



October 1, 2024

Mr. Reice Haase  
Deputy Executive Director  
ATTN: Lignite Research Program  
North Dakota Industrial Commission  
State Capitol – 14th Floor  
600 East Boulevard Avenue, Department 405  
Bismarck, ND 58505-0840

Dear Mr. Haase:

Subject: EERC Proposal No. 2025-0045 Entitled “Williston Basin Regional Initiative Technical Assistance Partnership: Support for Continuation of the PCOR Partnership”

The Energy & Environmental Research Center (EERC) of the University of North Dakota is pleased to submit this cost-share funding request to the Lignite Research, Development and Marketing Program (LRDMP). The \$100 application fee is provided through ACH transaction number 280386. The 3-year project has been selected for award by the U.S. Department of Energy with a start date of October 1, 2024. The EERC is committed to completing the project on schedule and within budget should the Commission make the requested grant.

If you have any questions, please contact me by telephone at (701) 777-5236 or by email at [kconnors@undeerc.org](mailto:kconnors@undeerc.org).

Sincerely,

DocuSigned by:  
A handwritten signature in black ink that reads "Kevin Connors".  
1D14EF7CF3CD456...

Kevin C. Connors  
Assistant Director for Regulatory Compliance  
and Energy Policy

Approved by:

DocuSigned by:  
A handwritten signature in black ink that reads "Charles D. Gorecki".  
29499751F2B84D7...  
Charles D. Gorecki, CEO  
Energy & Environmental Research Center

c: Erin Stieg, North Dakota Industrial Commission

Lignite Research, Development  
and Marketing Program

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North Dakota Industrial Commission

## Application

**Project Title:** Williston Basin Regional Initiative  
Technical Assistance Partnership: Support for  
Continuation of the PCOR Partnership

**Applicant:** University of North Dakota Energy &  
Environmental Research Center

**Principal Investigator:** Kevin C. Connors

**Date of Application:** October 1, 2024

**Amount of Request:** \$1,250,000

**Total Amount of Proposed Project:** \$6,250,000

**Duration of Project:** 36 Months

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## ABSTRACT

The Energy & Environmental Research Center (EERC) Williston Basin Regional Initiative Technical Assistance (WB-RITA) Partnership project has been selected for an award from the U.S. Department of Energy (DOE). The project will run for 3 years and build on the success of the Plains CO<sub>2</sub> Reduction (PCOR) Partnership in developing carbon capture, utilization, and storage (CCUS) technology. This DOE award is part of a continued federal funding effort to extend the work of the PCOR Partnership.

**Objective:** The goal of the WB-RITA Partnership is to identify and address storage and transport challenges facing commercial CCUS deployment in the Williston Basin, including North Dakota coal industries and utilities.

**Expected Results:** The WB-RITA Partnership will play a vital role in advancing CCUS deployment in North Dakota and the broader Williston Basin region by providing project developers, regulators, local governments, communities, and other key stakeholder groups with technical assistance to help developing projects in the Williston Basin overcome obstacles.

**Duration:** 3 years (October 1, 2024 – September 30, 2027).

**Total Project Cost:** The total value of the currently scoped project is \$6,250,000. This proposal requests \$1,250,000 from the North Dakota Industrial Commission Lignite Research, Development and Marketing Program (NDIC LRDMP) as cost share to the \$5,000,000 DOE will provide for the project. Consistent with the previous PCOR Partnership and support letters for this continuation of the PCOR Partnership Initiative, the EERC anticipates sustained industry partnership and stakeholder engagement. Those attendant contributions will be reported to NDIC as received, increasing the total value of the program.

**Participants:** DOE, NDIC LRDMP.

## PROJECT SUMMARY

The Williston Basin Regional Initiative Technical Assistance (WB-RITA) Partnership will foster the development of infrastructure and advance deployment of carbon capture, utilization, and storage (CCUS) technologies across the U.S. portion of the Williston Basin. Building on the long-standing success of the Energy & Environmental Research Center (EERC)-led Plains CO<sub>2</sub> Reduction (PCOR) Partnership Program, which leverages over 20 years of applied research in CCUS and over 260 member organizations, the WB-RITA Partnership will provide technical assistance to project developers, regulators, local governments, communities, and other key stakeholder groups. The success of this project relies on engaging these stakeholders, addressing their varying interests, and recognizing the importance of engaging the public and local communities with fact-based information on carbon capture, transport, utilization, and storage.

The EERC will manage the WB-RITA Partnership. The EERC requests cost share from the North Dakota Industrial Commission Lignite Research, Development and Marketing Program (NDIC LRDMP) to meet the U.S. Department of Energy (DOE) requirements. Our team also includes industry partners developing and operating CCUS projects in North Dakota and the surrounding Williston Basin region. Collectively, the WB-RITA Partnership, with many partners actively engaged in commercial projects, constitutes a powerful team that is leading the world in advancing CCUS deployment.

The goal of the WB-RITA Partnership is to identify and address storage and transport challenges facing commercial CCUS deployment in the U.S. portion of Williston Basin. To achieve this, the WB-RITA Partnership will 1) provide technical assistance to project developers, regulators, local governments, communities, and other key stakeholder groups to support CCUS deployment across the Williston Basin; 2) evaluate potential approaches to optimize storage resource development; 3) address emerging challenges to support safe and responsible deployment of carbon capture, transport, utilization, and storage; 4) support public engagement and education to inform local stakeholders and key decision-

makers regarding the safety and efficacy of CCUS and its role in secure, low-carbon-intensity energy production; and 5) provide regional technology transfer. Collectively, these efforts support the preservation and enhancement of North Dakota's lignite industry through advancing CO<sub>2</sub> emission reduction and creating opportunities for value-added products and partnerships across North Dakota's energy, agriculture, and industrial sectors.

### **PROJECT DESCRIPTION**

The EERC has been selected for an award of \$5,000,000 from DOE for the WB-RITA Partnership to provide technical assistance to project developers, regulators, local governments, communities, and other key stakeholder groups. Private sector entities have executed plans across the Williston Basin for large CO<sub>2</sub> storage facilities and regional carbon management hubs consisting of multiple carbon sources, storage reservoirs, and transport systems, such as pipelines, that link the sources and storage locations. The demand for technical assistance for private sector entities across the Williston Basin has grown substantially, with a need for greater specificity on potential storage resources and impacted communities within the Williston Basin. This demand is anticipated to include technical assistance for carbon storage development; storage resource management strategies; carbon transport, planning, and safety management; technology transfer; and facilitating two-way dialog with Williston Basin communities, including communicating project benefits to residents and incorporating their concerns into basin-scale carbon capture and storage (CCS) development. Given the multitude of stakeholders looking to develop storage projects within the Williston Basin, a basin-focused technical assistance partnership can ensure carbon storage resources continue to be developed and managed safely and efficiently.

The WB-RITA builds off the long-standing success of the PCOR Partnership Program with DOE continuing to provide federal funding under the WB-RITA Partnership award. The WB-RITA Partnership will leverage PCOR's 20-plus-year history of applied research in CCUS with over 260 member

organizations to address the critical challenges within the U.S. portion of the Williston Basin outlined in DOE Funding Opportunity Announcement (FOA) DE-FOA-0003014. Challenges to be addressed include the facets of siting CO<sub>2</sub> storage projects to mitigate pressure interference between neighboring storage facilities, the competition of pore space and mineral rights, transportation rights-of-way, and the impact of adjacent and diverse regulatory jurisdictions. The Williston Basin is rich in fossil fuel resources, CO<sub>2</sub> sources, and storage options, thereby providing all essential elements necessary for infrastructure development and widespread CCUS deployment. ***The vision for the WB-RITA Partnership is to build on the work of the long-standing PCOR Partnership program with a focus on providing technical assistance across the U.S. portion of the Williston Basin to promote CCUS infrastructure development and accelerate commercial deployment, thus enabling low-carbon-intensity and reduced greenhouse gas emissions for current and future plants that use coal and other fossil fuels.*** The WB-RITA Partnership anticipates sustained growth in industry support. The WB-RITA Partnership advances CCS research on the momentum generated from the PCOR Partnership Initiative, with nearly 20 letters of support from project partners within the Williston Basin (Appendix A). Our team also includes the industry partners developing and operating CCUS projects in North Dakota and surrounding Williston Basin region. With many partners actively engaged in commercial projects, the WB-RITA Partnership will leverage a powerful team that is leading the world in advancing and accelerating CCUS deployment.

**Objectives:** The WB-RITA Partnership's goal is to identify and address storage and transport challenges facing commercial CCUS deployment in Williston Basin. To achieve this endeavor, the WB-RITA Partnership will meet the following objectives: 1) provide technical assistance to project developers, regulators, local governments, communities, and other key stakeholder groups to support CCUS deployment across the Williston Basin; 2) evaluate potential approaches to optimize storage resource development; 3) address emerging challenges to support safe and responsible deployment of carbon capture, transport, utilization, and storage; 4) support public engagement and education to inform local

stakeholders and key decision-makers regarding the safety and efficacy of CCUS and its role in secure, low-carbon-intensity energy production; and 5) provide regional technology transfer.

**Methodology:** The EERC will identify and address challenges facing CCUS deployment in the Williston Basin to address the critical challenges outlined in DOE FOA DE-FOA-0003014: 1) siting CO<sub>2</sub> storage projects to mitigate pressure interference between neighboring storage facilities; 2) the competition of pore space and mineral rights; 3) transportation rights-of-way; and 4) the impact of adjacent and diverse regulatory jurisdictions. Through collaboration with project developers, regulators, local governments, communities, and other key stakeholder groups the EERC will provide technical assistance to support CCUS deployment across the Williston Basin. The project team will analyze storage resource potential and develop strategies to optimize storage resource development in the Williston Basin. The project team will address emerging challenges to support safe and responsible deployment of carbon capture, transport, utilization, and storage infrastructure. The EERC will engage the public through outreach and education to inform local stakeholders and key decision-makers regarding the safety and efficacy of CCUS and its role in secure, low-carbon-intensity energy production. Technology transfer activities will inform and educate CCUS stakeholders of project learnings through annual membership meetings, regulatory roundup meetings, technical advisory board meetings, webinars, reports, and conference presentations/papers. These activities will facilitate knowledge sharing and support DOE and NDIC LRDMP program goals.

The WB-RITA Partnership project will be organized into six tasks. The task structure is identical to that in the matching proposal that was awarded by DOE's Office of Fossil Energy and Carbon Management (FECM).

**Task 1.0 – Project Management and Planning:** Task 1.0 will be conducted throughout the project duration to ensure subsequent tasks and activities are completed according to the specific timelines. Task 1.0 will include reporting deliverables, quarterly reports, and the final report to NDIC. Results will



be provided in project reports and meetings with NDIC and will be shared at one or more technical conferences.

**Task 2.0 – Community Benefits Plan Implementation:** Task 2.0 work will focus on compliance requirements with the leveraged DOE funding and will address them in a manner that is most relevant and meaningful to North Dakota and Williston Basin communities, businesses, and workforces. The community benefits plan (CBP) implementation contains three actionable sections: diversity, equity, inclusion, and accessibility; energy equity; and workforce implications.

The stakeholders within the Williston Basin region form a diverse spectrum, including local communities, landowners, regulatory bodies, industry representatives, labor organizations, and tribal nations. The project team will engage with CCS developers and stakeholders within the Williston Basin to foster meaningful participation and address the unique needs and perspectives of diverse community members in and near project areas.

The project team will evaluate possible energy equity implications of CCS deployment in the Williston Basin, including effects on public health, prosperity, and the environment. Input from underserved communities will inform the research to improve understanding of distributional public benefits and cost of successful CCS deployment.

Workforce implications related to CCS will be evaluated within North Dakota and the Williston Basin. Development of the CCS jobs' knowledge, skills, and abilities will help identify relevant workforce training and gaps, reveal possible opportunities for education and apprenticeships, and yield an improved understanding of workforce implications related to CCS.

**Task 3.0 – Regional Storage Resource Management Strategies:** Task 3.0 will build on the project team's experience to quantify the impacts of pressure interference on storage resources and develop mitigation strategies and recommendations for regional-scale storage project development in the Williston Basin.

**Subtask 3.1 – Impact Performance Modeling and Forecasting:** Subtask 3.1 will use existing learnings about the impacts of pressure interference on the storage resource among sites as a function of the injection rates, spacing between sites, and number of sites to explore the effects of pressure interference on regional development. The technical approach will use increasingly complex modeling techniques, from simpler analytical and semianalytical approaches to more sophisticated geological modeling coupled with numerical reservoir simulations. Statistical analyses and machine learning of the modeling and simulation results will be used to quantify the relative importance of each factor, which will inform the investigation of management activities that could substantively reduce pressure interference at a regional scale.

**Subtask 3.2 – Pore and Pressure Space Management:** Activities in Subtask 3.2 will take the learnings from Subtask 3.1 and explore pore and pressure space management strategies for reducing regional pressure interference and thereby increasing the efficiency of the use of the storage resource. Management strategies to be explored may include but are not limited to 1) reducing per-well injection rates, 2) reducing the number of sites within a given area (density), 3) increasing the spacing between sites, and 4) installing producing wells at points/areas of expected or monitored pressure interference (active reservoir management). The case matrix of mitigation strategies will explore a broad parameter space for each factor to quantify the impacts and uncertainties of each strategy.

**Subtask 3.3 – Strategies for Regional Storage Resource Development:** The outcomes of Subtasks 3.1 and 3.2 will be summarized into recommendations for regional storage resource development that capture the potential impacts quantified in Subtask 3.1 and integrate the mitigation strategies explored in Subtask 3.2 (Deliverable [D]5). These recommendations may provide site spacing and operating guidelines for regional-scale storage project development in the Williston Basin.

**Task 4.0 – Emerging Challenges:** The project team will work with project developers, communities, resource managers, permitting agencies, and other stakeholders as necessary to support the most

responsible and equitable deployment of multiple carbon storage projects within the Williston Basin. Focus will be placed on acquiring information of greatest interest to affected communities. Specific activities under this task will include 1) providing advice, data, technical assistance, and strategies; 2) guiding the application of best practices in monitoring, reporting, and verification (MRV) planning for basin-scale monitoring; 3) conducting carbon storage resource assessments; and 4) identifying value-added crosscutting opportunities to maintain efficient development of the region's subsurface storage resources.

**Task 5.0 – Carbon Transport, Planning, and Safety Management:** Task 5.0 will build upon previous/existing project team projects/knowledge to support the planning of carbon transport infrastructure necessary for basin-scale development of carbon storage in the Williston Basin. The knowledge will help identify best practices, provide educational materials around CCS and pipelines, and engage relevant stakeholders.

