RESPONSE TO REVIEWERS COMMENTS

On May 7, 2009, Mr. Jeff Burgess of the Lignite Energy Council completed a site tour of the Charfuel® 18 tpd pilot facility (the "18 tpd Charfuel® Demonstration Facility") located at Hazen Research, Inc., as well as having a face-to-face question & answer ("Q&A") session with Mr. Rick Kenney, Vice President of Hazen, and Mr. Lee Meyer and Mr. Eric Altman of Carbon Fuels, LLC, to assist in Jeff's evaluation of the Project and to obtain answers to various reviewers' comments. To facilitate the evaluation of the Project, Jeff organized and condensed various reviewer comments into a truncated, cohesive body of issues to guide the Q&A session.

To assist the other reviewers, Carbon Fuels has produced the following comments and responses based on the discussions with Jeff Burgess during his visit. However, it is important to note that while these written responses may be helpful, they should not be considered substitute for the level of understanding that Jeff gained from the site tour and Q&A session; and, we, therefore, encourage the reviewers to contact of either Mr. Jeff Burgess or Carbon Fuels for further clarification.

EXISTING FACILITY

The 18 tpd Charfuel® Demonstration Facility represents approximately $12 million investment in engineering and design studies by well known engineering firms such as Morrison Knudsen Engineers; Ford Bacon & Davis; Stone and Webster; and, Black & Veatch, as well as a $6 million investment in construction, equipment, and operation. All of this technology, as well as the 18 tpd Charfuel® Demonstration Facility is the property of Carbon Fuels, LLC. Through contract, this equipment has been located, built, and operated at Hazen Research, Inc.'s facility in Golden, Colorado. Although Hazen will provide the personnel to run the operations and has been involved in the design of the plant, Carbon Fuels personnel and other subcontractors selected for their specialized skills will complete the configuration, make the facility ready for the operations and control certain operations during the runs set forth in the proposal.

Hazen has been operating for over 40 years as a third party engineering and development contractor that has a site with infrastructure, operating expertise, and existing permits to design, construct, and run scalable operations such as the 18 tpd Charfuel® Demonstration Facility. Hazen's typical role is to assist projects with pilot scale engineering and to operate pilot scale facilities to support commercialization of new processes. All of the equipment required for the ND lignite Project will be purchased with the North Dakota Industrial Commission (NDIC) grant money and none of the grant money will be used to pay for or reimburse parties for any equipment that is existing on the site. It is important to note that the majority of the $920K requested from NDIC grant in Module #1 is allocated for configuring/reconfiguring the piping and installation and the quench systems (or for related engineering support services) of existing equipment necessary to obtain the desired data to achieve the design criteria and heat and material balances necessary to build a commercial facility using ND lignite as the coal feedstock. Therefore, the demonstration grant money from the NDIC will be used only to configure the existing 18 tpd Charfuel® Demonstration Facility for processing ND lignite.

Who owns the 18 tpd Charfuel® Pilot Plant at Hazen Research?

Carbon Fuels, LLC owns and has paid for all the equipment located at Hazen. Unlike other proposals, the NDIC is not being asked to fund construction of the facility to conduct the proposed Carbon Fuels Project. This proposal offers the NDIC the use of an existing facility and only to fund the work required to determine commercial operating design criteria for utilizing

ND lignite. Therefore, the NDIC is obtaining the benefit of years of technology development, engineering, construction, permitting, and operating costs to verify the Charfuel® Process using ND lignite as the feedstock. ND lignite is very reactive, high moisture, low rank coal, which must be verified as a feedstock on an empirical basis to gain the design criteria for a commercial plant. Without this work, obtaining private sector funds for commercial development of Charfuel® commercial plant utilizing ND lignite will not be realizable.

What equipment is being purchased?
During Mr. Jeff Burgess' tour at Hazen, the specific modifications and additions that would be required to configure the 18 tpd Charfuel® Demonstration Facility for ND lignite were pointed out. Carbon Fuels' matching funds for this Project would be allocated to those features which are deemed generically necessary to run the facility, including upgrade of the instrumentation and control system, as well as additional instrumentation, wiring, piping, and insulation.

