MIDWEST AgEnergy

2841 3rd St SW
Underwood, ND 58576
(701) 442-7500

May 10, 2021

Karlene Fine, Executive Director
North Dakota Industrial Commission
State Capitol – 14th Floor
600 East Boulevard Ave Dept 405
Bismarck, ND 58505-0840

RE: Transmittal Letter for Midwest AgEnergy Group application for NDIC Renewable Energy Development Fund Grant.

Ms. Fine:

Please find enclosed an application describing the opportunity for Midwest AgEnergy Group to collect seismic data to advance the potential opportunity for geological storage of CO2 for North Dakota Industrial Commission Renewable Energy Development Fund Grant. Also included are a certificate of good standing within the state of ND and the $100 application Fee.

We believe this application is a critical step in understanding the potential for carbon capture and storage in eastern ND, which could unlock significant financial opportunities for ethanol producers, farmers, and other industries that emit CO2.

As you indicated in the April 28, 2021 correspondence the close date for this special session is May 10, 2021. If you have any questions regarding the application please contact Adam Dunlop of my staff. He can be reached at 701-442-7503 or adunlop@midwestagenergy.com.

Sincerely:

Jeff Zueger
CEO
Midwest AgEnergy Group

APPLICATION CHECKLIST

Use this checklist as a tool to ensure that you have all of the components of the application package. Please note, this checklist is for your use only and does not need to be included in the package.

☒	Application
☒	Transmittal Letter
☒	$100 Application Fee
☒	Tax Liability Statement
☒	Letters of Support (If Applicable)
☒	Other Appendices (If Applicable)

When the package is completed, send an electronic version to Ms. Karlene Fine at kfine@nd.gov, and 2 hard copies by mail to:

Karlene Fine, Executive Director
North Dakota Industrial Commission
State Capitol – 14th Floor
600 East Boulevard Ave Dept 405
Bismarck, ND 58505-0840

For more information on the application process please visit:
http://www.nd.gov/ndic/renew/info/submit-grant-app.pdf

Questions can be addressed to Jonathan Russo at (701) 328-5347.

Renewable Energy Program

North Dakota Industrial Commission

Application

Project Title:

Seismic Survey to Advance Potential for CO2 Storage in Eastern ND

Applicant:

Midwest AgEnergy Group

Principal Investigator:

Jeff Zueger

Date of Application:

May 10, 2021

Amount of Request:

$324,640

Total Amount of Proposed Project:

$649,280

Duration of Project:

6 months

Point of Contact (POC):

Adam Dunlop

POC Telephone:

701-442-7503

POC Email:

adunlop@midwestagenergy.com

POC Address:

2841 3rd Street SW

Underwood, ND 58576

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ABSTRACT

Objective:

Achieve a better understanding of the potential for safe and permanent Carbon Dioxide (CO2) storage in deep saline formations in eastern ND. This project will collect and analyze data to better characterize the subsurface geological features in Stutsman and Barnes Counties. We intend to acquire about 40 linear miles of 2D seismic images focusing on the Deadwood formation. This data will be used to evaluate large-scale structural trends, basement faults, depositional fabric, and depth prediction of reservoirs to assess the CO2 storage potential of the region.

Expected Results:

Ethanol producers and other entities that emit CO2 have strong financial drivers to permanently sequester CO2 if they can economically reach suitable injection zones. This study intends to obtain sufficient information to make informed decisions on the viability of geological sequestration in east central ND. The value created is in the knowledge regarding **if** there is potential for sequestration. If this study determines there is storage potential the expected results would be further subsurface characterization perhaps culminating in the drilling of a well. Any future storage project would strengthen the financial performance of the owner. This would protect existing jobs, add possible value to landowners, as well as create additional jobs during construction, operation and maintenance of the capture, compression, dehydration and injection facilities.

Duration:

Approximately 6 months to complete planning, permitting, seismic acquisition, data processing, interpret results, and complete project report.

Total Project Cost:

$649,280

Participants:

Midwest AgEnergy, Dakota Spirit AgEnergy, bp, seismic acquisition and processing companies to be determined.

PROJECT DESCRIPTION

Objectives:

The production of renewable fuels has had a marked impact on the economy of the state of North Dakota. The ethanol industry contributes $623 million annually to the state's economy and over $11 million in taxes. Existing facilities provide stable, good paying jobs to rural regions of the state. These facilities also provide a value-added market to agricultural producers.

There are numerous markets for biofuels that have aggressive carbon reduction goals. This translates into a financial opportunity for renewable fuel producers who can reduce the carbon intensity of the fuel they produce. Ethanol production via fermentation of grains produces a relatively pure stream of carbon dioxide (CO2). The ability to capture and permanently sequester this CO2 stream is the single largest opportunity to reduce the carbon intensity (CI) of fuel produced. This CI advantage, along with the 45Q tax code benefit, greatly enhances the financial incentives to permanently sequester CO2. Success in such an endeavor would ensure market access and enhance the financial stability of existing biorefineries and spur economic development in a variety of industries that have Environmental Social and Corporate Governance (ESG) criterion.

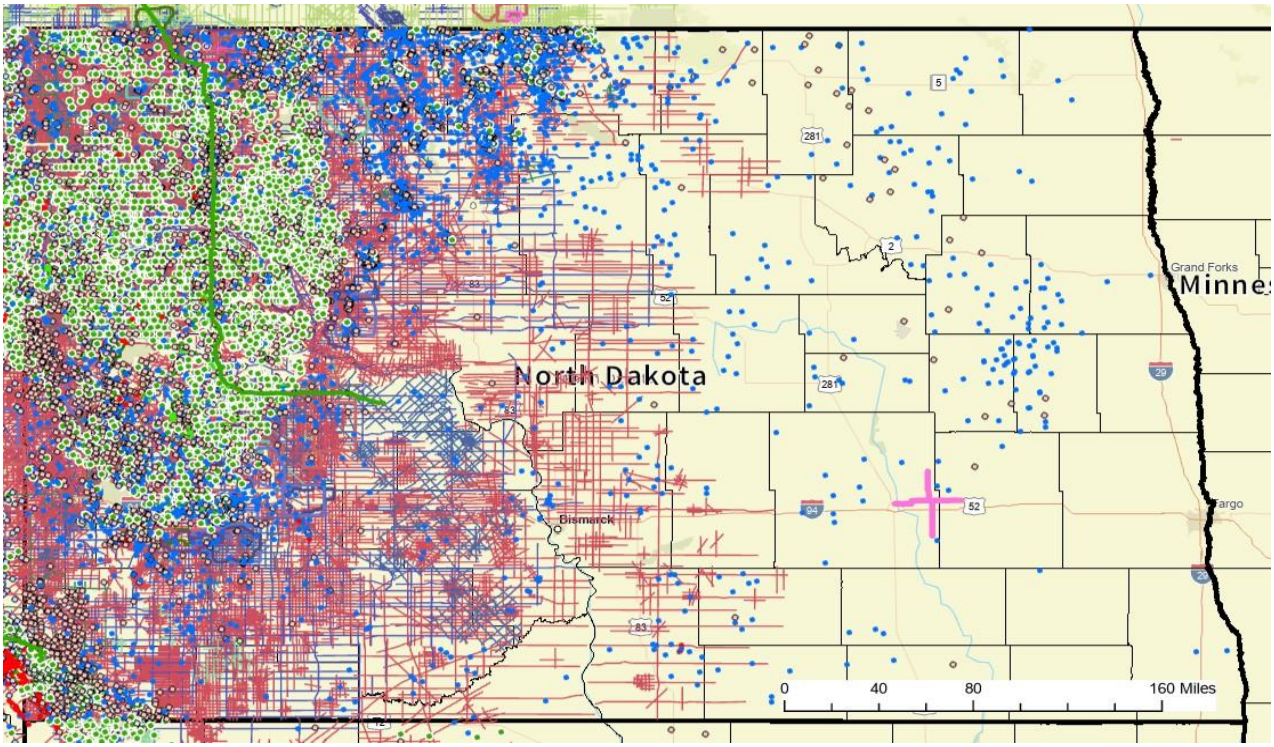
The objective of this project is to gather subsurface information required to achieve a better understanding of the potential for safe and permanent CO2 storage in deep saline formations in eastern ND. The geology of western ND is relatively well understood in large part because of the exploration and extraction of oil and gas. As these natural resources are not present in commercial quantities in eastern ND, there is significantly less information available for characterization of subsurface formations suitability to sequester CO2. Figure 1 is a depiction of the seismic data known to have been collected in ND along with exploration and production wells. This proposed project (bold pink lines) will collect data from a seismic survey at least 50 miles east of the nearest known commercially available seismic line.

