

*Box MPR--22*

TECHNICAL SECTION

of

PROGRESS REPORT NO. 22

on

CONTRACT NO. 14-32-0001-1513

to

OFFICE OF COAL RESEARCH

November 20, 1974

BATTELLE  
Columbus Laboratories  
505 King Avenue  
Columbus, Ohio 43201

SUMMARY

During this reporting period Chemico began reducing their New York office engineering staff on our job and continued the field construction of the PDU. Increased expediting activity by way of more visits to vendors was also emphasized at Chemico and by Battelle. Delays in the delivery of purchased equipment and materials to the field are seriously impacting on the PDU construction schedule.

TECHNICAL SECTION  
of  
PROGRESS REPORT NO. 22  
on  
CONTRACT NO. 14-32-0001-1513  
to  
OFFICE OF COAL RESEARCH  
from  
BATTELLE  
Columbus Laboratories  
November 20, 1974

INTRODUCTION AND PROJECT OBJECTIVE

This progress report describes work completed by Battelle on the Coal Gasification Program during the period October 18 to November 20, 1974. The work completed during this period was nonexperimental and was associated with the installation of the 25-ton-a-day coal gasification process development unit by Chemico for Battelle. Nothing of a patentable nature is disclosed within this report.

The general objective of the current contract is development of a two-stage fluidized-bed process utilizing a self-agglomerating fluidized-bed burner as part of a practical and economical method for producing synthesis gas by steam gasification of coal. The developed process is to be useful as part of a system for producing synthetic pipeline gas or for other purposes.

Pursuant to the general objective, a 25-ton-a-day-of-coal Process Development Unit (PDU) is to be erected and operated and the following aspects of the process explored:

- The operability of a self-agglomerating fluidized-bed coal burner operating on an Eastern bituminous coal under pressure and using air for combustion.

- The mechanical feasibility of continuously circulating a burden of hot-ash agglomerates between fluidized-bed burner and fluidized-bed gasifier vessels at 100 psig of pressure and the rates and temperatures required for effective heat transfer.
- The operability of integrated fluidized-bed burner and gasifier vessels both fed by Eastern bituminous coal (or char in the case of the burner) and operating at 100 psig of pressure. The gasifier is to be fluidized by steam and the endothermic heat of gasification is to be provided by the circulating burden of hot-ash agglomerates.
- The operability over extended time periods of a power-recovery turbine using hot, fluidized-bed burner effluent gases as the turbine working fluid.
- The factors that influence the long-term operability of the process. Included is to be the gathering of data on all key process variables and their affect on the characteristics of the process.

Concurrent with operation of the PDU, sufficient process data and information will be acquired to permit scale-up of the process to its next logical stage of development.

#### WORK COMPLETED

##### Detailed Engineering Design and Procurement of the PDU

Chemico provided Battelle with a new overall project schedule for the PDU installation on April 4, 1974. This schedule was first presented in Progress Report Number 15. Since then Chemico has been noting the work completed on the schedule and reissuing it. The most recent version received by Battelle is incorporated in this monthly report to OCR. Chemico is not formally reporting any change in the end point of the schedule. However, because of delays in equipment and materials deliveries it is obvious to us that the indicated mechanical completion date of February 15, 1975, will not be met.

Chemico has emphasized completion of their New York office engineering design work during this reporting period. The Chemico status report as of November 1 attached to this technical report as the Appendix provides details of the Chemico New York office activity during this reporting period.

#### Drawings

Virtually all of the Chemico drawings for the PDU have been "issued for construction". Chemico has a staff of about two draftsmen checking drawings, updating, correcting, and completing updated elevation and plan drawings.

#### Requisitions and Purchases

Purchase orders have been issued for all of the items required for the job with the exceptions of steam tracing, insulation (nonrefractory), miscellaneous duct work, pipe hangers and supports, some minor transition pieces and chokes, and other minor items. A subcontract to Chemico was let for painting the outside structure.

Numerous change orders on many of the commodity items are being issued almost daily by Chemico. The change orders are made necessary by updated materials take-offs on completed isometrics. The nature of the change orders is normally that of increasing or decreasing quantities, splitting orders, cancellations, etc.

A satisfactory replacement for the steam boiler has been located and bought. This problem was discussed in the problems and recommendations section of Progress Report No. 20.

#### Expediting and Inspection

At this point expediting and inspection of equipment and materials prior to delivery are the most important activities required for timely completion of the PDU

It has been determined that telephone calls as an expediting tool are next to worthless. For this reason Battelle has suggested to Chemico that no reliance be placed on promises received by phone and that an extensive campaign of visitation be undertaken and continued.

Mr. Thomas Dillon, Chemico's project engineer on our job, is coordinating this visitation activity and has made several visits to supplier's shops himself. Roughly one-third of Mr. Dillon's time during this reporting period has involved visitation and two-thirds has been devoted to other activities of the project engineer.

In addition to Mr. Dillon, we are informed by Chemico that 1.5 men from their expediting department are spending full time expediting and inspecting our orders. We have suggested that another member of the Chemico project staff be assigned to work full time with Mr. Dillon following the purchase orders including visits.

