TENASKA® TRAILBLAZER PARTNERS, LLC

Report to the Global CCS Institute

CO_2 Technology Evaluation, Methodology and Criteria

Final Report January 2011

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Abstract

The Tenaska Trailblazer Energy Center (Trailblazer or Project), is a nominal 760 MW supercritical pulverized coal electric generating station under development in Nolan County, Texas, United States, approximately nine miles east of Sweetwater, Texas.

Trailblazer is expected to be the first new-build coal plant in the United States to incorporate a commercial-scale carbon dioxide (CO_2) capture plant into the initial design. The Project will be designed to capture 85 to 90 percent of the CO_2 that otherwise would be emitted into the atmosphere.

In June 2009, Tenaska signed a Memorandum of Understanding (MOU) with Fluor Enterprises, Inc. (Fluor) to work together to define the scope of the Project and to develop and negotiate an Engineering, Procurement and Construction (EPC) contract for the pulverized coal power plant and the carbon capture plant. The MOU allowed Tenaska to evaluate and bid the carbon capture portion of the Project separately, allowing for a third party carbon capture supplier/constructor to work at the Trailblazer site in parallel with Fluor.

This report describes the process undertaken by Tenaska to identify and select the preferred vendor to perform the carbon capture Front End Engineering Design (FEED) for the Project. The process yielded four competitive bids which included estimates of performance and indicative cost of the carbon capture plant and firm FEED pricing, and a clear choice for award based on the evaluation process. The evaluation showed that four short listed vendors had competitive firm carbon capture FEED pricing. The selected technology vendor was determined by the 30-year evaluated cost and commercial experience with the process. In both cases, Fluor was the preferred choice.

This is the second in a series of knowledge sharing reports on Carbon Capture and Storage (CCS), developed by Tenaska for the Global CCS Institute.

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1.0 Executive Summary

Trailblazer is expected to be the first new-build coal plant in the United States to incorporate a commercial-scale CO_2 capture plant into the initial design. The Project will be designed to capture 85 to 90 percent of the CO_2 that otherwise would be emitted into the atmosphere. CO_2 from the Project will be sold into the Permian Basin CO_2 market in West Texas, where it will be used in Enhanced Oil Recovery (EOR) and ultimately stored permanently underground.

The carbon capture industry is still in its infancy and the business and technology issues associated with scaling up carbon capture equipment to full commercial power plant scale creates many challenges. Undertaking the carbon capture FEED early in the design process allows the owner to concentrate on the carbon capture FEED portion of the project and allows the design to mature to a point where better construction cost estimates can be developed based on the carbon capture FEED results.

A MOU signed in June 2009, between Tenaska and Fluor to develop and negotiate an EPC contract for the pulverized coal power plant and the carbon capture plant allowed Tenaska to evaluate and bid the carbon capture portion of the Project separately.

Thereafter, Tenaska entered into a pre-qualification and competitive bid process to identify the preferred carbon capture technology vendor. The selected vendor would proceed into an eight month FEED process to quantify capital cost for the carbon capture plant, including all interface costs with the pulverized coal power plant, and to establish performance guarantees. The selected vendor would need the financial strength to assume commercial risks associated with new technology should the Project proceed to construction and ultimately operation.

From June through September 2009, Tenaska contacted seven carbon capture technology vendors to determine their level of technology development in the industry to date and their interest in entering into a competitive bidding process for award of the carbon capture FEED. Six of the seven vendors responded with general information about their process technology, history of development, business profile and financial information. The duration of this process was extended to allow for sufficient time to schedule vendors and to gather the required resources. Interest in the technology is high and limited resources are available from most vendors.

This report describes the process undertaken by Tenaska to identify and select the preferred vendor to perform the carbon capture FEED for the Project. The process yielded four competitive bids which included estimates of performance and indicative cost of the carbon capture plant and firm FEED pricing, and a clear choice for award based on the evaluation process. The evaluation showed that all the short listed vendors had competitive firm carbon capture FEED pricing. The selected technology vendor was determined by the 30-year evaluated cost and commercial experience with the process. In both cases, Fluor was the preferred choice.

2.0 Introduction

The Project is a nominal 760 MW supercritical pulverized coal electric generating station under development in Nolan County, Texas, United States, approximately nine miles east of Sweetwater, Texas. Trailblazer is expected to be the first new-build pulverized coal-fueled power plant in the United States to incorporate a commercial-scale CO_2 capture plant into the initial design. The Project is being designed to capture 85 to 90 percent of the CO_2 that otherwise would be emitted into the atmosphere. CO_2 from the Project will be sold into the Permian Basin CO_2 market, where it will be used for EOR and ultimately permanently stored underground. Geologic storage of CO_2 will be considered should it become economically attractive.

Sub-bituminous coal will be delivered to the Project from the Powder River Basin in Wyoming via the Union Pacific (UP) and/or Burlington Northern Santa Fe (BNSF) railroads. The Project site is bordered on the north by the UP railroad and on the south by the BNSF railroad. The Project will interconnect to the Electric Reliability Council of Texas (ERCOT) 345 kV electrical system, most likely at a substation about three miles from the Project site.

The Project owner is Tenaska Trailblazer Partners, LLC. Tenaska Trailblazer Partners, LLC is owned 65% by affiliates of Tenaska, Inc. and 35% by Arch Coal, Inc. Tenaska, Inc. and Tenaska Trailblazer Partners, LLC are referred to collectively as “Tenaska” in this report.

In early 2007 Tenaska developed the opinion that it was increasingly likely that the United States would take steps to regulate CO_2 emissions. In response, the company formed a multi-discipline task force to investigate the development opportunities that would be created in a carbon-constrained environment. The task force believed there could be incentives for “first movers” that might not be available on an ongoing basis or to those who were slower to react to this change.

Task force members were drawn from the Development, Environmental and Engineering groups within Tenaska. After a six-month review, the task force recommended development of a pulverized coal plant with carbon capture in West Texas. The recommendation was taken to the company’s Executive Board, whose members approved the recommendation in the fourth quarter of 2007.

In February, 2008 the site was procured, an air permit application was filed with the Texas Commission on Environmental Quality (TCEQ), an electric interconnection request was filed with ERCOT, and the Project was announced to the public. Tenaska engaged Burns & McDonnell to serve as Owner’s Engineer in November, 2008. In June 2009, Tenaska signed an MOU with Fluor to work together to define the scope of the Project and related work and to develop and negotiate an EPC contract for the pulverized coal power plant and the carbon capture plant. The MOU allowed Tenaska to bid the carbon capture portion of the Project separately, allowing for a third party carbon capture supplier/constructor to work at the Trailblazer site in parallel with Fluor. In order to develop the Project with guarantees for plant performance and with a high percentage of the capital cost for the Project on a firm price basis (to be developed during an open book estimate phase), the carbon capture plant was included in the scope of supply of the Project.

Approaching the Project in this manner allowed Tenaska to understand the estimated cost for the entire Project and structure an EPC agreement that would be acceptable to the financial community. The carbon capture plant portion of the Project was structured as a separate add-on EPC scope and cost such that Tenaska could bid the technology in a competitive setting and award it separately from the pulverized coal part of the Project if desired.

From June through September 2009, Tenaska contacted seven carbon capture technology vendors to determine their level of technology development in the industry to date and their interest in entering into a competitive bidding process for award of the carbon capture FEED. Three bidders were eliminated due to shortcomings in their technology and experience, or an inability or unwillingness to meet Tenaska's bidding conditions, leaving a shortlist of four bidders in September 2009. In May 2010, Fluor was selected as the preferred supplier, based on the evaluation criteria discussed below. In June 2010, a MOU was developed with Fluor to conduct a FEED study for the carbon capture plant. Tenaska and Fluor executed a contract on July 15, 2010 for Fluor to perform the FEED study and to be the presumptive carbon capture technology provider for the Project.

See http://www.tenaskatrailblazer.com for more information about the Project. The report to the Global CCS Institute titled "Development of the Tenaska Trailblazer Energy Center", dated August 2010, provides a history of the Project, the rationale behind the site selection and technology selection, and identifies key challenges the Project faces. See http://www.globalccsinstitute.com for more information about the Global CCS Institute.

2.1 Developer Overview

Since its founding in 1987, Tenaska has successfully developed and constructed 15 power generation facilities, totaling more than 9,000 MW. Today, Tenaska operates eight power generation facilities totaling 6,700 MW that it owns in partnership with other companies. Tenaska also provides energy risk management services and is involved in asset acquisition and management, power marketing, fuel supply, natural gas exploration, production and transportation systems, biofuels marketing and electric transmission development.

Tenaska Capital Management, an affiliate, provides management services for standalone private equity funds, with almost $5 billion in assets, including nine power plants and multiple natural gas midstream assets, including gas storage, gathering and processing facilities. In 2009, Tenaska and its affiliates managed approximately 34,000 MW of assets on behalf of a variety of customers and private equity investors.

An affiliate, Tenaska Marketing Ventures (TMV), is regarded as one of the top 10 natural gas marketers in North America, and provides natural gas commodity, volume management, hedging and asset management products and services. In 2009, TMV was ranked No. 1 in the United States in natural gas pipeline capacity trading according to Boston-based CapacityCenter.com, which monitors and collects capacity and operational information on all interstate pipelines. Customers responding to Mastio & Company's "Value and Loyalty Benchmarking" survey in 2009 ranked TMV No. 1 in the nation among major marketers for value and loyalty.

Another affiliate, Tenaska Power Services Co. (TPS), specializes in electric power marketing and asset management for utilities and non-utility generators, and is one of the largest marketers of electric power in the United States. TPS has developed a significant presence in the wind industry, and currently schedules about 20% of the wind generation in ERCOT.

In 2009, Tenaska had gross operating revenues of $7.9 billion and assets of approximately $2.8 billion. In 2009, *Forbes* magazine ranked Tenaska as 16th among the largest privately-held United States companies, based on 2008 revenues.

See http://www.tenaska.com for more information about Tenaska.

2.2 Partner Overview

In March 2010, Arch Coal acquired a 35% share of Tenaska Trailblazer Partners, LLC from affiliates of Tenaska. St. Louis-based Arch Coal is the second largest United States coal producer, with revenues of $2.6 billion in 2009. Through its national network of mines, Arch Coal supplies cleaner-burning, low-sulfur coal to United States power producers to fuel roughly 8 percent of the nation's electricity. The company also ships coal to domestic and international steel manufacturers as well as international power producers.

In total, Arch Coal contributes about 16% of the United States' coal supply from 11 mining complexes in Wyoming, Utah, Colorado, West Virginia, Kentucky and Virginia.

Arch Coal controls a domestic reserve base totaling 4.7 billion tons. Of that total, 88% is low in sulfur and nearly 83% meets the most stringent requirements of the Clean Air Act without the application of expensive scrubbing technology.

In addition to becoming a valued partner, Arch Coal also will provide low-sulfur Powder River Basin coal to the Project under a 20-year coal supply agreement.

See http://www.archcoal.com for more information about Arch Coal.

2.3 Contractor Overview

Fluor Corporation is one of the world's largest publicly owned engineering, procurement, construction, maintenance, and project management companies. Fluor has more than 36,000 global employees, and maintains offices in more than 30 countries across six continents. Fluor ranks No. 111 on the Fortune 500 list of America's largest corporations. *Engineering News-Record (ENR)* magazine ranks Fluor No. 1 on its Top 100 Design-Build Firms list and No. 2 on its Top 400 Contractors list. See http://www.fluor.com for more information.

Burns & McDonnell is a full-service engineering, architecture, construction, environmental and consulting solutions firm. Its staff of more than 3,000 represents virtually all design disciplines. Burns & McDonnell plans, designs, permits, constructs and manages facilities all over the world. In 2010 *Engineering News-Record* ranked Burns & McDonnell number 22 in design firms and number 8 in power plant design firms. See http://www.burnsmcd.com for more information.

3.0 Purpose and Goals

This report discusses how Tenaska evaluated potential carbon capture technology suppliers and ultimately selected Fluor as the carbon capture technology supplier for the Project. The goal of this report is to provide information and insights that can be used by others who are embarking on a carbon capture technology selection process.

The key purposes of this report are to:

1. Describe potential contracting methods for the carbon capture plant to provide the best combination of performance and risk mitigation, and the reasons for selection of the bid process used. Define the relationship and contracting structure with the carbon capture technology and equipment vendor that would accommodate the needs of all parties and provide acceptable risk mitigation for the Project's owners and lenders.

2. Describe the process undertaken by Tenaska to pre-qualify the potential technology vendors for the carbon capture plant. The bidder selection process was complicated by the fact that Fluor, the prospective EPC contractor for the Project, had included a bid for its own proprietary carbon capture technology in its EPC bid. Other potential bidders were concerned that Fluor, who normally would direct the bidder selection process as the EPC contractor, had a potential conflict of interest. As a result, Burns & McDonnell, the Owner's Engineer, directed the carbon capture technology bidding process. Potential vendors were evaluated using a Kepner-Tregoe® type complex decision analysis method, which is described in more detail later in this report. Tenaska identified five important criteria against which potential bidders would be measured:

    - development status of the technology (most important);
    - its readiness for operation at commercial scale with commercial guarantees for performance (most important);
    - financial strength of bidder;
    - ability to perform work and meet schedules; and
    - other technical considerations.

