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**PHASE II CALDERON PROCESS TO PRODUCE
DIRECT REDUCED IRON
RESEARCH AND DEVELOPMENT PROJECT**

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Principal Author(s): **ALBERT CALDERON**

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Submitting
Organization(s)

CALDERON ENERGY COMPANY

500 Lehman Avenue

Name & Address

P.O. Box 126

Bowling Green, OH 43402

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QUARTERLY TECHNICAL PROGRESS REPORT
PHASE II CALDERON PROCESS TO PRODUCE DIRECT REDUCED IRON
RESEARCH AND DEVELOPMENT PROJECT

CALDERON ENERGY COMPANY
COOPERATIVE AGREEMENT NO. DE-FC22-95PC92638

Reporting Period: 4-01-06 to 6-30-06

Date of Report: 7-31-06;

Phase II Award Date: 6-23-00; Anticipated Completion Date: 12-03-06

Total Project: \$ 14,732,316.00 Total DOE Share This Action: \$6,457,000.00

Contracting Officer's Representative (COR): John Stipanovich;

Project Director: Albert Calderon

Assistant Project Director: Reina Calderon

Abstract

This project was initially targeted to the making of coke for blast furnaces by using proprietary technology of Calderon in a phased approach, and Phase I was successfully completed. The project was then re-directed to the making of iron units. In 2000, U.S. Steel teamed up with Calderon for a joint effort to produce directly reduced iron with the potential of converting it into molten iron or steel consistent with the Roadmap recommendations of 1998 prepared by the Steel Industry in cooperation with the Department of Energy by using iron ore concentrate and coal as raw materials, both materials being appreciably lower in cost than using iron pellets, briquettes, sinter and coke.

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Executive Summary

The commercialization path of the Calderon technology for making a feedstock for steelmaking with assistance from DOE initially focused on making coke and work was done which proved that the Calderon technology is capable of making good coke for hard driving blast furnaces. U.S. Steel which participated in such demonstration felt that the Calderon technology would be more meaningful in lowering the costs of making steel by adapting it to the making of iron - thus obviating the need for coke.

U.S. Steel and Calderon teamed up to jointly work together to demonstrate that the Calderon technology will produce in a closed system iron units from iron concentrate (ore) and coal competitively by eliminating pelletizing, sintering, coking and blast furnace operation. If such process steps could be eliminated, a huge reduction in polluting emissions and greenhouse gases (including CO₂) relating to steelmaking would ensue. Such reduction will restructure the steel industry away from the very energy-intensive steelmaking steps currently practiced and drastically reduce costs of making steel.

The development of a technology to lower U.S. steelmaking costs and become globally competitive is a priority of major importance. Therefore, the development work which Calderon is conducting presently under this Agreement with the U.S. Department of Energy becomes more crucial than ever.

The work performed during the second quarter of 2006, which the present Progress Report covers, was advanced on three parallel paths: the first is related to U.S. Steel Research, the second is related to Iron Dynamics (IDI), and the third is related to Altos Hornos of Mexico (AHMSA), the largest steelmaker in Mexico.

With respect to U.S. Steel, tests were conducted on iron/carbon material that had been produced during the previous quarter regarding metallization. The results were disappointing by virtue of the metallization being about 50% of that set by U.S. Steel. Work will continue to improve with the goal of meeting U.S. Steel's requirement of 80% metallization or better.

With respect to IDI, eight tests were conducted with the objective of reducing ore concentrate mixed with electric arc furnace dust and both being reduced with coal.

With respect to AHMSA, top executives including its chairman visited Calderon's pilot in Bowling Green on two occasions, during which time two test runs were made producing iron/carbon material that was "homogenized" by melting it to produce hot metal, in their presence. They were impressed and decided to work with Calderon.

Experimental Work - U.S. Steel

The iron/carbon material produced in Test Run I-194 which lasted 88 hours from a cold start and which was reported in the preceding Quarter, was screened and delivered to U.S. Steel in March for analysis.

