CALDERON COKEMAKING
PROCESS/DEMONSTRATION PROJECT

Quarterly Technical Report

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QUARTERLY TECHNICAL PROGRESS REPORT
CALDERON COKEMAKING PROCESS/DEMONSTRATION PROJECT
CALDERON ENERGY COMPANY
COOPERATIVE AGREEMENT NO. DE-FC22-95PC92638

Reporting Period: 5-26-99 to 8-25-99

Date of Report: 9-22-99; Award Date: 5-25-95; Anticipated Completion Date: 11-25-00

Total Project: \$ 6,332,060.00 Total DOE Share: \$3,039,389.00

Contracting Officer's Representative (COR): Dr. Michael J. Baird;

Project Director: Albert Calderon

Abstract

This project deals with the demonstration of a coking process using proprietary technology of Calderon, with the following objectives geared to facilitate commercialization:

- (i) making coke of such quality as to be suitable for use in hard-driving, large blast furnaces;
- (ii) providing proof that such process is continuous and environmentally closed to prevent emissions;
- (iii) demonstrating that high-coking-pressure (non-traditional) coal blends which cannot be safely charged into conventional by-product coke ovens can be used in the Calderon process;
- (iv) conducting a blast furnace test to demonstrate the compatibility of the coke produced; and
- (v) demonstrating that coke can be produced economically, at a level competitive with coke imports.

The activities of the past quarter were focused on the following:

- Detailed workings of the team
- Proposal to FETC for Phase II
- Permitting and Environmental Work
- Engineering Progress

TABLE OF CONTENTS

Introduction	Page 1
Accomplishments and Discussion	Page 1
Conclusion	Page 5

Introduction

The commercialization path of the Calderon cokemaking process consists of the following general phases:

Phase I-- Proof of capability to produce acceptable product coke, proof of the process being environmentally closed, proof that non-conventional coal blends can be used, and proof that coke can be economically produced domestically using U.S. metallurgical coals at a level competitive with low cost-producer coke produced from foreign countries that are not subjected to U.S. environmental standards.

Phase II-- Scale-up of coking reactor to full commercial size Demonstration Module (DEMO) in support of first commercial facility.

Phase III-- Construction and operation of first commercial facility.

Phase IV-- Worldwide commercialization of the technology to produce coke competitive with that produced by low-cost producer coke-exporting countries.

Accomplishments and Discussion

During the past quarter numerous discussions took place among the team players (Bethlehem Steel, LTV Steel, Bechtel Corporation, Calderon Energy, Alliance Machine and FETC), and an understanding was reached among these members of the team. This understanding is illustrated in the diagram on page 2. As noted, Calderon Energy will furnish technology and Bechtel will do the detail engineering procurement and construction. Bethlehem will furnish coal and support, and LTV will supply coal and take the coke for the

THE TEAM FOR THE DEMO PROJECT AT LTV

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blast furnace test. Alliance Machine will supply equipment for installation by Bechtel. The present Cooperative Agreement between U.S. DOE and Calderon Energy which is still current (Phase I) will be extended as Phase II, to cover the construction and operation of the full size commercial reactor (DEMO) at LTV. The drafting of the various agreements among the various parties was initiated.

Proposal to FETC for Phase II

The proposal to FETC for Phase II was completed about 75% during the quarter. This proposal when completed will consist of eight (8) sections:

- Facility Description
- Updated Material & Energy Balance
- Statement of Work/Schedule
- Budget including Equipment List, Cost Estimate and Manning
 - Period 1 - Construction
 - Period 2 - Operations
- Environmental Questionnaire
- Miscellaneous Forms
- Permit Application
- Exhibits

The plan it to submit the proposal to FETC by the end of September 1999 or the early part of October, 1999.

Permitting

Eighty percent (80%) of the work to prepare the permit was completed, and several meetings took place between Calderon and LTV regarding the preparation of the Permit to install and operate the DEMO in Cleveland. LTV's position is that the applicant for the Permit must be Calderon Energy rather than LTV, as LTV is reluctant to include the DEMO in its own "bubble".

A meeting was held with the City of Cleveland, Air Permitting Department, to determine if the DEMO can be excluded from LTV's "bubble". The indication was that a case should be made to justify the exclusion of the DEMO from LTV's plant by demonstrating the following:

- That the DEMO would not be owned by LTV
- That the DEMO would not be operated by LTV
- That the DEMO would be physically separated by a fence from LTV

These issues will be put in a narrative form and included in the Permit which Calderon Energy will file with the City of Cleveland, with Ohio EPA, and with U.S. EPA, Region V. The goal is to file such a permit no later than the early part of October, 1999.

Engineering Progress

The most critical piece of equipment from a delivery standpoint is the charger for the reactor and the second most critical item are the SiC tiles for lining the reactor.

Extensive detailed design work for the pusher took place particularly in the area of the seals for the prevention of fine coal migrating to the bearings and the push rods for the alignment of the ram to the hydraulic cylinders.

Discussions with Carborundum (now owned by St. Gobain, a French company) took place regarding the supply of the SiC tiles. Unfortunately information has been slow in coming. There is the possibility that the work would be done by Vesuvius (Buffalo, NY), as originally planned, if Carborundum does not act expeditiously.

Other engineering work consisted of completing the design of the special manipulating car to insert and withdraw the inner tube from the reactor, a heavy piece of equipment weighing around 330,000 lbs.

Other Issues

Notice was received that the House of Representatives included in its H.R. 2466 an appropriation equal to \$7 million for this project for FY 2000. An Environmental Assessment Questionnaire was prepared and sent to FETC.

Conclusion

During the next quarter, the plan is to have agreements among the stakeholders concluded, a cooperative agreement with DOE entered into for Phase II, the Permit application in place and the detailed engineering for the project begun by Bechtel.

Submitted by:

Albert Calderon
Project Director