

BC X-MPR--21

TECHNICAL SECTION

of

PROCESS REPORT NO. 21

on

CONTRACT NO. 14-32-0001-1513

to

OFFICE OF COAL RESEARCH

October 21, 1974

BATTELLE  
Columbus Laboratories  
505 King Avenue  
Columbus, Ohio 43201

### SUMMARY

During this reporting period Chemico concluded the bulk of their New York office engineering activity and continued the field construction of the PDU. Delays in the delivery of purchased equipment and materials to the field are seriously impacting on the overall completion date for the PDU construction. Chemico has reinforced their expediting activity recently and Battelle is also taking unprecedented steps to expedite delivery of equipment and materials to the field.

In addition to work directly related to the PDU installation significant portions of the Battelle Project Staff's time have been spent on an initial review of C. F. Braun and Company's concept of a commercial plant using the Agglomerating Burner-Gasification Process as a component. The first interim report was also concluded during this reporting period and submitted to OCR and A.G.A.

TECHNICAL SECTION  
of  
PROGRESS REPORT NO. 21  
on  
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to  
OFFICE OF COAL RESEARCH  
from  
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INTRODUCTION AND PROJECT OBJECTIVE

This progress report describes work completed by Battelle on the Coal Gasification Program during the period September 18 to October 18, 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 updating 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. PDU turnover to Battelle according to the schedule given on page 13 is still to be in the first quarter of calendar year 1975.

Chemico has emphasized completion of their New York office engineering design work during this reporting period. The Chemico status report as of October 1 attached to this technical report as Appendix A 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".

#### 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), painting, and some minor transition pieces and chokes.

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.

It also appears that a satisfactory replacement for the steam boiler has been located in a warehouse. This problem was discussed in the problems and recommendations section of the previous report.

#### Expediting

We have continually emphasized to Chemico the importance which Battelle attaches to thorough expediting in order to maintain the schedule. We receive Chemico's updated materials status report which lists all purchases and their status weekly. The materials status report is reviewed in depth by Battelle with Chemico's chief expeditor periodically.

We are informed by Chemico that for minor items they rely on telephone contacts and for major items visits to vendor's plants are made.

In spite of our diligence in the matter of expediting, delays in equipment and material's delivery are seriously impacting on the schedule. This subject is discussed in the Problems and Recommendations section of this report.

Equipment and Materials Received at the Site

Slightly more than one-third, or about 40 percent of the major items of process equipment have arrived at the site. The rate of receipt of equipment and materials has slowed substantially during this reporting period from what it was earlier. 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
D-201	Inert Gas Generator (for Coal Pulverizer)
K-203	Combustion Air Blower
K-202	Auxiliary Fan
O-201	Coal Pulverizer
P-201	Cyclone Separator & Support Ring
L-202	Spinner Separator
P-203	Bag Filter
J-301-A&B	Oil-Solids Pumps
O-301	Screw Conveyor Cooler
P-301	Pretreater Cyclone
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

FLWSHEET EQUIPMENT ITEMS (Continued)

<u>Description</u>	
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
U-050	Instrument Panel
O-505	Dump Hoppers
O-506	Dump Hoppers
O-507	Dump Hoppers
O-508	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
D-702	Inert Gas Generator (less motor)
G-703	Instrument Air Receiver
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
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

\* Returned to vendor for modification.

\*\* Dropped in the field and returned to vendor for repairs.

BULK ITEMS

<u>Chemico Cost Code Number</u>	<u>Description</u>
A-190	Anchor Bolts
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)
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
80V	Unistut
80V	Lighting Fixtures
80T-022	Pipe Fittings
U-100	Lab Panel
U-041	d/p Transmitters
80T-040	SS Pipe
U-060	Valves
80T-615	Valves
T-450	Swagelock Fittings
V-020	Substation #2
80V	Conduit Fittings
80V-100	Terminators
U-041	Level Transmitter
V-060	Cable
T-450	Tubing
80V	Electrical Fittings
80T-022	Pipe Fittings
T-450	SS Pipe



Presently all the steel for the coal feed structure is on site. The steel for the other structure (the burner-gasifier structure) is currently being fabricated in Chicago and the first two truck loads arrived on October 15.