What are the reasons the 18tpd Charfuel® Demonstration Facility needs to be configured from the previous runs?
The 18 tpd Charfuel® Demonstration Facility must be configured in various ways to accommodate a high moisture reactive green coal – ND lignite. During the tour of the facility at Hazen, Lee Meyer and Rick Kenney explained in detail those modifications that are anticipated in order to run ND lignite.

The costs appear too high for the short tests. Justify.
As was explained to Mr. Jeff Burgess, each run is approximately a three-day campaign, including preparation, pre-operation checks, heat-up, heat soaking, pressurization, run time, shut down, cool down, and decommissioning. If the Council members refer to the description of these two tasks in the grant Application, they will note that these runs require substantial operating preparation, which are included in Project's budget numbers. Even though, the actual runs are 6-7 hours, the entire operation takes several days. The facility is first gradually brought-up to operating temperature in several stages (approximately 20 hours) with hot partial oxidation ("POX") gas in a flow-through mode to bring the whole system up to operating temperature The system then must be heat-soaked to assure stable operating temperatures. This requires substantial consumables (natural gas, oxygen, and nitrogen at a cost of over $72K per run). Next, the system is brought-up to pressure in stages. Pressure leaks and equipment verification are conducted at each stage to ensure accurate instrumentation, control, monitoring, sampling, and the like. Finally, at operating temperature and pressure, the coal feed is started, and operations commenced. During the 6-7 hour run, samples are taken and the system's parameters varied to obtain data regarding yields. At the end of the run, the system is gradually cooled down, and mass samples (char and liquids) are collected. The system is then cleaned.

The estimated cost of the three budgetary components of the hot run: 1) System Check and Heat-Up; 2) Operations with Coal; and, 3) Cool-Down, Inspection and System Cleaning are $50K, $67K, and $30K, respectively, which include labor and consumables. The run with recycled oil is slightly higher. In addition to the labor and consumables, Carbon Fuels will be making a $250K "in-kind contribution" for the use of the Carbon Fuels' existing 18 tpd Charfuel® Demonstration Facility, including wear and tear. Because substantial mechanical and operating changes to the 18 tpd Charfuel® Demonstration Facility will be required in order to process and validate ND lignite as a feedstock (due to ND lignite's low rank, light-volatiles, and high-moisture content), no other coal feedstock will be able to be tested in this configuration or while the Project is underway (including while the facility is being configured for ND lignite). Additionally, the facility will have to be re-modified to run other higher rank coals following the

completion of the ND lignite Demonstration Project. This re-modification cost is not being charged to this Project.

It is also worth noting that the majority of the costs in the grant application are based on competitive bids from third party contractors.

Additionally, Charfuel® Process has a very short residence time, processing .5 lbs of coal every second. Thus, the system produces a large amount of material and provides numerous opportunities to modify operating conditions in the 6-7 hour run time. The third party engineers, Hazen Research, in concurrence with other third party engineers, have determined that expanding pilot plant testing for days, weeks or a month does not add significant information or data for scale up, but does add significant costs.

In the commercial plant the process gasses will be recycled, eliminating the need for consumables. This recycle system is not necessary or cost effective at the 18 tpd pilot size. The recycle technology is commercial and will be installed "of the shelf" in the 500 tpd facility.

CLARIFY OBJECTIVES

Why did the initial submission say "optimize operating conditions" and the amendment modified the objective to "determine commercial operating design criteria"?
It is, and always has been, the objective of this Project to determine the scale up parameters for constructing a 500 tpd Commercial Demonstration Facility utilizing ND lignite. Optimization of the process parameters for ND lignite will be undertaken in the Commercial Demonstration Facility under full operating conditions. This was explained to Mr. Jeff Burgess by Hazen in detail when Mr. Jeff Burgess visited Hazen. This Project is aimed at commercial scale up, not optimization of specific parameters which will be done in the 500 tpd Commercial Demonstration Facility which will run continuously.

