

DOE/PC/94114--T7

INSTALLATION OF A STOKER-COAL PREPARATION PLANT

IN

KRAKOW, POLAND

Technical Progress Report 7

October - December, 1995

Work Performed Under Cooperative Agreement DE-FC22-94PC94114

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EFH Coal Company

Wilkes-Barre, PA

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TECHNICAL PROGRESS REPORT 7

October - December, 1995

INSTALLATION OF A STOKER-COAL PREPARATION PLANT  
IN  
KRAKOW, POLAND

By  
Pete Rozelle, Program Manager  
EFH Coal Company

Cooperative Agreement No.  
DE-FC22-94PC94114

Project Officer  
Thomas J. Feeley, III  
U.S. Department of Energy  
Pittsburgh Energy Technology Center  
P.O. Box 10940  
Pittsburgh, PA 15236

## TABLE OF CONTENTS

<u>TITLE</u>	<u>PAGE</u>
TABLE OF CONTENTS	i
LIST OF FIGURES	ii
EXECUTIVE SUMMARY	iii
INTRODUCTION	1
PURPOSE	1
OBJECTIVE	1
WORK STATEMENT	2
PROGRESS DURING THIS PERIOD	2
DIFFICULTIES ENCOUNTERED	3
FUTURE WORK	3

## **LIST OF FIGURES**

<b><u>FIGURE</u></b>	<b><u>PAGE</u></b>
1. GANTT CHART	5

# **INSTALLATION OF A STOKER COAL PREPARATION PLANT IN KRAKOW, POLAND**

## **EXECUTIVE SUMMARY**

This report describes the progress made during this reporting period of a two-year project to demonstrate that the air pollution from a traveling-grate stoker being used to heat water at one of MPEC's central heating plants in Krakow, Poland can be reduced significantly by (1) substituting the unwashed, unsized coal currently being used with a mechanically cleaned, double-sized stoker fuel and by (2) optimizing the operating parameters of the stoker. It is anticipated that these improvements will prove to be cost-effective and hence will be adopted by the other central heating plants in Krakow and, ideally, throughout Eastern European cities where coal continues to be the primary source of fuel.

EFH Coal Company has formed a partnership with two Polish institutions -- MPEC, a central heating company in Krakow, and Naftokrak-Naftobudowa, preparation plant designers and fabricators--for the execution of this effort.

A long-term contract for the procurement of 750,000 tons of 20 mm. x 0 raw coal for the new plant has been negotiated with the Katowice Coal Holding Company. This long-term lease includes a site near the defunct Kazimierz-Julius preparation plant that has all of the infrastructure needed to build and operate the proposed 300 tph stoker coal preparation plant.

The search for markets for utilizing surplus production from the new plant continues. Bid prices for a prefabricated (modular) 300-tph turnkey preparation plant delivered to Poland for preparing a stoker coal ranged from \$3.2 to \$3.5 million dollars (U.S.).

A commitment has been negotiated with Bank PKO S.A. to provide \$2 million in cost-share financing toward the capital cost of the project. This sum, when added to the \$2.4 million in DOE - BPU funds will be adequate to meet the \$3 to \$3.5 million needed to finance the purchase, erection and start-up of the 300 tph processing plant.

Because of the unanticipated delays encountered during the onset of the project with forming the EFH Coal/Polish partnership and in negotiating long-term raw coal supply contracts, a second 90-day, no-cost time extension was requested.

## **INTRODUCTION**

The work being performed under this Cooperative Agreement between the United States Department of Energy (DOE) and EFH Coal Company (Participant) is one part of the assessment program in the Support for Eastern European Democracy (SEED) Act of 1989 (P.L. 101-179).

In October 1991, a Memorandum of Understanding (MOU) titled "Collaboration on the Krakow Clean Fossil Fuels and Energy Efficiency Program, A Project of Elimination of Low Emission Sources in Krakow" was signed by the DOE and the Ministry of Environmental Protection, Natural Resources and Forestry of the Republic of Poland, that describes the cooperation that is being undertaken by the respective governments to accomplish the goals of this program.

