Report to the
Global CCS Institute

Development History of the Entergy
Nelson 6 Carbon Capture Initiative

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Abstract

Purpose:

Our overall purpose is to install a technically feasible full scale carbon capture plant as a retrofit at Entergy Corporation’s (Entergy) existing Nelson 6 pulverized coal plant, located near Westlake, Louisiana, United States of America (USA). The successful completion of the Nelson 6 carbon capture project (Project) will play an important role in promoting the feasible commercialization of carbon capture retrofits around the world.

Description:

Tenaska, Inc. (Tenaska) and Entergy Services, Inc. (ESI) have formed a cooperative venture to develop a commercial-scale retrofit post-combustion carbon capture project to be located at Entergy’s Nelson 6, a 585 MW coal-fired power plant in Westlake, Louisiana. The carbon capture technology provided will be designed to capture up to 90 percent of the carbon dioxide (CO₂) from the unit’s flue gas stream. During an average operating year, this percent capture is equivalent to approximately 4 million tons (3.6 million metric tons) of CO₂. The Project could become commercially operational as early as 2015; the timing of commercial operation is dependent on enactment of federal legislation regarding the control of carbon emissions and upon appropriate regulatory approvals.

The Project will provide the captured CO₂ at a pressure in excess of 2,000 pounds per square inch absolute (psia) (138 bar) atmospheric pressure to Denbury Resources’ (Denbury) Green Pipeline that was completed in 2010.

Conclusion:

Following two years of careful planning, including the completion of a feasibility study, the Project team has concluded that the Nelson 6 pulverized coal plant is technically and physically suitable for the installation of a carbon capture plant. Commercial and financial feasibility is dependent upon the implementation of a federal carbon mandate and financial incentives provided by the USA legislative and executive branches of government and appropriate regulatory approvals.
# Development History of Entergy Nelson 6 Carbon Capture Initiative Report

## Table of Contents

1. **INTRODUCTION** .................................................................................................. 1
2. **PURPOSE AND GOALS** ....................................................................................... 2
3. **EXECUTIVE SUMMARY** ........................................................................................ 3
   3.1 Project Participants ................................................................................................. 3
   3.2 CO\(_2\) Storage ............................................................................................................. 3
   3.3 Retrofit Integration .................................................................................................... 3
   3.4 Project Risks ............................................................................................................. 3
4. **PROJECT DESCRIPTION** ...................................................................................... 4
   4.1 Overview ..................................................................................................................... 4
   4.1.1 Nelson 6 .................................................................................................................... 4
   4.1.2 The Nelson 6 CCS Project ......................................................................................... 4
   4.2 Key Project Participants ............................................................................................. 5
   4.2.1 Entergy ...................................................................................................................... 5
   4.2.2 Tenaska ...................................................................................................................... 7
   4.2.3 Denbury ..................................................................................................................... 8
5. **INTEGRATION OF A CCS RETROFIT PROJECT** ...................................................... 9
   5.1 Overview ..................................................................................................................... 9
   5.1.1 Flue Gas .................................................................................................................... 9
   5.1.2 Steam Supply and Condensate Return ....................................................................... 9
   5.1.3 Electricity .................................................................................................................. 9
   5.1.4 Cooling Water ......................................................................................................... 10
   5.1.5 Construction Lay down ........................................................................................... 10
   5.1.6 Health, Safety and Environmental Programs ......................................................... 10
6. **PROJECT DEVELOPMENT** ................................................................................. 12
   6.1 Development Team .................................................................................................. 12
   6.2 CCS Business Model ............................................................................................... 12
   6.3 Strategic Advantage ............................................................................................... 13
6.4 Project Risks and Barriers .................................................................................. 14
  6.4.1 Project Risks .................................................................................................. 14
  6.4.2 Project Barriers .......................................................................................... 14
  6.4.3 Conclusion .................................................................................................. 16

7.0 Relevance to Carbon Capture and Storage .................................................... 17

8.0 Conclusions ....................................................................................................... 18

