LA-9127

Los Alamos National Laboratory is operated by the University of California for the United States Department of Energy under contract W-7405-ENG-36.

POPCYCLE: A Computer Code for Calculating Nuclear and Fossil Plant Levelized Life-Cycle Power Costs

Los Alamos
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

Edited by Kyle Thorn

Photocomposition by E. Katherine Valdez

LA-9127

UC-32
Issued: February 1982

POPCYCLE: A Computer Code for Calculating Nuclear and Fossil Plant Levelized Life-Cycle Power Costs

R. W. Hardie

Los Alamos
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

CONTENTS

POPCYCLE: A COMPUTER CODE FOR CALCULATING NUCLEAR AND FOSSIL PLANT LEVELIZED LIFE-CYCLE POWER COSTS

by

R. W. Hardie

ABSTRACT

This report describes POPCYCLE, a computer code designed to calculate levelized life-cycle power costs for nuclear and fossil electrical generating plants. Included in this report are (1) derivations of the equations and a discussion of the methodology used by POPCYCLE, (2) a description of the input required by the code, (3) a listing of the input for a sample case, and (4) the output for a sample case.

I. INTRODUCTION

The POPCYCLE computer code is designed to calculate levelized life-cycle power costs for nuclear and fossil electrical generating plants. In addition to total levelized life-cycle costs, the code gives the capital, operation and maintenance, and fuel components making up the total. For nuclear plants, the various subcomponents making up the fuel component are also given. These subcomponents include fabrication, U_3O_8, enrichment, ThO_2, plutonium, ^{233}U, and fuel back-end costs.

POPCYCLE calculates levelized life-cycle power costs using what is called the "proportional debt repayment" method. This method assumes that the ratio of outstanding debt capital to outstanding equity capital remains constant throughout the lifetime of the plant. To account for income tax effects resulting from inflation, the calculations are performed using inflated (current) dollar parameters and the results are then converted to deflated (constant) dollars.

This report presents derivations of the equations used by POPCYCLE, discusses the methodology that the code is based on, and describes the input instructions to the code. Also included is a sample case for a nuclear power plant and for a coal-fired power plant.

II. METHODOLOGY

The cost of producing electricity from a generating plant normally can be expected to vary during the lifetime of the plant. However, the rates at which the costs vary usually are not the same for different types of generating plants or for the various cost components of any particular plant.

This leads to a couple of difficulties with calculating total power costs that vary with time. One example occurs when electricity from one plant type is more expensive than electricity from another plant type during part of its lifetime and less expensive during another part. For such a case, it may be difficult to determine which plant type produces the lesser expensive electricity over the total lifetime of the plants.

Another difficulty with varying total power costs is that it is hard to compare the relative contributions of the various cost components because the components may be varying at different rates.

For these reasons, levelized (that is, constant) life-cycle costs usually are used for comparing electrical generating costs because the total power cost is then characterized by a single number. Although levelized life-cycle costs can be calculated for any production process, the discussion in this report will be limited to electrical generating plants.

Figure 1 gives an example of time-dependent product costs for three plant types and illustrates the difficulty with determining which plant type produces the least expensive product. For the same three plants, Fig. 2 gives the levelized life-cycle product cost and illustrates the advantage of comparing levelized costs.

A. Derivation of Levelized Life-Cycle Power Cost Equations

The underlying principle in computing levelized life-cycle costs is that the income over the lifetime of a project must balance the expenses associated with the project. For electrical generating plants, income is

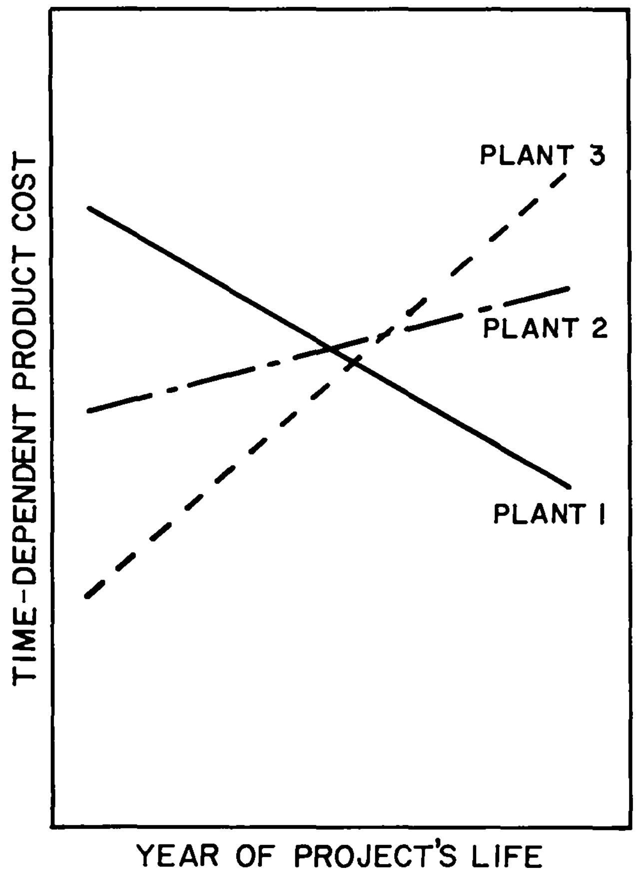

Fig. 1. Time-dependent product cost.

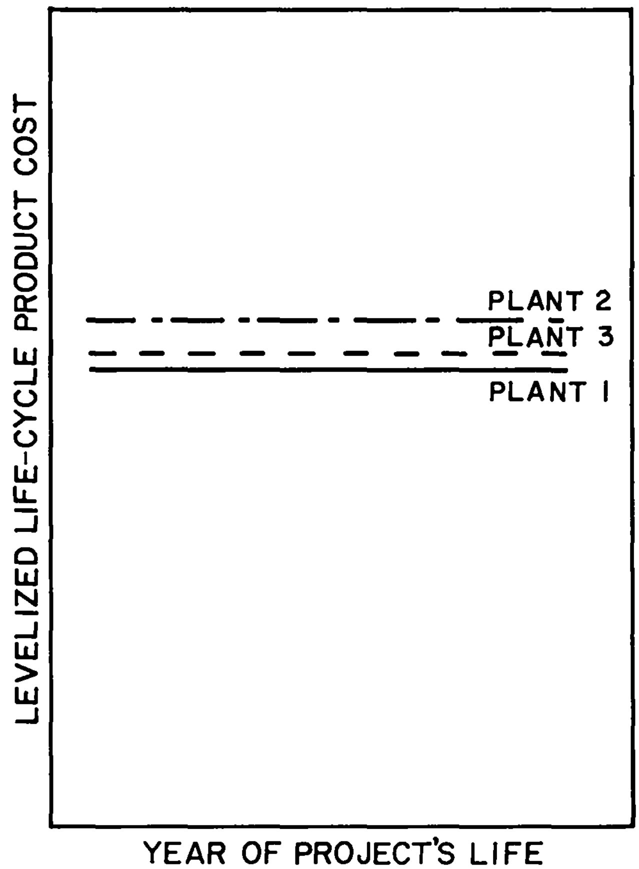

Fig. 2. Levelized life-cycle product cost.

derived from the revenue received from the sale of electricity. Expenses include net fuel costs, operation and maintenance costs, taxes, interest, return on the investment, recovery of the investment, and any other costs associated with the project.

The expression for levelized life-cycle costs depends on the method of debt capital repayment that is assumed. POPCYCLE uses what is called "proportional debt repayment," which assumes that the debt capital and equity capital are paid off in a constant ratio. Therefore, throughout the lifetime of a project, the ratio of outstanding debt to outstanding equity is constant.

Another method that is sometimes used is called "fixed-schedule repayment." This method assumes that the entire schedule of debt repayment is fixed in advance, and all expenses that occur after the start of the project come from equity capital.[1]

Projects that are part of an overall corporate financial structure probably are better represented by the proportional case. For such projects, all funds come from a pool of capital where the ratio of debt to equity is held constant. On the other hand, single projects that have their own independent debt structure probably are better represented by the fixed-schedule case. A comparison of the expressions for levelized life-cycle costs for both methods is given in Refs. 1 and 2.

The derivation of the levelized life-cycle cost expression for the proportional case can be started by tabulating a balance sheet for an arbitary year k of the project. The amount towards reducing the outstanding capital investment in year k is equal to the revenue received in year k minus the expenses in year k. All terms are defined in Table I.

TABLE I. Definition of Terms

Nonannual Quantities		Annual Quantities	
Term	**Definition**	**Term**	**Definition**
e	Equity fraction	I_k	Total investment outstanding at start of year k
i_e	Cost of equity		
b	Debt fraction	R_k	Revenue received at end of year k
i_b	Cost of debt	E_k	Quantity of electricity produced in year k
i	Cost of money	fch_k	Fixed charges for year k
	$= e \times i_e + b \times i_b$	oam_k	Operation and maintenance costs for year k
i'	Tax adjusted cost of money	$fuel_k$	Fuel cost for year k
	$= i - t \times b \times i_b$	rev_k	Gross revenue taxes for year k
L	Levelized life-cycle electrical power cost	dep_k	Depreciation on capital for year k
		$fdep_k$	Depreciation on fuel for year k
g	Gross revenue tax rate		$= fuel_k$ for fossil plants
t	Income tax rate	$tdep_k$	Total depreciation for year k
c	Investment tax credit rate		$= dep_k + fdep_k$
S	Net salvage value	bin_k	Bond interest for year k
K	Project lifetime		$= b \times i_b \times I_k$
		tot_k	Total operating costs for year k
			$= fch_k + oam_k + fuel_k$
		tnf_k	Total nonfuel operating costs for year k
			$= fch_k + oam_k$
		itc_k	Investment tax credit
			$= c \times I_1$ for $k = 1$,
			$= 0$ for $k > 1$
		cap_k	Annualized capital investment in year k

1. Balance Sheet for Year k.

$$\text{Amount towards reduction of investment in year k} = \text{revenue in year k} - \text{total operating costs for year k} - \text{return on debt and equity for year k} - \left(\text{income + gross revenue taxes for year k}\right) . \tag{1}$$

$$\text{Return on debt and equity for year k (assuming proportional debt repayment)} = \left(\text{cost of equity} \times \text{equity fraction} + \text{cost of debt} \times \text{debt fraction}\right) \times \text{total investment outstanding at start of year k}$$

$$= (e \times i_e + b \times i_b)I_k$$

$$= i \times I_k . \tag{2}$$

$$\text{Gross revenue taxes for year k} = \text{gross revenue tax rate} \times \text{revenue in year k}$$

$$= g \times R_k . \tag{3}$$

$$\text{Income taxes for year k} = \text{income tax rate} \times \left(\text{revenue in year k} - \text{deductible expenses in year k}\right) - \text{investment tax credits}$$

$$= t(R_k - tnf_k - tdep_k - bin_k - g \times R_k) - itc_k . \tag{4}$$

For proportional debt repayment,

$$bin_k = b \times i_b \times I_k . \tag{5}$$

Combining Eqs. (1)-(5) yields

$$\text{amount towards reduction of investment in year k} = R_k - tot_k - i \times I_k - g \times R_k - t(R_k - tnf_k - tdep_k - b \times i_b \times I_k - g \times R_k) + itc_k$$

$$= R_k(1 - g)(1 - t) - tot_k + t(tnf_k + tdep_k) + I_k (t \times b \times i_b - i) + itc_k . \tag{6}$$

$$\text{The investment outstanding at end of year k} = I_{k+1}$$

$$= \text{the investment outstanding at beginning of year k} - \text{the amount towards reduction of investment in year k} .$$

Substituting Eq. (6) in the above expression yields

$$\begin{aligned} I_{k+1} &= I_k - [R_k(1 - g)(1 - t) - tot_k + t(tnf_k + tdep_k) + I_k(t \times b \times i_b - i) + itc_k] \\ &= I_k(1 + i - t \times b \times i_b) - [R_k(1 - g)(1 - t) - tot_k + t(tnf_k + tdep_k) + itc_k] . \end{aligned}$$

Let

$$i' = i - t \times b \times i_b \ .$$

Then,

$$I_{k+1} = I_k(1 + i') - [R_k(1 - g)(1 - t) - tot_k + t(tnf_k + tdep_k) + itc_k] \ .$$

Using the above expression for years 1, 2, 3, and K of the project, we obtain the following.

