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FE-415-T-6



MASTER ●

A Facsimile Report



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FE--415-T6

MASTER

**CONSOL LIGNITE GASIFICATION
PROCESS DEVELOPMENT**

Monthly Progress Reports for the
Period January - December, 1969

Consolidation Coal Company
Library, Pennsylvania 15129

Prepared for

Office of Coal Research
U. S. Department of the Interior

OCR Contract No. 14-01-0001-415(2)
and No. 14-01-0001-415(3)

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FE--415-T6

CONTENTS

Monthly Progress Reports 56 through 67 for each month
January through December, 1969, respectively

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January 1969

PROGRESS REPORT NO. 56
OCR CONTRACT NO. 14-01-0001-115(2)
CONSOL LIGNITE GASIFICATION PROCESS DEVELOPMENT

A. Summary

Phase I - Feasibility Study

Complete.

Phase II - Bench-Scale Experiments

All effort in this area is devoted to preparation of a final report on Phase II activities. This includes work to update the potential commercial economics of the lignite gasification process.

Phase III - Pilot Plant Engineering

Preparation was made to contact Stearns-Roger re contract negotiations.

Financial

Estimated expenditures in January were \$8,000. Cumulative expenses to date are \$1,813,837.

Lignite Gasification
Progress Report No. 56

-2-

January, 1969

B. Technical Results and Program

Phase II - Bench-Scale Research

1. Experimental Projects (Projects 530, 532, etc.)

Report No. 1, dealing with the mechanics of fluo-solids, has been final typed and tables and figures are out for reproduction. Five copies of this report will be submitted to OCR for approval on February 19.

Report No. 2, dealing with physico-chemical studies, is in final draft and now undergoing internal review and revision. We estimate approval copies will be sent to OCR on or about March 15.

Report No. 3, dealing with the operation of the continuous bench-scale unit, is still being drafted. We estimate that approval copies of this report will be sent to OCR on April 15.

2. Supporting Patent and Legal Activities (Project No. 534)

The current laboratory reports and memoranda were reviewed for determination of Subject Inventions.

3. Supporting Process and Economic Analysis (Project No. 533)

Work has continued on the reevaluation of the economics of the CSG Process as applied to lignite. The impact of process operating conditions and process variations on product gas price is being evaluated. This work will be completed on or about April 1, 1969.

Phase III - Pilot Plant Engineering

4. Catalytic Design (Project No. 533.30)

On January 28, instructions were received from OCR to proceed with negotiations with Stearns-Roger for construction and operation contracts. A meeting with Stearns-Roger is scheduled for early February.

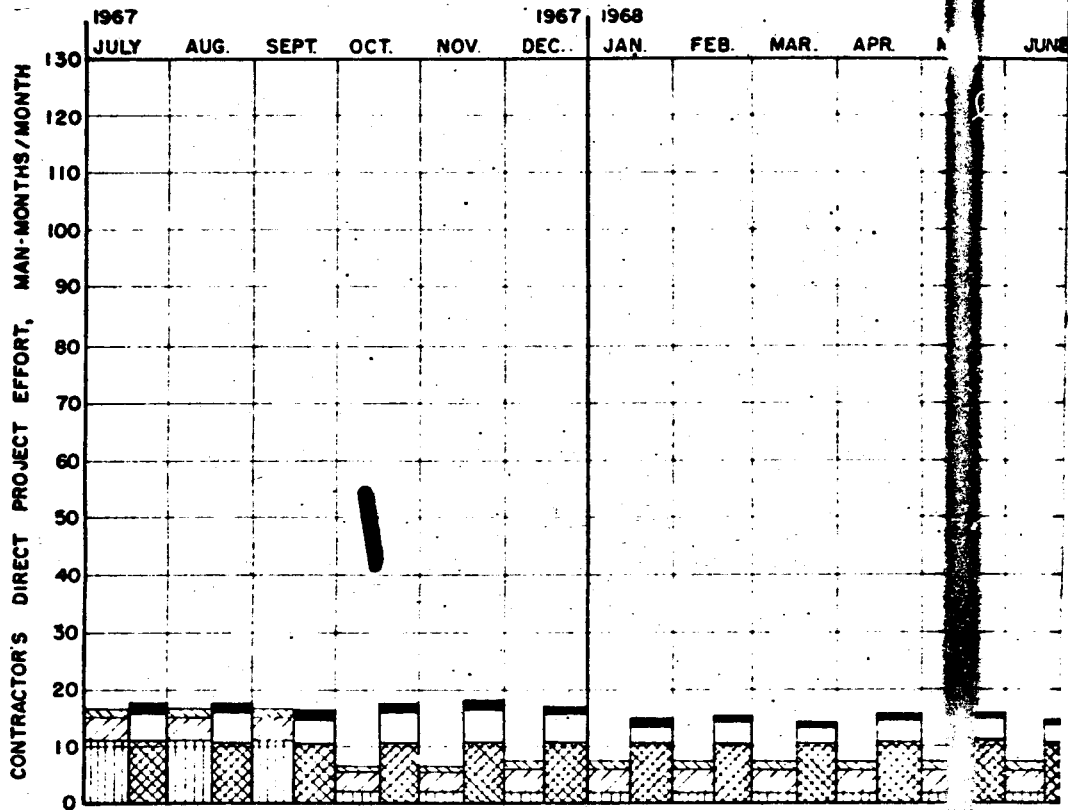
C. Subject Inventions

None.

D. Financial Status

<u>Expense</u>	<u>Actual</u>	<u>Budget</u>
Cumulative through December	\$ 1,805,837	\$ 3,575,000
Expended in period (estimate)	8,000	420,000
Cumulative through January	\$ 1,813,837	\$ 3,995,000

Att. - Monthly Progress Chart



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MONTHLY EXPENDITURES*

	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE
PREDICTED	103.7 M	72.2 M	92.0 M	94.0 M	94.0 M	52.0 M	40.0 M	20.0 M	70.0 M	70.0 M	12.0 M	220.0 M
ACTUAL	78.5 M	78.0 M	106.8 M	84.9 M	97.1 M	93.4 M	70.0 M	29.9 M	91.9 M	37.9 M	31.6 M	31.6 M

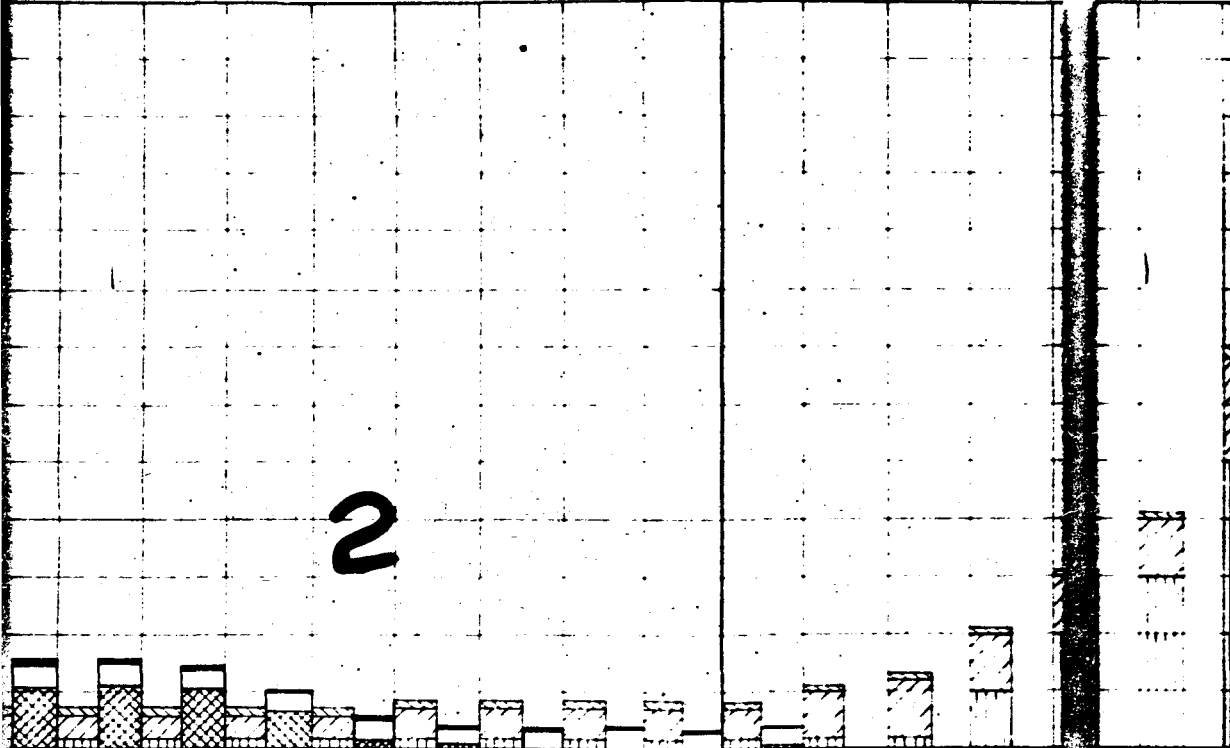
	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE
PREDICTED	1010.8 M	1083.0 M	1175.0 M	1269.0 M	1363.0 M	1415.0 M	1455.0 M	1475.0 M	1543.0 M	1615.0 M	1705.0 M	1955.0 M
ACTUAL	981.3 M	1089.3 M	1166.1 M	1251.0 M	1348.1 M	1441.5 M	1511.5 M	1541.4 M	1633.3 M	1671.2 M	1705.0 M	1732.1 M

CUMULATIVE EXPENDITURES*

* Expenditures Include All Costs & Fees.

MONTHLY
CONT

1968 1969
PR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY JUNE



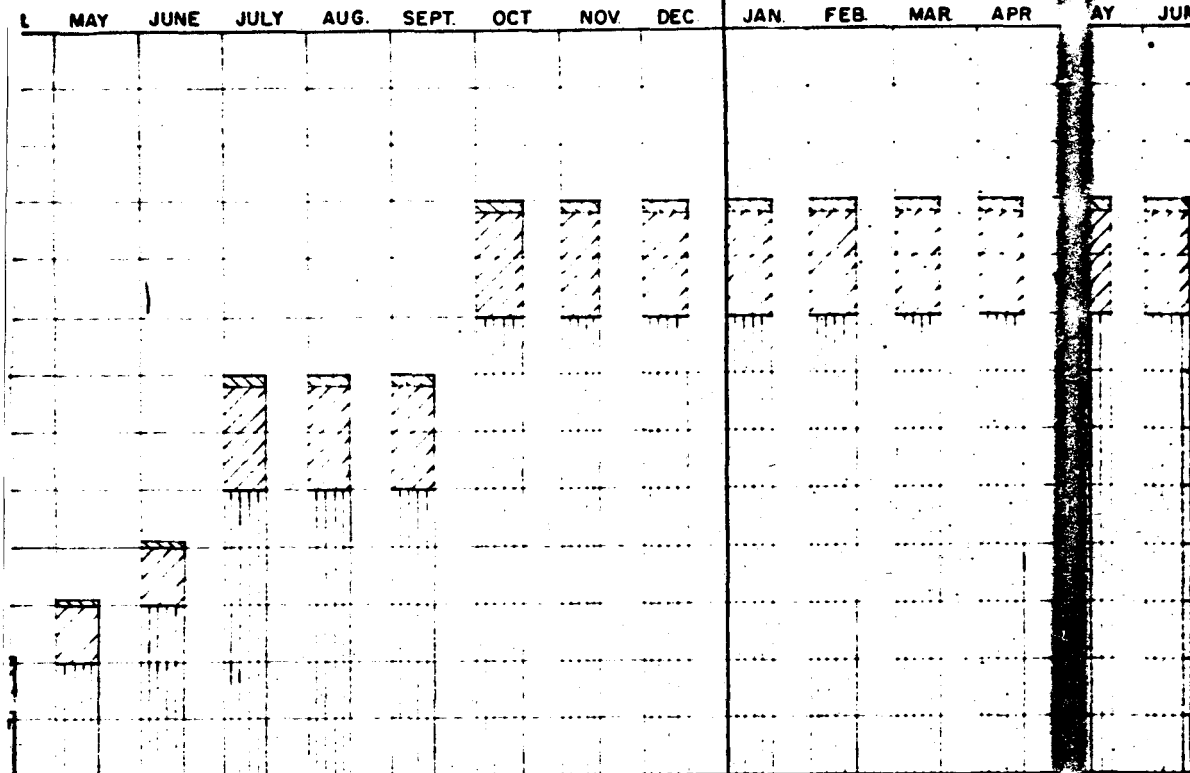
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2 M	30.1 M	31.6 M	19.8 M	13.7 M	9.9 M	9.4 M	8.4 M	11.9 M	8.0 M					
PR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE
0 M	1735.0 M	1955.0 M	2175.0 M	2395.0 M	2615.0 M	2935.0 M	3255.0 M	3575.0 M	3995.0 M	4285.0 M	4575.0 M	4815.0 M	0 M	5455.0 M
2 M	1701.3 M	1732.9 M	1752.7 M	1766.4 M	1776.3 M	1785.7 M	1794.1 M	1802.9 M	1813.8 M					

MONTHLY PROGRESS CHART

CONTRACT No. 14-01-0001-415

1969 1970



160.0 M 480.0 M 1000.0 M 1000.0 M 1000.0 M 1500.0 M 1500.0 M 1500.0 M 1250.0 M 1250.0 M 1250.0 M 1250.0 M 1500.0 M 1250.0 M

PR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY JUN

50 M 4975.0 M 5455.0 M 5555.0 M 5655.0 M 5755.0 M 5905.0 M 6055.0 M 6205.0 M 6330.0 M 6455.0 M 6580.0 M 6705.0 M 6830.0 M 6955.0 M

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1970												1971			
APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUN.	
125.0 M	125.0 M	125.0 M	125.0 M	125.0 M	125.0 M	125.0 M	125.0 M	125.0 M	125.0 M	125.0 M	25.0 M	125.0 M	125.0 M	170.0 M	
6705.0 M	6830.0 M	6955.0 M	7080.0 M	7205.0 M	7330.0 M	7455.0 M	7580.0 M	7705.0 M	7830.0 M	7955.0 M	8080.0 M	8205.0 M	8330.0 M	8455.0 M	

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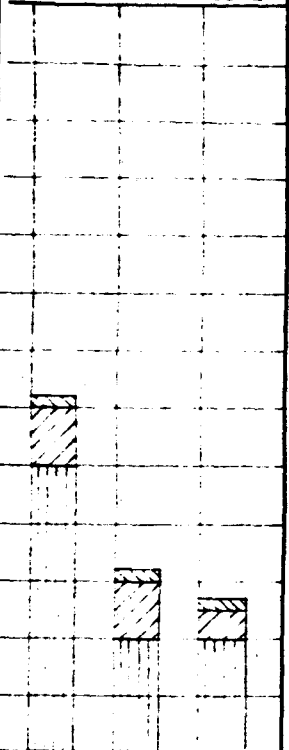
DATE: February, 1969

1971

APR. MAY JUNE

	PREDICTED	ACTUAL
SUPERVISING		
PROFESSIONAL		
TECHNICIAN		

⊕ Includes Supervisory Exempt Technicians.
 ⊗ Includes Clerical.



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MONTHLY PROGRESS CHART

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CONTRACT No. 14-01-0001-415

PROGRESS REPORT NO. 57
 OCR CONTRACT NO. 14-01-0001-415(2)
CONSOL LIGNITE GASIFICATION PROCESS DEVELOPMENT

February 1 to 28, 1969

A. Summary

Phase I - Feasibility Study

Complete.

Phase II - Bench-Scale Experiments

Report preparation continues.

Phase III - Pilot Plant Engineering

Updated construction costs (based on a July, 1969 start of construction) have been received from Stearns-Roger. By comparison with the November, 1968 proposals from other contractors, Stearns-Roger remains the preferred proposer, and negotiations will continue in March.

Financial

Estimated expenditures in February were \$18,000. Cumulative expenses to date are \$1,836,674.

B. Technical Results and ProgramPhase II - Bench-Scale Research1. Experimental Projects (Projects 530, 532, etc.)

Final report preparation continues. Assembly of Report No. 2 is delayed by late arrival of reduced figures and tables. Approval copies will be sent to OCR on or about April 1, 1969. Report No. 3 is still being drafted, and in view of its volume, probably will not be completed in final form until May.

2. Supporting Patent and Legal Activities (Project 534)

The current laboratory reports and memoranda were reviewed for determination of Subject Inventions.

3. Supporting Process and Economic Analysis (Project 533)

Work continued on the updating of the gas-from-lignite feasibility study. The basic process scheme has been optimized, and we are exploring the effect of byproducts (boiler char and hydrogen) on the economic attractiveness.

Cost estimation has begun, and preparation of the report to OCR should be started in late March.

Phase III - Pilot Plant Engineering4. Catalytic Design (Project No. 533.30)

Pursuant to OCR instructions, a meeting with Stearns-Roger was held on February 3, 1969. S-R's prices for the pilot plant construction were firm only until February 4, 1969, and it was agreed that S-R would obtain new commitments from vendors and subcontractors on the assumption that construction would start in July, 1969. In addition, the updated proposal will include the engineering required to certify the Catalytic mechanical design and the purchase of a performance bond.

On February 20, the revised figures shown below were received from S-R. A comparison is shown with the other comparable proposals received in November, 1968 (see RM-11990).

	<u>S-R Revised</u>	<u>Procon</u>	<u>Catalytic</u>
Estimated Cost	\$ 7,910,000	\$ 8,100,000	\$ 8,382,000
Fee	136,000	162,000	193,000
Cost + Fixed Fee	\$ 8,046,000	\$ 8,262,000	\$ 8,575,000
Guaranteed Maximum	\$ 8,517,000	-	-

As shown by the above comparison, S-R remains the preferred proposer.

Drafts of the proposed construction contract and operations contract have been forwarded to S-R for review, and a meeting with S-R officials is scheduled for early March.

C. Subject Inventions

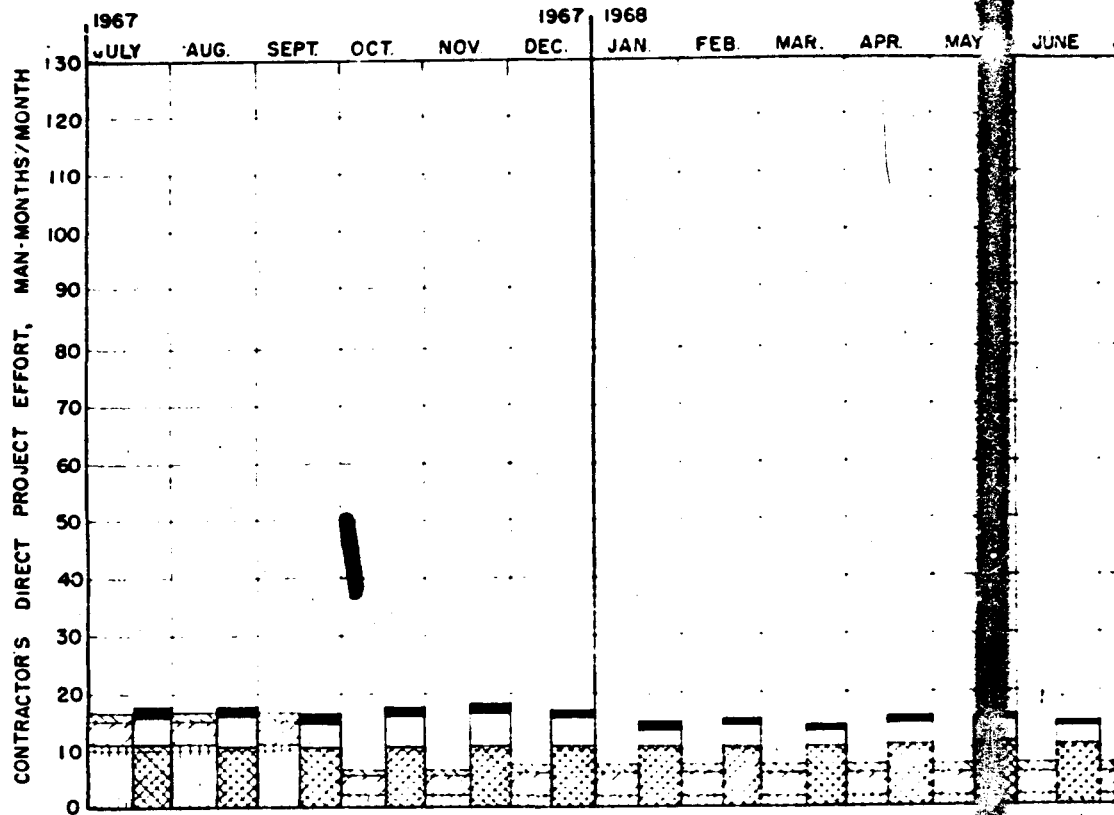
None.

D. Financial Status

	<u>Actual</u>	<u>Budget</u>
Cumulative through January	\$ 1,818,674	\$ 3,995,000
Expended in Period (estimate)	18,000	290,000
	\$ 1,836,674	\$ 4,285,000

3/12/69

Att. - Monthly Progress Chart



MONTHLY EXPENDITURES*

	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE
PREDICTED	103.7 M	72.2 M	92.0 M	94.0 M	94.0 M	52.0 M	40.0 M	20.0 M	70.0 M	70.0 M	20.0 M	220.0 M
ACTUAL	75.5 M	78.0 M	106.6 M	84.9 M	97.1 M	93.4 M	70.0 M	29.9 M	91.9 M	37.9 M	30.0 M	31.6 M

CUMULATIVE EXPENDITURES*

	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE
PREDICTED	103.7 M	175.9 M	267.9 M	361.9 M	455.9 M	507.9 M	547.9 M	567.9 M	637.9 M	707.9 M	727.9 M	947.9 M
ACTUAL	75.5 M	153.5 M	260.1 M	345.0 M	442.1 M	535.5 M	605.5 M	635.4 M	727.3 M	765.2 M	795.2 M	826.8 M

* Expenditures Include All Costs & Fees.

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MONTHLY
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MAY JUNE JULY AUG. SEPT. OCT NOV DEC 1968 1969 JAN. FEB. MAR. APR. M JUNE

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120.0 M	220.0 M	220.0 M	220.0 M	220.0 M	320.0 M	320.0 M	320.0 M	420.0 M	290.0 M	290.0 M	240.0 M	480.0 M	
30.1 M	31.6 M	19.8 M	13.7 M	9.4 M	9.4 M	6.4 M	9.4 M	12.9 M	12.9 M				
MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE
1735.0 M	1935.0 M	2175.0 M	2395.0 M	2615.0 M	2935.0 M	3255.0 M	3475.0 M	399.0 M	428.0 M	457.0 M	485.0 M	513.0 M	541.0 M
1701.3 M	1732.9 M	1752.7 M	1766.4 M	176.3 M	1785.7 M	1794.1 M	1801.9 M	1819.7 M	1836.7 M				

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MONTHLY PROGRESS CHART

CONTRACT No. 14-01-0001-415

1969 1970

APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY JUN.

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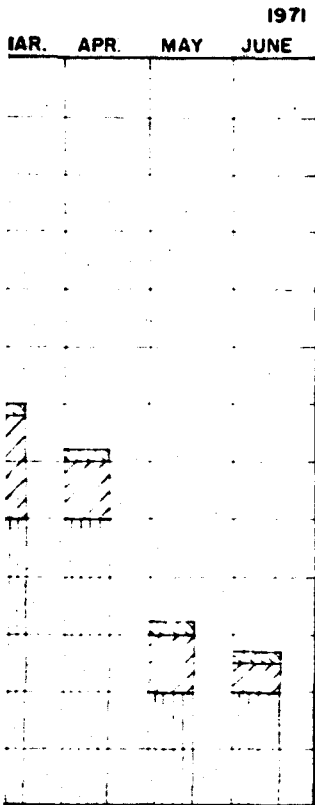
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APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY JUN.

4815.0 M 4975.0 M 5455.0 M 5555.0 M 5655.0 M 5755.0 M 5905.0 M 6055.0 M 6205.0 M 6330.0 M 6455.0 M 6580.0 M 6705.0 M 6830.0 M 6955.0 M

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DATE: February, 1969



	PREDICTED	ACTUAL
SUPERVISING		
PROFESSIONAL		*
TECHNICIAN		**

* Includes Supervisory Exempt Technicians
 ** Includes Clerical.

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15.0 M	125.0 M	125.0 M	170.0 M
JAN.	APR.	MAY	JUNE
80.0 M	8205.0 M	8330.0 M	8500.0 M

MONTHLY PROGRESS CHART

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 DEPARTMENT OF THE INTERIOR

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 RESEARCH DIVISION LIBRARY, PA.

CONTRACT No. 14-01-0001-415

PROGRESS REPORT NO. 58
 OCR CONTRACT NO. 14-01-0001-415(2)
 CONSOL LIGNITE GASIFICATION PROCESS DEVELOPMENT

March 1 to 31, 1969

A. Summary

Phase I - Feasibility Study

Complete.

Phase II - Bench-Scale Experiments

Report preparation continues.

Phase III - Pilot Plant Engineering

Negotiations with Stearns-Roger continued in March. Contracts for construction and operation of the Rapid City pilot plant are in preparation.

Financial

Estimated expenditures in February were \$11,000. Cumulative expenses to date are \$1,844,674.

B. Technical Results and Program

Phase II - Bench-Scale Research

1. Experimental Projects (Projects No. 530, 532, etc.)

Final report preparation continues. Approval copies of Volume III, Book 2, "Pilot Plant Research - Phase I, Research on CSG Process, Laboratory Physico-Chemical Studies," were forwarded to OCR on March 17, 1969. Draft preparation of Report No. 3 is still under way.

2. Supporting Patent and Legal Activities (Project No. 534.00)

The current laboratory reports and memoranda were reviewed for determination of Subject Inventions.

3. Supporting Process and Economic Analyses (Project No. 533.00)

The updating of the economics of pipeline gas from lignite via the CO₂ Acceptor Process is almost complete. Major drawings have been completed and tables are now being typed. The text of the report is now in preparation.

Approval copies of this report will be forwarded to OCR in the latter part of May.

Phase III - Pilot Plant Engineering

4. Catalytic Design (Project No. 533.30)

Meetings were held with Stearns-Roger on March 6 and 7, and on March 24 and 25, to discuss the costing and contractual arrangements involved in the construction and operation of the Rapid City pilot plant. As of the end of March, revised draft contracts for both phases of the pilot plant development have been prepared and are being reviewed by Stearns-Roger and Consol representatives.

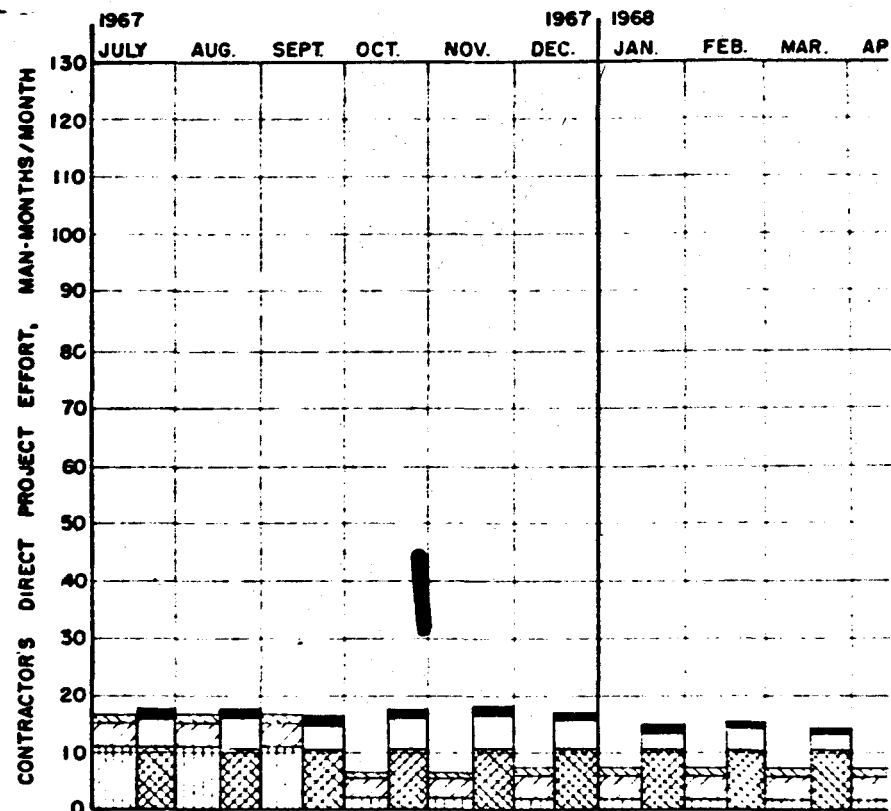
C. Subject Inventions

None.