9.0 Acronyms and Citations .................................................................................. 19
  9.1 Acronyms ....................................................................................................... 19
  9.2 Citations ........................................................................................................ 20
1.0 Introduction

Tenaska, Inc. (Tenaska) and Entergy Services, Inc. (ESI), have formed a cooperative venture to develop a commercial-scale retrofit post-combustion carbon capture project to be located at Entergy’s Nelson 6, a 585 MW coal-fired power plant in Westlake, Louisiana, United States of America (USA). The carbon capture technology provided will be designed to capture up to 90 percent of the CO₂ from the unit’s flue gas stream. During an average operating year, this percent capture is equivalent to approximately 4 million tons (3.6 million metric tons) of CO₂. The Project could become commercially operational as early as 2015; the timing of commercial operation is dependent on enactment of federal legislation regarding the control of carbon emissions and upon appropriate regulatory approvals.

The Project will provide the captured CO₂ at a pressure in excess of 2,000 psia (138 bar) atmospheric pressure to Denbury’s Green Pipeline that is already under construction and is expected to be operational before year end. Denbury will provide the CO₂ to existing oil fields for use in extracting more oil from wells that are depleting in pressure in a process known as enhanced oil recovery (EOR). The Green Pipeline passes within five miles (eight kilometers) of the Nelson 6 plant.

Tenaska and ESI have been working together on the feasibility and planning phases of the Project for approximately two years, since 2008. This report discusses the Project’s development efforts from inception to the current date as shown by the following timeline:

- Begin feasibility study – February, 2009
- Complete feasibility study – June 2009
- Global Carbon Capture and Storage (CCS) Institute application complete – December, 2009
- Global CCS Institute Funding Agreement executed– July, 2010
- Begin technology selection RFQ – August, 2010
2.0 Purpose and Goals

The purpose of this report is to give an overview of the project development history of the Entergy Nelson 6 carbon capture retrofit Project, including:

- A description of the key Project participants and their motivations for participating in the Project;
- A discussion of technical considerations involved in a carbon capture retrofit project;
- A discussion of the Project’s business model, including partner relationships; and
- A discussion of Project risks and barriers.
3.0 Executive Summary

Since its inception in 2008, the Project has been in the feasibility and planning stage, during which time, significant information has been gathered and key decisions made.

3.1 Project Participants

Selection of like-minded partners with complementary skill sets is a key initial step in project development. Entergy and Tenaska are financially stable, highly respected companies that share a belief in the importance of CCS. Both firms have a track record of allocating significant financial resources in support of carbon management initiatives. Despite their similarities, they bring different but complementary skill sets to the Project. Entergy brings the power plant to be retrofitted and their extensive experience operating coal-fired electric generating stations, while Tenaska brings the experience it has gained during the development of two other CCS projects and its strong reputation in the financial community.

3.2 CO₂ Storage

The Project intends to sell its captured CO₂ to Denbury. Denbury’s Green Pipeline, which passes within five miles (eight kilometers) of the Project, was completed in December 2010. Denbury will provide the CO₂ to existing oil fields for use in EOR efforts. The proximity of the Denbury Green Pipeline is a significant strategic advantage for the Project. The ability to sell the Project’s captured CO₂ to Denbury for use in US Gulf Coast EOR efforts eliminates regulatory risks associated with storage in saline aquifers and provides an income stream to support Project financing.

3.3 Retrofit Integration

There are four main areas that will require integration with the existing coal-fired generation facility: 1) flue gas to be treated; 2) steam supply and condensate returned to the coal fired generation facility; 3) utility electricity supply; and 4) cooling water. Integration will be made easier by the particular circumstances surrounding the existing Nelson 6 plant. Because it was originally planned for there to be a twin Nelson 5 unit, Nelson 6 has a double stack and therefore ample available space for the required Project equipment and plant laydown.