The DOE has selected eight U.S. companies to work with the government of Poland to improve the country's air quality, particularly around the historic city of Krakow. Although the program is focused on Krakow, it is intended to serve as a model for similar pollution control programs throughout Poland and, hopefully, much of Eastern Europe. The total cost of the SEED program is \$31 million with the DOE funding about half that amount.

Low emission sources in the Krakow area include 100,000 home stoves, 227 traveling grate (stoker-fired) boilers and more than 2,000 hand-fired boilers -- all coal fired.

## **PURPOSE**

The purpose of the U.S./Polish Memorandum of Understanding is to encourage the formation of commercial ventures by providing project development support, resources, and services to reduce low-emission sources in Krakow, Poland.

These commercial ventures can take the form of contracts, joint ventures, partnerships, and other commercially-feasible arrangements to achieve the purposes of this statute.

## **OBJECTIVE**

The specific objective of the work to be performed by EFH Coal under the terms of this Cooperative Agreement is to improve the quality of stack gas emissions from low-stack boilers in the Krakow area of Poland.

This objective will be accomplished by designing, constructing, and operating a beneficiation facility that will produce a low-ash, double-sized stoker coal for burning in a typical traveling-grate stoker commonly in use throughout this area. The low-ash, uniformly sized, quality stoker coal when burned properly in existing boilers will increase combustion efficiency, reduce stoker maintenance, and reduce significantly carbon monoxide, sulfur dioxide, and particulate levels in the stack gas emissions.

To facilitate the achievement of the stated objective, EFH Coal has executed an agreement with MPEC (a district heating company in Krakow) and Naftokrak/Naftobudowa (a construction and maintenance enterprise) to design, construct and operate a 300 mtpd coal cleaning facility. EFH Coal has also subcontracted with the Pennsylvania State University to characterize two candidate Polish coals and to perform combustion tests on washed sublots of these Polish coals in their combustion simulator facility.

## **WORK STATEMENT**

It is projected that a two-year effort will be needed to accomplish the objectives of this Cooperative Agreement, consisting of two budget periods and including the following nine tasks:

### **Budget Period I**

- Task 1 - Polish Coal Washability and Combustion Performance Evaluation
- Task 2 - Raw Coal Supply Contracts
- Task 3 - Specification of Major Preparation Plant Components
- Task 4 - Preparation Plant Flowsheet Design
- Task 5 - Cost Evaluations
- Task 6 - Securing Stoker Coal Supply Contracts
- Task 7- Final Economic Evaluation and Risk Assessment

### **Budget Period II**

- Task 8 - Plant Construction
- Task 9 - Plant Startup and Demonstration

## **PROGRESS DURING THIS PERIOD**

### **Task 1.0 - Polish Coal Washability and Combustion Performance**

#### **Subtask 1.1 - Washability Characteristics**

No Activity

#### **Subtask 1.2 - Stoker Combustion Performance Evaluation**

No Activity

#### **Subtask 1.3 - Training Program**

No Activity

### **Task 2.0 - Raw Coal Supply Contracts**

Ecocoal has signed a long-term lease for the use of the Kazimierz-Julius site with the Katowice Coal Holding Company. Included in the contract are: a long-term source of raw coal having the size distribution and washability characteristics necessary for the economic recovery of a salable stoker coal product for burning in stoker fired water-heating boilers; a site that is topographically suited to the construction and operation of a 300-tph stoker-coal preparation plant; the availability of electrical power (there is a power plant adjacent to the site); an adequate supply of process makeup water; rail and truck facilities for receiving raw coals and shipping products; adequate areas for storing and reclaiming raw coals and products; and essentially all of the infrastructure normally required to build and operate a commercial preparation plant complex.