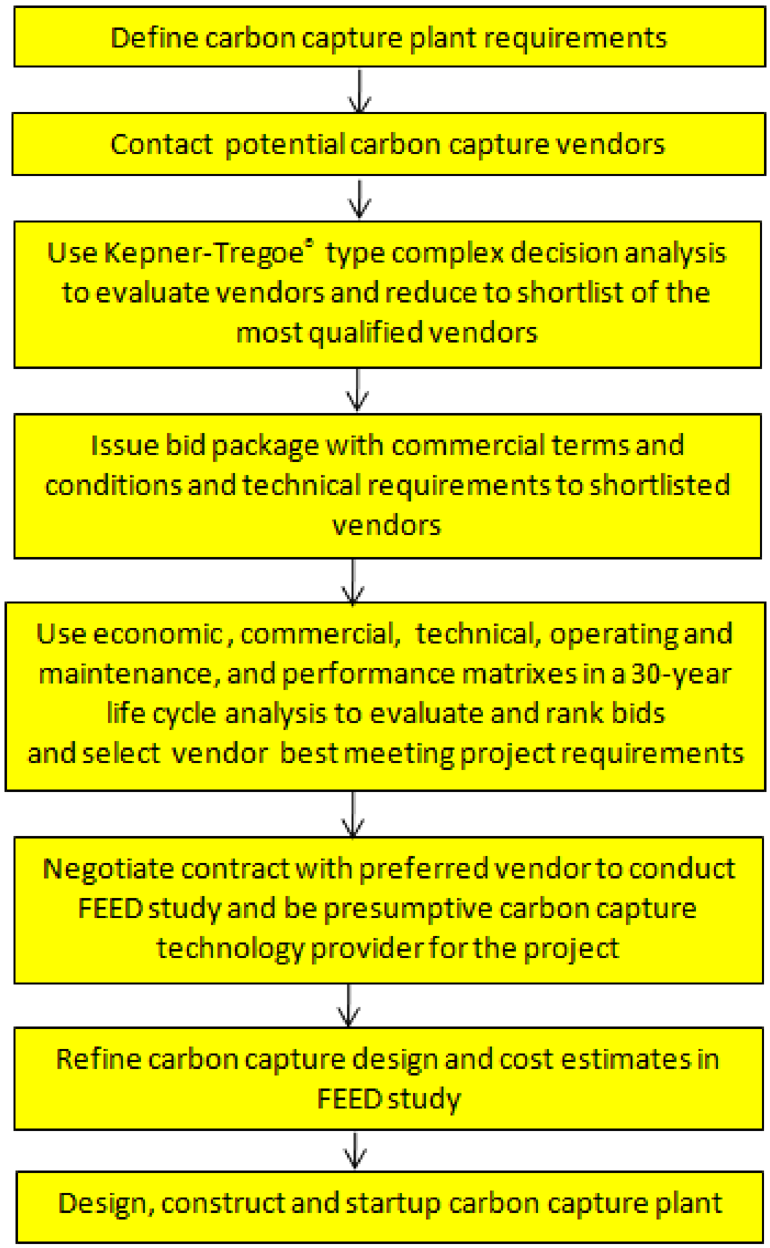
3. Explain the criteria and methodology used to evaluate the potential technology vendors and to arrive at a bidder's short list for a firm price carbon capture FEED proposal and to provide an indicative cost estimate for the carbon capture plant.

4. Explain the criteria and methodology used to evaluate the proposals received from the selected bidders. The bids received during the technology selection process, along with the bid from the EPC contractor, were evaluated based on economics, technology and organizational characteristics.

4.0 Evaluation of Carbon Capture Technologies

Figure 1 below illustrates the process Tenaska used to select the preferred vendor for the carbon capture FEED study and the presumptive carbon capture technology vendor for Trailblazer.

FIGURE 1 – Process used to select carbon capture FEED study vendor



4.1 Carbon Capture Technology Status

4.1.1 Overview

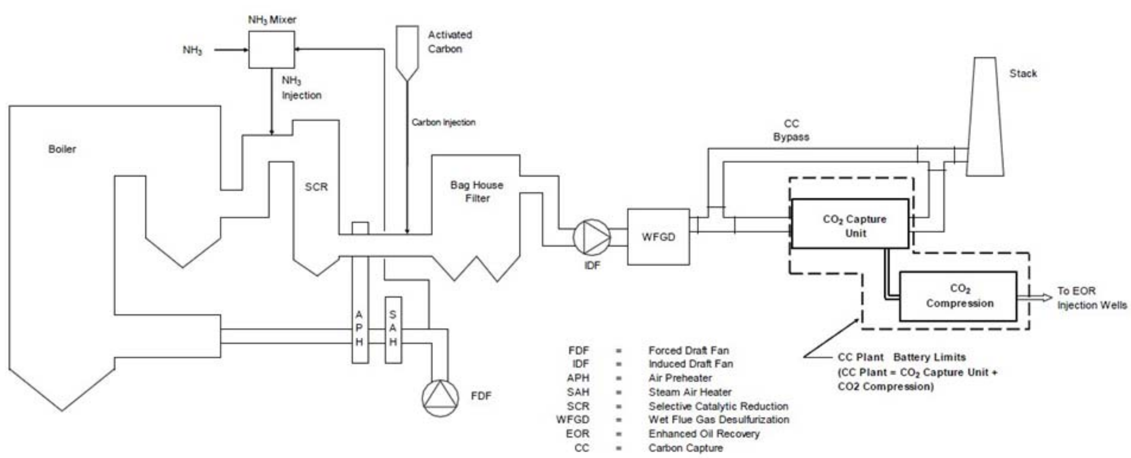
Trailblazer will use post-combustion carbon capture technology, which removes CO_2 from the flue gas produced by combustion of coal in the power plant. The technology to remove CO_2 from gas streams is well understood and is widely used in the natural gas and petroleum refining industries. However experience with CO_2 removal from power plant flue gas has been limited to much smaller scale than that contemplated for Trailblazer. Also the flue gas is near atmospheric pressure rather than the higher pressures generally experienced in other industries, further increasing the gas volume. Successfully removing CO_2 from the volume of flue gas produced by a power plant the magnitude of Trailblazer will require a major scale-up from currently operating plants.

Flue gas emissions from the Trailblazer boiler will be controlled as follows:

- Nitrogen oxide (NO_x) emissions will be controlled using low-NO_x burners with over-fire air and selective catalytic reduction (SCR) with ammonia injection;
- Particulate emissions will be controlled using fabric filtration in baghouses;
- Mercury emissions will be controlled by injection of activated carbon or other sorbent into the flue gas prior to passing through the fabric filter; and
- SO_2 emissions will be controlled using wet flue gas desulfurization with calcium carbonate addition.

Figure 2 below shows the flue gas path through the emission control equipment from the boiler to the stack. Treated flue gas entering the carbon capture unit will contain about 12% (by volume) CO_2 mixed with about 65% nitrogen, 4% oxygen, 1% argon and 18% water vapor. The flue gas entering the carbon capture unit will not contain more than 26 ppmv NO_x and 10 ppmv SO_2. Flue gas will enter Trailblazer's carbon capture unit at approximately 134°F and near atmospheric pressure.

FIGURE 2 – Trailblazer Flue Gas Treatment



A number of gas treating methods and processes have been developed and are commercially operated in the natural gas and petroleum refining industries. Much of the experience and techniques gained in the gas and petroleum refining and other industries will be applicable to removing CO_2 from power plant flue gas. Gas treating technology vendors generally consider their processes, solvents, and reagents to be proprietary, and reveal little information without confidentiality and licensing agreements in place. The vendors are hesitant to share information that would compromise their competitive position in the marketplace. The vendors are particularly sensitive about sharing information about emerging technologies. The ownership of the gas treating technology vendors continues to change, and their strategies continually evolve with ownership and marketplace changes.

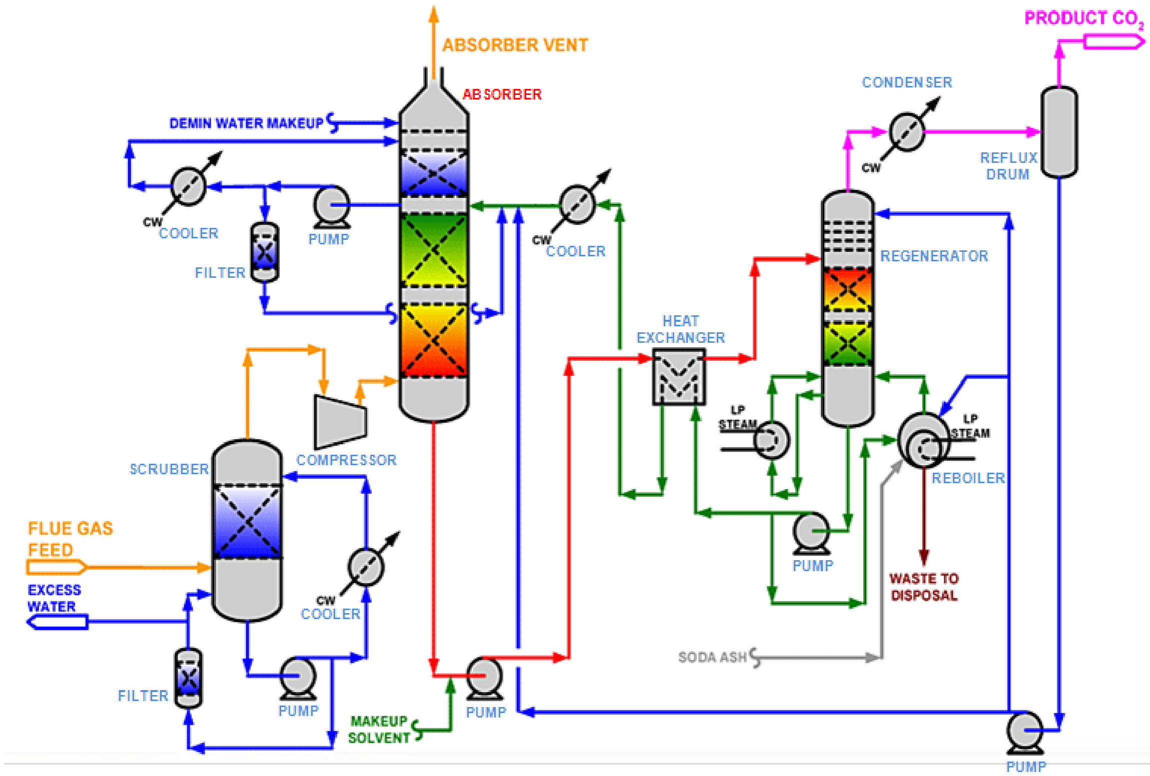
Typically in a gas treatment plant, the operating pressures and temperatures within the plant are determined by the pressure and temperature of the incoming gas, the required pressure of the product gas, the composition of the incoming gas, the product gas specification, and the reagent or solvent used. Gas treatment plant designers try to minimize power requirements for pumping and/or compression and steam requirements for heating. Various additives to the reagent or solvent may be used as activators, to control corrosion, or to reduce foaming.

The Trailblazer plant site and plant design will have certain characteristics that will require optimization of its gas treatment plant to remove the CO_2 form the flue gas. The Trailblazer facility will be located within a semi-arid region and will have minimal water available for cooling, so almost all cooling will be done with air coolers. Steam, condensate, and demineralized water requirements will be incorporated into the power plant design. Trailblazer also poses gas treatment plant design challenges due to the low pressure of the flue gas (near atmospheric pressure), the relatively high oxygen level of the flue gas (about 4% by volume), and the large quantity of flue gas produced by the boiler. These site characteristics will require insight from the technology provider to optimize the system for the best economic operating condition.

4.1.2 Fluor's CO_2 Capture Technology

Fluor was identified as the preferred supplier to perform the carbon capture FEED and proceed with the Project to completion. Fluor's Econamine Plus® carbon capture technology is conceptually shown in Figure 3 below. Fluor's amine-based solvent is formulated to recover CO_2 from low pressure, oxygen containing streams. The Fluor Econamine Plus® process is similar to gas treating processes which have been practiced for many years, and uses simple, reliable equipment that is well-known in the gas treating industry.

FIGURE 3 – Fluor Econamine Plus® Carbon Capture Plant Flow Diagram



Even with the deployment of high efficiency pollutant removal technologies upstream, residual quantities of SO_2, sulfuric acid (H_2SO_4), nitrogen oxides (NO_x), ammonia (NH_3), particulates, and other trace constituents remain in the flue gas. Impurities in the flue gas can lead to the formation of heat stable salts (HSS), the product of reactions between amines and various acids. The HSS must be converted back into amine through a reclaiming process. Generally it is more cost-effective to reduce HSS precursors before the flue gas encounters the solvent. To remove trace constituents remaining in the flue gas after upstream SCR, fabric filtration, and desulfurization, the flue gas is washed and cooled with water in a direct contact scrubber. Contaminants are removed from the water in filters, and excess water condensed from the flue gas is pumped to water treatment and recycling.

The cleansed flue gas is compressed and sent to an absorber vessel, where it is contacted with Fluor's solution. Distribution trays within the absorber create intimate contact between falling liquid and rising vapor, and CO_2 is removed from the gas by the liquid. Flue gas with 90% of the CO_2 removed leaves the top of the absorber and is routed to the stack. The solution high in CO_2 from the bottom of the absorber is sent to the top of a regenerator vessel. The rich solution falling down the regenerator is contacted with vapor rising up the regenerator, removing the CO_2 from the liquid. Distribution trays within the regenerator create intimate contact between the falling liquid and the rising vapor. Liquid from the bottom of the regenerator is heated with steam in reboilers, producing vapor that rises up the regenerator column. Solution from the bottom of the regenerator is returned to the top of the absorber. The rich solution going from the bottom of the absorber to the top of the regenerator is heated with lean solution going from the bottom of the regenerator to the top of the absorber. Vapor from the top of the regenerator is cooled in a condenser. Liquid condensed from the overhead vapor is returned to the regenerator or absorber as reflux. CO_2 removed by the treatment plant is concentrated in the uncondensed vapor, which is sent to dehydration and compression to CO_2 pipeline specifications.

4.2 Selection of Carbon Capture Technology Vendors

Tenaska evaluated the gas treating technologies available, and contacted seven carbon capture technology vendors to determine their level of technology development in the industry and their interest in entering into a competitive bidding process for award of the carbon capture FEED. Six of the seven vendors responded with general information about their process technology, history of development, business profile and financial information. A formal performance bid package with commercial terms and conditions and a technical bid package were issued to a shortlist of four bidders. The technical bid package given to the shortlisted bidders is included as Exhibit 1 to this report.

The four shortlisted carbon capture technology vendors were asked to provide a CO_2 removal system based on the following design criteria:

- The CO_2 removal system shall have a carbon dioxide recovery of 90% or greater;
- The plant is designed for 50% turndown in flue gas mass flow rate;
- Capacity factor for the power plant is 90%;
- Limited water is available for process cooling. Most equipment cooling must be air cooled; and
- The CO_2 removal system will deliver dry CO_2 meeting the specifications of West Texas CO_2 pipelines at 2,500 psig and a minimum 98% (by volume) CO_2 (Specifications are shown in Exhibit 1).

