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PACTOLUS:
A CODE FOR COMPUTING NUCLEAR POWER COSTS
PART 1: USER'S MANUAL

J. H. NAIL

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PACTOLUS:
A CODE FOR COMPUTING NUCLEAR POWER COSTS
PART 1: USER'S MANUAL

J. H. Nail
Advanced Concepts and Analysis Section
Mathematics Department

June 1967

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INTRODUCTION

PACTOLUS* is a cash flow economics code designed to use mass balance information over the reactor lifetime and with material and unit processing which may vary with time to generate the flow of dollars necessary for operating a reactor throughout for its lifetime.

This flow of dollars associated with operating a reactor actually consists of a series of distinct charges by a reprocessing industry, a fuel fabrication industry, a fuel enrichment industry, a shipping industry, and others. The construction phase, which involves many more industries, is also included. Each of the major calculations is conveniently separated in the code into subroutines that are easy to adjust as new information is obtained or as new approaches may be planned with various types of processes. It is thus easy to add to or modify cost calculations for a process without interrupting the flow of information through the other subroutines. This separation also helps the user find his way through the program logic.

PACTOLUS is divided into two main sections. The first is the section just mentioned, which generates the flow of dollars. The second section is a routine called POWERCO,⁽¹⁾ which converts the flow of dollars to obtain an average power cost, including an accounting for taxes and interest. We shall be primarily concerned with the plan and operation of the first part of PACTOLUS and the steps which must be followed to obtain the cash flow from burnup operation. The one modification which will be noted in POWERCO is a more extensive printout of results and clarification of some headings. There has been no modification of the basic calculational techniques.

*The name PACTOLUS is derived from the Pactolus river in Lydia, Asia Minor, which is famous for its golden sands. In mythology it is supposed to have run gold, hence the connotation of cash flow.

The PACTOLUS code is often used in conjunction with the ALTHAEA⁽²⁾ burnup code, which supplies lifetime mass balances for either fast or thermal reactors. The ALTHAEA output is a "burnup data tape" which is in the form required for PACTOLUS input.

PACTOLUS INPUT AND OPERATION

Referring now to the PACTOLUS user's guide in Appendix A, we shall discuss some of the input data necessary for the operation of PACTOLUS. No comment is made on parameters that are self-explanatory.

Card 1 (Appendix A, page A-4) is a control card which controls several options available to the user. As shown, information required on this card includes the number of core regions and the number of blanket regions. This card also controls the tape units used for input and output. The output tape unit described for the DAEDALUS⁽³⁾ tape is used for input to a linear programming model which can combine many DAEDALUS tapes to study a nuclear economy. NRELD is the number of batches (regions) included in a scheduled reload. This is used to calculate the size of a reload batch out of the reactor.

Another option on Card 1 is that of calculating reprocessing costs in one of two ways. The first is to use a computational model similar to the Nuclear Fuel Services (NFS) plant processing schedule; the second way is to calculate reprocessing costs from unit costs in dollars per kilogram of fuel. For this second method, unit costs (\$/kg) are provided on the economics parameter cards. These costs may be provided annually or less frequently as determined by the distribution defined on the economics parameter cards.

This card also defines some options for POWERCO. On this card the variables LL1, LL2, and LL6 are identical with the variables named in the POWERCO document. They describe methods of repaying bonds, of depreciating the capital expenses, and of modifying the bond repayment schedule.

Card 2 is the fabrication process card, which contains information describing the input to the fabrication process model. Currently, there is no true calculational model of a processing plant built into the fabrication subroutine, rather, the fabrication cost in dollars per kilogram is entered on the economics parameter card. Card 2 also requires that the user define

the maximum initial grams per cubic centimeter of fissile material expected in the blanket (if applicable). This concentration allows the code to determine automatically whether the region should be treated as a core or a blanket. Fractional losses of the core and blanket during fabrication are also input on this card.

Card 3 describes operation of the reprocessing plant. Input includes an operating cost of the reprocessing plant, reprocessing throughput, and reprocessing losses. This input is used in a model designed from the throughput schedule for the NFS reprocessing plant. The throughput is defined in the same way as in the NFS schedule but in this case there is the option of changing the throughput and the daily operating cost from that of the 1 tonne/day for the NFS plant. This built-in reprocessing schedule is used only if ISEP on Card 1 is zero. The alternative to this model is to input the unit costs in dollars per kilogram on the economics parameter card. The reprocessing time will still be defined by the throughput on the reprocessing plant card for either option.

Card 4 is the shipping card which defines the shipping cost and corresponding shipping times for four available shipping intervals, any one or several of which may be appropriate: 1) SHPFAB, the interval between conversion and fabrication, 2) SHPREA, the shipping time from fabricator to reactor, 3) SHPSEP, the shipping time from cooling basin to separation, and 4) SHPDES, the shipping time from reprocessing to any further process, or to recycle.

Card 5 is the plant construction cost card. On this card is described the cost of the moderator and some of the associated capital cost components such as the control system, the turbine heat exchangers, and the reactor site. It has a catch-all input for "All Other Costs." The next-to-last item on the card is the nonfuel working capital and is an estimate of the working capital required for the operation of the reactor. The last item is an option to describe the nondepreciable land costs as a separate item. There are some special outputs in POWERCO for this number.

Card 6 is a reactor operation card. It describes the reactor thermal-to-electrical efficiency, the reactor variable yearly operating cost (a number

multiplied by the capacity factor), the reactor yearly base operating cost (excluding insurance), and the fraction of investment in bonds.

Card 7 is insurance and taxes. The individual tax rates may be expressed as percentage variables D(15), D(16), and D(17), or collectively as \$/yr [Variable D(22)]. This card also includes the bond interest rate, equity return rate, and income tax rate. Some of this information for bonds and equity is primarily for POWERCO, which as used here has no card input but receives its information directly from PACTOLUS.

Card 8 describes several other process times, the startup date, the reactor depreciable life, the reactor construction time, the reactor fuel fabrication time, the prereactor inventory time, and the postreactor cooling time. Fuel fabrication time is required since there is no model plant currently programmed into the FAB subroutine which would describe the throughput.

Card 9 is the uranium cascade price card. It generates the cost of uranium, using a model describing costs from the diffusion cascade. Input includes the costs of separative duty, the value of tails, the tails composition, and the feed composition. If the input variable is zero the input tails composition is used; if the input variable is one, the composition of the optimum tails is calculated.

Cards 10 and 11 are isotope price cards. The prices for each of up to 20 isotopes are read from these cards. For the first 11 isotopes no atomic weights are necessary as they are fixed internally to conform with the ALTHAEA standard cross-section library. For the remaining nine, atomic weights are defined because they may vary depending on the isotopes considered during the burnup calculations.

The next cards are the economics parameter cards. There are from 2 to 40 of these, and the actual number is given on Card 1 (NCDS). The year in which these cards apply is identified as the variable "Time" on this card.

The last cards are the heading cards which are simply used to provide additional information on the title page. The number of these cards is given also on Card 1.

Following the card descriptions in Appendix A are a list and descriptions of the subroutines used in the PACTOLUS and POWERCO routines. Next is a brief description of the PACTOLUS program for the user. This is followed by a table of the common variables used in the program so that the user can find, by looking at the listing of the program and this table, a definition of named variables.

POWERCO INPUT

As mentioned before, the POWERCO version used here does not usually have any separate card input but has PACTOLUS supply this information. Certain modifications to POWERCO were necessary to accomplish this procedure. Certain other modifications pertaining to output were made and will be mentioned under "POWERCO output."

Generally, the POWERCO program requires information such as the plant investment, the reactor plant lifetime, the amount of nonfuel working capital, interest rate, bond and equity rates, income tax rate, and the fraction of investment that is financed by bonds. Also it requires the reactor power and two forms of reactor operating costs. These include a fixed operating cost and a cost that is multiplied by the capacity factor (which may vary with time) to get a variable operating cost. The POWERCO yearly variable input includes annual capacity factor figures, dollar value of fuel purchases, fabrication cost, reprocessing cost, uranium-plutonium credits, and a possibility of including a modified bond payment schedule.

PACTOLUS RESULTS

The sample PACTOLUS case is found in Appendix B. Page B-2 gives a summary of reactor information and fixed cost information. This includes the following: description of the reactor, description of the plant charges, plant construction cost, uranium cascade price schedule parameters, fixed process times, shipping charges, reprocessing charges (if the NFS calculation model is used), and a description of the cost associated with the first core purchase. The first core is described in this manner since in both PACTOLUS and POWERCO, the first core is financed with

capital, using the bond-equity ratio as for all capital expenses. The isotope prices are also described on this page.

Table 1 (page B-3) describes some variable charge rates and other parameters used in the calculation of the yearly costs. This includes the reprocessing charge by year and the reprocessing time associated with that charge. These times will be typical for a blanket or a core that might have been processed in that year for this reactor. The table also includes the fabrication charge rate for the blanket and core, the plutonium price ratio (which is multiplied by the base isotope price given on page B-2 of PACTOLUS results), the uranium feed price, the optimum tails composition associated with that feed price, the kilograms of U_3O_8 purchased in order to supply the uranium for this reactor year by year, and the associated kilograms of separative duty.

Table 2 (page B-4) describes the yearly cash flow in millions of dollars, and includes the year of operation, plant capacity factor, fuel purchases, fuel credits, fabrication charges, reprocessing charges, shipping charges, fuel losses, variable operating charges, and the total of all these. It should be noticed that the totals vary widely with time--some years show net charges and others show net credits, depending on the processes that take place during a given year.

Table 3 (page B-5) summarizes information concerning the fuel discharges as obtained from the ALTHAEA burnup tape. This includes the discharge number, a case number from the burnup tape for each discharge, a discharge time after startup, a residence time, tons of fuel at discharge, fuel exposure obtained, and initial and final enrichments of each loading.

Table 4 is the reactor property table. It describes some interesting properties of the reactor which can be determined from information available on the burnup tape. These include specific powers (MW/tonne of heavy metal), fuel yield (fissile material yield per year) specific inventory, and some conservation information concerning the number of kilowatt hours per ton of uranium and the number of kilograms fissioned per tonne of uranium. This table is subject to change from time to time.

Table 5 describes the kilograms of each isotope passing through the fabrication plants and Table 6 describes the kilograms passing through the reprocessing plant in a year. In the table of kilograms fabricated, the numbers represent the number of kilograms actually purchased or the number of kilograms existing before any losses were incurred. The kilograms reprocessed represent the number of kilograms remaining after the losses incurred in the reprocessing operation.

POWER COST (POWERCO) RESULTS

The next section is POWERCO output (again note that some headings have been modified for clarification). This section consists of the following:

The input data received from the PACTOLUS main program and its subroutines. (p. B-10)

The inputs of cash costs and credits year by year condensed from PACTOLUS Table 2. (p. B-11)

A page titled "Cash Expenses Before Income Tax." This describes the calculations used by POWERCO to determine the total expenses before income taxes. (p. B-12)

Total taxable income and calculation of income tax. (p. B-13)

"Payout of Investment," describing the annual amount of investments remaining, such as the outstanding bonds, the amount of bond interest paid, earnings on stock repaid, bonds repaid and recovery of equity. (p. B-14)

The total power cost, with a breakdown into its various parts, including fuel cost, the plant charges, and the operating charges. Each of these contributions to total cost broken down into bond payments, bond interest, return of equity, profit, and income tax. (p. B-15)

Breakdowns of the components of power cost with descriptions in the footnotes. (p. B-16 and B-17)

"Levelized payout of investment," where the only difference from the previous payout investment table is that in this table the total annual income is a constant. (p. B-18)

PROGRAM LISTINGS

Appendix C contains computer listings of all of the programs making up the PACTOLUS computer code as programmed for the UNIVAC 1107 in the Fortran IV language.

ACKNOWLEDGEMENT

The author wishes to express his appreciation for the excellent job of programming performed by J. L. Westra of the Scientific Programming and Analysis Department, Computer Sciences Corporation Northwest Operations.

REFERENCES

1. Royes Salmon. A Procedure and a Computer Code (POWERCO) for Calculating the Cost of Electricity Produced by Nuclear Power Stations, ORNL-3944 (Oak Ridge National Laboratory). June 1966.
2. E. T. Merrill. ALTHAEA. Part 1 - A One-Dimensional Two-Group Diffusion Code with an Effective Four-Group Burnup, BNWL-462. (Battelle-Northwest Laboratories) (to be published)
3. W. I. Neef. DAEDALUS - A Linear Programming Matrix Generator, Battelle-Northwest Laboratories. (to be published).

APPENDIX A

Figure 1 shows a 10x10 grid of 100 cells. Each cell contains a digit from 0 to 9. The digits are arranged in a pattern that resembles a stylized '100' or '1000'. The first column contains the digit '1' in the top 10 cells. The second column contains the digit '0' in the top 10 cells. The third column contains the digit '0' in the top 10 cells. The fourth column contains the digit '0' in the top 10 cells. The fifth column contains the digit '0' in the top 10 cells. The sixth column contains the digit '0' in the top 10 cells. The seventh column contains the digit '0' in the top 10 cells. The eighth column contains the digit '0' in the top 10 cells. The ninth column contains the digit '0' in the top 10 cells. The tenth column contains the digit '0' in the top 10 cells.

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USERS INSTRUCTIONS FOR THE PACTOLUS PROGRAM

THE PROGRAM COMPLEX FILE (PCF TAPE = U0724) FOR THE PACTOLUS PROGRAM MAY BE USED IN ANY ONE OF THREE DIFFERENT WAYS.

1

THE PACTOLUS INPUT CARDS SHOULD BE PLACED BEHIND THE CONTROL CARDS, USING AN XQT PACTLS. THIS WILL EXECUTE AND OUTPUT THE NORMAL PACTOLUS REPORTS FOLLOWED BY THE POWERCO REPORTS. THE PROGRAM WILL THEN READ THE NEXT GROUP OF INPUT CARDS AND CONTINUE THE PROCESS UNTIL ALL INPUT CARDS ARE READ.

A BURNUP TAPE IS REQUIRED AS INPUT ON CHANNEL H.

2

THE POWERCO INPUT CARDS SHOULD BE PLACED BEHIND THE CONTROL CARDS, USING AN XQT POWER. THIS WILL EXECUTE AND OUTPUT ONLY THE POWERCO REPORTS.

3

THIS LIST OF PACTOLUS DOCUMENTATION CAN BE PRODUCED USING AN XQT PDOC, PRECEDED BY A DAT DOCMNT, 2 CARD. PDOC CALLS SUBROUTINE DHG TO WRITE PAGE HEADINGS, AND USES THE UPD PROCESSOR, DOCMNT, AS DATA. PDOC ALSO CALLS SUBROUTINE PCTLUS WHICH EXECUTES THE SAMPLE DATA AND OUTPUTS THE NORMAL PACTOLUS AND POWERCO OUTPUT. A 7090 CREATED BURNUP TAPE ON CHANNEL H IS REQUIRED AS INPUT.

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PACTOLUS CARD FORMATS

COLUMNS

CARD NUMBER 1 --- CONTROL CARD (18I3,2I4,3A6)		
IRCVR	- CURRENTLY NOT USED	1-3
NCR	- NUMBER OF INITIAL CORE REGIONS (I3)	4-6
NBR	- NUMBER OF INITIAL BLANKET REGIONS (I3)	7-9
IHDG	- HEADER SWITCH, NUMBER OF HEADING CARDS TO BE READ	10-12
IPR	- DEBUG SWITCH, 0=NO DEBUG PRINTOUT, 1=SOME, 9=ALL PR OUT (I3)	13-15
KRELD	- NUMBER OF BATCHES IN RELOAD	16-18
NCDS	- NUMBER OF QUICK ECON PARAMETER CARDS (I3)	25-27
I90	- TAPE SWITCH, 0=1107 TAPE, 90=7090 TAPE(I3), -7=BLOCKED 1107 TAPE	28-30
ITAP	- TAPE UNIT FOR DAEDALUS TAPE OUTPUT	31-33
ISEP	- 0, REPROCESSING AS DESCRIBED IN ITEM 2 ON CARD 10	34-36
	- 1, ITEM 2 ON CARD 10 IS \$/KG REPROCESSING COST	
LL1	- BOND REPAYMENT OPTION	40-42
	- 01 = PROPORTIONAL CASE	
	- 02 = UNIF. PRINCIPAL RED.	
	- 03 = UNIFORM ANNUAL PAYMENT	
	- 04 = PER INPUT SCHEDULE	
	- 05 = DELAYED UNIFORM PRINCIPAL REDUCTION	
LL2	- DEPRECIATION OPTION	43-45
	- 01 = STRAIGHT LINE	
	- 02 = SUM OF - YEARS DIGITS	
LL6	- DELAYED BOND REPAYMENT OPTIONS. THE NUMBER ENTERED HERE	46-48
	- INDICATES THE YEAR IN WHICH BOND REPAYMENT IS TO START.	
	- USED ONLY IF LL1 = 05	
JCASE	- FIRST CASE TO BEGIN PROCESSING (I4)	55-58
LCASE	- LAST CASE TO PROCESS (I4)	59-62
ADATE	- ALPHABETIC DATE FOR REPORT HEADINGS (3A6)	3 63-80

CARD NUMBER 2 --- FABRICATION CARD (10F8.2)		
FABCOR	- CURRENTLY NOT USED	1-8
FABBLK	- CURRENTLY NOT USED	9-16
GFISS	- GM/CC FISSILE FUEL IN BLANKET	17-24
CORLOS	- CORE FAB LOSSES, PCT	25-32
BLKLOS	- BLANKET FAB LOSSES, PCT	33-40

CARD NUMBER 3 --- REPROCESSING CARD (10F8.2)		
SEPCST	- REPROCESSING PLANT OPERATING COST, \$/DAY	1-8
THRUPT	- REPROCESSING PLANT THROUGHPUT, KG/DAY	9-16
REPLOS	- REPROCESSING LOSSES, PCT	17-24

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PACTOLUS CARD FORMATS

COLUMNS

CARD NUMBER 4 --- SHIPPING CARD (10F8.2)		
CSHP1	- SHIPPING COST, PRE-FAB, \$/KG	1-8
SHPFAB	- SHIPPING TIME, PRE-FAB, DAYS	9-16
CSHP2	- SHIPPING COST, PRE-IRRADIATION, \$/KG	17-24
SHPREA	- SHIPPING TIME, PRE-IRRADIATION, DAYS	25-32
CSHP3	- SHIPPING COST, POST-IRRADIATION, \$/KG	33-40
SHPSEP	- SHIPPING TIME, POST-IRRADIATION, DAYS	41-48
CSHP4	- SHIPPING COST, POST-SEPARATION, \$/KG	49-56
SHPDES	- SHIPPING TIME, POST-SEPARATION, DAYS	57-64
CARD NUMBER 5 --- PLANT CONSTRUCTION COST CARD (10F8.2)		
CSTMOD	- MODERATOR COST, \$	1-8
CMLOSS	- MODERATOR LOSS RATE, PCT/YR	9-16
CSTCON	- COST OF CONTROL SYSTEM, \$	17-24
CSTPR	- COST OF PRESSURE VESSEL, \$	25-32
CSTIG	- COST OF TURBINES, \$	33-40
CSTHT	- COST OF HEAT EXCHANGERS, \$	41-48
CSTRS	- COST OF REACTOR SITE PREPARATION, \$	49-56
CSTOTH	- ALL OTHER CAPITAL COSTS, INCL CONSTR AND MATRLS, \$	57-64
D(3)	- NON-FUEL WORKING CAPITAL, \$	65-72
D(23)	- RECOVERABLE LAND COST, AS PART OF WORKING CAPITAL, \$	73-80
CARD NUMBER 6 --- REACTOR OPERATION AND FINANCING (10F8.2)		
EFF	- THERMAL TO ELECTRICAL CONV EFF, PCT	1-8
CYR	- PLANT BASE OPERATING COST, \$/YR.	9-16
CVARYR	- VARIABLE PLANT OPERATING COST(MULTIPLY BY LOAD FACTOR TO OBTAIN YEARLY COST) M \$/YR	17-24
D(18)	- INTERIM CAPITAL REPLACEMENTS, FRACTION/YR	25-32
	- (BLANK)	33-40
D(4)	- FRACTION OF INITIAL INVESTMENT IN BONDS	41-48
D(5)	- INTEREST RATE ON BONDS, FRACTIONAL	49-56
D(6)	- EARNING RATE ON EQUITY (AFTER TAXES), FRACTIONAL	57-64
	- (BLANK)	65-72
	- (BLANK)	73-80

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PACTOLUS CARD FORMATS

COLUMNS

CARD NUMBER 7 --- INSURANCE AND TAXES (10F8.2)		
CINS	- NUCLEAR LIABILITY INSURANCE, \$/YR	1- 8
D(21)	- NUCLEAR LIABILITY INSURANCE, \$/MWY THERMAL CAPACITY	9-16
D(19)	- PROPERTY INSURANCE, FRACTIONAL/YR	17-24
	- (BLANK)	25-32
	- (BLANK)	33-40
D(7)	- FEDERAL INCOME TAX RATE, FRACTIONAL	41-48
D(15)	- STATE INCOME TAX RATE, FRACTIONAL	49-56
D(16)	- STATE GROSS REVENUE TAX RATE, FRACTIONAL	57-64
D(17)	- PROPERTY TAX ON PLANT + INITIAL CORE, FRACTIONAL/YR	65-72
D(22)	- TOTAL NON-FED TAXES, IF NOT STATED SEPARATELY, \$/YR	73-80
CARD NUMBER 8 --- PROCESS AND STARTUP TIMES (10F8.2)		
TSTART	- REACTOR STARTUP DATE, YR	1-8
D(9)	- DEPRECIABLE LIFE	9-16
TCONST	- CONSTRUCTION TIME, YRS	17-24
TFAB	- FABRICATION TIME, DAYS	25-32
PRI	- PRE-REACTOR INVENTORY TIME, DAYS	33-40
COOL	- POST-REACTOR COOLING TIME, DAYS	41-48
CARD NUMBER 9 --- URANIUM CASCADE PRICES (12,6X,9F8.2)		
IS	- 0, USE INPUT VALUE FOR TAILS 1, CALCULATE OPTIMUM TAILS COMPOSITION	1-2
CS	- COST OF SEPARATIVE DUTY, \$/KG	9-16
CW	- TAILS VALUE, \$/KG	17-24
XT	- TAILS COMPOSITION, FRACTION	25-32
XF	- FEED COMPOSITION, FRACTION	33-40
CARD NUMBER 10 --- STANDARD ISOTOPE PRICE CARD (11F5.2)		
PISO(1)	- U -233 PRICE, \$/GRAM	1-5
PISO(2)	- U -235 PRICE, \$/GRAM	6-10
PISO(3)	- PU-239 PRICE, \$/GRAM	11-15
PISO(4)	- PU-241 PRICE, \$/GRAM	16-20
PISO(5)	- TH-232 PRICE, \$/GRAM	21-25
PISO(6)	- U -238 PRICE, \$/GRAM	26-30
PISO(7)	- U -234 PRICE, \$/GRAM	31-35
PISO(8)	- PU-240 PRICE, \$/GRAM	36-40
PISO(9)	- PA-233 PRICE, \$/GRAM	41-45
PISO(10)	- U -236 PRICE, \$/GRAM	46-50
PISO(11)	- PU-242 PRICE, \$/GRAM	51-55

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PACTOLUS CARD FORMATS

COLUMNS

CARD NUMBER 11 --- VARIABLE ISOTOPE PRICE CARD (9(I3,F5,2))		
MWT (12)-	ISOTOPE ATOMIC WEIGHT	1-3
PISO(12)	ISOTOPE PRICE, \$/GRAM	4-8
MWT (13)	ISOTOPE ATOMIC WEIGHT	9-11
PISO(13)	ISOTOPE PRICE, \$/GRAM	12-16
MWT (14)	ISOTOPE ATOMIC WEIGHT	17-19
PISO(14)	ISOTOPE PRICE, \$/GRAM	20-24
MWT (15)	ISOTOPE ATOMIC WEIGHT	25-27
PISO(15)	ISOTOPE PRICE, \$/GRAM	28-32
MWT (16)	ISOTOPE ATOMIC WEIGHT	33-35
PISO(16)	ISOTOPE PRICE, \$/GRAM	36-40
MWT (17)	ISOTOPE ATOMIC WEIGHT	41-43
PISO(17)	ISOTOPE PRICE, \$/GRAM	44-48
MWT (18)	ISOTOPE ATOMIC WEIGHT	49-51
PISO(18)	ISOTOPE PRICE, \$/GRAM	52-56
MWT (19)	ISOTOPE ATOMIC WEIGHT	57-59
PISO(19)	ISOTOPE PRICE, \$/GRAM	60-64
MWT (20)	ISOTOPE ATOMIC WEIGHT	65-67
PISO(20)	ISOTOPE PRICE, \$/GRAM	68-72

-- VARIABLE ECONOMIC PARAMETER CARDS (1-40) (12X,9F6,2) (SEE NCDS ON CARD 1)

CORFAB -	CORE FABRICATION COST, \$/KG	13-18
SRATO -	CORE REPROCESSING COST, \$/KG	19-24
PRATO -	PU PRICE RATIO,(TO THAT SHOWN ON CARD 10), FRACTION	25-30
XLDF -	LOAD FACTOR, FRACTION	31-36
CFX -	URANIUM FEED PRICE, \$/KG OF URANIUM AS UF6	37-42
DELFAB -	ADDITIONAL FABRICATION COST WHEN HANDLING RECYCLE FUELS, \$/KG	43-54
TIME -	CALENDER YEAR WHEN THESE PARAMETERS APPLY (19XX.OR 20XX)	55-60
BLKFAB -	BLANKET FABRICATION COST, \$/KG	61-66
BLKSEP -	BLANKET REPROCESSING COST, \$/KG	67-72
URATO -	U-233 PRICE RATIO,(TO THAT SHOWN ON CARD 10), FRACTION	73-78
LL9 -	IF A NUMBER ON LAST PARAMETER CARD, WILL CALL POWERCO AGAIN	80

-- HEADING CARDS -- (SEE IHDG ON CARD 1) (13A6,A2) (WITH REACTOR IDENTIFICATION SYMBOLS IN COLUMNS 73-76)

XHDG -	ARRAY OF HEADING INFORMATION FROM HEADING CARDS	60 1-80
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DESCRIPTIONS OF SUBROUTINES USED IN PACTOLUS PROGRAM

PACTOLUS SUBROUTINES

PACTLS - PACTOLUS MAIN PROGRAM
 COM1 - COMMON FOR PACTOLUS ROUTINES
 COM2 - COMMON FOR POWERCO ROUTINES
 CFTABL - WRITE COST FLOW TABLES (THREE PAGES OF PACTOLUS OUTPUT)
 CINPUT - READ IN PACTOLUS INPUT CARDS
 CLEAR - CLEARS N SUCCESSIVE CORE LOCATIONS TO ZERO
 CONVRT - READS 7090 CREATED TAPE WITH NTRAN AND CONVERTS INFO
 CTOTL - SUM TOTAL CONCENTRATIONS FOR 20 ISOTOPES
 FAB - CALCULATE AND STORE FABRICATION COSTS
 HDG3 - WRITE SUB-HEADING LINES FOR TABLES 3 AND 4
 HEADR - WRITE HEADER PAGE PRECEDING THE REPORT
 LOSS - CALCULATE AND STORE LOSSES
 PCTLUS - MAJOR PACTOLUS PROGRAM LOGIC IN SUBROUTINE FORM
 PHDG - SKIP TO A NEW PAGE AND WRITE PAGE HEADINGS
 PRICE - CALCULATE AND STORE FUEL VALUES
 PRODC - CALCULATE AND STORE KG PRODUCED AND USED FOR EACH PRODUCT
 PWRCC - POWERCO MAIN PROGRAM IN SUBROUTINE FORM (MODIFIED)
 READ - READ THE BURNUP INFO FROM MAGNETIC TAPE
 SEP - CALCULATE AND STORE REPROCESSING COSTS
 SHIP - CALCULATE AND STORE SHIPPING COSTS
 SKED - URANIUM CASCADE PRICE SCHEDULE
 TABL3 - WRITE TABLES 3 AND 4
 TAILS - CALCULATE THE U235 PRICE
 TIMLIB - INTERPOLATE ALL TIME LIBRARIES (VARIABLES THAT VARY WITH TIME)
 TMLIB - INTERPOLATE ONE TIME VARIABLE AS SPECIFIED IN CALL LIST

POWERCO SUBROUTINES

POWER - MAIN PROGRAM TO USE POWERCO
 BONDPY
 COSTEQ
 DATAK
 DEPREC
 EXPENS
 FACTRS
 FIXCHG
 INPUT
 OUTPUT
 PAYOUT
 PWERCO - POWERCO MAIN PROGRAM IN SUBROUTINE FORM

DESCRIPTION OF THE PACTOLUS PROGRAM

PURPOSE

THE PURPOSE OF THE PACTOLUS PROGRAM IS TO INPUT A REEL OF BURNUP INFORMATION WITH ASSOCIATED DATA CARDS, AND OUTPUT PROJECTED REACTOR COST AND PRODUCT REPORTS.

PROGRAM

THE PACTOLUS MAIN PROGRAM FIRST ASSIGNS TAPE UNITS TO BE USED AND THEN CALLS IN SUBROUTINE PCTLUS TO EXECUTE THE MAIN PROGRAM LOGIC FOR ONE GROUP OF INPUT CARDS. IF SUCCESSIVE CASES ARE TO BE RUN, SUBROUTINE PCTLUS IS CALLED FOR EACH CASE UNTIL ALL CASES HAVE BEEN PROCESSED.

