

BCA-MPR--16

TECHNICAL SECTION

of

PROGRESS REPORT NO. 16

on

CONTRACT NO. 14-32-0001-1513

to

OFFICE OF COAL RESEARCH

May 14, 1974

BATTELLE
Columbus Laboratories
505 King Avenue
Columbus, Ohio 43201

TECHNICAL SECTION
of
PROGRESS REPORT NO. 16
on
CONTRACT NO. 14-32-0001-1513
to
OFFICE OF COAL RESEARCH
from
BATTELLE
Columbus Laboratories
May 14, 1974

INTRODUCTION AND PROJECT OBJECTIVE

This progress report describes work completed by Battelle on the Coal Gasification Program during the period April 1 - May 14, 1974. The section that follows is the technical section. The administrative and financial section is appended.

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 effect 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.

SUMMARY

During this reporting period, work was continued by Chemico on the detailed engineering design and procurement of equipment for the Battelle Coal Gasification PDU. A field office was established at the site by Chemico in preparation for receiving equipment. The Chemico Field Superintendent joined the project staff at Chemico for purposes of planning the construction activity and coordinating the transition from office to field.

Chemico appears to be maintaining the new schedule presented in our previous monthly report. Procurement of major items of equipment (flowsheet items) is almost completed.

Battelle continued work with Chemico on points related to finalizing the PDU design and expediting the acquisition of PDU equipment. Substantial activity at Battelle also dealt with site clearing, the refractory design, and other matters closely related to operation of the PDU.

WORK COMPLETEDContractual

Subcontract modification No. 1 which was approved by OCR in February has been fully negotiated between Battelle and Chemico and fully signed. Copies of the modification are in the mail.

Detailed Engineering Design of the PDUChemico Activity

Chemico provided us with a new schedule for the PDU installation on April 4. This schedule was presented in Progress Report Number 15 (last month's report). At our most recent project review with Chemico on May 8, they reaffirmed the accuracy of the overall schedule. Some activities within the schedule have been shifted forward in time as is explained later in this report in the "Work Plan and Schedule" section. PDU turn-over to Battelle is still to be in the first quarter of calendar year 1975.

Chemico has emphasized procurement and completion of their engineering design work during this reporting period. A synthesis of information provided by Chemico's weekly and monthly reports during this reporting period, our resident engineer at Chemico, and the biweekly Battelle-Chemico project reviews provides the following status of activities.

- Process Flow Diagrams and Equipment Data Sheets. A new issue of updated process flowsheets for Sections 100 through 600 has not been received from Chemico yet. We understand that they are awaiting the results of computer-generated heat and material balances before issuing updated flowsheets.

• Process and Utility P&I's. Issue 2 of the process P&I's was issued by Chemico on March 29. Following a review of these P&I's at Battelle, sessions were held with Chemico piping and instrumentation specialists in Columbus on April 30 and May 1.² Based on the agreements reached at these sessions, the process P&I's were given provisional approval as "Issued for Construction".

The utilities P&I's and flowsheets issued on March 29 were not nearly as complete as were the process P&I's. Consequently, approval of these was delayed until they are more complete. Minor piping modifications and a recalculation of the material balance for the water distribution system are in progress at Chemico as a result of the April 30 and May 1 meetings and further discussions at Chemico on May 8 between Chemico and Battelle's Supervisor of Operations for the PDU.

• Requisitions and Purchases. Table 1 provides Battelle's summary of the status of procurement of the major items of process equipment (equipment shown on the process and utility flowsheets). It is estimated that 72 percent of the items of process equipment have been fully approved for purchase. For another 23 percent, Battelle has authorized Chemico to issue letters of intent subject to later Government approval. Another 4 to 5 percent of the equipment is out for bids and the remaining (less than 1 percent) has not been requisitioned yet by Chemico.

A listing of the major items of equipment for the PDU showing their status in the procurement cycle is appended as Table A-2. Also appended as Tables A-1 and A-3 are detailed listings showing the status of procurement for items not shown on the flowsheets. We intend to discontinue issuance of these tables in the monthly report and instead keep you informed of the delivery status of materials and equipment.

The general status of purchasing is that essentially all of the major items of process equipment are either purchased or letters of intent have been issued while we await formal Government approval. Chemico has commitments on the major amount of the materials required including steel, reinforcing bar, and piping.

²Mr. Frank Crowe, the Sponsor's Representative, attended part of the sessions.

