

METHANE RECOVERY FROM COALBEDS  
MONTHLY PROGRESS REPORT

April 1979

Contract No. DE-AC21-78MC08089

*TRW*

ENERGY SYSTEMS PLANNING DIVISION  
7600 Colshire Drive  
McLean, Virginia 22101

## TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
1. SUMMARY OF PROGRESS - APRIL 1979 .....	1-1
1.1 PROGRESS DURING APRIL 1979 .....	1-1
1.2 PROGRESS TO DATE .....	1-3
2. INTRODUCTION .....	2-1
2.1 BACKGROUND .....	2-1
2.2 SCOPE OF WORK .....	2-2
3. DISCUSSION OF PROGRESS DURING APRIL .....	3-1
3.1 ENGINEERING SUPPORT .....	3-1
3.2 RESOURCE ENGINEERING .....	3-1
3.3 TECHNOLOGY TEST PROJECTS .....	3-2
3.4 INFORMATION MANAGEMENT AND TECHNOLOGY TRANSFER .....	3-2
4. ACTIVE FIELD PROJECTS .....	4-1
5. SCHEDULES .....	5-1
5.1 MASTER SCHEDULE FOR 1979 .....	5-1
5.2 PLANS FOR MAY 1979 .....	5-1
5.3 PLANS FOR JUNE, JULY, AND AUGUST 1979 .....	5-3
6. DELIVERABLE STATUS .....	6-1
7. EXPENDITURE STATUS .....	7-1

LIST OF ILLUSTRATIONS

<u>Figure</u>	<u>Page</u>
2-1 Work Breakdown Structure .....	2-5
5-1 Master Project Schedule - CY 1979 .....	5-2
7-1 Expenditure Schedule .....	7-2

## 1. SUMMARY OF PROGRESS - APRIL 1979

This is a report of the progress of the integration and engineering effort by TRW Energy Systems Group under Contract No. DE-AC21-78MC08089. The Contract provides for assistance to the Methane Recovery from Coalbeds Project at the Morgantown Energy Technology Center. The report summarizes progress through the month of April 1979.

### 1.1 PROGRESS DURING APRIL 1979

#### Engineering Support

- Provided staff support for conducting the 1979 MRCP Symposium
- Conducted testing of the Maurer turbodrill at Terratek's Drilling Research Laboratory
- Continued definition of the MRCP work breakdown structure
- Provided MRCP draft inputs to UGR strategy planning
- Prepared MRCP input to the DOE UGR Semi-Annual Report
- Initiated FY 1980 PPD planning.

#### Resource Engineering

- Negotiated TRW participation in coring and testing of four wells being drilled by a confidential contractor in Colorado
- Negotiated TRW participation in coring and testing two wells being drilled by Fuelco on the northern flank of the San Juan Basin in Colorado
- Met with VPI Mining Engineering Department to discuss scope of work for methane from coalbeds proposal
- Met with Colorado Geological Survey to discuss geological site investigation.

#### Technology Test Projects

- Negotiations are continuing on final SOW and contract terms.

#### Information Management and Technology Transfer

- The 1979 Methane Recovery from Coalbeds Symposium was held on April 18, 19 and 20 at Pittsburgh, PA.

## 1.2 PROGRESS TO DATE (April 1979)

The following is a brief **summary** of the TRW Energy Systems Group progress under Contract No. **DE-AC21-78MC08089** during the period of December 1977 through April 1979.

### ENGINEERING SUPPORT

#### Planning and Analysis

- Assisted in the preparation and publication of the 1979 MRCP Project Plan Document (PPD)
- Assisted in the preparation of the MRCP Technical Implementation Plan (TIP)
- Assisted in revision of the MRCP Work Breakdown Structure
- Provided inputs and assistance for preparation and publication of Enhanced Gas Recovery Semi-Annual Report for the period ended September 1978.

#### Technical Review of Proposals

- Supported technical review and evaluation of four R&D proposals, three Technology Test Project proposals, and nine Resource Engineering proposals.

#### Technology Transfer and Information Management

- Assisted in planning and conducting the 1978 and 1979 Methane Recovery from **Coalbeds** Symposia
- Assisting in preparation of the MRCP Technology Transfer Plan and the Information Management Plan.

#### R&D Surveillance

- Planning, directing, and evaluating performance and reliability testing of the Maurer turbodrill.

### RESOURCE ENGINEERING

#### Planning and Analysis

- Assisted in the preparation and publication of the following:
  - a. Unminable Coal Drilling Project Plan
  - b. Resource Delineation Plan

- Participated in coordination meetings as follows:
  - a. Unminable Coal Project organization
  - b. Resource Delineation
  - c. Desorption Methods and Standards
- Developed contractual agreements with well service companies and cooperating companies
- Started work on the Illinois Basin Report

University Subcontracts

- Established contact with interested university potential participants and negotiated scope of work and level of effort with Colorado School of Mines, Pennsylvania State University, and Virginia Polytechnic Institute.

Field Activities

- Resource Delineation efforts have been directed to the following target areas:

San Juan County, New Mexico	Clay County, Illinois
Rio Blanco County, Colorado	Sublette County, Wyoming
Pittsburg County, Oklahoma	

TECHNOLOGY TEST PROJECTS

Management and Analysis

- Completed conceptual system designs for three candidate sites:

<u>Company</u>	<u>Types of Systems</u>	
	<u>Recovery</u>	<u>Utilization</u>
Ranger Fuels	Vertical wells	Pipeline injection
Eastern Associated	Gob gas	Mine shaft heating
Bethlehem Mines	Vertical wells	Pipeline injection

- Prepared and published the Technology Test Project Evaluation Report
- Initiated project negotiations with three potential subcontractors:

Occidental Research Corporation (ORC)

In cooperation with Island Creek Coal Company, ORC's objective is to develop a technique for recovery of methane from long horizontal holes drilled from within the mine and using the gas to produce LNG as in a similar application in Buchanan County, Virginia.

Waynesburg College

The objective is to develop and demonstrate a system for the recovery of methane from anthracite coal using stimulated multiple completion wells and utilizing the gas by injection into a local pipeline.

Pennsylvania Energy Resources, Inc. (PERI)

The objective is to develop and demonstrate a system for the recovery of methane from anthracite coal using stimulated multiple completion wells and utilizing the gas by injection into a local pipeline.

