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USER MANUAL FOR THE FINANCIAL MODEL

OF PETROLEUM RESERVOIR SYSTEM (FIMPER)

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1. SYSTEM DESCRIPTION

1.1 General

The Financial Model of a Petroleum Reservoir (FIMPER) System can be used to evaluate various petroleum prospects. It is written to run on an Hewlett Packard (HP) Series 1000 minicomputer and consists of two programs written in standard HP RTE FORTRAN IV and using standard HP routines.

1.2 System Philosophy

The financial model is programmed in two principal parts, a calculations program and a formatted output program. The calculations program is divided into a main control, input and modifications program with a subroutine for calculations control, and subroutines for royalty, operating expenses, taxes, loan balance and interest, and rate of return.

This program reads input data from a previously entered and stored data file and, if required, stores the calculated cash flow and other economic factors in an output file for further processing.

The program then allows some on-line modification of the initial data and recalculation by the financial model with subsequent saving of the cash flow data if desired.

The output program reads nominated cash flow files produced by the calculations program and produces a comparative report for a particular prospect.

2. FINANCIAL MODEL PROGRAM (BMRI1)

2.1 Scope

The program develops the cash flow forecast of the field over a period of 30 years after the year of discovery or until it starts to return a negative cash flow if this is less than 30 years.

The DCF ROR over the life of the field together with recoverable reserves and present worths at 10%, 15% and 20% are also determined.

Current Australian tax requirements and allowances are assumed.

2.2 Model Features

The program incorporates the following features:

(A) Physical data for the reservoir (Lines 1 to 12 of data input).

Most of this data is used for reference purposes only and is generally not used by the program in any calculations. It includes such things as well depth, pay thickness, porosity.

(B) Production profile (Lines 13 to 18 of data input).

The production rate of a petroleum resource is a function of the physical parameters of the reservoir and the development schedule for drilling wells and installing other necessary facilities. There are two ways to establish production rates in the model.

The user specifies initial production year determined by the time after discovery necessary to complete field delineation wells, development wells, production facilities, and a method to deliver the resource to market.

Annual production rates can then be generated by the program based on the specified per well production rate. In the early years of production, field development may still be continuing, therefore the production rate during the initial years of production is specified by the numbers of wells in operation during these years. Production decline after the initial

period is then determined by specifying the first year and annual percentage decline rate for either one or two different decline rates. Figure 1 is an illustration of a field production profile specified in this way.

Alternatively if the per well production rate is entered as zero in the program input the user can supply data for annual production for each year. This feature is useful where production rate is not expected to follow a regular pattern.

(C) Capital Investment data (Lines 19 to 21 of data input).

Australian law provides for deduction of depreciation and other allowances for investment in petroleum production. These deductions and allowances may be taken in the year they are incurred if the producer has income from other sources or they may be carried forward to offset future income. The program allows for either case by specifying an existing company - i.e. other income - or a new company - i.e. no other income.

Three principal categories of investment are involved and are treated in different ways.

Exploration expenditure which includes discovery well cost, geological and geophysical expense, and delineation well cost is deductible against petroleum income in the year incurred. If income from petroleum production is insufficient to take all of accumulated exploration expenditure in a year, the accumulated balance can be carried forward indefinitely.

Capital expenditure for pipelines, terminals, and other oil movement facilities can be depreciated on a straight line basis over either ten or twenty years. A seven-year loss carry-forward limitation applies after the start of income if this depreciation yields a negative taxable income. Ten years is used as basis in the program to maximize early cash income by deferring taxable income to a later date. This depreciation is taken first by the model due to the time limitation.

The largest investment is generally for production facilities which include:

a. Petroleum drilling plant which includes offshore platforms and cost of wells except for discovery and appraisal drilling.

b. Pumping equipment and gas/oil separators at wellhead.

c. Gathering lines and field storage tanks.

Until 1986 these facilities are subject to a 20% investment allowance in addition to a full writedown of investment. The investment allowance can be carried forward for seven years.

Production facilities can be written down for tax purposes on a five year declining balance basis. Twenty percent of the remaining balance can be written off each year with a switch to a straight line depreciation permitted during the last five years of operation. If the amount permitted is greater than remaining taxable income after other allowances, only enough is taken to make taxable income zero.

(D) Operating expense data (Lines 22 to 24 of data input).

Operating expenses for the production of petroleum generally fall into the categories of maintaining facilities and paying the salaries of operating personnel, maintenance and monitoring of wells and production facilities, operating materials, fuel, chemicals, and home office expenses required to support field operations.

The model accepts expense assumptions based on a fixed annual expense or on a rate variable with production rate or number of wells in operation or on a combination of them. After a base operating budget for a particular prospective field has been developed variations in expenses for other conditions are easily prepared for input to the model.

Home office expense is determined by the required skills and numbers of individuals required to support field operations. A basic home office contingent with specific additions for multi-field operations can usually support more than one field operation, therefore a fraction of a full home office budget should be assigned to a prospective field development. The annual cost is input as a single number representing thousands of dollars of home office or general and administration expense.

Additional provision is made for injection expenses required for secondary recovery on a fixed annual basis and/or per unit of production.

(E) Revenue (Line 25 of data input).

Annual revenues are calculated using the average daily production rates generated by the production profile times 365 times the unit price of the resource.

A single unit price can be specified for the life of the field. Alternatively, the price each year of production can be entered.

(F) Government Requirements

Royalties (Lines 26 and 27 of data input).

Royalty payable on petroleum produced onshore in Australia is under State Government jurisdiction. Royalty rates are summarized in the following:

New South Wales -	10% of wellhead value. Rate after renewal of lease is variable at Ministerial discretion.
Queensland -	10% of wellhead value.
South Australia -	10% of wellhead value.
Tasmania -	10% of wellhead value after first 227 kilolitres.
Victoria -	10% of value of petroleum produced. No royalty when average production per well is less than 15.9 kilolitres/day.
Western Australia -	10% of wellhead value while testing.
Primary license -	10% of wellhead value.
Secondary license -	10% to 12-1/2% as determined by Minister.
During initial term -	5% to 12-1/2% as determined by Minister.
Northern Territory -	10% of wellhead value.

Royalty on petroleum produced offshore is 10% of wellhead value on primary license and 11% to 12-1/2% on secondary license as determined by the Minister.

Generally, costs for surface processing and transporation by the producer are deductible from royalty basis. For instance, an offshore gas field where the gas is sold f.o.b. pipeline ashore would incur royalty based on the sale price less amortization of pipeline to shore, offshore processing facilities, and a portion of production platform investment. Amortization is taken over 20 years or linearly against reserves.

To allow for this, a wellhead price adjustment has been provided to bring the sale price down to the wellhead price. Royalties are then calculated on the wellhead price.

Taxation (Line 28 of data input).

Corporate income tax is levied at 46% of taxable income. Taxable income is defined as field revenue less royalty less operating expenses less exploration expenditure less oil movement facility depreciation less investment allowance less production facility depreciation.

Cash flow is net income plus non-cash deductions from taxable income less capital investment in any given year. It is calculated in the program as field revenue less operating cost, royalties, and income taxes less capital expenditure for any given year.

The tax rate is a data input item and may be varied.

The last year for investment allowance and the rate (Line 29 of data input) have been provided for as data.

(G) Financing data (Lines 30 and 31 of data input).

The program can look at the operator's financing of the development and the effect of interest payments on the DCF ROR.

2.3 Input Data Preparation

The data for each base case is stored in a standard ASCII file on disc in free format. The file name should be "Innnn" where nnnn is the base case number. The contents of the field are:

PART A - Line 1 through 12 contain basic field data.

Line 1 - Field description. This may consist of any printable ASCII characters to a maximum of 80.

Line 2 - Base case number. This is the reference number for each base case and is the basis for storing and retrieving data. There should be a unique number for each case. It should consist of 4 digits.

Line 3 - Extract. This line should contain only the words "OIL" or "GAS".

Line 4 - State code. This is a reference code only at this stage. For onshore fields, it should be the first digit of the post code for the area, i.e. 1 for ACT, 2 for NSW, 3 for VIC, 4 for QLD, 5 for SA, 6 for WA, 7 for TAS, 8 for NT.
For offshore fields, the code should be 9.

Line 5 - Water depth (metres). If onshore, enter 0.

Line 6 - Well depth (metres).

Line 7 - Porosity (%).

Line 8 - Permeability (mD).

Line 9 - Pay thickness (metres)

Line 10 - Pressure (MPa).

Line 11 - Temperature (^{o}C).

Line 12 - Distance to terminal (kilometres).

Note - Lines 5 to 12 are reference values only and are not used in any calculations. They are merely passed through to the reporting program. If any of their values are unknown, enter a 0.

PART B - Lines 13 through 18 contain field production data.

Line 13 - Year of initial development.

Line 14 - Years to initial production. This is the number of years from but including the base year, as input in Line 13.

Line 15 - Maximum life of field (years). The program has been written with a maximum available period of 30 years. However, the user may want to reduce this.

Line 16 - Maximum per well production. The units are
kilolitres/day/well for Oil
cubic metres/day/well for Gas
If this value is set to zero, the annual rates of production may be input (see note at end of this part).

Line 17 - Well numbers during the first years of production up to and including the year of maximum production.

Line 18 - Start year and % rate of first decline, start year and % rate of second decline. 4 numbers should be input.

Note: Alternatively, Lines 17 and 18 may be replaced by a single line of input which contains the maximum rate of production for each year of field production. If this option is used, the rate of production in Line 16 should be set to zero.

PART C - Lines 19 through 21 contain capital investment data.

Line 19 - Investment and production equipment capital (Million $/yr). Data should be input for each year that this type of capital is expended. There is no need to put in data for every year of the field life if it is zero as the program assumes zero if not given.

Line 20 - Depreciable capital (Million $/yr). Data should be input for each year that this capital is expended. There is no need to put in data for every year of the field life if it is zero as the program assumes zero if not given.

Line 21 - Exploration capital (Million $/yr). There is no need to put in data for every year of the field life if it is zero as the program assumes zero if not given.

PART D - Lines 22 through 24 contain operating expenses.

Line 22 - Per well operating cost (thousand$/well/year).

Line 23 - Per unit of production operating costs ($/kl for Oil or $/cu.m for Gas).

Note: For lines 22 and 23, the last value entered is repeated to the life of the project, i.e. entering 651, 562 will result in the operating costs being set to 651, 562, 562....

Line 24 - Four values (Million $/year), being
(a) General administrative costs
(b) Per well administrative costs
(c) General injection costs
(d) Per well injection costs.

PART E - Revenue information.

Line 25 - Price of products ($/Bbl for Oil or $/MCF for Gas).
Enter one value if the price remains constant else enter a value for each year of the life of the field.

Line 26 - Amount to adjust price to get well head price for royalty calculations ($/Bbl for Oil or $/MCF for Gas).

PART F - Government requirements.

Line 27 - Royalty rate (%).

Line 28 - Tax rate (%).

Line 29 - Last year for investment allowance and the rate of the investment allowance (%) (currently 1986 and 20% respectively).

Line 30 - Company type - 1 is for an existing company, 0 is for a new company with no other income other than this project.

PART G - Financing consideration.

Line 31 - % of borrowed capital needed to finance the project.

Line 32 - Rate of interest on borrowed capital.

2.4 Base Data Modifications

After the program has processed a Base Case and produced DCF ROR and recoverable reserves results, it allows the user to modify some of the input data and reprocess. The data that can be modified is:

1. Royalty %
2. Taxation %
3. Taxation benefits available to company type
4. Prices
5. Annual production (Assumes number of wells remains constant and modifies per well production correspondingly).
6. Per well production (Modifies maximum production).
7. Number of producing wells (Modifies maximum production on a pro rata basis).

Data may be modified as much as desired. However, major variations to production data should be treated carefully as these should be re-examined with a possible variation to capital investment and to operating costs.

2.5 Run Instructions

Data should first be entered into a data file using the system EDITR. A blank file I0000 has been created to assist in this.

i.e.
```
:RU,EDITR
/SOURCE FILE
/0
EOF
/MI0000
/1
        .
        .
    enter data
        .
        .
/ECInnnn
END OF EDIT
:
```
where nnnn is the case number.

The program can then be run by entering:

```
:RU,BMRI1
```

A sample of a typical run session is given in Appendix 1.

2.6 Output Description

Program BMRI1 produces a report of the complete cash flow forecast for the field development, together with the physical field data and calculated financial factors. This can also be saved in a data file for passing to the reporting program BMRO1. A sample of this report is given in Appendix 3.

3. REPORT PROGRAM (BMR01)

3.1 Scope

The report program BMR01 produces a comparative report of a number of alternative financial models for either or both Gas or Oil for a particular prospect.

The program is completely interactive and uses data previously prepared by program BMRI1 and stored in output files. The program asks for each particular case to be analysed, opens and reads the data and displays some identifying information. The user then has the ability to accept or reject this data. When the data has been processed, the user is asked if there are any further cases to be considered. If so, the program requests the next case. If not, the report is printed comparing the cases.

3.2 Run Instructions

The program may be scheduled by entering

```
:RU,BMR01
```

A sample of a typical run session is given in Appendix 4.

3.3 Output Description

The first page of the report contains the physical data and the description.

For each case analysed, there is a one page summary report giving the production information, various financial factors, the DCF ROR and then a simplified cash flow table.

The final page of the report is a comparative summary of the various cases selected.

A sample of a typical report is given in Appendix 5.

4. COMPUTER REQUIREMENTS

4.1 Hardware and Software

The programs have been written to run on an HP Series 1000 minicomputer system comprising an HP21MX central processor together with an interactive user terminal and a system printer capable of upper and lower case and being able to print 132 columns on the page. They require RTE IVA operating system incorporating spooling with a minimum partition of 18 pages for BMRI1 or of 11 pages for BMR01.

4.2 BMRI1 - Program Composition

A brief description of program flow and functions of the main program and subroutines is included in this section. Program and subroutine listings in the Appendixes contain some embedded comments of what is happening.

(A) BMRI1 - Main Program

This is the main data handling section of the program. It opens and reads the input files and produces output files for later processing.

Sections are:

1. Requests Base Case number, develops the data file name and opens the input data file in read mode.

2. Reads site information and production data. Develops production profile.

3. Reads financial data. Close data file.

4. Schedule calculations subroutine NCALC.

5. Determine payout term & recoverable reserves.

6. Schedule DCF ROR subroutine and prints out brief financial results.

7. See if a report is required. If so, print report.

8. See if results are to be saved. If so, develop output file name, create file, then open in write mode.

9. Write basic field data to file.

10. Write financial evaluation data to file.

11. Write yearly cash flow data to file.

12. Close file.

13. Check for any modifications.

14. Modify royalty if desired.

15. Modify tax rate if desired.

16. Modify company type if desired.

17. Modify prices if desired.

18. Modify production rates if desired.

19. Modify per well production and corresponding annual production rates.

20. Modify number of wells and corresponding production rates.

21. Check for more cases. If so, return and reprocess from Section 4.

22. Check for another run. If so, return and reprocess from Section 1.

(B) NCALC - Calculations Control Subroutine

This subroutine controls the financial calculation and subroutine control.

Sections are:

1. Calculate yearly revenue

2. Schedule operating costs subroutine AUSOP

3. Schedule royalties subroutine AUROY

4. Schedule interest subroutine OINT

5. Schedule taxation subroutine AINTX

6. Calculate debt financing data

(C) OINT - Interest Calculation Subroutine

This subroutine calculates interest and debt repayment for all prospects from input capital expenditures, loan percentage, and interest rate.

Sections are:

1. Calculate total capital expenditure.

2. Calculate annual and cumulative debt repayment.

3. Calculate loan balance and interest payable in year following applicable loan balance.

(D) ROR - Discounted Cash Flow Rate of Return and Present Worth Subroutine

This subroutine calculates DCF ROR from the operator net cash flow computed by NCALC and net present value at 10%, 15% and 20% discount rates and returns them to the main program.

Sections are:

1. Initialize local variables

2. Calculate net discounted present value at 10%, 15% and 20% rates by calling SUM subroutine.

3. Determine if total of cash flow is positive and less than 200%. If not, print error message accordingly and return to main

4. Set boundary for trials of 0% and 200%. Try 20% and converge to tolerance of .01% with a maximum of 25 trials

5. Go to subroutine SUM to compute net cash flow for the three sections above at the discount rate specified in the calling argument. Nominal discount factors are applied to the annual cash flows.

(E) AUSOP - Operating Expenses Subroutine

This subroutine calculates the annual project operating expenses.

Sections are:

1. Initialize data arrays using FLUSH subroutine
2. Calculate annual well operating costs from the per well production cost and the per unit of production cost
3. Calculate any injection costs if not Gas
4. Calculate General and Administrative costs
5. Accumulate all costs to give total operating costs

(F) AUROY - Royalty Subroutine

This subroutine calculates operator income and royalties.

Sections are:

1. Initialize data arrays using FLUSH subroutine
2. Calculate operator income from revenue and cost data
3. Calculate royalties payable

(G) AINTX - Taxation and Allowance Subroutine

This routine calculates allowances and taxes together with cash flow. It determines the duration of the project up to the time of a negative cash flow.

Sections are:

1. Determine any investment allowance available. If a new company, carry this forward as a loss until there is an income and use as much of this allowance as needed to reduce the income to zero. If an existing company, offset current income by the effective value of this allowance, i.e. decrease net cash flow by (1-Tax Rate/100) * Allowance.

2. Accumulate capital for production equipment allowance

3. Calculate depreciation at 10%/year over 10 years

4. Accumulate capital for exploration expenditure allowance

5. Calculate taxable income = operator income less investment allowance, depreciation and royalties

6. Reduce taxable income if positive by any previous losses over the previous 7 years

7. Reduce taxable income f positive by up to 20% of balance of production equipment allowance

8. Reduce taxable income if positive by the exploration expenditure allowance

9. Calculate tax payable

10. Determine cash flow

11. Accumulate cumulative cash flow

12. Check for negative cash flow. If negative, terminate production and adjust last 4 year cash flow for straight line application of production equipment allowance.

(H) Other Subroutines

Other utility subroutines used are:

1. SUM - calculates net discounted cash flow

2. RFILL - initializes array with real number

3. IFILL - initializes array with integer number

4. EXTND - fills remainder of array with last value input

5. PUSH - shifts data in array

6. WRITR - writes a real array to file

4.3 BMR01 - Program Composition

Program BMR01 accesses previously processed and saved output files from BMRI1 and does a comparative report. The program consists of a main section with 2 subroutines SOPEN and SCLOS which are the same subroutines used in BMRI1 for file handling.

