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THE EFFECTS OF CHANGING ECONOMIC CONDITIONS
ON ENERGY COSTS IN ZIRCALOY 4 CLAD
PRESSURIZED WATER REACTORS

BY
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DEPARTMENT
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NUCLEAR ENGINEERING

A REPORT TO
EAST CENTRAL NUCLEAR GROUP

DECEMBER 1, 1962

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MASSACHUSETTS INSTITUTE OF TECHNOLOGY

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M. I. T. Computation Center, Cambridge, Massachusetts

I. ABSTRACT

The effects of changing economic conditions on nuclear energy costs were studied for a 461 net electric megawatt, zircaloy 4 clad pressurized water reactor. This is a continuation of the study sponsored by the East Central Nuclear Group, Inc. of New York, New York. A similar reactor, but clad with stainless steel, was studied by Donald L. Trapp, formerly of MIT. His results were presented in his Master of Science thesis dated September, 1962. The calculational procedures described in Trapp's thesis were also used in this portion of the study.

The average burnup range studied was between 12,000 and 39,000 megawatt days per tonne of uranium. This corresponds to feed enrichments between 2.00 and 3.50 w/o U-235. Batch and three and five zone out-in fuel management with uniform chemical shim poison control were studied. The cost variables studied were the cost of natural UF_6 , the cost of separative work, fuel fabrication cost, reprocessing cost, plutonium credit and interest charges on fuel.

Five zone out-in fuel management gave the lowest fuel cycle cost for each feed enrichment and each cost basis. This was due primarily to the continued decrease in UF_6 cost and fabrication cost as the burnup of any particular feed enrichment was increased by increasing the number of zones. Even for the highest average burnup studied, the fuel cycle cost for every cost basis and every fuel management procedure was on the left hand side of the minimum of the fuel cycle cost versus burnup curve except for the cost basis in which a reduced fabrication cost was considered. With three zone out-in fuel management and 3.10 w/o enrichment, the average burnup was about 30,000 mwd/t. For this case, the net equilibrium fuel cycle cost, using an 80% load factor, was 1.82 mills/kwhe for present cost conditions, with interest charges on fuel at 4.75%/year, and 2.08 mills/kwhe with interest charges on fuel at 12%/year. For three zone out-in fuel management and 2.75 w/o fuel enrichment, the fuel cycle cost increased by 0.1 mill/kwhe for each of the following changes: increase in interest charge on UF_6 of 4.63%/year; increase in cost of natural UF_6 of \$3.03/kgU; increase in cost of separative work of \$4.65/kgU; increase in fabrication cost of \$15.63/kgU; increase in reprocessing cost of \$20.05/kgU, and decrease in plutonium credit of \$2.48/gmPu.

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III. INTRODUCTION

This report covers in part a study of the effects of changing economic conditions on energy costs in pressurized water reactors. Contained herein are the complete results for a zircaloy 4 clad pressurized water reactor. The results for a stainless steel clad pressurized water reactor are covered in the Master of Science thesis (T1) of Donald L. Trapp, formerly of MIT. This entire study was sponsored by the East Central Nuclear Group, Inc. of New York, New York.

The calculational procedures used in this portion of the study are entirely similar to those described by Trapp (T1) and the results contained herein are presented in a format similar to Trapp's. The only text material in this report is explanations of significant differences from corresponding text in Trapp's thesis.

IV. INPUT DATA

The detailed design data for the reactor were furnished by the Westinghouse Electric Corporation (R1) and are shown in Table 4.1. These data were reduced to the FUEL code and MOVE code input data shown in Table 4.2 and 4.3 respectively. The composition of zircaloy 4 was obtained from references (P1) and (S1). The cost input data for both the stainless steel clad and zircaloy 4 clad studies are given in Tables 4.4 and 4.5.

Table 4.1: Reactor Design Data (Zircaloy 4 Cladding)

<u>Item</u>	<u>Value</u>		
Total heat output	1473 MWt		
Total electrical output, net	461 MWe		
System pressure	2200 psia		
Average coolant temperature (H ₂ O)	300 °C		
Fuel rod outside diameter (cold)	0.4119 in		
Clad thickness, zircaloy 4 (cold)	0.0238 in		
UO ₂ pellet diameter (cold)	0.360 in		
Rod lattice pitch, square (cold)	0.553 in		
UO ₂ density	10.309 gm/cm ³		
Fractional volumes (hot)			
UO ₂	0.31408		
H ₂ O	0.55614		
Zircaloy 4			
Clad	0.09119		
Structure	0.03103		
Void in fuel element	<u>0.00756</u>		
	1.00000		
Core geometry (cylindrical)			
Radius, equivalent	151.13 cm		
Height	309.68 cm		
Radial reflector savings	7.5 cm		
Axial reflector savings	7.5 cm		
ε, fast fission factor	1.0553		
τ, Fermi age to thermal energy	48.48 cm ²		
p _{mod} , resonance escape probability for non-fuel materials	0.9736		
σ _{s,epi} (UO ₂), epithermal scattering cross-section for UO ₂	17.1 barns		
<u>Fuel enrichment, w/o</u>	<u>2.00</u>	<u>2.75</u>	<u>3.50</u>
p _g , U-238 resonance escape probability	0.7699	0.7708	0.7718
Thermal disadvantage factors			
ψ _{H₂O} = $\bar{\rho}_{H_2O} / \bar{\rho}_{fuel}$	1.2234	1.2628	1.3023
ψ _{clad} = $\bar{\rho}_{clad} / \bar{\rho}_{fuel}$	1.1117	1.1313	1.1512
D, diffusion coefficient, cm	0.3367	0.3287	0.3214

Table 4.2: FUEL Code Input Data (Zircaloy 4 Cladding)

Item	Enrichment			Units
	2.00	2.75	3.50	
N ₅ ⁰	0.00046573	0.00064037	0.00081501	atoms/barn cm
N ₈ ⁰	0.022532	0.022360	0.022187	atoms/barn cm
EVCUT	0.45	-	-	ev
SDP	0.81166	-	-	cm ⁻¹
TMOD	300.0	-	-	°C
PSI1(8)	13.708	13.664	13.627	-
C1	0.56415	-	-	cm
EPSI	1.0553	-	-	-
PLIN	0.98456	-	-	-
SIGOMD	0.014683	0.014699	0.014715	cm ⁻¹
SGOXEG	3.555 x 10 ⁶	-	-	barns
VFL	0.31408	-	-	-
PSI	1.2023	1.2379	1.2737	-
POWERD	66.288	-	-	kw/liter
ZETA	0.0001	-	-	neut/barn
SGMSFL	0.39327	0.39331	0.39334	cm ⁻¹
ANBP	0.0	-	-	atoms/barn cm
SIGOBP	0.0	-	-	barns
SGOIN7	47.67	-	-	barns
TAU	48.48	-	-	cm ²
D	0.3834	0.3823	0.3817	cm
PDNLIM	200.0	-	-	kw/liter
RIUFP	181.0	-	-	barns
RIPFP	264.0	-	-	barns
FPFCTR	1.0	-	-	-
APSI	0.0	-	-	barns/neut
RIBP	0.0	-	-	barns
OMPMOD	0.0264	-	-	-

Table 4.3: MOVE Code Input Data (Zircaloy 4 Cladding)

Item	Enrichment			Units
	2.00	2.75	3.50	
R*	151.13	-	-	cm
H	309.68	-	-	cm
δR	7.5	-	-	cm
δH	7.5	-	-	cm
ZSYM	0.0	-	-	-
DBSQU	1.2401×10^{-4}	1.2365×10^{-4}	1.2346×10^{-4}	cm^{-1}
PFAST	0.98456	-	-	-
PDENAV	66.288	-	-	kw/liter
RMAX	3.0	-	-	-
ERROR	0.001	-	-	-
DELCRT	0.001	-	-	-
DELTD	0.03836	-	-	years
CRIT	1.0	-	-	-

* This is the outer radius only. In any particular run, it is necessary to specify up to 10 radii, one for each radial mesh point region.

Table 4.4: Cost Input Data

	Symbol	Value for stainless steel study	Value for zircaloy 4 study
Material fractions:			
1. UF ₆	F(1)	1.000	1.000
2. Fabrication	F(2)	1.000	1.000
3. Shipping	F(3)	1.000	1.000
4. Reprocessing	F(4)	0.990	0.990
5. UO ₂ (NO ₃) ₂ to UF ₆	F(5)	0.987	0.987
6. UF ₆ credit	F(6)	0.987	0.987
7. Pu(NO ₃) ₄ to Pu	F(7)	0.980	0.980
8. Pu credit	F(8)	0.980	0.980
UF ₆ loss during conversion and fabrication	FLS	0.010	0.010, 0.005**
Fraction of core kept as spares	SPPC	0.020	0.020
Plant load factor	FLOAD	0.800	0.800
Net electrical efficiency	GAMMA	0.3130	0.3130
Batch size of fuel for reprocessing* 1 zone	WTF	68,078.0 kgU	63,423 kgU
3 zone	WTF	22,692.7 kgU	21,141 kgU
5 zone	WTF	13,615.6 kgU	12,685 kgU
Daily charge for reprocessing plant	D4	\$17,100/day	\$17,100/day
UO ₂ (NO ₃) ₂ conversion cost: UF ₆ < 5%	D51	\$5.60/kgU	\$5.60/kgU
UF ₆ > 5%	D52	\$32.00/kgU	\$32.00/kgU
UF ₆ pre-reactor time, from time all fabrication payments have been made	TUPR	0.0767 years	0.0767 years
Fabrication pre-reactor time, from time all fabrication payments have been made	TWPR	0.0767 years	0.0767 years
Time during which fabrication payments are made:			
Initial or full core charge	TFBP1	0.6667 years	0.6667 years
Out-in charge (1/3 or 1/5 of core)	TFBP2	0.5000 years	0.5000 years
Fabrication time, for basing UF ₆ capital carrying charges:			
Initial or full core charge	TFBU1	0.5000 years	0.5000 years
Out-in charge (1/3 or 1/5 of core)	TFBU2	0.3333 years	0.3333 years
Uranium post-reactor time	TPOST	0.4959 years	0.4959 years

* Fuel weight = density x fuel volume

** Cost basis 8 only

Table 4.5: Cost Input Data for 8 Cost Bases

Cost Parameter	Symbol	Units	Cost Basis							
			1	2	3	4	5	6	7	8
Cost of natural UF ₆	-	\$/kgU	23.50	23.50	<u>12.93</u>	23.50	<u>12.93</u>	<u>12.93</u>	23.50	23.50
Weight fraction of U-235 in UF ₆ of zero value	XO	-	0.002531	0.002531	<u>0.003192</u>	<u>0.002335</u>	<u>0.002989</u>	<u>0.002989</u>	0.002531	0.002531
Cost of separative work	CE	\$/kgU	30.00	30.00	30.00	<u>25.00</u>	<u>25.00</u>	<u>25.00</u>	30.00	30.00
Fabrication cost	C2	\$/kgU								
Stainless Steel			101.00	101.00	101.00	101.00	101.00	101.00	101.00	<u>106.00</u>
Zircaloy 4			140.00	140.00	140.00	140.00	140.00	140.00	140.00	<u>104.00</u>
Shipping cost	C(3)	\$/kgU	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
Pu(NO ₃) ₄ to Pu cost	C(7)	\$/kgPu	1500.00	1500.00	1500.00	1500.00	1500.00	<u>0.0</u>	1500.00	1500.00
Pu credit	C(8)	\$/kgPu	9500.00	9500.00	9500.00	9500.00	9500.00	<u>0.0</u>	9500.00	9500.00
Plant capital cost	C(14)	\$/kwe	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
Operating cost	C(15)	mills/kwhe	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
UF ₆ interest excluding time of fabrication	FU	per year	<u>0.0475</u>	0.12	0.12	0.12	0.12	0.12	<u>0.06</u>	0.12
UF ₆ interest during time of fabrication	FUFB	per year	<u>0.0475</u>	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Fabrication interest	FW	per year	0.12	0.12	0.12	0.12	0.12	0.12	<u>0.06</u>	0.12
Interest charge on plant capital	FCAP	per year	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14

Notes: a. XO derives from the cost of natural UF₆ as well as CE. b. Changes from cost basis 2 are underscored. c. Changes in Pu value and in reprocessing cost will be studied separately.

V. RESULTS

A. Reactor Performance

Some important features of the zircaloy 4 clad reactor performance are shown in Tables 5.1, 5.2, and 5.3 and Figs. 5.1, 5.2, and 5.3. The power density shapes shown in Fig. 5.2 have a more severe dip toward the center of the reactor than do the corresponding curves for the stainless steel clad reactor. For the same total energy release from a charge of fuel, the feed enrichment for the zircaloy clad reactor is less than the feed enrichment for the stainless steel clad reactor. For the same total energy release, the same number of fissions will have taken place in the stainless steel clad fuel charge as in the zircaloy clad fuel charge. The zircaloy clad fuel charge will have lost a higher percentage of its fissionable atoms than the stainless steel clad charge, even when the buildup and depletion of fissionable plutonium atoms are considered. The fuel charge moved to the central zone of the zircaloy clad reactor will not be able to carry as high a portion of its reactor's power output as will the corresponding fuel charge in the stainless steel clad reactor, so the power density will be lower in the center of the zircaloy clad reactor than in the center of the stainless steel clad reactor.

Table 5.1: Burnup and Ratio of Maximum to Average Power Density
(Zircaloy 4 Cladding)

Enrichment Cycle	2.00 w/o Equil. Transient		2.75 w/o Equil. Transient		3.10 w/o Equil. Transient		3.50 w/o Equil. Transient	
Batch—								
Cycle Number	1		1		1		1	
Average Burnup	12054		20159		23310		27809	
Maximum Burnup	17339		26690		30905		35543	
R*, initial	3.1361		3.1361		3.1361		3.1361	
R, final	1.2359		1.1814		1.1726		1.1679	
3-Zone—								
Cycle Number	7	3	6	3	6	3	6	3
Average Burnup	17037	17402	26687	27141	30926	31494	36156	36846
Maximum Burnup	19123	20175	29251	30239	33808	34763	39510	40298
R, initial	1.9637	1.9779	2.4424	2.4093	2.6575	2.6254	2.8159	2.7838
R, final	1.3738	1.4015	1.4280	1.4883	1.4182	1.4463	1.4781	1.4955
5-Zone—								
Cycle Number	8	5	8	5	10	5	9	5
Average Burnup	18341	18751	28603	29237	33370	34179	38550	39572
Maximum Burnup	20370	20821	30933	31590	35816	36665	41140	42201
R, initial	1.9912	1.9863	2.1511	2.1444	2.2567	2.2384	2.3170	2.3133
R, final	1.4648	1.4703	1.5389	1.5550	1.5505	1.5464	1.5635	1.5692

*R = Ratio of Maximum to Average Power Density.

- Note: 1. Data is given for the equilibrium cycle, after which reactor properties repeat periodically, and for that transient cycle for which the maximum burnup is the greatest.
2. Burnup in MWD/tonne U.

Table 5.2: Variation of Burnup, Power Density Ratio and Fuel Cycle Costs with Time
After Startup (Zircaloy 4 Cladding)

Three-zone fuel management, 2.75 w/o enrichment—

		Cycle	1	2	3	4	5	6	7
Start of cycle, years	Full power time		0.0	2.4065	3.3669	4.4001	5.4388	6.4744	7.5100
	Calendar time		0.0	3.0081	4.2086	5.5001	6.7985	8.0930	9.3875
Burnup, average (mwd/t)			24533	26306	27141	26544	26734	26687	26687
Burnup, maximum (mwd/t)			26774	28749	30239	29249	29217	29251	29251
Max. to Avg. Power Density ratio, initial			3.1112	2.6315	2.4093	2.4285	2.4795	2.4424	2.4424
Cost (mills/kwhe), Basis 1			1.9670	1.9561	2.0080	1.8839	1.8803	1.8833	1.8833
Cost (mills/kwhe), Basis 2			2.1856	2.2143	2.3166	2.1085	2.1072	2.1109	2.1109

Reactor lifetime = 30.0994 years

Average fuel cost:

Basis 1: 1.9260 mills/kwhe

Basis 2: 2.1587 mills/kwhe

Table 5.3: Initial Reactivity

Cladding	Enrichment, w/o	C_{REACTOR}
Stainless steel	3.00	1.147
	3.75	1.217
	4.50	1.270
Zircaloy 4	2.00	1.250
	2.75	1.353
	3.10	1.389
	3.50	1.424

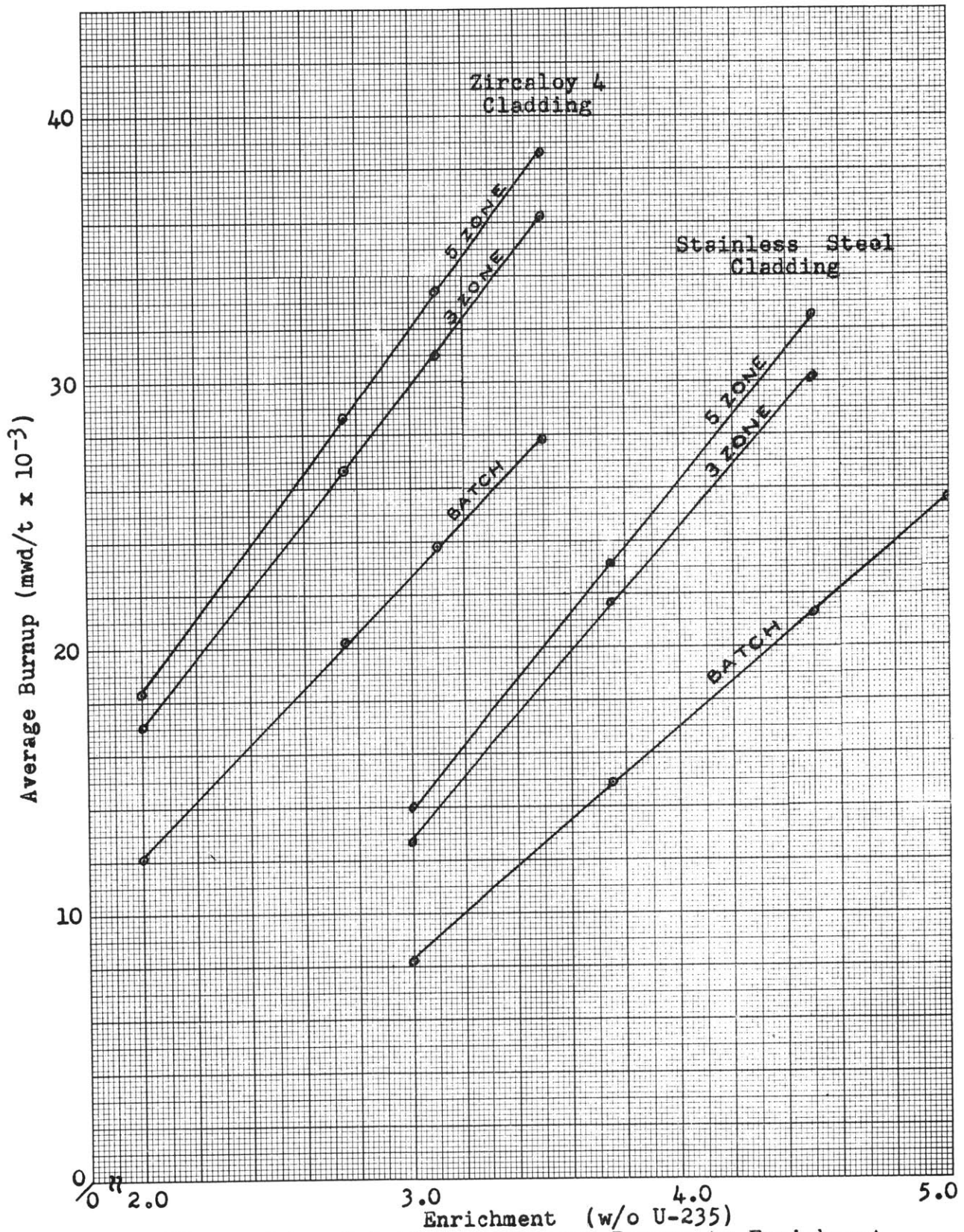
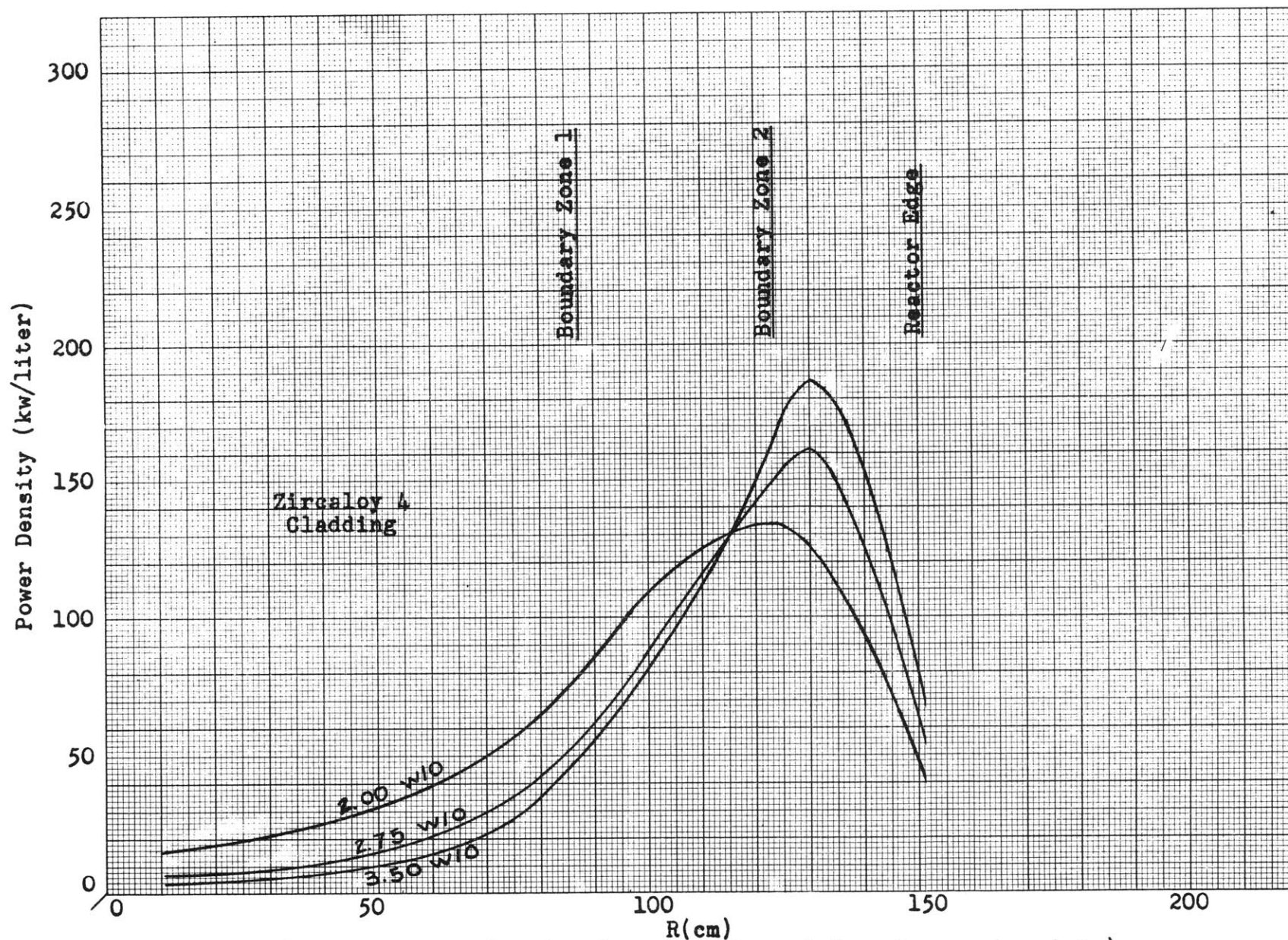


Figure 5.1: Relation of Average Burnup to Enrichment



(The power density is given for the axial center mesh point.)
 Figure 5.2: Variation of the Radial Power Density Distribution with Enrichment for 3 Zones and the Start of an Equilibrium Cycle

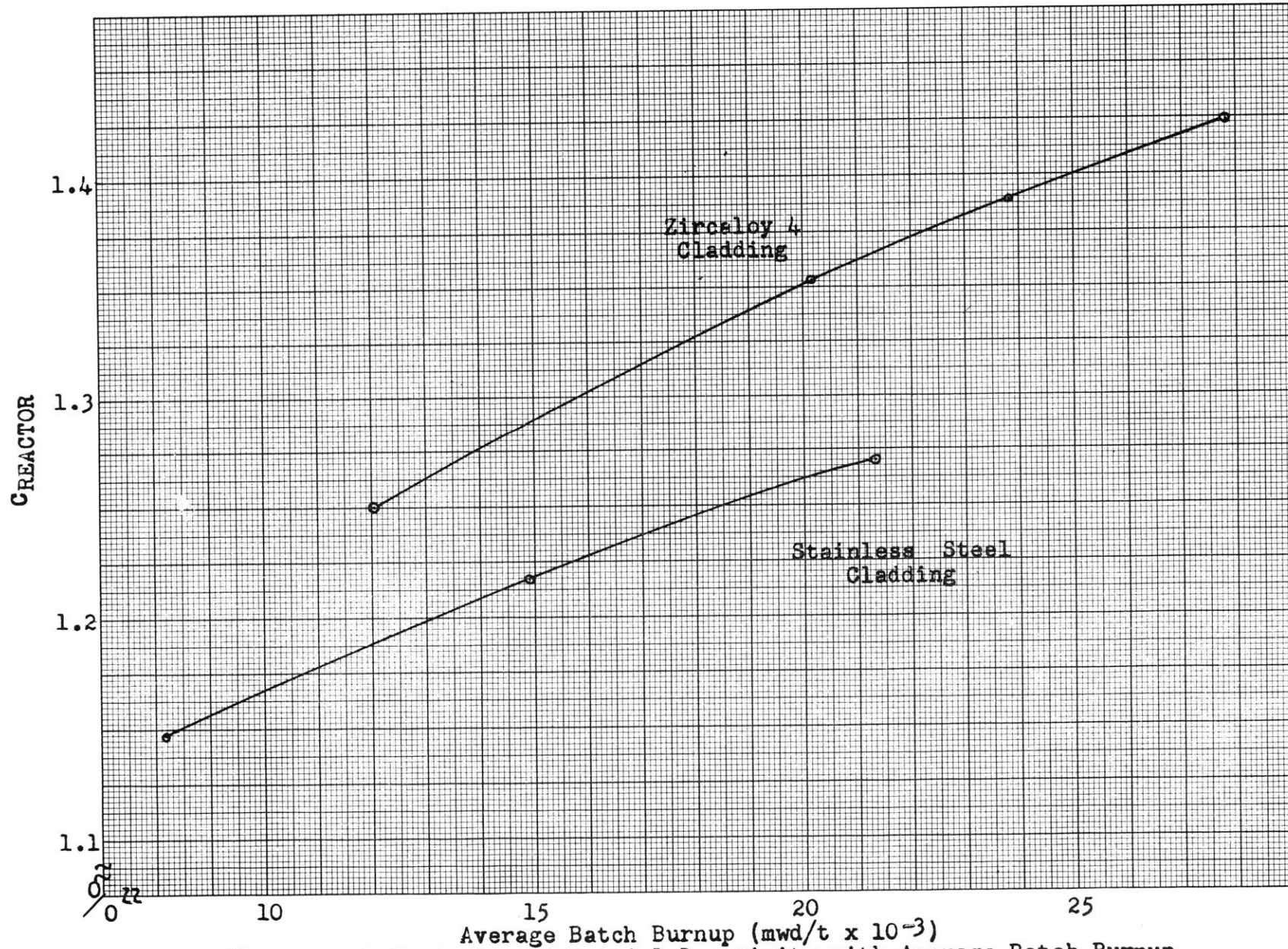


Figure 5.3: Variation of Initial Reactivity with Average Batch Burnup

B. Fuel Cost Results

All of the fuel cost results found in this study are shown in Figs. 5.4, 5.5 and 5.6 as a function of average fuel burnup. The only curves which reach minimum values before the highest burnups are attained are those for cost basis 8 in three and five zone out-in irradiation. A reduced fabrication cost is considered in cost basis 8.

Fig. 5.7 shows the fuel cycle cost components for batch irradiation versus fuel enrichment. This curve is in lieu of the cumulative type of curve, Fig. 7.2 used by Trapp (T1). The curves for 3 and 5 zone out-in fuel management are of the same character as those shown in Fig. 5.7. This figure shows the importance of high feed enrichment or high burnup on the reduction of the fabrication costs.

The minimum total costs for the zircaloy clad reactor for cost bases 1 through 7 are found at higher burnups than are the minimum total costs for the stainless steel clad reactor. This is primarily due to two reasons:

1. The higher fabrication costs of the zircaloy clad reactor favor higher burnups.
2. The lower feed enrichments of the zircaloy clad reactor result in lower UF_6 interest charges.

Table 5.4 shows the difference in cost and the percentage change in cost for different cost bases with respect to cost basis 1. This corresponds to Table 7.3 shown by Trapp (T1). On page 58 of the latter, it is stated that for the stainless steel clad reactor, the percent change in cost

for the same enrichment but different numbers of zones is nearly constant for any given cost basis. This is also true for the zircaloy clad reactor except for cost basis 6, in which the cost of natural UF_6 , the cost of separative work and the value of plutonium are all reduced. Because of the low feed enrichment for the zircaloy clad reactor, the value of the uranium discharged from the reactor for 3 and 5 zone out-in fuel management is not great enough to cover the costs of reprocessing and conversion. Because of this, the total fuel cycle cost for cost basis 6 is reduced faster than it otherwise would be as the number of zones is increased. If one takes the results for cost basis 6 for 3 and 5 zone out-in management and adds to them the net loss for reprocessing, converting and selling the UF_6 , the percentage change in cost for the same enrichment but different numbers of zones is nearly constant for cost basis 6 also. The differences from cost basis 1 for 3 zone management and 2.00 w/o and 2.75 w/o enrichments are plotted in Fig. 5.8.

Table 5.5 shows the cost coefficients. In appendix B are derived the equations for the cost coefficients for the interest charge on UF_6 , fabrication cost, reprocessing cost and plutonium credit. No simple equations can be derived for the cost coefficients for cost of natural UF_6 and cost of separative work.

The cost coefficients for the fabrication cost and reprocessing cost are constant for the fuel management procedure and enrichment shown and may be used for all values

of these costs. The cost coefficient for plutonium credit is constant and may be used if the plutonium credit is greater than the conversion cost of \$1.50/gmPu. As shown by equation B-1 of appendix B, the cost coefficient for the interest charge on UF_6 is a function of the unit cost of UF_6 feed and unit credit for UF_6 . In other words the cost coefficient for the interest charge on UF_6 is a function of the cost of natural UF_6 and the cost of separative work. The cost coefficient for interest charge on UF_6 shown in Table 5.5 is for cost basis 3, i.e. cost of natural $UF_6 = \$12.93/kgU$ and cost of separative work = \$30/kgU.

The cost coefficient for the cost of natural UF_6 was found by taking the difference in total fuel cycle cost between cost bases 2 and 3 and dividing by the change in cost of natural UF_6 . Similarly the cost coefficient for the cost of separative work was found by taking the difference in the total fuel cycle cost between cost bases 2 and 4 and dividing by the change in the cost of separative work. These two coefficients depend on the interest charge on UF_6 . The coefficients in Table 5.5 were calculated for an interest charge on UF_6 of 12%. These two coefficients are not independent of the cost of natural UF_6 or separative work and treating them as constant will give only approximate results. They should not be used outside of the range of the variables studied.

The cost coefficients for the cost of natural UF_6 and the cost of separative work cannot be used simultaneously.