## 2. INTRODUCTION

### 2.1 BACKGROUND

During the natural process of coal formation, methane, the principal constituent of natural **gas**, is generated and trapped in the coal seam as well as in the adjacent rock area. All coal deposits contain methane. The concentration of methane varies from seam to seam, and within the seam. Recent estimates of the methane reserves in **coalbeds** are reported to approximate 700 **trillion** cubic feet. Given current and conservatively projected economic and **technological** factors, the recovery of an estimated 300 trillion cubic feet of the resource appears feasible. Based on present consumption rate, this is equal to a **10- to 12-year** supply of the commodity.

Because of its volatility, methane has been considered a menace and hazardous to mining operations. The U. S. Bureau of Mines and many mining companies, in the interest of safety, have developed techniques for draining methane from the **coalbeds** prior to the start of underground coal mining, and for diluting the methane with fresh air during underground coal mining operations to reduce the concentration of coal dust and methane in the mines, and thereby reduce the probability of mine explosions and fires. Presently, all drainage techniques conclude by venting the coal gas into the atmosphere. Approximately 250 million cubic feet of methane are vented daily in U. S. mining operations. The content of the methane in gas vented from virgin coal is comparable to the quality of natural gas recovered from gas reservoirs. The content of methane in gas vented from gob (working mine) areas varies from 25 to 90 percent, depending on the venting techniques used.

In order to curb the waste of methane contained in coalbeds, and to provide for its recovery and utilization, the Department of Energy has initiated the Methane Recovery from Coal Project (MRCP) and assigned lead responsibility to the Morgantown Energy Technology Center. Major project objectives include:

- Location and characterization of methane resources
- Development of improved, cost-effective methane recovery and utilization technology

- Development of methane conservation techniques and systems
- Development of methane recovery prediction and projection techniques (models for well productivity)
- Development of field tests for pilot systems
- Investigation of legal and institutional constraints
- Transfer of applicable technologies to private industry.

On March 24, 1978, TRW was awarded Contract No. DE-AC21-78MC08089 to implement the engineering and integration necessary to achieve these objectives.

## 2.2 SCOPE OF WORK

### Objectives and Approaches

The primary objective of the TRW effort is to develop and demonstrate a set of conditions in which recovery and utilization of coalbed methane is clearly to the economic advantage of the relevant private sector interests and which minimizes the necessity for Federal involvement over an extended time period. The TRW approach is established to meet this objective and encompasses:

- Resource characterization to identify target sites with greatest potential
- Identification of R&D to improve recovery and utilization techniques
- Definition, selection, and implementation of systems application projects to verify technical and economic viability under a variety of field conditions
- Technology transfer sufficient to support extensive commercialization of coalbed methane
- Overall program integration to assure a coordinated effort.

### Statement of Work

Work under the TRW Methane Recovery from Coalbeds Project (MRCP) is defined by four discrete tasks:

### Task 1: Engineering Support

Provide to METC technical management and analysis support for the MRCP and related gas recovery projects. This support shall include the following subtasks:

Subtask 1.1 - Prepare and update gas recovery program planning inputs for Technical Implementation inputs, Project Plan Documents, Program and Project strategies, Resource Delineation and other project and subproject level planning documents.

Subtask 1.2 - Review and analyze technical proposals submitted to DOE/METC for resource delineation, technology development, and technology test projects.

Subtask 1.3 - Perform Project documentation functions including preparation of semi-annual project summary reports, and support the annual Methane Recovery from Coalbeds Symposium.

Subtask 1.4 - Review and provide technical surveillance for research and development projects supporting the Methane Recovery from Coalbeds Project,

### Task 2: Resource Delineation

Provide to METC technical assistance and subcontracting support in Resource Delineation activities of the MRCP including:

Subtask 2.1 - Overall resource delineation planning, field support, evaluation and analysis, and management support.

Subtask 2.2 - Subcontracting for, and management of, selected University activities necessary for MRCP resource delineation.

Subtask 2.3 - Subcontracting for, and managing data acquisition from, field activities involving drilling, well test, logging, fracturing, laboratory analysis, and evaluation of data derived.

### Task 3: Technology Test Projects

Provide to METC detailed design, development analysis, initial implementation evaluation and reporting of technology test projects.

Subtask 3.1 - Provide for the management, analysis, evaluation, and reporting of the technology test projects defined in Subtasks 3.2, 3.3, 3.4, 3.5, and other test projects as requested by METC.

Subtask 3.2 - Undertake a test to demonstrate the recovery of methane from multiple horizontal wells in an active mine and the utilization of the gas for the production of LNG or other purposes.

Subtask 3.3 - Undertake a test to demonstrate the recovery of methane using multiple, vertically drilled, fractured wells and the utilization of the gas by pipeline injection.

Subtask 3.4 - Undertake a test to demonstrate the feasibility of recovering methane from multiple production zones in a single well and utilizing the gas in a local distribution system pipeline.

Subtask 3.5 - Undertake a test to demonstrate the feasibility of recovering methane from multiple, vertically drilled wells with multiple production zones in unminable anthracite coal and utilizing the gas by pipeline insertion.

Task 4: Information Management and Technology Transfer

Provide technical assistance and support to METC for management and implementation of Methane Recovery from Coalbeds Project Information/Data and Technology Transfer.

Work Breakdown Structure

The work breakdown structure for the project is shown in Figure 2-1.