3.4 Project Risks

Perhaps the biggest risk facing the Project is lack of regulatory certainty. Resolution of issues surrounding carbon capture mandates and pricing, as well as those surrounding incentives and CO₂ storage requirements, are needed.
4.0  Project Description

4.1  Overview

4.1.1  Nelson 6

Nelson 6 is a 585 MW, pulverized coal-fired electricity generation unit primarily burning low sulfur Powder River Basin coal located in Westlake, Louisiana, USA. Existing emissions control systems consist of separated overfire air and low NOX burners to reduce NOX emissions and an electrostatic precipitator for particulate removal. The unit is 70 percent owned by Entergy Corporation with the remaining 30 percent ownership divided between a municipal utility and electrical cooperatives. Nelson 6 entered commercial operation in February 1982. Other electricity generation units in the Nelson plant complex include: two petroleum coke fired co-generation units that provide electricity and steam to local industry (each rated at 115 MW, net) and two natural gas fired units rated at 155 MW, net and 515 MW, net.

4.1.2  The Nelson 6 CCS Project

As discussed in Section 1, the Project is a cooperative venture between ESI and Tenaska. Tenaska plans to install a commercial-scale carbon capture plant adjacent to the Entergy’s Nelson 6 plant.

Figures 4.1 and 4.2 show the Nelson 6 plant and the space available for the carbon capture facility. The plant site has an open area well-suited for this purpose. The open area originally was intended to be the location of Nelson Unit 5, but Unit 5 was never constructed due to Entergy’s decision to advance its nuclear fleet instead.

FIGURE 4.1 – Nelson 6 Unit Today
The carbon capture technology provided will be designed to capture up to 90 percent of the carbon dioxide (CO₂) from the unit’s flue gas stream. During an average operating year, this percent capture is equivalent to approximately 4 million tons (3.6 million metric tons) of CO₂. The Project could become commercially operational as early as 2015; the timing of commercial operation is dependent on enactment of federal legislation regarding the control of carbon emissions and upon appropriate regulatory approvals.

The Project will provide the captured CO₂ at a pressure in excess of 2,000 psia (138 bar) atmospheric pressure to Denbury’s Green Pipeline that was completed in 2010. Denbury will provide the CO₂ to existing oil fields for use in extracting more oil from wells that are depleting in pressure in a process known as enhanced oil recovery (EOR). The Green Pipeline passes within five miles (eight kilometers) of the Nelson 6 plant; Denbury’s demand for CO₂ captured from anthropologic sources is immediate. The pipeline will give the Project access to all of the fields that Denbury’s Green Pipeline will serve in Louisiana and Texas.

4.2 Key Project Participants

4.2.1 Entergy

Entergy (NYSE:ETR) is an integrated energy company engaged primarily in electric power production and retail electric distribution operations. Its six regulated utility companies deliver electricity to approximately 2.7 million customers in portions of Arkansas, Louisiana, Mississippi, and Texas. Entergy has served the Gulf Coast region of the USA for nearly 100 years since its founding in 1913. With approximately 15,000
employees in the community, Entergy represents a major economic and people force in the four-state region. Entergy affiliates own or manage approximately 30,000 MW of electric generation domestically, and it is the second largest nuclear power generator in the US. Entergy ranks among the largest utility companies, with revenues of $10.7 billion USD and assets of over $37 billion USD in 2009. The Entergy affiliates participating in this Project include two regulated utility operating companies, Entergy Gulf States Louisiana, LLC and Entergy Texas, Inc., as well as ESI, which provides various administrative and support services to the regulated utility companies. Figure 4.2.1 shows the breadth of Entergy’s business holdings.

**FIGURE 4.2.1 – Entergy’s Presence**

![Entergy’s Presence](image)

Entergy’s overarching vision and aspirations are as follows:

- **Vision:**
  - Sustainable Development
  - Performance Excellence
  - Environmental Advocacy

- **Aspirations:**
  - To Continually Deliver Top-quartile Total Shareholder Return
  - To Provide Clean, Reliable And Affordable Power In Our Utility Business
  - To Operate Safe, Secure And Vital Nuclear Resources In An Environment That Is Expected To Grow Over The Long-Term And Be Carbon-Constrained
4.2.2 Tenaska

Tenaska is a group of privately held companies with 22 years of power plant development and energy marketing experience. In 2009, Forbes magazine ranked the company 16th among the top privately held companies in the US, based on 2008 revenues. Tenaska’s headquarters are in Omaha, Nebraska, USA. Regional offices are in Dallas, Texas; USA, Denver, Colorado; USA, and Calgary, Alberta Canada. Figure 4.2.2 shows Tenaska’s offices and project locations.