Neither can the cost coefficient for the interest charge on UF_6 be used in conjunction with either of these two coefficients. As an example, consider the 2.00 w/o, three zone case. In going from cost basis 2 to cost basis 3, the total fuel cycle cost decreases by 0.3315 mills/kwhe due to a drop in the cost of natural UF_6 of \$10.57/kgU. If this change were offset by an increase in UF_6 interest rate, use of the cost coefficient in Table 5.5 would give an interest rate of 33.8%. However, by considering the individual component cost figures, one finds that an interest rate of 21.7% is sufficient.

In summary, the cost coefficients for interest charge on UF_6 , fabrication cost, reprocessing cost and plutonium credit can be used to offset one another. The cost coefficients for fabrication cost, reprocessing cost and plutonium credit can be used to offset the cost coefficient for the cost of natural UF_6 or the cost coefficient for the cost of separative work. The cost coefficients for the interest charge on UF_6 , cost of natural UF_6 and the cost of separative work cannot be used to offset one another.

Fuel Cycle Cost (mills/kwhe)

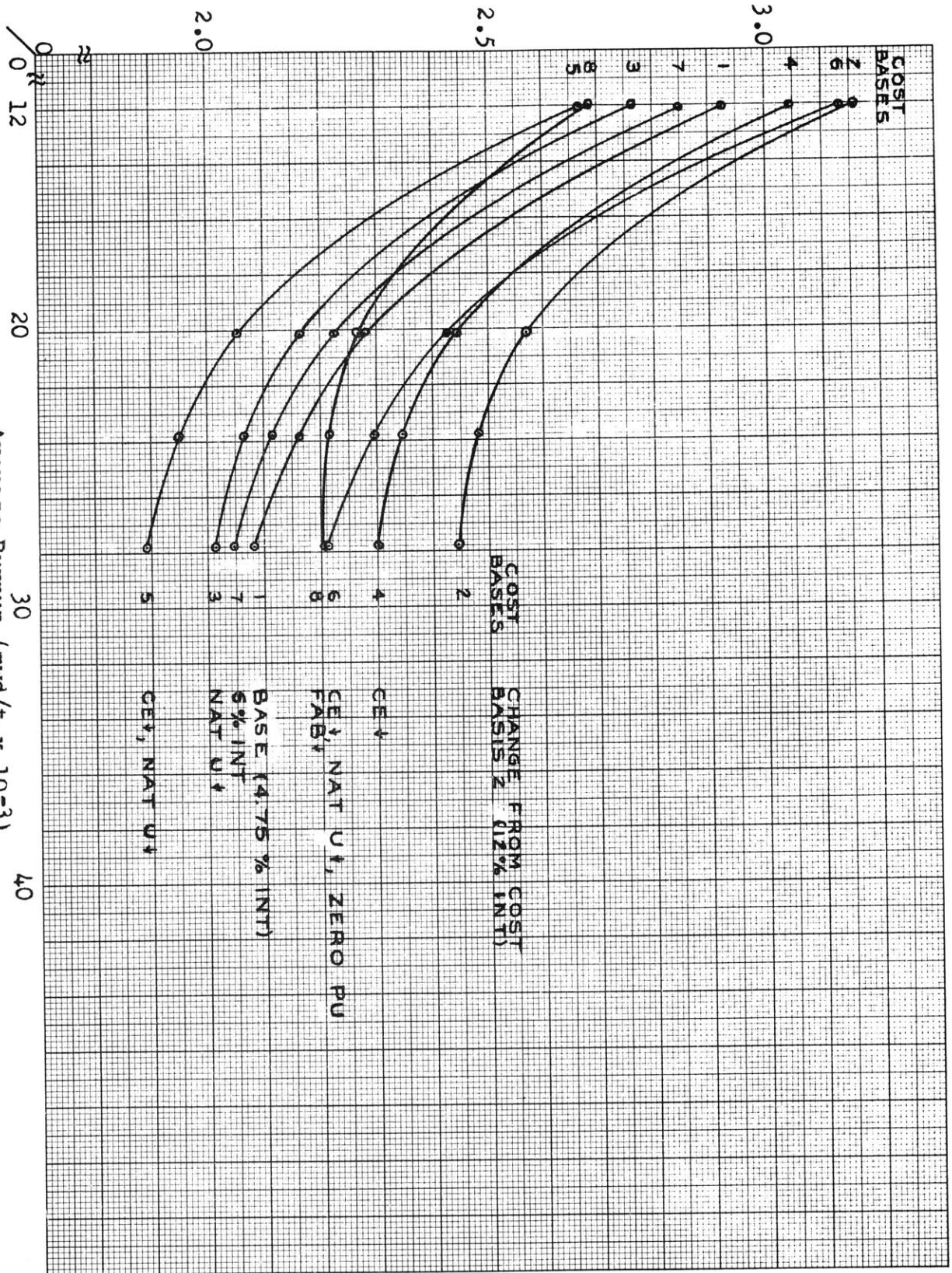


Figure 5.4: Variation of Fuel Cycle Cost with Average Burnup for Batch Irradiation (Zircaloy 4 Cladding)

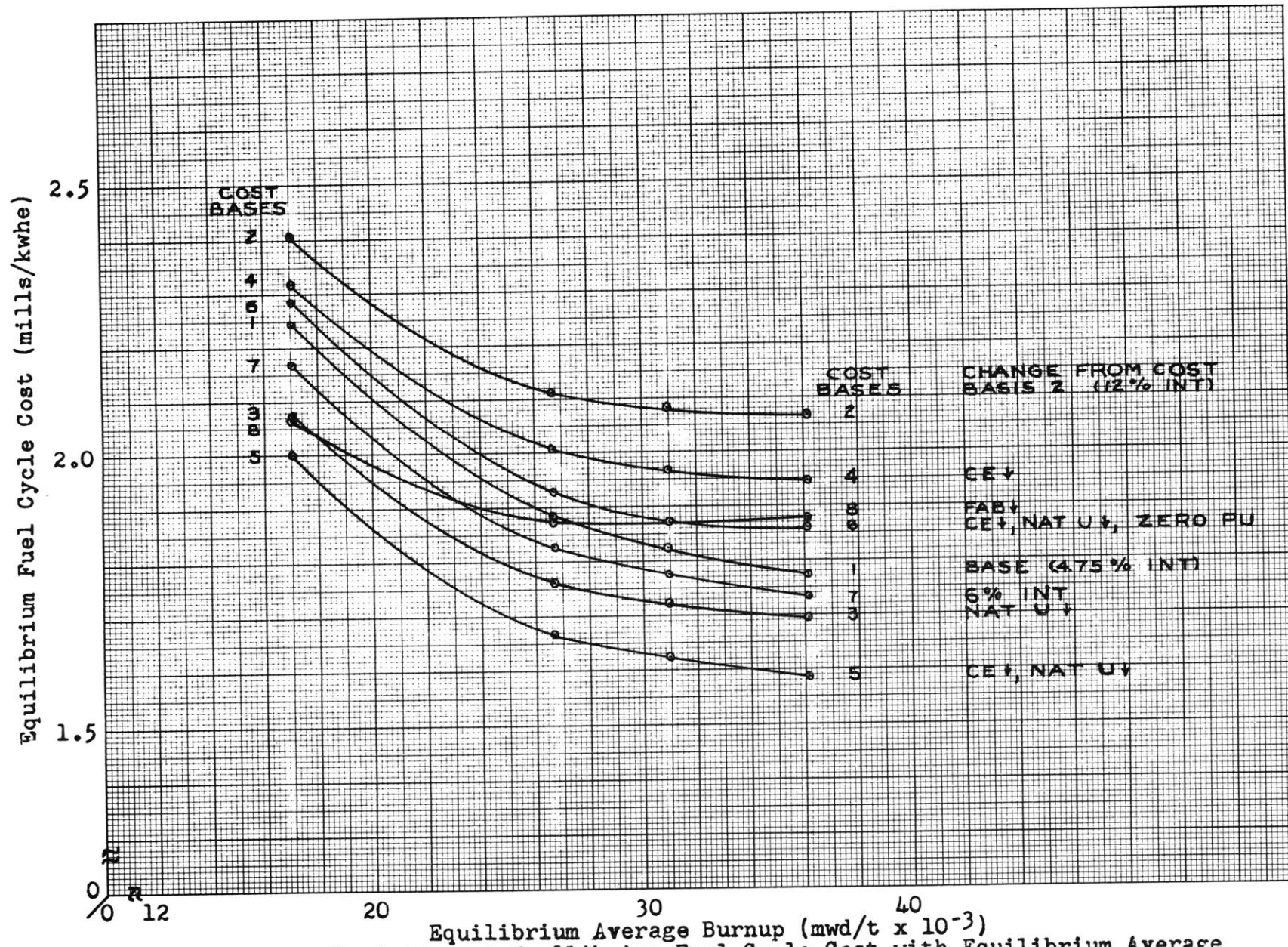


Figure 5.5: Variation of Equilibrium Fuel Cycle Cost with Equilibrium Average Burnup for Three Zone Out-in Irradiation (Zircaloy 4 Cladding)

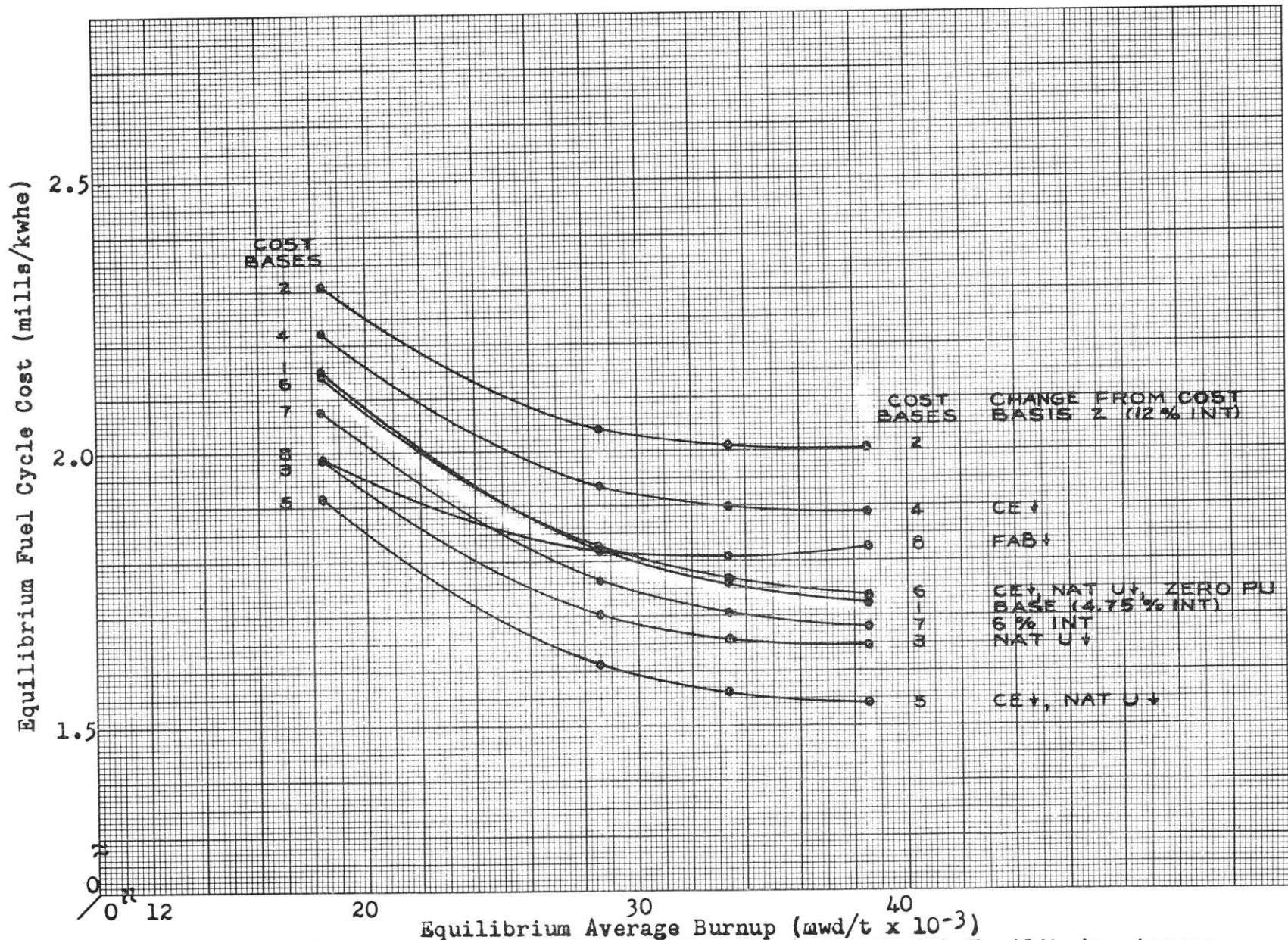


Figure 5.6: Variation of Equilibrium Fuel Cycle Cost with Equilibrium Average Burnup for Five Zone Out-in Irradiation (Zircaloy 4 Cladding)

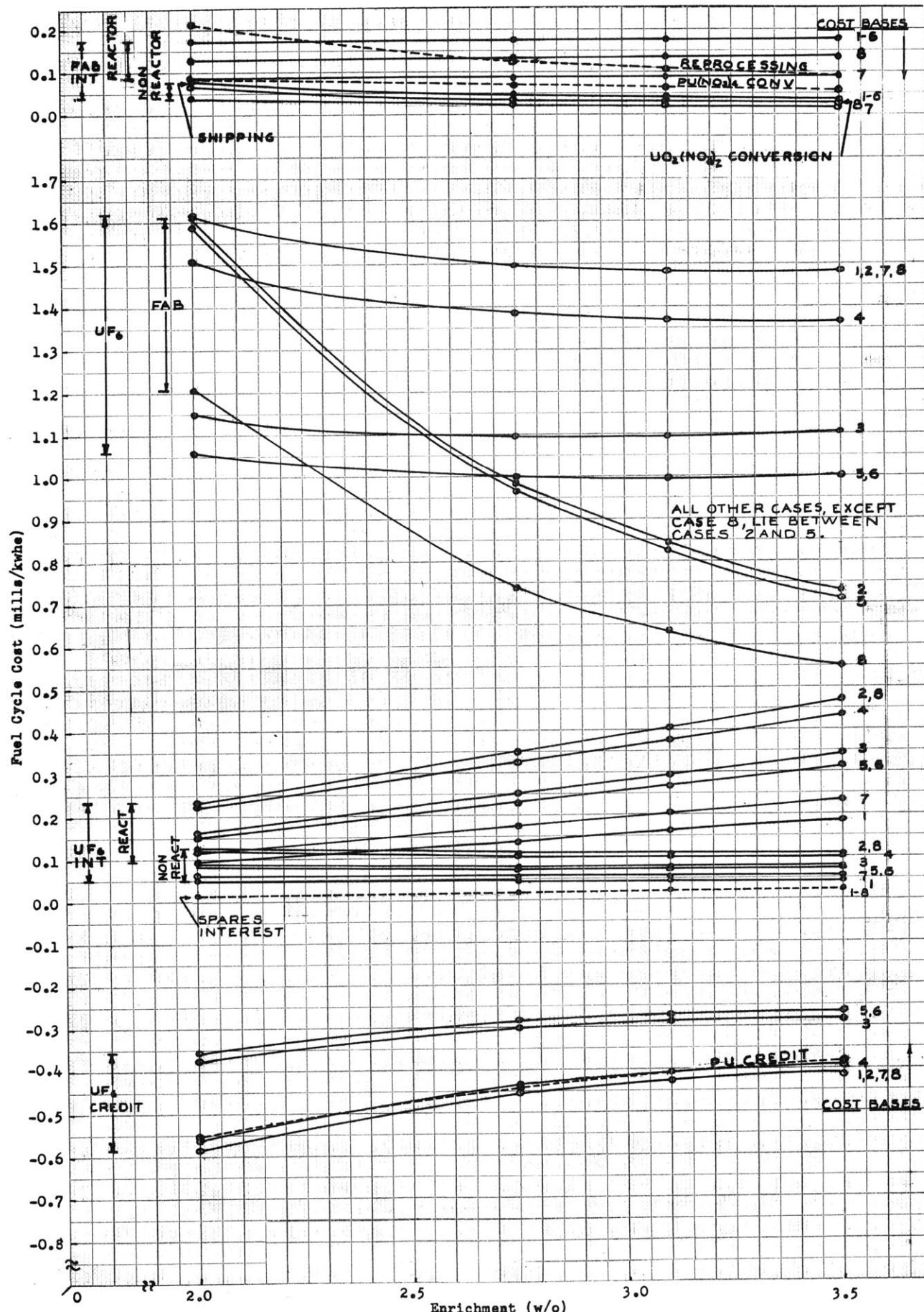


Figure 5:7: Fuel Cycle Cost Components for Batch Irradiation (Zircaloy 4 Cladding)

Table 54: The Difference in Cost and the Percentage Change in Cost for Different Cost Bases with Respect to Cost Basis 1 (Zircaloy 4 Cladding)

Fuel Management	Enrichment w/o	Cost Basis ***	1	2	3	4	5	6	7	8
			Batch*	2.00	Fuel Cycle Cost	2.9257	3.1562	2.7615	3.0446	2.6659
		Cost Diff.		0.2305	-0.1642	0.1189	-0.2598	0.2052	-0.0762	-0.2405
		% Change		7.88	-5.61	4.06	-8.88	7.01	-2.60	-8.22
Batch*	2.75	Fuel Cycle Cost	2.2804	2.5700	2.1655	2.4425	2.0548	2.4275	2.2274	2.2666
		Cost Diff.		0.2896	-0.1149	0.1621	-0.2256	0.1471	-0.0530	-0.0138
		% Change		12.70	-5.04	7.11	-9.89	6.45	-2.32	-0.61
3-Zone*	2.00	Fuel Cycle Cost	2.2413	2.4087	2.0772	2.3175	1.9995	2.2860	2.1681	2.0653
		Cost Diff.		0.1674	-0.1641	0.0762	-0.2418	0.0447	-0.0732	-0.1760
		% Change		7.47	-7.32	3.40	-10.79	1.99	-3.27	-7.85
3-Zone*	2.75	Fuel Cycle Cost	1.8833	2.1109	1.7620	2.0032	1.6688	1.9293	1.8278	1.8732
		Cost Diff.		0.2276	-0.1213	0.1199	-0.2145	0.0460	-0.0555	-0.0101
		% Change		12.09	-6.44	6.37	-11.39	2.44	-2.95	-0.54
5-Zone*	2.00	Fuel Cycle Cost	2.1495	2.3094	1.9884	2.2220	1.9141	2.1454	2.0759	1.9870
		Cost Diff.		0.1599	-0.1611	0.0725	-0.2354	-0.0041	-0.0736	-0.1625
		% Change		7.44	-7.49	3.37	-10.95	-0.19	-3.42	-7.56
5-Zone*	2.75	Fuel Cycle Cost	1.8204	2.0403	1.7015	1.9366	1.6119	1.8269	1.7636	1.8151
		Cost Diff.		0.2199	-0.1189	0.1162	-0.2085	0.0065	-0.0568	-0.0053
		% Change		12.08	-6.53	6.38	-11.45	0.36	-3.12	-0.29
3-Zone**	2.75	Fuel Cycle Cost	1.9260	2.1587	1.8048	2.0492	1.7101	1.9793	1.8705	1.9141
		Cost Diff.		0.2327	-0.1212	0.1232	-0.2159	0.0533	-0.0555	-0.0119
		% Change		12.08	-6.29	6.40	-11.21	2.77	-2.88	-0.62

* Equilibrium cycle costs in mills/kwhe.

** Average costs over plant lifetime in mills/kwhe.

*** Cost bases are described on Page 11.

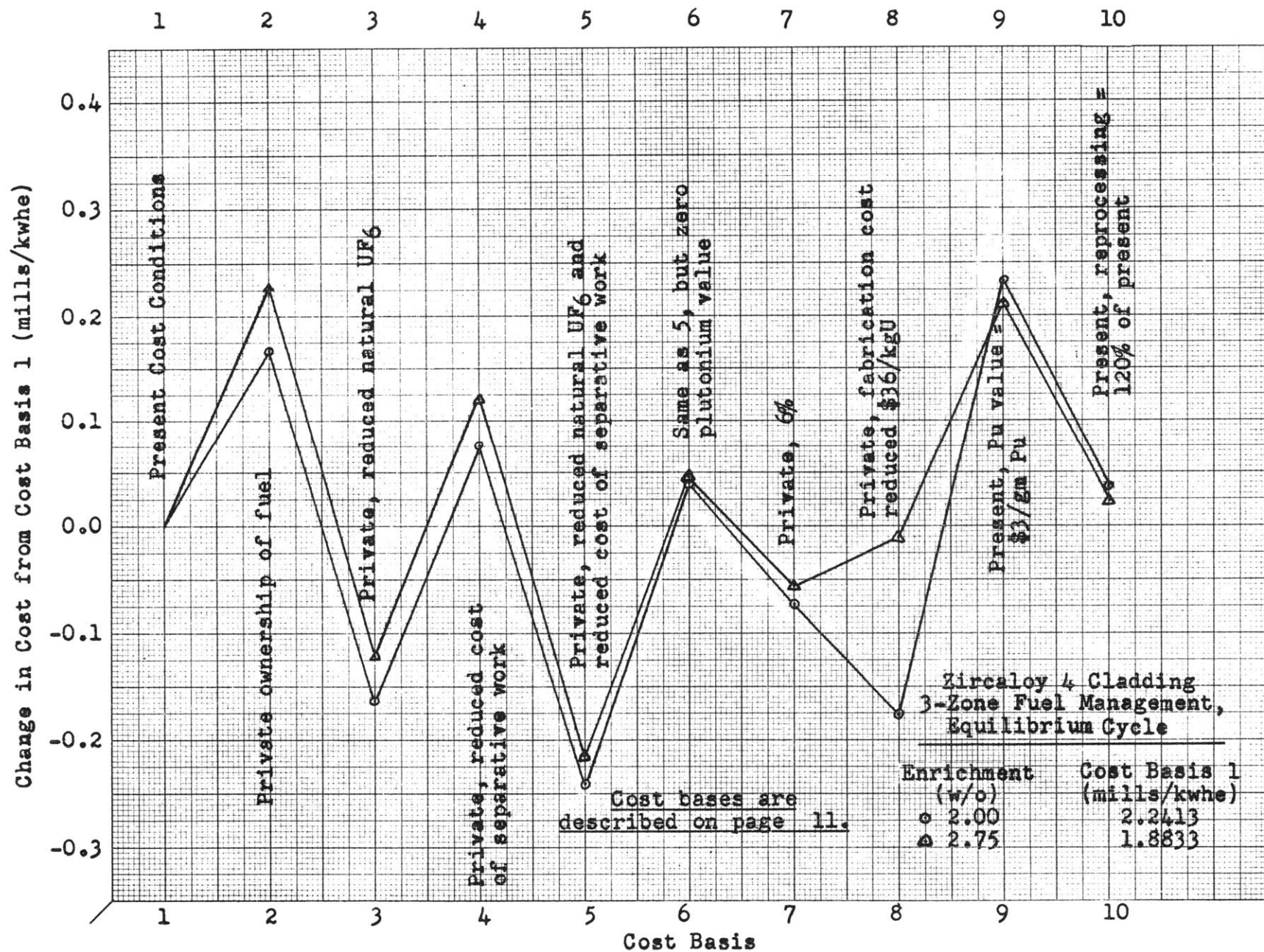


Figure 5.8: Change in Cost, with Respect to Cost Basis 1, for Various Cost Bases

Table 5.5: Cost Coefficients

These cost coefficients are prepared from the equilibrium cycle costs in three-zone out-in fuel management (Zircaloy 4 Cladding).

Variable	Increase in variable	Increase in fuel cycle cost (mills/kwhe)		Increase in fuel cycle cost (mills/kwhe)	Increase in variable	
		2.00	2.75		2.00	2.75
Enrichment, w/o		2.00	2.75		2.00	2.75
1. Interest charge on ^{1*} UF ₆ ^{2*}	1%/year	0.0152	0.0216	0.100	6.58%/yr.	4.63%/yr.
2. Cost of natural UF ₆ ^{1*} ^{3*}	\$1/kgU	0.0314	0.0330	0.100	\$3.18/kgU	\$3.03/kgU
3. Cost of separative work ^{1*} ^{3*}	\$1/kgU	0.0182	0.0215	0.100	\$5.49/kgU	\$4.65/kgU
4. Fabrication cost (C2)	\$1/kgU	0.00935	0.00640	0.100	\$10.70/kgU	\$15.63/kgU
5. Reprocessing cost	10% of present	0.0182	0.0116	0.100	55% of present	86% of present
6. Plutonium credit ^{4*}	\$1/gmPu	-0.0506	-0.0403	0.100	-\$1.98/gmPu	-\$2.48/gmPu

- 1* The cost coefficients apply to variables 1, 2 and 3 only if they are changed independently of one another.
- 2* The cost coefficient for variable 1 depends on the unit cost of UF₆ feed and unit credit as UF₆ of the uranium in the burned out fuel. The figures shown are for cost basis 3.
- 3* The cost coefficients for variables 2 and 3 were calculated with an interest charge on UF₆ of 12%.
- 4* The cost coefficients apply to variable 6 only if the plutonium credit is \$1.50/gmPu or greater.

Table 5.6: Variation with Fuel Enrichment of Equilibrium Burnup and Equilibrium Fuel Cycle Costs (Zircaloy 4 Cladding)

Fuel Management	Enrichment (w/o)	Equilibrium Burnup (mwd/t)	Equilibrium Cost,	
			Basis 1 (mills/kwhe)	Basis 2 (mills/kwhe)
Batch	2.00	12054	2.9257	3.1562
	2.75	20159	2.2804	2.5700
	3.10	23810	2.1607	2.4825
	3.50	27809	2.0837	2.4445
3-Zone	2.00	17037	2.2413	2.4087
	2.75	26687	1.8833	2.1109
	3.10	30926	1.8239	2.0831
	3.50	36156	1.7739	2.0685
5-Zone	2.00	18341	2.1495	2.3094
	2.75	28603	1.8204	2.0403
	3.10	33370	1.7585	2.0087
	3.50	38550	1.7235	2.0084

VI. APPENDICES

Appendix A: COST Subroutine Results

Some printouts from the COST subroutine are given in the following tables. The tables parallel those given by Trapp (T1). The cost printouts of the transient cycles are given for the 2.00 w/o and 2.75 w/o three-zone out-in cases.

Table 6.1: Cost Data for Batch and 2.00 w/o Enrichment
ENERGY-COST-BREAKDOWN-FOR-FUEL-DISCHARGED-AT-1.4249-YEARS

2.00 W/O U-235
 1-ZONE OUT-IN
 CYCLE NUMBER 1

MAX. TO AVERAGE POWER DENSITY (START OF CYCLE, NO XE) = 3.1361

GENERAL ZONE DISCHARGE
 AVERAGE BURNUP IN MWD/TONNE U = 12054.
 MAXIMUM BURNUP IN MWD/TONNE U = 17339

TIME IN REACTOR IN YEARS = 1.4249
 URANIUM CHARGED IN KG U = 63423.
 URANIUM DISCHARGED IN KG U = 62250.3
 URANIUM-235 W/O IN DISCHARGE = 1.077

PLUTONIUM DISCHARGED IN KG PU = 340.6
 PLUTONIUM COMPOSITION- 239,240,241,242 W/O = 0.677 0.193 0.106 0.024
 BILLIONS OF KILOWATT HOURS, ELECTRIC = 5.7428

FUEL COST BREAKDOWN IN MILLIONS OF DOLLARS

1=UF6	9.2918	9.2918	6.6044	8.6716	6.0778	6.0778	9.2918	9.2918
2=FABRICATION	9.1928	9.2509	9.1434	9.2261	9.1223	9.1223	9.2509	6.9212
3=SHIPPING	0.4440	0.4440	0.4440	0.4440	0.4440	0.4440	0.4440	0.4440
4=REPROCESSING	1.2091	1.2091	1.2091	1.2091	1.2091	1.2091	1.2091	1.2091
5=UO2(NO3)2 TO UF6	0.3441	0.3441	0.3441	0.3441	0.3441	0.3441	0.3441	0.3441
6=UF6 CREDIT	-3.3593	-3.3593	-2.1557	-3.2265	-2.0491	-2.0491	-3.3593	-3.3593
7=PU(NO3)4 TO PU	0.5007	0.5007	0.5007	0.5007	0.5007	0.	0.5007	0.5007
8=PU CREDIT	-3.1711	-3.1711	-3.1711	-3.1711	-3.1711	0.	-3.1711	-3.1711
9=SPARES CAPITAL	0.0922	0.0925	0.0785	0.0893	0.0758	0.0758	0.0925	0.0809
10=UF6 CAPITAL, NON REACTOR	0.2878	0.7272	0.4982	0.6860	0.4637	0.4637	0.3636	0.7272
11=FABRICATION CAPITAL, NON REACTOR	0.4523	0.4552	0.4499	0.4540	0.4489	0.4489	0.2276	0.3406
12=UF6 CAPITAL, REACTOR	0.5352	1.3520	0.9362	1.2716	0.8685	0.8685	0.6760	1.3520
13=FABRICATION CAPITAL, REACTOR	0.9824	0.9887	0.9772	0.9860	0.9749	0.9749	0.4943	0.7397
NET FUEL CYCLE COST	16.8020	18.1256	15.8589	17.4847	15.3096	17.9800	16.3641	15.4207

FUEL COST BREAKDOWN IN MILLS/KWH

1=UF6	1.6180	1.6180	1.1500	1.5100	1.0583	1.0583	1.6180	1.6180
2=FABRICATION	1.6008	1.6109	1.5921	1.6065	1.5885	1.5885	1.6109	1.2052
3=SHIPPING	0.0773	0.0773	0.0773	0.0773	0.0773	0.0773	0.0773	0.0773
4=REPROCESSING	0.2105	0.2105	0.2105	0.2105	0.2105	0.2105	0.2105	0.2105
5=UO2(NO3)2 TO UF6	0.0599	0.0599	0.0599	0.0599	0.0599	0.0599	0.0599	0.0599
6=UF6 CREDIT	-0.5850	-0.5850	-0.3754	-0.5618	-0.3568	-0.3568	-0.5850	-0.5850
7=PU(NO3)4 TO PU	0.0872	0.0872	0.0872	0.0872	0.0872	0.	0.0872	0.0872
8=PU CREDIT	-0.5522	-0.5522	-0.5522	-0.5522	-0.5522	0.	-0.5522	-0.5522
9=SPARES CAPITAL	0.0161	0.0161	0.0137	0.0155	0.0132	0.0132	0.0161	0.0141
10=UF6 CAPITAL, NON REACTOR	0.0501	0.1266	0.0868	0.1195	0.0808	0.0808	0.0633	0.1266
11=FABRICATION CAPITAL, NON REACTOR	0.0788	0.0793	0.0783	0.0791	0.0782	0.0782	0.0396	0.0593
12=UF6 CAPITAL, REACTOR	0.0932	0.2354	0.1630	0.2214	0.1512	0.1512	0.1177	0.2354
13=FABRICATION CAPITAL, REACTOR	0.1711	0.1722	0.1702	0.1717	0.1698	0.1698	0.0861	0.1288
NET FUEL CYCLE COST	2.9257	3.1562	2.7615	3.0446	2.6659	3.1309	2.8495	2.6852

14=PLANT CAPITAL COSTS	3.9927	3.9927	3.9927	3.9927	3.9927	3.9927	3.9927	3.9927
15=OPERATING COSTS	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000

4 TOTAL ENERGY COST IN MILLS/KWH	7.4184	7.6489	7.2542	7.5373	7.1586	7.6236	7.3422	7.1779
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3 AVERAGE TIME FOR A CYCLE = 1.7812 FRACTION OF TIME FOR REFUELING = 0.021536

Table 6.2: Cost Data for Batch and 2.75 w/o Enrichment
ENERGY COST BREAKDOWN FOR FUEL DISCHARGED AT 2.3912 YEARS

