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(FINAL QUARTERLY)

CALDERON COKEMAKING
PROCESS/DEMONSTRATION PROJECT

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Principal Author(s): ALBERT CALDERON

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DOE Award No.: DE- FC22 -95PC92638

Submitting

Organization(s)

Name & Address

CALDERON ENERGY COMPANY

500 Lehman Avenue

P.O. Box 126

Bowling Green, OH 43402

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ACQUISITION & ASSISTANCE
1998 MAY -4 P 1:58
USDOE-FETC

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FINAL QUARTERLY TECHNICAL PROGRESS REPORT
CALDERON COKEMAKING PROCESS/DEMONSTRATION PROJECT
CALDERON ENERGY COMPANY

COOPERATIVE AGREEMENT NO. DE-FC22-95PC92638

Reporting Period: 2-26-97 to 5-25-97

Date of Report: 6-23-97; Award Date: 5-25-95; Anticipated Completion Date: 11-25-97

Total Project: \$ 7,354,195.00 Total DOE Share: \$3,039,389.00

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

Project Director: Albert Calderon

Abstract

This project deals with the demonstration of a coking reactor (Process Development Unit--PDU-II) using Calderon's proprietary technology for making commercially acceptable coke. The activities of the past quarter were focused on the following:

1. Testing and Designing of the Submerged Quenching Closed System for the Process.
2. Usage of the Cracked Desulfurized Gas as a Reducing Gas to Make Directly Reduced Iron (DRI) in Order to Make the Process Economics Viable.
3. Changes in the Ceramic Liners for Supporting Them in the Coking Reactor.
4. Work Towards Testing of U.S. Steel's Coal in the Existing Process Development Unit in Alliance (PDU-I).
5. Permitting.

TABLE OF CONTENTS

Introduction	Page 1
Accomplishments and Discussion	Page 10
Conclusion	Page 15

Introduction

The proprietary Calderon cokemaking process is an environmentally acceptable system by virtue of its being closed, which consists of a unique coking reactor that carbonizes the coal in an annular heat exchanger; this exchanger is sealed to a unique submerged coking chamber. The raw gas from the reactor is directed in a sealed fashion to a unique regenerative hot gas cleanup that converts the raw gas to a hot, cracked, desulfurized syngas which is rich in H_2 and devoid of tars, oils, phenols, NH_3 and HCN. This syngas appears to be an excellent reducing gas which can be used in the reduction of iron ore to co-produce with the coke directly reduced iron (DRI), a feedstock in great demand.

To demonstrate this new technology, Calderon will construct and operate a full size commercial reactor with its attendant quenching and hot gas cleanup at its testing facility in Alliance, Ohio, (hereinafter referred to as PDU-II) at a cost of \$30 million. U.S. DOE has committed \$3 million to this project under a co-operative agreement entered into May 25, 1995. An additional \$12 million is being requested from Congress to be appropriated under the 1990 Clean Air Act Amendment (see Exhibits #1 and #2, letters from U.S. Steel and LTV Steel). The balance of the funding will be provided by the private sector on a 50-50 cost shared arrangement. Until the funds are made available to place orders, work on the project has proceeded to keep the project advancing towards commercial viability; several design changes have been made during the past two years to reach this goal. Bechtel's findings are summarized in a letter of April 9, 1997 (Exhibit #3) attached.

U. S. Steel
Technical Center
4000 Tech Center Drive
Monroeville, PA 15146
412 825 2130
Fax 412 825 2828

F. G. Jauss
General Manager
Research

May 12, 1997

Congressman Ralph Regula
2309 Rayburn House Office Building
Washington, DC 20515

Dear Congressman Regula:

During this past year U. S. Steel representatives have attended several meetings with the Calderon Energy Co. to discuss their latest technology for making coke. Our preliminary technical assessment is the process has a good probability of successfully charging coal and pushing coke without the environmental problems associated with conventional by-product coke ovens. We are currently working with Calderon Energy Co. to determine the feasibility of using the coking reactor in Alliance, Ohio, to determine if a high-quality blast-furnace coke can be produced.