#### 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\*. Chemico's most recent updated construction schedule which we presently have is dated October 7. Copies of this are being provided to the Operating Committee and to Dr. Detman.

The updated issues of the construction schedule are revised to show the delayed delivery of structural steel and projected later dates for refractory installation. Also shown on the construction schedule are the "actuals". Battelle's knowledge of the Chemico construction schedule indicates that, probably mechanical completion will be delayed <sup>to</sup> ~~on~~ February 15, 1975. A delay has not been formally reported by Chemico.

Construction formally began on June 10. Work done prior to mid-September was reported in our previous monthly reports to OCR. Battelle's field office is in daily contact with the Chemico construction personnel and more formal meetings between the Chemico field construction management, Battelle project staff, and various observers are held.

During this reporting period, with the exception of one minor foundation pad which was held for the completion of the compressor shed foundation, all of the concrete work was completed. The last elements were the substation foundation and the coal-storage pad.

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\* This schedule is not provided in this report because of its bulk.

The two transformers have been set in position, and work has continued on the electrical conduit. As soon as the reduced-voltage starters are received, the substation can be completed.

Good progress has been made on erection of the coal-feed structure. The steel is now at the 120-foot level. All of the major coal-feed vessels (G404, G-401 A&B, G-402, G-403, G-405, and G-406) have been set in place. This structure should be complete within another week. The steel for the burner/gasifier structure began to arrive during the week of October 14; therefore, Chemico will be able to proceed immediately with that structure.

The four coal feed lock hoppers, G-402, 403, 405, and 406, were rehydrotested by Chemico after installation to ensure that everything was proper before acceptance.

Work has continued on the field fabrication of the small piping. This work, as well as the electrical work and equipment installation, is being retarded by slow material receipts. As a result, the field labor force has been reduced to 28 from a peak of 41. The labor force would normally be expanding if the material were available.

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 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 done stress analysis on the major vessels and the expansion joints for the PDU. They have also visited the vessel supplier's shop with us on numerous occasions. Battelle's project engineer has visited other vendor shops with the Chemico project engineer for purposes of expediting deliveries.

No significant progress was made on the turbine procurement during this reporting period. An outside organization has been retained at Battelle's expense to prepare the legal suit required to obtain an

increased natural gas allocation at the site. The Battelle project manager has held discussions with this outside organization to explain the PDU's requirements for natural gas.

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 an initial review of C. F. Braun and Company's commercial concept of the Battelle process applied to use with a western coal. Numerous, substantial points of difference have arisen between the Braun concept and any preconceived concept Battelle has of a commercial operation.

During this reporting period preparation of our first interim report on all aspects of the program was concluded and the report was transmitted to OCR and A.G.A. Work was also concluded on the preparation of a paper for presentation 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 involve lack of equipment and materials in the field. We are finding that the previous expediting procedures used by Chemico, i.e., weekly phone calls to some vendors and periodic visits to others are inadequate to get equipment and materials into the field on schedule.

We have been informed by Chemico that, to strengthen their expediting effort, one man is being placed in the field full time to expedite on the Battelle orders. The Chemico project engineer is also doing field expediting by visitation to vendor's shops. Battelle has also made an open offer to Chemico to assist in expediting by having the Battelle project staff visit vendors if desired by Chemico.

Some specific example areas where there are materials and equipment delivery problems and steps which are being taken to work around them follow:

(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 are on the vessels presently with the result that the vessels failed final inspection. Presently the fabricator is putting new larger flanges on the vessels which should lead to their acceptance.

The delays which have been involved in acceptance of these vessels have prevented the first move-in of Babcock and Wilcox for purposes of installing the refractory lining in them. The vessels are now expected in acceptable form by early-November. Chemico is presently studying the schedule for Babcock and Wilcox to come do the refractory lining.