2.75 W/O U-235								
1-ZONE OUT-IN								
CYCLE NUMBER 1								
MAX. TO AVERAGE POWER DENSITY (START OF CYCLE, NO XE) = 3.1361								
CENTRAL ZONE DISCHARGE								
AVERAGE BURNUP IN MWD/TONNE U = 20159.								
MAXIMUM BURNUP IN MWD/TONNE U = 26690								
TIME IN REACTOR IN YEARS = 2.3912								
URANIUM CHARGED IN KG U = 63423								
URANIUM DISCHARGED IN KG U = 61565.8								
URANIUM-235 W/O IN DISCHARGE = 1.258								
PLUTONIUM DISCHARGED IN KG PU = 456.6								
PLUTONIUM COMPOSITION = 239,240,241,242 W/O = 0.624 0.202 0.135 0.040								
BILLIONS OF KILOWATT HOURS, ELECTRIC = 9.6043								
FUEL COST BREAKDOWN IN MILLIONS OF DOLLARS								
1=UF6	14.3884	14.3884	10.5269	13.3151	9.6011	9.6011	14.3884	14.3884
2=FABRICATION	9.3648	9.4548	9.3003	9.4118	9.2633	9.2633	9.4548	7.0996
3=SHIPPING	0.4440	0.4440	0.4440	0.4440	0.4440	0.4440	0.4440	0.4440
4=REPROCESSING	1.2091	1.2091	1.2091	1.2091	1.2091	1.2091	1.2091	1.2091
5=UO2(NO3)2 TO UF6	0.3403	0.3403	0.3403	0.3403	0.3403	0.3403	0.3403	0.3403
6=UF6 CREDIT	-4.3542	-4.3542	-2.8921	-4.1426	-2.7189	-2.7189	-4.3542	-4.3542
7=PU(NO3)4 TO PU	0.6712	0.6712	0.6712	0.6712	0.6712	0.	0.6712	0.6712
8=PU CREDIT	-4.2506	-4.2506	-4.2506	-4.2506	-4.2506	0.	-4.2506	-4.2506
9=SPARES CAPITAL	0.1988	0.1996	0.1659	0.1902	0.1579	0.1579	0.1996	0.1798
10=UF6 CAPITAL, NON REACTOR	0.4188	1.0579	0.7504	0.9881	0.6909	0.6909	0.5290	1.0579
11=FABRICATION CAPITAL, NON REACTOR	0.4608	0.4652	0.4576	0.4631	0.4558	0.4558	0.2326	0.3433
12=UF6 CAPITAL, REACTOR	1.3305	3.3614	2.4066	3.1309	2.2095	2.2095	1.6807	3.3614
13=FABRICATION CAPITAL, REACTOR	1.6795	1.6956	1.6679	1.6879	1.6613	1.6613	0.8478	1.2733
NET FUEL CYCLE COST	21.9013	24.6825	20.7976	23.4585	19.7348	23.3143	21.3924	21.7694
FUEL COST BREAKDOWN IN MILLS/KWH								
1=UF6	1.4981	1.4981	1.0961	1.3864	0.9997	0.9997	1.4981	1.4981
2=FABRICATION	0.9751	0.9844	0.9684	0.9800	0.9645	0.9645	0.9844	0.7392
3=SHIPPING	0.0462	0.0462	0.0462	0.0462	0.0462	0.0462	0.0462	0.0462
4=REPROCESSING	0.1259	0.1259	0.1259	0.1259	0.1259	0.1259	0.1259	0.1259
5=UO2(NO3)2 TO UF6	0.0354	0.0354	0.0354	0.0354	0.0354	0.0354	0.0354	0.0354
6=UF6 CREDIT	-0.4534	-0.4534	-0.3011	-0.4313	-0.2831	-0.2831	-0.4534	-0.4534
7=PU(NO3)4 TO PU	0.0699	0.0699	0.0699	0.0699	0.0699	0.	0.0699	0.0699
8=PU CREDIT	-0.4426	-0.4426	-0.4426	-0.4426	-0.4426	0.	-0.4426	-0.4426
9=SPARES CAPITAL	0.0207	0.0208	0.0173	0.0198	0.0164	0.0164	0.0208	0.0187
10=UF6 CAPITAL, NON REACTOR	0.0436	0.1102	0.0781	0.1029	0.0719	0.0719	0.0551	0.1102
11=FABRICATION CAPITAL, NON REACTOR	0.0480	0.0484	0.0476	0.0482	0.0475	0.0475	0.0242	0.0364
12=UF6 CAPITAL, REACTOR	0.1385	0.3500	0.2506	0.3260	0.2301	0.2301	0.1750	0.3500
13=FABRICATION CAPITAL, REACTOR	0.1749	0.1766	0.1737	0.1758	0.1730	0.1730	0.0883	0.1326
NET FUEL CYCLE COST	2.2804	2.5700	2.1655	2.4425	2.0548	2.4275	2.2274	2.2666
14=PLANT CAPITAL COSTS	3.9927	3.9927	3.9927	3.9927	3.9927	3.9927	3.9927	3.9927
15=OPERATING COSTS	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000
TOTAL ENERGY COST IN MILLS/KWH	6.7731	7.0627	6.6582	6.9352	6.5475	6.9202	6.7201	6.7593
AVERAGE TIME FOR A CYCLE = 2.9891 FRACTION OF TIME FOR REFUELING = 0.012833								

Table 6.3: Cost Data for Batch and 3.10 w/o Enrichment
ENERGY COST BREAKDOWN FOR FUEL DISCHARGED AT 2.8273 YEARS

3.10 W/O U-235								
1-ZONE OUT-IN								
CYCLE NUMBER 1								
MAX. TO AVERAGE POWER DENSITY (START OF CYCLE, NO XE) = 3.1361								
CENTRAL ZONE DISCHARGE --								
AVERAGE BURNUP IN MWD/TONNE U = 23810.								
MAXIMUM BURNUP IN MWD/TONNE U = 30905								
TIME IN REACTOR IN YEARS = 2.8273								
URANIUM CHARGED IN KG U = 63423.								
URANIUM DISCHARGED IN KG U = 61264.7								
URANIUM-235 W/O IN DISCHARGE = 1.350								
PLUTONIUM DISCHARGED IN KG PU = 499.4								
PLUTONIUM COMPOSITION = 239,240,241,242 W/O = 0.608 0.203 0.143 0.046								
BILLIONS OF KILOWATT HOURS, ELECTRIC = 11.3438								
FUEL COST BREAKDOWN IN MILLIONS OF DOLLARS								
1=UF6	16.8249	16.8249	12.4154	15.5305	11.2937	11.2937	16.8249	16.8249
2=FABRICATION	9.4471	9.5522	9.3758	9.5004	9.3310	9.3310	9.5522	7.1849
3=SHIPPING	0.4440	0.4440	0.4440	0.4440	0.4440	0.4440	0.4440	0.4440
4=REPROCESSING	1.2091	1.2091	1.2091	1.2091	1.2091	1.2091	1.2091	1.2091
5=UO2(NO3)2 TO UF6	0.3386	0.3386	0.3386	0.3386	0.3386	0.3386	0.3386	0.3386
6=UF6 CREDIT	-4.8695	-4.8695	-3.2772	-4.6158	-3.0681	-3.0681	-4.8695	-4.8695
7=PU(NO3)4 TO PU	0.7341	0.7341	0.7341	0.7341	0.7341	0.	0.7341	0.7341
8=PU CREDIT	-4.6492	-4.6492	-4.6492	-4.6492	-4.6492	0.	-4.6492	-4.6492
9=SPARES CAPITAL	0.2600	0.2610	0.2156	0.2477	0.2041	0.2041	0.2610	0.2376
10=UF6 CAPITAL, NON REACTOR	0.4826	1.2192	0.8743	1.1351	0.8023	0.8023	0.6096	1.2192
11=FABRICATION CAPITAL, NON REACTOR	0.4649	0.4700	0.4613	0.4675	0.4591	0.4591	0.2350	0.3535
12=UF6 CAPITAL, REACTOR	1.8209	4.6003	3.3276	4.2720	3.0454	3.0454	2.3001	4.6003
13=FABRICATION CAPITAL, REACTOR	2.0032	2.0255	1.9881	2.0146	1.9786	1.9786	1.0128	1.5235
NET FUEL CYCLE COST	24.5107	28.1603	23.4577	26.6286	22.1227	26.0378	24.0028	25.1511
FUEL COST BREAKDOWN IN MILLS/KWH								
1=UF6	1.4832	1.4832	1.0945	1.3691	0.9956	0.9956	1.4832	1.4832
2=FABRICATION	0.8328	0.8421	0.8265	0.8375	0.8226	0.8226	0.8421	0.6334
3=SHIPPING	0.0391	0.0391	0.0391	0.0391	0.0391	0.0391	0.0391	0.0391
4=REPROCESSING	0.1066	0.1066	0.1066	0.1066	0.1066	0.1066	0.1066	0.1066
5=UO2(NO3)2 TO UF6	0.0299	0.0299	0.0299	0.0299	0.0299	0.0299	0.0299	0.0299
6=UF6 CREDIT	-0.4293	-0.4293	-0.2889	-0.4069	-0.2705	-0.2705	-0.4293	-0.4293
7=PU(NO3)4 TO PU	0.0647	0.0647	0.0647	0.0647	0.0647	0.	0.0647	0.0647
8=PU CREDIT	-0.4098	-0.4098	-0.4098	-0.4098	-0.4098	0.	-0.4098	-0.4098
9=SPARES CAPITAL	0.0229	0.0230	0.0190	0.0218	0.0180	0.0180	0.0230	0.0209
10=UF6 CAPITAL, NON REACTOR	0.0425	0.1075	0.0771	0.1001	0.0707	0.0707	0.0537	0.1075
11=FABRICATION CAPITAL, NON REACTOR	0.0410	0.0414	0.0407	0.0412	0.0405	0.0405	0.0207	0.0312
12=UF6 CAPITAL, REACTOR	0.1605	0.4055	0.2933	0.3766	0.2685	0.2685	0.2028	0.4055
13=FABRICATION CAPITAL, REACTOR	0.1766	0.1786	0.1753	0.1776	0.1744	0.1744	0.0893	0.1343
NET FUEL CYCLE COST	2.1607	2.4825	2.0679	2.3474	1.9502	2.2953	2.1159	2.2172
14=PLANT CAPITAL COSTS	3.9927	3.9927	3.9927	3.9927	3.9927	3.9927	3.9927	3.9927
15=OPERATING COSTS	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000
TOTAL ENERGY COST IN MILLS/KWH	6.6534	6.9752	6.5606	6.8401	6.4429	6.7880	6.6086	6.7099
AVERAGE TIME FOR A CYCLE = 3.5341 FRACTION OF TIME FOR REFUELING = 0.010854								

Table 6.4: Cost Data for Batch and 3.50 w/o Enrichment
ENERGY COST BREAKDOWN FOR FUEL DISCHARGED AT 3.3049 YEARS

3.50 W/O U-235								
1-ZONE OUT-IN								
CYCLE NUMBER 1								
MAX. TO AVERAGE POWER DENSITY (START OF CYCLE, NO XE) = 3.1361								
CENTRAL ZONE DISCHARGE --								
AVERAGE BURNUP IN MWD/TONNE U = 27809.								
MAXIMUM BURNUP IN MWD/TONNE U = 35543								
TIME IN REACTOR IN YEARS = 3.3049								
URANIUM CHARGED IN KG U = 63423.								
URANIUM DISCHARGED IN KG U = 60938.1								
URANIUM-235 W/O IN DISCHARGE = 1.464								
PLUTONIUM DISCHARGED IN KG PU = 542.0								
PLUTONIUM COMPOSITION = 239,240,241,242 W/O = 0.595 0.202 0.151 0.052								
BILLIONS OF KILOWATT HOURS, ELECTRIC = 13.2489								
FUEL COST BREAKDOWN IN MILLIONS OF DOLLARS								
1=UF6	19.6412	19.6412	14.6054	18.0887	13.2544	13.2544	19.6412	19.6412
2=FABRICATION	9.5421	9.6649	9.4634	9.4028	9.4094	9.4094	9.6649	7.2834
3=SHIPPING	0.4440	0.4440	0.4440	0.4440	0.4440	0.4440	0.4440	0.4440
4=REPROCESSING	1.2091	1.2091	1.2091	1.2091	1.2091	1.2091	1.2091	1.2091
5=UO2(NO3)2 TO UF6	0.3368	0.3368	0.3368	0.3368	0.3368	0.3368	0.3368	0.3368
6=UF6 CREDIT	-5.5152	-5.5152	-3.7626	-5.2078	-3.5074	-3.5074	-5.5152	-5.5152
7=PU(NO3)4 TO PU	0.7967	0.7967	0.7967	0.7967	0.7967	0.	0.7967	0.7967
8=PU CREDIT	-5.0458	-5.0458	-5.0458	-5.0458	-5.0458	0.	-5.0458	-5.0458
9=SPARES CAPITAL	0.3376	0.3390	0.2784	0.3203	0.2622	0.2622	0.3390	0.3114
10=UF6 CAPITAL, NON REACTOR	0.5580	1.4097	1.0210	1.3086	0.9341	0.9341	0.7048	1.4097
11=FABRICATION CAPITAL, NON REACTOR	0.4695	0.4756	0.4657	0.4725	0.4630	0.4630	0.2378	0.3584
12=UF6 CAPITAL, REACTOR	2.4682	6.2354	4.5528	5.7745	4.1547	4.1547	3.1177	6.2354
13=FABRICATION CAPITAL, REACTOR	2.3652	2.3956	2.3457	2.3802	2.3323	2.3323	1.1978	1.8053
NET FUEL CYCLE COST	27.6074	32.3869	26.7106	30.4806	25.0434	29.2926	27.1288	29.2705
FUEL COST BREAKDOWN IN MILLS/KWH								
1=UF6	1.4825	1.4825	1.1024	1.3653	1.0004	1.0004	1.4825	1.4825
2=FABRICATION	0.7202	0.7295	0.7143	0.7248	0.7102	0.7102	0.7295	0.5497
3=SHIPPING	0.0335	0.0335	0.0335	0.0335	0.0335	0.0335	0.0335	0.0335
4=REPROCESSING	0.0913	0.0913	0.0913	0.0913	0.0913	0.0913	0.0913	0.0913
5=UO2(NO3)2 TO UF6	0.0254	0.0254	0.0254	0.0254	0.0254	0.0254	0.0254	0.0254
6=UF6 CREDIT	-0.4163	-0.4163	-0.2840	-0.3931	-0.2647	-0.2647	-0.4163	-0.4163
7=PU(NO3)4 TO PU	0.0601	0.0601	0.0601	0.0601	0.0601	0.	0.0601	0.0601
8=PU CREDIT	-0.3808	-0.3808	-0.3808	-0.3808	-0.3808	0.	-0.3808	-0.3808
9=SPARES CAPITAL	0.0255	0.0256	0.0210	0.0242	0.0198	0.0198	0.0256	0.0235
10=UF6 CAPITAL, NON REACTOR	0.0421	0.1064	0.0771	0.0988	0.0705	0.0705	0.0532	0.1064
11=FABRICATION CAPITAL, NON REACTOR	0.0354	0.0359	0.0351	0.0357	0.0349	0.0349	0.0179	0.0271
12=UF6 CAPITAL, REACTOR	0.1863	0.4706	0.3436	0.4358	0.3136	0.3136	0.2353	0.4706
13=FABRICATION CAPITAL, REACTOR	0.1785	0.1808	0.1770	0.1797	0.1760	0.1760	0.0904	0.1363
NET FUEL CYCLE COST	2.0837	2.4445	2.0161	2.3006	1.8902	2.2109	2.0476	2.2093
14=PLANT CAPITAL COSTS	3.9927	3.9927	3.9927	3.9927	3.9927	3.9927	3.9927	3.9927
15=OPERATING COSTS	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000
TOTAL ENERGY COST IN MILLS/KWH	6.5764	6.9372	6.5088	6.7933	6.3829	6.7036	6.5403	6.7020
AVERAGE TIME FOR A CYCLE = 4.1311 FRACTION OF TIME FOR REFUELING = 0.009286								

Table 6.5a: Cost Data for 3 Zone Out-in and 2.00 w/o Enrichment
BREAKDOWN OF ENERGY COST AVERAGED OVER 30.0739 YEARS

2.00 W/O U-235								
3-ZONE OUT-IN								
AVERAGE BURNUP FOR 35. CYCLES = 16602								
AVERAGE TIME FOR A CYCLE = 0.8593								
FRACTION OF TIME FOR REFUELING = 0.043368								
MAX. TO AVERAGE POWER DENSITY (EQUILIBRIUM CYCLE) = 1.9637								
CENTRAL ZONE DISCHARGE AT EQUILIBRIUM --								
AVERAGE BURNUP IN MWD/TONNE U = 17037.								
MAXIMUM BURNUP IN MWD/TONNE U = 19123								
TIME IN REACTOR IN YEARS = 2.0015								
URANIUM CHARGED IN KG U = 21141.								
URANIUM DISCHARGED IN KG U = 20607.5								
URANIUM-235 W/O IN DISCHARGE = 0.810								
PLUTONIUM DISCHARGED IN KG PU = 139.8								
PLUTONIUM COMPOSITION= 239,240,241,242 W/O= 0.609 0.220 0.131 0.039								
BILLIONS OF KILOWATT HOURS, ELECTRIC = 2.7056								
ENERGY COST BREAKDOWN IN MILLS/KWH								
1=UF6	1.1747	1.1747	0.8350	1.0963	0.7684	0.7684	1.1747	1.1747
2=FABRICATION	1.1537	1.1587	1.1483	1.1563	1.1462	1.1462	1.1587	0.8642
3=SHIPPING	0.0561	0.0561	0.0561	0.0561	0.0561	0.0561	0.0561	0.0561
4=REPROCESSING	0.1871	0.1871	0.1871	0.1871	0.1871	0.0051	0.1871	0.1871
5=UO2(ND3)2 TO UF6	0.0432	0.0432	0.0432	0.0432	0.0432	0.0012	0.0432	0.0432
6=UF6 CREDIT	-0.2586	-0.2586	-0.1537	-0.2535	-0.1498	-0.0121	-0.2586	-0.2586
7=PU(ND3)4 TO PU	0.0766	0.0766	0.0766	0.0766	0.0766	0.	0.0766	0.0766
8=PU CREDIT	-0.4853	-0.4853	-0.4853	-0.4853	-0.4853	0.	-0.4853	-0.4853
9=SPARES CAPITAL	0.0159	0.0159	0.0135	0.0154	0.0131	0.0131	0.0159	0.0139
10=UF6 CAPITAL, NON REACTOR	0.0254	0.0642	0.0436	0.0607	0.0407	0.0316	0.0321	0.0642
11=FABRICATION CAPITAL, NON REACTOR	0.0462	0.0464	0.0460	0.0463	0.0459	0.0459	0.0232	0.0346
12=UF6 CAPITAL, REACTOR	0.0825	0.2083	0.1436	0.1962	0.1334	0.1130	0.1042	0.2083
13=FABRICATION CAPITAL, REACTOR	0.1688	0.1696	0.1680	0.1692	0.1677	0.1677	0.0848	0.1265
NET FUEL CYCLE COST	2.2863	2.4570	2.1221	2.3647	2.0434	2.3361	2.2128	2.1056
14=PLANT CAPITAL COSTS	3.9927	3.9927	3.9927	3.9927	3.9927	3.9927	3.9927	3.9927
15=OPERATING COSTS	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000
TOTAL ENERGY COST IN MILLS/KWH	6.7790	6.9497	6.6148	6.8574	6.5361	6.8288	6.7055	6.5983
SPECIAL COST ANALYSIS COMPLETED - D.L.I.								

Table 6.5b:

ENERGY COST BREAKDOWN FOR FUEL DISCHARGED AT 5.3818 YEARS

Equilibrium Cycle

2.00 W/O U-235

3-ZONE OUT-IN

CYCLE NUMBER 7

MAX.TO AVERAGE POWER DENSITY (START OF CYCLE,NO XE) = 1.9637

CENTRAL ZONE DISCHARGE --

AVERAGE BURNUP IN MWD/TONNE U = 17037.

MAXIMUM BURNUP IN MWD/TONNE U = 19123

TIME IN REACTOR IN YEARS = 2.0015

URANIUM CHARGED IN KG U = 21141.

URANIUM DISCHARGED IN KG U = 20607.5

URANIUM-235 W/O IN DISCHARGE = 0.810

PLUTONIUM DISCHARGED IN KG PU = 139.8

PLUTONIUM COMPOSITION- 239,240,241,242 W/O= 0.609 0.220 0.131 0.039

BILLIONS OF KILOWATT HOURS, ELECTRIC = 2.7056

FUEL COST BREAKDOWN IN MILLIONS OF DOLLARS

1=UF6	3.0973	3.0973	2.2015	2.8905	2.0259	2.0259	3.0973	3.0973
2=FABRICATION	3.0397	3.0527	3.0258	3.0465	3.0205	3.0205	3.0527	2.2761
3=SHIPPING	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480
4=REPROCESSING	0.4933	0.4933	0.4933	0.4933	0.4933	0.	0.4933	0.4933
5=UO2(N03)2 TO UF6	0.1139	0.1139	0.1139	0.1139	0.1139	0.	0.1139	0.1139
6=UF6 CREDIT	-0.6369	-0.6369	-0.3728	-0.6268	-0.3652	0.	-0.6369	-0.6369
7=PU(N03)4 TO PU	0.2056	0.2056	0.2056	0.2056	0.2056	0.	0.2056	0.2056
8=PU CREDIT	-1.3020	-1.3020	-1.3020	-1.3020	-1.3020	0.	-1.3020	-1.3020
9=SPARES CAPITAL	0.0430	0.0431	0.0366	0.0416	0.0354	0.0354	0.0431	0.0376
10=UF6 CAPITAL, NON REACTOR	0.0648	0.1638	0.1111	0.1550	0.1037	0.0794	0.0819	0.1638
11=FABRICATION CAPITAL, NON REACTOR	0.1192	0.1197	0.1186	0.1194	0.1184	0.1184	0.0598	0.0892
12=UF6 CAPITAL, REACTOR	0.2219	0.5605	0.3864	0.5280	0.3589	0.3041	0.2803	0.5605
13=FABRICATION CAPITAL, REACTOR	0.4563	0.4582	0.4542	0.4573	0.4534	0.4534	0.2291	0.3417
NET FUEL CYCLE COST	6.0641	6.5171	5.6202	6.2703	5.4099	6.1852	5.8660	5.5881

FUEL COST BREAKDOWN IN MILLS/KWH

1=UF6	1.1447	1.1447	0.8137	1.0683	0.7488	0.7488	1.1447	1.1447
2=FABRICATION	1.1235	1.1283	1.1183	1.1260	1.1164	1.1164	1.1283	0.8412
3=SHIPPING	0.0547	0.0547	0.0547	0.0547	0.0547	0.0547	0.0547	0.0547
4=REPROCESSING	0.1823	0.1823	0.1823	0.1823	0.1823	0.	0.1823	0.1823
5=UO2(N03)2 TO UF6	0.0421	0.0421	0.0421	0.0421	0.0421	0.	0.0421	0.0421
6=UF6 CREDIT	-0.2354	-0.2354	-0.1378	-0.2316	-0.1350	0.	-0.2354	-0.2354
7=PU(N03)4 TO PU	0.0760	0.0760	0.0760	0.0760	0.0760	0.	0.0760	0.0760
8=PU CREDIT	-0.4812	-0.4812	-0.4812	-0.4812	-0.4812	0.	-0.4812	-0.4812
9=SPARES CAPITAL	0.0159	0.0159	0.0135	0.0154	0.0131	0.0131	0.0159	0.0139
10=UF6 CAPITAL, NON REACTOR	0.0240	0.0605	0.0411	0.0573	0.0383	0.0294	0.0303	0.0605
11=FABRICATION CAPITAL, NON REACTOR	0.0440	0.0442	0.0438	0.0441	0.0438	0.0438	0.0221	0.0330
12=UF6 CAPITAL, REACTOR	0.0820	0.2072	0.1428	0.1951	0.1327	0.1124	0.1036	0.2072
13=FABRICATION CAPITAL, REACTOR	0.1687	0.1694	0.1679	0.1690	0.1676	0.1676	0.0847	0.1263
NET FUEL CYCLE COST	2.2413	2.4087	2.0772	2.3175	1.9995	2.2860	2.1681	2.0653

Table 6.5e:

ENERGY COST BREAKDOWN FOR FUEL DISCHARGED AT 1.4379 YEARS									
2.00 W/D U-235									
3-ZONE OUT-IN									
CYCLE NUMBER 1									
MAX. TO AVERAGE POWER DENSITY (START OF CYCLE, NO XE) = 3.1112									
CENTRAL ZONE DISCHARGE --									
AVERAGE BURNUP IN MWD/TONNE U = 15467.									
MAXIMUM BURNUP IN MWD/TONNE U = 17431									
TIME IN REACTOR IN YEARS = 1.4379									
URANIUM CHARGED IN KG U = 21141.									
URANIUM DISCHARGED IN KG U = 20650.8									
URANIUM-235 W/O IN DISCHARGE = 0.882									
PLUTONIUM DISCHARGED IN KG PU = 133.4									
PLUTONIUM COMPOSITION- 239,240,241,242 W/O= 0.631 0.212 0.125 0.033									
BILLIONS OF KILOWATT HOURS, ELECTRIC = 2.4564									
FUEL COST BREAKDOWN IN MILLIONS OF DOLLARS									
1=UF6	3.0973	3.0973	2.2015	2.8905	2.0259	2.0259	3.0973	3.0973	
2=FABRICATION	3.0643	3.0836	3.0478	3.0754	3.0408	3.0408	3.0836	2.3071	
3=SHIPPING	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	
4=REPROCESSING	0.4933	0.4933	0.4933	0.4933	0.4933	0.4933	0.	0.4933	0.4933
5=UO2(N03)2 TO UF6	0.1141	0.1141	0.1141	0.1141	0.1141	0.	0.1141	0.1141	
6=UF6 CREDIT	-0.7627	-0.7627	-0.4613	-0.7441	-0.4470	0.	-0.7627	-0.7627	
7=PU(N03)4 TO PU	0.1961	0.1961	0.1961	0.1961	0.1961	0.	0.1961	0.1961	
8=PU CREDIT	-1.2422	-1.2422	-1.2422	-1.2422	-1.2422	0.	-1.2422	-1.2422	
9=SPARES CAPITAL	0.0310	0.0311	0.0264	0.0300	0.0255	0.0255	0.0311	0.0272	
10=UF6 CAPITAL, NON REACTOR	0.0804	0.2031	0.1390	0.1917	0.1294	0.0997	0.1015	0.2031	
11=FABRICATION CAPITAL, NON REACTOR	0.1508	0.1517	0.1500	0.1513	0.1496	0.1496	0.0759	0.1135	
12=UF6 CAPITAL, REACTOR	0.1648	0.4163	0.2872	0.3920	0.2667	0.2185	0.2081	0.4163	
13=FABRICATION CAPITAL, REACTOR	0.3305	0.3325	0.3287	0.3317	0.3279	0.3279	0.1663	0.2488	
NET FUEL CYCLE COST	5.8657	6.2624	5.4286	6.0279	5.2282	6.0359	5.7106	5.3600	
FUEL COST BREAKDOWN IN MILLS/KWH									
1=UF6	1.2609	1.2609	0.8962	1.1768	0.8248	0.8248	1.2609	1.2609	
2=FABRICATION	1.2475	1.2554	1.2408	1.2520	1.2379	1.2379	1.2554	0.9392	
3=SHIPPING	0.0602	0.0602	0.0602	0.0602	0.0602	0.0602	0.0602	0.0602	
4=REPROCESSING	0.2008	0.2008	0.2008	0.2008	0.2008	0.	0.2008	0.2008	
5=UO2(N03)2 TO UF6	0.0465	0.0465	0.0465	0.0465	0.0465	0.	0.0465	0.0465	
6=UF6 CREDIT	-0.3105	-0.3105	-0.1878	-0.3029	-0.1820	0.	-0.3105	-0.3105	
7=PU(N03)4 TO PU	0.0798	0.0798	0.0798	0.0798	0.0798	0.	0.0798	0.0798	
8=PU CREDIT	-0.5057	-0.5057	-0.5057	-0.5057	-0.5057	0.	-0.5057	-0.5057	
9=SPARES CAPITAL	0.0126	0.0127	0.0108	0.0122	0.0104	0.0104	0.0127	0.0111	
10=UF6 CAPITAL, NON REACTOR	0.0327	0.0827	0.0566	0.0780	0.0527	0.0406	0.0413	0.0827	
11=FABRICATION CAPITAL, NON REACTOR	0.0614	0.0618	0.0611	0.0616	0.0609	0.0609	0.0309	0.0462	
12=UF6 CAPITAL, REACTOR	0.0671	0.1695	0.1169	0.1596	0.1086	0.0889	0.0847	0.1695	
13=FABRICATION CAPITAL, REACTOR	0.1345	0.1354	0.1338	0.1350	0.1335	0.1335	0.0677	0.1013	
NET FUEL CYCLE COST	2.3880	2.5495	2.2100	2.4540	2.1284	2.4573	2.3248	2.1821	

Table 6.5a:

ENERGY COST BREAKDOWN FOR FUEL DISCHARGED AT 2.0430 YEARS									
2.00 W/O U-235									
3-ZONE OUT-IN									
CYCLE NUMBER 2									
MAX. TO AVERAGE POWER DENSITY (START OF CYCLE, NO XE) = 2.0243									
CENTRAL ZONE DISCHARGE --									
AVERAGE BURNUP IN MWD/TONNE U = 16807.									
MAXIMUM BURNUP IN MWD/TONNE U = 19067									
TIME IN REACTOR IN YEARS = 2.0430									
URANIUM CHARGED IN KG U = 21141.									
URANIUM DISCHARGED IN KG U = 20613.8									
URANIUM-235 W/O IN DISCHARGE = 0.820									
PLUTONIUM DISCHARGED IN KG PU = 139.0									
PLUTONIUM COMPOSITION- 239,240,241,242 W/O= 0.613 0.219 0.130 0.038									
BILLIONS OF KILOWATT HOURS, ELECTRIC = 2.6691									
FUEL COST BREAKDOWN IN MILLIONS OF DOLLARS									
1=UF6	3.0973	3.0973	2.2015	2.8905	2.0259	2.0259	3.0973	3.0973	
2=FABRICATION	3.0643	3.0836	3.0478	3.0754	3.0408	3.0408	3.0836	2.3071	
3=SHIPPING	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	
4=REPROCESSING	0.4933	0.4933	0.4933	0.4933	0.4933	0.	0.4933	0.4933	
5=UO2(NO3)2 TO UF6	0.1139	0.1139	0.1139	0.1139	0.1139	0.	0.1139	0.1139	
6=UF6 CREDIT	-0.6544	-0.6544	-0.3850	-0.6431	-0.3765	0.	-0.6544	-0.6544	
7=PU(NO3)4 TO PU	0.2043	0.2043	0.2043	0.2043	0.2043	0.	0.2043	0.2043	
8=PU CREDIT	-1.2938	-1.2938	-1.2938	-1.2938	-1.2938	0.	-1.2938	-1.2938	
9=SPARES CAPITAL	0.0441	0.0442	0.0375	0.0427	0.0362	0.0362	0.0442	0.0386	
10=UF6 CAPITAL, NON REACTOR	0.0775	0.1959	0.1339	0.1850	0.1247	0.0997	0.0979	0.1959	
11=FABRICATION CAPITAL, NON REACTOR	0.1508	0.1517	0.1500	0.1513	0.1496	0.1496	0.0759	0.1135	
12=UF6 CAPITAL, REACTOR	0.2275	0.5748	0.3963	0.5414	0.3681	0.3104	0.2874	0.5748	
13=FABRICATION CAPITAL, REACTOR	0.4695	0.4725	0.4670	0.4712	0.4659	0.4659	0.2362	0.3535	
NET FUEL CYCLE COST	6.1423	6.6314	5.7147	6.3802	5.5005	6.2766	5.9339	5.6921	
FUEL COST BREAKDOWN IN MILLS/KWH									
1=UF6	1.1604	1.1604	0.8248	1.0830	0.7590	0.7590	1.1604	1.1604	
2=FABRICATION	1.1481	1.1553	1.1419	1.1522	1.1393	1.1393	1.1553	0.8644	
3=SHIPPING	0.0554	0.0554	0.0554	0.0554	0.0554	0.0554	0.0554	0.0554	
4=REPROCESSING	0.1848	0.1848	0.1848	0.1848	0.1848	0.	0.1848	0.1848	
5=UO2(NO3)2 TO UF6	0.0427	0.0427	0.0427	0.0427	0.0427	0.	0.0427	0.0427	
6=UF6 CREDIT	-0.2452	-0.2452	-0.1443	-0.2410	-0.1411	0.	-0.2452	-0.2452	
7=PU(NO3)4 TO PU	0.0765	0.0765	0.0765	0.0765	0.0765	0.	0.0765	0.0765	
8=PU CREDIT	-0.4847	-0.4847	-0.4847	-0.4847	-0.4847	0.	-0.4847	-0.4847	
9=SPARES CAPITAL	0.0165	0.0166	0.0141	0.0160	0.0136	0.0136	0.0166	0.0145	
10=UF6 CAPITAL, NON REACTOR	0.0291	0.0734	0.0502	0.0693	0.0467	0.0373	0.0367	0.0734	
11=FABRICATION CAPITAL, NON REACTOR	0.0565	0.0568	0.0562	0.0567	0.0561	0.0561	0.0284	0.0425	
12=UF6 CAPITAL, REACTOR	0.0852	0.2154	0.1485	0.2029	0.1379	0.1163	0.1077	0.2154	
13=FABRICATION CAPITAL, REACTOR	0.1759	0.1770	0.1750	0.1765	0.1746	0.1746	0.0885	0.1324	
NET FUEL CYCLE COST	2.3013	2.4845	2.1411	2.3904	2.0608	2.3516	2.2232	2.1326	

Table 6.5e:

ENERGY COST BREAKDOWN FOR FUEL DISCHARGED AT 2.7150 YEARS

2.00 W/O U-235
 3=ZONE OUT-IN
 CYCLE NUMBER 3

MAX.TO AVERAGE POWER DENSITY (START OF CYCLE,NO XE) = 1.9779

CENTRAL ZONE DISCHARGE --

AVERAGE BURNUP IN MWD/TONNE U = 17402.