The main sections of the program are:

1. Program setup, report output logical unit input.
2. Input case number, develop file name and open for reading..
3. Read first line, display and input request to continue
4. Read remainder of file if OK else return to 2.
5. If 1st file of group, prepare field physical data report
6. Prepare summary report of case
7. Accumulate totals for comparative report. Close file.
8. See if another case to be considered. If so, return to 2.
9. Prepare comparative report. Exit.

The program prepares only one of many reports that could be generated from the stored data.

4.4 Storing, Compiling and Loading Programs and Data

(A) BMRI1

The source code for this program is stored on two cassettes, the first being one file containing the main program, the second being one file containing all the subroutines.

(a) Store the source code of the main program from cassette to disc file.

(b) Compile this module and save the relocable code.

(c) Store the source code of the subroutines from cassette to disc file.

(d) Compile this module and save the relocatable code.

(e) Run the loader.
Relocate the 1st relocatable file
Relocate the 2nd relocatable file
End.

(f) Save the program on disc.

(g) "Off" the program.

(B) BMR01

The source code for this program is stored on one cassette containing one file with the main program and all the subroutines needed.

(a) Store the source code from cassette to disc file.

(b) Compile and save the relocatable code.

(c) Load.

(d) Save the program on disc.

(e) "Off" the program.

(C) Data Files

Data files for 29 cases together with a dummy data file (I0000) for data preparation are stored on one cassette.

(a) Copy in the first file from the cassette and save as a temporary transfer file.

(b) Transfer to this file passing the cassette drive LU, the security code and the cartridge reference number for the transfer file.

i.e. TR,TEMP,LU,ISC,ICR

where LU is the cassette drive logical unit
ISC is the required security code
ICR is the required destination cartridge

This file will transfer the files from the cassette to the disc.

(c) Purge the transfer file.

APPENDIX 1

```
:RU,BMRI1

PROGRAM BMRI1

FINANCIAL MODEL OF PETROLEUM RESERVOIR
======================================


CASE:ISC:ICR ?1001


EROMANGA BASIN (PEDIRKA)

LIFE OF PROJECT BEFORE -VE CASH FLOW =  18 YEARS

DEVELOPMENT BY EXISTING COMPANY

DISCOUNT RATE OF RETURN 49.20
RECOVERABLE RESERVES     6.96

PRESENT WORTH  - 10%   177.66
               - 15%   121.62
               - 20%    82.63

DO YOU WANT A DETAILED PRINTOUT OF THIS CASE (Y/N) ?N

DO YOU WANT TO SAVE THIS RUN (Y/N) ?N

DO YOU WANT TO MODIFY ANY DATA AND RERUN (Y/N) ?N

ANOTHER RUN (Y/N) ?Y
CASE:ISC:ICR ?2001


EROMANGA BASIN (PEDIRKA)

LIFE OF PROJECT BEFORE -VE CASH FLOW =  23 YEARS

DEVELOPMENT BY EXISTING COMPANY

DISCOUNT RATE OF RETURN 28.81
RECOVERABLE RESERVES     4.87

PRESENT WORTH  - 10%    36.62
               - 15%    19.06
               - 20%     8.98

DO YOU WANT A DETAILED PRINTOUT OF THIS CASE (Y/N) ?N

DO YOU WANT TO SAVE THIS RUN (Y/N) ?N

DO YOU WANT TO MODIFY ANY DATA AND RERUN (Y/N) ?Y
```

```
TO MODIFY - ROYALTY RATE  ENTER 1
          - TAX RATE             2
          - COMPANY TYPE         3
          - PRICES               4
          - WELL PRODUCTION      5
          - PER WELL PROD'N      6
          - NUMBER OF WELLS      7

WHAT DO YOU WANT TO MODIFY ?6

CURRENT PER WELL PRODUCTION  50.0
NEW PRODUCTION RATE ?42.5

ANY MORE MODIFICATIONS (Y/N) ?N

LIFE OF PROJECT BEFORE -VE CASH FLOW =  22 YEARS

DEVELOPMENT BY EXISTING COMPANY

DISCOUNT RATE OF RETURN 25.04
RECOVERABLE RESERVES     4.08

PRESENT WORTH  - 10%    26.97
               - 15%    12.86
               - 20%     4.79

DO YOU WANT A DETAILED PRINTOUT OF THIS CASE (Y/N) ?Y

LU FOR OUTPUT ?23

DO YOU WANT TO SAVE THIS RUN (Y/N) ?Y
CASE:ISC:ICR ?2002
DATA BEING SAVED IN FILE 02002

FILE 02002 ::     0 ALREADY EXISTS
DO YOU WANT TO OVERWRITE IT (Y/N) ?Y

DO YOU WANT TO MODIFY ANY DATA AND RERUN (Y/N) ?N

ANOTHER RUN (Y/N) ?N

:
```

APPENDIX 2

```
EROMANGA BASIN (PEDIRKA)
1001                    "Base case number"
OIL                     "Extract - OIL or GAS"
0                       "State Code"
0                       "Water depth [m]"
2500                    "Well depth [m]"
12.5                    "Porosity [%]"
12.5                    "Permeability [mD]"
30                      "Pay thickness [m]"
25                      "Pressure [MPa]"
0                       "Temperature [degC]"
400                     "Distance to terminal [km]"
1980                    "Year of initial developmemt"
4                       "Years to initial production"
30                      "Max life of field"
140                     "Max per well prodn [kl/well/day or cu.m/well/day]"
19 22                   "Well numbers to and including year of max prodn"
3 17.5                  "Start years & rates of decline"
0 31.816 4.207 4.207"Investment & prodn equipment capital [M$/yr]"
0 23.87 23.87           "Depreciable capital [M$/yr]"
2.84                    "Exploration capital [M$/yr]"
651 562                 "Per well production costs [k$/well/yr]"
0                       "Per unit production costs [$/kl or $/cu.m]"
875 0 0 0               "Gen. & per well admin & inj. costs [M$/yr]"
25                      "Price [$/Bbl or $/MCF]"
0                       "Price adjustment to wellhead [$/Bbl or $/MCF]"
10                      "Government royalties [%]"
46                      "Taxation rate [%]"
1986,20                 "Last year of Investment Allowance & Rate"
1                       "Type of company - 1=existing,0=new"
0                       "Debt [%]"
0                       "Rate of interest on borrowed money [%]"
```

APPENDIX 3

Base case number	1001
This case number	1001
Extract	OIL
State	0
Water depth (m)	0
Well depth (m)	2500
Porosity (%)	12.5
Permeability (mD)	12.5
Pay thickness (m)	30
Pressure (MPa)	25
Temperature (degC)	0.0
Dist. to terminal (km)	400
Year of initial production	1983
Year of maximum production	1984
Field life (yr)	17
Maximum well production (kl/well/day)	140.0

Year	1	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Number of wells	2	0	0	0	19	22	22	22	22	22	22
Production in year	3	0.0	0.0	0.0	2660.0	3080.0	2541.0	2096.3	1729.5	1426.8	1177.1
Oil/Gas price	4	0.000	0.000	0.000	25.000	25.000	25.000	25.000	25.000	25.000	25.000
Adjustment to wellhead price	5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sales	6	0.000	0.000	0.000	152.670	176.775	145.840	120.318	99.262	81.891	67.560
Royalties	7	0.000	0.000	0.000	15.267	17.678	14.584	12.032	9.926	8.189	6.756
Well operating costs	8	0.000	0.000	0.000	12.369	12.364	12.364	12.364	12.364	12.364	12.364
General admin & inject costs	9	0.000	0.000	0.000	.875	.875	.875	.875	.875	.875	.875
Total operating costs	10	0.000	0.000	0.000	13.244	13.239	13.239	13.239	13.239	13.239	13.239
Income	11	0.000	0.000	0.000	139.426	163.536	132.601	107.079	86.023	68.652	54.321
Prodn equipment capital	12	0.000	31.816	4.207	4.207	0.000	0.000	0.000	0.000	0.000	0.000
Investment allowance	13	0.000	6.363	.841	.841	0.000	0.000	0.000	0.000	0.000	0.000
Prodn equipment allowance	14	0.000	0.000	0.000	5.587	4.470	3.576	2.861	2.288	1.831	1.465
Depreciable capital	15	0.000	23.870	23.870	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Depreciation allowance	16	0.000	2.387	4.774	4.774	4.774	4.774	4.774	4.774	4.774	4.774
Exploration capital	17	2.840	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Exploration allowance	18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Cumulative investment	19	2.840	58.526	86.603	90.810	90.810	90.810	90.810	90.810	90.810	90.810
Pretax income	20	0.000	0.000	0.000	112.956	136.615	109.667	87.413	69.035	53.858	41.327
Tax payable	21	0.000	0.000	0.000	51.960	62.843	50.447	40.210	31.756	24.775	19.010
Dedns against prior income	22	2.840	15.113	11.547	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Net cash flow	23	-1.534	-48.734	-22.765	67.992	83.016	67.570	54.837	44.341	35.688	28.555
Cumulative cash flow	24	-1.534	-50.267	-73.033	-5.041	77.975	145.545	200.382	244.723	280.412	308.967
Interest repayment	25	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Load repayment	26	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Income in producing country	27	0.000	0.000	0.000	72.199	83.016	67.570	54.837	44.341	35.688	28.555
Cumulative gross cash flow	28	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Unrecovered losses	29	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Government take	30	0.000	0.000	0.000	67.227	80.521	65.031	52.242	41.682	32.964	25.766
Operators equity	31	2.840	55.686	28.077	4.207	0.000	0.000	0.000	0.000	0.000	0.000
Cumulative operators equity	32	2.840	58.526	86.603	90.810	90.810	90.810	90.810	90.810	90.810	90.810
Debt repayment	33	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Year	1	1990	1991	1992	1993	1994	1995	1996
Number of wells	2	22	22	22	22	22	22	22
Production in year	3	971.1	801.2	661.0	545.3	449.9	371.1	306.2
Oil/Gas price	4	25.000	25.000	25.000	25.000	25.000	25.000	25.000
Adjustment to wellhead price	5	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sales	6	55.737	45.983	37.936	31.297	25.820	21.302	17.574
Royalties	7	5.574	4.598	3.794	3.130	2.582	2.130	1.757
Well operating costs	8	12.364	12.364	12.364	12.364	12.364	12.364	12.364
General admin & inject costs	9	.875	.875	.875	.875	.875	.875	.875
Total operating costs	10	13.239	13.239	13.239	13.239	13.239	13.239	13.239
Income	11	42.498	32.744	24.697	18.058	12.581	8.063	4.335
Prodn equipment capital	12	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Investment allowance	13	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Prodn equipment allowance	14	1.172	.937	.750	.750	.750	.750	.750
Depreciable capital	15	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Depreciation allowance	16	4.774	2.387	0.000	0.000	0.000	0.000	0.000
Exploration capital	17	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Exploration allowance	18	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Cumulative investment	19	90.810	90.810	90.810	90.810	90.810	90.810	90.810
Pretax income	20	30.979	24.822	20.154	14.179	9.249	5.183	1.828
Tax payable	21	14.250	11.418	9.271	6.522	4.255	2.384	.841
Dedns against prior income	22	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Net cash flow	23	22.674	16.728	11.633	8.187	5.350	3.014	1.090
Cumulative cash flow	24	331.641	348.369	360.002	368.189	373.690	376.974	378.430
Interest repayment	25	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Load repayment	26	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Income in producing country	27	22.674	16.728	11.633	8.406	5.745	3.549	1.737
Cumulative gross cash flow	28	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Unrecovered losses	29	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Government take	30	19.824	16.016	13.064	9.652	6.837	4.514	2.598
Operators equity	31	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Cumulative operators equity	32	90.810	90.810	90.810	90.810	90.810	90.810	90.810
Debt repayment	33	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Crmpany type	EXISTING
Payout (yr)	4.06
Profit/$ invested	4.17
Recoverable reserves	6.87
Operator equity	90.81
DCF ROR (%)	48.08
Capital investment	90.81
Royalties (%)	10.00
Tax rate (%)	46.00

PRESENT WORTH	10%	M$	175.43
OF NETT AT	15%	M$	119.68
	20%	M$	80.90

APPENDIX 4

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:RU,BMR01
PROGRAM BMR01
REPORT NUMBER 1

OUTPUT LU ?23
CASE:ISC:ICR ?1001

EROMANGA BASIN (PEDIRKA)
PROCESSED  7:59 AM  THU.,  7  AUG., 1980
EXTRACT OIL
OK ?Y
ANOTHER CASE ?Y
CASE:ISC:ICR ?1051

EROMANGA BASIN (PEDIRKA)
PROCESSED  1:59 PM  SUN.,  3  AUG., 1980
EXTRACT OIL
OK ?Y
ANOTHER CASE ?Y
CASE:ISC:ICR ?2001

EROMANGA BASIN (PEDIRKA)
PROCESSED  2:06 PM  SUN.,  3  AUG., 1980
EXTRACT GAS
OK ?Y
ANOTHER CASE ?Y
CASE:ISC:ICR ?2002
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EROMANGA BASIN (PEDIRKA)

PROCESSED 8:14 AM THU., 7 AUG., 1980

EXTRACT GAS

OK ?Y

ANOTHER CASE ?N

PROGRAM COMPLETED
:

APPENDIX 5

MINIMUM ECONOMIC RESERVOIR SIZE PROJECT

PROSPECTIVE AREA : EROMANGA BASIN (PEDIRKA)

FIELD PARAMETERS :

Well depth	2500 m
Porosity	12.5 %
Permeability	12.5 mD
Pay thickness	30.0 m
Pressure	25. MPa

MINIMUM ECONOMIC RESERVOIR SIZE PROJECT
****

PROSPECTIVE AREA : EROMANGA BASIN (PEDIRKA)
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CASE 1001 OIL PRODUCTION

Year of initial production 1983
Year of maximum production 1984
Field life 17 years
Reservoir size 6.9 Gl (43.2 MBbl)
Maximum production rate 140. kl/d (880.5 Bbl/d)
Government royalty 10.0%
Corporate tax 46.0%
DCF Rate of Return 48.08% p.a.

Year	Well Nos.	Cap. Invest. (M$)	Prodn Rate (kl/d)	Oil Price ($/Bbl)	Oper. Cost (M$)	Income (M$)	Tax (M$)	Nett Profit (M$)
1980	0	2.840	0.000	0.000	0.000	0.000	0.000	-1.534
1981	0	55.686	0.000	0.000	0.000	0.000	0.000	-48.734
1982	0	28.077	0.000	0.000	0.000	0.000	0.000	-22.765
1983	19	4.207	2660.000	25.000	13.244	139.426	51.960	67.992
1984	22	0.000	3080.000	25.000	13.239	163.536	62.843	83.016
1985	22	0.000	2541.000	25.000	13.239	132.601	50.447	67.570
1986	22	0.000	2096.325	25.000	13.239	107.079	40.210	54.837
1987	22	0.000	1729.469	25.000	13.239	86.023	31.756	44.341
1988	22	0.000	1426.812	25.000	13.239	68.652	24.775	35.688
1989	22	0.000	1177.120	25.000	13.239	54.321	19.010	28.555
1990	22	0.000	971.124	25.000	13.239	42.498	14.250	22.674
1991	22	0.000	801.177	25.000	13.239	32.744	11.418	16.728
1992	22	0.000	660.971	25.000	13.239	24.697	9.271	11.633
1993	22	0.000	545.301	25.000	13.239	18.058	6.522	8.187
1994	22	0.000	449.874	25.000	13.239	12.581	4.255	5.350
1995	22	0.000	371.146	25.000	13.239	8.063	2.384	3.014
1996	22	0.000	306.195	25.000	13.239	4.335	.841	1.090
		90.810			185.351		329.942	377.644

MINIMUM ECONOMIC RESERVOIR SIZE PROJECT
****

PROSPECTIVE AREA : EROMANGA BASIN (PEDIRKA)
==========

CASE 1011 OIL PRODUCTION

Year of initial production	1983	
Year of maximum production	1983	
Field life	16 years	
Reservoir size	6.0 Gl	(37.5 MBbl)
Maximum production rate	140. kl/d	(880.5 Bbl/d)
Government royalty	10.0%	
Corporate tax	46.0%	
DCF Rate of Return	46.06% p.a.	

Year	Well Nos.	Cap. Invest. (M$)	Prodn Rate (kl/d)	Oil Price ($/Bbl)	Oper. Cost (M$)	Income (M$)	Tax (M$)	Nett Profit (M$)
1980	0	2.840	0.000	0.000	0.000	0.000	0.000	-1.534
1981	0	54.784	0.000	0.000	0.000	0.000	0.000	-47.998
1982	0	27.942	0.000	0.000	0.000	0.000	0.000	-22.721
1983	19	2.347	2660.000	25.000	11.971	140.699	52.951	70.134
1984	19	0.000	2660.000	25.000	11.971	140.699	53.634	71.798
1985	19	0.000	2194.500	25.000	11.971	113.982	42.947	58.440
1986	19	0.000	1810.463	25.000	11.971	91.940	34.120	47.428
1987	19	0.000	1493.632	25.000	11.971	73.755	26.831	38.352
1988	19	0.000	1232.246	25.000	11.971	58.753	20.812	30.869
1989	19	0.000	1016.603	25.000	11.971	46.377	15.841	24.701
1990	19	0.000	838.698	25.000	11.971	36.166	11.736	19.616
1991	19	0.000	691.926	25.000	11.971	27.742	9.445	14.326
1992	19	0.000	570.839	25.000	11.971	20.792	7.665	9.602
1993	19	0.000	470.942	25.000	11.971	15.059	5.292	6.616
1994	19	0.000	388.527	25.000	11.971	10.328	3.333	4.158
1995	19	0.000	320.535	25.000	11.971	6.426	1.718	2.134
		87.913			155.623		286.325	325.921

MINIMUM ECONOMIC RESERVOIR SIZE PROJECT
****

PROSPECTIVE AREA : EROMANGA BASIN (PEDIRKA)
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CASE 1021 OIL PRODUCTION

Year of initial production	1983	
Year of maximum production	1983	
Field life	16 years	
Reservoir size	5.0 Gl	(31.6 MBbl)
Maximum production rate	140. kl/d	(880.5 Bbl/d)
Government royalty	10.0%	
Corporate tax	46.0%	
DCF Rate of Return	41.07% p.a.	