Bidders were asked to provide the following information with their proposals:

- Carbon capture process equipment - All equipment wetted by the carbon capture process fluids, equipment required for process heating and cooling, including the equipment motors, wetted instruments, and control valves. Include all thermal flue gas polishing equipment required by the carbon capture process. Include first fill of solvents and reagents;
- Flue gas handling fans - Fans necessary for overcoming flue gas differential pressure due to carbon capture process equipment;
- CO_2 compression and drying equipment;
- Field fabricated and shop fabricated tanks;
- Miscellaneous equipment;

- Flue-gas ductwork between, upstream, bypass and downstream of carbon capture process equipment;
- Piping requirements;
- Electrical, instrumentation, and controls requirements;
- Civil and structural requirements;
- Number of absorption trains required and the major pieces of equipment that makes up the absorption trains, and a description of turn-down and sparing philosophy for all equipment and systems;
- Number of regenerator trains required and the major pieces of equipment that makes up the regenerator trains;
- Number of solvent reclaim trains;
- Process flow diagram with heat and material balance and narrative of the proposed processes;
- Plot plan of the proposed process equipment and facility;
- Number of CO_2 compression and dehydration Trains and the number of stages of compression required;
- Solvent and reagent storage - volume of the storage tanks used and the concentrations of solvents and reagents stored. Identify and state storage volume and concentrations for other reagents, solvents, and chemicals required by the process;
- Utility requirements;
- Emission and waste stream information; and
- Predicted performance and operating data.

Following is a list of lessons learned from the process above:

- The basis of EPC indicative cost estimate needs to be analyzed carefully since a project of this scale has not been built;
- The payment schedule and cost for the CO_2 technology license fee varies;
- Due to heightened interest in this technology, the evaluation schedule should include ample time to obtain responses from technology providers;
- Scale-up factors for major equipment need to be considered carefully;
- Materials of construction for chemically wetted parts need to be compared and analyzed carefully; and
- Solvent usage and degradation basis need to be analyzed with respect to technology experience.

4.3 Carbon Capture Contractor Selection

In order to develop the Project with guarantees for plant performance, and to obtain a high percentage of the capital cost for the Project on a firm price basis (to be developed during an open book estimate phase), Tenaska conducted a competitive proposal process to select an EPC contractor for the Project. Bidders in the EPC process were asked to show the cost of the carbon capture plant as a separate component in the scope of supply for the Project, allowing Tenaska flexibility to select the Project's carbon capture technology after the presumptive EPC contractor was selected.

As previously mentioned, in June 2009 Fluor was selected in a competitive proposal process to enter into a MOU with Tenaska, making Fluor the presumptive EPC contractor for the Project. The evaluation was based on indicative pricing, experience, performance, schedule, commercial terms and ability to perform. As requested in the bid package, Fluor provided separate indicative pricing for its Econamine Plus® carbon capture technology.

Tenaska, in conjunction with Burns & McDonnell and Fluor, developed a list of seven potential carbon capture plant suppliers/constructors to contact regarding interest in making a proposal to provide their technology to capture carbon dioxide from the Trailblazer facility. Burns & McDonnell assumed the lead role for the carbon capture plant bidder selection and bid evaluation process to avoid potential conflicts of interest with Fluor both bidding on the carbon capture plant and acting as the EPC contractor for the pulverized coal portion of the Project. Burns & McDonnell served as a non-conflicted Owner's engineer for the evaluation process. Jointly, Tenaska and Burns & McDonnell evaluated all proposals. A fair and consistent process is required to obtain the true interest and response from technology providers.

A shortlist of four bidders was selected in September 2009 based on evaluation criteria discussed below. A formal performance bid package with commercial terms and conditions developed by Tenaska and Burns & McDonnell and a technical bid package developed by Fluor (and reviewed by Burns & McDonnell and Tenaska) was issued in October 2009. Indicative bids were solicited for either an engineer-procure (EP) approach or an EPC approach, whichever method the supplier preferred. One bidder submitted a bid under an EP approach and an EPC approach and three bidders submitted under an EPC approach only.

Bids were received in December 2009 and January 2010. Bid evaluation was conducted over the next several months, with several rounds of questions being sent to each of the bidders. In May 2010, Fluor was preliminarily selected as the preferred supplier, based on the evaluation criteria discussed below. In June 2010, a MOU was developed with Fluor to conduct a FEED study for the carbon capture plant. The MOU included a refined scope of work, allowed for technical clarifications and included the commercial terms and conditions. Tenaska and Fluor executed a contract in July 2010 for Fluor to perform the FEED study and to be the presumptive carbon capture technology provider for the Project. Ample time should be considered for MOU discussions and clarifications due to the new technology and emerging marketplace. The public announcement of this Contract is shown in Exhibit 2.

4.4 Available Contracting Options and Chosen Method

Several alternatives were available to Tenaska in contracting the pulverized coal power plant and the carbon capture plant. One alternative was a multiple contract approach, in which the owner selects an engineer to design the facility and awards several equipment and construction contracts to complete the facility. At the other end of the contracting spectrum was the EPC approach, in which the owner awards a contract to a single entity that is responsible for a project from beginning to end. A further alternative was a hybrid of these two methods, in which engineering is performed by a single entity and a limited number of contractors are selected to provide equipment and construction for selected areas of the facility. Tenaska selected the EPC approach for the following reasons:

- Funding for the Project will be provided by outside financial institutions that require project wrap guarantees for cost, schedule and performance. Such guarantees can only be provided under an EPC approach where the responsibility for the Project falls under a single contracting entity. The Project is planned to be the first-of-a-kind large scale commercial unit and this contracting structure is expected to be preferred by the financial institutions.
- Contractors that are capable of providing EPC services are generally large and financially strong enough to bear the financial risks associated with such a large project.
- The EPC approach provides a single point of responsibility for the Project and helps insulate the owner from cost, schedule and performance risk.

The potential downside of the EPC contracting approach is associated with risk allocation and the related cost burdens to manage this risk.

The Fluor-Tenaska MOU allowed Tenaska to bid the carbon capture portion of the Project separately, potentially allowing for a third party carbon capture supplier/constructor to work at the Trailblazer site in parallel with Fluor. This method of EPC contracting between Tenaska and Fluor allowed Tenaska to pursue two different carbon capture contracting alternatives: 1) negotiate acceptable technical and commercial terms with Fluor or 2) prepare and issue a request for proposal (RFP) document to pre-qualified bidders seeking firm carbon capture FEED proposals and an indicative cost bid for the carbon capture plant in a competitive bid situation. The basis for a negotiated contract with Fluor was in place, and in addition, Tenaska was free to seek firm carbon capture FEED proposals and indicative bids for the carbon capture plant to determine if the Fluor offering was best for the Project.

4.5 Key Shortlisting Process and Criteria Used

Confidentiality agreements were developed with the potential bidders so they could provide information concerning their process for recovery of CO_2 from flue gas streams. Meetings were held with the potential suppliers during July, August and September of 2009 to assess each potential supplier's level of interest and technology development.

After the meetings, Tenaska selected a short list of bidders based on the criteria described below. There was some attrition of bidders, including those who declined to participate in the process and those whose technology was not deemed by Tenaska to be sufficiently developed to be considered viable for Trailblazer.

4.5.1 Kepner-Tregoe® Evaluation

The remaining bidders were evaluated using a modified Kepner-Tregoe® type complex decision analysis method. Kepner-Tregoe® is a conscious, step-by-step approach for systematically solving problems, making good decisions, and analyzing potential risks and opportunities. Kepner-Tregoe® describes the following steps to decision analysis:

1. Prepare a decision statement having both an action and a result component;
2. Establish strategic requirements (musts), operational objectives (wants) and restraints (limits);
3. Rank objectives and assign relative weights;
4. Generate alternatives;
5. Assign a relative score for each alternative on an objective-by-objective basis;
6. Calculate a weighted score for each alternative and identify the top two or three;
7. List adverse consequences for each top alternative and evaluate the probability (high, medium, or low) and severity (high, medium, or low); and
8. Make a final, single choice between the alternatives.

The information provided by each potential supplier was analyzed and given weight scores in multiple categories using the evaluation matrix shown in Figure 4. The categories deemed to be the most important to Tenaska in choosing a technology to move forward with the carbon capture FEED and into detailed design were:

- Development status and commercial scale readiness for the technology;
- Financial strength of the bidder;
- Ability and manpower capacity to perform the carbon capture FEED and meet the Project schedule;
- Willingness to provide performance guarantees for the carbon capture plant; and
- Other technical considerations regarding the technology process.

Subcategories for each of these major categories were then weighted based on their level of importance to Tenaska on a score of 0 (not important) to 3 (critical), multiplied by a rating factor of 0 (poor) to 3 (excellent), and summed together to arrive at a total score for each major category. The technology vendors with the highest totals were selected as bidders for the Project. Figure 4 shows the Kepner-Tregoe® type decision analysis matrix used for Trailblazer carbon capture vendor screening.

Tenaska considered development status and readiness for commercial scale to be the most important of these criteria, with an overall weighting of 29%. Factors considered in this category included

- the number of systems in operation;
- the number of hours operating on coal flue gas;
- the size of the largest operating plant; and
- the CO_2 capture rates.

These are issues of critical importance in reducing the risks associated with plant scale up. A bidder receiving all excellent ratings of 3 would receive 6 points for the number of operating systems (weight of 2), 9 points for the total operating hours on coal flue gas (weight of 3), 9 points for the largest plant to date (weight of 3), and 9 points for apparent CO_2 capture rates (weight of 3), for a subtotal score of 33 points for development status and readiness for commercial scale operation. Tenaska placed the highest value on its assessment of the potential for each bidder's ability to design and build a successfully operating carbon capture plant that meets Trailblazer's size and operating requirements.

Technical considerations, such as performance factors, solvent characteristics and scale-up, were secondarily most important, with a weighting of 21%. A bidder receiving all excellent ratings of 3 would receive 9 points for performance potential (weight of 3), 6 points for solvent characteristics (weight of 2), and 9 points for scale up factor/plan credibility (weight of 3), for a subtotal score of 24 points for technical considerations. The performance potential includes consideration of operating modes, expected regulatory compliance and maintenance requirements.

The ability and capacity to perform the study and meet the schedule was ranked third, at 18%. Considerations included design engineering experience, procurement experience, project management experience, construction experience and commissioning experience.

A bidder receiving all excellent ratings of 3 would receive 6 points for design engineering experience (weight of 2), 6 points for procurement and contract/project management experience (weight of 2), 3 points for construction experience (weight of 1), and 6 points for commissioning experience (weight of 2), for a subtotal score of 21 points for the ability and capacity to perform the study and meet the schedule.

Financial strength was weighted at 16%. A bidder receiving all excellent ratings of 3 would receive 9 points for financial resources (weight of 3) and 9 points for creditworthiness (weight of 3), for a subtotal score of 18 points for financial strength.

Commercial guarantees for performance were also weighted at 16%. A bidder receiving all excellent ratings of 3 would receive 9 points for willingness to provide performance guarantees (weight of 3) and 9 points for the quality and perceived value of those guarantees (weight of 3), for a subtotal score of 18 points for commercial guarantees for performance.

4.5.2 Business Evaluation

Another important factor in the bidder selection process was the organization and financial strength of each potential bidder. In several cases, the technology supplier partnered with a constructor to form an EPC entity to be responsible for the carbon capture plant. In these cases, it was important to understand the history and commercial relationship between the parties that formed the EPC entity in order to evaluate their viability. Tenaska and its lenders needed assurances that the entity was indeed agreeing to take risk from both a technical and commercial standpoint so that Tenaska's liabilities are minimized. Newly formed relationships within a bidding entity that had not been fully developed were considered less desirable. Bidders that could provide EPC services under one company were viewed as the best alternative to minimize Tenaska's risks.

Interface between the carbon capture plant EPC contractor or EP supplier with the pulverized coal power plant EPC contractor was also a critical factor to consider, as these entities would have to coordinate closely in many areas regarding design, construction and start-up of the facility. The bidder's willingness to accept proposed liquidated damage amounts per day and percentage of contract caps and aggregate liquidated damage percentage of contract caps for performance and schedule, overall limit of liability, and warranty provisions was also a factor in the evaluation methodology. Figure 6 shows some of the commercial aspects that were considered.

FIGURE 4 –KEPNER-TREGOE® EVALUATION MATRIX TEMPLATE APPLIED BY TENASKA

Kemper-Tregoe® Decision Analysis for Trailblazer CCS Technology Screening

Category	Weight	Potential Score	% of Overall	Comments
1.0 Development Status/Commercial Scale Readiness				
1.1 Number Operating Systems	2	6	5%	
1.2 Total Operating Hours on Coal Flue Gas	3	9	8%	
1.3 Largest Plant	3	9	8%	
1.4 Apparent CO_2 capture rates	3	9	8%	
SUBTOTAL	**11**	**33**	**29%**	
2.0 Financial Strength				
2.1 Financial Resources based on Dun & Bradstreet data	3	9	8%	
2.2 Creditworthiness	3	9	8%	
SUBTOTAL	**6**	**18**	**16%**	
3.0 Ability/Capacity to Perform the Work and Meet Schedule				
3.1 Design Engineering Experience	2	6	5%	
3.2 Procurement and Contract/Project Mgmt Experience	2	6	5%	
3.3 Construction Experience	1	3	3%	
3.4 Commissioning Experience	2	6	5%	
SUBTOTAL	**7**	**21**	**18%**	
4.0 Commercial Guarantees for Performance				
4.1 Willingness to provide performance guarantees	3	9	8%	
4.2 Quality/Value of Guarantees	3	9	8%	
SUBTOTAL	**6**	**18**	**16%**	
5.0 Technical Considerations				
5.1 Performance Potential	3	9	8%	
5.2 Solvent Characteristics (Cost, Availability, Losses)	2	6	5%	
5.3 Scale-Up Factor / Plan Credibility	3	9	8%	
SUBTOTAL	**8**	**24**	**21%**	
OVERALL TOTAL	**38**	**114**	**100%**	

Potential Score is obtained by multiplying weighting times maximum rating of 3

Weighting:	Rating:
3 = “Critical”	3 = Excellent
2 = “Very Important”	2 = Good, Reasonable, Some
1 = “Important”	1 = Little, Few, Fair
0 = “Not Important	0 = None, Unacceptable, Poor

4.6 Description of Carbon Capture Technology Request for Proposal Process

A performance specification with a draft MOU and commercial term sheet was issued to the shortlisted bidders. The performance specification consisted of the following main sections:

1. Summary of bid items, including:

    - a lump-sum price for a carbon capture FEED study;
    - an indicative carbon capture plant cost under an EP approach with a designated relative cost accuracy range; and
    - an indicative carbon capture plant cost under an EPC approach with a designated relative cost accuracy range.

