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SRC-II DEMONSTRATION PROJECT
PHASE ZERO
TASK NUMBER 1

DELIVERABLE NUMBER 2

DEMONSTRATION PLANT
CAPITAL AND OPERATING COSTS

JULY 31, 1979

THE PITTSBURG & MIDWAY COAL MINING CO.
DENVER, COLORADO

PREPARED FOR

UNITED STATES DEPARTMENT OF ENERGY
UNDER CONTRACT
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SECTION 1

INTRODUCTION

This report contains the various cost estimates prepared by Stearns-Roger for the SRC-II 6700 tpsd Demonstration Plant at Morgantown, West Virginia, with descriptions of the methods used to prepare these estimates and the qualifications for them. The following estimates are included:

1] Direct Capital Costs
2] Elements of Indirect Capital Costs
3] Elements of Annual Operating Costs

Each of these estimates is presented in November 1978 dollars and in December 1977 dollars. The design revisions which are described in Section 6 of Deliverable No. 1 "Demonstration Plant Description," have been incorporated into all costs.

These costs are part of the source information for cash flow projections and relative timing of Budget Authorizations which appear in Deliverable 12, Volumes 1 and 3.

Appendix A to this report is a study, made by Bechtel Incorporated, to provide a third party confirmation of the preliminary capital cost estimate by Stearns-Roger for the design and construction of an SRC-II Demonstration Plant.

SECTION 2

DIRECT CAPITAL COSTS

Direct Capital Costs are those costs which would normally be incurred by the engineering and construction contractors for engineering, procurement and construction. The Direct Capital Costs estimated by Stearns-Roger for the SRC-II 6700 tpsd Demonstration Plant at Morgantown, West Virginia, are presented in Table 2-1, broken down by areas. Table 2-2 presents a breakdown of this same estimate into various cost elements. The methods used to make the estimate are described below. The estimate was developed in November 1978 dollars; de-escalation to December 1977 dollars (8.72%)[1] was handled on a total cost basis.

2.1 DIRECT FIELD COSTS

The Direct Field Costs were developed using the Stearns-Roger Computer-Aided Preliminary Estimating System (CAPES). CAPES uses basic equipment design information and preliminary conditions of service to develop the complete installed cost for each piece of equipment, through simulation based on a volumetric model technique. The volumetric models are typical mechanical flow diagrams (P & ID's) for specific types of equipment. These models are used in conjunction with size and service data to generate material takeoffs and labor requirements for all direct field accounts. Direct field accounts include process equipment, foundations, structures and structural supports, piping, electrical, instrumentation, insulation, and painting; and they are stated in terms of direct labor, direct material, and direct subcontract costs, based on user definition. These are then priced based on user-specified material costs, labor rates and productivities, and subcontractor unit costs to determine Direct Field Costs. CAPES has the capacity to develop prices on common types of process equipment; prototype or specialized equipment items for this plant were priced using in-house information or formal vendor phone quotations. There are approximately 1,000 pieces of equipment in the plant; of these, about 300 pieces were priced by CAPES (53 percent of the total equipment dollars).

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[1] Stearns-Roger uses 8.72% de-escalation for direct capital costs.

Current union contracts (fourth quarter, 1978) for the Morgantown area were used to develop craft wage rates. Informal unit price quotations from various subcontractors in Morgantown and Pittsburgh were used. Prices for bulk materials were based on currently prevailing levels.

Preliminary quantity takeoffs were made for several items, primarily the civil, structural, and equipment accounts in Unit 60. Other preliminary quantity takeoffs made include site preparation requirements, structures, and interconnecting piping. Spread footings were assumed for all foundations. Because the actual soil conditions are unknown, no piling costs were included. Site preparation excavation costs were based on 50/50 rock/earth ratio, and foundation excavation costs were based on common earth conditions. Other than for grass seeding around the administrative offices, no landscaping costs were included. It was assumed that the costs for construction or improvement of the main access roads to the site would be borne by others. No costs for infrastructures have been included, such as for schools, hospitals, and recreational facilities which might be required to support construction, operation, maintenance, and administrative work forces. Incoming power to the main plant substation was assumed to be provided by others.

Several areas include battery-limits unit estimates supplied by others, in lieu of estimates built up from equipment requirements. The areas and the suppliers of the estimates, which have been assumed to be lump-sum subcontracts, are as follows:

1] Area 21 - Texaco Development Corp.
2] Area 43 - Resources Conservation Co.
3] Area 44 - Air Liquide

The total construction labor effort is estimated to require about 11,113,500 craft hours; this includes all equipment and material installation, as well as supporting craft requirements such as warehousing, temporary facility construction, and construction equipment operation and maintenance. Based on a 39-month construction effort, the peak loading would be about 3,200 craft workers; the average craft work force would be about 1,500 workers.

2.2 INDIRECT FIELD COSTS

Indirect Field Costs include field staff costs, field office expenses, payroll taxes, insurance, performance bonds, consumable supplies, temporary facilities, construction equipment rental, and small tools. There is a direct relationship between Direct Field Labor Costs and Indirect Field Costs. For this estimate, Indirect Field Costs were estimated at 126 percent of Direct Field Labor Cost. Craft labor standby for startup and commissioning have been included.

2.3 ENGINEERING COSTS

Engineering Costs for Phase I were generated from a manhour takeoff based on the Deliverable No. 1, Demonstration Plant Description. The Phase II and III engineering costs were estimated based on historical data. Markups appropriate to government projects were used. The total estimate includes approximately 2,500,000 engineering hours for the A/E contractor. Various engineering subcontractors will be required during the design and engineering effort. Quotations were received from several subcontractors early in 1978; others were estimated by Stearns-Roger. These costs were escalated to November 1978 dollars and are assumed to be lump sum. The areas and subcontractors are as follows:

1]	Area 11	-	Kinetics Technology, Inc.
2]	Areas 12, 32, 44	-	Air Liquide
3]	Area 21	-	Texaco Development Corp.
4]	Areas 22, 23, 24, 25	-	Haldor Topsoe A/S
5]	Area 33	-	Shell Development Corp. (Goar, Arrington & Associates, Inc.)
6]	Area 41	-	U.S. Steel
7]	Area 42	-	Chem Pro
8]	Area 44	-	Air Liquide
9]	Area 55	-	Soils Test and Mapping Subcontractor

2.4 MISCELLANEOUS COSTS

The General and Administrative Expense (G&A), the West Virginia Business and Occupation Tax of 2.2%, and the appropriate engineering and construction management fees have been included in the Capital Cost Estimate. There is a possibility that the purchasing arrangements for this project can be arranged so as to avoid the major portion of West Virginia Business and Occupation Taxes of 2.2%.

2.5 COST EXPLANATION

Stearns-Roger prepared their initial Capital Cost Estimate for the Demonstration Plant on the basis of single responsibility for engineering procurement and construction, and a normal construction schedule. This cost estimate, together with the inclusion of the five required design revisions in Section 6 of Deliverable No. 1 amounted to 650 million dollars. Subsequently, DOE advised P&M and Stearns-Roger that the A/E and C/M responsibility should be split; there should be as many as possible firm price subcontractor construction contracts, and the target mechanical completion should be accelerated to December 1983.

As a result of these changes and constraints, the capital cost estimate was modified to provide for:

1] a 45 hour work week
2] labor inefficiencies due to overtime and oversaturation
3] concurrent performance of work
4] oversizing of process utilities

The total cost of these items is $90,000,000.

Construction management costs, not originally estimated under the single responsibility basis, were also added at a cost of $10,000,000.

The Demonstration Plant cost estimate of February 1979 has, therefore, been increased $100,000,000 -- from $650,000,000 to $750,000,000, and this value is used in the discussions that follow.

2.6 BRIDGING TASK COSTS

Please refer to Bridging in Deliverable 1, Section 1.4. A number of the Bridging items impact the capital cost estimate but are not included in the base design or cost. For some of these items order of magnitude cost estimates have been made. Others have not yet been sufficiently defined to cost estimate. In these cases, effect on the cost estimate is indicated. This information is summarized in Table 2-3.

2.7 ESTIMATE ACCURACY AND RELIABILITY

In the previous sections of this report, the Stearns-Roger system and procedures for developing the capital cost estimate for the SRC-II Demonstration Plant was explained, using the Deliverable No. 1, "Demonstration Plant Description". Since every item that makes up the estimate is subject to some uncertainty, our computerized risk analysis program was used to determine contingency and accuracy range. The computerized risk analysis which divides the estimate into numerous discrete costs and uses a Monte Carlo number simulation, was then run and the analysis showed an absolute range for all sample jobs of -26% and +24%. Detailed analysis and high and low distortions then reduced the range to $\pm$ 20% accuracy with an 18% allowance for indeterminants included in the project cost.

Risk analysis is a subjective approach requiring familiarity with the project design basis and estimating methodologies. The confidence level in the estimate is reflected in the contingency percent and accuracy range generated by the risk analysis. The 18% allowance for indeterminants includes process oversights, estimating errors, omissions, and minor design development

changes. It does not include major scope processing changes, changes in construction plans, acts of God, etc. It is Stearns-Roger's opinion that the estimate is within these costs using the processes and equipment described in Deliverable No. 1 as a basis.

TABLE 2-1

SRC II DEMONSTRATION PLANT

DIRECT CAPITAL COSTS (BREAKDOWN BY AREAS)

	11/78	12/77
Unit 10 - Primary Process Plants		
Area 11 - Dissolver Plant	$ 121.202M^2	$ 111.481M^2
Area 12 - Hydrogen Treating & Recovery Plant	39.018	35.889
Subtotals, Unit 10:	$ 160.220M^2	$ 147.370M^2
Unit 20 - Hydrogen Purification Plants		
Area 21 - Syngas Production Plant	$ 43.729M^2	$ 40.222M^2
Area 22 - Syngas Shift Conversion Plant	16.138	14.844
Area 23 - H_2 Purification & Compression Plant	38.794	35.682
Area 24 - Syngas Purification Plant	6.054	5.568
Area 25 - Methanation Plant	15.205	13.985
Subtotals, Unit 20:	$ 119.920M^2	$ 110.301M^2
Unit 30 - Refining & Gas Plants		
Area 31 - LP Gas Compression & Treatment Plant	$ 8.69M^2	$ 8.000M^2
Area 32 - Product Gas Plant	17.474	16.072
Area 33 - Sulfur Recovery Unit	26.567	24.436
Area 34 - Refining Plant	24.538	22.570
Area 35 - Hydrodesulfurization Unit	10.428	9.592
Subtotals, Unit 30:	$ 87.70M^2	$ 80.670M^2
Unit 40 - Secondary Recovery & Oxygen Plants		
Area 41 - Ammonia Recovery Plant	$ 13.237M^2	$ 12.175M^2
Area 42 - Tar Acid Recovery Plant	5.432	4.096
Area 43 - Plant Water Reclamation Unit	28.307	26.037
Area 44 - Oxygen Plant	59.946	55.138
Subtotals, Unit 40:	$ 106.922M^2	$ 98.346M^2
Unit 50 - Utility Systems & General Facilities		
Area 51 - Steam Generation System	$ 24.399M^2	$ 22.442M^2
Area 52 - Raw Water System	11.052	10.166
Area 53 - Cooling Water System	32.825	30.192
Area 54 - Miscellaneous Distribution System	65.616	60.353
Area 55 - General Plant Facilities	42.798	39.365
Subtotals, Unit 50:	$ 176.690M^2	$ 162.518M^2
Unit 60 - Coal & Slag Systems		
Area 61 - Coal Supply System	$ 55.096M^2	$ 50.677M^2
Area 62 - Coal Crushing System	36.017	33.128
Area 63 - Fine Coal Handling System	2.818	2.592
Area 64 - Plant Slag Handling System	3.152	2.899
Area 65 - Slag Disposal System	1.460	1.343
Subtotals, Unit 60:	$ 98.543M^2	$ 90.639M^2
TOTAL DIRECT CAPITAL COSTS:	$ 750.000M^2	$ 689.844M^2

TABLE 2-2

SRC-II DEMONSTRATION PLANT

DIRECT CAPITAL COSTS (BREAKDOWN BY COST ELEMENTS)

			$11/78		$12/77
I.	Engineering Costs				
	A. Prime Contractor	$	66.500M^2	$	61.166M^2
	B. Subcontractors		11.000		10.118
	Subtotals, Engineering Costs:	$	77.500M^2	$	71.284M^2
II.	Equipment and Materials Costs				
	A. Shop-Fabricated Equipment	$	159.390M^2	$	146.606M^2
	B. Field-Erected Equipment		29.960		27.557
	C. Construction Materials		136.000		125.092
	D. Battery Limits Units (1)		54.650		50.267
	Subtotals, Equipment and Materials Costs:	$	380.000M^2	$	349.522M^2
III.	Construction Costs				
	A. Direct Field Labor	$	90.800M^2	$	83.517M^2
	B. Indirect Field Costs		100.200		92.163
	C. Installation Subcontracts		86.439		79.506
	D. Battery Limits Units(1)		15.061		13.853
	Subtotals, Construction Costs:	$	292.500M^2	$	269.039M^2
	TOTAL DIRECT CAPITAL COSTS:	$	750.000M^2	$	689.845M^2

NOTE: All of the costs above include a pro rata share of G & A Expenses, Fees, Allowance for Indeterminants, and B & O Taxes.

(1) Provided by Licensors

TABLE 2-3

SRC-II DEMONSTRATION PLANT

BRIDGING ITEMS

PRELIMINARY COST ESTIMATES

Item No.	Description	Cost Estimate
1	Design Basis Changed from a Point to a Range Design	Increase
5	Dissolver Pump for Each Pass	+$2.773 MM
6	Reduce Hydrogen Partial Pressure	Decrease
7	Provide 2-Cold Boxes - Eliminate Mechanical Refrigeration	Increase
9	Three 50% Gasifiers	-($2.208 MM)
10	Three 50% Reciprocating Make-up Hydrogen Compressors	+$6.102 MM
12	Gas Treating Pressure Increase	Increase
13	Dow Drizol Dehydration	Increase
16	Two Oxygen Plant Trains	+$11 MM

NOTE: These costs are not included in the capital costs presented in this volume.

SECTION 3

ELEMENTS OF INDIRECT CAPITAL COSTS

Indirect Capital Costs are those costs which are typically incurred by the owner, rather than by the engineering and procurement contractors, and which must be committed sometime during the period prior to commencement of plant operation. Certain Indirect Capital Cost elements estimated by Stearns-Roger are shown in Table 3-1; these costs were estimated, as described below, in November 1978 dollars, and the totals were de-escalated to December 1977 dollars (8.0%)[1]. Appropriate contingencies have been included.

3.1 CATALYSTS AND CHEMICALS

The initial charge requirements, unit costs used, and net initial costs for all catalysts and chemicals are shown in Table 3-2.

3.2 LICENSE FEES

No recent quotations were received on license fees. Prior quotes and estimates were escalated and adjusted as required. Table 3-3 presents these estimates by area and licensor.

3.3 LAND

It was assumed that 2600 acres of land would be required and would cost $6,250,000 per P&M.

3.4 WORKING CAPITAL

(1) Raw Coal Inventory: A 30-day supply of raw coal was assumed to be required at $25 per ton.

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[1] Stearns-Roger uses 8% de-escalation for indirect capital and operating costs.

(2) Finished Product Inventory: A 10-day inventory of finished product was included, valued at cost (daily operating cost (without plant overhead) plus the cost of raw coal at $25 per ton, based on 365 days per year).

(3) Catalyst and Chemical Inventory: A 30-day supply of catalysts and chemicals was included, based on the annual replacement cost.

(4) Spare Part and Maintenance Material Inventory: This inventory cost was calculated at 5 percent of total capital equipment cost.

(5) Cash: One month's payroll plus allowance for benefits.

(6) Work in Progress: The amount of SRC-II liquid (valued at cost) required to fill all lines, and vessels and towers to their normal working levels.

(7) Accounts Receivable: 1/12 of year's revenue.

(8) Accounts Payable: 1/12 of year's A/P expenses.

TABLE 3-1

SRC-II DEMONSTRATION PLANT

ELEMENTS OF INDIRECT CAPITAL COSTS

		$11/78	$12/77
I.	Catalysts and Chemicals	$ 6.500 M^2	$ 6.018 M^2
II.	License Fees	3.335	3.088
III.	Land	6.250	5.787
IV.	Working Capital		
	A. Raw Coal Inventory	$ 5.400 M^2	$ 5.000 M^2
	B. Finished Product Inventory	3.190	2.953
	C. Catalyst and Chemical Inventory	0.275	.254
	D. Spare Part and Maintenance Material Inventory	10.025	9.282
	E. Cash*	---	---
	F. Work in Progress*	---	---
	G. Accounts Receivable*	---	---
	H. Accounts Payable*	---	---
	Subtotals, Working Capital: (Omissions as noted)	$ 18.890M^2	$ 17.490M^2
	TOTAL INDIRECT CAPITAL COST ELEMENTS: (Omissions as noted)	$ 34.975 M^2	$ 32.384 M^2

* These data are included in the cash flow analysis presented in Deliverable 12, Volumes 1 and 3.

TABLE 3-2

SRC-II DEMONSTRATION PLANT

INITIAL CATALYST AND CHEMICAL COSTS

Area	Description	Initial Quantity	Unit Cost ($11/78)	Net Cost ($11/78)
	Catalysts			
12	Molecular Sieve	362,000 lb	$ 1.44/lb	$ 521,300
22	SSK-1, SSK-2, CKA	--	--	1,868,000
25	HTZ-3, MCR-2X, RKL	--	--	1,450,000
33	S-201 Alumina	124,800 lb	.28/lb	34,900
33	Support Balls	40,500 lb	1.10/lb	44,600
33	SCOT Hydrogenation Catalyst			47,500
35	Reactor Catalyst			325,800
52	Cation Resin	1,000 cf	48.60/cf	46,600
52	Anion Resin	800 cf	135.00/cf	108,000
	Subtotal, Catalysts:			$4,446,700
	Chemicals			
12	Lean Oil	220 bbl	$ 25.00/bbl	$ 5,500
12	Diethanol Amine	60,600 lb	.49/lb	29,700
12	Antifoaming Agent	200 gal	43.00/gal	8,600
12	Freon	900 lb	.90/lb	800
24	Potassium Carbonate			93,600
25	Diethanol Amine	2,200 lb	.49/lb	1,100
25	Diethylene Glycol	5,100 lb	.28/lb	1,400
31	Diethanol Amine	48,000 lb	.49/lb	23,500
31	Antifoaming Agent	60 gal	43.00/gal	2,600
32	Triethylene Glycol	45,000 lb	.28/lb	12,600
32	Propane	5,500 gal	.54/gal	3,000
33	SCOT Solvent			704,900
33	Freon	11,000 lb	.90/lb	9,900

TABLE 3-2 (Continued)
SRC-II DEMONSTRATION PLANT
INITIAL CATALYST AND CHEMICAL COSTS

Area	Description	Initial Quantity	Unit Cost ($11/78)	Net Cost $11/78)
	Chemicals (Continued)			
41	Phosphoric Acid	50,000 lb	$ .29/lb	$ 14,500
41	Caustic (50%)	40,000 lb	.075/lb	3,000
42	Solvent			2,400
43	Sulfuric Acid	15,000 lb	.0225/lb	300
43	Caustic (50%)	12,000 lb	.075/lb	900
51	Neutralizing Amine	550 lb	.50/lb	300
51	Hydrazine	550 lb	3.85/lb	2,100
52	Quicklime	3,600 lb	.03/lb	100
52	Alum	72,000 lb	.075/lb	5,400
52	Polymer	2,000 lb	1.00/lb	2,000
52	Chlorine	20,000 lb	.08/lb	1,600
52	Sulfuric Acid	205,400 lb	.0225/lb	4,600
52	Caustic (50%)	238,600 lb	.075/lb	17,900
53	Chlorine	6,000 lb	.08/lb	500
53	Sulfuric Acid	257,000 lb	.0225/lb	5,800
53	Chromate Phosphate	38,700 lb	.30/lb	11,600
54	Diesel Fuel	1,600 gal	.50/gal	800
54	Chlorine	2,000 gal	.08/lb	200
	Subtotal, Chemicals:			$ 971,200
Total Without Allowance for Indeterminates				$ 5,417,900
Allowance for Indeterminates				1,082,100
TOTAL INITIAL CATALYST AND CHEMICAL COSTS:				$ 6,500,000

TABLE 3-3

SRC-II DEMONSTRATION PLANT

LICENSE FEES

Area	Licensor	Net Cost ($11/78)
21	Texaco Development Corp.	
22	Haldor Topsoe A/S	
23	Benfield Corporation	
25	Haldor Topsoe A/S	
33	Shell Development Corp.	
41	U. S. Steel	
42	Chem Pro	
Total Without Allowance for Indeterminates		$ 2.780 M^2
Allowance for Indeterminates		0.555
TOTAL LICENSE FEES:		$ 3.335 M^2

SECTION 4

ELEMENTS OF ANNUAL OPERATING COSTS

Certain elements of Annual Operating Costs were estimated by Stearns-Roger; these costs are shown in Table 4-1. These costs were estimated, as described below, in fourth quarter 1978 dollars, and the totals were de-escalated to December 1977 dollars (8.0%). Appropriate allowances have been included.

Cost of coal feed to the plant is not included in these operating costs. Coal feed cost are presented in Deliverable 12, Volumes 1 and 3.

4.1 OPERATING LABOR AND SUPPLIES

Table 4-2 shows the estimated number of operators required for plant operation. The average operator rate was estimated to be $21,225 per year. This rate is based on those currently in effect in Homer City, Pennsylvania (fourth quarter, 1978), and includes shift differentials and allowances for overtime, vacations, and holidays. Operating supplies were calculated at 10 per cent of operating labor.

4.2 MAINTENANCE LABOR

Table 4-3 shows the estimated direct-hire plant maintenance work force requirements. The average annual rate is $26,200 for the maintenance work force, based on the craft rates used for the estimation of Direct Capital Cost, based on the distribution shown in Table 4-3.

4-3 MAINTENANCE MATERIALS

The annual costs for maintenance materials were calculated as a percentage of Direct Capital Cost. These costs are shown in Table 4-4.

4.4 CONTRACT MAINTENANCE

Contract Maintenance was estimated to require the same number of workers as the direct-hire plant maintenance work force. The annual rate, covering wages, overheads, and fees, was estimated as $63,000 per worker.

4.5 CATALYSIS AND CHEMICALS

The annual replacement quantities, unit costs, and net annual replacement costs for catalysts and chemicals are shown in Table 4-5.

4.6 ELECTRICITY

The annual purchased power requirement, based on annual demand of 31,000 KVA and a power factor of 0.9, is 27.90 MW. Electricity costs were calculated using $0.02 per KWH. This was based on a rate schedule obtained from Monongahela Power Company on March 8, 1978.

4.7 LABOR BENEFITS AND IDLE TIME

The costs of labor benefits and idle time for craft workers were calculated at 40 percent of operating and maintenance labor costs.

4.8 PROPERTY TAXES AND INSURANCE

These costs were estimated as 1.5 percent of fixed capital investment (Direct Capital Cost). This would be a reasonable rate for a normal commercial venture; however, since the plant will be Federally owned, property taxes and insurance may not be applicable during this period.

4.9 PLANT OVERHEAD

Plant overhead includes salaries for all non-craft plant personnel, benefits (at 30% of salaries), and various office expenses. Table 4-6 summarizes the estimated noncraft plant personnel requirements.

TABLE 4-1

SRC-II DEMONSTRATION PLANT

ELEMENTS OF ANNUAL OPERATING COSTS

		$11/78	$12/77
I.	Direct Expense Elements		
	A. Operating Labor	$ 3.790 M^2	$ 3.509 M^2
	B. Operating Supplies	0.380	.352
	C. Maintenance Labor	3.455	3.199
	D. Maintenance Materials	11.380	10.537
	E. Contract Maintenance	8.315	7.699
	F. Catalysts and Chemicals	3.290	3.046
	G. Electricity	5.865	5.430
	Subtotals, Direct Expense Elements:	$ 36.475 M^2	$ 33.73 M^2
II.	Indirect Expense Elements		
	A. Labor Benefits and Idle Time	$ 2.900 M^2	$ 2.685 M^2
	B. Property Taxes and Insurance*	11.400	10.555
	C. Plant Overhead**	---	---
	Subtotals, Indirect Expense Elements:13-24	$ 14.300 M^2	$ 13.24 M^2
TOTAL ANNUAL OPERATING COST ELEMENTS: (Without Plant Overhead)		$ 50.775 M^2	$ 47.01 M^2

* This would be a reasonable rate for a normal commercial venture; however, since the plant will be Federally owned, property taxes and insurance may not be applicable during this period.

** The Plant Overhead data is included in the Cash Flow Analysis in Deliverable 12, Volumes 1 and 3.

TABLE 4-2

SRC-II DEMONSTRATION PLANT

PLANT OPERATIONS WORK FORCE

	Operator Positions x Shift Coverage*			
	Grade A	Grade B	Grade C	Total Requirements
Utility Areas	1x4.2 = 4.2	3x4.2 - 12.6	2x4.2 = 8.4	25.2
Process Areas	1x4.2 = 4.2	4x4.2 = 16.8	3x4.2 = 12.6	33.6
Gas Production and Treating Areas	1x4.2 = 4.2	4x4.2 = 16.8	5x4.2 = 21.0	42.0
Materials Handling and Offsite Areas	---	4x4.2 = 16.8 2x2.0 = 4.0	6x4.2 = 25.2 1x2.0 = 2.0	48.0
TOTAL REQUIREMENTS:	12.6	67.0	69.2	148.8

*Around-the-clock operation requires 3 shifts per day, 7 days per week, or 21 shifts per week. Since each operator works 5 shifts per week (40 hours), 4.2 operators are required for each around-the-clock position. Several positions require only 2-shift, 5 day-per-week coverage.

