MIDWEST
AgEnergy

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

April 7, 2020

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 Lignite Research Council Fund Grant.

Ms. Fine:

Please find enclosed Midwest AgEnergy Group's application to determine the potential for geological formations in central ND to permanently store carbon dioxide, for the North Dakota Industrial Commission Lignite Research Council Grant. Also included are a certificate of good standing within the state of ND and the $100 application Fee.

Work completed under this application will provide the final critical pieces of information required for Midwest AgEnergy Group and our partners to clearly define the potential to safety geologically sequester CO_2. If awarded the grant we intent to complete the project as described in the application.

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 for a Lignite Research Council Grant to*:**

Drill Stratigraphic Test Well & Determine Feasibility of Central ND Geology to Safely and Permanently Store Carbon Dioxide

Applicant: **Midwest AgEnergy Group**

Principle Investigator: **Jeff Zueger**

Date of Application: **April 7, 2020**

Request: **$3,388,000**

TABLE OF CONTENTS

ABSTRACT 3
PROJECT SUMMARY 4
PROJECT DESCRIPTION.....5
STANDARDS OF SUCCESS 16
BACKGROUND 17
QUALIFICATIONS 17
VALUE TO NORTH DAKOTA 21
MANAGEMENT 23
TIMETABLE 24
BUDGET 26
MATCHING FUNDS 28
TAX LIABILITY 28
CONFIDENTIAL INFORMATION 28

Figures

Figure 1- Detailed Project Flow Chart.....8
Figure 2- ISO 31000 Risk Assessment Flow Chart.....10
Figure 3- Drilling Program.....15
Figure 4- Stratigraphic Well Project Milestones and Schedule.....25

Tables

Table 1- Project Budget.....27

Appendices

APPENDIX A - Seismic Survey Project Description
APPENDIX B - EERC Project Proposal
APPENDIX C - Geostock Sandia Project Proposal (Redacted Version)
APPENDIX D - Letters of Support
APPENDIX E - Qualifications/CV/Resume
APPENDIX F - Affidavit of No Tax Liability

ABSTRACT

This project will provide critical information about central North Dakota geology as required to demonstrate the capacity for long term storage of carbon dioxide (CO_2). Midwest AgEnergy Group along with its partners have been studying the feasibility of CO_2 storage in the vicinity of the Blue Flint Ethanol plant near Underwood, ND. Several feasibility-level projects have been completed with results indicating very strong potential for sequestration in the vicinity of the plant. The intent of this phase of the project is to complete a stratigraphic test well. Drilling this well will enable collection of core samples of the formations currently believed to be suitable injection zones. The data collected from the test well will provide the final pieces of information needed to model and simulate CO_2 storage with a high degree of accuracy and confidence.

Feasibility-level efforts associated with collection of seismic information and modeling are currently underway. The stratigraphic well project efforts are expected to begin in May of 2020 with well boring conducted in August. The geological modeling and CO_2 storage forecasting utilizing the acquired data will be completed by March of 2021.

Results of the project are expected to clearly define the porosity and permeability of target formations and their capacity to safely sequester CO_2. Outside of Midwest AgEnergy, this knowledge is most valuable to those with coal related interests in McLean County. As proposed, this project will provide the valuable information to multiple interests at minimal additional cost.

Total project costs are estimated at $6,956,000. This grant request is for $3,388,000 with the balance of project costs being paid by MAG. Project timeline and costs were determined in the beginning months of the COVID-19 pandemic. The project is proposed under the assumption that service providers and equipment will not be prohibited from working because of COVID-19.

Project participants include Midwest AgEnergy, Blue Flint, the Energy and Environmental Research Center (EERC), and a general drilling contractor such as Geostock Sandia.

PROJECT SUMMARY

The primary objective of this project is to determine suitability of geology for long term carbon storage near Midwest AgEnergy Group's (Midwest AgEnergy) Blue Flint Ethanol (Blue Flint) plant in McLean County, ND. This project will assemble a team of geophysical experts to complete a stratigraphic test well, collect critical geologic formation data, analyze the acquired data and assess the ability to inject and safely store CO_2 within the geologic formations. Activities will include risk assessment, design, permitting, drilling, core extraction and analysis, and well completion of the stratigraphic boring. Data acquired will be used in models and reservoir simulations to determine the feasibility and potential quantity of CO_2 which can be safely stored. The geological study focus is primarily on the Deadwood / Red River and the Inyan Kara / Dakota formations. However, sufficient flexibility will be incorporated into the drilling plan to allow collection of core samples from other formations should field observations or logging reveal other potential storage targets.

The primary components of the project are:

- Complete a Risk Assessment at beginning and end of project consistent with ISO 31000 standards
- Create a drilling program, design a stratigraphic test well, and define the analytical program parameters and methods
- Obtain stratigraphic test well permit from North Dakota Industrial Commission (NDIC) Department of Mineral Resources
- Secure, contract, and mobilize drilling contractors and resources
- Drill, core, log, and temporarily abandon test well
- Analyze data and integrate into existing CMG GEM dynamic simulation models
- Provide adequate information for a Midwest AgEnergy assessment on options/opportunity to proceed with a CO_2 storage project

The objectives of the project are to acquire data of sufficient quantity and quality to:

- Model and clearly define the CO_2 storage capabilities as it relates to Midwest AgEnergy production
- Be prepared to pursue class VI Injection well permit should project proceed to next phase
- Provide petrophysical analysis and modeling results indicative of the potential for other CO_2 storage options near well-defined coal reserves in central ND

PROJECT DESCRIPTION

Objectives:

The overarching objective is to determine the feasibility for long term carbon dioxide storage in the vicinity of Midwest AgEnergy's Blue Flint plant in central ND. To achieve this objective, we must build a team of geophysical experts to design, permit, and complete a stratigraphic test well. The test well will enable the collection of critical information on target formations. The data obtained will be analyzed to model and quantify the CO_2 injection and storage potential of the formations. If funded in part by this grant, the information collected, data analysis, and modeling results will be made available to the public via the NDIC. The Project data and results will provide current coal reserve owners and coal users in central ND with accurate and reliable information regarding the feasibility of CO_2 geological storage.

Project Background:

Midwest AgEnergy has been working to define the capacity for geological storage of CO_2 in McLean County. We contracted EERC to conduct a preliminary evaluation (pre-feasibility analysis) of geological storage opportunity for Blue Flint, and Great River Energy's Coal Creek Station (Coal Creek). A petro-physical evaluation of potential storage formations within a 50-mile radius of the energy park was completed. This data was used to screen formations and model their potential capacity for CO_2 storage. The results indicated the CO_2 storage for both the Blue Flint and Coal Creek locations is technically viable. However, available data on the target formations necessary for modeling was relatively sparse. This was due to lack of geological exploration activities in the vicinity and at depths being contemplated for storage. There are little or no core samples available from target formations. EERC recommended a seismic survey to delineate the thickness and continuity of formations with the potential to permanently store CO_2. In a seismic survey, a 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.

Midwest AgEnergy subsequently hired a geophysical contractor and under the guidance of EERC performed a 2D seismic survey in a 4-mile line adjacent to the Coal Creek/Blue Flint industrial park. We investigated seismic data gathering methods on both reclaimed mine land and undisturbed land to determine the best seismic source for generating high quality data in further surveys. A source was identified which would work on either type of property because of the prevalence of reclaimed mine land in the area. That source technique was subsequently deployed over a much larger study area via a 3D seismic survey. (Appendix A -Seismic Survey Description explains these efforts in more detail.)

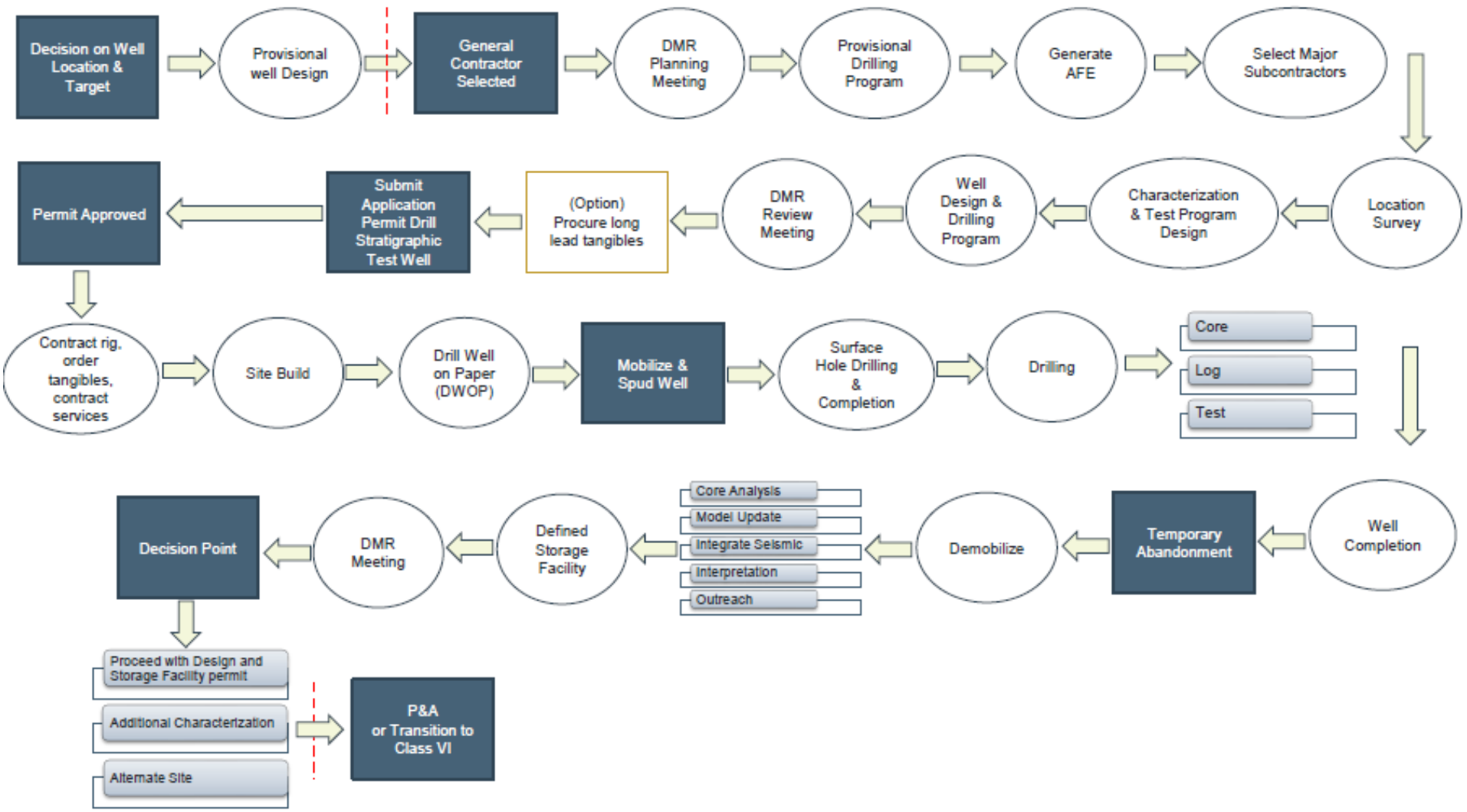
Field work associated with the 3D seismic survey was conducted over a 9.5 square mile area surrounding the Coal Creek Industrial park and was completed in January of 2020. Preliminary data indicates adequate continuity in target formations and a lack of faults or other hazards which could provide mechanisms for CO_2 to migrate out of the target zone(s) and thus jeopardize storage opportunity. Geophysical modeling to determine storage capacity of specific formations is also currently being completed by EERC. The final step for Midwest AgEnergy in understanding CO_2 storage feasibility is to characterize the porosity and permeability of rock layers believed to be suitable injection zones. This requires a stratigraphic test well to enable collecting and testing of core samples and is one of the key deliverables to this project.

Detailed Project Description:

This project will provide the final informational components needed to evaluate the feasibility of CO_2 storage for the Blue Flint biorefinery. The completion will provide technical information needed for Midwest AgEnergy to determine if proceeding with construction of Carbon Capture and Compression facility and class VI storage permit are appropriate. Successful

demonstration of CO_2 sequestration by Blue Flint will provide valuable information to any future carbon storage projects in the area. A flow chart summarizing project work activities is provided in FIGURE 1.

FIGURE 1


Decision on Well Location & Target
Provisional well Design
General Contractor Selected
DMR Planning Meeting
Provisional Drilling Program
Generate AFE
Select Major Subcontractors
Location Survey
Characterization & Test Program Design
Well Design & Drilling Program
DMR Review Meeting
(Option) Procure long lead tangibles
Submit Application Permit Drill Stratigraphic Test Well
Permit Approved
Contract rig, order tangibles, contract services
Site Build
Drill Well on Paper (DWOP)
Mobilize & Spud Well
Surface Hole Drilling & Completion
Drilling
Core
Log
Test
Well Completion
Temporary Abandonment
Demobilize
Core Analysis
Model Update
Integrate Seismic
Interpretation
Outreach
Defined Storage Facility
DMR Meeting
Decision Point
Proceed with Design and Storage Facility permit
Additional Characterization
Alternate Site
P&A or Transition to Class VI

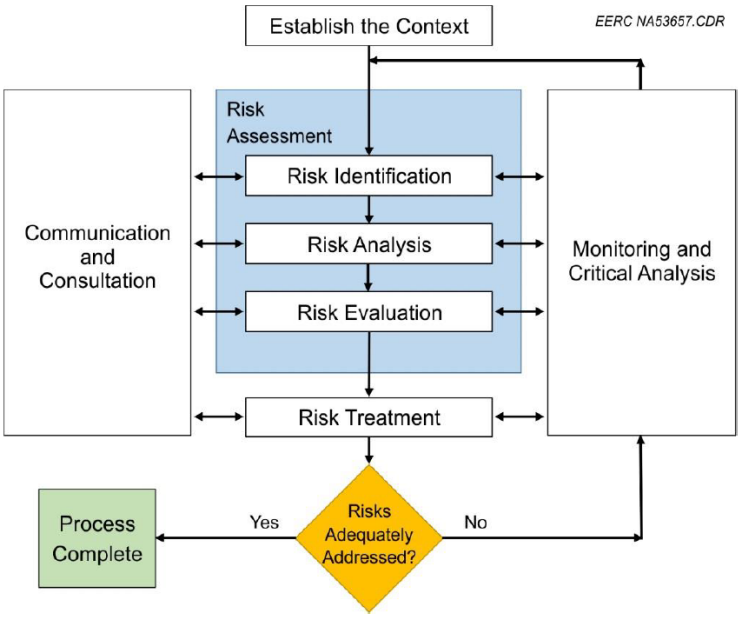
Midwest AgEnergy has solicited, received, and reviewed proposals from companies with expertise in geophysical exploration and modeling. Project participants will be awarded contracts early in project execution. A general contractor will be selected to be responsible for all field activities. They will hire sub-contractors necessary to drill and collect data on the stratigraphic test well. EERC will update models created in pre-feasibility and 3D seismic surveys with data collected on this project. They will also assist by providing technical review and expertise on many of the project tasks described below. Project tasks shall include:

1. Risk assessment - This task is intended to address the programmatic, technical and operational risks associated with defining a CO_2 storage facility. Results will be incorporated in project plan to develop a strategic site-specific risk based characterization program and implementation plan. According to PCOR guidelines –"Risk assessment, is defined as the iterative process of identifying, analyzing, and evaluating individual project risks. When applied to a storage complex, the risk assessment process enables project developers to proactively plan and implement mitigation strategies to address unacceptable risks. Because of the long-term nature of CO_2 storage projects, which may operate from 20 to 50 years or longer, risk assessment for these types of projects is most effective when it is repeated over time. This iterative process enables the evaluation of potential risks that may evolve from changing site conditions, changing site plans or designs, evolving operational activities, and/or policy and regulatory developments. Thus, the risk assessment process is one that is repeated from project inception through the project closure/postclosure phases*."*[1] We intend to follow the PCOR guidance and protocol adapted from the ISO 31000 standard as

[1] DOE NETL under Award Number DE-FC26-05NT42592

illustrated in Figure 2. As such, the assessment will occur at both the beginning and at the end of this phase of the project.

FIGURE 2



2. Drilling Stratigraphic Test Well and Collecting Data

    a. Design Well Drilling Program. A stratigraphic test well will be designed to gather data from the selected site. The drilling program will include the development of well design, casing specifications, wellsite preparation, contracting drilling rig equipment, completion, and analytical testing design. Design and costs will be such that they can be reassessed throughout project.

    b. Permitting of the stratigraphic well in accordance with the requirements of the State of North Dakota. Permit plans may be such that the stratigraphic test well could accommodate a future transition into Class VI compliant well. Meetings and consultation with NDIC Department of Oil and Gas will be conducted prior to submitting application.

c. Conduct Drill on Paper Exercise. A drill on paper exercise will be conducted prior to the beginning of drilling activities. This exercise will ensure proper health, safety, and environmental (HSE) guidelines are communicated and adhered to, reduce risk related to drilling activities, and serve to align project objectives.

d. Drill and Construct Stratigraphic Test Well. The General Contractor will oversee site preparation, the drilling of the stratigraphic test well, and the acquisition of characterization data at the well. They will retain an experienced drilling company and all necessary support services to drill the well to the Deadwood Formation. A stratigraphic test well will be drilled and completed to specification as outlined in finalized contract. Appropriate well site management, daily reports, and risk monitoring will be conducted. Daily briefings and weekly updates will be provided to monitor drilling progress, summarize HSE issues, and reduce potential risks. Geologic whole core and potentially sidewall cores will be collected and analyzed from the stratigraphic well. An extensive suite of open-hole wireline logs will be collected. For the cased hole, a full suite of wireline logs, a cement evaluation and a Vertical Seismic Profile (VSP) will be conducted. Data gathering will include coring and advanced borehole logging with formation testing to properly assess properties of both the caprock and formation/reservoir rock encountered in the well. The cores (petrography, mineralogy, etc.) will be analyzed by a third-party laboratory via thin-section microscopy and bulk XRD methods or full digestion ICP-MS. Other petrophysical parameters will also be determined, including cation and anion exchange capacity, specific surface area (BET), bulk density, permeability, and porosity. Detailed petrologic studies (thin section analysis, XRD, and SEM) of the rock composition, pore geometries, and diagenetic character of the sequestration zone(s) will be conducted, as well as, rock mechanics tests of the target formations and caprocks that will include

unconfined and triaxial compressive strength tests, static Young's modulus, and Poisson's ratio.

e. Temporary well completion or plugging and abandonment will be based on results of the data gathering. It is anticipated the well will be completed as a cased hole with intermediate casing for later use and re-entry or will be plugged per NDIC rules. The decision will be based on the encountered subsurface geologic conditions within the Deadwood formation and/or other objectives. If plugged and abandoned, the plugging and abandonment will be to the satisfaction of the State authorities.

f. Results will be compiled into a comprehensive report to be utilized in geological modeling and performance forecasting as well as in support of any future CO_2 permitting.

3. Geological Modeling and Performance Forecasting. The data gathered in step 2 will be used to update existing geologic models previously developed specifically for Blue Flint CO_2 storage in McLean County. The models will integrate the geological, structural and fluid properties in the storage area. Results will be integrated into geostatistical structural reservoir and fluid property models. Each storage complex will be assessed to determine the injectivity potential for CO_2 and determinations of fluid and pressure footprints, monitoring requirements, and updated risk assessment. The models will be used to assess the seal effectiveness of the CO_2 confining layers and determine the effective pore volume available for CO_2 storage. Computer Monitoring Groups (CMG) GEM dynamic simulation model will be calibrated with stratigraphic test well data then used to develop numerical values for sequestration.

4. Reporting and analysis of potential to proceed with implementation of next phase of the carbon storage project. All petrophysical data and CO_2 storage modeling will be provided in a final report. The modeling results will be specific to the needs of advancing the Blue

Flint storage project but highly indicative of the geophysical conditions likely to be encountered by any future geological carbon storage projects in McLean County.

5. Public Outreach – As part of the seismic surveys previously concluded, Midwest AgEnergy has made a concerted effort to keep the local public informed of the project. With each passing study, we are aware the level of interest and potential concerns can elevate. Throughout this project we intend to provide the public information in various formats and venues to address questions and avoid any misconceptions. We intend to be transparent with our intent to further develop this project, should it be warranted, and recognize the need to provide clear and consistent messaging in a proactive manner.

Technological, Economic and Project Needs:

The technology used to collect information during a stratigraphic test is well established. Oil and Gas exploration companies currently operating in western ND have the equipment and expertise to perform the tasks described in Detailed Project Description under the direction of an experienced general contractor.

A variety of options are being considered regarding what to do with the test bore once data has been collected. One option is that the test well could be plugged and permanently abandoned in accordance with NDIC Department of Mineral Resource (DMR) requirements. This is the least expensive stratigraphic test well option at around $4.5 million; however, the well bore can serve no additional purpose.

As an intermediate approach, the well could be temporarily abandoned in accordance with NDIC rules, which is the most flexible option because it would allow future closure and abandonment or the option of converting it to a monitoring or injection well.

In the final option, the stratigraphic test well could be finished as a CO_2 injection or monitoring well. In a phased (stage gate) approach as proposed in this application, this option is most

expensive, at around $8 million. However, when considering the entire scope of a carbon capture project, this could be the most cost-efficient use of project resources and dollars. This option might co-mingle research and project implementation and also presents a higher risk of stranding capital. Therefore, it is not the preferred approach at this time and finishing the well as an injector or monitoring well is not included in the proposed project budget. Should it become the preferred approach, additional debt or equity partners would be brought into the project to fund the finishing of the well and dilute the percent of project funded by NDIC.

We are proposing the intermediate option whereby the stratigraphic well would be temporarily abandoned while core samples are analyzed to determine if the geology and location are appropriate for CO_2 injection. This would allow a decision on the future purpose of the stratigraphic well to be informed by the data gathered in this project. The estimated cost for this approach is slightly over $5.5 million. This approach would require installation of well casing materials compatible with CO_2 to be put in place at the time of boring, while avoiding the sunk cost of $4.5 million on the first option. If the project were to continue, additional well finishing cost would be deferred beyond the scope of this project. If the project somehow proves not to be feasible the well would be properly secured per NDIC requirements.

A more detailed description of costs, design, labor, and equipment for these three options is provided in Appendix C.

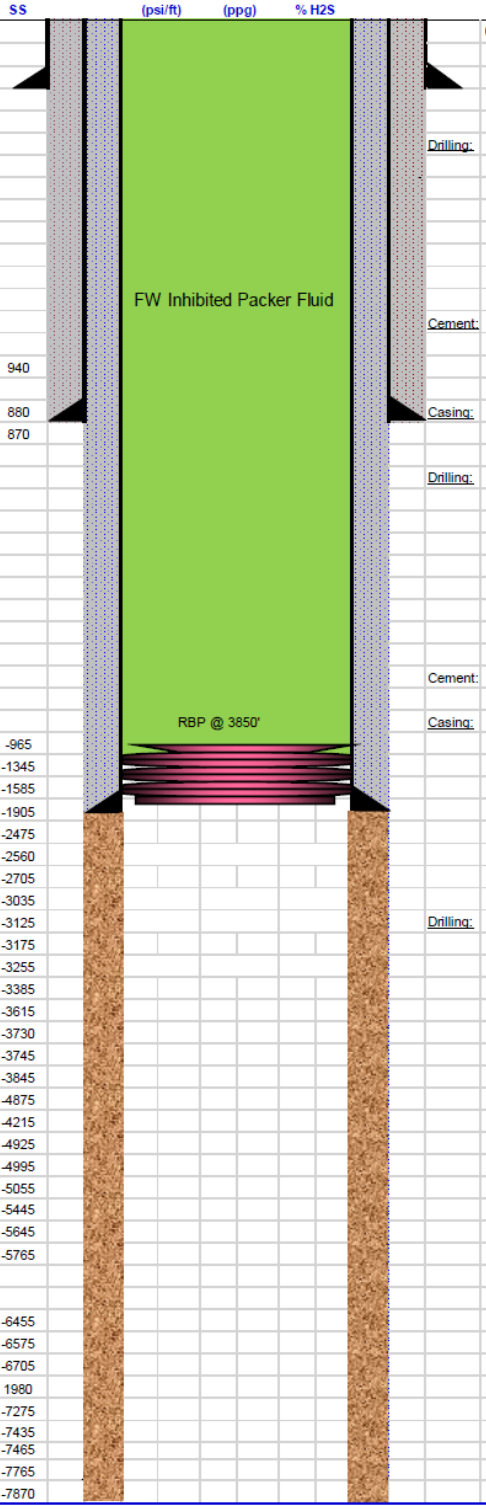
If the stratigraphic well were to be repurposed at any point, the volume of CO_2 to be stored and Class VI well requirements must be understood and incorporated into the stratigraphic drilling design to ensure proper sizing and achieve potential future permitting requirements. An example of how the well associated with this application might be completed is shown in FIGURE 3.

FIGURE 3

PROPOSED DRILLING PROGRAM (Option II Phase A+B)

COMPANY NAME	Midwest Ag Energy									DATE	5-Mar-20		
WELL NAME	MAE #1 Option II A+B		LOCATION	SE SW Sec.17, T145N						TD	9850		ft
			BHL:	SE SW Sec.17, T145N									
FIELD	Wildcat			COUNTRY	USA		State	North Dakota		G.L. ELEV.	1960.00		ft
WELL CLASSIFICATION		Stratigraphic Test.								K.B. ELEV.	1980.00		ft
OBJECTIVE ZONE(S)		Deadwood											

GEOLOGICAL				DOWNHOLE			MECHANICAL	
FORMATION	TOPS (FT)			GRADIENT MAX./EXP. (psi/ft)	MAX. EMW (ppg)	MAX. % H2S		
	TMD	TVD	SS					
							Conductor: 80' 20"	
							Drilling:	Drill 17-1/2"surface hole to 1110 ft RKB.
							Cement:	Cement to surface
K-Pierre (CM-23)	1040	1040	940					
CSTD	1100	1100	880				Casing:	13-3/8",54.5#, J-55, BTC,1100 ft.
Rat Hole	1110	1110	870					
							Drilling:	Drill 12-1/4" hole from 1110 ft RKB to 3950 ft RKB.
							Cement:	Cement to surface and utilize CO2 resistant cement per procedures
							Casing:	10 3/4 45.5 ppf J-55 BTC or LTC, 0-3225 ft; 3225-3700 ft 10 3/4 13 Cr SM-80L or Similar VAM TOP, 3700-3900 ft45.5 ppf J-55 BTC or LTC
GREENHORN	2945	2945	-965					
MOWRY SHALE	3325	3325	-1345					
INYA KARA	3565	3565	-1585					
SWIFT	3885	3885	-1905					
PIPER LIME - DRLG	4455	4455	-2475					
NESSON	4540	4540	-2560					
SPEARFISH	4685	4685	-2705					
AMSDEN	5015	5015	-3035					
TYLER	5105	5105	-3125				Drilling:	Drill 9-1/2" hole from 3950 ft RKB to 9850 ft RKB.
OTTER	5155	5155	-3175					
KIBBEY	*5235*	5235	-3255					
CHARLES	5365	5365	-3385					
RATCLIFFE	5595	5595	-3615					
MIDALE	5710	5710	-3730					
STATE 'A'	5725	5725	-3745					
MISSION CANYON	5825	5825	-3845					
Bakken	6855	6855	-4875					
Lodgepole (above Ba	6195	6195	-4215					
Three Forks	6905	6905	-4925					
Nisku	6975	6975	-4995					
Duperow	7035	7035	-5055					
Souris River	7425	7425	-5445					
Dawson Bay	7625	7625	-5645					
Interlake	7745	7745	-5765					
Gunton	8435	8435	-6455					
Stony. Mt	8555	8555	-6575					
Red River	*8685*	8685	-6705					
			1980					
Icebox	9255	9255	-7275					
Black Island	9415	9415	-7435					
Deadwood	9445	9445	-7465					
Precambrian	9745	9745	-7765					
LOG TD	9850	9850	-7870					



Drawing not to scale.

Environmental impacts during the study are similar to that of drilling an exploratory oil well. Established best management practices already being used in ND for drilling wells for oil production or waste disposal will be employed. A drilling pad will be built in the industrial area near Blue Flint. The location of the pad will be determined based on analysis of seismic data currently underway. A closed loop mud system will be utilized, and all solid and liquid wastes will be collected and disposed according to ND regulations. During the stratigraphic well core field activities about 110 contractors will be needed. The work is expected to take approximately 60-65 days.

This stratigraphic test well is the next step in Midwest AgEnergy's pursuit of a CO_2 sequestration project. It will provide the necessary information for us to determine if CO_2 storage is feasible. It will also provide much of the data required to complete a class VI injection well permit should MAG's analysis suggest the project is viable. However, the implications of this study are much larger than the benefits to Midwest AgEnergy. As we continue to see both regulatory and social drivers pushing to diminish the volume of CO_2 emitted to the atmosphere, this information is critical to understanding the utilization and value of coal and coal related assets in central ND. Whatever is learned from this project will be directly applicable and useful to the lignite industry and others facing carbon constraints.

Standards of success

The standards of success:

- Technical
    - A well bore is delivered that attains the total planned depth for the approved scope of the project.
    - Adequate data is collected and analyzed to determine if the target or other formations in the wellbore are suitable for CO_2 sequestration.

    - Sufficient data is collected to satisfy the Midwest AgEnergy needs of any future permit requirements such as a CO_2 storage permit application.
    - The well is successfully concluded either as completed, temporarily abandoned, or plugged per the approved scope of the project.
- Regulatory / HSE
    - The requirements set forth in the drilling permit by the State of North Dakota are satisfactorily filled per the approved scope of the project.
    - No serious incidents or accidents are recorded during the completion of the project.
- Project Management
    - The Risk Assessment successfully identifies and mitigates project risk.
    - The project is completed on budget for the approved scope of the project.
    - The project is completed on time for the approved scope of the project.

Background

Background of work completed or to be completed prior to the stratigraphic test well has previously been described in the Project Description section.

Qualifications

The Energy & Environmental Research Center

The Energy & Environmental Research Center (EERC) is a research, development, demonstration, and commercialization organization recognized as one of the world's leading developers of cleaner, more efficient energy and environmental technologies. The EERC has a proven track record working with industry to develop and deploy a wide range of innovative and synergistic technologies. The EERC has expertise in several areas that are relevant to the

proposed work, including data collection, management, and interpretation; petrophysical analysis; geostatistical analysis; geocellular modeling at field and regional scales; geologic characterization and reservoir evaluation; conducting predictive numerical injection and production simulations; performing fossil fuel and CO_2 storage resource assessments; and creating Geographic Information System (GIS) products.

The EERC has a specialized technical group focused on the implementation of new approaches to the exploration, development, and production of oil and gas resources and geologic CO_2 storage. Working closely with industry and government agencies, this group has developed tools and approaches specifically focused on resource assessment and optimization with a focus on commercial application of technology. Practicing under the long-standing EERC philosophy of collaboration with an interdisciplinary approach, the group's success is based on developing effective partnerships with energy and environmental industries and government agencies.

The EERC has conducted wide-ranging reservoir modeling activities to better understand the subsurface and predict reservoir response to production and injection operations. With nearly two decades of experience across numerous multi-year, multi-million dollar investigations, the EERC has extensive expertise in geomodel construction and numerical simulation in support of primary and secondary hydrocarbon recovery, brine disposal, CO_2 storage, CO_2 Enhanced Oil Recovery (EOR), and unconventional resource development. This expertise uniquely suits the EERC in providing professional support to this commercial effort in many aspects, including subsurface characterization, site and facility infrastructure design, laboratory analysis, risk assessment and mitigation, monitoring plan development, permitting support, public outreach, and operational optimization.

The EERC project team provides geologic characterization, reservoir surveillance, laboratory, permitting, operational and technical support for geologic CO_2 storage projects and CO_2 EOR. Experience includes: 1) demonstrated more than 18 geophysical monitoring techniques with

applications to Carbon Capture Utilization and Storage (CCUS) scenarios deployed at more than 100 wells/locations; 2) developed or improved several monitoring/surveillance and geologic characterization techniques with application to CCUS; 3) advised and executed drilling, completion, characterization and testing programs of more than a dozen unique CCUS wells, the collection of more than 50 square miles of 3-D seismic data, the collection and analysis of over 500 ft of core, the collection and interpretation of well logs for over 400 wells; 5) participated in wellsite operations for more than 400 wells 4) deployed and analyzed advanced real-time monitoring and SCADA systems with application to CCUS; 5) field tested and validated pre-commercialized applications of logging tools and completion technology; and 6) collaborated with the ND Department of Mineral Resources and project partners to develop drilling plans, permit application packages and storage facility permit application package templates for all known CCS wells within the region and 7) lead or was a key participant in more than 25 field-based applied research projects focused on advancing industrial CCUS projects within the region.

The EERC leads the PCOR (Plains CO_2 Reduction) Partnership Initiative funded by the U.S. Department of Energy (DOE), the North Dakota Industrial Commission, and more than 120 member organizations. The PCOR Initiative is addressing regional capture, transport, use, and storage challenges facing commercial CCUS deployment.

The EERC led the North Dakota Integrated Carbon Storage Complex Feasibility Study (CarbonSAFE), establishing the feasibility of storing at least 50 million tonnes (Mt) of CO_2 in a 25-year time frame in central North Dakota. The objective of the feasibility study was to fulfill the goals of the U.S. Department of Energy's (DOE's) CarbonSAFE Program and address technical and nontechnical challenges specific to commercial-scale deployment of a CO_2 storage project.

The EERC has experience working with state and federal governments to provide scientific support to inform policy makers and facilitate prudent regulatory frameworks. The EERC has

expertise advising clients on policy, regulatory, permitting, economics, and tax perspectives with applied research and scientifically derived technical information to inform sound business decisions. EERC project teams have developed permitting strategies and implemented policy solutions related to oil and gas exploration, production, transportation and incremental oil recovery; geologic CO_2 capture and storage; power generation; emissions reduction; and renewable energy systems.

General Contractor

The proposed Project Team includes world-wide leaders in carbon capture and sequestration. Geostock Sandia, LLC (GKS) is a leading candidate to become the general contractor. They secured bids and provided technical specifications to help prepare this application. GKS has more than 50 years of experience mapping, measuring, and modeling underground rock formations and is a leading technical provider of fluid injection and subsurface storage services to the oil and gas, petrochemical, steel manufacturing, and agricultural industries. Since the early-2000s, GKS has provided support to more than 19 carbon capture and sequestration (CCS) projects, providing geologic characterization and modeling services, planning and drilling stratigraphic test wells, and converting existing wells to CCS monitoring wells.

Below is a list of the CO_2 projects in which GKS has participated:

1) Frio Brine Pilot Test in Dayton, Texas w/Bureau of Economic Geology – 2002-2005
2) Frio Brine Pilot – Phase 2 Test in Dayton, Texas w/Bureau of Economic Geology – 2005-2007
3) Northern California Phase II – Grizzly Slough Pilot Well Project – 2006
4) SECARB Cranfield Phase II – Monitor/Observation Well Completion - 2008
5) Arizona Power Service Phase II Cholla Plant Pilot Test Well Installation - 2009 & 2010
6) Northern California Phase III Lage Scale Injection Project – Montezuma Hills - 2008 - 2010
7) Characterization of the Newark Basin of New York & New Jersey – ARRA Project (direct recipient) – 2009 - 2014
8) SECARB Cranfield Phase III DAS – Injection and Two Monitor/Observation Well Completions injection monitoring – 2009 - 2013
9) Western Kentucky Carbon Storage Test Marvin Blan Pilot Well – 2009 & 2010
10) Tenaska Taylorville Class 6 Well Permit Application – 2009 & 2010
11) EERC Denbury Bell Creek Field Phase II Monitoring/Observation Well Instrumentation Installation Project - 2011
12) South Louisiana Small-Scale Sequestration Project – 2011 – 2013

13) California Institute for Energy & Environment – Kings Island Citizens Green No 1 Pilot Well Installation - 2013
14) Geomechanical Characterization and Modeling of the Newark Basin (direct recipient) - 2015 - 2018
15) Eastern Kentucky Carbon Storage Test
16) Illinois State Geological Survey, Central Basin CarbonSAFE
17) Illinois State Geological Survey, Central Basin CarbonSAFE3
18) Wabash CarbonSafe
19) Wabash CarbonSafe3

Midwest AgEnergy & Blue Flint

Midwest AgEnergy is known as an international leader in the production of low carbon biofuels, with a mission of providing clean energy for a better world and bringing prosperity to our communities. The management team for this project was responsible for the design and construction of two unique biorefining facilities. Upon completion of construction, Blue Flint received the 2006 Governor's Choice Award for Economic Development – North Dakota Project of the Year. Similarly, the Dakota Spirit plant received the 2014 Jamestown Stutsman Development Corporation (JSDC) Growing Jamestown/Stutsman County Award. Collectively the facilities have produced over a billion gallons of ethanol with employees surpassing a million hours of safe work.