TABLE 1. MAJOR PROCESS EQUIPMENT ITEMS STATUS SUMMARY

Process Area ^(a)	Total Items	Not Requisitioned	Requisitions Out	Purchase Approved	LOI Approved ^(b)
100	4	0	0	4	0
200	12	0	0	10	2
300	10	0	0	4	6
400	9	0	0	9	0
500	21	0	0	17	4
600	16	0	4	7	5
700	9	0	0	8	1
800	12	0	1	8	3

(a) The section numbers and corresponding descriptive section names are

<u>Section</u>	<u>Name</u>
100	Coal Receiving and Storage
200	Coal Preparation and Grinding
300	Coal Pretreatment
400	Coal Feed System
500	Coal Gasification
600	Gas Treatment
700	Air, Inert Gas, and Natural Gas Utilities
800	Steam and Water Utilities.

(b) Letters of intent approved by Battelle prior to obtaining formal approvals of OCR and A.G.A.

- General Arrangement Drawings (including floor plans and elevations). These drawings are essentially complete except for minor changes which are continually being made as vendor certified drawings become available.

- Piping. Stress and other calculations for piping are being continued by Chemico. Personnel in Battelle's Structures and Mechanics Research Department are making independent calculations to check Chemico's recommendation that expansion joints are required in the solids transfer lines between the burner and gasifier.

We were informed by Chemico that four of the five required piping plans for various levels in the PDU are in progress. We have examined some of these. Chemico reports that the piping isometrics are 20 percent completed.

Chemico has issued purchase orders for some of the fabricated piping.

- Structural Steel. Chemico informs us that the structural steel design is now complete except for pipe racks and supports. The steel fabricator promises delivery of the steel for the outer structure in early July with completion of all deliveries by the middle of August.

- Foundations. The foundation drawings in sufficient detail for rebar fabrication have been promised by Chemico for the week of May 13. The critical path for the project, in Battelle's opinion, is currently through the production of the detailed foundation drawings.

- Electrical. Chemico reports that most major items of electrical equipment have been purchased. Electrical drafting is 15 percent complete.

Instead of subcontracting the electrical work, Chemico now intends to do it themselves. According to their construction personnel, this will expedite the construction completion date.

We have received drawings of elementary control diagrams for the interlock systems and these are being reviewed at Battelle.

• Equipment Deliveries. The most recent Chemico Materials Status Report, dated May 2, shows the following as ready for shipment to the site:

<u>OCR/A.G.A. Purchase Quotation and Authorization Sheet Serial Number</u>	<u>Description</u>
1	Process Air Compressors and Receivers
3	Coal Pulverizing Mill System
5	Recycle Make Gas Cooler
None Required	Annunciators
8	Load Cells
14	Dust Collectors
22	Pumps
13	Tanks
18	Instrument Air Dryer

Chemico has established a field office at the West Jefferson site and assigned a man to receive equipment there. We understand that the vendors of the above equipment have been informed by Chemico's Traffic Department to proceed with the deliveries.

According to the Materials Status Report, the following major items of equipment are expected to be ready for delivery in the forthcoming reporting period:

<u>OCR/A.G.A. Purchase Quotation and Authorization Sheet Serial Number</u>	<u>Description</u>
9	Three Cyclones
12	Steam Superheater
10	Gas Analyzers
19	Vibrating Screen
27	Temperature Indicators

As of this reporting date, no equipment has been received at the site.

• Construction. Construction work at the site by Chemico is to begin the first week in June. Battelle has not received the preliminary construction schedule which we noted was expected in our previous monthly report. We have asked for the construction schedule again and we are promised it within the next 2 weeks. It is our recent understanding that the schedule is not a CPM-type one but rather a bar-chart type.

Chemico's Field Superintendent, Mr. Robert L. Jordan, joined the project team at Chemico the week of May 6. Mr. Jordan is participating in the construction planning and gaining familiarity with the project to smooth the transition from the New York office to the field.

Mr. Leo Van Amerongen, Chemico's Manager of Field Construction presented an organization chart for the field work on our job at the last biweekly project review. Assignments appear to have been made to most of the key positions.

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

The major activity by Battelle related to the PDU has been examination of specifications for purchase requisitions, study of bids and bid analyses transmitted by Chemico, review of various engineering drawings; and general technical interface with Chemico.

T. L. Tewksbury, Battelle's Supervisor of Operations for the PDU, is devoting a significant amount of time to drawing review and to operations planning. We have held meetings with the Chemico staff responsible for preparing the facilities and operating manuals for the PDU. Mr. Tewksbury is presently outlining an operating manual including the start-up, normal operation, and shutdown. We plan to closely coordinate this effort with the responsible personnel at Chemico including exchange of drafts of narrative on the PDU equipment details and operation.

We have recommended that Babcock and Wilcox be awarded a sub-contract (to Chemico) for the design, materials supply, and installation of refractories in the major vessels and associated piping. Battelle's Thermal and Mechanical Energy Systems Section participated in the bids technical review and will assist Chemico and the refractory subcontractor in developing a suitable detailed refractory design.