Results and Discussion - U.S. Steel

The results of the analysis were received on June 29, and as shown in Exhibit 1, were disappointing. They averaged 39.9% metallization, close to 50% of the target of 80% metallization.

In view of such results, serious thought has been given as to the cause. It appears that the drops (avalanches) from the discharge end that are sporadic and unpredictable drag unreacted material from the reactor itself. Based on this observation, effort will be spent to

concentrate on this problem and find a solution wherein the material is discharged uniformly from the reactor without dragging unreacted material.

Experimental Work - IDI

While waiting for the test results from U.S. Steel, test runs for IDI were conducted. These test runs consisted of eight tests as shown in Table 1.

Table 1

Test Run #	Date 2006	Length in Hours	No. of Pushes
I-197	4/4 & 4/5	36 hrs : 00 min	408
I-198	4/9 & 4/10	35 hrs : 00 min	394
I-199	4/19 & 4/20	35 hrs : 45 min	406
I-201	5/1 & 5/2	35 hrs : 40 min	416
I-203	5/24 & 5/25	35 hrs : 45 min	408
I-204	6/13 & 6/14	35 hrs : 45 min	400
I-205	6/21 & 6/22	35 hrs : 45 min	411
I-206	6/28 & 6/29	36 hrs : 45 min	401

Since the EAF is classified as hazardous, the arrangement with IDI was that after each test all the material collected would be sent to IDI for analysis and proper disposal.

Results and Discussion - IDI

The results obtained during the Test Runs for IDI were such that the iron oxide would be reduced with coal and the ZnO be driven out of the mix which was made-up of 70% ore concentrate and 30% electric furnace dust, by making use of pyrolysis and metallization. The

challenge was to trap the ZnO in order to isolate it and make it acceptable to the recycler as a valuable material that he would buy from IDI.

A collector made-up of ten rows of ten vertical pipes suspended within a box was fabricated. This collector is equipped with a perforated scraping plate (scraper) that is adapted to cycle up and down while scraping the 100 pipes, the vertical movement of the scraper being effected by two air cylinders; see Exhibit 2. The inside of the collector was insulated; see Exhibit 3. The collector was installed outdoors; see Exhibit 4.

The deposit of the ZnO dust on the tubes and their being scraped have functioned well after the minor adjustments that included an increase in the clearance between the scraper lifting rods and the guiding glands, and the addition of lubricators that supply penetrating oil into the glands through which the supporting rods of the scraper plate, slide.

The problem that has persisted during the drops (avalanches) at the discharge of the reactor which drag unreacted material from the discharge end of the reactor have also affected the quality of the ZnO in the collector by virtue that the smoke which occurs during the avalanches entrains an excess amount of carbon and ore particulate matter that are transported from the reactor to the array of pipes in the collector, thus contaminating the ZnO with excessive carbon and iron oxide. The elimination or the drastic reduction of the avalanches from the end of the reactor appears to be an absolute necessity, not only to minimize the contamination of the ZnO but also to improve metallization which U.S. Steel requires.

Experimental Work - AHMSA

Through a third party who is familiar with the work being done by Calderon, an introduction was made directly to the Chairman of AHMSA, Mr. Ancira; it was relayed to him that Calderon has been working on a unique process to make hot metal from iron ore concentrate and steam coal in an attempt to eliminate pelletizing, cokemaking and blast furnace operation. Mr. Ancira became curious in wanting to know more about the Calderon process as AHMSA has in its strategic plans to increase its steelmaking capacity by 50% by making use of its own ore and its own coal. On April 26, Mr. Ancira, accompanied by Mr. Ferris, Vice President of Engineering, flew into Toledo in his private jet to observe a test (No. I-200) producing hot iron/carbon product (Exhibit 5) and melting it to make hot metal. Both were very impressed with the Calderon process and its simplicity. Before departing arrangements were made to run a second test wherein other officials from AHMSA, including its CEO, Mr. Zemudio would attend.