The Calderon process offers a possible replacement for the aging coke batteries in the steel industry because of the potentially significant environmental advantages and reduced operating costs. If coke batteries are not replaced and blast furnaces are to continue to operate, the coke will be supplied by imports. Consideration will be given to using this process if a high-quality blast-furnace coke can be made. Your support for Federal funding is requested to complete the development of the process.

Sincerely,

A handwritten signature in dark ink, appearing to read "F. G. Jauss", written over a large, light-colored circular mark.

U. S. Steel Group
A unit of USX Corporation

SENIOR VICE PRESIDENT
PURCHASING ENGINEERING AND STRATEGIC PLANNING

May 9, 1997

The Honorable Ralph S. Regula
United States House of Representatives
2309 Rayburn House Office Building
Washington, DC 20515

Dear Congressman Regula:

LTV Steel has been associated with Calderon Energy during the development of the Calderon cokemaking technology. Our interest in the technology has been driven by the potential of the process to replace conventional cokemaking with an operation which is completely closed, making it environmentally superior to all other cokemaking. LTV has committed technical assistance and financial resources for the development of the process to a commercial level.

Calderon's initial proposal to LTV consisted of 128 reactors to produce 500,000 tons per year, with each reactor producing 12 tons per day. As our technical people evaluated the process, it became clear that a plant with 128 reactors was not economically feasible. Calderon changed the configuration of the reactors and preliminary engineering studies reduced the number of reactors to produce 500,000 tons from 128 to 32, each producing 48 tons per day. Based on this configuration, LTV supported Calderon's application for matching funds authorized under the Clean Air Act amendments of 1990. At our request, you were instrumental in securing \$3.04 million for the project.

After the cooperative agreement between Calderon and DOE was signed, more detailed engineering of the design of the reactor revealed that a plant with the 32 reactors was also not economically viable. Calderon has now developed a reactor which will reduce the number of reactors required for the commercial plant to 8, each producing 200 tons per day. LTV sees this development as a major breakthrough for the commercialization of the process.

From the beginning, Calderon's concept for development of the process for commercialization has been to reduce the risks of transferring the technology from demonstration to commercialization by building and demonstrating one full scale reactor. LTV fully supports this philosophy. However, by redesigning the reactor to make it commercially attractive, the size of the reactor has increased from 48 tons per day to 200 tons per day and the cost of the demonstration has increased from \$7.2 million to \$30 million.

In addition to the cokemaking section of the technology, Calderon has developed a hot gas cleanup which is also completely closed. The product gas from this cleanup can be used to economically make Direct Reduced Iron (DRI). The DRI product is an excellent raw material feed for an Electric Arc Furnace or Blast Furnace Steelmaking Process. No other cokemaking process has this potential, which provides to further reinforce the ultimate economic viability of the process.

We understand that Calderon will have \$15 million from the private sector and intends to request an additional \$12 million of the funds authorized in the CAAA to complete the funding of the demonstration.

LTV has participated fully in the technical evolution of the Calderon process from the 128 reactors to the current 8, and we are excited by the developments. It appears that Calderon has found the solution to the material and cost problems encountered as the process was refined, and we fully support the project as it stands today. LTV believes this process may provide integrated steel producers with a practical economic solution to remain competitive with an environmentally friendly, low cost source of coke.

Your assistance in securing the additional funds to be able to move forward on the commercial demonstration of this extremely important technological advance is appreciated.

Very truly yours,

Richard J. Hipple

RJH-716/sec

Bechtel

50 Beale Street
San Francisco, CA 94105-1895
Mailing address: P.O. Box 193965
San Francisco, CA 94119-3965

April 9, 1997

Albert Calderon
President
Calderon Energy Company
500 Lehman Avenue
P.O. BOX 126
Bowling Green, Ohio 43402

Subject: Calderon Cokemaking Technology
Update on Progress and Accomplishments

Dear Albert:

I am pleased to report that we continue to make substantial progress in advancing the Calderon Cokemaking Technology initiative. This progress and Bechtel's participation in it are summarized in the following attachments:

- Calderon Cokemaking Technology Assessment,
- Process Demonstration Unit (PDU) Estimate Summary; and
- Summary of Efforts Underway to Support Commercialization.