During this reporting period, we have had additional discussions with vendors interested in supplying the gas turbine for the PDU. We are awaiting additional information from one of the two remaining bidders before we make a formal recommendation to OCR and A.G.A. We still plan

to discuss the reasons for our selection with C. F. Braun and Company's turbine specialists.

Drawings for a building to house auxiliary equipment (building to be provided by Battelle) were sent to Chemico to allow them first opportunity to bid. Our Plant and Facilities Department, the customer in the case of this building, believes it may be more convenient and expedient to have the building erected by Chemico if their bid is competitive. A bid has been received from Chemico and is being evaluated by the Plant and Facilities Department. Meetings are scheduled for the week of May 13 to further discuss our requirements with Chemico.

Clearing of materials and equipment which might obstruct the site and provision of storage space and field utilities have also been the responsibility of our Plant and Facilities Department during this reporting period.

It is our understanding that, because the PDU is an experimental operation, we will be exempted from the operating permit system by the Ohio EPA. We are awaiting clarification on this point.

Mr. Adams has continued in residence at Chemico's offices for purposes of expediting approvals, speeding the interchange of technical information between Battelle and Chemico, and generally monitoring the subcontractor's activity. Mr. Adams has been joined by Mr. Crowe, the Sponsor's Representative, for much of this time.

PROBLEMS AND RECOMMENDATIONS

Items of increasing concern are those related to the financial aspects of the program as are indicated in the Financial and Administrative Section of this report.

We do not have a final resolution of the problem related to obtaining adequate natural gas for the PDU operation. This does not present difficulty during the construction activity but will during the operating phases if a resolution cannot be had.

Chemico's Deputy Project Manager has indicated apprehension about maintaining the schedule for finishing piping, instrumentation, and

electrical drawings. This is apparently related to difficulties being experienced in obtaining vendor's certified drawings. It is also related we believe to manpower problems at Chemico (discussed in the Financial and Administrative Section).

Presently we do not foresee a materials or equipment delivery problem which should cause Chemico to deviate from their current schedule.

WORK PLAN AND SCHEDULE

Major emphasis will be given to our activities associated with installation and planning the start-up and operation of the PDU.

The schedule which Chemico is presently working under is shown on page 12. The schedule shows a field work start time of June and a mechanical completion date of mid-February, 1975. This is the same schedule as was presented in the previous monthly report to OCR but updated to be accurate as of the first week in May.

A major addition of information on the schedule is that of percentages of completion in the various categories (see the right margin). These percentages are based on Chemico's most recent comparative cost estimate. The percentages shown are based on a total cost estimate for the job as of the end of March. In the engineering-drafting activity, the percentage is as a percent of predicted man-hours. For the procurement activity the percentage is as a percent of estimated costs for the hardware.