    Both EP and EPC approaches were requested to maintain flexibility in how the carbon capture technology vendor was integrated into the overall Project. With the EP approach, the carbon capture technology vendor would be a subcontractor to Fluor, and Fluor would be responsible for the ultimate success of the carbon capture plant as the EPC contractor for the Project. This would fold the carbon capture plant into the single project wrap guarantees for cost, schedule and performance. However, Tenaska also could foresee circumstances where a separate EPC approach for the carbon capture plant could be acceptable to the owners and the financial community, and did not want to exclude carbon capture technologies because the vendor did not wish to be a subcontractor to Fluor.

2. Design basis for the Project, including:

    - site ambient conditions;
    - process and equipment design conditions;
    - anticipated flue gas properties;
    - steam supply conditions;
    - CO_2 product specifications at the boundary limit; and
    - economic evaluation factors.

3. Scope of supply description, including a process flow diagram and equipment, ductwork, piping, electrical, instrumentation and controls and civil/structural requirements.

4. Design deliverables summary and schedule for the proposal and FEED execution phase.

5. Supplier fill-in data sheets for proposal evaluation including:
    - description and number of absorber trains;
    - description and number of regenerator trains;
    - description and number of solvent reclaim trains;
    - description and number of compression and dehydration trains;
    - description of solvent type and storage facilities;
    - estimated performance including percent CO_2 captured;
    - flue gas pressure drop;
    - electrical power consumption, steam usage rate, water consumption, air consumption;
    - solvent consumption and emission rates;
    - estimated bulk quantities of piping, cable, instruments, input/output count, structural steel and concrete; and
    - preliminary mechanical and electrical equipment list.

The draft MOU and term sheet issued under the RFP included the performance specification outlined above, and addressed typical contract commercial terms, including:

- owner and contactor obligations;
- price and payment terms;
- performance and payment securities;
- liquidated damages;
- limits of liability;
- change provisions;
- insurance;
- completion criteria and others.

A copy of the technical bid documents is included as Exhibit 1 to this report.

4.7 Evaluation Criteria and Methodology

The bids were evaluated based on economic, technical and business factors. The evaluation was structured by completing the following tables and matrixes with information gathered from the bidders:

- Figure 5 shows the economic evaluation criteria;
- Figure 6 shows the commercial evaluation matrix;
- Figure 7 shows the technical evaluation matrix;
- Figure 8 shows the technical supplier matrix;

- Figure 9 shows the operating and maintenance matrix;
- Figure 10 shows the performance summary; and
- Figure 11 shows the evaluation summary matrix

The completed tables and matrixes allowed Tenaska to analyze each bidder's relative strengths and weaknesses in a structured and thorough fashion. The assessment team contained expertise from Tenaska's Development, Engineering and Finance Groups. Other organizations evaluating complicated proposals similar to this evaluation can adapt the methodology and criteria described in this report to reflect local factors and determine the best technology fit for their specific project and circumstances.

4.7.1 Economic Evaluation

The bid evaluation considered both the present-day indicative capital cost and the total cost over a 30-year life cycle. Performance parameters included in the 30-year life cycle cost assessment were steam usage, auxiliary power usage, system pressure drop, solvent usage and water consumption. Performance values provided by each bidder for these parameters were multiplied by the applicable 30-year evaluation factor to arrive at a life-cycle operating cost for each parameter. Project economic evaluation factors along with commercial issues were calculated for each parameter in Figures 5 and 6 below.

Expected performance data provided by the bidders was inserted into the evaluation spreadsheets above, and below and other variables were also assessed, as per Figures 7, 8, 9, 10 and 11. Thirty-year life cycle operating costs were also developed by the assessment team. The sum of the capital cost and 30-year operating cost was compared for each of the bidders to arrive at a 30-year evaluated cost. Following are some of the operation and maintenance assumptions used for the evaluation:

- CO_2 capture plant operated for 95% of the total operating hours during a 30-year period.
- Routine base load operation. Part load operation during only brief periods annually.
- 98% on-stream reliability
- Minimum 30-year equipment life for the majority of all equipment.
- Routine annual outages to coincide with the pulverized coal plant outage schedule.
- Slight reduction in annual availability for the first two years of operation.

Other economic factors included in the evaluation were:

- technology license fees for each bidder,
- contingency included by each bidder and
- relative accuracy of the estimate as characterized by each bidder (requested accuracy was -5%/+25%).

4.7.2 Technical Evaluation

In addition to the economic evaluation discussed above, an analysis was conducted regarding the technical basis of performance. Technical evaluation included consideration of pilot and demonstration plants in service for each bidder, scale-up factors used by each bidder in the carbon capture process to date, and scale-up factors used for equipment being proposed for Trailblazer. Bidders were asked to identify proposed suppliers for tower internals and their experience in similar applications and scale-up techniques to be used to maintain liquid and gas distribution within the spray towers. Solvent information, including availability in the market place, expected degradation rates and regeneration effectiveness, was requested. The technical information was summarized for each bidder in Figures 7 and 8 and considered along with the 30-year evaluated cost to arrive at a ranking of the bidders.

FIGURE 5 – Economic Evaluation Criteria

Economic Factors:	2009	2016	
Output:			Per Kw
Heat Rate:			Per Btu/kW hr
Discount Rate (Cost of Capital):			
Assumed Consumable Escalation:			
Assumed Chemical 1 Cost Per Ton:			
Assumed Chemical 2 Cost Per Ton:			
Assumed Chemical 3 Cost Per Ton:			
Assumed Chemical 4 Cost Per Ton:			
Assumed Chemical 5 Cost Per Ton:			
Byproduct Sales Value Per Ton			
Assumed Chemical 6 Cost Per Ton:			
Assumed Solvent 1 Cost Per Ton:			
Assumed Solvent 2 Cost Per Ton:			
Assumed Solvent 3 Cost Per Ton:			
Assumed Solvent 4 Cost Per Ton:			
Assumed Solvent 5 Cost Per Ton:			
CO_2 Value Per Ton			
Water Consumption, $/kgal:			
Steam Consumption, kW/1,000 lb/hr:			
Cost of Power, $/MWh:			
Assumed Capacity Factor:			
Assumed CO2 Removal Guarantee:			
Evaluation Period, Years:			

A.	**Auxiliary Power**		Kw in excess of guarantee
			$/kW-yr in excess of guarantee
B.	**Boiler Efficiency**		@ 0.1% below guarantee
C.	**Economizer Inlet to SH Outlet Pressure Drop**		Per 10 Ft. Delta P
D.	**Reheater Pressure Drop**		Per 5 psia drop in excess of guarantee
E.	**MCR Steam Flow**		1,000 lb/hr below guarantee
F.	**Boiler Main Steam Temperature**		MS 1 Degree F below guarantee
G.	**Boiler RH Steam Temperature**		RH 1 Degree F below guarantee
H.	**Pressure Drop Value**		Per 1 inch of pressure
I.	**Chemical 1**		Per lb/hr in excess of guarantee
J.	**Chemical 2**		Per lb/hr in excess of guarantee
K.	**Chemical 3**		Per lb/hr in excess of guarantee
L.	**Chemical 4**		Per lb/hr in excess of guarantee
M.	**Chemical5**		Per lb/hr in excess of guarantee
N.	**Chemical 6**		Per lb/hr in excess of guarantee

FIGURE 5 – Economic Evaluation Criteria (cont.)

O.	**Solvent 1**		Per lb/hr in excess of guarantee
P.	**Solvent 2**		Per lb/hr in excess of guarantee
Q.	**Solvent 3**		Per lb/hr in excess of guarantee
R.	**Solvent 4**		Per lb/hr in excess of guarantee
S.	**Solvent 5**		Per lb/hr in excess of guarantee
T.	**Other Solvent**		Per lb/hr in excess of guarantee
U.	**CO2 Capture Rate**		Per capture 0.1% below guarantee
V.	**Steam Consumption**		Per lb/hr in excess of guarantee
W.	**Water Consumption**		Per gpm in excess of guarantee
X.	**CO2 Capture System Availability**		Per 0.1% below guarantee
Y.	**Output Value for 1st Two Years**		Per kW of output
Z.	**Heat Rate Value for 1st Two Years**		Per Btu/kWh of Heat Rate
AA.	**Aux Power Value for 1st Two Years**		per kW of output (Should be used to gauge STG ouput for 1st two years at constant heat input)
AB.	**CO2 Value**		Per ton
AC.	**Byproduct Sales**		Per lb/hr in excess of guarantee

FIGURE 6 – Commercial Summary Evaluation Matrix

COMMERCIAL SUMMARY
Project No.: #####
Project Name: Tenaska Trailblazer Energy Center CO2 Capture Plant -CO2 Capture Plant

			#1	#2	#3	#4
		Bidder's Name-->	Bidder #1	Bidder #2	Bidder #3	Bidder #4
		Bidder's Contact Information-Name-->	Bidder #1	Bidder #2	Bidder #3	Bidder #4
		Bidder's Contact Information-Phone-->	####	####	####	####
		Quote/Proposal No.-->				
		Date-->				
	EPC CONTRACT		EPC CONTRACT			
	ITEM	SPECIFIED	Bidder #1	Bidder #2	Bidder #3	Bidder #4
1	Taxes					
2	Performance & Payment Security					
3	Liquidated Damages: Delay Liquidated Damages					
4	Liquidated Damages: Performance					
5	Liquidateed Damages: Total					
6	Limitation of Liability					
7	Project Schedule					
8	Intellectual Property					
9	Warranty					
10	Third Party Warranties					
	EP CONTRACT		EP CONTRACT			
	ITEM	SPECIFIED	Bidder #1	Bidder #2	Bidder #3	Bidder #4
1	Taxes					
2	Performance & Payment Security					
3	Liquidated Damages: Delay Liquidated Damages					
4	Liquidated Damages: Performance					
5	Liquidateed Damages: Total					
6	Limitation of Liability					
7	Project Schedule					
8	Intellectual Property					
9	Warranty					
10	Third Party Warranties					

FIGURE 7 – Technical Summary Evaluation Matrix

TECHNICAL SUMMARY
Project No.:#####
Project Name:Tenaska Trailblazer Energy Center CO2 Capture Plant -CO2 Capture Plant

	#1	#2	#3	#4
Bidder's Name-->	Bidder #1	Bidder #2	Bidder #3	Bidder #4
Bidder's Contact Information-Name-->	Bidder #1	Bidder #2	Bidder #3	Bidder #4
Bidder's Contact Information-Phone-->	Bidder #1	Bidder #2	Bidder #3	Bidder #4
Quote/Proposal No.-->				
Date-->				
EP Contract Structure Base Requirements Specified				
1 - Absorption Trains				
A - Number of Trains				
B - Major Equipment				
C - Turn Down Capability				
D - Sparing Philosophy				
2 - Stripper Trains				
A - Number of Trains				
B - Major Equipment				
3 - Solvent Reclaim Trains				
A - Number of Trains				
4 - Process Flow Diagrams(s)				
5 - Plot Plant				
6 - CO2 Compression and Dehydration				
A - Number of Trains				
B - Number of Stages of Compression				
7 - Solvent and Reagent Storage				
A - Solvent Storage Tank Volume				
B - Percent Concentration In Storage				
C - Percent Concentration In Process				
D - Capture System Initial Solvent Charge (Process Service Concentration)				
E - Reagent 1 Storage Tank Volume				
F - Reagent 2 Storage Tank Volume				
G - Other Reagent Storage Requirements				
8 - CO2 Capture				
A - Percent CO2 Capture (Guarantee)				
B - Impurities in CO2 Stream				
9 - Pressure Drop Through Carbon Capture Equipment (in. wc)				
10 - Electrical Power For Absorption, Stripping, and Reclamation Operations (kW)				
11 - Electrical Power For Fin Fan Cooling Operation				
12 - Electrical Power For Compression (kW)				
13 - Electrical Power For Booster Fan (kW)				
14 - Steam Usage @ 60 psig supply pressure (short tons/hr)				
15 - Steam Usage, lb Steam (@ 60 psig supply pressure)/lb CO2				
16 - Steam Usage, Btu (heat extracted from turbine)/lb CO2				
17 - Steam Heat Input (MMBTU/hr)				
18 - Steam Usage Plant Output Impact (kW)				
19 - Total Plant Output Reduction, Aux Power + Steam (kW)				
20 - Water Required				
A - Cooling Water				
i - Cooling Water Usage (gpm)				
B - Demineralized Water				
i - Demineralized Water Consumption (gpm)				
ii - Demineralized Water Consumption for Initial Solvent Fill Dilution (kgal)				
C - Service Water				
i - Service Water Consumption (gpm)				
D - Potable Water				
i - Potable Water Consumption (gpm)				
21 - Hydrogen Requirement (SCFM)				
22- Nitrogen Requirement (SCFM)				
23 - Instrument Air Requirement (SCFM)				
24 - Plant Air (SCFM)				
25 - Solvent Usage				
A - Solvent Type (MEA, DEA, Ammonia, etc)				
i - Initial Solvent Fill (tons)				
ii - Solvent Consumption (gallons or tons/yr)				
a - Amount of Solvent Consumption Due To Reclaimation				
b - Amount of Solvent Consumption Due To Degradation				
c - Amount of Solvent Consumption Emission Loss				
iii - Solvent Cost (US$/gallon or ton)				
B - Solvent Type (MEA, DEA, Ammonia, etc.)				
i - Initial Solvent Fill (tons)				
ii - Solvent Consumption (gallons or tons/yr)				
a - Amount of Solvent Consumption Due To Reclaimation				
b - Amount of Solvent Consumption Due To Degradation				
c - Amount of Solvent Consumption Emission Loss				
iii - Solvent cost (US$/gallon or ton)				
26 - Chemical Usage				
A - Chemical Type				
B - Initial Chemical Fill (tons)				
C - Chemical Consumption (gallons or tons/yr)				
D - Chemical Cost (US$/gallon or ton)				

FIGURE 7 – Technical Summary Evaluation Matrix (cont.)