Tenaska’s business activities are divided into seven major segments – Corporate, Development, Operations, Energy Marketing, Biofuels Marketing, Gas Exploration and Development and Power Fund Management. While the Development group is primarily responsible for power project development, it relies on input and assistance from each of the other business segments, providing a depth of talent and experience that is unmatched in the industry.

Tenaska employees have experience in all aspects of large-scale generating project development, including combined and simple cycle natural gas facilities, pulverized coal, fluidized-bed, waste coal and lignite facilities. Tenaska employees are experienced in gas and coal plant siting and permitting; engineering design and optimization; financing; construction contracting and management; fuel procurement and handling; commissioning; and operations and maintenance.

FIGURE 4.2.2 – Tenaska Offices and Project Locations
Since its inception, Tenaska has developed and constructed approximately 9,000 MW of generation. In 2009, the company’s revenues were $7.9 billion USD, while total assets were $2.8 billion USD.

Tenaska New Technologies, LLC, a special purpose affiliate of Tenaska, Inc., has been formed to construct, own and operate the Project. Tenaska New Technologies will contract with Denbury to purchase the captured CO₂ and deliver it for use in EOR efforts and ultimate storage. Tenaska New Technologies will contract with ESI for sulfur dioxide and CO₂ extraction services, and for hosting the Project at the Nelson plant complex.

4.2.3 Denbury
Denbury (NYSE:DNR) is a growing independent oil and gas company. Denbury is the largest oil and natural gas operator in Mississippi, owns the largest reserves of CO₂ used for tertiary oil recovery east of the Mississippi River, and holds significant operating acreage in the Barnett Shale play near Fort Worth, Texas, USA, onshore Louisiana and Alabama, and properties in Southeast Texas. Denbury’s goal is to increase the value of acquired properties through a combination of exploitation, drilling and proven engineering extraction practices, with its most significant emphasis relating to tertiary recovery operations. Denbury’s corporate headquarters is located in Plano, Texas. Figure 4.2.3 shows Denbury’s Gulf Coast CO₂ projects.

FIGURE 4.2.3 – Denbury Gulf Coast CO₂ Projects
5.0 Integration of a CCS Retrofit Project

5.1 Overview

There are four main areas that will require integration with the existing coal-fired generation facility: 1) Flue gas to be treated; 2) Steam supply and condensate returned to the coal fired generation facility; 3) Utility electricity supply; and 4) cooling water. The CCS facility has other requirements, but these either would be provided by stand-alone equipment (e.g. compressed air) or utilize existing Nelson site equipment with minimal impact on existing operations and existing system modifications as necessary to support the additional demands of the carbon capture plant (e.g. fire protection system, process water, solvent treatment, potable water, and waste water disposal).

5.1.1 Flue Gas

Raw Nelson 6 flue gas can be supplied to the CCS facility by installing diverting ducts between the electrostatic precipitator and the Nelson 6 stack. A double stack was constructed to serve Nelson 5 (which was never constructed due to advancement of nuclear plant construction) and Nelson 6. The processed flue gas from the CCS facility would be returned to the unused Nelson 5 stack. Nelson 6 will have the option to not divert the raw flue gas to the CCS facility and send it to the Nelson 6 stack if for any reason the CCS facility is unable to operate due to either scheduled or unscheduled outage.

5.1.2 Steam Supply and Condensate Return

There are several configuration possibilities regarding the source of the steam required for CCS processes. Additional feasibility analysis will be required to determine the optimal point of extraction. One option is to extract the steam from Nelson 6 turbine’s IP/LP crossover. The space available for this extraction as well as routing complications may require that this steam extraction take place at other locations. The Project team may also consider a thermally matched cogeneration facility at the Project to preserve the original steam turbine sizing and operating characteristics. Condensate out of the CCS process can be returned to the Nelson 6 deaerator.

