

**MASTER**

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**Quarterly Technical Progress Report  
for the Period  
April — June, 1978**

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**EVALUATION CONTRACTOR  
FOR  
JOINT DOE—GRI COAL  
GASIFICATION PROGRAM**

**Date Published—July 1978**

**PREPARED FOR THE UNITED STATES  
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C F B R A U N & C O

*Engineers*

ALHAMBRA CALIFORNIA 91802

July 21, 1978

BCL-511

QUARTERLY PROGRESS REPORT  
THIRD QUARTER FISCAL 1978

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QUARTERLY PROGRESS REPORT  
THIRD QUARTER FISCAL 1978

July 21, 1978  
BCL-511

I OBJECTIVE AND SCOPE OF WORK

The joint DOE-GRI Coal Gasification program for high Btu pipeline quality gas covers comparative evaluation of six coal gasification processes. These processes are HYGAS Steam-Oxygen, HYGAS Steam-Iron, CO<sub>2</sub> Acceptor, BI-GAS, Synthane, and Lurgi.

For the Third Quarter of Fiscal 1978, the scope of work under the DOE-GRI Coal Gasification program for high Btu gas includes the following.

- A General program activities
- B Factored estimates
- C Process studies

General program activities cover pilot plant surveillance, progress report evaluation, review and evaluation of pilot plant data, environmental coordination with other agencies, materials of construction program evaluation, and proposal evaluation.

Factored estimates involve preparation of commercial concept designs, factored estimates, and gas cost calculations for the six processes, using two coal feeds - western and eastern.

Process studies include a total of twenty-one studies. The bulk of these studies concentrate on methanation, acid gas removal, shift conversion, liquid effluent treating, and coal feeding. Other areas covered are coal pretreatment, solids disposal, flue gas cleanup, sulfur recovery, tail gas plant, and process water treatment.

The attached chart indicates overall project status.

QUARTERLY PROGRESS REPORT  
THIRD QUARTER FISCAL 1978

July 21, 1978  
BCL-511

## II SUMMARY OF PROGRESS TO DATE

During the quarter, the contract was further extended to the end of August 1978 to provide additional time for selection of a new evaluation contractor. Braun will continue with general program activities, to monitor pilot plant operations, evaluate run performance, monitor the MPC materials program, and complete the remaining technical reports currently under review.

Visits were made to the operating pilot plants, and trip reports prepared covering observation of the plant performance.

All engineering work was completed during this quarter and draft reports were submitted for review and comment to DOE-GRI and the GRI Project Advisors. Some six of the nine remaining reports were reviewed at a joint meeting on June 21 and recommended for publication. These reports will be submitted to DOE for final approval to publish. The three remaining reports requiring some revision will be resubmitted in draft form for review during the next quarter. Following release to publish the remaining reports, a final report will be submitted for approval.

## III DETAILED DESCRIPTION OF TECHNICAL PROGRESS

### TASK 0001, HYGAS PILOT PLANTS

#### Work Accomplished

Dennis Maifield traveled to Chicago on April 19 to monitor Run 71 at HYGAS and Run 15 at Steam-Iron. Test 71 operated for 11 days after reaching self-sustained conditions and was voluntarily terminated on April 28. Test 15 developed 36 hours of combined reactor operation and was terminated on April 24. A trip report on Run 70 was issued in April.

Roger Detman and Dennis Maifield attended a Project Advisors' meeting in Chicago on May 2. IGT representatives reviewed Tests 70 and 71 of the HYGAS pilot plant, as well as Tests 14 and 15 of the Steam-Iron pilot plant. Also they responded to questions submitted by the Project Advisors. Run 16 of the Steam-Iron facility logged 14 hours of combined reactor operation before termination on May 10. Dennis traveled to Chicago on May 22 to follow HYGAS Test 72. This test ran for 9 1/2 days after attaining self-sustained operation and was terminated on May 30.

QUARTERLY PROGRESS REPORT  
THIRD QUARTER FISCAL 1978

July 21, 1978  
BCL-511

TASK 0001, HYGAS PILOT PLANTS  
Work Accomplished Continued

Dennis Maifield went to Chicago on June 12 to observe Steam-Iron Run 17, which logged 154 hours of combined reactor operation and was terminated on June 16. Ralph Musgrove traveled to Chicago on June 15 to follow operation of HYGAS Run 73. This test was terminated on June 16 after temperature excursions in the steam-oxygen gasifier were observed. Instrumentation and electrical service lines for the HYGAS pilot plant were damaged in a fire at the LPM unit on June 22. Damage assessment and repairs are in progress. Draft reports of HYGAS Run 71 and Steam-Iron Runs 14 and 15 were completed.

Work Forecast

Reports on HYGAS Run 71 and Steam-Iron Runs 14 and 15 will be issued in July. We will continue to monitor operations at the pilot plants.

TASK 0008, LIQUID PHASE METHANATION

Work Accomplished

The LPM system operated for 30 hours with steam-methane reformer gas and 24 hours with product gas from HYGAS Run 71. LPM Run 6 was terminated on April 24.

The LPM unit did not operate during HYGAS Test 72. In June, Run 7 of the LPM unit operated on reformer gas, but was terminated on June 22 after a fire ignited during a process oil filter change. Fire damage is being assessed.

Work Forecast

Trip reports on LPM Runs 5 and 6 will be issued in July. Monitoring of the LPM pilot plant will continue.

QUARTERLY PROGRESS REPORT  
THIRD QUARTER FISCAL 1978

July 21, 1978  
BCL-511

TASK 0010, BI-GAS PILOT PLANT

Work Accomplished

This pilot plant was down during the entire quarter for repairs. Braun kept track of activities by telephone.