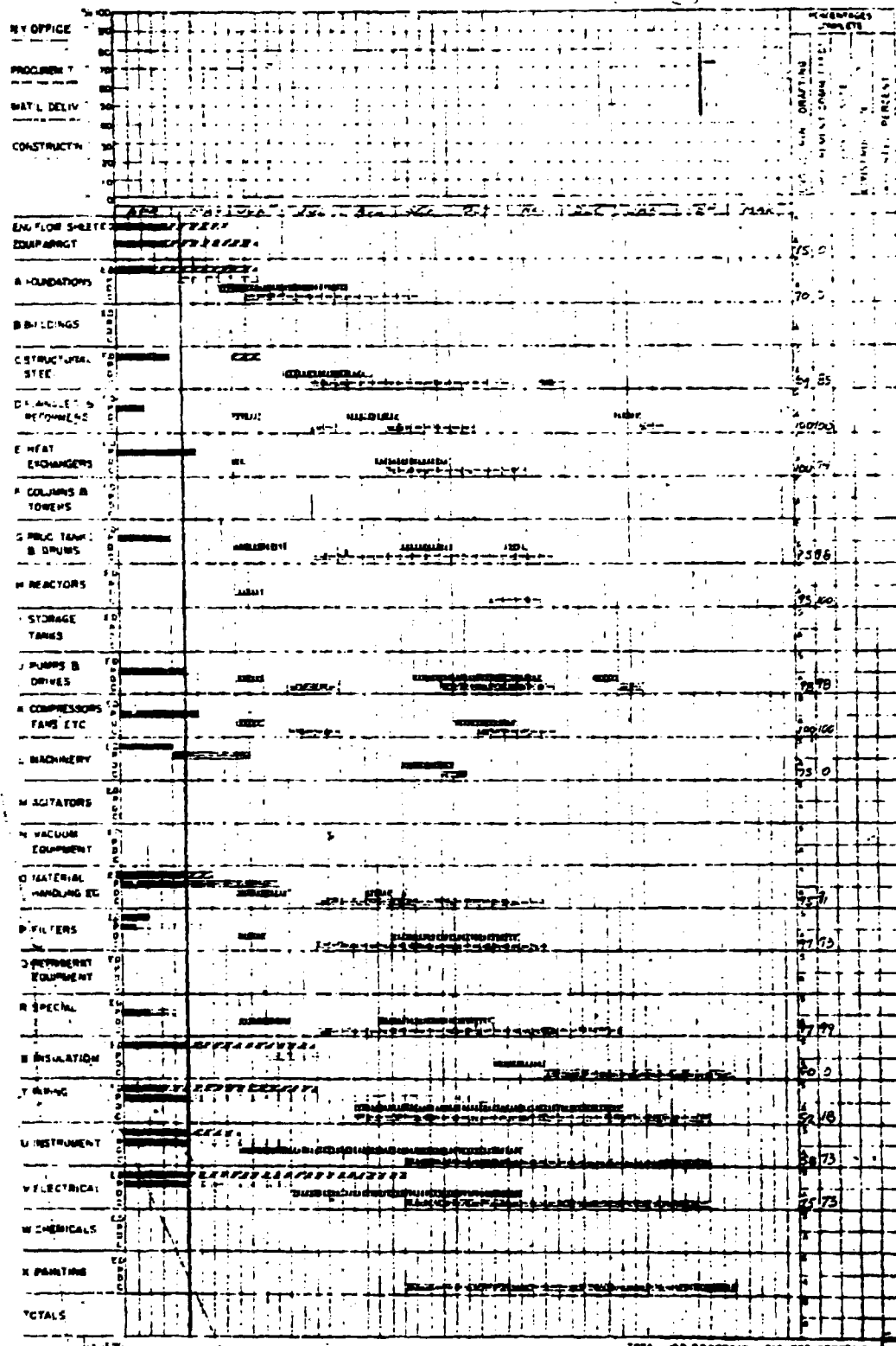
No changes have occurred in the completion date. The subtle changes within the updated schedule over that previously presented are

- (1) The start of delivery of foundation materials to the site is projected as 2 weeks earlier.
- (2) A 2-week engineering-drafting activity for the structural steel has been interspersed between the completion of the main engineering-drafting activity and the fabricated steel delivery to the site.
- (3) The delivery of structural steel to the site will start 2 weeks earlier.

- (4) The procurement in Category K (compressors, fans, etc) is shown as concluded 1 week earlier.
- (5) No bars were shown for Category L (machinery) previously and they are now.
- (6) Bars have been added for the engineering-drafting and procurement activities within Category O (material handling equipment).

Examination of the Chemico schedule particularly of the solid bars shows that most activities are on schedule. The engineering-drafting functions for the foundations and piping appear to be about 2 to 3 weeks behind schedule. Most other activities are on schedule within a week. We have emphasized to Chemico the importance we attach to completion of the foundation drawings.

At present we are committed to conclude all experimental work by July 1, 1975. Battelle is not including an updated overall program schedule in this report. When discussions currently in progress with OCR are completed, we will incorporate a new overall program schedule based on the PDU construction completion shown on the Chemico schedule.



CHEMICAL CONSTRUCTION CORPORATION
 JOB 1947 MASTER PROJECT SCHEDULE

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

APPROVED PROJECT MANAGER
 DATE 5-2-74

APPENDIX

DETAILED STATUS OF EQUIPMENT PROCUREMENT

APPENDIX

DETAILED STATUS OF EQUIPMENT PROCUREMENT

TABLE A-1. STATUS OF FOUNDATIONS, BUILDINGS, AND STRUCTURAL STEEL (CHEMICO A TO C EQUIPMENT)

Purchase orders have been authorized for the following:

<u>Component Identification</u>	<u>Name</u>	<u>OCR/A.G.A. Authorization Sheet Serial Number</u>
A-190	Anchor bolts	None required
A-190	Reinforcing bars	37
B-01, 02, 03, 04	Structural steel	7
C-01, 02, 03, 04	Structural steel	7

TABLE A-2. STATUS OF FLOWSHEET ITEMS (OR CHEMICO D TO R EQUIPMENT)

