



INDUSTRIAL COMMISSION OF NORTH DAKOTA

Doug Burgum
Governor

Drew H. Wrigley
Attorney General

Doug Goehring
Agriculture Commissioner

Tuesday, November 26, 2024

Governor's Conference Room or Microsoft Teams – 12:30 pm

Meeting Coordinators:

Karen Tyler, Executive Director

Brenna Jessen, Recording Secretary

Erin Stieg, Grant Admin Assistant

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I. Roll Call and Pledge of Allegiance

(approximately 12:35 pm)

II. North Dakota Mill and Elevator – Vance Taylor, Cathy Dub

- A. Presentation of FY '24 Audit - Robyn Hoffmann, State Auditor's Office (remote) (Attachment 1)
- B. Presentation of the 1st Quarter FY '25 Results (Attachment 2)
- C. Report on 2025 Legislative Priorities (Attachment 3)
- D. Other North Dakota Mill business

(approximately 1:00 pm)

III. North Dakota Housing Finance Agency – Dave Flohr (online), Jennifer Henderson

- A. Report on Multifamily Application Award Summary for Low-Income Housing Tax Credit, HOME Investment Partnership Program, National Housing Trust Fund, and Housing Incentive Fund and Brief on Annual Report of the Annual Multifamily Application Round Selections. (Attachment 4)
- B. Report on Issuance of Declarations of Intent to Issue to Multifamily Revenue Bonds for Riverside Cottages III and Brief on Report to Commission that NDHFA issued a declaration of intent to issue bonds to a multifamily project: Riverside Cottages (FKA Gardenette) acquisition/rehab project in Jamestown, ND. (Attachment 5)

- C. Report on 2025 Legislative Priorities (Attachment 6)
- D. Other Housing Finance Agency Business

(approximately 1:30 pm)

IV. Lignite Research Program – Mike Holmes, Erin Stieg

- A. Presentation of Lignite Research, Marketing, and Development Program Project Management and Financial Report – Erin Stieg (Attachment 7)
- B. **Consideration of Lignite Research Council recommended projects for Grant Round 105 – Mike Holmes**
 - i. LRC-105A: Production of Germanium and Gallium Concentrates for Industrial Processes (Attachment 8)
 - ii. LRC-105B: Williston Basin Regional Initiative Technical Assistance Partnership: Support for Continuation of PCOR Partnership (Attachment 9)
 - iii. LRC-105C: Coal Creek Carbon Capture: Geologic CO₂ Storage Complex Development Add-On (Attachment 10)
- C. Report on Research and Development and Enhance, Preserve, Protect Program – Mike Holmes (Attachment 11)
- D. Other Lignite Research Program business

(approximately 2:00 pm)

V. North Dakota Transmission Authority – Claire Vigesaa

- A. **Transmission Authority Report and Consideration of Approval of IJA Formula Grant Awards** (Attachment 12)
- B. **Consideration of Approval of Authorization to Apply for FY 2025 IJA Grid Resiliency Federal Grant Funding** (Attachment 12F)
- C. Other Transmission Authority Business

(approximately 2:30 pm)

VI. Bank of North Dakota – Don Morgan, Kelvin Hullet

- A. Report on 2025 Legislative Priorities (Attachment 13)
- B. Presentation of Non-Confidential Committee and Advisory Board Minutes, September 2024 meetings (Attachment 14)
- C. Other Bank of North Dakota Business

Meeting Closed to the Public for Executive Session Pursuant to NDCC 6-09-35 and 44-04-19.2

(approximately 2:45 pm)

VII. Bank of North Dakota Executive Session – Don Morgan, Kirby Evanger, Gus Staahl

- A. Presentation of Concentrations of Credit as of 9/30/2024 – Kirby Evanger (Confidential Attachment 15)
- B. Presentation of Problem Loans as of 10/31/2024 – Kirby Evanger (Confidential Attachment 16)
- C. Update on One Loan (Confidential Attachment 17)
- D. Presentation of Confidential Committee and Advisory Board Meeting Minutes, September 2024 (Confidential Attachment 18)
- E. Other Bank of North Dakota Confidential Business

Meeting Returns to Public Session

VIII. Action on Executive Session Items

(approximately 3:30 pm)

IX. Department of Mineral Resources – Nathan Anderson, Mark Bohrer, Ed Murphy, Clint Boyd

- A. Geological Survey Quarterly Report 9/24 – Ed Murphy, Clint Boyd (Attachment 19)
- B. **Consideration of the Following Cases** – Nathan Anderson and Mark Bohrer:
 - i. Order No. 33841 issued in Case No. 31152 and Order No. 33842 issued in Case No. 31153 regarding authorization for drilling of saltwater disposal well and determination of bond amount. (Attachment 22)
 - ii. Order No. 33918 issued in Case No. 31229 regarding field rules amendment to create 960 acre spacing unit (Attachment 23)
 - iii. The following Orders related to confiscation of production-related equipment and salable oil: (Attachments 24-28)

1. Order No. 34001 issued in Case No 31305, Placid 28-1V well McKenzie County
2. Order No 34002 issued in Case No 31306, Placid 28-2V well, McKenzie County
3. Order No 34003 issued in Case No 31307, Sheep Creek Storm 1-1v well, McKenzie County
4. Order No 34004 issued in Case No 31308, Duncan Federal 10-14 well, McKenzie County
5. Order No 34005 issued in Case No 31309, Duncan Federal 30-24 well, McKenzie County
- iv. Order No 33762 issued in Case No 31076 related to NDIC v. Rocky Top Energy LLC – recommendation of default order, civil penalties, recovery of costs (Attachment 29)
- C. DMR Legislative Priorities – Nathan Anderson
- D. Other DMR Business

(approximately 4:30 pm)

X. Legal Update* – Phil Axt, John Reiten

- A. Litigation Status: (Phil Axt)
 - i. NW Landowners v. State
 - ii. EPA Mercury and Air Toxics Rule
 - iii. EPA Carbon Rule
 - iv. EPA Methane OOOO Rule
 - v. BLM Venting and Flaring Rule
 - vi. BLM Conservation Rule
 - vii. CEQ NEPA Phase 2 Rule
 - viii. DAPL Intervention
- B. Other Legal Updates: (Phil Axt)
 - i. EPA Methane Tax Rule
- C. Federal Regulatory Update: (John Reiten)
 - i. BLM Resource Management Plan

* Possible Executive Session under N.D.C.C. 44-04-19.1(9) & 44-04-19.2 for attorney consultation

(approximately 4:45 pm)

XI. Office of the Industrial Commission – Karen Tyler

- A. **Consideration of October 29, 2024, Industrial Commission Meeting Minutes** (Attachment 30)
- B. Other Office of Industrial Commission business

XII. Adjournment

Next Meeting – December 12, 2024, 1:30 pm
Governor's Conference Room



NORTH DAKOTA OFFICE OF THE STATE AUDITOR

State Auditor Joshua C. Gallion

North Dakota Mill and Elevator Association

Audit Report for the Years Ended June 30, 2024 and 2023

Client Code 475



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INDEPENDENT AUDITOR'S REPORT

Members of the Legislative Assembly

Industrial Commission

Vance Taylor, President and CEO, North Dakota Mill and Elevator Association

Report on the Audit of the Financial Statements

Opinion

We have audited the financial statements of the business-type activities of the North Dakota Mill and Elevator Association, as of and for the years ended June 30, 2024 and 2023, and the related notes to the financial statements, which collectively comprise the North Dakota Mill and Elevator Association's basic financial statements as listed in the table of contents.

In our opinion, the accompanying financial statements referred to above present fairly, in all material respects, the respective financial position of the business-type activities of the North Dakota Mill and Elevator Association, as of June 30, 2024 and June 30, 2023, and the respective changes in financial position, and cash flows thereof for the year then ended in accordance with accounting principles generally accepted in the United States of America.

Basis for Opinion

We conducted our audit in accordance with auditing standards generally accepted in the United States of America (GAAS) and the standards applicable to the financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States. Our responsibilities under those standards are further described in the Auditor's Responsibilities for the Audit of the Financial Statements section of our report. We are required to be independent of the North Dakota Mill and Elevator Association and to meet our other ethical responsibilities, in accordance with the relevant ethical requirements relating to our audit. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Emphasis of Matter

As discussed in Note 1, the financial statements of the North Dakota Mill and Elevator Association are intended to present the financial position, the changes in financial position, and cash flows of only that portion of the business-type activities of the North Dakota Mill and Elevator that is attributable to the transactions of the North Dakota Mill and Elevator Association. They do not purport to, and do not, present fairly the financial position of the state of North Dakota, as of June 30, 2024 and 2023, the changes in its financial position, or its cash flows for the years then ended in accordance with accounting principles generally accepted in the United States of America. Our opinion is not modified with respect to this matter.

Responsibilities of Management for Financial Statements

Management is responsible for the preparation and fair presentation of the financial statements in accordance with accounting principles generally accepted in the United States of America, and for the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of the financial statements that is free from material misstatement, whether due to fraud or error.

In preparing the financial statements, management is required to evaluate whether there are conditions or events, considered in the aggregate, that raise substantial doubt about the North Dakota Mill and Elevator Association's ability to continue as a going concern for twelve months beyond the financial statement date, including any currently known information that may raise substantial doubt shortly thereafter.

Auditor's Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance but is not absolute assurance and therefore is not a guarantee that an audit conducted in accordance with GAAS and *Government Auditing Standards* will always detect a material misstatement when it exists. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control. Misstatements are considered material if there is a substantial likelihood that, individually or in the aggregate, they would influence the judgement made by a reasonable user based on the financial statements.

In performing an audit in accordance with GAAS and *Government Auditing Standards*, we

- exercise professional judgment and maintain professional skepticism throughout the audit.
- identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, and design and perform audit procedures responsive to those risks.

Such procedures include examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements.

- obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the North Dakota Mill and Elevator Association's internal control. Accordingly, no such opinion is expressed.
- evaluate the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluate the overall presentation of the financial statements.
- conclude whether, in our judgment, there are conditions or events, considered in the aggregate, that raise substantial doubt about the North Dakota Mill and Elevator Association's ability to continue as a going concern for a reasonable period of time.

We are required to communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit, significant audit findings, and certain internal control-related matters that we identified during the audit.

Required Supplementary Information

Accounting principles generally accepted in the United States of America require that the Management's Discussion and Analysis, the Schedule of Employer's Share of Net Pension Liability, the Schedule of Employer Contributions for pensions, the Schedule of Employer's Share of Net OPEB Liability and the Schedule of Employer Contributions for OPEB be presented to supplement the basic financial statements. Such information is the responsibility of management and, although not a part of the basic financial statements, is required by the Governmental Accounting Standards Board who considers it to be an essential part of the financial reporting for placing the basic financial statements in an appropriate operational, economic, or historical context. We have applied certain limited procedures to the required supplementary information in accordance with auditing standards generally accepted in the United States of America, which consisted of inquiries of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the basic financial statements, and other knowledge we obtained during our audit of the basic financial statements. We do not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance.

Supplementary Information

Our audit was conducted for the purpose of forming an opinion on the financial statements that collectively compare the North Dakota Mill and Elevator Association's basic financial statements. The Schedule of Appropriations is presented for purposes of additional analysis and is not a required part of the basic financial statements. Such information is the responsibility of management and was derived from and relates directly to the underlying accounting and other records used to prepare the basic financial statements. The information has been subjected to the

auditing procedures applied in the audit of the basic financial statements and certain additional procedures, including comparing and reconciling such information directly to the underlying accounting and other records used to prepare the basic financial statements or to the basic financial statements themselves, and other additional procedures in accordance with auditing standards generally accepted in the United States of America. In our opinion, the Schedule of Appropriations is fairly stated, in all material respects, in relation to the financial statements as a whole.

Other Reporting Required by Government Auditing Standards

In accordance with Government Auditing Standards, we have also issued our report dated November 14, 2024 on our consideration of the North Dakota Mill and Elevator Association's internal control over financial reporting and on our tests of compliance with certain provisions of laws, regulations, contracts, and grant agreements and other matters. The purpose of that report is solely to describe the scope of our testing of internal control over financial reporting and compliance and the results of that testing, and not to provide an opinion on the effectiveness of the North Dakota Mill and Elevator Association's internal control over financial reporting or on compliance. That report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering the North Dakota Mill and Elevator Association's internal control over financial reporting and compliance.

/S/

Joshua C. Gallion
State Auditor
Bismarck, North Dakota
November 14, 2024

MANAGEMENT'S DISCUSSION AND ANALYSIS

This section of North Dakota Mill and Elevator Association's annual financial report presents management's discussion and analysis of the Mill's financial performance during the fiscal year that ended June 30, 2024. Please read this information in conjunction with the financial statements that follow this section.

FINANCIAL HIGHLIGHTS

Condensed Financial Data

	FY 2024	FY 2023	FY 2022
Current Assets	\$ 119,336,938	\$ 130,869,833	\$ 142,549,577
Noncurrent Assets	5,221,325	7,316,413	934,959
Capital Assets	200,432,579	178,485,939	158,945,834
Total Assets	<u>\$ 324,990,842</u>	<u>\$ 316,672,185</u>	<u>\$ 302,430,370</u>
Deferred Outflow of Resources	<u>\$ 13,993,306</u>	<u>\$ 17,792,067</u>	<u>\$ 16,830,966</u>
Current Liabilities	\$ 97,045,275	\$ 113,671,512	\$ 131,851,550
Noncurrent Liabilities	94,785,821	86,273,461	53,962,626
Total Liabilities	<u>\$ 191,831,096</u>	<u>\$ 199,944,973</u>	<u>\$ 185,814,176</u>
Deferred Inflow of Resources	<u>\$ 12,361,697</u>	<u>\$ 9,485,629</u>	<u>\$ 16,547,166</u>
Invested in Capital Assets	\$ 134,075,745	\$ 135,431,478	\$ 136,668,904
Unrestricted	715,610	(10,397,828)	(19,768,910)
Total Net Position	<u>\$ 134,791,355</u>	<u>\$ 125,033,650</u>	<u>\$ 116,899,994</u>
Operating Revenue			
Gross Sales	\$ 504,415,675	\$ 532,743,300	\$ 473,013,523
Sales Deductions	(94,092,579)	(86,902,223)	(80,550,375)
Net Sales	<u>\$ 410,323,096</u>	<u>\$ 445,841,077</u>	<u>\$ 392,463,148</u>
Nonoperating Revenue			
Interest Income	514,044	90,643	3,298
Miscellaneous	100,316	35,616	154,340
Total Revenues	<u>\$ 410,937,456</u>	<u>\$ 445,967,336</u>	<u>\$ 392,620,786</u>
Operating Expenses			
Material Cost	\$ 334,686,221	\$ 375,142,839	\$ 333,147,294
Manufacturing, Selling, General	50,226,703	48,487,503	42,922,097
Non-operating Expenses			
Interest Expense	5,211,483	5,025,601	1,842,941
Other	17,880	73,128	30,665
Total Expenses	<u>\$ 390,142,287</u>	<u>\$ 428,729,071</u>	<u>\$ 377,942,997</u>
Revenue Over Expenses	\$ 20,795,168	\$ 17,238,265	\$ 14,677,789
Transfer to Industrial Commission	(120,000)	(54,520)	0
Transfer to General Fund	(9,877,705)	(8,188,176)	(6,971,950)
Transfer to Ag Fuel Tax Fund	(1,039,758)	(861,913)	(733,889)
Change in Net Position	<u>\$ 9,757,705</u>	<u>\$ 8,133,656</u>	<u>\$ 6,971,950</u>
Beginning Net Position, as restated	125,033,650	116,899,994	109,928,044
Ending Net Position	<u>\$ 134,791,355</u>	<u>\$ 125,033,650</u>	<u>\$ 116,899,994</u>

- Gross sales reached \$504,416,000.
- During the fiscal year, the Mill shipped 17,529,000 hundredweights of flour.
- The Mill made a profit of \$20,795,000
- Mill operations provided more than \$381,092,000 to the region and another \$884,133,000 in secondary economic activity for a total economic impact of more than \$1,265,225,000.

RESULTS OF OPERATIONS

Certain operating information is set forth below, as a percentage of gross sales for the fiscal years ended June 30, 2024, June 30, 2023, and June 30, 2022:

	FY 2024	FY 2023	FY 2022
Gross Margin	15.0%	13.3%	12.5%
Material Costs	66.4%	70.4%	70.4%
Operating Costs	9.9%	9.1%	9.1%
Profits	4.1%	3.2%	3.1%

Gross sales reached \$504,416,000 for the fiscal year compared to \$532,743,000 last year and \$473,013,000 in fiscal year 2022. Sales of spring wheat flour were 16,016,000 hundredweight or 91 percent of our total sales while sales of durum products were 1,513,000 hundredweight. This compares to sales of 14,631,000 hundredweight of spring wheat flour and 1,300,000 hundredweight of durum products last year. Bulk flour sales represent 83 percent of the flour sold. Flour packed in bags accounted for 17 percent of the flour sold.

As a result of this sales volume, the Mill spent more than \$317,655,000 buying wheat and durum. This is down from the previous year purchases of \$366,191,000 and down from purchases in fiscal year 2022 of \$319,708,000. In fiscal year 2024 the Mill settled the purchase of 38,494,000 bushels of wheat and durum while in fiscal year 2023 the Mill settled the purchase of 35,634,000 bushels. The majority of the grain purchased is from North Dakota growers or grain elevators.

In addition to spending over \$317,655,000 on grain, most of which went to North Dakota farmers, the Mill also spent \$38,576,000 with other North Dakota based suppliers. Payroll costs for the North Dakota Mill were \$24,860,000 for the year ended June 30, 2024. These three items when added together show that the Mill provided a direct economic impact to the region of over \$381,092,000. A North Dakota State University study stated that for every dollar in direct economic activity from wheat processing, another \$2.32 was generated in secondary economic activity. Thus, the Mill produced \$884,133,000 in secondary economic activity resulting in a total economic impact of more than \$1,265,225,000.

Operating costs were \$50,227,000 compared to \$48,488,000 last year and \$42,922,000 in fiscal year 2022. This is an increase of \$1,739,000 from last year. The primary causes for this increase in operating cost is due to increases in wages and benefits, increased insurance costs, and increased depreciation costs. Operating cost per hundredweight of production decreased to \$2.86 from \$3.03 in fiscal year 2023 and \$2.74 in fiscal year 2022.

Gross margins as a percent of gross sales were 15.0 percent for fiscal year 2024 moving from 13.3 percent in fiscal year 2023 and 12.5 percent in fiscal year 2022. Profits as a percent of gross sales were 4.1 percent compared to 3.2 percent last year and 3.1 percent in fiscal year 2022. The Mill experienced a profit of \$20,795,000 compared to a profit of \$17,238,000 last year.

LIQUIDITY

The North Dakota Mill's cash requirements relate primarily to capital improvements and a need to finance inventories and receivables based on raw material costs and levels. These cash needs are expected to be fulfilled by the Mill through operations and an established operating line of credit with the Bank of North Dakota. The Mill has a \$125,000,000 operating line of credit with the Bank of North Dakota. The Mill also has a term note and a construction note with the Bank of North Dakota.

CASH FLOWS FROM OPERATIONS

Operating activities for the year ended June 30, 2024, provided cash of \$49,474,000 compared to \$42,972,000 in fiscal year 2023 and a use of cash of \$7,922,000 in fiscal year 2022. Cash was used primarily for capital projects and transfers to APUF and the General Fund. There was an operating profit for this same period of \$25,410,000 compared to \$22,211,000 in fiscal year 2023 and \$16,394,000 in 2022.

CASH FLOWS FROM FINANCING ACTIVITIES

The North Dakota Mill had \$43,155,000 of short-term debt outstanding and payable to the Bank of North Dakota on June 30, 2024, compared to \$57,637,000 last year and \$69,000,000 in fiscal year 2022. The Mill also had \$58,850,000 in long term debt outstanding and payable to the Bank of North Dakota on June 30, 2024, compared to \$43,902,000 in fiscal year 2023 and \$32,748,000 in fiscal year 2022.

NET POSITION

Current assets decreased \$11,533,000 from last year. This decrease from last year is due primarily to decreases in the value of the inventory on hand. Receivables decreased \$2,405,000 while inventories decreased \$9,403,000 from last year's values.

The carrying value of capital assets increased \$21,947,000 to \$200,433,000 for the year ended June 30, 2024. For more detailed information regarding capital assets and long-term debt activity see the Notes to the Financial Statements.

Current liabilities decreased \$16,626,000 from last year. Long term liabilities increased \$8,512,000 from last year. The major changes were in the long-term notes payable to the Bank of North Dakota, which increased \$12,245,000 to the lease liability which increased \$4,963,000 and to the net pension liability which decreased \$8,579,000. The total net position increased by \$9,758,000, resulting in an improvement in overall financial position.

COMMODITY PRICE RISK

The North Dakota Mill utilizes futures contracts offered through regulated commodity exchanges to reduce risk. The Mill is exposed to risk of loss in the market value of inventories and fixed purchase and sales contracts. To reduce this risk, opposite and offsetting futures positions are taken.

INDUSTRY

U.S. annual wheat flour production decreased in 2023 to 420 million hundredweights down 2.4% from 2022. Production of whole wheat flour in the U.S. was estimated at 17.6 million hundredweights which is a 6% decrease from 2022. Durum flour and semolina production was 30.9 million hundredweights, up .9% from 2022. We expect grain and financial markets to continue to be volatile.

North Dakota produced another quality spring wheat and durum crop this year. Average spring wheat protein is estimated to be 13.9%. Harvest conditions were good. Spring wheat quality has an effect on flour quality. The crop this year is working well for our customers.

FINANCIAL STATEMENTS

Comparative Statement of Net Position

ASSETS	June 30, 2024	June 30, 2023
Current assets:		
Cash and cash equivalents	\$ 225	\$ 225
Receivables, net (note 4)	78,287,566	80,692,136
Inventories (note 5)	36,762,897	46,036,722
Notes receivable	2,117,647	2,117,647
Prepaid expense	2,168,604	2,023,103
Total current assets	\$ 119,336,939	\$ 130,869,833
Noncurrent assets:		
Notes receivable	\$ 4,235,294	\$ 6,352,941
Patronage capital credits	711,030	688,471
Other assets	275,000	275,000
Capital assets, net (note 6)	200,432,580	178,485,938
Total noncurrent assets	205,653,904	185,802,350
Total assets	\$ 324,990,843	\$ 316,672,183
 DEFERRED OUTFLOW OF RESOURCES		
Accumulated decrease in fair value of hedging derivative instruments	\$ 2,636,375	\$ 148,375
Derived from pensions	10,964,652	17,059,774
Derived from other post-employment benefits	392,279	583,918
Total deferred outflows of resources	\$ 13,993,306	\$ 17,792,067
 LIABILITIES		
Current liabilities:		
Checks issued in excess of cash	\$ 2,493,651	\$ 3,291,163
Accounts payable and other liabilities (note 7)	23,521,740	31,492,835
Due to state general fund	9,877,705	8,188,175
Due to ag products utilization fund	1,039,758	861,913
Hedging derivative instruments	2,636,375	148,375
Short term notes payable	43,154,738	57,636,505
Long-term liabilities - current portion		
Compensated absences	112,957	98,609
Notes payable	6,541,954	3,838,349
Lease liability	7,666,395	8,115,585
Total current liabilities	\$ 97,045,273	\$ 113,671,509
Noncurrent liabilities:		
Net other post-employment benefit liability	\$ 744,614	\$ 939,974
Net pension liability	15,569,905	24,149,157
Long-term liabilities - noncurrent portion		
Compensated absences	1,159,084	1,079,519
Notes payable	52,308,312	40,063,712
Lease liability	25,003,906	20,041,099
Total noncurrent liabilities	94,785,821	86,273,461
Total liabilities	\$ 191,831,094	\$ 199,944,970
 DEFERRED INFLOWS OF RESOURCES		
Derived from pensions	\$ 12,290,634	\$ 9,477,546
Derived from other post-employment benefits	71,063	8,083
Total deferred inflows of resources	\$ 12,361,697	\$ 9,485,629
 NET POSITION		
Invested in capital assets	\$ 134,075,746	\$ 135,431,478
Unrestricted	715,609	(10,397,827)
Total net position	\$ 134,791,355	\$ 125,033,651

The accompanying notes are an integral part of the financial statements.

Comparative Statement of Revenues, Expenses, and Changes in Net Position

OPERATING REVENUES	June 30, 2024	June 30, 2023
Sales (net of sales deductions of \$94,092,579 and \$86,902,224, respectively)	\$ 410,323,096	\$ 445,841,075
Total operating revenues	\$ 410,323,096	\$ 445,841,075
OPERATING EXPENSES		
Material cost	\$ 334,686,222	\$ 375,142,840
Wages and benefits	25,188,009	24,761,502
Repairs and maintenance	4,002,370	3,670,118
Operating supplies	1,382,683	1,620,052
Utilities	5,237,682	5,046,128
Insurance	2,537,442	2,178,314
Outside services	2,212,962	2,115,462
Office supplies	63,285	75,352
Computer expense	417,656	371,148
Communications	68,665	64,938
Travel and entertainment	203,077	266,680
Employee expense	219,193	348,348
Safety expense	113,367	198,935
Postage and mailing	44,768	38,825
Advertising	158,244	153,967
Dues and subscriptions	196,921	228,416
Legal and professional	43,563	49,229
Depreciation	8,136,823	7,300,087
Total operating expenses	\$ 384,912,932	\$ 423,630,341
Operating income	\$ 25,410,164	\$ 22,210,734
NONOPERATING REVENUES (EXPENSES)		
Interest income	\$ 514,044	\$ 90,643
Interest expense	(5,211,483)	(5,025,601)
Disposal of assets	(32,118)	(120,074)
Miscellaneous income	132,440	155,690
Other expense	(17,880)	(73,127)
Total nonoperating expenses	\$ (4,614,997)	\$ (4,972,469)
Gain before transfers	\$ 20,795,167	\$ 17,238,265
Transfer to state general fund	\$ (9,877,705)	\$ (8,188,175)
Transfer to ag products utilization fund	(1,039,758)	(861,913)
Transfer to Industrial Commission	(120,000)	(54,520)
Change in net position	\$ 9,757,704	\$ 8,133,657
Total net position - beginning of year	\$ 125,033,651	\$ 116,899,994
Total net position - ending	\$ 134,791,355	\$ 125,033,651

The accompanying notes are an integral part of the financial statements.

Comparative Statement of Cash Flows

	June 30, 2024	June 30, 2023
CASH FLOWS FROM OPERATING ACTIVITIES		
Receipts from customers and users	\$ 509,581,858	\$ 544,403,772
Payments to suppliers	(435,690,847)	(479,695,166)
Payments to employees	(24,143,893)	(21,736,183)
Net cash provided (used) by operating activities	\$ 49,747,118	\$ 42,972,423
CASH FLOWS FROM NONCAPITAL FINANCING ACTIVITIES		
Proceeds from noncapital debt	\$ 234,929,522	\$ 59,950,464
Principal paid on noncapital debt	(253,251,830)	(75,057,611)
Interest paid on noncapital debt	(4,487,903)	(4,842,150)
Ag promotion	(17,880)	(73,128)
Transfer to Industrial Commission	(120,000)	(54,520)
Transfer to state general fund	(8,188,175)	(6,971,950)
Transfer to ag products utilization fund	(861,913)	(733,889)
Net cash provided (used) by noncapital financing activities	\$ (31,998,179)	\$ (27,782,784)
CASH FLOWS FROM CAPITAL AND RELATED FINANCING ACTIVITIES		
Proceeds from capital debt	\$ 18,788,756	\$ 14,897,776
Principal paid on capital debt and leases	(8,887,731)	(8,295,991)
Interest paid on capital debt and leases	(1,780,746)	(815,913)
Acquisition and construction of capital assets	(25,871,730)	(21,301,583)
Net cash used by capital and related financing activities	\$ (17,751,451)	\$ (15,515,711)
CASH FLOWS FROM INVESTING ACTIVITIES		
Interest income on investments	\$ 2,512	\$ 9,913
Net cash provided by investing activities	\$ 2,512	\$ 9,913
Net increase in cash and cash equivalents	\$ 0	\$ (316,159)
Cash and cash equivalents, beginning	225	316,384
Cash and cash equivalents, ending	\$ 225	\$ 225
RECONCILIATION OF OPERATING INCOME TO NET CASH PROVIDED (USED) BY OPERATING ACTIVITIES		
Operating income	\$ 25,410,164	\$ 22,210,734
Adjustments to reconcile operating income to net cash provided by operating activities:		
Depreciation and amortization	17,277,206	15,844,462
Pension and OPEB expense	1,577,319	3,639,448
Interest expense paid on lease activities	1,074,234	632,462
Other nonoperating income	643,964	209,197
Decrease (Increase) in receivables, net	2,404,569	19,921,956
Decrease (Increase) in notes receivable	2,117,647	(8,470,677)
Decrease (Increase) in inventories	9,273,828	(6,172,638)
Decrease (Increase) in prepaid expense	(145,501)	(268,087)
Decrease (Increase) in patronage capital credits	(22,559)	(28,512)
Increase (Decrease) in accounts payable	(9,396,504)	(3,951,108)
Increase (Decrease) in accrued payroll	561,943	421,042
Increase (Decrease) in other liabilities	65,953	19,315
Increase (Decrease) in accrued sick and vacation pay	93,914	38,709
Decrease (Increase) in deferred outflows for pension and OPEB	(1,189,059)	(1,073,880)
Net cash provided by operating activities	\$ 49,747,118	\$ 42,972,423
SUPPLEMENTAL DISCLOSURE ON NON CASH TRANSACTIONS		
Assets acquired through lease	\$ 13,701,027	\$ 14,348,772
Total non cash transactions	\$ 13,701,027	\$ 14,348,772

The accompanying notes are an integral part of the financial statements.

Notes to the Financial Statements

NOTE 1 | SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

The significant accounting policies, as summarized below and the financial statements for the North Dakota Mill and Elevator Association (Mill) are in accordance with accounting principles generally accepted in the United States of America as prescribed by the Governmental Accounting Standards Board (GASB), which is the nationally accepted standard-setting body for establishing governmental accounting and financial reporting principles.

A. REPORTING ENTITY

For financial reporting purposes, the Mill has included all its operations as enterprise funds and has considered all potential component units for which the Mill is financially accountable and other organizations for which the nature and significance of their relationship with the Mill are such that exclusion would cause the Mill's financial statements to be misleading or incomplete. The Governmental Accounting Standards Board has set forth criteria to be considered in determining financial accountability. This criteria includes appointing a voting majority of an organization's governing body and (1) the ability of the Mill to impose its will on that organization; or (2) the potential for the organization to provide specific financial benefits to, or impose specific financial burdens on the Mill.

Based upon these criteria, there are no component units to be included within the Mill as a reporting entity and the Mill is included within the state of North Dakota as a reporting entity.

B. BASIS OF PRESENTATION

The accompanying financial statements are presented in accordance with accounting principles generally accepted in the United States of America as prescribed by the Governmental Accounting Standards Board (GASB). The Mill's activities are considered to be an enterprise fund, single business-type activity (BTA) and accordingly, are reported within a single column in the basic financial statements.

C. BASIS OF ACCOUNTING

The enterprise fund is accounted for on a flow of economic resources measurement focus. The accrual basis of accounting is utilized by the enterprise fund. Revenue is recognized at the time of shipment from the Mill or from the transloading site. Expenses are recognized at the time goods and services were received and accepted.

D. CASH AND CASH EQUIVALENTS

This classification appears on the Comparative Statement of Net Position and the Comparative Statement of Cash Flows and includes petty cash and cash on deposit with the Bank of North Dakota.

E. RECEIVABLES

Accounts receivable represents amounts due from customers for credit sales. Other receivables consist of grain margin accounts, and promissory notes from employees. Notes receivable represents amounts due from customers. The grain margin accounts and hedging derivative instruments are used to buy and sell spring wheat futures contracts on the Minneapolis Grain Exchange. Any activity would be recognized at cost after the settlement period. The allowance method is used to account for estimated uncollectible accounts receivable.

F. INVENTORIES

Grain committed to production is valued at cost. Grain committed to sale is valued at net commitment price. Excess grain inventories are valued at June 30 Minneapolis grain market values, less freight costs to Minneapolis. Flour, feed, and resale inventories are valued at ingredient cost plus manufacturing costs incurred in their production. Supplies inventories are valued at cost. The first-in, first-out basis is used for all inventories.

G. CAPITAL ASSETS

Capital assets are stated at cost. When it is determined that a project consisting of machinery, equipment, or buildings will span more than one year, a "construction in progress" project folder is established to facilitate the accumulation until completion. Upon completion, the completed item is transferred to the applicable asset category. Movable equipment with a cost of \$5,000 or more is capitalized and reported in the accompanying financial statements.

Depreciation is computed on a straight-line basis over the estimated useful life of the assets, generally 10 to 20 years for infrastructure, 30 to 40 years for buildings, 5 to 25 years for plant equipment, 7 to 10 years for office equipment and furniture, 3 to 8 years for intangibles, and 5 to 10 years for leasehold improvements. The leased right of use assets are amortized on a straight-line basis over the shorter of lease term or the assets useful life.

H. NONCURRENT LONG-TERM LIABILITIES

Noncurrent long-term liabilities include compensated absences that will not be paid within the next fiscal year and long-term notes payable to BND.

I. LEASES

Leased right of use assets and the corresponding lease liability are recorded at the present value of future payments over the shorter of the lease term or the assets useful life. The future lease payments are discounted using the implicit rate identified in the lease, or if not identified, then the Mill's incremental borrowing rate is used. The leased right of use assets are amortized on a straight-line basis.

J. COMPENSATED ABSENCES

Annual Leave - Union employees earn vacation within a range of 6 days to 30 days per year depending on length of continuous service. Other employees are entitled to earn annual leave,

based on tenure of employment, within a range of 12 days to 30 days per year. Individuals may bank earned vacation time to a total accumulation of 30 days payable at retirement or upon severance of employment.

Sick Leave - Union employees earn sick pay at the rate of one day for each two months of continuous employment. Upon termination, union employees shall be paid an amount equal to \$50 times the total unused days of accumulated leave, not to exceed \$5,000. Other employees earn sick pay at the rate of one day per month. Upon termination, these employees are entitled to be paid 10% of their accumulated sick leave, if employed 10 years or longer.

K. SCALE ACCRUED PURCHASES

Grain received/unloaded at the Mill that has not yet been settled by the Mill.

L. PENSIONS

For purposes of measuring the net pension liability, deferred outflows of resources and deferred inflows of resources related to pensions, and pension expense, information about the fiduciary net position of the North Dakota Public Employees Retirement System (NDPERS) and additions to/deductions from NDPERS' fiduciary net position have been determined on the same basis as they are reported by NDPERS. For this purpose, benefit payments (including refunds of employee contributions) are recognized when due and payable in accordance with the benefit terms. Investments are reported at fair value.

M. OTHER POST EMPLOYMENT BENEFITS (OPEB)

For purposes of measuring the net OPEB liability, deferred outflows of resources and deferred inflows of resources related to OPEB, and OPEB expense, information about the fiduciary net position of the North Dakota Public Employees Retirement System (NDPERS) and additions to/deductions from NDPERS' fiduciary net position have been determined on the same basis as they are reported by NDPERS. For this purpose, benefit payments are recognized when due and payable in accordance with the benefit terms. Investments are reported at fair value.

N. NET POSITION

The Mill's net position is classified as follows:

Invested in Capital Assets – This represents the Mill's total investment in capital assets, net of outstanding debt obligations related to those capital assets. To the extent debt has been incurred but not yet expended for capital assets, such amounts are not included as a component of invested in capital assets.

Unrestricted Net Position – Unrestricted net position includes resources derived from customer sales which may be used to meet the Mill's ongoing obligations.

O. REVENUE AND EXPENSE RECOGNITION

The Mill presents its revenues and expenses as operating or nonoperating based on recognition definitions from GASB Statement No. 9, Reporting Cash Flows of Proprietary and Nonexpendable Trust Funds and Governmental Entities that use Proprietary Fund Accounting. Operating activities are those activities that are necessary and essential to the mission of the Mill. Operating revenues include all charges to customers. Revenues from interest income, gains on sale of capital assets, and bad debt recovery are considered nonoperating since these are either investing, capital, or noncapital financing activities. Operating expenses are all expense transactions incurred other than those related to investing, capital, or noncapital financing activities and do not include interest expense and disposal of non-depreciated capital assets.

P. NEW ACCOUNTING PRONOUNCEMENTS

During fiscal year 2023, the Mill adopted GASB Statement No. 91, *Conduit Debt Obligations*, GASB Statement No. 94, *Public-Private and Public-Public Partnerships and Availability Payment Arrangements*, GASB Statement No. 96, *Subscription-Based Information Technology Arrangements*, and GASB Statement No. 99, *Omnibus 2022*

During fiscal year 2024, the Mill adopted GASB Statement No. 100, *Accounting Changes and Error Corrections-an amendment of GASB Statement*

The Mill will implement the following new pronouncements for fiscal years ending after 2024: GASB Statement No. 101, *Compensated Absences*, GASB Statement No. 102, *Certain Risk Disclosures*, GASB Statement No. 103, *Financial Reporting Model*. The effect that these GASB Statements will have on future financial statements has not yet been determined.

NOTE 2 | BUDGETING AND BUDGETARY CONTROL

The Mill provides its own operating funds. A two-year budget appropriation is approved by the State Legislature. The Mill's budgeting is on the accrual basis. The Mill does not use encumbrance accounting.

NOTE 3 | DEPOSITS

North Dakota Century Code (N.D.C.C.) sections 6-09-07 and 21-04-02 govern the deposit and investment of public funds.

N.D.C.C. section 6-09-07 states, "All state funds...must be deposited in the Bank of North Dakota...or must be deposited in accordance with constitutional and statutory provisions." N.D.C.C. section 21-04-02 provides that public funds belonging to or in the custody of the state shall be deposited in the Bank of North Dakota.

At June 30, 2024 and 2023, the carrying amounts of the Mill's deposits were \$225 and \$225, respectively, and the bank balances were \$1,000,000 and \$1,000,000, respectively. All deposits are

exposed to custodial credit risk because they are not covered by depository insurance and the deposits are uncollateralized. These monies are deposited in the Bank of North Dakota and are guaranteed by the state of North Dakota (N.D.C.C. section 6-09-10).

NOTE 4 | RECEIVABLES

Receivables at June 30, 2024 and 2023 consist of the following:

June 30, 2024	Gross Receivables	Allowance		Net Receivables
		Bad Debts	Billbacks/ Promotional	
Current Receivables				
Accounts	\$ 78,657,261	\$ (4,149,775)	\$ (962,947)	\$ 73,544,539
Margin accounts	4,677,944			4,677,944
Other	65,083			65,083
Total Current Receivables	<u>\$ 83,400,288</u>	<u>\$ (4,149,775)</u>	<u>\$ (962,947)</u>	<u>\$ 78,287,566</u>

June 30, 2023	Gross Receivables	Allowance		Net Receivables
		Bad Debts	Billbacks/ Promotional	
Current Receivables				
Accounts	\$ 80,685,389	\$ (2,536,627)	\$ (690,788)	\$ 77,457,974
Margin accounts	3,167,535			3,167,535
Other	66,627			66,627
Total Current Receivables	<u>\$ 83,919,551</u>	<u>\$ (2,536,627)</u>	<u>\$ (690,788)</u>	<u>\$ 80,692,136</u>

At June 30, 2024 and 2023, the ages of gross accounts receivable were as follows:

	2024	2023
Current	\$ 44,627,512	\$ 42,692,976
1-30 Days	21,208,296	25,556,752
31-60 Days	8,087,280	8,819,340
61-90 Days	3,222,322	2,378,607
Over 90 Days	1,511,851	1,237,714
	<u>\$ 78,657,261</u>	<u>\$ 80,685,389</u>

NOTE 5 | INVENTORIES

At June 30, 2024 and 2023, inventories consisted of the following:

	2024	2023
Grain	\$ 25,062,404	\$ 33,477,529
Flour, Feed, Resale	10,504,810	11,427,208
Supplies	1,195,683	1,131,985
Total Inventories	<u>\$ 36,762,897</u>	<u>\$ 46,036,722</u>

The Mill's net position in the grain market at June 30, 2024 and 2023 was as follows:

	2024 Bushels		2023 Bushels	
	Wheat	Durum	Wheat	Durum
Company Owned (Priced) Grain and Flour on Hand	3,497,465	169,438	2,733,924	217,338
Open Purchase Contracts				
Cash	5,312,881	1,148,896	3,284,556	1,030,798
Futures	5,790,000		6,650,000	
Subtotal	14,600,346	1,318,334	12,668,480	1,248,136
Committed to Production	(14,771,936)	(895,731)	(12,928,349)	(1,151,782)
Net Position (Short) Long	(171,590)	422,603	(259,869)	96,354

Any gains or losses on net open position would only occur if there were changes in the market price of wheat or durum prior to the Mill covering their open position. Losses on open purchase contracts could occur if there was a failure to deliver the commodity. The amount of loss would depend upon the difference between the contract price and the market price at that time.

NOTE 6 | CAPITAL ASSETS

The summary of changes in capital assets for fiscal years ended June 30, 2024 and 2023 is below:

	Balance July 1, 2023	Additions	Deletions	Transfers	Balance June 30, 2024
Capital Assets, Non-Depreciable:					
Land	\$ 1,783,611				\$ 1,783,611
Construction in Progress	17,115,545	\$ 25,871,732	\$ (12,724)	\$ (3,677,385)	39,297,168
Total Capital Assets, Non-Depreciable	\$ 18,899,156	\$ 25,871,732	\$ (12,724)	\$ (3,677,385)	\$ 41,080,779
Capital Assets, Depreciable/Amortizable:					
Infrastructure	\$ 18,787,292			\$ 1,351,534	\$ 20,138,826
Buildings	72,461,718		\$ (5,918)	231,677	72,687,478
Machinery & Equipment	129,952,938	\$ 5,000	(405,988)	1,958,438	131,510,388
Intangibles	2,043,632			135,736	2,179,368
Furniture & Fixtures	1,022,766		(32,515)		990,251
Leased Right of Use Asset	40,760,364	13,701,027	(5,404,691)		49,056,700
Total Capital Assets, Depreciable/Amortizable	\$ 265,028,710	\$ 13,706,027	\$ (5,849,112)	\$ 3,677,385	\$ 276,563,011
Less Accumulated Depreciation and Amortization:					
Infrastructure	\$ 3,693,122	\$ 726,974			\$ 4,420,096
Buildings	22,944,330	1,877,676	\$ (5,918)		24,816,088
Machinery & Equipment	63,616,593	5,275,638	(368,305)		68,523,926
Intangibles	1,384,333	172,797			1,557,130
Furniture & Fixtures	828,890	83,175	(32,515)		879,550
Leased Right of Use Asset	12,974,660	9,147,611	(5,107,851)		17,014,420
Total Accumulated Depreciation and Amortization	\$ 105,441,928	\$ 17,283,871	\$ (5,514,589)		\$ 117,211,210
Total Capital Assets, Depreciable, Net	\$ 159,586,782	\$ (3,577,844)	\$ (334,523)	\$ 3,677,385	\$ 159,351,801
Capital Assets, Net	\$ 178,485,938	\$ 22,293,888	\$ (347,247)	\$ -	\$ 200,432,580

	Balance				Balance	
	July 1, 2022	Additions	Deletions	Transfers	June 30, 2023	
Capital Assets, Non-Depreciable:						
Land	\$ 1,783,611				\$ 1,783,611	
Construction in Progress	26,141,763	\$ 21,323,657		\$ (30,349,875)	17,115,545	
Total Capital Assets, Non-Depreciable	\$ 27,925,374	\$ 21,323,657	\$ -	\$ (30,349,875)	\$ 18,899,156	
Capital Assets, Depreciable/Amortizable:						
Infrastructure	\$ 17,891,799		\$ (353,459)	\$ 1,248,952	\$ 18,787,292	
Buildings	72,188,025		(139,574)	413,267	72,461,718	
Machinery & Equipment	102,125,191	\$ 62,500	(737,308)	28,502,555	129,952,938	
Intangibles	1,894,093			149,539	2,043,632	
Furniture & Fixtures	1,017,392		(30,188)	35,562	1,022,766	
Leased Right of Use Asset	29,552,600	14,348,772	(3,141,008)		40,760,364	
Total Capital Assets, Depreciable/Amortizable	\$ 224,669,100	\$ 14,411,272	\$ (4,401,537)	\$ 30,349,875	\$ 265,028,710	
Less Accumulated Depreciation and Amortization:						
Infrastructure	\$ 3,400,894	\$ 645,687	\$ (353,459)		\$ 3,693,122	
Buildings	21,194,337	1,833,752	(83,759)		22,944,330	
Machinery & Equipment	59,651,739	4,571,845	(606,991)		63,616,593	
Intangibles	1,216,408	168,095	(170)		1,384,333	
Furniture & Fixtures	781,757	77,321	(30,188)		828,890	
Leased Right of Use Asset	7,403,505	8,544,375	(2,973,220)		12,974,660	
Total Accumulated Depreciation and Amortization	\$ 93,648,640	\$ 15,841,075	\$ (4,047,787)		\$ 105,441,928	
Total Capital Assets, Depreciable, Net	\$ 131,020,460	\$ (1,429,803)	\$ (353,750)	\$ 30,349,875	\$ 159,586,782	
Capital Assets, Net	\$ 158,945,834	\$ 19,893,854	\$ (353,750)	\$ -	\$ 178,485,938	

NOTE 7 | ACCOUNTS PAYABLE AND ACCRUED LIABILITIES

Accounts payable and accrued liabilities at June 30, 2024 and 2023 were as follows:

	2024	2023
Accounts Payable	\$ 11,200,246	\$ 10,724,343
Scale Accrued Purchases	7,118,222	16,193,116
Accrued Gain Sharing	4,713,945	4,047,147
Accrued Payroll	336,065	251,270
Accrued Payroll Taxes and Benefits	27,132	216,782
Accrued Commissions	126,130	60,177
Total accounts payable and accrued liabilities	\$ 23,521,740	\$ 31,492,835

NOTE 8 | SHORT-TERM NOTES PAYABLE

The Mill uses a revolving line of credit to finance current operations with the Bank of North Dakota. The line of credit is for \$125 million as of June 30, 2024 and \$81.8 million is unused. The line of credit is for \$125 million as of June 30, 2023 and \$67.3 million unused. All Mill assets including but not limited to equipment, accounts, and inventory are pledged as collateral for the line of credit along with the notes payable discussed in Note 10. The interest rate is variable at 1.0% over the 3-month FHLB (Federal Home Loan Bank), adjusted quarterly. As of June 30, 2024 and 2023, the rates were 6.49% and 6.21%, respectively. Short-term debt activity for the year ended June 30, 2024 and 2023 was as follows:

	Balance		Balance	
	July 1, 2023	Draws	Repayments	June 30, 2024
Line of credit	\$ 57,636,505	\$ 234,929,522	\$ (249,411,289)	\$ 43,154,738

	Balance		Balance	
	July 1, 2022	Draws	Repayments	June 30, 2023
Line of credit	\$ 69,000,000	\$ 59,950,464	\$ (71,313,959)	\$ 57,636,505

NOTE 9 | LONG-TERM LIABILITIES

The summary of changes in the long-term liabilities for June 30, 2024 and 2023 is as follows:

	Balance			Balance		Current	Noncurrent
	July 1, 2023	Additions	Reductions	June 30, 2024	Portion	Portion	
Compensated Absences	\$ 1,178,128	\$ 986,753	\$ (892,840)	\$ 1,272,041	\$ 112,957	\$ 1,159,084	
Notes Payable	43,902,061	18,788,756	(3,840,551)	58,850,266	6,541,953	52,308,313	
Lease Liability	28,156,684	13,702,215	(9,188,598)	32,670,301	7,666,395	25,003,906	
Total Long-Term Liabilities	\$ 73,236,873	\$ 33,477,724	\$ (13,921,989)	\$ 92,792,608	\$ 14,321,305	\$ 78,471,303	

	Balance			Balance		Current	Noncurrent
	July 1, 2022	Additions	Reductions	June 30, 2023	Portion	Portion	
Compensated Absences	\$ 1,139,418	\$ 950,840	\$ (912,130)	\$ 1,178,128	\$ 98,609	\$ 1,079,519	
Notes Payable	32,747,937	14,897,776	(3,743,652)	43,902,061	3,838,349	40,063,712	
Lease Liability	22,276,930	14,348,772	(8,469,018)	28,156,684	8,115,585	20,041,099	
Total Long-Term Liabilities	\$ 56,164,285	\$ 30,197,388	\$ (13,124,800)	\$ 73,236,873	\$ 12,052,543	\$ 61,184,330	

Compensated absences are also shown as long-term liabilities for annual and sick leave payable to employees upon retirement or severance of employment. See details in Note 1.

NOTE 10 | NOTES PAYABLE

The Mill borrowed \$40 million during fiscal year 2021 from the Bank of North Dakota to finance current operations and it is recorded as a notes payable. The interest rate is fixed at 2.5% and the term is ten years. In fiscal year 2023, the Mill entered into a \$40 million long term note with the Bank of North Dakota to fund the construction of a Midds Storage and Handling Facility. The note has a fixed 3.0% interest rate, 5-year term, requiring interest only monthly payments for the first 2 years, followed by 3 years of monthly principal and interest payments based on a 10-year amortization. In fiscal year 2023, the Mill drew down \$14,897,776 for the long term note and in fiscal year 2024, the Mill drew down \$18,788,756 for a total of \$33,686,533. The remaining will be drawn down in fiscal year 2025. All Mill assets including but not limited to equipment, accounts, and inventory are pledged as collateral for the notes payable along with the line of credit discussed in Note 8.

The schedule of maturities of notes payable is as follows:

Fiscal Year	Principal	Interest	Total
2025	6,541,953	1,594,997	8,136,950
2026	7,598,694	1,495,428	9,094,123
2027	7,809,116	1,393,342	9,202,456
2028	28,092,865	533,534	28,626,401
2029	4,350,940	170,781	4,521,721
2030	4,456,698	60,752	4,517,450
	<u>\$ 58,850,266</u>	<u>\$ 5,248,834</u>	<u>\$ 64,099,101</u>

NOTE 11 | LEASE OBLIGATIONS

During fiscal years ended June 30, 2024 and 2023, the Mill had leases for bulk rail and box cars with original terms of 3 to 26 years on 1094 and 1035 cars, respectively. The Mill also has leases with GM Financial for the CEO's automobile, BNSF for land and track rental, CSX for track rental, US Bancorp for two shuttlewagons, and Pitney Bowes for a postage meter. A summary of changes in leased assets is as follows:

	Balance July 1, 2023	Additions	Decreases	Balance June 30, 2024
Capital Assets:				
Leased Land	\$ 104,472			\$ 104,472
Leased Infrastructure	82,367			82,367
Leased Machinery & Equipment	40,567,638	\$ 13,701,027	\$ (5,404,691)	48,863,973
Leased Furniture & Fixtures	5,888			5,888
Total Leases Being Amortized	<u>\$ 40,760,365</u>	<u>\$ 13,701,027</u>	<u>\$ (5,404,691)</u>	<u>\$ 49,056,700</u>
Less Accumulated Amortization:				
Leased Land				
Leased Infrastructure	\$ 114,931	\$ 57,466		\$ 172,397
Leased Machinery & Equipment	12,856,366	9,088,463	(5,107,850)	16,836,979
Leased Furniture & Fixtures	3,364	1,682		5,046
Total Accumulated Amortization	<u>\$ 12,974,661</u>	<u>\$ 9,147,611</u>	<u>\$ (5,107,850)</u>	<u>\$ 17,014,422</u>
Leased Right of Use Asset, Net	<u>\$ 27,785,704</u>	<u>\$ 4,553,416</u>	<u>\$ (296,841)</u>	<u>\$ 32,042,278</u>

	Balance July 1, 2022	Additions	Decreases	Balance June 30, 2023
Capital Assets:				
Leased Land	\$ 104,472			\$ 104,472
Leased Infrastructure	82,367			82,367
Leased Machinery & Equipment	29,359,874	\$ 14,348,772	\$ (3,141,008)	40,567,638
Leased Furniture & Fixtures	5,888			5,888
Total Leases Being Amortized	<u>\$ 29,552,601</u>	<u>\$ 14,348,772</u>	<u>\$ (3,141,008)</u>	<u>\$ 40,760,365</u>
Less Accumulated Amortization:				
Leased Land				
Leased Infrastructure	\$ 22,641	\$ 92,290		\$ 114,931
Leased Machinery & Equipment	7,379,183	8,450,403	(2,973,220)	12,856,366
Leased Furniture & Fixtures	1,682	1,682		3,364
Total Accumulated Amortization	<u>\$ 7,403,506</u>	<u>\$ 8,544,375</u>	<u>\$ (2,973,220)</u>	<u>\$ 12,974,661</u>
Leased Right of Use Asset, Net	<u>\$ 22,149,095</u>	<u>\$ 5,804,397</u>	<u>\$ (167,788)</u>	<u>\$ 27,785,704</u>

The minimum future lease interest and principal payments for each of the next five years and in the aggregate is as follows:

Fiscal Year	Principal	Interest	Total
2025	\$ 7,666,395	\$ 1,399,801	\$ 9,066,196
2026	6,510,521	1,119,210	7,629,731
2027	5,360,231	850,033	6,210,264
2028	4,365,487	597,054	4,962,541
2029	2,669,767	409,980	3,079,747
2030-2034	6,097,900	802,986	6,900,886
	<u>\$ 32,670,301</u>	<u>\$ 5,179,064</u>	<u>\$ 37,849,365</u>

NOTE 12 | BONUS AND OTHER EMPLOYEE AGREEMENTS

The CEO's annual bonus opportunity is based on performance, up to 30% of base salary. The employee's annual bonus opportunity is based on achieving production, safety, and profit goals. Production and safety goals have a 4% bonus potential and if profit before gain sharing expense accrual and pension expense exceeds \$7 million for fiscal year 2024 and \$6 million for fiscal year 2023, the profit bonus would be 1% of base salary for each million in profits (before gain sharing expense accrual), or fraction thereof. The bonus potential was accrued. (See Note 7)

NOTE 13 | PENSION PLAN

The Mill participates in the North Dakota Public Employees' Retirement System (NDPERS), administered by the state of North Dakota. The following brief description of NDPERS is provided for general information purposes only. Participants should refer to N.D.C.C. chapter 54-52 for more complete information.

A. Description of Pension Plans

NDPERS is a cost-sharing multiple-employer defined benefit pension plan that covers substantially all employees of the State of North Dakota, its agencies and various participating political subdivisions. NDPERS provides for pension, death and disability benefits. The cost to administer the plan is financed through the contributions and investment earnings of the plan.

Responsibility for administration of the NDPERS defined benefit pension plan is assigned to a Board comprised of eleven members. The Governor is responsible for appointing three other members in addition to the Chairman of the Board. Four members are appointed by legislative management, and the remaining three Board members are elected from active employees currently contributing to PERS.

B. Pension Benefits

Benefits are set by statute. NDPERS has no provisions or policies with respect to automatic and ad hoc post-retirement benefit increases. Members of the Main System are entitled to unreduced monthly pension benefits beginning when the sum of age and years of credited service equal or exceed 85 (Rule of 85), or at normal retirement age (65). For members hired on or after January 1, 2016, the Rule of 85 was replaced with the Rule of 90 with a minimum age of 60. The monthly pension benefit is equal to 2.00% of their average monthly salary, using the highest 36 months out of the last 180 months of service, for each year of service. For members hired on or after January 1, 2020 the 2.00% multiplier was replaced with a 1.75% multiplier. The plan permits early retirement at ages 55-64 with three or more years of service.

Members may elect to receive the pension benefits in the form of a single life, joint and survivor, term-certain annuity, or partial lump sum with ongoing annuity. Members may elect to receive the value of their accumulated contributions, plus interest, as a lump sum distribution upon retirement or termination, or they may elect to receive their benefits in the form of an annuity. For each member electing an annuity, total payment will not be less than the members' accumulated contributions plus interest.

C. Death and Disability Benefits

Death and disability benefits are set by statute. If an active member dies with less than three years of service for the Main System, a death benefit equal to the value of the member's accumulated contributions, plus interest, is paid to the member's beneficiary. If the member has earned more than three years of credited service for the Main System, the surviving spouse will be entitled to a single payment refund, life-time monthly payments in an amount equal to 50% of the member's accrued normal retirement benefit, or monthly payments in an amount equal to the member's accrued 100% Joint and Survivor retirement benefit if the member had reached normal retirement age prior to date of death. If the surviving spouse dies before the member's accumulated pension benefits are paid, the balance will be payable to the surviving spouse's designated beneficiary.

Eligible members who become totally disabled after a minimum of 180 days of service, receive monthly disability benefits equal to 25% of their final average salary with a minimum benefit of \$100. To qualify under this section, the member has to become disabled during the period of eligible employment and apply for benefits within one year of termination. The definition for disabled is set by the NDPERS in the North Dakota Administrative Code.

D. Refunds of Member Account Balance

Upon termination, if a member of the Main System is not vested (is not 65 or does not have three years of service), they will receive the accumulated member contributions and vested employer contributions, plus interest, or may elect to receive this amount at a later date. If the member has vested, they have the option of applying for a refund or can remain as a terminated vested participant. If a member terminated and withdrew their accumulated member contribution and is subsequently reemployed, they have the option of repurchasing their previous service.

E. Member and Employer Contributions

Member and employer contributions paid to NDPERS are set by statute and are established as a percent of salaries and wages. Member contribution rates are 7% and employer contribution rates are 7.12% of covered compensation. As of January 1, 2024, the employer contribution rates are 8.12%. For members hired on or after January 1, 2020 member contribution rates are 7% and employer contribution rates are 8.26% of covered compensation. As of January 1, 2024, the employer contribution rates are 9.26%.

The member's account balance includes the vested employer contributions equal to the member's contributions to an eligible deferred compensation plan. The minimum member contribution is \$25 and the maximum may not exceed the following:

- 1 to 12 months of service – Greater of one percent of monthly salary or \$25
- 13 to 24 months of service – Greater of two percent of monthly salary or \$25
- 25 to 36 months of service – Greater of three percent of monthly salary or \$25
- Longer than 36 months of service – Greater of four percent of monthly salary or \$25

F. Pension Liabilities, Pension Expense, and Deferred Outflows of Resources and Deferred Inflows of Resources Related to Pensions

At June 30, 2024 and 2023, the Mill reported a liability of \$15,569,905 and \$24,149,157, respectively, for its proportionate share of the net pension liability. The net pension liability was measured as of June 30, 2023 and June 30, 2022 and the total pension liability used to calculate the net pension liability was determined by an actuarial valuation as of that date. The Mill's proportion of the net pension liability was based on the Mill's share of covered payroll in the Main System pension plan relative to the covered payroll of all participating Main System employers. At June 30, 2023, the Mill's proportion was 0.807462 percent, which was a decrease of 0.031031 percent from its proportion measured as of June 30, 2022. As June 30, 2022, the Mill's proportion was 0.838493 percent, which was an increase of 0.025441 from its proportion measured as of June 30, 2021.

For the years ended June 30, 2024 and 2023, the Mill recognized a pension expense of \$1,405,934 and \$3,454,939, respectively. At June 30, 2024 and June 30, 2023, the Mill reported deferred outflows of resources and deferred inflows of resources related to pensions from the following sources:

	2024	
	Deferred Outflows of Resources	Deferred Inflows of Resources
Differences between expected and actual experience	\$ 506,851	\$ 85,867
Changes of assumptions	8,585,428	11,817,953
Net difference between projected and actual earnings on pension plan investments	408,526	
Changes in proportion and differences between employer contributions and proportionate share of contributions	386,827	386,814
Employer contributions subsequent to the measurement date	1,077,020	
Total	<u>\$ 10,964,652</u>	<u>\$ 12,290,634</u>

\$1,077,020 reported as deferred outflows of resources related to pensions resulting from the Mill contributions subsequent to the measurement date will be recognized as a reduction of the net pension liability in the year ended June 30, 2025.

	2023	
	Deferred Outflows of Resources	Deferred Inflows of Resources
Differences between expected and actual experience	\$ 125,970	\$ 461,291
Changes of assumptions	14,441,551	8,952,962
Net difference between projected and actual earnings on pension plan investments	883,854	
Changes in proportion and differences between employer contributions and proportionate share of contributions	651,262	63,293
Employer contributions subsequent to the measurement date	957,137	
Total	<u>\$ 17,059,774</u>	<u>\$ 9,477,546</u>

\$957,137 reported as deferred outflows of resources related to pensions resulting from the Mill contributions subsequent to the measurement date will be recognized as a reduction of the net pension liability in the year ended June 30, 2024.

Other amounts reported as deferred outflows of resources and deferred inflows of resources related to pensions will be recognized in pension expense as follows:

Year ended June 30:

2025	65,846
2026	(1,759,921)
2027	237,558
2028	(946,485)
2029	-
Thereafter	-

Actuarial assumptions. The total pension liability in the July 1, 2023 actuarial valuation was determined using the following actuarial assumptions, applied to all periods included in the measurement:

Inflation	2.25%
Salary increases	3.5% to 17.75% including inflation
Investment rate of return	6.50%, net of investment expenses
Cost-of-living adjustments	None

For active members, inactive members and healthy retirees, mortality rates were based on the Sex-distinct Pub-2010 table for General Employees, with scaling based on actual experience. Respective corresponding tables were used for healthy retirees, disabled retirees, and active members. Mortality rates are projected from 2010 using the MP-2019 scale.

The long-term expected rate of return on pension plan investments was determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation. Best estimates of arithmetic real rates of return for each major asset class included in the Fund's target asset allocation are summarized in the following table:

Asset Class	Target Allocation	Long-Term Expected Real Rate of Return
Domestic Equity	31%	6.25%
International Equity	20%	6.95%
Private Equity	7%	9.45%
Domestic Fixed Income	23%	2.51%
International Fixed Income	0%	0.00%
Global Real Assets	19%	4.33%
Cash Equivalents	0%	0.00%

Discount rate. For PERS, GASB Statement No. 67 includes a specific requirement for the discount rate that is used for the purpose of the measurement of the Total Pension Liability. This rate considers the ability of the System to meet benefit obligations in the future. To make this determination, employer contributions, employee contributions, benefit payments, expenses and investment returns are projected into the future. The current employer and

employee fixed rate contributions are assumed to be made in each future year. The Plan Net Position (assets) in future years can then be determined and compared to its obligation to make benefit payments in those years. In years where assets are not projected to be sufficient to meet benefit payments, which is the case for the PERS plan, the use of a municipal bond rate is required.

The Single Discount Rate (SDR) is equivalent to applying these two rates to the benefits that are projected to be paid during the different time periods. The SDR reflects (1) the long-term expected rate of return on pension plan investments (during the period in which the fiduciary net position is projected to be sufficient to pay benefits) and (2) a tax-exempt municipal bond rate based on an index of 20-year general obligation bonds with an average AA credit rating as of the measurement date (to the extent that the contributions for use with the long-term expected rate of return are not met).

For the purpose of this valuation, the expected rate of return on pension plan investments is 6.50%; the municipal bond rate is 3.86%; and the resulting Single Discount Rate is 6.50%.

Sensitivity of the Employer's proportionate share of the net pension liability to changes in the discount rate. The following presents the Mill's proportionate share of the net pension liability as of June 30, 2023 calculated using the discount rate of 6.50 percent, as well as what the Mill's proportionate share of the net pension liability would be if it were calculated using a discount rate that is 1-percentage-point lower (5.50 percent) or 1-percentage-point higher (7.50 percent) than the current rate:

	1% Decrease (5.50%)	Current Discount Rate (6.50%)	1% Increase (7.50%)
Employer's proportionate share of the net pension liability	\$21,467,158	\$15,569,905	\$10,677,676

The following presents the Mill's proportionate share of the net pension liability as of June 30, 2022 calculated using the discount rate of 5.10 percent, as well as what the Mill's proportionate share of the net pension liability would be if it were calculated using a discount rate that is 1-percentage-point lower (4.10 percent) or 1-percentage-point higher (6.10 percent) than the current rate:

	1% Decrease (4.10%)	Current Discount Rate (5.10%)	1% Increase (6.10%)
Employer's proportionate share of the net pension liability	\$31,875,226	\$24,149,157	\$17,806,322

Pension plan fiduciary net position. Detailed information about the pension plan's fiduciary net position is available in the separately issued NDPERS financial report.

NOTE 14 | POST RETIREMENT BENEFITS

The Mill participates in the North Dakota Public Employees' Retirement System (NDPERS) other post employment benefits (OPEB) administered by the state of North Dakota. The following brief description of NDPERS is provided for general information purposes only. Participants should refer to NDAC Chapter 71-06 for more complete information.