Resumes or CV for key Project team members are included in Appendix E.

Value to North Dakota

Lignite coal is a critical resource for North Dakota's economy. The Lignite Energy Council reports that the North Dakota lignite industry is responsible for about 14,000 jobs in the state and $5.7 billion in economic activity.[2] The potential of future carbon legislation and/or regulations could significantly impact the ability for coal to contribute to North Dakota's economy and the livelihood of people working in the industry.

[2] (https://lignite.com/coal-strong/benefits-of-north-dakotas-homegrown-lignite-coal/)

The results of this project will provide Midwest AgEnergy with the knowledge and information necessary to pursue a full-scale CO_2 sequestration project in McLean County. McLean County is home to an estimated coal reserve of 1.5 billion tons of economically mineable lignite.[3] A project that successfully demonstrates that carbon dioxide storage is possible in close proximity to vast coal reserves enhances the value of that asset in a carbon constrained world. Technologies continue to emerge that will continue to enhance the value of lignite as both an economical energy source and a low carbon energy option.

Completing the Stratigraphic test well will require the employment of between 100 and 110 contractor personnel. The field work component of the project is estimated to require 60-65 days.

Midwest AgEnergy represents average annual Cost of Sales of approximately $275M and employs just under 100 people, slightly over half of which work at the Blue Flint facility near Underwood. According to RFA calculations[4] the Blue Flint facility supports over 1,000 full time jobs. The Blue Flint facility has taken steam off the backside of a turbine generator of the adjacent power plant for over 13 years. Providing low carbon intensity transportation fuel has been a foundational element of the business model for Midwest AgEnergy. A sequestration project will solidify the financial future for the organization, its employees, and all of the local suppliers who rely on Midwest AgEnergy to be a purchaser or supplier of goods and services.

The Ethanol industry has substantial economic effects to the overall economy of ND. About half of the corn grown in ND is utilized in ethanol production. The North Dakota ethanol industry contributes $623 million annually to the state's economy. In addition, state and local tax

[3] (https://www.dmr.nd.gov/ndgs/documents/Publication_List/pdf/RISeries/RI-104.pdf)

[4] https://www.dropbox.com/sh/2gp9bhatpembiyf/AACvnbX94r8_zFOtkVc_q_zga?dl=0&preview=ND_Infographic.pdf

revenues contribute more than $11 million annually. [5] North Dakota ethanol plants employ more than 230 workers directly in high-paying positions. The industry also supports nearly 7,000 jobs across all sectors of the economy.

Both Agricultural and Energy leaders recognize the value of this project to ND. Letters of support are included in Appendix D.

Management

The Implementation Team will be led by Principal Investigator Jeff Zueger, with the assistance of Project Manager Adam Dunlop. The Implementation Team will direct the efforts of external project participants such as EERC, and the project general contractor - which will direct activities of the roughly 30 subcontractor companies this project requires. Each external project participant will have a project manager to direct the execution of their scope. In doing so, each external project participant will develop and maintain a detailed project scope of work, schedule and budget. External project managers will provide frequent project updates to their scope of work, schedule and budget. Scope of work changes will be managed by a formal change order process.

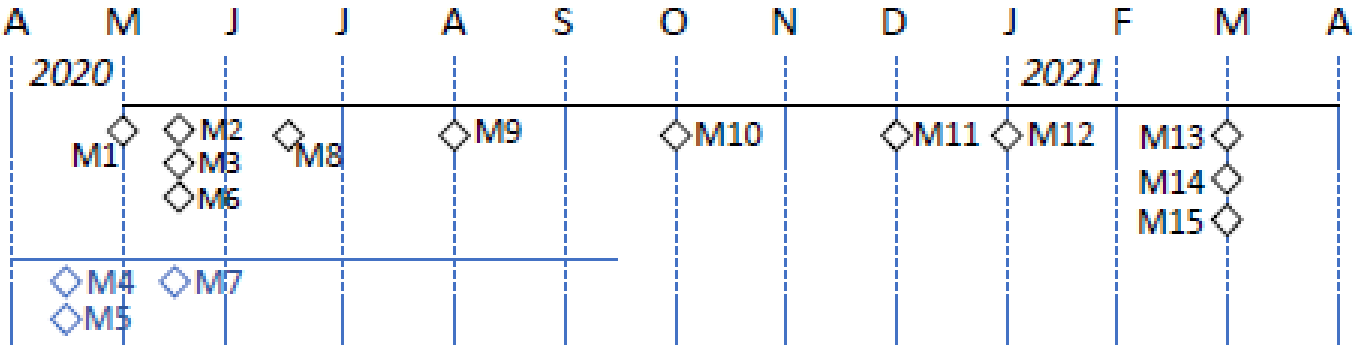
During the well drilling phase of the project, daily meetings between the general contractor and the Midwest AgEnergy Implementation Team will occur. Standing agenda items will include reviewing project status, schedule, change requests, HSE, and other issues. A written Daily Drilling Report will be sent out to internal and external groups daily to allow experts to review learnings and provide feedback on the project in real time.

[5] https://b3358ed0-933b-4e3a-a5f5-66189e78bb29.filesusr.com/ugd/1fd290_8317e15b7a7f4cedb1285a6dc740087c.pdf

Timetable

The Timetable for the Project is shown in Figure 4. The figure also contains milestones on tasks currently in process which will support the Stratigraphic Well project. Contract negotiations between Midwest AgEnergy and the other project participants are currently in process. Project implementation activities are anticipated to commence upon LRC decision regarding this grant application. Final report and technical data are expected to be available in first quarter of 2021.

FIGURE 4



M1: Initiate risk assessment
M2: Initiate outreach
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M4: 3-D seismic interpretation available to inform test well location
M5: Inyan Kara modeling results available to inform test well location
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M10: Initiate core analysis
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M12: initiate reservoir simulation
M13: Risk assessment 2 complete
M14: Storage facility defined
M15: Decision point

Existing MAG Prefeasibility Scope

Proposed Stratigraphic Test Well and Feasibility Scope

Budget

Table 1 contains a list of project associated costs and an indicator of what grant monies will support. As discussed in the project description section, we are requesting funding assistance to drill, collect data, model the formation(s) injection and storage capacity, and temporarily abandon the well in a condition where it could later serve a purpose (the intermediate option).

Table 1:

Project Associated Expense	Total Cost	NDIC Share	Applicant Share (In kind/Cash)
Risk Assessment	$134,000	$67,000	$67,000
Stratigraphic Permitting	$276,000	$138,000	$138,000
EERC Onsite Support	$490,000	$245,000	$245,000
Geo Modelling & Simulation	$330,000	$165,000	$165,000
Outreach	$140,000	$70,000	$70,000
Labor General Contractor	$265,000	$132,500	$132,500
Subcontractor/Survey/Equip Rental	$509,000	$254,500	$254,500
Drilling Rig	$1,980,000	$990,000	$990,000
Core and Logging	$1,150,000	$575,000	$575,000
Handling /Subcontractor	$400,000	$200,000	$200,000
Well Materials, Casing & Cement	$492,000	$246,000	$246,000
Contingency	$610,000	$305,000	$305,000
Project Management & Reclamation	$135,000	$0	$135,000
Operator License Bonding & Legal	$45,000	$0	$45,000
Total Project	$6,956,000	$ 3,388,000	$ 3,568,000
NDIC Total Request	$ 3,388,000	49%	
Applicant Share	$ 3,568,000	51%	

Detailed quotes from subcontractors were assimilated to determine well drilling, coring and analysis costs. Supporting data is found in Geostock Sandia general contractor proposal in Appendix C.

Many of these quotations were provided under different economic conditions for oil and gas exploration service providers than we are currently experiencing with the precipitous drop in oil

prices. We plan to rebid the project prior to awarding contracts and expect well service related costs to be lower than proposed here as drill rig availability is rapidly increasing. EERC's proposal (Appendix B) serves as the foundation for modeling, permitting, outreach, risk analysis, and site support tasks.

This funding request has been made to the NDIC via LRC for two primary reasons.

1. The information obtained in this project is of high value to coal related entities in central ND. If Midwest AgEnergy were to pursue this project without NDIC / LRC support, the geological data collected would remain the property of Midwest AgEnergy. We feel this is a mutually beneficial opportunity. Midwest AgEnergy gains assistance in advancing a potential project and the coal industry receives specific knowledge regarding capacity for carbon storage near clearly defined coal reserves.
2. The scope of the project as described in this application has been adapted to meet the data collection needs of any future projects for larger CO_2 producers. Core data will be collected from at least two formations. We intend to have the sidewall coring equipment on site and thus we have capabilities to collect core data on virtually any formation that shows potential as the stratigraphic well is drilled. If Midwest AgEnergy were to pursue this project without NDIC assistance, the information collection efforts would be limited to only the needs of advancing our project. We would likely target only one formation and capture significantly less data than described in this study. As proposed here, one stratigraphic test well is able to provide valuable information to many and diverse interests AND with minimal additional costs.

Matching funds

Midwest AgEnery expects to contribute over 50% of the project or about $3,568,000 in matching funds.

Tax liability

Midwest AgEnergy has no outstanding tax liabilities owed to the state of North Dakota or any of its political subdivisions. A notarized affidavit of this fact is included in Appendix F.

Confidential information

There is no confidential information in this application.

Appendices

APPENDIX A - Seismic Survey Project Description

APPENDIX B - EERC Project Proposal

APPENDIX C - Geostock Sandia Project Proposal (Redacted Version)

APPENDIX D - Letters of Support

APPENDIX E - Qualifications/CV/Resume

APPENDIX F - Affidavit of No Tax Liability

APPENDIX A

Seismic Survey Project Description

MIDWEST AgEnergy

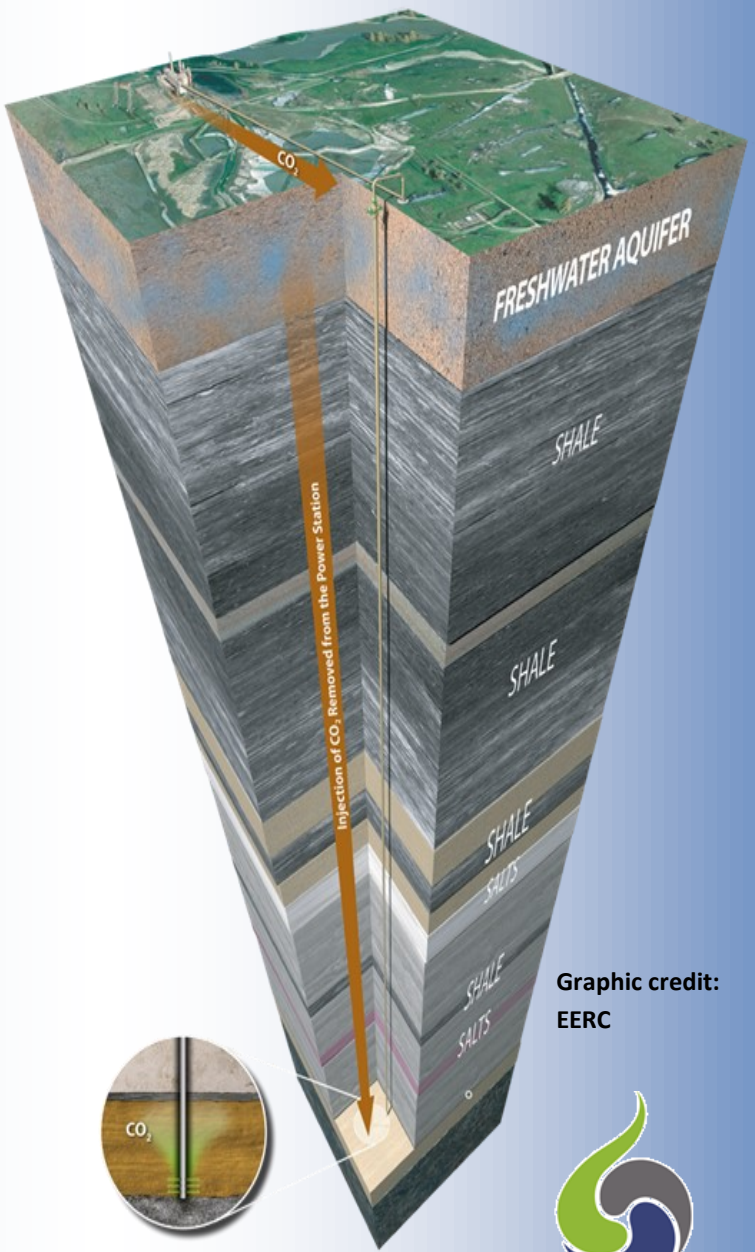
Midwest AgEnergy Group (MAG) owns and operates the Blue Flint Ethanol (BFE) facility near Underwood, ND. BFE purchases about 25 million bushels of corn and produces over 70 million gallons of ethanol along with about 200,000 tons of dry distillers grains each year. A byproduct of fermentation at the facility is carbon dioxide (CO_2). Blue Flint produces over 200,000 tons per year of CO_2, which is currently scrubbed and released to the atmosphere.

BFE has explored many opportunities to put this CO_2 to beneficial use. We are currently investigating the feasibility of safely storing the CO_2 deep underground, which is typically referred to as geological sequestration of CO_2.

Geologic Sequestration is the process of injecting CO_2 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.

By preventing CO_2 from entering the atmosphere, CCS will decrease the carbon intensity of ethanol fuel produced at the facility. The project may also create federal income tax credits for investors.

To learn more about CCS, see enclosed Global CCS Institute Fact Sheet or go to: http://www.ccsassociation.org/what-is-ccs/storage/



Graphic credit: EERC

2841 3rd St SW
Underwood, ND 58576

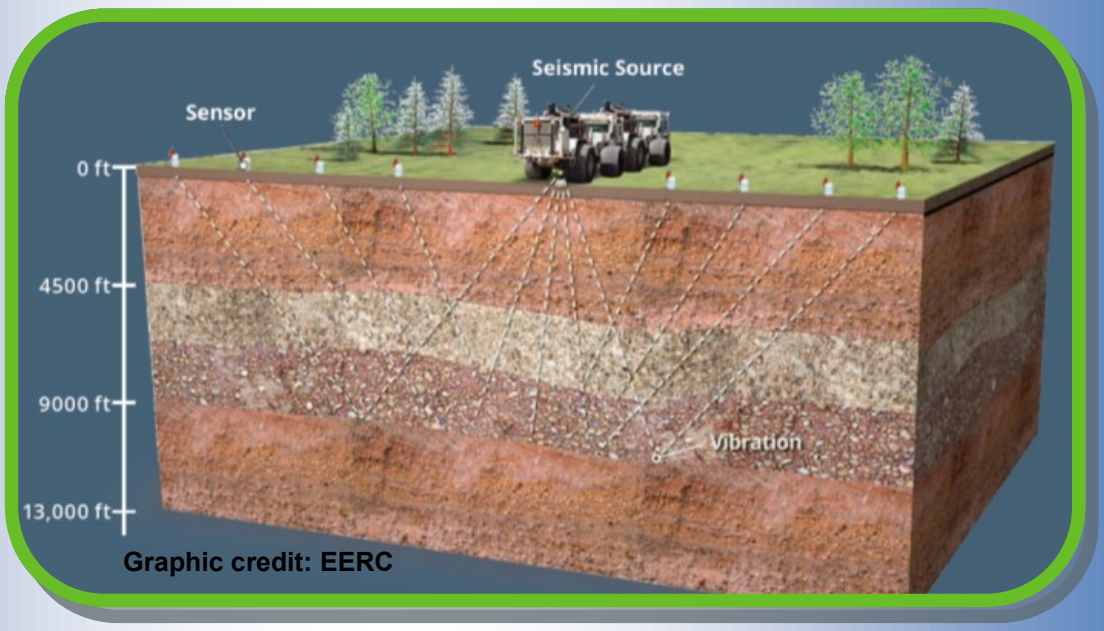
www.midwestagenergy.com

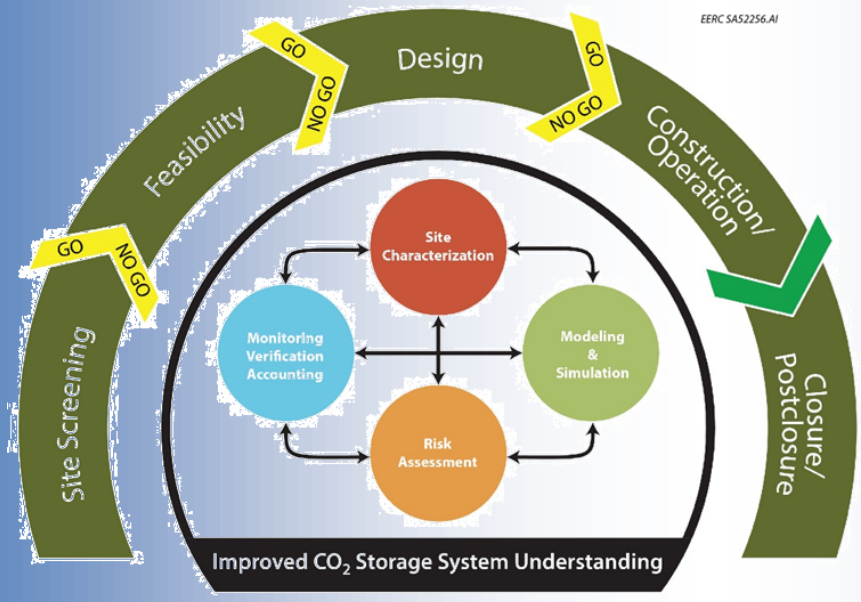
MIDWEST AgEnergy

Project Status

In early 2019, MAG commissioned the Energy and Environmental Research Center (EERC) to complete a feasibility level analysis of the geology near its BFE facility. The study determined that geological sequestration appears to be a technically viable option for CO_2 produced at BFE. However, additional site specific geological information is needed to determine if the project is indeed possible. A geophysical seismic survey was recommended as the next logical step to gather more data.

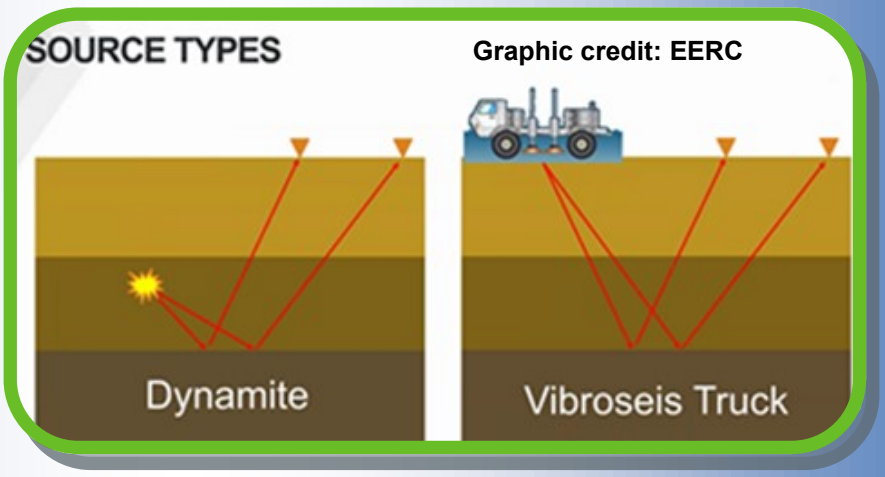
A geophysical seismic survey is commonly used to learn more about subsurface characteristics. In a geophysical survey, a seismic source generates vibrations that travel deep into the earth and are reflected back to the surface. Sensors at the surface record the vibrations, which are interpreted by Geophysicists 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 sensors. These types of surveys are very common and have already been conducted in every county in western ND.





MIDWEST AgEnergy

A critical component to a seismic survey is determining what type of vibration source will provide the best data regarding the subterranean strata. A “source test” is often conducted to determine the best manner to induce vibration by comparing methods from vibroseis trucks and explosive charges buried at various depths.



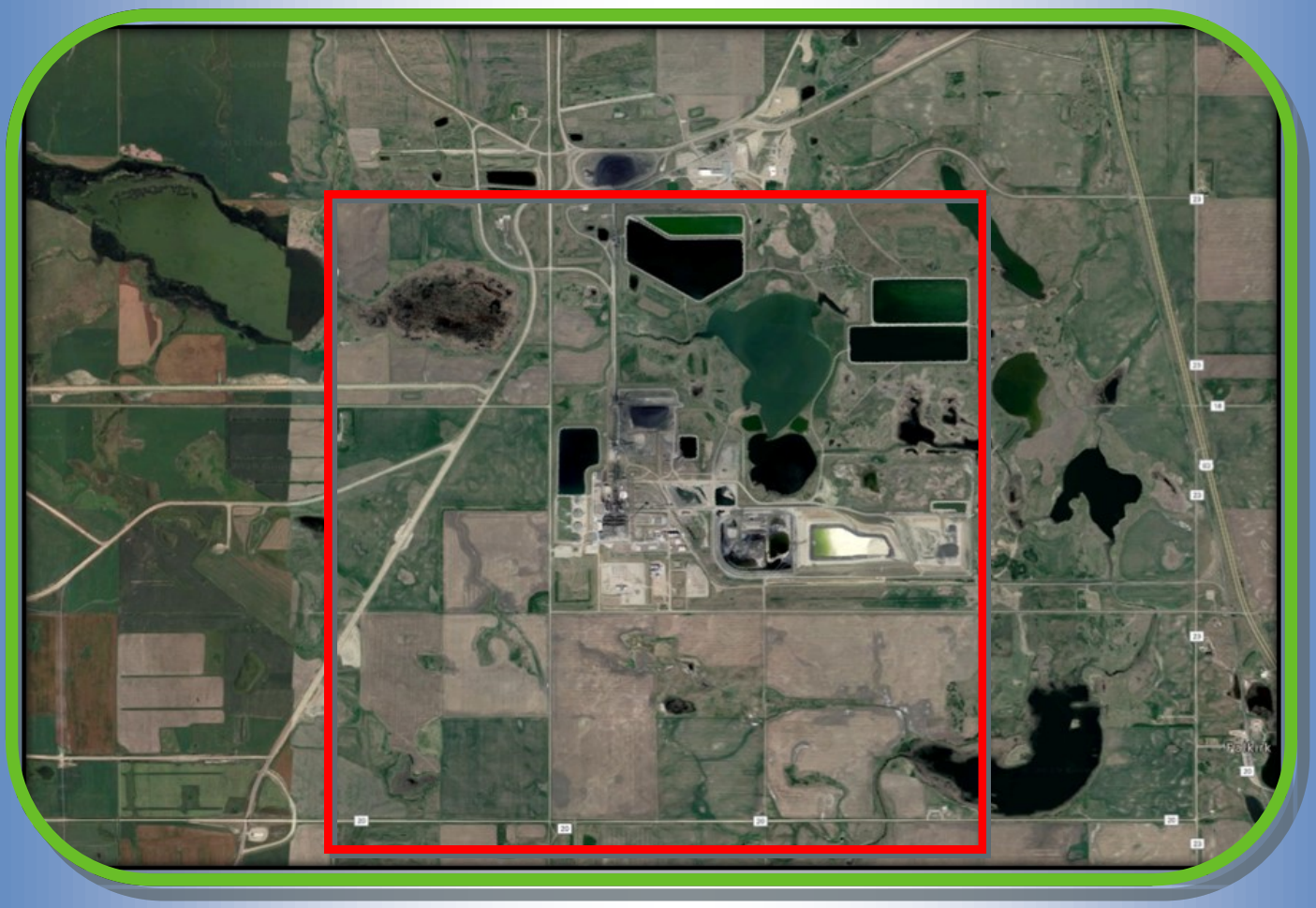
In August of 2019, MAG performed a four mile long source test on Falkirk Mine property directly west of Blue Flint.

All landowners within ½ mile of the survey line were informed of the testing. There were no noticeable impacts to property owners from the source test.

The source test data acquired has been analyzed and indicates additional geophysical survey activities are justified and should be completed if we wish to advance the project.

MIDWEST AgEnergy

Next Steps: MAG is hiring geophysicists to conduct a seismic survey over approximately nine square miles surrounding its facility. The data will be collected in the same manner as previous seismic events but over a much larger area. This will provide a clearer picture of the potential for CO_2 storage in formations underneath the area surrounding the site.



Community Impacts: As with previous seismic survey activities, MAG expects there to be minimal impacts on the general public and the environment. Field work will be conducted under a permit issued by the North Dakota Industrial Commission. Landowners who have property in the vicinity of the survey will be contacted and informed of project details. Great care is taken to avoid environmentally sensitive areas and infrastructure such as buildings, pipelines and wells. MAG looks forward to working with property owners in advance of the survey. We are excited about what we may learn from this investigation.

Questions?

Visit: www.midwestagenergy.com

Call: Adam Dunlop 701-442-7503

Email: adunlop@midwestagenergy.com

MIDWEST AgEnergy

APPENDIX B

EERC Project Proposal

Energy & Environmental Research Center
15 North 23rd Street, Stop 9018 • Grand Forks, ND 58202-9018 • P. 701.777.5000 • F. 701.777.5181
www.undeerc.org

March 27, 2020

Mr. Adam Dunlop
Director – Regulatory and Strategic Planning
Midwest AgEnergy
2841 3rd Street Southwest
Underwood, ND 58576

Dear Mr. Dunlop:

Subject: EERC Proposal No 2020-0175 Entitled "Feasibility Assessment to Advance Geologic CO_2 Storage"

The Energy & Environmental Research Center (EERC) is pleased to submit this proposal to evaluate the feasibility of geologic CO_2 storage as a means to manage CO_2 associated with ethanol production at Midwest AgEnergy's (MAE's) Blue Flint ethanol plant (Blue Flint) with the objective of defining a CO_2 storage facility in McLean County, North Dakota. Attaining this objective will provide the necessary technical and logistical information needed for MAE to decide whether to proceed to construction at this location, initiate storage facility infrastructure design, and process storage facility permits.

The EERC will support a CCS (carbon capture and storage) feasibly assessment near Blue Flint, including assisting MAE with stratigraphic test well permitting and drilling; evaluating the Inyan Kara and Black Island/Deadwood Formations for their potential to store nominally up to 500,000 tonnes per year of CO_2 captured from Blue Flint and associated point sources; calibrating geologic models and conducting fit-for-purpose performance simulations that incorporate new log, core, test, and 3D seismic data sets associated with the proposed efforts; conducting a programmatic technical and operational risk assessment to identify and address potential barriers to timely implementation of CCS at Blue Flint; and updating the technical and logistical pathway to commercial implementation of geologic CO_2 storage associated with Blue Flint. A description of the EERC's proposed scope of work is attached.

The estimated period of performance for this work as described is 10 months, with an estimated cost of $2,382,369. This work would be invoiced monthly on a cost-reimbursable basis.

We look forward to the opportunity to assist MAE with advancing geologic CO_2 storage at Blue Flint. Please contact me with any questions by phone at (701) 777-5073 or by e-mail at bbotnen@undeerc.org.

Sincerely,

Barry W. Botnen
Senior Hydrogeologist

BWB/rlo

Attachment

FEASIBLITY ASSESSMENT TO ADVANCE GEOLOGIC CO_2 STORAGE

EERC Proposal 2020-0175

Submitted to:

Adam Dunlop

Midwest AgEnergy
2841 3rd Street Southwest
Underwood, ND 58576

Submitted by:

Barry W. Botnen
John A. Hamling
Wesley D. Peck
Amanda J. Douglas-Livers
Kevin C. Connors

Energy & Environmental Research Center
University of North Dakota
15 North 23rd Street, Stop 9018
Grand Forks, ND 58202-9018

Barry W. Botnen, Project Manager

Charles D. Gorecki, CEO
Energy & Environmental Research Center

March 2020

TABLE OF CONTENTS

LIST OF FIGURES i

INTRODUCTION 1

SCOPE OF WORK FOR PHASE I 5
- Task 1 – Risk Assessment 5
- Task 2 – Stratigraphic Test Well 6
  - Subtask 2.1 – Stratigraphic Test Well Site Selection and Design 7
  - Subtask 2.2 – Well Permitting for Stratigraphic Test Well 7
  - Subtask 2.3 – Drilling the Stratigraphic Test Well 7
- Task 3 – Geologic Evaluation 7
  - Subtask 3.1 – Core Analysis and Laboratory Testing 8
  - Subtask 3.2 – Geologic Modeling and Performance Forecasting 8
  - Subtask 3.3 – Definition of Storage Facility Area 9
- Task 4 – Outreach 9

DELIVERABLES 10

TIME FRAME 10

COST 10

LIST OF FIGURES

1 Adaptive management approach to CO_2 storage project development. 3

2 Generalized time line illustrating provisional timing and duration of development phases and major milestones along the pathway to full commercial storage of CO_2 from Blue Flint 4

3 Relationship between contracted and proposed MAE activities pertaining to the definition of a storage facility to accommodate up to 500,000 tonnes /year of CO_2 4

FEASIBLITY ASSESSMENT TO ADVANCE GEOLOGIC CO_2 STORAGE

INTRODUCTION

The Energy & Environmental Research Center (EERC) proposes to assess the storage of up to 500,000 tonnes per year of CO_2 captured from Midwest AgEnergy's (MAE) Blue Flint ethanol plant and other associated point sources with the *objective of defining a CO_2 storage facility* in McLean County, North Dakota. Attaining this objective will provide the necessary technical and logistical information needed for MAE to decide whether to proceed to construction of carbon capture and storage (CCS) facilities at this location, initiate storage facility infrastructure design, and process storage facility permits. The feasibility assessment will evaluate geologic CO_2 storage using a combination of the Inyan Kara and Black Island/Deadwood Formations in proximity to the Blue Flint ethanol plant in McLean County. Proposed assessment efforts will leverage a recently completed prefeasibility geologic CO_2 storage investigation for Great River Energy (GRE) and MAE, as well as the results of ongoing CCS scoping efforts contracted by MAE–GRE. The expected outcomes of the proposed effort include 1) an assessment of the CO_2 storage resource of the Inyan Kara and Black Island/Deadwood Formations in central McLean County, North Dakota; 2) a defined CO_2 storage facility for storing up to 500,000 tonnes of CO_2 per year for 12- and 20-year injection periods; 3) identification of programmatic technical and operational risks and recommended actions; and 4) a recommended pathway for advancing commercial geologic CO_2 storage for Blue Flint that includes next steps, estimated costs, and a permitting action plan.

In 2019, the EERC conducted a prefeasibility evaluation of CO_2 storage as a means of managing CO_2 emissions associated with Coal Creek and Blue Flint as part of the "Geologic CO_2 Storage Assessment for the Midwest AgEnergy Blue Flint Ethanol Plant" project. A petrophysical evaluation of several potential storage formations was performed for wells within a 50-mile radius centered on Blue Flint/Coal Creek to characterize reservoir parameters that affect technical suitability for CO_2 storage. The evaluations were used to screen and rank the potential storage formations and assess CO_2 storage potential using analytical methods. Through these assessments, the EERC determined that sandstones of the Deadwood Formation hold the greatest potential to receive CO_2 at the target rates anticipated from Blue Flint. Based on the sparse regional data available and targeting only the Deadwood Formation, an assumed annual CO_2 storage rate of 185,000 tonnes per year will likely require one to two injection wells.

Current efforts to advance CCS at Blue Flint are being conducted as part of the ongoing "Geologic CO_2 Storage Site Characterization of the Midwest AgEnergy Blue Flint Ethanol Plant" work order. This effort includes interpretation of newly acquired 3D seismic data, integration of seismic data into the existing geologic model, and dynamic reservoir simulations to inform well placement of a stratigraphic test well. This project also includes developing a well-drilling and completion plan to support the stratigraphic test well permit process. The completion plan will be constructed to provide a provisional pathway to transition the well from a stratigraphic test well to a Class VI injection well in the future.

The North Dakota Industrial Commission's Department of Mineral Resources (NDIC DMR) provided regulatory clarification, confirming that the Class II aquifer exemption in the Dakota Group in North Dakota applies to Class VI injection activities in North Dakota as well

(North Dakota Industrial Commission, personal communication, November 8, 2019). As a result of the NDIC DMR clarification, a prefeasibility assessment of the Inyan Kara Formation was contracted by MAE. Results of the ongoing prefeasibility investigation, "Inyan Kara Formation Geologic CO_2 Storage Assessment," will provide needed insight regarding the potential number and distribution of injection wells needed to accommodate the rate of CO_2 capture associated with Blue Flint. To reduce the areal extent of the resulting CO_2 plume and manage challenges associated with acquiring and aggregating pore space rights, a stacked (multizone) storage approach using the Inyan Kara and Black Island/Deadwood Formations will be considered in the proposed effort.

The storage reservoir properties within the existing geologic models are based on relatively sparse data throughout the greater region, with no site-specific information available for the Black Island/Deadwood Formation and moderate information available for the Inyan Kara Formation. Characterization of the potential storage formations (i.e., Inyan Kara and Black Island/Deadwood) and associated confining zones will be informed by new well logs, core, well tests, and data acquired during drilling of a new stratigraphic test well. This information will be combined with the 3D seismic survey recently acquired by MAE to reduce uncertainty to a level adequate to define a CO_2 storage facility. Defining a storage facility will address fundamental risk assessment and technical, operational, and project-related questions regarding:

1. Injection and monitoring well locations and configuration (assuming one or two wells per pad: one into each storage horizon).
2. Extent and location of pressure and fluid footprints ("site" definition).
3. Number of landowner engagements (number of pore space owners) and prognosis for amalgamation effort.
4. Technical and logistical challenges of acquisition of pore space and site access.
5. Regional geologic framework based on best available data (faults, permeability, fatal flaws).
6. Assessment of the viability of the storage facility concept.

A defined storage facility provides the technical and logistical information for MAE to make a decision regarding the pursuit of storage facility permits and whether to proceed with infrastructure design and construction of a storage facility. The proposed effort will update a technical and logistical pathway to commercial implementation of geologic CO_2 storage associated with Blue Flint.

The proposed effort represents a component of an integrated adaptive management approach which manages uncertainty and informs an investment strategy for development of a geologic CO_2 storage site (Figure 1). Although options exist to accelerate the provisional Blue Flint implementation schedule shown in Figure 2, these options require increased investment at lower levels of confidence. The proposed effort attempts to provide a balanced, prudent approach to project development with consideration of the Internal Revenue Service (IRS) 45Q Tax Credit Program start of construction deadline.

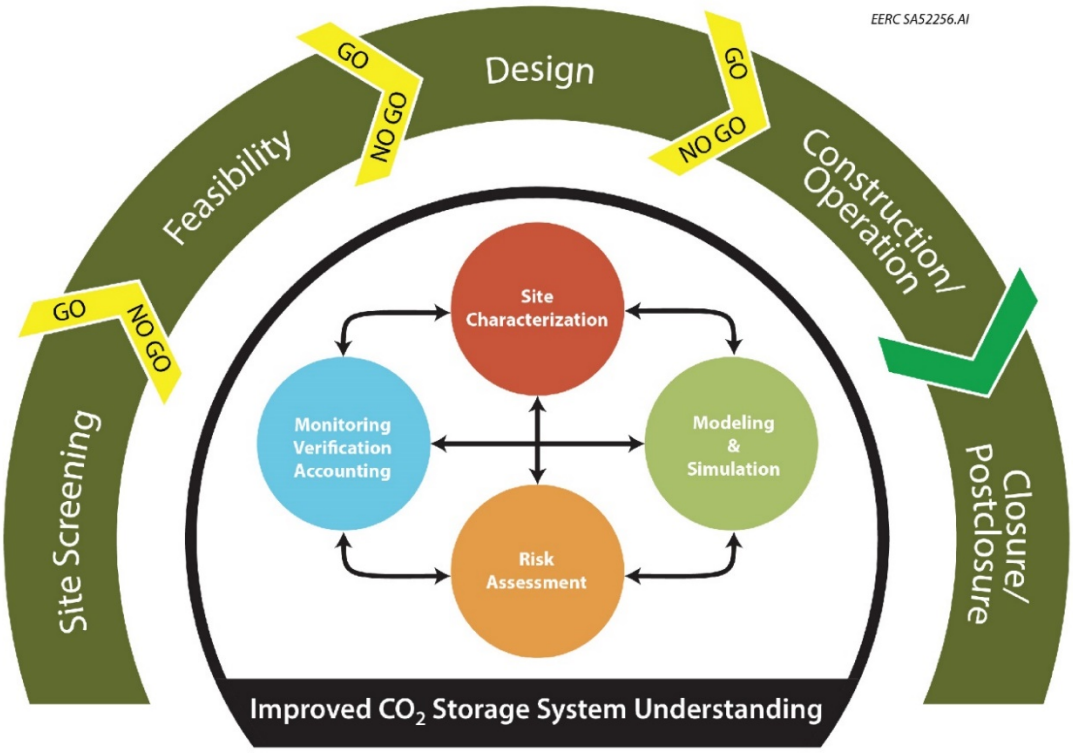


Figure 1. Adaptive management approach to CO_2 storage project development.

