

SECTION 14

ECONOMICS

The estimated capital requirements, project and fund drawdown schedules, operating costs, and required selling prices for representative project financial structures are presented in this section. All economics are based on mid-1977 dollars.

For estimating purposes, the complex was divided into five cost centers:

- (1) Coal Mine
- (2) Coal Preparation Plant
- (3) Process Plant
- (4) Power Plant
- (5) Offsites

For further economic analysis, sensitivities of required selling prices to the key parameters of capital investment, operating costs, and profitability level are summarized.

14.1 FIXED CAPITAL INVESTMENT

14.1.1 SCOPE

The preliminary fixed capital investment was estimated for a grassroots complex producing SNG, liquid fuels, and electric power from coal produced in a captive coal mine. The process plant portion of the complex consists of the principal process units described in Sections 4 and 5 and shown on the block flow diagram, Figure 4-1. (All figures and tables for this section have been placed at the end of the text.)

Necessary ancillary facilities are included, with such items as administration, warehouse, laboratory, changehouse, and related buildings and equipment; computer capability and communications systems; rolling stock, including trucks and automobiles for transportation within the confines of the complex; road paving and fencing; utilities distribution; and other items required for the efficient operation of an industrial complex of this magnitude.

14.1.2 SUMMARY

The estimated fixed capital investment for this complex is \$2.4 billion.

The total constructed costs, approximately \$2.2 billion, are shown for each of the unit areas in Table 14.1. To this have been added home office costs and sales taxes, which result in the total project fixed capital investment. Major equipment costs distributed by equipment classification for certain key units are shown in Table 14-2.

14.1.3 PROCEDURES

The estimate is considered to be within the -5, +20% accuracy range. It includes the cost of equipment, engineering, design and drafting, project management, field direct and indirect costs, procurement, contractor's fee, and supporting services. Allowances for instrument checkout and mechanical run-in are also included.

14.1.4 BASIS FOR UNIT AREAS

The basis for the estimate for each unit is discussed in the following paragraphs.

The equipment estimate for the Coal Mine (Unit 8), is based on vendor pricing. The balance of the estimate consists of in-house costing of mine support facilities, initial mine cuts, and road building.

Key process unit estimates were developed using a combination of in-house pricing and vendor pricing information for major equipment. The totals for major equipment costs were then used with historical cost multipliers to obtain the total constructed cost estimate for each unit. The units in this category are listed below:

<u>Unit No.</u>	<u>Description</u>
9	Coal Preparation
10-1	Coal Storage
10	Coal Grinding and Drying
12	SRC Dissolving
13	SRC Atmospheric Distillation
14	SRC Vacuum Distillation
15	Pyrolysis
16	Pyrolysis Atmospheric Distillation
17	Sour Gas Compression
18	Process Gasification
19	Shift Conversion
21	Heavy Liquids Hydrotreating
22	Thermal Cracking
24	Naphtha Hydrotreating
27	Saturate Gas/Acid Gas Removal
28	Olefin Recovery and Polymerization
29	Hydrogen Recovery and Purification
30	SNG Purification
31	LPG Fractionation
33	Fuel Gas Generation
35	Steam and Power Generation
36	Process Waste Water Treating

The Oxygen Plant (Unit 11), the Selective Acid Gas Removal (Unit 20), the Fuel Gas/Acid Gas Removal System (Unit 34), all represent proprietary turnkey units. Estimates for these units were based on vendor quotations.

Coking (Unit 23), Naphtha Reforming (Unit 25), Olefinic Gas/Acid Gas Removal (Unit 26), and the Sulfur Plant (Unit 32) were estimated on the basis of capacities using in-house historical cost data.

The remaining offsite units were estimated on the basis of in-house historical information. These include the following:

<u>Unit No.</u>	<u>Description</u>
37	Shops and Buildings
38	Fire Water System
39	Potable and Sanitary Water System
40	Raw Water System
41	Effluent Water Treating
42	Product Storage
43	Flare System
44	Site Preparation; Roads and Railroads
45	Instrument and Plant Air Systems

14.1.5 BASIS FOR COST CATEGORIES

The estimating procedures used for each cost category are detailed below:

A. Major Equipment Costs

Process and major equipment costs are based on vendor pricing combined with historical in-house experience. Vendor prices were solicited for certain special process equipment items where historical in-house pricing data were not completely applicable.

B. Constructed Cost

Constructed cost is estimated by applying an experience factor to major equipment cost. This factor includes the field direct and field indirect costs.

1. Field Direct Materials, Labor, and other Direct Costs.

Field direct costs include:

- (1) Concrete, structural steel, piping, instrumentation, and electrical
- (2) Labor for construction of the various units

- (3) Other direct costs such as miscellaneous freight, instrumentation checkout and run-in services, soils investigation, nonproductive time, and taxes that cannot be allocated to specific unit areas but are considered direct costs

The labor costs reflect mid-1977 average hourly rates for the eastern interior coal region and expected labor productivity for that area. The estimate is based on the work being performed during a standard workweek defined as five 8-hour days, Monday through Friday. No provision for premium costs for scheduled overtime work is included. However, an allowance for limited nonscheduled overtime has been included.

2. Field Indirect Costs. Field indirect costs include:

- (1) Temporary construction facilities and costs related to the job and its working conditions, including craft subsistence and transportation
- (2) Field administration and field office expense
- (3) Construction equipment, small tools, and consumables
- (4) Payroll taxes, insurance, union welfare, fringe benefits, permits, and bonds

C. Home Office Costs

Engineering-construction home office costs include management and administration, process and project engineering, construction support, design, drafting, accounting, estimating, scheduling, cost engineering, procurement, expediting, inspection, stenographic, clerical, engineering construction fee, overhead, and direct expenses such as printing, reproduction, computer charges, communications, and travel.

D. Spare Parts

Costs for spare parts are included in working capital.

E. Sales Tax

5% sales tax and/or use tax is included for materials and equipment.

F. Escalation

Escalation for the period after mid-1977 is not included.

G. Contingency

No contingency allowance has been included.

H. Exclusions from Fixed Capital Investment Estimate

The following cost items, which normally amount to less than 1% of the Fixed Capital Investment, are excluded from the estimate:

- (1) Owner's expenses connected with project
- (2) All taxes, except sales and payroll taxes
- (3) Client's local, state, and federal permits
- (4) Premium time costs, except nonscheduled overtime premium
- (5) Piling and unusual foundation conditions
- (6) Process licensing fees

14.2 TOTAL CAPITAL REQUIREMENTS

In addition to the fixed capital investment, total capital requirements include: land acquisition and rights of way; initial charges of catalysts and chemicals; startup costs, construction financing, and provision for working capital.

Initial capital requirements for the five cost centers used for estimating operating costs are summarized in Table 14-3. The estimated total capital requirement of the project amounts to about \$2.75 billion exclusive of construction financing costs, which depend on the project schedule, fund drawdown, and method of financing the project. This is discussed in subsections 14.4 and 14.6.

The Fixed Capital Investment is summarized by cost centers in Table 14-4. A detailed list of catalysts and chemicals estimated to cost \$9 million is presented in Table 14-5. Startup, estimated to cost about \$148 million, is summarized in Table 14-6 with construction changes and additional first-year maintenance based on experience factors for the types of units used. Provisions for working capital estimated at about \$165 million are shown in Table 14-7.

Recurring capital expenditures for replacement of coal mining equipment are based on the costs and useful lives shown in Table 14-8. Annual expenditures are shown in the Cash Flow Case Evaluations discussed in subsection 14.7.

The allowance for mineral rights is included in annual operating expenses in the form of royalties.

14.3 PROJECT SCHEDULE

The estimated project design, engineering, procurement, construction, and startup schedule is shown in Figure 14-1. This schedule was developed based on an analysis of the design, procurement of schedule-controlling equipment, fabrication, erection, and construction schedules. The results indicate mechanical completion in 60 months and capacity production 1 year later.

The estimated time required for construction completion is based on unit and major equipment count and type. Critical delivery equipment was predicted to require up to 36 months from time of order. Historical data from previous projects provided a basis for development of the project schedule.

14.4 FUND DRAWDOWN SCHEDULE

The fund requirements during the design, engineering, procurement, construction, and startup periods are illustrated in Figure 14-2; fund requirements are shown for 6-month intervals. The cumulative fund drawdowns are shown in Figure 14-3.

The Figure 14-2 and 14-3 fund drawdown schedules were developed based on the sum of the estimated fund requirement schedules for the five separate cost centers. These fund expenditure estimates were based on the construction schedule and experience gained from prior projects.

14.5 OPERATING COSTS

Estimated operating costs for each of the five cost centers are summarized in Table 14-9. Supporting details for the separate cost centers and elements are shown in Tables 14-10 through 14-18, which follow. The total projected annual operating costs are \$294 million.

14.5.1 GENERAL BASIS

The economic analysis is based on a plant operating period of 20 years. The operating rate is 330 stream days per year, equal to a 90.4% operating factor except for the first year of operation, when the complex is assumed to produce at a rate equal to 50% of capacity. The power plant is assumed to operate on a continuous basis 365 days per year, at an 80% operating factor. During periods of fuel gas gasifier maintenance shutdowns, the gas turbine units will be operated on fuel oil. In case of partial fuel gas supply curtailment, both fuel gas and oil can be fired together.

Plant overhead/administration is based on an estimated requirement for administrative and support personnel consisting of plant management, accounting, personnel, first aid, cafeteria, fire and safety, quality assurance, engineering, motor pool, material control, and other support personnel and associated indirect materials and supplies. A payroll burden of 35% of total payroll cost for direct operation and maintenance labor plus supervision was used. The general and administrative expense is based on 1.5% of the total operating cost. Property tax and insurance is based on 2.75% of the initial fixed capital investment.

Estimated manpower requirements for the complex are summarized in Table 14-10; they amount to approximately 2800 people.

Annual maintenance costs are summarized in Table 14-11.

14.5.2 BASIS FOR COST CENTERS

The basis for estimating the annual operating costs for each cost center are presented below.

A. Coal Mine

A royalty of \$1.50 per ton of clean coal was used. Operating supplies consist of explosives and associated supplies used in the mining operation. Equipment operating costs shown in Table 14-8 include operating and maintenance materials. Direct costs for operating labor and supervision are shown in Table 14-12. Maintenance labor and supervision are shown in Table 14-13. Payments to the Union Welfare Fund of \$1.55 per ton of clean coal are also included together with miscellaneous expenses, which consist of permits, bonds, and land reclamation.

B. Coal Preparation

Operating and maintenance labor for the coal preparation area are shown in Table 14-14. The total cost of maintenance is approximately 3% of the fixed capital investment. This is considered to be composed of 30% plant labor and 70% material.

C. Process Plant

Catalysts and chemicals required for the process plant are shown in Table 14-5. Operating and maintenance labor are detailed in Table 14-15. The cost of maintenance amounts to approximately 4% of the fixed capital investment as shown in Table 14-11. This is considered to be composed of preventive and routine work (60%) carried out by plant maintenance labor, and major maintenance tasks (40%) carried out by contract labor during unit shut-downs. The routine work is composed of 40% labor and 60% material.

D. Power Plant

Operating and maintenance labor are shown in Table 14-16. Total annual maintenance costs correspond to 1 mil per average production kW/h.

E. Offsites

Annual consumption and cost of chemicals for water treatment are shown in Table 14-17. Operating and maintenance labor are shown in Table 14-18. Total maintenance cost corresponds to 2% of fixed capital investment with about 40% allocated to labor and the balance to materials.

14.6 FINANCIAL PARAMETERS

14.6.1 FINANCIAL STRUCTURE

Economics were developed for three types of project financial structures:

- (1) 100% equity capital
- (2) Borrowed capital: 65% of the total investment borrowed at 9% interest, with principal repaid in equal installments over the 20-year project term; all working capital borrowed for the 20-year term; a loan commitment fee of 0.75% on funds not yet drawn down during the construction period
- (3) A nonprofit (0% discounted cash flow rate of return) or breakeven boundary case

14.6.2 RETURN ON INVESTMENT

For each of the above cases a discounted cash flow (DCF) rate of return after taxes is specified and the revenue required to meet this objective calculated. The DCF computations take into consideration the 10% depletion allowance on the coal mine operation, depreciation allowances as described below, an investment tax credit of 10%, and a combined income tax rate of 52% for state and federal taxes. It was estimated that 90% of the fixed capital investment is eligible for the investment tax credit. It has been assumed that the plant will be operated as an integrated subsidiary of profit-making industries that can write off initial losses against current earnings for tax purposes.

Useful lives for asset depreciation purposes conform with the minimum provided in the Depreciation Guidelines and Rules, Revenue Procedure 62-21. The double declining balance method of depreciation was used. An 8-year useful life was used for coal mine depreciation based on the guidelines for the mining industry. The guidelines for the chemicals and allied products industry under group three, "Guidelines for Manufacturing," were used to establish an 11-year useful life for the Coal Preparation and Process Plants. The guidelines for a steam production plant for the production of electricity for electric utilities, group four, were used as a basis for a 28-year useful life of the power plant.

14.7 REQUIRED PRODUCT SELLING PRICE

The revenue required to achieve a specific DCF was calculated for each of the three financial structure cases.

The results for the base cases are summarized in Table 14-19, which shows the contribution of each of the five cost centers to the total required revenue. The computer printouts for the cash flow case evaluations representing each of the three types of financing are shown in Table 14-20 through 14-22.

Table 14-20 contains the cash flow for the case of private ownership with 100% equity financing with a 12% DCF after tax rate of return on equity. The required revenue after taking credit for the byproduct sulfur at \$60 per ton, ammonia at \$140 per con and "needle coke" at \$150 per ton is \$807 million per year. Table 14-21 contains the cash flow for the case of private ownership with 65% debt and 9% per year interest. The required revenue is reduced to \$585 million by debt financing. Table 14-22 contains the cash flow for the breakeven case with no return on invested funds. The resulting revenue requirement is \$294 million per year.

For the typical case, the plant produces annually approximately 187,000 billion Btu and 7.0 billion kWh of electrical power. The selling prices required to achieve the required revenue are represented by the following linear equation:

$$\text{Required Revenue} = (\text{fuel price}) \times (187 \times 10^{12} \text{ Btu}) + (\text{power price}) \times (7.0 \times 10^9 \text{ kWh})$$

For the typical cases, the relationship between required selling prices for the three project structures is shown graphically in Figure 14-4.

14.8 SENSITIVITY ANALYSIS

The sensitivity of the required revenues to variations in selected variables was analyzed. The results indicate that the effect on the required selling prices of a 10% change in cost elements is as follows:

<u>Cost Element</u>	<u>% Change in Required Selling Price</u>	
	<u>100% Equity</u>	<u>65% Debt</u>
Operating costs	5.3%	4.2%
Capital associated costs	8.5%	8.0%
Run-of-mine coal cost	2.3%	5.7%
Clean coal cost	2.5%	4.0%

The effect on the required revenue of variations in the DCF is shown in Figure 14-5. Typical values follow:

<u>After Tax Rate of Return on Equity (%DCF)</u>	<u>Required Selling Price, % of Base Case</u>	
	<u>100% Equity</u>	<u>65% Debt</u>
0	36	69
6	52	80
12	100	100
18	152	150

14.9 POSSIBLE PRODUCT MARKET VALUES

A brief assessment of possible product market values and the effect of the resulting project revenues on profitability was completed. The results are summarized below.

To obtain the possible market values, the projected characteristics of these products were compared with those of conventional crude-oil based products. This comparative evaluation included discussions with major petroleum/chemical companies and utility companies plus review of industry reports and current literature.

The possible unit sales values shown in Table 14-23 were used as a basis to illustrate the effect of sales values on the economics, also to perhaps stimulate further effort on establishing marketability and product values. The results indicate a possible annual revenue of approximately \$965 million which is 36% and 4% greater than required to achieve a 12% DCF with 65% debt financing and 100% equity financing, respectively.