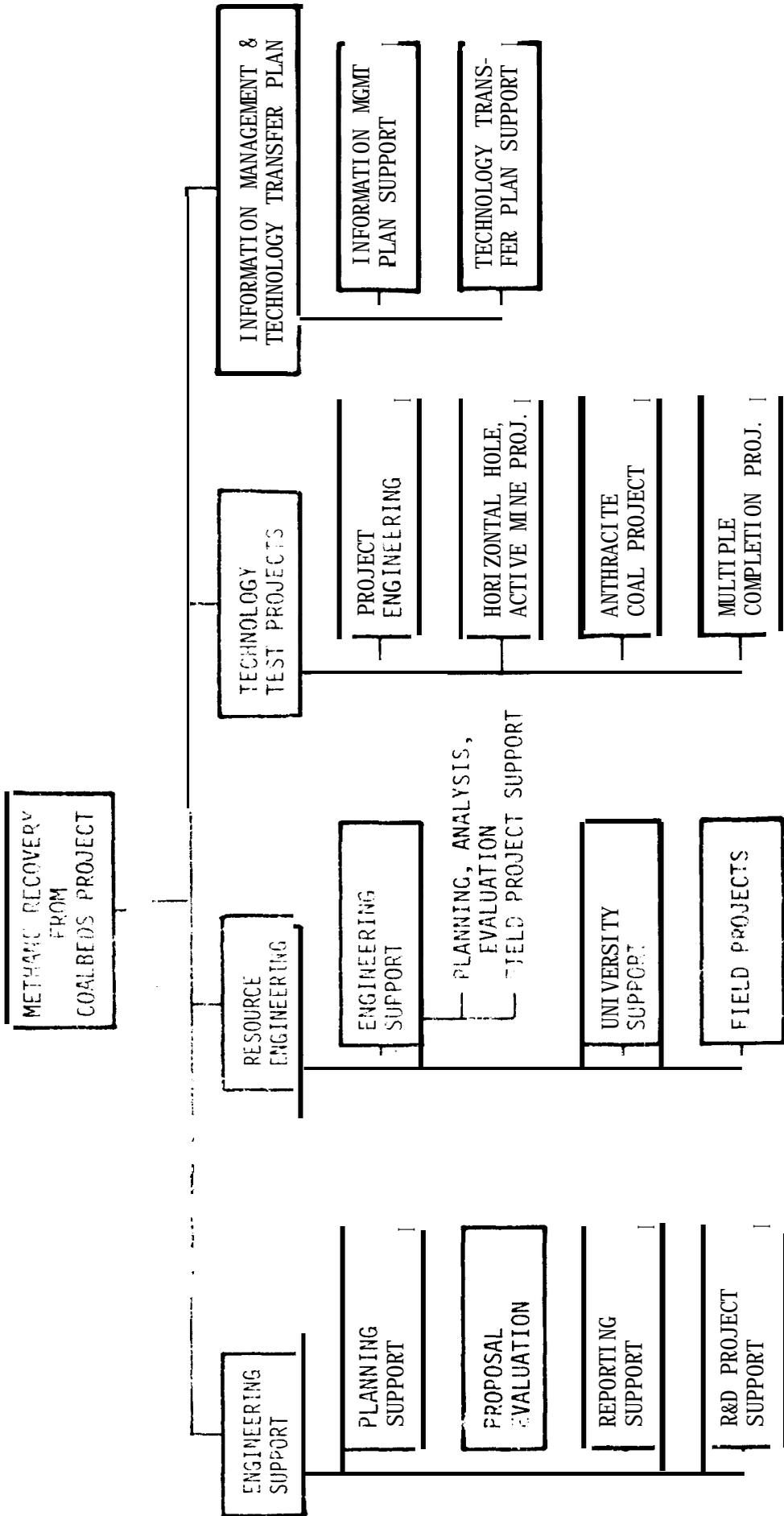


Figure 2-1. Work Breakdown Structure

### 3. DISCUSSION OF PROGRESS DURING APRIL 1979

#### 3.1 ENGINEERING SUPPORT

During April, TRW effort in this area consisted mainly of the following:

- Continued updating and further definition of the project WBS, in part, to support scheduled publication of the FY 1980 PPD. Provided a draft iteration for comment.
- MRCP draft inputs to UGR strategy planning documentation were prepared during the month.
- A draft input of the MRCP portion of the first UGR Semi-Annual Report was prepared, covering the period from December 1977 through September 30, 1978.
- Planning for the FY 1980 has been initiated. A draft outline for updating and revision of this document was prepared for comment (4-30).
- The 5-3/8" turbodrill was run on water at Ferratek's Drilling Research Laboratory in Salt Lake City on April 10 and 11. The turbodrill drilled through granite using a tricone roller bit and through limestone with the Christensen STRATAPAX bit. Sustained penetration rates in the range of 30 to 50 ft/hr were achieved.

#### 3.2 RESOURCE ENGINEERING

TRW effort in this area of activity during April consisted of the following:

- Meeting in Denver with a confidential contractor to negotiate MRCP participation in the coring and testing of four shallow wells in the Piceance Basin of Colorado.
- Meeting in Denver with Fuelco to negotiate MRCP in the coring and testing of Fruitland coals at about 3000 foot depth on the north flank of the San Juan Basin in Colorado.
- Reached agreement with Belco Petroleum for MRCP to perform injection tests on two of Belco's wells up for abandonment. The location of these tests are as yet undetermined.
- Met with Virginia Polytechnic Institute Mining Engineering Department to establish scope of work for methane from coalbeds proposal for portions of southeastern states.
- Met with Colorado Geological Survey to discuss potential geological site investigation in the northern part of the San Juan Basin. It is proposed that this investigation may be in conjunction with one of the Fuelco wells.

### 3.3 TECHNOLOGY TEST PROJECTS

The major effort in April was directed at completing modifications to the statement of work and contract terms for three cooperating site contractors.

A meeting was held with PER1 at Wilkes-Barre, PA on April 6 to discuss the final format and contract terms. Vendor cost quotes are being obtained for backup to the updated cost estimates.

- The details of the contract terms and changes to the Occidental Research Corporation tasks for this ongoing project were discussed at a April 12 meeting in Irvine, CA. The task structure will be revised to incorporate decision points and to provide better progress and funding correlation. ORC also proposed some changes to the terms of the standard contract. These changes are under discussion and should be resolved in May.
- Full agreement has been reached with Waynesburg College on all contract terms and the SOW. Submittal to ORO for approval to subcontract will be in early May.

### 3.4 INFORMATION MANAGEMENT AND TECHNOLOGY TRANSFER

- The 1979 Methane Recovery from Coalbeds Symposium was held at Pittsburgh, PA on April 18, 19 and 20. The number of attendees was approximately 200. The support effort will continue with the editing of papers and publication of the proceedings in the late May/early June period.

#### 4. ACTIVE FIELD PROJECTS

Each of the projects in the Engineering Support, Resource Engineering, and Technology Test Areas having substantial field activities, planning for field activities, or analysis activities immediately following field activities are summarized in this section. Project summaries will not appear beyond the point where no substantial additions to the data are expected.

