

BC L. MPR.-17

TECHNICAL SECTION

of

PROGRESS REPORT NO. 17

on

CONTRACT NO. 14-32-0901-1513

to

OFFICE OF COAL RESEARCH

June 17, 1974

BATTELLE
Columbus Laboratories
505 King Avenue
Columbus, Ohio 43201

TECHNICAL SECTION
of
PROGRESS REPORT NO. 17
on
CONTRACT NO. 14-32-0001-1513
to
OFFICE OF COAL RESEARCH
from
BATTELLE
Columbus Laboratories
June 17, 1974

INTRODUCTION AND PROJECT OBJECTIVE

This progress report describes work completed by Battelle on the Coal Gasification Program during the period May 15 - June 17, 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 and materials for the Battelle Coal Gasification PDU. The Chemico field office at Battelle's West Jefferson site began receiving equipment. The Chemico Field Superintendent arrived at the site and construction formally started on June 10.

Chemico appears to be maintaining overall the schedule presented in our previous monthly report. Procurement of major items of equipment (flowsheet items) is virtually complete and commitments on deliveries appear to be holding. Procurement at Chemico is emphasizing obtaining the bulk materials and equipment.

Battelle continued work with Chemico on points related to finalizing the PDU design. Substantial activity of Battelle also dealt with provision of construction utilities and information to Chemico at the site, monitoring of and liaison with Chemico's field construction personnel and detailed analysis of Chemico's activities on our subcontract.

WORK COMPLETED

Detailed Engineering Design of the PDU

Chemico provided us with a new overall project schedule for the PDU installation on April 4. This schedule was first presented in Progress Report Number 15. Since then Chemico has been updating the schedule and reissuing it on a biweekly basis. Their most recent version dated May 10, is incorporated in this report as page 11. No change has occurred in the end point of the schedule since it was issued. Internal changes are discussed in the "Work Plan and Schedule" section. PDU turnover to Battelle is still to be in the first quarter of calendar year 1975.

Chemico has emphasized procurement of bulk materials and equipment and completion of their engineering design work during this reporting period. Several of the Battelle project staff have been in residence at Chemico the past two weeks. The following status of activities is provided based on our observations during this period as well as information in more depth from Battelle's resident engineer at Chemico, Mr. R. R. Adams, who has spent more time at Chemico than the rest of the project staff.

Drawings

The following is our appraisal of the status of the drawings necessary for construction of the PDU which Chemico lists on their drawing list.

● Process Flow Diagrams*. In March discussions of Chemico's most up-to-date process flow diagrams were held with C. F. Braun, Battelle, and Chemico participation. Based on these discussions it appeared that the flowsheets essentially represented the Battelle Coal Gasification PDU but that minor modifications were required before formal approval could be provided. Also some cleaning up of the heat and material balance information shown on the flowsheets was required.

When a revised edition of the process flowsheets was not forthcoming, Battelle insisted that an adequate commitment of process engineering manpower be made to conclude the necessary work. We received assurances of this immediate commitment during the week of May 3.

● Utility Flow Diagrams**. Reviews of these flow diagrams are being conducted in detail under the direction of Mr. John Regan Chemico's deputy project manager on the Battelle job. Battelle observed one review to date in which the cooling water utility flow diagram was examined. Considerable modification of the piping and instrumentation*** was directed by Mr. Regan based on his review. We intend to observe the reviews which Mr. Regan will conduct for the other utility flow diagrams.

* By process flow diagrams we mean the flow diagrams for the 6 basic sections of the PDU namely:

<u>Section Number</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

** By utility flow diagrams we mean the flow diagrams for the utility sections of the PDU namely:

<u>Section Number</u>	<u>Name</u>
700	Air, Inert Gas, and Natural Gas Utilities
800	Steam and Water Utilities.

*** Because Chemico does not plan to issue both flow diagrams and P&I diagrams for the utilities sections, the flow diagrams are actually "hybrids" and show instrumentation.