TABLE 4-3

SRC-II DEMONSTRATION PLANT

PLANT MAINTENANCE WORK FORCE

Craft	Utility Areas	Process Areas	Gas Production and Treating Areas	Materials Handling and Offsite Areas	General Maintenance	Total Requirements
Instrument Fitters	1	3	3	1	4	12
Pipefitters	2	3	3	1	3	12
Electricians	--	2	2	--	2	6
Welders	1	2	2	1	6	12
Millwrights (Mechanics)	2	4	4	4	4	18
Machinists	--	--	--	--	4	4
Carpenters/Insulators	--	1	1	--	2	4
Operating Engineers	--	1	1	1	1	4
Boilermakers	--	--	--	--	8	8
Ironworkers	--	--	--	--	2	2
Painters	--	--	--	--	2	2
Riggers	--	--	--	--	4	4
Laborers	2	3	3	4	6	18
Teamsters	--	1	1	--	2	4
TOTAL REQUIREMENTS:	8	20	20	12	50	110

TABLE 4-4

SRC-II DEMONSTRATION PLANT

ANNUAL COSTS FOR MAINTENANCE MATERIALS

Unit	Net Cost Description	($11/78)
10	Primary Process Plants	$ 2.440 M^2
20	Hydrogen Production Plants	2.130
30	Refining and Gas Plants	1.330
40	Secondary Recovery and Oxygen Plants	1.630
50	Utility Systems and General Facilities	1.350
60	Coal and Slag Systems	2.500
TOTAL MAINTENANCE MATERIALS:		$11.380 M^2

TABLE 4-5

SRC-II DEMONSTRATION PLANT

ANNUAL CATALYST AND CHEMICAL COSTS

Area	Description	Annual Quantity	Unit Cost ($11/78)	Net Cost ($11/78)
	Catalysts			
22	SSK-1, SSK-2, CKA	---	---	$ 622,700
25	HTZ-3, MCR-2X, RKL	---	---	725,000
33	S-201 Alumina	41,600 lb	$ .28/lb	11,600
33	SCOT Hydrogenation Catalyst			15,800
35	Reactor Catalyst			218,300
52	Cation Resin	200 cf	48.60/cf	9,700
52	Anion Resin	160 cf	135.00/cf	21,600
	Subtotal, Catalysts:			$ 1,624,700
	Chemicals			
12	Diethanol Amine	18,250 lb	$ .49/lb	$ 8,900
12	Antifoaming Agent	60 gal	43.00/gal	2,600
24	Antifoaming Agent			6,900
24	Potassium Carbonate			31,000
25	Diethanol Amine	3,000 lb	.49/lb	1,500
25	Diethylene Glycol	21,600 lb	.28/lb	6,000
25	Antifoaming Agent	60 gal	43.00/gal	2,600
31	Diethanol Amine	73,000 lb	.49/lb	35,800
31	Antifoaming Agent	60 gal	43.00/gal	2,600
32	Triethylene Glycol	40,150 lb	.28/lb	11,200
33	SCOT Solvent			194,200
34	Corrosion Inhibitor	1,800 gal	11.80/gal	21,200
41	Phosphoric Acid	36,500 lb	.29/lb	10,600
41	Caustic (50%)	474,500 lb	.075/lb	35,600

Area	Description	Annual Quantity	Unit Cost ($11/78)	Net Cost ($11/78)
	Chemicals (Continued)			
42	Solvent			58,200
43	Sulfuric Acid	136,875 lb	$ .0225/lb	$ 3,100
43	Caustic (50%)	328,500 lb	.075/lb	24,600
51	Neutralizing Amine	2,365 lb	.50/lb	1,200
51	Hydrazine	460 lb	3.85/lb	1,800
52	Quicklime	43,800 lb	.03/lb	1,300
52	Alum	876,000 lb	0.75/lb	65,700
52	Polymer	21,900 lb	$ 1.00/lb	$ 21,900
52	Chlorine	248,600 lb	.08/lb	19,900
52	Sulfuric Acid	2,017,800 lb	.0225/lb	45,400
52	Caustic (50%)	3,650,000 lb	.075/lb	273,700
53	Chlorine	72,300 lb	.08/lb	5,800
53	Sulfuric Acid	394,000 lb	.0225/lb	8,900
53	Chromate Phosphonate	710,000 lb	.30/lb	213,000
54	Diesel Fuel	500 gal	.50/gal	300
54	Chlorine	21,900 lb	.08/lb	1,800
	Subtotal, Chemicals:			$ 1,117,300
Total Without Allowance for Indeterminates				$ 2,742,000
Allowance for Indeterminates				548,000
TOTAL ANNUAL CATALYST AND CHEMICAL COST:				$ 3,290,000

SRC-II DEMONSTRATION PLANT

NONCRAFT PLANT PERSONNEL

Function	Number Required
Plant Management	
Manager	1
Secretary	1
Subtotal, Plant Management:	2
Plant Administration	
Manager	1
Administrative Services Personnel	19
Purchasing Personnel	7
Material Control Personnel	18
Secretary	1
Subtotal, Plant Administration:	46
Human Resource	
Manager	1
Human Resource Personnel	5
Safety and Security Personnel	17
Health Protection Personnel	6
Public Relations Personnel	2
Secretary	1
Subtotal, Human Resource:	32
Plant Operations	
Manager	1
Plant and Shift Supervisors	22
Technical Personnel	12
Secretary	1
Subtotal, Plant Operations:	36
Plant Maintenance	
Manager	1
Technical Personnel	9
Craft Supervisors	5
Secretary	1
Subtotal, Plant Maintenance:	16
Technical Services	
Manager	1
Plant Laboratory Personnel	24
Plant Engineering Personnel	25
Process Evaluation Personnel	11
Environmental Personnel	5
Secretary	1
Subtotal, Technical Services:	67
TOTAL REQUIREMENTS:	199

Secretaries listed in Table 4-6 are for Department Heads only. However, each Department has several Clerk-Typists that handle typing as well as filing.

Bechtel Incorporated

Engineers - Constructors

Del Monte Tower
5575 Del Monte Drive
Houston, Texas 77056
Telephone: (713) 877-3000

Mail Address: P.O. Box 2166, Houston, TX 77001

July 17, 1979

Gulf Mineral Resources Company
1720 South Bellaire
Denver, Colorado 80222

Attention: Mr. D. K. Lessig

Subject: Bechtel Job 13651
Pittsburg & Midway Coal Mining Company
Gulf Project 1701-381
SRC-II Demonstration Plant
Confirmation of Preliminary
Capital Cost Estimate

BL-6

Gentlemen:

This letter serves as a forwarding letter for the Confirmation of Preliminary Capital Cost Estimate for SRC-II Demonstration Plant, Final Report. This report was prepared for The Pittsburg & Midway Coal Mining Company under Subcontract D-3055-SC-10.

Draft copies of the report were presented to GMRC at a meeting in Denver on June 25, 1979. Minor revisions were requested to the report at the meeting. These changes were made and photo-ready masters of the report were given to J. E. Lockwood on June 29, 1979.

Ten copies of the report in its final form are requested to be sent to me for Bechtel's internal distribution.

Very truly yours,

John DeDivitis
Project Manager

JDeD/hc

cc: Mr. J. E. Lockwood
Gulf Science & Technology Company

CONFIRMATION OF PRELIMINARY CAPITAL COST ESTIMATE FOR SRC-II DEMONSTRATION PLANT

FINAL REPORT

BECHTEL INCORPORATED
HOUSTON, TEXAS

DATE PUBLISHED-JUNE 1979

PREPARED FOR
THE PITTSBURG & MIDWAY COAL MINING CO.
UNDER SUBCONTRACT D-3055-SC-10

ABSTRACT

Bechtel Incorporated has performed a study for The Pittsburg & Midway Coal Mining Co. to provide a third party confirmation of the preliminary capital cost estimate by Stearns-Roger for the design and construction of a SRC-II Demonstration Plant. To provide the confirmation, Bechtel has prepared a capital cost estimate for the purpose of comparison with the Stearns-Roger estimate. The Bechtel cost estimate was developed using prices of major equipment, with all remaining costs "factored." The cost "factors" were based on Bechtel's historical data for similar types of plants, where possible.

The major conclusion of the study is that the Bechtel and Stearns-Roger estimated total plant capital costs are in close agreement. Cost estimate comparisons on a plant "area" basis are not meaningful, however, due to the differences in estimating techniques.

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TABLES

FIGURES

SECTION 1

INTRODUCTION AND BACKGROUND

Bechtel Incorporated has performed a study for The Pittsburg & Midway Coal Mining Co. to provide a third party confirmation of the preliminary capital cost estimate by Stearns-Roger for the design and construction of a 6,000 tons per calendar day SRC-II Demonstration Plant. To provide the confirmation, Bechtel has prepared a "factored" capital cost estimate for the purpose of comparison with the Stearns-Roger estimate. This report presents results of the Bechtel study.

The SRC-II process is a variation of the basic Solvent Refined Coal process (SRC-I). The major product of the SRC-I process is a low sulfur and low ash solid fuel, while the major product of the SRC-II process is a low sulfur liquid fuel oil.

The bench scale development of the basic Solvent Refined Coal process was done in the early 1960's by Spencer Chemical Company under the sponsorship of the Office of Coal Research. After Spencer Chemical Company was acquired by Gulf Oil Corporation, the development was continued by the Gulf Oil Subsidiary, The Pittsburg & Midway Coal Mining Co.

In 1966, a contract between The Pittsburg & Midway Coal Mining Co. and the Office of Coal Research was let to design, construct, and operate a 50 tons per day SRC-I pilot plant. Design was completed in 1969, construction was started in 1972, and the plant was first operated in 1974. After an initial period of process and equipment evaluation, the plant was operated to produce 6,000 tons of SRC-I product for a successful commercial burner test.

The 50 tons per day pilot plant was modified in late 1976 and early 1977 to produce liquid product SRC-II. Since that date, considerable SRC-II process information has been collected. The engineering designs and cost estimates developed by Stearns-Roger for the SRC-II Demonstration Plant have been based on the pilot test data and on supporting work from the Gulf-owned and operated Harmarville Research Center facility.

SECTION 2

RESULTS AND CONCLUSIONS

Bechtel Incorporated has performed a study for The Pittsburg & Midway Coal Mining Co. to provide a third party confirmation of the preliminary capital cost estimate by Stearns-Roger for the design and construction of a 6,000 tons per calendar day SRC-II Demonstration Plant. To provide the confirmation, Bechtel has prepared a "factored" capital cost estimate for the purpose of comparison with the Stearns-Roger estimate. Bechtel's historical data for similar types of plants were reviewed for the purpose of establishing applicable cost "factors." The factors are percentages of total plant equipment cost and vary with the type and size of plant being considered.

The major results and conclusions from the Bechtel study are presented below.

2.1 TOTAL PLANT COST ESTIMATES

The major conclusion of the study is that the Bechtel and Stearns-Roger total plant cost estimates are in close agreement. However, individual components of the total plant cost in each of the estimates differ somewhat.

2.2 PLANT AREA COST ESTIMATES

The Demonstration Plant has been divided into "areas" by process functions. Although the Bechtel and Stearns-Roger total estimated plant costs are in close agreement, there are differences between individual plant "area" cost estimates. Due to the differences in estimating techniques, cost comparisons on a plant area basis are not meaningful.

2.3 ESTIMATING ACCURACY

The Bechtel estimate is considered to be accurate within a range of minus 10 percent to plus 30 percent without contingency. Sufficient contingency was added to the estimated cost to provide a total estimate having a 50 percent chance of overrunning/underrunning. This results in an expected estimate accuracy range of plus or minus 20 percent.

2.4 COST ESCALATION AND PROJECT EXECUTION PLAN

The Bechtel and Stearns-Roger cost estimates are based on end-of-1978 dollars. Escalation must be added to the estimates to obtain actual anticipated cost. The increase due to escalation can be minimized by a well considered project execution plan.

Bechtel's factored capital cost estimate is based on a project execution plan which includes the following:

- All engineering, procurement, and construction managed and/or performed by a single engineering construction contractor with the capability of handling a project of this magnitude (commonly referred to in the process industries as an EPC contract).
- Engineering, procurement, and construction activities integrated to yield the earliest possible construction start consistent with maintaining continuity of construction.
- A firm basis for start of engineering, i.e., no substantive process changes, and change orders limited to 2 to 3 percent of total manhours.

SECTION 3

CONTRACT OBJECTIVES AND SCOPE

This program, "Confirmation of Preliminary Capital Cost Estimate for SRC-II Demonstration Plant," has been performed for The Pittsburg & Midway Coal Mining Co. by Bechtel Incorporated under Subcontract No. D-3055-SC-10. Work on this program was initiated on May 1, 1979, and was concluded on June 22, 1979.

The major objective of the program was "to provide a third party confirmation of the preliminary capital cost estimate by Stearns-Roger for the design and construction of a 6,000 tons per calendar day SRC-II Demonstration Plant." This work was carried out based on data prepared by Stearns-Roger and supplied to Bechtel by The Pittsburg & Midway Coal Mining Co.

To provide the cost confirmation, Bechtel has prepared a "factored" capital cost estimate for the purpose of comparison with the Stearns-Roger estimate. Bechtel's historical data for similar types of plants was reviewed for the purpose of establishing applicable cost "factors." The factors are percentages of total plant equipment cost and vary with the type and size of plant being considered.

The established factors were used for estimating bulk material costs, direct labor manhours, and subcontract costs. Equipment costs were obtained from Stearns-Roger. Bechtel selectively checked these costs.

The SRC-II Demonstration Plant has been divided into "units" according to function. Additionally, each unit has been subdivided into "areas" by process sections. For each area, Bechtel has provided the following:

- Total capital cost
- Major equipment cost

- Bulk material cost
- Direct labor cost and manhours
- Field indirect cost
- Home office cost
- Contingency cost
- Fee cost
- Business and occupation tax cost

Additionally, Bechtel has provided a range of risk for plant costs.

SECTION 4

PROCESS UNIT DESCRIPTIONS

The SRC-II Demonstration Plant has been divided into "units" according to function to simplify accounting and cost estimating procedures. Additionally, each unit has been subdivided into "areas" by process sections. The capital cost estimates have been carried out on an area basis.

Units 10, 20, 30, and 40 are processing plants which upgrade the coal to produce oil and gaseous products. Their supporting utility systems are included in Unit 50. Unit 60 includes all coal receiving, processing and handling. This unit also includes the ash handling and ash disposal systems. Process descriptions for each unit and each area have been presented by The Pittsburg & Midway Coal Mining Co. and Stearns-Roger.[1][2]

Designations for plant units and areas are presented in Table 4-1, which follows.

---

(1) The Pittsburg & Midway Coal Mining Co. and Stearns-Roger, "Demonstration Plant Conceptual Description - Phase Zero Report No. 1.1-4," DOE Contract ET-78-C-01-3055.

(2) Major Plant Alternates, transmitted to Bechtel on May 2, 1979, by Gulf Science and Technology Company.

Table 4-1

UNIT AND AREA DESIGNATIONS

Unit 10 Primary Process Plants

Area 11 - Dissolver Plant - Including slurry mixing, slurry charge heaters, dissolvers, water wash, raw products separation and cooling.

Area 12 - Hydrogen Treating and Recovery Plant - Including oil wash, acid gas removal, recycle compression, and high pressure cryogenic recovery plant.

Unit 20 Hydrogen Production Plants

Area 21 - Syngas Production Plant - Including synthesis gas production via gasification, plus ash handling to the area battery limit.

Area 22 - Syngas Shift Conversion Plant - Including high pressure shift conversion based on Haldor Topsoe A/S data.

Area 23 - Hydrogen Purification and Compression Plant - Including H_2S and CO_2 removal via a Benfield Hot Carbonate Unit, plus compression of makeup hydrogen to dissolver pressure.

Area 24 - Syngas Purification Plant - Including H_2S and CO_2 removal via a Benfield Unit.

Area 25 - Methanation Plant - Including DEA treating, a methanator based on Haldor Topsoe A/S designs, and glycol dehydration.

Unit 30 Gas Plants

Area 31 - Low Pressure Gas Compression and Treating Plant - Including vapor recovery, refrigerated flash system, DEA absorber, and DEA regeneration.

Area 32 - Product Gas Plant - Including deethanizer, depropanizer, refrigeration for Areas 31 and 32, and glycol dehydration.

Table 4-1 (Cont'd)

Area 33 - Sulfur Recovery Plant - Including Claus and SUPERSCOT units.

Area 34 - Refining Plant - Including main product fractionator, debutanizer, vacuum flash tower, and slurry transfer pumps.

Area 35 - Hydrodesulfurization Unit - Including a hydrotreater capable of the desulfurization of both naphtha and fuel oils.

Unit 40 Secondary Recovery Plants

Area 41 - Ammonia Recovery Plant - U. S. Steel Phosam-W process.

Area 42 - Tar Acids Recovery - ChemPro Equipment Corp. phenol recovery process.

Area 43 - Plant Water Reclamation Unit - Including evaporators and gravity separators.

Area 44 - Oxygen Plant - Including air compression, oxygen production unit, and oxygen compressors.

Unit 50 Utility Systems and General Facilities

Area 51 - Steam Generation System - Including boilers, boiler feedwater systems, and condensate return system.

Area 52 - Raw Water System - Including boiler feedwater and potable water treating.

Area 53 - Cooling Water System - Including cooling towers, pumps, and distribution system.

Area 54 - Miscellaneous Distribution Systems - Including fuel system, flare and drain systems, fire water systems, sanitary sewage systems, storage and shipping, and electrical distribution.

Area 55 - General Plant Facilities - Including site improvements and general plant buildings.

Table 4-1 (Cont'd)

Unit 60 Coal and Ash Systems

Area 61 - Coal Supply System - Including railroad dump hopper, rotary hopper, car dumper, dust suppression system, dust collection, belt conveyors, and radial stacker.

Area 62 - Coal Crushing System - Including radial reclaim belt conveyor system, reclaim hoppers, front-end loaders, crusher feed system, primary and secondary crushers, dust collection, and fine coal conveyors.

Area 63 - Fine Coal Handling System - Including feed surge hopper and splitter, dust collector, screw feeders, fine coal storage, weight belt feeder, and Redler conveyor.

Area 64 - Plant Ash Handling System - Including drum filter system, emergency ash holding system, coarse ash belt conveyors, ash pile, and ash reclaim conveyors.

Area 65 - Ash Disposal System - Including ash impoundment area and ash disposal dam.

SECTION 5

METHODOLOGY AND QUALIFICATIONS FOR BECHTEL CAPITAL COST ESTIMATES

The methodology and qualifications for the Bechtel capital cost estimates are presented in this section. Also presented is a listing of items which Bechtel believes require further consideration. Plant, unit, and area capital costs are presented in Section 6.

5.1 METHODOLOGY

This Bechtel capital cost estimate is a preliminary "factored" estimate. The estimate was developed using prices of major equipment, with all remaining costs "factored" utilizing Bechtel historical data from similar plants, where possible.

The capital cost estimate was prepared in the following manner:

1. A review of the data provided by Stearns-Roger was made. Cost estimate summary tables provided by Stearns-Roger are presented in Appendix A.

2. The equipment list supplied by Stearns-Roger was restructured according to Bechtel's code of accounts.

3. Where conflicts existed or data were unclear, telephone communication with Stearns-Roger resolved problems.

4. Stearns-Roger's equipment prices were selectively checked based on informal quotes and in-house data.

5. Bechtel's historical data for similar types of plants were reviewed for the purpose of establishing applicable cost "factors." The factors are percentages of total plant equipment cost, and vary with the type and size of plant being considered.

6. The established factors were used for estimating bulk material costs, direct labor manhours, and subcontract costs for each plant area (see Table 4-1 for a description of plant areas).

7. Wage rates and productivity factors were established.

8. Using appropriate wage rates and productivity factors, direct labor costs were developed.

9. Based on direct labor and material costs, an estimate of indirect costs were made.

10. Engineering procurement and all other home office support costs were estimated based upon total plant costs and historical data.

11. All other project costs such as fees and taxes were estimated based on total plant costs.

12. Preliminary quantity information provided was verified.

The estimating method described above was applied to each plant area and then summarized into unit and total plant costs. A detailed example of a factored cost estimate by Bechtel for Plant Area 33 (Sulfur Recovery Unit) is presented in Table 5-1 at the end of this section.

5.2 QUALIFICATIONS

The following is a list of preliminary scope and process qualifications used by Bechtel in preparing the capital cost estimate:

- All costs were based on year-end 1978 dollars. No escalation was included.
- Site preparation excavation costs were based on 50/50 rock/earth ratio.
- All foundations were assumed to be spread footings due to lack of information on the actual soil conditions. No piling was included.
- Landscaping costs, other than grass seeding, were not included.
- Actual craft wage rates and fringes for Morgantown, West Virginia were used.

- Costs for construction or improvement of the public access roads to the site, if required, were not included.

- Costs for infrastructure (e.g., housing, schools, roads) were not included.

- Costs for power transmission to the main plant substation were not included.

- No precommissioning, commissioning, or startup costs were included.

- No scheduled overtime costs were included.

- West Virginia business and occupation tax was included.

- Indirect capital costs were not included for such items as:

  - license fees

  - working capital

  - land

  - catalysts and chemicals, except as listed by Stearns-Roger

  - raw materials inventory

  - finished product inventory

- Estimate was based on a single contract for detailed engineering, procurement, and construction.

- Costs for third party technical support to monitor, design, engineer, procure, and construct were not included.

- Estimate was based on a reasonable schedule and did not consider either an accelerated schedule or stretch-out of the construction work. The schedule used for cost estimating, included in the back pocket of this report, shows a total elapsed time of 48 months from start of engineering to mechanical completion.

- The estimate does not allow for extensive design changes after start of engineering.

- No operator training was included.
- Costs associated with camp or housing facilities for construction personnel were not included.
- Estimate assumes craft labor is readily available in numbers required.
- Costs for third party technical support to monitor design, engineering, procurement, and construction were not included.
- Costs for an Environmental Impact Statement were not included.
- Costs for quality assurance, other than those normal to the chemical process industry, were not included.

5.3 ITEMS FOR FURTHER CONSIDERATION

Listed below are activities which Bechtel feels should be pursued in order to execute the project in an orderly and economical manner:

- A specific project execution plan should be developed.
- A labor survey should be conducted for the local (Morgantown) area.
- Soils surveys should be made.
- The socioeconomic impact of the project on the local area should be evaluated.
- The availability and serviceability of the following should be determined:
  - railroad transportation
  - public roads
  - housing
  - schools

Table 5-1

EXAMPLE OF FACTORED CAPITAL COST ESTIMATE
BY BECHTEL FOR PLANT AREA 33 - SULFUR RECOVERY UNIT

NOTE: All costs are in thousands of dollars (1978 $)

MAJOR EQUIPMENT, MATERIAL, AND SUBCONTRACT COSTS

Price supplied by Stearns-Roger	=	$ 4,989

BULK MATERIAL AND SUBCONTRACT COSTS

The bulk material and subcontract costs are taken as percentages (or cost "factors") of the major equipment costs. The cost factors are based on Bechtel's historical, proprietary data for similar types of plants, and vary with type and size of plant.

Bulk Material Costs		Cost Factor,%				
Instruments	=	18.3	x	4,989	=	$ 913
Piping	=	44.2	x	4,989	=	2,205
Structural Steel	=	8.2	x	4,989	=	409
Electrical	=	4.7	x	4,989	=	234
Concrete	=	4.2	x	4,989	=	209
Site Improvements	=	3.3	x	4,989	=	165
Total Bulk Material Cost	=	82.9	x	4,989	=	$ 4,135

Table 5-1 (Cont'd)

Subcontract Costs		Cost Factor, %				
Insulation	=	16.0	x	4,989		
Buildings	=	1.0	x	4,989		
Painting	=	1.1	x	4,989		
Total Subcontract Cost	=	18.1	x	4,989	=	$ 904
Cost for Other Materials (Catalyst) supplied by Stearns-Roger					=	$ 38
Total Bulk Material and Subcontract Costs					=	$ 5,077

DIRECT LABOR MANHOURS

Direct labor manhours are taken as multipliers (or manhour "factors") of the bulk material costs. The manhour factors are based on Bechtel's historical, proprietary data for similar types of plants, and vary with type and size of plant.

		Manhour Factor, Hrs/$1000 of Cost				
Instruments Manhours	=	30	x	913	=	27,600 hours
Piping Manhours	=	43	x	2,205	=	94,800
Structural Steel Manhours	=	32	x	409	=	13,200
Electrical Manhours	=	77	x	234	=	18,000
Concrete Manhours	=	115	x	209	=	24,000
Site Improvement Manhours	=	86	x	165	=	14,140
Major Equipment Manhours*					=	14,260
Total Direct Labor Manhours						206,000 hours

*Major equipment manhours have been obtained from Bechtel's proprietary "Manhour Standard" document.

Table 5-1 (Cont'd)

DIRECT LABOR COSTS		
206,000 hours @ $14.80/hour	=	$ 3,049
FIELD INDIRECT COSTS		
75% of direct labor costs ($3,049)	=	$ 2,287
SUBTOTAL FIELD COSTS		
4,989 + 5,077 + 3,049 + 2,287	=	$15,402
HOME OFFICE MANHOURS		
Bechtel used a factor of 4.3 manhours per thousand dollars field cost = 4.3 x 15,402	=	66,200 hours
HOME OFFICE COSTS		
66,200 hours @ $30/hour	=	$ 1,980
ENGINEERING BY OTHERS		
Price supplied by Stearns-Roger	=	$ 120
SUBTOTAL PLANT AREA COSTS		
15,402 + 1,980 + 120	=	$17,502
CONTINGENCY @ 10% of 17,502	=	1,750
		19,252
FEE @ 2% of 19,252	=	385
		19,637
BUSINESS & OCCUPATION TAX @ 2.2% of 19,637	=	432
TOTAL AREA 33 COSTS		$20,069

SECTION 6

COMPARISON OF BECHTEL AND STEARNS-ROGER CAPITAL COST ESTIMATES

The Bechtel and Stearns-Roger capital cost estimates for the SRC-II Demonstration Plant are presented in this section. Results based on comparisons between the estimates are also presented. The methodology and qualifications for the Bechtel cost estimates are presented in Section 5.

6.1 COMPARISON TABLES

Plant, unit, and area capital cost estimates from Stearns-Roger and Bechtel are presented in Tables 6-1 through 6-33 at the end of the section. More detailed summary tables for the Stearns-Roger and Bechtel cost estimates are presented in Appendices A and B, respectively. A detailed example of a factored cost estimate by Bechtel for Plant Area 33 is presented in Table 5-1.

6.2 COMPARISON OF TOTAL PLANT COST ESTIMATES

As can be seen from Table 6-1, the Bechtel and Stearns-Roger estimated total plant costs are in close agreement. However, individual cost components differ somewhat. These cost components are discussed below.

Major Equipment Cost

The total plant major equipment cost of $207,190,000 estimated by Stearns-Roger is considered to be reasonable based on Bechtel's selective check of the preliminary data sheets and pricing information supplied by Stearns-Roger.

Bulk Material and Subcontracts Costs

Bechtel's cost estimate for total bulk materials and subcontracts is approximately 11 percent lower than the Stearns-Roger estimate. The

major reason for this difference is that Stearns-Roger includes the cost of electrical installation work in its subcontract cost; Bechtel includes this work in the direct labor costs.

Direct Labor Costs

Bechtel's total direct labor cost estimate is approximately 65 percent higher than the Stearns-Roger estimate. This is due, primarily, to the fact that electrical installation work is included in Bechtel's direct labor costs. In addition, Bechtel includes the labor union fringe benefits as a part of direct labor cost while Stearns-Roger does not.

Bechtel's direct labor rate of $14.80 per hour is composed of $11.67 base rate plus $3.13 payroll taxes, insurance, and fringe benefits.

Field Indirect Costs

Field indirect costs are estimated as a percentage of direct labor costs. Bechtel's value for the percentage of direct labor cost was lower than Stearns-Roger's due to the fact that Stearns-Roger includes union fringes as part of labor indirects while Bechtel includes them in direct labor.

Bechtel's field indirect costs include:

- Temporary construction facilities such as temporary buildings, work areas, roads, unloading facilities, electrical power, water supply, sewage facilities, and general purpose scaffolding.
- Miscellaneous construction services such as cleanup, maintenance of equipment, material handling, warehousing, security, onsite transportation, and manual surveying crew.
- Construction equipment, tools, supplies, and utilities such as rental equipment, purchased equipment, small tools, consumable supplies, and purchased utilities. The cost of purchased equipment is the net cost after resale credit.

- Field office costs such as supervision, engineering, project control, and administrative personnel on the field payroll. Also included are field office materials such as computer facilities, office supplies, office equipment, communications costs, and relocation expenses for nonmanual personnel.

- Other operations such as welder's tests, craft training, show-up time, and manual travel expenses.

Subtotal, Field

Bechtel's estimate of total field costs is approximately 6 percent higher than the Stearns-Roger estimate. This small difference is well within the accuracy range of this type of estimate.

Home Office Costs

Bechtel's estimate of total home office costs is approximately 12 percent higher than the Stearns-Roger estimate. Based on available scope definition, Bechtel considers this to be a reasonable correlation.

Contingency

Bechtel's contingency is the allowance made in estimates for unforeseen elements of costs, other than scope changes, which previous experience has shown statistically likely to occur during project execution. Stearns-Roger used a contingency of 18 percent and Bechtel used a contingency of 10 percent for the cost estimates. Contingency and estimating accuracy are discussed further in Section 6.4.

6.3 COMPARISON OF PLANT AREA COST ESTIMATES

The Demonstration Plant has been divided into "areas" by process functions. Although the Bechtel and Stearns-Roger total estimated plant costs are in close agreement, there are differences between individual plant "area" cost estimates. These differences are due, primarily, to the differences in the estimating techniques. The Bechtel "factored" cost estimate includes items of cost for each plant area that have been historically

included in other similar plants. The Bechtel estimate, therefore, cannot account for possible differences between the estimates for the establishment of plant area battery limits, and in the interconnecting facilities to specific plant areas. Examples of interconnecting facilities are:

- pipe racks from plant to plant
- process piping within the pipe racks
- electrical power distribution
- sewers and water lines
- steam and utility lines
- plant layouts and plot plans
- switchgear and power equipment

Due to the differences in estimating techniques, cost comparisons on a plant area basis are not meaningful. However, cost comparisons on a total plant basis are meaningful, since differences in scope do not exist.

6.4 ESTIMATING ACCURACY

The Bechtel estimate is considered to be accurate within a range of minus 10 percent to plus 30 percent without contingency. Sufficient contingency was added to the estimated cost to provide a total estimate having a 50 percent chance of overrunning/underrunning. This results in an expected estimate accuracy range of plus or minus 20 percent. These data are shown graphically in Figure 6-1.

