-99	RH103 SUM	RU106	PD STABL	XE STABL	CM242 AM1	AM241 PU1
1960.	.2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.4	21.	3.	0.	0.	1.	0.	0.	1.	0.	0.	0.	3.	0.	0.
1962.	.4	80.	14.	1.	2.	4.	2.	0.	3.	2.	1.	2.	16.	0.	0.
1963.	.5	203.	49.	4.	7.	23.	10.	0.	15.	8.	2.	14.	87.	0.	0.
1964.	.5	136.	62.	4.	7.	21.	10.	0.	14.	8.	2.	13.	81.	0.	2.
1965.	.5	139.	50.	3.	5.	15.	7.	0.	10.	5.	2.	9.	58.	0.	3.
1966.	.8	226.	72.	5.	9.	28.	12.	1.	19.	10.	3.	17.	106.	0.	5.
1967.	.8	298.	101.	6.	11.	32.	15.	1.	22.	12.	4.	19.	124.	0.	6.
1968.	2.6	302.	109.	6.	12.	34.	15.	1.	23.	12.	4.	20.	129.	0.	9.
1969.	4.8	596.	150.	9.	19.	47.	22.	1.	32.	17.	6.	27.	186.	0.	11.
1970.	10.2	1008.	248.	15.	31.	73.	34.	2.	50.	27.	9.	41.	290.	0.	15.
1971.	19.3	2650.	613.	43.	83.	222.	102.	5.	150.	80.	26.	128.	868.	0.	22.
1972.	28.7	5261.	1305.	87.	171.	446.	204.	9.	302.	163.	53.	256.	1743.	0.	38.
1973.	38.4	8862.	2318.	156.	301.	828.	377.	17.	560.	299.	97.	483.	3214.	0.	73.
1974.	48.6	12639.	3680.	241.	462.	1313.	595.	27.	886.	471.	152.	773.	5072.	0.	134.
1975.	59.3	15950.	5048.	313.	602.	1719.	779.	36.	1160.	614.	198.	1009.	6628.	0.	229.
1976.	70.3	19293.	6289.	379.	729.	2103.	954.	43.	1418.	747.	241.	1232.	8099.	0.	357.
1977.	82.2	23346.	7836.	463.	891.	2589.	1175.	54.	1744.	915.	295.	1516.	9959.	0.	512.
1978.	95.3	27955.	9549.	556.	1071.	3124.	1418.	65.	2104.	1100.	354.	1826.	12006.	0.	703.
1979.	110.2	32617.	11182.	646.	1247.	3630.	1649.	75.	2445.	1279.	412.	2119.	13950.	0.	934.
1980.	127.4	37879.	12940.	748.	1444.	4182.	1900.	87.	2817.	1477.	477.	2440.	16074.	0.	1202.
1981.	147.6	46686.	15410.	904.	1758.	4948.	2255.	103.	3336.	1758.	571.	2867.	19096.	0.	1513.
1982.	170.1	59809.	19220.	1181.	2293.	6334.	2899.	133.	4279.	2267.	734.	3635.	24465.	0.	1887.
1983.	194.9	69680.	22414.	1367.	2675.	7101.	3259.	149.	4803.	2574.	847.	4046.	27519.	0.	2360.
1984.	221.9	80646.	25090.	1555.	3055.	7883.	3623.	166.	5338.	2887.	961.	4477.	30641.	0.	2910.
1985.	250.8	96513.	29320.	1851.	3649.	9174.	4216.	194.	6219.	3397.	1145.	5204.	35749.	0.	3528.
1986.	281.2	114381.	33843.	2172.	4295.	10536.	4843.	223.	7150.	3944.	1345.	5974.	41177.	0.	4257.
1987.	313.2	129329.	37128.	2437.	4831.	11525.	5296.	245.	7831.	4370.	1508.	6534.	45202.	0.	5108.
1988.	346.6	148955.	42053.	2790.	5540.	13009.	5978.	277.	8845.	4967.	1728.	7376.	51136.	0.	6055.
1989.	381.7	169622.	47332.	3162.	6290.	14598.	6707.	311.	9930.	5602.	1960.	8280.	57490.	0.	7137.
1990.	419.1	186730.	51580.	3462.	6892.	15878.	7296.	338.	10804.	6112.	2146.	9006.	62599.	0.	8360.

ANNUAL ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSS BASIS)

L W R ' S -- NO RECYCLE

CASE 1

JULI-G PERIOD ENDING	KR STABL	RU STABL	H-3 GRAMS
1960.	.0	0.	0.
1961.	.3	1.	0.
1962.	1.2	6.	0.
1963.	6.4	39.	1.
1964.	5.9	36.	1.
1965.	4.3	25.	0.
1966.	7.8	47.	1.
1967.	9.1	54.	1.
1968.	9.5	56.	1.
1969.	13.6	78.	1.
1970.	21.1	120.	2.
1971.	63.4	369.	6.
1972.	127.0	739.	13.
1973.	234.6	1378.	24.
1974.	370.5	2191.	38.
1975.	485.2	2864.	50.
1976.	593.9	3503.	61.
1977.	731.4	4311.	75.
1978.	882.6	5197.	91.
1979.	1025.7	6036.	105.
1980.	1181.3	6952.	121.
1981.	1400.6	8206.	143.
1982.	1799.7	10478.	184.
1983.	2019.2	11710.	206.
1984.	2242.0	12982.	228.
1985.	2606.4	15091.	265.
1986.	2991.0	17321.	304.
1987.	3269.2	18937.	332.
1988.	3688.8	21372.	375.
1989.	4138.5	23984.	420.
1990.	4500.7	26085.	457.

C U M U L A T I V E I S O T O P E P R O D U C T I O N A T D I S C H A R G E

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(NO LOSSES EXCEPT FOR RADIOACTIVE DECAY)

L W R ' S -- NO RECYCLE

CASE 1

YEAR	TOTAL INSTALLED CAPACITY	ISOTOPE PRODUCTION, KGS													
ENDING	GW(E)	TONNE	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	CM244 AM3	CM244 SUM	PU238 NP	PU238 CM	PU238 AM	PU238 SUM
1960.	.3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.5	2.	10.	10.	0.	0.	0.	0.	0.	-0.	0.	-0.	-0.	-0.	0.
1962.	.5	9.	53.	53.	1.	0.	0.	0.	0.	-0.	0.	-0.	-0.	-0.	0.
1963.	.6	30.	201.	201.	6.	1.	1.	0.	0.	-0.	0.	-0.	-0.	-0.	0.
1964.	.6	52.	382.	382.	14.	2.	2.	0.	0.	-0.	0.	-0.	-0.	-0.	0.
1965.	.6	67.	509.	509.	20.	2.	3.	0.	1.	-0.	1.	-0.	-0.	-0.	0.
1966.	1.0	93.	704.	704.	29.	3.	4.	0.	1.	-0.	1.	-0.	-0.	-0.	0.
1967.	1.0	128.	985.	985.	41.	4.	6.	0.	1.	-0.	1.	-0.	-0.	-0.	0.
1968.	3.0	163.	1269.	1269.	54.	6.	8.	0.	2.	-0.	2.	-0.	-0.	-0.	0.
1969.	5.7	224.	1696.	1696.	70.	7.	10.	0.	2.	-0.	2.	-0.	-0.	-0.	0.
1970.	12.0	325.	2405.	2405.	97.	10.	13.	1.	3.	-0.	3.	-0.	-0.	-0.	0.
1971.	22.7	590.	4204.	4204.	159.	15.	19.	2.	4.	-0.	4.	-0.	-0.	-0.	0.
1972.	33.7	1142.	8052.	8052.	298.	28.	35.	4.	7.	-0.	7.	-0.	-0.	-0.	0.
1973.	45.2	2086.	14787.	14787.	549.	52.	65.	7.	13.	-0.	13.	-0.	-0.	-0.	0.
1974.	57.2	3509.	25358.	25358.	967.	95.	120.	12.	26.	-0.	26.	-0.	-0.	-0.	0.
1975.	69.7	5338.	39457.	39457.	1559.	156.	202.	19.	44.	-0.	44.	-0.	-0.	-0.	0.
1976.	82.7	7532.	56643.	56643.	2305.	231.	304.	24.	66.	-0.	66.	-0.	-0.	-0.	0.
1977.	96.7	10189.	77764.	77764.	3246.	326.	434.	30.	94.	-0.	94.	-0.	-0.	-0.	0.
1978.	112.2	13363.	103243.	103243.	4400.	442.	593.	38.	128.	-0.	128.	-0.	-0.	-0.	0.
1979.	129.7	17052.	132947.	132947.	5751.	577.	778.	44.	167.	-0.	167.	-0.	-0.	-0.	0.
1980.	150.0	21331.	167334.	167334.	7309.	733.	990.	51.	209.	-0.	209.	-0.	-0.	-0.	0.
1981.	173.7	26566.	208641.	208641.	9142.	912.	1233.	59.	257.	-0.	257.	-0.	-0.	-0.	0.
1982.	200.2	33333.	260963.	260963.	11394.	1131.	1527.	71.	314.	-0.	314.	-0.	-0.	-0.	0.
1983.	229.5	41170.	321716.	321716.	14008.	1378.	1862.	82.	377.	-0.	377.	-0.	-0.	-0.	0.
1984.	261.4	50128.	390043.	390043.	16875.	1640.	2209.	88.	437.	-0.	437.	-0.	-0.	-0.	0.
1985.	295.7	60328.	470711.	470711.	20173.	1934.	2595.	97.	500.	-0.	500.	-0.	-0.	-0.	0.
1986.	332.2	73478.	564816.	564816.	23915.	2260.	3016.	108.	565.	-0.	565.	-0.	-0.	-0.	0.
1987.	370.7	87799.	669539.	669539.	27933.	2602.	3449.	114.	627.	-0.	627.	-0.	-0.	-0.	0.
1988.	411.2	104292.	789101.	789101.	32431.	2979.	3919.	124.	691.	-0.	691.	-0.	-0.	-0.	0.
1989.	454.1	123078.	924417.	924417.	37451.	3394.	4432.	136.	758.	-0.	758.	-0.	-0.	-0.	0.
1990.	500.0	143742.	1072427.	1072427.	42888.	3839.	4978.	146.	827.	-0.	827.	-0.	-0.	-0.	0.

CUMULATIVE ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSSES EXCEPT FOR RADIOACTIVE DECAY)

LWR'S -- NO RECYCLE

CASE 1

ISOTOPE PRODUCTION, KGS

YEAR ENDING	GW-YR	U-235	U-236	PM147	CE144	CS137	SR-90	KR-85	TC-99	RH103 SUM	RU106	PD STABL	XE STABL	CM242 AM1	AM241 PU1
1960.	.2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.6	21.	3.	0.	0.	1.	0.	0.	1.	0.	0.	0.	3.	-0.	-0.
1962.	1.0	101.	17.	1.	2.	5.	2.	0.	3.	2.	1.	2.	19.	-0.	0.
1963.	1.5	304.	66.	5.	8.	27.	12.	1.	19.	10.	3.	16.	107.	-0.	1.
1964.	2.1	440.	128.	7.	10.	48.	22.	1.	33.	18.	4.	29.	188.	-0.	2.
1965.	2.6	580.	178.	8.	9.	62.	28.	1.	43.	23.	4.	38.	246.	-0.	6.
1966.	3.4	805.	250.	11.	12.	89.	40.	2.	62.	33.	5.	55.	352.	-0.	10.
1967.	4.3	1103.	351.	15.	17.	119.	53.	2.	84.	44.	6.	74.	477.	-0.	17.
1968.	6.8	1405.	460.	17.	19.	150.	67.	3.	106.	56.	7.	93.	606.	-0.	26.
1969.	11.7	2000.	610.	23.	26.	193.	87.	4.	138.	73.	9.	120.	792.	-0.	37.
1970.	21.9	3008.	858.	33.	42.	262.	119.	5.	188.	101.	14.	161.	1082.	-0.	52.
1971.	41.2	5658.	1471.	68.	100.	479.	218.	9.	339.	181.	33.	289.	1949.	-0.	74.
1972.	69.9	10919.	2775.	140.	213.	914.	417.	18.	640.	344.	70.	545.	3693.	-0.	112.
1973.	108.3	19781.	5094.	264.	389.	1721.	784.	34.	1200.	643.	132.	1028.	6907.	-0.	185.
1974.	156.9	32419.	8774.	445.	622.	2995.	1359.	59.	2087.	1114.	217.	1800.	11979.	-0.	318.
1975.	216.2	48369.	13822.	657.	857.	4645.	2105.	91.	3246.	1728.	307.	2809.	18607.	-0.	547.
1976.	286.5	67661.	20112.	888.	1082.	6642.	3008.	129.	4664.	2474.	394.	4041.	26706.	-0.	903.
1977.	368.7	91007.	27948.	1149.	1336.	9080.	4109.	174.	6408.	3389.	492.	5557.	36665.	-0.	1414.
1978.	464.0	118962.	37496.	1445.	1620.	11996.	5427.	228.	8512.	4489.	600.	7383.	48670.	-0.	2115.
1979.	574.2	151580.	48678.	1764.	1914.	15352.	6944.	289.	10957.	5768.	712.	9502.	62620.	-0.	3046.
1980.	701.6	189458.	61618.	2112.	2232.	19184.	8674.	358.	13774.	7245.	833.	11942.	78694.	-0.	4243.
1981.	849.2	236144.	77027.	2539.	2676.	23693.	10717.	438.	17111.	9002.	987.	14810.	97790.	-0.	5750.
1982.	1019.3	295953.	96247.	3145.	3393.	29486.	13354.	543.	21389.	11269.	1227.	18445.	122255.	-0.	7629.
1983.	1214.2	365633.	118661.	3801.	4071.	35914.	16287.	659.	26193.	13843.	1460.	22491.	149774.	-0.	9977.
1984.	1436.0	446279.	143751.	4495.	4730.	42976.	19511.	784.	31531.	16730.	1692.	26968.	180415.	-0.	12872.
1985.	1686.8	542792.	173071.	5328.	5594.	51169.	23250.	929.	37750.	20128.	1991.	32172.	216164.	-0.	16380.
1986.	1968.1	657173.	206914.	6294.	6596.	60536.	27525.	1095.	44899.	24071.	2340.	38146.	257341.	-0.	20612.
1987.	2281.2	786502.	244042.	7306.	7544.	70678.	32148.	1271.	52730.	28441.	2678.	44680.	302543.	-0.	25689.
1988.	2627.8	935457.	286095.	8442.	8643.	82073.	37340.	1469.	61575.	33409.	3067.	52056.	353680.	-0.	31706.
1989.	3009.5	1105079.	333427.	9693.	9845.	94796.	43135.	1688.	71505.	39011.	3494.	60336.	411169.	-0.	38794.
1990.	3428.6	1291810.	385008.	10959.	10941.	108509.	49375.	1920.	82309.	45123.	3893.	69342.	473769.	-0.	47096.

CUMULATIVE ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSSES EXCEPT FOR RADIOACTIVE DECAY)

L W R ' S -- NO RECYCLE

CASE 1

ISOTOPE PRODUCTION, KGS

YEAR ENDING	KR STABL	RU STABL	H-3 GRAMS
1960.	.0	0.	0.
1961.	.3	1.	0.
1962.	1.4	8.	0.
1963.	7.8	46.	1.
1964.	13.7	82.	1.
1965.	18.0	107.	2.
1966.	25.8	154.	2.
1967.	34.8	208.	3.
1968.	44.3	263.	4.
1969.	57.9	341.	5.
1970.	79.0	462.	7.
1971.	142.4	831.	13.
1972.	269.4	1569.	25.
1973.	504.0	2948.	48.
1974.	874.6	5138.	83.
1975.	1359.7	8002.	129.
1976.	1953.6	11505.	183.
1977.	2685.1	15816.	248.
1978.	3567.7	21013.	325.
1979.	4593.3	27049.	412.
1980.	5774.6	34001.	511.
1981.	7175.2	42207.	626.
1982.	8974.9	52685.	775.
1983.	10994.0	64396.	938.
1984.	13236.1	77378.	1115.
1985.	15842.5	92469.	1318.
1986.	18833.5	109790.	1550.
1987.	22102.8	128727.	1797.
1988.	25791.6	150099.	2073.
1989.	29930.1	174083.	2379.
1990.	34430.8	200168.	2705.

NET ANNUAL ISOTOPE AVAILABILITY

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

L W R ' S -- NO RECYCLE

CASE 1

DURING PERIOD ENDING	TOTAL INSTALLED CAPACITY		ISOTOPE PRODUCTION, KILOGRAMS/YEAR												
	GW(E)	TONNE	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	CM244 AM3	CM244 SUM	PU238 NP	PU238 CM	PU238 AM	PU238 SUM
1960.	.3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.5	0.	0.	0.	-0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1962.	.5	2.	10.	10.	0.	0.	0.	-0.	-0.	0.	0.	0.	0.	0.	0.
1963.	.6	7.	43.	43.	1.	0.	0.	-0.	-0.	0.	0.	0.	0.	0.	0.
1964.	.6	21.	144.	144.	4.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1965.	.6	21.	177.	177.	7.	1.	1.	0.	0.	0.	0.	1.	0.	0.	1.
1966.	1.0	16.	123.	123.	5.	1.	1.	0.	0.	0.	0.	2.	0.	0.	2.
1967.	1.0	25.	189.	189.	7.	1.	1.	0.	0.	0.	0.	3.	0.	0.	3.
1968.	3.0	36.	271.	271.	11.	1.	2.	0.	0.	0.	0.	3.	0.	0.	4.
1969.	5.7	34.	273.	273.	12.	1.	2.	0.	0.	0.	0.	5.	0.	0.	5.
1970.	12.0	61.	410.	410.	15.	1.	2.	0.	0.	0.	1.	6.	0.	0.	6.
1971.	22.7	101.	685.	685.	24.	2.	3.	0.	0.	0.	1.	7.	0.	1.	8.
1972.	33.7	265.	1751.	1751.	56.	5.	6.	0.	0.	0.	1.	10.	0.	1.	11.
1973.	45.2	551.	3753.	3753.	125.	12.	15.	0.	0.	0.	1.	19.	0.	1.	20.
1974.	57.2	944.	6571.	6571.	226.	22.	27.	0.	1.	1.	2.	39.	0.	1.	41.
1975.	69.7	1423.	10301.	10301.	376.	38.	50.	0.	3.	1.	4.	75.	1.	2.	78.
1976.	82.7	1829.	13709.	13709.	533.	55.	74.	0.	5.	3.	8.	131.	1.	4.	137.
1977.	96.7	2195.	16653.	16653.	672.	68.	92.	0.	10.	5.	15.	204.	2.	8.	214.
1978.	112.2	2657.	20400.	20400.	847.	86.	117.	0.	15.	9.	25.	284.	3.	14.	301.
1979.	129.7	3174.	24537.	24537.	1038.	105.	143.	0.	19.	14.	34.	376.	4.	21.	402.
1980.	150.0	3689.	28512.	28512.	1216.	122.	167.	0.	24.	19.	44.	482.	5.	29.	515.
1981.	173.7	4278.	32904.	32904.	1402.	140.	190.	0.	30.	27.	57.	593.	6.	38.	636.
1982.	200.2	5236.	39452.	39452.	1649.	162.	219.	0.	35.	35.	70.	415.	7.	48.	469.
1983.	229.5	6767.	49979.	49979.	2027.	198.	265.	0.	39.	43.	82.	487.	7.	58.	552.
1984.	261.4	7837.	57922.	57922.	2353.	224.	302.	0.	45.	53.	97.	434.	9.	69.	512.
1985.	295.7	8958.	64934.	64934.	2581.	237.	312.	0.	53.	64.	117.	583.	11.	81.	675.
1986.	332.2	10699.	76552.	76552.	2968.	267.	347.	1.	60.	78.	138.	614.	12.	98.	723.
1987.	370.7	12650.	89186.	89186.	3367.	296.	379.	1.	59.	92.	151.	784.	13.	112.	908.
1988.	411.2	14321.	98960.	98960.	3616.	311.	390.	1.	64.	103.	167.	876.	14.	125.	1015.
1989.	454.1	16493.	112763.	112763.	4048.	342.	423.	1.	67.	120.	187.	1077.	16.	141.	1234.
1990.	500.0	18787.	127380.	127380.	4518.	377.	462.	1.	66.	136.	203.	1192.	16.	157.	1365.

NET ANNUAL ISOTOPE AVAILABILITY

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

L W R ' S -- NO RECYCLE

CASE 1

DURING PERIOD ENDING	ISOTOPE PRODUCTION, KILOGRAMS/YEAR														
	GW-YR	U-235	U-236	PM147	CE144	CS137	SR-90	KR-85	TC-99	RH103 SUM	RU106	PD STABL	XE STABL	CM242 AM1	AM241 PU1
1960.	.2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.4	-0.	-0.	0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	0.	0.
1962.	.4	20.	3.	-0.	0.	1.	0.	0.	1.	0.	0.	0.	3.	0.	0.
1963.	.5	79.	14.	-0.	1.	3.	2.	0.	2.	1.	0.	2.	14.	0.	0.
1964.	.5	199.	48.	0.	3.	20.	9.	0.	14.	7.	1.	13.	78.	0.	0.
1965.	.5	134.	61.	0.	3.	19.	8.	0.	13.	7.	1.	12.	73.	0.	2.
1966.	.8	136.	49.	2.	2.	13.	6.	0.	9.	5.	1.	8.	53.	0.	3.
1967.	.8	221.	71.	2.	3.	24.	11.	0.	17.	9.	1.	15.	95.	0.	4.
1968.	2.6	292.	99.	1.	4.	28.	13.	1.	20.	10.	2.	17.	112.	0.	6.
1969.	4.8	296.	107.	2.	4.	30.	13.	1.	20.	11.	2.	18.	116.	0.	8.
1970.	10.2	584.	147.	2.	7.	42.	19.	1.	29.	16.	3.	24.	167.	0.	10.
1971.	19.3	988.	243.	3.	12.	64.	30.	1.	45.	25.	4.	37.	261.	0.	14.
1972.	28.7	2597.	600.	4.	31.	196.	89.	4.	135.	72.	12.	115.	781.	0.	19.
1973.	38.4	5156.	1278.	6.	63.	392.	179.	8.	272.	147.	24.	230.	1569.	0.	34.
1974.	48.6	8685.	2272.	18.	111.	728.	331.	15.	504.	269.	44.	435.	2893.	0.	64.
1975.	59.3	12386.	3607.	36.	171.	1155.	522.	23.	798.	424.	68.	695.	4564.	0.	118.
1976.	70.3	15631.	4947.	65.	223.	1512.	684.	30.	1044.	553.	89.	908.	5965.	0.	202.
1977.	82.2	18907.	6164.	100.	270.	1850.	838.	37.	1276.	672.	108.	1109.	7289.	0.	314.
1978.	95.3	22879.	7679.	130.	330.	2277.	1032.	45.	1570.	823.	133.	1364.	8963.	0.	451.
1979.	110.2	27396.	9358.	158.	396.	2747.	1245.	55.	1893.	990.	159.	1643.	10805.	0.	620.
1980.	127.4	31965.	10958.	193.	462.	3193.	1448.	63.	2200.	1151.	185.	1907.	12555.	1.	823.
1981.	147.6	37121.	12681.	231.	535.	3678.	1668.	73.	2536.	1329.	215.	2196.	14467.	1.	1060.
1982.	170.1	45752.	15101.	269.	651.	4351.	1980.	87.	3003.	1582.	257.	2581.	17186.	1.	1334.
1983.	194.9	58613.	18836.	312.	849.	5571.	2546.	112.	3851.	2040.	330.	3272.	22019.	1.	1663.
1984.	221.9	68287.	21966.	377.	990.	6245.	2862.	126.	4323.	2316.	381.	3641.	24767.	2.	2080.
1985.	250.8	79033.	24588.	492.	1131.	6933.	3181.	140.	4804.	2599.	433.	4030.	27577.	2.	2564.
1986.	281.2	94583.	28734.	570.	1351.	8068.	3702.	164.	5597.	3058.	515.	4684.	32174.	2.	3109.
1987.	313.2	112093.	33166.	648.	1590.	9266.	4252.	188.	6435.	3549.	605.	5377.	37059.	2.	3752.
1988.	346.6	126742.	36386.	771.	1788.	10135.	4650.	207.	7048.	3933.	679.	5881.	40682.	3.	4502.
1989.	381.7	145976.	41212.	905.	2051.	11441.	5249.	233.	7961.	4470.	777.	6638.	46023.	3.	5337.
1990.	419.1	166230.	46386.	1015.	2328.	12838.	5889.	262.	8937.	5042.	882.	7452.	51741.	3.	6290.

NET ANNUAL ISOTOPE AVAILABILITY

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

LWR'S -- NO RECYCLE

CASE 1

DURING PERIOD ENDING	ISOTOPE PRODUCTION, KILOGRAMS/YEAR		
	KR STABL	RU STABL	H-3 GRAMS
1960.	.0	0.	0.
1961.	-.0	-0.	0.
1962.	.2	1.	0.
1963.	1.0	6.	0.
1964.	5.7	35.	1.
1965.	5.3	32.	1.
1966.	3.9	23.	0.
1967.	7.0	42.	1.
1968.	8.2	48.	1.
1969.	8.5	50.	1.
1970.	12.2	70.	1.
1971.	19.0	108.	2.
1972.	57.0	332.	5.
1973.	114.3	665.	11.
1974.	211.1	1240.	20.
1975.	333.5	1972.	32.
1976.	436.6	2578.	42.
1977.	534.5	3152.	52.
1978.	638.3	3880.	64.
1979.	794.3	4678.	77.
1980.	923.1	5433.	90.
1981.	1063.2	6257.	103.
1982.	1260.5	7386.	122.
1983.	1619.7	9430.	156.
1984.	1817.2	10539.	175.
1985.	2017.8	11684.	194.
1986.	2345.8	13582.	225.
1987.	2691.9	15588.	259.
1988.	2942.3	17044.	282.
1989.	3319.9	19235.	319.
1990.	3724.7	21586.	357.

CUMULATIVE ISOTOPE AVAILABILITY

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

L W R ' S -- NO RECYCLE

CASE 1

YEAR	TOTAL INSTALLED CAPACITY	ISOTOPE PRODUCTION, KGS													
ENDING	GW(E)	TONNE	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	CM244 AM3	CM244 SUM	PU238 NP	PU238 CM	PU238 AM	PU238 SUM
1960.	.3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.5	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	0.	-0.	-0.	-0.	0.
1962.	.5	2.	10.	10.	0.	0.	0.	-0.	-0.	-0.	0.	-0.	-0.	-0.	0.
1963.	.6	9.	52.	52.	1.	0.	0.	-0.	-0.	-0.	0.	0.	-0.	-0.	0.
1964.	.6	30.	197.	197.	6.	1.	0.	0.	0.	-0.	0.	0.	0.	-0.	0.
1965.	.6	52.	374.	374.	13.	1.	2.	0.	0.	0.	0.	1.	0.	0.	1.
1966.	1.0	67.	499.	499.	18.	2.	3.	0.	0.	0.	0.	4.	0.	0.	4.
1967.	1.0	93.	691.	691.	26.	3.	4.	0.	0.	0.	0.	6.	0.	0.	7.
1968.	3.0	128.	966.	966.	37.	4.	5.	0.	1.	0.	1.	10.	0.	0.	10.
1969.	5.7	163.	1245.	1245.	49.	5.	7.	0.	1.	0.	1.	15.	0.	1.	15.
1970.	12.0	224.	1663.	1663.	63.	7.	9.	0.	1.	1.	2.	20.	0.	1.	22.
1971.	22.7	325.	2358.	2358.	87.	9.	11.	0.	1.	1.	2.	27.	0.	2.	29.
1972.	33.7	590.	4122.	4122.	143.	14.	17.	0.	2.	1.	3.	37.	0.	2.	40.
1973.	45.2	1142.	7894.	7894.	268.	25.	32.	0.	2.	2.	4.	56.	0.	3.	59.
1974.	57.2	2086.	14498.	14498.	494.	47.	58.	0.	3.	3.	6.	95.	1.	4.	99.
1975.	69.7	3509.	24864.	24864.	870.	85.	108.	0.	6.	4.	9.	169.	1.	6.	176.
1976.	82.7	5338.	38690.	38690.	1403.	140.	182.	0.	11.	6.	17.	299.	2.	10.	311.
1977.	96.7	7532.	55546.	55546.	2075.	208.	274.	0.	20.	11.	32.	501.	4.	18.	523.
1978.	112.2	10189.	76260.	76260.	2921.	293.	391.	0.	35.	20.	55.	780.	7.	32.	820.
1979.	129.7	13363.	101248.	101248.	3960.	398.	534.	0.	53.	34.	87.	1151.	11.	53.	1215.
1980.	150.0	17052.	130380.	130380.	5176.	519.	700.	0.	76.	52.	127.	1624.	15.	82.	1721.
1981.	173.7	21331.	164106.	164106.	6578.	658.	891.	0.	103.	76.	179.	2203.	21.	119.	2344.
1982.	200.2	26566.	204617.	204617.	8228.	820.	1110.	0.	134.	109.	242.	2601.	27.	166.	2795.
1983.	229.5	33333.	255930.	255930.	10254.	1016.	1374.	0.	168.	147.	315.	3068.	34.	223.	3325.
1984.	261.4	41170.	315514.	315514.	12607.	1238.	1676.	1.	207.	195.	401.	3478.	43.	290.	3811.
1985.	295.7	50128.	382529.	382529.	15188.	1474.	1988.	1.	252.	251.	503.	4034.	53.	369.	4456.
1986.	332.2	60828.	461645.	461645.	18156.	1738.	2335.	1.	302.	320.	622.	4616.	65.	464.	5145.
1987.	370.7	73478.	553940.	553940.	21523.	2031.	2714.	1.	350.	400.	750.	5364.	77.	572.	6013.
1988.	411.2	87799.	656652.	656652.	25140.	2339.	3103.	1.	401.	488.	889.	6198.	90.	693.	6961.
1989.	454.1	104292.	773917.	773917.	29188.	2677.	3527.	1.	453.	589.	1043.	7227.	105.	829.	8161.
1990.	500.0	123078.	906633.	906633.	33706.	3050.	3988.	1.	503.	703.	1206.	8362.	121.	979.	9463.

C U M U L A T I V E I S O T O P E A V A I L A B I L I T Y

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

L W R ' S -- NO RECYCLE

CASE 1

ISOTOPE PRODUCTION, KGS

YEAR ENDING	GW-YR	U-235	U-236	PM147	CE144	CS137	SR-90	KR-85	TC-99	RH103 SUM	RU106	PD STABL	XE STABL	CM242 AM1	AM241 PU1
1960.	.2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.6	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.
1962.	1.0	20.	3.	-0.	0.	1.	0.	0.	1.	0.	0.	0.	3.	-0.	-0.
1963.	1.5	99.	17.	-0.	1.	4.	2.	0.	3.	2.	0.	2.	17.	-0.	0.
1964.	2.1	298.	65.	0.	3.	24.	11.	0.	17.	9.	1.	15.	96.	-0.	1.
1965.	2.6	432.	126.	0.	4.	42.	19.	1.	30.	16.	2.	26.	169.	0.	2.
1966.	3.4	568.	174.	2.	4.	55.	25.	1.	39.	21.	2.	34.	222.	0.	5.
1967.	4.3	789.	245.	3.	5.	78.	35.	1.	56.	29.	2.	49.	317.	0.	9.
1968.	6.8	1081.	344.	4.	6.	104.	47.	2.	75.	40.	3.	66.	429.	0.	15.
1969.	11.7	1377.	450.	5.	7.	132.	59.	2.	96.	51.	3.	84.	545.	0.	23.
1970.	21.9	1960.	598.	6.	10.	170.	77.	3.	124.	66.	4.	108.	712.	0.	33.
1971.	41.2	2948.	841.	7.	16.	231.	105.	4.	169.	91.	6.	145.	973.	0.	46.
1972.	69.9	5545.	1441.	10.	37.	421.	192.	8.	305.	163.	15.	260.	1754.	0.	65.
1973.	108.3	10700.	2720.	14.	79.	803.	366.	15.	576.	309.	31.	490.	3324.	0.	99.
1974.	156.9	19385.	4992.	28.	144.	1513.	688.	29.	1080.	578.	59.	925.	6216.	0.	163.
1975.	216.2	31771.	8599.	58.	230.	2634.	1193.	50.	1878.	1002.	98.	1620.	10781.	0.	280.
1976.	286.5	47402.	13546.	110.	317.	4085.	1848.	77.	2922.	1555.	138.	2528.	16746.	0.	482.
1977.	368.7	66308.	19710.	185.	401.	5841.	2641.	109.	4197.	2227.	177.	3637.	24035.	0.	796.
1978.	464.0	89187.	27389.	274.	495.	7985.	3608.	147.	5767.	3050.	221.	5001.	32998.	0.	1246.
1979.	574.2	116583.	36747.	370.	600.	10550.	4765.	192.	7661.	4040.	270.	6645.	43803.	1.	1864.
1980.	701.6	148548.	47705.	479.	708.	13501.	6097.	244.	9861.	5191.	320.	8552.	56358.	1.	2684.
1981.	849.2	185669.	60385.	602.	826.	16871.	7616.	302.	12397.	6520.	375.	10748.	70825.	1.	3739.
1982.	1019.3	231421.	75487.	735.	991.	20837.	9409.	370.	15400.	8102.	444.	13329.	88011.	1.	5067.
1983.	1214.2	290034.	94322.	880.	1256.	25932.	11725.	459.	19250.	10142.	552.	16600.	110029.	2.	6723.
1984.	1436.0	358321.	116288.	1058.	1507.	31584.	14300.	556.	23573.	12459.	657.	20242.	134796.	2.	8793.
1985.	1686.8	437353.	140876.	1310.	1751.	37795.	17131.	662.	28378.	15057.	761.	24271.	162374.	2.	11344.
1986.	1968.1	531936.	169610.	1583.	2071.	45000.	20414.	784.	33975.	18115.	896.	28955.	194548.	3.	14435.
1987.	2281.2	644030.	202776.	1873.	2442.	53238.	24166.	924.	40409.	21664.	1053.	34332.	231607.	3.	18165.
1988.	2627.8	770772.	239161.	2220.	2792.	62158.	28226.	1073.	47457.	25597.	1205.	40212.	272289.	3.	22640.
1989.	3009.5	916748.	280373.	2623.	3199.	72179.	32784.	1239.	55418.	30068.	1380.	46850.	318312.	4.	27943.
1990.	3428.6	1082978.	326759.	3044.	3644.	83368.	37872.	1424.	64355.	35110.	1572.	54302.	370052.	4.	34190.

CUMULATIVE ISOTOPE AVAILABILITY
(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

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LWR'S -- NO RECYCLE

CASE 1

YEAR ENDING	KR STABL	RU STABL	H-3 GRAMS
1960.	.0	0.	0.
1961.	-.0	-0.	-0.
1962.	.2	1.	0.
1963.	1.3	7.	0.
1964.	7.0	41.	1.
1965.	12.3	74.	1.
1966.	16.2	96.	1.
1967.	23.2	139.	2.
1968.	31.4	187.	3.
1969.	39.9	237.	3.
1970.	52.1	307.	4.
1971.	71.1	415.	6.
1972.	128.2	748.	11.
1973.	242.5	1412.	21.
1974.	453.6	2653.	41.
1975.	787.1	4624.	71.
1976.	1223.7	7202.	109.
1977.	1758.3	10355.	155.
1978.	2416.6	14234.	211.
1979.	3210.9	18912.	276.
1980.	4134.0	24344.	351.
1981.	5197.2	30601.	434.
1982.	6457.7	37986.	533.
1983.	8077.4	47417.	659.
1984.	9894.6	57956.	798.
1985.	11912.5	69640.	948.
1986.	14258.2	83222.	1121.
1987.	16950.2	98811.	1318.
1988.	19892.5	115854.	1528.
1989.	23212.4	135089.	1763.
1990.	26957.1	156675.	2023.

I S O T O P E P R O D U C T I O N

L W R ' S - - U236 RECYCLE

D I S T R I B U T I O N O F E L E C T R I C A L G E N E R A T I N G C A P A C I T Y

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L W R ' S - - U 2 3 6 R E C Y C L E

CASE 2

YEAR ENDING	TOTAL INSTALLED CAPACITY	NEWLY INSTALLED CAPACITY	NEWLY INSTALLED CAPACITY BY REACTOR TYPE, GIGAWATTS ELECTRICAL													
	GW(E)	GW(E)	PWR70	BWR70	PWR80	BWR80	PWR70 30U	BWR70 30U	PWR80 30U	BWR80 30U	LWR70 4PU	LWR80 4PU	LWR70 10PU	LWR70 30PU	LWR80 30PU	LMFBR
1960.	.3	.3	.1	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1961.	.5	.2	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1962.	.5	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1963.	.6	.1	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1964.	.6	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1965.	.6	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1966.	1.0	.4	.3	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1967.	1.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1968.	3.0	2.0	.9	1.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1969.	5.7	2.7	.0	.0	.0	.0	1.4	1.3	.0	.0	.0	.0	.0	.0	.0	.0
1970.	12.0	6.3	.0	.0	.0	.0	3.1	3.2	.0	.0	.0	.0	.0	.0	.0	.0
1971.	22.7	10.7	.0	.0	.0	.0	6.3	4.4	.0	.0	.0	.0	.0	.0	.0	.0
1972.	33.7	11.0	.0	.0	.0	.0	7.3	3.7	.0	.0	.0	.0	.0	.0	.0	.0
1973.	45.2	11.5	.0	.0	.0	.0	7.7	3.8	.0	.0	.0	.0	.0	.0	.0	.0
1974.	57.2	12.0	.0	.0	.0	.0	8.0	4.0	.0	.0	.0	.0	.0	.0	.0	.0
1975.	69.7	12.5	.0	.0	.0	.0	8.3	4.2	.0	.0	.0	.0	.0	.0	.0	.0
1976.	82.7	13.0	.0	.0	.0	.0	8.7	4.3	.0	.0	.0	.0	.0	.0	.0	.0
1977.	96.7	14.0	.0	.0	.0	.0	9.3	4.7	.0	.0	.0	.0	.0	.0	.0	.0
1978.	112.2	15.5	.0	.0	.0	.0	10.3	5.2	.0	.0	.0	.0	.0	.0	.0	.0
1979.	129.7	17.5	.0	.0	.0	.0	11.7	5.8	.0	.0	.0	.0	.0	.0	.0	.0
1980.	150.0	20.3	.0	.0	.0	.0	.0	.0	13.5	6.8	.0	.0	.0	.0	.0	.0
1981.	173.7	23.7	.0	.0	.0	.0	.0	.0	15.8	7.9	.0	.0	.0	.0	.0	.0
1982.	200.2	26.5	.0	.0	.0	.0	.0	.0	17.7	8.8	.0	.0	.0	.0	.0	.0
1983.	229.5	29.3	.0	.0	.0	.0	.0	.0	19.5	9.8	.0	.0	.0	.0	.0	.0
1984.	261.4	31.9	.0	.0	.0	.0	.0	.0	21.3	10.6	.0	.0	.0	.0	.0	.0
1985.	295.7	34.3	.0	.0	.0	.0	.0	.0	22.9	11.4	.0	.0	.0	.0	.0	.0
1986.	332.2	36.5	.0	.0	.0	.0	.0	.0	24.3	12.2	.0	.0	.0	.0	.0	.0
1987.	370.7	38.5	.0	.0	.0	.0	.0	.0	25.7	12.8	.0	.0	.0	.0	.0	.0
1988.	411.2	40.5	.0	.0	.0	.0	.0	.0	27.0	13.5	.0	.0	.0	.0	.0	.0
1989.	454.1	42.9	.0	.0	.0	.0	.0	.0	28.6	14.3	.0	.0	.0	.0	.0	.0
1990.	500.0	45.9	.0	.0	.0	.0	.0	.0	30.6	15.3	.0	.0	.0	.0	.0	.0

DISTRIBUTION OF ELECTRICAL GENERATING CAPACITY

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LWR'S -- U236 RECYCLE

CASE 2

YEAR ENDING	TOTAL INSTALLED CAPACITY GW(E)	NEWLY INSTALLED CAPACITY GW(E)	CUMULATIVE INSTALLED CAPACITY BY REACTOR TYPE, GIGAWATTS ELECTRICAL													
			PWR70	BWR70	PWR80	BWR80	PWR70 30U	BWR70 30U	PWR80 30U	BWR80 30U	LWR70 4PU	LWR80 4PU	LWR70 10PU	LWR70 30PU	LWR80 30PU	LMFBR
1960.	.3	.3	.1	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1961.	.5	.2	.2	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1962.	.5	.0	.2	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1963.	.6	.1	.2	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1964.	.6	.0	.3	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1965.	.6	.0	.3	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1966.	1.0	.4	.6	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1967.	1.0	.0	.6	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1968.	3.0	2.0	1.5	1.5	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1969.	5.7	2.7	1.5	1.5	.0	.0	1.4	1.3	.0	.0	.0	.0	.0	.0	.0	.0
1970.	12.0	6.3	1.5	1.5	.0	.0	4.4	4.5	.0	.0	.0	.0	.0	.0	.0	.0
1971.	22.7	10.7	1.5	1.5	.0	.0	10.8	8.9	.0	.0	.0	.0	.0	.0	.0	.0
1972.	33.7	11.0	1.5	1.5	.0	.0	18.1	12.6	.0	.0	.0	.0	.0	.0	.0	.0
1973.	45.2	11.5	1.5	1.5	.0	.0	25.8	16.4	.0	.0	.0	.0	.0	.0	.0	.0
1974.	57.2	12.0	1.5	1.5	.0	.0	33.8	20.4	.0	.0	.0	.0	.0	.0	.0	.0
1975.	69.7	12.5	1.5	1.5	.0	.0	42.1	24.6	.0	.0	.0	.0	.0	.0	.0	.0
1976.	82.7	13.0	1.5	1.5	.0	.0	50.8	28.9	.0	.0	.0	.0	.0	.0	.0	.0
1977.	96.7	14.0	1.5	1.5	.0	.0	60.1	33.6	.0	.0	.0	.0	.0	.0	.0	.0
1978.	112.2	15.5	1.5	1.5	.0	.0	70.4	38.7	.0	.0	.0	.0	.0	.0	.0	.0
1979.	129.7	17.5	1.5	1.5	.0	.0	82.1	44.6	.0	.0	.0	.0	.0	.0	.0	.0
1980.	150.0	20.3	1.5	1.5	.0	.0	82.1	44.6	13.5	6.8	.0	.0	.0	.0	.0	.0
1981.	173.7	23.7	1.5	1.5	.0	.0	82.1	44.6	29.3	14.7	.0	.0	.0	.0	.0	.0
1982.	200.2	26.5	1.5	1.5	.0	.0	82.1	44.6	47.0	23.5	.0	.0	.0	.0	.0	.0
1983.	229.5	29.3	1.5	1.5	.0	.0	82.1	44.6	66.5	33.3	.0	.0	.0	.0	.0	.0
1984.	261.4	31.9	1.5	1.5	.0	.0	82.1	44.6	87.8	43.9	.0	.0	.0	.0	.0	.0
1985.	295.7	34.3	1.5	1.5	.0	.0	82.1	44.6	110.7	55.3	.0	.0	.0	.0	.0	.0
1986.	332.2	36.5	1.5	1.5	.0	.0	82.1	44.6	135.0	67.5	.0	.0	.0	.0	.0	.0
1987.	370.7	38.5	1.5	1.5	.0	.0	82.1	44.6	160.7	80.3	.0	.0	.0	.0	.0	.0
1988.	411.2	40.5	1.5	1.5	.0	.0	82.1	44.6	187.7	93.6	.0	.0	.0	.0	.0	.0
1989.	454.1	42.9	1.5	1.5	.0	.0	82.1	44.6	216.3	108.1	.0	.0	.0	.0	.0	.0
1990.	500.0	45.9	1.5	1.5	.0	.0	82.1	44.6	246.9	123.4	.0	.0	.0	.0	.0	.0

ANNUAL ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSS BASIS)

L W R ' S -- U236 RECYCLE

CASE 2

DURING PERIOD ENDING	TOTAL INSTALLED CAPACITY		ISOTOPE PRODUCTION, KILOGRAMS/YEAR												
	GW(E)	TONNE	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	CM244 AM3	CM244 SUM	PU238 NP	PU238 CM	PU238 AM	PU238 SUM
1960.	.3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.5	2.	10.	10.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1962.	.5	7.	44.	44.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1963.	.6	21.	147.	147.	5.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1964.	.6	21.	181.	181.	8.	1.	2.	0.	0.	0.	0.	0.	0.	0.	0.
1965.	.6	16.	125.	125.	6.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.
1966.	1.0	25.	192.	192.	8.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.
1967.	1.0	36.	276.	276.	12.	1.	2.	0.	0.	0.	0.	0.	0.	0.	0.
1968.	3.0	34.	278.	278.	13.	1.	2.	0.	0.	0.	0.	0.	0.	0.	0.
1969.	5.7	61.	418.	418.	16.	2.	2.	0.	0.	0.	0.	0.	0.	0.	0.
1970.	12.0	101.	703.	703.	26.	2.	3.	1.	1.	0.	1.	0.	0.	0.	0.
1971.	22.7	265.	1801.	1801.	61.	6.	7.	1.	1.	0.	1.	0.	0.	0.	0.
1972.	33.7	551.	3863.	3863.	134.	14.	17.	4.	4.	0.	4.	0.	0.	0.	0.
1973.	45.2	944.	6751.	6751.	239.	25.	32.	6.	7.	0.	7.	0.	0.	0.	0.
1974.	57.2	1423.	10561.	10561.	398.	44.	59.	12.	14.	0.	14.	0.	0.	0.	0.
1975.	69.7	1829.	14027.	14027.	572.	62.	87.	17.	21.	0.	21.	0.	0.	0.	0.
1976.	82.7	2154.	16654.	16654.	722.	76.	106.	20.	25.	0.	25.	0.	0.	0.	0.
1977.	96.7	2566.	20015.	20015.	920.	93.	132.	25.	31.	0.	31.	0.	0.	0.	0.
1978.	112.2	3027.	23711.	23711.	1144.	112.	159.	31.	38.	0.	38.	0.	0.	0.	0.
1979.	129.7	3564.	27939.	27939.	1398.	132.	187.	36.	44.	0.	44.	0.	0.	0.	0.
1980.	150.0	4244.	33165.	33165.	1709.	157.	220.	43.	52.	0.	52.	0.	0.	0.	0.
1981.	173.7	5190.	39791.	39791.	2046.	182.	254.	49.	59.	0.	59.	0.	0.	0.	0.
1982.	200.2	6641.	49844.	49844.	2507.	219.	303.	59.	69.	0.	69.	0.	0.	0.	0.
1983.	229.5	7627.	57266.	57266.	2933.	245.	343.	67.	77.	0.	77.	0.	0.	0.	0.
1984.	261.4	8845.	65166.	65166.	3375.	264.	359.	72.	77.	0.	77.	0.	0.	0.	0.
1985.	295.7	10500.	76330.	76330.	3973.	295.	397.	80.	83.	0.	83.	0.	0.	0.	0.
1986.	332.2	12533.	89764.	89764.	4660.	330.	436.	89.	88.	0.	88.	0.	0.	0.	0.
1987.	370.7	14179.	100130.	100130.	5204.	356.	464.	96.	91.	0.	91.	0.	0.	0.	0.
1988.	411.2	16324.	114040.	114040.	5929.	392.	504.	105.	96.	0.	96.	0.	0.	0.	0.
1989.	454.1	18069.	124499.	124499.	6452.	414.	526.	110.	97.	0.	97.	0.	0.	0.	0.
1990.	500.0	20233.	138340.	138340.	7196.	451.	570.	120.	104.	0.	104.	0.	0.	0.	0.