To supplement the Chemico expediting and inspection activity, Battelle's project engineer (Mr. Adams), is making trips to vendor's shops and following up on his trips with phone calls.

In spite of the increased emphasis on expediting it now appears that the mechanical completion date of the PDU will be delayed by 6 weeks or more from the currently projected February 15, 1975, date.

#### Equipment and Materials Received at the Site

About 55 percent of the major items of process equipment have arrived at the site. The equipment is stored at the site and the materials for the most part, are being used as they are received. Equipment and material which have arrived to date are as follows:

#### FLWSHEET EQUIPMENT ITEMS

<u>Description</u>	
G-101	Coal Mill Surge Hopper
G-102	Coal Receiving Hopper
R-101	Grizzly
K-201	Main Fan

FLWSHEET EQUIPMENT ITEMS (Continued)

<u>Description</u>	
D-201	Inert Gas Generator (for Coal Pulverizer)
K-203	Combustion Air Blower
K-202	Auxiliary Fan
K-204	Screened Coal Blower
O-201	Coal Pulverizer
P-201	Cyclone Separator & Support Ring
L-202	Spinner Separator
P-203	Bag Filter
O-205	Ground Coal En Masse Conveyor/Elevator
J-301-A&B	Oil-Solids Pumps
O-301	Screw Conveyor Cooler
P-301	Pretreater Cyclone
K-303	Pretreated Coal Blower
P-302	Pretreated Coal Bag Filter
P-401-A&B	Bag Filters and Bin Vents
G-401-A	Combustor Feed Bin
G-401-B	Gasifier Feed Bin
G-402	Combustor Feed Pressurizing Bin
G-403	Combustor Feed Injection Bin
G-404	Pretreated Coal Receiving Bin
G-405	Gasifier Feed Pressurizing Bin
G-406	Gasifier Feed Injection Bin
P-501	Combustor Cyclone
P-502	Gasifier Cyclone
H-502	Gasifier Vessel and Spare Head
H-501	Combustor Vessel and Spare Head
O-502	Char and Sinter Cooler-Conveyor
K-501	Heater Recycle Blower
O-505	Dump Hoppers
G-050	Instrument Panel
O-506	Dump Hoppers
O-507	Dump Hoppers
O-508	Dump Hoppers
O-509	Dump Hoppers
O-512	Dump Hoppers
G-603	Sludge Settler
J-602-A&B	Venturi Circulating Pumps
E-604	Recycle Make Gas Cooler
K-603	Recycle Make Gas Compressor
E-605	Recycle Make Gas Aftercooler
D-702	Inert Gas Generator
G-703	Instrument Air Receiver

FLWSHEET EQUIPMENT ITEMS (Continued)

<u>Description</u>	
E-703	Instrument Air Aftercooler
K-701-A&B	Process Air Compressors
G-701-A&B	Process Air Receivers
R-701	Instrument Air Dryer Package
K-703	Natural Gas Booster Compressor
G-702	Inert Gas Receiver
R-804	Cooling Tower Water Treatment System
D-803	Steam Superheater
J-804-A&B	Valve Cooling Water Pumps
V-802	Emergency Electrical Generator
G-802	H. P. Water Surge Tank
J-803-A&B	Cooling Tower Water Pumps
R-803	Cooling Tower

BULK ITEMS

<u>Chemico Cost Code Number</u>	<u>Description</u>
A-190	Anchor Belts
T-600 & T-615	TFE-Lined Valves
R-301-2, R-601-2, R-602-2	Raschig Rings for Scrubbers
--	Needle Glove Valve
--	Flow Switches
T-626	Miscellaneous Valves
T-450	Tubing
--	Strainers
--	Tube Fittings
--	Gaskets
T-620 & T-621	Miscellaneous Valves
T-615	Miscellaneous Valve
U-060	Pressure Regulators
T-450	Filter Regulators
T-450	Miscellaneous Valves
U-030	Annunciators
V-020	Transformer substation (1)
A-190	Reinforcing Bars
U-030/U-041	Weigh Systems (load cells)



BULK ITEMS (Continued)

<u>Chemico Cost Code Number</u>	<u>Description</u>
T-550	Miscellaneous Valves
U-060	Miscellaneous Valves
R-301-2, R-601-2, R-602-2	Gaskets
U-041	Pneumatic Pressure Transmitters
V-032	Miscellaneous Electrical Supplies
U-060	Control Valves
U-020	Pressure Gauges
B-101	Small Bore Pipe (partial)
U-030	AIT 10-22 Gas Analyzers
"	AIT 30-39 Gas Analyzers
"	AIT 50-11 Gas Analyzers
80-V	Unistut
80-V	Lighting Fixtures
80-T-022	Pipe Fittings
U-100	Lab Panel
U-041	d/p Transmitters
80-T-040	S.S. Pipe
U-060	Valves
80-T-615	Valves
T-450	Swagelock Fittings
V-020	Substation No. 2
80-V	Conduit Fittings
80-V-100	Terminators
U-041	Level Transmitter
V-060	Cable
T450	Tubing
80-V	Electrical Fittings
80-T-022	Pipe Fittings
T-450	S.S. Pipe
V-100	Motor Control Center
80-V	Conduit Fittings
V-060	Wire
80-T	Shop Fabricated Pipe (partial)
T-450	Valve Manifold-Gauge Siphon
U-050	Main Control Panel
80-T-615	Pipe Fittings

In addition to the above listing, partial shipment of various orders for bulk items has been received. These items will be reported as received when the orders are completed.