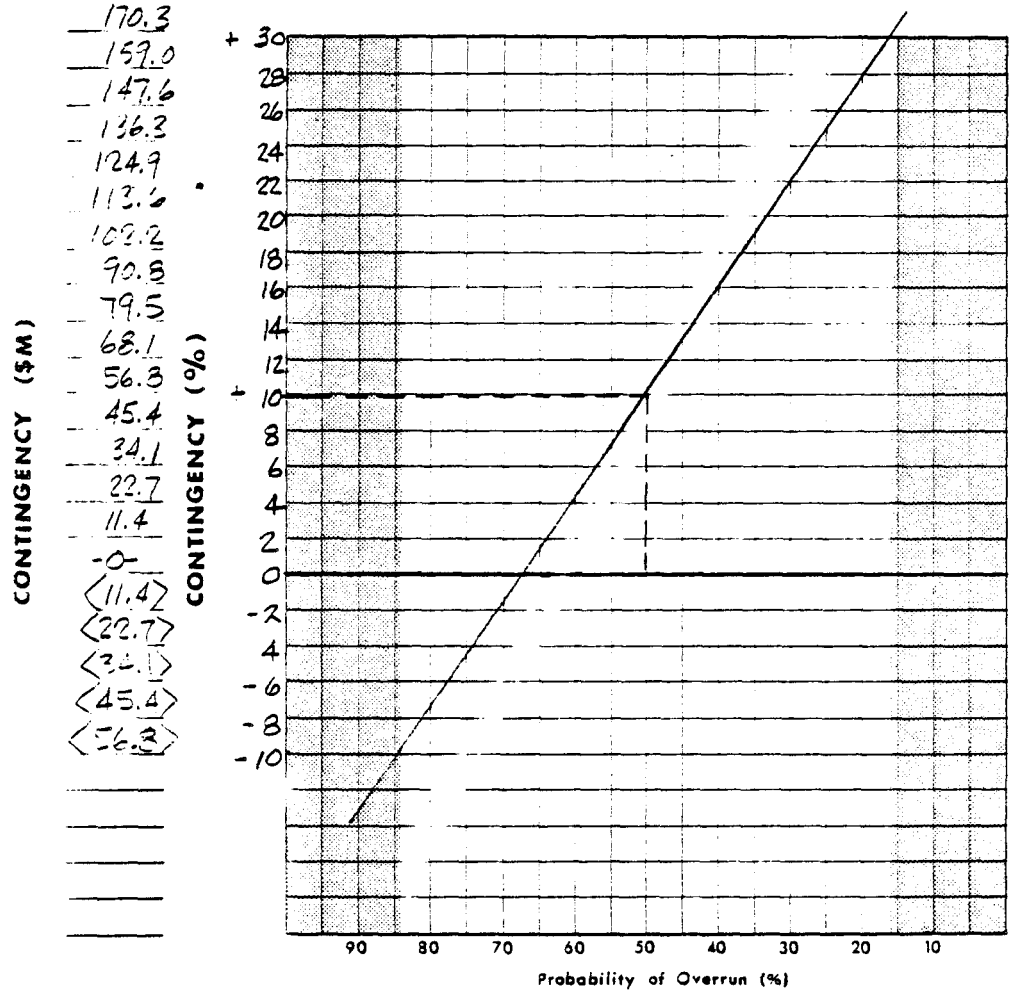
Figure 6-1

ANALYSIS OF RISK

RCE - 35 A
10/70

JOB NO 13651 /Client P&MCMCo
Type of Plant SR2 I
Location MORGANTOWN, W. Va.
Date 6-15-79

ANALYSIS OF RISK



ESTIMATE

Est Cost Excl. Contingency $ 567.8 MILLION
Accuracy Excl. Contingency* +30% -10%
Most Probable Cost $ 624.6 MILLION

MANAGEMENT DECISION

Probability of Overrun 50 %
Contingency 10 %
$ 56.8 MILLION
Estimate Accuracy
Incl. Contingency* +20% -20%

* Based on Standard Deviation

6.5 COST ESCALATION AND PROJECT EXECUTION PLAN

The Bechtel and Stearns-Roger cost estimates are based on end-of-1978 dollars. Escalation must be added to the estimates to obtain actual anticipated cost. The increase due to escalation can be minimized by a well considered project execution plan.

Bechtel's factored capital cost estimate is based on a project execution plan which includes the following:

- All engineering, procurement, and construction managed and/or performed by a single engineering construction contractor with the capability of handling a project of this magnitude (commonly referred to in the process industries as an EPC contract).

- Engineering, procurement, and construction activities integrated to yield the earliest possible construction start consistent with maintaining continuity of construction.

- A firm basis for start of engineering, i.e., no substantive process changes, and change orders limited to 2 to 3 percent of total manhours.

Table 6-1

SUMMARY COST COMPARISON FOR
ALL UNITS - SRC-II COAL LIQUEFACTION

	Capital Cost, Thousands of Dollars (1978 $)	
	Stearns-Roger	Bechtel
Major Equipment - Materials & Subcontracts	$207,190	$210,137
Bulk Material & Subcontracts	140,245	125,233
Direct Labor	56,239	92,705
Field Indirects	66,608	70,409
Subtotal, Field	$470,282	$498,484
Home Office	58,194	65,304
Other Engineering	3,990	4,000
Contingency	92,091	56,780
Fee	11,816	12,491
Business & Occupation Tax	13,887	14,015
Total Plant Cost	$650,260	$651,074
Direct Field Labor, Thousands of Manhours	4,830	6,266

Table 6-2

SUMMARY COST COMPARISON FOR
UNIT 10 - PRIMARY PROCESS PLANTS

	Capital Cost, Thousands of Dollars (1978 $)	
	Stearns-Roger	Bechtel
Major Equipment - Materials & Subcontracts	$ 65,917	$ 68,970
Bulk Material & Subcontracts	21,288	31,890
Direct Labor	9,748	22,874
Field Indirects	11,548	17,156
Subtotal, Field	$108,501	$140,890
Home Office	15,516	19,185
Other Engineering	--	975
Contingency	21,439	16,105
Fee	2,909	3,543
Business & Occupation Tax	3,147	3,975
Total Unit Cost	$151,512	$184,673
Direct Field Labor, Thousands of Manhours	830	1,548

Table 6-3

SUMMARY COST COMPARISON FOR
AREA 11 - DISSOLVER PLANT

	Capital Cost, Thousands of Dollars (1978 $)	
	Stearns-Roger	Bechtel
Major Equipment - Materials & Subcontracts	$ 48,797	$ 50,950
Bulk Material & Subcontracts	16,045	27,002
Direct Labor	7,393	19,100
Field Indirects	8,757	14,325
Subtotal, Field	$ 80,992	$111,377
Home Office	11,207	14,367
Other Engineering	--	350
Contingency	15,938	12,609
Fee	2,161	2,774
Business & Occupation Tax	2,306	3,112
Total Area Cost	$112,604	$144,589
Direct Field Labor, Thousands of Manhours	629	1,293

Table 6-4

SUMMARY COST COMPARISON FOR
AREA 12 - HYDROGEN TREATING & RECOVERY PLANT

	Capital Cost, Thousands of Dollars (1978 $)	
	Stearns-Roger	Bechtel
Major Equipment - Materials & Subcontracts	$ 17,120	$ 18,020
Bulk Material & Subcontracts	5,243	4,888
Direct Labor	2,355	3,774
Field Indirects	2,791	2,831
Subtotal, Field	$ 27,509	$ 29,513
Home Office	4,309	4,818
Other Engineering	--	625
Contingency	5,501	3,496
Fee	747	769
Business & Occupation Tax	841	863
Total Area Cost	$ 38,907	$ 40,084
Direct Field Labor, Thousands of Manhours	201	255

Table 6-5

SUMMARY COST COMPARISON FOR
UNIT 20 - HYDROGEN PRODUCTION PLANTS

	Capital Cost, Thousands of Dollars (1978 $)	
	Stearns-Roger	Bechtel
Major Equipment - Materials & Subcontracts	$ 48,132	$ 49,684
Bulk Material & Subcontracts	15,971	17,035
Direct Labor	5,817	12,419
Field Indirects	6,890	9,321
Subtotal, Field	$ 76,810	$ 88,459
Home Office	8,643	11,411
Other Engineering	--	650
Contingency	14,772	10,052
Fee	1,328	2,212
Business & Occupation Tax	2,238	2,481
Total Unit Cost	$103,791	$115,265
Direct Field Labor, Thousands of Manhours	495	839

Table 6-6

SUMMARY COST COMPARISON FOR
AREA 21 - SYNGAS PRODUCTION

	Capital Cost, Thousands of Dollars (1978 $)	
	Stearns-Roger	Bechtel
Total Field Costs Including Contingency	35,086	32,195
Home Office	1,477	3,728
Other Engineering	370	370
Fee	70	726
Business & Occupation Tax	817	814
Total Area cost	$ 37,820	$ 37,833
Direct Field Labor, Thousands of Manhours	77	50

Table 6-7

SUMMARY COST COMPARISON FOR
AREA 22 - SYNGAS SHIFT CONVERSION

	Capital Cost, Thousands of Dollars (1978 $)	
	Stearns-Roger	Bechtel
Major Equipment - Materials & Subcontracts	$ 5,732	$ 5,678
Bulk Material & Subcontracts	2,691	3,753
Direct Labor	759	2,612
Field Indirects	899	1,966
Subtotal, Field	$ 10,081	$ 14,009
Home Office	1,341	1,807
Other Engineering	235	235
Contingency	2,015	1,605
Fee	267	354
Business & Occupation Tax	311	397
Total Area Cost	$ 14,250	$ 18,407
Direct Field Labor, Thousands of Manhours	64	177

Table 6-8

SUMMARY COST COMPARISON FOR
AREA 23 - HYDROGEN PURIFICATION & COMPRESSION

	Capital Cost, Thousands of Dollars (1978 $)	
	Stearns-Roger	Bechtel
Major Equipment - Materials & Subcontracts	$ 9,550	$ 11,368
Bulk Material & Subcontracts	8,576	8,333
Direct Labor	2,793	5,927
Field Indirects	3,309	4,445
Subtotal, Field	$ 24,228	$ 30,073
Home Office	3,198	3,879
Other Engineering	15	15
Contingency	4,744	3,397
Fee	642	747
Business & Occupation Tax	723	838
Total Area Cost	$ 33,550	$ 38,949
Direct Field Labor, Thousands of Manhours	238	400

Table 6-9

SUMMARY COST COMPARISON FOR
AREA 24 - SYNGAS PURIFICATION PLANT

	Capital Cost, Thousands of Dollars (1978 $)	
	Stearns-Roger	Bechtel
Major Equipment - Materials & Subcontracts	$ 1,711	$ 1,752
Bulk Material & Subcontracts	1,149	1,183
Direct Labor	359	865
Field Indirects	426	649
Subtotal, Field	$ 3,645	$ 4,449
Home Office	482	574
Other Engineering	15	15
Contingency	716	504
Fee	97	111
Business & Occupation Tax	105	124
Total Area Cost	$ 5,060	$ 5,777
Direct Field Labor, Thousands of Manhours	31	58

Table 6-10

SUMMARY COST COMPARISON FOR
AREA 25 - METHANATION PLANT

	Capital Cost, Thousands of Dollars (1978 $)	
	Stearns-Roger	Bechtel
Major Equipment - Materials & Subcontracts	$ 4,139	$ 3,886
Bulk Material & Subcontracts	2,898	3,163
Direct Labor	996	2,276
Field Indirects	1,180	1,707
Subtotal, Field	$ 9,213	$ 11,032
Home Office	1,495	1,423
Other Engineering	15	15
Contingency	1,854	1,247
Fee	252	274
Business & Occupation Tax	282	308
Total Area Cost	$ 13,111	$ 14,299
Direct Field Labor, Thousands of Manhours	84	154

Table 6-11

SUMMARY COST COMPARISON FOR
UNIT 30 - REFINING AND GAS PLANTS

	Capital Cost, Thousands of Dollars (1978 $)	
	Stearns-Roger	Bechtel
Major Equipment - Materials & Subcontracts	$ 16,557	$ 15,588
Bulk Material & Subcontracts	16,777	17,667
Direct Labor	8,604	12,047
Field Indirects	10,192	9,039
Subtotal, Field	$ 52,130	$ 54,341
Home Office	7,797	7,002
Other Engineering	--	765
Contingency	10,359	6,212
Fee	1,401	1,366
Business & Occupation Tax	1,577	1,533
Total Unit Cost	$ 73,264	$ 71,219
Direct Field Labor, Thousands of Manhours	733	814

Table 6-12

SUMMARY COST COMPARISON FOR
AREA 31 - LOW PRESSURE GAS COMPRESSION & TREATING

	Capital Cost, Thousands of Dollars (1978 $)	
	Stearns-Roger	Bechtel
Major Equipment - Materials & Subcontracts	$ 1,506	$ 1,550
Bulk Material & Subcontracts	1,742	1,826
Direct Labor	854	1,642
Field Indirects	1,011	1,230
Subtotal, Field	$ 5,113	$ 6,248
Home Office	674	801
Other Engineering	--	--
Contingency	1,000	705
Fee	135	155
Business & Occupation Tax	148	174
Total Area Cost	$ 7,070	$ 8,083
Direct Field Labor, Thousands of Manhours	73	111

Table 6-13

SUMMARY COST COMPARISON FOR
AREA 32 - PRODUCT GAS PLANT

	Capital Cost, Thousands of Dollars (1978 $)	
	Stearns-Roger	Bechtel
Major Equipment - Materials & Subcontracts	$ 3,325	$ 3,375
Bulk Material & Subcontracts	3,108	4,116
Direct Labor	1,643	2,857
Field Indirects	1,946	2,142
Subtotal, Field	$ 10,022	$ 12,490
Home Office	2,028	1,611
Other Engineering	--	645
Contingency	2,083	1,475
Fee	283	324
Business & Occupation Tax	317	364
Total Area Cost	$ 14,733	$ 16,909
Direct Field Labor, Thousands of Manhours	138	193

Table 6-14

SUMMARY COST COMPARISON FOR
AREA 33 - SULFUR RECOVERY UNIT

	Capital Cost, Thousands of Dollars (1978 $)	
	Stearns-Roger	Bechtel
Major Equipment - Materials & Subcontracts	$ 5,398	$ 4,989
Bulk Material & Subcontracts	4,449	5,077
Direct Labor	2,829	3,049
Field Indirects	3,350	2,287
Subtotal, Field	$ 16,026	$ 15,402
Home Office	2,238	1,980
Other Engineering	--	120
Contingency	3,157	1,750
Fee	424	385
Business & Occupation Tax	485	432
Total Area Cost	$ 22,330	$ 20,069
Direct Field Labor, Thousands of Manhours	244	206

Table 6-15

SUMMARY COST COMPARISON FOR
AREA 34 - REFINING PLANT

	Capital Cost, Thousands of Dollars (1978 $)	
	Stearns-Roger	Bechtel
Major Equipment - Materials & Subcontracts	$ 4,360	$ 4,051
Bulk Material & Subcontracts	4,779	4,634
Direct Labor	2,542	3,241
Field Indirects	3,011	2,430
Subtotal, Field	$ 14,692	$ 14,356
Home Office	1,999	1,860
Other Engineering	--	--
Contingency	2,885	1,622
Fee	391	357
Business & Occupation Tax	439	400
Total Area Cost	$ 20,406	$ 18,595
Direct Field Labor, Thousands of Manhours	217	219

Table 6-16

SUMMARY COST COMPARISON FOR
AREA 35 - HYDRODESULFURIZATION PLANT

	Capital Cost, Thousands of Dollars (1978 $)	
	Stearns-Roger	Bechtel
Major Equipment - Materials & Subcontracts	$ 1,969	$ 1,623
Bulk Material & Subcontracts	2,698	2,014
Direct Labor	737	1,258
Field Indirects	874	950
Subtotal, Field	$ 6,278	$ 5,845
Home Office	858	750
Other Engineering	--	--
Contingency	1,234	660
Fee	167	145
Business & Occupation Tax	188	163
Total Area Cost	$ 8,725	$ 7,563
Direct Field Labor, Thousands of Manhours	62	85

Table 6-17

SUMMARY COST COMPARISON FOR
UNIT 40 - SECONDARY RECOVERY AND OXYGEN PLANTS

	Capital Cost, Thousands of Dollars (1978 $)	
	Stearns-Roger	Bechtel
Major Equipment - Materials & Subcontracts	$ 40,700	$ 39,509
Bulk Material & Subcontracts	11,225	8,959
Direct Labor	5,390	6,659
Field Indirects	6,385	5,860
Subtotal, Field	$ 63,700	$ 60,987
Home Office	7,632	7,870
Other Engineering	--	821
Contingency	12,330	6,968
Fee	1,670	1,532
Business & Occupation Tax	1,882	1,721
Total Unit Cost	$ 87,214	$ 79,899
Direct Field Labor, Thousands of Manhours	459	450

Table 6-18

SUMMARY COST COMPARISON FOR
AREA 41 - AMMONIA RECOVERY PLANT

	Capital Cost, Thousands of Dollars (1978 $)	
	Stearns-Roger	Bechtel
Major Equipment - Materials & Subcontracts	$ 951	$ 890
Bulk Material & Subcontracts	2,667	1,247
Direct Labor	1,771	915
Field Indirects	2,097	686
Subtotal, Field	$ 7,486	$ 3,738
Home Office	1,006	483
Other Engineering	106	106
Contingency	1,486	433
Fee	202	95
Business & Occupation Tax	226	107
Total Area Cost	$ 10,512	$ 4,962
Direct Field Labor, Thousands of Manhours	149	62

Table 6-19

SUMMARY COST COMPARISON FOR
AREA 42 - TAR ACID RECOVERY PLANT

	Capital Cost, Thousands of Dollars (1978 $)	
	Stearns-Roger	Bechtel
Major Equipment - Materials & Subcontracts	$ 450	$ 508
Bulk Material & Subcontracts	1,265	931
Direct Labor	545	683
Field Indirects	646	512
Subtotal, Field	$ 2,906	$ 2,634
Home Office	388	340
Other Engineering	132	132
Contingency	592	311
Fee	77	68
Business & Occupation Tax	95	77
Total Area Cost	$ 4,190	$ 3,562
Direct Field Labor, Thousands of Manhours	46	46

Table 6-20

SUMMARY COST COMPARISON FOR
AREA 43 - PLANT WATER RECLAMATION PLANT

	Capital Cost, Thousands of Dollars (1978 $)	
	Stearns-Roger	Bechtel
Major Equipment - Materials & Subcontracts	$ 13,230	$ 13,219
Bulk Material & Subcontracts	2,815	2,390
Direct Labor	1,071	1,761
Field Indirects	1,269	1,321
Subtotal, Field	$ 18,385	$ 18,691
Home Office	1,686	2,412
Other Engineering	--	--
Contingency	3,470	2,110
Fee	471	464
Business & Occupation Tax	528	521
Total Area Cost	$ 24,540	$ 24,198
Direct Field Labor, Thousands of Manhours	92	119

Table 6-21

SUMMARY COST COMPARISON FOR
AREA 44 - OXYGEN PLANT

	Capital Cost, Thousands of Dollars (1978 $)	
	Stearns-Roger	Bechtel
Major Equipment - Materials & Subcontracts	$ 26,068	$ 24,891
Bulk Material & Subcontracts	4,479	4,392
Direct Labor	2,003	3,300
Field Indirects	2,373	3,341
Subtotal, Field	$ 34,923	$ 35,924
Home Office	3,731	4,635
Other Engineering	583	583
Contingency	6,782	4,114
Fee	920	905
Business & Occupation Tax	1,033	1,016
Total Area Cost	$ 47,972	$ 47,177
Direct Field Labor, Thousands of Manhours	172	223

Table 6-22

SUMMARY COST COMPARISON FOR
UNIT 50 - UTILITY SYSTEMS & GENERAL FACILITIES

	Capital Cost, Thousands of Dollars (1978 $)	
	Stearns-Roger	Bechtel
Major Equipment - Materials & Subcontracts	$ 18,997	$ 18,180
Bulk Material & Subcontracts	52,625	36,311
Direct Labor	15,205	14,938
Field Indirects	18,010	11,205
Subtotal, Field	$104,837	$ 80,634
Home Office	13,849	10,404
Other Engineering	530	789
Contingency	20,612	9,182
Fee	2,776	2,020
Business & Occupation Tax	3,141	2,267
Total Unit Cost	$145,745	$105,296
Direct Field Labor, Thousands of Manhours	1,314	1,009

Table 6-23

SUMMARY COST COMPARISON FOR
AREA 51 - STEAM GENERATION SYSTEM

	Capital Cost, Thousands of Dollars (1978 $)	
	Stearns-Roger	Bechtel
Major Equipment - Materials & Subcontracts	$ 10,009	$ 8,940
Bulk Material & Subcontracts	3,147	4,870
Direct Labor	1,037	3,400
Field Indirects	1,227	2,550
Subtotal, Field	$ 15,420	$ 19,760
Home Office	2,037	2,550
Other Engineering	--	--
Contingency	3,020	2,231
Fee	409	491
Business & Occupation Tax	464	551
Total Area Cost	$ 21,350	$ 25,583
Direct Field Labor, Thousands of Manhours	89	230

Table 6-24

SUMMARY COST COMPARISON FOR
AREA 52 - RAW WATER SYSTEM

	Capital Cost, Thousands of Dollars (1978 $)	
	Stearns-Roger	Bechtel
Major Equipment - Materials & Subcontracts	$ 1,205	$ 1,005
Bulk Material & Subcontracts	2,658	1,850
Direct Labor	1,161	1,060
Field Indirects	1,375	795
Subtotal, Field	$ 6,399	$ 4,710
Home Office	844	609
Other Engineering	--	--
Contingency	1,252	532
Fee	169	117
Business & Occupation Tax	196	131
Total Area Cost	$ 8,860	$ 6,099
Direct Field Labor, Thousands of Manhours	100	72

Table 6-25

SUMMARY COST COMPARISON FOR
AREA 53 - COOLING WATER SYSTEM

	Capital Cost, Thousands of Dollars (1978 $)	
	Stearns-Roger	Bechtel
Major Equipment - Materials & Subcontracts	$ 3,160	$ 3,055
Bulk Material & Subcontracts	6,358	3,065
Direct Labor	4,382	3,270
Field Indirects	5,346	2,453
Subtotal, Field	$ 19,246	$ 11,843
Home Office	2,683	1,527
Other Engineering	--	--
Contingency	3,790	1,337
Fee	512	294
Business & Occupation Tax	569	330
Total Area Cost	$ 26,800	$ 15,331
Direct Field Labor, Thousands of Manhours	404	221

Table 6-26

SUMMARY COST COMPARISON FOR
AREA 54 - MISCELLANEOUS DISTRIBUTION SYSTEMS

	Capital Cost, Thousands of Dollars (1978 $)	
	Stearns-Roger	Bechtel
Major Equipment - Materials & Subcontracts	$ 4,563	$ 4,680
Bulk Material & Subcontracts	15,992	8,796
Direct Labor	8,417	6,438
Field Indirects	9,969	4,829
Subtotal, Field	$ 38,941	$ 24,743
Home Office	5,129	3,192
Other Engineering	--	--
Contingency	7,619	2,793
Fee	1,029	615
Business & Occupation Tax	1,160	690
Total Area Cost	$ 53,878	$ 32,033
Direct Field Labor, Thousands of Manhours	714	435

Table 6-27

SUMMARY COST COMPARISON FOR
AREA 55 - GENERAL PLANT FACILITIES

	Capital Cost, Thousands of Dollars (1978 $)	
	Stearns-Roger	Bechtel
Major Equipment - Materials & Subcontracts	$ 61	$ 500
Bulk Material & Subcontracts	24,468	17,730
Direct Labor	78	770
Field Indirects	92	578
Subtotal, Field	$ 24,699	$ 19,578
Home Office	3,289	2,526
Other Engineering	530	789
Contingency	4,931	2,289
Fee	657	503
Business & Occupation Tax	751	565
Total Area Cost	$ 34,857	$ 26,250
Direct Field Labor, Thousands of Manhours	7	52

Table 6-28

SUMMARY COST COMPARISON FOR
UNIT 60 - COAL AND ASH SYSTEMS

	Capital Cost, Thousands of Dollars (1978 $)	
	Stearns-Roger	Bechtel
Major Equipment - Materials & Subcontracts	$ 16,887	$ 18,206
Bulk Material & Subcontracts	22,360	13,371
Direct Labor	11,468	23,768
Field Indirects	13,583	17,828
Subtotal, Field	$ 64,298	$ 73,173
Home Office	8,223	9,432
Other Engineering	--	--
Contingency	12,579	8,261
Fee	1,733	1,818
Business & Occupation Tax	1,902	2,038
Total Unit Cost	$ 88,735	$ 94,722
Direct Field Labor, Thousands of Manhours	998	1,606

Table 6-29

SUMMARY COST COMPARISON FOR
AREA 61 - COAL SUPPLY SYSTEM

	Capital Cost, Thousands of Dollars (1978 $)	
	Stearns-Roger	Bechtel
Major Equipment - Materials & Subcontracts	$ 7,168	$ 8,485
Bulk Material & Subcontracts	15,766	7,417
Direct Labor	7,243	16,028
Field Indirects	8,579	12,021
Subtotal, Field	$ 38,756	$ 43,951
Home Office	5,108	5,655
Other Engineering	--	--
Contingency	7,582	4,961
Fee	1,025	1,091
Business & Occupation Tax	1,154	1,224
Total Area Cost	$ 53,625	$ 56,882
Direct Field Labor, Thousands of Manhours	638	1,083

Table 6-30

SUMMARY COST COMPARISON FOR
AREA 62 - COAL CRUSHING SYSTEM

	Capital Cost, Thousands of Dollars (1978 $)	
	Stearns-Roger	Bechtel
Major Equipment - Materials & Subcontracts	$ 8,808	$ 8,808
Bulk Material & Subcontracts	5,289	4,006
Direct Labor	3,468	4,336
Field Indirects	4,108	3,252
Subtotal, Field	$ 21,673	$ 20,402
Home Office	2,607	2,640
Other Engineering	--	--
Contingency	4,240	2,304
Fee	605	507
Business & Occupation Tax	635	569
Total Area Cost	$ 29,760	$ 26,422
Direct Field Labor, Thousands of Manhours	293	293

Table 6-31

SUMMARY COST COMPARISON FOR
AREA 63 - FINE COAL HANDLING SYSTEM

	Capital Cost, Thousands of Dollars (1978 $)	
	Stearns-Roger	Bechtel
Major Equipment - Materials & Subcontracts	$ 379	$ 305
Bulk Material & Subcontracts	469	968
Direct Labor	295	1,495
Field Indirects	349	1,122
Subtotal, Field	$ 1,492	$ 3,890
Home Office	196	501
Other Engineering	--	--
Contingency	292	439
Fee	40	97
Business & Occupation Tax	40	108
Total Area Cost	$ 2,060	$ 5,035
Direct Field Labor, Thousands of Manhours	25	101

Table 6-32

SUMMARY COST COMPARISON FOR
AREA 64 - PLANT ASH HANDLING SYSTEM

	Capital Cost, Thousands of Dollars (1978 $)	
	Stearns-Roger	Bechtel
Major Equipment - Materials & Subcontracts	$ 525	$ 521
Bulk Material & Subcontracts	443	225
Direct Labor	334	281
Field Indirects	396	213
Subtotal, Field	$ 1,698	$ 1,240
Home Office	224	159
Other Engineering	--	--
Contingency	332	140
Fee	45	31
Business & Occupation Tax	51	35
Total Area Cost	$ 2,350	$ 1,605
Direct Field Labor, Thousands of Manhours	29	19

Table 6-33

SUMMARY COST COMPARISON FOR
AREA 65 - ASH DISPOSAL SYSTEM

	Capital Cost, Thousands of Dollars (1978 $)	
	Stearns-Roger	Bechtel
Major Equipment - Materials & Subcontracts	$ 7	$ 87
Bulk Material & Subcontracts	394	755
Direct Labor	127	1,628
Field Indirects	150	1,220
Subtotal, Field	$ 678	$ 3,690
Home Office	89	477
Other Engineering	--	--
Contingency	133	417
Fee	18	92
Business & Occupation Tax	22	102
Total Area Cost	$ 940	$ 4,778
Direct Field Labor, Thousands of Manhours	14	110

APPENDIX A

STEARNS-ROGER CAPITAL COST SUMMARY TABLES

Stearns-Roger capital cost summary tables, provided to Bechtel by The Pittsburg & Midway Coal Mining Co., are presented in the following pages.