The decision point for determining the necessity and location of additional well(s) and/or collection of additional ancillary data will depend on results of the risk assessment, modeling results, and performance forecasts derived from integration of data from the first stratigraphic test well and discussions with NDIC DMR. At the conclusion of the proposed effort, MAE will have sufficient information to make a go/no-go decision with regard to 1) proceeding with the design and permitting phase of the project (Figure 2) and 2) collecting additional data based on risk assessment and storage facility permit requirements, and then proceeding to Phase II. See Figure 3 for detailed milestones for Phase I.

The proposed scope of work addresses only Phase I (feasibility) as depicted in Figure 2. The series of phases shown in Figure 2 are built on key milestones identified to attain MAE's goal of storing nominally up to 500,000 tonnes of CO_2 per year and meet deadlines imposed by the 45Q tax credit program. There is limited opportunity to shorten the duration of Phases I, II, and III. As such, circumstances that delay the initiation or completion of Phase I will likely result in a compression of the duration for Phase IV. IRS guidance released for the 45Q tax credit program related to start of construction informs potential means and implications associated with compressing Phase IV.

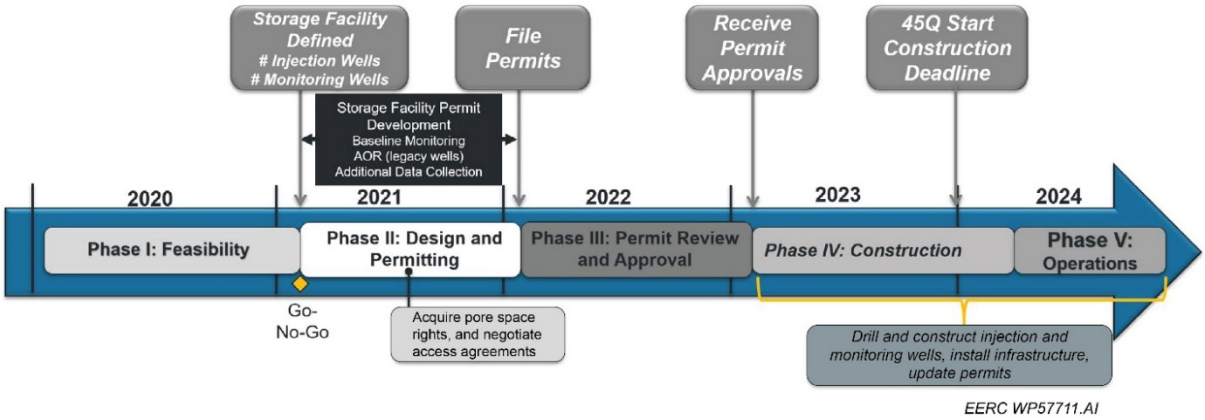
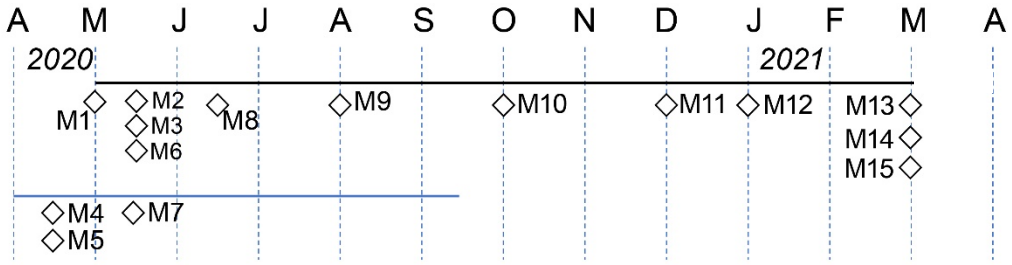


Figure 2. Generalized time line illustrating provisional timing and duration of development phases and major milestones along the pathway to full commercial storage of CO_2 from Blue Flint. The go/no-go decision options are 1) proceeding with the design and permitting phase and 2) collecting additional data based on risk assessment, and then proceeding to Phase II. See Figure 3 for detailed milestones for Phase I.



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M13: Risk Assessment 2 complete
M14: Storage facility defined
M15: Decision point

Existing MAG Prefeasibility Scope

Proposed Stratigraphic Test Well and Feasibility Scope

EERC BB57878.AI

Figure 3. Relationship between contracted and proposed MAE activities pertaining to the definition of a storage facility to accommodate up to 500,000 tonnes/year of CO_2. [Black] – time line and milestones for proposed effort. [Blue] – time line and milestones for the ongoing "Geologic CO_2 Storage Site Characterization of the Midwest AgEnergy Blue Flint Ethanol Plant" and "Inyan Kara Formation Geologic CO_2 Storage Assessment" efforts contracted by MAE.

The following scope of work addresses the activities needed to complete Phase I (feasibility) as depicted in Figure 2. Potential activities/costs that may be needed to progress to Phase II (Design and Permitting) but are not included in the proposed scope of work include:

1) Cost for design; general contracting; and execution of drilling, completion, testing, logging, and core collection associated with the stratigraphic test well.

2) Licensing or acquisition, processing, and interpretation of additional seismic surveys (2D or 3D).

3) Subsequent iterations of risk assessment modeling, performance forecasting, and characterization efforts resulting from additional data collection or characterization efforts associated with the go/no-go decision point.

4) Legacy well assessment and mitigation planning (mitigation costs can be deferred to the construction and operation phases).

5) Baseline monitoring efforts.

6) Securing site and pore space access.

The need for these ancillary activities and their attendant costs will be informed by the proposed effort.

SCOPE OF WORK FOR PHASE I

Task 1 – Risk Assessment

This task will address programmatic, technical, and operational risks associated with defining a CO_2 storage facility in McLean County within a time frame conducive to meeting MAE's longer-term goals for carbon storage. A risk assessment will take place twice in the course of the proposed Phase I project and will include the development and subsequent refinement of a risk register that clearly identifies and articulates actions needed to be taken to define the storage facility and facilitate development of the storage facility permit application. The initial assessment exercise will commence as early as possible to inform characterization activities associated with the stratigraphic test well. Results will be incorporated to develop a strategic site-specific risk-based characterization program and an implementation plan A second risk assessment will be conducted near the end of the Phase I project to consider the results of the storage facility definition with respect to MAE's longer-term goals and expected requirements to fulfill storage facility permit applications.

The proposed effort leverages the EERC's 10+ years of experience adapting and refining an international standard (ISO-31000) process for geologic CO_2 storage risk assessment. The resulting risk register will be highly adaptable to other industrial CCS projects in the region.

Task 2 – Stratigraphic Test Well

This task includes locating, permitting, and drilling a stratigraphic test well in the region anticipated to be part of MAE's future CO_2 storage facility. The stratigraphic test well will provide site-specific geologic and injection performance information necessary to define the storage facility, address and assess risks identified in Task 1, provide data to inform the design and location of injection and monitoring wells and associated geologic CO_2 storage infrastructure, and provide data required to develop a storage facility permit. The location of the well will be selected using investigations contracted by MAE, the "Geologic CO_2 Storage Site Characterization of the Midwest AgEnergy Blue Flint Ethanol Plant" (contracted ongoing effort), and the "Inyan Kara Formation Geologic CO_2 Storage Assessment" (contracted ongoing effort).

The test well will be drilled through the Deadwood Formation to the Precambrian basement rock. Approximately 850 feet of core will be collected across the two storage formation targets of interest: the Inyan Kara and Deadwood/Black Island Formations and their respective confining layers. A suite of geophysical logs will be collected to inform and define the CO_2 storage facility and address pertinent items identified in the first risk assessment or as otherwise required for a storage facility permit. In addition, well testing and fluid sampling will be conducted. The downhole-derived data will be analyzed to understand the distribution of petrophysical, geophysical, and lithologic properties throughout the geologic storage complex for incorporation into Task 3. The well will be designed to meet the CO_2 storage needs of MAE and to allow for future use as a UIC Class VI injection or monitoring well (e.g., appropriate cement and casing material) according to procedures and regulations established by NDIC DMR.

Task 2 only addresses one stratigraphic test well. If additional wells are determined to be necessary to define the storage facility and develop storage facility permits, the EERC will work with MAE to develop a revised pathway and additional scope of work and attendant budget for subsequent Class VI-compliant stratigraphic test well(s).

Because of market volatility, seasonal cost influences, service provider availability, and the nonbinding nature of service costs, costs for the attendant stratigraphic test well drilling (e.g., general contracting, site build, drilling, logging, coring, testing, casing, monitoring systems, cementing, integrity testing, and completion that allows for future transition to a UIC Class VI-compliant injection or monitoring well) ***ARE NOT INCLUDED*** *in the budget for the proposed scope of work. The estimated incremental cost for these activities and services is ($5,000,000 to $10,000,000).*

The proposed effort ***DOES*** *include EERC support in locating, permitting, and drilling a stratigraphic test well, including collaboration with MAE to assist in vetting and bidding a general contractor and working with MAE's designated general contractor to develop an authorization for expenditure (AFE) and drilling plans for a stratigraphic test well that would accommodate a transition pathway for use as a UIC Class VI-compliant monitoring or injection well. The effort includes on-site support during drilling operations, subsequent core, fluid and well testing, data processing, interpretation and integration with geologic modeling, and risk assessment efforts.*

Subtask 2.1 – Stratigraphic Test Well Site Selection and Design

The location and design of the stratigraphic test well is being determined through a separate ongoing effort contracted by MAE, the "Geologic CO_2 Storage Site Characterization of the Midwest AgEnergy Blue Flint Ethanol Plant." The well will be designed to accommodate the CO_2 storage needs of MAE. Subtask 2.1 is presented to provide continuity illustrating a critical prerequisite activity necessary for the proposed efforts (Figure 3). Costs associated with Subtask 2.1 are not included in the proposed effort because they are already covered by an existing contract.

Subtask 2.2 – Well Permitting for Stratigraphic Test Well

The EERC will interface with MAE and its designated drilling contractor to develop permit documents and a drilling program for the stratigraphic test well to accommodate a future transition from a stratigraphic test well to a Class VI-compliant injection or monitoring well. The EERC will also develop and communicate data collection and test programs for the Inyan Kara and Black Island/Deadwood Formations to define the CO_2 storage facility and address pertinent items identified in the risk register and as otherwise required for preparation of a geologic CO_2 storage facility permit application.

As part of this subtask, the EERC will assist MAE in working with a general drilling contractor to execute data collection associated with the stratigraphic test well drilling. EERC technical and permitting experts will travel to, and participate in meetings with, MAE, the drilling contractor, and NDIC DMR in Bismarck prior to permit submission. The purpose of the meeting will be to communicate the anticipated drilling program and solicit/incorporate feedback relative to the desired transition pathway for a Class VI-compliant well.

Subtask 2.3 – Drilling the Stratigraphic Test Well

The EERC will staff on-site technical advisors to accommodate 24-hour engineering, geology, and logistical support for drilling during coring, logging, testing, casing, and cementing operations for up to 35 days.

EERC activities include advising the selection of test intervals (e.g., core point, test and sample parameters and intervals, log intervals, etc.); collection of ancillary data relevant to subsequent laboratory test programs and permit preparation; providing and advising quality assurance/quality control of coring, logging, and testing results; and compliance with geologic CO_2 storage facility permit application requirements.

In addition, the EERC will advise and participate in the development and implementation of contingency plans should unexpected issues be encountered or variances occur during data collection, well testing, well drilling, or well completion that could affect the likelihood for use as a UIC VI-compliant injection or monitoring well or adversely affect a storage facility permit application.

Task 3 – Geologic Evaluation

This task encompasses the activities required to perform geologic evaluation of the Inyan Kara and Black Island/Deadwood Formations (planned storage targets) and their confining zones (e.g., the Skull Creek and Icebox Formations, respectively). Approximately 850 feet of core is tentatively planned for collection. This amount of core is based on the expected thicknesses of

the target formations and the NDIC DMR guidance of collecting 50 feet of the top and bottom confining layers (only a de minimus amount of Precambrian core is expected). Existing geologic and hydrogeologic evaluations will be updated based on data derived from analysis of new core, subsurface fluid samples, well logs, well tests, and available geophysical data (e.g., 3D survey collected by MAE). Results will be integrated into geostatistical structural, reservoir, and fluid property model(s). Reservoir simulations will be developed from these models and calibrated to well test data. Injection performance forecasts will be used to evaluate relevant injection scenarios. In collaboration with MAE, the results will be used to develop a geologic storage injection strategy for Blue Flint.

The results will provide key design and operational parameters for 1) defining the storage facility including injection, storage, and confining zones; 2) determining the number and location of injection and monitoring wells; 3) determining provisional design of wells and associated infrastructure; 4) determining fluid and pressure footprint and associated area of review (AOR); 5) monitoring, verification, and accounting (MVA) planning; 6) informing an updated risk assessment and identifying potential additional data collection and modeling iterations needed; and 7) preparation and acquisition of storage facility permits and supporting materials.

Subtask 3.1 – Core Analysis and Laboratory Testing

This subtask includes preparation, testing, and analysis of the newly collected core and fluid samples collected in Subtask 2.3. Petrographic, petrophysical, and geochemical analyses will be performed on core and fluid samples collected from the stratigraphic test well to assess factors that influence the viability and performance of long-term geologic storage of CO_2, to aid in the calibration and correlation of well logs, and to improve the accuracy of models and performance forecasts (e.g., injectivity, relative permeability, capacity, etc.). Analytical techniques will provide direct insight regarding the pore-size distribution of the target reservoir and cap rock, zones of heterogeneity within the reservoir, and major and minor mineral phases. Geochemical compatibility between injected CO_2 and reservoir fluids will be assessed to determine any potential interactions or chemical treatment programs that may be needed. This work will be managed by the EERC's Applied Geology Laboratory (some core preparation or tests may be sent to external laboratories). Results of these analyses will directly support the development of storage facility permits and supporting materials (e.g., monitoring, reporting, and verification program).

Subtask 3.2 – Geologic Modeling and Performance Forecasting

Geologic data derived/collected in Task 3.1 will be used to update existing geologic models of the proposed study area using industry standard software. The models will integrate the known and acquired geologic, structural, and fluid properties and data of the study area (for both the reservoir and confining zones) for the two prospective geologic storage horizons. Results will be integrated into geostatistical structural, reservoir, and fluid property model(s).

The models will be used to assess confining zones, CO_2 storage resource, total and effective pore volume, and lateral and vertical geologic heterogeneity (as interpreted from geophysical data). The models will inform an updated risk assessment, identify potential additional data collection and modeling iterations needed to define the CO_2 storage facility, and aid in the preparation and acquisition of storage facility permits.

Numerical reservoir simulation models will be developed using Computer Modelling Group Ltd.'s (CMG's) GEM dynamic simulation module using the geologic property model(s) as a foundation. The simulation model will then be calibrated to well test data.

Injectivity and performance of the storage complex will be assessed to evaluate the behavior of the injected CO_2 within the study area relative to various operating strategies. Injection performance forecasts for multiple realizations based on the statistical distribution and variability of geologic properties will be developed for an up to 500,000-tonnes/year CO_2 storage project. The results will be used to evaluate and develop an injection strategy for Blue Flint in collaboration with MAE.

The results of the reservoir simulation efforts will provide key design and operational parameters for 1) defining the storage facility, 2) informing selection of number and location of injection and monitoring wells, 3) informing provisional design for wells and associated infrastructure, 4) determining fluid and pressure footprint and associated AOR, 5) aiding MVA (monitoring, verification, and accounting) planning, 6) informing an updated risk assessment and identifying any potential additional data collection and modeling iterations needed, and 7) preparing the storage facility permit applications.

Subtask 3.3 – Definition of Storage Facility Area

Results developed in Subtask 3.2 will be used to define the storage facility area and associated AOR for the proposed CO_2 storage program. Pressure and CO_2 footprints will be estimated from the start of injection until postinjection stabilization for 12- and 20-year injection periods. This task will include a geographic analysis to estimate the magnitude of the necessary pore space acquisition and site access anticipated for the storage facility permits.

Task 4 – Outreach

The proposed outreach task will facilitate communication between technical and outreach groups to develop accurate messaging and effective outreach. Keys to preventing misunderstandings and misperceptions are understanding stakeholder and general public concerns, establishing open communications and transparency, and providing clear consistent messaging within a project. The EERC will support, within budgetary constraints, MAE's CCS project outreach to foster an environment that helps stakeholders to make informed decisions about the project within their community and the region.

The EERC will assist and support MAE's communications team with outreach plan development, messaging, and materials to introduce the CCS project concept and activities to a variety of audiences; written and visual content for focused outreach in support of field activities; and general information on the project and on permanent geologic storage of CO_2 captured from ethanol plants. Based on the needs of the MAE communications team, outreach task activities could include participation on an outreach advisory panel; development of custom project-focused outreach materials (e.g., fact sheets, posters, banners, presentations, infographics); educational materials for classroom and informal settings; engagement with local and regional stakeholders; and technical support for and participation in county-, city-, and state-level meetings.

DELIVERABLES

Deliverables will be a technical report and PowerPoint slides summarizing the methods and pertinent results of geologic modeling and computational simulation as described and will contain the following:

- Evaluation of geologic storage suitability and estimated CO_2 storage resource of the Inyan Kara and Black Island/Deadwood Formations in central McLean County, North Dakota.

- Stratigraphic test well characterization package that includes results and interpretations of laboratory analysis and well test program (includes materials packaged in a manner to meet MAE's data deliverable requirement to the North Dakota Geological Survey).

- A defined CO_2 storage facility including provisional number and location of wells, injection rates and associated forecasted pressure and CO_2 footprint from start of injection until postclosure stability.

- Provisional operating and design parameters for storing up to 500,000 tonnes of CO_2 per year for 12- and 20-year injection periods.

- A predrilling risk register (including potential receptors and impacts) and recommended actions (including a site-specific characterization program).

- An updated risk register after proposed characterization and modeling efforts have been completed.

- A recommended pathway for advancing commercial geologic CO_2 storage for Blue Flint that includes next steps, estimated costs, and a permitting action plan.

TIME FRAME

The proposed work is estimated to take a minimum of 10 months to perform. This proposed project work and time line assumes the following milestones will be met by the dates shown in Figure 3. The decision point denoted by M14 corresponds to the go/no-go decision point in Figure 3. The go/no-go decision options are 1) proceeding with the design and permitting phase and 2) collecting additional data based on risk assessment and storage facility permit requirements, and then proceeding to Phase II.

COST

The estimated cost for the proposed effort is $2,382,369, which includes EERC personnel hours, software licenses, and seismic data and laboratory services. Expenses will be invoiced monthly on a cost-reimbursable basis.

Project Associated Expense	Task 1	Task 2.2	Task 2.3	Task 3.1	Task 3.2-3.3	Task 4	Total Project
Labor	$ 80,184	$ 165,867	$ 261,907	$ 287,535	$ 144,296	$ 85,066	$ 1,024,855
Travel	$ 1,475	$ 4,273	$ 32,205	$ -	$ -	$ -	$ 37,953
Supplies	$ -	$ -	$ 10,000	$ 4,250	$ 60,000	$ -	$ 74,250
Communications	$ 500	$ 300	$ 300	$ 100	$ 300	$ 300	$ 1,800
Printing & Duplicating	$ 100	$ 100	$ 100	$ 100	$ 100	$ 200	$ 700
Natural Materials Analytical Research Lab	$ -	$ -	$ -	$ 96,036	$ -	$ -	$ 96,036
Analytical Research Lab	$ -	$ -	$ -	$ 55,738	$ -	$ -	$ 55,738
Graphics Services	$ 1,364	$ 1,364	$ -	$ 341	$ 1,364	$ 1,706	$ 6,139
Engineering Services Fee	$ 25	$ 25	$ 25	$ 25	$ 25	$ 25	$ 150
Outside Lab	$ -	$ -	$ -	$ 191,360	$ -	$ -	$ 191,360
Total Direct Costs	$ 83,648	$ 171,929	$ 304,537	$ 635,485	$ 206,085	$ 87,297	$ 1,488,981
Facilities & Administration	$ 50,189	$ 103,157	$ 182,722	$ 381,291	$ 123,651	$ 52,378	$ 893,388

APPENDIX C

Geostock Sandia Project Proposal

(Redacted Version)

Midwest AgEnergy

Underwood Facility:

Proposal for Drilling a Stratigraphic Test Well -or- Drilling and

Completing a CO_2 Injection Well -LRC Submission Document

Geostock Sandia Project Number: 200006MND

March 30, 2020

8860 Fallbrook Dr.
Houston, TX 77064
(346) 314-4347

Table of Contents

1. INTRODUCTION 4
2. SCOPE OF WORK 7
3. KEY ASSUMPTIONS 8
5. STANDARDS OF SUCCESS 11
6. EXECUTION SUMMARY DESCRIPTION 11
7. TASK SUMMARY: ENGINEERING DESIGN, PROCUREMENT AND EXECUTION 12
8. PROJECT OPTION'S DESCRIPTIONS 13
8.1. Project Description: Design And Permitting 14
8.2. Project Description: Final Design and Procurement 15
8.3. Project Description: Conduct Drill On Paper Exercise 15
8.4. Project Description: Option I 15
8.5. Drilling Description: Option I 16
8.6. Project Description: Option II 17
8.7. Drilling Description: Option II 19
8.8. Project Description: Option III 20
8.9. Drilling Description: Option III 22
9. WELL CONSTRUCTION KEY ELEMENTS 23
9.2. Perforation 25
9.3. Stimulation 25
9.4. Geological Data 25
10. GEOSTOCK SANDIA ROLES AND RESPONSIBILITIES 26
10.1.1. Project Manager 26
10.1.2. Geological/Engineering Resources 26
10.1.3. Field Supervisors 27
10.1.4. Onsite Geologist 27
10.1.5. Safety Coordinator 27
11. HEALTH & SAFETY PLAN 28
12. VENDOR AND MATERIALS PROCUREMENT AND QUALIFICATION 28
13. COMMUNICATION PLAN 29
14. STATEMENT OF QUALIFICATIONS 30
15. COMMERCIAL CONDITIONS 31
15.1. Cost Summary 31
15.2. Cost Estimate Assumptions 32
15.3. Compensation Schedule 33
EXHIBIT A: PROPOSED AS-BUILT WELL SCHEMATIC OPTION I 34

EXHIBIT B: PROPOSED AS-BUILT WELL SCHEMATIC OPTION II 35

EXHIBIT C: PROPOSED AS-BUILT WELL SCHEMATIC OPTION III 36

APPENDIX A: DETAILED COST ESTIMATE, OPTION I. 37

APPENDIX B: DETAILED COST ESTIMATE, OPTION II. 43

APPENDIX C: DETAILED COST ESTIMATE, OPTION III. 49

APPENDIX D: GEOSTOCK SANDIA SCHEDULE OF BILLING RATES 55

1. INTRODUCTION

Geostock Sandia, LLC (GKS) has previously submitted a Time and Materials Proposal (GKS Proposal No. 200006MND) for conducting operations for either the drilling of a stratigraphic test well or drilling and completing a CO_2 injection well at Midwest AgEnergy' s Underwood Facility. This document (200006MND-LRC) is not the original proposal, rather it is an edited version that offers support for Midwest Ag Energy's efforts to secure funding from the Lignite Research Council (LRC), while honoring GKS's wishes to keep certain intellectual property and commercial terms confidential. This document has no commercial function. The original proposal, submitted March 18, 2020 will be the basis document for all future commercial discussions.

As field data and individual well data such as drilling reports, final wellbore schematics, etc. were scarce in the public records or otherwise supplied, GKS prepared the proposal based on recent historical quotes and current pricing for materials and services. Due to the extensive reach of this project, and the short time for acquiring costs, opportunities exist to lower costs by removing some of the unknowns of the project. In addition, as the volatility in the oil and gas industry in North Dakota settles in, GKS expects that upon rebid, rates for the drilling rig (the single largest cost, outside of wire line logging) will drop substantially.

It is supposed that there could be three potential opportunities for CO_2 sequestration in the area:

A. Inyan Kara
B. Broom Creek
C. Deadwood

Of these three opportunities, the Inyan Kara is the likeliest to be present and to have reservoir properties conducive to supporting CO_2 sequestration. However, with an offset Class I injector present approximately one mile from the facility, the selection of the Inyan Kara Formation for injection will be the most problematic reservoir to exploit from a regulatory permitting point of view. The potential absence of the Broom Creek in the area, thus made the Deadwood Formation being identified as the primary geological target, with the dependable Inyan Kara being set as the secondary objective.

Due to the dearth of geological information, the nearest well being drilled to the target depth being greater than 10 miles away from the potential location

the most conservative alternatives with the least amount of risk were selected. As mentioned earlier, with more information, we are confident that the project costs can be reduced.

This proposal offers three options:

1. Option I: This alternative involves drilling of a basic stratigraphic well through the Deadwood Formation to a total depth (TD) of 9,850 feet. This includes drilling, casing and cased hole logging the surface interval. Geological information, necessary to the creation of a CO_2 permit for sequestration, will be collected across the wellbore via mud logging, electric logging, coring and fluid sampling. Upon conclusion of data collection, the well will be permanently abandoned. This option is the lowest cost and lowest risk alternative, but the wellbore will serve no other purpose.

2. Option II: Said option involves drilling of the basic stratigraphic well but preserving it for further utility. After drilling the surface hole section, setting surface casing and performing cement bond logging, the well is drilled through the Inyan Kara, preserving it as an injection zone. Geological information, necessary to the creation of a permit for CO_2 sequestration for this interval will be collected across the overlying confining zone and the potential injection interval via mud logging, electric logging, coring and fluid sampling. Upon conclusion of the data collection, an intermediate casing string will be installed that is conducive for use for CO_2 sequestration (If the lower zones are found wanting). Using this approach, if the lower zone is appropriate for use, the Inyan Kara is still preserved for future injection upon exhaustion of the Deadwood Formation.

   After installation of the intermediate casing, drilling is resumed with the maximum bit diameter to TD. The use of the maximum bit diameter allows for more choices for completion of the well at the lowest possible costs. At TD, geological information, necessary to the creation of a permit for CO_2 sequestration, will be collected across the overly confining zone and the potential injection interval via mud logging, electric logging, coring and fluid sampling. The drilling rig and associated services are demobilized in order to evaluate the best possible alternative for completion of the well which is temporarily abandoned via a barrier set in the intermediate casing. Option II is of higher cost than Option I, has moderate risk, but adds potential utility for the future use of the wellbore. While it is true that completion costs are deferred using this option, the costs

are optimized for the best completion, while still supporting the process for permitting the well for CO_2 sequestration or as a surveillance well.

3. Option III: Option III is the logical conclusion for subsurface completion of the project. This option provides that both the Inyan Kara is present and is desired to be preserved for future use; and the Deadwood Formation is present and is presumed as a suitable reservoir.

   The well is drilled through the Inyan Kara, preserving it as an injection zone. Geological information, necessary to the creation of a permit for CO_2 sequestration to this interval will be collected across the overly confining zone and the potential injection interval via mud logging, electric logging, coring and fluid sampling. Upon conclusion of data collection, an intermediate casing string will be installed that is conducive for use for CO_2 sequestration if the lower zones are found wanting. Using this approach, if the lower zone is appropriate for use, the Inyan Kara is still preserved for future injection upon exhaustion of the Deadwood Formation.

   After installation of the intermediate casing, drilling is resumed to the maximum bit diameter to TD. The use of the maximum bit diameter allows for more choices for completion of the well at the lowest possible costs. During drilling of the hole section and at TD, geological information, necessary to the creation of a permit for CO_2 sequestration will be collected across the overly confining zone and the potential injection interval via mud logging, electric logging, coring and fluid sampling.

   Unlike Option II, a completion casing string is installed with smart well completion technology. The drilling rig and associated services are demobilized, and a completion rig mobilized, and the well is prepared for completion. The Deadwood Formation is perforated, stimulated, a CO_2 resistant injection packer is installed, and CO_2 resistant injection tubing is installed in the well. The well is completed with a full surface wellhead intact, mechanical integrity testing is performed, including temperature and tracer logging. After demobilization of all services, GKS will create final summary reports in support of the CO_2 permitting process and reporting requirements by the North Dakota Industrial Commission's Oil and Gas Division.

Option III is of higher cost than both Options I and II, and offers more financial risk than Option II, but adds potential utility for the future use of the wellbore as opposed to Option I. Of all the risks associated with Option III, the most concerning is the requirements for the state of North Dakota for permitting the well as a CO_2 injector. As the data is not yet compiled, or examined, and permit granted, committing to a full completion without further guidance may not be an advisable action to undertake.

SCOPE OF WORK

To support Midwest AgEnergy' s CO_2 Sequestration Feasibility Project, GKS along with its affiliates and contractors will provide engineering, geological, and project management services to assist Midwest AgEnergy' s in constructing and testing a stratigraphic test well to evaluate commercial-scale CO_2 storage at the selected location. These services include:

(1) Design Well Drilling Program. A stratigraphic test well will be designed to gather data from the selected site. The drilling program will include the development well design, casing specifications, wellsite preparation, contracting drilling rig equipment, completion, and testing design. Design and costs will be reassessed and changed per the needs of the client.

(2) GKS will assist Midwest AgEnergy with the permitting of the stratigraphic well per the requirements of the State of North Dakota. GKS will participate in any hearings related to the issuance of the permit via telephone. Travel costs have not been factored into any proposed costs.

(3) Conduct Drill on Paper Exercise. A drill on paper exercise will be conducted prior to the beginning of drilling activities. This exercise will ensure proper health, safety, and environmental (HSE) guidelines are communicated and adhered to, reduce risk related to drilling activities, and serve to align project objectives.

Drill and Construct Stratigraphic Test Well. A stratigraphic test well will be drilled and completed to specification as outlined in Task 1. Appropriate well site management, daily reports, and risk monitoring will be conducted. Daily HSE briefings and weekly updates will be provided to monitor drilling progress and reduce potential risks. This will include temperature logging.

(4) Testing and Data Collection. Conditions permitting, geologic whole core and sidewall cores will be collected and analysed from the stratigraphic well. An extensive suite of open-hole wireline logs will be collected. For the cased hole, a full suite of wireline logs, a cement evaluation and a Vertical Seismic Profile (VSP) will be conducted. Depending upon the work option selected, mechanical integrity of the well and temperature logging will be conducted.

(5) Results will be compiled into a comprehensive report and provided to Midwest AgEnergy in support of the future CO_2 permitting.

The cost estimates provided includes direct labor and fringe cost, subcontractor charges, travel expenses, and other indirect costs to complete the tasks identified above.

3. KEY ASSUMPTIONS

1. The project will be fully funded prior to undertaking operations;
2. Midwest AgEnergy will be responsible for supplying a well location for drilling the well, which will allow for surveying the exact location to satisfy the location and site requirements of the drilling permit;
3. A 9,850-foot vertical stratigraphic test well will be drilled to near or below the logging depth of the Deadwood Formation;
4. The primary completion will be the Deadwood Formation;
5. Final well engineering design including any required modifications based on the final regulatory approvals (North Dakota Industrial Commission - NDIC);
6. A hearing is not needed by the NDIC prior to approving the permit drilling in order to start the project;
7. The well will be drilled on land that is leased or owned by Midwest AgEnergy and for which it has the subsurface rights to access both the minerals and the pore space;
8. GKS will be responsible for creating the permit and supporting documents that Midwest AgEnergy will submit to the State of North Dakota.

9. Midwest AgEnergy will be the operator of record for the well;

10. Midwest AgEnergy will provide the financial 'plugging' bond required by the State of North Dakota in order to drill the well;

11. Midwest AgEnergy will be responsible for payment of the drilling application fee;

12. The well site will require construction, lining and matting prior to mobilization of the drilling rig and associated equipment;

13. Drilling the well will require a closed-loop mud system;

14. Midwest AgEnergy will be responsible for the disposal of all the liquids and solids generated, GKS will budget and facilitate this process;

15. Due to the depth of the well, a rig will be selected that will have the capability to apply 100,000 lbf overpull to the string weight in air of the heaviest drill string or casing component at its landing point or the deepest point in the well;

16. Tubular goods selected for the project will be installed as CO_2 resistant per the intervals selected;

17. Tubular goods selected for the project are available in the marketplace;

18. The proposed schedule for the project assumes the well work activities will occur uninterrupted by plant alarms, releases and significant inclement weather

19. As needed, GKS and its subcontractors will be allowed access to the proposed well location to begin work;

20. If required, work permits will be issued without interruption to the normal rig operations and construction operations;

21. Lost circulation of drilling fluids or severe downhole well conditions are not anticipated or accounted for during the drilling of the injection well;

22. No fishing operations are planned or anticipated during the drilling or well work efforts for the planned well(s);

All completion equipment (injection packer and tubing) will be successfully installed and pressure-tested during the first attempt;

23. None of the liquids nor solids generated during the project will be classified as hazardous;

24. Midwest AgEnergy will be responsible for the disposal of all the liquids and solids generated, GKS will budget and facilitate this process;

25. Midwest AgEnergy will be responsible for the costs and establishment of a storm water pollution prevention plan (SWPP) and maintenance of same if required by permitting or otherwise by the State of North Dakota or local authorities;

26. Midwest AgEnergy can provide fresh water (at least 100 gpm) source for the project;

27. Freshwater and saltwater for the drilling program may have to be hauled on location;

28. As GKS does not hold a sales tax exemption certificate, all third-party invoices paid by GKS will include applicable sales or similar taxes related to the work and billed by third parties. GKS will also invoice per the North Dakota sales tax rate;

29. Midwest AgEnergy' s contractor qualification requirements will not prevent GKS from finding qualified vendors for the onsite work;

30. GKS's work scope is limited to the wellhead, well installation and testing, as well as the annulus pressure and monitoring system;

31. The cores (petrography, mineralogy, etc.) will be analysed by a third-party laboratory via thin-section microscopy and bulk X-Ray Diffraction (XRD) methods or full digestion Inductively Coupled Plasma Mass Spectrometry (ICP-MS). Other petrophysical parameters will also be determined, including cation and anion exchange capacity, specific surface area (BET), bulk density, permeability, and porosity. Detailed petrologic studies (thin section analysis, XRD, and SEM) of the rock composition, pore geometries, and diagenetic character of the sequestration zone(s) will be conducted, as well as, rock mechanics tests of the relevant formations and caprocks that will include unconfined and triaxial compressive strength tests, static Young's modulus, and Poisson's ratio; and,

32. The permitting of the well for CO_2 sequestration is not in the scope of this project.

5. STANDARDS OF SUCCESS

The standard of success is seen as the following:

(1) Project Management

a. The project, at conclusion, is near the budget forecast for the approved scope of the project.
b. The project, at conclusion, finished near the time forecast for the approved scope of the project.

(2) Technical

a. A well bore is delivered that attains the total planned depth for the approved scope of the project.
b. Adequate data is collected and analysed to determine whether any of the target formation in the wellbore are suitable to CO_2 sequestration.
c. Enough data is collected to satisfy future permit requirements.
d. The well is successfully concluded either as completed, temporarily abandoned or plugged per the approved scope of the project.

(3) Regulatory

a. The requirements set forth in the drilling permit by the State of North Dakota are satisfactorily filled per the approved scope of the project.

(4) HSE

a. No serious incidents or accidents are recorded during the completion of the project's approved scope.

6. EXECUTION SUMMARY DESCRIPTION

GKS will oversee site preparation, the drilling of the stratigraphic test well, and the acquisition of characterization data at the well. GKS will retain an experienced drilling company and all necessary support services to drill the

well to the Deadwood Formation. The borehole will be advanced to Total Depth (TD) of +/- 9,850 feet.

Data gathering will include coring and advanced borehole logging with formation testing to properly assess properties of both the caprock and formation/reservoir rock encountered in the well. During drilling and testing of the well, GKS will prepare requisite Sundry Notices for submittal to NDIC.