Activities associated with this study will include:

1. Collect and process 2D seismic image data to determine the structural features of geology in Stutsman and Barnes County.
2. Analyze this data to evaluate large-scale structural trends, basement faults, depositional fabric, and depth prediction of reservoirs for CO2 storage potential.
3. Report conclusions for utilization by entities with aspirations to pursue projects associated with carbon storage.

This data collection study is the first step of several needed to understanding CO2 storage potential. If interpretation of the data proves favorable, a significant level of site-specific research will be required to advance potential projects. However, should a full project get completed, the economics become more compelling for developing additional renewable and other energy projects, attracting new investment to ND.

Figure 1



Seismic data (red and blue lines and polygons) collection in North Dakota is concentrated in the western half of the state where oil production has been established (green dots) and has been non-existent in the eastern half where exploration wells have not discovered hydrocarbons (blue dots). Proposed data collection for this project highlighted in pink.

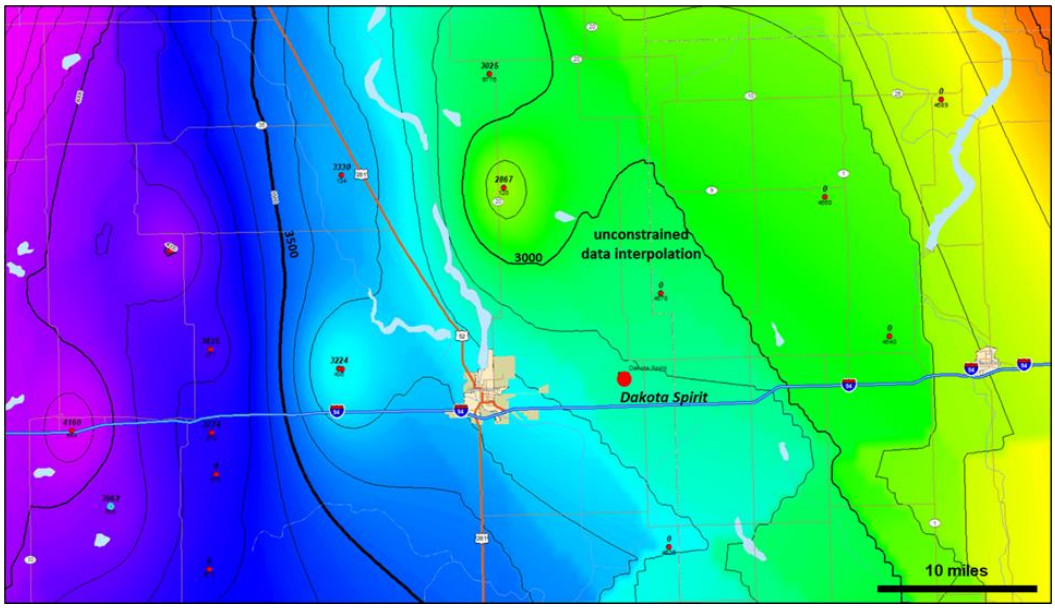
Methodology:

Geologic sequestration is the process of injecting CO2 captured from an industrial or energy-related source into deep subsurface rock formations for long-term storage. This is part of a process frequently referred to as "carbon capture and storage" or CCS. Midwest AgEnergy has been investigating opportunities for sequestration of CO2 from all of our assets as described in part in the Background/Qualifications section. Additional information regarding the process and benefits of carbon capture and storage is included in the CCS Institute Fact Sheet in ATTACHMENT A.

To safely and permanently store CO2, certain geological criterion must be present. A feasibility level assessment completed by project partners indicates these conditions may exist near Spiritwood, ND. The study area proposed for this project may be ideal for the State and interested parties in eastern ND as it appears to be on the edge of viable geology as described below.

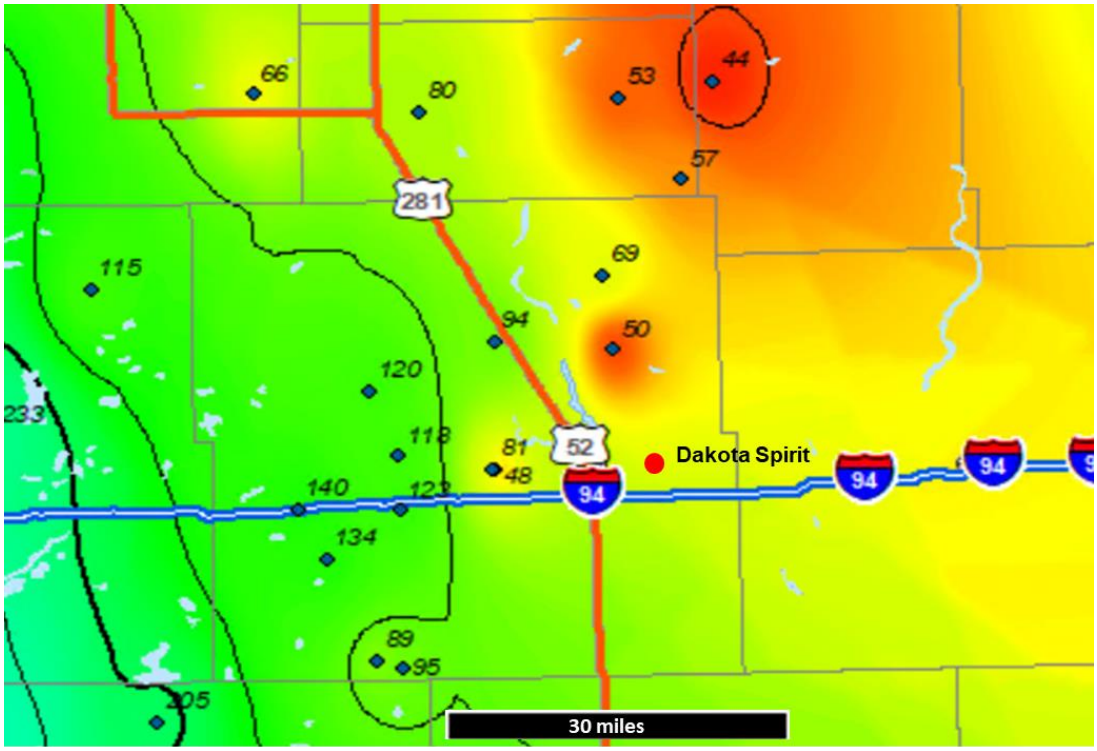
To keep injected CO2 plume size manageable, the subsurface pressure must be high enough to keep CO2 in the form of supercritical fluid. CO2 will stay liquified at depths in excess of about 2600 feet due to formation pressures. Figure 2 illustrates the estimated top of the Deadwood formation in the area of proposed study. Generally, the formation is deeper to the west but lack of well bore data near the proposed seismic site increases the uncertainty of formation depth in the project area.