ANNUAL ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSS BASIS)

LWR'S -- U236 RECYCLE

CASE 2

DURING PERIOD ENDING	ISOTOPE PRODUCTION, KILOGRAMS/YEAR														
	GW-YR	U-235	U-236	PM147	CE144	CS137	SR-90	KR-85	TC-99	RH103 SUM	RU106	PD STABL	XE STABL	CM242 AM1	AM241 PU1
1960.	.2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.4	21.	3.	0.	0.	1.	0.	0.	1.	0.	0.	0.	3.	0.	0.
1962.	.4	80.	14.	1.	2.	4.	2.	0.	3.	2.	1.	2.	16.	0.	0.
1963.	.5	203.	49.	4.	7.	23.	10.	0.	15.	8.	2.	14.	87.	0.	0.
1964.	.5	136.	62.	4.	7.	21.	10.	0.	14.	8.	2.	13.	81.	0.	2.
1965.	.5	139.	50.	3.	5.	15.	7.	0.	10.	5.	2.	9.	58.	0.	3.
1966.	.8	226.	72.	5.	9.	28.	12.	1.	19.	10.	3.	17.	106.	0.	5.
1967.	.8	298.	101.	6.	11.	32.	15.	1.	22.	12.	4.	19.	124.	0.	6.
1968.	2.6	302.	109.	6.	12.	34.	15.	1.	23.	12.	4.	20.	129.	0.	9.
1969.	4.8	596.	150.	9.	19.	47.	22.	1.	32.	17.	6.	27.	186.	0.	11.
1970.	10.2	988.	251.	15.	31.	74.	35.	2.	50.	27.	9.	41.	293.	0.	15.
1971.	19.5	2581.	625.	42.	84.	226.	103.	5.	152.	80.	26.	129.	879.	0.	22.
1972.	28.7	5090.	1336.	86.	173.	455.	209.	10.	307.	162.	54.	260.	1772.	0.	38.
1973.	38.4	8565.	2376.	152.	304.	845.	385.	18.	568.	296.	98.	490.	3268.	0.	73.
1974.	48.6	12216.	3800.	235.	466.	1338.	606.	28.	898.	465.	153.	784.	5154.	0.	135.
1975.	59.3	15412.	5326.	304.	606.	1751.	794.	36.	1174.	604.	200.	1024.	6738.	0.	231.
1976.	70.3	18270.	6744.	360.	720.	2097.	952.	43.	1405.	718.	238.	1225.	8061.	0.	359.
1977.	82.2	21765.	8566.	431.	864.	2535.	1150.	52.	1697.	864.	286.	1481.	9734.	0.	512.
1978.	95.3	25747.	10695.	510.	1023.	3015.	1368.	62.	2017.	1023.	339.	1760.	11572.	0.	696.
1979.	110.2	30527.	13146.	601.	1209.	3553.	1614.	73.	2377.	1204.	400.	2071.	13643.	0.	915.
1980.	127.4	36457.	16243.	714.	1438.	4208.	1911.	87.	2815.	1428.	476.	2453.	16164.	0.	1174.
1981.	147.6	44827.	19733.	861.	1752.	4984.	2271.	104.	3336.	1698.	570.	2886.	19235.	0.	1482.
1982.	170.1	57117.	24437.	1106.	2262.	6309.	2887.	132.	4227.	2158.	725.	3618.	24390.	0.	1853.
1983.	194.9	66034.	28896.	1259.	2622.	7024.	3225.	148.	4708.	2414.	830.	3996.	27269.	0.	2317.
1984.	221.9	77767.	34003.	1446.	3038.	7906.	3634.	167.	5302.	2738.	957.	4483.	30782.	0.	2852.
1985.	250.8	92605.	40743.	1704.	3607.	9145.	4204.	193.	6137.	3194.	1133.	5181.	35718.	0.	3462.
1986.	281.2	110910.	48759.	2014.	4283.	10592.	4868.	224.	7114.	3735.	1343.	5999.	41499.	0.	4178.
1987.	313.2	125413.	55256.	2260.	4821.	11712.	5382.	248.	7871.	4161.	1510.	6633.	45996.	0.	5021.
1988.	346.6	144569.	63824.	2583.	5530.	13219.	6075.	280.	8889.	4724.	1729.	7482.	52016.	0.	5965.
1989.	381.7	159928.	70339.	2837.	6098.	14322.	6581.	304.	9637.	5154.	1904.	8106.	56495.	0.	7041.
1990.	419.1	179507.	79109.	3160.	6810.	15862.	7288.	337.	10674.	5721.	2125.	8975.	62645.	0.	8221.

ANNUAL ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSS BASIS)

LWR 'S -- U236 RECYCLE

CASE 2

DURING PERIOD ENDING	KR STABL	RU STABL	H-3 GRAMS
1960.	.0	0.	0.
1961.	.3	1.	0.
1962.	1.2	6.	0.
1963.	6.4	39.	1.
1964.	5.9	36.	1.
1965.	4.3	25.	0.
1966.	7.8	47.	1.
1967.	9.1	54.	1.
1968.	9.5	56.	1.
1969.	13.6	78.	1.
1970.	21.3	121.	2.
1971.	64.2	373.	7.
1972.	129.1	750.	13.
1973.	238.5	1400.	24.
1974.	376.6	2225.	39.
1975.	493.2	2909.	51.
1976.	590.8	3483.	61.
1977.	714.2	4210.	74.
1978.	849.7	5006.	88.
1979.	1002.2	5899.	103.
1980.	1186.9	6986.	122.
1981.	1409.2	8258.	145.
1982.	1791.4	10429.	183.
1983.	1997.2	11576.	203.
1984.	2247.0	13005.	229.
1985.	2596.9	15030.	264.
1986.	3004.8	17396.	306.
1987.	3320.4	19229.	338.
1988.	3744.4	21688.	381.
1989.	4053.6	23486.	412.
1990.	4487.6	26003.	457.

CUMULATIVE ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSSES EXCEPT FOR RADIOACTIVE DECAY)

LWR'S -- U236 RECYCLE

CASE 2

YEAR ENDING	TOTAL INSTALLED CAPACITY		ISOTOPE PRODUCTION, KGS												
	GW(E)	TONNE	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	CM244 AM3	CM244 SUM	PU238 NP	PU238 CM	PU238 AM	PU238 SUM
1960.	.3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.5	2.	10.	10.	0.	0.	0.	0.	0.	-0.	0.	-0.	-0.	-0.	0.
1962.	.5	9.	53.	53.	1.	0.	0.	0.	0.	-0.	0.	-0.	-0.	-0.	0.
1963.	.6	30.	201.	201.	6.	1.	1.	0.	0.	-0.	0.	-0.	-0.	-0.	0.
1964.	.6	52.	382.	382.	14.	2.	2.	0.	0.	-0.	0.	-0.	-0.	-0.	0.
1965.	.6	67.	509.	509.	20.	2.	3.	0.	1.	-0.	1.	-0.	-0.	-0.	0.
1966.	1.0	93.	704.	704.	29.	3.	4.	0.	1.	-0.	1.	-0.	-0.	-0.	0.
1967.	1.0	128.	985.	985.	41.	4.	6.	0.	1.	-0.	1.	-0.	-0.	-0.	0.
1968.	3.0	163.	1269.	1269.	54.	6.	8.	0.	2.	-0.	2.	-0.	-0.	-0.	0.
1969.	5.7	224.	1696.	1696.	70.	7.	10.	0.	2.	-0.	2.	-0.	-0.	-0.	0.
1970.	12.0	325.	2410.	2410.	97.	10.	13.	1.	3.	-0.	3.	-0.	-0.	-0.	0.
1971.	22.7	590.	4226.	4226.	158.	15.	19.	2.	4.	-0.	4.	-0.	-0.	-0.	0.
1972.	33.7	1142.	8111.	8111.	291.	29.	37.	4.	8.	-0.	8.	-0.	-0.	-0.	0.
1973.	45.2	2086.	14900.	14900.	531.	54.	68.	7.	14.	-0.	14.	-0.	-0.	-0.	0.
1974.	57.2	3509.	25535.	25535.	928.	97.	127.	13.	27.	-0.	27.	-0.	-0.	-0.	0.
1975.	69.7	5338.	39697.	39697.	1501.	159.	215.	20.	47.	-0.	47.	-0.	-0.	-0.	0.
1976.	82.7	7492.	56582.	56582.	2223.	235.	321.	25.	71.	-0.	71.	-0.	-0.	-0.	0.
1977.	96.7	10058.	76956.	76956.	3142.	328.	453.	31.	99.	-0.	99.	-0.	-0.	-0.	0.
1978.	112.2	13086.	101179.	101179.	4286.	439.	612.	37.	133.	-0.	133.	-0.	-0.	-0.	0.
1979.	129.7	16650.	129814.	129814.	5684.	571.	799.	44.	173.	-0.	173.	-0.	-0.	-0.	0.
1980.	150.0	20894.	163894.	163894.	7393.	727.	1019.	52.	218.	-0.	218.	-0.	-0.	-0.	0.
1981.	173.7	26084.	204859.	204859.	9439.	908.	1273.	60.	269.	-0.	269.	-0.	-0.	-0.	0.
1982.	200.2	32725.	256185.	256185.	11946.	1125.	1576.	72.	328.	-0.	328.	-0.	-0.	-0.	0.
1983.	229.5	40352.	315304.	315304.	14879.	1369.	1918.	82.	393.	-0.	393.	-0.	-0.	-0.	0.
1984.	251.4	49197.	382786.	382786.	18254.	1630.	2278.	89.	455.	-0.	455.	-0.	-0.	-0.	0.
1985.	295.7	59698.	461968.	461968.	22227.	1922.	2675.	99.	521.	-0.	521.	-0.	-0.	-0.	0.
1986.	332.2	72231.	555194.	555194.	26887.	2249.	3111.	110.	590.	-0.	590.	-0.	-0.	-0.	0.
1987.	370.7	86409.	659503.	659503.	32090.	2602.	3574.	119.	659.	-0.	659.	-0.	-0.	-0.	0.
1988.	411.2	102733.	778563.	778563.	38019.	2989.	4078.	130.	730.	-0.	730.	-0.	-0.	-0.	0.
1989.	454.1	120802.	909027.	909027.	44471.	3399.	4604.	138.	800.	-0.	800.	-0.	-0.	-0.	0.
1990.	500.0	141036.	1054408.	1054408.	51666.	3845.	5174.	149.	874.	-0.	874.	-0.	-0.	-0.	0.

CUMULATIVE ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSSES EXCEPT FOR RADIOACTIVE DECAY)

LWR 'S -- U236 RECYCLE

CASE 2

ISOTOPE PRODUCTION, KGS

YEAR ENDING	GW-YR	U-235	U-236	PM147	CE144	CS137	SR-90	KR-85	TC-99	RH103 SUM	RU106	PD STABL	XE STABL	CM242 AM1	AM241 PU1
1960.	.2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.6	21.	3.	0.	0.	1.	0.	0.	1.	0.	0.	0.	3.	-0.	-0.
1962.	1.0	101.	17.	1.	2.	5.	2.	0.	3.	2.	1.	2.	19.	-0.	0.
1963.	1.5	304.	66.	5.	8.	27.	12.	1.	19.	10.	3.	16.	107.	-0.	1.
1964.	2.1	440.	128.	7.	10.	48.	22.	1.	33.	18.	4.	29.	188.	-0.	2.
1965.	2.6	580.	178.	8.	9.	62.	28.	1.	43.	23.	4.	38.	246.	-0.	6.
1966.	3.4	805.	250.	11.	12.	89.	40.	2.	62.	33.	5.	55.	352.	-0.	10.
1967.	4.3	1103.	351.	15.	17.	119.	53.	2.	84.	44.	6.	74.	477.	-0.	17.
1968.	6.8	1405.	460.	17.	19.	150.	67.	3.	106.	56.	7.	93.	606.	-0.	26.
1969.	11.7	2000.	610.	23.	26.	193.	87.	4.	138.	73.	9.	120.	792.	-0.	37.
1970.	21.9	2988.	862.	33.	42.	263.	120.	5.	189.	101.	14.	161.	1084.	-0.	52.
1971.	41.2	5569.	1486.	68.	101.	483.	220.	9.	341.	181.	33.	291.	1963.	-0.	74.
1972.	69.9	10659.	2823.	139.	215.	927.	424.	18.	648.	344.	70.	550.	3735.	-0.	112.
1973.	108.3	19225.	5198.	260.	393.	1751.	798.	35.	1217.	640.	133.	1040.	7003.	-0.	185.
1974.	156.9	31440.	8999.	436.	627.	3049.	1385.	60.	2115.	1105.	220.	1824.	12157.	-0.	320.
1975.	216.2	46852.	14324.	641.	864.	4731.	2145.	93.	3289.	1709.	310.	2848.	18896.	-0.	550.
1976.	286.5	65123.	21068.	856.	1075.	6720.	3044.	130.	4694.	2428.	393.	4073.	26956.	-0.	909.
1977.	368.7	86887.	29634.	1094.	1306.	9102.	4120.	174.	6391.	3291.	482.	5554.	36691.	-0.	1419.
1978.	464.0	112634.	40329.	1356.	1560.	11909.	5388.	226.	8408.	4314.	580.	7314.	48262.	-0.	2113.
1979.	574.2	143161.	53475.	1650.	1851.	15190.	6870.	285.	10785.	5519.	690.	9385.	61905.	-0.	3025.
1980.	701.6	179618.	69718.	1991.	2199.	19051.	8613.	354.	13600.	6947.	821.	11838.	78069.	-0.	4194.
1981.	849.2	224445.	89452.	2401.	2656.	23599.	10673.	436.	16936.	8645.	981.	14724.	97305.	-0.	5670.
1982.	1019.3	281562.	113889.	2963.	3354.	29369.	13299.	540.	21163.	10803.	1215.	18342.	121695.	-0.	7514.
1983.	1214.2	347596.	142785.	3551.	4002.	35722.	16199.	654.	25871.	13217.	1438.	22338.	148964.	-0.	9820.
1984.	1436.0	425363.	176788.	4193.	4683.	42812.	19437.	780.	31172.	15954.	1675.	26821.	179746.	-0.	12656.
1985.	1686.8	517968.	217532.	4948.	5533.	50979.	23165.	925.	37309.	19148.	1971.	32002.	215464.	-0.	16099.
1986.	1968.1	628878.	266291.	5842.	6559.	60406.	27467.	1091.	44423.	22883.	2328.	38000.	256963.	-0.	20253.
1987.	2281.2	754290.	321547.	6779.	7519.	70738.	32177.	1271.	52294.	27044.	2674.	44634.	302958.	-0.	25243.
1988.	2627.8	898859.	385372.	7827.	8623.	82342.	37465.	1473.	61182.	31768.	3066.	52116.	354975.	-0.	31170.
1989.	3009.5	1058787.	455710.	8892.	9644.	94783.	43130.	1685.	70819.	36922.	3437.	60222.	411470.	-0.	38164.
1990.	3428.6	1238294.	534819.	10039.	10776.	108481.	49364.	1917.	81492.	42643.	3843.	69197.	474114.	-0.	46328.

CUMULATIVE ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSSES EXCEPT FOR RADIOACTIVE DECAY)

LWR'S -- U236 RECYCLE

CASE 2

ISOTOPE PRODUCTION, KGS

YEAR ENDING	KR STABL	RU STABL	H-3 GRAMS
1960.	.0	0.	0.
1961.	.3	1.	0.
1962.	1.4	8.	0.
1963.	7.8	46.	1.
1964.	13.7	82.	1.
1965.	18.0	107.	2.
1966.	25.8	154.	2.
1967.	34.8	208.	3.
1968.	44.3	263.	4.
1969.	57.9	341.	5.
1970.	79.2	463.	7.
1971.	143.4	836.	13.
1972.	272.5	1586.	26.
1973.	511.0	2986.	49.
1974.	887.5	5211.	85.
1975.	1380.7	8120.	131.
1976.	1971.5	11603.	185.
1977.	2685.7	15814.	248.
1978.	3535.4	20820.	322.
1979.	4537.6	26719.	407.
1980.	5724.5	33705.	507.
1981.	7133.7	41963.	624.
1982.	8925.1	52392.	772.
1983.	10922.3	63968.	933.
1984.	13169.4	76973.	1111.
1985.	15766.3	92003.	1314.
1986.	18771.1	109399.	1547.
1987.	22091.5	128629.	1800.
1988.	25835.8	150316.	2082.
1989.	29889.4	173803.	2380.
1990.	34377.1	199806.	2706.

NET ANNUAL ISOTOPE AVAILABILITY

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

L W R ' S -- U236 RECYCLE

CASE 2

DURING PERIOD ENDING	TOTAL INSTALLED CAPACITY		ISOTOPE PRODUCTION, KILOGRAMS/YEAR												
	GW(E)	TONNE	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	CM244 AM3	CM244 SUM	PU238 NP	PU238 CM	PU238 AM	PU238 SUM
1960.	.3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.5	0.	0.	0.	-0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1962.	.5	2.	10.	10.	0.	0.	0.	-0.	-0.	0.	0.	0.	0.	0.	0.
1963.	.6	7.	43.	43.	1.	0.	0.	-0.	-0.	0.	0.	0.	0.	0.	0.
1964.	.6	21.	144.	144.	4.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1965.	.6	21.	177.	177.	7.	1.	1.	0.	0.	0.	0.	1.	0.	0.	1.
1966.	1.0	16.	123.	123.	5.	1.	1.	0.	0.	0.	0.	2.	0.	0.	2.
1967.	1.0	25.	189.	189.	7.	1.	1.	0.	0.	0.	0.	3.	0.	0.	3.
1968.	3.0	36.	271.	271.	11.	1.	2.	0.	0.	0.	0.	3.	0.	0.	4.
1969.	5.7	34.	273.	273.	12.	1.	2.	0.	0.	0.	0.	5.	0.	0.	5.
1970.	12.0	61.	410.	410.	15.	1.	2.	0.	0.	0.	1.	6.	0.	0.	6.
1971.	22.7	101.	690.	690.	23.	2.	3.	0.	0.	0.	1.	7.	0.	1.	8.
1972.	33.7	265.	1767.	1767.	55.	5.	6.	0.	0.	0.	1.	10.	0.	1.	11.
1973.	45.2	551.	3789.	3789.	120.	12.	16.	0.	0.	0.	1.	19.	0.	1.	19.
1974.	57.2	944.	6624.	6624.	215.	22.	29.	0.	1.	1.	2.	38.	0.	1.	39.
1975.	69.7	1423.	10363.	10363.	358.	39.	53.	0.	3.	1.	4.	72.	1.	2.	75.
1976.	82.7	1829.	13770.	13770.	515.	56.	78.	0.	6.	3.	9.	126.	1.	4.	131.
1977.	96.7	2154.	16356.	16356.	650.	68.	96.	0.	11.	5.	16.	196.	2.	8.	206.
1978.	112.2	2566.	19665.	19665.	828.	84.	119.	0.	17.	10.	26.	274.	3.	15.	291.
1979.	129.7	3027.	23306.	23306.	1030.	101.	143.	0.	20.	15.	36.	365.	4.	22.	391.
1980.	150.0	3564.	27470.	27470.	1258.	119.	169.	0.	25.	20.	45.	472.	5.	29.	506.
1981.	173.7	4244.	32617.	32617.	1538.	141.	198.	0.	30.	27.	58.	595.	5.	38.	638.
1982.	200.2	5190.	39142.	39142.	1841.	163.	228.	0.	36.	36.	71.	416.	6.	47.	469.
1983.	229.5	6641.	49030.	49030.	2257.	196.	273.	0.	42.	44.	85.	507.	8.	57.	571.
1984.	261.4	7627.	56349.	56349.	2640.	220.	308.	0.	47.	55.	102.	462.	9.	68.	539.
1985.	295.7	8845.	64144.	64144.	3037.	237.	323.	1.	56.	66.	122.	631.	11.	81.	722.
1986.	332.2	10500.	75145.	75145.	3576.	265.	357.	1.	62.	80.	142.	676.	12.	97.	785.
1987.	370.7	12533.	88381.	88381.	4194.	296.	393.	1.	62.	95.	157.	886.	13.	111.	1010.
1988.	411.2	14179.	98623.	98623.	4683.	320.	417.	1.	67.	106.	173.	1010.	14.	124.	1149.
1989.	454.1	16324.	112347.	112347.	5336.	352.	454.	1.	71.	123.	194.	1274.	16.	140.	1430.
1990.	500.0	18069.	122704.	122704.	5806.	372.	473.	1.	73.	140.	213.	1449.	17.	157.	1623.

NET ANNUAL ISOTOPE AVAILABILITY

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

L W R ' S -- U236 RECYCLE

CASE 2

DURING PERIOD ENDING	ISOTOPE PRODUCTION, KILOGRAMS/YEAR														
	GW-YR	U-235	U-236	PM147	CE144	CS137	SR-90	KR-85	TC-99	RH103 SUM	RU106	PD STABL	XE STABL	CM242 AM1	AM241 PU1
1960.	.2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.4	-0.	-0.	0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	0.	0.
1962.	.4	20.	3.	-0.	0.	1.	0.	0.	1.	0.	0.	0.	3.	0.	0.
1963.	.5	79.	14.	-0.	1.	3.	2.	0.	2.	1.	0.	2.	14.	0.	0.
1964.	.5	199.	48.	0.	3.	20.	9.	0.	14.	7.	1.	13.	78.	0.	0.
1965.	.5	134.	61.	0.	3.	19.	8.	0.	13.	7.	1.	12.	73.	0.	2.
1966.	.8	136.	49.	2.	2.	13.	6.	0.	9.	5.	1.	8.	53.	0.	3.
1967.	.8	221.	71.	2.	3.	24.	11.	0.	17.	9.	1.	15.	95.	0.	4.
1968.	2.6	292.	99.	1.	4.	28.	13.	1.	20.	10.	2.	17.	112.	0.	6.
1969.	4.8	296.	107.	2.	4.	30.	13.	1.	20.	11.	2.	18.	116.	0.	8.
1970.	10.2	584.	147.	2.	7.	42.	19.	1.	29.	16.	3.	24.	167.	0.	10.
1971.	19.3	968.	246.	3.	12.	65.	30.	1.	45.	25.	4.	37.	264.	0.	14.
1972.	28.7	2529.	612.	4.	31.	199.	91.	4.	137.	72.	12.	117.	791.	0.	19.
1973.	38.4	4988.	1309.	6.	64.	400.	183.	8.	276.	146.	24.	234.	1595.	0.	34.
1974.	48.6	8394.	2328.	18.	113.	743.	338.	15.	511.	267.	44.	441.	2941.	0.	65.
1975.	59.3	11971.	3724.	36.	172.	1177.	532.	23.	809.	419.	69.	706.	4639.	0.	119.
1976.	70.3	15104.	5219.	63.	224.	1540.	697.	31.	1057.	544.	90.	922.	6065.	0.	203.
1977.	82.2	17905.	6609.	98.	266.	1845.	835.	37.	1264.	646.	107.	1103.	7255.	0.	316.
1978.	95.3	21330.	8394.	127.	320.	2230.	1010.	44.	1527.	777.	129.	1333.	8761.	0.	451.
1979.	110.2	25232.	10482.	150.	379.	2651.	1201.	53.	1815.	921.	153.	1584.	10414.	0.	613.
1980.	127.4	29916.	12883.	180.	447.	3125.	1417.	62.	2139.	1084.	180.	1864.	12278.	1.	806.
1981.	147.6	35728.	15918.	213.	532.	3701.	1678.	73.	2533.	1286.	214.	2208.	14548.	1.	1035.
1982.	170.1	43930.	19339.	250.	649.	4383.	1994.	87.	3002.	1529.	257.	2597.	17312.	1.	1306.
1983.	194.9	55975.	23949.	298.	837.	5548.	2535.	111.	3805.	1942.	326.	3256.	21951.	1.	1633.
1984.	221.9	64713.	28318.	359.	971.	6177.	2832.	125.	4237.	2172.	374.	3597.	24542.	1.	2042.
1985.	250.8	76212.	33323.	461.	1124.	6952.	3190.	141.	4771.	2464.	430.	4035.	27704.	2.	2513.
1986.	281.2	90753.	39928.	524.	1335.	8042.	3691.	163.	5523.	2874.	510.	4663.	32146.	2.	3051.
1987.	313.2	108691.	47784.	603.	1586.	9315.	4274.	189.	6403.	3362.	604.	5399.	37349.	2.	3682.
1988.	346.6	122905.	54151.	710.	1785.	10300.	4725.	209.	7084.	3745.	679.	5970.	41396.	3.	4425.
1989.	381.7	141677.	62548.	839.	2047.	11625.	5333.	237.	8000.	4252.	778.	6734.	46815.	3.	5257.
1990.	419.1	156729.	68932.	942.	2257.	12596.	5778.	257.	8673.	4638.	857.	7295.	50846.	3.	6206.

NET ANNUAL ISOTOPE AVAILABILITY

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

L W R ' S -- U236 RECYCLE

CASE 2

DURING
PERIOD
ENDING

ISOTOPE PRODUCTION, KILOGRAMS/YEAR

	KR STABL	RU STABL	H-3 GRAMS
1960.	.0	0.	0.
1961.	-.0	-0.	0.
1962.	.2	1.	0.
1963.	1.0	6.	0.
1964.	5.7	35.	1.
1965.	5.3	32.	1.
1966.	3.9	23.	0.
1967.	7.0	42.	1.
1968.	8.2	48.	1.
1969.	8.5	50.	1.
1970.	12.2	70.	1.
1971.	19.2	109.	2.
1972.	57.8	336.	6.
1973.	116.2	675.	11.
1974.	214.6	1260.	21.
1975.	338.9	2002.	33.
1976.	443.9	2619.	43.
1977.	551.7	3135.	52.
1978.	642.8	3789.	63.
1979.	764.7	4506.	74.
1980.	902.0	5309.	88.
1981.	1068.2	6288.	104.
1982.	1268.3	7432.	123.
1983.	1612.3	9386.	156.
1984.	1797.5	10418.	173.
1985.	2022.3	11705.	194.
1986.	2337.2	13527.	225.
1987.	2704.4	15657.	260.
1988.	2988.3	17306.	287.
1989.	3369.9	19519.	324.
1990.	3648.3	21138.	351.

CUMULATIVE ISOTOPE AVAILABILITY

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

L W R ' S -- U236 RECYCLE

CASE 2

YEAR ENDING	TOTAL INSTALLED CAPACITY	ISOTOPE PRODUCTION, KGS													
	GW(E)	TONNE	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	CM244 AM3	CM244 SUM	PU238 NP	PU238 CM	PU238 AM	PU238 SUM
1960.	.3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.5	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	0.	-0.	-0.	-0.	0.
1962.	.5	2.	10.	10.	0.	0.	0.	-0.	-0.	-0.	0.	-0.	-0.	-0.	0.
1963.	.6	9.	52.	52.	1.	0.	0.	-0.	-0.	-0.	0.	0.	-0.	-0.	0.
1964.	.6	30.	197.	197.	6.	1.	0.	0.	0.	-0.	0.	0.	0.	-0.	0.
1965.	.6	52.	374.	374.	13.	1.	2.	0.	0.	0.	0.	1.	0.	0.	1.
1966.	1.0	67.	499.	499.	18.	2.	3.	0.	0.	0.	0.	4.	0.	0.	4.
1967.	1.0	93.	691.	691.	26.	3.	4.	0.	0.	0.	0.	6.	0.	0.	7.
1968.	3.0	128.	966.	966.	37.	4.	5.	0.	1.	0.	1.	10.	0.	0.	10.
1969.	5.7	163.	1245.	1245.	49.	5.	7.	0.	1.	0.	1.	15.	0.	1.	15.
1970.	12.0	224.	1663.	1663.	63.	7.	9.	0.	1.	1.	2.	20.	0.	1.	22.
1971.	22.7	325.	2363.	2363.	87.	9.	11.	0.	1.	1.	2.	27.	0.	2.	29.
1972.	33.7	590.	4144.	4144.	142.	14.	17.	0.	2.	1.	3.	37.	0.	2.	40.
1973.	45.2	1142.	7952.	7952.	262.	26.	33.	0.	2.	2.	4.	55.	0.	3.	59.
1974.	57.2	2086.	14609.	14609.	477.	48.	62.	0.	3.	3.	6.	93.	1.	4.	98.
1975.	69.7	3509.	25037.	25037.	836.	87.	115.	0.	6.	4.	10.	164.	1.	6.	171.
1976.	82.7	5338.	38926.	38926.	1351.	143.	193.	0.	11.	7.	18.	289.	2.	10.	301.
1977.	96.7	7492.	55485.	55485.	2000.	211.	289.	0.	22.	12.	34.	482.	5.	18.	505.
1978.	112.2	10058.	75467.	75467.	2828.	294.	407.	0.	38.	21.	59.	752.	8.	33.	793.
1979.	129.7	13086.	99224.	99224.	3858.	395.	550.	0.	57.	36.	92.	1112.	11.	54.	1178.
1980.	150.0	16650.	127308.	127308.	5116.	513.	719.	0.	80.	54.	134.	1575.	16.	83.	1674.
1981.	173.7	20894.	160732.	160732.	6654.	653.	917.	0.	107.	80.	187.	2158.	21.	120.	2299.
1982.	200.2	26084.	200908.	200908.	8495.	816.	1145.	0.	139.	113.	251.	2557.	27.	166.	2751.
1983.	229.5	32725.	251244.	251244.	10752.	1011.	1418.	0.	175.	152.	327.	3044.	35.	222.	3301.
1984.	261.4	40352.	309226.	309226.	13391.	1230.	1726.	1.	216.	201.	417.	3482.	43.	289.	3814.
1985.	295.7	49197.	375412.	375412.	16429.	1465.	2050.	1.	263.	260.	523.	4086.	54.	367.	4507.
1986.	332.2	59698.	453071.	453071.	20004.	1728.	2407.	1.	315.	330.	645.	4730.	65.	462.	5257.
1987.	370.7	72231.	544503.	544503.	24198.	2021.	2800.	1.	365.	412.	778.	5579.	78.	569.	6226.
1988.	411.2	86409.	646808.	646808.	28881.	2338.	3217.	1.	418.	503.	922.	6546.	92.	689.	7326.
1989.	454.1	102733.	763581.	763581.	34217.	2686.	3670.	1.	473.	608.	1081.	7769.	107.	824.	8700.
1990.	500.0	120802.	891541.	891541.	40023.	3054.	4143.	1.	528.	725.	1254.	9157.	123.	974.	10255.

C U M U L A T I V E I S O T O P E A V A I L A B I L I T Y

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

L W R ' S -- U236 RECYCLE

CASE 2

ISOTOPE PRODUCTION, KGS

YEAR ENDING	GW-YR	U-235	U-236	PM147	CE144	CS137	SR-90	KR-85	TC-99	RH103 SUM	RU106	PD STABL	XE STABL	CM242 AM1	AM241 PU1
1960.	.2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.6	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.
1962.	1.0	20.	3.	-0.	0.	1.	0.	0.	1.	0.	0.	0.	3.	-0.	-0.
1963.	1.5	99.	17.	-0.	1.	4.	2.	0.	3.	2.	0.	2.	17.	-0.	0.
1964.	2.1	298.	65.	0.	3.	24.	11.	0.	17.	9.	1.	15.	96.	-0.	1.
1965.	2.6	432.	126.	0.	4.	42.	19.	1.	30.	16.	2.	26.	169.	0.	2.
1966.	3.4	568.	174.	2.	4.	55.	25.	1.	39.	21.	2.	34.	222.	0.	5.
1967.	4.3	789.	245.	3.	5.	78.	35.	1.	56.	29.	2.	49.	317.	0.	9.
1968.	6.8	1081.	344.	4.	6.	104.	47.	2.	75.	40.	3.	66.	429.	0.	15.
1969.	11.7	1377.	450.	5.	7.	132.	59.	2.	96.	51.	3.	84.	545.	0.	23.
1970.	21.9	1960.	598.	6.	10.	170.	77.	3.	124.	66.	4.	108.	712.	0.	33.
1971.	41.2	2928.	844.	7.	16.	232.	105.	4.	170.	91.	6.	145.	976.	0.	46.
1972.	69.9	5458.	1457.	10.	38.	425.	194.	8.	307.	163.	15.	261.	1767.	0.	65.
1973.	108.3	10446.	2766.	14.	80.	815.	372.	16.	583.	309.	32.	495.	3361.	0.	99.
1974.	156.9	18840.	5094.	28.	145.	1540.	700.	29.	1095.	576.	60.	936.	6303.	0.	163.
1975.	216.2	30812.	8819.	58.	232.	2681.	1216.	51.	1904.	994.	99.	1642.	10942.	0.	282.
1976.	286.5	45915.	14038.	108.	320.	4160.	1883.	78.	2961.	1538.	139.	2563.	17006.	0.	485.
1977.	368.7	63820.	20647.	182.	398.	5910.	2673.	110.	4225.	2185.	177.	3666.	24261.	0.	801.
1978.	464.0	85150.	29041.	267.	483.	8004.	3617.	147.	5752.	2962.	217.	4999.	33022.	0.	1250.
1979.	574.2	110382.	39523.	357.	578.	10473.	4730.	191.	7568.	3883.	261.	6582.	43436.	1.	1862.
1980.	701.6	140298.	52406.	456.	685.	13359.	6032.	241.	9706.	4967.	311.	8446.	55714.	1.	2665.
1981.	849.2	176026.	68324.	565.	814.	16754.	7562.	299.	12240.	6252.	370.	10654.	70262.	1.	3696.
1982.	1019.3	219956.	87663.	688.	983.	20754.	9371.	368.	15242.	7781.	441.	13251.	87574.	1.	4997.
1983.	1214.2	275931.	111611.	829.	1242.	25828.	11677.	456.	19047.	9723.	547.	16508.	109525.	2.	6622.
1984.	1436.0	340644.	139929.	1000.	1481.	31416.	14223.	552.	23283.	11895.	647.	20104.	134067.	2.	8654.
1985.	1686.8	416856.	173253.	1235.	1734.	37651.	17065.	658.	28055.	14359.	754.	24139.	161771.	2.	11154.
1986.	1968.1	507609.	213181.	1480.	2048.	44833.	20339.	780.	33578.	17233.	887.	28802.	193917.	3.	14188.
1987.	2281.2	616300.	260965.	1747.	2428.	53124.	24116.	921.	39980.	20595.	1048.	34200.	231266.	3.	17849.
1988.	2627.8	739204.	315116.	2062.	2783.	62210.	28252.	1073.	47064.	24340.	1203.	40170.	272663.	3.	22247.
1989.	3009.5	880882.	377664.	2434.	3192.	72415.	32894.	1243.	55064.	28591.	1380.	46904.	319477.	4.	27470.
1990.	3428.6	1037611.	446596.	2824.	3570.	83357.	37868.	1422.	63737.	33229.	1547.	54200.	370323.	4.	33635.

CUMULATIVE ISOTOPE AVAILABILITY

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

L W R ' S -- U236 RECYCLE

CASE 2

ISOTOPE PRODUCTION, KGS

YEAR ENDING	KR STABL	RU STABL	H-3 GRAMS
1960.	.0	0.	0.
1961.	-.0	-0.	-0.
1962.	.2	1.	0.
1963.	1.3	7.	0.
1964.	7.0	41.	1.
1965.	12.3	74.	1.
1966.	16.2	96.	1.
1967.	23.2	139.	2.
1968.	31.4	187.	3.
1969.	39.9	237.	3.
1970.	52.1	307.	4.
1971.	71.3	416.	6.
1972.	129.1	752.	11.
1973.	245.2	1428.	22.
1974.	459.9	2687.	41.
1975.	798.8	4689.	72.
1976.	1242.7	7308.	111.
1977.	1774.4	10443.	157.
1978.	2417.2	14232.	211.
1979.	3181.9	18738.	274.
1980.	4083.9	24047.	347.
1981.	5152.1	30335.	431.
1982.	6420.3	37767.	531.
1983.	8032.6	47153.	657.
1984.	9830.1	57571.	794.
1985.	11852.4	69276.	945.
1986.	14189.6	82803.	1117.
1987.	16894.0	98460.	1316.
1988.	19882.3	115766.	1531.
1989.	23252.2	135285.	1771.
1990.	26900.5	156423.	2024.

I S O T O P E P R O D U C T I O N

L W R ' S - - P U R E C Y C L E

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CASE 3

[illegible]

DISTRIBUTION OF ELECTRICAL GENERATING CAPACITY

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LWR'S -- PU RECYCLE

CASE 3

YEAR ENDING	TOTAL INSTALLED CAPACITY GW(E)	NEWLY INSTALLED CAPACITY GW(E)	CUMULATIVE INSTALLED CAPACITY BY REACTOR TYPE, GIGAWATTS ELECTRICAL													
			PWR70	BWR70	PWR80	BWR80	PWR70 30U	BWR70 30U	PWR80 30U	BWR80 30U	LWR70 4PU	LWR80 4PU	LWR70 10PU	LWR70 30PU	LWR80 30PU	LMFBR
1960.	.3	.3	.1	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1961.	.5	.2	.2	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1962.	.5	.0	.2	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1963.	.6	.1	.2	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1964.	.6	.0	.3	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1965.	.6	.0	.3	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1966.	1.0	.4	.6	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1967.	1.0	.0	.6	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1968.	3.0	2.0	1.5	1.5	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1969.	5.7	2.7	2.9	2.8	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1970.	12.0	6.3	6.0	6.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1971.	22.7	10.7	12.3	10.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1972.	33.7	11.0	19.6	14.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1973.	45.2	11.5	27.3	17.9	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1974.	57.2	12.0	33.3	20.9	.0	.0	.0	.0	.0	.0	.0	.0	.0	3.0	.0	.0
1975.	69.7	12.5	39.8	23.9	.0	.0	.0	.0	.0	.0	.0	.0	.0	6.0	.0	.0
1976.	82.7	13.0	46.5	27.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	9.0	.0	.0
1977.	96.7	14.0	53.5	30.7	.0	.0	.0	.0	.0	.0	.0	.0	.0	12.5	.0	.0
1978.	112.2	15.5	61.2	34.5	.0	.0	.0	.0	.0	.0	.0	.0	.0	16.5	.0	.0
1979.	129.7	17.5	69.9	38.8	.0	.0	.0	.0	.0	.0	.0	.0	.0	21.0	.0	.0
1980.	150.0	20.3	69.9	38.8	10.2	5.1	.0	.0	.0	.0	.0	.0	.0	21.0	5.0	.0
1981.	173.7	23.7	69.9	38.8	22.0	11.0	.0	.0	.0	.0	.0	.0	.0	21.0	11.0	.0
1982.	200.2	26.5	69.9	38.8	34.7	17.3	.0	.0	.0	.0	.0	.0	.0	21.0	18.5	.0
1983.	229.5	29.3	69.9	38.8	48.4	24.1	.0	.0	.0	.0	.0	.0	.0	21.0	27.3	.0
1984.	261.4	31.9	69.9	38.8	63.4	31.5	.0	.0	.0	.0	.0	.0	.0	21.0	36.8	.0
1985.	295.7	34.3	69.9	38.8	79.4	39.5	.0	.0	.0	.0	.0	.0	.0	21.0	47.1	.0
1986.	332.2	36.5	69.9	38.8	95.8	47.7	.0	.0	.0	.0	.0	.0	.0	21.0	59.0	.0
1987.	370.7	38.5	69.9	38.8	112.1	55.9	.0	.0	.0	.0	.0	.0	.0	21.0	73.0	.0
1988.	411.2	40.5	69.9	38.8	128.8	64.2	.0	.0	.0	.0	.0	.0	.0	21.0	88.5	.0
1989.	454.1	42.9	69.9	38.8	146.4	73.0	.0	.0	.0	.0	.0	.0	.0	21.0	105.0	.0
1990.	500.0	45.9	69.9	38.8	165.3	82.5	.0	.0	.0	.0	.0	.0	.0	21.0	122.5	.0

ANNUAL ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSS BASIS)

LWR'S -- PU RECYCLE

CASE 3

DURING PERIOD ENDING	TOTAL INSTALLED CAPACITY		ISOTOPE PRODUCTION, KILOGRAMS/YEAR												
	GW(E)	TONNE	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	CM244 AM3	CM244 SUM	PU238 NP	PU238 CM	PU238 AM	PU238 SUM
1960.	.3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.5	2.	10.	10.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1962.	.5	7.	44.	44.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1963.	.6	21.	147.	147.	5.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1964.	.6	21.	181.	181.	8.	1.	2.	0.	0.	0.	0.	0.	0.	0.	0.
1965.	.6	16.	125.	125.	6.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.
1966.	1.0	25.	192.	192.	8.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.
1967.	1.0	36.	276.	276.	12.	1.	2.	0.	0.	0.	0.	0.	0.	0.	0.
1968.	3.0	34.	278.	278.	13.	1.	2.	0.	0.	0.	0.	0.	0.	0.	0.
1969.	5.7	61.	418.	418.	16.	2.	2.	0.	0.	0.	0.	0.	0.	0.	0.
1970.	12.0	101.	697.	697.	26.	2.	3.	1.	1.	0.	1.	0.	0.	0.	0.
1971.	22.7	265.	1784.	1784.	63.	6.	6.	1.	1.	0.	1.	0.	0.	0.	0.
1972.	33.7	551.	3826.	3826.	139.	13.	16.	3.	4.	0.	4.	0.	0.	0.	0.
1973.	45.2	944.	6697.	-3644.	251.	24.	30.	6.	6.	0.	6.	0.	0.	0.	0.
1974.	57.2	1423.	10592.	251.	417.	42.	55.	11.	13.	0.	13.	0.	0.	0.	0.
1975.	69.7	1858.	15522.	1215.	590.	71.	101.	18.	23.	0.	23.	0.	0.	0.	0.
1976.	82.7	2259.	20019.	-136.	740.	100.	153.	26.	37.	0.	37.	0.	0.	0.	0.
1977.	96.7	2683.	25059.	-1137.	912.	141.	230.	36.	64.	0.	64.	0.	0.	0.	0.
1978.	112.2	3155.	31318.	-1744.	1089.	195.	320.	49.	96.	0.	96.	0.	0.	0.	0.
1979.	129.7	3676.	38165.	1563.	1259.	257.	430.	64.	135.	0.	135.	0.	0.	0.	0.
1980.	150.0	4270.	45802.	-11.	1438.	328.	557.	80.	182.	0.	182.	0.	0.	0.	0.
1981.	173.7	5285.	60538.	-3989.	1662.	473.	834.	113.	281.	0.	281.	0.	0.	0.	0.
1982.	200.2	6671.	74959.	-334.	2018.	581.	1037.	139.	351.	0.	351.	0.	0.	0.	0.
1983.	229.5	7825.	92467.	1192.	2329.	727.	1327.	173.	445.	0.	445.	0.	0.	0.	0.
1984.	261.4	8946.	106769.	1603.	2545.	838.	1570.	199.	522.	0.	522.	0.	0.	0.	0.
1985.	295.7	10695.	132400.	939.	2897.	1060.	2060.	250.	673.	0.	673.	0.	0.	0.	0.
1986.	332.2	12596.	157315.	582.	3265.	1244.	2487.	294.	796.	0.	796.	0.	0.	0.	0.
1987.	370.7	14290.	180181.	-651.	3501.	1396.	2904.	330.	900.	0.	900.	0.	0.	0.	0.
1988.	411.2	16220.	205522.	-63.	3857.	1570.	3335.	371.	1019.	0.	1019.	0.	0.	0.	0.
1989.	454.1	18555.	241386.	-661.	4293.	1860.	4062.	438.	1225.	0.	1225.	0.	0.	0.	0.
1990.	500.0	20394.	272651.	44750.	4605.	2122.	4742.	500.	1421.	0.	1421.	0.	0.	0.	0.