Run times sufficient for scale-up:
Please remember that the residence time of the reactor is less than one second. Therefore, a 6-7 hour run will process about 6 tons of coal feedstock, which will provide a substantial amount of data, and is considerably more than standard pilot operations provide (especially when compared to batch processes). Thus, a large quantity of product (solid and liquid), as well as ample opportunity to take real-time gas samples (predicated upon variation in operating conditions) is provided in the 6-7 hour runs. Hazen has determined that these two planned runs would be more than adequate to provide the design criteria for a 500 tpd Commercial Demonstration Facility to be co-located in North Dakota. Part of the reason for conducting this set of tests with ND lignite is to determine the suitability of this feedstock to the Charfuel® Process by varying reactor and operating conditions. As stated earlier, the objective is to determine commercial operating design criteria and verify heat and material balances, as well as to characterize commercial grade products.

Why are two short runs sufficient?
As previously stated, reaction times for the Charfuel® Process occur in a fraction of a second. At each reaction interval data is taken; and, modifications to the reaction parameters can be made for subsequent reactions. Thus, for example, a competing process which has a 10-12 minute residence time would not produce ample data or material in a 6 to 7 hour run. The 18 tpd Charfuel® Demonstration Facility processes over 300 lbs of coal in a continuous flow system in a 10 minute time span. Therefore, the Charfuel® Process is able to collect as much data in a 7 hour

run as processes with a 10 minute residence time can collect in 175 days of operation. Independent engineering companies, including Hazen, have determined that additional run time would not add significant information or data, but does add significant costs.

Why do two short runs provide sufficient data in this process, but other processes needs weeks of continuous testing?
See above.

Explain internal recycle of oils
The Charfuel® Process is analogous to crude oil refining and, specifically, catalyst ("CAT") cracking. The campaign proposed for ND lignite, which is a very "green coal," is to have a first run without recycle of heavier materials back into the reactor. Analysis of all materials derived from this run will indicate the appropriate aliquot of material to be recycled into the reactor to be re-cracked into lighter materials. Mr. Jeff Burgess was shown the existing equipment in the facility that will be used to accomplish this recycle. The economics of the Charfuel® Process are predicted upon yields of light hydrocarbons, such as diesel, gasoline, jet fuel, and the like. Thus, as with oil refining, heavier materials are re-cracked to yield these very valuable transportation fuels. One advantage ND lignite has over higher rank coals is that the hydrocarbons are lighter in ND lignite, thus allowing more high value liquid fuels to be produced.

Is drying coal on a commercial scale going to add significant costs?
The Charfuel® Process requires feedstock having about 8% moisture. This is accomplished during grinding by heated, inert sweep gas in the mill. In commercial scale facilities, nitrogen from the air separation unit and captured process heat that would otherwise have to be dissipated will be sufficient to dry the feedstock. Mill sizes and drying time may have to be increased for ND lignite because it has high moisture content. The proposed Project will validate this.

INFORMATION/REPORTS CLARIFICATION

The information and reports to be provided during and after the Project are set forth in the proposal. We have asked Mr. Jeff Burgess, who has executed a Non-Disclosure Agreement with Carbon Fuels, to be a member of the interim and final report teams to monitor the Project and assure that the proper information is reported to the NDIC.

What information will be disclosed to the committee?
Carbon Fuels intends to disclose all of the quantitative and qualitative specifications for the feedstock, as well as all co-products produced.

The Sample and Analysis Protocol for North Dakota Lignite protocol will include quantitative and qualitative characterizations, including, for example, Proximate; Ultimate; Heating Value; Volatile Content; Forms of Sulfur; Elemental Ash Analyses; Ash Fusion Temperature (oxidizing and reducing); Selected Trace Metals (Hg, As); and, Particle Size Distribution (pulverized coal feed and char). Other analyses will be completed, as the program proceeds and needs arise, particularly related to the char and its utilization as a boiler fuel especially in fluidized bed combustors. These additional tests and analyses may include physical handling properties (friability, angles of repose and reclaim, and dustiness), reactivity (self-heating potential and oxygen uptake), and surface characteristics (porosity, pore volume, and SEM analysis). Additionally, liquid product characterization will include standardized petroleum assays, including, for example, pH, aromatic content, trace metals, and the like. These tests will be

developed with input from Tesoro Corporation's Mandan, ND refinery. (See attached Letter of Support).