- Piping and Instrumentation Diagrams. These diagrams are also being reviewed in depth under Mr. Regan's direction. Battelle has observed reviews of the P&I's for Sections 100 and 200, 300 (partial), and 600 (partial). In each case it appears that fairly extensive redrawing of the P&I's will be required.

The corrections and modifications directed by Mr. Regan appear to be based on sound engineering analysis and, while fairly numerous, they primarily involve piping and instrumentation and not major changes to equipment. We have been told that the flow diagrams and P&I's being redrawn will be reissued around the end of June.

- Plot Plan and General Arrangement Drawings. Most of these are reported by Chemico on their drawing list dated May 26, to be about 60 percent complete. We will be examining the most recent drawings within the next few weeks to check the degree of completion.

- Piping Isometrics. These are reported by Chemico to be 20 to 30 percent complete on their drawing list dated May 25. Battelle is presently examining isometrics at Chemico to assess the degree of completion. The isometric drawings observed so far are in a state of change due to the changing status of the P&I drawings.

- Electrical Wiring Drawings. These drawings are reported to range between 10 and 55 percent complete in Chemico's May 25 drawing list.

- Instrument Related Drawings. These are in various stages of development. Determination of the degree of completeness by Battelle awaits firming up of the P&I's.

- Foundation Drawings. Chemico, in their monthly report attached to the Financial and Administrative Section of this report, informs us that the foundation design for the coal feed and combustor-gasifier structures are complete. The foundation drawings issued to the field contained errors but we believe these have been corrected.

• Structural Steel Drawings. In Chemico's monthly report for May to Battelle these drawings are reported to be complete. A trip is planned for the week of June 17 by Battelle's project engineer to the steel fabricator to examine latest drawings and progress.

• Vendor Certified Drawings. Chemico has received some of these. We presently are determining precisely which ones have been received.

Requisitions and Purchases

In excess of 95 percent of the major items of process equipment shown on the process flowsheets requiring the prior approval of OCR and A.G.A. for purchase have been authorized for Chemico to purchase. Purchase orders have been issued on most of these items and scheduled deliveries are shown on Chemico's material status report.

Chemico reports that most of the bulk items related to piping, instrumentation, electrical and structures and foundations have been purchased.

Equipment and Materials Received at the Site

A number of items of equipment have arrived at the site and are stored there. The equipment which has arrived includes.

<u>OCR/A.G.A. Purchase Quotation and Authorization Sheet Serial Number</u>	<u>Description</u>
1	Process Air Compressors and Receivers
18	Instrument Air Dryer Package
29	Grizzly and Coal Receiving Hopper
2	Four Coal Bins and Hoppers
8	Weigh Systems (load cells)
22 and 23	Four Pumps
9	Three Cyclones
none	Valves
5	Recycle Make Gas Cooler
38	Recycle Make Gas Aftercooler
3	Coal Pulverizing Mill System
none	Annunciators

It appears from Chemico's latest materials status report and other information that the following major items of equipment will be delivered in the forthcoming reporting period:

<u>OCR/A.G.A. Purchase Quotation and Authorization Sheet Serial Number</u>	<u>Description</u>
11 Rev. 1	Two Cooler-Conveyors
19	Vibrating Screen
14	Dust Collectors
13	High Pressure Water Storage Tanks
2	Additional Bins and Hoppers
6	Combustor and Gasifier Vessels
12	Steam Superheater
none	Water Treatment System (cooling tower)

Fabricated reinforcing bar is to begin arriving the week of June 17, and fabricated structural steel will begin arriving the first week in July. Substantial amounts of the bulk items are also expected.

Construction of the PDU

Chemico issued their construction schedule on May 23, (issue P-1). Copies are being provided to Drs. R. E. Vener and C. L. Miller of OCR, Dr. Ab Flowers of A.G.A., and Dr. R. Detman of C. F. Braun. The construction schedule is not included in this report because of its bulk. Examination of the construction schedule by Battelle indicates that there is a relatively high degree of fluidity in it but that it generally conforms to the overall project schedule shown on page 11.