The cores (petrography, mineralogy, etc.) will be analyzed by a third-party laboratory via thin-section microscopy and bulk XRD methods or full digestion ICP-MS. Other petrophysical parameters will also be determined, including cation and anion exchange capacity, specific surface area (BET), bulk density, permeability, and porosity. Detailed petrologic studies (thin section analysis, XRD, and SEM) of the rock composition, pore geometries, and diagenetic character of the sequestration zone(s) will be conducted, as well as, rock mechanics tests of the target formations and caprocks that will include unconfined and triaxial compressive strength tests, static Young's modulus, and Poisson's ratio.

Temporary well completion or plugging and abandonment will be based on results of the data gathering. It is anticipated that the well will be completed as a cased hole with intermediate casing for later use and re-entry or will be plugged per NDIC rules. The decision will be based on the encountered subsurface geologic conditions within the Deadwood formation and/or other objectives. If plugged and abandoned, the plugging and abandonment will be to the satisfaction of the state authorities.

7. TASK SUMMARY: ENGINEERING DESIGN, PROCUREMENT AND EXECUTION

The following is a partial list of tasks post-permitting and project sanction by Midwest AgEnergy Group LLC:

- Final well engineering design including any required modifications based on the final regulatory approvals (NDIC);
- Vendor and materials procurement and qualification;
- Design and implementation of location health and safety program including assurances that all subcontracted personnel involved with this project will have completed applicable site-specific safety training from the local Contractor, Safety Council or as documented by Midwest AgEnergy Group LLC;

- Final design, procurement of materials and services, and implementation of a drilling program, bit program, drilling fluid program and solids control program;
- Final design, procurement of materials and services, and implementation of the tubular program and tubular running program;
- Final design, procurement of materials and services, and implementation of the cementing and cementing equipment program;
- Final design, procurement of materials and services, and implementation of open and cased hole logging and whole and sidewall coring program;
- Final design, procurement of materials and services, and implementation of well stimulation program, if the well is tested for formation suitability for injection;
- Final design, procurement of materials and services, and installation of the injection packer equipment;
- Final design, procurement of materials and services, and installation of the wellhead equipment;
- Design, procurement of materials and services, and implementation of any required well testing and regulatory compliance program;
- Location preparation to include procurement and installation of field office facilities, communications, and location hygiene facilities;
- Mobilization, rig-up, rig-down, and demobilization of suitably equipped drilling and completion rigs to achieve the construction objectives of the project;
- Supervision of the execution of the drilling and completion program for the asset;
- Supervision of site demobilization of services and equipment at the end of the project; and,
- Preparation and submission of the final well construction and geological summary report within 90 days after completion of drilling the well.

8. PROJECT OPTION'S DESCRIPTIONS

At its' core, the project's objectives are twofold, which are comprised of 1) the drilling of a stratigraphic test well to determine the presence of reservoir that is conducive to injection of CO_2; and, 2) collection of data to satisfy the technical data requirements for completing a permit for CO_2 sequestration in McClean County, North Dakota. Subordinate to the project is determining if there is additional utility for the well bore to establish a return on the investment of drilling the well or moving forward and abandoning the well, thereby considering it as a sunk cost. Figure A depicts the general workflow of the project.

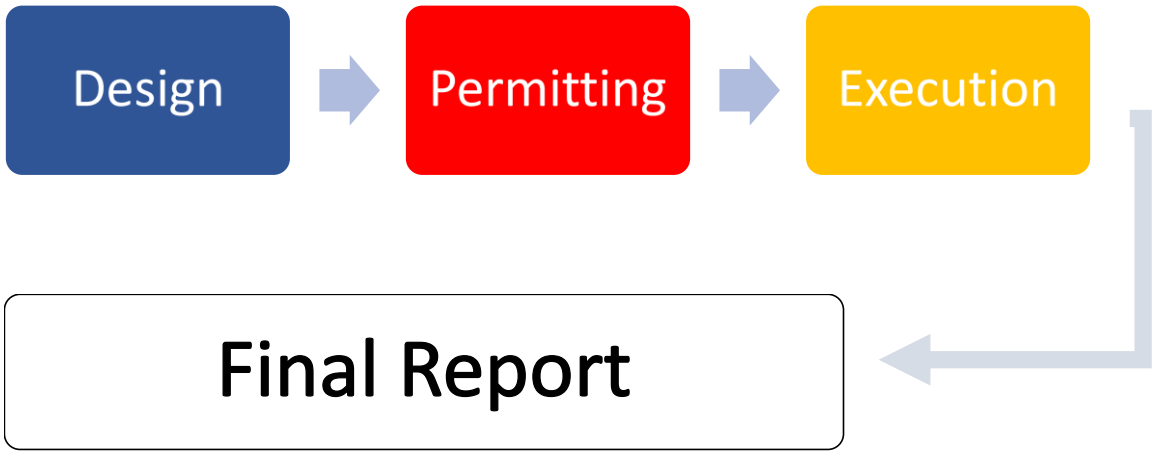

Figure A General Project Workflow

Based on the discussions with Midwest AgEnergy' s representative, this proposal offers three options, which will be described in greater detail in the next section.

8.1. Project Description: Design And Permitting

The main steps for permitting a well in North Dakota, once the operatorship and bonding are secured, are:

A. A review of geological data to determine the well location and supplemented by using GIS tools to view the potential location.
B. Creation of a geologic prognosis at that location to support the permit.
C. Development of a base well description and procedure based on the geological prognosis.
D. Direct the well survey firm to make the 'One Call' one week prior to the actual survey.
E. A formal survey of the location, staking of the well, and survey and marking of the drilling location after confirmation of it being free from any surface or subsurface encumbrance (for example: a power line or a pipeline).
F. A creation of the survey plat and location cut and fill diagram.
G. Creation of the Form 1 Intent to Drill Permit, payment of the application fee and submission of the formal documents.

The duration of the permitting phase from well spot identification to permitting is 4-6 weeks if a hearing is not needed.

8.2. Project Description: Final Design and Procurement

The final design and procurement will be completed following the permit approval.

8.3. Project Description: Conduct Drill On Paper Exercise

A drill on paper exercise will be conducted prior to the beginning of drilling activities. This exercise will ensure proper health, safety, and environmental (HSE) guidelines are communicated and adhered to, reduce risk related to drilling activities, and serve to align project objectives.

The expected duration of this effort would be one working day.

8.4. Project Description: Option I

This alternative involves drilling of the a basic stratigraphic well through the Deadwood formation to a TD of 9,850'. This includes drilling the surface interval, casing the surface interval and executing cased hole logging of the cased interval. After which the well will be drilled to TD. During the well deepening, geological information necessary to the creation of a CO_2 permit for sequestration will be collected across the wellbore via mud logging, electric logging, coring and fluid sampling. Upon conclusion of data collection, the well will be permanently abandoned. This option is the lowest cost, lowest risk alternative, but the wellbore will serve no other purpose. The proposed well bore for Option I can be seen in Exhibit A. It can be seen from the day versus depth figure below, well operations from spud to TD will be in the range of 35 days, which is nearly half the time taken to drill the

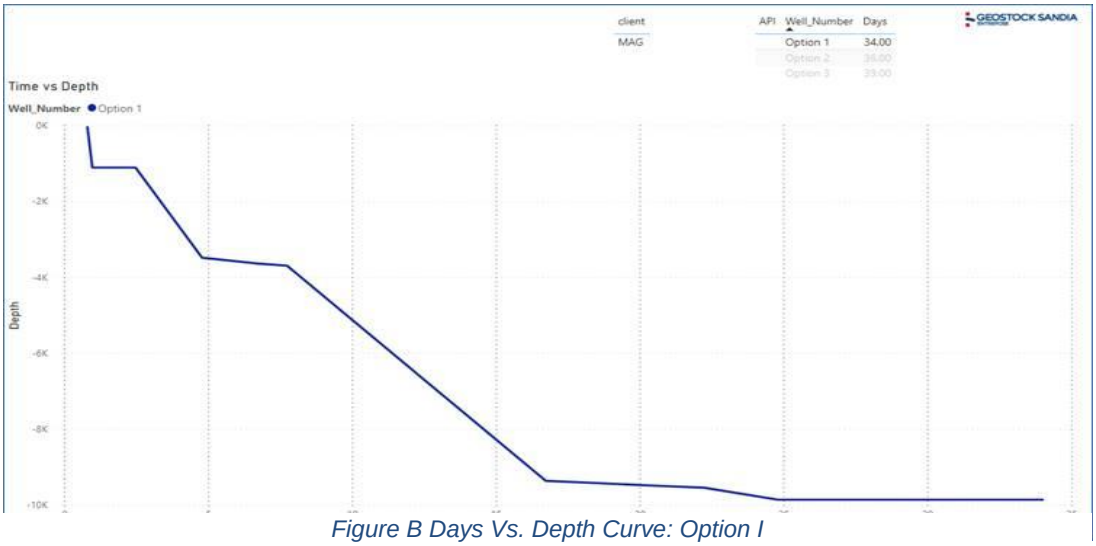

Figure B Days Vs. Depth Curve: Option I

nearest deep test, NDIC: 8711 in 1981, which was over 900 feet shallower. Based on the author of this proposal's recent experience, drilling wildcat vertical wells to the Red River Formation nearly 3000 feet deeper, the projection in Figure B looks reasonable.

8.5. Drilling Description: Option I

The steps to drill, harvest data, and plug the well are depicted in Figure C.

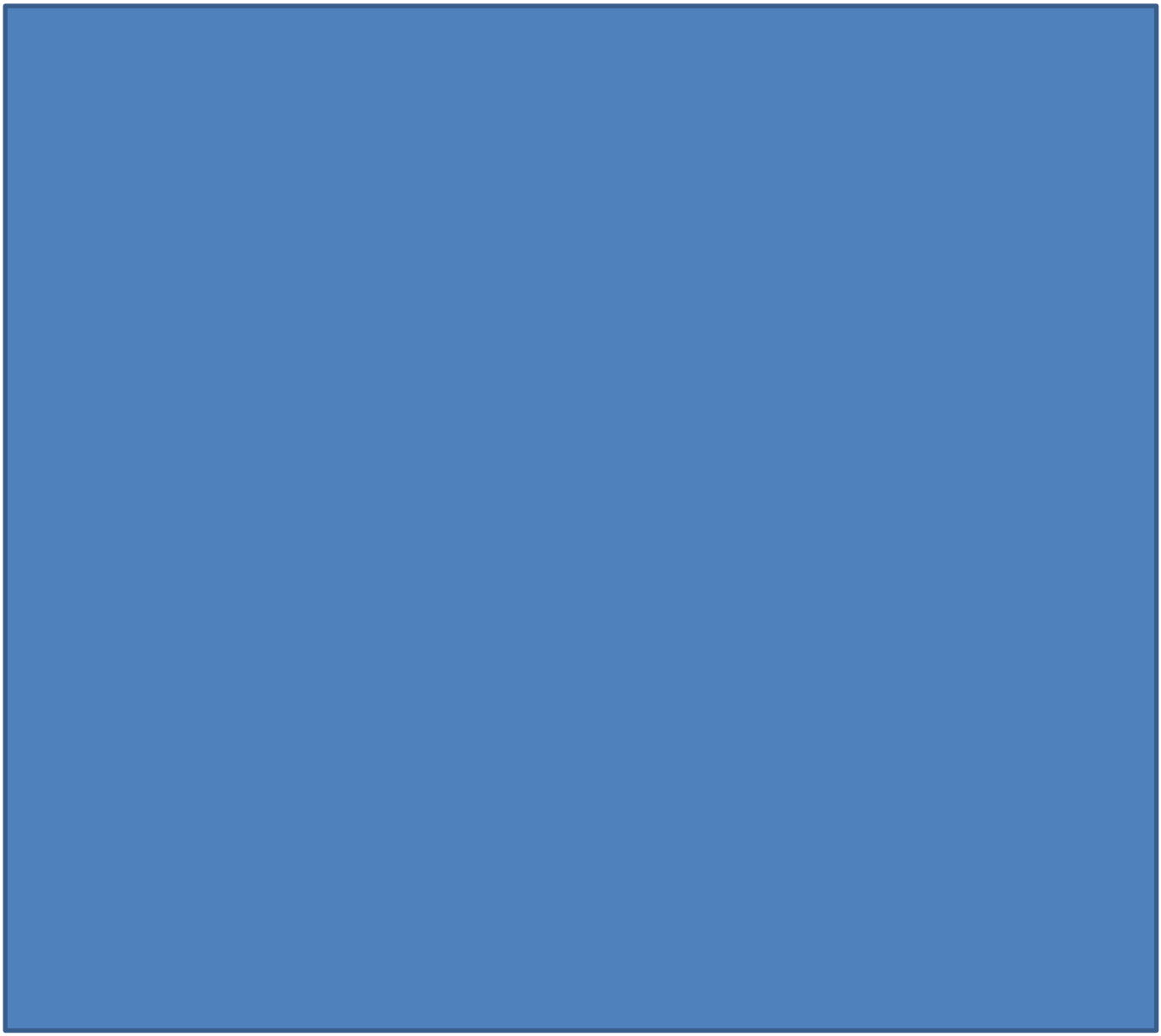

Figure C Well Construction Steps: Option I

Including location construction, and restoration, and not including final reporting the entire project for Option I will be 60.5 days.

8.6. Project Description: Option II

Option II: This option involves drilling of the a basic stratigraphic well but preserving it for further utility. After setting drilling, setting casing and cased logging the surface casing, the well is drilled through the Inyan Kara, preserving it as an injection zone. Geological information, necessary to the creation of a permit for CO_2 sequestration to this interval will be collected across the overlying confining zone and the potential injection interval via mud logging, electric logging, coring and fluid sampling. Upon conclusion of data collection, an intermediate casing string will be installed that is conducive for use for CO_2 sequestration if the lower zones are found wanting. Using this approach, if the lower zone is appropriate for use, the Inyan Kara is still preserved for future injection upon exhaustion of the Deadwood formation.

After installation of the intermediate casing, drilling is resumed to with the maximum bit diameter to TD assisted by using a mud motor. The use of the maximum bit diameter allows for more choices for completion of the well at the lowest possible costs. At TD, geological information necessary to the creation of a permit for CO_2 sequestration will be collected across the overly confining zone and the potential injection interval via mud logging, electric logging, coring and fluid sampling. The drilling rig and associated services are demobilized. In order to evaluate the best possible alternative for completion of the well, the well is temporarily abandoned via a barrier set in the intermediate casing. The proposed well bore for Option II can be seen in Exhibit B

Option II is of higher cost than Option I, has moderate risk, but adds potential utility for the future use of the wellbore. While it is true that completion costs are deferred using this option, the costs are optimized for the best completion, while still supporting the process for permitting the well for CO_2 sequestration or as a surveillance well.

The day versus depth is depicted in Figure D, and reveals a spud to TD duration of 39 days.

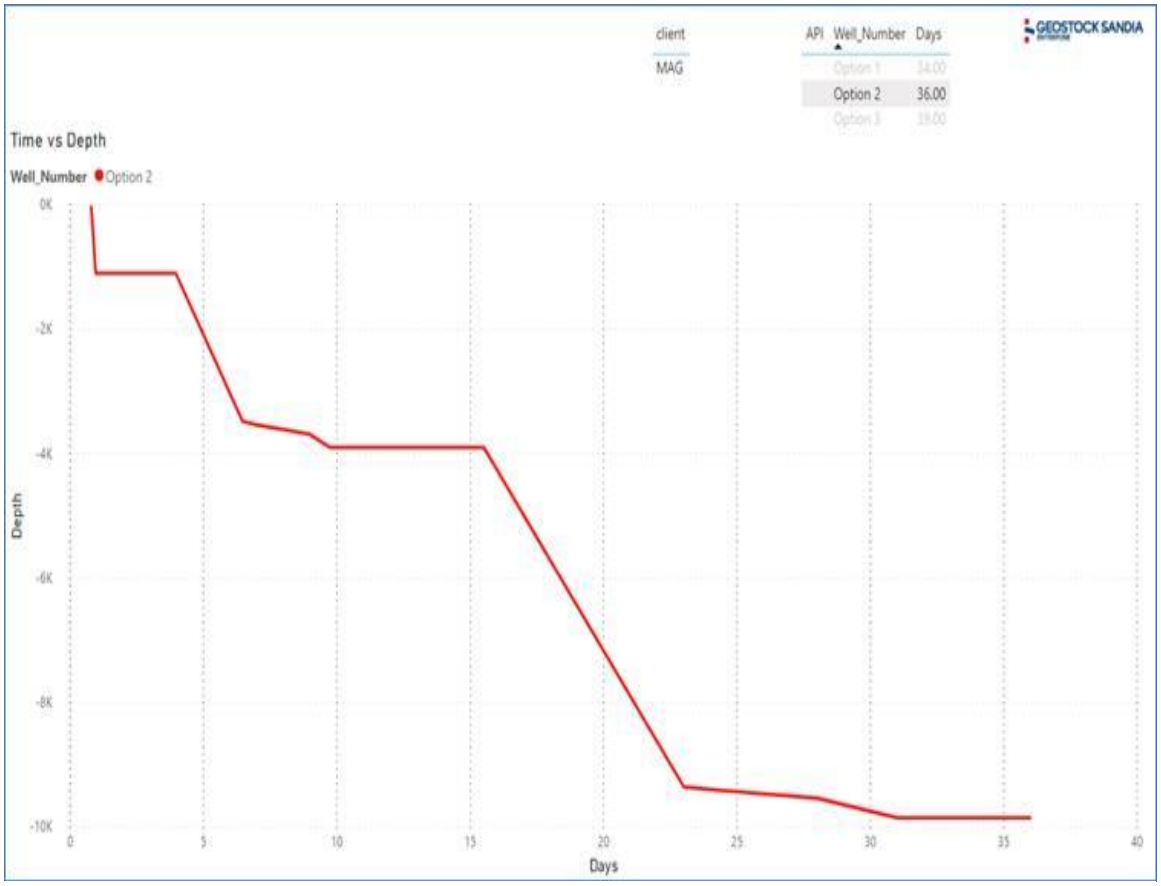

Figure D Time Vs. Depth Curve: Option II

8.7. Drilling Description: Option II

The steps to drill, harvest data, and temporarily abandon the well are depicted in Figure E.

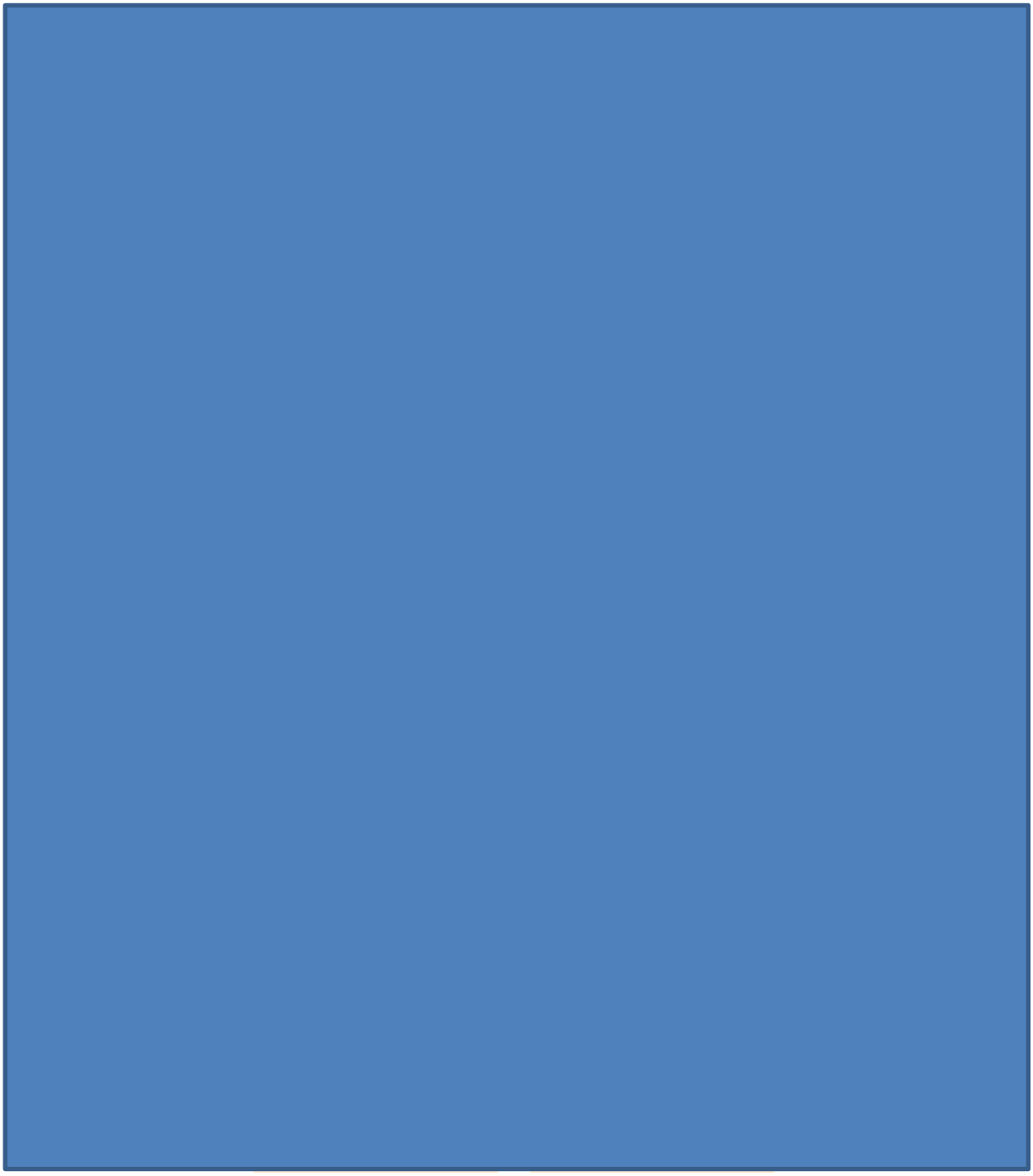

Figure E Well Construction Steps: Option II

Including location construction, well bore construction, data gathering and restoration, and not including final reporting the entire project for Option II will be 62.5 days.

8.8. Project Description: Option III

Option III: Option III is the logical conclusion for subsurface completion of the project. This option provides that both the Inyan Kara is present and is desired to be preserved for future use; and the Deadwood formation is present and is presumed as a suitable reservoir.

The well is drilled through the Inyan Kara, preserving it as an injection zone. Geological information, necessary to the creation of a permit for CO_2 sequestration to this interval will be collected across the overly confining zone and the potential injection interval via mud logging, electric logging, coring and fluid sampling. Upon conclusion of data collection, an intermediate casing string will be installed that is conducive for use for CO_2 sequestration if the lower zones are found wanting. Using this approach, if the lower zone is appropriate for use, the Inyan Kara is still preserved for future injection upon exhaustion of the Deadwood formation.

After installation of the intermediate casing, drilling is resumed to with the maximum bit diameter to TD assisted by a mud motor. The use of the maximum bit diameter allows for more choices for completion of the well at the lowest possible costs. During drilling of the hole section and at TD, geological information, necessary to the creation of a permit for CO_2 sequestration will be collected across the overly confining zone and the potential injection interval via mud logging, electric logging, coring and fluid sampling.

Unlike Option II, a completion casing string is installed with smart well completion technology. The drilling rig and associated services are demobilized, and a completion rig mobilized, and the well is prepared for completion. The Deadwood formation is perforated, stimulated, a CO_2 resistant injection packer is installed, and injection tubing that is CO_2 resistant is installed in the well. The well is completed with a full surface wellhead intact, mechanical integrity testing is performed, and includes temperature and tracer logging. The proposed completed well bore for Option III is depicted in Exhibit C.

After demobilization of all services, GKS will create final summary reports in support of the CO_2 permitting process and reporting requirements by the North Dakota Industrial Commission's Oil and Gas division.

Option III is of higher cost than both Options I and II, and offers more financial risk than Option II, but adds potential utility for the future use of the wellbore as opposed to Option I. Of all the risks associated with Option III, the one most of concern is the requirements for the state of North Dakota for permitting the well as a CO_2 injector. As the data is not yet compiled, or examined, and permit granted, committing to a full completion without further guidance may not be feasible.

The day versus depth is depicted in Figure F, and reveals a spud to TD duration of 39 days.

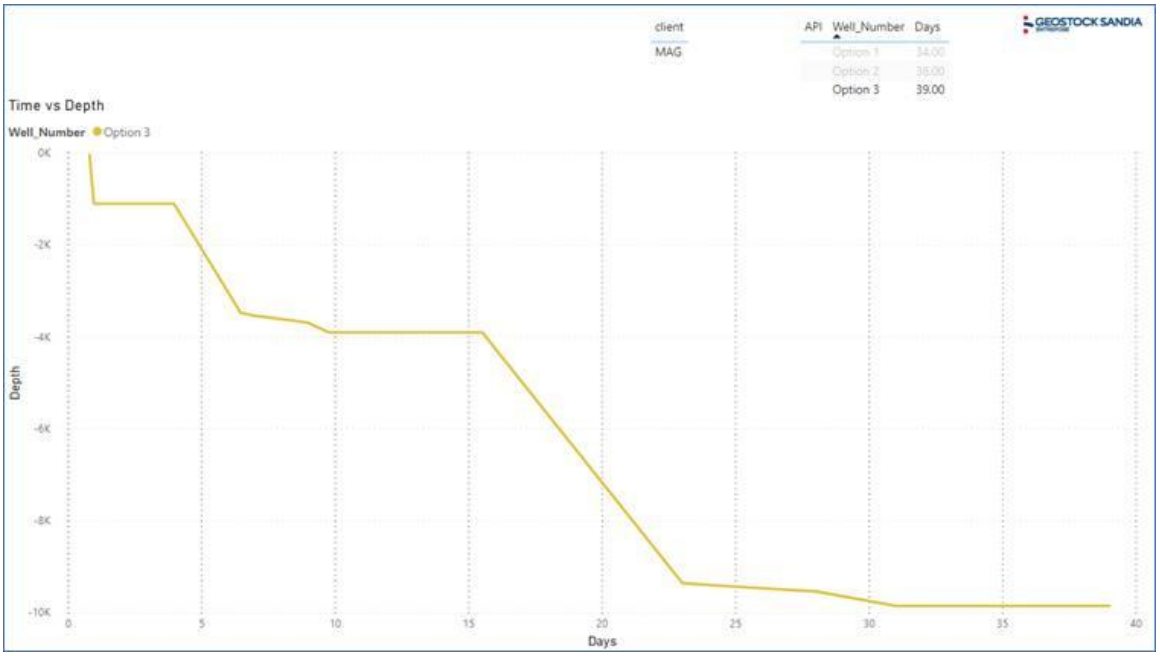

Figure F Time Vs. Depth Curve: Option III

8.9. Drilling Description: Option III

The steps to drill, harvest data, and TD the well is depicted in Figures G.

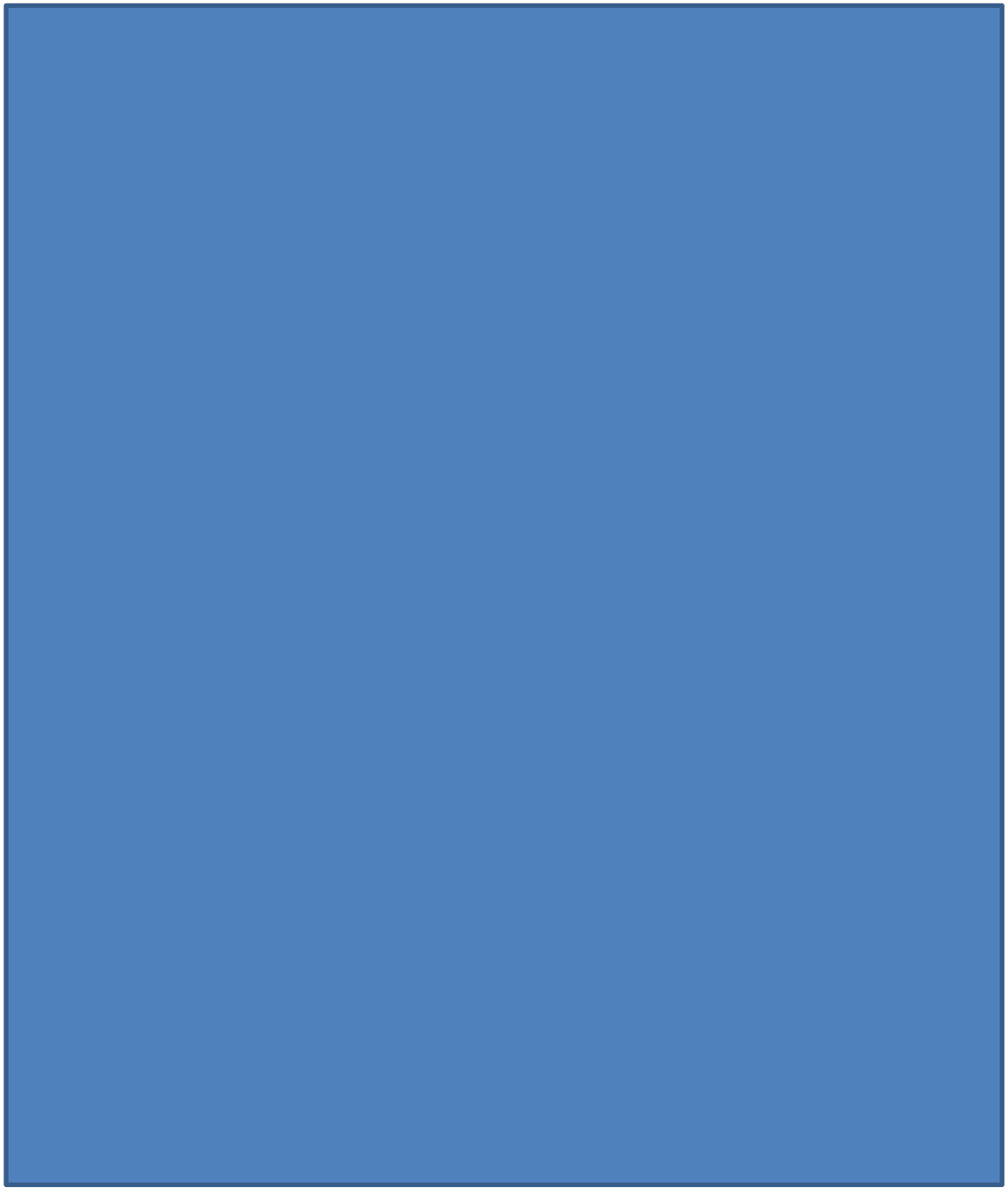

Figure G Well Construction Steps: Option III

Including location construction, well bore construction, data gathering and restoration, and not including final reporting the entire project for Option III will be 65.5 days.

Unlike Option II, Option III includes the completion of the well. Due to the stable conditions of the Williston Basin and the geological age of the Deadwood formation, it is viewed the completion will be rather straight forward as depicted in Figure H. The completion will take 17 days, with final operations taking another 9 days.

9. WELL CONSTRUCTION KEY ELEMENTS

9.1.1.1. Drilling Mud

The drilling mud for the surface section will be a fresh water based. For the next hole section, as the chance of the appearance of any salt sections is considered to be low, the fluid will be saltwater based to best deal with the problematic shales and gumbo found in the Williston Basin.

9.1.1.2. Cementing

Cement composition for the project will depend on the project scope. For Option I cementing, the cement material will be a Class A or similar

cement, plus additives or Class G or H for plugging the well. For Options II and III, cement components will vary, any cement used for cementation of chrome tubulars will be of a special variety of cement that is resistant to CO_2.

9.1.1.3. Casing

The casing used in the construction will be carbon steel for surface casing, as in Option I. For Options II and III the casing strings will be a combination of carbon steel and chrome casing where the confining zone and injection could be in contact with CO_2.

9.1.1.4. Injection String

The injection string installed in Option III will be chrome tubing, with premium, gas tight connections. The injection string will be fitted with a seal assembly for connection to the injection packer.

9.1.1.5. Injection Packer

The injection packer will be specifically built for this application with all wettable components built with chrome, CO_2 resistant components. The packer will be a hybrid that mimics the benefits of a permanent packer but is retrievable, if necessary.

9.1.1.6. Wellhead

For Option I, the wellhead will be a simple carbon steel type that will allow use of an intermediate casing, if needed, during well bore construction. Options II and III are envisioned to use a wellhead (A,B,C,D sections) that is fitted with CO_2 resistant components. Further, Option III envisages the installation of a special wellhead component to allow installation of the fiber bundle for distributed temperature sensing (DTS).

9.2. Perforation

Perforation, if undertaken, will be via a casing gun, 4-6 shots per a foot, with maximum depth of shot.

9.3. Stimulation

The stimulation treatment will be designed based on the results of the open hole logs and analysis of the core recovered from the well.

9.4. Geological Data

Geological data will be collected via:

- Mud Logging.
- Coring of defined confining zones and injection zones.
- Core analysis at an independent lab.
  - The cores (petrography, mineralogy, etc.) will be analysed by a third-party laboratory via thin-section microscopy and XRD methods or full digestion ICP-MS. Other petrophysical parameters will also be determined, including cation and anion exchange capacity, specific surface area (BET), bulk density, permeability, and porosity. Detailed petrologic studies (thin section analysis, XRD, and SEM) of the rock composition, pore geometries, and diagenetic character of the sequestration zone(s) will be conducted, as well as, rock mechanics tests of the target formations and caprocks that will include unconfined and triaxial compressive strength tests, static Young's modulus, and Poisson's ratio.

- The use of wire-line conveyed tools, as seen in the partial list below.

  - Spontaneous Potential
  - Laterlog-Resistivity
  - Caliper/Borehole Volume
  - Compensated Neutron/Lithodensity/Gamma Ray
  - Fracture Identification (minimum depth/charge)
  - CMR (minimum depth/charge)
  - Elemental Capture Spectroscopy (minimum depth/charge)
  - MDT with pump and basic downhole analyser (Deadwood formation)
  - Dielectric Scanner (minimum depth/charge)
  - Rotary Side Wall Core (50-100 Cores) state cost for max dia and min diameter
  - Spectral Gamma Ray (minimum depth/charge)
  - VSP or VSI Log. (minimum depth/charge)

10. GEOSTOCK SANDIA ROLES AND RESPONSIBILITIES

In addition to 'in-house' engineering and geological services, GKS will act as general contractor, under the general direction of the Midwest AgEnergy Field Representative, and shall furnish all supervision, labor, materials, construction equipment, tools and other items of expense necessary to perform the execution of the project and ensuing final reporting services.

GKS will submit a staffing plan for the entire project prior to the start of planning activities, including a staffing plan for management staff. These will include the following:

10.1.1. Project Manager

The Project Manager will be designated at the beginning of the well installation project. This person will plan the job with the technical team and coordinate all activities and job assignments in the office and in the field.

The Project Manager will be responsible for contractor prequalification, contract fulfillment, specifications, cost control, project tracking, and preparation of progress reports and deliverables. A final report must be submitted including lessons learned for the next well construction project. This individual will be the communications link between Midwest AgEnergy and the site team. This individual will provide full-time support both onsite and at the office.

10.1.2. Geological/Engineering Resources

For design of the well, permitting of the project, supporting of the execution of the construction well, geological services, and final reporting, the project manager will assemble a team to support the effort.

GKS engineers will prepare stratigraphic test well construction information for the proposed well and include a "step-by-step" procedure for installation and well testing (mechanical and formation). Well construction will follow NDIC rules and be compliant with EPA Class VI Well Construction Guidance (May 2012). The narrative will summarize proposed construction, completion, testing, and certification activities performed on the proposed stratigraphic test well. A schematic for the proposed well completion, wellhead, well annulus monitoring system (if needed), and proposed well closure schematic will be prepared for the site. GKS will also prepare well site layout plan for the well per NDIC requirements, and will include location

preparation (cut & fill plan) and installation of field office facilities, communications, and location hygiene facilities.

10.1.3. Field Supervisors

GKS will provide field supervisors for the project and will be onsite during the 24-hour operations to provide direct coordination of activities required for the installation of the well. Their responsibility will include but not be limited to, the oversight and coordination of all contractors and their activities, the following of established procedures, recording daily progress reports and performance evaluations of contractors. These individuals will also be responsible for the overall operation and personnel on the site and ensure that all personnel adhere to the established safety plan and will coordinate this plan with individual contractor's safety personnel.

10.1.4. Onsite Geologist

During key elements of geological data gathering during the execution of the wellbore construction, GKS will supply an experienced field geologist onsite to direct geological and geophysical data gathering. This includes supervision of logging, coring, fluid sampling, etc.

10.1.5. Safety Coordinator

The Safety Coordinator will be responsible for overall site safety. This person will be responsible for the development of a safety plan in coordination with Midwest AgEnergy, the management team, and the all respective contractors. This plan will be presented to individual subcontractors onsite. This individual will be used on an as needed basis and will be onsite when requested. Daily safety responsibilities will be the duties of the Field Supervisor and the individual Contractor's Safety Personnel.