Where does the mercury report to? Are there environmental issues?
The mercury in the coal is associated with the volatile material and is separated into the gas stream in the reactor during the process. The significance of this is that the mercury will be removed from the char that is used as a solid fuel for gasification or combustion, resulting in a cleaner boiler or gasification fuel. There is existing technology for further separation and sequestration of mercury from the gas stream. As it was explained to Mr. Jeff Burgess, this is one of the analyses that must be run to determine what downstream process needs to be added to a commercial scale operation to properly treat the gas stream to handle the mercury.

How is the char used in met coke?
Char is not metallurgical coke because so called "met coke" involves a structural aspect not present in char. The application for char for metallurgical coking is related to carbon reduction which is used to process "pig iron" into carbon steel. There are only few blast furnaces that actually use met coke charges because of the environmental problems. Char would be used in carbon steel production in a continuous caster.

GENERAL/FINANCING/MARKETS

Crude oil refining is considered by many to be the most successful energy infrastructure in the world. In part, this is because oil companies look at crude oil as feedstock, not as an end-product. The coal industry can emulate the oil refining industry's success by providing coal as a feedstock for further refining through the Charfuel® Process—rather than only providing coal as an end-product to be combusted for power generation.

Oil companies who extract crude in any part of the world do not concern themselves as much with markets for their product in local regions because, in fact, they are fungible and marketable worldwide. ND lignite, because of its low BTU content and high moisture, is generally not a portable material. The Charfuel® process views coal, including ND lignite, as a hydrocarbon feedstock, just like crude oil, and the resulting co-products will be fungible, in demand worldwide, and able to be cost-effectively shipped to other regions if necessary.

Is there an existing market for the products in ND?
The ND market for petroleum products is not crucial to the economic viability of a Charfuel® coal refinery located in ND. The hydro-carbon based fuels and petrochemicals can be cost effectively railed or pipe-lined to the rest of the nation. What is critical is the abundant amount of ND lignite feedstock available at a low cost per BTU. Moreover, the solid char is a clean boiler fuel for fluidized bed boilers or gasifiers, which can be utilized for power generation in the ND region. (See attached Letter of Support from MDU).

The Charfuel® Process would transform limited-utility lignite into fungible and high-demand co-products such as liquid fuels and petrochemicals which can serve large global markets, while creating additional wealth in North Dakota.

Cost to ship products not used in ND to other locales?
As pointed out above, the shipping costs for the products produced in ND are comparable to those of petroleum products, including transportation fuels and petrochemicals, which are

already produced in North Dakota at Tesoro's Mandan refinery, which has provided us a Letter of Support for the proposed project.

What is produced?

In an integrated Charfuel® Coal Refining Facility, which would include downstream integrated refinery capacity, the products are benzene, toluene, and xylene (petrochemicals), motor-grade gasoline, methanol, Jet-A, diesel, heating oil, CO_2 for enhanced oil recover ("EOR"), sulfur, ammonia for fertilizer, and char to be used as a clean boiler fuel by, for example, MDU or in carbon steel production. If the commercial scale Charfuel® Plant is co-located with an existing refinery, then the integrated downstream refinery portion is not needed; and, a Naphtha stream from the Charfuel® plant would be further processed by the refinery to yield standard transportation fuels.

Why doesn't a Commercial-Scale Charfuel® Facility already exist?

The Charfuel® process was originally conceived and developed during a period when oil prices were low, and the conventional wisdom was that the world was awash in oil. Thus, following several million dollars of initial investment to develop and validate the core Charfuel® process, the market at that time was not signaling a need for alternatives to oil. Only in the past couple of years has the need for alternatives to oil reemerged as a major energy issue. Therefore, during these past several years, Carbon Fuels responded to these new market needs by investing in and constructing the 18 tpd Demonstration Facility. Only recently have economics, politics, and environmental concerns raised this issue to criticality.

Why does Carbon Fuels think it will be able to attract industry capital when they have not been able to do so to-date?

This question assumes something that is not accurate. Trying to commercialize a process in the energy sector is an extensive, long-term, and tedious process. For example, the primary existing coal-to-liquid technologies (other than Charfuel®) were developed in Germany some 70 years ago. Carbon Fuels has attracted almost $18 million of government, industry, and private funds to develop the core Charfuel® process and to build the 18 tpd Charfuel® Demonstration Facility at Hazen.