A. Description of OPEB Plans

NDPERS OPEB plan is a cost-sharing multiple-employer defined benefit OPEB plan that covers members receiving retirement benefits from the PERS, the HPRS, and Judges retired under Chapter 27-17 of the North Dakota Century Code a credit toward their monthly health insurance premium under the state health plan based upon the member's years of credited service. Effective July 1, 2015, the credit is also available to apply towards monthly premiums under the state dental, vision and long-term care plan and any other health insurance plan. Effective August 1, 2019, the benefit may be used for any eligible health, prescription drug plan, dental, vision, or long term care plan premium expense. The Retiree Health Insurance Credit Fund is advance-funded on an actuarially determined basis.

Responsibility for administration of the NDPERS defined benefit OPEB plan is assigned to a Board comprised of nine members. The Board consists of a Chairman, who is appointed by the Governor; one member appointed by the Attorney General; one member appointed by the State Health Officer; three members elected by the active membership of the NDPERS system, one member elected by the retired public employees and two members of the legislative assembly appointed by the chairman of the legislative management.

B. OPEB Benefits

The employer contribution for the PERS, the HPRS and the Defined Contribution Plan is set by statute at 1.14% of covered compensation. Employees participating in the retirement plan as part-time/temporary members are required to contribute 1.14% of their covered compensation to the Retiree Health Insurance Credit Fund. Employees purchasing previous service credit are also required to make an employee contribution to the Fund. The benefit amount applied each year is shown as "prefunded credit applied" on the Statement of Changes in Plan Net Position for the OPEB trust funds. Beginning January 1, 2020, members first enrolled in the NDPERS Main System and the Defined Contribution Plan on or after that date will not be eligible to participate in RHIC. Therefore, RHIC will become for the most part a closed plan. There were no other benefit changes during the year.

Retiree health insurance credit benefits and death and disability benefits are set by statute. There are no provisions or policies with respect to automatic and ad hoc post-retirement benefit increases. Employees who are receiving monthly retirement benefits from the PERS, the HPRS, the Defined Contribution Plan, the Chapter 27-17 judges or an employee receiving disability benefits, or the spouse of a deceased annuitant receiving a surviving spouse benefit or if the member selected a joint and survivor option are eligible to receive a credit toward their monthly health insurance premium under the state health plan.

Effective July 1, 2015, the credit is also available to apply towards monthly premiums under the state dental, vision and long-term care plan and any other health insurance plan. Effective August 1, 2019 the benefit may be used for any eligible health, prescription drug plan, dental, vision, or long term care plan premium expense. The benefits are equal to \$5.00 for each of the employee's, or deceased employee's years of credited service not to exceed the premium in effect for selected coverage. The retiree health insurance credit is also available for early retirement with reduced benefits.

C. OPEB Liabilities, OPEB Expense, and Deferred Outflows of Resources and Deferred Inflows of Resources Related to OPEB

At June 30, 2024 and 2023, the Mill reported a liability of \$744,614 and \$939,974, respectively, for its proportionate share of the net OPEB liability. The net OPEB liability was measured as of June 30, 2023 and 2022 and the total OPEB liability used to calculate the net OPEB liability was determined by an actuarial valuation as of that date. The Mill's proportion of the net OPEB liability was based on the Mill's share of covered payroll in the OPEB plan relative to the covered payroll of all participating OPEB employers. At June 30, 2023, the Mill's proportion was 0.744799 percent, which was a decrease of 0.038311 percent. At June 30, 2022, the Mill's proportion was 0.783110 percent which was an increase of 0.013983 percent from its proportion measures as of June 30, 2021.

For the years ended June 30, 2024 and 2023, the Mill recognized OPEB expense of \$171,341 and \$184,509, respectively. At June 30, 2024 and 2023, the Mill reported deferred outflows of resources and deferred inflows of resources related to OPEB from the following sources:

	<u>2024</u>	
	<u>Deferred Outflows of Resources</u>	<u>Deferred Inflows of Resources</u>
Differences between expected and actual experience	\$ 14,009	\$ 8,521
Changes of assumptions	158,809	61,663
Net difference between projected and actual earnings on OPEB plan investments	53,782	-
Changes in proportion and differences between employer contributions and proportionate share of contributions	53,640	879
Employer contributions subsequent to the measurement date	112,039	
Total	<u>\$ 392,279</u>	<u>\$ 71,063</u>

\$112,039 reported as deferred outflows of resources related to OPEB resulting from the Mill's contributions subsequent to the measurement date will be recognized as a reduction of the net OPEB liability in the year ended June 30, 2025.

	2023	
	Deferred Outflows of Resources	Deferred Inflows of Resources
Differences between expected and actual experience	\$ 22,284	\$ 8,083
Changes of assumptions	236,769	
Net difference between projected and actual earnings on OPEB plan investments	126,564	
Changes in proportion and differences between employer contributions and proportionate share of contributions	81,558	
Employer contributions subsequent to the measurement date	116,743	
Total	<u>\$ 583,918</u>	<u>\$ 8,083</u>

\$116,743 reported as deferred outflows of resources related to OPEB resulting from the Mill's contributions subsequent to the measurement date will be recognized as a reduction of the net OPEB liability in the year ended June 30, 2024.

Other amounts reported as deferred outflows of resources and deferred inflows of resources related to OPEBs will be recognized in OPEB expense as follows:

Year ended June 30:	
2025	84,568
2026	65,055
2027	79,832
2028	(20,278)
2029	-
Thereafter	-

Actuarial assumptions. The total OPEB liability in the July 1, 2023 actuarial valuation was determined using the following actuarial assumptions, applied to all periods included in the measurement:

Inflation	2.25%
Salary increases	Not applicable
Investment rate of return	5.75%, net of investment expenses
Cost-of-living adjustments	None

For active members, inactive members and healthy retirees, mortality rates were based on the MortalityPub-2010 Healthy Retiree Mortality table (for General Employees), sex-distinct, with rates multiplied by 103% for males and 101% for females. Pub-2010 Disabled Retiree Mortality table (for General Employees), sex-distinct, with rates multiplied by 117% for males and 112%

for females. Pub-2010 Employee Mortality table (for General Employees), sex-distinct, with rates multiplied by 92% for both males and females. Mortality rates are projected from 2010 using the MP-2019 scale.

The long-term expected investment rate of return assumption for the RHIC fund was determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of RHIC investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation. Estimates of arithmetic real rates of return, for each major asset class included in the RHIC's target asset allocation as of July 1, 2023 are summarized in the following table:

Asset Class	Target Allocation	Long-Term Expected Real Rate of Return
Large Cap Domestic Equities	33%	6.10%
Small Cap Domestic Equities	6%	7.10%
Domestic Fixed Income	35%	2.59%
International Equities	26%	6.50%

Discount rate. The discount rate used to measure the total OPEB liability was 5.75%. The projection of cash flows used to determine the discount rate assumed plan member and statutory rates described in this report. For this purpose, only employer contributions that are intended to fund benefits of current RHIC members and their beneficiaries are included. Projected employer contributions that are intended to fund the service costs of future plan members and their beneficiaries are not included. Based on those assumptions, the RHIC fiduciary net position was projected to be sufficient to make all projected future payments of current plan members. Therefore, the long-term expected rate of return on RHIC investments was applied to all periods of projected benefit payments to determine the total OPEB liability.

Sensitivity of the Employer's proportionate share of the net OPEB liability to changes in the discount rate. The following presents the net OPEB liability of the Plans as of June 30, 2023, calculated using the discount rate of 5.75%, as well as what the RHIC net OPEB liability would be if it were calculated using a discount rate that is 1-percentage-point lower (4.75 percent) or 1-percentage-point higher (6.75 percent) than the current rate:

	1% Decrease (4.75%)	Current Discount Rate (5.75%)	1% Increase (6.75%)
Employer's proportionate share of the net OPEB liability	\$978,605	\$744,614	\$547,622

The following presents the net OPEB liability of the Plans as of June 30, 2022, calculated using the discount rate of 5.39%, as well as what the RHIC net OPEB liability would be if it were

calculated using a discount rate that is 1-percentage-point lower (4.39 percent) or 1-percentage-point higher (6.39 percent) than the current rate:

	1% Decrease (4.39%)	Current Discount Rate (5.39%)	1% Increase (6.39%)
Employer's proportionate share of the net OPEB liability	\$1,199,821	\$939,974	\$721,840

OPEB plan fiduciary net position. Detailed information about the OPEB plan's fiduciary net position is available in the separately issued NDPERS financial report.

NOTE 15 | DEFERRED COMPENSATION PLAN

The state offers its employees a deferred compensation plan created in accordance with Internal Revenue Code Section 457. The plan, available to all state employees, permits them to defer a portion of their current salary until future years. Participation in the plan is optional. The deferred compensation is not available to the employees until separation of employment, unforeseeable emergency, de minimis distribution, or qualified domestic relations orders.

All compensation deferred under the plans, all property and rights purchased with those amounts, and all income attributable to those amounts, property or rights are held in trust for the exclusive use of the employee or their beneficiary.

The Mill employees deposit to deferred compensation for June 30, 2024 and 2023 was \$426,682 and \$358,636, respectively.

NOTE 16 | CONCENTRATIONS

The Mill sells a substantial portion of its product to five major customers. Sales to these customers totaled approximately 8,546,223 and 8,229,996 hundredweight for the years ended June 30, 2024 and 2023, respectively. For June 30, 2024 and 2023, sales to these customers were 49% and 52% of total sales, respectively.

Approximately 70% of employees are employed under a four-year bargaining agreement that will expire at June 30, 2025. This contract contains a provision that states there shall be no strikes, slowdowns, or stoppages of work, picketing, boycotts, or other interference with the full operations of the business of the Mill by the employees covered by this agreement and there shall be no lockout by the Mill.

NOTE 17 | RELATED PARTY TRANSACTIONS

For fiscal years 2024 and 2023, section 54-18-19 of the N.D.C.C. provides that the Industrial Commission shall transfer to the state general fund, 50% of the annual earnings and undivided profits of the Mill after any transfers to other state agricultural-related programs. The moneys

must be transferred on an annual basis in the amounts and at the times requested by the director of the Office of Management and Budget. For the years ended June 30, 2024 and 2023, the Mill had a due to state general fund of \$9,877,705 and \$8,188,175, respectively.

Section 54-18-21 of the N.D.C.C. provides that the Industrial Commission shall transfer 5% of the net income earned by the Mill during that fiscal year to the Agricultural Products Utilization Fund. For the years ended June 30, 2024 and 2023, the Mill had a due to the Agricultural Products Utilization Fund of \$1,039,758 and \$861,913, respectively.

As referred to in Note 3, the Mill does all banking with the Bank of North Dakota. They also have a revolving line of credit with the Bank of North Dakota and notes payable, which are discussed in Notes 8 and 10.

The Mill paid the Industrial Commission, a state of North Dakota agency, \$120,000 and \$54,520 in fiscal years 2024 and 2023, respectively.

NOTE 18 | HEDGING DERIVATIVE INSTRUMENTS

Fair value measurements are used to record fair value adjustments to certain assets and liabilities and to determine fair value disclosures.

Fair Value Hierarchy

In accordance with GASB Statement No. 72, assets and liabilities are grouped at fair value in three levels, based on the markets in which the assets and liabilities are traded and the reliability of assumptions used to determine fair value. These levels are:

Level 1 - Valuation is based upon quoted prices in active markets for identical assets or liabilities that the reporting entity has the ability to access at the measurement date.

Level 2 – Valuation is based upon quoted prices for similar assets or liabilities in active markets, quoted prices for identical or similar assets or liabilities in markets that are not active, and model-based valuation techniques for which all significant assumptions are observable in the market.

Level 3 – Valuation is generated from model-based techniques that use significant assumptions not observable in the market. These unobservable assumptions reflect our own estimates of assumptions that market participants would use in pricing the asset or liability. Valuation techniques include use of option pricing models, discounted cash flow models and similar techniques.

Determination of Fair Value

In accordance with GASB Statement No. 72, fair values are based on the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. It is the Mill's policy to maximize the use of observable inputs and minimize the use of unobservable inputs when developing fair value measurement in accordance with the fair value hierarchy.

The following is a description of valuation methodologies used for liabilities recorded at fair value.

Hedging Derivative Instruments

Fair values of the grain future contracts are determined on the Minneapolis Grain Exchange.

Assets and Liabilities Recorded at Fair Value on a Recurring Basis

The balances of assets and liabilities measured at fair value on a recurring basis at June 30, 2024 and 2023 are as follows:

	2024			
	Total	Quoted Prices in Active Markets	Significant Other Observable Inputs	Significant Unobservable Inputs
		Level 1	Level 2	Level 3
Liabilities				
Hedging Derivative Instruments	\$ 2,636,375	\$ 2,636,375		
Total	\$ 2,636,375	\$ 2,636,375		
	2023			
	Total	Quoted Prices in Active Markets	Significant Other Observable Inputs	Significant Unobservable Inputs
		Level 1	Level 2	Level 3
Liabilities				
Hedging Derivative Instruments	\$ 148,375	\$ 148,375		
Total	\$ 148,375	\$ 148,375		

The fair values balances and notional amount of hedging derivative instruments outstanding at June 30, 2024 and the changes in fair values of such hedging derivative instruments for the year then ended as reported in the 2024 financial statements are \$2,636,375, classified as Hedging Derivative Instruments (one contract equals 5000 bushels) and \$2,636,375, classified as Deferred Outflows of Resources – Accumulated decrease in fair value of hedging derivative instruments.

The fair values balances and notional amount of hedging derivative instruments outstanding at June 30, 2023 and the changes in fair values of such hedging derivative instruments for the year then ended as reported in the 2023 financial statements are \$148,375, classified as Hedging Derivative Instruments (one contract equals 5000 bushels) and \$148,375, classified as Deferred Outflows of Resources – Accumulated decrease in fair value of hedging derivative instruments.

The fair value of the grain futures contracts was determined on the Minneapolis Grain Exchange. The daily limit for any trade days margin requirement is \$.60 per bushel, unless two or more wheat futures contract months within a crop year close at limit bid or limit offer, then the limit will increase by 50% per bushel the next business day. Daily price limits will revert back to \$.60 per bushel the business day after which no wheat futures contract month closes at the expanded limit bid or limit offer.

The Mill has entered into futures contracts for spring wheat to lock in a price for a future delivery or settlement period. These contracts are entered into to protect the Mill against price fluctuations of the commodity. The price protection is needed to cover any long or short positions compared to flour sales. The tables below show the cost and market values of these spring wheat futures at June 30, 2024 and 2023:

2024						
Month	# Contracts Long/(Short)	Average Cost	Quoted Prices in		Cost	Market Value
			Active Mkts			
Sept. 24	219	6.3746	6.1300	\$	7,201,163	\$ 6,712,350
Dec. 24	656	6.8753	6.3250		22,497,388	20,746,000
March 25	177	6.8803	6.4925		6,089,088	5,745,863
May 25	73	6.7316	6.5950		2,457,038	2,407,175
July 25	21	6.7451	6.6775		708,238	701,138
Sept. 25	12	6.5506	6.6175		393,038	397,050
					<u>\$ 39,345,953</u>	<u>\$ 36,709,576</u>

2023						
Month	# Contracts Long/(Short)	Average Cost	Quoted Prices in		Cost	Market Value
			Active Mkts			
Sept. 23	617	8.3344	8.1700	\$	25,661,225	\$ 25,204,450
Dec. 23	594	8.1983	8.2650		24,332,075	24,547,050
March 24	56	8.1068	8.3450		2,273,850	2,336,600
May 24	34	8.1904	8.3450		1,394,263	1,418,650
Sept. 24	20	7.7576	7.7800		775,763	778,000
Dec. 24	9	7.6800	7.7700		345,600	349,650
					<u>\$ 54,782,776</u>	<u>\$ 54,634,400</u>

The Mill is exposed to credit risk on hedging derivative instruments that are in asset positions. All grain futures trades are completed using two different national brokerage firms on the Minneapolis Grain Exchange. ADM Investor Services is rated A by the Standard & Poor's Rating Service. RJ O'Brien is a privately held business and is not rated by the Standard & Poor's Rating Service.

The Mill is exposed to rollover risk on grain futures trades whenever the hedge ratio (defined in aggregate of the size across all futures months relative to the underlying net cash position) does not equal 1.0. On June 30, 2024 and 2023, the tables below show the hedge ratio by futures month going forward:

June 30, 2024		June 30, 2023	
Period	Hedge Ratio	Period	Hedge Ratio
September 2024	1.0	September 2023	1.1
December 2024	1.0	December 2023	1.0
March 2025	1.0	March 2024	1.1
May 2025	1.0	May 2024	1.0
July 2025	1.0	September 2024	1.0
September 2025	1.0	December 2024	1.0
Net Position	1.0	Net Position	1.0

NOTE 19 | RISK MANAGEMENT

The Mill is exposed to various risks of loss related to torts; theft of, damage to and destruction of assets; errors and omissions; and natural disasters for which the Mill carries liability insurance and property insurance through the state's Risk Management Fund (RMF) and commercial insurance, respectively.

The 1995 Legislative Session established the RMF, an internal service fund, to provide a self-insurance vehicle for funding the liability exposures of state agencies resulting from the elimination of the state's sovereign immunity. The RMF manages the tort liability of the state, its agencies, and employees. All state agencies participate in the RMF and each fund's contribution was determined using a projected cost allocation approach. The statutory liability of the state is limited to a total of \$437,500 per person and \$1,750,000 per occurrence.

The Mill participated in North Dakota Workforce Safety and Insurance (WSI), an enterprise fund of the state of North Dakota. The WSI is a state insurance fund and a 'no fault' insurance system covering the state's employers and employees financed by premiums assessed to employers. The premiums are available for the payment of claims to employees injured in the course of employment.

The Mill participates in the State Bonding Fund which currently provides blanket fidelity bond coverage in the amount of \$2,000,000 for its employees. The State Bonding Fund does not currently charge any premium for this coverage.

There have been no significant reductions in insurance coverage from the prior years and settled claims resulting from these risks have not exceeded insurance coverage in any of the past three years.

NOTE 20 | COMMITMENTS AND CONTINGENCIES

At June 30, 2024 and 2023, the Mill had committed to purchase 5,312,881 and 3,284,556 bushels of spring wheat, respectively, and 1,148,896 and 1,030,798 bushels of durum, respectively.

In addition, at June 30, 2024 and 2023, construction commitments totaled \$28,172,834 and \$46,129,454, respectively, amounts authorized totaled \$67,470,000 and \$63,245,000, respectively,

and amounts expended/construction in progress totaled \$39,297,168 and \$17,115,545, respectively.

REQUIRED SUPPLEMENTARY INFORMATION
Schedule of Employer's Share of Net Pension Liability
ND Public Employees Retirement System
Last 10 Fiscal Years*

	Employer's proportion of the net pension liability (asset)	Employer's proportionate share of the net pension liability (asset)	Employer's covered-employee payroll	Employer's proportionate share of the net pension liability (asset) as a percentage of its covered-employee payroll	Plan fiduciary net position as a percentage of the total pension liability
2024	0.807462%	\$15,569,905	\$9,874,211	157.68%	65.31%
2023	0.838493%	\$24,149,157	\$9,733,537	248.10%	54.47%
2022	0.813052%	\$8,474,445	\$9,206,923	92.04%	78.26%
2021	0.820307%	\$25,807,034	\$9,048,978	285.19%	48.91%
2020	0.842955%	\$9,880,043	\$8,768,169	112.68%	71.66%
2019	0.832005%	\$14,040,992	\$8,547,332	164.27%	62.80%
2018	0.749966%	\$12,054,415	\$7,655,981	157.45%	61.98%
2017	0.836299%	\$8,150,549	\$8,427,920	96.71%	70.45%
2016	0.867931%	\$5,901,783	\$7,732,208	76.33%	77.15%
2015	0.817003%	\$5,185,693	\$6,882,262	75.35%	77.70%

*Complete data for this schedule is not available prior to 2015. The amounts presented for each fiscal year have a measurement date of the previous fiscal year end.

Schedule of Employer Contributions
ND Public Employees Retirement System
Last 10 Fiscal Years*

	Statutorily required contribution	Contributions in relation to the statutorily required contribution	Contribution deficiency (excess)	Employer's covered-employee payroll	Contributions as a percentage of covered-employee payroll
2024	\$1,077,020	(\$1,077,020)	\$0	\$10,425,039	10.33%
2023	\$957,137	(\$957,137)	\$0	\$9,874,211	9.69%
2022	\$916,749	(\$916,749)	\$0	\$9,733,537	9.42%
2021	\$811,839	(\$811,839)	\$0	\$9,206,923	8.82%
2020	\$772,196	(\$772,196)	\$0	\$9,048,978	8.53%
2019	\$796,459	(\$796,459)	\$0	\$8,768,169	9.08%
2018	\$708,182	(\$708,182)	\$0	\$8,547,332	8.29%
2017	\$642,553	(\$642,553)	\$0	\$7,655,981	8.39%
2016	\$630,801	(\$630,801)	\$0	\$8,427,920	7.48%
2015	\$573,685	(\$573,685)	\$0	\$7,732,208	7.42%

*Complete data for this schedule is not available prior to 2015.

Notes to Required Supplementary Information
For the Year Ended June 30, 2024

Changes of benefit terms.

In 2023, House Bill 1040 was passed, which closes the Main System to employees newly enrolled into the system on January 1, 2025 and later. The state employer contribution for 2026 and later was changed to be the amount sufficient to fund the Main System on actuarial basis, with the amortization of the unfunded liability determined on a level percent of payroll basis over a closed period beginning on January 1, 2026 and ending June 30, 2056.

Changes of assumptions.

All actuarial assumptions used in the actuarial valuation as of July 1, 2022 were based on an experience review for the period from July 1, 2014 to July 1, 2019, and were adopted for first use commencing with the actuarial valuation as of July 1, 2020. There have been no changes in actuarial assumptions since the previous actuarial valuation as of July 1, 2022.

Schedule of Employer's Share of Net OPEB Liability
ND Public Employees Retirement System
Last 10 Fiscal Years*

	Employer's proportion of the net OPEB liability (asset)	Employer's proportionate share of the net OPEB liability (asset)	Employer's covered-employee payroll	Employer's proportionate share of the net OPEB liability (asset) as a percentage of its covered-employee payroll	Plan fiduciary net position as a percentage of the total OPEB liability
2024	0.744799%	\$744,614	\$7,486,594	9.95%	62.74%
2023	0.783110%	\$939,974	\$8,084,872	11.63%	56.28%
2022	0.769127%	\$427,768	\$8,385,470	5.10%	76.63%
2021	0.776550%	\$653,232	\$8,852,437	7.38%	63.38%
2020	0.785778%	\$631,127	\$8,768,169	7.20%	63.13%
2019	0.781137%	\$615,199	\$8,547,332	7.20%	61.89%
2018	0.707681%	\$559,783	\$7,655,981	7.31%	59.78%

*Complete data for this schedule is not available prior to 2018. The amounts presented for each fiscal year have a measurement date of the previous fiscal year end.

**Schedule of Employer Contributions
ND Public Employees Retirement System
Last 10 Fiscal Years***

	Statutorily required contribution	Contributions in relation to the statutorily required contribution	Contribution deficiency (excess)	Employer's covered-employee payroll	Contributions as a percentage of covered-employee payroll
2024	\$112,039	(\$112,039)	\$0	\$10,425,039	1.07%
2023	\$116,743	(\$116,743)	\$0	\$7,486,594	1.56%
2022	\$124,973	(\$124,973)	\$0	\$8,084,872	1.55%
2021	\$122,209	(\$122,209)	\$0	\$8,385,470	1.46%
2020	\$123,089	(\$123,089)	\$0	\$8,852,437	1.39%
2019	\$127,521	(\$127,521)	\$0	\$8,768,169	1.45%
2018	\$113,390	(\$113,390)	\$0	\$8,547,332	1.33%

*Complete data for this schedule is not available prior to 2018.

Notes to Required Supplementary Information
For the Year Ended June 30, 2023

Changes of benefit terms.

Beginning January 1, 2020, members first enrolled in the NDPERS Main System and the Defined Contribution Plan on or after that date will not be eligible to participate in RHIC. Therefore, RHIC will become for the most part a closed plan. There have been no other changes in plan provisions since the previous actuarial valuation as of July 1, 2022.

Changes of assumptions.

All actuarial assumptions used in the actuarial valuation as of July 1, 2022 were based on an experience review for the period from July 1, 2014 to July 1, 2019, and were adopted for first use commencing with the actuarial valuation as of July 1, 2020. There have been no changes in actuarial assumptions since the previous actuarial valuation as of July 1, 2022.

SUPPLEMENTARY INFORMATION
Schedule of Appropriations
For the Year Ended June 30, 2024

OBJECT	2023-2025	2024	Balance June 30, 2024
	Final Appropriation	Expenses/ Transfers	
Salaries and wages	\$ 53,850,380	\$ 24,705,835	\$ 29,144,545
Operating expenses	42,391,653	17,137,440	25,254,213
Agriculture promotion	500,000	17,880	482,120
Contingency	500,000		500,000
TOTAL	\$ 97,242,033	\$ 41,861,155	\$ 55,380,878
SOURCE			
Special fund authority	\$ 97,242,033	\$ 41,861,155	\$ 55,380,878
TOTAL	\$ 97,242,033	\$ 41,861,155	\$ 55,380,878

2021-2023 Appropriation amounts come directly from the North Dakota Session Laws, Chapter 42, Senate Bill 2014

The following is a reconciliation of the GAAP expenses from the Statement of Revenues, Expenses, and Changes in Net Position to the Schedule of Appropriations:

Total operating expenses	2024
	\$ 384,912,932
Adjustments:	
Material cost	(334,686,222)
Depreciation	(8,136,823)
Change in compensated absences	(93,914)
Pension expense	(328,958)
OPEB expense	(59,302)
Demurrage	235,562
Agriculture promotion	17,880
Expenses per schedule of appropriations	<u>\$ 41,861,155</u>



NORTH DAKOTA OFFICE OF THE STATE AUDITOR

Fargo Office
1655 S. 43rd St., Ste. 203
Fargo, ND 58103

www.nd.gov/auditor

ndsao@nd.gov

**Report on Internal Control Over Financial Reporting and on Compliance and
Other Matters Based on an Audit of Financial Statements Performed in Accordance
With Government Auditing Standards**

Independent Auditor's Report

Members of the Legislative Assembly

Industrial Commission

Vance Taylor, President and CEO, North Dakota Mill and Elevator Association

We have audited, in accordance with auditing standards generally accepted in the United States of America and the standards applicable to financial audits contained in *Government Auditing Standards* issued by the Comptroller General of the United States, the financial statements of business-type activities of the North Dakota Mill and Elevator Association, as of and for the year ended June 30, 2024, and the related notes to the financial statements, which collectively comprise the North Dakota Mill and Elevator Association's basic financial statements, and have issued our report thereon dated November 14, 2024.

Report on Internal Control Over Financial Reporting

In planning and performing our audit of the financial statements, we considered North Dakota Mill and Elevator Association's internal control over financial reporting (internal control) as a basis for designing audit procedures that are appropriate in the circumstances for the purpose of expressing our opinion on the financial statements, but not for the purpose of expressing an opinion on the effectiveness of the North Dakota Mill and Elevator Association's internal control. Accordingly, we do not express an opinion on the effectiveness of the North Dakota Mill and Elevator's Association's internal control.

A deficiency in internal control exists when the design or operation of a control does not allow management or employees, in the normal course of performing their assigned functions, to prevent, or detect and correct, misstatements on a timely basis. *A material weakness* is a deficiency, or a combination of deficiencies, in internal control, such that there is a reasonable possibility that a material misstatement of the entity's financial statements will not be prevented, or detected and corrected on a timely basis. *A significant deficiency* is a deficiency, or a combination of deficiencies,

in internal control that is less severe than a material weakness, yet important enough to merit attention by those charged with governance.

Our consideration of internal control was for the limited purpose described in the first paragraph of this section and was not designed to identify all deficiencies in internal control that might be material weaknesses or significant deficiencies. Given these limitations, during our audit we did not identify any deficiencies in internal control that we consider to be material weaknesses. However, material weaknesses or significant deficiencies may exist that have not been identified.

Report on Compliance and Other Matters

As part of obtaining reasonable assurance about whether the North Dakota Mill and Elevator Association's financial statements are free of material misstatement, we performed tests of its compliance with certain provisions of laws, regulations, contracts, and grant agreements, noncompliance with which could have a direct and material effect on the financial statements. However, providing an opinion on compliance with those provisions was not an objective of our audit, and accordingly, we do not express such an opinion. The results of our tests disclosed no instances of noncompliance or other matters that are required to be reported under *Government Auditing Standards*.

Purpose of this Report

The purpose of this report is solely to describe the scope of our testing of internal control and compliance and the results of that testing, and not to provide an opinion on the effectiveness of the North Dakota Mill and Elevator's internal control or on compliance. This report is an integral part of an audit performed in accordance with Government Auditing Standards in considering the entity's internal control and compliance. Accordingly, this communication is not suitable for any other purpose.

/S/

Joshua C. Gallion
State Auditor
Bismarck, ND
November 14, 2024



NORTH DAKOTA OFFICE OF THE STATE AUDITOR

Fargo Office
1655 S. 43rd St., Ste. 203
Fargo, ND 58103

www.nd.gov/auditor

ndsao@nd.gov

Governance Communication

November 14, 2024

Industrial Commission

Legislative Audit and Fiscal Review Committee

We have audited the financial statements of the business-type activities, of the North Dakota Mill and Elevator Association for the years ended June 30, 2024 and 2023 and have issued our report thereon dated November 14, 2024. Professional standards require that we provide you with information about our responsibilities under generally accepted auditing standards and *Government Auditing Standards*, as well as certain information related to the planned scope and timing of our audit. We have communicated such information in our letter to you dated June 26, 2024. Professional standards also require that we communicate to you the following information related to our audit.

Significant Audit Matters

Qualitative Aspects of Accounting Practices

Management is responsible for the selection and use of appropriate accounting policies. The significant accounting policies used by the North Dakota Mill and Elevator Association are described in Note 1 to the financial statements. No new accounting policies were adopted and the application of existing policies was not changed during the fiscal years 2024 and 2023. We noted no transactions entered into by the North Dakota Mill and Elevator Association during fiscal years 2024 and 2023 for which there is a lack of authoritative guidance or consensus. All significant transactions have been recognized in the financial statements in the proper period.

Accounting estimates are an integral part of the financial statements prepared by management and are based on the management's knowledge and experience about past and current events and assumptions about future events. Certain accounting estimates are particularly sensitive because of their significance to the financial statements and because of the possibility that that future events affecting them may differ significantly from those expected. The most sensitive estimates affecting the North Dakota Mill and Elevator Association's financial statements were:

- Useful lives of capital assets
- Allowance for uncollectible receivables
- Net pension and OPEB liabilities

Management's estimate of the useful lives, as described in Note 1, is used to compute depreciation on capital assets. Management's estimate of allowance for uncollectible receivables is based on aging categories, past history, and an analysis of the collectability of individual accounts. Management's estimate of the net pension liability and net OPEB liability is based on an actuary's calculation in accordance with the employment contracts. We evaluated the key factors and assumptions used to develop the useful lives, allowances, net pension liability, and net OPEB liability in determining that they are reasonable in relation to the financial statements taken as a whole.

Difficulties Encountered in Performing the Audit

We encountered no significant difficulties in dealing with management in performing and completing our audit.

Corrected and Uncorrected Misstatements

Professional standards require us to accumulate all known and likely misstatements identified during the audit, other than those that are trivial, and communicate them to the appropriate level of management. No known or likely misstatements were identified during the audit.

Disagreements with Management

For purposes of this letter, a disagreement with management is a financial accounting, reporting, or auditing matter, whether or not resolved to our satisfaction, that could be significant to the financial statements or the auditor's report. We are pleased to report that no such disagreements arose during the course of our audit.

Management Representations

We have requested certain representations from management that are included in the management representation letter dated November 14, 2024.

Management Consultations with Other Independent Accountants

In some cases, management may decide to consult with other accountants about auditing and accounting matters, similar to obtaining a "second opinion" on certain situations. If a consultation involves application of an accounting principle to the North Dakota Mill and Elevator Association's financial statements or a determination of the type of auditor's opinion that may be expressed on that statement, our professional standards require the consulting accountant to check with us to determine that the consultant has all the relevant facts. To our knowledge, there were no such consultations with other accountants.

Other Audit Findings or Issues

We generally discuss a variety of matters, including the application of accounting principles and auditing standards, with management each year prior to retention as the North Dakota Mill and Elevator Association's auditors. However, these discussions occurred in the normal course of our professional relationship and our responses were not a condition to our retention.

Other Matters

We applied certain limited procedures to the Management Discussion and Analysis, Schedule of Employer's Share of Net Pension Liability, the Schedule of Employer Contributions for pensions, the Schedule of Employer's Share of Net OPEB Liability and the Schedule of Employer Contributions for OPEB which are required supplementary information (RSI) that supplements the basic financial statements. Our procedures consisted of inquiries of management regarding the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the basic financial statements, and other knowledge we obtained during our audit of the basic financial statements. We did not audit the RSI and do not express an opinion or provide any assurance on the RSI.

We were engaged to report on the Schedule of Appropriations, which accompany the financial statements but are not RSI. With respect to this supplementary information, we made certain inquiries of management and evaluated the form, content, and methods of preparing the information to determine that the information complies with accounting principles generally accepted in the United States of America, the method of preparing it has not changed from the prior period, and the information is appropriate and complete in relation to our audit of the financial statements. We compared and reconciled the supplementary information to the underlying accounting records used to prepare the financial statements or to the financial statements themselves.

Restriction on Use

This information is intended solely for the use of Legislative Audit and Fiscal Review Committee, the Industrial Commission, and management of the North Dakota Mill and Elevator Association is not intended to be, and should not be used by anyone other than these specified parties.

Very truly yours,



Robyn Hoffmann, CPA
Audit Manager



Office of the
State Auditor

NORTH DAKOTA STATE AUDITOR
JOSHUA C. GALLION

NORTH DAKOTA STATE AUDITOR'S OFFICE

600 E. Boulevard Ave. Dept. 117 | Bismarck, North Dakota 58505

 [ND.gov/Auditor](https://nd.gov/Auditor)

 NDSAO@nd.gov

 701-328-2241

 Facebook.com/NDStateAuditor

 Linkedin.com/company/NDStateAuditor



North Dakota Mill
Review of Operations
1st Quarter Ended 9/30/24

Summary

The Mill experienced a profit of \$5,123,603 in the first quarter compared to a profit of \$5,546,849 last year.

	<u>9/24</u>	<u>9/23</u>
Profits	\$5,123,603	\$5,546,849
Sales	118,548,084	127,888,159
Cwt. Shipped		
Spring	4,208,482	3,898,539
% to Total	92.2%	91.7%
Durum/Blends	<u>356,402</u>	<u>354,464</u>
Total	<u>4,564,884</u>	<u>4,253,003</u>
Bulk Shipments	3,822,117	3,580,141
% to Total	83.7%	84.2%
Bag Shipments	696,699	626,629
% to Total	15.3%	14.7%
Tote Shipments	43,068	46,233
% to total	1.0%	1.1%
Family Flour Shipments	143,582	128,204
% to Total	3.1%	3.0%
Organic Flour	36,104	24,539
% to Total	.8%	.6%

Wheat/Durum		
Bought:		
Spring / Winter	8,688,078	8,488,775
Durum	<u>946,474</u>	<u>829,254</u>
Total	<u>9,634,552</u>	<u>9,318,029</u>

Sales

Sales for the first quarter were \$118,548,084 compared to \$127,888,159 last year, a decrease of 7.3%. The price of grain settled with suppliers at the mill for the first quarter of the year is \$1.76 per bushel lower than last year. Shipments of 4,564,884 cwts. in the first quarter are 311,881 cwts., above last year. Bag shipments of 699,699 cwts. are 11.2% above last year. Family flour shipments were 143,582 cwts., an increase of 15,379 cwts., from last year's first quarter shipments of 128,204 cwts. Organic flour shipments were 36,104 cwts., an increase of 11,565 cwts. from last year.

Operating Costs

Operating costs for the first quarter were \$12,707,708 compared to \$11,641,871 last year, an increase of 9.2%. Total flour production for the first quarter was 6.0% above last year's first quarter. Operating cost per cwt. of production was \$2.82 per cwt., compared to \$2.74 last year, an increase of 2.9%

Profits

The mill had profits of \$ 5,123,603 in the first quarter compared to \$5,546,849 in the last year. This is a decrease of 7.6%. Gross margins as a percent of gross sales for the quarter were 16.0% compared to 14.4% last year.

Risk Management Position

The table below shows our hedge ratio by futures month going forward. As the table indicates the mill continues to be closely matched in the overall net positions with some slight variations in monthly positions.

Position Report 30-Sept-24

Period	Hedge Ratio
Dec-24	1.0
Mar-25	1.1
May-25	1.0
July-25	1.1
Sept-25	.9
Dec-25	1.0
Net Position	1.0



North Dakota Mill

Quarterly Income Statement Summary

For the Three Months Ending Monday, September 30, 2024

	1st Qtr			Fiscal Year 2025	Fiscal Year 2024	Change
	Sep 2024	Sep 2023	Change			
GROSS SALES	\$118,548,084	\$127,888,159	(\$9,340,074)	\$118,548,084	\$127,888,159	(\$9,340,074)
SALES DEDUCTIONS	(23,209,772)	(21,659,603)	(1,550,169)	(23,209,772)	(21,659,603)	(1,550,169)
NET SALES	\$95,338,312	\$106,228,556	(\$10,890,244)	\$95,338,312	\$106,228,556	(\$10,890,244)
COGS	(\$76,333,505)	(\$87,774,152)	\$11,440,647	(\$76,333,505)	(\$87,774,152)	\$11,440,647
GROSS MARGIN	\$19,004,807	\$18,454,404	\$550,403	\$19,004,807	\$18,454,404	\$550,403
Gross Margin	16.0%	14.4%	1.6%	16.0%	14.4%	1.6%
OPERATING EXPENSES						
PRODUCTION	(\$10,087,358)	(\$9,170,896)	(\$916,462)	(\$10,087,358)	(\$9,170,896)	(\$916,462)
QUALITY CONTROL	(341,921)	(333,336)	(8,585)	(341,921)	(333,336)	(8,585)
MARKETING	(717,580)	(670,645)	(46,935)	(717,580)	(670,645)	(46,935)
GENERAL & ADMIN	(1,560,849)	(1,466,995)	(93,854)	(1,560,849)	(1,466,995)	(93,854)
TOTAL OPERATING EXPENSES	(\$12,707,708)	(\$11,641,871)	(\$1,065,837)	(\$12,707,708)	(\$11,641,871)	(\$1,065,837)
per cwt production	\$2.82	\$2.74	\$0.08	\$2.82	\$2.74	\$0.08
OPERATING INCOME	\$6,297,099	\$6,812,532	(\$515,434)	\$6,297,099	\$6,812,532	(\$515,434)
OTHER INCOME	\$109,688	\$149,294	(\$39,606)	\$109,688	\$149,294	(\$39,606)
OTHER EXPENSES	(1,283,183)	(1,414,977)	131,794	(1,283,183)	(1,414,977)	131,794
NET INCOME	\$5,123,603	\$5,546,849	(\$423,246)	\$5,123,603	\$5,546,849	(\$423,246)
PRODUCTION - CWTS.						
SPRING WHEAT FLOUR	4,155,233	3,874,231	281,002	4,155,233	3,874,231	281,002
% to total	92.2%	91.1%	1.1%	92.2%	91.1%	1.1%
DURUM FLOUR/SEMO	353,250	379,013	(25,763)	353,250	379,013	(25,763)
% to total	7.8%	8.9%	(1.1%)	7.8%	8.9%	(1.1%)
TOTAL CWTS.	4,508,483	4,253,244	255,239	4,508,483	4,253,244	255,239
SALES - CWTS.						
SPRING WHEAT	4,208,482	3,898,539	309,943	4,208,482	3,898,539	309,943
% to total	92.2%	91.7%	0.5%	92.2%	91.7%	0.5%
DURUM & BLENDS	356,402	354,464	1,937	356,402	354,464	1,937
% to total	7.8%	8.3%	(0.5%)	7.8%	8.3%	(0.5%)
TOTAL CWTS.	4,564,884	4,253,003	311,881	4,564,884	4,253,003	311,881
BY-PRODUCTS	67,776	64,381	3,394	67,776	64,381	3,394
Price per ton	\$90.32	\$152.96	-\$62.64	\$90.32	\$152.96	-\$62.64



MEMORANDUM

TO: North Dakota Industrial Commission

FROM: Vance Taylor and Cathy Dub

DATE: October 17, 2024

RE: Budget Request 2025-2027 Biennium

The North Dakota Mill (NDM) has grown over the past twenty-four (24) years. We have increased shipments of flour from six million cwts. to over sixteen million cwts. Profits have grown from less than \$2 million in FY 2000 to over \$20.8 million in FY 2024. Over the past five years, profits have averaged \$15.5 million. Transfers to the General Fund have also increased as profits increased.

During this same period, our efficiencies have also increased due to the investments made in the mill and finding and retaining qualified people to work at the mill. The cwts shipped per FTE per year have increased from just over 50,000 cwts to 100,000 cwts per FTE. The investment in infrastructure and people has proven to be successful.

In 2022, NDM completed the H, I and D-Mill conversion that increased production capacity by 22% with a cost of \$24.5M. We are currently working on a Midds Storage and Handling facility project that will allow NDM to have additional by-product storage, reducing downtime and allowing additional revenue streams from specialty by-product sales. The total project cost is estimated at \$56M. Over the past six (6) fiscal years we have spent over \$115M on capital improvements with an additional \$37.9M still in progress. With the large amount of cash expended on capital projects, NDM would like to request a reduced transfer percentage to the General Fund. A 25% transfer rate would allow us to continue investing in growth and efficiencies as well as pay down some of our debt, allowing us to reduce our interest costs as rates remain elevated.

NDM's union contract expires June 30, 2025. NDM will negotiate a new contract with the union in the spring of 2025. As we have not started negotiations and are not certain of the wage increase that will be agreed upon, we have used increases of 4.0% for each year of the new biennium for salary and wage increases.

It would be in NDM's best interest to have the flexibility to hire employees as needed and not be legislatively mandated to a certain number of FTE's. This would allow us to change departments from 3-shift to 4-shift operations as we see the need to move in that direction. NDM would also request to be removed from the FTE Funding Pool this biennium. NDM operates as a for profit business and continues to manage employees in a manner that will allow for maximum profit potential.

The budgeting process began with the appropriations amount from the 2023-25 budget cycle and a 3% reduction of costs (\$3,046,351). We would not be able to achieve satisfactory results with these budget limits. All expenditures incurred are paid for with the revenues generated by the North Dakota Mill. No General Fund dollars are expended by the North Dakota Mill. It is necessary for us to have room within our budget to continue the growth NDM has experienced in order to achieve the profitability levels and make the General Fund and APUF transfers that are expected of the mill.

We developed the following budget assumptions based on our intent to continue to grow the business over time. In FY 2024, we had production of 17.57M cwts. and sales reached 17.52M cwts. We anticipate we will reach over 19.5M cwts. per year in sales within the 2025-2027 biennium. We evaluated the new biennium budget based on the current biennium budget and the first-year expenses as well as considering the current economic environment with continued inflationary pressure. We adjusted line-item operating expenses where needed to allow us to continue to meet our operating needs.

1. Salaries. We have added 4.0% wage increases for all employees for the upcoming biennium. We have budgeted to allow for overtime and shift differential to run our plant to full capacity (24/7) operation. In addition, we are requesting two (2) positions for the next biennium.

The two (2) requested positions are for car checkers. These positions move, clean, and load railcars and trucks with flour to ship to customers. With additional capacity we need more employees to complete the cleaning of vessels and the loading of flour. These two positions would bring the 2nd shift load out and the 3rd shift load out to five person crews to maximize efficiencies. These positions added \$359,984 to the salary and benefits expense.

2. Miscellaneous Supplies. The number of supplies we need to purchase has increased with the capacity of the mills. We have increased this item for the rise in supplies needed and inflation.
3. Utilities. Energy costs from NoDak Electric continue to increase. We expect that there will be more control periods that we will need to operate through resulting in a much higher demand charge.
4. Insurance. Property insurance rates have begun to stabilize; however, food safety issues as well as the increase in buildings and equipment from the expansion will drive up the cost of our property and liability insurance. The cost of property insurance is expected to increase with all the natural disasters occurring in the world today.
5. Operating Fees and Services. This item includes the cost of fumigations and heat treatment to eliminate insects as well as various other services used in the plant. The cost of fumigations and general services continue to rise.
6. IT Contractual Services and Repairs. Technology improvements and upgrades continue to be a major area of capturing efficiency. As more technology becomes web-based our costs will increase.
7. Professional Development and Professional Services. Professional development contains dues for various organizations. The dues for North American Millers Association (NAMA) are volume based.
8. Miscellaneous Expenses. We increased our miscellaneous expense category in response to the inflation we are experiencing as well as the additional capacity added.

Our budget request represents an overall increase of 6.4% over our last biennium budget.

November 26, 2024

To: North Dakota Industrial Commission

From: David Flohr, Executive Director

RE: Multifamily Application Award Summary for Low Income Housing Tax Credit, HOME Investment Partnership Program, National Housing Trust Fund, and Housing Incentive Fund

North Dakota Housing Finance Agency (NDHFA) held a multifamily rental production and rehabilitation application round to allocate funds available through the Federal Low Income Housing Tax Credit (LIHTC), HOME Investment Partnerships (HOME), National Housing Trust Fund (HTF) and the state Housing Incentive Fund (HIF). The application deadline was Sept. 30, 2024.

Seventeen applications were received, and one forward commitment of \$345,500 credits was in place. Including the forward commitment, the application round was oversubscribed by a combined \$36.7 million. Scoring and ranking was completed in November. Seven projects (including the forward commitment) were selected for funding. Detailed summaries of the successful projects are provided below. A listing of all the applications received is provided as an attachment.

BACKGROUND: FUNDING AVAILABILITY

Low Income Housing Tax Credit (LIHTC)

The LIHTC program was created with the passage of the Tax Reform Act of 1986 and made permanent in 1993. LIHTC gives investors a dollar-for-dollar reduction in their federal tax liability in exchange for providing financing for affordable rental housing. Annually the IRS establishes a per capita rate and a small state minimum volume cap for which states receive their credit allocation. North Dakota receives the small state minimum and forward allocates credits. A total of \$3,455,000 credits were available, and requests received totaled \$13,059,018 (\$9.6 million oversubscribed).

HOME Investment Partnership Program (HOME)

The HOME program is funded by HUD and is provided to states as formula grants to provide a wide range of activities including building, buying, and/or rehabilitating affordable housing for rent or homeownership or providing direct rental assistance to low-income households. HOME is the largest federal block grant available to state and local governments and is designed exclusively to create affordable housing for low-income households. North Dakota receives the small state minimum of \$3 million. A total of \$2,019,030.89 was made available for multifamily rental production and rehabilitation. Requests received totaled \$11.1 million. (\$9.1 million oversubscribed)

National Housing Trust Fund (HTF)

Created through the Housing and Economic Recovery Act of 2008 and first funded in 2016 through a directed set aside from a percentage of new mortgage purchases made by Fannie Mae and Freddie Mac. North Dakota receives the small state minimum which averages \$3 million. 100 percent of the fund must be used to create units targeted for 30 percent area median incomes. A total of \$3,048,816 was made available and a total of \$12.7 million in requests were received. (\$9.7 million oversubscribed)

Housing Incentive Fund (HIF)

Authorized by the 68th Legislative Assembly as a general fund appropriation for \$13.75 million, removed requirement that 10 percent of the fund be set-aside to prevent homelessness, and added single family projects in a developing community or for a community land trust project. A total of \$4.6 million was available for this application round. A total of eight applications were received requesting \$12.8 million. (\$8.2 oversubscribed)

SUCCESSFUL APPLICATION SUMMARY

Riverside Cottages Phase 2 (FKA The Gardenette Phase 2) (Forward Commitment)



Project Location: Multiple Buildings: Gardenette Drive, Jamestown

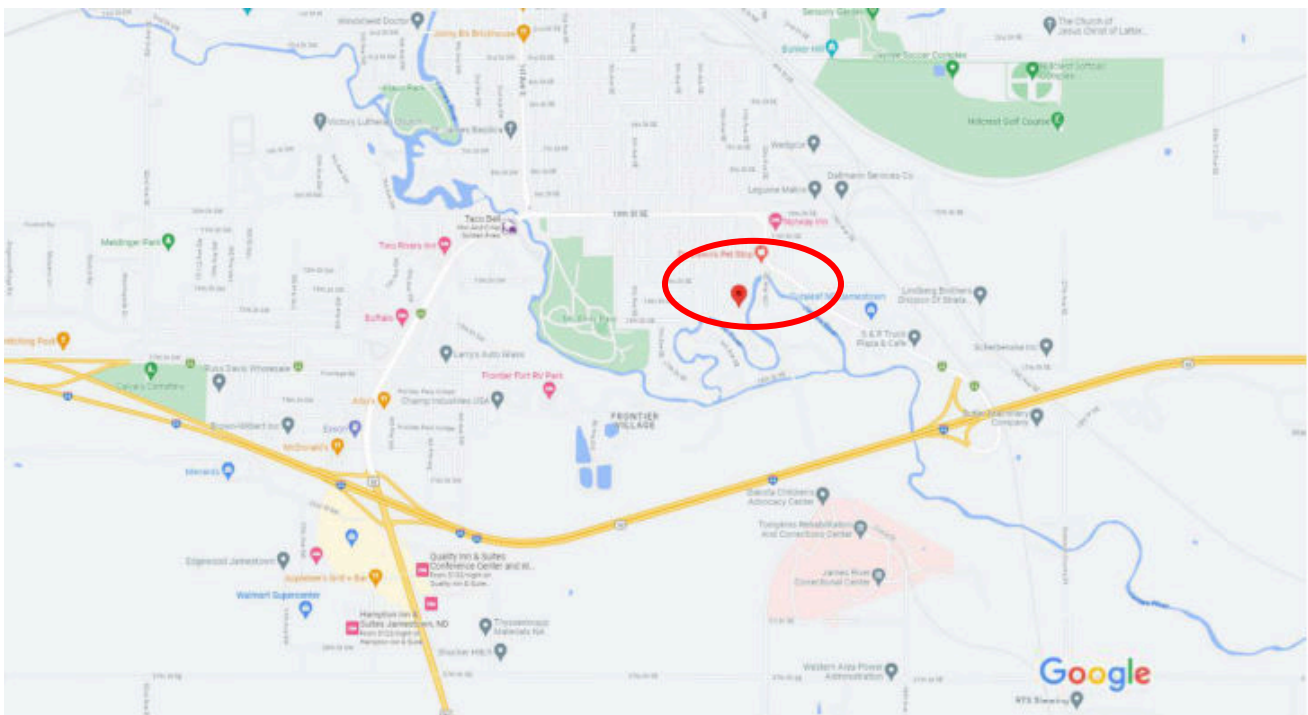
The Riverside Cottages is a multiphase acquisition rehab project acquiring and rehabbing an existing 168-unit development. The development is currently comprised of 42 single-story, slab-on-grade fourplexes. All existing 168 units are one bedroom. When construction is complete the rehabilitated development will host a mix of unit sizes to accommodate the variety of household sizes.

The project is divided into phases to maximize funding sources. Each phase is a separate application and must compete on its own. In phase 1, A total of 40 units, 8 three-bedroom units and rehab 32 one-bedroom units. In phase 2, rehabilitation of 40 one-bedroom units. And in phase 3, 50 one-bedroom and 20 two-bedroom units to round out the entire development and ensure we're meeting the housing needs in Jamestown. In total 150 units down from 168. Total Development costs include \$13 million for phase 1, \$12.8 million phase 2, and \$22.6 million for phase 3 for a total of \$58 million.

Stride Development PBC, St. Paul, MN, is the project developer who will be partnering with Community Works ND (CWND) a non-profit partner who will be part of the final ownership entity. CWND will provide property management and will be contracting with a community service provider to provide tenant support coordination services to the residents.

All three applications were selected for funding in 2023. Phase 1 to receive \$1,100,000 of 9% LIHTCs. Phase 2 to receive \$1,082,900 of 9% LIHTCs, and phase 3 to receive \$1,032,000 of 4% LIHTCs, \$3,000,000 in HIF, and will require a tax-exempt issuance which is still to be determined. \$345,500 of the Phase 2 award was forward committed credits.

Riverside Cottages, Jamestown



Wild Rose Senior Housing



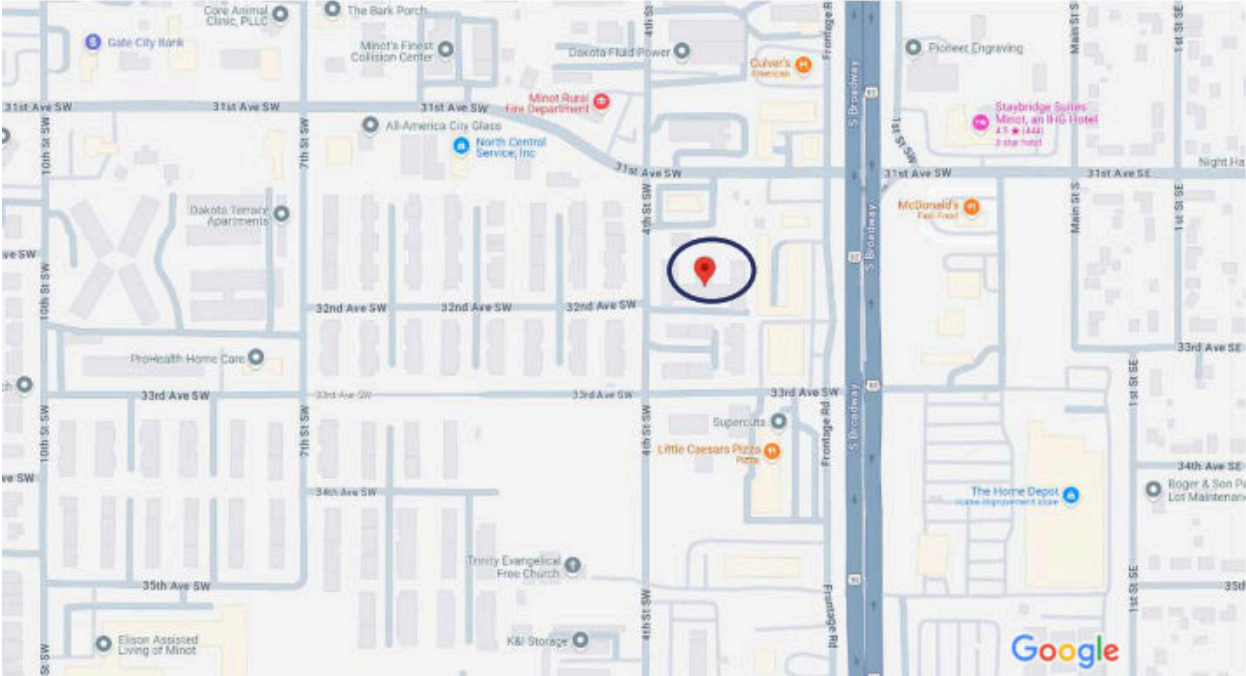
Wild Rose Senior Housing is a acquisition/rehabilitation of an existing 48-unit general occupancy project currently known as Southside Living, formally Guardian Manor. Southside living is a LIHTC project built in 1993 and will finish its original period of affordability on 12/31/2026. The project is in need of significant rehabilitation updates including

The project is optimal for conversion to senior housing as it is single-level cottage style units with community space and is located in close proximity to grocery and medical facilities.

The developer, American Covenant Senior Housing Foundation from Kalispell, MT, has experience owning and operating senior living communities that offer supportive services as needed. Total development costs of \$8.1 million of which \$3.9 million will be in hard rehabilitation costs. Completion of this project will preserve existing affordable housing for an additional 30 years.

Funding awarded includes \$300,359 4% LIHTCs, and \$2,150,000 HIF. A tax-exempt bond issuance will be required, amount TBD.

Project Location: 3204 4th Street SW, Minot ND 58701



Pleasant Valley Apartments

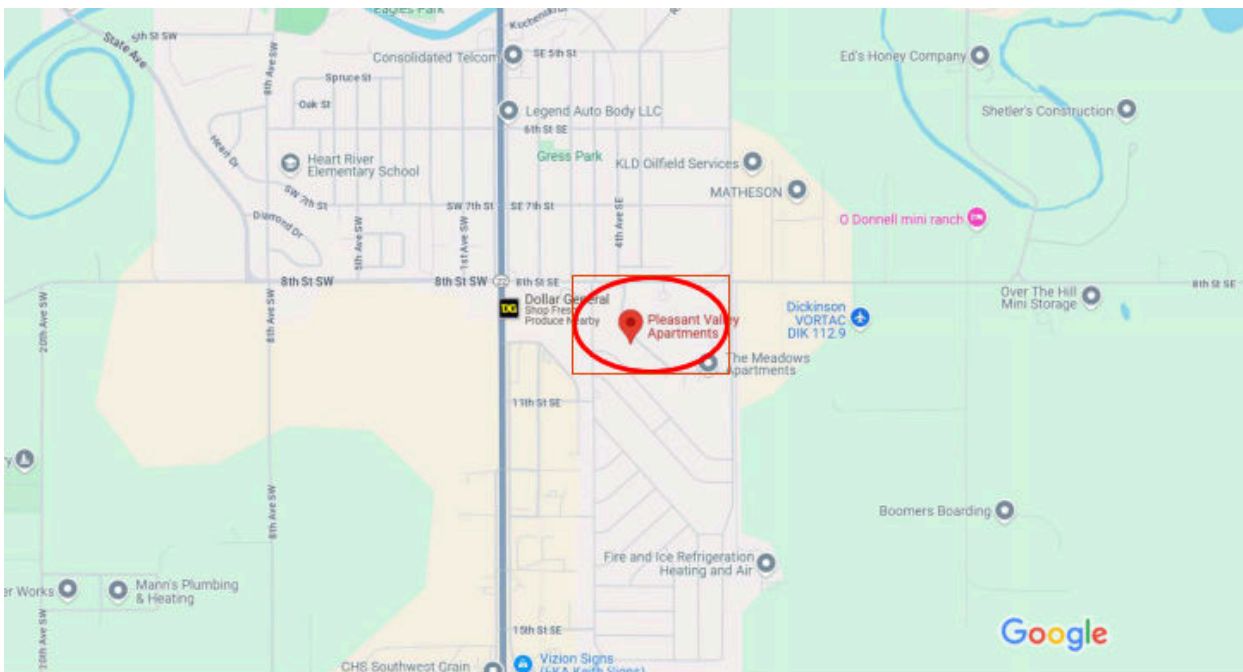


Pleasant Valley Apartments is an existing 60-unit general occupancy Section 8 project. Originally constructed between 1978 and 1981, the project has not undergone any significant renovations since built. Renovations include full kitchen, appliances, and flooring replacement, exterior upgrades, replacement of all building systems, and improvements to grounds and parking. The total development costs are estimated at \$17.2 million.

California Commercial Investment (CCI) Companies from Westlake Village, CA, will continue to own and operate the property. CCI owns and operates multiple affordable housing projects in Dickinson.

Funding awarded includes \$653,000 4% credits, \$1,258,307 HIF, and \$633,180 HOME. A tax-exempt bond issuance will be required, amount TBD.

Project Location: Multiple Buildings, Meadows Drive, Dickinson ND



Jewel City 2

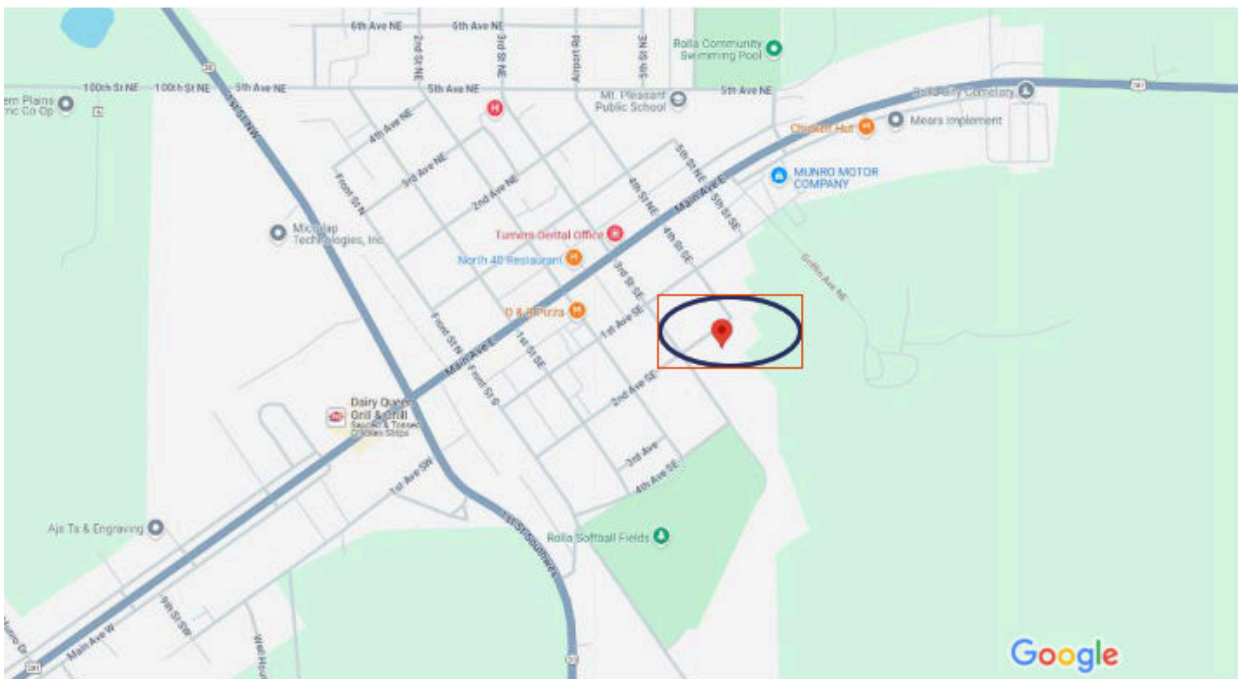


Jewel City 2 Apartments, is a 7-unit USDA Rural Development multi-family designated housing. Built in 1996, the property features all one-bedroom units with a common area laundry facility and community room. Substantial rehabilitation includes siding, roof, window, and door replacements, updating mechanical, systems and electrical systems, and interior improvements including flooring, cabinetry, appliances, bathroom fixtures, and installation of security access and systems. Total rehabilitation costs estimated at \$2.7 million. The property is currently operating and is fully occupied. Rehab work will be completed with tenants in place and utilizing Jewel City 1 for temporary relocation as needed.

Affordable Housing Developers, Inc. a non-profit developer from Dickinson owns and operate the building and is coordinating the rehabilitation.

Funding awarded includes \$975,000 HIF and \$1,385,850 HOME.

Project Location: 304 2nd Ave SE, Rolla

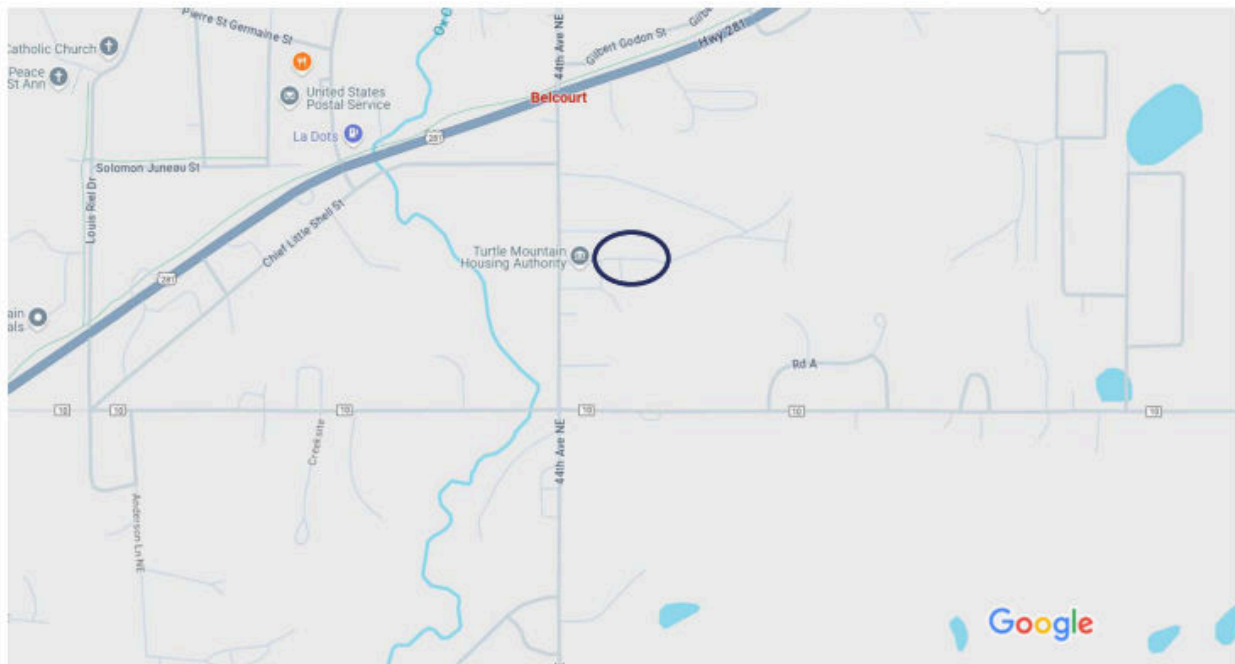


TMHA Veterans Village (additional allocation)

TMHA Veterans Village is the new construction of a 20-unit apartment complex. The project is being developed by Turtle Mountain Housing Authority who will use NAHASDA funds to subsidize rents similarly to project-based rental assistance. Tenants will pay 30 percent of their income towards rent. Initial cost estimates for the project did not adequately factor in the length of time inflationary effects coupled with lack of contracts would affect tribal construction costs. To cut costs the project transitioned from stick built to modular and other value engineering, however the total development costs still increased from the original \$5.3 million to \$11.8 million.