The second test (No. I-202) was conducted on May 10, in the presence of four AHMSA officials observing the making of hot iron/carbon product from ore concentrate and steam coal, and the melting it to homogenize it to produce hot metal. These four officials were also quite impressed with Calderon's technology for making hot metal; they took samples of the metal made for analysis; the result of the analysis is shown in Exhibit 6. The list of the visitors from AHMSA that observed the Calderon process in operation during the two tests is shown in Exhibit 7.

Results and Discussion - AHMSA

During the two visits of AHMSA, Calderon stressed the fact, that the Calderon process is not a DRI process and should not be judged for its technical viability by applying the metallization criteria of the iron/carbon produced per se, by virtue that such semi-metallized material possesses ample reductant (carbon) integrally contained within the material to complete the metallization during the melting ("homogenization") of the material. Reference was made to the positive findings at Iscor in South Africa with respect to melting low metallization with carbonaceous material in a channel furnace.

At the conclusion of the meeting of May 10, AHMSA indicated that it would like to receive a quotation from Calderon to run a special test using AHMSA's own ore and steam coal, for which AHMSA would pay for such a test. At this writing arrangements have been completed to run such a test during the week of the 14th of August and a payment of \$46,000 for such test has been received by Calderon; see Exhibit 8.

Conclusion

During the next Quarter the action plan is as follows:

- ! Conduct the test for AHMSA
- ! Make changes to the equipment to prevent avalanches that cause the dragging of unreacted material from the discharge end of the reactor to increase metallization to 80% as required by U.S. Steel.
- ! Secure an extension of the cooperative agreement with DOE for an additional year without cost to the U.S. Government. Calderon hopes that additional funding may be secured from IDI and/or AHMSA. In the meantime Calderon

has decided to provide more than 95% of the financial needs of this important development with a token contribution from the remaining DOE funds. It is the intention of Calderon not to let the termination of the cooperative agreement with DOE to occur. It would be a major loss to the steel industry to let such a promising technology die because of lack of funds.

Submitted by:

Albert Calderon
Project Director

References - Not Applicable

The work performed in this quarter which the report covers, was original work. No reference material was relied upon for the work.

From: "David M Rohaus" <DRohaus@uss.com>
To: <acalderon@bghost.net>
Sent: Thursday, June 29, 2006 8:58 AM
Attach: Calderon 6_01_06.xls
Subject: Results of March Testing

Mr. Calderon,

We finally have the results of the samples you sent us in March. We apologize for taking longer than normal. As you know, we have moved our facilities and our equipment was not accessible until early June.

The results are as follows:

Drum B - 44.6% metallization
Drum C - 35.0
Drum D - 37.2
Drum E - 42.9

We followed the same analytical method used in the past.

The workbook with all the data and calculations is attached for your review.

Please call with any questions. Note my new office number is 412-433-7243.

Thanks.

Dave Rohaus

(See attached file: Calderon 6_01_06.xls)

Calderon Data Sheet

CRUSHING DATA

Drum ID	Drum B +1/4
Drum Weight	29.0
Product Weight	331.2

1st crush

Plus 1/4 Inch Weight	189.8
Minus 1/4 Inch Weight	140.6
Uncrushable	0.0
Total	330.4

2nd crush

Plus 1/4 Inch Weight	132.2
Minus 1/4 Inch Weight	196.8
Uncrushable	0.0
Total	329.0

3rd crush

Plus 1/4 Inch Weight	85.6
Minus 1/4 Inch Weight	239.4
Uncrushable	3.6
Total	328.6

4th crush

Plus 1/4 Inch Weight	49.6
Minus 1/4 Inch Weight	274.0
Uncrushable	5.0
Total	328.6

5th crush

Plus 1/4 Inch Weight	32.8
Minus 1/4 Inch Weight	290.4
Uncrushable	5.0
Total	328.2