About 5 or 6 more pressure vessels are scheduled to be built by the same shop for the Battelle PDU. We are seriously exploring the possibility of cancelling the remainder of the order with this vendor and attempting to get the remaining vessels, which are smaller than the burner and gasifier vessels, fabricated locally.

(B) Refractory-lined, Shop Fabricated Pipe

This fabricator, according to Chemico, now has all of the drawings he needs. The fabricator is experiencing problems in obtaining some of the flanges he requires to complete the piping. It is our understanding that the flanges could be obtained much quicker if a premium was paid. No premium has been authorized and it is unlikely that one will be. A visit to this vendor's shop by the Battelle and Chemico project engineers is planned.

(C) Small Bore Piping and Fittings

The vendor of this material is not meeting his commitments to timely field delivery. We understand from Chemico that the vendor is simply a wholesaler and does not control the foundry

producing this material. Attempts at local spot purchase of the required piping and fittings have not been very successful. Battelle has suggested that Chemico and Chemico with Battelle, if necessary, visit the foundry used by this vendor.

(D) Scrubber Systems

The vendor of the scrubber systems has advised Chemico he cannot supply the required internals for the scrubbers until after the first of January 1975. He has been instructed to provide the external shells without delay. This way the piping for the scrubbers and the scrubber shells can be installed and the internals added as soon as they are available.

(E) Steam Boiler

In our previous monthly report we informed that the vendor of the packaged steam boiler purchased for the Battelle PDU was bankrupt. A substitute boiler has been located in another vendor's warehouse at about the same price as the original boiler. The substitute boiler has been examined in operation by both the Battelle and Chemico project engineers. Our plans are to proceed with purchase of this boiler which can be shipped to the site immediately.

The problems and plans for solution are typical of those arising 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 as page 13.

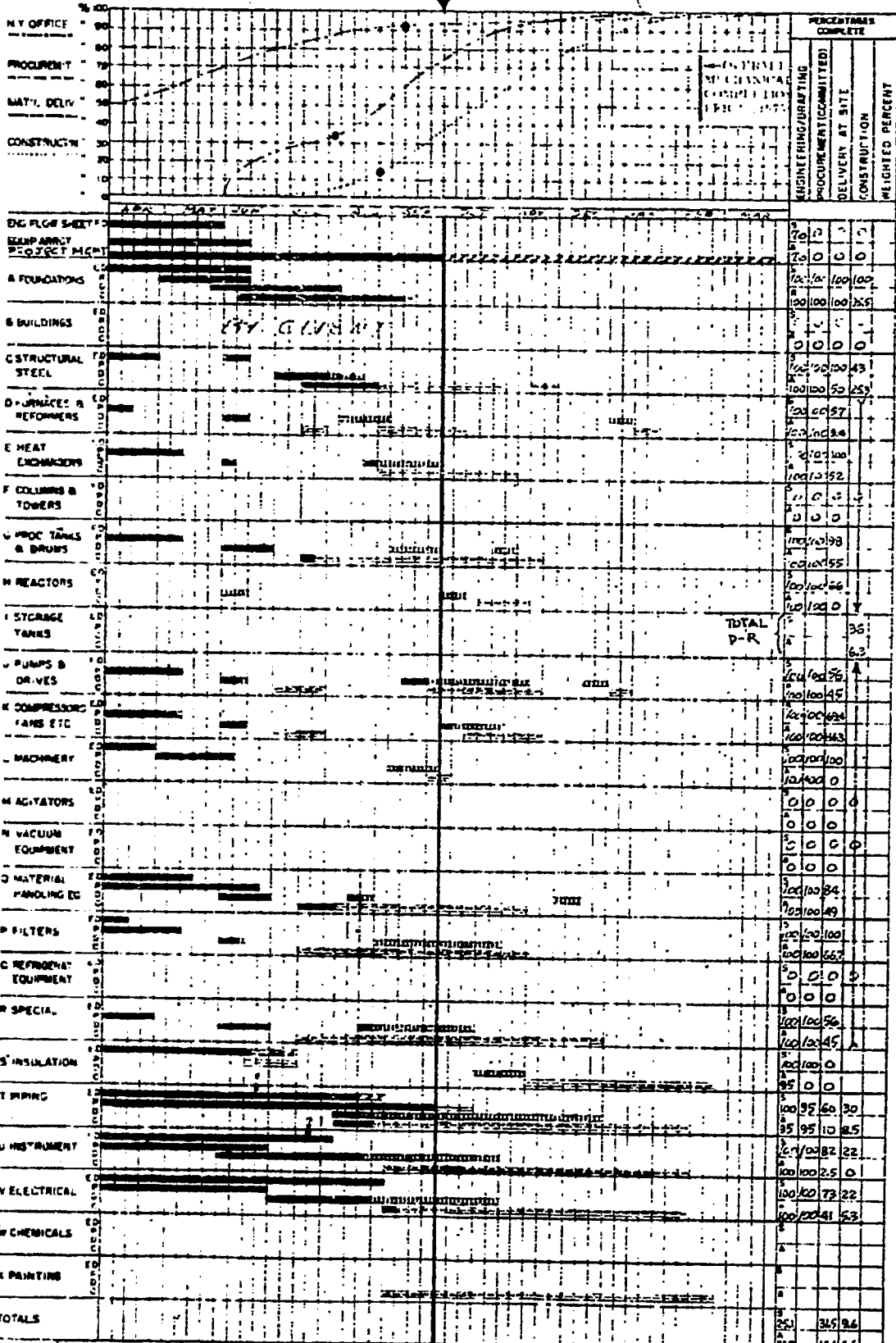
Deliveries are behind schedule in the following categories of the Chemico overall schedule:

- C. Structural steel
- D. Furnaces
- E. Heat Exchangers
- G. Tanks
- H. Reactors
- J. Pumps and Drives
- L. Machinery
- O. Material handling equipment
- P. Filters
- R. Special equipment
- T. Piping
- U. Instruments
- V. Electrical

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 13 shows these activities are only about 1/2 as far along as predicted. This is confirmed by the construction schedule sent to the operating committee which shows actual construction man-hours expended at only 14.9 percent of the total as compared to 30.9 percent projected to be sent by now.

It is apparent to Battelle that turnover of the PDU to us by the February 15, 1974, 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.

A meeting between Battelle and Chemico in New York on October 24 is planned to review what positive steps Chemico is taking to expedite equipment and materials deliveries to the field. It is also expected that, based on the increased expediting activity of the last few weeks at Chemico, they will provide Battelle with an updated projected schedule. It is also planned that Chemico will use critical path planning henceforth on this job.



APPROVED CONSTRUCTION DEPT. MESSRS. **BATTELLE'S COLUMBUS LABORATORIES** COAL GASIFICATION PROCESS DEVELOPMENT UNIT WEST JEFFERSON, OHIO

APPROVED PROJECT MANAGER *[Signature]*

CHEMICAL CONSTRUCTION CORPORATION  
 JOB 1947 MASTER PROJECT SCHEDULE -

TOTAL JOB PROGRESS WEIGHTED PERCENT 42.3  
 TOTAL JOB WEIGHT BASED ON CRITICAL PATH SCHEDULE AS OF 11/14/66

45 OF 10-1-74

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 A

to

TECHNICAL SECTION OF PROGRESS  
REPORT NO. 21 TO OCR

Chemico Monthly Report to Battelle

CHEMICAL CONSTRUCTION CORPORATION

JOB 1947J

BATTELLE'S COLUMBUS LABORATORIES

COAL GASIFICATION PDU

STATUS AS OF OCTOBER 1, 1974

A). Overall Status

The schedule predicted in July for piping drafting has slipped about three (3) weeks. Currently, piping drafting is complete with the exception of the expediting of the plan drawings and approximately twenty (20) isometric drawings which are in final checking stage for injection nozzle orientation.