Year	Well Nos.	Cap. Invest. (M$)	Prodn Rate (kl/d)	Oil Price ($/Bbl)	Oper. Cost (M$)	Income (M$)	Tax (M$)	Nett Profit (M$)
1980	0	2.840	0.000	0.000	0.000	0.000	0.000	-1.534
1981	0	54.146	0.000	0.000	0.000	0.000	0.000	-47.477
1982	0	27.980	0.000	0.000	0.000	0.000	0.000	-22.799
1983	16	0.000	2240.000	25.000	10.683	117.881	44.030	60.994
1984	16	0.000	2240.000	25.000	10.683	117.881	44.447	60.577
1985	16	0.000	1848.000	25.000	10.683	95.382	35.466	49.309
1986	16	0.000	1524.600	25.000	10.683	76.821	28.049	40.022
1987	16	0.000	1257.795	25.000	10.683	61.508	21.923	32.366
1988	16	0.000	1037.681	25.000	10.683	48.874	16.863	26.055
1989	16	0.000	856.087	25.000	10.683	38.452	12.685	20.853
1990	16	0.000	706.272	25.000	10.683	29.853	9.234	16.565
1991	16	0.000	582.674	25.000	10.683	22.759	7.483	11.932
1992	16	0.000	480.706	25.000	10.683	16.907	6.158	7.768
1993	16	0.000	396.583	25.000	10.683	12.079	4.159	5.243
1994	16	0.000	327.181	25.000	10.683	8.095	2.510	3.165
1995	16	0.000	269.924	25.000	10.683	4.809	1.150	1.455
		84.965			138.879		234.158	264.496

MINIMUM ECONOMIC RESERVOIR SIZE PROJECT
****

PROSPECTIVE AREA : EROMANGA BASIN (PEDIRKA)
==========

CASE 1031 OIL PRODUCTION

Year of initial production 1983
Year of maximum production 1983
Field life 16 years
Reservoir size 4.1 Gl (25.7 MBbl)
Maximum production rate 140. kl/d (880.5 Bbl/d)
Government royalty 10.0%
Corporate tax 46.0%
DCF Rate of Return 35.35% p.a.

Year	Well Nos.	Cap. Invest. (M$)	Prodn Rate (kl/d)	Oil Price ($/Bbl)	Oper. Cost (M$)	Income (M$)	Tax (M$)	Nett Profit (M$)
1980	0	2.840	0.000	0.000	0.000	0.000	0.000	-1.534
1981	0	53.265	0.000	0.000	0.000	0.000	0.000	-46.758
1982	0	26.276	0.000	0.000	0.000	0.000	0.000	-21.474
1983	13	0.000	1820.000	25.000	9.416	95.042	34.810	49.786
1984	13	0.000	1820.000	25.000	9.416	95.042	35.192	49.404
1985	13	0.000	1501.500	25.000	9.416	76.762	27.929	40.215
1986	13	0.000	1238.738	25.000	9.416	61.681	21.930	32.641
1987	13	0.000	1021.958	25.000	9.416	49.239	16.974	26.399
1988	13	0.000	843.116	25.000	9.416	38.974	12.881	21.254
1989	13	0.000	695.571	25.000	9.416	30.506	9.500	17.014
1990	13	0.000	573.846	25.000	9.416	23.520	6.708	13.518
1991	13	0.000	473.423	25.000	9.416	17.756	5.500	9.539
1992	13	0.000	390.574	25.000	9.416	13.001	4.629	5.927
1993	13	0.000	322.223	25.000	9.416	9.078	3.005	3.858
1994	13	0.000	265.834	25.000	9.416	5.841	1.665	2.155
1995	13	0.000	219.313	25.000	9.416	3.171	.560	.753
		82.381			122.408		181.284	202.698

MINIMUM ECONOMIC RESERVOIR SIZE PROJECT

PROSPECTIVE AREA : EROMANGA BASIN (PEDIRKA)

CASE 1041 OIL PRODUCTION

Year of initial production	1983	
Year of maximum production	1983	
Field life	15 years	
Reservoir size	3.1 Gl	(19.4 MBbl)
Maximum production rate	140. kl/d	(880.5 Bbl/d)
Government royalty	10.0%	
Corporate tax	46.0%	
DCF Rate of Return	28.42% p.a.	

Year	Well Nos.	Cap. Invest. (M$)	Prodn Rate (kl/d)	Oil Price ($/Bbl)	Oper. Cost (M$)	Income (M$)	Tax (M$)	Nett Profit (M$)
1980	0	2.840	0.000	0.000	0.000	0.000	0.000	-1.534
1981	0	51.319	0.000	0.000	0.000	0.000	0.000	-45.170
1982	0	25.629	0.000	0.000	0.000	0.000	0.000	-21.089
1983	10	0.000	1400.000	25.000	8.135	72.217	25.582	38.600
1984	10	0.000	1400.000	25.000	8.135	72.217	25.931	38.251
1985	10	0.000	1155.000	25.000	8.135	58.156	20.389	31.138
1986	10	0.000	952.875	25.000	8.135	46.555	15.810	25.276
1987	10	0.000	786.122	25.000	8.135	36.984	12.026	20.446
1988	10	0.000	648.551	25.000	8.135	29.088	8.900	16.466
1989	10	0.000	535.054	25.000	8.135	22.574	6.318	13.185
1990	10	0.000	441.420	25.000	8.135	17.200	4.185	10.482
1991	10	0.000	364.171	25.000	8.135	12.766	3.447	6.997
1992	10	0.000	300.441	25.000	8.135	9.109	3.031	3.935
1993	10	0.000	247.864	25.000	8.135	6.091	1.781	2.320
1994	10	0.000	204.488	25.000	8.135	3.602	.751	.991
		79.788			97.620		128.151	140.295

MINIMUM ECONOMIC RESERVOIR SIZE PROJECT
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PROSPECTIVE AREA : EROMANGA BASIN (PEDIRKA)
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CASE 1051 OIL PRODUCTION

Year of initial production	1982	
Year of maximum production	1982	
Field life	13 years	
Reservoir size	2.1 Gl	(13.2 MBbl)
Maximum production rate	140. kl/d	(880.5 Bbl/d)
Government royalty	10.0%	
Corporate tax	46.0%	
DCF Rate of Return	23.41% p.a.	

Year	Well Nos.	Cap. Invest. (M$)	Prodn Rate (kl/d)	Oil Price ($/Bbl)	Oper. Cost (M$)	Income (M$)	Tax (M$)	Nett Profit (M$)
1980	0	2.840	0.000	0.000	0.000	0.000	0.000	-1.534
1981	0	73.410	0.000	0.000	0.000	0.000	0.000	-66.492
1982	7	0.000	980.000	25.000	6.867	49.380	16.042	27.713
1983	7	0.000	980.000	25.000	6.867	49.380	16.420	27.335
1984	7	0.000	808.500	25.000	6.867	39.537	12.647	22.249
1985	7	0.000	667.013	25.000	6.867	31.416	9.527	18.061
1986	7	0.000	550.285	25.000	6.867	24.716	6.947	14.611
1987	7	0.000	453.985	25.000	6.867	19.189	4.813	11.771
1988	7	0.000	374.538	25.000	6.867	14.629	3.049	9.431
1989	7	0.000	308.994	25.000	6.867	10.868	1.492	7.288
1990	7	0.000	254.920	25.000	6.867	7.764	.207	5.528
1991	7	0.000	210.309	25.000	6.867	5.204	1.343	1.886
1992	7	0.000	173.505	25.000	6.867	3.091	.469	.699
		76.250			75.537		72.956	78.547

MINIMUM ECONOMIC RESERVOIR SIZE PROJECT
****

PROSPECTIVE AREA : EROMANGA BASIN (PEDIRKA)
==========

CASE 2001 GAS PRODUCTION

Year of initial production 1983
Year of maximum production 1983
Field life 22 years
Reservoir size 4.8 Gcu.m (.169 TCF)
Maximum production rate 50. kcu.m/d (1.766 MCFPD)
Government royalty 10.0%
Corporate tax 46.0%
DCF Rate of Return 27.49% p.a.

Year	Well Nos.	Cap. Invest. (M$)	Prodn Rate (cu.m/d)	Gas Price ($/MCF)	Oper. Cost (M$)	Income (M$)	Tax (M$)	Nett Profit (M$)
1980	0	2.840	0.000	0.000	0.000	0.000	0.000	-1.534
1981	0	23.267	0.000	0.000	0.000	0.000	0.000	-18.986
1982	0	3.812	0.000	0.000	0.000	0.000	0.000	-1.398
1983	15	0.000	750.000	2.230	4.109	17.449	5.384	9.909
1984	15	0.000	750.000	2.230	4.109	17.449	5.715	9.579
1985	15	0.000	750.000	2.230	4.109	17.449	5.979	9.315
1986	15	0.000	750.000	2.230	4.109	17.449	6.190	9.103
1987	15	0.000	750.000	2.230	4.109	17.449	6.359	8.934
1988	15	0.000	750.000	2.230	4.109	17.449	6.494	8.799
1989	15	0.000	750.000	2.230	4.109	17.449	6.602	8.691
1990	15	0.000	750.000	2.230	4.109	17.449	6.689	8.605
1991	15	0.000	750.000	2.230	4.109	17.449	6.758	8.535
1992	15	0.000	750.000	2.230	4.109	17.449	6.813	8.480
1993	15	0.000	750.000	2.230	4.109	17.449	6.858	8.436
1994	15	0.000	750.000	2.230	4.109	17.449	6.893	8.400
1995	15	0.000	750.000	2.230	4.109	17.449	6.922	8.372
1996	15	0.000	750.000	2.230	4.109	17.449	6.944	8.349
1997	15	0.000	750.000	2.230	4.109	17.449	6.962	8.331
1998	15	0.000	750.000	2.230	4.109	17.449	6.962	8.285
1999	15	0.000	525.000	2.230	4.109	10.982	4.285	5.105
2000	15	0.000	367.500	2.230	4.109	6.454	2.411	2.875
2001	15	0.000	257.250	2.230	4.109	3.285	1.099	1.311
		29.919			78.071		112.318	127.497

MINIMUM ECONOMIC RESERVOIR SIZE PROJECT
****

PROSPECTIVE AREA : EROMANGA BASIN (PEDIRKA)

CASE 2002 GAS PRODUCTION

Year of initial production 1983
Year of maximum production 1983
Field life 22 years
Reservoir size 4.3 Gcu.m (.153 TCF)
Maximum production rate 45. kcu.m/d (1.589 MCFPD)
Government royalty 10.0%
Corporate tax 46.0%
DCF Rate of Return 25.08% p.a.

Year	Well Nos.	Cap. Invest. (M$)	Prodn Rate (cu.m/d)	Gas Price ($/MCF)	Oper. Cost (M$)	Income (M$)	Tax (M$)	Nett Profit (M$)
1980	0	2.840	0.000	0.000	0.000	0.000	0.000	-1.534
1981	0	23.267	0.000	0.000	0.000	0.000	0.000	-18.986
1982	0	3.812	0.000	0.000	0.000	0.000	0.000	-1.398
1983	15	0.000	675.000	2.230	4.109	15.293	4.492	8.861
1984	15	0.000	675.000	2.230	4.109	15.293	4.822	8.531
1985	15	0.000	675.000	2.230	4.109	15.293	5.086	8.267
1986	15	0.000	675.000	2.230	4.109	15.293	5.297	8.056
1987	15	0.000	675.000	2.230	4.109	15.293	5.466	7.887
1988	15	0.000	675.000	2.230	4.109	15.293	5.602	7.752
1989	15	0.000	675.000	2.230	4.109	15.293	5.710	7.643
1990	15	0.000	675.000	2.230	4.109	15.293	5.796	7.557
1991	15	0.000	675.000	2.230	4.109	15.293	5.866	7.488
1992	15	0.000	675.000	2.230	4.109	15.293	5.921	7.432
1993	15	0.000	675.000	2.230	4.109	15.293	5.965	7.388
1994	15	0.000	675.000	2.230	4.109	15.293	6.001	7.352
1995	15	0.000	675.000	2.230	4.109	15.293	6.029	7.324
1996	15	0.000	675.000	2.230	4.109	15.293	6.052	7.301
1997	15	0.000	675.000	2.230	4.109	15.293	6.070	7.283
1998	15	0.000	675.000	2.230	4.109	15.293	6.070	7.237
1999	15	0.000	472.500	2.230	4.109	9.473	3.660	4.371
2000	15	0.000	330.750	2.230	4.109	5.398	1.973	2.362
2001	15	0.000	231.525	2.230	4.109	2.546	.792	.952
		29.919			78.071		96.670	109.127

MINIMUM ECONOMIC RESERVOIR SIZE PROJECT
****

PROSPECTIVE AREA : EROMANGA BASIN (PEDIRKA)
==========

SUMMARY REPORT

OIL CASES

Case	Max No. Wells	Reservoir Size (Gl)	(MBbl)	Cap Inv (M$)	Op Cost (M$)	DCF ROR (%)	Nett...Present..Value 10%	15%	25%
1001	22	6.87	43.20	90.81	185.35	48.08	175.43	119.68	80.90
1011	19	5.97	37.53	87.91	155.62	46.06	151.43	102.93	69.07
1021	16	5.03	31.60	84.97	138.88	41.07	119.62	79.44	51.49
1031	13	4.08	25.68	82.38	122.41	35.35	87.68	55.91	33.92
1041	10	3.08	19.37	79.79	97.62	28.42	55.65	32.38	16.42
1051	7	2.10	13.23	76.25	75.54	23.41	29.54	15.27	5.15

GAS CASES

Case	Max No. Wells	Reservoir Size (Gcm)	(TCF)	Cap Inv (M$)	Op Cost (M$)	DCF ROR (%)	Nett...Present..Value 10%	15%	25%
2001	15	4.80	.17	29.92	78.07	27.49	35.37	17.95	7.96
2002	15	4.32	.15	29.92	78.07	25.08	28.96	13.82	5.17