**Subtask 5.1 – Pipeline Infrastructure:** Subtask 5.1 will identify and investigate the challenges related to carbon transport and planning. Potential topics include pipeline design and safety protocols, pipeline reuse, routing corridors, and regional CCS hub development. Further, the regulatory environment around CO<sub>2</sub> pipelines is unclear, particularly as one crosses multiple jurisdictions as noted by project developers in the U.S. upper Midwest. CCS project development in the region has been rapidly evolving, and additional topic areas may be included. This subtask will compile information on the aforementioned topics to assist potential project developers deploy CCS the Williston Basin. This subtask will support community outreach efforts in Task 2.0 and in technology transfer in Task 6.0.

**Subtask 5.2 – Best Practices Regarding Carbon Transport:** Subtask 5.2 will take the learnings from Subtask 5.1 to develop recommendations and best practices for the CCS industry in carbon transport. These recommendations will provide basinwide assistance to project developers and unbiased technical information for the relevant local and regional stakeholders (e.g., landowners, legislative officials,

regulatory agencies, media, etc.) in and around the Williston Basin to aid in the development of pipeline networks for existing and planned CCS projects.

**Task 6.0 – Technology Transfer:** Task 6.0 will provide technology transfer and knowledge sharing to and among regional and federal regulators, resource agencies, industry, and lawmakers about CCS technologies and project development. Technical and regulatory challenges to the equitable and environmentally responsible deployment of CO<sub>2</sub> storage projects in the Williston Basin will be identified and assessed. Outcomes from this task will be transferred to identified stakeholders through technical products, web portals, presentations, meetings, and webinars.

**Subtask 6.1 – Legal and Regulatory Challenges:** This subtask will focus on nontechnical issues that must be resolved for effective storage-based carbon management in the Williston Basin, such as federal, state, and local regulations and permits required for carbon transport and storage; National Environmental Policy Act requirements for carbon storage activities; access to land; pore space; transportation rights-of-way; etc. In coordination with Subtask 6.2, the outcome will be a Williston Basin-specific permitting and best practices report (D1) and an associated technical brief (D2) summarizing the findings. No less than two additional technical briefs (D3 and D4) will be prepared addressing topics such as area of review, unitization/amalgamation, aquifer exemption, pipeline standards and safety, and legal policy barriers and challenges.

**Subtask 6.2 – State and Federal Policy and Regulatory Engagement:** The EERC will interface with relevant resource agencies, CO<sub>2</sub> storage industry and project developers, and regional and federal agencies with regulatory purview within the Williston Basin. The goal is to identify the gaps in and challenges to the regulatory certainty essential for the timely permitting of regional CO<sub>2</sub> storage projects and associated transportation. Included is the facilitation of sharing best practices and engagement activities that allow the gathering and exchange, both in person and via electronic media, of technical

information from pertinent entities who have a voice in CO<sub>2</sub> storage and transport regulation and administration.

Included are state-level regulator and resource agency meetings, a federal-level regulator and resource agency meeting, and assembly of a pipeline and hub technical working group comprising regulatory, legislative, industry, and nongovernmental organizations and other relevant participants.

***Subtask 6.3 –Basin-Scale Project Identification and Potential Interaction: Mapping Support –***

Incorporating carbon storage resource assessments performed under Task 3.0, data will be gathered, organized, and implemented into a web-based geographic information system (GIS) map identifying the following within the Williston Basin:

- Areal outline(s) of potential and proposed storage complexes
- Ongoing or potential CO<sub>2</sub> capture, transport, and storage projects
  - Visual identification of potential for interaction with respect to CO<sub>2</sub> plumes, pressure fronts, transport pathways, and impacts (positive and adverse) on affected communities
- Potential CO<sub>2</sub> sources
  - Identification of the source (anthropogenic or carbon dioxide removal)
  - Type of facility
  - Type of capture technology expected, if known
  - Status of capture technology
  - Approximate cost and schedule for operation of capture equipment, if known
  - Approximate quantity and quality of CO<sub>2</sub>
- CO<sub>2</sub> pipelines
- General locations of CO<sub>2</sub> injection wells
- Ongoing or potential projects that may compete for storage resources, e.g., hydrogen storage, geothermal activity, oil and gas production

**Anticipated Results:** The project will support North Dakota's vision to develop and deploy large-scale commercial CO<sub>2</sub> storage projects that reduce environmental impacts and increase sustainability of energy production from the state's vast lignite resources. The project will continue to advance North Dakota in developing CCUS technologies. The project will enable North Dakota to provide its technical expertise as companies develop carbon storage facilities, utilizing North Dakota's unique geology and the legal framework and regulatory certainty provided at the state and federal levels. The project is also expected to foster the development low-carbon-intensity energy products within the Williston Basin.

**Facilities:** The EERC research complex comprises 254,000 ft<sup>2</sup> of laboratories, fabrication facilities, technology demonstration facilities, and offices. The EERC has established working relationships with over 1300 clients, including federal and state agencies, universities, energy exploration and production companies, utilities, research and development firms, equipment vendors, architecture and engineering firms, chemical companies, and other organizations in all 50 states and in 53 countries.

**Resources:** The EERC will leverage existing data acquired throughout the PCOR Partnership to provide a basis of technical assistance to project stakeholders within the Williston Basin. Since 2003, the EERC has been able to leverage datasets to advance technical knowledge of CCUS deployment within North Dakota and the Williston Basin.

Supplemental datasets may be acquired from NDIC. As a result of a long history of exploration and production in North Dakota, extensive oil and gas datasets are available. Most notably, NDIC's data from over 30,000 wells are publicly available for free. These datasets consist of both spatial and tabular databases. Other available data (for free and/or purchase) include seismic surveys (2D and 3D), geophysical well logs, core data, water quality data, groundwater well locations, and water salinity.

The North Dakota Geological Survey's Wilson M. Laird Core & Sample Library is less than 1 mile from the EERC. The climate-controlled facility houses over 375,000 feet of core and 30,000 boxes of drill cuttings obtained from oil and gas wells, which represent about 75% of the cores cut in the North

Dakota portion of the Williston Basin and about 95% of the samples collected. Use of the facility is free of charge.

No equipment is expected to be purchased for this project.

**Techniques to Be Used, and Their Availability and Capability:** The proposed team has committed to the project and has ensured the availability of key personnel for the time frame of this project. The data generated through this project will largely comprise existing datasets generated throughout the PCOR Partnership activities, created through data analysis, technical and economic evaluation, GIS data storage, and stakeholder engagement. The NDIC Oil and Gas Division provides online access to all geophysical logs related to deep well drilling in North Dakota. Any and all relevant publicly available data will be used for the project.

**Environmental and Economic Impacts while Project Is Underway:** Funding through NDIC will help offset initial development costs of CO<sub>2</sub> storage projects, and incentives such as 45Q will provide tax credits that make CO<sub>2</sub> capture, transportation, and storage economically viable. The project team believes that as more CCS projects are developed, the costs of the technologies employed will continue to fall and projects such as this will become more economically and socially attractive. As part of the CBP implementation, the project team will set a clear plan to evaluate workforce implications related to CCS throughout the Williston Basin. Development of the CCS jobs' knowledge, skills, and abilities register will help identify existing relevant workforce training and gaps, reveal possible opportunities for education and apprenticeships, and improve our understanding of workforce implications related to CCS.

**Ultimate Technological and Economic Impacts:** The proposed project will support North Dakota's vision to develop and deploy large-scale commercial CO<sub>2</sub> storage projects that reduce environmental impacts and increase the sustainability of energy production. The proposed project will provide the technical knowledge needed to confidently invest in addressing critical challenges, help to foster growth in CCUS

to help diversify North Dakota's economy, leverage existing energy resources, and create sustainable jobs.

**Why the Project Is Needed:** This project supports North Dakota's role as a world leader in the development and implementation of CCUS technologies and helps ensure the state can continue using all of its abundant coal, oil, and gas reserves. CCUS provides significant economic opportunities for the state. In 2021, Governor Doug Burgum announced an ambitious goal for North Dakota to be carbon neutral by 2030, a goal to be achieved through innovation. Since his announcement, the state has attracted over \$15 billion in potential investments in CCUS, with more expected to come. This technology is an emerging opportunity that has the potential to create tens of thousands of skilled, high-paying jobs in the state while securing North Dakota's existing energy infrastructure.

The WB-RITA Partnership is intended to help LRDMP, its member organizations, and North Dakota's plan for accelerated deployment of CCUS. The products developed by the proposed effort will provide CCUS project planners and operators with previously unavailable insight and information that will facilitate and accelerate the deployment of CCUS projects in North Dakota.

#### **STANDARDS OF SUCCESS**

The proposed project is intended to provide technical assistance to address the critical challenges of CCS deployment. Challenges to be addressed include the facets of siting CO<sub>2</sub> storage projects to mitigate pressure interference between neighboring storage facilities, the competition of pore space and mineral rights, transportation rights-of-way, and the impact of adjacent and diverse regulatory jurisdictions. The WB-RITA Partnership will be a valuable public information resource for developers of carbon storage sites in the Williston Basin that need assistance in addressing these challenges and affected communities that seek to participate in the resolution of these challenges.

The WB-RITA Partnership will engage with regulatory agencies, PCOR Partnership partners in North Dakota and the Williston Basin, North Dakota carbon management hubs, and current North



Dakota Carbon Storage Assurance Facility Enterprise (CarbonSAFE) Initiative project partners including Minnkota Power Cooperative (Minnkota), Rainbow Energy Center (Rainbow), and ONEOK, Inc. (ONEOK). Ultimately, the WB-RITA Partnership will leverage the vast knowledge from CCS stakeholders across the Williston Basin. The success of this project will be measured by the following outcomes: 1) deploying innovations stemming from the development of current and future workforces made up of underrepresented workers and disadvantaged communities in the Williston Basin; 2) addressing key considerations and mitigation strategies regarding regional pressure interference of neighboring CO<sub>2</sub> storage projects in the Williston Basin; 3) engaging and addressing emerging topics to support project developers, communities, and enhance database and GIS to support stakeholder groups in the Williston Basin; 4) identifying and investigating challenges related to carbon transport and planning to assist project developers in CCS deployment in the Williston Basin; and 5) promoting regional technology transfer, including best practices of permitting basin-specific CO<sub>2</sub> storage projects, stakeholder engagement, and MRV plan data dissemination in the Williston Basin.

### **BACKGROUND/QUALIFICATIONS**

**Background:** The EERC has over two decades of experience in applied research and development and commercial demonstration of CCS. Through the EERC-led PCOR Partnership and CarbonSAFE Initiative projects, the EERC has built a broad network of CCS stakeholders in the Williston Basin, performed extensive technical characterization, developed monitoring strategies, and advanced technologies to improve and further all aspects of CCS. The EERC will leverage the experience gained through these past and ongoing efforts. This approach will enable the team to address a new vision and scope of work within a focused region and stakeholder group. CCS stakeholders within the Williston Basin region form a diverse spectrum, including local communities, landowners, regulatory bodies, industry representatives, labor organizations, and tribal nations. The success of this project relies on engaging

these stakeholders, addressing their varying interests, and recognizing the importance of underrepresented and disadvantaged communities impacted by CCS.

Many additional industrial and commercial organizations are in support of the proposal throughout the North Dakota, Montana, and South Dakota portions of the Williston Basin (Table 1). Their backgrounds span decades of experience in carbon management and regulatory policy. The commercial partners are members of PCOR Partnership and/or are associated with the CarbonSAFE and carbon storage hub projects in the basin.

**Table 1. WB-RITA Partnership Stakeholder Engagement and Support**

<b>Supporting Organization</b>	<b>Stakeholder Areas of Expertise</b>
North Dakota Governor Doug Burgum	Regulatory policy
North Dakota Congressman Kelly Armstrong	Regulatory policy
North Dakota U.S. Senator John Hoeven	Regulatory policy
North Dakota U.S. Senator Kevin Cramer	Regulatory policy
BEPC/DGC <sup>1</sup>	Carbon capture/storage/transport
Denbury Inc. <sup>2</sup>	Carbon capture/storage/transport
Harvestone	Carbon capture/storage/transport
Hess Corporation	Carbon capture/storage
Minnkota	Carbon capture/storage/transport
NACCO Natural Resources	Carbon capture/storage/transport
North Dakota Building Trades Unions	Workforce
North Dakota Department of Mineral Resources	Class VI regulatory agency in North Dakota
ONEOK	Carbon capture/storage
Rainbow	Carbon capture/storage
Red Trail Energy, LLC	Carbon capture/storage/low-carbon markets
Summit Carbon Solutions	Carbon capture/storage/transport/low-carbon markets
Montana Board of Oil and Gas	Regulatory policy

<sup>1</sup> Basin Electric Power Cooperative-owned Dakota Gasification Company.

<sup>2</sup> Denbury has been recently acquired by Exxon Mobil Corporation.

**Qualifications:** The EERC will lead the proposed project. The principal investigator (PI) and lead for Task 1.0 is Mr. Kevin Connors, Assistant Director for Regulatory Compliance and Energy Policy at the EERC. Mr. Connors will handle project management, planning, and reporting. He will ensure successful completion of the project on schedule and budget, coordinate and direct consultant activities, and

ensure transfer of data and products to project sponsors. Mr. Connors has served as PI on the PCOR Partnership Initiative since 2020, provided vast experience in the regulatory landscape, and been a pioneer in leading North Dakota in obtaining Class VI primacy for CO<sub>2</sub> storage. He gained expertise in the U.S. Environmental Protection Agency Underground Injection Control Program and North Dakota’s geologic storage of CO<sub>2</sub> statutes and authored North Dakota’s CO<sub>2</sub> storage administrative rules. In this position, he participated in the North Dakota CO<sub>2</sub> Storage Workgroup, testified before the North Dakota Administrative Rules Committee, authored publications, and presented at technical conferences on CCUS regulatory frameworks. He also has expertise in North Dakota’s pore space amalgamation process for CO<sub>2</sub> storage.

Each of the proposed tasks will be led by qualified individuals from the EERC who will work with the project partners as appropriate to accomplish task goals and corresponding project goals. Key personnel are listed in Figure 1 and Table 2, and resumes of key personnel are provided in Appendix B. The project team also includes multiple project advisors with decades of combined CCS and project management experience in North Dakota, who will support the PI.