A contract was signed with an organization (Drobas) to dispose of all the refuse that will be generated by the new stoker coal plant in a nearby worked-out dolomite mine; a letter of intent has also been signed with an additional firm (Haller) to dispose of refuse in a nearby worked-out limestone quarry.

Thus, signing the above contract guarantees the availability of the estimated 750,000 tph of minus 20mm raw coal to be fed to the plant, a suitable site having all of the necessary infrastructure to receive and process the raw coals, the areal requirements for storing/reclaiming/outloading salable products, and for disposing of generated wastes.



### **Task 3.0 - Specification of Major Preparation Plant Components**

This task is completed.

### **Task 4.0 - Preparation Plant Flowsheet Design**

This task is completed.

### **Task 5.0 - Cost Evaluations**

Biprostal, the engineering firm which has been sub-contracted to perform the many environmental and permitting activities that are required by the various levels of the Polish government before the plant site and refuse disposal areas can be prepared and the plant erected and operated continues compiling information for obtaining local, state, and federal permits for: surface facilities; water usage; refuse disposal; raw coal storage; clean coal stockpiling; and ground water protection.

### **Task 6.0 - Securing Stoker Coal Supply Contracts**

Negotiations continued with a number of potential customers for any stoker coal that might be produced in excess of that of MPEC's needs. Current efforts continue to be focused on two potential consumers; Nova Huta and Skawina. Contracts have been signed with MPEC and LEG.

### **Task 7.0 - Final Economic Evaluation and Risk Analysis**

Progress continued under this task during the reporting period.

Bids for modular plants built in the U.S. and shipped to Poland via a containerized ship have been received from Taywood Mining in Lexington, KY and from Fairmont Equipment Company. A typical plant has a capacity of 300 tph and uses four, 24 inch diameter heavy media cyclones. Total cost for the package plant ranged from \$3.2 million (Taywood) to \$3.5 million (Fairmont).

A commitment has been negotiated with Bank PKO S.A. to provide \$2 million in cost-share financing toward the capital cost of the project. This sum, when added to the \$2.4 million in DOE - BPU funds will be adequate to meet the \$3 to \$3.5 million needed to finance the purchase, erection and start-up of the 300 tph processing plant.

## **DIFFICULTIES ENCOUNTERED**

The extended delay in negotiating raw coal supply contracts has precluded the washability testing of the raw coal and the simulations of the combustion performance of burning the washed stoker coal in traveling-grate boilers.

The inability to execute a lease agreement for an acceptable site has delayed progress on the purchase and erection of the 300 tph plant.

## **FUTURE WORK**

- Collect a sample of raw coal from the Brzesze mine, ship this sample to Penn State, and initiate the washability testing of raw coal and the boiler performance simulations on samples of the washed coal.
- Continue to negotiate with Nova Huta Steel and Skawina for coal sales agreements, as well as LEG sources other than MPEC.
- Continue to collect and compile additional income and outlay, information so that the "proforma" for the project can be finalized.

Because of the inordinately long length of time it has taken to negotiate long-term raw-coal supply contracts with Polish coal producers, a fourth 90-day no-cost time extension was requested from the Department of Energy for Budget Period I.