D. Financial Status

	Actual	Budget
Cumulative through February, 1969	\$ 1,833,674	\$ 4,285,000
Expended in Period (estimate)	11,000	290,000
Cumulative through March, 1969	\$ 1,844,674	\$ 4,575,000

Att. - Monthly Progress Chart
4/10/69



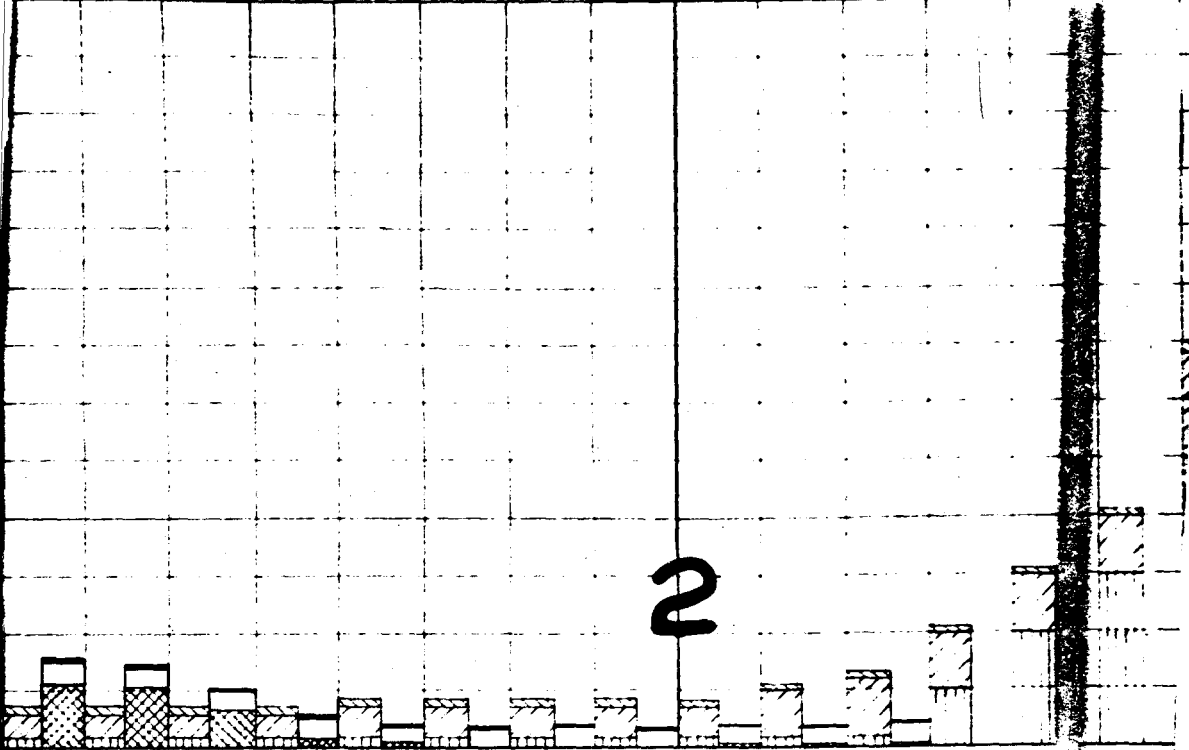
	MONTHLY EXPENDITURES*												
	1967	1967					1968		1968				
	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUN.	
PREDICTED	103.7 M	72.2 M	92.0 M	94.0 M	94.0 M	52.0 M	40.0 M	20.0 M	70.0 M	70.0 M	70.0 M	70.0 M	
ACTUAL	75.5 M	78.0 M	106.8 M	84.9 M	97.1 M	93.4 M	70.0 M	29.9 M	91.9 M	91.9 M	91.9 M	37.0 M	

	CUMULATIVE EXPENDITURES*												
	1967	1967					1968		1968				
	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUN.	
PREDICTED	1010.8 M	1083.0 M	1175.0 M	1269.0 M	1363.0 M	1415.0 M	1455.0 M	1475.0 M	1545.0 M	1615.0 M	1685.0 M	1755.0 M	
ACTUAL	981.3 M	1059.3 M	1166.1 M	1251.0 M	1348.1 M	1441.5 M	1511.5 M	1541.4 M	1633.3 M	1725.2 M	1817.1 M	1854.1 M	

* Expenditures Include All Costs & Fees.

MONTHLY
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MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC. 1968 1969 JAN. FEB. MAR. APR. MAY JUNE



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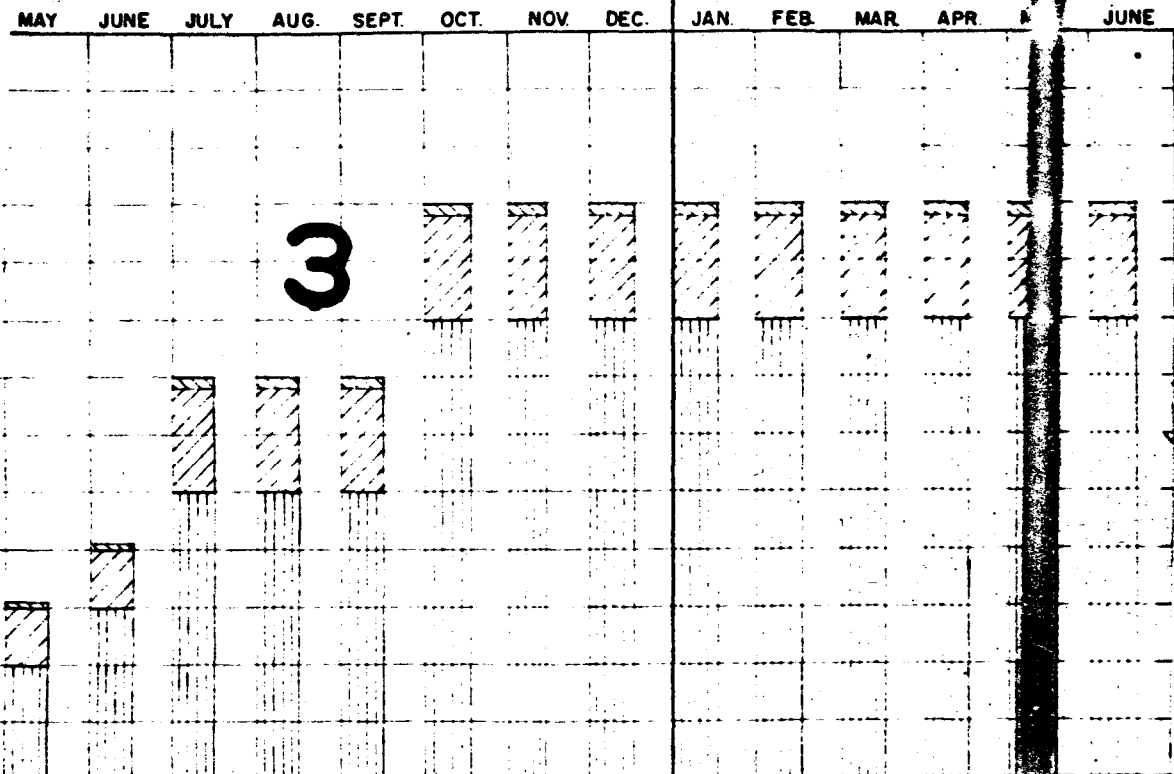
120.0 M	220.0 M	220.0 M	220.0 M	220.0 M	320.0 M	320.0 M	320.0 M	420.0 M	290.0 M	290.0 M	240.0 M	60.0 M	480.0 M
30.1 M	31.6 M	19.8 M	13.7 M	9.9 M	9.4 M	8.4 M	11.9 M	1.8 M	15.0 M	11.0 M			
MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	M.	JUNE
1735.0 M	1955.0 M	2178.0 M	2395.0 M	2615.0 M	2935.0 M	3255.0 M	3775.0 M	3995.0 M	4285.0 M	4575.0 M	485.0 M	497.0 M	5455.0 M
1701.3 M	1732.9 M	1752.7 M	1766.4 M	1776.3 M	1785.7 M	1794.1 M	1807.0 M	1818.7 M	1833.7 M	1844.7 M			

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MONTHLY PROGRESS CHART

CONTRACT No. 14-01-0001-415

1969 1970

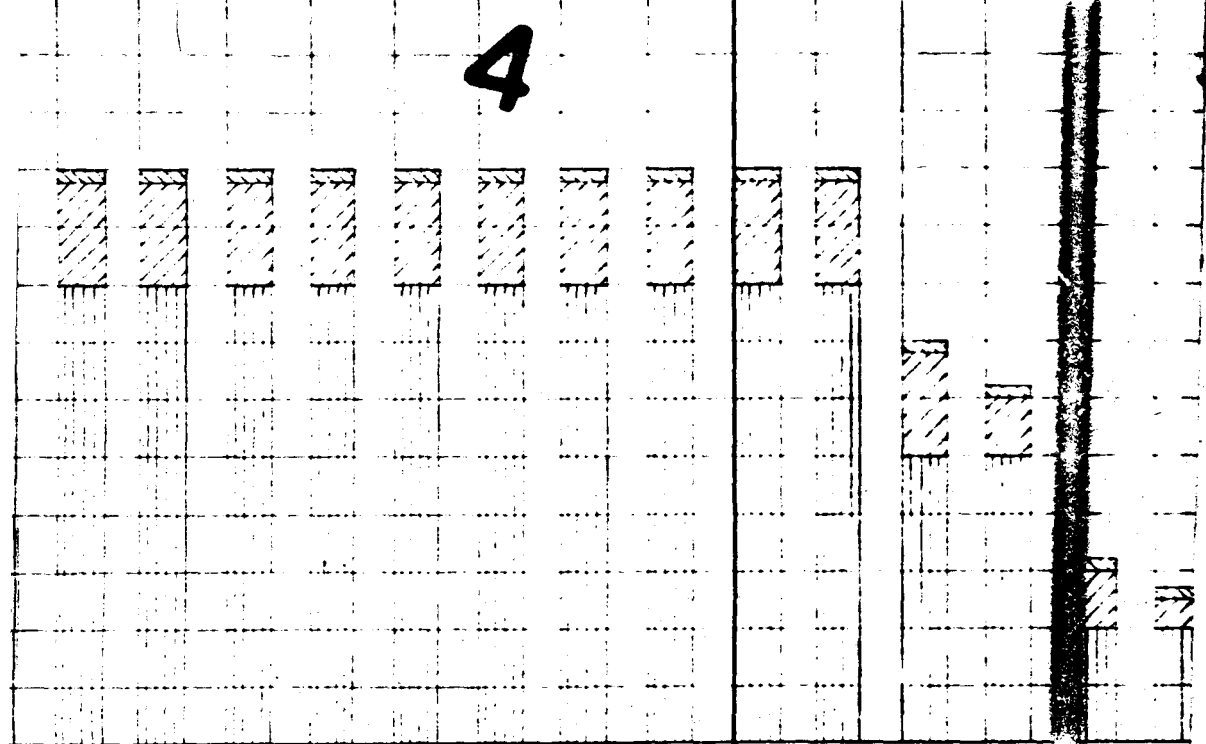


Month	Progress (M)
MAY	4975.0
JUNE	5455.0
JULY	5555.0
AUG.	5655.0
SEPT.	5755.0
OCT.	5905.0
NOV.	6055.0
DEC.	6205.0
JAN.	6330.0
FEB.	6455.0
MAR.	6580.0
APR.	6705.0
MAY	6830.0
JUNE	6955.0

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1970 1971
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4



0 M 125.0 M 125.0 M 125.0 M 125.0 M 125.0 M 125.0 M 125.0 M 125.0 M 125.0 M 125.0 M 25.0 M 125.0 M 125.0 M 125.0 M

PR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY JUNE

90 M 6630.0 M 6345.0 M 7080.0 M 7205.0 M 7330.0 M 7455.0 M 7580.0 M 7705.0 M 7830.0 M 7955.0 M 3080.0 M 8205.0 M 8330.0 M 8455.0 M

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DATE: March, 1969



PREDICTED ACTUAL

SUPERVISING [Hatched Box] [Solid Black Box]

PROFESSIONAL [Hatched Box] [White Box with *]

TECHNICIAN [Hatched Box] [Hatched Box with *]

* Includes Supervisory Exempt Technicians
 ** Includes Clerical.

5

25.0 M	125.0 M	125.0 M	170.0 M
MAR.	APR.	MAY	JUNE
8080.0 M	8205.0 M	8330.0 M	8500.0 M

MONTHLY PROGRESS CHART

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CONSOLIDATION COAL CO.
 RESEARCH DIVISION LIBRARY, PA.

CONTRACT No. 14-01-0001-415

PROGRESS REPORT NO. 59
 O.C.R. CONTRACT NO. 14-01-0001-415(2)
CONSOL. LIGNITE GASIFICATION PROCESS DEVELOPMENT

April 1 to 30, 1969

A. Summary

Phase I - Feasibility Study

Complete.

Phase II - Bench-Scale Experiments

Report preparation continues.

Phase III - Pilot Plant Engineering

Contract documents for the construction and operation of the Rapid City pilot plant were forwarded to O.C.R. in April.

Financial

Estimated expenditures in February were \$13,000. Cumulative expenses to date are \$1,859,101.

B. Technical Results and Program

Phase II - Bench-Scale Research

1. Experimental Projects (Projects No. 530, 532, etc.)

Work on Book 3 of R & D Report No. 16, Interim Report No. 3 continues. The first draft of this report is now complete and under-going review.

2. Supporting Patent and Legal Activities (Project No. 534)

The current laboratory reports and memoranda were reviewed for determination of Subject Inventions.

3. Supporting Process and Economic Analyses (Project No. 533)

The report presenting updated economics on the CSG Process is completed in draft form. Review and final typing are under way.

Phase III - Pilot Plant Engineering

4. Catalytic Design (Project No. 533.30)

Mutually satisfactory drafts of subcontracts between Stearns-Roger and Consol for the construction and operation of the Rapid City pilot plant were forwarded to OCR for approval on April 24.

The pilot plant model was set up in Sioux Falls, South Dakota on April 28 and subsequently moved to the Mundt Memorial Library, Madison, South Dakota. Brochures describing the process were prepared.

C. Subject Inventions

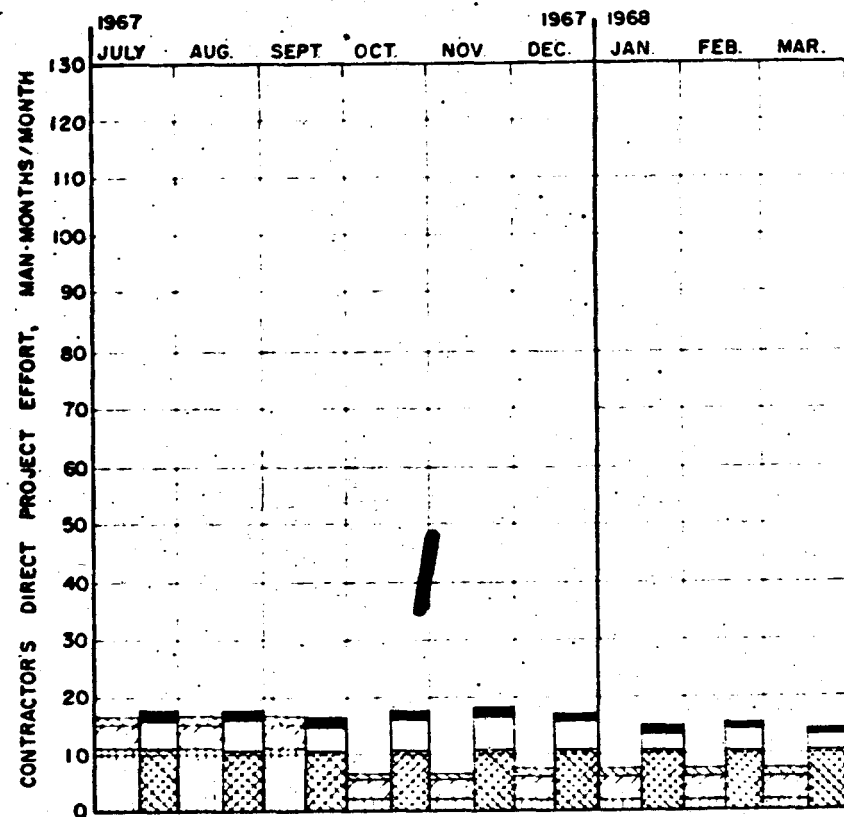
None.

D. Financial Status

<u>Expense</u>	<u>Actual</u>	<u>Budget</u>
Cumulative through March, 1969	\$ 1,846,101	\$ 4,575,000
Expended in Period (estimate)	13,000	240,000
Cumulative through April, 1969	\$ 1,859,101	\$ 4,815,000

Att. - Monthly Progress Chart

5/14/69



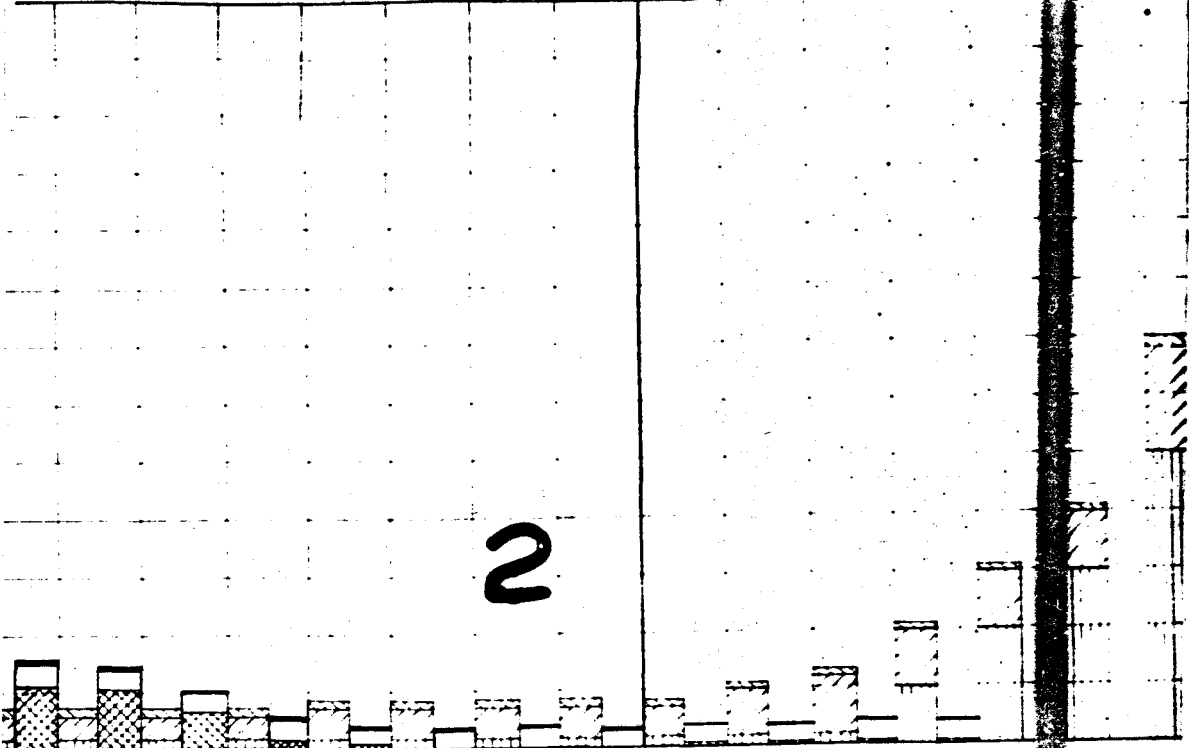
	MONTHLY EXPENDITURES*								
	1967	1967	1967	1967	1967	1967	1968	1968	1968
	JULY	AUG.	SEPT	OCT.	NOV	DEC.	JAN.	FEB.	MAR.
PREDICTED	103.7 M	72.2 M	92.0 M	94.0 M	94.0 M	52.0 M	47.0 M	20.0 M	70.0 M
ACTUAL	75.5 M	78.0 M	106.8 M	84.9 M	97.1 M	93.4 M	70.0 M	29.9 M	91.9 M
PREDICTED	1010.6 M	1083.0 M	1175.0 M	1269.0 M	1363.0 M	1415.0 M	1455.0 M	1475.0 M	1545.0 M
ACTUAL	981.3 M	1059.3 M	1166.1 M	1251.0 M	1348.1 M	1441.5 M	1511.5 M	1541.4 M	1633.3 M

CUMULATIVE EXPENDITURES*

* Expenditures Include All Costs & Fees.

MONTHLY
CONTRACT

1968 1969
 Y JUNE JULY AUG. SEPT. OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY JUNE JUL



2

5.0 M	220.0 M	220.0 M	220.0 M	220.0 M	320.0 M	320.0 M	320.0 M	420.0 M	290.0 M	290.0 M	240.0 M	160.0 M	480.0 M	194
31.6 M	31.6 M	19.8 M	13.7 M	9.9 M	34 M	8.4 M	11.4 M	1.8 M	164 M	11.0 M	13.2 M			
MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JUL
395.0 M	1955.0 M	2175.0 M	2395.0 M	2615.0 M	2935.0 M	3255.0 M	3575.0 M	3995.0 M	4285.0 M	4575.0 M	4815.0 M	4975.0 M	5455.0 M	58
18.3 M	1732.9 M	1752.7 M	1766.4 M	1776.3 M	1785.7 M	1794.1 M	1807.9 M	1819.7 M	1835.1 M	1846.1 M	1859.1 M			

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MONTHLY PROGRESS CHART

CONTRACT No. 14-01-0001-415

1969 1970

MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY JUNE

3

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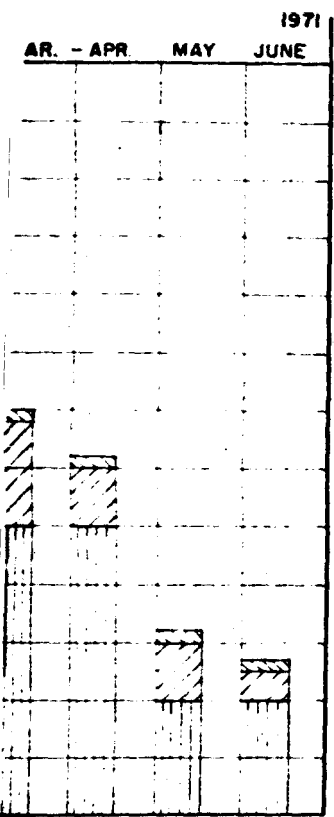
160.0 M	480.0 M	100.0 M	100.0 M	100.0 M	150.0 M	150.0 M	150.0 M	125.0 M	125.0 M	125.0 M	125.0 M	125.0 M	125.0 M
MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE
4975.0 M	5455.0 M	5555.0 M	5655.0 M	5755.0 M	5905.0 M	5055.0 M	6205.0 M	6330.0 M	6455.0 M	6580.0 M	6705.0 M	6800.0 M	6955.0 M

1970												1971		
APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUN.
125.0 M	125.0 M	125.0 M	125.0 M	125.0 M	125.0 M	125.0 M	125.0 M	125.0 M	125.0 M	125.0 M	25.0 M	125.0 M	125.0 M	17
6705.0 M	6830.0 M	6955.0 M	7080.0 M	7205.0 M	7330.0 M	7455.0 M	7580.0 M	7705.0 M	7830.0 M	7955.0 M	8080.0 M	8205.0 M	8330.0 M	8455.0 M

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DATE: April, 1969



PREDICTED ACTUAL

SUPERVISING [diagonal hatching] [solid black]

PROFESSIONAL [diagonal hatching] [white box]

TECHNICIAN [diagonal hatching] [diagonal hatching]

⊕ Includes Supervisory Exempt Technicians
 ⊕⊕ Includes Clerical.

5

MONTHLY PROGRESS CHART

OFFICE OF COAL RESEARCH
 DEPARTMENT OF THE INTERIOR

CONSOLIDATION COAL CO.
 RESEARCH DIVISION LIBRARY, PA.

CONTRACT No. 14-01-0001-415

PROGRESS REPORT NO. 60
 OCR CONTRACT NO. 14-01-0001-415(2)
CONSOL LIGNITE GASIFICATION PROCESS DEVELOPMENT

May 1 to 31, 1969

A. Summary

Phase I - Feasibility Study

Complete.

Phase II - Bench-Scale Experiments

Report preparation continues.

Phase III - Pilot Plant Engineering

Contract documents for pilot plant construction and operation were revised following a meeting with OCR on May 23. The revised documents are now being reviewed by Stearns-Roger.

Financial

Estimated expenditures in May were \$10,000. Cumulative expenses to date are \$1,870,510.

B. Technical Results and Program

Phase II - Bench-Scale Research

1. Experimental Projects (Project No. 530, 532, etc.)

Work on Book 3, Interim Report No. 3 of R & D Report No. 16 is still continuing. Final typing of the report will start in mid-June.

2. Supporting Patent and Legal Activities (Project No. 534)

The current laboratory reports and memoranda were reviewed for Subject Inventions.

3. Supporting Process and Economic Analyses (Project No. 533)

Approval copies of Interim Report No. 4, R & D Report No. 16, were submitted to OCR on May 13, 1967. OCR approval was received on May 21, 1967 and preparation of the necessary masters, etc., for publication has begun.

Phase III - Pilot Plant Engineering

4. Catalytic Design (Project No. 533.30)

A meeting was held with OCR on May 23 to review contract documents for the construction and operation of the Rapid City Pilot Plant. Revised documents, based upon the above review, have been resubmitted to Stearns-Roger for review.

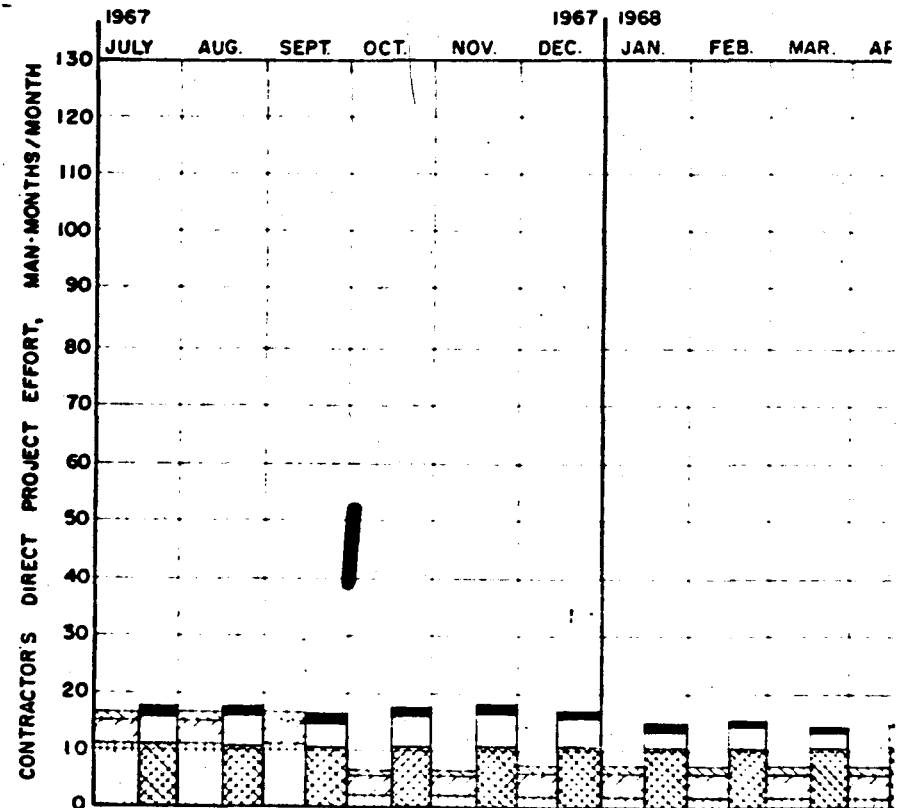
C. Subject Inventions

None.

D. Financial Status

Expense	Actual	Budget
Cumulative through April, 1969	\$ 1,860,510	\$ 4,815,000
Expended in Period (estimate)	10,000	160,000
Cumulative through May, 1969	\$ 1,870,510	\$ 4,975,000

Att. - Monthly Progress Chart
6/11/69



	MONTHLY EXPENDITURES*											
	1967	1967	1967	1967	1967	1967	1967	1968	1968	1968	1968	1968
	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUN.
PREDICTED	103.7 M	72.2 M	92.0 M	94.0 M	94.0 M	92.0 M	40.0 M	20.0 M	70.0 M	70.0 M	70.0 M	70.0 M
ACTUAL	75.5 M	78.0 M	106.6 M	84.9 M	97.1 M	93.4 M	70.0 M	29.9 M	91.9 M	37.9 M	37.9 M	37.9 M
PREDICTED	1010.6 M	1083.0 M	1174.0 M	1269.0 M	1363.0 M	1415.0 M	1455.0 M	1475.0 M	1543.0 M	1615.0 M	1675.0 M	1715.0 M
ACTUAL	981.3 M	1059.3 M	1166.1 M	1251.0 M	1348.1 M	1441.5 M	1511.5 M	1541.4 M	1633.3 M	1671.2 M	1671.2 M	1671.2 M

CUMULATIVE EXPENDITURES*

* Expenditures Include All Costs & Fees.

MO THLY
CONT

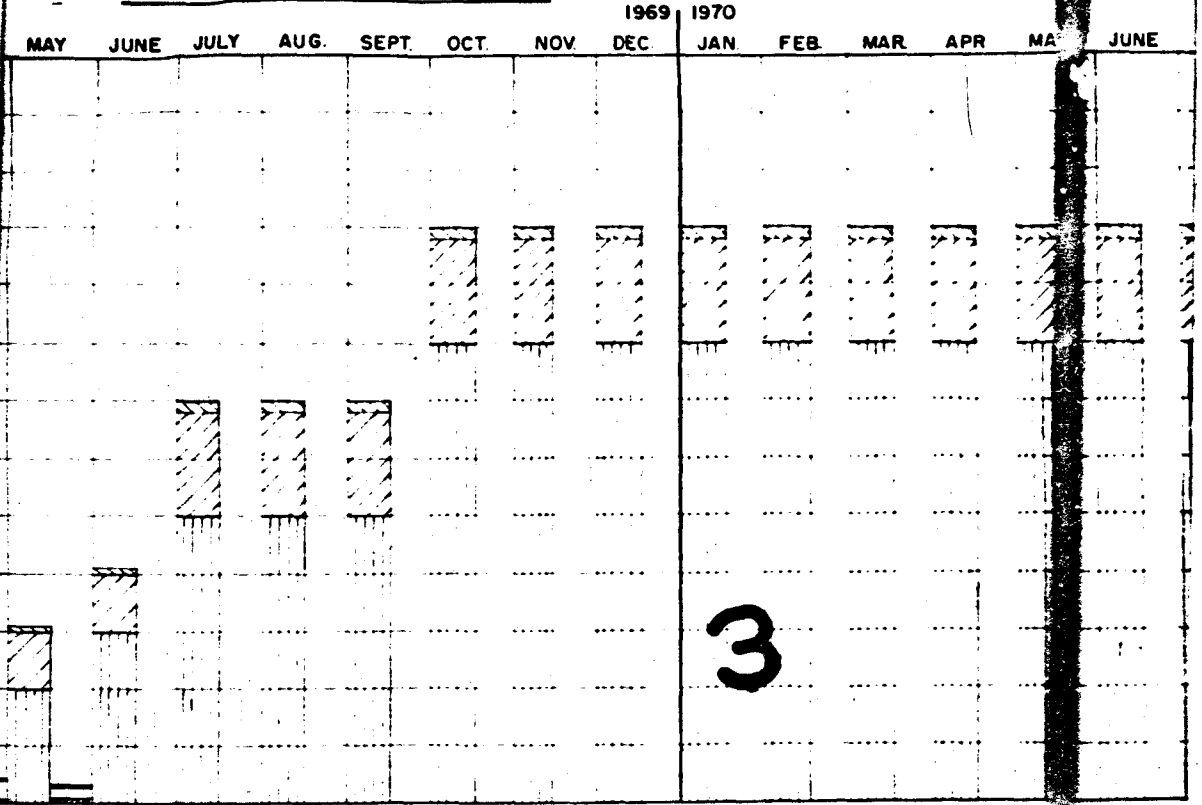
1968							1969						
MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE
20.0 M	220.0 M	220.0 M	220.0 M	220.0 M	320.0 M	320.0 M	320.0 M	420.0 M	290.0 M	290.0 M	240.0 M	60.0 M	480.0 M
30.1 M	31.6 M	19.8 M	13.7 M	9.9 M	9.4 M	8.4 M	11.8 M	1.8 M	16.4 M	12.0 M	13.4 M	10.0 M	
MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE
735.0 M	1955.0 M	2175.0 M	2395.0 M	2615.0 M	2935.0 M	3255.0 M	3575.0 M	3995.0 M	4285.0 M	4575.0 M	4815.0 M	4975.0 M	5455.0 M
181.3 M	1732.9 M	1752.7 M	1766.4 M	1776.3 M	1785.7 M	1794.1 M	1802.9 M	1818.7 M	1835.1 M	1847.1 M	1860.5 M	8.70	

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MONTHLY PROGRESS CHART

CONTRACT No. 14-01-0001-415



160.0 M	480.0 M	100.0 M	100.0 M	100.0 M	150.0 M	150.0 M	150.0 M	125.0 M	125.0 M	125.0 M	125.0 M	125.0 M	125.0 M	125.0 M
100.0 M														
MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	
4975.0 M	5455.0 M	5555.0 M	5655.0 M	5755.0 M	5905.0 M	6055.0 M	6205.0 M	6330.0 M	6455.0 M	6580.0 M	6705.0 M	6830.0 M	6955.0 M	
1870.5 M														

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1970												1971	
MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE
125.0 M	125.0 M	125.0 M	125.0 M	125.0 M	125.0 M	125.0 M	125.0 M	125.0 M	125.0 M	25.0 M	125.0 M	125.0 M	125.0 M
6830.0 M	6955.0 M	7080.0 M	7205.0 M	7330.0 M	7455.0 M	7580.0 M	7705.0 M	7830.0 M	7955.0 M	8080.0 M	8205.0 M	8330.0 M	8455.0 M

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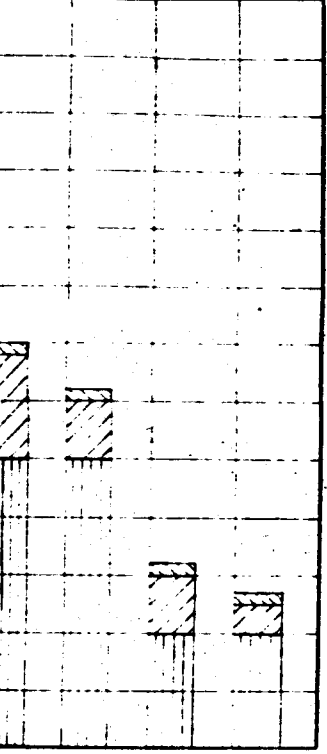
DATE: *May, 1969*

1971

MAR. APR. MAY JUNE

	PREDICTED	ACTUAL
SUPERVISING		
PROFESSIONAL		
TECHNICIAN		

Ⓢ Includes Supervisory Exempt Technicians.
 ⓈⓈ Includes Clerical.