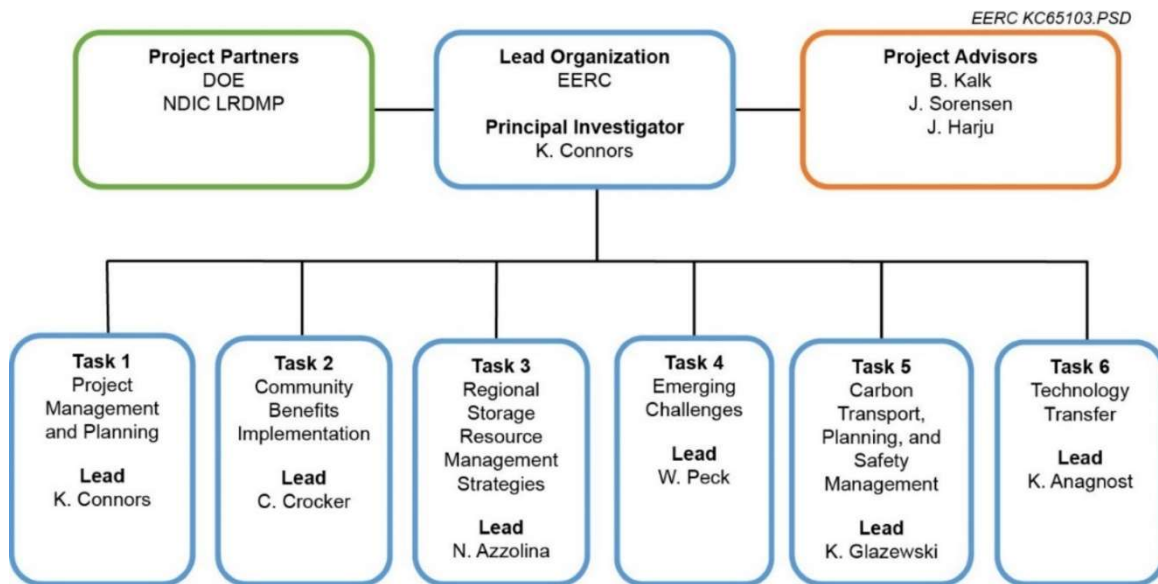


Figure 1. Project organizational chart showing key personnel.

**Table 2. Key Personnel Roles**

<b>Key Personnel</b>	<b>Role(s)</b>	<b>Responsibilities</b>
Kevin Connors	PI Task 1.0 lead	Provide day-to-day project oversight; provide project design, execution, reporting, and presentation of results; and ensure successful completion of project on schedule and budget.
Charlene Crocker	Task 2.0 lead	Oversee all activities within Task 2.0, including CBP implementation, outreach and education, and stakeholder engagement.
Nicholas Azzolina	Task 3.0 lead	Oversee all activities within Task 3.0, including quantifying impacts of pressure interference on storage resources and develop mitigation strategies for regional-scale storage project development in the Williston Basin.
Wesley Peck	Task 4.0 lead	Oversee all activities within Task 4.0, including supporting emerging topics, including supporting project developers and integrating carbon management strategies for multiple projects across the Williston Basin.
Kyle Glazewski	Task 5.0 lead	Oversee all activities within Task 5.0, including identifying and investigating challenges related to carbon transport and planning, including implementations of best practices for the CCUS industry in and around the Williston Basin
Katherine Anagnost	Task 6.0 lead	Oversee all activities within Task 6.0, including development of best practices of permitting, intra- and interstate issues, state and federal policy and regulatory engagement, and tools for GIS mapping regarding basin-scale project identification and interactions.
John Harju	Project advisor	Provide project oversight as necessary to ensure successful integration of project partners within the WB-RITA Program.
James Sorensen	Project advisor	Provide project oversight as necessary to ensure achievement of the project’s standards of success.
Brian Kalk	Project advisor	Provide project oversight as necessary to ensure achievement of the project’s standards of success.

**VALUE TO NORTH DAKOTA**

The WB-RITA Partnership will continue to build off the long-standing PCOR Partnership, leveraging over 20 years of applied research in CCUS with over 260 member organizations to provide technical assistance to address new and emerging challenges facing CCUS deployment in North Dakota. North Dakota’s leadership in CCUS stems from the state’s early efforts to establish policies and regulatory frameworks that provide industry certainty to make investment decisions. The 45Q tax credit has shown to be a business driver that is helping to advance projects across North Dakota. The WB-RITA Partnership will engage project developers, regulators, local governments, communities, and other key

stakeholder groups across North Dakota by providing technical assistance for addressing challenges to carbon capture, transport, utilization, and storage deployment. Engaging these stakeholders, addressing their varying interests, and recognizing the importance of engaging the public and local communities with fact-based information will bring value to North Dakota.

CCUS technology will allow coal-fired electricity generation with a substantially reduced carbon footprint, preserving assets and jobs in the coal and utility sectors. The pipeline from Beulah to Saskatchewan and the extension of the Greencore Pipeline into North Dakota illustrate how a basinwide approach to infrastructure development is essential for diversification and attendant economic benefits. The establishment of reliable CO<sub>2</sub> supplies from Minnkota's Project Tundra, BEPC's DGC, Rainbow's Coal Creek Station, and similar regional efforts to advance carbon capture will position North Dakota's energy future. These commercial demonstrations of low-carbon-intensity electricity generation will bring additional revenue streams to coal-fired utilities through sales for enhanced oil recovery in both conventional and unconventional oil fields in North Dakota. Advancing CCUS on North Dakota coal-fired electricity generation units brings value to the state by driving economic investment while ensuring the longevity of North Dakota's coal mining and electricity generation industries.

## **MANAGEMENT**

The EERC will oversee all tasks, schedule regular internal and external meetings with project participants, and ensure that the project is conducted using acceptable scientific methodologies and practices in accordance with the project plan (budget, schedule, deliverables, and milestones) and is meeting quality objectives. The EERC will keep NDIC LRDMP informed of project progress, coordinate activities as necessary for success, and be responsible for timely submission of all project deliverables and transfer of data and products to the project team. Project progress will be measured by completion of milestones and deliverables indicated in the project timeline in Figure 2. Progress reports will be

submitted throughout the duration of the project. A final comprehensive report will be provided to NDIC LRDMP at the end of the program.

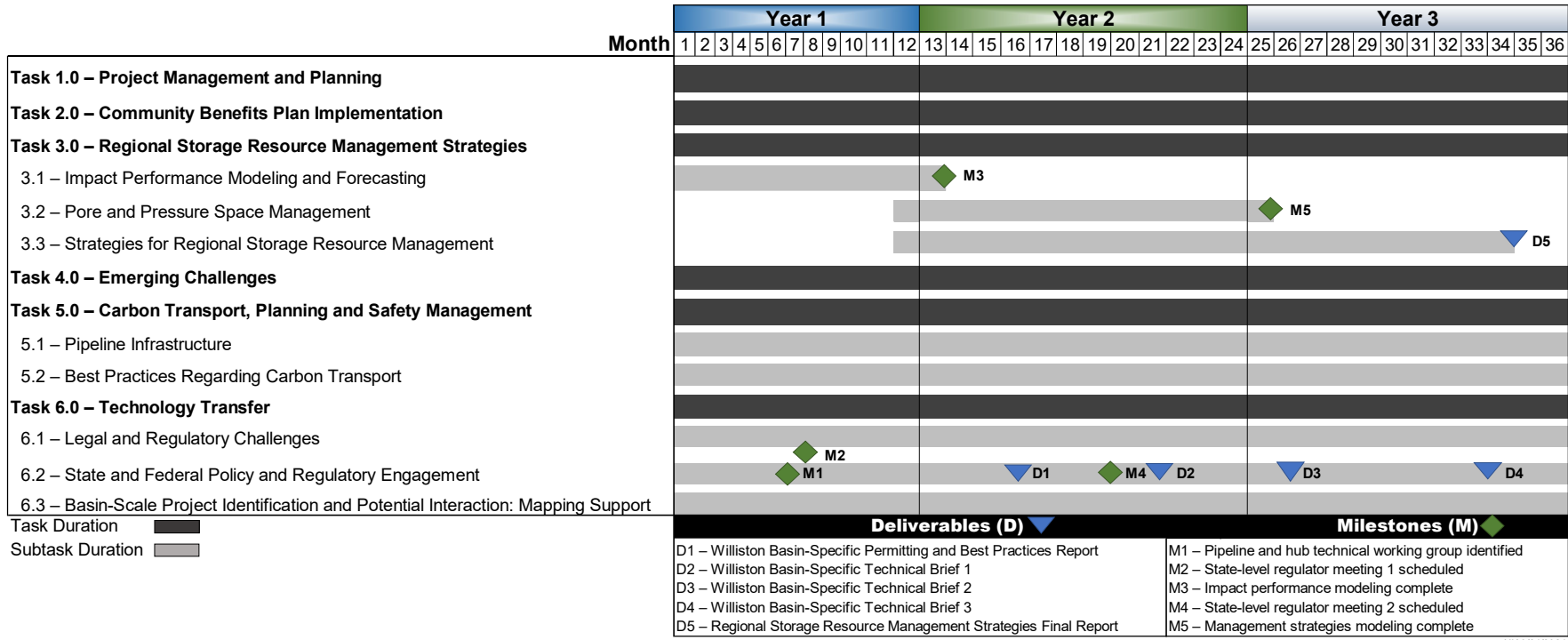
The milestones and deliverables are at key times during the study. The following milestones will be key to track and assist with evaluation points:

- The successful completion of **Milestone (M) 1 – Pipeline and Hub Technical Working Group Identified** will help to facilitate a knowledge-sharing technology transfer platform for CO<sub>2</sub> transport and hub-focused regulatory and industry staff in the Williston Basin.
- The successful completion of **M2 – State-Level Regulator Meeting 1 Scheduled** will lead to a key knowledge-sharing and technology transfer activity for state regulators and resource agency staff, leading to greater regulatory certainty in the Williston Basin.
- The successful completion of **M3 – Impact Performance Modeling Complete** will inform the investigation of management activities that could substantively reduce pressure interference at a regional scale.
- The successful completion of **M4 – State-Level Regulator Meeting 2 Scheduled** will lead to a follow-up knowledge-sharing and technology transfer activity for state regulators and resource agency staff, further increasing regulatory certainty in the Williston Basin.
- The successful completion of **M5 – Management Strategies Modeling Complete** will take learnings from the impact performance modeling and forecasting activities and explore relationships to inform reducing pressure interference at a regional scale.

#### **TIMETABLE**

This project is proposed to be performed over 36 months, with an anticipated start date of October 1, 2024.

23



NK 9/24/2024

Figure 2. Proposed project schedule.

**BUDGET AND MATCHING FUNDS**

The total estimated cost for the proposed work is \$6,250,000, as presented in Table 3. The EERC requests \$1,250,000 from LRDMP to be matched with \$5,000,000 from DOE’s FECM. Budget notes can be found in Appendix C.

**Table 3. Budget Breakdown**

<b>Project Associated Expense</b>	<b>NDIC Share (cash)</b>	<b>DOE Share (cash)</b>	<b>Total Project</b>
<b>Labor</b>	\$812,455	\$2,875,260	\$3,687,715
<b>Travel</b>	\$0	\$159,214	\$159,214
<b>Supplies</b>	\$0	\$33,778	\$33,778
<b>Rents and Leases</b>	\$0	\$17,800	\$17,800
<b>Communications</b>	\$0	\$297	\$297
<b>Printing and Duplicating</b>	\$0	\$5,850	\$5,850
<b>Food</b>	\$0	\$52,247	\$52,247
<b>UND SIMS<sup>1</sup> Team – CO<sub>2</sub> Hazmat Simulation</b>	\$0	\$40,000	\$40,000
<b>Laboratory Fees and Services</b>			
Document Production Services	\$15,309	\$74,930	\$90,239
Software Solution Services	\$0	\$14,858	\$14,858
Engineering Services Fee	\$0	\$6,747	\$6,747
Geoscience Services Fee	\$49	\$30,279	\$30,328
<b>Total Direct Costs</b>	\$827,813	\$3,311,260	\$4,139,073
<b>Facilities and Administration</b>	\$422,187	\$1,688,740	\$2,110,927
<b>Total Project Costs</b>	<b>\$1,250,000</b>	<b>\$5,000,000</b>	<b>\$6,250,000</b>

<sup>1</sup> University of North Dakota Simulation in Motion Safety.

**TAX LIABILITY**

The EERC, a department within UND, is a state-controlled institution of higher education and is not a taxable entity; therefore, it has no tax liability.

**CONFIDENTIAL INFORMATION**

No confidential information is included in this proposal.



**APPENDIX A**

**LETTERS OF SUPPORT**



Governor Doug Burgum



January 22, 2024

Dr. John A. Harju  
Vice President for Strategic Partnerships  
Energy & Environmental Research Center  
15 North 23rd Street, Stop 9018  
Grand Forks, ND 58202-9018

Dear Dr. Harju:

Subject: Support for EERC Proposal Entitled "Williston Basin Region Initiative"

North Dakota has a long history of responsible energy development and environmental leadership. We commend the EERC for its long-term commitment to making geologic storage and utilization of carbon dioxide a viable option in our quest for low-carbon solutions.

For those reasons and more, this letter serves as a strong expression of my support for the application by the Energy & Environmental Research Center (EERC) to the U.S. Department of Energy's Regional Initiative for Technical Assistance Partnerships (RITAP) to Advance Deployment of Basin-Scale Carbon Transport and Storage and Community Engagement (DE-FOA-0003014).

North Dakota's energy industries are global leaders in energy development and production. With our goal of energy innovation and being net carbon neutral by 2030, they continue to implement long-term strategies that provide meaningful and abundant contributions to our nation's energy needs. This project proposed by the EERC will accelerate the safe and socially equitable deployment of carbon capture, utilization, and storage within our state and the Williston Basin through technical assistance and by providing fact- and science-based community outreach and education materials.

We strongly support the efforts of the EERC and look forward to the exciting opportunities this work will bring to the state of North Dakota and our country in resolving our energy challenges.