MAXIMUM BURNUP IN MWD/TONNE U = 20175

TIME IN REACTOR IN YEARS = 2.7150

URANIUM CHARGED IN KG U = 21141.

URANIUM DISCHARGED IN KG U = 20597.6

URANIUM-235 W/O IN DISCHARGE = 0.794

PLUTONIUM DISCHARGED IN KG PU = 141.2

PLUTONIUM COMPOSITION- 239,240,241,242 W/O= 0.605 0.222 0.133 0.040

BILLIONS OF KILOWATT HOURS, ELECTRIC = 2.7637

FUEL COST BREAKDOWN IN MILLIONS OF DOLLARS

1=UF6	3.0973	3.0973	2.2015	2.8905	2.0259	2.0259	3.0973	3.0973
2=FABRICATION	3.0643	3.0836	3.0478	3.0754	3.0408	3.0408	3.0836	2.3071
3=SHIPPING	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480
4=REPROCESSING	0.4933	0.4933	0.4933	0.4933	0.4933	0.	0.4933	0.4933
5=UO2(NO3)2 TO UF6	0.1138	0.1138	0.1138	0.1138	0.1138	0.	0.1138	0.1138
6=UF6 CREDIT	-0.6099	-0.6099	-0.3540	-0.6015	-0.3477	0.	-0.6099	-0.6099
7=PU(NO3)4 TO PU	0.2076	0.2076	0.2076	0.2076	0.2076	0.	0.2076	0.2076
8=PU CREDIT	-1.3146	-1.3146	-1.3146	-1.3146	-1.3146	0.	-1.3146	-1.3146
9=SPARES CAPITAL	0.0585	0.0587	0.0499	0.0567	0.0481	0.0481	0.0587	0.0514
10=UF6 CAPITAL, NON REACTOR	0.0764	0.1929	0.1318	0.1822	0.1228	0.0997	0.0965	0.1929
11=FABRICATION CAPITAL, NON REACTOR	0.1508	0.1517	0.1500	0.1513	0.1496	0.1496	0.0759	0.1135
12=UF6 CAPITAL, REACTOR	0.2988	0.7549	0.5203	0.7111	0.4833	0.4125	0.3774	0.7549
13=FABRICATION CAPITAL, REACTOR	0.6240	0.6279	0.6206	0.6262	0.6192	0.6192	0.3139	0.4698
NET FUEL CYCLE COST	6.4082	7.0053	6.0160	6.7400	5.7902	6.5438	6.1416	6.0250

FUEL COST BREAKDOWN IN MILLS/KWH

1=UF6	1.1207	1.1207	0.7966	1.0459	0.7331	0.7331	1.1207	1.1207
2=FABRICATION	1.1088	1.1158	1.1028	1.1128	1.1003	1.1003	1.1158	0.8348
3=SHIPPING	0.0535	0.0535	0.0535	0.0535	0.0535	0.0535	0.0535	0.0535
4=REPROCESSING	0.1785	0.1785	0.1785	0.1785	0.1785	0.	0.1785	0.1785
5=UO2(NO3)2 TO UF6	0.0412	0.0412	0.0412	0.0412	0.0412	0.	0.0412	0.0412
6=UF6 CREDIT	-0.2207	-0.2207	-0.1281	-0.2176	-0.1258	0.	-0.2207	-0.2207
7=PU(NO3)4 TO PU	0.0751	0.0751	0.0751	0.0751	0.0751	0.	0.0751	0.0751
8=PU CREDIT	-0.4757	-0.4757	-0.4757	-0.4757	-0.4757	0.	-0.4757	-0.4757
9=SPARES CAPITAL	0.0212	0.0213	0.0180	0.0205	0.0174	0.0174	0.0213	0.0186
10=UF6 CAPITAL, NON REACTOR	0.0276	0.0698	0.0477	0.0659	0.0444	0.0361	0.0349	0.0698
11=FABRICATION CAPITAL, NON REACTOR	0.0546	0.0549	0.0543	0.0548	0.0541	0.0541	0.0275	0.0411
12=UF6 CAPITAL, REACTOR	0.1081	0.2731	0.1883	0.2573	0.1749	0.1493	0.1366	0.2731
13=FABRICATION CAPITAL, REACTOR	0.2258	0.2272	0.2246	0.2266	0.2240	0.2240	0.1136	0.1700
NET FUEL CYCLE COST	2.3187	2.5348	2.1768	2.4388	2.0951	2.3678	2.2222	2.1801

Table 6.5f:

ENERGY COST BREAKDOWN FOR FUEL DISCHARGED AT 3.3802 YEARS

2.00 W/D U-235
 3-ZONE OUT-IN
 CYCLE NUMBER 4

MAX. TO AVERAGE POWER DENSITY (START OF CYCLE, NO XE) = 1.9496

CENTRAL ZONE DISCHARGE --

AVERAGE BURNUP IN MWD/TONNE U = 16948.

MAXIMUM BURNUP IN MWD/TONNE U = 19021

TIME IN REACTOR IN YEARS = 1.9423

URANIUM CHARGED IN KG U = 21141.

URANIUM DISCHARGED IN KG U = 20610.0

URANIUM-235 W/D IN DISCHARGE = 0.814

PLUTONIUM DISCHARGED IN KG PU = 139.5

PLUTONIUM COMPOSITION- 239,240,241,242 W/O= 0.611 0.220 0.131 0.038

BILLIONS OF KILOWATT HOURS, ELECTRIC = 2.6915

FUEL COST BREAKDOWN IN MILLIONS OF DOLLARS

1=UF6	3.0973	3.0973	2.2015	2.8905	2.0259	2.0259	3.0973	3.0973
2= FABRICATION	3.0397	3.0527	3.0258	3.0465	3.0205	3.0205	3.0527	2.2761
3= SHIPPING	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480
4= REPROCESSING	0.4933	0.4933	0.4933	0.4933	0.4933	0.	0.4933	0.4933
5=UO2(NO3)2 TO UF6	0.1139	0.1139	0.1139	0.1139	0.1139	0.	0.1139	0.1139
6=UF6 CREDIT	-0.6438	-0.6438	-0.3776	-0.6332	-0.3696	0.	-0.6438	-0.6438
7=PU(NO3)4 TO PU	0.2051	0.2051	0.2051	0.2051	0.2051	0.	0.2051	0.2051
8=PU CREDIT	-1.2987	-1.2987	-1.2987	-1.2987	-1.2987	0.	-1.2987	-1.2987
9=SPARES CAPITAL	0.0417	0.0418	0.0355	0.0404	0.0343	0.0343	0.0418	0.0365
10=UF6 CAPITAL, NON REACTOR	0.0650	0.1642	0.1114	0.1554	0.1040	0.0794	0.0821	0.1642
11= FABRICATION CAPITAL, NON REACTOR	0.1192	0.1197	0.1186	0.1194	0.1184	0.1184	0.0598	0.0892
12=UF6 CAPITAL, REACTOR	0.2157	0.5450	0.3757	0.5133	0.3490	0.2951	0.2725	0.5450
13= FABRICATION CAPITAL, REACTOR	0.4428	0.4447	0.4408	0.4438	0.4400	0.4400	0.2223	0.3316
NET FUEL CYCLE COST	6.0392	6.4831	5.5933	6.2377	5.3841	6.1617	5.8463	5.5577

FUEL COST BREAKDOWN IN MILLS/KWH

1=UF6	1.1508	1.1508	0.8179	1.0740	0.7527	0.7527	1.1508	1.1508
2= FABRICATION	1.1294	1.1342	1.1242	1.1319	1.1222	1.1222	1.1342	0.8457
3= SHIPPING	0.0550	0.0550	0.0550	0.0550	0.0550	0.0550	0.0550	0.0550
4= REPROCESSING	0.1833	0.1833	0.1833	0.1833	0.1833	0.	0.1833	0.1833
5=UO2(NO3)2 TO UF6	0.0423	0.0423	0.0423	0.0423	0.0423	0.	0.0423	0.0423
6=UF6 CREDIT	-0.2392	-0.2392	-0.1403	-0.2353	-0.1373	0.	-0.2392	-0.2392
7=PU(NO3)4 TO PU	0.0762	0.0762	0.0762	0.0762	0.0762	0.	0.0762	0.0762
8=PU CREDIT	-0.4825	-0.4825	-0.4825	-0.4825	-0.4825	0.	-0.4825	-0.4825
9=SPARES CAPITAL	0.0155	0.0155	0.0132	0.0150	0.0127	0.0127	0.0155	0.0136
10=UF6 CAPITAL, NON REACTOR	0.0242	0.0610	0.0414	0.0577	0.0386	0.0295	0.0305	0.0610
11= FABRICATION CAPITAL, NON REACTOR	0.0443	0.0445	0.0441	0.0444	0.0440	0.0440	0.0222	0.0332
12=UF6 CAPITAL, REACTOR	0.0801	0.2025	0.1396	0.1907	0.1297	0.1097	0.1012	0.2025
13= FABRICATION CAPITAL, REACTOR	0.1645	0.1652	0.1638	0.1649	0.1635	0.1635	0.0826	0.1232
NET FUEL CYCLE COST	2.2438	2.4087	2.0781	2.3176	2.0064	2.2893	2.1721	2.0649

Table 6.5g:

ENERGY COST BREAKDOWN FOR FUEL DISCHARGED AT 4.0479 YEARS

2.00 W/O U-235
3-ZONE OUT-IN
CYCLE NUMBER 5

MAX. TO AVERAGE POWER DENSITY (START OF CYCLE, NO XE) = 1.9653

CENTRAL ZONE DISCHARGE --

AVERAGE BURNUP IN MWD/TONNE U = 17054.

MAXIMUM BURNUP IN MWD/TONNE U = 19184

TIME IN REACTOR IN YEARS = 2.0050

URANIUM CHARGED IN KG U = 21141.

URANIUM DISCHARGED IN KG U = 20607.1

URANIUM-235 W/O IN DISCHARGE = 0.809

PLUTONIUM DISCHARGED IN KG PU = 139.9

PLUTONIUM COMPOSITION- 239,240,241,242 W/O= 0.609 0.220 0.131 0.039

BILLIONS OF KILOWATT HOURS, ELECTRIC = 2.7084

FUEL COST BREAKDOWN IN MILLIONS OF DOLLARS

1=UF6	3.0973	3.0973	2.2015	2.8905	2.0259	2.0259	3.0973	3.0973
2=FABRICATION	3.0397	3.0527	3.0258	3.0465	3.0205	3.0205	3.0527	2.2761
3=SHIPPING	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480
4=REPROCESSING	0.4933	0.4933	0.4933	0.4933	0.4933	0.	0.4933	0.4933
5=UO2(N03)2 TO UF6	0.1139	0.1139	0.1139	0.1139	0.1139	0.	0.1139	0.1139
6=UF6 CREDIT	-0.6356	-0.6356	-0.3719	-0.6255	-0.3643	0.	-0.6356	-0.6356
7=PU(N03)4 TO PU	0.2057	0.2057	0.2057	0.2057	0.2057	0.	0.2057	0.2057
8=PU CREDIT	-1.3026	-1.3026	-1.3026	-1.3026	-1.3026	0.	-1.3026	-1.3026
9=SPARES CAPITAL	0.0431	0.0432	0.0367	0.0417	0.0354	0.0354	0.0432	0.0377
10=UF6 CAPITAL, NON REACTOR	0.0648	0.1637	0.1110	0.1549	0.1036	0.0794	0.0818	0.1637
11=FABRICATION CAPITAL, NON REACTOR	0.1192	0.1197	0.1186	0.1194	0.1184	0.1184	0.0598	0.0892
12=UF6 CAPITAL, REACTOR	0.2222	0.5613	0.3870	0.5287	0.3594	0.3046	0.2807	0.5613
13=FABRICATION CAPITAL, REACTOR	0.4571	0.4590	0.4550	0.4581	0.4542	0.4542	0.2295	0.3423
NET FUEL CYCLE COST	6.0660	6.5194	5.6219	6.2725	5.4115	6.1865	5.8676	5.5902

FUEL COST BREAKDOWN IN MILLS/KWH

1=UF6	1.1436	1.1436	0.8128	1.0672	0.7480	0.7480	1.1436	1.1436
2=FABRICATION	1.1223	1.1271	1.1172	1.1248	1.1152	1.1152	1.1271	0.8404
3=SHIPPING	0.0546	0.0546	0.0546	0.0546	0.0546	0.0546	0.0546	0.0546
4=REPROCESSING	0.1821	0.1821	0.1821	0.1821	0.1821	0.	0.1821	0.1821
5=UO2(N03)2 TO UF6	0.0421	0.0421	0.0421	0.0421	0.0421	0.	0.0421	0.0421
6=UF6 CREDIT	-0.2347	-0.2347	-0.1373	-0.2310	-0.1345	0.	-0.2347	-0.2347
7=PU(N03)4 TO PU	0.0759	0.0759	0.0759	0.0759	0.0759	0.	0.0759	0.0759
8=PU CREDIT	-0.4809	-0.4809	-0.4809	-0.4809	0.4809	0.	-0.4809	-0.4809
9=SPARES CAPITAL	0.0159	0.0159	0.0135	0.0154	0.0131	0.0131	0.0159	0.0139
10=UF6 CAPITAL, NON REACTOR	0.0239	0.0604	0.0410	0.0572	0.0383	0.0293	0.0302	0.0604
11=FABRICATION CAPITAL, NON REACTOR	0.0440	0.0442	0.0438	0.0441	0.0437	0.0437	0.0221	0.0329
12=UF6 CAPITAL, REACTOR	0.0820	0.2072	0.1429	0.1952	0.1327	0.1125	0.1036	0.2072
13=FABRICATION CAPITAL, REACTOR	0.1688	0.1695	0.1680	0.1691	0.1677	0.1677	0.0847	0.1264
NET FUEL CYCLE COST	2.2397	2.4071	2.0757	2.3159	1.9980	2.2842	2.1664	2.0640

Table 6.5h:

ENERGY COST BREAKDOWN FOR FUEL DISCHARGED AT 4.7147 YEARS

2.00 W/O U-235

3-ZONE OUT-IN

CYCLE NUMBER 6

MAX. TO AVERAGE POWER DENSITY (START OF CYCLE, NO XE) = 1.9627

CENTRAL ZONE DISCHARGE --

AVERAGE BURNUP IN MWDT/TONNE U = 17031.

MAXIMUM BURNUP IN MWDT/TONNE U = 19101

TIME IN REACTOR IN YEARS = 1.9997

URANIUM CHARGED IN KG U = 21141.

URANIUM DISCHARGED IN KG U = 20607.7

URANIUM-235 W/O IN DISCHARGE = 0.810

PLUTONIUM DISCHARGED IN KG PU = 139.8

PLUTONIUM COMPOSITION- 239,240,241,242 W/O= 0.610 0.220 0.131 0.039

BILLIONS OF KILOWATT HOURS, ELECTRIC = 2.7047

FUEL COST BREAKDOWN IN MILLIONS OF DOLLARS

1=UF6	3.0973	3.0973	2.2015	2.8905	2.0259	2.0259	3.0973	3.0973
2=FABRICATION	3.0397	3.0527	3.0258	3.0465	3.0205	3.0205	3.0527	2.2761
3=SHIPPING	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480
4=REPROCESSING	0.4933	0.4933	0.4933	0.4933	0.4933	0.	0.4933	0.4933
5=UO2(NO3)2 TO UF6	0.1139	0.1139	0.1139	0.1139	0.1139	0.	0.1139	0.1139
6=UF6 CREDIT	-0.6373	-0.6373	-0.3731	-0.6272	-0.3655	0.	-0.6373	-0.6373
7=PU(NO3)4 TO PU	0.2055	0.2055	0.2055	0.2055	0.2055	0.	0.2055	0.2055
8=PU CREDIT	-1.3018	-1.3018	-1.3018	-1.3018	-1.3018	0.	-1.3018	-1.3018
9=SPARES CAPITAL	0.0430	0.0430	0.0366	0.0416	0.0353	0.0353	0.0430	0.0376
10=UF6 CAPITAL, NON REACTOR	0.0648	0.1638	0.1111	0.1550	0.1037	0.0794	0.0819	0.1638
11=FABRICATION CAPITAL, NON REACTOR	0.1192	0.1197	0.1186	0.1194	0.1184	0.1184	0.0598	0.0892
12=UF6 CAPITAL, REACTOR	0.2217	0.5601	0.3861	0.5276	0.3587	0.3038	0.2801	0.5601
13=FABRICATION CAPITAL, REACTOR	0.4559	0.4578	0.4538	0.4569	0.4530	0.4530	0.2289	0.3414
NET FUEL CYCLE COST	6.0632	6.5160	5.6194	6.2693	5.4091	6.1845	5.8653	5.5871

FUEL COST BREAKDOWN IN MILLS/KWH

1=UF6	1.1452	1.1452	0.8140	1.0687	0.7490	0.7490	1.1452	1.1452
2=FABRICATION	1.1239	1.1287	1.1187	1.1264	1.1168	1.1168	1.1287	0.8415
3=SHIPPING	0.0547	0.0547	0.0547	0.0547	0.0547	0.0547	0.0547	0.0547
4=REPROCESSING	0.1824	0.1824	0.1824	0.1824	0.1824	0.	0.1824	0.1824
5=UO2(NO3)2 TO UF6	0.0421	0.0421	0.0421	0.0421	0.0421	0.	0.0421	0.0421
6=UF6 CREDIT	-0.2356	-0.2356	-0.1379	-0.2319	-0.1351	0.	-0.2356	-0.2356
7=PU(NO3)4 TO PU	0.0760	0.0760	0.0760	0.0760	0.0760	0.	0.0760	0.0760
8=PU CREDIT	-0.4813	-0.4813	-0.4813	-0.4813	-0.4813	0.	-0.4813	-0.4813
9=SPARES CAPITAL	0.0159	0.0159	0.0135	0.0154	0.0131	0.0131	0.0159	0.0139
10=UF6 CAPITAL, NON REACTOR	0.0240	0.0606	0.0411	0.0573	0.0383	0.0294	0.0303	0.0606
11=FABRICATION CAPITAL, NON REACTOR	0.0441	0.0442	0.0439	0.0442	0.0438	0.0438	0.0221	0.0330
12=UF6 CAPITAL, REACTOR	0.0820	0.2071	0.1428	0.1951	0.1326	0.1123	0.1035	0.2071
13=FABRICATION CAPITAL, REACTOR	0.1686	0.1693	0.1678	0.1689	0.1675	0.1675	0.0846	0.1262
NET FUEL CYCLE COST	2.2418	2.4092	2.0777	2.3179	1.9999	2.2866	2.1686	2.0657

Table 6.51:

ENERGY COST BREAKDOWN FOR FUEL DISCHARGED AT 5.3818 YEARS

Cleanup of Zone 2

2.00 W/O U-235

3-ZONE OUT-IN

CYCLE NUMBER 8

MAX. TO AVERAGE POWER DENSITY (START OF CYCLE, NO XE) = 1.9637

CENTRAL ZONE DISCHARGE --

AVERAGE BURNUP IN MWD/TONNE U = 13394.

MAXIMUM BURNUP IN MWD/TONNE U = 16178

TIME IN REACTOR IN YEARS = 1.3341

URANIUM CHARGED IN KG U = 21141.

URANIUM DISCHARGED IN KG U = 20709.1

URANIUM-235 W/O IN DISCHARGE = 0.988

PLUTONIUM DISCHARGED IN KG PU = 123.4

PLUTONIUM COMPOSITION- 239,240,241,242 W/O= 0.662 0.199 0.114 0.025

BILLIONS OF KILOWATT HOURS, ELECTRIC = 2.1272

FUEL COST BREAKDOWN IN MILLIONS OF DOLLARS

1=UF6	3.0973	3.0973	2.2015	2.8905	2.0259	2.0259	3.0973	3.0973
2=FABRICATION	3.0397	3.0527	3.0258	3.0465	3.0205	3.0205	3.0527	2.2761
3=SHIPPING	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480
4=REPROCESSING	0.4933	0.4933	0.4933	0.4933	0.4933	0.	0.4933	0.4933
5=UO2(NO3)2 TO UF6	0.1145	0.1145	0.1145	0.1145	0.1145	0.	0.1145	0.1145
6=UF6 CREDIT	-0.9530	-0.9530	-0.5975	-0.9210	-0.5722	0.	-0.9530	-0.9530
7=PU(NO3)4 TO PU	0.1815	0.1815	0.1815	0.1815	0.1815	0.	0.1815	0.1815
8=PU CREDIT	-1.1492	-1.1492	-1.1492	-1.1492	-1.1492	0.	-1.1492	-1.1492
9=SPARES CAPITAL	0.0287	0.0287	0.0244	0.0277	0.0236	0.0236	0.0287	0.0251
10=UF6 CAPITAL, NON REACTOR	0.0731	0.1848	0.1260	0.1745	0.1175	0.0794	0.0924	0.1848
11=FABRICATION CAPITAL, NON REACTOR	0.1192	0.1197	0.1186	0.1194	0.1184	0.1184	0.0598	0.0892
12=UF6 CAPITAL, REACTOR	0.1604	0.4053	0.2801	0.3814	0.2600	0.2027	0.2026	0.4053
13=FABRICATION CAPITAL, REACTOR	0.3041	0.3054	0.3028	0.3048	0.3022	0.3022	0.1527	0.2277
NET FUEL CYCLE COST	5.6576	6.0288	5.2696	5.8119	5.0838	5.9208	5.5212	5.1405

FUEL COST BREAKDOWN IN MILLS/KWH

1=UF6	1.4560	1.4560	1.0349	1.3589	0.9524	0.9524	1.4560	1.4560
2=FABRICATION	1.4290	1.4351	1.4224	1.4322	1.4200	1.4200	1.4351	1.0700
3=SHIPPING	0.0696	0.0696	0.0696	0.0696	0.0696	0.0696	0.0696	0.0696
4=REPROCESSING	0.2319	0.2319	0.2319	0.2319	0.2319	0.	0.2319	0.2319
5=UO2(NO3)2 TO UF6	0.0538	0.0538	0.0538	0.0538	0.0538	0.	0.0538	0.0538
6=UF6 CREDIT	-0.4480	-0.4480	-0.2809	-0.4330	-0.2690	0.	-0.4480	-0.4480
7=PU(NO3)4 TO PU	0.0853	0.0853	0.0853	0.0853	0.0853	0.	0.0853	0.0853
8=PU CREDIT	-0.5403	-0.5403	-0.5403	-0.5403	-0.5403	0.	-0.5403	-0.5403
9=SPARES CAPITAL	0.0135	0.0135	0.0115	0.0130	0.0111	0.0111	0.0135	0.0118
10=UF6 CAPITAL, NON REACTOR	0.0344	0.0869	0.0592	0.0820	0.0552	0.0373	0.0434	0.0869
11=FABRICATION CAPITAL, NON REACTOR	0.0560	0.0563	0.0558	0.0561	0.0557	0.0557	0.0281	0.0419
12=UF6 CAPITAL, REACTOR	0.0754	0.1905	0.1317	0.1793	0.1222	0.0953	0.0953	0.1905
13=FABRICATION CAPITAL, REACTOR	0.1430	0.1436	0.1423	0.1433	0.1421	0.1421	0.0718	0.1071
NET FUEL CYCLE COST	2.6597	2.8342	2.4773	2.7322	2.3899	2.7834	2.5956	2.4166

Table 6.5j:

ENERGY COST BREAKDOWN FOR FUEL DISCHARGED AT 5.3818 YEARS

Cleanup of Zone 3

2.00 W/O U-235

3-ZONE OUT-IN

CYCLE NUMBER 9

MAX. TO AVERAGE POWER DENSITY (START OF CYCLE, NO XE) = 1.9637

CENTRAL ZONE DISCHARGE --

AVERAGE BURNUP IN MWD/TONNE U = 6110.

MAXIMUM BURNUP IN MWD/TONNE U = 8862

TIME IN REACTOR IN YEARS = 0.6670

URANIUM CHARGED IN KG U = 21141.

URANIUM DISCHARGED IN KG U = 20928.0

URANIUM-235 W/O IN DISCHARGE = 1.446

PLUTONIUM DISCHARGED IN KG PU = 73.3

PLUTONIUM COMPOSITION- 239,240,241,242 W/O= 0.801 0.137 0.057 0.006

BILLIONS OF KILOWATT HOURS, ELECTRIC = 0.9704

FUEL COST BREAKDOWN IN MILLIONS OF DOLLARS

1=UF6	3.0973	3.0973	2.2015	2.8905	2.0259	2.0259	3.0973	3.0973
2=FABRICATION	3.0397	3.0527	3.0258	3.0465	3.0205	3.0205	3.0527	2.2761
3=SHIPPING	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480
4=REPROCESSING	0.4933	0.4933	0.4933	0.4933	0.4933	0.4933	0.4933	0.4933
5=UO2(ND3)2 TO UF6	0.1157	0.1157	0.1157	0.1157	0.1157	0.1157	0.1157	0.1157
6=UF6 CREDIT	-1.8581	-1.8581	-1.2652	-1.7555	-1.1801	-1.1801	-1.8581	-1.8581
7=PU(ND3)4 TO PU	0.1077	0.1077	0.1077	0.1077	0.1077	0.	0.1077	0.1077
8=PU CREDIT	-0.6821	-0.6821	-0.6821	-0.6821	-0.6821	0.	-0.6821	-0.6821
9=SPARES CAPITAL	0.0143	0.0144	0.0122	0.0139	0.0118	0.0118	0.0144	0.0125
10=UF6 CAPITAL, NON REACTOR	0.0969	0.2449	0.1704	0.2300	0.1579	0.1579	0.1225	0.2449
11=FABRICATION CAPITAL, NON REACTOR	0.1192	0.1197	0.1186	0.1194	0.1184	0.1184	0.0598	0.0892
12=UF6 CAPITAL, REACTOR	0.0981	0.2479	0.1734	0.2324	0.1604	0.1604	0.1240	0.2479
13=FABRICATION CAPITAL, REACTOR	0.1521	0.1527	0.1514	0.1524	0.1511	0.1511	0.0764	0.1139
NET FUEL CYCLE COST	4.9422	5.2540	4.7707	5.1122	4.6485	5.2229	4.8714	4.4064

FUEL COST BREAKDOWN IN MILLS/KWH

1=UF6	3.1918	3.1918	2.2686	2.9787	2.0877	2.0877	3.1918	3.1918
2=FABRICATION	3.1325	3.1458	3.1181	3.1394	3.1127	3.1127	3.1458	2.3455
3=SHIPPING	0.1525	0.1525	0.1525	0.1525	0.1525	0.1525	0.1525	0.1525
4=REPROCESSING	0.5084	0.5084	0.5084	0.5084	0.5084	0.5084	0.5084	0.5084
5=UO2(ND3)2 TO UF6	0.1192	0.1192	0.1192	0.1192	0.1192	0.1192	0.1192	0.1192
6=UF6 CREDIT	-1.9148	-1.9148	-1.3038	-1.8091	-1.2161	-1.2161	-1.9148	-1.9148
7=PU(ND3)4 TO PU	0.1110	0.1110	0.1110	0.1110	0.1110	0.	0.1110	0.1110
8=PU CREDIT	-0.7029	-0.7029	-0.7029	-0.7029	-0.7029	0.	-0.7029	-0.7029
9=SPARES CAPITAL	0.0148	0.0148	0.0126	0.0143	0.0121	0.0121	0.0148	0.0129
10=UF6 CAPITAL, NON REACTOR	0.0999	0.2524	0.1756	0.2370	0.1627	0.1627	0.1262	0.2524
11=FABRICATION CAPITAL, NON REACTOR	0.1228	0.1233	0.1222	0.1231	0.1220	0.1220	0.0617	0.0920
12=UF6 CAPITAL, REACTOR	0.1011	0.2555	0.1787	0.2395	0.1653	0.1653	0.1277	0.2555
13=FABRICATION CAPITAL, REACTOR	0.1567	0.1574	0.1560	0.1571	0.1557	0.1557	0.0787	0.1173
NET FUEL CYCLE COST	5.0930	5.4144	4.9163	5.2682	4.7904	5.3823	5.0201	4.5408

BATCH CORE AVERAGE BURNUP= 12181.