Project summary sheets for the month of March are included for the following projects:

##### Engineering Support

Maurer Turbodrill Testing

##### Resource Engineering.

Firm Planning and scheduling for confidential coreholes

Firm planning but indefinite schedule for Fuelco wells this summer

##### Technology Test Projects

Occidental Project

Pennsylvania Energy Resources Project

Waynesburg College Project

ENGINEERING SUPPORT

Active R&D Projects

TURBODRILL TESTING PROJECT  
HOUSTON AND FORT WORTH, TEXAS

STATUS

CONDUCTING PHASE I PERFORMANCE TESTS

CO-OPERATING COMPANY

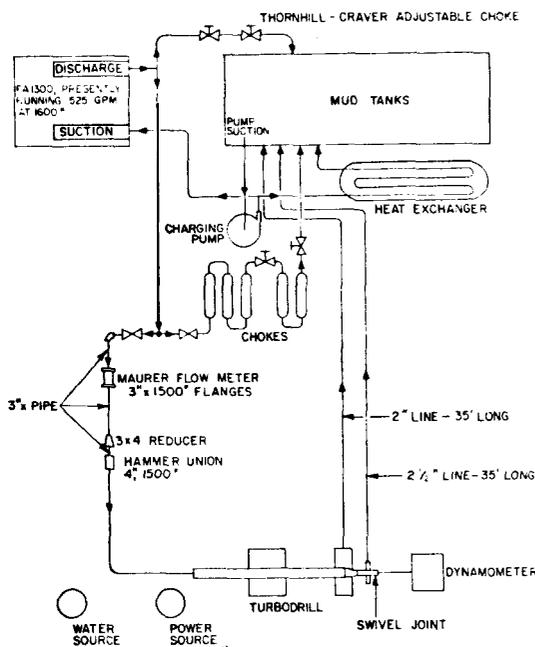
- Maurer Engineering Inc  
Houston, Texas
- TRW Mission Manufacturing  
Houston, Texas
- Gearhart-Owen Indus., Inc.  
Fort Worth, Texas

CONTRACT(S)

Basic:  
DE-AC21-78MC08089

FIELD TEST PERIOD(S)

Performance, Phase I - Feb 79  
Field Tests, Phase II - July 79  
Directional Drilling  
Test, Phase III - not scheduled



OBJECTIVE

Determine performance and wear characteristics and operational procedures required to apply the turbodrill to placing methane drainage boreholes - in horizontal or steeply-dipping coal seams.

FIELD ACTIVITY PROGRESS

- Maurer Engineering completed informal developmental testing at its Kor-King Facility in Houston, Texas on December 28, 1978. The test utilized water as the working fluid. Design mods were made to the bearing pack based on the results of the **teardown** inspection following each test.
- Formal Phase I testing was begun February 20, 1979. The test was prematurely terminated due to lower thrust bearing failure. A modification was made and testing resumed on March 15.
- Performance testing was completed at TerraTek's Drilling Research Laboratory in Salt Lake City, Utah on April 10 and 11, 1979. Water was the drilling fluid and the turbodrill drilled through granite using a tricone roller bit and through limestone with the STRATAPAX bit. Sustained penetration rates in the range of 30 to 50 ft/hr were achieved.

OTHER TESTING

Subsequent Phase II testing at Gearhart-Owen is awaiting results of field testing of the Los Alamos 7-3/4 inch motor at Fenton Hills the week of May 21, 1979.

ANALYSIS STATUS

Phase I - Part I data analysis is complete. TerraTek test data analysis is complete.

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## FIELD ACTIVITIES

Maurer Engineering has performed five short-duration shakedown tests of the Turbodrill. Baseline performance data were obtained. **Teardown** and inspection of the drill motor has revealed the same problem area: the pressure seal in the bearing package. Maurer Engineering instituted design modifications to the floating piston seal assembly in preparation for subsequent formal Phase I testing at TRW Mission Manufacturing. DOE/METC has exercised the option to proceed into a modified testing project using the flow-through version of the bearing pack. The flow-through bearing pack will be used in Phase I and Phase II. When an adequate pressure seal is obtained, an abbreviated Phase I test may be run. At that point, the project will proceed directly into Phase III testing in a rugged field environment.

Some potential drill motor operational difficulties were observed, during the TerraTek tests. Refinements in operational procedure will be determined by Los Alamos personnel at the upcoming field trials of the larger 7-3/4 inch turbodrill at Fenton Hills, New Mexico. These procedures will be used at the Gearhart-Owen Phase II tests to aid in checking the tendency of the turbodrill to overspeed during startup on bottom.

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## ANALYSIS ACTIVITIES

Preliminary baseline performance curves (at zero imposed bit-end pressure drops), have been determined from the shakedown tests and limited Phase I testing.

Preliminary indications of drilling rates to be expected at Gearhart-Owen are being determined from the TerraTek data to aid in **planning activities** for Phase II testing.

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## RESULTS

- More definitive results are expected from resumption of formal Phase I testing.
- Redesign of the floating-piston assembly on the oil reservoir of the sealed bearing pack model.
- Elimination of the pressure seal assembly and use of the seal leak-sleeve in the flow-through version of the bearing pack.
- Analyses of the preliminary shakedown test data and available Phase I data show characteristic torque, power, efficiency and rotary speed relationships as expected. However, pressure drops through the drill appear to be considerably higher than expected.
- Penetration rates achieved in relatively hard rock at TerraTek are encouraging in meeting the projected test schedule at Gearhart-Owen in the test plan being prepared.

RESOURCE ENGINEERING

Projects - Firm Planning

STATUS

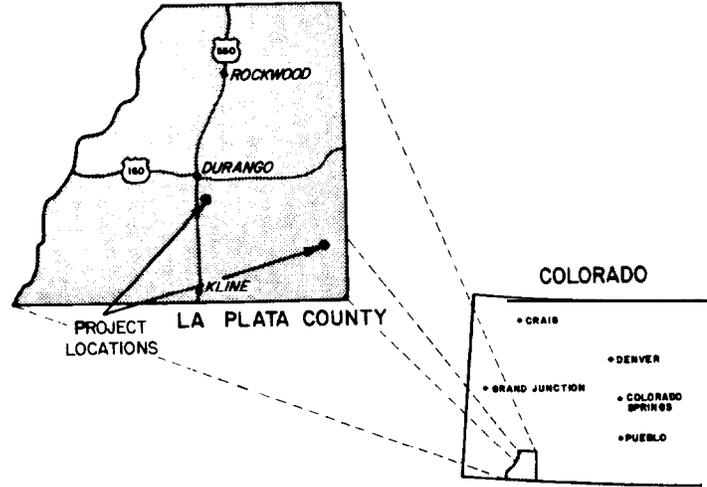
Firm Planning

CO-OPERATING COMPANY  
Fuel Resources Development  
Co. (Fuelco)  
Denver, Colorado  
(303) 571-7703

Locations: J-16-34(SU)-9-N - Section 16, T34(SU)N, R9W  
F-31-33-6-N - Section 31, T33N, R6W

CONTRACT(S)

FIELD TEST PERIOD(S)  
Summer, 1979



OBJECTIVE To determine the quantity and quality of the coal, the methane content of the coal, and some reservoir properties of the coal seams in the Ignacio Field Fruitland - Pictured Cliffs Formations, in the San Juan Basin. This effort will help determine the potential producibility of coal bed methane from this resource area.