SUBROUTINE PCTLUS FIRST CALLS SUBROUTINE CINPUT TO READ IN ALL INPUT CARDS FOR THE CASE BEING PROCESSED. THEN PROPER VARIABLES AND COUNTERS ARE INITIALIZED TO ZERO. SUBROUTINE READ IS THEN CALLED TO READ IN ONE HEADING RECORD AND ALL ASSOCIATED ISOTOPE RECORDS FROM THE BURNUP TAPE AND STORE THIS INFORMATION IN THE PROPER ARRAYS. THEN SUBROUTINES FAB, SEP, SHIP, PRICE, LOSS, AND PRODCIT ARE CALLED TO CALCULATE AND STORE COST AND PRODUCT INFORMATION INTO THE REPORTING ARRAYS. THE PROGRAM THEN TRANSFERS BACK TO THE CALL TO SUBROUTINE READ AND THE PROCESS IS REPEATED UNTIL ALL RECORDS FOR THE PARTICULAR CASE HAVE BEEN READ. WHEN READING HAS TERMINATED, SUBROUTINES CFTABL AND TABL3 ARE CALLED TO WRITE THE CASH FLOW AND PRODUCT USAGE REPORTS, AND COMMON ARRAYS FOR THE POWERCO PROGRAM ARE FILLED. SUBROUTINE PWRCO IS THEN CALLED WHICH EXECUTES THE POWERCO PROGRAM LOGIC AND OUTPUTS THE NORMAL POWERCO REPORTS. SUBROUTINE PCTLUS THEN RETURNS TO THE MAIN PROGRAM.

DEBUG PRINT-OUT CAN BE OBTAINED IN VARIOUS PLACES DEPENDING ON SWITCH IPR ON THE FIRST INPUT CARD.

- IPR=0 - NO DEBUG PRINT-OUT
- IPR=1 - ONE LINE PRINT-OUT FOR EACH HEADING RECORD
- IPR=2 - 31 LINES P-O FOR EACH HDG RCD, FAB-SEP-TAILS-PRICE-LOSS INFO
- IPR=9 - ALL ABOVE INFO PLUS ADDITIONAL 60-90 LINES OF SKED INFO

DESCRIPTIONS OF PACTOLUS COMMON VARIABLES		DIM BLOCK	
LTB	- LOGICAL TAPE UNIT FOR BURNUP TAPE		TAPES
LTI	- LOGICAL TAPE UNIT FOR CARD INPUT		TAPES
LTR	- LOGICAL TAPE UNIT FOR REPORT OUTPUT		TAPES
J	- COUNTER FOR ISOTOPE RECORDS READ FOR EACH HDG RECORD		XREAD
NSTEP	- NOT USED		XREAD
SUMT	- SUM OF ISOTOPE CONCENTRATIONS FOR THIS ISOTOPE RECORD		XREAD
SUMT1	- SUM OF ISOTOPE CONCENTRATIONS FOR FIRST ISOTOPE RECORD		XREAD
SMCX	- SUM OF ISOTOPE CONC FOR FIRST ISOTOPE RCD (C ARRAY)		XREAD
SMOX	- SUM OF ISOTOPE CONC FOR FIRST ISOTOPE RCD (D ARRAY)		XREAD
N3	- FINAL NUMBER OF ISOTOPE RECORDS FOR EACH HDG RECORD		XREAD
NSW	- NOT USED		XREAD
IEND	- END PROCESSING SWITCH (IEND=1, END PROCESSING)		XREAD
ICOR	- DISCHARGE SWITCH, 1=BLANKET, 0=CORE		XREAD
C23	- CONCENTRATION OF U233 FOR EACH ISOTOPE RECORD	60	CXX
C25	- CONCENTRATION OF U235 FOR EACH ISOTOPE RECORD	60	CXX
C49	- CONCENTRATION OF PU239 FOR EACH ISOTOPE RECORD	60	CXX
C41	- CONCENTRATION OF PU241 FOR EACH ISOTOPE RECORD	60	CXX
C02	- CONCENTRATION OF TH232 FOR EACH ISOTOPE RECORD	60	CXX
C28	- CONCENTRATION OF U238 FOR EACH ISOTOPE RECORD	60	CXX
C24	- CONCENTRATION OF U234 FOR EACH ISOTOPE RECORD	60	CXX
C40	- CONCENTRATION OF PU240 FOR EACH ISOTOPE RECORD	60	CXX
C13	- CONCENTRATION OF PA233 FOR EACH ISOTOPE RECORD	60	CXX
C26	- CONCENTRATION OF U236 FOR EACH ISOTOPE RECORD	60	CXX
C42	- CONCENTRATION OF PU242 FOR EACH ISOTOPE RECORD	60	CXX
CXX	- CONCENTRATIONS OF 9 ISOTOPES FOR EACH ISOTOPE RCD	60,9	CXX
DXX	- FAKE CONC OF 9 ISOTOPES FOR EACH ISOTOPE RCD	60,9	CXX
D23	- FAKE CONC OF U233 FOR EACH ISOTOPE RECORD	60	CXX
D25	- FAKE CONC OF U235 FOR EACH ISOTOPE RECORD	60	CXX
D49	- FAKE CONC OF PU239 FOR EACH ISOTOPE RECORD	60	CXX
D41	- FAKE CONC OF PU241 FOR EACH ISOTOPE RECORD	60	CXX
D02	- FAKE CONC OF TH232 FOR EACH ISOTOPE RECORD	60	CXX
D28	- FAKE CONC OF U238 FOR EACH ISOTOPE RECORD	60	CXX
D24	- FAKE CONC OF U234 FOR EACH ISOTOPE RECORD	60	CXX
D40	- FAKE CONC OF PU240 FOR EACH ISOTOPE RECORD	60	CXX
D13	- FAKE CONC OF PA233 FOR EACH ISOTOPE RECORD	60	CXX
D26	- FAKE CONC OF U236 FOR EACH ISOTOPE RECORD	60	CXX
D42	- FAKE CONC OF PU242 FOR EACH ISOTOPE RECORD	60	CXX
TIM	- TIMES FOR EACH ISOTOPE RCD IN DAYS	60	CXX
EX	- EXPOSURE FOR EACH ISOTOPE RCD	60	CXX
VF	- MASS FRACTION ARRAY (ONLY VF(1) IS USED)	24	CXX

DESCRIPTIONS OF PACTOLUS COMMON VARIABLES					DIM BLOCK	
M1	= CODE -- 0=GOOD HEADING RCD, -1=END OF TAPE					HED
MC	- CARDS 8 + 9 FROM ALTHAEA--IDENT IS 2ND	EQV TO ARRAY1	2	35		HED
	- AND 3RD NO.S IN THIS ARRAY					
AHGG	- ALPHABETIC HEADINGS FOR EACH PAGE - BCD			13		HED
ANAM	- NAMES OF ISOTOPES - BCD			35		HED
N11	- NUMBER OF ISOTOPES IN GROUP 1	EQV TO ARRAY1	85			HED
N12	- NUMBER OF ISOTOPES IN GROUP 2	EQV TO ARRAY1	86			HED
N13	- NUMBER OF ISOTOPES IN GROUP 3	EQV TO ARRAY1	87			HED
FTEMP	- FUEL TEMP	EQV TO ARRAY1	88			HED
SDPV	- DESC OF SPECTRUM -- SEE ALTHAEA INPUT	EQV TO ARRAY1	89			HED
TNL	- THERMAL NON LEAKAGE FACTOR	EQV TO ARRAY1	90			HED
TMOD	- MODERATOR TEMP	EQV TO ARRAY1	91			HED
IE	- NO. OF ISOTOPE UNIQUELY RESPONSIBLE FOR FAST EFFECT		92			HED
SCA	- EPITHERMAL EFF MACRO POTENTIAL (SCATTER X-SECT)		93			HED
PWI	- POWER, MW/TON	EQV TO ARRAY1	94			HED
DENS	- GM/CC OF METAL FUEL	EQV TO ARRAY1	95			HED
XK	- CONV. FACTOR	EQV TO ARRAY1	96			HED
TSNF	- MACRO NON-FUEL X-SECT	EQV TO ARRAY1	97			HED
JASON	- NUMBERS COMMUNICATED FROM JASON	EQV TO ARRAY1	98	13		HED
BMULT1	- MINIMUM K	EQV TO ARRAY1	111			HED
RKG	- TONS OF FUEL IN REGION (CONV TO KG)	EQV TO ARRAY1	112			HED
RTP	- REACTOR POWER	EQV TO ARRAY1	113			HED
HDM	- DUMMY FIELDS TO FILL OUT HEADING RCD TO 150 WORDS			37		HED

SUBROUTINE READ READS THE BURNUP TAPE HEADING
RECORDS INTO ARRAY1(150) EQUIVALENCED TO M1.

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DESCRIPTIONS OF PACTOLUS COMMON VARIABLES						DIM	BLOCK
M	- RECORD IDENT SWITCH, 1=NORMAL ISOTOPE RCD, 3=LAST RCD						ISOTP
NREC	- RECORD SEQUENCE NUMBER	EQV TO ARRAY	2				ISOTP
ACASE	- IDENTIFICATION INTEGER	EQV TO ARRAY	3				ISOTP
BCASE	- IDENTIFICATION CHARACTER	EQV TO ARRAY	4				ISOTP
YC	- ISOTOPE CONC (1-35), FAKES (36-55)	EQV TO ARRAY	5	55			ISOTP
XA	- MICRO ABS X-SECT	EQV TO ARRAY	60	35			ISOTP
ZA	- MICRO FISSION X-SECT	EQV TO ARRAY	95	30			ISOTP
XM	- INSTANTANEOUS K INFINITY	EQV TO ARRAY	115				ISOTP
AM	- GRADED K INFINITY	EQV TO ARRAY	116				ISOTP
RZ	- PHYSICS DATA NOT USED	EQV TO ARRAY	117				ISOTP
RID	- PHYSICS DATA NOT USED	EQV TO ARRAY	118				ISOTP
FFF	- PHYSICS DATA NOT USED	EQV TO ARRAY	119				ISOTP
ETA	- EFF NEUTRONS PRODUCED PER FISSION	EQV TO ARRAY	120				ISOTP
F	- THERMAL UTILIZATION	EQV TO ARRAY	121				ISOTP
PE	- RESONANCE ESCAPE PROBABILITY	EQV TO ARRAY	122				ISOTP
EPS	- FAST EFFECT	EQV TO ARRAY	123				ISOTP
ABSOR	- TOTAL MACRO ABS X-SECT	EQV TO ARRAY	124				ISOTP
ABFIS	- TOTAL MACRO FISSION X-SECT	EQV TO ARRAY	125				ISOTP
SUMA	- N-2N X-SECT	EQV TO ARRAY	126				ISOTP
PMIN	- MIN TO AVG POWER (OR FLUX)	EQV TO ARRAY	127				ISOTP
PMAX	- MAX TO AVG POWER (OR FLUX)	EQV TO ARRAY	128				ISOTP
TNEUT	- NEUTRON	EQV TO ARRAY	129				ISOTP
THT	- FLUX	EQV TO ARRAY	130				ISOTP
PWAV	- AVG FLUX FOR CONSTANT POWER	EQV TO ARRAY	131				ISOTP
TIMI	- TIME FOR THIS ISOTOPE RECORD	EQV TO ARRAY	132				ISOTP
EXPOS	- EXPOSURE FOR THIS ISOTOPE RECORD	EQV TO ARRAY	133				ISOTP
FRACT	- REGIONS MASS FRACTION OF THE CORE	EQV TO ARRAY	132				ISOTP
CUREFF	- KEFF FOR PREVIOUS TIME STEP	EQV TO ARRAY	133				ISOTP
CURTIM	- CURRENT AVG KEFF	EQV TO ARRAY	134				ISOTP
IDM	- DUMMY FIELDS TO FILL OUT ISOTOPE RECORD TO 150 WORDS			14			ISOTP

SUBROUTINE READ READS THE BURNUP TAPE ISOTOPE
RECORDS INTO ARRAY(150) EQUIVALENCED TO M.

DESCRIPTIONS OF PACTOLUS COMMON VARIABLES

DIM BLOCK

IRCVR	- DUMMY FOR NOW	CD1
NCR	- NUMBER OF INITIAL CORE REGIONS (I3)	CD1
NBR	- NUMBER OF INITIAL BLANKET REGIONS (I3)	CD1
IHDG	- HEADER SWITCH, 0=	CD1
IPR	- DEBUG SWITCH, 0=NO DEBUG PRINTOUT, 2=ALL PR OUT (I3)	CD1
JCASE	- FIRST CASE TO BEGIN PROCESSING (I4)	CD1
LCASE	- LAST CASE TO PROCESS (I4)	CD1
IS	- TAILS SWITCH	CD1
NCDS	- NUMBER OF QUICK ECON PARAMETER CARDS (I3)	CD1
I90	- TAPE SWITCH, 0=1107 TAPE, 90=7090 TAPE (I3)	CD1
ADATE	- ALPHABETIC DATE FOR REPORT HEADINGS (3A6)	3 CD1
NREG	- NUMBER OF REGIONS IN INITIAL CORE = NCR + NBR	CD1
NCNT	- COUNTER FOR REGIONS	CD1
NRCD	- COUNTER FOR NUMBER OF RECORDS READ	CD1
NYRS	- NUMBER OF YEARS IN REACTOR LIFETIME = FINAL TIM(N3)/365	CD1
ITAP	- DAEDALUS OUTPUT TAPE NO	CD1
ISEP	- REPROCESSING OPTIONS	CD1
NRELD	- NUMBER OF BATCHES IN RELOAD	CD1
FABCOR	- FIXED CORE FAB COST, \$/YR	CD2
FABBLK	- FIXED BLANKET FAB COST, \$/YR	CD2
GFISS	- GM/CC FISSILE FUEL IN BLANKET	CD2
CORLOS	- CORE FAB LOSSES, PCT	CD2
BLKLOS	- BLANKET FAB LOSSES, PCT	CD2
SEPCST	- REPROCESSING PLANT OPERATING COST, \$/DAY	CD3
THRUPT	- REPROCESSING PLANT THROUGHPUT, KG/DAY	CD3
REPLOS	- REPROCESSING LOSSES, PCT	CD3
CSHP1	- SHIPPING COST, PRE-FAB, \$/KG	CD4
SHPFAB	- SHIPPING TIME, PRE-FAB, DAYS	CD4
CSHP2	- SHIPPING COST, PRE-IRRADIATION, \$/KG	CD4
SHPREA	- SHIPPING TIME, PRE-IRRADIATION, DAYS	CD4
CSHP3	- SHIPPING COST, POST-IRRADIATION, \$/KG	CD4
SHPSEP	- SHIPPING TIME, POST-IRRADIATION, DAYS	CD4
CSHP4	- SHIPPING COST, POST-SEPARATION, \$/KG	CD4
SHPDES	- SHIPPING TIME, POST-SEPARATION, DAYS	CD4

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DESCRIPTIONS OF PACTOLUS COMMON VARIABLES		DIM BLOCK	
CSTMOD	- MODERATOR COST, \$		CD5
CMLOSS	- MODERATOR LOSS RATE, PCT/YR		CD5
CSTCON	- COST OF CONTROL SYSTEM, \$		CD5
CSTPR	- COST OF PRESSURE VESSEL, \$		CD5
CSTTG	- COST OF TURBINES, \$		CD5
CSTHT	- COST OF HEAT EXCHANGERS, \$		CD5
CSTRS	- COST OF REACTOR SITE, \$		CD5
CSTOTH	- ALL OTHER CAPITAL COSTS, INCL CONSTR AND MATRLS, \$		CD5
EFF	- THERMAL TO ELECTRICAL CONV EFF, PCT		CD6
CYR	- PLANT OPERATING COST, \$/YR		CD6
CINS	- INSURANCE, \$/YR		CD6
CVARYR	- VARIABLE OPER. COST		CD6
TSTART	- REACTOR STARTUP DATE, YR		CD7
TCONST	- CONSTRUCTION TIME, YRS		CD7
TFAB	- FABRICATION TIME, DAYS		CD7
PRI	- PRE-REACTOR INVENTORY TIME, DAYS		CD7
COOL	- POST-REACTOR INVENTORY TIME, DAYS		CD7
XF	- FEED COMPOSITION, FRACTION		CD8
CS	- COST OF SEPARATIVE DUTY, \$/KG		CD8
CW	- TAILS VALUE, \$/KG		CD8
XT	- TAILS COMPOSITION, FRACTION		CD8
PISO	- PRICES FOR EACH OF 20 ISOTOPES	20	CD9
MWT	- ATOMIC WTS FOR EACH OF 20 ISOTOPES	20	CD9
XHDG	- ARRAY OF HEADING INFORMATION FROM HEADING CARDS	60	CD9
CORFAB	= CORE FABRICATION COST	40	CD10
SRATO	= SEPARATIVE COST RATIO	40	CD10
PRATO	= PU PRICE RATIO	40	CD10
XLDF	= LOAD FACTOR	40	CD10
CFX	= URANIUM FEED PRICE	40	CD10
DELFA	= DELTA FABRICATION COST	40	CD10
PU233	= PRICE OF U233	40	CD10
TIME	= TIME (19XX OR 20XX)	40	CD10
BLKFAB	= BLANKET FABRICATION COST	40	CD10
BLKSEP	= BLANKET REPROCESSING COST	40	CD10

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DESCRIPTIONS OF PACTOLUS COMMON VARIABLES

DIM BLOCK

FPURC	= FUEL PURCHASE, \$	TABLE 1	40	YCOSTS
FCRED	= FUEL CREDIT, \$	TABLE 1	40	YCOSTS
FABCH	= FABRICATION CHARGE, \$	TABLE 1	40	YCOSTS
REPCB	= REPROCESSING CHARGE, \$	TABLE 1	40	YCOSTS
PRESHP	= PRE-REACTOR SHIPPING CHARGE, \$	TABLE 1	40	YCOSTS
POSTSH	= POST-REACTOR SHIPPING CHARGE, \$	TABLE 1	40	YCOSTS
FLOSS	= FUEL LOSS CHARGE, \$	TABLE 1	40	YCOSTS
TOTAL	= TOTAL CHARGES, \$	TABLE 1	40	YCOSTS
FABLSS	= FABRICATION LOSSES		40	YCOSTS
REPLSS	= REPROCESSING LOSSES		40	YCOSTS
BLREP	= BLANKET REPROCESSING CHARGE, \$/KG	TABLE 2	40	CRATES
COREP	= CORE REPROCESSING CHARGE, \$/KG	TABLE 2	40	CRATES
BLTIM	= BLANKET REPROCESSING TIME, DAYS	TABLE 2	40	CRATES
COTIM	= CORE REPROCESSING TIME, DAYS	TABLE 2	40	CRATES
XKGU	= KG U308 PURCHASED	TABLE 2	40	CRATES
XKGS	= KG SEPARATIVE DUTY	TABLE 2	40	CRATES
XKGUCR	= U308 CREDIT IN DISCHARGE		40	CRATES
XKGSCR	= SEP. DUTY CREDIT IN DISCHARGE		40	CRATES
XTT	= TAILS COMPOSITION		40	CRATES
RTONS	= TOTAL TONS OF FUEL IN REACTOR			REACT
TSEP	= TIME IN SEPARATIONS, DAYS			REACT
VI	= TOTAL VALUE OF ALL PURCHASES			REACT
VFF	= TOTAL VALUE OF ALL SALES OR CREDITS			REACT
VFR	= TOTAL VALUE OF ALL DUMMY FUEL SALES OR CREDITS			REACT
SXM	= XM FOR FIRST ISOTOPE GROUP			REACT
CT1	= TOTAL AMOUNT OF ALL ISOTOPES FOR FIRST ISOTOPE RECORD			REACT
CTN3	= TOTAL AMOUNT OF ALL ISOTOPES FOR LAST ISOTOPE RECORD			REACT
DFAB	= FIRST CORE FABRICATION CHARGE			REACT
DSHP	= FIRST CORE SHIPPING CHARGE			REACT
DPUR	= FIRST CORE FUEL PURCHASE COST			REACT
DLOS	= FIRST CORE FUEL FABRICATION LOSSES			REACT
VIX	= FUEL PURCHASE COST FOR PARTICULAR DISCHARGE			REACT
VFX	= VALUE OF DUMMY SALES OR CREDITS FOR THIS DISCHARGE			REACT
VFY	= VALUE OF SALES OR CREDITS FOR THIS DISCHARGE			REACT
TLIB	= TIME LIBRARIES, TABLES OF ITEMS THAT VARY WITH TIME		10,40	TLIB
VLIB	= INTERPOLATED VALUES FROM TIME LIBRARIES			TLIB
TIMX	= TIME TO USE IN INTERPOLATING TIME LIBRARIES			TLIB

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DESCRIPTIONS OF PACTOLUS COMMON VARIABLES

		DIM	BLOCK
PRDCT	- KG CHARGED	40,20	PRDCT
PRDN3	- KG DISCHARGED	40,20	PRDCT
PFISS	- FISSILE PCT		PRDCT
PRDN3A	- KG DISCHARGED (DAEDALUS LAG TIME)	40,20	PRDCT
IL	- SUBSCRIPT THIS ARRAY		TBL3
ICAS	- INTEGER PORTION OF CASE NO.	250	TBL3
IACAS	- CASE NO. (ALPHA. CHARACTER)	250	TBL3
STOKG	- KG IN CORE	250	TBL3
STORES	- RESIDENCE TIME	250	TBL3
STCTM	- TIME FROM STARTUP	250	TBL3
STCEX	- EXPOSURE	250	TBL3
STCYR	- YEAR	250	TBL3
T8	- STORAGE FOR READING BLOCKED TAPES		TBL3

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APPENDIX B

NUCLEAR POWER COSTS
AS CALCULATED
BY THE

PACTOLUS CODE
ON
DECEMBER 7, 1966

DECEMBER 7, 1966

REACTOR AND FUEL CYCLE DESCRIPTION

1000 MWE LWR

79.6 0/0 P.F.

REACTOR DESCRIPTION

REACTOR STARTUP DATE	1973.0	
REACTOR POWER	3067.4	MW(TM)
ELECTRICAL CONV. EFF	32.6	PCT
TONS OF FUEL IN REACTOR	130.7	TONNE
REACTOR LIFETIME	30.0	YRS

PLANT CHARGES

BOND INTEREST RATE	5.5	PCT
EARNING RATE ON EQUITY (AFTER TAX)	9.5	PCT
NUCLEAR LIABILITY COST PER YEAR	343000.0	\$/YR
NUCLEAR LIABILITY COST PER MWY	-0.0	\$/MWY
PROPERTY INSURANCE	-0.0	PCT/YR
PLANT BASE OPERATING COST	786000.0	\$/YR
FEDERAL INCOME TAX RATE	48.0	PCT
STATE INCOME TAX RATE	-0.0	PCT
STATE GROSS REVENUE TAX RATE	-0.0	PCT
PROPERTY TAX RATE	-0.0	PCT/YR
COMBINED STATE AND LOCAL TAXES	4060000.0	\$/YR
INTERIM CAPITAL REPLACEMENTS	-0.0	PCT/YR

PLANT CONSTRUCTION

CONSTRUCTION TIME	4.0	YRS
MODERATOR COST (THERMAL REACTORS)	-0.0	\$
COST OF CONTROL SYSTEM	-0.0	\$
COST OF PRESSURE VESSEL	-0.0	\$
COST OF TURBINE GENERATORS	-0.0	\$
COST OF HEAT EXCHANGERS	-0.0	\$
COST OF REACTOR SITE PREPARATION	-0.0	\$
OTHER CAPITAL COSTS	13059999.0	\$
RECOVERABLE LAND COST	72000.0	\$

URANIUM CASCADE PRICE SCHEDULE PARAMETERS

COST OF FEED (SEE TABLE 2)		
FEED COMPOSITION	.7110	PCT
COST OF SEPARATIVE DUTY	30.00	\$/KG
TAILS VALUE	.00	\$/KG

U233	-0.0	\$/GM
	-0.0	\$/GM
PA233	-0.0	\$/GM
	-0.0	\$/GM
	-0.0	\$/GM

U235	-0.0	\$/GM
U238	-0.0	\$/GM
U236	-0.0	\$/GM
	-0.0	\$/GM
	-0.0	\$/GM

ISOTOPE PRICES

FIXED PROCESS TIMES

PRE-FABRICATION SHIPPING TIME	180.0	DAYS
TIME IN FABRICATION	50.0	DAYS
SHIP FROM FABRICATOR TO REACT SITE	15.0	DAYS
PRE REACTOR INVENTORY TIME	30.0	DAYS
POST REACTOR COOLING	150.0	DAYS
TIME TO SHIP FUEL TO REPROCESS SITE	10.0	DAYS
(REPROCESSING TIME DETERMINED BY SIZE OF BATCH)		
SHIP TO FINAL DESTINATION	90.0	DAYS

SHIPPING CHARGES

PRE-FABRICATION SHIPPING COST	.0	\$/KG
FABRICATOR TO REACTOR SITE	.3	\$/KG
REACTOR SITE TO REPROCESSING PLANT	1.4	\$/KG
COST TO SHIP TO FINAL DESTINATION	5.8	\$/KG

REPROCESSING CHARGES

REPROCESSING PLANT THROUGHPUT	1000.0	KG/DAY
REPROCESSING PLANT OPERATING COST	23500.0	\$/DAY

FIRST CORE PURCHASE

FABRICATION CHARGE	6534414.7	\$
SHIPPING CHARGE	32672.1	\$
FUEL PURCHASE	20100711.0	\$
FUEL FABRICATION LOSSES	201007.1	\$

PU239	10.0	\$/GM
U234	-0.0	\$/GM
PU242	-0.0	\$/GM
	-0.0	\$/GM
	-0.0	\$/GM

PU241	10.0	\$/GM
PU240	-0.0	\$/GM
	.0	\$/GM
	-0.0	\$/GM
	-0.0	\$/GM

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DECEMBER 7, 1986

REACTOR AND FUEL CYCLE DESCRIPTION

1000 MWE LWR

79.6 O/D P.F.

TABLE 1
YEARLY COSTS IN MILLIONS OF DOLLARS

YEAR	CAPACITY FACTOR PCT	FUEL PURCHASE	FUEL CREDIT	FABRICATION CHARGE	REPROCESSING CHARGE	PRE-REACTOR SHIPPING CHARGE	POST-REACTOR SHIPPING CHARGE	FUEL LOSS CHARGE	VARIABLE OPERATING CHARGE	TOTAL
1973	79.6	.000	.000	.000	.000	.000	.000	.000	.796	.000
1974	79.6	6.358	.000	.000	.000	.000	.000	.000	.796	6.358
1975	79.6	6.358	3.067	1.634	1.023	.008	.235	.094	.796	6.284
1976	79.6	6.358	2.675	1.634	1.023	.008	.235	.090	.796	6.672
1977	79.6	6.358	2.592	1.634	1.023	.008	.235	.090	.796	6.755
1978	79.6	6.358	.000	1.634	1.023	.008	.235	.029	.796	9.346
1979	79.6	.000	2.534	1.634	.000	.008	.000	.064	.796	-1.829
1980	79.6	6.358	3.024	1.634	1.023	.008	.235	.094	.796	6.327
1981	79.6	6.358	2.785	1.634	1.023	.008	.235	.091	.796	6.563
1982	79.6	6.358	2.750	1.634	1.023	.000	.235	.028	.796	6.527
1983	79.6	6.358	2.744	.000	1.023	.008	.235	.091	.796	4.970
1984	79.6	6.358	.000	1.634	1.023	.008	.235	.091	.796	9.349
1985	79.6	6.358	2.766	1.634	1.023	.008	.235	.064	.796	6.555
1986	79.6	.000	2.766	1.634	.000	.008	.000	.091	.796	-1.033
1987	79.6	6.358	2.766	1.634	1.023	.008	.235	.091	.796	6.582
1988	79.6	6.358	2.766	1.634	1.023	.008	.235	.091	.796	6.582
1989	79.6	6.358	2.766	1.634	1.023	.000	.235	.028	.796	6.511
1990	79.6	6.358	2.766	.000	1.023	.008	.235	.091	.796	4.949
1991	79.6	6.358	.000	1.634	1.023	.008	.235	.091	.796	9.349
1992	79.6	6.358	2.766	1.634	1.023	.008	.235	.064	.796	6.555
1993	79.6	.000	2.766	1.634	.000	.008	.000	.091	.796	-1.033
1994	79.6	6.358	2.766	1.634	1.023	.008	.235	.091	.796	6.582
1995	79.6	6.358	2.766	1.634	1.023	.008	.235	.091	.796	6.582
1996	79.6	6.358	2.766	1.634	1.023	.000	.235	.028	.796	6.511
1997	79.6	6.358	2.766	.000	1.023	.008	.235	.091	.796	4.949
1998	79.6	6.358	.000	1.634	1.023	.008	.235	.091	.796	9.349
1999	79.6	6.358	2.766	1.634	1.023	.008	.235	.064	.796	6.555
2000	79.6	.000	2.766	1.634	.000	.008	.000	.091	.796	-1.033
2001	79.6	6.358	2.766	1.634	1.023	.008	.235	.091	.796	6.582
2002	79.6	.000	2.766	.000	1.023	.000	.235	.028	.796	-1.481
2003	.0	.000	14.715	.000	4.091	.000	.938	.147	.000	-9.538