Stearns-Roger

ESTIMATE SUMMARY

CUSTOMER	THE PITTSBURG & MIDWAY COAL MINING CO.	PROP NO.	
LOCATION	Morgantown, West Virginia	JOB NO.	C21500
PROJECT	SRC-I Demonstration Plant	DATE	10-14-75
AREA	ALL UNITS 10, 20, 30, 40, 50, 60	BY	HSI/EWH/BLR
REV. NO.	1	REV. DATE	2-5-76 BY KAF/JDK

ACT	DESCRIPTION	CRAFT HOURS	LABOR	MATERIAL	OTHER	TOTAL
A/B	CIVIL	1284 200	13 605 000	9 987 600	19 927 900	42 420 500
C	BUILDINGS & STRUCTURES	681 400	8 172 700	16 760 700	12 307 400	37 240 800
D	PROCESS EQUIPMENT	559 300	6 538 500	111 223 100	50 366 900	168 128 500
E	PIPING	2017 600	23 087 200	36 856 500	130 000	60 073 700
F	ELECTRICAL	—	—	7 870 600	9 504 200	17 374 800
G	PAINTING	—	—	—	6 823 300	6 823 300
L	PLANT ITEMS	—	—	1 135 200	2 050 200	3 185 400
N	INSTRUMENTS & CONTROLS	280 900	3 192 100	8 640 700	562 000	12 394 800
P	INSULATION	—	—		8 788 300	8 788 300
		—	—			
		—				
	DIRECT FIELD COST 11.30	4829 500	54 595 500	192 374 400	109 460 200	356 430 100
H	FIELD EXPENSE					
H	ALL RISK, PR TAX, BOND					
K	CONSTRUCTION SUPPLIES					
M	STARTUP					
S	TEMPORARY FACILITIES					
V	CRAFT BENEFITS					
V	CONSTRUCTION CAMP					
W	CONSTRUCTION EQUIP.					
	INDIRECT FIELD COST					66 608 100
	TOTAL FIELD COST					423 038 200
J	ENGINEERING					27 299 800
	TOTAL FIELD & ENG. COST					450 337 000
J	OVERHEAD					10 045 000
J	S/C ENGINEERING					3 990 000
R	PREMIUM PAY					1 631 800
	BATTERY-LIMITS UNITS					45 600 000
	CONTINGENCY (19%)					92 091 000
	SUB TOTAL					603 679 800
	G&A EXPENSE (3.3%)					20 823 000
	FEES (~ 2%)					11 816 200
	B&O TAX (2.2%)					13 881 000
	GRAND TOTAL — DIRECT CAPITAL COST					650 260 000

FORM 62 110 REV 10

Stearns-Roger

ESTIMATE SUMMARY

CUSTOMER THE PITTSBURG & MIDWAY COAL MINING CO.	PROP NO.
LOCATION Morgantown, West Virginia	JOB NO. C21500
PROJECT SRC-II Demonstration Plant	DATE 10-16-78
AREA UNIT 10	BY HSI/EWH/DLQ
REV. NO. 1 REV. DATE 4-5-79	BY KAF/JDK

ACT	DESCRIPTION	CRAFT HOURS	LABOR	MATERIAL	OTHER	TOTAL
A/2	CIVIL	84 100	897 800	514 200	—	1 412 600
C	BUILDINGS & STRUCTURES	122 700	1 481 100	2 915 400	—	4 396 500
D	PROCESS EQUIPMENT	71 100	830 700	37 072 100	28 844 700	66 747 500
E	PIPING	470 200	5 344 400	9 042 200	—	14 386 600
F	ELECTRICAL	—	—	1 350 800	1 344 700	2 695 500
G	PAINTING	—	—	—	831 600	831 600
L	PLANT ITEMS	—	—	—	—	—
N	INSTRUMENTS & CONTROLS	82 100	911 000	2 994 200	—	3 905 200
P	INSULATION	—			2 394 200	2 394 200
		—			—	
		—			—	
	DIRECT FIELD COST	830 200	9 465 000	53 789 500	33 415 200	96 669 700
H	FIELD EXPENSE					
H	ALL RISK, PR TAX, BOND					
K	CONSTRUCTION SUPPLIES					
M	STARTUP					
S	TEMPORARY FACILITIES					
V	CRAFT BENEFITS					
V	CONSTRUCTION CAMP.					
W	CONSTRUCTION EQUIP.					
	INDIRECT FIELD COST					11 547 900
	TOTAL FIELD COST					108 217 500
J	ENGINEERING					7 054 200
	TOTAL FIELD & ENG. COST					115 271 700
J	OVERHEAD					2 568 200
J	S/C ENGINEERING					975 000
R	PREMIUM PAY					293 300
	BATTERY-LIMITS UNITS					—
	CONTINGENCY (13%)					21 439 800
	SUB TOTAL					140 537 000
	G&A EXPENSE (3.5%)					4 918 400
	FEES (~2%)					2 908 500
	B&O TAX (2.1%)					3 147 100
	GRAND TOTAL -- DIRECT CAPITAL COST					151 511 000

FORM 82 · 110 REV. 10 76

Stearns-Roger

ESTIMATE SUMMARY

CUSTOMER	THE PITTSBURG & MIDWAY COAL MINING CO.	PROP NO.	
LOCATION	Morgantown, West Virginia	JOB NO.	C21500
PROJECT	SRC-II Demonstration Plant	DATE	10-16-78
AREA	II -- Dissolver Plant	BY	HSI / EWH / DLQ
REV. NO.	1 REV. DATE 4-5-79	BY	

ACT	DESCRIPTION	CRAFT HOURS	LABOR	MATERIAL	OTHER	TOTAL
A/B	CIVIL	60 700	646 800	355 000		1 002 200
C	BUILDINGS & STRUCTURES	101 300	1 222 300	2 416 400		3 639 200
D	PROCESS EQUIPMENT	39 200	466 000	15 339 700	22 908 100	49 245 800
E	PIPING	372 900	4 236 500	7 316 000		11 552 500
F	ELECTRICAL			1 620 600	832 500	1 453 300
G	PAINTING				671 000	671 000
L	PLANT ITEMS					
N	INSTRUMENTS & CONTROLS	56 200	624 600	1 946 200		2 570 900
P	INSULATION				1 836 800	1 836 800
	DIRECT FIELD COST	629 300	7 177 700	39 543 500	26 298 400	72 019 600
H	FIELD EXPENSE					
H	ALL RISK, PR TAX, BOND					
K	CONSTRUCTION SUPPLIES					
M	STARTUP					
S	TEMPORARY FACILITIES					
V	CRAFT BENEFITS					
V	CONSTRUCTION CAMP.					
W	CONSTRUCTION EQUIP.					
	INDIRECT FIELD COST					9 757 000
	TOTAL FIELD COST					80 776 600
J	ENGINEERING					5 276 800
	TOTAL FIELD & ENG. COST					86 053 400
J	OVERHEAD					1 923 400
J	S/C ENGINEERING (KTI)					350 000
R	PREMIUM PAY					215 100
	BATTERY-LIMITS UNITS					
	CONTINGENCY (18%)					15 937 800
	SUB TOTAL					104 479 700
	G&A EXPENSE (3.5%)					3 657 000
	FEES (~ 2%)					2 161 300
	B&O TAX (2.2%)					2 306 000
	GRAND TOTAL -- DIRECT CAPITAL COST					112 604 000

FORM 62 110 REV 10 76

Stearns-Roger

ESTIMATE SUMMARY

CUSTOMER	THE PITTSBURG & MIDWAY COAL MINING CO.	PROP NO.	
LOCATION	Morgantown, West Virginia	JOB NO.	C21500
PROJECT	SRC-II Demonstration Plant	DATE	10-16-78
AREA	12 -- Hydrogen Treating & Recovery Plant	BY	HSI / EWH / DLQ
REV. NO.	1 REV. DATE 4-5-79	BY	

ACT	DESCRIPTION	CRAFT HOURS	LABOR	MATERIAL	OTHER	TOTAL
A/B	CIVIL	23 400	251 000	159 400		410 400
C	BUILDINGS & STRUCTURES	21 400	258 300	499 000		757 300
D	PROCESS EQUIPMENT	32 900	383 700	11 183 400	5 934 600	17 503 700
E	PIPING	97 300	1 107 900	1 726 200		2 834 100
F	ELECTRICAL			730 000	512 200	1 242 200
G	PAINTING				160 600	160 600
L	PLANT ITEMS					
N	INSTRUMENTS & CONTROLS	25 900	286 400	948 000		1 234 400
P	INSULATION				507 400	507 400
	DIRECT FIELD COST	200 900	2 287 300	15 246 000	7 116 800	24 650 100
H	FIELD EXPENSE					
H	ALL RISK, PR TAX, BOND					
K	CONSTRUCTION SUPPLIES					
M	STARTUP					
S	TEMPORARY FACILITIES					
V	CRAFT BENEFITS					
V	CONSTRUCTION CAMP					
W	CONSTRUCTION EQUIP.					
	INDIRECT FIELD COST					2 790 800
	TOTAL FIELD COST					27 440 900
J	ENGINEERING					1 777 400
	TOTAL FIELD & ENG. COST					29 218 300
J	OVERHEAD					644 800
J	S/C ENGINEERING (Air Liquide)					625 000
R	PREMIUM PAY					68 200
	BATTERY-LIMITS UNITS					
	CONTINGENCY (18%)					5 501 000
	SUB TOTAL					34 057 300
	G&A EXPENSE (3.5%)					1 261 400
	FEES (~ 2%)					747 200
	BOTAL (2.2%)					841 100
	GRAND TOTAL -- DIRECT CAPITAL COST					38 907 000

FORM 62 110 REV 10 76

Stearns-Roger

ESTIMATE SUMMARY

CUSTOMER THE PITTSBURG & MIDWAY COAL MINING CO.	PROP NO.
LOCATION Morgantown, West Virginia	JOB NO. C21500
PROJECT SRC-II Demonstration Plant	DATE 10-16-78
AREA UNIT 20 -- Hydrogen Production Plants	BY HSI/EWH/DLQ
REV. NO. 1 REV. DATE 2-5-79	BY KAF/JDK

ACT	DESCRIPTION	CRAFT HOURS	LABOR	MATERIAL	OTHER	TOTAL
A/2	CIVIL	64 700	691 000	471 200	—	1 162 200
C	BUILDINGS & STRUCTURES	65 700	791 500	1 504 600	85 500	2 391 600
D	PROCESS EQUIPMENT	56 700	660 300	19 099 700	2 032 300	21 792 300
E	PIPING	270 100	3 079 500	8 247 300	—	11 326 800
F	ELECTRICAL	—		1 123 100	1 483 700	2 606 800
G	PAINTING	—		—	454 400	454 400
L	PLANT ITEMS	—		—	—	—
N	INSTRUMENTS & CONTROLS	33 000	425 200	1 245 000	—	1 670 200
P	INSULATION				1 355 500	1 355 500
	DIRECT FIELD COST	495 200	5 647 500	31 690 900	5 411 400	42 749 800
H	FIELD EXPENSE					
H	ALL RISK, PR TAX, BOND					
K	CONSTRUCTION SUPPLIES					
M	STARTUP					
S	TEMPORARY FACILITIES					
V	CRAFT BENEFITS					
V	CONSTRUCTION CAMP					
W	CONSTRUCTION EQUIP.					
	INDIRECT FIELD COST					6 890 300
	TOTAL FIELD COST					49 640 100
J	ENGINEERING					3 182 300
	TOTAL FIELD & ENG. COST					52 822 400
J	OVERHEAD					1 172 000
J	S/C ENGINEERING					900 000
R	PREMIUM PAY					169 500
	BATTERY-LIMITS UNITS					27 000 000
	CONTINGENCY (18%)					14 771 800
	SUB TOTAL					96 835 700
	G&A EXPENSE (3.5%)					3 388 900
	FEES (~ 2%)					1 329 000
	B&O TAX (2.2%)					2 238 400
	GRAND TOTAL -- DIRECT CAPITAL COST					102 791 000

FORM 82 · 110 REV 10 76

Stearns-Roger

ESTIMATE SUMMARY

CUSTOMER THE PITTSBURG & MIDWAY COAL MINING CO.	PROP NO.
LOCATION Morgantown, West Virginia	JOB NO. C21500
PROJECT SRC-II Demonstration Plant	DATE 10-16-78
AREA 21-- Syngas Production Plant	BY HSI / EWH / DLQ
REV. NO. REV. DATE	BY

ACT	DESCRIPTION	CRAFT HOURS	LABOR	MATERIAL	OTHER	TOTAL
A/2	CIVIL	1100				
C	BUILDINGS & STRUCTURES	2500				
D	PROCESS EQUIPMENT					
E	PIPING	73900				
F	ELECTRICAL					
G	PAINTING					
L	PLANT ITEMS					
N	INSTRUMENTS & CONTROLS					
P	INSULATION					
	DIRECT FIELD COST	77500				
H	FIELD EXPENSE					
H	ALL RISK, PR TAX, BOND					
K	CONSTRUCTION SUPPLIES					
M	STARTUP					
S	TEMPORARY FACILITIES					
V	CRAFT BENEFITS					
V	CONSTRUCTION CAMP					
W	CONSTRUCTION EQUIP					
	INDIRECT FIELD COST					
	TOTAL FIELD COST (Including Contingency)					35 085 700
J	ENGINEERING					167 000
	TOTAL FIELD & ENG. COST					35 252 700
J	OVERHEAD					61 400
J	S/C ENGINEERING					370 000
R						
	SUB TOTAL					35 684 100
	G&A EXPENSE (3.5%)					1 248 900
	FEES (~ 2%)					1 371 000
	B&O TAX (.22%)					81 400
	GRAND TOTAL -- DIRECT CAPITAL COST					37 820 000

FORM 62 110 REV 10 76

Stearns-Roger

ESTIMATE SUMMARY

CUSTOMER	THE PITTSBURG & MIDWAY COAL MINING CO.	PROP NO.	
LOCATION	Morgantown, West Virginia	JOB NO.	C21E00
PROJECT	SRC-II Demonstration Plant	DATE	10-16-78
AREA	22 -- Syngas Shift Conversion Plant	BY	HSI / EWH / DLQ
REV. NO.	REV. DATE	BY	

ACT	DESCRIPTION	CRAFT HOURS	LABOR	MATERIAL	OTHER	TOTAL
A/B	CIVIL	9 200	87 200	41 800		123 000
C	BUILDINGS & STRUCTURES	13 100	153 900	291 500		449 400
D	PROCESS EQUIPMENT	1 000	8 900	5 732 200		5 814 100
E	PIPING	31 200	353 800	1 809 700		2 163 500
F	ELECTRICAL			23 700	22 800	46 500
G	PAINTING				59 500	59 500
L	PLANT ITEMS					
N	INSTRUMENTS & CONTROLS	4 700	53 000	183 000		236 000
P	INSULATION				259 700	259 700
	DIRECT FIELD COST	64 200	731 800	8 108 900	342 000	9 159 700
H	FIELD EXPENSE					
H	ALL RISK, PR TAX, BOND					
K	CONSTRUCTION SUPPLIES					
M	STARTUP					
S	TEMPORARY FACILITIES					
V	CRAFT BENEFITS					
V	CONSTRUCTION CAMP					
W	CONSTRUCTION EQUIP.					
	INDIRECT FIELD COST					898 900
	TOTAL FIELD COST					10 058 600
J	ENGINEERING					642 000
	TOTAL FIELD & ENG. COST					10 700 600
J	OVERHEAD					234 700
J	S/C ENGINEERING (Haldor Topsoe)					235 000
R	PREMIUM PAY					22 100
	BATTERY-LIMITS UNITS					
	CONTINGENCY (18%)					2 015 000
	SUB TOTAL					13 209 400
	G&A EXPENSE (3.5%)					462 300
	FEES (~ 2%)					267 500
	B&O T&I (2.2%)					310 800
	GRAND TOTAL -- DIRECT CAPITAL COST					14 250 000

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Stearns-Roger

ESTIMATE SUMMARY

CUSTOMER THE PITTSBURG & MIDWAY COAL MINING CO.	PROP NO.
LOCATION Morgantown, West Virginia	JOB NO. C21500
PROJECT SRC-II Demonstration Plant	DATE 10-16-73
AREA 23 -- Hydrogen Purification & Compression Plant	BY HSI / EWH / DLG
REV. NO. REV. DATE	BY

ACT	DESCRIPTION	CRAFT HOURS	LABOR	MATERIAL	OTHER	TOTAL
A/B	CIVIL	43 100	461 000	362 800		823 800
C	BUILDINGS & STRUCTURES	34 000	408 900	767 000	85 500	1 261 400
D	PROCESS EQUIPMENT	40 500	471 500	7 517 300	2 032 300	10 021 100
E	PIPING	108 000	1 229 400	4 602 300		5 831 700
F	ELECTRICAL			617 200	1 080 300	1 697 500
G	PAINTING				206 700	206 700
L	PLANT ITEMS					
N	INSTRUMENTS & CONTROLS	12 700	141 400	322 600		464 000
P	INSULATION				531 700	531 700
	DIRECT FIELD COST	238 300	2 712 200	14 189 200	3 936 500	20 837 900
H	FIELD EXPENSE					
H	ALL RISK, PR TAX, BOND					
K	CONSTRUCTION SUPPLIES					
M	STARTUP					
S	TEMPORARY FACILITIES					
V	CRAFT BENEFITS					
V	CONSTRUCTION CAMP.					
W	CONSTRUCTION EQUIP.					
	INDIRECT FIELD COST					3 308 900
	TOTAL FIELD COST					24 146 800
J	ENGINEERING					1 541 300
	TOTAL FIELD & ENG. COST					25 688 100
J	OVERHEAD					568 500
J	S/C ENGINEERING (Haldor Topsoe)					15 000
R	PREMIUM PAY					81 400
	BATTERY-LIMITS UNITS					
	CONTINGENCY (18%)					4 743 500
	SUB TOTAL					31 091 500
	G&A EXPENSE (3.5%)					1 088 400
	FEES (~ 2%)					642 200
	S&O TAX (2.2%)					722 900
	GRAND TOTAL -- DIRECT CAPITAL COST					33 550 000

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Stearns-Roger ESTIMATE SUMMARY

CUSTOMER	THE PITTSBURG & MIDWAY COAL MINING CO.	PROP NO.	
LOCATION	Morgantown, West Virginia	JOB NO.	C21500
PROJECT	SRC-II Demonstration Plant	DATE	10-16-79
AREA	24 -- Sulfuric Purification Plant	BY	HSI / EWH / DLG
REV. NO.	REV. DATE	BY	

ACT	DESCRIPTION	CRAFT HOURS	LABOR	MATERIAL	OTHER	TOTAL
A/B	CIVIL	7,600	81,200	42,100		123,300
C	BUILDINGS & STRUCTURES	2,600	31,500	58,400		89,900
D	PROCESS EQUIPMENT	2,200	32,400	1,711,200		1,743,600
E	PIPING	14,000	160,300	721,300		881,600
F	ELECTRICAL			33,200	54,100	87,300
G	PAINTING				15,000	15,000
L	PLANT ITEMS					
N	INSTRUMENTS & CONTROLS	3,900	43,600	119,200		162,800
P	INSULATION				105,500	105,500
	DIRECT FIELD COST	30,900	349,000	2,685,400	174,600	3,209,000
H	FIELD EXPENSE					
H	ALL RISK, PR TAX, BOND					
K	CONSTRUCTION SUPPLIES					
M	STARTUP					
S	TEMPORARY FACILITIES					
V	CRAFT BENEFITS					
V	CONSTRUCTION CAMP					
W	CONSTRUCTION EQUIP					
	INDIRECT FIELD COST					425,300
	TOTAL FIELD COST					3,634,300
J	ENGINEERING					232,000
	TOTAL FIELD & ENG. COST					3,866,300
J	OVERHEAD					85,400
J	S/C ENGINEERING (Haldor Topsoe)					15,000
R	PREMIUM PAY					10,500
	BATTERY-LIMITS UNITS					
	CONTINGENCY (18%)					716,000
	SUB TOTAL					4,693,700
	G&A EXPENSE (3.5%)					164,300
	FEES (~ 2%)					94,700
	B&O TAX (2.2%)					105,300
	GRAND TOTAL -- DIRECT CAPITAL COST					5,060,000

FORM 62 - 110 REV 10 76

Stearns-Roger

ESTIMATE SUMMARY

CUSTOMER	THE PITTSBURG & MIDWAY COAL MINING CO.	PROP NO.	
LOCATION	Morgantown, West Virginia	JOB NO.	C21500
PROJECT	SRC-II Demonstration Plant	DATE	10-16-78
AREA	25 -- Methanation Plant	BY	HSI / EWH / DLQ
REV. NO.	1 REV. DATE 4-5-79	BY	

ACT	DESCRIPTION	CRAFT HOURS	LABOR	MATERIAL	OTHER	TOTAL
A/B	CIVIL	4 200	50 000	21 100		71 100
C	BUILDINGS & STRUCTURES	13 500	162 400	324 600		487 000
D	PROCESS EQUIPMENT	6 400	74 500	4 139 000		4 213 500
E	PIPING	43 000	492 900	877 300		1 370 200
F	ELECTRICAL			413 900	273 600	687 400
G	PAINTING				85 100	85 100
L	PLANT ITEMS					
N	INSTRUMENTS & CONTROLS	16 700	137 200	670 200		807 400
P	INSULATION				282 300	232 300
	DIRECT FIELD COST	84 300	967 000	6 396 000	641 000	8 004 000
H	FIELD EXPENSE					
H	ALL RISK, PR TAX, BOND					
K	CONSTRUCTION SUPPLIES					
M	STARTUP					
S	TEMPORARY FACILITIES					
V	CRAFT BENEFITS					
V	CONSTRUCTION CAMP.					
W	CONSTRUCTION EQUIP.					
	INDIRECT FIELD COST					1 180 000
	TOTAL FIELD COST					9 184 000
J	ENGINEERING					600 000
	TOTAL FIELD & ENG. COST					9 784 000
J	OVERHEAD					720 000
J	S/C ENGINEERING (Halder Toposo)					265 000
R	PREMIUM PAY					29 000
	BATTERY-LIMITS UNITS					
	CONTINGENCY (18%)					1 854 000
	SUB TOTAL					12 152 000
	G&A EXPENSE (3.5%)					425 000
	FEES (~ 2%)					252 000
	B&O TAX (2.2%)					282 000
	GRAND TOTAL — DIRECT CAPITAL COST					13 111 000

FORM 62 110 REV. 10 76

Stearns-Roger

ESTIMATE SUMMARY

CUSTOMER	THE PITTSBURG & MIDWAY COAL MINING CO.	PROP NO.	
LOCATION	Morgantown, West Virginia	JOB NO.	C21500
PROJECT	SRC-II Demonstration Plant	DATE	10-16-78
AREA	UNIT 30	BY	HSI/EWH/DLQ
REV. NO.	1 REV. DATE 2-5-79	BY	KAF/JDK

ACT	DESCRIPTION	CRAFT HOURS	LABOR	MATERIAL	OTHER	TOTAL
A/2	CIVIL	121 600	1 301 700	797 800		2 089 500
C	BUILDINGS & STRUCTURES	89 900	1 093 900	2 144 900	618 100	3 856 900
D	PROCESS EQUIPMENT	61 800	721 100	13 535 500	3 021 700	17 278 300
E	PIPING	392 000	4 484 100	6 008 100		10 492 200
F	ELECTRICAL			926 200	1 367 200	2 293 400
G	PAINTING				1 119 500	1 119 500
L	PLANT ITEMS					
N	INSTRUMENTS & CONTROLS	68 100	752 900	1 619 700		2 372 600
P	INSULATION				2 185 600	2 185 600
	DIRECT FIELD COST	732 300	8 353 700	25 022 200	8 312 100	41 688 000
H	FIELD EXPENSE					
H	ALL RISK, PR TAX, BOND					
K	CONSTRUCTION SUPPLIES					
M	STARTUP					
S	TEMPORARY FACILITIES					
V	CRAFT BENEFITS					
V	CONSTRUCTION CAMP					
W	CONSTRUCTION EQUIP.					
	INDIRECT FIELD COST					10 192 200
	TOTAL FIELD COST					51 880 200
J	ENGINEERING					3 397 300
	TOTAL FIELD & ENG. COST					55 277 500
J	OVERHEAD					1 257 500
J	S/C ENGINEERING					765 000
R	PREMIUM PAY					250 300
	BATTERY-LIMITS UNITS					
	CONTINGENCY (18%)					10 359 000
	SUB TOTAL					67 909 300
	G&A EXPENSE (3.5%)					2 377 200
	FEES (~ 2%)					1 400 000
	B&O TAX (2.2%)					1 576 600
	GRAND TOTAL -- DIRECT CAPITAL COST					73 264 000

FORM 62 · 110 REV 10 76

Stearns-Roger

ESTIMATE SUMMARY

CUSTOMER	THE PITTSBURG & MIDWAY COAL MINING CO.	PROP NO.	
LOCATION	Morgan-town, West Virginia	JOB NO.	C21500
PROJECT	SRC-II Demonstration Plant	DATE	10-16-75
AREA	31 -- Low Pressure Gas Compression & Treating Plant	BY	HSI / EWH / DLQ
REV. NO.	REV. DATE	BY	

ACT	DESCRIPTION	CRAFT HOURS	LABOR	MATERIAL	OTHER	TOTAL
A/B	CIVIL	16 000	170 700	119 600		290 300
C	BUILDINGS & STRUCTURES	5 400	64 200	125 200	226 400	417 000
D	PROCESS EQUIPMENT	5 300	67 000	1 506 100		1 573 100
E	PIPING	37 900	435 200	582 700		1 018 000
F	ELECTRICAL			89 100	140 600	229 700
G	PAINTING				88 600	88 600
L	PLANT ITEMS					
N	INSTRUMENTS & CONTROLS	8 300	91 200	146 700		237 900
P	INSULATION				221 900	221 900
	DIRECT FIELD COST	73 400	823 900	2 570 100	477 500	4 074 500
H	FIELD EXPENSE					
H	ALL RISK, PR TAX, BOND					
K	CONSTRUCTION SUPPLIES					
M	STARTUP					
S	TEMPORARY FACILITIES					
V	CRAFT BENEFITS					
V	CONSTRUCTION CAMP					
W	CONSTRUCTION EQUIP.					
	INDIRECT FIELD COST					1 011 300
	TOTAL FIELD COST					5 087 800
J	ENGINEERING					324 800
	TOTAL FIELD & ENG. COST					5 412 600
J	OVERHEAD					119 600
J	S/C ENGINEERING					
R	PREMIUM PAY					24 900
	BATTERY-LIMITS UNITS					
	CONTINGENCY (18%)					1 000 300
	SUB TOTAL					6 557 400
	G&A EXPENSE (3.5%)					229 500
	FEES (~ 2%)					135 300
	B&O TAX (2.2%)					147 800
	GRAND TOTAL -- DIRECT CAPITAL COST					7 070 000

FORM 62 - 110 REV 10 75

Stearns-Roger

ESTIMATE SUMMARY

CUSTOMER	THE PITTSBURG & MIDWAY COAL MINING CO.	PROP NO.	
LOCATION	Morgantown, West Virginia	JOB NO.	C21500
PROJECT	SRC-II Demonstration Plant	DATE	10-16-78
AREA	32 -- Product Gas Plant	BY	HSI/EWH/DLG
REV. NO.	1 REV. DATE 4-5-79	BY	

ACT	DESCRIPTION	CRAFT HOURS	LABOR	MATERIAL	OTHER	TOTAL
A/B	CIVIL	9 900	105 600	75 700		181 300
C	BUILDINGS & STRUCTURES	29 000	357 200	716 400	283 400	1 356 000
D	PROCESS EQUIPMENT	17 500	206 300	3 319 200	5 400	3 530 900
E	PIPING	61 400	706 300	861 100		1 667 400
F	ELECTRICAL			42 500	112 700	155 200
G	PAINTING				207 600	207 600
L	PLANT ITEMS					
N	INSTRUMENTS & CONTROLS	20 000	219 600	306 100		525 700
P	INSULATION				399 900	399 900
	DIRECT FIELD COST	137 900	1 595 000	5 472 000	1 008 000	8 028 000
H	FIELD EXPENSE					
H	ALL RISK, PR TAX, BOND					
K	CONSTRUCTION SUPPLIES					
M	STARTUP					
S	TEMPORARY FACILITIES					
V	CRAFT BENEFITS					
V	CONSTRUCTION CAMP.					
W	CONSTRUCTION EQUIP					
	INDIRECT FIELD COST					1 946 000
	TOTAL FIELD COST					9 974 000
J	ENGINEERING					660 000
	TOTAL FIELD & ENG. COST					10 634 000
J	OVERHEAD					245 000
J	S/C ENGINEERING (Air Liquide)					645 000
R	PREMIUM PAY					43 000
	BATTERY-LIMITS UNITS					
	CONTINGENCY (18%)					2 083 000
	SUB TOTAL					13 655 000
	G&A EXPENSE (3.5%)					479 000
	FEES (~ 2%)					283 000
	B&O TAX (2.2%)					317 000
	GRAND TOTAL -- DIRECT CAPITAL COST					14 733 000