APPENDIX 6

```
FTN4
      PROGRAM BMRI1
C
C     COMMON
C
      COMMON LUI,
     +  POPCST(30),CAPA(30),RPDN(30),FREV(30),ONTCF(30),
     +  POPIN(30),OROY(30),OINTRS(30),CUMCAP(30),
     +  OLON(30),OEQ(30),PW(3),NW(30),CAPB(30),CAPC(30),
     +  ONNTX(30),ONTX(30),ONIPC(30),PRICE(30),SUMAA(30),
     +  OGROCF(30),OCUNCF(30),FINT(30),OLOSS(30),OCINV(30),
     +  SUMCA(30),GVTK(30),ODTPY(30),IYEAR(30),WHPRI(30),
     +  NWT,IPY,XGA,WGA,XINJ,WINJ,WOC(30),GAD(30),
     +  GVROY,DTPY,RINT,DBT,IEXT(2),ALLOW(30),
     +  DPR(30),OEQTT(30),PWPRC(30),PUPRC(30),
     +  NSTATE,LIFEY,TAXRAT,ILYINV,PINVA,NCPY,MAXDIM

      DIMENSION NAME(3),IDESC(40),IDCB(144),IBUF(60),
     +  ITIME(15),RBUF(30)

      EQUIVALENCE (IDESC(41),ITIME),(IBUF,RBUF)
C
C*****************************************************************
C
C     VARIABLES USED
C                    (*)=ANNUAL DATA STORED IN ARRAY
C                     I =INPUT DATA FROM FILE
C                     O =OUTPUT DATA TO FILE
C                     R =REPORT DATA
C
C     COMMON DATA
C
C ALLOW (*)  OR = ALLOWANCES AVAILABLE AGAINST OTHER INCOME
C CAPA  (*) IOR = INVESTMENT & PRODN EQUIPMENT CAPITAL
C CAPB  (*) IOR = DEPRECIATION CAPITAL
C CAPC  (*) IOR = EXPLORATION CAPITAL
C CUMCAP(*)     = CUM. CAPITAL INVESTMENT
C DBT       IO  = % DEBT TO BE FINANCED
C DPR   (*)  OR = DEPRECIATION ALLOWANCE
C DTPY          = INTERMEDIATE VALUE FOR DEBT REPAYMENT
C FINT  (*)  OR = INVESTMENT ALLOWANCE
C FREV  (*)  OR = FIELD REVENUE
C GAD   (*)  OR = GENERAL ADMIN. AND INJECTION COSTS
C GVROY     IOR = % ROYALTIES
C GVTK  (*)  OR = GOVERNMENT TAKE - TAX + ROYALTIES
C IEXT      IOR = EXTRACT - OIL/GAS
C ILYINV    IO  = LAST YEAR OF INVESTMENT ALLOWANCE
C IPY       IOR = FIRST YEAR OF PRODUCTION
C IYEAR (*)  OR = YEARS OF PROJECT
C LIFEY     IOR = MAXIMUM LIFE OF FIELD
C LUI           = LOGICAL UNIT OF RUNNING TERMINAL
C MAXDIM        = MAXIMUM ARRAY SIZE FOR ANNUAL DATA
C NCPY      IOR = TYPE OF COMPANY (0=NEW,1=EXISTING)
C NSTATE    IOR = STATE CODE
C NW    (*) IOR = NUMBERS OF WEELS
C NWT           = MAX. NUMBER OF WELLS
C OCINV (*)  OR = CUM. INVESTMENT
C OCUNCF(*)  OR = CUM. NET CASH FLOW
C ODTPY (*)  OR = DEBT REPAYMENT
C OEQ   (*)  OR = OPERATORS EQUITY
```

```
C OEQTT (*)   OR = CUM. OPERATORS EQUITY
C OGROCF(*)   OR = GROSS CASH FLOW
C OINTRS(*)   OR = INTEREST ON DEBT
C OLON  (*)   OR = LOAN REPAYMENTS
C OLOSS (*)   OR = UNRECOVERABLE LOSSES
C ONIPC (*)   OR = INCOME IN PRODUCING COUNTRY
C ONNTX (*)   OR = TAXABLE INCOME
C ONTCF (*)   OR = NET CASH FLOW
C ONTX  (*)   OR = TAX PAYABLE
C OROY  (*)   OR = ROYALTIES PAYABLE
C PINVA       IO  = % INVESTMENT ALLOWANCE
C POPCST(*)   OR = OPERATOR COSTS
C POPIN (*)   OR = OPERATOR INCOME
C PRICE (*)  IOR = OIL PRICE AT PIPE HEAD
C PUPRC (*)  I   = PER UNIT PRODN COSTS
C PW          OR = PRESENT VALUE
C PWPRC (*)  I   = PER WELL PRODN COSTS
C RINT       IO  = % INTEREST ON DEBT
C RPDN  (*)   OR = DAILY RATES OF PRODUCTION
C SUMAA (*)   OR = PRODN EQUIPMENT ALLOWANCE
C SUMCA (*)   OR = EXPLORATION ALLOWANCE
C TAXRAT     IOR = % TAX RATE
C WGA        I   = PER WELL GENERAL & ADMIN COSTS
C WHPRI (*)  IOR = ADJUSTMENT TO PRICE FOR WELL HEAD PRICE
C WINJ       I   = PER WELL INJECTION COSTS
C WOC   (*)   OR = WELL OPERATING COSTS
C XGA        I   = ANNUAL GEN. & ADMIN. COSTS
C XINJ       I   = ANNUAL INJECTION COSTS
C
C     LOCAL VARIABLES
C
C DCFROR      OR = DCF ROR
C DISTER     IOR = DISTANCE TO TERMINAL
C ESC             = ESCALATION FACTOR IN MODS
C FRAC            = FRACTIONAL PART OF PAYOUT
C I               = LOOP COUNTER
C I1              = LOOP COUNTER IN OUTPUT
C I2              = LOOP COUNTER IN OUTPUT
C I3              = LOOP COUNTER IN OUTPUT
C I4              = LOOP COUNTER IN OUTPUT
C IANS            = Y/N ANSWER TO QUESTIONS
C IBTBL      IOR = BASE CASE NUMBER
C IBUF            = GENERAL INTEGER BUFFER
C ICR             = FILE CARTRIDGE REFERENCE
C IDCB            = FILE DATA CONTROL BLOCK
C IDESC      IOR = PROSPECT DESCRIPTION
C IDUM            = DUMMY
C IERR            = ERROR FLAG
C IMODY           = MODIFICATION NUMBER
C IOPT            = FILE OPEN OPTION
C IRPDNF          = TYPE OF PRODUCTION PROFILE FLAG
C ISC             = FILE SECURITY CODE
C ISIZE           = FILE SIZE FOR CREATE
C ITBL        OR = CASE NUMBER FOR FILING
C ITIME       OR = TIME/DATE
C IY              = YEAR COUNTER
C IYBASE     I   = BASE YEAR
C IYDC1      I   = YEAR OF 1ST DECLINE
C IYDC2      I   = YEAR OF 2ND DECLINE
C IYRMX       OR = YEAR OF MAXIMUM PRODUCTION
```

```
C J               = LOOP COUNTER
C K               = LOOP COUNTER
C LDESC           = LENGTH OF PROSPECT DESCRIPTION
C LEN             = LENGTH OF INPUT STRING
C LIFE            = TEMP HOLDER FOR LIFEY
C LINE            = LINE COUNT
C LUO             = OUTPUT DEVIVE LU
C NAME            = FILE NAME
C NEW             = TEMP HOLDER FOR MAX WELLS
C NWTN            = NEW MAX NO OF WELLS
C OCAPTL      OR  = CAPITAL INVESTMENT
C OEQT        OR  = MAX OPERATORS EQUITY
C PDN             = PRICE MODIFICATION VARIABLE
C PERMEB     IOR  = PERMEABILITY
C POROSY     IOR  = POROSITY
C PRDDI       OR  = PROFIT PER $ INVESTED
C PRESS      IOR  = PRESSURE OF OIL/GAS
C PWEL       IOR  = PER WELL PRODUCTION
C PYOUT       OR  = TIME TO RECOVER INVESTMENT
C RBUF            = GENERAL REAL BUFFER EQUIV TO IBUF
C RDECL1     I    = 1ST DECLINE RATE
C RDECL2     I    = 2ND DECLINE RATE
C RESSI       OR  = RECOVERABLE RESERVES
C TEMPC      IOR  = TEMPERATURE
C THICK      IOR  = PAY THICKNESS
C WADEP      IOR  = WATER DEPTH
C WDEP       IOR  = WELL DEPTH
C
C     EXTERNAL ROUTINES
C
C ABS             = HP ABSOLUTE FUNCTION
C CLOSE           = HP FILE CLOSE
C CODE            = HP FILE ENCODE/DECODE
C CREAT           = HP FILE CREATE
C EXTND           = FILL ARRAY WITH LAST INPUT VALUE
C FTIME           = HP DATE/TIME
C IFILL           = INTEGER FILL AN ARRAY
C LOGLU           = HP GET SCHEDULING LU
C MOD             = HP REMAINDER FUNCTION
C NCALC           = CALCULATIONS SUBROUTINE
C OPEN            = HP FILE OPEN
C PUSH            = MOVE DATA IN ARRAY
C READF           = HP FILE READ
C RFILL           = REAL FILL AN ARRAY
C ROR             = DCF ROR SUBROUTINE
C WRITF           = HP FILE WRITE
C WRITR           = WRITE REAL ARRAY TO FILE
C
C*************************************************************
C
C     GET SCHEDULING TERMINAL
C
      LUI=LOGLU(IDUM)
      MAXDIM=30
C
C     WRITE PROGRAM HEADING
C
      WRITE(LUI,5)
5     FORMAT(/"PROGRAM BMRI1"//"FINANCIAL MODEL OF PETROLEUM"
     + " RESERVOIR"/38"="/)
```

```
      CALL FTIME(ITIME)
      WRITE(LUI,30)(IBUF(I),I=1,15)
C
C     GET BASE CASE NUMBER
C
10    ITBL=0
      WRITE(LUI,20)
20    FORMAT(/"CASE:ISC:ICR ? ")
      READ(LUI,*) ITBL,ISC,ICR
30    FORMAT(40A2)
      IF (ITBL.EQ.0) GOTO 9000
C
C     DEVELOP FILE NAME
C
      CALL CODE
      WRITE(NAME,35) ITBL
35    FORMAT("I"I4" ")
      DO 40 I=1,3
      IF (NAME(I)/256.EQ.40B) NAME(I)=NAME(I)+20B*256
      IF (I.EQ.3) GOTO 40
      IF (MOD(NAME(I),256).EQ.40B) NAME(I)=NAME(I)+20B
40    CONTINUE
C
C     OPEN DATA FILE
C
      CALL OPEN(IDCB,IERR,NAME,IOPT,ISC,ICR)
      IF (IERR.GE.0) GOTO 50
      IF (IERR.NE.-6) GOTO 44
      WRITE(LUI,42)NAME,ICR
42    FORMAT("FILE "3A2"::"I6" DOES NOT EXIST")
      GOTO 9000
44    WRITE(LUI,46)IERR,NAME,ICR
46    FORMAT(/"ERROR"I4" IN OPENING "3A2"::"I6)
      GOTO 9200
C
C     START READING DATA - SITE INFO
C
C     PROSPECT DESCRIPTION
C
50    LINE=1
      CALL IFILL(IDESC,40,2H  )
      CALL READF(IDCB,IERR,IDESC,40,LDESC)
      IF (IERR.LT.0) GOTO 9100
      WRITE(LUI,51)(IDESC(I),I=1,LDESC)
51    FORMAT(//40A2)
C
C     CASE NUMBER
C
      LINE=LINE+1
      IBTBL=0
      CALL READF(IDCB,IERR,IBUF,60,LEN)
      IF (IERR.LT.0) GOTO 9100
      CALL CODE(LEN*2)
      READ(IBUF,*)IBTBL
C
C     EXTRACT
C
      LINE=LINE+1
      CALL READF(IDCB,IERR,IBUF,60,LEN)
      IF (IERR.LT.0) GOTO 9100
```

```
      IEXT=IBUF
      IF (IEXT.EQ.2HOI) GOTO 53
      IF (IEXT.EQ.2HGA) GOTO 54
      WRITE(LUI,52)(IBUF(I),I=1,LEN)
52    FORMAT("UNRECOGNIZED EXTRACT"/40A2/)
      GOTO 9100
53    IEXT(2)=2HL
      GOTO 55
54    IEXT(2)=2HS
C
C     STATE CODE
C
55    LINE=LINE+1
      NSTATE=0
      CALL READF(IDCB,IERR,IBUF,60,LEN)
      IF (IERR.LT.0) GOTO 9100
      CALL CODE(LEN*2)
      READ(IBUF,*)NSTATE
C
C     WATER DEPTH
C
      LINE=LINE+1
      WADEP=0
      CALL READF(IDCB,IERR,IBUF,60,LEN)
      IF (IERR.LT.0) GOTO 9100
      CALL CODE(LEN*2)
      READ(IBUF,*)WADEP
C
C     WELL DEPTH
C
      LINE=LINE+1
      WDEP=0
      CALL READF(IDCB,IERR,IBUF,60,LEN)
      IF (IERR.LT.0) GOTO 9100
      CALL CODE(LEN*2)
      READ(IBUF,*)WDEP
C
C     POROSITY
C
      LINE=LINE+1
      POROSY=0
      CALL READF(IDCB,IERR,IBUF,60,LEN)
      IF (IERR.LT.0) GOTO 9100
      CALL CODE(LEN*2)
      READ(IBUF,*)POROSY
C
C     PERMEABILITY
C
      LINE=LINE+1
      PERMEB=0
      CALL READF(IDCB,IERR,IBUF,60,LEN)
      IF (IERR.LT.0) GOTO 9100
      CALL CODE(LEN*2)
      READ(IBUF,*)PERMEB
C
C     THICKNESS
C
      LINE=LINE+1
      THICK=0
      CALL READF(IDCB,IERR,IBUF,60,LEN)
```

```
      IF (IERR.LT.0) GOTO 9100
      CALL CODE(LEN*2)
      READ(IBUF,*)THICK
C
C     PRESSURE
C
      LINE=LINE+1
      PRESS=0
      CALL READF(IDCB,IERR,IBUF,60,LEN)
      IF (IERR.LT.0) GOTO 9100
      CALL CODE(LEN*2)
      READ(IBUF,*)PRESS
C
C     TEMPERATURE
C
      LINE=LINE+1
      TEMPC=0
      CALL READF(IDCB,IERR,IBUF,60,LEN)
      IF (IERR.LT.0) GOTO 9100
      CALL CODE(LEN*2)
      READ(IBUF,*)TEMPC
C
C     DISTANCE TO TERMINAL
C
      LINE=LINE+1
      DISTER=0
      CALL READF(IDCB,IERR,IBUF,60,LEN)
      IF (IERR.LT.0) GOTO 9100
      CALL CODE(LEN*2)
      READ(IBUF,*)DISTER
C
C     GET PRODUCTION DATA
C
C     BASE YEAR
C
      LINE=LINE+1
      IYBASE=0
      CALL READF(IDCB,IERR,IBUF,60,LEN)
      IF (IERR.LT.0) GOTO 9100
      CALL CODE(LEN*2)
      READ(IBUF,*)IYBASE
C
C     1ST YEAR OF PRODUCTION
C
      LINE=LINE+1
      IPY=0
      CALL READF(IDCB,IERR,IBUF,60,LEN)
      IF (IERR.LT.0) GOTO 9100
      CALL CODE(LEN*2)
      READ(IBUF,*)IPY
C
C     MAX LIFE OF FIELD
C
      LINE=LINE+1
      LIFEY=0
      CALL READF(IDCB,IERR,IBUF,60,LEN)
      IF (IERR.LT.0) GOTO 9100
      CALL CODE(LEN*2)
      READ(IBUF,*)LIFEY
C
```

```
C       PER WELL PRODUCTION
C
        LINE=LINE+1
        PWEL=0
        CALL READF(IDCB,IERR,IBUF,60,LEN)
        IF (IERR.LT.0) GOTO 9100
        CALL CODE(LEN*2)
        READ(IBUF,*)PWEL
C
C       WELL NUMBERS
C
        LINE=LINE+1
        CALL IFILL(NW,LIFEY,0)
        CALL READF(IDCB,IERR,IBUF,60,LEN)
        IF (IERR.LT.0) GOTO 9100
        CALL CODE(LEN*2)
        READ(IBUF,*)NW
C
C       DECLINE RATES
C
        IF (PWEL.EQ.0) GOTO 60
        IRPDNF=0
        LINE=LINE+1
        IYDC1=0
        IYDC2=0
        RDECL1=0
        RDECL2=0
        CALL READF(IDCB,IERR,IBUF,60,LEN)
        IF (IERR.LT.0) GOTO 9100
        CALL CODE(LEN*2)
        READ(IBUF,*)IYDC1,RDECL1,IYDC2,RDECL2
        GOTO 70
C
C       RATES OF PRODUCTION
C
60      IRPDNF=1
        LINE=LINE+1
        CALL RFILL(RPDN,LIFEY,-1.)
        CALL READF(IDCB,IERR,IBUF,60,LEN)
        IF (IERR.LT.0) GOTO 9100
        CALL CODE(LEN*2)
        READ(IBUF,*)RPDN
        CALL EXTND(RPDN,LIFEY,-1.)
        CALL PUSH(RPDN,LIFEY,IPY)
C
C       DET MAX WELLS, PROD'N AND YEARS
C
70      IF (IPY.LT.IYBASE) IPY=IYBASE+IPY-1
        IF (IYDC1.LT.IYBASE) IYDC1=IPY+IYDC1-1
        IF (IYDC2.EQ.0) IYDC2=LIFEY+1
        IF (IYDC2.LT.IYBASE) IYDC2=IPY+IYDC2-1
        DO 72 I=1,LIFEY
        IYEAR(I)=IYBASE+I-1
        IF (IPY.EQ.IYEAR(I)) IPY=I
        IF (IYDC1.EQ.IYEAR(I)) IYDC1=I
        IF (IYDC2.EQ.IYEAR(I)) IYDC2=I
72      CONTINUE
        DO 73 I=LIFEY,IPY,-1
        J=I-IPY+1
73      NW(I)=NW(J)
```

```
      DO 74 I=1,IPY-1
74    NW(I)=0
      DO 75 I=IPY,LIFEY-1
      IF (NW(I+1).LE.NW(I)) GOTO 76
75    CONTINUE