New York General Engineering is being phased out and will essentially be complete by October 10, 1974. The requisition for supports and hangers is scheduled for completion October 5, 1974. The requisitions for steam tracing, insulation, and painting have been completed and are awaiting drawing attachments for release to bidders. A requisition for some transition pieces and chokes are currently outstanding.

The Purchasing Department has now issued all the purchase orders for the job with the exception of the few previously mentioned requisitions and has also issued many of the outstanding change orders.

Construction of the model will begin again on October 8, 1974. This function was halted for approximately one (1) month to allow for the completion of the piping isometrics and the receipt of approved vendor prints.

Preliminary descriptions of some of the equipment and procedures have been sketched out for the operating manual. This work will begin in earnest during October.

Vendor prints are being telephonically expedited for inclusion to the Mechanical Catalog and for shipment to the field construction site.

B). Financial Status

See Comparative Cost Statement dated as of September 23, 1974.

C). Material Status

Purchasing activities and material arrival in field and the changes in shop deliveries are reported in detail in the weekly report.

All D-R equipment purchase orders have been placed. The vendor which was selected to supply the boiler (P.O. #1947-19) has declared bankruptcy and will not deliver. Another boiler has been located which is in the warehouse for immediate delivery. A decision will be made on this boiler or alternatives on October 4, 1974. The piping changes required for the installation for any new boiler will be made in the field. The extent of the piping changes will be analyzed in New York. The extent of the changes will dictate the source of the purchase order (Field or New York office) for material.

The enclosed Purchase Commitments Report, dated as of September 25, 1974 and Master Project Schedule dated as of October 1, 1974 give detail information on material procurement and receiving.

The Material Status Report, which is issued with our weekly report, can no longer be considered a useful tool for construction scheduling and job completion unless the telephone expediting can be backed up by field expediting. This field expediting will now, in part, be the responsibility of the Project Engineer.

D). Process Engineering

The calculations by Chemico made around the 500 Section have been approved by Battelle. There was, however, a question about the procedure used to obtain the heat release as solids pass through the Gasifier. The verbal approval from Battelle and the above comment has been passed on to the Process Department (Ed Coles).

E). Process Flow Sheets

The Process Flow Sheets are to be updated by Ed Coles, of the Process Department. This work is expected to begin the week of October 14, 1974.

P & I Diagrams

The P & I diagrams have been checked for continuity and line size.

F). General Arrangements

All equipment has been located on drawings. All vendor prints for major equipment have been received. Some nozzle orientation still has yet to be confirmed by vendors.

The drawings are being updated to reflect the isometric drawings and checked for the continuity of the isometrics and the General Arrangement.

G). Structural Steel

Structural steel design is complete, including pipe racks and supports.

H). Foundation

All foundation drawings have been completed and issued for construction.

I). Piping

- (a). All piping isometrics have been completed and checked with the exception of the (20) isometrics which show the small injection piping. These (20) are in the checking stage.
- (b). General Arrangement piping drawings are being updated to reflect the completed isometrics.
- (c). Material take-off and requisition of bulk materials are being updated as the isometric drawings are released. The master valve

list will be reissued when all the isometric drawings are released. The Valve List is expected to be released the week of October 7, 1974.

J). Instrumentation

All instrumentation drawings are complete. The instrumentation schedule has been checked, updated and released. There are a few holds on set points which are yet to be fixed by the Process Department.

All instruments have been requisitioned and/or purchased.

The instrument control panel is scheduled for shipment the week of October 7, 1974. Some instruments will be field installed. To simplify field installations, the vendor will wire and identify the connections.

K). Electrical

All electrical drawings are complete.  
All electrical equipment has been ordered.  
All bulk items have been purchased.

L). Construction

- (a). All foundations have been completed.
- (b). All underground piping is complete with the exception of a few drain line connections.
- (c). Erection of the steel is underway.
- (d). Field run piping is being prefabricated.

