

GAS GENERATOR RESEARCH AND DEVELOPMENT

Progress Report No. 8  
April 1972  
(BCR Report L-465)

Submitted to the  
Office of Coal Research  
Department of the Interior  
Washington, D. C.

May 19, 1972

Bituminous Coal Research, Inc.  
35C Hochberg Road  
Monroeville, Pennsylvania

**BITUMINOUS COAL RESEARCH, INC.**  
PITTSBURGH, PENNSYLVANIA

JAMES R. GARVEY  
PRESIDENT  
JOHN W. IGOE  
EXECUTIVE VICE PRESIDENT  
D. PAUL MCCLOSKEY  
SECRETARY AND TREASURER



PLEASE ADDRESS REPLY TO:  
350 HOCHBERG ROAD  
MONROEVILLE, PA.  
15146  
PHONE: 412 327-1600

May 1, 1972

Mr. George Fumich, Jr.  
Director  
Office of Coal Research  
U.S. Department of the Interior  
Washington, D. C. 20240

SUBJECT: Monthly Progress Report No. 8  
OCR CONTRACT NO. 14-32-0001-1207

Dear Mr. Fumich,

The Phase II studies on process and equipment development continue according to schedule. The large-scale equipment from the Stage 2 FEDU (100 lb/hr) have been removed from the cubicle and stored outside according to CCR instructions. The final summary report of the Stage 2 FEDU work was mailed on April 21, 1972.

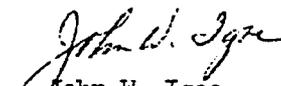
The large blower (6,000 cfm) for the cold model studies of the 5 ton per hour gasifier has been installed. The results from the first series of tests have indicated that it may be possible to study slag separation and char reaction by using two liquids with different vapor pressures.

Testing of catalysts is continuing in the bench-scale methanator. Promising catalysts are given life tests and then will be tested in the cold model of the FEDU. Bench-scale work on char gasification is continuing.

Detail engineering, solicitation of bids, and purchase of equipment for the methanation FEDU continues. We are awaiting bids on the design of a fluidized-bed FEDU.

Bids were received on the construction and operation of the 5 ton per hour pilot plant. These bids are being evaluated on both a technical and cost basis.

Very truly yours,

  
John W. Igoe

JWI:kag

8006

TABLE OF CONTENTS

	<u>Page</u>
I. INTRODUCTION. . . . .	439
A. Work Schedule . . . . .	439
B. Monthly Progress Charts . . . . .	439
II. PHASE II PROGRESS ACHIEVED DURING MONTH ENDING APRIL 25, 1972. . . . .	439
A. Laboratory-scale Process Studies. . . . .	439
1. Fluidized-bed Gasification (E. K. Diehl and J. T. Stewart). . . . .	439
2. Gas Processing (M. S. Graboski) . . . . .	442
3. Analytical Services (J. E. Noll). . . . .	464
4. Gas Chromatographic Procedures (J. E. Noll) . . . . .	464
B. Stage 2 Process and Equipment Development Unit--100 lb/hr (R. J. Grace, E. E. Donath, and R. L. Zahradnik). . . . .	465
1. Inspection of Stage 1 Refractories. . . . .	465
2. Future Work . . . . .	466
C. Cold Flow Model Experiments - 5 ton/hr Two-stage Gasifier (R. J. Grace, J. E. Noll, R. D. Harris, R. L. Zahradnik, and E. E. Donath) . . . . .	466
1. Stage 1 Model Tests . . . . .	466
2. Determination of Reactivity of Chars. . . . .	466
3. Development of Grindability Test for Low Density Chars. . . . .	466
4. Future Work . . . . .	466
D. Data Processing (R. K. Young and D. R. Hauck) . . . . .	466
1. Automated Data Acquisitions . . . . .	466
2. Commercial Gasifier Modeling. . . . .	470
3. Future Work . . . . .	470
E. Engineering Design and Evaluation . . . . .	470
1. BI-GAS Process. . . . .	470
2. CCR/BCR Gasification--Power Generation. . . . .	470

TABLE OF CONTENTS (continued)

	<u>Page</u>
F. Multipurpose Research Pilot Plant Facility (MERF) . . . . .	470
1. Pilot Plant Bid Evaluation . . . . .	470
2. Materials Evaluation Program . . . . .	471
G. Literature Search (V. E. Gleason). . . . .	472
H. Other. . . . .	472
1. Prime Contract Matters . . . . .	472
2. Outside Engineering and Services . . . . .	472
3. Brigham Young University . . . . .	472
4. FPC National Gas Survey - Economics of Manufacturing SNG from Coal. . . . .	476
5. Patent Matters . . . . .	479
I. Visitors During April, 1972. . . . .	481
J. Trips, Visits, and Meetings During April, 1972 . . . . .	482
K. Requests for Information . . . . .	482
III. WORK PLANNED FOR MAY, 1972 . . . . .	482
A. Trips and Meetings Planned . . . . .	483
B. Papers to be Presented . . . . .	483
C. Visitors Expected. . . . .	483
APPENDIX A-1 MANHOURS. . . . .	484
APPENDIX A-2 CUMULATIVE EXPENDITURES . . . . .	485
APPENDIX B KOPPERS PROGRESS REPORT NO. 33. . . . .	486

LIST OF FIGURES

<u>Figure</u>		<u>Page</u>
119	Correlation of Lignite Char Reactivity Data. . . . .	443
120	Correlation of Elkol Char Reactivity Data. . . . .	444
121	Correlation of Pittsburgh Seam Char Reactivity Data. . . . .	445
122	Correlation of Anthracite Reactivity Data. . . . .	446
123	Gas Processing Work Schedule for Calendar 1972 . . . . .	447
124	Catalyst Life Test Results . . . . .	460
125	Schematic Setup for Testing Prototype Stage 1 Reactor for Simulated Slag Removal . . . . .	467
126	View of Revised Model Installation From Newly Installed 6000 cfm Blower. . . . .	468
127	View of Revised Model Installation Facing Panel Board. . . . .	468
128	Rate of Weight Loss of 50 x 100 Mesh Materials At 1100 C in 100 Percent Steam. . . . .	469
129	Monthly Progress Chart, Expenditures, Brigham Young University . . . . .	473

LIST OF TABLES

<u>Table</u>		<u>Page</u>
97	Data and Results for BSM Test 61. Period 1 Conducted at 872 F and 1002 psig - Chromic-Oxide Catalyst No. 2904. . . . .	449
98	Summary of Results for BSM Test 61. Catalyst No. 2904 . . . . .	450
99	Data and Results for BSM Test 62. Period 1 Conducted at 850 F and 1002 psig - Chromic-Oxide Catalyst No. 2904. . . . .	451
100	Summary of Results for BSM Test 62. Catalyst No. 2904 . . . . .	454
101	Data and Results for BSM Test 64. Period 1 Conducted at 850 F and 995 psig - Chromic-Oxide Catalyst No. 2904. . . . .	457
102	Summary of Results for BSM Test 64. Catalyst No. 2904 . . . . .	459
103	Summary of Methanation PEDU Equipment Items Having Firm Quotations. . . . .	463
104	Summary Data for Tests in 1-1/4-inch Reactor, April, 1972. . . . .	474
105	Summary Data for Tests in 2-inch Reactor, April, 1972. . .	475
106	Revised Plant Investments and Capital Requirements-- Bituminous Coal for Synthetic Gas-Coal Task Force Review . . . . .	478