27 - Chemical Usage				
A - Chemical Type				
B - Initial Fill (tons)				
C - Chemical Consumption (gallons or tons/yr)				
D - Chemical Cost (US$/gallon or ton)				
28 - Water Condensed From Flue Gas (gpm)				
A - Composition and Characteristics				
29 - Cooling Tower Blowdown (gpm)				
A - Composition and Characteristics				
30 - Fugitive Gases and Vapors From Absorber				
A - Solvent (ppmv)				
B - Water				
C - SO_2				
D - SO_3				
E - O_2				
F - N_2				
G - CO_2				
H - NO				
I - NO_2				
J - NH_3				
K - Acetaldehyde				
L - Ar				
M - NO_x				
N - Dust				
O - Alkaline Coumpounds				
P - Product 1				
31 - Water Condensed In Compression Process (gpm)				
A - Composition and Characteristics				
32 - Solvent Blowdown (gpm)				
33 - Waste Stream (gpm)				
A - Composition and Characteristics				
34 - Point Sources, Fugitive Emissions, and Vents				
35 - Licensee Agreement				
36 - Information on Bidder's Ability To Staff Project To Meet Schedule.				
37 - Information On Bidder and Its Parent Company (If Applicable) financial strength				
Supplier Provided Options				
Exceptions and Clarifications				
Notes:				

FIGURE 8 – Technical Summary Supplier Basis Matrix

TECHNICAL SUMMARY SUPPLIER BASIS
Project No.: #####
Project Name: Tenaska Trailblazer Energy Center CO2 Capture Plant -CO2 Capture Plant

	#1	#2	#3	#4
Bidder's Name-->	Bidder #1	Bidder #2	Bidder #3	Bidder #4
Bidder's Contact Information-Name-->	Bidder #1	Bidder #2	Bidder #3	Bidder #4
Bidder's Contact Information-Phone-->	####	####	####	####
Quote/Proposal No.-->				
Date-->				
BASIS FOR PROCESS PERFORMANCE EXPECTATION				
1 - Configuration Description Of Pilot Plant, Demonstration Unit Or Commercial Unit.				
2 - Explanation Of Basis For Changes To The Configuration Between Reference Unit(s) and Proposed System For Trailblazer.				
BASIS FOR PHYSICAL SCALE-UP OF PROCESS EQUIPMENT				
1 - Describe Scale-up Ratios Previously Used In Development Of Proposed Capture Process To Date.				
2 - Equipment Size Comparison From Previous Experience To Expected Size For Trailblazer				
A - Absorber				
B - Stripper				
C - Heat Exchangers				
D - CO2 Compressors				
E - Solvent Recail Equipment				
3 - Equipment Comparison: Largest Size In Commercial Operation To Expected Size for Trailblazer. Explainataion Of Methods To Verifty Scalability If Trailblazer Expected Size Larger Than Currently Commercially Operating				
A - Absorber				
B - Stripper				
C - Heat Exchangers				
D - CO2 Compressors				
E - Solvent Recail Equipment				
4 - Proposed Supplier Of And Product Names Of Tower Packing/Trays and Distrubutors For Absorber And Stripper				
A - Information On Supplier Basis For Scale-up To Trailblazer Size				
B - Packing Supplier's Description Of Scale-up Techniques To Be Used To Maintain Necessary Liquid And Gas Distribution Within Towers				
C - Packing Supplier's Description Of Scale-up Techniques To Be Used To Provide Adquate Mechanical Support For Internals.				
D - Identify Changes In Packing Type Or Characteristics Between Reference Units And That Proposed For Trailblazer				
CHARACTERISTICS OF REAGENTS AND SOLVENTS USED				
1 - Listing Of Each Reagent and Solvent In Proposed CO2 Capture Process				
A - Manufacturer				
B - Proprietary Formulations (?)				
C - Corrosivity Information				
D - Degradation Rate				
E - Volatility				
F - Specific Design Measures Or Materials Of Construction Required For Process Equipment To Resist Corrosivity Or Mitigate Degradation Or Volatility				
Exceptions and Clarifications				

FIGURE 9 – Operation & Maintenance Summary Matrix

O&M SUMMARY
Project No.:#####
Project Name: Tenaska Trailblazer Energy Center CO2 Capture Plant -CO2 Capture Plant

			#1	#2	#3	#4
Bidder's Name-->			Bidder #1	Bidder #2	Bidder #3	Bidder #4
Bidder's Contact Information-Name-->			Bidder #1	Bidder #2	Bidder #3	Bidder #4
Bidder's Contact Information-Phone-->			####	####	####	####
Quote/Proposal No.-->						
Date-->						
CO2 Production	TPD					
Interest Rate	%					
Discount Rate	%					
Plant Life	Years					
Estimated Number of Operations Employees						
Average Employee Salary (Salary + Overhead)						
Consumable Escalation	%					
Labor Escalation	%					
Hours Per Year	Hours					
Capacity Factor	%					
Electricity Cost	2016$/MWh					
Initial Fill Solvent Cost, Solvent 1	2016$/ton					
Initial Fill Solvent Cost, Solvent 2	2016$/ton					
Initial Fill Solvent Cost, Solvent 3	2016$/ton					
Initial Fill Solvent Cost, Solvent 4	2016$/ton					
Initial Fill Solvent Cost, Powerspan Reagent 2	2016$/ton					
Initial Fill Chemical Cost, Checmical 1	2016$/ton					
Initial Fill Chemical Cost, Chemical 2	2016$/ton					
Initial Fill Chemical Cost, Chemical 3	2016$/ton					
Initial Fill Chemical Cost, Chemical 4	2016$/ton					
Initial Fill Chemical Cost, Chemical 5	2016$/ton					
Chemical Cost, Chemical 1	2016$/ton					
Chemical Cost, Chemical 2	2016$/ton					
Initial Fill Water Cost	2016$/kgal					
VARIABLE EXPENSES						
Initial Solvent Fill Cost		$/Ton CO2				
Initial Chemical Fill (Na2CO3) Cost		$/Ton CO2				
Initial Chemical Fill (Activated Carbon)		$/Ton CO2				
Initial Chemical Fill (Limestone)		$/Ton CO2				
Initial Chemical Fill (NaOH)		$/Ton CO2				
Initial Chemical Fill (Precoat Agent)		$/Ton CO2				
Initial Water Fill Cost		$/Ton CO2				
Solvent Usage Cost		$/Ton CO2				
Chemical Usage (Na2CO3) Cost		$/Ton CO2				
Chemical Usage (Activated Carbon) Cost		$/Ton CO2				
Chemical Usage (Limestone) Cost		$/Ton CO2				
Chemical Usage (NaOH) Cost		$/Ton CO2				
Chemical Usage (Precoat Agent)		$/Ton CO2				
Chemical Usage (TEG Gas)		$/Ton CO2				
Chemical Usage (Solid Fertilizer Sales Value)		$/Ton CO2				
Auxiliary Power For Absorption, Stripping, and Reclamation Operations		$/Ton CO2				
Auxiliary Power For Fin Fan Cooling		$/Ton CO2				
Auxiliary Power For Compression		$/Ton CO2				
Auxiliary Power For Booster Fan		$/Ton CO2				
Lost Generation From Steam Extraction		$/Ton CO2				
Water Usage Cost		$/Ton CO2				
FIXED EXPENSES						
Maintenance (1.5% of Equipment Capital Cost)		$/Ton CO2				
Labor		$/Ton CO2				
Total Cost, $/Ton CO2						

Notes:

FIGURE 10 – Performance Summary

PERFORMANCE SUMMARY
Project No.:#####
Project Name: Tenaska Trailblazer Energy Center CO2 Capture Plant -CO2 Capture Plant

			#1	#2	#3	#4
Bidder's Name-->			Bidder #1	Bidder #2	Bidder #3	Bidder #4
Bidder's Contact Information-Name-->			Bidder #1	Bidder #2	Bidder #3	Bidder #4
Bidder's Contact Information-Phone-->			####	####	####	####
Quote/Proposal No.-->						
Date-->						

CO2 Capture Rate Evaluation Factor	$/0.1%	
Solvent Usage Rate Evaluation Factor, Solvent 1	$/lb/hr	
Solvent Usage Rate Evaluation Factor, Solvent 2	$/lb/hr	
Solvent Usage Rate Evaluation Factor, Solvent 3	$/lb/hr	
Solvent Usage Rate Evaluation Factor, Solvent 4	$/lb/hr	
Solvent Usage Rate Evaluation Factor, Solvent 5	$/lb/hr	
Chemical Usage Rate Evaluation Factor, Chemical 1	$/lb/hr	
Chemical Usage Rate Evaluation Factor, Chemical 2	$/lb/hr	
Chemical Usage Rate Evaluation Factor, Chemical 3	$/lb/hr	
Chemical Usage Rate Evaluation Factor, Chemical 4	$/lb/hr	
Chemical Usage Rate Evaluation Factor, Chemical 5	$/lb/hr	
Chemical Usage Rate Evaluation Factor, Chemical 6	$/lb/hr	
Byproduct Sales Value	$/lb/hr	
Initial Fill Solvent Cost, Solvent 1	2016$/ton	
Initial Fill Solvent Cost, Solvent 2	2016$/ton	
Initial Fill Solvent Cost, Solvent 3	2016$/ton	
Initial Fill Solvent Cost, Solvent 4	2016$/ton	
Initial Fill Solvent Cost, Solvent 5	2016$/ton	
Initial Fill Chemical Cost, Chemical 1	2016$/ton	
Initial Fill Chemical Cost, Chemical 2	2016$/ton	
Initial Fill Chemical Cost, Chemical 3	2016$/ton	
Initial Fill Chemical Cost, Chemical 4	2016$/ton	
Initial Fill Chemical Cost, Chemical 5	2016$/ton	
Initial Chemical Fill, Chemical 6	$2016/ton	
Initial Fill Water Cost	2016$/kgal	
Auxiliary Power Usage Evaluation Factor	$/kW	
Flue Gas Presure Drop Evaluation Factor	$/inch	
Steam Consumption Evaluation Factor	$/lb/hr	
Water Usage Rate Evaluation Factor	$/1,000 gpm	

CO2 Capture Rate	%				
Solvent Usage Rate (Solvent 1)	lb/hr				
Solvent Usage Rate (Solvent 2)	lb/hr				
Solvent Usage Rate (Solvent 3)	lb/hr				
Solvent Usage Rate (Solvent 4)	lb/hr				
Chemical Usage Rate (Chemical 1)	lb/hr				
Chemical Usage Rate (Chemical 2)	lb/hr				
Chemical Usage Rate (Chemical 3)	lb/hr				
Chemical Usage Rate (Chemical 4)	lb/hr				
Chemical Usage Rate (Chemical 5)	lb/hr				
Solid Fertilizer Sales	lb/hr				
Initial Solvent Fill (Solvent 1)	ton				
Initial Solvent Fill (Solvent 2)	ton				
Initial Solvent Fill (Solvent 3)	ton				
Initial Solvent Fill (Solvent 4)	ton				
Initial Chemical Fill (Chemical 1)	ton				
Initial Chemical Fill (Chemical 2)	ton				
Initial Chemical Fill (Chemical 3)	ton				
Initial Chemical Fill (Chemical 4)	ton				
Initial Chemical Fill (Chemical 5)	ton				
Auxiliary Power Consumption (Excluding Booster Fan)	kW				
Flue Gas Pressure Drop	in.				
Steam Consumption (75 psia)	lb/hr				
Initial Fill Water Usage (Demineralized Water)	kgal				
Water Usage	gpm				

FIGURE 10 – Performance Summary Matrix (cont.)

Differential Cost Adjustment				
Differential CO2 Capture Rate Cost Adjustment				
Solvent Usage Cost (Solvent 1)				
Solvent Usage Cost (Solvent 2)				
Solvent Usage Cost (Solvent 3)				
Solvnet Usage Cost (Solvent 4)				
Differential Solvent Usage Cost Adjustment				
Chemical Usage Cost (Chemical 1)				
Chemical Usage Cost (Chemical 2)				
Chemical Usage Cost (Chemical 3)				
Chemical Usage Cost (Chemical 4)				
Chemical Usage Cost (Chemical 5)				
Differential Chemical Usage Cost Adjustment				
Byproduct Sales Value				
Initial Solvent Fill Cost (Solvent 1)				
Initial Solvent Fill Cost (Solvent 2)				
Initial Solvent Fill Cost (Solvent 3)				
Initial Solvent Fill Cost (Solvent 4)				
Initial Solvent Fill Cost				
Initial Chemical Fill (Chemical 1)				
Initial Chemical Fill (Chemical 2)				
Initial Chemical Fill (Chemical 3)				
Initial Chemical Fill (Chemical 4)				
Initial Chemical Fill (Chemical 5)				
Differential Initial Chemical Fill				
Auxiliary Power Consumption (Excluding Booster Fan) Cost				
Differential Auxiliary Power Consumption (Excluding Booster Fan) Cost Adjustment				
Flue Gas Pressure Drop Cost				
Differential Flue Gas Pressure Drop Cost Adjustment				
Steam Consumption (60 psig) Cost				
Differential Steam Consumption (60 psig) Cost Adjustment				
Initial Fill Water Usage (Demineralized Water)				
Differential Initial Fill Water Usage (Demineralized Water) Cost Adjustment				
Water Usage Cost				
Differential Water Usage Cost Adjustment				

FIGURE 11 – Evaluation Summary Matrix

PRICE SUMMARY
Project No.:#####
Project Name: Tenaska Trailblazer Energy Center CO2 Capture Plant -CO2 Capture Plant

Budget: $ -	#1	#2	#3	#4
Bidder's Name-->	Bidder #1	Bidder #2	Bidder #3	Bidder #4
Bidder's Contact Information-Name-->	Bidder #1	Bidder #2	Bidder #3	Bidder #4
Bidder's Contact Information-Phone-->	####	####	####	####
Quote/Proposal No.-->				
Date-->				
Price Breakdown Specified				
EP Contract Structure Base Requirements Specified				
1-Lump Sum FEED Price for EP Contract Structure				
2-Indicitive Pricing For An Engineer-Procure (EP) Contract Structure				
Total EP Contract Structure Base Amount				
EPC Contract Structure Alternates Specified				
1-Lump Sum FEED Price for EPC Contract Structure				
2-Indicative Price For An Engineer-Procure and Construct Contract				
Equipment				
Subcontracts				
Labor				
Indirects				
Contingency				
License Fee				
FEED Duration				
Total EPC Contract Structure Base Amount				
Supplier Provided Options				
SO1- ISBL Civil Site Work services				
Total Supplier Provided Options Selected (marked with an "X")				
Commercial Adjustments				
CA1- Licensor Fees				
Total Commercial Adjustment Amount				
Technical Adjustments				
TA1- Adjustment For CO2 Capture Rate				
TA2- Adjustment For Solvent Usage				
TA3- Adjustment For Chemical Usage				
TA4- Adjustment For Initial Solvent Fill				
TA5- Adjustment For Initial Chemical Fill				
TA6- Adjustent For Electrical Power Consumption				
TA7- Adjustment For Flue Gas Pressure Drop				
TA8 - Adjustment For Steam Consumption				
TA9 - Adjustmenet For Water Usage				
TA10 - Adjustment For Solid Fertilizer Sales				
Total Technical Adjustment Amount				
PRICING SUMMARY				
Total EP Contract Amount				
Over/Under Base EP Contract Amount				
EP Contract Ranking				
Total EPC Contract Amount				
Over/Under Base EPC Contract Amount				
EPC Contract Ranking				

4.7.3 Result

All of the factors outlined above were considered in the bid evaluation process to identify the preferred supplier to perform the carbon capture FEED and proceed with the Project to construction. The evaluation showed that all the short listed vendors had competitive firm carbon capture FEED pricing. The selected technology vendor was determined by the 30-year evaluated cost and commercial experience with the process. In both cases, Fluor was the preferred choice. Fluor was also the only EPC contractor with an in-house CO_2 technology and a single-source contracting ability.