We have identified the delivery of the let-down lock-hopper vessels as a potential problem. The delivery of the pretreater vessel could also be a problem. A visit by the Battelle project engineer to Stacey Manufacturing Company (the fabricator of these vessels) is planned. The purpose of this visit will be to clarify and attempt to improve delivery of the vessels.

It is more difficult to determine what influence delivery of items such as piping may have on the construction schedule than it is to judge the influence major vessels may have. We believe that a bottleneck may develop between the Chemico New York offices and field construction

unless the piping isometrics are issued to the fabricator very soon.

Construction formally began on June 10. The work so far has involved removing siding from a portion of existing building JS-2 and demolition of an existing block wall in preparation for foundation work. Foundation work is to begin the week of June 17.

Chemico has two of their staff in the field; Mr. Robert Jordan, the field superintendent, and Mr. Dan Washburn, a materials coordinator. Local tradesmen have been hired by Chemico for the work in progress. We understand that Mr. Mark Young, Chemico's construction supervisor (i.e., their No. 1 man in the field) will report in July and that, ultimately, about seven Chemico permanent staff will be in the field.

Battelle is establishing a field office at the site for monitoring the field construction: Mr. R. R. Adams will have responsibility for the civil-mechanical liaison between the Chemico field staff and Battelle and Mr. T. L. Tewksbury will have responsibility for the process liaison work*. Mr. W. C. Corder as project manager will coordinate the activities of Mr. Adams and Mr. Tewksbury and report to Dr. Goldberger and the Sponsors.

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

In addition to the Battelle activity already noted progress has been made in other areas directly related to the PDU design and installation.

Babcock and Wilcox (B&W) was awarded a subcontract (to Chemico) for the design, materials supply, and installation of refractories in the major vessels and associated piping. An initial meeting between Chemico, B&W and representatives of Battelle (including our Thermal and Mechanical Energy Systems Section) was held to review the refractory preliminary design. We also plan to have the Battelle Thermal and Mechanical Energy Systems Section review the fabrication drawings for approval when released by B&W.

* Because Mr. Adams is presently serving as our resident engineer in Chemico's offices in New York he initially will divide his time between New York and the field.

Our Plant and Facilities Department has been assisting Chemico in their field utilities hook-up, in establishing a bench mark, arranging for access to the site for Chemico and their local employees and other activities related to the start of construction. The Plant and Facilities Department has also issued specifications for bid on the site additions and modifications which are related to the PDU and for which Battelle will pay. Chemico was given the first opportunity to bid on the Battelle financed work noted. Now additional, local bidders have been given the same opportunity. Battelle metallurgists and materials specialists have been discussing materials selection with the Chemico personnel responsible for materials selection. In several instances, mutually agreeable materials of construction for items of equipment have been selected only after considerable discussion.

Progress on the turbine procurement was only nominal during this reporting period.

PROBLEMS AND RECOMMENDATIONS

The major item of present concern is financial. We are in frequent contact with members of the OCR/A.G.A. Operating Committee regarding this problem.

As noted elsewhere in this report, we are identifying potential problem areas having to do with both equipment and materials deliveries and the timely production of drawings by Chemico. We believe that Chemico and, sometimes, Chemico with assistance from Battelle, are working around and solving the equipment delivery problems by a variety of methods. Mr. Regan at Chemico appears to be giving a high degree of attention to the timely production of required drawings.

At present we foresee no technical problems which should cause Chemico to deviate from their current schedule.

WORK PLAN AND SCHEDULE

Major emphasis will be given to concluding the engineering design and construction of the PDU. A high level of attention must be given to expediting and construction work.

The overall schedule which Chemico is presently working under is shown on page 11. 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 is updated to reflect any changes as of the first of June. In the schedule presented last month only the "actual" percentages of completion in the various categories were presented in the right margin. In the schedule in this report the "scheduled" percentages have been added. Also before no percentages at all were given for delivery at site or construction. Now that both deliveries and construction have begun the columns have been filled in.

Another major addition to the schedule is that of the curves for New York office activity, materials delivery, and construction at the top of the schedule.