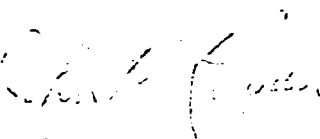
General progress in field construction is being hampered by lack of material being received in the field. A meeting in the field is tentatively scheduled for October 9, 1974 with Mark Young (Chemico Field Superintendent), Robert Adams (Battelle) and Tom Dillon (Chemico Project Engineer) to arrive at a critical path with respect to

CHEMICAL CONSTRUCTION CORPORATION

-5-

equipment delivery. The equipment suppliers will then be expedited to determine actual delivery dates and to report on fabrication progress.

For details of construction progress please refer to the enclosed Construction Schedule.

  
John P. Regan  
Project Manager

Attachments:

Drawing List Status as of 9/15/74  
Purchase Commitment Report as of 9/25/74  
Construction Schedule Drawings as of 10/1/74  
Master Project Schedule as of 10/1/74  
Comparative Cost Statement as of 9/23/74

FINANCIAL AND ADMINISTRATIVE SECTION

of

PROGRESS REPORT NO. 21

on

CONTRACT NO. 14-32-0001-1513

to

OFFICE OF COAL RESEARCH

OCTOBER 21, 1974

BATTELLE  
Columbus Laboratories  
505 King Avenue  
Columbus, Ohio 43201

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October 21, 1974

Financial

Table B-1 presents the Task Cost and Manpower Projection form for the month ending September 30, 1974. Billings have been paid to Chemico for New York operating costs through July and all of their fee except for the final payment which by contract is withheld. In addition, Chemico has been reimbursed \$748,766.43 for equipment invoices paid by them. Total actual disbursements to Chemico are \$1,834,508.90.

We have received and approved additional vouchers from Chemico for equipment purchases and for their services for August and September amounting to about \$451,412. 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.

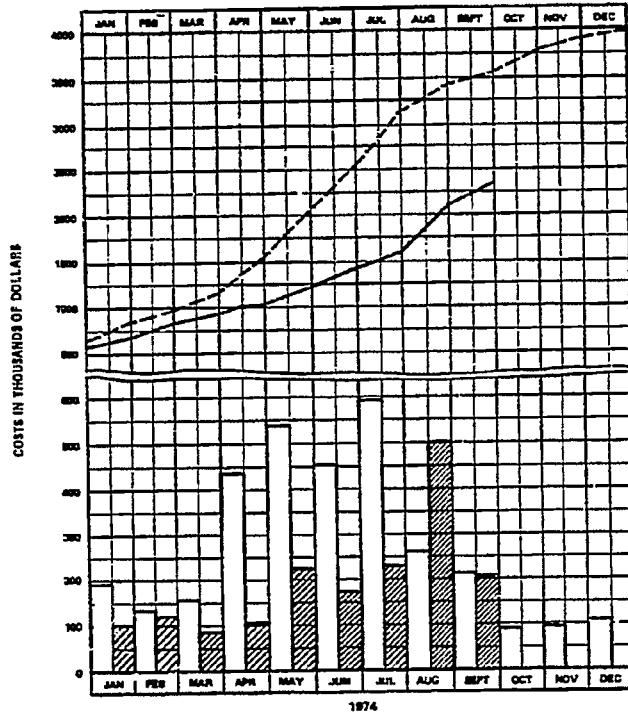
The cumulative money actually expended by Battelle, including actual payments to Chemico but exclusive of the Battelle fee, to date are about \$2,340,325 as shown in Table B-1. If the Battelle fee and approved-but-not-paid vouchers of Chemico's are included, the "expended" by Battelle is about \$2,878,152. This is about 70.2 percent of the total encumbered\* funds for the project.