FORM 62 · 110 REV 10 76

Stearns-Roger

ESTIMATE SUMMARY

CUSTOMER	THE PITTSBURG & MIDWAY COAL MINING CO.	PROP NO.	
LOCATION	Morgantown West Virginia	JOB NO.	C21500
PROJECT	SRC-II Demonstration Plant	DATE	10-16-78
AREA	33 -- Sulfur Recovery Unit	BY	HSI / EWH / DLO
REV. NO.	REV. DATE	BY	

ACT	DESCRIPTION	CRAFT HOURS	LABOR	MATERIAL	OTHER	TOTAL
A/B	CIVIL	55,000	590,100	357,800		947,900
C	BUILDINGS & STRUCTURES	11,500	139,100	242,300	59,300	440,700
D	PROCESS EQUIPMENT	22,700	263,200	4,935,500	462,500	5,661,200
E	PIPING	140,800	1,601,200	2,254,300		3,855,500
F	ELECTRICAL			164,900	275,300	440,200
G	PAINTING				173,000	173,000
L	PLANT ITEMS					
N	INSTRUMENTS & CONTROLS	13,700	152,400	323,300		475,700
P	INSULATION				598,800	598,800
	DIRECT FIELD COST	243,700	2,746,000	8,268,000	1,579,400	12,593,400
H	FIELD EXPENSE					
H	ALL RISK, PR TAX, BOND					
K	CONSTRUCTION SUPPLIES					
M	STARTUP					
S	TEMPORARY FACILITIES					
V	CRAFT BENEFITS					
V	CONSTRUCTION CAMP					
W	CONSTRUCTION EQUIP.					
	INDIRECT FIELD COST					3,350,100
	TOTAL FIELD COST					15,943,500
J	ENGINEERING					1,017,700
	TOTAL FIELD & ENG. COST					16,961,200
J	OVERHEAD					375,800
J	S/C ENGINEERING (Shell / GAA)					120,000
R	PREMIUM PAY					82,400
	BATTERY-LIMITS UNITS					
	CONTINGENCY (18%)					3,157,100
	SUB TOTAL					20,696,500
	G&A EXPENSE (3.5%)					724,400
	FEES (~ 2%)					474,000
	B&O TAX (2.3%)					435,100
	GRAND TOTAL -- DIRECT CAPITAL COST					22,330,000

FORM 62 - 11C REV 10 75

Stearns-Roger

ESTIMATE SUMMARY

CUSTOMER	THE PITTSBURG & MIDWAY COAL MINING CO.	PROP NO.	
LOCATION	Morgantown, West Virginia	JOB NO.	C21500
PROJECT	SRC-II Demonstration Plant	DATE	10-16-78
AREA	34-- Refining Plant	BY	HSI / EWH / DLQ
REV. NO.	1	REV. DATE	4-5-79
		BY	

ACT	DESCRIPTION	CRAFT HOURS	LABOR	MATERIAL	OTHER	TOTAL
A/B	CIVIL	33,600	359,100	187,500		546,600
C	BUILDINGS & STRUCTURES	29,000	348,300	693,300		1,041,600
D	PROCESS EQUIPMENT	10,600	123,900	1,815,900	2,543,900	4,483,700
E	PIPING	127,700	1,462,700	1,631,300		3,094,000
F	ELECTRICAL			250,200	537,000	787,200
G	PAINTING				442,200	442,200
L	PLANT ITEMS					
N	INSTRUMENTS & CONTROLS	15,600	173,800	282,900		456,700
P	INSULATION				755,200	755,200
	DIRECT FIELD COST	216,500	2,467,800	4,861,100	4,277,200	11,607,100
H	FIELD EXPENSE					
H	ALL RISK, PR TAX, BOND					
K	CONSTRUCTION SUPPLIES					
M	STARTUP					
S	TEMPORARY FACILITIES					
V	CRAFT BENEFITS					
V	CONSTRUCTION CAMP.					
W	CONSTRUCTION EQUIP					
	INDIRECT FIELD COST					3,010,800
	TOTAL FIELD COST					14,617,900
J	ENGINEERING					974,800
	TOTAL FIELD & ENG. COST					15,592,700
J	OVERHEAD					362,100
J	S/C ENGINEERING					
R	PREMIUM PAY					74,000
	BATTERY-LIMITS UNITS					
	CONTINGENCY (15%)					2,884,600
	SUB TOTAL					18,913,400
	G&A EXPENSE (3.5%)					662,400
	FEES (~ 2%)					391,500
	SUBTAL (2.2%)					432,700
	GRAND TOTAL -- DIRECT CAPITAL COST					20,401,000

FORM 62 110 REV. 10 76

Stearns-Roger

ESTIMATE SUMMARY

CUSTOMER THE PITTSBURG & MIDWAY COAL MINING CO.	PROP NO.
LOCATION Morgantown, West Virginia	JOB NO. C21500
PROJECT SRC-II Demonstration Plant	DATE 10-16-78
AREA 35 -- Hydrodesulfurization Unit	BY HSI / EWH / DLG
REV. NO. 1 REV. DATE 4-5-79	BY

ACT	DESCRIPTION	CRAFT HOURS	LABOR	MATERIAL	OTHER	TOTAL
A/B	CIVIL	7 100	76 200	47 200		123 400
C	BUILDINGS & STRUCTURES	14 900	134 500	367 200	49 500	601 200
D	PROCESS EQUIPMENT	5 200	60 700	1 962 300		2 029 500
E	PIPING	24 200	278 700	579 600		857 300
F	ELECTRICAL			375 500	301 600	677 100
G	PAINTING				208 100	208 100
L	PLANT ITEMS					
N	INSTRUMENTS & CONTROLS	10 500	115 900	560 700		676 600
P	INSULATION				207 900	207 900
	DIRECT FIELD COST	61 900	716 000	3 898 000	749 200	5 363 000
H	FIELD EXPENSE					
H	ALL RISK, PR TAX, BOND					
K	CONSTRUCTION SUPPLIES					
M	STARTUP					
S	TEMPORARY FACILITIES					
V	CRAFT BENEFITS					
V	CONSTRUCTION CAMP.					
W	CONSTRUCTION EQUIP.					
	INDIRECT FIELD COST					894 000
	TOTAL FIELD COST					6 257 000
J	ENGINEERING					420 000
	TOTAL FIELD & ENG. COST					6 677 000
J	OVERHEAD					155 000
J	S/C ENGINEERING					
R	PREMIUM PAY					21 000
	BATTERY-LIMITS UNITS					
	CONTINGENCY (18%)					1 234 000
	SUB TOTAL					8 087 000
	G&A EXPENSE (3.5%)					283 000
	FEES (~ 2%)					1167 000
	B&O TAX (2.2%)					188 000
	GRAND TOTAL -- DIRECT CAPITAL COST					9 725 000

FORM 62 110 REV 10 76

Stearns-Roger

ESTIMATE SUMMARY

CUSTOMER	THE PITTSBURG & MIDWAY COAL MINING CO.	PROP NO.	
LOCATION	Morgantown, West Virginia	JOB NO.	C21500
PROJECT	SRC-II Demonstration Plant	DATE	10-16-79
AREA	UNIT 40	BY	HSI / SVH / DLQ
REV. NO.	1 REV. DATE 4-5-79	BY	KAF / JDK

ACT	DESCRIPTION	CRAFT HOURS	LABOR	MATERIAL	OTHER	TOTAL
A/B	CIVIL	73 600	795 700	521 100	—	1 305 800
C	BUILDINGS & STRUCTURES	58 [illegible]	707 400	1 392 300	1 233 700	3 333 400
D	PROCESS EQUIPMENT	44 000	515 000	18 594 200	3 505 900	22 615 100
E	PIPING	247 200	2 [illegible]	3 432 900	—	6 262 400
F	ELECTRICAL	—	—	620 600	1 217 800	1 838 400
G	PAINTING	—	—	—	660 800	660 800
L	PLANT ITEMS	—	—	—	—	—
N	INSTRUMENTS & CONTROLS	35 800	396 800	1 113 600	—	1 510 400
P	INSULATION	—	—	—	1 032 000	1 032 000
		—	—	—	—	—
		—	—	—	—	—
	DIRECT FIELD COST	459 [illegible]	5 233 400	25 674 700	7 650 200	38 559 300
H	FIELD EXPENSE					
H	ALL RISK, PR TAX, BOND					
K	CONSTRUCTION SUPPLIES					
M	STARTUP					
S	TEMPORARY FACILITIES					
V	CRAFT BENEFITS					
V	CONSTRUCTION CAMP.					
W	CONSTRUCTION EQUIP.					
	INDIRECT FIELD COST					6 384 900
	TOTAL FIELD COST					44 943 200
J	ENGINEERING					2 909 500
	TOTAL FIELD & ENG. COST					47 852 700
J	OVERHEAD					1 073 500
J	S/C ENGINEERING					820 000
R	PREMIUM PAY					156 900
	BATTERY-LIMITS UNITS					18 600 000
	CONTINGENCY (18%)					12 330 200
	SUB TOTAL					80 833 300
	G&A EXPENSE (3.5%)					2 829 900
	FEES (~ 2%)					1 669 900
	B&O TAX (2.2%)					1 881 900
	GRAND TOTAL -- DIRECT CAPITAL COST					87 214 000

FORM 62 · 110 REV 10 75

Stearns-Roger

ESTIMATE SUMMARY

CUSTOMER	THE PITTSBURG & MIDWAY COAL MINING CO.	PROP NO.	
LOCATION	Morgantown, West Virginia	JOB NO.	C21500
PROJECT	SRC-II Demonstration Plant	DATE	10-16-78
AREA 41 --	Ammonia Recovery Plant	BY	HSI / EWH / DLA
REV. NO.	1 REV. DATE 4-5-79	BY	

ACT	DESCRIPTION	CRAFT HOURS	LABOR	MATERIAL	OTHER	TOTAL
A/B	CIVIL	4 200	44 200	21 100		65 300
C	BUILDINGS & STRUCTURES	14 200	170 900	340 700		511 600
D	PROCESS EQUIPMENT	3 200	37 500	611 500	339 700	988 700
E	PIPING	121 600	1 399 300	1 178 400		2 577 700
F	ELECTRICAL			58 900	153 800	212 700
G	PAINTING				336 700	336 700
L	PLANT ITEMS					
N	INSTRUMENTS & CONTROLS	6 000	67 100	179 400		246 500
P	INSULATION				397 800	397 800
	DIRECT FIELD COST	149 200	11 719 000	2 350 000	1 228 000	5 133 000
H	FIELD EXPENSE					
H	ALL RISK, PR TAX, BOND					
K	CONSTRUCTION SUPPLIES					
M	STARTUP					
S	TEMPORARY FACILITIES					
V	CRAFT BENEFITS					
V	CONSTRUCTION CAMP.					
W	CONSTRUCTION EQUIP.					
	INDIRECT FIELD COST					2 097 000
	TOTAL FIELD COST					7 434 000
J	ENGINEERING					485 000
	TOTAL FIELD & ENG. COST					7 919 000
J	OVERHEAD					180 000
J	S/C ENGINEERING (USSteel)					106 000
R	PREMIUM PAY					52 000
	BATTERY-LIMITS UNITS					
	CONTINGENCY (18%)					1 486 000
	SUB TOTAL					9 743 000
	G&A EXPENSE (3.5%)					341 000
	FEES (~ 2%)					202 000
	B&O TAX (2.2%)					226 000
	GRAND TOTAL -- DIRECT CAPITAL COST					10 512 000

FORM 62 - 110 REV 10 76

Stearns-Roger ESTIMATE SUMMARY

CUSTOMER	THE PITTSBURG & MIDWAY COAL MINING CO.	PROP NO.	
LOCATION	Morgantown, West Virginia	JOB NO.	C3500
PROJECT	SRC-II Demonstration Plant	DATE	10-16-73
AREA	42 -- Tar Acid Recovery Plant	BY	HSI/EWH/DLO
REV. NO.	REV. DATE	BY	

ACT	DESCRIPTION	CRAFT HOURS	LABOR	MATERIAL	OTHER	TOTAL
A/B	CIVIL	2 700	28 200	12 700		40 900
C	BUILDINGS & STRUCTURES	12 400	143 600	274 900		423 500
D	PROCESS EQUIPMENT	2 400	27 700	450 400		478 100
E	PIPING	21 900	251 200	385 500		636 700
F	ELECTRICAL			44 800	158 600	203 400
G	PAINTING				57 500	57 500
L	PLANT ITEMS					
N	INSTRUMENTS & CONTROLS	6 600	73 700	181 400		255 100
P	INSULATION				149 100	149 100
	DIRECT FIELD COST	46 000	529 400	1134 500	365 200	2 244 300
H	FIELD EXPENSE					
H	ALL RISK, PR TAX, BOND					
K	CONSTRUCTION SUPPLIES					
M	STARTUP					
S	TEMPORARY FACILITIES					
V	CRAFT BENEFITS					
V	CONSTRUCTION CAMP					
W	CONSTRUCTION EQUIP.					
	INDIRECT FIELD COST					645 900
	TOTAL FIELD COST					2 890 200
J	ENGINEERING					184 500
	TOTAL FIELD & ENG. COST					3 074 700
J	OVERHEAD					68 000
J	S/C ENGINEERING					131 500
R	PREMIUM PAY					15 900
	BATTERY-LIMITS UNITS					
	CONTINGENCY (18%)					592 200
	SUB TOTAL					3 882 300
	G&A EXPENSE (3.5%)					135 900
	FEES (~ 2%)					76 900
	B&O TAX (2.2%)					94 900
	GRAND TOTAL -- DIRECT CAPITAL COST					4 190 000

FORM 62 110 REV 10 76

Stearns-Roger

ESTIMATE SUMMARY

CUSTOMER THE PITTSBURG & MIDWAY COAL MINING CO.	PROP NO.
LOCATION Morgantown, West Virginia	JOB NO. C21500
PROJECT SRC-II Demonstration Plant	DATE 10-16-78
AREA 43 -- Plant Water Reclamation Unit	BY HSI / EWH / DLA
REV. NO. 1 REV. DATE 4-5-79	BY

ACT	DESCRIPTION	CRAFT HOURS	LABOR	MATERIAL	OTHER	TOTAL
A/B	CIVIL	28 000	399 300	161 000		460 300
C	BUILDINGS & STRUCTURES	12 200	145 200	296 000		443 200
D	PROCESS EQUIPMENT	6 700	77 800	3 764 100	1 366 200	5 208 100
E	PIPING	32 700	463 300	755 900		1 199 200
F	ELECTRICAL			278 300	731 300	1 009 600
G	PAINTING				121 100	121 100
L	PLANT ITEMS					
N	INSTRUMENTS & CONTROLS	6 500	72 400	179 700		252 100
P	INSULATION				291 400	291 400
	DIRECT FIELD COST	92 100	1 104 000	5 435 000	2 510 000	8 985 000
H	FIELD EXPENSE					
H	ALL RISK, PR TAX, BOND					
K	CONSTRUCTION SUPPLIES					
M	STARTUP					
S	TEMPORARY FACILITIES					
V	CRAFT BENEFITS					
V	CONSTRUCTION CAMP.					
W	CONSTRUCTION EQUIP.					
	INDIRECT FIELD COST					1 269 000
	TOTAL FIELD COST					10 254 000
J	ENGINEERING					650 000
	TOTAL FIELD & ENG. COST					10 904 000
J	OVERHEAD					240 000
J	S/C ENGINEERING					
R	PREMIUM PAY					31 000
	BATTERY-LIMITS UNITS (RLC Brine Concentrator)					8 100 000
	CONTINGENCY (18%)					3 470 000
	SUB TOTAL					22 745 000
	G&A EXPENSE (3.5%)					796 000
	FEES (~ 2%)					471 000
	B&O TAX (2.2%)					528 000
	GRAND TOTAL -- DIRECT CAPITAL COST					24 540 000

FORM 62 110 REV. 10/75

Stearns-Roger

ESTIMATE SUMMARY

CUSTOMER	THE PITTSBURG & MIDWAY COAL MINING CO.	PROP NO.	
LOCATION	Morgantown, West Virginia	JOB NO.	C21500
PROJECT	SRC-II Demonstration Plant	DATE	10-16-78
AREA	44 -- Oxygen Plant	BY	HSI / EWH / DLQ
REV. NO.	1	REV. DATE	4-5-79
		BY	

ACT	DESCRIPTION	CRAFT HOURS	LABOR	MATERIAL	OTHER	TOTAL
A/B	CIVIL	38 700	413 000	326 300		739 300
C	BUILDINGS & STRUCTURES	21 000	240 700	480 700	1 233 700	1 955 100
D	PROCESS EQUIPMENT	31 700	372 000	13 768 000	1 800 000	15 940 200
E	PIPING	65 000	735 700	1 113 100		1 848 800
F	ELECTRICAL			238 600	174 100	412 700
G	PAINTING				145 500	145 500
L	PLANT ITEMS					
N	INSTRUMENTS & CONTROLS	16 700	183 600	573 100		756 700
P	INSULATION				193 700	193 700
	DIRECT FIELD COST	172 100	1 945 000	16 500 000	3 154 000	21 992 000
H	FIELD EXPENSE					
H	ALL RISK, PR TAX, BOND					
K	CONSTRUCTION SUPPLIES					
M	STARTUP					
S	TEMPORARY FACILITIES					
V	CRAFT BENEFITS					
V	CONSTRUCTION CAMP					
W	CONSTRUCTION EQUIP.					
	INDIRECT FIELD COST					2 323 000
	TOTAL FIELD COST					24 315 000
J	ENGINEERING					1 590 000
	TOTAL FIELD & ENG. COST					25 905 000
J	OVERHEAD					585 500
J	S/C ENGINEERING (Air Liquide)					532 500
R	PREMIUM PAY					53 000
	BATTERY-LIMITS UNITS (Air Liquide Oxygen Plant)					10 500 000
	CONTINGENCY (18%)					6 782 000
	SUB TOTAL					44 353 000
	G&A EXPENSE (3.5%)					1 554 000
	FEES (~ 2%)					920 000
	B&O TAX (2.2%)					1 033 000
	GRAND TOTAL -- DIRECT CAPITAL COST					47 932 000

FORM 62 110 REV. 10 76

Stearns-Roger

ESTIMATE SUMMARY

CUSTOMER	THE PITTSBURG & MIDWAY COAL MINING CO.	PROP NO.	
LOCATION	Morgantown, West Virginia	JOB NO.	C21500
PROJECT	SRC-II Demonstration Plant	DATE	10-16-79
AREA	UNIT 50 -- Utility Systems and General Facilities	BY	HSI/SVH/DLR
REV. NO.	1 REV. DATE 4-5-79	BY	KAF/JDK

ACT	DESCRIPTION	CRAFT HOURS	LABOR	MATERIAL	OTHER	TOTAL
A/B	CIVIL	520 900	5 685 400	4 067 700	11 754 500	21 507 600
C	BUILDINGS & STRUCTURES	202 100	2 418 900	4 671 100	10 339 700	17 429 700
D	PROCESS EQUIPMENT	30 100	349 600	6 138 600	12 858 300	19 346 500
E	PIPING	504 000	5 790 200	8 175 000	130 000	14 095 200
F	ELECTRICAL			2 238 100	2 410 700	4 648 800
G	PAINTING				3 079 100	3 079 100
L	PLANT ITEMS			1 135 200	1 202 900	2 338 100
N	INSTRUMENTS & CONTROLS	46 400	518 200	1 320 200	562 000	2 400 400
P	INSULATION				1 538 400	1 538 400
	DIRECT FIELD COST	1313 500	14 762 300	27 745 900	43 875 600	86 383 800
H	FIELD EXPENSE					
H	ALL RISK, PR TAX, BOND					
K	CONSTRUCTION SUPPLIES					
M	STARTUP					
S	TEMPORARY FACILITIES					
V	CRAFT BENEFITS					
V	CONSTRUCTION CAMP.					
W	CONSTRUCTION EQUIP.					
	INDIRECT FIELD COST					18 010 000
	TOTAL FIELD COST					104 393 800
J	ENGINEERING					6 663 400
	TOTAL FIELD & ENG. COST					111 057 200
J	OVERHEAD					2 457 700
J	S/C ENGINEERING					520 000
R	PREMIUM PAY					442 900
	BATTERY-LIMITS UNITS					
	CONTINGENCY (18%)					20 611 700
	SUB TOTAL					135 099 500
	G&A EXPENSE (3.5%)					4 728 300
	FEES (~ 2%)					2 773 400
	B&O TAX (2.2%)					3 140 800
	GRAND TOTAL -- DIRECT CAPITAL COST					145 745 000

FORM 82 110 REV 10 79

Stearns-Roger

ESTIMATE SUMMARY

CUSTOMER THE PITTSBURG & MIDWAY COAL MINING CO.	PROP NO.
LOCATION Morgantown, West Virginia	JOB NO. C21500
PROJECT SRC-II Demonstration Plant	DATE 10-16-79
AREA 51-- Steam Generation System	BY HSI / EWH / DLQ
REV. NO. 1 REV. DATE 4-5-79	BY

ACT	DESCRIPTION	CRAFT HOURS	LABOR	MATERIAL	OTHER	TOTAL
A/B	CIVIL	22,700	243,400	168,700		412,100
C	BUILDINGS & STRUCTURES	2,100	24,900	45,600	700,100	970,600
D	PROCESS EQUIPMENT	13,000	151,000	1,358,600	7,450,100	10,159,700
E	PIPING	36,500	419,600	1,056,100		1,475,700
F	ELECTRICAL			118,000	138,400	256,400
G	PAINTING				92,900	92,900
L	PLANT ITEMS					
N	INSTRUMENTS & CONTROLS	15,100	167,500	329,000		496,500
P	INSULATION				298,200	298,200
	DIRECT FIELD COST	391,400	11,006,400	4,074,000	9,079,700	14,162,100
H	FIELD EXPENSE					
H	ALL RISK, PR TAX, BOND					
K	CONSTRUCTION SUPPLIES					
M	STARTUP					
S	TEMPORARY FACILITIES					
V	CRAFT BENEFITS					
V	CONSTRUCTION CAMP.					
W	CONSTRUCTION EQUIP.					
	INDIRECT FIELD COST					1,227,800
	TOTAL FIELD COST					15,389,900
J	ENGINEERING					982,300
	TOTAL FIELD & ENG. COST					16,372,200
J	OVERHEAD					362,500
J	S/C ENGINEERING					
R	PREMIUM PAY					30,200
	BATTERY-LIMITS UNITS					
	CONTINGENCY (18%)					3,019,700
	SUB TOTAL					19,784,600
	G&A EXPENSE (3.5%)					692,400
	FEES (~ 2%)					409,300
	B&O TAX (2.2%)					463,700
	GRAND TOTAL -- DIRECT CAPITAL COST					21,350,000

FORM 62 110 REV. 10 76

Stearns-Roger

ESTIMATE SUMMARY

CUSTOMER THE PITTSBURG & MIDWAY COAL MINING CO.	PROP NO.
LOCATION Morgantown, West Virginia	JOB NO. C21500
PROJECT SRC-II Demonstration Plant	DATE 10-16-78
AREA 52-- Raw Water System	BY HSI / EWH / DLB
REV. NO. 1 REV. DATE 4-5-79	BY

ACT	DESCRIPTION	CRAFT HOURS	LABOR	MATERIAL	OTHER	TOTAL
A/B	CIVIL	29 300	312 300	159 500	269 000	740 800
C	BUILDINGS & STRUCTURES	7 900	95 000	173 200	281 000	549 200
D	PROCESS EQUIPMENT	7 300	84 300	697 500	507 300	1 289 100
E	PIPING	46 000	521 300	871 900	130 000	1 530 200
F	ELECTRICAL			156 600	253 400	410 000
G	PAINTING				143 000	143 000
L	PLANT ITEMS					
N	INSTRUMENTS & CONTROLS	9 400	106 600	176 100	7 000	289 700
P	INSULATION				37 900	37 900
	DIRECT FIELD COST	99 900	1 127 000	2 234 800	1 623 600	4 990 400
H	FIELD EXPENSE					
H	ALL RISK, PR TAX, BOND					
K	CONSTRUCTION SUPPLIES					
M	STARTUP					
S	TEMPORARY FACILITIES					
V	CRAFT BENEFITS					
V	CONSTRUCTION CAMP					
W	CONSTRUCTION EQUIP.					
	INDIRECT FIELD COST					1 375 000
	TOTAL FIELD COST					6 365 400
J	ENGINEERING					406 300
	TOTAL FIELD & ENG. COST					6 771 700
J	OVERHEAD					149 800
J	S/C ENGINEERING					
R	PREMIUM PAY					33 800
	BATTERY-LIMITS UNITS					
	CONTINGENCY (18%)					1 252 000
	SUB TOTAL					8 207 300
	G&A EXPENSE (3.5%)					287 200
	FEES (~ 2%)					169 300
	B&O TAX (.22%)					196 200
	GRAND TOTAL -- DIRECT CAPITAL COST					8 860 000

FORM 62 110 REV 10 75

Stearns-Roger

ESTIMATE SUMMARY

CUSTOMER	THE PITTSBURG & MIDWAY COAL MINING CO.	PROP NO.	
LOCATION	Morgantown, West Virginia	JOB NO.	C21500
PROJECT	SRC-II Demonstration Plant	DATE	10-16-79
AREA	53 -- Cooling Water System	BY	HSI / EWH / DLQ
REV. NO.	1 REV. DATE 4-5-79	BY	

ACT	DESCRIPTION	CRAFT HOURS	LABOR	MATERIAL	OTHER	TOTAL
A/2	CIVIL	298 900	3 193 800	2 726 200		5 920 000
C	BUILDINGS & STRUCTURES	5 100	59 400	127 600	194 200	381 200
D	PROCESS EQUIPMENT	1 800	20 400	730 200	2 329 400	3 180 000
E	PIPING	87 400	992 000	1 483 700		2 475 700
F	ELECTRICAL			501 500	862 400	1 364 300
G	PAINTING				166 400	166 400
L	PLANT ITEMS					
N	INSTRUMENTS & CONTROLS	10 500	116 300	194 500		310 800
P	INSULATION				101 500	101 500
	DIRECT FIELD COST	403 700	4 381 900	5 864 100	3 653 900	13 899 900
H	FIELD EXPENSE					
H	ALL RISK, PR TAX, BOND					
K	CONSTRUCTION SUPPLIES					
M	STARTUP					
S	TEMPORARY FACILITIES					
V	CRAFT BENEFITS					
V	CONSTRUCTION CAMP					
W	CONSTRUCTION EQUIP.					
	INDIRECT FIELD COST					5 345 900
	TOTAL FIELD COST					19 245 300
J	ENGINEERING					1 228 500
	TOTAL FIELD & ENG. COST					20 474 300
J	OVERHEAD					453 000
J	S/C ENGINEERING					
R	PREMIUM PAY					131 500
	BATTERY-LIMITS UNITS					
	CONTINGENCY (18%)					3 790 500
	SUB TOTAL					24 849 300
	G&A EXPENSE (3.5%)					869 700
	FEES (~ 2%)					500 000
	B&O TAX (2.2%)					561 200
	GRAND TOTAL -- DIRECT CAPITAL COST					26 780 200

FORM 62 110 REV 10 78

Stearns-Roger

ESTIMATE SUMMARY

CUSTOMER	THE PITTSBURG & MIDWAY COAL MINING CO.	PROP NO.	
LOCATION	Morgantown, West Virginia	JOB NO.	C21500
PROJECT	SRC-II Demonstration Plant	DATE	10-16-78
AREA	54-- Miscellaneous Distribution Systems	BY	HSI / EWH / DLD
REV. NO.	1 REV. DATE 4-5-79	BY	

ACT	DESCRIPTION	CRAFT HOURS	LABOR	MATERIAL	OTHER	TOTAL
A/B	CIVIL	178,400	1,913,000	1,004,800		2,922,300
C	BUILDINGS & STRUCTURES	135,900	2,226,400	4,301,400		6,527,800
D	PROCESS EQUIPMENT	6,000	69,600	2,191,100	2,371,500	4,632,200
E	PIPING	334,100	3,852,800	4,763,300		8,616,100
F	ELECTRICAL			529,500	801,300	1,330,800
G	PAINTING				2,674,800	2,674,800
L	PLANT ITEMS					
N	INSTRUMENTS & CONTROLS	9,600	107,100	261,500	555,000	923,600
P	INSULATION				1,100,300	1,100,300
	DIRECT FIELD COST	713,900	8,171,400	13,051,600	7,503,400	23,726,400
H	FIELD EXPENSE					
H	ALL RISK, PR TAX, BOND					
K	CONSTRUCTION SUPPLIES					
M	STARTUP					
S	TEMPORARY FACILITIES					
V	CRAFT BENEFITS					
V	CONSTRUCTION CAMP.					
W	CONSTRUCTION EQUIP.					
	INDIRECT FIELD COST					9,969,100
	TOTAL FIELD COST					33,695,500
J	ENGINEERING					2,469,900
	TOTAL FIELD & ENG. COST					41,165,400
J	OVERHEAD					911,000
J	S/C ENGINEERING					
R	PREMIUM PAY					245,200
	BATTERY-LIMITS UNITS					
	CONTINGENCY (18%)					7,618,300
	SUB TOTAL					49,940,400
	G&A EXPENSE (3.5%)					1,747,900
	FEES (~ 2%)					1,029,200
	B&O TAX (2.2%)					1,160,500
	GRAND TOTAL -- DIRECT CAPITAL COST					53,878,001