Regards,

Doug Burgum  
Governor

**KELLY ARMSTRONG**  
AT-LARGE, NORTH DAKOTA

**ENERGY AND COMMERCE COMMITTEE**  
VICE CHAIR  
ENERGY, CLIMATE, AND GRID SECURITY  
INNOVATION, DATA, AND COMMERCE  
OVERSIGHT AND INVESTIGATIONS

**COMMITTEE ON OVERSIGHT AND ACCOUNTABILITY**  
NATIONAL SECURITY, THE BORDER, AND FOREIGN  
AFFAIRS

**SELECT SUBCOMMITTEE ON THE WEAPONIZATION  
OF THE FEDERAL GOVERNMENT**

**Congress of the United States**  
**House of Representatives**  
Washington, DC 20515

WASHINGTON OFFICE:  
2235 RAYBURN HOUSE OFFICE BUILDING  
WASHINGTON, DC 20515  
(202) 225-2611

DISTRICT OFFICES:  
3217 FIECHTNER DRIVE, SUITE B  
FARGO, ND 58103  
(701) 353-6665

U.S. FEDERAL BUILDING  
220 E ROSSER AVENUE, ROOM 228  
BISMARCK, ND 58501  
(701) 354-6700

ARMSTRONG.HOUSE.GOV

January 22, 2024

Dr. John A. Harju  
Vice President for Strategic Partnerships  
Energy & Environmental Research Center  
15 North 23rd Street, Stop 9018  
Grand Forks, ND 58202-9018

Dear Dr. Harju:

Subject: Support for EERC Proposal Entitled "Williston Basin Region Initiative"

I am writing to express my support for the application submitted by the Energy & Environmental Research Center (EERC) to the U.S. Department of Energy's Regional Initiative for Technical Assistance Partnerships (RITAP) to Advance Deployment of Basin-Scale Carbon Transport and Storage and Community Engagement (DE-FOA-0003014).

In my role as the Vice Chair of the Energy and Commerce Committee of the U.S. House of Representatives, I have the privilege to showcase North Dakota's vibrant energy resources and those enterprises that lead their environmentally responsible production and development. I am particularly proud of my frequent opportunities to highlight the ongoing leadership of the EERC in formulating an economically viable low-carbon future for our nation and world.

Through community engagement, this program will focus on technical assistance within the Williston Basin and provide stakeholders with integrated carbon management strategies to achieve low-carbon footprints. I am confident that this will further propel North Dakota's leadership in the pursuit of long-term energy solutions.

I strongly support the EERC's efforts, which will lead to exciting opportunities for the state of North Dakota and the nation in resolving near- and long-term energy challenges.

Sincerely,



Kelly Armstrong  
U.S. Congressman

JOHN HOEVEN  
NORTH DAKOTA

338 RUSSELL SENATE OFFICE BUILDING  
TELEPHONE: (202) 224-2551  
FAX: (202) 224-7999

hoeven.senate.gov

## United States Senate

WASHINGTON, DC 20510

January 22, 2024

COMMITTEES:  
AGRICULTURE  
APPROPRIATIONS  
ENERGY AND NATURAL RESOURCES  
INDIAN AFFAIRS

Dr. John A. Harju  
Vice President for Strategic Partnerships  
Energy & Environmental Research Center  
15 North 23rd Street, Stop 9018  
Grand Forks, ND 58202-9018

Subject: Support for EERC Proposal Entitled "Williston Basin Region Initiative"

Dear Dr. Harju:

I am writing to express my support for the application submitted by the Energy & Environmental Research Center (EERC) to the U.S. Department of Energy's Regional Initiative for Technical Assistance Partnerships (RITAP) to Advance Deployment of Basin-Scale Carbon Transport and Storage and Community Engagement (DE-FOA-0003014).

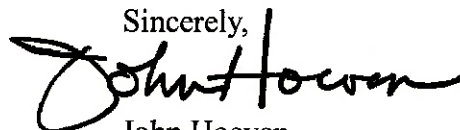
As a member of the U.S. Senate Committee on Energy and Natural Resources, I am committed to advancing our nation's energy security. During my time as governor and my tenure in the U.S. Senate, we have been working to build North Dakota into an energy powerhouse for our nation. At the same time, our state is leading the way in innovative new technologies, like carbon capture, utilization, and storage (CCUS), which will empower the United States to continue utilizing all of our abundant energy resources with better environmental stewardship. In particular, we:

- Developed and passed through the North Dakota legislature a regulatory framework for long-term carbon sequestration in the state.
- Established trust funds for state oversight and for long-term liability.
- Secured approval from the U.S. Environmental Protection Agency to give North Dakota regulatory primacy over Class VI wells.

These are among the critical elements that set our state apart in making geologic sequestration a reality, and the EERC has been a central player throughout these efforts. Under this proposal, the EERC will accelerate the commercial deployment of CCUS within the Williston Basin and continue to inform and educate through public outreach, helping to ensure our nation can realize the benefits of this critical energy technology.

Accordingly, I hope this application receives favorable consideration. Thank you for your efforts in this important matter. Please keep me informed of the review process, and feel free to contact my office should you need any further assistance.

Sincerely,



John Hoeven  
U.S. Senator

# United States Senate

January 22, 2024

Dr. John A. Harju  
Vice President for Strategic Partnerships  
Energy & Environmental Research Center  
15 North 23rd Street, Stop 9018  
Grand Forks, ND 58202-9018

Dear Dr. Harju:

Subject: Support for EERC Proposal Entitled “Williston Basin Region Initiative”

I am writing to express my support for the application submitted by the Energy & Environmental Research Center (EERC) to the U.S. Department of Energy’s Regional Initiative for Technical Assistance Partnerships (RITAP) to Advance Deployment of Basin-Scale Carbon Transport and Storage and Community Engagement (DE-FOA-0003014).

As you know, I have been relentless in my support for our state’s all-the-above energy industry and for the world-class energy research across multiple disciplines undertaken by the EERC. I have introduced and worked on multiple pieces of legislation to encourage research, development, and implementation of carbon capture, utilization, and storage (CCUS) technologies.

North Dakota is among the nation’s premier states in energy production and environmental conservation. I am a proponent of development and production of all of the state’s energy resources—conventional and renewable—and believe North Dakota’s energy research and policies should serve as a model for the rest of the country. The EERC’s proposed efforts will accelerate the commercial deployment of CCUS in North Dakota and throughout the Williston Basin, which will lead to an expansion of the opportunities for our nation’s industries and further inform and educate the public through outreach and stakeholder engagement.

I am a strong advocate for the work being done at the EERC and remain supportive and committed to the opportunities being pursued, including this geologic carbon storage project within the Williston Basin, and the promise they provide for the state of North Dakota and the nation.

Sincerely,



Kevin Cramer  
U.S. Senator



February 8, 2024

Mr. Kevin C. Connors  
Assistant Director for Regulatory Compliance  
and Energy Policy  
Energy & Environmental Research Center  
University of North Dakota  
15 North 23rd Street, Stop 9018  
Grand Forks, ND 58202-9018

Dear Mr. Connors:

Subject: Support for EERC Proposal No. 2024-0091 in Response to U.S. Department of Energy (DOE)  
Funding Opportunity Announcement No. DE-FOA-0003014

Basin Electric Power Cooperative (Basin Electric), and its subsidiary the Dakota Gasification Company (DGC), are pleased to support the Energy & Environmental Research Center (EERC) proposed project entitled "Williston Basin Regional Initiative Technical Assistance Partnership."

Basin Electric is a not-for-profit generation and transmission cooperative incorporated in 1961 to provide supplemental power to 141 member cooperatives across nine states. We maintain an all-of-the-above energy strategy that takes advantage of the benefits of renewables while maintaining baseload that ensures the reliability and affordability our members expect.

DGC's Great Plains Synfuels Plant produces pipeline-quality natural gas, several chemical and fertilizer products, and is a participant in one of the largest carbon capture and sequestration projects in the world. The plant has captured and transported more than 40 million metric tons of carbon dioxide (CO<sub>2</sub>) for sequestration since 2000. In 2023, DGC received permit approval to store over 25 million metric tonnes of CO<sub>2</sub> in a class VI storage reservoir located near the facility.

The goal of accelerating growth of the Williston Basin's carbon management industry in a manner that is equitable and environmentally responsible is very much in alignment with our interests in developing clean energy across the U.S. portion of the Williston Basin. Basin Electric will benefit greatly from knowledge gained and collaboration between the EERC and related research programs.

We look forward to this exciting opportunity to continue working closely with the EERC and other stakeholders in the Williston Basin.

Sincerely,



Todd Brickhouse  
CEO & General Manager



February 12, 2024

Kevin C. Connors  
Assistant Director for Regulatory Compliance  
and Energy Policy  
Energy & Environmental Research Center  
University of North Dakota  
15 North 23rd Street, Stop 9018  
Grand Forks, ND 58202-9018

Subject: Support for EERC Proposal 2024-0091 in Response to U.S. Department of Energy (DOE)  
Funding Opportunity Announcement No. DE-FOA-0003014

Dear Mr. Connors:

Denbury Inc. (Denbury) is pleased to support the Energy & Environmental Research Center (EERC) proposed project entitled "Williston Basin Regional Initiative Technical Assistance Partnership."

Denbury is an experienced developer of carbon capture, utilization, and storage (CCUS) solutions and enhanced oil recovery (EOR). Recently acquired by ExxonMobil, Denbury carries out exploration, development, and production of oil and natural gas from its assets in the Gulf Coast and Rocky Mountain regions of the United States. For over two decades, we have maintained a unique strategic focus on utilizing CO<sub>2</sub> in our EOR operations and since 2012 have also been active in CCUS through the injection of captured industrial-sourced CO<sub>2</sub>.

The Williston Basin has a maturing carbon capture and storage (CCS) industry. As such, we understand the demand for and value of technical assistance for these commercial endeavors. Denbury has relied on past EERC expertise in technical areas and coupled that with our own managerial and business experience to create a winning partnership toward accelerating CCS deployment. EERC's project proposal addressing challenges, fostering development of infrastructure, and accelerating deployment of CCS in the U.S. portion of the Williston Basin are very much aligned with Denbury's mission to provide its customers with safe, reliable, and affordable energy while minimizing our environmental impact.

Denbury, therefore, recognizes the significant value of the proposed initiative and will support this effort by collaborating on specific activities as appropriate, subject to an award from DOE. We look forward to this exciting opportunity to continue working closely with the EERC and other stakeholders in the Williston Basin.

Sincerely,

A handwritten signature in blue ink that reads "Kate Ryan".

Kate Ryan  
VP, Gulf Coast Business



Harvestone  
2841 3rd St SW  
Underwood, ND 58576  
(701) 442-7513

February 7, 2024

Kevin C. Connors  
Assistant Director for Regulatory Compliance and Energy Policy  
Energy & Environmental Research Center  
University of North Dakota  
15 North 23rd Street, Stop 9018  
Grand Forks, ND 58202-9018

Dear Mr. Connors:

Subject: Support for EERC Proposal 2024-0091 in Response to U.S. Department of Energy (DOE) Funding Opportunity Announcement No. DE-FOA-0003014

Harvestone Low Carbon Partners (HLCP) is pleased to support the Energy & Environmental Research Center (EERC) proposed project entitled "Williston Basin Regional Initiative Technical Assistance Partnership."

HLCP owns and operates three ethanol biorefineries that buy locally grown corn and turn it into clean-burning, American-made fuel. We're also actively developing infrastructure projects to capture and permanently sequester the carbon dioxide (CO<sub>2</sub>) that is generated in the ethanol production process at each of these facilities. In doing so, we are creating a steady market for North Dakota and Indiana farmers as we build a renewable and sustainable energy future.

HLCP began carbon capture and storage (CCS) operations at its Blue Flint Ethanol plant in the fall of 2023, becoming the second Class VI injection project in operation in North Dakota. The Blue Flint plant produces more than 200,000 metric tonnes per year of CO<sub>2</sub>, a byproduct of the fermentation process. Based on our experience in advancing multiple CCS projects, we understand the demand for and value of technical assistance for these commercial endeavors. HLCP has benefited greatly from knowledge gained and collaborative opportunities through research programs at the EERC, and the opportunity presented within will create a winning partnership toward accelerating CCS deployment.

Addressing challenges, fostering development of infrastructure, and accelerating deployment of CCS in the U.S. portion of the Williston Basin are very much aligned with HLCP vision in doing our part to reduce our carbon footprint. Carbon Zero: A Vision of Harvestone is a multiphased initiative aimed at making our plants net carbon zero.

HLCP, therefore, recognizes the significant value of the proposed initiative and will support this effort by collaborating on specific activities as appropriate, subject to an award from DOE.

We look forward to this exciting opportunity to continue working closely with the EERC and other stakeholders in the Williston Basin.

Sincerely,

A handwritten signature in black ink that reads "Adam C. Dunlop". The signature is written in a cursive style and is followed by a long horizontal line.

Adam Dunlop  
Chief Development Officer







Hess Corporation  
1501 McKinney Street  
Houston, TX 77010

February 7, 2024

Mr. Kevin C. Connors  
Assistant Director for Regulatory Compliance and Energy Policy  
Energy & Environmental Research Center  
University of North Dakota  
15 North 23rd Street, Stop 9018  
Grand Forks, ND 58202-9018

Dear Mr. Connors:

Subject: Support for EERC Proposal No. 2024-0091 in Response to U.S. Department of Energy (DOE) Funding Opportunity Announcement No. DE-FOA-0003014

Hess Corporation (Hess) is pleased to support the Energy & Environmental Research Center (EERC) proposed project entitled "Williston Basin Regional Initiative Technical Assistance Partnership."

Hess is an American global independent energy company involved in exploration and production of crude oil and natural gas. At Hess, an executive-led task force has been leading the development and implementation of our Low-Carbon Transition Framework, including our plan to achieve net-zero Scope 1 and 2 greenhouse gas (GHG) emissions on an equity basis by 2050.

We are committed to examine additional opportunities to address our GHG emissions, including energy efficiency from electrification of our operations, carbon capture and sequestration (CCS), and deployment of advanced technologies that are not currently commercially viable or are still in development.

Addressing challenges, fostering development of infrastructure, and accelerating deployment of CCS in the U.S. portion of the Williston Basin are very much aligned with Hess's mission to become the world's most trusted energy partner, delivering reliable and sustainable energy to meet the growing demand.

Hess, therefore, recognizes the significant value of the proposed initiative and will support this effort by collaborating on specific activities as appropriate, subject to an award from DOE.

We look forward to this exciting opportunity to continue working closely with the EERC and other stakeholders in the Williston Basin.

Sincerely,

A handwritten signature in black ink, appearing to read "Brent Lohnes".

Brent Lohnes  
General Manager – North Dakota  
Hess Corporation



5301 32nd Ave S  
Grand Forks, ND 58201-3312  
Phone 701.795.4000  
[www.minnkota.com](http://www.minnkota.com)

February 9, 2024

Mr. Kevin C. Connors, Assistant Director  
Regulatory Compliance and Energy Policy  
UND Energy & Environmental Research Center  
15 North 23rd Street, Stop 9018  
Grand Forks, ND 58202-9018

RE: Support for EERC Proposal No. 2024-0091 in Response to U.S. Department of Energy (DOE) Funding Opportunity Announcement No. DE-FOA-0003014

Dear Mr. Connors,

Minnkota Power Cooperative, Inc. (Minnkota) is pleased to support the Energy & Environmental Research Center (EERC) proposed project entitled "Williston Basin Regional Initiative Technical Assistance Partnership."