Figure 2



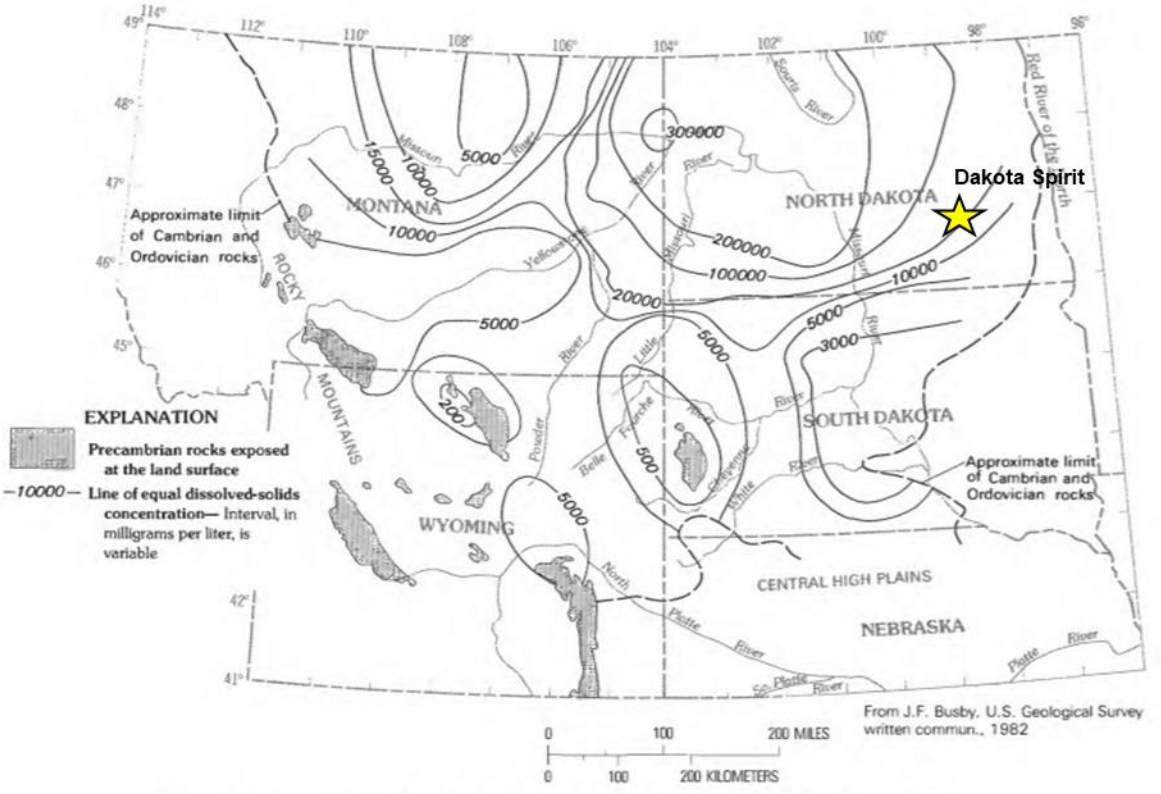
Any formation selected for injection must also be thick enough and sufficiently porous and permeable to allow storage. It must also have sufficient caprock in place to keep the CO2 contained. Figure 3 illustrates the Deadwood formation is estimated to be 60- 80 feet thick in the vicinity of DSA with formation thickness decreasing to the east.

Figure 3



Finally, the formation fluids must be brackish and unsuitable as a source of underground drinking water. Figure 4 shows USGS research indicating the salinity of the Deadwood formation in the project area should exceed 10,000 ppm and is thus not considered a viable source of drinking water.[1]

Figure 4



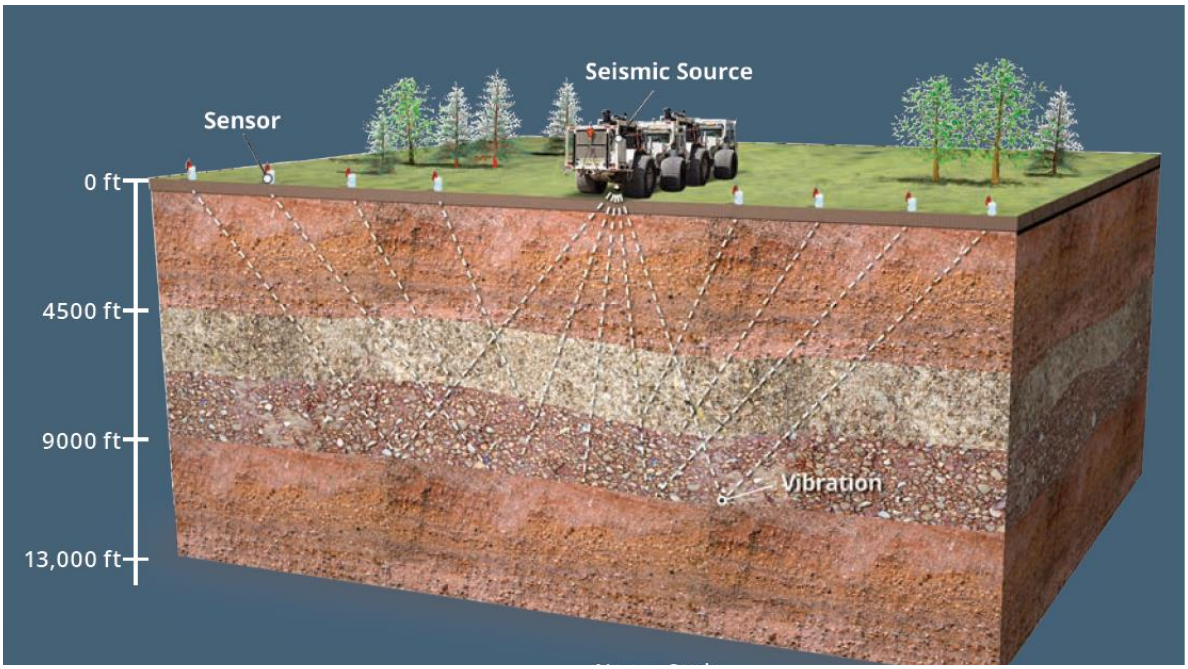
With pre-feasibility and due diligence completed, the logical next steps require gathering more data about the subsurface. Using geophysics via a seismic survey can provide a significant amount of information regarding the subsurface potential for CO2 storage at a reasonable cost.

A Geophysical Survey is where a seismic source generates vibrations that travel deep into the earth and are reflected back to the surface. Sensors at the surface record the vibrations, which are interpreted by Geophysicists to learn more about subsurface rock layers. The seismic source can be a truck that creates vibrations through a metal plate pressed into the ground or deeply buried explosives. The vibrations, whether created by a truck or explosives, are very slight and likely only perceivable by the

[1] Downey and Dinwiddie, 1988: **https://pubs.usgs.gov/pp/1402a/report.pdf)**

sensors. These types of surveys are very common and have already been conducted in every county in western ND. Figure 5 generally depicts the process of seismic acquisition.

Figure 5



Graphic courtesy of EERC

This project will collect about 40 linear miles of seismic data near Spiritwood, ND and is further described in the Techniques section of this application.

Anticipated Results:

The value to the State is in possessing accurate and reliable data regarding the subsurface in eastern ND. Based on feasibility analysis, the project location is on the edge of what might be considered a potential injection zone and thus the anticipated results are unknown. If this project reveals insufficient formation thickness, inadequate caprock or geological faults- CO2 storage in this area likely has limited potential. However, if the data indicates the study area is devoid of these challenges, significant opportunities may be present for those who emit CO2 in eastern ND. Of course, additional work must be conducted to better understand these opportunities. Results of this study may also indicate that conducting a similar project further east or west is advisable in the search for suitable geology.

It is worth noting that using State or Federal research dollars for data collecting activities, similar to what we are proposing, have resulted in advancement of storage opportunities in other states. In 2010-2014 the Department of Energy and state of Illinois, in collaboration with the Midwest Geologic Sequestration Consortium, performed a 2D Seismic reflection survey across about 125 miles in central Illinois.[2]

[2] Paper available at: https://www.osti.gov/servlets/purl/1202235

Facilities:

Midwest AgEnergy Group (MAG) owns and operates the Dakota Spirit AgEnergy facility near Spiritwood, ND. Dakota Spirit purchases about 25 million bushels of corn and produces over 70 million gallons of ethanol each year along with about 200,000 tons of dry distillers grains and about 10 tons or corn oil . A byproduct of fermentation at the facility is carbon dioxide (CO2). Dakota Spirit produces about 200,000 tons per year of CO2, which is currently scrubbed and released to the atmosphere. MAG has explored many opportunities to put this CO2 to beneficial use.

The majority of seismic activities are proposed to be conducted on county roads. Equipment expected to be used will be vibroseis trucks to impart the vibrations and geophones to collect the information. Further discussion is presented in the Techniques section. Figure 6 provides an example of equipment used in the Blue Flint 2D survey conducted in 2019.