<u>Flowsheet or Equipment Item Number</u>	<u>Name</u>	<u>OCR/A.G.A. Authorization Sheet Serial Number</u>
1. Purchase orders have been authorized for the following items:		
G-102	Coal Receiving Hopper	29
R-101	Grizzly	29
O-101	Coarse Coal Conveyor/Elevator	30
G-101	Coal Mill Surge Hopper	2
O-201	Coal Pulverizer	3
O-205	Ground Coal Conveyor/Elevator	30
P-204	Vibrating Screen	19
P-201	Cyclone Separator	3
P-203	Bag Filter	3
K-201	Main Fan	3
K-202	Auxiliary Fan	3
K-203	Combustion Air Blower	3
D-201	Inert Gas Generator (for Coal Pulverizer)	3
R-201	Diverter Valve	None Required
O-301	Screw Conveyor Cooler	11 Rev. 1
P-301	Coal Pretreater Cyclone	9
J-301A&B	Oil-Solids Pumps	22 & 23
H-301	Coal Pretreater Vessel	34
P-401A/B	Bag Filters and Bin Vents	14
G-401A	Combustor Feed Bin	2
G-401B	Gasifier Feed Bin	2
G-402	Combustor Feed Pressurizing Bin	2
G-403	Combustor Feed Injection Bin	2
G-404	Pretreated Coal Receiving Bin	2
G-405	Gasifier Feed Pressurizing Bin	2
G-406	Gasifier Feed Injection Bin	2
R-403	Diverter Valve	None Required
H-501	Combustor Vessel	6
H-502	Gasifier Vessel	6
P-501	Combustor Cyclone	9
P-502	Gasifier Cyclone	9
O-502	Char and Sinter Conveyor Cooler	11 Rev. 1
T-550	Emergency Hot Shut-Off Valves	25
T-550	Hot Valves for Let-Down Lock Hoppers	26
T-550	Throttling Valves for Hot Solids	24
G-501	Combustor Cyclone Receiving Hopper	33
G-502	Combustor Cyclone Let-Down Hopper	33

TABLE A-2. (Cont)

G-503	Gasifier Cyclone Receiving Hopper	33
G-504	Gasifier Cyclone Let-Down Hopper	33
G-505	Char Receiving Hopper	33
G-506	Char Let-Down Hopper	33
G-509	Gasifier Ash Let-Down Hopper	33
G-510	Combustor Ash Let-Down Hopper	33
G-511	Cooler Conveyor Receiving Hopper	33
J-601A&B	Venturi Circulating Pumps	22 & 23
J-602A&B	Venturi Circulating Pumps	22 & 23
G-603	Sludge Settler Tank	13
E-604	Recycle Make Gas Cooler	5
E-605	Recycle Make Gas Aftercooler	38
D-602	Combustor Furnace With Stack	32
J-603	Transfer (Sludge) Pump	None Required
G-701A&B	Process Air Receivers	1
K-701A&B	Process Air Compressors	1
D-702	Inert Gas Generator Package	16
G-702	Inert Gas Receiver Tank	21
R-701	Instrument Air Dryer Package	18
J-702	Inert Gas Generator Sump Pump	Included in 16
E-703	Instrument Air Aftercooler	Included in 1
G-703	Instrument Air Receiver	Included in 1
G-802	High-Pressure Water Storage Tank	13
D-802	Packaged Steam Boiler	20
D-803	Steam Superheater	12
R-804	Water Treatment System (Cooling Tower)	None Required
R-803	Cooling Tower and Erection	28
R-801	Boiler Feedwater Treatment System	40
J-801A&B	Boiler Feedwater Pumps	40
G-801	Deaerator	40

2. Bids have been received by Chemico on the following items. These bids have been reviewed by Chemico, their recommendations have been made to Battelle, and requests for authority to purchase have been submitted to OCR/A.G.A. after Battelle's review.

<u>Flowsheet or Equipment Item Number</u>	<u>Name</u>	<u>OCR/A.G.A. Authorization Sheet Serial Number</u>
K-204	Screened Coal Blower	41
P-205	Screened Coal Cyclone	41

TABLE A-2. (Cont)

RV-301	Rotary Valve	42
RV-302	Rotary Valve	42
K-303	Pretreated Coal Blower	41
P-302	Pretreated Coal Bag Filter	41
R-301	Pretreater Venturi Scrubber	51
P-304	Gas Separator	51
K-501	Start-Up Recycle Blower	45
D-501	Start-Up (and Pretreater) Heater	50
H-501	Combustor Refractories	52
H-502	Gasifier Refractories	52
R-601	Flue Gas Venturi Scrubber	51
R-602	Make Gas Venturi Scrubber	51
P-601	Gas Separator	51
P-602	Gas Separator	51
K-603	Recycle Make Gas Booster Compressor	43
K-703A&B	Natural Gas Booster Compressors	44
J-802A&B	High-Pressure Water Storage Tank Pumps	46
J-803A&B	Cooling Tower Water Pumps	46
J-804A&B	Valve Cooling Water Pumps	46

3. The following items are out for bids:

R-605	Gas Dryer Package
K-604	Combustion Air Blower
P-603	Prefilter
P-604	Afterfilter
G-804	Valve Water Jacket Surge Tank