5.0 Relevance to Carbon Capture and Storage

The carbon capture industry is still in its infancy. Trailblazer is expected to be the first new-build pulverized coal power plant in the United States to incorporate a commercial-scale CO_2 capture plant into the initial design. It is being designed to capture 85 to 90 percent of the CO_2 that otherwise would be emitted into the atmosphere. The business and technology issues associated with scaling up carbon capture equipment to full commercial power plant scale create many challenges.

A carbon capture FEED study for a carbon capture plant needed to support 100% of the flue gas flow from a plant the size of Trailblazer has not yet been completed. Selection of the carbon capture technology vendor for a FEED study was extremely important. The considerations and processes presented in this report should help other projects as they select their carbon capture technology vendors and begin their carbon capture FEED studies.

The results of this carbon capture FEED study will provide a credible source from which to verify cost estimates of carbon capture plants and associated compression equipment for similar coal plant projects world-wide. Interface issues with the coal plant facilities will be thoroughly investigated during the carbon capture FEED study, and a better understanding of total plant impacts will be gained.

The process described in this report was successfully used in the selection of the carbon capture technology provider for Trailblazer. The methodology evaluated the extensive data supplied by the bidders and focused on areas that made the most economic sense to the facility, considering initial costs as well as fixed and variable operating costs over the life of the Project. Other organizations evaluating complicated proposals in such a selection process will be able to adapt the methodology and criteria described in this report to reflect local factors for operating and capital expenditures and determine the best technology fit for their specific project and circumstances.

Two major lessons were learned. First, Tenaska has reasonable confidence that current technology providers can meet the CO_2 capture requirements of Trailblazer. Second, the gas treating industry continues to evolve and change, with new technologies and modifications to existing technologies are constantly evolving. Decisions made today on CO_2 removal technology should be reviewed and confirmed as project go-ahead decisions are made in the future.

This study will be a benchmark point for the industry moving forward.

6.0 Conclusions

The business and technology issues associated with scaling up carbon capture equipment to full commercial power plant scale create many challenges.

Supplier efforts to develop their carbon capture technology lead to modifications in solvents and scale-up factors which in turn lead to changes in the number of absorption, regenerator and compression trains, etc. New suppliers are entering the market looking for pilot and/or demonstration units to prove their product. Promising but unproven technologies at this scale require careful risk analysis for a project trying to select a carbon capture technology.

The new teaming of technology suppliers and construction contractors also creates challenges, as the relationships between the parties and the responsibility for project risk are still in the development phase.

Tenaska used a highly disciplined approach to analyze the technological and commercial issues associated with the selection of Trailblazer's carbon capture technology vendor. This approach resulted in the selection of Fluor's carbon capture technology for Trailblazer.

Observations that may be useful to others entering into a similar vendor selection process include:

- A solid plan for pre-qualification of bidders, bidding and evaluation of the technology and commercial offerings, and award of the carbon capture FEED study is critical in making the correct decision and moving forward on the right path.
- When selecting a carbon capture FEED contractor, the plant owner should look for a technology vendor that has a consistent scale-up development plan backed by solid demonstration results.
- There are different contracting methods available to a project owner depending on the stage of the project at the time of the carbon capture FEED. Undertaking the carbon capture FEED early in the process allows the owner to concentrate on the carbon capture FEED portion of the project and allows the design to mature to point where better construction costs can be developed based on the carbon capture FEED results.
- If the carbon capture FEED is tied into a package where the successful bidder is also providing EPC services for the project, it is important to select an EPC entity with solid financial backing and the ability to absorb owner risk, and to make sure that solid contractual agreements are in place between all the parties. Wrapped commercial guarantees are expected to be preferred for projects that are financed.

Obviously, each project will be different and have different sets of issues that are most important to it. The use of a disciplined process that incorporates project-specific criteria will lead to the best outcome.

7.0 Acronyms and Citations

Acronym/Abbreviation/Frequently Used Term	Definition
Arch Coal	Arch Coal, Inc.
BNSF	Burlington Northern Santa Fe Railway
CCS	Carbon Capture and Storage
CO_2	Carbon Dioxide
EOR	Enhanced Oil Recovery
EP	Engineer/Procure
EPC	Engineering, Procurement and Construction
ERCOT	Electric Reliability Council of Texas
FEED	Front-End Engineering Design
Fluor	Fluor Enterprises, presumptive EPC contractor
H_2SO_4	Sulfuric Acid
HSS	Heat Stable Salts
MOU	Memorandum of Understanding
NH_3	Ammonia
NOx	Nitrogen Oxides
Owners' Engineer	Burns & McDonnell
ppmv	parts per million by volume
Project	Tenaska Trailblazer Energy Center
RFP	Request for Proposals
SCR	Selective Catalytic Reduction
SO_2	Sulfur Dioxide
TCEQ	Texas Commission on Environmental Quality
Tenaska	Tenaska, Inc., developer of the Trailblazer Energy Center, and Tenaska Trailblazer Partners, LLC, owner of the Trailblazer Energy Center
TMV	Tenaska Marketing Ventures

TPS	Tenaska Power Services Co.
Trailblazer	Tenaska Trailblazer Energy Center
UP	Union Pacific Railroad

October 5, 2009

SCHEDULE 1 to EXHIBIT A – SCOPE OF SERVICES
CARBON DIOXIDE CAPTURE PLANT – MINI SPECIFICATION

1.0 INTRODUCTION AND SUMMARY

This document outlines the basic requirements for the supply of a carbon dioxide capture and compression facility, that will be used to capture the CO_2 from the flue gas of a new coal fired power station.

Provide the following pricing and technical information requested below in accordance with the details of this document:

Item 1 Summary. Modified lump sum FEED prices and information
The lump sum price and schedule needed to perform a Front End Engineering Design (FEED) effort that produces a firm open book price for scope of Item 2 and 3 (i.e. two proposals), including firm process guarantees. Note that the actual FEED award will be for scope of Item 2 or 3, not both, as determined by Buyer.

Item 2 Summary. Indicative OEM cost and information
a. Indicative pricing for an Engineer-Procure (EP) contract to include:
1. Licensee agreement
2. Process engineering design
3. Engineering and procurement schedule
4. Process equipment hardware
5. Control system design and programming
6. Technical assistance for detailed design of the carbon capture system BOP by others
7. Technical assistance for erection, commissioning, and startup etc.

b. Estimated installation quantities for a complete carbon capture plant
c. O&M cost estimate.
d. Performance guarantees

Item 3 Summary. Indicative EPC cost and information
The additive indicative price to convert Item 2 from an EP contract to an Engineer, Procure and Construct (EPC) contract for the complete carbon capture and compression plant.

Anticipated Project Schedule for the Carbon Capture Plant

Carbon Capture Plant FEED phase	1-Jan-2010
Complete Carbon Capture Plant of FEED phase	1-Aug-2010
Site access available	1-Jan-2011
Start Carbon Capture Plant erection	1-Jul-2011
Carbon Capture Plant mechanical completion	1-May-2014
Start Carbon Capture Plant tuning and testing with Coal fired flue gas	1-Apr-2015

Project Completion	1-Aug-2015

2.0 PROPOSAL AND QUOTE REQUEST DETAILS

Item 1. Firm OEM FEED price and information

The firm prices and schedules needed to perform a Front End Engineering Design (FEED) effort that produces a firm open book price for scope of Item 2 and 3 (i.e. two proposals), including firm process guarantees. Note that the actual FEED award will be for scope of Item 2 or 3, not both, as determined by Buyer.

Provide a proposal that includes as a minimum:

- The items listed in Table 8 Design Deliverables Summary
- A completed Table A - Supplier Fill-In Data Sheet.
- A completed Table B - Supplier Basis for Process Design and Scale-up Fill-in Data Sheet.

Prices should include early issue of process design information for review by the Owner and EPC Contractor.

Prices should also include cost for weekly phone conferences, meetings, and presentation of results. Meetings may include periodic design reviews to include progress review, PFD review, P&ID review, plot plan review, scope discussions, sparing, turn-down, selection of equipment suppliers, approach to scale-up and other items in Table 8.

Item 2. Indicative OEM cost and information (+25%/-5% cost accuracy range)

a. Indicative and individual pricing for an Engineer-Procure (EP) contact to include the following:

   1. Licensee agreement. Provide details of structure, form and pricing with response.

   2. Process engineering design. For the design deliverables see Table 8 Design Deliverables.

   3. Process equipment hardware. For supply and delivery of all the process and mechanical equipment essential to the carbon capture and compression plant functionality, i.e. all equipment wetted by process fluids, and associated instruments, valves and control valves etc. See Table 7 Scope of Supply Summary.

   4. Control system SAMA (Scientific Apparatus Makers Association) Logic Diagrams and System Graphics Layouts

   5. Technical assistance for detailed design of the carbon capture system BOP by others. Including; conceptual layouts, piping material requirements, participation in constructability reviews, etc., see Table 8 Design Deliverables Summary.

   6. Technical assistance for; erection, commissioning and startup by others. Include an appropriate allowance for training.

b. Estimated installation quantities for a complete carbon capture facility (reference Sketch 1 for carbon capture facility battery limits. This includes the other equipment and materials not included in the scope of supply for Item 2, but are needed to build a fully functioning carbon capture and compression facility. This material list must include:
   1. Pipe quantities, by size and material.
   2. Cable quantities.
   3. Electrical power distribution equipment
   4. Instrument count, I/O count.
   5. Building and Structural steel quantities.
   6. Building siding quantities, sizes of enclosed building in terms of sq.ft and cu.ft.
   7. Concrete and foundation quantities.
   8. Equipment list for any utility equipment not included in Item 1, for example condensate return pump. List must include indicative equipment capacity/size.

c. O&M cost estimate.

d. Performance guarantees, provide data in data request Table A, Supplier Fill-In Data Sheet.

e. Provide information to demonstrate the bidder’s ability to staff the project and meet the schedule.

f. Provide financial information to demonstrate the bidder’s and its parent company (if applicable) financial strength to stand behind schedule and performance guarantees for the project.

g. Carbon Capture supplier shall base its design and supply on the Largest Shipping Sizes, including Complete Assemblies and Skid Mounted equipment based on the following definitions:
   1. Largest Shippable Size:
      A section, unit, or portion of a larger assembly (such as a tank, pipe system, flue, or mechanical equipment) that is fabricated to the largest size possible such that it is a completed assembly or part of an assembly such that the parts are as large as possible only limited by the size that can be shipped by truck or rail (legally 13’-6” from ground to top of load, 53’ in length, 8’-6” in width and 47,000 lb payload). Largest Shippable Size includes truck loads that are permitable as over-sized loads or on extended flat-bed, single or double drop deck and/or other special trailers (generally 15’-6” in height and 16’ in width, length and weight are negotiable with states). Largest Shippable Size is correspondingly larger for transport by rail (15’ in height, 14’ in width, 500,000 lbs in weight and negotiable with RR in length). Largest shippable size includes addition or assembly of parts or sub-parts, appurtenances such as stiffeners, bracing, manifolds, headers, instruments, doors, nozzles, flanges, components, etc. that are installed or assembled onto the shipping unit and that will not be damaged during transportation using normal crating, packing, or shipping methods. Largest shippable size units may include temporary bracing, supports, cribbing, lifting provisions, etc. to facilitate shipment, loading, unloading, and final assembly.

2. Complete Assemblies:
   Mechanical equipment especially large sized mechanical equipment that are not part of a skid, such as fans, pumps, blowers, tanks, valves, compressors, feeders, etc. that are assembled in their entirety (including motors, instruments, connections, actuators, and other accessories as applicable) for shipment and construction.

3. Skid Mounted:
   Refers to an equipment system that is assembled as a nearly complete package in which equipment, motors, process piping, power distribution, air, instrumentation, valves, valve controllers or actuators, PLC and/or local controls are internal to the boundaries of the steel frame platform of the skid. Generally, skid mounted equipment will have a single terminal point such as a panel, terminal block, or junction box for electrical power and control wiring, although a second terminal or terminals (which may be the junction box on the motor if the starters or MCC is not part of the skid) may apply for higher voltage requirements. MCC, motor starters, transformers, power supplies, and other electrical equipment that are part of the skid are mounted on the skid and pre-wired from the terminal to the load (motor, etc.). Compressed air requirements will terminate at a single inlet manifold. A minimum of field assembly should be required, limited generally to connections of the process fluid and utilities.

4. Shipping sizes should conform to the shipping guidelines included in item 1 above and must be coordinated with constructor.

<u>Item 3. Indicative EPC cost and information (+25%/-5% cost accuracy range)</u>

The additive indicative price to take Item 2 and convert it an, engineer, procure and construct (EPC) contract for the complete supply and erection of the carbon capture and compression plant. Scope would include such items as foundations, structures, buildings, power distribution, piping and all other scope within the battery limits. Indicative pricing should assume that civil site work, and storm water provision is provided by others. Reference Sketch 1 for the carbon capture facility battery limits.