      IYRMX=LIFEY
      GOTO 80
76    IYRMX=I
      DO 78 I=IYRMX+1,LIFEY
78    NW(I)=NW(IYRMX)
C
C     CALCULATE PRODUCTION PROFILE
C
80    NWT=NW(IYRMX)
      IF (IRPDNF.EQ.0) GOTO 100
      CALL PUSH(RPDN,LIFEY,IPY)
      DO 90 I=1,LIFEY
90    RPDN(I)=RPDN(I)/365.
      PWEL=RPDN(IYRMX)/NW(IYRMX)
      GOTO 150
100   DO 110 I=1,IPY-1
110   RPDN(I)=0.0
      RDECL1=(100.-RDECL1)/100.
      RDECL2=(100.-RDECL2)/100.
      DO 140 I=IPY,LIFEY
      IF (I.GE.IYDC1) GOTO 120
      RPDN(I)=PWEL*NW(I)
      GOTO 140
120   IF (I.GE.IYDC2) GOTO 130
      RPDN(I)=RPDN(I-1)*RDECL1
      GOTO 140
130   RPDN(I)=RPDN(I-1)*RDECL1
140   CONTINUE
C
C     READ COST & FINANCIAL DATA
C
C     DEPRECIABLE CAPITAL
C
150   LINE=LINE+1
      CALL RFILL(CAPA,LIFEY,0.)
      CALL READF(IDCB,IERR,IBUF,60,LEN)
      IF (IERR.LT.0) GOTO 9100
      CALL CODE(LEN*2)
      READ(IBUF,*)CAPA
C
C     EQUIPMENT CAPITAL
C
      LINE=LINE+1
      CALL RFILL(CAPB,LIFEY,0.)
      CALL READF(IDCB,IERR,IBUF,60,LEN)
      IF (IERR.LT.0) GOTO 9100
      CALL CODE(LEN*2)
      READ(IBUF,*)CAPB
C
C     EXPLORATION CAPITAL
C
      LINE=LINE+1
      CALL RFILL(CAPC,LIFEY,0.)
      CALL READF(IDCB,IERR,IBUF,60,LEN)
      IF (IERR.LT.0) GOTO 9100
```

```
      CALL CODE(LEN*2)
      READ(IBUF,*)CAPC
C
C     PER WELL OPERATING COSTS
C
      LINE=LINE+1
      CALL RFILL(PWPRC,LIFEY,-1.)
      CALL READF(IDCB,IERR,IBUF,60,LEN)
      IF (IERR.LT.0) GOTO 9100
      CALL CODE(LEN*2)
      READ(IBUF,*)PWPRC
      CALL EXTND(PWPRC,LIFEY,-1.)
      CALL PUSH(PWPRC,LIFEY,IPY)
C
C     PER UNIT OPERATING COSTS
C
      LINE=LINE+1
      CALL RFILL(PUPRC,LIFEY,-1.)
      CALL READF(IDCB,IERR,IBUF,60,LEN)
      IF (IERR.LT.0) GOTO 9100
      CALL CODE(LEN*2)
      READ(IBUF,*)PUPRC
      CALL EXTND(PUPRC,LIFEY,-1.)
      CALL PUSH(PUPRC,LIFEY,IPY)
C
C     GENERAL ADMIN & INJECTION COSTS
C
      LINE=LINE+1
      XGA=0.
      WGA=0.
      XINJ=0.
      WINJ=0.
      CALL READF(IDCB,IERR,IBUF,60,LEN)
      IF (IERR.LT.0) GOTO 9100
      CALL CODE(LEN*2)
      READ(IBUF,*)XGA,WGA,XINJ,WINJ
C
C     PRICE AT END OF PIPELINE
C
      LINE=LINE+1
      CALL RFILL(PRICE,LIFEY,-1.)
      CALL READF(IDCB,IERR,IBUF,60,LEN)
      IF (IERR.LT.0) GOTO 9100
      CALL CODE(LEN*2)
      READ(IBUF,*)PRICE
      CALL EXTND(PRICE,LIFEY,-1.)
      CALL PUSH(PRICE,LIFEY,IPY)
C
C     WELL HEAD PRICE ADJUSTMENT
C
      LINE=LINE+1
      CALL RFILL(WHPRI,LIFEY,-1.)
      CALL READF(IDCB,IERR,IBUF,60,LEN)
      IF (IERR.LT.0) GOTO 9100
      CALL CODE(LEN*2)
      READ(IBUF,*)WHPRI
      CALL EXTND(WHPRI,LIFEY,-1.)
      CALL PUSH(WHPRI,LIFEY,IPY)
C
C     ROYALTIES
```

```
C
      LINE=LINE+1
      GVROY=0.
      CALL READF(IDCB,IERR,IBUF,60,LEN)
      IF (IERR.LT.0) GOTO 9100
      CALL CODE(LEN*2)
      READ(IBUF,*)GVROY
C
C     TAXRATE
C
      LINE=LINE+1
      TAXRAT=0.
      CALL READF(IDCB,IERR,IBUF,60,LEN)
      IF (IERR.LT.0) GOTO 9100
      CALL CODE(LEN*2)
      READ(IBUF,*)TAXRAT
C
C     INVESTMENT ALLOWANCE DATA
C
      LINE=LINE+1
      ILYINV=0.
      PINVA=0.
      CALL READF(IDCB,IERR,IBUF,60,LEN)
      IF (IERR.LT.0) GOTO 9100
      CALL CODE(LEN*2)
      READ(IBUF,*)ILYINV,PINVA
C
C     COMPANY TYPE
C
      LINE=LINE+1
      NCPY=0
      CALL READF(IDCB,IERR,IBUF,60,LEN)
      IF (IERR.LT.0) GOTO 9100
      CALL CODE(LEN*2)
      READ(IBUF,*)NCPY
C
C     DEBT PERCENT
C
      LINE=LINE+1
      DBT=0.
      CALL READF(IDCB,IERR,IBUF,60,LEN)
      IF (IERR.LT.0) GOTO 9100
      CALL CODE(LEN*2)
      READ(IBUF,*)DBT
C
C     INTEREST ON DEBT
C
      LINE=LINE+1
      RINT=0.
      CALL READF(IDCB,IERR,IBUF,60,LEN)
      IF (IERR.LT.0) GOTO 9100
      CALL CODE(LEN*2)
      READ(IBUF,*)RINT
C
C     CLOSE INPUT FILE
C
      CALL CLOSE(IDCB)
C
C     INITIALISE & CALL NCALC
C
```

```
      LIFE=LIFEY
160   LIFEY=LIFE
      CALL NCALC
      DO 170 J=1,LIFEY
      IF (OCUNCF(J))170,170,180
170   CONTINUE
180   FRAC=OCUNCF(J-1)/ONTCF(J)
      PYOUT=J-1+ABS(FRAC)
      OCAPTL=OCINV(LIFEY)
      PRDDI=OCUNCF(LIFEY)/OCAPTL
      DO 190 I=1,LIFEY
190   GVIK(I)=OROY(I)+ONTX(I)
      RESSI=0.0
      DO 220 I=1,LIFEY
220   RESSI=RESSI+RPDN(I)*365/1E6
      OEQT=OCINV(LIFEY)*(1.-DBT/100.)
C
C     GET DCF ROR
C
      CALL ROR(ONTCF,LIFEY,PW,DCFROR,LUI)
C
C     PRINT RESULTS TO TERMINAL
C
      IF (NCPY.EQ.0) GOTO 224
      WRITE(LUI,222)
222   FORMAT(/"DEVELOPMENT BY EXISTING COMPANY"/)
      GOTO 228
224   WRITE(LUI,226)
226   FORMAT(/"DEVELOPMENT BY NEW COMPANY")
228   WRITE(LUI,230)DCFROR,RESSI,(PW(I),I=1,3)
230   FORMAT("DISCOUNT RATE OF RETURN"F6.2/
     +       "RECOVERABLE RESERVES   "F6.2//
     +       "PRESENT WORTH  - 10%   "F6.2/
     +       "                - 15%   "F6.2/
     +       "                - 20%   "F6.2/)
C
C     SEE IF WANT PRINTOUT
C
235   WRITE(LUI,240)
240   FORMAT("DO YOU WANT A DETAILED PRINTOUT OF THIS CASE (Y/N) ?_")
      READ(LUI,1530)IANS
      IF (IANS.EQ.1HN) GOTO 1500
      IF (IANS.NE.1HY) GOTO 235
C
C     GET PRINTOUT LU
C
      IF (LUO.GT.0) GOTO 1000
      WRITE(LUI,260)
260   FORMAT(/"LU FOR OUTPUT ?_")
      READ(LUI,*)LUO
C
C     TIME/DATE
C
1000  WRITE(LUO,1020)(IDESC(I),I=1,55)
1020  FORMAT(//X,40A2,20X,15A2/X,130"=")
C
C     BASE DATA
C
      WRITE(LUO,1025)IBTBL
1025  FORMAT(X,"Base case number"18X,I6)
```

```
      WRITE(LUO,1026)ITBL
1026  FORMAT(X,"This case number"18X,I6)
      WRITE(LUO,1027)IEXT
1027  FORMAT(X,"Extract"29X,2A2)
      WRITE(LUO,1030)NSTATE,WADEP,WDEP,POROSY,PERMEB,THICK,PRESS
     +  ,TEMPC,DISTER,IYEAR(IPY),IYEAR(IYRMX),LIFEY,PWEL
1030  FORMAT(X,"State"29X,I6/
     +       X,"Water depth (m)"19X,I6/
     +       X,"Well depth (m)"20X,I6/
     +       X,"Porosity (%)"22X,F6.1/
     +       X,"Permeability (mD)"17X,F6.1/
     +       X,"Pay thickness (m)"17X,I6/
     +       X,"Pressure (MPa)"20X,I6/
     +       X,"Temperature (degC)"16X,F6.1/
     +       X,"Dist. to terminal (km)"12X,I6/
     +       X,"Year of initial production"10X,I4/
     +       X,"Year of maximum production"10X,I4/
     +       X,"Field life (yr)"19X,I6/
     +       X,"Maximum well production"11X,F6.1/
     +       X," (kl/well/day)")
C
C     YEARLY DATA
C
      I4=(LIFEY-1)/10+1
      DO 1060 K=1,I4
      IF (K.LT.I4) I3=10
      IF (K.EQ.I4) I3=LIFEY-(K-1)*10
      I1=(K-1)*10+1
      I2=I1+I3-1
      WRITE(LUO,1050)
1050  FORMAT(2X)
      WRITE(LUO,1100)(IYEAR (I),I=I1,I2)
      WRITE(LUO,1110)(NW    (I),I=I1,I2)
      WRITE(LUO,1120)(RPDN  (I),I=I1,I2)
      WRITE(LUO,1155)(PRICE (I),I=I1,I2)
      WRITE(LUO,1157)(WHPRI (I),I=I1,I2)
      WRITE(LUO,1160)(FREV  (I),I=I1,I2)
      WRITE(LUO,1180)(OROY  (I),I=I1,I2)
      WRITE(LUO,1130)(WOC   (I),I=I1,I2)
      WRITE(LUO,1140)(GAD   (I),I=I1,I2)
      WRITE(LUO,1150)(POPCST(I),I=I1,I2)
      WRITE(LUO,1170)(POPIN (I),I=I1,I2)
      WRITE(LUO,1190)(CAPA  (I),I=I1,I2)
      WRITE(LUO,1200)(FINT  (I),I=I1,I2)
      WRITE(LUO,1210)(SUMAA (I),I=I1,I2)
      WRITE(LUO,1220)(CAPB  (I),I=I1,I2)
      WRITE(LUO,1230)(DPR   (I),I=I1,I2)
      WRITE(LUO,1240)(CAPC  (I),I=I1,I2)
      WRITE(LUO,1250)(SUMCA (I),I=I1,I2)
      WRITE(LUO,1260)(OCINV (I),I=I1,I2)
      WRITE(LUO,1270)(ONNTX (I),I=I1,I2)
      WRITE(LUO,1280)(ONTX  (I),I=I1,I2)
      WRITE(LUO,1282)(ALLOW (I),I=I1,I2)
      WRITE(LUO,1290)(ONTCF (I),I=I1,I2)
      WRITE(LUO,1300)(OCUNCF(I),I=I1,I2)
      WRITE(LUO,1310)(OINTRS(I),I=I1,I2)
      WRITE(LUO,1320)(OLON  (I),I=I1,I2)
      WRITE(LUO,1330)(ONIPC (I),I=I1,I2)
      WRITE(LUO,1340)(OGROCF(I),I=I1,I2)
      WRITE(LUO,1350)(OLOSS (I),I=I1,I2)
```

```
      WRITE(LUO,1360)(GVTK  (I),I=I1,I2)
      WRITE(LUO,1370)(OEQ   (I),I=I1,I2)
      WRITE(LUO,1380)(OEQTT (I),I=I1,I2)
      WRITE(LUO,1390)(ODTPY (I),I=I1,I2)
1060  CONTINUE
1100  FORMAT(X,"Year                                1"10I10)
1110  FORMAT(X,"Number of wells                     2"10I10)
1120  FORMAT(X,"Production in year                  3"10F10.1)
1130  FORMAT(X,"Well operating costs                8"10F10.3)
1140  FORMAT(X,"General admin & inject costs        9"10F10.3)
1150  FORMAT(X,"Total operating costs              10"10F10.3)
1155  FORMAT(X,"Oil/Gas price                       4"10F10.3)
1157  FORMAT(X,"Adjustment to wellhead price        5"10F10.3)
1160  FORMAT(X,"Sales                               6"10F10.3)
1170  FORMAT(X,"Income                             11"10F10.3)
1180  FORMAT(X,"Royalties                           7"10F10.3)
1190  FORMAT(X,"Prodn equipment capital            12"10F10.3)
1200  FORMAT(X,"Investment allowance               13"10F10.3)
1210  FORMAT(X,"Prodn equipment allowance          14"10F10.3)
1220  FORMAT(X,"Depreciable capital                15"10F10.3)
1230  FORMAT(X,"Depreciation allowance             16"10F10.3)
1240  FORMAT(X,"Exploration capital                17"10F10.3)
1250  FORMAT(X,"Exploration allowance              18"10F10.3)
1260  FORMAT(X,"Cumulative investment              19"10F10.3)
1270  FORMAT(X,"Pretax income                      20"10F10.3)
1280  FORMAT(X,"Tax payable                        21"10F10.3)
1282  FORMAT(X,"Dedns against prior income         22"10F10.3)
1290  FORMAT(X,"Net cash flow                      23"10F10.3)
1300  FORMAT(X,"Cumulative cash flow               24"10F10.3)
1310  FORMAT(X,"Interest repayment                 25"10F10.3)
1320  FORMAT(X,"Load repayment                     26"10F10.3)
1330  FORMAT(X,"Income in producing country        27"10F10.3)
1340  FORMAT(X,"Cumulative gross cash flow         28"10F10.3)
1350  FORMAT(X,"Unrecovered losses                 29"10F10.3)
1360  FORMAT(X,"Government take                    30"10F10.3)
1370  FORMAT(X,"Operators equity                   31"10F10.3)
1380  FORMAT(X,"Cumulative operators equity        32"10F10.3)
1390  FORMAT(X,"Debt repayment                     33"10F10.3)
C
C     FIELD PROSPECTS
C
      IF (NCPY.EQ.0) WRITE(LUO,1396)
      IF (NCPY.EQ.1) WRITE(LUO,1398)
1396  FORMAT(/X,"Company type"20X"NEW")
1398  FORMAT(/X,"Company type"20X"EXISTING")
      WRITE(LUO,1400)PYOUT,PRDDI,RESSI,OEQT,DCFROR,OCAPTL,
     +  GVROY,TAXRAT
1400  FORMAT(X,"Payout (yr)"23X,F6.2/
     +       X,"Profit/$ invested"17X,F6.2/
     +       X,"Recoverable reserves"14X,F6.2/
     +       X,"Operator equity"19X,F6.2/
     +       X,"DCF ROR (%)"23X,F6.2/
     +       X,"Capital investment"16X,F6.2/
     +       X,"Royalties (%)"21X,F6.2/
     +       X,"Tax rate (%)"22X,F6.2)
      WRITE(LUO,1410)PW
1410  FORMAT(/X,"PRESENT WORTH    10% M$"F8.2/
     +  "  OF NETT AT"6X"15% M$"F8.2/18X"20% M$"F8.2/)
      WRITE(LUO,1420) 6137B
1420  FORMAT(A2)
```

```
C
C     SEE IF INTERESTED IN SAVING
C
1500  ITBL=0
1510  WRITE(LUI,1520)
1520  FORMAT(/"DO YOU WANT TO SAVE THIS RUN (Y/N) ?_")
      READ(LUI,1530)IANS
1530  FORMAT(A1)
      IF (IANS.EQ.1HN) GOTO 2000
      IF (IANS.NE.1HY) GOTO 1510
C
C     ASK FOR CASE NUMBER
C
1535  WRITE(LUI,1540)
1540  FORMAT("CASE:ISC:ICR ?_")
      READ(LUI,*)ITBL,ISC,ICR
      CALL CODE
      WRITE(NAME,1550)ITBL
1550  FORMAT("0"I4" ")
      DO 1560 I=1,3
      IF (NAME(I)/256.EQ.40B) NAME(I)=NAME(I)+20B*256
      IF (I.EQ.3) GOTO 1560
      IF (MOD(NAME(I),256).EQ.40B) NAME(I)=NAME(I)+20B
1560  CONTINUE
      WRITE(LUI,1570)NAME
1570  FORMAT("DATA BEING SAVED IN FILE "3A2)
C
C     TRY TO CREATE FILE
C
1575  ISIZE=(115+66*LIFEY)/128+1
      CALL CREAT(IDCB,IERR,NAME,ISIZE,3,ISC,ICR)
      IF (IERR.GT.0) GOTO 1700
      IF (IERR.EQ.-2) GOTO 1590
      WRITE(LUI,1580)IERR,NAME,ICR
1580  FORMAT(/"ERROR"I4" IN CREATING FILE "3A2"::"I6)
      GOTO 9200
C
C     SEE IF WANT TO OVERWRITE
C
1590  WRITE(LUI,1600)NAME,ICR
1600  FORMAT(/"FILE "3A2"::"I6" ALREADY EXISTS"/
     + "DO YOU WANT TO OVERWRITE IT (Y/N) ?_")
      READ(LUI,1530)IANS
      IF (IANS.EQ.1HN) GOTO 1535
      IF (IANS.NE.1HY) GOTO 1590
C
C     PURGE EXISTING OUTPUT FILE
C
      CALL PURGE(IDCB,IERR,NAME,ISC,ICR)
      IF (IERR.GE.0) GOTO 1575