The application was provided with a conditional commitment of \$537,716 in 2023 9% LIHTCs and was awarded \$606,984 in additional 9% credits for a total of \$1,144,700 LIHTCs.

Project Location: Intersection of 44th Avenue NE and Belcourt Drive, Belcourt, ND



Engle Court Phase 1

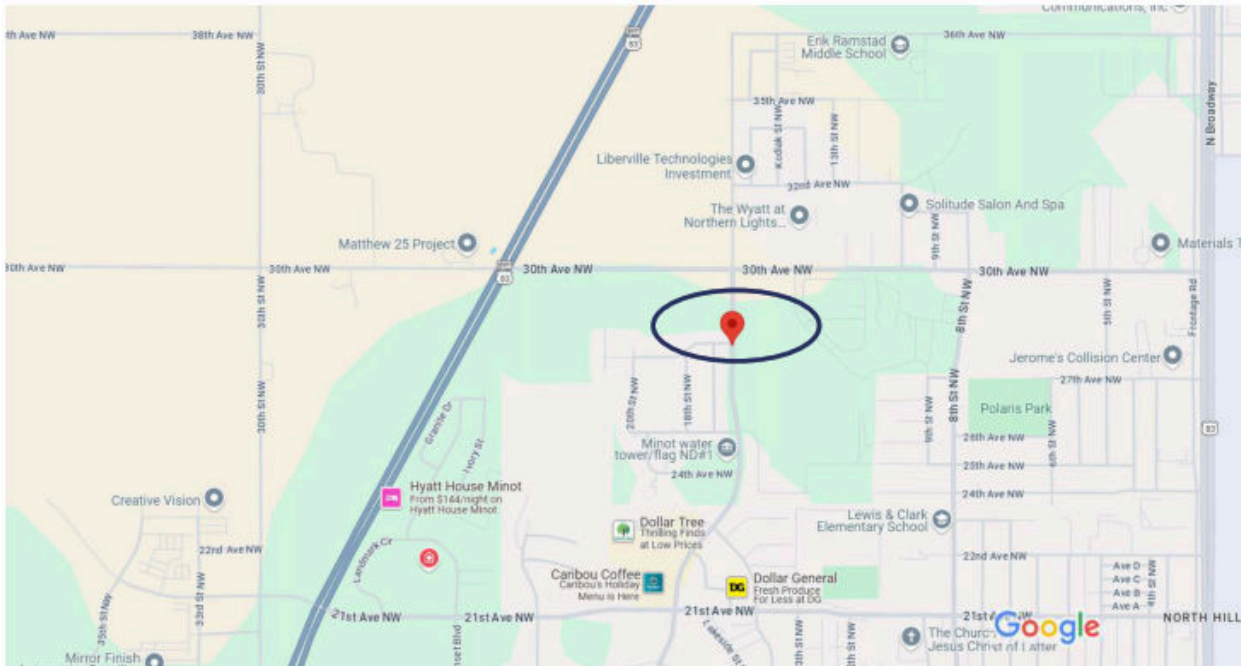


Engle Court Phase 1 is the new construction of a 36-unit general occupancy apartment and is part of Minot Housing Authority's (MHA) repositioning plan to reposition 40 single-family public housing units that are currently scattered throughout the City of Minot. MHA will sell the properties which are in need of rehabilitation and updating to single family homeowners. Any current residents of the housing units will receive relocation vouchers. The project based rental assistance from the homes will create 20 project based rental assistance units for Engle Court so individuals living in 20 of the units will pay no more than 30 percent of their income toward rent.

Beyond Shelter Inc, is the developer and a non profit arm of the housing authority will be the owner/property manager. MHA will provide tenant support coordination to residents of the property.

The application was awarded \$1,178,700 9% LIHTCs and \$3,048,816 Housing Trust Fund.

Project Location: Address TBD, Tolberg Shores Second Addition, Minot



Prairie Meadows



Prairie Meadows is an acquisition and substantial rehabilitation of The Meadows and Prairie Avenue Townhomes, both existing LIHTC projects located in Dickinson.

The Meadows is an existing affordable housing project that consists of 9, single story buildings and a community building for a total of 58 rental units. The property was originally built in 1980 and currently consists of (34) one bedroom and (24) two-bedroom apartments. 18 units will receive exterior stoops and new doors for direct exterior access making all units have a dedicated entrance. 7 of the existing 1-bedroom units will be converted into 3-bedroom units so the finished site will contain (27) 1-bedroom units, (24) 2-bedroom units, and (7) 3-bedroom units. Building system and envelope upgrades to include roofing, windows, doors, camera/security system, domestic hot water heating and HVAC system replacements. Unit upgrades to include LVT flooring, appliances, painting, window coverings, kitchen cabinets, countertops, bathroom vanities and showers. Site improvements include new concrete walkways, updated landscaping, new playground equipment, basketball court, and parking lot improvements.

Prairie Avenue Townhomes is another existing affordable housing project that consists of 5, single story buildings containing (4) 1-bedroom units, (10) 2-bedroom units, and (10) 3-bedroom units for a total of 24 rental units. This property was originally built in 2006 and is in its extended-use period from the original tax credit award. Exterior upgrades to include new roofs, exterior doors and hardware as needed. Unit upgrades

to include LVT flooring, appliances, painting, window coverings, kitchen cabinets, and countertops. Site improvements include repairs to concrete walkways, replacement of playground equipment, and landscaping.

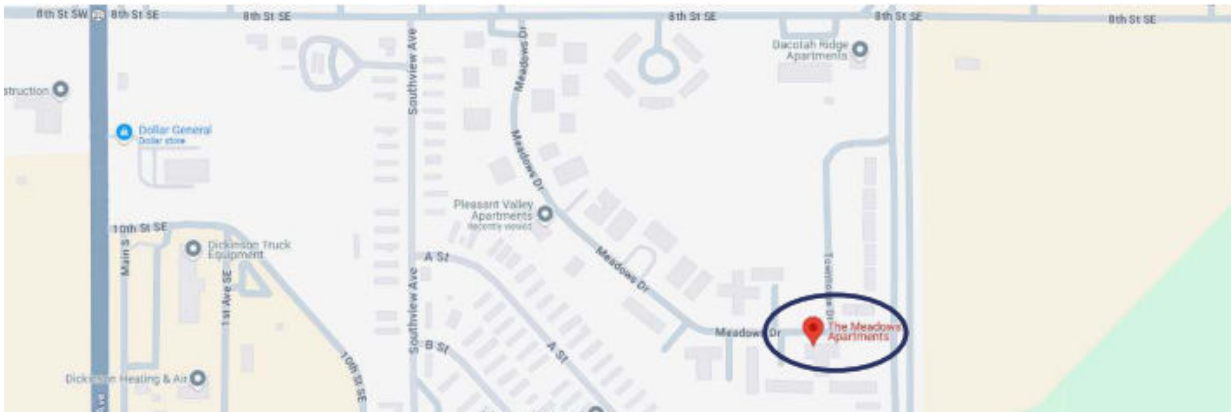
The completed development, known as Prairie Meadows, will consist of (14) buildings scattered across 2 separate sites and will contain (31) 1-bedroom units, (34) 2-bedroom units, and (17) 3- bedroom units for a total of 82 rental units. All units will have dedicated entrances and all universal project standards will be implemented as certified by the architect. 17 of the finished units will implement the universal design standards, of which (3) will be two bedrooms or larger. All units will have full rental assistance provided thru a project-based USDA Rural Development 515 contract that allows each tenant to pay 30% of their adjusted income as their rent contribution with the remainder of the rent subsidized by the Rural Development contract making the asking rents of the proposed development within the NDHFA maximum allowable rents for each designation.

The developer and owner is MetroPlains Development Partners who have owned and operated affordable housing in North Dakota for over 45-years. MetroPlains Management will continue to manage the property.

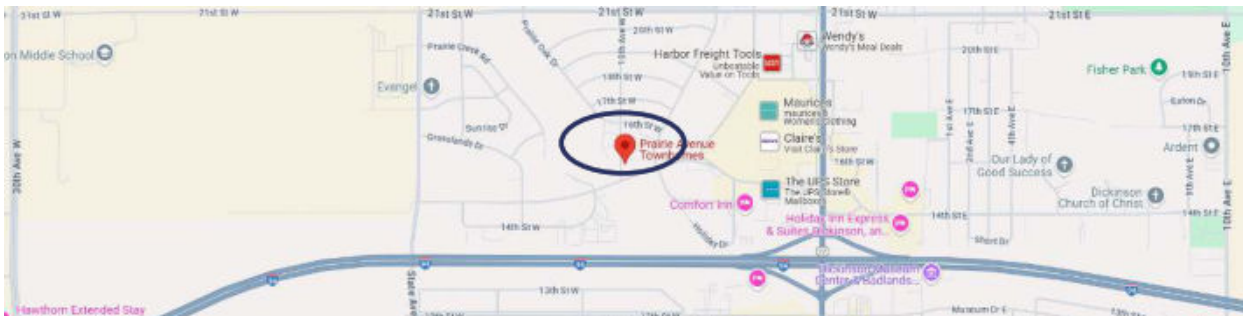
The application was awarded \$1,081,743 in 9% LIHTCs.

Project Location: 972 Meadows Drive and 1510 10th Ave W, Dickinson.

The Meadows



Prairie Ave Townhomes



2024 Annual Application Round- Applications Due 09/30/2024

9% LIHTC Available 3,455,000 HOME Available \$2,020,915.65 Max LIHTC per Project: 34% \$ 1,174,700
 HIF Available \$ 4,633,832.32 HTF Available \$3,048,816.23

Development Name	Request for Set Aside	Applicant Developer	Location	Total Units	Type of Development	Target Population	LIHTC 9 Requested	LIHTC 4 Requested	HIF Requested	HOME Requested	HTF Requested	Development Cost
CWND Rolla		CWND Rolla, LLC	Rolla	47	Rehabilitation	General Occupancy			\$ 500,000.00			\$ 1,500,000.00
Dakota Terrace		EWR Minot Dakota Terrace Apts, LLC	Minot	53	Rehabilitation	Senior (55+)			\$ 3,000,000.00			\$ 3,243,464.00
Elson Shores I		Housing Authority of Cass County	West Fargo	40	New Construction	Senior (62+)	1,142,400		\$ 400,000.00	\$ 1,100,000.00	\$ 200,000.00	\$ 15,960,217.00
Elson Shores II		Housing Authority of Cass County	West Fargo	36	New Construction	Senior (62+)	1,142,400		\$ 400,000.00	\$ 100,000.00	\$ 100,000.00	\$ 13,583,691.00
Enclave Estates at Mandan		Enclave Estates Development at Mandan GP.	Mandan	25	New Construction	General Occupancy	1,082,900		\$ 750,000.00	\$ 750,000.00	\$ 750,000.00	\$ 11,545,923.00
Engle Court Phase 1		Minot Housing Authority	Minot	36	New Construction	General Occupancy	1,142,400		\$ 1,000,000.00	\$ 200,000.00	\$ 2,700,000.00	\$ 18,268,552.00
Gardenette, Phase 2 (forward commit)	Non-Profit	Stride Development	Jamestown	40	Acquisition Rehab	General Occupancy	337,628					\$ 12,836,164.00
Grand Forks Townhomes	Non-Profit	Grand Forks Homes, Inc	Grand Forks	36	New Construction	General Occupancy	1,142,171		\$ 330,600.00	\$ 1,557,504.00	\$ 2,700,000.00	\$ 17,764,996.00
Grand Forks Twinhomes	Non-Profit	Grand Forks Homes, Inc	Grand Forks	24	New Construction	General Occupancy	905,157		\$ 400,000.00			\$ 12,182,511.00
Harvest Acres	Non-Profit, CHDO	Beyond Shelter, Inc	Fargo	40	New Construction	Senior (62+)	1,142,400		\$ 400,000.00	\$ 1,555,129.00	\$ 200,000.00	\$ 13,468,048.00
Jewel City 2	CHDO	Affordable Housing Developers, Inc	Rolla	7	Rehabilitation	General Occupancy			\$ 975,000.00	\$ 1,385,850.00		\$ 2,710,579.00
Prairie Meadows		MHL Limited Partnership #121	Dickinson	82	Acquisition Rehab	General Occupancy	1,014,917					\$ 11,999,694.00
Pleasant Valley Apartments		Pleasant Valley TC Apartments, LP	Dickinson	62	Acquisition Rehab	General Occupancy		648,230	\$ 3,000,000.00	\$ 939,549.00		\$ 17,301,685.00
Sharptail Apartments		CommunityWorks North Dakota	Fargo	34	New Construction	General Occupancy	1,073,000			\$ 1,000,000.00	\$ 1,650,000.00	\$ 12,376,592.00
TMHA Veterans Village	Native American	Turtle Mountain Housing Authority	Belcourt	20	New Construction	Senior (55+)	783,645					\$ 11,820,583.00
Villas at Durango		Commonwealth Dev Corp of America	Bismarck	40	New Construction	General Occupancy	1,100,000		\$ 312,005.00	\$ 1,248,020.00	\$ 2,578,303.00	\$ 15,594,991.00
Wild Rose Senior Housing	Non-Profit	Wild Rose Senior Housing	Minot	48	Acquisition Rehab	Senior (55+)		300,359	\$ 2,150,000.00			\$ 8,128,115.00
Windsong Apartments		CommunityWorks North Dakota	Bismarck	40	New Construction	General Occupancy	1,050,000			\$ 1,350,000.00	\$ 1,900,000.00	\$ 13,553,334.00
18	7			710			13,059,018	948,589	\$ 12,867,605.00	\$ 11,186,052.00	\$ 12,778,303.00	\$ 213,839,139.00

Amount Oversubscribed 9,604,018 \$ 8,233,772.68 \$ 9,165,136.35 \$ 9,729,486.77

2024 Annual Application Round- Applications Selected for Commitment

Development Name	Request for Set Aside	Applicant Developer	Location	Total Units	Type of Development	Target Population	LIHTC 9 Awarded	LIHTC 4 Awarded	HIF Awarded	HOME Awarded	HTF Awarded	Development Cost
Gardenette, Phase 2 (forward commit)	Non-Profit	Stride Development	Jamestown	40	Acquisition Rehab	General Occupancy	345,500					\$ 12,836,164.00
Wild Rose Senior Housing	Non-Profit	Wild Rose Senior Housing	Minot	48	Acquisition Rehab	Senior (55+)		300,359	\$ 2,150,000.00			\$ 8,128,115.00
Pleasant Valley Apartments		Pleasant Valley TC Apartments, LP	Dickinson	62	Acquisition Rehab	General Occupancy		653,000	\$ 1,508,832.32	\$ 635,065.65		\$ 17,301,685.00
Jewel City 2	CHDO	Affordable Housing Developers, Inc	Rolla	7	Rehabilitation	General Occupancy			\$ 975,000.00	\$ 1,385,850.00		\$ 2,710,579.00
TMHA Veterans Village	Native American	Turtle Mountain Housing Authority	Belcourt	20	New Construction	Senior (55+)	606,984					\$ 11,820,583.00
Engle Court Phase 1		Minot Housing Authority	Minot	36	New Construction	General Occupancy	1,174,700				\$ 3,048,816.23	\$ 18,268,552.00
Prairie Meadows		MHL Limited Partnership #121	Dickinson	82	Acquisition Rehab	General Occupancy	1,081,743					\$ 11,999,694.00

Funding Remaining 295 246,073 \$ - \$ - \$ -

November 26, 2024

TO: Industrial Commission

FR: David Flohr, Executive Director

Report: Authorizing Declarations of Intent to Issue Multifamily Revenue Bonds

On May 25, 2023, NDHFA issued a Declaration of “Official Intent” to issue Multifamily Revenue Bonds in the amount not to exceed \$11,800,000. The proceeds of the bonds will be used for the acquisition and rehabilitation of Riverside Cottages III, a 70-unit affordable housing rental project located in Jamestown, North Dakota. A copy of the declarations is attached.

The issuance of tax-exempt bonds is required for a project to qualify for a non-competitive 4% tax credit allocation. The authority to issue the intent declaration was given by a Resolution Authorizing Declarations of Intent adopted by the Commission on March 24, 2015.


Riverside Cottages is a multiphase acquisition and rehabilitation of an existing 168-unit development. Phases 1 and 2 will utilize 9% Low Income Housing Tax Credits (LIHTCs) and Phase 3 will be financed utilizing 4% LIHTCs and tax-exempt bond financing. Currently all the units in the project are one-bedroom, but through the renovation, the project will create 8 three-bedroom units and 20 two-bedroom units, lowering the total count to 150. Development team includes Stride Development PBD, St. Paul and Community Works North Dakota, a non-profit from Mandan.

The issuance of an official intent memo declares the intention to issue multifamily bonds, however does not obligate the Agency to give final approval for the issuance of the bonds. Final approval for issuance of the bonds can only be authorized by independent action of the Industrial Commission. Prior to final bond issuance, the application must meet underwriting conditions and receive an approval for 4% tax credits. Once underwriting conditions are met, the project will then presented to the Commission with a request to approve the issuance of a Resolution Authorizing Revenue Bonds and approve the substantially drafted bond documents.



MEMORANDUM

TO: RIVERSIDE COTTAGES III, LLLP

FROM: David Flohr, Executive Director 

DATE: OCTOBER 24, 2024

RE: Declaration of "Official Intent" with respect to Authorizing Declarations of Intent to Issue Multifamily Revenue Bonds

By the authority granted in a certain resolution entitled "Resolution Authorizing Declarations of Intent to Issue Multifamily Revenue Bonds" and adopted by the Industrial Commission of North Dakota on March 24, 2015, I hereby declare, pursuant to Section 1.150-2 of the Internal Revenue Code Regulations, the Agency's intention to issue bonds in an amount not to exceed **\$11,800,000** to provide funds to finance a loan with respect to the Project noted above (a **70** unit affordable housing rental project located in **Jamestown ND**, North Dakota), subject to the following:

The declaration of intention stated in the preceding paragraph does not obligate the Agency to give final approval for the issuance of said Bonds. Final approval of the issuance of the Bonds can only be authorized by independent action of the Industrial Commission, which may contain such conditions thereto as the Industrial Commission may deem appropriate. The Industrial Commission in its absolute discretion may refuse to give final approval to authorize the issuance of the Bonds and shall not be liable to any person, including, but not limited to, the developer, the borrower or any other applicant, for its refusal or inability to do so.



David A. Flohr Executive Director

INDUSTRIAL COMMISSION

Doug Burgum Governor

Drew H. Wrigley Attorney General

Doug Goehring Agriculture Commissioner

November 26, 2024

TO: Industrial Commission

FR: David Flohr, Executive Director

Report: Authorizing Declarations of Intent to Issue Multifamily Revenue Bonds

On October 24, 2024, NDHFA issued a Declaration of "Official Intent" to issue Multifamily Revenue Bonds in the amount not to exceed \$11,800,000. The proceeds of the bonds will be used for the acquisition and rehabilitation of Riverside Cottages III, a 70-unit affordable housing rental project located in Jamestown, North Dakota. A copy of the declarations is attached.

The issuance of tax-exempt bonds is required for a project to qualify for a non-competitive 4% tax credit allocation. The authority to issue the intent declaration was given by a Resolution Authorizing Declarations of Intent adopted by the Commission on March 24, 2015.


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By the authority granted in a certain resolution entitled "Resolution Authorizing Declarations of Intent to Issue Multifamily Revenue Bonds" and adopted by the Industrial Commission of North Dakota on March 24, 2015, I hereby declare, pursuant to Section 1.150-2 of the Internal Revenue Code Regulations, the Agency's intention to issue bonds in an amount not to exceed **\$11,800,000** to provide funds to finance a loan with respect to the Project noted above (a **70** unit affordable housing rental project located in **Jamestown ND**, North Dakota), subject to the following:

The declaration of intention stated in the preceding paragraph does not obligate the Agency to give final approval for the issuance of said Bonds. Final approval of the issuance of the Bonds can only be authorized by independent action of the Industrial Commission, which may contain such conditions thereto as the Industrial Commission may deem appropriate. The Industrial Commission in its absolute discretion may refuse to give final approval to authorize the issuance of the Bonds and shall not be liable to any person, including, but not limited to, the developer, the borrower or any other applicant, for its refusal or inability to do so.



November 26, 2024

To: North Dakota Industrial Commission

From: David Flohr, Executive Director

RE: NDHFA legislation for the 2025 session

NDHFA will be requesting a language change to our budget narrative related to the Housing Incentive Fund (HIF) and the ND Homeless Grant (NDHG). For administrative purposes that benefit the Agency and the service providers receiving NDHG funding we will ask that the general fund appropriation for NDHG be transferred to the Housing Incentive Fund. This allows the Agency and homeless service providers maximum flexibility in administering the NDHG.

The language below is from the 2023 Industrial Commission bill HB 1014 that describes the transfer of general fund appropriations to HIF with a new section 3 specifying the NDHG funds be transferred and designated for use under the appropriate HIF section of the NDCC for homeless prevention.

SECTION 6. APPROPRIATION - TRANSFER - FOSSIL RESTORATION FUND - HOUSING INCENTIVE FUND - ONE-TIME FUNDING.

1. There is appropriated out of any moneys in the general fund in the state treasury, not otherwise appropriated, the sum of \$250,000, which the office of management and budget shall transfer to the fossil excavation and restoration fund during the biennium beginning July 1, 2023, and ending June 30, 2025.
2. There is appropriated out of any moneys in the general fund in the state treasury, not otherwise appropriated, the sum of \$xxx,xxx,xxx which the office of management and budget shall transfer to the housing incentive fund during the biennium beginning July 1, 2023, and ending June 30, 2025.
- 3. There is appropriated out of any moneys in the general fund in the state treasury, not otherwise appropriated, the sum of \$xxx,xxx,xxx, which the office of management and budget shall transfer to the housing incentive fund and will be specified for use pursuant to NDCC 54-17-40.3(e) during the biennium beginning July 1, 2023, and ending June 30, 2025.**
4. The funding provided in this section is considered a one-time funding item



LIGNITE RESEARCH PROGRAM PROJECT MANAGEMENT REPORT

Erin Stieg, Grant Administrative Assistant, NDIC

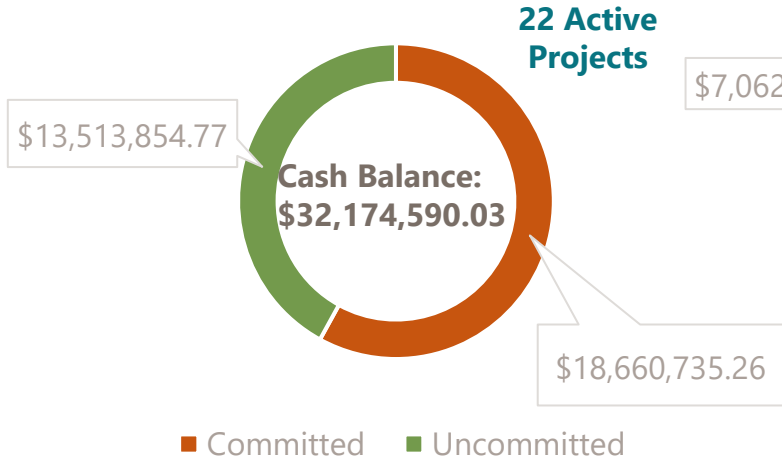
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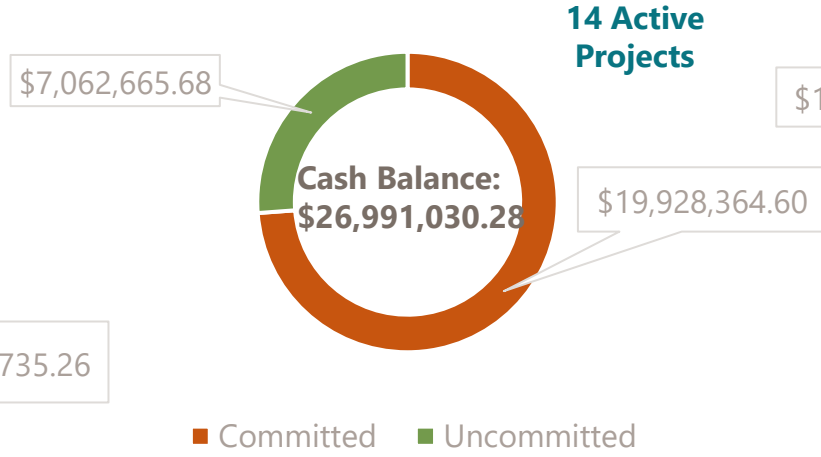
November 2024

INDUSTRIAL COMMISSION-MANAGED FUNDS

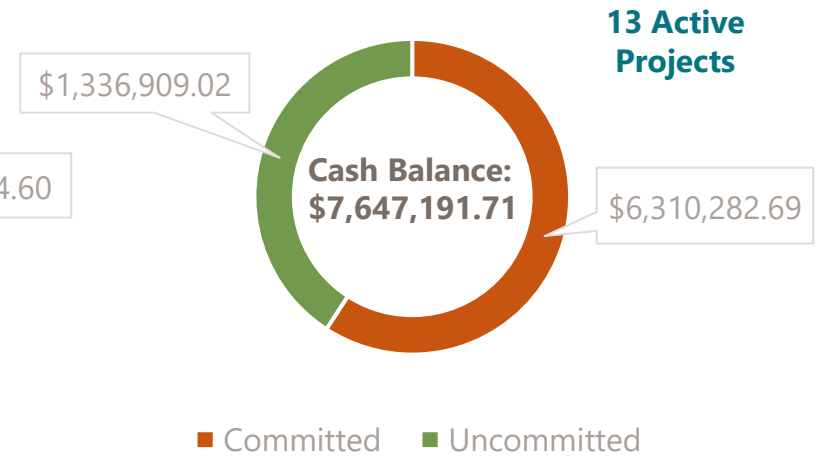
Lignite Research Fund



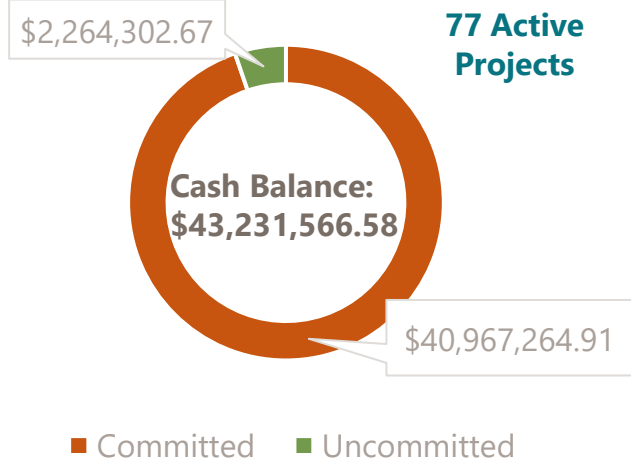
Oil and Gas Research Fund



Renewable Energy Fund



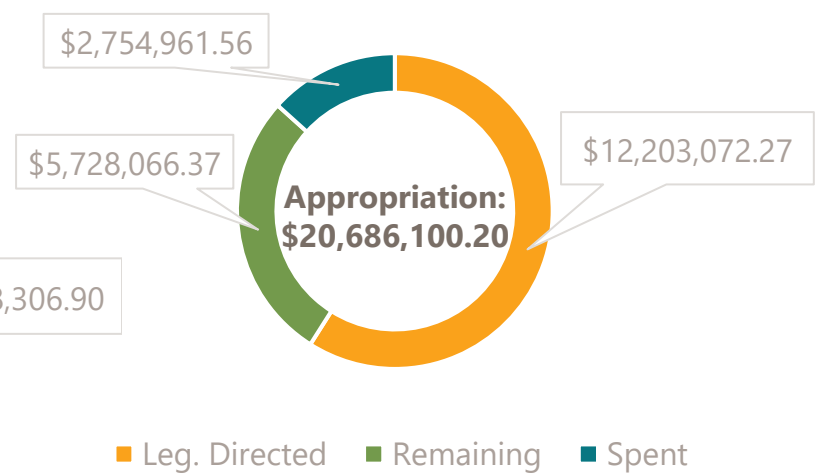
Outdoor Heritage Fund



CSEA Fund*



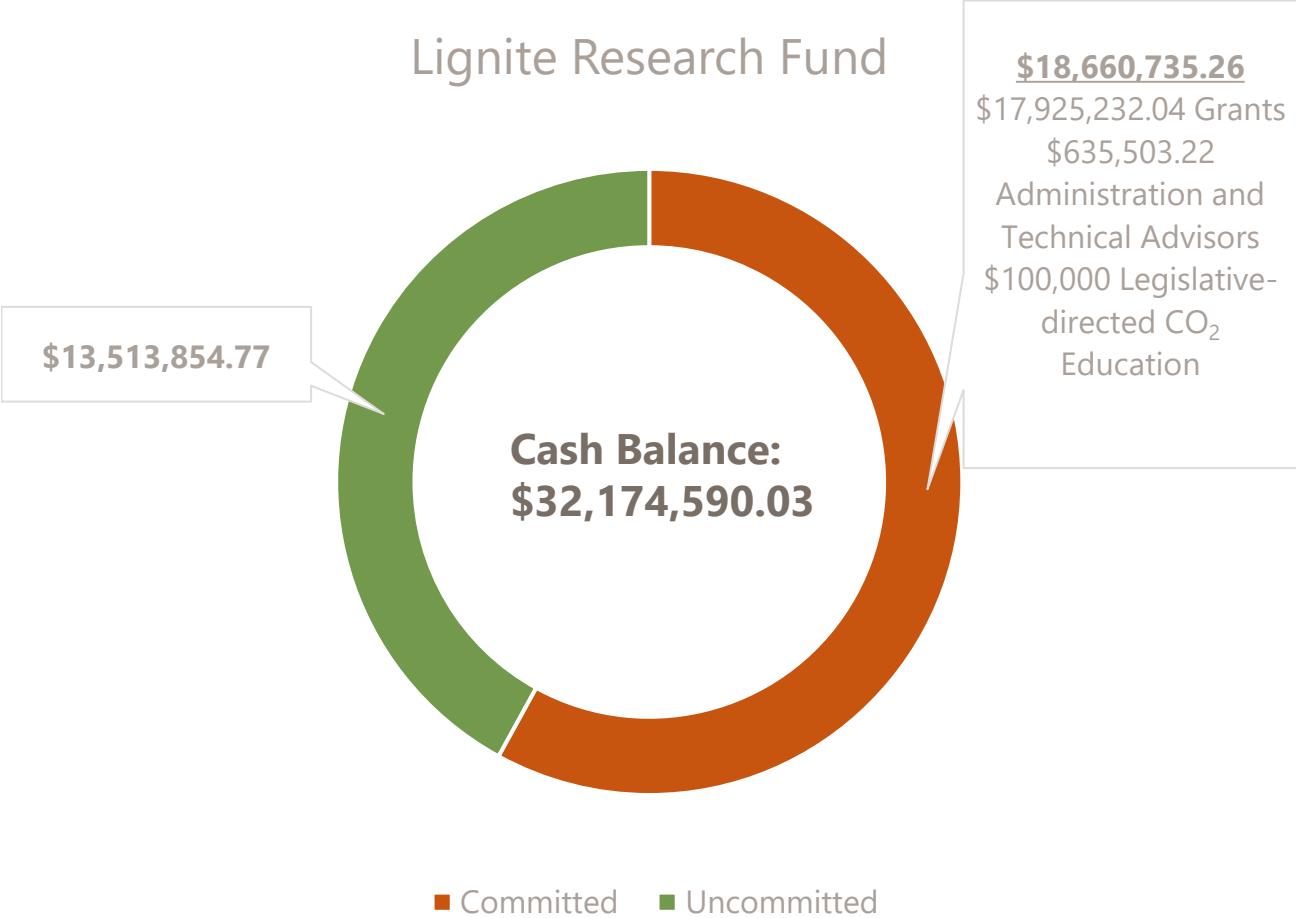
SERC Fund



LIGNITE RESEARCH FUND BALANCE

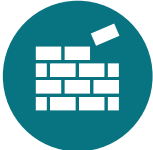
NOVEMBER 2024

Lignite Research Fund



Funding Source:

- \$8.5 million coal severance and conversion taxes
- \$10 million oil and gas taxes



258 Cumulative Projects



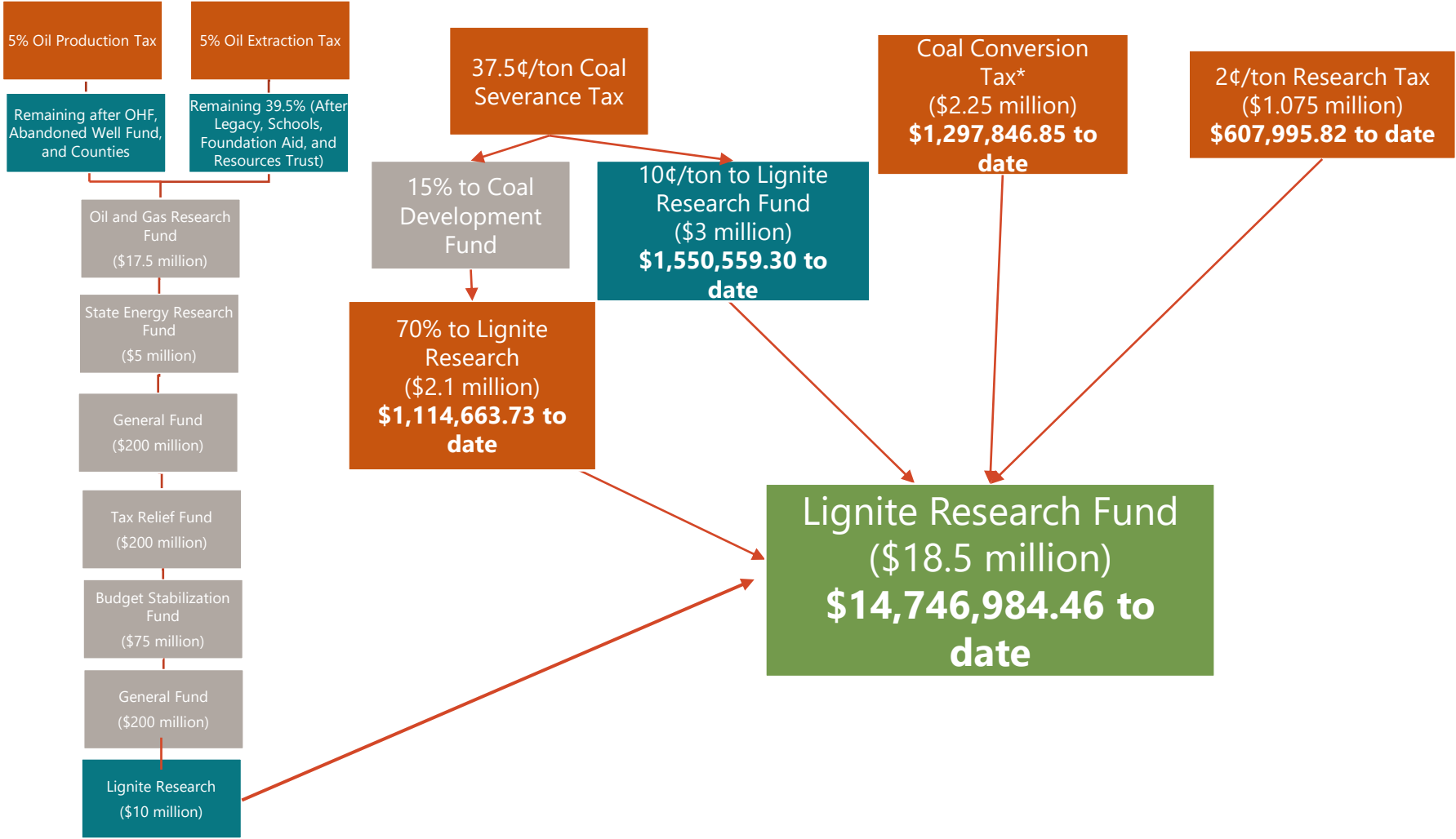
22 Active Projects



Cumulative Value:

- \$176.3 million granted
- \$2.8 billion project value

2023-2025 BIENNIUM APPROPRIAT AND FORECASTED INCOME



Lignite Research Program							
Grant Round 105 Applications and Funding Requests (November 2024)							
Grant #	Application Title	Principal Investigator	Applicant	Funding Requested	Total Project Costs	Duration	Matching Funds
LRC-105A	Production of Germanium and Gallium Concentrates for Industrial Processes	Dr. Steve Benson	Microbeam Technologies	\$376,000	\$3,134,978	3 years	DOE match of \$2,499,978
LRC-105B	Williston Basin Regional Initiative Technical Assistance Partnership: Support for Continuation of PCOR Partnership	Kevin Connors	EERC	\$1,250,000	\$6,250,000	3 years	DOE match of \$5,000,000
LRC-105C	Coal Creek Carbon Capture: Geologic CO2 Storage Complex Development Add-On	Amanda Livers-Douglas	EERC	\$5,150,874	\$10,945,607	2 years	DOE match of \$5,150,874 and private cash match of \$643,859
			Totals:	\$6,776,874	\$20,330,585		

It was moved by ____ and seconded by ____ that the Industrial Commission accepts the recommendation of the Lignite Research Council, approves the following Lignite Research Program projects, and authorizes the Office of the Industrial Commission to enter into contracts for the following projects:

FY24-105- A Production of Germanium and Gallium Concentrates for Industrial Processes; Submitted by Microbeam Technologies; Total Project Costs: \$3,134,978; Award Amount: \$376,000

FY24-105- B Williston Basin Regional Initiative Technical Assistance Partnership: Support for Continuation of PCOR Partnership; Submitted by EERC; Total Project Costs: \$6,250,000; Award Amount: \$1,250,000

FY24-105- C Coal Creek Carbon Capture: Geologic CO2 Storage Complex Development Add-On; Submitted by EERC; Total Project Costs: \$10,945,607; Award Amount: \$5,150,874

LRC-105A

Title: Production of Germanium and Gallium Concentrates for Industrial Processes

Submitted By: Microbeam Technologies

PM/PI: Alex Benson

Duration: 3 years

Purpose: Microbeam Technologies Incorporated (MTI) is teamed with UND and Barr Engineering with support from industry including North American Coal and BNI Energy to demonstrate germanium and gallium extraction from North Dakota Lignite at the bench-scale. This phase II project effort would build on Phase I to develop a conceptual design to extract, separate, recover and purify germanium and gallium from mixed rare earth element concentrates at lower costs than current methods. The U.S. is import-reliant on germanium and gallium and while demand increases. The project team is requesting \$376,000 leveraged to a total project size of \$3,135,483 with DOE and industry support.

Funding: NDIC: \$376,000; Total Project Costs: \$3,134,978

Technical Advisor's Recommendation:

Fund – There is an increasing need for domestic source of Rare Earth Elements (REE's) and critical minerals. Germanium and gallium are two of the critical minerals of interest that are present in North Dakota lignite. The technology would integrate with the UND REE recovery technology and seek to produce germanium and gallium in saleable concentrations. The three technical reviewers recommended funding the project with an average score of 204.6 out of 250. The proposed project has a strong leveraging of state funding with roughly 88% match.

Funding would be subject to:

- Technical advisor participates in project reviews
- Technical advisor reviews the project management plan with the project team

Conflicts of Interest: BNI and North American Coal are supporting the project

Reviewers: Fund - 3; Consider Funding - 0; Do Not Fund – 0

LRC: Fund: Yes - 15; No – 0; Abstain - 0

October 1, 2024

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

Dear Mr. Haase:

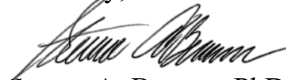
Subject: Proposed Project entitled “Bipartisan Infrastructure Law (BIL) – Production of Germanium and Gallium Concentrates for Industrial Processes” for consideration for funding as part of the October 1, 2024 Grant Round.

We are pleased to submit this proposal for co-funding. The proposal was submitted in response to US Department of Energy (DOE) funding opportunity announcement (FOA) DE-FOA-0002619 “Bipartisan Infrastructure Law (BIL) Advanced Processing of Rare Earth Elements and Critical Minerals for Industrial and Manufacturing Applications,” Area of Interest (AOI-2) Production of Critical Minerals and Materials Excluding Materials Containing Rare Earth Elements from Coal-Based Resources.” The project was selected by the DOE for an award (Award No. is DE-FE0032522) with a start date of September 1, 2024, and a period of performance of thirty-six months. In addition to the request for co-funding from the North Dakota Industrial Commission (NDIC), other project members providing cost share include North American Coal Corporation, 5N Plus Semiconductors LLC, University of North Dakota, Barr Engineering, Lattice Materials, BNI Energy, and Microbeam Technologies Inc.

This project team includes key member of the supply chain for the production Ge and Ga metal that includes carbon-ore producers (NACC), pilot-scale mixed rare earth oxide/salt (MREO/MRES) operator (UND), advanced separation/purification/reduction to metal process developers (Microbeam and 5N Plus), and industrial partners (Lattice Materials and 5N Plus). This effort is aimed at achieving major (>50%) domestic production of these energy-critical elements utilizing easily accessible (usable within 4-5 years) carbon-ore resources.

Please let me know if you have any questions or comments. We will send a check for \$100 for the application fee.

Sincerely,



Steven A. Benson, PhD
President

c/enc. Mike Holmes, LEC

Shipping:
4200 James Ray Drive, Ste. 193
Grand Forks, ND 58202

Mailing:
PO Box 5
Victoria, MN 55386-0005

Phone: 701-757-6200
Fax: 701-738-4899
info@microbeam.com

Bipartisan Infrastructure Law (BIL) – Production of Germanium and Gallium Concentrates for Industrial Processes – Phase II

Submitted to:

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

Submitted by:

Microbeam Technologies Incorporated
4200 James Ray Drive, Ste. 193
Grand Forks, ND 58202

Principal Investigator:

Dr. Steve Benson
Phone: 701-213-7070
Email: sbenson@microbeam.com

Project Manager:

Mr. Alex Benson
Phone: 701-330-0308
Email: abenson@microbeam.com

10/01/2024

Total Project Costs: \$3,134,978

NDIC Amount Requested: \$376,000

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1.0 ABSTRACT

Microbeam Technologies Incorporated (MTI) has teamed with the University of North Dakota (UND) and Barr Engineering with support from the US DOE National Energy Technology Laboratory (NETL), North American Coal Corporation (NACC), BNI Energy, Lattice Materials, and 5N Plus Semiconductors to conduct a Phase II project to demonstrate at a bench-scale the production of Ge and Ga metal utilizing abundant lignite-based carbon-ore resources. Phase II builds on the Phase I conducted by MTI, UND, and Dennis James funded by NETL, NDIC, and NACC to develop a conceptual design to extract, separate, recover and purify germanium and gallium from lignite carbon ore-derived mixed rare earth element concentrates (MREC) at lower costs than current conventional methods. The technology involves a combination of pyrometallurgical and hydrometallurgical processes to produce high purity Ge and Ga metals and intermediate forms from the MREC derived from UND's pilot-scale production facility. Ge and Ga are used in a variety of applications that include advanced electronics, optoelectronics, fiber optics, solar cells, and computer chips. Currently, the Ge and Ga supply in terms of price, delivery schedule and availability are largely controlled by foreign entities. The US dependency on imports for 100% Ga and >50% of Ge creates significant risks that weakens national defense capabilities, limits economic output, hinders technological advancement, and creates geopolitical tensions.

The technical and economic feasibility of the concept was derived from the results of modeling, testing, and analysis conducted as part the Phase I project, and the results from past projects conducted by MTI that were supported by the National Science Foundation (NSF) and industry. The technology involves separation of Ge/Ga from MREC via vaporization and recovered via condensation followed by refining of Ge/Ga into usable materials. Preliminary estimates of the production of Ge and Ga from a 0.5 to 1 mtpd MREC is 8 to 25 metric tons of Ge and 6 to 20 metric tons of Ga concentrate per year.

The duration of the Phase II project is expected to be 36 months, and the total project is \$3,135,483 that includes \$635,505 of cost share. The cost share received from other project partners is \$259,505. The NDIC share of the proposed project is \$376,000. The remaining budget, \$2,499,978, will be funded by the DOE through Award No. DE-FE0032522.

2.0 PROJECT SUMMARY

This Phase II project will conduct testing to demonstrate the ability of the technology to achieve major (>50%) domestic production of these energy-critical Ge and Ga elements utilizing easily accessible (usable within 4-5 years) resources. The patented technology¹ is based on an innovative process that recovers, separates, and refines Ge and Ga to produce high value high purity metals for use by industry at lower costs.

The concept developed as part of Phase I involves a combination of pyrometallurgical and hydrometallurgy methods to recover and refine Ge and Ga from UND's pilot MREC. The MREC has unique properties in that it does not contain some of the challenging impurities found in fly ash, zinc ore refining waste, and bauxite refining residues used in the production of Ge and Ga metals. The MREC has very low levels of zinc, arsenic, lead, and other intermediate volatility elements that will vaporize and condense at similar temperatures. The first step in the recovery process is the vaporization and selective condensation to produce relatively pure Ge and Ga concentrates. For Ge concentrate, the steps include extraction to form GeCl_4 , hydrolysis to form GeO_2 , metallization to form Ge metal, and zone refining to produce high purity Ge metal (99.999+%). For Ga, the processes involve the formation of GaCl_3 , electrowinning to produce Ga metal, and zone refining to produce high purity Ga metal (99.999+%).

3.0 PROJECT DESCRIPTION

3.1 Overview of Project Scope

The goal of the project is to demonstrate, at a bench-scale, an environmentally benign process to produce Ge and Ga that is fully integrated with downstream uses and with the properties of UND's MREC which is a Mixed Rare Earth Oxide/Mixed Rare Earth Salt (MREO/MRES). The first task is project management and planning that will involve the coordination of the project to attain all project objectives and provide deliverables on time and within budget. The second task will involve the design and

¹ Benson, S. and Benson, A. (2024) System and Method for Producing Critical Minerals. (U.S. Patent No. 12,031,195 B2). U.S. Patent and Trademark Office.

construction of a bench-scale system that is capable of processing MREO/MRES to produce high purity Ge and Ga metals. The third task will be aimed at performing shakedown and parametric testing of the system to determine the optimum conditions required to produce Ge and Ga metals from MREC. The fourth task will involve production of Ge and Ga metal under optimized conditions using a MREC derived from a Ge- and Ga-rich lignite. The fifth task will be aimed at determining the economic viability and the commercialization potential of the technology that would utilize products from a MREC production facility.

3.2 Project Objectives

In order to meet the goal described in section 3.1, the following specific objectives will involve: 1) design and construct a bench-scale pyrometallurgical system that has the capability to demonstrate the ability to vaporize Ge and Ga from the MREC, selectively condense, and concentrate Ge and Ga in oxides and metal forms of purity >90% oxide basis, 2) perform shakedown and parametric testing of the system to identify the optimum conditions temperatures and gas compositions necessary to produce Ge and Ga concentrates from pilot-scale MREC, 3) conduct analysis of the concentrates produced under a range of conditions to determine form and abundance of Ge and Ga as a function pyrometallurgical system conditions, 4) perform bench-scale production testing to produce high purity Ge and Ga metals (99.999%+) under optimum conditions for end user evaluation using MREC from Ge and Ga-rich lignite, analyze the purity of Ge and Ga concentrates, and test the ability to refine to metal using conventional technologies, and 5) perform a technical and economic analysis of the commercialization potential of the process. Completion of these objectives will provide a foundation for development of an economically viable, sustainable, and responsible critical mineral supply chain in the United States.

3.3 Methodology

Task 1.0 – Project Management and Reporting

Subtask 1.1 – Project Management Plan

The project team will manage and direct the project in accordance with a Project Management Plan to meet all technical, schedule and budget objectives and requirements. The project manager will coordinate activities in order to effectively accomplish the work and will ensure that project plans, results, and decisions are appropriately documented, and project reporting and briefing requirements are satisfied.

Management of project risks will occur in accordance with the risk management methodology delineated in the Project Management Plan in order to identify, assess, monitor and mitigate technical uncertainties as well as schedule, budgetary and environmental risks associated with all aspects of the project. The results and status of the risk management process will be presented during project reviews and in quarterly progress reports with emphasis placed on the medium- and high-risk items.

Subtask 1.2 – Technology Maturation Plan

The project team will develop a Technology Maturation Plan (TMP) that describes the current technology readiness level (TRL) of the proposed technology/technologies, relates the proposed project work to maturation of the proposed technology, describes the expected TRL at the end of the project, and describes any known post-project research and development necessary to further mature the technology.

Task 2.0 – Bench Scale System Design and Construction

This task will involve finalizing a modular bench-scale system design based on the conceptual design process flow diagrams, procuring all materials and supplies for construction, and constructing the system that can process MREC from a pilot-scale production facility to produce high purity Ge and Ga metals. The assembled bench-scale system will consist of 1) a high temperature furnace system designed to vaporize Ge and Ga from the MREC, 2) a condenser system to recover Ge and Ga concentrates separately, and 3) a particulate control (capture) system. The materials collected will be subjected to analysis to determine

chemical composition using the materials analysis system, along with Ge and Ga condensate processing to produce high purity metal.

Subtask 2.1 Furnace System

This subtask will focus on the design of the bench scale system furnace to provide sufficient temperature, gas composition, and residence time to vaporize the Ge/Ga from the MREO/MRES concentrate. This work will be based on the conceptual design information derived from past experimental data combined with modeling using tools such as FactSage and Aspen. The main furnace system is expected to be commercially available and is planned to be fitted with a feed system, reducing gas purge, and high temperature transport lines to the condensation system.

Subtask 2.2 Condensation Capture System

This subtask will be aimed at designing, procuring materials, and constructing a heat exchange system to cool the gas stream to allow for the condensation and recovery of Ge and Ga in the bench scale system.

Subtask 2.3 Particulate Control System

This subtask involves the design and installation of a cyclone and baghouse integrated into the bench scale system that can capture sub-micrometer particles that are rich in Ge and Ga.

Subtask 2.4 Materials Analysis System

The Ge and Ga condensation products will be analyzed to determine the abundance of Ge and Ga and levels of other elements that can be considered impurities that can impact purification processing. Techniques such as X-ray fluorescence (XRF) will be used to determine the bulk composition of the materials, while techniques such as scanning electron microscopy (SEM) and X-ray microanalysis will be performed to examine microstructure and determine the composition of selected features to ascertain associations of elements. Of specific interest is determining the form(s) of condensed Ge and Ga, whether metallic, oxide, sulfide, or other form(s). Selected samples will be characterized using techniques such as Inductively Coupled Plasma-Mass Spectrometry (ICP-MS) to determine the abundance of impurities and the abundance of critical minerals such as rare earth elements (REE), Ge, Ga, Sc, and Y.

Subtask 2.5 Ge Condensate Processing

The potential for direct metallization of Ge condensate will be evaluated using a high temperature melting furnace that can be operated in reducing conditions (such as hydrogen atmosphere) to convert germanium oxide into elemental germanium, in forms such as metal ingots or liquid droplets. The purity of the germanium metal will be determined using techniques such as ICP-MS.

If the direct metallization of Ge condensate is determined not be feasible because of factors such as impurity levels, the Ge condensate will be processed using an industry standard method to produce Ge products, including GeCl_4 , GeO_2 and Ge metal. The process involves reacting the Ge concentrate in a heated vessel to produce GeCl_4 gas, which is condensed to produce a liquid. The team will produce gram sized samples of this material for analysis. The team will hydrolyze samples of the GeCl_4 to produce GeO_2 and subsequently reduce the GeO_2 to form Ge metal, with a target purity of 99.9%.

Subtask 2.6 Ga Condensate Processing

For the Ga concentrate, a direct chlorination of the Ga pre-concentrate with Cl_2 gas at elevated temperatures will be utilized, followed by selective condensation and subsequent gas cleanup. The condensed GaCl_3 will be electrolyzed using a low-temperature, molten-salt cell.

Subtask 2.7 Zone refining of Ge and Ga

When enough Ge and Ga unrefined metals are available from prior subtasks, supporting team members will subject the materials to further purification via zone refining. The objective of this subtask is to produce materials that are of high purity (target purity of 99.999%). The resulting materials will be analyzed using techniques such as SEM, ICP-MS, and XRF analysis.

Task 3.0 – Shakedown and Parametric Testing

The pyrometallurgical system to vaporize Ge and Ga from the MREC followed by selective condensation to produce Ge and Ga concentrates is the unique feature of the technology and requires parametric testing. The shakedown and parametric testing will be conducted using MREC produced by a subrecipient's pilot system.

Subtask 3.1 Shakedown Testing

The project team will test all electrical and mechanical systems associated with the vaporization, condensation, and particulate control systems. Initial operation shakedown of the system will be conducted with the flow of materials such as silica sand or clay materials to measure feed rates, flow through the furnace system, heat exchangers, and particulate control. The team will conduct an initial test (or tests) of the systems with a preference to use the more abundant Stage 2 MREC from the UND process for this Subtask. Sampling protocols will be developed and samples of the Ge/Ga extracted material, condenser hopper samples, heat transfer surface accumulation, cyclone and baghouse will be gathered and analyzed using methods such as SEM, ICP-MS, and XRF analysis. In addition, the particulate exiting the heat exchange system will be collected using a 4-stage particle impactor (including backup filter) to measure the presence of particles of various diameters. The team will measure the mass in each stage of the impactor and analyze the composition of materials collected on each stage of the impactor using techniques such as SEM and X-ray microanalysis.

Subtask 3.2 Parametric Testing

Based on the shakedown testing of the pyrometallurgical system, the team will have developed the key initial operating conditions that will be used for Ge and Ga production runs. All testing of the pyrometallurgical system will be performed using Stage 1 and Stage 2 MREC sourced from a subrecipient's pilot facility.

Sampling and analysis protocols will be the same as developed in Subtask 3.1.

Task 4.0 – Production Testing

The goal of the production testing is to produce Ge and Ga metal samples for evaluation by commercial project team members who are interested in utilizing the produced materials in their processes.

Subtask 4.1 Ge and Ga-rich feedstock selection

The team will review data from recent mine sampling and analysis efforts to identify a region in one or more project partner's active mine(s) suitable to selectively recover 30 to 50 tonnes of Ge and Ga-rich

lignite carbon ore. The material will be processed through a MREC pilot facility to produce approximately 150 kg of MREC to contain higher levels of Ge and Ga. The estimated quantity of Ge and Ga metal produced from the MREC is estimated to be on the order of 0.5 to 1.0 gram per 1 kg of concentrate. This estimate is based on production of a MREC with 16 ppm levels of each of Ge and Ga in the original lignite feedstock material. The amount of Ge and Ga metal to be produced under this Subtask is expected to be approximately 50 grams of each material, which is expected to be sufficient for project support team members to perform subsequent quality/purity testing.

Subtask 4.2 Production of Ge and Ga Concentrates

The team will leverage the optimum process conditions determined in the parametric testing (Subtask 3.2) to produce Ge and Ga concentrates. It is anticipated that at a feed rate of about 5 to 10 kg/hr of MREC and run campaigns of 4 hours per day will produce sufficient quantities of the Ge and Ga concentrates for recovery for subsequent refining. The samples will be analyzed using methods such as SEM, ICP-MS, and XRF analysis.

Subtask 4.3 Refining of Ge and Ga Concentrates to Metals

The project team will refine Ge and Ga concentrates to metals following the refining process descriptions in Subtasks 2.5 to 2.7.

Subtask 4.4 Ge and Ga Metal Quality Evaluation

Commercial project team members who have an interest in using Ge and Ga in their process(es) will evaluate the purity of the produced materials using methods such as SEM, ICP-MS, and XRF analysis.

Task 5.0 – Techno-economic Analysis and Commercialization

Subtask 5.1 Review Overall Process Performance

The project team will conduct the following work under this subtask:

- 1) Compile and review all analysis and analytical data.
- 2) Review and update the process design and operating parameters, as necessary, based on the results of testing.

- 3) Update the process flow diagrams and the heat and materials balances, as needed, when updates that improve process operation, performance, and product purity/consistency are identified.
- 4) Obtain feedback from potential product end users on the properties of the product material(s).

Subtask 5.2 Techno-economic Analysis

The project team will complete a techno-economic analysis (TEA) of the overall Ge and Ga separation technology based upon the bench-scale experimental testing results. The TEA may build upon past modeling efforts and preliminary TEA conducted as part of an earlier related project. Specifically, the TEA will include a projected cost comparison for the advanced systems/processes relative to a similarly sized system(s) that utilizes conventional technologies. Environmental life cycle analyses (LCA) will also be addressed as a part of the TEA.

Task 6.0 – Critical Materials Collaborative (CMC) Research Development and Demonstration (RD&D) Coordination

The Principal Investigator (PI) or designee will participate in an in-person Annual CMC Meeting, most likely in Washington D.C., where they will give a presentation on research progress. The coordination meeting is intended to build an innovative ecosystem and facilitate rich scientific and technical exchange and discussion. The attendees will include PIs selected from the DE-FOA-0002619, the Critical Materials Collaborative, DOE Program Offices and Federal agencies that fund relevant and related critical materials/minerals projects, and stakeholders working on critical materials projects. Additionally, project teams will attend and participate, either virtually or physically, in other critical materials RD&D related meetings convened by DOE or the CMC when relevant.

3.4 Anticipated Results

This project is expected to design, construct and demonstrate the pyrometallurgical process to separate Ge and Ga from a MREC through vaporization combined with selective condensation to produce Ge and Ga concentrates at a TRL of 4 or 5.

3.5 Facilities and Resources

Current Facilities and Resources

Microbeam has two locations, one in Grand Forks, ND and one in Minnetonka, MN. Both locations have offices and laboratory space. The Grand Forks location houses high temperature furnaces, two advanced computer-controlled scanning electron microscopes equipped with x-ray microanalysis (CCSEM), chemical fractionation equipment, and associated sample preparation equipment. The Minnetonka location is about 7000 square feet of office, shop, and laboratory area for testing. The shop/laboratory testing area has a shop area for construction and modification of testing equipment, a fluidized bed reactor, metals recovery system, sample preparation and field test staging area. The metals recovery system was designed to be used to study the vaporization, condensation, and capture of critical minerals such as Ge and Ga that was developed through National Science Foundation projects.

UND lab and Pilot scale facilities

Advanced Materials Characterization Lab (UND) -- The AMCL has experienced technicians and analytical chemists and has a vast array of analytical equipment and capabilities, including SEM-EDS, XRF, XRD, ICP-OES and thermal gravimetric analysis. Pilot-Scale REE Extraction Facility (UND) -- UND pilot facility is capable of processing 500 kg/hr of cleaned coal through the REE extraction and recovery process with low rank coals. The facility operates in a continuous mode in producing a pre-concentrate at a rate of roughly 8-10 kg (pure REE basis, despite a concentration near 60-70%) per week of a 300-ppm feedstock.

New Equipment

New bench-scale equipment will be purchased as part of the project. The bench-scale system will be installed at Microbeam's Minnetonka location in the shop laboratory area. The design of the system is based on the conceptual design developed during Phase I. The system will separate Ge and Ga through vaporization from the MREC and selectively condense the Ge and Ga as oxides or metals. The condensed materials will be recovered at carefully controlled temperatures and atmospheres. The equipment that will

be purchased or constructed includes: 1) a high temperature furnace system that will process MREC at a rate of 5 lb/hr to vaporize Ge and Ga, 2) a gas solid separation unit will be designed to produce a Ge and Ga free MREC, 3) a condensation system to selectively condense Ga and Ge producing concentrates, 4) a bench-top x-ray fluorescence analyzer to measure the composition of the concentrates quickly allowing for rapid feedback, 5) a cyclone and filter system to capture the particles and condensed phase materials for recycling, and 6) auxiliary equipment including fans to maintain gas flow, ventilation, sensors (temperature, flow rates, gas composition), and a lab view control system. This system is essential to be able to demonstrate the feasibility of the conceptual design. The approximate footprint of the Ge/Ga system will be about 600 ft². Microbeam's Minnetonka facility has adequate utilities (power, ventilation), safety, and access (loading dock).

3.6 Environmental and Economic Impacts

The technology proposed is an environmentally benign process to produce 90 to 99% pure germanium and gallium oxides, salts, or metals from REE concentrates derived from coal, following which refining to >99% is achievable. The technology is consistent with the objectives of the DOE FOA to develop domestic sources of critical materials that includes germanium and gallium. International production rates of the two critical elements (minerals) are estimated at 130 tonnes and 300 tonnes per year for Ge and Ga, respectively. US consumption of each mineral totaled 23% and 5%, respectively, and the US was 50 to 100% import reliant^{2,3}. For example, a single 1-3 MTPD REE concentrate plant would be able to mitigate up to 23% and 42% of the US demand for each of the Ge and Ga, and this while utilizing a lignite more enriched in the REE than Ge and Ga specifically. The UND process for REE recovery simultaneously concentrates these critical minerals from the lignite sources, resulting in a major opportunity for domestic production (potentially past current consumption rates) of these two critical minerals with minimal additional cost over REE production.

² Jaskula, B. W. "Mineral Commodity Summaries: Gallium." United States Geologic Survey, p62, 2021.

³ Tolcin, A. C. "Mineral Commodity Summaries: Germanium." United States Geologic Survey, p68, 2021

3.7 Relevance and Outcomes/Impacts

The benefit of the project is the development of a domestic source of Ge and Ga from the abundant lignite resources. The elements are extensively used in military and domestic applications and demand for these elements is expected to increase. The elements are used in advanced electronics, optoelectronics, fiber optics, solar cells, computer chips, and other applications. Lignites with concentrations in excess of 25 ppm on a dry whole-coal basis for each critical mineral have been identified inside and outside of active mines, making these elements easily recoverable from lignite in quantities to significantly offset US import demands.

4.0 STANDARDS OF SUCCESS

Critical Success Factors include: 1) availability of lignite-derived MREC from the UND facility that contains Ge and Ga and 2) ability to produce 90 to 99% pure Ge and Ga concentrates resulting in 20 % lower costs by decreasing processing steps and in lowering environmental impact as compared to currently available refining and purification processes.

5.0 BACKGROUND

Germanium and gallium are very important elements used in advanced electronics, optoelectronics, fiber optics, solar cells, computer chips, and other applications. The elements are of great economic importance to the US and pose a supply security risk and thus are classified as critical. The US is dependent upon imports for 100 % gallium and >50% of germanium. Figure 1 shows the countries that the United States imports these elements from. Ge and Ga have been receiving media attention due to China's plans to implement export controls. Selected news media articles include: 1) *Pentagon Seeks Supply of Chip-Mineral Gallium After China Curbs Exports*⁴, "The Pentagon plans to issue a first-time contract to US or Canadian companies by year-end to recover gallium, a mineral used in semiconductors and military radar

⁴ Financial Post, financialpost.com/pmn/business-pmn/pentagon-seeks-supply-of-chip-mineral-gallium-after-china-curbs-exports, Jul 26, 2023

systems, after China curbed exports this month.”, 2) *China turning the screws on US military, taking away key material*⁵, “This is just the beginning of China’s countermeasures, and China’s toolbox has many more types of measures available.” 3) *“China Restricts Export of Chipmaking Metals in Clash With US”*⁶ China on August 1, 2023, will apply export controls on germanium and gallium to protect national security. 4) *China restricts exports of chip-making metals gallium and germanium*⁷.