Carbon Fuels has held discussions with several large potential partners including Tesoro and MDU who have written Letters of Support for this project. Several other large oil refining companies are also considering utilization of the Charfuel® process. Additionally, Carbon Fuels has interest from several institutional energy investors (such as private equity energy investors) who have indicated that they would be able to provide financing to construct a commercial-scale Charfuel® plant(s). However, these entities do not typically finance earlier-stage development activities such as what would be achieved with the proposed project, which is why the NDIC grant money is required. Once we have completed the proposed project, achieved site selection, identified coal suppliers and co-products customers, and retained an Engineering Procurement and Construction ("EPC") company, these entities would be interested in financing the construction and development of the commercial-scale operations.

What are the differences between running lignite vs. higher grade coals? Capital, Revenue, CoGs, IRR, Any additional technology challenges.

Carbon Fuels has completed preliminary financial models using both bituminous coal and lignite and while Carbon Fuels knows that ND lignite has different characteristics from the lignite modeled, we are confident that the financial metrics are similar.

Due to the high throughput of the Charfuel® Process, the capital costs are low relative to the amount co-products produced. The depreciation of these costs calculated on a 20 year straight line method would be less than 10% of the revenue. This dynamic means that the process is not sensitive to capital costs and modeling has been completed that shows that even if the capital costs are doubled from the estimates from the engineering studies, the commercial facility would still have an IRR above 30% (non-leveraged using 100% equity financing at $42/bbl crude oil).

Carbon Fuels doesn't believe that a significant amount of additional capital equipment in the coal handling or downstream processes for ND lignite is required, but even if there is, the low sensitivity to capital costs shows that the plant can accommodate them without significantly changing the economics.

Also, an interesting financial dynamic occurs between using lower grade coal vs. higher grade coals. Since coal costs have a relationship to the amount of energy (BTUs) contained, and the Charfuel® Coal Refining Process simply refines the materials contained in the coal products using a high throughput process with relatively low sensitivity to capital costs, using a lower grade coal results in lower revenues and lower costs of goods sold ("CoGS") but does not substantially change the operating margins or the Project internal rate of return ("IRR").

With three times more coal (measured by energy content) in the world than crude oil, as crude oil becomes scarce it will increase in price faster than coal. This rise in crude oil price will result in an increase in the price of petroleum product prices. Since the Charfuel® Coal Refining Process is utilizing abundant and relatively inexpensive coal and selling the produced co-products into existing petro-fuel and petrochemical markets, one expects the economics of the Charfuel® to get better in rising crude oil markets.

As a final item worth noting, CO_2 has become the "buzz word" for the news channels and environmental groups, but they do not discern between CO_2 emission and CO_2 captured for industrial use. A 10,000 tpd Charfuel facility running ND lignite will produce about 1.3 Million Metric Tons of CO_2 per annum. However, considering the DOE estimates that the US has the potential to sequester 140 to 670 billion metric tons of captured carbon dioxide and the Enhance Oil Recovery ("EOR") industry is estimated to require about 7,500 million metric tons between now and 2030 to produce an additional 39 to 48 billion barrels of economically recoverable domestic oil, Carbon Fuels has a high degree of confidence that the captured CO_2 from the Charfuel® can be marketed for EOR use.

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March 23, 2009

E-mail and Mail Delivery

Mr. Lee Meyer
Carbon Fuels, LLC
3600 South Yosemite Street, Suite 360
Denver, CO 80237

Subject: Carbon Fuels Charfuel® Process Scaleup from 18 to 500 st/d
Hazen Project 10183

Dear Mr. Meyer:

Carbon Fuels, LLC has asked Hazen Research, Inc. to summarize our assessment and conclusion that scaling the 18-st/d pilot unit, currently located at the Hazen facility, supports the scaleup factor of a 500-st/d reactor planned for the next phase of the project. We understand that this information is requested to support the due diligence of investors in making an informed decision regarding the next steps in commercializing the Charfuel process.