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TABLE 2
VARIABLE CHARGE RATES

YEAR	REPROCESSING CHARGE, \$/KG		REPROCESSING TIME, DAYS		FABRICATION CHARGE, \$/KG		PU PRICE RATIO	U FEED PRICE \$/KG	TAILS COMPOSITION W/O	KG U308 PURCHASED	KG SEPARATIVE DUTY
	BLKT	CORE	BLKT	CORE	BLKT	CORE					
1969					.0	50.0	1.0	22.00	.000	.0	.0
1970					.0	50.0	1.0	22.00	.000	.0	.0
1971					.0	50.0	1.0	22.00	.000	.0	.0
1972					.0	50.0	1.0	22.00	.260	639651.2	274640.2
1973	.0	.0	.0	.0	.0	50.0	1.0	22.00	.000	.00	.0
1974	.0	.0	.0	.0	.0	50.0	1.0	22.00	.260	193785.49	92181.4
1975	.0	31.3	.0	43.6	.0	50.0	1.0	22.00	.260	193785.49	92181.4
1976	.0	31.3	.0	43.6	.0	50.0	1.0	22.00	.260	193785.49	92181.4
1977	.0	31.3	.0	43.6	.0	50.0	1.0	22.00	.260	193785.49	92181.4
1978	.0	31.3	.0	43.6	.0	50.0	1.0	22.00	.260	193785.49	92181.4
1979	.0	.0	.0	.0	.0	50.0	1.0	22.00	.260	.00	.0
1980	.0	31.3	.0	43.6	.0	50.0	1.0	22.00	.260	193785.49	92181.4
1981	.0	31.3	.0	43.6	.0	50.0	1.0	22.00	.260	193785.49	92181.4
1982	.0	31.3	.0	43.6	.0	50.0	1.0	22.00	.260	193785.49	92181.4
1983	.0	31.3	.0	43.6	.0	50.0	1.0	22.00	.260	193785.49	92181.4
1984	.0	31.3	.0	43.6	.0	50.0	1.0	22.00	.260	193785.49	92181.4
1985	.0	31.3	.0	43.6	.0	50.0	1.0	22.00	.260	193785.49	92181.4
1986	.0	.0	.0	.0	.0	50.0	1.0	22.00	.260	.00	.0
1987	.0	31.3	.0	43.6	.0	50.0	1.0	22.00	.260	193785.49	92181.4
1988	.0	31.3	.0	43.6	.0	50.0	1.0	22.00	.260	193785.49	92181.4
1989	.0	31.3	.0	43.6	.0	50.0	1.0	22.00	.260	193785.49	92181.4
1990	.0	31.3	.0	43.6	.0	50.0	1.0	22.00	.260	193785.49	92181.4
1991	.0	31.3	.0	43.6	.0	50.0	1.0	22.00	.260	193785.49	92181.4
1992	.0	31.3	.0	43.6	.0	50.0	1.0	22.00	.260	193785.49	92181.4
1993	.0	.0	.0	.0	.0	50.0	1.0	22.00	.260	.00	.0
1994	.0	31.3	.0	43.6	.0	50.0	1.0	22.00	.260	193785.49	92181.4
1995	.0	31.3	.0	43.6	.0	50.0	1.0	22.00	.260	193785.49	92181.4
1996	.0	31.3	.0	43.6	.0	50.0	1.0	22.00	.260	193785.49	92181.4
1997	.0	31.3	.0	43.6	.0	50.0	1.0	22.00	.260	193785.49	92181.4
1998	.0	31.3	.0	43.6	.0	50.0	1.0	22.00	.260	193785.49	92181.4
1999	.0	31.3	.0	43.6	.0	50.0	1.0	22.00	.260	193785.49	92181.4
2000	.0	.0	.0	.0	.0	50.0	1.0	22.00	.260	.00	.0
2001	.0	31.3	.0	43.6	.0	50.0	1.0	22.00	.260	193785.49	92181.4
2002	.0	31.3	.0	43.6	.0	50.0	1.0	22.00	.260	.00	.0
2003	.0	31.3	.0	43.6	.0	50.0	1.0	22.00	.260	.00	.0

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TABLE 3
FUEL DISCHARGE SUMMARY

DISCHARGE NUMBER	CASE NUMBER	DISCHARGE TIME, YRS AFTER STARTUP	CALENDAR TIME	RESIDENCE TIME, YRS	TONNES DISCHARGED	FUEL EXPOSURE MWD/TONNE	INITIAL ENRICHMENT	FINAL ENRICHMENT
1	2T	2.22	1975.	2.22	32.7	12607.4	1.85	1.48
2	4T	3.19	1976.	3.19	32.7	19067.4	2.05	1.33
3	1T	4.20	1977.	4.20	32.7	25113.7	2.25	1.27
4	3T	5.37	1978.	5.37	32.7	31538.4	2.45	1.21
5	5T	6.64	1979.	4.42	32.7	28292.2	2.55	1.42
6	6T	7.80	1980.	4.61	32.7	28690.5	2.55	1.35
7	7T	8.97	1981.	4.77	32.7	29394.2	2.55	1.33
8	8T	10.14	1983.	4.77	32.7	29514.0	2.55	1.32
9	9T	11.31	1984.	4.67	32.7	29088.0	2.55	1.33
10	10T	12.48	1985.	4.67	32.7	29088.0	2.55	1.33
11	11T	13.64	1986.	4.67	32.7	29088.0	2.55	1.33
12	12T	14.81	1987.	4.67	32.7	29088.0	2.55	1.33
13	13T	15.98	1988.	4.67	32.7	29088.0	2.55	1.33
14	14T	17.15	1990.	4.67	32.7	29088.0	2.55	1.33
15	15T	18.32	1991.	4.67	32.7	29088.0	2.55	1.33
16	16T	19.49	1992.	4.67	32.7	29088.0	2.55	1.33
17	17T	20.65	1993.	4.67	32.7	29088.0	2.55	1.33
18	18T	21.82	1994.	4.67	32.7	29088.0	2.55	1.33
19	19T	22.99	1995.	4.67	32.7	29088.0	2.55	1.33
20	20T	24.16	1997.	4.67	32.7	29088.0	2.55	1.33
21	21T	25.33	1998.	4.67	32.7	29088.0	2.55	1.33
22	22T	26.50	1999.	4.67	32.7	29088.0	2.55	1.33
23	23T	27.66	2000.	4.67	32.7	29088.0	2.55	1.33
24	24T	28.83	2001.	4.67	32.7	29088.0	2.55	1.33
25	25T	30.00	2002.	4.67	32.7	29088.0	2.55	1.33
26	26T	30.00	2002.	3.50	32.7	22995.7	2.55	1.53
27	27T	30.00	2002.	2.34	32.7	15852.7	2.55	1.80
28	28T	30.00	2002.	1.17	32.7	8863.8	2.55	2.11

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TABLE 4
REACTOR PROPERTIES TABLE

AVERAGE SPECIFIC POWER, MW/TONNE HEAVY METAL	18.1
INITIAL FULL POWER SPECIFIC POWER, MW/TONNE HEAVY METAL	23.5
YIELD, FISSILE KG PRODUCED PER YEAR	-353.0
YIELD, KG PU PRODUCED PER YEAR	208.7
YIELD, KG U235 PRODUCED PER YEAR	-561.7
YIELD, KG U233 PRODUCED PER YEAR	.0
SPECIFIC INVENTORY, KG OF FISSILE PU (OR U233) PER MEGAWATT THERMAL	.000
KILOWATT-HOURS (ELECTRIC) PER TONNE OF U308	4.0330+04
KILOWATT-HOURS (THERMAL) PER TONNE OF U308	1.2371+05
KILOGRAMS FISSIONED PER TONNE OF U308	5.4122-03

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TABLE 5
KILOGRAMS FABRICATED EACH YEAR
(BEFORE LOSSES)

YEAR	TH232	PA233	U233	U234	U235	U236	U238	PU239	PU240	PU241	PU242
1969	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1970	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1971	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1972	.0	.0	.0	.0	2803.7	.0	129204.7	.0	.0	.0	.0
1973	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1974	.0	.0	.0	.0	831.2	.0	32174.9	.0	.0	.0	.0
1975	.0	.0	.0	.0	831.2	.0	32174.9	.0	.0	.0	.0
1976	.0	.0	.0	.0	831.2	.0	32174.9	.0	.0	.0	.0
1977	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1978	.0	.0	.0	.0	831.2	.0	32174.9	.0	.0	.0	.0
1979	.0	.0	.0	.0	831.2	.0	32174.9	.0	.0	.0	.0
1980	.0	.0	.0	.0	831.2	.0	32174.9	.0	.0	.0	.0
1981	.0	.0	.0	.0	831.2	.0	32174.9	.0	.0	.0	.0
1982	.0	.0	.0	.0	831.2	.0	32174.9	.0	.0	.0	.0
1983	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1984	.0	.0	.0	.0	831.2	.0	32174.9	.0	.0	.0	.0
1985	.0	.0	.0	.0	831.2	.0	32174.9	.0	.0	.0	.0
1986	.0	.0	.0	.0	831.2	.0	32174.9	.0	.0	.0	.0
1987	.0	.0	.0	.0	831.2	.0	32174.9	.0	.0	.0	.0
1988	.0	.0	.0	.0	831.2	.0	32174.9	.0	.0	.0	.0
1989	.0	.0	.0	.0	831.2	.0	32174.9	.0	.0	.0	.0
1990	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1991	.0	.0	.0	.0	831.2	.0	32174.9	.0	.0	.0	.0
1992	.0	.0	.0	.0	831.2	.0	32174.9	.0	.0	.0	.0
1993	.0	.0	.0	.0	831.2	.0	32174.9	.0	.0	.0	.0
1994	.0	.0	.0	.0	831.2	.0	32174.9	.0	.0	.0	.0
1995	.0	.0	.0	.0	831.2	.0	32174.9	.0	.0	.0	.0
1996	.0	.0	.0	.0	831.2	.0	32174.9	.0	.0	.0	.0
1997	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1998	.0	.0	.0	.0	831.2	.0	32174.9	.0	.0	.0	.0
1999	.0	.0	.0	.0	831.2	.0	32174.9	.0	.0	.0	.0
2000	.0	.0	.0	.0	831.2	.0	32174.9	.0	.0	.0	.0
2001	.0	.0	.0	.0	831.2	.0	32174.9	.0	.0	.0	.0
2002	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

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TABLE 5
KILOGRAMS FABRICATED EACH YEAR
(BEFORE LOSSES)

YEAR										FISS PRG	TOTAL
1969	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1970	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1971	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1972	.0	.0	.0	.0	.0	.0	.0	.0	.0	132008.4	.0
1973	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1974	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	33006.1
1975	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	33006.1
1976	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	33006.1
1977	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1978	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	33006.1
1979	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	33006.1
1980	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	33006.1
1981	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	33006.1
1982	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	33006.1
1983	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1984	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	33006.1
1985	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	33006.1
1986	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	33006.1
1987	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	33006.1
1988	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	33006.1
1989	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	33006.1
1990	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1991	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	33006.1
1992	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	33006.1
1993	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	33006.1
1994	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	33006.1
1995	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	33006.1
1996	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	33006.1
1997	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1998	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	33006.1
1999	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	33006.1
2000	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	33006.1
2001	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	33006.1
2002	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

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TABLE 6
KILOGRAMS REPROCESSED EACH YEAR
(AFTER LOSSES)

YEAR	TH232	PA233	U233	U234	U235	U236	U238	PU239	PU240	PU241	PU242
1969	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1970	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1971	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1972	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1973	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1974	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1975	.0	.0	.0	.0	273.9	55.8	31369.6	180.0	36.7	17.2	3.0
1976	.0	.0	.0	.0	219.6	75.2	31122.1	171.9	53.9	27.7	7.1
1977	.0	.0	.0	.0	179.3	90.6	30891.0	182.6	66.6	35.9	12.0
1978	.0	.0	.0	.0	144.8	105.5	30651.8	189.4	77.5	43.0	18.0
1979	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1980	.0	.0	.0	.0	193.5	105.2	30759.0	212.6	70.0	39.3	13.5
1981	.0	.0	.0	.0	189.8	105.5	30717.8	190.8	70.7	39.7	13.8
1982	.0	.0	.0	.0	182.6	106.7	30693.0	191.3	72.2	40.4	14.6
1983	.0	.0	.0	.0	181.1	106.7	30693.0	191.3	72.6	40.8	15.0
1984	.0	.0	.0	.0	185.6	106.3	30701.3	191.3	71.8	40.0	14.6
1985	.0	.0	.0	.0	185.6	106.3	30701.3	191.3	71.8	40.0	14.6
1986	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1987	.0	.0	.0	.0	185.6	106.3	30701.3	191.3	71.8	40.0	14.6
1988	.0	.0	.0	.0	185.6	106.3	30701.3	191.3	71.8	40.0	14.6
1989	.0	.0	.0	.0	185.6	106.3	30701.3	191.3	71.8	40.0	14.6
1990	.0	.0	.0	.0	185.6	106.3	30701.3	191.3	71.8	40.0	14.6
1991	.0	.0	.0	.0	185.6	106.3	30701.3	191.3	71.8	40.0	14.6
1992	.0	.0	.0	.0	185.6	106.3	30701.3	191.3	71.8	40.0	14.6
1993	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1994	.0	.0	.0	.0	185.6	106.3	30701.3	191.3	71.8	40.0	14.6
1995	.0	.0	.0	.0	185.6	106.3	30701.3	191.3	71.8	40.0	14.6
1996	.0	.0	.0	.0	185.6	106.3	30701.3	191.3	71.8	40.0	14.6
1997	.0	.0	.0	.0	185.6	106.3	30701.3	191.3	71.8	40.0	14.6
1998	.0	.0	.0	.0	185.6	106.3	30701.3	191.3	71.8	40.0	14.6
1999	.0	.0	.0	.0	185.6	106.3	30701.3	191.3	71.8	40.0	14.6
2000	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2001	.0	.0	.0	.0	185.6	106.3	30701.3	191.3	71.8	40.0	14.6
2002	.0	.0	.0	.0	185.6	106.3	30701.3	191.3	71.8	40.0	14.6
2003	.0	.0	.0	.0	1368.6	329.7	123985.0	665.8	187.5	99.5	57.6

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BNWL-429

DECEMBER 7,1966

REACTOR AND FUEL CYCLE DESCRIPTION

1000 MWE LWR

79.6 0/0 P.F.

TABLE 6
KILOGRAMS REPROCESSED EACH YEAR
(AFTER LOSSES)

YEAR										FISS PRD	TOTAL
1969	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1970	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1971	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1972	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1973	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1974	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1975	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	31936.2
1976	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	31677.6
1977	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	31458.0
1978	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	31229.9
1979	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1980	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	31393.1
1981	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	31328.1
1982	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	31300.8
1983	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	31300.4
1984	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	31310.9
1985	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	31310.9
1986	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1987	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	31310.9
1988	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	31310.9
1989	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	31310.9
1990	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	31310.9
1991	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	31310.9
1992	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	31310.9
1993	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
1994	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	31310.9
1995	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	31310.9
1996	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	31310.9
1997	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	31310.9
1998	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	31310.9
1999	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	31310.9
2000	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2001	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	31310.9
2002	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	31310.9
2003	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	126693.6

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BNWL-429

DECEMBER 7, 1966

REACTOR AND FUEL CYCLE DESCRIPTION

1000 MWE LWR

79.6 0/0 P.F.

INPUT DATA

CARD 1

BOND REPAYMENT UNIFORM PRINCIPAL REDUCTION
STRAIGHT LINE DEPRECIATION

CARD 2

PLANT INVESTMENT, \$M	130.6000	(INITIAL FINANCING)
PROJECT LIFE, YEARS	30.5279	
NONFUEL WORKING CAPITAL, \$M	.5000	(INITIAL FINANCING)
FRACTION OF INITIAL INVESTMENT IN BONDS	.6000	
BOND INTEREST RATE	.0550	
EQUITY EARNING RATE (AFTER TAXES)	.0950	
FEDERAL INCOME TAX RATE	.4800	

CARD 3

REACTOR POWER, MWE	1000.0047	
DEPRECIABLE LIFE, YEARS	30.0000	
NONFUEL VARIABLE OPERATING COST FACTOR	1.0000	
INITIAL CORE INVESTMENT, \$M	26.8688	(INITIAL FINANCING)

FIRST YEAR OF OPERATION 1973

CARD 4

INTERIM CAPITAL REPLACEMENTS, \$M/YR	-.0000
PROPERTY INSURANCE, \$M/YR	-.0000
NUCLEAR LIABILITY, \$M/YR	.3430
NUCLEAR LIABILITY, \$M/DESIGN MWYE	-.0000

CARD 5

STATE AND LOCAL TAXES, \$M/YR	4.0600	
RECOVERABLE COST OF LAND, \$M	.0720	(INITIAL FINANCING)

REACTOR OPERATING LIFE, YEARS 30.0000

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BNWL-429

ANNUAL INPUT DATA: EXPENSES IN \$/YR

YEAR	LOAD FACTOR	FUEL PURCHASES	FABRICATION COST	REPROCESS COST	U-PL CREDIT	BASE OPERATING COST	VARIABLE OPERATING COST	SPECIFIED BOND PAYMENTS
1 1973	.79600	.00000	.00000	.00000	.00000	.78600	.79600	.00000
2 1974	.79600	6.35799	.00000	.00000	.00000	.78600	.79600	.00000
3 1975	.79600	6.35799	1.70555	1.28802	3.06715	.78600	.79600	.00000
4 1976	.79600	6.35799	1.70555	1.28404	2.67547	.78600	.79600	.00000
5 1977	.79600	6.35799	1.70555	1.28309	2.59203	.78600	.79600	.00000
6 1978	.79600	6.35799	1.70555	1.28243	.00000	.78600	.79600	.00000
7 1979	.79600	.00000	1.70555	.00000	2.53436	.78600	.79600	.00000
8 1980	.79600	6.35799	1.70555	1.28762	3.02435	.78600	.79600	.00000
9 1981	.79600	6.35799	1.70555	1.28523	2.78528	.78600	.79600	.00000
10 1982	.79600	6.35799	1.63380	1.28487	2.75003	.78600	.79600	.00000
11 1983	.79600	6.35799	.07175	1.28482	2.74408	.78600	.79600	.00000
12 1984	.79600	6.35799	1.70555	1.28504	.00000	.78600	.79600	.00000
13 1985	.79600	6.35799	1.70555	1.25737	2.76611	.78600	.79600	.00000
14 1986	.79600	.00000	1.70555	.02766	2.76611	.78600	.79600	.00000
15 1987	.79600	6.35799	1.70555	1.28504	2.76611	.78600	.79600	.00000
16 1988	.79600	6.35799	1.70555	1.28504	2.76611	.78600	.79600	.00000
17 1989	.79600	6.35799	1.63380	1.28504	2.76611	.78600	.79600	.00000
18 1990	.79600	6.35799	.07175	1.28504	2.76611	.78600	.79600	.00000
19 1991	.79600	6.35799	1.70555	1.28504	.00000	.78600	.79600	.00000
20 1992	.79600	6.35799	1.70555	1.25737	2.76611	.78600	.79600	.00000
21 1993	.79600	.00000	1.70555	.02766	2.76611	.78600	.79600	.00000
22 1994	.79600	6.35799	1.70555	1.28504	2.76611	.78600	.79600	.00000
23 1995	.79600	6.35799	1.70555	1.28504	2.76611	.78600	.79600	.00000
24 1996	.79600	6.35799	1.63380	1.28504	2.76611	.78600	.79600	.00000
25 1997	.79600	6.35799	.07175	1.28504	2.76611	.78600	.79600	.00000
26 1998	.79600	6.35799	1.70555	1.28504	.00000	.78600	.79600	.00000
27 1999	.79600	6.35799	1.70555	1.25737	2.76611	.78600	.79600	.00000
28 2000	.79600	.00000	1.70555	.02766	2.76611	.78600	.79600	.00000
29 2001	.79600	6.35799	1.70555	1.28504	2.76611	.78600	.79600	.00000
30 2002	.79600	.00000	.00000	1.28504	2.76611	.78600	.79600	.00000
31 2003	.00000	.00000	.00000	5.17665	14.71482	.00000	.00000	.00000

CASH EXPENSES BEFORE FEDERAL INCOME TAX, \$M

PROBLEM IDENTIFICATION 1000 MWE LWR

79.6 0/0

YEAR	9.500 PCT PRESENT WORTH FACTOR	FUEL OPERATING EXPENSES	PRORATED 31 YR FUEL EXPENSES	NON-FUEL OPERATING EXPENSES	DEPRECIATION	BOND INTEREST	TOTAL STATE INCOME AND REVENUE TAXES
1 1973	.91324	.00000	5.84219	5.98500	4.35333	5.21535	-.00000
2 1974	.83401	6.35799	5.84219	5.98500	4.35333	5.04711	-.00000
3 1975	.76165	6.28441	5.84219	5.98500	4.35333	4.87887	-.00000
4 1976	.69557	6.67211	5.84219	5.98500	4.35333	4.71064	-.00000
5 1977	.63523	6.75459	5.84219	5.98500	4.35333	4.54240	-.00000
6 1978	.58012	9.34597	5.84219	5.98500	4.35333	4.37416	-.00000
7 1979	.52979	-.82881	5.84219	5.98500	4.35333	4.20592	-.00000
8 1980	.48382	6.32681	5.84219	5.98500	4.35333	4.03769	-.00000
9 1981	.44165	6.56348	5.84219	5.98500	4.35333	3.86945	-.00000
10 1982	.40351	6.52663	5.84219	5.98500	4.35333	3.70121	-.00000
11 1983	.36851	4.97047	5.84219	5.98500	4.35333	3.53298	-.00000
12 1984	.33654	9.34857	5.84219	5.98500	4.35333	3.36474	-.00000
13 1985	.30734	6.55481	5.84219	5.98500	4.35333	3.19650	-.00000
14 1986	.28067	-1.03290	5.84219	5.98500	4.35333	3.02827	-.00000
15 1987	.25632	6.58247	5.84219	5.98500	4.35333	2.86003	-.00000
16 1988	.23409	6.58247	5.84219	5.98500	4.35333	2.69179	-.00000
17 1989	.21378	6.51072	5.84219	5.98500	4.35333	2.52355	-.00000
18 1990	.19523	4.94866	5.84219	5.98500	4.35333	2.35532	-.00000
19 1991	.17829	9.34857	5.84219	5.98500	4.35333	2.18708	-.00000
20 1992	.16282	6.55481	5.84219	5.98500	4.35333	2.01884	-.00000
21 1993	.14870	-1.03290	5.84219	5.98500	4.35333	1.85061	-.00000
22 1994	.13580	6.58247	5.84219	5.98500	4.35333	1.68237	-.00000
23 1995	.12402	6.58247	5.84219	5.98500	4.35333	1.51413	-.00000
24 1996	.11326	6.51072	5.84219	5.98500	4.35333	1.34590	-.00000
25 1997	.10343	4.94866	5.84219	5.98500	4.35333	1.17766	-.00000
26 1998	.09446	9.34857	5.84219	5.98500	4.35333	1.00942	-.00000
27 1999	.08626	6.55481	5.84219	5.98500	4.35333	.84119	-.00000
28 2000	.07878	-1.03290	5.84219	5.98500	4.35333	.67295	-.00000
29 2001	.07194	6.58247	5.84219	5.98500	4.35333	.50471	-.00000
30 2002	.06570	-1.48107	5.84218	5.98498	4.35333	.33647	-.00000
31 2003	.06000	-9.53817	.00000	.00000	.00000	.16824	-.00000

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BNWL-429

CALCULATION OF FEDERAL INCOME TAX, \$M

PROBLEM IDENTIFICATION 1000 MWE LWR

79.6 0/0

YEAR	POWER UNITS (M MWH)	TOTAL POWER SALES	TOTAL TAX DEDUCTIBLE EXPENSES	TAXABLE INCOME (FEDERAL)	FEDERAL INCOME TAX	TOTAL EXPENSES INCL TAX	TOTAL CASH RECEIPTS
1 1973	6.97299	28.73638	21.39587	7.34051	3.52344	9.50845	28.73638
2 1974	6.97299	28.73638	21.22763	7.50875	3.60420	15.94719	28.73638
3 1975	6.97299	28.73638	21.05940	7.67698	3.68495	15.95436	28.73638
4 1976	6.97299	28.73638	20.89116	7.84522	3.76571	16.42281	28.73638
5 1977	6.97299	28.73638	20.72292	8.01346	3.84646	16.58605	28.73638
6 1978	6.97299	28.73638	20.55469	8.18169	3.92721	19.25818	28.73638
7 1979	6.97299	28.73638	20.38645	8.34993	4.00797	9.16416	28.73638
8 1980	6.97299	28.73638	20.21821	8.51817	4.08872	16.40053	28.73638
9 1981	6.97299	28.73638	20.04998	8.68640	4.16947	16.71796	28.73638
10 1982	6.97299	28.73638	19.88174	8.85464	4.25023	16.76186	28.73638
11 1983	6.97299	28.73638	19.71350	9.02288	4.33098	15.28645	28.73638
12 1984	6.97299	28.73638	19.54526	9.19112	4.41174	19.74531	28.73638
13 1985	6.97299	28.73638	19.37703	9.35935	4.49249	17.03229	28.73638
14 1986	6.97299	28.73638	19.20879	9.52759	4.57324	9.52535	28.73638
15 1987	6.97299	28.73638	19.04055	9.69583	4.65400	17.22146	28.73638
16 1988	6.97299	28.73638	18.87232	9.86406	4.73475	17.30222	28.73638
17 1989	6.97299	28.73638	18.70408	10.03230	4.81550	17.31122	28.73638
18 1990	6.97299	28.73638	18.53584	10.20054	4.89626	15.82992	28.73638
19 1991	6.97299	28.73638	18.36761	10.36877	4.97701	20.31059	28.73638
20 1992	6.97299	28.73638	18.19937	10.53701	5.05777	17.59757	28.73638
21 1993	6.97299	28.73638	18.03113	10.70525	5.13852	10.09062	28.73638
22 1994	6.97299	28.73638	17.86290	10.87349	5.21927	17.78674	28.73638
23 1995	6.97299	28.73638	17.69466	11.04172	5.30003	17.86749	28.73638
24 1996	6.97299	28.73638	17.52642	11.20996	5.38078	17.87650	28.73638
25 1997	6.97299	28.73638	17.35818	11.37820	5.46153	16.39520	28.73638
26 1998	6.97299	28.73638	17.18995	11.54643	5.54229	20.87586	28.73638
27 1999	6.97299	28.73638	17.02171	11.71467	5.62304	18.16285	28.73638
28 2000	6.97299	28.73638	16.85347	11.88291	5.70380	10.65590	28.73638
29 2001	6.97299	28.73638	16.68524	12.05114	5.78455	18.35201	28.73638
30 2002	6.97299	28.73631	16.51697	12.21934	5.86528	10.36919	28.73631
31 2003	.00000	.00000	.16824	-.16824	-.08075	-9.61893	.57200

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BNWL-429

PAYOUT OF INVESTMENTS, \$M

PROBLEM IDENTIFICATION

1000 MWE LWR

79.6 0/0

YEAR	CASH FLOW	OUTSTANDING BONDS	EQUITY CAPITAL NOT RECOVERED	BOND INTEREST	EARNINGS ON UNRECOVERED EQUITY	BONDS REPAID	RECOVERY OF EQUITY
1 1973	19,22793	94,82448	63,21632	5,21535	6,00555	3,05885	4,94818
2 1974	12,78920	91,76563	58,26814	5,04711	5,53547	3,05885	-,85224
3 1975	12,78202	88,70677	59,12038	4,87887	5,61644	3,05885	-,77215
4 1976	12,31357	85,64792	59,89252	4,71064	5,68979	3,05885	-1,14571
5 1977	12,15033	82,58906	61,03824	4,54240	5,79863	3,05885	-1,24956
6 1978	9,47820	79,53021	62,28779	4,37416	5,91734	3,05885	-3,87216
7 1979	19,57223	76,47135	66,15995	4,20592	6,28519	3,05885	6,02225
8 1980	12,33585	73,41250	60,13770	4,03769	5,71308	3,05885	-,47377
9 1981	12,01843	70,35365	60,61146	3,86945	5,75809	3,05885	-,66797
10 1982	11,97452	67,29479	61,27943	3,70121	5,82155	3,05885	-,60709
11 1983	13,44993	64,23594	61,88653	3,53298	5,87922	3,05885	,97888
12 1984	8,99107	61,17708	60,90765	3,36474	5,78623	3,05885	-3,21875
13 1985	11,70409	58,11823	64,12639	3,19650	6,09201	3,05885	-,64328
14 1986	19,21103	55,05938	64,76967	3,02827	6,15312	3,05885	6,97080
15 1987	11,51492	52,00052	57,79887	2,86003	5,49089	3,05885	,10514
16 1988	11,43416	48,94167	57,69373	2,69179	5,48090	3,05885	,20261
17 1989	11,42516	45,88281	57,49112	2,52355	5,46166	3,05885	,38109
18 1990	12,90646	42,82396	57,11002	2,35532	5,42545	3,05885	2,06684
19 1991	8,42580	39,76511	55,04319	2,18708	5,22910	3,05885	-2,04924
20 1992	11,13881	36,70625	57,09243	2,01884	5,42378	3,05885	,63733
21 1993	18,64576	33,64740	56,45510	1,85061	5,36323	3,05885	8,37306
22 1994	10,94964	30,58854	48,08204	1,68237	4,56779	3,05885	1,64062
23 1995	10,86889	27,52969	46,44141	1,51413	4,41193	3,05885	1,88397
24 1996	10,65988	24,47084	44,55744	1,34590	4,23296	3,05885	2,22218
25 1997	12,34118	21,41198	42,33527	1,17766	4,02185	3,05885	4,08282
26 1998	7,86052	18,35313	38,25245	1,00942	3,63398	3,05885	,15826
27 1999	10,57353	15,29427	38,09419	,84119	3,61895	3,05885	3,05455
28 2000	18,08048	12,23542	35,03964	,67295	3,32877	3,05885	11,01991
29 2001	10,38437	9,17657	24,01973	,50471	2,28187	3,05885	4,53893
30 2002	18,36711	6,11771	19,48080	,33647	1,85068	3,05885	13,12111
31 2003	10,19093	3,05886	6,35969	,16824	,60417	3,05885	6,35967