FIELD ACTIVITY PROGRESS

Planned Tests

- Conventional Coring - Up to 120' in each well
- Drill Stem Testing - One DST in each well
- Sidewall Coring - Up to 50 cores in each well
- Geophysical Logging - Laterolog, Neutron Density, Sonic, Gamma, Caliper

4

OTHER TESTING

- Desorption of coal samples
- Lab analyses of coal samples

ANALYSIS STATUS

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FIELD ACTIVITIES

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ANALYSIS ACTIVITIES

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RESULTS

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COLORADO

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STATUS  
FIRM PLANNING

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CO-OPERATING COMPANY

CONFIDENTIAL

CONTRACT(S)

FIELD TEST PERIOD(S)

May - June 1979

Confidential Colorado - Four wells.

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OBJECTIVE

To obtain gas content data, data on changes of gas content with depth, and a real reservoir characteristics for up to nine coal seams.

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FIELD ACTIVITY PROGRESS

Planned Activities

Conventional Coring - Up to 90 feet in each of the four wells.

Sidewall Coring - Up to 100 cores.

Drill Stem Testing - Up to one DST per well

Logging - High resolution density, caliper, natural gamma, resistivity, neutron and sonic

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OTHER TESTING

Desorption of coal samples

Physical properties analyses of overburden, interburden and underburden

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ANALYSIS STATUS

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FIELD ACTIVITIES

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ANALYSIS ACTIVITIES

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RESULTS

TECHNOLOGY TEST PROJECTS

LONG HORIZONTAL HOLES, ACTIVE MINE TEST PROJECT  
 BUCHANAN COUNTY, VIRGINIA

STATUS Active Field Work in Progress - Negotiations in Progress

CONTRACT(S)

DE-AC21-78MC08089

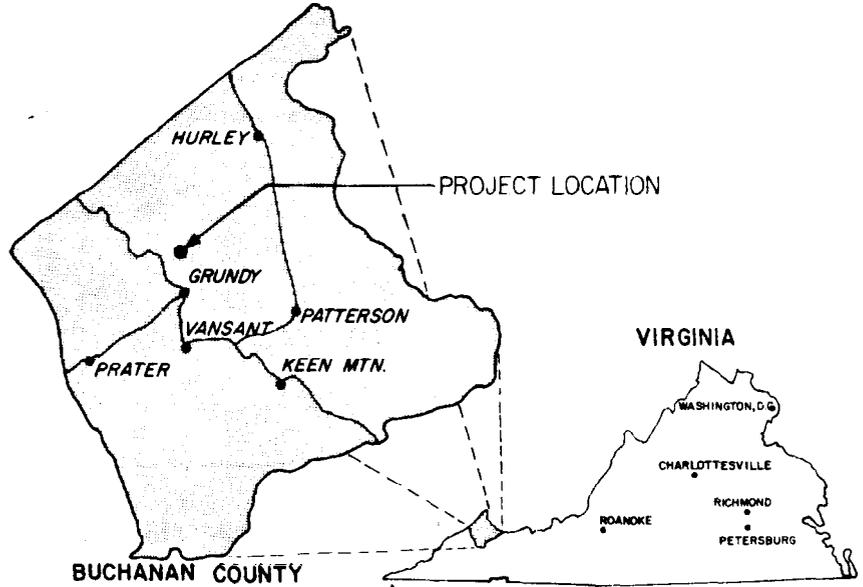
Location Island Creek Coal, Virginia Pocahontas Mine No. 5

CO-OPERATING COMPANY

Occidental Research Corp (ORC)  
 Irvine, California with Island  
 Creek Coal Co., Lexington, KY

GENERAL SCHEDULE

Concept Phase - March 78 to  
 Aug 78  
 Design and Verification Phase - Sep 78 to  
 Sep 79  
 Implementation Phase - Oct 79  
 Phase - Jun 82



OBJECTIVE

To develop a technique for recovery of methane from long horizontal holes drilled from within the mine and using the gas to produce LNG or in a similar application.

PROGRESS TO DATE

- Test site utilities installed.
- Acker drill shakedown in progress.
- Cost/benefit analysis completed.
- In-mine piping for test site complete.
- Negotiations in progress on sharing contract.
- First long hole planned for May completion.
- Three short holes (500') have been drilled with a USBM drill.

RECOVERY SYSTEM SUMMARY

(10) 2000 ft horizontal holes drilled into longwall panel from mine. Use of a drill bit guidance system. Development of fail-safe piping system for in-mine use.

UTILIZATION SYSTEM SUMMARY

Pipeline to nearby mine site to small capacity developmental LNG or similar application if LNG not viable use. Alternate uses - Pipeline injection; minehead uses.

LONG HORIZONTAL ACTIVE MINE TEST PROJECT

DESIGN AND ANALYSIS ACTIVITIES

- Planning and restructuring of tasks continues. A structure which provides for a go/no-go review after completing two long holes is being developed.
- A meeting was held in Irvine, CA to resolve differences in contract terms and SOW. ORC will revise SOW and update costs and supply cost backups. TRW rewrote the contract and supplied a new draft to ORC. ORC will rewrite the standard patent clause and supply justification for submittal to the Contracting Officer.

FIELD ACTIVITIES

- Shakedown of the Acker drill continues with technical assistance by Acker to determine fixes for breakdowns.
- Approval for the collection and venting systems has been obtained.

SCHEDULE

MILESTONE/ACTIVITY	1979											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Complete Drill & Piping Shakedown			△									
Complete Initial 2000 ft. holes					△			△			△	
Complete Vertical Venthole (test)												
Complete LNG Utilization Analysis						△						
Complete Testing & Evaluation								△			△	