Hazen has been in the business of developing processes for major industries for more than 47 years. We have helped our clients develop numerous innovative processes, many of which have become successful large-scale commercial operations. A typical development project at Hazen includes feedstock characterization, conceptual process flowsheet formulation, laboratory-scale studies to confirm basic process chemistry, bench-scale studies to provide some of the important process parameters (material handling properties of process streams, liquid–solid separation characteristics, etc.), and pilot-scale studies to gain operating information for the process and define process specifications. The pilot plant information may also include data on materials of construction, effects of recycle streams, and scaleup issues. In most cases, the development program provides the basis for completing a detailed design of a larger-scale demonstration plant or a commercial plant. For the mining or energy industries, the commercial plant may process many thousands or tens of thousands of tons of feedstock per day.

Simply stated, the Carbon Fuels Charfuel process converts (refines) coal to liquid fuels, chemicals, and synthesis gas. The coal feed and reactor systems are simple in concept, with fine coal being fed under pressure and by gravity into a reaction zone and material transfer through the reactor driven by gas flow, which is controlled by the system pressure drop. The reaction products are then quenched by nozzle flow

within the reactor to essentially stop the reaction. In this phase of the process there are no moving parts. Hazen has worked with Carbon Fuels in the development and demonstration of the Charfuel process since 2002. In support of this effort over the 7-yr period, Hazen has completed projects ranging from technical and economic assessments of the Charfuel process through design and operation of Stage 1 of the 18-st/d pilot plant. A list of the projects follows:

Hazen Project 9868:	Due Diligence Study of the Carbon Fuels Charfuel Coal Refining Process
Hazen Project 9919:	Carbon Fuels Process Development Program Phase I: 18-st/day Pilot Plant Design
Hazen Project 9976:	Macroeconomic Evaluation for the Carbon Fuels Coal Refinery Process
Hazen Project 10056:	Preparation for 18-st/d Pilot Plant
Hazen Project 10088:	Critical Path and Equipment Refurbishment Tasks for 18-st/d IPDU
Hazen Project 10183:	Carbon Fuels Pilot Plant
Hazen Project 10226:	Evaluation of the Economic Viability of Specific Collocation Scenarios for a Charfuel Commercial Facility

In the initial due diligence study (Project 9868), Hazen reviewed all prior technical information provided by Carbon Fuels, which included studies completed by Ford, Bacon & Davis, Ebasco Services, Morrison-Knudsen Engineers, and Stone and Webster Engineering Corporation. Based upon this prior technical information, Hazen determined that the scaleup from 18 to 500 st/d was supported by sound engineering data and analysis. Hazen's report[1] contained the following conclusions:

> "The studies reviewed by Hazen concluded that the operation of a 500-st/day demonstration unit was the next logical step in the process development. This would demonstrate the Charfuel process at a scale sufficiently large to verify the design of the HDP reactor and the coupling of this reactor with the POX unit." (page 9)
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> "Although the [Charfuel] process will ultimately need to be demonstrated at a scale large enough to provide sufficient products for market tests (i.e. 500 st/day), many of the critical design questions can be answered at a much smaller, less-costly scale. A pilot-scale operation with a capacity of 10 to 25 st/day should be sufficient to identify and resolve process-related problems in integrating selected commercial and non-commercial process unit operations." (page 10)

In Project 9919, Hazen determined that a pilot plant was the next step required in developing the process and defined project objectives, including a critical review of the existing information on the 18-st/d pilot plant with refinement of the original design. As a result, Hazen proposed a phased program for the 18-st/d pilot plant in two stages. Stage 1 incorporated all unit operations in the critical front end of the process, excluding the gas conditioning and liquid recovery sections, which were judged to be more

[1]Gertenbach, Dennis D., et al. 2002. *Due diligence study of the carbon fuels Charfuel coal refining process.* Hazen Research, Inc. company report (Project 9868). May 17.

straightforward. In Stage 2, the gas conditioning and liquid recovery sections of the process would be added and the integrated pilot plant would then be operated to demonstrate the entire process with the exception of the gas recycle, which was determined to be impractical and unnecessary for the pilot plant. One of the key objectives of the 18-st/d pilot plant was to provide plant engineering and design information (process specifications) for use by a commercial engineering company in providing detailed designs for the scaled-up 500-st/d demonstration plant.