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25.0 M 125.0 M 125.0 M 170.0 M

MAR. APR. MAY JUNE

8080.0 M 8205.0 M 8330.0 M 8500.0 M

MONTHLY PROGRESS CHART
 OFFICE OF COAL RESEARCH
 DEPARTMENT OF THE INTERIOR
CONSOLIDATION COAL CO.
 RESEARCH DIVISION LIBRARY, PA.
 CONTRACT No. 14-01-0001-415

PROGRESS REPORT NO. 61
 OCR CONTRACT NO. 14-01-0001-415(2)
CONSOL LIGNITE GASIFICATION PROCESS DEVELOPMENT

June 1 to 30, 1969

A. Summary

Phase I - Feasibility Study

Complete.

Phase II - Bench-Scale Experiments

Report preparation continues.

Phase III - Pilot Plant Engineering

A pre-contract audit was conducted, preparatory to signing contracts for the construction and operation of the Rapid City Pilot Plant.

Financial

Estimated expenditures were \$10,000. Cumulative expense to date is \$1,880,510.

B. Technical Results and Program

Phase II - Bench-Scale Research

1. Experimental Projects (Project No. 530, 532, etc.)

Final typing of Book 3, Interim Report No. 3 of R & D Report No. 16 is in progress. An approval copy of this report will be submitted to OCR in early July.

2. Supporting Patent and Legal Activities (Project No. 534)

The current laboratory reports and memoranda were reviewed for Subject Inventions.

3. Supporting Process and Economic Analyses (Project No. 533)

No work was done on this project in June.

Phase III - Pilot Plant Engineering

4. Catalytic Design (Project No. 533.30)

A brief review was made of several alternatives involving reactors and their arrangement.

The plant model was moved from Madison, South Dakota, to Rapid City, South Dakota, and put on display in the First National Bank.

A pre-contract audit was conducted by the Defense Contract Auditing Agency at Consol, Stearns-Roger, and Continental Oil Company offices.

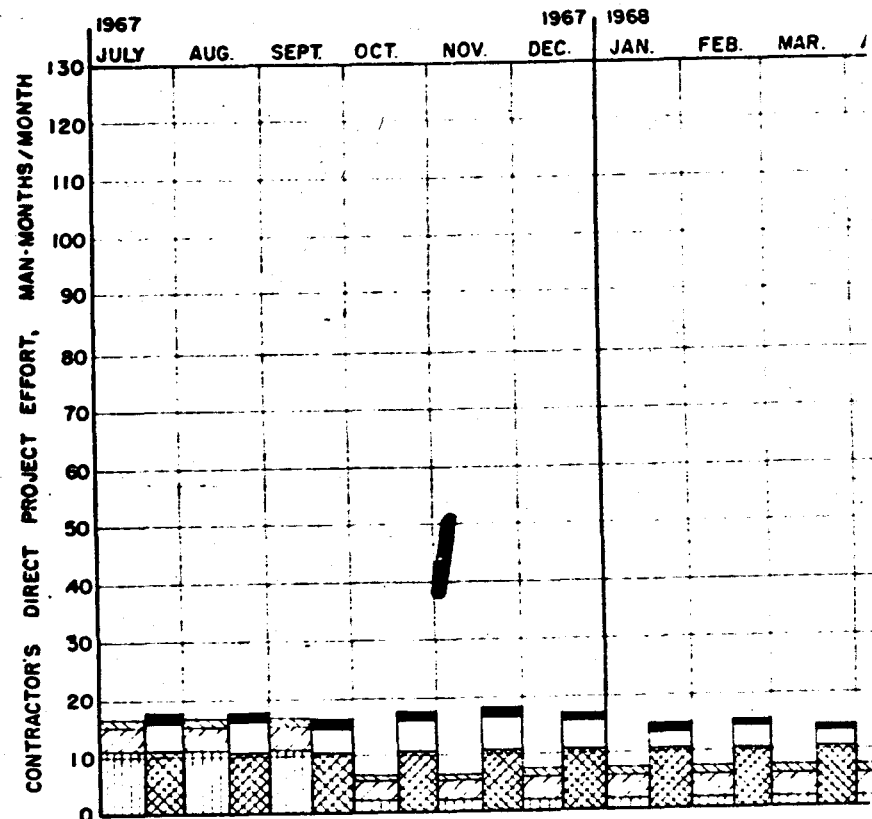
C. Subject Inventions

None.

D. Financial Status

Expense	Actual	Budget
Cumulative through May, 1969	\$ 1,870,510	\$ 4,975,000
Expended in Period (estimate)	10,000	480,000
Cumulative through June, 1969	\$ 1,880,510	\$ 5,455,000

Att. - Monthly Progress Chart
7/14/69



	MONTHLY EXPENDITURES*								
	1967 JULY	AUG.	SEPT.	OCT.	NOV.	1967 DEC.	1968 JAN.	FEB.	MAR.
PREDICTED	103.7 M	72.2 M	92.0 M	94.0 M	94.0 M	52.0 M	40.0 M	20.0 M	70.0 M
ACTUAL	75.5 M	78.0 M	106.8 M	84.9 M	97.1 M	93.4 M	70.0 M	29.9 M	91.9 M
PREDICTED	1010.8 M	1083.0 M	1175.0 M	1269.0 M	1363.0 M	1415.0 M	1455.0 M	1475.0 M	1545.0 M
ACTUAL	981.3 M	1059.3 M	1166.1 M	1251.0 M	1348.1 M	1441.5 M	1511.5 M	1541.4 M	1633.3 M

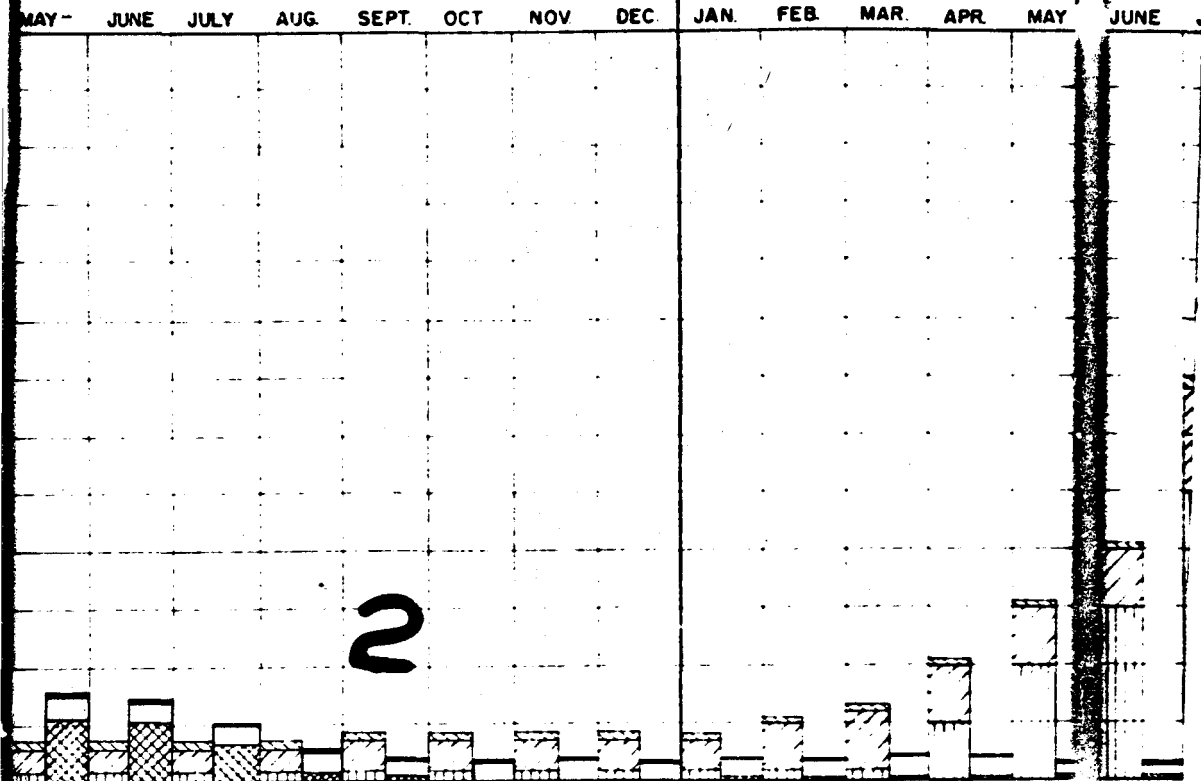
CUMULATIVE EXPENDITURES*

* Expenditures Include All Costs & Fees.

MONTHLY

CONTR

1968 1969

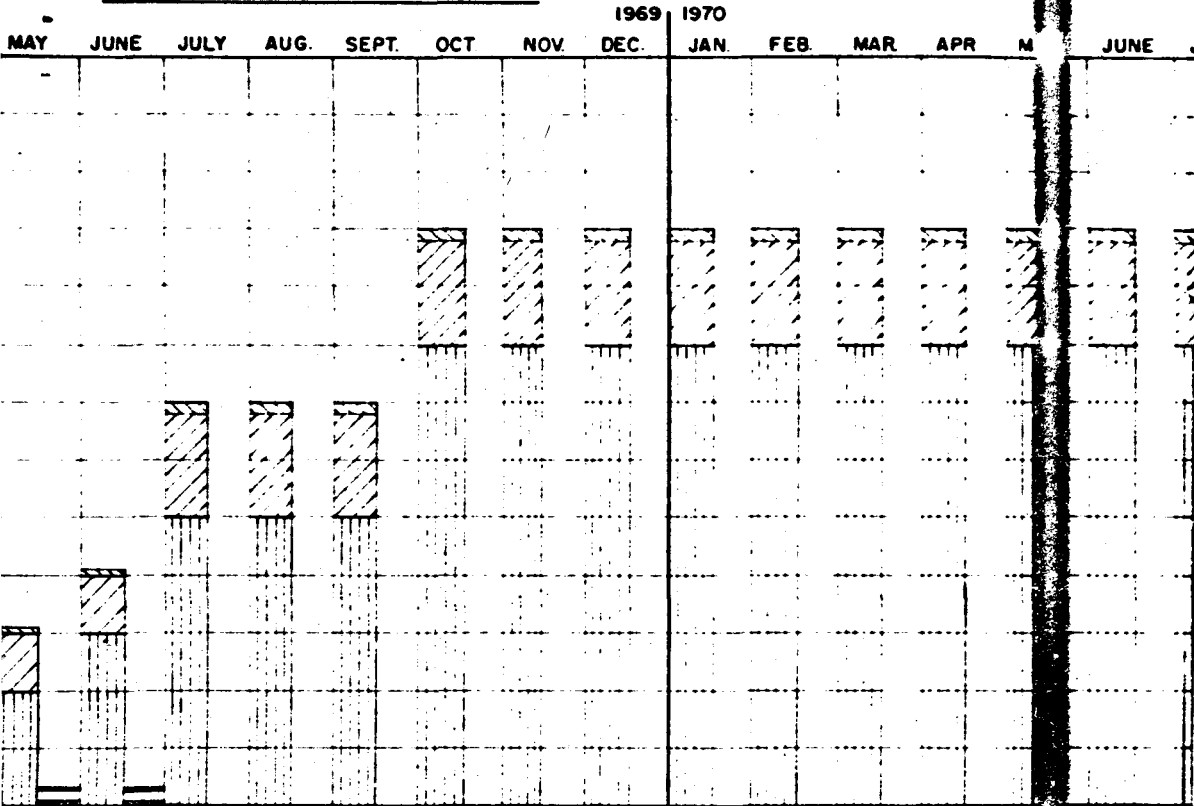


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1968	1969												
MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.	JAN. FEB. MAR. APR. MAY JUNE												
120.0 M	220.0 M	220.0 M	220.0 M	220.0 M	320.0 M	320.0 M	320.0 M	420.0 M	290.0 M	290.0 M	240.0 M	160.0 M	480.0 M
30.1 M	31.6 M	19.8 M	13.7 M	9.9 M	9.4 M	8.4 M	11.9 M	1.8 M	16.4 M	12.0 M	13.4 M	10.0 M	10.0 M
MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE
1735.0 M	1955.0 M	2175.0 M	2395.0 M	2615.0 M	2935.0 M	3255.0 M	3575.0 M	3995.0 M	4285.0 M	4575.0 M	4815.0 M	4975.0 M	5455.0 M
1701.3 M	1732.9 M	1752.7 M	1766.4 M	1776.3 M	1785.7 M	1794.1 M	1802.9 M	1818.7 M	1935.1 M	1847.1 M	1860.5 M	1870.5 M	1880.3 M

MONTHLY PROGRESS CHART

CONTRACT No. 14-01-0001-415



4975.0 M	5455.0 M	5555.0 M	5655.0 M	5755.0 M	5905.0 M	6055.0 M	6205.0 M	6330.0 M	6455.0 M	6580.0 M	6705.0 M	6830.0 M	6955.0 M
1870.5 M	1880.5 M												

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1970												1971	
MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUN.
125.0 M	125.0 M	125.0 M	125.0 M	125.0 M	125.0 M	125.0 M	125.0 M	125.0 M	125.0 M	25.0 M	125.0 M	125.0 M	170.0 M
6830.0 M	6955.0 M	7080.0 M	7205.0 M	7330.0 M	7455.0 M	7580.0 M	7705.0 M	7830.0 M	7955.0 M	8080.0 M	8205.0 M	8330.0 M	8455.0 M

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PROGRESS REPORT NO. 62
 OCR CONTRACT NO. 14-01-0001-415 (3)
CONSOL LIGNITE GASIFICATION PROCESS DEVELOPMENT

July 1 to 31, 1969

A. Summary

Phase I - Feasibility Study

Complete.

Phase II - Bench-Scale Experiments

Report writing is completed. Preparation of final copies is under way.

Phase III - Pilot Plant Engineering

Complete.

Phase IV - Pilot Plant Construction

A subcontract for this work was signed on July 18, 1969 with Stearns-Roger. The initial work is directed for an appraisal of alternate reactor design for the gasification section.

Financial

Estimated expenditures were \$20,000. Cumulative expense to date is \$1,898,256.

DATE: July 31, 1969

1971

	PREDICTED	ACTUAL
SUPERVISING		
PROFESSIONAL		
TECHNICIAN		

⊙ Includes Supervisory Exempt Technicians.
 ⊛ Includes Clerical.

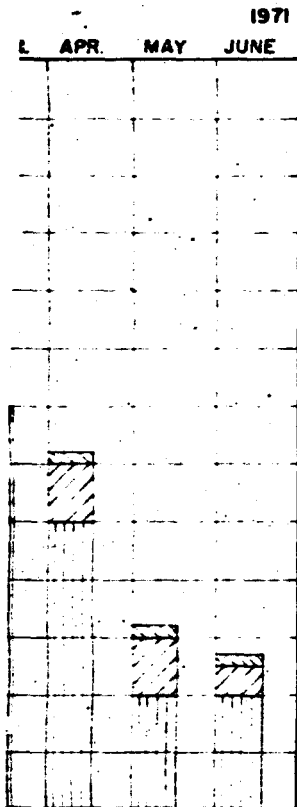
5

MONTHLY PROGRESS CHART

OFFICE OF COAL RESEARCH
 DEPARTMENT OF THE INTERIOR

CONSOLIDATION COAL CO.
 RESEARCH DIVISION LIBRARY, PA.

CONTRACT No. 14-01-0001-415



	APR.	MAY	JUNE
DM	125.0M	125.0M	170.0M
RM	8205.0M	8330.0M	8500.0M

B. Technical Results and Program

Phase II - Bench-Scale Research

1. Experimental Projects (Project No. 530, 532, etc.)

An approval copy of Book 3, Interim Report No. 3 of R & L Report No. 16 was submitted to the Office of Coal Research on July 11, 1969 and approval was received on July 16, 1969. Final copies of this report are being prepared.

2. Supporting Patent and Legal Activities (Project No. 534)

The current laboratory reports and memoranda were reviewed for Subject Inventions.

3. Supporting Process and Economic Analyses (Project No. 533)

No work was done on this project in July.

Phase III - Pilot Plant Engineering

4. Catalytic Design (Project No. 533.30)

Contract 14-01-0001-415 was amended on July 11, 1969 to include subcontracts for the construction of a Pilot Plant at Rapid City, South Dakota and its subsequent operation (Phase IV). A subcontract for the construction of the CSG Pilot Plant was executed with Stearns-Roger on July 14, 1969. Accordingly, work on Phase III under this contract is completed.

Phase IV - Pilot Plant Construction

5. Consol Assistance (Project No. 536.00)

A review was held in Library to start this project and Consol turned over a complete set of files to Stearns, including all the pertinent Consol, M. W. Kellogg, and Catalytic Construction work. Consol prepared an organization chart and has set up correspondence and business procedures. E. G. Ellington of Conoco was made Project Manager for Consol.

A meeting was held in Library with N. P. Cochran, Stearns-Roger and Consol to formulate a contract change order which would permit Stearns-Roger to review and evaluate ultimate reactor design systems.

6. Stearns-Roger Subcontract (Project No. 700.00)

A progress report on this project was submitted by D. W. Dawson, Project Manager for Stearns-Roger; a copy is attached.

C. Subject Inventions

None.

D. Financial Status

<u>Expense</u>	<u>Actual</u>	<u>Budget</u>
Cumulative through June, 1969	\$ 1,878,256	\$ 1,878,256
<u>Expended in Period (estimate)</u>		
Consol	15,000	16,215
Stearns-Roger	5,000	5,000
	<u>20,000</u>	<u>21,215</u>
Cumulative through July, 1969	\$ 1,898,256	\$ 1,899,471

The budget for this contract has been revised in accordance with the recent amendment. Expenditures shown above will be the total of expenditures by Consol and Stearns-Roger as derived from the two monthly progress reports.

Att. - Monthly Progress Chart- Consol & Stearns-Roger
- Stearns-Roger Progress Report
8/15/69

PROJECT STATUS REPORT

CONSOLIDATION COAL COMPANY
CSG PILOT PLANT
RAPID CITY, SOUTH DAKOTA

CCC Project No. 536
 S-R Job No. B-37000
 July 31, 1969

PROJECT REPORT SUMMARY

Contract for this project was signed on July 14, 1969. As requested by Consol, Stearns-Roger has made arrangements for the groundbreaking ceremony to be held in Rapid City on August 18. Invitations to the ceremony will be issued by Consol.

ENGINEERING

Design

Work on the final design details of the Reactor System started on July 25. Preparation of equipment specification sheets for final inquiry started July 21. Change Order No. 1 concerning review and evaluation of the operability, capital and operating costs of the Reactor System was authorized and started on July 30.

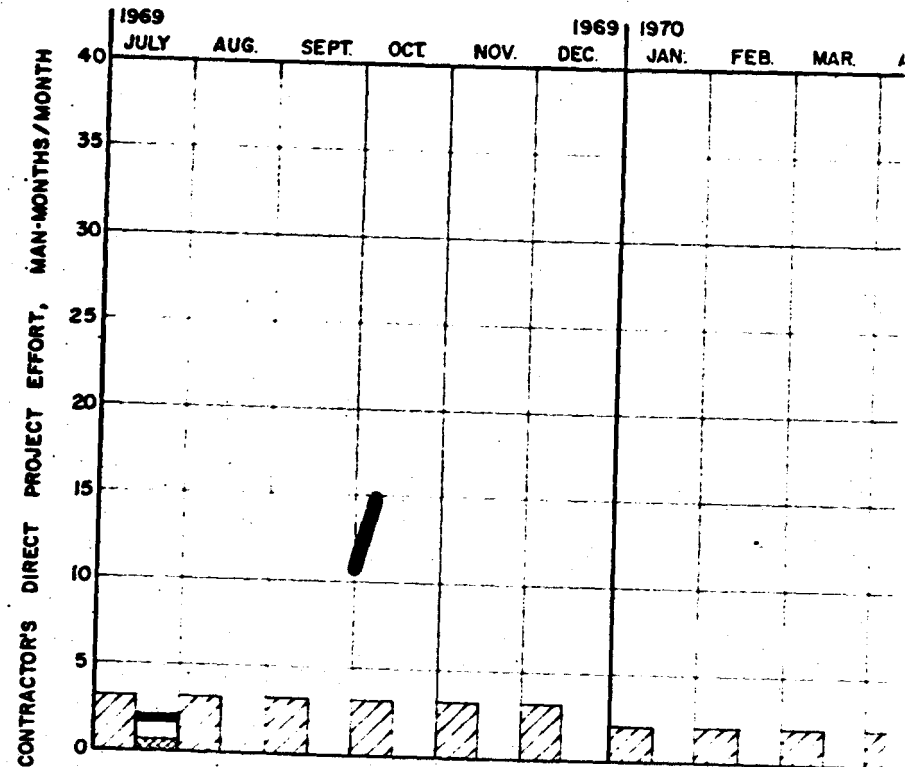
Instruments

Recommendations for Vendors to be sent inquiries for various classes of instruments was submitted to Consol for approval on July 22.

Project

Initial contacts have been made with the utility suppliers for fuel gas, power, and water. Performance bond application has been submitted to Consol. Preparation of the Job Procedure Memorandum and the detailed estimate are in progress and estimated for issue by August 6.

D. H. Dawson
 D. H. Dawson
 Project Manager



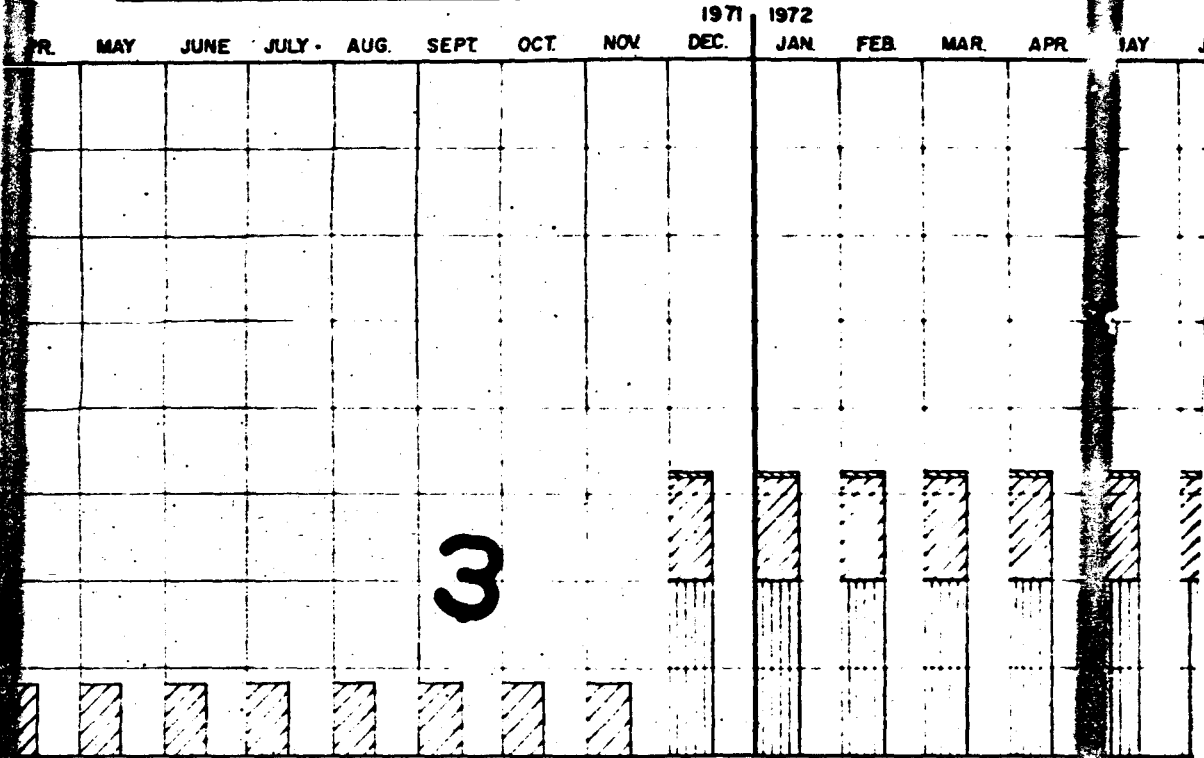
		MONTHLY EXPENDITURES*									
		1969	1969	1969	1969	1969	1969	1970	1970	1970	1970
		JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.
PREDICTED		15,215	14,685	14,965	13,155	14,385	17,065	15,585	15,595	12,605	
ACTUAL		15,000									
PREDICTED		16,215	30,900	45,865	59,020	73,405	90,470	106,055	121,650	134,305	
ACTUAL		15,000									

CUMULATIVE EXPENDITURES*

* Expenditures Include All Costs & Fees

MONTHLY PROGRESS CHART (SUPERVISIO &

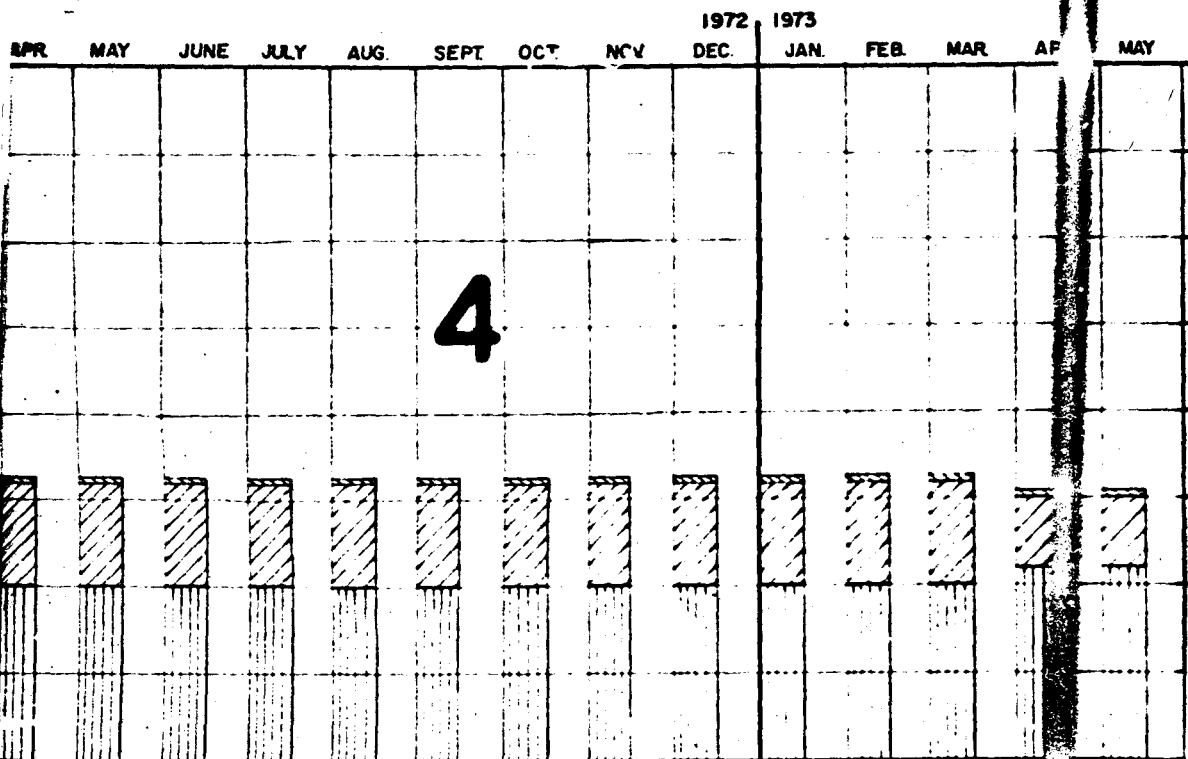
CONTRACT No. 14-01-0001-415 (3)



145	18,705	15,955	14,875	14,875	14,875	14,875	14,875	39,475	39,475	7,475	39,475	39,475	39,475
APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY
14,340	363,045	379,000	393,875	408,750	423,625	438,500	453,375	492,850	532,325	571,800	611,275	650,750	690,225

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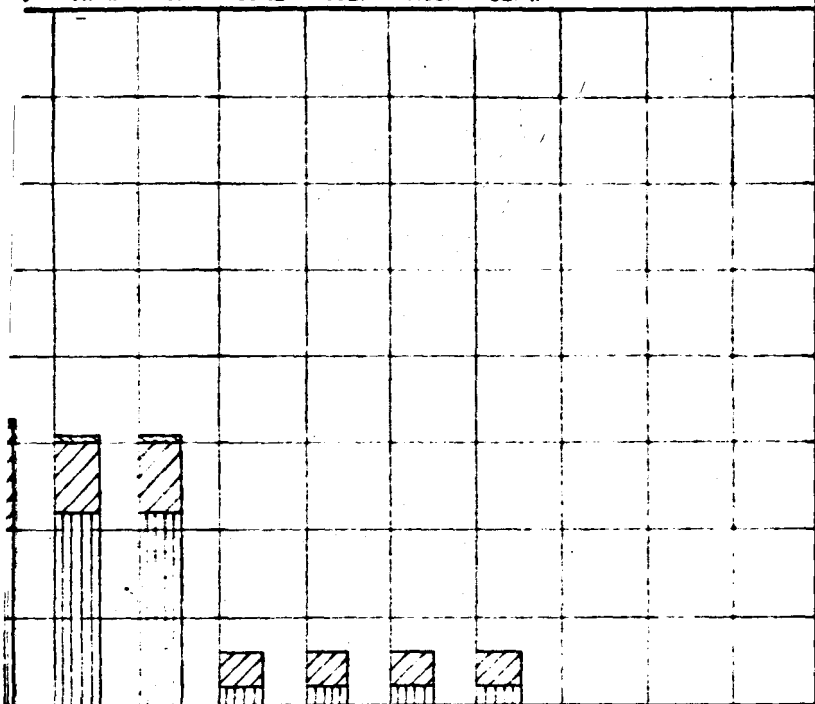
1973

APR. MAY JUNE JULY AUG. SEPT.