The possible \$965 million annual revenue shown in Table 14-23 would result in the following DCFs:

65% debt - 20% DCF

100% equity - 13% DCF

Details of the cash flow analysis for the 65% debt case are shown in Table 14-24 and the sensitivity of DCF to change in revenue, fixed capital investment, and operating costs, are shown in Figure 14-6.

This analysis is considered only a starting point in the survey of possible U.S. market values for these products. The results, however, clearly emphasize the importance of definition of coal liquefaction product characteristics, marketability, and market values. This type of information should be developed for these products and also for all other coal liquefaction product types.

Table 14-1 - Fixed Capital Investment
(Base Case)

Unit No.	Description	Cost \$ Million
08	Coal Mine	231.310
09	Coal Preparation	64.035
10	Coal Storage, Grinding, and Drying	36.712
11	Oxygen Plant	181.800
12	SRC Dissolving	209.849
13	SRC Atmospheric Distillation	23.902
14	SRC Vacuum Distillation	27.970
15	Pyrolysis	16.103
16	Pyrolysis Atmospheric Distillation	1.880
17	Sour Gas Compression	5.492
18	Process Gasification	24.042
19	Shift Conversion	40.409
20	Selective Acid Gas Removal	48.633
21	Heavy Liquids Hydrotreating	83.804
22	Thermal Cracking	28.697
23	Coking	55.615
24	Naphtha Hydrotreating	19.221
25	Naphtha Reforming	12.847
26	Olefinic Gas/Acid Gas Removal	11.756
27	Saturate Gas/Acid Gas Removal	20.982
28	Olefin Recovery and Polymerization	3.307
29	Hydrogen Recovery and Purification	23.549
30	SNG Purification	21.156
31	LPG Fractionation	23.303
32	Sulfur Plant	33.700
33	Fuel Gas Generation	96.350
34	Fuel Gas/Acid Gas Removal	64.533
35	Steam and Power Generation	348.000
36	Process Waste Water Treating	9.283
37	Shops and Buildings	16.133
38	Fire Water System	5.880
39	Potable and Sanitary Water System	.391
40	Raw Water System	24.284
41	Effluent Water Treating	2.103
42	Product Storage	30.569
43	Flare System	1.454
44	Site Preparation, Roads and Railroads	15.493
45	Instrument and Plant Air Systems	4.000
	Total Direct Construction Cost	1,866.547
	Field Indirects at 16%	298.648
	Total Construction Cost	2,165.195
	Home Office Overhead and Fee at 10%	216.520
	Total	2,381.715
	Sales Tax	42.485
	Total Fixed Capital Investment	2,424.200
	Say	2,425.000

Account Code	Equipment Description	Coal Preparation Unit 9	Coal Storage Grinding and Drying Unit 10	SRC Dissolving Unit 12	SRC Atmospheric Distillation Unit 15	SRC Vacuum Distillation Unit 14	Pyrolysis Unit 15	Pyrolysis Atmospheric Distillation Unit 16	Sour Gas Compression Unit 17
0500	Process feeders	1,015	45	22,259					
0900	Samplers	175	764						
1100	Columns				287	5,575	610	74	
1200	Vessels				47		244	22	166
1300	Heat exchangers and condensers			16,545	2,357	1,617	5,327	445	628
1400	Furnaces and heaters			4,010	3,822	2,352			
1500	Pumps and drivers	980		5,301	344	1,476	75	23	
1600	Boilers								
1700	Cooling towers								
1800	Compressors and blowers	30		5,594	1,555		708	178	1,890
1900	Storage tanks	48							
2000	Material-handling equipment	17,768	17,110	133			714		
2100	Reduction equipment	1,350	1,596						
2200	Separation equipment	1,600	1,842				546		
2300	Concentration equipment								
2400	Agitators, mixers, and blenders			15					
2500	Reactors			33,538			131		
2600	Hoppers and bins	1,224							
2700	Classification and screening	2,412							
2800	Other major equipment	1,688	2,381	23		1,530			
Total major equipment		28,270	23,538	87,416	8,390	10,548	6,357	742	2,684

^aUnits 38, 39, and 43.

A

Gas ession t 17	Process Gasification Unit 18	Shift Conversion Unit 19	Heavy Liquids Hydrotreating Unit 21	Thermal Cracking Unit 22	Coking Unit 23	Naphtha Hydrotreating Unit 24	Naphtha Reforming Unit 25	Olefinic Gas/Acid Gas Removal Unit 26	Saturate Gas/Acid Gas Removal Unit 27	Olefin Recovery and Polymerizati Unit 28
			218	558	1,150	501	108	5,222	4,875	186
166	1,085	187	1,494	556	5,764	546	87	81	128	244
528	945	9,817	8,997	2,121	760	4,242	945	1,112	1,711	645
			2,044	5,250	1,971	242	2,159			
	251		1,206	391	1,075	185	84	571	589	59
	977									
390			5,567	448	410	1,071	1,149			
					91			58	58	
	2,110							121	196	
					12,500					
	4,380	5,498	15,192			1,030	1,094			
					272					
					541		55	5	7	
584	9,648	14,872	54,518	9,504	22,555	7,417	5,679	4,950	7,564	1,152

B

Table 14-2 - Major Equipment Costs
(\$000)

Hydrogen recovery and purification Unit 29	SNG Purification Unit 30	LPG Fractionation Unit 31	Fuel Gas Generation Unit 33	Steam and Power Generation Unit 35	Process Waste Water Treating Unit 36	Raw Water System Unit 40	Effluent Water Treating Unit 41	Other Utilities ¹⁾	Product Storage and Tank Farm Unit 42	Account Code Total
										23,319
		205			887					959
										16,014
2,172	360	62	1,796	217	457		75			13,590
181	1,634	750	16,536		1,490		33			76,206
	260									22,110
17	81	41	840		242	1,651	74	292	563	16,189
										977
						12,742				12,742
	4,053	945								23,376
				538	248	456	5	12	14,808	16,302
			3,150							38,875
										2,949
			3,046			2,722	875	25		13,085
										12,500
										15
325	1,125		12,843							75,056
										1,496
										2,412
10,374	2,059	8,308		231,015		10	181	360	4,908	263,243
15,069	9,572	10,511	38,211	231,770	3,321	17,561	1,245	689	20,279	631,393

Table 14-3 - Total Initial Capital Requirements
(\$ million)
(Base Case)

Item	Coal Mine	Coal Preparation	Process Plant	Power Plant	Offsites	Total
Fixed capital investment (See Table 14-4)	300.0	83.0	1432.0	452.0	158.0	2425.0
Initial catalysts and chemicals (See Table 14-5)	-	-	9.0	-	-	9.0
Startup cost (See Table 14-6)	10.0	6.5	112.5	14.5	4.5	148.0
Construction financing ^a	<u>36.0</u>	<u>10.0</u>	<u>180.0</u>	<u>56.5</u>	<u>19.5</u>	<u>302.0</u>
Depreciable investment	346.0	99.5	1733.5	523.0	182.0	2884.0
Working capital (a) (See Table 14-7)	-	-	-	-	-	165.0
Land, rights of way	-	-	-	-	-	<u>3.0</u>
Total capital requirement						3052.0

^a Applicable to cases using 65% debt at 9% interest and 0.75% commitment fee only.

Table 14-4 - Fixed Capital Investment by Cost Centers
(\$ million)
(Base Case)

Cost Center	Unit		Constructed Cost		Fixed Capital Investment	
	Number	Description	Subtotal	Total	Total	By Cost Center
Mine	08	Mine		268.3		500
Coal Preparation	09	Coal Preparation		74.3		85
Process Plant	10	Grinding and Drying	17.0			
	11	Oxygen Plant	210.9			
	12	SRC Dissolving	243.4			
	13	SRC Atmospheric Distillation	27.7			
	14	SRC Vacuum Distillation	32.4			
	15	Pyrolysis	18.7			
	16	Pyrolysis Atmospheric Distillation	2.2			
	17	Sour Gas Compression	6.4			
	18	Process Gasification	27.9			
	19	Shift Conversion	46.9			
	20	Selective Acid Gas Removal	56.4			
	21	Heavy Liquids Hydrotreating	97.2			
	22	Thermal Cracking	33.3			
	23	Coking	64.5			
	24	Naphtha Hydrotreating	22.3			
	25	Naphtha Reforming	14.9			
	26	Olefinic Gas/Acid Gas Removal	13.6			
	27	Saturate Gas/Acid Gas Removal	24.3			
	28	Olefin Recovery and Polymerization	3.8			
	29	Oxygen Recovery and Purification	27.3			
	30	SNG Purification	24.5			
	31	LPG Fractionation	27.0			
	32	Sulfur Plant	39.1			
	33	Fuel Gas Generation	111.8			
34	Fuel Gas/Acid Gas Removal	74.9				
36	Process Waste Water Treating	<u>10.8</u>		1,279.2		1,432
Power Plant	35	Steam and Power Generation		403.7		452
Offsites	10-1	Coal Storage	25.6			
	37-39, 43,44	General Facilities	43.3			
	40	Raw Water System	28.2			
	41	Effluent Water Treating	2.4			
	42	Product Storage	35.5			
	45	Instrument and Plant Air Systems	<u>4.7</u>		139.7	
		Total Constructed Cost		2,165.2	2,165.2	
		Home Office Cost			216.5	
		Sales Tax			42.5	
		Total Fixed Capital Investment			2,424.2	2,425

Table 14-5 - Process Plant Catalyst and Chemical Requirements
(Base Case)

Unit	Catalyst or Chemical	Initial Charge	Basis or Make-Up Requirement	Cost	
				Initial Charge (\$000)	Annual Use (\$000)
19	<u>Shift Conversion</u> Shift catalyst	10,330 ft ³	3-yr life	1,770	590
20	<u>Selective Acid Gas Removal</u> Physical solvent	321,000 gal	2,140 gpd	142	312
21	<u>Heavy Liquids Hydrotreating</u> Catalyst (Co-Mo)	1,366,000 lb	3-yr life	2,526	842
24	<u>Naphtha Hydrotreating</u> Catalyst (Co-Mo)	151,900 lb	3-yr life	285	95
25	<u>Naphtha Reforming</u> Catalyst (Pt-Ra)	91,325 lb	5-yr life	1,250	250
26	<u>Olefinic Gas/Acid Gas Removal</u> Monoethanolamine Sodium hydroxide Cellulose, asbestos and diatomaceous earth Corrosion inhibitor Antifoam	256,000 lb 140 lb	1,200 lb/day 70 lb/day 5 lb/day.	97 nil	150 38 nil
			1 gpd 2 gpd		nil 1

Table 14-5 (Contd)

Unit	Catalyst or Chemical	Initial Charge	Basis or Make-up Requirement	Cost	
				Initial Charge (\$000)	Annual Use (\$000)
27	<u>Saturate Gas/Acid Gas Removal</u>				
	Monoethanolamine (100 wt%)	320,000 lb	1,500 lb/day	122	188
	Sodium hydroxide (50 wt%)	12 ton	6 TPD	2	277
	Corrosion inhibitor		1 gpd		nil
	Antifoam		2.5 gpd		1
28	Diatomaceous earth		27 lb/day		1
	<u>Olefin Recovery and Polymerization</u>				
29	Lean oil	67,230 lb	900 lb/day	5	22
	Molecular sieve agent	114,100 lb	3-yr life	159	53
	Methanol injection		1,400 gpd	96	210
30	<u>Hydrogen Recovery and Purification</u>				
	Molecular sieve agent	350,700 lb	3-yr life	486	162
	Catalyst (cobalt-molybdenum)	968 ft ³	3-yr life	56	19
	Catalyst (zinc oxide)	452 ft ³	3-yr life	36	13
31	<u>SNG Purification</u>				
	Zinc oxide pellets	195 ft ³	3-yr life	15	5
	Methanation catalyst-fluidized	5,350 ft ³	2-yr life	500	250
	Methanation catalyst-fixed bed	763 ft ³	3-yr life	100	34
	Methanation oil	36,000 gal	0.6 gpm	40	315
31	Diethylene glycol		1,543 gpd		143
	<u>LPG Fractionation</u>				
31	Sodium hydroxide (50 wt%)		0.5 TPD		24
	Sweetening reagent		1.0 lb/day		6

Table 14-5 (Contd)

Unit	Catalyst or Chemical	Initial Charge	Basis or Make-Up Requirement	Cost	
				Initial Charge (\$000)	Annual Use (\$000)
32	<u>Sulfur Plant</u> Catalyst ADA Vanadium Sodium carbonate	31,000 ft ³ 23,338 lb 46,676 lb 175,231 lb	3-yr life 106 lb/day 161 lb/day 7,291 lb/day	465 146 273 5	155 219 311 72
34	<u>Fuel Gas/Acid Gas Removal</u> Physical solvent	480,000 gal	3,200 gpd	221	765
35	<u>Steam and Power Generation</u> Sulfuric acid (93 wt%) Sodium hydroxide (50 wt%)	24,000 gal 30,000 gal	322 TPY 200 TPY	8 29	15 30
36	<u>Process Waste Water Treating</u> Sodium hydroxide (50 wt%) Phosphoric acid (100 wt%)	58,200 lb	4 TPD 624 lb/day	12 8,846	198 42 5,808
				Say <u>9,000</u>	<u>6,000</u>

Table 14-6 - Startup Costs
(\$ million)
(Base Case)

Item	Coal Mine	Coal Preparation	Process Plant	Power Plant	Offsites	Total
<u>Prestartup</u>						
Construction Changes	0.0	2.5	43.0	4.5	1.5	51.5
Advance Hiring Recruiting, settling, training	4.9	0.5	3.6	1.1	0.5	10.6
<u>Payroll</u>						
Operating Personnel	2.0	0.3	1.2	0.5	0.3	
Administrative	1.9	0.1	1.5	0.3	0.1	
Payroll burden	1.0	0.1	0.9	0.3	0.1	
Payroll Subtotal	4.9	0.5	3.6	1.1	0.5	10.6
Prestartup Subtotal	9.8	3.5	50.2	6.7	2.5	71.7
<u>Operating</u>						
Contract Operating Assistance	0.0	0.4	4.4	1.2	0.6	6.6
Support Maintenance	0.0	2.5	58.0	6.5	1.5	68.5
Operating Subtotal	0.0	2.9	62.4	7.7	2.1	75.1
Total Startup Costs	9.8	6.4	112.6	14.4	4.6	147.8
Say	10.0	6.5	112.5	14.5	4.5	148.0

Table 14-7 - Estimate of Working Capital Requirement ^a
(\$ million)
(Base Case)

Item	Coal Mine	Coal Preparation	Process Plant	Power Plant	Offsites	Total
Coal feed inventory (14 days)	0	7.5	0	0	0	7.5
Finished product inventory (30 days)	15.0	1.1	20.5	6.6	2.1	45.3
Spare parts inventory (1% of fixed capital investment)	3.0	.8	14.3	4.5	1.6	24.2
Budget for current expenses (30 days)	15.0	1.1	20.5	6.6	2.1	45.3
Accounts receivable (30 days)	19.0	2.3	34.8	8.5	2.9	67.5
Credit for accounts receivable (30 days)	<u>(10.0)</u>	<u>(0.5)</u>	<u>(9.5)</u>	<u>(2.9)</u>	<u>(0.9)</u>	<u>(23.8)</u>
Total	42.0	12.3	80.6	23.3	7.8	166.0
Say						165.0

^a Applicable to cases using 65% debt at 9% interest and 0.75% commitment fee only.