FORM 62 · 110 REV 10 76

Stearns-Roger

ESTIMATE SUMMARY

CUSTOMER	THE PITTSBURG & MIDWAY COAL MINING CO.	PROP NO.	
LOCATION	Morgantown, West Virginia	JOB NO.	C21500
PROJECT	SRC-II Demonstration Plant	DATE	10-16-78
AREA	55 -- General Plant Facilities	BY	HSI / EWH / DLQ
REV. NO.	1	REV. DATE	4-5-79
		BY	

ACT	DESCRIPTION	CRAFT HOURS	LABOR	MATERIAL	OTHER	TOTAL
A/B	CIVIL	1 1600	17 900	8 500	11 435 500	11 511 900
C	BUILDINGS & STRUCTURES	1 200	13 200	23 300	8 764 400	9 000 900
D	PROCESS EQUIPMENT	2 000	23 830	61 170		85 000
E	PIPING					
F	ELECTRICAL			932 100	355 200	1 287 300
G	PAINTING				2 000	2 000
L	PLANT ITEMS			1 135 200	1 203 900	2 339 100
N	INSTRUMENTS & CONTROLS	1 300	20 700	359 100		379 800
P	INSULATION					
	DIRECT FIELD COST	61600	75 160	2 519 400	22 010 000	24 605 000
H	FIELD EXPENSE					
H	ALL RISK, PR TAX, BOND					
K	CONSTRUCTION SUPPLIES					
M	STARTUP					
S	TEMPORARY FACILITIES					
V	CRAFT BENEFITS					
V	CONSTRUCTION CAMP.					
W	CONSTRUCTION EQUIP.					
	INDIRECT FIELD COST					92 200
	TOTAL FIELD COST					24 697 200
J	ENGINEERING					1 574 400
	TOTAL FIELD & ENG. COST					26 273 600
J	OVERHEAD -					581 400
J	S/C ENGINEERING (Geotechnical)					530 000
R	PREMIUM PAY					2 200
	BATTERY-LIMITS UNITS					
	CONTINGENCY (18%)					4 930 700
	SUB TOTAL					32 317 900
	G&A EXPENSE (3.5%)					1 131 100
	FEES (~ 2%)					656 300
	B&O TAX (2.2%)					751 200
	GRAND TOTAL -- DIRECT CAPITAL COST					34 857 000

FORM 62 1:0 REV. 10 76

Stearns-Roger

ESTIMATE SUMMARY

CUSTOMER THE PITTSBURG & MIDWAY COAL MINING CO.	PROP NO.
LOCATION Morgantown, West Virginia	JOB NO. C21500
PROJECT SRC-II Demonstration Plant	DATE 10-16-79
AREA UNIT 60 -- Coal and Ash Systems	BY HSI/EWH/DLQ
REV. NO. REV. DATE 2-5-79	BY KAF/JDK

ACT	DESCRIPTION	CRAFT HOURS	LABOR	MATERIAL	OTHER	TOTAL
A/B	CIVIL	407 300	4 234 400	3 525 000	7 173 400	14 942 800
C	BUILDINGS & STRUCTURES	142 300	1 679 900	4 132 400	30 400	5 842 700
D	PROCESS EQUIPMENT	295 600	3 461 900	16 783 000	104 000	20 348 800
E	PIPING	134 100	1 559 500	1 951 000		3 510 500
F	ELECTRICAL			1 611 900	1 680 100	3 291 900
G	PAINTING				677 900	677 900
L	PLANT ITEMS				847 300	847 300
N	INSTRUMENTS & CONTROLS	16 500	188 000	448 000		636 000
P	INSULATION				292 600	292 600
	DIRECT FIELD COST	997 900	11 123 500	29 451 200	10 795 700	50 380 500
H	FIELD EXPENSE					
H	ALL RISK, PR TAX, BOND					
K	CONSTRUCTION SUPPLIES					
M	STARTUP					
S	TEMPORARY FACILITIES					
V	CRAFT BENEFITS					
V	CONSTRUCTION CAMP.					
W	CONSTRUCTION EQUIP.					
	INDIRECT FIELD COST					13 582 900
	TOTAL FIELD COST					63 963 400
J	ENGINEERING					4 082 100
	TOTAL FIELD & ENG. COST					68 045 500
J	OVERHEAD					1 506 100
J	S/C ENGINEERING					
R	PREMIUM PAY					333 900
	BATTERY-LIMITS UNITS					
	CONTINGENCY (18%)					12 579 500
	SUB TOTAL					82 465 000
	G&A EXPENSE (3.5%)					2 635 200
	FEES (~ 2%)					1 732 600
	B&O TAX (2.2%)					1 902 200
	GRAND TOTAL -- DIRECT CAPITAL COST					88 735 000

FORM 62 110 REV 10 78

Stearns-Roger

ESTIMATE SUMMARY

CUSTOMER	THE PITTSBURG & MIDWAY COAL MINING CO.	PROP NO.	
LOCATION	Morgantown, West Virginia	JOB NO.	C21500
PROJECT	SRC-II Demonstration Plant	DATE	10-16-78
AREA	61 -- Coal Supply System	BY	HSI/EWH/DLG
REV. NO.	1 REV. DATE 4-5-79	BY	

ACT	DESCRIPTION	CRAFT HOURS	LABOR	MATERIAL	OTHER	TOTAL
A/B	CIVIL	357,200	3,737,400	2,932,600	7,157,500	13,327,500
C	BUILDINGS & STRUCTURES	73,400	768,600	2,102,600	30,400	2,999,600
D	PROCESS EQUIPMENT	141,200	1,661,400	7,064,100	104,000	8,829,500
E	PIPING	58,300	605,500	718,600		1,324,100
F	ELECTRICAL			640,300	793,100	1,441,400
G	PAINTING				260,400	260,400
L	PLANT ITEMS				347,300	347,300
N	INSTRUMENTS & CONTROLS	2,000	32,100	166,300		241,400
P	INSULATION				108,500	108,500
	DIRECT FIELD COST	631,900	7,103,600	13,632,500	9,331,200	29,965,700
H	FIELD EXPENSE					
H	ALL RISK, PR TAX, BOND					
K	CONSTRUCTION SUPPLIES					
M	STARTUP					
S	TEMPORARY FACILITIES					
V	CRAFT BENEFITS					
V	CONSTRUCTION CAMP.					
W	CONSTRUCTION EQUIP.					
	INDIRECT FIELD COST					8,579,000
	TOTAL FIELD COST					38,544,700
J	ENGINEERING					2,460,200
	TOTAL FIELD & ENG. COST					41,004,900
J	OVERHEAD					907,700
J	S/C ENGINEERING					
R	PREMIUM PAY					210,900
	BATTERY-LIMITS UNITS					
	CONTINGENCY (18%)					7,582,300
	SUB TOTAL					49,705,800
	G&A EXPENSE (3.5%)					1,739,700
	FEES (~ 2%)					1,025,100
	B&O TAX (2.2%)					1,154,400
	GRAND TOTAL -- DIRECT CAPITAL COST					53,625,000

FORM 62 · 110 REV. 10 76

Stearns-Roger

ESTIMATE SUMMARY

CUSTOMER	THE PITTSBURG & MIDWAY COAL MINING CO.	PROP NO.	
LOCATION	Morgantown, West Virginia	JOB NO.	C21500
PROJECT	SRC-II Demonstration Plant	DATE	10-16-78
AREA	62-- Coal Crushing System	BY	HSI / EWH / DLD
REV. NO.	1	REV. DATE	4-5-79
		BY	

ACT	DESCRIPTION	CRAFT HOURS	LABOR	MATERIAL	OTHER	TOTAL
A/B	CIVIL	26 900	265 100	149 900	1 000	415 000
C	BUILDINGS & STRUCTURES	54 900	621 900	1 637 100		2 309 100
D	PROCESS EQUIPMENT	137 200	1 592 000	8 202 300		10 404 300
E	PIPING	64 000	743 000	1 093 300		1 836 300
F	ELECTRICAL			957 300	741 900	1 634 200
G	PAINTING				367 900	367 900
L	PLANT ITEMS					
N	INSTRUMENTS & CONTROLS	7 900	90 100	349 900		340 000
P	INSULATION				153 400	153 400
	DIRECT FIELD COST	292 900	3 367 200	13 205 800	1 291 200	17 464 200
H	FIELD EXPENSE					
H	ALL RISK, PR TAX, BOND					
K	CONSTRUCTION SUPPLIES					
M	STARTUP					
S	TEMPORARY FACILITIES					
V	CRAFT BENEFITS					
V	CONSTRUCTION CAMP.					
W	CONSTRUCTION EQUIP.					
	INDIRECT FIELD COST					4 108 000
	TOTAL FIELD COST					21 572 200
J	ENGINEERING					1 376 600
	TOTAL FIELD & ENG. COST					22 948 800
J	OVERHEAD					507 900
J	S/C ENGINEERING					
R	PREMIUM PAY					101 000
	BATTERY-LIMITS UNITS					
	CONTINGENCY (18%)					4 240 400
	SUB TOTAL					27 798 100
	G&A EXPENSE (3.5%)					721 900
	FEES (~ 2%)					605 200
	B&O TAX (2.2%)					634 800
	GRAND TOTAL -- DIRECT CAPITAL COST					29 760 000

FORM 62 · 110 REV 10 76

Stearns-Roger ESTIMATE SUMMARY

CUSTOMER	THE PITTSBURG & MIDWAY COAL MINING CO.	PROP NO.	
LOCATION	Morgantown, West Virginia	JOB NO.	C21500
PROJECT	SRC-II Demonstration Plant	DATE	10-16-78
AREA	63-- Fine Coal Handling System	BY	HSI / EWH / DLQ
REV. NO.	REV. DATE	BY	

ACT	DESCRIPTION	CRAFT HOURS	LABOR	MATERIAL	OTHER	TOTAL
A/B	CIVIL	2 500	25 200	16 000	100	41 300
C	BUILDINGS & STRUCTURES	7 900	93 300	255 000		348 300
D	PROCESS EQUIPMENT	8 800	103 300	379 200		483 000
E	PIPING	4 900	56 800	60 300		117 100
F	ELECTRICAL			41 700	51 200	92 900
G	PAINTING				21 500	21 500
L	PLANT ITEMS					
N	INSTRUMENTS & CONTROLS	600	6 900	13 800		20 700
P	INSULATION				9 000	9 000
	DIRECT FIELD COST	24 700	284 500	766 000	81 300	1134 300
H	FIELD EXPENSE					
H	ALL RISK, PR TAX, BOND					
K	CONSTRUCTION SUPPLIES					
M	STARTUP					
S	TEMPORARY FACILITIES					
V	CRAFT BENEFITS					
V	CONSTRUCTION CAMP					
W	CONSTRUCTION EQUIP.					
	INDIRECT FIELD COST					349 500
	TOTAL FIELD COST					1 483 800
J	ENGINEERING					94 200
	TOTAL FIELD & ENG. COST					1 578 000
J	OVERHEAD					34 800
J	S/C ENGINEERING					
R	PREMIUM PAY					8 600
	BATTERY-LIMITS UNITS					
	CONTINGENCY (18%)					291 900
	SUB TOTAL					1 913 300
	G&A EXPENSE (3.5%)					67 000
	FEES (~ 2%)					39 500
	B&O TAX (2.2%)					40 200
	GRAND TOTAL -- DIRECT CAPITAL COST					2 060 000

FORM 62 110 REV. 10 76

Stearns-Roger

ESTIMATE SUMMARY

CUSTOMER	THE PITTSBURG & MIDWAY COAL MINING CO.	PROP NO.	
LOCATION	Morgantown, West Virginia	JOB NO.	C21500
PROJECT	SRC-II Demonstration Plant	DATE	10-16-79
AREA	14 -- Plant Ash Handling System	BY	HSI / EWH / DLQ
REV. NO.	REV. DATE	BY	

ACT	DESCRIPTION	CRAFT HOURS	LABOR	MATERIAL	OTHER	TOTAL
A/B	CIVIL	9 200	95 200	51 000	400	146 600
C	BUILDINGS & STRUCTURES	4 100	48 500	136 700		185 200
D	PROCESS EQUIPMENT	8 300	98 800	524 700		623 500
E	PIPING	6 300	73 300	77 900		151 200
F	ELECTRICAL			53 300	66 100	119 900
G	PAINTING				27 300	27 300
L	PLANT ITEMS					
N	INSTRUMENTS & CONTROLS	300	8 800	17 300		26 100
P	INSULATION				11 600	11 600
	DIRECT FIELD COST	28 700	324 600	841 900	105 900	1292 400
H	FIELD EXPENSE					
H	ALL RISK, PR TAX, BOND					
K	CONSTRUCTION SUPPLIES					
M	STARTUP					
S	TEMPORARY FACILITIES					
V	CRAFT BENEFITS					
V	CONSTRUCTION CAMP.					
W	CONSTRUCTION EQUIP.					
	INDIRECT FIELD COST					396 000
	TOTAL FIELD COST					1688 400
J	ENGINEERING					103 100
	TOTAL FIELD & ENG. COST					1791 500
J	OVERHEAD					391 900
J	S/C ENGINEERING					
R	PREMIUM PAY					9 700
	BATTERY-LIMITS UNITS					
	CONTINGENCY (18%)					332 300
	SUB TOTAL					2173 400
	G&A EXPENSE (3.5%)					76 200
	FEES (~2%)					44 900
	B&O TAX (2.2%)					50 500
	GRAND TOTAL -- DIRECT CAPITAL COST					2350 000

FORM 62 - 110 REV. 10 76

Stearns-Roger ESTIMATE SUMMARY

CUSTOMER	THE PITTSBURG & MIDWAY COAL MINING CO.	PROP NO.	
LOCATION	Morgantown, West Virginia	JOB NO.	C2500
PROJECT	SRC-II Demonstration Plant	DATE	10-16-78
AREA	65 -- Ash Disposal System	BY	HSI/EWH/DLR
REV. NO.	REV. DATE	BY	

ACT	DESCRIPTION	CRAFT HOURS	LABOR	MATERIAL	OTHER	TOTAL
A/B	CIVIL	13 500	121 500	374 500	14 400	512 400
C	BUILDINGS & STRUCTURES					
D	PROCESS EQUIPMENT	100	800	6 700		7 500
E	PIPING	100	900	900		1 800
F	ELECTRICAL			700	800	1 500
G	PAINTING				300	300
L	PLANT ITEMS					
N	INSTRUMENTS & CONTROLS		100	200		300
P	INSULATION				100	100
	DIRECT FIELD COST	13 700	123 300	385 000	15 600	523 900
H	FIELD EXPENSE					
H	ALL RISK, PR TAX, BOND					
K	CONSTRUCTION SUPPLIES					
M	STARTUP					
S	TEMPORARY FACILITIES					
V	CRAFT BENEFITS					
V	CONSTRUCTION CAMP					
W	CONSTRUCTION EQUIP.					
	INDIRECT FIELD COST					150 400
	TOTAL FIELD COST					674 300
J	ENGINEERING					43 000
	TOTAL FIELD & ENG. COST					717 300
J	OVERHEAD					15 800
J	S/C ENGINEERING					
R	PREMIUM PAY					3 700
	BATTERY-LIMITS UNITS					
	CONTINGENCY (18%)					132 600
	SUB TOTAL					869 400
	G&A EXPENSE (3.5%)					30 400
	FEES (~ 2%)					17 900
	B&O TAX (2.2%)					22 300
	GRAND TOTAL -- DIRECT CAPITAL COST					940 000

FORM 62 · 110 REV. 10 76

APPENDIX B

BECHTEL CAPITAL COST SUMMARY TABLES

The Bechtel capital cost summary tables are presented in the following pages.

RCE - 10 C
10/70

JOB NO. & TITLE 13651 SRC II
CLIENT
JOB LOCATION

TAKEOFF
PRICED
CHECKED

APPROVED
DATE
SHEET ___ OF ___

DIRECT FIELD COST SUMMARY ALL UNITS - SUMMARY

	QUANTITY / UNIT	$ M QUOTED	MANHOURS TOTAL	MANHOURS $/MH	TOTAL COST MATERIAL	TOTAL COST LABOR	TOTAL COST SUBCONTRACT	TOTAL COST TOTAL
.11 "C" - Columns & Vessels	236 EA		19750		46,711,630	2,923,000	28,509,000	49,854,830
.12 "D" - Tanks	68 EA		860		207,440	12,700	646,730	854,400
.13 "E" - Exchangers	196 EA		21230		19,153,080	3,142,000	2,369,400	21,836,680
.14 "F" - Fired Heaters	32 EA		43180		13,947,200	639,100	7,822,000	22,408,300
.15 "G" - Pumps & Drivers	365 EA		44950		6,524,610	665,300	—	7,189,910
.16 "H" - Vacuum Equipment	12 EA		860		366,000	12,700	—	378,700
.17 "K" - Compressors & Drs.	26 EA		55480		22,895,600	821,100	—	23,716,700
.18 "T" - Special Equipment	160 EA		250230		19,718,200	3,702,500	8,043,700	31,464,400
DESIGN DEVELOPMENT					5,588,280			5,588,280
PROPRIETARY S/C							45,604,200	45,604,200
TOTAL MAJOR EQUIPMENT	1095 EA.		436540		136,979,000	64,599,000	73,157,500	216,596,400
.21 "J" - Instruments			387,536		12,503,900	5,734,300	—	18,238,200
.22 "L" - Piping			1,960,775		40,175,700	29,007,300	1,400,000	69,323,000
.23 "M" - Structural Steel			278,888		8,557,000	4,126,000		12,683,000
.24 "N" - Insulation			8760		131,700	1,294,000	7,888,200	8,149,300
.25 "P" - Electrical			823,172		13,174,500	12,177,500		25,352,000
.26 "Q" - Concrete Work			1,371,430		12,286,900	20,288,800		32,575,700
.27 "R" - Buildings			111,100		3,440,700	1,643,200	6,490,300	11,574,200
.28 "S" - Site Improvements			835,462		5,169,300	12,359,600	12,195,000	29,723,900
.29 "X" - Painting			20,660		326,600	3,056,00	2,165,300	2,797,500
PLANT MISC.			31,160		475,800	460,800	500,000	941,600
					+100			+100
TOTAL OTHER MATERIALS			5,828,943		96,242,200	86,232,500	28,883,800	211,358,500
CATALYST			870		107,200	129,00		120,100
					<100>		+100	
TOTAL DIRECT COST			6,266,353		233,328,300	92,705,300	102,041,400	428,075,000

SHEET NO ___ PLANT ___

RCE - 10 C
10/70

JOB NO. & TITLE 13651 SRC II — TAKEOFF SWB — APPROVED
CLIENT — PRICED — DATE
JOB LOCATION — CHECKED — SHEET ___ OF ___

DIRECT FIELD COST SUMMARY UNIT 10

	QUANTITY / UNIT	$M QUOTED	MANHOURS TOTAL	MANHOURS $/MH	TOTAL COST MATERIAL	TOTAL COST LABOR	TOTAL COST SUBCONTRACT	TOTAL COST TOTAL
.11 "C" - Columns & Vessels	62 EA		5320		23991830			
.12 "D" - Tanks	1 EA		20		9000			
.13 "E" - Exchangers	51 EA		2900		7534700			
.14 "F" - Fired Heaters	8 EA		29100		9428000			
.15 "G" - Pumps & Drivers	601 EA		11640		2678480			
.16 "H" - Vacuum Equipment	1 EA		20		6000			
.17 "K" - Compressors & Drs.	5 EA		11000		4030400			
.18 "T" - Special Equipment	17 EA		4530		508600		7620000	
DESIGN ALLOWANCE					3157990			
TOTAL MAJOR EQUIPMENT	206 EA		64530		61350000		7620000	
.21 "J" - Instruments			116820		3889000			
.22 "L" - Piping			507520		11750000			
.23 "M" - Structural Steel			117840		3473000			
.24 "N" - Insulation			—		—		3067000	
.25 "P" - Electrical			275580		3681000			
.26 "Q" - Concrete Work			357400		3067000			
.27 "R" - Buildings			—		—		1123000	
.28 "S" - Site Improvements			108310		1227000			
.29 "X" - Painting			—		—		613000	
TOTAL OTHER MATERIALS			1483470		27087000		4803000	
TOTAL DIRECT COST			1548000	14.82	88437000	22874000	12423000	123734000

SHEET NO ___ PLANT ___

RCE - 10 C
10/70

JOB NO. & TITLE 13651 SRC II
CLIENT
JOB LOCATION

TAKEOFF EA
PRICED EA
CHECKED

APPROVED
DATE 5-21-79
SHEET ___ OF ___

DIRECT FIELD COST SUMMARY AREA 11

	QUANTITY / UNIT	$ M QUOTED	MANHOURS TOTAL	MANHOURS $/MH	TOTAL COST MATERIAL	TOTAL COST LABOR	TOTAL COST SUBCONTRACT	TOTAL COST TOTAL
.11 "C" - Columns & Vessels	46 EA.		3120		29029030			
.12 "D" - Tanks	-		-					
.13 "E" - Exchangers	43 EA.		2540		7024500			
.14 "F" - Fired Heaters	5 EA.		29100		9428000			
.15 "G" - Pumps & Drivers	51 EA.		7080		2048680			
.16 "H" - Vacuum Equipment	1 EA		20		6000			
.17 "K" - Compressors & Drs.	½ EA		3000		1050000			
.18 "T" - Special Equipment	10 EA		250		63800			
DESIGN ALLOW'S MISC. ITEMS	@ 5%				2300000 (10)			
TOTAL MAJOR EQUIPMENT	162 EA.		45,110		50950000			
.21 "J" - Instruments			91200		3057000			
.22 "L" - Piping			439,200		10190000			
.23 "M" - Structural Steel			103200		3057000			
.24 "N" - Insulation					-		2547000	
.25 "P" - Electrical			228,000		3057000			
.26 "Q" - Concrete Work			296,400		2547000			
.27 "R" - Buildings					-		1019000	
.28 "S" - Site Improvements			89,890		1019000			
.29 "X" - Painting					-		509000	
TOTAL OTHER MATERIALS			1,247,890		22927000		4075000	
TOTAL DIRECT COST			1,293,000	14.80	73877000	19110000	4075000	97052000

SHEET NO ___ PLANT 11

RCE - 10 C
10/70

JOB NO. & TITLE 13651 SRC II COAL LIQUEFACTION
CLIENT
JOB LOCATION

TAKEOFF SWB
PRICED SWB
CHECKED

APPROVED
DATE 5-23-79
SHEET ___ OF ___

DIRECT FIELD COST SUMMARY AREA 12 HYDROGEN TREATING & RECOVERY PLANT

	QUANTITY / UNIT	$ M QUOTED	MANHOURS TOTAL	MANHOURS $/MH	TOTAL COST MATERIAL	TOTAL COST LABOR	TOTAL COST SUBCONTRACT	TOTAL COST TOTAL
.11 "C" - Columns & Vessels	16 EA.		2200		4967800			
.12 "D" - Tanks	1 EA.		20		9000			
.13 "E" - Exchangers	6 EA.		360		510200			
.14 "F" - Fired Heaters	-		-					
.15 "G" - Pumps & Drivers	10 EA.		4560		629800			
.16 "H" - Vacuum Equipment	-							
.17 "K" - Compressors & Drs.	2 EA		8000		2980400			
.18 "T" - Special Equipment	7 EA.		4280		444800		7620000	
DESIGN ALLOW & MISC. ITEMS @ 5%	44 EA.				858000			
TOTAL MAJOR EQUIPMENT			19420		10400000		7620000	
.21 "J" - Instruments			25620		832000			
.22 "L" - Piping			68320		1560000			
.23 "M" - Structural Steel			14640		416000			
.24 "N" - Insulation			-		-		520000	
.25 "P" - Electrical			47580		624000			
.26 "Q" - Concrete Work			61,000		520000			
.27 "R" - Buildings			-		-		104000	
.28 "S" - Site Improvements			18420		208000			
.29 "X" - Painting			-		-		104000	
TOTAL OTHER MATERIALS			235580		4160000		728000	
TOTAL DIRECT COST			255000	14.50	14560000	3774000	8348000	26682000

SHEET NO ___

~~PLANT~~ AREA 12

RCE - 10 C
10/70

JOB NO. & TITLE 13651 SRC II Coal Liquefac
CLIENT
JOB LOCATION

TAKEOFF CG
PRICED
CHECKED

APPROVED
DATE 6/11/79
SHEET ___ OF ___

DIRECT FIELD COST SUMMARY

UNIT 20

	QUANTITY / UNIT	$M QUOTED	MANHOURS TOTAL	MANHOURS $/MH	TOTAL COST MATERIAL	TOTAL COST LABOR	TOTAL COST SUBCONTRACT	TOTAL COST TOTAL
.11 "C" - Columns & Vessels	56 EA		4895		8502000		22677000	
.12 "D" - Tanks	6 EA		100		117800		304400	
.13 "E" - Exchangers	44 EA		13300		6829300		-	
.14 "F" - Fired Heaters	-		-		-		-	
.15 "G" - Pumps & Drivers	55 EA		10420		1739300		-	
.16 "H" - Vacuum Equipment	3 EA		540		308900		-	
.17 "K" - Compressors & Drs.	1 EA		4000		2202500		-	
.18 "T" - Special Equipment	19 EA		50		13000		-	
Proprietary S/C					-		27000000	
Design Develop					784500		-	
TOTAL MAJOR EQUIPMENT	184 EA		33295		20355600		29298100	
.21 "J" - Instruments			101184		3372800		-	
.22 "L" - Piping			361417		7793400		-	
.23 "M" - Structural Steel			38716		987700		-	
.24 "N" - Insulation			-		-		10719000	
.25 "P" - Electrical			102144		1327800		-	
.26 "Q" - Concrete Work			138866		1187900		-	
.27 "R" - Buildings			-		-		88000	
.28 "S" - Site Improvements			63568		712200		-	
.29 "X" - Painting			-		-		5723000	
Prod Adjust								
TOTAL OTHER MATERIALS			805895		15381800		16530000	
					(100)		+100	
TOTAL DIRECT COST			839190	14.80	35767300	124195000	30951200	79138000

SHEET NO ___ PLANT ___

RCE - 10 C
10/70

JOB NO. & TITLE 13651 SEC II COAL LIQUIFAC
CLIENT
JOB LOCATION

TAKEOFF CG
PRICED CG
CHECKED

APPROVED
DATE 6/8/79
SHEET 2 OF 9

DIRECT FIELD COST SUMMARY

AREA 21 SYNGAS PRODUCTION

	QUANTITY / UNIT	$ M QUOTED	MANHOURS TOTAL	MANHOURS $/MH	TOTAL COST MATERIAL	TOTAL COST LABOR	TOTAL COST SUBCONTRACT	TOTAL COST TOTAL
.11 "C" - Columns & Vessels	9 EA							
.12 "D" - Tanks	-							
.13 "E" - Exchangers	6 EA							
.14 "F" - Fired Heaters	-							
.15 "G" - Pumps & Drivers	21 EA							
.16 "H" - Vacuum Equipment	-							
.17 "K" - Compressors & Drs.	-							
.18 "T" - Special Equipment	18 EA							
TOTAL MAJOR EQUIPMENT								
.21 "J" - Instruments			-					
.22 "L" - Piping			34981					
.23 "M" - Structural Steel			7636					
.24 "N" - Insulation			-					
.25 "P" - Electrical			5964					
.26 "Q" - Concrete Work			950					
.27 "R" - Buildings			-					
.28 "S" - Site Improvements			399					
.29 "X" - Painting								
TOTAL OTHER MATERIALS			49930					
TOTAL DIRECT COST (Including Contingency)			49930	14 MH				32/95000