In support of your upcoming meetings with the Department of Energy (DOE), I would like to underline Bechtel's continued commitment to our shared goal of realizing both the technological and commercial potential of the Technology. Bechtel looks forward to providing the design and construct services as a builder and to participating in the development and ownership of projects as an investor. We are particularly satisfied with the responses from other industry participants to our solicitations of their interest in playing major roles in the Technology's funding, demonstration and development.

Please let me know if there is anything we can do to support your presentations before DOE.

Sincerely,

Mary B. Moreton
Program Manager

Attachments, 4 pages

cc: P. Winder, Bechtel Enterprises

Bechtel Corporation

Calderon Cokemaking Technology Assessment

Over the last 10 months, Bechtel performed a preliminary, but detailed, assessment of the Calderon Cokemaking Technology and its prospects for generating a commercial business. This study considered the Technology's technical feasibility, its cost and schedule for continued development, as well as the economic factors required for launching a successful commercial venture. The study has allowed Bechtel to conclude the following:

1. Viability of the Technology

The Technology has no apparent technical flaws. Additionally, the Technology is environmentally beneficial, generating only minimal solid and liquid wastes. These findings warrant the Technology's further development.

2. The Development State of the Technology

Development of the Technology suggests a phased approach. PDU design activities should begin with further simulation of the process heat and material balance, development of the reactor mechanical design, and elaboration of a technology development and testing plan.

3. Commercial-scale Demonstration of the Technology

The Technology should be demonstrated on a commercial-scale to virtually eliminate scaleup risk. Design and construction of a full-size module demonstration unit will take approximately 12 months and will facilitate future design work for a commercial-scale battery comprising multiple reactors (modules). Commercial-scale demonstration to satisfy commercial viability conclusions stated below should include:

- Modular coking reactor (rated capacity of 63,000 annual tons of coke) and hydraulic pusher
- Coal drying and materials handling
- Coke quenching chamber
- Full-scale, continuous, hot gas cleanup system, with full sorbent regeneration

Demonstration testing to prove-up the Technology process and equipment should include:

- Operation of the PDU for a minimum of 6 months for process and production demonstration
- Operation of the PDU for an additional phase (~6 months) to test a range of coals

4. Environmental Advantages of the Technology

The Technology can establish new environmental standards for cokemaking that could render existing technologies environmentally obsolete.

5. Capital Cost Advantage of the Technology

The Technology appears to hold a capital cost advantage over existing technologies for construction of new facilities.

6. Operating Cost Advantage of the Technology

The Technology appears to hold a very significant operating cost advantage over all existing technologies. This advantage is expected to grow as tightening environmental requirements further increase operating costs for facilities using other existing technologies.

Calderon Energy Company

April 9, 1997

Attachment Page 2

7. Market Opportunity for the Technology

There is a significant anticipated shortfall in metallurgical coke supply and new coke facilities will need to be constructed. Further, these new facilities must represent an improvement, environmentally and operationally, over existing facilities.

8. Commercialization of the Technology

Commercialization of the Calderon Cokemaking Technology requires definition and development of a first commercial project including viable use for the syngas as either an iron ore reducing medium, a fuel, or a chemical feedstock, resulting in a two-product facility. Additional resources will be required to define and develop a first commercial project, with specific needs to meet project cost, schedule, and performance assurances, particularly if this first commercial project requires off balance sheet financing.

Calderon Cokemaking Technology
Process Demonstration Unit Estimate Summary

(all costs in 4Q86 US \$1000's)