Table 14-8 - Coal Mine Equipment
(Base Case)

Quantity	Item	Unit Cost (\$000)	Total Cost (\$000)	Operating Cost (\$000/Year)	Operation (Hours/Year)	Life (Hours Each)	Replacement Schedule (Years)
6	Dragline (175 yd ³)	31,000	186,000	17,490	40,600	--	20
6	Coal shovel (12 yd ³)	1,200	7,200	900	27,600	50,000	11
15	Rotary drill (crawler mounted)	670	10,050	4,587	73,600	30,000	6
24	Coal hauler (120 T)	335	8,040	3,440	25,800	25,000	5
6	Dozer with ripper	235	1,410	480	27,600	15,000	3
3	Reject hauler (120 T)	335	1,005	604	22,000	25,000	5
6	Scraper (35 yd ³)	305	1,830	718	14,600	15,000	6
12	Grader	95	1,140	470	58,800	15,000	3
6	Rubber-tired dozer	140	840	464	27,600	15,000	3
12	Track dozer	190	2,280	895	55,200	15,000	3
6	Sprinkler truck	160	960	366	29,600	15,000	3
6	Trac-drill with compressor	90	540	68	8,700	15,000	10
6	Front-end loader	140	840	250	13,600	15,000	7
3	Tire truck	40	120	8	6,000	20,000	10
2	Low boy with tractor	37	74	3	1,200	15,000	20
6	Fuel lube truck	45	270	94	29,400	15,000	3
6	Flatbed truck	8	48	46	32,200	20,000	8
6	ANFO mix truck	50	300	109	29,400	15,000	3
6	Explosive truck	15	90	43	29,400	20,000	4
6	Mine pumping system	50	300	50	9,000	30,000	20
2	Hydraulic crane (15 T)	200	400	23	4,800	15,000	9
1	Mobile crane (50 T)	430	430	8	1,500	15,000	15
6	Welding truck	20	120	30	19,000	15,000	5
6	Electrical truck	25	150	23	15,200	15,000	6
5	Dump truck (10 T)	10	50	21	14,200	15,000	5
6	30-Passenger bus	30	180	25	11,200	15,000	8
60	Pickup	5	300	277	201,000	10,000	3
	Total		224,967	31,492			
	Less power cost (included in power plant)		11,880				
	Equipment operating cost			19,612			

Table 14-9 - Annual Operating Cost Summary
(\$ million/year) (Base Case)

Item	Coal Mine	Coal Preparation	Process Plant	Power Plant	Offsites	Total
<u>Mine Royalty</u>	22.275	-	-	-	-	22.275
<u>Materials and Supplies</u>						
Operating supplies	13.542	.155	1.418	0.644	0.289	16.048
Equipment operation	19.612	-	-	-	-	19.612
Maintenance materials and contract labor	-	1.746	44.383	8.800	2.554	57.483
Catalysts and chemicals	-	-	6.000	-	1.250	7.250
Total material and supplies	33.154	1.901	53.051	9.444	4.093	100.393
<u>Labor</u>						
Operating labor and supervision	13.910	0.518	4.728	2.146	0.964	22.266
Maintenance labor and supervision	4.652	0.555	9.883	1.039	0.449	16.578
Payroll burden	6.463	0.376	5.114	1.115	0.494	13.562
Plant overhead	9.970	0.580	7.890	1.720	0.763	20.923
Union welfare	23.000	-	-	-	-	23.000
Total labor costs	57.995	2.029	27.615	6.020	2.670	96.329
<u>G and A Overhead</u>	4.500	0.095	1.767	0.470	0.169	7.001
<u>Miscellaneous Costs</u>	0.800	-	-	-	-	0.800
<u>Property Taxes and Insurance</u>	8.250	2.283	39.380	12.430	4.345	66.688
<u>Total operating costs</u>	126.974	6.308	120.563	28.364	11.277	293.486

Table 14-10 - Manpower Summary
(Base Case)

Item	Operating	Maintenance	Administration	Total
Administration			348	348
Coal mine	887	308		1,195
Coal preparation	33	22		55
Process plant	322	566		888
Power plant	141	57		198
Offsites	<u>85</u>	<u>27</u>	<u>—</u>	<u>112</u>
Total	1,468	980	348	2,796

Table 14-11 - Annual Maintenance Cost Summary
(\$ million)
(Base Case)

Unit No.	Description	Labor Including Payroll Burden	Contract Labor	Materials	Total	% of Fixed Capital Investment
08	<u>Nine</u>	6.280	None	31.492 ^a	37.772	b
09	<u>Coal Preparation</u>	0.750	None	1.746	2.496	3
	<u>Process Plant</u>					
10	Grinding and Drying				0.762	4
11	Oxygen Plant				7.086	3
12	SRC Dissolving				10.904	4
13	SRC Atm Distillation				1.241	4
14	SRC Vacuum Distillation				1.452	4
15	Pyrolysis				1.047	5
16	Pyrolysis Atm Distillation				0.099	4
17	Sour Gas Compression				0.358	5
18	Process Gasification				1.562	5
19	Shift Conversion				2.101	4
20	Selective Acid Gas Removal				2.527	4
21	Heavy Liquids Hydrotreating				4.355	4
22	Thermal Cracking				1.865	5
23	Coking				3.612	5
24	Naphtha Hydrotreating				0.999	4
25	Naphtha Reforming				0.667	4
26	Olefinic Gas/Acid Gas Removal				0.609	4
27	Saturate Gas/Acid Gas Removal				1.089	4
28	Olefin Recovery and Polymerization				0.170	4
29	Hydrogen Recovery and Purification				1.223	4
30	SNG Purification				1.372	5
31	LPG Fractionation				1.210	4
32	Sulfur Plant				1.314	3
33	Fuel Gas Generation				6.261	5
34	Fuel Gas/Acid Gas Removal				3.356	4
36	Process Waste Water Treating				0.484	4
	Process Plant Total	13.342	23.090	21.293	57.725	4.03
35	<u>Steam and Power Generation</u>	1.405		8.800	10.205	c
	<u>Offsites</u>					
10-1	Coal Storage				0.579	2
37-39, 43-44	General Facilities				0.980	2
40	Raw Water System				0.638	2
41	Effluent Water Treating				0.054	2
42	Product Storage				0.803	2
45	Instrument and Plant Air Systems				0.106	2
	Offsites Total	0.606	0.660	1.894	3.160	2
	Total	22.381	23.750	53.488	99.622	4.11

a Includes operating materials.
b See Tables 14-8 and 14-13.
c 1 mil/kWh.

Table 14-12 - Coal Mine Operating Labor and Supervision
(Base Case)

Category	Number of Employees		Salaries and Wages		Payroll Cost
	Per Shift	Total	(\$/Day)	(\$/Year)	(\$000/Year)
<u>Supervision</u>					
Pit superintendent		6		32,000	192
Chief mine engineer		1		30,000	30
Mine engineer		6		20,000	120
Shift foreman	4	25		22,000	550
Blast foreman	6	25		22,000	550
Dispatcher	1	5		22,000	110
Total supervision	13	68			1,552
<u>Operating Labor</u>					
Dragline operator	6	26	74.24		502
Dragline oiler	4	26	68.79		465
Dragline groundman	12	51	58.79		912
Coal shovel operator	6	26	54.28		434
Coal shovel groundman	6	26	59.56		403
Dozer operator (coal)	4	26	56.92		385
Coal haul driver	24	99	56.92		1,465
Rotary drill operator	12	48	56.92		710
Rotary drill helper	12	48	51.76		677
Truck driver reject	3	20	56.92		296
Scraper operator	6	12	56.92		178
Grader operator	4	17	56.91		385
R.T. dozer operator	6	26	56.91		385
Dozer operator (spoil)	12	35	56.92		755
Sprinkler truck driver		9	54.26		127
F.E. loader operator		5	56.92		104
Trac-drill driller		6	56.92		89
Trac-drill helper		4	54.26		85
Fuel lube driver	6	26	54.26		367
Fuel lube mechanic helper	6	26	54.26		367
ANFO truck driver	6	26	54.26		367
Loader/shooter	18	76	56.92		1,125
Utility man (laborer)	24	100	54.26		1,411
Misc. driver	6	25	54.26		364
Total operating labor	190	819			12,358
Total labor and supervision	203	887			13,910
Payroll burden					4,870
Total					18,780

Table 14-13 - Coal Mine Maintenance Labor and Supervision
(Base Case)

Category	Number of Employees		Salaries and Wages		Payroll Cost
	Per Shift	Total	(\$/Day)	(\$/Year)	(\$000/Year)
<u>Supervision</u>					
General shop supt.		1		29,000	29
Mechanical supt.		1		29,000	29
Electrical supt.		1		29,000	29
Mechanical foreman	2	9		22,000	198
Electrical foreman	2	9		22,000	198
Shop foreman	2	9		22,000	198
Agronomist		1		20,000	<u>20</u>
Total supervision	6	31			761
<u>Labor</u>					
Mechanic, First Class	7	24	59.56		372
Mechanic, Second Class	15	32	56.92		474
Electrician, First Class	6	26	59.56		403
Electrician, Second Class	3	13	56.92		192
Welder	9	30	56.92		444
Mechanic's helper	15	32	54.85		456
Parts man	4	9	54.85		128
Tool man	3	13	54.85		185
Tire man	3	13	54.85		185
Misc. equipment operator	3	13	56.92		192
Misc. driver	6	16	54.26		226
Laborers	4	19	54.26		268
Rodman		6	54.26		85
Clerk		12	42.00		131
Typist		12	37.00		115
Draftsman		3	32.00		39
Agronomist helper		4	54.26		56
Total labor	78	227			<u>3,951</u>
Total labor and supervision	84	308			4,652
Payroll burden					<u>1,628</u>
Total					6,280

Table 14-14 - Coal Preparation Labor
(Base Case)

Category	Number of Employees		Salaries and Wages		Payroll Cost
	Per Shift	Total	(\$/Day)	(\$/Year)	(\$000/Year)
<u>Operating Labor</u>					
Area foreman	1	5		22,000	110
Operator	4	16	56.92		237
Helper	<u>3</u>	<u>12</u>	54.85		171
Total	8	35			518
Payroll burden					<u>181</u>
Total operating labor					<u>699</u>
<u>Maintenance Labor</u>					
Foreman	1	5		22,000	110
Journeymar.	5	30	56.92		<u>445</u> 555
Payroll burden					<u>195</u>
Total maintenance labor					<u>750</u>

Table 14-15 - Process Plant Labor
(Base Case)

Category	Number of Employees		Salaries and Wages		Payroll Cost
	Per Shift	Total	(\$/Hour)	(\$/Year)	(\$000/Year)
<u>Operating Labor</u>					
Operating superintendent		1		33,000	33
Section manager		4		22,000	88
Shift superintendent	1	5		20,000	100
Shift foreman	5	20		17,500	350
Subtotal	6	30			571
<u>Operators</u>					
Unit 10	8	32			
Unit 11	5	20			
Unit 12, 13, 14	8	32			
Unit 15, 16, 18	6	24			
Unit 19, 20, 21	8	32			
Unit 22, 23	6	24			
Unit 24, 25	5	20			
Unit 17, 26, 27	5	20			
Unit 28, 29, 30, 31	7	28			
Unit 32, 33, 34	6	24			
Unit 36	2	8			
Boardman	2	8			
Laborer	5	20			
Subtotal	73	292	6.50		4,156
Total	79	322			4,728
Payroll burden					1,654
Total operating labor and supervision					6,382
<u>Maintenance Labor</u>					
Maintenance superintendent		1		33,000	33
Craft foreman	4	40		25,000	1,000
Labor foreman	2	15		20,000	300
Journeyman	32	373	9.00		6,983
General labor	16	137	5.50		1,567
Total	54	566			9,883
Payroll burden					3,459
Total maintenance labor and supervision					13,342

Table 14-16 - Power Plant Labor
(Base Case)

Category	Number of Employees		Salaries and Wages		Payroll Cost
	Per Shift	Total	(\$/Hour)	(\$/Year)	(\$000/Year)
<u>Operating Labor</u>					
Superintendent		1		33,000	33
Asst. superintendent		1		25,000	25
Shift foreman/chemist	1	6		20,000	120
Clerk	—	1			13
Subtotal supervision	1	9			191
Control room	5	20	10.00		416
Turbine operator	10	40	7.50		624
Fireman	8	32	7.50		499
Oiler	10	40	5.00		416
Subtotal labor	33	132			1,955
Total		141			2,146
Payroll burden					751
Total operating labor and supervision					<u>2,897</u>
<u>Maintenance Shop</u>					
Foreman		2		22,000	44
Journeyman	5	50	9.00		936
Janitor		3	5.50		34
Clerk	—	—			—
Total		57			1,039
Payroll burden					364
Total maintenance labor and supervision					<u>1,403</u>

Table 14-17 - Offsites Chemical Requirements
(Base Case)

Unit	Chemical	Annual Consumption (ton/Year)	Annual Cost (\$000)
40	<u>Clarifier</u>		
	Aluminum sulfate	900	116
	Lime	1,400	42
	Polyelectrolyte polymer	100	132
40	<u>Cooling Tower</u>		
	Gaseous chlorine	425	60
	Inhibitor	290	600
	Dispersant	85	130
39	<u>Potable Water</u>		
	Sodium hypochlorite	44	11
35 + Proc.	<u>Boiler Feed Water</u>		
	Chelant	27	54
	Hydrazine	25	80
	Trisodium phosphate	4	2
			<u>1,227</u>
			Say 1,250

Table 14-18 - Offsites Labor
(Base Case)

Category	Number of Employees		Salaries and Wages		Payroll Cost
	Per Shift	Total	(\$/Day)	(\$/Year)	(\$000/Year)
<u>Operation</u>					
<u>Supervision</u>					
Section manager		1		22,000	22
Day foreman		2		17,500	35
Shift foreman	<u>1</u>	<u>3</u>		17,500	<u>53</u>
Subtotal	1	6			110
<u>Labor</u>					
Unit 10	6	27			
Unit 39	2	9			
Unit 40	1	5			
Unit 41	2	10			
Unit 42	<u>4</u>	<u>28</u>			
Subtotal	<u>15</u>	<u>79</u>	6.50		<u>854</u>
Total	<u>16</u>	<u>85</u>			964
Payroll burden					<u>337</u>
Total operating labor and supervision					<u>1,031</u>
<u>Maintenance</u>					
Shift foreman	1	5		17,500	88
Journeyman	3	15	9.00		281
Laborer and painter	<u>1</u>	<u>7</u>	5.50		<u>80</u>
Total maintenance	<u>5</u>	<u>27</u>			449
Payroll burden					<u>157</u>
Total maintenance labor and supervision					<u>606</u>

Table 14-19 - Contribution of Cost Centers
to Required Annual Revenue (RAR)
(Base Case)

Category	Breakeven Case 0% DCF		12% DCF			
			100% Equity		65% Debt	
	RAR \$MM/Year	%	RAR \$MM/Year	%	RAR \$MM/Year	%
Coal mine	145.6	34.9	216.0	23.2	180.3	25.5
Coal preparation	10.6	2.5	28.3	3.0	20.4	2.9
Process plant	188.4	45.2	478.7	51.5	351.1	49.6
Power plant	52.8	12.7	150.8	16.2	113.4	16.0
Offsites	19.6	4.7	56.2	6.1	42.8	6.0
Total	417.0	100.0	930.0	100.0	708.7	100.0
Byproduct credit	123.0	29.5	123.0	13.2	123.0	17.4
Total energy products	294.0	70.5	807.0	86.8	585.0	82.6

Table 14-20 - Cash Flow Case Evaluation, Base Case - Central Location,
100% Equity, 12% DCF (constant mid-1977 \$ millions)