DATE: *1/1/73*

PROJECTED
 SUPERVISING 
 PROFESSIONAL 
 TECHNICIAN 

⊕ Includes Supervisory
 ⊗ Includes Civil



1,475	36,075	36,075	11,475	11,475	11,475	41,120		
APR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.		
1,475	1,121,050	1,157,125	1,168,600	1,180,075	1,191,550	1,232,670		

MONTHLY PROJECTIONS
 OFFICE OF
 DEPARTMENT
 CONSOLIDATED
 RESEARCH DIVISION
 CONTRACT No.

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(See 3rd Part)

DATE: July 1969

1973

	PREDICTED	ACTUAL
SUPERVISING		
PROFESSIONAL		
TECHNICIAN		

⊛ Includes Supervisory Exempt Technicians.
 ⊛ Includes Clerical.

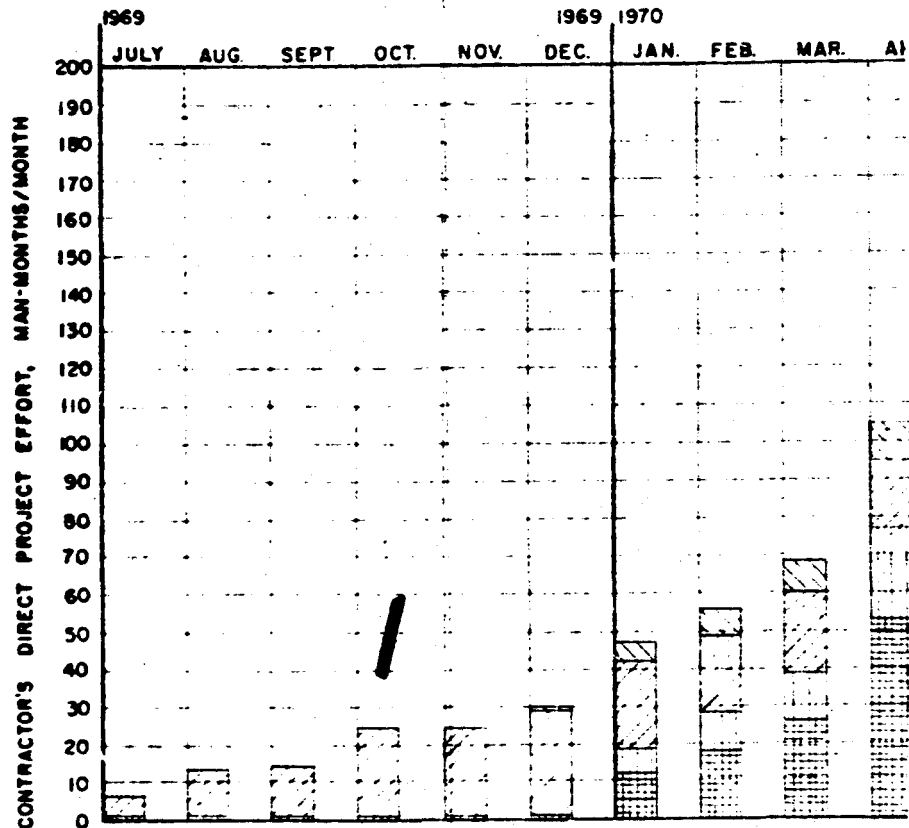
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MONTHLY PROGRESS CHART

OFFICE OF COAL RESEARCH
DEPARTMENT OF THE INTERIOR

CONSOLIDATION COAL CO.
RESEARCH DIVISION LIBRARY, PA.

CONTRACT No. 14-01-0001-415 (3)



MONTHLY EXPENDITURES *

	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.
PREDICTED	0	300	400	500	600	680	720	750	780	800
ACTUAL										
PREDICTED	0	300	400	500	600	680	720	750	780	800
ACTUAL										

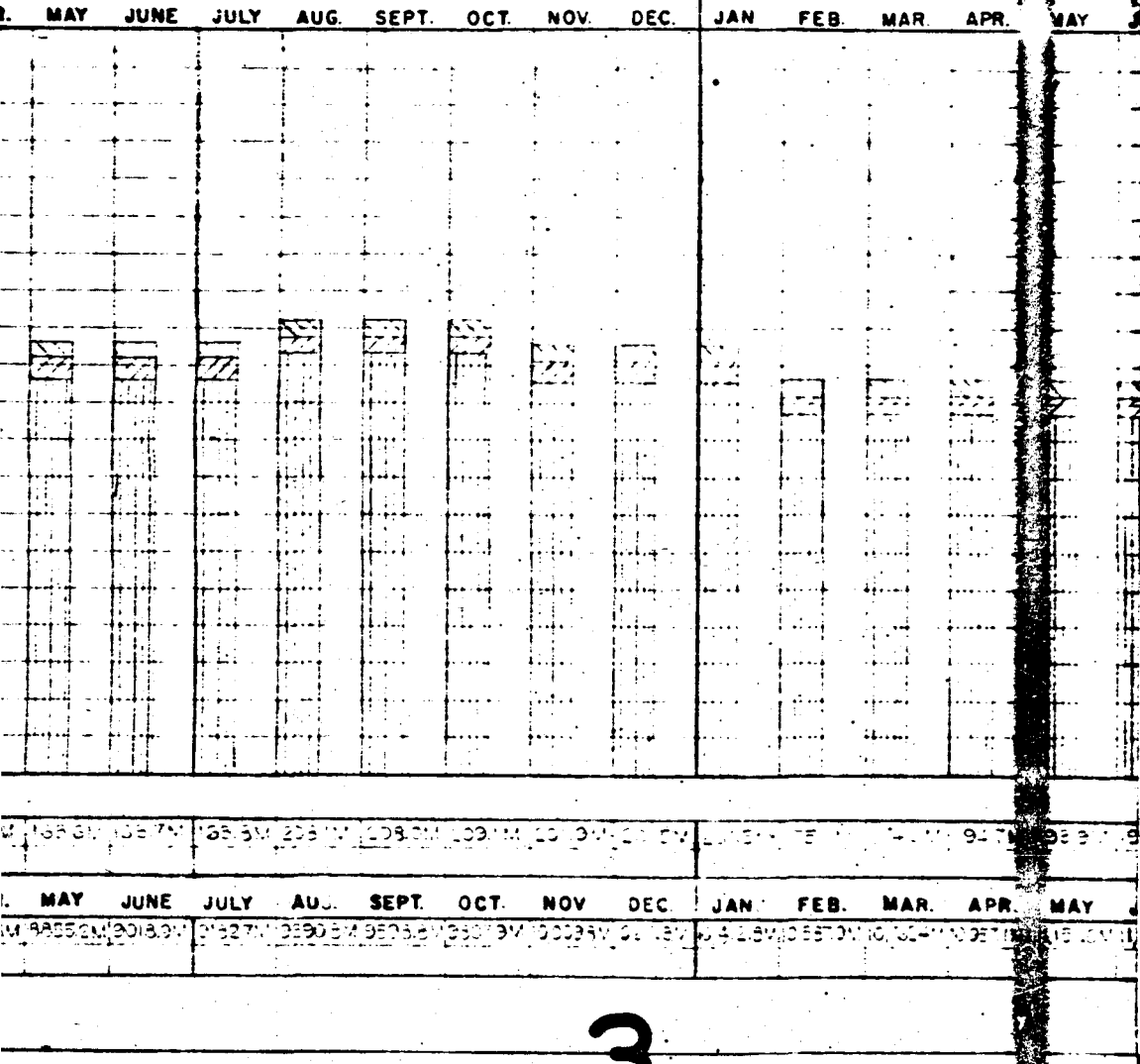
CUMULATIVE EXPENDITURES *

* EXPENDITURES INCLUDE ALL COSTS & FEES

MONTHLY PROGRESS CHART

CONTRACT NO. 14-GI-0001-415 (3)

1971, 1972



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August, 1969

B. Technical Results and Program

Phase II - Bench-Scale Research

1. Experimental Projects (Project No. 530, 532, etc.)

Final copies of Book 3, Interim Report No. 3, R & D Report No. 16 were forwarded to the Office of Coal Research on August 29, 1969. This completes the current effort on this phase of the project.

2. Supporting Patent and Legal Activities (Project No. 534)

The current laboratory reports and memoranda were reviewed for Subject Inventions.

3. Supporting Process and Economic Analyses (Project No. 533)

No work was done on this project in August.

Phase III - Pilot Plant Engineering

Complete.

Phase IV - Pilot Plant Construction

4. Consol Assistance (Project No. 536.00)

A ground breaking ceremony was held in Rapid City, South Dakota on August 18, 1969. Some 200 people attended.

Messrs. Ellington and Marwig visited Stearns' Engineering offices periodically to follow progress and answer questions on the job.

A review meeting will be held in Denver on September 22 to examine the Stearns-Roger's updated job schedule as well as their conclusions covering reactor design (Change Order No. 1).

5. Stearns-Roger Subcontract (Project No. 700.00)

A progress report by Stearns-Roger is attached.

C. Subject Inventions

None.

August, 1969

B. Financial Status

<u>Expense</u>	<u>Actual</u>	<u>Budget</u>
Cumulative through July, 1969	\$ 1,890,001	\$ 1,899,471
<u>Expended in Period (estimate)</u>		
Consol	34,000*	14,685
Stearns-Roger	26,300	25,000
Cumulative through August, 1969	\$ 1,950,301	\$ 1,939,156

* Includes \$27,067 for purchase of Stearns-Roger bond as per Stearns-Roger's construction subcontract.

Att. - Monthly Progress Chart-Consol & Stearns-Roger
- Stearns-Roger Progress Report

8/10/69

PROJECT STATUS REPORT

CONSOLIDATION COAL COMPANY
CSG PILOT PLANT
RAPID CITY, SOUTH DAKOTA

CCC Project No. 536
 S-R Job No. B-37000
 August 29, 1969

PROJECT REPORT SUMMARY

Groundbreaking ceremonies, attended by representatives of the Office of Coal Research; Continental Oil Company; Consolidation Coal Co.; Stearns-Roger Corporation; national, state, and local government agencies and many local residents, were held in Rapid City on August 18. Engineering is proceeding simultaneously on checking and completion of reactor system design as outlined by the Bid Documents and also on Change Order No. 1 which covers evaluation of five alternate cases. Report on this evaluation will be completed during September.

ENGINEERINGProcess

Design review of process conditions for pump and compressor systems is now in progress. Similar review for heat exchangers, fired heaters, gas quench system and waste disposal system will start in early September.

Mechanical

Specifications covering fifteen pressure vessels and storage have been completed and sent to vendors. Work is in final stages on specifications for the coal handling system, coal grinding, steam boiler, cooling tower, and carbon dioxide removal system. Inquiries for the compressors and most of the major pump items are scheduled for the week of September 2.

Investigation and evaluation of metals for the hot solids transfer lines is underway. Some of the more promising alloys might allow consolidation of the reactor system and elimination of some of the thermal expansion problems.

Bids for the reactor vessels are due August 29 and will be analyzed September 3-10. Consideration has been given to refractory specification and nozzle design.

Work on the alternate reactor systems evaluation Change Order No. 1 has included the services of a metallurgical consultant in the investigation of alloys which might stand direct contact with process conditions.

PROJECT STATUS REPORT

CONSOLIDATION COAL COMPANY
CSG PILOT PLANT
RAPID CITY, SOUTH DAKOTA

CCC Project No. 536
 S-R Job No. B-37000
 August 29, 1969

ENGINEERING (Continued)Drafting

Some layout work has been done in regard to investigating the feasibility of locating the three reactor vessels in a common shell. Details for the railroad siding have been revised to meet the railroad requirements, so that application for a license can be made. Drawings for the plant fence have been revised to locate all details.

Structural

Checking of design for the structural steel is in progress.

Instrumentation

Data sheets for case instruments and transmitters have been checked against the flow diagrams. Instrumentation specifications for the carbon dioxide removal system and steam boiler package have been reviewed to be sure that the Vendors' standard instrumentation will meet the project specifications which have been submitted to Consol for approval.

PROJECT MANAGEMENT

Negotiations for fuel gas, telephones, and construction power have continued, and we are waiting for a formal proposal from the gas company. Job Procedure Memorandum has been completed. Detailed project estimate has been issued. Bids for All Risk insurance have been solicited. Other insurance certificates will be transmitted to Consol by September 3. Negotiations with the state of South Dakota for sales tax exemption should be settled by September 5.

D. H. Dawson
 D. H. Dawson
 Project Manager

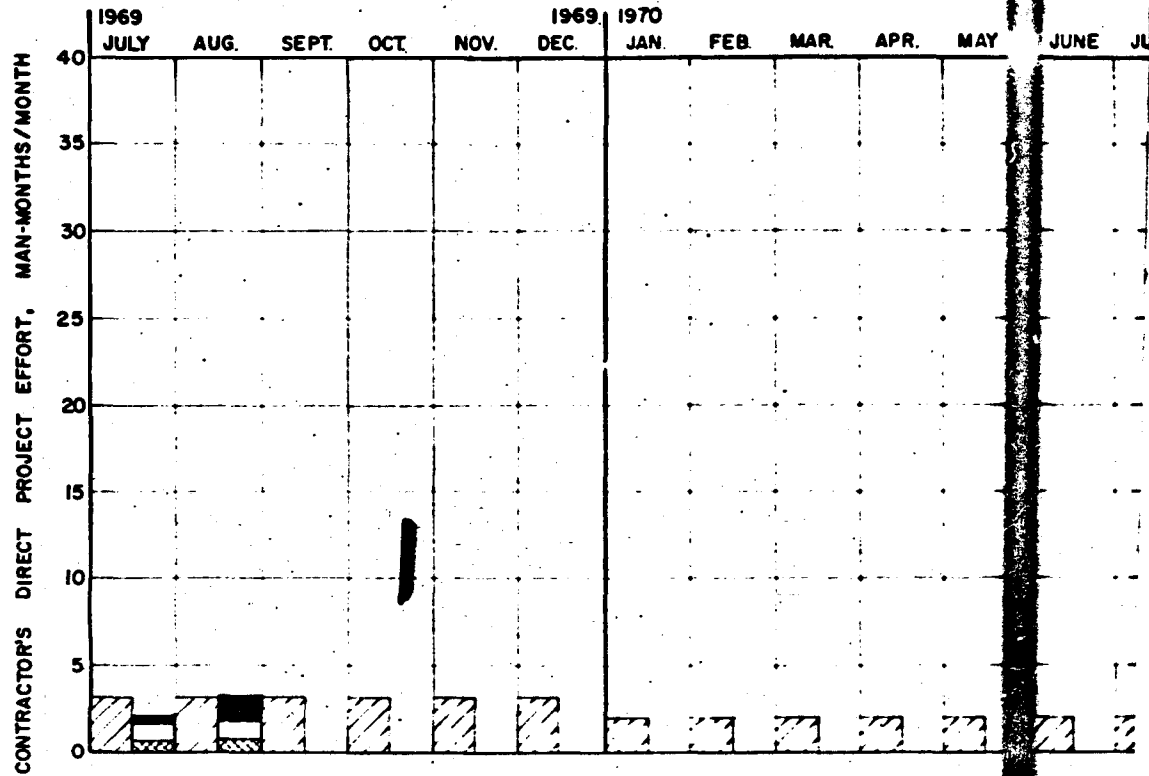
Attachment: Progress Chart

DISTRIBUTION:

Consol - 5
 C. A. Schulz - 5

Continental Oil Co. - 6
 E. E. Ellington, CED
 J. B. Hambleton, CED
 D. F. Wegner, CED
 B. D. Robertson, CED
 L. Thompson, MED
 Dr. C. V. Foster, PED

Stearns-Roger - 5
 FCP/MED/CS/TGS/FE
 CFL/JTN/VLB/HAN/FE
 ALC, FAN/JAP, DHD



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MONTHLY EXPENDITURES*

	1969	AUG.	SEPT.	OCT.	NOV.	DEC.	1970	JAN.	FEB.	MAR.	APR.	MAY	JUNE
PREDICTED	16,215	14,695	14,965	13,155	14,385	17,065	5,595	15,595	12,655	12,975	15,815	12,655	
ACTUAL	11,745	34,000											

CUMULATIVE EXPENDITURES*

	1969	AUG.	SEPT.	OCT.	NOV.	DEC.	1970	JAN.	FEB.	MAR.	APR.	MAY	JUNE
PREDICTED	16,215	30,900	45,865	59,020	73,405	90,470	96,065	121,660	134,315	147,190	163,005	175,660	
ACTUAL	11,745	45,745											

*Expenditures Include All Costs & Fees

MONTHLY

CONTRACT

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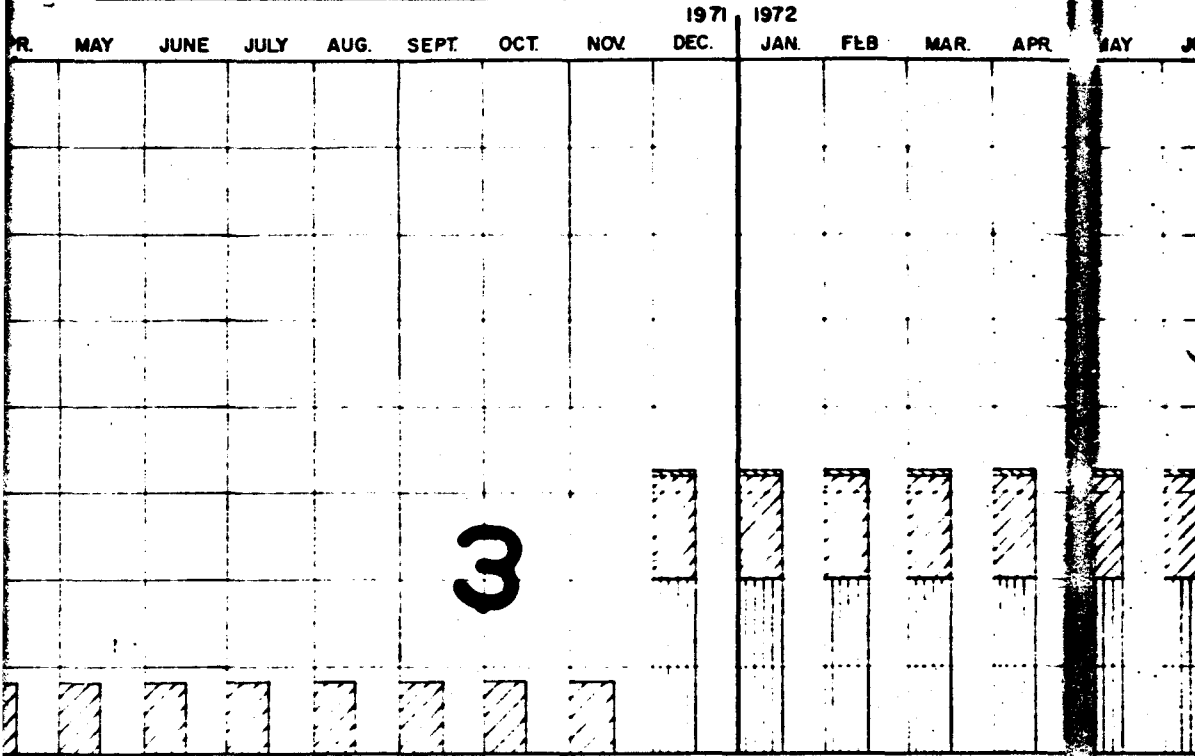
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13,815	12,655	13,315	12,835	12,505	12,505	12,505	20,155	20,135	23,235	22,295	21,45	21,295	21,355
MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN	FEB.	MAR.	APR	MAY	JUNE
160,395	173,650	196,965	199,800	212,305	224,810	237,315	257,470	277,605	300,900	323,195	344,340	365,485	379,000

MONTHLY PROGRESS CHART (SUPERVISIO &

CONTRACT No. 14-01-0001-415 (3)



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PR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUN.
145	8,715	15,955	14,875	14,875	14,875	14,875	14,875	39,475	39,475	39,475	39,475	39,475	39,475	39,475
3,340	361,045	379,000	393,875	408,750	423,625	438,500	453,375	492,850	532,325	571,800	611,275	650,750	690,225	729,700

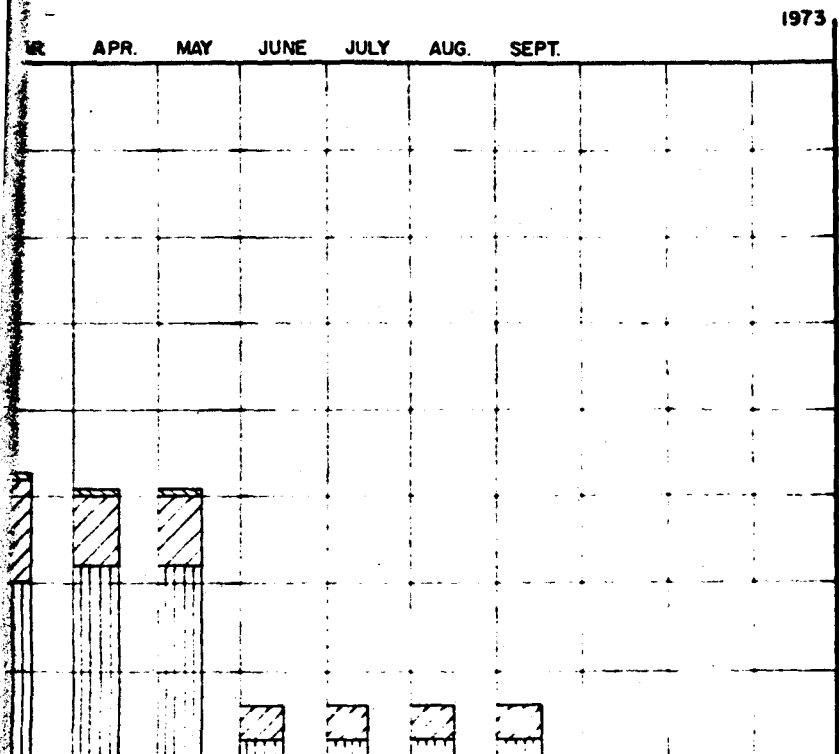
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APR	MAY	JUNE	JULY	AUG.	SEPT	OCT.	NOV	DEC.	JAN.	FEB.	MAR.	APR.	MAY	
39,475	39,475	39,475	39,475	39,475	39,475	39,475	39,475	39,475	39,475	39,475	39,475	39,475	39,475	
APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	
650,750	690,225	729,700	769,175	808,650	848,125	887,600	927,075	966,550	1,006,025	1,045,500	1,084,975	1,124,450	1,163,925	

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4

DATE: August 19



39,475	36,075	36,075	11,475	11,475	11,475	41,120		
MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.		
1,24,975	1,121,050	1,157,125	1,168,600	1,190,075	1,191,550	1,232,670		

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(See 4-5 Chart)

DATE: August 1969

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⊛ Includes Supervisory Exempt Technicians.
 ⊛ Includes Clerical.

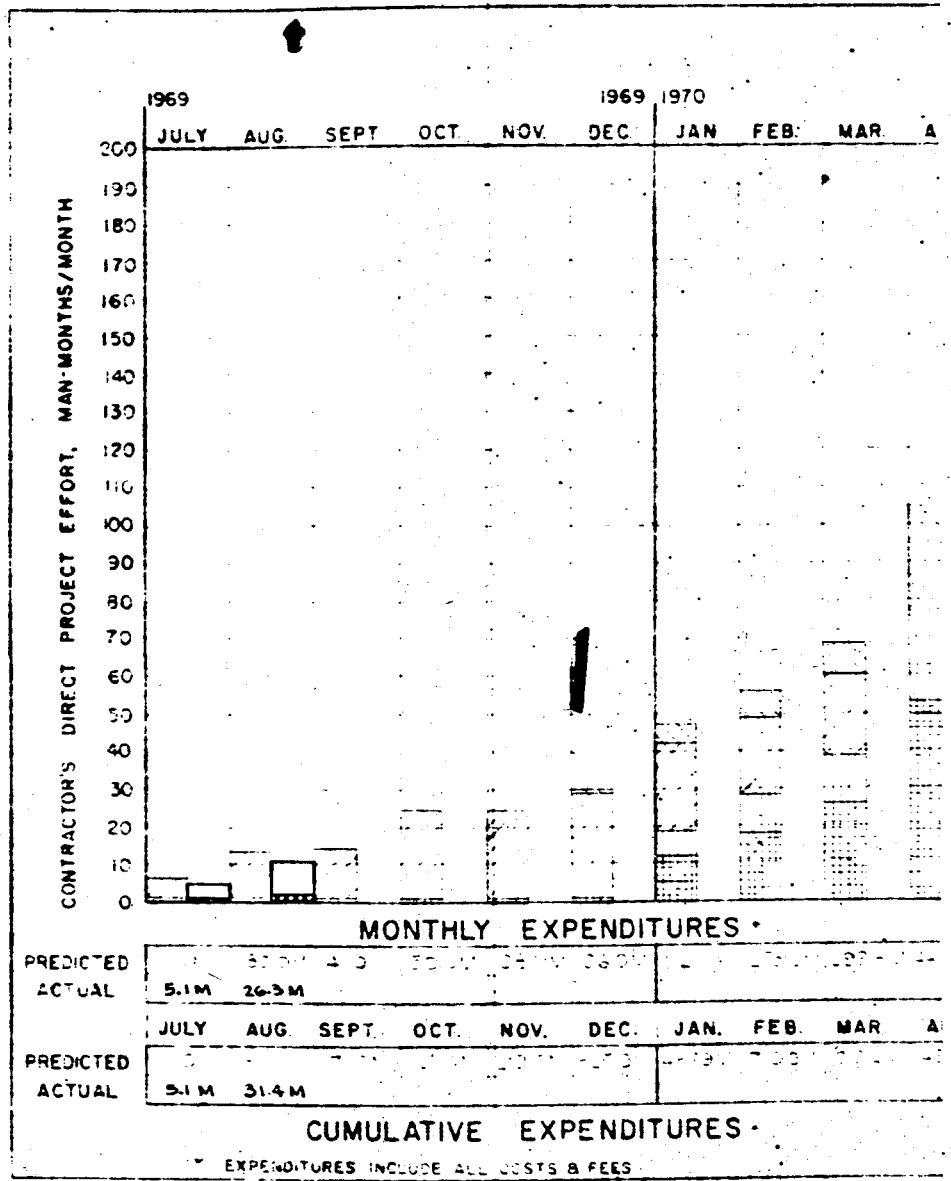
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MONTHLY PROGRESS CHART

OFFICE OF COAL RESEARCH
DEPARTMENT OF THE INTERIOR

CONSOLIDATION COAL CO.
RESEARCH DIVISION LIBRARY, PA

CONTRACT No. 14-01-0001-415 (3)



MONTHLY EXPENDITURES

PREDICTED	5.0M	4.0M	5.0M	6.0M	7.0M	8.0M	9.0M	10.0M	11.0M	12.0M
ACTUAL	5.1M	26.3M								
PREDICTED	5.0M	31.4M								
ACTUAL	5.1M	31.4M								

CUMULATIVE EXPENDITURES

EXPENDITURES INCLUDE ALL COSTS & FEES

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* INCLUDES SUPERVISORY EXP

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OPERATIONS — STURNS-ROG

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DATE: August 1969

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TECHNICIAN S-R
TECHNICIAN S/C

- INCLUDES SUPERVISORY EXEMPT TECHNICIANS
- INCLUDES CLERICAL

CONSTRUCTION — STEARNS ROGER JOB B-37000
OPERATIONS — STEARNS-ROGER JOB B-37400

6

MONTHLY PROGRESS CHART

OFFICE OF COAL RESEARCH
U.S. DEPARTMENT OF THE INTERIOR

CONSOLIDATION COAL CO.
RESEARCH DIVISION LIBRARY, PA

CONTRACT NO. 14-01-0001-415 (3)

PROGRESS REPORT NO. 64
OCR CONTRACT NO. 14-01-0001-415 (3)
CONSOL LIGNITE GASIFICATION PROCESS DEVELOPMENT

September 1 to 30, 1969

A. Summary

Phase I - Feasibility Study

Complete.

Phase II - Bench-Scale Experiments

Current phase complete.

Phase III - Pilot Plant Engineering

Complete.

Phase IV - Pilot Plant Construction

Change Order No. 1 (Study of Reactor Systems) was completed. Recommendation was submitted to OCR to pursue a modified three vessel system and place reactor orders to Belmas Company.

Financial

Estimated expenditures in September were \$9,000.
Cumulative expense to date is \$55,479.

Progress Report no. 63

B. Technical Results and Program

Phase II - Bench-Scale Research

Complete.

Phase III - Pilot Plant Engineering

Complete.

PHASE IV - Pilot Plant Construction

1. Supporting Process and Economic Analyses (Project No. 533)

No work was done on this project in September.

2. Supporting Patent and Legal Activities (Project No. 534)

The current reports and memoranda were reviewed for Subject Inventions.

3. Consol Assistance on Construction of Lignite Pilot Plant (Project No. 536)

The primary work done in September consisted of completion of the evaluation of alternative reactor design systems. On September 29 Stearns-Roger issued a report of this study. They recommend proceeding with the base Catalytic design but with modification of the hot piping to eliminate expansion problems. The proposed alternative is less costly, as well as having process and safety advantages.

The Stearns-Roger recommendation was forwarded to OCR along with a request to place the reactor orders to Belmas Company. The reactors are the determining item on the critical path schedule.

Purchasing has not begun but many items have been inquired.

Further details are contained in the attached Stearns-Roger Project Status Report.

4. Stearns-Roger Subcontract (Project No. 700.00)

A progress report by Stearns-Roger is attached.