ANNUAL ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSS BASIS)

LWR'S -- PU RECYCLE

CASE 3

DURING PERIOD ENDING	ISOTOPE PRODUCTION, KILOGRAMS/YEAR														
	GW-YR	U-235	U-236	PM147	CE144	CS137	SR-90	KR-85	TC-99	RH103 SUM	RU106	PD STABL	XE STABL	CM242 AM1	AM241 PU1
1960.	.2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.4	21.	3.	0.	0.	1.	0.	0.	1.	0.	0.	0.	3.	0.	0.
1962.	.4	80.	14.	1.	2.	4.	2.	0.	3.	2.	1.	2.	16.	0.	0.
1963.	.5	203.	49.	4.	7.	23.	10.	0.	15.	8.	2.	14.	87.	0.	0.
1964.	.5	136.	62.	4.	7.	21.	10.	0.	14.	8.	2.	13.	81.	0.	2.
1965.	.5	139.	50.	3.	5.	15.	7.	0.	10.	5.	2.	9.	58.	0.	3.
1966.	.8	226.	72.	5.	9.	28.	12.	1.	19.	10.	3.	17.	106.	0.	5.
1967.	.8	298.	101.	6.	11.	32.	15.	1.	22.	12.	4.	19.	124.	0.	6.
1968.	2.6	302.	109.	6.	12.	34.	15.	1.	23.	12.	4.	20.	129.	0.	9.
1969.	4.8	596.	150.	9.	19.	47.	22.	1.	32.	17.	6.	27.	186.	0.	11.
1970.	10.2	1008.	248.	15.	31.	73.	34.	2.	50.	27.	9.	41.	290.	0.	15.
1971.	19.3	2650.	613.	43.	83.	222.	102.	5.	150.	80.	26.	128.	868.	0.	22.
1972.	28.7	5261.	1305.	87.	171.	446.	204.	9.	302.	163.	53.	256.	1743.	0.	38.
1973.	38.4	8862.	2318.	156.	301.	828.	377.	17.	560.	299.	97.	483.	3214.	0.	73.
1974.	48.6	12639.	3680.	241.	462.	1313.	595.	27.	886.	471.	152.	773.	5072.	0.	40.
1975.	59.3	15681.	4982.	315.	603.	1731.	777.	35.	1167.	625.	207.	1036.	6676.	0.	43.
1976.	70.3	18871.	6135.	386.	735.	2136.	949.	43.	1438.	774.	262.	1302.	8230.	0.	54.
1977.	82.2	22106.	7421.	462.	879.	2574.	1133.	52.	1730.	937.	321.	1599.	9907.	0.	54.
1978.	95.3	25898.	8763.	546.	1038.	3069.	1339.	61.	2060.	1119.	388.	1935.	11799.	0.	44.
1979.	110.2	30037.	10101.	637.	1209.	3586.	1553.	71.	2406.	1315.	460.	2293.	13783.	0.	29.
1980.	127.4	34627.	11536.	739.	1398.	4143.	1781.	81.	2779.	1530.	540.	2682.	15926.	0.	43.
1981.	147.6	42147.	13373.	902.	1708.	4959.	2101.	96.	3325.	1868.	679.	3292.	19146.	0.	43.
1982.	170.1	53156.	16476.	1152.	2181.	6226.	2651.	121.	4180.	2356.	852.	4095.	24053.	0.	8.
1983.	194.9	61914.	19022.	1350.	2564.	7097.	2995.	137.	4767.	2739.	1021.	4733.	27505.	0.	5.
1984.	221.9	71136.	21117.	1534.	2921.	7893.	3315.	152.	5304.	3089.	1173.	5303.	30673.	0.	16.
1985.	250.8	84365.	24274.	1826.	3478.	9208.	3829.	175.	6189.	3666.	1425.	6279.	35868.	0.	30.
1986.	281.3	99364.	27746.	2136.	4076.	10553.	4370.	200.	7097.	4255.	1680.	7240.	41224.	0.	39.
1987.	313.2	112080.	30260.	2399.	4584.	11577.	4769.	219.	7792.	4742.	1907.	8003.	45381.	0.	45.
1988.	346.6	126744.	33624.	2706.	5175.	12896.	5293.	243.	8682.	5327.	2167.	8964.	50659.	0.	39.
1989.	381.7	143900.	37545.	3078.	5883.	14553.	5929.	273.	9795.	6067.	2500.	10231.	57260.	0.	39.
1990.	419.1	156926.	40289.	3366.	6424.	15842.	6400.	294.	10659.	6658.	2778.	11278.	62397.	0.	33.

ANNUAL ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSS BASIS)

LWR'S -- PU RECYCLE

CASE 3

DURING PERIOD ENDING	ISOTOPE PRODUCTION, KILOGRAMS/YEAR		
	KR STABL	RU STABL	H-3 GRAMS
1960.	.0	0.	0.
1961.	.3	1.	0.
1962.	1.2	6.	0.
1963.	6.4	39.	1.
1964.	5.9	36.	1.
1965.	4.3	25.	0.
1966.	7.8	47.	1.
1967.	9.1	54.	1.
1968.	9.5	56.	1.
1969.	13.6	78.	1.
1970.	21.1	120.	2.
1971.	63.4	369.	6.
1972.	127.0	739.	13.
1973.	254.6	1378.	24.
1974.	370.5	2191.	38.
1975.	483.5	2896.	50.
1976.	590.5	3589.	62.
1977.	703.8	4343.	75.
1978.	851.4	5195.	89.
1979.	963.3	6090.	104.
1980.	1104.2	7057.	120.
1981.	1300.5	8496.	143.
1982.	1640.0	10638.	180.
1983.	1847.5	12154.	204.
1984.	2041.3	13533.	227.
1985.	2353.4	15834.	264.
1986.	2682.2	18166.	302.
1987.	2923.1	19957.	331.
1988.	3242.2	22259.	369.
1989.	3628.6	25191.	416.
1990.	3913.2	27511.	452.

CUMULATIVE ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSSES EXCEPT FOR RADIOACTIVE DECAY)

L W R ' S -- PU RECYCLE

CASE 3

YEAR	TOTAL INSTALLED CAPACITY	ISOTOPE PRODUCTION, KGS													
ENDING	GW(E)	TONNE	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	CM244 AM3	CM244 SUM	PU238 NP	PU238 CM	PU238 AM	PU238 SUM
1960.	.3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.5	2.	10.	10.	0.	0.	0.	0.	0.	-0.	0.	-0.	-0.	-0.	0.
1962.	.5	9.	53.	53.	1.	0.	0.	0.	0.	-0.	0.	-0.	-0.	-0.	0.
1963.	.6	30.	201.	201.	6.	1.	1.	0.	0.	-0.	0.	-0.	-0.	-0.	0.
1964.	.6	52.	382.	382.	14.	2.	2.	0.	0.	-0.	0.	-0.	-0.	-0.	0.
1965.	.6	67.	509.	509.	20.	2.	3.	0.	1.	-0.	1.	-0.	-0.	-0.	0.
1966.	1.0	93.	704.	704.	29.	3.	4.	0.	1.	-0.	1.	-0.	-0.	-0.	0.
1967.	1.0	128.	985.	985.	41.	4.	6.	0.	1.	-0.	1.	-0.	-0.	-0.	0.
1968.	3.0	163.	1269.	1269.	54.	6.	8.	0.	2.	-0.	2.	-0.	-0.	-0.	0.
1969.	5.7	224.	1696.	1696.	70.	7.	10.	0.	2.	-0.	2.	-0.	-0.	-0.	0.
1970.	12.0	325.	2405.	2405.	97.	10.	13.	1.	3.	-0.	3.	-0.	-0.	-0.	0.
1971.	22.7	590.	4204.	4204.	159.	15.	19.	2.	4.	-0.	4.	-0.	-0.	-0.	0.
1972.	33.7	1142.	8052.	8052.	298.	28.	35.	4.	7.	-0.	7.	-0.	-0.	-0.	0.
1973.	45.2	2086.	14787.	4446.	549.	52.	65.	7.	13.	-0.	13.	-0.	-0.	-0.	0.
1974.	57.2	3509.	25452.	4770.	967.	95.	120.	12.	26.	-0.	26.	-0.	-0.	-0.	0.
1975.	69.7	5367.	41014.	6025.	1557.	165.	221.	21.	48.	-0.	48.	-0.	-0.	-0.	0.
1976.	82.7	7626.	61077.	5932.	2297.	265.	374.	30.	83.	-0.	83.	-0.	-0.	-0.	0.
1977.	96.7	10309.	86190.	4850.	3209.	406.	605.	43.	144.	-0.	144.	-0.	-0.	-0.	0.
1978.	112.2	13464.	117562.	3159.	4298.	600.	925.	58.	235.	-0.	235.	-0.	-0.	-0.	0.
1979.	129.7	17139.	155771.	4766.	5557.	856.	1354.	76.	361.	-0.	361.	-0.	-0.	-0.	0.
1980.	150.0	21409.	201602.	4783.	6995.	1183.	1911.	96.	529.	-0.	529.	-0.	-0.	-0.	0.
1981.	173.7	26694.	262183.	837.	8656.	1654.	2744.	133.	790.	-0.	790.	-0.	-0.	-0.	0.
1982.	200.2	33365.	337185.	546.	10674.	2233.	3781.	167.	1112.	-0.	1112.	-0.	-0.	-0.	0.
1983.	229.5	41189.	429659.	1746.	13003.	2956.	5107.	209.	1515.	-0.	1515.	-0.	-0.	-0.	0.
1984.	261.4	50136.	536434.	3354.	15548.	3790.	6677.	243.	1980.	-0.	1980.	-0.	-0.	-0.	0.
1985.	295.7	60831.	668849.	4308.	18445.	4844.	8737.	302.	2578.	-0.	2578.	-0.	-0.	-0.	0.
1986.	332.2	73427.	826195.	4921.	21710.	6081.	11223.	358.	3277.	-0.	3277.	-0.	-0.	-0.	0.
1987.	370.7	87717.	1006415.	4309.	25211.	7467.	14126.	405.	4055.	-0.	4055.	-0.	-0.	-0.	0.
1988.	411.2	103937.	1211982.	4291.	29068.	9026.	17460.	457.	4921.	-0.	4921.	-0.	-0.	-0.	0.
1989.	454.1	122492.	1453406.	3669.	33361.	10872.	21521.	535.	5962.	-0.	5962.	-0.	-0.	-0.	0.
1990.	500.0	142886.	1726096.	48458.	37966.	12977.	26261.	613.	7159.	-0.	7159.	-0.	-0.	-0.	0.

CUMULATIVE ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSSES EXCEPT FOR RADIOACTIVE DECAY)

LWR'S -- PU RECYCLE

CASE 3

ISOTOPE PRODUCTION, KGS

YEAR ENDING	GW-YR	U-235	U-236	PM147	CE144	CS137	SR-90	KR-85	TC-99	RH103 SUM	RU106	PD STABL	XE STABL	CM242 AM1	AM241 PU1
1960.	.2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.6	21.	3.	0.	0.	1.	0.	0.	1.	0.	0.	0.	3.	-0.	-0.
1962.	1.0	101.	17.	1.	2.	5.	2.	0.	3.	2.	1.	2.	19.	-0.	0.
1963.	1.5	304.	66.	5.	8.	27.	12.	1.	19.	10.	3.	16.	107.	-0.	1.
1964.	2.1	440.	128.	7.	10.	48.	22.	1.	33.	18.	4.	29.	188.	-0.	2.
1965.	2.6	580.	178.	8.	9.	62.	28.	1.	43.	23.	4.	38.	246.	-0.	6.
1966.	3.4	805.	250.	11.	12.	89.	40.	2.	62.	33.	5.	55.	352.	-0.	10.
1967.	4.3	1103.	351.	15.	17.	119.	53.	2.	84.	44.	6.	74.	477.	-0.	17.
1968.	6.8	1405.	460.	17.	19.	150.	67.	3.	106.	56.	7.	93.	606.	-0.	26.
1969.	11.7	2000.	610.	23.	26.	193.	87.	4.	138.	73.	9.	120.	792.	-0.	37.
1970.	21.9	3008.	858.	33.	42.	262.	119.	5.	188.	101.	14.	161.	1082.	-0.	52.
1971.	41.2	5658.	1471.	68.	100.	479.	218.	9.	339.	181.	33.	289.	1949.	-0.	74.
1972.	69.9	10919.	2775.	140.	213.	914.	417.	18.	640.	344.	70.	545.	3693.	-0.	112.
1973.	108.3	19781.	5094.	264.	389.	1721.	784.	34.	1200.	643.	132.	1028.	6907.	-0.	185.
1974.	156.9	32419.	8774.	445.	622.	2995.	1359.	59.	2087.	1114.	217.	1800.	11979.	-0.	225.
1975.	216.2	48100.	13756.	660.	859.	4657.	2103.	91.	3253.	1738.	316.	2836.	18655.	-0.	267.
1976.	286.5	66971.	19891.	896.	1089.	6687.	3001.	128.	4691.	2512.	420.	4138.	26885.	-0.	321.
1977.	368.7	89077.	27312.	1155.	1326.	9108.	4060.	172.	6421.	3449.	531.	5737.	36792.	-0.	375.
1978.	464.0	114976.	36074.	1439.	1584.	11969.	5300.	222.	8481.	4568.	653.	7672.	48591.	-0.	418.
1979.	574.2	145013.	46176.	1751.	1860.	15281.	6723.	279.	10887.	5882.	786.	9964.	62374.	-0.	446.
1980.	701.7	179639.	57712.	2093.	2163.	19075.	8340.	343.	13666.	7412.	934.	12647.	78299.	-0.	488.
1981.	849.2	221786.	71085.	2522.	2598.	23599.	10237.	417.	16990.	9280.	1146.	15939.	97445.	-0.	531.
1982.	1019.3	274942.	87560.	3103.	3249.	29285.	12638.	512.	21170.	11636.	1426.	20034.	121499.	-0.	538.
1983.	1214.2	336857.	106582.	3750.	3900.	35714.	15324.	617.	25937.	14375.	1734.	24767.	149003.	-0.	542.
1984.	1436.1	407992.	127699.	4434.	4525.	42791.	18264.	730.	31241.	17464.	2040.	30070.	179676.	-0.	557.
1985.	1686.9	492357.	151974.	5257.	5339.	51021.	21647.	860.	37429.	21129.	2445.	36349.	215544.	-0.	586.
1986.	1968.1	591721.	179720.	6202.	6272.	60409.	25488.	1006.	44526.	25385.	2903.	43589.	256768.	-0.	624.
1987.	2281.3	703802.	209979.	7197.	7164.	70606.	29634.	1163.	52318.	30126.	3359.	51591.	302149.	-0.	668.
1988.	2627.9	830546.	243603.	8273.	8122.	81890.	34203.	1333.	61000.	35453.	3846.	60555.	352807.	-0.	706.
1989.	3009.6	974445.	281148.	9478.	9224.	94572.	39295.	1523.	70795.	41520.	4423.	70786.	410067.	-0.	743.
1990.	3428.7	1131371.	321436.	10698.	10217.	108254.	44734.	1722.	81453.	48178.	4990.	82064.	472464.	-0.	776.

CUMULATIVE ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSSES EXCEPT FOR RADIOACTIVE DECAY)

L W R ' S -- PU RECYCLE

CASE 3

ISOTOPE PRODUCTION, KGS

YEAR ENDING	KR STABL	RU STABL	H-3 GRAMS
1960.	.0	0.	0.
1961.	.3	1.	0.
1962.	1.4	8.	0.
1963.	7.8	46.	1.
1964.	13.7	82.	1.
1965.	18.0	107.	2.
1966.	25.8	154.	2.
1967.	34.8	208.	3.
1968.	44.3	263.	4.
1969.	57.9	341.	5.
1970.	79.0	462.	7.
1971.	142.4	831.	13.
1972.	269.4	1569.	25.
1973.	504.0	2948.	48.
1974.	874.6	5138.	83.
1975.	1358.1	8035.	129.
1976.	1948.6	11624.	184.
1977.	2652.4	15967.	248.
1978.	3483.8	21162.	323.
1979.	4447.1	27252.	409.
1980.	5551.3	34309.	506.
1981.	6851.8	42805.	622.
1982.	8491.8	53443.	767.
1983.	10359.3	65597.	929.
1984.	12380.6	79130.	1105.
1985.	14734.0	94964.	1308.
1986.	17416.2	113129.	1539.
1987.	20359.3	133086.	1786.
1988.	23581.5	155345.	2056.
1989.	27210.1	180536.	2359.
1990.	31123.4	208048.	2682.

NET ANNUAL ISOTOPE AVAILABILITY

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

L W R ' S -- PU RECYCLE

CASE 3

DURING PERIOD ENDING	TOTAL INSTALLED CAPACITY	ISOTOPE PRODUCTION, KILOGRAMS/YEAR													
	GW(E)	TONNE	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	CM244 AM3	CM244 SUM	PU238 NP	PU238 CM	PU238 AM	PU238 SUM
1960.	.3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.5	0.	0.	0.	-0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1962.	.5	2.	10.	10.	0.	0.	0.	-0.	-0.	0.	0.	0.	0.	0.	0.
1963.	.6	7.	43.	43.	1.	0.	0.	-0.	-0.	0.	0.	0.	0.	0.	0.
1964.	.6	21.	144.	144.	4.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1965.	.6	21.	177.	177.	7.	1.	1.	0.	0.	0.	0.	1.	0.	0.	1.
1966.	1.0	16.	123.	123.	5.	1.	1.	0.	0.	0.	0.	2.	0.	0.	2.
1967.	1.0	25.	189.	189.	7.	1.	1.	0.	0.	0.	0.	3.	0.	0.	3.
1968.	3.0	36.	271.	271.	11.	1.	2.	0.	0.	0.	0.	3.	0.	0.	4.
1969.	5.7	34.	273.	273.	12.	1.	2.	0.	0.	0.	0.	5.	0.	0.	5.
1970.	12.0	61.	410.	410.	15.	1.	2.	0.	0.	0.	1.	6.	0.	0.	6.
1971.	22.7	101.	685.	685.	24.	2.	3.	0.	0.	0.	1.	7.	0.	1.	8.
1972.	33.7	265.	1751.	1751.	56.	5.	6.	0.	0.	0.	1.	10.	0.	1.	11.
1973.	45.2	551.	3753.	3753.	125.	12.	15.	0.	0.	0.	1.	19.	0.	1.	20.
1974.	57.2	944.	6571.	-3564.	226.	22.	27.	0.	1.	1.	2.	39.	0.	1.	41.
1975.	69.7	1423.	10384.	250.	376.	38.	50.	0.	3.	1.	4.	75.	1.	2.	78.
1976.	82.7	1858.	15216.	1195.	531.	63.	91.	0.	5.	3.	8.	131.	1.	4.	137.
1977.	96.7	2259.	19624.	-128.	666.	90.	138.	0.	10.	5.	15.	204.	2.	8.	213.
1978.	112.2	2683.	24563.	-1109.	821.	127.	207.	0.	18.	9.	28.	282.	3.	14.	300.
1979.	129.7	3155.	30696.	-1705.	980.	175.	288.	0.	30.	17.	47.	370.	5.	24.	399.
1980.	150.0	3676.	37405.	1534.	1133.	231.	387.	0.	52.	27.	78.	465.	7.	36.	507.
1981.	173.7	4270.	44890.	-7.	1294.	295.	501.	0.	77.	42.	118.	563.	9.	53.	625.
1982.	200.2	5285.	59331.	-3905.	1496.	425.	750.	1.	108.	61.	170.	394.	11.	74.	480.
1983.	229.5	6671.	73460.	-327.	1816.	522.	933.	1.	146.	85.	231.	457.	14.	100.	572.
1984.	261.4	7825.	90618.	1169.	2096.	653.	1194.	1.	225.	116.	341.	403.	20.	131.	554.
1985.	295.7	8946.	104635.	1573.	2290.	753.	1413.	1.	282.	173.	455.	534.	25.	186.	746.
1986.	332.2	10695.	129755.	923.	2607.	953.	1854.	1.	357.	222.	579.	556.	31.	233.	820.
1987.	370.7	12596.	154173.	575.	2938.	1118.	2238.	2.	419.	290.	708.	706.	36.	302.	1044.
1988.	411.2	14290.	176581.	-633.	3151.	1254.	2613.	2.	540.	371.	912.	780.	45.	357.	1183.
1989.	454.1	16220.	201416.	-58.	3471.	1411.	3002.	3.	639.	484.	1122.	956.	53.	456.	1465.
1990.	500.0	18555.	236562.	-644.	3864.	1671.	3655.	3.	722.	601.	1323.	1051.	59.	536.	1647.

NET ANNUAL ISOTOPE AVAILABILITY

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

L W R ' S -- PU RECYCLE

CASE 3

DURING PERIOD ENDING	ISOTOPE PRODUCTION, KILOGRAMS/YEAR														
	GW-YR	U-235	U-236	PM147	CE144	CS137	SR-90	KR-85	TC-99	RH103 SUM	RU106	PD STABL	XE STABL	CM242 AM1	AM241 PU1
1960.	.2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.4	-0.	-0.	0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	0.	0.
1962.	.4	20.	3.	-0.	0.	1.	0.	0.	1.	0.	0.	0.	3.	0.	0.
1963.	.5	79.	14.	-0.	1.	3.	2.	0.	2.	1.	0.	2.	14.	0.	0.
1964.	.5	199.	48.	0.	3.	20.	9.	0.	14.	7.	1.	13.	78.	0.	0.
1965.	.5	134.	61.	0.	3.	19.	8.	0.	13.	7.	1.	12.	73.	0.	2.
1966.	.8	136.	49.	2.	2.	13.	6.	0.	9.	5.	1.	8.	53.	0.	3.
1967.	.8	221.	71.	2.	3.	24.	11.	0.	17.	9.	1.	15.	95.	0.	4.
1968.	2.6	292.	99.	1.	4.	28.	13.	1.	20.	10.	2.	17.	112.	0.	6.
1969.	4.8	296.	107.	2.	4.	30.	13.	1.	20.	11.	2.	18.	116.	0.	8.
1970.	10.2	584.	147.	2.	7.	42.	19.	1.	29.	16.	3.	24.	167.	0.	10.
1971.	19.3	988.	243.	3.	12.	64.	30.	1.	45.	25.	4.	37.	261.	0.	14.
1972.	28.7	2597.	600.	4.	31.	196.	89.	4.	135.	72.	12.	115.	781.	0.	19.
1973.	38.4	5156.	1278.	6.	63.	392.	179.	8.	272.	147.	24.	230.	1569.	0.	34.
1974.	48.6	8685.	2272.	18.	111.	728.	331.	15.	504.	269.	44.	435.	2893.	0.	64.
1975.	59.3	12386.	3607.	36.	171.	1155.	522.	23.	798.	424.	68.	695.	4564.	0.	35.
1976.	70.3	15367.	4882.	65.	223.	1522.	682.	30.	1050.	562.	93.	932.	6009.	0.	38.
1977.	82.2	18494.	6012.	100.	272.	1879.	834.	36.	1294.	696.	118.	1172.	7407.	0.	48.
1978.	95.3	21664.	7273.	131.	325.	2264.	995.	44.	1557.	843.	145.	1439.	8917.	0.	47.
1979.	110.2	25380.	8587.	161.	384.	2699.	1176.	51.	1854.	1007.	174.	1741.	10619.	1.	39.
1980.	127.4	29436.	9899.	192.	447.	3153.	1363.	60.	2165.	1183.	207.	2063.	12404.	1.	25.
1981.	147.6	33934.	11305.	228.	518.	3644.	1564.	68.	2501.	1377.	243.	2414.	14333.	1.	38.
1982.	170.1	41304.	13106.	265.	632.	4361.	1845.	81.	2992.	1681.	306.	2963.	17232.	2.	38.
1983.	194.9	52093.	16146.	308.	807.	5475.	2328.	102.	3762.	2120.	384.	3685.	21648.	2.	7.
1984.	221.9	60676.	18642.	376.	949.	6242.	2630.	115.	4290.	2465.	460.	4260.	24754.	3.	4.
1985.	250.8	69713.	20695.	480.	1081.	6942.	2910.	128.	4774.	2780.	528.	4773.	27606.	4.	14.
1986.	281.3	82678.	23789.	562.	1288.	8098.	3362.	148.	5570.	3299.	641.	5651.	32281.	5.	27.
1987.	313.2	97377.	27191.	639.	1509.	9281.	3837.	169.	6388.	3830.	756.	6516.	37102.	7.	34.
1988.	346.6	109839.	29655.	761.	1697.	10181.	4187.	185.	7013.	4267.	858.	7202.	40843.	8.	39.
1989.	381.7	124209.	32951.	890.	1916.	11342.	4648.	205.	7814.	4794.	975.	8067.	45593.	10.	34.
1990.	419.1	141022.	36794.	1000.	2178.	12798.	5206.	230.	8816.	5460.	1125.	9208.	51534.	12.	34.

NET ANNUAL ISOTOPE AVAILABILITY

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

L W R ' S -- PU RECYCLE

CASE 3

DURING
PERIOD
ENDING

ISOTOPE PRODUCTION, KILOGRAMS/YEAR

	KR STABL	RU STABL	H-3 GRAMS
1960.	.0	0.	0.
1961.	-.0	-0.	0.
1962.	.2	1.	0.
1963.	1.0	6.	0.
1964.	5.7	35.	1.
1965.	5.3	32.	1.
1966.	3.9	23.	0.
1967.	7.0	42.	1.
1968.	8.2	48.	1.
1969.	8.5	50.	1.
1970.	12.2	70.	1.
1971.	19.0	108.	2.
1972.	57.0	332.	5.
1973.	114.3	665.	11.
1974.	211.1	1240.	20.
1975.	333.5	1972.	32.
1976.	435.1	2607.	43.
1977.	531.5	3230.	53.
1978.	633.4	3909.	63.
1979.	748.3	4676.	76.
1980.	867.0	5481.	88.
1981.	993.8	6351.	102.
1982.	1170.4	7647.	122.
1983.	1476.0	9574.	153.
1984.	1662.7	10939.	174.
1985.	1837.2	12180.	193.
1986.	2118.1	14251.	225.
1987.	2414.0	16349.	257.
1988.	2630.8	17961.	282.
1989.	2918.0	20033.	314.
1990.	3265.8	22672.	354.

CUMULATIVE ISOTOPE AVAILABILITY

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

L W R ' S -- PU RECYCLE

CASE 3

YEAR ENDING	TOTAL INSTALLED CAPACITY	ISOTOPE PRODUCTION, KGS													
	GW(E)	TONNE	PU-RP	PU-SF	NP237	AM241	AM243	CM242	CM244	CM244 AM3	CM244 SUM	PU238 NP	PU238 CM	PU238 AM	PU238 SUM
1960.	.3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.5	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	0.	-0.	-0.	-0.	0.
1962.	.5	2.	10.	10.	0.	0.	0.	-0.	-0.	-0.	0.	-0.	-0.	-0.	0.
1963.	.6	9.	52.	52.	1.	0.	0.	-0.	-0.	-0.	0.	0.	-0.	-0.	0.
1964.	.6	30.	197.	197.	6.	1.	0.	0.	0.	-0.	0.	0.	0.	-0.	0.
1965.	.6	52.	374.	374.	13.	1.	2.	0.	0.	0.	0.	1.	0.	0.	1.
1966.	1.0	67.	499.	499.	18.	2.	3.	0.	0.	0.	0.	4.	0.	0.	4.
1967.	1.0	93.	691.	691.	26.	3.	4.	0.	0.	0.	0.	6.	0.	0.	7.
1968.	3.0	128.	966.	966.	37.	4.	5.	0.	1.	0.	1.	10.	0.	0.	10.
1969.	5.7	163.	1245.	1245.	49.	5.	7.	0.	1.	0.	1.	15.	0.	1.	15.
1970.	12.0	224.	1663.	1663.	63.	7.	9.	0.	1.	1.	2.	20.	0.	1.	22.
1971.	22.7	325.	2358.	2358.	87.	9.	11.	0.	1.	1.	2.	27.	0.	2.	29.
1972.	33.7	590.	4122.	4122.	143.	14.	17.	0.	2.	1.	3.	37.	0.	2.	40.
1973.	45.2	1142.	7894.	7894.	268.	25.	32.	0.	2.	2.	4.	56.	0.	3.	59.
1974.	57.2	2086.	14498.	4364.	494.	47.	58.	0.	3.	3.	6.	95.	1.	4.	99.
1975.	69.7	3509.	24946.	4678.	870.	85.	108.	0.	6.	4.	9.	169.	1.	6.	176.
1976.	82.7	5367.	40198.	5909.	1401.	148.	199.	0.	11.	6.	17.	299.	2.	10.	311.
1977.	96.7	7626.	59860.	5819.	2067.	238.	337.	0.	20.	11.	32.	500.	4.	18.	522.
1978.	112.2	10309.	84472.	4758.	2888.	365.	544.	0.	38.	20.	58.	779.	8.	32.	818.
1979.	129.7	13464.	115215.	3100.	3868.	539.	832.	0.	67.	36.	103.	1143.	12.	56.	1211.
1980.	150.0	17139.	152658.	4673.	5001.	770.	1219.	0.	116.	62.	178.	1598.	19.	92.	1709.
1981.	173.7	21409.	197574.	4692.	6295.	1063.	1720.	0.	188.	101.	289.	2149.	27.	144.	2320.
1982.	200.2	26694.	256943.	824.	7791.	1486.	2470.	1.	290.	159.	448.	2527.	39.	217.	2782.
1983.	229.5	33365.	330442.	536.	9607.	2006.	3402.	1.	425.	238.	662.	2965.	53.	315.	3333.
1984.	261.4	41189.	421067.	1711.	11703.	2657.	4596.	1.	634.	345.	979.	3344.	73.	444.	3861.
1985.	295.7	50136.	525706.	3288.	13993.	3406.	6009.	1.	892.	505.	1397.	3853.	97.	627.	4577.
1986.	332.2	60831.	655475.	4225.	16601.	4353.	7862.	2.	1215.	708.	1923.	4379.	128.	855.	5361.
1987.	370.7	73427.	809675.	4826.	19539.	5464.	10100.	2.	1588.	971.	2559.	5051.	162.	1150.	6363.
1988.	411.2	87717.	986291.	4228.	22690.	6710.	12712.	3.	2069.	1306.	3375.	5792.	206.	1499.	7497.
1989.	454.1	103937.	1187746.	4209.	26161.	8111.	15713.	3.	2630.	1741.	4370.	6703.	258.	1943.	8903.
1990.	500.0	122492.	1424342.	3599.	30025.	9770.	19367.	3.	3253.	2276.	5529.	7702.	315.	2464.	10481.

CUMULATIVE ISOTOPE AVAILABILITY

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

L W R ' S -- PU RECYCLE

CASE 3

ISOTOPE PRODUCTION, KGS

YEAR ENDING	GW-YR	U-235	U-236	PM147	CE144	CS137	SR-90	KR-85	TC-99	RH103 SUM	RU106	PD STABL	XE STABL	CM242 AM1	AM241 PU1
1960.	.2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.6	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.
1962.	1.0	20.	3.	-0.	0.	1.	0.	0.	1.	0.	0.	0.	3.	-0.	-0.
1963.	1.5	99.	17.	-0.	1.	4.	2.	0.	3.	2.	0.	2.	17.	-0.	0.
1964.	2.1	298.	65.	0.	3.	24.	11.	0.	17.	9.	1.	15.	96.	-0.	1.
1965.	2.6	432.	126.	0.	4.	42.	19.	1.	30.	16.	2.	26.	169.	0.	2.
1966.	3.4	568.	174.	2.	4.	55.	25.	1.	39.	21.	2.	34.	222.	0.	5.
1967.	4.3	789.	245.	3.	5.	78.	35.	1.	56.	29.	2.	49.	317.	0.	9.
1968.	6.8	1081.	344.	4.	6.	104.	47.	2.	75.	40.	3.	66.	429.	0.	15.
1969.	11.7	1377.	450.	5.	7.	132.	59.	2.	96.	51.	3.	84.	545.	0.	23.
1970.	21.9	1960.	598.	6.	10.	170.	77.	3.	124.	66.	4.	108.	712.	0.	33.
1971.	41.2	2948.	841.	7.	16.	231.	105.	4.	169.	91.	6.	145.	973.	0.	46.
1972.	69.9	5545.	1441.	10.	37.	421.	192.	8.	305.	163.	15.	260.	1754.	0.	65.
1973.	108.3	10700.	2720.	14.	79.	803.	366.	15.	576.	309.	31.	490.	3324.	0.	99.
1974.	156.9	19385.	4992.	28.	144.	1513.	688.	29.	1080.	578.	59.	925.	6216.	0.	163.
1975.	216.2	31771.	8599.	58.	230.	2634.	1193.	50.	1878.	1002.	98.	1620.	10781.	0.	198.
1976.	286.5	47138.	13481.	110.	318.	4096.	1846.	77.	2928.	1564.	142.	2552.	16789.	0.	236.
1977.	368.7	65632.	19493.	185.	403.	5881.	2635.	108.	4222.	2261.	189.	3724.	24196.	0.	283.
1978.	464.0	87296.	26766.	275.	491.	8010.	3565.	145.	5779.	3104.	239.	5163.	33113.	0.	330.
1979.	574.2	112676.	35353.	373.	586.	10526.	4653.	188.	7633.	4111.	294.	6904.	43732.	1.	368.
1980.	701.7	142112.	45252.	481.	689.	13439.	5903.	235.	9798.	5294.	354.	8968.	56136.	1.	393.
1981.	849.2	176047.	56557.	600.	801.	16776.	7322.	289.	12299.	6671.	420.	11382.	70469.	1.	430.
1982.	1019.3	217350.	69663.	729.	962.	20754.	8988.	352.	15291.	8352.	516.	14345.	87701.	2.	468.
1983.	1214.2	269443.	85809.	872.	1203.	25755.	11096.	432.	19053.	10472.	641.	18030.	109349.	3.	474.
1984.	1436.1	330119.	104451.	1051.	1444.	31408.	13454.	520.	23343.	12937.	780.	22290.	134103.	3.	477.
1985.	1686.9	399832.	125145.	1293.	1675.	37632.	16036.	616.	28116.	15717.	918.	27063.	161708.	5.	491.
1986.	1968.1	482510.	148934.	1562.	1976.	44870.	19006.	725.	33686.	19016.	1100.	32714.	193990.	6.	517.
1987.	2281.3	579887.	176125.	1848.	2322.	53127.	22378.	849.	40074.	22846.	1306.	39230.	231091.	8.	550.
1988.	2627.9	689725.	205780.	2190.	2652.	62094.	26018.	981.	47086.	27114.	1511.	46432.	271934.	9.	589.
1989.	3009.6	813935.	238731.	2584.	3006.	72018.	30030.	1125.	54900.	31908.	1731.	54500.	317527.	12.	622.
1990.	3428.7	954956.	275525.	2999.	3414.	83171.	34501.	1285.	63715.	37368.	1991.	63708.	369061.	14.	655.

CUMULATIVE ISOTOPE AVAILABILITY

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

LWR'S -- PU RECYCLE

CASE 3

ISOTOPE PRODUCTION, KGS

YEAR ENDING	KR STABL	RU STABL	H-3 GRAMS
1960.	.0	0.	0.
1961.	-.0	-0.	-0.
1962.	.2	1.	0.
1963.	1.3	7.	0.
1964.	7.0	41.	1.
1965.	12.3	74.	1.
1966.	16.2	96.	1.
1967.	23.2	139.	2.
1968.	31.4	187.	3.
1969.	39.9	237.	3.
1970.	52.1	307.	4.
1971.	71.1	415.	6.
1972.	128.2	748.	11.
1973.	242.5	1412.	21.
1974.	453.6	2653.	41.
1975.	787.1	4624.	71.
1976.	1222.2	7231.	110.
1977.	1753.7	10461.	156.
1978.	2387.2	14370.	211.
1979.	3135.4	19046.	275.
1980.	4002.4	24527.	348.
1981.	4996.2	30878.	431.
1982.	6166.6	38524.	529.
1983.	7642.6	48098.	652.
1984.	9305.4	59037.	790.
1985.	11142.6	71217.	940.
1986.	13260.6	85467.	1113.
1987.	15674.6	101817.	1309.
1988.	18305.4	119778.	1519.
1989.	21223.3	139811.	1749.
1990.	24489.1	162483.	2006.

I S O T O P E P R O D U C T I O N

L W R ' S -- P U A N D U 2 3 6 R E C Y C L E

DISTRIBUTION OF ELECTRICAL GENERATING CAPACITY

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LWR'S -- PU AND U236 RECYCLE

CASE 4

YEAR ENDING	TOTAL INSTALLED CAPACITY	NEWLY INSTALLED CAPACITY	NEWLY INSTALLED CAPACITY BY REACTOR TYPE, GIGAWATTS ELECTRICAL													
	GW(E)	GW(E)	PWR70	BWR70	PWR80	BWR80	PWR70 30U	BWR70 30U	PWR80 30U	BWR80 30U	LWR70 4PU	LWR80 4PU	LWR70 10PU	LWR70 30PU	LWR80 30PU	LMFBR
1960.	.3	.3	.1	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1961.	.5	.2	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1962.	.5	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1963.	.6	.1	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1964.	.6	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1965.	.6	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1966.	1.0	.4	.3	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1967.	1.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1968.	3.0	2.0	.9	1.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1969.	5.7	2.7	.0	.0	.0	.0	1.4	1.3	.0	.0	.0	.0	.0	.0	.0	.0
1970.	12.0	6.3	.0	.0	.0	.0	3.1	3.2	.0	.0	.0	.0	.0	.0	.0	.0
1971.	22.7	10.7	.0	.0	.0	.0	6.3	4.4	.0	.0	.0	.0	.0	.0	.0	.0
1972.	33.7	11.0	.0	.0	.0	.0	7.3	3.7	.0	.0	.0	.0	.0	.0	.0	.0
1973.	45.2	11.5	.0	.0	.0	.0	7.7	3.8	.0	.0	.0	.0	.0	.0	.0	.0
1974.	57.2	12.0	.0	.0	.0	.0	6.7	3.3	.0	.0	.0	.0	.0	2.0	.0	.0
1975.	69.7	12.5	.0	.0	.0	.0	6.3	3.2	.0	.0	.0	.0	.0	3.0	.0	.0
1976.	82.7	13.0	.0	.0	.0	.0	6.4	3.2	.0	.0	.0	.0	.0	3.4	.0	.0
1977.	96.7	14.0	.0	.0	.0	.0	6.9	3.4	.0	.0	.0	.0	.0	3.7	.0	.0
1978.	112.2	15.5	.0	.0	.0	.0	7.7	3.8	.0	.0	.0	.0	.0	4.0	.0	.0
1979.	129.7	17.5	.0	.0	.0	.0	8.8	4.4	.0	.0	.0	.0	.0	4.3	.0	.0
1980.	150.0	20.3	.0	.0	.0	.0	.0	.0	9.9	4.9	.0	.0	.0	.0	5.5	.0
1981.	173.7	23.7	.0	.0	.0	.0	.0	.0	11.8	5.9	.0	.0	.0	.0	6.0	.0
1982.	200.2	26.5	.0	.0	.0	.0	.0	.0	13.0	6.5	.0	.0	.0	.0	7.0	.0
1983.	229.5	29.3	.0	.0	.0	.0	.0	.0	14.2	7.1	.0	.0	.0	.0	8.0	.0
1984.	261.4	31.9	.0	.0	.0	.0	.0	.0	14.9	7.5	.0	.0	.0	.0	9.5	.0
1985.	295.7	34.3	.0	.0	.0	.0	.0	.0	15.5	7.8	.0	.0	.0	.0	11.0	.0
1986.	332.2	36.5	.0	.0	.0	.0	.0	.0	16.0	8.0	.0	.0	.0	.0	12.5	.0
1987.	370.7	38.5	.0	.0	.0	.0	.0	.0	16.3	8.2	.0	.0	.0	.0	14.0	.0
1988.	411.2	40.5	.0	.0	.0	.0	.0	.0	17.0	8.5	.0	.0	.0	.0	15.0	.0
1989.	454.2	42.9	.0	.0	.0	.0	.0	.0	17.9	9.0	.0	.0	.0	.0	16.0	.0
1990.	500.0	45.8	.0	.0	.0	.0	.0	.0	19.2	9.6	.0	.0	.0	.0	17.0	.0

D I S T R I B U T I O N O F E L E C T R I C A L G E N E R A T I N G C A P A C I T Y

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L W R ' S -- P U A N D U 2 3 6 R E C Y C L E

CASE 4

YEAR ENDING	TOTAL INSTALLED CAPACITY	NEWLY INSTALLED CAPACITY	CUMULATIVE INSTALLED CAPACITY BY REACTOR TYPE, GIGAWATTS ELECTRICAL													
	GW(E)	GW(E)	PWR70	BWR70	PWR80	BWR80	PWR70	BWR70	PWR80	BWR80	LWR70	LWR80	LWR70	LWR70	LWR80	LMFBR
							30U	30U	30U	30U	4PU	4PU	10PU	30PU	30PU	
1960.	.3	.3	.1	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1961.	.5	.2	.2	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1962.	.5	.0	.2	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1963.	.6	.1	.2	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1964.	.6	.0	.3	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1965.	.6	.0	.3	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1966.	1.0	.4	.6	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1967.	1.0	.0	.6	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1968.	3.0	2.0	1.5	1.5	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1969.	5.7	2.7	1.5	1.5	.0	.0	1.4	1.3	.0	.0	.0	.0	.0	.0	.0	.0
1970.	12.0	6.3	1.5	1.5	.0	.0	4.4	4.5	.0	.0	.0	.0	.0	.0	.0	.0
1971.	22.7	10.7	1.5	1.5	.0	.0	10.8	8.9	.0	.0	.0	.0	.0	.0	.0	.0
1972.	33.7	11.0	1.5	1.5	.0	.0	18.1	12.6	.0	.0	.0	.0	.0	.0	.0	.0
1973.	45.2	11.5	1.5	1.5	.0	.0	25.8	16.4	.0	.0	.0	.0	.0	.0	.0	.0
1974.	57.2	12.0	1.5	1.5	.0	.0	32.5	19.7	.0	.0	.0	.0	.0	2.0	.0	.0
1975.	69.7	12.5	1.5	1.5	.0	.0	38.8	22.9	.0	.0	.0	.0	.0	5.0	.0	.0
1976.	82.7	13.0	1.5	1.5	.0	.0	45.2	26.1	.0	.0	.0	.0	.0	8.4	.0	.0
1977.	96.7	14.0	1.5	1.5	.0	.0	52.1	29.5	.0	.0	.0	.0	.0	12.1	.0	.0
1978.	112.2	15.5	1.5	1.5	.0	.0	59.8	33.3	.0	.0	.0	.0	.0	16.1	.0	.0
1979.	129.7	17.5	1.5	1.5	.0	.0	68.6	37.7	.0	.0	.0	.0	.0	20.4	.0	.0
1980.	150.0	20.3	1.5	1.5	.0	.0	68.6	37.7	9.9	4.9	.0	.0	.0	20.4	5.5	.0
1981.	173.7	23.7	1.5	1.5	.0	.0	68.6	37.7	21.7	10.8	.0	.0	.0	20.4	11.5	.0
1982.	200.2	26.5	1.5	1.5	.0	.0	68.6	37.7	34.7	17.3	.0	.0	.0	20.4	18.5	.0
1983.	229.5	29.3	1.5	1.5	.0	.0	68.6	37.7	48.9	24.4	.0	.0	.0	20.4	26.5	.0
1984.	261.4	31.9	1.5	1.5	.0	.0	68.6	37.7	63.8	31.9	.0	.0	.0	20.4	36.0	.0
1985.	295.7	34.3	1.5	1.5	.0	.0	68.6	37.7	79.3	39.7	.0	.0	.0	20.4	47.0	.0
1986.	332.2	36.5	1.5	1.5	.0	.0	68.6	37.7	95.3	47.7	.0	.0	.0	20.4	59.5	.0
1987.	370.7	38.5	1.5	1.5	.0	.0	68.6	37.7	111.6	55.9	.0	.0	.0	20.4	73.5	.0
1988.	411.2	40.5	1.5	1.5	.0	.0	68.6	37.7	128.6	64.4	.0	.0	.0	20.4	88.5	.0
1989.	454.2	42.9	1.5	1.5	.0	.0	68.6	37.7	146.5	73.4	.0	.0	.0	20.4	104.5	.0
1990.	500.0	45.8	1.5	1.5	.0	.0	68.6	37.7	165.7	83.0	.0	.0	.0	20.4	121.5	.0

ANNUAL ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSS BASIS)

LWR'S -- PU AND U236 RECYCLE

CASE 4

DURING PERIOD ENDING	TOTAL INSTALLED CAPACITY		ISOTOPE PRODUCTION, KILOGRAMS/YEAR												
	GW(E)	TONNE	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	CM244 AM3	CM244 SUM	PU238 NP	PU238 CM	PU238 AM	PU238 SUM
1960.	.3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.5	2.	10.	10.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1962.	.5	7.	44.	44.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1963.	.6	21.	147.	147.	5.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1964.	.6	21.	181.	181.	8.	1.	2.	0.	0.	0.	0.	0.	0.	0.	0.
1965.	.6	16.	125.	125.	6.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.
1966.	1.0	25.	192.	192.	8.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.
1967.	1.0	36.	276.	276.	12.	1.	2.	0.	0.	0.	0.	0.	0.	0.	0.
1968.	3.0	34.	278.	278.	13.	1.	2.	0.	0.	0.	0.	0.	0.	0.	0.
1969.	5.7	61.	418.	418.	16.	2.	2.	0.	0.	0.	0.	0.	0.	0.	0.
1970.	12.0	101.	703.	703.	26.	2.	3.	1.	1.	0.	1.	0.	0.	0.	0.
1971.	22.7	265.	1801.	1801.	61.	6.	7.	1.	1.	0.	1.	0.	0.	0.	0.
1972.	33.7	551.	3863.	3863.	134.	14.	17.	4.	4.	0.	4.	0.	0.	0.	0.
1973.	45.2	944.	6751.	-143.	239.	25.	32.	6.	7.	0.	7.	0.	0.	0.	0.
1974.	57.2	1423.	10624.	283.	398.	44.	59.	12.	14.	0.	14.	0.	0.	0.	0.
1975.	69.7	1849.	15097.	733.	571.	69.	100.	18.	23.	0.	23.	0.	0.	0.	0.
1976.	82.7	2204.	19198.	-271.	718.	95.	146.	25.	35.	0.	35.	0.	0.	0.	0.
1977.	96.7	2601.	24038.	-1248.	901.	133.	218.	35.	59.	0.	59.	0.	0.	0.	0.
1978.	112.2	3034.	29741.	-1952.	1096.	182.	305.	47.	89.	0.	89.	0.	0.	0.	0.
1979.	129.7	3559.	36634.	-631.	1321.	245.	414.	62.	129.	0.	129.	0.	0.	0.	0.
1980.	150.0	4227.	44915.	-17.	1596.	319.	545.	79.	176.	0.	176.	0.	0.	0.	0.
1981.	173.7	5274.	59417.	-2372.	1898.	451.	799.	110.	265.	0.	265.	0.	0.	0.	0.
1982.	200.2	6592.	73969.	1178.	2290.	574.	1031.	139.	349.	0.	349.	0.	0.	0.	0.
1983.	229.5	7646.	91022.	-16.	2632.	725.	1334.	174.	449.	0.	449.	0.	0.	0.	0.
1984.	261.4	8841.	105132.	213.	3002.	829.	1558.	198.	519.	0.	519.	0.	0.	0.	0.
1985.	295.7	10522.	129349.	-596.	3489.	1029.	2006.	245.	654.	0.	654.	0.	0.	0.	0.
1986.	332.2	12561.	156242.	385.	4064.	1231.	2469.	292.	787.	0.	787.	0.	0.	0.	0.
1987.	370.7	14176.	178861.	-14.	4480.	1385.	2886.	330.	893.	0.	893.	0.	0.	0.	0.
1988.	411.2	16130.	204697.	1182.	5024.	1569.	3334.	373.	1018.	0.	1018.	0.	0.	0.	0.
1989.	454.2	17958.	235819.	-2436.	5423.	1834.	4017.	435.	1214.	0.	1214.	0.	0.	0.	0.
1990.	500.0	20112.	270296.	43829.	5985.	2116.	4741.	501.	1421.	0.	1421.	0.	0.	0.	0.