Minnkota is a not-for-profit electric generation and transmission cooperative that provides wholesale electric energy to 11 member-owner distribution cooperatives located in eastern North Dakota and northwestern Minnesota. The primary source of electric generation for the Minnkota member-owners is the [Milton R. Young Station \(MRY\)](#), a two-unit, lignite coal-based power plant located near the town of Center, North Dakota. Minnkota is currently pursuing [Project Tundra](#), an initiative to retrofit MRY's station with technology to capture up to 4 million tons of CO<sub>2</sub> annually. Those emissions would be stored safely in a secure geologic formation more than a mile underground.

Minnkota has successfully permitted over 200 million metric tonnes of CO<sub>2</sub> storage capacity in and around the Milton R. Young Station. As such, we understand the demand for and value of technical assistance for these commercial endeavors. Throughout the development of project Tundra, Minnkota has relied on EERC's technical expertise coupled with our own managerial and business experience to create a winning partnership toward accelerating commercial CCS deployment. Our mission is to provide our member-owners and end users with sustainable, resilient, and equitable access to clean energy.

Minnkota, therefore, recognizes the significant value of the proposed initiative and will support this effort by collaborating on specific activities as appropriate, subject to an award from DOE.

We look forward to this exciting opportunity to continue working closely with the EERC and other stakeholders in the Williston Basin.

Sincerely,

A handwritten signature in black ink that reads "Stacey Dahl".

Stacey A. Dahl  
VP External Affairs



**CHRISTOPHER D. FRIEZ**  
Vice President-Land, Associate General Counsel and Assistant Secretary

Telephone: 701-222-7580  
E-Mail: [christopher.friez@nacco.com](mailto:christopher.friez@nacco.com)

February 9, 2024

Mr. Kevin C. Connors  
Assistant Director for Regulatory Compliance and Energy Policy  
Energy & Environmental Research Center  
University of North Dakota  
15 North 23rd Street, Stop 9018  
Grand Forks, ND 58202-9018

RE: Support for EERC Proposal No. 2024-0091 in Response to U.S. Department of Energy (DOE)  
Funding Opportunity Announcement No. DE-FOA-0003014

Dear Mr. Connors:

NACCO Natural Resources Corporation (NACCO) is pleased to support the Energy & Environmental Research Center (EERC) proposed project entitled “Williston Basin Regional Initiative Technical Assistance Partnership.”

For more than 100 years, NACCO has provided resources to produce reliable and affordable energy throughout the Williston Basin and across the country. Like the EERC, our team drives innovation and strives to deliver long-term success with a proud history of safety and environmental stewardship.

Addressing challenges, fostering development of infrastructure, and accelerating deployment of carbon capture and storage (CCS) in the U.S. portion of the Williston Basin is very much aligned with our vision of operating safely and as responsible environmental stewards—from permitting and mine planning to operations management and reclamation. We recognize the value and need for technical assistance to help accelerate the deployment of CCS across the Williston Basin.

NACCO recognizes the significant value of the proposed initiative and will support this effort by collaborating on specific activities as appropriate, subject to an award from DOE.

We look forward to this exciting opportunity to continue working closely with the EERC and other stakeholders in the Williston Basin.

Very truly yours,

NACCO Natural Resources Corporation



Christopher D. Friez

Vice President-Land, Associate General Counsel and Assistant Secretary



## NORTH DAKOTA STATE BUILDING AND CONSTRUCTION TRADES COUNCIL

2901 Twin City Dr. Suite 201  
Mandan, North Dakota 58554  
(701) 663-8821

© 250-C

February 7, 2024

Mr. Kevin C. Connors  
Assistant Director for Regulatory Compliance and Energy Policy  
Energy & Environmental Research Center  
University of North Dakota  
15 North 23rd Street, Stop 9018  
Grand Forks, ND 58202-9018

Dear Mr. Connors:

Subject: Support for EERC Proposal No. 2024-0091 in Response to U.S. Department of Energy (DOE) Funding Opportunity Announcement No. DE-FOA-0003014

The North Dakota's Building Trades Unions (NDBTU) is pleased to support the Energy & Environmental Research Center (EERC) proposed project entitled "Williston Basin Regional Initiative Technical Assistance Partnership."

Advocating for thousands of union members in the construction industry, from residential, commercial, and industrial projects, the NDBTU understands the value of collaboration to get the job done. Our member organizations represent fifteen-craft disciplines with numerous career pathways, foundation to finish. Our members work on the front lines for carbon capture and storage (CCS) project developers within the Williston Basin and beyond. The NDBTU promotes quality jobs with family benefits and dignified retirement, workforce development through registered apprenticeship programs, and place safety at the highest level ensuring our members go home at the end of the day to their families. Through teamwork with our partners, we recognize the value of education and awareness for the safety and benefit of the communities we live and work in.

The NDBTU works to provide our contractors with the safest, most highly-skilled workforce ready to help build a stronger North Dakota. We, therefore, recognize the significant value of the proposed initiative and will support this effort by collaborating on specific activities as appropriate, subject to an award from DOE.

We look forward to this exciting opportunity to continue working closely with the EERC and other stakeholders in the Williston Basin.

Respectfully, I am

A handwritten signature in black ink, appearing to read "Jason Ehlert". The signature is fluid and cursive, with the first name "Jason" and last name "Ehlert" clearly distinguishable.

Jason Ehlert  
President

***Mission Statement***

To bring about safe workplaces, living wages, family benefits, and registered apprenticeship education to all persons engaged in the construction industry.

***Vision Statement***

To purposefully support the dignity of the American worker.

***About the Council***

The North Dakota's Building Trades Unions are comprised of fifteen Labor Unions with members working in all facets of construction from foundation to finish in all communities across North Dakota.



February 9, 2024

Mr. Kevin C. Connors  
Assistant Director for Regulatory Compliance  
and Energy Policy  
Energy & Environmental Research Center  
University of North Dakota  
15 North 23rd Street, Stop 9018  
Grand Forks, ND 58202-9018

**Subject: Support for EERC Proposal No. 2024-0091 in Response to U.S. Department of Energy (DOE) Funding Opportunity Announcement No. DE-FOA-0003014**

Dear Mr. Connors:

The North Dakota Department of Mineral Resources (DMR) is pleased to support the Energy & Environmental Research Center's (EERC) proposed project entitled "Williston Basin Regional Initiative Technical Assistance Partnership."

DMR, comprised of the North Dakota Geological Survey and the North Dakota Oil and Gas Division, has firsthand knowledge of the state's portion of the Williston Basin, recognizing the vital role its extensive resources play in the economy of not only the state, but the entire United States.

Through its technical expertise and permitting experience, the EERC has already played a prominent role in helping to accelerate commercial deployment of carbon capture and storage (CCS). In addition, the EERC, through the Plains CO<sub>2</sub> Reduction (PCOR) Partnership Program, assisted the state to secure primacy for the North Dakota Underground Injection Control Class VI Program. The EERC has worked closely with DMR staff to help identify knowledge gaps and anticipate regulatory challenges related to CCS commercialization.

Addressing challenges, fostering development of infrastructure, and accelerating deployment of CCS in the U.S. portion of the Williston Basin are very much aligned with DMR's carbon dioxide underground storage policy to promote the geologic storage of carbon dioxide. The North Dakota policy declares carbon dioxide, a potentially valuable commodity and recognizes pore space property as a resource.

DMR, therefore, recognizes the significant value of the proposed initiative and will support this effort through further collaboration on specific activities as appropriate, subject to an award from DOE.

We look forward to this exciting opportunity to continue working closely with the EERC and other stakeholders in the Williston Basin.

Sincerely,

A handwritten signature in blue ink that reads "Lynn D. Helms".

Lynn D. Helms  
Director

Mark F. Bohrer  
ASSISTANT DIRECTOR  
OIL AND GAS DIVISION

Lynn D. Helms  
DIRECTOR  
DEPT. OF MINERAL RESOURCES

Edward C. Murphy  
STATE GEOLOGIST  
GEOLOGICAL SURVEY



February 8, 2024

Kevin C. Connors  
Assistant Director for Regulatory Compliance and Energy Policy  
Energy & Environmental Research Center  
University of North Dakota  
15 North 23rd Street, Stop 9018  
Grand Forks, ND 58202-9018

Subject: Support for EERC Proposal 2024-0091 in Response to U.S. Department of Energy (DOE) Funding Opportunity Announcement No. DE-FOA-0003014

Dear Mr. Connors:

ONEOK, Inc. (ONEOK) is pleased to support the Energy & Environmental Research Center (EERC) proposed project entitled "Williston Basin Regional Initiative Technical Assistance Partnership."

ONEOK is a leading midstream service provider and owns one of the nation's premier natural gas liquids (NGL) systems connecting NGL supply in the Rocky Mountain, Midcontinent, and Permian regions, including the Williston Basin of North Dakota.

ONEOK is currently working with EERC on the recently awarded CarbonSAFE Phase II project, known as the Roughrider Carbon Storage Hub. This project seeks to characterize and determine the feasibility of multiple stacked geologic formations in order to develop a large-scale storage complex in northwestern North Dakota. The carbon storage hub would sequester CO<sub>2</sub> captured from several ONEOK gas-processing plants as well as potential third party CO<sub>2</sub> emitters. ONEOK facilities in the Williston Basin produce over 300,000 tons per year of CO<sub>2</sub> emissions, and growth projects could result in over 3 million tons per year of CO<sub>2</sub> emissions within the CarbonSAFE Phase II project area.

Accelerating deployment of carbon capture and storage (CCS) in the U.S. portion of the Williston Basin is in alignment with ONEOK's core values to operate in an environmentally sustainable manner. Managing greenhouse gas (GHG) emissions and the expectations of our stakeholders regarding environmental stewardship is vital to our long-term success. ONEOK has identified GHG emissions as an important area of focus, and we continuously look for opportunities to reduce emissions through strategic programs and initiatives.

ONEOK, therefore, recognizes the significant value of the proposed initiative of an integrated carbon capture, transportation, utilization, and storage system in North Dakota and will support this effort by collaborating on specific activities as appropriate, subject to an award from DOE. We look forward to this exciting opportunity to continue working closely with the EERC and other stakeholders in the Williston Basin.

Sincerely,

A handwritten signature in blue ink, appearing to read "A. Farquharson", written over a light blue circular stamp.

Andrew Farquharson  
VP Alternative Energy Solutions

***This letter of support and the project described herein will not give rise to any legally binding obligation on the part of ONEOK. ONEOK and EERC expressly disclaim any partnership or joint venture between them with respect to the contents of the letter of support and the project.***





February 6, 2024

Kevin C. Connors  
Assistant Director for Regulatory Compliance  
and Energy Policy  
Energy & Environmental Research Center  
University of North Dakota  
15 North 23rd Street, Stop 9018  
Grand Forks, ND 58202-9018

Dear Mr. Connors:

Subject: Support for EERC Proposal 2024-0091 in Response to U.S. Department of Energy (DOE)  
Funding Opportunity Announcement No. DE-FOA-0003014

Rainbow Energy Center (REC) and Nexus Line are pleased to support the Energy & Environmental Research Center (EERC) proposed project entitled “Williston Basin Regional Initiative Technical Assistance Partnership.”

REC is the proud owner of Coal Creek Station and Nexus Line owns the high-voltage direct current (HVDC) transmission line that transmits power from Coal Creek Station to Buffalo, Minnesota. Together, our team works to maximize efficient energy production and sound energy management to unlock the energy sector’s full potential. REC is working diligently to capitalize on innovative technologies so that future generations have sustainable energy solutions.

Carbon capture, utilization, and storage (CCUS) is a vital part of the future success of Coal Creek Station. CCUS technology has been proven and is an economical option for a facility like Coal Creek Station. We see CCUS as the best option to manage CO<sub>2</sub> emissions at our facility.

Addressing challenges, fostering development of infrastructure, and accelerating deployment of CCUS in the U.S. portion of the Williston Basin are very much aligned with REC’s commitment to be a world leader in responsible electricity generation and carbon management. We are dedicated to doing our part to help North Dakota reach its goal of being carbon neutral by 2030.

REC, therefore, recognizes the significant value of the proposed initiative and will support this effort by collaborating on specific activities as appropriate, subject to an award from DOE.

We look forward to this exciting opportunity to continue working closely with the EERC and other stakeholders in the Williston Basin.

Sincerely,

A handwritten signature in blue ink that reads "Jessica K. Bell".

Jessica K. Bell  
Vice President – External Affairs



**RED TRAIL**  
ENERGY

# RED TRAIL ENERGY, LLC

“Our Farms, Our Fuel, Our Future”

PO Box 11 Richardton, ND 58652 (701)-974-3308 FAX (701)-974-3309

February 6, 2024  
Mr. Kevin C. Connors  
Assistant Director for Regulatory Compliance  
and Energy Policy  
Energy & Environmental Research Center  
University of North Dakota  
15 North 23rd Street, Stop 9018  
Grand Forks, ND 58202-9018

Dear Mr. Connors:

Subject: Support for EERC Proposal No. 2024-0091 in Response to U.S. Department of Energy (DOE) Funding Opportunity Announcement No. DE-FOA-0003014

Red Trail Energy, LLC (RTE) is pleased to support the Energy & Environmental Research Center (EERC) proposed project entitled “Williston Basin Regional Initiative Technical Assistance Partnership.”

RTE is a North Dakota-based investor group formed to finance, construct, and operate a corn-based ethanol production facility located near Richardton, North Dakota. Originally constructed as one of the first coal-fired ethanol plants in the nation, RTE converted to natural gas in 2016. RTE produces 59–65 million gallons of ethanol using 21–23 million bushels of corn annually. The plant will generate 2.8 gallons of ethanol from every bushel of corn.

RTE is a leader in commercial CCS implement. RTE was the first-Class VI project approved under state primacy. In June of 2022, RTE began operating its CO<sub>2</sub> capture facility adjacent to the ethanol facility. Approximately 180,000 tonnes of CO<sub>2</sub> is captured annually, transported a short distance, and geologically stored via Class VI injection well located on RTE property. Based on our experience in advancing a multi-year CCS project, we understand the demand for and value of technical assistance for these commercial endeavors. RTE has benefited greatly from knowledge gained and collaborative opportunities through research programs at the EERC, and the opportunity presented within will create a winning partnership toward accelerating CCS deployment.