C. Subject Inventions

None.

Progress Report No. 64

D. Financial Status

<u>Expense</u>	<u>Actual</u>	<u>Budget</u>
Cumulative through August, 1969	\$ 1,956,635 ⁽¹⁾	\$ 1,939,156
<u>Expended in Period (estimate)</u>		
Consol	9,000	14,965
Stearns-Roger	<u>33,300</u>	<u>41,000</u>
Cumulative through September, 1969	\$ 1,998,935	\$ 1,996,121

⁽¹⁾ includes \$31,900 Stearns-Roger costs for July and August not yet billed.

Att. - Monthly Progress Chart-Consol & Stearns-Roger
- Stearns-Roger Progress Report

10/13/69

PROJECT STATUS REPORT

CONSOLIDATION COAL COMPANY
CSG PILOT PLANT
RAPID CITY, SOUTH DAKOTA

CCC Project No. 536
S-R Job No. B-37000
September 30, 1969

PROJECT REPORT SUMMARY

The report for Change Order No. 1, which covers evaluation of the reactor system and five alternate designs, was sent to Consol on September 26. Recommendation to purchase the three reactor vessels was sent to Consol on September 12. Action to be taken on these recommendations will determine the completion date for the project.

ENGINEERING

Process

Design review of process conditions for the major equipment is essentially complete. Remaining process review work in progress includes requirements for utilities equipment and systems, gas quench, reactor jacket water and the inert gas purge system.

Mechanical

Specifications and inquiries for equipment have proceeded essentially as outlined in the Equipment Status List and Schedule issued Sept. 12. Heat exchangers inquiry is rescheduled to be issued October 1.

Preliminary specification for expansion joints have been prepared and issued for inquiry on September 30. Early selection of a manufacturer is necessary in order to have expansion joint stress data available when the reactor vessels fabricator starts stress analysis of the nozzles.

Work is in progress on completing the design details for the reactor vessels. This includes clarification of design requirements which the vessel fabricator needs in order to prepare shop drawings.

Drafting

Work has continued on the piping drafting and hot piping design as described in the report on the reactor system design. This work is coordinated with the expansion joint and reactor details design mentioned elsewhere in this report.

CONSOLIDATION COAL COMPANY
CSG PILOT PLANT
RAPID CITY, SOUTH DAKOTA

CCC Project No. 536
S-R Job No. B-37000
September 30, 1969

ENGINEERING (Continued)

Drafting (Continued)

Rough grading drawing has been completed. Details for location and type of curb cut for the plant entrance have been completed. Three men are working on the design check of the structure. A fourth man is scheduled to start on a review of the architectural work next week. In some instances the structural check work will be done by computer.

Recommendation for a revised power distribution system was submitted to Consol on September 17. A study of a stepless type of control for the reactor heaters is in progress.

Instrumentation

Specification sheets for individual case instrument and transmitters have been submitted to Consol for approval and also issued for inquiry. Checking of control valve sizing has started. Stearns-Roger general instrument specifications were sent to Consol on August 29, and approval is anticipated by October 3.

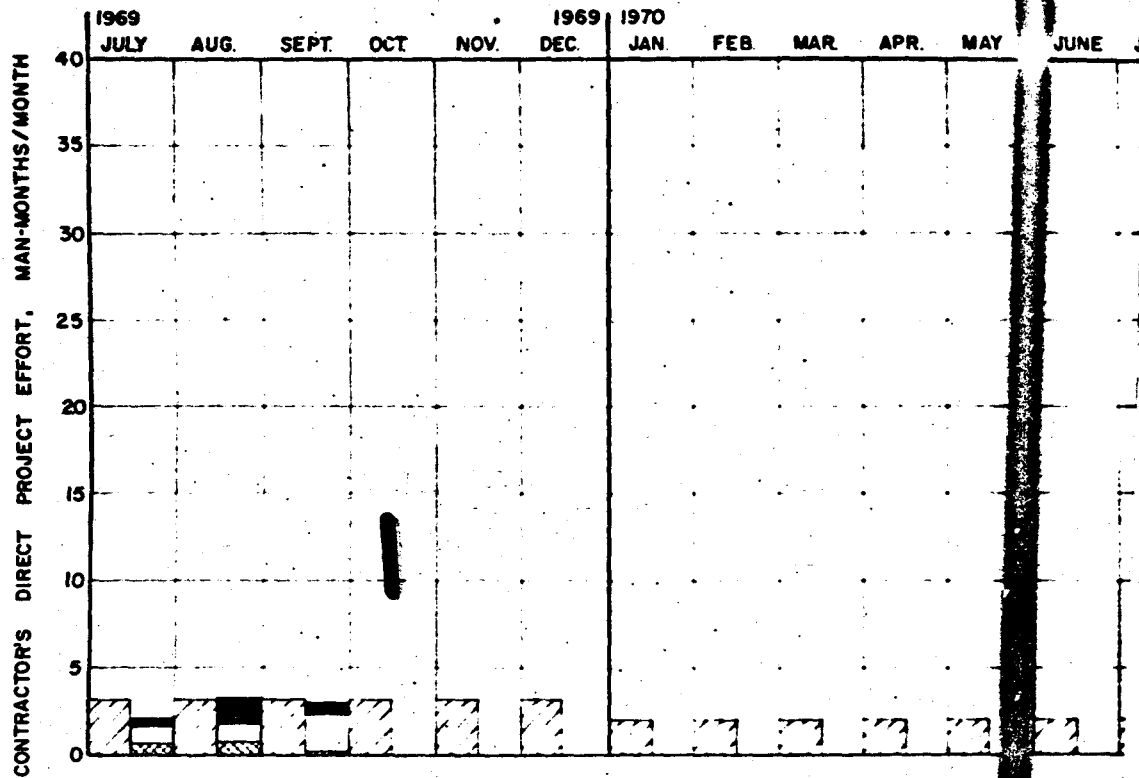
PROJECT MANAGEMENT

Preparation of a detailed arrow diagram network started September 15. The logic portion of the network is about 60% complete. Durations are being added to the job activities, and the schedule should be ready for calculation on the computer by mid-October. Listed in decreasing order of importance to project completion, the critical items appear to be fabrication of: reactor vessels incoloy piping, control valves for extremely hot service and fired heaters with incoloy tubes.

Negotiations for fuel gas, telephone, electrical power, water, railroad siding and building permit have continued. Subcontract specifications are being reviewed and revised to conform to the project schedule. We plan to have the pre-job labor meeting in Rapid City in October, and to do the rough grading, construction roads and plant fence before the severe winter weather.

A preliminary meeting with tax and legal representatives of the State of South Dakota revealed great resistance to a favorable ruling for sales tax exemption. Alternate approaches and references to supporting precedents are being investigated before we make a formal request for a tax ruling.

D. H. Dawson
D. H. Dawson
Project Manager



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MONTHLY EXPENDITURES*

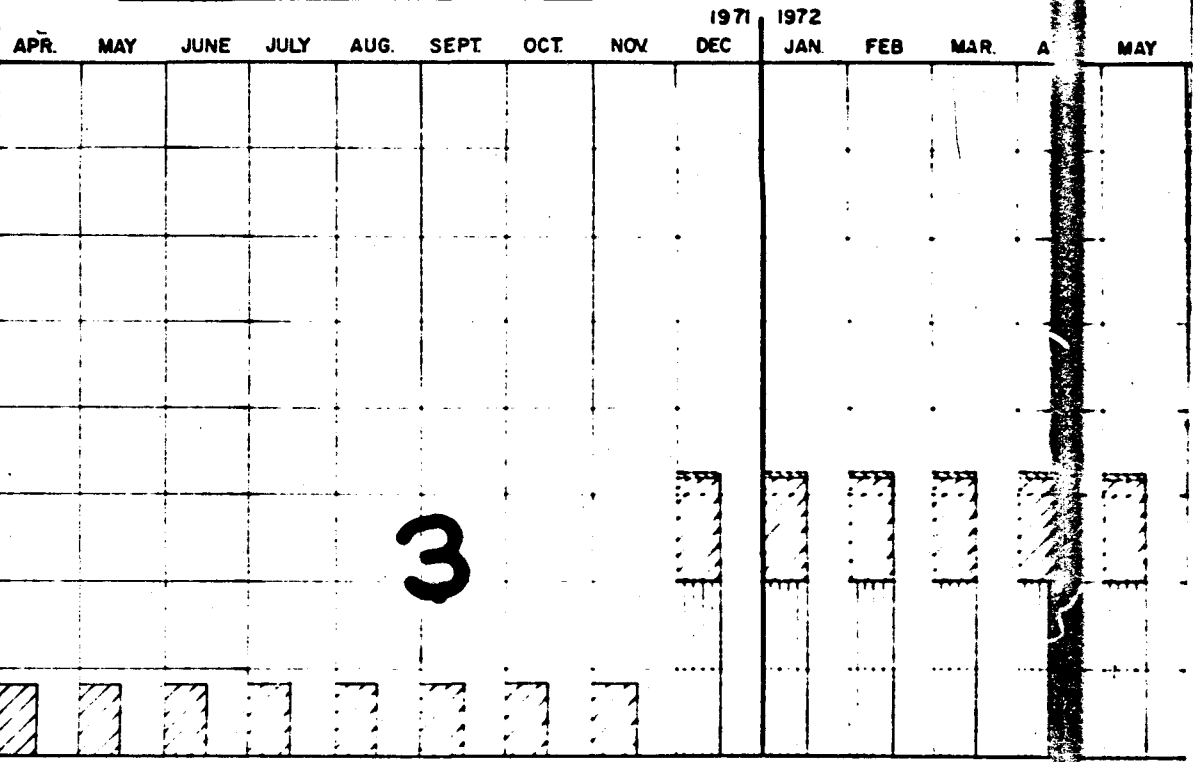
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PREDICTED	5,215	14,965	14,965	13,55	14,385	7,265	5,595	5,595	11,655	11,975	3,815	12,655
ACTUAL	11,745	24,734	9,200									
PREDICTED	16,215	30,900	45,865	59,020	73,405	80,470	86,065	121,650	134,305	147,180	160,995	173,640
ACTUAL	11,745	46,479	55,479									

CUMULATIVE EXPENDITURES*

* Expenditures Include All Costs & Fees.

MONTHLY PROGRESS CHART (SUPERVISOR &)

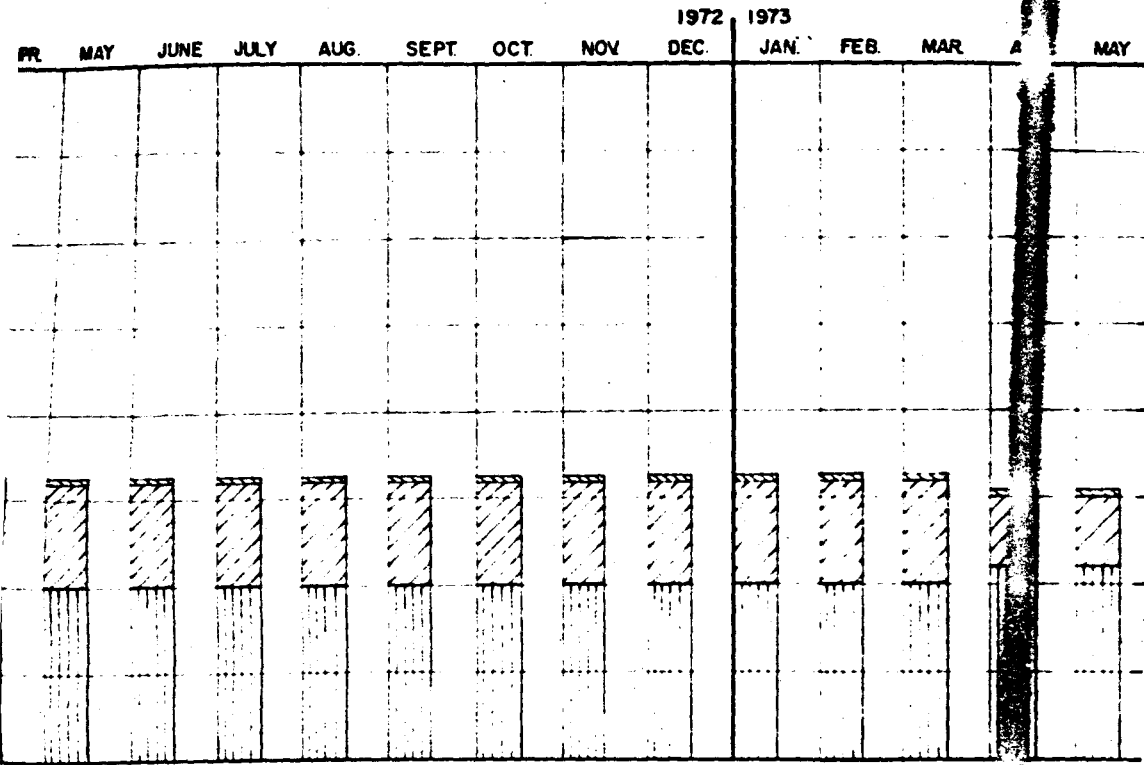
CONTRACT No. 14-01-0001-415 (3)



21,145	18,705	15,955	14,875	14,875	14,875	14,875	4,875	59,475	32,475	32,475	59,475	32,475	59,475
APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY
344,340	363,045	379,000	393,875	409,750	423,625	439,500	453,375	460,250	532,375	577,800	611,275	656,700	697,225

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ION & LAB WORK)



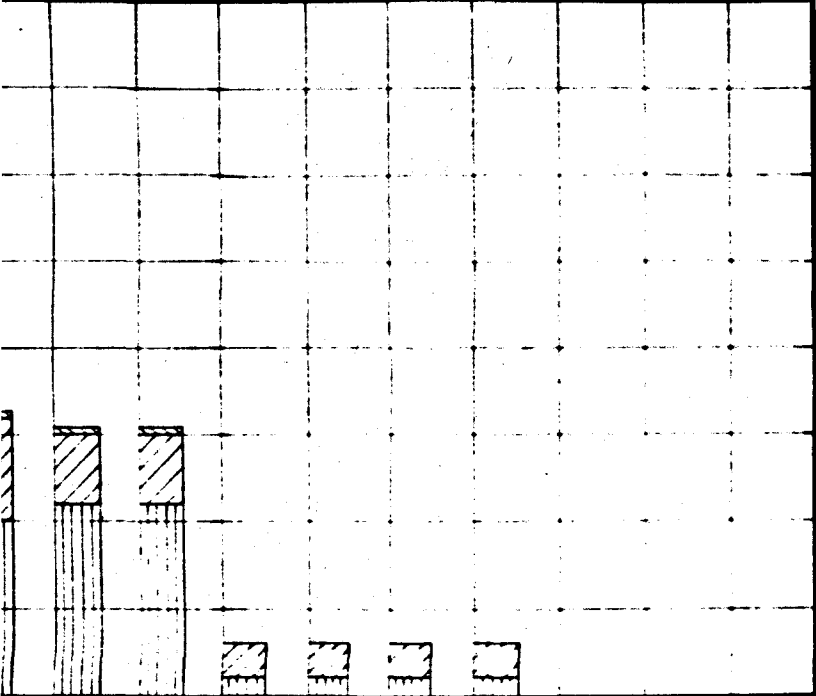
PR	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	PR	MAY
0,475	39,475	39,475	39,475	39,475	39,475	39,475	39,475	39,475	39,475	39,475	39,475	0,075	36,075
0,750	690,225	729,700	769,175	808,650	848,125	887,600	927,075	966,550	1,006,025	1,045,500	1,084,975	21,050	1,157,12

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DATE: Sept 1969

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4,975	36,075	36,075	11,475	11,475	11,475	41,120
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APR. APR. MAY JUNE JULY AUG. SEPT.

4,975	1,121,050	1,157,125	1,168,600	1,190,075	1,191,550	1,232,670
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 CONTRACT No.

DATE: Sept. 1969

1973

	PREDICTED	ACTUAL
SUPERVISING		
PROFESSIONAL		
TECHNICIAN		

⊕ Includes Supervisory Exempt Technicians.

⊗ Includes Clerical.

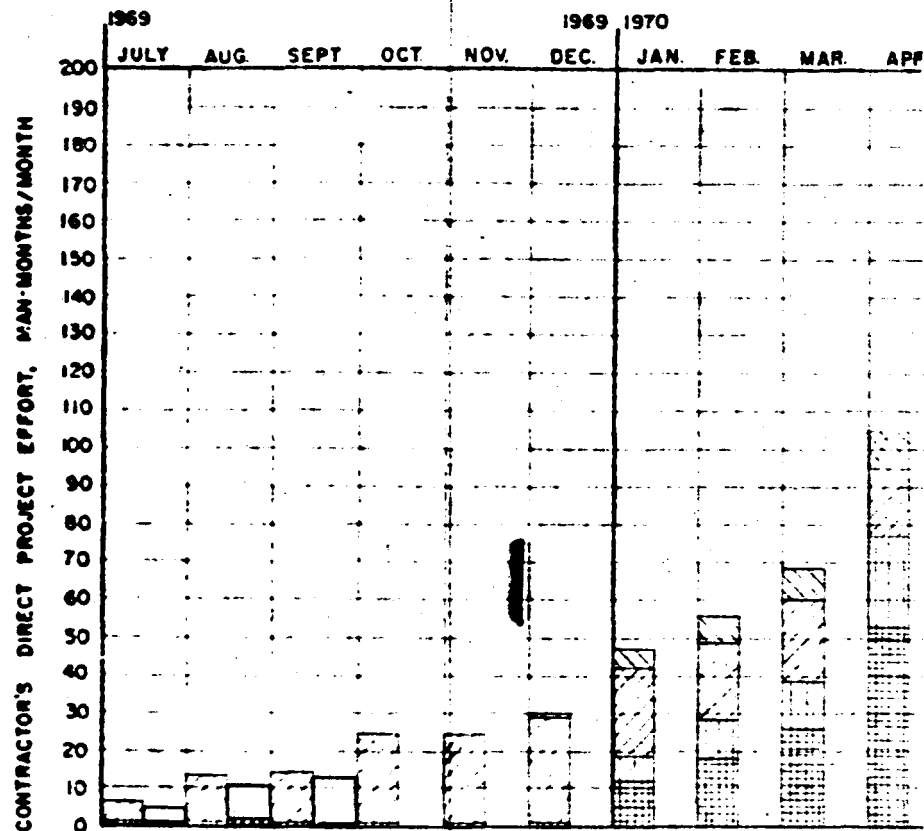
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MONTHLY PROGRESS CHART

OFFICE OF COAL RESEARCH
DEPARTMENT OF THE INTERIOR

CONSOLIDATION COAL CO.
RESEARCH DIVISION LIBRARY, PA

CONTRACT No. 14-01-0001-415 (3)

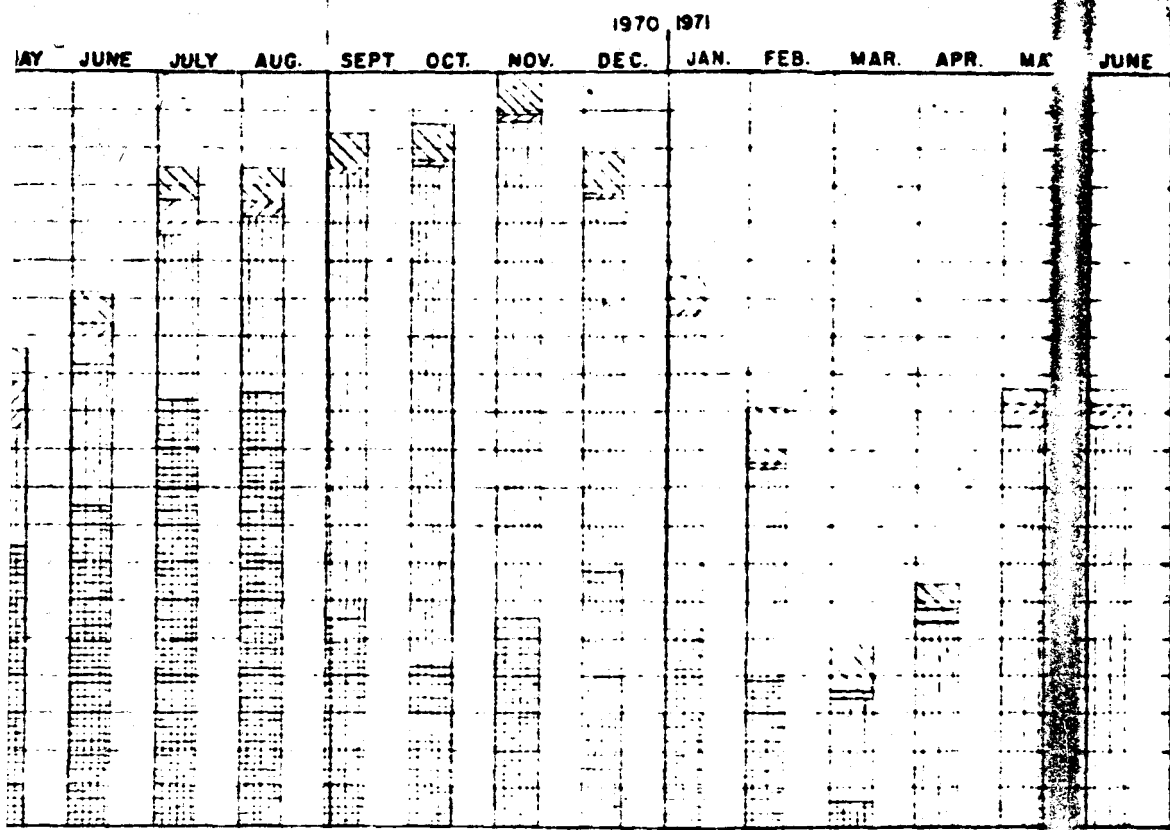


MONTHLY EXPENDITURES *

	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.
PREDICTED	0	30.0M	4.0M	50.0M	25.0M	26.0M	20.0M	25.0M	19.0M	45.0M
ACTUAL	5.1M	26.8M	55.0M							
PREDICTED	0	30.0M	7.0M	57.0M	82.0M	108.0M	128.0M	153.0M	172.0M	217.0M
ACTUAL	5.1M	31.9M	65.2M							

CUMULATIVE EXPENDITURES -

* EXPENDITURES INCLUDE ALL COSTS & FEES



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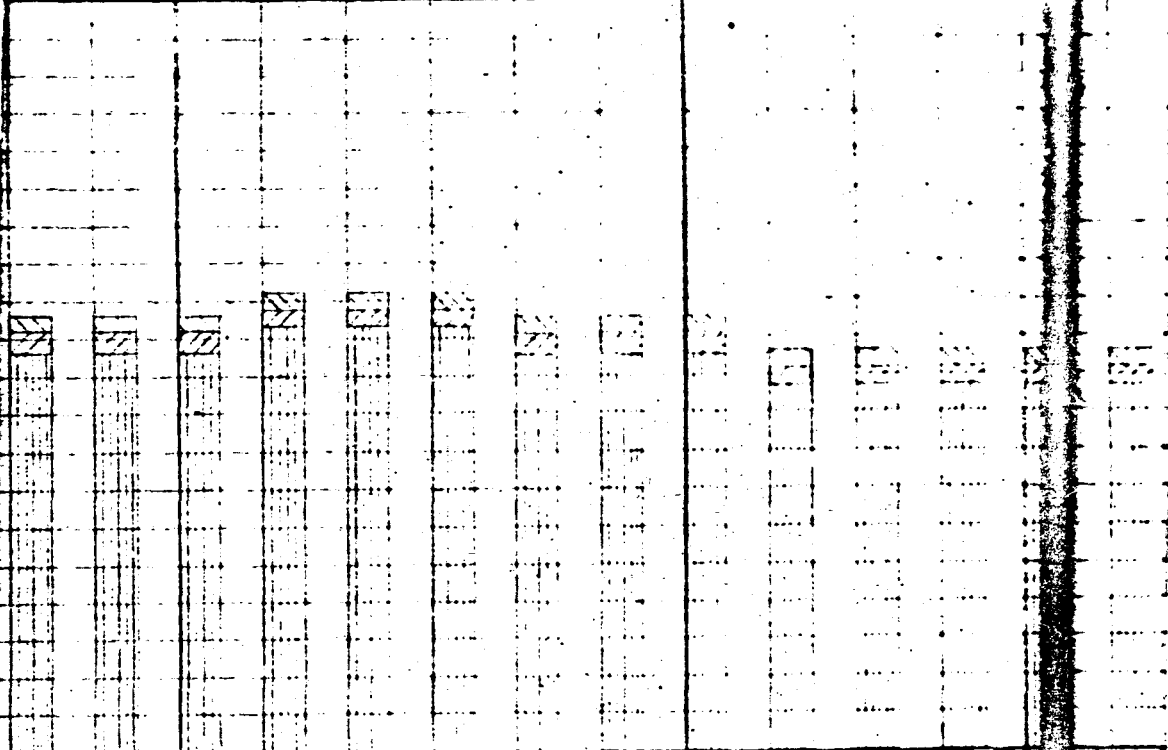
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MONTHLY PROGRESS CHART (CONSTRUCTION)

CONTRACT NO. 14-01-0001-415 (3)

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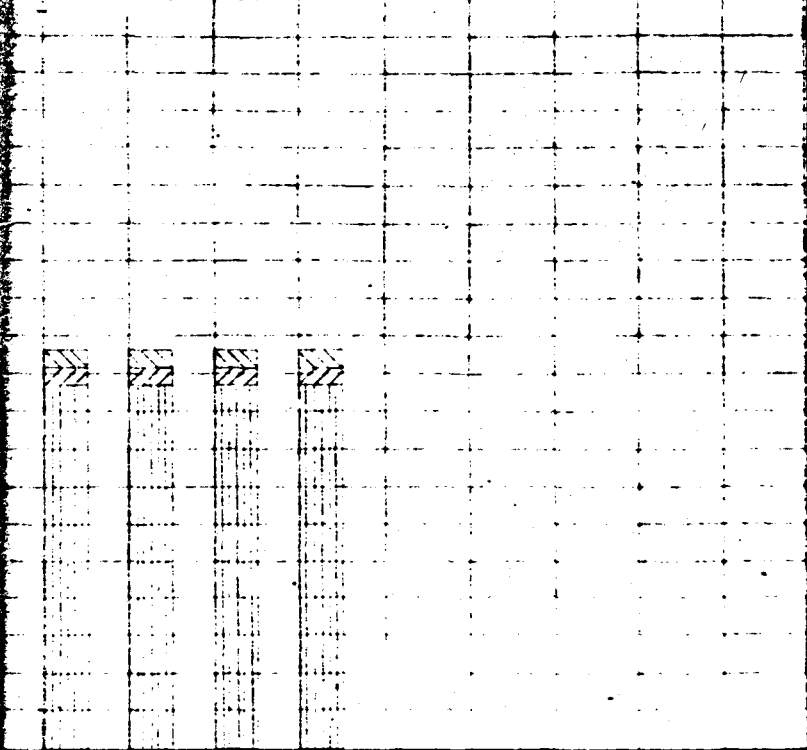
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⊕ INCLUDES SUPERVISORY EXEMPT

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CONSTRUCTION — STEEL 3-ROGER

OPERATIONS — STEEL 3-ROGER

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CONSTRUCTION — STEARNS-ROGER JOB B-37000
OPERATIONS — STEARNS-ROGER JOB B-37400

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MONTHLY PROGRESS CHART

OFFICE OF COAL RESEARCH
U.S. DEPARTMENT OF THE INTERIOR

CONSOLIDATION COAL CO.
RESEARCH DIVISION LIBRARY, PA

CONTRACT NO. 14-01-0001-415 (3)

PROGRESS REPORT NO. 65
OCR CONTRACT NO. 14-01-0001-415(3)
CONSOL LIGNITE GASIFICATION PROCESS DEVELOPMENT

October 1 to 31, 1969

A. Summary

Phase I - Feasibility Study

Complete.

Phase II - Bench-Scale Experiments

Current phase complete.

Phase III - Pilot Plant Engineering

Complete.

Phase IV - Pilot Plant Construction

Progress at Stearns-Roger in reviewing and finalizing equipment specifications has proceeded on schedule. Site preparation has started, but major field work will not begin until early 1970.

The projected completion of construction is April, 1971; reactor and furnace deliveries are critical and will influence the schedule.

Financial

Estimated Consol expenditures in October were \$11,000. Total cumulative expense is \$2,060,344.

SEPT. OCT. NOV. DEC.

October, 1969

B. Technical Results and Program

Phase II - Bench-Scale Research

Complete.

Phase III - Pilot Plant Engineering

Complete.

Phase IV - Pilot Plant Construction

1. Supporting Process and Economic Analyses (Project No. 533)

No work was done on this project in October.

2. Supporting Patent and Legal Activities (Project No. 534)

The current reports and memoranda were reviewed for Subject Inventions.

3. Consol Assistance on Construction of Lignite Pilot Plant (Project No. 536)

Joint effort with Stearns-Roger during the month consisted of the following:

- a. The mechanical flow diagrams were reviewed and a number of improvements were made. These diagrams are now "approved for design."
- b. The hot valve requirements were reviewed. Some valves were eliminated and a considerable simplification of valve specifications was achieved.
- c. The purge gas system and lockhopper systems were reviewed, revised, and simplified.
- d. A meeting was held with IGT in Chicago to obtain guidance on the design and mechanical details of electrode heaters to be installed within the gasification vessels.

Further details are contained in the attached Stearns-Roger project status report.

4. Stearns-Roger Sub-Contract (Project No. 700)

Progress report by Stearns-Roger is attached.

October, 1969

C. Subject Inventions

None.

D. Financial Status

<u>Expense</u>	<u>Actual</u>	<u>Budget</u>
Cumulative through September, 1969 ⁽¹⁾	\$ 1,998,344	\$ 1,996,121
Expended in period (estimate)		
Consol	11,000	13,155
Stearns-Roger	<u>51,000</u>	<u>50,000</u>
Cumulative through October, 1969	\$ 2,060,344	\$ 2,059,276

⁽¹⁾ Includes \$64,000 Stearns-Roger costs for July through September, not yet billed.

Att. - Monthly Progress Charts (Consol and Stearns-Roger)
- Stearns-Roger Progress Report

11/12/69

PROJECT STATUS REPORT

CONSOLIDATION COAL COMPANY
CSG PILOT PLANT
RAPID CITY, SOUTH DAKOTA

CCC Project No. 536
S-R Job No. B-37000
October 31, 1969

PROJECT REPORT SUMMARY

Reactor system piping and nozzle design has been simplified to eliminate most of the Incoloy on the vessels and to substantially decrease the amount of Incoloy required for piping. This reduction of Incoloy will probably improve the delivery of the reactors enough to make the fired heater Incoloy tubes and the Incoloy valves the critical items which determine the completion date of the project.