PERIOD	-5	-4	-3	-2	-1	1	2	3	4	5	6	7
REVENUE	0.000	0.000	0.000	0.000	0.000	403.558	807.117	807.117	807.117	807.117	807.117	807.117
REQUIRED REVENUE	0.000	0.000	0.000	0.000	0.000	40.218	80.437	80.437	80.437	80.437	80.437	80.437
WEDGE COKE	0.000	0.000	0.000	0.000	0.000	16.429	33.858	33.858	33.858	33.858	33.858	33.858
SULFU	0.000	0.000	0.000	0.000	0.000	4.227	8.455	8.455	8.455	8.455	8.455	8.455
AMMONIA	0.000	0.000	0.000	0.000	0.000	164.932	329.867	329.867	329.867	329.867	329.867	329.867
... T O T A L ...	0.000	0.000	0.000	0.000	0.000	11.136	22.275	22.275	22.275	22.275	22.275	22.275
ICOSTS)	0.000	0.000	0.000	0.000	0.000	1.000	2.000	2.000	2.000	2.000	2.000	2.000
MINE REVENUES	0.000	0.000	0.000	0.000	0.000	1.000	2.000	2.000	2.000	2.000	2.000	2.000
OPERATING SUPPLIES	0.000	0.000	0.000	0.000	0.000	1.000	2.000	2.000	2.000	2.000	2.000	2.000
CATALYSTS/CHEMICALS	0.000	0.000	0.000	0.000	0.000	1.000	2.000	2.000	2.000	2.000	2.000	2.000
OPER LABOUR W/SUPERVN	0.000	0.000	0.000	0.000	0.000	1.000	2.000	2.000	2.000	2.000	2.000	2.000
PAYROLL BURDEN	0.000	0.000	0.000	0.000	0.000	1.000	2.000	2.000	2.000	2.000	2.000	2.000
PLANT OVERHEAD/ADMIN	0.000	0.000	0.000	0.000	0.000	1.000	2.000	2.000	2.000	2.000	2.000	2.000
UNION WELFARE FUND	0.000	0.000	0.000	0.000	0.000	1.000	2.000	2.000	2.000	2.000	2.000	2.000
G AND A OVERHEAD	0.000	0.000	0.000	0.000	0.000	1.000	2.000	2.000	2.000	2.000	2.000	2.000
MISC	0.000	0.000	0.000	0.000	0.000	1.000	2.000	2.000	2.000	2.000	2.000	2.000
MINE EQUIPMENT OPER.	0.000	0.000	0.000	0.000	0.000	1.000	2.000	2.000	2.000	2.000	2.000	2.000
MAINTENANCE MATERIAL	0.000	0.000	0.000	0.000	0.000	1.000	2.000	2.000	2.000	2.000	2.000	2.000
MAINTENANCE LABOUR	0.000	0.000	0.000	0.000	0.000	1.000	2.000	2.000	2.000	2.000	2.000	2.000
PROPERTY TAX + INSUR	0.000	0.000	0.000	0.000	0.000	1.000	2.000	2.000	2.000	2.000	2.000	2.000
... T O T A L ...	0.000	0.000	0.000	0.000	0.000	249.254	293.386	293.386	293.386	293.386	293.386	293.386
DEPREC - MINE	0.000	0.000	0.000	0.000	0.000	77.500	58.125	45.367	34.040	27.819	23.623	19.427
DEPREC - COAL PREP	0.000	0.000	0.000	0.000	0.000	20.750	15.562	11.672	8.723	6.565	4.924	3.693
DEPREC - PROCESS PLT	0.000	0.000	0.000	0.000	0.000	282.454	231.099	189.081	154.763	120.575	93.205	71.205
DEPREC - PUMPER PLANT	0.000	0.000	0.000	0.000	0.000	33.321	30.941	28.731	26.679	24.775	23.034	21.401
DEPREC - OFF-SITES	0.000	0.000	0.000	0.000	0.000	16.250	14.625	13.153	11.840	10.664	9.595	8.536
DEPLETION ALLOWANCE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
COST + DEPR + DEPL	0.000	0.000	0.000	0.000	0.000	679.269	643.738	581.400	529.407	489.760	461.734	442.668
PROFIT BEFORE TAX	0.000	0.000	0.000	0.000	0.000	214.637	286.129	348.467	400.460	440.087	468.133	487.179
INCOME TAXES	0.000	0.000	0.000	0.000	0.000	111.031	148.787	181.203	208.237	228.845	243.429	253.343
TAX -CREDIT	0.000	0.000	0.000	0.000	0.000	218.230	0.000	0.709	0.006	0.916	1.064	1.064
PROFIT AFTER TAX	0.000	0.000	0.000	0.000	0.000	113.224	137.342	167.973	192.227	212.158	226.608	233.940
AVERAGE ANNUAL NET PROFIT	0.000	0.000	0.000	0.000	0.000	543.499	687.694	825.987	928.248	1000.472	1064.956	1118.432
GROSS CF OPERATIONS	0.000	0.000	0.000	0.000	0.000	243.493	303.193	362.849	422.428	482.076	541.724	601.372
ACCUM GROSS CASHFLOW	0.000	0.000	0.000	0.000	0.000	243.493	546.686	909.535	1331.963	1814.039	2355.763	2957.135
INVESTMENT)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LAND	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FIXED CAP INVESTMENT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
INITIAL CAT + CHEN.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
START-UP COSTS	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
EQUIPMENT REPLACER	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL FIXED INVEST	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WORKING CAP PAID IN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ACCUM GROSS CF TOTAL	0.000	0.000	0.000	0.000	0.000	243.493	546.686	909.535	1331.963	1814.039	2355.763	2957.135
NET CASH FLOW	0.000	0.000	0.000	0.000	0.000	243.493	546.686	909.535	1331.963	1814.039	2355.763	2957.135
ACCUM NET CASHFLOW	0.000	0.000	0.000	0.000	0.000	243.493	790.179	1299.714	1931.677	2745.716	3660.480	4717.615
... NET CASH FLOW DISCOUNTED AT 12.000 / PERIOD ...	0.000	0.000	0.000	0.000	0.000	243.493	790.179	1299.714	1931.677	2745.716	3660.480	4717.615
FACTORS	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PRESENT VALUE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CUMULATIVE VALUE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Table 14-20 (Contd)

PERIOD	8	9	10	11	12	13	14	15	16	17	18	19
(REVENUES)												
REQUIRED REVENUE	807.117	807.117	807.117	807.117	807.117	807.117	807.117	807.117	807.117	807.117	807.117	807.117
NEEDLE CORE	80.437	80.437	80.437	80.437	80.437	80.437	80.437	80.437	80.437	80.437	80.437	80.437
SULFU	33.858	33.858	33.858	33.858	33.858	33.858	33.858	33.858	33.858	33.858	33.858	33.858
AMMUNIA	8.455	8.455	8.455	8.455	8.455	8.455	8.455	8.455	8.455	8.455	8.455	8.455
... T O T A L ...	929.867	929.867	929.867	929.867	929.867	929.867	929.867	929.867	929.867	929.867	929.867	929.867
COSTS												
WAGE MATERIALS	22.275	22.275	22.275	22.275	22.275	22.275	22.275	22.275	22.275	22.275	22.275	22.275
OPERATING SUPPLIES	16.048	16.048	16.048	16.048	16.048	16.048	16.048	16.048	16.048	16.048	16.048	16.048
CATALYSTS/CHEMICALS	7.250	7.250	7.250	7.250	7.250	7.250	7.250	7.250	7.250	7.250	7.250	7.250
OPER LABOR / SUPERVIS	22.166	22.166	22.166	22.166	22.166	22.166	22.166	22.166	22.166	22.166	22.166	22.166
PAYROLL BURDEN	13.562	13.562	13.562	13.562	13.562	13.562	13.562	13.562	13.562	13.562	13.562	13.562
PLANT OVERHEAD/ADMIN	20.923	20.923	20.923	20.923	20.923	20.923	20.923	20.923	20.923	20.923	20.923	20.923
UNION WELFARE FUND	23.000	23.000	23.000	23.000	23.000	23.000	23.000	23.000	23.000	23.000	23.000	23.000
G AND A OVERHEAD	7.001	7.001	7.001	7.001	7.001	7.001	7.001	7.001	7.001	7.001	7.001	7.001
MISC	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000
MINE EQUIPMENT OPER	19.612	19.612	19.612	19.612	19.612	19.612	19.612	19.612	19.612	19.612	19.612	19.612
WAGE MATERIAL	57.483	57.483	57.483	57.483	57.483	57.483	57.483	57.483	57.483	57.483	57.483	57.483
MAIN WANCE LABOR	16.578	16.578	16.578	16.578	16.578	16.578	16.578	16.578	16.578	16.578	16.578	16.578
PROPERTY TAX + INSUR	66.888	66.888	66.888	66.888	66.888	66.888	66.888	66.888	66.888	66.888	66.888	66.888
... T O T A L ...	293.386	293.386	293.386	293.386	293.386	293.386	293.386	293.386	293.386	293.386	293.386	293.386
DEPRE - MINE	14.937	12.653	12.071	10.000	12.914	9.686	7.474	9.773	7.397	5.948	9.024	6.167
DEPRE - MINE WREP	9.205	9.205	9.205	9.205	9.205	9.205	9.205	9.205	9.205	9.205	9.205	9.205
DEPRE - PROCESS PL	7.772	7.772	7.772	7.772	7.772	7.772	7.772	7.772	7.772	7.772	7.772	7.772
DEPRE - EQUIP	2.603	2.603	2.603	2.603	2.603	2.603	2.603	2.603	2.603	2.603	2.603	2.603
DEPRE - EQUIP	4.395	4.395	4.395	4.395	4.395	4.395	4.395	4.395	4.395	4.395	4.395	4.395
DEPRE - EQUIP	4.395	4.395	4.395	4.395	4.395	4.395	4.395	4.395	4.395	4.395	4.395	4.395
COST + DEPR + DEPL	437.903	425.846	423.386	330.074	327.410	325.326	325.568	325.568	324.379	324.455	325.192	324.084
PROFIT BEFORE TAX	491.964	501.615	506.481	506.481	599.789	602.457	604.301	604.299	604.438	604.412	604.872	603.803
INCOME TAXES	295.821	260.840	262.091	263.370	311.896	313.277	314.361	314.235	314.874	315.234	315.234	315.617
TAX CREDIT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PROFIT AFTER TAX	230.143	240.725	244.390	243.111	287.893	289.180	289.940	290.064	289.564	289.178	289.638	288.186
AVERAGE ANNUAL NET PROFIT	242.934											
GROSS CFP OPERATIONS	380.460	375.641	374.390	373.111	324.491	322.203	322.120	322.265	321.627	321.117	322.420	321.493
ACCUM GROSS CASHFLOW	345.826	3869.467	4234.857	4607.968	4932.556	5255.762	5577.681	5900.127	6211.754	6542.300	6864.493	7186.413
INVESTMENT)												
LAND	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FIXED CAP INVESTMENT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
STAFF - CASHER	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
EQUIPMENT REPLACEMENT	2.64	7.502	9.725	7.200	19.097	8.864	8.840	16.667	2.64	0.000	19.447	0.000
TOTAL FIXED INVEST	2.64	7.502	9.725	7.200	19.097	8.864	8.840	16.667	2.64	0.000	19.447	0.000
WORKING CAP PAID IN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ACCUM GROSS CFP TOTAL	751.378	1119.517	1484.182	1850.093	2155.386	2478.790	2800.049	3185.648	3427.011	3748.457	4050.760	4372.223
NET CASH FLOW	380.326	288.139	364.665	365.911	305.494	323.203	321.280	305.576	311.363	312.147	302.603	321.693
ACCUM NET CASHFLOW	751.378	1119.517	1484.182	1850.093	2155.386	2478.790	2800.049	3185.648	3427.011	3748.457	4050.760	4372.223
----- NET CASH FLOW DISCOUNTED AT 12.000 / PERIOD -----												
FACTORS	2.59	75.205	1.83	1.63	1.55	1.50	1.45	1.40	1.35	1.30	1.25	1.20
PRESENT VALUE	87.217	75.205	66.923	59.082	49.943	44.229	37.403	31.328	27.743	25.142	23.179	21.379
CUMULATIVE VALUE	-482.408	-407.019	-340.950	-280.788	-236.275	-194.256	-156.543	-125.205	-95.319	-68.979	-46.651	-25.472

Table 14-20 (Contd)

PERIOD	20
REVENUES	
REQUIRED REVENUE	807,317
NET CASH FLOW	80,437
SULFUR	33,858
AMMONIA	8,555
... T O T A L ...	929,867
(COSTS)	
MINE ROYALTIES	22,275
OPERATING SUPPLIES	16,048
CATALYSTS/CHEMICALS	7,250
OPER LABOR W/SUPERV	22,106
PAYROLL BURDEN	13,562
PLANT OVERHEAD/ADMIN	20,923
UNION WELFARE FUND	23,000
G AND A OVERHEAD	7,001
MISC EQUIPMENT OPER.	19,000
MAINTENANCE MATERIAL	21,032
PROPERTY TAX & INSUR	20,275
... T O T A L ...	293,306
DEPRECIATION	
DEPREC - MINE	5,075
DEPREC - COAL PREP	0,000
DEPREC - PROCESS PLY	0,000
DEPREC - POWER PLANT	11,807
DEPREC - OFF-SITES	5,566
DEPLETION ALLOWANCE	7,284
COST + DEPR + DEPL	323,215
PROFIT BEFORE TAX	606,659
INCOME TAXES	319,457
TAX CREDIT	0,000
PROFIT AFTER TAX	287,202
AVERAGE ANNUAL NET PROFIT	242,934
GROSS CF - OPERATIONS	321,023
ACCUM GROSS CASHFLOW	7507,437
(INVESTMENT)	
LAND	0,000
FIXED CAP INVESTMENT	0,000
INITIAL CAT + CHEM.	0,000
START-UP COSTS	0,000
EQUIPMENT REPLACEMEN	0,000
TOTAL FIXED INVEST	0,000
WORKING CAP PAID IN	-112,800
ACCUM GROSS CF TOTAL	6805,247
NET CASH FLOW	533,023
ACCUM NET CASHFLOW	4805,247
----- NET CASH FLOW DISCOUNTED AT 12.000 / PERIOD -----	
FACTORS	.059
PRESENT VALUE	25,472
CUMULATIVE VALUE	-1,000

Table 14-21 - Cash Flow Case Evaluation, Base Case - Central Location, Total Complex, 65/35 Debt/Equity Ratio with 9% Interest, 20 Year Repayment (constant mid-1977 \$ millions)