During the time period while the location is being prepared, a Field Supervisor will be required to coordinate field operations and assure the location is being prepared according to specifications required by the selected drilling contractor.

When the rotary drilling rig and associated equipment is mobilized, an additional Field Supervisor and a Safety Coordinator may be required to be onsite. The Safety Coordinator will be responsible for entry documentation, assurance of training requirements for subcontractors, assurance that each subcontractor is adhering to their own safety policies as well as those

established by Midwest AgEnergy and their Safety Personnel. This will be of the utmost importance while rigging up or down the drilling equipment.

GKS regards Safety as a job fundamental. GKS has adopted the philosophy that "all accidents are preventable" and ensures that a safety culture extends to our employees, contractors, and all aspects of our field projects. For all field projects, safety is continually assessed, and jobs will be shut down if deficiencies are identified. Work will only be re-initiated when deficiencies or procedures have been corrected to assure a safe working environment. GKS has safely operated and managed multiple projects of similar size in scope for over 20 years.

11. HEALTH & SAFETY PLAN

GKS maintains the highest level of awareness and safety training to ensure that it protects the environment, and the health of:

1) our employees, and other company's employees or sub-contract workers; and,
2) any off-site persons who could be potentially affected by our field activities.

GKS makes technical assessments to identify and mitigate project risks. The company consistently and expertly develops, implements, and audits site-specific health and safety plans, as well as ensures that quality assurance and quality control programs are in place for all field projects. The management of GKS has drawn on and enhanced its long experience with safety and training when formerly employed under DuPont, a recognized world-class leader in industrial safety issues. GKS will design and implement a Sitewide Health & Safety Plan, which will include assurances that all subcontracted personnel involved with this project will have completed applicable site-specific safety training from the local Contractor Safety Council or as documented by Midwest AgEnergy Group LLC and will prepare sub-plans to the Sitewide Health & Safety Plan.

12. VENDOR AND MATERIALS PROCUREMENT AND QUALIFICATION

Specifications for drilling and testing of the well (grading, drilling, field sampling, quality assurance, and health and safety) consistent with stratigraphic test well objectives will be prepared for the procurement/contracting process. GKS will identify/select service contractors in consultation with Midwest AgEnergy Group LLC's contractor

qualification requirements. Quotes will be ranked for best qualified bidder and awards/agreements contracted and scheduled by GKS.

13. COMMUNICATION PLAN

The following table details the communication plan for this project.

Stakeholder	Communication Method	Frequency	Group	Notes
Key Stakeholders	Project Kick-off Meeting	Prior to the project	GKS Project Manager, Midwest AgEnergy Staff	**BOTH** team and Client meetings recommended. Includes project schedule and key project deliverables, meeting minutes change request log, issues log.
Midwest AgEnergy Project Management	Meeting	Daily	GKS Project Manager, Midwest AgEnergy Staff.	Usually a conference call or an e-mail update focuses on reviewing project status, schedule, change requests, HSE, and other issues.
Midwest AgEnergy & GKS's Regulatory	Communication Via Email or Phone	Daily	GKS Project Manager, Midwest AgEnergy Staff.	Daily Drilling Report sent out to internal and external groups daily. Midwest AgEnergy to provide a distribution list for the reports.
GKS	Meeting	Daily	GKS Project Manager	Consists of a daily communication during the whole project to finish.
Midwest AgEnergy' s Technical Staff. GKS's Technical Staff	Communication Via Email or Phone	Daily	GKS Project Manager, Midwest AgEnergy Staff,	Document transfers via e-mail and Share Point for large files (such as well logs). Any altered documents will have a date and version number in the file name.

14. STATEMENT OF QUALIFICATIONS

Geostock Sandia, LLC (and our parent company Geostock, SAS) has more than 50 years of experience mapping, measuring, and modeling underground rock formations and is a leading technical provider of fluid injection and subsurface storage services to the oil and gas, petrochemical, steel manufacturing, and agricultural industries. Since the early-2000s, GKS has provided support to more than 19 carbon capture and sequestration (CCS) projects, providing geologic characterization and modeling services, planning and drilling stratigraphic test wells, and converting existing wells to CCS monitoring wells. GKS has 30 employees and consultants in the US, and an additional 500 through Geostock SAS with deep experience in design, planning, procurement, construction, and operation of all classes of underground injection wells and underground storage facilities (reservoir, salt caverns, mined caverns).

GKS can provide expertise and services on:

- feasibility studies and detailed site appraisals
- front-end engineering and design (FEED) studies
- project management
- geologic and engineering data management and interpretation expertise
- seismic services
- reservoir characterization
- geologic models for reservoir simulations
- well construction, conversion, testing, and maintenance
- advanced monitoring technology for injection, verification, and assurance.

Below is a list in approximate chronological order of the CO2 projects that GKS has been involved in.

1) Frio Brine Pilot Test in Dayton Texas w/Bureau of Economic Geology – 2002-2005
2) Frio Brine Pilot – Phase 2 Test in Dayton Texas w/Bureau of Economic Geology – 2005-2007
3) Northern California Phase II – Grizzly Slough Pilot Well Project – 2006
4) SECARB Cranfield Phase II – Monitor/Observation Well Completion - 2008
5) Arizona Power Service Phase II Cholla Plant Pilot Test Well Installation - 2009 & 2010
6) Northern California Phase III Lage Scale Injection Project– Montezuma Hills - 2008 - 2010

7) Characterization of the Newark Basin of New York & New Jersey – ARRA Project (direct recipient) – 2009 - 2014
8) SECARB Cranfield Phase III DAS – Injection and Two Monitor/Observation Well Completions injection monitoring – 2009 - 2013
9) Western Kentucky Carbon Storage Test Marvin Blan Pilot Well – 2009 & 2010
10) Tenaska Taylorville Class 6 Well Permit Application – 2009 & 2010
11) EERC Denbury Bell Creek Field Phase II Monitoring/Observation Well Instrumentation Installation Project - 2011
12) South Louisiana Small-Scale Sequestration Project – 2011 – 2013
13) California Institute for Energy & Environment – Kings Island Citizens Green No 1 Pilot Well Installation - 2013
14) Geomechanical Characterization and Modeling of the Newark Basin (direct recipient) - 2015 - 2018
15) Eastern Kentucky Carbon Storage Test
16) Illinois State Geological Survey, Central Basin CarbonSAFE
17) Illinois State Geological Survey, Central Basin CarbonSAFE3
18) Wabash CarbonSafe
19) Wabash CarbonSafe3

15. COMMERCIAL CONDITIONS

15.1. Cost Summary

The Time and Materials (T&M) fee estimate for the three options described earlier in the document:

OPTION	ESTIMATE COST	Appendix
I	$4,487,683	A
II	$5,561,891	B
III	$7,947,443	C

Table 1 ESTIMATED WELL CONSTRUCTION COSTS

The cost for the Stratigraphic Well/ CO_2 Injection Well installation is based on our engineering knowledge and our experience with other stratigraphic/injection well installations over the last several years. The cost estimates for the well options are based on current estimates of pricing and duration of well installation tasks. As such, the estimates provided should be considered as budgetary estimates only. Prior to initiating well activities, GKS will prepare a complete well budget estimate using updated vendor quotes. Detailed cost descriptions for the options are included in Appendix A, B and C, respectively. Rates for professional services and subcontractor fees are shown in Appendix D. All major 'Out of Scope' items will be billed as incurred and after proper authorization to proceed has been obtained from Midwest AgEnergy.

15.2. Cost Estimate Assumptions

In preparing this cost estimate, the following assumptions were made :

1. GKS will receive a purchase order for the work in advance of scheduling of field and in-house activities.
2. One vertical well will be constructed.
3. Surface matting will be required for well bore construction.
4. The project will not stop for any major holidays.
5. Wet weather has not been factored into any of the estimates.
6. If Midwest AgEnergy has additional requirements for safety standards (EMR/TRIR), GKS will reserve the option to update quotes based on alternate vendor selection.
7. All cuttings will be hauled off location.
8. None of the liquids nor solids generated during the project will be classified as hazardous and Midwest AgEnergy will be responsible for the disposal of all the liquids and solids generated during the project;
9. The proposed schedule for the project assumes the well work activities will occur uninterrupted by plant or field alarms, releases and significant inclement weather.
10. If required, work permits will be issued without interruption to the normal rig operations and construction operations.
11. Lost circulation of drilling fluids or severe downhole well conditions are not anticipated or accounted for during the drilling of the stratigraphic test well.
12. No fishing operations are planned or anticipated during the drilling or well work efforts for the planned well(s).
13. All completion equipment (injection packer and tubing) will be successfully installed and pressure-tested during installation.

14. Midwest AgEnergy shall provide fresh water (at least 100 gpm) source for the project.
15. As GKS does not hold a sales tax exemption certificate, all third-party invoices paid by GKS will include applicable sales or similar taxes related to the work and billed by third parties. GKS will invoice Midwest AgEnergy the actual North Dakota tax rate.
16. Midwest AgEnergy' s contractor qualification requirements will not prevent GKS from finding qualified vendors for the onsite work.
17. An acid job is budgeted be performed as a part of the completion.
18. A large drilling rig will be required to drill the well.
19. Final estimated costs, for all options, include an estimated ND sales taxes at a rate of 5%.
20. The final cost includes contingency costs of 10%.
21. Cost for surface surveillance of the DTS system, or associated rentals are not in the scope of the project estimates.

15.3. Compensation Schedule

EXHIBIT A: PROPOSED AS-BUILT WELL SCHEMATIC OPTION I

PROPOSED DRILLING PROGRAM (Option I)

COMPANY NAME	Midwest Ag Energy						**DATE**	5-Mar-20	
WELL NAME	MAE #1 Option 1	**LOCATION**	SE SW Sec.17, T145N				**TD**	9850	ft
		BHL:	SE SW Sec.17, T145N						
FIELD	Wildcat		**COUNTRY** USA		**State**	North Dakota	**G.L. ELEV.**	1960.00	ft
WELL CLASSIFICATION		Stratigraphic Test.					**K.B. ELEV.**	1980.00	ft
OBJECTIVE ZONE(S)		Deadwood							

GEOLOGICAL				DOWNHOLE			MECHANICAL		
				GRADIENT	MAX.				
FORMATION	TOPS (FT)			MAX./EXP.	EMW	MAX.			
	TMD	TVD	SS	(psi/ft)	(ppg)	% H2S			
								Conductor: 80' 20"	
							Drilling:	Drill 13-1/2"surface hole to 1110 ft RKB.	
K-Pierre (CM-23)	**1040**	1040	940						
CSTD	**1100**	**1100**	880				Casing:	9-5/8",36#, J-55, 1100 ft.	Cement to surface.
Rat Hole	**1110**	**1110**	870						
							Drilling:	Drill 8-3/4" hole from 1110 ft RKB to 9850 ft RKB.	
GREENHORN	**2945**	2945	-965						
MOWRY SHALE	**3325**	3325	-1345						
INYA KARA	3565	3565	-1585						
SWIFT	**3885**	3885	-1905						
PIPER LIME - DRLG	4455	4455	-2475						
NESSON	**4540**	4540	-2560						
SPEARFISH	**4685**	4685	-2705						
AMSDEN	5015	5015	-3035						
TYLER	5105	5105	-3125						
OTTER	**5155**	5155	-3175						
KIBBEY	***5235***	5235	-3255						
CHARLES	**5365**	5365	-3385						
RATCLIFFE	5595	5595	-3615						
MIDALE	**5710**	5710	-3730						
STATE 'A'	5725	5725	-3745						
MISSION CANYON	**5825**	5825	-3845						
Bakken	**6855**	6855	-4875						
Lodgepole (above I	**6195**	6195	-4215						
Three Forks	**6905**	6905	-4925						
Nisku	**6975**	6975	-4995						
Duperow	7035	7035	-5055						
Souris River	**7425**	7425	-5445						
Dawson Bay	**7625**	7625	-5645						
Interlake	**7745**	7745	-5765						
			1980						
			1980						
Gunton	8435	8435	-6455						
Stony. Mt	**8555**	8555	-6575						
Red River	***8685***	8685	-6705						
			1980						
Icebox	**9255**	9255	-7275						
Black Island	**9415**	9415	-7435						
Deadwood	9445	9445	-7465						
Precambrian	**9745**	9745	-7765						
LOG TD	**9850**	9850	-7870						

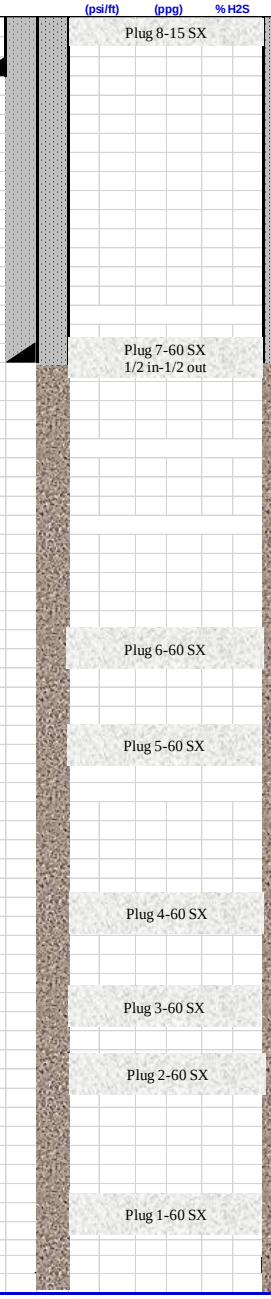

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EXHIBIT B: PROPOSED AS-BUILT WELL SCHEMATIC OPTION II

PROPOSED DRILLING PROGRAM (Option II Phase A+B)

COMPANY NAME	Midwest Ag Energy				**DATE**	5-Mar-20	
WELL NAME	MAE #1 Option II A+B	**LOCATION**	SE SW Sec.17, T145N		**TD**	9850	ft
		BHL:	SE SW Sec.17, T145N				
FIELD	Wildcat	**COUNTRY**	USA	**State**	North Dakota	**G.L. ELEV.**	1960.00 ft
WELL CLASSIFICATION	Stratigraphic Test.					**K.B. ELEV.**	1980.00 ft
OBJECTIVE ZONE(S)	Deadwood						

GEOLOGICAL				DOWNHOLE				MECHANICAL	
	TOPS (FT)			GRADIENT	MAX.	MAX.			
FORMATION	TMD	TVD	SS	MAX./EXP. (psi/ft)	EMW (ppg)	% H2S			
								Conductor: 80' 20"	
							Drilling:	Drill 17-1/2"surface hole to 1110 ft RKB.	
							Cement:	Cement to surface	
K-Pierre (CM-23)	**1040**	1040	940						
CSTD	**1100**	**1100**	880				Casing:	13-3/8",54.5#, J-55, BTC,1100 ft.	
Rat Hole	**1110**	**1110**	870						
							Drilling:	Drill 12-1/4" hole from 1110 ft RKB to 3950 ft RKB.	
							Cement:	Cement to surface and utilize CO2 resistant cement per procedures	
							Casing:	10 3/4 45.5 ppf J-55 BTC or LTC, 0-3225 ft; 3225-3700 ft 10 3/4 13 Cr SM-80L or Similar VAM TOP, 3700-3900 ft45.5 ppf J-55 BTC or LTC	
GREENHORN	**2945**	2945	-965						
MOWRY SHALE	**3325**	3325	-1345						
INYA KARA	3565	3565	-1585						
SWIFT	**3885**	3885	-1905						
PIPER LIME - DRLG	4455	4455	-2475						
NESSON	**4540**	4540	-2560						
SPEARFISH	**4685**	4685	-2705						
AMSDEN	5015	5015	-3035						
TYLER	5105	5105	-3125				Drilling:	Drill 9-1/2" hole from 3950 ft RKB to 9850 ft RKB.	
OTTER	**5155**	5155	-3175						
KIBBEY	***5235***	5235	-3255						
CHARLES	**5365**	5365	-3385						
RATCLIFFE	5595	5595	-3615						
MIDALE	**5710**	5710	-3730						
STATE 'A'	5725	5725	-3745						
MISSION CANYON	**5825**	5825	-3845						
Bakken	**6855**	6855	-4875						
Lodgepole (above Ba	**6195**	6195	-4215						
Three Forks	**6905**	6905	-4925						
Nisku	**6975**	6975	-4995						
Duperow	7035	7035	-5055						
Souris River	**7425**	7425	-5445						
Dawson Bay	**7625**	7625	-5645						
Interlake	**7745**	7745	-5765						
Gunton	8435	8435	-6455						
Stony. Mt	**8555**	8555	-6575						
Red River	***8685***	8685	-6705						
			1980						
Icebox	**9255**	9255	-7275						
Black Island	**9415**	9415	-7435						
Deadwood	9445	9445	-7465						
Precambrian	**9745**	9745	-7765						
LOG TD	**9850**	9850	-7870						

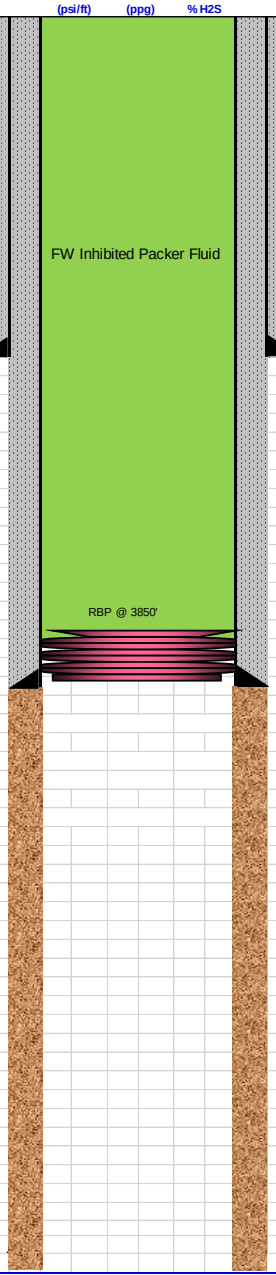

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EXHIBIT C: PROPOSED AS-BUILT WELL SCHEMATIC OPTION III

PROPOSED DRILLING PROGRAM (Option III)

COMPANY NAME	Midwest Ag Energy							**DATE**	12-Mar-20		
WELL NAME	MAE #1 Option III 10.75		**LOCATION**	SE SW Sec.17, T145N R82W				**TD**	9850		ft
			BHL:	SE SW Sec.17, T145N							
FIELD	Wildcat		**COUNTRY**	USA		**State**	North Dakota	**G.L. ELEV.**		1960.00	ft
WELL CLASSIFICATION		Stratigraphic Test.						**K.B. ELEV.**		1980.00	ft
OBJECTIVE ZONE(S)		Deadwood									

GEOLOGICAL				DOWNHOLE			MECHANICAL	
FORMATION	**TOPS (FT)**			**GRADIENT MAX./EXP. (psi/ft)**	**MAX. EMW (ppg)**	**MAX. %H2S**		
	TMD	**TVD**	**SS**					
								Conductor: 80' 20"
							Drilling:	Drill 17-1/2"surface hole to 1110 ft RKB
							Cement:	Cement to surface
K-Pierre (CM-23)	**1040**	1040	940				Casing:	13-3/8",54.5#, J-55, BTC,1100 ft.
CSTD	**1100**	**1100**	880					
Rat Hole	**1110**	**1110**	870					
							Drilling:	Drill 12-1/4" hole from 1110 ft RKB to 3950 ft RKB.
							Cement:	Cement to surface and utilize CO2 resistant cement per procedures
							Casing:	10 3/4 45.5 ppf J-55 BTC or LTC, 0-3225 ft; 3225-3700 ft 10 3/4 13 Cr SM-80L or Similar VAM TOP, 3700-3900 ft45.5 ppf J-55 BTC or LTC
GREENHORN	**2945**	2945	-965					
MOWRY SHALE	**3325**	3325	-1345					
INYA KARA	3565	3565	-1585					
SWIFT	**3885**	3885	-1905					
PIPER LIME - DRLG	4455	4455	-2475					
NESSON	**4540**	4540	-2560					
SPEARFISH	**4685**	4685	-2705					
AMSDEN	5015	5015	-3035		**4 1/2 13Cr**		Drilling:	Drill 9-1/2" hole from 3950 ft RKB to 9850 ft RKB.
TYLER	5105	5105	-3125					
OTTER	**5155**	5155	-3175		**Vam Top**			
KIBBEY	***5235***	5235	-3255					
CHARLES	**5365**	5365	-3385		**OR IPC**			
RATCLIFFE	5595	5595	-3615					
MIDALE	**5710**	5710	-3730		**Pipe**			
STATE 'A'	5725	5725	-3745					
MISSION CANYON	**5825**	5825	-3845					
Bakken	**6855**	6855	-4875					
Lodgepole (above Ba	**6195**	6195	-4215		DYT@ 6159 ft			
Three Forks	**6905**	6905	-4925					
Nisku	**6975**	6975	-4995					
Duperow	7035	7035	-5055					
Souris River	**7425**	7425	-5445					
Dawson Bay	**7625**	7625	-5645					
Interlake	**7745**	7745	-5765				Cement:	Cement to surface and utilize CO2 resistant cement per procedures
					Pkr: 9490			
Gunton	8435	8435	-6455				Casing:	7" 26 ppf HCL-80 LTC, 0-3225 ft; 3225-3700 ft 7" 13 Cr 29 ppf or Similar VAM TOP, 3700-9300ft 7" 26 ppf HCL-80 LTC, 9300-9760ft 7" 13 Cr 29 ppf or Similar VAM TOP.
Stony. Mt	**8555**	8555	-6575					
Red River	***8685***	8685	-6705					
			1980				Tubing:	4-1/2" 13 Cr VAM TOP or IPC Pipe
Icebox	**9255**	9255	-7275					
Black Island	**9415**	9415	-7435					
Deadwood	9445	9445	-7465					
Precambrian	**9745**	9745	-7765					
LOG TD	**9850**	9850	-7870					Drawing not to scale.

APPENDIX A: DETAILED COST ESTIMATE, OPTION I.

1: Midwestern AgEnergy - Underwood Facility - 9,850' Vertical Stratigraphic Test Well - Day Rate Drill & PA	Job Planning, Location Prep, Drilling Cost, Restoration, & Reporting Subtotal	Completion	TOTAL
Milestone Days:	61.5	0	61.5
Cumulative Days:	61.5	0	61.5
GEOSTOCK SANDIA LABOR			
Labor - Office			
Permitting Specialist	$ -	$ -	$ -
Sr. Consultant	$ 28,470	$ -	$ 28,470
Sr. Principle Engineer/Geologist	$ 29,785	$ -	$ 29,785
Principle Engineer/Geologist	$ -	$ -	$ -
Senior Engineer/Geologist	$ 55,005	$ -	$ 55,005
Project Engineer/Geologist	$ 12,800	$ -	$ 12,800
Staff Engineer/Geologist	$ 7,800	$ -	$ 7,800
Procurement Manager	$ 6,400	$ -	$ 6,400
Administrative	$ 2,240	$ -	$ 2,240
Labor - Field			
Sr. Principle Site Supervisor	$ -	$ -	$ -
Principle Site Supervisor	$ -	$ -	$ -
Senior Site Supervisor	$ 192,850	$ -	$ 192,850
Project Site Supervisor	$ -	$ -	$ -
Site Safety Supervisor	$ 79,950	$ -	$ 79,950
Wellsite Quality Coordinator	$ -	$ -	$ -
Site Geologist	$ 43,560	$ -	$ 43,560
Labor - Expenses			
Per Diem, Mileage, Lodging	$ 41,625	$ -	$ 41,625
Travel	$ 9,000	$ -	$ 9,000
Miscellaneous	$ 3,075	$ -	$ 3,075
Labor Subtotal	$ 512,560	$ -	$ 512,560
SUBCONTRACTORS / SERVICES / RENTALS			
Location			
Location Survey / Stake	$ 7,500	$ -	$ 7,500
Drill Mousehole / Rathole	$ 8,000	$ -	$ 8,000
Conductor Pipe Installation	$ 16,000	$ -	$ 16,000
Location Construction / Build	$ 50,000	$ -	$ 50,000
Pit Liner	$ -	$ -	$ -
Location Mats			
Liner / Fabric	$ 13,000	$ -	$ 13,000
Rental	$ 88,560	$ -	$ 88,560
Install / Remove	$ 28,000	$ -	$ 28,000
Transportation	$ 90,000	$ -	$ 90,000
Restoration & Cleanup	$ 18,650	$ -	$ 18,650
Scoria / Gravel (haul & spread)	$ 10,000	$ -	$ 10,000

1: Midwestern AgEnergy - Underwood Facility - 9,850' Vertical Stratigraphic Test Well - Day Rate Drill & PA	Job Planning, Location Prep, Drilling Cost, Restoration, & Reporting Subtotal	Completion	TOTAL
Dirt Work	$ 5,000	$ -	$ 5,000
Lumber	$ 500	$ -	$ 500
Field Office & Trailer			
Rental	$ 6,765	$ -	$ 6,765
Set up / Tear Down	$ 1,000	$ -	$ 1,000
Transportation	$ 5,000	$ -	$ 5,000
Sanitation			
Rental	$ 6,150	$ -	$ 6,150
Servicing	$ 4,700	$ -	$ 4,700
Set up / Tear Down	$ 400	$ -	$ 400
Electric Service Installation	$ -	$ -	$ -
Add'l Transportation (Location Equipment)	$ -	$ -	$ -
Surface Rentals / Services			
Rolloff Boxes			
Rental w/ Berms	$ 6,370	$ -	$ 6,370
Transportation	$ 8,000	$ -	$ 8,000
Frac Tanks			
Rental w/ Berms	$ 10,530	$ -	$ 10,530
Transportation	$ 8,000	$ -	$ 8,000
Box / Tank Cleanout	$ 3,400	$ -	$ 3,400
Hydro Vac Services / Vacuum Trucks	$ 38,000	$ -	$ 38,000
Crane Services	$ -	$ -	$ -
Forklift	$ 6,825	$ -	$ 6,825
Light Towers	$ 5,460	$ -	$ 5,460
Cellar Pump	$ 240	$ -	$ 240
Sump Pump	$ 10,125	$ -	$ 10,125
Centrifugal Pump & Hoses	$ 8,100	$ -	$ 8,100
Generator	$ 2,975	$ -	$ 2,975
Fuel (Surface Equipment)	$ 950	$ -	$ 950
Add'l Transportation (Surface Equipment)	$ 10,500	$ -	$ 10,500
Drilling Rig & Equipment			
Drilling Rig			
Mobilization	$ 211,000	$ -	$ 211,000
Demobilization	$ 211,000	$ -	$ 211,000
Infield Move	$ -	$ -	$ -
Day Rate	$ 738,000	$ -	$ 738,000
MOB / DEMOB Rate	$ 61,200	$ -	$ 61,200
Crew Per Diem / Lodging	$ -	$ -	$ -
Extra Equipment (ditch magnets, etc)	$ 35,000	$ -	$ 35,000
Diesel Fuel (1,500 gal/day @ $1.5/gal)	$ 83,250	$ -	$ 83,250
Shaker Screens	$ 12,500	$ -	$ 12,500

1: Midwestern AgEnergy - Underwood Facility - 9,850' Vertical Stratigraphic Test Well - Day Rate Drill & PA	Job Planning, Location Prep, Drilling Cost, Restoration, & Reporting Subtotal	Completion	TOTAL
Consumables	$ 8,750	$ -	$ 8,750
Rig Monitor			
Day Rate	$ 16,695	$ -	$ 16,695
Set up / Tear Down	$ 1,000	$ -	$ 1,000
BOP Rental	$ -	$ -	$ -
BOP Nipple Up / Test / Nipple Down	$ 4,100	$ -	$ 4,100
Rental Spools / Adapters	$ -	$ -	$ -
Drill Pipe / Collars	$ -	$ -	$ -
Stabilizers / Jars	$ 18,500	$ -	$ 18,500
Rental Subs / Crossovers	$ 100	$ -	$ 100
Addl Pipe Racks	$ 210	$ -	$ 210
Drill Bits			
Surface Hole: 13.5 "	$ 5,500	$ -	$ 5,500
Production Hole: 8.75"	$ 20,000	$ -	$ 20,000
Cleanout Bit	$ 1,500	$ -	$ 1,500
Drilling Equipment Inspection / Redress	$ 10,000	$ -	$ 10,000
Welding Services	$ 10,000	$ -	$ 10,000
Addl Transportation (Drilling Equipment)	$ 16,000	$ -	$ 16,000
Directional Drilling Services			
Mud Motor	$ 40,625	$ -	$ 40,625
Standby Rate	$ -	$ -	$ -
Per Diem	$ -	$ -	$ -
Mob / Demob / Addl Charges	$ -	$ -	$ -
LIH Insurance	$ -	$ -	$ -
Inspection / Redress	$ 19,000	$ -	$ 19,000
Fluids & Solids Control			
Mud Engineer	$ -	$ -	$ -
Drilling Mud	$ 68,250	$ -	$ 68,250
Mudlogging			
Mudlogging RU / RD	$ 500	$ -	$ 500
Mudlogging Services	$ 59,125	$ -	$ 59,125
Mudlogging Standby	$ 3,500	$ -	$ 3,500
Mudlogging Transportation	$ 4,000	$ -	$ 4,000
Closed Loop Solids Control Day Rate	$ 53,750	$ -	$ 53,750
Closed Loop Solids Control RU / RD	$ 7,200	$ -	$ 7,200
Closed Loop Solids Control Screens	$ 6,100	$ -	$ 6,100
Closed Loop Solids Control Chemicals	$ 13,000	$ -	$ 13,000
Closed Loop Solids Control Transportation	$ 20,000	$ -	$ 20,000
Solids Disposal	$ 45,000	$ -	$ 45,000
Solids Transport	$ -	$ -	$ -
Mud Disposal	$ 900	$ -	$ 900

1: Midwestern AgEnergy - Underwood Facility - 9,850' Vertical Stratigraphic Test Well - Day Rate Drill & PA	Job Planning, Location Prep, Drilling Cost, Restoration, & Reporting Subtotal	Completion	TOTAL
Mud Transport	$ 3,000	$ -	$ 3,000
Liquids Disposal	$ 700	$ -	$ 700
Liquids Transport	$ 4,200	$ -	$ 4,200
Water & Transportation (per load)	$ 12,800	$ -	$ 12,800
Brine & Transportation (per load)	$ 12,000	$ -	$ 12,000
Casing Crews & Equipment			
Run Surface: 9 5/8"	$ 5,140	$ -	$ 5,140
Run Production:	$ -	$ -	$ -
CRT Surface Casing	$ 3,800	$ -	$ 3,800
CRT Intermediate Casing & Torque Turn	$ -	$ -	$ -
CRT Production Casing & Torque Turn	$ -	$ -	$ -
Clean / Inspect / Drift Surface	$ 3,500	$ -	$ 3,500
Clean / Inspect / Drift Intermediate	$ -		$ -
Clean / Inspect / Drift Production	$ -		$ -
Clean / Inspect / Drift Injection	$ -		$ -
Wellhead Installation Services	$ -	$ -	$ -
Cementing Services & Equipment			
Surface: 9 5/8"	$ 22,699	$ -	$ 22,699
Production:	$ -	$ -	$ -
Plug and Abandon	$ 22,924	$ -	$ 22,924
Coring			
Coring 30 ft	$ -	$ -	$ -
Coring 60 ft	$ 278,763		$ 278,763
Wellsite Handling	$ 20,000	$ -	$ 20,000
Core Analysis	$ 100,000	$ -	$ 100,000
Logging / Wireline			
Gyro Survey	$ -	$ -	$ -
Flo-Drift	$ 22,800	$ -	$ 22,800
Surface Open Hole	$ -	$ -	$ -
Surface Cased Hole	$ 8,500	$ -	$ 8,500
Intermediate Open Hole	$ -	$ -	$ -
Intermediate Cased Hole	$ -	$ -	$ -
Production Open Hole (including VSP)	$ 375,000	$ -	$ 375,000
Production Cased Hole	$ -	$ -	$ -
COMPLETION			
Workover Rig			
Mobilization	$ -	$ -	$ -
Demobilization	$ -	$ -	$ -
Infield Move	$ -	$ -	$ -
Day Rate	$ -	$ -	$ -
Crew Per Diem	$ -	$ -	$ -

1: Midwestern AgEnergy - Underwood Facility - 9,850' Vertical Stratigraphic Test Well - Day Rate Drill & PA	Job Planning, Location Prep, Drilling Cost, Restoration, & Reporting Subtotal	Completion	TOTAL
Extra Equipment	$ -	$ -	$ -
Consumables	$ -	$ -	$ -
Perforating	$ -	$ -	$ -
Slickline Services	$ -	$ -	$ -
Wireline Services (Packer Setting, etc)	$ -	$ -	$ -
Wireline Logging / Gravel Pack Logging	$ -	$ -	$ -
Tubing Running Crew / Services	$ -	$ -	$ -
Tubing Clean / Drift / Inspection	$ -	$ -	$ -
Tubing Testing Crew	$ -	$ -	$ -
DAS and Gauges	$ -	$ -	$ -
DAS and Gauges Installation	$ -	$ -	$ -
Completion Fluids	$ -	$ -	$ -
Annulus Fluid Inhibitor	$ -	$ -	$ -
Mills / Bits	$ -	$ -	$ -
Workstring / Collars / Handling Tools Rental	$ -	$ -	$ -
Downhole Rentals	$ -	$ -	$ -
BOP Rental	$ -	$ -	$ -
Tree Installation Services	$ -	$ -	$ -
Workover Equipment Inspection / Redress / Damages	$ -	$ -	$ -
Add'l Transportaions (Completion)	$ -	$ -	$ -
Miscellaneous Expenses			
Miscellaneous Expenses	$ 12,300	$ -	$ 12,300
Subcontractors / Services / Rentals Handling Fee	$ 319,208	$ -	$ 319,208
Subcontractors / Services / Rentals Subtotal	$ 3,511,289	$ -	$ 3,511,289
LABOR & SERVICE SUBTOTAL (NONTANGIBLES)	$ 4,023,849	$ -	$ 4,023,849
UNIT RATE MATERIALS (TANGIBLES)			
Conductor	$ -	$ -	$ -
Surface Casing: 9 5/8 47# L80 BTC	$ 41,316.00	$ -	$ 41,316
Production Casing:	$ -	$ -	$ -
Production Tubing:	$ -	$ -	$ -
Surface Casing Float Equipment & Plug Set	$ 5,050	$ -	$ 5,050
Intermediate Casing Float Equipment & Plug Set	$ -	$ -	$ -
Production Casing Float Equipment & Plug Set	$ -	$ -	$ -
Downhole Nipples	$ -	$ -	$ -
Completion Screens / Tools	$ -	$ -	$ -
Sump Packer	$ -	$ -	$ -
Production Packer	$ -	$ -	$ -
Wellhead Equipment A Section	$ 2,000	$ -	$ 2,000
Wellhead Equipment B Section	$ -	$ -	$ -
Wellhead Equipment C Section	$ -	$ -	$ -

1: Midwestern AgEnergy - Underwood Facility - 9,850' Vertical Stratigraphic Test Well - Day Rate Drill & PA	Job Planning, Location Prep, Drilling Cost, Restoration, & Reporting Subtotal	Completion	TOTAL
Wellhead Tree	$ -	$ -	$ -
Drilling Fluid Materials / Chemicals	$ -	$ -	$ -
State & Local Taxes	*$ 2,418*	*$ -*	*$ 2,418*
Materials Handling Fee	$ 5,078	$ -	$ 5,078
MATERIAL SUBTOTAL (TANGIBLES)	$ 55,863	$ -	$ 55,863
MILESTONE SUBTOTAL	$ 4,079,712	$ -	$ 4,079,712
Contingency	*$ 407,971*	*$ -*	*$ 407,971*
MILESTONE TOTAL	$ 4,487,683	$ -	$ 4,487,683
CUMULATIVE TOTAL			$ 4,487,683

APPENDIX B: DETAILED COST ESTIMATE, OPTION II.