ANNUAL ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSS BASIS)

L W R ' S -- PU AND U236 RECYCLE

CASE 4

DURING PERIOD ENDING	ISOTOPE PRODUCTION, KILOGRAMS/YEAR														
	GW-YR	U-235	U-236	PM147	CE144	CS137	SR-90	KR-85	TC-99	RH103 SUM	RU106	PD STABL	XE STABL	CM242 AM1	AM241 PU1
1960.	.2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.4	21.	3.	0.	0.	1.	0.	0.	1.	0.	0.	0.	3.	0.	0.
1962.	.4	80.	14.	1.	2.	4.	2.	0.	3.	2.	1.	2.	16.	0.	0.
1963.	.5	203.	49.	4.	7.	23.	10.	0.	15.	8.	2.	14.	87.	0.	0.
1964.	.5	136.	62.	4.	7.	21.	10.	0.	14.	8.	2.	13.	81.	0.	2.
1965.	.5	139.	50.	3.	5.	15.	7.	0.	10.	5.	2.	9.	58.	0.	3.
1966.	.8	226.	72.	5.	9.	28.	12.	1.	19.	10.	3.	17.	106.	0.	5.
1967.	.8	298.	101.	6.	11.	32.	15.	1.	22.	12.	4.	19.	124.	0.	6.
1968.	2.6	302.	109.	6.	12.	34.	15.	1.	23.	12.	4.	20.	129.	0.	9.
1969.	4.8	596.	150.	9.	19.	47.	22.	1.	32.	17.	6.	27.	186.	0.	11.
1970.	10.2	988.	251.	15.	31.	74.	35.	2.	50.	27.	9.	41.	293.	0.	15.
1971.	19.3	2581.	625.	42.	84.	226.	103.	5.	152.	80.	26.	129.	879.	0.	22.
1972.	28.7	5090.	1336.	86.	173.	455.	209.	10.	307.	162.	54.	260.	1772.	0.	38.
1973.	38.4	8565.	2376.	152.	304.	845.	385.	18.	568.	296.	98.	490.	3268.	0.	73.
1974.	48.6	12216.	3800.	235.	466.	1338.	606.	28.	898.	465.	153.	784.	5154.	0.	72.
1975.	59.3	15263.	5280.	306.	607.	1759.	792.	36.	1179.	612.	206.	1042.	6770.	0.	76.
1976.	70.3	17912.	6604.	365.	723.	2119.	946.	43.	1418.	739.	254.	1279.	8150.	0.	83.
1977.	82.2	20772.	8195.	433.	854.	2527.	1115.	51.	1688.	887.	311.	1557.	9709.	0.	81.
1978.	95.3	24083.	9985.	506.	997.	2974.	1299.	59.	1985.	1049.	373.	1868.	11423.	0.	71.
1979.	110.2	28207.	12062.	595.	1171.	3501.	1517.	69.	2334.	1242.	446.	2233.	13450.	0.	54.
1980.	127.4	33423.	14706.	707.	1389.	4146.	1785.	81.	2764.	1481.	536.	2675.	15935.	0.	49.
1981.	147.6	41037.	17612.	870.	1713.	5010.	2130.	97.	3339.	1822.	678.	3303.	19349.	0.	49.
1982.	170.1	51261.	21434.	1095.	2163.	6233.	2655.	121.	4157.	2276.	848.	4097.	24101.	0.	28.
1983.	194.9	58989.	24786.	1263.	2517.	7032.	2964.	135.	4688.	2612.	1008.	4697.	27287.	0.	39.
1984.	221.9	69061.	28899.	1448.	2905.	7902.	3325.	152.	5270.	2965.	1163.	5287.	30744.	0.	39.
1985.	250.8	81619.	34047.	1712.	3445.	9170.	3825.	175.	6117.	3496.	1405.	6218.	35782.	0.	41.
1986.	281.3	97364.	40371.	2025.	4084.	10635.	4414.	202.	7098.	4109.	1681.	7265.	41621.	0.	36.
1987.	313.2	109148.	45066.	2266.	4572.	11700.	4828.	221.	7812.	4580.	1905.	8061.	45911.	0.	40.
1988.	346.6	124010.	51145.	2561.	5177.	13076.	5377.	247.	8732.	5160.	2170.	9056.	51402.	0.	40.
1989.	381.7	136551.	55559.	2834.	5721.	14294.	5815.	267.	9545.	5720.	2447.	10058.	56305.	0.	51.
1990.	419.0	152275.	61612.	3159.	6374.	15850.	6406.	294.	10580.	6389.	2762.	11260.	62498.	0.	30.

ANNUAL ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSS BASIS)

LWR'S -- PU AND U236 RECYCLE

CASE 4

DURING PERIOD ENDING	KR STABL	RU STABL	H-3 GRAMS
1960.	.0	0.	0.
1961.	.3	1.	0.
1962.	1.2	6.	0.
1963.	6.4	39.	1.
1964.	5.9	36.	1.
1965.	4.3	25.	0.
1966.	7.8	47.	1.
1967.	9.1	54.	1.
1968.	9.5	56.	1.
1969.	13.6	78.	1.
1970.	21.3	121.	2.
1971.	64.2	373.	7.
1972.	129.1	750.	13.
1973.	238.5	1400.	24.
1974.	376.6	2225.	39.
1975.	492.0	2931.	51.
1976.	586.9	3546.	61.
1977.	691.5	4248.	73.
1978.	805.1	5023.	86.
1979.	939.9	5937.	101.
1980.	1106.0	7052.	120.
1981.	1318.4	8565.	145.
1982.	1641.8	10646.	180.
1983.	1827.7	12045.	202.
1984.	2046.6	13526.	227.
1985.	2350.2	15740.	263.
1986.	2708.1	18278.	305.
1987.	2958.6	20145.	335.
1988.	3290.9	22533.	374.
1989.	3553.9	24726.	408.
1990.	3911.1	27480.	453.

CUMULATIVE ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSSES EXCEPT FOR RADIOACTIVE DECAY)

L W R ' S -- PU AND U236 RECYCLE

CASE 4

YEAR ENDING	TOTAL INSTALLED CAPACITY	ISOTOPE PRODUCTION, KGS													
	GW(E)	TONNE	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	CM244 AM3	CM244 SUM	PU238 NP	PU238 CM	PU238 AM	PU238 SUM
1960.	.3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.5	2.	10.	10.	0.	0.	0.	0.	0.	-0.	0.	-0.	-0.	-0.	0.
1962.	.5	9.	53.	53.	1.	0.	0.	0.	0.	-0.	0.	-0.	-0.	-0.	0.
1963.	.6	30.	201.	201.	6.	1.	1.	0.	0.	-0.	0.	-0.	-0.	-0.	0.
1964.	.6	52.	382.	382.	14.	2.	2.	0.	0.	-0.	0.	-0.	-0.	-0.	0.
1965.	.6	67.	509.	509.	20.	2.	3.	0.	1.	-0.	1.	-0.	-0.	-0.	0.
1966.	1.0	93.	704.	704.	29.	3.	4.	0.	1.	-0.	1.	-0.	-0.	-0.	0.
1967.	1.0	128.	985.	985.	41.	4.	6.	0.	1.	-0.	1.	-0.	-0.	-0.	0.
1968.	3.0	163.	1269.	1269.	54.	6.	8.	0.	2.	-0.	2.	-0.	-0.	-0.	0.
1969.	5.7	224.	1696.	1696.	70.	7.	10.	0.	2.	-0.	2.	-0.	-0.	-0.	0.
1970.	12.0	325.	2410.	2410.	97.	10.	13.	1.	3.	-0.	3.	-0.	-0.	-0.	0.
1971.	22.7	590.	4226.	4226.	158.	15.	19.	2.	4.	-0.	4.	-0.	-0.	-0.	0.
1972.	33.7	1142.	8111.	8111.	291.	29.	37.	4.	8.	-0.	8.	-0.	-0.	-0.	0.
1973.	45.2	2086.	14900.	8006.	531.	54.	68.	7.	14.	-0.	14.	-0.	-0.	-0.	0.
1974.	57.2	3509.	25597.	8362.	928.	97.	127.	13.	27.	-0.	27.	-0.	-0.	-0.	0.
1975.	69.7	5358.	40766.	9168.	1500.	166.	227.	21.	50.	-0.	50.	-0.	-0.	-0.	0.
1976.	82.7	7562.	60041.	8972.	2217.	261.	374.	29.	83.	-0.	83.	-0.	-0.	-0.	0.
1977.	96.7	10163.	84161.	7807.	3118.	393.	591.	41.	139.	-0.	139.	-0.	-0.	-0.	0.
1978.	112.2	13197.	113984.	5936.	4214.	574.	896.	55.	223.	-0.	223.	-0.	-0.	-0.	0.
1979.	129.7	16755.	150689.	5375.	5535.	818.	1310.	73.	343.	-0.	343.	-0.	-0.	-0.	0.
1980.	150.0	20982.	195658.	5412.	7130.	1136.	1855.	95.	507.	-0.	507.	-0.	-0.	-0.	0.
1981.	173.7	26256.	255123.	3089.	9029.	1586.	2654.	130.	753.	-0.	753.	-0.	-0.	-0.	0.
1982.	200.2	32847.	329142.	4316.	11318.	2157.	3684.	166.	1074.	-0.	1074.	-0.	-0.	-0.	0.
1983.	229.5	40493.	420192.	4327.	13950.	2879.	5018.	209.	1482.	-0.	1482.	-0.	-0.	-0.	0.
1984.	261.4	49333.	525363.	4580.	16952.	3703.	6576.	243.	1945.	-0.	1945.	-0.	-0.	-0.	0.
1985.	295.7	59855.	654751.	4023.	20441.	4726.	8581.	296.	2526.	-0.	2526.	-0.	-0.	-0.	0.
1986.	332.2	72416.	811035.	4449.	24505.	5950.	11049.	355.	3218.	-0.	3218.	-0.	-0.	-0.	0.
1987.	370.7	86592.	989932.	4471.	28984.	7326.	13934.	405.	3990.	-0.	3990.	-0.	-0.	-0.	0.
1988.	411.2	102723.	1194669.	5693.	34008.	8884.	17266.	459.	4858.	-0.	4858.	-0.	-0.	-0.	0.
1989.	454.2	120681.	1430529.	3297.	39431.	10705.	21282.	532.	5890.	-0.	5890.	-0.	-0.	-0.	0.
1990.	500.0	140793.	1700876.	47178.	45416.	12805.	26021.	613.	7089.	-0.	7089.	-0.	-0.	-0.	0.

CUMULATIVE ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSSES EXCEPT FOR RADIOACTIVE DECAY)

LWR'S -- PU AND U236 RECYCLE

CASE 4

ISOTOPE PRODUCTION, KGS

YEAR ENDING	GW-YR	U-235	U-236	PM147	CE144	CS137	SR-90	KR-85	TC-99	RH103 SUM	RU106	PD STABL	XE STABL	CM242 AM1	AM241 PU1
1960.	.2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.6	21.	3.	0.	0.	1.	0.	0.	1.	0.	0.	0.	3.	-0.	-0.
1962.	1.0	101.	17.	1.	2.	5.	2.	0.	3.	2.	1.	2.	19.	-0.	0.
1963.	1.5	304.	66.	5.	8.	27.	12.	1.	19.	10.	3.	16.	107.	-0.	1.
1964.	2.1	440.	128.	7.	10.	48.	22.	1.	33.	18.	4.	29.	188.	-0.	2.
1965.	2.6	580.	178.	8.	9.	62.	28.	1.	43.	23.	4.	38.	246.	-0.	6.
1966.	3.4	805.	250.	11.	12.	89.	40.	2.	62.	33.	5.	55.	352.	-0.	10.
1967.	4.3	1103.	351.	15.	17.	119.	53.	2.	84.	44.	6.	74.	477.	-0.	17.
1968.	6.8	1405.	460.	17.	19.	150.	67.	3.	106.	56.	7.	93.	606.	-0.	26.
1969.	11.7	2000.	610.	23.	26.	193.	87.	4.	138.	73.	9.	120.	792.	-0.	37.
1970.	21.9	2988.	862.	33.	42.	263.	120.	5.	189.	101.	14.	161.	1084.	-0.	52.
1971.	41.2	5569.	1486.	68.	101.	483.	220.	9.	341.	181.	33.	291.	1963.	-0.	74.
1972.	69.9	10659.	2823.	139.	215.	927.	424.	18.	648.	344.	70.	550.	3735.	-0.	112.
1973.	108.3	19225.	5198.	260.	393.	1751.	798.	35.	1217.	640.	133.	1040.	7003.	-0.	185.
1974.	156.9	31440.	8999.	436.	627.	3049.	1385.	60.	2115.	1105.	220.	1824.	12157.	-0.	258.
1975.	216.2	46703.	14278.	643.	866.	4738.	2143.	93.	3294.	1716.	316.	2866.	18927.	-0.	333.
1976.	286.5	64615.	20882.	863.	1079.	6749.	3037.	130.	4712.	2456.	412.	4145.	27077.	-0.	415.
1977.	368.7	85387.	29077.	1100.	1298.	9122.	4077.	172.	6401.	3343.	517.	5702.	36786.	-0.	496.
1978.	464.0	109470.	39062.	1358.	1531.	11887.	5277.	221.	8385.	4392.	632.	7570.	48209.	-0.	566.
1979.	574.2	137677.	51124.	1646.	1801.	15116.	6664.	276.	10720.	5634.	762.	9803.	61659.	-0.	618.
1980.	701.7	171100.	65830.	1980.	2129.	18918.	8287.	340.	13484.	7115.	917.	12478.	77594.	-0.	666.
1981.	849.2	212137.	83442.	2402.	2589.	23495.	10214.	416.	16823.	8937.	1137.	15781.	96944.	-0.	714.
1982.	1019.3	263398.	104876.	2954.	3228.	29192.	12619.	510.	20980.	11213.	1416.	19878.	121045.	-0.	741.
1983.	1214.2	322387.	129662.	3548.	3845.	35557.	15275.	614.	25668.	13825.	1716.	24576.	148333.	-0.	779.
1984.	1436.1	391448.	158562.	4192.	4486.	42646.	18226.	727.	30938.	16790.	2021.	29862.	179076.	-0.	817.
1985.	1686.9	473067.	192608.	4955.	5290.	50842.	21606.	857.	37055.	20286.	2415.	36080.	214859.	-0.	857.
1986.	1968.1	570431.	232979.	5858.	6260.	60316.	25492.	1006.	44153.	24395.	2888.	43345.	256480.	-0.	892.
1987.	2281.3	679579.	278045.	6797.	7147.	70639.	29697.	1164.	51965.	28975.	3350.	51407.	302391.	-0.	931.
1988.	2627.9	803589.	329190.	7819.	8117.	82102.	34348.	1338.	60697.	34135.	3845.	60462.	353793.	-0.	970.
1989.	3009.6	940140.	384749.	8882.	9060.	94521.	39323.	1522.	70241.	39855.	4370.	70521.	410098.	-0.	1020.
1990.	3428.6	1092415.	446361.	10030.	10100.	108212.	44767.	1721.	80822.	46243.	4947.	81780.	472596.	-0.	1048.

CUMULATIVE ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSSES EXCEPT FOR RADIOACTIVE DECAY)

L W R ' S -- PU AND U236 RECYCLE

CASE 4

ISOTOPE PRODUCTION, KGS

YEAR ENDING	KR STABL	RU STABL	H-3 GRAMS
1960.	.0	0.	0.
1961.	.3	1.	0.
1962.	1.4	8.	0.
1963.	7.8	46.	1.
1964.	13.7	82.	1.
1965.	18.0	107.	2.
1966.	25.8	154.	2.
1967.	34.8	208.	3.
1968.	44.3	263.	4.
1969.	57.9	341.	5.
1970.	79.2	463.	7.
1971.	143.4	836.	13.
1972.	272.5	1586.	26.
1973.	511.0	2986.	49.
1974.	887.5	5211.	85.
1975.	1379.6	8141.	131.
1976.	1966.5	11687.	185.
1977.	2658.1	15936.	248.
1978.	3463.2	20959.	321.
1979.	4403.1	26896.	404.
1980.	5509.1	33947.	502.
1981.	6827.4	42512.	619.
1982.	8469.2	53158.	765.
1983.	10296.9	65203.	925.
1984.	12343.5	78729.	1102.
1985.	14693.7	94469.	1304.
1986.	17401.8	112747.	1538.
1987.	20360.4	132892.	1788.
1988.	23651.3	155426.	2064.
1989.	27205.2	180152.	2359.
1990.	31116.3	207632.	2682.

NET ANNUAL ISOTOPE AVAILABILITY

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

L W R ' S -- PU AND U236 RECYCLE

CASE 4

DURING PERIOD ENDING	TOTAL INSTALLED CAPACITY	ISOTOPE PRODUCTION, KILOGRAMS/YEAR													
	GW(E)	TONNE	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	CM244 AM3	CM244 SUM	PU238 NP	PU238 CM	PU238 AM	PU238 SUM
1960.	.3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.5	0.	0.	0.	-0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1962.	.5	2.	10.	10.	0.	0.	0.	-0.	-0.	0.	0.	0.	0.	0.	0.
1963.	.6	7.	43.	43.	1.	0.	0.	-0.	-0.	0.	0.	0.	0.	0.	0.
1964.	.6	21.	144.	144.	4.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1965.	.6	21.	177.	177.	7.	1.	1.	0.	0.	0.	0.	1.	0.	0.	1.
1966.	1.0	16.	123.	123.	5.	1.	1.	0.	0.	0.	0.	2.	0.	0.	2.
1967.	1.0	25.	189.	189.	7.	1.	1.	0.	0.	0.	0.	3.	0.	0.	3.
1968.	3.0	36.	271.	271.	11.	1.	2.	0.	0.	0.	0.	3.	0.	0.	4.
1969.	5.7	34.	273.	273.	12.	1.	2.	0.	0.	0.	0.	5.	0.	0.	5.
1970.	12.0	61.	410.	410.	15.	1.	2.	0.	0.	0.	1.	6.	0.	0.	6.
1971.	22.7	101.	690.	690.	23.	2.	3.	0.	0.	0.	1.	7.	0.	1.	8.
1972.	53.7	265.	1767.	1767.	55.	5.	6.	0.	0.	0.	1.	10.	0.	1.	11.
1973.	45.2	551.	3789.	3789.	120.	12.	16.	0.	0.	0.	1.	19.	0.	1.	19.
1974.	57.2	944.	6624.	-133.	215.	22.	29.	0.	1.	1.	2.	38.	0.	1.	39.
1975.	69.7	1423.	10418.	284.	358.	39.	53.	0.	3.	1.	4.	72.	1.	2.	75.
1976.	82.7	1849.	14803.	726.	514.	62.	90.	0.	6.	3.	9.	126.	1.	4.	131.
1977.	96.7	2204.	18823.	-258.	646.	85.	132.	0.	11.	5.	16.	196.	2.	8.	206.
1978.	112.2	2601.	23565.	-1215.	810.	119.	196.	0.	19.	10.	28.	273.	3.	15.	291.
1979.	129.7	3034.	29153.	-1906.	987.	164.	274.	0.	28.	17.	46.	361.	4.	24.	389.
1980.	150.0	3559.	35907.	-613.	1189.	220.	373.	0.	47.	26.	73.	460.	6.	35.	501.
1981.	173.7	4227.	44022.	-12.	1436.	287.	491.	0.	72.	40.	112.	572.	8.	50.	630.
1982.	200.2	5274.	58234.	-2319.	1709.	406.	719.	1.	103.	59.	162.	400.	11.	70.	481.
1983.	229.5	6592.	72493.	1157.	2061.	515.	927.	1.	142.	82.	224.	481.	14.	95.	591.
1984.	261.4	7646.	89206.	-12.	2368.	652.	1201.	1.	213.	113.	326.	435.	20.	127.	582.
1985.	295.7	8841.	103033.	213.	2702.	745.	1402.	1.	280.	166.	446.	587.	25.	177.	789.
1986.	352.2	10522.	126766.	-580.	3140.	925.	1805.	1.	360.	219.	579.	619.	31.	228.	879.
1987.	370.7	12561.	153121.	381.	3657.	1106.	2222.	2.	416.	289.	705.	805.	36.	297.	1138.
1988.	411.2	14176.	175288.	-10.	4032.	1244.	2597.	2.	525.	364.	889.	905.	44.	352.	1302.
1989.	454.2	16130.	200607.	1162.	4521.	1410.	3000.	2.	631.	473.	1104.	1135.	53.	445.	1632.
1990.	500.0	17958.	231108.	-2382.	4880.	1648.	3615.	3.	716.	597.	1314.	1274.	59.	530.	1863.

NET ANNUAL ISOTOPE AVAILABILITY

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

L W R ' S -- PU AND U236 RECYCLE

CASE 4

DURING PERIOD ENDING	ISOTOPE PRODUCTION, KILOGRAMS/YEAR														
	GW-YR	U-235	U-236	PM147	CE144	CS137	SR-90	KR-85	TC-99	RH103 SUM	RU106	PD STABL	XE STABL	CM242 AM1	AM241 PU1
1960.	.2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.4	-0.	-0.	0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	0.	0.
1962.	.4	20.	3.	-0.	0.	1.	0.	0.	1.	0.	0.	0.	3.	0.	0.
1963.	.5	79.	14.	-0.	1.	3.	2.	0.	2.	1.	0.	2.	14.	0.	0.
1964.	.5	199.	48.	0.	3.	20.	9.	0.	14.	7.	1.	13.	78.	0.	0.
1965.	.5	134.	61.	0.	3.	19.	8.	0.	13.	7.	1.	12.	73.	0.	2.
1966.	.8	136.	49.	2.	2.	13.	6.	0.	9.	5.	1.	8.	53.	0.	3.
1967.	.8	221.	71.	2.	3.	24.	11.	0.	17.	9.	1.	15.	95.	0.	4.
1968.	2.6	292.	99.	1.	4.	28.	13.	1.	20.	10.	2.	17.	112.	0.	6.
1969.	4.8	296.	107.	2.	4.	30.	13.	1.	20.	11.	2.	18.	116.	0.	8.
1970.	10.2	584.	147.	2.	7.	42.	19.	1.	29.	16.	3.	24.	167.	0.	10.
1971.	19.3	968.	246.	3.	12.	65.	30.	1.	45.	25.	4.	37.	264.	0.	14.
1972.	28.7	2529.	612.	4.	31.	199.	91.	4.	137.	72.	12.	117.	791.	0.	19.
1973.	38.4	4988.	1309.	6.	64.	400.	183.	8.	276.	146.	24.	234.	1595.	0.	34.
1974.	48.6	8394.	2328.	18.	113.	743.	338.	15.	511.	267.	44.	441.	2941.	0.	65.
1975.	59.3	11971.	3724.	36.	172.	1177.	532.	23.	809.	419.	69.	706.	4639.	0.	64.
1976.	70.3	14958.	5174.	63.	225.	1547.	696.	30.	1061.	550.	93.	938.	6093.	0.	67.
1977.	82.2	17554.	6472.	98.	268.	1864.	830.	36.	1276.	665.	114.	1151.	7335.	0.	73.
1978.	95.3	20356.	8031.	128.	316.	2222.	979.	43.	1520.	798.	140.	1401.	8738.	0.	72.
1979.	110.2	23602.	9785.	152.	369.	2615.	1140.	50.	1786.	944.	168.	1682.	10280.	1.	62.
1980.	127.4	27643.	11821.	180.	434.	3079.	1332.	58.	2101.	1118.	201.	2010.	12105.	1.	47.
1981.	147.6	32755.	14412.	211.	514.	3647.	1567.	68.	2488.	1333.	241.	2407.	14342.	1.	43.
1982.	170.1	40216.	17259.	248.	634.	4406.	1870.	82.	3005.	1640.	305.	2973.	17415.	2.	43.
1983.	194.9	50236.	21006.	295.	801.	5482.	2331.	102.	3742.	2049.	382.	3688.	21691.	2.	25.
1984.	221.9	57809.	24290.	363.	932.	6184.	2602.	114.	4219.	2351.	453.	4228.	24559.	3.	34.
1985.	250.8	67680.	28321.	456.	1075.	6949.	2919.	128.	4743.	2669.	523.	4758.	27669.	4.	34.
1986.	281.3	79986.	33366.	526.	1275.	8065.	3359.	148.	5505.	3146.	632.	5596.	32204.	5.	37.
1987.	313.2	95416.	39563.	603.	1512.	9353.	3876.	171.	6388.	3698.	756.	6538.	37459.	7.	32.
1988.	346.6	106965.	44164.	713.	1692.	10290.	4239.	187.	7031.	4122.	857.	7255.	41320.	8.	35.
1989.	381.7	121530.	50122.	844.	1917.	11500.	4721.	208.	7859.	4644.	977.	8150.	46262.	10.	36.
1990.	419.0	133820.	54447.	944.	2118.	12571.	5106.	225.	8590.	5148.	1101.	9053.	50675.	12.	45.

NET ANNUAL ISOTOPE AVAILABILITY

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

L W R ' S -- PU AND U236 RECYCLE

CASE 4

DURING PERIOD ENDING	ISOTOPE PRODUCTION, KILOGRAMS/YEAR		
	KR STABL	RU STABL	H-3 GRAMS
1960.	.0	0.	0.
1961.	-.0	-0.	0.
1962.	.2	1.	0.
1963.	1.0	6.	0.
1964.	5.7	35.	1.
1965.	5.3	32.	1.
1966.	3.9	23.	0.
1967.	7.0	42.	1.
1968.	8.2	48.	1.
1969.	8.5	50.	1.
1970.	12.2	70.	1.
1971.	19.2	109.	2.
1972.	57.8	336.	6.
1973.	116.2	675.	11.
1974.	214.6	1260.	21.
1975.	338.9	2002.	33.
1976.	442.8	2638.	43.
1977.	528.2	3192.	52.
1978.	622.4	3823.	62.
1979.	724.6	4521.	73.
1980.	845.9	5343.	86.
1981.	995.4	6346.	102.
1982.	1186.5	7708.	123.
1983.	1477.6	9582.	153.
1984.	1644.9	10840.	172.
1985.	1841.9	12174.	193.
1986.	2115.2	14166.	224.
1987.	2437.3	16450.	259.
1988.	2662.7	18131.	285.
1989.	2961.8	20280.	318.
1990.	3198.5	22254.	347.

CUMULATIVE ISOTOPE AVAILABILITY

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

L W R ' S -- PU AND U236 RECYCLE

CASE 4

YEAR	TOTAL INSTALLED CAPACITY	ISOTOPE PRODUCTION, KGS													
ENDING	GW(E)	TONNE	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	CM244 AM3	CM244 SUM	PU238 NP	PU238 CM	PU238 AM	PU238 SUM
1960.	.3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.5	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	0.	-0.	-0.	-0.	0.
1962.	.5	2.	10.	10.	0.	0.	0.	-0.	-0.	-0.	0.	-0.	-0.	-0.	0.
1963.	.6	9.	52.	52.	1.	0.	0.	-0.	-0.	-0.	0.	0.	-0.	-0.	0.
1964.	.6	30.	197.	197.	6.	1.	0.	0.	0.	-0.	0.	0.	0.	-0.	0.
1965.	.6	52.	374.	374.	13.	1.	2.	0.	0.	0.	0.	1.	0.	0.	1.
1966.	1.0	67.	499.	499.	18.	2.	3.	0.	0.	0.	0.	4.	0.	0.	4.
1967.	1.0	93.	691.	691.	26.	3.	4.	0.	0.	0.	0.	6.	0.	0.	7.
1968.	3.0	128.	966.	966.	37.	4.	5.	0.	1.	0.	1.	10.	0.	0.	10.
1969.	5.7	163.	1245.	1245.	49.	5.	7.	0.	1.	0.	1.	15.	0.	1.	15.
1970.	12.0	224.	1663.	1663.	63.	7.	9.	0.	1.	1.	2.	20.	0.	1.	22.
1971.	22.7	325.	2363.	2363.	87.	9.	11.	0.	1.	1.	2.	27.	0.	2.	29.
1972.	33.7	590.	4144.	4144.	142.	14.	17.	0.	2.	1.	3.	37.	0.	2.	40.
1973.	45.2	1142.	7952.	7952.	262.	26.	33.	0.	2.	2.	4.	55.	0.	3.	59.
1974.	57.2	2086.	14609.	7853.	477.	48.	62.	0.	3.	3.	6.	93.	1.	4.	98.
1975.	69.7	3509.	25092.	8202.	836.	87.	115.	0.	6.	4.	10.	164.	1.	6.	171.
1976.	82.7	5358.	39959.	8992.	1350.	149.	205.	0.	11.	7.	18.	289.	2.	10.	301.
1977.	96.7	7562.	58848.	8801.	1996.	234.	336.	0.	22.	12.	34.	482.	5.	18.	505.
1978.	112.2	10163.	82486.	7658.	2806.	353.	532.	0.	40.	21.	61.	751.	8.	33.	792.
1979.	129.7	13197.	111711.	5824.	3793.	516.	806.	0.	67.	37.	104.	1106.	12.	56.	1175.
1980.	150.0	16755.	147680.	5273.	4981.	735.	1179.	0.	111.	62.	173.	1558.	18.	91.	1667.
1981.	173.7	20982.	191749.	5308.	6417.	1021.	1670.	0.	179.	100.	279.	2117.	27.	140.	2284.
1982.	200.2	26256.	250026.	3032.	8126.	1425.	2388.	1.	275.	155.	431.	2501.	38.	209.	2747.
1983.	229.5	32847.	322562.	4232.	10187.	1938.	3316.	1.	407.	232.	638.	2963.	51.	302.	3317.
1984.	261.4	40493.	411792.	4245.	12555.	2587.	4516.	1.	604.	336.	940.	3375.	71.	427.	3873.
1985.	295.7	49333.	514859.	4492.	15257.	3328.	5918.	1.	861.	489.	1351.	3935.	95.	601.	4631.
1986.	332.2	59855.	641660.	3946.	18397.	4247.	7722.	2.	1189.	690.	1879.	4524.	126.	824.	5474.
1987.	370.7	72416.	794818.	4364.	22054.	5347.	9943.	2.	1560.	952.	2513.	5294.	161.	1115.	6570.
1988.	411.2	86592.	970137.	4386.	26086.	6583.	12539.	3.	2027.	1281.	3307.	6158.	203.	1459.	7820.
1989.	454.2	102723.	1170780.	5583.	30607.	7983.	15538.	3.	2582.	1705.	4287.	7245.	254.	1892.	9392.
1990.	500.0	120681.	1401924.	3237.	35488.	9620.	19152.	3.	3201.	2239.	5440.	8463.	312.	2408.	11182.

C U M U L A T I V E I S O T O P E A V A I L A B I L I T Y

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

L W R ' S -- PU AND U236 RECYCLE

CASE 4

ISOTOPE PRODUCTION, KGS

YEAR ENDING	GW-YR	U-235	U-236	PM147	CE144	CS137	SR-90	KR-85	TC-99	RH103 SUM	RU106	PD STABL	XE STABL	CM242 AM1	AM241 PU1
1960.	.2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.6	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.
1962.	1.0	20.	3.	-0.	0.	1.	0.	0.	1.	0.	0.	0.	3.	-0.	-0.
1963.	1.5	99.	17.	-0.	1.	4.	2.	0.	3.	2.	0.	2.	17.	-0.	0.
1964.	2.1	298.	65.	0.	3.	24.	11.	0.	17.	9.	1.	15.	96.	-0.	1.
1965.	2.6	432.	126.	0.	4.	42.	19.	1.	30.	16.	2.	26.	169.	0.	2.
1966.	3.4	568.	174.	2.	4.	55.	25.	1.	39.	21.	2.	34.	222.	0.	5.
1967.	4.3	789.	245.	3.	5.	78.	35.	1.	56.	29.	2.	49.	317.	0.	9.
1968.	6.8	1081.	344.	4.	6.	104.	47.	2.	75.	40.	3.	66.	429.	0.	15.
1969.	11.7	1377.	450.	5.	7.	132.	59.	2.	96.	51.	3.	84.	545.	0.	23.
1970.	21.9	1960.	598.	6.	10.	170.	77.	3.	124.	66.	4.	108.	712.	0.	33.
1971.	41.2	2928.	844.	7.	16.	232.	105.	4.	170.	91.	6.	145.	976.	0.	46.
1972.	69.9	5458.	1457.	10.	38.	425.	194.	8.	307.	163.	15.	261.	1767.	0.	65.
1973.	108.3	10446.	2766.	14.	80.	815.	372.	16.	583.	309.	32.	495.	3361.	0.	99.
1974.	156.9	18840.	5094.	28.	145.	1540.	700.	29.	1095.	576.	60.	936.	6303.	0.	163.
1975.	216.2	30812.	8819.	58.	232.	2681.	1216.	51.	1904.	994.	99.	1642.	10942.	0.	227.
1976.	286.5	45769.	13993.	108.	320.	4167.	1882.	78.	2965.	1545.	142.	2579.	17034.	0.	293.
1977.	368.7	63323.	20465.	182.	399.	5936.	2666.	110.	4241.	2210.	186.	3730.	24369.	0.	366.
1978.	464.0	83679.	28496.	268.	480.	8022.	3580.	146.	5761.	3008.	233.	5132.	33108.	0.	437.
1979.	574.2	107281.	38281.	359.	567.	10454.	4633.	186.	7547.	3953.	284.	6813.	43388.	1.	498.
1980.	701.7	134924.	50102.	458.	667.	13294.	5851.	233.	9648.	5071.	343.	8823.	55493.	1.	545.
1981.	849.2	167678.	64514.	566.	788.	16637.	7276.	287.	12135.	6404.	413.	11230.	69835.	1.	587.
1982.	1019.3	207894.	81773.	686.	958.	20663.	8968.	351.	15140.	8043.	511.	14203.	87249.	2.	629.
1983.	1214.2	258130.	102779.	825.	1195.	25672.	11080.	431.	18882.	10092.	637.	17891.	108941.	2.	653.
1984.	1436.1	315939.	127069.	1001.	1423.	31270.	13411.	518.	23101.	12443.	772.	22118.	133499.	3.	686.
1985.	1686.9	383619.	155390.	1231.	1661.	37505.	16002.	614.	27844.	15111.	909.	26876.	161169.	5.	720.
1986.	1968.1	463605.	188756.	1478.	1958.	44713.	18970.	723.	33349.	18258.	1087.	32472.	193373.	6.	755.
1987.	2281.3	559022.	228320.	1747.	2317.	53045.	22382.	849.	39738.	21956.	1300.	39011.	230832.	8.	786.
1988.	2627.9	665987.	272484.	2064.	2645.	62123.	26074.	983.	46768.	26078.	1507.	46266.	272152.	9.	820.
1989.	3009.6	787518.	322606.	2441.	3005.	72204.	30157.	1129.	54627.	30722.	1730.	54416.	318413.	12.	855.
1990.	3428.6	921338.	377054.	2832.	3354.	83126.	34525.	1284.	63217.	35869.	1966.	63469.	369088.	14.	899.

CUMULATIVE ISOTOPE AVAILABILITY

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

L W R ' S -- PU AND U236 RECYCLE

CASE 4

ISOTOPE PRODUCTION, KGS

YEAR ENDING	KR STABL	RU STABL	H-3 GRAMS
1960.	.0	0.	0.
1961.	-.0	-0.	-0.
1962.	.2	1.	0.
1963.	1.3	7.	0.
1964.	7.0	41.	1.
1965.	12.3	74.	1.
1966.	16.2	96.	1.
1967.	23.2	139.	2.
1968.	31.4	187.	3.
1969.	39.9	237.	3.
1970.	52.1	307.	4.
1971.	71.3	416.	6.
1972.	129.1	752.	11.
1973.	245.2	1428.	22.
1974.	459.9	2687.	41.
1975.	798.8	4689.	72.
1976.	1241.6	7327.	112.
1977.	1769.9	10519.	158.
1978.	2392.3	14342.	211.
1979.	3116.9	18863.	273.
1980.	3962.8	24206.	344.
1981.	4958.2	30552.	427.
1982.	6144.7	38261.	527.
1983.	7622.3	47843.	651.
1984.	9267.2	58683.	787.
1985.	11109.1	70856.	937.
1986.	13224.3	85022.	1109.
1987.	15661.7	101472.	1308.
1988.	18324.4	119603.	1521.
1989.	21286.2	139883.	1756.
1990.	24484.7	162137.	2006.

I S O T O P E P R O D U C T I O N

L W R ' S - U236 RECYCLE WITH FAST REACTORS

DISTRIBUTION OF ELECTRICAL GENERATING CAPACITY

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LWR'S - U235 RECYCLE WITH FAST REACTORS

CASE 5

YEAR ENDING	TOTAL INSTALLED CAPACITY GW(E)	NEWLY INSTALLED CAPACITY GW(E)	NEWLY INSTALLED CAPACITY BY REACTOR TYPE, GIGAWATTS ELECTRICAL													
			PWR70	BWR70	PWR80	BWR80	PWR70 30U	BWR70 30U	PWR80 30U	BWR80 30U	LWR70 4PU	LWR80 4PU	LWR70 10PU	LWR70 30PU	LWR80 30PU	LMFBR
1960.	.3	.3	.1	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1961.	.5	.2	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1962.	.5	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1963.	.6	.1	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1964.	.6	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1965.	.6	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1966.	1.0	.4	.3	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1967.	1.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1968.	3.0	2.0	.9	1.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1969.	5.7	2.7	.0	.0	.0	.0	1.4	1.3	.0	.0	.0	.0	.0	.0	.0	.0
1970.	12.0	6.3	.0	.0	.0	.0	3.1	3.2	.0	.0	.0	.0	.0	.0	.0	.0
1971.	22.7	10.7	.0	.0	.0	.0	6.3	4.4	.0	.0	.0	.0	.0	.0	.0	.0
1972.	33.7	11.0	.0	.0	.0	.0	7.3	3.7	.0	.0	.0	.0	.0	.0	.0	.0
1973.	45.2	11.5	.0	.0	.0	.0	7.7	3.8	.0	.0	.0	.0	.0	.0	.0	.0
1974.	57.2	12.0	.0	.0	.0	.0	8.0	4.0	.0	.0	.0	.0	.0	.0	.0	.0
1975.	69.7	12.5	.0	.0	.0	.0	8.3	4.2	.0	.0	.0	.0	.0	.0	.0	.0
1976.	82.7	13.0	.0	.0	.0	.0	8.7	4.3	.0	.0	.0	.0	.0	.0	.0	.0
1977.	96.7	14.0	.0	.0	.0	.0	9.3	4.7	.0	.0	.0	.0	.0	.0	.0	.0
1978.	112.2	15.5	.0	.0	.0	.0	10.3	5.2	.0	.0	.0	.0	.0	.0	.0	.0
1979.	129.7	17.5	.0	.0	.0	.0	11.7	5.8	.0	.0	.0	.0	.0	.0	.0	.0
1980.	150.0	20.3	.0	.0	.0	.0	.0	.0	12.2	6.1	.0	.0	.0	.0	.0	2.0
1981.	173.7	23.7	.0	.0	.0	.0	.0	.0	14.5	7.2	.0	.0	.0	.0	.0	2.0
1982.	200.2	26.5	.0	.0	.0	.0	.0	.0	15.7	7.8	.0	.0	.0	.0	.0	3.0
1983.	229.5	29.3	.0	.0	.0	.0	.0	.0	16.2	8.1	.0	.0	.0	.0	.0	5.0
1984.	261.4	31.9	.0	.0	.0	.0	.0	.0	16.6	8.3	.0	.0	.0	.0	.0	7.0
1985.	295.7	34.3	.0	.0	.0	.0	.0	.0	16.9	8.4	.0	.0	.0	.0	.0	9.0
1986.	332.2	36.5	.0	.0	.0	.0	.0	.0	15.7	7.8	.0	.0	.0	.0	.0	13.0
1987.	370.7	38.5	.0	.0	.0	.0	.0	.0	14.3	7.2	.0	.0	.0	.0	.0	17.0
1988.	411.2	40.5	.0	.0	.0	.0	.0	.0	13.0	6.5	.0	.0	.0	.0	.0	21.0
1989.	454.1	42.9	.0	.0	.0	.0	.0	.0	11.9	6.0	.0	.0	.0	.0	.0	25.0
1990.	500.0	45.9	.0	.0	.0	.0	.0	.0	12.6	6.3	.0	.0	.0	.0	.0	27.0

DISTRIBUTION OF ELECTRICAL GENERATING CAPACITY

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LWR'S - U235 RECYCLE WITH FAST REACTORS

CASE 5

YEAR ENDING	TOTAL INSTALLED CAPACITY GW(E)	NEWLY INSTALLED CAPACITY GW(E)	CUMULATIVE INSTALLED CAPACITY BY REACTOR TYPE, GIGAWATTS ELECTRICAL													
			PWR70	BWR70	PWR80	BWR80	PWR70 30U	BWR70 30U	PWR80 30U	BWR80 30U	LWR70 4PU	LWR80 4PU	LWR70 10PU	LWR70 30PU	LWR80 30PU	LMFBR
1960.	.3	.3	.1	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1961.	.5	.2	.2	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1962.	.5	.0	.2	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1963.	.6	.1	.2	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1964.	.6	.0	.3	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1965.	.6	.0	.3	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1966.	1.0	.4	.6	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1967.	1.0	.0	.6	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1968.	3.0	2.0	1.5	1.5	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1969.	5.7	2.7	1.5	1.5	.0	.0	1.4	1.3	.0	.0	.0	.0	.0	.0	.0	.0
1970.	12.0	6.3	1.5	1.5	.0	.0	4.4	4.5	.0	.0	.0	.0	.0	.0	.0	.0
1971.	22.7	10.7	1.5	1.5	.0	.0	10.8	8.9	.0	.0	.0	.0	.0	.0	.0	.0
1972.	33.7	11.0	1.5	1.5	.0	.0	18.1	12.6	.0	.0	.0	.0	.0	.0	.0	.0
1973.	45.2	11.5	1.5	1.5	.0	.0	25.8	16.4	.0	.0	.0	.0	.0	.0	.0	.0
1974.	57.2	12.0	1.5	1.5	.0	.0	33.8	20.4	.0	.0	.0	.0	.0	.0	.0	.0
1975.	69.7	12.5	1.5	1.5	.0	.0	42.1	24.6	.0	.0	.0	.0	.0	.0	.0	.0
1976.	82.7	13.0	1.5	1.5	.0	.0	50.8	28.9	.0	.0	.0	.0	.0	.0	.0	.0
1977.	96.7	14.0	1.5	1.5	.0	.0	60.1	33.6	.0	.0	.0	.0	.0	.0	.0	.0
1978.	112.2	15.5	1.5	1.5	.0	.0	70.4	38.7	.0	.0	.0	.0	.0	.0	.0	.0
1979.	129.7	17.5	1.5	1.5	.0	.0	82.1	44.6	.0	.0	.0	.0	.0	.0	.0	.0
1980.	150.0	20.3	1.5	1.5	.0	.0	82.1	44.6	12.2	6.1	.0	.0	.0	.0	.0	2.0
1981.	173.7	23.7	1.5	1.5	.0	.0	82.1	44.6	26.7	13.3	.0	.0	.0	.0	.0	4.0
1982.	200.2	26.5	1.5	1.5	.0	.0	82.1	44.6	42.3	21.2	.0	.0	.0	.0	.0	7.0
1983.	229.5	29.3	1.5	1.5	.0	.0	82.1	44.6	58.5	29.3	.0	.0	.0	.0	.0	12.0
1984.	261.4	31.9	1.5	1.5	.0	.0	82.1	44.6	75.1	37.6	.0	.0	.0	.0	.0	19.0
1985.	295.7	34.3	1.5	1.5	.0	.0	82.1	44.6	92.0	46.0	.0	.0	.0	.0	.0	28.0
1986.	332.2	36.5	1.5	1.5	.0	.0	82.1	44.6	107.7	53.8	.0	.0	.0	.0	.0	41.0
1987.	370.7	38.5	1.5	1.5	.0	.0	82.1	44.6	122.0	61.0	.0	.0	.0	.0	.0	58.0
1988.	411.2	40.5	1.5	1.5	.0	.0	82.1	44.6	135.0	67.5	.0	.0	.0	.0	.0	79.0
1989.	454.1	42.9	1.5	1.5	.0	.0	82.1	44.6	146.9	73.5	.0	.0	.0	.0	.0	104.0
1990.	500.0	45.9	1.5	1.5	.0	.0	82.1	44.6	159.5	79.8	.0	.0	.0	.0	.0	131.0

ANNUAL ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSS BASIS)

LWR'S - U236 RECYCLE WITH FAST REACTORS

CASE 5

DURING PERIOD ENDING	TOTAL INSTALLED CAPACITY		ISOTOPE PRODUCTION, KILOGRAMS/YEAR												
	GW(E)	TONNE	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	CM244 AM3	CM244 SUM	PU238 NP	PU238 CM	PU238 AM	PU238 SUM
1960.	.3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.5	2.	10.	10.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1962.	.5	7.	44.	44.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1963.	.6	21.	147.	147.	5.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1964.	.6	21.	181.	181.	8.	1.	2.	0.	0.	0.	0.	0.	0.	0.	0.
1965.	.6	16.	125.	125.	6.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.
1966.	1.0	25.	192.	192.	8.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.
1967.	1.0	36.	276.	276.	12.	1.	2.	0.	0.	0.	0.	0.	0.	0.	0.
1968.	3.0	34.	278.	278.	13.	1.	2.	0.	0.	0.	0.	0.	0.	0.	0.
1969.	5.7	61.	418.	418.	16.	2.	2.	0.	0.	0.	0.	0.	0.	0.	0.
1970.	12.0	101.	703.	703.	26.	2.	3.	1.	1.	0.	1.	0.	0.	0.	0.
1971.	22.7	265.	1801.	1801.	61.	6.	7.	1.	1.	0.	1.	0.	0.	0.	0.
1972.	33.7	551.	3863.	3863.	134.	14.	17.	4.	4.	0.	4.	0.	0.	0.	0.
1973.	45.2	944.	6751.	6751.	239.	25.	32.	6.	7.	0.	7.	0.	0.	0.	0.
1974.	57.2	1423.	10561.	10561.	398.	44.	59.	12.	14.	0.	14.	0.	0.	0.	0.
1975.	69.7	1829.	14027.	14027.	572.	62.	87.	17.	21.	0.	21.	0.	0.	0.	0.
1976.	82.7	2154.	16654.	16654.	722.	76.	106.	20.	25.	0.	25.	0.	0.	0.	0.
1977.	96.7	2566.	20015.	20015.	920.	93.	132.	25.	31.	0.	31.	0.	0.	0.	0.
1978.	112.2	3027.	23711.	23711.	1144.	112.	159.	31.	38.	0.	38.	0.	0.	0.	0.
1979.	129.7	3564.	27939.	14884.	1398.	132.	187.	36.	44.	0.	44.	0.	0.	0.	0.
1980.	150.0	4244.	33283.	20229.	1709.	157.	220.	43.	52.	0.	52.	0.	0.	0.	0.
1981.	173.7	5162.	43154.	19869.	2038.	187.	254.	50.	59.	0.	59.	0.	0.	0.	0.
1982.	200.2	6561.	56576.	16537.	2484.	233.	304.	61.	69.	0.	69.	0.	0.	0.	0.
1983.	229.5	7484.	69288.	10640.	2882.	275.	344.	71.	76.	0.	76.	0.	0.	0.	0.
1984.	261.4	8577.	81798.	4542.	3284.	302.	359.	76.	75.	0.	75.	0.	0.	0.	0.
1985.	295.7	10057.	105181.	-11135.	3815.	369.	399.	89.	80.	0.	80.	0.	0.	0.	0.
1986.	332.2	11822.	128139.	-25392.	4404.	429.	436.	101.	83.	0.	83.	0.	0.	0.	0.
1987.	370.7	13172.	157797.	-42197.	4836.	512.	467.	115.	83.	0.	83.	0.	0.	0.	0.
1988.	411.2	14843.	195596.	-56409.	5383.	620.	510.	134.	85.	0.	85.	0.	0.	0.	0.
1989.	454.1	15969.	230778.	-62039.	5669.	716.	530.	149.	82.	0.	82.	0.	0.	0.	0.
1990.	500.0	17433.	277524.	125793.	6139.	863.	579.	173.	84.	0.	84.	0.	0.	0.	0.