PERIOD	-5	-4	-3	-2	-1	1	2	3	4	5	6	7
REVENUES												
REQUIRED REVENUE	0.000	0.000	0.000	0.000	0.000	292.428	385.256	385.256	585.256	585.256	585.256	585.256
RENT	0.000	0.000	0.000	0.000	0.000	50.218	80.437	80.437	80.437	80.437	80.437	80.437
SURPL	0.000	0.000	0.000	0.000	0.000	18.429	31.858	31.858	31.858	31.858	31.858	31.858
AMORTIA	0.000	0.000	0.000	0.000	0.000	8.127	8.435	8.435	8.435	8.435	8.435	8.435
... T O T A L ...	0.000	0.000	0.000	0.000	0.000	354.002	709.006	709.006	708.006	708.006	708.006	726.006
LCOSTS												
NEW CAPITALS	0.000	0.000	0.000	0.000	0.000	11.188	22.376	22.376	22.376	22.376	22.376	22.376
REPAIRS	0.000	0.000	0.000	0.000	0.000	7.648	15.296	15.296	15.296	15.296	15.296	15.296
CHEMICALS	0.000	0.000	0.000	0.000	0.000	3.625	7.250	7.250	7.250	7.250	7.250	7.250
OPER LASH WASTE	0.000	0.000	0.000	0.000	0.000	22.166	22.166	22.166	22.166	22.166	22.166	22.166
PAYROLL WAGES	0.000	0.000	0.000	0.000	0.000	13.562	13.562	13.562	13.562	13.562	13.562	13.562
PLANT OPERATIONS	0.000	0.000	0.000	0.000	0.000	20.923	20.923	20.923	20.923	20.923	20.923	20.923
UNION WELFARE FUND	0.000	0.000	0.000	0.000	0.000	11.500	11.500	11.500	11.500	11.500	11.500	11.500
CLUB & UPHOHEAD	0.000	0.000	0.000	0.000	0.000	7.400	7.400	7.400	7.400	7.400	7.400	7.400
CONTRACTOR	0.000	0.000	0.000	0.000	0.000	7.400	7.400	7.400	7.400	7.400	7.400	7.400
PIPE EQUIPMENT OPER.	0.000	0.000	0.000	0.000	0.000	9.406	19.612	19.612	19.612	19.612	19.612	19.612
MAINTENANCE PAYROLL	0.000	0.000	0.000	0.000	0.000	57.483	57.483	57.483	57.483	57.483	57.483	57.483
MAINTENANCE LABOR	0.000	0.000	0.000	0.000	0.000	16.378	16.378	16.378	16.378	16.378	16.378	16.378
PROPERTY TAX - INSUR	0.000	0.000	0.000	0.000	0.000	64.688	64.688	64.688	64.688	64.688	64.688	64.688
PROPERTY TAX - INSUR	0.000	0.000	0.000	0.000	0.000	121.137	121.137	121.137	121.137	121.137	121.137	121.137
INTEREST ON LOAN	0.000	0.000	0.000	0.000	0.000	14.850	14.850	14.850	14.850	14.850	14.850	14.850
INTEREST ON WCAP	0.000	0.000	0.000	0.000	0.000	424.733	424.733	424.733	424.733	424.733	424.733	424.733
... T O T A L ...	0.000	0.000	0.000	0.000	0.000	-346.421	-151.402	-62.828	-381	51.437	92.170	115.450
DEPREC - RENE	0.000	0.000	0.000	0.000	0.000	60.429	44.872	44.872	38.320	28.725	23.895	20.000
DEPREC - COAL PREP	0.000	0.000	0.000	0.000	0.000	11.255	21.508	21.508	17.645	14.571	11.538	9.000
DEPREC - PAPER PLANT	0.000	0.000	0.000	0.000	0.000	37.189	37.189	37.189	37.189	37.189	37.189	37.189
DEPREC - OFF-SITES	0.000	0.000	0.000	0.000	0.000	18.441	18.441	18.441	18.441	18.441	18.441	18.441
DEPLETION ALLIANCE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
COST - DEPR - DEPR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PLUGIT BEFORE TAX	0.000	0.000	0.000	0.000	0.000	-346.421	-151.402	-62.828	-381	51.437	92.170	115.450
INCOME TAXES	0.000	0.000	0.000	0.000	0.000	-284.139	-73.529	-34.871	-188	26.747	47.928	30.242
TAX CREDIT	0.000	0.000	0.000	0.000	0.000	218.250	0.000	0.000	0.000	0.000	0.000	0.000
PLUGIT AFTER TAX	0.000	0.000	0.000	0.000	0.000	-44.692	-67.873	-29.449	-179	25.690	46.146	35.692
AVERAGE ANNUAL NET PROFIT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
GROSS CF, OPERATIONS	0.000	0.000	0.000	0.000	0.000	431.658	321.162	289.666	264.395	247.358	239.417	229.739
ACQUM GRDIS CASHFLOW	0.000	0.000	0.000	0.000	0.000	631.658	752.820	762.284	1306.639	1552.797	1789.214	2016.949
(INVESTMENT)												
FIXED CAP INVESTMENT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
INITIAL CAT & CHEM.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
START-UP COSTS	0.000	0.000	0.000	0.000	0.000	75.000	0.000	0.000	0.000	0.000	0.000	0.000
INT. DURING CONSTR.	0.000	0.000	0.000	0.000	0.000	94.212	154.994	0.000	0.000	0.000	0.000	0.000
COMMITMENT FEE	0.000	0.000	0.000	0.000	0.000	13.897	13.897	13.897	13.897	13.897	13.897	13.897
EQUIPMENT REPLACEMENT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL FIXED INVEST	0.000	0.000	0.000	0.000	0.000	108.997	195.352	117.898	117.898	117.898	117.898	117.898
WORKING CAP PAID IN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
BORROWER CAPITAL	12.997	15.952	15.402	1101.410	731.076	0.000	0.000	0.000	0.000	0.000	0.000	0.000
BORROWER WORKING CAP	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ACQUM GROSS CF TOTAL	-93.000	-273.000	-783.000	-851.748	-932.646	-570.688	-254.846	-254.846	-254.846	-254.846	-254.846	-254.846
LOAN REPAYMENT	0.000	0.000	0.000	0.000	0.000	93.912	93.912	93.912	93.912	93.912	93.912	93.912
W/CP REPAYMENT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NET CASH FLOW	-93.000	-180.000	-510.000	-68.748	-10.918	268.746	227.230	188.460	170.383	144.091	172.468	191.983
ACQUM NET CASHFLOW	-93.000	-273.000	-783.000	-851.748	-932.646	-669.920	-442.612	-254.846	-254.846	-254.846	-254.846	-254.846
... NET CASH FLOW DISCOUNTED AT 12.000 / PERIOD ...												
PRESENT VALUE	-893	-797	-712	-634	-567	-507	-452	-404	-361	-322	-287	-257
CUMULATIVE VALUE	-83.016	-163.489	-263.008	-43.491	-45.976	133.115	102.796	76.216	61.412	46.393	35.207	31.557
DEBT BALANCE	13.997	29.169	45.351	1147.161	1878.237	1764.325	1690.413	1624.501	1562.889	1498.637	1434.745	1370.853
DEBT W/CP BAL	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Table 14-21 (Contd)

PERIOD	8	9	10	11	12	13	14	15	16	17	18	19
REVENUE	585,256	585,256	585,256	585,256	585,256	585,256	585,256	585,256	585,256	585,256	585,256	585,256
ACQUIRED REVENUE	80,437	80,437	80,437	80,437	80,437	80,437	80,437	80,437	80,437	80,437	80,437	80,437
NEEDLE COKE	38,455	38,455	38,455	38,455	38,455	38,455	38,455	38,455	38,455	38,455	38,455	38,455
AMURIA	8,455	8,455	8,455	8,455	8,455	8,455	8,455	8,455	8,455	8,455	8,455	8,455
... F O Y A L ...	708,006	708,006	708,006	708,006	708,006	708,006	708,006	708,006	708,006	708,006	708,006	708,006
COSTS	22,675	22,675	22,675	22,675	22,675	22,675	22,675	22,675	22,675	22,675	22,675	22,675
OPERATING EXPENSES	19,230	19,230	19,230	19,230	19,230	19,230	19,230	19,230	19,230	19,230	19,230	19,230
CATALYTIC/REAGENTS	7,230	7,230	7,230	7,230	7,230	7,230	7,230	7,230	7,230	7,230	7,230	7,230
OPER LABOR W/S/PERUM	22,166	22,166	22,166	22,166	22,166	22,166	22,166	22,166	22,166	22,166	22,166	22,166
PAYROLL BURDEN	13,562	13,562	13,562	13,562	13,562	13,562	13,562	13,562	13,562	13,562	13,562	13,562
PLANT OVERHEAD/ADMIN	20,923	20,923	20,923	20,923	20,923	20,923	20,923	20,923	20,923	20,923	20,923	20,923
PLANT RELIEF FUND	23,000	23,000	23,000	23,000	23,000	23,000	23,000	23,000	23,000	23,000	23,000	23,000
CLAM & OVERHEADS	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800
WISC	800	800	800	800	800	800	800	800	800	800	800	800
TIME EQUIPMENT OPER.	19,612	19,612	19,612	19,612	19,612	19,612	19,612	19,612	19,612	19,612	19,612	19,612
MAINTENANCE MATERIAL	57,483	57,483	57,483	57,483	57,483	57,483	57,483	57,483	57,483	57,483	57,483	57,483
MAINTENANCE LABOR	16,578	16,578	16,578	16,578	16,578	16,578	16,578	16,578	16,578	16,578	16,578	16,578
PROPERTY TAX + INSUR	66,688	66,688	66,688	66,688	66,688	66,688	66,688	66,688	66,688	66,688	66,688	66,688
PROPERTY TAX + INSUR	101,925	101,925	101,925	101,925	101,925	101,925	101,925	101,925	101,925	101,925	101,925	101,925
INTEREST ON WCAP	14,830	14,830	14,830	14,830	14,830	14,830	14,830	14,830	14,830	14,830	14,830	14,830
... F O Y A L ...	409,661	409,661	409,661	409,661	409,661	409,661	409,661	409,661	409,661	409,661	409,661	409,661
DEPREC - WME	17,189	17,189	17,189	17,189	17,189	17,189	17,189	17,189	17,189	17,189	17,189	17,189
DEPREC - COAL PREP	3,997	3,997	3,997	3,997	3,997	3,997	3,997	3,997	3,997	3,997	3,997	3,997
DEPREC - POWER PLANT	19,030	19,030	19,030	19,030	19,030	19,030	19,030	19,030	19,030	19,030	19,030	19,030
DEPREC - OFF-SITES	8,724	8,724	8,724	8,724	8,724	8,724	8,724	8,724	8,724	8,724	8,724	8,724
DEPLETION ALLOWANCE	10,920	10,920	10,920	10,920	10,920	10,920	10,920	10,920	10,920	10,920	10,920	10,920
CBST + DEPR + DEPL	578,816	578,816	578,816	578,816	578,816	578,816	578,816	578,816	578,816	578,816	578,816	578,816
PROFIT BEFORE TAX	129,190	129,190	129,190	129,190	129,190	129,190	129,190	129,190	129,190	129,190	129,190	129,190
INCOME TAXES	67,319	67,319	67,319	67,319	67,319	67,319	67,319	67,319	67,319	67,319	67,319	67,319
TAX CREDIT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PROFIT AFTER TAX	61,871	61,871	61,871	61,871	61,871	61,871	61,871	61,871	61,871	61,871	61,871	61,871
AVERAGE ANNUAL NET PROFIT	62,523	62,523	62,523	62,523	62,523	62,523	62,523	62,523	62,523	62,523	62,523	62,523
GROSS CF OPERATIONS	231,166	231,166	231,166	231,166	231,166	231,166	231,166	231,166	231,166	231,166	231,166	231,166
ACCUM GROSS CASHFLOW	2250-115	2483-233	2710-142	2958-176	3183-407	3432-931	3525-447	3721-131	3921-800	4225-736	4332-780	4545-772
(INVESTMENTS)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LAND CAP INVESTMENT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FIXED ASSET ACQUIS.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
START-UP COSTS	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
INT. DURING CONSTR.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
COMMITMENT FEE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
EQUIPMENT AFFILIATION	-264	-264	-264	-264	-264	-264	-264	-264	-264	-264	-264	-264
TOTAL FIXED INVEST	-264	-264	-264	-264	-264	-264	-264	-264	-264	-264	-264	-264
WORKING CAP PAID IN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ADDED WORKING CAP	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ACCUM GROSS CF TOTAL	1208-001	1431-617	1557-801	1689-635	2095-789	2245-293	2436-929	2615-986	2816-391	3020-327	3207-933	3420-866
W/CAP REPAYMENT	91-014	91-012	91-012	91-012	91-012	91-012	91-012	91-012	91-012	91-012	91-012	91-012
NET CASH FLOW	136-900	134-704	122-222	137-222	72-221	32-612	97-724	89-145	106-493	110-024	93-694	119-021
ACCUM NET CASHFLOW	456-705	586-400	718-601	855-603	928-325	1024-437	1122-151	1207-306	1313-799	1423-823	1517-517	1616-538
----- NET CASH FLOW DISCOUNTED AT 12-000 / PERIOD -----												
FACTORS	220	205	183	163	146	130	116	104	93	83	74	66
PRESENT VALUE	31,593	26,949	24,166	22,498	20,519	18,343	16,346	14,827	13,467	12,431	11,346	10,461
CUMULATIVE VALUE	-158-031	-131-084	-106-919	-84-921	-61-468	-39-122	-18-295	-10-235	-2-346	7-861	17-991	29-991
DEBT BALANCE	1124-001	1033-030	930-117	845-205	751-293	657-381	563-469	469-557	375-645	281-733	187-821	93-909
W/CAP LOAN	165-000	165-000	165-000	165-000	165-000	165-000	165-000	165-000	165-000	165-000	165-000	165-000

Table 14-21 (Contd)

20

PERIOD	20
REVENUES	
SALES REVENUE	585,246
NEBLE CONE	80,537
SULFU	33,858
ARMOSEA	8,455
... T O T A L ...	708,096
EXPENSES	
MINE ROYALTIES	22,275
OPERATING SUPPLIES	16,948
CATALYSTS/CHEMICALS	7,250
DEP. LAB. & SUPPLY	21,449
PLANT OVERHEAD/ADMIN	20,923
UNION WELFARE FUND	23,000
G AND A OVERHEAD	7,001
MISC	800
MINE EQUIPMENT OPERA	19,612
MINE EQUIPMENT MAINT	17,272
MAINTENANCE LAB. &	17,473
PROPERTY TAX & INSUR	66,688
INTEREST ON LIAN	0,000
INTEREST ON W/CAP	0,000
... T O T A L ...	293,386
DEPRECIATION	
DEPRECIATION - MINE	6,696
DEPRECIATION - COAL WREP	0,000
DEPRECIATION - PROCESS PLANT	0,000
DEPRECIATION - POWER PLANT	13,748
DEPRECIATION - SHELTER	61,730
DEPRECIATION - ALLIANCE	19,720
CONST. & DEPR. > DEPR.	339,424
PREDFIT BEFORE TAX	369,282
INCOME TAXES	191,563
TAX CREDIT	0,000
PREDFIT AFTER TAX	176,919
AVERAGE ANNUAL NET PROFIT	82,323
NET CASH FLOW	222,937
ACCUM. GROSS CASH FLOW	4786,030
INVESTMENTS	
LAND	0,000
FIXED CAP INVESTMENT	0,000
INITIAL CAT & CHEM.	0,000
MINE CONSTRUCTION	0,000
PLANT CONSTRUCTION	0,000
COMMITMENT FEE	0,000
EQUIPMENT REPLACEMENT	0,000
TOTAL FIXED INVEST	0,000
WORKING CAP PAID IN	-169,000
BORROWED CAPITAL	0,000
BORROWED WORKING/CAP	0,000
ACCUM. GROSS CF TOTAL	3808,824
LOAN REPAYMENT	93,913
W/CAP REPAYMENT	165,000
NET CASH FLOW	129,045
ACCUM. NET CASH FLOW	1765,584
***** NET CASH FLOW DISCOUNTED AT 12.000 / PERIOD *****	
FACTORS	
PRESENT VALUE	-0.59
CUMULATIVE VALUE	7.591
DEBT BALANCE	-1,083
SBL W/CAP LDN	0,000

Table 14-22 - Cash Flow Case Evaluation, Base Case - Central Location, Total Complex, Breakeven Case - 0% DCF (constant mid-1977 \$ million)