2. Balance Sheet for Year 1.

$$I_2 = I_1(1 + i') - [R_1(1 - g)(1 - t) - tot_1 + t(tnf_1 + tdep_1) + itc_1] \ .$$

3. Balance Sheet for Year 2.

$$\begin{aligned} I_3 &= I_2(1 + i') - [R_2(1 - g)(1 - t) - tot_2 + t(tnf_2 + tdep_2) + itc_2] \\ &= I_1(1 + i')^2 \\ &\quad - (1 + i')[R_1(1 - g)(1 - t) - tot_1 + t(tnf_1 + tdep_1) + itc_1] \\ &\quad - [R_2(1 - g)(1 - t) - tot_2 + t(tnf_2 + tdep_2) + itc_2] \ . \end{aligned}$$

4. Balance Sheet for Year 3.

$$\begin{aligned} I_4 &= I_3(1 + i') - [R_3(1 - g)(1 - t) - tot_3 + t(tnf_3 + tdep_3) + itc_3] \\ &= I_1(1 + i')^3 \\ &\quad - (1 + i')^2 [R_1(1 - g)(1 - t) - tot_1 + t(tnf_1 + tdep_1) + itc_1] \\ &\quad - (1 + i') [R_2(1 - g)(1 - t) - tot_2 + t(tnf_2 + tdep_2) + itc_2] \\ &\quad - [R_3(1 - g)(1 - t) - tot_3 + t(tnf_3 + tdep_3) + itc_3] \ . \end{aligned}$$

5. Balance Sheet for Year K. Because the capital investment is fully recovered at the end of the project, except for the salvage value,

$$\begin{aligned} I_{K+1} &= S \\ &= I_K(1 + i') - [R_K(1 - g)(1 - t) - tot_K + t(tnf_K + tdep_K) + itc_K] \\ &= I_1(1 + i')^K \\ &\quad - (1 + i')^{K-1}[R_1(1 - g)(1 - t) - tot_1 + t(tnf_1 + tdep_1) + itc_1] \\ &\quad - (1 + i')^{K-2}[R_2(1 - g)(1 - t) - tot_2 + t(tnf_2 + tdep_2 + itc_2] \\ &\quad - \ldots - [R_K(1 - g)(1 - t) - tot_K + t(tnf_K + tdep_K) + itc_K] \ . \end{aligned} \tag{7}$$

Dividing Eq. (7) by $(1 + i')^K$ and rearranging yields

$$I_1 - \frac{S}{(1 + i')^K} = \sum_{k=1}^{K} \frac{R_k(1 - g)(1 - t) - tot_k + t(tnf_k + tdep_k) + itc_k}{(1 + i')^k}$$

or

$$\sum_{k=1}^{K} \frac{R_k}{(1 + i')^k} = \frac{I_1 - \dfrac{S}{(1 + i')^K}}{(1 - g)(1 - t)} + \sum_{k=1}^{K} \frac{tot_k - t(tnf_k + tdep_k) - itc_k}{(1 - g)(1 - t)(1 + i')^k} \ . \tag{8}$$

Equation (8) confirms that the revenues over the lifetime of the project (the left side of the equation) are equal to the expenses over the lifetime of the project (the right side of the equation). The revenue in year k is equal to the quantity of product produced in that year, E_k, times the price of the product. The levelized life-cycle power cost, L, is the *constant* cost of electricity over the plant's lifetime. Therefore, $R_k = L \times E_k$ for all values of k and

$$L = \frac{\sum_{k=1}^{K} \frac{R_k}{(1+i')^k}}{\sum_{k=1}^{K} \frac{E_k}{(1+i')^k}} . \tag{9}$$

Combining Eqs. (8) and (9) yields

$$L = \frac{I_1 - \frac{S}{(1+i')^K} + \sum_{k=1}^{K} \frac{tot_k - t(tnf_k + tdep_k) - itc_k}{(1+i')^k}}{(1-g)(1-t) \sum_{k=1}^{K} \frac{E_k}{(1+i')^k}} . \tag{10}$$

The capital investment can be represented as a uniform annual payment over the lifetime K using the capital recovery factor crf(i′, K).

$$cap_k = \left[I_1 - \frac{S}{(1 + i')^K} \right] \times crf(i',K) , \tag{11}$$

where

$$crf(i',K) = \left[\frac{i'(1+i')^K}{(1+i')^K - 1} \right] .$$

Substituting Eq. (11) in the expression for L [Eq. (10)] yields

$$L = \frac{\sum_{k=1}^{K} \frac{cap_k + tot_k - t(tnf_k + tdep_k) - itc_k}{(1+i')^k}}{(1-g)(1-t) \sum_{k=1}^{K} \frac{E_k}{(1+i')^k}} . \tag{12}$$

If the expressions for tot_k, tnf_k, and $tdep_k$ are substituted in Eq. (12), we get

$$L = \frac{\sum_{k=1}^{K} \frac{cap_k + fch_k + oam_k + fuel_k - t(fch_k + oam_k + dep_k + fdep_k) - itc_k}{(1+i')^k}}{(1-g)(1-t) \sum_{k=1}^{K} \frac{E_k}{(1+i')^k}} .$$

The levelized life-cycle cost can be expressed as a function of each of the following components.

$$L = \left.\frac{\displaystyle\sum_{k=1}^{K} \frac{cap_k + fch_k + (t/1-t)(cap_k - dep_k) - [itc_k/(1-t)]}{(1+i')^k}}{\displaystyle\sum_{k=1}^{K} \frac{E_k}{(1+i')^k}}\right\} \textit{capital related costs plus income taxes on capital minus investment tax credits}$$

$$+ \left.\frac{\displaystyle\sum_{k=1}^{K} \frac{oam_k}{(1+i')^k}}{\displaystyle\sum_{k=1}^{K} \frac{E_k}{(1+i')^k}}\right\} \textit{operation and maintenance charges}$$

$$+ \left.\frac{\displaystyle\sum_{k=1}^{K} \frac{fuel_k + (t/1-t)(fuel_k - fdep_k)}{(1+i')^k}}{\displaystyle +\sum_{k=1}^{K} \frac{E_k}{(1+i')^k}}\right\} \textit{fuel costs plus income taxes on fuel, if any}$$

$$+ \left.\frac{\displaystyle\frac{g}{1-g}\sum_{k=1}^{K} \frac{cap_k + fch_k + oam_k + fuel_k - t(fch_k + oam_k + dep_k + fdep_k) - itc_k}{(1+i')^k}}{\displaystyle (1-t)\sum_{k=1}^{K} \frac{E_k}{(1+i')^k}}\right\} \textit{gross revenue taxes} .$$

The parameter denoted with an "i," which is the weighted average of the cost of equity and the cost of debt, commonly is referred to as the "cost of money." Similarly, "i'" usually is referred to as the "tax adjusted cost of money." This is because i' accounts for the fact that interest on capital is tax deductible and therefore lowers the effective cost of money. As seen by the above equations, the "discount rate," which is used to translate the value of money over time, is equal to i' for proportional debt repayment. The discount rate for fixed-schedule repayment, as shown in Refs. 1 and 2, is simply equal to the cost of equity, i_e.

B. Treatment of Inflation

1. Current and Constant Dollar Costs. A common error in economic analyses is to improperly mix inflated (current dollar) and deflated (constant dollar) parameters. For example, inflated money costs are frequently used with deflated expenses, or vice-versa. The general form for the levelized life-cycle cost equation is

$$L = \frac{\displaystyle\sum_{k=1}^{K} \frac{C_k}{(1+j)^k}}{\displaystyle\sum_{k=1}^{K} \frac{E_k}{(1+j)^k}} , \qquad (13)$$

where

C_k = expenditures in year k
E_k = quantity of electricity produced in year k,
j = discount rate, and
K = project lifetime.

If the expenditures and the discount rate are both inflated parameters, then L is the inflated levelized life-cyle cost. The trouble with such a parameter is that it is difficult to have a "feel" for such a value because it is not in today's dollars.

One solution is to use deflated parameters for both the expenditures and the discount rate. This gives levelized costs that are in deflated dollars, but there are income tax related effects that result in this method being in error if inflation really does occur.

Starting with the following expression yields a more satisfactory solution.

$$\text{income} = \sum_{k=1}^{K} \frac{E_k \times L_{\text{In}}}{(1 + j_{\text{In}})^k}$$

$$= \sum_{k=1}^{K} \frac{E_k \times L_{\text{de}}(1 + z)^k}{(1 + j_{\text{In}})^k} ,$$

where

L_{In} = inflated levelized cost,
L_{de} = deflated levelized cost,
j_{In} = inflated discount rate, and
z = inflation rate.

Solving this equation for L_{de},

$$L_{\text{de}} = \frac{L_{\text{In}} \displaystyle\sum_{k=1}^{K} \frac{E_k}{(1 + j_{\text{In}})^k}}{\displaystyle\sum_{k=1}^{K} \frac{E_k(1 + z)^k}{(1 + j_{\text{In}})^k}} . \tag{14}$$

Substituting Eq. (13) into Eq. (14), where inflated parameters are used in Eq. (13), yields

$$L_{\text{de}} = \frac{\displaystyle\sum_{k=1}^{K} \frac{C_k^{\text{In}}}{(1 + j_{\text{In}})^k}}{\displaystyle\sum_{k=1}^{K} \frac{E_k(1 + z)^k}{(1 + j_{\text{In}})^k}} . \tag{15}$$

The denominator of Eq. (15) is frequently written as

$$\sum_{k=1}^{K} \frac{E_k}{(1 + j_{\text{de}})^k} ,$$

where j_{de} is the deflated discount rate. The expression for j_{de} is given by

$$j_{de} = \frac{(1 + j_{in})}{(1 + z)} - 1 \ .$$

This approach gives levelized life-cycle costs in deflated, or constant, dollars, but takes the impact of inflation on income taxes into account. All input costs to POPCYCLE must be in the same year's dollars—referred to as "price-year" dollars. If an inflation rate is specified, POPCYCLE then inflates the costs to current year's dollars.

2. Inflation Versus Escalation. Another common error in economic analyses is to confuse *inflation* and *escalation*. Inflation is a general loss of purchasing power usually measured using the "gross national product price deflators." Escalation, on the other hand, is a real price increase above inflation. As an example, suppose the price in current dollars of a piece of equipment increased by 15% in a year when the inflation rate was 10%. The escalation rate for that piece of equipment would then be 1.15/1.10 = 0.045, or 4.5%. That is,

$$\begin{matrix}\text{constant dollar} \\ \text{price in year n + 1}\end{matrix} = \begin{matrix}\text{constant dollar} \\ \text{price in year n}\end{matrix} \times \left(1 + \begin{matrix}\text{escalation} \\ \text{rate}\end{matrix}\right)$$

and

$$\begin{matrix}\text{current dollar} \\ \text{price in year n + 1}\end{matrix} = \begin{matrix}\text{current dollar} \\ \text{price in year n}\end{matrix} \times \left(1 + \begin{matrix}\text{inflation} \\ \text{rate}\end{matrix}\right)\left(1 + \begin{matrix}\text{escalation} \\ \text{rate}\end{matrix}\right) \ .$$

C. Capital Costs

The initial capital investment, I_1, is one of the most important input parameters to POPCYCLE. Because capital investments frequently are given on many different bases, this section outlines the method that should be used in determining I_1 for use in POPCYCLE. The expression for calculating I_1, including interest during construction (IDC), is

$$I_1 = \sum_{n=1}^{N} G_n(1 + i)^{N-n} \ ,$$

where

G_n = capital cost outlay in year n of construction,
i = interest rate during construction, and
N = number of years for capital construction.

If i is the inflated interest rate and G_n the inflated capital cost outlay, then the above expression calculates the total capital cost in "year of commercial operation" dollars (that is, year N + 1). To convert these to "price-year" dollars, the above must be divided by $(1 + z)^{NY}$, where z is the inflation rate and NY is the first year of commercialization minus the price year.

Therefore, the general form of the expression for calculating the total capital investment, including IDC, in "price-year" dollars is

$$I_1 = \frac{1}{(1+z)^{NY}} \sum_{n=1}^{N} G_n(1+i)^{N-n} \ ,$$

and the expression for IDC in "price-year" dollars is

$$IDC = \frac{1}{(1+z)^{NY}} \sum_{n=1}^{N} [G_n(1+i)^{N-n} - G_n] \ .$$

Frequently, capital cost data are given on a "build today, operate today" basis. The relationship between G_n and capital costs on this basis is

$$G'_n = G_n(1+e)^{N-n}(1+z)^{N-n} \ ,$$

where e is the capital cost escalation rate, and G'_n is the capital cost outlay in year n of construction escalated and inflated to the start-up date.

1. Capital Investment Annuity. In inflated dollars, the expression for the capital investment annuity amortized over the lifetime of the plant, cap_k, becomes

$$cap_k = \left[I_1 - \frac{S(1+z)^K}{(1+i'_{ln})^K} \right] \times \left[\frac{i'_{ln}(1+i'_{ln})^K}{(1+i'_{ln})^K - 1} \right] \ ,$$

where

I_1 = initial capital investment ($) in constant, price-year dollars,
S = salvage value of the plant ($) at the end of life in constant, price-year dollars, and
i'_{ln} = inflated, tax adjusted cost of money.

If the decommissioning cost exceeds the salvage value, then S is set equal to zero and the decommissioning cost is added to the fixed charges discussed below.

2. Fixed Charges. Costs included in the "fixed charges" category include property insurance, property taxes, capital replacements, and decommissioning costs. The expression for fixed charges in year k in inflated dollars, fch_k, is

$$fch_k = [(pir + ptr + crr) \times I_1 + dcom] \times (1+z)^k \ ,$$

where

pir = property insurance rate (fraction/year),
ptr = property tax rate (fraction/year),
crr = capital replacement rate (fraction/year),
I_1 = initial capital investment ($) in constant, price-year dollars, and
dcom = decommissioning cost in constant, price-year dollars ($)—only added to fch_k for $k = K$.

3. Income Taxes on Capital. The general expression for the calculation of income taxes for year k is

income tax rate $\times$ (revenue in year k $-$ deductible expense in year k) .

Depending on the relative magnitude and time dependence of the revenues and expenses, there may be cases where deductible expenses exceed revenues during some years of a project's lifetime. However, POPCYCLE takes the entire deduction in the year in which it occurs. This should more closely approximate the real world where additional deductions from a project can be used to reduce income tax liabilities for other projects. This would not be a good assumption, of course, if the entire income for the corporation results from a single project.

4. Capital Depreciation Allowance. Two methods of calculating the capital depreciation for income tax purposes are included in POPCYCLE—straight-line depreciation and sum-of-digits depreciation. The expression for the depreciation allowance, dep_k, for each method is given below.

$$dep_k = \frac{I_1 - S \times (1+z)^K}{K} \quad \Big\} \text{ straight-line depreciation}$$

$$dep_k = \frac{[I_1 - S \times (1+z)^K](K+1-k)}{\sum_{k'=1}^{K} k'} \quad \Big\} \text{ sum-of-digits depreciation ,}$$

where

I_1 = initial capital investment (\$) in constant, price-year dollars, and
S = salvage value (\$) in constant, price-year dollars.