ANNUAL ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSS BASIS)

L W R ' S - U236 RECYCLE WITH FAST REACTORS

CASE 5

DURING PERIOD ENDING	ISOTOPE PRODUCTION, KILOGRAMS/YEAR														
	GW-YR	U-235	U-236	PM147	CE144	CS137	SR-90	KR-85	TC-99	RH103 SUM	RU106	PD STABL	XE STABL	CM242 AM1	AM241 PU1
1960.	.2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.4	21.	3.	0.	0.	1.	0.	0.	1.	0.	0.	0.	3.	0.	0.
1962.	.4	80.	14.	1.	2.	4.	2.	0.	3.	2.	1.	2.	16.	0.	0.
1963.	.5	203.	49.	4.	7.	23.	10.	0.	15.	8.	2.	14.	87.	0.	0.
1964.	.5	136.	62.	4.	7.	21.	10.	0.	14.	8.	2.	13.	81.	0.	2.
1965.	.5	139.	50.	3.	5.	15.	7.	0.	10.	5.	2.	9.	58.	0.	3.
1966.	.8	226.	72.	5.	9.	28.	12.	1.	19.	10.	3.	17.	106.	0.	5.
1967.	.8	298.	101.	6.	11.	32.	15.	1.	22.	12.	4.	19.	124.	0.	6.
1968.	2.6	302.	109.	6.	12.	34.	15.	1.	23.	12.	4.	20.	129.	0.	9.
1969.	4.8	596.	150.	9.	19.	47.	22.	1.	32.	17.	6.	27.	186.	0.	11.
1970.	10.2	988.	251.	15.	31.	74.	35.	2.	50.	27.	9.	41.	293.	0.	15.
1971.	19.3	2581.	625.	42.	84.	226.	103.	5.	152.	80.	26.	129.	879.	0.	22.
1972.	28.7	5090.	1336.	86.	173.	455.	209.	10.	307.	162.	54.	260.	1772.	0.	38.
1973.	38.4	8565.	2376.	152.	304.	845.	385.	18.	568.	296.	98.	490.	3268.	0.	73.
1974.	48.6	12216.	3800.	235.	466.	1338.	606.	28.	898.	465.	153.	784.	5154.	0.	135.
1975.	59.3	15412.	5326.	304.	606.	1751.	794.	36.	1174.	604.	200.	1024.	6738.	0.	231.
1976.	70.3	18270.	6744.	360.	720.	2097.	952.	43.	1405.	718.	238.	1225.	8061.	0.	359.
1977.	82.2	21765.	8566.	431.	864.	2535.	1150.	52.	1697.	864.	286.	1481.	9734.	0.	512.
1978.	95.3	25747.	10695.	510.	1023.	3015.	1368.	62.	2017.	1023.	339.	1760.	11572.	0.	696.
1979.	110.2	30527.	13146.	601.	1209.	3553.	1614.	73.	2377.	1204.	400.	2071.	13643.	0.	915.
1980.	127.4	36457.	16243.	714.	1438.	4208.	1911.	87.	2815.	1428.	476.	2453.	16164.	0.	1056.
1981.	147.6	44223.	19609.	864.	1755.	4965.	2258.	103.	3323.	1689.	576.	2898.	19158.	0.	1247.
1982.	170.1	55825.	24114.	1104.	2253.	6247.	2847.	130.	4186.	2130.	745.	3631.	24155.	0.	1436.
1983.	194.9	63721.	28228.	1253.	2602.	6930.	3158.	145.	4645.	2369.	881.	4054.	26927.	0.	1597.
1984.	221.9	73900.	32870.	1429.	2990.	7713.	3513.	162.	5173.	2654.	1013.	4520.	30054.	0.	1706.
1985.	250.8	86155.	38733.	1674.	3522.	8863.	4012.	186.	5949.	3062.	1257.	5313.	34681.	0.	1762.
1986.	281.2	101229.	45594.	1955.	4129.	10119.	4567.	212.	6798.	3524.	1500.	6121.	39735.	0.	1677.
1987.	313.2	111481.	50628.	2177.	4603.	11097.	4968.	232.	7461.	3872.	1774.	6920.	43737.	0.	1463.
1988.	346.6	124374.	56940.	2452.	5193.	12341.	5478.	257.	8302.	4307.	2122.	7927.	48804.	0.	1097.
1989.	381.7	132097.	60566.	2639.	5595.	13063.	5745.	271.	8795.	4565.	2418.	8647.	51866.	0.	600.
1990.	419.1	142686.	65866.	2882.	6115.	14255.	6199.	295.	9601.	4955.	2847.	9808.	56789.	0.	48.

ANNUAL ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSS BASIS)

L W R ' S - U236 RECYCLE WITH FAST REACTORS

CASE 5

DURING PERIOD ENDING	ISOTOPE PRODUCTION, KILOGRAMS/YEAR		
	KR STABL	RU STABL	H-3 GRAMS
1960.	.0	0.	0.
1961.	.3	1.	0.
1962.	1.2	6.	0.
1963.	6.4	39.	1.
1964.	5.9	36.	1.
1965.	4.3	25.	0.
1966.	7.8	47.	1.
1967.	9.1	54.	1.
1968.	9.5	56.	1.
1969.	13.6	78.	1.
1970.	21.3	121.	2.
1971.	64.2	373.	7.
1972.	129.1	750.	13.
1973.	258.5	1400.	24.
1974.	376.6	2225.	39.
1975.	493.2	2909.	51.
1976.	590.8	3483.	61.
1977.	714.2	4210.	74.
1978.	849.7	5006.	88.
1979.	1002.2	5899.	103.
1980.	1186.9	6986.	122.
1981.	1403.2	8240.	144.
1982.	1773.4	10358.	181.
1983.	1970.4	11489.	201.
1984.	2191.9	12777.	223.
1985.	2516.5	14740.	256.
1986.	2870.7	16853.	292.
1987.	3145.7	18591.	321.
1988.	3495.1	20793.	356.
1989.	3697.2	22147.	377.
1990.	4033.5	24367.	412.

CUMULATIVE ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSSES EXCEPT FOR RADIOACTIVE DECAY)

L W R ' S - U236 RECYCLE WITH FAST REACTORS

CASE 5

YEAR ENDING	TOTAL INSTALLED CAPACITY	ISOTOPE PRODUCTION, KGS													
	GW(E)	TONNE	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	CM244 AM3	CM244 SUM	PU238 NP	PU238 CM	PU238 AM	PU238 SUM
1960.	.3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.5	2.	10.	10.	0.	0.	0.	0.	0.	-0.	0.	-0.	-0.	-0.	0.
1962.	.5	9.	53.	53.	1.	0.	0.	0.	0.	-0.	0.	-0.	-0.	-0.	0.
1963.	.6	30.	201.	201.	6.	1.	1.	0.	0.	-0.	0.	-0.	-0.	-0.	0.
1964.	.6	52.	382.	382.	14.	2.	2.	0.	0.	-0.	0.	-0.	-0.	-0.	0.
1965.	.6	67.	509.	509.	20.	2.	3.	0.	1.	-0.	1.	-0.	-0.	-0.	0.
1966.	1.0	93.	704.	704.	29.	3.	4.	0.	1.	-0.	1.	-0.	-0.	-0.	0.
1967.	1.0	128.	985.	985.	41.	4.	6.	0.	1.	-0.	1.	-0.	-0.	-0.	0.
1968.	3.0	163.	1269.	1269.	54.	6.	8.	0.	2.	-0.	2.	-0.	-0.	-0.	0.
1969.	5.7	224.	1696.	1696.	70.	7.	10.	0.	2.	-0.	2.	-0.	-0.	-0.	0.
1970.	12.0	325.	2410.	2410.	97.	10.	13.	1.	3.	-0.	3.	-0.	-0.	-0.	0.
1971.	22.7	590.	4226.	4226.	158.	15.	19.	2.	4.	-0.	4.	-0.	-0.	-0.	0.
1972.	33.7	1142.	8111.	8111.	291.	29.	37.	4.	8.	-0.	8.	-0.	-0.	-0.	0.
1973.	45.2	2086.	14900.	14900.	531.	54.	68.	7.	14.	-0.	14.	-0.	-0.	-0.	0.
1974.	57.2	3509.	25535.	25535.	928.	97.	127.	13.	27.	-0.	27.	-0.	-0.	-0.	0.
1975.	69.7	5338.	39697.	39697.	1501.	159.	215.	20.	47.	-0.	47.	-0.	-0.	-0.	0.
1976.	82.7	7492.	56582.	56582.	2223.	235.	321.	25.	71.	-0.	71.	-0.	-0.	-0.	0.
1977.	96.7	10058.	76956.	76956.	3142.	328.	453.	31.	99.	-0.	99.	-0.	-0.	-0.	0.
1978.	112.2	13086.	101179.	101179.	4286.	439.	612.	37.	133.	-0.	133.	-0.	-0.	-0.	0.
1979.	129.7	16650.	129814.	116759.	5684.	571.	799.	44.	173.	-0.	173.	-0.	-0.	-0.	0.
1980.	150.0	20894.	164012.	137903.	7393.	727.	1019.	52.	218.	-0.	218.	-0.	-0.	-0.	0.
1981.	173.7	26056.	208222.	158828.	9431.	913.	1273.	61.	269.	-0.	269.	-0.	-0.	-0.	0.
1982.	200.2	32617.	266045.	176612.	11915.	1144.	1577.	74.	327.	-0.	327.	-0.	-0.	-0.	0.
1983.	229.5	40100.	336769.	188688.	14796.	1418.	1921.	86.	391.	-0.	391.	-0.	-0.	-0.	0.
1984.	261.4	48678.	420164.	194828.	18081.	1717.	2279.	94.	452.	-0.	452.	-0.	-0.	-0.	0.
1985.	295.7	58735.	527052.	185399.	21895.	2084.	2678.	109.	514.	-0.	514.	-0.	-0.	-0.	0.
1986.	332.2	70557.	656953.	161770.	26300.	2510.	3114.	124.	578.	-0.	578.	-0.	-0.	-0.	0.
1987.	370.7	83729.	816427.	121250.	31135.	3018.	3580.	141.	639.	-0.	639.	-0.	-0.	-0.	0.
1988.	411.2	98572.	1013486.	66304.	36518.	3633.	4090.	164.	701.	-0.	701.	-0.	-0.	-0.	0.
1989.	454.1	114540.	1245360.	5362.	42187.	4343.	4619.	183.	757.	-0.	757.	-0.	-0.	-0.	0.
1990.	500.0	131973.	1523484.	131754.	48325.	5200.	5197.	212.	812.	-0.	812.	-0.	-0.	-0.	0.

CUMULATIVE ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSSES EXCEPT FOR RADIOACTIVE DECAY)

LWR'S - U236 RECYCLE WITH FAST REACTORS

CASE 5

ISOTOPE PRODUCTION, KGS

YEAR ENDING	GW-YR	U-235	U-236	PM147	CE144	CS137	SR-90	KR-85	TC-99	RH103 SUM	RU106	PD STABL	XE STABL	CM242 AM1	AM241 PU1
1960.	.2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.6	21.	3.	0.	0.	1.	0.	0.	1.	0.	0.	0.	3.	-0.	-0.
1962.	1.0	101.	17.	1.	2.	5.	2.	0.	3.	2.	1.	2.	19.	-0.	0.
1963.	1.5	304.	66.	5.	8.	27.	12.	1.	19.	10.	3.	16.	107.	-0.	1.
1964.	2.1	440.	128.	7.	10.	48.	22.	1.	33.	18.	4.	29.	188.	-0.	2.
1965.	2.6	580.	178.	8.	9.	62.	28.	1.	43.	23.	4.	38.	246.	-0.	6.
1966.	3.4	805.	250.	11.	12.	89.	40.	2.	62.	33.	5.	55.	352.	-0.	10.
1967.	4.3	1103.	351.	15.	17.	119.	53.	2.	84.	44.	6.	74.	477.	-0.	17.
1968.	6.8	1405.	460.	17.	19.	150.	67.	3.	106.	56.	7.	93.	606.	-0.	26.
1969.	11.7	2000.	610.	23.	26.	193.	87.	4.	138.	73.	9.	120.	792.	-0.	37.
1970.	21.9	2988.	862.	33.	42.	263.	120.	5.	189.	101.	14.	161.	1084.	-0.	52.
1971.	41.2	5569.	1486.	68.	101.	483.	220.	9.	341.	181.	33.	291.	1963.	-0.	74.
1972.	69.9	10659.	2823.	139.	215.	927.	424.	18.	648.	344.	70.	550.	3735.	-0.	112.
1973.	108.3	19225.	5198.	260.	393.	1751.	798.	35.	1217.	640.	133.	1040.	7003.	-0.	185.
1974.	156.9	31440.	8999.	436.	627.	3049.	1385.	60.	2115.	1105.	220.	1824.	12157.	-0.	320.
1975.	216.2	46852.	14324.	641.	864.	4731.	2145.	93.	3289.	1709.	310.	2848.	18896.	-0.	550.
1976.	286.5	65123.	21068.	856.	1075.	6720.	3044.	130.	4694.	2428.	393.	4073.	26956.	-0.	909.
1977.	368.7	86887.	29634.	1094.	1306.	9102.	4120.	174.	6391.	3291.	482.	5554.	36691.	-0.	1419.
1978.	464.0	112634.	40329.	1356.	1560.	11909.	5388.	226.	8408.	4314.	580.	7314.	48262.	-0.	2113.
1979.	574.2	143161.	53475.	1650.	1851.	15190.	6870.	285.	10785.	5519.	690.	9385.	61905.	-0.	3025.
1980.	701.6	179618.	69718.	1991.	2199.	19051.	8613.	354.	13600.	6947.	821.	11838.	78069.	-0.	4076.
1981.	849.2	223841.	89327.	2404.	2660.	23581.	10660.	435.	16923.	8636.	987.	14736.	97227.	-0.	5317.
1982.	1019.2	279666.	113441.	2963.	3347.	29289.	13247.	538.	21109.	10767.	1239.	18367.	121382.	-0.	6745.
1983.	1214.1	343387.	141669.	3546.	3978.	35550.	16080.	650.	25754.	13135.	1500.	22422.	148310.	-0.	8332.
1984.	1436.0	417287.	174539.	4172.	4626.	42451.	19200.	771.	30926.	15789.	1763.	26941.	178364.	-0.	10026.
1985.	1686.8	503442.	213272.	4902.	5425.	50345.	22743.	909.	36875.	18851.	2139.	32254.	213045.	-0.	11773.
1986.	1968.0	604671.	258866.	5747.	6360.	59314.	26754.	1064.	43673.	22375.	2569.	38375.	252779.	-0.	13432.
1987.	2281.2	716152.	309494.	6623.	7219.	69057.	31068.	1230.	51134.	26247.	3058.	45296.	296516.	-0.	14875.
1988.	2627.8	840526.	366434.	7575.	8162.	79820.	35786.	1410.	59435.	30554.	3652.	53223.	345320.	-0.	15949.
1989.	3009.5	972623.	427000.	8499.	8952.	91059.	40656.	1593.	68230.	35120.	4244.	61870.	397186.	-0.	16525.
1990.	3428.5	1115309.	492866.	9456.	9798.1	103234.	45861.	1788.	77831.	40075.	4969.	71677.	453975.	-0.	16548.

CUMULATIVE ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSSES EXCEPT FOR RADIOACTIVE DECAY)

L W R ' S - U236 RECYCLE WITH FAST REACTORS

CASE 5

ISOTOPE PRODUCTION, KGS

YEAR ENDING	KR STABL	RU STABL	H-3 GRAMS
1960.	.0	0.	0.
1961.	.3	1.	0.
1962.	1.4	8.	0.
1963.	7.8	46.	1.
1964.	13.7	82.	1.
1965.	18.0	107.	2.
1966.	25.8	154.	2.
1967.	34.8	208.	3.
1968.	44.3	263.	4.
1969.	57.9	341.	5.
1970.	79.2	463.	7.
1971.	143.4	836.	13.
1972.	272.5	1586.	26.
1973.	511.0	2986.	49.
1974.	887.5	5211.	85.
1975.	1380.7	8120.	131.
1976.	1971.5	11603.	185.
1977.	2685.7	15814.	248.
1978.	3535.4	20820.	322.
1979.	4537.6	26719.	407.
1980.	5724.5	33705.	507.
1981.	7127.8	41945.	623.
1982.	8901.2	52303.	770.
1983.	10871.5	63791.	929.
1984.	13063.4	76569.	1101.
1985.	15579.9	91309.	1297.
1986.	18450.5	108162.	1518.
1987.	21596.2	126752.	1755.
1988.	25091.4	147545.	2015.
1989.	28788.5	169692.	2281.
1990.	32822.0	194059.	2568.

NET ANNUAL ISOTOPE AVAILABILITY

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

L W R ' S - U236 RECYCLE WITH FAST REACTORS

CASE 5

DURING PERIOD ENDING	TOTAL INSTALLED CAPACITY	ISOTOPE PRODUCTION, KILOGRAMS/YEAR													
	GW(E)	TONNE	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	CM244 AM3	CM244 SUM	PU238 NP	PU238 CM	PU238 AM	PU238 SUM
1960.	.3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.5	0.	0.	0.	-0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1962.	.5	2.	10.	10.	0.	0.	0.	-0.	-0.	0.	0.	0.	0.	0.	0.
1963.	.6	7.	43.	43.	1.	0.	0.	-0.	-0.	0.	0.	0.	0.	0.	0.
1964.	.6	21.	144.	144.	4.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1965.	.6	21.	177.	177.	7.	1.	1.	0.	0.	0.	0.	1.	0.	0.	1.
1966.	1.0	16.	123.	123.	5.	1.	1.	0.	0.	0.	0.	2.	0.	0.	2.
1967.	1.0	25.	189.	189.	7.	1.	1.	0.	0.	0.	0.	3.	0.	0.	3.
1968.	3.0	36.	271.	271.	11.	1.	2.	0.	0.	0.	0.	3.	0.	0.	4.
1969.	5.7	34.	273.	273.	12.	1.	2.	0.	0.	0.	0.	5.	0.	0.	5.
1970.	12.0	61.	410.	410.	15.	1.	2.	0.	0.	0.	1.	6.	0.	0.	6.
1971.	22.7	101.	690.	690.	23.	2.	3.	0.	0.	0.	1.	7.	0.	1.	8.
1972.	33.7	265.	1767.	1767.	55.	5.	6.	0.	0.	0.	1.	10.	0.	1.	11.
1973.	45.2	551.	3789.	3789.	120.	12.	16.	0.	0.	0.	1.	19.	0.	1.	19.
1974.	57.2	944.	6624.	6624.	215.	22.	29.	0.	1.	1.	2.	38.	0.	1.	39.
1975.	69.7	1423.	10363.	10363.	358.	39.	53.	0.	3.	1.	4.	72.	1.	2.	75.
1976.	82.7	1829.	13770.	13770.	515.	56.	78.	0.	6.	3.	9.	126.	1.	4.	131.
1977.	96.7	2154.	16356.	16356.	650.	68.	96.	0.	11.	5.	16.	196.	2.	8.	206.
1978.	112.2	2566.	19665.	19665.	828.	84.	119.	0.	17.	10.	26.	274.	3.	15.	291.
1979.	129.7	3027.	23306.	23306.	1030.	101.	143.	0.	20.	15.	36.	365.	4.	22.	391.
1980.	150.0	3564.	27470.	14677.	1258.	119.	169.	0.	25.	20.	45.	472.	5.	29.	506.
1981.	173.7	4244.	32721.	19928.	1538.	141.	198.	0.	30.	27.	58.	595.	5.	38.	638.
1982.	200.2	5162.	42414.	19595.	1834.	168.	229.	0.	36.	36.	71.	416.	6.	47.	469.
1983.	229.5	6561.	55586.	16348.	2235.	210.	273.	0.	42.	44.	85.	507.	8.	57.	571.
1984.	261.4	7484.	68059.	10584.	2594.	247.	310.	0.	47.	55.	102.	461.	9.	68.	538.
1985.	295.7	8577.	80330.	4620.	2956.	271.	323.	1.	55.	66.	122.	628.	11.	82.	721.
1986.	332.2	10057.	103251.	-10739.	3433.	332.	359.	1.	61.	80.	141.	668.	13.	101.	782.
1987.	370.7	11822.	125742.	-24719.	3964.	386.	392.	1.	60.	95.	155.	872.	14.	120.	1006.
1988.	411.2	13172.	154785.	-41209.	4352.	460.	420.	1.	64.	106.	170.	984.	16.	137.	1138.
1989.	454.1	14843.	191792.	-55173.	4844.	557.	459.	1.	66.	123.	190.	1231.	18.	166.	1415.
1990.	500.0	15969.	226221.	-60739.	5102.	643.	477.	1.	67.	141.	207.	1382.	21.	192.	1594.

NET ANNUAL ISOTOPE AVAILABILITY

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

L W R ' S - U236 RECYCLE WITH FAST REACTORS

CASE 5

DURING PERIOD ENDING	ISOTOPE PRODUCTION, KILOGRAMS/YEAR														
	GW-YR	U-235	U-236	PM147	CE144	CS137	SR-90	KR-85	TC-99	RH103 SUM	RU106	PD STABL	XE STABL	CM242 AM1	AM241 PU1
1960.	.2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.4	-0.	-0.	0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	0.	0.
1962.	.4	20.	3.	-0.	0.	1.	0.	0.	1.	0.	0.	0.	3.	0.	0.
1963.	.5	79.	14.	-0.	1.	3.	2.	0.	2.	1.	0.	2.	14.	0.	0.
1964.	.5	199.	48.	0.	3.	20.	9.	0.	14.	7.	1.	13.	78.	0.	0.
1965.	.5	134.	61.	0.	3.	19.	8.	0.	13.	7.	1.	12.	73.	0.	2.
1966.	.8	136.	47.	2.	2.	13.	6.	0.	9.	5.	1.	8.	53.	0.	3.
1967.	.8	221.	71.	2.	3.	24.	11.	0.	17.	9.	1.	15.	95.	0.	4.
1968.	2.6	292.	99.	1.	4.	28.	13.	1.	20.	10.	2.	17.	112.	0.	6.
1969.	4.8	296.	107.	2.	4.	30.	13.	1.	20.	11.	2.	18.	116.	0.	8.
1970.	10.2	584.	147.	2.	7.	42.	19.	1.	29.	16.	3.	24.	167.	0.	10.
1971.	19.3	968.	246.	3.	12.	65.	30.	1.	45.	25.	4.	37.	264.	0.	14.
1972.	28.7	2529.	612.	4.	31.	199.	91.	4.	137.	72.	12.	117.	791.	0.	19.
1973.	38.4	4988.	1309.	6.	64.	400.	183.	8.	276.	146.	24.	234.	1595.	0.	34.
1974.	48.6	8394.	2328.	18.	113.	743.	338.	15.	511.	267.	44.	441.	2941.	0.	65.
1975.	59.3	11971.	3724.	36.	172.	1177.	532.	23.	809.	419.	69.	706.	4639.	0.	119.
1976.	70.3	15104.	5219.	63.	224.	1540.	697.	31.	1057.	544.	90.	922.	6065.	0.	203.
1977.	82.2	17905.	6609.	98.	266.	1845.	835.	37.	1264.	646.	107.	1103.	7255.	0.	316.
1978.	95.3	21330.	8394.	127.	320.	2230.	1010.	44.	1527.	777.	129.	1333.	8761.	0.	451.
1979.	110.2	25232.	10482.	150.	379.	2651.	1201.	53.	1815.	921.	153.	1584.	10414.	0.	613.
1980.	127.4	29916.	12883.	180.	447.	3125.	1417.	62.	2139.	1084.	180.	1864.	12278.	1.	806.
1981.	147.6	35728.	15918.	213.	532.	3701.	1678.	73.	2533.	1286.	214.	2208.	14548.	1.	931.
1982.	170.1	43338.	19217.	250.	650.	4366.	1982.	87.	2991.	1520.	259.	2608.	17242.	1.	1099.
1983.	194.9	54708.	23632.	298.	834.	5494.	2500.	110.	3767.	1917.	335.	3268.	21740.	1.	1266.
1984.	221.9	62447.	27664.	360.	963.	6095.	2772.	122.	4181.	2132.	396.	3649.	24235.	1.	1408.
1985.	250.8	72422.	32213.	460.	1107.	6783.	3084.	137.	4656.	2388.	456.	4068.	27049.	2.	1504.
1986.	281.2	84432.	37958.	522.	1304.	7795.	3523.	157.	5354.	2756.	566.	4782.	31213.	2.	1553.
1987.	313.2	99205.	44682.	596.	1528.	8899.	4010.	179.	6118.	3171.	675.	5509.	35761.	3.	1478.
1988.	346.6	109251.	49616.	698.	1704.	9759.	4362.	196.	6715.	3485.	798.	6228.	39363.	3.	1290.
1989.	381.7	121886.	55801.	815.	1922.	10853.	4810.	217.	7472.	3877.	955.	7134.	43924.	4.	967.
1990.	419.1	129455.	59355.	907.	2071.	11488.	5044.	229.	7916.	4109.	1088.	7782.	46679.	4.	529.

NET ANNUAL ISOTOPE AVAILABILITY

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

L W R ' S - U236 RECYCLE WITH FAST REACTORS

CASE 5

DURING
PERIOD
ENDING

ISOTOPE PRODUCTION, KILOGRAMS/YEAR

	KR STABL	RU STABL	H-3 GRAMS
1960.	.0	0.	0.
1961.	-.0	-0.	0.
1962.	.2	1.	0.
1963.	1.0	6.	0.
1964.	5.7	35.	1.
1965.	5.3	32.	1.
1966.	3.9	23.	0.
1967.	7.0	42.	1.
1968.	8.2	48.	1.
1969.	8.5	50.	1.
1970.	12.2	70.	1.
1971.	19.2	109.	2.
1972.	57.8	336.	6.
1973.	116.2	675.	11.
1974.	214.6	1260.	21.
1975.	358.9	2002.	33.
1976.	443.9	2619.	43.
1977.	531.7	3135.	52.
1978.	642.8	3789.	63.
1979.	764.7	4506.	74.
1980.	902.0	5309.	88.
1981.	1068.2	6288.	104.
1982.	1262.9	7416.	123.
1983.	1596.1	9322.	154.
1984.	1773.3	10340.	171.
1985.	1972.7	11499.	190.
1986.	2264.8	13266.	218.
1987.	2583.6	15168.	249.
1988.	2831.1	16732.	273.
1989.	3145.6	18713.	303.
1990.	3327.5	19932.	321.

C U M U L A T I V E I S O T O P E A V A I L A B I L I T Y

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

L W R ' S - U236 RECYCLE WITH FAST REACTORS

CASE 5

YEAR ENDING	TOTAL INSTALLED CAPACITY	ISOTOPE PRODUCTION, KGS													
	GW(E)	TONNE	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	CM244 AM3	CM244 SUM	PU238 NP	PU238 CM	PU238 AM	PU238 SUM
1960.	.3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.5	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	0.	-0.	-0.	-0.	0.
1962.	.5	2.	10.	10.	0.	0.	0.	-0.	-0.	-0.	0.	-0.	-0.	-0.	0.
1963.	.6	9.	52.	52.	1.	0.	0.	-0.	-0.	-0.	0.	0.	-0.	-0.	0.
1964.	.6	30.	197.	197.	6.	1.	0.	0.	0.	-0.	0.	0.	0.	-0.	0.
1965.	.6	52.	374.	374.	13.	1.	2.	0.	0.	0.	0.	1.	0.	0.	1.
1966.	1.0	67.	499.	499.	18.	2.	3.	0.	0.	0.	0.	4.	0.	0.	4.
1967.	1.0	93.	691.	691.	26.	3.	4.	0.	0.	0.	0.	6.	0.	0.	7.
1968.	3.0	128.	966.	966.	37.	4.	5.	0.	1.	0.	1.	10.	0.	0.	10.
1969.	5.7	163.	1245.	1245.	49.	5.	7.	0.	1.	0.	1.	15.	0.	1.	15.
1970.	12.0	224.	1663.	1663.	63.	7.	9.	0.	1.	1.	2.	20.	0.	1.	22.
1971.	22.7	325.	2363.	2363.	87.	9.	11.	0.	1.	1.	2.	27.	0.	2.	29.
1972.	33.7	590.	4144.	4144.	142.	14.	17.	0.	2.	1.	3.	37.	0.	2.	40.
1973.	45.2	1142.	7952.	7952.	262.	26.	33.	0.	2.	2.	4.	55.	0.	3.	59.
1974.	57.2	2086.	14609.	14609.	477.	48.	62.	0.	3.	3.	6.	93.	1.	4.	98.
1975.	69.7	3509.	25037.	25037.	836.	87.	115.	0.	6.	4.	10.	164.	1.	6.	171.
1976.	82.7	5338.	38926.	38926.	1351.	143.	193.	0.	11.	7.	18.	289.	2.	10.	301.
1977.	96.7	7492.	55485.	55485.	2000.	211.	289.	0.	22.	12.	34.	482.	5.	18.	505.
1978.	112.2	10058.	75467.	75467.	2828.	294.	407.	0.	38.	21.	59.	752.	8.	33.	793.
1979.	129.7	13086.	99224.	99224.	3858.	395.	550.	0.	57.	36.	92.	1112.	11.	54.	1178.
1980.	150.0	16650.	127308.	114514.	5116.	513.	719.	0.	80.	54.	134.	1575.	16.	83.	1674.
1981.	173.7	20894.	160836.	135249.	6654.	653.	917.	0.	107.	80.	187.	2158.	21.	120.	2299.
1982.	200.2	26056.	204180.	155774.	8488.	820.	1146.	0.	139.	113.	251.	2557.	27.	166.	2751.
1983.	229.5	32617.	260865.	173222.	10723.	1028.	1419.	0.	175.	152.	327.	3044.	35.	222.	3301.
1984.	261.4	40100.	330191.	185072.	13317.	1274.	1729.	1.	216.	201.	417.	3481.	43.	289.	3813.
1985.	295.7	48678.	411929.	191100.	16273.	1543.	2051.	1.	263.	260.	523.	4082.	54.	369.	4505.
1986.	332.2	58735.	516684.	181865.	19706.	1873.	2410.	1.	314.	330.	644.	4719.	66.	467.	5252.
1987.	370.7	70557.	643979.	158700.	23670.	2256.	2802.	1.	362.	413.	775.	5554.	80.	584.	6217.
1988.	411.2	83729.	800242.	118969.	28022.	2712.	3222.	1.	413.	504.	916.	6495.	95.	717.	7307.
1989.	454.1	98572.	993324.	65086.	32866.	3265.	3680.	1.	464.	608.	1072.	7676.	113.	877.	8666.
1990.	500.0	114540.	1220512.	5314.	37968.	3903.	4157.	1.	513.	726.	1239.	8998.	132.	1063.	10193.

CUMULATIVE ISOTOPE AVAILABILITY

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

L W R ' S - U236 RECYCLE WITH FAST REACTORS

CASE 5

ISOTOPE PRODUCTION, KGS

YEAR ENDING	GW-YR	U-235	U-236	PM147	CE144	CS137	SR-90	KR-85	TC-99	RH103 SUM	RU106	PD STABL	XE STABL	CM242 AM1	AM241 PU1
1960.	.2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.6	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.
1962.	1.0	20.	3.	-0.	0.	1.	0.	0.	1.	0.	0.	0.	3.	-0.	-0.
1963.	1.5	99.	17.	-0.	1.	4.	2.	0.	3.	2.	0.	2.	17.	-0.	0.
1964.	2.1	298.	65.	0.	3.	24.	11.	0.	17.	9.	1.	15.	96.	-0.	1.
1965.	2.6	432.	126.	0.	4.	42.	19.	1.	30.	16.	2.	26.	169.	0.	2.
1966.	3.4	568.	174.	2.	4.	55.	25.	1.	39.	21.	2.	34.	222.	0.	5.
1967.	4.3	789.	245.	3.	5.	78.	35.	1.	56.	29.	2.	49.	317.	0.	9.
1968.	6.8	1081.	344.	4.	6.	104.	47.	2.	75.	40.	3.	66.	429.	0.	15.
1969.	11.7	1377.	450.	5.	7.	132.	59.	2.	96.	51.	3.	84.	545.	0.	23.
1970.	21.9	1960.	598.	6.	10.	170.	77.	3.	124.	66.	4.	108.	712.	0.	33.
1971.	41.2	2928.	844.	7.	16.	232.	105.	4.	170.	91.	6.	145.	976.	0.	46.
1972.	69.9	5458.	1457.	10.	38.	425.	194.	8.	307.	163.	15.	261.	1767.	0.	65.
1973.	108.3	10446.	2766.	14.	80.	815.	372.	16.	583.	309.	32.	495.	3361.	0.	99.
1974.	156.9	18840.	5094.	28.	145.	1540.	700.	29.	1095.	576.	60.	936.	6303.	0.	163.
1975.	216.2	30812.	8819.	58.	232.	2681.	1216.	51.	1904.	994.	99.	1642.	10942.	0.	282.
1976.	286.5	45915.	14038.	108.	320.	4160.	1883.	78.	2961.	1538.	139.	2563.	17006.	0.	465.
1977.	368.7	63820.	20647.	182.	398.	5910.	2673.	110.	4225.	2185.	177.	3666.	24261.	0.	801.
1978.	464.0	85150.	29041.	267.	483.	8004.	3617.	147.	5752.	2962.	217.	4999.	33022.	0.	1250.
1979.	574.2	110382.	39523.	357.	578.	10473.	4730.	191.	7568.	3883.	261.	6582.	43436.	1.	1862.
1980.	701.6	140298.	52406.	456.	685.	13359.	6032.	241.	9706.	4967.	311.	8446.	55714.	1.	2665.
1981.	849.2	176026.	68324.	565.	814.	16754.	7562.	299.	12240.	6252.	370.	10654.	70262.	1.	3592.
1982.	1019.2	219364.	87540.	688.	985.	20738.	9360.	367.	15230.	7773.	444.	13262.	87505.	1.	4686.
1983.	1214.1	274072.	111172.	829.	1239.	25758.	11630.	454.	18998.	9690.	558.	16530.	109244.	2.	5945.
1984.	1436.0	336519.	138836.	1001.	1473.	31264.	14118.	548.	23178.	11822.	675.	20179.	133479.	2.	7344.
1985.	1686.8	408941.	171048.	1235.	1712.	37333.	16858.	651.	27834.	14210.	793.	24247.	160528.	2.	8837.
1986.	1968.0	493373.	209006.	1477.	2008.	44275.	19968.	767.	33187.	16966.	962.	29029.	191740.	3.	10376.
1987.	2281.2	592578.	253689.	1738.	2354.	52164.	23490.	898.	39306.	20137.	1156.	34538.	227501.	3.	11839.
1988.	2627.8	701829.	303304.	2042.	2672.	60731.	27278.	1038.	46020.	23622.	1376.	40766.	266865.	4.	13111.
1989.	3009.5	823715.	359105.	2394.	3021.	70197.	31420.	1190.	53492.	27499.	1643.	47900.	310788.	4.	14058.
1990.	3428.5	953171.	418460.	2759.	3314.	80082.	35696.	1344.	61407.	31608.	1910.	55683.	357468.	5.	14565.

CUMULATIVE ISOTOPE AVAILABILITY

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

L W R ' S - U236 RECYCLE WITH FAST REACTORS

CASE 5

ISOTOPE PRODUCTION, KGS

YEAR ENDING	KR STABL	RU STABL	H-3 GRAMS
1960.	.0	0.	0.
1961.	-.0	-0.	-0.
1962.	.2	1.	0.
1963.	1.3	7.	0.
1964.	7.0	41.	1.
1965.	12.3	74.	1.
1966.	16.2	96.	1.
1967.	23.2	139.	2.
1968.	31.4	187.	3.
1969.	39.9	237.	3.
1970.	52.1	307.	4.
1971.	71.3	416.	6.
1972.	129.1	752.	11.
1973.	245.2	1428.	22.
1974.	459.9	2687.	41.
1975.	798.8	4689.	72.
1976.	1242.7	7308.	111.
1977.	1774.4	10443.	157.
1978.	2417.2	14232.	211.
1979.	3181.9	18738.	274.
1980.	4083.9	24047.	347.
1981.	5152.1	30335.	431.
1982.	6415.0	37750.	530.
1983.	8011.0	47072.	655.
1984.	9784.4	57412.	790.
1985.	11757.0	68912.	936.
1986.	14021.9	82178.	1103.
1987.	16605.5	97345.	1291.
1988.	19436.6	114077.	1493.
1989.	22582.2	132790.	1714.
1990.	25909.7	152723.	1940.

I S O T O P E P R O D U C T I O N

LWR'S - PU & U236 RECYCLE WITH FAST REACTORS

DISTRIBUTION OF ELECTRICAL GENERATING CAPACITY

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LWR'S - PU & U236 RECYCLE WITH FAST REACTORS

CASE 6

YEAR ENDING	TOTAL INSTALLED CAPACITY GW(E)	NEWLY INSTALLED CAPACITY GW(E)	NEWLY INSTALLED CAPACITY BY REACTOR TYPE, GIGAWATTS ELECTRICAL													
			PWR70	BWR70	PWR80	BWR80	PWR70 30U	BWR70 30U	PWR80 30U	BWR80 30U	LWR70 4PU	LWR80 4PU	LWR70 10PU	LWR70 30PU	LWR80 30PU	LMFBR
1960.	.3	.3	.1	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1961.	.5	.2	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1962.	.5	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1963.	.6	.1	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1964.	.6	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1965.	.6	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1966.	1.0	.4	.3	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1967.	1.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1968.	3.0	2.0	.9	1.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1969.	5.7	2.7	.0	.0	.0	.0	1.4	1.3	.0	.0	.0	.0	.0	.0	.0	.0
1970.	12.0	6.3	.0	.0	.0	.0	3.1	3.2	.0	.0	.0	.0	.0	.0	.0	.0
1971.	22.7	10.7	.0	.0	.0	.0	6.3	4.4	.0	.0	.0	.0	.0	.0	.0	.0
1972.	33.7	11.0	.0	.0	.0	.0	7.3	3.7	.0	.0	.0	.0	.0	.0	.0	.0
1973.	45.2	11.5	.0	.0	.0	.0	7.7	3.8	.0	.0	.0	.0	.0	.0	.0	.0
1974.	57.2	12.0	.0	.0	.0	.0	6.7	3.3	.0	.0	.0	.0	2.0	.0	.0	.0
1975.	69.7	12.5	.0	.0	.0	.0	6.3	3.2	.0	.0	.0	.0	3.0	.0	.0	.0
1976.	82.7	13.0	.0	.0	.0	.0	6.0	3.0	.0	.0	.0	.0	4.0	.0	.0	.0
1977.	96.7	14.0	.0	.0	.0	.0	6.7	3.3	.0	.0	.0	.0	4.0	.0	.0	.0
1978.	112.2	15.5	.0	.0	.0	.0	7.7	3.8	.0	.0	4.0	.0	.0	.0	.0	.0
1979.	129.7	17.5	.0	.0	.0	.0	9.0	4.5	.0	.0	4.0	.0	.0	.0	.0	.0
1980.	150.0	20.3	.0	.0	.0	.0	.0	.0	12.2	6.1	.0	.0	.0	.0	.0	2.0
1981.	173.7	23.7	.0	.0	.0	.0	.0	.0	14.5	7.2	.0	.0	.0	.0	.0	2.0
1982.	200.2	26.5	.0	.0	.0	.0	.0	.0	15.7	7.8	.0	.0	.0	.0	.0	3.0
1983.	229.5	29.3	.0	.0	.0	.0	.0	.0	15.5	7.8	.0	1.0	.0	.0	.0	5.0
1984.	261.4	31.9	.0	.0	.0	.0	.0	.0	15.3	7.6	.0	2.0	.0	.0	.0	7.0
1985.	295.7	34.3	.0	.0	.0	.0	.0	.0	14.9	7.4	.0	3.0	.0	.0	.0	9.0
1986.	332.2	36.5	.0	.0	.0	.0	.0	.0	14.4	7.1	.0	2.0	.0	.0	.0	13.0
1987.	370.7	38.5	.0	.0	.0	.0	.0	.0	15.0	7.5	.0	.0	.0	.0	.0	16.0
1988.	411.2	40.5	.0	.0	.0	.0	.0	.0	16.4	8.1	.0	.0	.0	.0	.0	16.0
1989.	454.1	42.9	.0	.0	.0	.0	.0	.0	16.6	8.3	.0	.0	.0	.0	.0	18.0
1990.	500.0	45.9	.0	.0	.0	.0	.0	.0	18.0	8.9	.0	.0	.0	.0	.0	19.0

DISTRIBUTION OF ELECTRICAL GENERATING CAPACITY

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LWR'S - PU & U236 RECYCLE WITH FAST REACTORS

CASE 6

YEAR ENDING	TOTAL INSTALLED CAPACITY GW(E)	NEWLY INSTALLED CAPACITY GW(E)	CUMULATIVE INSTALLED CAPACITY BY REACTOR TYPE, GIGAWATTS ELECTRICAL													
			PWR70	BWR70	PWR80	BWR80	PWR70 30U	BWR70 30U	PWR80 30U	BWR80 30U	LWR70 4PU	LWR80 4PU	LWR70 10PU	LWR70 30PU	LWR80 30PU	LMFBR
1960.	.3	.3	.1	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1961.	.5	.2	.2	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1962.	.5	.0	.2	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1963.	.6	.1	.2	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1964.	.6	.0	.3	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1965.	.6	.0	.3	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1966.	1.0	.4	.6	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1967.	1.0	.0	.6	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1968.	3.0	2.0	1.5	1.5	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1969.	5.7	2.7	1.5	1.5	.0	.0	1.4	1.3	.0	.0	.0	.0	.0	.0	.0	.0
1970.	12.0	6.3	1.5	1.5	.0	.0	4.4	4.5	.0	.0	.0	.0	.0	.0	.0	.0
1971.	22.7	10.7	1.5	1.5	.0	.0	10.8	8.9	.0	.0	.0	.0	.0	.0	.0	.0
1972.	33.7	11.0	1.5	1.5	.0	.0	18.1	12.6	.0	.0	.0	.0	.0	.0	.0	.0
1973.	45.2	11.5	1.5	1.5	.0	.0	25.8	16.4	.0	.0	.0	.0	.0	.0	.0	.0
1974.	57.2	12.0	1.5	1.5	.0	.0	32.5	19.7	.0	.0	.0	.0	2.0	.0	.0	.0
1975.	69.7	12.5	1.5	1.5	.0	.0	38.8	22.9	.0	.0	.0	.0	5.0	.0	.0	.0
1976.	82.7	13.0	1.5	1.5	.0	.0	44.8	25.9	.0	.0	.0	.0	9.0	.0	.0	.0
1977.	96.7	14.0	1.5	1.5	.0	.0	51.5	29.2	.0	.0	.0	.0	13.0	.0	.0	.0
1978.	112.2	15.5	1.5	1.5	.0	.0	59.2	33.0	.0	.0	4.0	.0	13.0	.0	.0	.0
1979.	129.7	17.5	1.5	1.5	.0	.0	68.2	37.5	.0	.0	8.0	.0	13.0	.0	.0	.0
1980.	150.0	20.3	1.5	1.5	.0	.0	68.2	37.5	12.2	6.1	8.0	.0	13.0	.0	.0	2.0
1981.	173.7	23.7	1.5	1.5	.0	.0	68.2	37.5	26.7	13.3	8.0	.0	13.0	.0	.0	4.0
1982.	200.2	26.5	1.5	1.5	.0	.0	68.2	37.5	42.4	21.1	8.0	.0	13.0	.0	.0	7.0
1983.	229.5	29.3	1.5	1.5	.0	.0	68.2	37.5	57.9	28.9	8.0	1.0	13.0	.0	.0	12.0
1984.	261.4	31.9	1.5	1.5	.0	.0	68.2	37.5	73.2	36.5	8.0	3.0	13.0	.0	.0	19.0
1985.	295.7	34.3	1.5	1.5	.0	.0	68.2	37.5	88.1	43.9	8.0	6.0	13.0	.0	.0	28.0
1986.	332.2	36.5	1.5	1.5	.0	.0	68.2	37.5	102.5	51.0	8.0	8.0	13.0	.0	.0	41.0
1987.	370.7	38.5	1.5	1.5	.0	.0	68.2	37.5	117.5	58.5	8.0	8.0	13.0	.0	.0	57.0
1988.	411.2	40.5	1.5	1.5	.0	.0	68.2	37.5	133.9	66.6	8.0	8.0	13.0	.0	.0	73.0
1989.	454.1	42.9	1.5	1.5	.0	.0	68.2	37.5	150.5	74.9	8.0	8.0	13.0	.0	.0	91.0
1990.	500.0	45.9	1.5	1.5	.0	.0	68.2	37.5	168.5	83.8	8.0	8.0	13.0	.0	.0	110.0

ANNUAL ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSS BASIS)

LWR'S - PU & U236 RECYCLE WITH FAST REACTORS

CASE 6

DURING PERIOD ENDING	TOTAL INSTALLED CAPACITY	ISOTOPE PRODUCTION, KILOGRAMS/YEAR													
	GW(E)	TONNE	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	CM244 AM3	CM244 SUM	PU238 NP	PU238 CM	PU238 AM	PU238 SUM
1960.	.3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.5	2.	10.	10.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1962.	.5	7.	44.	44.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1963.	.6	21.	147.	147.	5.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1964.	.6	21.	181.	181.	8.	1.	2.	0.	0.	0.	0.	0.	0.	0.	0.
1965.	.6	16.	125.	125.	6.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.
1966.	1.0	25.	192.	192.	8.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.
1967.	1.0	36.	276.	276.	12.	1.	2.	0.	0.	0.	0.	0.	0.	0.	0.
1968.	3.0	34.	278.	278.	13.	1.	2.	0.	0.	0.	0.	0.	0.	0.	0.
1969.	5.7	61.	418.	418.	16.	2.	2.	0.	0.	0.	0.	0.	0.	0.	0.
1970.	12.0	101.	703.	703.	26.	2.	3.	1.	1.	0.	1.	0.	0.	0.	0.
1971.	22.7	265.	1801.	1801.	61.	6.	7.	181.	1.	0.	1.	0.	0.	0.	0.
1972.	33.7	551.	3863.	3863.	134.	14.	17.	4.	4.	0.	4.	0.	0.	0.	0.
1973.	45.2	944.	6751.	-175.	239.	25.	32.	6.	7.	0.	7.	0.	0.	0.	0.
1974.	57.2	1423.	10624.	235.	398.	44.	59.	12.	14.	0.	14.	0.	0.	0.	0.
1975.	69.7	1849.	15100.	-1414.	571.	69.	100.	18.	23.	0.	23.	0.	0.	0.	0.
1976.	82.7	2204.	19222.	-1391.	717.	95.	146.	25.	35.	0.	35.	0.	0.	0.	0.
1977.	96.7	2607.	24355.	-1805.	900.	134.	221.	35.	59.	0.	59.	0.	0.	0.	0.
1978.	112.2	3042.	30217.	-1781.	1095.	186.	313.	48.	91.	0.	91.	0.	0.	0.	0.
1979.	129.7	3554.	37071.	-151.	1315.	251.	427.	63.	133.	0.	133.	0.	0.	0.	0.
1980.	150.0	4271.	47517.	1217.	1596.	361.	624.	88.	208.	0.	208.	0.	0.	0.	0.
1981.	173.7	5171.	60013.	1691.	1890.	455.	781.	109.	269.	0.	269.	0.	0.	0.	0.
1982.	200.2	6558.	76298.	2811.	2302.	564.	947.	132.	329.	0.	329.	0.	0.	0.	0.
1983.	229.5	7486.	90975.	4695.	2658.	644.	1054.	148.	358.	0.	358.	0.	0.	0.	0.
1984.	261.4	8500.	101078.	2482.	3022.	632.	1015.	146.	331.	0.	331.	0.	0.	0.	0.
1985.	295.7	10117.	128415.	-3387.	3577.	742.	1202.	171.	384.	0.	384.	0.	0.	0.	0.
1986.	332.2	11901.	149645.	-5924.	4193.	748.	1153.	172.	343.	0.	343.	0.	0.	0.	0.
1987.	370.7	13137.	174750.	-1124.	4594.	756.	1037.	170.	283.	0.	283.	0.	0.	0.	0.
1988.	411.2	14773.	207573.	-1486.	5131.	813.	990.	180.	256.	0.	256.	0.	0.	0.	0.
1989.	454.1	16109.	228385.	-2864.	5523.	774.	717.	166.	147.	0.	147.	0.	0.	0.	0.
1990.	500.0	17703.	261628.	133959.	6027.	869.	725.	182.	135.	0.	135.	0.	0.	0.	0.