PERIOD	-5	-4	-3	-2	-1	1	2	3	4	5	6	7
REVENUES	0.000	0.000	0.000	0.000	0.000	146.868	293.736	293.736	293.736	293.736	293.736	293.736
MINERAL REVENUE	0.000	0.000	0.000	0.000	0.000	40.437	80.874	80.874	80.874	80.874	80.874	80.874
WORLD COKE	0.000	0.000	0.000	0.000	0.000	16.229	32.458	32.458	32.458	32.458	32.458	32.458
SULFUR	0.000	0.000	0.000	0.000	0.000	4.227	8.455	8.455	8.455	8.455	8.455	8.455
AMMONIA	0.000	0.000	0.000	0.000	0.000	208.242	416.485	416.485	416.485	416.485	416.485	416.485
... T O T A L ...	0.000	0.000	0.000	0.000	0.000	11.138	22.275	22.275	22.275	22.275	22.275	22.275
(COSTS)	0.000	0.000	0.000	0.000	0.000	6.024	12.048	12.048	12.048	12.048	12.048	12.048
MINE ROYALTIES	0.000	0.000	0.000	0.000	0.000	3.625	7.250	7.250	7.250	7.250	7.250	7.250
OPERATIVE SUPPLIES	0.000	0.000	0.000	0.000	0.000	22.166	44.332	44.332	44.332	44.332	44.332	44.332
CATALYSTS/CHEMICALS	0.000	0.000	0.000	0.000	0.000	13.562	27.124	27.124	27.124	27.124	27.124	27.124
OPER LABOR W/SUPERVN	0.000	0.000	0.000	0.000	0.000	20.923	41.846	41.846	41.846	41.846	41.846	41.846
PAYROLL BURDEN	0.000	0.000	0.000	0.000	0.000	7.601	15.202	15.202	15.202	15.202	15.202	15.202
PLANT OVERHEAD/ADMIN	0.000	0.000	0.000	0.000	0.000	8.000	16.000	16.000	16.000	16.000	16.000	16.000
UNION WELFARE FUND	0.000	0.000	0.000	0.000	0.000	19.612	39.224	39.224	39.224	39.224	39.224	39.224
G AND A OVERHEAD	0.000	0.000	0.000	0.000	0.000	57.483	114.966	114.966	114.966	114.966	114.966	114.966
MISC EQUIPMENT OPER	0.000	0.000	0.000	0.000	0.000	16.578	33.156	33.156	33.156	33.156	33.156	33.156
MILE EQUIPMENT OPER	0.000	0.000	0.000	0.000	0.000	66.688	133.376	133.376	133.376	133.376	133.376	133.376
MAINTENANCE MATERIAL	0.000	0.000	0.000	0.000	0.000	293.386	586.772	586.772	586.772	586.772	586.772	586.772
MAINTENANCE LABOR	0.000	0.000	0.000	0.000	0.000	293.386	586.772	586.772	586.772	586.772	586.772	586.772
PROPERTY TAX + INSUR	0.000	0.000	0.000	0.000	0.000	293.386	586.772	586.772	586.772	586.772	586.772	586.772
... T O T A L ...	0.000	0.000	0.000	0.000	0.000	249.294	498.588	498.588	498.588	498.588	498.588	498.588
DEPREC - MINE	0.000	0.000	0.000	0.000	0.000	77.500	155.000	155.000	155.000	155.000	155.000	155.000
DEPREC - CHAL PREP	0.000	0.000	0.000	0.000	0.000	20.750	41.500	41.500	41.500	41.500	41.500	41.500
DEPREC - PROCESS PLT	0.000	0.000	0.000	0.000	0.000	282.454	564.908	564.908	564.908	564.908	564.908	564.908
DEPREC - POWER PLANT	0.000	0.000	0.000	0.000	0.000	30.321	60.642	60.642	60.642	60.642	60.642	60.642
DEPREC - OFF-SITES	0.000	0.000	0.000	0.000	0.000	16.250	32.500	32.500	32.500	32.500	32.500	32.500
DEPLETION ALLOWANCE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CUST + DEPR + DEPL	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PROFIT BEFORE TAX	0.000	0.000	0.000	0.000	0.000	-71.327	-142.654	-142.654	-142.654	-142.654	-142.654	-142.654
INCOME TAXES	0.000	0.000	0.000	0.000	0.000	-245.090	-490.180	-490.180	-490.180	-490.180	-490.180	-490.180
TAX CREDIT	0.000	0.000	0.000	0.000	0.000	218.250	436.500	436.500	436.500	436.500	436.500	436.500
PROFIT AFTER TAX	0.000	0.000	0.000	0.000	0.000	-7.987	-15.974	-15.974	-15.974	-15.974	-15.974	-15.974
AVERAGE ANNUAL NET PROFIT	2.571	2.571	2.571	2.571	2.571	2.571	2.571	2.571	2.571	2.571	2.571	2.571
GROSS CF, OPERATIONS	0.000	0.000	0.000	0.000	0.000	422.288	844.576	844.576	844.576	844.576	844.576	844.576
ACCUR GROSS CASHFLOW	0.000	0.000	0.000	0.000	0.000	422.288	844.576	844.576	844.576	844.576	844.576	844.576
INVESTMENTS	3.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LAND	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FIXED CAP INVESTMENT	90.000	180.000	180.000	180.000	180.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
INITIAL CAT + CHER.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
START-UP COSTS	0.000	0.000	0.000	0.000	0.000	75.000	150.000	150.000	150.000	150.000	150.000	150.000
EQUIPMENT REPLACEMENT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL FIXED INVEST	93.000	180.000	180.000	180.000	180.000	75.000	150.000	150.000	150.000	150.000	150.000	150.000
WORKING CAP PAID IN	0.000	0.000	0.000	0.000	0.000	112.000	224.000	224.000	224.000	224.000	224.000	224.000
ACCUR GROSS CF TOTAL	-93.000	-273.000	-783.000	-1853.000	-2510.000	-2274.712	-2033.441	-1836.909	-1649.204	-1496.231	-1366.739	-1260.766
NET CASH FLOW	-93.000	-180.000	-510.000	-1070.000	-1657.000	233.288	466.576	466.576	466.576	466.576	466.576	466.576
ACCUR NET CASHFLOW	-93.000	-273.000	-783.000	-1853.000	-2510.000	-2274.712	-2033.441	-1836.909	-1649.204	-1496.231	-1366.739	-1260.766
----- NET CASH FLOW DISCOUNTED AT 0.000 / PERIOD -----												
FACTORS	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
PRESENT VALUE	-93.000	-180.000	-510.000	-1070.000	-1657.000	233.288	466.576	466.576	466.576	466.576	466.576	466.576
CUMULATIVE VALUE	-93.000	-273.000	-783.000	-1853.000	-2510.000	-2274.712	-2033.441	-1836.909	-1649.204	-1496.231	-1366.739	-1260.766

Table 14-22 (Contd)

PERIOD	8	9	10	11	12	13	14	15	16	17	18	19
REVENUES												
REQUIRED REVENUE	293,736	293,736	293,736	293,736	293,736	293,736	293,736	293,736	293,736	293,736	293,736	293,736
MEGAL COKE	40,437	40,437	40,437	40,437	40,437	40,437	40,437	40,437	40,437	40,437	40,437	40,437
SULFUR	33,858	33,858	33,858	33,858	33,858	33,858	33,858	33,858	33,858	33,858	33,858	33,858
AMMONIA	8,455	8,455	8,455	8,455	8,455	8,455	8,455	8,455	8,455	8,455	8,455	8,455
*** T O T A L ***	410,486	410,486	410,486	410,486	410,486	410,486	410,486	410,486	410,486	410,486	410,486	410,486
(COSTS)												
TIME RIVALITIES	22,275	22,275	22,275	22,275	22,275	22,275	22,275	22,275	22,275	22,275	22,275	22,275
OPERATING SUPPLIES	16,048	16,048	16,048	16,048	16,048	16,048	16,048	16,048	16,048	16,048	16,048	16,048
CATALYSTS/CHEMICALS	7,250	7,250	7,250	7,250	7,250	7,250	7,250	7,250	7,250	7,250	7,250	7,250
OPER LABR W/SUPERVN	22,166	22,166	22,166	22,166	22,166	22,166	22,166	22,166	22,166	22,166	22,166	22,166
PAYROLL BURDEN	13,562	13,562	13,562	13,562	13,562	13,562	13,562	13,562	13,562	13,562	13,562	13,562
PLANT OVERHEAD/ADMIN	20,923	20,923	20,923	20,923	20,923	20,923	20,923	20,923	20,923	20,923	20,923	20,923
UNION WELFARE FUND	23,000	23,000	23,000	23,000	23,000	23,000	23,000	23,000	23,000	23,000	23,000	23,000
G AND A OVERHEAD	7,001	7,001	7,001	7,001	7,001	7,001	7,001	7,001	7,001	7,001	7,001	7,001
MISC	800	800	800	800	800	800	800	800	800	800	800	800
MINE EQUIPMENT OPER.	19,612	19,612	19,612	19,612	19,612	19,612	19,612	19,612	19,612	19,612	19,612	19,612
MAINTENANCE MATERIAL	57,483	57,483	57,483	57,483	57,483	57,483	57,483	57,483	57,483	57,483	57,483	57,483
MAINTENANCE LABOR	16,578	16,578	16,578	16,578	16,578	16,578	16,578	16,578	16,578	16,578	16,578	16,578
PROPERTY TAX + INSUR	66,688	66,688	66,688	66,688	66,688	66,688	66,688	66,688	66,688	66,688	66,688	66,688
*** T O T A L ***	293,386	293,386	293,386	293,386	293,386	293,386	293,386	293,386	293,386	293,386	293,386	293,386
DEPREC - MINE	14,637	12,853	12,071	10,853	12,014	9,686	7,474	9,775	7,397	5,548	9,023	6,767
DEPREC - COAL PREP	6,565	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
DEPREC - PROCESS PLT	93,205	93,205	93,205	93,205	93,205	93,205	93,205	93,205	93,205	93,205	93,205	93,205
DEPREC - POWER PLANT	19,835	15,410	17,103	15,891	14,747	13,693	12,715	11,807	11,807	11,807	11,807	11,807
DEPREC - OFF-SITES	7,772	6,993	5,295	5,666	5,666	5,666	5,666	5,666	5,666	5,666	5,666	5,666
DEPLETION ALLOWANCE	2,533	3,395	3,718	4,395	3,365	4,099	4,099	4,099	4,099	4,099	4,099	4,099
COST + DEPR + DEPL	437,903	428,252	425,865	423,386	330,078	327,410	325,326	325,566	324,375	323,455	324,504	324,504
PROFIT BEFORE TAX	-21,917	-11,766	-9,360	-6,900	86,408	69,076	91,160	90,916	92,107	93,031	91,294	92,422
INCOME TAXES	-11,137	-6,519	-4,667	-3,508	44,934	46,319	47,403	47,277	47,895	48,576	47,473	46,699
TAX CREDIT	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
PROFIT AFTER TAX	-10,280	-5,648	-4,493	-3,312	41,476	42,756	43,757	43,640	44,211	44,655	43,821	44,362
AVERAGE ANNUAL NET PROFIT		2,671										
GROSS CF, OPERATIONS	134,237	129,218	127,597	126,608	78,166	36,740	75,197	79,522	79,204	74,724	75,827	75,040
ACCUM GROSS CASHFLOW	1636,625	1765,873	1695,840	2028,527	2098,695	2175,415	2251,172	2326,774	2402,197	2476,922	2552,549	2627,590
(INVESTMENT)												
LAND	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
FINED CAP INVESTMENT	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
INITIAL CAT + CHEM.	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
START-UP COSTS	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
EQUIPMENT REPLACEREN	264	7,502	7,502	7,200	19,097	0,000	840	18,667	264	0,000	19,447	0,000
TOTAL FIXED INVEST	264	7,502	7,502	7,200	19,097	0,000	840	18,667	264	0,000	19,447	0,000
WORKING CAP PAID IN	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
ACCUM GROSS CF TOTAL	-1096,793	-975,077	-856,835	-737,348	-678,277	-601,497	-526,640	-467,685	-392,544	-317,821	-261,641	-186,860
NET CASH FLOW	133,973	121,716	118,242	118,448	59,371	76,746	74,857	59,153	74,940	74,724	59,180	75,040
ACCUM NET CASHFLOW	-1096,793	-975,077	-856,835	-737,348	-678,277	-601,497	-526,640	-467,685	-392,544	-317,821	-261,641	-186,860
***** NET CASH FLOW DISCOUNTED AT 0.000 / PERIOD *****												
FACTORS	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
PRESENT VALUE	133,973	121,716	118,242	119,448	59,071	76,746	74,857	59,153	74,940	74,724	59,180	75,040
CUMULATIVE VALUE	-1096,793	-975,077	-856,835	-737,348	-678,277	-601,497	-526,640	-467,685	-392,544	-317,821	-261,641	-186,860

Table 14-22 (Contd)

PERIOD	20
(REVENUES)	
REQUIRED REVENUE	293,730
NEEDLE COKE	80,437
SULFU	33,658
AMMONIA	8,455
*** T O T A L ***	416,486
(COSTS)	
MINE REVALUATIES	22,275
OPERATING SUPPLIES	16,048
CATALYSTS/CHEMICALS	7,250
OPER LABOR W/SUPERVN	22,166
PAYROLL SUPERV/ADMIN	15,562
PLANT OVERHEAD/ADMIN	20,923
UNION WELFARE FUND	23,000
G AND A OVERHEAD	7,001
MISC	800
MINE EQUIPMENT OPER	19,612
MAINTENANCE MATERIAL	57,483
MAINTENANCE LABOR	16,578
PROPERTY TAX + INSUR	65,588
*** T O T A L ***	293,386
DEPREC - MINE	5,075
DEPREC - COAL PREP	0,000
DEPREC - PROCESS PLT	0,000
DEPREC - POWER PLANT	11,007
DEPREC - OFF-SITES	5,666
DEPLETION ALLOWANCE	7,204
COST + DEPR + DEPL	323,213
PROFIT BEFORE TAX	93,268
INCOME TAXES	48,499
TAX CREDIT	0,000
PROFIT AFTER TAX	44,768
AVERAGE ANNUAL NET PROFIT	2,671
GROSS CF, OPERATIONS	74,600
ACCUM GROSS CASHFLOW	2702,140
(INVESTMENTS)	
LAND	0,000
FIXED CAP INVESTMENT	0,000
INITIAL CAT + CHEM	0,000
START-UP COSTS	0,000
EQUIPMENT REPLACEMEN	0,000
TOTAL FIXED INVEST	0,000
WORKING CAP PAID IN	-112,000
ACCUM GROSS CF TOTAL	-0,000
NET CASH FLOW	166,630
ACCUM NET CASHFLOW	-0,000
----- NET CASH FLOW DISCOUNTED AT 0.000 / PERIOD -----	
FACTORS	1,000
PRESENT VALUE	186,630
CUMULATIVE VALUE	-0,000

Table 14-23 - Possible Annual Sales Value

Products	Daily Output	Unit Sales Price (\$)	Annual Sales (\$ Million)
SNG	149 200 MMSCFD	4.25/Mft ³	\$ 209.3
LPG ₃	13 040 BPSD	13.50/Bbl	58.1
LPG ₄	2 114 BPSD	15.50/Bbl	10.8
Gasoline	34 822 BPSD	17.60/Bbl	202.2
Fuel Oil	27 020 BPSD	17.00/Bbl	<u>151.6</u>
			422.7
Coke, Needle	1 625 TPD	150/Ton	80.4
Sulfur	1 710 TPD	60/Ton	33.9
Ammonia	185	140/Ton	<u>8.5</u>
			122.8
Power	19 200 MW-hr ^a	30/MW-hr	<u>210.2</u>
Possible Annual Revenue			\$ 965.0
Required Annual Revenue:			
At 100% Equity @ 12%			\$ 930.0
At 65/35 Debt/Equity @ 12%			\$ 708.0
^a Average using 80% load factor.			