DESCRIPTION	PLANT EQUIP	BULK MAT'L	DIRECT LABOR	S/C	TOTAL
PLANT EQUIPMENT	\$4,003	\$31	\$477		\$4,511
Bulk Material					
"A" SITEWORK				\$3	\$3
"B" EARTHWORK			\$81	\$10	\$90
"G" CONCRETE		\$180	\$181		\$361
"H" STEEL		\$298	\$367		\$665
"K" ARCH FINISH					\$0
"L" UNIT CONSTRUCTION				\$100	\$100
"M" MECHANICAL BULKS	\$190	\$1,245	\$49	\$193	\$1,676
"R" PIPING		\$236	\$750		\$986
"T" ELECTRICAL EQUIPMENT	\$122		\$33		\$155
"U" RACEWAY		\$35	\$245		\$279
"W" WIRE & CABLE		\$47	\$137		\$184
"X" INSTRUMENTATION	\$214	\$88	\$85		\$387
TOTAL BULKS	\$525	\$2,129	\$1,907	\$306	\$4,866
SUBTOTAL DIRECT COSTS	\$4,529	\$2,160	\$2,384	\$306	\$9,378
DESIGN ALLOWANCE					\$2,050
CONSTRUCTION CRANES/HEAVY LIFT					\$100
INSURANCE					\$50
SPARE PARTS					\$50
SERVICES					\$3,759
ESCALATION					\$333
SUBTOTAL PROJECT CAPITAL COST EXCLDG OTHERS					\$15,719
OWNERS COSTS					\$2,700
PHASE I - START-UP/TEST OPERATING COST (3 MONTHS):					\$2,994
PHASE I - TESTING SERVICES					\$476
SUBTOTAL PHASE I					\$3,470
PHASE II - DEMONSTRATION TESTING OPERATION COST FOR 6 MONTHS					\$6,150
PHASE II - DEMONSTRATION TESTING SERVICES (6 MONTHS)					\$580
SUBTOTAL PHASE II					\$6,730
PHASE III - COAL BLEND TESTING OPERATING COST FOR 6 MONTHS					\$8,150
PHASE III - COAL BLEND TESTING SERVICES (6 MONTHS)					\$580
SUBTOTAL PHASE III					\$6,730
SUBTOTAL OPERATING COSTS					\$18,930
TOTAL PROJECT COST (EXCLDG COST RECOVERY)					\$35,175
COST RECOVERY FOR PHASE I TESTING (@50% SALABLE PRODUCT)					(\$405)
COST RECOVERY FOR PHASE II TESTING (@100% SALABLE PRODUCT)					(\$3,234)
COST RECOVERY FOR PHASE III TESTING (@50% SALABLE PRODUCT)					(\$1,817)
SUBTOTAL COST RECOVERY					(\$5,256)
TOTAL PROJECT COST WITH COST RECOVERY					\$29,919

Calderon Cokemaking Technology
Summary of Efforts Underway to Support Commercialization

1. Ongoing Engineering Support to Advance the Initiative

Under a Memorandum of Understanding (MOU) signed on January 21, 1997, Bechtel and Calderon have the basis for establishing a long-term commercial relationship. The MOU provides that Bechtel will render services for the design and construction of the Process Demonstration Unit (PDU) and projects utilizing the Calderon Cokemaking Technology and Process.

2. Conceptual Design Definition for Cokemaking Facilities

Bechtel is currently refining the Conceptual Design Definition for a project utilizing the Calderon Cokemaking Process for the production of metallurgical coke.

3. Conceptual Design Definition for Syngas-based DRI Facilities

Bechtel is currently engineering the Conceptual Design Definition for a project utilizing the Calderon Cokemaking Process that would utilize its Syngas for the production of Direct Reduced Iron (DRI).

4. Plan for Investments in the Process Demonstration Unit

Bechtel and Calderon have drawn up, and are executing, a plan to attract parties to the PDU who will participate in the future commercialization of the Technology as either contractors, investors or both. Careful thought is being given to which participants will provide future projects with the greatest chance of attracting commercial project financing.

5. Solicitation of Investors for the PDU

Bechtel and Calderon are soliciting potential PDU participants targeted as essential parties to achieving the successful commercialization of the Technology. Commercial arrangement discussions with interested parties are ongoing.

6. Joint Business Planning Activities

Bechtel and Calderon are working together to define their respective long term interests in the Technology's commercialization. This effort includes the detailed financial modeling of representative projects and the sensitivity testing of project economics under positive and negative scenarios.

7. Coke and DRI Market Research

In order to inform its business planning activities, Bechtel and Calderon have initiated an ongoing effort to better understand the future demand for products produced by the Calderon Technology and Process. To this end, the companies are examining existing demand forecasts and the fundamental factors creating demand.