All structural steel for both the coal feed and the burner-gasifier structure have been received except the grating and stair tread and rails for the burner-gasifier structure.

#### Construction of the PDU

Chemico issued their first construction schedule on May 23, (Issue P-1). Several refinements to the schedule have been made since the first issue. Copies of the updated issues have been provided to Dr. R. E. Vener of OCR, Dr. Ab Flowers of A.G.A., and Dr. R. Detman of C. F. Braun with Battelle's monthly reports. The most recent schedule issue transmitted was the one dated October 7 with Progress Report Number 21. A meeting was held between Chemico and Battelle in New York on October 24 for purposes of reviewing the Chemico materials status report. At that time it was obvious to Battelle that there were too many unconfirmed and unsubstantiated delivery dates for Chemico to be making meaningful projections about the overall construction schedule. We noted that we did not want time spent by Chemico on making new construction schedules until reliable delivery dates were confirmed. Issue of a new overall construction schedule is expected within the next 2 weeks.

Construction was initiated formally on June 10. Work done prior to mid-November was reported in our previous monthly reports to OCR. Battelle's field office is in daily contact with the Chemico construction personnel.

The normal scale-up effort on construction has continued to be delayed by slow deliveries on materials and equipment. The field labor force has averaged about 30 during this reporting period. This is less than half what would be expected if adequate materials were at the site.

The coal-feed structure has been completed to the 130-foot level. There is a minor superstructure still to be added after the pre-treated coal bag filter (P-302) is installed. This filter is part of the Sprout-Waldron pneumatic conveying system, and it was received at the site during this reporting period.

Erection of the combustor/gasifier structure has been started, and work is now at the 35-foot level. The railings, stairs, and floor plates for this structure are scheduled for delivery before the end of November.

All of the electrical conduit required for the job has now been received, and work in this area is accelerating. Approximately 4,500 feet of conduit are now in place. This is about 10 percent of the total job.

Work has continued at a nominal pace on field fabrication of small-bore piping. The limitation has been the availability of bulk pipe fittings. An essential shipment is reported to have left the distributor, but it has not been received in the field. Chemico is attempting to trace this shipment as of the end of the reporting period.

The inert-gas generating system and the cooling tower were received and set in place.

There were no lost-time accidents during the reporting period.

Battelle Activity Directly Related to Detailed  
Design and Installation of the PDU

In addition to the Battelle activity related to monitoring Chemico's design and construction work and assisting in expediting already noted, the Battelle staff have been participating in other areas directly related to the PDU design and installation.

Members of our Applied Solids Mechanics Section have continued to follow and inspect the construction of the major vessels for the PDU. Materials of construction specialists at Battelle have assisted the project staff in making selections of substitute materials in some cases to expedite deliveries.

No significant progress was made on the turbine procurement nor on obtaining an increased natural gas allocation at the site during this reporting period.

The building addition to house the utility equipment and the motor control center, control panel, etc., which is part of Battelle's contribution to the program is about 40 percent completed.

Battelle Activity on the Program Not Directly Related  
to the PDU Installation

Significant amounts of the Battelle project staff's time have been diverted to review of C. F. Braun and Company's commercial concept and cost estimate of the Battelle process applied to use with a western coal.

During this reporting period a paper was presented by Battelle at the Sixth Pipeline Gas Symposium sponsored by A.G.A., OCR, and the International Gas Union.

PROBLEMS AND RECOMMENDATIONS

Practically all technically related problems at present continue to be due to lack of equipment and materials in the field. As noted earlier in this report steps are being taken by Chemico and by Battelle to improve this situation.

Specific example areas where there were materials and equipment delivery problems and the steps which were being taken to work around them were reported in last month's report. The situation with these items is as follows:

(A) Vessels

Both the burner and the gasifier vessels had to be returned to the fabricator because Battelle and Chemico field personnel found the flanges fabricated for and used on the vessels unacceptable. The fabricator attempted to modify the flanges which were on the vessels initially with the result that the vessels failed final inspection. Following this, the fabricator replaced the flanges with larger flanges which met the code requirements. The burner and gasifier vessels are en route to the site.

The delays in acceptance of these vessels delayed the scheduled first move-in of Babcock and Wilcox for installation of the refractory lining.

Ten more pressure vessels are scheduled to be built by the same shop for the Battelle PDU. These consist of the coal pretreater and all the letdown lock hopper vessels. We explored the possibility of cancelling this portion of the order with this vendor and placing it elsewhere. This proved to be futile because no other organizations contacted would provide a credible and acceptable delivery date.

In early November we were informed by this vendor that he, for a variety of reasons, could not deliver the letdown lock hoppers until March of 1975. This had a devastating effect on the construction schedule. Battelle and Chemico jointly agreed to modify the specification to permit use of carbon steel rather than stainless steel nozzles. This brought the delivery date back to about the first of the year.