5. Investment Tax Credits. The investment tax credit is a credit against the income tax liabilities in the year the capital investment occurs. Its magnitude is equal to the investment tax credit rate multiplied by the capital investment. Because the credit is assumed to be taken in the first year of plant operation, its effect on the levelized life-cycle cost is large.

The U.S. Master Tax Guide (Sec. 1179) provides the following regulation regarding the maximum investment tax credit.

"The investment tax credit may not exceed tax liability (see ¶ 1178). If tax liability exceeds \$25,000, the tax credit may not exceed \$25,000 plus 50% of the tax liability over that amount (Code Sec. 46(a)(3); Reg. § 1.46-1)."

For a capital intensive project, it is very likely that the investment tax credit for the first year of operation will exceed 50% of the income tax liability plus \$25,000 and could even exceed the entire tax liability. Nevertheless, POPCYCLE takes the entire investment tax credit in the first year of plant operation. Using logic similar to that described above, this assumes that these additional credits could be used to reduce the income tax liabilities for other projects.

Even though a project may have income tax liabilities on both capital and fuel, the entire investment tax credit is included in the capital portion of the total power costs printout.

D. Operation and Maintenance Costs

Operation and maintenance costs consist of two types, fixed and variable, plus nuclear liability insurance. Fixed costs are independent of the capacity factor whereas variable costs are proportional to the capacity factor. The expression for operation and maintenance costs in year k in inflated dollars, oam_k, is

$$oam_k = (foam_k + voam_k \times capf_k + rnli_k) \times (1 + z)^k ,$$

where

$foam_k$ = fixed operation and maintenance costs in constant, price-year dollars in year k,
$voam_k$ = variable operation and maintenance costs in constant, price-year dollars in year k,
$capf_k$ = capacity factor in year k, and
$rnli_k$ = nuclear liability insurance costs in year k in constant, price-year dollars.

E. Fuel Cycle Costs

1. Fuel Cycle Model. A schematic diagram of the nuclear fuel cycle model in POPCYCLE is shown in Fig. 3. Not all nuclear power plants will have all of the steps shown in this figure. For example, the Light Water Reactor on the once-through cycle will not incur the reprocessing and waste shipping and storage costs—nor will it receive the fuel credits resulting from reprocessing the spent fuel. Similarly, a plutonium-fueled Fast Breeder Reactor will not incur the U_3O_8-related costs.

POPCYCLE uses reactor charge and discharge data plus other fuel cycle information described below to calculate the nuclear fuel cycle cost components.

Reactor charge and discharge data are specified for each year of the plant's lifetime and for as many fuel cycle zones as desired. For example, charge and discharge data for three zones (the core, axial blanket, and radial blanket) may be specified for a Fast Breeder Reactor. All charges are assumed to occur at the beginning of the year, and all discharges at the end of the year. The six types of charge and discharge data that must be specified for a nuclear plant, and their corresponding units of measure, are

1. ^{232}Th (kg/year)
2. ^{233}U (kg/year)
3. ^{235}U (kg/year)
4. ^{238}U (kg/year)
5. Fissile plutonium (kg/year)
6. Total nuclear fuel heavy metal (kg/year).

Other types of nuclear cycle information that are required include

1. Enrichment cost by year ($/kg of SWU)*
2. Tails composition by year (%)
3. ThO_2 cost by year ($/lb)
4. ^{233}U cost by year ($/kg)
5. U_3O_8 cost by year ($/lb)
6. Fissile plutonium cost by year ($/kg)
7. Fabrication cost by year ($/kg heavy metal)
8. Back-end fuel cost by year ($/kg heavy metal)**
9. Fabrication loss fraction†

*Separative work unit.
**Back-end costs are defined as any costs incurred after the fuel is discharged from the reactor such as spent fuel shipping, reprocessing, and waste storage costs.
†Fraction of material lost during fabrication.

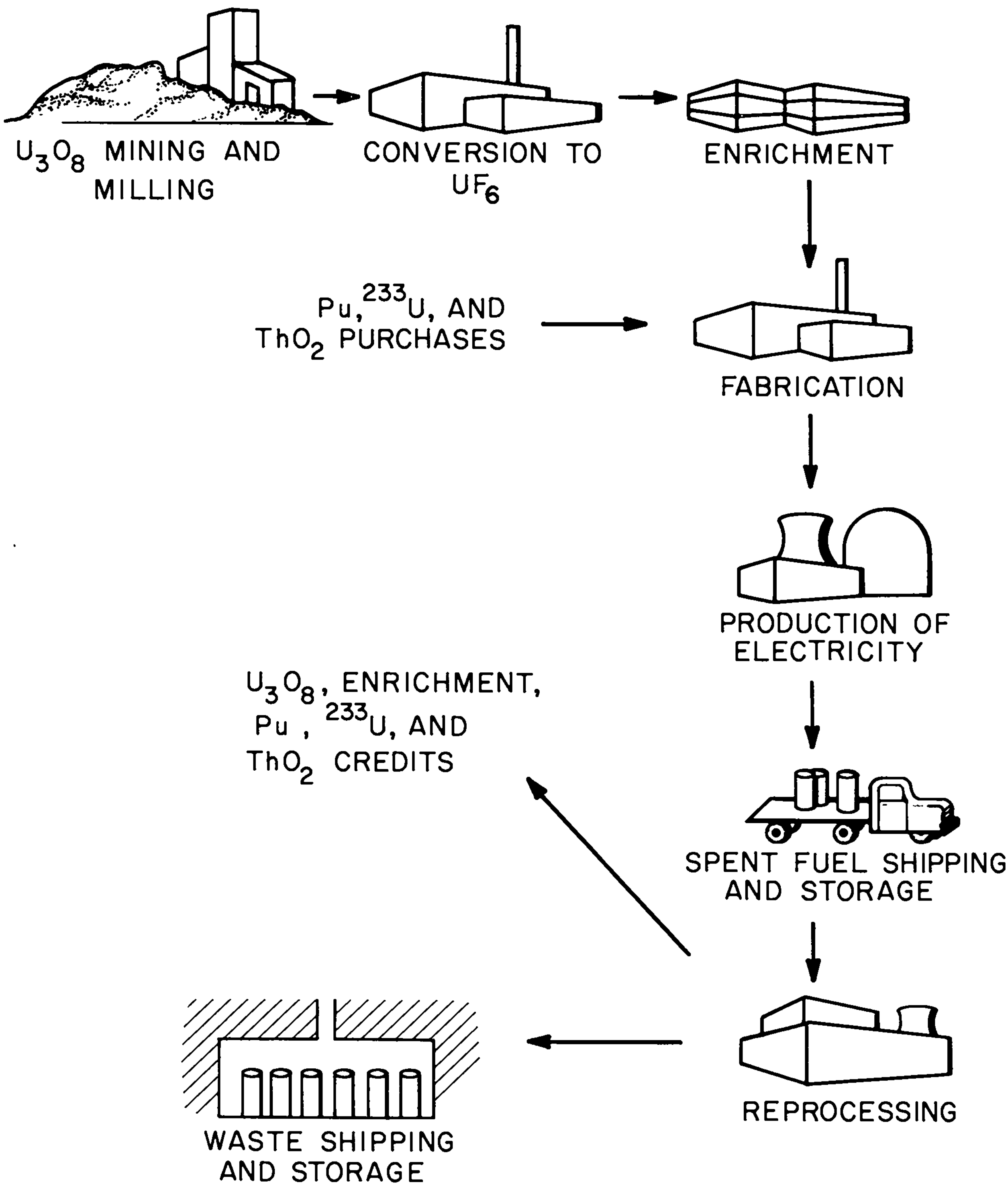

Fig. 3. Nuclear fuel cycle model.

10. Reprocessing loss fraction*
11. Fabrication lead time (years)**
12. Back-end lag time (years)†

The ^{235}U and ^{238}U charge and discharge data, along with the tails composition and loss fractions, are used to compute U_3O_8 and enrichment requirements. These requirements and the U_3O_8 and enrichment costs are then used to calculate the U_3O_8 and enrichment subcomponents of the fuel cycle component.

Similarly, the ^{233}U, fissile plutonium, and ThO_2 subcomponents are obtained using the charge and discharge information and the costs of these materials. The fabrication and back-end cost subcomponents are obtained using the fabrication and back-end costs and the total heavy metal throughput data.

For fossil plants, the fuel cycle cost in year k is simply the quantity of fuel required in year k times the cost per quantity in year k. The three fossil fuel types considered, and their units of measure, are shown below.

1. Coal (tons/year)
2. Oil (barrels/year)
3. Gas (10^3 scf/year)

2. Income Taxes on Fuel. POPCYCLE uses the "unit of production" method for calculating nuclear fuel depreciation allowances for income tax purposes, which is probably the most widely used method for determining such allowances.[3] Using this method, the project's total lifetime fuel expenses are apportioned by year according to the amount of energy produced in each year.

The expression for the fuel depreciation allowance, $fdep_k$, using this method is

$$fdep_k = \frac{E_k}{\sum\limits_{k'=1}^{K} E_{k'}} \sum_{k=1}^{K} fuel_{k'} \; .$$

As an option, the code will also assume that the nuclear fuel depreciation allowance is taken in the year that the expense occurs (that is, $fdep_k = fuel_k$). A description of several nuclear fuel depreciation schemes appears in Ref. 4. For fossil plants, the fuel costs are treated in POPCYCLE as an expense item, so there aren't any fuel-related income taxes for such plants.

F. Cash Flow Schedule Assumptions

The cost model used in POPCYCLE makes several assumptions regarding when costs occur and when credits are received. First, POPCYCLE assumes that plants begin operation at the beginning of year 1 and end operation at the end of year K. The total initial capital cost, including interest during construction, is assumed to occur at the beginning of year 1. Amortization payments, fixed charges, income taxes, investment tax credits, operation and maintenance costs, and gross revenue taxes are all assumed to occur at the end of each year.

Fuel feed charges occur at the beginning of each year minus any lead time. Fuel discharge credits are received at the end of each year plus any lag time. Revenue from the sale of electricity is received at the end of each year.

*Fraction of material lost during reprocessing.
**Length of time from when fresh fuel is purchased until it is loaded into the reactor.
†Length of time from when spent fuel is discharged from the reactor until back-end fuel costs are paid (and any credits are received).

III. INPUT INSTRUCTIONS

The following pages present the input instructions to POPCYCLE. There are four basic types of input to the code:

(1) Hollerith data;
(2) integer data (nonsubscripted)—this type of data is read in using 6-column fields;
(3) floating point data (nonsubscripted)—this type of data is read in using 12-column fields; and
(4) floating point data (subscripted).

Subscripted floating point data in POPCYCLE are read in using a generalized input subroutine. The format for data read in through the generalized input subroutine must adhere to the following form. All cards contain 6 data fields of 12 columns each (I1, I2, E9.0). Columns 4-12 of each field contain the data, D, associated with the particular field (see exception below); columns 2-3 of each field contain an integer, N, from 0 to 99. The first column of each field must contain one of the following.

Character	Instructions
0 or blank	no effect
1	repeat associated data entry N times
2	do N linear interpolations between associated data entry and succeeding data entry
3	terminate reading of this array with previous data entry
4	repeat previous D data entries N times (if D is a floating point number, code converts to an integer)
5	ignore (skip) this data field
6	fill the remaining locations of this array with associated data entry
7	do N geometric interpolations between associated data entry and succeeding data entry
8	repeat previous N data entries and scale by D

PLANT INDEPENDENT DATA

CARD 1: FORMAT (12A6)

ID(L), L = 1, 12	Identification card.

CARD 2: FORMAT (7I6)

IP	Number of plant types in this case.
KY	Number of years in the problem over which plants can be built.
KLFE	Number of years plants operate.
MD	Method of depreciating capital costs (0/1 = straight line/sum of years digits).
NPRT	Print option (0/1/2 = mini/midi/maxi).
MSPRT	Start-up year for midi- and maxi-print options (detailed yearly nuclear requirements are given for a plant starting up in this year).
MFA	Nuclear fuel accounting method (0/1 = direct expense/unit of production).

CARD 3: FORMAT (6E12.6)

FIB	Fraction of investment in bonds.
BIR	Inflated bond interest rate (fraction/year).
EIR	Inflated equity return rate (fraction/year).
CTR	Combined federal and state income tax rate (fraction/year).
PTR	Property tax rate (fraction/year).
GTR	Gross revenue tax rate (fraction/year).

CARD 4: FORMAT (6E12.6)

PIR	Property insurance rate (fraction/year).
CRR	Capital replacement rate (fraction/year).
CONV	Cost of converting U_3O_8 to UF_6 ($/kg of uranium).
SD	Starting date—first year in the problem that a plant can be built (year A.D.).
RITC	Investment tax credit rate (fraction/year).
RINFL	Inflation rate (fraction/year).

CARD 5: FORMAT [6(I1,I2,E9.0)]*

CSWU(K), K = 1, KY	Enrichment cost in year K in constant, price-year dollars ($/kg SWU).

CARD 6: FORMAT [6(I1,I2,E9.0)]

TCOM(K), K = 1, KY	Enrichment plant tails composition in year K (fraction).

CARD 7: FORMAT [6(I1,I2,E9.0)]

WTHO2(K), K = 1, KY	ThO_2 price in year K in constant, price-year dollars ($/lb of ThO_2).

CARD 8: FORMAT [6(I1,I2,E9.0)]

WU233(K), K = 1, KY	Uranium-233 price in year K in constant, price-year dollars ($/kg of ^{233}U).