ANNUAL ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSS BASIS)

LWR'S - PU & U236 RECYCLE WITH FAST REACTORS

CASE 6

DURING PERIOD ENDING	ISOTOPE PRODUCTION, KILOGRAMS/YEAR														
	GW-YR	U-235	U-236	PM147	CE144	CS137	SR-90	KR-85	TC-99	RH103 SUM	RU106	PD STABL	XE STABL	CM242 AM1	AM241 PU1
1960.	.2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.4	21.	3.	0.	0.	1.	0.	0.	1.	0.	0.	0.	3.	0.	0.
1962.	.4	80.	14.	1.	2.	4.	2.	0.	3.	2.	1.	2.	16.	0.	0.
1963.	.5	203.	49.	4.	7.	23.	10.	0.	15.	8.	2.	14.	87.	0.	0.
1964.	.5	136.	62.	4.	7.	21.	10.	0.	14.	8.	2.	13.	81.	0.	2.
1965.	.5	139.	50.	3.	5.	15.	7.	0.	10.	5.	2.	9.	58.	0.	3.
1966.	.8	226.	72.	5.	9.	28.	12.	1.	19.	10.	3.	17.	106.	0.	5.
1967.	.8	298.	101.	6.	11.	32.	15.	1.	22.	12.	4.	19.	124.	0.	6.
1968.	2.6	302.	109.	6.	12.	34.	15.	1.	23.	12.	4.	20.	129.	0.	9.
1969.	4.8	596.	150.	9.	19.	47.	22.	1.	32.	17.	6.	27.	186.	0.	11.
1970.	10.2	988.	251.	15.	31.	74.	35.	2.	50.	27.	9.	41.	293.	0.	15.
1971.	19.3	2581.	625.	42.	84.	226.	103.	5.	152.	80.	26.	129.	879.	0.	22.
1972.	28.7	5090.	1336.	86.	173.	455.	209.	10.	307.	162.	54.	260.	1772.	0.	38.
1973.	38.4	8565.	2376.	152.	304.	845.	385.	18.	568.	296.	98.	490.	3268.	0.	73.
1974.	48.6	12216.	3800.	235.	466.	1338.	606.	28.	898.	465.	153.	784.	5154.	0.	72.
1975.	59.3	15257.	5279.	306.	607.	1758.	792.	36.	1179.	611.	206.	1042.	6771.	0.	75.
1976.	70.3	17898.	6603.	364.	723.	2119.	946.	43.	1418.	738.	254.	1279.	8154.	0.	63.
1977.	82.2	20701.	8177.	431.	854.	2528.	1114.	51.	1688.	885.	313.	1562.	9722.	0.	51.
1978.	95.3	23990.	9951.	504.	998.	2977.	1297.	59.	1985.	1046.	376.	1878.	11444.	0.	35.
1979.	110.2	27997.	11989.	589.	1168.	3490.	1508.	69.	2325.	1232.	448.	2237.	13419.	0.	19.
1980.	127.4	33417.	14642.	708.	1400.	4198.	1793.	81.	2793.	1493.	551.	2747.	16140.	0.	18.
1981.	147.6	40980.	17624.	857.	1714.	4973.	2127.	97.	3310.	1768.	660.	3256.	19192.	0.	30.
1982.	170.1	52347.	21762.	1097.	2209.	6264.	2706.	124.	4177.	2217.	835.	4031.	24216.	0.	45.
1983.	194.9	60295.	25464.	1248.	2558.	6970.	3025.	139.	4651.	2463.	972.	4472.	27064.	0.	71.
1984.	221.9	69900.	29764.	1411.	2919.	7647.	3352.	154.	5112.	2705.	1084.	4824.	29789.	0.	114.
1985.	250.8	82808.	35605.	1677.	3482.	8947.	3875.	179.	5982.	3189.	1373.	5820.	34989.	0.	137.
1986.	281.3	98346.	42594.	1959.	4083.	10211.	4413.	205.	6834.	3670.	1635.	6687.	40079.	0.	107.
1987.	313.2	108414.	47349.	2161.	4514.	11065.	4759.	222.	7414.	3980.	1899.	7413.	43610.	0.	55.
1988.	346.6	121934.	53530.	2429.	5088.	12306.	5261.	247.	8253.	4419.	2248.	8429.	48661.	0.	46.
1989.	381.7	134085.	58329.	2633.	5529.	13211.	5615.	265.	8868.	4754.	2548.	9217.	52437.	0.	33.
1990.	419.1	147309.	64101.	2881.	6066.	14500.	6137.	291.	9738.	5189.	2929.	10334.	57713.	0.	7.

ANNUAL ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSS BASIS)

LWR'S - PU & U236 RECYCLE WITH FAST REACTORS

CASE 6

DURING PERIOD ENDING	KR STABL	RU STABL	H-3 GRAMS
1960.	.0	0.	0.
1961.	.3	1.	0.
1962.	1.2	6.	0.
1963.	6.4	39.	1.
1964.	5.9	36.	1.
1965.	4.3	25.	0.
1966.	7.8	47.	1.
1967.	9.1	54.	1.
1968.	9.5	56.	1.
1969.	13.6	78.	1.
1970.	21.3	121.	2.
1971.	64.2	373.	7.
1972.	129.1	750.	13.
1973.	258.5	1400.	24.
1974.	376.6	2225.	39.
1975.	492.1	2931.	51.
1976.	587.0	3547.	61.
1977.	691.2	4254.	73.
1978.	804.2	5034.	86.
1979.	934.2	5926.	101.
1980.	1110.0	7164.	121.
1981.	1317.9	8482.	144.
1982.	1681.3	10639.	181.
1983.	1883.3	11809.	201.
1984.	2087.8	12888.	221.
1985.	2426.3	15175.	258.
1986.	2769.4	17336.	294.
1987.	3009.4	18868.	319.
1988.	3352.5	21075.	355.
1989.	3602.2	22711.	381.
1990.	3965.7	25027.	418.

CUMULATIVE ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSSES EXCEPT FOR RADIOACTIVE DECAY)

LWR'S - PU & U236 RECYCLE WITH FAST REACTORS

CASE 6

YEAR ENDING	TOTAL INSTALLED CAPACITY	ISOTOPE PRODUCTION, KGS													
	GW(E)	TONNE	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	CM244 AM3	CM244 SUM	PU238 NP	PU238 CM	PU238 AM	PU238 SUM
1960.	.3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.5	2.	10.	10.	0.	0.	0.	0.	0.	-0.	0.	-0.	-0.	-0.	0.
1962.	.5	9.	53.	53.	1.	0.	0.	0.	0.	-0.	0.	-0.	-0.	-0.	0.
1963.	.6	30.	201.	201.	6.	1.	1.	0.	0.	-0.	0.	-0.	-0.	-0.	0.
1964.	.6	52.	382.	382.	14.	2.	2.	0.	0.	-0.	0.	-0.	-0.	-0.	0.
1965.	.6	67.	509.	509.	20.	2.	3.	0.	1.	-0.	1.	-0.	-0.	-0.	0.
1966.	1.0	93.	704.	704.	29.	3.	4.	0.	1.	-0.	1.	-0.	-0.	-0.	0.
1967.	1.0	128.	985.	985.	41.	4.	6.	0.	1.	-0.	1.	-0.	-0.	-0.	0.
1968.	3.0	163.	1269.	1269.	54.	6.	8.	0.	2.	-0.	2.	-0.	-0.	-0.	0.
1969.	5.7	224.	1696.	1696.	70.	7.	10.	0.	2.	-0.	2.	-0.	-0.	-0.	0.
1970.	12.0	325.	2410.	2410.	97.	10.	13.	1.	3.	-0.	3.	-0.	-0.	-0.	0.
1971.	22.7	590.	4226.	4226.	158.	15.	19.	2.	4.	-0.	4.	-0.	-0.	-0.	0.
1972.	33.7	1142.	8111.	8111.	291.	29.	37.	4.	8.	-0.	8.	-0.	-0.	-0.	0.
1973.	45.2	2086.	14900.	7974.	531.	54.	68.	7.	14.	-0.	14.	-0.	-0.	-0.	0.
1974.	57.2	3509.	25597.	8282.	928.	97.	127.	13.	27.	-0.	27.	-0.	-0.	-0.	0.
1975.	69.7	5358.	40769.	6940.	1500.	166.	227.	21.	50.	-0.	50.	-0.	-0.	-0.	0.
1976.	82.7	7562.	60066.	5624.	2217.	260.	373.	29.	83.	-0.	83.	-0.	-0.	-0.	0.
1977.	96.7	10169.	84483.	3881.	3117.	394.	595.	41.	139.	-0.	139.	-0.	-0.	-0.	0.
1978.	112.2	13211.	114751.	2151.	4212.	580.	907.	56.	225.	-0.	225.	-0.	-0.	-0.	0.
1979.	129.7	16765.	151857.	2035.	5527.	830.	1335.	75.	350.	-0.	350.	-0.	-0.	-0.	0.
1980.	150.0	21037.	199393.	3272.	7123.	1189.	1959.	104.	545.	-0.	545.	-0.	-0.	-0.	0.
1981.	173.7	26208.	259424.	4982.	9013.	1643.	2740.	131.	794.	-0.	794.	-0.	-0.	-0.	0.
1982.	200.2	32765.	335751.	7822.	11316.	2204.	3687.	160.	1093.	-0.	1093.	-0.	-0.	-0.	0.
1983.	229.5	40251.	426772.	12562.	13973.	2845.	4741.	182.	1410.	-0.	1410.	-0.	-0.	-0.	0.
1984.	261.4	48752.	527920.	15114.	16995.	3472.	5755.	184.	1688.	-0.	1688.	-0.	-0.	-0.	0.
1985.	295.7	58869.	656449.	11841.	20573.	4209.	6957.	210.	2008.	-0.	2008.	-0.	-0.	-0.	0.
1986.	332.2	70770.	806231.	6053.	24765.	4951.	8109.	217.	2276.	-0.	2276.	-0.	-0.	-0.	0.
1987.	370.7	83906.	981088.	5037.	29359.	5699.	9146.	216.	2473.	-0.	2473.	-0.	-0.	-0.	0.
1988.	411.2	98679.	1188716.	3605.	34490.	6504.	10135.	226.	2635.	-0.	2635.	-0.	-0.	-0.	0.
1989.	454.1	114788.	1417147.	787.	40013.	7268.	10851.	214.	2683.	-0.	2683.	-0.	-0.	-0.	0.
1990.	500.0	132491.	1678808.	134778.	46040.	8126.	11575.	227.	2717.	-0.	2717.	-0.	-0.	-0.	0.

CUMULATIVE ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSSES EXCEPT FOR RADIOACTIVE DECAY)

LWR'S - PU & U236 RECYCLE WITH FAST REACTORS

CASE 6

ISOTOPE PRODUCTION, KGS

YEAR ENDING	GW-YR	U-235	U-236	PM147	CE144	CS137	SR-90	KR-85	TC-99	RH103 SUM	RU106	PD STABL	XE STABL	CM242 AM1	AM241 PU1
1960.	.2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.6	21.	3.	0.	0.	1.	0.	0.	1.	0.	0.	0.	3.	-0.	-0.
1962.	1.0	101.	17.	1.	2.	5.	2.	0.	3.	2.	1.	2.	19.	-0.	0.
1963.	1.5	304.	66.	5.	8.	27.	12.	1.	19.	10.	3.	16.	107.	-0.	1.
1964.	2.1	440.	128.	7.	10.	48.	22.	1.	33.	18.	4.	29.	188.	-0.	2.
1965.	2.6	580.	178.	8.	9.	62.	28.	1.	43.	23.	4.	38.	246.	-0.	6.
1966.	3.4	805.	250.	11.	12.	89.	40.	2.	62.	33.	5.	55.	352.	-0.	10.
1967.	4.3	1103.	351.	15.	17.	119.	53.	2.	84.	44.	6.	74.	477.	-0.	17.
1968.	6.8	1405.	460.	17.	19.	150.	67.	3.	106.	56.	7.	93.	606.	-0.	26.
1969.	11.7	2000.	610.	23.	26.	193.	87.	4.	138.	73.	9.	120.	792.	-0.	37.
1970.	21.9	2988.	862.	33.	42.	263.	120.	5.	189.	101.	14.	161.	1084.	-0.	52.
1971.	41.2	5569.	1486.	68.	101.	483.	220.	9.	341.	181.	33.	291.	1963.	-0.	74.
1972.	69.9	10659.	2823.	139.	215.	927.	424.	18.	648.	344.	70.	550.	3735.	-0.	112.
1973.	108.3	19225.	5198.	260.	393.	1751.	798.	35.	1217.	640.	133.	1040.	7003.	-0.	185.
1974.	156.9	31440.	8999.	436.	627.	3049.	1385.	60.	2115.	1105.	220.	1824.	12157.	-0.	257.
1975.	216.2	46698.	14277.	643.	865.	4738.	2143.	93.	3294.	1716.	316.	2866.	18929.	-0.	332.
1976.	286.5	64596.	20880.	862.	1079.	6748.	3036.	130.	4711.	2454.	412.	4146.	27083.	-0.	394.
1977.	368.7	85297.	29057.	1098.	1298.	9122.	4076.	172.	6400.	3339.	519.	5708.	36805.	-0.	444.
1978.	464.0	109287.	39007.	1353.	1532.	11890.	5274.	221.	8384.	4385.	635.	7586.	48248.	-0.	479.
1979.	574.2	137285.	50997.	1636.	1798.	15109.	6653.	275.	10709.	5617.	766.	9823.	61667.	-0.	497.
1980.	701.7	170702.	65639.	1974.	2139.	18963.	8283.	340.	13502.	7110.	934.	12571.	77807.	-0.	515.
1981.	849.2	211682.	83263.	2384.	2594.	23502.	10207.	415.	16812.	8877.	1127.	15826.	96999.	-0.	544.
1982.	1019.3	264030.	105024.	2942.	3275.	29229.	12664.	513.	20989.	11094.	1399.	19858.	121215.	-0.	588.
1983.	1214.2	324324.	130488.	3524.	3905.	35531.	15380.	620.	25640.	13557.	1672.	24330.	148279.	-0.	658.
1984.	1436.1	394225.	160252.	4137.	4525.	42366.	18355.	735.	30752.	16262.	1919.	29154.	178068.	-0.	771.
1985.	1686.9	477032.	195858.	4877.	5343.	50345.	21782.	868.	36733.	19451.	2333.	34973.	213056.	-0.	906.
1986.	1908.1	575378.	238452.	5731.	6281.	59406.	25663.	1019.	43567.	23121.	2801.	41660.	253135.	-0.	1012.
1987.	2281.3	683792.	285800.	6594.	7097.	69115.	29794.	1177.	50982.	27101.	3300.	49073.	296745.	-0.	1065.
1988.	2627.9	805725.	339330.	7530.	8007.	79842.	34326.	1351.	59234.	31520.	3898.	57502.	345406.	-0.	1109.
1989.	3009.6	939810.	397659.	8459.	8823.	91230.	39101.	1531.	68102.	36274.	4497.	66720.	397843.	-0.	1140.
1990.	3428.7	1087119.	461760.	9425.	9695.	103646.	44283.	1726.	77840.	41463.	5177.	77053.	455556.	-0.	1145.

C U M U L A T I V E I S O T O P E P R O D U C T I O N A T D I S C H A R G E

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(NO LOSSES EXCEPT FOR RADIOACTIVE DECAY)

LWR'S - PU & U236 RECYCLE WITH FAST REACTORS

CASE 6

ISOTOPE PRODUCTION, KGS

YEAR ENDING	KR STABL	RU STABL	H-3 GRAMS
1960.	.0	0.	0.
1961.	.3	1.	0.
1962.	1.4	8.	0.
1963.	7.8	46.	1.
1964.	13.7	82.	1.
1965.	18.0	107.	2.
1966.	25.8	154.	2.
1967.	34.8	208.	3.
1968.	44.3	263.	4.
1969.	57.9	341.	5.
1970.	79.2	463.	7.
1971.	143.4	836.	13.
1972.	272.5	1586.	26.
1973.	511.0	2986.	49.
1974.	887.5	5211.	85.
1975.	1379.6	8142.	131.
1976.	1966.6	11689.	185.
1977.	2657.8	15943.	248.
1978.	3462.0	20977.	321.
1979.	4396.2	26903.	404.
1980.	5506.2	34067.	503.
1981.	6824.1	42549.	619.
1982.	8505.4	53187.	766.
1983.	10388.8	64996.	925.
1984.	12476.6	77884.	1095.
1985.	14902.9	93058.	1293.
1986.	17672.2	110395.	1516.
1987.	20681.7	129263.	1752.
1988.	24034.1	150338.	2010.
1989.	27636.3	173049.	2280.
1990.	31602.1	198076.	2573.

NET ANNUAL ISOTOPE AVAILABILITY

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

LWR'S - PU & U236 RECYCLE WITH FAST REACTORS

CASE 6

DURING PERIOD ENDING	TOTAL INSTALLED CAPACITY		ISOTOPE PRODUCTION, KILOGRAMS/YEAR													
	Gw(E)	TONNE	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	CM244 AM3	CM244 SUM	PU238 NP	PU238 CM	PU238 AM	PU238 SUM	
1960.	.3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	
1961.	.5	0.	0.	0.	-0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	
1962.	.5	2.	10.	10.	0.	0.	0.	-0.	-0.	0.	0.	0.	0.	0.	0.	
1963.	.6	7.	43.	43.	1.	0.	0.	-0.	-0.	0.	0.	0.	0.	0.	0.	
1964.	.6	21.	144.	144.	4.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	
1965.	.6	21.	177.	177.	7.	1.	1.	0.	0.	0.	0.	1.	0.	0.	1.	
1966.	1.0	16.	123.	123.	5.	1.	1.	0.	0.	0.	0.	2.	0.	0.	2.	
1967.	1.0	25.	189.	189.	7.	1.	1.	0.	0.	0.	0.	3.	0.	0.	3.	
1968.	3.0	36.	271.	271.	11.	1.	2.	0.	0.	0.	0.	3.	0.	0.	4.	
1969.	5.7	34.	273.	273.	12.	1.	2.	0.	0.	0.	0.	5.	0.	0.	5.	
1970.	12.0	61.	410.	410.	15.	1.	2.	0.	0.	0.	1.	6.	0.	0.	6.	
1971.	22.7	101.	690.	690.	23.	2.	3.	0.	0.	0.	1.	7.	0.	1.	8.	
1972.	33.7	265.	1767.	1767.	55.	5.	6.	0.	0.	0.	1.	10.	0.	1.	11.	
1973.	45.2	551.	3789.	3789.	120.	12.	16.	0.	0.	0.	1.	19.	0.	1.	19.	
1974.	57.2	944.	6624.	-164.	215.	22.	29.	0.	1.	1.	2.	38.	0.	1.	39.	
1975.	69.7	1423.	10418.	237.	358.	39.	53.	0.	3.	1.	4.	72.	1.	2.	75.	
1976.	82.7	1849.	14805.	-1379.	514.	62.	90.	0.	6.	3.	9.	126.	1.	4.	131.	
1977.	96.7	2204.	18843.	-1357.	646.	85.	132.	0.	11.	5.	16.	196.	2.	8.	206.	
1978.	112.2	2607.	23872.	-1764.	810.	121.	199.	0.	19.	10.	28.	273.	3.	15.	291.	
1979.	129.7	3042.	29616.	-1742.	985.	167.	282.	0.	28.	17.	46.	361.	4.	24.	389.	
1980.	150.0	3554.	36331.	-146.	1184.	225.	384.	0.	48.	26.	74.	460.	6.	35.	500.	
1981.	173.7	4271.	46568.	1195.	1437.	324.	562.	0.	73.	41.	114.	570.	9.	51.	629.	
1982.	200.2	5171.	58815.	1660.	1701.	409.	703.	1.	107.	60.	167.	399.	11.	71.	481.	
1983.	229.5	6558.	74776.	2759.	2072.	507.	853.	1.	167.	84.	251.	481.	16.	97.	594.	
1984.	261.4	7486.	89163.	4608.	2392.	579.	948.	1.	216.	125.	341.	434.	20.	139.	593.	
1985.	295.7	8500.	99068.	2443.	2720.	568.	913.	1.	264.	164.	428.	588.	24.	180.	791.	
1986.	332.2	10117.	125860.	-3306.	3220.	667.	1082.	1.	287.	208.	496.	621.	27.	232.	880.	
1987.	370.7	11901.	146663.	-5795.	3773.	672.	1038.	1.	265.	257.	522.	809.	26.	275.	1110.	
1988.	411.2	13137.	171260.	-1096.	4135.	679.	933.	1.	308.	282.	590.	918.	31.	298.	1246.	
1989.	454.1	14773.	203426.	-1452.	4618.	731.	891.	1.	275.	345.	620.	1154.	31.	351.	1536.	
1990.	500.0	16109.	223821.	-2803.	4970.	695.	645.	1.	227.	377.	603.	1299.	31.	364.	1693.	

NET ANNUAL ISOTOPE AVAILABILITY

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

LWR'S - PU & U236 RECYCLE WITH FAST REACTORS

CASE 6

DURING PERIOD ENDING	ISOTOPE PRODUCTION, KILOGRAMS/YEAR														
	GW-YR	U-235	U-236	PM147	CE144	CS137	SR-90	KR-85	TC-99	RH103 SUM	RU106	PD STABL	XE STABL	CM242 AM1	AM241 PU1
1960.	.2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.4	-0.	-0.	0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	0.	0.
1962.	.4	20.	3.	-0.	0.	1.	0.	0.	1.	0.	0.	0.	3.	0.	0.
1963.	.5	79.	14.	-0.	1.	3.	2.	0.	2.	1.	0.	2.	14.	0.	0.
1964.	.5	199.	48.	0.	3.	20.	9.	0.	14.	7.	1.	13.	78.	0.	0.
1965.	.5	134.	61.	0.	3.	19.	8.	0.	13.	7.	1.	12.	73.	0.	2.
1966.	.8	136.	49.	2.	2.	13.	6.	0.	9.	5.	1.	8.	53.	0.	3.
1967.	.8	221.	71.	2.	3.	24.	11.	0.	17.	9.	1.	15.	95.	0.	4.
1968.	2.6	292.	99.	1.	4.	28.	13.	1.	20.	10.	2.	17.	112.	0.	6.
1969.	4.8	296.	107.	2.	4.	30.	13.	1.	20.	11.	2.	18.	116.	0.	8.
1970.	10.2	584.	147.	2.	7.	42.	19.	1.	29.	16.	3.	24.	167.	0.	10.
1971.	19.3	968.	246.	3.	12.	65.	30.	1.	45.	25.	4.	37.	264.	0.	14.
1972.	28.7	2529.	612.	4.	31.	199.	91.	4.	137.	72.	12.	117.	791.	0.	19.
1973.	38.4	4988.	1309.	6.	64.	400.	183.	8.	276.	146.	24.	234.	1595.	0.	34.
1974.	48.6	8394.	2328.	18.	113.	743.	338.	15.	511.	267.	44.	441.	2941.	0.	65.
1975.	59.3	11971.	3724.	36.	172.	1177.	532.	23.	809.	419.	69.	706.	4639.	0.	64.
1976.	70.3	14952.	5173.	63.	225.	1546.	696.	30.	1061.	550.	93.	938.	6094.	0.	66.
1977.	82.2	17540.	6470.	98.	268.	1863.	830.	36.	1276.	664.	114.	1151.	7338.	0.	55.
1978.	95.3	20287.	8013.	127.	316.	2223.	978.	43.	1519.	796.	141.	1406.	8750.	0.	45.
1979.	110.2	23510.	9752.	152.	369.	2618.	1139.	50.	1786.	942.	169.	1690.	10299.	1.	31.
1980.	127.4	27438.	11750.	180.	432.	3070.	1324.	58.	2092.	1109.	202.	2014.	12077.	1.	17.
1981.	147.6	32749.	14349.	210.	518.	3692.	1574.	69.	2514.	1344.	248.	2472.	14526.	1.	16.
1982.	170.1	40161.	17272.	246.	634.	4373.	1867.	82.	2979.	1591.	297.	2930.	17273.	2.	26.
1983.	194.9	51301.	21326.	295.	818.	5509.	2376.	104.	3759.	1995.	376.	3628.	21795.	2.	40.
1984.	221.9	59089.	24954.	357.	947.	6129.	2656.	117.	4186.	2217.	437.	4025.	24357.	3.	62.
1985.	250.8	68502.	29169.	457.	1081.	6725.	2943.	130.	4600.	2435.	488.	4342.	26810.	4.	100.
1986.	281.3	81151.	34893.	520.	1289.	7868.	3402.	151.	5383.	2870.	618.	5238.	31490.	5.	120.
1987.	313.2	96379.	41742.	588.	1511.	8980.	3875.	173.	6151.	3303.	736.	6018.	36071.	6.	94.
1988.	346.6	106245.	46402.	699.	1671.	9731.	4178.	187.	6673.	3582.	855.	6671.	39249.	7.	48.
1989.	381.7	119495.	52460.	816.	1883.	10823.	4619.	208.	7428.	3977.	1011.	7586.	43795.	8.	40.
1990.	419.1	131403.	57162.	900.	2047.	11619.	4930.	223.	7981.	4278.	1147.	8296.	47194.	8.	29.

NET ANNUAL ISOTOPE AVAILABILITY

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

LWR'S - PU & U236 RECYCLE WITH FAST REACTORS

CASE 6

DURING PERIOD ENDING	ISOTOPE PRODUCTION, KILOGRAMS/YEAR		
	KR STABL	RU STABL	H-3 GRAMS
1960.	.0	0.	0.
1961.	-.0	-0.	0.
1962.	.2	1.	0.
1963.	1.0	6.	0.
1964.	5.7	35.	1.
1965.	5.3	32.	1.
1966.	3.9	23.	0.
1967.	7.0	42.	1.
1968.	8.2	48.	1.
1969.	8.5	50.	1.
1970.	12.2	70.	1.
1971.	19.2	109.	2.
1972.	57.8	336.	6.
1973.	116.2	675.	11.
1974.	214.6	1260.	21.
1975.	338.9	2002.	33.
1976.	442.9	2638.	43.
1977.	528.3	3192.	52.
1978.	622.0	3829.	62.
1979.	723.8	4531.	73.
1980.	840.8	5333.	86.
1981.	999.0	6448.	103.
1982.	1186.1	7634.	122.
1983.	1513.2	9575.	154.
1984.	1695.0	10628.	171.
1985.	1879.0	11599.	188.
1986.	2183.7	13657.	219.
1987.	2492.4	15603.	250.
1988.	2708.5	16981.	271.
1989.	3017.2	18967.	302.
1990.	3242.0	20440.	324.

CUMULATIVE ISOTOPE AVAILABILITY

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

LWR'S - PU & U236 RECYCLE WITH FAST REACTORS

CASE 6

YEAR	TOTAL INSTALLED CAPACITY	ISOTOPE PRODUCTION, KGS													
ENDING	GW(E)	TONNE	PU-RP	PU-Sp	NP237	AM241	AM243	CM242	CM244	CM244 AM3	CM244 SUM	PU238 NP	PU238 CM	PU238 AM	PU238 SUM
1960.	.3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.5	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	0.	-0.	-0.	-0.	0.
1962.	.5	2.	10.	10.	0.	0.	0.	-0.	-0.	-0.	0.	-0.	-0.	-0.	0.
1963.	.6	9.	52.	52.	1.	0.	0.	-0.	-0.	-0.	0.	0.	-0.	-0.	0.
1964.	.6	30.	197.	197.	6.	1.	0.	0.	0.	-0.	0.	0.	0.	-0.	0.
1965.	.6	52.	374.	374.	13.	1.	2.	0.	0.	0.	0.	1.	0.	0.	1.
1966.	1.0	67.	499.	499.	18.	2.	3.	0.	0.	0.	0.	4.	0.	0.	4.
1967.	1.0	93.	691.	691.	26.	3.	4.	0.	0.	0.	0.	6.	0.	0.	7.
1968.	3.0	128.	966.	966.	37.	4.	5.	0.	1.	0.	1.	10.	0.	0.	10.
1969.	5.7	163.	1245.	1245.	49.	5.	7.	0.	1.	0.	1.	15.	0.	1.	15.
1970.	12.0	224.	1663.	1663.	63.	7.	9.	0.	1.	1.	2.	20.	0.	1.	22.
1971.	22.7	325.	2363.	2363.	87.	9.	11.	0.	1.	1.	2.	27.	0.	2.	29.
1972.	33.7	590.	4144.	4144.	142.	14.	17.	0.	2.	1.	3.	37.	0.	2.	40.
1973.	45.2	1142.	7952.	7952.	262.	26.	33.	0.	2.	2.	4.	55.	0.	3.	59.
1974.	57.2	2086.	14609.	7822.	477.	48.	62.	0.	3.	3.	6.	93.	1.	4.	98.
1975.	69.7	3509.	25093.	8124.	836.	87.	115.	0.	6.	4.	10.	164.	1.	6.	171.
1976.	82.7	5358.	39961.	6809.	1350.	149.	204.	0.	11.	7.	18.	289.	2.	10.	301.
1977.	96.7	7562.	58871.	5517.	1995.	234.	336.	0.	22.	12.	34.	482.	5.	18.	505.
1978.	112.2	10169.	82798.	3808.	2805.	354.	535.	0.	40.	21.	61.	751.	8.	33.	792.
1979.	129.7	13211.	112459.	2111.	3790.	521.	817.	0.	67.	37.	104.	1106.	12.	56.	1175.
1980.	150.0	16765.	148822.	1997.	4974.	745.	1201.	0.	112.	62.	174.	1557.	18.	91.	1666.
1981.	173.7	21037.	195407.	3209.	6411.	1068.	1763.	0.	181.	100.	281.	2115.	27.	140.	2283.
1982.	200.2	26208.	254239.	4885.	8112.	1476.	2466.	1.	281.	157.	438.	2498.	38.	210.	2746.
1983.	229.5	32765.	329041.	7670.	10184.	1981.	3318.	1.	437.	235.	672.	2959.	53.	306.	3319.
1984.	261.4	40251.	418243.	12318.	12576.	2556.	4266.	1.	637.	352.	988.	3370.	73.	443.	3885.
1985.	295.7	48752.	517373.	14823.	15296.	3120.	5179.	1.	877.	503.	1379.	3932.	96.	619.	4647.
1986.	332.2	58869.	643334.	11618.	18515.	3783.	6260.	2.	1131.	692.	1823.	4523.	122.	846.	5490.
1987.	370.7	70770.	790117.	5943.	22289.	4449.	7298.	2.	1354.	922.	2277.	5296.	147.	1114.	6557.
1988.	411.2	83906.	961472.	4941.	26423.	5122.	8230.	2.	1611.	1170.	2781.	6173.	177.	1403.	7753.
1989.	454.1	98679.	1164946.	3537.	31041.	5845.	9120.	2.	1826.	1471.	3297.	7280.	206.	1743.	9229.
1990.	500.0	114788.	1388808.	774.	36011.	6531.	9765.	2.	1984.	1792.	3776.	8522.	235.	2094.	10851.

CUMULATIVE ISOTOPE AVAILABILITY

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

LWR'S - PU & U236 RECYCLE WITH FAST REACTORS

CASE 6

ISOTOPE PRODUCTION, KGS

YEAR ENDING	GW-YR	U-235	U-236	PM147	CE144	CS137	SR-90	KR-85	TC-99	RH103 SUM	RU106	PD STABL	XE STABL	CM242 AM1	AM241 PU1
1960.	.2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.6	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.
1962.	1.0	20.	3.	-0.	0.	1.	0.	0.	1.	0.	0.	0.	3.	-0.	-0.
1963.	1.5	99.	17.	-0.	1.	4.	2.	0.	3.	2.	0.	2.	17.	-0.	0.
1964.	2.1	298.	65.	0.	3.	24.	11.	0.	17.	9.	1.	15.	96.	-0.	1.
1965.	2.6	432.	126.	0.	4.	42.	19.	1.	30.	16.	2.	26.	169.	0.	2.
1966.	3.4	568.	174.	2.	4.	55.	25.	1.	39.	21.	2.	34.	222.	0.	5.
1967.	4.3	789.	245.	3.	5.	78.	35.	1.	56.	29.	2.	49.	317.	0.	9.
1968.	6.8	1081.	344.	4.	6.	104.	47.	2.	75.	40.	3.	66.	429.	0.	15.
1969.	11.7	1377.	450.	5.	7.	132.	59.	2.	96.	51.	3.	84.	545.	0.	23.
1970.	21.9	1960.	598.	6.	10.	170.	77.	3.	124.	66.	4.	108.	712.	0.	33.
1971.	41.2	2928.	844.	7.	16.	232.	105.	4.	170.	91.	6.	145.	976.	0.	46.
1972.	69.9	5458.	1457.	10.	38.	425.	194.	8.	307.	163.	15.	261.	1767.	0.	65.
1973.	108.3	10446.	2766.	14.	80.	815.	372.	16.	583.	309.	32.	495.	3361.	0.	99.
1974.	156.9	18840.	5094.	28.	145.	1540.	700.	29.	1095.	576.	60.	936.	6303.	0.	163.
1975.	216.2	30812.	8819.	58.	232.	2681.	1216.	51.	1904.	994.	99.	1642.	10942.	0.	227.
1976.	286.5	45764.	13992.	108.	320.	4167.	1882.	78.	2964.	1544.	142.	2580.	17036.	0.	292.
1977.	368.7	63304.	20462.	182.	399.	5935.	2666.	110.	4240.	2208.	185.	3731.	24374.	0.	347.
1978.	464.0	83591.	28476.	268.	480.	8022.	3579.	145.	5760.	3005.	233.	5137.	33124.	0.	392.
1979.	574.2	107101.	38227.	359.	567.	10457.	4631.	186.	7546.	3946.	286.	6828.	43423.	1.	422.
1980.	701.7	134539.	49977.	457.	665.	13288.	5841.	232.	9638.	5055.	345.	8841.	55500.	1.	438.
1981.	849.2	167288.	64326.	564.	792.	16677.	7272.	287.	12152.	6399.	420.	11313.	70026.	1.	454.
1982.	1019.3	207449.	81598.	682.	960.	20669.	8962.	350.	15131.	7990.	507.	14244.	87299.	2.	479.
1983.	1214.2	258749.	102924.	822.	1212.	25706.	11119.	433.	18890.	9985.	630.	17872.	109094.	3.	518.
1984.	1436.1	317838.	127878.	993.	1446.	31248.	13503.	523.	23076.	12201.	752.	21897.	133451.	4.	560.
1985.	1686.9	386340.	157047.	1226.	1675.	37259.	16116.	620.	27676.	14636.	864.	26238.	160261.	5.	679.
1986.	1908.1	467492.	191940.	1468.	1978.	44276.	19124.	733.	33060.	17506.	1050.	31476.	191751.	6.	799.
1987.	2281.3	563871.	233682.	1724.	2325.	52245.	22532.	860.	39210.	20809.	1261.	37494.	227822.	7.	892.
1988.	2627.9	670116.	280084.	2032.	2627.	60782.	26159.	994.	45883.	24391.	1485.	44166.	267070.	8.	939.
1989.	3009.6	789611.	332544.	2388.	2964.	70217.	30138.	1140.	53311.	28368.	1754.	51752.	310866.	9.	978.
1990.	3428.7	921014.	389706.	2747.	3266.	80232.	34331.	1292.	61292.	32646.	2024.	60048.	358059.	10.	1005.

CUMULATIVE ISOTOPE AVAILABILITY

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

LWR'S - PU & U236 RECYCLE WITH FAST REACTORS

CASE 6

ISOTOPE PRODUCTION, KGS

YEAR ENDING	KR STABL	RU STABL	H-3 GRAMS
1960.	.0	0.	0.
1961.	-.0	-0.	-0.
1962.	.2	1.	0.
1963.	1.3	7.	0.
1964.	7.0	41.	1.
1965.	12.3	74.	1.
1966.	16.2	96.	1.
1967.	23.2	139.	2.
1968.	31.4	187.	3.
1969.	39.9	237.	3.
1970.	52.1	307.	4.
1971.	71.3	416.	6.
1972.	129.1	752.	11.
1973.	245.2	1428.	22.
1974.	459.9	2687.	41.
1975.	798.8	4689.	72.
1976.	1241.6	7327.	112.
1977.	1770.0	10520.	158.
1978.	2392.0	14349.	211.
1979.	3115.8	18880.	273.
1980.	3956.6	24213.	344.
1981.	4955.6	30660.	428.
1982.	6141.7	38294.	527.
1983.	7654.9	47869.	652.
1984.	9349.9	58496.	787.
1985.	11228.9	70095.	932.
1986.	13412.6	83753.	1100.
1987.	15905.0	99355.	1290.
1988.	18613.5	116337.	1490.
1989.	21630.7	135304.	1710.
1990.	24872.7	155744.	1939.