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\* 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 B-1,  
BATTELLE PDU  
TASK COST AND MANPOWER PROJECTIONS  
MONTH ENDING SEPTEMBER 30, 1974



MANPOWER (MAN-MONTHS)

Pred.	6.0	6.0	6.0	6.0	6.5	6.5	8.0	8.0	11	11	13	15
Act.	4.3	4.0	4.4	3.7	4.0	4.8	4.2	4.3	3.8			

DIRECT LABOR & OVERHEAD COSTS (THOUSANDS OF DOLLARS)

Pred.	21.8	19.8	22.8	25	25	25	32.5	36	60.8	66	77	96.5
Act.	19.6	18.2	16.4	17.8	17.9	21.6	18.3	18.9	17.3			

SUBCONTRACT AND CONSULTANT COSTS (THOUSANDS OF DOLLARS)<sup>(1)</sup>

Pred.	169	115	128	404	504	422	556	221	145	7	0	0
Act.	77.9	103	64.8	87.8	207	142	208	478	191			

NON-EXPENDABLE EQUIPMENT (THOUSANDS OF DOLLARS)<sup>(2)</sup>

Pred.	0	0	0	0	0	0	0.5	1.0	1.2	10.0	4.0	1.5
Act.	0	0	0	0	0	0	0	0	0			

MATERIALS, SUPPLIES, TRAVEL, AND ODC (THOUSANDS OF DOLLARS)<sup>(3)</sup>

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
Act.	3.2	1.4	2.3	2.2	4.8	4.3	3.7	4.3	1.8			

TOTAL (THOUSANDS OF DOLLARS)<sup>(4)</sup>

Pred.	184	138	156	434	534	462	691	281	213	80	93	110
Act.	100.7	123	85.6	107.8	229.5	168	230	801.2	210			

KEY TO GRAPH:

PREDICTED TOTAL COSTS     
  ACTUAL TOTAL COSTS  
 PREDICTED CUMULATIVE     
  ACTUAL CUMULATIVE

NOTES:

- (1) OUTSIDE CONSULTANTS
- (2) NON-EXPENDABLE EQUIPMENT TO BE PURCHASED BY SUBCONTRACTOR IS INCLUDED IN SUBCONTRACT CATEGORY
- (3) COST OF BATTELLE RESIDENT CONSULTANTS INCLUDED IN THIS CATEGORY
- (4) DOES NOT INCLUDE BATTELLE FEE

In Chemico's comparative cost estimate dated September 23, 1974, which is contained in their monthly report for September to Battelle they estimate they have either spent or committed \$3,783,445. 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 \$4,375,676 as of early October or 116 percent of the encumbered funds. This is approximately in accordance with information given to OCR by Battelle's Mr. Evans by telephone on October 1.

Because we were encroaching upon funds currently encumbered for the project and the delays in PDU 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.

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 Consultant) |
| (3) R. R. Adams      | (6) E. Rodabaugh                        |

CHEMICAL CONSTRUCTION CORPORATION  
PERSONNEL ASSIGNED TO PROJECT\*\*

- |                     |                       |
|---------------------|-----------------------|
| (1) S. G. Arya      | (20) J. J. Madorma    |
| (2) H. H. Becker    | (21) F. Matherne      |
| (3) R. A. Brady     | (22) J. R. Mavus      |
| (4) T. Dillon       | (23) E. J. Miller     |
| (5) S. DeMarco      | (24) F. Nesi          |
| (6) H. M. Diamond   | (25) H. Osborne       |
| (7) M. J. Dicianni  | (26) J. L. Parodi     |
| (8) H. L. Dresher   | (27) E. A. Postrk     |
| (9) G. G. Elsis     | (28) N. Razfar        |
| (10) F. Elstner     | (29) J. P. Regan      |
| (11) H. Fredrickson | (30) E. C. Reidy      |
| (12) G. Gutterman   | (31) P. S. Schlaff    |
| (13) G. Handza      | (32) F. W. Shirley    |
| (14) H. J. Hubchen  | (33) L. Van Amerongen |
| (15) D. Iorio       | (34) N. Vario         |
| (16) R. L. Jordan   | (35) P. Witzig        |
| (17) V. Kuris       | (36) M. Young         |
| (18) J. Landy       | (37) A. Yuen          |
| (19) J. Lazzarotti  | (38) J. Perrone       |

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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.