ENGINEERING

Process

As a result of a study by Stearns-Roger of process design conditions, Consol design personnel attended a meeting in Denver on October 21 and 22 to review and to resolve design questions and revisions proposed by Stearns-Roger. Details of the changes, as covered in the conference notes pages 1-6 dated October 27, will be incorporated into the mechanical flow diagrams which will be issued "Approved For Design" during the week of November 3. Stearns-Roger has been asked to make a new survey of the total purge gas requirements before the generators, dryers, and compressors for this system are purchased.

Mechanical

Major effort during the past month has concentrated on redesign of the reactor vessels and the associated valves, piping and layout dimensions. Key design personnel from Consol and Stearns-Roger visited the Institute of Gas Technology in Chicago to learn and evaluate if the techniques for design of the electrode plates for supplementary heat to the reactors could be applicable to this project. Inquiries for expansion joints are now being evaluated, so that load data from these items can be available as a basis for the stress analysis for the reactor nozzles. Letters of intent to purchase the reactors and the lignite crushing and drying system were issued on October 30.

Details on engineering, inquiries, recommendations, approval and purchasing of equipment are covered in the Equipment Status List issued on October 27. This phase of the project is on schedule except for some of the routine design carbon steel tanks and vessels which previous bidders have now declined to bid. Inquiries to other fabricators are being prepared, and the time lost will not affect overall job progress.

PROJECT STATUS REPORT

CONSOLIDATION COAL COMPANY
CSG PILOT PLANT
RAPID CITY, SOUTH DAKOTA

CCC Project No. 536
S-R Job No. B-37000
October 31, 1969

ENGINEERING - continued

Drafting

Drawing list has been issued. Work has continued on layout details which affect the reactor system. Underground piping drawings have been started.

Check of structural steel design basis will be complete by November 7. Architectural drawings have been reviewed and supplementary schedules for doors, hardware, windows have been prepared.

A proposal for a stepless type of control for the reactor electrode heaters has been submitted to Consol.

Instrumentation

General instrument specifications and data sheets for individual case instruments and transmitters have been approved by Consol. Bids for transmitters and case instruments have been evaluated and submitted to Consol for approval. Inquiries for the Incoloy valves for hot services will be issued the week of November 3.

PROJECT MANAGEMENT

Detailed arrow diagram network schedule and computer printout was completed October 20. This schedule will be updated as more accurate material deliveries based on purchase orders become available. Summary schedule diagram Sheet W is attached to this report, and will be monitored and updated for each monthly status report.

Negotiations for fuel gas, telephones, electrical power, water, railroad siding and building permit were continued by a visit of the Project Manager to Rapid City on October 14-15. Pre-job labor conference to set work rules and to advise the labor organizations of the Equal Opportunity Employer requirements was held in Rapid City on October 14.

Inquiries for the subcontracts for caissons, buildings, reinforced concrete, electrical and structural steel will be issued the week of November 10.

SUMMARY OF PROJECT CHANGES

<u>Original Guaranteed Maximum Price</u>	<u>Approved Change Orders</u>	<u>Approved Guaranteed Maximum Price</u>	<u>Pending Change Notices</u>	<u>Estimated Guaranteed Maximum Price</u>
\$8,479,000	\$8,820	\$8,487,820	\$29,400	\$8,517,220

PROJECT STATUS REPORT

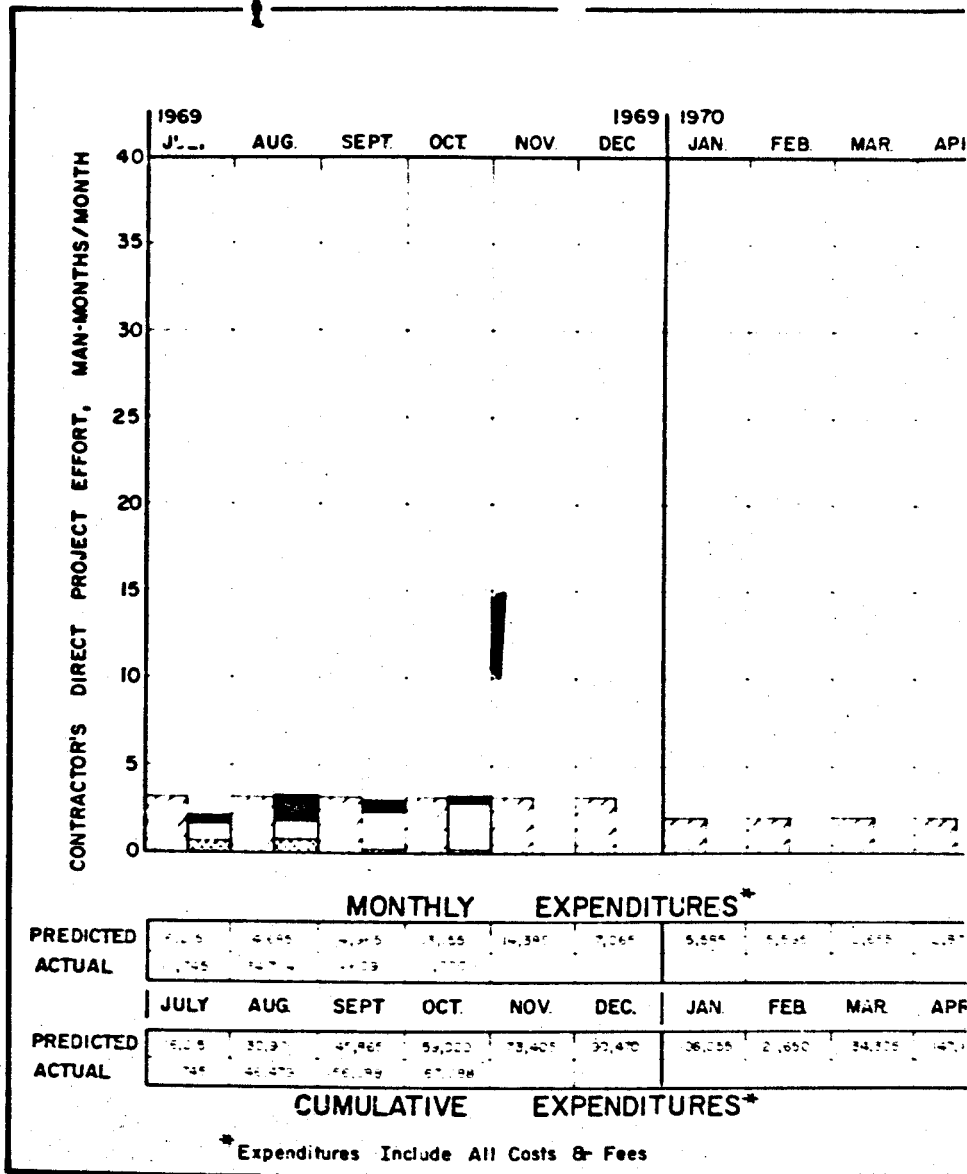
CONSOLIDATION COAL COMPANY
CSG PILOT PLANT
RAPID CITY, SOUTH DAKOTA

CCC Project No. 536
 S-R Job No. B-37600
 October 31, 1969

CONSTRUCTION

Rough grading for plant site and railroad siding started October 27.
 Rock sub-base for plant roads, permanent parking area and construction
 employee parking will be in place, and all rough grading finished by
 approximately November 7. Plant fence will be installed November 10-26.
 No further construction work is contemplated until start of caisson
 work in January 1970.

D. H. Dawson
 D. H. Dawson
 Project Manager



MONTHLY

CONTRACT

MAY JUNE JULY AUG SEPT OCT NOV 1970 DEC 1971 JAN FEB MAR APR MAY JUNE

2

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13,815	2,655	3,315	2,815	2,505	2,515	2,505	2,155	2,115	2,205	2,205	2,145	2,105	2,105
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MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB	MAR	APR	MAY	JUN
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160,225	173,650	186,965	199,900	212,305	224,810	237,315	247,470	257,625	300,810	321,195	344,440	370,045	373,090
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SION & LAB WORK)

1972									1973				
APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY

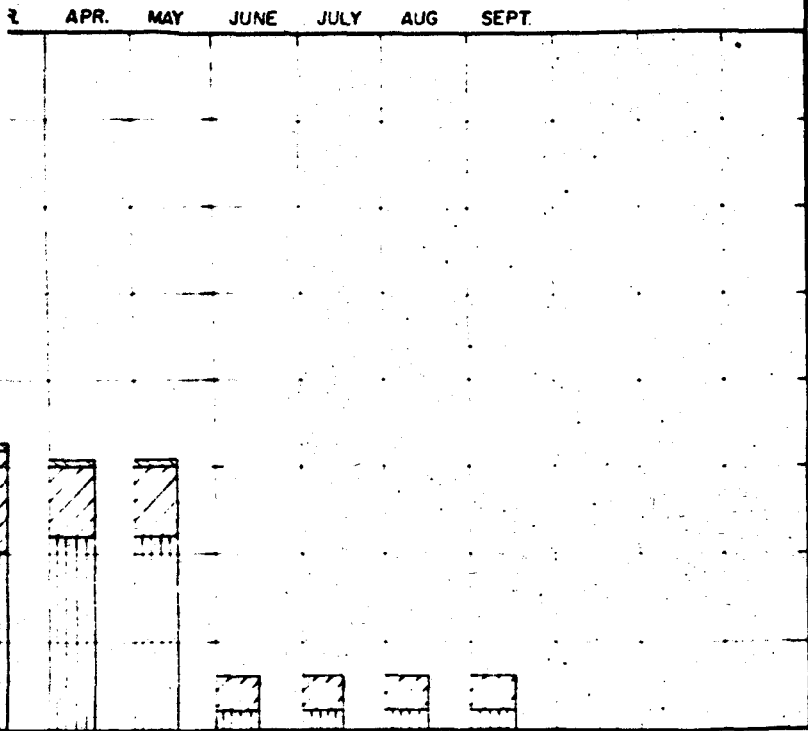
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39,475	39,475	39,475	39,475	39,475	39,475	39,475	39,475	39,475	39,475	39,475	39,475	39,475	36,075	36,075
APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	
650,750	690,225	729,700	769,175	808,650	848,125	887,600	927,075	966,550	1,006,025	1,045,500	1,084,975	1,124,450	1,163,925	

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DATE: *October, 1969*

1973



PREDICTED
 SUPERVISING 
 PROFESSIONAL 
 TECHNICIAN 
 * Includes Supervisory
 * Includes Critical.

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3,475	36,075	36,075	11,475	11,475	11,475	41,120
VAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.
34,975	1,121,050	1,157,125	1,168,620	1,190,075	1,191,550	1,232,670

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MONTHLY F
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CONTRACT No.

DATE: *October, 1969*

1973

	PREDICTED	ACTUAL
SUPERVISING	XXXX	XXXX
PROFESSIONAL	XXXX	XXXX *
TECHNICIAN	XXXX	XXXX **

* Includes Supervisory Exempt Technicians
 ** Includes Clerical.

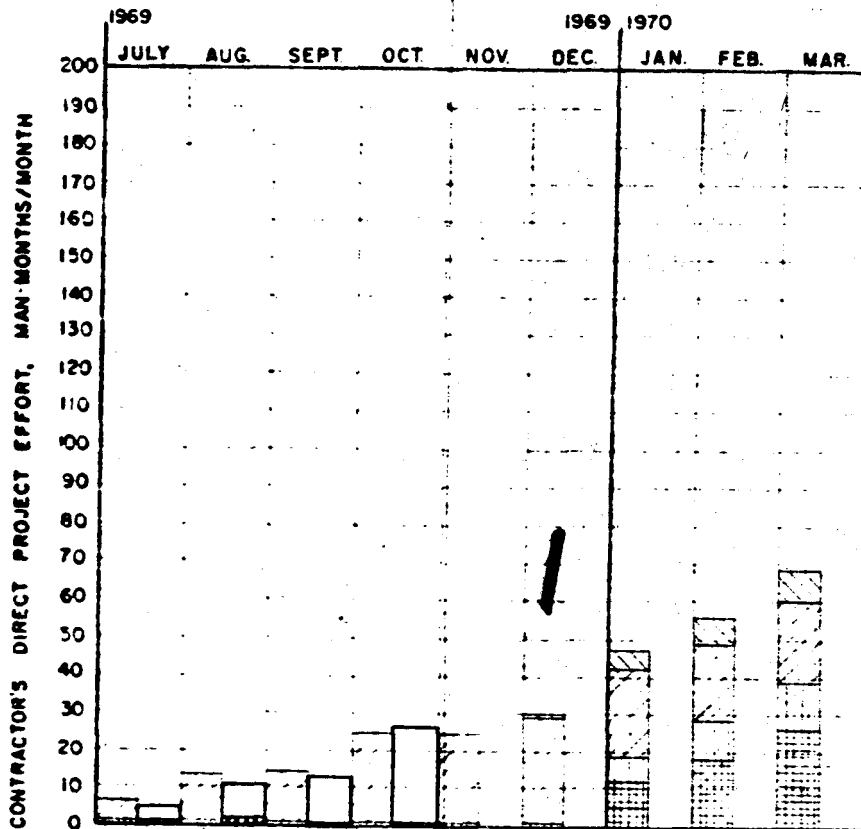
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MONTHLY PROGRESS CHART

OFFICE OF COAL RESEARCH
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CONSOLIDATION COAL CO.
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CONTRACT No. 14-01-0001-415 (3)



MONTHLY EXPENDITURES *

	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.
PREDICTED	50.0M	45.0M	50.0M	55.0M	60.0M	120.0M	175.0M	230.0M	285.0M
ACTUAL	6.2M	25.0M	32.0M	51.0M					
PREDICTED	50.0M	45.0M	50.0M	55.0M	60.0M	120.0M	175.0M	230.0M	285.0M
ACTUAL	6.2M	31.2M	64.0M	111.0M					

CUMULATIVE EXPENDITURES -

* EXPENDITURES INCLUDE ALL COSTS & FEES

DATE: *September*

1973

PREPARED

SUPERVISING

PROFESSIONAL

TECHNICIAN S-R

TECHNICIAN S/C

INCLUDES SUPERVISORY EXEM

INCLUDES CLERICAL

CONSTRUCTION — STEELWORKS ROGER

OPERATIONS — STEELWORKS-ROGE

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RESEARCH DIVISION

CONTRACT NO. 14-

5

PROGRESS REPORT NO. 66
 OCR CONTRACT NO. 14-01-0001-415(3)
CONSOL LIGNITE GASIFICATION PROCESS DEVELOPMENT

November 1 to 30, 1969

A. Summary

Phase I - Feasibility Study

Complete.

Phase II - Bench-Scale Experiments

Current phase complete.

Phase III - Pilot Plant Engineering

Complete.

Phase IV - Pilot Plant Construction

Engineering design, vendor inquiry, and purchasing by Stearns-Roger have continued. These plans are about three weeks behind schedule but may not delay project completion.

Current site preparation work will be completed in December when the plant fence is completed.

Financial

Estimated expenditures in November were \$9,500 by Consol, and \$39,200 by Stearns. Total cumulative expense is \$2,101,469.

DATE: *October 1969*

1973
 OCT. NOV. DEC.

	PREDICTED	ACTUAL
SUPERVISING	██████	██████
PROFESSIONAL	██████	██████
TECHNICIAN S-R	██████	██████
TECHNICIAN S/C	██████	██████

- INCLUDES SUPERVISORY EXEMPT TECHNICIANS
- INCLUDES CLERICAL

CONSTRUCTION — STEARNS ROGER JOB B-37000
 OPERATIONS — STEARNS-ROGER JOB B-37400

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MONTHLY PROGRESS CHART	
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RESEARCH DIVISION	LIBRARY, PA
CONTRACT NO. 14-01-0001-415 (3)	

OCT. NOV. DEC.

B. Technical Results and Program

Phase II - Bench-Scale Research

Complete.

Phase III - Pilot Plant Engineering

Complete.

Phase IV - Pilot Plant Construction

1. Supporting Process and Economic Analyses (Project No. 533)

No work was done on this project in November.

2. Supporting Patent and Legal Activities (Project No. 534)

The current reports and memoranda were reviewed for Subject Inventions.

3. Consol Assistance on Construction of Lignite Pilot Plant (Project No. 536)

The following items were carried out in conjunction with the Stearns-Roger work:

- a. Review of revised equipment specifications.
- b. Evaluation of bids on equipment with important process duty (fired heaters, compressors, etc.).
- c. Assistance in heat transfer calculations for regenerator overhead gas.

4. Stearns-Roger Sub-Contract (Project No. 700)

Progress report by Stearns-Roger is attached.

C. Subject Inventions

None.

D. Financial Status

<u>Expense</u>	<u>Actual</u>	<u>Budget</u>
Cumulative through October, 1969	\$ 2,052,769	\$ 2,059,276
Expended in period (estimate)		
Consol	9,500	14,385
Stearns-Roger	<u>39,200</u>	<u>98,000</u>
Cumulative through November, 1969	\$ 2,101,469	\$ 2,171,661

Att. - Monthly Progress Charts (Consol and Stearns-Roger)
- Stearns-Roger Progress Report

12/15/69

PROJECT STATUS REPORT

CONSOLIDATION COAL COMPANY
CSG PILOT PLANT
RAPID CITY, SOUTH DAKOTA

CCC Project No. 536
S-R Job No. B-37000
December 5, 1969

PROJECT REPORT SUMMARY

Work now in progress includes engineering design, inquiries to vendors, purchasing, and a limited amount of drafting layout. These phases are approximately three weeks behind schedule. This situation may not delay the completion of the project, but it may prevent our taking advantage of anticipated improvement of Incoloy deliveries now that the nickel strike has been settled.

ENGINEERING

Process

Process design problems and check of flow diagram continuity, originally outside the scope of this contract but now added to Stearns-Roger work, delayed issue of the flow diagrams "For Approval" until December 1. They are now estimated for comment and return by Consol by December 11. Redesign work to correct inconsistencies in the flare system and purge gas system is in progress and should complete during December.

Mechanical

Details on engineering, inquiries recommendations, approval and purchasing are covered by the Equipment Status List issued on December 1 and the following equipment summary:

Description	No. Items	Specifications		On		Consol	
		In Prog	Comp.	Inq.	Recc.	App.	Purch
Agitators	1	--	--	--	--	1	--
Bins, Hoppers	8	7	--	--	--	1	--
Boiler	1	--	--	1	--	--	--
Cooling Twr	1	--	--	--	--	--	1
Cyclones	4	--	--	4	--	--	--
Comprs	8	--	--	--	6	2	--
Conveyors	4	--	--	--	--	1	3
Hoists	2	--	--	2	--	--	--
Crushers	2	--	--	--	--	--	2
Dryers	5	1	--	3	1	--	--
Exchgrs	11	--	2	2	7	--	--
Feeders	8	--	--	5	--	--	3
Filters	2	2	--	--	--	--	--
Fired Htrs	6	--	--	--	1	--	--
Elec. Gen	1	--	--	1	--	--	5
Misc.	5	--	--	1	2	1	1
Pkg Systems	3	--	--	2	--	--	1
Pumps	20	--	--	--	--	11	7
Scale	1	--	--	--	--	--	2
Screens	1	--	--	--	--	--	1
Flare Stk	1	1	--	--	--	--	1
Tanks	3	--	--	--	2	--	--
Vessels	34	--	--	11	5	--	1
Water Trt.	2	--	--	1	--	--	18

PROJECT STATUS REPORT

Page 2 of 4

CONSOLIDATION COAL COMPANY
CSG PILOT PLANT
RAPID CITY, SOUTH DAKOTA

CCC Project No. 536
S-R Job No. B-37000
December 5, 1969

Mechanical - continued

Work on critical items included recommendation of expansion joint manufacturer and also blanket commitment for Incoloy pipe. These items were approved by Consol on November 26 and December 2. Heaters which have long delivery Incoloy tubes were ordered on November 26. For further details on materials please refer to Material Status Report No. 1 issued on November 26.

Electrical motor list based on recommended and quoted equipment has been prepared so that a revised single line power distribution diagram may be prepared as a basis for the bids for electrical subcontract which is scheduled for inquiry in late December.

Drafting

As work has continued on layout details for the reactor system, the discovery and study of piping and layout interferences not acknowledged by the contract Bid Documents has caused the general progress on layout to fall behind schedule. Problems encountered so far are mostly of the category of discontinuity, interference, omission of necessary components rather than specified or detailed items which are not suitable for the intended service.

The architectural, reinforced concrete, caisson, structural steel, and administration building electrical drawings have been checked sufficiently to serve as a basis for subcontract bids for that work.

Instrumentation

Supplier for transmitters and case instruments has been selected, and work toward completing the process information on the data sheets should be completed in December. Some of the quotations for nuclear type level transmitters, valves for extremely hot service, temperature indicators and alarm systems have been received. Like the situation with mechanical equipment, the leading manufacturers who can offer exotic one-of-a-kind items already have so much business that they are relatively immune to expediting efforts. Work is in progress on inquiry data sheets for control valves, flow elements and level transmitters.

PROJECT MANAGEMENT

The arrow diagram network schedule attached to this report has been updated to show the new durations of activities corresponding to work which has been done or committed for purchase. For visual ease in

CONSOLIDATION COAL COMPANY
CSC PILOT PLANT
RAPID CITY, SOUTH DAKOTA

CCC Project No. 536
S-R Job No. B-37000
December 5, 1969

PROJECT MANAGEMENT - continued

reviewing the schedule, a decorative line has been drawn to separate the completed and unfinished work. Position of this line will be shifted on succeeding issues.

Commitments for electrical power and railroad siding have been completed. Negotiations for fuel gas and water have continued.

Subcontract bids for caissons, reinforced concrete and structural steel are due December 15.

CONSTRUCTION

Rough grading for the plantsite and railroad siding started October 27 and completed November 7. Plant fence was started December 1 and will be completed by December 17. No further construction is contemplated until start of caisson work in January 1970.

SUMMARY OF PROJECT CHANGES

Pending Change Notices listed in this summary and in future reports, are based on quickly prepared, very approximate estimates that may be accurate to plus or minus 30%. These Change Notices fall into the categories of:

1. Approved by Consol from the standpoint of general scope, but subject to mutual agreement and approval of a definitive close cost estimate Change Order which may take several weeks to define and estimate.
2. Approved by Consol only for the work of preparing an estimate for review by Consol.

CONSOLIDATION COAL COMPANY
CSC PILOT PLANT
RAPID CITY, SOUTH DAKOTA

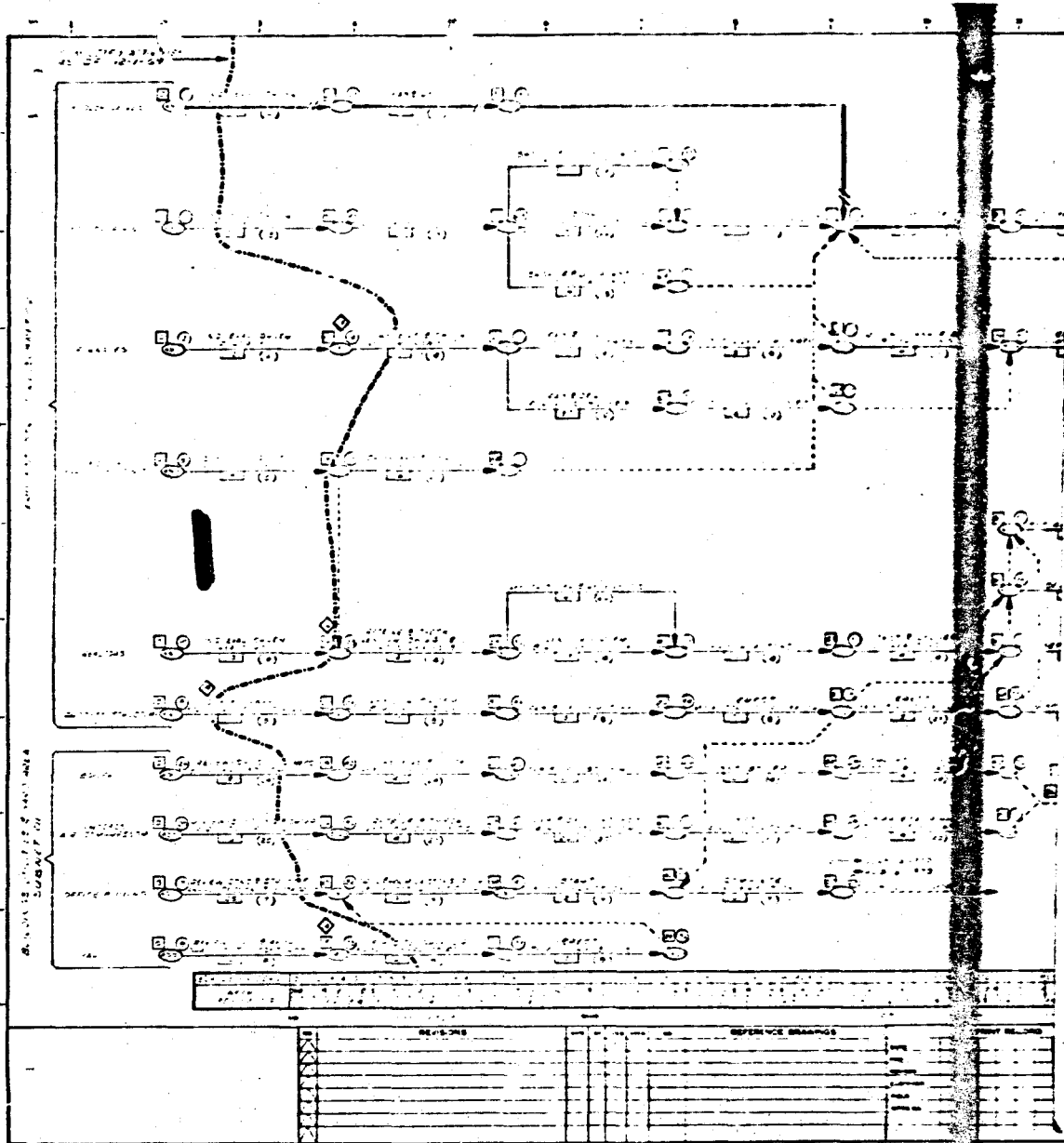
CCC Project No. 536
S-R Job No. B-37000
December 5, 1969

SUMMARY OF PROJECT CHANGES - continued

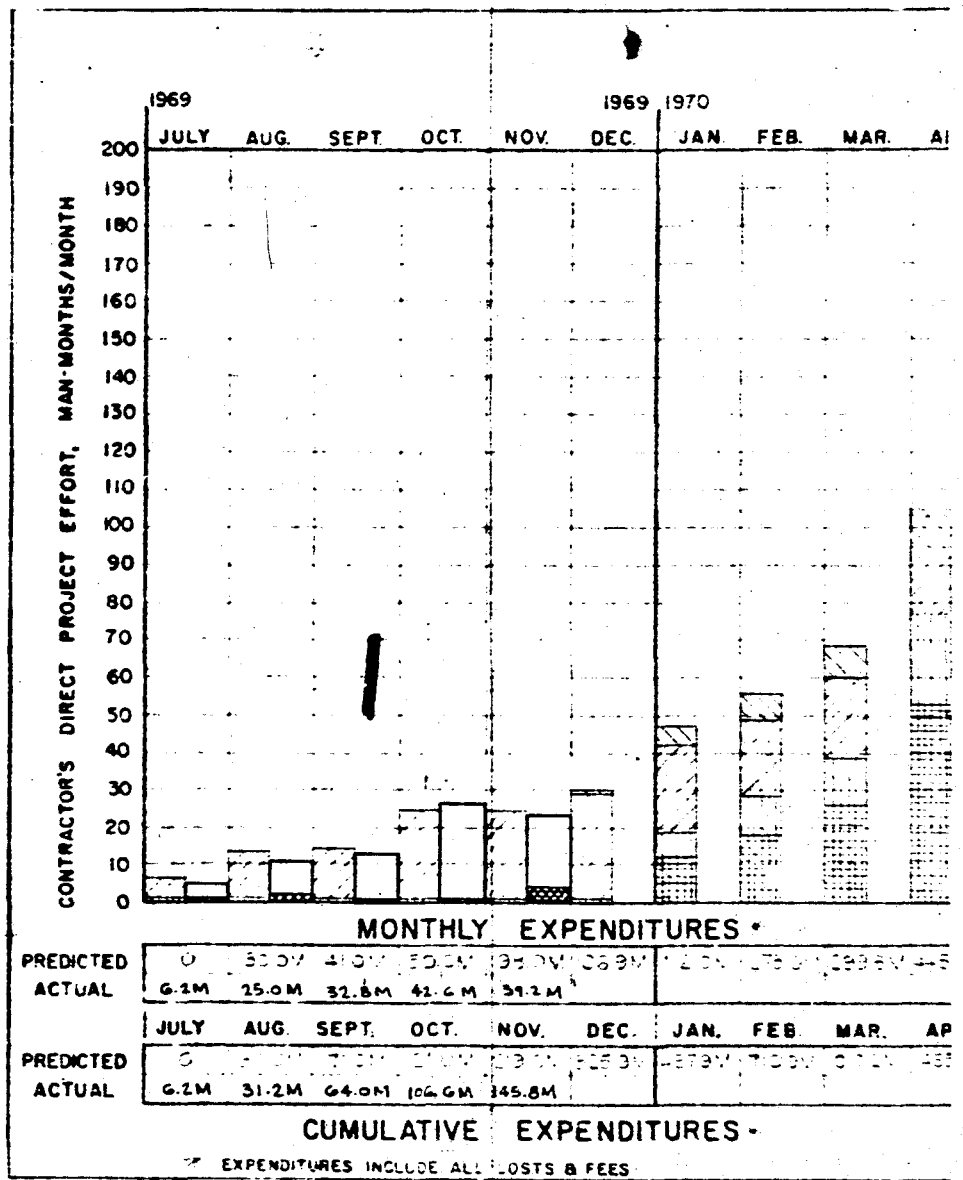
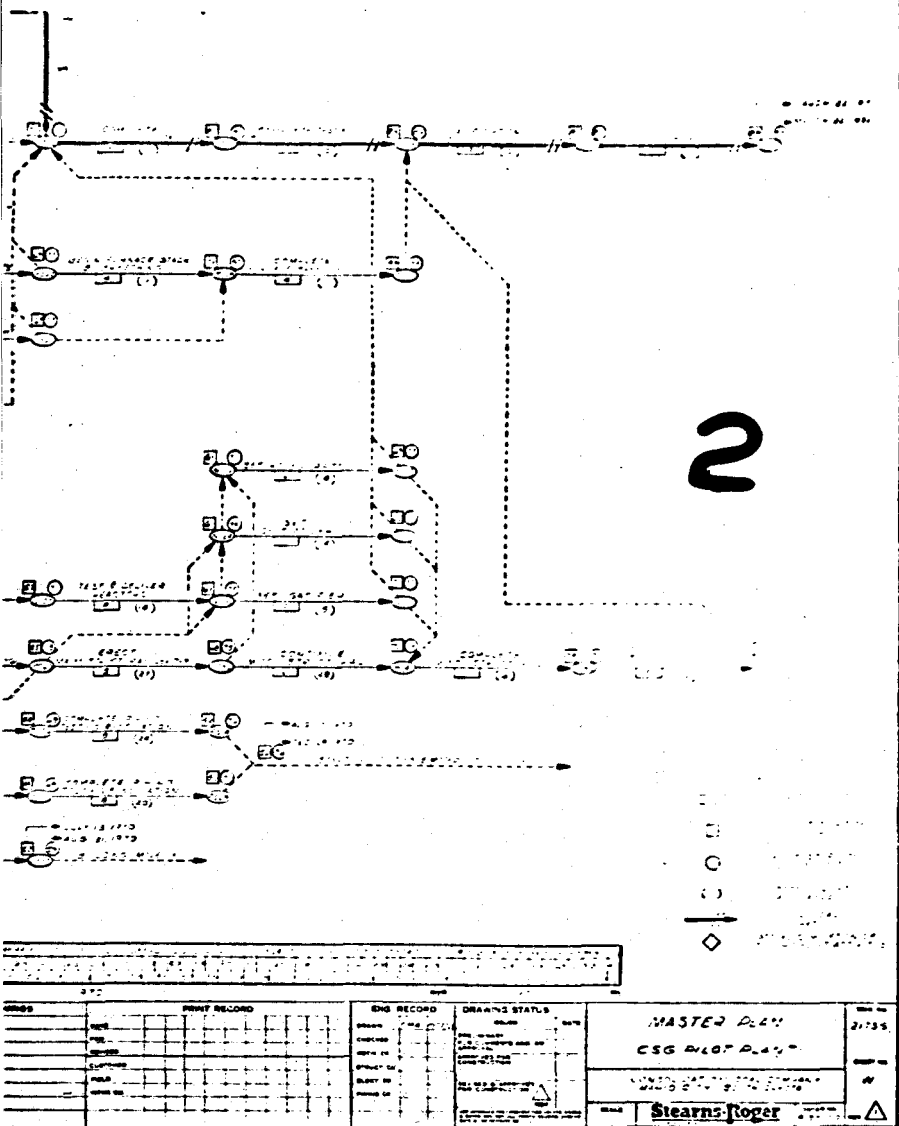
	<u>Increase</u>	<u>Decrease</u>
<u>Approved Change Orders</u>		
1. Reactor system study	8,820	
Original Maximum Price	8,465,129	
Presently Approved Total	\$8,473,949	
<u>Pending Change Notices</u>		
5. Delete roof at heaters	600	16,000
6. Add'l Regen. Nozzles	2,700	
7. Incr. disch. pressure prehr compr	30,000	
8. Redesign purge gas systems	13,000	
9. Add instr & duct, lignite crush & grind	1,000	
10. Boiler controls, 2 element pneu type		7,800
11. Delete Fuel Gas Booster Blower	1,000	
12. Add two PC & PCV	4,000	
13. Revise Canteen to Fallout Shelter	900	
14. Perspective Drawing for OCR	3,000	
15. Revise 32 Pres & 3 Temp Transmttrs	1,900	
16. Revise Hammernill specs		160,000
17. Redesign expansion joints & piping		
		128,400
Net Pending Changes		\$8,345,549
Estimated Total		