Addressing challenges, fostering development of infrastructure, and accelerating deployment of CCS in the U.S. portion of the Williston Basin are very much aligned with RTE’s mission to create economic benefit for our investors, local communities, and the state of North Dakota by converting our natural resources and regional corn production into ethanol and beneficial coproducts.

RTE, therefore, recognizes the significant value of the proposed initiative and will support this effort by collaborating on specific activities as appropriate, subject to an award from DOE.

We look forward to this exciting opportunity to continue working closely with the EERC and other stakeholders in the Williston Basin.

Sincerely,

Jodi Johnson  
Chief Executive Officer  
Red Trail Energy, LLC



February 9, 2024

Kevin C. Connors  
Assistant Director for Regulatory Compliance  
and Energy Policy  
Energy & Environmental Research Center  
University of North Dakota  
15 North 23rd Street, Stop 9018  
Grand Forks, ND 58202-9018

Dear Mr. Connors:

Subject: Support for EERC Proposal 2024-0091 in Response to U.S. Department of Energy (DOE) Funding Opportunity Announcement No. DE-FOA-0003014

Summit Carbon Solutions (SCS) is pleased to support the Energy & Environmental Research Center (EERC) proposed project entitled "Williston Basin Regional Initiative Technical Assistance Partnership."

SCS is committed to driving job growth across the Midwest, reducing emissions, and providing a substantial boost to the ethanol and agricultural industries critical to the economy. We believe in advancing communities through decarbonization solutions. In 2021, SCS announced a partnership that has expanded to 51 ethanol plants across the Midwest. Utilizing proven technology, SCS captures CO<sub>2</sub> before it is emitted into the atmosphere and plans to transport it to North Dakota to be permanently and safely stored deep underground. SCS is in the process of permitting carbon storage facilities and has recently acquired 80% of the right-of-way needed for its proposed Midwest Carbon Express CO<sub>2</sub> pipeline in North Dakota. We are dedicated to working with landowners to address concerns and reach a mutually agreeable path forward.

Accelerating deployment of carbon capture and storage in the U.S. portion of the Williston Basin is in alignment with SCS's mission of connecting industrial facilities via strategic infrastructure to store CO<sub>2</sub> safely and permanently in the Midwest.

SCS is a proud member of the Plains CO<sub>2</sub> Reduction Partnership (PCOR) and recognizes the significant value of an integrated carbon capture, transportation, utilization, and storage system in North Dakota. We support EERC's proposed effort and are prepared to collaborate with the EERC, and other members of the PCOR Partnership, as prudent to facilitate the proposed initiative if awarded by DOE.

We look forward to this exciting opportunity to continue working closely with the EERC and other stakeholders in the Williston Basin.

Sincerely,

A handwritten signature in blue ink, appearing to read "Wade Boeshans", is written over a horizontal line.

Wade Boeshans  
Executive Vice President

DEPARTMENT OF NATURAL RESOURCES  
AND CONSERVATION  
BOARD OF OIL AND GAS CONSERVATION



GREG GIANFORTE, GOVERNOR

OIL AND GAS CONSERVATION DIVISION

STATE OF MONTANA

February 7, 2024

Mr. Kevin C. Connors

Assistant Director for Regulatory Compliance and Energy Policy

Energy & Environmental Research Center

University of North Dakota

15 North 23rd Street, Stop 9018

Grand Forks, ND 58202-9018

Subject: Support for EERC Proposal No. 2024-0091 in Response to U.S. Department of Energy (DOE) Funding Opportunity Announcement No. DE-FOA-0003014

Dear Mr. Connors:

The Montana Board of Oil and Gas Conservation (MBOGC) is pleased to support the Energy & Environmental Research Center (EERC) proposed project entitled "Williston Basin Regional Initiative Technical Assistance Partnership."

MBOGC is responsible for the regulation of oil and gas exploration and production in Montana. The Division's authority includes protecting correlative rights of the owners of the mineral estate, requiring that measures be taken to prevent waste of oil and natural gas, preventing contamination of or damage to land or underground strata caused by drilling operations and production, regulating underground injection used for disposal of oil and gas wastes and for injection of fluids for enhanced recovery, and utilizing the damage mitigation account to plug and reclaim orphaned and pre-regulatory wells. MBOGC is the agency designated by the Montana legislature to regulate geologic storage of carbon dioxide (CO<sub>2</sub>) and is preparing to begin the Class VI primacy application process.

Accelerating deployment of CCS in the U.S. portion of the Williston Basin is in alignment with our mission to help ensure that our land and water resources provide benefits for present and future generations.

MBOGC, therefore, recognizes the significant value of the proposed initiative of an integrated carbon capture, transportation, utilization, and storage system in Montana and will support this effort by collaborating on specific activities as appropriate, subject to an award from DOE.

We look forward to this exciting opportunity to continue working closely with the EERC and other stakeholders in the Williston Basin.

Sincerely,

Benjamin Jones

Administrator

Montana Board of Oil & Gas Conservation

DIVISION OFFICE  
1539 11th AVENUE  
PO BOX 201601  
HELENA, MONTANA 59620-1601  
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TECHNICAL AND  
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NORTHERN FIELD OFFICE  
201 MAIN STREET  
PO BOX 690  
SHELBY, MONTANA 59474-0690  
(406) 434-2422

## **APPENDIX B**

### **RESUMES FOR KEY PERSONNEL**



**KEVIN C. CONNORS**

Assistant Director for Regulatory Compliance and Energy Policy  
Energy & Environmental Research Center (EERC), University of North Dakota (UND)  
15 North 23rd Street, Stop 9018, Grand Forks, North Dakota 58202-9018 USA  
701.777.5236, kconnors@undeerc.org

***Education and Training***

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

***Research and Professional Experience***

**November 2021–Present:** Assistant Director for Regulatory Compliance and Energy Policy, EERC, UND.

- Works with a multidisciplinary team of scientists, engineers, and business professionals to integrate legal and regulatory policy, permitting, economics, and tax perspectives with applied research related to incremental oil recovery, unconventional oil recovery, and CO<sub>2</sub> capture and geologic storage.
- Manages the Plains CO<sub>2</sub> Reduction (PCOR) Partnership focused on commercial deployment of carbon capture, utilization, and storage (CCUS).

Principal areas of interest and expertise include regulatory policy, permitting, and regulatory interpretation related to the geologic storage of CO<sub>2</sub>, enhanced oil recovery, and unconventional oil and gas development.

**July 2019–October 2021:** Principal Policy and Regulatory Strategist, EERC, UND.

- Worked 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<sub>2</sub> capture and geologic storage.

**November 2018–June 2019:** Principal Consultant Drilling and Well Operations, Equinor Energy, Austin, Texas.

- Worked as a regulatory advisor for Equinor’s Williston Basin Bakken asset.
- Gained experience in securing federal and state permits to drill, advising Equinor stakeholders on regulatory issues, and maintaining compliance in a multijurisdictional regulatory environment.
- Worked on special projects with Equinor’s research and technology teams as the lead regulatory advisor in developing solutions to gas flaring and CO<sub>2</sub> emissions in the Bakken.

**October 2010–October 2018:** North Dakota Industrial Commission (NDIC) Oil and Gas Division.

**October 2015–October 2018:** Pipeline Program Supervisor.

- Position was created by the North Dakota Legislature to develop North Dakota’s first Underground Gathering Pipeline Program to improve pipeline integrity.
- 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.
- 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.

- Position was created by the North Dakota Legislature to provide a timely response to the U.S. Environmental Protection Agency (EPA) rules relating to geologic sequestration of CO<sub>2</sub> (Class VI).
- Successfully led North Dakota's efforts to obtain Class VI primacy for the state of North Dakota.
- Gained expertise in the EPA Underground Injection Control (UIC) Program and North Dakota's geologic storage of CO<sub>2</sub> statutes and authored and adopted North Dakota's CO<sub>2</sub> storage rules through the administrative rule-making process.
- 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.
- Has expertise in North Dakota's pore space amalgamation process for CO<sub>2</sub> storage and gas storage.
- In 2018, 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.

- Administered the North Dakota Class II UIC Program.
- 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.
- Prepared and submitted quarterly reports to EPA as part of the UIC program primacy agreement between North Dakota and EPA.
- In spring 2015, 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 BLM.

**October 2010–July 2011:** Petroleum Engineer.

- As an oil and gas inspector, conducted enforcement and compliance inspections in the field during a time of increasing oil and gas activity.

**January–September 2010:** Wellsite Geologist, Weatherford.

- Provided geological services for the drilling and completion of horizontal wells in the Bakken and Three Forks Formations.

***Awards and Honors***

- 2022 Governor's Award for Excellence in Public Service, for state team members who go above and beyond to serve North Dakotans and deliver on the shared purpose to Empower People, Improve Lives, and Inspire Success.
- 2022 Distinguished Service Award – Research & Development Program, Lignite Energy Council, for dedication and service to the Lignite Energy Council and the lignite industry in North Dakota.

***Publications***

Has authored and coauthored numerous professional publications.



**CHARLENE R. CROCKER**

Senior Research Scientist, Outreach 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  
701.777.5018, ccrocker@undeerc.org

***Education and Training***

B.S., Chemistry, University of North Dakota, 1994.  
B.A., French, Colby College, Waterville, ME, 1986.

***Research and Professional Experience***

**2002–Present:** Senior Research Scientist, Outreach Team Lead, EERC, UND, Grand Forks, ND.

- Responsibilities include managerial and principal investigator duties for projects related to public outreach and scientific research.
- Outreach includes development of public outreach programs for CO<sub>2</sub> sequestration, critical minerals and rare elements, water, and fish advisories and development of CO<sub>2</sub> sequestration public outreach materials, water quality education, and water-based geoscience education program and outreach activities for middle and high school students.
- Research has included projects related to development of sorbents for emission control strategies in fossil fuel-fired energy systems; projects related to environmental management and air quality; collaborating with other scientists on development of carbon-based flue gas sorbents, particulate matter (PM) sampling, evaluation of bioassessment tools, fish consumption survey development, proposal and report writing, data analysis, presentation of results, and budget tracking; developing PM-sampling protocols; and directing activities of student assistants. Specific roles and activities include the following:
  - Outreach Task Lead for U.S. Department of Energy (DOE)–North Dakota Industrial Commission (NDIC)–Red Trail Energy (RTE)-funded Phase III Integrated Carbon Capture and Storage for North Dakota Ethanol Production project, including public outreach materials development and support for research and fieldwork associated with project activities in Stark County, North Dakota.
  - Outreach Task Lead and team member for North Dakota Carbon Storage Assurance Facility Enterprise (CarbonSAFE) Phase II project, funded by DOE, NDIC, Minnkota Power Cooperative, Basin Electric Power Cooperative, BNI Energy, North American Coal, and ALLETE Clean Energy, including public outreach materials development and support for research and fieldwork associated with project activities in central North Dakota.
  - Outreach Team member for Wyoming CarbonSAFE Phase II project, funded by DOE, Basin Electric Power Cooperative, and others, including public outreach materials development and consulting for research and fieldwork associated with project activities in central North Dakota.
  - Program Coordinator and student supervisor for EERC Energy Hawks internship program, funded by the State Energy Research Center (SERC) at the EERC, including development and implementation of an energy literacy syllabus for a multidisciplinary team of graduate and undergraduate students during a 10-week internship; supervision of student activities; and guidance in development of white papers focused on value-added energy topics for North Dakota.



- Expertise spans public outreach and scientific research activities. Public outreach programs have focused on fossil energy transformations, CO<sub>2</sub> emissions, water quality and use, and fish consumption advisories and include general public and K–12 education and award-winning documentary development, writing, and production. Research has focused on trace element emissions and control for fossil fuel combustion systems, with a particular emphasis on air pollution issues related to Hg and fine particulates.
- Experience includes stakeholder engagement, information-sharing, and focus group moderation; water quality monitoring, analytical methods, and education; development and implementation of fish consumption surveys.

**1994–2002:** Research Chemist, EERC, UND.

- Managed projects related to environmental management and air quality.
- Collaborated with other scientists on fish consumption survey development, PM sampling, corrosion of ceramic and alloy materials, coal ash, water purification, and surface decontamination research; proposal and report writing; data analysis; presentation of results; and budget tracking.
- Developed PM sampling protocols.
- Participated in development of a water-based geoscience education program and outreach activities for school children and directed activities of student assistants.
- Developed and implemented analytical methods employing laser-induced breakdown spectroscopy (LIBS); atomic absorption spectroscopy (AAS) (flame, graphite furnace, and hydride generation); inductively coupled plasma (ICP) spectroscopy; trace element analysis of water, coal, and coal by-products; and atomic fluorescence spectroscopy (AFS).
- Previous duties performed in the Analytical Research Laboratory focused on water quality and energy-related analyses. Responsibilities included preparing and analyzing ultratrace element samples in aqueous and inorganic media using AAS, ICP, and IC; recording and disseminating analytical results and quality control checks; performing research on ultratrace elemental analysis of Hg using AFS; and preparing reagents and solutions.

**1993–1994:** Research Assistant, EERC, UND.

- Prepared and analyzed ultratrace element samples in inorganic media, performed research on ultratrace element analysis of Hg in air using AFS, and prepared reagents and solutions.

**1990:** Naturalist, Deep Portage Conservation Reserve, Hackensack, MN.

- Planned and conducted environmental education programs for children and adults, evaluated curriculum, and organized lending of educational learning stations.

**1988–1990:** Sanctuary Manager, Wetlands, Pines & Prairie Audubon Sanctuary, Warren, MN.

- Planned and conducted environmental education programs, organized chapter meetings, published the Sanctuary newsletter, and performed administrative tasks.

**1988:** Park Ranger/Interpreter, Boston Harbor Islands State Park, Boston, MA.

- Interpreted natural and human history, developed special programs and led walking tours of the islands, and conducted school programs.

***Publications***

Has authored and coauthored over 50 publications.



**DR. NICHOLAS A. AZZOLINA**

Assistant Director for Applied Data Analytics  
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, nazzolina@undeerc.org

***Education and Training***

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.

***Research and Professional Experience***

**September 2021–Present:** Assistant Director for Applied Data Analytics, EERC, UND.

- Hydrogeologist and statistician with over 25 years of industrial and consulting experience, specializing in analyzing and modeling large, complex environmental datasets.
- Manages technical staff and supports projects across the EERC's Subsurface Group, requiring machine learning, statistics, and data analytics expertise. Example research areas and projects include i) carbon dioxide (CO<sub>2</sub>) management through carbon capture, utilization, and storage (CCUS); ii) oil and gas production from conventional and unconventional reservoirs; iii) water resource options for the energy industry, iv) risk assessments for CCUS and other subsurface projects, and v) life cycle analyses (LCAs) for CCUS and other subsurface projects.