CARD 9: FORMAT [6(I1,I2,E9.0)]

WU308(K), K = 1, KY	U_3O_8 price in year K in constant, price-year dollars ($/lb of U_3O_8).

CARD 10: FORMAT [6(I1,I2,E9.0)]

WFSPU(K), K = 1, KY	Fissile plutonium price in year K in constant, price-year dollars ($/kg of fissile plutonium).

CARD 11: FORMAT [6(I1,I2,E9.0)]

WCOAL(K), K = 1, KY	Coal price in year K in constant, price-year dollars ($/short ton of coal).

*Generalized input format. See description of generalized input format at the beginning of Sec. III.

CARD 12: FORMAT [6(I1,I2,E9.0)]

WOIL (K), K = 1, KY	Oil price in year K in constant, price-year dollars ($/barrel of oil).

CARD 13: FORMAT [6(I1,I2,E9.0)]

WGAS(K), K = 1, KY	Gas price in year K in constant, price-year dollars ($\$/10^3$ standard cubic feet of gas).

CARD 14: FORMAT [6(I1,I2,E9.0)]

CAPF(KK), KK = 1, KLFE	Capacity factor in year KK of plant lifetime (fraction).

PLANT DEPENDENT DATA*

CARD P1: FORMAT (8A6)

TEM(I), I = 1, 8	Plant identification card.

CARD P2: FORMAT (A6, 2I6)

NAME	Plant name.
NTYP	Plant type (0/1 = fossil plant/nuclear plant).
NZN	Number of fuel cycle zones.

CARD P3: FORMAT (5E12.6)

POW	Plant power level (kWe).
SALV	Negative/positive = decommissioning cost/salvage value at end of plant life in constant, price-year dollars ($/kWe).
FOMC	Fixed operation and maintenance charges in constant, price-year dollars ($/year).
VOMC	Variable operation and maintenance charges at 100% capacity factor in constant, price-year dollars ($/year)
RNLI	Nuclear liability insurance in constant, price-year dollars ($/year)

CARD P4: FORMAT (4E12.6)

FRL	Fabrication losses (fraction).
REL	Reprocessing losses (fraction).
FLT	Fabrication lead time (years).
RLT	Fuel cycle back-end lag time (years).

CARD P5: FORMAT [6(I1,I2,E9.0)]

DCAP(K), K = 1, KY	Capital cost, including interest and escalation during construction, in constant, price-year dollars for a plant starting in year K ($/kWe).

*Repeat from eard P1 for IP plant types.

CARD P6: FORMAT [6(I1,I2,E9.0)] (OPTIONAL, REQUIRED IF NTYP = 0)

FSCAL(K,I), K = 1, KY
I = 1, 3

Fossil cost scaling factors in year K for coal (I = 1), oil (I = 2), and gas (I = 3). These factors are multiplied by the fuel prices in cards 11-13 to give the effective fuel price for this plant type.

CARD P7: FORMAT [6(I1,I2,E9.0)] (OPTIONAL, REQUIRED IF NTYP > 0)

FMOD(M), M = 1, NZN

U_3O_8 and enrichment feed modifiers for fuel cycle zone M. The calculated U_3O_8 and enrichment feed requirements are multiplied by these modifiers to give the effective feed requirements This modifier can be used to account for ^{236}U poisoning, for example.

CARD P8: FORMAT [6(I1,I2,E9.0)] (OPTIONAL, REQUIRED IF NTYP > 0)

DMOD(M), M = 1, NZN

U_3O_8 and enrichment discharge modifiers for fuel cycle zone M. The calculated U_3O_8 and enrichment discharge credits are multiplied by these modifiers to give the effective discharge credits.

CARD P9: FORMAT [6(I1,I2,E9.0)] (OPTIONAL, REQUIRED IF NTYP > 0)

FABR(K,M), K = 1, KY
M = 1, NZN

Fuel fabrication cost in constant, price-year dollars for plant in year K and fuel cycle zone M ($/kg of heavy metal).

CARD P10: FORMAT [6(I1,I2,E9.0)] (OPTIONAL, REQUIRED IF NTYP > 0)

REPR(K,M), K = 1, KY
M = 1, NZN

Fuel back-end cost in constant, price-year dollars for plant in year K and fuel cycle zone M ($/kg of heavy metal). The back-end costs include all costs incurred after the fuel is discharged from the reactor, such as spent fuel shipping, reprocessing, waste shipping, and waste storage costs.

CARD P11: FORMAT [6(I1,I2,E9.0)]

FEED(L,KK,M), L = 1, 9
KK = 1, KLFE
M = 1, NZN

Feed rate of fuel cycle item L in year KK of plant life for fuel cycle zone M. The type of fuel and unit of measure for each L is listed below.

L	Fuel Type	Unit of Measure
1	^{232}Th	kg/year
2	^{233}U	kg/year
3	^{235}U	kg/year
4	^{238}U	kg/year
5	Fissile plutonium	kg/year
6	Total heavy metal	kg/year
7	Coal	ton/year
8	Oil	bbl/year
9	Gas	10^3scf/year

For a nuclear plant, of course, fuel cycle items 7-9 will be zero, and for a fossil plant, fuel cycle items 1-6 will be zero.

CARD P12: FORMAT [6(I1,I2,E9.0)]

DISC(L,KK,M), L = 1, 9 KK = 1, KLFE M = NZN	Discharge rate of fuel cycle item L in year KK of plant life for fuel cycle zone M.

IV. SAMPLE CASE

This section presents the input data and print-out for a sample case consisting of two plant types—a Light Water Reactor on the once-through cycle and a coal-fired power plant.

A. Sample Case Input

Table II lists the input deck for the sample case. Note that the card number for nonsubscripted input and the variable names for subscripted arrays are punched in columns 73-80. This is not required because the code does not read these columns but was done to facilitate comparing the sample case input with the input instructions in Sec. III.

This sample case also provides examples of all of the generalized input options discussed in Sec. III except option 8 (repeat previous N data entries...).

B. Sample Case Output

Table III is a computer print-out for the sample case. The first part of the POPCYCLE print-out just prints out the input data in the order it is read in. For the nonsubscripted data, the variable name is printed on the left, a definition of the variable appears in the middle, and the input value is along the right.

For each subscripted data array, the first line is the definition of the variable, the second line is the variable name and the length of the array, and the next line (or lines) contains the input values as stored by the code. These parameters can be compared with the input data to see how the various options are used by the generalized input routine. For example, the fuel worth of coal array, FWCOAL, varies from 1.0 to 2.6388 over 50 years at 2%/year. This array was input using option 7 (do N geometric interpolations...).

The rest of the print-out is self-explanatory. The columns headed by capital, operation and maintenance, fuel, and gross revenues taxes correspond to the expressions in Sec. II.

TABLE II. Sample Case Input

```
 POPCYCLE DOCUMENT SAMPLE CASE   (LWR-OT SYSTEM AND COAL PLANT)                 1
    2   50    30     1     1     5     0                                        2
         .55    .1109345    .1559345       .50         .025          .0         3
      .0025        .0035        6.60     1981.          0.1         .06         4
748   114.50       302.143                                                   CSWU
6       .002                                                                 TCOM
6        15.                                                               FWTHO2
6   88.538+3                                                               FWU233
748    38.50       101.593                                                 FWU308
6   156.76+3                                                               FWFSPU
748      1.0       2.63883                                                 FWCOAL
6        1.0                                                                FWOIL
6        1.0                                                                FWGAS
6       0.70                                                                 CAPF
 LIGHT WATER REACTOR, LE U235 FUEL, ONCE-THROUGH CYCLE (LWR-U5(LE)+U-OT)       P1
L-U5LO     1     1                                                             P2
     1270.+3        -267.       18.8+6        0.8+6         0.0                P3
        .015          1.0          1.0          1.0                            P4
6      1335.                                                                 DCAP
6        1.0                                                                 FMOD
6        1.0                                                                 DMOD
6       228.                                                                 FABR
6       195.                                                                 REPR
          0.           0.        2201.       97111.          0.      99312.  FEED
1 3      0.5            5            5            5            5             FEED
          0.           0.         972.       31270.          0.      32242.  FEED
1 3    0.428          9.5            5            5            5             FEED
3                                                                            FEED
          0.           0.         263.       30526.        213.      31198.  DISC
1 3    0.428          9.5            5            5            5             DISC
          0.           0.        1363.       98138.        544.     100499.  DISC
1 3      0.5            5            5            5            5             DISC
3                                                                            DISC
 COAL PLANT WITH EV COOLING AND FGD, EFF=.3734, 10560 BTU/LB COAL              P1
  COAL      0     1                                                            P2
     1.232+6          0.0       12.9+6       22.1+6         0.0                P3
          .0           .0           .0           .0                            P4
6       975.                                                                 DCAP
6      32.39                                                                FSCAL
1 6       .0    3.2691+61 2      .0429          9.3                          FEED
6        .03                                                                 DISC
```

TABLE III. Sample Case Output

```
                              * * * *   P O P C Y C L E   * * * * *

          POPCYCLE DOCUMENT SAMPLE CASE    (LWR-OT SYSTEM AND COAL PLANT)
     IP   NUMBER OF PLANTS                                                                      2
     KY   NUMBER OF YEARS PLANTS CAN BE BUILT                                                  50
   KLFE   NUMBER OF YEARS PLANTS OPERATE                                                       30
     MD   METHOD OF DEPRECIATING CAPITAL COSTS  (0/1=STRAIGHT LINE/SUM OF DIGITS)               1
   NPRT   PRINT OPTION  (0/1/2=MINI/MIDI/MAXI)                                                  1
  MSPRT   STARTUP YEAR FOR MAXI-PRINT OPTION                                                    5
    MFA   NUCLEAR FUEL ACCOUNTING METHOD    (0/1=DIRECT EXPENSE/UNIT OF PRODUCTION)             0

    FIB   FRACTION OF INVESTMENT IN BONDS                                              5.5000E-01
    BIR   INFLATED BOND INTEREST RATE  (FRACTION/YEAR)                                 1.1093E-01
    EIR   INFLATED EQUITY INTEREST RATE  (FRACTION/YEAR)                               1.5593E-01
    CTR   COMBINED INCOME TAX RATE  (FRACTION/YEAR)                                    5.0000E-01
    PTR   PROPERTY TAX RATE  (FRACTION/YEAR)                                           2.5000E-02
    GTR   GROSS REVENUE TAX RATE  (FRACTION/YEAR)                                      0.

    PIR   PROPERTY INSURANCE RATE  (FRACTION/YEAR)                                     2.5000E-03
    CRR   CAPITAL REPLACEMENT RATE  (FRACTION/YEAR)                                    3.5000E-03
   CONV   COST OF CONVERTING U308 TO UF6  ($/KG OF U)                                  6.6000E+00
     SD   STARTING DATE  (YEAR A. D.)                                                  1.9810E+03
   RITC   INVESTMENT TAX CREDIT RATE  (FRACTION/YEAR)                                  1.0000E-01
  RINFL   INFLATION RATE  (FRACTION/YEAR)                                              6.0000E-02

 SWU COST BY YEAR   ($/KG SWU)
       CSWU    50
 .11450E+03 .11679E+03 .11913E+03 .12151E+03 .12394E+03 .12642E+03 .12895E+03 .13152E+03 .13415E+03 .13684E+03
 .13957E+03 .14237E+03 .14521E+03 .14812E+03 .15108E+03 .15410E+03 .15718E+03 .16033E+03 .16353E+03 .16680E+03
 .17014E+03 .17354E+03 .17701E+03 .18055E+03 .18416E+03 .18785E+03 .19161E+03 .19544E+03 .19935E+03 .20333E+03
 .20740E+03 .21155E+03 .21578E+03 .22009E+03 .22450E+03 .22899E+03 .23356E+03 .23824E+03 .24300E+03 .24786E+03
 .25282E+03 .25787E+03 .26303E+03 .26829E+03 .27366E+03 .27913E+03 .28471E+03 .29041E+03 .29622E+03 .30214E+03
 TAILS COMPOSITION BY YEAR   (FRACTION)
       TCOM    50
 .20000E-02 .20000E-02 .20000E-02 .20000E-02 .20000E-02 .20000E-02 .20000E-02 .20000E-02 .20000E-02 .20000E-02
 .20000E-02 .20000E-02 .20000E-02 .20000E-02 .20000E-02 .20000E-02 .20000E-02 .20000E-02 .20000E-02 .20000E-02
 .20000E-02 .20000E-02 .20000E-02 .20000E-02 .20000E-02 .20000E-02 .20000E-02 .20000E-02 .20000E-02 .20000E-02
 .20000E-02 .20000E-02 .20000E-02 .20000E-02 .20000E-02 .20000E-02 .20000E-02 .20000E-02 .20000E-02 .20000E-02
 .20000E-02 .20000E-02 .20000E-02 .20000E-02 .20000E-02 .20000E-02 .20000E-02 .20000E-02 .20000E-02 .20000E-02
 FUEL WORTH OF THO2     ($/LB THO2)
       THO2    50
 .15000E+02 .15000E+02 .15000E+02 .15000E+02 .15000E+02 .15000E+02 .15000E+02 .15000E+02 .15000E+02 .15000E+02
 .15000E+02 .15000E+02 .15000E+02 .15000E+02 .15000E+02 .15000E+02 .15000E+02 .15000E+02 .15000E+02 .15000E+02
 .15000E+02 .15000E+02 .15000E+02 .15000E+02 .15000E+02 .15000E+02 .15000E+02 .15000E+02 .15000E+02 .15000E+02
 .15000E+02 .15000E+02 .15000E+02 .15000E+02 .15000E+02 .15000E+02 .15000E+02 .15000E+02 .15000E+02 .15000E+02
 .15000E+02 .15000E+02 .15000E+02 .15000E+02 .15000E+02 .15000E+02 .15000E+02 .15000E+02 .15000E+02 .15000E+02
 FUEL WORTH OF U233     ($/KG U233)
       U233    50
 .88538E+05 .88538E+05 .88538E+05 .88538E+05 .88538E+05 .88538E+05 .88538E+05 .88538E+05 .88538E+05 .88538E+05
 .88538E+05 .88538E+05 .88538E+05 .88538E+05 .88538E+05 .88538E+05 .88538E+05 .88538E+05 .88538E+05 .88538E+05
 .88538E+05 .88538E+05 .88538E+05 .88538E+05 .88538E+05 .88538E+05 .88538E+05 .88538E+05 .88538E+05 .88538E+05
 .88538E+05 .88538E+05 .88538E+05 .88538E+05 .88538E+05 .88538E+05 .88538E+05 .88538E+05 .88538E+05 .88538E+05
 .88538E+05 .88538E+05 .88538E+05 .88538E+05 .88538E+05 .88538E+05 .88538E+05 .88538E+05 .88538E+05 .88538E+05
 FUEL WORTH OF U308     ($/LB U308)
       U308    50
 .38500E+02 .39270E+02 .40055E+02 .40856E+02 .41673E+02 .42507E+02 .43357E+02 .44224E+02 .45109E+02 .46011E+02
```