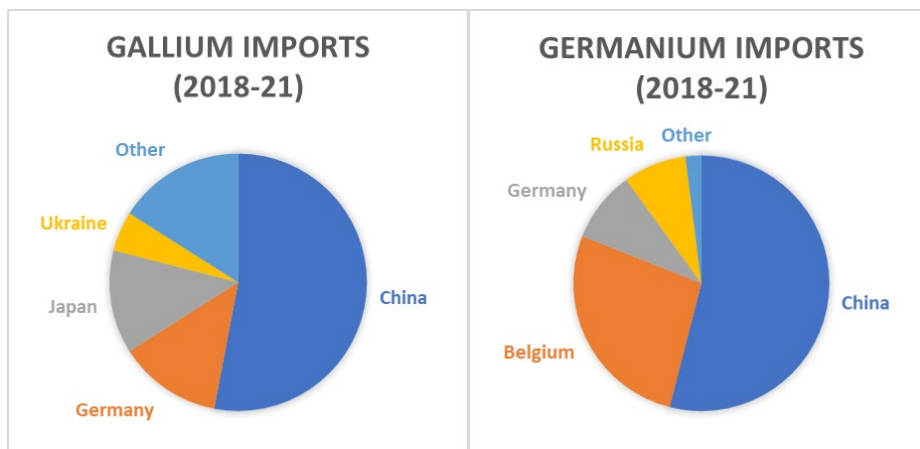


Figure 1. Gallium⁸ and Germanium⁹ imports.

Currently, the primary global germanium resource is in Zn-refinery residue and coal fly ash. Secondary sources are from recycling and coal directly. The estimated minimum recoverable Ge in zinc ores and coals using existing recovery technologies is about 119 ktonnes¹⁰ total, globally. The expected recovery of quantities of Ge is ~7 kt for zinc ore and ~112 kt for coal. With improved technologies, the estimated recovery potential of up to 440 kt (~50 kt from zinc or/and ~390 kt from coal) could be made available. Low levels of production from coal fly ash are thought to be due to the limitations in technology available

⁵ American Military News, americanmilitarynews.com/2023/07/china-turning-the-screws-on-us-military-taking-away-key-material/, July 7, 2023.

⁶ Bloomberg, [bloomberg.com/news/articles/2023-07-03/china-to-restrict-exports-of-metals-critical-to-chip-production?utm_source=website&utm_medium=share&utm_campaign=email](https://www.bloomberg.com/news/articles/2023-07-03/china-to-restrict-exports-of-metals-critical-to-chip-production?utm_source=website&utm_medium=share&utm_campaign=email), July 3, 2023.

⁷ Dow Jones Newswire, [.marketwatch.com/story/china-imposes-export-control-on-gallium-germanium-related-items-c94a4867?reflink=mw_share_email](https://www.marketwatch.com/story/china-imposes-export-control-on-gallium-germanium-related-items-c94a4867?reflink=mw_share_email), July 3, 2023.

⁸ U.S. Geological Survey, (2023, January). Gallium - USGS Publications Warehouse. Gallium, Mineral Commodity Summaries. <https://pubs.usgs.gov/periodicals/mcs2023/mcs2023-gallium.pdf>.

⁹ U.S. Geological Survey, (2023, January). Germanium - USGS Publications Warehouse. Germanium, Mineral Commodity Summaries, January 2023. <https://pubs.usgs.gov/periodicals/mcs2023/mcs2023-germanium.pdf>

¹⁰ Frenzel, M., Ketris, M., & Gutzmer, J. (2013). On the geological availability of germanium. *Mineralium Deposita*, 49(4), 471-486.

to extract and refine Ge from coal ash⁹. Currently, lignite is a significant source of Ge in China with 16 metric tons being produced annually at the Lincang lignite mine¹¹. The primary sources of Ge in the US are believed to be similar to the sources of China. It is estimated that the US reserves of Zn may contain more than 2500 tonnes of recoverable Ge and the coal deposits may contain over 1.7 million tonnes of recoverable Ge¹².

Gallium is a byproduct of bauxite and Zn-ore processing. Ga-bearing zinc ore is extracted with sulfuric acid and goes through a multistep complex process to form a GaCl₃ solution that goes through electrolysis to produce Ga metal. The Ga metal is further refined by Zone refining¹³. Gallium has been identified in coals around the world, as referenced by Seredin and Finkelman (2008)¹⁴ and Qin, et. al. (2015)¹⁵. However, gallium has not been widely studied as many other trace elements, likely due to its low environmental toxicity. Thus, while data shows gallium is present in many coals, there is not enough data to support its mode of occurrence.

In North Dakota lignite, gallium occurs in relatively consistent concentrations ranging from low single digit parts per million (ppm) up to 48 ppm on a dry whole coal basis. Vertical incremental sampling has not shown any relationships in the seam, such as germanium's tendency to be concentrated at the top of the seam. Aerially, gallium does not show any patterns other than an apparent regional consistency; however, this could be due to the scarcity of data.

Statistical analyses of conventional trace element analyses do show a number of strong correlations between gallium and other elements. Silica, alumina, potassium, titanium, and the rare earth elements all have a correlation coefficient exceeding 0.9. Selenium, vanadium, cobalt, rubidium, magnesium, and

¹¹ Hu, Rui-Zhong, Hua-Wen Qi, Mei-Fu Zhou, Wen-Chao Su, Xian-Wu Bi, Jian-Tang Peng, Hong Zhong, and. "Geological and geochemical constraints on the origin of the giant Lincang coal seam-hosted germanium deposit, Yunnan, SW China: A review." *Ore Geology Reviews* 36.1-3 (2009): 221-234.

¹² Ruiz, A. G., Sola, P. C., and Palmerola, N. M. (2018). Germanium: Current and novel Recovery Processes. *Advanced Material and Device Applications with Germanium*. <https://doi.org/10.5772/intechopen.77997>

¹³ Butcher, T., Brown, T., & , (2013). Gallium. *Critical Metals Handbook*, 150-176.

¹⁴ Seredin, Vladimir V. and Finkelman, Robert B., 2008, *Metalliferous coals: A review of the main genetic and geochemical types*. *International Journal of Coal Geology*, v. 76, p. 253-289

¹⁵ Qin, Shenjun, Sun, Yuzhuang, Li, Yanheng, Wang, Jinxi, Zhao, Cunliang, and Ge, Kang, November 2015, *Coal deposits as promising alternative sources for gallium*. *Elsevier Earth Science Reviews*, Volume 10, p. 95-101.

thorium all have high coefficients as well. SEM analyses of coal samples support the alumina-silicate correlation.

The Phase 1 project goal was to develop a concept to extract, separate, recover and purify germanium and gallium from lignite carbon ore-derived rare earth element concentrates. This effort was aimed at achieving major (>50%) domestic production of these energy-critical elements utilizing easily accessible (usable within 4-5 years) resources. As part of the Phase I effort, this technical research plan was developed to perform bench scale proof-of-concept testing to determine the viability to produce high purity germanium and gallium metal materials from the University of North Dakota's pilot-scale MREC. The goal is an advanced innovative process that recovers, separates, and refines Ge and Ga to produce high value high purity metals for use by industry at lower costs.

The concept developed as part of Phase I involves a combination of pyrometallurgical and hydrometallurgy methods to recover the germanium and gallium from the UND's pilot MREC. The MREC concentrate has unique properties in that it does not contain some of the challenging impurities found in fly ash and other materials used in the production of Ge and Ga metals¹⁶. The MREC concentrate has very low levels of zinc, arsenic, lead, and other intermediate volatility elements that will vaporize and condense at similar temperatures. The first step in the recovery process is the vaporization and selective condensation to produce relatively pure Ge and Ga concentrates. For Ge concentrate, the steps include extraction to form GeCl_4 , hydrolysis to form GeO_2 , metallization to form Ge metal, and zone refining to produce high purity Ge metal (99.999+%). For Ga, the processes involve the formation of GaCl_3 , electrowinning to produce Ga metal, and zone refining to produce high purity Ga metal (99.999+%).

6.0 QUALIFICATIONS

The personnel who are part of the project team are uniquely qualified to perform the project. The personnel include fuel scientists who have knowledge of the forms and abundance of critical mineral in the

¹⁶ James R. Piedmont, Richard J. Riordan, "The Supply of Germanium For Future World Demands," Proc. SPIE 0164, 4th European Electro-Optics Conf, (25 July 1979); doi: 10.1117/12.965520

lignite feedstocks and understand the behavior of critical minerals during processing, chemical and mechanical engineers who have direct experience with the recovery of critical minerals and designing and constructing pilot scale processes, and chemists who can analyze the materials. The project team will work together to develop the overall concept for the recovery of Ge/Ga that is consistent with refining and end use requirements.

Dr. Steve Benson, Dr. Benson will be the technical lead and Principal investigator for this proposed project. Dr. Benson, Microbeam President, has a BS in Chemistry from Minnesota State University and a Ph.D. in Fuel Science from Pennsylvania State University. Prior to joining Microbeam full time in 2017 he held faculty and research positions at the UND. He was PI on the DOE and industry funded project (FOA 1202, DE-FE0027006) to develop technologies to recover REE from coal and coal byproducts. He has 45 years of experience in fuel analysis, fuel properties, combustion, gasification, ash transformations, pollution control, and critical mineral recovery. In addition, Dr. Benson has developed and managed numerous complex multidisciplinary research, development and commercialization projects associated with the utilization of coal funded by US DOE and industry. Dr. Benson is one of the inventors on a US patent held by UND for the extraction of REE/CM from lignite and associated materials, one of the inventors on a US patent held by MTI for algorithms used with handheld XRF and PGNAAs-DGA for measuring REE-CM, and one of the inventors of a patent for the process of producing separated Ge and Ga concentrates from ash materials and mixed rare earth element concentrates.

Alex Benson, Mr. Benson will be Project Manager for this project and will be responsible for the day-to-day coordination of the efforts. Mr. Benson is currently a Senior Project Manager at Microbeam. He has a B.S. degree in Mechanical Engineering from University of St. Thomas. Mr. Benson has over 5 years of experience conducting projects associated with critical minerals. Currently he leads multiple commercial projects associated with REE/CM resource evaluation, detection, measurement, and extraction from carbon-ore and associated waste materials. He was the project PI (DE-SC0021837) and is one of the inventors on a US patent held by Microbeam for algorithms used with handheld XRF and PGNAAs-DGA for REE/CM measurements and of a US patent for Ge and Ga separation from ash materials and mixed rare

earth element concentrates. Mr. Benson has over seven years of manufacturing engineering, project management and commercialization in the medical device manufacturing industry. He led engineering activities for new product launches and capacity expansion projects.

Eric Kolb, Mr. Kolb, Research Engineer, has a B.S. degree from UND in Mechanical Engineering. Mr. Kolb worked with UND on the design, construction, and operation of UND's pilot-scale REE and CM processing plant (DE-FE0031835). His experience associated with the UND system will provide important information that will facilitate integrating the Ge and Ga recovery process into the UND MREC production process. Mr. Kolb has experience in performing analysis using electron microscopes as well as performing tests using the metals recovery unit and other high temperature equipment at Microbeam. Mr. Kolb will coordinate the assembly, shakedown, and testing efforts associated with the Ge/Ga separation and capture system. He will work closely with UND to develop the process control system.

UND is the technology developer IP holder for REE and CM extraction from coal resource technology that will produce the MREC for this proposed project. In 2016, UND was among the first teams to be awarded funds from the DOE (FOA 1202, DE-FE0027006) to develop technologies to recover REE from coal and coal byproducts. The UND team that included Microbeam successfully advanced the technology from the lab-scale to a pilot-scale system under DE-FE0031835 (500 kg/hour of mine waste feed). UND also previously led a successful project to perform a conceptual design and feasibility study (AACE Class 4) to produce 1 mtpd of REE concentrate using UND's technology (contract 89243320RFE000032). The key people from UND will be Dan Laudal and Nolan Theaker.

Dr. Daniel Laudal, Research Professor in Chemical Engineering and Executive Director of the Energy and Mines Research Institute. Dr. Laudal holds a B.S. and Ph.D. in Chemical Engineering from UND. He will support the project as a technical advisor. Dr. Laudal was the technical lead for UND's original lab-scale project and the original PI for the bench-scale project (DE-FE0027006). His Ph.D. research/dissertation was the foundation for the proposed technology/project. Dr. Laudal has been PI, Co-PI, or key personnel on numerous DOE, State, and Industry-funded projects, primarily focusing on technology development and scale-up, including several efforts related to REE/CM. In addition, Dr. Laudal was the Environmental

Manager for Minnkota Power Cooperative, an electric generation and transmission cooperative that operates in ND and MN.

Nolan Theaker, Technical Group Manager – Critical Minerals at UND’s Energy and Mines Research Institute, has B.S. and M.S. degrees in Chemical Engineering from the University of Louisville, Kentucky. He will be the principal investigator (PI) for the UND portion of the proposed project. Mr. Theaker has been the technical driver for UND’s technology development and resource characterization efforts related to REE/CM since he joined IES in 2018. He is widely recognized within the DOE and the research community as a leading expert on REE/CM technologies. Mr. Theaker was the Co-PI/technical lead on UND’s bench-scale demonstration (DE-FE0027006), the PI on the ongoing pilot-scale project (DE-FE0031835), and the Co-PI/technical lead on the conceptual design and feasibility study (89243320RFE000032).

Barr Engineering is a comprehensive engineering and environmental firm, providing consulting services to clients globally. Barr works with clients on large and complex engineering and environmental projects, providing services that range from initial permitting and siting assistance through process and facility design to construction management, operations support, and closure planning. Barr’s services and staff have grown to meet client needs for over 50 years, with offices in seven states and Canada. Barr has collaborated with UND and Microbeam on technology development since efforts began in 2016 and was the engineering lead on the team’s successful AACE Class 4 pre-FEED study. The project manager from Barr Engineering is Chad Haugen.

Chad Haugen, Senior Process Engineer, has a BS degree in Chemical Engineering from UND and is a professional engineer. He will be the project manager from Barr on this proposed project. Mr. Haugen has 15 years of process engineering and project management experience providing process engineering support for projects related to critical minerals. These projects included leaching rare earth elements from coal for a domestic source. The project included pre-feasibility design evaluations, techno-economic analysis, and a review of the design and implementation of a lab/pilot testing system. He also provided preliminary engineering support and completed a techno-economic analysis for extracting rare earth elements from

geothermal brines in Southern California near the Salton Sea. On this project he will assist in the system design and review the efforts associated with the construction of the system. In addition, he will be the lead on the Technical and Economic Assessment for the project.

7.0 VALUE TO NORTH DAKOTA

This project has the potential to demonstrate a technology that can utilize the abundant lignite resource to produce critical minerals. The technology would be implemented in North Dakota and would provide high paying jobs associated with the extraction, concentrating, separation and refining to produce a high value product. In addition, ND will facilitate in the development of a domestic source of Ge and Ga from the abundant lignite resources. The elements are extensively used in military and domestic applications and demand for these elements is expected to increase.

8.0 MANAGEMENT

The management structure for the project is shown in Figure 2, which is designed on a task-by-task basis with the task leaders and key/essential personnel for each task identified. The team brings together the unique expertise required. The organization of the project, illustrated in Figure 1, shows the breakdown of the project by task and the personnel who will be contributing to the effort.

Dr. Steve Benson is the principal investigator and will manage the overall effort. He has managed numerous DOE and industry projects similar in complexity and size to this proposed project. He was the principal investigator of Phase I of this effort.

Mr. Alex Benson will be the project manager for this project. Due to the size and scope of this project, it is important to split principal investigator and project management responsibilities to ensure successful completion of the project. Mr. Benson will be responsible for day-to-day coordination efforts including tracking project deliverables, due dates, budgets, and overall progress in meeting project objectives. Mr. Benson has led multiple DOE and NDIC funded projects ranging from \$250,000 to \$2.5 million.

Microbeam utilizes several project management tools that include Smartsheet and Jira. Jira is used to track personnel time and Smartsheet is used to track project schedule. Smartsheet is software used to track project progression, assignment of tasks, allocation of resources, and adherence to project timeline. Smartsheet can also be used to notify individuals of upcoming action items, provide Gantt charts for reporting, and as a location for notes and comments regarding progress updates. Information from Jira on personnel time for each project is utilized by Quickbooks to track spending and is used for invoicing.

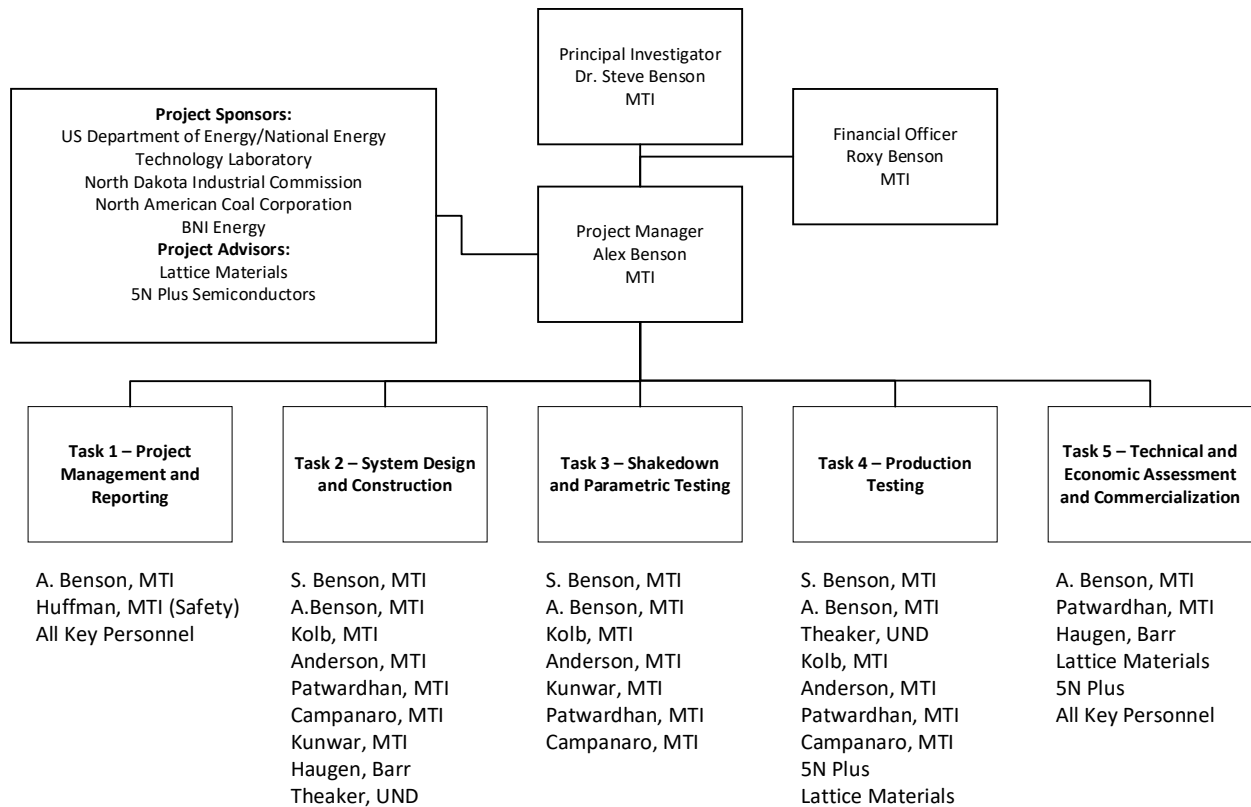


Figure 2. Project organizational chart.

9.0 TIMETABLE

The project is expected to take 36 months to complete. The timeline is shown in Figure 3.

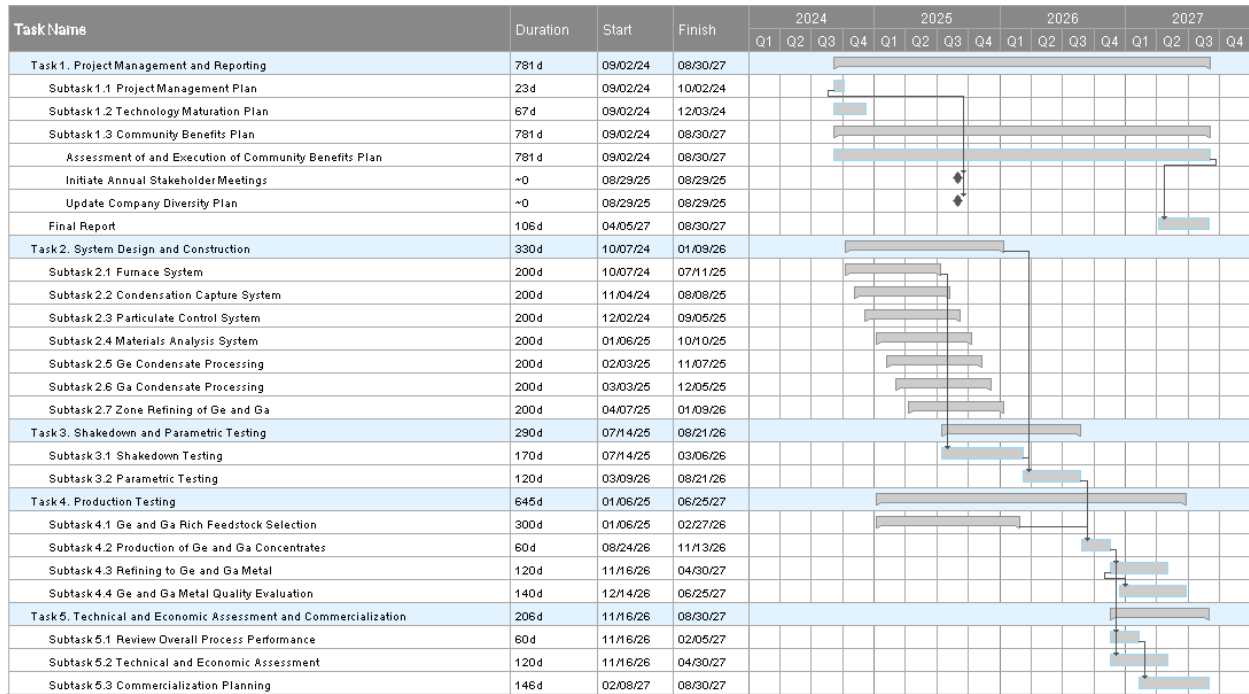


Figure 3. Proposed project timeline.

10.0 BUDGET

The overall project and subrecipient budgets are summarized in Table 2. The total budget for the project is \$3,135,483. The costs are shared by the DOE for a total of \$2,499,978 that covers the cost of personnel, travel, equipment, supplies, analysis, indirect, and general and administrative (G&A). Note that the indirect and G&A rates are approved by the US Department of Energy. The NDIC share of the overall budget is \$376,000 that covers personnel, indirect, and G&A costs.

Table 1. Overall Project Budget.

Budget Category:	Total Budget	DOE	NDIC Cash	NACC Cash	MTI Cash	Inkind	Total
	Incl. Cost Share	Share	Cost Share	Cost Share	Cost Share	Cost Share	Budget
Personnel	\$ 672,657.00	\$ 486,221.00	\$ 166,508.00	\$ 19,928.00			\$ 672,657.00
Fringe	\$ 242,157.00	\$ 175,040.00	\$ 59,943.00	\$ 7,174.00			\$ 242,157.00
Total Personnel	\$ 914,814.00	\$ 661,261.00	\$ 226,451.00	\$ 27,102.00			\$ 914,814.00
Travel	\$ 24,238.00	\$ 24,238.00					\$ 24,238.00
Equipment	\$ 594,419.00	\$ 594,419.00					\$ 594,419.00
Supplies	\$ 39,479.00	\$ 39,479.00					\$ 39,479.00
Subrecipient - UND	\$ 415,000.00	\$ 380,000.00				\$ 35,000.00	\$ 415,000.00
Subrecipient - Barr Eng.	\$ 290,880.00	\$ 280,880.00				\$ 10,000.00	\$ 290,880.00
Subrecipient - Inkind - NACC	\$ 75,420.00					\$ 75,420.00	\$ 75,420.00
Subrecipient - Inkind - BNI Energy	\$ 20,000.00					\$ 20,000.00	\$ 20,000.00
Subrecipient - Inkind - Lattice Materials	\$ 10,000.00					\$ 10,000.00	\$ 10,000.00
Subrecipient - Inkind - 5N Plus	\$ 56,085.00					\$ 56,085.00	\$ 56,085.00
Ventilation Contractor - Inkind - MTI	\$ 8,000.00				\$ 8,000.00		\$ 8,000.00
Analysis	\$ 48,430.00	\$ 48,430.00	\$ -	\$ -			\$ 48,430.00
Total Direct Costs	\$ 2,496,765.00	\$ 2,028,707.00	\$ 226,451.00	\$ 27,102.00	\$ 8,000.00	\$ 206,505.00	\$ 2,496,765.00
Indirect Costs	\$ 322,106.00	\$ 232,829.00	\$ 79,734.00	\$ 9,543.00			\$ 322,106.00
G&A Costs	\$ 316,612.00	\$ 238,442.00	\$ 69,815.00	\$ 8,355.00			\$ 316,612.00
Total Indirect Costs	\$ 638,718.00	\$ 471,271.00	\$ 149,549.00	\$ 17,898.00	\$ -	\$ -	\$ 638,718.00
Total Direct & Indirect Costs	\$ 3,135,483.00	\$ 2,499,978.00	\$ 376,000.00	\$ 45,000.00	\$ 8,000.00	\$ 206,505.00	\$ 3,135,483.00

11.0 MATCHING FUNDS

Approximately 80% of the project costs are covered by the US DOE. The remaining 20% of the costs are covered by NDIC (\$376,000), 5N Plus (\$56,085), Barr Engineering (\$10,000), BNI Coal (\$20,000), Lattice Materials (\$10,000), Microbeam Technologies Inc (\$8,000), North American Coal Corporation (\$120,420), and University of North Dakota (\$35,000). The cost share is described as follows:

- NACC is providing \$120,420 in the form of cash that will cover personnel, indirect, and G&A and inkind support to identify and provide coal for testing.
- Microbeam will provide \$8,000 in cash that covers the installation of ventilation equipment.
- UND will provide inkind support of \$35,000 to produce MREC.
- Barr Engineering will provide inkind support of \$10,000 for engineer design and support.
- BNI Energy will provide inkind support of \$20,000 for use in identifying potential optimum lignite properties for testing.

- Lattice Materials will provide inkind support of \$10,000 for consultation on the quality of germanium metal produced required for the manufacture of products for defense and commercial applications.
- 5 NPlus semiconductors will provide inkind support of \$56,085 to perform refining tests on the germanium and gallium rich concentrates to produce metals.

12.0 TAX LIABILITY

None – See statement in Appendix

13.0 CONFIDENTIAL INFORMATION

None

14.0 APPENDICES

14.1 Resumes

14.2 Project Letters of Commitment

14.3 DOE Award Letter

14.4 Tax Liability Statement

IDENTIFYING INFORMATION:

NAME: Benson, Steven

POSITION TITLE: President

PRIMARY ORGANIZATION AND LOCATION: Microbeam Technologies Incorporated, Grand Forks, North Dakota, United States

Professional Preparation:

ORGANIZATION AND LOCATION	DEGREE (if applicable)	RECEIPT DATE	FIELD OF STUDY
Pennsylvania State University, University Park, Pennsylvania, United States	PHD	05/1987	Fuel Science
Minnesota State University, Moorhead, Minnesota, United States	BS	07/1977	Chemistry

Appointments and Positions

1991 - present President, Microbeam Technologies Incorporated, Grand Forks, North Dakota, United States

2015 - 2017 Associate Vice President for Research, Energy & Environmental Research Center, University of North Dakota, Grand Forks, North Dakota, United States

2010 - 2014 Chair Petroleum Engineer Department and Director Institute for Energy Studies, University of North Dakota, Grand Forks, North Dakota, United States

2008 - 2010 Professor, Chemical Engineering, University of North Dakota, Grand Forks, North Dakota, United States

1994 - 2008 Associate Director for Research/Senior Research Manager, Energy & Environmental Research Center, University of North Dakota, Grand Forks, North Dakota, United States

1986 - 1994 Senior Research Manager, Energy & Environmental Research Center, University of North Dakota, Grand Forks, North Dakota, United States

1984 - 1987 Graduate Research Assistant, Pennsylvania State University, University Park, Pennsylvania, United States

1983 - 1984 Research Supervisor, UND Energy Research Center, Grand Forks, North Dakota, United States

1977 - 1983 Research Chemist, ERDA and US DOE, Grand Forks Energy Technology Center, Grand Forks, North Dakota, United States

Products**Products Most Closely Related to the Proposed Project**

1. Laudal DA, Benson SA, Addleman RS, Palo D. Leaching behavior of rare earth elements in Fort Union lignite coals of North America. International Journal of Coal Geology. 2018 April 15; 191:112.
2. Daniel LA, Benson SA, Palo D, Addleman AS. Rare Earth Elements in North Dakota Lignite Coal and Lignite-Related Materials. ASME, J. Energy Resour. Technology. 2018 April 09;

140(6):062205.

3. James DW, Krishnamoorthy G, Benson SA. Modeling trace element partitioning during coal combustion. *Fuel Processing Technology*. 2014; 126:284.
4. Fuka M, Kolb E, Benson A, Benson S. System and Method for Predicting the Presence of Rare Earth Elements. Patent No. US 11,733,184 B2. 2023 August 22.
5. Laudal D, Benson S. Rare Earth Extraction from Coal. US Patent US 10,669,610 B2. 2020 June 02.

Other Significant Products, Whether or Not Related to the Proposed Project

1. Benson S, Patwardhan S, Stadem D, Langfeld J. Energy System Performance Manager. US Patent Application 63/159762. 2021 March 11.
2. Mota R, Krishnamoorthy G, Dada O, Benson S. Hydrogen rich syngas production from oxy-steam gasification of a lignite coal – A design and optimization study. *Applied thermal engineering*. 2015 November 01; 90:13.
3. Benson SA., Laumb M. The Path to Higher Availability Through Reduced Syngas Cooler Fouling. *Gasification Technologies Conference*. 2007 October 14.
4. Van Dyk JC, Waanders FB, Benson SA, Laumb M. Viscosity Predictions of the slag composition of gasified coal, utilizing FactSage equilibrium modeling. *Fuel*. 2009; 88:67.
5. Patwardhan S, Stadem D, Benson S, Krishnamoorthy G. Modeling Ash Partitioning in Slagging Energy Conversion Systems. *Pittsburgh Coal Conference*. 2022 September 19.

Synergistic Activities

1. College of Earth and Mineral Science Alumni Achievement Award, Pennsylvania State University, 2002;
2. Science and Technology Award, Impacts of Fuel Impurities Conference, 2014.
3. UND Spirit Award for Teaching and Research, 2013

Certification:

When the individual signs the certification on behalf of themselves, they are certifying that the information is current, accurate, and complete. This includes, but is not limited to, information related to domestic and foreign appointments and positions. Misrepresentations and/or omissions may be subject to prosecution and liability pursuant to, but not limited to, 18 U.S.C. §§ 287, 1001, 1031 and 31 U.S.C. §§ 3729-3733 and 3802.

Certified by Benson, Steven in SciENev on 2023-10-12 16:14:26

IDENTIFYING INFORMATION:

NAME: Benson, Alexander

POSITION TITLE: Sr. Project Manager

PRIMARY ORGANIZATION AND LOCATION: Microbeam Technologies Inc., Minnetonka, Minnesota, United States

Professional Preparation:

ORGANIZATION AND LOCATION	DEGREE (if applicable)	RECEIPT DATE	FIELD OF STUDY
University of St Thomas., St. Paul, Minnesota, United States	BS	12/2011	Mechanical Engineering

Appointments and Positions

2019 - present Sr. Project Manager, Microbeam Technologies Inc., Minnetonka, Minnesota, United States

2017 - 2019 Sr. Research Engineer (part-time), Microbeam Technologies Inc., Denver, Colorado, United States

2017 - 2019 Manufacturing Manager, Medtronic - Minimally Invasive Technology Group, Boulder, Colorado, United States

2016 - 2017 Sr. Product Engineer, Medtronic - Minimally Invasive Technology Group, Boulder, Colorado, United States

2015 - 2016 Sr. Manufacturing Engineer, Medtronic Energy and Component Center, Minneapolis, Minnesota, United States

2012 - 2015 Manufacturing Engineer, American Medical Systems, Minnetonka, Minnesota, United States

2007 - 2012 Lab Assistant (part-time), Microbeam Technologies Inc, Grand Forks, North Dakota, United States

Products**Products Most Closely Related to the Proposed Project**

1. Fuka M, Kolb E, Benson A, Benson S., inventors. Microbeam Technologies, Inc., assignee. System And Method For Predicting Abundance Of Rare Earth Elements. United States of America 11,733,184. 2022 February 11.
2. Benson A, Benson S, Kolb E, Fuka M. Development of Low-Cost Rare Earth Element Analysis and Sorting Methods. [revised 2021 January]. [Print]. 2017 July. Other: Contract No. FY18-LXXXIII-213

Other Significant Products, Whether or Not Related to the Proposed Project

1. Benson S, Patwardhan S, Stadem D, Langfeld J, Benson A, Desell T. Application of Condition Based Monitoring and Neural Networks to Predict the Impact of Ash Deposition on Plant Performance. Accepted for presentation at 28th International Conference on the Impact of Fuel Quality on Power Production and the Environment, 2022.; 2022.

Synergistic Activities

1. "Development of Low-Cost Rare Earth Element Analysis and Sorting Method" - North Dakota Industrial Commission funded research project. Developing an REE predictive algorithm to be used with pXRF and PGNAA to assist in the exploration, identification, and sorting of REE in coal.
2. "Recovery of Lanthanides from Coal - chapter in DOE Rare Earth Elements in Coal and Coal Byproducts book. Submitted for review.
3. "Investigation of Rare Earth Element Extraction From North Dakota Coal-Related Feedstocks" (DE-FOA-0001202). Subcontract to University of North Dakota.
4. "Conceptual Design of a One Ton Per Day Rare Earth Oxide Extraction and Concentration Plant from Low-Rank Coal Resources" (89243320RFE000032). Subcontract to University of North Dakota.

Certification:

When the individual signs the certification on behalf of themselves, they are certifying that the information is current, accurate, and complete. This includes, but is not limited to, information related to domestic and foreign appointments and positions. Misrepresentations and/or omissions may be subject to prosecution and liability pursuant to, but not limited to, 18 U.S.C. §§ 287, 1001, 1031 and 31 U.S.C. §§ 3729-3733 and 3802.

Certified by Benson, Alexander in SciENcv on 2023-10-07 16:35:38

IDENTIFYING INFORMATION:

NAME: Kolb, Eric

POSITION TITLE: Research Engineer

PRIMARY ORGANIZATION AND LOCATION: Microbeam Technologies Inc., Minnetonka ,
Minnesota, United States**Professional Preparation:**

ORGANIZATION AND LOCATION	DEGREE (if applicable)	RECEIPT DATE	FIELD OF STUDY
University of North Dakota , Grand Forks , North Dakota, United States	BS	12/2020	Mechanical Engineering

Appointments and Positions

2021 - present Research Engineer , Microbeam Technologies Inc., Minnetonka , Minnesota, United States

2020 - 2021 Associate Research Engineer , Microbeam Technologies Inc., Grand Forks , North Dakota, United States

2019 - 2020 Intern, Microbeam Technologies Inc , Grand Forks , North Dakota, United States

Products**Products Most Closely Related to the Proposed Project**

1. Benson A, Benson S, Fuka M, Kolb E. Development of Low-Cost Rare Earth Element Analysis and Sorting Methods. [revised 2021 January]. [Print]. 2017 July. Other: Contract No. FY18-LXXXIII-213
2. Benson A, Benson S, Fuka M, Kolb E., inventors. Microbeam Technologies Inc., assignee. System And Method For Predicting Abundance Of Rare Earth Elements With Handheld X-Ray Fluorescence. United States of America 11,733,184. 2021 February 11.

Other Significant Products, Whether or Not Related to the Proposed Project**Synergistic Activities**

1. "Rare Earth Element Extraction and Concentration at Pilot-Scale from North Dakota Coal-Related Feedstocks"(DE-FE0031835). Subcontract to the University of North Dakota. Assisting the University with design, construction, and operation of the pilot- scale facility.
2. "Conceptual Design of a One Ton Per Day Rare Earth Oxide Extraction and Concentration Plant from Low-Rank Coal Resources" (89243320RFE000032). Subcontract to University of North Dakota. Assisting the University of North Dakota in writing a National Instrument (NI) 43-101 technical report on the extraction and concentration plant.
3. "Development of of Low-Cost Rare Earth Element Analysis and Sorting Method" - North Dakota Industrial Commission funded research project. Developing an REE predictive algorithm to be used with pXRF and PGNAAs to assist in the exploration, identification, and sorting of REE in coal
4. Fundamentals of Mineral and Metallurgical Processing Short Course. This class was studying common theory's and practices of mineral and metallurgical processing hosted by the Society of

Mining Engineering.

Certification:

When the individual signs the certification on behalf of themselves, they are certifying that the information is current, accurate, and complete. This includes, but is not limited to, information related to domestic and foreign appointments and positions. Misrepresentations and/or omissions may be subject to prosecution and liability pursuant to, but not limited to, 18 U.S.C. §§ 287, 1001, 1031 and 31 U.S.C. §§ 3729-3733 and 3802.

Certified by Kolb, Eric in SciENev on 2023-10-10 09:15:55

Dr. Daniel A. Laudal, Research Professor and Executive Director, University of North Dakota
daniel.laudal@und.edu | 701-777-5745

Education and Training

University of North Dakota	Chemical Engineering	B.S. 2006
University of North Dakota	Chemical Engineering	Ph.D. 2017

Research and Professional Experience

2022-Present Executive Director, UND College of Engineering & Mines Research Institute

Leading the research division of the College of Engineering & Mines.

2021-Present Research Professor and Director, UND Energy & Minerals Innovation Center (EMIC)

Leading the research programs in Energy and Minerals at the College of Engineering & Mines. Help realize the EMIC goal of developing UND into a premier “Energy University” that “inspires the creation of new knowledge to enable the development of revolutionary energy technologies, train the next generation of energy experts, and establish advanced industries required to make affordable emissions free energy technologies a reality”. Responsibilities include identifying key technical and economic barriers to the development of secure, affordable, and reliable energy production technologies; identifying proposal opportunities and develop new relationships with potential partners; and drawing from resources across campus building teams to deliver the research, education, and outreach required to meet the needs of public and private partners.

2019-2021 Environmental Manager / Project Tundra Project Manager, Minnkota Power Coop.

Led the environmental regulatory compliance and environmental planning efforts for a generation & transmission cooperative serving eastern ND and northwestern MN. As Project Tundra Project Manager, led Minnkota’s development of a \$1.5B world-scale carbon capture and storage project for the Milton R. Young Station, a lignite coal fired power plant in ND. Responsibilities included leading development of the design, permitting and financing of the carbon capture plant and geologic storage facility.

2016-2018 Manager: Major Projects, UND Institute for Energy Studies (IES).

Primary roles included developing and writing funding proposals, managing research projects, coordinating IES research staff and students, and process design/development of innovative solutions to challenges in the energy industry. Principal Investigator or Project Manager or several DOE, State and industry funded projects. Research focused on the following major areas: carbon management for the power industry, production of co-products from coal and associated materials, value-added opportunities/technology development for North Dakota’s energy industries.

2012-2015 Research Engineer, UND Institute for Energy Studies.

Lead researcher or principal investigator on several federal, state and industry funded projects. Work involved early-stage R&D of novel processes and technologies, primarily focusing on laboratory- and bench-scale demonstrations. Areas of focus included chemical looping combustion and post combustion carbon dioxide capture.

2008-2012 Research Engineer, UND Energy & Environmental Research Center.

Research involved design and operation of various lab and pilot-scale gasification, combustion and advanced power systems. Gained invaluable experience with high pressure and high temperature systems and fluidized beds.

2006-2008 Field Engineer, Schlumberger Oilfield Services.

Design, execution and evaluation of well cementing operations in the Williston Basin.

Selected Publications/Patents

Laudal, D., Benson, S. "Rare earth element extraction from coal." U.S. Patent No. 10,669,610. March 2017

Theaker, N., **Laudal, D.**, Lucky, C. "Generation of rare earth elements from organically associated leach solutions." U.S. Patent Application No. 17/519,346. Filed May 2022.

Theaker, N., **Laudal, D.** "Method for leaching rare earth elements and critical minerals from organically associated materials." U.S. Patent Application No. 17/519,341. Filed May 2022.

Laudal, D., Benson, S., Addleman, S., Palo, D. "Leaching behavior of rare earth elements in Fort Union lignite coals of North America." *International Journal of Coal Geology* 191 (2018) 112-124.

Laudal, D., Benson, S., Addleman, S., Palo, D. "Rare earth elements in North Dakota lignite coal and lignite-related materials." *ASME Journal of Energy Resources and Technology* 140 (2018).

Park, D., Middleton, A., Smith, R., Deblonde, G., **Laudal, D.**, Theaker, N., Hsu-Kim, H., Jia, Y. "A biosorption-based approach for selective extraction of rare earth elements from coal byproducts." *Separation and Purification Technology*. Volume 241:116726. June 2020.

Van der Watt, J.G., **Laudal, D.**, Krishnamoorthy, G., Feilen, H., Mann, M., Shallbetter, R., Nelson, T., Srinivasachar, S. "Development of a spouted bed reactor for chemical looping combustion." *Journal of Energy Resources and Technology*. 140(11), 112002 (8 pages), November 2018.

Nelson, T., van der Watt, J.G., **Laudal, D.**, Feilen, H., Mann, H., Srinivasachar, S. "Reactive jet and cyclonic attrition analysis of ilmenite in chemical looping combustion systems." *International Journal of Greenhouse Gas Control*. Volume 91, December 2019, 102837.

Nasah, J., Jensen, B., Dyrstad-Cincotta, N., Gerber, J., **Laudal, D.**, Mann, M., Srinivasachar, S. "Method for separation of coal conversion products from oxygen carriers." *International Journal of Greenhouse Gas Control*. Volume 88, September 2019, pages 361-370.

Emerson, S., Zhu, T., Davis, T. Peles, A., She, Y., Willigan, R., Vanderspurt, T., Swanson, M., **Laudal, D.** "Liquid Phase Reforming of Woody Biomass to Hydrogen". *International Journal of Hydrogen Energy*, August 2013.

Synergistic Activities

Dr. Laudal's technical areas of expertise include carbon capture, utilization and storage, critical mineral and rare earth processing technologies, coal utilization, and carbon-based products. His PhD research involved evaluation of lignite coals as a resource of critical minerals, including the development of a new processing technology that led to one patent issued, two patents pending, and a series of DOE-, state- and industry-funded R&D projects to continue research in this area. Dr. Laudal is currently leading UND's Phase 1 project under DE-FE0032295 (DE-FOA-0002618) that is performing a front-end engineering & design and business plan to commercialize the patented technology.

Nolan L. Theaker

Technical Group Manager – Critical Minerals, Institute for Energy Studies
University of North Dakota, Grand Forks, ND 58202

Education and Training

University of Louisville	Chemical Engineering	B.S. 2016
University of Louisville	Chemical Engineering	M.Eng. 2017
University of North Dakota	Chemical Engineering	Pursuing PhD

Research and Professional Experience

2017-Present Technical Group Manager, UND Institute for Energy Studies.

Responsibilities include high-level innovative research and development of novel concepts for submission of funding proposals. Coordinated and led efforts associated with downstream rare earth element concentration operations that have resulted in the development of final process flow diagrams and process designs. Principle Investigator to \$6.5M pilot-scale REE extraction and concentration project, as well as PI/Co-PI on 7 other proposals, managing up to \$10M in total project funds involving pilot-scale design, construction, and operation; resource identification and quantification; engineering-scale economic and engineering analyses; and novel process development and commercialization. Key contributor/PI to multiple proposals involving REE/CM extraction and/or concentration from multiple, conventional and unconventional feedstocks. Proposed efforts associated with coal conversion and value improvement using chemical/thermal methods. Co-PI for project involving CO₂ utilization from coal-derived flue gases.

2016-2017 Research Assistant, University of Louisville Conn Center.

Research involved design and operation of multi-stage electrochemical reactor scheme for efficient production of fuels from CO₂. Developed nano-functionalized electrocatalysts for improvements in activity and selectivity for targeted reactions in two phase reaction systems. Implemented phase-segregation devices for multi-step electrochemical reaction system, with planned production cost below research benchmarks to date.

2014-2015 Co-op Engineer, University of Kentucky CAER.

Research involved improvement and operation of a DOE bench-scale CO₂ capture unit in multiple reaction conditions, including enzymatic and amine-based systems. Evaluation and comparison of catalyst performance in a holistic view for CO₂ capture was conducted, including novel organic and enzymatic catalysts. Implemented system changes for improved user functionality of the system, including development of control systems and equipment selection for easy manual usage.

Publications/Presentations

- Theaker, N.**, Strain, J. M., Kumar, B., Brian, J. P., Kumari, S., & Spurgeon, J. M. (2018). Heterogeneously Catalyzed Two-Step Cascade Electrochemical Reduction of CO₂ to Ethanol. *Electrochimica Acta*, 274, 1-8. doi:10.1016/j.electacta.
- Park, D., Middleton, A., Smith, R., Laudal, D., **Theaker, N.**, Hsu-Kim, H., Jiao, Y. A Biosorption-based approach for the selective extraction of REEs from coal byproducts. *Separation and Purification Technology*. 2020.

3. Dong, Z; Deblonde, G; Middleton, A; Hu, D; Dohnalkova, A; Kovarik, L; Qafoku, O; Shutthanandan, S; Jin, H; Hsu-Kim, H; **Theaker, N**; Jiao, Y; Park, D. “Microbe Encapsulated Silica Gel Biosorbent for Selective Extraction of Scandium from Coal Byproducts.” *Environmental Science and Technology*. 2021.
4. Mann, M; **Theaker, N**; Benson, S; Palo, D. “Investigation of Rare Earth Element Extraction from North Dakota Coal-Related Feedstocks – Final Report”. Submitted March 31, 2020.
5. Mann, M., **Theaker, N.**, Ling, A., Haugen, C., Winburn, R., Brewer, J., Benson, S., Benson, A., James, D., Goven, G., Koenig, A, Srinivasachar, S. “Feasibility Study of a One Tonne per day Rare Earth Extraction and Concentration Plant from Low-Rank Coal Resources.” Submitted January 28, 2022.
6. **Theaker, N.**, Rew, B., Laudal, D., Mann, M. Investigation of rare earth element extraction from North Dakota Coal-Related Feed Stocks. 2019 NETL Annual Crosscutting Projects Review Meeting. April 9th, 2019. Pittsburgh, PA.
7. **Theaker, N.** “Extraction of Rare Earth Elements from Lignite Coal – Kinetics of Extraction and Bench-Scale Updates.” 2019 Annual Society of Mining Engineering” Presented February 2, 2019.
8. Zygarlicke, C; Folkedahl, B; Feole, I; Kurz, B; **Theaker, N**; Benson, S; Hower, J; Eble, C. “Rare-Earth Elements (REEs) in U.S. Coal-Based Resources: Sampling, Characterization, and Round-Robin Interlaboratory Study – Final Report”. Submitted September 30th, 2019.
9. Gautam, M; Hofsommer, D. T; **Theaker, N**; Paxton, W. F; Grapperhaus, C. A; Spurgeon, J. M. "The effect of flue gas contaminants on electrochemical reduction of CO₂ to methyl formate in a dual methanol/water electrolysis system." *Chem Catalysis*, 2022.
10. Spurgeon, J; **Theaker, N**; Phipps, C; Uttarwar, S; Grapperhaus, C. A. "A Comparative Technoeconomic Reduction of CO₂ with Methanol to Produce Methyl Formate." *ACS Sustainable Chemistry & Engineering*, 2022.

Patents/Applications:

1. Theaker, Nolan; Laudal, Dan. 2020. Method for Leaching Rare Earth Elements and Critical Minerals from Organically Associated Materials. USA. 63/112,846A, filed Nov. 12, 2020.
2. Theaker, Nolan; Laudal, Dan; Lucky, Christine. 2020. Generation of Rare Earth Elements from Organically-Associated Leach Solutions. USA. 63/112,842A, filed Nov. 12, 2020.

Synergistic Activities

Mr. Theaker’s principal area of research interest include energy, fuels, and alternative critical material research. These include developing alternative uses and sources of fuels and valuable materials, both carbon and mineral based, as well as developing new and unconventional sources of energy-critical materials.

*NAME Haugen, Chad

*Required fields

ORCID ID (Optional)

*POSITION TITLE Senior Process Engineer

*PRIMARY ORGANIZATION & LOCATION Barr Engineering Co., Minneapolis, Minnesota, U.S.

*PROFESSIONAL PREPARATION - (see [PAPPG Chapter II.D.2.h.i.a.3](#))

PREVIOUS ORGANIZATION(S) & LOCATION(S)	DEGREE (if applicable)	RECEIPT DATE* (MM/YYYY)	FIELD OF STUDY
University of North Dakota, Grand Forks, North Dakota, United States	BS	05/2008	Chemical Engineering

Note - For Fellowship applicants only, please include the start date of the Fellowship.

*APPOINTMENTS AND POSITIONS - (see [PAPPG Chapter II.D.2.h.i.a.4](#))

Start Date - End Date	Appointment or Position Title, Organization, and Location
2018 - present	Senior Process Engineer, Barr Engineering Co., Minneapolis, Minnesota, United States
2012 - 2018	Process Engineer, Barr Engineering Co., Minneapolis, Minnesota, United States
2008 - 2012	Production Engineer and Shift Supervisor, Archer Daniels Midland, Corn Processing Division, Marshall, Minnesota, United States

***Synergistic Activities - (see [PAPPG Chapter II.D.2.h.\(i\)\(a\)\(6\)](#))**

1. Professional Engineer registration in Minnesota and Illinois.
2. Member of American Institute of Chemical Engineers (AIChE) from 2023 to the present.

***Certification:**

When the individual signs the certification on behalf of themselves, they are certifying that the information is current, accurate, and complete. This includes, but is not limited to, information related to domestic and foreign appointments and positions. Misrepresentations and/or omissions may be subject to prosecution and liability pursuant to, but not limited to, 18 U.S.C. §§287, 1001, 1031 and 31 U.S.C. §§3729-3733 and 3802.

Signature

(Please type out full name): Chad Andrew Haugen

Date: 10/12/2023



UND.edu

COLLEGE OF ENGINEERING & MINES

Office of the Dean
Upton II, Room 165
243 Centennial Dr Stop 8155
Grand Forks, ND 58202-8155
Phone: 701.777.3411
Fax: 701.777.4838
Website: engineering.UND.edu

October 20, 2023

Alexander Benson
Sr. Project Manager
Microbeam Technologies Inc.
4200 James Ray Drive, Ste 193
Grand Forks, ND 58202

Re: Support of the proposal entitled "Production of Germanium and Gallium Concentrates for Industrial Processes" submitted in response to DE-FOA-0002619 "Bipartisan Infrastructure Law (BIL) – Advanced Processing of Critical Minerals and Materials for Industrial and Manufacturing Applications".

Dear Mr. Benson:

The University of North Dakota, College of Engineering & Mines (UND) is pleased to team with Microbeam Technologies Inc. to design, construct, and operate a bench-scale unit to produce germanium and gallium from mixed rare earth element (MREE) concentrates.

UND will work with Microbeam to test the Ge concentrates that are produced from the bench-scale for use in further purification and refinement processes. UND will produce the MREE that will be used as a feedstock in this project through our existing pilot-scale REE extraction facility. In addition to providing the feedstock for the project, UND will assist in the process design, techno-economic assessment, and commercialization efforts. The proposed technology can be integrated at the commercial scale with UND's REE processing plant, so it is critical that UND be involved in discussions related to the supply chain development of the Ge/Ga production process.


The total cost of UND's work in this project is \$415,000. Of this, UND commits to providing up to \$35,000 as in-kind cost share in the form of salary, fringe benefits, and indirect costs associated with the effort of faculty and senior researchers at UND (Dr. Daniel Laudal and Mr. Kevan Rusk) who will contribute to the techno-economic analysis and commercialization planning efforts. Our attached budget justification provides full details. If you have any question or require additional information, please contact UND's project manager, Nolan Theaker at nolan.theaker@und.edu.

We look forward to continuing our collaborations with the Microbeam team.

Sincerely

DocuSigned by:

9CFF8579D0B9464...
Daniel Laudal, Ph.D.
Executive Director
College of Engineering & Mines Research Institute
University of North Dakota
daniel.laudal@und.edu

DocuSigned by:

DD9BE15BC81D4AA...
Karen Katrinak
Karen Katrinak, Ph.D.
Proposal Development Officer
Research and Sponsored Programs Development
University of North Dakota
karen.katrinak@und.edu

October 20, 2023

Mr. Alexander Benson
Sr. Project Manager
Microbeam Technologies Inc.
4200 James Ray Drive, Ste 193
Grand Forks, ND 58202

Re: Support of the proposal entitled "Production of Germanium and Gallium Concentrates for Industrial Processes" submitted in response to DE-FOA-0002619 "Bipartisan Infrastructure Law (BIL) – Advanced Processing of Critical Minerals and Materials for Industrial and Manufacturing Applications"

Dear Mr. Benson:

Barr Engineering Co. is pleased to team with Microbeam Technologies Inc. to design, construct, and operate a bench-scale unit to produce germanium and gallium from mixed rare earth element (MREE) concentrates. Having worked with Microbeam on previous DOE-funded projects along with others, Barr has the experience to assist Microbeam in successfully executing this project.

Barr will work with the Microbeam team to assist in the project's subsystem designs, technical and economic assessment (TEA), and commercialization planning tasks. With our extensive experience in process development, process modeling, and engineering related to mineral processing, Barr will provide Microbeam with the required tools and insights to evaluate and scale the proposed technology fully.

The DOE-funded share of Barr's participation in this 36-month project is \$280,880. These costs cover Barr's contributions to Task 1: Project Management and Reporting, Task 2: System Design and Construction/Setup, and Task 5: Technical and Economic Assessment and Commercialization. In conducting these tasks, Barr proposes to provide up to \$10,000 of in-kind cost share through a combination of software fees, staff labor, and travel expenses. If you have questions or require additional information, please contact Chad Haugen by phone at 218-779-9776 or by email at chaugen@barr.com.

Sincerely,

A handwritten signature in blue ink that reads "Chad Haugen".

Chad Haugen, PE
Senior Process Engineer
Project Manager

A handwritten signature in blue ink that reads "Daniel R. Palo".

Daniel R. Palo, PhD, P.Eng., PE
Vice President and Senior Process Engineer
Principal in Charge

North American COAL

October 27, 2023

Alexander Benson
Sr. Project Manager
Microbeam Technologies Inc.
4200 James Ray Drive, Ste 193
Grand Forks, ND 58202

Re: Support of the proposal entitled "Production of Germanium and Gallium Concentrates for Industrial Processes" submitted in response to DE-FOA-0002619 "Bipartisan Infrastructure Law (BIL) – Advanced Processing of Critical Minerals and Materials for Industrial and Manufacturing Applications".

Dear Mr. Benson:

North American Coal Corporation (NACC) is pleased to team with Microbeam Technologies Inc. to design, construct, and operate a bench-scale unit to produce germanium and gallium from mixed rare earth element (MREE) concentrates.

NACC will work with Microbeam to select and procure a lignite resource with high germanium and gallium to be used for testing and to participate in the technical and economical assessments. It is estimated that 30-60 tons of lignite will be required for the testing efforts in this project. The ability to domestically produce Ge and Ga for industrial applications is important to the US economy. This technology could produce a valuable opportunity to current mine wastes.

NACC will provide up to \$120,000 in the form of cash and in-kind cost share. NACC will provide \$15,000 in cash per year, totaling \$45,000 for the entirety of the project. The \$75,000 of in-kind cost share will be a result of the costs from personnel time related to selection of a resource and participation in TEA development and the costs of collecting 30-60 tons of lignite.

If you have questions and require additional information, please contact me or Gerard Goven at (701) 250-2604, gerard.goven@nacoal.com.

Sincerely,
THE NORTH AMERICAN COAL CORPORATION



Carroll L. Dewing
Senior Vice President and Chief Operating Officer

PHONE (701) 355-5588



FAX (701) 794-3125

A BNI ENERGY COMPANY

October 20, 2023

Alexander Benson
Sr. Project Manager
Microbeam Technologies Inc.
4200 James Ray Drive, Ste 193
Grand Forks, ND 58202

Re: Support of the proposal entitled "Production of Germanium and Gallium Concentrates for Industrial Processes" submitted in response to DE-FOA-0002619 "Bipartisan Infrastructure Law (BIL) – Advanced Processing of Critical Minerals and Materials for Industrial and Manufacturing Applications".

Dear Mr. Benson:

BNI Coal is pleased to team with Microbeam Technologies Inc. to design, construct, and operate a bench-scale unit to produce germanium and gallium from mixed rare earth element (MREE) concentrates.

BNI will work with Microbeam to select and procure a lignite resource with high germanium and gallium to be used for testing and to participate in the technical and economical assessments. It is estimated that 30 tons of lignite will be required for the testing efforts in this project. The ability to domestically produce Ge and Ga for industrial applications is important to the US economy. This technology could produce a valuable opportunity to current mine wastes.

BNI will provide \$20,000 in the form of in-kind cost share. The cost share will be a result of the costs from personnel time related to selection of a resource and participation in TEA development and the costs of collecting approximately 30 tons of lignite. If you have questions and require additional information, please contact Jon Rudnick by phone at 701-355-5530 or by email at jrudnick@bnicoal.com.

Sincerely,

A handwritten signature in black ink, appearing to read "Mike Heger", with a long horizontal line extending to the right.

Mike Heger
General Manager



October 20, 2023

Alexander Benson
Sr. Project Manager
Microbeam Technologies Inc.
4200 James Ray Drive, Ste 193
Grand Forks, ND 58202

Re: Support of the proposal entitled "Production of Germanium and Gallium Concentrates for Industrial Processes" submitted in response to DE-FOA-0002619 "Bipartisan Infrastructure Law (BIL) – Advanced Processing of Critical Minerals and Materials for Industrial and Manufacturing Applications".

Dear Mr. Benson:

5N Plus is pleased to team with Microbeam Technologies Inc. to design, construct, and operate a bench-scale unit to produce germanium and gallium from mixed rare earth element (MREE) concentrates.

5N Plus will work with Microbeam to test the Ge concentrates that are produced from the bench-scale for use in further purification and refinement processes. 5N Plus operates a commercial level Ge recycling facility in Utah but also has laboratory-scale equipment that will be able to simulate a commercial application for dechlorination, hydrolysis, reduction, and zone refining. The ability to domestically produce Ge and Ga for industrial applications is important to the US economy. In addition to the testing of Microbeam's Ge concentrates, 5N Plus will provide input on technical and economic evaluations and commercialization opportunities.

5N Plus will conduct testing and advisory services as part of in-kind cost share for a total of \$56,000 for the project. If you have questions and require additional information, please contact Jason Merrell by phone at 801-808-5938 or by email at Jason.Merrell@5nplus.com.

Sincerely,

A handwritten signature in blue ink, appearing to read "Jason Merrell".

Jason Merrell, PhD
Director of Engineering
& Technology Development



October 12, 2023

Alexander Benson
Sr. Project Manager
Microbeam Technologies Inc.
4200 James Ray Drive, Ste 193
Grand Forks, ND 58202

Re: Support of the proposal entitled "Production of Germanium and Gallium Concentrates for Industrial Processes" submitted in response to DE-FOA-0002619 "Bipartisan Infrastructure Law (BIL) – Advanced Processing of Critical Minerals and Materials for Industrial and Manufacturing Applications".

Dear Mr. Benson:

Lattice Materials is pleased to team with Microbeam Technologies Inc. to design, construct, and operate a bench-scale unit to produce germanium and gallium from mixed rare earth element (MREE) concentrates.

Lattice Materials will work with Microbeam to test the Ge concentrates that are produced from the bench-scale for use in further purification and refinement processes. Lattice Materials has laboratory-scale equipment that will be able to assist in evaluating the feasibility of the Ge produced from this technology. The ability to domestically produce Ge and Ga for industrial applications is important to the US economy. In addition to the testing of Microbeam's Ge concentrates, Lattice Materials will provide input on technical and economic evaluations and commercialization opportunities.

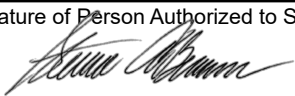
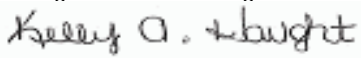
Lattice Materials will conduct testing and advisory services as part of in-kind cost share for an estimated total of \$10,000 for the project. If you have questions and require additional information, please contact Travis Wood by phone at (406) 556-5754 or by email at travisw@latticematerials.com.

Sincerely,

A handwritten signature in black ink, appearing to read "Travis Wood". The signature is stylized and fluid, with a large initial "T" and "W".

Travis Wood
General Manager
Lattice Materials

ASSISTANCE AGREEMENT

1. Award No. DE-FE0032522		2. Modification No.	3. Effective Date 09/01/2024	4. CFDA No. 81.089	
5. Awarded To MICROBEAM TECHNOLOGIES INCORPORATED Attn: ROXANNE BENSON P.O. BOX 5 Victoria MN 553860005		6. Sponsoring Office Fossil Energy and Carbon Management FECM-1 U.S. Department of Energy 1000 Independence Avenue, S.W. Washington DC 20585		7. Period of Performance 09/01/2024 through 08/31/2027	
8. Type of Agreement <input type="checkbox"/> Grant <input checked="" type="checkbox"/> Cooperative Agreement <input type="checkbox"/> Other	9. Authority See Page 2		10. Purchase Request or Funding Document No. 24FE003329		
11. Remittance Address MICROBEAM TECHNOLOGIES INCORPORATED Attn: Roxanne Benson P.O. BOX 5 Victoria MN 553860005		12. Total Amount Govt. Share: \$2,499,978.00 Cost Share : \$635,505.00 Total : \$3,135,483.00		13. Funds Obligated This action: \$2,499,978.00 Total : \$2,499,978.00	
14. Principal Investigator		15. Program Manager Brett Michael Hakey Phone: 304-285-0262		16. Administrator U.S. DOE/NETL NATIONAL ENERGY TECH LAB 3610 Collins Ferry Road Morgantown WV 26505-2353	
17. Submit Payment Requests To VIPERS https://vipers.doe.gov Any questions, please contact by call/email 855-384-7377 or VipersSupport@hq.doe.gov		18. Paying Office VIPERS https://vipers.doe.gov Any questions, please contact by call/email 855-384-7377 or VipersSupport@hq.doe.gov		19. Submit Reports To See Attachment 3 - Reporting Requirements Checklist	
20. Accounting and Appropriation Data 00174-2023-31-232413-25500-1611475-0000000-0000000-0000000					
21. Research Title and/or Description of Project Bipartisan Infrastructure Law (BIL) - Production of Germanium and Gallium Concentrates for Industrial Processes.					
For the Recipient			For the United States of America		
22. Signature of Person Authorized to Sign 			25. Signature of Grants/Agreements Officer 		
23. Name and Title Steven A. Benson, President		24. Date Signed 09/10/2024	26. Name of Officer Kelly A. Haught		27. Date Signed 09/10/2024

CONTINUATION SHEET

REFERENCE NO. OF DOCUMENT BEING CONTINUED
DE-FE0032522

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NAME OF OFFEROR OR CONTRACTOR
MICROBEAM TECHNOLOGIES INCORPORATED

ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	<p>UEI: X7LDM8GNRVF1</p> <p>Block 9 Authority: Public Law (P.L.) 95-91, DOE Organization Act, as amended;</p> <ul style="list-style-type: none"> • P.L. 116-260, Div. Z, Energy Act of 2020, Title VII, Sec. 7001, as amended, codified at 42 U.S.C. 13344; and • P.L. 117-58, Infrastructure Investment and Jobs Act (IIJA), Sec. 41003(b), which authorized appropriations for 42 U.S.C. 13344(a). <p>Project Period: 09/01/2024 - 08/31/2027 Budget Period 1: 09/01/2024 - 08/31/2027</p> <p>Recipient Business Point of Contact: Roxanne Benson rbenson@microbeam.com 701-739-6909</p> <p>Recipient Principal Investigator Dr. Steven A. Benson sbenson@microbeam.com 701-213-7070</p> <p>DOE Project Officer: Brett Hakey Brett.Hakey@netl.doe.gov 304-285-0262</p> <p>DOE Award Administrator: Sheldon Funk Sheldon.Funk@netl.doe.gov 304-285-0204</p> <p>ASAP: NO: STD IMMEDIATE Extent Competed: COMPETED Davis-Bacon Act: YES PI: Steven A. Benson Fund: 00174 Appr Year: 2023 Allottee: 31 Report Entity: 232413 Object Class: 25500 Program: 1611475 Project: 0000000 WFO: 0000000 Local Use: 0000000</p>				

Industrial Commission
Tax Liability Statement

Applicant:

Microbeam Technologies Incorporated
4200 James Ray Drive, Ste. 193
Grand Forks, ND 58202-6090

Application Title:

Bipartisan Infrastructure Law (BIL) – Production of Germanium and Gallium
Concentrates for Industrial Processes – Phase II

Program:

- Lignite Research, Development and Marketing Program
- Renewable Energy Program
- Oil & Gas Research Program
- Clean Sustainable Energy Authority

Certification:

I hereby certify that the applicant listed above does not have any outstanding tax liability owed to the State of North Dakota or any of its political subdivisions.