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COST OF POWER CALCULATION

PROBLEM IDENTIFICATION 1000 MWE LWR

79.6 0/0

FUEL CYCLE ANALYSIS

POWER COST, MILLS/KWHE 4.1211

	CASH PER KWH	CASH TO EQUITY	EQUITY RETURN	BOND INTEREST	BONDS REPAID	INCOME TAX	TOTAL
PLANT DEPRECIATION	.6243	.2497	.5120	.4504	.3647	.4635	2.0404
INITIAL CORE BURNUP	.0713	-.0057	.1520	.0927	.0750	.1384	.4524
OPERATING AND MAINTENANCE COSTS	.8583	.8583	.0028	.0020	.0016	.0041	.8688
FUEL CYCLE COSTS	.7665	.7665	-.0037	.0000	.0000	-.0034	.7595
FABRICATION	.1957	.1957	-.0128	.0000	.0000	-.0118	.1710
REPROCESSING	.1722	.1722	-.0356	.0000	.0000	-.0328	.1038
FUEL PURCHASES	.7294	.7294	-.0046	.0000	.0000	-.0043	.7205
FUEL CREDIT	-.3308	-.3308	.0494	.0000	.0000	.0456	-.2358
TOTAL	2.3205	1.8688	.6632	.5450	.4413	.6027	4.1211

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COST OF POWER CALCULATION

UTILITY ANALYSIS

PROBLEM IDENTIFICATION 1000 MWE LWR 79.6 0/0

POWER COST, MILLS/KWHE 4.1211

FIXED CHARGES	1.3586
DEPRECIABLE CAPITAL	.6144
LAND AND LAND RIGHTS	.0000
OPERATION AND MAINTENANCE	.6950
NUCLEAR LIABILITY	.0492
OPERATING COSTS	1.1116
NUCLEAR FUEL	.9958
OPERATION AND MAINTENANCE	.1158
FINANCING CHARGES AND INCOME TAX (1)	1.6509

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(1) INCLUDES ALL BOND INTEREST, RETURN ON EQUITY, AND FEDERAL INCOME TAXES

COST OF POWER CALCULATION

SITE ECONOMICS ANALYSIS

PROBLEM IDENTIFICATION 1000 KWE LWR

79.6 0/0

POWER COST, MILLS/KWE

4.1211

FIXED CHARGES

2.8984

DEPRECIABLE CAPITAL
LAND AND LAND RIGHTS
WORKING CAPITAL (1)
NUCLEAR LIABILITY (2)
STATE AND LOCAL TAXES (2)

2.0404
.0013
.2252
.0492
.5822

OPERATING COSTS

1.2227

FUEL (3)
OPERATION, MAINTENANCE, AND INSURANCE (3)

.9958
.2269

- (1) INCLUDES BOND INTEREST, RETURN ON EQUITY, AND FEDERAL INCOME TAXES NOT INCLUDED WITH ASSOCIATED ENTRIES
- (2) DOES NOT INCLUDE EFFECT ON FEDERAL INCOME TAX
- (3) DOES NOT INCLUDE BOND INTEREST, RETURN ON EQUITY, OR FEDERAL INCOME TAX

LEVELIZED PAYOUT OF INVESTMENTS, \$M

PROBLEM IDENTIFICATION 1000 RWE LWR

79.6 0/0

		LEVELIZED TOTAL INCOME	CASH FLOW	EQUITY CAPITAL NOT RECOVERED	EARNINGS ON UNRECOVERED EQUITY	RECOVERY OF EQUITY
1	1973	28.56212	19.13732	63.21632	6.00555	4.85757
2	1974	28.56212	12.69858	58.35875	5.54408	-95147
3	1975	28.56212	12.69140	59.31022	5.63447	-88080
4	1976	28.56212	12.22295	60.19101	5.71815	-1,26468
5	1977	28.56212	12.05971	61.45570	5.83829	-1,37983
6	1978	28.56212	9.38758	62.83553	5.96938	-4,01481
7	1979	28.56212	19.48161	66.85034	6.35078	5,86605
8	1980	28.56212	12.24524	60.98429	5.79351	-64481
9	1981	28.56212	11.92781	61.62910	5.85476	-85526
10	1982	28.56212	11.88390	62.48436	5.93601	-81218
11	1983	28.56212	13.35931	63.29653	6.01317	75431
12	1984	28.56212	8.90046	62.54222	5.94151	-3,46465
13	1985	28.56212	11.61347	66.00687	6.27065	-91254
14	1986	28.56212	19.12042	66.91941	6.35734	6,67596
15	1987	28.56212	11.42430	60.24345	5.72313	-21771
16	1988	28.56212	11.34355	60.46116	5.74381	-15091
17	1989	28.56212	11.33454	60.61206	5.75815	-100601
18	1990	28.56212	12.61584	60.61807	5.75872	1,64296
19	1991	28.56212	8.33518	58.97512	5.60264	-2,51339
20	1992	28.56212	11.04819	61.48851	5.84141	12909
21	1993	28.56212	18.55514	61.35942	5.82915	7,81654
22	1994	28.56212	10.85903	53.54289	5.08657	1,03123
23	1995	28.56212	10.77827	52.51166	4.98861	1,21668
24	1996	28.56212	10.76927	51.29498	4.87302	1,49149
25	1997	28.56212	12.25057	49.80349	4.73133	3,28272
26	1998	28.56212	7.76990	46.52076	4.41947	-71785
27	1999	28.56212	10.48292	47.23861	4.48767	2,09521
28	2000	28.56212	17.98987	45.14340	4.28862	9,96944
29	2001	28.56212	10.29375	35.17396	3.34153	3,38866
30	2002	28.56212	18.27654	31.78530	3.01960	11,86160
31	2003	29.13412	25.04323	19.92369	1.89275	19,92339

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APPENDIX C
INDEX TO PROGRAMS

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CFTABL	C-2	COSTEQ	C-30
CINPUT	C-7	DATAACK	C-31
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CENVRT	C-49	EXPENS	C-34
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C	PACTLS PROGRAM PACTOLUS	PAC	010
C	PROGRAM TO REPORT COST FLOW INFORMATION FOR REACTORS	PAC	020
C		PAC	030
C	COMMON FOR PACTOLUS PROGRAM		040
C	INCLUDE COM1		050
C		PAC	140
C	ASSIGN TAPE UNITS	PAC	150
	LTI = 5	PAC	170
	LTR = 6	PAC	180
	LTB = 8	PAC	182
C		PAC	190
C	EXECUTE PACTOLUS MAIN PROGRAM LOGIC	PAC	200
210	CALL PCTOLUS	PAC	210
	IF (IEND.EQ.0) GO TO 210	PAC	960
C	STOP	PAC	980
	END	PAC	990
C			-
C	ROUTINE TO WRITE CASH FLOW TABLE	CFTB	010
C	SUBROUTINE CFTABL	CFTB	020
C		CFTB	021
C			037
C	COMMON FOR PACTOLUS AND POWERCO PROGRAMS		040
	INCLUDE COM1		050
	INCLUDE COM2		055
C			100
	COMMON /SHP/SHP2(40),SHP4(40)	CFTB	127
	DIMENSION SHP1(40),SHP3(40)	CFTB	130
	EQUIVALENCE (SHP1,FRESHP),(SHP3,POSTSH)	CFTB	140
	DIMENSION XAVART(40)		
	DATA BLANKY/10 /	3/16/67R	
C		CFTB	190
	ISTOP = 0		
	TLIFE = TIM(23)/365.		
C		CFTB	240
C	WRITE HEADING LINES FOR CASH FLOW TABLE	CFTB	250
1	CALL PHDG	CFTB	260
C		CFTB	280
C	WRITE FIRST PAGE OF CASH FLOW REPORT	CFTB	290
	WRITE (LTR,630)	CFTB	300
	WRITE (LTR,640) ISTAR1	CFTB	320
	WRITE (LTR,650) SHPFAB	CFTB	320
	WRITE (LTR,660) RTP	CFTB	320
	WRITE (LTR,662) TFAB	CFTB	320
	WRITE (LTR,660) EFF	CFTB	320
	WRITE (LTR,664) SHPREA	CFTB	320
	WRITE (LTR,670) RTONS	CFTB	320
	WRITE (LTR,686) PRI	CFTB	320
	WRITE (LTR,690) TLIFE		
	WRITE (LTR,698) COOL	CFTB	320
	WRITE (LTR,700)	CFTB	320
	WRITE (LTR,810) SHPSEP	CFTB	320
	WRITE (LTR,710)	CFTB	320
	WRITE (LTR,814)	CFTB	320
	WRITE (LTR,712) D(5)	CFTB	320
	WRITE (LTR,816) SHPLES	CFTB	320
	WRITE (LTR,714) D(6)	CFTB	320
	WRITE (LTR,715) CINS	CFTB	320
	WRITE (LTR,825)	CFTB	320
	WRITE (LTR,716) D(21)	4/05/67R	
	WRITE (LTR,828) CSHP1	CFTB	320
	WRITE (LTR,717) CYR	3/16/67R	
	WRITE (LTR,830) CSHP2	CFTB	320
	WRITE (LTR,718) D(7)		

```

WRITE (LTR,832)      CSHP3      3/16/67R
WRITE (LTR,719)      D(17)      CFTB 320
WRITE (LTR,836)      CSHP4      4/05/67R
WRITE (LTR,700)      CFTB 320
WRITE (LTR,720)      3/16/67R
WRITE (LTR,722)      TCONST     CFTB 320
WRITE (LTR,724)      CSTWCO     CFTB 320
WRITE (LTR,728)      CSTCON     CFTB 320
WRITE (LTR,730)      CSTPR      CFTB 320
WRITE (LTR,860)      CFTB 320
WRITE (LTR,732)      CSTTG      CFTB 320
WRITE (LTR,862)      THRUP      CFTB 320
WRITE (LTR,734)      CSTHT      CFTB 320
WRITE (LTR,864)      SEPCST     CFTB 320
WRITE (LTR,736)      CSTRS      CFTB 320
WRITE (LTR,738)      CSTOTH     CFTB 320
WRITE (LTR,737)      D(23)      4/05/67R
WRITE (LTR,700)      CFTB 320
WRITE (LTR,700)      CFTB 320
WRITE (LTR,750)      CFTB 320
WRITE (LTR,690)      CFTB 320
WRITE (LTR,752)      CFTB 320
WRITE (LTR,892)      DFAB       CFTB 320
WRITE (LTR,754)      XF         CFTB 320
WRITE (LTR,894)      CSHP       CFTB 320
WRITE (LTR,756)      CS         CFTB 320
WRITE (LTR,896)      CPUR       CFTB 320
WRITE (LTR,758)      CW         CFTB 320
WRITE (LTR,897)      CLOS       CFTB 320
C      WRITE OUT ISOTOPE PRICES CFTB 327
DO 25 I=1,20          3/16/67R
IF (ANAM(I)) 25,23,25 3/16/67R
23 ANAM(I)=BLANKY      3/16/67R
25 CONTINUE           3/16/67R
WRITE (LTR,900) (ANAM(I),PISO(I),I=1,20) CFTB 340
C      CALCULATE NUMBER OF YEARS TO PRINT OUT CFTB 347
NY = IFIX(D(2)) + 1   CFTB 350
NYRS = IFIX(TIM(N3)/365.00001) + 1 CFTB 360
C      CFTB 370
C      WRITE DAEDALUS TAPE
C
IF(ITAP.EQ.0) GO TO 989 CFTB 581
IF (ISTOP.EQ. 1) GO TO 989 4/07/67R
LTR = ITAP             CFTB 583
ISTOP = 1
GO TO 1                CFTB 584
989 IF(ISTOP.EQ.0) GO TO 100
IDU = 0
NYR = ((TIM(N3) + SHPSEP+COOL+TSEP+SHPDES)/365.)/1.000001
NYR = NYR + 1.0
IPRE = ( TCONST-(TFAB+SHPREA+PRI) /365.)/1.000001
ICNSTR = TCONST/1.000001
ICNSTR = ICNSTR + 1
DO 220 I=IPRE,ICNSTR
CCI = I - 1
TCYR = TSTART + CCI - TCONST
WRITE(LTR,1000)TCYR,IDU,IDU,IDU, XKGU(I),XKGS(I),XKGUCR(I),
1XKGSCR(I)
WRITE (LTR,1001)PRDCT(I,3),PRDCT(I,5),PRDCT(I,8),PRDCT(I,10),
2PRDCT(I,1),PRDCT(I,7),PRDCT(I,4),PRDCT(I,9),PRDCT(I,2),PRDCT
3(I,6),(PRDCT(I,J),J=11,20)
220 WRITE(LTR,1001)PRDN3A(I,3),PRDN3A(I,5),PRDN3A(I,8),PRDN3A(I,10),
2PRDN3A(I,1),PRDN3A(I,7),PRDN3A(I,4),PRDN3A(I,9),PRDN3A(I,2),
3,PRDN3A(I,6),(PRDN3A(I,J),J=11,20)
DO 99 I=1,NYR
TP = I + 1CNSTR

```

```

TCYR = TSTART + I - 1.0
TIMX = TCYR
XLDF(I) = TMLIB(5)
FABC = FABCH(I) + SHP1(I) + SHP2(I)
REPC = REPC(I) + SHP3(I) + SHP4(I)
WRITE (LTR,1002)TCYR,XLDF(I), FABC,REPC ,XKGU(IP),XKGS(I
1P),XKGUCR(IP),XKGSCK(IP)
WRITE (LTR,1001)PRDCT(IP,3),PRDCT(IP,5),PRDCT(IP,8),PRDCT(IP,10),
2PRDCT(IP,1),PRDCT(IP,7),PRDCT(IP,4),PRDCT(IP,9),PRDCT(IP,2),PRDCT
3(IP,6),(PRDCT(IP,J),J=11,20)
99 WRITE (LTR,1001)PRDN3A(IP,3),PRDN3A(IP,5),PRDN3A(IP,8),PRDN3A(IP,10
2),PRDN3A(IP,1),PRDN3A(IP,7),PRDN3A(IP,4),PRDN3A(IP,9),PRDN3A(IP,2)
3,PRDN3A(IP,6),(PRDN3A(IP,J),J=11,20)
LTR = 6
C
C WRITE OUT TABLE 1, PAGE 2 OF REPORT CFTB 380
100 CALL PHUG CFTB 390
NTBL = 1 CFTB 395
WRITE (LTR,960) NTBL CFTB 396
WRITE (LTR,920) CFTB 400
DO 430 I = 1,NY CFTB 402
PRESHP(I) = SHP1(I) + SHP2(I) CFTB 405
POSTSH(I) = SHP3(I) + SHP4(I) CFTB 407
TOTAL(I) = FPURC(I)-FCRED(I)+FABCH(I)+REPC(I)+PRESHP(I)+ CFTB 412
1 POSTSH(I)+FLOSS(I) CFTB 413
TIMX = TSTART + FLOAT(I-1) CFTB 415
XLDF(I) = TMLIB(5) CFTB 416
XYRS = NYRS
IF(I,LT,NYRS) XFT(I) = 1.0
IF(I,EQ,NYRS) XFT(I) = 1.+TIM(N3)/365.-XYRS
IF(I,GT,NYRS) XFT(I) = 0.
XLDF(I) = XLDF(I)*XFT(I)
IYR = IFIX(TIMX) CFTB 417
XVARFT(I) = CVARYR*XLDF(I)
WRITE (LTR,930) IYR,XLDF(I),FPURC(I),FCRED(I),FABCH(I),REPC(I),CFTB 420
1 PRESHP(I),POSTSH(I),FLOSS(I),XVARFT(I),TOTAL(I)
430 CONTINUE CFTB 430
C CFTB 470
C WRITE OUT TABLE 2, PAGE 3 OF REPORT CFTB 480
CALL PHUG CFTB 490
NTBL = 2 CFTB 496
WRITE (LTR,960) NTBL CFTB 497
WRITE (LTR,940) CFTB 500
NY = NY + IFIX(TCONST) CFTB 502
DO 580 K = 1,NY CFTB 503
TIMX = TSTART + FLOAT(K-1) - TCONST CFTB 506
CALL TIMLIB CFTB 507
BLKFAB(K) = VLIB(4) CFTB 509
CORFAB(K) = VLIB(3) CFTB 510
PRATO(K) = VLIB(9) CFTB 511
CFX(K) = VLIB(6) CFTB 512
IYR = IFIX(TIMX) CFTB 514
IF (TIMX.LT.TSTART) GO TO 540 CFTB 515
I = K - IFIX(TCONST) CFTB 519
WRITE (LTR,950) IYR,BLREP(I),CCREP(I),BLTIM(I),COTIM(I), CFTB 520
1 BLKFAB(K),CORFAB(K),PRATO(K),CFX(K),XAT(K),XKGU(K),XKGS(K)
GO TO 580 CFTB 530
540 WRITE (LTR,955) IYR,BLKFAB(K),CORFAB(K),PRATO(K),CFX(K) CFTB 540
1,XAT(K),XKGU(K),XKGS(K)
580 CONTINUE CFTB 580
C DISCHARGE SUMMARY TABLE
CALL PHUG
WRITE(LTR,2000)
WRITE(LTR,2001)

```

```

IL = IL - 1
ICRCT = 0
DO 590 LLI=1,IL
  LI = LLI
  ILI = LI-ICRCT
  WRITE(LTR,2002)LI,ICAS(LI),IACAS(LI),STCTM(LI),STCYR(LI),STORES(LI
1),STCKG(LI),STOEX(LI),ENRI(LI),ENRF(LI)
  IF (ILI.LE.33) GO TO 590
  ICRCT = ICRCT + 34
  CALL PHOG
  WRITE(LTR,2000)
  WRITE(LTR,2001)
590 CONTINUE

```

C
C

630	FORMAT (12X,19HREACTOR DESCRIPTION,46X,19HFIXED PROCESS TIMES)	CFTB 610
640	FORMAT (21H REACTOR STARTUP DATE, 15X, F9.1)	CFTB 620
650	FORMAT (14H REACTOR POWER, 22X, F9.1, 3X, 6HkW(TH))	CFTB 630
660	FORMAT (21H ELECTRICAL CONV. EFF, 15X,2PF9.1,3X, 3HPCT)	CFTB 640
670	FORMAT (24H TONS OF FUEL IN REACTOR,12X,F9.1, 3X, 5HTONNE)	CFTB 650
680	FORMAT (17H REACTOR LIFETIME, 19X, F9.1, 3X, 3HYRS)	CFTB 660
690	FORMAT (18H PLANT LOAD FACTOR, 18X, F9.1, 3X, 3HPCT)	CFTB 670
700	FORMAT (1H)	CFTB 680
710	FORMAT (14X, 13HPLANT CHARGES)	CFTB 690
712	FORMAT (20H BOND INTEREST RATE, 16X,2PF9.1,3X,3HPCT)	CFTB 700
714	FORMAT (35H EARNING RATE ON EQUITY (AFTER TAX),1X,2PF9.1,3X,3HPCT)	CFTB 710
715	FORMAT (32H NUCLEAR LIABILITY COST PER YEAR, 4X,F9.1,3X,4H\$/YR)	CFTB 712
716	FORMAT (31H NUCLEAR LIABILITY COST PER DAY, 5X,F9.1,3X,5H\$/DAY)	4/05/67R
717	FORMAT (26H PLANT BASE OPERATING COST, 10X,F9.1,3X,5H\$/YR)	3/16/67
718	FORMAT (16H INCOME TAX RATE, 20X,2PF9.1,3X,4HPCT)	3/16/67
719	FORMAT (18H PROPERTY TAX RATE, 18X,2PF9.1,3X,6HPCT/YR)	3/16/67
720	FORMAT (14X, 16HPLANT CONSTRUCTION)	CFTB 720
722	FORMAT (13H CONSTRUCTION TIME, 18X, F9.1, 3X, 3HYRS)	CFTB 722
724	FORMAT (36H MODERATOR COST (THERMAL REACTORS) ,F9.1,3X,1H\$)	CFTB 724
728	FORMAT (24H COST OF CONTROL SYSTEM, 12X, F9.1, 3X, 1H\$)	CFTB 728
730	FORMAT (24H COST OF PRESSURE VESSEL, 12X, F9.1, 3X, 1H\$)	CFTB 730
732	FORMAT (27H COST OF TURBINE GENERATORS, 9X, F9.1, 3X, 1H\$)	CFTB 732
734	FORMAT (24H COST OF HEAT EXCHANGERS, 12X, F9.1, 3X, 1H\$)	CFTB 734
736	FORMAT (33H COST OF REACTOR SITE PREPARATION,3X,F9.1,3X,1H\$)	3/16167
737	FORMAT (22H RECOVERABLE LAND COST, 14X,F9.1,3X,1H\$)	3/16167
738	FORMAT (24H OTHER CAPITAL COSTS, 9X, F12.1, 3X, 1H\$)	CFTB 738
750	FORMAT (5X,41HURANIUM CASCADE PRICE SCHEDULE PARAMETERS)	CFTB 750
752	FORMAT (28H COST OF FEED (SEE TABLE 2))	CFTB 752
754	FORMAT (17H FEED COMPOSITION, 19X,2PF11.4,4H PCT)	CFTB 754
756	FORMAT (24H COST OF SEPARATIVE DUTY, 12X, F10.2, 2X 4H\$/KG)	CFTB 756
758	FORMAT (12H TAILS VALUE, 24X, F10.2, 2X 4H\$/KG)	CFTB 758
C	OUTPUT FORMATS ---- RIGHT SIDE OF PAGE	CFTB 797
800	FORMAT (1H+,65X,29HPRE-FABRICATION SHIPPING TIME, 7X, F9.1, 3X, 1 4HDAYS)	CFTB 798
802	FORMAT (1H+,65X,19HTIME IN FABRICATION, 17X,F9.1,3X,4HDAYS)	CFTB 800
804	FORMAT (1H+,65X,36HSHIP FROM FABRICATOR TO REACT SITE , F9.1,3X, 1 4HDAYS)	CFTB 801
806	FORMAT (1H+,65X,26HPRE REACTOR INVENTORY TIME,10X,F9.1,3X,4HDAYS)	CFTB 802
808	FORMAT (1H+,65X,20HPOST REACTOR COOLING, 16X,F9.1,3X,4HDAYS)	CFTB 804
810	FORMAT (1H+,65X,36HTIME TO SHIP FUEL TO REPROCESS SITE , F9.1,3X, 1 4HDAYS)	CFTB 805
814	FORMAT (1H+,67X,47H(REPROCESSING TIME DETERMINED BY SIZE OF BATCH) 1)	CFTB 806
816	FORMAT (1H+,65X,26HSHIP TO FINAL DESTINATION ,10X,F9.1,3X,4HDAYS)	CFTB 808
825	FORMAT (1H+,76X,16HSHIPPING CHARGES)	CFTB 810
828	FORMAT (1H+,65X,29HPRE-FABRICATION SHIPPING COST, 7X, F9.1, 3X, 1 4H\$/KG)	CFTB 811
830	FORMAT (1H+,65X,29HFABRICATOR TO REACTOR SITE 7X, F9.1, 3X, 1 4H\$/KG)	CFTB 814
		CFTB 815
		CFTB 816
		CFTB 825
		CFTB 828
		CFTB 829
		CFTB 830
		CFTB 831

832 FORMAT (1H+,65X,36HREACTOR SITE TO REPROCESSING PLANT , F9.1,3X, CFTB 832
 1 4H\$/KG) CFTB 833
 836 FORMAT (1H+,65X,36HCOST TO SHIP TO FINAL DESTINATION , F9.1,3X, CFTB 836
 1 4H\$/KG) CFTB 837
 860 FORMAT (1H+,70X,20HREPROCESSING CHARGES) CFTB 860
 862 FORMAT (1H+,65X,29HREPROCESSING PLANT THROUGHPUT 7X, F9.1, 3X, CFTB 862
 1 6HKG/DAY) CFTB 863
 864 FORMAT (1H+,65X,36HREPROCESSING PLANT OPERATING COST , F9.1,3X, CFTB 864
 1 5H\$/DAY) CFTB 865
 890 FORMAT (1H+,70X,20HFIRST CORE PURCHASE) CFTB 890
 892 FORMAT (1H+,65X,18HFABRICATION CHARGE, 14X,F13.1, 3X, 1H\$) CFTB 892
 894 FORMAT (1H+,65X,12HSHIPPING CHARGE , 14X,F13.1, 3X, 1H\$) CFTB 894
 896 FORMAT (1H+,65X,13HFUEL PURCHASE, 18X,F14.1, 3X, 1H\$) CFTB 896
 897 FORMAT (1H+,65X,23HFUEL FABRICATION LOSSES, 10X,F12.1,3X, 1H\$) CFTB 897
 C OUTPUT FORMATS ---- ISOTOPE PRICES CFTB 899
 900 FORMAT (1H0, // 53X, 15HISOTOPE PRICES / 5(2X,A6,F8.1,2X, CFTB 900
 1 4H\$/GM, 3(11X,A6,F8.1,2X, 4H\$/GM) /)) CFTB 901
 C CFTB 917
 C CFTB 918
 C CFTB 920
 920 FORMAT (42X, 35HYEARLY COSTS IN MILLIONS OF DOLLARS // CFTB 920
 1 105M YEAR CAPACITY FUEL FUEL FABRICATION REPCFTB 921
 2 REPROCESSING PR2-REACTOR PCST-REACTOR FUEL,5X,13H VARIABLE ,2
 2X ,5HTOTAL / 9X, CFTB 923
 3 19HFACTOR PURCHASE,6X,6HCREDIT,2(7X,6HCHARGE,1X), 6X, CFTB 923
 4 2(8HSHIPPING,6,4X), 3X, 4HLOSS,5X,9HOPERATING/11X,3HPCT, 55X,
 5 2(6X,6HCHARGE), 7X,6HCHARGE,6X,6HCHARGE //)
 930 FORMAT (1X,14,2PF9.1,-6PF13.3,5(F13.3),F13.3,2F12.3)
 940 FORMAT (49X, 21HVARIALE CHARGE RATES // 2X,4HYEAR, 5X, CFTB 940
 1 12HREPROCESSING, 7X,12HREPROCESSING, 8X,11HFABRICATION, 4X, CFTB 941
 2 18HPU PRICE U FEED,6X,5HTAILS,6X,7HKG U308,9X,2HKG,11X,12HCH
 3ARGE, 5/KG,8X,10HTIME, DAYS,8X,12HCHARGE, 5/KG, 6X, 16HRATIO
 4PRICE, 3X,11HCOMPOSITION,2X,24HPURCHASED SEPARATIVE / 11X,3
 5(12HBLKT CORE,7X),10X, 4H\$/KG,8X,3HWO,22X,4HCUTY)
 950 FORMAT(2X,14,1X,3(2F8.1,3X),3X,F4.1, 3X,F9.2,F11.3,4X,F9.2,4X,F9.1
 1)
 955 FORMAT (2X,14,39X, 2F8.1,6X,F4.1,3X, F9.2,F11.3,4X,F9.1,4X,F9.1)
 960 FORMAT (1H , 55X, 5HTABLE,12) CFTB 960
 1000 FORMAT(F5.0,3,110,4F10.1)
 1001 FORMAT(11F10.1/9F10.1)
 1002 FORMAT(F5.0,F10.3,7F10.1)
 2000 FORMAT(/54X,7HTABLE 3 /48X,22HFUEL DISCHARGE SUMMARY)
 2001 FORMAT(/29X,10HDISCHARGE TIME,YRS,5X,32X,4HFUEL/5X,9HDISCHARGE,4X
 1,4HCASE,7X,6H AFTER,5X,8HCALENDAR,5X,9HRESIDENCE,6X,6HTONNES,8X,8H
 2EXPOSURE,9X,7HINITIAL,8X,5HFINAL/7X,6HNUMBER,4X,6HNUMBER,5X,
 37HSTARTUP,6X,4HTIME,8X,9HTIME, YRS,5X,10HDISCHARGED,5X,9HWD/TONNE
 4,4X,10HENRICHMENT,3X,10HENRICHMENT)
 2002 FORMAT(8X,I2,7X,I4,A1,F11.2,F13.0,F14.2,F14.1,F15.1,2PF14.2,F13.2)
 990 RETURN CFTB 990
 END