6th crush

Plus 1/4 Inch Weight	23.2
Minus 1/4 Inch Weight	300.0
Uncrushable	5.0
Total	328.2

METALLIZATION CALCULATION

	Weight, lb.	%
Uncrushable	5.00	1.52
+1/4 Inch	23.2	7.07
- 1/4 Inch	300.0	91.41
Total	328.20	100.00

Uncrushable

Fe Total	95.60	(**assumed all metallic)
Fe Met**	95.60	
C	0.022	
S	0.514	

+ 1/4 Inch	+100 Mesh	-100 Mesh	Composite
%	35.01	64.99	100.00
Fe Total	95.60	74.99	82.21
Fe Met	95.60	34.19	55.69

C	0.022	0.520	0.346
S	0.514	0.400	0.440

- 1/4 Inch	+100 Mesh	-100 Mesh	Composite
%	7.97	92.03	100.00
Fe Total	95.60	69.23	71.33
Fe Met	95.60	23.77	29.49

C	0.022	6.090	5.606
S	0.514	0.400	0.409

Overall

	Wt. Fraction, %	Fe Total	Fe Met	% Met	C	S
Uncrushable	1.52	95.60	95.60	100.00	0.022	0.514
+1/4 Inch	7.07	82.21	55.69	67.7	0.346	0.440
- 1/4 Inch	91.41	71.33	29.49	41.3	5.606	0.409
Composite	100.00	72.47	32.35	44.6	5.15	0.41

Calderon Data Sheet

Drum ID	Drum C +1/4 in
Drum Weight	36
Product Weight	357

After 1st Crush

Plus 1/4 Inch Weight	158.4
Minus 1/4 Inch Weight	196.8
Uncrushable	0
Total	355.2

After 2nd Crush

Plus 1/4 Inch Weight	82.2
Minus 1/4 Inch Weight	271.20
Uncrushable	0
Total	353.4

After 3rd Crush

Plus 1/4 Inch Weight	43.8
Minus 1/4 Inch Weight	307.00
Uncrushable	1
Total	351.8

After 4th Crush

Plus 1/4 Inch Weight	22
Minus 1/4 Inch Weight	328.00
Uncrushable	1.4
Total	351.4

After 5th Crush

Plus 1/4 Inch Weight	12
Minus 1/4 Inch Weight	337.80
Uncrushable	1.4
Total	351.2

METALLIZATION CALCULATION

	Weight, lb.	%
Uncrushable	1.40	0.40
+1/4 Inch	12.0	3.42
- 1/4 Inch	337.8	96.18
Total	351.20	100.00

Uncrushable

Fe Total	95.60	(**assumed all metallic)
Fe Met**	95.60	
C	0.022	
S	0.514	

+ 1/4 Inch	+100 Mesh	-100 Mesh	Composite
%	51.36	48.64	100.00
Fe Total	95.60	68.03	82.19
Fe Met	95.60	20.49	59.07

C	0.022	0.560	0.284
S	0.514	0.430	0.473

- 1/4 Inch	+100 Mesh	-100 Mesh	Composite
%	6.66	93.34	100.00
Fe Total	95.60	63.55	65.68
Fe Met	95.60	16.38	21.66

C	0.022	6.930	6.470
S	0.514	0.410	0.417

Overall

	Wt. Fraction, %	Fe Total	Fe Met	% Met	C	S
Uncrushable	0.40	95.60	95.60	100.00	0.022	0.514
+1/4 Inch	3.42	82.19	59.07	71.9	0.284	0.473
- 1/4 Inch	96.18	65.68	21.66	33.0	6.470	0.417
Composite	100.00	66.37	23.23	35.0	6.23	0.42

Calderon Data Sheet

Drum ID	Drum D +1/4 in
Drum Weight	45.0
Product Weight	318.0

After 1st Crush

Plus 1/4 Inch Weight	163.8
Minus 1/4 Inch Weight	152.2
Uncrushable	0.0
Total	316.0