Modifications are to be made in the procedure for installing these vessels in the burner-gasifier structure such that progress in the erection of this structure will not be delayed by delay in the vessel's delivery until after the first of the year (these vessels were supposed to be delivered last March).

It is Battelle's intent to follow the fabrication of these vessels on almost a daily basis and Chemico has a full-time inspector in the vendor's shop.

(B) Refractory-lined, Shop Fabricated Pipe

Pipe larger than 2.5 inches in diameter is being shop fabricated. Smaller pipe is being field fabricated. One vendor has most of the order for shop fabricated pipe including that to be refractory lined (loops between burner and gasifier, hot product and combustion gas, etc.).

During this reporting period Battelle and Chemico visited this pipe fabricator's shop. The fabricator is working on our order and intends to have shipped all the shop fabricated pipe to us by the end of January. About one-third of the order has already been fabricated and 83 pieces of pipe were received in the field. At the time of the visit another one-third of the order was ready for fabrication and awaited drawing release by

Chemico.(now said to have been released). The fabricator lacked materials for the remaining one-third of the order.

To follow this order, Chemico has one of their field expeditors visiting the fabricator's shop two times a week. This expeditor is to report his findings directly to the Chemico project engineer and construction superintendent.

(C) Small Bore Piping and Fittings (also small valves)

The vendors of these materials are not meeting their commitments to timely field deliveries. In most cases partial shipments have been made but these are inadequate for effective field fabrication of piping at a good rate.

In most cases Chemico has placed purchase orders for the myriad of small bore pipe, fittings, and valves with wholesalers or distributors of these materials. These distributors claim to have little control over their sources.

Mild success has been achieved with cancelling some orders and making spot purchases locally (at significantly higher costs). It is expected that Chemico will continue to do this. In addition visits are planned to the distributors and, if helpful, to the sources of their supplies.

(D) Scrubber Systems

Several trips by Chemico personnel to the vendor of this equipment have resulted in assurances from the vendor that all of the scrubbing equipment will be shipped by the first of the year. This is a 3 month delay in this vendor's promised delivery but is better than the approximately 6-month delay he projected a month ago. Frequent visits to this vendor are being made.

(E) Steam Boiler

In our Progress Reports 20 and 21 we informed that the vendor of the packaged steam boiler purchased for the Battelle PDU was bankrupt. A substitute boiler was located in another vendor's warehouse at about the same price as the original boiler. The substitute boiler was examined in operation by

both the Battelle and Chemico project engineers. This boiler has been purchased and is being shipped to the site immediately.

Some new problems related to delivery schedules on equipment and materials have arisen during this reporting period. They are related to timely delivery of solids control valves and the start-up heater. Both problems were discovered by visitation of the Battelle and Chemico project engineers to vendors' shops. Resolution of the new problems is in progress.

The problems noted and means for solution are typical of those encountered on a daily basis. We do not believe these types of problems are unique in the construction industry at present. The general method of approach will be continued diligence to solving and working around the equipment and materials delivery problems.

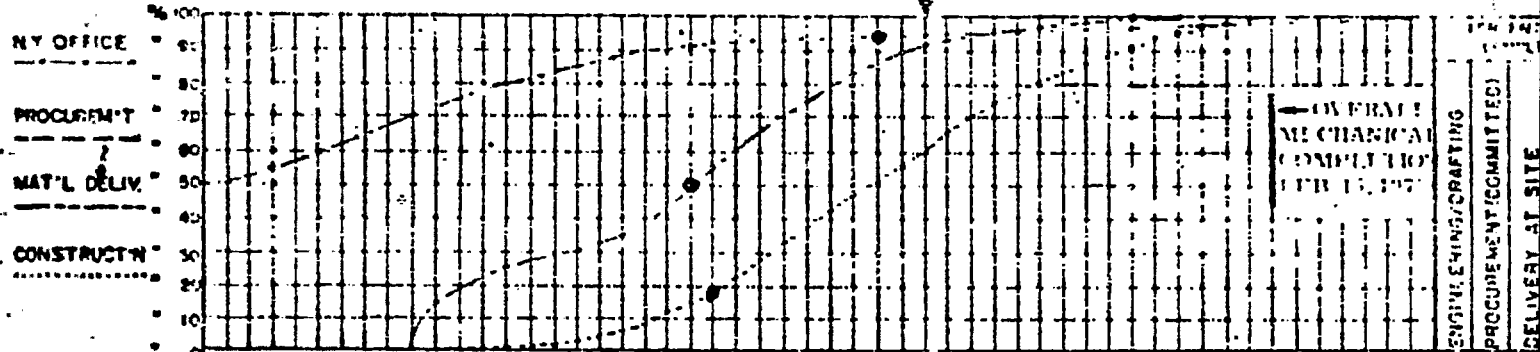
#### Work Plan and Schedule

Major emphasis by Chemico must be on expediting materials and equipment deliveries to the site and field construction during the forthcoming reporting period.

Chemico has not formally reported any change in the overall schedule upon which they have been working since April of this year. A copy of the overall schedule as of October 1 is included in this report on page 14. As noted elsewhere in this report we expect a new construction schedule from Chemico based on information gained by their increased number of visits to vendors. This schedule should be available within 2 weeks.