ANTHRACITE COAL DRAINAGE TEST PROJECT  
LUZERNE COUNTY, PENNSYLVANIA

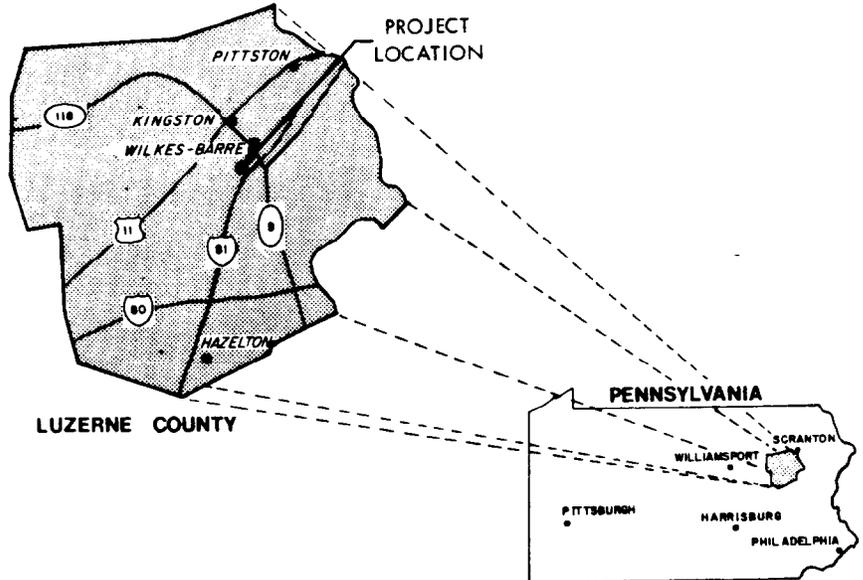
STATUS

CONCEPT PHASE COMPLETE - NEGOTIATIONS IN PROGRESS

CONTRACT(S)

DE-AC21-78MC08089

Location Southwest of Wilkes-Barre on the Susquehanna



CO-OPERATING COMPANY

Pennsylvania Energy  
Resources, Inc. (PERI)  
Wilkes-Barre, Pennsylvania

GENERAL SCHEDULE

Concept Phase- June 1976  
to Aug 1978

Design and - May 1979  
Verification to Dec 1979

Implementation- Jan 1979  
Phase to Dec 1981

OBJECTIVE

To develop and demonstrate a system for the recovery of methane from anthracite coal using stimulated multiple, multiple completion wells and utilizing the gas by injection into a local pipeline.

PROGRESS TO DATE

- Experimental well drilled in 1976. Initial production was 85 MCFD before well was killed during hydraulic fracturing.
- Detail plan established for design and verification activities.
- Cost estimates completed for next phases.

RECOVERY SYSTEM SUMMARY

(3) Multiple completion wells in Red Ash veins of Northern anthracite fields. Stimulation by gas, explosive or hydraulic fracturing.

UTILIZATION SYSTEM SUMMARY

Recovered gas to be utilized by injection into pipeline serving local area.

ANTHRACITE COAL DRAINAGE TEST PROJECT

DESIGN AND ANALYSIS ACTIVITIES

- Awaiting contract negotiations. Statement of work has been structured to provide for one well to be drilled and tested during CY 1979. Completion will be delayed until CY 1980.

FIELD ACTIVITIES

- Site inspection planned for early April.

SCHEDULE

MILESTONE/ACTIVITY	1979											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Drilling Preparation					△		△					
- complete site selection					△		△					
- complete legal arrangements							△					
- complete well design								△				
Complete Initial Utilization									△			
System Design										△		
Prepare Maps											△	
Update Design						△						
Develop Procurement specifications											△	
Drill First Well										△		
Phase II Design Report											△	

MULTIPLE COMPLETION DEVELOPMENT TEST PROJECT  
GREEN COUNTY, PENNSYLVANIA

STATUS Concept Phase Complete - Negotiations in Progress

CONTRACT(S)  
**DE-AC21-78MC08089**

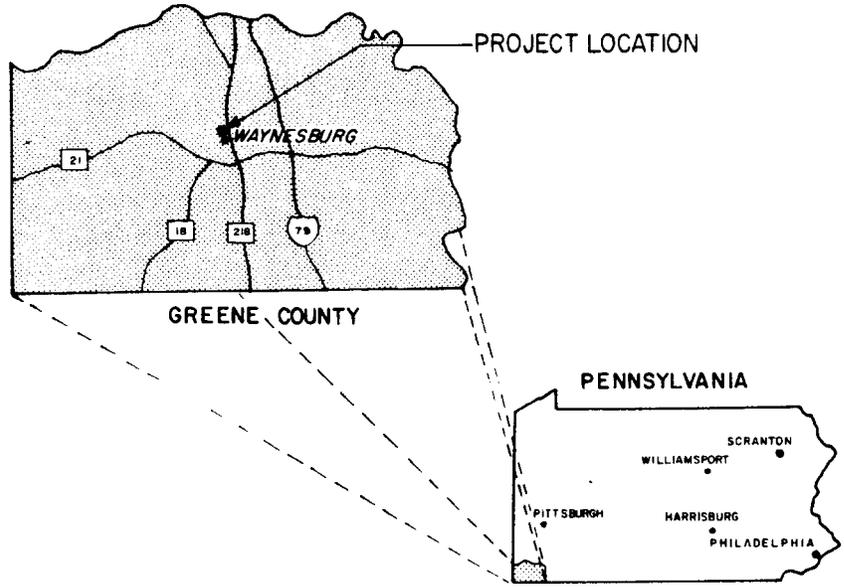
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CO-OPERATING COMPANY  
Waynesburg College  
Waynesburg, Pennsylvania

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GENERAL SCHEDULE  
Concept Phase - Mar 1978  
to Aug 78  
  
Design and Verification Phase - May 1979  
to Aug 1979  
  
Implementation Phase - Sep 1979  
to Dec 1979

Location Purman Run Tract on college campus North of Waynesburg



OBJECTIVE To develop and demonstrate a multiple completion technique system considering a variable need for dewatering each zone and utilizing the recovered methane in a local distribution pipeline.

PROGRESS TO DATE

- Basic site and target coal seams identified.
- Pipeline route and tie-in point identified.
- Cost estimate complete.
- Potential benefits estimated.

RECOVERY SYSTEM SUMMARY Single well drilled into three seams overlain by the college facilities. Isolation and stimulation of individual zones planned. Multiple dewatering pumps considered in design.

UTILIZATION SYSTEM SUMMARY Recovered gas to be utilized in college's distribution system. Estimates of production will satisfy 70 percent of peak demand.

MULTIPLE COMPLETION DEVELOPMENT TEST PROJECT

DESIGN AND ANALYSIS ACTIVITIES

- Awaiting go ahead for design and verification phase.
- Determining if any environmental problems could arise.
- Cost estimates were revised and backed up by vendor quotes. Cost remains at approximately \$250K (\$150 DOE).

FIELD ACTIVITIES

- Site revisited in March - no changes.

SCHEDULE

MILESTONE/ACTIVITY	1979											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Phase I Report	△				△							
Begin Coring					△	△						
Complete Coring							△					
Complete Well Design									△			
Complete Drilling Operations									△			
Complete Multiple Fracturing									△			
Start Pipeline Hookup Tests										△		
Phase II Design Report												△

## 5. SCHEDULES

Three types of schedules are shown in this Section - the Master Schedule showing major milestones, the detailed schedule of events for next month, and major events occurring in the next quarter.