3.0 DESIGN BASIS

The CO_2 removal system shall be designed based on the following design criteria:

- The CO_2 removal system shall have a carbon dioxide recovery of 90% or greater.
- The plant is designed for 50% turndown in Flue Gas mass flow rate.
- Capacity Factor (CF) for the power plant is 90%
- All rotating equipment drivers shall be electric.
- This site has minimal water availability. No make-up water or cooling water is available for process cooling. All equipment cooling, for example gearbox, must be air cooled.

Table 1 – Site Conditions

Parameter	Summer	Winter	Average
Extreme dry bulb temperature, °F	110	-9	
Design dry bulb temperature (Note 1), °F	99	16	64
Design wet bulb temperature, °F	75	13	55
Relative humidity at design, %	34	56	56

Precipitation:	25 inches annual average
	9 inches/24 hours drainage design (100 year frequency)
Site Elevation:	2,000 feet above mean sea level
Atmospheric Pressure:	13.66 psia (Assumed)

Notes:
1. Assume design dry bulb temperature is 82 °F and 12 °F approach to the dry bulb temperature for all air coolers.

Table 2 - Properties of Flue Gas to be processed by the Carbon Capture plant

Temperature, °F		134
Pressure, psia		13.663
Flow, lbmol/hr		312,998
Composition, %v/v		
	CO_2	11.745
	H_2O	17.716
	O_2	4.342
	N_2	65.397
	Ar	0.784
	SO_2	10 ppmv
	NO_x	26.3 ppmv

Table 3 - Properties of Utilities Available at Battery Limits

Steam Supply Pressure, psig	40 - 65
Steam Supply Temperature, °F	Saturated
Steam Supply Design Pressure, psig	75
Steam Supply Design Temperature, °F	725
Condensate Return Pressure, psig	54
Condensate Return Design Pressure, psig	75 @ 350°F

Table 4 - Steam Purity Expected for Normal Operation

SiO2	<20 ppb
Sodium	<3 ppb
Cation Conductivity	<0.3 µS/cm

Table 5: CO_2 Product Specification at the Battery Limits

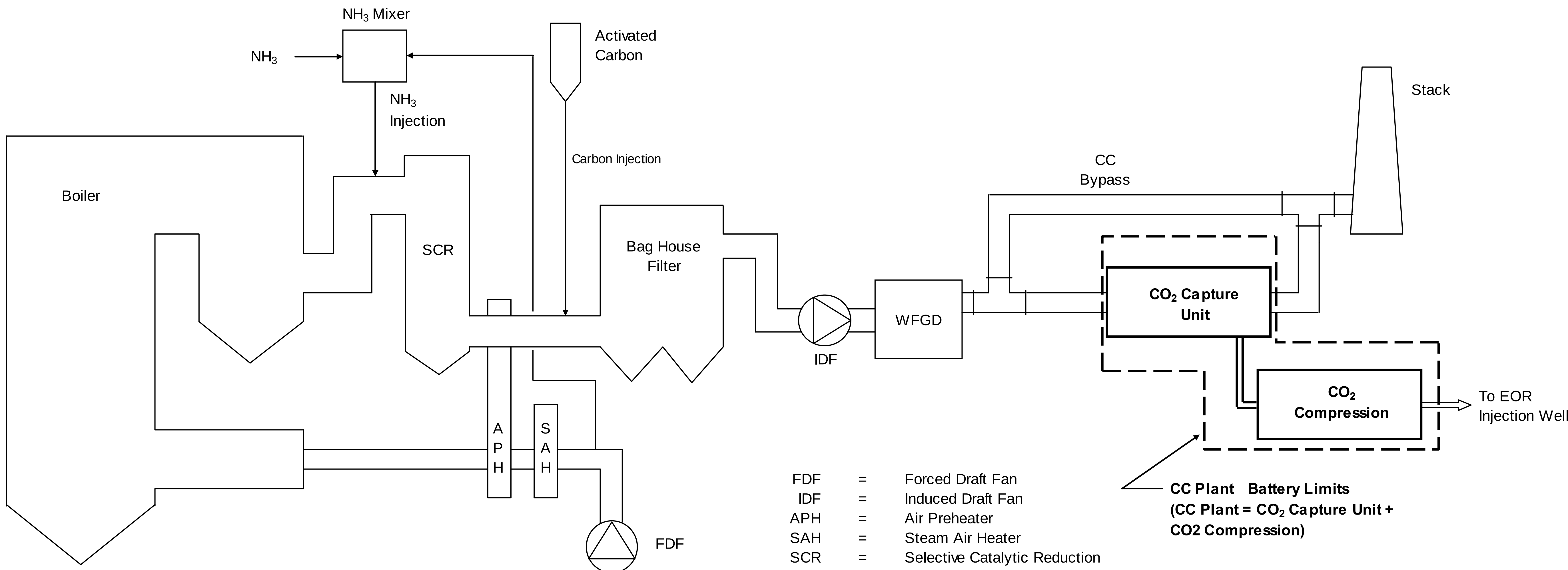
Pressure, psig	2,500
Temperature, °F	< 100
SO_2	Not Detectable
CO_2, mol %	> 98
N_2, mol %	< 4
CH_4	Not Detectable
H_2S	< 20 ppm by weight of H_2S per million parts of CO_2
O_2	< 10 ppm by weight of O_2 per million parts of CO_2
H_2O Dry	< 30 lbs of H_2O in vapor phase per million cubic feet of CO_2
NH_3	Not Detectable
Solvent	Not Detectable

Use the following economic factors to determine the lowest life cycle cost:

Table 6 – Economic Factors

Life cycle duration	Assume 30 years
Value of steam	Assume $284 per lbm/hr of steam flow at full load process consumption.
Value of electrical power	Assume $3550 per kW based on full load process demand.
Value of pressure drop	Assume $1,325,800 per inch
Value of solvent	Assume $75,820 per lb/hr for MEA, $421,415 per lb/hr for DEA, $48,916 per lb/hr for ammonia
Value of CO_2 captured	Assume $4,476,842 per 0.1% below 90%

Sketch 1 – Power Plant with Carbon Dioxide Capture Plant



FDF	=	Forced Draft Fan
IDF	=	Induced Draft Fan
APH	=	Air Preheater
SAH	=	Steam Air Heater
SCR	=	Selective Catalytic Reduction
WFGD	=	Wet Flue Gas Desulfurization
EOR	=	Enhanced Oil Recovery
CC	=	Carbon Capture

Table 7 - Scope Of Supply

Item	Description	Carbon Capture and CO_2 Compression Equipment (EP), Item 2	Carbon Capture and CO_2 Compression Facility (EPC), Item 3
Process/Mechanical Equipment			
1	**Carbon Capture Process Equipment**. All equipment wetted by the carbon capture process fluids, equipment required for process heating and cooling (air coolers etc.), including the equipment motors, wetted instruments, control valves. Include all thermal equipment of flue gas polishing equipment required by the CC process. Large equipment shall include all access platforms, ladders, stairs and lifting equipment that are attached to the equipment. Include first fill of solvents and reagents.	Yes	Yes
2	**Flue Gas Handling Fans** i.e. fans necessary for overcoming flue gas differential pressure due to carbon capture process equipment	Yes	Yes
3	**CO_2 Compression Equipment** i.e. compressors, driers, etc	Yes	Yes
4	**Field Fabricated and Shop Fabricated Tanks**	No	Yes
5	**Miscellaneous Equipment** i.e. equipment not related to the carbon capture or compression processes (i.e. sump pumps, safety showers, building fire protection, vapor and gas detection equipment, CEMS air conditioning, etc.).	No	Yes
6	**Flue-gas Ductwork** (Includes: Support Steel, Thermal Insulation, Dampers, Expansion joints, etc.) Note that the Bidder's scope of supply for ductwork begins with the inlet flange of the first item of process equipment and ends with the discharge flange of the treated flue gas from the Absorber. Flue-gas ductwork within the carbon capture unit between pieces of process equipment is by the Bidder.	Yes	Yes
7	**Between Carbon Capture Process Equipment** i.e. between the carbon capture by-pass damper(s) discharge flange(s) and outlet flange of the last process column.	Yes	Yes
8	**Upstream of Carbon Capture Process Equipment** i.e. up stream of the carbon capture by-pass damper(s) discharge flange(s) (flue gas properties at this initial point of the Seller's scope is given in Table 8).	No	No
9	**Bypass of Carbon Capture Process Equipment** i.e. between by-pass damper(s) and stack.	No	No
10	**Downstream of Carbon Capture Process Equipment** i.e. from outlet flange of last process column to stack.	No	No
Piping			
11	**Between Carbon Capture Process Equipment within Battery Limits**	No	Yes
12	**Between Carbon Capture Process Equipment and CO_2 Compression Equipment** i.e. used to transport CO_2 from process equipment to compressor(s)	No	Yes
13	**Liquid Waste Streams** i.e. used for removal of Carbon Capture and CO_2 Compression Facility waste streams that will be identified by the Seller.	No	No
14	**Supply Liquids** i.e. required by the Carbon Capture and CO_2 Compression Facility (demineralized water, cooling water supply and return, steam, condensate, etc.).	No	No
15	**Between CO_2 Compression Equipment** i.e. between CO_2 compressors and driers	No	Yes
16	**Downstream of CO_2 Compression Equipment**	No	No
17	**Miscellaneous Piping** i.e. piping not related to the carbon capture or compression processes (i.e. potable water, building fire protection, air conditioning, etc.).	No	Yes
Electrical, Instrumentation, and Controls			
18	**345 kV Power Distribution line to Auxiliary Transformers located at the CC Plant,** including connection of the 345 kV power lines to the Auxiliary Transformers	No	No
19	**Auxiliary Power Distribution at the CC Plant** (345kV/13.6kV)	No	Yes
20	**Motors** for Carbon Capture Process Equipment and CO_2 Compression Equipment	Yes	Yes
21	**Electric Power Cable(s) <u>from</u> MCC** for the Carbon Capture and CO_2 Compression Facility	Yes	Yes
22	**Power Distribution for the CC Plant** beginning with the secondary connections to the Auxiliary Transformers secondary	No	Yes
23	**DCS Equipment**	No	No
24	**Control and Instrumentation Cabling** for control signals used by DCS equipment.	No	No
Civil, Structural			
25	**Buildings** for Carbon Capture and CO_2 Compression Facility	No	Yes
26	**Foundations** for Carbon Capture and CO_2 Compression Facility	No	Yes
27	**Civil Site Work,** All Grading, Storm Water Facilities, Roads and Paving	No	No
28	**Structural Steel** for support of all structures, vessels, flues and ducts, pipe systems, and all provisions for access and egress including stair towers. Include all hoists, cranes, monorails for facility.	No	Yes

Table 8 - Design Deliverables Summary

Item	Description	Provide with proposal	Provide in FEED Phase	Provide in Execution Phase
1	Process Design Basis	N/A	Preliminary (ARO +4 weeks) AFD (ARO +8 weeks)	Final
2	Process/Mass Flow Diagrams (PFD) Heat and Material Balances for all Design Basis Cases Utility Consumption, solvent, chemicals, and reagent consumption, Electrical load lists. Emissions, solid and liquid waste streams for disposal	Conceptual (Trailblazer Specific)	Preliminary (ARO +8weeks) AFD (ARO + 12weeks)	Final
3	Site Plan	Conceptual (Generic)	Preliminary (ARO +8weeks) AFD (if Item 3) (ARO + 12weeks)	
4	Process Functional Descriptions MSDS Sheets for solvents, chemicals, and reagents	Brief Narrative	Preliminary (ARO +20 weeks)	Final
5	Piping and Instrument Diagram (P&ID) Showing equipment sizing, piping size and specification, valves, instrumentation, and process control requirements standards and clearly indicating the interfaces and scope of supply.	Conceptual (Generic)	Preliminary (ARO +10 weeks) AFD (ARO +16 weeks)	AFC
6	Equipment layouts and arrangements, including plans and elevations.	Conceptual (Trailblazer Specific)	Preliminary (ARO +6 weeks) AFD (ARO +16 weeks)	AFC
7	Design requirements for flue gas distribution into and out of the CC Plant.	N/A	Preliminary (ARO +12 weeks) Final (ARO +16 weeks)	N/A
8	Equipment lists with equipment capacities, prices, and not-to-exceed motor loads.	Conceptual (Trailblazer Specific)	Preliminary (ARO +8 weeks) Final (ARO +16 weeks)	N/A
9	Instrument list and DCS I/O List in Microsoft Excel format .	N/A	Preliminary (ARO +16 weeks) Final (ARO +20 weeks)	N/A
10	Preliminary controls descriptions and logics and I/O count.	N/A	Preliminary (ARO +12 weeks) AFD (ARO +16 weeks)	AFC
11	Valve and piping specialty items list (if Item 3)	N/A	Preliminary (ARO +8weeks) AFD (ARO + 12weeks)	AFC
12	Special design requirements, such as maximum and minimum flow velocities (data that is unique to the CO_2 removal system process that is needed for the balance of plant design).	N/A	AFD (ARO +11 weeks)	AFC
13	Bulk material take-off lists for piping by size, pipe specification, and system.	N/A	AFD (ARO +11 weeks)	AFC
14	Bulk material take-off lists for electrical materials and cable.	N/A	AFD (ARO +11 weeks)	AFC
15	Equipment purchase specifications for major equipment, including tanks, pumps, ducts, filters, fans, heat exchangers, specialty equipment, and all other equipment within the battery limits.	N/A	AFD (ARO +11 weeks)	AFC
16	Outline drawings for all equipment within the battery limits including all internals (i.e. packing, mist eliminators, internal support structures, etc.).Include weights and dimensions of major components, platforming, foundation loads, interface locations (including size, spec, loads, etc.) for piping, structural, and electrical interfaces.	Conceptual (Trailblazer Specific)	AFD (ARO +11 weeks)	AFC
17	Provide material selection criteria for materials wetted by process fluids.	N/A	AFD (ARO +11 weeks)	AFC
18	Manuals with detailed operating, commissioning, and maintenance procedures for Seller equipment and systems. Include maintenance philosophy manpower requirements.	Brief Narrative	Preliminary (ARO +11 weeks)	Final
19	DCS Programming Functional Description	Brief Narrative	Preliminary (ARO +22 weeks)	Final
20	Instrument Location Plans and Elevations	Brief Narrative	Preliminary (ARO +20 weeks) AFD (ARO +24 weeks))	Final