Signature

President

Title

9/30/2024

Date

LRC-105B

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

Submitted By: EERC

PM/PI: Kevin Connors

Duration: 3 years

Purpose: The proposed project would be a continuation of PCOR efforts in the Williston Basin. The stated goal of the project is to identify and address storage and transport challenges facing commercial CCUS deployment in the Williston Basin. The total value of the proposed effort is \$6,250,000 including a request of \$1,250,000. The PCOR program would continue in parallel with funding from members to further leverage the results of the Williston Basin Project. The proposed project would be a three-year effort.

Funding: NDIC: \$1,250,000; Total Project Costs: \$6,250,000

Technical Advisor's Recommendation:

Fund – All three technical reviewers recommended funding the project with an average score of 235 out of 250 and facilitating commercial CCUS is a primary focus for sustaining use of our vast lignite resources. Carbon management is a critical component of the lignite industry R&D roadmap and the lignite research program, and PCOR has been central to our progress. This Williston Basin effort would continue that progress as we add to the commercial applications.

Funding would be subject to:

- Technical advisor participates in project reviews
- Technical advisor reviews the project management plan with the project team

Conflicts of Interest: Many of the ND lignite industry members indirectly as PCOR members

Reviewers: Fund - 3; Consider Funding - 0; Do Not Fund – 0

LRC: Fund: Yes - 15; No – 0; Abstain - 0



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.

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

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

Point of Contact (POC): Kevin C. Connors

POC Telephone: (701) 777-5236

POC Email: kconnors@undeerc.org

POC Address: 15 North 23rd Street, Stop 9018
Grand Forks, ND 58202-9018

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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 CO₂ 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 CO₂ 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 CO₂ 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 CO₂ 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 CO₂ 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, CO₂ 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 CO₂ 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 CO₂ 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 CO₂ 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, CO₂ 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 CO₂ 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 CO₂ 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 CO₂ capture, transport, and storage projects
 - Visual identification of potential for interaction with respect to CO₂ plumes, pressure fronts, transport pathways, and impacts (positive and adverse) on affected communities
- Potential CO₂ 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 CO₂
- CO₂ pipelines
- General locations of CO₂ 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 CO₂ 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 ft² 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 CO₂ storage projects, and incentives such as 45Q will provide tax credits that make CO₂ 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 CO₂ 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 CO₂ 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 CO₂ 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 CO₂ 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

Supporting Organization	Stakeholder Areas of Expertise
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 ¹	Carbon capture/storage/transport
Denbury Inc. ²	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

¹ Basin Electric Power Cooperative-owned Dakota Gasification Company.

² 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 CO₂ storage. He gained expertise in the U.S. Environmental Protection Agency Underground Injection Control Program and North Dakota’s geologic storage of CO₂ statutes and authored North Dakota’s CO₂ storage administrative rules. In this position, he participated in the North Dakota CO₂ 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 CO₂ 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.

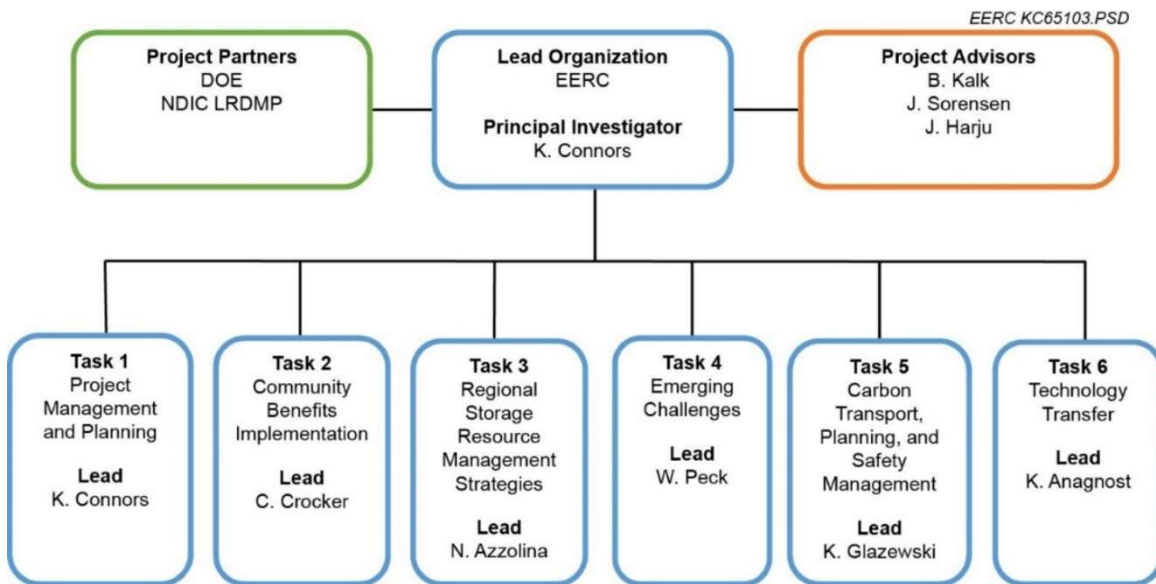


Figure 1. Project organizational chart showing key personnel.

Table 2. Key Personnel Roles

Key Personnel	Role(s)	Responsibilities
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 CO₂ 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

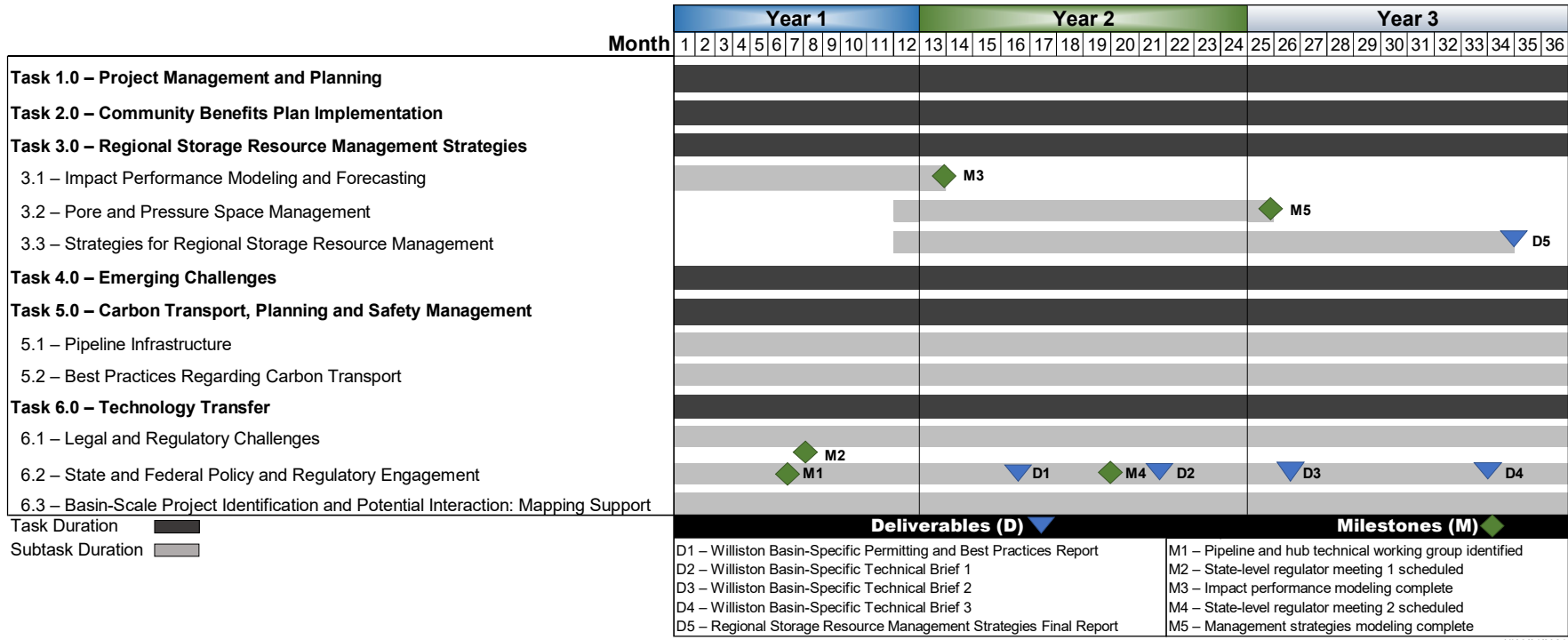
submitted throughout the duration of the project. A final comprehensive report will be provided to NDIC LRDMP at the end of the program.

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 CO₂ 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.



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

Project Associated Expense	NDIC Share (cash)	DOE Share (cash)	Total Project
Labor	\$812,455	\$2,875,260	\$3,687,715
Travel	\$0	\$159,214	\$159,214
Supplies	\$0	\$33,778	\$33,778
Rents and Leases	\$0	\$17,800	\$17,800
Communications	\$0	\$297	\$297
Printing and Duplicating	\$0	\$5,850	\$5,850
Food	\$0	\$52,247	\$52,247
UND SIMS¹ Team – CO₂ Hazmat Simulation	\$0	\$40,000	\$40,000
Laboratory Fees and Services			
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
Total Direct Costs	\$827,813	\$3,311,260	\$4,139,073
Facilities and Administration	\$422,187	\$1,688,740	\$2,110,927
Total Project Costs	\$1,250,000	\$5,000,000	\$6,250,000

¹ 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).

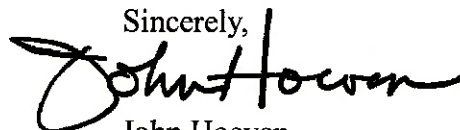
As a member of the U.S. Senate Committee on Energy and Natural Resources, I am committed to advancing our nation's energy security. During my time as governor and my tenure in the U.S. Senate, we have been working to build North Dakota into an energy powerhouse for our nation. At the same time, our state 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 (CO₂) for sequestration since 2000. In 2023, DGC received permit approval to store over 25 million metric tonnes of CO₂ 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 CO₂ in our EOR operations and since 2012 have also been active in CCUS through the injection of captured industrial-sourced CO₂.

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". The signature is fluid and cursive, written in a professional style.

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 (CO₂) 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 CO₂, 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 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

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 CO₂ 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 CO₂ 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

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 being more prominent.

Jason Ehlert
President

Mission Statement

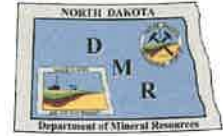
To bring about safe workplaces, living wages, family benefits, and registered apprenticeship education to all persons engaged in the construction industry.

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 CO₂ 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,

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 CO₂ captured from several ONEOK gas-processing plants as well as potential third party CO₂ emitters. ONEOK facilities in the Williston Basin produce over 300,000 tons per year of CO₂ emissions, and growth projects could result in over 3 million tons per year of CO₂ 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 CO₂ 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 CO₂ capture facility adjacent to the ethanol facility. Approximately 180,000 tonnes of CO₂ 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 CO₂ 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 CO₂ 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 CO₂ safely and permanently in the Midwest.

SCS is a proud member of the Plains CO₂ 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", 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 (CO₂) 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
(406) 444-6731

TECHNICAL AND
SOUTHERN FIELD OFFICE
2535 ST. JOHNS AVENUE
BILLINGS, MONTANA 59102-4693
(406) 656-0040

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 CO₂ capture and geologic storage.
- Manages the Plains CO₂ 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 CO₂, 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 CO₂ 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 CO₂ 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 CO₂ (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 CO₂ statutes and authored and adopted North Dakota's CO₂ 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 CO₂ 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 CO₂ sequestration, critical minerals and rare elements, water, and fish advisories and development of CO₂ 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, CO₂ 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 (CO₂) 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 CO₂ 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 CO₂ Reduction (PCOR) Partnership Program, focused on CO₂ storage in central North America.
- Led full-CO₂-chain techno-economic investigation in North Dakota linking lignite mining and electric generation to CO₂ enhanced oil recovery (EOR).

Principal areas of interest and expertise include geology, geologic storage of CO₂, CO₂ 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-CO₂-chain techno-economic investigation in North Dakota linking lignite mining and electric generation to CO₂ 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 CO₂ capture, utilization, and storage (CCUS); power generation; emissions reduction; and renewable energy systems.
- Currently supports the Plains CO₂ 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) CO₂ 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 CO₂ sequestration technologies.
- Work also included development, management, and dissemination of market-oriented materials for programs focused on CO₂ 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
Energy & Environmental Research Center (EERC), University of North Dakota (UND)
15 North 23rd Street, Stop 9018, Grand Forks, North Dakota 58202-9018 USA
701.777.5157, jharju@undeerc.org

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)
15 North 23rd Street, Stop 9018, Grand Forks, North Dakota 58202-9018 USA
701.777.5287, jsorensen@undeerc.org

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 CO₂ in saline formations, CO₂-based enhanced oil recovery (EOR) and associated CO₂ storage, and other energy and environmental research.
- Primary areas of interest and expertise are characterization of geologic formations for CO₂ storage, development of commercial-scale CO₂ storage projects, and CO₂-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 CO₂ 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 CO₂ 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 CO₂.

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

Energy & Environmental Research Center (EERC), University of North Dakota (UND)
15 North 23rd Street, Stop 9018, Grand Forks, North Dakota 58202-9018 USA
701.777.5455 (phone), 701.261.0373 (cell), bkalk@undeerc.org

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 – CO₂ Hazmat Simulation: Create a CO₂ 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.

LRC-105C

Title: Coal Creek Carbon Capture: Geologic CO₂ Storage Complex Development Add-On

Submitted By: EERC

PM/PI: Amanda Livers-Douglas

Duration: 2 years

Purpose: The EERC is working with Rainbow Energy Center toward commercial storage of carbon dioxide from the Coal Creek Station, in a storage complex adjacent to the power plant. This add-on scope of work would include coring, injection testing, and modeling to support the overall project objective – to advance carbon capture and storage at Coal Creek Station by characterizing and obtaining a permit for a storage complex capable of accommodating 200 MMt of CO₂. The proposed add-on would be 23 months in duration with a total budget of \$10,945,607 including \$5,150,874 requested from the Lignite Research Program.

Funding: NDIC: \$5,150,874; Total Project Costs: \$10,945,607

Technical Advisor's Recommendation:

Fund – The proposed project is important to the Lignite Research Program in support of the overall carbon management efforts for North Dakota lignite. Results would be valuable to any plant in the region considering geologic storage, especially with stacked storage as a consideration. Both of the technical reviewers recommended funding with an average score of 230 out of 250. The project would leverage state funding with funding from the DOE and industry.

Funding would be subject to:

- Technical advisor participates in project reviews
- Technical advisor reviews the project management plan with the project team

Conflicts of Interest: EERC, Rainbow Energy Center, and North American Coal Falkirk Mine (indirect).

Reviewers: Fund - 2; Consider Funding - 0; Do Not Fund – 0

LRC: Fund: Yes - 14; No – 0: Abstain - 0



October 1, 2024

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

Dear Mr. Haase:

Subject: EERC Proposal No. 2025-0049 Entitled “Coal Creek Carbon Capture: Geologic CO₂ Storage Complex Development Add-On”

The Energy & Environmental Research Center (EERC) was awarded \$38 million from the U.S. Department of Energy (DOE) in September of 2023 through the DOE Carbon Storage Assurance Facility Enterprise (CarbonSAFE) Initiative to characterize and permit a geologic carbon dioxide (CO₂) storage complex in central North Dakota to store CO₂ captured from the Coal Creek Station power plant. DOE approved an additional \$5.15 million of funding in September 2024 to support data characterization activities. The funding being requested from the Lignite Research, Development and Marketing Program (LRDMP) would be used as cost share for this additional funding from the DOE. The requested funding would support coring, injection testing, and materials compatibility modeling necessary to address data gaps and uncertainties identified as part of ongoing efforts funded by DOE, Rainbow Energy Center, and LRDMP.

The \$100 application fee for this proposal is provided through ACH Transaction Number 280730.

This transmittal letter represents a binding commitment by the EERC to complete the project described in this proposal. If you have any questions, please contact me by telephone at (701) 777-5344 or by e-mail at alivers@undeerc.org.

Sincerely,

DocuSigned by:

Amanda J. Alivers-Douglas
Assistant Director for Integrated Subsurface
Projects

Approved by:

DocuSigned by:

Charles D. Gorecki, CEO
Energy & Environmental Research Center

AJL/rlo

Attachment

c: Erin Stieg, North Dakota Industrial Commission

Lignite Research, Development
and Marketing Program

North Dakota Industrial
Commission

Application

**Project Title: Coal Creek Carbon Capture:
Geologic CO₂ Storage Complex Development
Add-On**

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

Principal Investigator: Amanda J. Livers-Douglas

Date of Application: 10/1/2024

Amount of Request: \$5,150,874

Total Amount of Proposed Project: \$10,945,607

Duration of Project: 23 months

**Point of Contact (POC): Amanda J.
Livers-Douglas**

POC Telephone: (701) 777-5344

POC: Email: alivers@undeerc.org

POC Address: 15 North 23rd Street, Stop 9018

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ABSTRACT

Objective: The proposed add-on scope of work including coring, injection testing, and materials compatibility modeling will support the overall project objective, to advance development of carbon capture and storage at Coal Creek Station by characterizing and obtaining a permit for a storage complex capable of accommodating 200 MMt of CO₂. The goal of collecting additional whole core and performing water injection tests is to reduce uncertainties in the prospective storage formations and provide the data necessary to design, optimize, and permit a storage complex to meet the target injection volumes. The objective of the materials compatibility modeling is to determine suitable materials required to permit and construct project wells and other surface infrastructure.

Expected Results: Results from the proposed coring and injection testing will comprise petrophysical properties and injectivity data that are necessary to address data gaps and associated geologic uncertainty for the potential storage reservoirs, particularly the carbonate reservoirs. Materials compatibility modeling will result in data and information necessary to select suitable materials for project wells and other surface infrastructure. These proposed efforts will support the successful completion of Stage 2, which is anticipated to result in a fully characterized and permitted geologic CO₂ storage complex that is ready to transition to construction and operation.

Duration: 23 months (November 18, 2024 – October 1, 2026)

Total Project Cost: The total value of the project is \$61,333,508 (Stage 1: \$2,700,000, Stage 2: \$47,687,901, and Add-On: \$10,945,607). \$5,150,874 is being requested from LRDMP to fund the proposed add-on scope of work. Project partner Rainbow Energy Center (REC) will provide \$643,859, and DOE will provide \$5,150,874 to fund the proposed add-on scope of work.

Participants: The project lead is the EERC, and the project will be conducted in partnership with LRDMP, DOE, REC, and Naset Consulting Service, Inc.

PROJECT SUMMARY

The Energy & Environmental Research Center (EERC) and project partners Rainbow Energy Center (REC) and Neset Consulting Service, Inc. (Neset) were awarded \$38 million from the U.S. Department of Energy (DOE) in September of 2023 through the DOE Carbon Storage Assurance Facility Enterprise (CarbonSAFE) Initiative to characterize and permit a geologic carbon dioxide (CO₂) storage complex in central North Dakota to store up to 200 million metric tons (MMt) of CO₂ captured from Coal Creek Station power plant (Coal Creek). Project partner REC and the Lignite Research, Development and Marketing Program (LRDMP) have each provided \$6.1 million to date to fund this effort.

Successful completion of the project will result in a fully characterized and permitted storage complex that is ready to transition to construction and operation. The project will advance the development of carbon capture and storage (CCS) at Coal Creek. Implementation of CCS at Coal Creek would reduce the CO₂ emissions from the plant by 95%, representing a 19% reduction of CO₂ emissions from North Dakota's stationary sources and provide Coal Creek with a pathway to low-carbon energy, resulting in resiliency against future legislation, regulations, and/or taxes associated with carbon emissions by providing safe, reliable, affordable, environmentally prudent baseload energy generation for the United States. Additionally, the development of CCS at Coal Creek will create approximately 35–40 long-term jobs and over 2000 direct/indirect short-term construction jobs. The project will facilitate attracting, training, and retaining a skilled and well-qualified workforce for these new and existing jobs. The proposed project is also designed to provide internship opportunities to students from minority-serving institutions and tribal colleges.

This existing project consists of two stages of work. Stage 1 comprised evaluation of existing 2D seismic data, geologic modeling, and CO₂ injection simulations to inform Stage 2 site characterization activities including design of a 3D seismic survey and placement and design of a stratigraphic test well

and associated coring, logging, and testing plans. Stage 1 also included materials testing to help inform the stratigraphic test well design.

The objective of Stage 2 is to fully characterize and obtain a permit for one or more geologic CO₂ storage facilities sufficient for storing 200 MMt of CO₂. As part of Stage 2, the EERC and project team will prepare and submit applications for underground injection control (UIC) Class VI storage facility permit(s) sufficient for the Coal Creek development scenario. Near-surface and subsurface data will be acquired and analyzed to fully characterize the proposed storage complex. The EERC will oversee acquisition and processing of 3D seismic data; drilling, coring, logging, testing, and completion of a stratigraphic test well; and collection of baseline water-quality data from underground sources of drinking water. Geologic modeling and reservoir simulation will incorporate characterization data to delineate the extent of pore space necessary to store CO₂ and determine the area of review (AOR). In addition, the project will include a pipeline front-end engineering and design (FEED) study and assess National Environmental Policy Act (NEPA)-related issues for the project's capture, transport, and storage site.

Stage 1 was successfully completed in May 2024. Results from Stage 1 highlighted the need for additional site characterization and materials compatibility evaluation to achieve the Stage 2 objective. While Stage 1 results show the target storage formations have capacity to store up to 200 MMt of CO₂ in a stacked storage scenario where CO₂ is injected into multiple stacked reservoirs, low injectivity rates and geologic uncertainties within deeper storage prospects, such as the Interlake–Red River and Black Island–Deadwood Formations and the Madison Group, require additional characterization. As part of this proposed add-on scope of work (SOW), the EERC is proposing collection of additional whole core and injection testing to reduce uncertainties in these prospective storage formations and provide the data necessary to design, optimize, and permit a storage complex to meet the target injection volumes.

Based on findings from Stage 1 efforts, the EERC is also proposing additional evaluation of materials compatibility to determine appropriate casing alloy and tubular design for Class VI injection wells.

DOE approved \$5.151 million of funding in September 2024 to support additional site characterization efforts. The EERC is requesting \$5.151 million in funding from LRDMP to match this DOE funding. REC is also providing an additional \$644k to fund this effort.

PROJECT DESCRIPTION

Objectives

The proposed add-on SOW including coring, injection testing, and materials compatibility modeling will support the overall project objective, to advance development of CCS at Coal Creek by characterizing and obtaining a permit for a storage complex capable of accommodating 200 MMt of CO₂. The goal of collecting additional whole core and performing water injection tests is to reduce uncertainties in the prospective storage formations and provide the data necessary to design, optimize, and permit a storage complex to meet the target injection volumes. The objective of the materials compatibility modeling is to determine suitable materials required to design and permit project wells and other surface infrastructure.

Methodology

The existing Stage 2 SOW funded by LRDMP, DOE, and REC is divided into nine tasks. Task 1.0, a project management, planning, and reporting activity, spans the duration of the project and ensures that all subsequent tasks and activities are being completed according to specified timelines and provides for both LRDMP and DOE reporting. Task 2.0 covers NEPA compliance and submittal of an environmental information volume (EIV). Task 3.0 includes development of permitting documents necessary to construct and operate a commercial geologic storage complex. Permitting documents will be developed specific to North Dakota's UIC Class VI primacy program. Modeling and simulation will be conducted as part of Task 3.0 to address UIC Class VI regulations, predict the boundaries of the injected CO₂ plumes at

the proposed site, and determine each AOR to support Class VI permits and inform development of monitoring plans. Task 4.0 includes activities required to characterize the CO₂ storage complex of the proposed project, including drilling/coring/testing/logging one new stratigraphic test well, acquisition and analysis of a new 3D seismic survey, and characterization of core and data from the new stratigraphic test well and offset well(s). Task 5.0 will yield a storage field development plan to inform commercialization of the storage hub. Task 6.0 will conduct a CO₂ source feasibility study to demonstrate due diligence and include all necessary information to support development of the Class VI permit applications. The CO₂ source feasibility study will build on ongoing and existing FEED studies conducted by the EERC and project partners. Task 7.0 will initiate a pipeline FEED study to include pipelines needed to connect the CO₂ source to the storage site. Task 8.0 includes direct collaborative efforts with project partners for development of business and financial plans as entry requirements for future DOE CarbonSAFE funding. Task 9.0 includes a societal considerations and impacts assessment and plans that incorporate diversity, equity, inclusion, and accessibility; the Justice40 Initiative; community, labor, and stakeholder engagement; and quality jobs.

The proposed add-on SOW consists of coring, injection testing, and materials compatibility modeling to support Stage 2 Task 3.0 – UIC Class VI “Authorization to Construct” and Task 4.0 – Detailed Site Characterization of a Commercial-Scale CO₂ Storage Site.

Stratigraphic Test Well Coring and Injection Test

Stage 1 geologic modeling and simulation efforts highlighted the data gaps and associated geologic uncertainty for the potential storage reservoirs, particularly the carbonate reservoirs, the Interlake–Red River Formation and Madison Group, and the deepest target of interest, the Black Island–Deadwood Formations. To help reduce this uncertainty and better characterize these reservoirs the EERC is proposing to conduct a water injection test within these zones in the stratigraphic test well and collect additional whole core from these intervals.

The EERC will collaborate with Naset to select and contract the pertinent services to perform an injection test within the Interlake-Red River and Black Island–Deadwood Formations and Madison Group in the stratigraphic test well. An independent third party will interpret the injection test results. The resulting interpreted dataset, such as permeability and pressure, will be used to refine the existing 3D geologic models and calibrate reservoir simulation parameters. Data derived from this injection test and analysis of whole core data will not only support characterization of the site, it will inform the suitability of these reservoirs for geologic CO₂ storage across the state.

Materials Compatibility Modeling

Findings from the Stage 1 materials recommendation and testing demonstrated the need for additional evaluation of materials compatibility to determine appropriate casing alloy and tubular design for Class VI injection wells. This SOW will include additional modeling and consultation with industry experts with carbon capture, utilization, and storage operational experience. This effort will result in a determination of suitable materials and demonstration of material compatibility required to design and permit project wells and other surface infrastructure. While the results of this study will be project specific, this effort will establish a framework for demonstration of material compatibility that will benefit other project developers looking to design and permit geologic CO₂ storage projects in the state.

Anticipated Results

Results from the proposed coring and injection testing will comprise petrophysical properties and injectivity data that are needed to reduce uncertainties and design, optimize, and permit a storage complex to meet the target injection volumes. Materials compatibility modeling will result in determination of suitable materials and demonstration of material compatibility required to design and permit project wells and other surface infrastructure. These efforts will support the successful completion of Stage 2, which is anticipated to result in a fully characterized and permitted geologic CO₂ storage complex that is ready to transition to construction and operation.

Successful completion of this project and implementation of CCS at Coal Creek would provide a pathway to low-carbon energy, which would provide Coal Creek with resiliency against future legislation, regulations, and/or taxes associated with carbon emissions. Development of CCS at Coal Creek would allow Coal Creek to continue to provide safe, reliable, affordable, and environmentally prudent baseload energy. Successful completion of the proposed project would also position Coal Creek to be eligible to apply for hundreds of millions of dollars through loan programs or funding made available through the Bipartisan Infrastructure Law and Inflation Reduction Act to support construction of capture facilities.

Facilities, Resources, and Techniques to Be Used and Their Availability and Capability

The EERC has all necessary office and computer resources immediately available to complete the proposed SOW. Computer resources include industry-standard modeling, simulation, and petrophysical analysis software and high-performance workstations capable of running this software. Project partner Naset has a state-of-the-art facility, including office space, a full-service shop, total on-site electrical power backup, and a geosteering operations center capable of providing service across the entire Williston Basin and beyond. These capabilities ensure Naset will be able to provide drilling support services no matter when the wells are ultimately drilled. Project partner REC has extensive office and computer resources at its headquarters in Bismarck, North Dakota. The field activities proposed as part of the Stage 2 add-on will be constrained to the existing well pad on land owned by North American Coal Corporation (NACCO). The EERC has a field site access commitment letter from NACCO (Appendix A).

The individual partners mentioned within the proposed project represent decades of experience in drilling, geological consulting services, subsurface data collection, CCS project development, and coal plant operations. All project participants have committed the necessary resources to execute this project, as evidenced by the letters of support in Appendix A.

The industry-standard techniques to be used to accomplish the proposed SOW are discussed in the Methodology section.

Environmental and Economic Impacts while Project Is Underway

Field activities for the proposed add-on SOW will include coring and water injection testing. This work will be conducted in accordance with state and local laws, and field crews will follow industry-standard safety practices. No permanent adverse environmental impacts associated with field activities are anticipated.

These activities will occur on the existing well pad in the newly drilled stratigraphic test well. These activities will involve a drilling and workover rig, trailers, logging trucks, and other heavy equipment. The coring will be completed over a 2-month period. The injection testing is anticipated to take around a month. No area outside this 450-by-450-ft well pad and access road are anticipated to be disturbed. The coring and injection test will be carried out under a permit issued by the North Dakota Industrial Commission (NDIC).

Ultimate Technological and Economic Impacts

The lignite-fired power plants in North Dakota present an opportunity to demonstrate the economic feasibility of large-scale CCS for the existing domestic coal fleet, as they are optimally located near both appropriate geologic storage and oil fields amenable to enhanced oil recovery (EOR) operations. The economic health of central North Dakota is tied to energy jobs in the area. Currently, the lignite industry directly employs 3623 people, with another 9500 indirect employees supported by the industry, accounting for over \$5.4 billion in economic impact. Technology advances that continue the responsible use of lignite and bring new industries to the region are critically needed to sustain and grow these jobs. Based on a recent study by the EERC, the economic impact to a state such as North Dakota from development of a new carbon capture and EOR industry would be tremendous if deployed statewide: \$2.5 billion–\$3.0 billion in annual economic activity, state revenue increased by \$160 million per year,

and creation of approximately 8000 long-term jobs (Stanislawski et al., 2019). At Coal Creek alone, approximately 35–40 direct jobs will be created.

With this project, the project team aims to perform the work necessary to develop large-scale CCS associated with Coal Creek that will increase sustainability of energy production and delivery. This project will fully characterize the site and obtain the permits for a storage complex for storage of up to 200 MMt of CO₂, which will accommodate CO₂ captured from Coal Creek and will have excess capacity for additional future sources that could provide further economic opportunity, optionality, and resilience for both the facility and the region.

To date, CO₂ storage evaluations and operations have focused exclusively on sandstone formations. Carbonate formations also offer significant CO₂ storage potential in North Dakota but have not yet been sufficiently evaluated to realize their potential. This project will include characterization of several carbonate formations for CO₂ storage. Understanding the storage capacity and technical challenges associated with CO₂ storage in carbonates will provide the critical information needed to support the business case for other CCS projects looking to store CO₂ in a carbonate formation. As the number of commercial CCS projects being developed in North Dakota increases, CO₂ storage in carbonate reservoirs will be absolutely vital for optimizing use of pore space. Future CCS projects in North Dakota will benefit through the key information relating to the storage potential and characteristics of carbonate formations in the Williston Basin that will be generated through the proposed work.

Why the Project Is Needed

The polar vortex (which caused severe limitations to wind power generation capacity and natural gas availability) that swept through the Midwest in early 2019 and the challenges faced by the Electric Reliability Council of Texas in 2021 are profound reminders of why we need to keep our entire power generation mix on the table; CCS can serve as a long-term solution to carbon emissions while also

providing firm baseload generation to mitigate the impact of intermittent supply from renewables on grid reliability. Ultimately, Coal Creek can serve as a model and example for the rest of the nation's existing coal fleet and provide baseload power with reduced CO₂ emissions.

Investing in this project ensures that this initiative can move down the project development path, and anticipated subsequent projects in North Dakota will be better-informed and more likely to succeed and make progress toward Governor Doug Burgum's goal of North Dakota carbon neutrality by 2030.

STANDARDS OF SUCCESS

The proposed study is to advance development of CCS at Coal Creek. The study will result in a fully characterized and permitted storage complex that is ready to move to construction. Successful outcomes for the project include obtaining a North Dakota UIC Class VI storage facility permit(s) for the storage complex. Additionally, at the end of the project, all required leases, development plans, business plans, and other agreements related to the storage complex will be in place to inform a final investment decision. By the end of the project, Coal Creek will meet the prerequisites to apply for additional funding through the DOE CarbonSAFE project to support construction of pipeline, compressors, injection wells, and other associated infrastructure.

BACKGROUND/QUALIFICATIONS

Background

The project team completed Stage 1, including evaluating the site for the ability to geologically store up to 200 MMt of CO₂. This effort resulted in 2D seismic interpretations, geologic models, and reservoir simulation results that are being used to inform Stage 2 data characterization and permitting activities. Stage 1 work leveraged prior regional characterization conducted by the EERC in partnership with Midwest AgEnergy (MAG) to characterize, design, and develop a UIC Class VI storage facility permit application for the Brook Creek Formation within the project area to store CO₂ from the Blue Flint Ethanol plant.

Stage 1 efforts were also informed by geologic characterization that was previously completed as part of a separate CarbonSAFE Phase II North Dakota integrated carbon storage complex feasibility study funded by DOE associated with Project Tundra showed the potential of permanently and safely storing at least 50 MMt of CO₂ within 30 years within a CO₂ storage complex approximately 20 miles southwest of Coal Creek. The results of that project show that two of the prospective formations within the storage complex, the Broom Creek and Black Island–Deadwood Formations, are capable of storing large amounts of CO₂. Datasets generated from that project include the drilling, coring, logging, testing, sampling, and characterization of a stratigraphic test well (BNI 1) and interpretation of an existing 9-mi² 3D seismic survey.

Additionally, efforts associated with Project Tundra eventually led to a CarbonSAFE Phase III award. As part of the ongoing CarbonSAFE Phase III efforts associated with Project Tundra, geologic characterization data were collected from drilling, coring, logging, testing, and sampling of two recent stratigraphic test wells approximately 20 miles to the southwest of Coal Creek (J-LOC 1 and Liberty 1). An injection test was also conducted at this site along with a 12-mi² 3D seismic survey. The characterization data collected from Project Tundra was used to complement the information available from MAG.

Data and learnings from these efforts will be applied to execution of Stage 2 and add-on scope activities.

Qualifications

The EERC will lead the project, with support from project partners REC and Naset. The principal investigator (PI) is Ms. Amanda Livers-Douglas, EERC Assistant Director for Integrated Subsurface Projects. In this role, she will handle project management, planning, and reporting; coordinate and direct subcontractor activities; and ensure successful completion of the project on schedule and budget. Ms. Livers-Douglas has served as PI on several commercial CCS projects and as task lead on DOE projects

at the EERC. She has broad expertise in CO₂ geologic storage, including geologic site characterization, regulatory compliance, and North Dakota UIC Class VI permitting and will help guide project activities.

Each of the project 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. Figure 1 shows the task structure and key personnel. The add-on scope will be led by Caitlin Olsen and Agustinus Zandy as part of Phase 2 Tasks 3.0 and 4.0. Resumes of key personnel are provided in Appendix B. The project team also includes multiple project advisors with decades of combined CCS experience and/or relevant industry experience who will support the PI. Four project advisors from project partners Neset and REC will also advise the PI on technical and nontechnical issues to meet the proposed project goals and timelines.

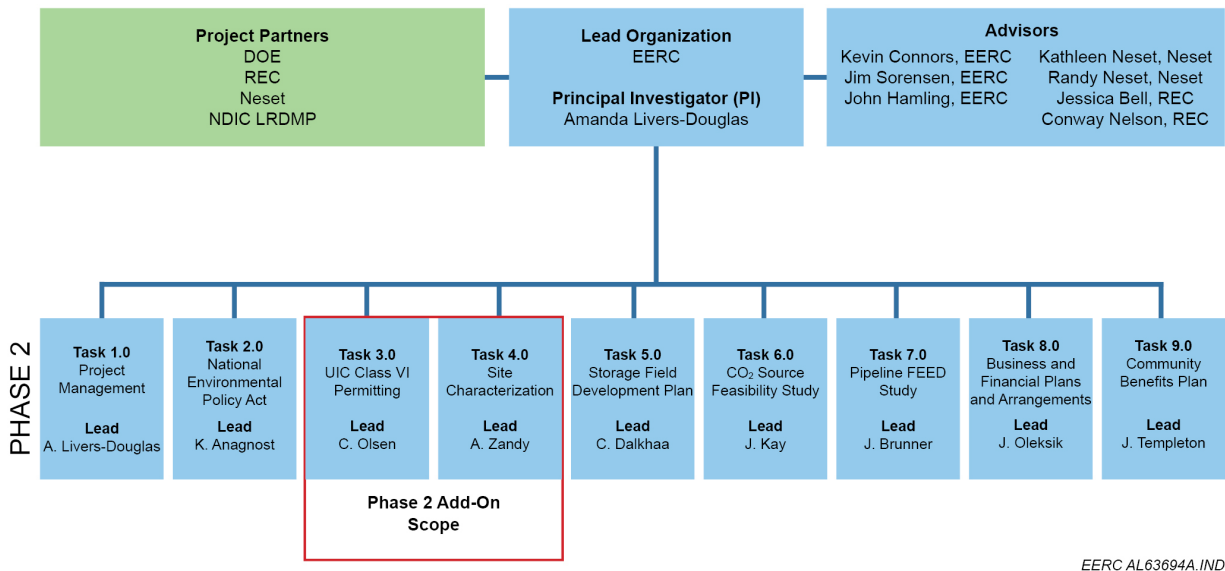


Figure 1. Project organizational chart showing key personnel.

A wide variety of previous work has given the EERC the experience and capabilities necessary to lead and carry out the proposed project. The research, field experience, and partnership investment that have been built through the EERC-led Plains CO₂ Reduction (PCOR) Partnership enable the EERC to confidently propose and execute the proposed project. The PCOR Partnership has covered all aspects of

developing CO₂ storage projects and has led directly to new CCS storage programs in the region. For example, the EERC worked with Red Trail Energy to obtain a UIC Class VI storage facility permit and assisted with implementing the project, which became operational in June 2022. Red Trail Energy's Class VI permit was the first issued by North Dakota and the third issued in the United States. Additionally, the EERC-led DOE CarbonSAFE Phase II and Phase III projects in partnership with Project Tundra resulted in UIC Class VI storage facility permits to accommodate 4 MMT/year of geologic storage for another lignite power generation facility in North Dakota, Milton R. Young Station. Moreover, the EERC has been exploring development of CCS around Blue Flint Ethanol and Coal Creek through prefeasibility, feasibility, and site characterization studies in collaboration with MAG since 2019. Lastly, the EERC previously conducted a pre-FEED capture study and is currently leading a capture FEED study at Coal Creek in collaboration with REC.

REC owns and operates Coal Creek and has committed to developing the world's largest postcombustion CO₂ capture facility, which will capture 95% of Coal Creek's CO₂ emissions, totaling 8.9 MMT/year. This substantial investment in resources and infrastructure goes hand in hand with the proposed effort to characterize and develop the CO₂ storage resources for the site. REC also has strategic partnerships outside of the proposed work that are key to the success of the larger CCS program. REC has agreements with MAG to utilize geologic and demographic information collected by MAG to advance development of CCS at Coal Creek. REC's partnership with NACCO provides the land access necessary to characterize and permit the storage complex site proposed by this work. Finally, REC has committed to providing the appropriate cost share and resources necessary to complete the proposed effort, as described in its letter of support (Appendix A).

Neset has provided drilling, production, and geological consulting services to operators in the Williston Basin for over 40 years. Neset will provide the resources and know-how to plan, permit, and complete the characterization well to be drilled as part of this proposed effort. Neset's consultants will

ensure high-quality data and samples are collected from the characterization wells and use its experience to maximize the collection of samples and data from multiple horizons. Naset has committed to providing the appropriate personnel and resources needed for the project, as described in its attached letter of support.

The EERC and Naset are currently partnered on efforts funded by North Dakota to characterize the potential to develop underground storage of natural gas and related gases in subsurface salt formations. Through these efforts, the EERC and Naset have experience working together to budget, plan, and carry out well drilling, coring, and logging in the Williston Basin, experience that is directly applicable to the proposed effort.

VALUE TO NORTH DAKOTA

Establishment of CCS at Coal Creek will reduce 95% of the CO₂ emissions from the plant, which represents a 19% reduction of CO₂ from North Dakota's stationary sources, providing an important step in helping reach Governor Burgum's goal for North Dakota to achieve net-zero carbon emissions by 2030. Capturing emissions from coal-based processes at REC will remove greenhouse gases that would otherwise enter the atmosphere; improve resiliency of Coal Creek against future legislation, regulations, and/or taxes associated with carbon emissions; allow Coal Creek to continue to provide safe, reliable, affordable, and environmentally prudent baseload energy; and contribute to continued energy independence in domestic markets. If future project phases are realized and the project is ultimately implemented, the life of the plant will be extended, ensuring continued quality jobs in the region. Coal Creek and NACCO's Falkirk Mine, which feeds the plant, support 700 direct/indirect jobs. Development of CCS at Coal Creek will result in approximately 35–40 direct long-term jobs and over 2000 direct/indirect short-term construction jobs.

Additionally, results from the project including subsurface data and information related to the storage capacity and technical challenges associated with CO₂ storage in carbonates will greatly benefit

other CCS project developers in North Dakota. This information will be made publicly available through the NDIC Department of Mineral Resources website and project reports and can be used to support the development of future projects.

MANAGEMENT

The project team comprises researchers from the EERC and staff and project advisors from Naset and REC. The EERC will schedule regular internal and external meetings with project staff and advisors to 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 all partners informed of project progress, coordinate activities as necessary for the execution of a successful project, and be responsible for timely submission of all project deliverables and transfer of data and products to the team.

REC will coordinate efforts to support site characterization, including providing existing characterization data and access to land within the area of interest. REC will also assist with NEPA documentation and business financial plans and arrangements.

Naset will serve as primary point of contact for obtaining quotes and materials for drilling operations and help plan and participate in community outreach events.

Project progress will be measured by completion of milestones and deliverables as noted in the project timeline in Figure 2. The milestones and deliverables are at key times during the design, site characterization, permitting, and commercial development components of the project. The deliverables are indicated where key documents and reports are noted, while the milestones are noted as key accomplishments during the project's progress. Semiannual reports will be provided to LRDMP throughout the duration of the project. A final report will be provided in addition to interim reports including a geologic catalog of materials, detailed site and subsurface characterization storage resource/capacity assessment, and UIC Class VI storage facility permit application(s).

TIMETABLE

The project timeline for the proposed add-on SOW will align with the Stage 2 timeline shown in Figure 2, which had a start date of October 1, 2023. The Stage 2 add-on SOW will be a 23-month effort, with a projected start date of November 2024.

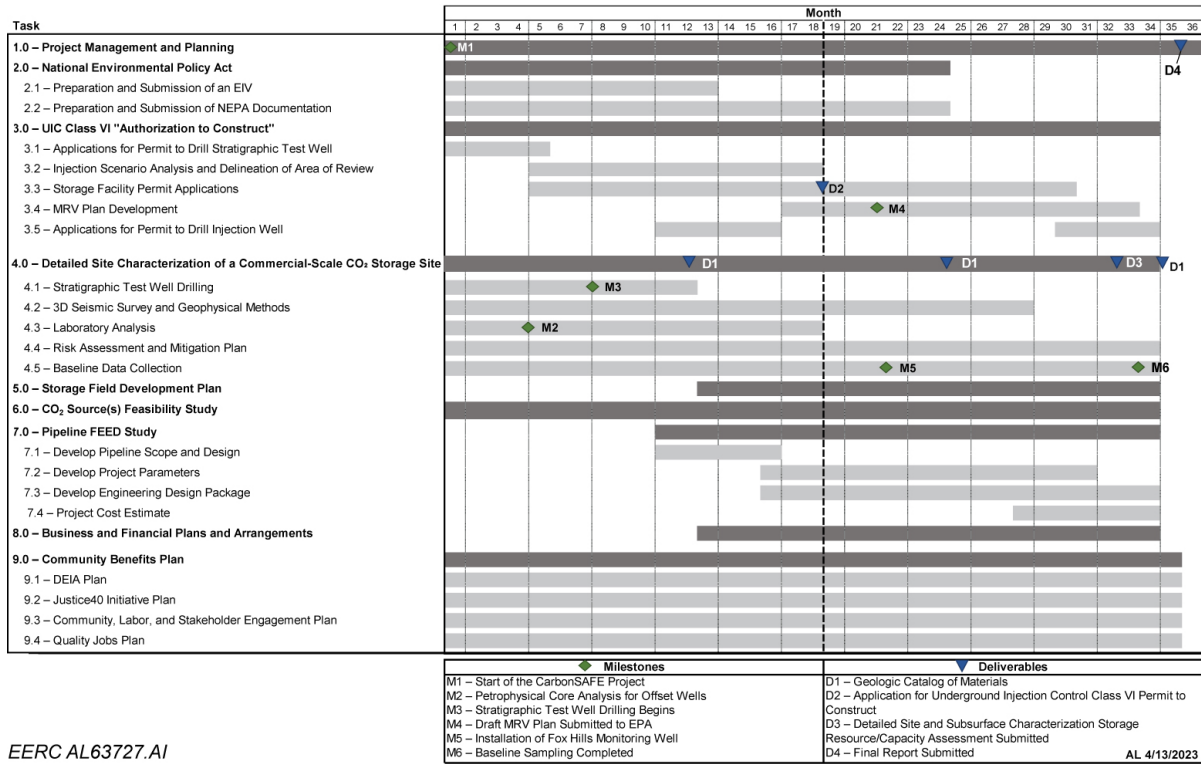


Figure 2. Project Gantt chart for Stage 2. Stage 2 add-on scope will be performed as part of Task 3.0 – UIC Class VI “Authorization to Construct” and Task 4.0 – Detailed Site Characterization of a Commercial-Scale CO₂ Storage Site. Note: deliverables for Stage 2 are prescribed by DOE.

BUDGET AND MATCHING FUNDS

Table 1 shows a summary of the proposed budget. Letters of commitment for the cost share from REC can be found in Appendix A. Budget notes can be found in Appendix C. If less funding is available than requested, changes to the scope will be considered.

Table 1. Budget Breakdown

Project Associated Expense	NDIC Share (Cash)	DOE Share (Cash)	Commercial Share (Cash)	Total Project
Labor	\$482,659	\$0	\$0	\$482,659
Travel	\$33,858	\$0	\$0	\$33,858
Supplies	\$600	\$0	\$0	\$600
Subcontractor – Neset	\$3,952,123	\$4,321,092	\$540,136	\$8,813,351
Subcontractor – Paragon	\$103,723	\$829,782	\$103,723	\$1,037,228
Subcontractor – SLB	\$100,000	\$0	\$0	\$100,000
Subcontractor – Stress Engineering	\$60,000	\$0	\$0	\$60,000
Subcontractor – Loudon Technical Services	\$8000	\$0	\$0	\$8,000
Communications	\$60	\$0	\$0	\$60
Printing & Duplicating	\$980	\$0	\$0	\$980
Laboratory Fees & Services				
Document Production Service	\$9285	\$0	\$0	\$9285
Software Solution Services	\$3910	\$0	\$0	\$3910
Technical Software Fee	\$3777	\$0	\$0	\$3777
Field Safety Fee	\$45,711	\$0	\$0	\$45,711
Geoscience Services Fee	\$3387	\$0	\$0	\$3387
Outside Lab – MVTL	\$10,110	\$0	\$0	\$10,110
Total Direct Costs	\$4,818,183	\$5,150,874	\$643,859	\$10,612,916
Facilities & Administration	\$332,691	\$0	\$0	\$332,691
Total Project Costs	\$5,150,874	\$5,150,874	\$643,859	\$10,945,607

TAX LIABILITY

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

CONFIDENTIAL INFORMATION

This proposal does not contain confidential information.

REFERENCES

Stanislawski, J.J.; Folkedahl, B.C.; Jensen, M.D.; Musich, M.A. *Regional Impacts of Carbon Capture and Sequestration in the State of North Dakota*; Final Report for Lignite Energy Council; EERC Publication 2019-EERC-02-07; Energy & Environmental Research Center: Grand Forks, ND, Feb 2019.

APPENDIX A

LETTERS OF SUPPORT

September 25, 2024

Ms. Amanda Livers-Douglas
Assistant Director for Integrated Subsurface Projects
University of North Dakota
Energy & Environmental Research Center
15 North 23rd Street, Stop 9018
Grand Forks, ND 58202-9018

Dear Ms. Livers-Douglas:

Subject: EERC Proposal No. 2025-0049 Entitled “Coal Creek Carbon Capture Geologic CO₂ Storage Complex Development Add-On”

I am writing to confirm Rainbow Energy Center’s commitment to support the Energy & Environmental Research Center (EERC) in its pursuit of funding from the Lignite Research, Development and Marketing Program (LRDMP) to complete site characterization and permitting for the geologic storage of CO₂ captured as part of commercial-scale CO₂ storage in central North Dakota.

The vision for this carbon capture and storage (CCS) project is to equip Coal Creek Station with a full-scale postcombustion CO₂ capture system that will capture up to 10 million tonnes per year of CO₂, approximately 95% of CO₂ emissions, at Coal Creek Station, located between Washburn and Underwood, North Dakota. When Rainbow Energy Center resolves the financial and technical challenges associated with the commercial deployment of an integrated CCS project, the captured CO₂ will be committed to the geologic storage sites being addressed in the proposed effort unless a portion of the CO₂ can be marketed for CO₂ enhanced oil recovery.

Rainbow Energy Center and its partners represent the largest landowner and pore space owner in the proposed project area. As part of its support and commitment, Rainbow Energy Center will support appropriate field site access to Rainbow Energy Center-owned land to facilitate the work described in the application, should funding for the proposed project be awarded.

To demonstrate our support and commitment, should LRDMP and U.S Department of Energy (DOE) funding for the proposed project be awarded, Rainbow Energy Center will fund an additional \$643,859 for a total of \$ 5,354,784 in cash cost share. This will be provided with no limitations, restrictions, or contingencies.

We welcome the opportunity to partner with the EERC, Neset Consulting Services, DOE, and LRDMP to establish an integrated CCS project in North Dakota: a project that will ensure wise, future development of our state’s abundant coal resource and optimization of pore space. If you have any questions, please contact me by telephone or by email.

Sincerely,



Jeffrey Jonson
President

NESET

6844 Highway 40, Tioga, ND 58852 701-664-1492

April 13, 2023

Ms. Amanda Livers-Douglas
Assistant Director for Integrated Subsurface Projects
University of North Dakota
Energy & Environmental Research Center
15 North 23rd Street, Stop 9018
Grand Forks, ND 58202-9018

Dear Ms. Livers-Douglas:

Subject: EERC Proposal No. 2023-0147 Entitled "Coal Creek Carbon Capture: Geologic CO₂ Storage Complex Development

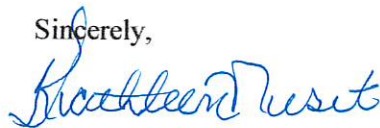
I am writing in support of the Energy & Environmental Research Center's (EERC's) pursuit of carbon capture and storage (CCS) at Coal Creek Station.

Neset Consulting Services, an officially certified Woman-Owned Business and Woman-Owned Small Business, has successfully operated in the Willison Basin from its headquarters in Tioga, ND, for over 40 years, contributing to the successful completion of 7700+ wells. We have worked in collaboration with the EERC to serve as a drilling contractor for multiple UIC (underground injection control) Class VI-compliant appraisal wells to support geologic storage on anthropogenic CO₂. We are committed to providing the staff and resources necessary to support outreach and the drilling, characterization, logging, coring, testing and completion of appraisal well(s) as outlined in the subject proposal.

We welcome the opportunity to partner with the EERC, Rainbow Energy Center, the U.S. Department of Energy, and Lignite Research, Development and Marketing Program to establish an integrated CCS project in North Dakota: a project that will ensure wise, future development of our nation's abundant energy resources. If you would like to discuss, please contact me by telephone or by email.

I look forward to working with you and hope to see this project move forward in North Dakota.

Sincerely,



Kathleen Neset
President, Owner



November 7, 2022

Ms. Amanda Livers-Douglas
Assistant Director for Integrated Subsurface Projects
University of North Dakota
Energy & Environmental Research Center
15 North 23rd Street, Stop 9018
Grand Forks, ND 58202-9018

Re: CarbonSAFE Site Characterization and Permitting for Commercial-Scale Geologic
Carbon Storage in Central North Dakota (DE-FOA-0002711)

Dear Ms. Livers-Douglas:

The North American Coal Corporation, a NACCO company, is committed to support the Energy & Environmental Research Center (EERC) in its response to the subject U.S. Department of Energy (DOE) funding opportunity to complete site characterization and permitting for the geologic storage of CO₂ captured as part of Rainbow Energy Center's emerging commercial-scale CO₂ storage project in central North Dakota.

North American Coal represents one of the largest landowners with pore space ownership within the proposed project area. As part of its support and commitment, North American Coal will support appropriate field site access to North American Coal-owned land to facilitate the work described in the application, should funding for the proposed project be awarded. North American Coal is interested in the potential opportunity to lease pore space for CO₂ storage at this site.

We welcome this opportunity to partner with the EERC, Neset Consulting Service, Rainbow Energy Center, DOE, and the rest of the team pursuing opportunities to resolve challenges associated with the commercial deployment of an integrated carbon capture and storage project in North Dakota. If successful, it will help ensure wise future development of our state's abundant natural resources. If you have any questions, please contact me by telephone or by email.

Sincerely,

A handwritten signature in blue ink, appearing to read 'D Straley', is written over a horizontal line.

David Straley
Director, External Affairs

NACCO Natural Resources Land Department

2000 Schafer Street, Suite D
Bismarck, ND 58501-1204

701.258.2200

nacco.com



APPENDIX B

QUALIFICATIONS OF KEY PERSONNEL



AMANDA J. LIVERS-DOUGLAS

Assistant Director for Integrated Subsurface Projects
Energy & Environmental Research Center (EERC), University of North Dakota (UND)
15 North 23rd Street, Stop 9018, Grand Forks, North Dakota 58202-9018 USA
701.777.5344, alivers@undeerc.org

Education and Training

M.S., Geology, University of Kansas, 2016.

B.A., Physics, Concordia College, Moorhead, Minnesota, 2013.

Geophysics experience includes seismic reflection, seismic refraction tomography, side-scatter analysis, multichannel analysis of surface waves, backscatter analysis of surface waves, diffraction imaging, and ground-penetrating radar diffraction tomography.

Software experience includes HampsonRussell, Petrel, Vista, Omni, Kingdom, GeoTomo Geothrust and Vecon, RadExPro TomoSeis, MASW/SurfSeis, SeisUtilities, and MatLab.

Research and Professional Experience

2022–Present: Assistant Director for Integrated Subsurface Projects, EERC, UND.

- Leads team of geoscientists focused on subsurface investigations of both conventional and unconventional resources, CO₂ storage, enhanced oil recovery, water disposal, and produced gas storage.
- Provides oversight for development of reservoir models including interpretation and integration of geophysical data for hydrocarbon resource assessment and geologic CO₂ storage analyses.
- Serves as carbon capture and storage (CCS) project advisor for geologic site characterization, monitoring, regulatory compliance, and North Dakota underground injection control (UIC) Class VI permitting.
- Has served as project manager for project development and permitting phase of several commercial carbon CCS projects.
- Has overseen development of geologic exhibits for five UIC Class VI permits submitted to state of North Dakota and served as expert witness at hearings for these permits, testifying to suitability of storage zone for safe and permanent storage of CO₂.

Principal areas of interest and expertise include characterization and monitoring of subsurface by developing innovative processing methods and designing specialized data acquisition surveys.

2020–2022: Principal Geoscientist, EERC, UND.

- Supervised interdisciplinary team of researchers focused on understanding deep subsurface geology.
- Provided oversight for development of reservoir models including interpretation and integration of geophysical data for hydrocarbon resource assessment and geologic CO₂ storage analyses.

March 2016–2019: Senior Research Geophysicist, EERC, UND.

- Developed geophysical models of subsurface.
- Performed advanced interpretation on variety of geophysical datasets.
- Performed petrophysical analyses of geophysical data.
- Assisted in preparation of technical reports.

- Interfaced with diverse team of scientists and engineers to assess project uncertainties in oil and gas development and geologic CO₂ storage.

August 2013–March 2016: Exploration Division Research Assistant, Kansas Geological Survey (KGS), Lawrence, Kansas, Missouri.

- Developed new seismic processing methods for void detection.
- Processed seismic data using near-surface processing methods, including refraction tomography, multichannel analysis of surface waves, backscatter analysis of surface waves, diffraction imaging, and side-scatter analysis.
- Generated near-surface models to accompany professional reports for clients that contracted KGS services.
- Interpreted preliminary results using generated 2D and 2.5D models, downhole data, and log data.
- Worked on team to produce professional site assessment reports for clients.
- Tested in-house software, reporting encountered errors, and suggesting changes to streamline user interfaces.
- Designed field surveys and led field crews in seismic data collection.

May–August 2015: Geoscience Intern, Chesapeake Energy Corporate Headquarters, Oklahoma City, Oklahoma.

- Interpreted and correlated well logs for the Powder River Basin, Wyoming, using GeoGraphix.
- Tied well log data to 3D seismic data and picked formation horizons using SMT Kingdom.
- Analyzed relationship between seismic attribute trends and historic drilling activity, including completion and production data using SMT Kingdom and Spotfire.
- Compiled information on basin's geologic history, petroleum system, and current drilling activity.
- Presented geophysical interpretations and overview of basin to engineering and geosciences business units.

January 2011–May 2013: Paleontology Field Investigator and Laboratory Technician, Concordia College, Moorhead, Minnesota.

- Developed and implemented electronic cataloging system to update 1500 bone entries.
- Investigated Hell Creek Formation outcrops in eastern Montana for possible bone sites by walking the outcrops.
- Recorded possible site location coordinates and transferred GPS (global positioning system) coordinates and field notes into electronic maps.
- Quarried, cast, and transported bones from the field, and cleaned and restored bones in the lab.

May–August 2012: Incorporated Research Institutions for Seismology Intern, Virginia Polytechnic Institute and State University, Blacksburg, Virginia.

- Completed 7-day training at New Mexico Tech, Socorro, New Mexico, comprising seismology short courses and field training at the Program for Array Seismic Studies of Continental Lithosphere's (PASSCAL) instrument center; surveyed seismic station locations, and deployed seismometers throughout Idaho and Oregon for an IDOR (EarthScope Idaho–Oregon) large-scale active seismic survey.
- Processed 2D land data from the Salton Seismic Imaging Project using refraction tomography.
- Created 2D tomography models, and interpreted subsurface structural geology.
- Presented results during poster session at American Geophysical Fall Meeting.

Spring 2010–Spring 2012: Student Assistant, Department of Physics, Concordia College, Moorhead, Minnesota.

- Served as department tutor, teaching assistant, and lab technician.

May–August 2011: North Dakota Geological Survey Student Worker, Wilson M. Laird Core and Sample Library, Grand Forks, North Dakota.

- Compiled reports on 37 EarthScope Transportable Array Stations in North Dakota containing information about station locations, instrumentation, and data collection, and generated standard geologic maps for each station.

Publications

Has coauthored several professional publications.



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 CO₂ capture and geologic storage.
- Manages the Plains CO₂ 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 CO₂, 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 CO₂ 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 CO₂ 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 the geologic sequestration of CO₂ (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 CO₂ statutes and authored and adopted North Dakota’s CO₂ 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 CO₂ 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.



JAMES A. SORENSEN

Director of Subsurface Research and Development
Energy & Environmental Research Center (EERC), University of North Dakota (UND)
15 North 23rd Street, Stop 9018, Grand Forks, North Dakota 58202-9018 USA
701.777.5287, jsorensen@undeerc.org

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 conventional, unconventional, and enhanced oil and gas production; the geological storage of CO₂; and other energy and environmental research. Primary areas of interest and expertise are enhanced oil recovery (EOR) in unconventional tight oil formations, CO₂ utilization and storage in geologic formations, and tight oil resource assessment and development.

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 CO₂ 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 CO₂ utilization and storage. Led research focused on EOR in the Bakken.

1997–1999: Program Manager, EERC, UND.
Managed projects focused on produced water management and environmental fate 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.



JOHN A. HAMLING

Assistant Vice President for Strategic Partnerships
Energy & Environmental Research Center (EERC), University of North Dakota (UND)
15 North 23rd Street, Stop 9018, Grand Forks, North Dakota 58202-9018 USA
701.777.5472, jhamling@undeerc.org

Principal Areas of Expertise

Hamling has over 20 years of experience in the energy industry catalyzing and implementing pioneering solutions that facilitate the prudent development and use of low-carbon and fossil energy. Hamling has broadly developed and strengthened strategic business relationships and has grown an energy-focused research and development (R&D) portfolios at state, national, and global levels.

Hamling serves as a development lead and advisor for screening, risk assessment, characterization, qualification, design, permitting, incentive program compliance, installation, and monitoring aspects of multiple geologic CO₂ storage projects ranging from 1000 to over 18,000,000 tonnes per year, including several currently operating underground injection control (UIC) Class VI storage projects in the United States. Hamling also serves as an advisor and development lead for several enhanced oil recovery (EOR) pilots in both conventional and unconventional fields; produced water treatment demonstration and use projects; high-value mineral resource assessment and recovery projects; and commercial development projects focused on direct air capture and low-carbon hydrogen production, storage, and use.

Hamling has led efforts resulting in the development, proof of concept, and validation of several improved monitoring techniques applicable to both dedicated and associated geologic CO₂ storage and EOR applications. Hamling's experience extends to the design, implementation, and oversight of surface, near-surface, deep subsurface, and reservoir characterization and surveillance programs.

Hamling's experience includes well-logging principals and applications, well drilling, well completions, wellbore integrity, risk assessment, logistics, well stimulation and enhanced recovery in tight oil plays, and health, safety, and environmental (HSE) programs. Hamling has lead the formation and management of a policy and regulatory team focused on carbon capture and storage (CCS), gas storage, improved oil recovery (IOR)/EOR, and unconventional oil and gas development with extensive experience conducting risk assessments and developing monitoring, mitigation, and verification/monitoring, reporting, and verification (MRV) programs compliant with the California Air Resources Board Low Carbon Fuel Standard CCS Protocol, MRV plan provisions of the U.S. Environmental Protection Agency (EPA) greenhouse gas reporting rule Subpart RR compliant with the Internal Revenue Service (IRS) 45Q tax credit program, EPA UIC Class II and Class VI programs, state/provincial regulatory programs, and emerging carbon markets/incentive programs.

Hamling has served as project manager (PM), principal investigator (PI), and task lead for several multiyear, multimillion-dollar research and demonstration projects and has led data analytics, operations, and reservoir surveillance groups at the EERC alongside several adaptive, multidisciplinary project teams. These activities encompass both contract research and several strategic partnership programs among the state of North Dakota, the U.S. Department of Energy (DOE), and private industry

designed to propel the development and implementation of approaches that benefit practical energy development.

Education and Training

M.S. Petroleum Engineering, University of North Dakota, 2022.

B.S., Mechanical Engineering, University of North Dakota, 2007.

Associate of Science, Associate of Arts, Williston State College, 2004.

Certified Engineer in Training (EIT)

Research and Professional Experience

May 2022–Present: Assistant Vice President for Strategic Partnerships, EERC, UND. Hamling broadly develops relationships to advance technologies and concepts that enable commercial application of CCS, unconventional oil and gas production, and IOR in conventional and unconventional oil plays.

May 2021–Present: Assistant Vice President for CCUS, EERC Foundation. Hamling has actively played a key role in standing up and growing a national and international portfolio of commercial research service capabilities focused on carbon capture, utilization, and storage (CCUS) within the EERC Foundation.

May 2021–May 2022: Director of Subsurface Initiative, EERC, UND. Broadly developed and strengthened strategic business relationships and subsurface R&D portfolios at state, national, and global levels. Led multidisciplinary teams of scientists and engineers and played a lead role in working with industry partners to stand up several individual CCUS projects that exceeded \$10 billion of commercial investment when fully implemented. Served as PM/PI/task lead for multiyear, multimillion-dollar, DOE-sponsored state research programs focused on carbon management and geologic storage. Hamling also led the design, implementation, and operation of an active reservoir management demonstration and brine treatment technology testbed facility.

2018–April 2021: Assistant Director of Integrated Projects, EERC, UND. In this role, Hamling advanced innovation and technologies to enable commercial application of geologic carbon storage, unconventional oil and gas production, and IOR in both conventional and unconventional oil plays.

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

2012–2018: Principal Engineer, Oilfield Operations Group Lead, EERC, UND. Hamling served as PM, PI, and task lead for several multiyear, multimillion-dollar projects, leading a multidisciplinary team of scientists and engineers working to develop and implement MVA concepts for large-scale (>1 million tons per year) CO₂ storage and EOR operations. Hamling also worked with a multidisciplinary team in the development, design, and implementation of new approaches that benefit the economical exploration, development, and production of oil and gas.