2: Midwestern AgEnergy - Underwood Facility - 9,850' Vertical CO2 Sequestration Well - Day Rate Drill & TA	Job Planning, Location Prep, Drilling Cost, Restoration, & Reporting Subtotal	Completion	TOTAL
Milestone Days:	62.5	0	62.5
Cumulative Days:	62.5	0	62.5
GEOSTOCK SANDIA LABOR			
Labor - Office			
Permitting Specialist	$ -	$ -	$ -
Sr. Consultant	$ 28,730	$ -	$ 28,730
Sr. Principle Engineer/Geologist	$ 30,015	$ -	$ 30,015
Principle Engineer/Geologist	$ -	$ -	$ -
Senior Engineer/Geologist	$ 56,715	$ -	$ 56,715
Project Engineer/Geologist	$ 14,080	$ -	$ 14,080
Staff Engineer/Geologist	$ 7,800	$ -	$ 7,800
Procurement Manager	$ 6,400	$ -	$ 6,400
Administrative	$ 2,240	$ -	$ 2,240
Labor - Field			
Sr. Principle Site Supervisor	$ -	$ -	$ -
Prinicple Site Supervisor	$ -	$ -	$ -
Senior Site Supervisor	$ 196,650	$ -	$ 196,650
Project Site Supervisor	$ -	$ -	$ -
Site Safety Supervisor	$ 81,250	$ -	$ 81,250
Wellsite Quality Coordinator	$ -	$ -	$ -
Site Geologist	$ 57,420	$ -	$ 57,420
Labor - Expenses			
Per Diem, Mileage, Lodging	$ 43,875	$ -	$ 43,875
Travel	$ 13,000	$ -	$ 13,000
Miscellaneous	$ 3,125	$ -	$ 3,125
Labor Subtotal	$ 541,300	$ -	$ 541,300
SUBCONTRACTORS / SERVICES / RENTALS			
Location			
Location Survey / Stake	$ 7,500	$ -	$ 7,500
Drill Mousehole / Rathole	$ 8,000	$ -	$ 8,000
Conductor Pipe Installation	$ 16,000	$ -	$ 16,000
Location Construction / Build	$ 50,000		$ 50,000
Pit Liner	$ -	$ -	$ -
Location Mats			
Liner / Fabric	$ 13,000		$ 13,000
Rental	$ 111,000	$ -	$ 111,000
Install / Remove	$ 28,000	$ -	$ 28,000
Transportation	$ 90,000	$ -	$ 90,000
Restoration & Cleanup	$ 18,650	$ -	$ 18,650
Scoria / Gravel (haul & spread)	$ 15,000	$ -	$ 15,000

2: Midwestern AgEnergy - Underwood Facility - 9,850' Vertical CO2 Sequestration Well - Day Rate Drill & TA	Job Planning, Location Prep, Drilling Cost, Restoration, & Reporting Subtotal	Completion	TOTAL
Dirt Work	$ 5,000	$ -	$ 5,000
Lumber	$ 500	$ -	$ 500
Field Office			
Rental	$ 6,875	$ -	$ 6,875
Set up / Tear Down	$ 2,000	$ -	$ 2,000
Transportation	$ 5,000	$ -	$ 5,000
Sanitation			
Rental	$ 6,250	$ -	$ 6,250
Servicing	$ -	$ -	$ -
Set up / Tear Down	$ 400	$ -	$ 400
Electric Service Installation	$ -	$ -	$ -
Add'l Transportation (Location Equipment)	$ -	$ -	$ -
Surface Rentals / Services			
Rolloff Boxes			
Rental w/ Berms	$ 5,250	$ -	$ 5,250
Transportation	$ 8,000	$ -	$ 8,000
Frac Tanks			
Rental w/ Berms	$ 13,910	$ -	$ 13,910
Transportation	$ 8,000	$ -	$ 8,000
Box / Tank Cleanout	$ 3,400	$ -	$ 3,400
Hydro Vac Services / Vacuum Trucks	$ 38,000	$ -	$ 38,000
Crane Services	$ -	$ -	$ -
Forklift	$ 7,275	$ -	$ 7,275
Light Towers	$ 5,820	$ -	$ 5,820
Cellar Pump	$ 240	$ -	$ 240
Sump Pump	$ 10,875	$ -	$ 10,875
Centrifugal Pump & Hoses	$ 8,700	$ -	$ 8,700
Generator	$ 3,868	$ -	$ 3,868
Fuel (Surface Equipment)	$ 1,088	$ -	$ 1,088
Add'l Transportation (Surface Equipment)	$ 10,800	$ -	$ 10,800
Drilling Rig & Equipment			
Drilling Rig			
Mobilization	$ 211,000	$ -	$ 211,000
Demobilization	$ 211,000	$ -	$ 211,000
Infield Move	$ -	$ -	$ -
Day Rate	$ 792,000	$ -	$ 792,000
MOB / DEMOB Rate	$ 107,100	$ -	$ 107,100
Crew Per Diem / Lodging	$ -	$ -	$ -
Extra Equipment (ditch magnets, etc)	$ 36,000	$ -	$ 36,000
Diesel Fuel (1,500 gal/day @ $1.5/gal)	$ 92,250	$ -	$ 92,250
Shaker Screens	$ 20,000	$ -	$ 20,000
Consumables	$ 10,250	$ -	$ 10,250

2: Midwestern AgEnergy - Underwood Facility - 9,850' Vertical CO2 Sequestration Well - Day Rate Drill & TA	Job Planning, Location Prep, Drilling Cost, Restoration, & Reporting Subtotal	Completion	TOTAL
Rig Monitor			
Day Rate	$ 20,790	$ -	$ 20,790
Set up / Tear Down	$ 1,000	$ -	$ 1,000
BOP Rental	$ 24,150	$ -	$ 24,150
BOP Nipple Up / Test / Nipple Down	$ 8,200	$ -	$ 8,200
Rental Spools / Adapters	$ -	$ -	$ -
Drill Pipe / Collars	$ -	$ -	$ -
Stabilizers / Jars	$ 37,000	$ -	$ 37,000
Rental Subs / Crossovers	$ 200	$ -	$ 200
Add'l Pipe Racks	$ 140	$ -	$ 140
Drill Bits			
Surface Hole: 17.5 "	$ 5,000	$ -	$ 5,000
Intermediate Hole 12.25"	$ 5,000	$ -	$ 5,000
Production Hole: 9.5"	$ 36,000	$ -	$ 36,000
Cleanout Bit	$ 3,000	$ -	$ 3,000
Drilling Equipment Inspection / Redress	$ 10,000	$ -	$ 10,000
Welding Services	$ 10,000	$ -	$ 10,000
Add'l Transportation (Drilling Equipment)	$ 18,000	$ -	$ 18,000
Directional Drilling Services			
Mud Motor	$ 30,875	$ -	$ 30,875
Standby Rate	$ -	$ -	$ -
Per Diem	$ -	$ -	$ -
Mob / Demob / Add'l Charges	$ -	$ -	$ -
LIH Insurance	$ -	$ -	$ -
Inspection / Redress	$ 19,000	$ -	$ 19,000
Fluids & Solids Control			
Mud Engineer	$ -	$ -	$ -
Drilling Mud	$ 85,750	$ -	$ 85,750
Mudlogging			
Mudlogging RU / RD	$ 500	$ -	$ 500
Mudlogging Services	$ 66,000	$ -	$ 66,000
Mudlogging Standby	$ 9,500	$ -	$ 9,500
Mudlogging Transportation	$ 4,000	$ -	$ 4,000
Closed Loop Solids Control Day Rate	$ 61,250	$ -	$ 61,250
Closed Loop Solids Control RU / RD	$ 7,200	$ -	$ 7,200
Closed Loop Solids Control Screens	$ 12,200	$ -	$ 12,200
Closed Loop Solids Control Chemicals	$ 23,000	$ -	$ 23,000
Closed Loop Solids Control Transportation	$ 30,000	$ -	$ 30,000
Solids Disposal	$ 68,500	$ -	$ 68,500
Solids Transport	$ -	$ -	$ -
Mud Disposal	$ 300	$ -	$ 300
Mud Transport	$ 1,000	$ -	$ 1,000

2: Midwestern AgEnergy - Underwood Facility - 9,850' Vertical CO2 Sequestration Well - Day Rate Drill & TA	Job Planning, Location Prep, Drilling Cost, Restoration, & Reporting Subtotal	Completion	TOTAL
Liquids Disposal	$ 100	$ -	$ 100
Liquids Transport	$ 600	$ -	$ 600
Water & Transportation (per load)	$ 6,400	$ -	$ 6,400
Brine & Transportation (per load)	$ 10,000	$ -	$ 10,000
Casing Crews & Equipment			
Run Surface: 13 3/8"	$ 5,140	$ -	$ 5,140
Run Intermediate: 10 3/4"	$ 9,050	$ -	$ 9,050
Run Production: 7"	$ -	$ -	$ -
CRT Surface Casing	$ 3,800	$ -	$ 3,800
CRT Intermediate Casing & Torque Turn	$ 6,000	$ -	$ 6,000
CRT Production Casing & Torque Turn	$ -	$ -	$ -
Clean / Inspect / Drift Surface	$ 3,500	$ -	$ 3,500
Clean / Inspect / Drift Intermediate	$ 4,750	$ -	$ 4,750
Clean / Inspect / Drift Production	$ -	$ -	$ -
Clean / Inspect / Drift Injection	$ -	$ -	$ -
Wellhead Installation Services	$ 12,600	$ -	$ 12,600
Cementing Services & Equipment			
Surface: 13 3/8"	$ 26,771		$ 26,771
Intermediate: 10 3/4"	$ 43,330		$ 43,330
Production: 7"	$ -		$ -
Plug and Abandon	$ -		$ -
Coring			
Coring 30 ft	$ -	$ -	$ -
Coring 60 ft	$ 278,763	$ -	$ 278,763
Wellsite Handling	$ 20,000	$ -	$ 20,000
Core Analysis	$ 100,000	$ -	$ 100,000
Logging / Wireline			
Gyro Survey	$ -	$ -	$ -
Flo-Drift	$ 21,850	$ -	$ 21,850
Surface Open Hole	$ -	$ -	$ -
Surface Cased Hole	$ 8,000	$ -	$ 8,000
Intermediate Open Hole	$ 210,000	$ -	$ 210,000
Intermediate Cased Hole	$ 24,000	$ -	$ 24,000
Production Open Hole (including VSP)	$ 370,000	$ -	$ 370,000
Production Cased Hole	$ -	$ -	$ -
COMPLETION			
Workover Rig			
Mobilization	$ -	$ -	$ -
Demobilization	$ -	$ -	$ -
Infield Move	$ -	$ -	$ -
Day Rate	$ -	$ -	$ -
Crew Per Diem	$ -	$ -	$ -

2: Midwestern AgEnergy - Underwood Facility - 9,850' Vertical CO2 Sequestration Well - Day Rate Drill & TA	Job Planning, Location Prep, Drilling Cost, Restoration, & Reporting Subtotal	Completion	TOTAL
Extra Equipment	$ -	$ -	$ -
Consumables	$ -	$ -	$ -
Perforating	$ -	$ -	$ -
Slickline Services	$ -	$ -	$ -
Wireline Services (Packer Setting, etc)	$ -	$ -	$ -
Wireline Logging / Gravel Pack Logging	$ -	$ -	$ -
Tubing Running Crew / Services	$ -	$ -	$ -
Tubing Clean / Drift / Inspection	$ -	$ -	$ -
Tubing Testing Crew	$ -	$ -	$ -
DAS and Gauges	$ -	$ -	$ -
DAS and Gauges Installation	$ -	$ -	$ -
Completion Fluids	$ -	$ -	$ -
Annulus Fluid Inhibitor	$ -	$ -	$ -
Mills / Bits	$ -	$ -	$ -
Workstring / Collars / Handling Tools Rental	$ -	$ -	$ -
Downhole Rentals	$ -	$ -	$ -
BOP Rental	$ -	$ -	$ -
Tree Installation Services	$ -	$ -	$ -
Workover Equipment Inspection / Redress / Damages	$ -	$ -	$ -
Add'l Transportaions (Completion)	$ -	$ -	$ -
Miscellaneous Expenses			
Miscellaneous Expenses	$ 12,500	$ -	$ 12,500
Subcontractors / Services / Rentals Handling Fee	$ 376,271	$ -	$ 376,271
Subcontractors / Services / Rentals Subtotal	$ 4,138,979	$ -	$ 4,138,979
LABOR & SERVICE SUBTOTAL (NONTANGIBLES)	$ 4,680,279	$ -	$ 4,680,279
UNIT RATE MATERIALS (TANGIBLES)			
Conductor	$ -	$ -	$ -
Surface Casing: 13 3/8" 54.5# J55 BTC	$ 39,036	$ -	$ 39,036
Intermediate Casing: 10 3/4" 45.5 # L80	$ 96,670	$ -	$ 96,670
Intermediate Casing: 10 3/4" 13 Cr L80	$ 158,923	$ -	$ 158,923
Production Casing: 7 " 26 # HCL-80 BTC	$ -	$ -	$ -
Production Casing: 7" 29 # 13Cr95	$ -	$ -	$ -
Production Tubing: 4 1/2" 13 Cr	$ -	$ -	$ -
Surface Casing Float Equipment & Plug Set	$ 3,350	$ -	$ 3,350
Intermediate Casing Float Equipment & Plug Set	$ 5,050	$ -	$ 5,050
Production Casing Float Equipment & Plug Set	$ -	$ -	$ -
Downhole Nipples	$ -	$ -	$ -
Completion Screens / Tools	$ -	$ -	
Sump Packer	$ -	$ -	$ -
Production Packer	$ -	$ -	$ -

2: Midwestern AgEnergy - Underwood Facility - 9,850' Vertical CO2 Sequestration Well - Day Rate Drill & TA	Job Planning, Location Prep, Drilling Cost, Restoration, & Reporting Subtotal	Completion	TOTAL
Wellhead Equipment A Section	$ 11,000	$ -	$ 11,000
Wellhead Equipment B Section	$ 11,500	$ -	$ 11,500
Wellhead Equipment C Section	$ -	$ -	$ -
Wellhead Tree	$ -	$ -	$ -
Drilling Fluid Materials / Chemicals	$ -	$ -	$ -
State & Local Taxes	*$ 16,276*	*$ -*	*$ 16,276*
Materials Handling Fee	$ 34,180	$ -	$ 34,180
MATERIAL SUBTOTAL (TANGIBLES)	**$ 375,985**	**$ -**	
MILESTONE SUBTOTAL	**$ 5,056,265**	**$ -**	**$ 5,056,265**
Contingency	*$ 505,626*	*$ -*	*$ 505,626*
MILESTONE TOTAL	**$ 5,561,891**	**$ -**	**$ 5,561,891**
CUMULATIVE TOTAL			**$ 5,561,891**

APPENDIX C: DETAILED COST ESTIMATE, OPTION III.

3: Midwestern AgEnergy - Underwood Facility - 9,850' Vertical CO2 Sequestration Well - Day Rate Drill & Completion	Job Planning, Location Prep, & Drilling Cost Subtotal	Completion Cost, Restoration / Cleanup, & Reporting Subtotal	TOTAL
Milestone Days:	65.5	26	91.5
Cumulative Days:	65.5	26	91.5
GEOSTOCK SANDIA LABOR			
Labor - Office			
Permitting Specialist	$ -	$ -	$ -
Sr. Consultant	$ 24,310	$ 11,960	$ 36,270
Sr. Principle Engineer/Geologist	$ 24,955	$ 10,580	$ 35,535
Principle Engineer/Geologist	$ -	$ -	$ -
Senior Engineer/Geologist	$ 43,415	$ 17,860	$ 61,275
Project Engineer/Geologist	$ -	$ 14,080	$ 14,080
Staff Engineer/Geologist	$ 7,800	$ -	$ 7,800
Procurement Manager	$ 6,400	$ -	$ 6,400
Administrative	$ 1,600	$ 640	$ 2,240
Labor - Field			
Sr. Principle Site Supervisor	$ -	$ -	$ -
Prinicple Site Supervisor	$ -	$ -	$ -
Senior Site Supervisor	$ 208,050	$ 49,400	$ 257,450
Project Site Supervisor	$ -	$ -	$ -
Site Safety Supervisor	$ 85,150	$ 33,800	$ 118,950
Wellsite Quality Coordinator	$ -	$ -	$ -
Site Geologist	$ 61,380	$ -	$ 61,380
Labor - Expenses			
Per Diem, Mileage, Lodging	$ 64,875	$ 6,500	$ 71,375
Travel	$ 6,000	$ 2,000	$ 8,000
Miscellaneous	$ 3,275	$ 1,300	$ 4,575
Labor Subtotal	$ 537,210	$ 148,120	$ 685,330
SUBCONTRACTORS / SERVICES / RENTALS			
Location			
Location Survey / Stake	$ 7,500	$ -	$ 7,500
Drill Mousehole / Rathole	$ 8,000	$ -	$ 8,000
Conductor Pipe Installation	$ 16,000	$ -	$ 16,000
Location Construction / Build	$ 50,000	$ -	$ 50,000
Pit Liner	$ -	$ -	$ -
Location Mats			
Liner / Fabric	$ 13,000	$ -	$ 13,000
Rental	$ 131,000	$ -	$ 131,000
Install / Remove	$ 14,000	$ 14,000	$ 28,000
Transportation	$ 45,000	$ 45,000	$ 90,000
Restoration & Cleanup	$ -	$ 18,650	$ 18,650

3: Midwestern AgEnergy - Underwood Facility - 9,850' Vertical CO2 Sequestration Well - Day Rate Drill & Completion	Job Planning, Location Prep, & Drilling Cost Subtotal	Completion Cost, Restoration / Cleanup, & Reporting Subtotal	TOTAL
Scoria / Gravel (haul & spread)	$ 5,000	$ 5,000	$ 10,000
Dirt Work	$ 5,000	$ -	$ 5,000
Lumber	$ 500	$ -	$ 500
Field Office			
Rental	$ 6,875	$ 2,860	$ 9,735
Set up / Tear Down	$ 2,000	$ 2,000	$ 4,000
Transportation	$ 5,000	$ 2,500	$ 7,500
Sanitation			
Rental	$ 6,550	$ 2,600	$ 9,150
Servicing	$ -	$ 520	$ 520
Set up / Tear Down	$ 400	$ 400	$ 800
Electric Service Installation	$ -	$ -	$ -
Add'l Transportation (Location Equipment)	$ -	$ 1,000	$ 1,000
Surface Rentals / Services			
Rolloff Boxes			
Rental w/ Berms	$ 6,230	$ -	$ 6,230
Transportation	$ 8,000	$ -	$ 8,000
Frac Tanks			
Rental w/ Berms	$ 13,390	$ 5,720	$ 19,110
Transportation	$ 8,000	$ 8,000	$ 16,000
Box / Tank Cleanout	$ 3,400	$ 3,400	$ 6,800
Hydro Vac Services / Vacuum Trucks	$ 26,000	$ 8,000	$ 34,000
Crane Services	$ -	$ -	$ -
Forklift	$ 7,725	$ 3,150	$ 10,875
Light Towers	$ 6,180	$ 2,520	$ 8,700
Cellar Pump	$ 240	$ -	$ 240
Sump Pump	$ 12,875	$ -	$ 12,875
Centrifugal Pump & Hoses	$ 10,300	$ -	$ 10,300
Generator	$ 4,378	$ 1,785	$ 6,163
Fuel (Surface Equipment)	$ 1,288	$ 525	$ 1,813
Add'l Transportation (Surface Equipment)	$ 10,800	$ 2,400	$ 13,200
Drilling Rig & Equipment			
Drilling Rig			
Mobilization	$ 211,000	$ -	$ 211,000
Demobilization	$ 211,000	$ -	$ 211,000
Infield Move	$ -	$ -	$ -
Day Rate	$ 846,000	$ -	$ 846,000
MOB / DEMOB Rate	$ 30,600	$ -	$ 30,600
Crew Per Diem / Lodging	$ -	$ -	$ -
Extra Equipment (ditch magnets, etc)	$ 39,000	$ -	$ 39,000
Diesel Fuel (1,500 gal/day @ $1.5/gal)	$ 99,000	$ -	$ 99,000

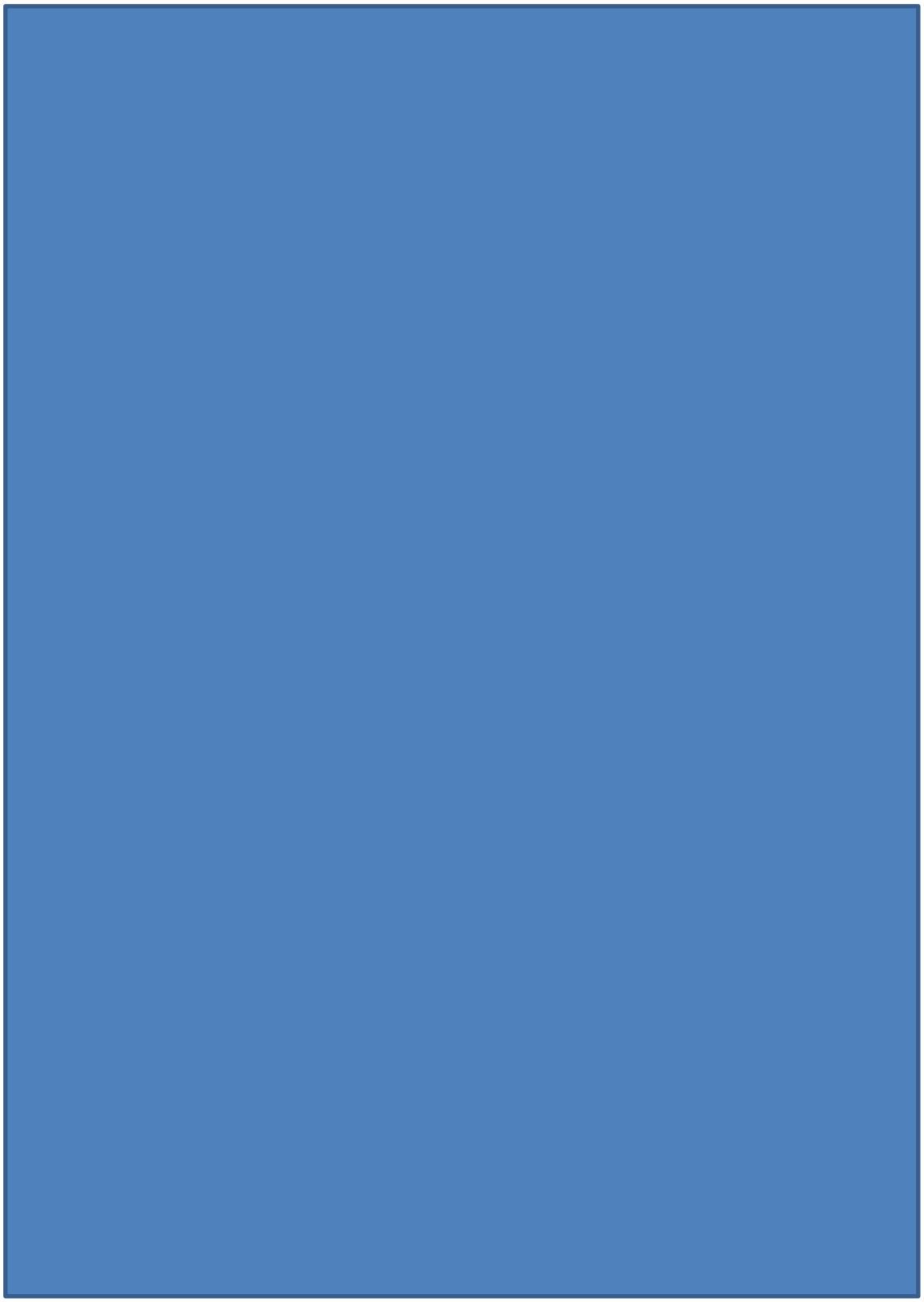
3: Midwestern AgEnergy - Underwood Facility - 9,850' Vertical CO2 Sequestration Well - Day Rate Drill & Completion	Job Planning, Location Prep, & Drilling Cost Subtotal	Completion Cost, Restoration / Cleanup, & Reporting Subtotal	TOTAL
Shaker Screens	$ 20,000	$ -	$ 20,000
Consumables	$ 11,000	$ -	$ 11,000
Rig Monitor			
Day Rate	$ 24,570	$ -	$ 24,570
Set up / Tear Down	$ 1,000	$ -	$ 1,000
BOP Rental	$ 27,300	$ -	$ 27,300
BOP Nipple Up / Test / Nipple Down	$ 8,200	$ -	$ 8,200
Rental Spools / Adapters	$ -	$ -	$ -
Drill Pipe / Collars	$ -	$ -	$ -
Stabilizers / Jars	$ 18,500	$ -	$ 18,500
Rental Subs / Crossovers	$ 100	$ -	$ 100
Add'l Pipe Racks	$ 70	$ -	$ 70
Drill Bits			
Surface Hole: 17.5 "	$ 5,000	$ -	$ 5,000
Intermediate Hole 12.25	$ 5,000	$ -	$ 5,000
Production Hole: 9.5"	$ 36,000	$ -	$ 36,000
Cleanout Bit	$ 4,500	$ -	$ 4,500
Drilling Equipment Inspection / Redress	$ 10,000	$ -	
Welding Services	$ 10,000	$ -	$ 10,000
Add'l Transportation (Drilling Equipment)	$ 18,000	$ -	$ 18,000
Directional Drilling Services			
Mud Motor	$ 30,875	$ -	$ 30,875
Standby Rate	$ -	$ -	$ -
Per Diem	$ -	$ -	$ -
Mob / Demob / Add'l Charges	$ -	$ -	$ -
LIH Insurance	$ -	$ -	$ -
Inspection / Redress	$ 19,000	$ -	$ 19,000
Fluids & Solids Control			
Mud Engineer	$ -	$ -	$ -
Drilling Mud	$ 85,750	$ -	$ 85,750
Mudlogging			
Mudlogging RU / RD	$ 500	$ -	$ 500
Mudlogging Services	$ 66,000	$ -	$ 66,000
Mudlogging Standby	$ 9,500	$ -	$ 9,500
Mudlogging Transportation	$ 4,000	$ -	$ 4,000
Closed Loop Solids Control Day Rate	$ 61,250	$ -	$ 61,250
Closed Loop Solids Control RU / RD	$ 3,600	$ -	$ 3,600
Closed Loop Solids Control Screens	$ 6,100	$ -	$ 6,100
Closed Loop Solids Control Chemicals	$ 10,000	$ -	$ 10,000
Closed Loop Solids Control Transportation	$ 20,000	$ -	$ 20,000
Solids Disposal	$ 68,500	$ -	$ 68,500

3: Midwestern AgEnergy - Underwood Facility - 9,850' Vertical CO2 Sequestration Well - Day Rate Drill & Completion	Job Planning, Location Prep, & Drilling Cost Subtotal	Completion Cost, Restoration / Cleanup, & Reporting Subtotal	TOTAL
Solids Transport	$ -	$ -	$ -
Mud Disposal	$ 300	$ -	$ 300
Mud Transport	$ 1,000	$ -	$ 1,000
Liquids Disposal	$ 100	$ -	$ 100
Liquids Transport	$ 4,800	$ -	$ 4,800
Water & Transportation (per load)	$ 6,400	$ -	$ 6,400
Brine & Transportation (per load)	$ 10,000	$ -	$ 10,000
Casing Crews & Equipment			
Run Surface: 13 3/8"	$ 5,140	$ -	$ 5,140
Run Intermediate: 10 3/4"	$ 9,050	$ -	$ 9,050
Run Production: 7"	$ 10,000	$ -	$ 10,000
CRT Surface Casing	$ 3,800	$ -	$ 3,800
CRT Intermediate Casing & Torque Turn	$ 6,000	$ -	$ 6,000
CRT Production Casing & Torque Turn	$ 7,150	$ -	$ 7,150
Clean / Inspect / Drift Surface	$ 3,500	$ -	$ 3,500
Clean / Inspect / Drift Intermediate	$ 4,750	$ -	$ 4,750
Clean / Inspect / Drift Production	$ 5,880	$ -	$ 5,880
Wellhead Installation Services	$ 18,900	$ 6,300	$ 25,200
Cementing Services & Equipment			
Surface: 13 3/8"	$ 26,771	$ -	$ 26,771
Intermediate: 10 3/4"	$ 43,330	$ -	$ 43,330
Production: 7"	$ 57,108	$ -	$ 57,108
Plug and Abandon	$ -	$ -	$ -
Coring			
Coring 30 ft	$ -	$ -	$ -
Coring 60 ft	$ 278,763	$ -	$ 278,763
Wellsite Handling	$ 20,000	$ -	$ 20,000
Core Analysis	$ -	$ 100,000	$ 100,000
Logging / Wireline			
Gyro Survey	$ -	$ -	$ -
Flo-Drift	$ 21,850	$ -	$ 21,850
Surface Open Hole	$ -	$ -	$ -
Surface Cased Hole	$ 8,000	$ -	$ 8,000
Intermediate Open Hole	$ 210,000	$ -	$ 210,000
Intermediate Cased Hole	$ 24,000	$ -	$ 24,000
Production Open Hole (including VSP)	$ 370,000	$ -	$ 370,000
Production Cased Hole	$ 30,000	$ 30,000	$ 60,000
MIT Logging	$ -	$ 30,000	$ 30,000
COMPLETION			
Workover Rig			
Mobilization	$ -	$ 10,000	$ 10,000

3: Midwestern AgEnergy - Underwood Facility - 9,850' Vertical CO2 Sequestration Well - Day Rate Drill & Completion	Job Planning, Location Prep, & Drilling Cost Subtotal	Completion Cost, Restoration / Cleanup, & Reporting Subtotal	TOTAL
Demobilization	$ -	$ 50,000	$ 50,000
Infield Move	$ -	$ -	$ -
Day Rate	$ -	$ 118,405	$ 118,405
Crew Per Diem	$ -	$ 11,700	$ 11,700
Extra Equipment	$ -	$ -	$ -
Consumables	$ -	$ 2,400	$ 2,400
Perforating	$ -	$ 18,000	$ 18,000
Slickline Services	$ -	$ -	$ -
Wireline Services (Packer Setting, etc)	$ -	$ -	$ -
Wireline Logging	$ -	$ 14,000	$ 14,000
Tubing Running Crew / Services	$ -	$ 13,200	$ 13,200
Tubing Clean / Drift / Inspection	$ -	$ 6,500	$ 6,500
Tubing Testing Crew	$ -	$ 31,250	$ 31,250
DAS and Gauges	$ -	$ 350,000	$ 350,000
DAS and Gauges Installation	$ -	$ 25,000	$ 25,000
Completion Fluids	$ -	$ 26,000	$ 26,000
Annulus Fluid Inhibitor	$ -	$ 2,100	$ 2,100
Mills / Bits	$ -	$ 3,500	$ 3,500
Workstring / Collars / Handling Tools Rental	$ -	$ 15,000	$ 15,000
Packer Installation Rentals	$ -	$ 2,100	$ 2,100
BOP Rental	$ -	$ 9,900	$ 9,900
Packer Installation Services	$ -	$ 13,000	$ 13,000
Workover Equipment Inspection / Redress / Damages	$ -	$ 10,000	$ 10,000
Add'l Transportations (Completion)	$ -	$ 8,000	$ 8,000
Miscellaneous Expenses			
Miscellaneous Expenses	$ 13,100.00	$ 5,200	$ 18,300
Subcontractors / Services / Rentals Handling Fee	$ 365,524	$ 104,159	$ 469,682
Subcontractors / Services / Rentals Subtotal	$ 4,020,760	$ 1,145,744	$ 5,166,504
LABOR & SERVICE SUBTOTAL (NONTANGIBLES)	**$ 4,557,970**	**$ 1,293,864**	**$ 5,851,834**
UNIT RATE MATERIALS (TANGIBLES)			
Conductor	$ -	$ -	$ -
Surface 13 3/8" 54.5# J55 BTC	$ 39,036.00	$ -	$ 39,036
Intermediate 10 3/4" 45.5 # L80	$ 96,670.00	$ -	$ 96,670
Intermediate 10 3/4" 13 Cr L80	$ 158,922.50	$ -	$ 158,923
Production 7 " 26 # L80 BTC	$ 135,450.00	$ -	$ 135,450
Production 7" 29 # 13Cr95	$ 103,270.00	$ -	$ 103,270
Production: 4 1/2" 13 Cr JFE Bear	$ -	$ 449,595	$ 449,595
Surface Casing Float Equipment & Plug Set	$ 3,350	$ -	$ 3,350
Intermediate Casing Float Equipment & Plug Set	$ 5,050	$ -	$ 5,050

3: Midwestern AgEnergy - Underwood Facility - 9,850' Vertical CO2 Sequestration Well - Day Rate Drill & Completion	Job Planning, Location Prep, & Drilling Cost Subtotal	Completion Cost, Restoration / Cleanup, & Reporting Subtotal	TOTAL
Production Casing Float Equipment & Plug Set	$ 37,500	$ -	$ 37,500
Downhole Nipples	$ -	$ -	$ -
Completion Screens / Tools	$ -	$ -	$ -
Sump Packer	$ -	$ -	$ -
Production Packer	$ -	$ 41,000	$ 41,000
Wellhead Equipment A Section	$ 11,000	$ -	$ 11,000
Wellhead Equipment B Section	$ 11,500	$ -	$ 11,500
Wellhead Equipment C Section	$ 16,500	$ -	$ 16,500
Wellhead Tree	$ -	$ 80,000	$ 80,000
Drilling Fluid Materials / Chemicals	$ -	$ -	$ -
State & Local Taxes	*$ 30,912*	$ 28,530	*$ 59,442*
Materials Handling Fee	$ 64,916	$ 59,912	$ 124,829
MATERIAL SUBTOTAL (TANGIBLES)	$ 714,077	$ 659,037	$ 1,373,114
MILESTONE SUBTOTAL	$ 5,272,047	$ 1,952,901	$ 7,224,948
Contingency	*$ 527,205*	*$ 195,290*	*$ 722,495*
MILESTONE TOTAL	$ 5,799,252	$ 2,148,191	$ 7,947,443
CUMULATIVE TOTAL			$ 7,947,443

APPENDIX D: GEOSTOCK SANDIA SCHEDULE OF BILLING RATES



APPENDIX D

Letters of Support

GREAT RIVER ENERGY™

12300 Elm Creek Boulevard
Maple Grove, Minnesota 55369-4718
763-445-5000
greatriverenergy.com

March 31, 2020

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 Stratigraphic Test Well

Dear Ms. Karlene Fine:

Great River Energy (GRE) submits this letter in support of Midwest AgEnergy Group's NDIC grant application for a stratigraphic test well. GRE is the majority owner of Midwest AgEnergy and owns and operates Coal Creek Station, which provides steam and water supply to Midwest AgEnergy's Blue Flint Ethanol facility near Underwood, North Dakota.

Midwest AgEnergy is continuing to study the potential for carbon capture and storage at Blue Flint Ethanol facility. 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 Lignite Research Council grant application for assistance in pursuing a stratigraphic test well and the associated research. If this project were to be successful, it would be very valuable to the owners of coal reserves and the operators in the region by demonstrating carbon storage in central North Dakota is a reasonable option. The information to be gathered through stratigraphic boring and core analysis will be of interest to any coal related asset in central North Dakota.

Great River Energy fully supports this project and looks forward to reviewing the results of this effort. If you have any questions, please feel free to contact me at 612.747.8615 or eolsen@grenergy.com.

Sincerely,

Great River Energy

Eric J. Olsen
Vice President and General Counsel

March 30, 2020

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

Dear Ms. Fine:

The North American Coal Corporation (NACoal) is pleased to support Midwest AgEnergy's NDIC grant application for a stratigraphic test well near the Falkirk Mine. Midwest AgEnergy is continuing to study the potential for carbon dioxide capture and storage from their Blue Flint Ethanol facility near Underwood, North Dakota. If this project were to be successful, the data and knowledge gained by the partners could be valuable to entities and operators doing business in McLean County by demonstrating carbon dioxide storage in central North Dakota is technically feasible and a reasonable option.

We are supportive of research and development strategies and programs that help gather facts and evidence to prove sequestering or using carbon dioxide as a beneficial product is technically feasible. The information to be gathered through stratigraphic boring and core analysis will be valuable to any coal related asset in central North Dakota.

NACoal has benefited greatly from knowledge gained and collaborative opportunities available through research programs with multiple partners. We also have a vested interest in helping our partners enhance, preserve, and protect existing coal resources for decades to come; and we believe this project will lead to more opportunities for those that share that same interest—especially since Blue Flint is powered by fuel from lignite.

We look forward to seeing the results of this opportunity and will continue working to benefit the many people who rely on the lignite industry. If you have any questions, please feel free to contact me at 701-222-7596 or David.Straley@NACoal.com.