Figure 6

Resources:

Resources required for the project will consist of contracted professionals with equipment and expertise in geophysics and associated areas. A Request for Proposals will be issued and contractors selected to provide the following services:

1. Seismic Acquisition
2. Seismic Data Processing
3. Permitting and Survey
4. Technical Experts and Quality Control Consultant

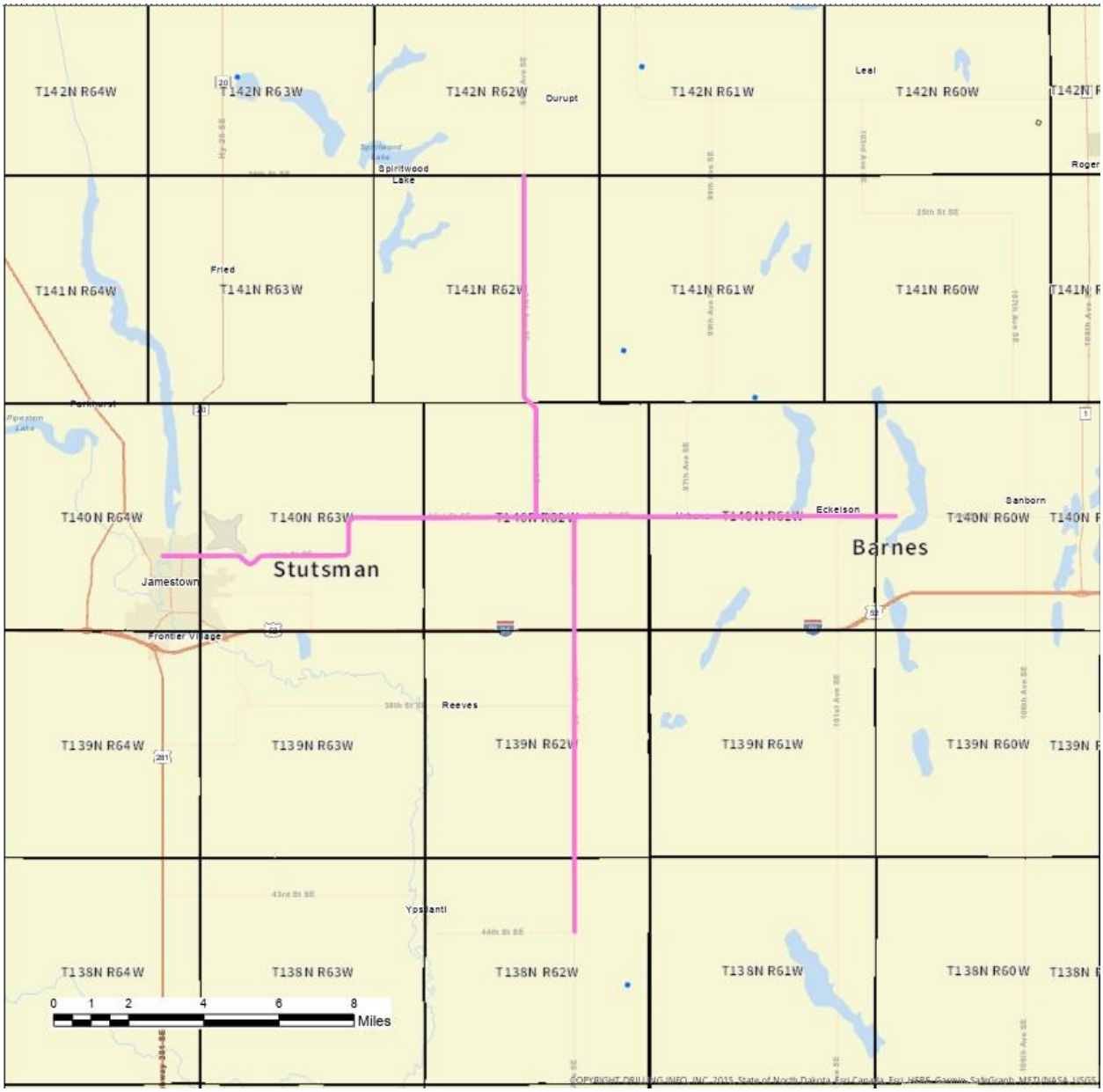
Additionally, MAG has been collaborating with bp and they are currently serving as a technical advisor on the project.

Techniques to Be Used, Their Availability and Capability:

With the history of oil and gas exploration in the Williston Basin, seismic data acquisition has been extensively used in the state of North Dakota. However, in the area of Spiritwood, ND, there has not previously been seismic data acquisition to refer to in describing the subsurface in and around the Dakota Spirit facility. Hence, reflection seismic data is proposed using 2-dimension (2D) techniques accessing county and local roads. A grid of approximately 40 mi (Figure 7) is proposed for data acquisition to take place using a qualified contractor company for seismic data acquisition.

As there is no commercially available seismic data for this region, we are proposing a seismic survey of a sufficient size to gain insight into geological trends which will indicate if there is storage potential.

Figure 7



Proposed seismic survey to be collected targets long, continuous stretches of county road to provide a regional view of the geological structure, encompassing nearby exploration wells and allowing a first order assessment of the suitability for carbon storage to be made.

For these given reflection seismic techniques, acoustic wave generation typically comes from vibroseis "thumper" trucks or shot hole explosives detonated at drilled depths of several 10s of feet below the surface. For the purposes of this proposal, **only the vibroseis method restricted to county and local roads is considered**. Reflections from the generated acoustic waves will be collected by geophones or accelerometers at the surface using modern recording equipment. Recording equipment can be temporarily deployed along county and local roads with little to no impact to soils and road supporting materials. Proposed data acquisition parameters are given in Table 1 below.

Table 1

Parameter	Standard	Proposed
Primary Target Depth	3000-3500 ft	3000-3500 ft
Receiver Point (RP)	110 ft	27.5 ft
Geophones per Group	6	1
Source Point (SP)	110 ft	110 ft
Active Line Length	6000	7920
Active Channels per SP	64	288
Source	Vibroseis	Vibroseis
Source Type	INOVA AHV-IV (or similar)	INOVA AHV-IV (or similar)
# Sources / SP	2	2
# Sweeps / SP	2	2
Sweep Length	4 s	24 s
Sweep Type	Linear	Subject to in-field testing
Recording Sample Rate	2 ms	2 ms
Recording Filter	TBD	TBD

It is anticipated that application of the Standard survey design in the above table will only partially satisfy the seismic imaging and subsurface description requirements at the project site. Specifically, the resolution details at the target injection levels (Deadwood Fm) will be of reduced quality lacking internal stratigraphic and structural character for primary imaging requirements. For this reason, **the "Proposed" design is recommended for acquisition.** With the Proposed acquisition parameters, higher resolution imaging and improved signal to noise ratio data for structural and stratigraphic details are expected. From the higher resolution data of the Proposed parameters, improved injection and storage strategies can be drafted with improved confidence and well planning for improved well placement and drilling results can be realized from the 2D data.

Environmental and Economic Impacts while Project is Underway:

Seismic activities are common in western ND. There is a Geophysical Exploration permitting process administered by the NDIC Department of Mineral Resources to ensure minimal impact to the surrounding communities. One of the first tasks is to complete field surveying along the proposed 2D line to ensure no work will be conducted in the vicinity of any infrastructure. A line will be determined

that is free of buildings, water wells, pipelines and other infrastructure. Additionally, all landowners within ½ mile of the line will be notified and informed of the testing.

Most contracted resources will likely be coming from outside the Stutsman/Barnes County area and bring short term economic benefit to the local community's hospitality industry while the field work is occurring.

Ultimate Technological and Economic Impacts:

Because the state has primacy regarding regulation of CO2 injection wells, ND is becoming a popular target for CCS projects. In a carbon-constrained future, CCS projects are believed to be one mechanism by which ND could continue to supply energy from our diverse fuel sources to the nation. Thus, assets within the state and from outside are investigating storage opportunities with a primary focus being on the western and central regions. Understanding geology throughout the state is imperative to determining where future CCS projects might occur. The majority of the ethanol production capacity in ND is located in the east. Projects contemplating a CO2 pipeline would benefit immensely from understanding distance to suitable injection zone. Viability of existing ethanol plants can be greatly enhanced if CO2 storage is possible. By supporting this project, the NDIC REC could open the gateway to a multitude of additional investigations and projects that could stand to benefit financially through CCS.

In ND, subsurface pore space in which CO2 may be stored is considered property of the surface landowner. Therefore, to inject CO2, financial consideration is given to the surface property owner. If CO2 storage is found to be plausible in regions further east in ND, additional landowners would be able to receive financial benefit if projects were to occur.