8. Screening of Potential Sites for Commercial Projects

In anticipation of the successful demonstration of the Technology, Bechtel and Calderon are already examining the technical and economic aspects of sites considered for possible first commercial projects.

Accomplishments and Discussion

During the past quarter the following has been accomplished:-

1. Testing and Design of the Submerged Quenching Closed System for the Process.

In the original design a system of a lockhopper arrangement was provided making use of large and expensive valves. To eliminate the valves a barometric leg filled with water was considered to provide a water seal. The coke would be dropped into the barometric leg while the water is circulated in order to furnish a carrier for the coke in a submerged fashion. The question was that coke could not be left submerged excessively as the moisture in the coke would be too high, the desired moisture being around 4%. A series of tests were conducted at the LTV Research Laboratories in Independence, Ohio, to determine the length of time during which the coke would be in the water; it was found to be 43 seconds when the temperature of the coke when pushed, is 1900°F at the center of a lump of coke measuring 2" x 3". A scale model of the quench system was constructed and tested; it successfully demonstrated that this simple and workable solution would eliminate the large and expensive valves.

2. Usage of the Cracked, Desulfurized Gas as a Reducing Gas to Make Directly Reduced Iron (DRI) in Order to Make the Process Economics Viable.

During the carbonization of the coal, the devolatilized raw gas when cracked and desulfurized contains H_2 and CO with small quantities of CH_4 and CO_2 , but the dominant gas being H_2 ; this analysis makes it a good candidate for use as a reducing gas instead of reformed natural gas, in the direct reduction of iron. This information was submitted to Midrex and HYL, the largest two companies that build direct reduction plants. Their comments are in Exhibits #4 and #5 attached. This makes the Calderon cokemaking process doubly valuable by virtue of not only being able to make coke but also DRI. (Since the documents appear distorted on the scan, Exhibits #4 and #5 are summarized as follows:)

"Date: 2/1/97 10:24:08 AM
From: RGREEWA
Subject: RE: Syngas composition
To: See Below

MIDREX DIRECT REDUCTION

Mary-

This is to confirm my conversation with Bruce Kelley, Vice President-Engineering & Technology for Midrex Corporation, on utilization of high hydrogen direct reduction gas, such as produced by the Calderon cokemaking.

The cracker offgas (direct reduction gas) composition supplied to Kelley, based on the latest mass balance of Bob Duthie contained 76.0% H₂, 23.3% CO, 0.5% N₂ and 0.2% CO₂ with a heat value of 304 Btu/scf.

Kelley advised that his gas composition was "great" and highly suitable for Midrex direct reduction. Higher hydrogen gas is preferred over their normal 40% CO reducing gas composition as it is lower in density and therefore higher reduction bed velocities can be tolerated without fluidization, which in turn increases reduction furnace productivity.

The initial Midrex megamod built at OPCO in Venezuela operates quite successfully with a reducing gas having a 3.0 to 3.5 to 1 hydrogen to carbon monoxide so Midrex is very familiar with operation with higher hydrogen reducing gases.

Bruce asked that Bechtel supply reduction gas composition, pressure, volume, temperature and sulfur content in advance of our meeting with Midrex during the week of March 3, 1997. He would be pleased to provide DRI production figures for the different gas volumes based on Midrex operation. In the meantime, as previously advised, a figure of 10 MMBtu reducing gas heating value per tonne of DRI is a conservative output value. At this point in time a range of DRI production from 1,000,000 to 1,200,000 (a Midrex megamod) is a reasonable value for a 1,000,000 tpy cokemaking facility.

Regards,

Dick Greenwalt

To: Mary B. Moreton
CC: Richard S. Harding
CC: Robert C. Schenk
CC: William P. Imrie
CC: James G. Remeta"

"HYL

Telefax date: 03/02/97

To: Jeremy Jones Bechtel, San Francisco CA	From: Pablo E. Duarte Commercial Planning & Proposals
Fax: (95 415) 768 3398	Fax: (52 8) 328-2811
Ref.: Use of syngas for DR plant	Pages: 1

Dear Mr. Jones:

Regarding the possibility for using the syngas in the HYL III process, our comments are as follows:

1. The syngas, as per indicated analysis, can be used directly in the HYL III process, as reducing gas. This will require a small recycling gas stream. Desired pressure is 7.0 kg/cm²A.
2. Based on the 79,000 scfm (or 126,995 Nm³/hr) syngas availability, the HYL III module can produce a maximum of about 70 Mton/hr. Product quality could be 92-93% metallization and 0.3% carbon.
3. Due to gas analysis constraints, related to the high N₂ content (8.6%), there will be surplus purge gas of 85,200 Nm³/hr, which is equivalent to about 174 Gcal/hr export.
4. Main equipment required includes: HYL III reactor tower, top gas scrubbing unit, recycle gas compressor, a small heater for temperature adjustment of the recycle gas, related material handling for iron ore/DRI and utilities. No process gas heater nor CO₂ removal are needed.

Best regards,

Pablo E. Duarte

cc: R. Quintero, HYL
C. Dominquez, HYL

HYL Technology Division Hylsa, S.A. de C.V. Ave. Munich 101 66452 San Nicolas de los Garza, N.L. Mexico
Tel: (52 8) 328-2433; (52 8) 328-2828 Fax: (52 8) 328-2811; (52 83) 28-2810"

3. Changes in the Ceramic Liners for Supporting Them in the Coking Reactor.

The liners of silicon carbide cast in the first round needed modification in the anchors and in the tenons. Modifications were made to the mold and a second set of liners was cast with the changes. The problems with the anchors and the tenons were eliminated.

An opinion was received from the largest builder of conventional coke ovens (TSOA) from Germany regarding the selection of the ceramic liners. TSOA advised that the selection of the silicon carbide was the proper material for the contemplated application (see Exhibit #6). The ceramic expert (Dr. Yount) at U.S. Steel Research, stated the silicon carbide for this application was the right selection because of its resistance to chemical attack while having excellent properties to resist abrasion from the moving coke.

4. Work Towards Testing of U.S. Steel's Coal in the Existing Process Development Unit in Alliance (PDU-I).

U.S. Steel (U.S.S.) is the largest coke maker in the Western Hemisphere and the largest merchant coke company in the world. On May 1st, U.S.S. gave Calderon the opportunity to present its technology to a large group of U.S. Steel experts. The reception was well received. Since then four meetings have followed to plan and conduct tests at the existing pilot plant of Calderon (PDU-I) located in Alliance, Ohio. These tests will demonstrate in a small scale, the quality of coke that the Calderon process will produce using U.S. Steel's coal blend currently used at its largest steel plant which is situated at Gary, Indiana. The Gary facility uses close to 3 million tons of coke per year. Arrangements are being made to re-activate PDU-I which has not operated since October 1992. Further, U.S. Steel has extensive reserves of low volatile coal which has limited use by virtue of the pressures it develops during carbonization. U.S. Steel believes that such coal may not be a problem in the Calderon process by virtue of the solid

**THYSSEN STILL OTTO
TECHNICAL SERVICES**

Translation of:

Preliminary Report concerning the Calderon Technology prepared by TSOA in Bochum

1. Silicon Carbide

As can be seen from the enclosed analysis, the material is very well suited for this purpose, except for SiC utilizing foreign binding components (Item 8), which has the tendency to disintegrate under oxidizing atmospheres or in contact with steam. We do not have information about manufacturing costs for SiC under Pos. 1 through 7. Didier Refractories, Inc. manufactures a "SiC-paste" that could be used as a connection medium between tiles.

2. Thermodynamics

In our opinion, the heat balance calculations performed here match the identified dimensions so that we do not see a problem with regards to the thermodynamics of the system. We would like to point out, however, that also with this coking process approximately 40 - 50% of the generated raw coke oven gas energy is needed for heating purposes.

3. General Comments

We have doubts that the anticipated bulk density of 1100 kg/m^3 can be reached with the charging coal preheated to 120°C . In addition, we anticipate raw gas leakage from the coking chamber into the heating flues, which could lead to immediate cracking and plugging of the heating flues.