I S O T O P E P R O D U C T I O N

CASE 6 FOR 180 GW(E) AT 1980

DISTRIBUTION OF ELECTRICAL GENERATING CAPACITY

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CASE 6 FOR 180 GW(E) AT 1980

CASE 7

YEAR ENDING	TOTAL INSTALLED CAPACITY	NEWLY INSTALLED CAPACITY	NEWLY INSTALLED CAPACITY BY REACTOR TYPE, GIGAWATTS ELECTRICAL													
	GW(E)	GW(E)	PWR70	BWR70	PWR80	BWR80	PWR70 30U	BWR70 30U	PWR80 30U	BWR80 30U	LWR70 4PU	LWR80 4PU	LWR70 10PU	LWR70 30PU	LWR80 30PU	LMFBR
1960.	.3	.3	.1	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1961.	.5	.2	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1962.	.5	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1963.	.6	.1	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1964.	.6	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1965.	.6	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1966.	1.0	.4	.3	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1967.	1.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1968.	3.0	2.0	.9	1.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1969.	5.7	2.7	.0	.0	.0	.0	1.4	1.3	.0	.0	.0	.0	.0	.0	.0	.0
1970.	12.0	6.3	.0	.0	.0	.0	3.1	3.2	.0	.0	.0	.0	.0	.0	.0	.0
1971.	22.7	10.7	.0	.0	.0	.0	6.3	4.4	.0	.0	.0	.0	.0	.0	.0	.0
1972.	35.4	12.7	.0	.0	.0	.0	8.5	4.2	.0	.0	.0	.0	.0	.0	.0	.0
1973.	48.8	13.4	.0	.0	.0	.0	8.9	4.5	.0	.0	.0	.0	.0	.0	.0	.0
1974.	63.6	14.8	.0	.0	.0	.0	8.6	4.2	.0	.0	.0	.0	2.0	.0	.0	.0
1975.	79.2	15.6	.0	.0	.0	.0	8.4	4.2	.0	.0	.0	.0	3.0	.0	.0	.0
1976.	95.7	16.5	.0	.0	.0	.0	8.3	4.2	.0	.0	.0	.0	4.0	.0	.0	.0
1977.	113.3	17.6	.0	.0	.0	.0	9.1	4.5	.0	.0	.0	.0	4.0	.0	.0	.0
1978.	132.4	19.1	.0	.0	.0	.0	9.4	4.7	.0	.0	5.0	.0	.0	.0	.0	.0
1979.	154.0	21.6	.0	.0	.0	.0	11.1	5.5	.0	.0	5.0	.0	.0	.0	.0	.0
1980.	180.0	26.0	.0	.0	.0	.0	.0	.0	14.0	7.0	.0	3.0	.0	.0	.0	2.0
1981.	208.0	28.0	.0	.0	.0	.0	.0	.0	16.0	8.0	.0	2.0	.0	.0	.0	2.0
1982.	240.2	32.2	.0	.0	.0	.0	.0	.0	18.8	9.4	.0	1.0	.0	.0	.0	3.0
1983.	275.4	35.2	.0	.0	.0	.0	.0	.0	18.1	9.1	.0	3.0	.0	.0	.0	5.0
1984.	313.7	38.3	.0	.0	.0	.0	.0	.0	17.5	8.8	.0	5.0	.0	.0	.0	7.0
1985.	354.7	41.0	.0	.0	.0	.0	.0	.0	15.3	7.7	.0	9.0	.0	.0	.0	9.0
1986.	398.6	43.9	.0	.0	.0	.0	.0	.0	16.6	8.3	.0	6.0	.0	.0	.0	13.0
1987.	444.8	46.2	.0	.0	.0	.0	.0	.0	17.5	8.7	.0	3.0	.0	.0	.0	17.0
1988.	493.4	48.6	.0	.0	.0	.0	.0	.0	19.7	9.9	.0	.0	.0	.0	.0	19.0
1989.	544.9	51.5	.0	.0	.0	.0	.0	.0	20.4	10.1	.0	.0	.0	.0	.0	21.0
1990.	600.0	55.1	.0	.0	.0	.0	.0	.0	21.4	10.7	.0	.0	.0	.0	.0	23.0

D I S T R I B U T I O N O F E L E C T R I C A L G E N E R A T I N G C A P A C I T Y

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CASE 6 FOR 180 GW(E) AT 1980

CASE 7

YEAR ENDING	TOTAL INSTALLED CAPACITY GW(E)	NEWLY INSTALLED CAPACITY GW(E)	CUMULATIVE INSTALLED CAPACITY BY REACTOR TYPE, GIGAWATTS ELECTRICAL													
			PWR70	BWR70	PWR80	BWR80	PWR70 30U	BWR70 30U	PWR80 30U	BWR80 30U	LWR70 4PU	LWR80 4PU	LWR70 10PU	LWR70 30PU	LWR80 30PU	LMFBR
1960.	.3	.3	.1	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1961.	.5	.2	.2	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1962.	.5	.0	.2	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1963.	.6	.1	.2	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1964.	.6	.0	.3	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1965.	.6	.0	.3	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1966.	1.0	.4	.6	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1967.	1.0	.0	.6	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1968.	3.0	2.0	1.5	1.5	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1969.	5.7	2.7	1.5	1.5	.0	.0	1.4	1.3	.0	.0	.0	.0	.0	.0	.0	.0
1970.	12.0	6.3	1.5	1.5	.0	.0	4.4	4.5	.0	.0	.0	.0	.0	.0	.0	.0
1971.	22.7	10.7	1.5	1.5	.0	.0	10.8	8.9	.0	.0	.0	.0	.0	.0	.0	.0
1972.	35.4	12.7	1.5	1.5	.0	.0	19.3	13.1	.0	.0	.0	.0	.0	.0	.0	.0
1973.	48.8	13.4	1.5	1.5	.0	.0	28.2	17.6	.0	.0	.0	.0	.0	.0	.0	.0
1974.	63.6	14.8	1.5	1.5	.0	.0	36.8	21.8	.0	.0	.0	.0	2.0	.0	.0	.0
1975.	79.2	15.6	1.5	1.5	.0	.0	45.2	26.0	.0	.0	.0	.0	5.0	.0	.0	.0
1976.	95.7	16.5	1.5	1.5	.0	.0	53.5	30.2	.0	.0	.0	.0	9.0	.0	.0	.0
1977.	113.3	17.6	1.5	1.5	.0	.0	62.6	34.7	.0	.0	.0	.0	13.0	.0	.0	.0
1978.	132.4	19.1	1.5	1.5	.0	.0	72.0	39.4	.0	.0	5.0	.0	13.0	.0	.0	.0
1979.	154.0	21.6	1.5	1.5	.0	.0	83.1	44.9	.0	.0	10.0	.0	13.0	.0	.0	.0
1980.	180.0	26.0	1.5	1.5	.0	.0	83.1	44.9	14.0	7.0	10.0	3.0	13.0	.0	.0	2.0
1981.	208.0	28.0	1.5	1.5	.0	.0	83.1	44.9	30.0	15.0	10.0	5.0	13.0	.0	.0	4.0
1982.	240.2	32.2	1.5	1.5	.0	.0	83.1	44.9	48.8	24.4	10.0	6.0	13.0	.0	.0	7.0
1983.	275.4	35.2	1.5	1.5	.0	.0	83.1	44.9	66.9	33.5	10.0	9.0	13.0	.0	.0	12.0
1984.	313.7	38.3	1.5	1.5	.0	.0	83.1	44.9	84.4	42.3	10.0	14.0	13.0	.0	.0	19.0
1985.	354.7	41.0	1.5	1.5	.0	.0	83.1	44.9	99.7	50.0	10.0	23.0	13.0	.0	.0	28.0
1986.	398.6	43.9	1.5	1.5	.0	.0	83.1	44.9	116.3	58.3	10.0	29.0	13.0	.0	.0	41.0
1987.	444.8	46.2	1.5	1.5	.0	.0	83.1	44.9	133.8	67.0	10.0	32.0	13.0	.0	.0	58.0
1988.	493.4	48.6	1.5	1.5	.0	.0	83.1	44.9	153.5	76.9	10.0	32.0	13.0	.0	.0	77.0
1989.	544.9	51.5	1.5	1.5	.0	.0	83.1	44.9	173.9	87.0	10.0	32.0	13.0	.0	.0	98.0
1990.	600.0	55.1	1.5	1.5	.0	.0	83.1	44.9	195.3	97.7	10.0	32.0	13.0	.0	.0	121.0

ANNUAL ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSS BASIS)

CASE 6 FOR 180 GW(E) AT 1980

CASE 7

DURING PERIOD ENDING	TOTAL INSTALLED CAPACITY	ISOTOPE PRODUCTION, KILOGRAMS/YEAR													
	GW(E)	TONNE	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	CM244 AM3	CM244 SUM	PU238 NP	PU238 CM	PU238 AM	PU238 SUM
1960.	.3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.5	2.	10.	10.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1962.	.5	7.	44.	44.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1963.	.6	21.	147.	147.	5.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1964.	.6	21.	181.	181.	8.	1.	2.	0.	0.	0.	0.	0.	0.	0.	0.
1965.	.6	16.	125.	125.	6.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.
1966.	1.0	25.	192.	192.	8.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.
1967.	1.0	36.	276.	276.	12.	1.	2.	0.	0.	0.	0.	0.	0.	0.	0.
1968.	3.0	34.	278.	278.	13.	1.	2.	0.	0.	0.	0.	0.	0.	0.	0.
1969.	5.7	61.	418.	418.	16.	2.	2.	0.	0.	0.	0.	0.	0.	0.	0.
1970.	12.0	101.	703.	703.	26.	2.	3.	1.	1.	0.	1.	0.	0.	0.	0.
1971.	22.7	265.	1801.	1801.	61.	6.	7.	1.	1.	0.	1.	0.	0.	0.	0.
1972.	35.4	551.	3863.	3863.	134.	14.	17.	4.	4.	0.	4.	0.	0.	0.	0.
1973.	48.8	979.	6949.	23.	244.	25.	32.	7.	7.	0.	7.	0.	0.	0.	0.
1974.	63.6	1494.	11088.	699.	411.	45.	60.	12.	14.	0.	14.	0.	0.	0.	0.
1975.	79.2	2012.	16219.	-295.	607.	72.	104.	19.	24.	0.	24.	0.	0.	0.	0.
1976.	95.7	2473.	21194.	581.	788.	102.	156.	27.	38.	0.	38.	0.	0.	0.	0.
1977.	113.3	2987.	27211.	-2396.	1010.	146.	237.	38.	63.	0.	63.	0.	0.	0.	0.
1978.	132.4	3539.	34053.	-1392.	1253.	203.	336.	52.	97.	0.	97.	0.	0.	0.	0.
1979.	154.0	4180.	42375.	-4065.	1526.	275.	464.	69.	142.	0.	142.	0.	0.	0.	0.
1980.	180.0	5036.	54393.	134.	1865.	396.	680.	97.	221.	0.	221.	0.	0.	0.	0.
1981.	208.0	6238.	71111.	1744.	2248.	517.	894.	125.	299.	0.	299.	0.	0.	0.	0.
1982.	240.2	7789.	89409.	2588.	2727.	646.	1101.	154.	375.	0.	375.	0.	0.	0.	0.
1983.	275.4	8987.	108742.	8060.	3180.	770.	1295.	181.	436.	0.	436.	0.	0.	0.	0.
1984.	313.7	10195.	121110.	166.	3601.	773.	1290.	181.	418.	0.	418.	0.	0.	0.	0.
1985.	354.7	12222.	154169.	3273.	4290.	923.	1587.	218.	505.	0.	505.	0.	0.	0.	0.
1986.	398.6	14407.	179067.	-7078.	5023.	932.	1537.	220.	457.	0.	457.	0.	0.	0.	0.
1987.	444.8	15881.	205352.	-6256.	5509.	939.	1411.	219.	394.	0.	394.	0.	0.	0.	0.
1988.	493.4	17986.	246563.	1149.	6156.	1055.	1486.	243.	407.	0.	407.	0.	0.	0.	0.
1989.	544.9	19586.	272622.	1404.	6632.	1019.	1201.	228.	295.	0.	295.	0.	0.	0.	0.
1990.	600.0	21641.	314476.	171214.	7252.	1141.	1235.	249.	287.	0.	287.	0.	0.	0.	0.

ANNUAL ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSS BASIS)

CASE 6 FOR 180 GW(E) AT 1980

CASE 7

DURING PERIOD ENDING	ISOTOPE PRODUCTION, KILOGRAMS/YEAR														
	GW-YR	U-235	U-236	PM147	CE144	CS137	SR-90	KR-85	TC-99	RH103 SUM	RU106	PD STABL	XE STABL	CM242 AM1	AM241 PU1
1960.	.2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.4	21.	3.	0.	0.	1.	0.	0.	1.	0.	0.	0.	3.	0.	0.
1962.	.4	80.	14.	1.	2.	4.	2.	0.	3.	2.	1.	2.	16.	0.	0.
1963.	.5	203.	49.	4.	7.	23.	10.	0.	15.	8.	2.	14.	87.	0.	0.
1964.	.5	136.	62.	4.	7.	21.	10.	0.	14.	8.	2.	13.	81.	0.	2.
1965.	.5	139.	50.	3.	5.	15.	7.	0.	10.	5.	2.	9.	58.	0.	3.
1966.	.8	226.	72.	5.	9.	28.	12.	1.	19.	10.	3.	17.	106.	0.	5.
1967.	.8	298.	101.	6.	11.	32.	15.	1.	22.	12.	4.	19.	124.	0.	6.
1968.	2.6	302.	109.	6.	12.	34.	15.	1.	23.	12.	4.	20.	129.	0.	9.
1969.	4.8	596.	150.	9.	19.	47.	22.	1.	32.	17.	6.	27.	186.	0.	11.
1970.	10.2	988.	251.	15.	31.	74.	35.	2.	50.	27.	9.	41.	293.	0.	15.
1971.	19.3	2581.	625.	42.	84.	226.	103.	5.	152.	80.	26.	129.	879.	0.	22.
1972.	30.1	5090.	1336.	86.	173.	455.	209.	10.	307.	162.	54.	260.	1772.	0.	38.
1973.	41.5	8952.	2440.	157.	314.	862.	393.	18.	580.	303.	100.	498.	3338.	0.	73.
1974.	54.1	12925.	3958.	245.	487.	1383.	628.	29.	929.	482.	159.	808.	5334.	0.	74.
1975.	67.3	16788.	5665.	331.	659.	1894.	855.	39.	1270.	658.	222.	1118.	7300.	0.	81.
1976.	81.5	20296.	7304.	407.	811.	2359.	1055.	48.	1579.	821.	282.	1417.	9084.	0.	79.
1977.	96.3	24019.	9248.	493.	980.	2883.	1276.	58.	1926.	1007.	353.	1768.	11093.	0.	85.
1978.	112.5	28263.	11457.	586.	1164.	3454.	1515.	69.	2304.	1209.	430.	2155.	13280.	0.	64.
1979.	130.9	33204.	13963.	693.	1376.	4103.	1784.	81.	2734.	1441.	520.	2600.	15773.	0.	52.
1980.	152.9	39655.	17127.	835.	1653.	4948.	2127.	97.	3294.	1752.	641.	3200.	19024.	0.	16.
1981.	176.7	49176.	20908.	1028.	2056.	5953.	2551.	116.	3964.	2119.	794.	3884.	22998.	0.	18.
1982.	204.1	61719.	25650.	1300.	2614.	7446.	3212.	147.	4964.	2641.	997.	4803.	28791.	0.	34.
1983.	233.9	71792.	30272.	1495.	3055.	8375.	3614.	166.	5586.	2979.	1177.	5419.	32523.	0.	57.
1984.	266.3	82979.	35209.	1687.	3479.	9194.	4003.	184.	6141.	3277.	1312.	5861.	35816.	0.	130.
1985.	300.9	98832.	42368.	2017.	4172.	10825.	4648.	214.	7230.	3898.	1668.	7121.	42320.	0.	132.
1986.	337.7	117538.	50580.	2357.	4881.	12355.	5267.	244.	8258.	4511.	2003.	8245.	48481.	0.	163.
1987.	376.1	130111.	56385.	2594.	5383.	13351.	5658.	263.	8933.	4892.	2306.	9102.	52598.	0.	100.
1988.	416.3	147035.	63787.	2939.	6108.	14944.	6285.	293.	10005.	5486.	2733.	10420.	59044.	0.	45.
1989.	458.6	161993.	69654.	3193.	6655.	16034.	6711.	315.	10744.	5890.	3082.	11358.	63560.	0.	56.
1990.	503.6	179259.	76734.	3516.	7346.	17668.	7363.	347.	11845.	6459.	3561.	12762.	70229.	0.	70.

ANNUAL ISOTOPE PRODUCTION AT DISCHARGE
(NO LOSS BASIS)

CASE 6 FOR 180 GW(E) AT 1980

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CASE 7

DURING PERIOD ENDING	ISOTOPE PRODUCTION, KILOGRAMS/YEAR		
	KR STABL	RU STABL	H-3 GRAMS
1960.	.0	0.	0.
1961.	.3	1.	0.
1962.	1.2	6.	0.
1963.	6.4	39.	1.
1964.	5.9	36.	1.
1965.	4.3	25.	0.
1966.	7.8	47.	1.
1967.	9.1	54.	1.
1968.	9.5	56.	1.
1969.	13.6	78.	1.
1970.	21.3	121.	2.
1971.	64.2	373.	7.
1972.	129.1	750.	13.
1973.	243.6	1426.	25.
1974.	389.6	2296.	40.
1975.	530.7	3153.	55.
1976.	655.0	3944.	68.
1977.	791.6	4842.	84.
1978.	939.0	5825.	100.
1979.	1105.3	6946.	119.
1980.	1317.5	8420.	143.
1981.	1580.4	10146.	172.
1982.	1994.1	12654.	215.
1983.	2246.3	14222.	242.
1984.	2488.5	15540.	265.
1985.	2901.0	18417.	312.
1986.	3292.3	21083.	356.
1987.	3558.9	22879.	384.
1988.	3977.3	25726.	430.
1989.	4274.6	27690.	461.
1990.	4724.9	30628.	508.

CUMULATIVE ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSSES EXCEPT FOR RADIOACTIVE DECAY)

CASE 6 FOR 180 GW(E) AT 1980

CASE 7

YEAR	TOTAL INSTALLED CAPACITY	ISOTOPE PRODUCTION, KGS													
ENDING	GW(E)	TONNE	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	CM244 AM3	CM244 SUM	PU238 NP	PU238 CM	PU238 AM	PU238 SUM
1960.	.3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.5	2.	10.	10.	0.	0.	0.	0.	0.	-0.	0.	-0.	-0.	-0.	0.
1962.	.5	9.	53.	53.	1.	0.	0.	0.	0.	-0.	0.	-0.	-0.	-0.	0.
1963.	.6	30.	201.	201.	6.	1.	1.	0.	0.	-0.	0.	-0.	-0.	-0.	0.
1964.	.6	52.	382.	382.	14.	2.	2.	0.	0.	-0.	0.	-0.	-0.	-0.	0.
1965.	.6	67.	509.	509.	20.	2.	3.	0.	1.	-0.	1.	-0.	-0.	-0.	0.
1966.	1.0	93.	704.	704.	29.	3.	4.	0.	1.	-0.	1.	-0.	-0.	-0.	0.
1967.	1.0	128.	985.	985.	41.	4.	6.	0.	1.	-0.	1.	-0.	-0.	-0.	0.
1968.	3.0	163.	1269.	1269.	54.	6.	8.	0.	2.	-0.	2.	-0.	-0.	-0.	0.
1969.	5.7	224.	1696.	1696.	70.	7.	10.	0.	2.	-0.	2.	-0.	-0.	-0.	0.
1970.	12.0	325.	2410.	2410.	97.	10.	13.	1.	3.	-0.	3.	-0.	-0.	-0.	0.
1971.	22.7	590.	4226.	4226.	158.	15.	19.	2.	4.	-0.	4.	-0.	-0.	-0.	0.
1972.	35.4	1142.	8111.	8111.	291.	29.	37.	4.	8.	-0.	8.	-0.	-0.	-0.	0.
1973.	48.8	2120.	15098.	8172.	535.	54.	69.	7.	14.	-0.	14.	-0.	-0.	-0.	0.
1974.	63.6	3614.	26260.	8945.	946.	99.	129.	13.	28.	-0.	28.	-0.	-0.	-0.	0.
1975.	79.2	5626.	42553.	8724.	1553.	170.	233.	22.	51.	-0.	51.	-0.	-0.	-0.	0.
1976.	95.7	8099.	63828.	9386.	2341.	273.	389.	31.	86.	-0.	86.	-0.	-0.	-0.	0.
1977.	113.3	11086.	91118.	7069.	3351.	418.	627.	45.	146.	-0.	146.	-0.	-0.	-0.	0.
1978.	132.4	14625.	125256.	5762.	4604.	620.	963.	61.	238.	-0.	238.	-0.	-0.	-0.	0.
1979.	154.0	18805.	167695.	1761.	6130.	895.	1427.	82.	370.	-0.	370.	-0.	-0.	-0.	0.
1980.	180.0	23841.	222140.	1947.	7995.	1289.	2107.	115.	578.	-0.	578.	-0.	-0.	-0.	0.
1981.	208.0	30079.	293266.	3707.	10243.	1804.	3001.	149.	856.	-0.	856.	-0.	-0.	-0.	0.
1982.	240.2	37868.	382693.	6313.	12969.	2447.	4102.	185.	1199.	-0.	1199.	-0.	-0.	-0.	0.
1983.	275.4	46855.	491469.	14406.	16149.	3214.	5396.	220.	1589.	-0.	1589.	-0.	-0.	-0.	0.
1984.	313.7	57050.	612636.	14629.	19750.	3982.	6686.	228.	1948.	-0.	1948.	-0.	-0.	-0.	0.
1985.	354.7	69272.	766936.	18033.	24040.	4899.	8272.	267.	2380.	-0.	2380.	-0.	-0.	-0.	0.
1986.	398.6	83679.	946135.	11087.	29063.	5824.	9808.	277.	2747.	-0.	2747.	-0.	-0.	-0.	0.
1987.	444.8	99560.	1151651.	4994.	34572.	6754.	11219.	277.	3037.	-0.	3037.	-0.	-0.	-0.	0.
1988.	493.4	117546.	1398314.	6244.	40728.	7798.	12704.	301.	3331.	-0.	3331.	-0.	-0.	-0.	0.
1989.	544.9	137132.	1670982.	7693.	47360.	8806.	13904.	292.	3501.	-0.	3501.	-0.	-0.	-0.	0.
1990.	600.0	158774.	1985514.	178963.	54613.	9933.	15137.	311.	3657.	-0.	3657.	-0.	-0.	-0.	0.

CUMULATIVE ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSSES EXCEPT FOR RADIOACTIVE DECAY)

CASE 6 FOR 180 GW(E) AT 1980

CASE 7

ISOTOPE PRODUCTION, KGS

YEAR ENDING	GW-YR	U-235	U-236	PM147	CE144	CS137	SR-90	KR-85	TC-99	RH103 SUM	RU106	PD STABL	XE STABL	CM242 AM1	AM241 PU1
1960.	.2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.6	21.	3.	0.	0.	1.	0.	0.	1.	0.	0.	0.	3.	-0.	-0.
1962.	1.0	101.	17.	1.	2.	5.	2.	0.	3.	2.	1.	2.	19.	-0.	0.
1963.	1.5	304.	66.	5.	8.	27.	12.	1.	19.	10.	3.	16.	107.	-0.	1.
1964.	2.1	440.	128.	7.	10.	48.	22.	1.	33.	18.	4.	29.	188.	-0.	2.
1965.	2.6	580.	178.	8.	9.	62.	28.	1.	43.	23.	4.	38.	246.	-0.	6.
1966.	3.4	805.	250.	11.	12.	89.	40.	2.	62.	33.	5.	55.	352.	-0.	10.
1967.	4.3	1103.	351.	15.	17.	119.	53.	2.	84.	44.	6.	74.	477.	-0.	17.
1968.	6.8	1405.	460.	17.	19.	150.	67.	3.	106.	56.	7.	93.	606.	-0.	26.
1969.	11.7	2000.	610.	23.	26.	193.	87.	4.	138.	73.	9.	120.	792.	-0.	37.
1970.	21.9	2988.	862.	33.	42.	263.	120.	5.	189.	101.	14.	161.	1084.	-0.	52.
1971.	41.2	5569.	1486.	68.	101.	483.	220.	9.	341.	181.	33.	291.	1963.	-0.	74.
1972.	71.3	10659.	2823.	139.	215.	927.	424.	18.	648.	344.	70.	550.	3735.	-0.	112.
1973.	112.8	19612.	5262.	264.	402.	1768.	806.	35.	1228.	646.	135.	1048.	7073.	-0.	185.
1974.	166.9	32537.	9220.	449.	653.	3110.	1414.	62.	2157.	1128.	227.	1856.	12407.	-0.	259.
1975.	254.2	49325.	14885.	678.	928.	4933.	2234.	97.	3427.	1786.	335.	2974.	19707.	-0.	340.
1976.	315.6	69621.	22190.	932.	1192.	7180.	3235.	139.	5006.	2607.	450.	4391.	28791.	-0.	418.
1977.	411.9	93640.	31438.	1214.	1470.	9899.	4432.	188.	6932.	3613.	578.	6159.	39885.	-0.	502.
1978.	524.4	121903.	42895.	1525.	1768.	13126.	5838.	245.	9236.	4822.	719.	8314.	53165.	-0.	565.
1979.	655.2	155107.	56858.	1873.	2103.	16929.	7479.	311.	11970.	6263.	879.	10914.	68938.	-0.	617.
1980.	808.2	194763.	73985.	2284.	2519.	21491.	9423.	388.	15264.	8015.	1081.	14114.	87961.	-0.	632.
1981.	984.9	243938.	94893.	2795.	3092.	26953.	11744.	480.	19228.	10134.	1334.	17998.	110959.	-0.	648.
1982.	1189.0	305658.	120543.	3463.	3886.	33784.	14669.	597.	24192.	12776.	1664.	22801.	139750.	-0.	681.
1983.	1422.9	377449.	150815.	4174.	4653.	41388.	17924.	725.	29777.	15754.	2008.	28220.	172272.	-0.	737.
1984.	1689.2	460429.	186024.	4916.	5393.	49637.	21489.	864.	35918.	19032.	2316.	34082.	208089.	-0.	866.
1985.	1990.2	559260.	228392.	5821.	6391.	59328.	25611.	1024.	43148.	22930.	2826.	41202.	250408.	-0.	997.
1986.	2327.9	676798.	278971.	6860.	7509.	70328.	30252.	1204.	51405.	27441.	3416.	49448.	298889.	-0.	1159.
1987.	2704.0	806909.	335356.	7901.	8472.	82073.	35171.	1392.	60338.	32333.	4013.	58550.	351487.	-0.	1257.
1988.	3120.3	953945.	399143.	9052.	9593.	95142.	40596.	1598.	70342.	37819.	4740.	68969.	410531.	-0.	1300.
1989.	3578.9	1115938.	468798.	10195.	10601.	109004.	46315.	1814.	81087.	43708.	5452.	80328.	474091.	-0.	1355.
1990.	4082.5	1295197.	545531.	11403.	11706.	124181.	52545.	2048.	92932.	50168.	6287.	93089.	544320.	-0.	1422.

CUMULATIVE ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSSES EXCEPT FOR RADIOACTIVE DECAY)

CASE 6 FOR 180 GW(E) AT 1980

CASE 7

ISOTOPE PRODUCTION, KGS

YEAR ENDING	KR STABL	RU STABL	H-3 GRAMS
1960.	.0	0.	0.
1961.	.3	1.	0.
1962.	1.4	8.	0.
1963.	7.8	46.	1.
1964.	13.7	82.	1.
1965.	18.0	107.	2.
1966.	25.8	154.	2.
1967.	34.8	208.	3.
1968.	44.3	263.	4.
1969.	57.9	341.	5.
1970.	79.2	463.	7.
1971.	143.4	836.	13.
1972.	272.5	1586.	26.
1973.	516.1	3012.	49.
1974.	905.6	5309.	87.
1975.	1436.3	8462.	137.
1976.	2091.3	12406.	198.
1977.	2882.9	17248.	270.
1978.	3821.9	23073.	355.
1979.	4927.2	30019.	455.
1980.	6244.7	38438.	573.
1981.	7825.1	48584.	713.
1982.	9819.2	61238.	889.
1983.	12065.5	75460.	1082.
1984.	14554.0	91001.	1288.
1985.	17455.0	109418.	1529.
1986.	20747.3	130501.	1800.
1987.	24306.1	153381.	2086.
1988.	28283.5	179107.	2401.
1989.	32558.1	206797.	2730.
1990.	37283.0	237425.	3088.

NET ANNUAL ISOTOPE AVAILABILITY

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

CASE 6 FOR 180 GW(E) AT 1980

CASE 7

DURING PERIOD ENDING	TOTAL INSTALLED CAPACITY	ISOTOPE PRODUCTION, KILOGRAMS/YEAR													
	GW(E)	TONNE	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	CM244 AM3	CM244 SUM	PU238 NP	PU238 CM	PU238 AM	PU238 SUM
1960.	.3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.5	0.	0.	0.	-0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1962.	.5	2.	10.	10.	0.	0.	0.	-0.	-0.	0.	0.	0.	0.	0.	0.
1963.	.6	7.	43.	43.	1.	0.	0.	-0.	-0.	0.	0.	0.	0.	0.	0.
1964.	.6	21.	144.	144.	4.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1965.	.6	21.	177.	177.	7.	1.	1.	0.	0.	0.	0.	1.	0.	0.	1.
1966.	1.0	16.	123.	123.	5.	1.	1.	0.	0.	0.	0.	2.	0.	0.	2.
1967.	1.0	25.	189.	189.	7.	1.	1.	0.	0.	0.	0.	3.	0.	0.	3.
1968.	3.0	36.	271.	271.	11.	1.	2.	0.	0.	0.	0.	3.	0.	0.	4.
1969.	5.7	34.	273.	273.	12.	1.	2.	0.	0.	0.	0.	5.	0.	0.	5.
1970.	12.0	61.	410.	410.	15.	1.	2.	0.	0.	0.	1.	6.	0.	0.	6.
1971.	22.7	101.	690.	690.	23.	2.	3.	0.	0.	0.	1.	7.	0.	1.	8.
1972.	35.4	265.	1767.	1767.	55.	5.	6.	0.	0.	0.	1.	10.	0.	1.	11.
1973.	48.8	551.	3789.	3789.	120.	12.	16.	0.	0.	0.	1.	19.	0.	1.	19.
1974.	63.6	979.	6817.	30.	219.	23.	29.	0.	1.	1.	2.	38.	0.	1.	39.
1975.	79.2	1494.	10874.	693.	370.	40.	54.	0.	3.	1.	4.	73.	1.	2.	75.
1976.	95.7	2012.	15903.	-281.	546.	65.	94.	0.	6.	3.	9.	129.	1.	4.	134.
1977.	113.3	2473.	20778.	577.	709.	92.	141.	0.	11.	5.	17.	205.	2.	8.	215.
1978.	132.4	2987.	26675.	-2340.	909.	131.	214.	0.	19.	10.	29.	292.	3.	15.	311.
1979.	154.0	3539.	33378.	-1358.	1127.	182.	303.	0.	30.	18.	48.	396.	5.	25.	425.
1980.	180.0	4180.	41532.	-3978.	1374.	247.	418.	0.	51.	28.	78.	514.	7.	37.	557.
1981.	208.0	5036.	53307.	132.	1678.	356.	612.	0.	78.	43.	121.	648.	9.	54.	712.
1982.	240.2	6238.	69690.	1711.	2023.	464.	805.	1.	114.	64.	178.	454.	12.	77.	543.
1983.	275.4	7789.	87625.	2540.	2454.	581.	991.	1.	178.	91.	268.	552.	17.	106.	676.
1984.	313.7	8987.	106573.	7904.	2862.	692.	1165.	1.	240.	136.	376.	505.	22.	152.	680.
1985.	354.7	10195.	118701.	175.	3241.	695.	1161.	1.	301.	184.	485.	687.	28.	202.	917.
1986.	398.6	12222.	151099.	3221.	3861.	830.	1428.	2.	350.	236.	586.	736.	33.	262.	1030.
1987.	444.8	14407.	175502.	-6920.	4521.	837.	1383.	2.	336.	301.	636.	955.	33.	322.	1310.
1988.	493.4	15881.	201255.	-6121.	4958.	844.	1270.	2.	405.	339.	744.	1096.	39.	353.	1488.
1989.	544.9	17986.	241636.	1131.	5541.	948.	1337.	2.	366.	425.	791.	1373.	40.	427.	1840.
1990.	600.0	19586.	267175.	1381.	5969.	916.	1081.	2.	316.	469.	785.	1554.	39.	445.	2038.

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

CASE 6 FOR 180 GW(E) AT 1980

CASE 7

JURING PERIOD ENDING	ISOTOPE PRODUCTION, KILOGRAMS/YEAR														
	GW-YR	U-235	U-236	PM147	CE144	CS137	SR-90	KR-85	TC-99	RH103 SUM	RU106	PD STABL	XE STABL	CM242 AM1	AM241 PU1
1960.	.2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.4	-0.	-0.	0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	0.	0.
1962.	.4	20.	3.	-0.	0.	1.	0.	0.	1.	0.	0.	0.	3.	0.	0.
1963.	.5	79.	14.	-0.	1.	3.	2.	0.	2.	1.	0.	2.	14.	0.	0.
1964.	.5	199.	48.	0.	3.	20.	9.	0.	14.	7.	1.	13.	78.	0.	0.
1965.	.5	134.	61.	0.	3.	19.	8.	0.	13.	7.	1.	12.	73.	0.	2.
1966.	.8	136.	49.	2.	2.	13.	6.	0.	9.	5.	1.	8.	53.	0.	3.
1967.	.8	221.	71.	2.	3.	24.	11.	0.	17.	9.	1.	15.	95.	0.	4.
1968.	2.6	292.	99.	1.	4.	28.	13.	1.	20.	10.	2.	17.	112.	0.	6.
1969.	4.8	296.	107.	2.	4.	30.	13.	1.	20.	11.	2.	18.	116.	0.	8.
1970.	10.2	584.	147.	2.	7.	42.	19.	1.	29.	16.	3.	24.	167.	0.	10.
1971.	19.3	968.	246.	3.	12.	65.	30.	1.	45.	25.	4.	37.	264.	0.	14.
1972.	30.1	2529.	612.	4.	31.	199.	91.	4.	137.	72.	12.	117.	791.	0.	19.
1973.	41.5	4988.	1309.	6.	64.	400.	183.	8.	276.	146.	24.	234.	1595.	0.	34.
1974.	54.1	8773.	2391.	18.	116.	758.	345.	15.	522.	272.	45.	448.	3004.	0.	65.
1975.	67.3	12667.	3879.	36.	180.	1216.	551.	24.	836.	433.	72.	727.	4801.	0.	65.
1976.	81.3	16452.	5552.	65.	244.	1666.	750.	33.	1143.	592.	100.	1006.	6570.	0.	71.
1977.	96.3	19890.	7158.	102.	300.	2075.	927.	41.	1421.	739.	127.	1276.	8176.	0.	70.
1978.	112.5	23539.	9063.	138.	363.	2535.	1121.	49.	1734.	906.	159.	1591.	9984.	0.	75.
1979.	130.9	27698.	11228.	170.	431.	3037.	1330.	58.	2074.	1088.	194.	1939.	11952.	1.	56.
1980.	152.9	32540.	13684.	206.	509.	3608.	1566.	68.	2461.	1297.	234.	2340.	14195.	1.	46.
1981.	176.7	38862.	16785.	244.	612.	4352.	1868.	82.	2965.	1576.	288.	2880.	17121.	1.	14.
1982.	204.1	48192.	20489.	289.	761.	5236.	2239.	98.	3567.	1907.	357.	3496.	20698.	2.	16.
1983.	233.9	60485.	25137.	348.	968.	6549.	2820.	124.	4468.	2377.	449.	4323.	25912.	2.	30.
1984.	266.3	70356.	29667.	428.	1131.	7366.	3173.	140.	5027.	2681.	529.	4877.	29270.	3.	50.
1985.	300.9	81320.	34505.	542.	1288.	8086.	3514.	155.	5527.	2949.	590.	5275.	32235.	4.	115.
1986.	337.7	96855.	41520.	623.	1544.	9520.	4081.	181.	6507.	3509.	751.	6409.	38088.	6.	117.
1987.	376.1	115187.	49568.	703.	1807.	10866.	4625.	206.	7432.	4060.	901.	7421.	43633.	7.	144.
1988.	416.3	127509.	55257.	841.	1993.	11742.	4968.	222.	8039.	4403.	1038.	8192.	47338.	8.	88.
1989.	458.6	144095.	62511.	982.	2261.	13143.	5518.	248.	9004.	4937.	1230.	9378.	53140.	9.	40.
1990.	503.6	158753.	68261.	1081.	2464.	14101.	5893.	266.	9670.	5301.	1387.	10222.	57204.	10.	50.

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

CASE 6 FOR 180 GW(E) AT 1980

CASE 7

DURING PERIOD ENDING	ISOTOPE PRODUCTION, KILOGRAMS/YEAR		
	KR STABL	RU STABL	H-3 GRAMS
1960.	.0	0.	0.
1961.	-.0	-0.	0.
1962.	.2	1.	0.
1963.	1.0	6.	0.
1964.	5.7	35.	1.
1965.	5.3	32.	1.
1966.	3.9	23.	0.
1967.	7.0	42.	1.
1968.	8.2	48.	1.
1969.	8.5	50.	1.
1970.	12.2	70.	1.
1971.	19.2	109.	2.
1972.	57.8	336.	6.
1973.	116.2	675.	11.
1974.	219.2	1284.	21.
1975.	350.6	2067.	34.
1976.	477.6	2838.	47.
1977.	589.5	3549.	58.
1978.	712.4	4358.	71.
1979.	845.1	5242.	85.
1980.	994.8	6251.	101.
1981.	1185.7	7578.	122.
1982.	1422.3	9131.	146.
1983.	1794.7	11389.	183.
1984.	2021.6	12800.	206.
1985.	2239.7	13986.	226.
1986.	2610.9	16576.	265.
1987.	2963.0	18975.	302.
1988.	3203.0	20591.	327.
1989.	3579.6	23153.	366.
1990.	3847.2	24921.	392.

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

CASE 6 FOR 180 GW(E) AT 1980

CASE 7

YEAR ENDING	TOTAL INSTALLED CAPACITY	ISOTOPE PRODUCTION, KGS													
	GW(E)	TONNE	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	CM244 AM3	CM244 SUM	PU238 NP	PU238 CM	PU238 AM	PU238 SUM
1960.	.3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.5	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	0.	-0.	-0.	-0.	0.
1962.	.5	2.	10.	10.	0.	0.	0.	-0.	-0.	-0.	0.	-0.	-0.	-0.	0.
1963.	.6	9.	52.	52.	1.	0.	0.	-0.	-0.	-0.	0.	0.	-0.	-0.	0.
1964.	.6	30.	197.	197.	6.	1.	0.	0.	0.	-0.	0.	0.	0.	-0.	0.
1965.	.6	52.	374.	374.	13.	1.	2.	0.	0.	0.	0.	1.	0.	0.	1.
1966.	1.0	67.	499.	499.	18.	2.	3.	0.	0.	0.	0.	4.	0.	0.	4.
1967.	1.0	93.	691.	691.	26.	3.	4.	0.	0.	0.	0.	6.	0.	0.	7.
1968.	3.0	128.	966.	966.	37.	4.	5.	0.	1.	0.	1.	10.	0.	0.	10.
1969.	5.7	163.	1245.	1245.	49.	5.	7.	0.	1.	0.	1.	15.	0.	1.	15.
1970.	12.0	224.	1663.	1663.	63.	7.	9.	0.	1.	1.	2.	20.	0.	1.	22.
1971.	22.7	325.	2363.	2363.	87.	9.	11.	0.	1.	1.	2.	27.	0.	2.	29.
1972.	35.4	590.	4144.	4144.	142.	14.	17.	0.	2.	1.	3.	37.	0.	2.	40.
1973.	48.8	1142.	7952.	7952.	262.	26.	33.	0.	2.	2.	4.	55.	0.	3.	59.
1974.	63.6	2120.	14803.	8016.	482.	49.	62.	0.	3.	3.	6.	93.	1.	4.	98.
1975.	79.2	3614.	25742.	8773.	852.	89.	116.	0.	6.	4.	10.	165.	1.	6.	172.
1976.	95.7	5626.	41710.	8558.	1398.	153.	210.	0.	11.	7.	18.	293.	2.	10.	305.
1977.	113.3	8099.	62560.	9206.	2107.	245.	350.	0.	22.	12.	34.	495.	5.	18.	518.
1978.	132.4	11086.	89304.	6936.	3016.	376.	564.	0.	41.	21.	62.	784.	8.	33.	825.
1979.	154.0	14625.	122757.	5653.	4144.	557.	867.	0.	69.	38.	108.	1173.	13.	58.	1243.
1980.	180.0	18805.	164346.	1731.	5517.	804.	1284.	0.	117.	64.	182.	1677.	19.	94.	1791.
1981.	208.0	23841.	217698.	1910.	7196.	1158.	1896.	1.	191.	105.	296.	2312.	29.	148.	2469.
1982.	240.2	30079.	287403.	3634.	9218.	1621.	2701.	1.	297.	165.	463.	2748.	41.	224.	3013.
1983.	275.4	37868.	375043.	6190.	11672.	2199.	3691.	1.	464.	250.	714.	3279.	58.	328.	3666.
1984.	313.7	46855.	481645.	14124.	14534.	2888.	4856.	1.	686.	376.	1063.	3759.	80.	478.	4317.
1985.	354.7	57050.	600396.	14350.	17775.	3579.	6017.	2.	962.	546.	1508.	4417.	107.	676.	5200.
1986.	398.6	69272.	751610.	17685.	21636.	4403.	7444.	2.	1275.	762.	2037.	5119.	139.	933.	6190.
1987.	444.8	83679.	927229.	10881.	26157.	5233.	8827.	2.	1563.	1034.	2597.	6035.	170.	1248.	7453.
1988.	493.4	99560.	1128627.	4904.	31115.	6069.	10096.	2.	1909.	1334.	3243.	7083.	208.	1591.	8883.
1989.	544.9	117546.	1370352.	6124.	36655.	7008.	11432.	2.	2204.	1709.	3913.	8402.	246.	2006.	10654.
1990.	600.0	137132.	1637568.	7545.	42624.	7913.	12512.	2.	2437.	2113.	4550.	9891.	284.	2435.	12609.

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CASE 6 FOR 180 GW(E) AT 1980

CASE 7

ISOTOPE PRODUCTION, KGS

YEAR ENDING	GW-YR	U-235	U-236	PM147	CE144	CS137	SR-90	KR-85	TC-99	RH103 SUM	RU106	PD STABL	XE STABL	CM242 AM1	AM241 PU1
1960.	.2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.6	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.
1962.	1.0	20.	3.	-0.	0.	1.	0.	0.	1.	0.	0.	0.	3.	-0.	-0.
1963.	1.5	99.	17.	-0.	1.	4.	2.	0.	3.	2.	0.	2.	17.	-0.	0.
1964.	2.1	298.	65.	0.	3.	24.	11.	0.	17.	9.	1.	15.	96.	-0.	1.
1965.	2.6	432.	126.	0.	4.	42.	19.	1.	30.	16.	2.	26.	169.	0.	2.
1966.	3.4	568.	174.	2.	4.	55.	25.	1.	39.	21.	2.	34.	222.	0.	5.
1967.	4.3	789.	245.	3.	5.	78.	35.	1.	56.	29.	2.	49.	317.	0.	9.
1968.	6.8	1081.	344.	4.	6.	104.	47.	2.	75.	40.	3.	66.	429.	0.	15.
1969.	11.7	1377.	450.	5.	7.	132.	59.	2.	96.	51.	3.	84.	545.	0.	23.
1970.	21.9	1960.	598.	6.	10.	170.	77.	3.	124.	66.	4.	108.	712.	0.	33.
1971.	41.2	2928.	844.	7.	16.	232.	105.	4.	170.	91.	6.	145.	976.	0.	46.
1972.	71.3	5458.	1457.	10.	38.	425.	194.	8.	307.	163.	15.	261.	1767.	0.	65.
1973.	112.8	10446.	2766.	14.	80.	815.	372.	16.	583.	309.	32.	495.	3361.	0.	99.
1974.	106.9	19220.	5157.	28.	149.	1555.	708.	30.	1105.	582.	61.	943.	6366.	0.	163.
1975.	234.2	31887.	9036.	58.	242.	2735.	1242.	52.	1941.	1015.	102.	1670.	11167.	0.	228.
1976.	315.6	48339.	14588.	110.	343.	4338.	1962.	82.	3084.	1607.	151.	2677.	17736.	0.	299.
1977.	411.9	68229.	21746.	187.	441.	6314.	2840.	117.	4505.	2346.	202.	3952.	25912.	0.	368.
1978.	524.4	91767.	30809.	283.	544.	8705.	3891.	159.	6239.	3252.	260.	5543.	35896.	0.	443.
1979.	655.2	119465.	42037.	388.	655.	11544.	5126.	207.	8312.	4340.	324.	7482.	47848.	1.	498.
1980.	808.2	152005.	55721.	506.	779.	14888.	6567.	262.	10773.	5637.	396.	9822.	62044.	1.	543.
1981.	984.9	190867.	72506.	636.	932.	18900.	8274.	328.	13737.	7214.	486.	12703.	79165.	1.	557.
1982.	1189.0	239060.	92995.	780.	1144.	23704.	10311.	405.	17305.	9121.	600.	16198.	99863.	2.	571.
1983.	1422.9	299544.	118132.	952.	1438.	29711.	12879.	504.	21772.	11498.	749.	20521.	125775.	3.	600.
1984.	1609.2	369900.	147799.	1165.	1723.	36398.	15737.	612.	26799.	14179.	904.	25398.	155045.	4.	649.
1985.	1990.2	451220.	182304.	1443.	1997.	43653.	18867.	729.	32326.	17128.	1042.	30674.	187280.	5.	763.
1986.	2327.9	548075.	223824.	1739.	2366.	52175.	22487.	864.	38833.	20637.	1272.	37082.	225368.	7.	879.
1987.	2704.0	663262.	273392.	2048.	2780.	61849.	26561.	1016.	46265.	24697.	1537.	44503.	269000.	9.	1021.
1988.	3120.3	790771.	328649.	2425.	3136.	72178.	30880.	1175.	54304.	29100.	1806.	52695.	316338.	10.	1108.
1989.	3578.9	934866.	391160.	2858.	3551.	83672.	35643.	1349.	63308.	34037.	2133.	62073.	369478.	11.	1146.
1990.	4082.5	1093619.	459422.	3292.	3924.	95863.	40664.	1530.	72978.	39337.	2453.	72295.	426682.	12.	1194.

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

CASE 6 FOR 180 GW(E) AT 1980

CASE 7

ISOTOPE PRODUCTION, KGS

YEAR ENDING	KR STABL	RU STABL	H-3 GRAMS
1960.	.0	0.	0.
1961.	-.0	-0.	-0.
1962.	.2	1.	0.
1963.	1.3	7.	0.
1964.	7.0	41.	1.
1965.	12.3	74.	1.
1966.	16.2	96.	1.
1967.	23.2	139.	2.
1968.	31.4	187.	3.
1969.	39.9	237.	3.
1970.	52.1	307.	4.
1971.	71.3	416.	6.
1972.	129.1	752.	11.
1973.	245.2	1428.	22.
1974.	464.5	2711.	42.
1975.	815.1	4778.	74.
1976.	1292.7	7616.	116.
1977.	1882.2	11165.	168.
1978.	2594.6	15524.	230.
1979.	3439.7	20766.	302.
1980.	4434.5	27017.	387.
1981.	5620.2	34595.	487.
1982.	7042.6	43726.	607.
1983.	8837.3	55115.	756.
1984.	10858.9	67914.	920.
1985.	13098.6	81900.	1095.
1986.	15709.5	98476.	1300.
1987.	18672.6	117451.	1531.
1988.	21875.5	138043.	1774.
1989.	25455.1	161196.	2042.
1990.	29302.3	186117.	2322.