      WRITE(LUI,1610)IERR,NAME
1610  FORMAT(/"ERROR"I4" IN PURGING EXISTING FILE" 3A2)
      GOTO 9200
C
C     WRITE TO FILE
C
1700  LINE=1
      IDESC(56)=IEXT(1)
      IDESC(57)=IEXT(2)
      CALL WRITF(IDCB,IERR,IDESC,57)
```

```
      IF (IERR.LT.0) GOTO 9120
C
C     MISC VALUES
C
      IBUF(1)=IBTBL
      IBUF(2)=ITBL
      IBUF(3)=NSTATE
      IBUF(4)=IYEAR(IPY)
      IBUF(5)=IYEAR(IYRMX)
      IBUF(6)=LIFEY
      IBUF(7)=NCPY
      IBUF(8)=ILYINV
      RBUF(5)=WADEP
      RBUF(6)=WDEP
      RBUF(7)=POROSY
      RBUF(8)=PERMEB
      RBUF(9)=THICK
      RBUF(10)=PRESS
      RBUF(11)=TEMPC
      RBUF(12)=DISTER
      RBUF(13)=PWEL
      RBUF(14)=PYOUT
      RBUF(15)=PRDDI
      RBUF(16)=RESSI
      RBUF(17)=OEQT
      RBUF(18)=DCFROR
      RBUF(19)=OCAPTL
      RBUF(20)=GVROY
      RBUF(21)=TAXRAT
      RBUF(22)=PINVA
      RBUF(23)=DBT
      RBUF(24)=RINT
      RBUF(25)=PW(1)
      RBUF(26)=PW(2)
      RBUF(27)=PW(3)
      LINE=LINE+1
      CALL WRITF(IDCB,IERR,IBUF,54)
      IF (IERR.LT.0) GOTO 9120
C
C     YEARS, WELLS
C
      DO 1710 I=1,LIFEY
      IBUF(I)=NW(I)
1710  IBUF(LIFEY+I)=IYEAR(I)
      LINE=LINE+1
      CALL WRITF(IDCB,IERR,IBUF,LIFEY*2)
      IF (IERR.LT.0) GOTO 9120
C
C     REMAINDER OF REAL ARRAYS
C
      CALL WRITR(IDCB,IERR,RPDN  ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9120
      CALL WRITR(IDCB,IERR,PRICE ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9120
      CALL WRITR(IDCB,IERR,WHPRI ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9120
      CALL WRITR(IDCB,IERR,FREV  ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9120
      CALL WRITR(IDCB,IERR,OROY  ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9120
```

```
      CALL WRITR(IDCB,IERR,WOC    ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9120
      CALL WRITR(IDCB,IERR,GAD    ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9120
      CALL WRITR(IDCB,IERR,POPCST,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9120
      CALL WRITR(IDCB,IERR,POPIN ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9120
      CALL WRITR(IDCB,IERR,CAPA   ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9120
      CALL WRITR(IDCB,IERR,FINT   ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9120
      CALL WRITR(IDCB,IERR,SUMAA ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9120
      CALL WRITR(IDCB,IERR,CAPB   ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9120
      CALL WRITR(IDCB,IERR,DPR    ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9120
      CALL WRITR(IDCB,IERR,CAPC   ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9120
      CALL WRITR(IDCB,IERR,SUMCA ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9120
      CALL WRITR(IDCB,IERR,OCINV ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9120
      CALL WRITR(IDCB,IERR,ONNTX ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9120
      CALL WRITR(IDCB,IERR,ONTX   ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9120
      CALL WRITR(IDCB,IERR,ALLOW ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9120
      CALL WRITR(IDCB,IERR,ONTCF ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9120
      CALL WRITR(IDCB,IERR,OCUNCF,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9120
      CALL WRITR(IDCB,IERR,OINTRS,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9120
      CALL WRITR(IDCB,IERR,OLON   ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9120
      CALL WRITR(IDCB,IERR,ONIPC ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9120
      CALL WRITR(IDCB,IERR,OGROCF,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9120
      CALL WRITR(IDCB,IERR,OLOSS ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9120
      CALL WRITR(IDCB,IERR,GVTK   ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9120
      CALL WRITR(IDCB,IERR,OEQ    ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9120
      CALL WRITR(IDCB,IERR,OEQTT ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9120
      CALL WRITR(IDCB,IERR,ODTPY ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9120
      CALL CLOSE(IDCB)
C
C     SEE IF WANT TO MODIFY
C
2000  WRITE(LUI,2010)
2010  FORMAT(/"DO YOU WANT TO MODIFY ANY DATA AND RERUN (Y/N) ?_")
      READ(LUI,1530)IANS
      IF (IANS.EQ.1HN) GOTO 9000
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```
      IF (IANS.NE.1HY) GOTO 2000
C
C     SEE WHAT TO MODIFY
C
2020  WRITE(LUI,2030)
2030  FORMAT(/"TO MODIFY - ROYALTY RATE  ENTER 1"/
     +         "           - TAX RATE             2"/
     +         "           - COMPANY TYPE         3"/
     +         "           - PRICES               4"/
     +         "           - WELL PRODUCTION      5"/
     +         "           - PER WELL PROD'N      6"/
     +         "           - NUMBER OF WELLS      7"/)
      WRITE(LUI,2050)
2050  FORMAT("WHAT DO YOU WANT TO MODIFY ?_")
      IMODY=0
      READ(LUI,*)IMODY
      GOTO (2020,2100,2200,2300,2400,2500,2600,2700,3000),IMODY+1
C
C     MODIFY ROYALTY
C
2100  WRITE(LUI,2110)GVROY
2110  FORMAT(/"CURRENT ROYALTY "F4.1"%"/
     +  "NEW ROYALTY ?_")
      READ(LUI,*)GVROY
      GOTO 3000
C
C     MODIFY TAXRATE
C
2200  WRITE(LUI,2210)TAXRAT
2210  FORMAT(/"CURRENT TAX RATE "F4.1"%"/
     +  "NEW TAX RATE ?_")
      READ(LUI,*)TAXRAT
      GOTO 3000
C
C     MODIFY COMPANY TYPE
C
2300  IF (NCPY.EQ.0) GOTO 2320
      WRITE(LUI,2310)
2310  FORMAT(/"THE COMPANY TYPE HAS BEEN CHANGED FROM AN EXISTING "
     1        "COMPANY TO A NEW COMPANY")
      NCPY=0
      GOTO 3000
2320  WRITE(LUI,2330)
2330  FORMAT(/"THE COMPANY TYPE HAS BEEN CHANGED FROM A NEW "
     1        "COMPANY TO AN EXISTING COMPANY")
      NCPY=1
      GOTO 3000
C
C     MODIFY PRICES
C
2400  WRITE(LUI,2410)(I,PRICE(I),I=1,MAXDIM)
2410  FORMAT(/"CURRENT PRICES"/6(5(I2,F6.2,6X)/))
      WRITE(LUI,2420)
2420  FORMAT(/"ENTER YEAR,PRICE,ESCALATION RATE"/"IF ESC RATE SET "
     +  "TO ZERO, A UNIFORM PRICE FROM THE NOMINATED YEAR IS"
     +  "ASSUMED"//"ENTER 0 FOR YEAR TO TERMINATE")
2430  IY=0
      ESC=0.0
      WRITE(LUI,2440)
2440  FORMAT("YEAR,PRICE,ESC RATE ?_")
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```
      READ(LUI,*)IY,PDN,ESC
      IF (IY.EQ.0) GOTO 3000
      IF (IY.GE.1.AND.IY.LE.MAXDIM) GOTO 2460
      WRITE(LUI,2450)
2450  FORMAT("INVALID YEAR")
      GOTO 2430
2460  DO 2470 I=IY,MAXDIM
      J=I-IY
2470  PRICE(I)=PDN*(1+ESC)**J
      GOTO 2400
C
C     MODIFY PRODUCTION RATES
C
2500  WRITE(LUI,2510)(I,RPDN(I),I=1,MAXDIM)
2510  FORMAT(/"CURRENT RATES OF PRODUCTION"/6(5(I2,F8.1,4X)/))
      WRITE(LUI,2520)
2520  FORMAT(/"ENTER YEAR,NEW RATE OF PRODUCTION"/
     +  "ENTER 0 FOR YEAR TO TERMINATE")
      IY=0
      WRITE(LUI,2540)
2540  FORMAT("YEAR,PROD'N ?_")
      READ(LUI,*)IY,PDN
      IF (IY.EQ.0) GOTO 3000
      RPDN(IY)=PDN
      GOTO 2430
C
C     MODIFY PRODUCTION BY PER WELL FIGURE
C
2600  WRITE(LUI,2610)PWEL
2610  FORMAT(/"CURRENT PER WELL PRODUCTION"F6.1/
     +  "NEW PRODUCTION RATE ?_")
      READ(LUI,*)PDN
      DO 2620 I=1,MAXDIM
2620  RPDN(I)=RPDN(I)*PDN/PWEL
      PWEL=PDN
      GOTO 3000
C
C     MODIFY NO OF WELLS
C
2700  WRITE(LUI,2710)NWT
2710  FORMAT(/"MAXIMUM NO. OF WELLS"I4/
     +  "NEW MAXIMUM NUMBER ?_")
      READ(LUI,*)NWTN
      DO 2720 I=IPY,MAXDIM
      NEW=(NW(I)*NWTN)/NWT
      RPDN(I)=RPDN(I)*NEW/NW(J)
2720  NW(I)=NEW
      NWT=NWTN
      GOTO 3000
C
C     SEE IF ANY MORE CASES
C
3000  WRITE(LUI,3010)
3010  FORMAT(/"ANY MORE MODIFICATIONS (Y/N) ?_")
      READ(LUI,30)IANS
      IF (IANS.EQ.1HY) GOTO 2020
      IF (IANS.NE.1HN) GOTO 3000
      GOTO 160
C
C     SEE IF ANOTHER RUN
```

```
C
9000  WRITE(LUI,9010)
9010  FORMAT(/"ANOTHER RUN (Y/N) ?_")
      READ(LUI,1530)IANS
      IF (IANS.EQ.1HY) GOTO 10
      IF (IANS.NE.1HN) GOTO 9000
C
C     SUCCESSFUL COMPLETION
C
      WRITE(LUI,9030)
9030  FORMAT(/"PROGRAM COMPLETED"/)
      GOTO 9500
C
C     FILE READ ERROR
C
9100  WRITE(LUI,9110)IERR,LINE,NAME
9110  FORMAT(/"READ ERROR"I4" AT LINE"I3" OF FILE "3A2)
      CALL CLOSE(IDCB)
      GOTO 9000
C
C     FILE WRITE ERROR
C
9120  WRITE(LUI,9130)IERR,LINE,NAME
9130  FORMAT(/"WRITE ERROR"I4" AT LINE"I3" OF FILE "3A2)
      CALL CLOSE(IDCB)
      GOTO 9000
C
C     OTHER ERRORS
C
9200  WRITE(LUI,9210)
9210  FORMAT(/"PROGRAM ABORTED"/)
C
C     END
C
9500  END
      END$
```

```
FTN4
C=============================================================
C
C     CALCULATION SUBROUTINE
C
C=============================================================
      SUBROUTINE NCALC
C
C     COMMON
C
      COMMON LUI,
     +  POPCST(30),CAPA(30),RPDN(30),FREV(30),ONTCF(30),
     +  POPIN(30),OROY(30),OINTRS(30),CUMCAP(30),
     +  OLON(30),OEQ(30),PW(3),NW(30),CAPB(30),CAPC(30),
     +  ONNTX(30),ONTX(30),ONIPC(30),PRICE(30),SUMAA(30),
     +  OGROCF(30),OCUNCF(30),FINT(30),OLOSS(30),OCINV(30),
     +  SUMCA(30),GVTK(30),ODTPY(30),IYEAR(30),WHPRI(30),
     +  NWT,IPY,XGA,WGA,XINJ,WINJ,WOC(30),GAD(30),
     +  GVROY,DTPY,RINT,DBT,IEXT(2),ALLOW(30),
     +  DPR(30),OEQTT(30),PWPRC(30),PUPRC(30),
     +  NSTATE,LIFEY,TAXRAT,ILYINV,PINVA,NCPY,MAXDIM
C
C*************************************************************
C
C     VARIABLES USED - OTHER THAN COMMON
C
C I                   LOOP COUNTER
C J                   LOOP COUNTER
C MAXDIM              MAXIMUM ARRAY SIZE FOR ANNUAL DATA
C
C     EXTERNAL ROUTINES
C
C AINTX               TAXATION SUBROUTINE
C AUROY               ROYALTIES SUBROUTINE
C AUSOP               OPERATING COSTS SUBROUTINE
C OINT                INTEREST CALCULATION SUBROUTINE
C RFILL               REAL FILL AN ARRAY
C
C*************************************************************
C
C     INITIALIZE ARRAYS
C
      CALL RFILL(FREV,MAXDIM,0.0)
C
C     CALC REVENUE
C
      DO 40 I=1,LIFEY
      FREV(I)=365*RPDN(I)*PRICE(I)/1E6
      IF (IEXT.EQ.2HOI) FREV(I)=FREV(I)/.158987
      IF (IEXT.EQ.2HGA) FREV(I)=FREV(I)/.028317
40    CONTINUE
C
C     CALL OPCOST, ROYALTY, INTEREST, & TAX SUBROUT
C
      CALL AUSOP
      CALL AUROY
      CALL OINT
      CALL AINTX
      DO 100 J=1,LIFEY
      ONIPC(J)=POPIN(J)-OROY(J)-OINTRS(J)-ONTX(J)
```

```
100   OEQ(J)=(CAPA(J)+CAPB(J)+CAPC(J))*(1.-(DBT/100.))
      OEQTT(1)=OEQ(1)
      DO 55 I=2,LIFEY
55    OEQTT(I)=OEQTT(I-1)+OEQ(I)
      DO 54 J=1,LIFEY
54    OLON(J)=(CAPA(J)+CAPB(J)+CAPC(J))*DBT/100.
      DO 51 J=IPY,LIFEY
51    ODTPY(J)=DTPY
      RETURN
      END
C=============================================================
C
C     OPERATING COSTS SUBROUTINE
C
C=============================================================
      SUBROUTINE AUSOP
C
C     COMMON
C
      COMMON LUI,
     +  POPCST(30),CAPA(30),RPDN(30),FREV(30),ONTCF(30),
     +  POPIN(30),OROY(30),OINTRS(30),CUMCA?(30),
     +  OLON(30),OEQ(30),PW(3),NW(30),CAPB(30),CAPC(30),
     +  ONNTX(30),ONTX(30),ONIPC(30),PRICE(30),SUMAA(30),
     +  OGROCF(30),OCUNCF(30),FINT(30),OLOSS(30),OCINV(30),
     +  SUMCA(30),GVTK(30),ODTPY(30),IYEAR(30),WHPRI(30),
     +  NWT,IPY,XGA,WGA,XINJ,WINJ,WOC(30),GAD(30),
     +  GVROY,DTPY,RINT,DBT,IEXT(2),ALLOW(30),
     +  DPR(30),OEQTT(30),PWPRC(30),PUPRC(30),
     +  NSTATE,LIFEY,TAXRAT,ILYINV,PINVA,NCPY,MAXDIM
C
C**************************************************************
C
C     VARIABLES USED - OTHER THAN COMMON
C
C J                   LOOP VARIABLE
C YINJ                INJECTION COST MULTIPLIER (OIL=1,GAS=0)
C
C     EXTERNAL ROUTINES
C
C     RFILL           REAL FILL AN ARRAY
C
C**************************************************************
C
C     INITIALIZE
C
      CALL RFILL(WOC,MAXDIM,0.0)
      CALL RFILL(GAD,MAXDIM,0.0)
      CALL RFILL(POPCST,MAXDIM,0.0)
C
C     CALCULATES WELLOPERATING COST,WOC(J), & GENL. & ADMIN.,
C     GAD(J) FROM INPUT DATA.
C
      DO 40 J=IPY,LIFEY
      WOC(J)=NW(J)*PWPRC(J)+365.*RPDN(J)*PUPRC(J)
40    WOC(J)=WOC(J)/1000.
C     IS IT GAS; IF SO SET INJECTION COSTS=0.
      YINJ=1.
      IF (IEXT.EQ.2HGA) YINJ=0.
      DO 50 J=IPY,LIFEY