Key: AFD = Approved For Design or Bid, AFC = Approved For Construction, ARO = Document due this many weeks After Receipt of Order

Table A - Supplier Fill-In Data Sheet

Item	Description	Provide with proposal	Provide in FEED Phase
PHYSICAL DESCRIPTION OF CARBON CAPTURE FACILITY			
1	**Number of Absorption Trains**	Number of Trains:_______ Bidder shall furnish the number of Absorption trains required for the specified flue gas flow and shall identify the major pieces of equipment that makes up the absorption train, i.e. DCC, DCC heat Exchanger, Absorber, Booster Fan, etc. Bidder shall also provide a description of turn-down and sparing philosophy for all equipment and systems.	The same information will suffice for the FEED phase proposal, but the details and specifics of the connection of the elements of each train will be expected to be developed in the FEED work. The type, manufacturer and quantity of the fill in the absorber will also be developed in the FEED. Heat exchanger duties pump sizing, and detailed technical information will be developed in the FEED as well.
2	**Number of Stripper Trains**	Number of Trains:______ Bidder shall furnish the number of Stripper trains required for the specified flue gas flow and shall identify the major pieces of equipment that makes up the absorption train, i.e. Cross Exchanger, Stripper, Solvent Cooler, Reboiler, CO_2 Moisture Condenser, etc.	The same information will suffice for the FEED phase proposal, but the details and specifics of the connection of the elements of each train will be expected to be developed in the FEED work.
3	**Number of Solvent Reclaim Trains**	Number of Trains:______	The same information will suffice for the FEED phase proposal.
4	**Process Flow Diagram**	Bidder shall provide a typical flow diagram and narrative of the proposed processes.	The same information will suffice for the FEED phase proposal, but the details and specifics of the connection of the elements of each train will be expected to be developed in the FEED work (see item 6 of Table 8).
5	**Plot Plan**	Bidder shall provide a conceptual plot plan of the proposed process equipment and facility	The same information will suffice for the FEED phase proposal, but the details and specifics of the connection of the elements of each train will be expected to be developed in the FEED work (see item 2 of Table 8).
6	**Number of CO_2 Compression and Dehydration Trains**	Number of Trains:______ Number of Compression Stages:______ The Bidder shall specify the number of parallel compression trains used in his design and shall identify the number of stages of compression required to reach the specified final delivery pressure.	The compressor manufacturer will be identified in the FEED phase proposal.
7	**Solvent and Reagent Storage**	Solvent Storage Tank Volume:_____ Percent Concentration in Storage:_____ Percent Concentration in Process Service:_____ Capture System Initial Solvent Charge (Process Service Concentration:_____ Reagent 1 Storage Tank Volume:_____ Reagent 2 Storage Tank Volume:_____ Reagent 3 Storage Tank Volume:_____ Reagent 4 Storage Tank Volume:_____ The Bidder shall specify the volume of the solvent storage tank used for this facility and shall identify and state storage volume for other reagents required by the process. (i.e., corrosion inhibitors, pH adjusting chemicals, intermediates, etc. used in either the carbon dioxide capture process or in the solvent reclaim process.)	The same information will suffice for the FEED phase proposal.

CARBON CAPTURE FACILITY PERFORMANCE
Note that performance figures are to be based on the operation of the carbon capture facility at the full flue gas flow rates and operating conditions specified. All numbers should reflect the total flow of all process trains.

8	**Percent CO_2 in Flue Gas Captured and CO_2 Purity**	Percent Capture:(Guarantee):______ Impurities in CO_2 stream _______	This will be guarantee performance number subject to performance test and LD variance resolution.
9	**Predicted Flue Gas Pressure Drop Through the Carbon Capture Equipment** (Inlet of first process piece to discharge of Absorber**)**	_____ "wc	The FEED will develop a range of pressure drop numbers for various operating loads and the condition of the fill material.
10	**Electrical Power Consumed in the Absorption, Stripping, and Reclamation Operations.**	______ kW	This will be guarantee performance number subject to performance test and LD variance resolution.
11	**Electrical Power Consumed in the Compression Operation**	______ kW	This will be guarantee performance number subject to performance test and LD variance resolution.
12	**Total Electrical Power Consumed** **Total Electrical Power Demand Installed**	______ kW ______ kW	Total installed power will be used for BOP costing.
13	**Steam Used in the Carbon Capture Process (60 psig supply pressure)**	_____short tons/hr	This will be guarantee performance number subject to performance test and LD variance resolution.
14	**Water Required (water types and flows, i.e. demineralized, etc)**	Type 1 ____ _____gpm Type 2 ____ _____gpm Type 3 ____ _____gpm	Cooling load/circulating cooling water flows with design supply and return temperatures/air cooling shall be part of guaranteed performance. The same information will suffice for the FEED phase proposal.
15	**Hydrogen**	_____SCFM	The same information will suffice for the FEED phase proposal.
16	**Nitrogen**	_____SCFM	The same information will suffice for the FEED phase proposal.
17	**Instrument Air**	_____SCFM	The same information will suffice for the FEED phase proposal.
18	**Plant Air**	_____SCFM	The same information will suffice for the FEED phase proposal.
19	**Solvent Consumption and Approximate Cost**	Gallons or Tons/yr_____ US$/gallon or ton______	The same information will suffice for the FEED phase proposal This will be guarantee performance number subject to performance test and LD variance resolution. Solvent availability must be guaranteed
20	**Water Condensed from the Incoming Flue Gas**	_____gpm The Bidder shall supply the estimated composition and characteristics of this stream	The same information will suffice for the FEED phase proposal.
21	**Blowdown from Cooling towers or closed circuit cooling loop.**	_____gpm The Bidder shall supply the estimated composition and characteristics of this stream	The same information will suffice for the FEED phase proposal.
22	**Fugitive gasses and vapors from the Absorber**	Solvent _____ppmv Reaction Product 1 _____ppmv Reaction Product 2 _____ppmv Reaction Product 3 _____ppmv Reaction Product 4 _____ppmv The bidder shall identify expected reaction products in this stream and give the estimated ppmv and lb/hr in the primarily nitrogen stream.	The same information will suffice for the FEED phase proposal.
23	**Water Condensed in the Compression Process and Removed in Interstage Dehydration**	_____gpm The Bidder shall supply the estimated composition and characteristics of all waste streams.	The same information will suffice for the FEED phase proposal.
24	**Blowdown Rate of Solvent from the Process to Solvent Reclamation**	_____gpm	The same information will suffice for the FEED phase proposal.
25	**Waste Stream**	_____gpm Bidder shall supply the estimated flow, composition and characteristics of this stream	The same information will suffice for the FEED phase proposal.

26	**Point Sources, fugitive emissions, and vents**	Bidder to identify all point sources, fugitive emissions, etc. including tanks, silos, sumps, vents, safety reliefs, including the expected annual and instantaneous release in pounds.	The same information will suffice for the FEED phase proposal.

Table B - Supplier Basis for Process Design and Scale-up - Fill-In Data Sheet

Item	Description	Provide with proposal. Attach additional sheets as needed and reference all attachments below.
DESCRIPTION OF BASIS FOR PROCESS PERFORMANCE EXPECTATION OF CARBON CAPTURE FACILITY		
1	**Provide information to describe the configuration of the pilot plant, demonstration unit or commercial unit proving successful operation of the same CO_2 capture process as proposed for the Trailblazer Energy Center project. Explain the basis for any changes to the configuration between the reference unit and the system proposed for Trailblazer.**	
2	**Provide test plans and test data or commercial operating data from the plant(s) identified in (1) above as necessary to allow an independent verification that these plants were able to continuously operate with the same level of CO_2 capture performance as required for the Trailblazer project. Include information on the duration of the test runs or commercial operation.**	
DESCRIPTION OF BASIS FOR PHYSICAL SCALE-UP OF PROCESS EQUIPMENT FOR CARBON CAPTURE FACILITY		
3	**Describe the scale-up ratios (based on both volumetric flue gas flow rate and on CO_2 mass flow rate of CO_2 captured) that have previously been employed in the development of the proposed CO_2 capture process to date. Address the scale-up from laboratory scale to bench scale to pilot scale to commercial scale. Compare previously demonstrated scale-up ratios to that which will be required for design and construction of the CO_2 capture system for the Trailblazer project.**	
4	**Provide a tabular comparison of the equipment sizes (e.g., diameter, throughput, rated capacity, etc.) used in the previous experience from plants listed in (1) above to the sizes that would be used at the Trailblazer Energy Center. Include, as a minimum, the absorber, stripper, heat exchangers, CO_2 compressors, and solvent reclaim equipment.**	
5	**For each equipment component listed in (4) above, provide a tabulation of the size of the largest commercially operating unit of that equipment. Identify the plant name and location at which the largest unit is operating. In each case where the largest commercially operating unit is smaller than the unit that will be required for application to Trailblazer, provide an explanation of the methods to be used to verify the scalability of such equipment to the size needed.**	
6	**Provide the proposed supplier of and the product names of the tower packing/trays and distributors for the absorber and stripper. Provide information illustrating that such supplier has established the basis to be used for scale-up of the towers to the size required for Trailblazer. Include the packing supplier's description of the scale-up techniques that will be used to (a)maintain the necessary liquid distribution and gas distribution within the towers and (b)provide adequate mechanical support for the internals. Identify any changes in packing type or characteristics between the reference units identified in (1) above to that proposed for Trailblazer.**	
DESCRIPTION OF CHARACTERISTICS OF REAGENTS AND SOLVENTS USED IN CARBON CAPTURE PROCESS		
7	**Provide a listing of each reagent and solvent employed in the CO_2 capture process proposed for the Trailblazer project. Identify the manufacturer of each reagent or solvent, and identify any that utilize proprietary formulations. Provide MSDS for each reagent or solvent used in the proposed process.**	
8	**For each reagent or solvent listed in (7) above, provide information on the corrosivity, degradation rate and volatility. Identify any specific design measures or materials of construction required for process equipment to resist the corrosivity or mitigate the degradation or volatility.**	

Exhibit 2

TENASKA®

News Release

FOR IMMEDIATE RELEASE – July 26, 2010

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Tenaska Chooses Fluor Carbon Capture Technology

Trailblazer Energy Center Will Use ***Econamine FG Plus*** *at Pioneering Plant*

SWEETWATER, Texas – Tenaska has chosen Fluor Corporation's Econamine FG Plus^{sm} carbon capture technology for use in its proposed Tenaska Trailblazer Energy Center, being developed near Sweetwater.

Trailblazer will be a pioneering 600-megawatt (net) electricity generating plant fueled by pulverized coal and is expected to be among the first full-scale commercial power plants in the nation, and the first in Texas, to capture 85 to 90 percent of the carbon dioxide (CO_2) byproduct, sending it via pipeline to the Permian Basin to be used in enhanced oil recovery.

Based on the projected rate of capture, the plant will emit significantly less CO_2 than an equivalent capacity natural gas-fueled plant.

Econamine FG Plus^{sm} is a Fluor (NYSE: FLR) proprietary, amine-based technology for large-scale, post-combustion CO_2 capture. The technology is one of the first and among the most widely applied commercial solutions proven in operating environments to remove CO_2 from high-oxygen content flue gases.

"Fluor's Econamine FG Plus^{sm} technology has been licensed at commercial scale in 26 industrial plants worldwide, including three in the United States," said Michael Lebens, president of Tenaska's Engineering & Operations Group. "The combination of Fluor's expertise with the technology and its 20 years of experience in practical applications makes it the best choice for use at Trailblazer."

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Tenaska's initial design and engineering work for Trailblazer also is being performed by Fluor, the project's engineering, procurement and construction contractor. Fluor, based in Irving, Texas, designs, builds and maintains many of the world's most challenging and complex projects.

Dave Dunning, president of Fluor's Power Group, said the company is pleased that its technology has been chosen for the Trailblazer project. "Trailblazer represents an innovative environmental breakthrough in clean energy production that will have positive implications worldwide," he said. "Fluor is eager to move forward and begin building this important new energy source for Tenaska and Texas."

Trailblazer will generate more than $740 million in Nolan County economic impact during construction and during operation will provide more than 100 direct well-paying permanent jobs, plus an estimated 70 secondary jobs from increased local spending. In addition, the captured CO_2 used in enhanced oil recovery will add more than 10 million barrels of oil production annually to the West Texas economy.

Arch Coal, Inc. has a 35 percent equity interest in the project and will supply the coal from the Powder River Basin in Wyoming.

Tenaska recently completed an administrative hearing on its application for a Texas Commission on Environmental Quality (TCEQ) air quality permit, and expects to have a final permit by the end of this year.

About Tenaska

Tenaska has developed approximately 9,000 megawatts (MW) of electric generating capacity across the United States. Tenaska's affiliates operate and manage eight power plants in six states totaling more than 6,700 MW of generating capacity owned in partnership with other companies. Tenaska Capital Management, an affiliate, provides management services for stand-alone private equity funds, with nearly $5 billion in assets, including nine power plants (with approximately 5,400 MW of capacity) and multiple natural gas midstream assets, including gas storage, gathering and processing facilities.

Tenaska is applying proven pre- and post-combustion technologies on a commercial scale in its two environmentally friendly clean coal projects. Taylorville Energy Center in Christian County, Illinois, will convert Illinois coal into clean-burning substitute natural gas, use it to generate electricity and capture more than 50 percent of the plant's CO_2 emissions. Trailblazer Energy Center in Nolan County, Texas, is expected to be the first commercial scale, conventional coal-fueled power plant in the world to capture a significant portion of its CO_2. This plant's success would demonstrate how existing plants in the U.S. and China could be retrofitted cost-effectively with this carbon-reducing technology. Tenaska was recently listed in benchmarking studies by the Natural Resources Defense Council as having among the very best fleet-wide records in the United States for controlling emissions. For more information about Tenaska, visit www.tenaska.com

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About Fluor Corporation

Fluor Corporation (NYSE: FLR) designs, builds and maintains many of the world's most challenging and complex projects. Through its global network of offices on six continents, the company provides comprehensive capabilities and world-class expertise in the fields of engineering, procurement, construction, commissioning, operations, and maintenance and project management. Headquartered in Irving, Texas, Fluor is a FORTUNE 150 company and had revenues of $22 billion in 2009. For more information, visit www.fluor.com.

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