Under Hazen Projects 10056, 10088, and 10183, Hazen completed the final design of Stage 1 of the pilot plant; procured the required equipment, instrumentation, and supplies; fabricated the pilot plant, and completed the mechanical shakedown of all systems. The Stage 1 pilot plant was successfully operated and demonstrated the critical unit operations of the Charfuels process. Inspection of the inside of the HDP reactor revealed no significant wear, however the total operating time was limited. Erosion and other effects of the reactor walls will be better assessed in longer operating times and/or controlled wear tests. If wear is found to be present, it can be controlled by proper selection of the refractory lining material.

As part of the efforts under Project 10183, a top-level design of the entire (Stages 1 and 2) pilot plant was completed, including a process flow diagram; piping and instrumentation diagrams; heat and material balance modeling; process specifications; equipment, instrumentation, and supplies lists; and plot plans and elevation drawings for the pilot plant equipment and structures. Some of this work was subcontracted to VECO USA, Inc., a local engineering company. The gas separation step, which is practical on a commercial scale, is not feasible for the pilot plant and was determined not to be critical in proving the technology.

Project 9976 provided top-level economics (macroeconomic evaluation) for the operation of a 5,000-st/d commercial Charfuels facility. Project 10226 considered the economics of various scenarios in which a 500-st/d commercial demonstration Charfuel facility would be collocated with a utility, an oil refinery, or a steel mill. The issue of the proper scale factor for the next development after the pilot plant was addressed in the Project 10226 report.[2]

> "After reviewing the scaleup factors for engineering designs and the potential markets for products to be produced in the Charfuel demonstration facility, a production rate of 500 st/day as-received coal feed was selected for use in all of the scenarios. This size results in a scaleup factor of about 27, which is high, but not excessive, for a process demonstrating a green (uncommercialized) technology." (page 2)

Selecting an appropriate scaleup factor for moving a process from the pilot-plant scale to demonstration or commercial scale depends in large part on the status of the technology. Balancing the risk of a process failure at the commercial scale with development time and project costs also affects the decision. Certain unit operations in the Charfuel process (the hydrodisproportionation (HDP) reactor and the coal feed

[2]Reeves, Robert A., et al. 2005. *Evaluation of the economic viability of specific collocation scenarios for a Charfuel commercial facility.* Hazen Research, Inc. company report (Project 10226). May 17.

interface between the pressure oxidation (POX) reactor and the HDP reactor) represent new technology that is yet to be proven on commercial scale. However, the majority of the unit operations in the Charfuel process have been proven on a commercial scale. Previous engineering studies and Hazen's assessment have concluded that moving the technology from 18 to 500 st/d is reasonable.

Other factors to consider in the scaleup of the process technology are residence time and throughput, as well as the effects of these parameters on the size of process vessels and equipment. The Charfuel process is unique in this respect because of the high feed rates and relatively small size of the HDP reactor, the most critical unit operation in the process. The diameter of the reaction chamber in the HDP reactor for the 18-st/d pilot plant at Hazen is 2 in. In the 500-st/d reactor, the diameter increases only to about 10.5 in. Therefore, the increase in the size of the key component of the Charfuel process in scaling from 18 to 500 st/d is relatively small.

Please contact me if you have any questions or require further information.

Sincerely,

Charles W. (Rick) Kenney
Vice President

CWK/lmr

MONTANA-DAKOTA
UTILITIES CO.
A Division of MDU Resources Group, Inc.

400 North Fourth Street
Bismarck, ND 58501
(701) 222-7900

April 8, 2009

Ms. Karlene Fine, Executive Director
North Dakota Industrial Commission
Lignite Research, Development and Marketing Program
State Capitol, 14th Floor
600 East Boulevard Avenue, Dept. 405
Bismarck, ND 58505-0840

RE: Letter of Support for Carbon Fuels, LLC's Application for Demonstration Project Grant

Dear Karlene:

Montana-Dakota Utilities Co., A Division of MDU Resources Group, Inc. (MDU) submits this letter in support of Carbon Fuels, LLC's demonstration project grant application under the NDIC/LRC Lignite Research, Development and Marketing Program. MDU has previously had discussions with Carbon Fuels about the "Charfuel®" coal refining and fuels manufacturing technology and the potential for it to be commercially implemented utilizing North Dakota lignite. MDU understands that the proposed demonstration project would help to characterize the solid fuel (called "char") produced by the Charfuel® process. MDU believes char has the potential to be utilized as a supplemental feedstock for our existing lignite-fired power plants.