Sincerely,

The North American Coal Corporation

David Straley
Director, Government and Public Affairs

STATE OF NORTH DAKOTA
DEPARTMENT OF AGRICULTURE
600 E BOULEVARD AVE, DEPT 602
BISMARCK, ND 58505-0020

DOUG GOEHRING
COMMISSIONER

March 23, 2020

Ms. Karlene Fine
Executive Director
North Dakota Industrial Commission
600 East Boulevard Ave. Dept 405
Bismarck, ND 58505-0840

RE: Support of Midwest AgEnergy NDIC grant application for stratigraphic test well

Dear Ms. Karlene Fine:

Midwest AgEnergy Group is continuing to study the potential for carbon capture and storage at their Blue Flint Ethanol facility near Underwood, North Dakota. 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 dedication to stewardship of our natural resources and community outreach efforts.

We support Midwest AgEnergy's Lignite Research Council grant application for assistance in pursuing a stratigraphic test well and the associated research. If this project were to be successful, it would be incredibly valuable to the owners of coal reserves and the operators' in McLean County by demonstrating carbon storage in central North Dakota is a reasonable option.

Developing long-term strategies to mitigate CO2 emissions is an integral part keeping coal as a viable option in our country's energy mix. The information to be gathered through stratigraphic boring and core analysis will be valuable to any coal related asset in central North Dakota.

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

Sincerely,

Doug Goehring
North Dakota Agriculture Commissioner

March 23,2020

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 Stratigraphic Test Well

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 Blue Flint Ethanol facility. As a Senator in District 8 this project is important to the long term viability of Blue Flint and the coal resources that exist in our area.This project also supports our agriculture community as millions of bushels of corn from central North Dakota are used annually to produce ethanol at this plant. The plant depends on the burning of coal and thus it's future depends on carbon capture.

Midwest AgEnergy Group is continuing to study the potential for carbon capture and storage at their Blue Flint Ethanol facility near Underwood 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 Lignite Research Council grant application for assistance in pursuing a Stratigraphic Test Well and the associated research. If this project were to be successful, it would be incredibly valuable to the owners of coal reserves and the operators' in McLean County by demonstrating carbon storage in central ND is a reasonable option.

Developing long-term strategies to mitigate CO2 emissions is an integral part keeping coal as a viable option in our countries energy mix. The information to be gathered through stratigraphic boring and core analysis will be valuable to any coal related asset in central ND.

I give this project its highest support and look forward to reviewing the results of this effort. If you have any questions, please feel free to contact me at hcandersson@nd.gov or 701.861.9749.

Sincerely,

Howard C. Anderson Jr.

Senator Howard C. Anderson Jr.

March 23, 2020

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 Stratigraphic Test Well

Dear Ms. Karlene Fine:

Midwest AgEnergy Group is continuing to study the potential for carbon capture and storage at their Blue Flint Ethanol facility near Underwood 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.

I support Midwest AgEnergy's Lignite Research Council grant application for assistance in pursuing a Stratigraphic Test Well and the associated research. If this project were to be successful, it would be incredibly valuable to the owners of coal reserves and the operators' in McLean County by demonstrating carbon storage in central ND is a reasonable option.

Developing long-term strategies to mitigate CO2 emissions is an integral part keeping coal as a viable option in our countries energy mix. The information to be gathered through stratigraphic boring and core analysis will be valuable to any coal related asset in central ND.

I give this project the highest support and look forward to reviewing the results of this effort. If you have any questions, please feel free to contact me at 701-355-0364 or vrlaning@nd.gov.

Sincerely,

Vernon Laning

Vernon Laning
District 8 Representative

APPENDIX E

Participant Qualifications

Experience and Qualifications

William Armstrong, P.E. **William.Armstrong@GeostockSandia.com**
Principal Engineer **(346) 314-4298**
www.GeostockSandia.com

SUMMARY

Over 35 years of engineering and consulting experience with disposal/injection, hydrocarbon storage, and CO_2 sequestration wells. Responsible for the design and installation of new wells, and the design and performance of remedial workover, stimulation, and testing for existing wells. Also, responsible for providing client interface, regulatory support, project planning and management services, as well as supervision during the execution of these projects.

PROFESSIONAL EXPERIENCE

Geostock Sandia, LLC, Houston, TX – Vice President – Field Services 2001 to Present
Responsible for project management, engineering design, and well site supervision of brine and waste disposal wells, CO_2 sequestration wells, and hydrocarbon storage wells and supervision and direction of engineers and geologists on injection/disposal well projects.
Select project experience includes:

- Arcelor Mittal – Designed, drilled, and installed the Waste Ammonia Liquor (WAL) No. 3 disposal well, at its manufacturing facility located in Portage, Indiana. Designed and supervised all the maintenance work on the facilities four Class I hazardous disposal wells and one deep monitor including four major workovers/recompletions, stimulations, and annual testing projects since 1986.
- DuPont China - Designed, drilled, and installed a stratigraphic test well to assess the potential for injection.
- Tesoro – Designed, drilled, installed, and tested two Class I non-hazardous injection wells. Designed and supervised maintenance and testing projects on the two wells.
- Dakota Gasification Company - Designed and supervised all the maintenance work on the facilities two Class I disposal wells including workovers, stimulations, and annual testing projects since 1986.
- Phillips 66 - Designed and conducted multiple maintenance projects on hydrocarbon storage wells at Benedum and Goldsmith TX and Medford, OK.
- Sasol – Designed and installed the facilities new Class I injection well. Designed and supervised the workovers, clean outs, stimulations, and MITs on facilities two wells.

Texas World Operations, Inc., Houston, TX – VP / Operations Manager 1986 to 2000
General manager for the firm. Supervision and direction of engineers and geologists on injection/disposal well projects. Project engineering and field supervision. Engineering design, project management, and field supervision of Class I disposal wells, Class V lateral injection wells, deep monitor wells, sidetracking of existing wells to improve injection properties, chemical and mechanical stimulation projects to improve the injection performance, and other maintenance work on disposal wells to restore and maintain mechanical integrity. Supervised the preparation of state and federal permits and no-migration petitions. Contract negotiations with clients and subcontractors

Cockrell Oil Corporation, Houston, TX – Drilling and Production Engineer 1983 to 1986
Design and field supervision for several land drilling projects. Coordination and supervision of the drilling and production operations for a new field in Michigan. Planned, coordinated, and supervised workovers and recompletions, the plugging and abandonment of ten (10) offshore satellite wells, a field abandonment project in South Louisiana, and numerous wireline recompletions. Supervised the installation and maintenance of production equipment

Phillips Petroleum Company, Bartlesville, OK - Technician 1980 to 1981
Worked as technician in the Research and Development Department. Responsible for setting up and running enhanced oil recovery simulations. Experience and responsibilities included: Ran enhanced oil recovery polymer and surfactant floods under ambient conditions; Ran enhanced oil recovery polymer and surfactant floods under simulated reservoir conditions; Installed and tested a computer controlled automated core laboratory; and, Recording and collecting the data from the enhanced oil recovery simulations.

EDUCATION/CERTIFICATIONS

Bachelors of Science, Chemical Engineering - Louisiana Tech University

Bachelors of Science, Biology - University of Arkansas at Little Rock

OSHA Refresher

IADC WellSharp Well Control

Randy Smith Well Control School

Halliburton Cementing School

Formation Damage Prevention, SPE

Sand Control Methods, SPE

Hazardous Waste Operations Comprehensive, Metcalf & Eddy

OSHA Supervisors Training, Texas A&M

OSHA Training, Texas A&M

PROFESSIONAL ASSOCATIONS

Registered Professional Engineer, Texas (Serial Number 76312)

Society of Petroleum Engineers (SPE)

Experience and Qualifications

Capucine Courault **capucine.courault@geostocksandia.com**
Manager of Geology & Geophysics **(346) 314-4332**
www.GeostockSandia.com **https://www.linkedin.com/in/capucine-courault-49808b149/**

SUMMARY

Senior geologist with more than 10 years of experience in underground gas storage in depleted field, salt dome, and mined cavern. Data analysis for optimized recommendations for storage operators, geologic studies and mapping, due diligence, project management.

PROFESSIONAL EXPERIENCE

GEOSTOCK US / GEOSTOCK SANDIA, Houston, TX **2008 - Present**
Manager of Geology and Geophysics for underground gas storage (2017-2018)
Senior Geologist (2014-2017), Geologist (2008-2014)
Depleted field storage: Field study, reservoir mapping and analysis; Attention to reservoir specificities that can impact storage operation; and Due diligence.
Salt dome storage: Prefeasibility studies: geological and hydrogeological settings, salt dome mapping; Geological programs of salt cavern wells: permit application, logging and coring programs, log analysis and core description; and Follow-up of salt cavern development: iterative update of geological analyses with acquired field data.
Mined cavern storage: Field geologist, core description, monitoring well testing; Coordination with hydrogeological and geomechanical experts for storage evaluation; and Hydrogeological monitoring.

GEOSTOCK, **France** **2008**
Geological data acquisition for projects of Geostock US

ICF Environment (environmental consultant), **France** **2006 - 2007**
Project engineer for environmental studies
Project management for site(s) assessment (quality of soil and underground water): historical and vulnerability data acquisition, field investigations planning and execution, data analysis for recommendations on future site development. Field supervision for contaminated soil excavation.

Association Scientifique pour la Géologie et ses Applications, France **2005**
Staff scientist for Environmental site study for Gaz de France
Synthesis of environmental impact studies of past gas plants. Bibliographical study about ferro/ferri-cyanides behavior in soils and underground waters. Presentation of results to Gaz de France.

SITA Centre Est (waste management), **France** **2004**
Intern - Study of a waste facility impact on water quality
Preliminary study: site history and activity, compilation of site geological and hydrogeological data. Report writing with conclusions and recommendations in order to improve the site impact control.

LEM (Laboratoire Environnement et Minéralurgie), France **2003**
Research study: Kinetics textile coloring decomposition study for an industrial application
Bibliographical study. Experimentation: UV and infrared spectrometry measures in order to follow-up the kinetics process

EDUCATION/CERTIFICATION

Professional geologist (PG): Texas

2004: Geologic Engineer (Ecole Nationale Supérieure de Géologie), France – Master equivalent

2003-2004: Universitat Politècnica de Catalunya, Spain – University exchange program
Earth Sciences, applied geology, geotechnics, development/environment, hydraulics

PROFESSIONAL ASSOCATIONS

American Association of Petroleum Geologists

LANGUAGES

English: fluent and technical

French: fluent and technical, native language

Spanish: fluent and technical, one year studying in Barcelona, Spain

German: intermediate

GEOSTOCK SANDIA ENTREPOSE

Daniel J. Collins, CPG, RG

Education

Masters of Science, Geology
University of Delaware, 1980-1982

Bachelors of Science, Geology
University of Delaware, 1976-1980

Production Systems An. Using Prosper/MBAL	2001	Structural Analysis, Exxon	1985
Visual MODFlow, Waterloo Hydro (NWWA)	1996	Reservoir Geology, Exxon	1985
Falloff Test Analysis, RDS, Inc.	1995	Operations Geology, Exxon	1984
OSHA Supervisors Training, DuPont	1992	Advanced Well Analysis, Schlumb.	1984
OSHA Training, DuPont	1988	Hydrocarbon Well Logging, EG&G	1983
Fundamentals of RCRA, DuPont	1988	Basic Well Logging, Exxon	1983
Risk Assessment Methods, Exxon	1985		

Research & Professional Experience

Geostck Sandia, LLC – Sr. Principal Geologist **1997 - Present**

Provides principal technical consulting and project management for first-in-kind carbon sequestration pilot demonstration project in the United States (Frio Brine Pilot) and currently managing South Louisiana Small Scale Sequestration Pilot. Provides principal consulting for Class I hazardous and non-hazardous deepwell disposal sites and facilities under the Underground Injection Control program. Skills include injectate and groundwater flow model conceptualization, organizing project work teams, interpreting and mapping subsurface geology/stratigraphy, aquifer test analysis, field activity and wellsite supervision, Land Ban regulations, and document preparation of State Permit Applications and Federal No Migration Petitions for Class I hazardous and nonhazardous injection wells.

DuPont Environmental Remediation Services – Project Director **1987 - 1996**

Provided principal consulting for 15 Class I hazardous and non-hazardous deepwell sites and 10 facilities under RCRA corrective action. Duties included supervision/leadership of a groups of professional engineers and geologists generating Land Ban exemption petitions and state permits for Class I waste injection operations, deepwell feasibility studies, preparation of site work plans for confirmatory sampling investigations, monitoring well installation and unit closures, facility acquisition/divestiture assessments, and specific budget, schedule and scope management of over 100 projects. Skills include organizing work teams, interpreting subsurface geology/stratigraphy, aquifer test analysis, groundwater flow model conceptualization, Land Ban regulations and writing sections of documents.

Exxon Co., USA – Sr. Geologist **1982 - 1987**

Responsible for generating oil and gas exploration prospects on company lease holdings and State waters, developing regional subsurface structure maps and models of paleo-depositional patterns, analyzing well logs for hydrocarbon potential and monitoring industry activity. Responsible for implementing a detailed study of a producing oil and gas field and recommending additional infill/step-out drilling locations. Evaluated geological hazards and prepared drilling programs with engineering department for the district's wildcat wells. Performed well site evaluation of drilling parameters for abnormal pressure detection and wellsite geophysical well log evaluation for hydrocarbons.

Publications

Freeman, D. R., Collins, D. J., Stehle, D. E., Hovorka, S. D., Meckel, T. A., and Trevino, R., 2009, Design of research well instrumentation for a long-duration CO2 flood the Southeast Carbon Sequestration Partnership (SECARB) Phase III DAS Cranfield Project: Carbon Sequestration Conference Proceedings, Ninth Annual Conference on Carbon Sequestration, Paper 880, Pittsburgh., Pa.

Shirley, D. H., Collins, D. J., and Boyer, J. L., 2009, Exploring Geologic CO_2 Storage in Arizona: Southwest Hydrology, September/October, pp. 28-29.

Collins, D. J., Duguid, A., and Papadeas, P. W., 2008, Potential strategies for demonstrating mechanical integrity in CO2 injection wells; Carbon Sequestration Conference Proceedings, Seventh Annual Conference on Carbon Sequestration, Paper 445, Pittsburgh, Pa.

Collins, D. J., Hovorka, S. D., and Freeman, D. R., 2008, Design of Research Well Instrumentation for a long-duration CO2 flood, the Southeast Carbon Sequestration Partnership (SECARB) Phase II Cranfield Project; Carbon Sequestration Conference Proceedings, Seventh Annual Conference on Carbon Sequestration, Paper 311, Pitt., Pa.

Freifeld, B. M., Trautz, R. C., Kharaka, Y. K., Phelps, T. J., Myer, L. R., Hovorka, S. D., and Collins, D. J., 2005, The U-Tube: A Novel System for Acquiring Borehole Fluid Samples from a Deep Geologic CO_2 Sequestration Experiment; Journal of Geophysical Research, v. 110, b10203.

Collins, D. J., Miller E. A., Hovorka, S. D., Holz, M. H., and Myer, L. R., 2005, From concept to reality: A systematic project management approach for field implementation of the Frio Brine Pilot Test; Carbon Sequestration Conference Proceedings, Fourth Annual Conference on Carbon Sequestration, Paper 48, Alexandria, Va.

Papadeas, P. W., Collins, D. J., Hovorka, S. D., Holz, M. H., and Knox, P., 2005, Review of existing injection well permit regulations and expectations of future geologic sequestration CO_2 regulations with monitoring conditions; Carbon Sequestration Conference Proceedings, Fourth Annual Conference on Carbon Sequestration, Paper 33, Alexandria, Va.

Synergistic Activities

2014 to Present	Project Investigator for Geomechanics of Mesozoic Basins Project
2011 to 2015	Project Manager for Field Services Provider to South Louisiana Small-Scale Sequestration R&D Project
2009 to 2017	Project Investigator for Newark Basin Characterization Project
2008 to 2014	Project Manager for Field Services Provider to SECARB Cranfield Phase III
2008 to 2011	Project Manager for Field Services Provider to WestCarb Az Utilities Phase II
2007 to 2014	Project Manager for Field Services Provider to SECARB Cranfield Phase II & Phase III

BARRY W. BOTNEN
Senior Hydrogeologist
Energy & Environmental Research Center (EERC), University of North Dakota (UND)
15 North 23rd Street, Stop 9018, Grand Forks, North Dakota 58202-9018 USA
Phone: 701.777.5073, Fax: 701.777.5181, E-Mail: bbotnen@undeerc.org

Principal Areas of Expertise

Mr. Botnen has over 20 years of experience in carbon dioxide (CO_2) sequestration/storage, contaminated site assessment, contaminant release investigation, remedial design/action, wetlands identification/delineation, biota studies, and the stewardship of contaminated nuclear sites. He has performed numerous subsurface site investigations relating to hazardous wastes and has completed many Phase I and Phase II site assessments as well as Phase III cleanup activities.

Qualifications

B.S., Environmental Geology and Technology, University of North Dakota, 1994.

Professional Experience

2019–Present: Senior Hydrogeologist, EERC, UND.

2001–2019: Hydrogeologist, Oilfield Operations Group, EERC, UND. Mr. Botnen currently supports multiple activities for the U.S. Department of Energy's (DOE's) CarbonSAFE Program. He was a key member of the Plains CO_2 Reduction (PCOR) Partnership team, one of seven regional partnerships funded by DOE's National Energy Technology Laboratory Regional Carbon Sequestration Partnership Program. The PCOR Partnership Program was a three-phase, multiyear, multimillion-dollar program, focused on assessing the technical and economic feasibility of capturing and storing CO_2 emissions from stationary sources in the northern Great Plains and adjacent area. Most recently, Mr. Botnen has been working to develop and implement monitoring, verification, and accounting concepts for large-scale (>1 million tons per year) CO_2 storage and enhanced oil recovery operations. He also served as the task leader for the Terrestrial Field Validation Test portion of the PCOR Partnership. Mr. Botnen has extensive experience in the design and construction of groundwater and soil remediation systems.

1996–2001: Associate Geologist, OASIS Environmental, Inc., Anchorage, Alaska. Mr. Botnen's responsibilities included the following:

- Project manager for an Alaska Railroad Corporation site assessment to identify appropriate remedial alternatives.
- Remedial investigations at King Salmon Air Force Base, Alaska, and Elmendorf Air Force Base, Alaska, as part of a staff augmentation with Radian International Inc. and Jacobs Engineering.
- Wetland identifications/delineations for remote natural gas drilling operations.
- Determination of wetland areas to be permitted for access roads and drill pad construction along the western edge of Cook Inlet.

- Project manager for a Tesoro, Alaska, release investigation, including installing and sampling groundwater-monitoring wells and soil borings, oversight of remedial design using soil vapor extraction (SVE) and AS techniques.
- Quality assurance supervisor for construction of a fuel pipeline traversing the coastal mudflats from the Port of Anchorage to the Anchorage International Airport.
- Field geologist for the following projects:
  - Elmendorf Air Force Base pipeline release assessment.
  - Several projects at King Salmon Airport, including field supervision for a contaminated site excavation, sampling in a support of a wetland and human food chain pathway evaluation, assisting in a wetland revegetation project, preparing project proposal costs for a postclosure monitoring program, and conducting field work and associated administrative tasks for a treatability study.
- Excavation of the Trans-Alaska Pipeline System (TAPS) in Thompson Pass near Valdez, Alaska.
- Site assessment and remedial action in Valdez, Alaska, involving a diesel release at the Robe River Pumphouse.
- Environmental site assessments at four former construction camps along the TAPS.
- Wetlands delineation project at Fort Richardson, Alaska.
- Wetlands delineation and biota sampling project at King Salmon Airport.

Professional Membership
National Groundwater Association

Publications and Presentations
Has authored or coauthored numerous professional publications.

JOHN A. HAMLING
Assistant Director for Integrated Projects
Energy & Environmental Research Center (EERC), University of North Dakota (UND)
15 North 23rd Street, Stop 9018, Grand Forks, North Dakota 58202-9018 USA
701.777.5472 (phone), 701.777.5181 (fax), jhamling@undeerc.org

Principal Areas of Expertise
Mr. Hamling has over 10 years of combined experience in unconventional oil and gas development, enhanced oil recovery (EOR), and carbon capture, utilization, and storage (CCUS).

Qualifications
B.S., Mechanical Engineering, University of North Dakota, 2007.
Associate of Science, Associate of Arts, Williston State College, 2004.
Certified Engineer in Training (EIT)

Professional Experience
2018–Present: Assistant Director for Integrated Projects, EERC, UND. In this role, Mr. Hamling brings scientific and engineering innovation to field demonstrations. The major objective in this role is to catalyze and implement pioneering solutions that facilitate the prudent development and use of fossil energy. One of his primary focuses is to advance the commercial application of geologic CO_2 utilization and improved oil recovery in both conventional and unconventional oil plays. Experience includes design, implementation, and oversight of surface, near-surface, deep subsurface, and reservoir characterization and surveillance programs for geologic CO_2 storage and EOR. Mr. Hamling has led efforts resulting in development, proof-of concept, and validation of improved monitoring and characterization techniques applicable to dedicated and associated geologic CO_2 storage and EOR applications. He advises development, testing, and commercial demonstration of IOR techniques to improve EUR of oil in conventional and unconventional tight oil plays. He led and advised development and field demonstration of novel geophysics techniques for commercial surveillance of geologic CO_2 storage and EOR. Expertise includes well-logging principals and applications; produced water treatment; saltwater disposal; water management; CCUS policy and regulatory environment; well drilling; well completions; wellbore integrity; risk assessment; logistics; well stimulation; IOR; enhanced recovery in tight oil plays; and HSE programs. Mr. Hamling has served as PM/PI/task lead for multiyear, multimillion-dollar field-based demonstration R&D projects in collaboration with industrial partners. Leads multidisciplinary team of geophysics, data analytics, operations, reservoir surveillance and policy and regulatory experts. Activities encompass contract research and strategic partnership programs with state of North Dakota, DOE, and private industry to propel development and implementation of approaches to benefit practical energy development.

2017–Present: Adjunct Lecturer, Department of Petroleum Engineering, UND.

2009–2018: Principal Engineer/Oilfield Operations Group Lead (2012–2018), Research Manager (2011–2012), Research Engineer (2009–2011), EERC. PM/PI/task lead for multiyear, multimillion-dollar projects, leading multidisciplinary team of scientists and engineers working to develop and implement MVA concepts for large-scale (>1 MT/yr) CO_2 storage and EOR operations. Worked with teams to develop, design, and implement new approaches to benefit economic exploration, development, and production of oil and gas. Worked on design and implementation of new approaches to benefit exploration, development, and production of oil and gas and with PCOR Partnership, evaluating potential for CO_2 storage in geologic formations. Responsibilities included field operations design, deployment, and interpretation related to oilfield technologies applicable to the CO_2 capture and storage industry; laboratory functions related to Applied Geology Laboratory; data analysis; regulatory compliance; communication of operations between service providers, management teams, industry partners, and governmental organizations, and investigation and/or demonstration of techniques and/or technologies that can enhance oil and gas production or economically benefit the oil and gas industry while reducing environmental footprint of drilling and production operations.

2007–2009: Reservoir Evaluation Engineer/HSE Rep/Loss Prevention Team Lead, Schlumberger Ltd.

Professional Activities

- Continuous collaboration with Denbury Onshore LLC since 2009 focused on Bell Creek oil field, including geologic characterization and modeling, reservoir simulation, and field testing of >16 research-monitoring techniques through PCOR Partnership large-scale field demonstration project and other DOE-funded projects. Activities included drilling/recompletion of five wells, collection of >90 PNL logs, deployment and processing of permeant geophone array and casing-conveyed downhole pressure/temperature gauges.

- Senior project advisor for two Williston Basin unconventional tight oil rich gas/CO_2 EOR field injection tests.

- Managed drilling and completion of ten new wells; design, construction, and operation of million-dollar brine treatment and produced water test bed facility; deployment of casing-conveyed pressure/ temperature systems; installation, operation, and interpretation of permanent geophone array for passive and active seismic monitoring; acquisition and interpretation of time-lapse 3-D seismic surveys in active commercial EOR project covering >40 mi^2; development and field testing of novel geophysical monitoring systems for commercial EOR floods; collection and analysis of over 500 ft of core; and collection and interpretation of well logs for over 400 wells for characterization and time-lapse monitoring (including production log to evaluate well performance (i.e., time-lapse corrosion logs, time-lapse fluid saturation logs, flow logs, pressure and fluid sampling).

- Schlumberger Wireline Engineer. Designed and oversaw open and cased-hole logging operations for >300 wells in both conventional and unconventional oil and gas plays. Field testing and validation of pre-commercialization applications of logging tools for unconventional reservoirs. Also served as HSE officer, loss prevention team lead, and explosives and radiation safety officer for wellsite activities.

- Vice-Chair and Communications Chair, Society of Petroleum Engineers International Williston Basin Section since 2012. Developed and coordinated technical program on evolving drilling and stimulation practices and emerging technologies in Williston Basin.

Publications and Presentations

Has authored and coauthored numerous technical publications.

LONNY L. JACOBSON
Principal Operations Specialist and Oilfield Operations Team Lead
Energy & Environmental Research Center (EERC), University of North Dakota (UND)
15 North 23rd Street, Stop 9018, Grand Forks, North Dakota 58202-9018 USA
701.777.5331 (phone), 701.777.5181 (fax), ljacobson@undeerc.org

Principal Areas of Expertise

Mr. Jacobson's principal areas of interest and expertise include drilling and completion design; logging; coring; monitoring, verification, and accounting (MVA) plans; permit preparation for Class I, II, and VI wells; optimizing wellsite layout for well servicing/completions; hydraulic fracturing techniques; logistics; field implementation planning; site management; and economic cost–benefit analysis of projects.

Qualifications

B.A., Economics, University of North Dakota, 2007.
H_2S Certification, 2019; OSHA 10-hour Hazard Recognition Training, 2017; Well Control Training, Workover and Completion, 2015.

Professional Experience

January 2020–Present: Principal Operations Specialist and Oilfield Operations Team Lead, EERC, UND. Mr. Jacobson's responsibilities include leading a team of scientists and engineers in the design and conduct of field activities for the EERC related to drilling, logging, coring, and completion. He also analyzes hydraulic fracturing practices and conducts oil and gas pipeline evaluations and inspections in conjunction with EERC oilfield projects. In addition, Mr. Jacobson performs economic evaluations (e.g., cost–benefit analysis) of projects.

August 2015–December 2019: Senior Operations Specialist and Oilfield Operations Team Lead, EERC, UND. Mr. Jacobson's responsibilities included designing and leading field activities for the EERC related to drilling, logging, coring, and completion. He also analyzed hydraulic fracturing practices and conducted oil and gas pipeline evaluations and inspections in conjunction with EERC oilfield projects. In addition, Mr. Jacobson he performed economic evaluations (e.g., cost–benefit analysis) of projects.

2007–2015: Operation Manager/Consultant, Bonetraill Rentals, LLC, Williston, North Dakota. Mr. Jacobson's responsibilities included hydraulic fracturing procedures, workover operations, completions, drilling operations, coil tubing, wireline, installation, independent third-party inspection of gas and production water pipelines, invoicing, daily reports, and overseeing other consultants for an oilfield service company that provides services to some of the largest oilfield operations in the Williston Basin region.

Mr. Jacobson took projects from concept through to production. He worked as a site manager for over 100 workover operations and has experience working in multiple formations, including the

Bakken/Three Forks, Midale, Spearfish, Dakota, Red River, and Mission Canyon. He also has experience in the completion of produced-water disposal wells in the state of North Dakota. Mr. Jacobson typically managed health, safety, and environment (HSE) during all operations, except in extreme sour/H_2S environments. Specific site management projects included the following:

- Site Manager, Sundance Energy, Inc., which included site acquisition; site management during site preparation, drilling, completion (hydraulic fracturing, drill outs/cleanouts), and flow testing; site facilities and equipment installation; daily reporting; and site restoration.

- Site Manager, Cornerstone Natural Resources, LLC, which included site management during completion (hydraulic fracturing, drillout/cleanouts), flow testing, site facilities and equipment installation, and daily reporting.

- Site Manager, Crescent Point Energy US Corporation, which included site management during completion (hydraulic fracturing, drillout/cleanouts), flow testing, and daily reporting.

Site management for these projects also included controlling site access, serving as first point of contact for on-site contractors performing work, coordinating on-site activities among all on-site contractors, scheduling equipment deliveries and services, participating in daily phone conferences, ensuring maintenance/snow removal of pad and access roads, arranging fueling services, managing on-site analysis of fluids, arranging and managing off-site analysis of fluids, and scheduling and supervising water hauling and proper disposal of fluids. Mr. Jacobson was in charge of all scheduling and work performed on-site during well activities, ensuring all testing/ work did not impact/damage the formation or future testing procedures.

2010–2011: Shop Supervisor, R&M Energy Systems, Oklahoma City, Oklahoma. Mr. Jacobson's responsibilities included manufacturing of sucker rod guides, overseeing a small work staff, maintenance of machinery, inventory, orders from different companies, and quality control procedures. Maintained the second-best profit margin in the company within the first year of operations.

2006–2006: Consultant, Bonetraill Rentals, LLC, Williston, North Dakota. Mr. Jacobson's responsibilities included hydraulic fracturing procedures, workover operations, drilling operations, daily reports, and invoicing.

Publications and Presentations

Has coauthored several technical publications.

WESLEY D. PECK
Assistant Director for Subsurface Strategies
Energy & Environmental Research Center (EERC), University of North Dakota (UND)
15 North 23rd Street, Stop 9018, Grand Forks, North Dakota 58202-9018 USA
701.777.5195 (phone), 701.777.5181 (fax), wpeck@undeerc.org

Principal Areas of Expertise

Mr. Peck's principal areas of interest and expertise include geology, geologic storage of CO_2, CO_2 enhanced oil recovery (EOR), and geographic information systems (GIS).

Qualifications

M.S., Geology, University of North Dakota, 1992. Thesis: The Stratigraphy and Sedimentology of the Sentinel Butte Formation (Paleocene) in South-Central Williams County, North Dakota.

B.S., Earth Science, North Dakota State University, 1987.

Professional Experience

2020–Present: Assistant Director for Subsurface Strategies, EERC, UND. Mr. Peck leads efforts in subsurface resource development with an emphasis on the Williston and Powder River Basins. He served as principal investigator (PI) on the multiyear U.S. Department of Energy (DOE)-sponsored North Dakota CarbonSAFE Feasibility project. He also served as task lead and PI of the regional geologic characterization component of the Plains CO_2 Reduction Partnership (PCOR) Partnership Program, which focused on CO_2 storage in central North America. Mr. Peck recently led a full-CO_2-chain techno-economic investigation in North Dakota linking lignite mining and electric generation to CO_2 EOR.

2015–2019: Principal Geologist, EERC, UND. Mr. Peck was involved in subsurface resource development with an emphasis on the Williston and Powder River Basins. He served as PI on the multiyear DOE-sponsored North Dakota CarbonSAFE Feasibility project. He also served as task lead and PI of the regional geologic characterization component of the PCOR Partnership Program. Mr. Peck recently led a full-CO_2-chain techno-economic investigation in North Dakota linking lignite mining and electric generation to CO_2 EOR.

2011–2015: Research Manager, EERC, UND. Mr. Peck's responsibilities include overseeing a staff of geologists and GIS specialists involved with oil and gas research activities in the Williston Basin as well as regional geologic characterization activities associated with the PCOR Partnership.

1991–2011: Research Scientist, EERC, UND. Mr. Peck's responsibilities included overseeing major GIS activities at the EERC, serving as task leader for the regional characterization component of the PCOR Partnership, as well as report and proposal writing.

1989–1991: Graduate Research Assistant, EERC, UND. Mr. Peck's responsibilities included acquisition and management of geologic data related to Cretaceous and Tertiary geology of the Williston Basin. Mr. Peck also assisted in the collection of Cretaceous and Tertiary fossils and stratigraphic information in western North Dakota and eastern Montana.

Publications and Presentations

Has authored and coauthored several professional publications.

KEVIN C. CONNORS
Principal Policy and Regulatory Strategist
Energy & Environmental Research Center (EERC), University of North Dakota (UND)
15 North 23rd Street, Stop 9018, Grand Forks, North Dakota 58202-9018 USA
Phone: (701) 777-5236, Fax: (701) 777-5181, E-Mail: kconnors@undeerc.org

Principal Areas of Expertise
Mr. Connors' principal areas of interest and expertise include regulatory policy, permitting, and regulatory interpretation related to the geologic storage of CO_2, enhanced oil recovery, and unconventional oil and gas development.

Qualifications
B.S., Geology, University of Montana, 2009.

Professional Experience
July 2019–Present: Principal Policy and Regulatory Strategist, EERC, UND. Mr. Connors works with a multidisciplinary team of scientists, engineers, and business professionals to integrate legal and regulatory policy, economics, and tax perspectives with applied research related to incremental oil recovery, unconventional oil recovery, and CO_2 capture and geologic storage.

November 2018–June 2019: Principal Consultant Drilling and Well Operations, Equinor Energy, Austin, Texas. Mr. Connors worked as a regulatory advisor for Equinor's Williston Basin Bakken asset. He gained experience in securing federal and state permits to drill, advising Equinor stakeholders on regulatory issues, and maintaining compliance in a multi-jurisdictional regulatory environment. Mr. Connors worked on special projects with Equinor's research and technology teams as the lead regulatory advisor in developing solutions to gas flaring and CO_2 emissions in the Bakken.

October 2010–October 2018: North Dakota Industrial Commission (NDIC) Oil and Gas Division.
October 2015–October 2018: Pipeline Program Supervisor. This position was created by the North Dakota Legislature to develop North Dakota's first Underground Gathering Pipeline Program to improve pipeline integrity. The development of the pipeline program included administrative rule making, hiring and managing office and field staff, developing a data management system (database), and meeting with industry leaders and academic researchers. Mr. Connors created guidance documents for program staff, regulatory inspectors, and the regulated community; testified before the North Dakota Legislature; and presented at public events throughout western North Dakota.

July 2011–October 2018: CCS Supervisor. This position was created by the North Dakota Legislature to provide a timely response to the U.S. Environmental Protection Agency (EPA)

rules relating to the geologic sequestration of CO_2 (Class VI). Mr. Connors successfully led North Dakota's efforts to obtain Class VI primacy for the state of North Dakota. He gained expertise in the EPA Underground Injection Control (UIC) Program and North Dakota's geologic storage of CO_2 statutes and authored and adopted North Dakota's CO_2 storage rules through the administrative rule-making process. In this position, he participated in the North Dakota Carbon Dioxide Storage Workgroup, testified before the North Dakota Administrative Rules Committee, authored publications, and presented at technical conferences on carbon capture and storage regulatory frameworks. He also has expertise in North Dakota's pore space amalgamation process for CO_2 storage and gas storage. In 2018, he developed guidelines for gas storage in North Dakota. The guidance document was intended to provide a pathway forward for permitting and storing Bakken produced gas to mitigate flaring.

October 2013–October 2015: UIC Supervisor. Mr. Connors administered the North Dakota Class II UIC Program. During his time as UIC Supervisor, he issued over 100 UIC permits, revised and updated program technical guidelines, evaluated regulatory filings, performed technical evaluations of UIC permit applications, and processed well completion reports, workover reports, and various other regulatory filings. He prepared and submitted quarterly reports to EPA as part of the UIC program primacy agreement between North Dakota and EPA. In spring 2015, Mr. Connors created a regulatory comparison table using North Dakota Statutes and regulations in comparison to the Bureau of Land Management (BLM) proposed rules on hydraulic fracturing. The regulatory comparison was key evidence in the state of North Dakota's lawsuit against the BLM.

October 2010–July 2011: Petroleum Engineer. As an oil and gas inspector, Mr. Connors conducted enforcement and compliance inspections in the field during a time of increasing oil and gas activity.

January–September 2010: Wellsite Geologist, Weatherford. Mr. Connors provided geological services for the drilling and completion of horizontal wells in the Bakken and Three Forks Formations.

DR. NICHOLAS A. AZZOLINA
Principal Hydrogeologist and Statistician
Energy & Environmental Research Center (EERC), University of North Dakota (UND)
15 North 23rd Street, Stop 9018, Grand Forks, North Dakota 58202-9018 USA
701.777.5120 (phone), 701.777.5181 (fax), nazzolina@undeerc.org

Principal Areas of Expertise

Dr. Azzolina is a hydrogeologist and statistician with 20 years of industrial and consulting experience, specializing in statistical analysis and modeling of large, complex environmental data sets.