Table 14-24 - Cash Flow Case Evaluation, Base Case - Central Location, Total Complex, 65/35 Debt/Equity Ratio with 9% Interest, 20 Year Repayment Return on Investment Using Possible Product Values (constant mid-1977 \$ millions)

	PERIOD	-3	-2	-1	1	2	3	4	5	6	7
REVENUES		0.000	0.000	0.000	42,210	42,200	81,230	81,230	81,230	81,230	81,230
EXPENSES		0.000	0.000	0.000	42,210	42,200	81,230	81,230	81,230	81,230	81,230
NET CASH FLOW		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SULPHUR		0.000	0.000	0.000	16,520	16,520	31,050	31,050	31,050	31,050	31,050
AMMONIA		0.000	0.000	0.000	4,227	4,227	8,455	8,455	8,455	8,455	8,455
... T T A L ...		0.000	0.000	0.000	482,674	482,674	965,348	965,348	965,348	965,348	965,348
COSTS											
MINE ROYALTIES		0.000	0.000	0.000	11,138	11,138	22,275	22,275	22,275	22,275	22,275
OPERATING SUPPLIES		0.000	0.000	0.000	8,024	8,024	16,048	16,048	16,048	16,048	16,048
CATALYSTS/CHEMICALS		0.000	0.000	0.000	3,625	3,625	7,250	7,250	7,250	7,250	7,250
OPER LABOR / SUPERVIS		0.000	0.000	0.000	22,166	22,166	44,332	44,332	44,332	44,332	44,332
PLANT OVERHEAD/ADMIN		0.000	0.000	0.000	13,252	13,252	26,504	26,504	26,504	26,504	26,504
UNION WELFARE FUND		0.000	0.000	0.000	31,500	31,500	63,000	63,000	63,000	63,000	63,000
G AND A OVERHEAD		0.000	0.000	0.000	7,001	7,001	14,002	14,002	14,002	14,002	14,002
MISC EQUIPMENT OPER.		0.000	0.000	0.000	8,800	8,800	17,600	17,600	17,600	17,600	17,600
MISC EQUIPMENT MAINT		0.000	0.000	0.000	9,812	9,812	19,624	19,624	19,624	19,624	19,624
MAINTENANCE MATERIAL		0.000	0.000	0.000	17,372	17,372	34,744	34,744	34,744	34,744	34,744
PROPERTY TAX + INSUR		0.000	0.000	0.000	66,688	66,688	133,376	133,376	133,376	133,376	133,376
INTEREST ON LIAN		0.000	0.000	0.000	132,137	132,137	264,274	264,274	264,274	264,274	264,274
INTEREST ON WCAP		0.000	0.000	0.000	14,850	14,850	29,700	29,700	29,700	29,700	29,700
... T T A L ...		0.000	0.000	0.000	426,733	426,733	853,466	853,466	853,466	853,466	853,466
DEPREC - MINE		0.000	0.000	0.000	86,972	86,972	173,944	173,944	173,944	173,944	173,944
DEPREC - COAL PREP		0.000	0.000	0.000	15,970	15,970	31,940	31,940	31,940	31,940	31,940
DEPREC - PROCESS PLY		0.000	0.000	0.000	9,954	9,954	19,908	19,908	19,908	19,908	19,908
DEPREC - POWER PLANT		0.000	0.000	0.000	172,008	172,008	344,016	344,016	344,016	344,016	344,016
DEPREC - SHELTER		0.000	0.000	0.000	34,118	34,118	68,236	68,236	68,236	68,236	68,236
DEPREC - WASTE		0.000	0.000	0.000	1,000	1,000	2,000	2,000	2,000	2,000	2,000
DEPREC - WASTE		0.000	0.000	0.000	1,000	1,000	2,000	2,000	2,000	2,000	2,000
DEPLETION ALLOWANCE		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
COST + OPER + DEPL		0.000	0.000	0.000	900,423	900,423	1,800,846	1,800,846	1,800,846	1,800,846	1,800,846
PROFIT BEFORE TAX		0.000	0.000	0.000	-17,949	-17,949	-35,898	-35,898	-35,898	-35,898	-35,898
INCOME TAXES		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TAX CREDIT		0.000	0.000	0.000	218,230	218,230	436,460	436,460	436,460	436,460	436,460
PROFIT AFTER TAX		0.000	0.000	0.000	202,773	202,773	405,546	405,546	405,546	405,546	405,546
AVERAGE ANNUAL NET PROFIT		0.000	0.000	0.000	202,773	202,773	405,546	405,546	405,546	405,546	405,546
ACCJA GROSS CASHFLOW		0.000	0.000	0.000	482,674	482,674	965,348	965,348	965,348	965,348	965,348
INVESTMENT		3,000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FIXED CAP INVESTMENT		90,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
START-UP COSTS		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
INT - DURING CONSTR.		0.000	1,280	2,560	9,212	15,494	0.000	0.000	0.000	0.000	0.000
COMMITMENT FEE		13,987	13,987	13,987	6,116	0.000	0.000	0.000	0.000	0.000	0.000
EQUIPMENT REPLACEMENT		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL FIXED INVEST		106,987	106,987	106,987	116,216	116,216	116,216	116,216	116,216	116,216	116,216
WORKING CAP FUND IN		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
BORROWED CAPITAL		13,987	13,987	13,987	11,011,610	11,011,610	711,076	0.000	0.000	0.000	0.000
BORROWED WORKINGCAP		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ACCUM GROSS CF TOTAL		-93,000	-233,000	-783,000	-631,748	-932,456	-514,342	-69,847	315,899	721,487	1,084,873
LDAN REPAYMENT		0.000	0.000	0.000	93,912	93,912	93,912	93,912	93,912	93,912	93,912
W/CAP REPAYMENT		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NET CASH FLOW		-93,000	-100,000	-510,000	-60,836	-350,544	311,794	293,716	287,424	245,801	258,316
ACCUM NET CASHFLOW		-93,000	-223,000	-783,000	-631,748	-932,456	-600,234	-237,671	34,123	347,039	615,283
... NET CASH FLOW DISCOUNTED AT 20.011 % PERIOD ...											
FACTORS		0.633	0.694	0.779	0.822	0.833	0.822	0.794	0.761	0.726	0.694
PRESENT VALUE		-77,493	-184,978	-295,061	-32,432	-252,595	104,588	97,781	72,462	96,879	43,152
CUMULATIVE VALUE		-77,493	-262,471	-497,532	-530,014	-488,179	-342,591	-264,318	-227,460	-184,317	-151,287

Table 14-24 (Contd)

PERIOD	8	9	10	11	12	13	14	15	16	17	18	19
REVENUES	842,200	842,200	842,200	842,200	842,200	842,200	842,200	842,200	842,200	842,200	842,200	842,200
REQUIRED REVENUE	80,437	80,437	80,437	80,437	80,437	80,437	80,437	80,437	80,437	80,437	80,437	80,437
EXCESS	761,763	761,763	761,763	761,763	761,763	761,763	761,763	761,763	761,763	761,763	761,763	761,763
DEBIT	33,825	33,825	33,825	33,825	33,825	33,825	33,825	33,825	33,825	33,825	33,825	33,825
AMOUNT	845,938	845,938	845,938	845,938	845,938	845,938	845,938	845,938	845,938	845,938	845,938	845,938
... F O T A L ...	845,938	845,938	845,938	845,938	845,938	845,938	845,938	845,938	845,938	845,938	845,938	845,938
EXPENSES	22,275	22,275	22,275	22,275	22,275	22,275	22,275	22,275	22,275	22,275	22,275	22,275
OPERATING SUPPLIES	14,048	14,048	14,048	14,048	14,048	14,048	14,048	14,048	14,048	14,048	14,048	14,048
CATALYSTS/CHEMICALS	7,250	7,250	7,250	7,250	7,250	7,250	7,250	7,250	7,250	7,250	7,250	7,250
LABOR W/SUPERV	22,166	22,166	22,166	22,166	22,166	22,166	22,166	22,166	22,166	22,166	22,166	22,166
PAYROLL BURDEN	13,582	13,582	13,582	13,582	13,582	13,582	13,582	13,582	13,582	13,582	13,582	13,582
PLANT OPERATOR/ADMN	20,823	20,823	20,823	20,823	20,823	20,823	20,823	20,823	20,823	20,823	20,823	20,823
PLANT OPERATOR/ADMN	7,001	7,001	7,001	7,001	7,001	7,001	7,001	7,001	7,001	7,001	7,001	7,001
... F O T A L ...	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000
MINE EQUIPMENT OPER.	19,612	19,612	19,612	19,612	19,612	19,612	19,612	19,612	19,612	19,612	19,612	19,612
MAINTENANCE MATERIAL	57,483	57,483	57,483	57,483	57,483	57,483	57,483	57,483	57,483	57,483	57,483	57,483
MAINTENANCE SUPPLIES	16,288	16,288	16,288	16,288	16,288	16,288	16,288	16,288	16,288	16,288	16,288	16,288
OPERATING SUPPLIES	44,488	44,488	44,488	44,488	44,488	44,488	44,488	44,488	44,488	44,488	44,488	44,488
INTEREST ON LTA	101,423	92,923	44,521	76,058	61,816	59,154	50,712	42,260	33,608	25,356	16,004	8,552
INTEREST ON WCAP	14,850	14,850	14,850	14,850	14,850	14,850	14,850	14,850	14,850	14,850	14,850	14,850
... F O T A L ...	409,661	401,209	392,357	384,304	375,652	367,400	359,648	350,496	342,044	333,792	325,150	316,688
DEPREC - MINE	17,198	12,965	11,599	11,130	10,148	12,385	9,259	7,177	7,230	5,422	4,928	4,928
DEPREC - COAL WREP	5,997	5,997	5,997	5,997	5,997	5,997	5,997	5,997	5,997	5,997	5,997	5,997
DEPREC - PROCESS PLT	104,030	104,030	104,030	104,030	104,030	104,030	104,030	104,030	104,030	104,030	104,030	104,030
DEPREC - SUPER PLANT	22,256	20,666	19,190	17,820	16,507	15,365	14,267	13,248	12,248	11,248	10,248	9,248
DEPREC - OIL-SLITERS	8,728	7,892	7,056	6,220	5,384	4,548	3,712	2,876	2,040	1,204	388	0
DEPREC - OTHER	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
COST - SUPER + OEN	578,328	560,315	555,429	545,184	535,449	525,461	515,463	505,465	495,467	485,469	475,471	465,473
PROFIT BEFORE TAX	366,134	398,635	439,521	419,766	539,489	547,485	598,063	569,870	574,815	567,766	595,046	549,992
TAXES	209,360	207,250	212,981	218,378	268,534	284,492	290,103	295,196	298,806	305,059	309,424	311,936
TAX CREDIT	0	0	0	0	0	0	0	0	0	0	0	0
PROFIT AFTER TAX	156,774	191,385	226,540	191,388	270,955	262,993	267,870	274,674	276,009	262,761	285,622	237,956
AVERAGE ANNUAL NET PROFIT	185,344	202,773	201,467	256,955	262,793	267,870	272,874	275,911	280,697	285,622	291,946	297,946
SECURE CASH FLOW	315,499	356,461	358,242	362,367	308,546	312,458	315,409	319,058	324,002	327,249	330,366	336,266
SECURE CASH FLOW	317,214	353,255	360,607	425,175	456,128	447,596	419,465	509,163	383,445	616,734	649,120	682,586
INVESTMENT	0	0	0	0	0	0	0	0	0	0	0	0
LAND	0	0	0	0	0	0	0	0	0	0	0	0
FIXED CAP INVESTMENT	0	0	0	0	0	0	0	0	0	0	0	0
START-UP COSTS	0	0	0	0	0	0	0	0	0	0	0	0
INT. BORING COSTS	0	0	0	0	0	0	0	0	0	0	0	0
COMMITMENT FEE	0	0	0	0	0	0	0	0	0	0	0	0
EQUIPMENT REPLACEN	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL FIXED INVEST	0	0	0	0	0	0	0	0	0	0	0	0
WORKING CAP PAID IN	0	0	0	0	0	0	0	0	0	0	0	0
BORROWED CAPITAL	0	0	0	0	0	0	0	0	0	0	0	0
BORROWED WORKING/CAP	0	0	0	0	0	0	0	0	0	0	0	0
ACCOM GROSS CF TOTAL	213,000	247,949	192,946	318,454	347,410	378,958	410,197	440,418	472,856	505,323	536,624	572,250
LOAN REPAYMENT	93,912	93,912	93,912	93,912	93,912	93,912	93,912	93,912	93,912	93,912	93,912	93,912
WCAP REPAYMENT	0	0	0	0	0	0	0	0	0	0	0	0
NET CASH FLOW	200,223	252,037	235,409	244,225	195,225	218,944	221,027	209,479	259,856	233,357	217,027	242,334
ACCOM NET CASHFLOW	1378,704	1436,741	1898,346	2151,402	2347,136	2586,102	2787,137	2995,938	3221,464	3451,021	3675,848	3918,282
... NET CASH FLOW DISCOUNTED AT 20.011 / PERIOD ...	0	0	0	0	0	0	0	0	0	0	0	0
FACTORS	0	0	0	0	0	0	0	0	0	0	0	0
PRESENT VALUE	24,103	19,839	16,588	14,111	9,801	6,211	4,963	4,228	4,986	4,219	3,249	1,042
CUMULATIVE VALUE	-86,023	-70,184	-61,615	-47,305	-38,703	-30,493	-23,519	-18,137	-13,170	-8,931	-5,687	-2,610

Table 14-24 (Contd)

PERIOD	20
REVENUES	82,000
MINERALS REVENUE	93,858
MINERALS COST	8,455
SULFU	
AMPMZA	
... T O T A L ...	964,950
COSETS	
MINE ROYALTIES	22,275
OPERATING SUPPLIES	16,048
CATALYZERS/CHEMICALS	7,150
PLANT LABOR W/SUPERV	22,105
PLANT CHEMICALS/ADMIN	20,025
UNION WELFARE FUND	23,000
GRAND A OVERHEAD	7,001
MISC	-800
MINE EQUIPMENT OPER.	10,612
MINE EQUIPMENT MAINT	16,378
MAINTENANCE LABOR	16,378
PROPERTY TAX + INSUR	66,688
INTEREST ON LTAK	-6,000
INTEREST ON W/CAF	0,000
... T O T A L ...	293,366
DEPRECIATION - MINE	6,896
DEPRECIATION - COAL PREP	0,000
DEPRECIATION - PROCESS PLANT	0,000
DEPRECIATION - POWER PLANT	13,240
DEPRECIATION - OTHER PLANT	9,290
DEPLETION ALLOWANCE	18,290
COST + DEPR + DEPL	339,424
PROFIT BEFORE TAX	625,226
INCOME TAXES	325,274
TAX CREDIT	0,000
PROFIT AFTER TAX	300,253
AVERAGE ANNUAL NET PROFIT	202,773
GROSS CF OPERATIONS	356,201
ACCUM GROSS CASHFLOW	7173,677
INVESTMENTS	
LAND	0,000
LAND CAP INVESTMENT	0,000
MINERALS CHEM.	0,000
START-UP COSTS	0,000
INT. DURING CONSTR.	0,000
COMMITMENT FEE	0,000
EQUIPMENT REPLACEMENT	0,000
TOTAL FIXED INVEST	0,000
WORKING CAP PAID IN	-165,000
BORROWED CAPITAL	0,000
BORROWED WORKING/CAP	0,000
ACCUM GROSS CF TOTAL	6233,821
LOAN REPAYMENT	93,912
W/CAP REPAYMENT	165,000
NET CASH FLOW	353,370
ACCUM NET CASHFLOW	4170,381
----- NET CASH FLOW DISCOUNTED AT 20.011 / PERIOD -----	
PRESENT VALUE	2,000
CUMULATIVE VALUE	-2,000