It will be noted that the "actual" percentage for engineering and drafting completion dropped from last month in the engineering flow-sheet, equipment arrangement and project management category. The reason this percentage is lower is apparently because Chemico now estimates more man hours to complete the engineering and drafting work in this category than they did in early May. From our observation of the review Mr. Regan is conducting of the flowsheets and P&I's we can understand that more man hours will be required than Chemico might have estimated in early May.

The percentage of completion of engineering and drafting in all other categories is shown as either 100 percent and no change or as having increased since early May. It is not clear how the percentage of completion of all other work on engineering and drafting other than the most fundamental, the process engineering, could have increased while the percentage of completion of process engineering decreased. We are pursuing this with Chemico.

The percentage of the total equipment and materials procured is shown as increased in each category since the previous monthly report. This is in agreement with Battelle's observations and our records are in reasonable agreement with the percentages shown also.

We are seeking information from Chemico on how they arrive at the total job progress weighted percent shown for the first time in this updated schedule (lower right hand corner). The 22.4 percent shown seems somewhat low and misleading to us.

In virtually all cases Chemico indicates on the schedule that the actual accomplishment is equal to or only a few percent behind scheduled accomplishment. Areas which we believe emphasis is required presently to catch up with the scheduled accomplishment are in the engineering flowsheet engineering and drafting and foundations.

At present we are contractually 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 the OCR/A.G.A. operating committee are completed, we will incorporate a new overall program schedule based on the PDU construction completion shown on the Chemico schedule.

FINANCIAL AND ADMINISTRATIVE SECTION

of

PROGRESS REPORT NO. 17

on

CONTRACT NO. 14-32-0001-1513

to

OFFICE OF COAL RESEARCH

June 17, 1974

**BATTELLE
Columbus Laboratories
505 King Avenue
Columbus, Ohio 43201**

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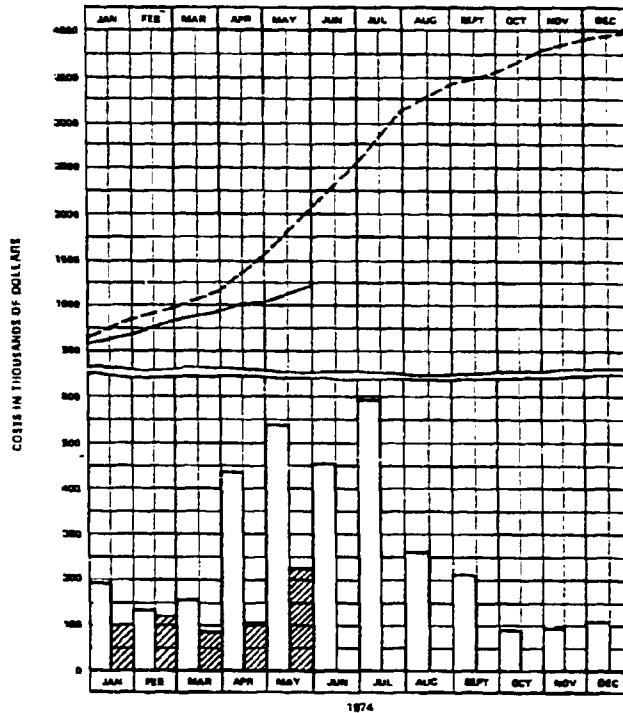
Table B-1 presents the Task Cost and Manpower Projection form for the month ending May 31, 1974. Billings have been paid to Chemico for New York operating costs through April and all of their fee except for the final payment which by contract is withheld. In addition, Chemico has been reimbursed \$109,890 for equipment invoices paid by them. Total actual disbursements to Chemico are \$816,877.81.

The cumulative money actually expended by Battelle, including payments to Chemico, to date are about \$1,230,868 as shown in Table B-1. This is only 32 percent of the total encumbered* funds for the project. Chemico estimates their billings for New York operating costs for the months of May and June will be about \$200,000. Only the actual disbursements to Chemico are included in Table B-1.