TABLE III. (cont)

.46931E+02	.47869E+02	.48827E+02	.49803E+02	.50799E+02	.51815E+02	.52852E+02	.53909E+02	.54987E+02	.56086E+02
.57208E+02	.58352E+02	.59519E+02	.60709E+02	.61924E+02	.63162E+02	.64425E+02	.65714E+02	.67028E+02	.68368E+02
.69736E+02	.71130E+02	.72553E+02	.74004E+02	.75484E+02	.76993E+02	.78533E+02	.80104E+02	.81706E+02	.83340E+02
.85007E+02	.86707E+02	.88441E+02	.90209E+02	.92014E+02	.93854E+02	.95731E+02	.97645E+02	.99598E+02	.10159E+03

FUEL WORTH OF FIS PU (\$/KG FIS PU)
FSPU 50

.15676E+06	.15676E+06	.15676E+06	.15676E+06	.15676E+06	.15676E+06	.15676E+06	.15676E+06	.15676E+06	.15676E+06
.15676E+06	.15676E+06	.15676E+06	.15676E+06	.15676E+06	.15676E+06	.15676E+06	.15676E+06	.15676E+06	.15676E+06
.15676E+06	.15676E+06	.15676E+06	.15676E+06	.15676E+06	.15676E+06	.15676E+06	.15676E+06	.15676E+06	.15676E+06
.15676E+06	.15676E+06	.15676E+06	.15676E+06	.15676E+06	.15676E+06	.15676E+06	.15676E+06	.15676E+06	.15676E+06
.15676E+06	.15676E+06	.15676E+06	.15676E+06	.15676E+06	.15676E+06	.15676E+06	.15676E+06	.15676E+06	.15676E+06

FUEL WORTH OF COAL (\$/TON COAL)
COAL 50

.10000E+01	.10200E+01	.10404E+01	.10612E+01	.10824E+01	.11041E+01	.11262E+01	.11487E+01	.11717E+01	.11951E+01
.12190E+01	.12434E+01	.12682E+01	.12936E+01	.13195E+01	.13459E+01	.13728E+01	.14002E+01	.14282E+01	.14568E+01
.14859E+01	.15157E+01	.15460E+01	.15769E+01	.16084E+01	.16406E+01	.16734E+01	.17069E+01	.17410E+01	.17758E+01
.18114E+01	.18476E+01	.18845E+01	.19222E+01	.19607E+01	.19999E+01	.20399E+01	.20807E+01	.21223E+01	.21647E+01
.22080E+01	.22522E+01	.22972E+01	.23432E+01	.23900E+01	.24378E+01	.24866E+01	.25363E+01	.25871E+01	.26388E+01

FUEL WORTH OF OIL (\$/BARREL OIL)
OIL 50

.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01
.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01
.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01
.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01
.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01

FUEL WORTH OF GAS (\$/MCF GAS)
GAS 50

.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01
.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01
.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01
.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01
.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01	.10000E+01

CAPACITY FACTOR DURING EACH YEAR OF PLANT LIFE (FRACTION)
CAPF 30

.70000E+00	.70000E+00	.70000E+00	.70000E+00	.70000E+00	.70000E+00	.70000E+00	.70000E+00	.70000E+00	.70000E+00
.70000E+00	.70000E+00	.70000E+00	.70000E+00	.70000E+00	.70000E+00	.70000E+00	.70000E+00	.70000E+00	.70000E+00
.70000E+00	.70000E+00	.70000E+00	.70000E+00	.70000E+00	.70000E+00	.70000E+00	.70000E+00	.70000E+00	.70000E+00

* * * * INVESTMENT RETURN RATES

1.007E-01	AVERAGE RETURN ON INVESTMENT--INFLATED AND TAX ADJUSTED
1.312E-01	AVERAGE RETURN ON INVESTMENT--INFLATED
3.838E-02	AVERAGE RETURN ON INVESTMENT--DEFLATED AND TAX ADJUSTED
6.716E-02	AVERAGE RETURN ON INVESTMENT--DEFLATED

* * * DATA FOR PLANT 1 LIGHT WATER REACTOR, LE U235 FUEL, ONCE-THROUGH CYCLE (LWR-U5(LE)+U-OT)

NAME	PLANT NAME	L-U5LO
NTYP	0/1=FOSSIL PLANT/NUCLEAR PLANT	1
NZN	NUMBER OF FUEL CYCLE ZONES	1
POW	PLANT POWER LEVEL--IF 1.0, CALCULATE LEVELIZED ANNUAL $ (KW)	1.2700E+06
SALV	SALVAGE VALUE ($/KW)	-2.6700E+02
FOMC	FIXED OPERATION AND MAINTENANCE CHARGES ($/YEAR)	1.8800E+07
VOMC	VARIABLE OPERATION AND MAINTENANCE CHARGES ($/YEAR)	8.0000E+05
RNLI	NUCLEAR LIABILITY INSURANCE ($/YEAR)	0.
FRL	FABRICATION LOSSES (FRACTION)	1.5000E-02
REL	REPROCESSING LOSSES (FRACTION)	1.0000E+00
FLT	FABRICATION LEAD TIME (YEARS)	1.0000E+00
RLT	FUEL BACKEND LAG TIME (YEARS)	1.0000E+00

LAST1 = 16611
LAST2 = 17453

CAPITAL COST BY YEAR FOR L-U5LO ($/KW)
OCAP 50

.13350E+04	.13350E+04	.13350E+04	.13350E+04	.13350E+04	.13350E+04	.13350E+04	.13350E+04	.13350E+04	.13350E+04
.13350E+04	.13350E+04	.13350E+04	.13350E+04	.13350E+04	.13350E+04	.13350E+04	.13350E+04	.13350E+04	.13350E+04
.13350E+04	.13350E+04	.13350E+04	.13350E+04	.13350E+04	.13350E+04	.13350E+04	.13350E+04	.13350E+04	.13350E+04
.13350E+04	.13350E+04	.13350E+04	.13350E+04	.13350E+04	.13350E+04	.13350E+04	.13350E+04	.13350E+04	.13350E+04
.13350E+04	.13350E+04	.13350E+04	.13350E+04	.13350E+04	.13350E+04	.13350E+04	.13350E+04	.13350E+04	.13350E+04

U3O8 AND SWU FEED MODIFIERS BY FUEL CYCLE ZONE FOR L-U5LO (FRACTION)
FMOD 1
.10000E+01

U3O8 AND SWU DISCHARGE MODIFIERS BY FUEL CYCLE ZONE FOR L-U5LO (FRACTION)
DMOD 1
.10000E+01

FABRICATION COST BY YEAR FOR EACH FUEL CYCLE ZONE FOR L-U5LO ($/KG)
FABR 50

.22800E+03	.22800E+03	.22800E+03	.22800E+03	.22800E+03	.22800E+03	.22800E+03	.22800E+03	.22800E+03	.22800E+03
.22800E+03	.22800E+03	.22800E+03	.22800E+03	.22800E+03	.22800E+03	.22800E+03	.22800E+03	.22800E+03	.22800E+03
.22800E+03	.22800E+03	.22800E+03	.22800E+03	.22800E+03	.22800E+03	.22800E+03	.22800E+03	.22800E+03	.22800E+03
.22800E+03	.22800E+03	.22800E+03	.22800E+03	.22800E+03	.22800E+03	.22800E+03	.22800E+03	.22800E+03	.22800E+03
.22800E+03	.22800E+03	.22800E+03	.22800E+03	.22800E+03	.22800E+03	.22800E+03	.22800E+03	.22800E+03	.22800E+03

FUEL BACKEND COST BY YEAR FOR EACH FUEL CYCLE ZONE FOR L-U5LO ($/KG)
REPR 50

.19500E+03	.19500E+03	.19500E+03	.19500E+03	.19500E+03	.19500E+03	.19500E+03	.19500E+03	.19500E+03	.19500E+03
.19500E+03	.19500E+03	.19500E+03	.19500E+03	.19500E+03	.19500E+03	.19500E+03	.19500E+03	.19500E+03	.19500E+03
.19500E+03	.19500E+03	.19500E+03	.19500E+03	.19500E+03	.19500E+03	.19500E+03	.19500E+03	.19500E+03	.19500E+03
.19500E+03	.19500E+03	.19500E+03	.19500E+03	.19500E+03	.19500E+03	.19500E+03	.19500E+03	.19500E+03	.19500E+03
.19500E+03	.19500E+03	.19500E+03	.19500E+03	.19500E+03	.19500E+03	.19500E+03	.19500E+03	.19500E+03	.19500E+03

FEED RATE FOR EACH FUEL CYCLE ITEM DURING EACH YEAR OF PLANT LIFE IN EACH FUEL CYCLE ZONE FOR L-U5LO (UNITS/YR)
FEED 270

0.	0.	.22010E+04	.97111E+05	0.	.99312E+05	0.	0.	0.	0.
0.	.97200E+03	.31270E+05	0.	.32242E+05	0.	0.	0.	0.	0.
.97200E+03	.31270E+05	0.	.32242E+05	0.	0.	0.	0.	0.	.97200E+03
.31270E+05	0.	.32242E+05	0.	0.	0.	0.	0.	.97200E+03	.31270E+05
0.	.32242E+05	0.	0.	0.	0.	0.	.97200E+03	.31270E+05	0.
.32242E+05	0.	0.	0.	0.	0.	.97200E+03	.31270E+05	0.	.32242E+05
0.	0.	0.	0.	0.	.97200E+03	.31270E+05	0.	.32242E+05	0.
0.	0.	0.	0.	.97200E+03	.31270E+05	0.	.32242E+05	0.	0.

TABLE III. (cont)

0.	0.	0.	.97200E+03	.31270E+05	0.	.32242E+05	0.	0.	0.
0.	0.	.97200E+03	.31270E+05	0.	.32242E+05	0.	0.	0.	0.
0.	.97200E+03	.31270E+05	0.	.32242E+05	0.	0.	0.	0.	0.
.97200E+03	.31270E+05	0.	.32242E+05	0.	0.	0.	0.	0.	.97200E+03
.31270E+05	0.	.32242E+05	0.	0.	0.	0.	0.	.97200E+03	.31270E+05
0.	.32242E+05	0.	0.	0.	0.	0.	.97200E+03	.31270E+05	0.
.32242E+05	0.	0.	0.	0.	0.	.97200E+03	.31270E+05	0.	.32242E+05
0.	0.	0.	0.	0.	.97200E+03	.31270E+05	0.	.32242E+05	0.
0.	0.	0.	0.	.97200E+03	.31270E+05	0.	.32242E+05	0.	0.
0.	0.	0.	.97200E+03	.31270E+05	0.	.32242E+05	0.	0.	0.
0.	0.	.97200E+03	.31270E+05	0.	.32242E+05	0.	0.	0.	0.
0.	.97200E+03	.31270E+05	0.	.32242E+05	0.	0.	0.	0.	0.
.97200E+03	.31270E+05	0.	.32242E+05	0.	0.	0.	0.	0.	.97200E+03
.31270E+05	0.	.32242E+05	0.	0.	0.	0.	0.	.97200E+03	.31270E+05
0.	.32242E+05	0.	0.	0.	0.	0.	.97200E+03	.31270E+05	0.
.32242E+05	0.	0.	0.	0.	0.	.97200E+03	.31270E+05	0.	.32242E+05
0.	0.	0.	0.	0.	.97200E+03	.31270E+05	0.	.32242E+05	0.
0.	0.	0.	0.	.97200E+03	.31270E+05	0.	.32242E+05	0.	0.
0.	0.	0.	.97200E+03	.31270E+05	0.	.32242E+05	0.	0.	0.