```

```
      GAD(J)=XGA+WGA*RPDN(J)*365.+XINJ*YINJ+WINJ*YINJ*RPDN(J)*365.
50    GAD(J)=GAD(J)/1000.
      DO 60 J=IPY,LIFEY
60    POPCST(J)=WOC(J)+GAD(J)
      RETURN
      END
C=============================================================
C
C     ROYALTIES SUBROUTINE
C
C=============================================================
      SUBROUTINE AUROY
C
C     COMMON
C
      COMMON LUI,
     +  POPCST(30),CAPA(30),RPDN(30),FREV(30),ONTCF(30),
     +  POPIN(30),OROY(30),OINTRS(30),CUMCAP(30),
     +  OLON(30),OEQ(30),PW(3),NW(30),CAPB(30),CAPC(30),
     +  ONNTX(30),ONTX(30),ONIPC(30),PRICE(30),SUMAA(30),
     +  OGROCF(30),OCUNCF(30),FINT(30),OLOSS(30),OCINV(30),
     +  SUMCA(30),GVTK(30),ODTPY(30),IYEAR(30),WHPRI(30),
     +  NWT,IPY,XGA,WGA,XINJ,WINJ,WOC(30),GAD(30),
     +  GVROY,DTPY,RINT,DBT,IEXT(2),ALLOW(30),
     +  DPR(30),OEQTT(30),PWPRC(30),PUPRC(30),
     +  NSTATE,LIFEY,TAXRAT,ILYINV,PINVA,NCPY,MAXDIM
C
C*************************************************************
C
C     VARIABLES USED - OTHER THAN COMMON
C
C J                 LOOP COUNTER
C
C     EXTERNAL ROUTINES
C
C RFILL             REAL FILL AN ARRAY
C
C*************************************************************
C
C     INITIALIZE
C
      CALL RFILL(POPIN,MAXDIM,0.0)
      CALL RFILL(OROY,MAXDIM,0.0)
C
C     CALCULATES ROYALTY PAYABLE(OROY), BASED ON INPUT ROYALTY RATE,
C     (GVROY) AND PROJECT AND OPERATOR INCOME (POPIN)
C
      DO 10 J=1,LIFEY
      POPIN(J)=FREV(J)-POPCST(J)
      IF (PRICE(J).EQ.0.0) GOTO 10
      OROY(J)=FREV(J)*(GVROY/100.)*(PRICE(J)-WHPRI(J))/PRICE(J)
10    CONTINUE
      RETURN
      END
C=============================================================
C
C     TAXATION & ALLOWANCES SUBROUTINE
C
C=============================================================
      SUBROUTINE AINTX
```

```
C
C      COMMON
C
       COMMON LUI,
      +  POPCST(30),CAPA(30),RPDN(30),FREV(30),ONTCF(30),
      +  POPIN(30),OROY(30),OINTRS(30),CUMCAP(30),
      +  OLON(30),OEQ(30),PW(3),NW(30),CAPB(30),CAPC(30),
      +  ONNTX(30),ONTX(30),ONIPC(30),PRICE(30),SUMAA(30),
      +  OGROCF(30),OCUNCF(30),FINT(30),OLOSS(30),OCINV(30),
      +  SUMCA(30),GVTK(30),ODTPY(30),IYEAR(30),WHPRI(30),
      +  NWT,IPY,XGA,WGA,XINJ,WINJ,WOC(30),GAD(30),
      +  GVROY,DTPY,RINT,DBT,IEXT(2),ALLOW(30),
      +  DPR(30),OEQTT(30),PWPRC(30),PUPRC(30),
      +  NSTATE,LIFEY,TAXRAT,ILYINV,PINVA,NCPY,MAXDIM
C
C*************************************************************
C
C      VARIABLES USED - OTHER THAN COMMON
C
C ADJUST              ADJUSTMENT TO EQUIP. ALLOW. IN LAST 5 YEARS
C I                   LOOP COUNTER
C I1                  LOOP COUNTER IN LOSS CALCULATION
C I2                  LOOP COUNTER IN LOSS CALCULATION
C IPCF                POSITIVE CASH FLOW FLAG
C IY                  YEAR COUNTER
C SUMA                TOTAL CAPITAL EQUIPMENT ALLOWANCE
C SUMAD               ADJUSTMENT TO PRODN EQUIP ALLOW
C SUMC                TOTAL EXPLORATION ALLOWANCE
C
C      EXTERNAL ROUTINES
C
C RFILL               REAL FILL AN ARRAY
C
C*************************************************************
C
C      INITIALIZE
C
       IPCF=0
       IY=0
       CALL RFILL(FINT  ,MAXDIM,0.0)
       CALL RFILL(DPR   ,MAXDIM,0.0)
       CALL RFILL(SUMAA ,MAXDIM,0.0)
       CALL RFILL(SUMCA ,MAXDIM,0.0)
       CALL RFILL(OLOSS ,MAXDIM,0.0)
       CALL RFILL(ONNTX ,MAXDIM,0.0)
       CALL RFILL(ONTX  ,MAXDIM,0.0)
       CALL RFILL(ONTCF ,MAXDIM,0.0)
       CALL RFILL(OCUNCF,MAXDIM,0.0)
       CALL RFILL(OCINV ,MAXDIM,0.0)
       CALL RFILL(ALLOW ,MAXDIM,0.0)
       SUMA=0.0
       SUMC=0.0
C
C      START LOOPING
C
90     IY=IY+1
       IF (IY.LE.LIFEY) GOTO 100
       WRITE(LUI,92)LIFEY
92     FORMAT(/"FIELD STILL HAS +VE CASH FLOW AFTER"I4" YEARS")
       RETURN
```

```
C
C     DETERMINE INVESTMENT ALLOWANCE
C
100   IF (IYEAR(IY).GT.ILYINV) GOTO 120
      FINT(IY)=PINVA/100.*CAPA(IY)
C
C     ACCUMULATE CAPA FOR PRODUCTION EQUIPMENT ALLOWANCE
C
120   SUMA=SUMA+CAPA(IY)
C
C     DEPRECIATION OF CAPB AT 10%
C
      IF (CAPB(IY).EQ.0) GOTO 140
      DO 130 I=0,9
130   DPR(IY+I)=DPR(IY+I)+.1*CAPB(IY)
C
C     ACCUMULATE CAPC FOR EXPLORATION EXPENDITURE ALLOWANCE
C
140   SUMC=SUMC+CAPC(IY)
C
C     TAXABLE INCOME
C
      ONNTX(IY)=POPIN(IY)-FINT(IY)-DPR(IY)-OROY(IY)
      IF (ONNTX(IY).GT.0) GOTO 150
      OLOSS(IY)=-ONNTX(IY)
      ONNTX(IY)=0.0
      IF (NCPY.EQ.0) GOTO 220
      ALLOW(IY)=ALLOW(IY)+OLOSS(IY)
      OLOSS(IY)=0.0
      ALLOW(IY)=ALLOW(IY)+.2*SUMA
      SUMA=.8*SUMA
      ALLOW(IY)=ALLOW(IY)+SUMC
      SUMC=0.0
      GOTO 220
C
C     REDUCE ONNTX BY PREVIOUS LOSSES
C
150   IF (NCPY.EQ.1) GOTO 172
      I1=MAX0(IY-7,1)
      I2=IY-1
      DO 170 I=I1,I2
      IF (OLOSS(I).EQ.0) GOTO 170
      IF (OLOSS(I).GT.ONNTX(IY)) GOTO 160
      ONNTX(IY)=ONNTX(IY)-OLOSS(I)
      OLOSS(I)=0.0
      GOTO 170
160   OLOSS(I)=OLOSS(I)-ONNTX(IY)
      ONNTX(IY)=0.0
      GOTO 220
170   CONTINUE
C
C     REDUCE ONNTX BY PROP. EQUIP. ALLOWANCE
C
172   IF (SUMA.EQ.0) GOTO 190
      IF (SUMA*.2.GT.ONNTX(IY)) GOTO 180
      ONNTX(IY)=ONNTX(IY)-SUMA*.2
      SUMAA(IY)=.2*SUMA
      SUMA=SUMA*.8
      GOTO 190
180   SUMAA(IY)=ONNTX(IY)
```

```
      ONNTX(IY)=0.0
      IF (NCPY.EQ.0) GOTO 184
      ALLOW(IY)=ALLOW(IY)+.2*SUMA-SUMAA(IY)
      SUMA=.8*SUMA
      GOTO 202
184   SUMA=SUMA-SUMAA(IY)
      GOTO 220
C
C     REDUCE ONNTX BY EXPLORATION EXPENDITURE
C
190   IF (SUMC.EQ.0) GOTO 210
      IF (SUMC.GT.ONNTX(IY)) GOTO 200
      ONNTX(IY)=ONNTX(IY)-SUMC
      SUMCA(IY)=SUMC
      SUMC=0.0
      GOTO 210
200   SUMCA(IY)=ONNTX(IY)
      ONNTX(IY)=0.0
      IF (NCPY.EQ.0) GOTO 204
202   ALLOW(IY)=ALLOW(IY)+SUMC-SUMCA(IY)
      SUMC=0.0
      GOTO 220
204   SUMC=SUMC-SUMCA(IY)
      GOTO 220
C
C     CALCULATE TAX PAYABLE
C
210   ONTX(IY)=ONNTX(IY)*TAXRAT/100.
C
C     CASH FLOW
C
220   ONTCF(IY)=-CAPA(IY)-CAPB(IY)-CAPC(IY)+POPIN(IY)-ONTX(IY)
     1  -OROY(IY)-OINTRS(IY)
      IF (NCPY.EQ.0) GOTO 225
      ONTCF(IY)=ONTCF(IY)+(TAXRAT)/100.*ALLOW(IY)
225   IF (ONTCF(IY).GT.0.0) IPCF=IPCF+1
C
C     ACCUMULATE CASH FLOW
C
      IF (IY.GT.1) GOTO 230
      OCUNCF(IY)=ONTCF(IY)
      OCINV(IY)=CAPA(IY)+CAPB(IY)+CAPC(IY)
      GOTO 90
230   OCUNCF(IY)=ONTCF(IY)+OCUNCF(IY-1)
      OCINV(IY)=CAPA(IY)+CAPB(IY)+CAPC(IY)+OCINV(IY-1)
      IF (IPCF.EQ.0) GOTO 90
C
C     CHECK FOR -VE CASH FLOW
C
      IF (ONTCF(IY).GT.0) GOTO 90
      LIFEY=IY-1
      IF (OCUNCF(IY).LT.0) GOTO 250
      LIFEY=LIFEY-1
      WRITE(LUI,232)LIFEY
232   FORMAT(/"LIFE OF PROJECT TO LAST +VE CASH FLOW =",I4" YEARS")
      DO 240 I=5,1,-1
      ADJUST=SUMAA(IY-6)-SUMAA(IY-I)
      ONNTX(IY-I)=ONNTX(IY-I)-ADJUST
      ONTX(IY-I)=ONNTX(IY-I)*TAXRAT/100.
      ONTCF(IY-I)=ONTCF(IY-I)-ADJUST
      SUMAA(IY-I)=SUMAA(IY-I)+ADJUST
```

```
240   OCUNCF(IY-I)=OCUNCF(IY-I)-ADJUST
250   RETURN
C
      END
C=============================================================
C
C     INTEREST SUBROUTINE
C
C=============================================================
      SUBROUTINE OINT
C
C     COMMON
C
      COMMON LUI,
     +  POPCST(30),CAPA(30),RPDN(30),FREV(30),ONTCF(30),
     +  POPIN(30),OROY(30),OINTRS(30),CUMCAP(30),
     +  OLON(30),OEQ(30),PW(3),NW(30),CAPB(30),CAPC(30),
     +  ONNTX(30),ONTX(30),ONIPC(30),PRICE(30),SUMAA(30),
     +  OGROCF(30),OCUNCF(30),FINT(30),OLOSS(30),OCINV(30),
     +  SUMCA(30),GVTK(30),ODTPY(30),IYEAR(30),WHPRI(30),
     +  NWT,IPY,XGA,WGA,XINJ,WINJ,WOC(30),GAD(30),
     +  GVROY,DTPY,RINT,DBT,IEXT(2),ALLOW(30),
     +  DPR(30),OEQTT(30),PWPRC(30),PUPRC(30),
     +  NSTATE,LIFEY,TAXRAT,ILYINV,PINVA,NCPY,MAXDIM

      DIMENSION XLOBL(30),SDTPY(30)
C
C*************************************************************
C
C     VARIABLES USED - OTHER THAN COMMON
C
C IYPD              LIFEY OF PROJECT
C J                 LOOP COUNTER
C OD                TOTAL DEBT TO PAY
C SDTPY  (*)        DEBT PAID
C XLOBL  (*)        OUTSTANDING DEBT
C
C*************************************************************

      OINTRS(1)=0.
      CUMCAP(1)=CAPA(1)+CAPB(1)+CAPC(1)
      DO 10 J=2,LIFEY
10    CUMCAP(J)=CUMCAP(J-1)+CAPA(J)+CAPB(J)+CAPC(J)
      IYPD=LIFEY+1-IPY
      OD=CUMCAP(LIFEY)*DBT/100.
      DTPY=OD/IYPD
      DO 14 J=1,LIFEY
14    SDTPY(J)=0.
      SDTPY(IPY)=DTPY
      DO 15 J=IPY+1,LIFEY
15    SDTPY(J)=SDTPY(J-1)+DTPY
      XLOBL(1)=0.
      DO 20 J=2,IPY
20    XLOBL(J)=CUMCAP(J-1)*DBT/100.
      DO 30 J=IPY+1,LIFEY
30    XLOBL(J)=CUMCAP(J-1)*DBT/100.-SDTPY(J-1)
      DO 40 J=2,LIFEY
40    OINTRS(J)=XLOBL(J)*(RINT/100.)
      RETURN
      END
```

```
C=============================================================
C
C      DCF ROR SUBROUTINE
C
C=============================================================
       SUBROUTINE ROR(CF,N,PW,RG,LUI)
C
       DIMENSION CF(1),RT(3),PW(1)
C
       RG=0
       SAL=0.
       CAP=0.
       RT(1)=10.
       RT(2)=15.
       RT(3)=20.
       CAP=0.
       RU=200.
       DO 100 I=1,3
       RTT=RT(I)
       CALL SUM(RTT,CF,N,PWW,CAP)
100    PW(I)=PWW
       TCF=-CAP
       DO 10 I=1,N
10     TCF=TCF+CF(I)
       IF (TCF.GT.0) GOTO 20
       WRITE(LUI,15)
15     FORMAT("OUT OF BOUNDS <0")
       RETURN
16     WRITE(LUI,18)
18     FORMAT("OUT OF BOUNDS >200")
       RETURN
20     CALL SUM(200.,CF,N,DCF,CAP)
       IF (DCF.GT.0) GOTO 16
       RL=0.
       RU=200.
       RG=20.
       I=1
25     CALL SUM(RG,CF,N,DCF,CAP)
       IF (DCF.LT.0) RU=RG
       IF (DCF.GE.0) RL=RG
       RG=RL+0.50*(RU-RL)
       I=I+1
       IF (I.LT.25) GOTO 40
       WRITE(LUI,30)
30     FORMAT("NOT CONVERGING")
       RETURN
40     IF ((RU-RL).GT.0.01) GOTO 25
       RETURN
       END
C=============================================================
C
C      NET CASH FLOW
C
C=============================================================
       SUBROUTINE SUM(RR,CF,N,DCF,CAP)
       DIMENSION CF(1)
       R=RR/100.
       DCF=0.
       F=(EXP(R)-1.)/R
       DO 10 I=1,N
```

```
10      DCF=DCF+CF(I)*EXP(-R*I)
        DCF=DCF*F
        DCF=DCF-CAP
        RETURN
        END
C=======================================================
C
C       FILL A REAL ARRAY WITH A VALUE
C
C=======================================================
        SUBROUTINE RFILL(ARRAY,LIFE,VALUE)
        DIMENSION ARRAY(1)
        DO 10 I=1,LIFE
10      ARRAY(I)=VALUE
        RETURN
        END
C=======================================================
C
C       FILL AN INTEGER ARRAY WITH A VALUE
C
C=======================================================
        SUBROUTINE IFILL(IARRAY,LIFE,IVAL)
        DIMENSION IARRAY(1)
        DO 10 I=1,LIFE
10      IARRAY(I)=IVAL
        RETURN
        END
C=======================================================
C
C       FILL THE REMAINDER OF AN ARRAY WITH THE LAST VALUE ENTERED
C
C=======================================================
        SUBROUTINE EXTND(ARRAY,LIFE,VALUE)
        DIMENSION ARRAY(1)
        DO 10 I=LIFE,1,-1
        IF (ARRAY(I).NE.VALUE) GOTO 20
10      CONTINUE
20      IF (I.EQ.LIFE) RETURN
        DO 30 J=I+1,LIFE
30      ARRAY(J)=ARRAY(I)
        RETURN
        END
C=======================================================
C
C       PUSH DATA ALONG AN ARRAY AND FILL WITH ZEROES
C
C=======================================================
        SUBROUTINE PUSH(ARRAY,LIFE,IVAL)
        DIMENSION ARRAY(1)
        IF (IVAL.LE.1) RETURN
        DO 10 I=LIFE,IVAL,-1
        J=I-IVAL+1
10      ARRAY(I)=ARRAY(J)
        DO 20 I=1,IVAL-1
20      ARRAY(I)=0.
        RETURN
        END
C=======================================================
C
C       WRITE A REAL ARRAY TO FILE
```

```
C
C=============================================================
      SUBROUTINE WRITR(IDCB,IERR,ARRAY,LIFEY,LINE)
      DIMENSION IDCB(1),ARRAY(1),IBUF(60),RBUF(30)
      EQUIVALENCE (IBUF,RBUF)
      DO 10 I=1,LIFEY
10    RBUF(I)=ARRAY(I)
      CALL WRITF(IDCB,IERR,IBUF,LIFEY*2)
      RETURN
      END
      END$
```