Table 6.6a: Cost Data for 3 Zone Out-in and 2.75 w/o Enrichment
 BREAKDOWN OF ENERGY COST AVERAGED OVER 30.0994 YEARS

2.75 W/O U-235									
3-ZONE OUT-IN									
AVERAGE BURNUP FOR 22. CYCLES = 25810									
AVERAGE TIME FOR A CYCLE = 1.3682									
FRACTION OF TIME FOR REFUELING = 0.026763									
MAX. TO AVERAGE POWER DENSITY (EQUILIBRIUM CYCLE) = 2.4424									
CENTRAL ZONE DISCHARGE AT EQUILIBRIUM --									
AVERAGE BURNUP IN MWD/TONNE U = 26687.									
MAXIMUM BURNUP IN MWD/TONNE U = 29251									
TIME IN REACTOR IN YEARS = 3.1099									
URANIUM CHARGED IN KG U = 21141.									
URANIUM DISCHARGED IN KG U = 20345.6									
URANIUM-235 W/O IN DISCHARGE = 0.926									
PLUTONIUM DISCHARGED IN KG PU = 174.3									
PLUTONIUM COMPOSITION- 239,240,241,242 W/O= 0.562 0.225 0.154 0.059									
BILLIONS OF KILOWATT HOURS, ELECTRIC = 4.2382									
ENERGY COST BREAKDOWN IN MILLS/KWH									
1=UF6	1.1701	1.1701	0.8561	1.0828	0.7808	0.7808	1.1701	1.1701	
2=FABRICATION	0.7535	0.7587	0.7488	0.7559	0.7465	0.7465	0.7587	0.5671	
3=SHIPPING	0.0361	0.0361	0.0361	0.0361	0.0361	0.0361	0.0361	0.0361	
4=REPROCESSING	0.1204	0.1204	0.1204	0.1204	0.1204	0.0100	0.1204	0.1204	
5=UO2(N03)2 TO UF6	0.0275	0.0275	0.0275	0.0275	0.0275	0.0023	0.0275	0.0275	
6=UF6 CREDIT	-0.2233	-0.2233	-0.1399	-0.2159	-0.1340	-0.0234	-0.2233	-0.2233	
7=PU(N03)4 TO PU	0.0614	0.0614	0.0614	0.0614	0.0614	0.	0.0614	0.0614	
8=PU CREDIT	-0.3888	-0.3888	-0.3888	-0.3888	-0.3888	0.	-0.3888	-0.3888	
9=SPARES CAPITAL	0.0203	0.0203	0.0169	0.0194	0.0161	0.0161	0.0203	0.0183	
10=UF6 CAPITAL, NON REACTOR	0.0246	0.0622	0.0439	0.0582	0.0405	0.0331	0.0311	0.0622	
11=FABRICATION CAPITAL, NON REACTOR	0.0305	0.0307	0.0303	0.0306	0.0302	0.0302	0.0154	0.0230	
12=UF6 CAPITAL, REACTOR	0.1235	0.3120	0.2229	0.2908	0.2048	0.1788	0.1560	0.3120	
13=FABRICATION CAPITAL, REACTOR	0.1702	0.1714	0.1692	0.1708	0.1687	0.1687	0.0857	0.1282	
NET FUEL CYCLE COST	1.9260	2.1587	1.8048	2.0492	1.7101	1.9793	1.8705	1.9141	
14=PLANT CAPITAL COSTS	3.9927	3.9927	3.9927	3.9927	3.9927	3.9927	3.9927	3.9927	
15=OPERATING COSTS	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	
TOTAL ENERGY COST IN MILLS/KWH	6.4187	6.6514	6.2975	6.5419	6.2028	6.4720	6.3632	6.4068	
SPECIAL COST ANALYSIS COMPLETED - D.L.T.									

Table 6.6b:

ENERGY COST BREAKDOWN FOR FUEL DISCHARGED AT 7.5100 YEARS

Equilibrium Cycle

2.75 W/O U-235

3-ZONE OUT-IN

CYCLE NUMBER 6

MAX. TO AVERAGE POWER DENSITY (START OF CYCLE, NO XE) = 2.4424

CENTRAL ZONE DISCHARGE --

AVERAGE BURNUP IN MWD/TONNE U = 26687.

MAXIMUM BURNUP IN MWD/TONNE U = 29251

TIME IN REACTOR IN YEARS = 3.1099

URANIUM CHARGED IN KG U = 21141.

URANIUM DISCHARGED IN KG U = 20345.6

URANIUM-235 W/O IN DISCHARGE = 0.926

PLUTONIUM DISCHARGED IN KG PU = 174.3

PLUTONIUM COMPOSITION 239,240,241,242 W/O = 0.562 0.225 0.154 0.059

BILLIONS OF KILOWATT HOURS, ELECTRIC = 4.2382

FUEL COST BREAKDOWN IN MILLIONS OF DOLLARS

1=UF6	4.7961	4.7961	3.5090	4.4384	3.2004	3.2004	4.7961	4.7961
2=FABRICATION	3.0936	3.1036	3.0650	3.0929	3.0557	3.0557	3.1036	2.3186
3=SHIPPING	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480
4=REPROCESSING	0.4933	0.4933	0.4933	0.4933	0.4933	0.	0.4933	0.4933
5=UO2(NO3)2 TO UF6	0.1125	0.1125	0.1125	0.1125	0.1125	0.	0.1125	0.1125
6=UF6 CREDIT	-0.8261	-0.8261	-0.5078	-0.8026	-0.4895	0.	-0.8261	-0.8261
7=PU(NO3)4 TO PU	0.2563	0.2563	0.2563	0.2563	0.2563	0.	0.2563	0.2563
8=PU CREDIT	-1.6231	-1.6231	-1.6231	-1.6231	-1.6231	0.	-1.6231	-1.6231
9=SPARES CAPITAL	0.0858	0.0860	0.0716	0.0820	0.0681	0.0681	0.0860	0.0774
10=UF6 CAPITAL, NON REACTOR	0.0962	0.2429	0.1713	0.2273	0.1580	0.1255	0.1215	0.2429
11=FABRICATION CAPITAL, NON REACTOR	0.1209	0.1217	0.1202	0.1213	0.1198	0.1198	0.0608	0.0909
12=UF6 CAPITAL, REACTOR	0.5191	1.3113	0.9369	1.2224	0.8606	0.7465	0.6557	1.3113
13=FABRICATION CAPITAL, REACTOR	0.7192	0.7239	0.7149	0.7214	0.7127	0.7127	0.3619	0.5408
NET FUEL CYCLE COST	7.9817	8.9464	7.4679	8.4899	7.0728	8.1767	7.7465	7.9389

FUEL COST BREAKDOWN IN MILLS/KWH

1=UF6	1.1316	1.1316	0.8279	1.0472	0.7551	0.7551	1.1316	1.1316
2=FABRICATION	0.7276	0.7323	0.7232	0.7298	0.7210	0.7210	0.7323	0.5471
3=SHIPPING	0.0349	0.0349	0.0349	0.0349	0.0349	0.0349	0.0349	0.0349
4=REPROCESSING	0.1164	0.1164	0.1164	0.1164	0.1164	0.	0.1164	0.1164
5=UO2(NO3)2 TO UF6	0.0265	0.0265	0.0265	0.0265	0.0265	0.	0.0265	0.0265
6=UF6 CREDIT	-0.1949	-0.1949	-0.1198	-0.1894	-0.1155	0.	-0.1949	-0.1949
7=PU(NO3)4 TO PU	0.0605	0.0605	0.0605	0.0605	0.0605	0.	0.0605	0.0605
8=PU CREDIT	-0.3830	-0.3830	-0.3830	-0.3830	-0.3830	0.	-0.3830	-0.3830
9=SPARES CAPITAL	0.0202	0.0203	0.0169	0.0193	0.0161	0.0161	0.0203	0.0183
10=UF6 CAPITAL, NON REACTOR	0.0227	0.0573	0.0404	0.0536	0.0373	0.0296	0.0287	0.0573
11=FABRICATION CAPITAL, NON REACTOR	0.0285	0.0287	0.0284	0.0286	0.0283	0.0283	0.0144	0.0214
12=UF6 CAPITAL, REACTOR	0.1225	0.3094	0.2211	0.2884	0.2031	0.1761	0.1547	0.3094
13=FABRICATION CAPITAL, REACTOR	0.1697	0.1708	0.1687	0.1702	0.1682	0.1682	0.0854	0.1276
NET FUEL CYCLE COST	1.8833	2.1109	1.7620	2.0032	1.6688	1.9293	1.8278	1.8732

Table 6.6c:

ENERGY COST BREAKDOWN FOR FUEL DISCHARGED AT 2.4065 YEARS

2.75 W/O U-235

3-ZONE OUT-IN

CYCLE NUMBER 1

MAX. TO AVERAGE POWER DENSITY (START OF CYCLE, NO XE) = 3.1112

CENTRAL ZONE DISCHARGE --

AVERAGE BURNUP IN MWD/TONNE U = 24533.

MAXIMUM BURNUP IN MWD/TONNE U = 26774

TIME IN REACTOR IN YEARS = 2.4065

URANIUM CHARGED IN KG U = 21141.

URANIUM DISCHARGED IN KG U = 20402.0

URANIUM-235 W/O IN DISCHARGE = 1.022

PLUTONIUM DISCHARGED IN KG PU = 169.2

PLUTONIUM COMPOSITION 239,240,241,242 W/O = 0.582 0.217 0.149 0.051

BILLIONS OF KILOWATT HOURS, ELECTRIC = 3.8961

FUEL COST BREAKDOWN IN MILLIONS OF DOLLARS

1=UF6	4.7961	4.7961	3.5090	4.4384	3.2004	3.2004	4.7961	4.7961
2=FABRICATION	3.1216	3.1516	3.1001	3.1373	3.0878	3.0878	3.1516	2.3665
3=SHIPPING	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480
4=REPROCESSING	0.4933	0.4933	0.4933	0.4933	0.4933	0.	0.4933	0.4933
5=UO2(NO3)2 TO UF6	0.1128	0.1128	0.1128	0.1128	0.1128	0.	0.1128	0.1128
6=UF6 CREDIT	-0.9992	-0.9992	-0.6324	-0.9633	-0.6038	0.	-0.9992	-0.9992
7=PU(NO3)4 TO PU	0.2487	0.2487	0.2487	0.2487	0.2487	0.	0.2487	0.2487
8=PU CREDIT	-1.5750	-1.5750	-1.5750	-1.5750	-1.5750	0.	-1.5750	-1.5750
9=SPARES CAPITAL	0.0667	0.0669	0.0557	0.0638	0.0530	0.0530	0.0669	0.0603
10=UF6 CAPITAL, NON REACTOR	0.1197	0.3024	0.2147	0.2824	0.1976	0.1575	0.1512	0.3024
11=FABRICATION CAPITAL, NON REACTOR	0.1536	0.1551	0.1525	0.1544	0.1519	0.1519	0.0775	0.1164
12=UF6 CAPITAL, REACTOR	0.4140	1.0460	0.7475	0.9749	0.6866	0.5776	0.5230	1.0460
13=FABRICATION CAPITAL, REACTOR	0.5634	0.5688	0.5595	0.5662	0.5573	0.5573	0.2844	0.4271
NET FUEL CYCLE COST	7.6637	8.5155	7.1343	8.0819	6.7585	7.9334	7.4794	7.5435

FUEL COST BREAKDOWN IN MILLS/KWH

1=UF6	1.2310	1.2310	0.9006	1.1392	0.8214	0.8214	1.2310	1.2310
2=FABRICATION	0.8012	0.8089	0.7957	0.8052	0.7925	0.7925	0.8089	0.6074
3=SHIPPING	0.0380	0.0380	0.0380	0.0380	0.0380	0.0380	0.0380	0.0380
4=REPROCESSING	0.1266	0.1266	0.1266	0.1266	0.1266	0.	0.1266	0.1266
5=UO2(NO3)2 TO UF6	0.0289	0.0289	0.0289	0.0289	0.0289	0.	0.0289	0.0289
6=UF6 CREDIT	-0.2565	-0.2565	-0.1623	-0.2472	-0.1550	0.	-0.2565	-0.2565
7=PU(NO3)4 TO PU	0.0638	0.0638	0.0638	0.0638	0.0638	0.	0.0638	0.0638
8=PU CREDIT	-0.4042	-0.4042	-0.4042	-0.4042	-0.4042	0.	-0.4042	-0.4042
9=SPARES CAPITAL	0.0171	0.0172	0.0143	0.0164	0.0136	0.0136	0.0172	0.0155
10=UF6 CAPITAL, NON REACTOR	0.0307	0.0776	0.0551	0.0725	0.0507	0.0404	0.0388	0.0776
11=FABRICATION CAPITAL, NON REACTOR	0.0394	0.0398	0.0392	0.0396	0.0390	0.0390	0.0199	0.0299
12=UF6 CAPITAL, REACTOR	0.1063	0.2685	0.1918	0.2502	0.1762	0.1483	0.1342	0.2685
13=FABRICATION CAPITAL, REACTOR	0.1446	0.1460	0.1436	0.1453	0.1430	0.1430	0.0730	0.1096
NET FUEL CYCLE COST	1.9670	2.1856	1.8311	2.0743	1.7347	2.0362	1.9197	1.9362

Table 6.6d:

ENERGY COST BREAKDOWN FOR FUEL DISCHARGED AT 3.3669 YEARS

2.75 W/O U-235
3-ZONE OUT-IN
CYCLE NUMBER 2

MAX. TO AVERAGE POWER DENSITY (START OF CYCLE, NO XE) = 2.6315

CENTRAL ZONE DISCHARGE

AVERAGE BURNUP IN MWD/TONNE U = 26306.
MAXIMUM BURNUP IN MWD/TONNE U = 28749
TIME IN REACTOR IN YEARS = 3.3669
URANIUM CHARGED IN KG U = 21141.
URANIUM DISCHARGED IN KG U = 20355.5
URANIUM-235 W/O IN DISCHARGE = 0.942
PLUTONIUM DISCHARGED IN KG PU = 173.5
PLUTONIUM COMPOSITION 239,240,241,242 W/O = 0.566 0.224 0.153 0.058
BILLIONS OF KILOWATT HOURS, ELECTRIC = 4.1777

FUEL COST BREAKDOWN IN MILLIONS OF DOLLARS

1=UF6	4.7961	4.7961	3.5090	4.4384	3.2004	3.2004	4.7961	4.7961
2=FABRICATION	3.1216	3.1516	3.1001	3.1373	3.0878	3.0878	3.1516	2.3665
3=SHIPPING	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480
4=REPROCESSING	0.4933	0.4933	0.4933	0.4933	0.4933	0.	0.4933	0.4933
5=UO2(NO3)2 TO UF6	0.1125	0.1125	0.1125	0.1125	0.1125	0.	0.1125	0.1125
6=UF6 CREDIT	-0.8550	-0.8550	-0.5285	-0.8295	-0.5085	0.	-0.8550	-0.8550
7=PU(NO3)4 TO PU	0.2551	0.2551	0.2551	0.2551	0.2551	0.	0.2551	0.2551
8=PU CREDIT	-1.6155	-1.6155	-1.6155	-1.6155	-1.6155	0.	-1.6155	-1.6155
9=SPARES CAPITAL	0.0933	0.0937	0.0779	0.0893	0.0741	0.0741	0.0937	0.0844
10=UF6 CAPITAL, NON REACTOR	0.1159	0.2928	0.2078	0.2735	0.1913	0.1575	0.1464	0.2928
11=FABRICATION CAPITAL, NON REACTOR	0.1536	0.1551	0.1525	0.1544	0.1519	0.1519	0.0775	0.1164
12=UF6 CAPITAL, REACTOR	0.5649	1.4270	1.0195	1.3302	0.9366	0.8081	0.7135	1.4270
13=FABRICATION CAPITAL, REACTOR	0.7883	0.7958	0.7828	0.7922	0.7797	0.7797	0.3979	0.5976
NET FUEL CYCLE COST	8.1720	9.2505	7.7145	8.7791	7.3066	8.4075	7.9151	8.2193

FUEL COST BREAKDOWN IN MILLS/KWH

1=UF6	1.1480	1.1480	0.8399	1.0624	0.7661	0.7661	1.1480	1.1480
2=FABRICATION	0.7472	0.7544	0.7421	0.7510	0.7391	0.7391	0.7544	0.5665
3=SHIPPING	0.0354	0.0354	0.0354	0.0354	0.0354	0.0354	0.0354	0.0354
4=REPROCESSING	0.1181	0.1181	0.1181	0.1181	0.1181	0.	0.1181	0.1181
5=UO2(NO3)2 TO UF6	0.0269	0.0269	0.0269	0.0269	0.0269	0.	0.0269	0.0269
6=UF6 CREDIT	-0.2047	-0.2047	-0.1265	-0.1986	-0.1217	0.	-0.2047	-0.2047
7=PU(NO3)4 TO PU	0.0611	0.0611	0.0611	0.0611	0.0611	0.	0.0611	0.0611
8=PU CREDIT	-0.3867	-0.3867	-0.3867	-0.3867	-0.3867	0.	-0.3867	-0.3867
9=SPARES CAPITAL	0.0223	0.0224	0.0186	0.0214	0.0177	0.0177	0.0224	0.0202
10=UF6 CAPITAL, NON REACTOR	0.0277	0.0701	0.0497	0.0655	0.0458	0.0377	0.0350	0.0701
11=FABRICATION CAPITAL, NON REACTOR	0.0368	0.0371	0.0365	0.0370	0.0364	0.0364	0.0186	0.0279
12=UF6 CAPITAL, REACTOR	0.1352	0.3416	0.2440	0.3184	0.2242	0.1934	0.1708	0.3416
13=FABRICATION CAPITAL, REACTOR	0.1887	0.1905	0.1874	0.1896	0.1866	0.1866	0.0952	0.1430
NET FUEL CYCLE COST	1.9561	2.2143	1.8466	2.1014	1.7490	2.0125	1.8946	1.9674

Table 6.6e:

ENERGY COST BREAKDOWN FOR FUEL DISCHARGED AT 4.4001 YEARS

2.75 W/O U-235
3-ZONE OUT-IN
CYCLE NUMBER 3

MAX. TO AVERAGE POWER DENSITY (START OF CYCLE, NO XE) = 2.4093

CENTRAL ZONE DISCHARGE

AVERAGE BURNUP IN MWD/TONNE U = 27141.

MAXIMUM BURNUP IN MWD/TONNE U = 30239

TIME IN REACTOR IN YEARS = 4.4001

URANIUM CHARGED IN KG U = 21141.

URANIUM DISCHARGED IN KG U = 20333.8

URANIUM-235 W/O IN DISCHARGE = 0.906

PLUTONIUM DISCHARGED IN KG PU = 175.4

PLUTONIUM COMPOSITION 239,240,241,242 W/O = 0.558 0.227 0.154 0.061

BILLIONS OF KILOWATT HOURS, ELECTRIC = 4.3103

FUEL COST BREAKDOWN IN MILLIONS OF DOLLARS

1=UF6	4.7961	4.7961	3.5090	4.4384	3.2004	3.2004	4.7961	4.7961
2=FABRICATION	3.1216	3.1516	3.1001	3.1373	3.0878	3.0878	3.1516	2.3665
3=SHIPPING	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480
4=REPROCESSING	0.4933	0.4933	0.4933	0.4933	0.4933	0.	0.4933	0.4933
5=UO2(NO3)2 TO UF6	0.1124	0.1124	0.1124	0.1124	0.1124	0.	0.1124	0.1124
6=UF6 CREDIT	-0.7915	-0.7915	-0.4831	-0.7704	-0.4668	0.	-0.7915	-0.7915
7=PU(NO3)4 TO PU	0.2578	0.2578	0.2578	0.2578	0.2578	0.	0.2578	0.2578
8=PU CREDIT	-1.6326	-1.6326	-1.6326	-1.6326	-1.6326	0.	-1.6326	-1.6326
9=SPARES CAPITAL	0.1219	0.1224	0.1018	0.1167	0.0968	0.0968	0.1224	0.1103
10=UF6 CAPITAL, NON REACTOR	0.1142	0.2886	0.2048	0.2696	0.1885	0.1575	0.1443	0.2886
11=FABRICATION CAPITAL, NON REACTOR	0.1536	0.1551	0.1525	0.1544	0.1519	0.1519	0.0775	0.1164
12=UF6 CAPITAL, REACTOR	0.7299	1.8439	1.3174	1.7189	1.2192	1.0561	0.9220	1.8439
13=FABRICATION CAPITAL, REACTOR	1.0301	1.0400	1.0230	1.0353	1.0190	1.0190	0.5200	0.7810

NET FUEL CYCLE COST 8.6550 9.9852 8.3044 9.4790 7.8667 8.9175 8.3214 8.8903

FUEL COST BREAKDOWN IN MILLS/KWH

1=UF6	1.1127	1.1127	0.8141	1.0297	0.7425	0.7425	1.1127	1.1127
2=FABRICATION	0.7242	0.7312	0.7192	0.7279	0.7164	0.7164	0.7312	0.5490
3=SHIPPING	0.0343	0.0343	0.0343	0.0343	0.0343	0.0343	0.0343	0.0343
4=REPROCESSING	0.1145	0.1145	0.1145	0.1145	0.1145	0.	0.1145	0.1145
5=UO2(NO3)2 TO UF6	0.0261	0.0261	0.0261	0.0261	0.0261	0.	0.0261	0.0261
6=UF6 CREDIT	-0.1836	-0.1836	-0.1121	-0.1787	-0.1083	0.	-0.1836	-0.1836
7=PU(NO3)4 TO PU	0.0598	0.0598	0.0598	0.0598	0.0598	0.	0.0598	0.0598
8=PU CREDIT	-0.3788	-0.3788	-0.3788	-0.3788	-0.3788	0.	-0.3788	-0.3788
9=SPARES CAPITAL	0.0283	0.0284	0.0236	0.0271	0.0225	0.0225	0.0284	0.0256
10=UF6 CAPITAL, NON REACTOR	0.0265	0.0670	0.0475	0.0625	0.0437	0.0365	0.0335	0.0670
11=FABRICATION CAPITAL, NON REACTOR	0.0356	0.0360	0.0354	0.0358	0.0352	0.0352	0.0180	0.0270
12=UF6 CAPITAL, REACTOR	0.1693	0.4278	0.3056	0.3988	0.2808	0.2450	0.2139	0.4278
13=FABRICATION CAPITAL, REACTOR	0.2390	0.2413	0.2374	0.2402	0.2364	0.2364	0.1206	0.1812

NET FUEL CYCLE COST 2.0080 2.3166 1.9267 2.1992 1.8251 2.0689 1.9306 2.0626

Table 6.6f:

ENERGY COST BREAKDOWN FOR FUEL DISCHARGED AT 5.4388 YEARS

2.75 W/O U-235
 3-ZONE OUT-IN
 CYCLE NUMBER 4

MAX. TO AVERAGE POWER DENSITY (START OF CYCLE, NO XE) = 2.4285

CENTRAL ZONE DISCHARGE --

AVERAGE BURNUP IN MWD/TONNE U = 26544.
 MAXIMUM BURNUP IN MWD/TONNE U = 29249
 TIME IN REACTOR IN YEARS = 3.0323
 URANIUM CHARGED IN KG U = 21141.
 URANIUM DISCHARGED IN KG U = 20349.4
 URANIUM-235 W/O IN DISCHARGE = 0.932
 PLUTONIUM DISCHARGED IN KG PU = 174.0
 PLUTONIUM COMPOSITION 239,240,241,242 W/O = 0.563 0.224 0.153 0.059
 BILLIONS OF KILOWATT HOURS, ELECTRIC = 4.2155

FUEL COST BREAKDOWN IN MILLIONS OF DOLLARS

1=UF6	4.7961	4.7961	3.5090	4.4384	3.2004	3.2004	4.7961	4.7961
2=FABRICATION	3.0836	3.1036	2.0650	3.0929	3.0557	3.0557	3.1036	2.3186
3=SHIPPING	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480
4=REPROCESSING	0.4933	0.4933	0.4933	0.4933	0.4933	0.	0.4933	0.4933
5=UO2(NO3)2 TO UF6	0.1125	0.1125	0.1125	0.1125	0.1125	0.	0.1125	0.1125
6=UF6 CREDIT	-0.8374	-0.8374	-0.5159	-0.8131	-0.4969	0.	-0.8374	-0.8374
7=PU(NO3)4 TO PU	0.2558	0.2558	0.2558	0.2558	0.2558	0.	0.2558	0.2558
8=PU CREDIT	-1.6200	-1.6200	-1.6200	-1.6200	-1.6200	0.	-1.6200	-1.6200
9=SPARES CAPITAL	0.0836	0.0838	0.0698	0.0799	0.0664	0.0664	0.0838	0.0755
10=UF6 CAPITAL, NON REACTOR	0.0965	0.2437	0.1719	0.2280	0.1585	0.1255	0.1218	0.2437
11=FABRICATION CAPITAL, NON REACTOR	0.1209	0.1217	0.1202	0.1213	0.1198	0.1198	0.0608	0.0909
12=UF6 CAPITAL, REACTOR	0.5071	1.2812	0.9153	1.1943	0.8408	0.7278	0.6406	1.2812
13=FABRICATION CAPITAL, REACTOR	0.7013	0.7058	0.6971	0.7034	0.6950	0.6950	0.3529	0.5273
NET FUEL CYCLE COST	7.9414	8.8882	7.4219	8.4347	7.0293	8.1386	7.7120	7.8855

FUEL COST BREAKDOWN IN MILLS/KWH

1=UF6	1.1377	1.1377	0.8324	1.0529	0.7592	0.7592	1.1377	1.1377
2=FABRICATION	0.7315	0.7362	0.7271	0.7337	0.7249	0.7249	0.7362	0.5500
3=SHIPPING	0.0351	0.0351	0.0351	0.0351	0.0351	0.0351	0.0351	0.0351
4=REPROCESSING	0.1170	0.1170	0.1170	0.1170	0.1170	0.	0.1170	0.1170
5=UO2(NO3)2 TO UF6	0.0267	0.0267	0.0267	0.0267	0.0267	0.	0.0267	0.0267
6=UF6 CREDIT	-0.1986	-0.1986	-0.1224	-0.1929	-0.1179	0.	-0.1986	-0.1986
7=PU(NO3)4 TO PU	0.0607	0.0607	0.0607	0.0607	0.0607	0.	0.0607	0.0607
8=PU CREDIT	-0.3843	-0.3843	-0.3843	-0.3843	-0.3843	0.	-0.3843	-0.3843
9=SPARES CAPITAL	0.0198	0.0199	0.0166	0.0190	0.0158	0.0158	0.0199	0.0179
10=UF6 CAPITAL, NON REACTOR	0.0229	0.0578	0.0408	0.0541	0.0376	0.0298	0.0289	0.0578
11=FABRICATION CAPITAL, NON REACTOR	0.0287	0.0289	0.0285	0.0288	0.0284	0.0284	0.0144	0.0216
12=UF6 CAPITAL, REACTOR	0.1203	0.3039	0.2171	0.2833	0.1995	0.1727	0.1520	0.3039
13=FABRICATION CAPITAL, REACTOR	0.1664	0.1674	0.1654	0.1669	0.1649	0.1649	0.0837	0.1251
NET FUEL CYCLE COST	1.8839	2.1085	1.7606	2.0009	1.6675	1.9306	1.8294	1.8706

Table 6.6g:

ENERGY COST BREAKDOWN FOR FUEL DISCHARGED AT 6.4744 YEARS

2.75 W/O U-235
3-ZONE OUT-IN
CYCLE NUMBER 5

MAX. TO AVERAGE POWER DENSITY (START OF CYCLE, NO XE) = 2.4795

CENTRAL ZONE DISCHARGE --

AVERAGE BURNUP IN MWD/TONNE U = 26734.

MAXIMUM BURNUP IN MWD/TONNE U = 29217

TIME IN REACTOR IN YEARS = 3.1075

URANIUM CHARGED IN KG U = 21141.

URANIUM DISCHARGED IN KG U = 20344.4

URANIUM-235 W/O IN DISCHARGE = 0.924

PLUTONIUM DISCHARGED IN KG PU = 174.4

PLUTONIUM COMPOSITION 239,240,241,242 W/O = 0.562 0.225 0.154 0.060

BILLIONS OF KILOWATT HOURS, ELECTRIC = 4.2456

FUEL COST BREAKDOWN IN MILLIONS OF DOLLARS

1=UF6	4.7961	4.7961	3.5090	4.4384	3.2004	3.2004	4.7961	4.7961
2=FABRICATION	3.0836	3.1036	3.0650	3.0929	3.0557	3.0557	3.1036	2.3186
3=SHIPPING	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480
4=REPROCESSING	0.4933	0.4933	0.4933	0.4933	0.4933	0.	0.4933	0.4933
5=UO2(NO3)2 TO UF6	0.1124	0.1124	0.1124	0.1124	0.1124	0.	0.1124	0.1124
6=UF6 CREDIT	-0.8229	-0.8229	-0.5055	-0.7996	-0.4874	0.	-0.8229	-0.8229
7=PU(NO3)4 TO PU	0.2564	0.2564	0.2564	0.2564	0.2564	0.	0.2564	0.2564
8=PU CREDIT	-1.6239	-1.6239	-1.6239	-1.6239	-1.6239	0.	-1.6239	-1.6239
9=SPARES CAPITAL	0.0857	0.0859	0.0715	0.0819	0.0680	0.0680	0.0859	0.0774
10=UF6 CAPITAL, NON REACTOR	0.0961	0.2427	0.1712	0.2271	0.1579	0.1255	0.1214	0.2427
11=FABRICATION CAPITAL, NON REACTOR	0.1209	0.1217	0.1202	0.1213	0.1198	0.1198	0.0608	0.0909
12=UF6 CAPITAL, REACTOR	0.5184	1.3096	0.9356	1.2208	0.8595	0.7459	0.6548	1.3096
13=FABRICATION CAPITAL, REACTOR	0.7187	0.7233	0.7143	0.7208	0.7122	0.7122	0.3617	0.5404
NET FUEL CYCLE COST	7.9829	8.9464	7.4675	8.4898	7.0724	8.1755	7.7477	7.9391

FUEL COST BREAKDOWN IN MILLS/KWH

1=UF6	1.1297	1.1297	0.8265	1.0454	0.7538	0.7538	1.1297	1.1297
2=FABRICATION	0.7263	0.7310	0.7219	0.7285	0.7197	0.7197	0.7310	0.5461
3=SHIPPING	0.0349	0.0349	0.0349	0.0349	0.0349	0.0349	0.0349	0.0349
4=REPROCESSING	0.1162	0.1162	0.1162	0.1162	0.1162	0.	0.1162	0.1162
5=UO2(NO3)2 TO UF6	0.0265	0.0265	0.0265	0.0265	0.0265	0.	0.0265	0.0265
6=UF6 CREDIT	-0.1938	-0.1938	-0.1191	-0.1883	-0.1148	0.	-0.1938	-0.1938
7=PU(NO3)4 TO PU	0.0604	0.0604	0.0604	0.0604	0.0604	0.	0.0604	0.0604
8=PU CREDIT	-0.3825	-0.3825	-0.3825	-0.3825	-0.3825	0.	-0.3825	-0.3825
9=SPARES CAPITAL	0.0202	0.0202	0.0168	0.0193	0.0160	0.0160	0.0202	0.0182
10=UF6 CAPITAL, NON REACTOR	0.0226	0.0572	0.0403	0.0535	0.0372	0.0296	0.0286	0.0572
11=FABRICATION CAPITAL, NON REACTOR	0.0285	0.0287	0.0283	0.0286	0.0282	0.0282	0.0143	0.0214
12=UF6 CAPITAL, REACTOR	0.1221	0.3084	0.2204	0.2875	0.2024	0.1757	0.1542	0.3084
13=FABRICATION CAPITAL, REACTOR	0.1693	0.1704	0.1683	0.1698	0.1677	0.1677	0.0852	0.1273
NET FUEL CYCLE COST	1.8803	2.1072	1.7589	1.9997	1.6658	1.9256	1.8249	1.8699

Table 6.6h:

ENERGY COST BREAKDOWN FOR FUEL DISCHARGED AT 7.5100 YEARS

Cleanup of Zone 2

2.75 W/O U-235

3-ZONE OUT-IN

CYCLE NUMBER 7

MAX. TO AVERAGE POWER DENSITY (START OF CYCLE, NO XE) = 2.4424

CENTRAL ZONE DISCHARGE --

AVERAGE BURNUP IN MW/D/TONNE U = 22627.

MAXIMUM BURNUP IN MW/D/TONNE U = 26023

TIME IN REACTOR IN YEARS = 2.0712

URANIUM CHARGED IN KG U = 21141.