As of June 1 it is estimated that a total of about \$3,018,752 has been "spent" on the project including payments for services to Chemico, Battelle operating costs, and equipment purchase order payments and commitments. Most payments for equipment have not been made and will not be until the equipment is delivered. The \$3,018,752 is 79.4 percent of the encumbered funds. Should equipment deliveries and construction hold as

* 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.

TABLE B-1.
BATTTELLE PDU
TASK COST AND MANPOWER PROJECTIONS
MONTH ENDING MAY 31, 1974



MANPOWER (MAN-MONTHS)

Prd.	6.0	6.0	5.0	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							

DIRECT LABOR & OVERHEAD COSTS (THOUSANDS OF DOLLARS)

Prd.	21.8	19.8	22.8	25	25	25	32.5	36	60.8	65	77	95.5
Act.	18.6	18.2	18.4	17.8	17.9							

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

Prd.	189	115	128	404	504	422	556	??*	145	7	0	0
Act.	77.9	103	64.9	87.8	207							

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	0							

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

Prd.	2.2	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	4.5							

TOTAL (THOUSANDS OF DOLLARS)⁽⁴⁾

Prd.	194	138	156	434	534	452	591	261	213	90	93	110
Act.	100.7	123	85.6	107.8	229.5							

KEY TO GRAPH:

PREDICTED TOTAL COSTS
 ACTUAL TOTAL COSTS
 PREDICTED CUMULATIVE
 ACTUAL CUMULATIVE

NOTE:

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

now scheduled, a preliminary assessment indicates that we may be encroaching upon the funds currently encumbered for the project within the next 60 days.

On May 15 a meeting was held in Chemico's offices in New York and a new, more-definitive cost estimate was provided by Chemico. The results of this meeting were transmitted to OCR and A.G.A. by Battelle's letters of May 16 and May 21. Meetings were held between the senior members of the OCR/A.G.A. Operating Committee, Battelle, and Chemico the week of May 21.

As a result of these recent meetings, Battelle has in progress a very extensive review of all aspects of Chemico's operation on our subcontract with them. To implement the review, a special team of Battelle engineers headed by Mr. D. Peterseim, have taken residence in Chemico's offices in New York. The project staff at Battelle are assisting Mr. Peterseim in his activity as well as continuing to move the project forward by daily contact (in residence) at Chemico.

It is expected that the review team will be prepared to make an oral interim report to the Operating Committee the week of June 17 and a final report by the end of June. Continued close surveillance by the project staff is also planned.

BATTELLE'S 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 and Special Review)
- (6) R. D. Fischer
- (7) R. Filbert (Special Review)
- (8) D. Peterseim (Special Review)

CHEMICAL CONSTRUCTION CORPORATION
PERSONNEL ASSIGNED TO PROJECT**

- | | |
|---------------------|-----------------------|
| (1) S. G. Arya | (21) J. R. Mavus |
| (2) H. H. Becker | (22) E. J. Miller |
| (3) R. A. Brady | (23) F. Nesi |
| (4) E. T. Coles | (24) S. Noss |
| (5) S. DeMarco | (25) H. Osborne |
| (6) H. M. Diamond | (26) J. L. Parodi |
| (7) M. J. Dicianni | (27) E. A. Postrk |
| (8) H. L. Dresher | (28) N. Razfar |
| (9) G. G. Elsis | (29) J. P. Regan |
| (10) F. Elstner | (30) E. C. Reidy |
| (11) H. Fredrickson | (31) P. S. Schlaff |
| (12) G. Gutterman | (32) F. W. Shirley |
| (13) G. Handza | (33) L. Van Amerongen |
| (14) H. J. Hubchen | (34) N. Vario |
| (15) D. Iorio | (35) P. Witzig |
| (16) R. L. Jordan | (36) A. Yuen |
| (17) V. Kuris | (37) F. Peterson |
| (18) J. Landy | (38) J. Perrone |
| (19) J. Lazzarotti | (39) E. Ezcurra |
| (20) J. J. Madorma | |

* 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.