Letters of support from Jamestown/Stutsman development Corporation and the ND Farmers Union are attached in APPENDIX B.

Why the Project is Needed:

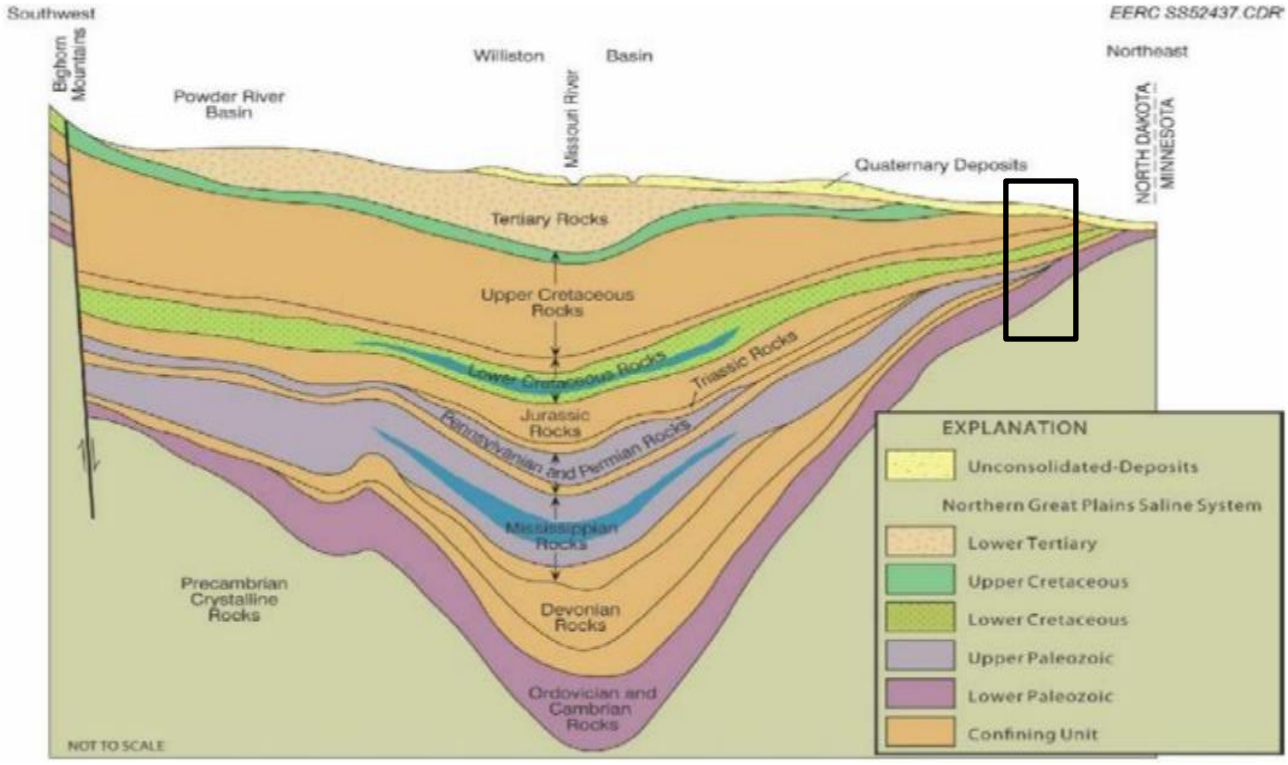
The development of CCS projects in North Dakota has so far been concentrated in the central and western parts of the state. In these areas, there are multiple geological formations that are suitable for sequestration, providing a target-rich environment. There is extensive subsurface data available from the hydrocarbon industry that can be used for the characterization of CCS prospects; that is large collections of 2D and 3D reflection seismic image data and multiple well penetrations with comprehensive digital well log information.

The eastern side of the state lacks this comprehensive subsurface data set. As the rocks get shallower toward the east, the conditions necessary for the generation of hydrocarbons do not exist. This lack of hydrocarbon development opportunities has limited the amount of data collected, as explorers appraised the area in the 1950s and did not discover developable hydrocarbons. However, the same geological formations that enable CO2 storage in the central part of the state also exist in the east, and there is expected to be storage resource available.

To describe the potential for CCUS project development in eastern North Dakota, more subsurface information is needed. The primary risks associated with developing a CCS project in eastern North Dakota are the capacity of the reservoir rock formations to contain CO2 and the ability of the overlying seal formations to prevent the vertical migration of CO2 into shallow sources of drinking water. With the current sparse dataset, some of the key uncertainties are: the depth of the reservoir formation in eastern North Dakota; the extent and nature of any subsurface faulting; the salinity, temperature, pressure, porosity and permeability of the reservoir and seal formations. While many of these uncertainties can only be understood by drilling an appraisal well, some of the first-order uncertainties can be addressed more economically by collecting 2D reflection seismic image data over a regional extent. This data allows an assessment of the depth to reservoir and presence of any pre-existing structural features that could be vertical leakage pathways, which may prevent future CCUS development. Assuming that no first-order barriers to project development are observed, this 2D reflection seismic image data will then provide the basic information needed to locate and drill a follow-up appraisal well to collect the site-specific data needed to advance a project.

We propose collecting around 40 miles of regional 2D reflection seismic image data along county roads through Stutsman and Barnes counties. This seismic data acquisition proposal consists of ~20 miles in the north-south direction and ~20 miles in the east-west direction, allowing for the observation of large-scale structural trends, basement faults, depositional fabric, and depth prediction of reservoirs.

Figure 8



SW to NE cross-section through the Williston basin from UND EERC. Area of interest is shown by the black box on the right side

STANDARDS OF SUCCESS

Standards of Success should include: The measurable deliverables of the project that will determine whether it is a success.

The scope of this project is quite narrow but the implications of potential future CO2 sequestration in eastern ND are broad. To be considered successful this project shall:

1. Collect and process 2D seismic image data and determine the structural features of geology in Stutsman and Barnes County.
2. Analyze this data to evaluate large-scale structural trends, basement faults, depositional fabric, and depth prediction of reservoirs for CO2 storage potential.
3. Report conclusions for utilization by entities with aspirations to pursue projects associated with carbon storage.

The value to North Dakota; An explanation of what parts of the public and private sector will likely make use of the project's results, and when and in what way.

Midwest AgEnergy will use the results of this survey to inform the decision on what to do with the CO2 produced at DSA. If the geology appears suitable, we will take additional exploratory steps. If the geology appears unfavorable, we will investigate alternative methods to use the CO2 and if we can cost effectively get it to a suitable injection location.

Other ethanol producers and any industry that generates CO2 stand to benefit from the results of this survey. Financial and social incentives have never been higher to pursue CCS projects. Virtually any entity with CO2 emissions should be interested in understanding the geological potential for sequestration proximate to their production.

The potential that commercial use will be made of the project's results; How the project will enhance the education, research, development and marketing of North Dakota's renewable energy resources.

Midwest AgEnergy's Blue Flint Plant and Red Trail Energy have both made public announcements regarding the pursuit of CCS from ethanol production facilities in western ND. Foundational to these announcements was an understanding of subsurface capability to safely accommodate storage. While this project does not ensure that similar geology exists, discovery of suitable storage will very likely result in at least one commercial project.

How it will preserve existing jobs and create new ones. How it will otherwise satisfy the purposes established in the mission of the Program.

Biofuel production facilities have been under significant economic strain over the past year due to the loss of fuel demand caused by the COVID pandemic. In the future, liquid transportation fuels will likely be under downward pressure due to improved vehicle fuel efficiency standards and wider adoption of electric vehicles. Having the capacity to reduce the carbon intensity of biofuel produced and ability to monetize tax credits through CCS can effectively differentiate a biofuel producer from their peers. This

helps ensure that they continue operating, maintaining both jobs and a continuous market for ag producers who supply feedstock.

Additionally, CCS projects will require the construction of capture, compression, dehydration and injection facilities. These facilities will require additional staff to operate and maintain as well as create demand for electrical energy to operate the compressors.