### 5.1 MASTER SCHEDULE FOR 1979

The major milestones for the TRW effort are shown in Figure 5-1.

### 5.2 PLANS FOR MAY 1979

#### Engineering Support

7 May		Initiate the draft for the FY 1980 PPD.
8 May		Restructuring of the Information Management/Technology Transfer Plans at Morgantown, West Virginia.
15 May		Initiate the draft inputs to the UGR Semi-Annual Report for the October 1978 - March 1979 period.
24 May		Complete revised MRCP internal WBS.
26 May		Monitor turbodrill tests at the Los Alamos test site in Fenton Hills, New Mexico.

#### Resource Engineering

8 - 11 May	-	Meet with University of New Mexico and Supron to discuss proposal to do additional testing in the San Juan Basin.
8 - 11 May	-	Meet in Denver with Consolidated Gas and other potential cooperators.
14 - 15 May	-	Technical direction meeting with VPI.
23 May		Participation in <b>prefracturing</b> , fracturing and long-term production testing of confidential well in Colorado.

#### Technology Test Projects

3 May		Final wrap-up of contract, SOW, and cost estimates at Waynesburg College, Waynesburg, PA.
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# MASTER PROJECT SCHEDULE — CY 1979

MODIFIED  
UPDATED

MARCH 1979  
APRIL 1979

MILESTONES/ACTIVITIES	CY 1978			CY 1979			CY 1980											
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
PROJECT MANAGEMENT, PLANNING AND ANALYSIS																		
— PROJECT PLAN DOCUMENT																		
— SEMI-ANNUAL REPORT INPUTS																		
— ANNUAL REPORT																		
— TURBO DRILL TESTING																		
RESOURCE ENGINEERING																		
— RESOURCE DELINEATION PLAN																		
— COMPLETED FIELD TESTS (NO. TESTED)																		
— BASIN REPORTS																		
— FIELD SITE GEO. INVESTIGATION																		
TECHNOLOGY TEST PROJECTS																		
— HORIZONTAL HOLES IN MINE																		
— MULTIPLE COMPLETION																		
— ANTHRACITE COAL																		
INFO MANAGEMENT/TECHNOLOGY TRANSFER																		
— INFORMATION MGMT PLAN																		
— TECHNOLOGY TRANSFER PLAN																		
— SYMPOSIA/WORKSHOPS																		

Technology Test Projects (Continued)

11 May Submit Waynesburg College subcontract package to DOE for approval to subcontract.

16 May Final wrapup of contract terms and SOW with Occidental Research at McLean, VA.

17 May Submit patents clause variation request for ORC to DOE.

21 May Final wrapup of PER1 contract package at Wilkes-Barre, PA.

25 May Complete first long hole in ORC project.

30 May Submit PER1 contract package to DOE for approval to subcontract.

Information Management/Technology Transfer

15 May Final symposium accounting and payoff of all bills.

7 May Complete transcript of selected MRCP symposium papers from tape recording.

6 May Provide draft of MRCP Symposium synopsis to METC for publicity release use.

5.3 PLANS FOR JUNE, JULY AND AUGUST 1979

Engineering Support

Early June - Complete the Phase III Test Plan for the Maurer turbodrill and submit for approval and signature. Reestablish contact with Gearhart-Owen cognizant personnel and make preparations for testing.

Mid June Complete current update of the WBS.

End of June - Complete draft input to the UGR Semi-Annual Report.

Early July - Complete review draft of the FY 1980 PPD.

Resource Engineering

- Early June - Coring and testing of three of four confidential wells Type I in Colorado.
- Mid-June Completion of Illinois Basin Report.
- June-July - Participation in coring, desorbing and testing of two Fuelco wells (Type I) on the northern edge of the San Juan Basin.
- Late July - Completion of Powder River Report.
- Late August - Completion of San Juan Basin Report.

Technology Test Projects

- Early June - Sign contracts with ORC, PER1 and Waynesburg College.
- Mid-June Review of Occidental project at Irvine, CA.
- Late June - Start coring at Waynesburg College site.
- Early July - Complete well specification and drilling plan for the PER1 project.
- Mid-July - Complete site access arrangements for PER1 project.
- Early August - Complete design for Waynesburg College project.
- Late August - Start field work on PER1 project.
- Late August - Complete 2nd long drill test hole at Island Creek for ORC project.

Information Management/Technology Transfer

- Early June - Complete draft of Information Management Plan.
- Early July - Complete draft of Technology Transfer Plan.

## 6. DELIVERABLE STATUS

The deliverables for the TRW effort are specified in Article III of the Contract. The status of each of the deliverables follows.

Reference: Article III, 1 Reports

<u>Paragraphs and Description</u>	<u>Delivery Date</u>	<u>Completion Status</u>
a. Monthly Progress Reports	Within 10 days after each month of contract performance.	PERIODIC
b. Monthly Financial Reports	Within 10 days after calendar month of performance.	PERIODIC
c. Contractor's Reports on Government-owned Capital Equipment	With each voucher.	AS APPLICABLE
d. Annual Reports	Within 15 days after annual period of contract.	CY 1978 - COMPLETED FEBRUARY 1979
e. Phase Reports	Within 10 days after completion of each phase of the work.	COMPLETED - DECEMBER 1978
f. Draft Final Report	Within 5.4 months after effective date of the contract.	WHEN APPLICABLE
g. Final Report	Within 30 days of DOE approval or recommended change of Draft.	WHEN APPLICABLE
h. Post Contract Reports	Semi annually after completion of the contract, if work continues at contractor's expense.	WHEN APPLICABLE

Reference: Appendix A, 1.2 Deliverables, 1.2.1 Phase I.