**December 2016–September 2021:** Principal Hydrogeologist and Statistician, EERC, UND.

- Supported various projects related to CO<sub>2</sub> enhanced oil recovery (EOR), CCUS, unconventional oil and gas production, and chemical contamination of environmental media (soil, groundwater, and sediment).
- Conducted LCAs and risk assessments for CCUS 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***

Has authored and coauthored numerous peer-reviewed and other professional 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, wpeck@undeerc.org

***Education and Training***

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.

***Research and Professional Experience***

**2020–Present:** Assistant Director for Subsurface Strategies, EERC, UND.

- Leads efforts in subsurface resource development with emphasis on Williston and Powder River Basins.
- Serves as principal investigator (PI) on two multiyear U.S. Department of Energy (DOE)-sponsored North Dakota CarbonSAFE projects: 2-year Phase II feasibility study and 3-year Phase III characterization and permitting study.
- Served as task lead and PI for regional geologic characterization component of Plains CO<sub>2</sub> Reduction (PCOR) Partnership Program, focused on CO<sub>2</sub> storage in central North America.
- Led full-CO<sub>2</sub>-chain techno-economic investigation in North Dakota linking lignite mining and electric generation to CO<sub>2</sub> enhanced oil recovery (EOR).

Principal areas of interest and expertise include geology, geologic storage of CO<sub>2</sub>, CO<sub>2</sub> EOR, and geographic information systems (GIS).

**2015–2019:** Principal Geologist, EERC, UND.

- Was involved in subsurface resource development with emphasis on Williston and Powder River Basins.
- Served as PI on multiyear DOE-sponsored North Dakota CarbonSAFE feasibility project.
- Also served as task lead and PI of regional geologic characterization component of PCOR Partnership Program.
- Recently led full-CO<sub>2</sub>-chain techno-economic investigation in North Dakota linking lignite mining and electric generation to CO<sub>2</sub> EOR.

**2011–2015:** Research Manager, EERC, UND.

- Oversaw staff of geologists and GIS specialists involved with oil and gas research activities in Williston Basin as well as regional geologic characterization activities associated with PCOR Partnership.

**1991–2011:** Research Scientist, EERC, UND.

- Oversaw major GIS activities at EERC, served as task leader for regional characterization component of PCOR Partnership, and wrote reports and proposals.

**1989–1991:** Graduate Research Assistant, EERC, UND.

- Acquired and managed geologic data related to Cretaceous and Tertiary geology of Williston Basin.
- Assisted in collection of Cretaceous and Tertiary fossils and stratigraphic information in western North Dakota and eastern Montana.

***Publications***

Has authored and coauthored numerous professional publications.



**KYLE A. GLAZEWSKI**

Assistant Director for Research, Community Benefits, and Stakeholder Engagement  
Energy & Environmental Research Center (EERC), University of North Dakota (UND)  
15 North 23rd Street, Stop 9018, Grand Forks, North Dakota 58202-9018 USA  
701.777.5421, kglazewski@undeerc.org

***Education and Training***

M.S., Geography, University of North Dakota, 2005.

B.S., Geography, University of North Dakota, 2003.

Software experience includes ESRI ArcView 3.2 and 3.3, ArcMap 8.x, ArcGIS 9.x, and ArcGIS 10.x; Spatial Analyst Extension for GIS; ERDAS Imagine; HYSPLIT (Hybrid Single-Particle Lagrangian Integrated Trajectory) atmospheric dispersion model; AnnAGNPS (Annual Agricultural Non-Point Source Pollution) watershed model; Soil and Water Assessment Tool (SWAT); and Microsoft Office Suite.

***Research and Professional Experience***

**2024–Present:** Assistant Director for Research, Community Benefits, and Stakeholder Engagement, EERC, UND.

- Oversees technical staff focused on the development and implementation of project-based outreach plans and stakeholder engagement strategies to include workforce development and diversity, equality, inclusion, and accessibility planning and execution.
- Communicates stakeholder engagement strategies and information on solutions that enable prudent and economical production of fossil fuels, renewables, and alternative energy and reduce the carbon intensity of energy production.
- Assist stakeholders in understanding the benefits, risks, and regulatory implications of energy.
- Ensures consistency of community benefit plan development and execution and ensures outreach activities are coordinated between all EERC projects.

Principal areas of interest and expertise include stakeholder engagement, wellbore evaluation, corrosion assessment, CCS monitoring, geologic site characterization, CCS infrastructure development, produced water management, geospatial analysis, and GIS technology.

Principal areas of interest and expertise include wellbore evaluation, corrosion assessment, CCS monitoring, geologic site characterization, CCS infrastructure development, produced water management, geospatial analysis, and GIS technology.

**2008–2024:** Principal Analyst, Data/GIS Team Lead, EERC, UND.

- Oversees geographic information system (GIS) activities for technical team.
- Principal investigator (PI) or task lead on multiple federal, state, and private industry projects.
- Lead or coauthor on multiple technical reports and presentations in carbon capture and storage (CCS), water management, and oil and gas.

**2005–2008:** Watershed Coordinator, Grand Forks County Soil Conservation District, Grand Forks, North Dakota.

- Administered and managed all aspects of two U.S. Environmental Protection Agency 319 water quality projects, including field data collection, watershed modeling with GIS template, data organization and analysis, final assessment report preparation, project implementation proposal writing, assisting with total maximum daily load (TMDL) development, assisting with water quality assessment project planning, budget management and planning, public outreach, and assisting landowners with conservation planning to improve water quality as well as working with other agencies on water quality projects.

***Publications***

Has authored or coauthored numerous publications.



**KATHERINE K. ANAGNOST**

Senior Regulatory and Permitting Specialist  
Energy & Environmental Research Center (EERC), University of North Dakota (UND)  
15 North 23rd Street, Stop 9018, Grand Forks, North Dakota 58202-9018 USA  
701.777.5437, kanagnost@undeerc.org

***Education and Training***

B.S., Legal Assistance, Moorhead State University, 1992.

***Research and Professional Experience***

**2022–Present:** Senior Regulatory and Permitting Specialist, EERC, UND.

- Works with a multidisciplinary team of scientists, engineers, and business professionals to integrate permitting, regulatory, legal, policy, economics, and tax perspectives with technical information and applied research related to geologic CO<sub>2</sub> capture, utilization, and storage (CCUS); power generation; emissions reduction; and renewable energy systems.
- Currently supports the Plains CO<sub>2</sub> Reduction (PCOR) Partnership Initiative to Accelerate CCUS Deployment as the technology transfer task lead, informing and educating stakeholders about CCUS technologies and project development, with particular emphasis placed on issues related to infrastructure development strategies and regulatory frameworks.
- Currently supports the Bipartisan Infrastructure Law (BIL) Coal Creek Carbon Capture: Site Characterization and Permitting as the National Environmental Policy Act (NEPA) task lead, performing work elements required to obtain a NEPA determination for the potential future Phase IV Carbon Storage Assurance Facility Enterprise (CarbonSAFE) project at proposed sites and support of the NEPA review process.
- Currently supports the Prairie Horizon Carbon Management Hub as the regional technology transfer and engagement task lead, informing and educating stakeholders about CCUS technologies, identifying and assessing nontechnical challenges to CCUS deployment, and facilitating a carbon hub advisory team comprising industry and regulatory stakeholders to inform decision-making.
- Currently supports the Future Lignite Electrical Generation Facilities Study as the regulations and policy review task lead, reviewing federal and state policy factors and incentives/challenges associated with a new lignite-fired power plant in North Dakota.
- Supports public and industry outreach and stakeholder engagement efforts through development of products and website content to inform and educate about the opportunities associated with CCUS.

Principal areas of interest and expertise include regulatory compliance; geologic CCUS; power generation; emissions reduction; and renewable energy systems. Additional experience includes the areas of fossil-fuel-based generation and transmission, legal analysis and writing, and technical research experience toward successful energy strategy permit development.

**2015–2022:** North American Electric Reliability Corporation (NERC) Compliance Coordinator, Minnkota Power Cooperative (MPC), Grand Forks, North Dakota.

- Coordinated with technical and support teams to establish, maintain, and demonstrate compliance with corporate requirements and NERC regulations.

- Spearheaded the effort to bring comprehensive Critical Infrastructure Program regulatory compliance to the Milton R. Young Generating Station within the scheduled implementation time frame.
- Coordinated a multidisciplinary team in the development of a new Critical Infrastructure Program regulatory supply chain risk management program within the required implementation time frame.
- Achieved expedited industry consensus to regulatory modifications as participating member (and first MPC employee) on a NERC Standard Drafting Team and served (as the first MPC employee) on a North American Transmission Forum peer review team.

**2009–2015:** Research Specialist/Project Manager, EERC, UND.

- Worked for the PCOR Partnership, one of seven regional partnerships funded by the U.S. Department of Energy's National Energy Technology Laboratory Regional Carbon Sequestration Partnership Program, to assess the technical and economic feasibility of capturing and storing (sequestering) CO<sub>2</sub> emissions in the northern Great Plains and adjacent areas. In this capacity, facilitated the development of project plans for research data, presentations, technical reports, peer-reviewed articles, and proposals for projects involving CO<sub>2</sub> sequestration technologies.
- Work also included development, management, and dissemination of market-oriented materials for programs focused on CO<sub>2</sub> sequestration, including public outreach and education via print, video, and web forums.

**2006–2009:** Contracts Officer, EERC, UND.

- Prepared, reviewed, negotiated, and administered sponsored research agreements, in-kind agreements, subcontracts, hotel agreements, and confidentiality agreements in accordance with federal and nonfederal contractual requirements, government and university regulations and policies, and EERC policies.
- Disclosed intellectual property (IP) to research sponsors, including government agencies.
- Tracked important contractual and U.S. Patent and Trademark Office compliance dates associated with IP.
- Effectively communicated and maintained daily contact with research sponsors, agency representatives, UND employees, and EERC employees via telephone, email, and/or letter.

**1994–2006:** Legal Assistant, MPC.

- Assisted legal counsel in the representation of MPC and six distribution cooperative member-owners, including drafting corporate governance documents; assisting with environmental matters including compliance with polychlorinated biphenyl use, storage, disposal, and recordkeeping; and preparing and submitting federal environmental reports for proposed cooperative construction activities.
- Coordinated with engineering consultant and technical department supervisors on the preparation and organization of Spill Prevention Control and Countermeasures (SPCC) plans.
- Reviewed federal regulations and determined potential impacts and/or ensured compliance.
- Wrote articles for corporate publications.
- Led Minnesota member-owner utilities' compliance with the Conservation Improvement Program, created to provide improved awareness and adoption of energy-efficient technologies and reduced energy costs for Minnesota households. In this role, worked with regional Community Action Agencies on development of energy conservation measures benefiting low-income households.

***Publications***

Has authored or coauthored several publications.





**DR. JOHN A. HARJU**

Vice President for Strategic Partnerships  
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***Education and Training***

Ph.D., Petroleum Engineering, University of North Dakota, 2022.  
M.Eng., Petroleum Engineering, University of North Dakota, 2020.  
B.S., Geology, University of North Dakota, 1986.

***Research and Professional Experience***

**2002–Present:** EERC, UND.

**July 2015–Present:** Vice President for Strategic Partnerships. Harju leads efforts to build and grow dynamic working relationships with industry, government, and research entities globally in support of the EERC's mission to provide practical, pioneering solutions to the world's energy and environmental challenges. Harju represents the EERC regionally, nationally, and internationally in advancing its core research priorities: coal utilization and emissions, carbon management, oil and gas, alternative fuels and renewable energy, and energy–water. Harju's principal areas of interest and expertise include carbon sequestration, enhanced oil recovery, unconventional oil and gas development, waste management, geochemistry, technology development, hydrology, and analytical chemistry, especially as applied to the upstream oil and gas industry.

**2003–June 2015:** Associate Director for Research. Harju led a team of scientists and engineers building industry–government–academic partnerships to carry out research, development, demonstration, and commercialization of energy and environmental technologies.

**2002–2003:** Senior Research Advisor. Harju developed, marketed, managed, and disseminated research programs focused on the environmental and health effects of power and natural resource production, contaminant cleanup, water management, and analytical techniques.

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

**1999–2002:** Vice President, Crystal Solutions, LLC, Laramie, Wyoming. Harju's firm was involved in commercial E&P produced water management, regulatory permitting and compliance, and environmental impact monitoring and analysis.

**1997–2002:** Gas Research Institute (GRI) (now Gas Technology Institute [GTI]), Chicago, Illinois.

**2000–2002:** Principal Scientist, Produced Water Management. Harju developed and deployed produced water management technologies and methodologies for cost-effective and environmentally responsible management of oil and gas produced water.

**1998–2000:** Program Team Leader, Soil, Water, and Waste. Harju managed projects and programs related to the development of environmental technologies and informational products related to the North American oil and gas industry; formulated requests for proposals (RFPs), reviewed proposals, and

formulated contracts; performed technology transfer activities; and supervised staff and contractors. Harju served as Manager of the Environmentally Acceptable Endpoints project, a multiyear program focused on rigorous determination of appropriate cleanup levels for hydrocarbons and other energy-derived contaminants in soils. Harju led GRI/GTI involvement with industry environmental consortia and organizations, such as Petroleum Environmental Research Forum, Society of Petroleum Engineers, American Gas Association, Integrated Petroleum Environmental Consortium, and American Petroleum Institute.

**1997–1998:** Principal Technology Manager (1997–1998) and Associate Technology Manager (1997), Soil and Water Quality.

**1988–1996:** EERC, UND.

**1994–1996:** Senior Research Manager, Oil and Gas Group. Harju served as:

- Program Manager for assessment of the environmental transport and fate of oil- and gas-derived contaminants, focused on mercury and sweetening and dehydration processes.
- Project Manager for field demonstration of innovative produced water treatment technology using freeze crystallization and evaporation at oil and gas industry site.
- Program Manager for environmental transport and fate assessment of MEA and its degradation compounds at a Canadian sour gas-processing site.
- Program Manager for demonstration of unique design for oil and gas surface impoundments.
- Director of the National Mine Land Reclamation Center for the Western Region.
- Co-principal investigator on a project exploring feasibility of underground coal gasification in southern Thailand.
- Consultant to an International Atomic Energy Agency program entitled “Solid Wastes and Disposal Methods Associated with Electricity Generation Fuel Chains.”

**1988–1994:** Research Manager (1994), Hydrogeologist (1990–1994), Research Specialist (1989–1990), and Laboratory Technician (1988–1989).