SHEET NO _____ PLANT _____

RCE - 10 C
10/70

JOB NO. & TITLE SRC II
CLIENT
JOB LOCATION

TAKEOFF CG
PRICED CG
CHECKED

APPROVED
DATE 5/25/79
SHEET 2 OF 5

DIRECT FIELD COST SUMMARY — AREA 22 SYNGAS SHIFT CONVERSION

	QUANTITY / UNIT	$ M QUOTED	MANHOURS TOTAL	MANHOURS $/MH	TOTAL COST MATERIAL	TOTAL COST LABOR	TOTAL COST SUBCONTRACT	TOTAL COST TOTAL
.11 "C" - Columns & Vessels	10 EA		1470		3087300			
.12 "D" - Tanks	-		-		-			
.13 "E" - Exchangers	4 EA		490		2319100			
.14 "F" - Fired Heaters	-		-		-			
.15 "G" - Pumps & Drivers	1 EA		400		528000			
.16 "H" - Vacuum Equipment	-		-		-			
.17 "K" - Compressors & Drs.	-		-		-			
.18 "T" - Special Equipment	-		-		-			
DESIGN DEVELOP 4%					218300			
TOTAL MAJOR EQUIPMENT			7360		5677500			
.21 "J" - Instruments			16692		556400		-	
.22 "L" - Piping			67200		1555600		-	
.23 "M" - Structural Steel			9732		289600		-	
.24 "N" - Insulation			-		-		380400	
.25 "P" - Electrical			34644		465600		-	
.26 "Q" - Concrete Work			29748		255600		-	
.27 "R" - Buildings			-		-		-	
.28 "S" - Site Improvements			16144		181700		-	
.29 "X" - Painting			-		-		68100	
TOTAL OTHER MATERIALS			174160		3304500		448500	
TOTAL DIRECT COST			176520	14.89	8982000	2612500	448500	12043000

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SHEET NO _____ PLANT _____

RCE - 10 C
10/70

JOB NO. & TITLE SRC II
CLIENT
JOB LOCATION

TAKEOFF
PRICED CG
CHECKED

APPROVED
DATE 5/25/79
SHEET 2 OF 12

DIRECT FIELD COST SUMMARY

AREA 23 HYDROGEN PURIFICATION & COMPRESSION

	QUANTITY / UNIT	$ M QUOTED	MANHOURS TOTAL	MANHOURS $/MH	TOTAL COST MATERIAL	TOTAL COST LABOR	TOTAL COST SUBCONTRACT	TOTAL COST TOTAL
.11 "C" - Columns & Vessels	13 EA		985		1930800		2267700	
.12 "D" - Tanks	2 EA		20		3400		30400	
.13 "E" - Exchangers	10 EA		11,940		2803900			
.14 "F" - Fired Heaters	-		-		-			
.15 "G" - Pumps & Drivers	19 EA		9825		1471700			
.16 "H" - Vacuum Equipment	3 EA		540		30900			
.17 "K" - Compressors & Drs.	1 EA		4000		2202500			
.18 "T" - Special Equipment	-		-					
Design Development 4%					343900			
TOTAL MAJOR EQUIPMENT			26310		9070100		2298100	
.21 "J" - Instruments			74004		2466900			
.22 "L" - Piping			161088		3728800			
.23 "M" - Structural Steel			14904		443400			
.24 "N" - Insulation			-		-		306900	
.25 "P" - Electrical			37212		500200			
.26 "Q" - Concrete Work			68808		591100			
.27 "R" - Buildings			-		-			
.28 "S" - Site Improvements			18164		204600			
.29 "X" - Painting			-		-		90900	
TOTAL OTHER MATERIALS			374180		7935000		397800	
					(100)		(1100)	
TOTAL DIRECT COST			400,490	14.83	17005000	59270000	26960004	25628000

SHEET NO
PLANT

RCE - 10 C
10/70

JOB NO. & TITLE SRC II
CLIENT
JOB LOCATION

TAKEOFF CG
PRICED CG
CHECKED

APPROVED
DATE 6/13/79
SHEET 2 OF 5

DIRECT FIELD COST SUMMARY AREA 24 SYNGAS PURIFICATION

	QUANTITY / UNIT	$ M QUOTED	MANHOURS TOTAL	MANHOURS $/MH	TOTAL COST MATERIAL	TOTAL COST LABOR	TOTAL COST SUBCONTRACT	TOTAL COST TOTAL
.11 "C" - Columns & Vessels	5 EA		520		797600			
.12 "D" - Tanks	-		-		-			
.13 "E" - Exchangers	5 EA		290		1266500			
.14 "F" - Fired Heaters	-		-		-			
.15 "G" - Pumps & Drivers	2 EA		820		120700			
.16 "H" - Vacuum Equipment	-		-		-			
.17 "K" - Compressors & Drs.	-		-		-			
.18 "T" - Special Equipment	-		-		-			
DESIGN DEVELOP 4%					67500			
TOTAL MAJOR EQUIPMENT			1630		1752300			
.21 "J" - Instruments			3264		108600		-	
.22 "L" - Piping			30504		706100		-	
.23 "M" - Structural Steel			2004		59600		-	
.24 "N" - Insulation			-		-		64800	
.25 "P" - Electrical			7560		101600		-	
.26 "Q" - Concrete Work			12228		105100		-	
.27 "R" - Buildings			-		-		8800	
.28 "S" - Site Improvements			1250		14000		-	
.29 "X" - Painting			-		-		14000	
							(+)100	
TOTAL OTHER MATERIALS			56810		1095200		87700	
TOTAL DIRECT COST			58440	140	2847300	8650000	87700	39000000

SHEET NO
PLANT

RCE - 10 C
10/70

JOB NO. & TITLE SRC II — TAKEOFF CG — APPROVED
CLIENT — PRICED CG — DATE 6/13/79
JOB LOCATION — CHECKED — SHEET 2 OF 9

DIRECT FIELD COST SUMMARY ACEA 25 METHANATION

	QUANTITY / UNIT	$ M QUOTED	MANHOURS TOTAL	MANHOURS $/MH	TOTAL COST MATERIAL	TOTAL COST LABOR	TOTAL COST SUBCONTRACT	TOTAL COST TOTAL
.11 "C" - Columns & Vessels	19 EA		1910		3186300			
.12 "D" - Tanks	4 EA		80		144000			
.13 "E" - Exchangers	17 EA		580		439000			
.14 "F" - Fired Heaters	-		-		-			
.15 "G" - Pumps & Drivers	12 EA		375		94100			
.16 "H" - Vacuum Equipment	-		-		-			
.17 "K" - Compressors & Drs.	-		-		-			
.18 "T" - Special Equipment	1 EA		50		13000			
DESIGN DEVELOP 4%					149000			
TOTAL MAJOR EQUIPMENT			2995		3885700			
.21 "J" - Instruments			7224		2409000		-	
.22 "L" - Piping			67644		15659000		-	
.23 "M" - Structural Steel			4440		1321000		-	
.24 "N" - Insulation			-		-		1438000	
.25 "P" - Electrical			16764		2265400		-	
.26 "Q" - Concrete Work			27132		2331000		-	
.27 "R" - Buildings			-		-		-	
.28 "S" - Site Improvements			27611		3109000		-	
.29 "X" - Painting			-		-		3109000	
							(+) 300	
TOTAL OTHER MATERIALS			150815		27083000		4550000	
TOTAL DIRECT COST			153810	14.92	65940000	22760000	4550000	93250000

SHEET NO — PLANT

RCE - 10 C
10/70

JOB NO. & TITLE 13651 SRC II — TAKEOFF SWB — APPROVED
CLIENT — PRICED — DATE
JOB LOCATION — CHECKED — SHEET ___ OF ___

DIRECT FIELD COST SUMMARY UNIT 30

	QUANTITY / UNIT	$ M QUOTED	MANHOURS TOTAL	MANHOURS $/MH	TOTAL COST MATERIAL	TOTAL COST LABOR	TOTAL COST SUBCONTRACT	TOTAL COST TOTAL
.11 "C" - Columns & Vessels	55 EA.		6070		27994000		4070000	
.12 "D" - Tanks	9 EA.		—		1283100		23700	
.13 "E" - Exchangers	56 EA.		3825		3360180		—	
.14 "F" - Fired Heaters	11 EA.		8840		1573600		9000	
.15 "G" - Pumps & Drivers	80 EA.		6150		349130			
.16 "H" - Vacuum Equipment	2 EA.		60		10300			
.17 "K" - Compressors & Drs.	9 EA.		22880		5057800			
.18 "T" - Special Equipment	11 EA.		260		101400			
DESIGN ALLOWANCE					613590			
TOTAL MAJOR EQUIPMENT	233 EA.		48085		151485000		439700	
.21 "J" - Instruments			75,820		25060000			
.22 "L" - Piping			338,170		78530000			
.23 "M" - Structural Steel			53 260		16190000			
.24 "N" - Insulation			—		—		2048000	
.25 "P" - Electrical			104500		14070000			
.26 "Q" - Concrete Work			145500		12560000			
.27 "R" - Buildings			—		—		1560000	
.28 "S" - Site Improvements			47795		5310000			
.29 "X" - Painting					—		1840000	
TOTAL OTHER MATERIALS			765,045		151720000		2388000	
CATALYST			870		1072000			
TOTAL DIRECT COST			814,000	14.85	304277000	120466000	28277000	453020000

SHEET NO ___ PLANT ___

RCE - 10 C
10/70

JOB NO. & TITLE 13651 SRC II COAL LIQUEFAC TAKEOFF S A APPROVED
CLIENT PRICED S A DATE 5-11-79
JOB LOCATION CHECKED SHEET 1 OF 6

DIRECT FIELD COST SUMMARY — AREA 31. LOW PRESSURE GAS COMPRESSION & TREATING

	QUANTITY / UNIT	$ M QUOTED	MANHOURS TOTAL	MANHOURS $/MH	TOTAL COST MATERIAL	TOTAL COST LABOR	TOTAL COST SUBCONTRACT	TOTAL COST TOTAL
.11 "C" - Columns & Vessels	6 EA		725		2062000			
.12 "D" - Tanks	-							
.13 "E" - Exchangers	7 EA.		300		267600			
.14 "F" - Fired Heaters	-							
.15 "G" - Pumps & Drivers	6 EA.		300		12000			
.16 "H" - Vacuum Equipment	-							
.17 "K" - Compressors & Drs.	2 EA		5000		988500			
.18 "T" - Special Equipment	2 EA		40		1700			
DESIGN ALLOWANCE & MISC. ITEMS	@ 5% 25 Pi		-		73800			
TOTAL MAJOR EQUIPMENT			6365		1549800			
.21 "J" - Instruments			9600		310000			
.22 "L" - Piping			30,000		697000			
.23 "M" - Structural Steel			3600		108000			
.24 "N" - Insulation			-		-		46000	
.25 "P" - Electrical			19,200		263000			
.26 "Q" - Concrete Work			36,000		310000			
.27 "R" - Buildings			-		-		15000	
.28 "S" - Site Improvements			6235		62000			
.29 "X" - Painting					-		15000	
TOTAL OTHER MATERIALS			104,635		1750000		76000	
TOTAL DIRECT COST			111,000	148	3299800	1642200	76000	5018000

SHEET NO PLANT AREA-31

B-14

RCE - 10 C
10/70

JOB NO. & TITLE 13651 SRC II COAL LIQUEFAC.
CLIENT
JOB LOCATION

TAKEOFF SWB
PRICED SWB
CHECKED

APPROVED
DATE 5-10-79
SHEET ___ OF ___

DIRECT FIELD COST SUMMARY AREA 32 PRODUCT GAS PLANT

	QUANTITY / UNIT	$ M QUOTED	MANHOURS TOTAL	MANHOURS $/MH	TOTAL COST MATERIAL	TOTAL COST LABOR	TOTAL COST SUBCONTRACT	TOTAL COST TOTAL
.11 "C" - Columns & Vessels	15 EA.		940		2291000			
.12 "D" - Tanks	-							
.13 "E" - Exchangers	14 EA		465		3946000			
.14 "F" - Fired Heaters	-							
.15 "G" - Pumps & Drivers	10 EA.		250		1290000			
.16 "H" - Vacuum Equipment	1 EA		20		340000			
.17 "K" - Compressors & Drs.	2 EA		12000		26037000		SUBCONTRACT	
.18 "T" - Special Equipment	2 EA		40		180000			
DESIGN ALLOWANCE & MISC. ITEMS @ 4%	4% EA.				1300000			
TOTAL MAJOR EQUIPMENT			13715		33755000			
.21 "J" - Instruments			20,400		6750000			
.22 "L" - Piping			69,600		16200000			
.23 "M" - Structural Steel			10,800		3370000			
.24 "N" - Insulation			-		-		506000	
.25 "P" - Electrical			34800		4720000			
.26 "Q" - Concrete Work			31200		2700000			
.27 "R" - Buildings					-		67000	
.28 "S" - Site Improvements			12,485		1350000			
.29 "X" - Painting					-		34000	
TOTAL OTHER MATERIALS			179,285		35090000		607000	
TOTAL DIRECT COST			193,000	14.80	68844500	28565000	607000	103448000

SHEET NO ___

PLANT 32

RCE - 10 C
10/70

JOB NO. & TITLE 13651 SRC II COAL LIQUEFACTION TAKEOFF SWB APPROVED
CLIENT PRICED SWB DATE 5-14-79
JOB LOCATION CHECKED SHEET OF

DIRECT FIELD COST SUMMARY AREA 33 SULFUR RECOVERY

	QUANTITY / UNIT	$ M QUOTED	MANHOURS TOTAL	MANHOURS $/MH	TOTAL COST MATERIAL	TOTAL COST LABOR	TOTAL COST SUBCONTRACT	TOTAL COST TOTAL
.11 "C" - Columns & Vessels	14 EA.		2100		3786000		407000	
.12 "D" - Tanks	1 EA.		-				23700	
.13 "E" - Exchangers	12 EA.		1820		1722380			
.14 "F" - Fired Heaters	5 EA.		3540		1078900		9000	
.15 "G" - Pumps & Drivers	20 EA.		1650		93930			
.16 "H" - Vacuum Equipment	1 EA		40		6900			
.17 "K" - Compressors & Drs.	2 EA.		4800		1070800			
.18 "T" - Special Equipment	4 EA.		80		16200			
DESIGN ALLOWANCE & MISC. ITEMS @ 4%	1 LOT EA				191390			
TOTAL MAJOR EQUIPMENT			14030		4549100		439700	
.21 "J" - Instruments			27,600		913000			
.22 "L" - Piping			94,800		2205000			
.23 "M" - Structural Steel			13,200		409000			
.24 "N" - Insulation							800000	
.25 "P" - Electrical			18000		234000			
.26 "Q" - Concrete Work			24000		209000			
.27 "R" - Buildings							50000	
.28 "S" - Site Improvements			14140		165000			
.29 "X" - Painting							54000	
TOTAL OTHER MATERIALS			191,740		4135000		904000	
CATALYST			230		38200			
TOTAL DIRECT COST			206,000	14.00	8722300	3049000	1343700	13115000

SHEET NO PLANT 33

RCE - 10 C
10/70

JOB NO. & TITLE 13651 SRC II
CLIENT
JOB LOCATION

TAKEOFF SMB
PRICED SMB
CHECKED

APPROVED
DATE 5-21-79
SHEET ___ OF ___

DIRECT FIELD COST SUMMARY AREA 34 REFINING PLANT

	QUANTITY / UNIT	$M QUOTED	MANHOURS TOTAL	MANHOURS $/MH	TOTAL COST MATERIAL	TOTAL COST LABOR	TOTAL COST SUBCONTRACT	TOTAL COST TOTAL
.11 "C" - Columns & Vessels	12 EA.		1115		13656000			
.12 "D" - Tonks	8 EA.				1283100		⇨	
.13 "E" - Exchangers	17 EA.		1110		671900			
.14 "F" - Fired Heaters	4 EA.		3500		321700			
.15 "G" - Pumps & Drivers	28 EA.		3150		157100			
.16 "H" - Vacuum Equipment	-				—			
.17 "K" - Compressors & Drs.	1 EA		80		4600		2.5 MH	
.18 "T" - Special Equipment	3 EA		100		91100			
UPGRADING & MISC. ITEMS @ 4%	83 EA.				156000			
TOTAL MAJOR EQUIPMENT			9055		4051100			
.21 "J" - Instruments			10080		336000			
.22 "L" - Piping			106080		2455000			
.23 "M" - Structural Steel			19800		591000			
.24 "N" - Insulation					—		372000	
.25 "P" - Electrical			26,160		352000			
.26 "Q" - Concrete Work			35,760		307000			
.27 "R" - Buildings					—		24000	
.28 "S" - Site Improvements			12065		137000			
.29 "X" - Painting					—		60000	
TOTAL OTHER MATERIALS			209,945		4178000		456000	
TOTAL DIRECT COST			219,000	14.80	8229100	3240900	456000	11926000

SHEET NO ___

PLANT 34

RCE - 10 C
10/70

JOB NO. & TITLE 13651 SRC II COAL LIQUEFACTION
CLIENT
JOB LOCATION

TAKEOFF SWB
PRICED SWB
CHECKED

APPROVED
DATE 5-14-79
SHEET OF

DIRECT FIELD COST SUMMARY AREA 35 HYDRODESULFURIZATION

	QUANTITY / UNIT	$ M QUOTED	MANHOURS TOTAL	MANHOURS $/MH	TOTAL COST MATERIAL	TOTAL COST LABOR	TOTAL COST SUBCONTRACT	TOTAL COST TOTAL
.11 "C" - Columns & Vessels	6 EA		1190		620500			
.12 "D" - Tanks								
.13 "E" - Exchangers	5 EA.		130		30370			
.14 "F" - Fired Heaters	2 EA		1800		173000			
.15 "G" - Pumps & Drivers	6 EA		800		73200		D+ Sub.	
.16 "H" - Vacuum Equipment								
.17 "K" - Compressors & Drs.	1 EA.		1000		390200			
.18 "T" - Special Equipment								
DESIGN ALLOW. F MISC. ITEMS @ 4%	40 EA.				62400			
TOTAL MAJOR EQUIPMENT			4920		1623000			
.21 "J" - Instruments			8140		272000			
.22 "L" - Piping			37690		876000			
.23 "M" - Structural Steel			5860		174000			
.24 "N" - Insulation			—		—		324000	
.25 "P" - Electrical			6340		86000			
.26 "Q" - Concrete Work			18540		160000			
.27 "R" - Buildings					—		—	
.28 "S" - Site Improvements			2870		32000			
.29 "X" - Painting			—		—		21000	
TOTAL OTHER MATERIALS			79440		1600000		345000	
CATALYST			640		69000			
TOTAL DIRECT COST			85,000	14.80	3292000	1258000	345000	4895000

SHEET NO
PLANT 35

RCE - 10 C
10/70

JOB NO. & TITLE 13651 SRC II Coal Liquefac. TAKEOFF CG APPROVED
CLIENT PRICED DATE 6/11/79
JOB LOCATION CHECKED SHEET OF

DIRECT FIELD COST SUMMARY UNIT 40

	QUANTITY / UNIT	$M QUOTED	MANHOURS TOTAL	MANHOURS $/MH	TOTAL COST MATERIAL	TOTAL COST LABOR	TOTAL COST SUBCONTRACT	TOTAL COST TOTAL
.11 "C" - Columns & Vessels	30 EA		2295		3814000			
.12 "D" - Tanks	10 EA		60		506000		3505900	
.13 "E" - Exchangers	31 EA		965		13701000			
.14 "F" - Fired Heaters	5 EA		2760		2317400			
.15 "G" - Pumps & Drivers	71 EA		3475		1630000			
.16 "H" - Vacuum Equipment	6 EA		240		408000			
.17 "K" - Compressors & Drs.	4 EA		14200		11315000			
.18 "T" - Special Equipment	7 EA		1130		2319000			
Proprietary S/C							18600000	
Design Allowance					1032700		<2007>	
TOTAL MAJOR EQUIPMENT	164 EA		26285		17402900		22105700	
.21 "J" - Instruments			42012		1399300			
.22 "L" - Piping			128448		2975200			
.23 "M" - Structural Steel			29112		877300			
.24 "N" - Insulation			-		-		888300	
.25 "P" - Electrical			95208		1278300			
.26 "Q" - Concrete Work			85704		740200			
.27 "R" - Buildings			-		-		91500	
.28 "S" - Site Improvements			43181		483200			
.29 "X" - Painting			-		-		226000	
					+100			
TOTAL OTHER MATERIALS			423665		7753600		1205800	
TOTAL DIRECT COST			449950	14.80	25156500	66590000	23311500	55127000

SHEET NO PLANT

RCE · 10 C
10/70

JOB NO. & TITLE Sec II
CLIENT
JOB LOCATION

TAKEOFF CG
PRICED CG
CHECKED

APPROVED
DATE 5/25/79
SHEET 2 OF 8

DIRECT FIELD COST SUMMARY

AREA 41 - AMMONIA RECOVERY

	QUANTITY / UNIT	$ M QUOTED	MANHOURS TOTAL	MANHOURS $/MH	TOTAL COST MATERIAL	TOTAL COST LABOR	TOTAL COST SUBCONTRACT	TOTAL COST TOTAL
.11 "C" - Columns & Vessels	8 EA		1000		313800		-	
.12 "D" - Tanks	1 EA		-		-	-	339700	
.13 "E" - Exchangers	10 EA		200		159100		-	
.14 "F" - Fired Heaters	-		-		-	-	-	
.15 "G" - Pumps & Drivers	17 EA		875		56700			
.16 "H" - Vacuum Equipment	-							
.17 "K" - Compressors & Drs.	-							
.18 "T" - Special Equipment	-							
Design Develop 4%					20800			
TOTAL MAJOR EQUIPMENT			2075		550400		339700	
.21 "J" - Instruments			5340		178100			
.22 "L" - Piping			17316		400700			
.23 "M" - Structural Steel			4488		133600			
.24 "N" - Insulation			-		-		133600	
.25 "P" - Electrical			11928		160300			
.26 "Q" - Concrete Work			10368		89100			
.27 "R" - Buildings			-		-		8900	
.28 "S" - Site Improvements			10285		115800			
.29 "X" - Painting			-		-		26700	
							(+)100	
TOTAL OTHER MATERIALS			59725		1077600		169200	
TOTAL DIRECT COST			61800	14.80	1628000	915000	509000	3052000

SHEET NO _____ PLANT _____

RCE - 10 C
10/70

JOB NO. & TITLE SRC II
CLIENT
JOB LOCATION

TAKEOFF CG
PRICED CG
CHECKED

APPROVED
DATE 6/13/79
SHEET 2 OF 8

DIRECT FIELD COST SUMMARY AREA 42 TAR ACID RECOVERY

	QUANTITY / UNIT	$M QUOTED	MANHOURS TOTAL	MANHOURS $/MH	TOTAL COST MATERIAL	TOTAL COST LABOR	TOTAL COST SUBCONTRACT	TOTAL COST TOTAL
.11 "C" - Columns & Vessels	8 EA		710		349400			
.12 "D" - Tanks	1 EA		20		3400			
.13 "E" - Exchangers	10 EA		100		91600			
.14 "F" - Fired Heaters	-		-		-			
.15 "G" - Pumps & Drivers	18 EA		750		32900			
.16 "H" - Vacuum Equipment	2 EA		40		6600			
.17 "K" - Compressors & Drs.	-		-					
.18 "T" - Special Equipment	-		-					
DESIGN DEVELOP. 4%					19600			
TOTAL MAJOR EQUIPMENT			1620		508500			
.21 "J" - Instruments			3996		133200			
.22 "L" - Piping			12900		298500			
.23 "M" - Structural Steel			3348		99700			
.24 "N" - Insulation			-		-		99700	
.25 "P" - Electrical			8928		120000			
.26 "Q" - Concrete Work			7692		66100			
.27 "R" - Buildings			-		-		7600	
.28 "S" - Site Improvements			7666		86400			
.29 "X" - Painting			-		-		19300	
					(+) 100		<100>	
TOTAL OTHER MATERIALS			44530		804000		126500	
TOTAL DIRECT COST			46150	14.2	1312500	6830000	126500	2122000

SHEET NO
PLANT

BECHTEL

RCE - 10 C 10/70

JOB NO. & TITLE SRC II — TAKEOFF CG — APPROVED

CLIENT — PRICED CG — DATE 6/25/79

JOB LOCATION — CHECKED — SHEET 2 OF 13

DIRECT FIELD COST SUMMARY — AREA 43 WASTE WATER RECLAMATION

	QUANTITY / UNIT	$ M QUOTED	MANHOURS TOTAL	MANHOURS $/MH	TOTAL COST MATERIAL	TOTAL COST LABOR	TOTAL COST SUBCONTRACT	TOTAL COST TOTAL
.11 "C" - Columns & Vessels	9 EA		450		1867000			
.12 "D" - Tanks	6 EA		40		42200		1366200	
.13 "E" - Exchangers	4 EA		420		708400		-	
.14 "F" - Fired Heaters	4 EA		2100		2102400		-	
.15 "G" - Pumps & Drivers	26 EA		1550		66200		-	
.16 "H" - Vacuum Equipment	1 EA		50		11800		-	
.17 "K" - Compressors & Drs.	-		-		-	-	-	-
.18 "T" - Special Equipment	4 EA		530		1269000		8100000	
DESIGN ( ) / EVELOP					508400		(200)	
TOTAL MAJOR EQUIPMENT			5140		3753000		9466000	
.21 "J" - Instruments			11076		369000			
.22 "L" - Piping			44232		1024000			
.23 "M" - Structural Steel			5676		169000			
.24 "N" - Insulation			-		-		195000	
.25 "P" - Electrical			23952		322000			
.26 "Q" - Concrete Work			24,444		210000			
.27 "R" - Buildings			-		-		-	
.28 "S" - Site Improvements			4480		51000			
.29 "X" - Painting							50000	
TOTAL OTHER MATERIALS			113860		2145000		245000	
TOTAL DIRECT COST			119000	14.0	5898000	1761000	9711000	17370000

SHEET NO _____ PLANT _____

RCE - 10 C
10/70

JOB NO. & TITLE SRC II
CLIENT
JOB LOCATION

TAKEOFF CG
PRICED CG
CHECKED

APPROVED
DATE 5/25/79
SHEET 2 OF 16

DIRECT FIELD COST SUMMARY — AREA 44 OXYGEN

	QUANTITY / UNIT	$ M QUOTED	MANHOURS TOTAL	MANHOURS $/MH	TOTAL COST MATERIAL	TOTAL COST LABOR	TOTAL COST SUBCONTRACT	TOTAL COST TOTAL
.11 "C" - Columns & Vessels	5 EA		140		315000		-	
.12 "D" - Tanks	2 EA		-		-	-	1800000	
.13 "E" - Exchangers	7 EA		240		411000		-	
.14 "F" - Fired Heaters	1 EA		1820		215000		-	
.15 "G" - Pumps & Drivers	10 EA		300		7200		-	
.16 "H" - Vacuum Equipment	3 EA		150		22400		-	
.17 "K" - Compressors & Drs.	4 EA		14200		11315000		-	
.18 "T" - Special Equipment	3 EA		600		105000		10500000	
Design Factor 4%					483900			
TOTAL MAJOR EQUIPMENT			17450		12591000		12300000	
.21 "J" - Instruments			21600		719000			
.22 "L" - Piping			54000		1252000			
.23 "M" - Structural Steel			15600		415000			
.24 "N" - Insulation			-		-		460000	
.25 "P" - Electrical			50400		676000			
.26 "Q" - Concrete Work			43200		375000			
.27 "R" - Buildings			-		-		75000	
.28 "S" - Site Improvements			20750		230000			
.29 "X" - Painting			-				130000	
TOTAL OTHER MATERIALS			205550		3721000		665000	
TOTAL DIRECT COST			223000	14.8	16319000	33000000	12965000	32583000

SHEET NO
PLANT

RCE - 10 C
10/70

JOB NO. & TITLE 13651 SRC II — TAKEOFF SWB — APPROVED
CLIENT — PRICED — DATE
JOB LOCATION — CHECKED — SHEET ___ OF ___

DIRECT FIELD COST SUMMARY UNIT 50

	QUANTITY / UNIT	$ M QUOTED	MANHOURS TOTAL	MANHOURS $/MH	TOTAL COST MATERIAL	TOTAL COST LABOR	TOTAL COST SUBCONTRACT	TOTAL COST TOTAL
.11 "C" - Columns & Vessels	33 EA.		1180		5,320,000		1,762,000	
.12 "D" - Tanks	42 EA.		680		711,900		2,907,300	
.13 "E" - Exchangers	14 EA.		240		58,800		2,369,400	
.14 "F" - Fired Heaters	8 EA.		1320		628,200		781,300	
.15 "G" - Pumps & Drivers	98 EA.		13265		1,594,700			
.16 "H" - Vacuum Equipment	—		—		—		—	
.17 "K" - Compressors & Drs.	7 EA.		3400		289,900			
.18 "T" - Special Equipment	26 EA.		2660		669,000		423,700	
					(5,000)		4,400	
TOTAL MAJOR EQUIPMENT	228 EA.		22,745		4,486,000		13,694,000	
.21 "J" - Instruments			30,300		1,010,000			
.22 "L" - Piping			515,640		8,123,000		140,000	
.23 "M" - Structural Steel			39,960		1,600,000			
.24 "N" - Insulation			—		—		813,000	
.25 "P" - Electrical			144,820		3,940,000			
.26 "Q" - Concrete Work			207,90		1,663,000			
.27 "R" - Buildings			10,800		1,000,000		500,000	
.28 "S" - Site Improvements			37,158		250,000		12,195,000	
.29 "X" - Painting			—		—		57,000	
							5,000	
TOTAL OTHER MATERIALS			986,468		17,586,000		18,725,000	
TOTAL DIRECT COST			1,009,213	14.50	22,072,000	14,938,000	32,419,000	69,429,000