D. H. Dawson
D. H. Dawson
Project Manager

Attachments: Progress Chart
Master Plan Schedule

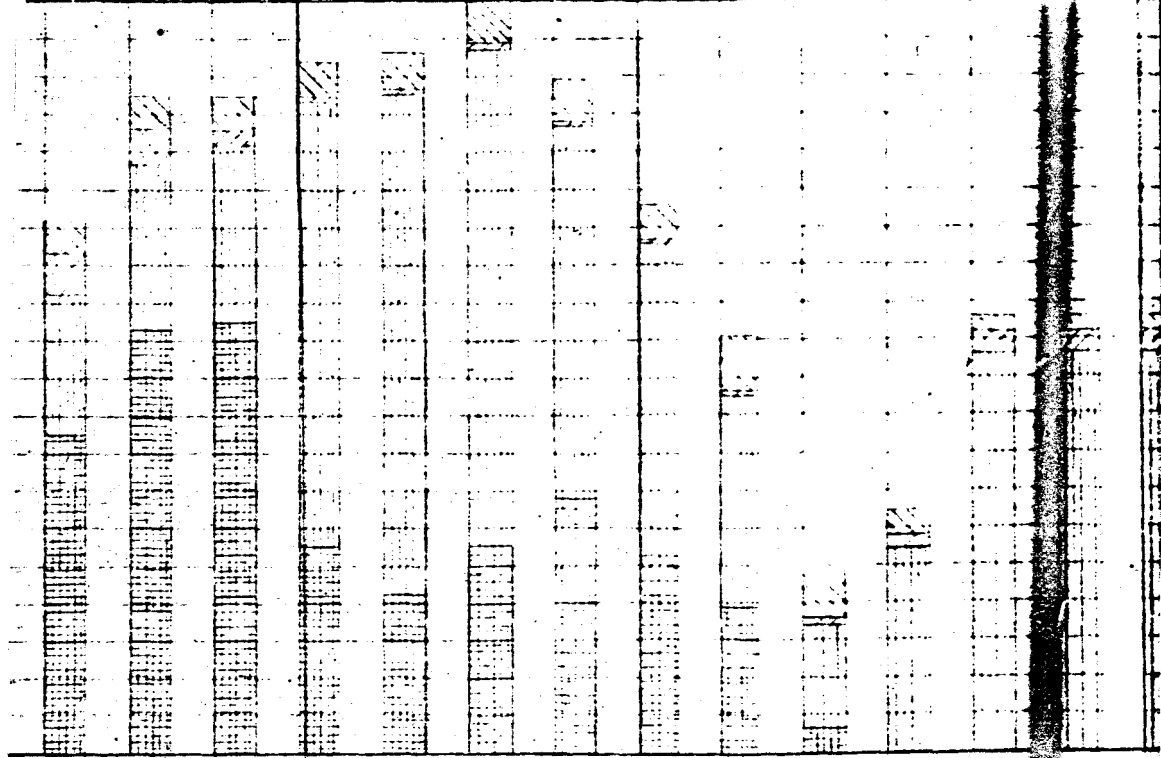


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2

1973

APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.

DATE: *March*

PREPARED

SUPERVISING

PROFESSIONAL

TECHNICIAN S-R

TECHNICIAN S/C

INCLUDES SUPERIOR EXEMP

INCLUDES CLERK

CONSTRUCTION — STEEL IS-ROGER

OPERATIONS — STEEL IS-ROGER

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MONTHLY PROGRESS

OFFICE OF COM
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CONSOLIDATION
RESEARCH DIVISION

CONTRACT NO. 14-6









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DATE: *June 1969*

1973

OCT. NOV. DEC.

PREDICTED ACTUAL

SUPERVISING  
 PROFESSIONAL  
 TECHNICIAN S-R  
 TECHNICIAN S/C  

 INCLUDES SUPERVISORY EXEMPT TECHNICIANS
 INCLUDES CLERICAL

CONSTRUCTION — STEARNS-ROGER JOB B-37000
 OPERATIONS — STEARNS-ROGER JOB B-37400

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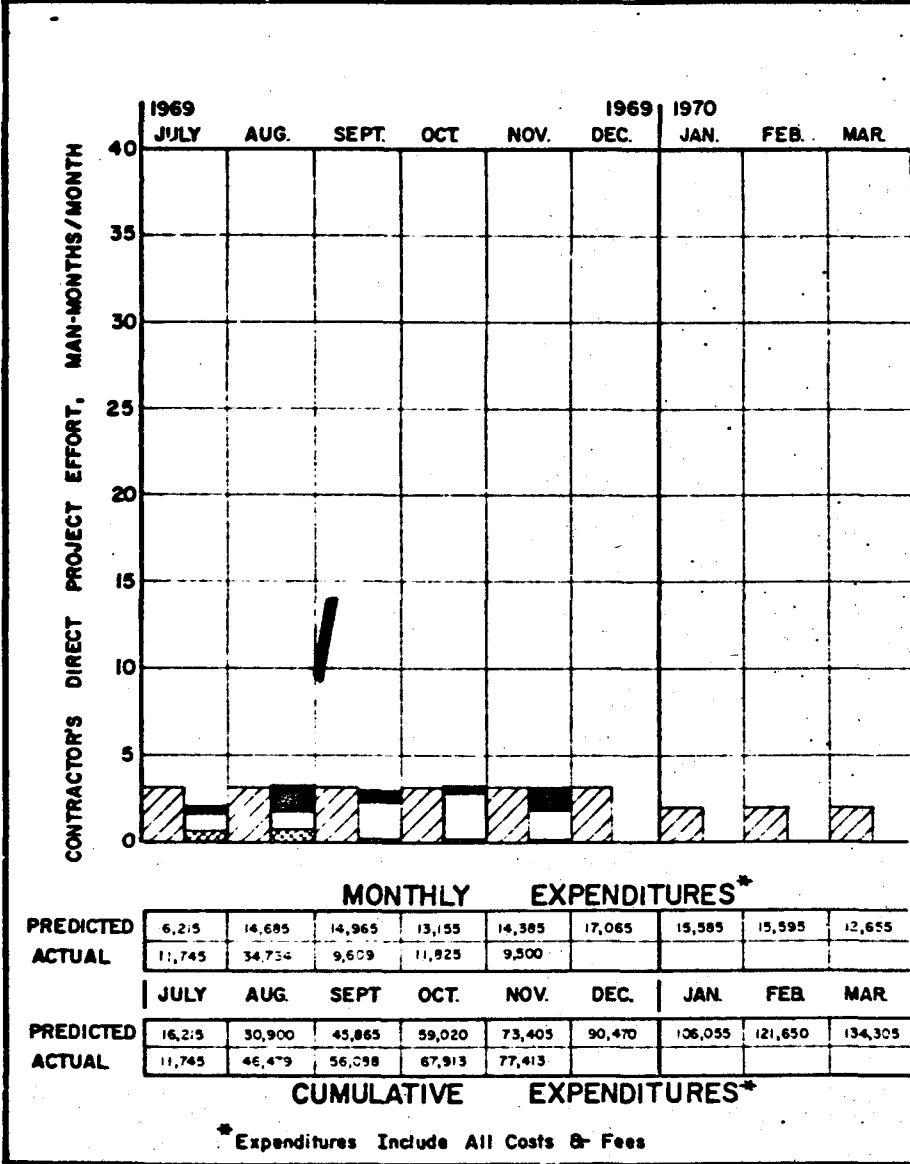
MONTHLY PROGRESS CHART

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 RESEARCH DIVISION LIBRARY, PA

CONTRACT NO. 14-01-0001-415 (3)

OCT. NOV. DEC.



MONTHLY EXPENDITURES*

	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.
PREDICTED	6,215	14,685	14,965	13,155	14,385	17,065	15,585	15,595	12,655
ACTUAL	11,745	34,734	9,609	11,925	9,500				

CUMULATIVE EXPENDITURES*

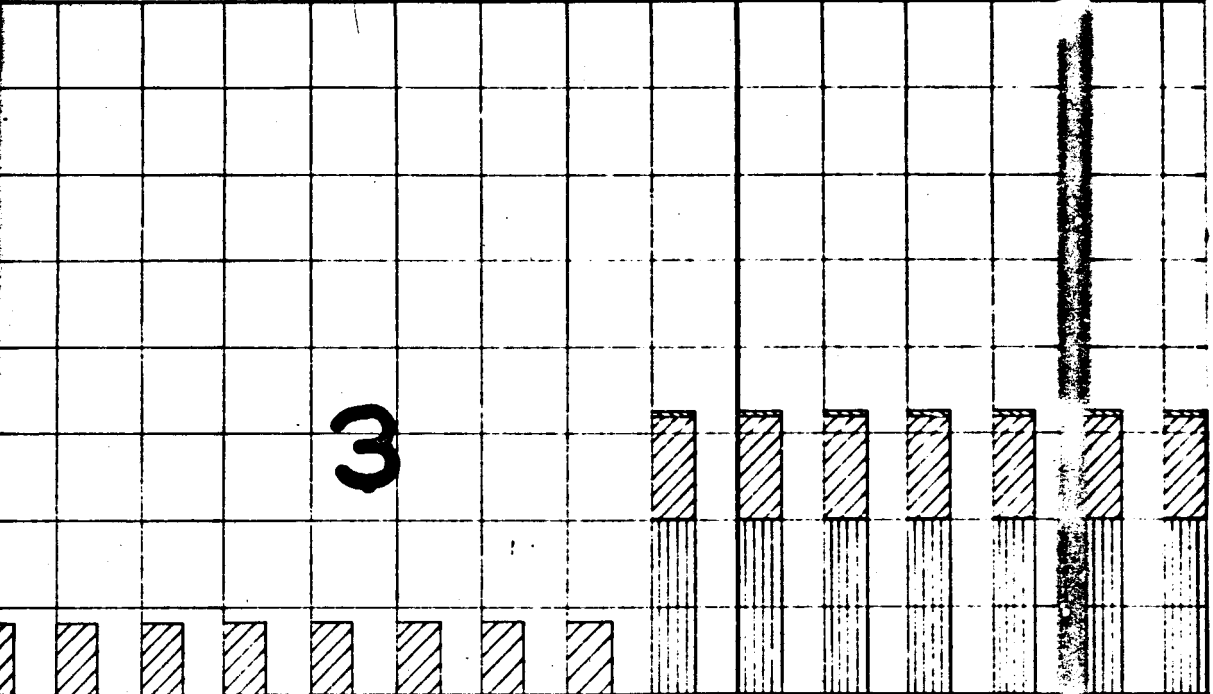
	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.
PREDICTED	16,215	30,900	45,865	59,020	73,405	90,470	106,055	121,650	134,305
ACTUAL	11,745	46,479	56,088	67,913	77,413				

* Expenditures Include All Costs & Fees

MONTHLY PROGRESS CHART (SUPERVISIC &

CONTRACT No. 14-01-0001-415 (3)

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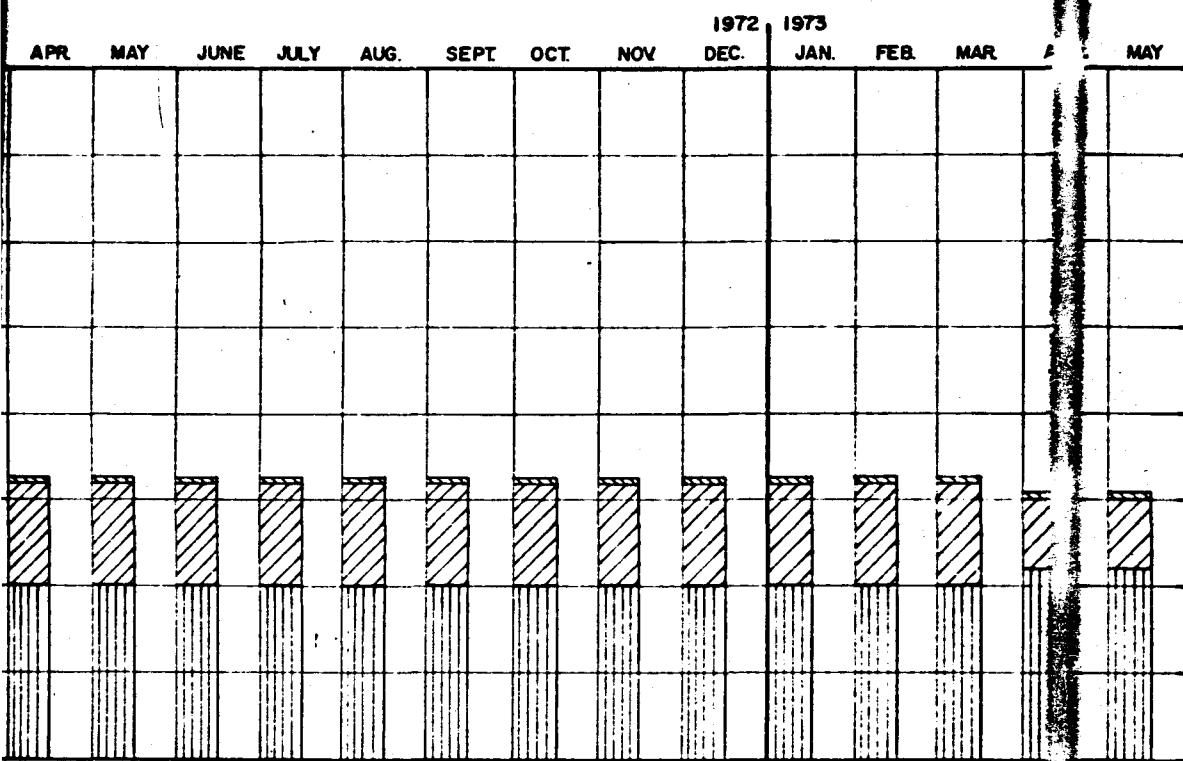
1,145	18,705	15,955	14,875	14,875	14,875	14,875	14,875	39,475	39,475	39,475	39,475	39,475	39,475	39,475
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APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY JUN

4,340	363,045	379,000	393,875	408,750	423,625	438,500	453,375	492,850	532,325	571,800	611,275	650,750	690,225	729,700
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SION & LAB WORK)



APR	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV	DEC.	JAN.	FEB.	MAR.	APR	MAY
650,750	690,225	729,700	769,175	808,650	848,125	887,600	927,075	966,550	1,006,025	1,045,500	1,084,975	1,124,450	1,157,125

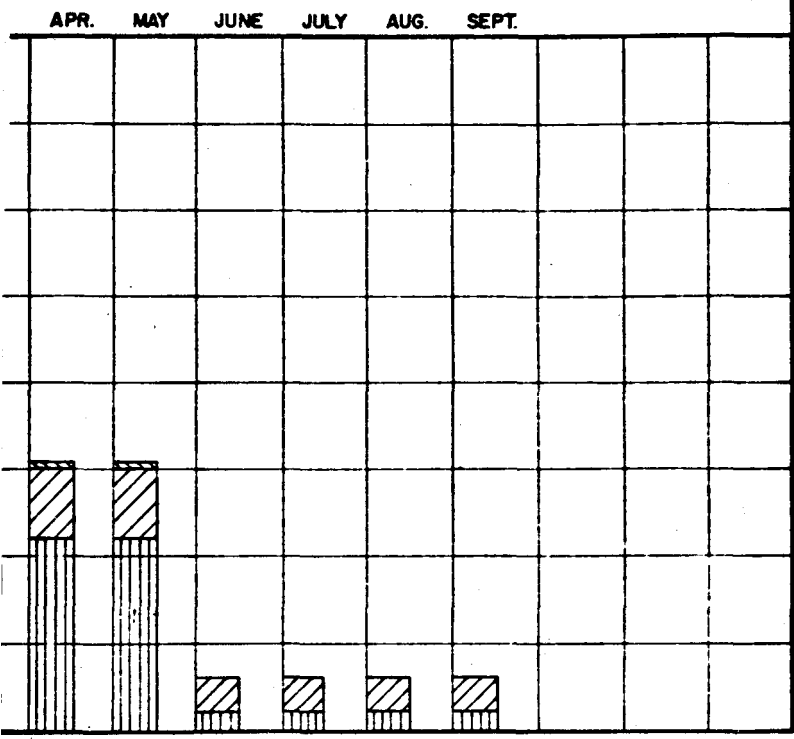
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36,075	36,075	11,475	11,475	11,475	41,120		
APR	MAY	JUNE	JULY	AUG.	SEPT.		
1,121,050	1,157,125	1,168,600	1,180,075	1,191,550	1,232,670		

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OFFICE OF C
DEPARTMENT

CONSOLIDAT
RESEARCH DIVISION

CONTRACT No. 1

DATE: December, 1969

1973

	PREDICTED	ACTUAL
SUPERVISING		
PROFESSIONAL		
TECHNICIAN		

⊕ Includes Supervisory Exempt Technicians
 ⊕⊕ Includes Clerical.

6

MONTHLY PROGRESS CHART

OFFICE OF COAL RESEARCH
 DEPARTMENT OF THE INTERIOR

CONSOLIDATION COAL CO.
 RESEARCH DIVISION LIBRARY, ...

CONTRACT No. 14-01-0001-415 (3)

PROGRESS REPORT NO. 67
 OCR CONTRACT NO. 14-01-0001-415(3)
CONSOL LIGNITE GASIFICATION PROCESS DEVELOPMENT

December 1 to 31, 1969

A. Summary

Phase I - Feasibility Study

Complete.

Phase II - Bench-Scale Experiments

Current phase complete.

Phase III - Pilot Plant Engineering

Complete.

Phase IV - Pilot Plant Construction

Engineering design, vendor inquiry, and purchasing by Stearns has continued. This work is now four to six weeks behind schedule, and four additional engineers are assigned to the project to expedite the effort. The projected construction completion date remains March 22, 1971.

A skeleton field construction crew will be set up in Rapid City in January to supervise caisson and building subcontracts.

Financial

Estimated expenditures in December were \$14,500 by Consol and \$110,400 by Stearns. Total cumulative expense is \$2,237,490.

B. Technical Results and Program

Phase II - Bench-Scale Research

Complete.

Phase III - Pilot Plant Engineering

Complete.

Phase IV - Pilot Plant Construction

1. Supporting Process and Economic Analyses (Project No. 533)

No work was done on this project in December.

2. Supporting Patent and Legal Activities (Project No. 534)

The current reports and memoranda were reviewed for Subject Inventions.

3. Consol Assistance on Construction of
Lignite Pilot Plant (Project No. 536)

Other than continued monitoring of the Stearns-Roger activities, the major Consol effort this month was a detailed review of the P and I drawings issued in November by Stearns.

A set of 20 drawings was checked and marked up reflecting many minor and a few major corrections. The marked-up prints were discussed with Stearns and turned over for preparation of a final set which will be approved for design in January.

4. Stearns-Roger Subcontract (Project No. 700)

Progress Report by Stearns is attached.

C. Subject Inventions

None.

D. Financial Status

<u>Expense</u>	<u>Actual</u>	<u>Budget</u>
Cumulative through November, 1969	\$ 2,102,599	\$ 2,170,661
Expended in Period (estimate)		
Consol	14,500	17,065
Stearns	110,400	106,900
Cumulative through December, 1969	\$ 2,237,490	\$ 2,294,626

Att. - Stearns-Roger Progress Report
Progress Chart
T: 1/14/70

PROJECT STATUS REPORT

Page 1 of 5

CONSOLIDATION COAL COMPANY
CSG PILOT PLANT
RAPID CITY, SOUTH DAKOTA

CCC Project No. 536
S-R Job No. B-37000
January 2, 1970

PROJECT REPORT SUMMARY

Work now in progress includes engineering design, inquiries to vendors and subcontractors, purchasing, preparation of general specifications, revisions to the flow diagrams and a limited amount of drafting layout. These phases are four to six weeks behind schedule. The current assignment of four more process and mechanical design engineers will help to reduce further delay in the schedule.

ENGINEERING

Process

Process design problems concerning phases of the project that were originally outside the scope of this contract have been taking some of the time of our key design personnel who otherwise would have been concentrating on equipment evaluation and selection. During the past two monthly project status review meeting with Consol, the pending process design problems have been reviewed in detail.

Flow diagrams for the process functions and for the major utility systems were returned with comments from Consol on December 12. Detail work to comply with these comments and to cover changes recommended by Stearns-Roger is estimated to be complete for issue by January 12. Re-design of the flare system and purge gas system has been postponed until late January.

Mechanical

Details on engineering, inquiries, recommendations, approvals and purchasing are covered by the Equipment Status List issued on January 7 and by the following equipment summary:

PROJECT STATUS REPORT

Page 2 of 5

CONSOLIDATION COAL COMPANY
CSG PILOT PLANT
RAPID CITY, SOUTH DAKOTA

CCC Project No. 536
S-R Job No. B-37000
January 2, 1970

Description	No. Items	Specifications		On		Consol App.	Purch
		In Prog	Comp.	Inq.	Rec.		
Agitators	1	--	--	-	--	-	1
Bins, Hoppers	8	7	--	-	--	1	--
Boiler	1	--	--	-	1	-	1
Cooling Tur	1	--	--	4	--	-	--
Cyclones	4	--	--	1	--	2	5
Comprs	8	--	--	1	--	1	3
Conveyors	4	--	--	2	--	-	--
Hoists	2	--	--	-	--	-	2
Crushers	2	--	--	-	--	1	--
Dryers	5	1	--	3	--	4	1
Exchgrs	11	--	2	2	--	5	3
Feeders	8	--	--	-	--	-	--
Filters	2	2	--	-	--	-	5
Fired Htrs	6	--	--	-	1	-	--
Elec. Gen	1	--	--	1	--	1	1
Misc.	4	--	--	-	2	-	1
Pkg Systems	3	--	--	1	1	-	1
Pumps	20	--	--	-	--	8	12
Scale	1	--	--	-	--	-	1
Screens	1	--	--	-	--	-	--
Flare Stk	1	1	--	-	--	2	1
Tanks	3	--	--	-	3	4	18
Vessels	34	--	--	9	--	-	1
Water Trt	2	--	--	1	--	-	1
Percent of Total	100	8	1	18	8	22	43

PROJECT STATUS REPORT

Page 3 of 5

CONSOLIDATION COAL COMPANY
CSC PILOT PLANT
RAPID CITY, SOUTH DAKOTA

CCC Project No. 536
S-R Job No. B-37000
January 2, 1970

Mechanical - continued

Expansion joint supplier has been selected. Blanket commitment for the extremely long delivery Incoloy pipe and fittings is awaiting approval by Consol. For further details on materials, please refer to Material Status Report No. 2 issued on January 2.

Drafting

Work has continued on layout details for the reactor system. Layout for underground piping is far enough advanced so that requisitions have been issued for items such as hydrants and post indicator valves. General piping specifications are ready for approval by Consol. Welding procedures have been reviewed. Eight existing procedures are ready to be recommended to Consol. One new procedure must be written and qualified.

Drawings for about 60 per cent of the caissons have been issued. The remainder will be completed in January. Foundation design for the stack for the heaters is in progress.

Single line electrical diagrams have been redrawn to suit the equipment as now recommended, and to serve as the basis for electrical subcontract inquiries to be issued in mid-January.

Instrumentation

Suppliers for multi-point temperature indicators and recorders and alarm annunciator have been selected. Bids for the extremely high temperature service gate valves have been transmitted to Consol. Selection of a supplier for these valves, the most critical and longest delivery on the entire project, is held up pending a more detailed investigation and evaluation of the qualifications of the bidders. Selection may be made by January 16. Lack of approved flow diagrams has held up progress on instrumentation change orders.

PROJECT MANAGEMENT

The arrow diagram network schedule attached to this report has been updated with the decorative line relocated to separate the completed and unfinished work. The "Critograph Schedule" computer printout showing job activities sorted by earliest start date within each general account category has been issued. This schedule will be monitored and revised by the computer as the job progresses.

Caisson subcontract has been awarded. Inquiries for extending the city water main to the plant site have been sent to bidders. Recommendations for the subcontractor for the general building and all concrete foundations were submitted to Consol, who then requested rebids by all bidders to cover

PROJECT STATUS REPORT

Page 4

CONSOLIDATION COAL COMPANY
CSC PILOT PLANT
RAPID CITY, SOUTH DAKOTA

CCC Project No. 536
S-R Job No. B-37000
January 2, 1970

PROJECT MANAGEMENT - continued

corrections to the Catalytic Construction Co. drawings. Re-inquiries will be issued by January 8, and a subcontractor may be selected by the end of January. Structural steel supplier will be recommended to Consol by January 8. Subcontractor for refractory linings for the reactors has been recommended. Inquiry for prefabricated buildings has been issued.

Application for building permit has been made.

CONSTRUCTION

Plant fence will be completed by January 15. The assistant superintendent, resident engineer and field engineer will arrive in Rapid City January 15-19 to start layout work. Caisson subcontractor will start work January 26. Building subcontractor will start work in early March.