After 2nd Crush

Plus 1/4 Inch Weight	93.4
Minus 1/4 Inch Weight	220.6
Uncrushable	0.4
Total	314.4

After 3rd Crush

Plus 1/4 Inch Weight	55.6
Minus 1/4 Inch Weight	256.4
Uncrushable	1.6
Total	313.6

After 4th Crush

Plus 1/4 Inch Weight	34.4
Minus 1/4 Inch Weight	277.2
Uncrushable	1.6
Total	313.2

After 5th Crush

Plus 1/4 Inch Weight	20.0
Minus 1/4 Inch Weight	291.2
Uncrushable	1.6
Total	312.8

METALLIZATION CALCULATION

	Weight, lb.	%
Uncrushable	1.60	0.51
+1/4 Inch	20.0	6.39
- 1/4 Inch	291.2	93.09
Total	312.80	100.00

Uncrushable

Fe Total	95.60	
Fe Met**	95.60	(**assumed all metallic)
C	0.022	
S	0.514	

+ 1/4 Inch	+100 Mesh	-100 Mesh	Composite
%	41.82	58.18	100.00
Fe Total	95.60	69.16	80.22
Fe Met	95.60	18.41	50.69

C	0.022	0.330	0.201
S	0.514	0.410	0.453

- 1/4 Inch	+100 Mesh	-100 Mesh	Composite
%	11.17	88.83	100.00
Fe Total	95.60	69.62	72.52
Fe Met	95.60	16.35	25.20

C	0.022	7.890	7.011
S	0.514	0.410	0.422

Overall	Wt. Fraction, %	Fe Total	Fe Met	% Met	C	S
Uncrushable	0.51	95.60	95.60	100.00	0.022	0.514
+1/4 Inch	6.39	80.22	50.69	63.2	0.201	0.453
- 1/4 Inch	93.09	72.52	25.20	34.8	7.011	0.422
Composite	100.00	73.13	27.19	37.2	6.54	0.42

Calderon Data Sheet

Drum ID	Drum E +1/4in
Drum Weight	44.0
Product Weight	372.6

After 1st Crush

Plus 1/4 Inch Weight	179.4
Minus 1/4 Inch Weight	187.8
Uncrushable	0.0
Total	367.2

After 2nd Crush

Plus 1/4 Inch Weight	99.6
Minus 1/4 Inch Weight	265.4
Uncrushable	1.2
Total	366.2

After 3rd Crush

Plus 1/4 Inch Weight	67.0
Minus 1/4 Inch Weight	295.4
Uncrushable	3.0
Total	365.4

After 4th Crush

Plus 1/4 Inch Weight	44.2
Minus 1/4 Inch Weight	317.6
Uncrushable	3.2
Total	365.0

After 5th Crush

Plus 1/4 Inch Weight	33.0
Minus 1/4 Inch Weight	328.6
Uncrushable	3.4
Total	365.0

METALLIZATION CALCULATION

	Weight, lb.	%
Uncrushable	3.40	0.93
+1/4 Inch	33.0	9.04
- 1/4 Inch	328.6	90.03
Total	365.00	100.00

Uncrushable

Fe Total	95.60	
Fe Met**	95.60	(**assumed all metallic)
C	0.022	
S	0.514	

+ 1/4 Inch	+100 Mesh	-100 Mesh	Composite
%	38.15	61.85	100.00
Fe Total	95.60	63.99	76.05
Fe Met	95.60	27.72	53.62

C	0.022	0.880	0.553
S	0.514	0.450	0.474

- 1/4 Inch	+100 Mesh	-100 Mesh	Composite
%	13.44	86.56	100.00
Fe Total	95.60	69.16	72.71
Fe Met	95.60	18.11	28.52

C	0.022	5.970	5.171
S	0.514	0.420	0.433

Overall

	Wt. Fraction, %	Fe Total	Fe Met	% Met	C	S
Uncrushable	0.93	95.60	95.60	100.00	0.022	0.514
+1/4 Inch	9.04	76.05	53.62	70.5	0.553	0.474
- 1/4 Inch	90.03	72.71	28.52	39.2	5.171	0.433
Composite	100.00	73.23	31.42	42.9	4.71	0.44