Deliveries are behind schedule in virtually all categories of the Chemico schedule. Needless to say, construction related to these categories is also behind. Comparison of the actual percent completion of delivery at the site and actual percent completion of construction in the lower right-hand corner of the schedule on page 14 shows these activities are only about one-half as far along as predicted. The major holdup appears to be in delivery of bulk materials (pipe fittings, pipe, valves, electrical, etc.) rather than major equipment.

AS OF



Item	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	May	June	July	Aug	Sept	Oct	Nov	Dec	Total	Procurement	Delivery at Site	
BIG FLOW SHEETS																							100	100	100
CONTRACT MGMT																							100	100	100
A. FOUNDATIONS																							100	100	100
B. BUILDINGS																							100	100	100
C. STRUCTURAL STEEL																							100	100	100
D. PIPES & FITTINGS																							100	100	100
E. HEAT EXCHANGERS																							100	100	100
F. COLUMNS & TOWERS																							100	100	100
G. CONDENSERS & DRUMS																							100	100	100
H. REACTORS																							100	100	100
I. STORAGE TANKS																							100	100	100
J. PUMPS & DRIVES																							100	100	100
K. COMPRESSORS FANS ETC.																							100	100	100
L. MACHINERY																							100	100	100
M. AGITATORS																							100	100	100
N. VACUUM EQUIPMENT																							100	100	100
O. MATERIAL HANDLING EQ																							100	100	100
P. FILTERS																							100	100	100
Q. REFRIGERAT EQUIPMENT																							100	100	100
R. SPECIAL																							100	100	100



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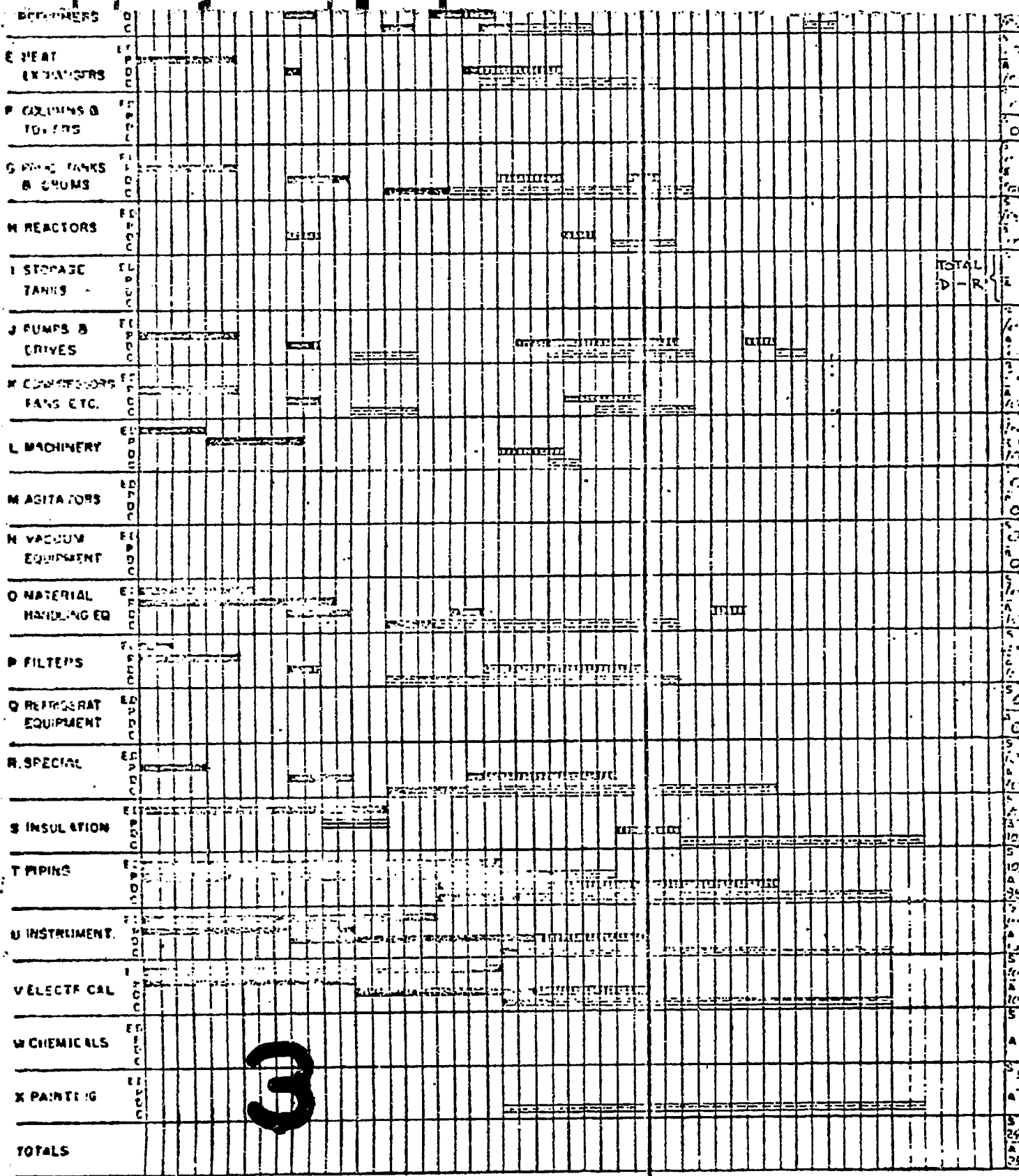
← CIVIL & MECHANICAL COMPLETION FEB 15, 1977