URANIUM DISCHARGED IN KG U = 20452.7

URANIUM-235 W/O IN DISCHARGE = 1.113

PLUTONIUM DISCHARGED IN KG PU = 163.5

PLUTONIUM COMPOSITION 239,240,241,242 W/O = 0.601 0.209 0.144 0.045

BILLIONS OF KILOWATT HOURS, ELECTRIC = 3.5934

FUEL COST BREAKDOWN IN MILLIONS OF DOLLARS

1=UF6	4.7961	4.7961	3.5090	4.4384	3.2004	3.2004	4.7961	4.7961
2=FABRICATION	3.0836	3.1036	3.0650	3.0929	3.0557	3.0557	3.1036	2.3186
3=SHIPPING	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480
4=REPROCESSING	0.4933	0.4933	0.4933	0.4933	0.4933	0.4933	0.4933	0.4933
5=UO2(NO3)2 TO UF6	0.1130	0.1130	0.1130	0.1130	0.1130	0.1130	0.1130	0.1130
6=UF6 CREDIT	-1.1711	-1.1711	-0.7576	-1.1223	-0.7182	-0.7182	-1.1711	-1.1711
7=PU(NO3)4 TO PU	0.2404	0.2404	0.2404	0.2404	0.2404	0.	0.2404	0.2404
8=PU CREDIT	-1.5225	-1.5225	-1.5225	-1.5225	-1.5225	0.	-1.5225	-1.5225
9=SPARES CAPITAL	0.0571	0.0573	0.0477	0.0546	0.0454	0.0454	0.0573	0.0516
10=UF6 CAPITAL, NON REACTOR	0.1052	0.2659	0.1879	0.2486	0.1732	0.1732	0.1329	0.2659
11=FABRICATION CAPITAL, NON REACTOR	0.1209	0.1217	0.1202	0.1213	0.1198	0.1198	0.0608	0.0909
12=UF6 CAPITAL, REACTOR	0.3669	0.9269	0.6628	0.8638	0.6087	0.6087	0.4635	0.9269
13=FABRICATION CAPITAL, REACTOR	0.4790	0.4821	0.4761	0.4804	0.4747	0.4747	0.2411	0.3602
NET FUEL CYCLE COST	7.3101	8.0547	6.7833	7.6499	6.4319	7.7140	7.1565	7.1113

FUEL COST BREAKDOWN IN MILLS/KWH

1=UF6	1.3347	1.3347	0.9765	1.2351	0.8906	0.8906	1.3347	1.3347
2=FABRICATION	0.8581	0.8637	0.8529	0.8607	0.8504	0.8504	0.8637	0.6452
3=SHIPPING	0.0412	0.0412	0.0412	0.0412	0.0412	0.0412	0.0412	0.0412
4=REPROCESSING	0.1373	0.1373	0.1373	0.1373	0.1373	0.1373	0.1373	0.1373
5=UO2(NO3)2 TO UF6	0.0315	0.0315	0.0315	0.0315	0.0315	0.0315	0.0315	0.0315
6=UF6 CREDIT	-0.3259	-0.3259	-0.2108	-0.3123	-0.1999	-0.1999	-0.3259	-0.3259
7=PU(NO3)4 TO PU	0.0669	0.0669	0.0669	0.0669	0.0669	0.	0.0669	0.0669
8=PU CREDIT	-0.4237	-0.4237	-0.4237	-0.4237	-0.4237	0.	-0.4237	-0.4237
9=SPARES CAPITAL	0.0159	0.0159	0.0133	0.0152	0.0126	0.0126	0.0159	0.0144
10=UF6 CAPITAL, NON REACTOR	0.0293	0.0740	0.0523	0.0692	0.0482	0.0482	0.0370	0.0740
11=FABRICATION CAPITAL, NON REACTOR	0.0336	0.0339	0.0334	0.0337	0.0333	0.0333	0.0169	0.0253
12=UF6 CAPITAL, REACTOR	0.1021	0.2580	0.1844	0.2404	0.1694	0.1694	0.1290	0.2580
13=FABRICATION CAPITAL, REACTOR	0.1333	0.1342	0.1325	0.1337	0.1321	0.1321	0.0671	0.1002
NET FUEL CYCLE COST	2.0343	2.2415	1.8877	2.1288	1.7899	2.1467	1.9915	1.9790

Table 6.61:

ENERGY COST BREAKDOWN FOR FUEL DISCHARGED AT 7.5100 YEARS

Cleanup of Zone 3

2.75 W/O U-235

3-ZONE OUT-IN

CYCLE NUMBER 8

MAX. TO AVERAGE POWER DENSITY (START OF CYCLE, NO XE) = 2.4424

GENERAL ZONE DISCHARGE --

AVERAGE BURNUP IN MWD/TONNE U = 11855.

MAXIMUM BURNUP IN MWD/TONNE U = 16422

TIME IN REACTOR IN YEARS = 1.0356

URANIUM CHARGED IN KG U = 21141.

URANIUM DISCHARGED IN KG U = 20754.4

URANIUM-235 W/O IN DISCHARGE = 1.738

PLUTONIUM DISCHARGED IN KG PU = 114.1

PLUTONIUM COMPOSITION 239,240,241,242 W/O = 0.733 0.158 0.095 0.015

BILLIONS OF KILOWATT HOURS, ELECTRIC = 1.8827

FUEL COST BREAKDOWN IN MILLIONS OF DOLLARS

1=UF6	4.7961	4.7961	3.5090	4.4384	3.2004	3.2004	4.7961	4.7961
2=FABRICATION	3.0836	3.1036	3.0650	3.0929	3.0557	3.0557	3.1036	2.3186
3=SHIPPING	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480
4=REPROCESSING	0.4933	0.4933	0.4933	0.4933	0.4933	0.4933	0.4933	0.4933
5=UO2(NO3)2 TO UF6	0.1147	0.1147	0.1147	0.1147	0.1147	0.1147	0.1147	0.1147
6=UF6 CREDIT	-2.4438	-2.4438	-1.7085	-2.2916	-1.5804	-1.5804	-2.4438	-2.4438
7=PU(NO3)4 TO PU	0.1678	0.1678	0.1678	0.1678	0.1678	0.	0.1678	0.1678
8=PU CREDIT	-1.0627	-1.0627	-1.0627	-1.0627	-1.0627	0.	-1.0627	-1.0627
9=SPARES CAPITAL	0.0286	0.0286	0.0238	0.0273	0.0227	0.0227	0.0286	0.0258
10=UF6 CAPITAL, NON REACTOR	0.1387	0.3504	0.2511	0.3263	0.2305	0.2305	0.1752	0.3504
11=FABRICATION CAPITAL, NON REACTOR	0.1209	0.1217	0.1202	0.1213	0.1198	0.1198	0.0608	0.0909
12=UF6 CAPITAL, REACTOR	0.2226	0.5623	0.4052	0.5227	0.3713	0.3713	0.2812	0.5623
13=FABRICATION CAPITAL, REACTOR	0.2395	0.2411	0.2381	0.2402	0.2373	0.2373	0.1205	0.1801
NET FUEL CYCLE COST	6.0473	6.6212	5.7649	6.3385	5.5184	6.4133	5.9834	5.7415

FUEL COST BREAKDOWN IN MILLS/KWH

1=UF6	2.5475	2.5475	1.8638	2.3575	1.6999	1.6999	2.5475	2.5475
2=FABRICATION	1.6379	1.6485	1.6280	1.6428	1.6231	1.6231	1.6485	1.2315
3=SHIPPING	0.0786	0.0786	0.0786	0.0786	0.0786	0.0786	0.0786	0.0786
4=REPROCESSING	0.2620	0.2620	0.2620	0.2620	0.2620	0.2620	0.2620	0.2620
5=UO2(NO3)2 TO UF6	0.0609	0.0609	0.0609	0.0609	0.0609	0.0609	0.0609	0.0609
6=UF6 CREDIT	-1.2981	-1.2981	-0.9075	-1.2172	-0.8395	-0.8395	-1.2981	-1.2981
7=PU(NO3)4 TO PU	0.0891	0.0891	0.0891	0.0891	0.0891	0.	0.0891	0.0891
8=PU CREDIT	-0.5645	-0.5645	-0.5645	-0.5645	-0.5645	0.	-0.5645	-0.5645
9=SPARES CAPITAL	0.0152	0.0152	0.0127	0.0145	0.0120	0.0120	0.0152	0.0137
10=UF6 CAPITAL, NON REACTOR	0.0737	0.1861	0.1334	0.1733	0.1224	0.1224	0.0931	0.1861
11=FABRICATION CAPITAL, NON REACTOR	0.0642	0.0646	0.0638	0.0644	0.0636	0.0636	0.0323	0.0483
12=UF6 CAPITAL, REACTOR	0.1182	0.2987	0.2152	0.2776	0.1972	0.1972	0.1493	0.2987
13=FABRICATION CAPITAL, REACTOR	0.1272	0.1280	0.1264	0.1276	0.1261	0.1261	0.0640	0.0957
NET FUEL CYCLE COST	3.2121	3.5169	3.0621	3.3668	2.9312	3.4065	3.1782	3.0497

BATCH CORE AVERAGE BURNUP= 20390.

Table 6.7a: Cost Data for 3 Zone Out-in and 3.10 w/o Enrichment
BREAKDOWN OF ENERGY COST AVERAGED OVER 30.5313 YEARS

3.10 w/o U-235								
3-ZONE OUT-IN								
AVERAGE BURNUP FOR 19. CYCLES = 29816								
AVERAGE TIME FOR A CYCLE = 1.6069								
FRACTION OF TIME FOR REFUELING = 0.022615								
MAX.TO AVERAGE POWER DENSITY (EQUILIBRIUM CYCLE) = 2.6575								
CENTRAL ZONE DISCHARGE AT EQUILIBRIUM --								
AVERAGE BURNUP IN MWD/TONNE U = 30926.								
MAXIMUM BURNUP IN MWD/TONNE U = 33808								
TIME IN REACTOR IN YEARS = 3.6179								
URANIUM CHARGED IN KG U = 21141.								
URANIUM DISCHARGED IN KG U = 20232.4								
URANIUM-235 W/O IN DISCHARGE = 0.988								
PLUTONIUM DISCHARGED IN KG PU = 187.0								
PLUTONIUM COMPOSITION- 239,240,241,242 W/O= 0.548 0.226 0.159 0.066								
BILLIONS OF KILOWATT HOURS, ELECTRIC = 4.9113								
ENERGY COST BREAKDOWN IN MILLS/KWH								
1=UF6	1.1844	1.1844	0.8740	1.0933	0.7950	0.7950	1.1844	1.1844
2=FABRICATION	0.6570	0.6623	0.6525	0.6594	0.6500	0.6500	0.6623	0.4956
3=SHIPPING	0.0313	0.0313	0.0313	0.0313	0.0313	0.0313	0.0313	0.0313
4=REPROCESSING	0.1042	0.1042	0.1042	0.1042	0.1042	0.0149	0.1042	0.1042
5=UO2(NO3)2 TO UF6	0.0237	0.0237	0.0237	0.0237	0.0237	0.0034	0.0237	0.0237
6=UF6 CREDIT	-0.2204	-0.2204	-0.1410	-0.2119	-0.1341	-0.0331	-0.2204	-0.2204
7=PU(NO3)4 TO PU	0.0570	0.0570	0.0570	0.0570	0.0570	0.	0.0570	0.0570
8=PU CREDIT	-0.3610	-0.3610	-0.3610	-0.3610	-0.3610	0.	-0.3610	-0.3610
9=SPARES CAPITAL	0.0225	0.0226	0.0187	0.0214	0.0177	0.0177	0.0226	0.0205
10=UF6 CAPITAL, NON REACTOR	0.0248	0.0628	0.0449	0.0585	0.0412	0.0345	0.0314	0.0628
11=FABRICATION CAPITAL, NON REACTOR	0.0267	0.0269	0.0265	0.0268	0.0264	0.0264	0.0135	0.0202
12=UF6 CAPITAL, REACTOR	0.1442	0.3643	0.2631	0.3385	0.2409	0.2128	0.1822	0.3643
13=FABRICATION CAPITAL, REACTOR	0.1721	0.1735	0.1709	0.1727	0.1703	0.1703	0.0867	0.1299
NET FUEL CYCLE COST	1.8664	2.1314	1.7647	2.0138	1.6625	1.9232	1.8176	1.9123
14=PLANT CAPITAL COSTS	3.9927	3.9927	3.9927	3.9927	3.9927	3.9927	3.9927	3.9927
15=OPERATING COSTS	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000
TOTAL ENERGY COST IN MILLS/KWH	6.3591	6.6241	6.2574	6.5065	6.1552	6.4159	6.3103	6.4050
SPECIAL COST ANALYSIS COMPLETED - D.L.T.								

Table 6.7b:

ENERGY COST BREAKDOWN FOR FUEL DISCHARGED AT 8.7643 YEARS

Equilibrium Cycle

3.10 W/O U-235

3-ZONE OUT-IN

CYCLE NUMBER 6

MAX. TO AVERAGE POWER DENSITY (START OF CYCLE, NO XF) = 2.6575

CENTRAL ZONE DISCHARGE --

AVERAGE BURNUP IN MWD/TONNE U = 30926.

MAXIMUM BURNUP IN MWD/TONNE U = 33808

TIME IN REACTOR IN YEARS = 3.6179

URANIUM CHARGED IN KG U = 21141.

URANIUM DISCHARGED IN KG U = 20232.4

URANIUM-235 W/O IN DISCHARGE = 0.988

PLUTONIUM DISCHARGED IN KG PU = 187.0

PLUTONIUM COMPOSITION= 239,240,241,242 W/O= 0.548 0.226 0.159 0.066

BILLIONS OF KILOWATT HOURS, ELECTRIC = 4.9113

FUEL COST BREAKDOWN IN MILLIONS OF DOLLARS

1=UF6	5.6083	5.6083	4.1385	5.1768	3.7646	3.7646	5.6083	5.6083
2=FABRICATION	3.1046	3.1280	3.0839	3.1150	3.0727	3.0727	3.1280	2.3389
3=SHIPPING	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480
4=REPROCESSING	0.4933	0.4933	0.4933	0.4933	0.4933	0.	0.4933	0.4933
5=UO2(NO3)2 TO UF6	0.1118	0.1118	0.1118	0.1118	0.1118	0.	0.1118	0.1118
6=UF6 CREDIT	-0.9302	-0.9302	-0.5832	-0.8990	-0.5585	0.	-0.9302	-0.9302
7=PU(NO3)4 TO PU	0.2749	0.2749	0.2749	0.2749	0.2749	0.	0.2749	0.2749
8=PU CREDIT	-1.7412	-1.7412	-1.7412	-1.7412	-1.7412	0.	-1.7412	-1.7412
9=SPARES CAPITAL	0.1103	0.1106	0.0915	0.1050	0.0866	0.0866	0.1106	0.1006
10=UF6 CAPITAL, NON REACTOR	0.1115	0.2817	0.2010	0.2627	0.1847	0.1476	0.1408	0.2817
11=FABRICATION CAPITAL, NON REACTOR	0.1217	0.1226	0.1209	0.1221	0.1205	0.1205	0.0613	0.0917
12=UF6 CAPITAL, REACTOR	0.7023	1.7742	1.2812	1.6486	1.1730	1.0215	0.8871	1.7742
13=FABRICATION CAPITAL, REACTOR	0.8424	0.8488	0.8368	0.8452	0.8337	0.8337	0.4244	0.6346
NET FUEL CYCLE COST	8.9579	10.2309	8.4574	9.6635	7.9642	9.1951	8.7173	9.1867

FUEL COST BREAKDOWN IN MILLS/KWH

1=UF6	1.1419	1.1419	0.8426	1.0541	0.7665	0.7665	1.1419	1.1419
2=FABRICATION	0.6321	0.6369	0.6279	0.6343	0.6256	0.6256	0.6369	0.4762
3=SHIPPING	0.0301	0.0301	0.0301	0.0301	0.0301	0.0301	0.0301	0.0301
4=REPROCESSING	0.1004	0.1004	0.1004	0.1004	0.1004	0.	0.1004	0.1004
5=UO2(NO3)2 TO UF6	0.0228	0.0228	0.0228	0.0228	0.0228	0.	0.0228	0.0228
6=UF6 CREDIT	-0.1894	-0.1894	-0.1187	-0.1830	-0.1137	0.	-0.1894	-0.1894
7=PU(NO3)4 TO PU	0.0560	0.0560	0.0560	0.0560	0.0560	0.	0.0560	0.0560
8=PU CREDIT	-0.3545	-0.3545	-0.3545	-0.3545	-0.3545	0.	-0.3545	-0.3545
9=SPARES CAPITAL	0.0225	0.0225	0.0186	0.0214	0.0176	0.0176	0.0225	0.0205
10=UF6 CAPITAL, NON REACTOR	0.0227	0.0574	0.0409	0.0535	0.0376	0.0301	0.0287	0.0574
11=FABRICATION CAPITAL, NON REACTOR	0.0248	0.0250	0.0246	0.0249	0.0245	0.0245	0.0125	0.0187
12=UF6 CAPITAL, REACTOR	0.1430	0.3612	0.2609	0.3357	0.2388	0.2080	0.1806	0.3612
13=FABRICATION CAPITAL, REACTOR	0.1715	0.1728	0.1704	0.1721	0.1698	0.1698	0.0864	0.1292
NET FUEL CYCLE COST	1.8239	2.0831	1.7220	1.9676	1.6216	1.8722	1.7749	1.8705

Table 6.7e:

ENERGY COST BREAKDOWN FOR FUEL DISCHARGED AT 2.8320 YEARS

3.10 W/O U-235									
3-ZONE OUT-IN									
CYCLE NUMBER 1									
MAX. TO AVERAGE POWER DENSITY (START OF CYCLE, NO XE) = 3.1112									
CENTRAL ZONE DISCHARGE --									
AVERAGE BURNUP IN MWD/TONNE U = 28486.									
MAXIMUM BURNUP IN MWD/TONNE U = 30879									
TIME IN REACTOR IN YEARS = 2.8320									
URANIUM CHARGED IN KG U = 21141.									
URANIUM DISCHARGED IN KG U = 20295.3									
URANIUM-235 W/O IN DISCHARGE = 1.096									
PLUTONIUM DISCHARGED IN KG PU = 182.3									
PLUTONIUM COMPOSITION= 239,240,241,242 W/O= 0.569 0.218 0.156 0.058									
BILLIONS OF KILOWATT HOURS, ELECTRIC = 4.5238									
FUEL COST BREAKDOWN IN MILLIONS OF DOLLARS									
1=UF6	5.6083	5.6083	4.1385	5.1768	3.7646	3.7646	5.6083	5.6083	
2=FABRICATION	3.1490	3.1841	3.1253	3.1668	3.1103	3.1103	3.1841	2.3950	
3=SHIPPING	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	
4=REPROCESSING	0.4933	0.4933	0.4933	0.4933	0.4933	0.4933	0.4933	0.4933	
5=UO2(NO3)2 TO UF6	0.1122	0.1122	0.1122	0.1122	0.1122	0.1122	0.1122	0.1122	
6=UF6 CREDIT	-1.1306	-1.1306	-0.7287	-1.0846	-0.6917	-0.6917	-1.1306	-1.1306	
7=PU(NO3)4 TO PU	0.2680	0.2680	0.2680	0.2680	0.2680	0.	0.2680	0.2680	
8=PU CREDIT	-1.6973	-1.6973	-1.6973	-1.6973	-1.6973	0.	-1.6973	-1.6973	
9=SPARES CAPITAL	0.0868	0.0872	0.0720	0.0827	0.0681	0.0681	0.0872	0.0793	
10=UF6 CAPITAL, NON REACTOR	0.1390	0.3511	0.2521	0.3268	0.2312	0.2312	0.1756	0.3511	
11=FABRICATION CAPITAL, NON REACTOR	0.1550	0.1567	0.1538	0.1558	0.1530	0.1530	0.0783	0.1178	
12=UF6 CAPITAL, REACTOR	0.5666	1.4314	1.0338	1.3299	0.9465	0.9465	0.7157	1.4314	
13=FABRICATION CAPITAL, REACTOR	0.6689	0.6763	0.6638	0.6726	0.6606	0.6606	0.3382	0.5087	
NET FUEL CYCLE COST	8.5671	9.6886	8.0347	9.1512	7.5670	8.9962	8.3808	8.6852	
FUEL COST BREAKDOWN IN MILLS/KWH									
1=UF6	1.2397	1.2397	0.9148	1.1443	0.8322	0.8322	1.2397	1.2397	
2=FABRICATION	0.6961	0.7038	0.6908	0.7000	0.6875	0.6875	0.7038	0.5294	
3=SHIPPING	0.0327	0.0327	0.0327	0.0327	0.0327	0.0327	0.0327	0.0327	
4=REPROCESSING	0.1091	0.1091	0.1091	0.1091	0.1091	0.1091	0.1091	0.1091	
5=UO2(NO3)2 TO UF6	0.0248	0.0248	0.0248	0.0248	0.0248	0.0248	0.0248	0.0248	
6=UF6 CREDIT	-0.2499	-0.2499	-0.1611	-0.2398	-0.1529	-0.1529	-0.2499	-0.2499	
7=PU(NO3)4 TO PU	0.0592	0.0592	0.0592	0.0592	0.0592	0.	0.0592	0.0592	
8=PU CREDIT	-0.3752	-0.3752	-0.3752	-0.3752	-0.3752	0.	-0.3752	-0.3752	
9=SPARES CAPITAL	0.0192	0.0193	0.0159	0.0183	0.0151	0.0151	0.0193	0.0175	
10=UF6 CAPITAL, NON REACTOR	0.0307	0.0776	0.0557	0.0722	0.0511	0.0511	0.0388	0.0776	
11=FABRICATION CAPITAL, NON REACTOR	0.0343	0.0346	0.0340	0.0344	0.0338	0.0338	0.0173	0.0260	
12=UF6 CAPITAL, REACTOR	0.1252	0.3164	0.2285	0.2940	0.2092	0.2092	0.1582	0.3164	
13=FABRICATION CAPITAL, REACTOR	0.1479	0.1495	0.1467	0.1487	0.1460	0.1460	0.0747	0.1124	
NET FUEL CYCLE COST	1.8938	2.1417	1.7761	2.0229	1.6727	1.9886	1.8526	1.9199	

**Table 6.8a: Cost Data for 3 Zone Out-in and 3.50 w/o Enrichment
BREAKDOWN OF ENERGY COST AVERAGED OVER 30.5619 YEARS**

3.50 W/O U-235								
3-ZONE OUT-IN								
AVERAGE BURNUP FOR 16. CYCLES = 34652								
AVERAGE TIME FOR A CYCLE = 1.9101								
FRACTION OF TIME FOR REFUELING = 0.018827								
MAX. TO AVERAGE POWER DENSITY (EQUILIBRIUM CYCLE) = 2.8159								
CENTRAL ZONE DISCHARGE AT EQUILIBRIUM --								
AVERAGE BURNUP IN MWD/TONNE U = 36156.								
MAXIMUM BURNUP IN MWD/TONNE U = 39510								
TIME IN REACTOR IN YEARS = 4.2493								
URANIUM CHARGED IN KG U = 21141.								
URANIUM DISCHARGED IN KG U = 20094.5								
URANIUM-235 W/O IN DISCHARGE = 1.044								
PLUTONIUM DISCHARGED IN KG PU = 199.8								
PLUTONIUM COMPOSITION- 239,240,241,242 W/O= 0.533 0.225 0.166 0.076								
BILLIONS OF KILOWATT HOURS, ELECTRIC = 5.7420								
ENERGY COST BREAKDOWN IN MILLS/KWH								
1=UF6	1.1897	1.1897	0.8847	1.0956	0.8028	0.8028	1.1897	1.1897
2=FABRICATION	0.5701	0.5755	0.5658	0.5725	0.5632	0.5632	0.5755	0.4312
3=SHIPPING	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269
4=REPROCESSING	0.0896	0.0896	0.0896	0.0896	0.0896	0.0847	0.0896	0.0896
5=UO2(NO3)2 TO UF6	0.0202	0.0202	0.0202	0.0202	0.0202	0.0191	0.0202	0.0202
6=UF6 CREDIT	-0.2141	-0.2141	-0.1394	-0.2049	-0.1319	-0.1260	-0.2141	-0.2141
7=PU(NO3)4 TO PU	0.0524	0.0524	0.0524	0.0524	0.0524	0.	0.0524	0.0524
8=PU CREDIT	-0.3316	-0.3316	-0.3316	-0.3316	-0.3316	0.	-0.3316	-0.3316
9=SPARES CAPITAL	0.0251	0.0252	0.0207	0.0238	0.0195	0.0195	0.0252	0.0231
10=UF6 CAPITAL, NON REACTOR	0.0249	0.0629	0.0454	0.0584	0.0416	0.0412	0.0314	0.0629
11=FABRICATION CAPITAL, NON REACTOR	0.0233	0.0235	0.0231	0.0234	0.0230	0.0230	0.0118	0.0176
12=UF6 CAPITAL, REACTOR	0.1680	0.4245	0.3096	0.3933	0.2826	0.2799	0.2122	0.4245
13=FABRICATION CAPITAL, REACTOR	0.1744	0.1761	0.1731	0.1752	0.1723	0.1723	0.0880	0.1320
NET FUEL CYCLE COST	1.8189	2.1207	1.7405	1.9948	1.6307	1.9067	1.7772	1.9244
14=PLANT CAPITAL COSTS	3.9927	3.9927	3.9927	3.9927	3.9927	3.9927	3.9927	3.9927
15=OPERATING COSTS	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000
TOTAL ENERGY COST IN MILLS/KWH	6.3116	6.6134	6.2332	6.4875	6.1234	6.3994	6.2699	6.4171
SPECIAL COST ANALYSIS COMPLETED - D.L.T.								

Table 6.8b:

ENERGY COST BREAKDOWN FOR FUEL DISCHARGED AT 10.2997 YEARS

Equilibrium Cycle

3.50 W/O U-235

3-ZONE OUT-IN

CYCLE NUMBER 6

MAX. TO AVERAGE POWER DENSITY (START OF CYCLE, NO XE) = 2.8159

CENTRAL ZONE DISCHARGE --

AVERAGE BURNUP IN MWD/TONNE U = 36156.

MAXIMUM BURNUP IN MWD/TONNE U = 39510

TIME IN REACTOR IN YEARS = 4.2493

URANIUM CHARGED IN KG U = 21141.

URANIUM DISCHARGED IN KG U = 20094.5

URANIUM-235 W/O IN DISCHARGE = 1.044

PLUTONIUM DISCHARGED IN KG PU = 199.8

PLUTONIUM COMPOSITION- 239,240,241,242 W/O= 0.533 0.225 0.166 0.076

BILLIONS OF KILOWATT HOURS, ELECTRIC = 5.7420

FUEL COST BREAKDOWN IN MILLIONS OF DOLLARS

1=UF6	6.5471	6.5471	4.8685	6.0296	4.4181	4.4181	6.5471	6.5471
2=FABRICATION	3.1289	3.1561	3.1058	3.1406	3.0923	3.0923	3.1561	2.3623
3=SHIPPING	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480
4=REPROCESSING	0.4933	0.4933	0.4933	0.4933	0.4933	0.4933	0.4933	0.4933
5=UO2(NO3)2 TO UF6	0.1111	0.1111	0.1111	0.1111	0.1111	0.1111	0.1111	0.1111
6=UF6 CREDIT	-1.0238	-1.0238	-0.6517	-0.9855	-0.6211	-0.6211	-1.0238	-1.0238
7=PU(NO3)4 TO PU	0.2937	0.2937	0.2937	0.2937	0.2937	0.	0.2937	0.2937
8=PU CREDIT	-1.8598	-1.8598	-1.8598	-1.8598	-1.8598	0.	-1.8598	-1.8598
9=SPARES CAPITAL	0.1439	0.1443	0.1186	0.1364	0.1117	0.1117	0.1443	0.1325
10=UF6 CAPITAL, NON REACTOR	0.1285	0.3247	0.2342	0.3019	0.2145	0.2145	0.1624	0.3247
11=FABRICATION CAPITAL, NON REACTOR	0.1227	0.1237	0.1218	0.1231	0.1212	0.1212	0.0619	0.0926
12=UF6 CAPITAL, REACTOR	0.9551	2.4128	1.7593	2.2357	1.6060	1.6060	1.2064	2.4128
13=FABRICATION CAPITAL, REACTOR	0.9972	1.0059	0.9898	1.0009	0.9855	0.9855	0.5029	0.7529
NET FUEL CYCLE COST	10.1857	11.8771	9.7324	11.1689	9.1145	10.6806	9.9435	10.7873

FUEL COST BREAKDOWN IN MILLS/KWH

1=UF6	1.1402	1.1402	0.8479	1.0501	0.7694	0.7694	1.1402	1.1402
2=FABRICATION	0.5449	0.5497	0.5409	0.5470	0.5385	0.5385	0.5497	0.4114
3=SHIPPING	0.0258	0.0258	0.0258	0.0258	0.0258	0.0258	0.0258	0.0258
4=REPROCESSING	0.0859	0.0859	0.0859	0.0859	0.0859	0.0859	0.0859	0.0859
5=UO2(NO3)2 TO UF6	0.0193	0.0193	0.0193	0.0193	0.0193	0.0193	0.0193	0.0193
6=UF6 CREDIT	-0.1783	-0.1783	-0.1135	-0.1716	-0.1082	-0.1082	-0.1783	-0.1783
7=PU(NO3)4 TO PU	0.0511	0.0511	0.0511	0.0511	0.0511	0.	0.0511	0.0511
8=PU CREDIT	-0.3239	-0.3239	-0.3239	-0.3239	-0.3239	0.	-0.3239	-0.3239
9=SPARES CAPITAL	0.0251	0.0251	0.0207	0.0238	0.0195	0.0195	0.0251	0.0231
10=UF6 CAPITAL, NON REACTOR	0.0224	0.0566	0.0408	0.0526	0.0374	0.0374	0.0283	0.0566
11=FABRICATION CAPITAL, NON REACTOR	0.0214	0.0215	0.0212	0.0214	0.0211	0.0211	0.0108	0.0161
12=UF6 CAPITAL, REACTOR	0.1663	0.4202	0.3064	0.3894	0.2797	0.2797	0.2101	0.4202
13=FABRICATION CAPITAL, REACTOR	0.1737	0.1752	0.1724	0.1743	0.1716	0.1716	0.0876	0.1311
NET FUEL CYCLE COST	1.7739	2.0685	1.6950	1.9451	1.5873	1.8601	1.7317	1.8787

Table 6.8c:

ENERGY COST BREAKDOWN FOR FUEL DISCHARGED AT 3.3226 YEARS

3.50 W/O U-235								
3-ZONE OUT-IN								
CYCLE NUMBER 1								
MAX.TO AVERAGE POWER DENSITY (START OF CYCLE,NO XE) = 3.1112								
CENTRAL ZONE DISCHARGE --								
AVERAGE BURNUP IN MWD/TONNE U = 33011.								
MAXIMUM BURNUP IN MWD/TONNE U = 35575								
TIME IN REACTOR IN YEARS = 3.3226								
URANIUM CHARGED IN KG U = 21141.								
URANIUM DISCHARGED IN KG U = 20174.5								
URANIUM-235 W/O IN DISCHARGE = 1.184								
PLUTONIUM DISCHARGED IN KG PU = 195.3								
PLUTONIUM COMPOSITION- 239,240,241,242 W/O= 0.556 0.216 0.163 0.065								
BILLIONS OF KILOWATT HOURS, ELECTRIC = 5.2425								
FUEL COST BREAKDOWN IN MILLIONS OF DOLLARS								
1=UF6	6.5471	6.5471	4.8685	6.0296	4.4181	4.4181	6.5471	6.5471
2=FABRICATION	3.1807	3.2216	3.1545	3.2009	3.1365	3.1365	3.2216	2.4278
3=SHIPPING	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480	0.1480
4=REPROCESSING	0.4933	0.4933	0.4933	0.4933	0.4933	0.4933	0.4933	0.4933
5=UO2(NO3)2 TO UF6	0.1115	0.1115	0.1115	0.1115	0.1115	0.1115	0.1115	0.1115
6=UF6 CREDIT	-1.2863	-1.2863	-0.8437	-1.2281	-0.7964	-0.7964	-1.2863	-1.2863
7=PU(NO3)4 TO PU	0.2870	0.2870	0.2870	0.2870	0.2870	0.	0.2870	0.2870
8=PU CREDIT	-1.8178	-1.8178	-1.8178	-1.8178	-1.8178	0.	-1.8178	-1.8178
9=SPARES CAPITAL	0.1131	0.1136	0.0933	0.1073	0.0879	0.0879	0.1136	0.1044
10=UF6 CAPITAL, NON REACTOR	0.1614	0.4076	0.2956	0.3783	0.2703	0.2703	0.2038	0.4076
11=FABRICATION CAPITAL, NON REACTOR	0.1565	0.1585	0.1552	0.1575	0.1543	0.1543	0.0793	0.1195
12=UF6 CAPITAL, REACTOR	0.7727	1.9520	1.4235	1.8086	1.2994	1.2994	0.9760	1.9520
13=FABRICATION CAPITAL, REACTOR	0.7926	0.8028	0.7861	0.7977	0.7816	0.7816	0.4014	0.6050
NET FUEL CYCLE COST	9.6598	11.1390	9.1549	10.4739	8.5738	10.1046	9.4785	10.0991
FUEL COST BREAKDOWN IN MILLS/KWH								
1=UF6	1.2488	1.2488	0.9287	1.1501	0.8428	0.8428	1.2488	1.2488
2=FABRICATION	0.6067	0.6145	0.6017	0.6106	0.5983	0.5983	0.6145	0.4631
3=SHIPPING	0.0282	0.0282	0.0282	0.0282	0.0282	0.0282	0.0282	0.0282
4=REPROCESSING	0.0941	0.0941	0.0941	0.0941	0.0941	0.0941	0.0941	0.0941
5=UO2(NO3)2 TO UF6	0.0213	0.0213	0.0213	0.0213	0.0213	0.0213	0.0213	0.0213
6=UF6 CREDIT	-0.2454	-0.2454	-0.1609	-0.2343	-0.1519	-0.1519	-0.2454	-0.2454
7=PU(NO3)4 TO PU	0.0547	0.0547	0.0547	0.0547	0.0547	0.	0.0547	0.0547
8=PU CREDIT	-0.3467	-0.3467	-0.3467	-0.3467	-0.3467	0.	-0.3467	-0.3467
9=SPARES CAPITAL	0.0216	0.0217	0.0178	0.0205	0.0168	0.0168	0.0217	0.0199
10=UF6 CAPITAL, NON REACTOR	0.0308	0.0778	0.0564	0.0722	0.0516	0.0516	0.0389	0.0778
11=FABRICATION CAPITAL, NON REACTOR	0.0299	0.0302	0.0296	0.0300	0.0294	0.0294	0.0151	0.0228
12=UF6 CAPITAL, REACTOR	0.1474	0.3724	0.2715	0.3450	0.2479	0.2479	0.1862	0.3724
13=FABRICATION CAPITAL, REACTOR	0.1512	0.1531	0.1499	0.1522	0.1491	0.1491	0.0766	0.1154
NET FUEL CYCLE COST	1.8426	2.1248	1.7463	1.9979	1.6355	1.9274	1.8080	1.9264