DISCHARGE RATE FOR EACH FUEL CYCLE ITEM DURING EACH YEAR OF PLANT LIFE IN EACH FUEL CYCLE ZONE FOR L-U5LO (UNITS/YR)

DISC 270

0.	0.	.26300E+03	.30526E+05	.21300E+03	.31198E+05	0.	0.	0.	0.
0.	.26300E+03	.30526E+05	.21300E+03	.31198E+05	0.	0.	0.	0.	0.
.26300E+03	.30526E+05	.21300E+03	.31198E+05	0.	0.	0.	0.	0.	.26300E+03
.30526E+05	.21300E+03	.31198E+05	0.	0.	0.	0.	0.	.26300E+03	.30526E+05
.21300E+03	.31198E+05	0.	0.	0.	0.	0.	.26300E+03	.30526E+05	.21300E+03
.31198E+05	0.	0.	0.	0.	0.	.26300E+03	.30526E+05	.21300E+03	.31198E+05
0.	0.	0.	0.	0.	.26300E+03	.30526E+05	.21300E+03	.31198E+05	0.
0.	0.	0.	0.	.26300E+03	.30526E+05	.21300E+03	.31198E+05	0.	0.
0.	0.	0.	.26300E+03	.30526E+05	.21300E+03	.31198E+05	0.	0.	0.
0.	0.	.26300E+03	.30526E+05	.21300E+03	.31198E+05	0.	0.	0.	0.
0.	.26300E+03	.30526E+05	.21300E+03	.31198E+05	0.	0.	0.	0.	0.
.26300E+03	.30526E+05	.21300E+03	.31198E+05	0.	0.	0.	0.	0.	.26300E+03
.30526E+05	.21300E+03	.31198E+05	0.	0.	0.	0.	0.	.26300E+03	.30526E+05
.21300E+03	.31198E+05	0.	0.	0.	0.	0.	.26300E+03	.30526E+05	.21300E+03
.31198E+05	0.	0.	0.	0.	0.	.26300E+03	.30526E+05	.21300E+03	.31198E+05
0.	0.	0.	0.	0.	.26300E+03	.30526E+05	.21300E+03	.31198E+05	0.
0.	0.	0.	0.	.26300E+03	.30526E+05	.21300E+03	.31198E+05	0.	0.
0.	0.	0.	.26300E+03	.30526E+05	.21300E+03	.31198E+05	0.	0.	0.
0.	0.	.26300E+03	.30526E+05	.21300E+03	.31198E+05	0.	0.	0.	0.
0.	.26300E+03	.30526E+05	.21300E+03	.31198E+05	0.	0.	0.	0.	0.
.26300E+03	.30526E+05	.21300E+03	.31198E+05	0.	0.	0.	0.	0.	.26300E+03
.30526E+05	.21300E+03	.31198E+05	0.	0.	0.	0.	0.	.26300E+03	.30526E+05
.21300E+03	.31198E+05	0.	0.	0.	0.	0.	.26300E+03	.30526E+05	.21300E+03
.31198E+05	0.	0.	0.	0.	0.	.26300E+03	.30526E+05	.21300E+03	.31198E+05
0.	0.	0.	0.	0.	.26300E+03	.30526E+05	.21300E+03	.31198E+05	0.
0.	0.	0.	0.	.26300E+03	.30526E+05	.21300E+03	.31198E+05	0.	0.
0.	0.	0.	.13630E+04	.98138E+05	.54400E+03	.10050E+06	0.	0.	0.

TABLE III. (cont)

FUEL CYCLE COST COMPONENTS (MILLS/KWH)
FOR PLANT, L-U5LO, STARTING UP IN YEAR KS

KS	YEAR	THO2	U233	FISSPU	U308	SWU	FABRICATION	FUEL BACKEND
1	1981.0	0.	0.	0.	3.470E+00	2.934E+00	1.133E+00	7.829E-01
2	1982.0	0.	0.	0.	3.530E+00	2.988E+00	1.133E+00	7.829E-01
3	1983.0	0.	0.	0.	3.597E+00	3.047E+00	1.133E+00	7.829E-01
4	1984.0	0.	0.	0.	3.665E+00	3.108E+00	1.133E+00	7.829E-01
5	1985.0	0.	0.	0.	3.735E+00	3.171E+00	1.133E+00	7.829E-01
6	1986.0	0.	0.	0.	3.806E+00	3.234E+00	1.133E+00	7.829E-01
7	1987.0	0.	0.	0.	3.879E+00	3.299E+00	1.133E+00	7.829E-01
8	1988.0	0.	0.	0.	3.953E+00	3.365E+00	1.133E+00	7.829E-01
9	1989.0	0.	0.	0.	4.028E+00	3.432E+00	1.133E+00	7.829E-01
10	1990.0	0.	0.	0.	4.105E+00	3.501E+00	1.133E+00	7.829E-01
11	1991.0	0.	0.	0.	4.184E+00	3.571E+00	1.133E+00	7.829E-01
12	1992.0	0.	0.	0.	4.264E+00	3.642E+00	1.133E+00	7.829E-01
13	1993.0	0.	0.	0.	4.346E+00	3.715E+00	1.133E+00	7.829E-01
14	1994.0	0.	0.	0.	4.429E+00	3.789E+00	1.133E+00	7.829E-01
15	1995.0	0.	0.	0.	4.514E+00	3.865E+00	1.133E+00	7.829E-01
16	1996.0	0.	0.	0.	4.601E+00	3.942E+00	1.133E+00	7.829E-01
17	1997.0	0.	0.	0.	4.690E+00	4.021E+00	1.133E+00	7.829E-01
18	1998.0	0.	0.	0.	4.780E+00	4.101E+00	1.133E+00	7.829E-01
19	1999.0	0.	0.	0.	4.872E+00	4.184E+00	1.133E+00	7.829E-01
20	2000.0	0.	0.	0.	4.966E+00	4.267E+00	1.133E+00	7.829E-01
21	2001.0	0.	0.	0.	5.062E+00	4.353E+00	1.133E+00	7.829E-01
22	2002.0	0.	0.	0.	5.160E+00	4.440E+00	1.133E+00	7.829E-01
23	2003.0	0.	0.	0.	5.257E+00	4.526E+00	1.133E+00	7.829E-01
24	2004.0	0.	0.	0.	5.354E+00	4.612E+00	1.133E+00	7.829E-01
25	2005.0	0.	0.	0.	5.450E+00	4.698E+00	1.133E+00	7.829E-01
26	2006.0	0.	0.	0.	5.545E+00	4.782E+00	1.133E+00	7.829E-01
27	2007.0	0.	0.	0.	5.639E+00	4.866E+00	1.133E+00	7.829E-01
28	2008.0	0.	0.	0.	5.733E+00	4.949E+00	1.133E+00	7.829E-01
29	2009.0	0.	0.	0.	5.825E+00	5.031E+00	1.133E+00	7.829E-01
30	2010.0	0.	0.	0.	5.916E+00	5.112E+00	1.133E+00	7.829E-01
31	2011.0	0.	0.	0.	6.005E+00	5.191E+00	1.133E+00	7.829E-01
32	2012.0	0.	0.	0.	6.093E+00	5.269E+00	1.133E+00	7.829E-01
33	2013.0	0.	0.	0.	6.179E+00	5.345E+00	1.133E+00	7.829E-01
34	2014.0	0.	0.	0.	6.263E+00	5.420E+00	1.133E+00	7.829E-01
35	2015.0	0.	0.	0.	6.345E+00	5.492E+00	1.133E+00	7.829E-01
36	2016.0	0.	0.	0.	6.425E+00	5.563E+00	1.133E+00	7.829E-01
37	2017.0	0.	0.	0.	6.502E+00	5.631E+00	1.133E+00	7.829E-01
38	2018.0	0.	0.	0.	6.577E+00	5.697E+00	1.133E+00	7.829E-01
39	2019.0	0.	0.	0.	6.649E+00	5.760E+00	1.133E+00	7.829E-01
40	2020.0	0.	0.	0.	6.717E+00	5.820E+00	1.133E+00	7.829E-01
41	2021.0	0.	0.	0.	6.782E+00	5.877E+00	1.133E+00	7.829E-01
42	2022.0	0.	0.	0.	6.844E+00	5.931E+00	1.133E+00	7.829E-01
43	2023.0	0.	0.	0.	6.902E+00	5.981E+00	1.133E+00	7.829E-01
44	2024.0	0.	0.	0.	6.955E+00	6.028E+00	1.133E+00	7.829E-01
45	2025.0	0.	0.	0.	7.004E+00	6.070E+00	1.133E+00	7.829E-01
46	2026.0	0.	0.	0.	7.049E+00	6.108E+00	1.133E+00	7.829E-01
47	2027.0	0.	0.	0.	7.088E+00	6.142E+00	1.133E+00	7.829E-01
48	2028.0	0.	0.	0.	7.122E+00	6.170E+00	1.133E+00	7.829E-01
49	2029.0	0.	0.	0.	7.150E+00	6.194E+00	1.133E+00	7.829E-01
50	2030.0	0.	0.	0.	7.172E+00	6.211E+00	1.133E+00	7.829E-01

TABLE III. (cont)

LEVELIZED POWER COST IN CONSTANT DOLLARS (MILLS/KWHR)
FOR PLANT, L-U5LO, STARTING UP IN YEAR KS

KS	YEAR	TOTAL POWER COST	CAPITAL (INCL INC TAX ON CAPITAL AND FIXED CHARGES)	OPERATION AND MAINTENANCE	FUEL (INCL INCOME TAX ON FUEL)	GROSS REVENUE TAX
1	1981.0	3.536E+01	2.455E+01	2.486E+00	8.320E+00	0.
2	1982.0	3.547E+01	2.455E+01	2.486E+00	8.434E+00	0.
3	1983.0	3.560E+01	2.455E+01	2.486E+00	8.561E+00	0.
4	1984.0	3.573E+01	2.455E+01	2.486E+00	8.690E+00	0.
5	1985.0	3.586E+01	2.455E+01	2.486E+00	8.822E+00	0.
6	1986.0	3.599E+01	2.455E+01	2.486E+00	8.957E+00	0.
7	1987.0	3.613E+01	2.455E+01	2.486E+00	9.094E+00	0.
8	1988.0	3.627E+01	2.455E+01	2.486E+00	9.234E+00	0.
9	1989.0	3.641E+01	2.455E+01	2.486E+00	9.377E+00	0.
10	1990.0	3.656E+01	2.455E+01	2.486E+00	9.522E+00	0.
11	1991.0	3.671E+01	2.455E+01	2.486E+00	9.671E+00	0.
12	1992.0	3.686E+01	2.455E+01	2.486E+00	9.823E+00	0.
13	1993.0	3.701E+01	2.455E+01	2.486E+00	9.977E+00	0.
14	1994.0	3.717E+01	2.455E+01	2.486E+00	1.013E+01	0.
15	1995.0	3.733E+01	2.455E+01	2.486E+00	1.030E+01	0.
16	1996.0	3.750E+01	2.455E+01	2.486E+00	1.046E+01	0.
17	1997.0	3.766E+01	2.455E+01	2.486E+00	1.063E+01	0.
18	1998.0	3.784E+01	2.455E+01	2.486E+00	1.080E+01	0.
19	1999.0	3.801E+01	2.455E+01	2.486E+00	1.097E+01	0.
20	2000.0	3.819E+01	2.455E+01	2.486E+00	1.115E+01	0.
21	2001.0	3.837E+01	2.455E+01	2.486E+00	1.133E+01	0.
22	2002.0	3.855E+01	2.455E+01	2.486E+00	1.152E+01	0.
23	2003.0	3.874E+01	2.455E+01	2.486E+00	1.170E+01	0.
24	2004.0	3.892E+01	2.455E+01	2.486E+00	1.188E+01	0.
25	2005.0	3.910E+01	2.455E+01	2.486E+00	1.206E+01	0.
26	2006.0	3.928E+01	2.455E+01	2.486E+00	1.224E+01	0.
27	2007.0	3.946E+01	2.455E+01	2.486E+00	1.242E+01	0.
28	2008.0	3.964E+01	2.455E+01	2.486E+00	1.260E+01	0.
29	2009.0	3.981E+01	2.455E+01	2.486E+00	1.277E+01	0.
30	2010.0	3.998E+01	2.455E+01	2.486E+00	1.294E+01	0.
31	2011.0	4.015E+01	2.455E+01	2.486E+00	1.311E+01	0.
32	2012.0	4.032E+01	2.455E+01	2.486E+00	1.328E+01	0.
33	2013.0	4.048E+01	2.455E+01	2.486E+00	1.344E+01	0.
34	2014.0	4.064E+01	2.455E+01	2.486E+00	1.360E+01	0.
35	2015.0	4.079E+01	2.455E+01	2.486E+00	1.375E+01	0.
37	2017.0	4.109E+01	2.455E+01	2.486E+00	1.405E+01	0.
38	2018.0	4.123E+01	2.455E+01	2.486E+00	1.419E+01	0.
39	2019.0	4.136E+01	2.455E+01	2.486E+00	1.432E+01	0.
40	2020.0	4.149E+01	2.455E+01	2.486E+00	1.445E+01	0.
41	2021.0	4.161E+01	2.455E+01	2.486E+00	1.458E+01	0.
42	2022.0	4.173E+01	2.455E+01	2.486E+00	1.469E+01	0.
43	2023.0	4.184E+01	2.455E+01	2.486E+00	1.480E+01	0.
44	2024.0	4.194E+01	2.455E+01	2.486E+00	1.490E+01	0.
45	2025.0	4.203E+01	2.455E+01	2.486E+00	1.499E+01	0.
46	2026.0	4.211E+01	2.455E+01	2.486E+00	1.507E+01	0.
47	2027.0	4.218E+01	2.455E+01	2.486E+00	1.515E+01	0.
48	2028.0	4.225E+01	2.455E+01	2.486E+00	1.521E+01	0.
49	2029.0	4.230E+01	2.455E+01	2.486E+00	1.526E+01	0.
50	2030.0	4.234E+01	2.455E+01	2.486E+00	1.530E+01	0.