		ENGINEERING/DRAFTING	PROCUREMENT (COMMITTED)	DELIVERY AT SITE	CONSTRUCTION	WEIGHTED PERCENT
		50	0	0	0	
		100	0	0	0	
		100	100	100	100	
		100	100	100	55.4	
		0	0	0	0	
		0	0	0	0	
		100	100	100	72	
		100	100	95	48.1	
		100	100	57		
		100	100	29		
		100	100	100		
		100	100	52		
		0	0	0		
		100	100	98		
		100	100	55		
		100	100	100		
		100	100	0		
	TOTAL	100	100	86		
	D - R	100	100	88		
		100	100	89		
		100	100	45		
		100	100	100		
		100	100	43		
		100	100	100		
		100	100	0		
		0	0	0		
		0	0	0		
		0	0	0		
		100	100	91		
		100	100	53		
		100	100	100		
		100	100	67		
		0	0	0		
		0	0	0		
		100	100	100		
		100	100	15		

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14

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LEGEND		TOTAL JOB PROGRESS WEIGHT	2
ENGINEERING DRAFTING		DELIVERY AT SITE	
FOREIGN PRINT		CONSTRUCTION	
MOVEMENT COMMITTED		ACTUAL PROGRESS	
		TOTAL JOB WEIGHT	100
		BASED ON CRITICAL PATH SCHEDULE	
		UPDATED AS OF	

APPROVED CONSTRUCTION DEPT MISC. 3  
 CHEMICAL CONSTRUCTION CORPORATION  
 JOB 19-17 MASTER PROJECT SCHEDULE -

**BATTELLE'S COLUMBUS LABORATORIES**  
 COAL GASIFICATION PROCESS DEVELOPMENT UNIT  
 WEST JEFFERSON OHIO

APPROVED

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100	0	0	0
52			
0	0	0	
38			
55			
100			
0			4
TOTAL		16	
D-R		8	
			1
100	15		
100			
100	43		
100			
0	0	0	
0	0	0	
0	0	0	
0	0	0	
100	91		1
100	53		
100			
100	67		
0	0	0	
0	0	0	
100	100		
100	15		
100	50	1	
100	0	1	
100	100	30	46
35	35	35	12.2
100	100	100	40
100	100	48	1
100	100	91	40
100	100	50	2.5
250		339	14
250		336	16

TOTAL JOB PROGRESS WEIGHTED PERCENT 61.9

AT SITE		TOTAL JOB WEIGHT	27	42.31
PROGRESS		BASED ON CRITICAL PATH SCHEDULE AS OF		
		UPDATED AS OF		

**WEST COLUMBUS LABORATORIES**  
 QUALIFICATION PROCESS DEVELOPMENT UNIT  
 WEST JEFFERSON OHIO

APPROVED PROJECT MANAGER  
*[Signature]*  
 11-1-74

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It is apparent to Battelle that turnover of the PDU to us by the February 15, 1975, date will not occur. However, with an all-out expediting effort on Chemico's part we see no reason why there should be any more than a 2-month delay which still would permit turnover in about the first calendar quarter of 1975.

At present Battelle is contractually committed to conclusion of all experimental work by July, 1975. A new overall schedule is contained in our proposed contract modification to OCR. When the new schedule is approved, we will include it in our monthly reports.

APPENDIX

to

TECHNICAL SECTION OF PROGRESS  
REPORT NO. 22 TO OCR

Chemico Monthly Report to Battelle



CHEMICAL CONSTRUCTION CORPORATION

JOB 1947J

BATTELLE'S COLUMBUS LABORATORIES

COAL GASIFICATION PDU

STATUS AS OF NOVEMBER 1, 1974

A). Overall Status

All drafting is complete. All isometric drawings are completed and have been checked.

The bulk requisition for piping has been revised and will be issued early November.

The requisition for hangers and supports has been released and placed with "Power Piping". The requisition for steam tracing, insulation and painting are complete and will be out for bids in November.

A preliminary writeup of the operating manual is in typing. This draft will be the basis of a review between Battelle and Chemico for the purpose of assembling a complete and useful manual.

Vendor prints are being assembled for inclusion in the mechanical catalog. Approved vendor prints are also being collected for distribution to Battelle. Battelle was originally omitted from the distribution list.

B. Financial Status

See Comparative Cost Statement dated 10/20/74

C. Material Status

Purchasing activities, material arrival in field and the changes in shop deliveries are reported in detail in the Weekly Report.

CHEMICAL CONSTRUCTION CORPORATION

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C). Material Status (continued)

All D-R equipment purchase orders have been placed.

A steam generator has been purchased from Industrial Steam to replace the boiler originally ordered from Superior, which subsequently declared bankruptcy.