Chemical Construction Corporation

ONE PENN PLAZA • NEW YORK, N. Y. 10001
(34TH STREET BETWEEN 7TH & 8TH AVENUES)
TELEPHONE: (212) 239-5100 • TELEX: 234410 • CABLE: CHEMICONST. N. Y.

June 11, 1974

Mr. W. C. Corder
Minerals and Metallurgical Processing
Division
Battelle Memorial Institute
Columbus Laboratories
505 King Avenue
Columbus, Ohio 43201

Letter No. CB-339
Contract 1947J
Re: Battelle's Columbus Laboratories
Coal Gasification
Process Development Unit

Monthly Status Report

Dear Bill:

Attached is one copy of our Status Report dated June 6, 1974.

Very truly yours,

A handwritten signature in cursive script, appearing to read 'Fritz W. Peterson'.

Fritz W. Peterson
Assistant Manager Operations

FWP:d
w/attachments

CHEMICAL CONSTRUCTION CORPORATION

JOB 1947

BATTELLE'S COLUMBUS LABORATORIES

COAL GASIFICATION PDU

STATUS AS OF JUNE 6, 1974

A). Overall Status

During this month, work proceeded on schedule in most areas. Deliveries continue to be a problem (see "C"- Material Status).

B). Financial Status

Purchase Orders and Letters of Intent	\$ 1,697,974
Services billed up to June 6, 1974	656,298
Estimated billing for services May and June	<u>200,000</u>
	\$ 2,554,272

The new estimate and Comparative Cost Statement were prepared at a meeting held on May 15, 1974.

C). Material Status

Most of the purchasing activities during this month have been on bulk items. Deliveries have been acceptable except for stainless steel and Carpenter 20 pipe and fittings. We are making extensive surveys to improve delivery.

C). Material Status - continued

1. A to C Material

(% Based on Estimated Cost) *
%

Total Purchased 93.7

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	0.8
e. Requisitions out for bids	2.3
f. Quotes being evaluated by Engineering	0.0
g. Evaluations under Project review	0.0
h. Recommendations submitted to BCL	0.0
i. Approved for purchase or letter of intent	1.2
j. Equipment* committed but not purchased	17.8
k. Equipment purchased	77.90

3. S to Z Equipment and Materials

(% Based on Estimated Cost) *
%

Materials committed 81.0

* Estimate as of April 21, 1974

4. Purchase Commitments

We attach a copy of the Purchase Commitments Report dated May 15, 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, have been incorporated and still requires checking before an "Issue for Construction" can be released. The changes in transfer lines in the 500 Section have been extensive and the drawings have not been finished.

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 55%.

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 and Combustor-Gasifier structures and the stack are complete.

Anchor bolts and rebars have been requisitioned.

I). Piping

Piping isometrics have started and are reported to be 30% complete.

All bulk items have been requisitioned.

J). Instrumentation

Most instruments and instrumentation materials are requisitioned and/or purchased. Instrumentation drawings are more than 60% complete (See enclosed drawing list and status for detail.

All bulk items have been requisitioned.

K). Electrical

Most electrical equipment is purchased.

Electrical drafting completion is reported to average 25%.

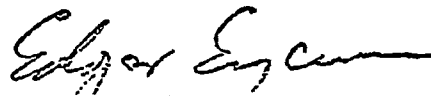
All bulk items, except miscellaneous left for field purchasing, have been requisitioned.

L). Construction

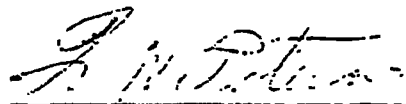
Chemico Field Office started receiving equipment.

Mobilization for start of construction work has been completed.

Prepared by



Edgardo M. Ezcurra
Project Engineer



Fritz W. Peterson
Assistant Manager Operations

Attachments:

Drawing List and Status as of May 26, 1974

Purchase Commitment Report as of May 15, 1974

NOTE: ATTACHMENTS TO CHEMICO REPORT NOT PROVIDED IN
THIS REPORT