C	ROUTINE TO READ IN PACTOLUS CARD INPUT	CINP 010
	SUBROUTINE CINP	CINP 020
C		CINP 021
C		037
C	COMMON FOR PACTOLUS AND POWERCO PROGRAMS	040
	INCLUDE COM1	050
	INCLUDE COM2	055
C		100
C	INITIALIZE PROPER VARIABLES AND COUNTERS TO ZERO	CINP 120
	CALL CLEAR (EEE(1),6848)	CINP 130
	CALL CLEAR (D(1),64)	CINP 140
C		CINP 190
C	READ CONTROL CARD	CINP 200
	READ (LTI,910) IRCVR,NCR,NBR,INDG,IPR,NREL,K,K,NCDS,I90,	
	1ITAP,ISEP,K, LL1,LL2,LL6,L,L, JCASE,LCASE,ADATE	
	IF (LCASE.GT.0) LCASE = LCASE + 1	CINP 220
	NREG = NCR + NBR	CINP 240
	NCNT = 0	CINP 250
C		CINP 340
C	READ FABRICATION CARD	CINP 350
	READ (LTI,920) FABCCR,FABBLK,GFISS,CORLOS,BLKLOS	CINP 360
C		CINP 390
C	READ REPROCESSING CARD	CINP 400
	READ (LTI,920) SEPCST,THRUPT,REPLUS	CINP 410
C		CINP 440
C	READ SHIPPING CARD	CINP 450
	READ (LTI,920) CSHP1,SHPFAB,CSHP2,SHPREA,CSHP3,SHPSEP,CSHP4,	CINP 460
	1 SHPDES	CINP 461
C		CINP 490
C	READ PLANT CONSTRUCTION COST CARD	CINP 500
	READ (LTI,920) CSTMOD,CMLOSS,CSTCON,CSTPR,CSTTG,CSTHT,CSTRS,	CINP 510
	1 CSTOTH,D(3),D(23)	3/31/67R
C	CALCULATE AND STORE INITIAL CAPITAL EXPENDITURES	CINP 520
	D(1) = CSTCON + CSTPR+CSTTG+CSTHT+CSTRS+CSTOTH	
	IF(IRCVR.GT.0) GO TO 11	
	D(1) = D(1) + CSTMOD	
	GO TO 12	
	11 D(3) = D(3) + CSTMOD/1.0E6	
	12 CONTINUE	
C		CINP 540
C	READ REACTOR OPERATING CARD	CINP 550
	READ (LTI,920) EFF,CYR,CVARYR,HOLD,HOLD,D(4),D(5),D(6),HOLD,HOLD	3/31/67R
C		
C	READ INSURANCE AND TAXES CARD	3/31/67R
	READ (LTI,920) CINS,D(21),HOLD,HOLD,HOLD,D(7),HOLD,HOLD,D(17),D(22)	3/31/67R
C		
C	READ PROCESS AND STARTUP TIMES CARD	CINP 590
	READ (LTI,920) TSTART,D(9),TCONST,TFAB,PRI,COOL	CINP 600
	D(14) = TSTART	
C		
C	READ URANIUM CASCADE PRICE CARD	CINP 640
	READ (LTI,950) IS,CS,CW,XT,XF	CINP 650
C		CINP 660
C	READ ISOTOPE PRICE CARDS	CINP 690
	READ (LTI,960) (PISO(I),I=1,11)	CINP 700
	READ (LTI,970) (MWT(K),PISO(K),K=12,20)	CINP 710
C		CINP 720
C	READ QUICK ECON PARAM CARDS	CINP 740
	DO 780 I = 1,NCDS	CINP 750
	READ (LTI,940) CORFAB(I),SRATO(I),PRATO(I),XLDF(I),CFX(I),	CINP 755
	1 DELFAB(I),PU233(I),TIME(I),BLKFAB(I),BLKSEP(I),LL9	CINP 760
C	(A NUMBER IN COL 80 OF THE LAST CARD WILL CAUSE CYCLING THROUGH	2/01/67R
C	POWERCO AFTER THIS CASE. POWERCO CAN BE ENTERED DIRECTLY BY	2/01/67R
	XGT POWER)	2/01/67R
C	780 CONTINUE	CINP 780
C		CINP 787

C	READ HEADING CARDS	CINP 790
	IF (IHOG.EQ.0) GO TO 850	CINP 800
	K2 = IHOG*14	CINP 810
	READ (LTI,930) (XHDG(K),K=1,K2)	CINP 820
C		CINP 830
C	FILL TIME LIBRARIES	CINP 840
850	DO 890 I = 1,NCDS	CINP 850
	TLIB(1,I) = TIME(I)	CINP 852
	TLIB(2,I) = DELFAB(I)	CINP 854
	TLIB(3,I) = CORFAB(I)	CINP 856
	TLIB(4,I) = BLKFAB(I)	CINP 858
	TLIB(5,I) = XLDF(I)	CINP 860
	TLIB(6,I) = CFX(I)	CINP 862
	TLIB(7,I) = PU233(I)	CINP 864
	TLIB(8,I) = SRATO(I)	CINP 866
	TLIB(9,I) = PRATO(I)	CINP 868
	TLIB(10,I) = BLKSEP(I)	
890	CONTINUE	CINP 890
C		CINP 899
C	INPUT FORMATS	CINP 900
910	FORMAT (18I3,2I4,3A6)	CINP 910
920	FORMAT (10F8.2)	CINP 920
930	FORMAT (13A6,A2)	CINP 930
940	FORMAT(12X,10F6.2,7X,11)	
950	FORMAT (I2,6X, 9F8.2)	CINP 950
960	FORMAT (11F5.2)	CINP 960
970	FORMAT (9(13,F5.2) ,	CINP 970
C		CINP 980
C	WRITE PROPER HEADING PAGE AND RETURN	CINP 985
	CALL HEADR	CINP 986
	RETURN	CINP 990
	END	-
C		
	SUBROUTINE CLEAR - TO CLEAR SUCCESSIVE CORE LOCATIONS TO ZERO	CLR 010
	SUBROUTINE CLEAR (A,N)	CLR 020
	DIMENSION A(2)	CLR 300
DO 500	I = 1,N	CLR 400
500	A(I) = 0.0	CLR 500
	RETURN	CLR 700
	END	-

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C      ROUTINE TO READ 7090 TAPE WITH NTRAN AND CONVERT INFO      CONV 010
      SUBROUTINE CONVRT (MARRAY)      CONV 020
C      COMMON FOR PACTOLUS PROGRAM      CONV 030
C      INCLUDE COM1      040
      DIMENSION MARRAY(150),LARRAY(150)      CONV 050
C      CALL NTRAN (LTR,2,150,LARRAY,LSTAT)      CONV 090
      IF (LSTAT.EQ.-1) GO TO 270      CONV 100
      IF (LSTAT.LT.0) GO TO 876      CONV 250
270      IF (LSTAT.EQ.-1) GO TO 270      CONV 270
      IF (LSTAT.LT.0) GO TO 876      CONV 290
C      PUT HEADING INFO INTO ARRAY1 OR ISOTOPE INFO INTO ARRAY      CONV 300
C      NWDS = FLD(3,15,LARRAY(2))      CONV 310
      DO 330 I = 1,NWDS      CONV 315
      330 MARRAY(I) = LARRAY(1+2)      CONV 320
C      CONVERT HEADING AND ISOTOPE INFO      CONV 330
      FLD(1,35,MARRAY(1)) = FLD(3,15,MARRAY(1))      CONV 340
      IF (NWDS.LE.1) GO TO 900      CONV 350
      MARRAY(2) = FLD(3,15,MARRAY(2))      CONV 355
      MARRAY(3) = FLD(3,15,MARRAY(3))      CONV 360
      CALL NCNVRT(MARRAY(4),MARRAY(4),1,3)      CONV 370
C      CONVERT FORTRAN II INTEGERS, ALPHAMERIC INFO, AND NEG NUMBERS      CONV 380
C      DETERMINE IF RECORD IS HEADING OR ISOTOPE RECORD      CONV 450
C      IF (NWDS.GT.120) GO TO 750      CONV 460
C      HEADING RECORD, CONVERT THE HEADING INFO      CONV 470
      DO 600 I = 5,17      CONV 480
      600 MARRAY(I) = FLD(3,15,MARRAY(I))      CONV 490
      DO 620 I = 20,34      CONV 500
      620 MARRAY(I) = FLD(3,15,MARRAY(I))      CONV 510
      CALL NCNVRT(MARRAY(37),MARRAY(37),48,3)      CONV 540
      MARRAY(85) = FLD(3,15,MARRAY(85))      CONV 550
      MARRAY(86) = FLD(3,15,MARRAY(86))      CONV 560
      MARRAY(87) = FLD(3,15,MARRAY(87))      CONV 570
      MARRAY(92) = FLD(3,15,MARRAY(92))      CONV 660
      GO TO 900      CONV 670
C      ISOTOPE RECORD, CONVERT INFORMATION      CONV 720
C      750 CONTINUE      CONV 730
      DO 770 I = 5,59      CONV 740
      770 MARRAY(I) = MAX0(MARRAY(I),0)      CONV 750
      GO TO 900      CONV 760
C      WRITE ERROR MESSAGE -- IMPROPER READ      CONV 770
      870 WRITE (LTR,880) NRCD,LSTAT,MARRAY(1)      CONV 780
      880 FORMAT (1H0 // 25H***** IMPROPER READ AFTER,15, 8H RECORDS,5X,      CONV 850
      1 7HLSTAT =,I3,5X,4HMI =,I3,5X,6H***** // )      CONV 860
      IEND = 1      CONV 870
      M = 6      CONV 880
C      CONVERT ANY NEGATIVE NUMBERS      CONV 887
      900 IF (MARRAY(1).LT.0) MARRAY(1)=-FLD(1,35,MARRAY(1))      CONV 890
      RETURN      CONV 900
      END      CONV 970

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C	FUNCTION TO SUM THE TOTAL CONCENTRATIONS FOR 20 ISOTOPES	CTOT 010
	FUNCTION CTOTL (KINC)	CTOT 020
C		CTOT 025
C	COMMON FOR PACTOLUS PROGRAM	040
	INCLUDE COM1	050
C		CTOT 180
C	SUM FOR KTH ISOTOPE RECORD	CTOT 190
	K = KINC	CTOT 200
	CT = C23(K)*233. + C25(K)*235. + C49(K)*239. + C41(K)*241.	CTOT 220
1	+ C02(K)*232. + C28(K)*238. + C24(K)*234. + C40(K)*240.	CTOT 230
2	+ C13(K)*233. + C26(K)*236. + C42(K)*242.	CTOT 240
	DO 300 I = 12,20	CTOT 280
300	CT = CT + CXX(K,I-1)*FLOCAT(NWT(I))	CTOT 300
	CTOTL = CT	CTOT 400
	RETURN	CTOT 900
	END	-
C	ROUTINE TO WRITE HEADING LINES FOR DOCUMENTATION LIST	DHOG 002
	SUBROUTINE DHOG	DHOG 005
C		DHOG 007
C		DHOG 020
	COMMON /TAPES/LTB,LTJ,LTR	025
	COMMON /ADATE/ADATE(3),LSW,KARD(15)	030
	DATA NPAG/0/	DHOG 080
C		DHOG 150
	NPAG = NPAG + 1	DHOG 160
	WRITE (LTR,200) ADATE,NPAG	DHOG 190
200	FORMAT (1H1, 19X, 44HDOCUMENTATION OF THE PACTOLUS PROGRAM AS OF	DHOG 200
1	3A6, 10X, 4HPAGE,I4 //)	DHOG 210
	LSW = 0	DHOG 300
	RETURN	DHOG 500
	END	-
C	ROUTINE TO CALCULATE AND STORE FABRICATION COSTS	FAB 010
	SUBROUTINE FAB	FAB 020
C		037
C	COMMON FOR PACTOLUS AND POWERCO PROGRAMS	040
	INCLUDE COM1	050
	INCLUDE COM2	055
C		100
C		FAB 280
C	CALCULATE TOTAL ENRICHMENT TIMES DENSITY	FAB 290
	ENR1 = C25(1)*235. + C49(1)*239. + C41(1)*241. + C23(1)*233.	FAB 300
	CT1 = CTOTL(1)	FAB 305
	ENR = (ENR1/CT1) * DENS	FAB 310
C	CALCULATE TIME TO BUY FABRICATION	FAB 390
	TIM1 = ((TIM(1)-SHPREA-PRI-TFAB/2.)/365.) + 1.0	
	TIMX = TSTART + TIM1 - 1.0	
C	INTERPOLATE IN THE TIME LIBRARY	FAB 430
	CALL TIMLIB	FAB 440
C		FAB 580
C	DETERMINE IF THIS IS A CORE OR BLANKET DISCHARGE	FAB 590
	IF (GFISS.LT.ENK) GO TO 650	FAB 600
C	BLANKET DISCHARGE --- SET BLANKET SWITCH (ICOR = 1)	FAB 610
	ICOR = 1	FAB 615
	FABCS1 = VL10(4)	FAB 620
	DELFB1 = 0.0	FAB 630
	GO TO 700	FAB 635
C	CORE DISCHARGE	FAB 640
650	DELFB1 = VL10(2)	FAB 650
	FABCS1 = VL10(3)	FAB 670
	ICOR = 0	FAB 675

C		FAB	680
C	CALCULATE FABRICATION COST, CONVERT FROM TONS TO KG	FAB	690
	700 CFACTR = 1000.0	FAB	700
	IF (XK.LT.1.60 E+11) CFACTR = 907.185		
	RKG = RKG * CFACTR	FAB	720
	FABC = (DELFBI + FABCST) * RKG	FAB	750
C	DETERMINE IF DEBUG PRINTOUT IS WANTED	FAB	760
	IF (IPR.GE.2) WRITE (LTR,770) FABC,RKG,INDX,ICOR	FAB	765
	770 FORMAT (5X, 9HFAB DEBUG, 3X, 2E12.5,2I3)	FAB	770
C		FAB	780
C	DETERMINE IF THIS IS FABRICATION COST OR CAPITAL EXPENSE	FAB	790
	800 IF (NCNT.GT.NREG) GO TO 900	FAB	800
	CFAB = DFAB + FABC	FAB	820
	GO TO 950	FAB	840
C	DETERMINE THE PROPER INDEX AND FILL FABCH ARRAY	FAB	890
	900 INDX = MAX1(TIM1,1.0)	FAB	900
	FABCH(INDX) = FABCH(INDX) + FABC	FAB	920
C		FAB	940
	950 RETURN	FAB	950
	END		
C	ROUTINE TO WRITE SUB-HEADING LINES FOR TABLES 3 AND 4	HDG3	010
	SUBROUTINE HDG3(K)	HDG3	020
C		HDG3	030
C	COMMON FOR PACTOLUS PROGRAM		040
	INCLUDE COM1		050
C		HDG3	150
C	WRITE PAGE HEADINGS	HDG3	160
	CALL PHOG	HDG3	170
C		HDG3	180
C		HDG3	190
	IF (K.LE.2) WRITE (LTR,600)	HDG3	200
	IF (K.GT.2) WRITE (LTR,610)	HDG3	210
	IF ((K.EQ.2).OR.(K.EQ.4)) GO TO 400	HDG3	230
	WRITE (LTR,620)	HDG3	300
	GO TO 800	HDG3	370
C	WRITE HEADING LINE FOR SECOND GROUP OF ISOTOPES	HDG3	390
	400 WRITE (LTR,630) (ANAM(I),I=12,20)	HDG3	400
C		HDG3	570
C	OUTPUT FORMATS	HDG3	590
	600 FORMAT (1H0,54X,7HTABLE 5/ 45X,30HKILOGRAMS FABRICATED EACH YEAR/5		
	20X,20H (BEFORE LOSSES) /)		
	610 FORMAT (1H0,54X,7HTABLE 6/ 44X,31HKILOGRAMS REPROCESSED EACH YE		
	2AR / 51X,17H(AFTER LOSSES) /)		
	620 FORMAT (2X,4HYEAR,5X,105HTH232 PA233 U233 U234	HDG3	620
	1 U235 U236 U238 PU239 PU240 PU241 PU242	HDG3	621
	2 /)	HDG3	622
	630 FORMAT (2X,4HYEAR, 9(4X,46), 4X,17HFISS PRD TOTAL /)	HDG3	630
C		HDG3	700
	800 RETURN	HDG3	800
	END		

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C      ROUTINE TO WRITE HEADER PAGE PRECEDING THE REPORT      HEAD 010
SUBROUTINE HEADR      HEAD 020
C      HEAD 021
C      HEAD 037
C      COMMON FOR PACTOLUS PROGRAM      HEAD 040
INCLUDE COM1      HEAD 050
C      HEAD 100
C      HEAD 160
C      HEAD 190
C      HEAD 260
WRITE (LTR,300) ADATE      HEAD 300
300 FORMAT (1H1 /// 50X,19HNUCLEAR POWER COSTS / 53X,14HAS CALCULATHEAD 310
1ED / 57X, 7HBY THE // 53X,14HPACTOLUS CODE / 59X,2HON / 50X, HEAD 320
2 3A6 // )      HEAD 340
C      HEAD 350
C      DETERMINE IF EXTRA HEADING LINES SHOULD BE WRITTEN      HEAD 360
IF (IMDG.E3.0) GO TO 600      HEAD 370
K2 = IMDG*14      HEAD 390
WRITE (LTR,400) (XHDG(K),K=1,K2)      HEAD 400
400 FORMAT (20X,13A6,A2 )      HEAD 570
C      HEAD 580
C      WRITE REMAINDER OF HEADING LINES      HEAD 600
600 WRITE (LTR,620)      HEAD 620
620 FORMAT (1H0 // 41X,38HADVANCED CONCEPTS AND ANALYSIS SECTION // HEAD 630
1 46X,27HETHELLE MEMORIAL INSTITUTE / 45X,30HPACIFIC NORTHWEST LABHEAD 640
2CRATORIES // 50X,19HPOST OFFICE BOX 999 / 46X,27HRICHLAND, WASHINHEAD 650
3GTON 99352 // 37X,44HTELEPHONE, AREA CODE 509, 942-1111 EXT 379HEAD 660
46 / 46X,27HCABLE ADDRESS. BAT NOR LAB )      HEAD 850
C      HEAD 900
RETURN      HEAD 900
END

C      ROUTINE TO CALCULATE AND STORE LOSSES      LOS 010
SUBROUTINE LOSS      LOS 020
C      LOS 030
C      COMMON FOR PACTOLUS PROGRAM      LOS 040
INCLUDE COM1      LOS 050
C      LOS 190
C      CALCULATE INDEXES FOR LOSS VARIABLES      LOS 200
K1 = MAX1( (TIM(1)-SHPREA-PRI)/365. + 1.0,1.0)      LOS 200
K2 = MAX1( (TIM(K3)+CCOL+SHPSEP+TSEP)/365. + 1.0,1.0)      LOS 240
C      FILL UP LOSS ARRAYS      LOS 340
XLOSS = CORLOS      LOS 350
IF (ICOR.GT.0) XLOSS = BLKLOS      LOS 370
XL = XLOSS*VIX      LOS 390
IF (NCNT.GT.NREG) FLOSS(K1) = FLOSS(K1) + XL      LOS 400
IF (NCNT.LE.NREG) DLOS = DLOS + XL      LOS 420
FLOSS(K2) = FLOSS(K2) + REPOS*VFY      LOS 500
FABLSS(K1) = FABLSS(K1) + XL      LOS 520
REPLSS(K2) = REPLSS(K2) + REPOS*VFY      LOS 521
C      LOS 580
C      DETERMINE IF DEBUG PRINTOUT IS NEEDED      LOS 590
IF (IPR.GE.2) WRITE (LTR,700) XL,VFY,DLOS,XLOSS,ICOR      LOS 600
700 FORMAT (5X,12HLOSS DEBUG , 4E12.5,I3 )      LOS 700
RETURN      LOS 970
END

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C	MAIN PROGRAM LOGIC OF THE PACTOLUS PROGRAM	PAC	005
	SUBROUTINE PCTLUS	PAC	010
C		PAC	030
C	COMMON FOR PACTOLUS AND POWERCO PROGRAMS		040
	INCLUDE COM1		050
	INCLUDE COM2		055
C		PAC	140
	DIMENSION DU(20)	PAC	150
	DATA SMIL/1.0E+6/	PAC	190
C	READ NECESSARY INPUT CARDS	PAC	200
C	CALL CINPUT	PAC	210
C	INITIALIZE PROPER VARIABLES AND COUNTERS TO ZERO	PAC	230
	CALL CLEAR(FPDR(1),400)		
	CALL CLEAR(ELREP(1),320)		
	CALL CLEAR(RTONS,16)		
	CALL CLEAR(UT10)		
	CALL CLEAR(RTIM,765)		
C			
C	LOAD TAPE H ON THE GROUP	PAC	290
C	READ BURNUP INFO FOR ONE CASE	PAC	300
	IL = 0		
310	CALL READ	PAC	310
	IL = IL + 1		
	IF (NCNT.LT.NREG) GO TO 311		
	NNREG = NREG + NRELD		
	IF (NCNT.LT.NREG) RKGSTO = RKGSTO + RKG*ENRI(IL)		
	IF (NCNT.EQ.NREG) RFTM = (TIM(N3)-TIM(1))/365.		
311	CONTINUE		
	ICAS(IL) = IC(2)		
	IACAS(IL) = IC(3)		
	STOKG(IL) = RKG		
	STORES(IL) = (TIM(N3)-TIM(1))/365.		
	STOTM(IL) = TIM(N3)/365.		
	STOEX(IL) = EX(N3)		
	IYER = STOTM(IL) + TSTART		
	STOYR(IL) = IYER		
C	ARE WE AT END OF THIS GROUP OF CASES	PAC	320
	IF (IEND.EQ.0) GO TO 770	PAC	330
C	ADD UP TOTAL TONS OF FUEL IN REACTOR	PAC	332
	IF (NCNT.LT.NREG) RTONS = RTONS + RKG	PAC	333
C	DETERMINE IF DEBUG PRINTOUT IS WANTED	PAC	335
	IF (IPR.LE.0) GO TO 400	PAC	340
	IF (MOD(NCNT,40).EQ.0) CALL PHDG	PAC	345
	TM = TIM(N3)/365. + 1.0	PAC	347
	WRITE (LIR,366) IC(2),IC(3),I1,TM,RKG, EX(N3),N3	PAC	350
360	FORMAT (8X,3,CASE NO.,15,A1, 8X,3HM =,I2, 8X,6HTIME =,F5.1, 8X,	PAC	360
	1 5HRKG =,F6.1,2X,5HEXP =,F9.1,3X,12,9H ISOTOPES)	PAC	361
C		PAC	380
C	UPDATE DISCHARGE COUNTER AND CALC AND STORE FAB COSTS	PAC	390
400	NCNT = NCNT + 1	PAC	400
	CALL FAB	PAC	410
C	CALCULATE AND STORE REPROCESSING COSTS	PAC	440
	CALL SEP	PAC	450
C	CALCULATE AND STORE SHIPPING COSTS	PAC	490
	CALL SHIP	PAC	500
C	CALCULATE INITIAL AND FINAL FUEL VALUES	PAC	540
	CALL PRICE	PAC	550
C	CALCULATE AND STORE LOSSES	PAC	590
	CALL LOSS	PAC	600
C		PAC	639

C	CALCULATE AND STORE RG OF EACH PRODUCT CHARGED	PAC 640
	CALL PROUCT	PAC 650
	PU = (C49(1)*239./CT1)*RKG/FABLSS + (C41(1)*241./CT1)*RKG/FABLSS	
	IF(NCNT.LE.FKGE) RFIS = RFIS + PU	
C		PAC 690
C	CALCULATE MASS BALANCE TABLES AND SUMMARY PHYSICS INFO	PAC 700
	GO TO 310	PAC 750
C		PAC 755
C	WRITE CASH FLOW REPORT	PAC 760
770	D(2) = (TIM(N3)+COOL+SHFSEP+TSEP)/365.00001	PAC 770
	CALL CFTABL	PAC 780
	CALL PHYSIC	
	CALL TABL3	PAC 790
C	FILL POWERCO COMMON WITH NECESSARY INFO	PAC 800
	D(1) = D(1) / SMIL	PAC 801
	D(3) = D(3) / SMIL	PAC 803
	D(8) = RTP * EFF	PAC 810
	D(10) = (CVARYR+D(21)*D(8))/SMIL	3/31/67R
	D(11) = (QFAB + QSHF + QPUR + QLOS) / SMIL	PAC 813
	D(20)=QINS/SMIL	3/31/67R
	D(21)=D(21)*D(8)/SMIL	3/31/67R
	D(22)=D(22)/SMIL	3/31/67R
	D(23)=D(23)/SMIL	3/31/67R
	D(26)=TLIFE	3/31/67R
	D(17)=D(17)*(L(1)+D(23))	3/31/67R
	NY = D(2) + .999999	
	DO 870 I = 1,NY	PAC 830
	PFW(I) = XLDF(I)	PAC 840
	CURA(I) = FPUFC(I)/SMIL	PAC 842
	CFAB(I) = (FALCH(I) + PRESHP(I) + FABLSS(I))/ SMIL	PAC 844
	CREP(I) = (REPCH(I) + POSTSH(I) + REPLSS(I))/ SMIL	PAC 846
	CFLU(I) = FCREC(I)/SMIL	PAC 848
	EEE(I) = (CYR+QINS)*XFT(I)/SMIL+D(17)+D(22)*XFT(I)	3/31/67R
870	CONTINUE	PAC 870
C	PUT IN HEADING INFORMATION	PAC 872
	DO 880 I = 1,6	PAC 875
880	DES(I) = AHCG(I)	PAC 880
C		PAC 890
C	RUN POWERCO PROGRAM	PAC 900
	CALL PWRCC	PAC 910
	IF (ITAP .LE. 0) GO TO 999	4/12/67R
	LTR=ITAP	4/07/67R
	DO 950 IZ = 1,20	
950	DU(1) = 0.	
	WRITE (LTR,1002) DU(1)	
	WRITE(LTR,1001) SPAVG,SHFP,YILDT,YILDPU,YILD23,YILD25,SPINV,	
	1 WEPT,TRFT,CFPT,(DU(I),I=1,10)	
	WRITE(LTR,1001) (DU(I),I=1,20)	
	END FILE LTR	4/07/67R
	LTR=6	4/07/67R
1001	FORMAT(11F10.1/9F10.1)	
1002	FORMAT(F5.0,F10.3,7F10.1)	
999	RETURN	4/12/67R
	END	