BACKGROUND/QUALIFICIATIONS

Please provide a summary of prior work related to the project conducted by the applicant and other participants as well as by other organizations. ***This should also include summary of the experience and qualifications pertinent to the project of the applicant, principal investigator, and other participants in the project.***

Midwest AgEnergy Group, LLC has successfully developed two bio refineries in ND. Blue Flint Ethanol located at Underwood, ND, and Dakota Spirit AgEnergy at Spiritwood, ND. MAG commenced operations in 2007 and has produced over 1 billion gallons of ethanol refined from ND corn. Our businesses are recognized as technological leaders in the biofuels industry, starting with our innovative Combined Heat and Power plant design which utilizes steam from co-located power production facilities. Both facilities have pathways into low carbon fuel markets and as an organization we have long term objectives to continue to reduce the carbon intensity of the fuels we produce. The single largest opportunity to reduce carbon intensity is through capturing and permanently sequestering the CO2 produced from the fermentation process. Such a project could result in 40% reduction of site carbon score.

Midwest AgEnergy has made considerable progress toward safe and permanent storage of CO2 adjacent to its Blue Flint Ethanol facility. Under the direction of Adam Dunlop, the Regulatory and Technical Services Director, MAG has successfully completed:

1. Feasibility Assessment of Subsurface potential for CO2 storage through evaluation of existing well data.
2. 2D Seismic survey and source testing to determine best seismic source for data acquisition in a combination of mined and undisturbed soils.
3. 3D Seismic survey over approximately 9 square miles surrounding the Blue Flint location.
4. Drilling of a Stratigraphic Test well to collect subsurface core samples and logs required to accurately model the safety and capacity of CO2 storage reservoirs.

Over the course of 2021-22 we anticipate these efforts will culminate in a permit application for geological sequestration of CO2 produced at the Blue Flint facility and the construction of carbon capture compression and dehydration plant adjacent to the biorefinery.

Our intent is to follow a similar program to incrementally understand subsurface viability for CO2 storage near the Dakota Spirit plant in Spiritwood, ND. We have completed a feasibility level

assessment using publicly available well data and there appears to be potential for storage in the Deadwood formation beneath DSA.

MAG has been collaborating with **bp** on this project. They have contributed subsurface expertise in the prefeasibility portions of this study and are now anticipated to serve as a technical advisor on the design and execution of the 2D Seismic project.

bp's ambition is to become a net zero company by 2050 or sooner, and to help the world get to net zero. bp is America's largest energy investor since 2005, investing more than $130 billion in the economy and supporting more than 115,000 additional jobs through its business activities.

CCUS is at the heart of our plans to deliver low carbon electricity and energy, and to contribute to our net zero ambition. Through combining low carbon energy with CO_2 storage as a service, we believe CCUS can play a key role to help hard to abate industries decarbonize and transition.

The CCUS strategy is demonstrated in the Net Zero Teesside project[3] and the Northern Endurance Partnership[4]. bp is leading these partnerships, working with ENI, Equinor, Shell, Total and National Grid.

bp's leadership in seismic acquisition and imaging is a result of sustained investment in technology and high performance computing. bp's Center for High Performance Computing is located in Houston and opened in 2013. It enables bp to do complex modeling of the geological formations below the surface, develop advanced algorithms to improve the understanding of reservoirs, and to advance new acquisition technologies and survey designs that help see the subsurface more clearly. Established in 2016 bp's Subsurface Technical Center specializes in advanced seismic imaging.

[3] https://www.bp.com/en/global/corporate/news-and-insights/reimagining-energy/net-zero-teesside-project.html

[4] https://www.bp.com/en/global/corporate/news-and-insights/reimagining-energy/northern-endurance-partnership-to-develop-offshore-ccus-infrastructure.html

MANAGEMENT

*A description of **how** the applicant will manage and oversee the project to ensure it is being carried out on schedule and in a manner that best ensures its objectives will be met, **and a description of the evaluation points to be used** during the course of the project.*

Critical elements of this project are securing high quality geophysical data in a safe, responsible and cost effective manner, and maintaining positive public relationships throughout the project.

Professional contractors will be utilized for the data acquisition, processing, and permitting. MAG has a contractor prequalification process to ensure those selected have demonstrated a safe and efficient job performance. The first stage gate in project management will be reviewing contractor proposals for adherence to the acquisition parameters specified in the RFP. Only contractors who can achieve the requirements and are within the cost estimates provided in the budget portion of this application will be considered.

The second stage gate will be line placement and permitting. The lines shown in this application are for informational purposes only. Once all infrastructure is identified by surveyors, the line or vibroeisis locations will be revised to avoid any potential impediments.

Third stage gate will be pre-acquisition equipment inspection and quality control audit. This will be conducted by a qualified geophysicist or other third-party individuals with appropriate level of expertise to ensure the vibriosis equipment delivered and frequencies specified are appropriate and functioning adequately.

Consultation and educational meetings with be held with the appropriate local officials prior to any field activities to keep the residents appraised of the project and its potential impacts to the local community.

TIMETABLE

Please provide a project schedule setting forth the starting and completion dates, dates for completing major project activities, and proposed dates upon which the interim reports will be submitted.

We are estimating the full project from procurement to reporting to be completed within six months. The availability of acquisition contractors will be the primary driver of the schedule. Significant cost savings may be available on mobilization/demobilization if the selected contractor has other jobs in ND and we can be flexible with our timeline. For the purposes of the schedule, we have assumed only 5 weeks from contract to mobilization. This is an estimate and will likely be updated upon award of contract.

A tentative schedule of activities is included as APPENDIX D.

BUDGET

*Please use the table below to provide an **itemized list** of the project's capital costs; direct operating costs, including salaries; and indirect costs; and an explanation of which of these costs will be supported by the grant and in what amount. The budget should identify all other committed and prospective funding sources and the amount of funding from each source. **Please feel free to add columns and rows as needed.** Higher priority will be given to those projects have matching private industry investment equal to at least 50% or more of total cost.*

Project Associated Expense	Total Cost	NDIC's Share	Applicant's Share (Cash)	Applicant's Share (In-Kind)	Other Project Sponsor's Share
Seismic Study Design & Tech Support	$ 67,880.00		$ -		$ 67,880.00
Permit/Notifications	$ 20,000.00		$ 20,000.00		
Pre-Mobilization Audit	$ 9,000.00		$ 9,000.00		
Seismic Acquisition	$ 467,000.00	$ 324,640.00	$ 142,360.00		
Data Processing	$ 45,400.00		$ 35,000.00		$ 10,400.00
Data Interpretation	$ 20,000.00				$ 20,000.00
Management / Reporting	$ 20,000.00		$ 20,000.00		
Project Total	$ 649,280.00	100%			
NDIC Total Request	**$ 324,640.00**	50.0%			
Applicant Cash Total	$ 226,360.00	34.4%			
Other Sponsor Total	$ 98,280.00	15.6%			

Please use the space below to justify project associated expenses and discuss if less funding is available than requested, whether the project's objectives will be unattainable or delayed.

The largest cost on this project is the seismic acquisition activities. Budgetary estimates have been provided for this task based on prescreening discussions with potential service providers. Part of this project will be a competitive bid program to select the most appropriate resource.

Mobilization is a significant component of the acquisition cost. We intend to investigate any opportunity to share this cost with other projects but for the purpose of the budget above included all mobilization costs.

The Other Project Sponsor's Share costs include the labor hours bp believes necessary to support MAG as a technical consultant. In the event bp were unable to participate, MAG will hire geophysical resources to provide the study design, technical support, and data interpretation.

CONFIDENTIAL INFORMATION

Any information in the application that is entitled to confidentiality and which the applicant wants to be kept confidential should be placed in an appendix to allow for administrative ease in protecting the information from public disclosure while allowing public access to the rest of the application. The appendix must be clearly labeled as confidential and must include the following information: (a.) a

general description of the nature of the information sought to be protected, (b.) an explanation of why the information derives independent economic value, actual or potential, from not being generally known to other persons, (c.) an explanation of why the information is not readily ascertainable by proper means by other persons, (d.) a general description of any person or entity that may obtain economic value from disclosure or use of the information, and how the person or entity may obtain this value, and (e.) a description of the efforts used to maintain the secrecy of the information.

If there is no confidential information, please note that below. If you plan to request confidentiality for ***reports*** *if the proposal is successful, this section must still be completed.*

No items are believed to be confidential in the application or reports.

PATENTS/RIGHTS TO TECHNICAL DATA

Any patents or rights that the applicant wishes to reserve must be identified in the application. If this does not apply to your proposal, please note that below.

There are no patents associated with this project.