From MDU's high level review of the Charfuel® process, the char co-product appears to be an attractive feedstock for blending with the North Dakota lignite that is currently used to fuel a number of our facilities. The proposed demonstration project by Carbon Fuels would yield critical data and materials characteristics from test runs of North Dakota lignite that would facilitate MDU's further technical analysis of the char co-product and its suitability as a blending feedstock for our lignite-fired power plants in North Dakota.

MDU envisions that utilizing char as a supplemental feedstock has the potential to yield environmental benefits to our lignite-fired power plants, as well. Carbon Fuels has reported that the char is expected to be substantially free of pollutants, such as mercury, sulfur and nitrogen. In addition, since the char contains little to no moisture, the heating value should be significantly higher than lignite, potentially reducing CO_2 emissions. If these claims can be verified, the utilization of char as a supplemental feedstock in MDU's power plants has the potential to reduce emissions without the need for additional pre- or post-combustion air quality control systems. The proposed demonstration project would help MDU to quantify these potential environmental benefits.

If proven using North Dakota lignite, Carbon Fuels' technology has the potential to be a significant contributor to the expansion of North Dakota's lignite mining, fuels refining, and power generation industries. MDU therefore supports Carbon Fuels' proposed demonstration project and is optimistic that the data and results provided will be beneficial in proving the feasibility of this technology.

Sincerely,

Andrea Stomberg
Vice President – Electric Supply

John S. Berger
Vice President, Refining

TESORO

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April 9, 2009

Ms. Karlene Fine, Executive Director
North Dakota Industrial Commission
Lignite Research, Development and Marketing Program
State Capitol, 14th Floor
600 East Boulevard Avenue, Dept. 405
Bismarck, ND 58505-0840

RE: Letter of Support for Carbon Fuels, LLC Demonstration Project Grant

Dear North Dakota Industrial Commission:

Tesoro Corporation is writing to support Carbon Fuels, LLC's application for a demonstration project grant through the NDIC's Lignite Research, Development and Marketing Program. Tesoro has held a series of meetings with Carbon Fuels to discuss the potential for constructing a commercial-scale "Charfuel" plant near Tesoro's Mandan refinery, which could provide the refinery with an alternative liquid feedstock derived from North Dakota lignite coal. Based on information presented by Carbon Fuels, this feedstock could potentially be further processed in Tesoro's existing refinery to produce gasoline, diesel and other co-products, and could be delivered to regional markets via the existing pipeline system and existing tanker fleets.

Tesoro has an established program to continuously evaluate alternative crude oils and other feedstocks for our refineries, with a focus on materials that can be sourced cost-effectively from nearby regions. In North Dakota, lignite represents a raw material that could potentially be upgraded into an alternative feedstock for our refinery, and Carbon Fuels' Charfuel process appears to have the potential to provide a lignite-based feedstock in support of our efforts.

In order to validate the compatibility of Charfuel-derived feedstocks with Tesoro's Mandan refinery, it is critical to understand the chemical characteristics of the products derived from the Charfuel process specifically utilizing North Dakota lignite coal. It is our understanding that the demonstration project proposed by Carbon Fuels in its NDIC grant application is targeted toward determining these specific data, so Tesoro would be interested in the findings of the project. These results could then support further development discussions between Carbon Fuels and Tesoro, which could result in the construction of a co-located Charfuel plant near our Mandan operations.

Tesoro believes Carbon Fuels' proposed demonstration project has the potential to contribute to the continuing expansion of North Dakota's energy industry, and therefore merits the support of the North Dakota Industrial Commission.

Sincerely,

John S. Berger
Refinery Manager

JSB/sms