C	PDOC	PDOC 002
C	PROGRAM TO LIST OUT DOCUMENTATION CARDS	PDOC 005
C		PDOC 007
C	COMMON FOR PACTOLUS PROGRAM	010
	COMMON /TAPES/LTB,LTI,LTR	025
	COMMON /ADATE/ADATE(3),LSW,KARD(15)	030
C	DIMENSION LT(7)	PDOC 035
	DATA MINUS/1H-/KBLNK/1H /	PDOC 040
C	ASSIGN TAPE UNITS	PDOC 050
	LTB = 8	PDOC 120
	LTI = 25	PDOC 130
	LTR = 6	PDOC 135
C	SET UP ORLW FOR READING INPUT CARDS	PDOC 140
	CALL SETDAR (LTI,2,LTB)	PDOC 150
C	READ THE DATE CARD AND WRITE PAGE HEADING	PDOC 150
	READ (LTI,700) (ADATE(I),I=1,3)	PDOC 160
	CALL CHUG	PDOC 170
	IEND = 1	PDOC 350
C	READ ANOTHER INPUT CARD	PDOC 360
	460 READ (LTI,700) KARD	PDOC 380
C	DETERMINE IF PAGE HEADING SHOULD BE WRITTEN	PDOC 400
	IF (KARD(15).EQ.MINUS) GO TO 600	PDOC 420
	IF (KARD(14).EQ.MINUS) GO TO 750	PDOC 440
	LSW = 1	PDOC 450
	KARD(15) = KBLNK	PDOC 460
C	WRITE OUT THE CARD	PDOC 490
	600 WRITE (LTR,620) KARD	PDOC 500
	620 FORMAT (20X,13A6,2A1)	PDOC 520
	IF (LSW.GT.0) CALL CHUG	PDOC 550
	GO TO 460	PDOC 570
C	INPUT FORMATS	PDOC 590
	700 FORMAT (13A6,2A1)	PDOC 600
C	EXECUTE THE PACTOLUS PROGRAM WITH THE SAMPLE INPUT	PDOC 620
	750 CALL PCTLUS	PDOC 640
	STOP	PDOC 660
	END	PDOC 670
		PDOC 680
		PDOC 700
		PDOC 730
		PDOC 740
		PDOC 750
		PDOC 900
		-
C	ROUTINE TO WRITE PAGE HEADINGS FOR EACH PAGE OF REPORT	PHDG 010
	SUBROUTINE PHDG	PHDG 020
C		PHDG 022
C	COMMON FOR PACTOLUS PROGRAM	037
	INCLUDE COM1	040
	DATA NPAGE/0/, BLANK/1H /	050
	IF (AHDG(13).EQ.0.0) AHDG(13)=BLANK	3/31/67R
C		3/31/67R
	NPAGE = NPAGE + 1	PHDG 180
	WRITE (LTR,300) ADATE,NPAGE,(AHDG(I),I=1,13)	PHDG 190
	300 FORMAT (1H1, 3A6, 23X,34HREACTOR AND FUEL CYCLE DESCRIPTION, 33X,	PHDG 240
	1 4HPAGE,I4 // 40X,13A6 /)	PHDG 270
	RETURN	PHDG 300
	END	PHDG 310
		PHDG 900
		-

```

SUBROUTINE PHYSIC
INCLUDE COM1
INCLUDE COM2
NYR = (TIM(N3) + COOL + SHPSEP + TSEP) / 365.00001 + 1.0
DO 1 I=1,NYR
1 AVLDF = AVLDF + XLDF(I)
  AVLDF = AVLDF/NYR
  NCONS = TCONST/1.00001 + 1.0
  NYR = NYR + NCONS
DO 2 I=1,NYR
2 TU308 = TU308 + XKGU(I)
  TU308 = TU308 - XKGUCR(NYR)
  PTM = (COOL + SHPSEP + TSEP + SHPDES + SHPFAB + TFAB + SHPREA + PRI
1) / 365.
C RFTM IS GENERATED IN READ
C TMWD IS GENERATED IN READ
C GMPMWD IS INPUT
C EU IS INPUT
C ETH IS INPUT
  SPAVG = RTP*AVLDF/RTONS
  SPFP = RTP/RTONS
C
  WRITE(LTR,98)
98 FORMAT(1H1)
C
  PU239 = 0.
  YILDPU=0.0
  YILD23=0.0
  YILD25=0.0
  YILDT =0.0
  DO 3 I=1,NYR
  YILDPU = (PRDN3A(I,8) + PRDN3A(I,10) - (PRDCT(I,8) + PRDCT(I,10))) *
1365./TIM(N3)+YILOPU
  YILD23 = (PRDN3A(I,2) - PRDCT(I,2))*365./TIM(N3)+YILD23
  YILD25 = (PRDN3A(I,5) - PRDCT(I,5))*365./TIM(N3)+YILD25
3 YILDT = (PRDN3A(I,2) + PRDN3A(I,5) + PRDN3A(I,8) + PRDN3A(I,10)
1 - (PRDCT(I,2) + PRDCT(I,5) + PRDCT(I,8) + PRDCT(I,10))) *
2 365./TIM(N3)+YILDT
C
  SPINV = (RFIS + (PTM*RKGSTO/RFTM)*1000.)/RTP
C
  WEPT = RTP*EFF*AVLDF*TIM(N3)*24000./TU308
  WTHPT = WEPT/EFF
  GFPT = RTP*AVLDF*TIM(N3)*1.05/(TU308*1000.)
C
  CALL PHDG
  WRITE(LTR,99)
  WRITE(LTR,100) SPAVG
  WRITE(LTR,101) SPFP
  WRITE(LTR,102) YILDT
  WRITE(LTR,103) YILDPU
  WRITE(LTR,104) YILD25
  WRITE(LTR,105) YILD23
  WRITE(LTR,106) SPINV
  WRITE(LTR,105) WEPT
  WRITE(LTR,106) WTHPT
  WRITE(LTR,107) GFPT
C
C
99 FORMAT( ///52X,7HTABLE 4/48X,24HREACTOR PROPERTIES TABLE)
100 FORMAT(///10X,43H AVERAGE SPECIFIC POWER,MW/TONNE HEAVY METAL ,37X,
1F10.1)
101 FORMAT(1H0,9X,54H INITIAL FULL POWER SPECIFIC POWER,MW/TONNE HEAVY
1METAL ,26X,F10.1)
102 FORMAT(1H0,9X,35HYIELD, FISSILE KG PRODUCED PER YEAR ,45X,F10.1)
103 FORMAT(1H0,9X,30HYIELD, KG PU PRODUCED PER YEAR ,50X,F10.1)
104 FORMAT(1H0,9X,32HYIELD, KG U235 PRODUCED PER YEAR,48X,F10.1)

```

```

ROUTINE TO CALCULATE AND STORE FUEL VALUES
SUBROUTINE PRICE
COMMON FOR PACTOLUS PROGRAM
INCLUDE COM1
DIMENSION PRC(20)
DATA BCAF/1.65/
OUTPUT FORMATS
150 FORMAT ( 5X, 7HPRICE , 5X, 8E12.5 )

PERFORM PRICE CALCULATIONS AS FOLLOWS -- BY ISOTOPE NUMBER
1 U233 INPUT CARDS C23 PRC 171
2 U235 BUY AND SELL -- PRICE SCHEDULE C25 PRC 172
3 PU239 BUY+SELL - CARD*PU PRICE RATIOS C49 PRC 173
4 PU241 BUY+SELL - CARD*PU PRICE RATIOS C41 PRC 174
5 TH232 INPUT CARDS C02 PRC 175
6 U238 INPUT CARDS C28 PRC 176
7 U234 INPUT CARDS C24 PRC 177
8 PU240 BUY+SELL - CARD*PU PRICE RATIOS C40 PRC 178
9 PU233 INPUT CARDS C13 PRC 179
10 U236 INPUT CARDS C26 PRC 180
11 PU242 BUY+SELL - CARD*PU PRICE RATIOS C42 PRC 181
12 INPUT CARDS - VARIABLE ISOTOPIES CXX PRC 182
INPUT CARDS - VARIABLE ISOTOPIES CXX PRC 184
INPUT CARDS - VARIABLE ISOTOPIES CXX PRC 185
20 INPUT CARDS - VARIABLE ISOTOPIES CXX PRC 190
PRC 191
PRC 197
PRC 198
PRC 200

UPDATE TIME LIBRARIES FOR BUYING TIME
TIM1 = (TIM(1)-PRI-SHPREA-TFAB-SHPFAB)/365. + 1.0
TIMX = TSTART + TIM1 - 1.0
CALL TIMLIB
PRATIO = VLIB(9)
K1 = MAX1(TIM1,1.0)
PRC 210
PRC 230
PRC 240

CALCULATE CONVERSION CONSTANT AND ALL ISOTOPE PRICES TO BUY
CCONV = ( BCAF / DENS ) * RKG*1000.0
PRC 250
PRC 260
PRC(1) = C23(1) * PISO(1) * 233. * PRATIO
CALC U235 PRICE IN TAILS ROUTINE
PRC 281
PRC(2) = TAILS(1)/BCAF
PRC 238
PRC(3) = C49(1) * PISO(3)*PRATIO * 239.
PRC 285
PRC(4) = C41(1) * PISO(4)*PRATIO * 241.
PRC 286
PRC(5) = C02(1) * PISO(5) * 232.
PRC 288
PRC(6) = C26(1) * PISO(6) * 238.
PRC 290
PRC(7) = C24(1) * PISO(7) * 234.
PRC 292
PRC(8) = C40(1) * PISO(8)*PRATIO * 240.
PRC 294
PRC(9) = C13(1) * PISO(9) * 233.
PRC 296
PRC(10) = C26(1) * PISO(10) * 236.
PRC 298
PRC(11) = C42(1) * PISO(11)*PRATIO * 242.
PRC 300

```


END

C	ROUTINE TO READ CORRUPT INFO FROM TAPE	READ	010
	SUBROUTINE READ	READ	020
C		READ	021
C			037
C	COMMON FOR FACTOLUS PROGRAM		040
	INCLUDE COM1		050
C			078
	DIMENSION ARRAY(150),ARRAY1(150)		095
	EQUIVALENCE (ARRAY,M),(ARRAY1,M1)		097
C			100
C			105
	IEND = 0	READ	120
C	DETERMINE IF INPUT TAPE WAS CREATED ON 7090 OR 1107	READ	150
	160 IF (I90.LE.0) GO TO 210	READ	160
C	CONVERT 7090 TAPE	READ	169
	CALL CONVRT (ARRAY1)	READ	170
	GO TO 220	READ	185
C		READ	190
C	READ HEADING RECORD	READ	200
	210 READ (LTB) L,(ARRAY1(I),I=1,L)	READ	210
	220 NRCD = NRCD + 1	READ	220
	KCASE = KC(2)	READ	230
C	DETERMINE IF END TAPE HAS BEEN REACHED, IF SO GO TO 940	READ	250
	IF (M1) 940,280,160	READ	260
C	COMPARE PRESENT CASE WITH PREVIOUS	READ	270
C	TEST FOR FIRST AND LAST CASE NEEDED FOR PROCESSING	READ	270
	280 IF (JCASE.EQ.0) GO TO 300	READ	280
	IF (KCASE.NE.JCASE) GO TO 160	READ	285
	JCASE = 0	READ	290
	300 IF (KCASE.EQ.LCASE) IEND = 1	READ	300
C	STORE VARIABLE ISOTOPES AND SUM THE CONCENTRATIONS	READ	775
C	STORE INFO FOR THIS HEADING RECORD	READ	360
	370 J = 0	READ	370
C		READ	430
C	SET INDEX INFO AND READ ISOTOPE RECORDS	READ	440
	+50 J = J + 1	READ	450
C	TEST FOR INPUT FROM 7090 OR 1107	READ	460
	470 IF (I90.LE.0) GO TO 500	READ	470
	CALL CONVRT (ARRAY)	READ	480
	GO TO 540	READ	485
C	READ 1107 CREATED TAPE	READ	495
	500 READ (LTB) L,(ARRAY(I),I=1,L)	READ	500
	540 NRCD = NRCD + 1	READ	540
C	DETERMINE IF THIS A PROPER ISOTOPE RECORD	READ	570
	IF (M.GT.0) IF (M=6) 750,750,700	READ	580
C	NOT AN ISOTOPE RECORD, BACKSPACE TAPE AND RETURN	READ	590
	J = J - 1	READ	600
	BACKSPACE LTB	READ	610
	GO TO 970	READ	690
C		READ	692
C	M EXCEEDS 6, WRITE ERROR MESSAGE	READ	697
	700 WRITE (LTR,710) M	READ	700
	710 FORMAT (1H0 // 2JX,32H***** AN IMPROPER VALUE OF M =,12,25H WAS	READ	710
	1ENCOUNTERED ***** //)	READ	711
	STOP	READ	730
C		READ	740
C	GOOD ISOTOPE RECORD, STORE INFO FROM CARD	READ	745
	750 C23(J) = ARRAY(5)	READ	750
	C25(J) = ARRAY(6)	READ	752
	C49(J) = ARRAY(7)	READ	754
	C41(J) = ARRAY(8)	READ	756
	C02(J) = ARRAY(9)	READ	758
	C28(J) = ARRAY(10)	READ	760
	C24(J) = ARRAY(11)	READ	762
	C40(J) = ARRAY(12)	READ	764

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C13(J) = ARRAY(13)          READ 766
C26(J) = ARRAY(14)          READ 768
C42(J) = ARRAY(15)          READ 770
SUMC = 0.0                  READ 777
SUMD = 0.0                  READ 778
DO 790 I = 1,9              READ 780
  CXX(J,I) = ARRAY(I+15)    READ 785
  DXX(J,I) = ARRAY(I+50)    READ 786
  SUMC = SUMC + ARRAY(I+15)  READ 788
  SUMD = SUMD + ARRAY(I+50)  READ 789
790 CONTINUE                READ 790
C   STORE THE FAKE INFO     READ 797
  D23(J) = ARRAY(40)        READ 800
  D25(J) = ARRAY(41)        READ 802
  D49(J) = ARRAY(42)        READ 804
  D41(J) = ARRAY(43)        READ 806
  D28(J) = ARRAY(45)        READ 808
  D24(J) = ARRAY(46)        READ 810
  D40(J) = ARRAY(47)        READ 812
  D13(J) = ARRAY(48)        READ 814
  D26(J) = ARRAY(49)        READ 816
  D42(J) = ARRAY(50)        READ 818
C   CONVERT TIME IN SECONDS TO TIME IN DAYS  READ 829
  TIM(J) = ARRAY(132)/86400. READ 830
  EX(J) = ARRAY(133)        READ 832
  IF(J.NE.1) GO TO 782
  TIMX = TIM(J)/365. + TSTART
  CALL TIMLIB
  XLDP = VLIB(5)
  RTP = RTP/XLDP
782 CONTINUE
C   ASSIGN VF=MASS FRACTION  READ 839
  VF(1) = ARRAY(134)        READ 840
C   SUM THE TOTAL CONCENTRATION OF FUEL  READ 864
  SMCS = C23(J)+C25(J)+C49(J)+C41(J)+C02(J)+C28(J)+C24(J)+C40(J)+
1  C13(J)+C26(J)+C42(J) + SUMC  READ 865
  IF(J.EQ.1) SUM1 = SMCS      READ 866
  SMDS = D23(J)+D25(J)+D49(J)+D41(J)+D24(J)+D40(J)+D13(J)+D26(J)+
1  D42(J) + SUMD              READ 866
  SUMT = SMCS + SMDS          READ 867
  IF(J-1)901,900,901          READ 868
900 CXI = CTOTL(1)
  DEN1 = CXI/.6025
  RKG = DEN1*RKG/DENS
  DENS = DEN1
901 CONTINUE
C   DETERMINE IF WE ARE AT THE END OF ISOTOPE RECORDS  READ 907
C   IF (J.GE.60) GO TO 970  READ 909
910 IF (M=3) 450,970,970     READ 910
C   IF (M=3) 450,970,970     READ 930
C   END TAPE, SET PROPER SWITCHES, REWIND TAPE, AND RETURN  READ 931
C   IEND = 1                  READ 938
C   SET N3 EQUAL TO NUMBER OF ISOTOPE RECORDS READ  READ 939
940 N3 = J                    READ 940
C   TMWD = TMWD + EX(N3)*RKG  READ 960
970 N3 = J                    READ 970
  NL = IL + 1
  ENRI(NL) = (C23(1)+C25(1) + C49(1) + C41(1))/SUM1
  ENRF(NL) = (C23(N3) + C25(N3) + C49(N3) + C41(N3))/SMCS
  RETURN                      READ 990
  END

```

C	ROUTINE TO CALCULATE AND STORE REPROCESSING COSTS	SEP 010
	SUBROUTINE SEP	SEP 020
C		SEP 030
C	COMMON FOR PACTOLUS PROGRAM	040
	INCLUDE COM1	050
C		SEP 270
C	INTERPOLATE IN TIME LIBRARY	SEP 280
	TIM1 = (TIM(N3)+COOL+SHPSEP)/365. + 1.0	SEP 290
	TIMX = TSTART + TIM1 - 1.0	
	CALL TIMLIB	SEP 300
	SRATIO = VLIB(8)	SEP 320
	BCOST = VLIB(10)	
	IF(ISEP)10,20,10	
10	SCOST = SRATIO	
	SRATIO = 1.0	
20	CONTINUE	
	K1 = MAX1(TIM1,1.0)	SEP 330
C	CALCULATE CLEANUP TIME	SEP 400
	XCL = RKG/THRUPT	SEP 410
	TCLEAN = 8.0	SEP 420
	IF (XCL.GT.24.) TCLEAN = XCL/3.0	SEP 430
C		SEP 440
C	CALCULATE ENRICHMENT	SEP 450
	ENR = 0.0	SEP 460
	DO 530 I = 1,N3	SEP 470
	ENR1 = C25(I)+C49(I)+C41(I)+C23(I)	SEP 480
	CXSM = 0.0	SEP 482
	DO 485 K = 1,9	SEP 483
485	CXSM = CXSM + CXX(I,K)	SEP 485
	ENRT = ENR1 + C02(I)+C28(I)+C24(I)+C40(I)+C13(I)+C26(I)+C42(I) +	SEP 490
1	CXSM	SEP 491
	ENR1 = (ENR1/ENRT)	SEP 510
	ENR = AMAX1(ENR,ENR1)	SEP 520
530	CONTINUE	SEP 530
C		SEP 540
C	CALCULATE THRUX VARIABLE, DEPENDING ON ENR	SEP 600
	X = ENR * 100.0	SEP 610
	X2 = X*X	SEP 611
	X3 = X2*X	SEP 612
	X4 = X3*X	SEP 613
	TX = THRUPT/1000.0	SEP 620
	IF (X.GT.3.0) IF (X-9.) 660,660,700	SEP 625
	THRUX = THRUPT	SEP 630
	GO TO 750	SEP 640
660	THRUX = (829.3 + 354.6*X - 148.4*X2 + 18.81*X3 - 0.7954*X4) * TX	SEP 660
	GO TO 750	SEP 680
700	IF (X.GT.20) GO TO 730	SEP 700
	THRUX = (1408. - 151.4*X + 6.885*X2 - .1172*X3) * TX	SEP 710
	GO TO 750	SEP 720
730	THRUX = (682.1 - 44.42*X + 1.382*X2 - .0222*X3 + 1.776E-4*X4)*TX	SEP 730
C		SEP 738
C	IF FUEL CONTAINS THORIUM, TAKE HALF OF CALCULATED VALUE	SEP 740
750	IF (C02(1).GT.1.0E-20) THRUX = THRUX/2.0	SEP 750
C	CALCULATE SEPARATIONS TIME	SEP 755
	TSEP = (RKG/THRUX)	SEP 760
C	CALCULATE UF6 CONVERSION COST	SEP 770
	ENR = (C25(N3)/ENRT) * 100.0	SEP 780
	C1 = C25(N3)*235. + C26(N3)*236. + C28(N3)*238.	SEP 782
	CTN3 = CTOTL(N3)	SEP 790
	C2 = (C1/CTN3) * 1000.0*RKG	SEP 800
	CPR = .0056	SEP 810
	IF (ENR.GT.5.0) CPR = .032	SEP 820
	RCOST = SEPCST*TSEP*SRATIO + C2*CPR	SEP 840
	RCOST1 = RCOST/RKG	SEP 850

```

C      DETERMINE IF THIS IS A CORE OR BLANKET DISCHARGE
      IF (ICOR.LE.0)      GO TO 890
      IF (ISEP)760,770,760
760  RCOST = BCOST*RK6

      RCOST1 = BCOST
770  CONTINUE
      BLREP(K1) = RCOST1
      BLTIM(K1) = TSEP + TCLEAN
      GO TO 920
890  IF (ISEP)891,771,891
891  RCOST = SCOST*RK6
      RCOST1 = SCOST
771  CONTINUE
      COREP(K1) = RCOST1
      CCTIM(K1) = TSEP + TCLEAN
C      ADD UP REPROCESSING CHARGES
920  REPC(K1) = REPC(K1) + RCOST
C      DETERMINE IF DEBUG PRINTOUT IS WANTED
      IF (IPRGE,2) WRITE (LTR,950) X,ENR,TSEP,K1,RCOST,C2,ICOR,RK6
1    , THROX,TCLEAN
950  FORMAT (5X, 9HSEP DEBUG, 3X, 3E12.5,2(I3,2E12.5),E12.5 )
      RETURN
      END

```

SEP 845
SEP 860

SEP 875
SEP 880

SEP 895
SEP 900
SEP 920
SEP 930
SEP 940
SEP 941
SEP 950
SEP 970
-

```

C      ROUTINE TO CALCULATE AND STORE SHIPPING COSTS
      SUBROUTINE SHIP
C
C      COMMON FOR PACTOLUS PROGRAM
      INCLUDE COM1
C
      COMMON /SHP/SHP2(40),SHP4(40)
      DIMENSION SHP1(40),SHP3(40)
      EQUIVALENCE (SHP1,PRESHP),(SHP3,POSTSH)
C
C      CALCULATE INDEXES FOR SHIPPING VARIABLES
      K1 = (TIM(1)-SHPREA-TFAB-PRI)/365. + 1.0
      K2 = MAX1 ( (TIM(1)-PRI)/365. + 1.0,1.0)
      K3 = MAX1 ( (TIM(N3)+SHPSEP+COOL)/365. + 1.0,1.0)
      K4 = MAX1(FLOAT(K3) + (TSEP+SHPDES)/365.,1.0)
C      IF K1 IS LESS THAN ZERO, COST IS PART OF INITIAL CORE
      IF ( (K1.GT.0).AND.(NCNT.GT.NREG) ) GO TO 400
      CSHP = CSHP + (CSHP1+CSHP2)*RK6
      GO TO 420
C
C      FILL IN PROPER SHIPPING COST ARRAYS
400  SHP1(K1) = SHP1(K1) + CSHP1*RK6
      SHP2(K2) = SHP2(K2) + CSHP2*RK6
420  SHP3(K3) = SHP3(K3) + CSHP3*RK6
      SHP4(K4) = SHP4(K4) + CSHP4*RK6
      RETURN
      END

```

SHP 010
SHP 020
037
040
050
SHP 120
SHP 127
SHP 130
SHP 140
SHP 190
SHP 200
SHP 220
SHP 240
SHP 260
SHP 280
SHP 350
SHP 360
SHP 370
SHP 380
SHP 385
SHP 390
SHP 400
SHP 410
SHP 420
SHP 460
SHP 970
-

```

C          URANIUM CASCADE PRICE SCHEDULE                                SKED 010
SUBROUTINE SKED(NX)                                                    SKED 020
C                                                                                   SKED 022

C          COMMON FOR PACTOLUS PROGRAM                                         040
INCLUDE COM1                                                            050
COMMON /TALS,VXT,VPXT,VXF,ISS,NB,CF,VA(60),VT(60),LFISS(60),VTH    060
1 ,FBF(60),VU233,TH(60),BF(60)                                         061
C                                                                                   SKED 069
DIMENSION C1(60),C2(60),C3(60)                                         SKED 070
EQUIVALENCE (C1,C25),(C2,C26),(C3,C28)                                SKED 075
C                                                                                   SKED 079
DATA CMLT/0.00165983/                                                  SKED 080

C          TVAL = 3.00
VAMIN = TVAL/(1000,*0.6023)
CT2 = C25(1)*235. + C28(1)*238. + C26(1)*236.                        SKED 096
CT3 = C25(N3)*235. + C26(N3)*236. + C28(N3)*238.                    SKED 097
C                                                                                   SKED 098
C          CALC KG U308 PURCHASED AND KG OF SEPARATIVE DUTY                SKED 099
TIMX = (TIM(1)-PRI-SHPREA-YFAB-SHPFAB) / 365.                          SKED 100
K1 = MAX1(TIMX+TCONST+1.0,1.0)                                         SKED 101
TIMX = (TIM(N3)+COOL+SHPSEP+TSEP+SHPDES)/365.
K2 = MAX1(TIMX+TCONST+1.0,1.0)
X25 = C25(1)*235./CT2                                                  SKED 102
X26 = C26(1)*236./CT2                                                  SKED 103
X28 = C28(1)*238./CT2                                                  SKED 104
FPR = (X25-X1)/(XF-X1)                                                  SKED 106
U = X25*235. + X26*236. + X28*238.                                    SKED 108
U308 = 3.0*U + 128.0                                                  SKED 110
UF6 = 3.0*U                                                            SKED 111
UKG = RKG*CT2*1.65/DENS*(1.0+CORLOS)
X25F = C25(N3)*235./CT3
X26F = C26(N3)*236./CT3
X28F = C28(N3)*238./CT3
FPRF = (X25F-X1)/(XF-X1)
UF = X25F*235. + X26F*236. + X28F*238.
U308F=3.0*UF + 128.0
UG6F = 3.0*UF                                                         SKED 125
UKGF = RKG*CT3*1.65/DENS*(1.0-REPL0S)                                SKED 127
C
C          CALCULATION OF URANIUM ENRICHMENTS FROM THE ISOTOPIC CONC.
J = NX                                                                SKED 140
C
C          YT = (C1(J)*235.117)/(C1(J)*235.117+C2(J)*236.120+C3(J)*238.125)
IF(XT-YT)55,55,50
50 VA(J) = VAMIN
UKG = 0.0
UKGF = 0.0
GO TO 310
55 YT1 = YT
YT = AMAX1(YT,XT)                                                    SKED 170
C
C          CALCULATION OF URANIUM CASCADE COSTS FOR CALCULATED ENRICHMENTS
C
60 VX=(2.0*YT-1.0)*ALOG(YT/(1.0-YT))
IF (J.EQ.1) VX1 = VX
C          BRANCH ON ISS SWITCH, 1=NORMAL, 2=CW,GT,CF, 3=SEPDUTY.LE.0
IF (ISS.LE.2) IF (IS) 250,250,270
VA(J) = (YT * (CF-CW) / XF + CW) * CMLT
GO TO 300
250 VA(J) = (CS*(VX+(VXT*(YT-XF) - VXF*(YT-XT)) / (XF-XT)) + CF *
1 (YT-XT) / (XF-XT) - CW*(YT-XF) / (XF-XT)) * CMLT
GO TO 300
C          SKED 210
C          SKED 220
C          SKED 230
C          SKED 240
C          SKED 245
C          SKED 250
C          SKED 251
C          SKED 260

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270 VA(J) = (CS*(VX-VXT-(YT-XT) * VPXT) + CW) * CMLT          SKED 270
C      SET PRICE TO MAXIMUM OF PRICE CALCULATED AND VAMIN      SKED 290
300 VA(J) = AMAX1(VA(J),VAMIN)                                  SKED 300
310 VT(J) = VA(J)*(C1(J)*235.117+C2(J)*236.120+C3(J)*238.125) SKED 330
C                                                                SKED 380
C      DETERMINE IF DEBUG PRINTOUT IS WANTED.                  SKED 390
C      IF (IPR,LT,6)      GO TO 800                             SKED 400
C      WRITE DEBUG PRINT OUT                                    SKED 420
C      WRITE (LTR,700)                                           SKED 430
C      WRITE (LTR,710) VT(J),VA(J),UFISS(J),VU233,TH(J),VTH, C1(J), SKED 450
C      1 C2(J),C3(J)                                             SKED 451
C      WRITE (LTR,720)                                           SKED 490
C      WRITE (LTR,710) TIM(J),BF(J),FBF(J)                      SKED 510
C      WRITE (LTR,730) CF,XF,IS,CS,XT,VAMIN,ISS,CW,YT,VXF,VX,VXT SKED 540
C                                                                SKED 670
C      OUTPUT FORMATS                                           SKED 690
700 FORMAT (54H0 SKED DEBUG, VT(J),VA(J),UFISS,VU233,TH,VTH,C1,C2,C3) SKED 700
710 FORMAT ( 1H0,1P9E11.3)                                       SKED 710
720 FORMAT (32H0 TIM(J), BF(J), FBF(J) )                        SKED 720
730 FORMAT ( 5H0CF =,1PE11.4, 8H XF =,E11.4, 22X, 9H          SKED 730
1 IS =,I4/5H CS =,E11.4,8H XT =,E11.4,11H VAMIN =,E11.4,9H
2 ISS =,I4/5H CW =,E11.4,8H YT =,E11.4,11H VXF =,E11.4/
35H VX =,E11.4,8H VXT =,E11.4)
C                                                                SKED 790
800 CONTINUE                                                    SKED 800
C                                                                SKED 810
C      STORE CALCULATED QUANTITIES FOR REPORTING ROUTINE      SKED 820
C      IF(NX=1)810,810,830                                       SKED 820
810 XKGU(K1) = XKGU(K1) + FPR*UKG*U308/UF6                     SKED 825
XKGS(K1) = XKGS(K1) + (VX-VXT+FPR*(VXT-VXF))*UKG
XXT(K1) = XT*100.
RETURN
C                                                                SKED 850
830 XKGUCR(K2) = XKGUCR(K2) + FPRF*UKGF*U308F/UF6F            SKED 860
XKGSCR(K2) = XKGSCR(K2) + (VX-VXT+FPRF*(VXT-VXF))*UKGF
XXT(K2) = XT*100.
C                                                                SKED 890
900 RETURN                                                       SKED 900