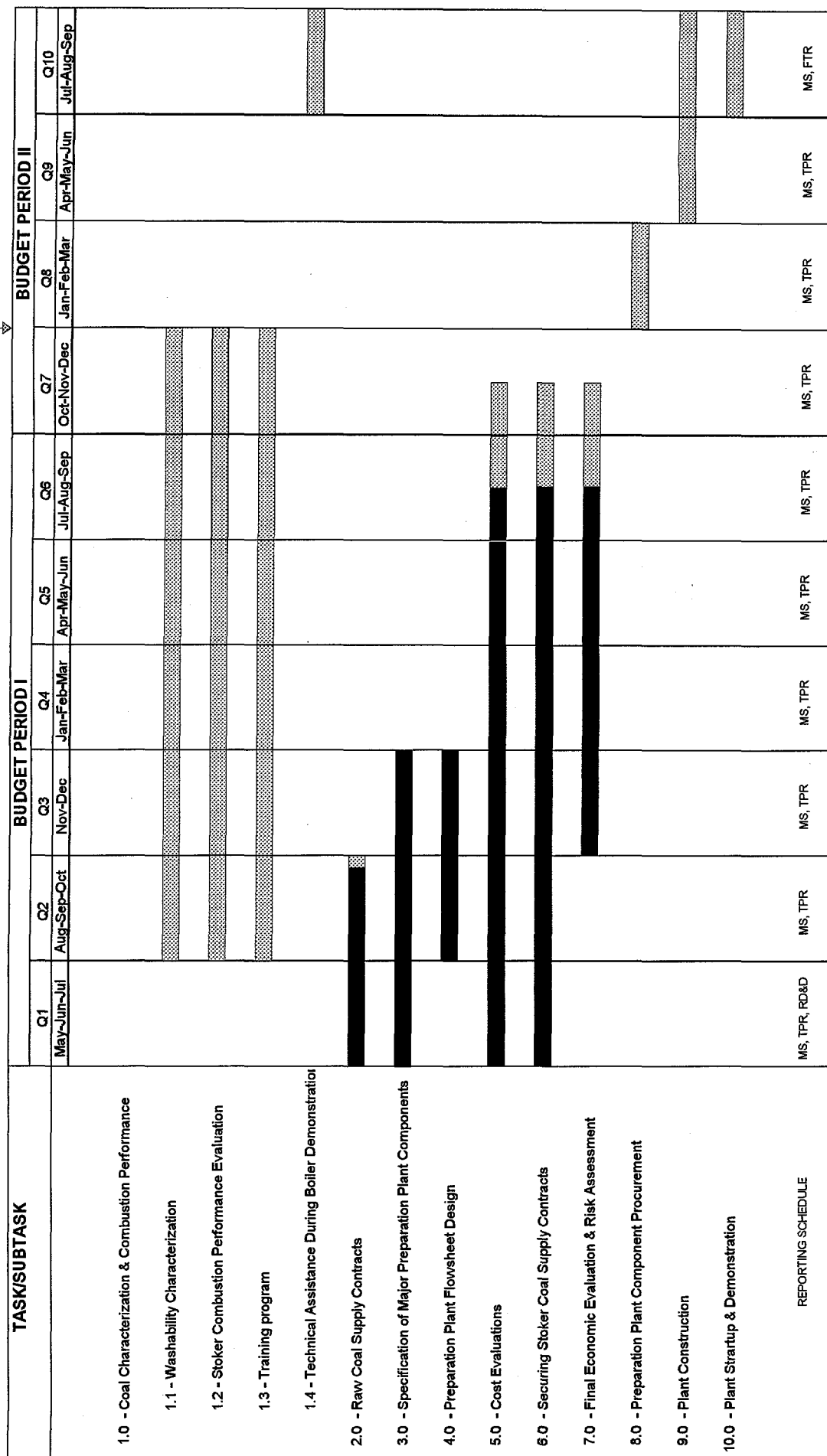
The revised Gantt Chart shown in Figure 1 illustrates the status of the project at the end of this reporting period (December, 1995).

Figure 1 - GANTT CHART (REVISION III)

# KRAKOW CLEAN FOSSIL FUELS AND ENERGY EFFICIENCY PROGRAM

## INSTALLATION OF A STOKER COAL PREPARATION PLANT IN KRAKOW, POLAND

12/31/85



Report Legend:

MS - Federal Assistance Management Summary  
 TPR - Technical Progress Report  
 RD&D - Notice of Energy RD&D Project  
 FTR - Final Technical Report

Performance Legend:

PLANNED  
 ACTUAL