4. Among the items upon which no specifications for requisition have been written by Chemico yet are the following:

P-503	Vibrating Screen (remote)
None Yet	Tote Bins

TABLE A-3. STATUS OF OTHER^(a) MATERIALS AND EQUIPMENT

1. Purchase orders have been authorized for the following:

<u>Cost</u> <u>Identification</u> <u>Number</u>	<u>Name</u>	<u>OCR/A.G.A.</u> <u>Authorization</u> <u>Sheet Serial</u> <u>Number</u>
U-030	Radiation-Type Density Gages and Switches	35
None	Panel Instruments	4
U-030/41	Weigh Systems (load cells)	8
U-050	Instrument Control Panel	15
U-030	Multipoint Temperature Indicators and Recorders	27
U-030	Gas Analyzers	10
U-041	Receivers - Panel Mounted	Included in 15
U-030	Annunciators	None required
V-020	Transformer Substations	17
V-100	Motor Control Centers	31
V-802	Emergency Electrical Generator	36
T-550	Restrictor Valves	None required
T-550	TFE Lined Plug Valves	None required
T-640	Butterfly Valves	None required
T-550	Pinch Valves	39
T-626	Stainless Steel Valves	None required

2. The following are either out for bids or have been purchased:

U-010	DP Transmitters
U-020	Purgemeters
U-020	Rotameters
U-060	Control Valves
U-060	Safety and Relief Valves
U-060	Pressure Regulators
U-060	Ball Valves
U-060	Air Operated Gate Valves
U-020	Thermocouples
V-100	Circuit Breaker Panel Boards
V-110	600-Volt Cable
V-200	Indoor Transformers
T-615	Cast Iron Valves
T-124	TFE-Lined Pipe
T-550	Metering Gate Valves
T-620	Forged Carbon Steel Valves

TABLE A-3. (Cont)

T-621	Cast Carbon Steel Valves
T-551	Stainless Steel Expansion Joints
T-550	Shut-Off Valves

- (a) This is called S through Z items by Chemico. These are nonflowsheet items and are insulation (S), piping (T), instrumentation (U), electrical (V), chemicals and catalysts (W), painting (X), miscellaneous site work (Y), and travel and subsistence related to field work (Z).

FINANCIAL AND ADMINISTRATIVE SECTION

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May 14, 1974

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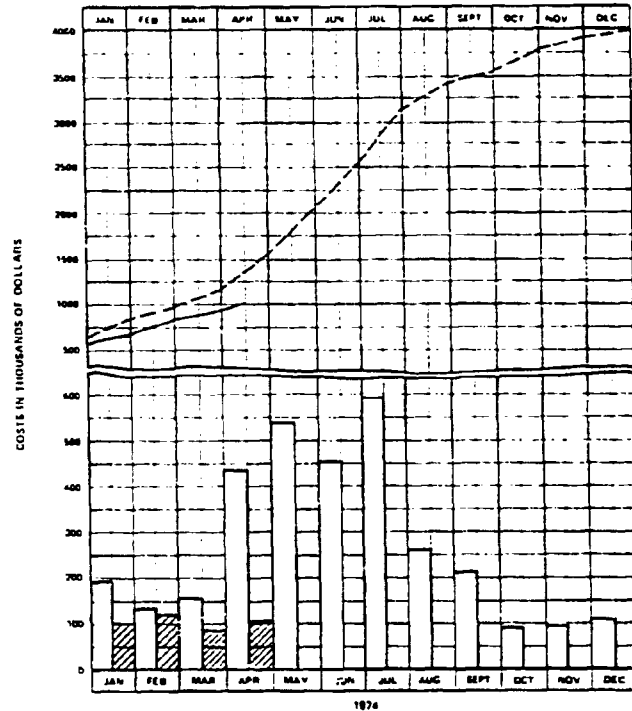
BATTELLE
Columbus Laboratories

May 14, 1974

Table B-1 presents the Task Cost and Manpower Projection form for the month ending April 30, 1974. Billings have been received from Chemico for New York operating costs through April and all of their fee except for the final payment which by contract is withheld. Total actual disbursements to Chemico are \$609,891.80.

Chemico's billing for New York operating costs for the month of April is \$97,096.01. Neither the billing for April nor one received for \$109,890 worth of equipment were received from Chemico in time for their payment to be reflected in Battelle's voucher to OCR dated May 13. As shown in the attached monthly report of Chemico, they estimate their May billing for services will be \$100,000. The sum of the two billings and the estimate for May are not included in Table B-1 because we have not paid them yet. It is estimated that, as of May 1, a total of about \$706,987 has been spent by Chemico on engineering, procurement, and other activities related to their current phase of work. The Battelle Project Office authorized payment of \$109,890 to Chemico to pay equipment vendors. Chemico has been authorized to commit an additional \$1,500,000 (approximately) to suppliers of equipment and materials for the PDU. About \$340,000 of this is in letters of intent authorized by Battelle. They have, as indicated in their appended report, committed about \$1,387,751 of this.