<u>Paragraphs and Description</u>	<u>Delivery Date</u>	<u>Completion Status</u>
a. Plan for Readily Available Central Data Base Information System.	A Phase I deliverable. Exact due date not specified.	IN PREPARATION
b. Plan for Delineation of the Coal-bed Methane Resource.	A Phase I deliverable. Exact due date not specified.	COMPLETED - FEBRUARY 1979
c. A preliminary & System Design d. for site developed for the first project.	A Phase I deliverable. Exact due date not specified.	COMPLETED - NOVEMBER 1978
e. A Program Plan	A Phase I deliverable. Exact due date not specified.	FY 1979 VERSION COMPLETED IN DECEMBER 3978
f. A List and Ranking of Potential Resource Contractors.	A Phase I deliverable. Exact due date not specified.	COMPLETED - MARCH 1979
g. A complete Technology Transfer Plan	A Phase I deliverable. Exact due date not specified.	DELAYED - PENDING INFO/MANAGEMENT PLAN COMPLETION
h. An updated Cost Estimate for Phase I Options	A Phase I deliverable. Exact due date not specified.	COMPLETED - JULY 1978
i. An updated Cost Estimate for Phase II Options	A Phase I deliverable. Exact due date not specified.	COMPLETED - DECEMBER 1978
j. Oral Presentation to TPO MERC at completion Phase I.	A Phase I deliverable.	COMPLETED - NOVEMBER 1978

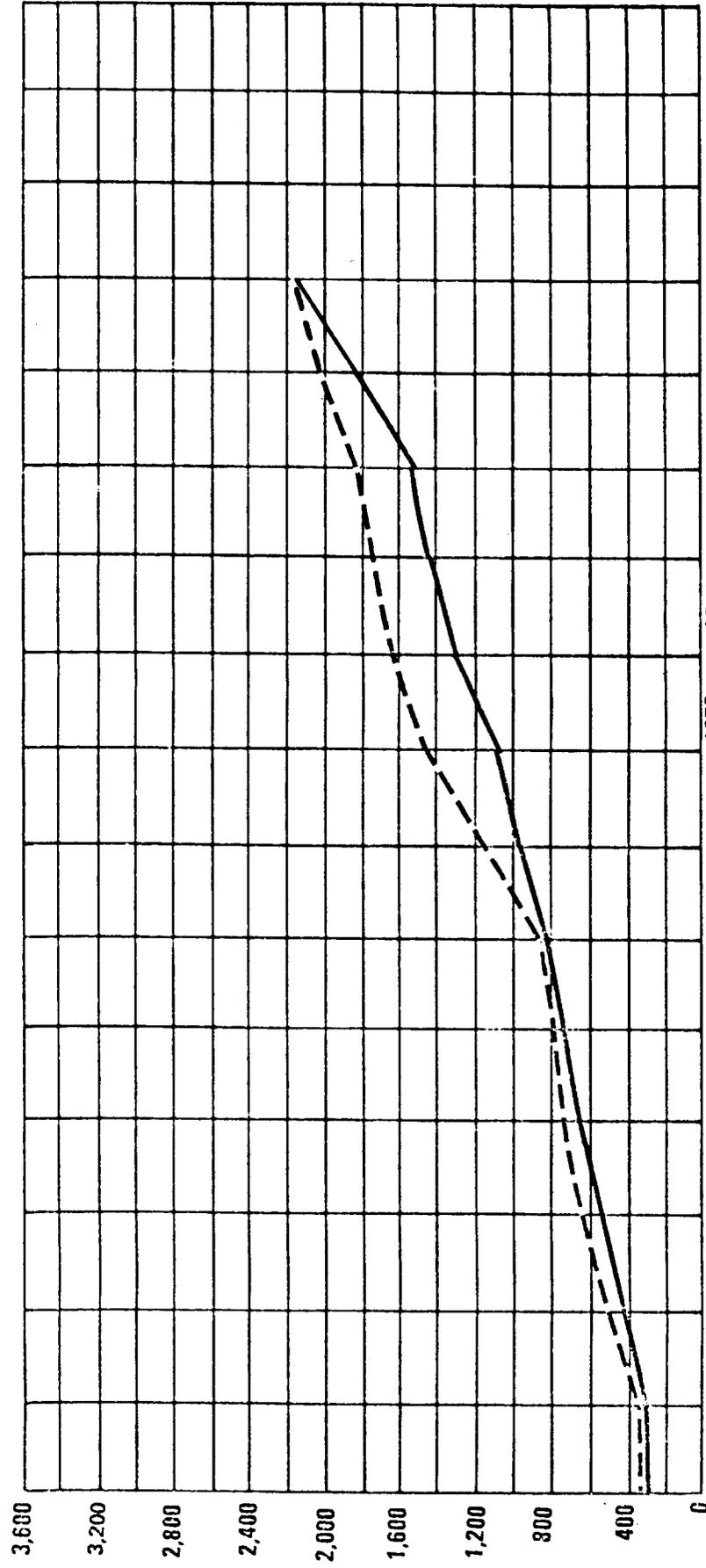
Reference: Contract Modifications Covering CY 1979 Effort (TBS)

<u>Paragraphs and Description</u>	<u>Delivery Date</u>	<u>Completion Status</u>
a. Well Test Reports	90 days after tests. Reports for CY 1978 tests due ASAP.	REQUIRED: <u>9</u> DELIVERED: <u>0</u> PAST DUE: <u>0</u>
b. Basin Reports	Approximately 6 week intervals starting in <b>May</b>	REQUIRED: <u>6</u> DELIVERED: <u>0</u> PAST DUE: <u>0</u>
c. Detailed Site Investigation Report	November 1979	FIELD ACTIVITIES WILL NOT START UNTIL LATE SUMMER 1979.
d. Phase II Design Report	30 days after completion of design.	REQUIRED: <u>3</u> DELIVERED: <u>0</u> IN WORK: <u>0</u>

## 7. EXPENDITURE STATUS

The expenditure plan and actual costs through the current reporting month are shown in Figure 7-1.

<b>CONTRACT SUMMARY REPORT</b>		CONTRACT TITLE Methane from Coalbeds		CUSTOMER DOE	PERIOD ENDING 4/27/79
SALES NUMBER 97141	CONTRACT NUMBER DE-AC21-78MC08089	CONTRACT TYPE CPFF	CONTRACT PERIOD FROM: 12/12/77 TO: 2/12/79	CONTRACT VALUE (\$ 000); COST FEE % TOTAL 1815 149 8.2 1964	



	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR
PLAN	380	508	667	725	782	853	1129	1434	1680	1770	1815	2015	2128
ACTUAL	350	441	547	637	711	823	953	1075	1320	1441	1516	1830	2128
VARIANCE	30	67	120	88	71	30	176	359	360	329	299	185	--
COMMIT.	26	47	108	92	127	110	127	251	360	373	371	215	157

DEVELOPMENTS/PROBLEMS THIS REVIEW PERIOD:  
 This report reflects cost only.  
 The actual for the month of April is \$297K. DOE authorizes incurring up to \$400K cost in excess of current funding.

PROJECT MANAGER  
 A. D. Starbird  
 OPERATIONS MANAGER  
 R. L. Robertson

--- PLAN  
 — ACTUAL

Figure 7-1. Expenditure Schedule