5.1.3 Electricity

The Nelson plant site is served by several onsite transmission switchyards, as shown in Figure 5.1.3 overleaf. These switchyards are connected to Entergy’s 500kV, 230kV and 138kV transmission systems. A dedicated electric feed is planned to be taken from an onsite 230kV transmission switchyard to serve the Project rather than integrating the Project’s electrical usage as a parasitic load of Nelson 6.
5.1.4 Cooling Water
Cooling water is supplied to the Nelson site from the Sabine River Authority. A settling pond is used to clarify this water prior to use. The settling pond has ample capacity to process the estimated volumes of water required for both the Nelson generating units and the proposed Project. Additional pumping and pipe infrastructure would need to be installed to deliver cooling water from the settling pond to the Project. A new cooling tower will be required to meet the cooling needs of the Project, as the existing cooling tower does not have adequate additional capacity.

5.1.5 Construction Lay down
Approximately 130 acres are currently used as outage equipment lay down and contractor parking on the Nelson plant site. This area would be utilized for construction equipment lay down and parking for the Project and is expected to be adequate for these purposes.

5.1.6 Health, Safety and Environmental Programs
Entergy has implemented rigorous health, safety and environmental programs for all of its electricity generation facilities, including the Nelson plant site. The Nelson plant site has been designated as an OSHA Voluntary Protection Program (VPP) star site since August 23, 2003. Approval into VPP is OSHA’s official recognition of the outstanding efforts of employers and employees who have achieved exemplary occupational safety and health. The proposed carbon capture facility’s operations are expected to meet or
exceed Entergy’s Safety, Health and Environmental processes, procedures and standards. Safety is a significant priority for Tenaska. Its Tenaska Ferndale Cogeneration Station has never had a lost-time injury since it commenced operation in 1994. The Ferndale plant also has been designated as an USA Occupational Safety and Health Administration Voluntary Protection Program Star site. This designation recognizes exemplary worksites with comprehensive, successful safety and health management systems.
6.0 Project Development

6.1 Development Team

In early 2009, a team was formed to support a feasibility study to determine the viability of a full scale retrofit at the Nelson site. The team was comprised of Entergy, Tenaska, Denbury and a prospective technology supplier. The purpose of the feasibility study was to prepare a preliminary design basis and capital and operation and maintenance (O&M) cost estimate. Based on the results of the feasibility study, it was determined that the Nelson site is very suitable for the integration of a CCS retrofit.

Since the Project’s inception in 2008, the roles of the original team members have evolved into specific roles, which will be described in more detail below.

Subsequent to the completion of the feasibility study, Entergy and Tenaska entered into a Project Development Agreement (PDA). The PDA provides a clear pathway for the next critical phase of the Project development. As mentioned previously, the primary focus during 2011 will be the selection of a technology provider, engineering contractor, retrofit integration design and FEED study. However, the team will also be reviewing environmental impacts and monitoring federal legislation during the next phase of development.

Entergy and Tenaska are currently in the process of selecting a final technology. Entergy and its partners will remain the owners of Nelson 6 coal plant, and Tenaska will perform the FEED study and construct and own the CCS retrofit plant. Tenaska intends to sell the captured CO2 to Denbury for use in EOR.

6.2 CCS Business Model

It was decided that the ideal structure is to have a non-regulated entity like Tenaska develop, construct and own the CCS plant. The partners believe this structure will provide much more certainty around the cost of the CCS plant and reduce or eliminate the commercialization risk to Entergy and its utility customers.