STATE PROGRAMS AND INCENTIVES

Any programs or incentives from the State that the applicant has participated in within the last five years should be listed below, along with the timeframe and value.

In the past 5 years, MAG and DSA have participated in the following state programs and incentives:

- JSDC Incentive Grant: $665,000 - documents executed July 2014; funded 2015
- NDIC's Grant to study BPC market analysis: $83,810 – approved July 2018, funded 2018 (Jul and Oct)
- NDIC Renewable Energy Fund Grant for 3D phase of CCS: awarded (to project partner Great River Energy) Nov 2019, funded $619,347 through 2020
- NDIC LRC Grant to drill stratigraphic test well: awarded 2020; $3,388,000 + up to $250,000 (amend #1); $2,903,349 funded in March 2021

APPENDIX A

CCS Fact Sheet from Global CCS Institute

FACT SHEET

GEOLOGICAL STORAGE OF CO_2: SAFE, PERMANENT, AND ABUNDANT

Storing carbon dioxide (CO_2) emissions produced by a wide variety of industries keeps this greenhouse gas out of the atmosphere.

The injection and storage of CO_2 has been working safely and effectively for 45 years. In fact, With abundant underground storage resources at our disposal, storage remains the easiest and most logical CO_2 mitigation solution.

There are many similar geological systems throughout the world that are capable of retaining centuries' worth of CO_2 captured from industrial processes. Although geologic storage of gases occurs naturally and has been used safely by industry for many decades, it remains a challenge to describe this process to the public.

Fortunately, there are many locations globally that have formations with these characteristics; most are in vast geological features called sedimentary basins. Almost all oil and gas production is associated with sedimentary basins, and the types of geologic formations that trap oil and gas (and also naturally occurring CO_2) are similar to those that make good CO_2 storage reservoirs.

HOW DOES GEOLOGICAL STORAGE OF CO_2 WORK?

Geological storage involves injecting CO_2 captured from industrial processes into rock formations deep underground, thereby permanently removing it from the atmosphere.

Typically, the following geologic characteristics are associated with effective storage sites:

- rock formations have enough millimetre-sized voids, or pores, to provide the capacity to store the CO_2
- pores in the rock are sufficiently connected, a feature called permeability, to accept the amount of CO_2 at the rate it is injected, allowing the CO_2 to move and spread out within the formation
- an extensive cap rock or barrier at the top of the formation to contain the CO_2 permanently.

Figure 1: Storage Overview

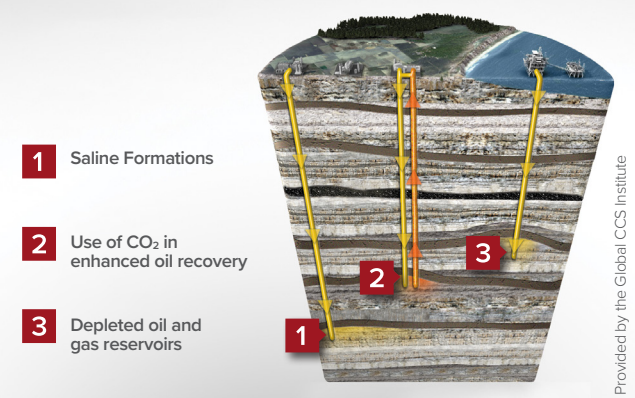
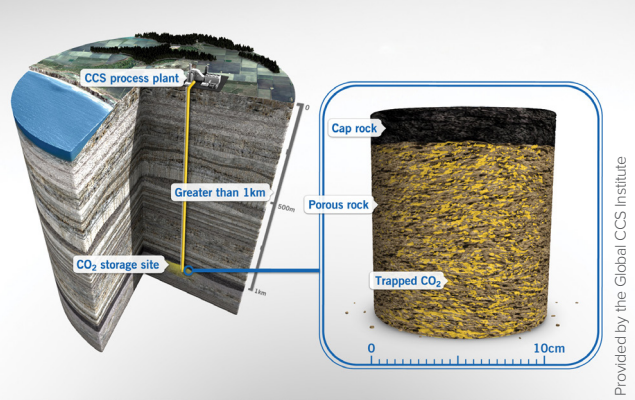


Figure 2: Core Sample



The storage overview figure shows the different types of storage options available.

1. Deep saline formations refer to any saline waterbearing formation (the water can range from slightly brackish to many times the concentration of seawater, but is usually non-potable). The saline formation is sealed by a caprock for permanent storage.
2. EOR, which involves injecting CO_2 to increase oil production from mature oil fields.
3. Depleted oil or gas fields that are no longer economic for oil or gas production, but have established trapping and storage characteristics.

HOW IS CO_2 INJECTED UNDERGROUND AND WHY DOES IT STAY THERE?

Once captured, the CO_2 is compressed into a fluid almost as dense as water and pumped down through a well into a porous geological formation. The pores in underground formations are initially filled with a fluid – either oil, gas, or salty water. Whilst a majority of existing CCS facilities utilise storage associated with EOR, future deployment of CCS will increasingly require storage in deep saline aquifers, which have wider geographical distribution and larger theoretical storage resources in comparison to oil and gas reservoirs. Because injected CO_2 is slightly more buoyant than the salty water that co-exists within the storage formation, a portion of the CO_2 will migrate to the top of the formation and become structurally trapped beneath the impermeable cap rock that acts as a seal. In most natural systems, there are numerous barriers between the reservoir and the surface.

Some of the trapped CO_2 will slowly start to dissolve into the saline water and become trapped indefinitely (called solution trapping); another portion may become trapped in tiny pore spaces (referred to as residual trapping). The ultimate trapping process involves dissolved CO_2 reacting with the reservoir rocks to form a new mineral. This process, called mineral trapping, may be relatively quick or very slow, but it effectively locks the CO_2 into a solid mineral permanently.

HOW MUCH CO_2 CAN BE STORED UNDERGROUND?

Many people assume that one of the biggest challenges impeding the acceleration of CCS facilities is limited underground CO_2 storage resources.

The reality is, there is more underground storage resource than is actually needed to meet climate targets.

In fact, a large proportion of the world's key CO_2 storage locations have now been vigorously assessed and almost every high-emitting nation has demonstrated substantial underground storage resources. As an example, there is between 2,000 and 20,000 billion tonnes of storage resources in North America alone. Countries including China, Canada, Norway, Australia, US and the UK all boast significant storage availability, and other countries such as Japan, India, Brazil and South Africa have also proven their storage capability.

HOW DO WE KNOW THAT IT WORKS?

Over 200 million tonnes of anthropogenic CO_2 has been successfully injected underground. Accumulated experience of CO_2 injection worldwide over several decades has proven there are no technical barriers preventing the implementation of storage. Over 40 sites have or are presently safely and securely injecting man-made CO_2 underground, mainly for EOR or explicitly for dedicated geological storage. Additional experience is also gained from industrial analogues such as waste water or natural-gas storage.

A variety of monitoring technologies have been successfully deployed, demonstrating our ability to measure, monitor and verify injected CO_2 in the subsurface. Monitoring of a CO_2 storage site occurs over its entire lifecycle from pre-injection to operations to post-injection; it enables the progress of CO_2 injection to be measured and provides assurance that storage is developing as expected. Operational and research experience over several decades demonstrates that injected CO_2 can be monitored to confirm its containment.

FOR MORE INFORMATION

Visit globalccsinstitute.com or email info@globalccsinstitute.com

APPENDIX B

Letters of Support

DEVELOPMENT
JAMESTOWN / STUTSMAN COUNTY

April 30, 2021

Ms. Karlene Fine
Executive Director
North Dakota Industrial Commission
Attn: Lignite Research Development and Marketing Program
State Capital
600 East Boulevard Ave. Dept 405
Bismarck ND 58505-0840

RE: Support of Midwest AgEnergy NDIC Grant application for 2D Seismic Study

Dear Ms. Karlene Fine:

I am writing in support of the grant application from Midwest AgEnergy Group to continue to advance the ability to sequester CO2 at their Dakota Spirit AgEnergy facility. As the CEO for Jamestown/Stutsman Development Corporation this project is important to the long-term viability of Dakota Spirit and other assets that exist in our area.