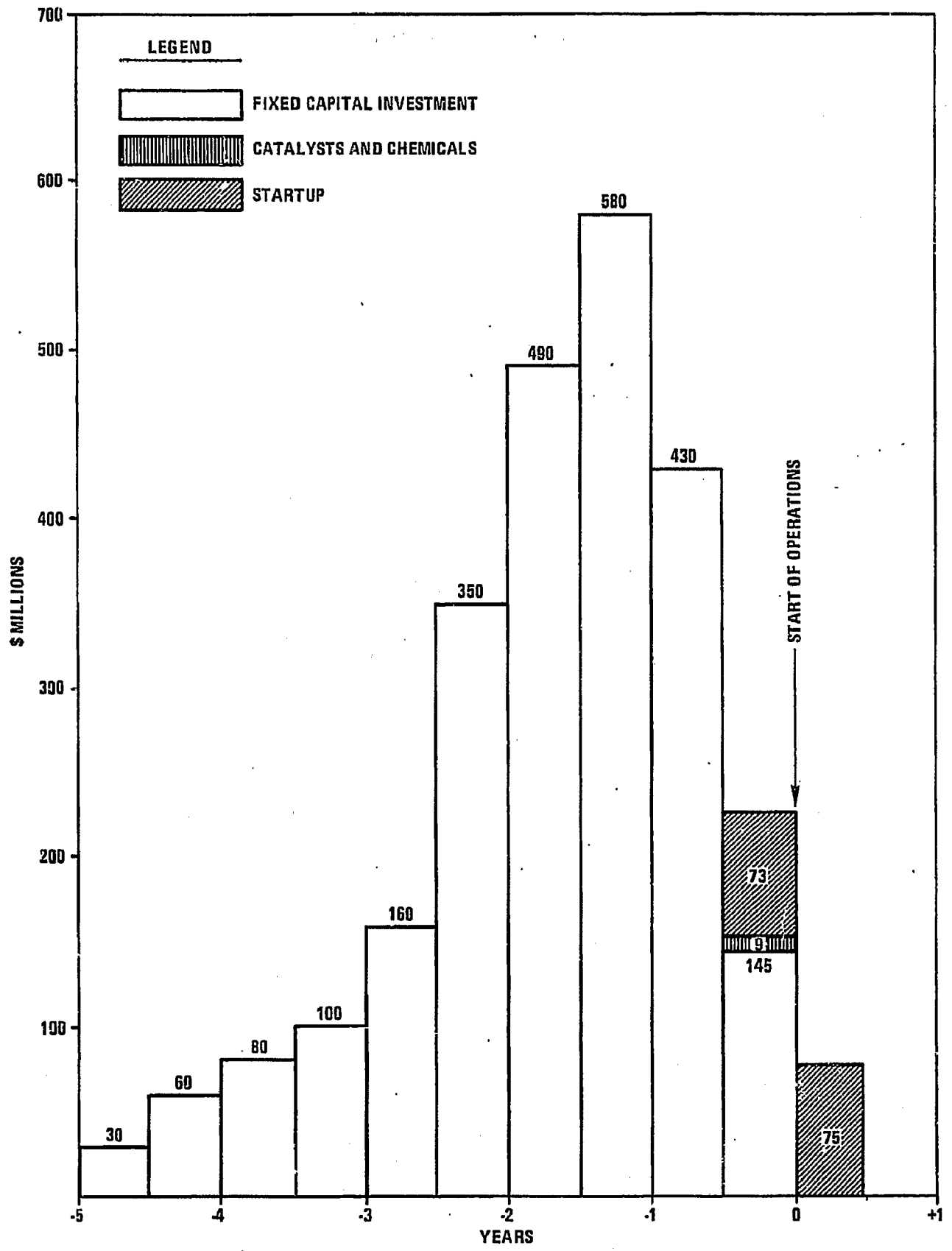


Figure 14-2 - Fund Drawdown Schedule

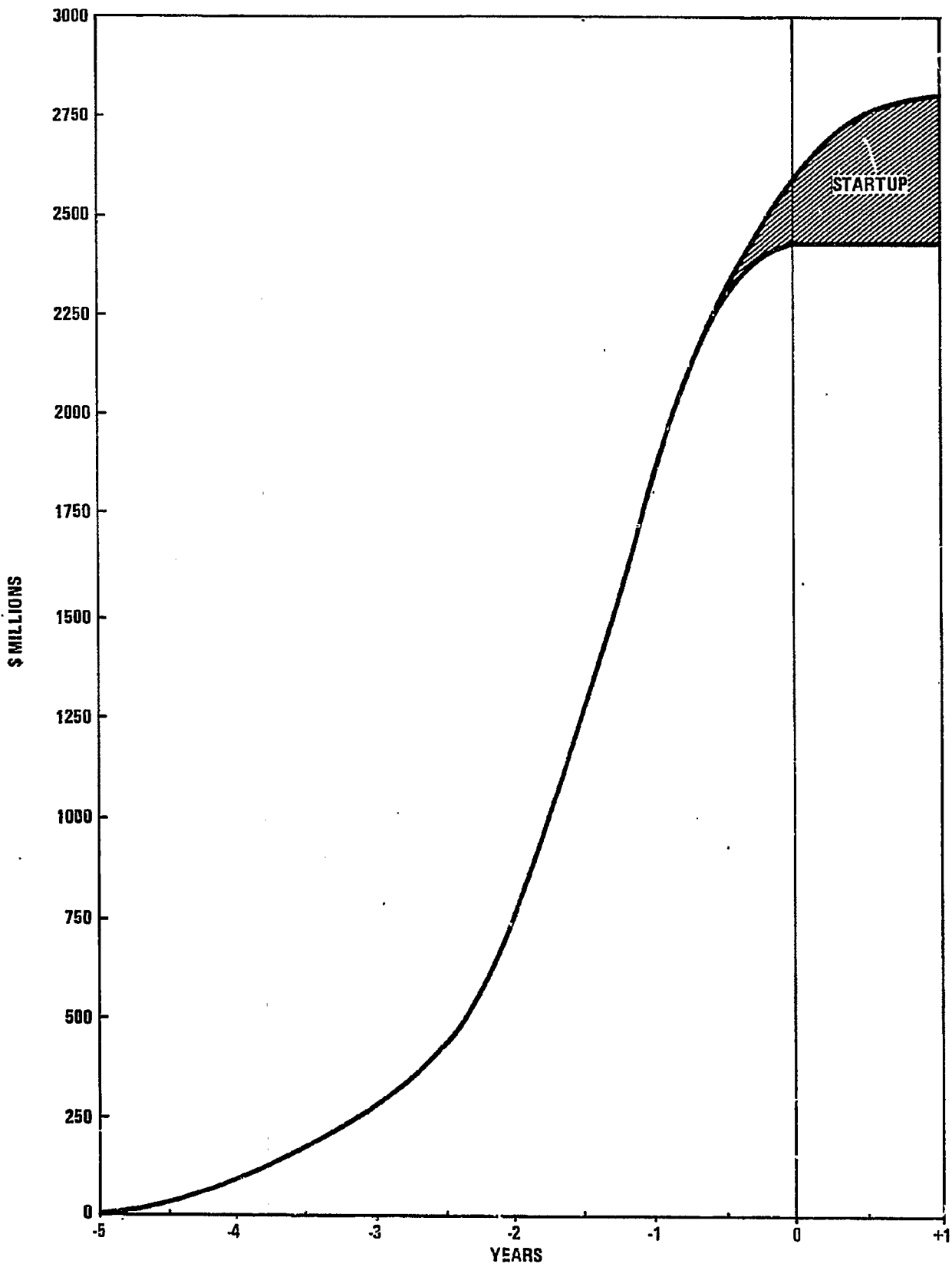


Figure 14-3 - Cumulative Fund Drawdown Schedule

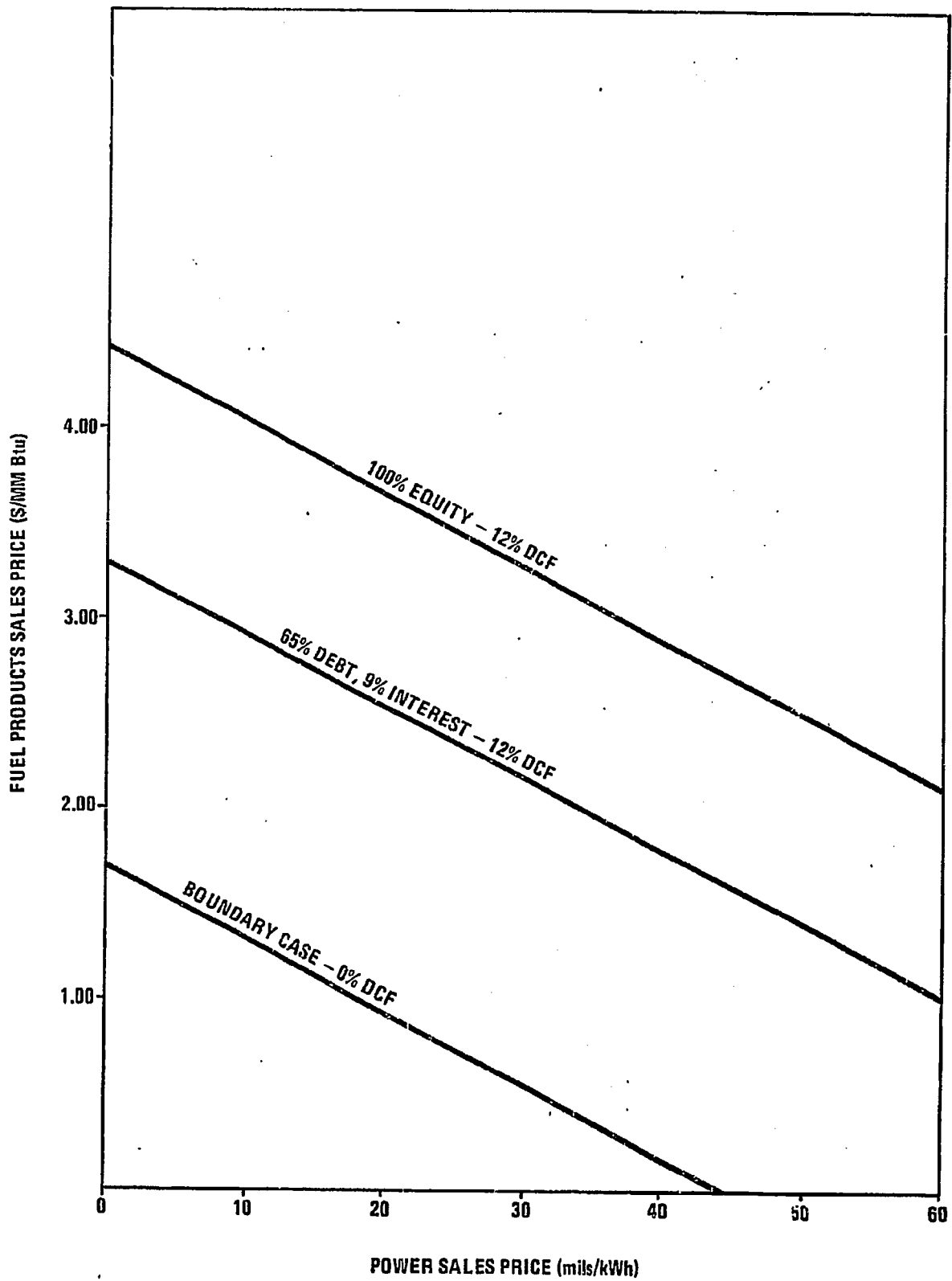


Figure 14-4 - Required Product Selling Price

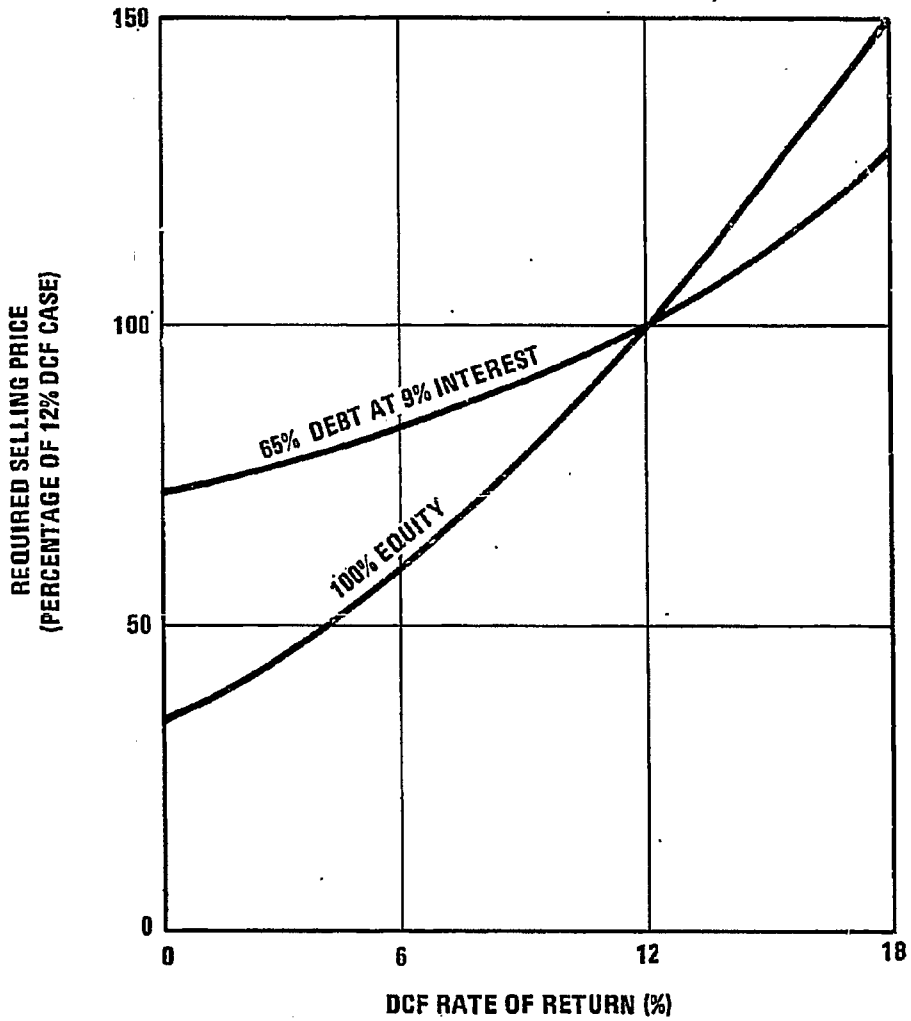


Figure 14-5 - Sensitivity of Required Product Selling Price to DCF

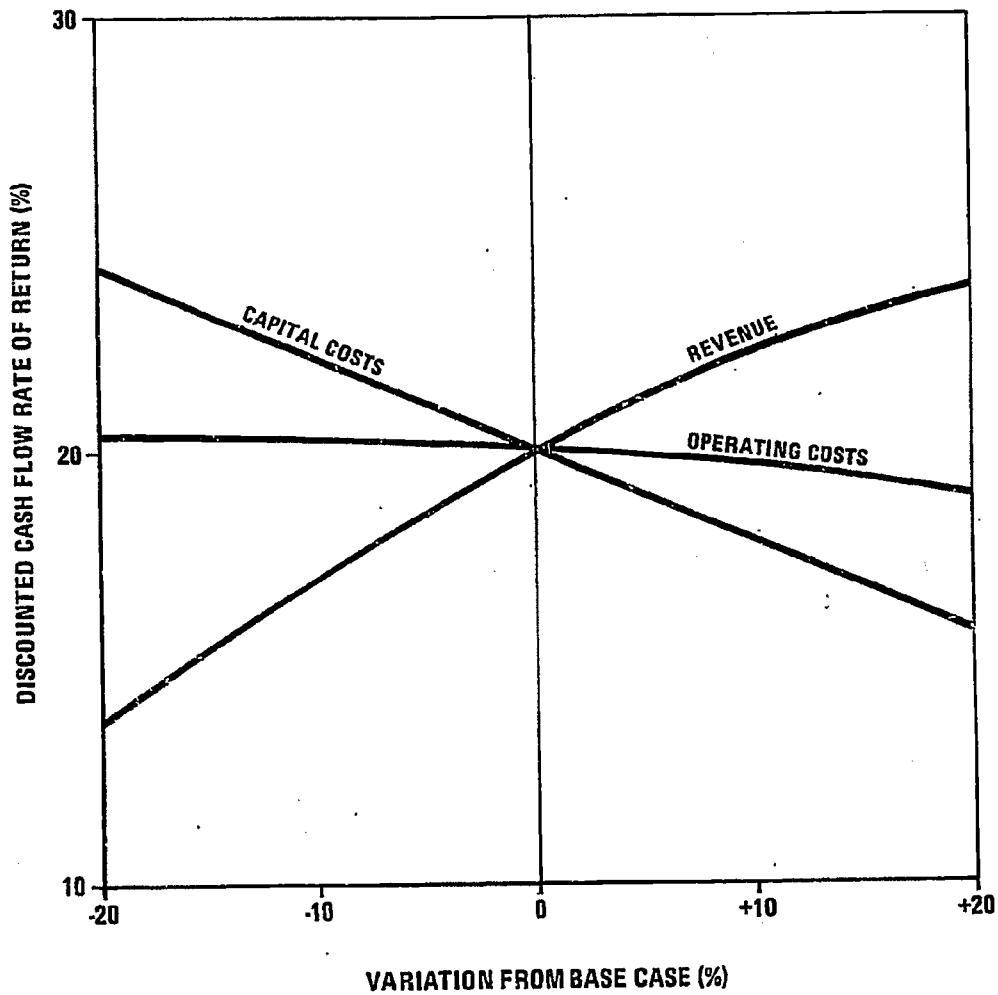


Figure 14-6 - Sensitivity Analysis of DCF
 Possible Annual Revenue of \$842 Million
 65% Debt at 9% Interest