TABLE B 1.
BATTELLE PDU
TASK COST AND MANPOWER PROJECTIONS
MONTH ENDING APRIL 30, 1974



MANPOWER (MEN-MONTHS)

Prd.	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								

DIRECT LABOR & OVERHEAD COSTS (THOUSANDS OF DOLLARS)

Prd.	21.8	19.8	22.8	25	25	25	32.5	36	80.8	65	77	96.5
Act.	19.5	18.2	18.4	17.8								

SUBCONTRACT AND CONSULTANT COSTS (THOUSANDS OF DOLLARS)⁽¹⁾

Prd.	169	115	128	404	504	422	556	221	145	7	0	0
Act.	77.9	103	64.9	87.8								

NON-EXPENDABLE EQUIPMENT (THOUSANDS OF DOLLARS)⁽²⁾

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

MATERIALS, SUPPLIES, TRAVEL, AND ODC (THOUSANDS OF DOLLARS)⁽³⁾

Prd.	3.2	3.2	5.2	6.0	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								

TOTAL (THOUSANDS OF DOLLARS)⁽⁴⁾

Prd.	194	138	156	434	534	452	591	281	212	90	93	110
Act.	100.7	123	85.6	107.8								

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 PDU

The cumulative expenditures of Battelle, including payments to Chemico to date are about \$1,001,400, as shown in Table B-1. The sum of actual expenditures to date, the billing for April by Chemico, and equipment purchase order or letter of intent authorizations is about \$2,707,000 or 71 percent of the currently encumbered* funds for the program.

On page 2 of Chemico's attached report, they inform us that a new cost estimate will be presented at a meeting on May 15. This is a result of our insistence that a more definitive cost estimate be provided than Chemico provided in their previous monthly report to us and in subsequent conversations.

In our previous monthly report to OCR, we concluded that, based on the fragmentary information Chemico gave Battelle, they were estimating the job at about \$3,755,000 at that time. The most definitive figure which Chemico would officially provide was \$3,507,000. These are 19.5 and 11.6 percent, respectively, above the current authorization of \$3,143,000 in Subcontract Modification Number 1. Consequently, we expect that the estimate Chemico will provide on May 15 to be at least 20 percent above their current authorization.

We believe Chemico's performance on our project has improved in the past month and one half. The assignment of supplemental manpower at Chemico at the project manager and project engineer levels is having a visible positive effect. Mr. Stanley Noss (Chemico's Process Plants Company's Vice President for Special Projects), who was assigned overall responsibility for the job at Chemico, continues to see that Battelle obtains the documents we believe are required to monitor the work. The only exception has been the new cost estimate which Mr. Noss was unable to deliver as promised on May 8.

We are continuing to have biweekly project review meetings with Chemico. At the project meetings, Chemico is represented by Mr. Noss and Chemico personnel from the project staff, expediting, and construction. Following the April 24 project review, Dr. Goldberger and Mr. Corder met briefly with Mr. John Clarke, Chemico Process Plants Company's President.

* Letter from Mr. James A. Nelson (OCR) to Battelle dated February 25, 1974, shows OCR funds of \$2,670,000 and A.G.A. funds of \$1,130,000.

In our most recent project review (May 8), there was an implication of manpower shortage difficulties regarding turning out drawings (particularly piping, electrical, and instrumentation). We have observed what appears to us to be a higher than normal personnel attrition rate at Chemico in recent months. This could be responsible for the implied manpower shortage difficulties. We plan to watch this situation closely and, should it become apparent that our project may be influenced adversely, we will pursue a solution at whatever Chemico management level is appropriate.

BATELLE COLUMBUS LABORATORIES
PERSONNEL ASSIGNED TO PROJECT**

- (1) W. M. Goldberger
- (2) W. C. Corder
- (3) R. R. Adams
- (4) T. L. Tewksbury
- (5) H. R. Batchelder (Staff Consultant)
- (6) R. D. Fischer

CHEMICAL CONSTRUCTION CORPORATION
PERSONNEL ASSIGNED TO PROJECT**

- | | |
|--------------------|---------------|
| (1) F. W. Peterson | (8) N. Razfar |
| (2) E. M. Ezcurrea | (9) R. Jordan |
| (3) E. T. Coles | (10) J. Regan |
| (4) J. B. Perrone | (11) J. Reidy |
| (5) H. Osborne | (12) G. Elsis |
| (6) F. S. Schlaff | (13) M. Dowd |
| (7) E. Postek | |

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

CHEMICAL CONSTRUCTION CORPORATION

JOB 1947

BATTELLE'S COLUMBUS LABORATORIES
COAL GASIFICATION PDU

STATUS AS OF MAY 3, 1974

A). Overall Status

During this month substantial progress was made in committing equipment and materials, with emphasis in obtaining acceptable deliveries.