2011–2012: Research Manager, EERC, UND. Hamling's responsibilities included managing characterization and monitoring research activities and operations for large-scale (>1 million tons per year) combined EOR and CO₂ storage projects for the Plains CO₂ Reduction (PCOR) Partnership. Hamling also led various research activities related to oil and gas production, infrastructure, and development from unconventional reservoirs.

2009–2011: Research Engineer, EERC, UND. Hamling focused on the design and implementation of new approaches that benefit the exploration, development, and production of oil and gas and with the PCOR Partnership, evaluating the potential for CO₂ storage in geologic formations. Specific responsibilities included field operations design, deployment, and interpretation relating to oilfield technologies applicable to the CCS industry; laboratory functions relating to the Applied Geology Laboratory (AGL); data analysis; regulatory compliance; and communication of operations between service providers, management teams, industry partners, and governmental organizations. Additional responsibilities included investigation and/or demonstration of techniques and/or technologies that can enhance oil and gas production or economically benefit the oil and gas industry while reducing the environmental footprint of drilling and production operations.

2007–2009: Reservoir Evaluation Engineer; HSE Representative; and Loss Prevention Team Leader, Reservoir Evaluation segment, Schlumberger Limited. Hamling was responsible for providing tailored geophysical solutions for specific and unique oilfield applications, executing basic and advanced reservoir evaluations utilizing real-time wellbore measurement technologies, reservoir pressure and fluid sampling, and interpretation of reservoir measurement data. In this role, Hamling designed and oversaw all aspects of openhole and cased-hole logging operations for over 300 wells in both conventional and unconventional oil and gas plays and also served as an HSE officer, loss prevention team lead, and explosives and radiation safety officer for wellsite activities.

2004–2007: Student Research Scientist/Engineer, EERC, UND. Hamling was responsible for conducting research related to the development of new methods to join high-temperature, creep-resistant alloys and advanced processing and manufacture techniques for silicon carbide ceramic composites; materials testing in accordance with ASME (American Society of Mechanical Engineers), ASTM International, and ISO (International Organization for Standardization) standards; analyzing scanning electron microscopy micrographs; designing and fabricating composite micrometeorite shielding; and literature and patent review.

Professional Activities

Society of Petroleum Engineers International Williston Basin Section – have continuously served as a section officer and board member since 2012. Positions include Acting Chairperson, Vice-Chairperson, and Communications Chairperson.

Served as PCOR Partnership representative on the writing committee for two U.S. Department of Energy Regional Carbon Sequestration Partnership (RCSP) Program BPMs entitled *Best Practices for Monitoring, Verification, and Accounting of CO₂ Stored in Deep Geologic Formations – Version 3* and *Best Practices for Operating Carbon Storage Projects*.

Publications

Hamling has authored and coauthored numerous technical publications.

NESET

RESUME:

KATHLEEN NESET

Updated: November 28, 2022

ADDRESS:

6844 Highway 40
Tioga, North Dakota 58852
kathleenneset@nesetconsulting.com
Telephone: 701-664-1492 office
701-664-1491 fax
701-641-0004 cell

PROFESSIONAL:

ND Petroleum Council Board of Directors, Executive Committee
North Dakota Petroleum Council: Past Chair
ND Clean Sustainable Energy Authority
ND Early Childhood Transition Committee
UND College of Engineering and Mines Executive Board
UND Petroleum Engineering Industry Advisory Committee
Theodore Roosevelt Medora Foundation Board of Directors
Diocese of Bismarck Catholic Foundation Board of Directors
API Williston, Dickinson, Minot ND Chapters: Member
AAPG: Member
North Dakota Geological Society
Federal Reserve Bank of Minneapolis: Past Director
North Dakota State Board of Higher Education: Past Chair
ND 2020 & Beyond: Co-chair

EDUCATION:

December 2021	H2S Safety Training
September 2018	Shell Energy Executive Program, Roberts, Louisiana
April 2011	Hess Home Safe
April 2009	Core Workshop, Regina, Saskatchewan
March 2009	H ₂ S Respirator Fit Test
April 2008	Complex Well Workshop, Minot, North Dakota
May 2002	Horizontal Technology for Geologists, Short Course, Mauer Technology Inc. Bismarck, ND.
May 2001	Nisku Core Workshop, Regina, Saskatchewan
May 1984	Well Control School, Prentice Training, Lafayette, LA.
June 1978	B.A. Brown University, Providence, Rhode Island. Geology major with emphasis in mathematics.
June 1974	Warren Hills Regional High School, Washington, New Jersey.

AWARDS & CERTIFICATES:

- 2022: Woman Business Enterprise National Council certification
- 2022: Woman Owned Small Business
- 2022: Woman Business Enterprise
- 2014: Williston API Individual Outstanding Achievement winner
- 2014: Top 25 Leading Women in Business
- 2014: Ambassador Award - Williston Regional Economic Development Corporation
- 2015: Williston API Lifetime Achievement Award
- 2015: North Dakota Petroleum Council Hall of Fame
- 2015: Leading Ladies Panelist
- 2017 University of Mary Virtuous Leadership Award
- 2018 Inspired Woman Award

GENERAL EXPERIENCE:

March 1980 to present:

President, Neset Consulting Service, manage wellsite geology, engineering, and mudlogging consulting business. From 1980 through 2006 Roy and Kathleen started, managed, and lead Neset Consulting Service as we provided geological and engineering services to the oil industry, primarily in the Northern Rockies. From 2006 to present Kathleen has served as president of the company with a new branding to NESET in 2018. This rebranding represented the continual reinventing of the company to meet the diverse needs of the ever changing oil and gas industry. Recently the focus has built out and embraced carbon capture and management for the industry. NESET has been involved both geologically and with overall operational management of multiple carbon sequestration projects in ND. Work has also included the development of wind technician training for the wind industry, and NESET has broadened engineering providing all engineering, surveying, wellsite supervision, and well design and management.

March 1980 to Sept 2006:

Wellsite geologist, Tioga, ND: through wellsite work in the Rocky Mountains, I have acquired techniques for the complete evaluation of both wildcat and development wells. My experience in horizontal drilling has kept me current in the newest trends of oil and gas exploration, including the targeting of remote bottomhole locations in highly deviated wellbores and multi-laterals. Recent work has given me horizontal experience in the Ordovician Montoya formation of the Permian Basin, West Texas.

August 1990 to January 1992:

Temporary Business Manager, Tioga Public Schools, Tioga, ND.

November 1985 to May 1986:

Science Teacher, Tioga High School, Tioga, ND.

February 1979 to March 1980:

Hydrocarbon well logger, Core Laboratories, Casper, Wyoming: provided me with invaluable wellsite knowledge and experience. Through logging I have seen firsthand the geology of East Texas, the Powder River Basin, Green River Basin, and the Williston Basin. I have also gained wellsite experience in east Texas, and seismic experience in Michigan.

Randy Neset

Phone: 701-641-0778

E-mail: <mailto:randyneset@nesetconsulting.com>

Current Residence: Tioga ND

Neset Consulting Employment History

Vice President of Engineering

- ◇ General drilling contractor for large CCUS project western North Dakota
- ◇ General drilling contractor for over 12 saltwater disposal wells
- ◇ Design drilling and completion programs for horizontal Bakken and Three Forks and SWD wells
- ◇ Manage 150 field personnel including drilling, completion, and production supervisors, safety supervisors, midstream operators, lease operators, OGI technicians, and well techs
- ◇ Successfully work with NDIC as lead contractor to plug and abandon wells with CARES Act Funds
- ◇ Establish strategic partnerships with industry service companies to provide first in class services to clients
- ◇ Develop vendor management and accounts payable procedures for NDIC P&A program, CCUS programs, and EERC wells
- ◇ Train mudloggers and lease operators on oil and gas operations
- ◇ Assist in managing over 300 mudloggers operating on over a peak of 112 drilling rigs

Experience:

SHD Oil & Gas, LLC – Tioga ND

Dates Employed: 2010 – 2021

Chief Operating Officer

- ◇ Assist raising over \$350 million around project
- ◇ HBP over 37,000 acres
- ◇ Increase production from 0 – 10,000 bopd
- ◇ Direct all field operations including drilling, completions, and production
- ◇ Solicit bids and hire contractors for interim wellsite reclamation
- ◇ Work with surveyors for scouting, staking, and permitting in accordance with BIA, BLM, TERO, and State of North Dakota regulations
- ◇ Solicit bids and hire contractors for wellsite construction
- ◇ Field development design utilizing multi-well pads
- ◇ Develop drilling plan - hire all contractors for drilling operations
- ◇ Reservoir engineering - volumetrics to calculate OOIP
- ◇ Manage daily production and operations
- ◇ Provide technical support to lease operators
- ◇ Design production facilities
- ◇ Design rod and tubing strings, downhole pumps, pumping units
- ◇ Supervise workover rig - SRL installation and workovers

RC Disposal, LLC – Tioga ND

Dates Employed: 2011 – 2014

President

Responsibilities included raising \$7.5 million to drill and complete 2 x SWD wells, permitting salt water disposal well through NDIC, generating AFE salt water disposal well, designing wellbore and surface

facilities, hiring service contractors to perform work, overseeing drilling and completion of well, and managing day to day operations. The company was successfully sold for \$20 million.

**Hess Corporation – Tioga ND
Lift Tech**

Dates Employed: 2009 - 2010 Artificial

Responsibilities included providing technical support to Lease Operators, analyzing dynamometer cards for downhole pump performance, designing rod and tubing strings, downhole pumps, pumping units, writing workover procedures and cost estimates, designing treatment programs for scale, corrosion, and paraffin and training – Roustabout, Lease Operator, Workover Rig Manager.

**Helmerich and Payne – Dickinson ND
Roughneck**

Dates Employed: 2008

Responsibilities included serving as a floorhand, performing rig up, rig down operations, making up BHA and drill pipe, teaching new rig hands the floorhand responsibilities and general rig maintenance.

**Eagle Well Service – Kenmare ND
Righand**

Dates Employed: 2007

Responsibilities included serving as a floorhand, operating tubing and rod tongs, operating rig while swabbing during well completions and teaching new rig hands the floorhand responsibilities

**Montana Air National Guard – Great Falls MT
Intelligence Analyst**

Dates Employed: 2002 - 2010

Responsibilities included providing timely threat analysis to F-16 pilots, providing current intelligence to Wing Commander, keeping Intelligence library updated with newly released material, supervising airmen appointed to me, ensuring on the job training is adequate for younger airmen and completing Pacific AEF tour in South Korea and Operation Iraqi Freedom Tour – 6 months at Balad AB, Iraq. Received an Air Force Achievement Award.

**Larry's Service – Tioga ND
Mechanic Assistant**

Dates Employed: 1999 - 2002

Responsibilities included installation of new tires on vehicles and ensure customer's vehicle is safe to drive, changing oil and service customer's vehicle to shop standards, serving as an associate with customers to ensure their vehicle is serviced the way they would like, helping lead mechanic install engines, transmissions, axles, transfer cases and service all of these items and test driving vehicles to ensure mechanical problems are fixed.

**Neset Farms – Tioga ND
Heavy equipment operator/laborer**

Dates Employed: 1999 - 2002

Responsibilities included operation of farm machinery, maintenance of Neset Farms grain elevator, calibration of seeder, sprayer, and combine for optimal efficiency and maintaining records of labor time, fuel used, hourly use of equipment, items purchased and regular farm supplies

Skills & Education:

Graduated high school from Tioga ND in 2002

Montana Tech – Bachelors of Science in Petroleum Engineering, graduated in May 2009

- | | |
|------------------------|------------------------------|
| ◇ Microsoft Word | ◇ Adobe |
| ◇ Microsoft Excel | ◇ Well Control Certified |
| ◇ Microsoft Powerpoint | ◇ WellPro |
| ◇ WellView | ◇ H ₂ S Certified |
| ◇ WellEZ | ◇ 10 HR OSHA |

Jessica K. Bell

1224 1st Avenue Northeast • Beulah, ND • 701.891.9708
• belljessicak@gmail.com

OBJECTIVE	To continue my endeavor to positively impact individuals and promote the energy industry by utilizing my experience in environmental and tax policy, business development and government relations.
EXPERIENCE	<p>Rainbow Energy Center; August 2022-Current <i>Director, Government & Public Affairs</i></p> <ul style="list-style-type: none">• Execute project development opportunities• Evaluate best practices for carbon capture utilization and storage technologies• Coordinate research efforts with the EERC• Enhance environmental, social and governance practices• Monitor and evaluate Federal and State regulations as they pertain to independent power producers• Interact with regional transmission operators to ensure power deliverability <p>NACCO Natural Resources; May 2004-Current <i>Environmental Manager of Northern Operations (2020-2022)</i></p> <ul style="list-style-type: none">• Oversee and manage all environmental matters for northern operations• Evaluate best practices for carbon management, including carbon capture utilization and storage technologies, soil carbon storage and other opportunities• Evaluate and improve environmental, social and governance compliance• Monitor and evaluate Federal environmental regulations impacting operations and articulate the position of NACCO Natural Resources for Federal Register Notice filings <p>Coyote Creek Mining Company <i>Environmental Manager (2017-2020)</i></p> <ul style="list-style-type: none">• Primarily responsible for all environmental duties at the mine site including securing all permits for operation at local, state and federal level, air quality, wildlife management, cultural resources management, waste management and short and long-term budgeting and department management• Active participant in the Lignite Energy Council trade organization• Completed life of mine Individual Permit from the Department of the Army Corps of Engineers• Initiated application to mine Federal coal with the Department of the Interior <p>The Coteau Properties Company Freedom Mine <i>Environmental Specialist (2007-2017); Tour Guide (2006-2007); Environmental Assistant (2004-2005)</i></p> <ul style="list-style-type: none">• Manage over 15,000 acres of mined and reclaimed farm land alongside local producers• Repeatedly proved mined and reclaimed farm land is more successful than before mining and released thousands of acres of productive land from company liability and bonds• Write and update all environmental sections of mining permits• Supervisory experience of both employees and contractors• Initiated environmental baseline studies for first new coal mine in 30 years in ND <p>North Dakota State Senate; Nov 2012-Nov 2022 <i>District 33 Senator & Citizen Legislator</i></p>

CONWAY NELSON, P. Eng, PMP

43 Arlington St., Regina, Saskatchewan S4S 3H7 · 306 529-9426

conwaynelson@gmail.com

Engineering and Project Management professional with over 25 years of experience. Highly developed skills in engineering design, project management, people management, team building, leadership, communication, relationship development.

EXPERIENCE

November 2023 – present

Director, Carbon Management

Rainbow Energy Center, Bismarck, ND (remote from Regina, SK)

- Leading the development of an 8.5M tonne per year carbon capture and storage project for a 1200 MW coal fired power station.
- Overseeing execution of a \$47M NETL CarbonSafe grant to characterize geologic sequestration in the area local to the power station.
- Overseeing completion of a \$16M FEED study to finalize the scope and cost for the retrofit of carbon capture equipment to the power station and a subsequent Bridge Study to work towards a final investment decision.

May 2021 – October 2023

Vice President, Project Development & Technical Services,

International Carbon Capture & Storage Knowledge Centre, Regina, SK

- Led a team of engineers and chemists that provide high level process design and technical advice related to planning and execution of carbon capture projects across various industries (power generation, cement, oil and gas, refineries, etc.).
- Responsible for business development activities and grew the PD&TS team from five to twelve staff in two years.
- Presented at various industry conferences and webinars about Carbon Capture lessons learned and the work of the Knowledge Centre.
- Oversaw technical consulting services executed for carbon capture projects across a variety of industries.

June 2019 – May 2021

Manager, Power Production Project Delivery Office, SaskPower, Regina, SK

- Lead a team of 19 project managers and project control specialists to deliver the power production sustainment portfolio of projects (\$130m annual budget) as well as new generation projects that are managed by SaskPower (Chinook Power Station, Great Plains Power Station)
- Provide guidance and mentorship to Project Managers across Power Production to ensure effective project delivery.
- Emphasize continuous improvement by defining and optimizing our Project Management processes, developing, measuring and displaying KPI's while continuing to foster strong relationships with our engineering, construction and operations team members

EXPERIENCE (cont.)

May 2018 – June 2019

Lead, Project Lifecycle Optimization Initiative, SaskPower, Regina, SK

- Led a corporate optimization initiative to examine how projects are managed across SaskPower and make recommendations to improve performance. Performed internal and external research and worked with the SaskPower executive to achieve alignment regarding the practice of project management.
SaskPower established a corporate project management office based on my team's recommendations and have been working towards increasing project management maturity

May 2018 – June 2019

Lead, Project Lifecycle Optimization Initiative, SaskPower, Regina, SK

- Led a corporate optimization initiative to examine how projects are managed across SaskPower and make recommendations to improve performance. Performed internal and external research and worked with the SaskPower executive to achieve alignment regarding the practice of project management.
SaskPower established a corporate project management office based on my team's recommendations and have been working towards increasing project management maturity

April 2016 – May 2018

Manager, Power Production Project Delivery Office, SaskPower, Regina, SK

- Managed a team of 15 project managers and project control specialists to deliver the power production sustainment portfolio of projects (\$130m annual budget) as well as new generation projects that are managed by SaskPower (Chinook Power Station - \$680m budget).
- Worked closely with the Transmission business unit PDO to share best practices.

November 2013 – April 2016

Manager, Clean Energy, SaskPower, Regina, SK

- Led a team responsible for evaluating the feasibility of clean energy technologies primarily nuclear and solar power.

August 2008 – November 2013

Manager, Mechanical Engineering, SaskPower, Regina, SK

- Led a team of engineers and contracted resourced to manage projects and provide mechanical engineering services to execute the power production capital plan.

March 2006 – August 2008

Project Leader, SaskPower, Regina, SK

- Managed the refurbishment of a 300 Megawatt boiler and various projects related to emissions reduction technology for coal-fired power plants.

April 2003 – March 2006

Mechanical Engineer II, SaskPower, Regina, SK

- Performed engineering design and managed capital sustainment projects of increased complexity and magnitude for power generation plants.

EXPERIENCE (cont.)

March 2000 – April 2003

Mechanical Engineer I, *SaskPower, Regina, SK*

- Performed engineering design and managed capital sustainment projects for power generation plants.

January 1998 – March 2000

Project Engineer, *BAR Engineering, Lloydminster, AB*

- Design and project engineering work for various oil and gas clients.

PROFESSIONAL AFFILIATIONS

Professional Engineer *Association of Professional Engineers & Geoscientists of Saskatchewan*

Permission to Consult *Association of Professional Engineers & Geoscientists of Saskatchewan*

Project Management Professional *Project Management Institute*

EDUCATION

December 1997

B. Sc. in Mechanical Engineering, *University of Saskatchewan*

SKILLS

- Engineering
- Business Development
- Relationship Building
- Project Management
- Corporate Improvement
- Contract Management and Negotiation
- Communication
- Corporate Strategy
- People Management
- Leadership
- Coaching

ACTIVITIES & INTERESTS

- Travelling and spending time with my family
- Cycling, competing in triathlons, running races and adventure races
- Parent volunteer for youth hockey, triathlon, karate and speed skating

REFERENCES

Available upon request



JOHN A. BRUNNER

Senior Research Engineer

Energy & Environmental Research Center (EERC), University of North Dakota (UND)

15 North 23rd Street, Stop 9018, Grand Forks, North Dakota 58202-9018 USA

(701) 777-5059, jbrunner@undeerc.org

Education and Training

B.S., Mechanical Engineering, University of North Dakota, 2019.

Software experience includes Microsoft Office Suite, PTC Creo, Visio, Autodesk, MATLAB, GT Suite, and Solidworks.

Fabrication experience includes pipe/tube bending and cutting and MIG and SMAW welding.

Research and Professional Experience

February 2024–Present: Senior Research, EERC, UND

May 2019–February 2024: Research Engineer, EERC, UND.

- Contributes to the design, modeling, and fabrication of experimental equipment, including oversight and operation.
- Assists in preparation of proposals, interprets data, writes reports and papers, and presents results to clients and papers at national and international conferences.

Principal areas of interest and expertise include design and modeling of experimental equipment, gasification and combustion technologies, energy storage systems, and renewable energy technologies.

April 2018–April 2019: Research Engineering Assistant, EERC, UND.

- Worked on the design and modeling of flue gas exhaust.
- Assisted in modeling of a carbon dioxide capture system.
- Modeled a portable baghouse.
- Led a project to integrate virtual reality into the engineering design process.

February 2016–April 2018: Facilities and Safety Assistant, EERC, UND.

- Conducted scheduled safety inspections.
- Assisted in the hazard communication program.
- Calibrated and maintained safety equipment.

Summers 2015–2017: Laboratory Intern, RMB Environmental Laboratories, Detroit Lakes, Minnesota.

- Conducted nitrate and nitrite testing.
- Assisted in total phosphorus, ortho-phosphorus, biological oxygen demand, chemical biological oxygen demand, bacteria, and solids testing.

Publications

Has coauthored several publications.



DR. CHANTSALMAA DALKHAA

Principal Reservoir Engineer, Reservoir Engineering Team
Energy & Environmental Research Center (EERC), University of North Dakota (UND)
15 North 23rd Street, Stop 9018, Grand Forks, North Dakota 58202-9018 USA
701.777.5448, dalkhaa@undeerc.org

Education and Training

Ph.D., Petroleum and Natural Gas Engineering, Middle East Technical University (METU), Ankara, Turkey, 2010.

M.S., Petroleum and Natural Gas Engineering, METU, Ankara, Turkey, 2005.

B.S., Petroleum and Natural Gas Engineering, METU, Ankara, Turkey, 2003.

Proficient in the use of Petrel (geologic modeling), Eclipse (fluid flow reservoir simulation), CMG IMEX/STARS/GEM/CMOST, TOUGH2/TOUGHREACT, ArcGIS/Arcmap, and IHS Harmony/DeclinePLUS/RTA/Petra.

Research and Professional Experience

February 2020–Present: Principal Reservoir Engineer, EERC, UND.

- Coleads Reservoir Engineering team, supervising reservoir engineers and geoscientists, managing and overseeing projects, contributing to research proposal writing and preparation, and conducting technical and research work.

Principal areas of interest and expertise include numerical modeling and simulation of various EOR techniques including rich gas, CO₂ and surfactant, CO₂ storage and monitoring, unconventional production evaluation, and Class VI permit applications.

June 2019–January 2020: Senior Reservoir Engineer, EERC, UND.

- Supervised junior reservoir engineers and student research assistants and worked with reservoir engineers, geologists, and geophysicists to develop and calibrate geologic models of the subsurface and run dynamic simulations to evaluate CO₂ EOR performance of oil fields and the long-term fate of CO₂ sequestration into saline aquifers, evaluate production performance of unconventional oil and gas reservoirs, and assess refracturing potential in the Bakken petroleum system.

2016–May 2019: Reservoir Engineer, Reservoir Modeling and Simulation, EERC, UND.

- Worked with teams of reservoir engineers, geologists, and geophysicists to develop and calibrate geologic models of the subsurface and run dynamic simulations to evaluate CO₂ EOR performance of oil fields and the long-term fate of CO₂ sequestration into saline aquifers, estimate ultimate oil recovery, and evaluate production performance of unconventional oil reservoirs.

2014–2015: Postdoctoral Fellow, Department of Chemical and Petroleum Engineering, University of Calgary, Calgary, Alberta, Canada.

- Constructed a geologic model of heavy Canadian oil fields using Petrel.
- Simulated a wormhole formation and growth in CHOPS reservoir and performed history matching of reservoir fluid and sand productions.
- Assessed reservoir performance of thermal, solvent, and hybrid EOR methods using CMG STARS.

2011–2014: Postdoctoral Fellow, Department of Geoscience, University of Calgary, Calgary, Alberta, Canada.

- Stimulated microbial activities in a CHOPS reservoir in the Lloydminster area, Canada, to enhance oil recovery for a project funded by Natural Sciences and Engineering Research Council of Canada and Husky Oil Operation Ltd.
- Performed reactive transport simulation of CO₂ injection into a reservoir and CO₂ leakage to shallower formations for the Quest Project, funded by Shell Canada.
- Applied stable isotopic techniques in monitoring of injected CO₂ for the Quest Project and Swan Hills and PennWest CO₂ pilot projects.
- Simulated CO₂ injection into a H₂S-containing aquifer located in central Alberta for a project funded by Carbon Management Canada.
- Performed oilfield fluid sampling and analysis at various fields (Pembina Cardium CO₂ EOR pilot, Swan Hills CO₂ EOR fields in the Western Canadian Sedimentary Basin).
- Performed laboratory work on CO₂ reactivity and microbial EOR in CHOPS reservoirs.

2006–2011: Research and Teaching Assistant, Department of Petroleum & Natural Gas Engineering, METU, Ankara, Turkey.

- Performed reservoir simulation of immiscible CO₂ and water alternating gas injection into a heavy oil field in Europe in southeastern Turkey using Eclipse/Petrel.
- Mentored and guided senior year students for graduation projects and coordination of courses.
- Evaluated coalbed methane production capacity from the Soma coal bed in Turkey.

Professional Activities

Member, Association of Professional Engineers and Geoscientists of Alberta – Engineer in Training (2011–present)

Member, Society of Petroleum Engineers (2003–present)

Member, European Association of Geoscientists and Engineers (2010)

Member, The Geochemical Society (2012)

Technical Reviewer, *Journal of CO₂ Utilization* (2019–present), *International Journal of Greenhouse Gas Control* (2017–present), and *Greenhouse Gases: Science and Technology* (2017–present)

Postdoctoral Representative, Faculty of Science, University of Calgary (2012–2013)

General volunteer, MentorUp Calgary (2014)

General volunteer, APEGA (2014)

Member, EERC Social Cause Committee (2016–present)

Publications

Has coauthored several professional publications.



JOHN P. KAY

Principal Engineer, Emissions and Carbon Capture
Energy & Environmental Research Center (EERC), University of North Dakota (UND)
15 North 23rd Street, Stop 9018, Grand Forks, North Dakota 58202-9018 USA
701.777.4580, jkay@undeerc.org

Education and Training

B.S., Geological Engineering, University of North Dakota, 1994.
Associate Degree, Engineering Studies, Minot State University, 1989.

Research and Professional Experience

2011–Present: Principal Engineer, Emissions and Carbon Capture, EERC, UND.

- Responsibilities include management of CO₂ separation research related to bench-, pilot-, and demonstration-scale equipment for advancement of technology as well as development of cleanup systems to remove SO_x, NO_x, particulate, and trace elements to render flue gas clean enough for separation.
- Principal areas of interest and expertise include applications of solvents for removing CO₂ from gas streams to advance technology and look toward transformational concepts and techno-economic assessments.
- Experience includes 12 years of field testing site management and sampling techniques for hazardous air pollutants and mercury control in combustion systems along with 10 years of experience utilizing scanning electron microscopy (SEM), x-ray diffraction (XRD), and x-ray fluorescence (XRF) techniques to analyze coal, fly ash, biomass, ceramics, and high-temperature specialty alloys.
- Other interests include computer modeling systems and high-temperature testing systems.

2005–2011: Research Manager, EERC, UND.

- Responsibilities included management and supervision of research involving design and operation of bench-, pilot-, and demonstration-scale equipment for development of clean coal technologies.
- Work also involved testing and development of fuel conversion (combustion and gasification) and gas cleanup systems for removal of sulfur, nitrogen, particulate, and trace elements.

1994–2005: Research Specialist, EERC, UND.

- Responsibilities included conducting SEM, XRD, and XRF analysis and maintenance; creating innovative techniques for analysis and interpretation of coal, fly ash, biomass, ceramics, alloys, high-temperature specialty alloys, and biological tissue; managing day-to-day operations of Natural Materials Analytical Research Laboratory; supervising student workers; developing and performing infrared analysis methods in high-temperature environments; and performing fieldwork related to mercury control in combustion systems.

1993–1994: Research Technician, Agvise Laboratories, Northwood, North Dakota.

- Responsibilities included receiving and processing frozen soil samples for laboratory testing of chemical penetration, maintaining equipment and inventory, and training others in processing techniques utilizing proper laboratory procedures.

1991–1993: Teaching Assistant, Department of Geology and Geological Engineering, UND.

- Responsibilities included teaching Introduction to Geology Recitation, Introduction to Geology Laboratory, and Structural Geology; preparation and grading of assignments; and administering and grading class examinations.

1990–1992: Research Assistant, Natural Materials Analytical Laboratory, EERC, UND.

- Responsibilities included operating x-ray diffractometer and interpreting and manipulating XRD data, performing software manipulation for analysis of XRD data, performing maintenance and repair of XRD machine and sample carbon coating machine, preparing samples for XRD and SEM analysis, and performing point count analysis on SEM.

Professional Activities

Member, ASM International

Member, American Ceramic Society

Member, Microscopy Society of America

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

2021–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 CO₂ capture, utilization, and storage (CCUS); power generation; emissions reduction; and renewable energy systems.
- Currently supports the Plains CO₂ 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.
- Supports public and industry outreach 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.

2015–2021: 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 North American Electric Reliability Corporation (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) CO₂

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 CO₂ sequestration technologies.

- Work also included development, management, and dissemination of market-oriented materials for programs focused on CO₂ 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.



JOHN S. OLESIK

Senior Engineer

Energy & Environmental Research Center (EERC), University of North Dakota (UND)
15 North 23rd Street, Stop 9018, Grand Forks, North Dakota 58202-9018 USA
701.777.5027, jsoleksik@undeerc.org

Education and Training

B.S., Petroleum Engineering, University of North Dakota, 2016.

B.A., Economics, University of North Dakota, 2016.

Research and Professional Experience

May 2021– Present: Senior Engineer, Advanced Energy Systems, EERC, UND.

April 2019–April 2021: Research Engineer, Advanced Energy Systems, EERC, UND.

- Contributes to design, modeling, and fabrication of experimental equipment.
- Oversees and operates equipment.
- Interprets data.
- Assists in preparing proposals, reports, and papers.
- Presents project results to clients and at national and international conferences.

Principal areas of interest and expertise include energy and chemical conversion, pre- and postcombustion carbon capture and utilization, emission control and impurities removal, upstream petroleum production facilities, and economic assessment.

October 2018–April 2019: Research Engineer (temporary), EERC, UND.

- Served as floor engineer for operation of pilot-scale coal gasification system.
- Assisted in planning and execution of equipment and system assembly.
- Prepared, moved, and assembled pilot-scale components for testing.
- Performed in-field troubleshooting for malfunctioning system components.

May 2017–Present: Partner, JOLS Contractors LLP, Williston, North Dakota.

- Partnered with other general contractors in residential roofing, remodeling, and repair business. Planned and designed projects to meet customer needs.
- Coordinated with other contractors to schedule work and complete projects on time and on budget.
- Performed bidding, expensing, and billing.

January–April 2017: Associate Field Technology Specialist, Halliburton, Williston, North Dakota.

- Performed testing on water, sand, and fracture fluid samples to ensure quality of work.
- Maintained and tracked pressure, chemical concentrations, sand concentrations, and fluid downhole rate to assist fracture crew in delivering fracture to customer design specifications.

August 2015–May 2016: Managing Director of Marketing, Dakota Venture Group.

- Worked toward new recruiting strategy for developing talent within Dakota Venture Group.
- Maintained communication between investors, alumni, advisory board, and group members.
- Released updates, newsletters, quarterly updates, and promotional material.
- Executed four due diligence reports, one of which serving as team lead.

Summer 2015: Drilling Engineer Intern, Marathon Oil Corporation, Williston, North Dakota.

Summer 2014: Floorhand, Nabors Drilling USA, Williston, North Dakota.

Summers 2012 and 2013: Warehouse Supervisor, Total Service Supply, Williston, North Dakota.

Professional Activities

Member, Society of Petroleum Engineers

Publications

Has coauthored several publications.



CAITLIN M. OLSEN

Principal Policy and Regulatory Strategist
Energy & Environmental Research Center (EERC), University of North Dakota (UND)
15 North 23rd Street, Stop 9018, Grand Forks, North Dakota 58202-9018 USA
701.777.5399, colsen@undeerc.org

Education and Training

B.S., Geology with a Hydrogeology minor, University of Wisconsin – River Falls, 2013.

Research and Professional Experience

January 2024–Present: Principal Policy and Regulatory Strategist, EERC, UND.

- Works with project teams and EERC clients to inform strategies and implement solutions that enable prudent production and use of fossil energy and reduce the carbon intensity of energy production.
- Develops, communicates, and informs sound regulation, policy, guidelines, standards development, and technical and business strategies.
- 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 incremental oil recovery; unconventional oil recovery; geologic CO₂ capture, utilization, and storage (CCUS); power generation; emissions reduction; and renewable energy systems.

Principal areas of interest and expertise include regulatory compliance, geologic CCUS, power generation, emissions reduction, and renewable energy systems. Experience also includes project management, data analysis, staff supervision and development, and safety audits.

February 2022–January 2024: Senior Regulatory and Permitting Specialist, EERC, UND.

- Worked 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 incremental oil recovery, unconventional oil recovery, geologic CCUS, power generation, emissions reduction, and renewable energy systems.

August 2021–January 2022: Assistant Compliance Manager, Mayo Clinic, Rochester, Minnesota.

- Created and managed compliance assurance program for the Facilities Management Division at Mayo Clinic.
- Served as project manager for developing and implementing lockout tagout program for southeast Minnesota health systems hospitals and clinics.
- Developed and implemented confined-space protocols for southeast Minnesota hospitals and clinics.
- Maintained currency in assigned compliance areas including Joint Commission, Occupational Safety and Health Administration, and U.S. Environmental Protection Agency (EPA).

June 2018–July 2021: Production and Measurement Supervisor, North Dakota Industrial Commission (NDIC) Oil and Gas Division, Bismarck, North Dakota.

- Supervised work of production, auditing, and measurement department, which includes team of field inspectors, production assistants, and temporary office workers.

- Coordinated and reviewed production reporting processes, measurement processes, and measurement reporting processes that support regulatory functions of NDIC.
- Led Production and Measurement team on various production-tracking and metering projects, including working with web developers to build new reporting database.
- Managed oil-conditioning and gas capture compliance projects within state of North Dakota.
- Analyzed statistical data to predict and summarize future gas capture changes.
- Conducted and coordinated response to industry and public inquiries related to production reporting and oil and gas measurement-related field activities, providing responses in timely manner.
- Maintained relationships with gas midstream providers and provided strong communication lines with executive personnel.
- Reviewed surface commingling applications, tracked and input meter information, reviewed proving reports, and tracked natural gas liquid units.
- Conducted yearly appraisals, organized workflow, monitored employee productivity, hired and trained new employees, and performed other supervisory duties.
- Developed, researched, and delivered orders of Commission, including gas capture and oil-conditioning policies, resulting in statewide changes to oil and gas production protocol.

November 2013–June 2018: Petroleum Engineer–Field Inspector, NDIC Oil and Gas Division, Williston, North Dakota.

- Conducted physical compliance inspections of drilling exploration and oil production sites, which included permitted locations, drill rigs, production and injection wells, and associated facilities.
- Ensured permitting compliance for drilling rigs.
- Compiled information on geologic zones penetrated, drillstem tests run, cores cut, and directional surveys.
- Inspected well completions, recompletions, workovers, plugged wellsites, and pipelines to monitor and evaluate progress of reclamation.
- Approved openhole-plugging procedures and witnessed plugging of wells to ensure proper isolation of oil and water reservoirs.
- Oversaw remediation of spills in wetlands, sloughs, grassland, and cropland and monitored requirements of environmental and reclamation concerns.
- Investigated and responded to public complaints and operator inquiries.
- Ensured compliance guidelines were met by working with EPA, Bureau of Land Management, and Forest Service.
- Generated diverse range of presentations including oil-conditioning policies, gas capture recommendations, electromagnetic and electrical resistivity tomography surveying, microseismic monitoring, and magnetic ranging capabilities.

May–August 2012: Environmental Inspector, Regulatory Department, City of Minneapolis, Minneapolis, Minnesota.

- Inspected and conducted routine field investigations to resolve environmental problems such as noise, air quality, water quality, and soil pollution.
- Coordinated and prepared reports, research efforts, and mapping projects related to environmental projects and issues.
- Drafted and issued permits and ensured compliance through inspections.
- Reviewed and recommended permit denials, revocations, or administrative fines.
- Responded to private and public agencies for emergency response and reporting of emergency incidents and provided assistance to city as required.

- Represented Health Department in public meetings, public relations, media relations, and communications with elected officials and other stakeholders.



DR. JOHN A. TEMPLETON

Senior Geoscientist

Energy & Environmental Research Center (EERC), University of North Dakota (UND)
15 North 23rd Street, Stop 9018, Grand Forks, North Dakota 58202-9018 USA
(701) 777-5338, jtempleton@undeerc.org

Education and Training

Ph.D., Geology, Columbia University, 2015.

M.Div., Wake Forest University, 2004.

B.S., Geology and Chemistry, University of North Carolina, Chapel Hill, 2001.

Research and Professional Experience

2021–Present: Senior Geoscientist, EERC, UND.

- Interfaces with diverse team of scientists and engineers to assess project uncertainties in oil and gas development and geologic CO₂ storage, including developing geophysical models of subsurface and performing regional geological characterization.
- Helps lead diversity, equity, inclusion, and accessibility efforts at EERC.

Principal areas of interest and expertise include structural geology, tectonics, sedimentology and stratigraphy, geophysical interpretation, and exploration geology.

2017–2021: Senior Geologist, Lower 48 New Ventures, ConocoPhillips.

- Served as lead structural geologist for exploration team focusing on Lower 48 opportunities in Gulf Coast and Rocky Mountain basins.

2016: Senior Geologist, Permian Basin Development Team, ConocoPhillips.

- Served as lead geologist for San Andres and Holt redevelopment on Central Basin Platform focused on carbonate sequence stratigraphy and quantitative seismic stratigraphy.

2015: Geologist, Global New Ventures, ConocoPhillips.

- Led Southeast Asia regional project including Myanmar, Cambodia, and Vietnam.

2014: Intern, Subsurface Technology Clastic Stratigraphy Group, ConocoPhillips.

- Work focused on quantitative seismic stratigraphic interpretation of deepwater turbidite channel reservoirs in Choctaw Basin, Gulf of Mexico.

2013: Intern, Sedimentology Research Group, Statoil, Norway.

- Work focused on sediment provenance of Triassic and Jurassic rift basins, North Sea, using detrital zircon thermochronology.

2011–2014: Teaching Assistant, Columbia University.

- Served as Graduate Teaching Assistant for Plate Tectonics, Advanced General Geology, Death Valley field course, and Introduction to the Solid Earth.

2008–2009: Assistant Teacher, Candler Elementary School, Candler, North Carolina.

- Assisted with reading and math for second and fifth grade classrooms.

2008–2009: Interim Campus Minister, United Methodist Wesley Foundation, University of North Carolina, Asheville.

2006–2007: Youth and Children’s Minister, First Baptist Church, Spruce Pine, North Carolina.

2005–2006: Associate Campus Minister, Mars Hill College, Mars Hill, North Carolina.

Publications

Has authored and coauthored several professional publications.



DR. AGUSTINUS ZANDY

Principal Operations Specialist

Energy & Environmental Research Center (EERC), University of North Dakota (UND)
15 North 23rd Street, Stop 9018, Grand Forks, North Dakota 58202-9018 USA
701.777.5435, azandy@undeerc.org

Education and Training

Ph.D., Petroleum Engineering, University of North Dakota, 2022.

M.S., Petroleum Engineering, University of North Dakota, 2017.

Bachelor's degree, Chemical Engineering, Bandung Institute of Technology, Indonesia, 2007.

Research and Professional Experience

October 2022–Present: Principal Operations Specialist, EERC, UND.

- Works with project teams and EERC clients and leads efforts related to carbon capture, utilization, and storage (CCUS) projects; well drilling and completion designs; field activities related to drilling, logging, coring, and completion; well production/injection performance; and well injection (step rate, extended, and fall-off tests) and stress tests interpretation.
- Mentors junior team members.
- Works with team members to prepare proposals.
- Develops and manages projects, personnel, and budgets.
- Prepares and manages the preparation of technical reports.
- Delivers technical presentations.
- Works with potential clients and service companies.
- Prepares and organizes technical documents related to drilling and injection permitting for Class I, II, and VI wells and storage facility permits.

Principal areas of interest and expertise include drilling and completion design (Class I, Class II, and Class VI wells); production optimization and simulation; artificial lift design (gas lift and electric submersible pump); and drilling, logging, coring, well-testing, and production operations.

August 2020–September 2022: Senior Operations Specialist, EERC, UND.

- Worked with project teams and EERC clients to perform drilling and completion design.
- Conducted field activities related to drilling, logging, coring, and completion.
- Analyzed artificial lift designs (gas lift and electric submersible pump).
- Evaluated well production/injection performance.
- Mentored junior team members.
- Worked with team members to prepare proposals.
- Developed and managed projects, personnel, and budgets.
- Prepared and managed preparation of technical reports.
- Delivered technical presentations, working with team members, clients, and potential clients.
- Prepared and organized technical documents related to drilling and injection permitting for Class I, II, and VI wells.

2017–July 2020: Oilfield Operations Specialist, EERC, UND.

- Led efforts related to design and execution of oil and gas field activities such as well drilling, logging, downhole fluid sampling, coring, and well completion and analyzing hydraulic fracturing practices to look for optimization methods.
- Worked with team members to prepare proposals.
- Developed and managed projects, personnel, and budgets.
- Prepared and managed preparation of technical reports and delivered technical presentations, working with team members, clients, and potential clients.
- Prepared and organized technical documents related to drilling and injection permitting for Class I, II, and VI wells.

2016–2017: Research Assistant (part-time), EERC, UND.

- Worked at EERC while completing M.S. degree, where activities included initiating completion design for CO₂ sequestration and brine inject wells for CO₂ plume optimization projects and gathering and organizing technical documents related to drilling and injection permitting for Class I, II, and VI wells.

2015–2016: Senior Petroleum Engineer, Tiabumi Petroleum, Jakarta, Indonesia.

- Accelerated well production by 50% by conducting well service and ESP frequency adjustment.
- Designed well completion (including artificial lift selection and well type) for three development wells.
- Yielded 30% piping cost reduction by proposing multifunctional dual-pipe system.
- Advanced production facility processes up to 99% by converting batching to continuous system, modifying piping system and fluid flow at no cost.

2010–2015: Petroleum Engineer, Medco E&P Indonesia, Jakarta, Indonesia.

- Developed waterflood pattern optimization by identifying fluid flow direction and connectivity in formation.
- Introduced interference test as methodology to identify flow unit connectivity in Baturaja Formation, and analyzed test results using Ecrin.
- Formulated best well completion design using WellFlo, which includes completion type, tubing size, artificial lift selection and installation schedule, perforation method, and specification and stimulation type, with various scenarios related to reservoir performance forecasting.
- Executed multistage acidizing operation using coiled-tubing unit in limestone reservoir with reservoir contact of 2500 ft MD and total acid treatment volume of 1800 bbl, substantially increasing oil production.
- Stimulated well production by selecting optimum artificial lift, redesigning existing artificial lift (gas lift and ESP), and stimulating reservoir.
- Pioneered monobore system for marginal gas field well that reduced drilling capital expenditures with no gas rate reduction.
- Introduced sand control selection methodology for unconsolidated reservoir to minimize wellbore damage during production.

2007–2010: Asset Production Engineer, Medco E&P Indonesia.

- Established production and water injection network model using WellFlo and ReO that successfully increased total water injection rate by 20% and improved piping system to reduce pipe operating pressure by 5–10 psig.

- Implemented ESP–gas lift hybrid system that was successful in minimizing production loss by 30% during ESP system failure and installed with no failures.
- Coordinated slickline operations such as pressure–temperature downhole survey, resetting gas lift valve, and inside mandrel (IM-Pack OFF) installation for gas lift deepening and tubing clearance, including electronic memory gauge programming and data receiving.
- Initiated intermittent gas lift installation in low-production wells, which successfully increased production by 50% from 12 wells.
- Established water injection well stimulation schedule using rigless operation that effectively maintained voidage replacement ratio (VRR) >1.0.

Professional Activities

Member, Society of Petroleum Engineers

Publications

Has coauthored several professional publications.

APPENDIX C
BUDGET NOTES

BUDGET JUSTIFICATION

ENERGY & ENVIRONMENTAL RESEARCH CENTER (EERC)

BACKGROUND

The Energy & Environmental Research Center (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 among budget 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 Code of Federal Regulations (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 which 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.

Subcontract – Neset Consulting Service (Neset): Neset will generate authorization for expenditure (AFE) for the stratigraphic test well and be hired as a general drilling contractor to select, contract, and manage third parties for the drilling and injection test operations. The cost (\$8,813,351) is based on an updated AFE for the stratigraphic test well coring (\$5,401,364) and a quote for the injection test (\$3,411,987).

Subcontract – Paragon Geophysical Services, Inc. (Paragon): Paragon will acquire 3D seismic data for the project area. The cost (\$1,037,228) is based on an updated AFE.

Subcontract – SLB: SLB will design the injection test, interpret the data, and generate a report. The cost (\$100,000) is based on historical expenses from previous efforts with similar scope.

Subcontract – Stress Engineering Services Inc. (Stress Engineering): Stress Engineering will conduct evaluation of materials compatibility testing and perform corrosion modeling to determine and generate a demonstration of materials compatibility for Class VI permitting. The cost (\$60,000) is based on historical expenses from previous efforts with similar scope.

Subcontract – Loudon Technical Services: Loudon Technical Services will provide advisement and oversight on the materials compatibility evaluation and modeling. The cost (\$8,000) is based on previous efforts with similar scope.

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.

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, Web site design, brochures, and photographs. The estimated cost is based on prior experience with similar projects.

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.

The technical software fee is a use fee for an advanced project management tool. Costs are associated with software, data entry, maintenance, and enhancement of the system.

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.

Field safety fees cover safety training and certifications, providing necessary personal protective equipment, and annual physicals. The estimated cost is based on the number of days individuals are budgeted to work in the field.

Outside Lab – Minnesota Valley Testing Laboratories, Inc. (MVTL): MVTL fees are for performing water analysis on the fluid used in the injection test. This cost is based on historical quotes for similar jobs.

Facilities and Administrative Costs: 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 (MTDC). 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 \$5,150,874, and Rainbow Energy Center is providing \$643,859 of cost share.

Research & Development and EPP Update

Mike Holmes

North Dakota Industrial Commission Meeting

Tuesday, November 26, 2024

Lignite Research Councils R&D Program

An Industry / Government Partnership



Public / Private Partnership

<http://www.lignite.com/ResDev/index.htm>

<http://www.nd.gov/ndic/lrc-infopage.htm>

Lignite Research Program – Historical Challenges Met

To highlight a few...

Thriving with high-sodium coal

Optimized operations and cleanability

Support of only U.S. coal-to-synfuels plant

DGC added urea to product suite

Lignite mining, use, and reclamation advances through data, instrumentation & controls

Spiritwood – industrial complex

DryFining – coal upgrading

Meeting regulations for primary pollutants

Addressed control of nitrogen and sulfur emissions

Mercury costs reduced by more than 20X

Sustaining industry responsible for \$5.7 billion of economic impact and 12,000 jobs.

Commercial CO₂ projects in North Dakota

Lignite Industry Technology Roadmap

Support continued options to enhance performance of the existing fleet

Invest in transformational research (Next generation of Lignite conversion systems that integrate CO₂ capture)

Focus on Carbon Capture Utilization & Storage (CCUS)

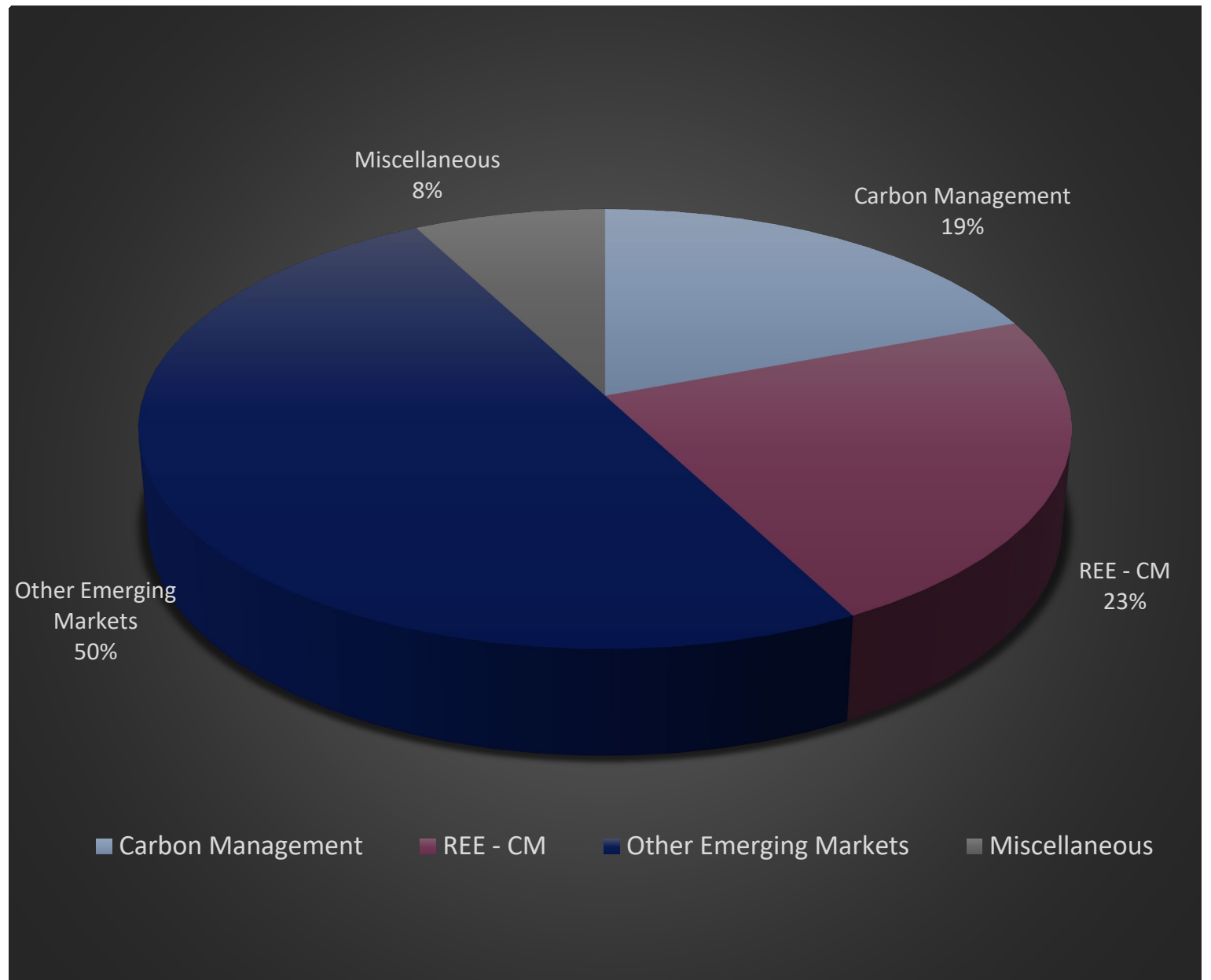
Leverage International R&D breakthroughs

Renewed Focus

Additional value propositions for lignite

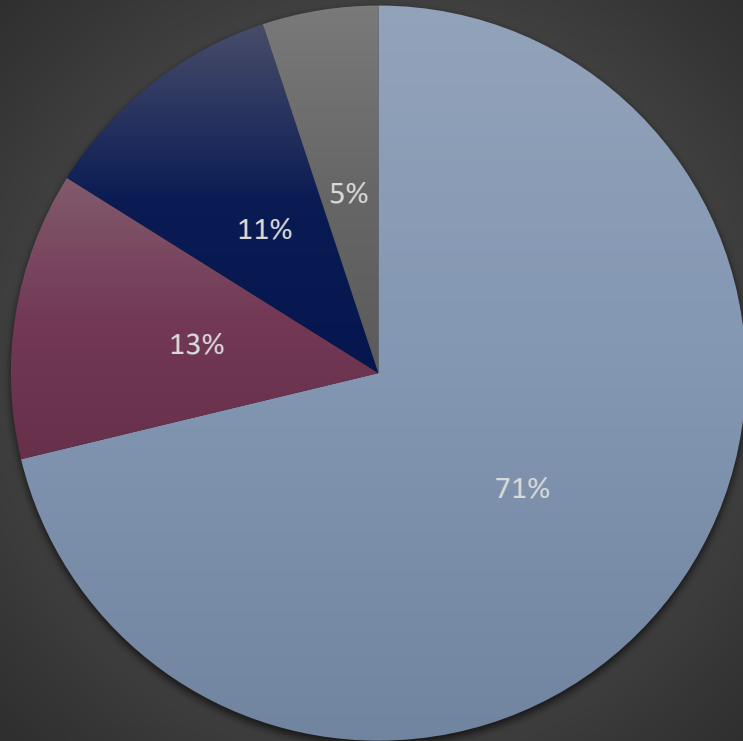
Polygeneration opportunities

Lignite Research Program – Active Projects



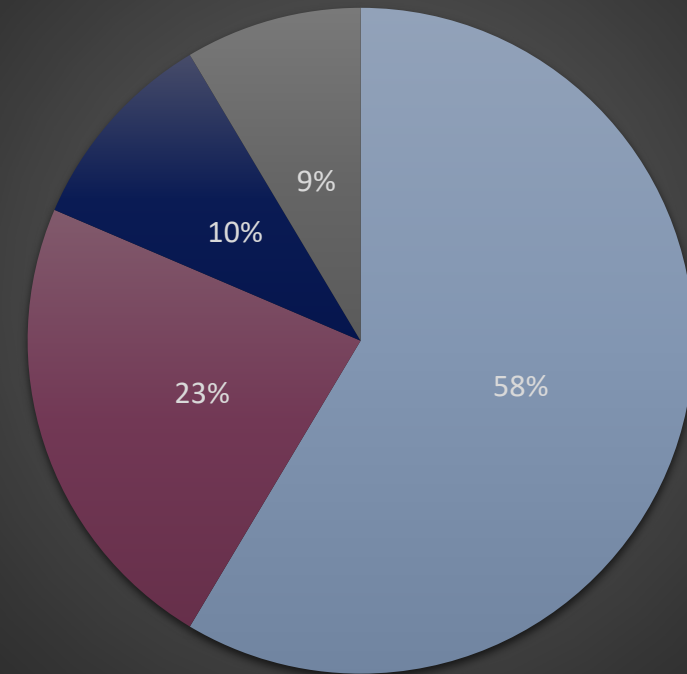
Lignite Research Program – Active Projects Funding

NDIC Funding \$44.4M



■ Carbon Mgmt ■ REE - CM ■ Emerging Mkts ■ Miscellaneous

Total Project Funding \$161.84M



■ Carbon Mgmt ■ REE - CM ■ Emerging Mkts ■ Miscellaneous

Lignite Research Program & EPP Overview

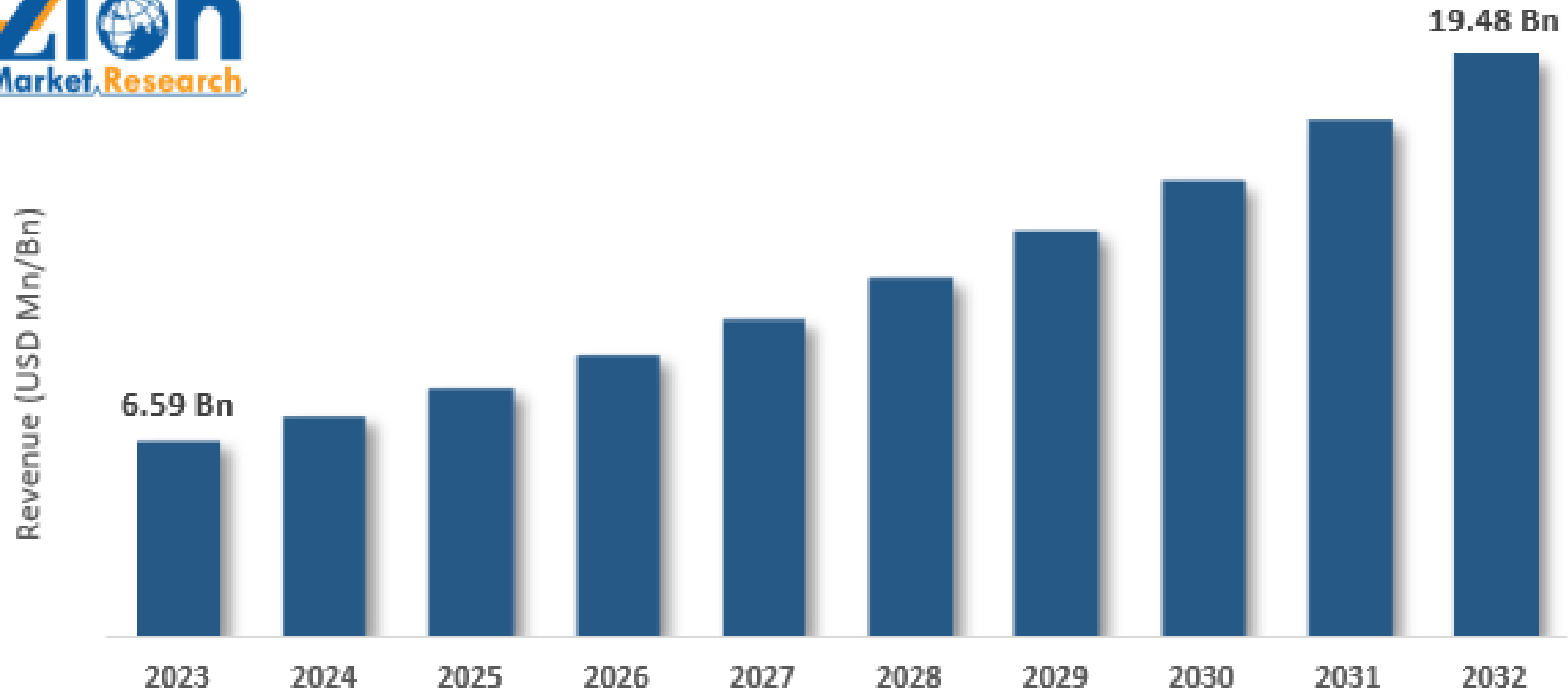
Current Portfolio

- Emerging Markets
- Carbon Management

Enhance Preserve and Protect Project

Q&A and Discussion of Path Forward

Global Rare Earth Metals Market, 2024-2032 (USD Billion)



CAGR : 12.80%

Source: Zion Market Research

**ELEVATED CRITICAL MINERAL CONCENTRATIONS
ASSOCIATED WITH THE PALEOCENE-EOCENE THERMAL MAXIMUM,
GOLDEN VALLEY FORMATION, NORTH DAKOTA**

by

Edward C. Murphy, Levi D. Moxness, and Ned W. Kruger



Lignite Research Program

Rare Earth Elements and Critical Minerals

Rare Earth Element Extraction and Concentration at Pilot-Scale from North Dakota Coal-Related Feedstocks – Phase 3

–Directed at demonstrating novel technology for rare earth element recovery from North Dakota lignite coal feedstocks at the pilot scale.

Lead: Nolan Theaker, UND Institute for Energy Studies

Awarded follow-on FEED Study

Williston Basin CORE-CM Initiative

Focused on the expansion and transformation of coal and coal-based resource utilization within the Williston Basin to produce Rare Earth Elements, Critical Minerals and Non-fuel Carbon Products.

Lead: John Kay, EERC

Additional funding Increment

Production of Germanium and Gallium Concentrates for Industrial Processes

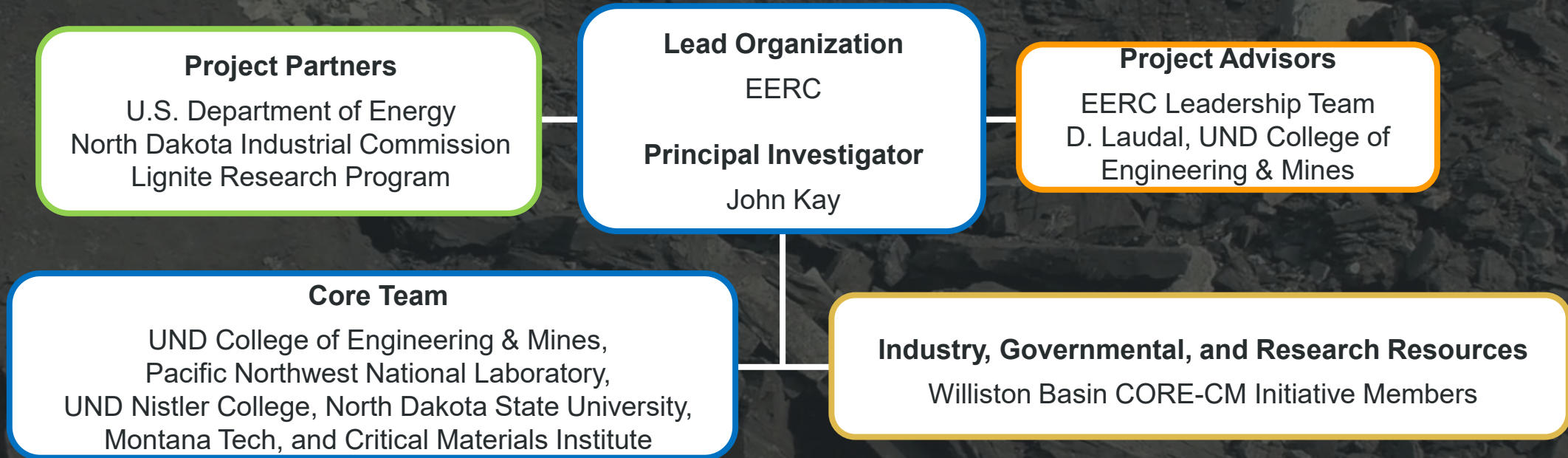
Targets Germanium and Gallium removal and concentration, integrated into the UND IES REE recovery process.

Lead: Steven Benson, MTI

North Dakota Rare Earth and Critical Element Resource Evaluation

This project targets a better understanding of the North Dakota rare earth element and critical mineral resource.