AIR
CYLINDER

AIR
CYLINDER

ARRAY OF
PIPES

SCRAPER

BOX

COLLECTOR

Exhibit 2

INTERNAL
INSULATION

SCRAPER

ARRAY OF
PIPES

COLLECTOR

Exhibit 3

COLLECTOR

HOT IRON/CARBON PRODUCT
PRIOR TO HOMOGENIZING

Exhibit 5

From: "Armando Ferriz D." <aferriz@gan.com.mx>
To: <CalBook@bghost.net>; <acalderon@bghost.net>
Cc: "Gerardo Garcia Franco" <ggarciaf@gan.com.mx>
Sent: Friday, May 19, 2006 12:02 PM
Subject: Preliminary Results of the chemical analysis

Dear. Mr. Calderon:

Attached I am sending the Preliminary Results of the chemical analysis of the samples that we took from your pilot plant during our past visit:

Coal:

Ash	11.13%
Vol. Mat	37.50
Fixed C.	51.37
Sulphur	0.69

Molten Metal Samples:

%Carbón	%Manganese	%Phosphorous	%Sulphur	%Silicon	%Titanium
2.39	0.030	0.022	0.29	0.018	0.001
2.38	0.030	0.022	0.31	0.020	0.001
2.47	0.029	0.022	0.31	0.020	0.001

In the attached exhibit we include: **slag, ore and the ore/coal mix.**

Material	SiO2	Al2O3	CaO	MgO	P2O5	Mn	TiO2	Fe	S	Na2O	K2O	Zn
MIX CALDERON	4.18	0.74	1.65	1.09	0.017	0.224	0.391	50.60	0.190	0.013	0.054	0.005
ORE CALDERON	4.26	0.45	0.52	0.45	0.020	0.321	0.250	66.80	0.010	0.013	0.006	0.010
SLAG CALDERON	20.80	23.61	32.18	13.51		0.422		3.83		0.162	0.072	0.000

Exhibit 6

07/31/2006

AHMSA

ALTOS HORNOS DE MEXICO

Lic. Alonso Ancira Elizondo
Presidente del Consejo de Administración

5150 N Loop 1604 W
Sn. Antonio, Tx. 78249
Tel. (210) 341 37 77
aancira@gan.com.mx

Monclova, Coahuila
Tel. (866) 649 30 00
Fax (866) 633 84 52
México, D.F.
Tel. (55) 52 55 99 00
Fax (55) 52 43 32 20

Luis E. Zamudio M.
C.E.O.

www.ahmsa.com

P.O. Box 121
Monclova, Coah., 25770
Fax (52-866) 633 76 73
Phone 649 30 27
lzamudio@gan.com.mx

011/52 →

AHMSA

ALTOS HORNOS DE MEXICO

Armando Ferriz
Vice President Steel and Engineering

www.ahmsa.com

011 →

P.O. Box 121
25770 Monclova, Coah.
Dir. (52+866) 649 30 85
Fax 649 23 04
Comm. 649 36 00
Exts. 3085-3603
aferriz@gan.com.mx

AHMSA

ALTOS HORNOS DE MEXICO

Ing. José Cruz García Martínez
Subdirector de Ingeniería de Proyectos

www.ahmsa.com

Apartado Postal 121
25770 Monclova, Coah.
Dir. (866) 649 36 21
Fax 649 30 58
Comm. 649 33 30
Ext. 3620
jcgarciam@gan.com.mx

AHMSA

ALTOS HORNOS DE MEXICO

Gerardo García
Process Development
Steel and Engineering Area

www.ahmsa.com

Edificio GAN
Módulo 1, 2° Piso
P.O. Box 121 • México
Monclova, Coah., 25770
Fax (866) 649 23 19
Comm. 649 36 00
Ext. 3613
ggarciaf@gan.com.mx