Table 6.9a: Cost Data for 5 Zone out-in and 2.00 w/o Enrichment
BREAKDOWN OF ENERGY COST AVERAGED OVER 30.2532 YEARS

2.00 W/O U-235
5-ZONE OUT-IN

AVERAGE BURNUP FOR 53. CYCLES = 17749

AVERAGE TIME FOR A CYCLE = 0.5708

FRACTION OF TIME FOR REFUELING = 0.065934

MAX. TO AVERAGE POWER DENSITY (EQUILIBRIUM CYCLE) = 1.9912

CENTRAL ZONE DISCHARGE AT EQUILIBRIUM --
AVERAGE BURNUP IN MWD/TONNE U = 18341
MAXIMUM BURNUP IN MWD/TONNE U = 20370
TIME IN REACTOR IN YEARS = 2.1629
URANIUM CHARGED IN KG U = 12685.
URANIUM DISCHARGED IN KG U = 12343.4
URANIUM-235 W/O IN DISCHARGE = 0.749
PLUTONIUM DISCHARGED IN KG PU = 87.1
PLUTONIUM COMPOSITION- 239,240,241,242 W/O= 0.593 0.228 0.135 0.043
BILLIONS OF KILOWATT HOURS, ELECTRIC = 1.7477

ENERGY COST BREAKDOWN IN MILLS/KWH

1=UF6	1.0988	1.0988	0.7810	1.0255	0.7187	0.7187	1.0988	1.0988
2=FABRICATION	1.0792	1.0840	1.0741	1.0817	1.0722	1.0722	1.0840	0.8085
3=SHIPPING	0.0525	0.0525	0.0525	0.0525	0.0525	0.0525	0.0525	0.0525
4=REPROCESSING	0.2070	0.2070	0.2070	0.2070	0.2070	0.0073	0.2070	0.2070
5=UO2(NO3)2 TO UF6	0.0404	0.0404	0.0404	0.0404	0.0404	0.0014	0.0404	0.0404
6=UF6 CREDIT	-0.2113	-0.2113	-0.1227	-0.2085	-0.1205	-0.0144	-0.2113	-0.2113
7=PU(NO3)4 TO PU	0.0741	0.0741	0.0741	0.0741	0.0741	0.	0.0741	0.0741
8=PU CREDIT	-0.4691	-0.4691	-0.4691	-0.4691	-0.4691	0.	-0.4691	-0.4691
9=SPARES CAPITAL	0.0160	0.0160	0.0136	0.0154	0.0131	0.0131	0.0160	0.0160
10=UF6 CAPITAL, NON REACTOR	0.0228	0.0575	0.0391	0.0544	0.0365	0.0297	0.0287	0.0575
11=FABRICATION CAPITAL, NON-REACTOR	0.0433	0.0435	0.0431	0.0434	0.0430	0.0430	0.0217	0.0324
12=UF6 CAPITAL, REACTOR	0.0807	0.2038	0.1405	0.1919	0.1305	0.1136	0.1019	0.2038
13=FABRICATION CAPITAL, REACTOR	0.1695	0.1703	0.1687	0.1699	0.1684	0.1684	0.0851	0.1270
NET FUEL CYCLE COST	2.2038	2.3674	2.0423	2.2787	1.9669	2.2056	2.1299	2.0355
14=PLANT CAPITAL COSTS	3.9927	3.9927	3.9927	3.9927	3.9927	3.9927	3.9927	3.9927
15=OPERATING COSTS	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000
TOTAL ENERGY COST IN MILLS/KWH	6.6965	6.8601	6.5350	6.7714	6.4596	6.6983	6.6226	6.5282

SPECIAL COST ANALYSIS COMPLETED - D.L.T.

Table 6.9b:

ENERGY COST BREAKDOWN FOR FUEL DISCHARGED AT 4.3992 YEARS

Equilibrium Cycle

2.00 W/O U-235

5-ZONE OUT-IN

CYCLE NUMBER 8

MAX. TO AVERAGE POWER DENSITY (START OF CYCLE, NO XE) = 1.9912

CENTRAL ZONE DISCHARGE --

AVERAGE BURNUP IN MWD/TONNE U = 18341.

MAXIMUM BURNUP IN MWD/TONNE U = 20370

TIME IN REACTOR IN YEARS = 2.1629

URANIUM CHARGED IN KG U = 12685.

URANIUM DISCHARGED IN KG U = 12343.4

URANIUM-235 W/O IN DISCHARGE = 0.749

PLUTONIUM DISCHARGED IN KG PU = 87.1

PLUTONIUM COMPOSITION= 239,240,241,242 W/U= 0.593 0.228 0.135 0.043

BILLIONS OF KILOWATT HOURS, ELECTRIC = 1.7477

FUEL COST BREAKDOWN IN MILLIONS OF DOLLARS

1=UF6	1.8584	1.8584	1.3209	1.7344	1.2156	1.2156	1.8584	1.8584
2=FABRICATION	1.8239	1.8316	1.8155	1.8279	1.8124	1.8124	1.8316	1.3657
3=SHIPPING	0.0888	0.0888	0.0888	0.0888	0.0888	0.0888	0.0888	0.0888
4=REPROCESSING	0.3502	0.3502	0.3502	0.3502	0.3502	0.	0.3502	0.3502
5=UO2(N03)2 TO UF6	0.0682	0.0682	0.0682	0.0682	0.0682	0.	0.0682	0.0682
6=UF6 CREDIT	-0.3221	-0.3221	-0.1821	-0.3198	-0.1805	0.	-0.3221	-0.3221
7=PU(N03)4 TO PU	0.1280	0.1280	0.1280	0.1280	0.1280	0.	0.1280	0.1280
8=PU CREDIT	-0.8110	-0.8110	-0.8110	-0.8110	-0.8110	0.	-0.8110	-0.8110
9=SPARES CAPITAL	0.0279	0.0279	0.0237	0.0270	0.0229	0.0229	0.0279	0.0244
10=UF6 CAPITAL, NON REACTOR	0.0370	0.0934	0.0634	0.0884	0.0591	0.0477	0.0467	0.0934
11=FABRICATION CAPITAL, NON REACTOR	0.0715	0.0718	0.0712	0.0717	0.0711	0.0711	0.0359	0.0535
12=UF6 CAPITAL, REACTOR	0.1400	0.3537	0.2438	0.3332	0.2265	0.1972	0.1769	0.3537
13=FABRICATION CAPITAL, REACTOR	0.2959	0.2971	0.2945	0.2965	0.2940	0.2940	0.1486	0.2215
NET FUEL CYCLE COST	3.7567	4.0362	3.4753	3.8835	3.3454	3.7496	3.6282	3.4728

FUEL COST BREAKDOWN IN MILLS/KWH

1=UF6	1.0633	1.0633	0.7558	0.9924	0.6955	0.6955	1.0633	1.0633
2=FABRICATION	1.0436	1.0480	1.0388	1.0459	1.0370	1.0370	1.0480	0.7814
3=SHIPPING	0.0508	0.0508	0.0508	0.0508	0.0508	0.0508	0.0508	0.0508
4=REPROCESSING	0.2004	0.2004	0.2004	0.2004	0.2004	0.	0.2004	0.2004
5=UO2(N03)2 TO UF6	0.0390	0.0390	0.0390	0.0390	0.0390	0.	0.0390	0.0390
6=UF6 CREDIT	-0.1843	-0.1843	-0.1042	-0.1830	-0.1033	0.	-0.1843	-0.1843
7=PU(N03)4 TO PU	0.0733	0.0733	0.0733	0.0733	0.0733	0.	0.0733	0.0733
8=PU CREDIT	-0.4640	-0.4640	-0.4640	-0.4640	-0.4640	0.	-0.4640	-0.4640
9=SPARES CAPITAL	0.0159	0.0160	0.0136	0.0154	0.0131	0.0131	0.0160	0.0140
10=UF6 CAPITAL, NON REACTOR	0.0211	0.0534	0.0363	0.0506	0.0338	0.0273	0.0267	0.0534
11=FABRICATION CAPITAL, NON REACTOR	0.0409	0.0411	0.0407	0.0410	0.0407	0.0407	0.0205	0.0306
12=UF6 CAPITAL, REACTOR	0.0801	0.2024	0.1395	0.1907	0.1296	0.1128	0.1012	0.2024
13=FABRICATION CAPITAL, REACTOR	0.1693	0.1700	0.1685	0.1697	0.1682	0.1682	0.0850	0.1268
NET FUEL CYCLE COST	2.1495	2.3094	1.9884	2.2220	1.9141	2.1454	2.0759	1.9870

Table 6.9c:

ENERGY COST BREAKDOWN FOR FUEL DISCHARGED AT 1.4459 YEARS

2.00 W/O U-235

5-ZONE OUT-IN

CYCLE NUMBER 1

MAX. TO AVERAGE POWER DENSITY (START OF CYCLE, NO XE) = 3.0546

CENTRAL ZONE DISCHARGE --

AVERAGE BURNUP IN MWD/TONNE U = 15613.

MAXIMUM BURNUP IN MWD/TONNE U = 17271

TIME IN REACTOR IN YEARS = 1.4459

URANIUM CHARGED IN KG U = 12685.

URANIUM DISCHARGED IN KG U = 12388.2

URANIUM-235 W/O IN DISCHARGE = 0.873

PLUTONIUM DISCHARGED IN KG PU = 80.7

PLUTONIUM COMPOSITION= 239,240,241,242 W/O= 0.629 0.214 0.125 0.033

BILLIONS OF KILOWATT HOURS, ELECTRIC = 1.4878

FUEL COST BREAKDOWN IN MILLIONS OF DOLLARS

1=UF6	1.8584	1.8584	1.3209	1.7344	1.2156	1.2156	1.8584	1.8584
2=FABRICATION	1.8386	1.8502	1.8287	1.8453	1.8245	1.8245	1.8502	1.3843
3=SHIPPING	0.0888	0.0888	0.0888	0.0888	0.0888	0.0888	0.0888	0.0888
4=REPROCESSING	0.3502	0.3502	0.3502	0.3502	0.3502	0.	0.3502	0.3502
5=UO2(NO3)2 TO UF6	0.0685	0.0685	0.0685	0.0685	0.0685	0.	0.0685	0.0685
6=UF6 CREDIT	-0.4472	-0.4472	-0.2694	-0.4368	-0.2614	0.	-0.4472	-0.4472
7=PU(NO3)4 TO PU	0.1186	0.1186	0.1186	0.1186	0.1186	0.	0.1186	0.1186
8=PU CREDIT	-0.7514	-0.7514	-0.7514	-0.7514	-0.7514	0.	-0.7514	-0.7514
9=SPARES CAPITAL	0.0187	0.0188	0.0159	0.0181	0.0154	0.0154	0.0188	0.0164
10=UF6 CAPITAL, NON REACTOR	0.0475	0.1199	0.0822	0.1132	0.0765	0.0598	0.0600	0.1199
11=FABRICATION CAPITAL, NON REACTOR	0.0905	0.0910	0.0900	0.0908	0.0898	0.0898	0.0455	0.0681
12=UF6 CAPITAL, REACTOR	0.0990	0.2500	0.1725	0.2354	0.1602	0.1318	0.1250	0.2500
13=FABRICATION CAPITAL, REACTOR	0.1994	0.2006	0.1983	0.2001	0.1979	0.1979	0.1003	0.1501
NET FUEL CYCLE COST	3.5795	3.8165	3.3138	3.6752	3.1930	3.6236	3.4857	3.2748

FUEL COST BREAKDOWN IN MILLS/KWH

1=UF6	1.2491	1.2491	0.8878	1.1657	0.8170	0.8170	1.2491	1.2491
2=FABRICATION	1.2358	1.2436	1.2292	1.2403	1.2263	1.2263	1.2436	0.9304
3=SHIPPING	0.0597	0.0597	0.0597	0.0597	0.0597	0.0597	0.0597	0.0597
4=REPROCESSING	0.2354	0.2354	0.2354	0.2354	0.2354	0.	0.2354	0.2354
5=UO2(NO3)2 TO UF6	0.0460	0.0460	0.0460	0.0460	0.0460	0.	0.0460	0.0460
6=UF6 CREDIT	-0.3006	-0.3006	-0.1811	-0.2936	-0.1757	0.	-0.3006	-0.3006
7=PU(NO3)4 TO PU	0.0797	0.0797	0.0797	0.0797	0.0797	0.	0.0797	0.0797
8=PU CREDIT	-0.5051	-0.5051	-0.5051	-0.5051	-0.5051	0.	-0.5051	-0.5051
9=SPARES CAPITAL	0.0126	0.0126	0.0107	0.0122	0.0103	0.0103	0.0126	0.0110
10=UF6 CAPITAL, NON REACTOR	0.0319	0.0806	0.0552	0.0761	0.0514	0.0402	0.0403	0.0806
11=FABRICATION CAPITAL, NON REACTOR	0.0608	0.0612	0.0605	0.0610	0.0603	0.0603	0.0306	0.0458
12=UF6 CAPITAL, REACTOR	0.0665	0.1681	0.1159	0.1583	0.1077	0.0886	0.0840	0.1681
13=FABRICATION CAPITAL, REACTOR	0.1340	0.1349	0.1333	0.1345	0.1330	0.1330	0.0674	0.1009
NET FUEL CYCLE COST	2.4059	2.5652	2.2273	2.4702	2.1461	2.4355	2.3429	2.2011

Table 6.10a: Cost Data for 5 Zone Out-in and 2.75 w/o Enrichment
BREAKDOWN OF ENERGY COST AVERAGED OVER 30.6700 YEARS

2.75 W/O U-235
 5-ZONE OUT-IN

AVERAGE BURNUP FOR 34. CYCLES = 27414

AVERAGE TIME FOR A CYCLE = 0.9021

FRACTION OF TIME FOR REFUELING = 0.041274

MAX. TO AVERAGE POWER DENSITY (EQUILIBRIUM CYCLE) = 2.1511

CENTRAL ZONE DISCHARGE AT EQUILIBRIUM --

AVERAGE BURNUP IN MWD/TONNE U = 28603

MAXIMUM BURNUP IN MWD/TONNE U = 30933

TIME IN REACTOR IN YEARS = 3.3579

URANIUM CHARGED IN KG U = 12685

URANIUM DISCHARGED IN KG U = 12177.7

URANIUM-235 W/O IN DISCHARGE = 0.841

PLUTONIUM DISCHARGED IN KG PU = 107.4

PLUTONIUM COMPOSITION- 239,240,241,242 W/O= 0.545 0.233 0.156 0.066

BILLIONS OF KILOWATT HOURS, ELECTRIC = 2.7256

ENERGY COST BREAKDOWN IN MILLS/KWH

1=UF6	1.1016	1.1016	0.8060	1.0195	0.7351	0.7351	1.1016	1.1016
2=FABRICATION	0.7094	0.7143	0.7051	0.7118	0.7029	0.7029	0.7143	0.5340
3=SHIPPING	0.0340	0.0340	0.0340	0.0340	0.0340	0.0340	0.0340	0.0340
4=REPROCESSING	0.1341	0.1341	0.1341	0.1341	0.1341	0.0071	0.1341	0.1341
5=UO2(NO3)2 TO UF6	0.0258	0.0258	0.0258	0.0258	0.0258	0.0014	0.0258	0.0258
6=UF6 CREDIT	-0.1827	-0.1827	-0.1123	-0.1776	-0.1082	-0.0188	-0.1827	-0.1827
7=PU(NO3)4 TO PU	0.0590	0.0590	0.0590	0.0590	0.0590	0.	0.0590	0.0590
8=PU CREDIT	-0.3739	-0.3739	-0.3739	-0.3739	-0.3739	0.	-0.3739	-0.3739
9=SPARES CAPITAL	0.0204	0.0205	0.0170	0.0195	0.0162	0.0162	0.0205	0.0185
10=UF6 CAPITAL, NON REACTOR	0.0223	0.0563	0.0398	0.0526	0.0367	0.0310	0.0281	0.0563
11=FABRICATION CAPITAL, NON REACTOR	0.0288	0.0290	0.0286	0.0289	0.0285	0.0285	0.0145	0.0217
12=UF6 CAPITAL, REACTOR	0.1213	0.3064	0.2189	0.2856	0.2011	0.1789	0.1532	0.3064
13=FABRICATION CAPITAL, REACTOR	0.1715	0.1727	0.1704	0.1721	0.1699	0.1699	0.0863	0.1291
NET FUEL CYCLE COST	1.8716	2.0970	1.7525	1.9913	1.6611	1.8862	1.8149	1.8638
14=PLANT CAPITAL COSTS	3.9927	3.9927	3.9927	3.9927	3.9927	3.9927	3.9927	3.9927
15=OPERATING COSTS	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000
TOTAL ENERGY COST IN MILLS/KWH	6.3643	6.5897	6.2452	6.4840	6.1538	6.3789	6.3076	6.3565

SPECIAL COST ANALYSIS COMPLETED - D.L.T.

Table 6.10b:

ENERGY COST BREAKDOWN FOR FUEL DISCHARGED AT 7.0310 YEARS

Equilibrium Cycle

2.75 W/O U-235

5-ZONE OUT-IN

CYCLE NUMBER 8

MAX. TO AVERAGE POWER DENSITY (START OF CYCLE, NO XE) = 2.1511

CENTRAL ZONE DISCHARGE

AVERAGE BURNUP IN MWD/TONNE U = 28603.

MAXIMUM BURNUP IN MWD/TONNE U = 30933

TIME IN REACTOR IN YEARS = 3.3579

URANIUM CHARGED IN KG U = 12685.

URANIUM DISCHARGED IN KG U = 12177.7

URANIUM-235 W/O IN DISCHARGE = 0.841

PLUTONIUM DISCHARGED IN KG PU = 107.4

PLUTONIUM COMPOSITION- 239,240,241,242 W/O= 0.545 0.233 0.156 0.066

BILLIONS OF KILOWATT HOURS, ELECTRIC = 2.7256

FUEL COST BREAKDOWN IN MILLIONS OF DOLLARS

1=UF6	2.8778	2.8778	2.1054	2.6631	1.9203	1.9203	2.8778	2.8778
2=FABRICATION	1.8502	1.8622	1.8391	1.8558	1.8335	1.8335	1.8622	1.3912
3=SHIPPING	0.0888	0.0888	0.0888	0.0888	0.0888	0.0888	0.0888	0.0888
4=REPROCESSING	0.3502	0.3502	0.3502	0.3502	0.3502	0.	0.3502	0.3502
5=UO2(N03)2 TO UF6	0.0673	0.0673	0.0673	0.0673	0.0673	0.	0.0673	0.0673
6=UF6 CREDIT	-0.4074	-0.4074	-0.2421	-0.3993	-0.2359	0.	-0.4074	-0.4074
7=PU(N03)4 TO PU	0.1578	0.1578	0.1578	0.1578	0.1578	0.	0.1578	0.1578
8=PU CREDIT	-0.9997	-0.9997	-0.9997	-0.9997	-0.9997	0.	-0.9997	-0.9997
9=SPARES CAPITAL	0.0556	0.0557	0.0464	0.0531	0.0441	0.0441	0.0557	0.0502
10=UF6 CAPITAL, NON REACTOR	0.0549	0.1388	0.0980	0.1298	0.0903	0.0753	0.0694	0.1388
11=FABRICATION CAPITAL, NON REACTOR	0.0725	0.0730	0.0721	0.0728	0.0719	0.0719	0.0365	0.0545
12=UF6 CAPITAL, REACTOR	0.3275	0.8273	0.5912	0.7713	0.5430	0.4836	0.4137	0.8273
13=FABRICATION CAPITAL, REACTOR	0.4660	0.4690	0.4632	0.4674	0.4618	0.4618	0.2345	0.3504
NET FUEL CYCLE COST	4.9616	5.5609	4.6377	5.2783	4.3934	4.9792	4.8068	4.9472

FUEL COST BREAKDOWN IN MILLS/KWH

1=UF6	1.0558	1.0558	0.7725	0.9771	0.7045	0.7045	1.0558	1.0558
2=FABRICATION	0.6788	0.6832	0.6747	0.6809	0.6727	0.6727	0.6832	0.5104
3=SHIPPING	0.0326	0.0326	0.0326	0.0326	0.0326	0.0326	0.0326	0.0326
4=REPROCESSING	0.1285	0.1285	0.1285	0.1285	0.1285	0.	0.1285	0.1285
5=UO2(N03)2 TO UF6	0.0247	0.0247	0.0247	0.0247	0.0247	0.	0.0247	0.0247
6=UF6 CREDIT	-0.1495	-0.1495	-0.0888	-0.1465	-0.0866	0.	-0.1495	-0.1495
7=PU(N03)4 TO PU	0.0579	0.0579	0.0579	0.0579	0.0579	0.	0.0579	0.0579
8=PU CREDIT	-0.3668	-0.3668	-0.3668	-0.3668	-0.3668	0.	-0.3668	-0.3668
9=SPARES CAPITAL	0.0204	0.0204	0.0170	0.0195	0.0162	0.0162	0.0204	0.0184
10=UF6 CAPITAL, NON REACTOR	0.0202	0.0509	0.0359	0.0476	0.0331	0.0276	0.0255	0.0509
11=FABRICATION CAPITAL, NON REACTOR	0.0266	0.0268	0.0265	0.0267	0.0264	0.0264	0.0134	0.0200
12=UF6 CAPITAL, REACTOR	0.1202	0.3035	0.2169	0.2830	0.1992	0.1774	0.1518	0.3035
13=FABRICATION CAPITAL, REACTOR	0.1710	0.1721	0.1699	0.1715	0.1694	0.1694	0.0860	0.1285
NET FUEL CYCLE COST	1.8204	2.0403	1.7015	1.9366	1.6119	1.8269	1.7636	1.8151

Table 6.10c:

- ENERGY COST BREAKDOWN FOR FUEL DISCHARGED AT 2.4247 YEARS

2.75 W/O U-235
5-ZONE OUT-IN
CYCLE NUMBER 1

MAX. TO AVERAGE POWER DENSITY (START OF CYCLE, NO XE) = 3.0546

CENTRAL ZONE DISCHARGE --
AVERAGE BURNUP IN MWD/TONNE U = 24660.
MAXIMUM BURNUP IN MWD/TONNE U = 26621
TIME IN REACTOR IN YEARS = 2.4247
URANIUM CHARGED IN KG U = 12685.
URANIUM DISCHARGED IN KG U = 12239.3
URANIUM-235 W/O IN DISCHARGE = 1.011
PLUTONIUM DISCHARGED IN KG PU = 102.1
PLUTONIUM COMPOSITION= 239,240,241,242 W/O= 0.581 0.219 0.149 0.051
BILLIONS OF KILOWATT HOURS, ELECTRIC = 2.3499

FUEL COST BREAKDOWN IN MILLIONS OF DOLLARS

1=UF6	2.8778	2.8778	2.1054	2.6631	1.9203	1.9203	2.8778	2.8778
2=FABRICATION	1.8730	1.8910	1.8601	1.8824	1.8527	1.8527	1.8910	1.4200
3=SHIPPING	0.0888	0.0888	0.0888	0.0888	0.0888	0.0888	0.0888	0.0888
4=REPROCESSING	0.3502	0.3502	0.3502	0.3502	0.3502	0.	0.3502	0.3502
5=UO2(NO3)2 TO UF6	0.0676	0.0676	0.0676	0.0676	0.0676	0.	0.0676	0.0676
6=UF6 CREDIT	-0.5882	-0.5882	-0.3712	-0.5675	-0.3548	0.	-0.5882	-0.5882
7=PU(NO3)4 TO PU	0.1501	0.1501	0.1501	0.1501	0.1501	0.	0.1501	0.1501
8=PU CREDIT	-0.9507	-0.9507	-0.9507	-0.9507	-0.9507	0.	-0.9507	-0.9507
9=SPARES CAPITAL	0.0403	0.0405	0.0337	0.0386	0.0320	0.0320	0.0405	0.0365
10=UF6 CAPITAL, NON REACTOR	0.0709	0.1791	0.1272	0.1672	0.1171	0.0945	0.0895	0.1791
11=FABRICATION CAPITAL, NON REACTOR	0.0922	0.0930	0.0915	0.0926	0.0912	0.0912	0.0465	0.0699
12=UF6 CAPITAL, REACTOR	0.2495	0.6303	0.4504	0.5875	0.4137	0.3492	0.3152	0.6303
13=FABRICATION CAPITAL, REACTOR	0.3406	0.3439	0.3383	0.3423	0.3369	0.3369	0.1719	0.2582
NET FUEL CYCLE COST	4.6621	5.1734	4.3414	4.9123	4.1151	4.7656	4.5502	4.5895

FUEL COST BREAKDOWN IN MILLS/KWH

1=UF6	1.2247	1.2247	0.8960	1.1333	0.8172	0.8172	1.2247	1.2247
2=FABRICATION	0.7971	0.8047	0.7916	0.8011	0.7884	0.7884	0.8047	0.6043
3=SHIPPING	0.0378	0.0378	0.0378	0.0378	0.0378	0.0378	0.0378	0.0378
4=REPROCESSING	0.1490	0.1490	0.1490	0.1490	0.1490	0.	0.1490	0.1490
5=UO2(NO3)2 TO UF6	0.0288	0.0288	0.0288	0.0288	0.0288	0.	0.0288	0.0288
6=UF6 CREDIT	-0.2503	-0.2503	-0.1580	-0.2415	-0.1510	0.	-0.2503	-0.2503
7=PU(NO3)4 TO PU	0.0639	0.0639	0.0639	0.0639	0.0639	0.	0.0639	0.0639
8=PU CREDIT	-0.4046	-0.4046	-0.4046	-0.4046	-0.4046	0.	-0.4046	-0.4046
9=SPARES CAPITAL	0.0172	0.0172	0.0143	0.0164	0.0136	0.0136	0.0172	0.0155
10=UF6 CAPITAL, NON REACTOR	0.0302	0.0762	0.0541	0.0711	0.0498	0.0402	0.0381	0.0762
11=FABRICATION CAPITAL, NON REACTOR	0.0392	0.0396	0.0390	0.0394	0.0388	0.0388	0.0198	0.0297
12=UF6 CAPITAL, REACTOR	0.1062	0.2682	0.1917	0.2500	0.1761	0.1486	0.1341	0.2682
13=FABRICATION CAPITAL, REACTOR	0.1450	0.1463	0.1440	0.1457	0.1434	0.1434	0.0732	0.1099
NET FUEL CYCLE COST	1.9840	2.2016	1.8475	2.0904	1.7512	2.0280	1.9364	1.9531

Table 6.11a: Cost Data for 5 Zone Out-in and 3.10 w/o Enrichment
 BREAKDOWN OF ENERGY COST AVERAGED OVER 30.9590 YEARS

3.10 W/O U-235 5-ZONE OUT-IN									
AVERAGE BURNUP FOR 29. CYCLES = 31811									
AVERAGE TIME FOR A CYCLE = 1.0676									
FRACTION OF TIME FOR REFUELING = 0.034694									
MAX. TO AVERAGE POWER DENSITY (EQUILIBRIUM CYCLE) = 2.2567									
CENTRAL ZONE DISCHARGE AT EQUILIBRIUM --									
AVERAGE BURNUP IN MWD/TONNE U = 33370.									
MAXIMUM BURNUP IN MWD/TONNE U = 35816									
TIME IN REACTOR IN YEARS = 3.9367									
URANIUM CHARGED IN KG U = 12685.									
URANIUM DISCHARGED IN KG U = 12102.2									
URANIUM-235 W/O IN DISCHARGE = 0.882									
PLUTONIUM DISCHARGED IN KG PU = 114.8									
PLUTONIUM COMPOSITION= 239,240,241,242 W/O= 0.529 0.234 0.162 0.075									
BILLIONS OF KILOWATT HOURS, ELECTRIC = 3.1799									
ENERGY COST BREAKDOWN IN MILLS/KWH									
1=UF6	1.1101	1.1101	0.8192	1.0247	0.7452	0.7452	1.1101	1.1101	
2=FABRICATION	0.6159	0.6268	0.6117	0.6182	0.6093	0.6093	0.6208	0.6646	
3=SHIPPING	0.0293	0.0293	0.0293	0.0293	0.0293	0.0293	0.0293	0.0293	
4=REPROCESSING	0.1155	0.1155	0.1155	0.1155	0.1155	0.0105	0.1155	0.1155	
5=UO2(NO3)2 TO UF6	0.0221	0.0221	0.0221	0.0221	0.0221	0.0020	0.0221	0.0221	
6=UF6 CREDIT	-0.1775	-0.1775	-0.1114	-0.1715	-0.1066	-0.0254	-0.1775	-0.1775	
7=PU(NO3)4 TO PU	0.0544	0.0544	0.0544	0.0544	0.0544	0.	0.0544	0.0544	
8=PU CREDIT	-0.3443	-0.3443	-0.3443	-0.3443	-0.3443	0.	-0.3443	-0.3443	
9=SPARES CAPITAL	0.0227	0.0228	0.0188	0.0216	0.0178	0.0178	0.0228	0.0207	
10=UF6 CAPITAL, NON REACTOR	0.0224	0.0565	0.0405	0.0526	0.0371	0.0320	0.0283	0.0565	
11=FABRICATION CAPITAL, NON REACTOR	0.0251	0.0253	0.0249	0.0252	0.0248	0.0248	0.0126	0.0189	
12=UF6 CAPITAL, REACTOR	0.1414	0.3573	0.2581	0.3320	0.2363	0.2123	0.1786	0.3573	
13=FABRICATION CAPITAL, REACTOR	0.1735	0.1749	0.1723	0.1741	0.1716	0.1716	0.0874	0.1309	
NET FUEL CYCLE COST	1.8106	2.0672	1.7110	1.9539	1.6125	1.8294	1.7602	1.8586	
14=PLANT CAPITAL COSTS	3.9927	3.9927	3.9927	3.9927	3.9927	3.9927	3.9927	3.9927	
15=OPERATING COSTS	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	
TOTAL ENERGY COST IN MILLS/KWH	6.3033	6.5599	6.2037	6.4466	6.1052	6.3221	6.2529	6.3513	
SPECIAL COST ANALYSIS COMPLETED - D.L.T.									