Lead: Steven Benson, MTI
Added Resource Evaluation



U.S. DEPARTMENT OF
ENERGY



NATIONAL ENERGY TECHNOLOGY LABORATORY



BASIN ELECTRIC POWER COOPERATIVE

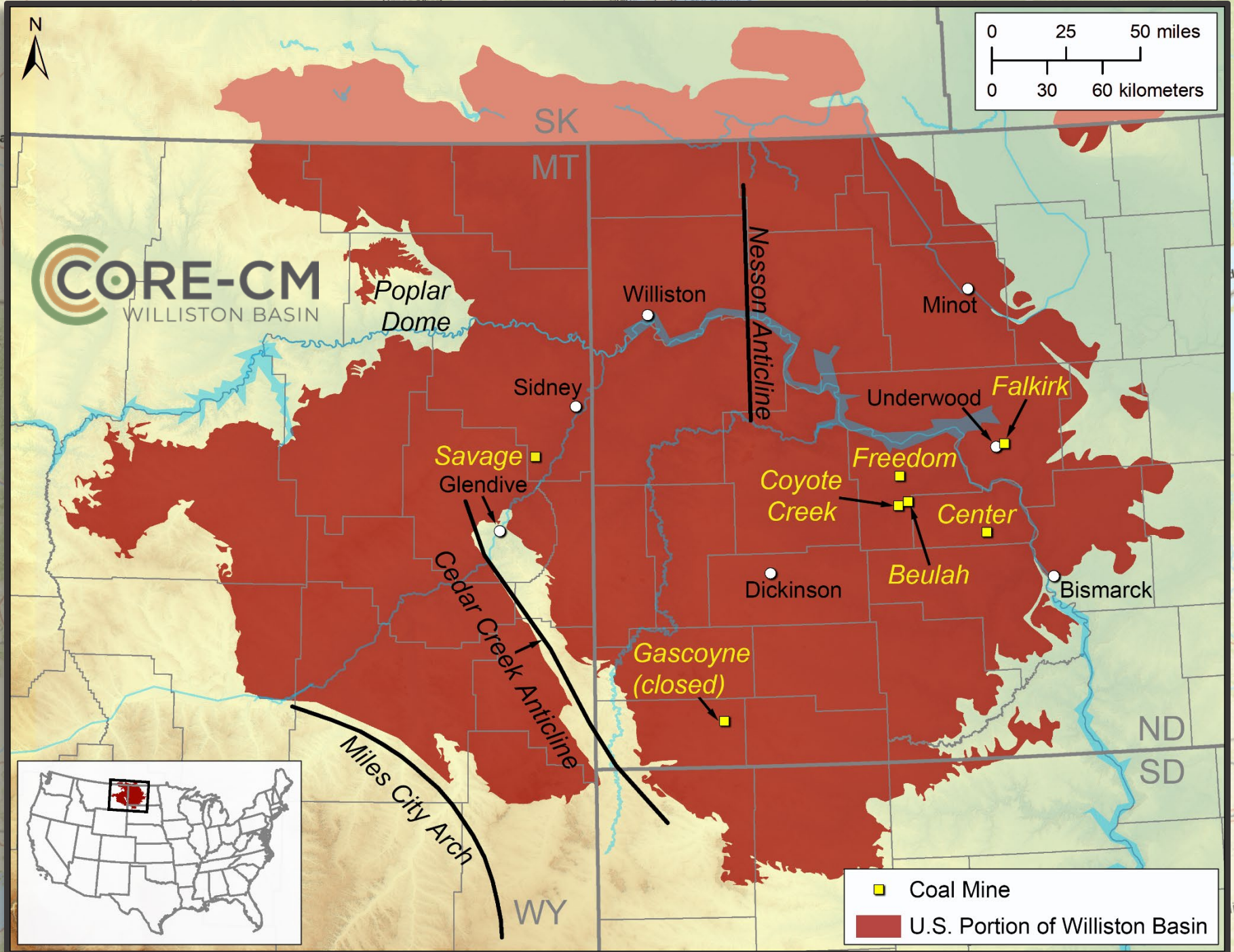
A Touchstone Energy® Cooperative



AN ALLETE COMPANY

Current 
Chemicals





Featured Projects – Critical Minerals (2)



Pilot-scale Demonstration (2020-2024) : 500 kg/hour demonstration facility

Funding: \$5.4M (DOE), \$1.8M (NDIC/Partners)

Goals: Demonstrate UND's lignite-based REE/CM technology at a commercially-relevant scale in a continuous process and validate the economic feasibility

Outcome: Successfully constructed and operated the pilot plant, producing REE products in excess of the 65% goal. Processed > 100 tons of REE-enriched lignite feeds



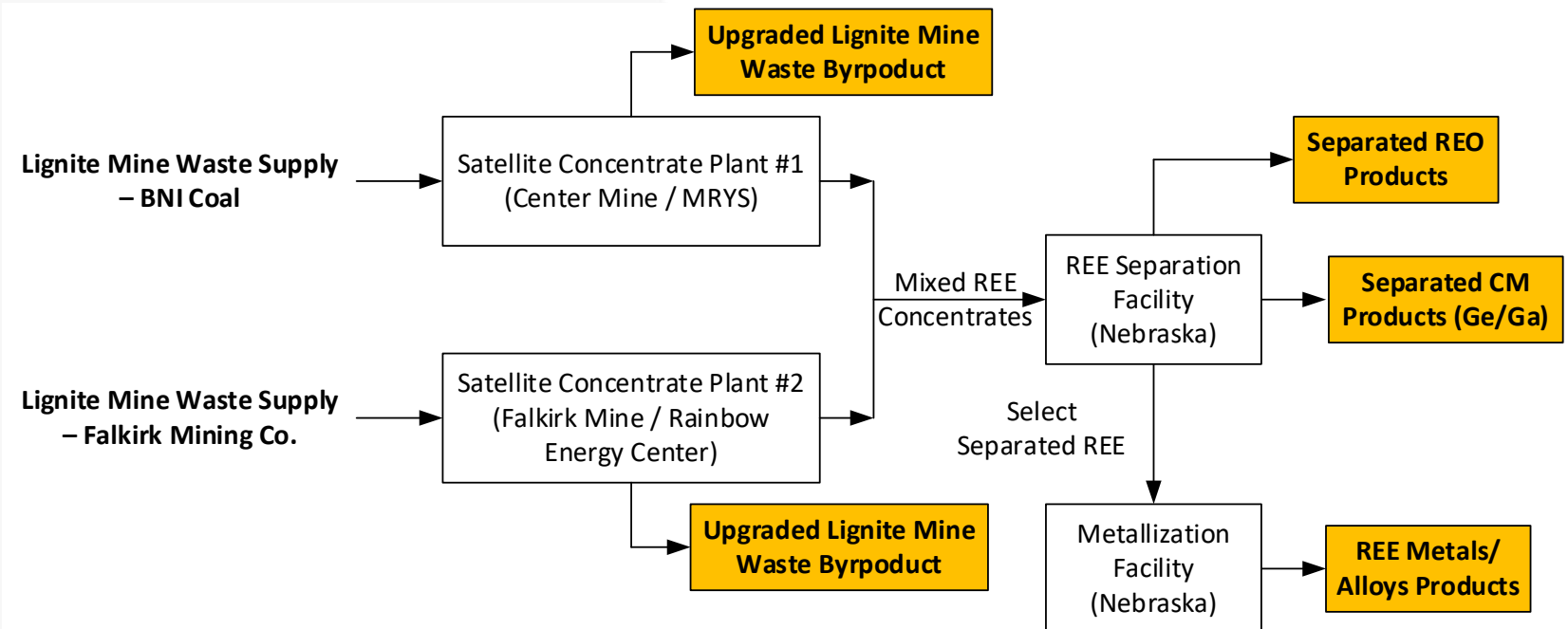
RARE EARTH SALTS



Featured Projects – Critical Minerals (1)



- **BIL: Rare Earth Elements Demonstration Facility (DE-FOA-0002618)**
- Phase 1: FEED Study (\$10 Million) – 2023-2024
 - UND one of two awards
- Phase 2: Construction / Operation (~\$250 Million) – 2025+
 - DOE indicated only one project to move on to Phase 2



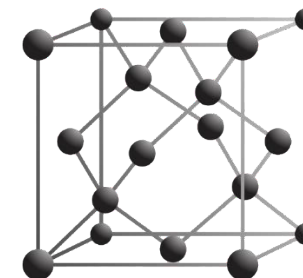
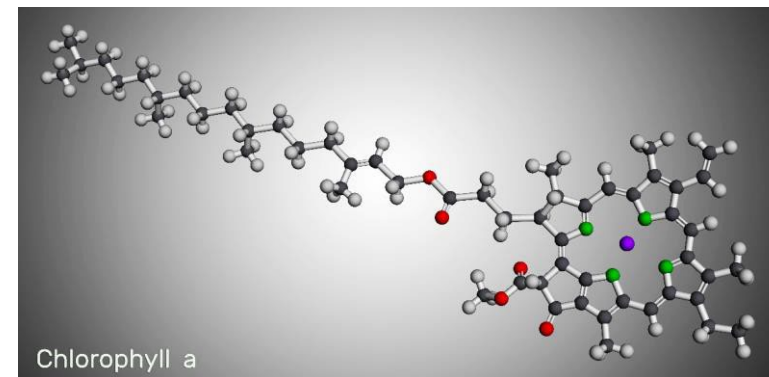
Achievements

- Successfully commissioned and operated the REE extraction pilot for over 130 tons of lignite resources to date
 - Able to produce detailed equipment lists from pilot needs and operability requirements
 - Exciting data on products
- FEED Study still underway – identifying new areas of potential improvement
 - Completing engineering and costing for the two-plant concept able to produce >20% of US demand of Sc, Ge, and Ga
 - Wastewater produced from the MREC process actually found to be RCRA non-hazardous across all categories without treatment – directly impacts potential costs and environmental impacts

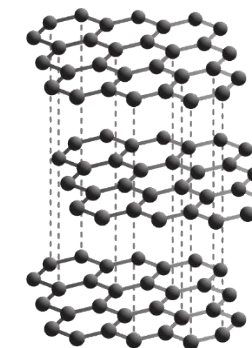


PERIODIC TABLE OF THE ELEMENTS

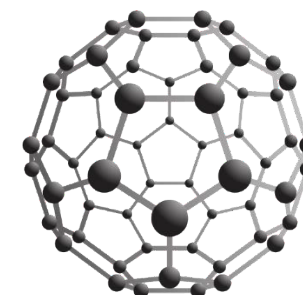
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1	H																	2	He																				
IIA												III A	IVA	VA	VIA	VIIA																							
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IIIB		IVB		VB		VIB		VIIB		VIIIB		IB		IIB		13	Al	14	Si	15	P	16	S	17	Cl	18	Ar												
11	Na	12	Mg	19	K	20	Ca	21	Sc	22	Ti	23	V	24	Cr	25	Mn	26	Fe	27	Co	28	Ni	29	Cu	30	Zn	31	Ga	32	Ge	33	As	34	Se	35	Br	36	Kr
37	Rb	38	Sr	39	Y	40	Zr	41	Nb	42	Mo	43	Tc	44	Ru	45	Rh	46	Pd	47	Ag	48	Cd	49	In	50	Sn	51	Sb	52	Te	53	I	54	Xe				
55	Cs	56	Ba	72	Hf	73	Ta	74	W	75	Re	76	Os	77	Ir	78	Pt	79	Au	80	Hg	81	Tl	82	Pb	83	Bi	84	Po	85	At	86	Rn						
87	Fr	88	Ra	104	Rf	105	Db	106	Sg	107	Bh	108	Hs	109	Mt	110	Ds	111	Rg	112	Cn	113	Uut	114	Uuq	115	Uup	116	Uuh	117	Uus	118	Uuo						
Lanthanides series		57	La	58	Ce	59	Pr	60	Nd	61	Pm	62	Sm	63	Eu	64	Gd	65	Tb	66	Dy	67	Ho	68	Er	69	Tm	70	Yb	71	Lu								
Actinides series		89	Ac	90	Th	91	Pa	92	U	93	Np	94	Pu	95	Am	96	Cm	97	Bk	98	Cf	99	Es	100	Fm	101	Md	102	No	103	Lr								



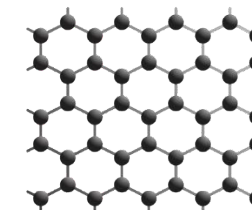
Diamond



Graphite



Fullerene



Graphene

Lignite Research Program Carbon Materials

Laboratory-Scale Coal-Derived Graphene Process – Development of a technological process for converting North Dakota Lignite into high-value solid carbon products such as graphene.

Lead: Alexander Azenkeng, EERC (UND)

Advanced Processing of Coal and Coal Waste to Produce Graphite for Fast-Charging Lithium-Ion Batteries – Follow on EERC project.

Lead: Alexander Azenkeng, EERC (UND)

Lignite Derived Carbon Materials for Lithium-Ion Battery Anodes – Develop and demonstrate an economic process for production of advanced composite anode materials for lithium-ion batteries using lignite.

Lead: Xiaodong Hou, UND Institute for Energy Studies

ND Lignite Coal-Based Pitch for Production of High Value Carbon Products – Use of Lignite to produce coal pitch for use in carbon materials such as graphene, asphalt, tires, ...

Lead: David Berry, AmeriCarbon Products, LLC.

ND FEED study Added

COAL-BASED ENGINEERED AGGREGATE

- Coal powder or coal waste mixed with proprietary inorganic polymers
- Superior mechanical strength and lower weight



EERC | UND UNIVERSITY OF NORTH DAKOTA

Lignite Research Program Building Materials Projects

Systematically Applied Research to Develop High Value Products from Coal

Development of new improved building materials out of lignite-based resources.

Lead: Bill Easter, Semplastics

Incorporation of Coal and Coal Waste Into High-Value Materials

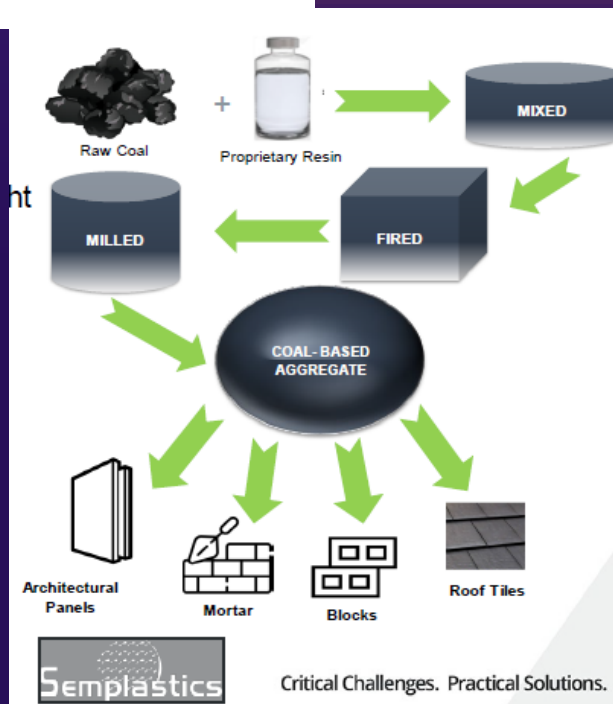
Follow-on of Semplastics project for development of new improved building materials out of lignite-based resources. Leading toward a demonstration structure.

Lead: Bill Easter, Semplastics

Development of Novel Sintered Coal Building Materials

Microbeam Technologies Incorporated (MTI) approach to making building materials from coal Feedstocks.

Lead: Matt Fuka, MTI





Graphite is on the list of mineral commodities critical to the U.S. economy & national security

In 2023, China accounted for

92%

The average electric vehicle contains

175lbs. of processed graphite

of anode graphite production globally

Reference: Benchmark Materials



918,500

Plug-In, electric light vehicles produced in the United States in 2022

4

operational U.S. lithium-ion battery plants (21 more in development)

REQUIRE

1.2 Million TONS

of spherical graphite every year

Reference: Google



Read More caer.uky.edu

\$73B

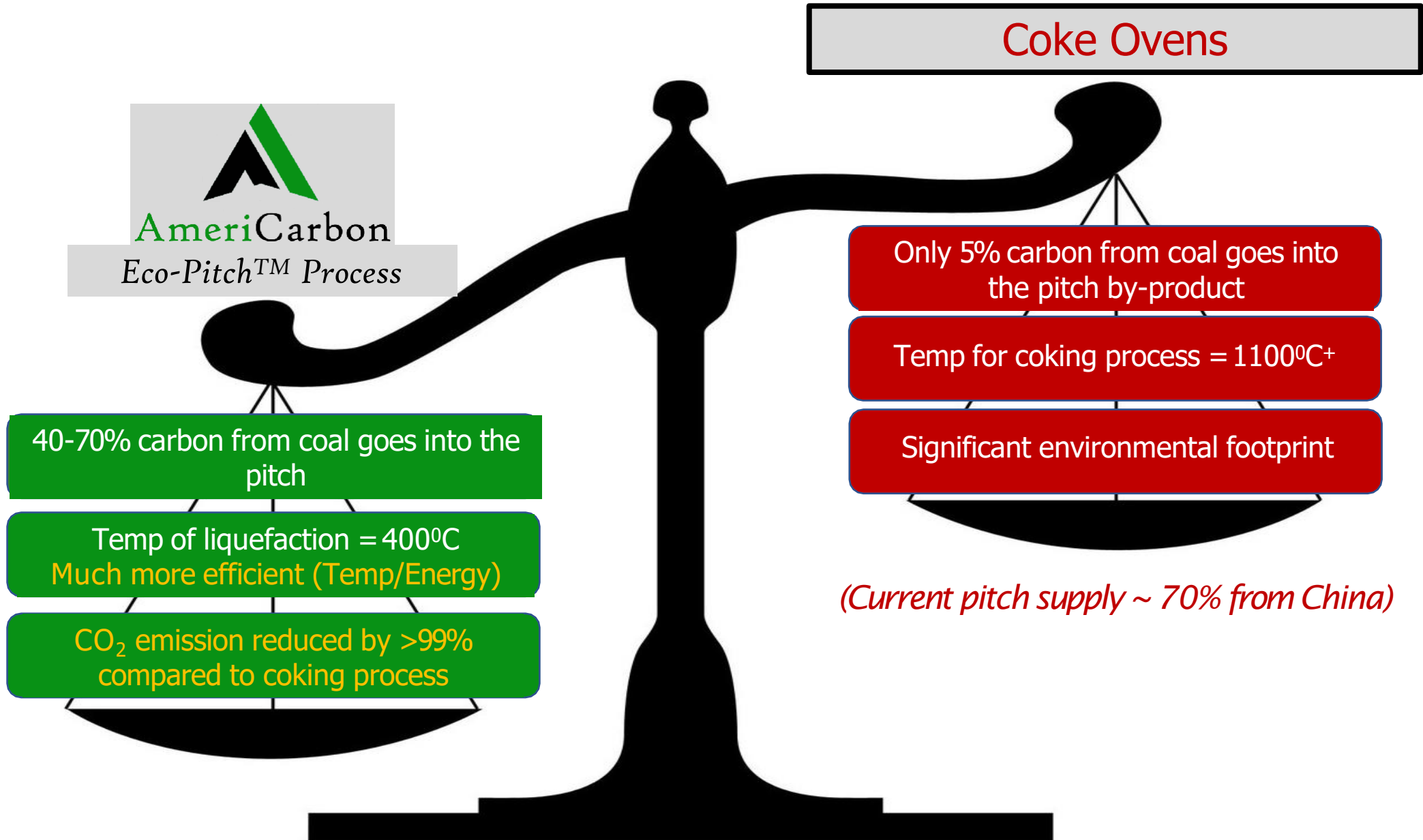
In planned battery projects announced in 2023—each needs graphite supply

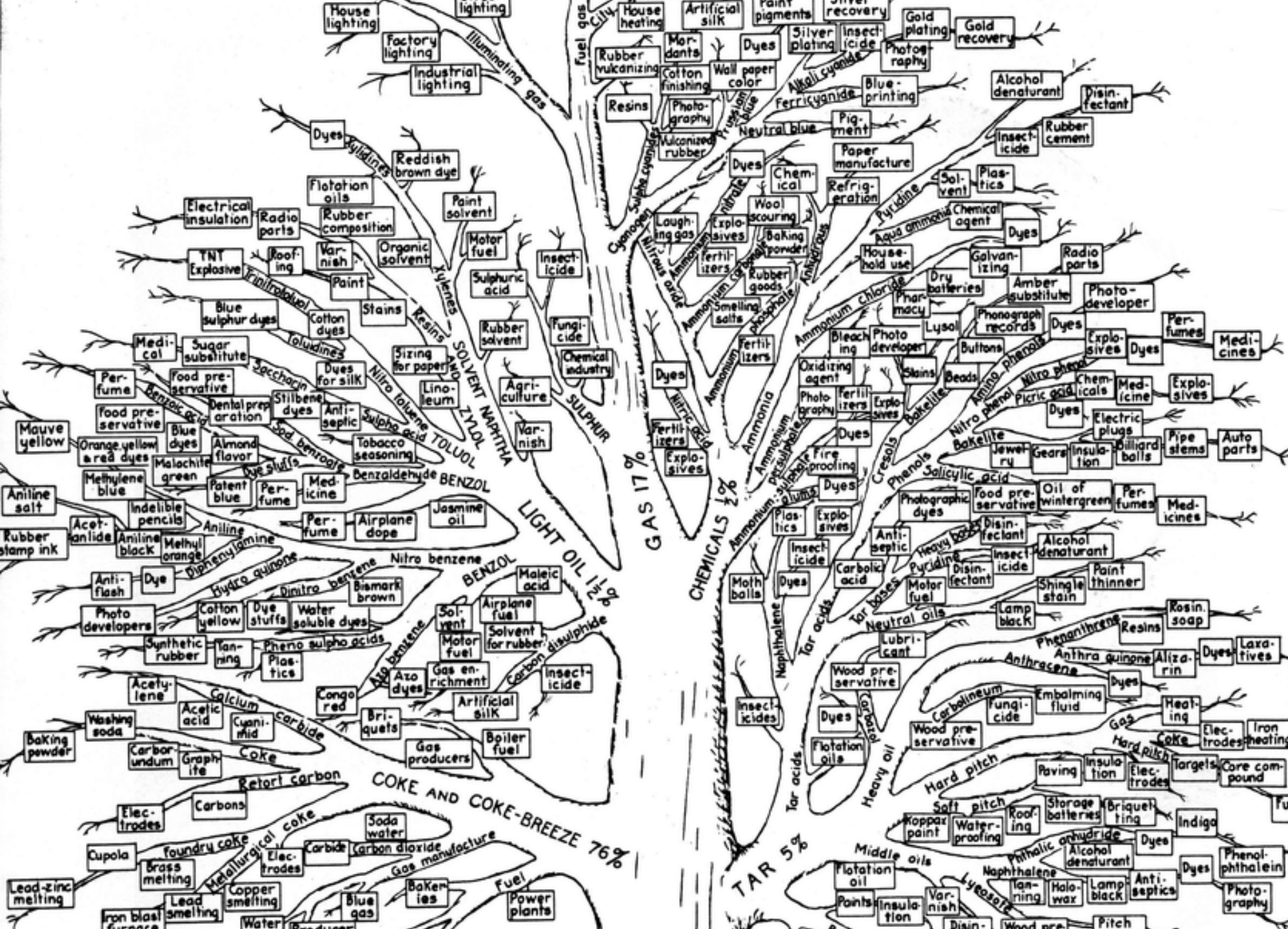
Reference: NPR

THE **CRUCIAL NEED** FOR **GRAPHITE**



AMERICARBON VS COKE OVEN PITCH





COAL PRODUCTS TREE

Showing the products obtainable from coal by carbonization in the modern by-product coke oven.

Carbon Capture Projects Update

Redundancy Study for CO₂ Capture at Coal Creek Station

EERC, Jason Laumb

Awarded May 2023

Objective: The EERC in partnership with Rainbow Energy Center (REC) proposed to evaluate equipment redundancy needs for carbon capture at the Coal Creek Station. The project would support the front-end engineering design study for the capture plant through this study to reduce operational risks for supplying baseload power with high reliability and availability. The project would leverage state funding with matching cash from REC. The project results would provide a cost-benefit analysis for design of the system with redundancy. This effort also supports the original REC Coal Creek Station carbon capture project intent to 1) reduce the technological and economic risks associated with investing in a post-combustion capture retrofit project and 2) provide information and learnings that will enable evaluation and deployment of similar North Dakota facilities.

Funding: NDIC: \$700,000; Total Project Costs: \$1,400,000

Coal Creek Carbon Capture: Geologic CO₂ Storage Complex Development

UND & EERC: Amanda Livers-Douglas

Awarded May 2023

Objective: The EERC in partnership with Rainbow Energy Center (REC) proposed to advance development of a geologic carbon dioxide (CO₂) storage complex in central North Dakota to store CO₂ captured from Coal Creek Station. The objective of Stage 1 is to conduct a set of activities necessary to advance site characterization, including evaluation of existing two-dimensional (2D) seismic data, geologic modeling, and CO₂ injection simulations to inform placement and design of a stratigraphic test well. The objective of Stage 2 is to characterize and permit the geologic CO₂ storage complex fully. The project would leverage state funding with matching cash from REC in Stage 1 and DOE funding would be added in Stage 2. Successful completion of Stage 2 would result in a fully characterized and permitted geologic CO₂ storage complex.

Funding: NDIC: \$6,119,690; Total Project Costs: \$50,387,901

Carbon Capture Projects Update Continued

Phase I Bridge Study for CCS at Coal Creek Station

Rainbow Energy Center, Conway Nelson

Awarded May of 2024

Objective: Rainbow Energy Center proposed to continue optimizing the process design and economics for a carbon capture system at the Coal Creek Station. The bridge study will be performed in parallel to the ongoing redundancy and Front-End Engineering and Design studies to reduce risks and optimize costs. The project will leverage state funding with matching cash from REC over the 10-month effort.

Funding: NDIC: \$1,094,416; Total Project Costs: \$2,188,833

PCOR Initiative to Accelerate CCUS Deployment Request for project incremental funding of \$500,000 of the previously approved \$2,000,000 based on additional scope of work and receipt of matching funds.

EERC, Kevin Connors

Third increment of \$500,000 of \$2,000,000 award was in early 2022

Project Tundra CREST Study and Project Tundra FEED Amendment

Both final reports were completed in 2023.

Lignite Research Council Fall 2024 Proposals

In addition to the report reviews many discussions were held with the technology developers on ongoing and potential future R&D projects. Initial conversations with technology developers about the October 1, 2024, grant round indicate that we should see at least three proposals focusing on carbon management, extraction of Germanium and Gallium, and the best practices for working with landowner in future energy developments.

Proposals for **Grant Round 105** are due by the end of today. Based on Conversations with technology developers and industry we expect roughly four proposals, including:

- A follow on to PCOR that would be focused on the Williston Basin carbon management activities. Expected request is for ~\$0.5 million out of a total project size of ~1.5 million. EERC led consortium.
- An evaluation of stacked storage opportunities for CO₂ storage in deep saline formations. Approximately \$5 million is the expected request (~\$11 million total) for the project team led by EERC and Rainbow Energy Center.
- A project focused on Germanium and Gallium extraction from North Dakota lignite. Anticipate a request of around \$370 K of a roughly \$3.5 million project. Microbeam

Grant Round 106

- Expect to see a request for phase 2 of the bridge study for the Coal Creek carbon capture project.
- Add-on scope for the next-generation lignite-fired power plant study.
- A project focused on best practices for working and communicating with North Dakota landowners on energy development. Jessie Beckers is working with several land owners and the initial estimate was that they will be requesting around \$200.
- Potential studies and data gathering to add to the record for future legal activities

EPP

Lignite
Plant
of the
Future



Lignite Plant of the Future

Identify challenges and opportunities for building the next-generation lignite facility in the current and future business environments.

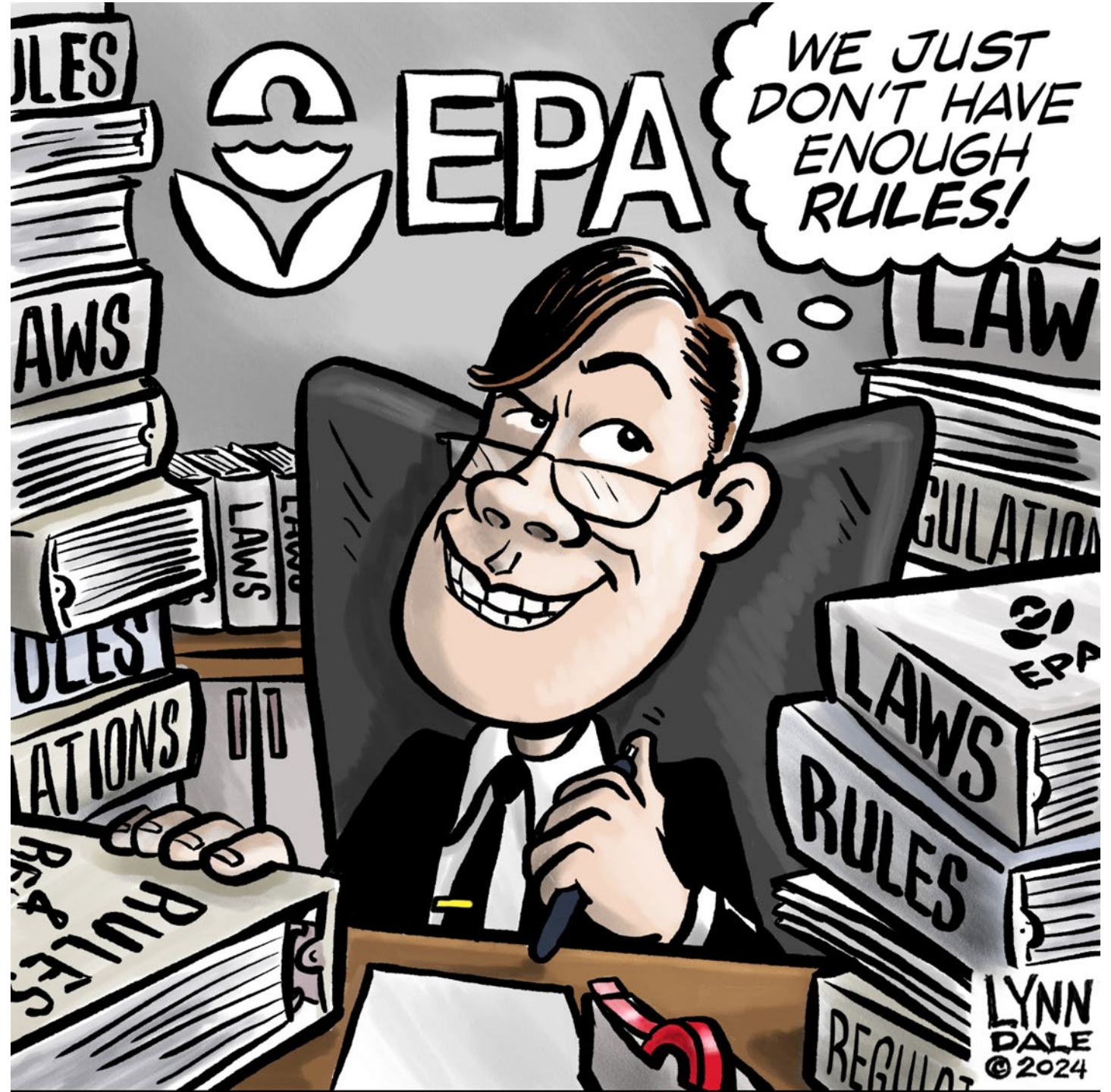
Focus of Study, funded with \$500k from LRC

- Permitting and regulatory hurdles
- Fair access to financing
- Insurance
- Additional Products, including usage of CO₂
- Evaluate future needs for power generation and demand growth

Engage industry members for input.

- The EERC project team met with LEC member organizations on two separate occasions to discuss key priorities for the members and understand challenges.

Threats:
Lignite
Industry
Faces
Regulatory
Onslaught
from EPA



Sampling of Regulatory Points of Focus

Existential Threats by Rulemaking:

EPA Overreach

- MATS Rule
- Greenhouse Gas Rule (Carbon Rule)
- Coal Combustion Residual Rule
- Regional Haze

Bureau of Land Management

- Resource Management Plan

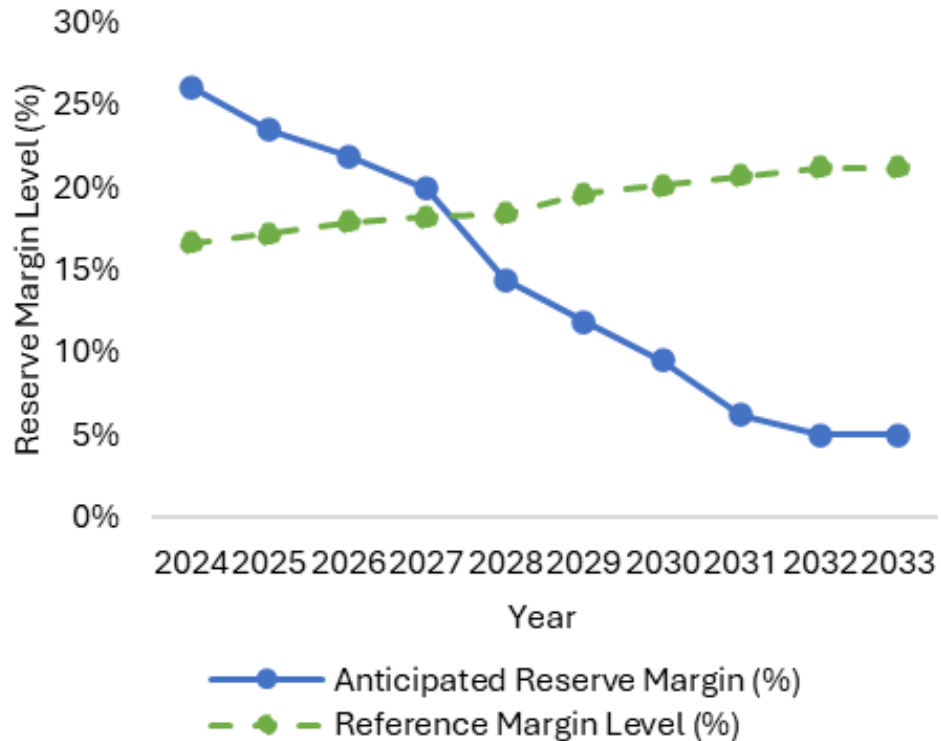
Minnesota 100% Carbon Free by 2040

Lignite
Industry
Will
Keep
Fighting
EPA

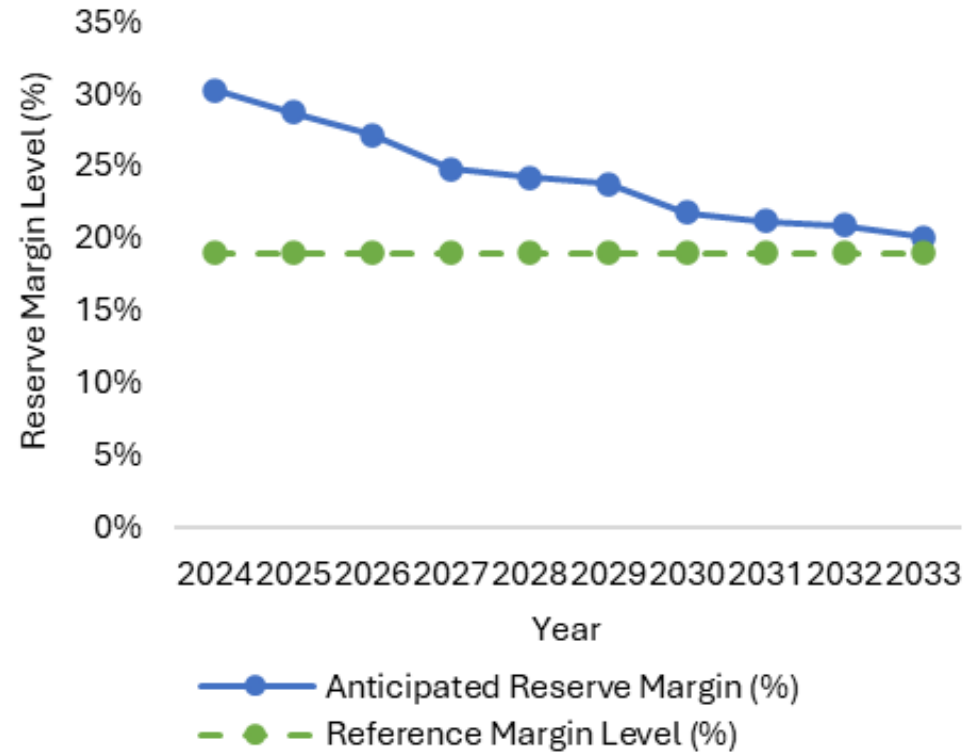


RESOURCE ADEQUACY

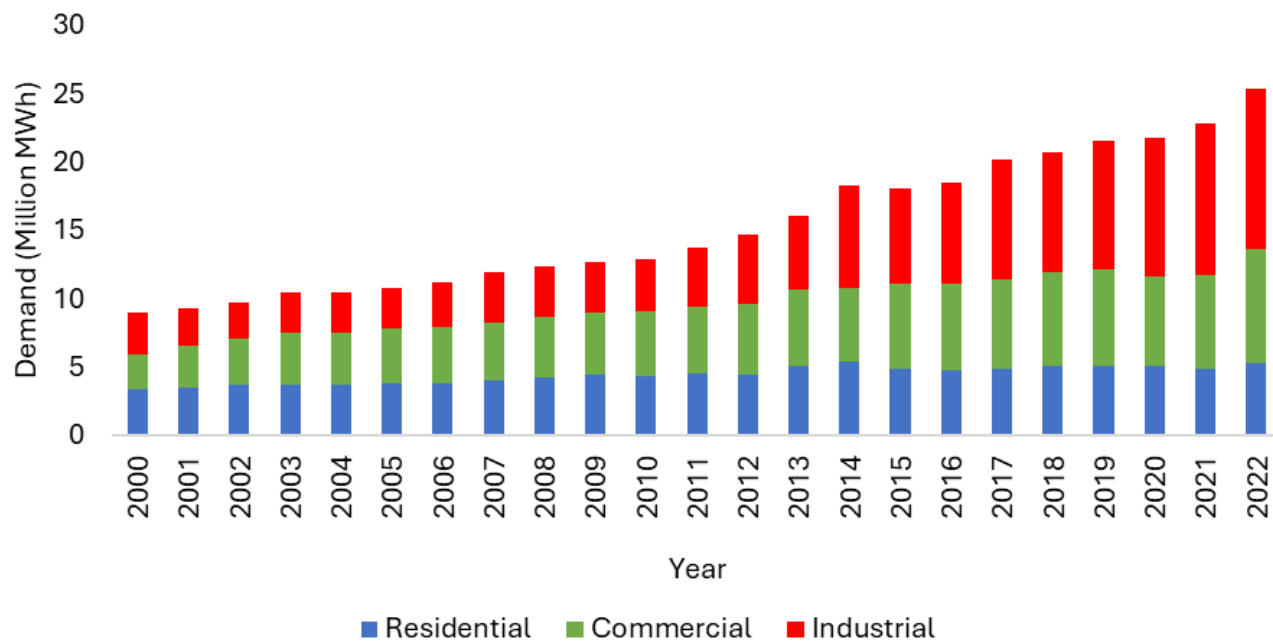
MISO



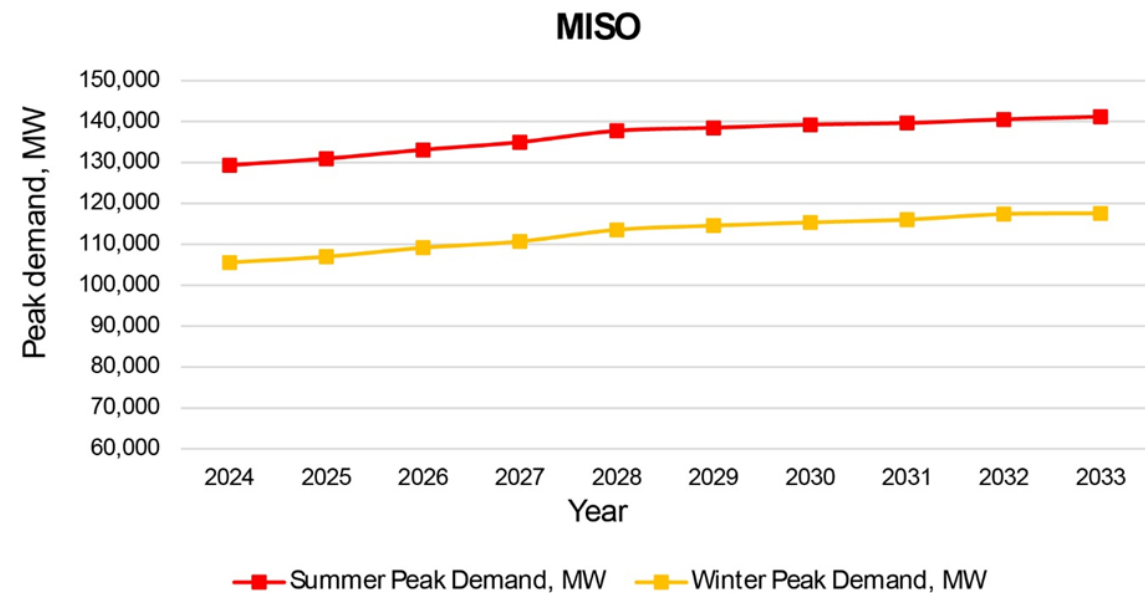
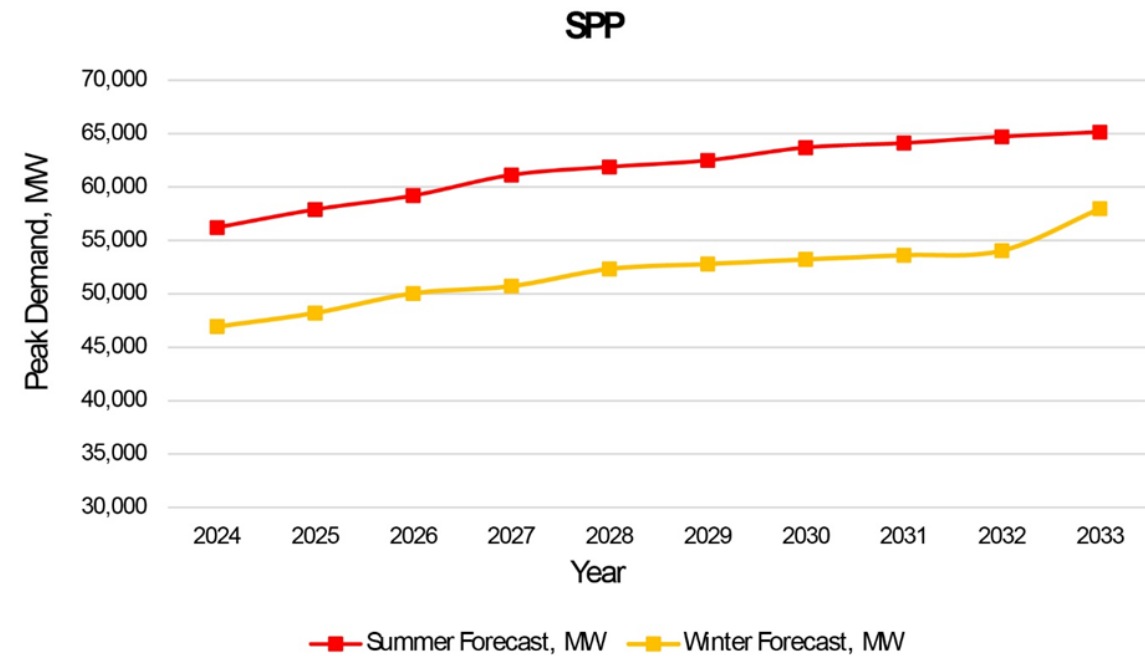
SPP



DEMAND GROWTH



Historical Demand Growth in North Dakota



- MISO: 149 GW of dispatchable power available in 2022.
- But without coal, only 101 GW of dispatchable power would be available.

Questions



It was moved by _____ and seconded by _____ that the Industrial Commission approve FY 2024 Federal IIJA Formula Grant Awards in an amount totaling \$4,244,359.00 inclusive of the 15% state match, as follows:

Burke Divided Electric Cooperative - \$550,000

Lakota Municipal Utility - \$1,707,109

Verendrye Electric Cooperative - \$314,250

KEM Electric Cooperative - \$620,000

Valley City Municipal Utility - \$1,053,000

North Dakota Industrial Commission

Claire Vigesaa – Executive Director
ND Transmission Authority
November 26, 2024

TOPICS...

- Nuclear Energy Activity
- Grid United – North Plains Connector
- DOE Transmission Related Grants
- IIJA Grid Resilience Grant Recommendation

Nuclear Energy

- ❑ Three Mile Island-Microsoft
 - ❑ 835 MW Unit 1 2028
- ❑ Palisade – Michigan Restart
 - ❑ 800MW October 2025
- ❑ Google
 - ❑ 7 Small Modular Reactors (SMR)
 - ❑ 500MW 2030-2035
- ❑ Amazon
 - ❑ 320MW SMRs – Consortium of Public Utilities

Duane Arnold Plant-Iowa??

North Plains Connector Event

*Jim Atchison-Executive Director of SE Montana
Development Corporation*

Governor Gianforte

John Williams-Mayor of Colstrip

Claire Vigesaa-ND Transmission Authority

Mr. Green-Montana Director of Commerce

Brant Johnson-Grid United

*Vaughn Zenko-Eastern Montana Economic
Development Exec Director.*



October 24, 2024 Colstrip MT

DOE Transmission Grants

❑ Minnesota Power Allete – HVDC Modernization	\$ 50.0 million
❑ MISO/SPP (Joint Target Interconnection Queue)	\$464.0 million
❑ North Plains Connector (Grid United-MN Power)	\$700.0 million
❑ TSED Grant Mott Community Center	\$ 14.3 million
❑ TSED Grant Amidon Fire Hall	\$.7 million
❑ MDU (Hettinger to Elgin 115kV upgrade)	\$ 15.6 million
❑ Otter Tail Power (System automation)	\$ 19.6 million
❑ IIJA NDTA Formula Grant FY22/23*	\$ 7.5 million
❑ IIJA NDTA Formula Grant FY24*	\$ 3.8 million

**not inclusive of 15% state match*

FY 24 IIJA Grid Resilience Grant

- ❑ Seven Applications Considered (held over from Grant Round 1)
- ❑ Total Project Costs \$8,157,822
- ❑ Total Grant Request - \$5,456,359
- ❑ **Total Grant Dollars Available \$4,244,685**

Grant Award Recommendation

Utility Applicant	Total Project Cost	Grant Award	Project Description
Burke-Divide Electric Cooperative	\$820,000	\$550,000	Addition of 2 circuit breakers @ Kenaston Switchyard. Reduce scope of outages
Lakota Municipal Utility	\$2,626,322	\$1,707,109	Complete OVHD to URD City Conversion
Verendrye Electric Cooperative	\$628,500	\$314,250	3.5 mile OVHD to URD; Ryder to Radar Base
KEM Electric Cooperative	\$835,000	\$620,000	Upgrading sectionalizing devices with SCADA compatible devices
Valley City Municipal Utility	\$1,620,000	\$1,053,000	Replace 1.8 mile 69kV transmission line with steel poles

Grant Award Recommendation

Total Project(s) Costs \$5,962,822

Total Grant Funding Available FY24 \$4,244,685

Total Grant Award Recommendation (5 projects) \$4,244,359

N O R T H
Dakota
Be Legendary.

BIL 40101(d) Application

Project Title:

Kenaston Switchyard 60 kV Breaker Additions

Applicant:

Burke-Divide Electric Cooperative, Inc.

Date of Application:

11/20/2023

Date of Application Revision:

08/30/2024

Amount of Grant Request:

\$550,000

Total Amount of Proposed Project:

\$820,000

Duration of Project:

4 months (Construction)

Point of Contact (POC):

Eric Sieg, Operations Manager

POC Telephone:

701-939-6671

POC Email:

eric@bdec.coop

POC Address:

9549 Hwy 5

North Dakota Transmission
Authority

North Dakota Industrial Commission

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EXHIBIT II – Proposed Kenaston Switchyard Layout	8

Applicant Description

Burke-Divide Electric Cooperative, Inc. (BDEC) is a consumer-owned, not-for-profit Rural Electric Cooperative (REC) located in northwestern North Dakota. BDEC’s mission statement is: *to provide reliable, high-quality electricity at a competitive cost, to strengthen the area economy and to lead in improving the region’s quality of life through innovative, state of the art products, and service while operating within cooperative principles.*

BDEC was originally formed in 1945 and currently serves approximately 1,410 members and 3,470 meters across all or parts of Burke, Divide, Ward, Renville, Mountrail, and Williams counties in northwestern North Dakota as detailed in Figure 1.

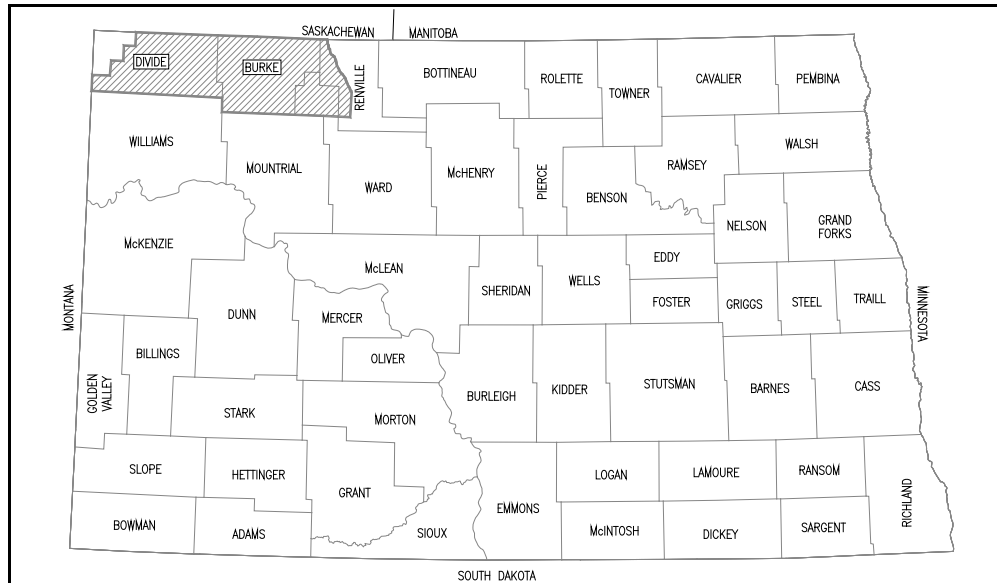


Figure 1: BDEC Service Territory

BDEC purchases its wholesale power through Upper Missouri Power Cooperative (UMPC), who in turn purchases power from Western Area Power Administration (WAPA) and Basin Electric Power Cooperative (BEPC). BDEC currently owns and operates approximately 130 miles of

transmission line, 2,641 miles of distribution line, and 16 distribution substations with most recently reported total annual sales of 189,359 MWh.

BDEC has 31 full-time employees and is governed by a Board of Directors comprised of 7 member consumers. The board meets on the last Wednesday of each month and hosts an annual meeting for its membership in June of each year. BDEC headquarters is located at 9549 W Hwy 5, Columbus, ND 58727 and has outposts located in Kenmare and Crosby.

Project Description

BDEC intends to install two (2) high-voltage circuit breakers on its 60 kV transmission system emanating from the Kenaston Switchyard, a joint-owned substation with BEPC. BDEC owns and maintains the 25 MVA, 115-60 kV transformer and subsequent downline 60 kV equipment, while Basin Electric owns and maintains the 115 kV side and associated high-side equipment upstream of the transformer.

As referenced in Figure 2, The Kenaston Switchyard is a crucial facility that serves 20+ miles of BDEC owned 60 kV transmission line and provides power to BDEC's Niobe, Norma, and Sauk Prairie distribution substations.

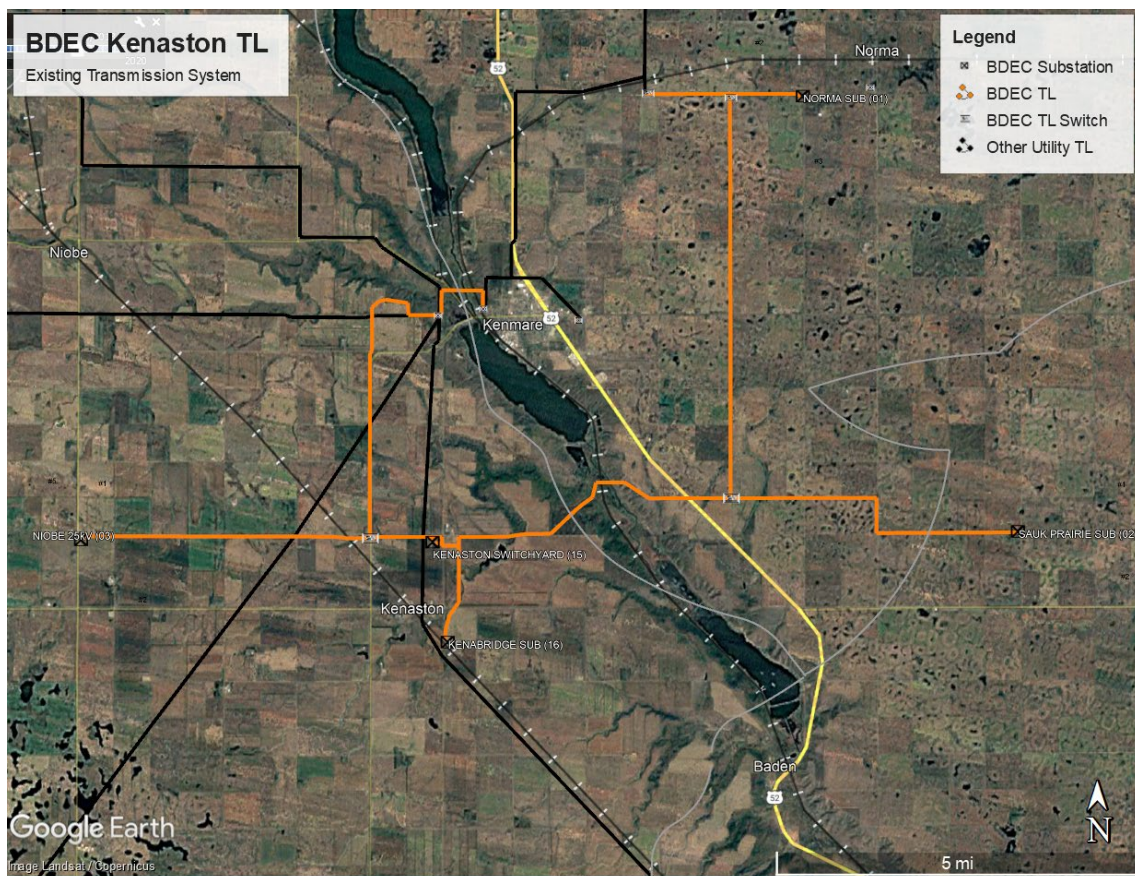


Figure 2: Kenaston Switchyard Transmission Area

The breaker additions will be on the BDEC side of the 115-60 kV transformer. Currently, the only fault clearing device in place in the Kenaston Switchyard allows all faults to travel back through the 115-60 kV transformer to a Basin Electric owned breaker on the 115 kV side. When this happens, power is lost to three (3) BDEC substations which collectively provide power to 784 meters.

BDEC plans to add two (2) breakers on its 60 kV system splitting its transmission line out of the Kenaston Switchyard into two (2) directions one (1) span outside of this sub. The addition of these breakers will help isolate the cause/location of the fault, reduce the number of members affected by an outage, and, hopefully, reduce the duration of an outage. It will also help sustain longevity of the 115/60 kV transformers life as it should not see the line faults travel back thru to the current 115 kV breaker.

BDEC also plans to install a second 3-way switch just outside the switchyard for added system flexibility. Further details on the proposed project can be found in EXHIBIT I – Existing Kenaston Switchyard Layout and EXHIBIT II – Proposed Kenaston Switchyard Layout.

Standards of Success

Outage Statistics

Burke-Divide Electric records the duration and frequency of outages on their electrical system annually. In recent years, BDEC has experienced higher-than-normal outages during the winter months of January, November, and December due to frost and ice, but also during summer months of June and July due to wind and lightning strikes.

Table 1 summarizes outage statistics across BDEC system from 2018-2023. The proposed improvements for the Kenaston Switchyard will help reduce outage durations and interruptions by increasing sectionalizing capabilities in the area.

Table 1: BDEC Outage Information (2018-2023)

Year	Outage Duration (min)	Outage Interruptions	Consumers	SAIDI	CAIDI
2018	382.0	615	3,489	0.11	0.62
2019	654.0	579	3,485	0.19	1.13
2020	240.0	525	3,442	0.07	0.46
2021	281.0	477	3,418	0.08	0.59
2022	7626.0	1094	3,442	2.22	6.97
2023	2090.0	979	3,446	0.61	2.13
Average	1878.8	711.5	3,453.7	0.55	1.98

Specifically, the circuit breaker additions will enable BDEC to segment the 60 kV transmission system out of Kenaston and effectively reducing cascading system events and overall fault exposures.

Community Benefits

Operating as a REC, BDEC serves most of the farming communities within northwestern North Dakota including the areas around the Kenaston Switchyard. While neither BDEC nor the surrounding Kenaston area may qualify as “disadvantage communities” per the Justice40 Initiative, BDEC does operate on seven core cooperative principles that guides their daily operations.

One of these core values is *Voluntary and Open Membership*, meaning that membership in the cooperative is open to all persons, regardless of gender, religion, or race. *Concern for Community* is another core cooperative principle that BDEC follows and actively adheres to this principle as evident by continuing to provide area high-school scholarships, donating funds to local fire departments, and other notable charitable contributions proposed by the membership.

BDEC strives to provide reliable electrical service to its customers by properly maintaining its’ current infrastructure, replacing aged or damaged equipment, and incorporating new industry available technology. The installation of these circuit breakers is in line with the NDTA’s objectives for grid resiliency and reliable energy to local communities.

The scope of work defined within this project will need to be contracted out to an outside source. This will bring in an influx of funding to the project area as contract crews will need food, fuel, and lodging while working on this project.

Operational Benefits

Within the last two (2) years, BDEC has experienced twelve interruptions along the 60 kV transmission system out of Kenaston which fell back to the high-side, 115 kV circuit breaker to clear the faults which in turn dropped services to all three (3) distribution substations. The circuit breaker additions would reduce exposure to all 748 meters by allowing one (1) circuit breaker to provide protection to 347 meters and with the other circuit breaker protecting the remaining 437 meters.

Continuing to allow operations to roll through the Kenaston power transformer raises the risk of eventual equipment failure by unnecessarily exposing the power transformer to high levels of fault current. The 60 kV circuit breakers can be coordinated with upstream 115 kV circuit breaker to act as the first line of defense preserving long-term reliability for the broader Kenaston service territory.

Operational Savings

Segmenting the 60 kV transmission line will reduce the time it takes for a dispatched crew to complete a patrol to verify damage so they can restore power to the membership. And allow BDEC to monitor the breaker operations via our SCADA system which will notify us when any operations have occurred.

Project Timeline

This project has been identified in BDEC's 2024-2027 Construction Work Plan with a tentative start date in the 2nd quarter of 2026 and completion being in the 3rd quarter of 2026, primarily due to extensive material lead-times. Certain long-lead time materials have already been placed on order to alleviate projected time constraints.

Engineering design, project coordination, and material procurement will all be required in advance in order for BDEC to meet projected timelines and maintain viability. BDEC intends to coordinate with adjacent power supplier (MDU) to provide alternative power source for BDEC's three (3) distribution substations. Once this project begins, it is important that it stays on schedule so that power feeds can be switched back to normal as quickly as possible to ensure BDEC is able to continue to provide reliable power to its membership.

Key project milestones would be to have all major material procured and a construction contract awarded by end of 2025. Construction would then be scheduled through the 2026 construction season.

Project Budget

This project is estimated at a total cost of **\$820,000**.

This includes costs to rework the substation steel infrastructure to accommodate the dual breaker additions, installation of two (2) 60 kV breakers and associated relaying equipment, and the installation of a 3-way switch and LAM pole directly outside the substation structure for additional system flexibility.

Burke-Divide Electric Cooperative is requesting **\$550,000** from the North Dakota Transmission Authority to offset the cost of this project.

Burke-Divide Electric Cooperative will cover the remainder of the project costs through long-term financing with Rural Utility Services (RUS).

EXHIBIT I – Existing Kenaston Switchyard Layout

EXISTING KENASTON SWITCHYARD LAYOUT

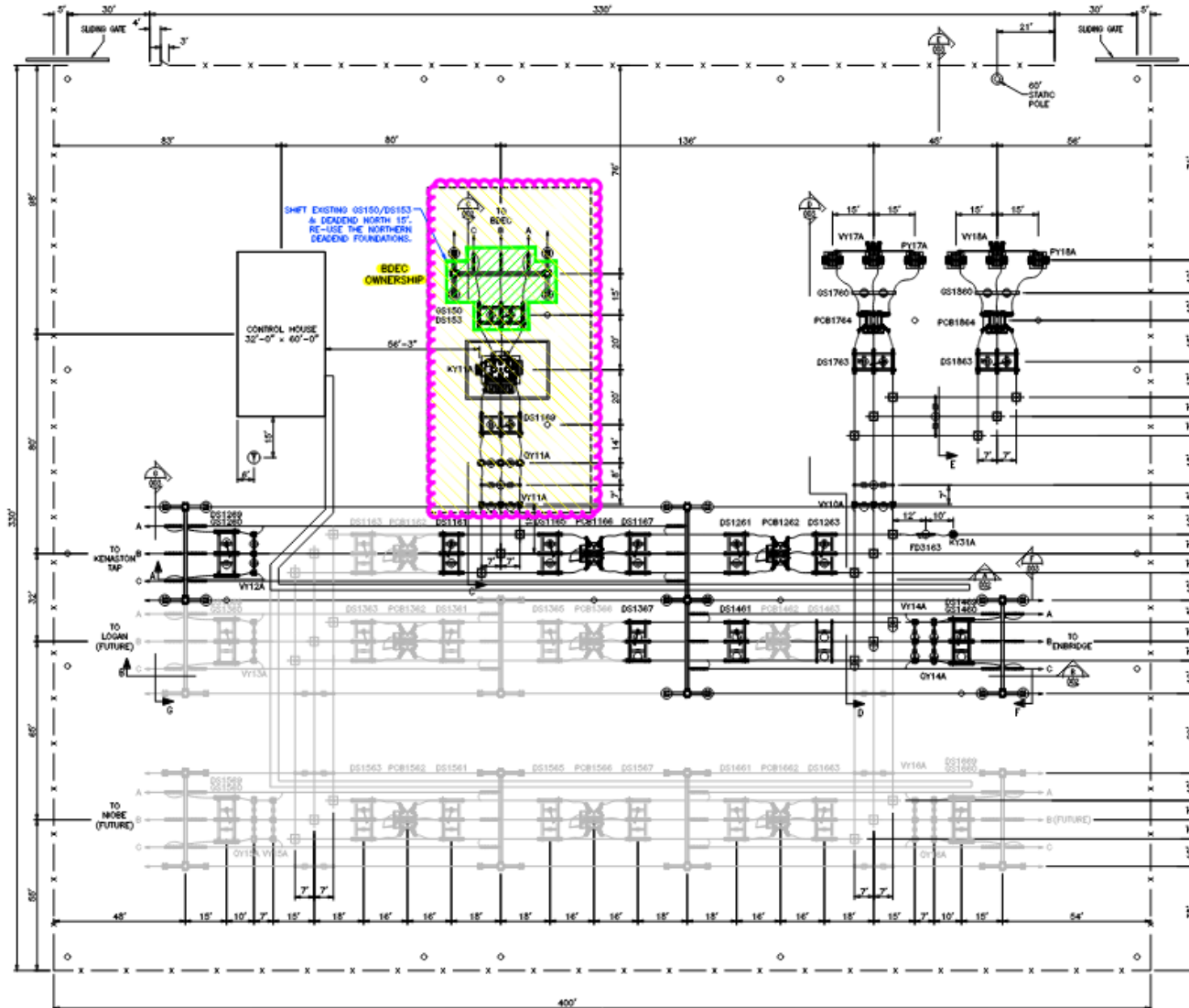
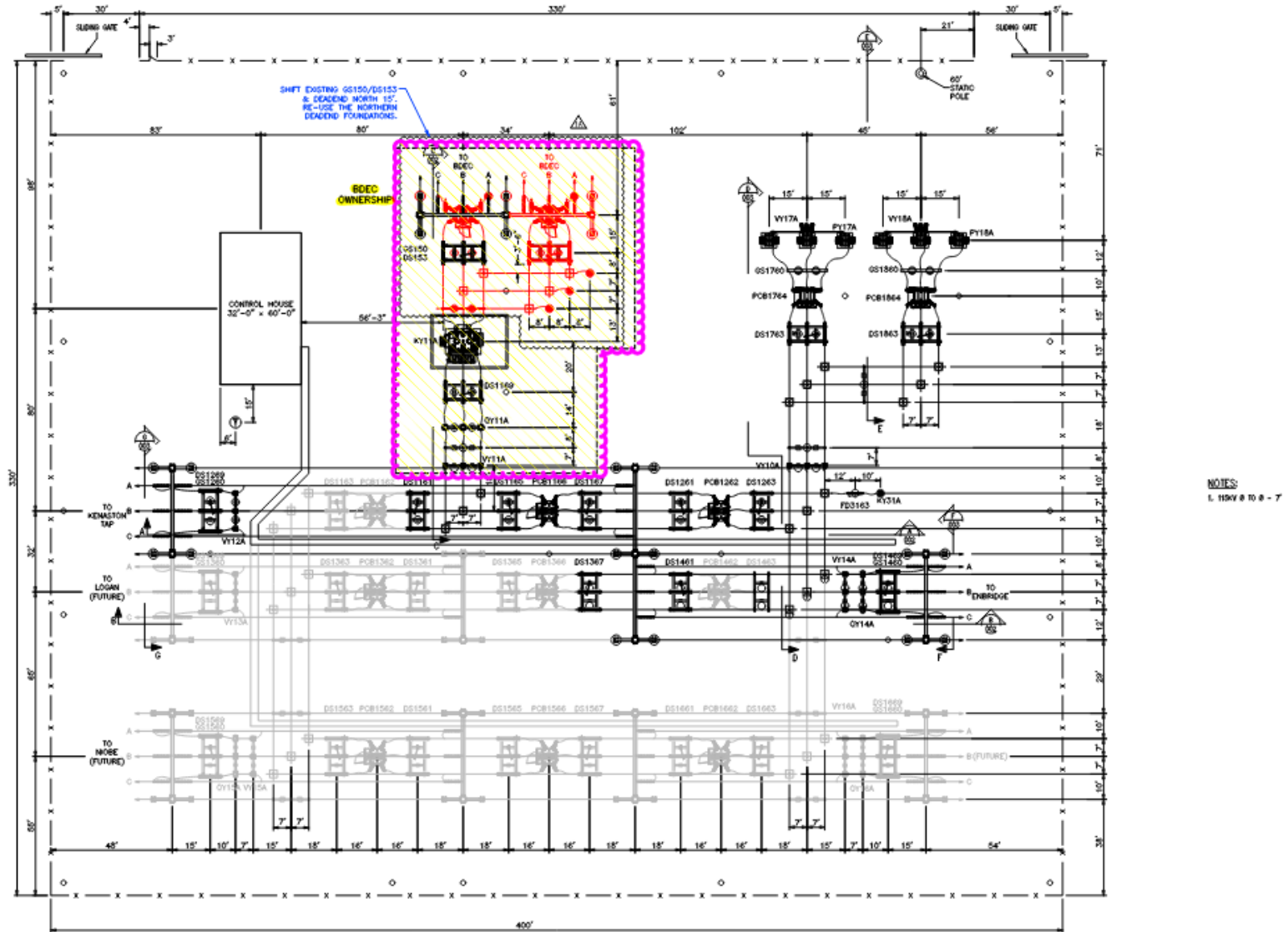


EXHIBIT II – Proposed Kenaston Switchyard Layout

PROPOSED KENASTON SWITCHYARD LAYOUT



North Dakota Transmission
Authority

North Dakota Industrial Commission

BIL 40101(d) Application

Project Title:

Overhead to Underground

Applicant:

City of Lakota/Lakota Municipal Utilities

Date of Application:

11/20/2023

***updated 9/11/24**

Amount of Grant Request:

\$1,707,109.30

Total Amount of Proposed Project:

\$2,626,322

Duration of Project:

November '24 - January '26 (14 months)

Point of Contact (POC):

Amie Vasichek

POC Telephone:

701-247-2454

POC Email:

lakotact@polarcomm.com

POC Address:

PO Box 505

Lakota, ND 58344

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Applicant Description

The City of Lakota is in Nelson County, ND and is also the county seat. As such, the City of Lakota provides critical emergency response service and provides critical service to the Good Samaritan Home, an elderly care home. Reliable electric and water service is critical to the health and safety of those residents. The City of Lakota also serves a large agriculture trade area and is home to a large Cenex Harvest States Agronomy Facility. Given the northern tier climate, the planting, spraying, and harvest windows are short. Any interruption in providing service to the region's agriculture producers has a significant impact on food & energy production.