TABLE III. (cont)

F U E L   C Y C L E   I N F O R M A T I O N - - L-U5LO

FEED DATA FOR ZONE 1

YEAR	TH232(KG)	U233(KG)	U235(KG)	U238(KG)	FISSPU(KG)	TOTAL(KG)
1	0.	0.	2.20100F+03	9.71110E+04	0.	9.93120E+04
2	0.	0.	9.72000E+02	3.12700E+04	0.	3.22420E+04
3	0.	0.	9.72000E+02	3.12700E+04	0.	3.22420E+04
4	0.	0.	9.72000E+02	3.12700E+04	0.	3.22420E+04
5	0.	0.	9.72000E+02	3.12700E+04	0.	3.22420E+04
6	0.	0.	9.72000E+02	3.12700E+04	0.	3.22420E+04
7	0.	0.	9.72000E+02	3.12700E+04	0.	3.22420E+04
8	0.	0.	9.72000E+02	3.12700E+04	0.	3.22420E+04
9	0.	0.	9.72000E+02	3.12700E+04	0.	3.22420E+04
10	0.	0.	9.72000E+02	3.12700E+04	0.	3.22420E+04
11	0.	0.	9.72000E+02	3.12700E+04	0.	3.22420E+04
12	0.	0.	9.72000E+02	3.12700E+04	0.	3.22420E+04
13	0.	0.	9.72000E+02	3.12700E+04	0.	3.22420E+04
14	0.	0.	9.72000E+02	3.12700E+04	0.	3.22420E+04
15	0.	0.	9.72000E+02	3.12700E+04	0.	3.22420E+04
16	0.	0.	9.72000E+02	3.12700E+04	0.	3.22420E+04
17	0.	0.	9.72000E+02	3.12700E+04	0.	3.22420E+04
18	0.	0.	9.72000E+02	3.12700F+04	0.	3.22420E+04
19	0.	0.	9.72000E+02	3.12700E+04	0.	3.22420E+04
20	0.	0.	9.72000E+02	3.12700E+04	0.	3.22420E+04
21	0.	0.	9.72000E+02	3.12700E+04	0.	3.22420E+04
22	0.	0.	9.72000E+02	3.12700E+04	0.	3.22420E+04
23	0.	0.	9.72000E+02	3.12700E+04	0.	3.22420E+04
24	0.	0.	9.72000E+02	3.12700E+04	0.	3.22420E+04
25	0.	0.	9.72000E+02	3.12700E+04	0.	3.22420E+04
26	0.	0.	9.72000E+02	3.12700E+04	0.	3.22420E+04
27	0.	0.	9.72000E+02	3.12700E+04	0.	3.22420E+04
28	0.	0.	9.72000E+02	3.12700E+04	0.	3.22420E+04
29	0.	0.	9.72000E+02	3.12700E+04	0.	3.22420E+04
30	0.	0.	9.72000E+02	3.12700E+04	0.	3.22420E+04

TABLE III. (cont)

F U E L   C Y C L E   I N F O R M A T I O N - -   L-U5LD

DISCHARGE DATA FOR ZONE 1

YEAR	TH232(KG)	U233(KG)	U235(KG)	U238(KG)	FISSPU(KG)	TOTAL(KG)
1	0.	0.	2.63000E+02	3.05260E+04	2.13000E+02	3.11980E+04
2	0.	0.	2.63000E+02	3.05260E+04	2.13000E+02	3.11980E+04
3	0.	0.	2.63000E+02	3.05260E+04	2.13000E+02	3.11980E+04
4	0.	0.	2.63000E+02	3.05260E+04	2.13000E+02	3.11980E+04
5	0.	0.	2.63000E+02	3.05260E+04	2.13000E+02	3.11980E+04
6	0.	0.	2.63000E+02	3.05260E+04	2.13000E+02	3.11980E+04
7	0.	0.	2.63000E+02	3.05260E+04	2.13000E+02	3.11980E+04
8	0.	0.	2.63000E+02	3.05260E+04	2.13000E+02	3.11980E+04
9	0.	0.	2.63000E+02	3.05260E+04	2.13000E+02	3.11980E+04
10	0.	0.	2.63000E+02	3.05260E+04	2.13000E+02	3.11980E+04
11	0.	0.	2.63000E+02	3.05260E+04	2.13000E+02	3.11980E+04
12	0.	0.	2.63000E+02	3.05260E+04	2.13000E+02	3.11980E+04
13	0.	0.	2.63000E+02	3.05260E+04	2.13000E+02	3.11980E+04
14	0.	0.	2.63000E+02	3.05260E+04	2.13000E+02	3.11980E+04
15	0.	0.	2.63000E+02	3.05260E+04	2.13000E+02	3.11980E+04
16	0.	0.	2.63000E+02	3.05260E+04	2.13000E+02	3.11980E+04
17	0.	0.	2.63000E+02	3.05260E+04	2.13000E+02	3.11980E+04
18	0.	0.	2.63000E+02	3.05260E+04	2.13000E+02	3.11980E+04
19	0.	0.	2.63000E+02	3.05260E+04	2.13000E+02	3.11980E+04
20	0.	0.	2.63000E+02	3.05260E+04	2.13000E+02	3.11980E+04
21	0.	0.	2.63000E+02	3.05260E+04	2.13000E+02	3.11980E+04
22	0.	0.	2.63000E+02	3.05260E+04	2.13000E+02	3.11980E+04
23	0.	0.	2.63000E+02	3.05260E+04	2.13000E+02	3.11980E+04
24	0.	0.	2.63000E+02	3.05260E+04	2.13000E+02	3.11980E+04
25	0.	0.	2.63000E+02	3.05260E+04	2.13000E+02	3.11980E+04
26	0.	0.	2.63000E+02	3.05260E+04	2.13000E+02	3.11980E+04
27	0.	0.	2.63000E+02	3.05260E+04	2.13000E+02	3.11980E+04
28	0.	0.	2.63000E+02	3.05260E+04	2.13000E+02	3.11980E+04
29	0.	0.	2.63000E+02	3.05260E+04	2.13000E+02	3.11980E+04
30	0.	0.	1.36300E+03	9.81380E+04	5.44000E+02	1.00499E+05

*********LIFETIME AVERAGE MATERIAL FLOWS WITH LOSSES**
(UNITS/YR) /
(UNITS/GWE-YR)

AVG FEED	0.	0.	1.02839E+03	3.39743E+04	0.	3.50027E+04
	0.	0.	8.09758E+02	2.67514E+04	0.	2.75612E+04
AVG DISC	0.	0.	0.	0.	0.	0.
	0.	0.	0.	0.	0.	0.
AVG NET FEED	0.	0.	1.02839E+03	3.39743E+04	0.	3.50027E+04
	0.	0.	8.09758E+02	2.67514E+04	0.	2.75612E+04

TABLE III. (cont)

U 3 0 8 AND SEPARATIVE WORK REQUIREMENTS

FOR PLANT,L-U5LD, ZONE 1, STARTING UP IN YEAR 5

	YEAR	U 3 0 8 PURCHASES (LB)	U 3 0 8 CREDITS (LB)	S W U PURCHASES (KG)	S W U CREDITS (KG)
1	1981.	0.	0.	0.	0.
2	1982.	0.	0.	0.	0.
3	1983.	0.	0.	0.	0.
4	1984.	1.03462E+06	0.	2.65692E+05	0.
5	1985.	4.68911E+05	0.	1.42017E+05	0.
6	1986.	4.68911E+05	0.	1.42017E+05	0.
7	1987.	4.68911E+05	0.	1.42017E+05	0.
8	1988.	4.68911E+05	0.	1.42017E+05	0.
9	1989.	4.68911E+05	0.	1.42017E+05	0.
10	1990.	4.68911E+05	0.	1.42017E+05	0.
11	1991.	4.68911E+05	0.	1.42017E+05	0.
12	1992.	4.68911E+05	0.	1.42017E+05	0.
13	1993.	4.68911E+05	0.	1.42017E+05	0.
14	1994.	4.68911E+05	0.	1.42017E+05	0.
15	1995.	4.68911E+05	0.	1.42017E+05	0.
16	1996.	4.68911E+05	0.	1.42017E+05	0.
17	1997.	4.68911E+05	0.	1.42017E+05	0.
18	1998.	4.68911E+05	0.	1.42017E+05	0.
19	1999.	4.68911E+05	0.	1.42017E+05	0.
20	2000.	4.68911E+05	0.	1.42017E+05	0.
21	2001.	4.68911E+05	0.	1.42017E+05	0.
22	2002.	4.68911E+05	0.	1.42017E+05	0.
23	2003.	4.68911E+05	0.	1.42017E+05	0.
24	2004.	4.68911E+05	0.	1.42017E+05	0.
25	2005.	4.68911E+05	0.	1.42017E+05	0.
26	2006.	4.68911E+05	0.	1.42017E+05	0.
27	2007.	4.68911E+05	0.	1.42017E+05	0.
28	2008.	4.68911E+05	0.	1.42017E+05	0.
29	2009.	4.68911E+05	0.	1.42017E+05	0.
30	2010.	4.68911E+05	0.	1.42017E+05	0.
31	2011.	4.68911E+05	0.	1.42017E+05	0.
32	2012.	4.68911E+05	0.	1.42017E+05	0.
33	2013.	4.68911E+05	0.	1.42017E+05	0.
34	2014.	0.	0.	0.	0.
35	2015.	0.	0.	0.	0.
36	2016.	0.	0.	0.	0.
37	2017.	0.	0.	0.	0.

*********LIFETIME AVERAGE U308 AND SWU REQUIREMENTS WITH LOSSES**********

(TON/YR) / (TON/GWE-YR)	(TON/YR) / (TON/GWE-YR)	(KG/YR) / (KG/GWE-YR)	(KG/YR) / (KG/GWE-YR)
2.43884E+02	0.	1.46140E+05	0.
1.92035E+02	0.	1.15071E+05	0.

TABLE III. (cont)

N U C L E A R   F U E L   R E Q U I R E M E N T S   FOR PLANT, L-U5LO, STARTING UP IN YEAR 5

	YEAR	NET U3O8 PURCHASED (LBS)	NET SWU CONSUMED (KGS)	NET U235 PRODUCED (KGS)	NET U233 PRODUCED (KGS)	NET FISSPU PRODUCED (KGS)
1	1981.	0.	0.	0.	0.	0.
2	1982.	0.	0.	0.	0.	0.
3	1983.	0.	0.	0.	0.	0.
4	1984.	1.03462E+06	2.65692E+05	-2.23452E+03	0.	0.
5	1985.	4.68911E+05	1.42017E+05	-9.86802E+02	0.	0.
6	1986.	4.68911E+05	1.42017E+05	-9.86802E+02	0.	0.
7	1987.	4.68911E+05	1.42017E+05	-9.86802E+02	0.	0.
8	1988.	4.68911E+05	1.42017E+05	-9.86802E+02	0.	0.
9	1989.	4.68911E+05	1.42017E+05	-9.86802E+02	0.	0.
10	1990.	4.68911E+05	1.42017E+05	-9.86802E+02	0.	0.
11	1991.	4.68911E+05	1.42017E+05	-9.86802E+02	0.	0.
12	1992.	4.68911E+05	1.42017E+05	-9.86802E+02	0.	0.
13	1993.	4.68911E+05	1.42017E+05	-9.86802E+02	0.	0.
14	1994.	4.68911E+05	1.42017E+05	-9.86802E+02	0.	0.
15	1995.	4.68911E+05	1.42017E+05	-9.86802E+02	0.	0.
16	1996.	4.68911E+05	1.42017E+05	-9.86802E+02	0.	0.
17	1997.	4.68911E+05	1.42017E+05	-9.86802E+02	0.	0.
18	1998.	4.68911E+05	1.42017E+05	-9.86802E+02	0.	0.
19	1999.	4.68911E+05	1.42017E+05	-9.86802E+02	0.	0.
20	2000.	4.68911E+05	1.42017E+05	-9.86802E+02	0.	0.
21	2001.	4.68911E+05	1.42017E+05	-9.86802E+02	0.	0.
22	2002.	4.68911E+05	1.42017E+05	-9.86802E+02	0.	0.
23	2003.	4.68911E+05	1.42017E+05	-9.86802E+02	0.	0.
24	2004.	4.68911E+05	1.42017E+05	-9.86802E+02	0.	0.
25	2005.	4.68911E+05	1.42017E+05	-9.86802E+02	0.	0.
26	2006.	4.68911E+05	1.42017E+05	-9.86802E+02	0.	0.
27	2007.	4.68911E+05	1.42017E+05	-9.86802E+02	0.	0.
28	2008.	4.68911E+05	1.42017E+05	-9.86802E+02	0.	0.
29	2009.	4.68911E+05	1.42017E+05	-9.86802E+02	0.	0.
30	2010.	4.68911E+05	1.42017E+05	-9.86802E+02	0.	0.
31	2011.	4.68911E+05	1.42017E+05	-9.86802E+02	0.	0.
32	2012.	4.68911E+05	1.42017E+05	-9.86802E+02	0.	0.
33	2013.	4.68911E+05	1.42017E+05	-9.86802E+02	0.	0.
34	2014.	0.	0.	0.	0.	0.
35	2015.	0.	0.	0.	0.	0.
36	2016.	0.	0.	0.	0.	0.
37	2017.	0.	0.	0.	0.	0.

*********LIFETIME AVERAGE FUEL REQUIREMENTS WITH LOSSES**************************************

(TON/YR) / (TON/GWE-YR)	(KG/YR) / (KG/GWE-YR)	(KG/YR) / (KG/GWE-YR)	(KG/YR) / (KG/GWE-YR)	(KG/YR) / (KG/GWE-YR)
2.43884E+02	1.46140E+05	-1.02839E+03	0.	0.
1.92035E+02	1.15071E+05	-8.09758E+02	0.	0.