SHEET NO ___ PLANT ___

RCE - 10 C
10/70

JOB NO. & TITLE 13651 SRC II Coal Ligue. TAKEOFF BOL APPROVED
CLIENT P & M PRICED DATE
JOB LOCATION Morgantown, W. Va. CHECKED DLee 5/15/79 SHEET 1 OF 1

DIRECT FIELD COST SUMMARY Area 51 Demonstration Plant

Steam Generation System	QUANTITY / UNIT	$ M QUOTED	MANHOURS TOTAL	MANHOURS $/MH	TOTAL COST MATERIAL	LABOR	SUBCONTRACT	TOTAL
.11 "C" - Columns & Vessels	5 EA.		240		868000			
.12 "D" - Tanks								
.13 "E" - Exchangers			-					
.14 "F" - Fired Heaters	4 EA		1300		624200		7500000	
.15 "G" - Pumps & Drivers	12 EA		3050		630000			
.16 "H" - Vacuum Equipment	-		-					
.17 "K" - Compressors & Drs.	-		-					
.18 "T" - Special Equipment	-		-				100000	(Crane)
					(1000)			
TOTAL MAJOR EQUIPMENT	21 EA		4590		1340000		7600000	
.21 "J" - Instruments			9000		300000			
.22 "L" - Piping			99,360		2300000			
.23 "M" - Structural Steel			10080		300000			
.24 "N" - Insulation			-				370000	
.25 "P" - Electrical			44,640		600000			
.26 "Q" - Concrete Work			50400		440000			
.27 "R" - Buildings			-				300000	
.28 "S" - Site Improvements			11520		130000			
.29 "X" - Painting			-				130000	
TOTAL OTHER MATERIALS			225000		4070000		800000	
TOTAL DIRECT COST			229590	14.80	5410000	3400000	8400000	17210000

SHEET NO PLANT

BECHTEL RCE - 10 C 10/70

JOB NO. & TITLE 13651 SRC II Coal Ligue. TAKEOFF RDL APPROVED
CLIENT P + M PRICED DATE
JOB LOCATION Morgantown, W. Va. CHECKED 5/25/74 SHEET 1 OF 1

DIRECT FIELD COST SUMMARY Area 52 - Raw Water System

	QUANTITY / UNIT	$M QUOTED	MANHOURS TOTAL	MANHOURS $/MH	TOTAL COST MATERIAL	TOTAL COST LABOR	TOTAL COST SUBCONTRACT	TOTAL COST TOTAL
.11 "C" - Columns & Vessels	7/Ea.		270		178700			
.12 "D" - Tanks	12/Ea		380		72000		272400	
.13 "E" - Exchangers	—		—		—		—	
.14 "F" - Fired Heaters	—		—		—		—	
.15 "G" - Pumps & Drivers	29/Ea		2695		186100			
.16 "H" - Vacuum Equipment	—		—		—		—	
.17 "K" - Compressors & Drs.	3/Ea		100		2900			
.18 "T" - Special Equipment	16 Ea		580		84800		204400	
See "S" below					5000		32000	
TOTAL MAJOR EQUIPMENT	67 Ea		4025		525000		480000	
.21 "J" - Instruments			1800		60000		—	
.22 "L" - Piping			29760		650000		140000	
.23 "M" - Structural Steel			1010		30000		—	
.24 "N" - Insulation			—		—		20000	
.25 "P" - Electrical			7440		100000		—	
.26 "Q" - Concrete Work			18000		1000000		—	
.27 "R" - Buildings			—		—		610000	
.28 "S" - Site Improvements			9598		20000		35000	
.29 "X" - Painting					—		30000	
							50000	
TOTAL OTHER MATERIALS			67,608		960000		890000	
TOTAL DIRECT COST	67 Ea.		71,633	14.80	1485000	1060000	1370000	3915000

SHEET NO PLANT 52

BECHTEL

RCE - 10 C
10/70

JOB NO. & TITLE 13651 - SRC II
CLIENT
JOB LOCATION

TAKEOFF RDL APPROVED
PRICED DATE
CHECKED SHEET ___ OF ___

DIRECT FIELD COST SUMMARY Area 53 - Cooling Water System

	QUANTITY / UNIT	$M QUOTED	MANHOURS TOTAL	MANHOURS $/MH	TOTAL COST MATERIAL	TOTAL COST LABOR	TOTAL COST SUBCONTRACT	TOTAL COST TOTAL
.11 "C" - Columns & Vessels	—		—		—		—	
.12 "D" - Tanks	5 Ea		100		24600		—	
.13 "E" - Exchangers	14 Ea		240		58800		2369400	
.14 "F" - Fired Heaters	—		—		—		—	
.15 "G" - Pumps & Drivers	28 Ea.		4165		532600		—	
.16 "H" - Vacuum Equipment	—		—		—		—	
.17 "K" - Compressors & Drs.	—		—		—		—	
.18 "T" - Special Equipment	6 Ea		40		5500		64200	
					(500)		4000	
TOTAL MAJOR EQUIPMENT	53 Ea.		4,545		621000		2434000	
.21 "J" - Instruments			2700		90000		—	
.22 "L" - Piping			84000		1400000		—	
.23 "M" - Structural Steel			3020		90000		—	
.24 "N" - Insulation			—		—		60000	
.25 "P" - Electrical			17860		240000		—	
.26 "Q" - Concrete Work			101710		810000		—	
.27 "R" - Buildings					—		225000	
.28 "S" - Site Improvements			7165		—		60000	
.29 "X" - Pointing					—		90000	
TOTAL OTHER MATERIALS			216,455		2630000		435000	
TOTAL DIRECT COST	53 Ea.		221,000	14.80	3251000	3270000	2869000	9390000

SHEET NO ___ PLANT ___

RCE - 10 C 10/70

JOB NO. & TITLE 13651 - SRC II TAKEOFF RDL APPROVED
CLIENT PRICED DATE
JOB LOCATION CHECKED SHEET ___ OF ___

DIRECT FIELD COST SUMMARY Area 54 - Flare + Drain System

	QUANTITY / UNIT	$M QUOTED	MANHOURS TOTAL	MANHOURS $/MH	TOTAL COST MATERIAL	TOTAL COST LABOR	TOTAL COST SUBCONTRACT	TOTAL COST TOTAL
.11 "C" - Columns & Vessels	21 Ea		670		2665000		1762000	
.12 "D" - Tanks	25 Ea		200		617300		2634900	
.13 "E" - Exchangers	—		—		—		—	
.14 "F" - Fired Heaters	4 Ea		20		40000		313000	
.15 "G" - Pumps & Drivers	29 Ea		3355		246000		—	
.16 "H" - Vacuum Equipment	—		—		—		—	
.17 "K" - Compressors & Drs.	4 Ea		3300		287000		—	
.18 "T" - Special Equipment	4 Ea		1040		78700		55100	
Adj					5000		8000	
TOTAL MAJOR EQUIPMENT	87		8585		15000000		3180000	
.21 "J" - Instruments			16800		560000		—	
.22 "L" - Piping			302520		3773000		—	
.23 "M" - Structural Steel			11090		330000		—	
.24 "N" - Insulation					—		233000	
.25 "P" - Electrical			60,000		2800000		—	
.26 "Q" - Concrete Work			27,120		233000		—	
.27 "R" - Buildings					—		367000	
.28 "S" - Site Improvements			8875		100000		1000000	
.29 "X" - Painting					—		300000	
TOTAL OTHER MATERIALS	—		426,405		7796000		10000000	
TOTAL DIRECT COST	83 Ea.		434,990	14.50	9296000	6438000	41800000	19914000

SHEET NO ___ PLANT ___

RCE - 10 C
10/70

JOB NO. & TITLE 13651 SRC II Demo Pit. TAKEOFF D. Lee 6/1/79 APPROVED _____
CLIENT Gulf PRICED D. L. DATE _____
JOB LOCATION Morgantown W Va CHECKED _____ SHEET ___ OF _____

DIRECT FIELD COST SUMMARY Area 55 - General Plant Facilities.

	QUANTITY / UNIT	$M QUOTED	MANHOURS TOTAL	MANHOURS $/MH	TOTAL COST MATERIAL	TOTAL COST LABOR	TOTAL COST SUBCONTRACT	TOTAL COST TOTAL
.11 "C" - Columns & Vessels								
.12 "D" - Tanks								
.13 "E" - Exchangers								
.14 "F" - Fired Heaters								
.15 "G" - Pumps & Drivers								
.16 "H" - Vacuum Equipment								
.17 "K" - Compressors & Drs.								
.18 "T" - Special Equipment	(Mobile maintenance)		1000		500,000	—	—	
TOTAL MAJOR EQUIPMENT			1000		500,000	—	—	
.21 "J" - Instruments			—		—	—	—	—
.22 "L" - Piping			—		—	—	—	—
.23 "M" - Structural Steel			14760		850,000	—	—	—
.24 "N" - Insulation (Fireproof pipe rack)			—		—	—	100,000	
.25 "P" - Electrical			14880		200,000	—	—	—
.26 "Q" - Concrete Work			10560		80,000	—	—	—
.27 "R" - Buildings			10,800		1,000,000	—	350,000	
.28 "S" - Site Improvements			—		—	—	120,000	
.29 "X" - Painting			—		—	—	—	—
TOTAL OTHER MATERIALS			51,000		2,130,000		1,560,000	
TOTAL DIRECT COST			52,000	14.80	2,630,000	770,000	1,560,000	19,000,000

SHEET NO _____ PLANT _____

RCE - 10 C
10/70

JOB NO. & TITLE 13651 SRC II
CLIENT
JOB LOCATION

TAKEOFF APPROVED
PRICED DATE
CHECKED SHEET ___ OF ___

DIRECT FIELD COST SUMMARY UNIT 60

	QUANTITY / UNIT	$M QUOTED	MANHOURS TOTAL	MANHOURS $/MH	TOTAL COST MATERIAL	TOTAL COST LABOR	TOTAL COST SUBCONTRACT	TOTAL COST TOTAL
.11 "C" - Columns & Vessels								
.12 "D" - Tanks								
.13 "E" - Exchangers								
.14 "F" - Fired Heaters								
.15 "G" - Pumps & Drivers								
.16 "H" - Vacuum Equipment								
.17 "K" - Compressors & Drs.								
.18 "T" - Special Equipment			241600		18206000	—	—	
TOTAL MAJOR EQUIPMENT	—		241600		18206000	—	—	
.21 "J" - Instruments			21,400		3268000			
.22 "L" - Piping			109,580		16811100			
.23 "M" - Structural Steel			—		—			
.24 "N" - Insulation			8760		1317000			
.25 "P" - Electrical			100920		15404000			
.26 "Q" - Concrete Work			436170		43728000			
.27 "R" - Buildings			100300		24407000		1090000	
.28 "S" - Site Improvements			535,450		19659000			
.29 "X" - Painting			20,660		3266000			
PLANT MISC.			31160		4758000			
TOTAL OTHER MATERIALS			1364400		132618000		1090000	
TOTAL DIRECT COST			1,606,000		314678000	237682000	1090000	553450000

SHEET NO ___ PLANT ___

RCE - 10 C
10/70

JOB NO. & TITLE 13651 SRC II
CLIENT PITTSBURGH & MIDWAY COAL CO.
JOB LOCATION MORGANTOWN, W. VA.

TAKEOFF S & R
PRICED R. P. D.
CHECKED MBK

APPROVED
DATE 31 MAY '79
SHEET OF

DIRECT FIELD COST SUMMARY PLANT 61

	QUANTITY / UNIT	$ M QUOTED	MANHOURS TOTAL	MANHOURS $/MH	TOTAL COST MATERIAL	TOTAL COST LABOR	TOTAL COST SUBCONTRACT	TOTAL COST TOTAL
.11 "C" - Columns & Vessels								
.12 "D" - Tanks								
.13 "E" - Exchangers								
.14 "F" - Fired Heaters								
.15 "G" - Pumps & Drivers								
.16 "H" - Vacuum Equipment								
.17 "K" - Compressors & Drs.								
.18 "T" - Special Equipment	34 EA		91,000		8485000			
TOTAL MAJOR EQUIPMENT			91,000		8485000			
.21 "J" - Instruments			15,240		2174000			
.22 "L" - Piping			78480		11253000			
.23 "M" - Structural Steel			-		-			
.24 "N" - Insulation			6,240		895000			
.25 "P" - Electrical			72,240		10358000			
.26 "Q" - Concrete Work			330,360		24283000			
.27 "R" - Buildings			9,480		5027000		109000	
.28 "S" - Site Improvements			442,320		13711000			
.29 "X" - Painting			15,440		2174000			
PLANT MISC.			22,200		3192000			
TOTAL OTHER MATERIALS			992,000		73088000		109000	
TOTAL DIRECT COST			1,083,000		157930000	160280000	109000	319300000

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SHEET NO 61-1

PLANT

BECHTEL

RCE - 10 C
10/70

JOB NO. & TITLE 13651 SRC II — TAKEOFF SJR — APPROVED
CLIENT — PRICED — DATE
JOB LOCATION — CHECKED — SHEET ___ OF ___

DIRECT FIELD COST SUMMARY PLANT 62

	QUANTITY / UNIT	$M QUOTED	MANHOURS TOTAL	MANHOURS $/MH	TOTAL COST MATERIAL	TOTAL COST LABOR	TOTAL COST SUBCONTRACT	TOTAL COST TOTAL
.11 "C" - Columns & Vessels								
.12 "D" - Tanks								
.13 "E" - Exchangers								
.14 "F" - Fired Heaters								
.15 "G" - Pumps & Drivers								
.16 "H" - Vacuum Equipment								
.17 "K" - Compressors & Drs.								
.18 "T" - Special Equipment			137200		8808000			
TOTAL MAJOR EQUIPMENT			137,200		8808000			
.21 "J" - Instruments			2800		10000			
.22 "L" - Piping			14,500		352000			
.23 "M" - Structural Steel			—		—			
.24 "N" - Insulation			1200		26000			
.25 "P" - Electrical			13,400		317000			
.26 "Q" - Concrete Work			83,000		1753000			
.27 "R" - Buildings			30,100		1321000			
.28 "S" - Site Improvements			4,500		—			
.29 "X" - Painting			2,100		70000			
PLANT MISC.			4,200		97000			
TOTAL OTHER MATERIALS			155,800		4006000			
TOTAL DIRECT COST			293,000	14.80	12814000	4336000	—	17150000

SHEET NO ___ PLANT ___

JOB NO. & TITLE 13651 SRC II TAKEOFF S&R APPROVED

CLIENT PITTSBURGH & MIDWAY COAL CO. PRICED R.P.D. DATE 7 JUNE '79

JOB LOCATION MORGANTOWN, W. VA. CHECKED SHEET OF

RCE - 10 C 10/70

DIRECT FIELD COST SUMMARY PLANT 63

	QUANTITY / UNIT	$ M QUOTED	MANHOURS TOTAL	MANHOURS $/MH	TOTAL COST MATERIAL	TOTAL COST LABOR	TOTAL COST SUBCONTRACT	TOTAL COST TOTAL
.11 "C" - Columns & Vessels								
.12 "D" - Tanks								
.13 "E" - Exchangers								
.14 "F" - Fired Heaters								
.15 "G" - Pumps & Drivers								
.16 "H" - Vacuum Equipment								
.17 "K" - Compressors & Drs.								
.18 "T" - Special Equipment	12 EA.		5,000		305,000			
TOTAL MAJOR EQUIPMENT			5,000		305,000			
.21 "J" - Instruments			1,440		17,500			
.22 "L" - Piping			7,320		90,000			
.23 "M" - Structural Steel			-		-			
.24 "N" - Insulation			600		7,200			
.25 "P" - Electrical			6,720		83,500			
.26 "Q" - Concrete Work			14,640		109,000			
.27 "R" - Buildings			60,720		617,000			
.28 "S" - Site Improvements			1,080		-			
.29 "X" - Painting			1,440		17,500			
PLANT MISC.			2,040		25,600			
TOTAL OTHER MATERIALS			96,000		968,000			
TOTAL DIRECT COST			101,000	MH/$	1273,000	1495,000		2768,000

SHEET NO 63-1 PLANT

BECHTEL RCE-10C 10/70

JOB NO. & TITLE 13651 SRC II TAKEOFF S&R APPROVED

CLIENT PITTSBURGH & MIDWAY COAL CO. PRICED R.P.D. DATE 7 JUNE '79

JOB LOCATION MORGANTOWN, W. VA. CHECKED mbh SHEET OF

DIRECT FIELD COST SUMMARY PLANT 64

	QUANTITY / UNIT	$M QUOTED	MANHOURS TOTAL	MANHOURS $/MH	TOTAL COST MATERIAL	TOTAL COST LABOR	TOTAL COST SUBCONTRACT	TOTAL COST TOTAL
.11 "C" - Columns & Vessels								
.12 "D" - Tanks								
.13 "E" - Exchangers								
.14 "F" - Fired Heaters								
.15 "G" - Pumps & Drivers								
.16 "H" - Vacuum Equipment								
.17 "K" - Compressors & Drs.								
.18 "T" - Special Equipment	13 EA		6,700		521000			
TOTAL MAJOR EQUIPMENT			6,700		521000			
.21 "J" - Instruments			960		10300			
.22 "L" - Piping			1460		53100			
.23 "M" - Structural Steel			—		—			
.24 "N" - Insulation			120		4200			
.25 "P" - Electrical			1340		48900			
.26 "Q" - Concrete Work			8,170		82500			
.27 "R" - Buildings			—		—			
.28 "S" - Site Improvements			190		—			
.29 "X" - Painting			240		10200			
PLANT MISC.			420		15600			
TOTAL OTHER MATERIALS			12,300		224800			
TOTAL DIRECT COST			19,000	14.85	745800	281200		1027000

SHEET NO 64-1 PLANT

RCE - 10 C
10/70

JOB NO. & TITLE 13651 SRC II
CLIENT PITTSBURGH & MIDWAY COAL CO.
JOB LOCATION MORGANTOWN, W. VA.

TAKEOFF S&R
PRICED R. P. D.
CHECKED mdh

APPROVED
DATE 7 JUNE '79
SHEET OF

DIRECT FIELD COST SUMMARY PLANT 65

	QUANTITY / UNIT	$ M QUOTED	MANHOURS TOTAL	MANHOURS $/MH	TOTAL COST MATERIAL	TOTAL COST LABOR	TOTAL COST SUBCONTRACT	TOTAL COST TOTAL
.11 "C" - Columns & Vessels								
.12 "D" - Tanks								
.13 "E" - Exchangers								
.14 "F" - Fired Heaters								
.15 "G" - Pumps & Drivers								
.16 "H" - Vacuum Equipment								
.17 "K" - Compressors & Drs.								
.18 "T" - Special Equipment	2 EA.		1,700		87000			
TOTAL MAJOR EQUIPMENT			1,700		87000			
.21 "J" - Instruments			1,560		116000			
.22 "L" - Piping			7,820		600000			
.23 "M" - Structural Steel			—		—			
.24 "N" - Insulation			600		4800			
.25 "P" - Electrical			7,220		552000			
.26 "Q" - Concrete Work			—		—			
.27 "R" - Buildings			—		—			
.28 "S" - Site Improvements			87,360		5942000			
.29 "X" - Painting			1,440		115000			
PLANT MISC.			2300		177000			
TOTAL OTHER MATERIALS			108,300		7550000			
TOTAL DIRECT COST			110,000	1.00	8420000	11628000		24700000

SHEET NO 65-1

PLANT

DESIGN BASIS CONFIRMED

START OF FOUNDATIONS

MECHANICAL COMPLETION

MONTH NUMBER 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59

MILESTONES

AWARD P&I 1st PHT

ENGINEERING

PROCESS
- DETAILED PROCESS DESIGN
- PROCESS DATA SHEETS
- P&IDs

P&IDS
- BEC
- SOIL TESTING

SOIL TESTING
- MR
- BEC

SITE SURVEY / SITE PLANS
- MR
- SITE SURVEY

PLOT PLANS
- GRADING PLANS
- PLOT PLANS
- GRADE ABOVE

EQUIPMENT AREA
- PROCESS
- UTILITY

MODEL
- MODEL DESIGN

ORTHOS
- ORTHOS
- LAST SHEETS

ISO'S & P/S
- ALLOY MTO

FENCES, RR, GEN. OFFSITES
- FENCES & RDS & ROADS

FOUNDATIONS
- FOUNDATIONS

UNDERGROUND
- UNDERGROUND

STRUCT. P/R & EQUIP. STRUCT
- EQUIP. STRUCT

SINGLE LINES & AREA CLASSIF.
- SINGLE LINES
- DATA CLASS

U/G & DTL. ELECT.
- U/G DWGS
- LIGHTING, A/S ELEC, PWR DISTRIBUTION

INSTRUMENTS
- P&ID INPUT
- DATA SHEETS
- LOOP DIAG, INSTALLATION DTLS, PANEL DWGS

PROCUREMENT

FIRST PROCESS DATA SHEETS

LAST PROCESS DATA SHEETS

FIRST VENDOR INFORMATION

LAST VENDOR INFORMATION

C,D VESSELS
- SPEC-MR-BEC-VP and F&D

E. EXCHANGERS
- SPEC-MR-BEC-VP and F&D

E. COOLING TOWER
- SPEC-MR-BEC-VP and F&D

F. FURNACES, FIRED HEATERS
- SPEC-MR-BEC-VP and F&D

G PUMPS
- SPEC-MR-BEC-VP and F&D

K COMPRESSORS
- SPEC-MR-BEC-VP and F&D

TV. SPECIAL EQUIP
- SPEC-MR-BEC-VP and F&D

OXYGEN PLANT
- MR
- MCC
- VP
- F&D

MOLE SIEVE
- MR
- BEC
- VP
- F&D

WATER TREATMENT
- MR
- BEC
- VP
- F&D

DEMINERALIZER UNIT
- MR
- BEC
- VP
- F&D

CONV, DUMPERS, STACKERS, ETC
- MR
- BEC
- VP
- F&D

BULKS - PIANG, ELEC, INSTR.
- MR-BEC-F&D

CONSTRUCTION & TEMP FACILITIES
- CONST TEMP BLDGS & FACILITIES

SITE PREP
- MR
- BEC S/C
- SITE PREP

AREA 01 EQUIPMENT
- SET EQUIP.
- FDNS, U/G, STR. BASES
- PIPING
- ELECT & INSTR
- INSTALL PIPING & SPOOLS
- TESTING
- CLEAN/FLUSH EQUIP.
- NO-LOAD
- LOAD RACK
- EQUIP PLTFS
- ELECT & INSTR.
- CKT OUT & RUN-IN MOTORS
- COND PAINT & INSUL

AREA 02 - EQUIPMENT
- FDNS & U/G
- PIPING
- ELECT & INSTR
- SET PWR BLR
- SET EQUIP.
- CLEAN, INSPECT & NO-LOAD EQUIP.

AREA 03 EQUIPMENT
- FDNS & U/G
- PIPING
- ELECT. & INSTR
- SET COLD BOX & ZECK CAP W/STM DRIVE
- INSTALL SPOOLS

AREA 04 EQUIPMENT
- FDNS & U/G
- PIPING
- ELECT & INSTR
- SET EQUIP.
- OXYGEN PLANT
- OPERATIONAL CHECK

AREA 05 EQUIPMENT
- FDNS & U/G
- PIPING
- ELECT & INSTR
- SET EQUIPMENT
- SET STM DRIVE
- SET DISTRIBUTOR
- SEE VENDOR DRAWING
- CKT OUT

BUILDINGS
- EQUIP PTF
- CKT OUT & RUN-IN MOTORS

BOILERS
- MR
- BEC S/C
- CONSTRUCT BOILERS
- ERECT BOILER
- TEST
- CALIB, INSUL
- BOIL OUT
- STEAM ON

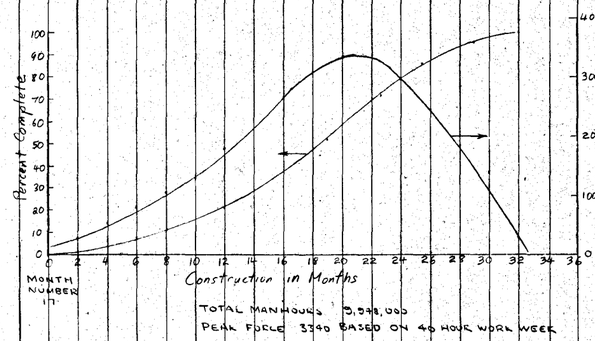
WATER RESERVOIR
- RESERVOIR

AREA 06 - EQUIPMENT
- SET EQUIP
- DUST COLLECTION SYSTEM

DUST COLLECTION SYSTEM
- FDNS AND U/G

FDNS & U/G
- ELECT & INSTR & PIPING

ELECT & INST & PIPING
- DIPING, ELECTR & INSTR



LEGEND

▽ MILESTONES

COMMON ABBREVIATIONS

A/G	ABOVE GROUND	MATL.	MATERIAL
APPVL	APPROVAL	MCC	MOTOR CONTROL CENTER
BEC	BID, EVALUATE & COMMIT.	MISC.	MISCELLANEOUS
BLDG.	BUILDING	MTO	MATERIAL TAKE OFF
C/A	CLIENT APPROVAL	PFD	PROCESS FLOW DIAGRAM
COL'S	COLUMNS	PKG.	PACKAGE
COMP	COMPLETE	PLTF	PLATFORM
CS	CARBON STEEL	PNL	PANEL
DEL	DELIVER	PO	PURCHASE ORDER
DES	DESIGN	PREL	PRELIMINARY
DESIG	DESIGNATION	PROC	PROCESS
DWG	DRAWING	PWY	PIPEWAY
ELEC	ELECTRICAL	S/C	SUBCONTRACT
ELEM	ELEMENTARY	SCH	SCHEDULE
ENGR	ENGINEERING	SPECS	SPECIFICATIONS
EQUIP	EQUIPMENT	SS	STAINLESS STEEL
FAB	FABRICATE	ST	START
FDN	FOUNDATIONS	STD	STANDARD
HTR	HEATER	STG	STORAGE
IFA	ISSUE FOR APPROVAL	STL	STEEL
IFC	ISSUE FOR CONSTRUCTION	STM	STEAM
IFM	ISSUE FOR MODEL	STRUCT	STRUCTURAL
INST	INSTALL	SUB STA	SUB STATION
INSTR	INSTRUMENT	SW GR	SWITCH GEAR
INSUL	INSULATION	U/G	UNDERGROUND
INTCON	INTERCONNECTING	UTIL	UTILITIES
M/R	MATERIAL REQUISITION	VP	VENDOR PRINT
M/R-P	M/R FOR PURCHASE		
M/R-Q	M/R FOR QUOTES		

OTHER

PROPRIETARY EQUIPMENT DELIVERY ONLY
APPROXIMATE, SPECS AND CHARACTERISTICS
NOT SHOWN, ALL EQUIPMENT & CITY

PRELIMINARY

NO.	DATE	REVISION	DWG BY	APP'D/APP'VD
△				
△				
△				
△				
1	9/1/79	ISSUED FOR INTERIM SCHEDULE REPORT		
0	9/14/79	ISSUED FOR ESTIMATE TIME FRAME		

BECHTEL

THE PITTSBURGH & MIDWAY COAL MINING CO.
SRC II DEMONSTRATION PLANT

E.P.C. SUMMARY SCHEDULE

JOB NO.	DRAWING NO.	REV.
13651	HPS-44	1

NOTE: DRAWING ISSUES FOR WEEKLY PROGRESS REPORTING ARE NOT NECESSARILY A REVISION OF THE BASIC SCHEDULE.

SCHEDULE REVISIONS WILL BE NOTED BY A NEW REVISION NUMBER AND ENTRY ABOVE THE TITLE BLOCK IN THE USUAL MANNER.

DATE 6/12/79

WEEK NO. | REV. NO.