APPENDIX 7

```
FTN4
      PROGRAM BMR01
C
C     DIMENSIONS
C
      DIMENSION POPCST(30),CAPA(30),RPDN(30),FREV(30),ONTCF(30),
     +  POPIN(30),OROY(30),OINTRS(30),OCINV(30),
     +  OLON(30),OEQ(30),PW(3,20),CAPB(30),CAPC(30),GVTK(30),
     +  ONNTX(30),ONTX(30),ONIPC(30),PRICE(30),SUMAA(30),
     +  SUMCA(30),OGROCF(30),OCUNCF(30),FINT(30),OLOSS(30),
     +  ODTPY(30),WOC(30),GAD(30),NC(20),ITIME(15),
     +  DPR(30),OEQTT(30),WHPRI(30),ALLOW(30),
     +  NAME(3),IDESC(40),IDCB(144),IBUF(60),RBUF(30),
     +  IYEAR(30),NWELLS(30),IEXT(2,20),TOTAL(5),VALUE(6,20)

      EQUIVALENCE (IBUF,RBUF)
C
C*****************************************************************
C
C     VARIABLES USED
C                    (*)=ANNUAL DATA STORED IN ARRAY
C                     I =INPUT DATA FROM FILE
C                     R =REPORT DATA
C
C     VARIABLES
C
C ALLOW (*)  I  = ALLOWANCES AVAILABLE AGAINST OTHER INCOME
C CAPA  (*)  I  = INVESTMENT & PRODN EQUIPMENT CAPITAL
C CAPB  (*)  I  = DEPRECIATION CAPITAL
C CAPC  (*)  I  = EXPLORATION CAPITAL
C CAPINV      R = CUM. CAPITAL INVESTMENT
C DBT        I  = % DEBT TO BE FINANCED
C DCFROR     IR = DCF ROR
C DISTER     I  = DISTANCE TO TERMINAL
C DPR   (*)  I  = DEPRECIATION ALLOWANCE
C FINT  (*)  I  = INVESTMENT ALLOWANCE
C FREV  (*)  I  = FIELD REVENUE
C GAD   (*)  I  = GENERAL ADMIN. AND INJECTION COSTS
C GVROY      IR = % ROYALTIES
C GVTK  (*)  I  = GOVERNMENT TAKE - TAX + ROYALTIES
C I             = LOOP COUNTER
C IANS          = Y/N ANSWER TO QUESTIONS
C IBTBL      I  = BASE CASE NUMBER
C IBUF          = GENERAL INTEGER BUFFER
C ICR           = FILE CARTRIDGE REFERENCE
C IDCB          = FILE DATA CONTROL BLOCK
C IDESC      IR = PROSPECT DESCRIPTION
C IDUM          = DUMMY
C IERR          = ERROR FLAG
C IEXT       I  = EXTRACT - OIL/GAS
C ILYINV     I  = LAST YEAR OF INVESTMENT ALLOWANCE
C IOPT          = FILE OPEN OPTION
C IPY        IR = FIRST YEAR OF PRODUCTION
C ISC           = FILE SECURITY CODE
C ITBL       I  = CASE NUMBER FOR FILING
C ITIME      IR = TIME/DATE
C ITYPE         = LOOP COUNTER (1=OIL,2=GAS)
C IYEAR (*)  IR = YEARS OF PROJECT
C IYRMX      IR = YEAR OF MAXIMUM PRODUCTION
C LEN           = LENGTH OF INPUT STRING
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C LIFEY       IR = MAXIMUM LIFE OF FIELD
C LINE           = LINE COUNT
C LUI            = LOGICAL UNIT OF RUNNING TERMINAL
C LUO            = OUTPUT DEVIVE LU
C N              = LOOP COUNTER FOR NUMBER OF CASES
C NAME           = FILE NAME
C NC          R  = ARRAY OF CASE NUMBERS
C NCASE          = CASE NUMBER COUNTER
C NCPY        I  = TYPE OF COMPANY (0=NEW,1=EXISTING)
C NPAGE       R  = REPORT PAGE NUMBER
C NPRNT          = PRINT FLAG
C NSTATE      I  = STATE CODE
C NWELLS(*)   IR = NUMBERS OF WEELS
C NWT            = MAX. NUMBER OF WELLS
C OCAPTL      I  = CAPITAL INVESTMENT
C OCINV (*)   I  = CUM. INVESTMENT
C OCUNCF(*)   I  = CUM. NET CASH FLOW
C ODTPY (*)   I  = DEBT REPAYMENT
C OEQ   (*)   I  = OPERATORS EQUITY
C OEQT        I  = MAX OPERATORS EQUITY
C OEQTT (*)   I  = CUM. OPERATORS EQUITY
C OGROCF(*)   I  = GROSS CASH FLOW
C OINTRS(*)   I  = INTEREST ON DEBT
C OLON  (*)   I  = LOAN REPAYMENTS
C OLOSS (*)   I  = UNRECOVERABLE LOSSES
C ONIPC (*)   I  = INCOME IN PRODUCING COUNTRY
C ONNTX (*)   I  = TAXABLE INCOME
C ONTCF (*)   IR = NET CASH FLOW
C ONTX  (*)   IR = TAX PAYABLE
C OROY  (*)   I  = ROYALTIES PAYABLE
C PERMEB      IR = PERMEABILITY
C PINVA       I  = % INVESTMENT ALLOWANCE
C POPCST(*)   IR = OPERATOR COSTS
C POPIN (*)   IR = OPERATOR INCOME
C POROSY      IR = POROSITY
C PRDDI       I  = PROFIT PER $ INVESTED
C PRESS       IR = PRESSURE OF OIL/GAS
C PRICE (*)   IR = OIL PRICE AT PIPE HEAD
C PW          IR = PRESENT VALUE
C PWEL        IR = PER WELL PRODUCTION
C PWELI        R = PER WELL PRODUCTION (IMPERIAL)
C PYOUT       I  = TIME TO RECOVER INVESTMENT
C RBUF           = GENERAL REAL BUFFER EQUIV TO IBUF
C RESSI       IR = RECOVERABLE RESERVES
C RESSII       R = RECOVERABLE RESERVES (IMPERIAL)
C RINT        I  = % INTEREST ON DEBT
C RPDN  (*)   IR = DAILY RATES OF PRODUCTION
C SUMAA (*)   I  = PRODN EQUIPMENT ALLOWANCE
C SUMCA (*)   I  = EXPLORATION ALLOWANCE
C TAXRAT      IR = % TAX RATE
C TEMPC       IR = TEMPERATURE
C THICK       IR = PAY THICKNESS
C TOTAL        R = ARRAY OF COLUMN TOTALS
C VALUE        R = ARRAY OF CASE TOTALS
C WADEP       IR = WATER DEPTH
C WDEP        IR = WELL DEPTH
C WHPRI (*)   I  = ADJUSTMENT TO PRICE FOR WELL HEAD PRICE
C WOC   (*)   I  = WELL OPERATING COSTS
C
C     EXTERNAL ROUTINES
```

```
C
C CLOSE          = HP FILE CLOSE
C CODE           = HP FILE ENCODE/DECODE
C FTIME          = HP DATE/TIME
C LOGLU          = HP GET SCHEDULING LU
C MAXO           = HP MAXIMUM FUNCTION
C MOD            = HP REMAINDER FUNCTION
C OPEN           = HP FILE OPEN
C READF          = HP FILE READ
C READR          = READ REAL ARRAY FROM FILE
C SLEW           = TOP OF PAGE ROUTINE
C
C*************************************************************
C
C     GET SCHEDULING TERMINAL
C
      LUI=LOGLU(IDUM)
C
C     WRITE HEADING
C
      WRITE(LUI,10)
10    FORMAT(/"PROGRAM BMR01"//"REPORT NUMBER 1"/)
C
C     OUTSPOOL SETUP - GET LU
C
      WRITE(LUI,100)
100   FORMAT(/"OUTPUT LU ?_")
      READ(LUI,*)LUO
C
C     GET CASE NUMBER
C
200   WRITE(LUI,210)
210   FORMAT(/"CASE:ISC:ICR ?_")
      NCASE=NCASE+1
      ISC=0
      ICR=0
      READ(LUI,*)NC(NCASE),ISC,ICR
      IF (NC(NCASE).GT.0) GOTO 220
      NCASE=NCASE-1
      IF (NCASE.EQ.0) GOTO 9000
      GOTO 1000
C
C     CREATE FILE NAME
C
220   CALL CODE
      WRITE(NAME,230)NC(NCASE)
230   FORMAT("O"I4" ")
      DO 240 I=1,3
      IF (NAME(I)/256.EQ.40B) NAME(I)=NAME(I)+20B*256
      IF (I.EQ.3) GOTO 240
      IF (MOD(NAME(I),256).EQ.40B) NAME(I)=NAME(I)+20B
240   CONTINUE
C
C     OPEN FILE FOR INSPOOLING
C
      CALL OPEN(IDCB,IERR,NAME,IOPT,ISC,ICR)
      IF (IERR.GT.0) GOTO 300
      IF (IERR.EQ.-6) GOTO 250
      WRITE(LUI,245)IERR,NAME
245   FORMAT(/"ERROR"I4" IN OPENING FILE "3A2)
```

```
      GOTO 9000
250   WRITE(LUI,260) NAME,ICR
260   FORMAT("FILE CONTAINING DATA FOR CASE "3A2" DOES NOT EXIST ON"
     + " DISC"I6)
      NCASE=NCASE-1
      GOTO 200
C
C     READ FIRST LINES OF DATA AND PRINT
C
300   LINE=1
      CALL READF(IDCB,IERR,IBUF,57,LEN)
      IF (IERR.LT.0) GOTO 9100
      WRITE(LUI,310)(IBUF(I),I=1,57)
310   FORMAT(//40A2//"PROCESSED "15A2//"EXTRACT "2A2/)
      IF (NCASE.GT.1) GOTO 330
      DO 320 I=1,40
320   IDESC(I)=IBUF(I)
C
C     CHECK IF THIS THE RIGHT FILE
C
330   WRITE(LUI,340)
340   FORMAT("OK ? ")
      READ(LUI,350)IANS
350   FORMAT(A1)
      IF (IANS.EQ.1HY) GOTO 360
      IF (IANS.NE.1HN) GOTO 330
      CALL CLOSE(IDCB)
      NCASE=NCASE-1
      GOTO 200
C
C     WRITE HEADING TO PRINTER
C
360   IEXT(1,NCASE)=IBUF(56)
      IEXT(2,NCASE)=IBUF(57)
      DO 380 I=1,5
380   TOTAL(I)=0.0
      IF (NCASE.GT.1) GOTO 412
      CALL FTIME(ITIME)
      NPAGE=NPAGE+1
      WRITE(LUO,400)NPAGE,(ITIME(I),I=9,15),IDESC
400   FORMAT(//X"PAGE :"I4,56X,7A2//21X,"MINIMUM ECONOMIC RESERVOIR "
     +  "SIZE PROJECT"/21X,39"*"///X,"PROSPECTIVE AREA : "40A2/
     +  X,59"="//)
      WRITE(LUO,410)
410   FORMAT(X,"FIELD PARAMETERS :"/X,16"-"//)
C
C     READ REST OF DATA
C
412   LINE=LINE+1
      CALL READF(IDCB,IERR,IBUF,54,LEN)
      IF (IERR.LT.0) GOTO 9100
      IBTBL=IBUF(1)
      ITBL=IBUF(2)
      NSTATE=IBUF(3)
      IPY=IBUF(4)
      IYRMX=IBUF(5)
      LIFEY=IBUF(6)
      NCPY=IBUF(7)
      ILYINV=IBUF(8)
      WADEP=RBUF(5)
```

```
      WDEP=RBUF(6)
      POROSY=RBUF(7)
      PERMEB=RBUF(8)
      THICK=RBUF(9)
      PRESS=RBUF(10)
      TEMPC=RBUF(11)
      DISTER=RBUF(12)
      PWEL=RBUF(13)
      PYOUT=RBUF(14)
      PRDDI=RBUF(15)
      RESSI=RBUF(16)
      OEQT=RBUF(17)
      DCFROR=RBUF(18)
      OCAPTL=RBUF(19)
      GVROY=RBUF(20)
      TAXRAT=RBUF(21)
      PINVA=RBUF(22)
      DBT=RBUF(23)
      RINT=RBUF(24)
      PW(1,NCASE)=RBUF(25)
      PW(2,NCASE)=RBUF(26)
      PW(3,NCASE)=RBUF(27)
      IF (IERR.LT.0) GOTO 9100
C
C     READ IN YEARS, WELLS
C
      LINE=LINE+1
      CALL READF(IDCB,IERR,IBUF,LIFEY*2,LEN)
      IF (IERR.LT.0) GOTO 9100
      DO 415 I=1,LIFEY
      NWELLS(I)=IBUF(I)
415   IYEAR(I)=IBUF(LIFEY+I)
C
C     REMAINDER OF REAL ARRAYS
C
      CALL READR(IDCB,IERR,RPDN  ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9100
      CALL READR(IDCB,IERR,PRICE ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9100
      CALL READR(IDCB,IERR,WHPRI ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9100
      CALL READR(IDCB,IERR,FREV  ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9100
      CALL READR(IDCB,IERR,OROY  ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9100
      CALL READR(IDCB,IERR,WOC   ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9100
      CALL READR(IDCB,IERR,GAD   ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9100
      CALL READR(IDCB,IERR,POPCST,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9100
      CALL READR(IDCB,IERR,POPIN ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9100
      CALL READR(IDCB,IERR,CAPA  ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9100
      CALL READR(IDCB,IERR,FINT  ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9100
      CALL READR(IDCB,IERR,SUMAA ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9100
      CALL READR(IDCB,IERR,CAPB  ,LIFEY,LINE)
```

```
      IF (IERR.LT.0) GOTO 9100
      CALL READR(IDCB,IERR,DPR    ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9100
      CALL READR(IDCB,IERR,CAPC   ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9100
      CALL READR(IDCB,IERR,SUMCA ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9100
      CALL READR(IDCB,IERR,OCINV ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9100
      CALL READR(IDCB,IERR,ONNTX ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9100
      CALL READR(IDCB,IERR,ONTX   ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9100
      CALL READR(IDCB,IERR,ALLOW ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9100
      CALL READR(IDCB,IERR,ONTCF ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9100
      CALL READR(IDCB,IERR,OCUNCF,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9100
      CALL READR(IDCB,IERR,OINTRS,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9100
      CALL READR(IDCB,IERR,OLON   ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9100
      CALL READR(IDCB,IERR,ONIPC ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9100
      CALL READR(IDCB,IERR,OGROCF,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9100
      CALL READR(IDCB,IERR,OLOSS ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9100
      CALL READR(IDCB,IERR,GVTK   ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9100
      CALL READR(IDCB,IERR,OEQ    ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9100
      CALL READR(IDCB,IERR,OEQTT ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9100
      CALL READR(IDCB,IERR,ODTPY ,LIFEY,LINE)
      IF (IERR.LT.0) GOTO 9100
      CALL CLOSE(IDCB)
C
C     PRINT FIELD DATA IF 1ST CASE
C
      IF (NCASE.GT.1) GOTO 500
      IF (WADEP.GT.0.0) WRITE(LUO,420)WADEP
      IF (WDEP.GT.0.0) WRITE(LUO,430)WDEP
      IF (POROSY.GT.0.0) WRITE(LUO,440)POROSY
      IF (PERMEB.GT.0.0) WRITE(LUO,450)PERMEB
      IF (THICK.GT.0.0) WRITE(LUO,460)THICK
      IF (PRESS.GT.0.0) WRITE(LUO,470)PRESS
      IF (TEMPC.GT.0.0) WRITE(LUO,480)TEMPC
420   FORMAT(11X"Water depth          "I6" m"/)
430   FORMAT(11X"Well depth           "I6" m"/)
440   FORMAT(11X"Porosity             "F6.1" %"/)
450   FORMAT(11X"Permeability         "F6.1" mD"/)
460   FORMAT(11X"Pay thickness        "F6.1" m"/)
470   FORMAT(11X"Pressure             "F6.0" MPa"/)
480   FORMAT(11X"Temperature          "F6.0" deg C"/)
      CALL SLEW(LUO)
C
C     PRINT CASE HEADING
500   NPAGE=NPAGE+1
```

```
      WRITE(LUO,400)NPAGE,(ITIME(I),I=9,15),IDESC
      WRITE(LUO,600)NC(NCASE),(IEXT(I,NCASE),I=1,2)
600   FORMAT(X,"CASE "I4,6X,2A2"PRODUCTION"/X,29"-"//)
C
C     WRITE CASE DETAILS
C
      IF (IEXT(1,NCASE).EQ.2HGA) GOTO 620
      RESSII=RESSI/.159
      PWELI=PWEL/.159
      WRITE(LUO,610)IPY,IYRMX,LIFEY,RESSI,RESSII,PWEL,PWELI,GVROY,
     +  TAXRAT,DCFROR
610   FORMAT(11X"Year of initial production  "I4/
     +   11X"Year of maximum production  "I4/
     +   11X"Field life                  "I6" years"/
     +   11X"Reservoir size              "F6.1" Gl"4X"("F6.1" MBbl)"/
     +   11X"Maximum production rate     "F6.0" kl/d"2X"("F6.1" Bbl/d)"/
     +   11X"Government royalty          "F6.1"%"/
     +   11X"Corporate tax               "F6.1"%"/
     +   11X"DCF Rate of Return          "F6.2"% p.a."//
     +  X,"Year  Well     Cap.     Prodn      Oil      Oper. "
     +  "   Income      Tax       Nett "/
     +  X,"      Nos.   Invest.     Rate     Price      Cost "
     +  "                         Profit"/
     +  X,14X"(M$)"5X"(kl/d)"4X"($/Bbl)"4(4X"(M$)"2X)/
     +  X,"----  ----",7(2X,8"-"))
      GOTO 700
620   RESSII=RESSI*.035315
      PWELI=PWEL*.035315
      WRITE(LUO,630)IPY,IYRMX,LIFEY,RESSI,RESSII,PWEL,PWELI,GVROY,
     +  TAXRAT,DCFROR
630   FORMAT(11X"Year of initial production  "I4/
     +   11X"Year of maximum production  "I4/
     +   11X"Field life                  "I6" years"/
     +   11X"Reservoir size              "F6.1" Gcu.m"4X"("F6.3" TCF)"/
     +11X"Maximum production rate     "F6.0" kcu.m/d"2X"("F6.3" MCFPD)"/
     +11X"Government royalty          "F6.1"%"/
     +   11X"Corporate tax               "F6.1"%"/
     +   11X"DCF Rate of Return          "F6.2"% p.a."//
     +  X,"Year  Well     Cap.     Prodn      Gas      Oper. "
     +  "   Income      Tax       Nett "/
     +  X,"      Nos.   Invest.     Rate     Price      Cost "
     +  "                         Profit"/
     +  X,14X"(M$)"4X"(cu.m/d)"3X"($/MCF)"4(4X"(M$)"2X)/
     +  X,"----  ----",7(2X,8"-"))
C
C     WRITE YEARLY DATA
C
700   NWT=0
      DO 720 I=1,LIFEY
      IF (I.EQ.1) GOTO 702
      CAPINV=OCINV(I)-OCINV(I-1)
      GOTO 704
702   CAPINV=OCINV(I)
704   WRITE(LUO,710)IYEAR(I),NWELLS(I),CAPINV,RPDN(I),PRICE(I),
     +  POPCST(I),POPIN(I),ONTX(I),ONTCF(I)
710   FORMAT(X,I4,I6,7F10.3)
      NWT=MAXO(NWT,NWELLS(I))
      TOTAL(1)=TOTAL(1)+CAPINV
      TOTAL(2)=TOTAL(2)+POPCST(I)
      TOTAL(3)=TOTAL(3)+ONTX(I)
```

```
      TOTAL(4)=TOTAL(4)+ONTCF(I)
720   TOTAL(5)=TOTAL(5)+RPDN(I)*PRICE(I)
C
C     WRITE TOTALS
C
      WRITE(LUO,730)(TOTAL(I),I=1,4)
730   FORMAT(13X,8"-",22X,8"-",12X,8"-",2X,8"-"/
     +  11X,F10.3,20X,F10.3,10X,2F10.3)
      CALL SLEW(LUO)
C
C     ACCUMULATE TOTALS FOR FINAL REPORT
C
      VALUE(1,NCASE)=NWT+.1
      VALUE(2,NCASE)=RESSI
      VALUE(3,NCASE)=RESSII
      VALUE(4,NCASE)=TOTAL(1)
      VALUE(5,NCASE)=TOTAL(2)
      VALUE(6,NCASE)=DCFROR
C
C     SEE IF ANOTHER CASE
C
800   WRITE(LUI,810)
810   FORMAT(/"ANOTHER CASE ?_")
      READ(LUI,350)IANS
      IF (IANS.EQ.1HY) GOTO 200
      IF (IANS.NE.1HN) GOTO 800
C
C     SUMMARY REPORT - CHECK FOR ANY CASES
C
1000  IF (NCASE.EQ.0) GOTO 9100
      NPAGE=NPAGE+1
      WRITE(LUO,400)NPAGE,(ITIME(I),I=9,15),IDESC
      WRITE(LUO,1010)
1010  FORMAT(X,"SUMMARY REPORT"/X,14"-")
C
C     LOOP FOR OIL/GAS
C
      DO 1080 ITYPE=1,2
      NPRNT=0
      DO 1080 N=1,NCASE
      IF (ITYPE.EQ.1.AND.IEXT(1,N).EQ.2HGA) GOTO 1080
      IF (ITYPE.EQ.2.AND.IEXT(1,N).EQ.2HOI) GOTO 1080
      IF (NPRNT.EQ.1) GOTO 1060
      IF (ITYPE.EQ.2) GOTO 1030
      WRITE(LUO,1020)
1020  FORMAT(//X,"OIL CASES"/X,9"-"//
     +  X,"Case Max No.  Reservoir Size  Cap Inv  Op Cost"
     +  "  DCF ROR    Nett...Present..Value"/
     +  X,"       Wells    (Gl)   (MBbl)   (M$)      (M$)  "
     +  "    (%)        10%      15%      25%"/
     +  X,"----   ---",5(2X,7"-"),X,3(2X,6"-"))
      GOTO 1060
1030  WRITE(LUO,1040)
1040  FORMAT(//X,"GAS CASES"/X,9"-"//
     +  X,"Case Max No.  Reservoir Size  Cap Inv  Op Cost"
     +  "  DCF ROR    Nett...Present..Value"/
     +  X,"       Wells   (Gcm)   (TCF)    (M$)      (M$)  "
     +  "    (%)        10%      15%      25%"/
     +  X,"----   ---",5(2X,7"-"),X,3(2X,6"-"))
C
```

```
C      OUTPUT CASE DATA
C
1060   WRITE(LUO,1070)NC(N),(VALUE(I,N),I=1,6),(PW(I,N),I=1,3)
1070   FORMAT(X,I4,I6,5F9.2,X,3F8.2)
       NPRNT=1
1080   CONTINUE
C
C      CLOSE OUTPUT FILE
C
       CALL SLEW(LUO)
       GOTO 9200
C
C      END MESSAGES
C
9000   WRITE(LUI,9010)
9010   FORMAT(/"PROGRAM ABORTED"/)
       GOTO 9500
C
C      FILE READ ERROR
C
9100   WRITE(LUI,9110)IERR,NAME
9110   FORMAT(/"ERROR"I4" IN READING FILE "3A2)
       CALL CLOSE(IDCB)
       GOTO 9000
C
C      GOOD COMLETION
C
9200   WRITE(LUI,9210)
9210   FORMAT(/"PROGRAM COMPLETED")
9500   END
C=============================================================
C
C      READ REAL ARRAY FROM FILE
C
C=============================================================
       SUBROUTINE READR(IDCB,IERR,ARRAY,LIFEY,LINE)
       DIMENSION IDCB(1),ARRAY(1),IBUF(60),RBUF(30)
       EQUIVALENCE (IBUF,RBUF)
       LINE=LINE+1
       CALL READF(IDCB,IERR,IBUF,LIFEY*2,LEN)
       IF (IERR.LT.0) RETURN
       DO 10 I=1,LIFEY
10     ARRAY(I)=RBUF(I)
       RETURN
       END
C=============================================================
C
C      TOP OF PAGE
C
C=============================================================
       SUBROUTINE SLEW(LUO)
       WRITE(LUO,10)6137B
10     FORMAT(A2)
       RETURN
       END
       END$
```