END

C
C      ROUTINE TO WRITE TABLES 3 AND 4
SUBROUTINE TABL3
C
C      COMMON FOR PACTOLUS AND POWERCO PROGRAMS
C      INCLUDE COM1
C      INCLUDE COM2
C
C      WRITE APPROPRIATE SUB-HEADING LINES
C      CALL HDG3 (1)
NYRS = IFIX(TIM(N3)/365.00001 + TCONST) + 1
TSTRT = TSTART - TCONST
DO 320 I = 1,NYRS
I1 = TSTRT + FLOAT(I-1)
WRITE (LTR,800) I1,(PRDCT(I,K),K=1,11)
320 CONTINUE
C
C      WRITE ISOTOPES 12 TO 20
C      CALL HDG3(2)
DO 450 I = 1,NYRS
I1 = TSTRT + FLOAT(I-1)
TOTL = 0.0
DO 400 L = 1,20
400 TOTL = TOTL + PRDCT(I,L)
WRITE (LTR,800) I1,(PRDCT(I,K),K=12,20),PFISS,TOTL
450 CONTINUE

```

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-
TAB3 010
TAB3 020
TAB3 030
040
050
055
TAB3 180
TAB3 240
TAB3 250
TAB3 260
TAB3 265
TAB3 270
TAB3 280
TAB3 300
TAB3 320
TAB3 330
TAB3 340
TAB3 350
TAB3 360
TAB3 370
TAB3 380
TAB3 390
TAB3 400
TAB3 410
TAB3 450

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C		TAB3 460
C	WRITE TABLE OF KILOGRAMS DISCHARGED EACH YEAR	TAB3 490
	CALL HDG3(3)	TAB3 500
	DO 620 I = 1,NY	TAB3 520
	I1 = TSTRT + FLOAT(I-1)	TAB3 530
	WRITE (LTR,800) I1,(PRDN3(I,K),K=1,11)	TAB3 540
620	CONTINUE	TAB3 620
C		TAB3 630
	CALL HDG3(4)	TAB3 670
	DO 750 I = 1,NY	TAB3 680
	I1 = TSTRT + FLOAT(I-1)	TAB3 690
	TOTL = 0.0	TAB3 700
	DO 720 L = 1,20	TAB3 710
720	TOTL = TOTL + PRDN3(I,L)	TAB3 720
	WRITE (LTR,800) I1,(PRDN3(I,K),K=12,20),PFISS,TOTL	TAB3 730
750	CONTINUE	TAB3 750
C		TAB3 760
C		TAB3 780
C	OUTPUT FORMATS	TAB3 790
800	FORMAT (2X,I4, 11(F10.1))	TAB3 800
900	RETURN	TAB3 900
	END	-
C		
C	ROUTINE TO CALCULATE U235 PRICE	TAIL 010
	FUNCTION TAILS (NX)	TAIL 020
C		TAIL 022
C	COMMON FOR PACTOLUS PROGRAM	040
	INCLUDE COM1	050
	COMMON /TALS/VXT,VPXT,VXF,ISS,N8,CF,VA(60),VT(60),UFISS(60),VTH	060
1	,FBF(60),VU233,TH(60),BF(60)	061
C		TAIL 090
	CF = VLIB(6)	TAIL 094
	N = IS	TAIL 096
	VXF=(2.0*XF-1.0)*ALOG(XF/(1.0-XF))	TAIL 99
	IF (N.NE.0) GO TO 200	TAIL 098
C		TAIL 099
C		TAIL 101
100	XTLOG=ALOG(XT/(1.0-XT))	TAIL 100
	VXT=(2.0*XT-1.0)*XTLOG	TAIL 101
	VPXT=(2.0*XT-1.0)/(XT*(1.0-XT))+2.0*XTLOG	TAIL 102
	IS = 1	TAIL 103
	GO TO 300	TAIL 104
C		TAIL 105
200	IF (CS) 270,270,201	TAIL 200
201	IF (CF-C*) 280,280,202	TAIL 201
202	S=CS/(CF-C*)	TAIL 202
C		TAIL 203
	AM=0.0	TAIL 204
	IS=1	TAIL 205
	AN=0.0	TAIL 206
	IM=0	TAIL 207
	IN=0	TAIL 208
	IF (S-5.0) 207,207,206	TAIL 209
206	XT=XF*0.7	TAIL 206
	GO TO 210	TAIL 207
207	IF (S-0.010) 209,208,208	TAIL 207
208	E=.0143+.5562*S-.3349*S**2+.1075*S**3-.0161*S**4+.00096*S**5	TAIL 208
1	-.000014*S**6	TAIL 209
	XT=XF*E	TAIL 210
	GO TO 210	TAIL 211
209	XT=1.5*S	TAIL 209
C		TAIL 210

210	XTLOG=ALOG(XT/(1.0-XT))	TAIL 210
	VXT=(2.0*XT-1.0)*XTLOG	TAIL 211
	VPXT=(2.0*XT-1.0)/(XT*(1.0-XT))+2.0*XTLOG	TAIL 212
	RFS=VXF-VXT-(XF-XT)*VPXT	TAIL 213
	Y=S*RFS	TAIL 214
C		TAIL 215
215	IF (Y-1.0) 220,300,225	TAIL 215
220	IF (Y-0.999999) 230,230,300	TAIL 220
225	IF (Y-1.000001) 300,235,235	TAIL 225
C		TAIL 226
230	AN=-1.0	TAIL 230
	GO TO 240	TAIL 231
235	AN=1.0	TAIL 235
240	IF (IN) 245,245,250	TAIL 240
245	AM=AN	TAIL 245
	IN=1	TAIL 246
C		TAIL 247
250	IF (AM=AN) 255,260,255	TAIL 250
255	IM=IM+1	TAIL 255
	AM=0.0	TAIL 256
	IF (IM.GT.100) GO TO 310	TAIL 257
260	XT=XT+0.0001*AN/(2.0*IM)	TAIL 260
	GO TO 210	TAIL 261
C		TAIL 262
C		TAIL 263
270	IS=3	TAIL 270
	XT=0.0	TAIL 271
	VXT=0.0	TAIL 272
	VPXT=0.0	TAIL 273
	GO TO 300	TAIL 274
C		TAIL 275
280	IS=2	TAIL 280
	XT=XF	TAIL 281
	VXT=VXF	TAIL 282
	VPXT=(2.0*XF-1.0)/(XF*(1.0-XF))+2.0*ALOG(XF/(1.0-XF))	TAIL 283
	WXT=VPXT	TAIL 284
C		TAIL 285
300	ISS = IS	TAIL 300
	IF (IPR=2) 400,320,320	TAIL 302
310	WRITE (LTR,315) IM	TAIL 310
315	FORMAT (23H0IMPROPER VALUE OF IM =,I4)	TAIL 315
320	WRITE (LTR,330) XF,XTLOG,S,XT,VXF,Y,CS,VXT,WXT,CF,VPXT,ISS,CW,	TAIL 320
	1 RFS,N	TAIL 321
330	FORMAT(12H0TAILS DEBUG/5H XF =,1PE11.4,5X,7HXTLOG =,E11.4,5X,5HS	TAIL 330
	1 =,E11.4/5H XT =,E11.4,5X,7HVXF =,E11.4,5X,5HY =,E11.4/5H CS =,E11.4/5H	TAIL 3001
	2,E11.4,5X,7HVXT =,E11.4,5X,5HWXT =,E11.4/5H CF =,E11.4,5X,7HVPXT	TAIL 3002
	3 =,E11.4,5X,5HISS =,I4/5H CW =,E11.4,5X,7HRFS =,E11.4,5X,5HIS	TAIL 3003
	4=,I4)	TAIL 3004
C		TAIL 370
C	GET PROPER PRICES FROM SUBROUTINE SKED	TAIL 390
400	CALL SKED(NX)	TAIL 400
	TAILS = VT(NX)	TAIL 950
	RETURN	TAIL 970
	END	

C	SUBROUTINE TMLIB	TLIB 010
C	INTERPOLATE IN THE TIME LIBRARIES	TLIB 002
C	INCLUDE COM1	TLIB 005
C		050
C	DETERMINE IF TIME EXCEEDS LIBRARY VALUES	TLIB 075
C		TLIB 076
C	IF (TIMX.GT.TLIB(1,NCDS)) GO TO 120	TLIB 077
C	LOOP FOR EACH LIBRARY ENTRY	TLIB 079
C	DO 90 K = 1,NCDS	TLIB 080
C	IF (K.LE.1) IF (TLIB(1,1)-TIMX) 82,82,120	TLIB 081
C	82 IF (TLIB(1,K)-TIMX) 90,200,300	TLIB 082
C	90 CONTINUE	TLIB 090
C	GO TO 150	TLIB 096
C		TLIB 098
C	WRITE ERROR MESSAGE AND END PROCESSING	TLIB 119
C	120 WRITE (LTR,130) TIMX,TLIB(1,1),TLIB(1,NCDS)	TLIB 120
C	130 FORMAT (1H0 // 20X,15H***** THE TIME,F10.2, 41H FALLS OUTSIDE OF	TLIB 130
C	1THE TIME LIBRARY VALUES,F10.2, 4H AND,F10.2, 7H ***** //	TLIB 131
C	150 K = NCDS	TLIB 150
C	EXACT MATCH, FILL VLIB ARRAY WITH LIBRARY VALUES	TLIB 190
C	200 DO 220 I = 2,10	TLIB 200
C	220 VLIB(I) = TLIB(I,K)	TLIB 220
C	GO TO 500	TLIB 240
C	INTERPOLATE TO GET VALUES FOR TIME LIBRARIES	TLIB 290
C	300 FRAC = (TIMX-TLIB(1,K-1))/(TLIB(1,K)-TLIB(1,K-1))	TLIB 300
C	DO 330 I = 2,10	TLIB 310
C	330 VLIB(I) = TLIB(I,K-1)+FRAC*(TLIB(I,K)-TLIB(I,K-1))	TLIB 330
C	FILL TIME PORTION OF LIBRARY	TLIB 490
C	500 VLIB(1) = TIMX	TLIB 500
C	RETURN	TLIB 600
C	END	
C		
C	INTERPOLATE IN THE TIME LIBRARIES	TLIB 002
C	FUNCTION TMLIB(I)	TLIB 010
C		TLIB 005
C	COMMON FOR PACTOLUS PROGRAM	040
C	INCLUDE COM1	050
C		TLIB 075
C	DETERMINE IF TIME EXCEEDS LIBRARY VALUES	TLIB 076
C	IF (TIMX.GT.TLIB(1,NCDS)) GO TO 120	TLIB 077
C	LOOP FOR EACH LIBRARY ENTRY	TLIB 079
C	DO 90 K = 1,NCDS	TLIB 080
C	IF (K.LE.1) IF (TLIB(1,1)-TIMX) 82,82,120	TLIB 081
C	82 IF (TLIB(1,K)-TIMX) 90,200,300	TLIB 082
C	90 CONTINUE	TLIB 090
C	GO TO 150	TLIB 096
C		TLIB 098
C	WRITE ERROR MESSAGE AND END PROCESSING	TLIB 119
C	120 WRITE (LTR,130) TIMX,TLIB(1,1),TLIB(1,NCDS)	TLIB 120
C	130 FORMAT (1H0 // 20X,15H***** THE TIME,F10.2, 41H FALLS OUTSIDE OF	TLIB 130
C	1THE TIME LIBRARY VALUES,F10.2, 4H AND,F10.2, 7H ***** //	TLIB 131
C	150 K = NCDS	TLIB 150
C	EXACT MATCH, FILL VLIB ARRAY WITH LIBRARY VALUES	TLIB 190
C	200 VLB = TLIB(I,K)	TLIB 200
C	GO TO 500	TLIB 240
C	INTERPOLATE TO GET VALUES FOR TIME LIBRARIES	TLIB 290
C	300 FRAC = (TIMX-TLIB(1,K-1))/(TLIB(1,K)-TLIB(1,K-1))	TLIB 300
C	VLB = TLIB(I,K-1)+FRAC*(TLIB(I,K)-TLIB(I,K-1))	TLIB 330
C	ASSIGN VALUE TO FUNCTION	TLIB 490
C	500 TMLIB = VLB	TLIB 500
C	RETURN	TLIB 600
C	END	

C POWER - A ROUTINE FOR ENTERING POWERCO DIRECTLY

CALL PWERCO
STOP
END

C POWERCO PROGRAM -- TO GENERATE TABLES OF COSTS AND EXPENSES

C
C
C

READ IN ONE GROUP OF POWERCO INPUT CARDS

200 SUBROUTINE PWERCO
CALL INPUT
CALL DATABK
CALL FACTRS
CALL DEPREC
CALL EXPENS
CALL BONDPR
CALL COSTEQ
CALL PAYOUT(1,,0.)
CALL OUTPUT(1,,0.)
CALL FIXCHG
CALL PAYOUT(0,,1.)

CALL OUTPUT(0,,1.)
GO TO 200

END
C PROGRAM TO CALL AND CYCLE THROUGH PWERCO
CALL PWERCO
STOP
END

```

SUBROUTINE COSTEQ
C
C      COMMON FOR POWERCO PROGRAM
C      COMMON /PCO/EEE(180),TAA(180),TAB(180),TAC(180),TAD(180),
1  TAE(180),TAG(180),TEH(180),TEQ(180),TAJ(180),TAK(180),TAL(180),
2  TAM(180),TEA(180),TEB(180),TEE(180),TEFAB(180),CURA(180),U(180),
3  CSHP(180),CREP(180),CPLU(180),PFA(180),LES(8),EB(180),EFU(180),
4  ECU(180),EP(180),WPY(180),SYQ(180),BRP(180),Pw(180),Z(180),
5  ELW(180),PwE(180),XEP(180),XEPw(180),XTU(180),XTUw(180)
C      COMMON /DTBL/D(35),LL1,LL2,LL3,LL4,LL5,LL6,LL7,LL8,LL9,LL10,
1  YRD,TXR,DMW,YOU,PLT,YRS,W,C,BND,RRE,RRB,RRW,RRV,NY,SSH,SREP,
2  SPLU,P,BOT,TOP
C
C      PCO 060
C      PCO 070
C      PCO 080
C      PCO 081
C      PCO 082
C      PCO 083
C      PCO 084
C      PCO 085
C      PCO 086
C      PCO 087
C      PCO 088
C      PCO 090

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```

      BOT=0.
      IF(LL1-1)71,10,71
10    TOP=PLT+D(11)+*C*(1.-PFW(NY))
      DO 12 N=1,NY
      TOP=TOP+PFW(N)*(EB(N)-TXR*(EB(N)-EFO(N)+EP(N)+SYD(N)))
12    BOT=BOT+PFW(N)*U(N)
15    P=TOP/(BOT*(1.-TXR))*1.0E+09
      RETURN
71    TOP=(1.-BND)*PLT+(1.-BND)*D(11)+*C*(1.-BND-PWE(NY))
      DO 72 N=1,NY
      TOP=TOP+PWE(N)*(EB(N)+TXR*(EFO(N)-EB(N)-EP(N)-SYD(N))
      1-TAU(N))+TAL(N)+TAJ(N))
72    BOT=BOT+PWE(N)*U(N)
73    P=TOP/(BOT*(1.-TXR))*1.0E+09
      RETURN
      END

```

	SUBROUTINE DATACK	DAT 020
C		DAT 022
C	COMMON FOR POWERCO PROGRAM	055
	INCLUDE COM2	055
	DATA L1/6/	DAT 060
C		DAT 070
C	ASSIGN PROPER VALUES FOR POWERCO USE	DAT 090
	PLT = D(1)	DAT 100
	YRS = D(2)	DAT 102
	*C = D(3)+D(23)	3/31/67R
	BND=D(4)	3/27/67R
	RRB=D(5)	3/27/67R
	RRE=D(6)	3/27/67R
	TXR=D(7)	3/27/67R
	DMW = D(8)	DAT 114
	YRC=FLOAT(IFIX(D(9)+0.9999))+0.0000001	2/06/67R
	VOU = D(10)	DAT 118
	DO 130 K = 1,NY	DAT 125
	TAA(K)=0.0	2/01/67R
	TAB(K)=0.0	2/01/67R
	130 TEH(K) = VOU * PFW(K) + RRE(K)	DAT 130
C		DAT 140
C	WRITE PAGE HEADINGS	DAT 150
	CALL PHCG	DAT 160
	WRITE (L1,511)	DAT 170
	WRITE (L1,512)	
	GO TO (91,92,93,94,45),LL1	
	91 WRITE (L1,513)	
	GO TO 95	
	92 WRITE (L1,514)	
	GO TO 95	
	93 WRITE (L1,515)	
	GO TO 95	
	94 WRITE (L1,516)	
	GO TO 95	
	45 WRITE (L1,575)LL0	3/31/67R
	95 IF(LL2-1)96,96,97	
	96 WRITE (L1,517)	
	GO TO 101	
	97 WRITE (L1,518)	
	101 WRITE (L1,521)	
	WRITE (L1,522)PLT	
	WRITE (L1,523)YRS	
	WRITE (L1,524)D(3)	3/25/67R
	WRITE (L1,525)BND	
	WRITE (L1,526)RRB	

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      IF (END=0.999995) 103,104,104
103  WRITE(L1,527)RRE
      GO TO 105
104  WRITE(L1,570)RRE
105  WRITE(L1,528)TXR
      WRITE(L1,529)
      WRITE(L1,530)YR
      WRITE(L1,531)YR
      HOLD=D(10)-D(21)
      WRITE(L1,533)HOLD
      WRITE(L1,541)D(11)
      ID14=D(14)+.001
      WRITE(L1,542)ID14
      WRITE(L1,543)
      IF (D(22)) 121,120,121
120  WRITE(L1,544)D(15)
      WRITE(L1,545)D(16)

      WRITE(L1,546)D(17)
      GO TO 122
121  WRITE(L1,551)
      WRITE(L1,561)
122  WRITE(L1,547)D(18)
      WRITE(L1,548)D(19)
      WRITE(L1,549)D(20)
      HOLD=D(21)/D(8)
      WRITE(L1,553)HOLD
      WRITE(L1,552)
      IF (D(22)) 123,124,123
123  WRITE(L1,553)D(22)
      GO TO 125
124  WRITE(L1,561)
125  WRITE(L1,554)D(23)
      WRITE(L1,551)
      WRITE(L1,555)D(26)
      WRITE(L1,537)
      WRITE(L1,538)
      INITYR=D(14)-0.99
      DO 102 N=1,NY
      NCWYR=INITYR+N
      CVOU=CVOU*PPR(N)
102  WRITE(L1,540),NCWYR,FFN(N),CURA(N),CFAB(N),CREP(N),CPLU(N),EEE(N)
      1,CVOU, ,BRP(N)
      DAT 480
      DAT 490
      DAT 511
C      OUTPUT FORMATS
511  FORMAT(15H01:PUT DATA )
512  FORMAT(7H0CARD 1)
513  FORMAT(31H BOND REPAYMENT PROPORTIONAL)
514  FORMAT(46H BOND REPAYMENT UNIFORM PRINCIPAL REDUCTION)
515  FORMAT(40H BOND REPAYMENT UNIFORM TOTAL PAYMENT)
516  FORMAT(37H BOND REPAYMENT AS SCHEDULED BELOW)
517  FORMAT(30H STRAIGHT LINE DEPRECIATION)
518  FORMAT(36H SUM OF YEARS DIGITS DEPRECIATION)
521  FORMAT(7H0CARD 2)
522  FORMAT(40H PLANT INVESTMENT, $M ,F12.4)
523  FORMAT(40H PROJECT LIFE, YEARS ,F12.4)
524  FORMAT(40H NONFUEL WORKING CAPITAL, $M ,F12.4)
525  FORMAT(43H FRACTION OF INITIAL INVESTMENT IN BONDS,F9.4)
526  FORMAT(40H BOND INTEREST RATE ,F12.4)
527  FORMAT(40H EQUITY EARNING RATE (AFTER TAXES) ,F12.4)
528  FORMAT(40H FEDERAL INCOME TAX RATE ,F12.4)
529  FORMAT(7H0CARD 3)
530  FORMAT(40H REACTOR POWER, MWE ,F12.4)
531  FORMAT(40H DEPRECIABLE LIFE, YEARS ,F12.4)
533  FORMAT(42H NONFUEL VARIABLE OPERATING COST FACTOR,F10.4)
537  FORMAT(40H1ANNUAL INPUT DATA, EXPENSES IN $M/YR/)
538  FORMAT(1H0,82X,4HBASE,7X,8HVARIBLE,4X,9HSPECIFIED,18X,4HLOAD,9X, 2/28/67R

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14HFUEL,5X,11HFABRICATION,3X,9HREPROCESS,6X,4HU-PU,7X,9HOPERATING, 2/28/67R
24X,9HOPERATING,7X,4HBCND/6X,4HYEAR,7X,6HFACTOR,5X,9HPURCHASES,7X, 2/28/67R
34HCOST,9X,4HCOST,7X,6HCREDIT,9X,4HCOST,9X,4HCOST,7X,8HPAYMENTS/) 2/28/67R
540 FORMAT(1X,I3,I6,8F13.5) 1/26/67R
541 FORMAT(40H INITIAL CORE INVESTMENT, $M ,F12.4) 1/26/67R
542 FORMAT(1H0/36H FIRST YEAR OF OPERATION ,I11) 2/16/67R
543 FORMAT(7HOCARD 4) 2/16/67R
544 FORMAT(40H STATE INCOME TAX RATE ,F12.4) 3/31/67R
545 FORMAT(40H STATE REVENUE TAX RATE ,F12.4) 3/31/67R
546 FORMAT(40H PROPERTY TAX, $M/YR ,F12.4) 3/31/67R
547 FORMAT(40H INTERIM REPLACEMENTS, $M ,F12.4) 3/31/67R
548 FORMAT(40H PROPERTY INSURANCE, $M/YR ,F12.4) 3/31/67R
549 FORMAT(40H NUCLEAR LIABILITY, $M/YR ,F12.4) 3/31/67R
550 FORMAT(40H NUCLEAR LIABILITY, $M/DESIGN MWYE ,F12.4) 3/31/67R
551 FORMAT(1HC) 3/31/67R
552 FORMAT(7HOCARD 5) 3/31/67R
553 FORMAT(40H STATE AND LOCAL TAXES, $M/YR ,F12.4) 4/11/67R
554 FORMAT(40H RECOVERABLE COST OF LAND, $M ,F12.4) 3/31/67R
555 FORMAT(40H REACTOR OPERATING LIFE, YEARS ,F12.4) 3/31/67R
561 FORMAT(1H ) 3/31/67R
570 FORMAT(40H SUPPLEMENTARY BOND INTEREST RATE ,F12.4) 3/31/67R
575 FORMAT(46H BOND REPAYMENT UNIFORM PRINCIPAL REDUCTION,, 3/31/67R
1 17H STARTING IN YEAR,2X,I2) 3/31/67R
RETURN
END

```

```

SUBROUTINE DEPREC
C
C
C      COMMON FOR POWERCC PROGRAM
C      INCLUDE COM2
C
C      DO 200 N = 1,NY
200 SYD(N) = 0.0
LDE = YRD
GO TO (5,7),LL2
5 SLD=PLT/YRD
DO 6 N=1,LDE
6 SYD(N)=SLD
RETURN
7 ABB=PLT*2./((YRD*(YRD+1.))
DO 8 N=1,LDE
8 SYD(N)=ABB*(LDE+1-N)
RETURN
END

```

DEP 022
PCO 060
PCO 070
055
PCO 090
DEP 190
DEP 200
DEP 210


```

SUBROUTINE EXPENS
C
C
C      COMMON FOR POWERCO PROGRAM
COMMON /PCO/EEE(180),TAA(180),TAB(180),TAC(180),TAD(180),
1 TAE(180),TAG(180),TEH(180),TEG(180),TAJ(180),TAK(180),TAL(180),
2 TAM(180),TEA(180),TEB(180),TEE(180),CFAB(180),CURA(180),U(180),
3 CSHP(180),CREP(180),CPLU(180),PFW(180),DES(8),EB(180),EFU(180),
4 EDU(180),EP(180),WPY(180),SYD(180),BRP(180),PwV(180),Z(180),
5 ELM(180),PWE(180),XEP(180),XEPW(180),XTU(180),XTUW(180)
COMMON /DTBL/D(35),LL1,LL2,LL3,LL4,LL5,LL6,LL7,LL8,LL9,LL10,
1 YRD,TXR,DMW,VOL,PLT,YRS,W,C,BND,RRE,RRB,RRW,RRV,NY,SSH,SREP,
2 SPLU,P,BOT,TOF
C
C      WEX = 0.0
C      WRX = D(11)
C
C      DO 4 M=1,NY
C      EB(M)=CURA(M)+CFAB(M)+CREP(M)+TEH(M)-CPLU(M)
C      EFU(M)=EB(M)-TEH(M)
C      ELM(M)=TEH(M)
C      U(M)=PFW(M)*D(M)*1000.*24.*365.
C      Z(M)=U(M)*1.0E-09
C      WRX=WRX+EFU(M)
4 WEX=WEX+PFW(M)
C      DO 3 M=1,NY
3 EP(M)=WRX*PFW(M)/WEX
C      RETURN
C      END
EXP 020
EXP 022
PCO 060
PCO 070
PCO 080
PCO 081
PCO 082
PCO 083
PCO 084
PCO 085
PCO 086
PCO 087
PCO 088
PCO 090
EXP 100
EXP 110

SUBROUTINE FACTRS
C
C      COMMON FOR POWERCO PROGRAM
COMMON /PCO/EEE(180),TAA(180),TAB(180),TAC(180),TAD(180),
1 TAE(180),TAG(180),TEH(180),TEG(180),TAJ(180),TAK(180),TAL(180),
2 TAM(180),TEA(180),TEB(180),TEE(180),CFAB(180),CURA(180),U(180),
3 CSHP(180),CREP(180),CPLU(180),PFW(180),DES(8),EB(180),EFU(180),
4 EDU(180),EP(180),WPY(180),SYD(180),BRP(180),PwV(180),Z(180),
5 ELM(180),PWE(180),XEP(180),XEPW(180),XTU(180),XTUW(180)
COMMON /DTBL/D(35),LL1,LL2,LL3,LL4,LL5,LL6,LL7,LL8,LL9,LL10,
1 YRD,TXR,DMW,VOL,PLT,YRS,W,C,BND,RRE,RRB,RRW,RRV,NY,SSH,SREP,
2 SPLU,P,BOT,TOF
C
C      RRW=BND*RRB+(1.-BND)*RRE
3 RRV=BND*RRB*(1.-TXR)+(1.-BND)*RRE
30 PWE(1)=1./(1.+RRE)
10 PwV(1)=1./(1.+RRV)
C      DO 11 N=2,NY
C      PWE(N)=PWE(1)*PWE(N-1)
11 PwV(N)=PwV(1)*PwV(N-1)
C      RETURN
C      END
FAC 020
PCO 060
PCO 070
PCO 080
PCO 081
PCO 082
PCO 083
PCO 084
PCO 085
PCO 086
PCO 087
PCO 088
PCO 090