Work Forecast

Braun will monitor activities.

TASK 0013, SYNTHANE PILOT PLANT

Work Accomplished

During the quarter, there were several attempts to operate the pretreater and gasifier on Illinois coal. There were no operations of sufficient duration to allow Braun on-site observation. On June 21-23, Andy Manda, John Butler, and Roger Detman visited the pilot plant in conjunction with the Project Advisors' meeting held there. Andy inspected the plant in some detail and observed the removal of clinkers from the reactor.

Work Forecast

Andy Manda will monitor the plant activities and visit the plant as needed.

TASK 0021, EFFLUENT TREATMENT

Work Accomplished

Work on the Final Report FE-2240-51, Sulfur Removal from Flue Gas, was completed and the draft sent to the advisors for review and comment on May 30. The report was discussed by the advisors in Pittsburgh on June 21 and minor comments given. DOE will arrange to review the report and give their approval for publication.

Work Forecast

Publication of the report upon DOE release.

QUARTERLY PROGRESS REPORT  
THIRD QUARTER FISCAL 1978

July 21, 1978  
BCL-511

TASK 0025, MATERIALS OF CONSTRUCTION

Work Accomplished

The second report on materials of construction, FE-2240-59, Materials Development Studies for High Btu Gasification, was published. It summarizes the accomplishments to date in the five phase testing program of the Metal Properties Council.

Participation in the MPC program continued with meetings of the Phase III group, progress reviews at IITRI, and a planning session with the group chairmen. Plans were formulated to publish the results of the program in book form for public purchase. An agenda was agreed upon for a symposium on corrosion-erosion for January 1979, sponsored by the Lawrence Berkeley Laboratory and Committee T-12 of the National Association of Corrosion Engineers.

Work Forecast

Review of accomplishments of test work at Southwest Research Institute with the GRI Project Advisors and a meeting with the Phase V committee.

TASK 0033, COMBINED SHIFT AND METHANATION

Work Accomplished

The report was completed and handed to the Project Advisors on May 16 at Alhambra. The advisors discussed it at the Pittsburgh meeting on June 21 and suggested additions, which Braun will incorporate and reissue the draft report.

Work Forecast

Braun will resubmit the report for approval.



QUARTERLY PROGRESS REPORT  
THIRD QUARTER FISCAL 1978

July 21, 1978  
BCL-511

TASK 0049, REPORT FOLLOWUP

Work Accomplished

The Fixed Bed Methanation Processes report was submitted to the advisors on May 4. The advisors discussed it both at the meeting in Alhambra on May 16 and in Pittsburgh on June 21. The report will be published when DOE has completed its review and releases it for publication.

The Hydrogen Production Study was discussed between Braun and the Koppers Company. Koppers supplied Braun with additional information about their vendor cost data. Braun incorporated the new data and other Koppers' suggestions and issued a new version of the report to the advisors on June 21 in Pittsburgh. The advisors' comments will be handled by telephone.

Work Forecast

Continue following up on reports.

TASK 0151, SULFUR RECOVERY

Work Accomplished

The report on this work was completed and sent to the advisors on May 30. The advisors discussed the report and made minor suggestions for revision at the meeting on June 21. The report now awaits DOE approval to be issued.

Work Forecast

Publish the report when released by DOE.

TASK 0300, PLANT SIZE STUDY

Work Accomplished

The report was handed to the advisors on May 16. It was withdrawn for expurgation shortly thereafter and restructured for reissue on June 8. The advisors discussed it at great length at the June 21 meeting. They decided to greatly modify its content to reduce the potential for misuse or misinterpretation of the information. Braun was instructed to resubmit the report.

QUARTERLY PROGRESS REPORT  
THIRD QUARTER FISCAL 1978

July 21, 1978  
BCL-511

TASK 0300, PLANT SIZE STUDY Continued

Work Forecast

Rework and resubmit the report.

TASKS 3001, 3003, 3004, 3006, AND 3007  
TASKS 3002 AND 3008 - FACTORED ESTIMATE  
DESIGNS FOR EASTERN COAL AND LIGNITE

Work is now complete on these tasks. Reports were submitted for review in May.

TASK 3009, FACTORED ESTIMATE REPORTS

Work Accomplished

The cost summary of the report on Factored Estimates for Eastern Coal Commercial Concepts was sent to the advisors on March 24 and reviewed in the advisors' meeting on April 5. The advisors selected Phase III for presentation. The completed report was sent to the advisors on May 5. They discussed it at the advisors' meeting in Alhambra on May 16 and Pittsburgh on June 21. Minor revisions to the text were suggested and accepted. The DOE directed Braun to prepare the final draft version for transmittal to the government for final approval.

The report on Factored Estimates for Lignite Commercial Concepts was reviewed at the meeting on June 21 and recommended for publication. DOE requested final draft copies be transmitted to the government for final approval.

Work Forecast

Transmittal of camera-ready copies of the reports for publication by the government when approval to publish is received from DOE.

QUARTERLY PROGRESS REPORT  
THIRD QUARTER FISCAL 1978

July 21, 1978  
BCL-511

TASK 6001, FINAL REPORT

Work Accomplished

Drafts of final report sections involving completed tasks have been prepared and are under internal review.

Work Forecast

Complete description of accomplishments on remaining tasks when release to publish reports is obtained from DOE.

IV CONCLUSIONS

Conclusions where appropriate are included in the technical reports described earlier.

Sincerely yours

A handwritten signature in cursive script that reads "Roger Detman".

Roger Detman  
Project Manager

RFD JS

## INTERMEDIATE EVENT AND DATA ITEM DELIVERABLES LOG

[illegible]

[illegible]

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