I S O T O P E P R O D U C T I O N

CASE 6 FOR 120 GW(E) AT 1980

DISTRIBUTION OF ELECTRICAL GENERATING CAPACITY

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CASE 6 FOR 120 GW(E) AT 1980

CASE 8

YEAR ENDING	TOTAL INSTALLED CAPACITY GW(E)	NEWLY INSTALLED CAPACITY GW(E)	NEWLY INSTALLED CAPACITY BY REACTOR TYPE, GIGAWATTS ELECTRICAL													
			PWR70	BWR70	PWR80	BWR80	PWR70 30U	BWR70 30U	PWR80 30U	BWR80 30U	LWR70 4PU	LWR80 4PU	LWR70 10PU	LWR70 30PU	LWR80 30PU	LMFBR
1960.	.3	.3	.1	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1961.	.5	.2	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1962.	.5	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1963.	.6	.1	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1964.	.6	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1965.	.6	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1966.	1.0	.4	.3	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1967.	1.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1968.	3.0	2.0	.9	1.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1969.	5.7	2.7	.0	.0	.0	.0	1.4	1.3	.0	.0	.0	.0	.0	.0	.0	.0
1970.	12.0	6.3	.0	.0	.0	.0	3.1	3.2	.0	.0	.0	.0	.0	.0	.0	.0
1971.	22.7	10.7	.0	.0	.0	.0	6.3	4.4	.0	.0	.0	.0	.0	.0	.0	.0
1972.	30.9	8.2	.0	.0	.0	.0	5.5	2.7	.0	.0	.0	.0	.0	.0	.0	.0
1973.	40.0	9.1	.0	.0	.0	.0	6.1	3.0	.0	.0	.0	.0	.0	.0	.0	.0
1974.	49.7	9.7	.0	.0	.0	.0	5.1	2.6	.0	.0	.0	.0	2.0	.0	.0	.0
1975.	59.8	10.1	.0	.0	.0	.0	4.7	2.4	.0	.0	.0	.0	3.0	.0	.0	.0
1976.	70.5	10.7	.0	.0	.0	.0	5.1	2.6	.0	.0	.0	.0	3.0	.0	.0	.0
1977.	81.7	11.2	.0	.0	.0	.0	5.5	2.7	.0	.0	.0	.0	3.0	.0	.0	.0
1978.	93.6	11.9	.0	.0	.0	.0	6.4	3.2	.0	.0	2.3	.0	.0	.0	.0	.0
1979.	105.9	12.3	.0	.0	.0	.0	6.2	3.1	.0	.0	3.0	.0	.0	.0	.0	.0
1980.	120.0	14.1	.0	.0	.0	.0	.0	.0	6.7	3.4	.0	3.0	.0	.0	.0	1.0
1981.	139.0	19.0	.0	.0	.0	.0	.0	.0	10.0	5.0	.0	2.0	.0	.0	.0	2.0
1982.	160.2	21.2	.0	.0	.0	.0	.0	.0	12.1	6.1	.0	1.0	.0	.0	.0	2.0
1983.	183.6	23.4	.0	.0	.0	.0	.0	.0	13.0	6.4	.0	1.0	.0	.0	.0	3.0
1984.	209.1	25.5	.0	.0	.0	.0	.0	.0	13.0	6.5	.0	1.0	.0	.0	.0	5.0
1985.	236.6	27.5	.0	.0	.0	.0	.0	.0	12.3	6.2	.0	1.0	.0	.0	.0	8.0
1986.	265.8	29.2	.0	.0	.0	.0	.0	.0	12.1	6.1	.0	.0	.0	.0	.0	11.0
1987.	296.6	30.8	.0	.0	.0	.0	.0	.0	11.2	5.6	.0	.0	.0	.0	.0	14.0
1988.	329.0	32.4	.0	.0	.0	.0	.0	.0	12.3	6.1	.0	.0	.0	.0	.0	14.0
1989.	363.3	34.3	.0	.0	.0	.0	.0	.0	13.5	6.8	.0	.0	.0	.0	.0	14.0
1990.	400.0	36.7	.0	.0	.0	.0	.0	.0	14.5	7.2	.0	.0	.0	.0	.0	15.0

DISTRIBUTION OF ELECTRICAL GENERATING CAPACITY

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CASE 6 FOR 120 GW(E) AT 1980

CASE 8

YEAR ENDING	TOTAL INSTALLED CAPACITY GW(E)	NEWLY INSTALLED CAPACITY GW(E)	CUMULATIVE INSTALLED CAPACITY BY REACTOR TYPE, GIGAWATTS ELECTRICAL													
			PWR70	BWR70	PWR80	BWR80	PWR70 30U	BWR70 30U	PWR80 30U	BWR80 30U	LWR70 4PU	LWR80 4PU	LWR70 10PU	LWR70 30PU	LWR80 30PU	LMFBR
1960.	.3	.3	.1	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1961.	.5	.2	.2	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1962.	.5	.0	.2	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1963.	.6	.1	.2	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1964.	.6	.0	.3	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1965.	.6	.0	.3	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1966.	1.0	.4	.6	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1967.	1.0	.0	.6	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1968.	3.0	2.0	1.5	1.5	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1969.	5.7	2.7	1.5	1.5	.0	.0	1.4	1.3	.0	.0	.0	.0	.0	.0	.0	.0
1970.	12.0	6.3	1.5	1.5	.0	.0	4.4	4.5	.0	.0	.0	.0	.0	.0	.0	.0
1971.	22.7	10.7	1.5	1.5	.0	.0	10.8	8.9	.0	.0	.0	.0	.0	.0	.0	.0
1972.	30.9	8.2	1.5	1.5	.0	.0	16.3	11.6	.0	.0	.0	.0	.0	.0	.0	.0
1973.	40.0	9.1	1.5	1.5	.0	.0	22.3	14.7	.0	.0	.0	.0	.0	.0	.0	.0
1974.	49.7	9.7	1.5	1.5	.0	.0	27.4	17.3	.0	.0	.0	.0	2.0	.0	.0	.0
1975.	59.8	10.1	1.5	1.5	.0	.0	32.1	19.7	.0	.0	.0	.0	5.0	.0	.0	.0
1976.	70.5	10.7	1.5	1.5	.0	.0	37.2	22.3	.0	.0	.0	.0	8.0	.0	.0	.0
1977.	81.7	11.2	1.5	1.5	.0	.0	42.7	25.0	.0	.0	.0	.0	11.0	.0	.0	.0
1978.	93.6	11.9	1.5	1.5	.0	.0	49.2	28.2	.0	.0	2.3	.0	11.0	.0	.0	.0
1979.	105.9	12.3	1.5	1.5	.0	.0	55.4	31.3	.0	.0	5.2	.0	11.0	.0	.0	.0
1980.	120.0	14.1	1.5	1.5	.0	.0	55.4	31.3	6.7	3.4	5.2	3.0	11.0	.0	.0	1.0
1981.	139.0	19.0	1.5	1.5	.0	.0	55.4	31.3	16.7	8.4	5.2	5.0	11.0	.0	.0	3.0
1982.	160.2	21.2	1.5	1.5	.0	.0	55.4	31.3	28.8	14.5	5.2	6.0	11.0	.0	.0	5.0
1983.	183.6	23.4	1.5	1.5	.0	.0	55.4	31.3	41.8	20.9	5.2	7.0	11.0	.0	.0	8.0
1984.	209.1	25.5	1.5	1.5	.0	.0	55.4	31.3	54.8	27.4	5.2	8.0	11.0	.0	.0	13.0
1985.	236.6	27.5	1.5	1.5	.0	.0	55.4	31.3	67.1	33.6	5.2	9.0	11.0	.0	.0	21.0
1986.	265.8	29.2	1.5	1.5	.0	.0	55.4	31.3	79.2	39.7	5.2	9.0	11.0	.0	.0	32.0
1987.	296.6	30.8	1.5	1.5	.0	.0	55.4	31.3	90.4	45.3	5.2	9.0	11.0	.0	.0	46.0
1988.	329.0	32.4	1.5	1.5	.0	.0	55.4	31.3	102.7	51.4	5.2	9.0	11.0	.0	.0	60.0
1989.	363.3	34.3	1.5	1.5	.0	.0	55.4	31.3	116.2	58.2	5.2	9.0	11.0	.0	.0	74.0
1990.	400.0	36.7	1.5	1.5	.0	.0	55.4	31.3	130.7	65.4	5.2	9.0	11.0	.0	.0	89.0

ANNUAL ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSS BASIS)

CASE 6 FOR 120 GW(E) AT 1980

CASE 8

DURING PERIOD ENDING	TOTAL INSTALLED CAPACITY		ISOTOPE PRODUCTION, KILOGRAMS/YEAR												
	GW(E)	TONNE	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	CM244 AM3	CM244 SUM	PU238 NP	PU238 CM	PU238 AM	PU238 SUM
1960.	.3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.5	2.	10.	10.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1962.	.5	7.	44.	44.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1963.	.6	21.	147.	147.	5.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1964.	.6	21.	181.	181.	8.	1.	2.	0.	0.	0.	0.	0.	0.	0.	0.
1965.	.6	16.	125.	125.	6.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.
1966.	1.0	25.	192.	192.	8.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.
1967.	1.0	36.	276.	276.	12.	1.	2.	0.	0.	0.	0.	0.	0.	0.	0.
1968.	3.0	34.	278.	278.	13.	1.	2.	0.	0.	0.	0.	0.	0.	0.	0.
1969.	5.7	61.	418.	418.	16.	2.	2.	0.	0.	0.	0.	0.	0.	0.	0.
1970.	12.0	101.	703.	703.	26.	2.	3.	1.	1.	0.	1.	0.	0.	0.	0.
1971.	22.7	265.	1801.	1801.	61.	6.	7.	1.	1.	0.	1.	0.	0.	0.	0.
1972.	30.9	551.	3863.	3863.	134.	14.	17.	4.	4.	0.	4.	0.	0.	0.	0.
1973.	40.0	889.	6437.	-489.	232.	24.	32.	6.	7.	0.	7.	0.	0.	0.	0.
1974.	49.7	1321.	9945.	-444.	378.	42.	57.	11.	13.	0.	13.	0.	0.	0.	0.
1975.	59.8	1637.	13595.	544.	521.	63.	93.	17.	22.	0.	22.	0.	0.	0.	0.
1976.	70.5	1890.	16811.	-339.	628.	85.	132.	22.	32.	0.	32.	0.	0.	0.	0.
1977.	81.7	2222.	20925.	2128.	780.	118.	197.	31.	54.	0.	54.	0.	0.	0.	0.
1978.	93.6	2565.	25619.	-217.	938.	162.	273.	41.	81.	0.	81.	0.	0.	0.	0.
1979.	105.9	2985.	30960.	-2484.	1122.	213.	361.	53.	114.	0.	114.	0.	0.	0.	0.
1980.	120.0	3576.	39796.	-5090.	1363.	307.	530.	75.	178.	0.	178.	0.	0.	0.	0.
1981.	139.0	4247.	50481.	-1127.	1559.	394.	689.	94.	234.	0.	234.	0.	0.	0.	0.
1982.	160.2	5236.	62759.	3298.	1865.	470.	811.	111.	278.	0.	278.	0.	0.	0.	0.
1983.	183.6	5963.	75499.	6677.	2101.	557.	953.	129.	323.	0.	323.	0.	0.	0.	0.
1984.	209.1	6877.	83731.	2625.	2420.	553.	929.	129.	303.	0.	303.	0.	0.	0.	0.
1985.	236.6	8090.	103020.	3026.	2813.	646.	1136.	152.	364.	0.	364.	0.	0.	0.	0.
1986.	265.8	9602.	121761.	-6702.	3342.	633.	1025.	147.	310.	0.	310.	0.	0.	0.	0.
1987.	296.6	10627.	138235.	-4974.	3701.	583.	795.	132.	216.	0.	216.	0.	0.	0.	0.
1988.	329.0	11912.	166187.	1754.	4108.	619.	712.	136.	176.	0.	176.	0.	0.	0.	0.
1989.	363.3	12838.	183139.	-3592.	4390.	585.	474.	123.	83.	0.	83.	0.	0.	0.	0.
1990.	400.0	14163.	207819.	104200.	4799.	665.	493.	137.	79.	0.	79.	0.	0.	0.	0.

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CASE 6 FOR 120 GW(E) AT 1980

CASE 8

DURING PERIOD ENDING	ISOTOPE PRODUCTION, KILOGRAMS/YEAR														
	GW-YR	U-235	U-236	PM147	CE144	CS137	SR-90	KR-85	TC-99	RH103 SUM	RU106	PD STABL	XE STABL	CM242 AM1	AM241 PU1
1960.	.2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.4	21.	3.	0.	0.	1.	0.	0.	1.	0.	0.	0.	3.	0.	0.
1962.	.4	80.	14.	1.	2.	4.	2.	0.	3.	2.	1.	2.	16.	0.	0.
1963.	.5	203.	49.	4.	7.	23.	10.	0.	15.	8.	2.	14.	87.	0.	0.
1964.	.5	136.	62.	4.	7.	21.	10.	0.	14.	8.	2.	13.	81.	0.	2.
1965.	.5	139.	50.	3.	5.	15.	7.	0.	10.	5.	2.	9.	58.	0.	3.
1966.	.8	226.	72.	5.	9.	28.	12.	1.	19.	10.	3.	17.	106.	0.	5.
1967.	.8	298.	101.	6.	11.	32.	15.	1.	22.	12.	4.	19.	124.	0.	6.
1968.	2.6	302.	109.	6.	12.	34.	15.	1.	23.	12.	4.	20.	129.	0.	9.
1969.	4.8	596.	150.	9.	19.	47.	22.	1.	32.	17.	6.	27.	186.	0.	11.
1970.	10.2	988.	251.	15.	31.	74.	35.	2.	50.	27.	9.	41.	293.	0.	15.
1971.	19.3	2581.	625.	42.	84.	226.	103.	5.	152.	80.	26.	129.	879.	0.	22.
1972.	26.3	5090.	1336.	86.	173.	455.	209.	10.	307.	162.	54.	260.	1772.	0.	38.
1973.	34.0	7950.	2274.	146.	289.	818.	371.	17.	550.	286.	94.	477.	3156.	0.	73.
1974.	42.3	11205.	3569.	221.	435.	1272.	575.	26.	854.	441.	144.	749.	4890.	0.	69.
1975.	50.8	13322.	4756.	272.	538.	1564.	704.	32.	1048.	544.	184.	930.	6020.	0.	66.
1976.	59.9	15240.	5746.	313.	619.	1821.	810.	37.	1218.	635.	220.	1106.	7007.	0.	71.
1977.	69.4	17589.	7065.	368.	728.	2160.	949.	43.	1442.	758.	268.	1341.	8303.	0.	69.
1978.	79.5	20202.	8516.	426.	842.	2516.	1094.	50.	1677.	885.	319.	1594.	9670.	0.	89.
1979.	90.0	23672.	10253.	497.	985.	2952.	1276.	58.	1966.	1040.	376.	1889.	11341.	0.	88.
1980.	101.9	27994.	12518.	596.	1177.	3541.	1513.	69.	2356.	1257.	462.	2313.	13603.	0.	66.
1981.	118.1	32850.	14427.	702.	1392.	4093.	1736.	79.	2723.	1468.	554.	2716.	15788.	0.	21.
1982.	136.1	40982.	17527.	872.	1743.	4966.	2123.	97.	3309.	1778.	679.	3257.	19199.	0.	11.
1983.	155.9	47019.	20023.	990.	2009.	5516.	2355.	108.	3678.	1983.	795.	3633.	21421.	0.	41.
1984.	177.4	55789.	23768.	1135.	2332.	6166.	2669.	123.	4119.	2211.	898.	3974.	24024.	0.	102.
1985.	200.5	65374.	27937.	1334.	2753.	7122.	3058.	141.	4758.	2574.	1092.	4681.	27836.	0.	126.
1986.	224.8	79204.	33888.	1580.	3275.	8236.	3526.	163.	5508.	2989.	1333.	5476.	32304.	0.	154.
1987.	250.3	88599.	38186.	1749.	3639.	8918.	3816.	178.	5974.	3233.	1531.	6000.	35122.	0.	94.
1988.	276.9	99077.	42868.	1960.	4090.	9883.	4200.	197.	6626.	3571.	1825.	6825.	39067.	0.	51.
1989.	304.9	107484.	46331.	2102.	4401.	10504.	4440.	209.	7049.	3791.	2060.	7398.	41692.	0.	68.
1990.	334.7	118562.	51050.	2302.	4831.	11545.	4861.	230.	7752.	4153.	2357.	8278.	45946.	0.	36.

ANNUAL ISOTOPE PRODUCTION AT DISCHARGE
(NO LOSS BASIS)

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CASE 6 FOR 120 GW(E) AT 1980

CASE 8

DURING PERIOD ENDING	ISOTOPE PRODUCTION, KILOGRAMS/YEAR		
	KR STABL	RU STABL	H-3 GRAMS
1960.	.0	0.	0.
1961.	.3	1.	0.
1962.	1.2	6.	0.
1963.	6.4	39.	1.
1964.	5.9	36.	1.
1965.	4.3	25.	0.
1966.	7.8	47.	1.
1967.	9.1	54.	1.
1968.	9.5	56.	1.
1969.	13.6	78.	1.
1970.	21.3	121.	2.
1971.	64.2	373.	7.
1972.	129.1	750.	13.
1973.	230.4	1358.	24.
1974.	357.4	2118.	37.
1975.	437.0	2610.	45.
1976.	503.0	3053.	53.
1977.	588.8	3639.	63.
1978.	678.3	4259.	73.
1979.	790.9	5010.	85.
1980.	937.4	6040.	102.
1981.	1075.2	7008.	118.
1982.	1317.0	8473.	143.
1983.	1463.5	9410.	159.
1984.	1660.6	10447.	178.
1985.	1906.6	12115.	205.
1986.	2208.4	14035.	237.
1987.	2407.5	15230.	257.
1988.	2676.0	16963.	285.
1989.	2852.6	18100.	303.
1990.	3142.1	19964.	333.

CUMULATIVE ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSSES EXCEPT FOR RADIOACTIVE DECAY)

CASE 6 FOR 120 GW(E) AT 1980

CASE 8

YEAR ENDING	TOTAL INSTALLED CAPACITY	ISOTOPE PRODUCTION, KGS													
	GW(E)	TONNE	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	CM244 AM3	CM244 SUM	PU238 NP	PU238 CM	PU238 AM	PU238 SUM
1960.	.3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.5	2.	10.	10.	0.	0.	0.	0.	0.	-0.	0.	-0.	-0.	-0.	0.
1962.	.5	9.	53.	53.	1.	0.	0.	0.	0.	-0.	0.	-0.	-0.	-0.	0.
1963.	.6	30.	201.	201.	6.	1.	1.	0.	0.	-0.	0.	-0.	-0.	-0.	0.
1964.	.6	52.	382.	382.	14.	2.	2.	0.	0.	-0.	0.	-0.	-0.	-0.	0.
1965.	.6	67.	509.	509.	20.	2.	3.	0.	1.	-0.	1.	-0.	-0.	-0.	0.
1966.	1.0	93.	704.	704.	29.	3.	4.	0.	1.	-0.	1.	-0.	-0.	-0.	0.
1967.	1.0	128.	985.	985.	41.	4.	6.	0.	1.	-0.	1.	-0.	-0.	-0.	0.
1968.	3.0	163.	1269.	1269.	54.	6.	8.	0.	2.	-0.	2.	-0.	-0.	-0.	0.
1969.	5.7	224.	1696.	1696.	70.	7.	10.	0.	2.	-0.	2.	-0.	-0.	-0.	0.
1970.	12.0	325.	2410.	2410.	97.	10.	13.	1.	3.	-0.	3.	-0.	-0.	-0.	0.
1971.	22.7	590.	4226.	4226.	158.	15.	19.	2.	4.	-0.	4.	-0.	-0.	-0.	0.
1972.	30.9	1142.	8111.	8111.	291.	29.	37.	4.	8.	-0.	8.	-0.	-0.	-0.	0.
1973.	40.0	2031.	14586.	7660.	523.	53.	68.	7.	14.	-0.	14.	-0.	-0.	-0.	0.
1974.	49.7	3352.	24604.	7289.	901.	95.	125.	13.	27.	-0.	27.	-0.	-0.	-0.	0.
1975.	59.8	4989.	38269.	7903.	1422.	158.	218.	19.	48.	-0.	48.	-0.	-0.	-0.	0.
1976.	70.5	6879.	55145.	7629.	2050.	243.	350.	26.	78.	-0.	78.	-0.	-0.	-0.	0.
1977.	81.7	9100.	76142.	9829.	2830.	361.	547.	36.	129.	-0.	129.	-0.	-0.	-0.	0.
1978.	93.6	11666.	101830.	9681.	3768.	522.	820.	49.	205.	-0.	205.	-0.	-0.	-0.	0.
1979.	105.9	14650.	132879.	7286.	4890.	735.	1181.	64.	312.	-0.	312.	-0.	-0.	-0.	0.
1980.	120.0	18227.	172763.	2283.	6253.	1041.	1711.	88.	478.	-0.	478.	-0.	-0.	-0.	0.
1981.	139.0	22473.	223309.	1222.	7812.	1434.	2399.	112.	695.	-0.	695.	-0.	-0.	-0.	0.
1982.	160.2	27709.	286089.	4541.	9677.	1901.	3210.	134.	946.	-0.	946.	-0.	-0.	-0.	0.
1983.	183.6	33672.	361598.	11229.	11778.	2455.	4162.	158.	1234.	-0.	1234.	-0.	-0.	-0.	0.
1984.	209.1	40549.	445371.	13895.	14198.	3004.	5091.	162.	1490.	-0.	1490.	-0.	-0.	-0.	0.
1985.	236.6	48639.	548492.	17022.	17011.	3646.	6227.	186.	1798.	-0.	1798.	-0.	-0.	-0.	0.
1986.	265.8	58240.	670379.	10446.	20353.	4273.	7250.	186.	2041.	-0.	2041.	-0.	-0.	-0.	0.
1987.	296.6	68868.	808769.	5626.	24054.	4850.	8045.	171.	2180.	-0.	2180.	-0.	-0.	-0.	0.
1988.	329.0	80780.	975050.	7474.	28163.	5462.	8756.	172.	2274.	-0.	2274.	-0.	-0.	-0.	0.
1989.	363.3	93618.	1158240.	3933.	32552.	6039.	9229.	160.	2271.	-0.	2271.	-0.	-0.	-0.	0.
1990.	400.0	107781.	1366127.	108201.	37352.	6694.	9722.	171.	2265.	-0.	2265.	-0.	-0.	-0.	0.

CUMULATIVE ISOTOPE PRODUCTION AT DISCHARGE

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(NO LOSSES EXCEPT FOR RADIOACTIVE DECAY)

CASE 6 FOR 120 GW(E) AT 1980

CASE 8

ISOTOPE PRODUCTION, KGS

YEAR ENDING	GW-YR	U-235	U-236	PM147	CE144	CS137	SR-90	KR-85	TC-99	RH103 SUM	RU106	PD STABL	XE STABL	CM242 AM1	AM241 PU1
1960.	.2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.6	21.	3.	0.	0.	1.	0.	0.	1.	0.	0.	0.	3.	-0.	-0.
1962.	1.0	101.	17.	1.	2.	5.	2.	0.	3.	2.	1.	2.	19.	-0.	0.
1963.	1.5	304.	66.	5.	8.	27.	12.	1.	19.	10.	3.	16.	107.	-0.	1.
1964.	2.1	440.	128.	7.	10.	48.	22.	1.	33.	18.	4.	29.	188.	-0.	2.
1965.	2.6	580.	178.	8.	9.	62.	28.	1.	43.	23.	4.	38.	246.	-0.	6.
1966.	3.4	805.	250.	11.	12.	89.	40.	2.	62.	33.	5.	55.	352.	-0.	10.
1967.	4.3	1103.	351.	15.	17.	119.	53.	2.	84.	44.	6.	74.	477.	-0.	17.
1968.	6.8	1405.	460.	17.	19.	150.	67.	3.	106.	56.	7.	93.	606.	-0.	26.
1969.	11.7	2000.	610.	23.	26.	193.	87.	4.	138.	73.	9.	120.	792.	-0.	37.
1970.	21.9	2988.	862.	33.	42.	263.	120.	5.	189.	101.	14.	161.	1084.	-0.	52.
1971.	41.2	5569.	1486.	68.	101.	483.	220.	9.	341.	181.	33.	291.	1963.	-0.	74.
1972.	67.5	10659.	2823.	139.	215.	927.	424.	18.	648.	344.	70.	550.	3735.	-0.	112.
1973.	101.5	18609.	5097.	253.	378.	1724.	785.	34.	1198.	629.	129.	1028.	6891.	-0.	185.
1974.	143.8	29814.	8666.	416.	590.	2957.	1340.	58.	2052.	1070.	209.	1777.	11781.	-0.	254.
1975.	194.6	43136.	13421.	594.	781.	4453.	2011.	87.	3100.	1615.	288.	2707.	17801.	-0.	320.
1976.	254.5	58376.	19167.	772.	940.	6173.	2772.	118.	4318.	2250.	364.	3813.	24807.	-0.	391.
1977.	324.0	75965.	26232.	965.	1114.	8191.	3654.	154.	5760.	3008.	451.	5154.	33111.	-0.	459.
1978.	403.5	96167.	34747.	1172.	1300.	10520.	4659.	194.	7437.	3893.	544.	6748.	42780.	-0.	548.
1979.	493.5	119839.	45000.	1404.	1520.	13231.	5821.	240.	9403.	4933.	648.	8637.	54122.	-0.	634.
1980.	595.4	147833.	57519.	1682.	1802.	16470.	7193.	294.	11759.	6190.	786.	10950.	67725.	-0.	699.
1981.	713.5	180683.	71945.	2004.	2133.	20187.	8752.	354.	14483.	7658.	947.	13666.	83514.	-0.	719.
1982.	849.6	221665.	89473.	2422.	2620.	24692.	10661.	429.	17792.	9437.	1152.	16923.	102712.	-0.	729.
1983.	1005.5	268684.	109496.	2863.	3086.	29644.	12756.	510.	21469.	11420.	1371.	20556.	124133.	-0.	769.
1984.	1182.9	324473.	133264.	3350.	3602.	35133.	15113.	601.	25588.	13631.	1583.	24531.	148157.	-0.	869.
1985.	1383.4	389847.	161201.	3926.	4235.	41453.	17802.	705.	30347.	16205.	1884.	29212.	175993.	-0.	993.
1986.	1608.2	469051.	195089.	4617.	5017.	48741.	20893.	824.	35855.	19193.	2276.	34688.	208297.	-0.	1146.
1987.	1858.5	557650.	233275.	5320.	5703.	56547.	24197.	950.	41828.	22426.	2668.	40688.	243419.	-0.	1239.
1988.	2135.4	656727.	276143.	6076.	6436.	65138.	27806.	1088.	48454.	25997.	3159.	47513.	282486.	-0.	1288.
1989.	2440.3	764211.	322474.	6802.	7048.	74154.	31566.	1229.	55503.	29788.	3640.	54911.	324178.	-0.	1353.
1990.	2775.0	882773.	373524.	7564.	7730.	84004.	35655.	1383.	63254.	33941.	4177.	63189.	370125.	-0.	1387.

C U M U L A T I V E I S O T O P E P R O D U C T I O N A T D I S C H A R G E

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(NO LOSSES EXCEPT FOR RADIOACTIVE DECAY)

CASE 6 FOR 120 GW(E) AT 1980

CASE 8

ISOTOPE PRODUCTION, KGS

YEAR ENDING	KR STABL	RU STABL	H-3 GRAMS
1960.	.0	0.	0.
1961.	.3	1.	0.
1962.	1.4	8.	0.
1963.	7.8	46.	1.
1964.	13.7	82.	1.
1965.	18.0	107.	2.
1966.	25.8	154.	2.
1967.	34.8	208.	3.
1968.	44.3	263.	4.
1969.	57.9	341.	5.
1970.	79.2	463.	7.
1971.	143.4	836.	13.
1972.	272.5	1586.	26.
1973.	502.9	2944.	48.
1974.	860.3	5062.	82.
1975.	1297.4	7672.	123.
1976.	1800.4	10725.	169.
1977.	2389.2	14364.	222.
1978.	3067.5	18623.	283.
1979.	3858.4	23633.	353.
1980.	4795.8	29673.	436.
1981.	5871.0	36681.	530.
1982.	7188.1	45154.	644.
1983.	8651.6	54563.	768.
1984.	10312.2	65011.	903.
1985.	12218.8	77126.	1059.
1986.	14427.2	91161.	1238.
1987.	16834.7	106391.	1427.
1988.	19510.7	123353.	1633.
1989.	22363.3	141453.	1846.
1990.	25505.4	161417.	2077.

NET ANNUAL ISOTOPE AVAILABILITY

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

CASE 6 FOR 120 GW(E) AT 1980

CASE 8

DURING PERIOD ENDING	TOTAL INSTALLED CAPACITY		ISOTOPE PRODUCTION, KILOGRAMS/YEAR												PU238 NP	PU238 CM	PU238 AM	PU238 SUM
	GW(E)	TONNE	PU-RP	PU-SP	NP237	AM241	AM243	CM242	CM244	CM244 AM3	CM244 SUM							
1960.	.3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	
1961.	.5	0.	0.	0.	-0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	
1962.	.5	2.	10.	10.	0.	0.	0.	-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0.	
1963.	.6	7.	43.	43.	1.	0.	0.	-0.	-0.	0.	0.	0.	0.	0.	0.	0.	0.	
1964.	.6	21.	144.	144.	4.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	
1965.	.6	21.	177.	177.	7.	1.	1.	0.	0.	0.	0.	1.	0.	0.	0.	0.	1.	
1966.	1.0	16.	123.	123.	5.	1.	1.	0.	0.	0.	0.	2.	0.	0.	0.	0.	2.	
1967.	1.0	25.	189.	189.	7.	1.	1.	0.	0.	0.	0.	3.	0.	0.	0.	0.	3.	
1968.	3.0	36.	271.	271.	11.	1.	2.	0.	0.	0.	0.	3.	0.	0.	0.	0.	4.	
1969.	5.7	34.	273.	273.	12.	1.	2.	0.	0.	0.	0.	5.	0.	0.	0.	0.	5.	
1970.	12.0	61.	410.	410.	15.	1.	2.	0.	0.	0.	1.	6.	0.	0.	0.	0.	6.	
1971.	22.7	101.	690.	690.	23.	2.	3.	0.	0.	0.	1.	7.	0.	0.	1.	0.	8.	
1972.	30.9	265.	1767.	1767.	55.	5.	6.	0.	0.	0.	1.	10.	0.	0.	1.	0.	11.	
1973.	40.0	551.	3789.	3789.	120.	12.	16.	0.	0.	0.	1.	19.	0.	0.	1.	0.	19.	
1974.	49.7	889.	6315.	-472.	209.	22.	28.	0.	1.	1.	2.	38.	0.	0.	1.	0.	39.	
1975.	59.8	1321.	9753.	-428.	340.	38.	52.	0.	3.	1.	4.	71.	1.	0.	2.	0.	73.	
1976.	70.5	1637.	13330.	540.	469.	57.	84.	0.	6.	3.	9.	121.	1.	0.	4.	0.	126.	
1977.	81.7	1890.	16482.	-325.	565.	76.	119.	0.	11.	5.	16.	183.	2.	0.	8.	0.	193.	
1978.	93.6	2222.	20513.	2092.	702.	106.	177.	0.	17.	10.	27.	247.	3.	0.	14.	0.	264.	
1979.	105.9	2565.	25116.	-204.	844.	146.	246.	0.	26.	16.	42.	320.	4.	0.	22.	0.	346.	
1980.	120.0	2985.	30350.	-2426.	1010.	192.	325.	0.	43.	24.	67.	401.	6.	0.	32.	0.	438.	
1981.	139.0	3576.	39007.	-4981.	1227.	276.	477.	0.	65.	37.	102.	493.	7.	0.	45.	0.	546.	
1982.	160.2	4247.	49473.	-1103.	1403.	354.	620.	0.	92.	54.	145.	345.	10.	0.	62.	0.	417.	
1983.	183.6	5236.	61505.	3233.	1678.	422.	730.	1.	143.	73.	216.	413.	13.	0.	84.	0.	511.	
1984.	209.1	5963.	73993.	6548.	1891.	500.	857.	1.	188.	108.	296.	366.	17.	0.	120.	0.	502.	
1985.	236.6	6877.	82067.	2583.	2178.	497.	836.	1.	223.	145.	368.	491.	20.	0.	155.	0.	666.	
1986.	265.8	8090.	100972.	2977.	2532.	581.	1022.	1.	259.	179.	438.	505.	23.	0.	195.	0.	723.	
1987.	296.6	9602.	119341.	-6553.	3008.	568.	922.	1.	243.	228.	471.	661.	23.	0.	238.	0.	922.	
1988.	329.0	10627.	135480.	-4865.	3331.	524.	716.	1.	292.	254.	546.	733.	27.	0.	256.	0.	1016.	
1989.	363.3	11912.	162868.	1724.	3698.	557.	640.	1.	249.	311.	560.	932.	26.	0.	305.	0.	1263.	
1990.	400.0	12838.	179483.	-3513.	3951.	526.	427.	1.	173.	334.	508.	1040.	24.	0.	310.	0.	1374.	

NET ANNUAL ISOTOPE AVAILABILITY

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

CASE 6 FOR 120 GW(E) AT 1980

CASE 8

DURING PERIOD ENDING	ISOTOPE PRODUCTION, KILOGRAMS/YEAR														
	GW-YR	U-235	U-236	PM147	CE144	CS137	SR-90	KR-85	TC-99	RH103 SUM	RU106	PD STABL	XE STABL	CM242 AM1	AM241 PU1
1960.	.2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.4	-0.	-0.	0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	0.	0.
1962.	.4	20.	3.	-0.	0.	1.	0.	0.	1.	0.	0.	0.	3.	0.	0.
1963.	.5	79.	14.	-0.	1.	3.	2.	0.	2.	1.	0.	2.	14.	0.	0.
1964.	.5	199.	48.	0.	3.	20.	9.	0.	14.	7.	1.	13.	78.	0.	0.
1965.	.5	134.	61.	0.	3.	19.	8.	0.	13.	7.	1.	12.	73.	0.	2.
1966.	.8	136.	49.	2.	2.	13.	6.	0.	9.	5.	1.	8.	53.	0.	3.
1967.	.8	221.	71.	2.	3.	24.	11.	0.	17.	9.	1.	15.	95.	0.	4.
1968.	2.6	292.	99.	1.	4.	28.	13.	1.	20.	10.	2.	17.	112.	0.	6.
1969.	4.8	296.	107.	2.	4.	30.	13.	1.	20.	11.	2.	18.	116.	0.	8.
1970.	10.2	584.	147.	2.	7.	42.	19.	1.	29.	16.	3.	24.	167.	0.	10.
1971.	19.3	968.	246.	3.	12.	65.	30.	1.	45.	25.	4.	37.	264.	0.	14.
1972.	26.3	2529.	612.	4.	31.	199.	91.	4.	137.	72.	12.	117.	791.	0.	19.
1973.	34.0	4988.	1309.	6.	64.	400.	183.	8.	276.	146.	24.	234.	1595.	0.	34.
1974.	42.3	7791.	2229.	18.	107.	719.	326.	14.	495.	257.	42.	430.	2841.	0.	65.
1975.	50.8	10981.	3498.	36.	161.	1119.	505.	22.	768.	397.	65.	674.	4401.	0.	61.
1976.	59.9	13055.	4660.	61.	199.	1376.	618.	27.	944.	490.	83.	837.	5418.	0.	58.
1977.	69.4	14935.	5631.	92.	229.	1602.	711.	31.	1096.	572.	99.	995.	6306.	0.	63.
1978.	79.5	17237.	6923.	113.	269.	1899.	834.	36.	1298.	682.	121.	1207.	7473.	0.	61.
1979.	90.0	19798.	8345.	130.	312.	2213.	961.	42.	1510.	797.	143.	1434.	8703.	0.	78.
1980.	101.9	23199.	10048.	153.	365.	2596.	1121.	49.	1769.	936.	169.	1700.	10207.	1.	77.
1981.	118.1	27434.	12268.	177.	436.	3114.	1329.	58.	2120.	1131.	208.	2082.	12243.	1.	58.
1982.	136.1	32193.	14138.	207.	515.	3600.	1524.	67.	2451.	1322.	249.	2445.	14210.	1.	18.
1983.	155.9	40163.	17177.	248.	645.	4367.	1864.	82.	2978.	1601.	306.	2931.	17279.	2.	10.
1984.	177.4	46079.	19623.	293.	744.	4851.	2068.	91.	3310.	1785.	358.	3270.	19279.	3.	36.
1985.	200.5	54673.	23293.	363.	863.	5422.	2344.	104.	3707.	1990.	404.	3577.	21622.	3.	89.
1986.	224.8	64067.	27378.	412.	1019.	6264.	2685.	119.	4282.	2317.	492.	4213.	25052.	4.	111.
1987.	250.3	77620.	33210.	473.	1212.	7243.	3096.	138.	4957.	2690.	600.	4929.	29073.	5.	136.
1988.	276.9	86827.	37423.	556.	1347.	7843.	3350.	150.	5376.	2910.	689.	5400.	31610.	6.	83.
1989.	304.9	97095.	42010.	658.	1514.	8691.	3688.	166.	5963.	3214.	821.	6143.	35160.	7.	45.
1990.	334.7	105335.	45404.	729.	1629.	9237.	3899.	177.	6344.	3412.	927.	6658.	37523.	7.	60.

NET ANNUAL ISOTOPE AVAILABILITY

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

CASE 6 FOR 120 GW(E) AT 1980

CASE 8

DURING PERIOD ENDING	ISOTOPE PRODUCTION, KILOGRAMS/YEAR		
	KR STABL	RU STABL	H-3 GRAMS
1960.	.0	0.	0.
1961.	-.0	-0.	0.
1962.	.2	1.	0.
1963.	1.0	6.	0.
1964.	5.7	35.	1.
1965.	5.3	32.	1.
1966.	3.9	23.	0.
1967.	7.0	42.	1.
1968.	8.2	48.	1.
1969.	8.5	50.	1.
1970.	12.2	70.	1.
1971.	19.2	109.	2.
1972.	57.8	336.	6.
1973.	116.2	675.	11.
1974.	207.4	1222.	20.
1975.	321.7	1906.	31.
1976.	393.3	2349.	39.
1977.	452.7	2748.	45.
1978.	529.9	3275.	53.
1979.	610.5	3833.	62.
1980.	711.8	4509.	73.
1981.	843.6	5436.	87.
1982.	967.7	6307.	101.
1983.	1185.3	7625.	122.
1984.	1317.2	8469.	135.
1985.	1494.5	9403.	151.
1986.	1716.0	10904.	175.
1987.	1987.6	12632.	202.
1988.	2166.7	13707.	218.
1989.	2408.4	15266.	242.
1990.	2567.3	16290.	257.

CUMULATIVE ISOTOPE AVAILABILITY

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

CASE 6 FOR 120 GW(E) AT 1980

CASE 8

YEAR ENDING	TOTAL INSTALLED CAPACITY	ISOTOPE PRODUCTION, KGS													
	GW(E)	TONNE	PU-RP	PU-Sp	NP237	AM241	AM243	CM242	CM244	CM244 AM3	CM244 SUM	PU238 NP	PU238 CM	PU238 AM	PU238 SUM
1960.	.3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.5	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	0.	-0.	-0.	-0.	0.
1962.	.5	2.	10.	10.	0.	0.	0.	-0.	-0.	-0.	0.	-0.	-0.	-0.	0.
1963.	.6	9.	52.	52.	1.	0.	0.	-0.	-0.	-0.	0.	0.	-0.	-0.	0.
1964.	.6	30.	197.	197.	6.	1.	0.	0.	0.	-0.	0.	0.	0.	-0.	0.
1965.	.6	52.	374.	374.	13.	1.	2.	0.	0.	0.	0.	1.	0.	0.	1.
1966.	1.0	67.	499.	499.	18.	2.	3.	0.	0.	0.	0.	4.	0.	0.	4.
1967.	1.0	93.	691.	691.	26.	3.	4.	0.	0.	0.	0.	6.	0.	0.	7.
1968.	3.0	128.	966.	966.	37.	4.	5.	0.	1.	0.	1.	10.	0.	0.	10.
1969.	5.7	163.	1245.	1245.	49.	5.	7.	0.	1.	0.	1.	15.	0.	1.	15.
1970.	12.0	224.	1663.	1663.	63.	7.	9.	0.	1.	1.	2.	20.	0.	1.	22.
1971.	22.7	325.	2363.	2363.	87.	9.	11.	0.	1.	1.	2.	27.	0.	2.	29.
1972.	30.9	590.	4144.	4144.	142.	14.	17.	0.	2.	1.	3.	37.	0.	2.	40.
1973.	40.0	1142.	7952.	7952.	262.	26.	33.	0.	2.	2.	4.	55.	0.	3.	59.
1974.	49.7	2031.	14301.	7514.	471.	48.	61.	0.	3.	3.	6.	93.	1.	4.	98.
1975.	59.8	3352.	24119.	7150.	811.	85.	113.	0.	6.	4.	10.	163.	1.	6.	170.
1976.	70.5	4989.	37510.	7751.	1280.	142.	197.	0.	11.	7.	18.	283.	2.	10.	295.
1977.	81.7	6879.	54049.	7484.	1845.	218.	315.	0.	22.	12.	33.	463.	4.	18.	486.
1978.	93.6	9100.	74625.	9639.	2547.	324.	492.	0.	38.	21.	59.	707.	7.	32.	746.
1979.	105.9	11666.	99802.	9496.	3391.	469.	738.	0.	63.	36.	99.	1021.	11.	54.	1087.
1980.	120.0	14650.	130230.	7148.	4401.	660.	1063.	0.	103.	59.	162.	1415.	17.	85.	1517.
1981.	139.0	18227.	169314.	2244.	5628.	936.	1539.	0.	165.	93.	258.	1897.	24.	130.	2051.
1982.	160.2	22473.	218845.	1199.	7031.	1288.	2159.	1.	250.	143.	394.	2227.	34.	191.	2452.
1983.	183.6	27709.	280368.	4451.	8709.	1709.	2889.	1.	384.	211.	594.	2623.	47.	274.	2944.
1984.	209.1	33672.	354370.	11008.	10600.	2206.	3746.	1.	557.	311.	868.	2969.	63.	391.	3423.
1985.	236.6	40549.	436473.	13627.	12778.	2700.	4582.	1.	759.	444.	1203.	3436.	83.	543.	4062.
1986.	265.8	48639.	537535.	16694.	15310.	3276.	5603.	1.	990.	606.	1596.	3914.	105.	734.	4753.
1987.	296.6	58240.	656987.	10252.	18317.	3840.	6525.	1.	1195.	811.	2007.	4545.	128.	966.	5638.
1988.	329.0	68868.	792602.	5523.	21649.	4358.	7240.	2.	1443.	1035.	2478.	5242.	154.	1215.	6611.
1989.	363.3	80780.	955554.	7330.	25346.	4908.	7880.	2.	1637.	1307.	2945.	6133.	179.	1510.	7822.
1990.	400.0	93618.	1135082.	3861.	29297.	5427.	8306.	1.	1749.	1593.	3342.	7125.	202.	1808.	9135.

CUMULATIVE ISOTOPE AVAILABILITY

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(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

CASE 6 FOR 120 GW(E) AT 1980

CASE 8

ISOTOPE PRODUCTION, KGS

YEAR ENDING	GW-YR	U-235	U-236	PM147	CE144	CS137	SR-90	KR-85	TC-99	RH103 SUM	RU106	PD STABL	XE STABL	CM242 AM1	AM241 PU1
1960.	.2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	.6	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.
1962.	1.0	20.	3.	0.	0.	1.	0.	0.	1.	0.	0.	0.	3.	-0.	-0.
1963.	1.5	99.	17.	-0.	1.	4.	2.	0.	3.	2.	0.	2.	17.	-0.	0.
1964.	2.1	298.	65.	0.	3.	24.	11.	0.	17.	9.	1.	15.	96.	-0.	1.
1965.	2.6	432.	126.	0.	4.	42.	19.	1.	30.	16.	2.	26.	169.	0.	2.
1966.	3.4	568.	174.	2.	4.	55.	25.	1.	39.	21.	2.	34.	222.	0.	5.
1967.	4.3	789.	245.	3.	5.	78.	35.	1.	56.	29.	2.	49.	317.	0.	9.
1968.	6.8	1081.	344.	4.	6.	104.	47.	2.	75.	40.	3.	66.	429.	0.	15.
1969.	11.7	1377.	450.	5.	7.	132.	59.	2.	96.	51.	3.	84.	545.	0.	23.
1970.	21.9	1960.	598.	6.	10.	170.	77.	3.	124.	66.	4.	108.	712.	0.	33.
1971.	41.2	2928.	844.	7.	16.	232.	105.	4.	170.	91.	6.	145.	976.	0.	46.
1972.	67.5	5458.	1457.	10.	38.	425.	194.	8.	307.	163.	15.	261.	1767.	0.	65.
1973.	101.5	10446.	2766.	14.	80.	815.	372.	16.	583.	309.	32.	495.	3361.	0.	99.
1974.	143.8	18237.	4995.	28.	140.	1516.	689.	29.	1078.	566.	58.	925.	6202.	0.	163.
1975.	194.6	29218.	8493.	58.	218.	2600.	1177.	49.	1847.	963.	94.	1599.	10603.	0.	224.
1976.	254.5	42273.	13153.	105.	289.	3916.	1766.	73.	2790.	1453.	130.	2436.	16021.	0.	282.
1977.	324.0	57208.	18784.	173.	348.	5428.	2434.	100.	3886.	2025.	164.	3431.	22327.	0.	345.
1978.	403.5	74445.	25707.	247.	413.	7204.	3208.	130.	5184.	2707.	203.	4639.	29799.	0.	405.
1979.	493.5	94243.	34052.	322.	481.	9252.	4091.	164.	6694.	3504.	245.	6073.	38502.	1.	483.
1980.	595.4	117442.	44100.	402.	563.	11636.	5111.	202.	8463.	4440.	292.	7773.	48710.	1.	559.
1981.	713.5	144876.	56368.	488.	667.	14484.	6315.	248.	10583.	5571.	354.	9855.	60953.	1.	616.
1982.	849.6	177069.	70507.	585.	790.	17754.	7685.	299.	13034.	6893.	426.	12299.	75162.	2.	634.
1983.	1005.5	217232.	87683.	701.	970.	21715.	9360.	362.	16013.	8493.	519.	15231.	92441.	2.	642.
1984.	1182.9	263311.	107306.	835.	1142.	26071.	11199.	430.	19322.	10278.	617.	18501.	111720.	3.	678.
1985.	1383.4	317984.	130599.	1009.	1333.	30897.	13269.	507.	23029.	12268.	712.	22078.	133342.	4.	766.
1986.	1608.2	382050.	157977.	1193.	1568.	36455.	15630.	595.	27312.	14584.	848.	26291.	158394.	5.	876.
1987.	1858.5	459670.	191187.	1396.	1857.	42865.	18344.	695.	32269.	17274.	1024.	31219.	187467.	6.	1010.
1988.	2135.4	546497.	228610.	1636.	2111.	49730.	21245.	802.	37645.	20184.	1201.	36620.	219077.	7.	1092.
1989.	2440.3	643592.	270620.	1924.	2382.	57285.	24413.	918.	43608.	23397.	1422.	42762.	254238.	8.	1135.
1990.	2775.0	748927.	316024.	2217.	2609.	65214.	27715.	1037.	49953.	26809.	1638.	49420.	291760.	9.	1193.

C U M U L A T I V E I S O T O P E A V A I L A B I L I T Y
(WITH TARGET IRRADIATION, PROCESS LOSSES AND DECAY LOSSES)

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CASE 6 FOR 120 GW(E) AT 1980

CASE 8

ISOTOPE PRODUCTION, KGS			
YEAR ENDING	KR STABL	RU STABL	H-3 GRAMS
1960.	.0	0.	0.
1961.	-.0	-0.	-0.
1962.	.2	1.	0.
1963.	1.3	7.	0.
1964.	7.0	41.	1.
1965.	12.3	74.	1.
1966.	16.2	96.	1.
1967.	23.2	139.	2.
1968.	31.4	187.	3.
1969.	39.9	237.	3.
1970.	52.1	307.	4.
1971.	71.3	416.	6.
1972.	129.1	752.	11.
1973.	245.2	1428.	22.
1974.	452.6	2650.	41.
1975.	774.3	4556.	70.
1976.	1167.6	6905.	105.
1977.	1620.4	9652.	144.
1978.	2150.3	12927.	189.
1979.	2760.8	16761.	241.
1980.	3472.6	21269.	300.
1981.	4316.2	26706.	371.
1982.	5283.9	33013.	451.
1983.	6469.3	40639.	548.
1984.	7786.4	49107.	653.
1985.	9281.0	58510.	768.
1986.	10996.9	69413.	901.
1987.	12984.5	82045.	1053.
1988.	15151.2	95752.	1213.
1989.	17559.6	111018.	1389.
1990.	20127.0	127308.	1570.

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