The telephone expediting report is being backed up by field expediting. One Field inspector has been assigned full time and area expeditors have increased their time allocation for Job 1947. New York Project Engineering is doing some expediting and Battelle personnel are also involved.

D). Process Engineering

The process flow sheets will be updated by Ed Coles. These are expected to be complete by the end of November.

P & I Diagrams

The P & I diagrams are complete.

F). General Arrangements

The General Arrangements drawings are complete.

G). Structural Steel

Structural steel design is complete.

H). Foundation

All foundation drawings are complete.

I). Piping

- (a). Isometrics - All isometric drawings are complete.
- (b). General Arrangement - all General Arrangement drawings are complete and have been updated to reflect the completed isometric drawings.
- (c). Material take-off and requisition of bulk material is complete. The master valve list is complete.

All piping drawings are being reviewed. The General Arrangements are being checked against the isometrics and the Process Flow Sheets for continuity.

Additional piping work will be required to relocate the auxiliary stack and some piping if the location of the elevator is finalized at the southeast corner of the structure.

J). Instrumentation

All instrumentation drawings are complete. All holds on set points have been removed and the instrument schedule is complete.

K). Electrical

All electrical work is complete.

L). Construction

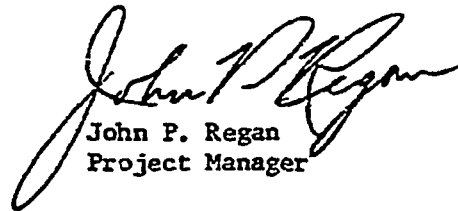
- (a). All foundations are complete.
- (b). All underground work is complete.
- (c). Erection of steel is underway.
- (d). Field run piping is being prefabricated.
- (e). Equipment is being set as it is received in the field.

CHEMICAL CONSTRUCTION CORPORATION

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The construction progress has been slowed due to lack of materials and equipment arriving at site. An effort is being made to improve deliveries on all equipment by a concentrated push on the vendors by field expediting. The main bottleneck to construction, at present, is the late delivery quoted by Stacey for the G-500 series vessels.

JPR-TD-d

  
John P. Regan  
Project Manager

FINANCIAL AND ADMINISTRATIVE SECTION

of

PROGRESS REPORT NO. 22

on

CONTRACT NO. 14-32-0001-1513

to

OFFICE OF COAL RESEARCH

November 20, 1974

BATTELLE  
Columbus Laboratories  
505 King Avenue  
Columbus, Ohio 43201

FINANCIAL AND ADMINISTRATIVE SECTION

of

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FINANCIAL

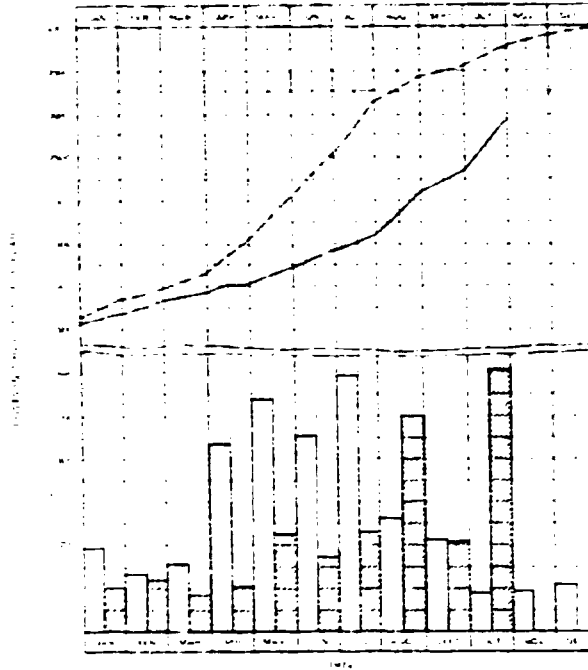
Table B-1 presents the Task Cost and Manpower Projection form for the month ending October 31, 1974. Billings have been paid to Chemico for New York operating costs through September and all of their fee except for the final payment which by contract is withheld. In addition, Chemico has been reimbursed \$1,101,570.40 for equipment invoices paid by them. Total actual disbursements to Chemico are \$2,414,574.

We have received and approved additional vouchers from Chemico for equipment purchases and for their services for October amounting to about \$292,929. This approval was received too late by Battelle's accounting group for the payment to be reflected in this month's Battelle voucher to OCR.

The cumulative money actually expended by Battelle, including actual payments to Chemico but exclusive of the Battelle fee, to date are about \$2,948,100 as shown in Table B-1. If the Battelle fee and approved-but-not-paid vouchers of Chemico are included, the "expended" by Battelle is about \$3,331,559. This is about 81.3 percent of the total encumbered\* funds for the project.

\* Letter from Mr. G. Edward Larson (OCR) to Battelle dated July 27, 1974, shows OCR funds of \$2,733,333 and A.G.A. funds of \$1,366,667.