***Professional Activities***

Member, National Coal Council (appointed 2018)

Member, National Petroleum Council (appointed 2010)

Member, Mainstream Investors, LLC, Board of Governors (2014–present)

Member, DOE Unconventional Resources Technology Advisory Committee (2012–2014)

Member, Interstate Oil and Gas Compact Commission (appointed 2010)

Member, Rocky Mountain Association of Geologists

***Publications***

Has authored or coauthored more than 100 professional publications and nearly 300 technical presentations.



**JAMES A. SORENSEN**

Director of Subsurface Research and Development  
Energy & Environmental Research Center (EERC), University of North Dakota (UND)  
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***Education and Training***

M.Eng., Petroleum Engineering, University of North Dakota, 2020.  
B.S., Geology, University of North Dakota, 1991.

***Research and Professional Experience***

**October 2019–Present:** Director of Subsurface Research and Development, EERC, UND.

- Responsible for developing and managing programs and projects focused on the geological storage of CO<sub>2</sub> in saline formations, CO<sub>2</sub>-based enhanced oil recovery (EOR) and associated CO<sub>2</sub> storage, and other energy and environmental research.
- Primary areas of interest and expertise are characterization of geologic formations for CO<sub>2</sub> storage, development of commercial-scale CO<sub>2</sub> storage projects, and CO<sub>2</sub>-based EOR in unconventional tight oil formations.

**July 2018–September 2019:** Assistant Director for Subsurface Strategies, EERC, UND.

- Developed business opportunities, provided technical support and guidance regarding emerging areas of research, and served as a principal investigator (PI) and task manager for projects related to the sequestration of CO<sub>2</sub> in geologic media and the sustainable development of tight oil resources.

**1999–July 2018:** Principal Geologist, EERC, UND.

- Served as manager and co-PI for programs to develop strategies for CO<sub>2</sub> utilization and storage.
- Led research focused on the characterization of geologic formations in the north-central United States and western Canada for their suitability to store CO<sub>2</sub>.

**1997–1999:** Program Manager, EERC, UND.

- Managed projects focused on produced water management from oil and gas production operations and environmental fate and remediation of natural gas-processing chemicals.

**1993–1997:** Geologist, EERC, UND.

- Conducted field-based hydrogeologic investigations focused on natural gas production sites.

**1991–1993:** Research Specialist, EERC, UND.

- Assembled and maintained comprehensive databases related to oil and gas drilling, production, and waste management.

***Professional Activities***

Member, Society of Petroleum Engineers

***Publications***

Has coauthored nearly 200 publications.



**DR. BRIAN P. KALK**

Chief Research Officer

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***Education and Training***

Ph.D., Natural Resource Management, North Dakota State University, 2007. Dissertation: "Development of a Process that Ensures Regulatory Compliance and Stakeholder Satisfaction."

M.S., Environmental Engineering, North Dakota State University, 2001. Thesis: "Surface Water Flow in Golden Lake."

B.S., Political Science, Campbell University, Buies Creek, North Carolina, 1991.

***Research and Professional Experience***

**June 2023–Present:** Chief Research Officer, EERC, UND.

- Leads the research team, within the executive leadership group, to advance new technologies and practical solutions to critical energy and environmental challenges in support of the EERC mission and strategic plan.

**July 2022–May 2023:** Assistant Vice President for Strategic Partnerships, EERC, UND.

- Led efforts to build and grow dynamic working relationships with industry, government, and research entities globally in support of the EERC's mission to provide practical, pioneering solutions to the world's energy and environmental challenges.
- Represented the EERC regionally, nationally, and internationally in advancing its strategic energy and environmental initiatives.

**May 2019–June 2022:** Executive Director, Research and Technology Park, North Dakota State University, Fargo, North Dakota.

- Spearheaded operations and provided a catalyst for innovation in science, technology, and creativity, leading to discoveries that improved lives and benefited North Dakota's and the region's economy.
- Established and strengthened partnerships with local, regional, and national leadership to continuously drive business development.
- Engaged in shared learning, fostered collaborations, and achieved research objectives while constantly addressing ways to improve the regional workforce.
- Participated in strategic research discussions with local, national, and international companies operating, or planning to operate, in North Dakota.
- Developed and maintained strategic relationships with national industry organizations such as the Association of University Research Parks and the International Business Innovation Association.

**February 2017–April 2019:** Director of Energy Systems Development, Design, and Operations, EERC, UND.

- Led a multidisciplinary team of scientists and engineers focused on research, development, and commercialization of innovative energy technologies as they relate to coal utilization and emissions, carbon management, and alternative fuels and renewable energy.

**2009–January 2017:** Commissioner and Chair (2012–2014), North Dakota Public Service Commission (PSC), Bismarck, North Dakota.

- As Commissioner, was responsible for maintaining the critical balance of ensuring reliable, affordable energy availability while preserving North Dakota’s natural resources, interacting with members of industry, both political parties, the media, and numerous special interest groups.
- Directly involved in determining electricity rate cases; siting for energy conversion facilities involving coal, wind, and natural gas; and determining the routes of jurisdictional pipelines and power lines.
- Was also responsible for policy development and implementation while managing over 40 professional staff and a \$20 million budget. Portfolios included the following:
  - **Energy Generation** – Directly involved in the siting of over \$5.5 billion in facilities, including jurisdictional wind farms, natural gas facilities, and coal generation.
  - **Electric Transmission Lines** – Directly involved in the siting of over \$1.2 billion in jurisdictional power lines, which included serving on the board of the two regional transmission organizations that operate in North Dakota, direct involvement in the regional electric transmission planning and cost allocation and testifying in front of the Federal Energy Regulatory Commission (FERC).
  - **Pipeline Safety** – Worked with stakeholders to enhance public awareness, safety, and operation of jurisdictional pipelines, including working closely with industry and the Pipeline Hazardous Material Safety Administration (PHMSA) on new and developing technologies that enhance the operation and safety of the pipelines. Also worked with the North Dakota “One Call” board and the North Dakota Common Ground Alliance to enhance the awareness of the state’s “Call Before You Dig” Program.
  - **Rate Cases** – Determined fair rate of return and compensation for regulated utility companies under the PSC jurisdiction.
- While at the PSC, served as Chairman, member of the National Coal Council, President of the Midwest Regulatory Commissioners, and Chair of the National Association of Regulatory Commissioners (NARUC) Clean Coal and Carbon Management Committee.
- Was also part of the 2015 U.S. Department of Energy delegation that travelled to China to discuss Clean Energy Technologies and related policies, testified in front of the U.S. Senate Energy and Natural Resources Committee on critical energy policy, and provided perspective to the American Wind Energy Association on numerous occasions.

**2006–2008:** Upper Great Plains Transportation Institute, North Dakota State University, Fargo, North Dakota.

- Established an interdisciplinary management and logistics program to meet the needs of transportation professionals.
- Was directly involved in all aspects of the program, including student recruitment and advising, research and publication, coordination of instructors, budget preparation and execution, and classroom instruction.

**1986–2006:** United States Marine Corps.

***Awards and Honors***

- Joint Meritorious Achievement Medal: Navy and Marine Corps Commendation Medal, Gold Star in lieu of 2nd and 3rd awards Navy and Marine Corps Achievement Medal, Gold Star in lieu of 2nd and 3rd awards The Combat Action Ribbon
- Presidential Unit Citation
- Joint Meritorious Unit Citation Navy Unit Citation Meritorious Unit Citation

- Marine Corps Good Conduct Medal National Defense Service Medal Armed Forces Expeditionary Medal Southwest Asia Service Medal
- Global War on Terrorism Expeditionary Medal Global War on Terrorism Service Medal Armed Forces Service Medal
- Humanitarian Service Medal
- Military Outstanding Volunteer Medal Sea Service Deployment Ribbon NATO Medal
- Kuwait Liberation Medal (Kuwait) Kuwait Liberation Medal (Saudi Arabia)

**APPENDIX C**  
**BUDGET JUSTIFICATION**

## BUDGET JUSTIFICATION

### ENERGY & ENVIRONMENTAL RESEARCH CENTER (EERC)

#### BACKGROUND

The EERC is an independently organized multidisciplinary research center within the University of North Dakota (UND). The EERC is funded through federal and nonfederal grants, contracts, and other agreements. Although the EERC is not affiliated with any one academic department, university faculty may participate in a project, depending on the scope of work and expertise required to perform the project.

#### INTELLECTUAL PROPERTY

The applicable federal intellectual property (IP) regulations will govern any resulting research agreement(s). In the event that IP with the potential to generate revenue to which the EERC is entitled is developed under this project, such IP, including rights, title, interest, and obligations, may be transferred to the EERC Foundation, a separate legal entity.

#### BUDGET INFORMATION

The proposed work will be done on a cost-reimbursable basis. The distribution of costs between among categories (labor, travel, supplies, equipment, etc.) and among funding sources of the same scope of work is for planning purposes only. The project manager may incur and allocate allowable project costs among the funding sources for this scope of work in accordance with Office of Management and Budget (OMB) Uniform Guidance 2 CFR 200.

Escalation of labor and EERC recharge center rates is incorporated into the budget when a project's duration extends beyond the university's current fiscal year (July 1 – June 30). Escalation is calculated by prorating an average annual increase over the anticipated life of the project.

The cost of this project is based on a specific start date indicated at the top of the EERC budget. Any delay in the start of this project may result in a budget increase. Budget category descriptions presented below are for informational purposes; some categories may not appear in the budget.

**Salaries:** Salary estimates are based on the scope of work and prior experience on projects of similar scope. The labor rate used for specifically identified personnel is the current hourly rate for that individual. The labor category rate is the average rate of a personnel group with similar job descriptions. Salary costs incurred are based on direct hourly effort on the project. Faculty who work on this project may be paid an amount over the normal base salary, creating an overload that is subject to limitation in accordance with university policy. As noted in the UND EERC Cost Accounting Standards Board Disclosure Statement, administrative salary and support costs that can be specifically identified to the project are direct-charged and not charged as facilities and administrative (F&A) costs. Costs for general support services such as contracts and IP, accounting, human resources, procurement, and clerical support of these functions are charged as F&A costs.

**Fringe Benefits:** Fringe benefits consist of two components, which are budgeted as a percentage of direct labor. The first component is a fixed percentage approved annually by the UND cognizant audit agency, the Department of Health and Human Services. This portion of the rate covers vacation, holiday, and sick leave (VSL) and is applied to direct labor for permanent staff eligible for VSL benefits. Only the actual approved rate



will be charged to the project. The second component is estimated on the basis of historical data and is charged as actual expenses for items such as health, life, and unemployment insurance; social security; worker's compensation; and UND retirement contributions.

**Travel:** Travel may include site visits, fieldwork, meetings, and conferences. Travel costs are estimated and paid in accordance with OMB Uniform Guidance 2 CFR 200, Section 474; and UND travel policies, which can be found at <https://campus.und.edu/finance/procurement-and-payment-services/travel/travel.html> (Policies & Procedures, A–Z Policy Index, Travel). Daily meal rates are based on U.S. General Services Administration rates unless further limited by UND travel policies; other estimates such as airfare, lodging, ground transportation, and miscellaneous costs are based on a combination of historical costs and current market prices. Miscellaneous travel costs may include parking fees, Internet charges, long-distance phone, copies, faxes, shipping, and postage.

**Supplies:** Supplies include items and materials that are necessary for the research project and can be directly identified to the project. Supply and material estimates are based on prior experience with similar projects. Examples of supply items are chemicals, gases, glassware, nuts, bolts, piping, data storage, paper, memory, software, toner cartridges, maps, sample containers, minor equipment (value less than \$5000), signage, safety items, subscriptions, books, and reference materials. General-purpose office supplies (pencils, pens, paper clips, staples, Post-it notes, etc.) are included in the F&A cost.

**Rents and Leases:** Venue rental for annual meeting. Estimated costs are based on prior experience with similar projects.

**Communications:** Telephone, cell phone, and fax line charges are included in the F&A cost; however, direct project costs may include line charges at remote locations, long-distance telephone charges, postage, and other data or document transportation costs that can be directly identified to a project. Estimated costs are based on prior experience with similar projects.

**Printing and Duplicating:** Page rates are established annually by the university's duplicating center. Printing and duplicating costs are allocated to the appropriate funding source. Estimated costs are based on prior experience with similar projects.

**Food:** Expenditures for annual project partner meetings where the primary purpose is dissemination of technical information may include the cost of food. EERC employees in attendance will not receive per diem reimbursement for meals that are paid by project funds. The estimated cost is based on the number and location of project partner meetings.

**UND Simulation in Motion Safety Team – CO<sub>2</sub> Hazmat Simulation:** Create a CO<sub>2</sub> hazmat simulation. Costs are based on estimates.

**Professional Development:** Fees are for memberships in technical areas directly related to work on this project. Technical journals and newsletters received as a result of a membership are used throughout the development and execution of the project by the research team.

**Operating Fees:** Operating fees generally include EERC recharge centers, outside laboratories, and freight.

EERC recharge center rates are established annually and approved by the university.

Laboratory and analytical recharge fees are charged on a per-sample, hourly, or daily rate. Additionally, laboratory analyses may be performed outside the university when necessary. The estimated cost is based on the test protocol required for the scope of work.

Document production services recharge fees are based on an hourly rate for production of such items as report figures, posters, and/or images for presentations, maps, schematics, website design, brochures, and photographs. The estimated cost is based on prior experience with similar projects.

Engineering services recharge fees cover specific expenses related to retaining qualified and certified design and engineering personnel. The rate includes training to enhance skill sets and maintain certifications using webinars and workshops. The rate also includes specialized safety training and related physicals. The estimated cost is based on the number of hours budgeted for this group of individuals.

Geoscience services recharge fees are discipline fees for costs associated with training, certifications, continuing education, and maintaining required software and databases. The estimated cost is based on the number of hours budgeted for this group of individuals.

Software solutions services recharge fees are for development of customized websites and interfaces, software applications development, data and financial management systems for comprehensive reporting and predictive analysis tools, and custom integration with existing systems. The estimated cost is based on prior experience with similar projects.

**Facilities and Administrative Cost:** The F&A rate proposed herein is approved by the U.S. Department of Health and Human Services and is applied to modified total direct costs (MTDCs). MTDC is defined as total direct costs less individual capital expenditures, such as equipment or software costing \$5000 or more with a useful life of greater than 1 year, as well as subawards in excess of the first \$25,000 for each award.

**Cost Share:** Cash cost share is being provided by the U.S. Department of Energy in the amount of \$5,000,000.