Figure 6.2 shows the organizational structure being used to develop the Project.
6.3 Strategic Advantage

One of the unique aspects and strategic advantages of the Nelson 6 retrofit Project is its proximity to Denbury’s recently completed Green Pipeline. The Green Pipeline passes within five miles (eight kilometers) of the Project, and will transport CO\textsubscript{2} to oil fields in Louisiana and Texas for use in EOR efforts. A March 2005 DOE study estimates there are 181 reservoirs and 16.5 billion bbls of stranded oil that is amenable to CO\textsubscript{2} – EOR production on shore along the Gulf Coast in Texas and Louisiana. Underlying these oil bearing formations are deep saline aquifers, which are suitable for long term geologic sequestration of CO\textsubscript{2} after the oil fields have been produced. It is anticipated that Denbury will receive the CO\textsubscript{2} at the Project’s fence line, and will construct and operate the pipeline lateral required to transport the CO\textsubscript{2} to Denbury’s Green Pipeline.

The Green Pipeline is designed to transport up to 800 million cubic feet (MMCF) per day (22.7 million cubic meters per day) of CO\textsubscript{2}, and is a 24-inch (61-centimeter) diameter pipeline. It is approximately 320 miles (515 kilometers) in length, developed for the purpose of transportation of CO\textsubscript{2}, beginning in Donaldsonville, Louisiana connecting to its existing pipeline network, and ending at a location in Denbury’s Hastings Field in Brazoria County, Texas. The Louisiana portion of the pipeline is approximately 200 miles (322 kilometers) in length, and the Texas portion of the pipeline is approximately 120 miles (193 kilometers) in length.
The Green Pipeline along with the Nelson 6 CCS anthropogenic CO₂ will become an integral part of the already existing Denbury CO₂ operations as depicted in Figure 4.2.3. The hundreds of miles of existing CO₂ pipelines along with the Green Pipeline are depicted by the grey lines in Figure 4.2.3. The EOR operations that utilize the CO₂ are shown as the Phase I through Phase 8 oil production areas. The current source of natural CO₂ is known as Jackson Dome.

6.4 Project Risks and Barriers

6.4.1 Project Risks

As of today, not all of the commercialization risks of CCS are known. The following discussion encompasses the risks the Project has identified thus far.

6.4.1.1 Commercialization Risks

There is no quick inexpensive way to commercialize CCS. The first projects will be required to put millions of dollars of up front capital at risk. However, a carbon capture retrofit plant at Nelson 6 should have a lower capital cost as compared to other retrofits due to the ample space and services available at that specific location.

The true capital cost of a full-scale commercial carbon capture retrofit is not known precisely, although there has been a significant amount of uninformed comment in the media regarding the cost of carbon capture. It will require a lengthy and expensive front-end engineering and design (FEED) study to better determine these costs. Likewise, the true operating cost of a full-scale commercial carbon capture retrofit will not be known until the first projects go on line.

Ultimately, the Project will have to find a way to achieve enough certainty of cost and revenue streams to satisfy public service commissions, utility customers, lenders and equity owners.

It should be noted that the EOR option at Nelson 6 allows carbon capture to proceed without waiting for all of the issues associated with saline aquifer storage to be resolved, thereby reducing geologic risk. Use of CO₂ from the Project also will reduce the USA dependence on foreign oil imports.

6.4.1.2 Policy Risks

USA Department of Energy Secretary Steven Chu, in a letter to the Carbon Sequestration Leadership Forum, recognized that coal is ‘likely to be a major and growing source of electricity generation for the foreseeable future’. Despite statements like these, one of the biggest question marks associated with development of full-scale, commercial CCS retrofits revolves around US Federal government policy in terms of carbon prices, incentives, CO₂ storage requirements and carbon capture mandates. Some level of certainty is required for CCS projects to move forward.

6.4.2 Project Barriers

The Project will assist in overcoming barriers for purchasers of CO₂ capture equipment, technology vendors and project developers. For purchasers of CO₂ capture equipment, the Project will demonstrate the ability of the process to provide predictable CO₂ capture
performance at a commercial-scale. It will also provide information necessary to refine cost estimates transferable to future installations.

Some of the barriers that the Project will help to address are discussed below.