Also, we are still concerned about the coke quality that can be achieved through the movement of the coke cake through the tubular reactor. This alone requires the installation of a full-size reactor and to run respective tests.

structure configured in the Calderon coking reactor. A test program to be initiated as soon as practical is in progress. Bethlehem Steel has also joined U.S Steel in this phase of the program.

5. Permitting.

The permits for the construction and operation of the full size commercial reactor (PDU-II) to produce 8 tons/hr of coke have been filed with the Ohio EPA. The receipt of the permit is expected to occur in July 1997.

Conclusion

The next quarter's objectives are:-

- Putting together funding for the full size commercial reactor (PDU-II).
- Working towards the reactivation of the existing process development unit (PDU-I) in Alliance, Ohio for the demonstration of making coke suitable for the blast furnace for U.S. Steel and Bethlehem Steel.
- Preparation of a feasibility assessment to make use of the syngas as a reducing gas for the co-production of coke and DRI to insure commercial viability.

Submitted by:

Albert Calderon
Project Director

U. S. DEPARTMENT OF ENERGY
RECOMMENDATIONS FOR THE ANNOUNCEMENT AND DISTRIBUTION
OF DEPARTMENT OF ENERGY (DOE) SCIENTIFIC AND TECHNICAL INFORMATION (STI)
(See instructions on reverse side. Use plain bond paper if additional space is needed for explanations.)

PART I (DOE, DOE Contractors, Grantees, and Awardees complete)

A. Product/Report Data

1. (Award) Contract No. DE-FC22-95PC92638

2. Title Calderon Cokemaking
Process/Demonstration Project

3. Product/Report Description

☒ a. Report (Complete all that apply)

(1) ☒ Print ☒ Nonprint (specify) Diskette file

(2) ☒ Quarterly ☐ Semiannual ☐ Annual ☐ Final

☐ Topical ☐ Phase I ☐ Phase II

☐ Other (specify) _____

Dates covered 2-26-97 thru 5-25-97

☐ b. Conference/Meeting/Presentation (Complete all that apply)

(1) ☐ Print ☐ Nonprint (specify) _____

☐ Published proceedings

☐ Other (specify) _____

(2) Conference Title (no abbreviations) _____

Location (city/state/country) _____

Date(s) (m/d/y) ____/____/____ thru (m/d/y) ____/____/____

Sponsor _____

☐ c. Software—Additional forms are required. Follow instructions on the back of this form.

☐ d. Other (Provide complete description) _____

B. Patent Information

Yes No

☐ ☒ Is any new equipment, process, or material disclosed?
If yes, identify page numbers _____

☐ ☒ Has an invention disclosure been submitted?
If yes, identify the disclosure number and to whom it was submitted. Disclosure number _____
Submitted to _____

☐ ☒ Are there patent-related objections to the release of this STI product? If so, state the objections. _____

C. Contact (Person knowledgeable of content)

Name Albert Calderon

Phone 419/354-4632

Position Project Director

Organization Calderon Energy Company

ART II (DOE/DOE Contractors complete/or as instructed by DOE contracting officer)

A. DOE Identifiers

1. Product/Report Nos. _____

2. Funding Office(s) (NOTE: Essential data) _____

B. Copies for Transmittal to AD-21 (OSTI)

(STI must be of sufficient quality for microfilming/copying.)

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☐ 3. Two unclassified for processing

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☐ 3. Special Handling (Legal basis must be noted below.)

☐ a. Unclassified Controlled Nuclear Information (UCNI)

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☐ d. Translations of copyrighted material

☐ e. Small Business Innovation Research (SBIR)

☐ f. Commercializable information

☐ (1) Proprietary

☐ (2) Protected CRADA information

Release date ____/____/____

☐ (3) Other (explain) _____

☐ 4. Program Directed Special Handling (copy attached)

D. Releasing Official

A. Patent Clearance ("X" one)

☐ Has been submitted for DOE patent clearance

☐ DOE patent clearance has been granted

B. Released by

(Name) _____

(Signature) _____

(Phone) _____

(Date) _____

(Do not identify Sigma categories for Nuclear Weapons Data reports, and do not provide additional instructions that are inconsistent with C below.)

C. Recommendation ("X" at least one)

☐ 1. Program/Standard Announcement/Distribution

(Available to U.S. and foreign public)