As a result, committed deliveries of D-R equipment are thus far consistent with the requirements of the Project Master Schedule (February 15, 1975 completion), and the remaining equipment deliveries can be expected to follow suit, providing no slippages occur.

Material deliveries continue to be a problem. So far this has been solved by several means:

1. Paying extra for warehouse material (structural steel, plate for flanges).
2. Changing specifications and design to match more readily available items (valves), in some cases ordering back-up spares.
3. Finding new sources of supply. We were very fortunate in that Chemico had a long delivery check valve and two electric motors left over on another project.

B). Financial Status

Purchase Orders and Letters of Intent	\$ 1,387,751
Billing for Services up to May 8, 1974	656,298
Estimated Billing for Services May	<u>100,000</u>
	\$ 2,144,049

B). Financial Status (continued)

The new estimate and Comparative Cost Statement will be presented at a meeting scheduled for May 15, 1974.

C). Material Status1. A to C Material

(% Based on Estimated Cost)
%

Total Purchased 79.1

2. D to R Equipment

(% Based on Estimated Cost)
%

a. Requisitions not started	0.0
b. Requisitions being prepared	0.0
c. Requisitions being reviewed or revised	0.0
d. Approved Requisitions being processed	2.6
e. Requisitions out for bids	0.0
f. Quotes being evaluated by Engineering	0.0
g. Evaluations under Project review	0.0
h. Recommendations submitted to BCL	1.4
i. Approved for purchase or letter of intent	0.9
j. Equipment committed but not purchased	20.0
k. Equipment purchased	75.1

3. S to Z Equipment and Materials

(% Based on Estimated Cost)
%

a. Bids being evaluated	0.0
b. Approved for purchasing	3.9
c. Materials committed but not purchased	2.2
d. Materials purchased	65.6

C). Material Status (continued)

4. Purchase Commitments

We attach a copy of the Purchase Commitments report dated May 1, 1974.

D). Process Engineering

Process engineering is essentially completed.

E). Flow Sheets

P&I's have been reviewed with BCL. BCL's comments, as well as package vendors information, is being incorporated into an "Issue for Construction".

F). General Arrangements

General Arrangement drawings are being refined, incorporating piping and equipment vendor's drawings information. Some recently committed equipment drawings will become available shortly, thus permitting further progress.

Completion is presently reported as 50%.

G). Structural Steel

Structural steel design is essentially complete, save for pipe racks and supports. Completion of this design on schedule, in order to assure acceptable delivery, required considerable effort in view of the lack of equipment and piping information. A substantial increase in material resulted.

H). Foundations

Foundation design for the Coal Feed structure is essentially

H). Foundations (continued)

complete. It is expected to be released behind schedule but before critically affecting the construction schedule.

Anchor bolts have been requisitioned.

I). Piping

Piping isometrics have started and are reported to be 20% complete.

All bulk items have been requisitioned.

J). Instrumentation

Most instruments and instrumentation materials are requisitioned and/or purchased. Instrumentation drawings are more than 50% complete (See enclosed drawing list and status for details).

All bulk items have been requisitioned.

K). Electrical

Most electrical equipment is purchased. Electrical construction is now planned to be done directly by Chemico, allowing for a better control of the materials procurement and delivery.

Electrical drafting completion is reported to average 15%.

All bulk items, except miscellaneous left for field purchasing, have been requisitioned.

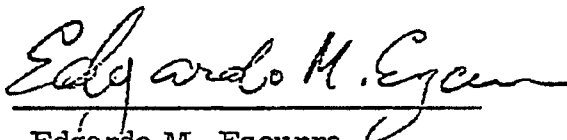
L). Construction

Chemico Field Office was installed and is ready to receive equipment.

Construction is expected to start on schedule by June 1, 1974.

Chemico's Field Superintendent, Mr. Robert L. Jordan, is planning the construction effort from the New York office prior to his moving to the field.

Prepared by



Edgardo M. Ezcurra
Project Engineer



Fritz W. Peterson
Assistant Manager Operations

Attachments:

- Project Master Schedule as of May 3, 1974
- Drawing List and Status as of April 28, 1974
- Purchase Commitments Report as of May 1, 1974

NOTE: ATTACHMENTS TO CHEMICO REPORT NOT PROVIDED IN THIS
REPORT