TABLE A-1  
BATTLE PUL  
TASK COST AND MANPOWER PROJECTIONS  
MONTH ENDING 01 FEB 61 1955



Month	Jan 54	Feb 54	Mar 54	Apr 54	May 54	Jun 54	Jul 54	Aug 54	Sep 54	Oct 54	Nov 54	Dec 54	Jan 55	Feb 55
Pred	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0
Act	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0

Month	Jan 54	Feb 54	Mar 54	Apr 54	May 54	Jun 54	Jul 54	Aug 54	Sep 54	Oct 54	Nov 54	Dec 54	Jan 55	Feb 55
Pred	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0	3.2	3.4	3.6
Act	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0	3.2	3.4	3.6

Month	Jan 54	Feb 54	Mar 54	Apr 54	May 54	Jun 54	Jul 54	Aug 54	Sep 54	Oct 54	Nov 54	Dec 54	Jan 55	Feb 55
Pred	1.0	1.15	1.3	1.45	1.6	1.75	1.9	2.05	2.2	2.35	2.5	2.65	2.8	2.95
Act	1.0	1.03	1.14	1.25	1.37	1.49	1.61	1.73	1.85	1.97	2.09	2.21	2.33	2.45

Month	Jan 54	Feb 54	Mar 54	Apr 54	May 54	Jun 54	Jul 54	Aug 54	Sep 54	Oct 54	Nov 54	Dec 54	Jan 55	Feb 55
Pred	0	0	0	0	0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5
Act	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Month	Jan 54	Feb 54	Mar 54	Apr 54	May 54	Jun 54	Jul 54	Aug 54	Sep 54	Oct 54	Nov 54	Dec 54	Jan 55	Feb 55
Pred	3.2	3.2	5.2	5.0	5.0	5.0	2.0	3.0	6.0	8.0	12.0	12.0	12.0	12.0
Act	3.2	1.4	2.3	2.2	4.6	4.3	3.7	4.2	1.8	5.1				

Month	Jan 54	Feb 54	Mar 54	Apr 54	May 54	Jun 54	Jul 54	Aug 54	Sep 54	Oct 54	Nov 54	Dec 54	Jan 55	Feb 55
Pred	19.8	13.8	15.6	43.4	53.4	45.2	59.1	26.1	21.3	9.0	9.3	11.0		
Act	100.7	22.3	85.6	107.8	225.5	168	230	501.2	210	608				

KEY TO GRAPH

- PREDICTED TOTAL COSTS
- ACTUAL TOTAL COSTS
- PREDICTED CUMULATIVE
- ACTUAL CUMULATIVE

NOTES

1. COSTS ARE IN THOUSANDS OF DOLLARS.  
 2. COSTS ARE SUBJECT TO CHANGE DURING THE COURSE OF THE PROJECT.  
 3. ACTUAL COSTS ARE SUBJECT TO CHANGE DURING THE COURSE OF THE PROJECT.  
 4. COSTS ARE SUBJECT TO CHANGE DURING THE COURSE OF THE PROJECT.

In Chemico's comparative cost estimate dated October 20, 1974, which is contained in their monthly report for September to Battelle they estimate they have either spent or committed \$4,048,000. We estimate that this combined with Battelle expenditures on the project, including the Battelle fee, brings the total amount either spent or committed to about \$4,672,056 as of early November or 113 percent of the encumbered funds.\*

Because we were encroaching upon funds currently encumbered for the project and the delays in EDU installation would not allow Battelle to meet our schedule commitments, we submitted a proposed prime contract modification to OCR in August with subsequent copies to A.G.A. The proposal contains updated cost information and a new overall project schedule.

Both the Operating Committee and the OCR's contract officers are fully aware of the financial problems associated with the project and Battelle is in frequent contact with them on these matters.

#### Administrative

The chief administrative problem at this time is receiving an early approval of OCR and A.G.A. of the modified proposal for the prime contract modification submitted on August 27 to OCR with a subsequent copy to A.G.A.

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\* Last month we reported the total amount either committed or spent as \$4,375,676 or 116 percent of the encumbered funds. Obviously \$4.37 mm is only about 106 percent of the encumbered \$4.1 mm so we either had an arithmetic error or a typographical error in the percent.



BATTELLE'S COLUMBUS LABORATORIES'  
PERSONNEL ASSIGNED TO PROJECT\*

- |                      |                                            |
|----------------------|--------------------------------------------|
| (1) W. M. Goldberger | (4) T. L. Tewksbury                        |
| (2) W. C. Corder     | (5) H. R. Batchelder (Staff<br>Consultant) |

CHEMICAL CONSTRUCTION CORPORATION  
PERSONNEL ASSIGNED TO PROJECT\*\*

- |                    |                       |
|--------------------|-----------------------|
| (1) T. Dillon      | (10) J. P. Regan      |
| (2) M. J. Dicianni | (11) F. W. Shirley    |
| (3) G. G. Elsis    | (12) L. Van Amerongen |
| (4) H. J. Hubchen  | (13) N. Vario         |
| (5) D. Iorio       | (14) P. Witzig        |
| (6) R. L. Jordan   | (15) M. Young         |
| (7) V. Kuris       | (16) A. Yuen          |
| (8) F. Matherne    | (17) J. Perrone       |
| (9) E. A. Postrk   |                       |

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\* Only staff who devote significant portions of their time to the program are listed. Various others have temporary assignments.

\*\* Identified by Chemico as "key" staff on project.