6.4.2.1 Barriers for CCS Owners and Operators

- Confirmation of design performance efficiency;
- Scale-up of technology and physical facilities;
- Confirming solvent-related issues (distribution, foaming, volatilization, degradation rate, consumption rate, corrosion potential, and waste disposal);
- Confirmation of the existing unit’s future availability
- The performance impact of transient operation (start-up, shut-down, and upsets) on both a commercial power plant and a commercial CO₂ capture plant; and
- Quantifying and confirming incremental air emissions.

6.4.2.2 Barriers for Developers

- Technical and commercial challenges related to retrofitting an existing coal-fired generation facility with CO₂ capture equipment;
- Project costs – including project development costs, implementation costs and cost per ton of CO₂ captured;
- Refinement of project development and technical implementation plans and associated timelines;
- True risks and mitigation strategies related to CO₂ capture projects;
- Sufficient performance guarantees from technology and engineering providers;
- Specific needs for water, steam, electricity and other commodities necessary to operate the project;
- Environmental concerns that may be common to many CO₂ capture projects, strategies to mitigate these concerns and related costs to the project;
- Community engagement and concerns;
- The processes followed to receive legal, regulatory and permitting approval, and the costs and timelines associated with those efforts; and
- Successful financing.

6.4.2.3 Storage Barriers

Approximately 4 million tons (3.6 million metric tons) of CO₂ per year will be captured and sold to Denbury for EOR at Denbury’s existing oil field operations. The experience and insights gained as a result of the Project will help to identify the technical and
commercial challenges and available mitigation strategies associated with the post-combustion CO₂ capture and transportation for EOR purposes business model.

6.4.3 Conclusion
Many barriers to the widespread deployment of CCS technologies are known at this time, and others will be identified only as a project moves through its life cycle toward implementation. The Project is positioned as essentially a proof of concept for the post-combustion CO₂ capture retrofit and EOR business model. The strong and experienced group of Project partners that has been assembled ensures that the barriers encountered along the road to implementation will be thoughtfully addressed and resolved, with the knowledge and insights gained from this experience available for the enrichment of the Global CCS Institute and its membership.
7.0 Relevance to Carbon Capture and Storage

The overall goal in the retrofitting of the Nelson 6 coal facility with a carbon capture system is to demonstrate that such technology is commercially and technically feasible on a full-scale basis. The experience gained during the retrofit process can be used to address carbon capture at existing coal facilities worldwide. Successful implementation of the Project will create an important step in developing the systems necessary to address GHGs and to develop a “game changer” facility that is a transferrable in full scale as a world class platform for carbon capture. To date nearly all carbon capture projects in operation have only achieved the pilot stage (≈1 MW) or demonstration stage (≈50 MW).

Important knowledge that is transferable to other advancing carbon capture projects in the USA and emerging countries such as China and India will be gained from the continued development of Tenaska’s carbon capture retrofit at Nelson 6 to help bring projects from the pilot and demonstration stages to full scale operation. Answers to such important questions such as scale up and commercialization stand as a viable goals.
8.0 Conclusions

The project team believes the Nelson 6 coal plant site is ready for its next stage of development and is very suitable for a CCS retrofit plant. Over the next year, the team will focus on the selection of a carbon capture technology and an engineering firm to perform front end engineering and design study (FEED). The FEED study will eliminate one very important unknown at this stage, by providing a detailed capital cost estimate.
9.0 Acronyms and Citations

9.1 Acronyms

CCS - Carbon Capture and Sequestration
CO₂ - Carbon Dioxide
Denbury - Denbury Resources
Entergy - Entergy Corporation
ESI - Entergy Services, Inc.
EOR - Enhanced Oil Recovery
FEED - Front End Engineering and Design
GHG - Green House Gas
IGCC - Integrated Gasification Combined Cycle
MMCF - Million standard cubic feet
PDA - Project Development Agreement
Psia - Pounds per square inch
TEC - Taylorville Energy Center
Tenaska - Tenaska, Inc. and its affiliates
Trailblazer - Trailblazer Energy Center
USA - United States of America
9.2 Citations