AHMSA

ALTOS HORNOS DE MEXICO

Ing. Ramiro Araiza Durán
Gerente Tecnología

www.ahmsa.com

Apartado Postal 121
Monclova, Coah., 25770
Fax (866) 649 20 79
Comm. 649 33 30
Ext. 2808
raraizaduran@gan.com.mx

CALDERON ENERGY CO. OF BOWLING GREEN

P.O. BOX 126, BOWLING GREEN, OHIO 43402
TELEPHONE (419) 354-4632
TELEFAX (419) 353-6293

VIA FEDERAL EXPRESS

July 13, 2006

Mr. Juan Manuel Campos Charles
Concursos y Contratos
Altos Hornos de Mexico, S.A.DE.C.V.
Prol. Juarex S/N
25770 Monclova, Coahuila.
MEXICO

Subject: O/Re: A6B0650163

Dear Mr. Campos Charles:

This will acknowledge receipt of your quotation request. We are pleased to quote to AHMSA for the services to conduct a test on your samples of steam coal and iron ore at our facility in Bowling Green, Ohio, to convert these samples into an iron/carbon product which will be tested in Mexico.

These services will comprise a Test Run of roughly 54 hours from cold start during the week of August 14, 2006. The Test Run will begin with the use of Calderon's coal and ore during the first 12 to 14 hours to bring the equipment to steady state. Once the steady state condition is reached by taking samples of the iron/carbon material and grinding them, AHMSA's iron ore and coal will be used to the end of the test which is projected to last an additional 40 hours of continuous operation. During the Test Run Calderon personnel will cooperate with the AHMSA representatives to enable them to monitor the process, including the taking of appropriate measurements and collecting pertinent data in order to produce meaningful results which are quite important to AHMSA.

As the iron/carbon product is produced it will be collected in drums which will be alphabetically identified and in the order and the time at which the product was produced. At the end of the Test the drums will be put on pallets for shipment to AHMSA.

Our plan is to begin the test on Tuesday the 15th of August; however we recommend that AHMSA personnel arrive on the 14th in order to work out the details of the Test so that all personnel (AHMSA's and Calderon's) are fully informed of the procedures of the test.

PRICE: The cost to AHMSA for the Test Run is a lump sum of \$46,000.

TERMS: Payment is due before the Test Run begins to be wired to Calderon's account at SKY BANK in Bowling Green, Ohio, Main Branch, Routing Number: 041201936, Our Account Number: 617607

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CALDERON ENERGY CO.
BOWLING GREEN, OHIO 43402

Lic. Juan Manuel Campos Charles
AHMSA
July 13, 2006
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It is mutually agreed herein that complete data sheets generated during the test will be made available to both AHMSA and Calderon, that such data sheets will be treated as confidential matter, and that a copy of the report issued by AHMSA relating to the testing of the iron/carbon product in Mexico be delivered to Calderon as soon as it is produced and such report be treated as confidential matter. Calderon wishes to emphasize again that the iron/carbon product produced by the Calderon process is a non-uniform intermediate feedstock that needs to be homogenized by melting it to make hot metal as the Calderon product is NOT a DRI.

It is understood by AHMSA, that no rights of any kind in the Calderon technology are conferred upon AHMSA by virtue of participating in the Test since the purpose of the running of the Test is only for evaluation purposes.

The relationship between AHMSA and Calderon to date has been outstanding and the intention of both is to continue such a good relationship.

If AHMSA finds this quotation letter satisfactory it is requested from AHMSA to endorse it by countersigning in the space indicated in both original duplicates and returning one original to us.

Respectfully submitted,

CALDERON ENERGY CO.

By

Name Albert Calderon

Title President

ALTOS HORNOS DE MEXICO, S.A. DE C.V.

By

Name JESUS GARCIA IZAGUIRRE

Title CONTRACT MANAGER