CONSOLIDATION COAL COMPANY
CSG PILOT PLANT
RAPID CITY, SOUTH DAKOTA

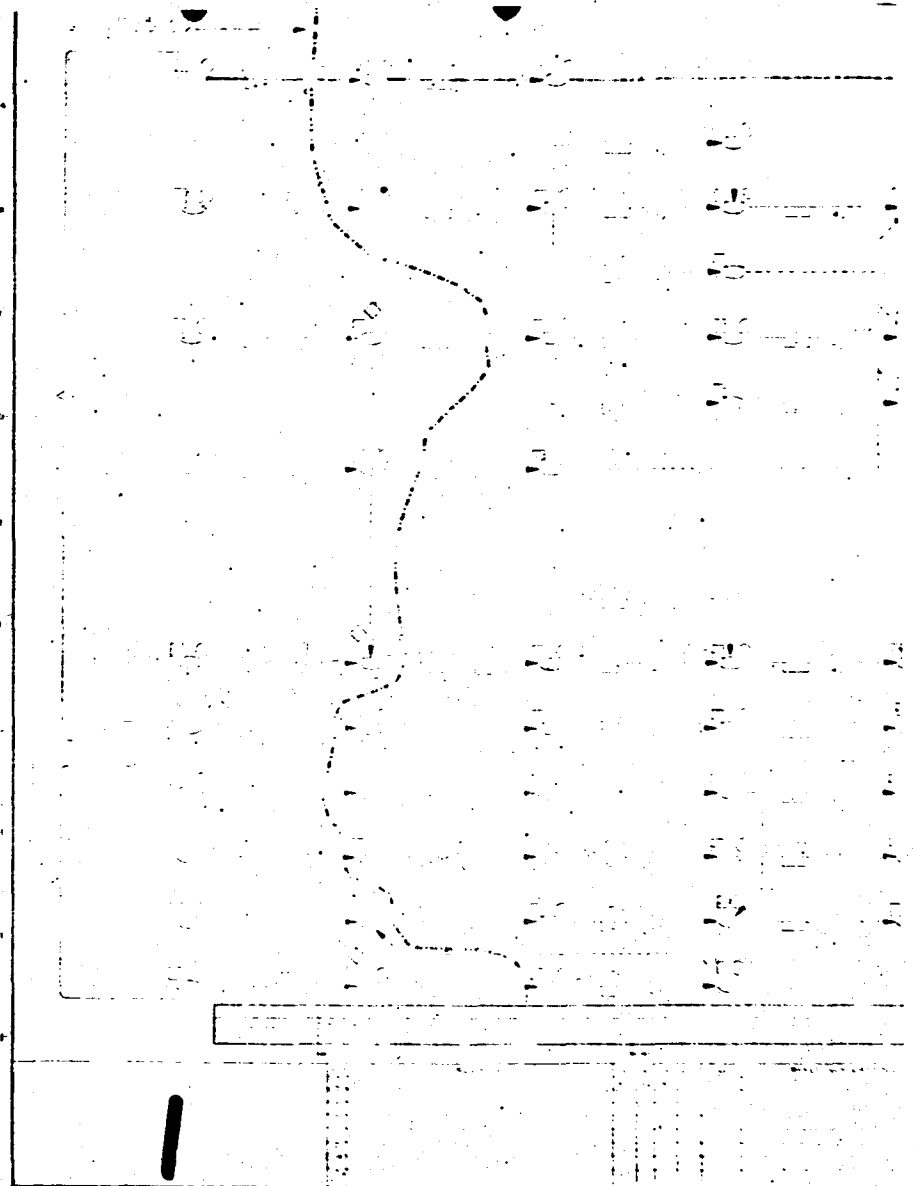
CCC Project No. 536
 S-R Job No. B-37000
 January 2, 1970

SUMMARY OF PROJECT CHANGES

	<u>Increase</u>	<u>Decrease</u>
<u>Approved Change Orders</u>		
1. Reactor system study	8,820	
Original Maximum Price	<u>8,465,129</u>	
Presently Approved Total	<u>\$8,473,949</u>	
<u>Pending Change Notices</u>		
5. Delete roof at heaters		14,000
6. Add'l Regen. Nozzles	600	
7. Incr. disch. pressure prehr compr	2,700	
8. Redesign purge gas systems	30,000	
9. Add instr & duct, lignite crush & grind	13,000	
10. Boiler controls, 2 element pneu type	1,000	
11. Delete Fuel Gas Booster Blower		7,800
12. Add two PC & PCV	1,000	
13. Revise Canteen to Fallout Shelter	4,000	
14. Perspective Drawing for OCR	900	
15. Revise 32 Pres & 3 Temp Transmttrs	3,000	
16. Revise Hammermill specs	1,900	
17. Redesign expansion joints & piping		160,000
18. Delete car puller		10,330
19. Revise Fire System per F Mutual	7,000	
20. Frt. Elev vs. Manlift & Hoist	6,200	
21. Study reactor offgas prequench	1,000	
22. Study Rand Corp Surplus Equip	200	
23. Incr Size P-209	800	
24. Subs. Coulds for Aurora J-314	200	
25. Revise reactor refractory specs	800	
26. Redesign reactors		40,000
27. Heavier tubes on exchangers	600	
Net Pending Changes - - - - -		\$ 157,230
Estimated Total - - - - -		<u>\$8,316,719</u>

Attachments: Progress Chart
 Master Plan

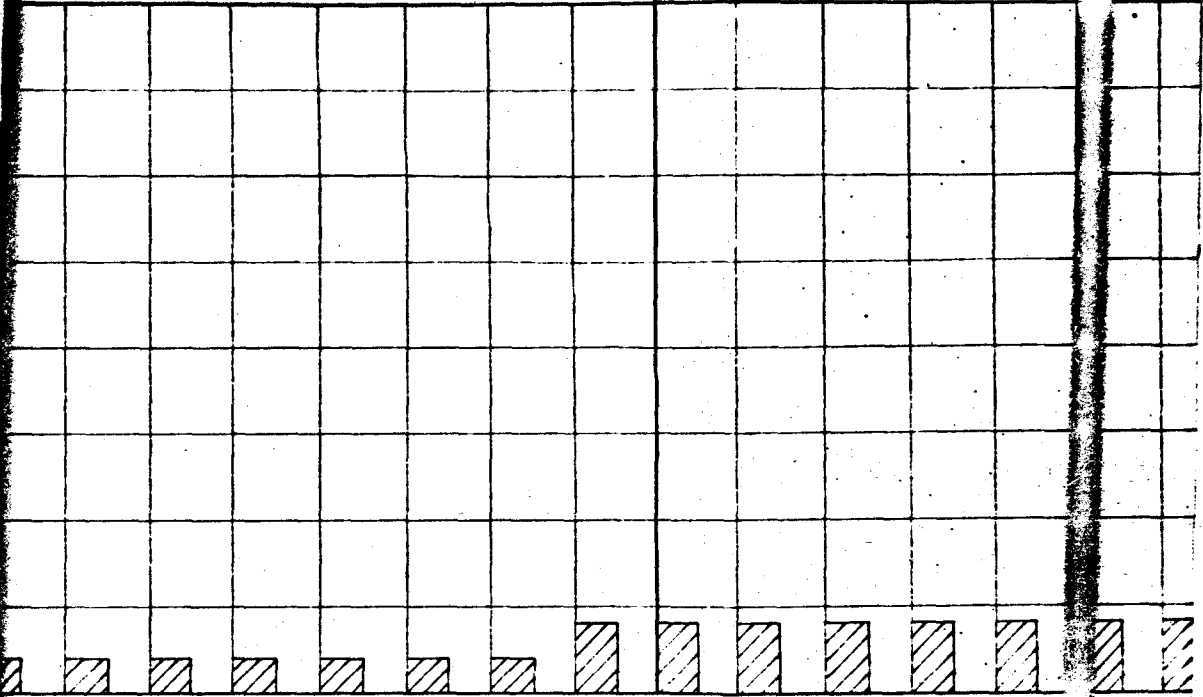
D. H. Dawson
 D. H. Dawson
 Project Manager



MONTHLY PROGRESS

CONTRACT NO.

1970 1971
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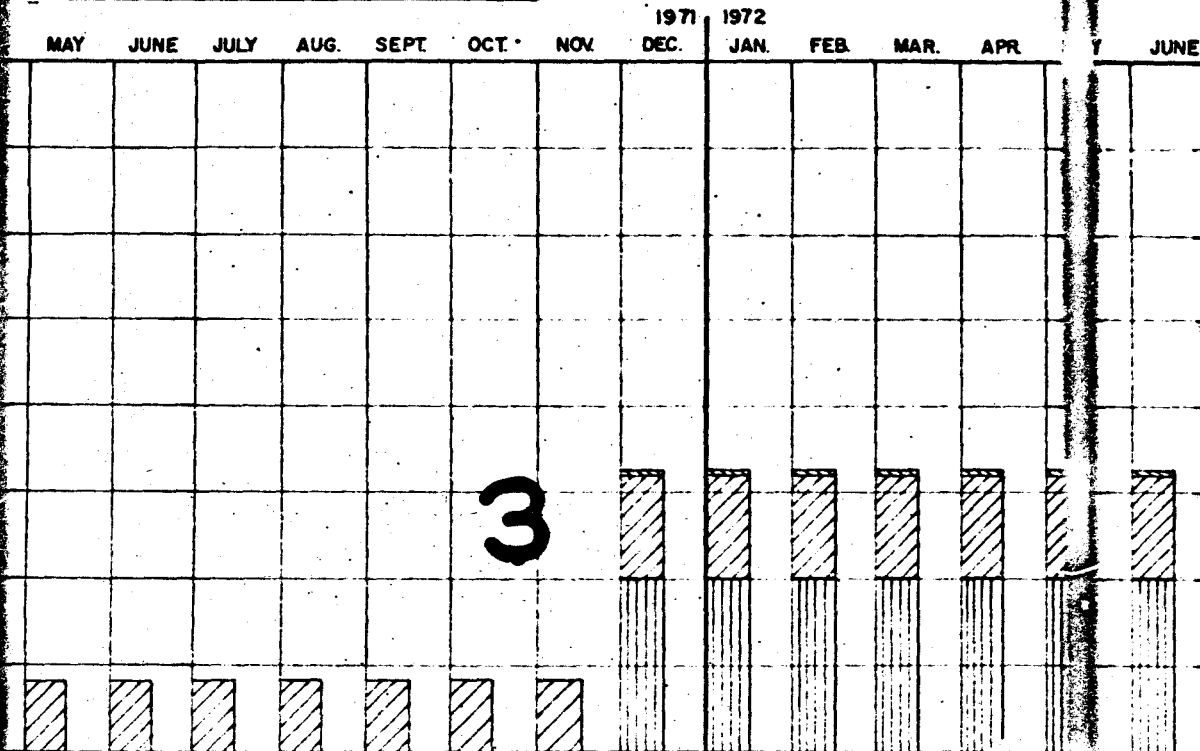
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10,995	173,650	166,965	199,800	212,305	224,810	237,315	257,470	277,605	300,900	323,195	344,340	363,045	379,000	390,000

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MONTHLY PROGRESS CHART (SUPERVISION & LA)

CONTRACT No. 14-01-0001-415 (3)

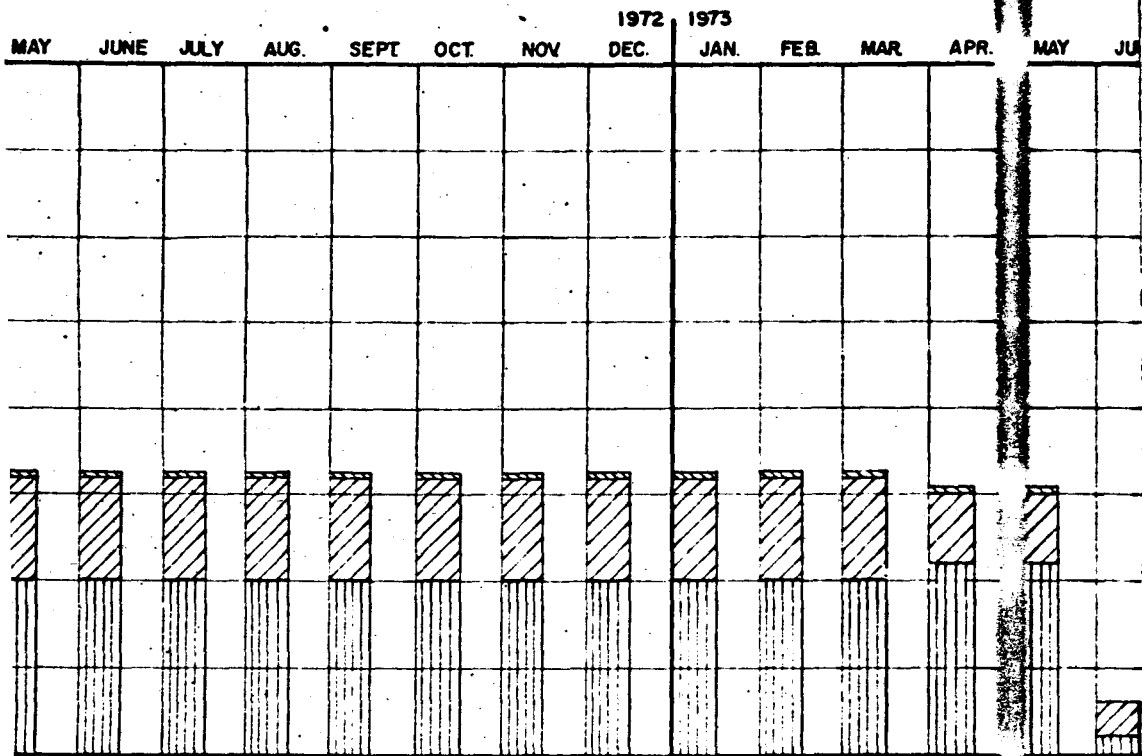


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18,705	15,955	14,875	14,875	14,875	14,875	14,875	39,475	39,475	39,475	39,475	39,475	39,475	39,475
MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE
363,045	379,000	393,875	408,750	423,625	438,500	453,375	492,850	532,325	571,800	611,275	650,750	689,225	729,700

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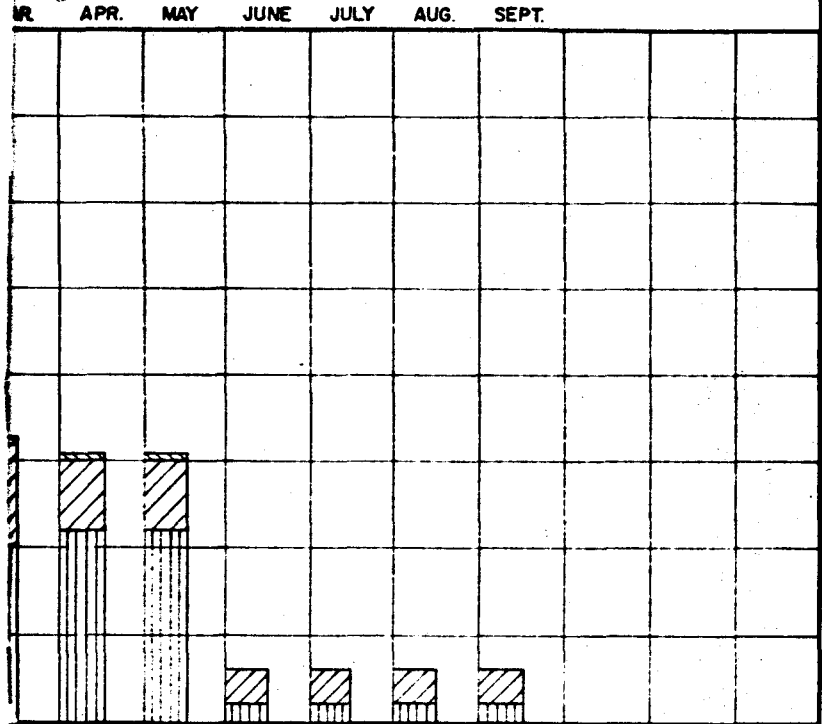


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9,475	39,475	39,475	39,475	39,475	39,475	39,475	39,475	39,475	39,475	39,475	36,075	36,075	11,475
MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUN
0,225	729,700	769,175	808,650	848,125	887,600	927,075	966,550	1,006,025	1,045,500	1,084,975	1,121,050	1,157,125	1,168,100

DATE: _____

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475	36,075	36,075	11,475	11,475	11,475	41,120		
MR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.		
6,975	1,121,050	1,157,125	1,168,600	1,180,075	1,191,550	1,232,670		

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- ⊕ Includes Supervisory Ex
 ⊗ Includes Clerical.







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 CONTRACT No. 14

(New 415 Chart)

DATE: December 1969

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PROFESSIONAL		 ⊕
TECHNICIAN		 ⊕ ⊕

⊕ Includes Supervisory Exempt Technicians.
 ⊕ ⊕ Includes Clerical.

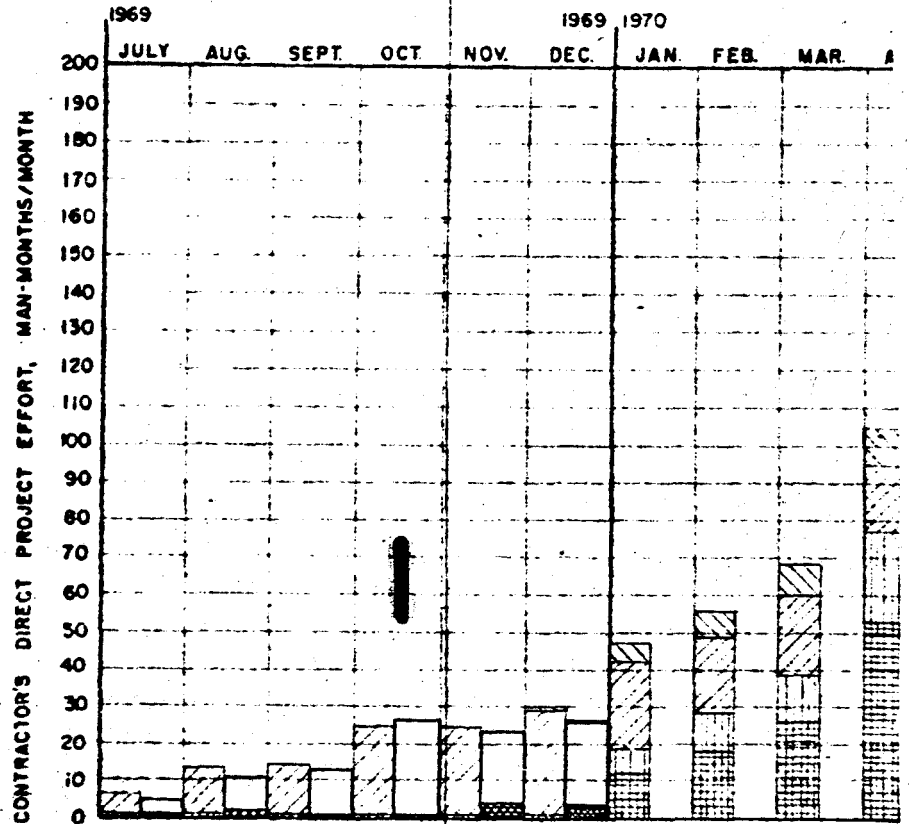
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MONTHLY PROGRESS CHART

OFFICE OF COAL RESEARCH
 DEPARTMENT OF THE INTERIOR

CONSOLIDATION COAL CO.
 RESEARCH DIVISION LIBRARY, PA.

CONTRACT No. 14-01-0001-415 (3)

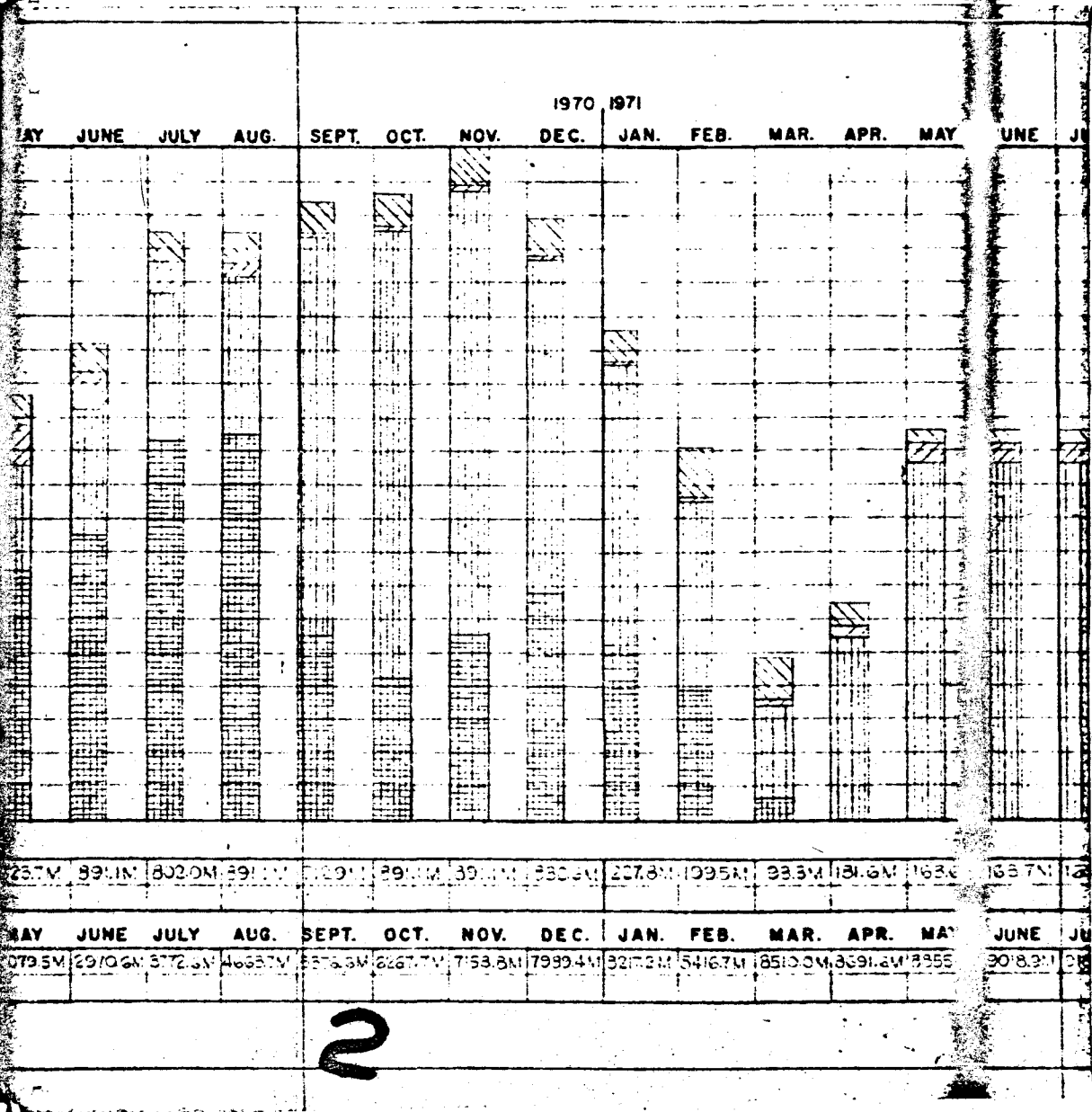


MONTHLY EXPENDITURES *

	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.
PREDICTED	0	30.0M	41.0M	50.0M	58.0M	106.9M	112.0M	278.0M	299.2M	445
ACTUAL	6.2M	25.0M	32.8M	42.6M	51.7M	110.4M				
PREDICTED	0	15.0M	7.0M	15.0M	10.0M	325.9M	437.9M	7.03M	1010.2M	1455
ACTUAL	6.2M	51.2M	64.0M	106.6M	146.3M	256.7M				

CUMULATIVE EXPENDITURES *

* EXPENDITURES INCLUDE ALL COSTS & FEES



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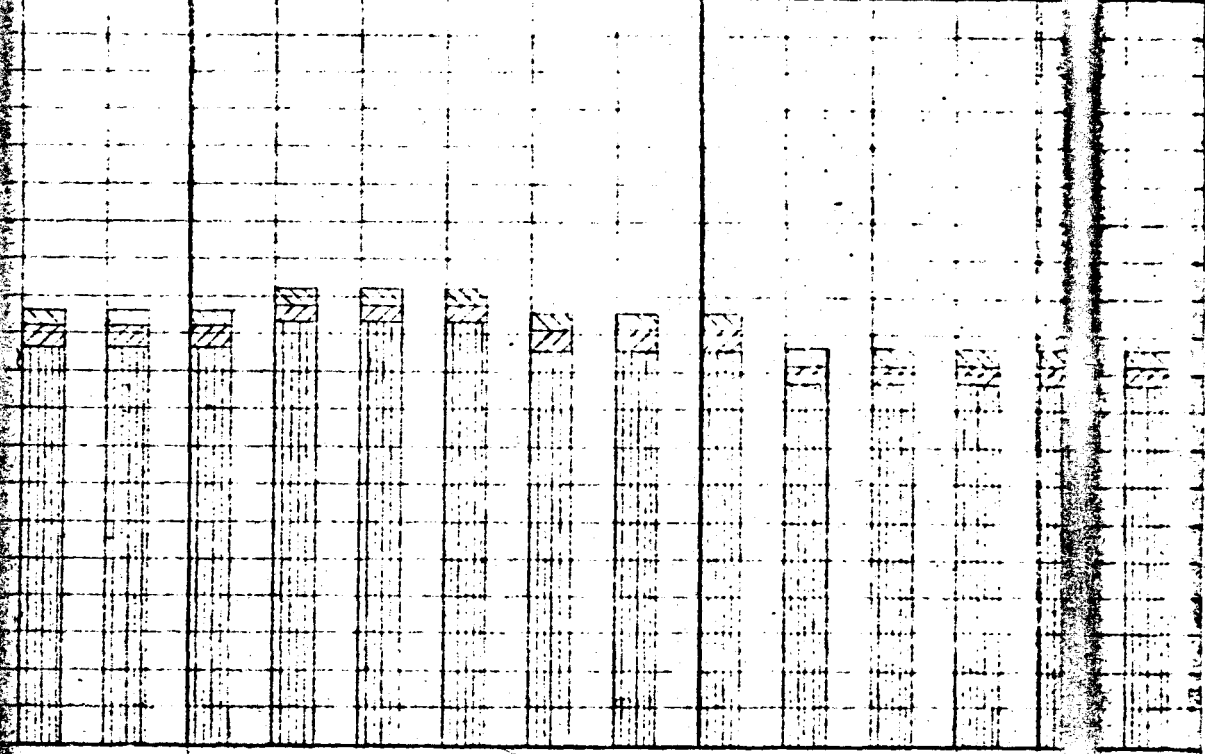
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MONTHLY PROGRESS CHART (CONSTR)

CONTRACT NO. 14-01-0001-415 (3)

1971 1972

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163.6M 168.7M 163.6M 203.1M 208.0M 209.1M 201.9M 201.5M 201.5M 175.1M 174.8M 194.7M 191.8M 192.8M

MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC. JAN. FEB. MAR. APR. JUNE

1855.2M 2018.3M 2182.7M 2390.8M 2529.8M 2660.7M 2700.9M 2713.5M 2642.5M 2557.9M 2462.4M 2395.7M 2300.0M 2143.3M

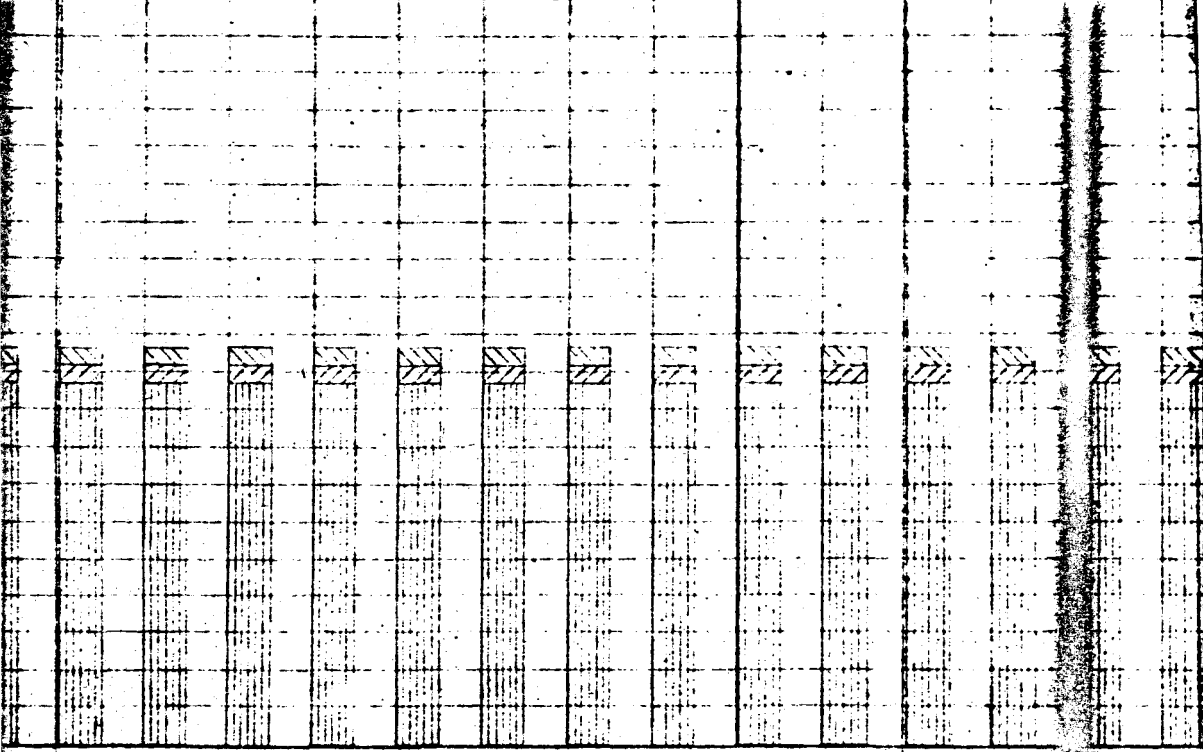
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1972 1973

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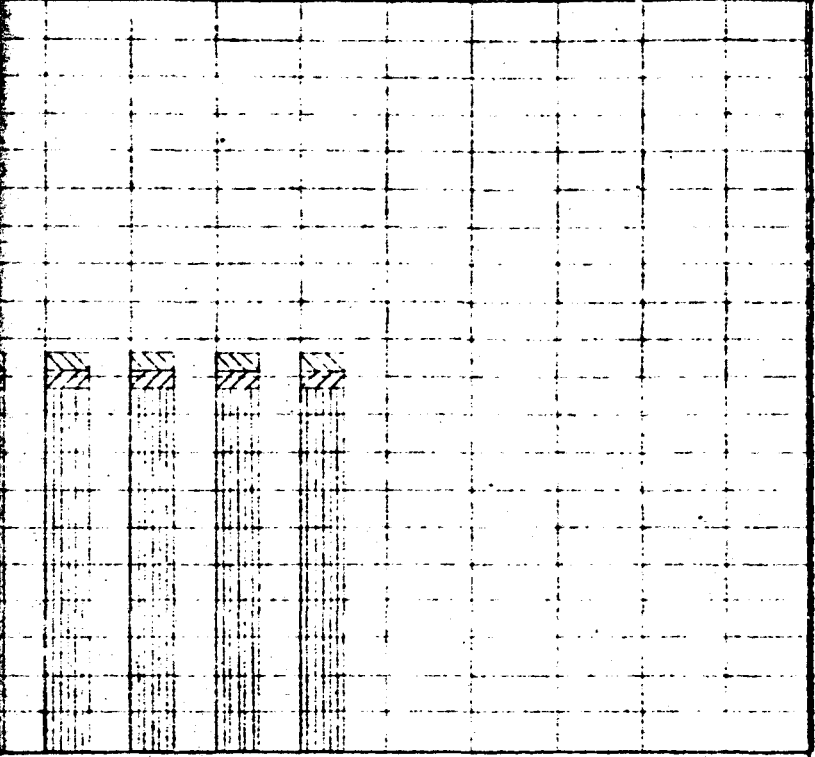
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15M 167.5M 16.2M 120.3M 10.1M 13.0M

JAN. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.

22.9M 13.60.4M 13.521.6M 13.412.4M 13.562.5M 13.578.5M

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DATE: 2-1-73

PREPARED

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- PROFESSIONAL
- TECHNICIAN S-R
- TECHNICIAN S/C

- INCLUDES SUPERVISORY EXPENSE
- INCLUDES CLEANING

CONSTRUCTION — STEEL — ROOF
 OPERATIONS — STEEL — ROOF

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OFFICE OF CONSTRUCTION	U.S. DEPARTMENT OF COMMERCE
CONSTRUCTION RESEARCH DIVISION	STATISTICAL SECTION
CONTRACT NO. 14	



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

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

1973



OCT. NOV. DEC.




PREDICTED ACTUAL

SUPERVISING  

PROFESSIONAL  

TECHNICIAN S-R  

TECHNICIAN S/C  

 INCLUDES SUPERVISORY EXEMPT TECHNICIANS
  INCLUDES CLERICAL

CONSTRUCTION — STEARNS-ROGER JOB B-37000
OPERATIONS — STEARNS-ROGER JOB B-37400

6

MONTHLY PROGRESS CHART

OFFICE OF COAL RESEARCH
U.S. DEPARTMENT OF THE INTERIOR

CONSOLIDATION COAL CO.
RESEARCH DIVISION LIBRARY, PA.

CONTRACT NO. 14-01-0001-415 (3)

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