Midwest AgEnergy Group is continuing to study the potential for carbon capture and storage at their Dakota Spirit facility near Spiritwood ND. The company is in a unique position to take advantage of value created by permanently storing CO2. Midwest AgEnergy has a strong history of innovation and production of low carbon biofuels. Over the years we have observed their strong dedication to stewardship of our natural resources and community outreach efforts.

We support Midwest AgEnergy's Renewable Energy Council grant application for assistance in pursuing a 2D Seismic Study and the associated data analysis. If this project were to be successful, it would be incredibly valuable to the agricultural producers in Stutsman County by demonstrating carbon storage in eastern ND is a reasonable option. Developing long-term strategies to mitigate CO2 emissions is an integral part of our nation's energy and agriculture future.

I give this project my support and look forward to reviewing the results of this effort. If you have any questions, please feel free to contact me at connie@growingjamestown.com.

Sincerely,

Connie Ova, CEO

NORTH DAKOTA
Farmers Union

PO Box 2136 • 1415 12th Ave SE
Jamestown, ND 58401
800-366-8331 • 701-252-2341
ndfu.org

May 6, 2021

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

RE: Support of Midwest AgEnergy NDIC Grant Application for 2D Seismic Study

Dear Ms. Fine:

North Dakota Farmers Union (NDFU) represents more than 50,000 farm and ranch families and their energy and agriculture supply cooperatives. We are the largest general farm organization in the state.

I am writing in support of the grant application from Midwest AgEnergy Group to continue to advance the ability to sequester CO2 at their Dakota Spirit AgEnergy facility. We feel this project is important to the long-term viability of Dakota Spirit and the farming community in central North Dakota.

Midwest AgEnergy Group continues to study the potential for carbon capture and storage at their Dakota Spirit facility near Spiritwood ND. The company is in a unique position to take advantage of value created by permanently storing CO2. Midwest AgEnergy has a strong history of innovation and production of low carbon biofuels. Over the years we have observed their strong dedication to stewardship of our natural resources and community outreach efforts.

We support Midwest AgEnergy's Renewable Energy Council grant application for assistance in pursuing a 2D Seismic Study and the associated data analysis. If this project is successful, it will be incredibly valuable and a potential income source to the agricultural producers in Stutsman County by demonstrating carbon storage in eastern ND is a reasonable option.

Developing long-term strategies to mitigate CO2 emissions is an integral part of our nation's energy and agriculture future. I give this project my support and look forward to reviewing the results of this effort. If you have any questions, please feel free to contact me.

Sincerely,

NORTH DAKOTA FARMERS UNION

Mark Watne
President

APPENDIX C

Certificate of Good Standing

State of North Dakota
SECRETARY OF STATE

Certificate of Good Standing
of
DAKOTA SPIRIT AGENERGY, LLC

SOS Control ID#: 0000099205

Certificate #: 020097018

The undersigned, as Secretary of State of the state of North Dakota, hereby certifies that, according to the records of this office,

DAKOTA SPIRIT AGENERGY, LLC

a Limited Liability Company - Business - Domestic was formed under the laws of NORTH DAKOTA and filed with this office effective March 25, 2010. This entity has, as of the date set forth below, complied with all applicable North Dakota laws.

ACCORDINGLY, the undersigned, as such Secretary of State, and by virtue of the authority vested in him by law, hereby issues this Certificate of Good Standing.

DATE: April 29, 2021

Alvin A. Jaeger
Secretary of State

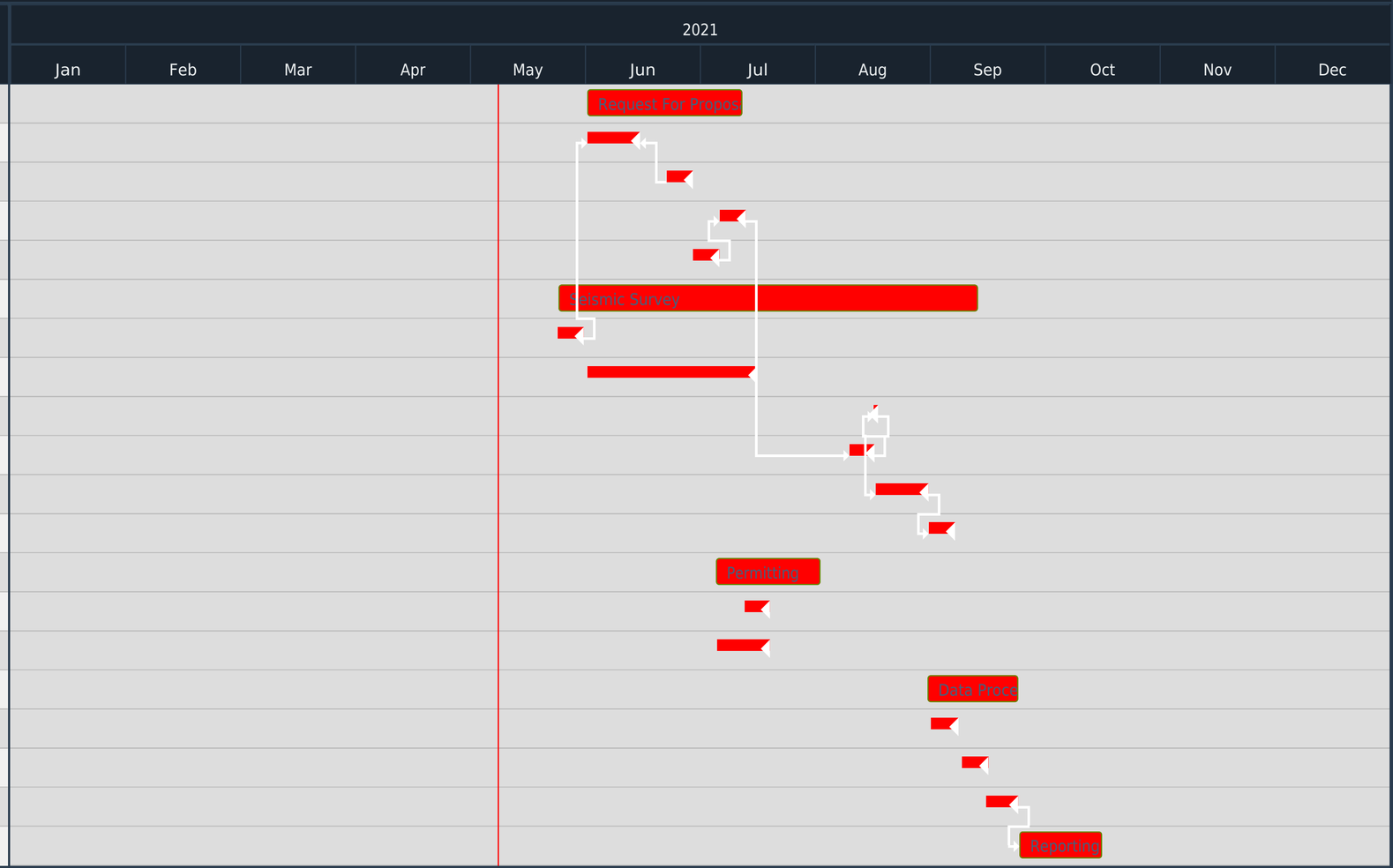
APPENDIX D

Project Schedule

Export To PDF

Week | Month | Year | Day

Name	Start	End
Request For Proposal - Contracting	06/01/2021	07/12/2021
Survey Design & Tender	06/01/2021	06/15/2021
Proposal Review	06/22/2021	06/29/2021
Contracting	07/06/2021	07/13/2021
Prequalification	06/29/2021	07/06/2021
Seismic Survey	05/24/2021	09/13/2021
Design Survey	05/24/2021	05/31/2021
Planning	06/01/2021	07/16/2021
Pre-Mobilization Audit	08/16/2021	08/17/2021
Mobilization	08/10/2021	08/17/2021
Data Acquisition	08/17/2021	08/31/2021
Demobilization	08/31/2021	09/07/2021
Permitting	07/05/2021	08/02/2021
Notifications	07/12/2021	07/19/2021
Field Survey of Line & Adjustments	07/05/2021	07/19/2021
Data Processing	08/31/2021	09/23/2021
Recover Data From Geophones	09/01/2021	09/08/2021
Contractor Processing	09/09/2021	09/16/2021
Interpretation	09/15/2021	09/23/2021
Reporting	09/24/2021	10/16/2021



+ Add Task