Table 6.11b:

ENERGY COST BREAKDOWN FOR FUEL DISCHARGED AT 9.8207 YEARS									
Equilibrium Cycle									
3.10 W/O U-235									
5-ZONE OUT-IN									
CYCLE NUMBER 10									
MAX.TO AVERAGE POWER DENSITY (START OF CYCLE,NO XE) = 2.2567									
CENTRAL ZONE DISCHARGE --									
AVERAGE BURNUP IN MWD/TONNE U = 33370.									
MAXIMUM BURNUP IN MWD/TONNE U = 35816									
TIME IN REACTOR IN YEARS = 3.9367									
URANIUM CHARGED IN KG U = 12685.									
URANIUM DISCHARGED IN KG U = 12102.2									
URANIUM-235 W/O IN DISCHARGE = 0.882									
PLUTONIUM DISCHARGED IN KG PU = 114.8									
PLUTONIUM COMPOSITION- 239,240,241,242 W/O= 0.529 0.234 0.162 0.075									
BILLIONS OF KILOWATT HOURS, ELECTRIC = 3.1799									
FUEL COST BREAKDOWN IN MILLIONS OF DOLLARS									
1=UF6	3.3651	3.3651	2.4832	3.1062	2.2588	2.2588	3.3651	3.3651	
2=FABRICATION	1.8628	1.8768	1.8504	1.8691	1.8437	1.8437	1.8768	1.4034	
3=SHIPPING	0.0888	0.0888	0.0888	0.0888	0.0888	0.0888	0.0888	0.0888	
4=REPROCESSING	0.3502	0.3502	0.3502	0.3502	0.3502	0.	0.3502	0.3502	
5=UO2(NO3)2 TO UF6	0.0669	0.0669	0.0669	0.0669	0.0669	0.	0.0669	0.0669	
6=UF6 CREDIT	-0.4460	-0.4460	-0.2697	-0.4352	-0.2613	0.	-0.4460	-0.4460	
7=PU(NO3)4 TO PU	0.1687	0.1687	0.1687	0.1687	0.1687	0.	0.1687	0.1687	
8=PU CREDIT	-1.0687	-1.0687	-1.0687	-1.0687	-1.0687	0.	-1.0687	-1.0687	
9=SPARES CAPITAL	0.0720	0.0722	0.0597	0.0686	0.0565	0.0565	0.0722	0.0657	
10=UF6 CAPITAL, NON REACTOR	0.0635	0.1603	0.1145	0.1495	0.1052	0.0886	0.0802	0.1603	
11=FABRICATION CAPITAL, NON REACTOR	0.0730	0.0736	0.0725	0.0733	0.0723	0.0723	0.0368	0.0550	
12=UF6 CAPITAL, REACTOR	0.4454	1.1252	0.8128	1.0456	0.7441	0.6669	0.5626	1.1252	
13=FABRICATION CAPITAL, REACTOR	0.5500	0.5541	0.5463	0.5519	0.5444	0.5444	0.2771	0.4143	
NET FUEL CYCLE COST	5.5918	6.3874	5.2757	6.0348	4.9695	5.6199	5.4308	5.7490	
FUEL COST BREAKDOWN IN MILLS/KWH									
1=UF6	1.0583	1.0583	0.7809	0.9768	0.7104	0.7104	1.0583	1.0583	
2=FABRICATION	0.5858	0.5902	0.5819	0.5878	0.5798	0.5798	0.5902	0.4413	
3=SHIPPING	0.0279	0.0279	0.0279	0.0279	0.0279	0.0279	0.0279	0.0279	
4=REPROCESSING	0.1101	0.1101	0.1101	0.1101	0.1101	0.	0.1101	0.1101	
5=UO2(NO3)2 TO UF6	0.0210	0.0210	0.0210	0.0210	0.0210	0.	0.0210	0.0210	
6=UF6 CREDIT	-0.1403	-0.1403	-0.0848	-0.1369	-0.0822	0.	-0.1403	-0.1403	
7=PU(NO3)4 TO PU	0.0531	0.0531	0.0531	0.0531	0.0531	0.	0.0531	0.0531	
8=PU CREDIT	-0.3361	-0.3361	-0.3361	-0.3361	-0.3361	0.	-0.3361	-0.3361	
9=SPARES CAPITAL	0.0227	0.0227	0.0188	0.0216	0.0178	0.0178	0.0227	0.0207	
10=UF6 CAPITAL, NON REACTOR	0.0200	0.0504	0.0360	0.0470	0.0331	0.0278	0.0252	0.0504	
11=FABRICATION CAPITAL, NON REACTOR	0.0230	0.0231	0.0228	0.0230	0.0227	0.0227	0.0116	0.0173	
12=UF6 CAPITAL, REACTOR	0.1401	0.3539	0.2556	0.3288	0.2340	0.2097	0.1769	0.3539	
13=FABRICATION CAPITAL, REACTOR	0.1730	0.1743	0.1718	0.1735	0.1712	0.1712	0.0871	0.1303	
NET FUEL CYCLE COST	1.7585	2.0087	1.6591	1.8978	1.5628	1.7673	1.7079	1.8080	

Table 6.11c:

ENERGY COST BREAKDOWN FOR FUEL DISCHARGED AT 2.8668 YEARS

3.10 W/O U-235	
5-ZONE OUT-IN	
CYCLE NUMBER 1	
MAX. TO AVERAGE POWER DENSITY (START OF CYCLE, NO XE) = 3.0546	
CENTRAL ZONE DISCHARGE --	
AVERAGE BURNUP IN MWD/TONNE U = 28719.	
MAXIMUM BURNUP IN MWD/TONNE U = 30820	
TIME IN REACTOR IN YEARS = 2.8668	
URANIUM CHARGED IN KG U = 12685.	
URANIUM DISCHARGED IN KG U = 12173.7	
URANIUM-235 W/O IN DISCHARGE = 1.082	
PLUTONIUM DISCHARGED IN KG PU = 110.0	
PLUTONIUM COMPOSITION- 239,240,241,242 W/O= 0.567 0.219 0.156 0.058	
BILLIONS OF KILOWATT HOURS, ELECTRIC = 2.7366	

FUEL COST BREAKDOWN IN MILLIONS OF DOLLARS

1=UF6	3.3651	3.3651	2.4832	3.1062	2.2588	2.2588	3.3651	3.3651
2=FABRICATION	1.8895	1.9105	1.8752	1.9001	1.8663	1.8663	1.9105	1.4370
3=SHIPPING	0.0888	0.0888	0.0888	0.0888	0.0888	0.0888	0.0888	0.0888
4=REPROCESSING	0.3502	0.3502	0.3502	0.3502	0.3502	0.	0.3502	0.3502
5=UO2(NO3)2 TO UF6	0.0673	0.0673	0.0673	0.0673	0.0673	0.	0.0673	0.0673
6=UF6 CREDIT	-0.6625	-0.6625	-0.4256	-0.6361	-0.4044	0.	-0.6625	-0.6625
7=PU(NO3)4 TO PU	0.1617	0.1617	0.1617	0.1617	0.1617	0.	0.1617	0.1617
8=PU CREDIT	-1.0241	-1.0241	-1.0241	-1.0241	-1.0241	0.	-1.0241	-1.0241
9=SPARES CAPITAL	0.0527	0.0529	0.0437	0.0502	0.0414	0.0414	0.0529	0.0482
10=UF6 CAPITAL, NON REACTOR	0.0822	0.2078	0.1493	0.1933	0.1369	0.1111	0.1039	0.2078
11=FABRICATION CAPITAL, NON REACTOR	0.0930	0.0940	0.0923	0.0935	0.0918	0.0918	0.0470	0.0707
12=UF6 CAPITAL, REACTOR	0.3428	0.8660	0.6254	0.8046	0.5726	0.4857	0.4330	0.8660
13=FABRICATION CAPITAL, REACTOR	0.4063	0.4108	0.4032	0.4086	0.4013	0.4013	0.2054	0.3090
NET FUEL CYCLE COST	5.2130	5.8885	4.8906	5.5645	4.6086	5.3452	5.0992	5.2852

FUEL COST BREAKDOWN IN MILLS/KWH

1=UF6	1.2297	1.2297	0.9074	1.1351	0.8254	0.8254	1.2297	1.2297
2=FABRICATION	0.6904	0.6981	0.6852	0.6943	0.6820	0.6820	0.6981	0.5251
3=SHIPPING	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324
4=REPROCESSING	0.1280	0.1280	0.1280	0.1280	0.1280	0.	0.1280	0.1280
5=UO2(NO3)2 TO UF6	0.0246	0.0246	0.0246	0.0246	0.0246	0.	0.0246	0.0246
6=UF6 CREDIT	-0.2421	-0.2421	-0.1555	-0.2324	-0.1478	0.	-0.2421	-0.2421
7=PU(NO3)4 TO PU	0.0591	0.0591	0.0591	0.0591	0.0591	0.	0.0591	0.0591
8=PU CREDIT	-0.3742	-0.3742	-0.3742	-0.3742	-0.3742	0.	-0.3742	-0.3742
9=SPARES CAPITAL	0.0193	0.0193	0.0160	0.0184	0.0151	0.0151	0.0193	0.0176
10=UF6 CAPITAL, NON REACTOR	0.0301	0.0759	0.0546	0.0707	0.0500	0.0406	0.0380	0.0759
11=FABRICATION CAPITAL, NON REACTOR	0.0340	0.0344	0.0337	0.0342	0.0336	0.0336	0.0172	0.0258
12=UF6 CAPITAL, REACTOR	0.1253	0.3164	0.2285	0.2940	0.2092	0.1775	0.1582	0.3164
13=FABRICATION CAPITAL, REACTOR	0.1485	0.1501	0.1473	0.1493	0.1466	0.1466	0.0751	0.1129
NET FUEL CYCLE COST	1.9049	2.1518	1.7871	2.0334	1.6841	1.9532	1.8634	1.9313

Table 6.12a: Cost Data for 5 Zone Out-in and 3.50 w/o Enrichment
 BREAKDOWN OF ENERGY COST AVERAGED OVER 30.1264 YEARS

3.50 W/O U-235
 5-ZONE OUT-IN

AVERAGE BURNUP FOR 24. CYCLES = 36502

AVERAGE TIME FOR A CYCLE = 1.2553

FRACTION OF TIME FOR REFUELING = 0.029286

MAX. TO AVERAGE POWER DENSITY (EQUILIBRIUM CYCLE) = 2.3170

CENTRAL ZONE DISCHARGE AT EQUILIBRIUM --

AVERAGE BURNUP IN MWD/TONNE U = 38550.

MAXIMUM BURNUP IN MWD/TONNE U = 41140

TIME IN REACTOR IN YEARS = 4.5416

URANIUM CHARGED IN KG U = 12685.

URANIUM DISCHARGED IN KG U = 12020.5

URANIUM-235 W/O IN DISCHARGE = 0.937

PLUTONIUM DISCHARGED IN KG PU = 122.0

PLUTONIUM COMPOSITION= 239,240,241,242 W/O= 0.516 0.234 0.167 0.083

BILLIONS OF KILOWATT HOURS, ELECTRIC = 3.6734

ENERGY COST BREAKDOWN IN MILLS/KWH

1=UF6	1.1294	1.1294	0.8398	1.0401	0.7622	0.7622	1.1294	1.1294
2=FABRICATION	0.5413	0.5465	0.5373	0.5436	0.5348	0.5348	0.5465	0.4095
3=SHIPPING	0.0255	0.0255	0.0255	0.0255	0.0255	0.0255	0.0255	0.0255
4=REPROCESSING	0.1007	0.1007	0.1007	0.1007	0.1007	0.0144	0.1007	0.1007
5=UO2(NO3)2 TO UF6	0.0192	0.0192	0.0192	0.0192	0.0192	0.0028	0.0192	0.0192
6=UF6 CREDIT	-0.1790	-0.1790	-0.1149	-0.1719	-0.1092	-0.0344	-0.1790	-0.1790
7=PU(NO3)4 TO PU	0.0503	0.0503	0.0503	0.0503	0.0503	0.	0.0503	0.0503
8=PU CREDIT	-0.3186	-0.3186	-0.3186	-0.3186	-0.3186	0.	-0.3186	-0.3186
9=SPARES CAPITAL	0.0252	0.0253	0.0208	0.0239	0.0195	0.0195	0.0253	0.0232
10=UF6 CAPITAL, NON REACTOR	0.0228	0.0577	0.0417	0.0536	0.0382	0.0334	0.0288	0.0577
11=FABRICATION CAPITAL, NON REACTOR	0.0222	0.0224	0.0220	0.0223	0.0219	0.0219	0.0112	0.0168
12=UF6 CAPITAL, REACTOR	0.1644	0.4154	0.3030	0.3849	0.2765	0.2506	0.2077	0.4154
13=FABRICATION CAPITAL, REACTOR	0.1749	0.1766	0.1736	0.1756	0.1727	0.1727	0.0883	0.1323

NET FUEL CYCLE COST 1.7783 2.0713 1.7003 1.9491 1.5938 1.8034 1.7352 1.8824

14=PLANT CAPITAL COSTS 3.9927 3.9927 3.9927 3.9927 3.9927 3.9927 3.9927 3.9927

15=OPERATING COSTS 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000 0.5000

TOTAL ENERGY COST IN MILLS/KWH 6.2710 6.5640 6.1930 6.4418 6.0865 6.2961 6.2279 6.3751

SPECIAL COST ANALYSIS COMPLETED - D.L.T.

Table 6.12b:

ENERGY COST BREAKDOWN FOR FUEL DISCHARGED AT 10.4833 YEARS									
Equilibrium Cycle									
3.50 W/O U-235									
5-TONE OUT-IN									
CYCLE NUMBER 9									
MAX.TO AVERAGE POWER DENSITY (START OF CYCLE,NO XE) = 2.3170									
CENTRAL ZONE DISCHARGE --									
AVERAGE BURNUP IN MWD/TONNE U = 38550.									
MAXIMUM BURNUP IN MWD/TONNE U = 41140									
TIME IN REACTOR IN YEARS = 4.5416									
URANIUM CHARGED IN KG U = 12685.									
URANIUM DISCHARGED IN KG U = 12020.5									
URANIUM-235 W/O IN DISCHARGE = 0.937									
PLUTONIUM DISCHARGED IN KG PU = 122.0									
PLUTONIUM COMPOSITION- 239,240,241,242 W/O= 0.516 0.234 0.167 0.083									
BILLIONS OF KILOWATT HOURS, ELECTRIC = 3.6734									
FUEL COST BREAKDOWN IN MILLIONS OF DOLLARS									
1=UF6	3.9284	3.9284	2.9212	3.6179	2.6510	2.6510	3.9284	3.9284	
2=FABRICATION	1.8774	1.8937	1.8635	1.8844	1.8554	1.8554	1.8937	1.4174	
3=SHIPPING	0.0888	0.0888	0.0888	0.0888	0.0888	0.0888	0.0888	0.0888	
4=REPROCESSING	0.3502	0.3502	0.3502	0.3502	0.3502	0.	0.3502	0.3502	
5=UO2(NO3)2 TO UF6	0.0664	0.0664	0.0664	0.0664	0.0664	0.	0.0664	0.0664	
6=UF6 CREDIT	-0.4998	-0.4998	-0.3685	-0.4851	-0.2969	0.	-0.4998	-0.4998	
7=PU(NO3)4 TO PU	0.1793	0.1793	0.1793	0.1793	0.1793	0.	0.1793	0.1793	
8=PU CREDIT	-1.1354	-1.1354	-1.1354	-1.1354	-1.1354	0.	-1.1354	-1.1354	
9=SPARES CAPITAL	0.0923	0.0925	0.0761	0.0875	0.0716	0.0716	0.0925	0.0850	
10=UF6 CAPITAL, NON REACTOR	0.0736	0.1858	0.1342	0.1727	0.1228	0.1039	0.0929	0.1858	
11=FABRICATION CAPITAL, NON REACTOR	0.0736	0.0742	0.0731	0.0739	0.0727	0.0727	0.0371	0.0556	
12=UF6 CAPITAL, REACTOR	0.5970	1.5083	1.1001	1.3975	1.0041	0.9030	0.7542	1.5083	
13=FABRICATION CAPITAL, REACTOR	0.6395	0.6450	0.6347	0.6419	0.6320	0.6320	0.3225	0.4828	
NET FUEL CYCLE COST	6.3312	7.3775	6.0436	6.9399	5.6621	6.3784	6.1708	6.7128	
FUEL COST BREAKDOWN IN MILLS/KWH									
1=UF6	1.0694	1.0694	0.7952	0.9849	0.7217	0.7217	1.0694	1.0694	
2=FABRICATION	0.5111	0.5155	0.5073	0.5130	0.5051	0.5051	0.5155	0.3859	
3=SHIPPING	0.0242	0.0242	0.0242	0.0242	0.0242	0.0242	0.0242	0.0242	
4=REPROCESSING	0.0953	0.0953	0.0953	0.0953	0.0953	0.	0.0953	0.0953	
5=UO2(NO3)2 TO UF6	0.0181	0.0181	0.0181	0.0181	0.0181	0.	0.0181	0.0181	
6=UF6 CREDIT	-0.1361	-0.1361	-0.0840	-0.1321	-0.0808	0.	-0.1361	-0.1361	
7=PU(NO3)4 TO PU	0.0488	0.0488	0.0488	0.0488	0.0488	0.	0.0488	0.0488	
8=PU CREDIT	-0.3091	-0.3091	-0.3091	-0.3091	-0.3091	0.	-0.3091	-0.3091	
9=SPARES CAPITAL	0.0251	0.0252	0.0207	0.0238	0.0195	0.0195	0.0252	0.0231	
10=UF6 CAPITAL, NON REACTOR	0.0200	0.0506	0.0365	0.0470	0.0334	0.0283	0.0253	0.0506	
11=FABRICATION CAPITAL, NON REACTOR	0.0200	0.0202	0.0199	0.0201	0.0198	0.0198	0.0101	0.0151	
12=UF6 CAPITAL, REACTOR	0.1625	0.4106	0.2995	0.3804	0.2733	0.2458	0.2053	0.4106	
13=FABRICATION CAPITAL, REACTOR	0.1741	0.1756	0.1728	0.1747	0.1720	0.1720	0.0878	0.1314	
NET FUEL CYCLE COST	1.7235	2.0084	1.6452	1.8892	1.5414	1.7364	1.6799	1.8274	72

Table 6.12c:

ENERGY COST BREAKDOWN FOR FUEL DISCHARGED AT 3.3506 YEARS									
3.50 W/O U-235									
5-ZONE OUT-IN									
CYCLE NUMBER 1									
MAX. TO AVERAGE POWER DENSITY (START OF CYCLE, NO XE) = 3.0547									
CENTRAL ZONE DISCHARGE --									
AVERAGE BURNUP IN MWD/TONNE U = 33159.									
MAXIMUM BURNUP IN MWD/TONNE U = 35412									
TIME IN REACTOR IN YEARS = 3.3506									
URANIUM CHARGED IN KG U = 12685.									
URANIUM DISCHARGED IN KG U = 12102.4									
URANIUM-235 W/O IN DISCHARGE = 1.171									
PLUTONIUM DISCHARGED IN KG PU = 117.8									
PLUTONIUM COMPOSITION- 239,240,241,242 W/O= 0.555 0.218 0.163 0.064									
BILLIONS OF KILOWATT HOURS, ELECTRIC = 3.1598									
FUEL COST BREAKDOWN IN MILLIONS OF DOLLARS									
1=UF6	3.9284	3.9284	2.9212	3.6179	2.6510	2.6510	3.9284	3.9284	
2=FABRICATION	1.9085	1.9330	1.8927	1.9206	1.8819	1.8819	1.9330	1.4567	
3=SHIPPING	0.0888	0.0888	0.0888	0.0888	0.0888	0.0888	0.0888	0.0888	
4=REPROCESSING	0.3502	0.3502	0.3502	0.3502	0.3502	0.3502	0.3502	0.3502	
5=UO2(NO3)2 TO UF6	0.0669	0.0669	0.0669	0.0669	0.0669	0.0669	0.0669	0.0669	
6=UF6 CREDIT	-0.7572	-0.7572	-0.4955	-0.7234	-0.4681	-0.4681	-0.7572	-0.7572	
7=PU(NO3)4 TO PU	0.1732	0.1732	0.1732	0.1732	0.1732	0.	0.1732	0.1732	
8=PU CREDIT	-1.0971	-1.0971	-1.0971	-1.0971	-1.0971	0.	-1.0971	-1.0971	
9=SPARES CAPITAL	0.0684	0.0687	0.0565	0.0650	0.0532	0.0532	0.0687	0.0632	
10=UF6 CAPITAL, NON REACTOR	0.0956	0.2415	0.1753	0.2241	0.1602	0.1602	0.1208	0.2415	
11=FABRICATION CAPITAL, NON REACTOR	0.0939	0.0951	0.0931	0.0945	0.0926	0.0926	0.0476	0.0717	
12=UF6 CAPITAL, REACTOR	0.4661	1.1775	0.8586	1.0909	0.7838	0.7838	0.5887	1.1775	
13=FABRICATION CAPITAL, REACTOR	0.4796	0.4858	0.4756	0.4826	0.4729	0.4729	0.2429	0.3661	
NET FUEL CYCLE COST	5.8653	6.7548	5.5595	6.3542	5.2096	6.1335	5.7549	6.1298	
FUEL COST BREAKDOWN IN MILLS/KWH									
1=UF6	1.2432	1.2432	0.9245	1.1450	0.8390	0.8390	1.2432	1.2432	
2=FABRICATION	0.6040	0.6118	0.5990	0.6078	0.5956	0.5956	0.6118	0.4610	
3=SHIPPING	0.0281	0.0281	0.0281	0.0281	0.0281	0.0281	0.0281	0.0281	
4=REPROCESSING	0.1108	0.1108	0.1108	0.1108	0.1108	0.1108	0.1108	0.1108	
5=UO2(NO3)2 TO UF6	0.0212	0.0212	0.0212	0.0212	0.0212	0.0212	0.0212	0.0212	
6=UF6 CREDIT	-0.2396	-0.2396	-0.1568	-0.2289	-0.1481	-0.1481	-0.2396	-0.2396	
7=PU(NO3)4 TO PU	0.0548	0.0548	0.0548	0.0548	0.0548	0.	0.0548	0.0548	
8=PU CREDIT	-0.3472	-0.3472	-0.3472	-0.3472	-0.3472	0.	-0.3472	-0.3472	
9=SPARES CAPITAL	0.0217	0.0218	0.0179	0.0206	0.0168	0.0168	0.0218	0.0200	
10=UF6 CAPITAL, NON REACTOR	0.0303	0.0764	0.0555	0.0709	0.0507	0.0507	0.0382	0.0764	
11=FABRICATION CAPITAL, NON REACTOR	0.0297	0.0301	0.0295	0.0299	0.0293	0.0293	0.0151	0.0227	
12=UF6 CAPITAL, REACTOR	0.1475	0.3726	0.2717	0.3453	0.2481	0.2481	0.1863	0.3726	
13=FABRICATION CAPITAL, REACTOR	0.1518	0.1537	0.1505	0.1527	0.1497	0.1497	0.0769	0.1159	
NET FUEL CYCLE COST	1.8562	2.1378	1.7595	2.0110	1.6487	1.9411	1.8213	1.9400	

Appendix B: Derivation of Cost Coefficients

The equations for the cost coefficients are derived below. Nomenclature is as given by Trapp (T1).

Interest Charge on UF₆ (FU)

A change in FU affects the UF₆ capital, non-reactor (\bar{C}_{10}) and UF₆ capital, reactor (\bar{C}_{12}).

$$(\bar{C}_{10} + \bar{C}_{12}) = \frac{1000}{P} FU \left[C_1 \cdot f_1 \cdot W_1 \cdot WTF \left(\frac{TFBP}{2} + TUPR + \frac{TR}{2 \text{ FLOAD}} \right) - C_6 \cdot f_6 \cdot W_6 \cdot WTF \left(TPOST + \frac{WTF}{365R} + \frac{TR}{2 \text{ FLOAD}} \right) \right]$$

$$\frac{d(\bar{C}_{10} + \bar{C}_{12})}{d(FU)} = \frac{d(\bar{C}_{\text{total}})}{d(FU)} \frac{\text{mills/kwhe}}{\%} = \frac{10}{P} \left[C_1 \cdot f_1 \cdot W_1 \cdot WTF \left(\frac{TFBP}{2} + TUPR + \frac{TR}{2 \text{ FLOAD}} \right) - C_6 \cdot f_6 \cdot W_6 \cdot WTF \left(TPOST + \frac{WTF}{365R} + \frac{TR}{2 \text{ FLOAD}} \right) \right] \quad (\text{B-1})$$

Fabrication Cost (C2)

A change in C2 affects the following costs: fabrication (\bar{C}_2), spares capital (\bar{C}_9), fabrication capital, non-reactor (\bar{C}_{11}) and fabrication capital, reactor (\bar{C}_{13}).

$$\begin{aligned} (\bar{C}_2 + \bar{C}_9 + \bar{C}_{11} + \bar{C}_{13}) = & \left\{ \frac{1000}{P} \cdot f_2 \cdot W_2 \cdot WTF [C_2 + C_1 (FLS + TFBU \cdot FUFB)] \right\} \\ & + \left\{ \frac{1000}{P} \frac{TR}{\text{FLOAD}} \cdot FCAP \cdot SPPC [C_1 \cdot f_1 \cdot W_1 \cdot WTF \right. \\ & \left. + f_2 \cdot W_2 \cdot WTF \{C_2 + C_1 (FLS + TFBU \cdot FUFB)\}] \right\} \\ & + \left\{ \frac{1000}{P} \cdot FW \left[\frac{TFBP}{2} + TWPR \right] f_2 \cdot W_2 \cdot WTF [C_2 + C_1 (FLS \right. \\ & \left. + TFBU \cdot FUFB)] \right\} + \left\{ \frac{1000}{P} \frac{TR \cdot FW \cdot f_2 \cdot W_2 \cdot WTF}{2 \text{ FLOAD}} [C_2 \right. \\ & \left. + C_1 (FLS + TFBU \cdot FUFB)] \right\} \end{aligned}$$

$$\begin{aligned}
\frac{d(\bar{C}_2 + \bar{C}_9 + \bar{C}_{11} + \bar{C}_{13})}{d(C_2)} &= \frac{d(\bar{C}_{total})}{d(C_2)} \frac{\text{mills/kwhe}}{\$/\text{kg U}} = \left\{ \frac{1000}{P} \cdot f_2 \cdot W_2 \cdot WTF \right\} \\
&+ \left\{ \frac{1000}{P} \cdot \frac{TR}{FLOAD} \cdot FCAP \cdot SPPC \cdot f_2 \cdot W_2 \cdot WTF \right\} \\
&+ \left\{ \frac{1000}{P} \cdot f_2 \cdot W_2 \cdot WTF \cdot FW \left[\frac{TFBP}{2} + TWPR \right] \right\} \\
&+ \left\{ \frac{1000}{P} \cdot f_2 \cdot W_2 \cdot WTF \cdot \frac{FW \cdot TR}{2 FLOAD} \right\} \quad (B-2)
\end{aligned}$$

Reprocessing Cost (D_4)

$$\bar{C}_4 = \frac{1000}{P} \cdot f_4 \cdot W_4 \cdot D_4 \left(t + \frac{WTF}{R} \right)$$

$$\frac{d(\bar{C}_4)}{d(D_4)} = \frac{d(\bar{C}_{total})}{d(D_4)} \frac{\text{mills/kwhe}}{\$/\text{day}} = \frac{1000}{P} \cdot f_4 \cdot W_4 \left(t + \frac{WTF}{R} \right) \quad (B-3)$$

Plutonium Credit (C_8)

$$\bar{C}_8 = \frac{1000}{P} \cdot f_8 \cdot W_8 \cdot WTF \cdot C_8$$

$$\frac{d(\bar{C}_8)}{d(C_8)} = \frac{d(\bar{C}_{total})}{d(C_8)} \frac{\text{mills/kwhe}}{\$/\text{gm Pu}} = \frac{10^6}{P} \cdot f_8 \cdot W_8 \cdot WTF \quad (B-4)$$

Appendix C: SPACFX Description

In the FUELMOVE code it is necessary to solve for the thermal flux shape in the reactor. This is done in the SPACFX subroutine as described by McLeod (M1). Basically, one writes the two group diffusion equations, eliminates the fast flux between the two equations, writes the resulting partial differential equation in five point difference form and then satisfies the resulting difference equation at every mesh point in the reactor by an iteration technique. The iteration technique used by McLeod (M1) was the modified Crout reduction. This technique was found to give unsatisfactory results at the higher enrichments used in the current study. The extrapolated Liebmann iteration technique was used, instead, as it gave satisfactory results.

The input and output of the SPACFX subroutine were not changed so that the rest of the FUELMOVE code was not disturbed by the change in iteration technique. The extrapolated Liebmann technique is described in detail by Hansen (H1). One starts with Eq. 4C15 of (M1) and rearranges it in the following form:

$$\begin{aligned} \phi_{1,j} = & \frac{d_{1,j,2}}{e_{1,j} - d_{1,j,1}} \phi_{1-1,j} + \frac{d_{1,j,3}}{e_{1,j} - d_{1,j,1}} \phi_{1+1,j} \\ & + \frac{d_{1,j,4}}{e_{1,j} - d_{1,j,1}} \phi_{1,j-1} + \frac{d_{1,j,5}}{e_{1,j} - d_{1,j,1}} \phi_{1,j+1} \end{aligned} \quad (C-1)$$

The subscripts i, j pertain to a particular mesh point. Then one inserts a factor "F" as follows:

$$\begin{aligned} \phi_{1,j}^{v+1} = & F \frac{d_{1,j,2}}{e_{1,j} - d_{1,j,1}} \phi_{1-1,j}^{v+1} + F \frac{d_{1,j,3}}{e_{1,j} - d_{1,j,1}} \phi_{1+1,j}^v \\ & + F \frac{d_{1,j,4}}{e_{1,j} - d_{1,j,1}} \phi_{1,j-1}^{v+1} + F \frac{d_{1,j,5}}{e_{1,j} - d_{1,j,1}} \phi_{1,j+1}^v \\ & + (1 - F) \phi_{1,j}^v \end{aligned} \quad (C-2)$$

The superscript v refers to the number of the iteration loop. It is seen that when $F=1$, Eq. (C-1) is again obtained. The factor F can range from 1 to less than 2. An optimum value of F can be found for which the computer time required to obtain a satisfactory solution is a minimum. However, in FUELMOVE the number of mesh points used is so small that it was not worthwhile to optimize the factor F for every set of coefficients. The value of 1.5 was found to be the optimum for one case and was used throughout. The coefficients d and e are calculated in the SPFUN subroutine as before. The initial flux shape estimate is made in the MAIN program. Subsequently, when the SPACFX subroutine is left and then re-entered, the initial estimate of the flux shape is the one previously calculated.

The results for one fuel enrichment for which the modified Crout reduction technique gave satisfactory results were compared to the results given by the extrapolated Liebmann method. It was found that the two methods approached the exact solution from different directions, one from above and one from below. The maximum variation among the various results were as follows:

<u>Result</u>	<u>Maximum Variation</u>
Normalized flux	< 4%
Power density	< 1%
Central flux time and burnup	< 0.1%

As the criterion for convergence, ERROR, is reduced, the above variations are reduced. The above results were obtained with ERROR = 0.001.

The extrapolated Liebmann method has a few other advantages over the modified Crout reduction method in this application:

1. Much less computer storage space is required.
2. Only one FORTRAN statement is used for the iteration, whereas 30 or so statements are used in the modified

Crout reduction method.

Approximately the same amount of computer time is used for both iteration methods.

VII. REFERENCES

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