```

```

SUBROUTINE FIXCHG
C
C      COMMON FOR POWERCO PROGRAM
C      INCLUDE COM2
C
C      DATA L1/6/
C      DIMENSION FUELC(7),FABC(7),REPC(7),PURC(7),RECC(7),WCC(7),
1      PLANTC(7),COREC(7),TOTAL(7)
C
C      SALCOR=CPLU(NY)-CPLU(NY-1)
C      XTUT = 0.0
C      XEPT = 0.0
C      XTAT = 0.0
C      XTALI=0.0
C      XTALP=0.0
C      FABI = 0.0
C      REPI = 0.0
C      PURI = 0.0
C      RECI = 0.0
C      FABI=0.0
C      REPT=0.0
C      PURT=0.0
C      RECT=0.0
C      PVFIX=0.0
C
C      WCI = 0.0
C      COREI=0.0
C      TAXEFC=0.0
C      TAXEP = 0.0
C      TAXSYD=0.0
C      TOTINS=0.0
C      PVLOAD=0.0
C      PVINS=0.0
C      IF (RRE-1.E-34) 10,10,11
10  FNYE=NY
C      GO TO 12
11  FNYE=(1.-PWE(NY))/RRE
12  IF (RRV-1.E-34) 13,13,14
13  VFV=NY
C      GO TO 15
14  VFV=(1.-PwV(NY))/RRV
15  WEX=0.0
C      POWER=0.0
C      TOTELM=0.0
C      TOTFIX=0.0
C      FABC=0.0
C      REPCS=0.0
C      PURCS=0.0
C      RECCS=SALCOR
C      DO 20 N=1,NY
C      WEX=WEX+PFE(N)
C      POWER=POWER+2(N)
C      TOTELM=TOTELM+ELM(N)
C      TOTFIX=TOTFIX+EEE(N)
C      FABC=FABC+CFAB(N)
C      REPCS=REPCS+CREP(N)
C      PURCS=PURCS+CPUR(N)
20  RECCS=RECCS-CPLU(N)
C      DO 19 N=1,NY
C      IF (LL1-1)30,32,30
30  ADZ=PWE(N)
C      GO TO 34
32  ADZ=PwV(N)
34  XTALI=XTALI+(1.-TXR)*TAU(N)*ADZ / (PLT+WCC+D(11))
C      XTALP=XTALP+TAL(N) *ADZ / (PLT+WCC+D(11))

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```

FIX 022
055
055
FIX 057
FIX 060
3/07/67R
3/07/67R
FIX 110
2/28/67R
FIX 120
FIX 130
FIX 140
2/10/67R
2/10/67R
2/09/67R
2/09/67R
2/09/67R
2/13/67R
2/13/67R
2/13/67R
2/13/67R
2/14/67R
2/06/67R
2/09/67R
3/16/67R
3/16/67R
3/07/67R
3/19/67R
3/19/67R
3/19/67R
3/19/67R
3/19/67R
3/19/67R
2/14/67R
2/06/67R
2/06/67R
2/06/67R
2/28/67R
2/06/67R
2/09/67R
2/14/67R
2/06/67R
2/06/67R
2/06/67R
2/06/67R
2/01/67R
2/01/67R
2/01/67R

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TAXEFU=TAXEFU+ADZ      *TXR*EFU(N)      2/01/67R
TAXEP =TAXEP -ADZ      *TXR*EP (N)      2/01/67R
TAXSYD=TAXSYD-ADZ      *TXR*SYD(N)      2/01/67R
XTAT=XTAT+ADZ*SYD(N)      2/01/67R
XEP(N)=ELM(N)+EP(N)
XEPW(N)=ADZ*XEP(N)
XEPT=XEPT+XEPW(N)
FABT=FABT+CFAB(N)*ADZ      2/13/67R
REPT=REPT+CREP(N)*ADZ      2/13/67R
PORT=PORT+CORA(N)*ADZ      2/13/67R
RECT=RECT-CPLU(N)*ADZ      2/13/67R
FABI =FABI +FABCS *PFW(N)/WEX*ADZ      2/09/67R
REPI =REPI +REPCS *PFW(N)/WEX*ADZ      2/09/67R
PURI =PURI +PURCS *PFW(N)/WEX*ADZ      2/09/67R
RECI =RECI +RECCS *PFW(N)/WEX*ADZ      2/09/67R
PVFIX=PVFIX+EEE(N)*ADZ      2/14/67R
WCI =WCI +ELM(N) *ADZ      2/09/67R
COREI =COREI+(D(11)-SALCCR)*PFW(N)/WEX*ADZ      2/28/67R
PVLOAD=PVLOAD+PFW(N)*ADZ      3/16/67R
PFWFAC=AMAX1(0.,AMIN1(1.,D(26)-FLOAT(N)+1))      3/31/67R
TOTINS=TOTINS+PFWFAC      3/16/67R
PVINS=PVINS+ADZ*PFWFAC      3/16/67R
XTU(N)=EFU(N)-EP(N)
XTUW(N)=ADZ*XTU(N)
19 XTUT=XTUT+XTUW(N)
FUELI=FABI+REPI+PURI+RECI      3/07/67R
XTAL=XTALI+XTALP      2/13/67R
PVSAL=SALCCR*ADZ      2/28/67R
RECT=RECT+PVSAL      2/28/67R
IF (LL1-1)36,38,36
36 FCRD=(1.-BND+XTAL-TXR*XTAT/PLT)/(FNYE*(1.-TXR))
FCRN=(1.-BND-PWE(NY)+XTAL)/(FNYE*(1.-TXR))
EXPW=XEPT/FNYE
FWC=(D(11)*(1.-BND)+XTUT+D(11)*XTAL)/(FCRN*(1.-TXR)*FNYE)      2/06/67R
PFW=BOT/FNYE*1.0E-9
PRTZ=TXR*XTAT/PLT
PNTZ=1.-BND+XTAL-PRTZ
GO TO 40
38 FCRD=(PLT-TXR*XTAT)/(PLT*(1.-TXR)*VFV)
FCRN=RRV/(1.-TXR)
EXPW=XEPT/VFV
IF (RRV-1.E-34) 24,24,25      3/19/67R
24 FWC=0.      3/19/67R
GO TO 26      3/19/67R
25 FWC=(D(11)+XTUT)/(RRV*VFV)      3/19/67R
26 PFW=BOT/VFV*1.0E-9      3/19/67R
XTAL=BND      2/01/67R
XTALP=XTAL-XTALI      2/01/67R
40 PRTZ=TXR*XTAT/PLT
TERM1=FCRD*PLT
TERM2=FCRN*WC
TERM3=FCRN*FWC
TERM4 = EXPW
A=TERM1+TERM2+TERM3+TERM4
F=A/PFW      2/06/67R
SPLU = A      FIX 330
DELA=(PLT-D(12))*FCRD +(WC-D(13))*FCRN
ACHK=A-DELA
WRITE(L1,510)
WRITE(L1,800)(DES(I),I=1,8)
WRITE(L1,512)FCRD
WRITE(L1,513)FCRN
WRITE(L1,515)A      2/01/67R
IF ((LL1 .EQ. 1) .AND. (RRV .LE. 0.0)) GO TO 43      3/29/67R
IF ((LL1 .GT. 1) .AND. (RRV .LE. 0.0)) GO TO 43      3/29/67R

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WRITE(L1,514)FWC
43 FACTOR=1.0E+9/((1.-TXR)*BOT)
PCSTAX=1.0E+9/BOT
WCC(1)=TOTEL/PPOWER
WCC(2)=WCC(1)
WCC(3)=(1.-BND-ADZ)*WC*PCSTAX+WC*PCSTAX-WCC(2)
WCC(4)=XTALI*WC*FACTOR
WCC(5)=XTALP*WC*PCSTAX
WCC(6)=TXR*(1.-BND-ADZ+XTALP)*WC*FACTOR
WCC(7)=FCRN*WC/PPW+WC*PCSTAX
FABC(1)=FABC/PPOWER
REPC(1)=REPC/PPOWER
PURC(1)=PURC/PPOWER
RECC(1)=RECC/PPOWER
FABC(2)=FABC(1)
REPC(2)=REPC(1)
PURC(2)=PURC(1)
RECC(2)=RECC(1)
FABC(3)=FABC(2)*FACTOR
REPC(3)=REPC(2)*FACTOR
PURC(3)=PURC(2)*FACTOR
RECC(3)=RECC(2)*FACTOR
FABC(4)=0.0
REPC(4)=0.0
PURC(4)=0.0
RECC(4)=0.0
FABC(5)=0.0
REPC(5)=0.0
PURC(5)=0.0
RECC(5)=0.0
FABC(6)=TXR*(FABC-FABI)*FACTOR
REPC(6)=TXR*(REPC-REPI)*FACTOR
PURC(6)=TXR*(PURC-PURI)*FACTOR
RECC(6)=TXR*(RECC-RECI)*FACTOR
FABC(7)=(FABC-FABI)*TXR*FACTOR
REPC(7)=(REPC-REPI)*TXR*FACTOR
PURC(7)=(PURC-PURI)*TXR*FACTOR
RECC(7)=(RECC-RECI)*TXR*FACTOR
DO 44 I=1,7
44 FUEL(I)=FABC(I)+REPC(I)+PURC(I)+RECC(I)
PLANTC(1)=PLT/PPOWER
PLANTC(2)=PLANTC(1)*(1.-BND)
PLANTC(3)=(1.-BND)*PLT*PCSTAX-PLANTC(2)
PLANTC(4)=XTALI*PLT*FACTOR
PLANTC(5)=XTALP*PLT*PCSTAX
PLANTC(6)=TXR*((1.-BND)*PLT+XTALP*PLT-XTAT)*FACTOR
PLANTC(7)=FCRD*PLT/PPW
COREC(1)=(D(11)-SALCOR)/POWER
COREC(2)=(1.-BND)*D(11)-PVSAL*PCSTAX-COREC(1)
COREC(3)=(1.-BND)*D(11)-PVSAL*PCSTAX-COREC(2)
COREC(4)=XTALI*D(11)*FACTOR
COREC(5)=XTALP*D(11)*PCSTAX
COREC(6)=TXR*((1.-BND)*D(11)-PVSAL+XTALP*D(11)-COREC(1))*FACTOR
COREC(7)=(1.-BND)*D(11)-PVSAL+XTALP*D(11)-TXR*COREC(1)*FACTOR
DO 47 I=1,7
47 TOTAL(I)=WCC(I)+FUEL(I)+PLANTC(I)+COREC(I)
WRITE(L1,801)
WRITE(L1,800) (DES(I), I=1,8)
WRITE(L1,516) P
IF (BND-.99995) 51,52,52
51 WRITE(L1,1000)
GO TO 53
52 WRITE(L1,1001)
53 WRITE(L1,800) PLANTC
WRITE(L1,800) COREC

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C   (ALL FINAL RECOVERY OF WC AND TAX GO TO EQUITY, NONE TO BONDS. 3/29/67R
C   COREC(3) AND ACC(3) MAY BE NEGATIVE) 3/29/67R
WRITE(L1,807) ACC 2/10/67R
WRITE(L1,802) FUEL 2/10/67R
WRITE(L1,803) FARC 2/10/67R
WRITE(L1,804) REPC 2/10/67R
WRITE(L1,805) PORC 2/10/67R
WRITE(L1,806) RECC 2/10/67R
WRITE(L1,810) TOTAL 2/09/67R
C   P.O. WITH ALL FINANCING CHARGES, PROFITS, AND INCOME TAX IN FIN 3/29/67R
DEPCAP=PLANTC(2)+PLANTC(5) 3/29/67R
GROUND=0.0 3/29/67R
FIXOP=(TOTFIX-D(20)*TOTINS)/POWER 3/31/67R
AETNA=(D(20)*TOTINS+D(21)*EX)/POWER 3/31/67R
FUEL=FUEL(2)+FUEL(5)+COREC(2)+COREC(5) 3/29/67R
CANDM=ACC(2)+ACC(5)-FIXOP-AETNA-GROUND 3/29/67R
FIN=TOTAL(3)+TOTAL(4)+TOTAL(6) 3/29/67R
FIX=DEPCAP+GROUND+FIXOP+AETNA 2/28/67R
OPCOST=FUEL+CANDM 2/28/67R
WRITE(L1,900) 1/31/67R
WRITE(L1,900) (DES(I),I=1,8) 1/31/67R
WRITE(L1,901) P 1/31/67R
WRITE(L1,901) FIX 1/31/67R
WRITE(L1,902) DEPCAP 1/31/67R
WRITE(L1,903) GROUND 1/31/67R
WRITE(L1,904) FIXOP 3/31/67R
WRITE(L1,905) AETNA 1/31/67R
WRITE(L1,906) OPCOST 1/31/67R
WRITE(L1,907) FUEL 1/31/67R
WRITE(L1,908) CANDM 3/31/67R
WRITE(L1,909) FIN 3/31/67R
C   P.O. WITH FUEL, CORE, AND RESIDUAL AC FINANCING AND TAXES ONLY 3/29/67R
C   TO WORKAP, OPERATING COSTS WITHOUT FINANCING TO CANDM, 3/29/67R
C   INCOME TAXES WITH ASSOCIATED FINANCING (EXCEPT FOR AETNA, TAXES) 4/12/67R
DEPCAP=PLANTC(7) 3/29/67R
GROUND=D(23)*(1-BND-ADZ+XTAL)*FACTOR 4/12/67R
AETNA=(D(20)*FVINS+D(21)*FVLCAD)*POSTAX 4/11/67R
TAXES=D(22)*FVINS*POSTAX 4/11/67R
CANDM=ACC(1)-(D(20)+D(22))*TOTINS+D(21)*EX/POWER 3/31/67R
FUEL=FUEL(2)+FUEL(5)+COREC(2)+COREC(5) 3/09/67R
WORKAP=FUEL(3)+FUEL(4)+FUEL(6)+COREC(3)+COREC(4)+COREC(6) 3/29/67R
1 + (WC-D(23))*(1-BND-ADZ+XTAL)*FACTOR 4/12/67R
2 + WC1*POSTAX-AETNA-CANDM-TAXES 3/31/67R
FIX=DEPCAP+GROUND+WORKAP+AETNA+TAXES 3/31/67R
OPCOST=FUEL+CANDM 3/07/67R
WRITE(L1,910) 3/07/67R
WRITE(L1,900) (DES(I),I=1,8) 3/07/67R
WRITE(L1,901) P 3/07/67R
WRITE(L1,901) FIX 3/07/67R
WRITE(L1,902) DEPCAP 3/07/67R
WRITE(L1,903) GROUND 3/07/67R
WRITE(L1,911) WORKAP 3/07/67R
WRITE(L1,905) AETNA 3/07/67R
WRITE(L1,913) TAXES 3/31/67R
WRITE(L1,906) OPCOST 3/07/67R
WRITE(L1,912) FUEL 3/07/67R
WRITE(L1,908) CANDM 3/07/67R
C   OUTPUT FORMATS
C   510 FORMAT(26H1FIXED CHARGE CALCULATIONS/)
510 FORMAT(26H1FIXED CHARGE CALCULATIONS/)
512 FORMAT(41H0FIXED CHARGE RATE ON DEPRECIABLE CAPITAL, F14.4)
513 FORMAT(41H0FIXED CHG RATE ON NONDEPRECIABLE CAPITAL, F14.4)
514 FORMAT(41H0FUEL WORKING CAPITAL, SM, F14.4)
515 FORMAT(41H0CONSTANT ANNUAL INCOME REQUIRED, SM, F14.4)
516 FORMAT(1H0/24H0POWER COST, MILLS/KWH, 9X,F14.4/1H0)
800 FORMAT(27H0PROBLEM IDENTIFICATION, 9A6/)

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801 FORMAT(26H1COST OF POWER CALCULATION,75X,19HFUEL CYCLE ANALYSIS) 1/30/67R
802 FORMAT (1H0,4X,16HFUEL CYCLE COSTS,26X, 2/13/67R
      1 F8,4,8X,5F9,4,F12,4) 3/07/67R
803 FORMAT (1H0,7X,11HFABRICATION,28X, 2/13/67R
      1 F8,4,8X,5F9,4,F12,4) 3/07/67R
804 FORMAT (      8X,12HREPROCESSING,27X, 2/13/67R
      1 F8,4,8X,5F9,4,F12,4) 3/07/67R
805 FORMAT (      8X,14HFUEL PURCHASES,25X, 2/13/67R
      1 F8,4,8X,5F9,4,F12,4) 3/07/67R
806 FORMAT (      8X,11HFUEL CREDIT,28X, 2/13/67R
      1 F8,4,8X,5F9,4,F12,4) 3/07/67R
807 FORMAT (1H0,4X,31HOPERATING AND MAINTENANCE COSTS,11X, 2/13/67R
      1 F8,4,8X,5F9,4,F12,4) 3/07/67R
808 FORMAT (1H0,4X,18HPLANT DEPRECIATION,24X, 2/13/67R
      1 F8,4,8X,5F9,4,F12,4) 3/07/67R
809 FORMAT (1H0,4X,32HINITIAL CORE BURNUP ,10X, 2/28/67R
      1 F8,4,8X,5F9,4,F12,4) 3/07/67R
810 FORMAT (1H0,5X,5HTOTAL,37X, 2/13/67R
      1 F8,4,8X,5F9,4,F12,4) 3/07/67R
900 FORMAT(26H1COST OF POWER CALCULATION,78X,16HUTILITY ANALYSIS) 1/31/67R
901 FORMAT(1H0,4X,13HFIXED CHARGES,34X, F14,4)1/31/67R
902 FORMAT(1H0,7X,19HDEPRECIABLE CAPITAL,30X, F14,4)1/26/67R
903 FORMAT(      8X,20HLAND AND LAND RIGHTS,29X, F14,4)1/26/67R
904 FORMAT(      8X,25HOPERATION AND MAINTENANCE,24X, F14,4)3/31/67R
905 FORMAT(      8X,17HNUCLEAR LIABILITY,32X, F14,4)1/26/67R
906 FORMAT(1H0,4X,15HOPERATING COSTS,32X, F14,4)1/31/67R
907 FORMAT(1H0,7X,12HNUCLEAR FUEL,37X, F14,4)2/06/67R
908 FORMAT(      8X,37HOPERATION, MAINTENANCE, AND INSURANCE,12X F14,4)3/31/67R
909 FORMAT(1H0,4X,32HFINANCING CHARGES AND INCOME TAX,15X, F14,4)3/31/67R
910 FORMAT(26H1COST OF POWER CALCULATION,71X,23HSITE ECONOMICS ANALYSIS)4/04/67R
      1S) 4/04/67R
911 FORMAT(      8X,15HWORKING CAPITAL,34X, F14,4)3/07/67R
912 FORMAT(1H0,7X,4HFUEL,45X, F14,4)3/07/67R
913 FORMAT(      8X,21HSTATE AND LOCAL TAXES, 28X, F14,4)4/03/67R
1000 FORMAT (1H0,46X,73H CASH CASH TO EQUITY BOND 3/07/67R
      1BONDS INCOME TOTAL/ 3/16/67R
      2 47X,73H PER KWH EQUITY RETURN INTEREST 3/07/67R
      3EPAYD TAX ) 3/16/67R
1001 FORMAT (1H0,46X,73H CASH SUP-BONDS SUP-BOND BOND 3/07/67R
      1BONDS INCOME TOTAL/ 3/21/67R
      2 47X,73H PER KWH REPAYD INTEREST INTEREST R3/07/67R
      3EPAYD TAX ) 3/21/67R
      RETURN
      END
      SUBROUTINE INTAP(DRUM,TAPE)
      COMMON ICMN(20),YCMN(80),B(4400)
      CALL NTRAN(DRUM,10)
      CALL NTRAN(TAPE,10)
      DO 80 I=1,101
      CALL NTRAN(TAPE,2,4400,B,UT)
      10 IF(JT+1)12,10,50
      12 IF(JT+2)900,500,900
      50 CALL NTRAN(DRUM,1, JT,B,UD)
      52 IF(JD+1)950,52,80
      80 CONTINUE
      GO TO 980
500 CALL NTRAN(TAPE,22)
      RETURN

```

```

900 PRINT 1050,DRUM,TAPE,I,JT
905 CALL SLITE(5)
    GO TO 500
950 PRINT 1000,DRUM,TAPE,I,JD
    GO TO 905
980 PRINT 1080,DRUM,TAPE
    GO TO 905
1000 FORMAT(24H0SUBR. INTAP DRUM ERROR/6X,5H0RUM=,I3,8H TAPE=,I3,
1 5H I=,I3,6H JD=,I4)
1050 FORMAT(24H0SUBR. INTAP TAPE ERROR/6X,5H0RUM=,I3,8H TAPE=,I3,
1 5H I=,I3,6H JT=,I4)
1080 FORMAT(40H0SUBR. INTAP ERROR. NO END OF TAPE-FILE/
1 6X,5H0RUM=,I3,8H TAPE=,I3)
    END

```

```

SUBROUTINE INPUT
C
C      COMMON FOR PACTOLUS AND POWERCO PROGRAMS
C      INCLUDE COM1
C      INCLUDE COM2
C
C      DATA LI,BLNX/5,1H /
C
C      LTR = 6
1 READ(LI,401)LL1,LL2,LL3,LL4,LL5,LL6,LL7,LL8,
1LL9,LL10,(DES(I),I=1,8)
IF(LL3=1) 150,90,200
90 IF(LL4)97,97,92
92 HOLD02=D(20)+D(22)
HOLD21=D(21)
HOLD26=D(26)
DO 89 N=1,LL4
READ(LI,404)J,D(J)
IF ((J.LE. 0) .OR. (J.GT. 35)) GO TO 130
IF (J= 8) 89,87,79
79 IF (J=10) 89,88,80
80 IF (J=20) 89,82,81
81 IF (J=22) 87,82,84
82 DO 83 I=1,NY
83 EEE(I)=EEE(I)-HOLD02*AMAX1(0.,AMIN1(1.,D(26)-FLOAT(I)+1))
1 + (D(20)+D(22))*AMAX1(0.,AMIN1(1., D(26)-FLOAT(I)+1))
HOLD02=D(20)+D(22)
GO TO 89
84 IF (N=26) 89,85,89
85 DO 86 I=1,NY
86 EEE(I)=EEE(I)-(D(20)+D(22))*AMAX1(0.,AMIN1(1.,HOLD26-FLOAT(I)+1))
1 + (D(20)+D(22))*AMAX1(0.,AMIN1(1., D(26)-FLOAT(I)+1))
GO TO 89
87 D(21)=D(21)*D(8)
D(10)=D(10)-HOLD21
88 D(10)=D(10)+D(21)
89 CONTINUE
IF (LL5.LE.0) GO TO 200
97 DO 120 N=1,LL5
READ(LI,405)M,K,AD
IF ((M.LE. 0) .OR. (M.GT. 180)) GO TO 131
GO TO (101,102,103,104,105,106,107),K

```

```

INP 030
040
050
055
INP 059
INP 060
INP 070
INP 075
INP 080
3/31/67R
3/31/67R
3/31/67R
3/19/67R
3/19/67R
4/04/67R
3/24/67R
3/24/67R
3/31/67R
3/31/67R
3/19/67R
3/31/67R
3/31/67R
3/19/67R
3/31/67R
3/31/67R
3/31/67R
3/19/67R
3/31/67R
3/31/67R
3/31/67R
3/31/67R
3/19/67R
INP 095
INP 098
4/04/67R

```

101 PFW (M) = AD	INP 101
GO TO 120	INP 101
102 CURA(M) = AD	INP 102
GO TO 120	INP 102
103 CFAB(M) = AD	INP 103
GO TO 120	INP 103
104 CREP(M) = AD	INP 104
GO TO 120	INP 104
105 CPLU(M) = AD	INP 105
GO TO 120	INP 105
106 EEE(K)=AD+(D(20)+D(22))*AMAX1(0.,AMIN1(1.,D(26)-FLOAT(K)+1))	3/31/67R
GO TO 120	INP 106
107 BRP(K)=AD	
120 CONTINUE	INP 120
GO TO 200	INP 130
130 WRITE (6,406) D(J),J	4/04/67R
GO TO 89	4/04/67R
131 WRITE (6,406) AD,M	4/04/67R
GO TO 120	4/04/67R
C	INP 140
150 READ(LI,402) (D(N),N=1,35)	INP 150
D(21)=D(21)*D(8)	3/31/67R
D(10)=D(10)+D(21)	3/31/67R
IF (D(26)) 95,95,96	3/31/67R
95 D(26)=D(2)	3/31/67R
96 NY=D(2)+0.999	2/01/67R
DO 170 K = 1,NY	INP 165
READ(LI,402)PFW(K),CURA(K),CFAB(K),CREP(K),CPLU(K),EEE(K),BRP(K)	2/01/67R
PFWFAC=AMAX1(0.,AMIN1(1.,D(26)-FLOAT(K)+1))	3/31/67R
170 EEE(K)=EEE(K)+(D(20)+D(22))*PFWFAC	3/31/67R
C	INP 180
C ASSIGN VALUES FOR PAGE HEADING ROUTINE	INP 190
200 ADATE(1) = BLNK	INP 200
ADATE(2) = BLNK	INP 202
ADATE(3) = BLNK	INP 204
DO 250 I = 1,8	INP 240
250 AHDG(I) = DES(I)	INP 250
DO 270 I = 9,13	INP 260
270 AHDG(I) = BLNK	INP 270
C	INP 380
C INPUT FORMATS	INP 390
401 FORMAT(10I2,8A6)	
402 FORMAT(7E10.0)	
403 FORMAT(14,E16.0,5E10.0)	
404 FORMAT(14,E20.0)	
405 FORMAT(2I4,E12.0)	
406 FORMAT(22H0***** A VALUE OF, 1PE14.5,49H HAS BEEN ENTERED ER	4/04/67R
1RONEOUSLY WITH A SUBSCRIPT OF, I6)	4/04/67R
C	INP 450
RETURN	INP 900
END	


```

SUBROUTINE OUTPUT(RED,RAD)
C                                     OUT 022
C             COMMON FOR POWERCO PROGRAM      055
C             INCLUDE CORR2                   055
C                                     PCC 090
C             DATA LTR/6/
C                                     OUT 040
C             DATA L1/6/                   OUT 060
C             IF (RAD) 400,20,399           1/26/67R
20 WRITE(L1,505)
   WRITE(L1,600) (DES(I),I=1,8)
   WRITE(LTR,541) NY                        2/06/67R
   INITYR=L(14)-0.99                      2/14/67R
   DO 16 N = 1,NY                          OUT 180
   NOWYR=INITYR+N                          1/26/67R
16 WRITE(L1,543)N,NOWYR,Z(N),EB(N),ELM(N),EP(N),SYD(N),TAU(N),TAC(N) 1/26/67R
   WRITE(L1,508)
   WRITE(L1,600) (DES(I),I=1,8)
   WRITE (LTR,544)
   IF (LL1,EG,1) GO TO 14                  OUT 220
12 DO 13 N=1,NY                            OUT 240
   NOWYR=INITYR+N                          1/26/67R
13 WRITE(L1,543)N,NOWYR,TAD(N),TAC(N),TEB(N),TEA(N),TES(N),PWE(N),
   1TAE(N)                                1/26/67R
   GO TO 400                              1/26/67R
14 DO 17 N=1,NY                            OUT 290
   NOWYR=INITYR+N                          1/26/67R
17 WRITE(L1,543)N,NOWYR,TAD(N),TAC(N),TEB(N),TEA(N),TES(N),PwV(N),
   1TAE(N)                                1/26/67R
   GO TO 400                              1/26/67R
399 WRITE(LTR,507)                         1/26/67R
   GO TO 401                              1/26/67R
400 WRITE (LTR,506)                         OUT 400
401 WRITE(LTR,600) (DES(I),I=1,8)           1/31/67R
   IF (RAD) 402,403,402                    1/26/67R
402 WRITE(LTR,547)                         1/26/67R
403 IF (BNC-.99995) 405,404,404           3/07/67R
404 WRITE(LTR,545)                         3/07/67R
   GO TO 400                              3/07/67R
405 WRITE(LTR,546)                         3/07/67R
406 DO 18 N=1,NY                          3/07/67R
   NOWYR=INITYR+N                          1/26/67R
18 WRITE(L1,543)N,NOWYR,TAA(N),TAB(N),TAG(N),TAU(N),TAK(N),TAL(N),
   1TAM(N)                                1/26/67R
C                                     OUT 490
C             OUTPUT FORMATS              OUT 495
505 FORMAT(30H1CASH EXPENSES BEFORE INCOME TAX, $M//) 1/26/67R
506 FORMAT(20H1PAYOUT OF INVESTMENTS, $M//)          2/06/67R
507 FORMAT(30H1LEVELIZED PAYOUT OF INVESTMENTS, $M//) 2/06/67R
508 FORMAT(30H1CALCULATION OF INCOME TAX, $M//)       1/26/67R
541 FORMAT(1H0,12X,5HPower,10X,5HTOTAL,8X,8HNON-FUEL,7X,8HPRORATED,
   136X,10HTOTAL TAX/19X,5HUNITS,8X,8HEXPENSES,6X,9HOPERATING,5X,13, 2/06/67R
   28H YR FUEL,23X,4HBOND,8X,10HDEDUCTIBLE/6X,4HYEAR,8X,7H(M MWF),6X, 2/06/67R
   310HBFORE TAX,6X,8HEXPENSES,7X,8HEXPENSES,5X,12HDEPRECIATION,5X, 2/06/67R
   48HINTEREST,7X,8HEXPENSES/)              2/06/67R
543 FORMAT(1X,13,16,7F15.5)                1/26/67R
544 FORMAT(1H0,18X,5HTOTAL,7X,10HTOTAL TAX,38X,5HTOTAL,10X,7HPRESENT,1/26/67R
   17X,8HNON-FUEL/19X,5HPower,7X,10HDEDUCTIBLE,7X,7HTAXABLE,9X,6HINCOM1/26/67R
   2E,7X,8HEXPENSES,10X,5HWORKTH,6X,12HWORK CAPITAL/6X,4HYEAR,9X,5HSALE1/26/67R
   3S,8X,8HEXPENSES,9X,6HINCOME,11X,3HTAX,8X,8HINCL TAX,9X,6HFACTOR,8X1/26/67R
   4,8HRECOVERY/)                          1/26/67R
545 FORMAT(1H+,117H                          OUTSTANDING 3/07/67R

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1      SUPPLEMENTARY SUPPLEMENTARY3/07/67R
2 /      114H      OUTSTANDING SUPPLEMENTARY TOT3/07/67R
3AL      BOND      BOND      BONDS      BONDS / 3/07/67R
4      114H      YEAR      BONDS      BONDS      INCO3/07/67R
5ME      INTEREST      INTEREST      REPAID      REPAID /3/07/67R
546 FORMAT(1H+,114H      EQUITY      3/07/67R
1      EARNINGS      RECOVERY / 3/07/67R
2      114H      OUTSTANDING      CAPITAL      TOT3/07/67R
3AL      BOND      ON UNRECOVERED      BONDS      OF / 3/07/67R
4      114H      YEAR      BONDS      NOT RECOVERED      INCO3/07/67R
5ME      INTEREST      EQUITY      REPAID      EQUITY /3/07/67R
547 FORMAT(1H+,40X,9HLEVELIZED)      1/30/67R
600 FORMAT (27H PROBLEM IDENTIFICATION ,8A6///)      2/06/67R
C      IF (RAD) 99,99,97      OUT 890
97 IF (LL9) 98,99,98      3/22/67R
98 CALL POWERCO      3/22/67R
99 RETURN      2/21/67R
END      2/21/67R

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```

SUBROUTINE PAYOUT(REQ,RAD)
C
C      COMMON FOR POWERCO PROGRAM
C      COMMON /PCU/EEB(180),TAA(180),TAB(180),TAC(180),TAL(180),
1 TAE(180),TAG(180),TEH(180),TEG(180),TAJ(180),TAK(180),TAL(180),
2 TAM(180),TEA(180),TEB(180),TEE(180),CFAP(180),CURA(180),U(180),
3 CSHP(180),CREP(180),CPLU(180),PFW(180),DES(8),EB(180),EFU(180),
4 EDU(180),EP(180),EPY(180),SYD(180),BRP(180),PAW(180),Z(180),
5 ELM(180),PNE(180),XEP(180),XEPN(180),XTU(180),XTUN(180)
C      COMMON /DTBL/D(35),LL1,LL2,LL3,LL4,LL5,LL6,LL7,LL8,LL9,LL10,
1 YRD,TXR,DMW,VOU,PLT,YRS,XC,END,RRE,RRE,PRW,RRY,NY,SSH,SREP,
2 SPLU,P,BOT,TOP
C
DO 16 N=1,NY
TAE(N)=0.

TAD(N)=REQ*(U(N)*P*1.0E-09)+RAD*SPLU
16 TAG(N)=TAD(N)
TAG(NY)=TAG(NY)+XC
TAE(NY)=XC
DO 17 N=1,NY
TAJ(N)=TAA(N)*RRD
TAK(N)=TAB(N)*RRE
TAC(N)=TEH(N)+EP(N)+SYD(N)+TAJ(N)
TEB(N)=TAD(N)-TAC(N)
TEA(N)=TEB(N)*TXR
TEG(N)=EB(N)+TEA(N)
IF (LL1-1) 15,12,15
12 TAL(N)=BND*(TAG(N)-TEG(N)-TAJ(N)-TAK(N))
TAA(N+1)=TAA(N)-TAL(N)
15 TAJ(N)=TAG(N)-TEG(N)-TAJ(N)-TAK(N)-TAL(N)
17 TAB(N+1)=TAB(N)-TAM(N)
RETURN
END

```

C	POWERCO PROGRAM -- TO GENERATE TABLES OF COSTS AND EXPENSES	PCO 010
	SUBROUTINE PARCO	PCO 020
C		PCO 030
C		PCO 180
	CALL DATABK	PCO 300
	CALL FACIRS	
	CALL DEPREC	PCO 320
	CALL EXPENS	
	CALL BONOPY	PCO 360
	CALL COSTEQ	PCO 380
	CALL PAYOUT(1,,0,)	
	CALL OUTPUT(1,,0,)	
	CALL FIXCHG	
	CALL PAYOUT(0,,1,)	
	CALL OUTPUT(0,,1,)	
	RETURN	PCO 900
	END	

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