TABLE III. (cont)

* * * DATA FOR PLANT 2 COAL PLANT WITH FV COOLING AND FGO, EFF=.3734, 10560 BTU/LB COAL

NAME	PLANT NAME	COAL
NTYP	0/1=FOSSIL PLANT/NUCLEAR PLANT	0
NZN	NUMBER OF FUEL CYCLE ZONES	1
POW	PLANT POWER LEVEL--IF 1.0, CALCULATE LEVELIZED ANNUAL \$ (KW)	1.2320E+06
SALV	SALVAGE VALUE (\$/KW)	0.
FOMC	FIXED OPERATION AND MAINTENANCE CHARGES (\$/YEAR)	1.2900E+07
VOMC	VARIABLE OPERATION AND MAINTENANCE CHARGES (\$/YEAR)	2.2100E+07
RNLI	NUCLEAR LIABILITY INSURANCE (\$/YEAR)	0.
FRL	FABRICATION LOSSES (FRACTION)	0.
REL	REPROCESSING LOSSES (FRACTION)	0.
FLT	FABRICATION LEAD TIME (YEARS)	0.
RLT	FUEL BACKEND LAG TIME (YEARS)	0.

LAST1 = 16611
LAST2 = 17453

CAPITAL COST BY YEAR FOR COAL (\$/KW)
DCAP 50

.97500E+03	.97500E+03	.97500E+03	.97500E+03	.97500E+03	.97500E+03	.97500E+03	.97500E+03	.97500E+03	.97500E+03
.97500E+03	.97500E+03	.97500E+03	.97500E+03	.97500E+03	.97500E+03	.97500E+03	.97500E+03	.97500E+03	.97500E+03
.97500E+03	.97500E+03	.97500E+03	.97500E+03	.97500E+03	.97500E+03	.97500E+03	.97500E+03	.97500E+03	.97500E+03
.97500E+03	.97500E+03	.97500E+03	.97500E+03	.97500E+03	.97500E+03	.97500E+03	.97500E+03	.97500E+03	.97500E+03
.97500E+03	.97500E+03	.97500E+03	.97500E+03	.97500E+03	.97500E+03	.97500E+03	.97500E+03	.97500E+03	.97500E+03

FOSSIL COST SCALING FACTORS BY YEAR FOR EACH FOSSIL COST ITEM FOR COAL (COAL/OIL/GAS)
FSCAL 150

.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02
.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02
.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02
.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02
.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02
.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02
.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02
.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02
.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02
.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02
.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02
.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02
.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02
.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02
.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02	.32390E+02

FEED RATE FOR EACH FUEL CYCLE ITEM DURING EACH YEAR OF PLANT LIFE IN EACH FUEL CYCLE ZONE FOR COAL (UNITS/YR)
FEED 270

0.	0.	0.	0.	0.	0.	.32691E+07	0.	0.	0.
0.	0.	0.	0.	0.	.32691E+07	0.	0.	0.	0.
0.	0.	0.	0.	.32691E+07	0.	0.	0.	0.	0.
0.	0.	0.	.32691E+07	0.	0.	0.	0.	0.	0.
0.	0.	.32691E+07	0.	0.	0.	0.	0.	0.	0.
0.	.32691E+07	0.	0.	0.	0.	0.	0.	0.	0.
.32691E+07	0.	0.	0.	0.	0.	0.	0.	0.	.32691E+07
0.	0.	0.	0.	0.	0.	0.	0.	.32691E+07	0.
0.	0.	0.	0.	0.	0.	0.	.32691E+07	0.	0.
0.	0.	0.	0.	0.	0.	.32691E+07	0.	0.	0.
0.	0.	0.	0.	0.	.32691E+07	0.	0.	0.	0.
0.	0.	0.	0.	.32691E+07	0.	0.	0.	0.	0.
0.	0.	0.	.32691E+07	0.	0.	0.	0.	0.	0.
0.	0.	.32691E+07	0.	0.	0.	0.	0.	0.	0.

TABLE III. (cont)

0.	.32691E+07	0.	0.	0.	0.	0.	0.	0.	0.
.32691E+07	0.	0.	0.	0.	0.	0.	0.	0.	.32691E+07
0.	0.	0.	0.	0.	0.	0.	0.	.32691E+07	0.
0.	0.	0.	0.	0.	0.	0.	.32691E+07	0.	0.
0.	0.	0.	0.	0.	0.	.32691E+07	0.	0.	0.
0.	0.	0.	0.	0.	.32691E+07	0.	0.	0.	0.
0.	0.	0.	0.	.32691E+07	0.	0.	0.	0.	0.
0.	0.	0.	.32691E+07	0.	0.	0.	0.	0.	0.
0.	0.	.32691E+07	0.	0.	0.	0.	0.	0.	0.
0.	.32691E+07	0.	0.	0.	0.	0.	0.	0.	0.
.32691E+07	0.	0.	0.	0.	0.	0.	0.	0.	.32691E+07
0.	0.	0.	0.	0.	0.	0.	0.	.32691E+07	0.
0.	0.	0.	0.	0.	0.	0.	.32691E+07	0.	0.

DISCHARGE RATE FOR EACH FUEL CYCLE ITEM DURING EACH YEAR OF PLANT LIFE IN EACH FUEL CYCLE ZONE FOR COAL (UNITS/YR)
DISC 270

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

TABLE III. (cont)

LEVELIZED POWER COST IN CONSTANT DOLLARS (MILLS/KWHR)
FOR PLANT, COAL, STARTING UP IN YEAR KS

KS	YEAR	TOTAL POWER COST	CAPITAL (INCL INC TAX ON CAPITAL AND FIXED CHARGES)	OPERATION AND MAINTENANCE	FUEL (INCL INCOME TAX ON FUEL)	GROSS REVENUE TAX
1	1981.0	3.973E+01	1.735E+01	3.755E+00	1.862E+01	0.
2	1982.0	4.010E+01	1.735E+01	3.755E+00	1.899E+01	0.
3	1983.0	4.048E+01	1.735E+01	3.755E+00	1.937E+01	0.
4	1984.0	4.087E+01	1.735E+01	3.755E+00	1.976E+01	0.
5	1985.0	4.126E+01	1.735E+01	3.755E+00	2.016E+01	0.
6	1986.0	4.166E+01	1.735E+01	3.755E+00	2.056E+01	0.
7	1987.0	4.208E+01	1.735E+01	3.755E+00	2.097E+01	0.
8	1988.0	4.249E+01	1.735E+01	3.755E+00	2.139E+01	0.
9	1989.0	4.292E+01	1.735E+01	3.755E+00	2.182E+01	0.
10	1990.0	4.336E+01	1.735E+01	3.755E+00	2.226E+01	0.
11	1991.0	4.380E+01	1.735E+01	3.755E+00	2.270E+01	0.
12	1992.0	4.426E+01	1.735E+01	3.755E+00	2.315E+01	0.
13	1993.0	4.472E+01	1.735E+01	3.755E+00	2.362E+01	0.
14	1994.0	4.519E+01	1.735E+01	3.755E+00	2.409E+01	0.
15	1995.0	4.568E+01	1.735E+01	3.755E+00	2.457E+01	0.
16	1996.0	4.617E+01	1.735E+01	3.755E+00	2.506E+01	0.
17	1997.0	4.667E+01	1.735E+01	3.755E+00	2.556E+01	0.
18	1998.0	4.718E+01	1.735E+01	3.755E+00	2.608E+01	0.
19	1999.0	4.770E+01	1.735E+01	3.755E+00	2.660E+01	0.
20	2000.0	4.823E+01	1.735E+01	3.755E+00	2.713E+01	0.
21	2001.0	4.878E+01	1.735E+01	3.755E+00	2.767E+01	0.
22	2002.0	4.931E+01	1.735E+01	3.755E+00	2.821E+01	0.
23	2003.0	4.985E+01	1.735E+01	3.755E+00	2.875E+01	0.
24	2004.0	5.038E+01	1.735E+01	3.755E+00	2.928E+01	0.
25	2005.0	5.091E+01	1.735E+01	3.755E+00	2.980E+01	0.
26	2006.0	5.143E+01	1.735E+01	3.755E+00	3.032E+01	0.
27	2007.0	5.194E+01	1.735E+01	3.755E+00	3.084E+01	0.
28	2008.0	5.245E+01	1.735E+01	3.755E+00	3.134E+01	0.
29	2009.0	5.294E+01	1.735E+01	3.755E+00	3.184E+01	0.
30	2010.0	5.343E+01	1.735E+01	3.755E+00	3.233E+01	0.
31	2011.0	5.391E+01	1.735E+01	3.755E+00	3.281E+01	0.
32	2012.0	5.438E+01	1.735E+01	3.755E+00	3.328E+01	0.
33	2013.0	5.484E+01	1.735E+01	3.755E+00	3.373E+01	0.
34	2014.0	5.528E+01	1.735E+01	3.755E+00	3.418E+01	0.
35	2015.0	5.571E+01	1.735E+01	3.755E+00	3.460E+01	0.
36	2016.0	5.612E+01	1.735E+01	3.755E+00	3.502E+01	0.
37	2017.0	5.652E+01	1.735E+01	3.755E+00	3.542E+01	0.
38	2018.0	5.690E+01	1.735E+01	3.755E+00	3.580E+01	0.
39	2019.0	5.726E+01	1.735E+01	3.755E+00	3.616E+01	0.
40	2020.0	5.760E+01	1.735E+01	3.755E+00	3.650E+01	0.
41	2021.0	5.792E+01	1.735E+01	3.755E+00	3.681E+01	0.
42	2022.0	5.821E+01	1.735E+01	3.755E+00	3.711E+01	0.
43	2023.0	5.848E+01	1.735E+01	3.755E+00	3.738E+01	0.
44	2024.0	5.872E+01	1.735E+01	3.755E+00	3.762E+01	0.
45	2025.0	5.894E+01	1.735E+01	3.755E+00	3.783E+01	0.
46	2026.0	5.912E+01	1.735E+01	3.755E+00	3.802E+01	0.
47	2027.0	5.927E+01	1.735E+01	3.755E+00	3.817E+01	0.
48	2028.0	5.939E+01	1.735E+01	3.755E+00	3.828E+01	0.
49	2029.0	5.947E+01	1.735E+01	3.755E+00	3.836E+01	0.
50	2030.0	5.951E+01	1.735E+01	3.755E+00	3.840E+01	0.

TABLE III. (cont)

F O S S I L   P L A N T   F U E L   C Y C L E   F E E D   R E Q U I R E M E N T S - -   COAL

1	3.26910E+06	0.	0.
2	3.26910E+06	0.	0.
3	3.26910E+06	0.	0.
4	3.26910E+06	0.	0.
5	3.26910E+06	0.	0.
6	3.26910E+06	0.	0.
7	3.26910E+06	0.	0.
8	3.26910E+06	0.	0.
9	3.26910E+06	0.	0.
10	3.26910E+06	0.	0.
11	3.26910E+06	0.	0.
12	3.26910E+06	0.	0.
13	3.26910E+06	0.	0.
14	3.26910E+06	0.	0.
15	3.26910E+06	0.	0.
16	3.26910E+06	0.	0.
17	3.26910E+06	0.	0.
18	3.26910E+06	0.	0.
19	3.26910E+06	0.	0.
20	3.26910E+06	0.	0.
21	3.26910E+06	0.	0.
22	3.26910E+06	0.	0.
23	3.26910E+06	0.	0.
24	3.26910E+06	0.	0.
25	3.26910E+06	0.	0.
26	3.26910E+06	0.	0.
27	3.26910E+06	0.	0.
28	3.26910E+06	0.	0.
29	3.26910E+06	0.	0.
30	3.26910E+06	0.	0.

REFERENCES

1. R. Salmon, "A Procedure and a Computer Code (POWERCO) for Calculating the Cost of Electricity Produced by Nuclear Power Stations," Oak Ridge National Laboratory report ORNL-3944 (June 1966).

2. R. W. Hardie, "BICYCLE II: A Computer Code for Calculating Levelized Life-Cycle Costs," Los Alamos National Laboratory report LA-8909 (November 1981).

3. J. A. Hughes, "Methods of Nuclear Fuel Management for Utilities," Ph.D. Thesis (University of Illinois, Champaign-Urbana, Illinois, 1975).

4. K. E. Asmussen, R. H. Brogli, S. E. Nowicki, and B. W. Southworth, "A Manual on Fuel Cycle Cost Calculations and a Description of the Code: GACOST," Gulf General Atomic, Gulf-GA-A10593 (October 1972).

☆U.S. GOVERNMENT PRINTING OFFICE: 1982-576-020/20

Printed in the United States of America
Available from
National Technical Information Service
US Department of Commerce
5285 Port Royal Road
Springfield, VA 22161

Microfiche $3.50 (A01)

Page Range	Domestic Price	NTIS Price Code	Page Range	Domestic Price	NTIS Price Code	Page Range	Domestic Price	NTIS Price Code	Page Range	Domestic Price	NTIS Price Code
001-025	$ 5.00	A02	151-175	$11.00	A08	301-325	$17.00	A14	451-475	23.00	A20
026-050	6.00	A03	176-200	12.00	A09	326-350	18.00	A15	476-500	24.00	A21
051-075	7.00	A04	201-225	13.00	A10	351-375	19.00	A16	501-525	25.00	A22
076-100	8.00	A05	226-250	14.00	A11	376-400	20.00	A17	526-550	26.00	A23
101-125	9.00	A06	251-275	15.00	A12	401-425	21.00	A18	551-575	27.00	A24
126-150	10.00	A07	276-300	16.00	A13	426-450	22.00	A19	576-600	28.00	A25
									601-up	†	A99

†Add $1.00 for each additional 25-page increment or portion thereof from 601 pages up.

Los Alamos