Qualifications

Ph.D., Environmental Management and Science, Carnegie Mellon University, 2015.
M.S., Hydrogeology, Syracuse University, 2005.
B.A., Geological and Geophysical Sciences, Princeton University, 1997.
Proficient in the use of:

- Microsoft Word, Excel, PowerPoint, and Access
- Visual MODFLOW and Ground Water Vistas (groundwater modeling)
- ESRI ArcMap, SEGA GIS, Visual Sample Plan (geospatial mapping)
- PHREEQC and VisualMINTEQ (geochemical reaction modeling)
- Minitab, Netica, PAST, R, and SAS (statistical modeling)

Professional Experience

December 2016–Present: Principal Hydrogeologist and Statistician, EERC, UND. Dr. Azzolina performs statistical data analyses and supports projects related to CO_2 enhanced oil recovery (EOR), CO_2 storage, unconventional oil and gas production, and chemical contamination of environmental media (soil, groundwater, and sediment). He also specializes in conducting life cycle assessments for carbon capture, utilization, and storage (CCUS) projects and leads risk assessments for CO_2 storage, EOR, and other subsurface projects.

2010–2017: Independent Consultant, The CETER Group, Inc.
2008–2010: Scientist/Project Manager, Foth, Green Bay, Wisconsin.
2005–2008: Scientist/Project Manager, The RETEC Group, Inc., Ithaca, New York.
2004–2005: Scientist, O'Brien and Gere Engineers, Inc., Syracuse, New York.
2003–2005: Research Assistant/Head Teaching Assistant, Syracuse University, Department of Earth Science, Syracuse, New York.
2000–2003: Supervisor, McMaster-Carr Supply Co., Dayton, New Jersey.
1997–2000: Senior Field Engineer, Schlumberger Oilfield Services, Edinburg, Texas.

Publications and Presentations

Has authored or coauthored numerous professional publications and presentations.

STEVEN A. SMITH
Principal Geologist, Integrated Analytical Solutions
Energy & Environmental Research Center (EERC), University of North Dakota (UND)
15 North 23rd Street, Stop 9018, Grand Forks, North Dakota 58202-9018 USA
701.777.5108 (phone), 701.777.5181 (fax), ssmith@undeerc.org

Principal Areas of Expertise
Mr. Smith's principal areas of interest and expertise are petroleum geology, CO_2 enhanced oil recovery (EOR), laboratory investigation of fluid flow in conventional and unconventional reservoirs, and geological sequestration of CO_2.

Qualifications
B.S., Geology, University of North Dakota, 2001.

Professional Experience
2018–Present: Principal Geologist, Integrated Analytical Solutions, EERC, UND. Mr. Smith's responsibilities include the development of new business opportunities related to laboratory- and field-based investigations of EOR, CO_2 storage, and resource assessment of unconventional oil plays. In addition, Mr. Smith is focused on research opportunities and methods development for core-scale rock characterization, fluid behavior, and organic petrology.

2010–2018: Senior Geologist, AGL Team Lead, EERC, UND. Mr. Smith worked with a multidisciplinary team collaborating on research activities devoted to furthering our understanding of the subsurface geological environment. He managed the Applied Geology Laboratory (AGL), which is actively pursuing research into the derivation of the physical properties of rocks and encompasses the disciplines of petrophysics, geochemistry, and geomechanics. The primary focus of the laboratory is the oil and gas industry and carbon capture and storage marketplace.

2004–2010: Research Scientist, EERC, UND. Mr. Smith's responsibilities included developing and implementing a work plan for acid gas monitoring, verification, and accounting (MVA) for the Zama acid gas disposal and enhanced oil recovery (EOR) project in Alberta; coordinating engineering, geological, geomechanical, and geochemical characterization activities for the Zama project; developing and maintaining a database of oil-bearing geologic reservoir characteristics as they pertain to CO_2 storage in the states and provinces of the Plains CO_2 Reduction (PCOR) Partnership region; evaluating saline aquifer systems and determining their potential for CO_2 sequestration; and developing estimates of the CO_2 storage capacity within oil-bearing and saline strata of the Williston, Alberta, Powder River, and Denver–Julesberg Basins. He also worked as a well site geologist in the Williston Basin.

2001–2003: Wellsite Geologist, Subcontractor, Baker, Montana. Mr. Smith's responsibilities included overseeing all of the oil company's interests, with respect to the geologic decisions on

location; preparing morning report and geologic strip logs to summarize well progression; directing interaction with oil company upper management; evaluating sample cuttings, gas, and drill times while project well was drilling; performing structural geologic correlation with offset wells; and working in close communication with directional driller and rig crew to maintain accuracy in completion of well.

1994: Staff Geologist Intern, R.E. Wight Associates, Inc., Middletown, Pennsylvania. Mr. Smith's responsibilities included system checks and operation at groundwater remediation sites, hazardous materials sampling and preparation, well purging, sampling, and recharge calculations.

Professional Membership
Society of Petroleum Engineers
Society of Organic Petrology

Publications and Presentations
Has coauthored several publications.

NICHOLAS W. BOSSHART
Assistant Director for Geoscience and Engineering
Energy & Environmental Research Center (EERC), University of North Dakota (UND)
15 North 23rd Street, Stop 9018, Grand Forks, North Dakota 58202-9018 USA
701.777.5334 (phone), 701.777.5181 (fax), nbosshart@undeerc.org

Principal Areas of Expertise

Nicholas W. Bosshart has experience and expertise in subsurface investigations of both conventional and unconventional resources, carbon dioxide storage, enhanced oil recovery, water disposal, and produced gas storage.

Qualifications

M.S., Geology, University of North Dakota, 2014.
B.S., Geology, University of Northern Iowa, 2012.
Proficient in the use of Surfer, Petra, Petrel, Neuralog, and CMG software.

Professional Experience

February 2020–Present: Assistant Director for Geoscience and Engineering, EERC, UND. Mr. Bosshart leads a team of geologists, reservoir engineers, geological engineers, geophysicists, and petrophysicists, all focused on finding solutions to energy challenges. Mr. Bosshart has experience and expertise in project and personnel management and activities related to geologic characterization, geologic modeling, numerical simulation, reservoir surveillance, and risk management.

June 2014–January 2020: Principal Geoscientist, EERC, UND. Mr. Bosshart supervises an interdisciplinary team of researchers focused on understanding deep subsurface geology. Mr. Bosshart's responsibilities include providing oversight for the development and simulation of geophysical reservoir models for hydrocarbon resource assessment and geologic CO_2 storage analyses.

June 2013–June 2014: Intern and Graduate Student Research Assistant, EERC, UND. Mr. Bosshart's responsibilities included 3-D modeling (Petrel) for geologic CO_2 storage and unconventional resources. This experience also included over 120 hours of modeling software and geostatistics training.

May–June 2013: Graduate Student Teaching Assistant, South Dakota School of Mines and Technology, Annapurna Region, Himalayas, Nepal. Mr. Bosshart was a graduate student teaching assistant for geologic field studies of the Himalayas. His responsibilities included identification and mapping of metamorphic rocks associated with the Main Central Thrust Zone of the Himalayas, mapping and developing reports discussing active geomorphic agents in the region, and mapping of glacial sediments.

August 2012−May 2013: Graduate Student Teaching Assistant, Harold Hamm School of Geology and Geologic Engineering, UND. Mr. Bosshart instructed introductory geology laboratory courses.

2006–2014: Unit Supply Specialist, Iowa National Guard, United States Army, Camp Dodge, Johnston, Iowa. Deployed as part of the Multinational Force & Observers (MFO) in the Sinai Peninsula, Egypt, during 2008–2009.

Publications and Presentations

Has authored or coauthored several professional publications.

NICOLE M. MASSMANN
Director of Communications
Energy & Environmental Research Center (EERC), University of North Dakota (UND)
15 North 23rd Street, Stop 9018, Grand Forks, North Dakota 58202-9018 USA
701.777.5428 (phone), 701.777.5181 (fax), nmassmann@undeerc.org

Principal Areas of Expertise

Ms. Massmann's principal areas of interest and expertise include strategic communication planning, media and public relations, information dissemination, social media, and marketing.

Qualifications

B.S., Scientific and Technical Communication, University of Minnesota, Crookston, 2003.

Professional Experience

2017–Present: Director of Communications, EERC, UND. Ms. Massmann's responsibilities include:

- Supporting the EERC leadership team, developing and implementing the EERC's strategic marketing communications plan using a wide range of media, including press releases, op-ed pieces, social media, Web pages, event booths, fact sheets, and brochures.
- Developing and implementing an internal communication and engagement plan.
- Developing strategic communication plans for initiatives with federal, state, and industrial clients.
- Attending conferences, meetings, exhibits, and other events to market EERC initiatives and capabilities.
- Leading on-site tours.
- Managing the outreach and graphics departments

2013–2017: Communication Coordinator, Center for Rural Health (CRH), School of Medicine and Health Sciences (SMHS), UND. Ms. Massmann's responsibilities included:

- Coordinating communication, marketing, and public relations efforts for 30+ projects, including news releases, media contacts and inquiries, newsletters, op-eds, blog posts, and social media.
- Providing leadership on strategic communication planning for specific project audiences and funding requirements.
- Creating Web content for CRH projects.
- Informing local, state, and federal agencies of CRH work through meetings, reports, and networking.
- Planning large annual conferences and other events.
- Training new staff on communication processes and branding within CRH.
- Developing an overall communication plan for CRH, including internal and external communication processes.

- Exhibiting on behalf of CRH and its programs at national, state, regional, and local conferences and trade shows.
- Developing and editing project documents, such as flyers, brochures, journal articles, and reports.
- Writing feature articles on rural health topics for *North Dakota Medicine* magazine.
- Overseeing social media accounts, and analyzing efficacy of posts.
- Serving as principal investigator (PI) on the National Institutes of Mental Health Outreach Partnership Program, which included managing grant budgets and disseminating information about mental health issues.
- Working with SMHS communication and public relations staff on branding standards that satisfy CRH, SMHS, and UND overall branding and identity requirements.
- Maintaining current and relevant topics for available presentations from the CRH Speakers' Bureau.
- Creating and disseminating a monthly electronic newsletter.
- Supervising a communication specialist and student interns.

2010–2013: Project Coordinator, CRH, SMHS, UND. Ms. Massmann's responsibilities included:
- Serving as content specialist for hospitals implementing acute stroke care quality improvement initiatives.
- Planning meetings, events, and conferences for Critical Access Hospitals (CAHs) working on a statewide stroke care initiative.
- Disseminating information to the CAH Quality Network and various taskforces on stroke guidelines.
- Facilitating discussions to develop a streamlined system for urban and rural hospitals to communicate on stroke care.
- Writing a statewide health assessment report on chronic disease statuses in North Dakota.
- Coordinating a leadership team comprised of experts in American Indian health, rural health, public health, and community engagement that included the North Dakota Department of Health, North Dakota State University, UND, and United Tribes Technical College to develop strategies for addressing chronic disease in North Dakota.
- Participating in community engagement strategies and training.
- Assessing community engagement efforts for efficacy and success.

2004–2010: Quality Assurance Associate, PRACS Institute, Ltd., East Grand Forks, Minnesota.

2002–2003: Intern, Crookston Area Chamber of Commerce, Crookston, Minnesota.

1997–2001: Radio Announcer/Operator, KROX Radio, Crookston, Minnesota.

Professional Memberships & Committee Participation
- Wyoming CarbonSAFE Outreach Advisory Board Member, 2018–present
- EERC Financial Transparency Team Member, 2018
- EERC Employee Development Program Committee Member, 2018
- EERC Employee Engagement Committee Member, 2017–present
- Public Relations Society of America Member, 2015–present

- University of North Dakota Marketing Council Member, 2017–present
- North Dakota CarbonSAFE Outreach Advisory Board member, 2017–present
- Energizing North Dakota Partnership Summit planning committee member, 2017–present
- Dakota Conference on Rural and Public Health Planning Committee member, 2013–2017
- National Organization of State Offices of Rural Health Communication Committee member, 2013–2017
- North Dakota Rural Health Association member, 2013–2017
- Mind Matters Conference on Brain Injury planning committee, 2013–2017
- UND School of Medicine and Health Sciences Transition Champion Team member, 2015–2016
- Toastmasters International Member, 2010–2013
- North Dakota Participating Hospitals Advisory Council member, 2010–2012
- Healthy North Dakota Coordinating Committee member, 2011–2013
- Statewide Stroke System of Care Annual Conference Planner and Facilitator, 2011
- North Dakota Cancer Coalition member, 2011–2013
- Society for Quality Assurance member, 2007–2010
- Program Improvement Advisory Committee (PIAC) for Communications program, University of Minnesota, Crookston (UMC), 2005

Publications and Presentations

Ms. Massmann has authored or coauthored numerous professional publications and presentations.

Name:	James William Cron
Address:	101 Iowa Avenue NE, Flaxton, ND 58737
Contact Numbers:	D: +1-701-213-4484 C: +1-701-201-1266
Email:	j_w_cron@yahoo.com
Citizenship:	United States

Summary

Degreed engineer with robust technical and interpersonal skills with the proven ability to coordinate multiple initiatives such as field operations or supervise diverse teams in support of large-scale drilling and completion operations. Strong operations, engineering design, leadership and project coordination abilities, thereby conducting the operations with stringent safety, environmental and regulatory practices and compliance. Extensive experience in drilling, completing and producing wells in remote locations under severe conditions. Seeking a position with a top-tier drilling, completion, production or services operations engineering team.

Employment History

Cron OFC GmbH, USA (Principal Engineering Consultant/Well Site Consultant) May 2012 to Present

Technical Consultant (Technology) (Contract)

Industry: Oil and Gas Extraction

Accountable for planning, implementing, monitoring and supervising all processes as requested by the client in regards to drilling, completion, well services, reservoir and production engineering.

Provided technical services for field development, well planning, permitting, well bore construction, completions and operations supervision.

Provided business and technical (reservoir, drilling, and production engineering) advice to senior executives concerning new and existing assets.

Key Achievements:

Acted as senior well site consultant for three deep vertical wells and one horizontal well (2 vertical and one horizontal wildcat wells) for two different operators in Q4, 2017, resulting in 100% success rate. Provided site leadership resulting in no LTA's over the course of a demanding program. Interfaced with vendors, services sourcing, scheduling, approving work, cost management and filing necessary JSA documentation for same. Set daily work programs for the drilling contractor team and associated service providers to achieve daily targets. Created real-time results for ECD's and T&D to manage drilling and fluid optimization targets, resulting in lower than expected fluid losses and no stuck pipe situations. Managed complex wildcat horizontal drilling program using a RSS, in a tight target, resulting in project goal attainment and successful production well.

Provided engineering experience for design of two wildcat and one infield well, creating well designs, researching offset wells, fashioning base drilling procedures, crafting permit documents and forming vendor lists resulting in the successful permitting one of new well and resurrection of two expired permits.

Reviewed 50 existing vertical and horizontal wells, creating risk profile for fracturing candidates. Created liner design, ran T&D analysis for landing of liner in OH wellbores, created cement design, created fracturing designs on stacked pay candidates. Utilized past experience to create candidate from existing vertical well bore creating monobore design. Summarized data and went to marketplace with RFQ's. Result was the creation of three AFE's for new well base case, sidetrack, and utilizing an existing open hole completion, with support documentation.

Provided engineering support for 2016/2017 budgeting and reserve process by generating RFQ's, submitting same to vendors, negotiating pricing and selecting vendors. Created and submitted AFE's covering client's PUD and PDNP candidates.

In 2014 and 2015, advised integrated team on field development plans, and provided drilling and completion design, material and vendor selection, permitting, AFE preparation, invoice review and compliance, project implementation supervision and project management for a three rig drilling program in North Dakota supplemented by the use of RT assets. This effort resulted in the drilling of 41 horizontal wells and 5 vertical wells over the time span culminating in 43 well completions using beam pump or ESP artificial lift systems. Pursued targets include unconventional dirty clastic and tight carbonate reservoirs.

Prepared HSE compliant work programs for potential well intervention activities for: tubing installation, repairs, AL installations, CT operations, casing repairs, remedial cementing, fishing, acidizing, wellhead repairs, wireline, and e-line operations.

Reviewed 170 wells for upside potential, using well log analysis, recent geological mapping and current internal and governmental well files. Created tiered reference system for indicating upside, potential upside and neutral rating assigned by opportunity and risk. Created 19 'solid' upside opportunities for further exploitation, coupled with 26 medium risk exploitation candidates.

Compiled and analyzed engineering and cost details to create a management summary for the client's wells drilled in 2014-15. This effort included the review of costs and coding, resulting in vendor reviews and refunds for incorrect invoices, as well as correct re-coding of incorrectly coded invoices. Effort required the creating of SQL queries in Access to obtain data from the client's drilling database.

Created and updated HPHT design, created contacts with vendors, devised RFQ's for PUD's for a potential HPHT deep gas acquisition. Compiled drilling, completion, facilities and cost information to create an AFE to help determine potential costs versus data room costs. Provided detailed defense of cost model for future acquisition reference.

Reviewed HIT and pin break issues in a field that utilized rod pumps. Compiled various data and analyzed results to create three options to reduce said failures. A pilot project was introduced utilizing cathodic protection as means of reducing corrosion and ensuing failures.

In a two-month period, devised field development plans, provided drilling and completion design, material and vendor selection, permitting, AFE preparation and implementation supervision for seven vertical wells in North Dakota, with an additional 6 horizontal wells for 2013.

Delivered acquisition support by creating RFQ's, leading discussions with potential vendors, compiling cost data and creating PUD AFE's for potential unconventional acquisition.

Created a casing inventory report that reconciled actual used versus the amount purchased. This action required creating SQL queries to determine amount of casing run, minus hardware via the drilling database. The results were used to

update the inventory, well costs and material transfer data.

Provided rig overview and support for two active drilling rigs drilling in order to have initial wells drilled by the end of 2012. This included the institution of a drilling database and maintenance of same.

Provided real time log analysis, and completion decision support for the entire group of wells.

Recommended perforation intervals, and created the completion program (guns, acid treatment) for each of the wells. Provide field supervision of same.

Specified, reviewed and approved contracts, specified materials and purchases for various drilling services, OCTG, field services and consulting engagements.

Provided petroleum engineering support on Iraqi assets review

Afforded field development plans, estimated costs and calculated economic feasibility of shale gas development in Poland.

Responsible for field development plans, estimated costs, computed material balance and decline curve analysis for analogous reservoir and calculated economic feasibility of high pressure carbonate reservoir in Poland.

Created economic model and tested initial economic analysis for oil shale development in Portugal.

Provided reservoir engineering analysis, created and presented a summary presentation for assessment of farm-in potential for onshore (Netherlands) gas opportunity.

Delivered log analysis to determine test and completion design for multi-target well in Columbia.

Initiated production diagnostics and economics forecasts, with a modified development plan for a new field development in Columbia.

Maintained a production database for multi-well project in Columbia, and provided update reports and projections to senior management team.

Ward Williston Oil Company, USA May 2006 to May 2012

Petroleum Engineer (Technology) (Permanent)

Industry: Oil and Gas Extraction

Accountable for planning, implementing, monitoring and supervising all processes in regards to drilling, well services, and production engineering.

Designed and managed all project aspects in an integrated team setting: from initial prospect development, analysis and engineering design to commercial negotiation and field implementation. Provided senior-level engineering support to local field office.

Provided business and technical (reservoir, drilling, and production engineering) advice to senior executives concerning new ventures and current opportunities.

Key Achievements:

Devised field development plans, and provided drilling and completion design, material and vendor selection, AFE preparation and implementation supervision for twelve new wells, four re-entries, eight injection wells, and two water supply wells.

Provided well design, material selection, vendor selection, permitting and operations support for drilling and completion of one new injector for water flood

optimization project in 2012.

Working with an integrated team, planned, budgeted, permitted and drilled and/or re-entered and competed one producer, one injector and one water supply well in Q1 2011 on time and under budget.

Implemented a slim-hole liner system, restoring three wells to production and alleviating the need for re-drills resulting in cost savings of USD 2.4 MM.

Acquired extensive experience working in multi-drive reservoirs that feature high salinity and high H_2S and CO_2 concentrations.

Develop expertise in methodology of re-entering abandoned producing wells in water flood and restoring them to production for 35% of the cost of a new well.

Provided design expertise and procurement effort to drill and complete seven new wells and three re-entries, including first ever horizontal well in Mouse River Park (ND) water flood unit. Increased peak uplift by 8,000 barrels/month of oil at the same field for 2006 to present.

Specified, reviewed and approved contracts, specified materials and purchases for various drilling services, OCTG, well heads, field services and consulting engagements.

Created specification, purchased and implemented the use of down pressure gauges for producing field data collection and analysis. Provided field surveillance support.

Slashed drilling days on mature field by 43% by utilizing performance drilling methods.

Tested and won governmental authority to use real time survey tool to reduce drilling costs and days on well by 10%, while realizing reduced HSE issues.

Created and implemented permitting workflow to reduce permitting time for new wells, reducing lost time from 30% to 2%.

Designed, installed and supported firm's first producing well large bore progressive cavity pump (PCP) installation.

Designed, installed and supported ESP for water flood development.

Created pursuit team, and provided project management and engineering expertise for fast track $135MM valuation of conventional and unconventional assets in Williston Basin.

Developed foam acid treatment methodology for exploiting tight, under-pressured carbonates, reducing treatment costs by 20%.

Specified, tested, purchased and implemented the following computer programs: Sysdrill drilling engineering software; Prodeval production database; RIMBASE drilling/workover database; OGRE economic analysis and reserves software; Theta rod design software; and GIS system (ARC GIS).

Provided technical reservoir engineering analysis, technical presentations and technical field tours, resulting in multi-million dollar sale of USD 80 MM (3P) assets of my former employer to a group of outside investors.

Established geo-modeling and reservoir simulation as standard operating procedure for firm resulting in 1.7 MMBBL in additional reserves and created the field development plans, design and economics to capture the additional reserves.

Provided additional reservoir engineering scrutiny of third-party bank reserves report, which added USD 3.4 MM in 2011 report.

Provided engineering design and data criteria, interfaced with vendors, and

rendered QA/QC of all open and cased hole logging, coring and drill stem testing operations. Provided technical analysis of said data for well completion decisions.

Wrote grant, made presentation and won grant award (USD 98,000) for North Dakota's first portable multi-phase flow meter measurement system.

Prepared technical design for facets of a portable multi-phase flow meter measuring system, which included vessel coating, flange selection, safety systems, ventilation systems, facility design, trailer design, and fluid analysis specifications.

Provided reserves estimation and set pricing point for field acquisition resulting in 60 bopd of additional production.

Appointed acting technical advisor for the State of North Dakota's Petroleum Research Council.

Provided expert testimony in two cases before the State of North Dakota's industrial Commission, including the successful case for unitization of the Little Deep Creek Madison Unit.

Halliburton, Netherlands Oct 2004 to May 2006

Business Development Manager (Technology Management) (Permanent)

Industry: Petroleum Engineering Technology

Accountable for planning, implementing, monitoring and supervising all initiatives for drilling and well services business development, sales, marketing and IT implementation projects for clients throughout Western Europe.

Experience gained in managing all project aspects: from initial project business development, proposal generation, commercial negotiation and post-sale effort including assessment, planning, scheduling and monitoring to ensure adherence to project's costs initiatives and guidelines. Provided business and technical advice for senior executives concerning client issues and opportunities.

Key Achievements:

Named member of Western Europe Senior Management Team responsible for regional sales, budget and resource planning.

Exceeded financial targets for 2004, resulting in USD 10 MM in revenue.

Created tender pursuit team and won USD 1.2 MM (projected) tender, beating four other competitors technically and financially.

Received second highest rating in Western Europe for 2004.

Provided business and technical support to displace competitor from key German account, resulting in largest engineering technology sale in Germany by employer.

Halliburton, Malaysia May 2002 to Oct 2004

Systems General Manager Drilling and Well Services (Technology Management) (Permanent)

Industry: Petroleum Engineering Technology

Accountable for planning, implementing, monitoring and supervising all initiatives for drilling and well services engineering business development, sales, marketing and IT implementation projects for clients throughout the Eastern Hemisphere.

Managed all aspects of projects: from initial project business development, through

assessment, planning, scheduling and monitoring to ensure adherence to project's costs initiatives and guidelines. Supervised a team of four Business Development Managers, providing career, technical and quota guidance. Provided senior level technical support and mentoring to regional drilling engineering support team.

Key Achievements:

Created 31% growth year on year and met 2004 financial targets, resulting in USD 23 MM in revenue.

Member of AP Regional and Eastern Hemisphere Senior Management Team responsible for regional and hemispherical sales, budget and resource planning.

Created double-digit growth (>15%) two years in a row for Asia-Pacific Region, creating record revenue in each year.

Led the only system in the hemisphere to hit financial targets of USD 17.4 MM in revenue for 2003.

Promoted to Eastern Hemisphere System's General Manager, July 2003.

Identified adjacent market and then created a business and technical tender response that resulted in USD 300,000 tender win with new client.

Received Landmark's "President's Club" Award, an internal international achievement award for outstanding performance for 2002.

Managed business development aspects of a drilling engineering project for key Asian client, valued at more than USD 800,000.

Assessed, created and implemented workflow strategy for key client, resulting in a USD 200,000 consulting engagement.

Teamed with local Operations Manager to create proposal for a long-term engineering consulting and M&S agreement. This effort resulted in a three-year consulting and M&S contract worth USD 200,000 per year.

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Halliburton, USA

Feb 2001 to May 2002
(Permanent)

Team Lead for Drilling and Well Services Engineering and Production Support (Technology Management)

Industry: Petroleum Engineering Technology

Directed a diverse, virtual support team of up to 25, who were involved in providing solutions in the areas of drilling and well services engineering, reservoir engineering, production data system and production engineering economics. Determined budgets, provided forecasting, and managed fiscal spending for seven cost centers in North America.

Collaborated with Development Software Group to analyze product performance issues and implement solutions for product enhancements. Provided engineering sales and business development support for new clients.

Key Achievements:

Analyzed, planned and managed the merger of two technical groups, resulting in streamlined management resources as well as reduced personnel and administration costs, resulting in cost savings of USD 100,000 per year.

Developed skill matrix, budgeted, planned and delivered engineering and IT training for direct reports.

Served on team and contributed to creating an innovative fast-track engineering training method, which resulted in reducing “hiring-to-billing” time by six months for new hires.

Implemented new performance review method for direct reports, which resulted in increased performance metrics against plan for the entire team.

Developed USD 1.5 MM budget for staffing and operations for North American team, resulting in flat spending and increased efficiency.

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Landmark Graphics, Australia (a Halliburton company) Nov 1997 to Feb 2001

Team Lead for Drilling and Well Services Engineering Support (Permanent)
(Technology Management)

Industry: Petroleum Engineering Technology

Designed and supervised drilling and well services engineering data management implementation projects and follow-up support efforts tin the Asia-Pacific Region.

Managed a virtual team of nine. Implemented real-time, on-site drilling engineering and knowledge management solutions to offshore US, Gulf Coast and Australia’s Northwest Shelf drilling programs.

Provided drilling engineering guidance and training to both support and service staff throughout the region. Acted as Principal Drilling Consultant to corporate drilling data projects. Served as Tier II Drilling Technical Support Specialist for the Asia-Pacific Region. Provided business development support to Australia and New Zealand.

Key Achievements:

Awarded Landmark’s “Top Gun” Award for excellent technical support throughout the Asia-Pacific Region, 1999.

Revamped a customer’s Directional Drilling database and recommended well planning strategies to implement then world’s second longest extended reach well.

Collaborated in developing new cost/time matrix functions for corporate drilling projects to standardize drilling operations for offshore, onshore and complex drilling projects for USD 2 MM knowledge transfer project.

Designed regional support model and escalation path to support company’s drilling engineering products and knowledge management efforts.

Solicited property, formed facilities team, assigned team roles, developed cost savings target, negotiated lease and managed facilities’ change for Landmark's Australia East Coast office, reducing costs by 30%, while doubling facility space and optimizing location to coincide with staff commuting needs.

Negotiated new M&S and consulting contract with client, was granted corporate power of attorney to execute agreement. This effort resulted in increased M&S and consulting revenue from the client.

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Landmark Graphics, USA

Aug 1995 to Nov 1997

(Permanent)

Drilling and Well Services Products Support Engineer (Technical)

Industry: Petroleum Engineering Technology

Provided Drilling IT and Drilling Engineering Products support to numerous client projects throughout North America.

Responsible for providing Instruction, Well Planning and Drilling Engineering support expertise to Wellbore Construction Engineers throughout Australia, North America, South America and Africa. Assisted with implementing numerous rollouts of IT Drilling products. Supported business development efforts of regional sales team.

Key Achievements:

Educated client's Development Team on Drilling Database Product usage to reduce costs of a USD 300 MM drilling project by 10%.

Designed and implemented knowledge and change management initiatives, resulting in data quality target of 90%, exceeding target by 5%.

Installed company's Drilling Database Software for GOM operator's 17 offshore drilling and workover rigs through remote and hazardous environments, on time and on budget.

Self-Employed, USA

Jun 1992 to Aug 1995

(Contract)

Petroleum Engineering Consultant (Technical)

Industry: Oil and Gas Extraction

Provided Petroleum Engineering guidance and support to multiple fields throughout the Piceance, Denver-Julesburg, Uintah, Green River, Big Horn, Wind River, Powder River, Hugoton and Williston Basin.

Managed teams of up to four field staff.

Performed field production engineering analysis and management of waterflood and coal bed methane fields located in Wyoming and New Mexico.

Key Achievements:

Analyzed field operations initiatives and implemented a restructuring plan, reducing operating costs by up to 40% per lease.

Designed, implemented and supervised a Bottom Hole Pressure Survey Program, resulting in a 270 bopd uplift at a Wyoming waterflood.

Successfully researched, analyzed and produced a detailed reserve engineering report to evaluate a client's credit line. Instrumental in facilitating the achievement of full credit line access within four months.

Forecasted 700 wells, formed maps, recorded PUD's and developed type curves to determine reserves for multi-basin pipeline deliverability and future acquisition study.

Mobil Oil Corporation, USA Mar 1991 to May 1992

Operations Engineer (Technical) (Permanent)

Industry: Oil and Gas Extraction

Member of team accountable for successfully designing and implementing drilling and well implementation projects. Collaborated with management and reservoir management team to implement new Pumping Unit Pilot program, well recompletions and reentries for numerous projects.

Operations member of West Ranch Reservoir Management Team.

Supervised teams of up to four.

Key Achievements:

Facilitated the achievement of more than USD 3.2 MM of revenue and 1,100-boepd uplift.

Provided engineering design and supervised the successful implementation of Pumping Unit Pilot program, resulting in savings of more than USD 270,000, decreasing gas lift requirements by 2,000 Mcfpd and surpassing uplift goal by 50 bopd.

Developed new method to install pumps for mechanical-packer isolated gravel packs, resulting in additional 20 bopd of uplift without increasing gas interference.

Utilized new technology to recomplete gas well, at depths below 10,000 ft, resulting in a 500% increase in production from site and a payout of the project in less than one business week.

Dowell Schlumberger, USA Dec 1990 to Mar 1991

Field Engineer (Junior Technical) (Permanent)

Industry: Petroleum Engineering Services

Assisted with the creation and implementation of cement designs for new wells and mud acid stimulation procedures.

Education

Tertiary Education

University of North Dakota Dec 1990

Bachelor of Science, Geological Engineering, Petroleum Engineering Option.

Robert Kennedy College 2009

MBA, Technology Management

Other Education

WWC 2018

IADC Well Control Supervisor Drilling , Surface Stack

Total Safety 2017

H2S Awareness

OMESOL 2016
PipeSim Fundamentals

WWC 2016
Well Control Supervisor Drilling and Completion Certification

OMESOL 2016
Process Design Fundamentals

WWC 2014
Well Control Supervisor Certification

Schlumberger 2013
Schlumberger Drilling Academy

SPE 2013
Modern Well Design Short Course

WCI 2011
Well Control Supervisor Certification

Fundamentals of Reservoir Simulation 2011
Completion Certification

ESRI 2011
Arc Basics

Daneshy Consulting 2010
Fundamentals of Hydraulic Fracturing
Advanced Horizontal Well Fracturing

William M. Cobb & Associates, Inc. 2008
Advanced Waterflood Course

Piece Training, Inc. 2007
Well Test Analysis Workshop

Hugh Reid and Assoc. Ltd. 2007
Practical Drillstem Test Interpretation

SiteLark, Inc. 2006
Basic Waterflood Course

University of Michigan-Ross School of Business
Negotiation Strategies and Skills 2006
Executive Management Course II 2001

Landmark Graphics
Consultative Sales Process 2004
Miller Heiman Strategic Selling Course 2003
Consultative Business Processes 2002

Interaction Associates, Inc. 2001
The Coaching Edge, Management Development Course

Landmark Graphics 2001
Casing Seat/Stresscheck Casing Design Course

GSM 1997
GSM Directional Drilling-Well Planning Course

Professional Affiliations

Society of Petroleum Engineers (Life Member)
American Association of Drilling Engineers

Other Achievements

Published co-author, SPE International 2009

SPE 124052, “Fracture Characterization and Dynamic Modeling in a Brownfield Carbonate Reservoir”

2008

Published co-author in The American Oil and Gas Reporter
“Technologies Optimize Aging Assets”

Landmark Graphics 2002
"President’s Club" Award

Landmark Graphics 2002
Certified Trainer, COMPASS Directional Drilling Software

Landmark Graphics 2001
Certified Trainer, Drilling Information Management System (DIMS) Software

Landmark Graphics 2000
“Star” Award for Service Delivery

Software Knowledge

Microsoft Office
Excel, Word, Visio, Access, MSProject

Landmark Graphics Engineering and Database Products
COMPASS, WELLPLAN, OpenWells, Casing Seat/StressCheck, EDM, PROFILE, DIMS, Decision Space Asset Planner, Decision Space Well Plan

Additional Technology Knowledge

Wellview
ORGE and eXpress Economics Analysis Programs
Paradigm’s Sysdrill Engineering Package
ProdEval Production Database
Kelly Down Directional Planning Software
Theta Beam Pumping Unit Design
RIMBASE Drilling and Completion Database
WFLOOD black oil simulator
Power Draw Well Bore Schematic Program
Carbonate Advisor

PT 40
Mathcad Prime
Prosper
Tank
Ecrin
Schlumberger Blueview
Petroleum Toolkit
ESRI Arc
Aspen HYSYS
QuickDecline
RStudio
Innova Hydraulics and T&D
PipeSim

Hobbies and Interests

Archery
Snow Skiing
Motorcycle Touring
Antique Farm Machinery Renovation

Jeff Zueger
Chief Executive Officer

Prior to MAG, Jeff's career experience includes 13 years in electric power generation with Great River Energy in engineering, operations, and as part of the plant leadership team. He held the position of Leader of Generation and Operations Support when Great River Energy began to explore construction of an ethanol facility to utilize unused energy at the power station. Jeff became General Manager for Blue Flint Ethanol in 2006 and lead construction, startup, and overall business activities for Blue Flint Ethanol. In 2012, Jeff became Chief Operating Officer for Midwest AgEnergy Group as the business prepared to expand to construct Dakota Spirit AgEnergy. In 2016, Jeff was named the Chief Executive Officer where he manages all aspects of the successful business for MAG. Jeff is an active voice for the ethanol industry and has been the Chairman of the North Dakota Ethanol Council since its inception in 2009, where he was a founding member. Jeff graduated from North Dakota State University with a BS in Mechanical Engineering and is a registered Professional Engineer.

Adam Dunlop,
Regulatory & Technical Services Director

Adam Dunlop provides leadership surrounding Regulatory and Technical Services for MAG. He has been with the company for over thirteen years in various roles with increasing responsibilities. He is passionate about continuous learning, clean energy technologies, and preserving the environment through sensible regulations. Under his direction, MAG has successfully protected its most critical assets from lost time, as MAG employees have worked millions of hours over more than a decade without losing time due to an injury. Adam facilitates development and implementation of MAG's strategic plan; working diligently to enable continuous facility improvements leading to strong financial performance. His group evaluates, selects, and implements projects and new technologies that align with core business objectives and long-term goals. Under Adam's direction, MAG has increased market opportunities by successfully petitioning for unique carbon intensity pathways to various State, Federal and Provincial Governments with renewable or low carbon fuel standards. Adam holds a BA in Biology and Chemistry from Jamestown College (now the University of Jamestown) and an MS in Environmental Management from the University of Maryland.

APPENDIX F

Affidavit of No Tax Liability

State of North Dakota
SECRETARY OF STATE

Certificate of Good Standing
of
MIDWEST AGENERGY GROUP, LLC

SOS Control ID#: 0000130509

Certificate #: 018084026

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

MIDWEST AGENERGY GROUP, LLC

a Limited Liability Company - Business - Domestic was formed under the laws of NORTH DAKOTA and filed with this office effective August 28, 2013. 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: March 19, 2020

Alvin A. Jaeger
Secretary of State