The City of Lakota has a population of 680 residents and continues to grow. The City of Lakota owns and operates its own utility, Lakota Municipal Utilities, which provides electricity, water, and sewer to our customers. The Lakota Municipal Utilities sold 14,936,673 kWh to its customers in 2024.

According to the Climate and Economic Justice Screening Tool, Lakota and Nelson County are rated 65th percentile for low median income. In 2024, Lakota Municipal Utilities had on average 25 households on fuel assistance with the state funded assistance program; each averaging 65% LIHEAP Cost Share. The Lakota Municipal Utilities makes every effort to assist its utility customers by seeking assistance during dire financial times; connecting them to resources such as Red River Community Action, Salvation Army and Red Cross. Lakota Public School has approximately 22% of the student population qualified for the free/reduced meal program. These are significant factors our utility considers when anticipating needed maintenance work and improvements to the utility system. Our utility has affordable rates for our customers, increasing rates to cover the actual cost of improvements would not be burdensome on our customer base.

Project Description

Over the course of 5 years, our utility experienced dozens of outages, mostly due to overhead line failures. A report generated from the APPA eReliability Tracker indicates the severity with each outage. Nearly 50% of our outages were due to overhead failure resulting in more than 76 hours of downtime and resulting in 380 of our customers without power during that time.

The city of Lakota and Lakota Municipal Utilities would like to convert the overhead electrical lines to underground throughout town. This project would address the aging system and the City of Lakota does not have journeyman linemen on staff to complete necessary maintenance or handle outages. The age and condition of the grid increases the likelihood of weather-induced outages, and supply chain issues can delay the repair of damaged equipment. Our most recent outage occurred on July 7th, 2024 and resulted in utility customers being without electricity for over 48 hours. This recent outage resulted in hiring two different contract services to assist with replacing damaged transformers and \$50,000 in expense.

The city of Lakota & Lakota Municipal Utilities will follow NDCC and bid the entire project with the requirement of the contractor to follow the RTES, NEPA AND DBA guidelines.

Lakota Municipal Utilities has a bucket truck and other equipment that will be used to assist with the project and help mitigate overall costs. Over the course of 10 years, Lakota Municipal has hired over \$440,000 in sub-contractors/Journeymen Lineman for repair work needed to the distribution system. This cost does not include other expenses such as engineering, equipment, and in-kind labor that have been incurred.

Through this project, the City of Lakota's goal is to reduce the number of outage events by 80% and the duration of outages to 2 hours per customer per year.

Standards of Success

In 2020 Missouri River Energy Services (MRES) conducted an assessment of Lakota's Distribution System. In the provided assessment, it was noted one of the high priority items was to replace or upgrade the aging wooden electrical poles. North Dakota is known for high winds; with the condition our electrical poles are in it is very likely to have pole failures leading to frequent outages. This raises a safety concern or a risk of harming a person or destruction of property with the fragile aging poles. Although it is understood this measure is more expensive up front, we feel it is more cost-effective in the long run. Putting the overhead lines underground will require less

maintenance and are less likely to need repairs or replacement over time. With the increased protection from severe weather, it will be less likely to have outages and related damages.

This provides a more reliable service to our citizens and businesses. This project also has a positive economic impact by reducing outage-caused downtime for our Lakota business community.

As stated in the 2024 MRES assessment, the overall distribution pole condition requires replacement. Our primary sub-contractor, North Holt Electric, is approximately 75 miles away and during times of need are not always able to make Lakota Municipal Utility a priority as they also service other customers. This consideration would potentially have Lakota without power for an extended timeframe.

This project will not require new rights of way, impeded access to any natural resources, historical tribal lands, or important cultural locations. During this project, a brief access restriction to certain areas for reasons of safety may occur, however, interruptions will be planned in cooperation with any businesses and residential areas affected.

This project will involve construction, maintenance and repair of public infrastructure in the United States and Lakota Municipal Utilities recognizes our obligations under Build America, Buy America (BABA) in our design, procurement and contract management.

Project Timeline

If awarded, we anticipate this project to begin summer 2025, however we are also aware the extended time it will take for the appropriate transformers to be built and delivered. This may cause a delay in the project, but we will work with our contractor to proceed with as much prep work as possible leading up to delivery of the transformers. We estimate the 12-15 months for the delivery of the transformers, but are hopeful that wait time for these critical items has significantly decreased prior to awarding of the grant.

Project Milestones:

1. Bid Packet/Advertise: December 2024-January 2025
2. Contracts signed/Bid Award/Order Materials – January-April 2025
3. Installation – April 2025-November 2025
4. Final Inspection: November 2025-January 2026

Project Budget

Contractor Labor and Equipment - \$2,165,565

Mobilization - \$72,000

Engineering Services - \$ 150,000

Contingencies (10%) - \$238,757

Total estimated project cost - \$2,626,322

The city of Lakota is fully prepared to provide 35% cost match of the project amounting to \$919,212.70. We anticipate financing a portion of the cost match in addition to utilizing some of our reserves.

North-Holt Electric, Inc
 East Grand Forks, MN 56721

15-Nov-23
 estimated cost
 overhead to Ugrd
 conversion

City of Lakota Electric Utilitiy
 Lakota, ND 58344

Conductor materials

	4/0 primary 15 kv wire`	60,000 ft	\$	210,000.00	
	1/0 primary 15kv wire	5600	\$	19,600.00	
	secondary 240 volt wire	10,500	\$	21,000.00	
	copper grounding	1,400	\$	1,400.00	
11/15/2023	Total		\$	252,000.00	
8/23/2024	Revised up 7% inflation		\$		269,640.00

Cabinet materials

	3 phse junction cabinets	73	\$	182,500.00	
	secondary pedestals	50	\$	25,000.00	
count ?	1 phase pad transformer	80	\$	200,000.00	LOW
count ?	3 phase transformers	15	\$	90,000.00	LOW
	moduals	219	\$	21,900.00	
	200 amp elbows	862	\$	258,600.00	
	200 amp pro caps	438	\$	43,800.00	
	grd crimps	657	\$	32,850.00	
	grd rods	73	\$	17,300.00	
11/15/2023	totals		\$	871,950.00	
8/23/2024	Revised up 9% inflation		\$		950,425.00

Estimated costs continued

Labor & Equipment excavation

trench/ Bore	20,000 ft	\$	360,000.00
Misc excavation	200 units	\$	160,000.00
Secondary pole conversions	100 units	\$	150,000.00
11/15/2023	Totals	\$	670,000.00
8/23/2024	Revised for Federal wages est increase 15%	\$	770,500.00
11/15/2023	Mobilization	\$	72,000.00
8/23/2024	Mobilization	\$	72,000.00
11/15/2023	Engineering service cost ??	\$	100,000.00
8/23/2024	Engineering service 5-9% ?? total project costs	\$	150,000.00
11/15/2023	estimated project costs	\$	1,875,950.00
8/23/2024	Revised Est project costs	\$	2,212,565.00

NOTE

no overhead line demo cost

no meetings/outage scheduling

No professional engineer service
staking sheets / etc.

Hwy 1 east to H2O plant not included.
could add about \$ 175,00.00 to project
Labor, Materials & equipment.

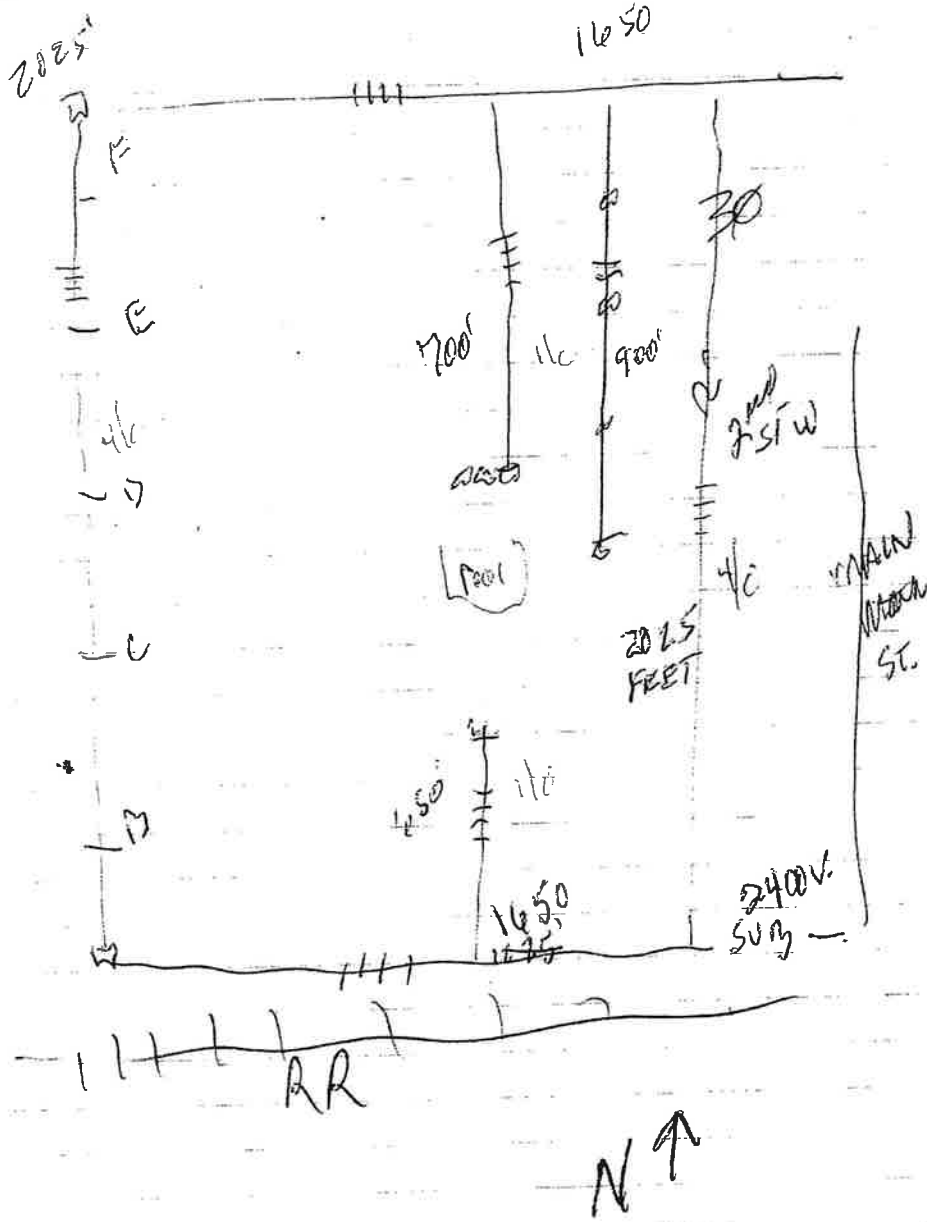
No pricing for residential underground Or commercial accounts on private property.



Date _____ Project _____
 By _____ Subject _____
 Scale _____ Page _____ of _____

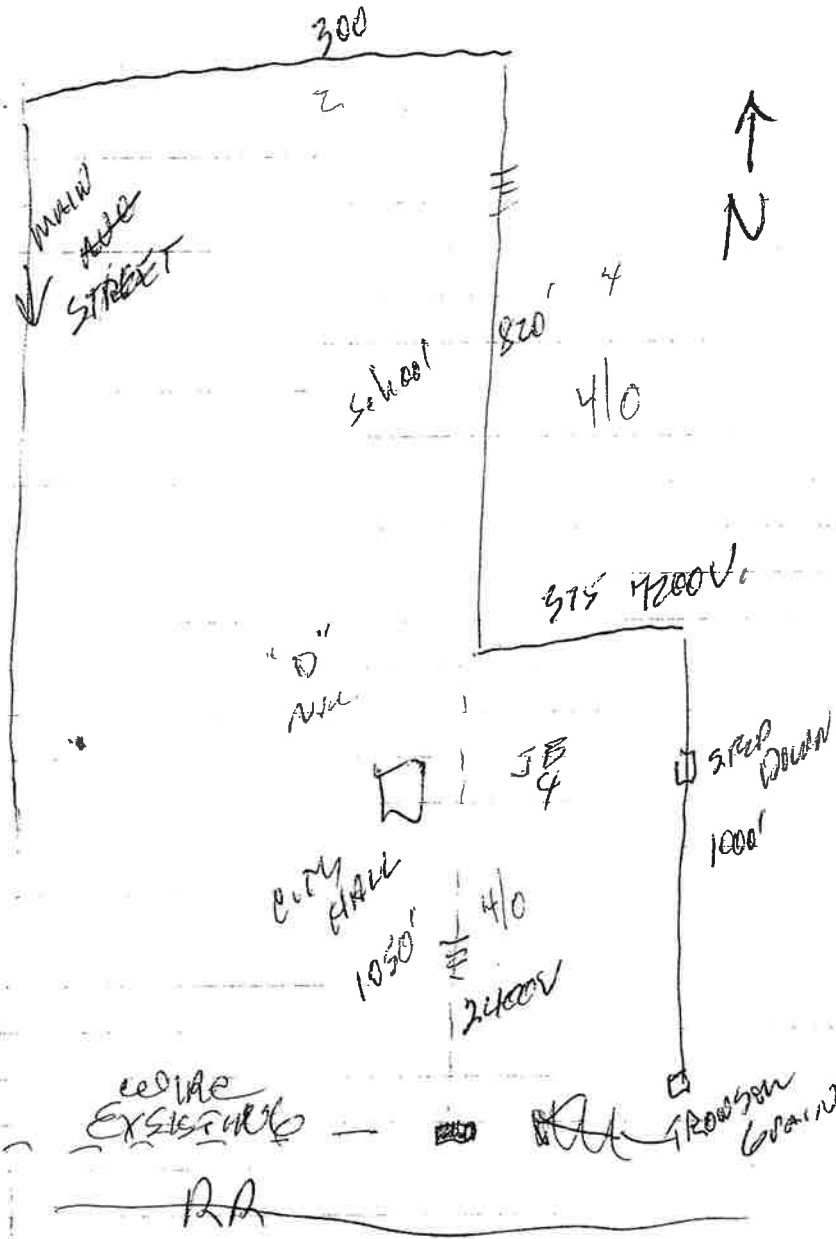
TOTAL	LABOR & EQ	1,793,950.	
Material	4%	72,000 -	
Eng. Serv.	6%?	100,000 -	
		<u>1,875,950.00</u>	Big ?

No DEMO ! where to bring it?
 Garage scheduled -
 meetings
 Staffing & Engineering Service?



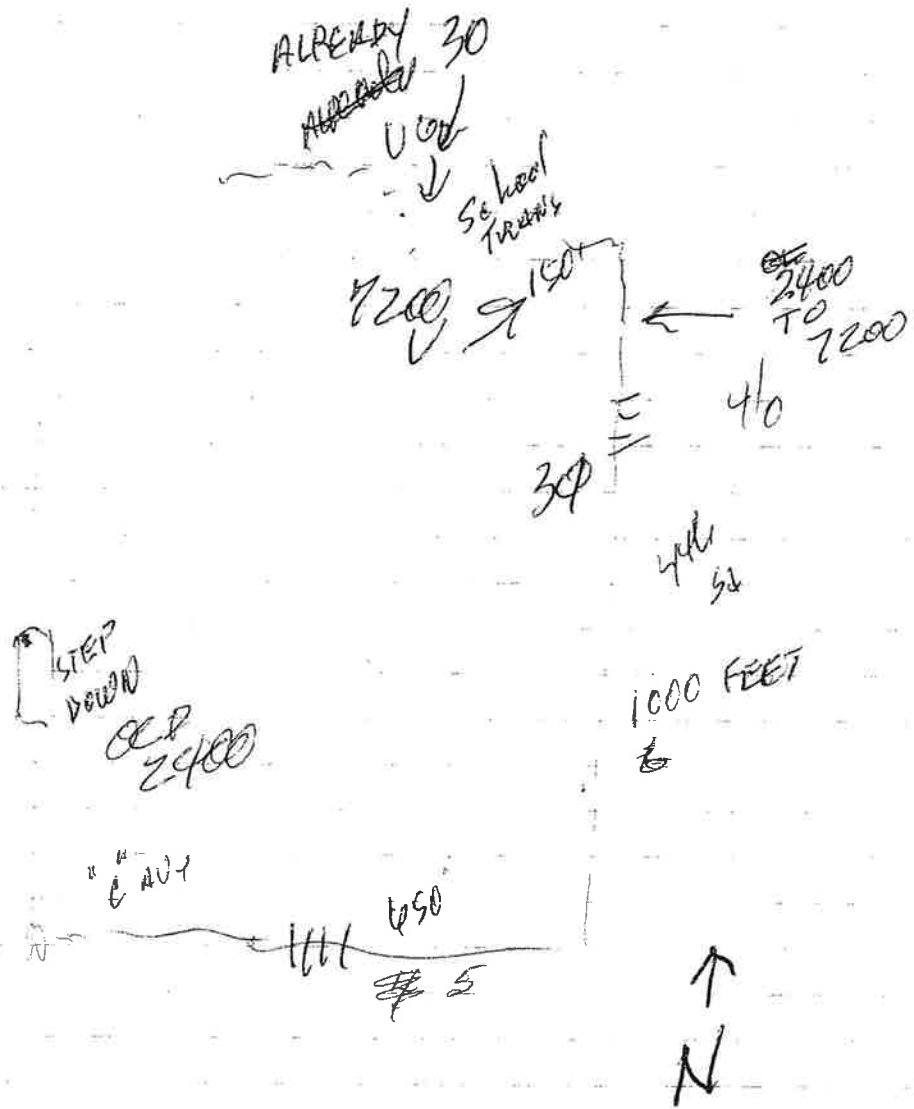


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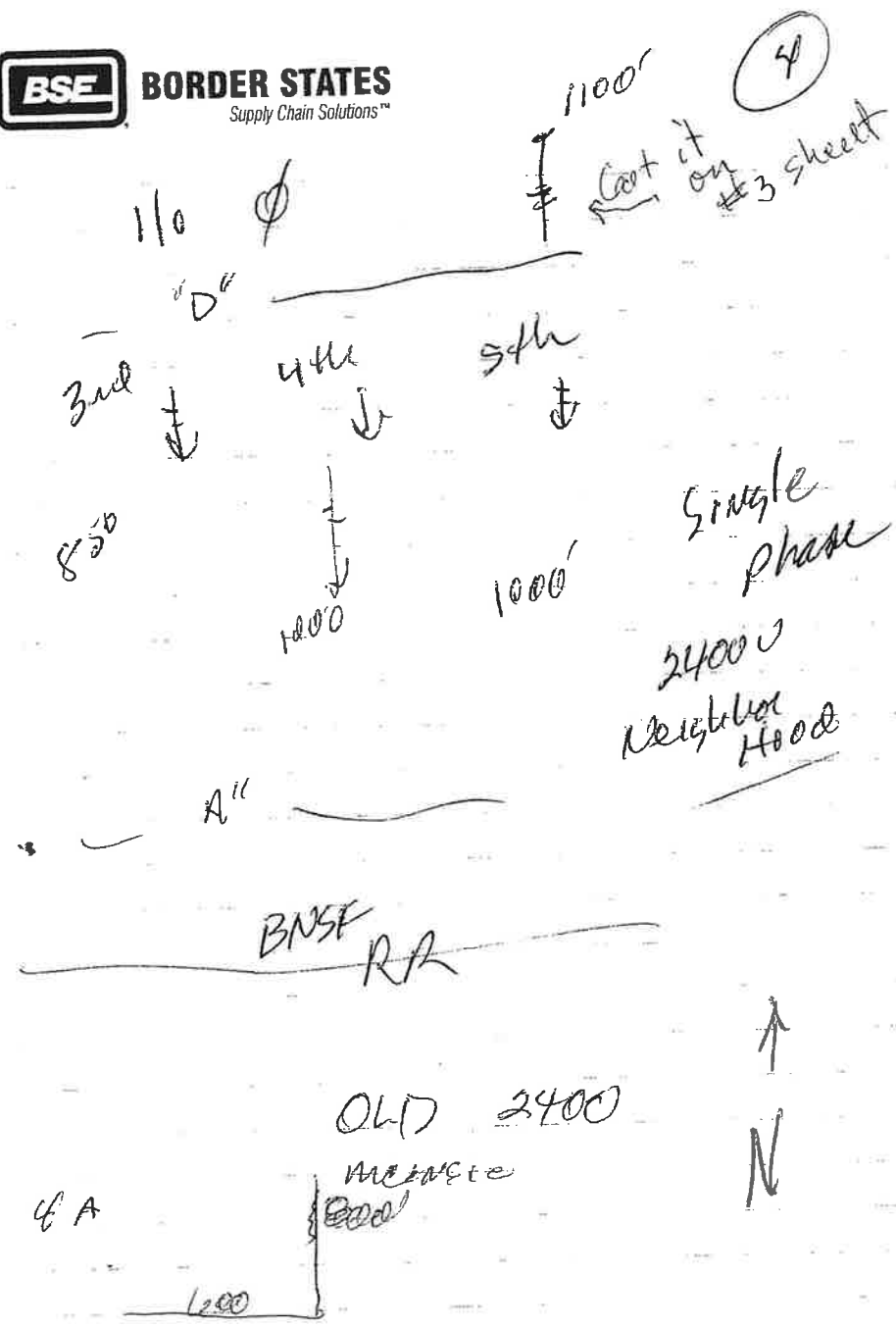


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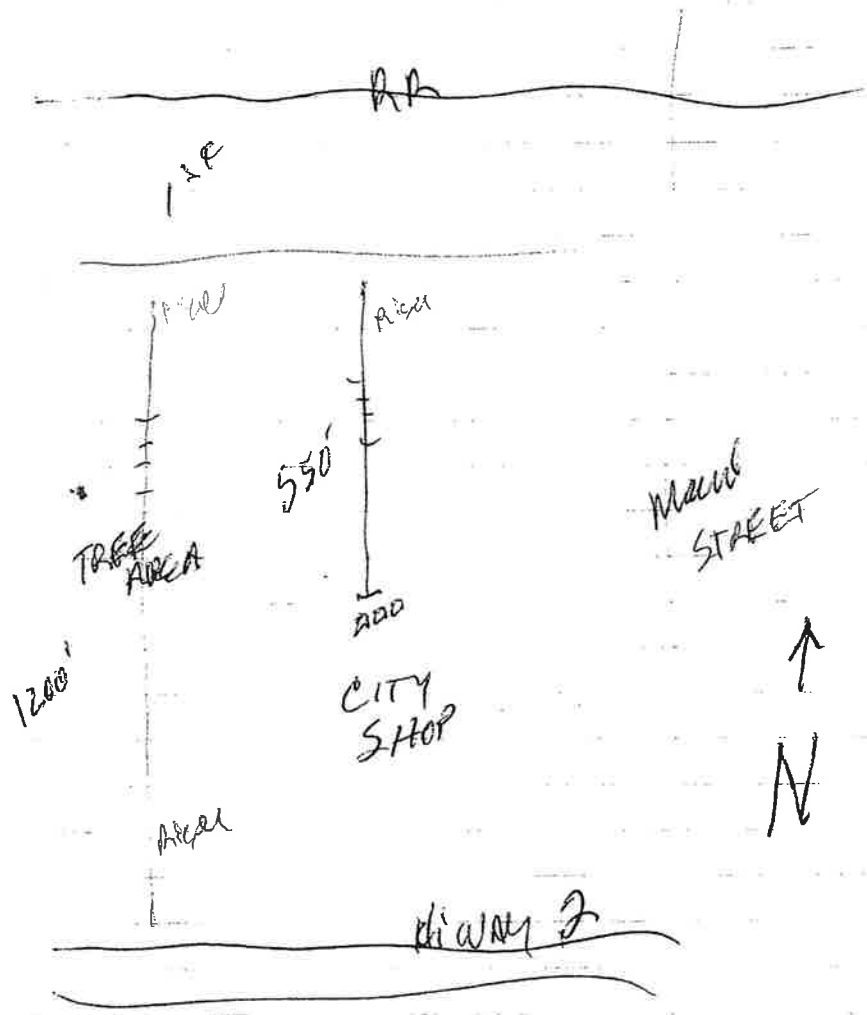


BORDER STATES
Supply Chain Solutions™



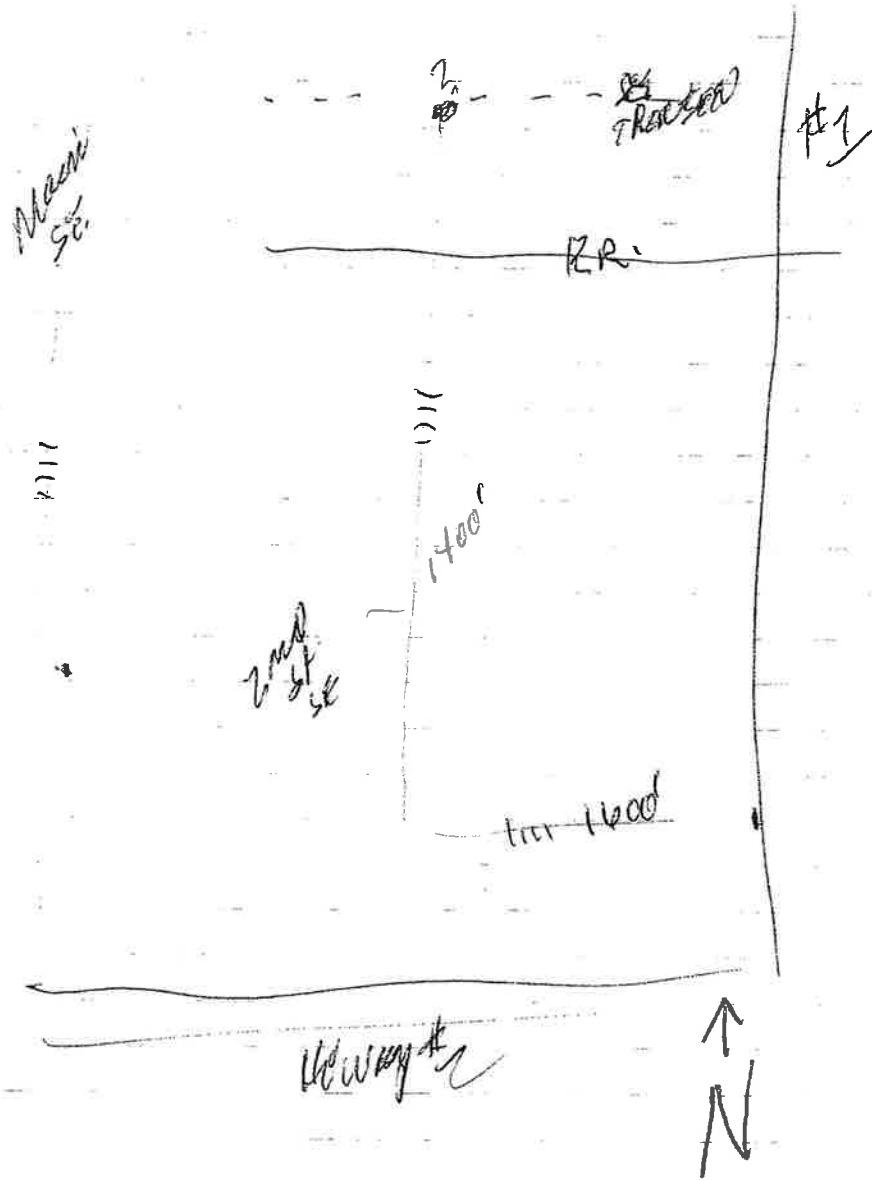
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South
of
TRACKS





6

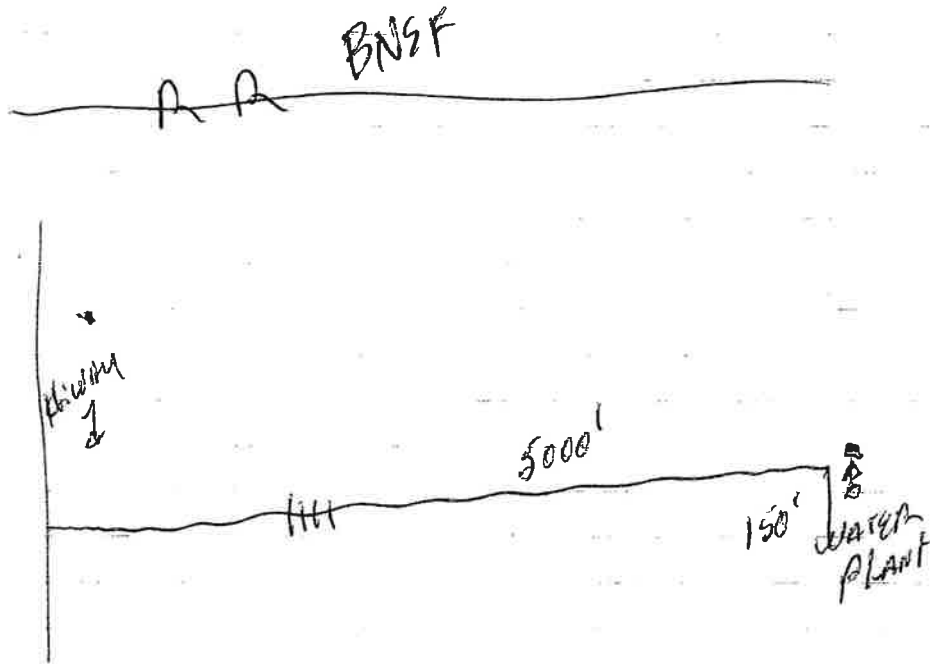




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EAST



Causes Pie Chart

Lakota Municipal Utilities

Start Date:

End Date:

Includes outages that started on the End Date.

Top-level Cause

Substation:

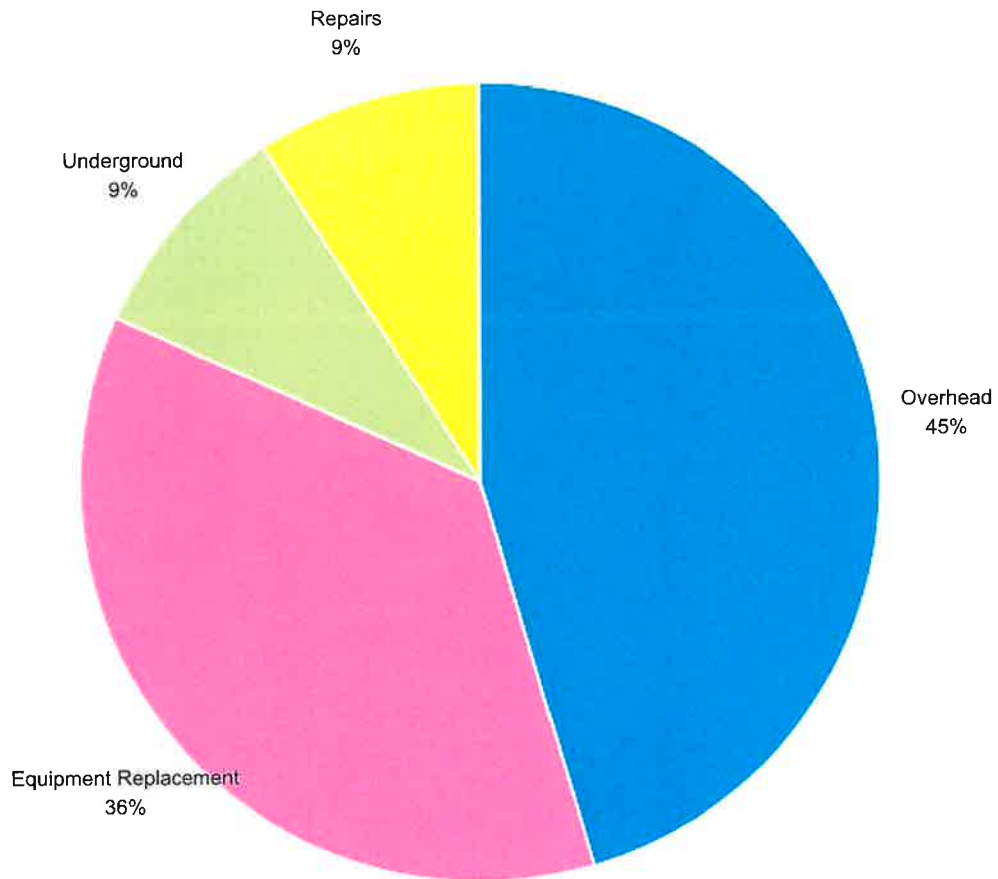
 

Circuit:

Report on Outage:

- Count
- Duration
- Customers Interrupted



2024 MRES Distribution Assessment for Lakota

September 9th, 2024

Agenda

- Review results of 2020 on-site assessment
- Review results of 2024 on-site assessment
- Summary
- Future steps

Review of 2020 on-site assessment performed by Jeff Becthold

- Distribution lines from WAPA substation
- Lakota 7200V Y to 2400V delta substation in town
- High school pole mounted transformers
- Fire hall alley exposed secondary
- Secondary wires mounted higher than primary
- Overall distribution pole condition

Distribution line from substation

- This circuit is the only backup to the underground feed from the substation
- Conductors are laying on the crossarms. At a minimum we need to change a few poles and re-tie the line.
- Recommend a new underground circuit that would originate at the substation and end near the community center



Review of 2020 on-site assessment performed by Jeff Becthold

- Distribution lines from WAPA substation
- Lakota 7200V Y to 2400V delta substation in town
- High school pole mounted transformers
- Fire hall alley exposed secondary
- Secondary wires mounted higher than primary
- Overall distribution pole condition

Missing neutral downtown area

- Unfinished July outage/conversion.
- This is an extremely dangerous condition that is putting the public and affected customers at risk!
- We need to correct this ASAP



Review of 2020 on-site assessment performed by Jeff Becthold

- Distribution lines from WAPA substation
- Lakota 7200V Y to 2400V delta substation in town
- ~~High school pole mounted transformers~~
- ~~Fire hall alley exposed secondary~~
- Secondary wires mounted higher than primary
- Overall distribution pole condition

Review of 2020 on-site assessment performed by Jeff Becthold

- Distribution lines from WAPA substation
- Lakota 7200V Y to 2400V delta substation in town
- High school pole mounted transformers
- Fire hall alley exposed secondary
- **Secondary wires mounted higher than primary**
- Overall distribution pole condition

Secondary wire over primary

- Secondary wire needs to be lower than Primary wire to be worked on safely.
- Safety issue if primary falls into secondary, injecting high voltage into secondary.
- This is a code violation



Review of 2020 on-site assessment performed by Jeff Becthold

- Distribution lines from WAPA substation
- Lakota 7200V Y to 2400V delta substation in town
- High school pole mounted transformers
- Fire hall alley exposed secondary
- Secondary wires mounted higher than primary
- Overall distribution pole condition

Wood pole condition

- Recommend pole testing entire system
- Contract with a large powerline contractor to change out bad poles.
- An electrical engineering firm could assist in procuring the material and labor. Often this will save costs on the entire project.



- **Tree Trimming**
- Safety warning labels
- Material
- Equipment
- Staffing

Tree Trimming

- Tree trimming is a critical part of distribution maintenance.
- Reduces outages and system losses.
- Recommended an outside contractor to come in and get the system “caught up” so the city can maintain with current equipment.



- Tree Trimming
- ~~Safety warning labels~~
- ~~Material~~
- Equipment
- Staffing

- Tree Trimming
- Safety warning labels
- Material
- **Equipment**
- Staffing

Equipment

- Recommend purchasing a used digger derrick. MRES can assist in the search
- Recommend the purchase of a skid steer for all around use.



- Tree Trimming
- Safety warning labels
- Material
- Equipment
- Staffing

Staffing

- MRES suggests the community further evaluate how to approach maintenance of the distribution system long-term going forward. To ensure reliability of the distribution system going forward, proactive distribution maintenance is needed. MRES considers this a High Priority.



Review of 2024 system assessment performed by Sam Jones

1. Substation transformer and breaker issues
2. Water plant 3 phase
3. Update mapping
4. Convert the remainder of the delta system
5. Coordination study/system modeling

Substation transformer LTC

- The load tap changer on the substation transformer is nonoperational
- The control panel has failed
- WAPA also has noted the LTC itself is malfunctioning
- This can lead to power quality issues for our customers



Substation breaker

- The main circuit breaker feeding town is very old
- WAPA has been keeping up on maintenance of the main unit itself, but I question whether the control is functioning properly
- A failure here could be very damaging to the distribution system



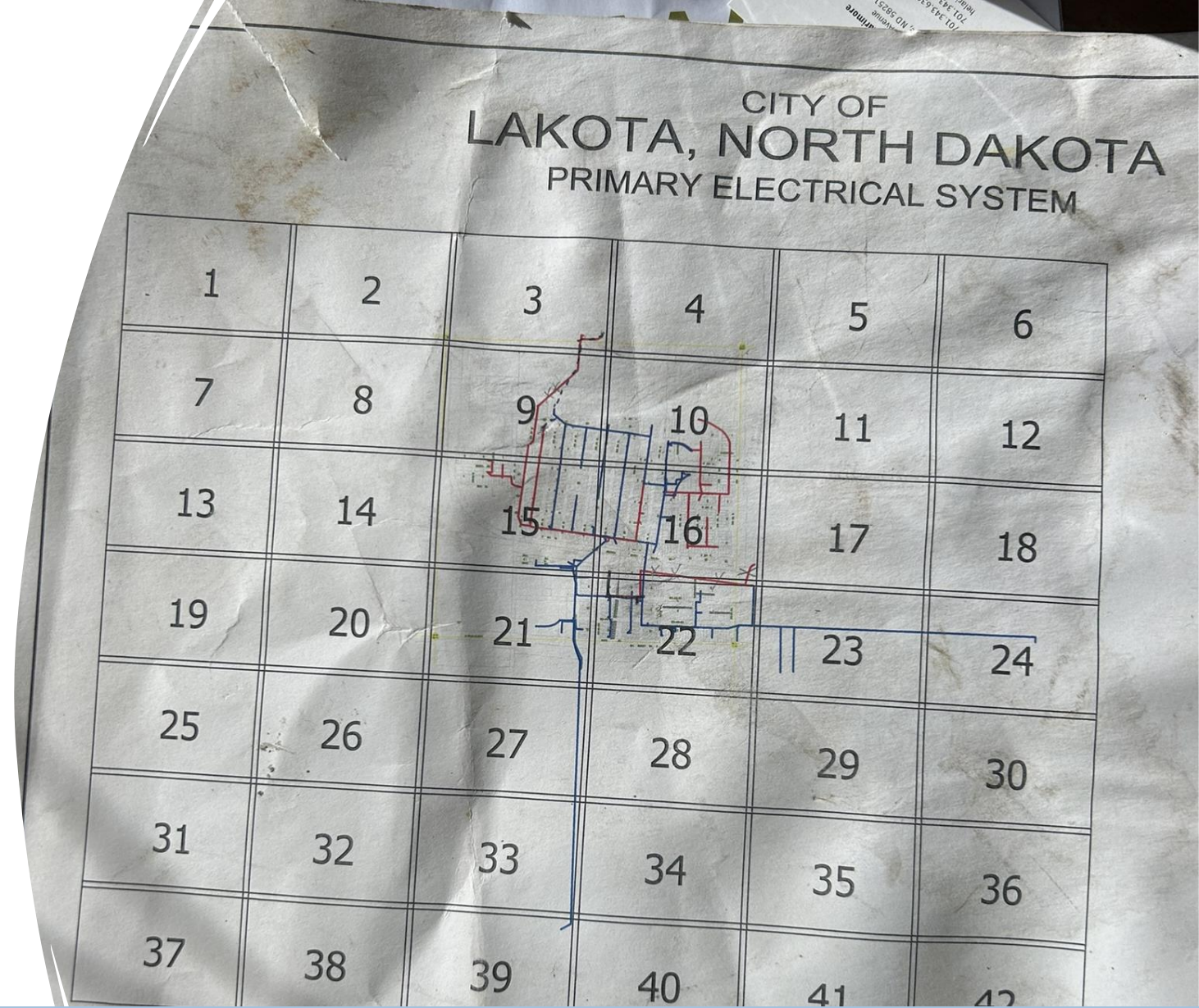
Water treatment plant line

- 1.2-mile section of powerline running through swampy wet terrain feeding this critical infrastructure.
- Delta bank at water plant should be “floated” to avoid back feed and equipment damage



Update Electric System Map

- The last time the map was updated was 2014.
- It is critical to keep an updated map book for employee's and outside contractors
- This would be accomplished by and engineering firm. A system model could be built at the same time.



Convert remaining delta system

- The remaining delta system should be converted to avoid a similar situation to that of July 1st.
- Having two different system voltages and configurations can be confusing and potentially dangerous to electrical workers
- We need to maintain more inventory to work on both.



Coordination study and system model

- Fuse coordination issues make outage restoration difficult, extending outage times
- Recommend an engineering firm model the system and update the fuse coordination.
- This would be beneficial for cost estimates future projects and procuring grants.



Summary

1. Highest priority is to string a neutral to finish this summers outage/conversion. Northolt is aware of this issue and should be contacted to finish the planned work.
2. Second highest is to repair the overhead feed from the substation. I recommend replacing insulators and identifying key poles that need to be changed. I would recommend contacting Northolt or Nodak. MRES could possibly help here as well.
3. Third highest is wood pole conditions. I would recommend contacting a wood pole inspection company to test all the poles in town. Once we know the scope of the problem, we could then decide if this is something Northolt could accomplish. It may be better to convert to underground in certain areas.

Summary continued

5. Fourth highest is to trim trees near 3 phase primary lines. I recommend contacting Carr's Tree Service out of Fargo. They work for other utilities in the area and are powerline certified. Jake Carr 612-849-3939
6. Fifth highest is to contact WAPA about the planned 2020 upgrades to the substation and their future timetables. Figure out a scope of work and associated costs so we can plan for this budget wise.
7. Sixth highest is to contact an engineering firm to produce a plan to convert the remaining delta system. This project will likely be all underground construction. It will involve outside contractors and require thoughtful planning.
8. Seventh highest is to contact an engineering firm to build a system model. This will include a new updated system map, and a coordination study based on current and future demand. An OSHA required fault current study could also be obtained at this time.

Next Steps

- Approach to mitigate recommendations
 - Near term
 - Longer term
- Community approach on DM longer term
 - Community hire staff directly
 - MRES crew performs DM for the community
 - Contractor (city do one off bids/projects, consider development of contractor agreement for DM services)
 - Other

North Dakota Transmission
Authority

North Dakota Industrial Commission

BIL 40101(d) Application

Project Title:

VEC Ryder-Rader Overhead to Underground

Applicant:

Verendrye Electric Cooperative

Date of Application:

11/20/23 (Original Submission)

9/23/24 (Revised)

Amount of Grant Request:

\$314,250

Total Amount of Proposed Project:

\$628,500

Duration of Project:

Completed In 2025 Construction Season

Point of Contact (POC):

Wesley Mason

POC Telephone:

701-624-0374

POC Email:

wesleyrm@verendrye.com

POC Address:

615 Highway 52 West Velva, ND 58790-7417

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Applicant Description

Provide a description of the applicant (i.e., type of entity, corporate structure, MWh sold annually, etc.).

Project Description

Provide a description of the project with enough detail to allow the reviewers to adequately evaluate the project.

Standards of Success

Provide a description of how the proposed project will fulfill any or all of the program objectives.

Project Timeline

Provide a project timeline including anticipated start date, significant project milestones, and anticipated project completion date or project duration.

Project Budget

Provide a total project budget, clearly describing the amount of funding requested from NDTA.

Applicant Description

Background:

Verendrye Electric Cooperative (VEC) is an electric cooperative founded in 1939. It is located in north-central North Dakota. VECs system consists of 16,631 services in portions of Ward, Sheridan, Wells, McHenry, Pierce, and Renville counties, with general headquarters and operations located in Velva, an additional office in Minot, and outposts in Harvey and the Minot Air Force Base. VEC maintains a distribution system of 4,617 miles of which 2,415 miles are overhead and 2,202 miles are underground conductor. In 2022 VEC sold 587,906 MWhs of electricity with a coincident system peak of 122,624 KWs.

The majority of VECs service area is rural, but also serves the urban area surrounding the City of Minot. The majority of the system demand comes from that urban area around Minot. Approximately 38.3% of the energy sales are from residential-related activities. Small and large commercial and industrial energy sales comprise 47.0% of the sales. Energy sales from the Minot Air Force Base were 14.7%.

Qualifications:

VEC employs a dedicated team of 63 individuals, with a strong emphasis on skilled linemen. Additionally, VEC currently employs and has employed a licensed Professional Engineer with the state of North Dakota going back into the 1970's. Further VEC has demonstrated technical feasibility designing, constructing, and maintaining the current system of over 4,600 miles of primary distribution line. Along with the on staff experience and expertise, VEC routinely incorporates outside consultants for additional engineering related to specialty services such as environmental review and long-range planning. Verendrye typically installs approximately 80 miles of underground cable per year. Materials are kept in stock on hand and are continuously replenished. VEC has an on hand stock of American made conductor and associated equipment in anticipation of meeting the Build America/Buy American initiative. With the exception of boring, all labor is performed by VECs highly trained in-house line workers.

Project Description

Description:

Project activities include replacement of 3.5 miles of three-phase #4 ACSR (aluminum conductor steel reinforced) overhead distribution line with three-phase 4/0 AL-URD (aluminum underground) distribution cable. Additional equipment in this proposal includes the installation of a 3 phase bi-directional regulator bank for improved voltage support, and four PV4H reclosers for improved sectionalizing and protective functionality.

Location:

The project is located northeast of Makoti (47.993175, -101.559865) in Ward County, North Dakota. The Project is located in Sections 7, 8, 9, 10, 11, 16, and 17, T152N, R85W. The Project

runs parallel along the north side of 233rd Avenue SW from the west side of 198th Street SW to the east side of 156th Street SW, and then along the east side of 156th Street SW for approximately 0.25 miles.

Via the Justice40 and Energy Justice resources VEC identifies tract 38101011300 as the project location. There are no Disadvantaged communities designated in that tract. The substation that this project is located on reaches onto the Fort Berthold Reservation and supplies several services in that territory. The Energy Justice dashboard identifies the population of the tract as 5134 persons meeting the accepted criteria for a rural area.

Description of Need:

VEC proposes to convert 3.5 miles of overhead power line to underground. This is a 3-phase tie line that runs from the Ryder Substation to the Radar Substation. It was built predominantly in the 1960s as part of a 3 phase build out to support local military activity. It was constructed to the antiquated standards of that time. The older line design is considerably weaker than a modern design. VEC continues to maintain the existing line to its original function with well planned maintenance programs. But overhead power lines are susceptible to catastrophic weather events and vulnerable to damage from transportation and agricultural accidents. Converting these lines to underground will minimize weather events, environmental issues, and provides improved reliability and resiliency. This is part of a larger project developed by VEC while creating the long range work plan to underground the whole tie line. Due to the geography and climate of the local area, this area in particular has been shown historically to be susceptible to major winter storm events.

The 5 year average outage duration, including major storm events, for VECs system is 2.74 hours. The Ryder substation, due to its susceptibility to weather events and remote location to VECs outposts, 5 year average outage time is 11.34 hours. The 5 year average number of outages per substation per year for VEC is 27.76 occurrences, by the same metric the Ryder substation 5 year average is 36.2 occurrences. The 5 year average of consumers per outage for VEC is 23.38 consumers per outage, again by the same metric the 5 year average for Ryder substation is 38 consumers per outage.

Design and Engineering:

All design and engineering work will be performed by our in-house engineers and technicians. As an United States Department of Agriculture (USDA) borrower, through Rural Utility Services (RUS) department, all of VECs construction work meets or exceeds the applicable RUS and National Electric Safety Code (NESC) standards. This project will be completed to the same level of diligence and care to meet or exceed all applicable standards in the NESC and RUS.

Standards of Success

As demonstrated by the above data, the Ryder-Radar tie line on the Ryder substation is a prime candidate for improvement to 1) reduce the magnitude and duration of outages 2) reduce the frequency and impacts of outages. By utilizing this funding opportunity VEC can additionally offset the costs of the proposed project and avoid passing that funding requirement onto the members in this rural underserved community.

Utilizing these metrics, after the proposed undergrounding of the Ryder-Radar tie line, VEC expects to see a measured decrease in outage duration, frequency, and customers affected. Our goal with this initiative is to bring the Ryder substation outage metrics in line with the system average, VEC is confident this project is a crucial step in that goal and will yield a measurable outcome.

Project Timeline

Timeline:

The proposed project aims to increase the system's reliability by converting the 3.5 miles of tie line overhead 12KV 3-phase line to underground from the Ryder substation to the Radar substation in the existing route and existing right-of-way. This will involve retiring and removing the overhead system and installing a new 3-phase underground power line with associated equipment for underground construction. A NEPA compliant Environmental Study and Archeological Review are complete with no issues found, VEC expects Environmental Review approval from Rural Utility Services (RUS) in early 2025. The project will be implemented over the course of VEC's normal construction season from May-October 2025 pending grant approval. We are confident that the result will be a more reliable and robust electrical distribution system.

As is typical for projects of the size and scope VEC deals with, the project may be broken up into multiple work orders and completed in phases. This project will be worked in 3 distinct phases of construction, cutover, and retirement. With milestones for the completion of each phase.

Project Closeout:

When this project's construction, cut over, and retirement phases are done we will close out the project. This process includes facility inspections including photos of all structures installed, GPS coordinates of equipment, and diagrams of electrical switches and vaults.

When appropriate the work orders will be reviewed to ensure proper documentation of installed materials, equipment usage, and labor. Upon closeout of the work orders documentation is retained in perpetuity and will conform to all reporting requirements of the NDTA BIL 40101(d) Program.

Project Budget

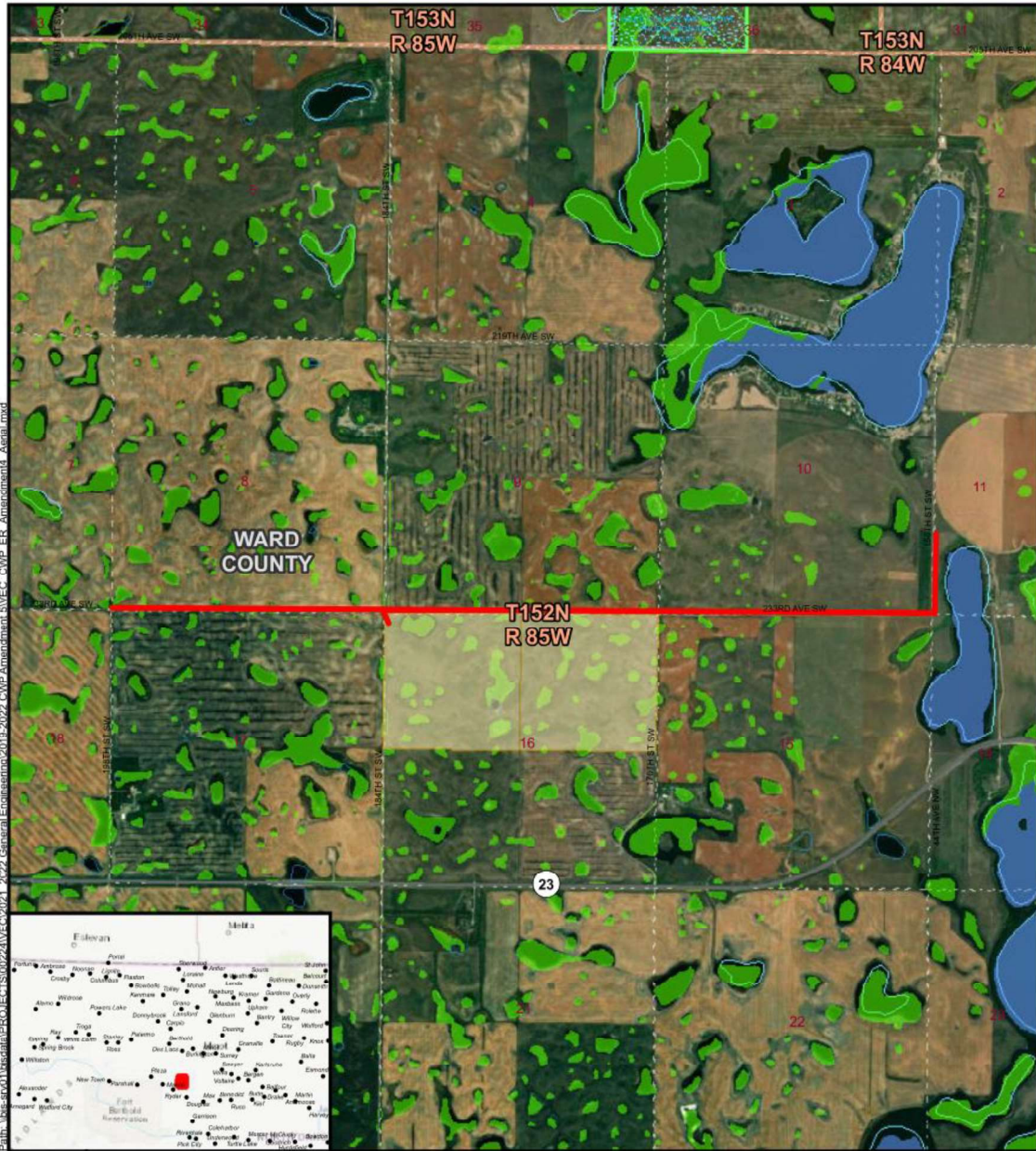
VEC has a long history of managing projects of this nature and has historical cost justification for its estimates, the estimates contained herein are pulled from the RUS approved 2023-2026 Construction Work Plan for VEC. VEC meets the Davis-Bacon Act requirements for prevailing wage and requires all contractors do so as well.

The overall estimated budget of the project is \$628,500.00, with a 50% proposed cost share this proposal is seeking \$314,250.00 of funding from the NDTA. A breakdown of these costs is below.

In addition to the quantified budget items below VEC has and will be providing in-kind services not captured in this budget overview for this project and will be responsible for any cost overruns.

Item	Per Unit Cost	Quantity		Subtotal
Regulators	\$30,000.00	3		\$90,000.00
Reg Bypass SWs	\$1,500.00	3		\$4,500.00
Ground Sleeves	\$1,000.00	3		\$3,000.00
Protective Devices PV4Hs	\$5,000.00	4		\$20,000.00
4/0 UG Line	\$146,000.00	3.5		\$511,000.00
			Total	\$628,500.00
			50% Cost Share	\$314,250.00

PROJECT MAPS RYDER-RADAR TIE LINE



Path: \\s01\usdata\PROJ\ECTS\00924\VE\0924_2022_Estimate\Estimate.mxd; 12-2022; Estimate\Estimate.mxd; 12-2022; CWD\Amendment_SVEC_cWP_ER_Amendment4_Aerial.mxd



Military Base	Piping Plover Critical Habitat	USFWS Easement	Wetland Type
Railroads	Whooping Crane Sighting	Wetland	Lake
USFWS WPA	US - Army Corps. of Engineers	Grassland	Freshwater Pond
USFWS NWR	Waterfowl Production Area	Grassland and Wetland	Riverine
ND PLOTS Land	BLM Land	Multi-Purpose	Wetland
Wildlife Management Area	State Surface Tract	NWR	
		WPA	

Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBasis, IGN,

1 inch = 2,512 feet

0 0.375 0.75 Miles

9/21/2023

RUS ID: 322

DESCRIPTION: Convert 3Ø, #4 ACSR with 3Ø, 4/0 AL-URD

Figure: 31

North Dakota Transmission
Authority

North Dakota Industrial Commission

BIL 40101(d) Application

Project Title: Sectionalizing and Protective Devices

Applicant: KEM Electric Cooperative

Date of Application: 9/27/2024

**Amount of Grant Request:
\$620,000**

**Total Amount of Proposed Project:
\$835,000**

Duration of Project:

3 years including waiting for devices.

Point of Contact (POC):

Trisha Samuelson

POC Telephone:

701-355-5856

POC Email:

Tsamuelson@iea.coop

POC Address:

1600 E. Interstate Ave, Ste 2

Bismarck, ND 58503

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Applicant Description

KEM Electric Cooperative, Inc. provides electricity to rural members in Emmons, Kidder, McIntosh, and Logan Counties in south-central North Dakota. KEM has a headquarters office in Linton, North Dakota along with an outpost in Steele, North Dakota. KEM's service territory is approximately 3,693 square miles and serves 4,065 meters. The Cooperative owns 122 miles of transmission lines, 2,233 miles of overhead distribution line, 690 miles of underground distribution, and 13 distribution substations. The Cooperative sells approximately 115,000 MWhs per year. The location of KEM's service area is shown in Figure 1 below.

KEM's membership consists mostly of rural residential and rural agricultural members. KEM has some seasonal recreational members, some small commercial members, and a few small industrial members. KEM's service area has continued to see population decline since the 1930's and has many areas of low income and lower than average education levels. Kidder County is considered a Disadvantaged Community and Emmons County is considered a Partially Disadvantaged Community according to the Justice40 Screening Tool.

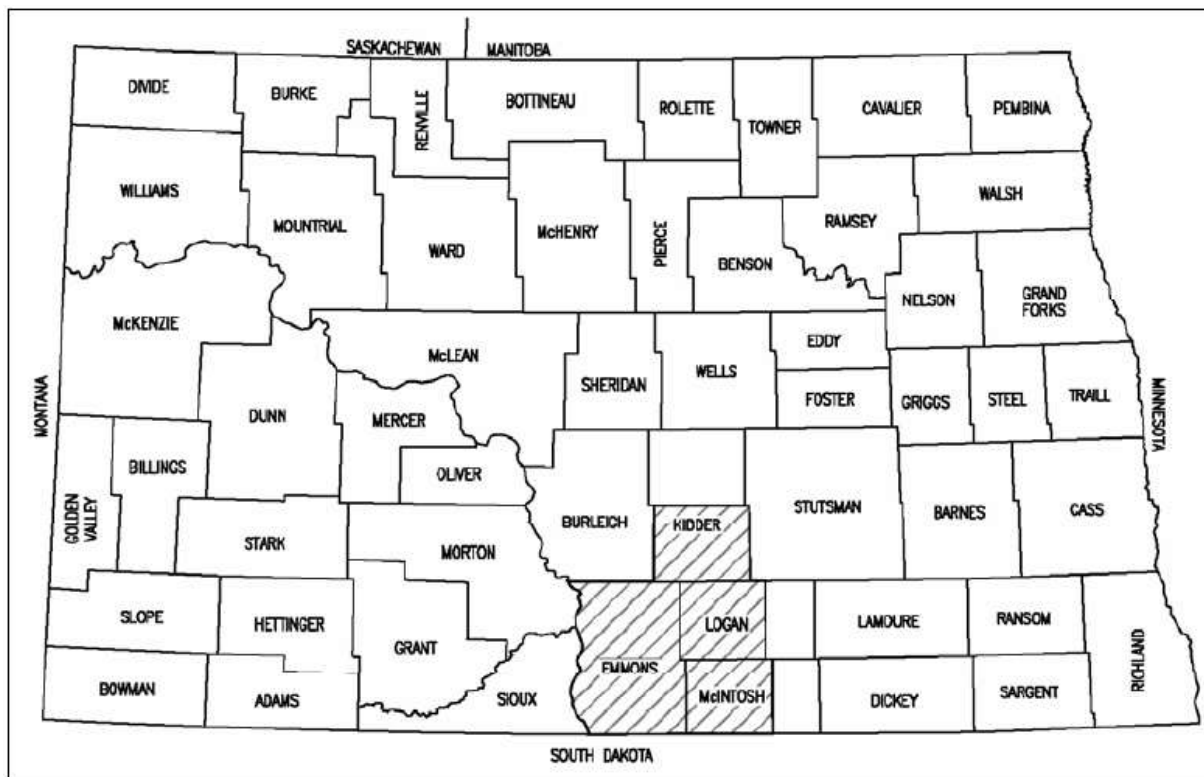


Figure 1: KEM Electric Cooperative Service Area

Project Description

KEM plans to upgrade outdated sectionalizing devices with more reliable devices which have newer technology and are compatible with SCADA. Exhibits of the project locations are in Appendix A. KEM plans to replace 11 old hydraulic reclosers with new Cooper Nova T/S with Form 7 Controllers in 3 distribution substations. The new reclosers will be SCADA capable and will allow KEM to remotely operate the devices, reducing outage times and allowing little to no outage time during planned maintenance. KEM has several Cooper Nova T/S devices installed on their system already and have the training necessary to continue to utilize these devices on their system. Proposed locations for the Cooper Nova T/S are shown in Table 1 below.

Table 1: Cooper Nova T/S with Form 7s

Substation	# Nova T/S w/Controllers	# Meters Impacted	T/R/S	County	State	DAC
Tappen Sub	4	433	T139N R70W S19	Kidder	North Dakota	Yes
Steel Sub	3	469	T139N R73W S7	Kidder	North Dakota	Yes
Hazelton Sub	4	280	T135N R77W S18	Emmons	North Dakota	Partial

In addition to new substation reclosers, KEM plans to replace old single-phase hydraulic reclosers on distribution lines with 35 newer technology S&C TripSavers as part of this project. These allow the Cooperative to retire oil filled reclosers, reduce their annual maintenance costs, reduce mis-operations, better coordinate between devices, reduce outage hours and frequency, and provide data such as fault current and load current to allow for informed decision making. KEM has been installing S&C TripSavers on their system for the last five years with a good track record of reduced outages, reliable operations, and exceptional customer support. Proposed locations of S&C TripSavers are shown in Table 2 below.

Table 2: S&C TripSaver Locations

Substation-Circuit #	# TripSavers	# Meters Impacted	T/R/S	County	State	DAC
Tappen Ckt #4	1	53	T139N R70W 2	Kidder	North Dakota	Yes
Tappen Ckt #4	1	53	T139N R70W 10	Kidder	North Dakota	Yes
Tappen Ckt #4	1	53	T139N R70W 11	Kidder	North Dakota	Yes
Tappen Ckt #4	1	53	T139N R70W 23	Kidder	North Dakota	Yes
Tappen Ckt #1	1	96	T139N R71W 8	Kidder	North Dakota	Yes
Tappen Ckt #1	1	96	T139N R71W 11	Kidder	North Dakota	Yes
Tappen Ckt #1	1	96	T139N R71W 3	Kidder	North Dakota	Yes
Tappen Ckt #1	1	96	T140N R71W 23	Kidder	North Dakota	Yes
Tappen Ckt #1	1	96	T140N R71W 28	Kidder	North Dakota	Yes
Steele Ckt #1	1	67	T140N R73W 17	Kidder	North Dakota	Yes
Steele Ckt #1	1	67	T140N R73W 18	Kidder	North Dakota	Yes

Substation-Circuit #	# TripSavers	# Meters Impacted	T/R/S	County	State	DAC
Steele Ckt #1	1	67	T140N R73W 30	Kidder	North Dakota	Yes
Steele Ckt #1	1	67	T140N R74W 21	Kidder	North Dakota	Yes
Steele Ckt #4	2	121	T139N R73W 1	Kidder	North Dakota	Yes
Steele Ckt #4	1	121	T139N R72W 8	Kidder	North Dakota	Yes
Steele Ckt #3	1	219	T139N R73W 10	Kidder	North Dakota	Yes
Steele Ckt #3	1	219	T139N R73W 15	Kidder	North Dakota	Yes
Steele Ckt #3	1	219	T138N R73W 4	Kidder	North Dakota	Yes
Steele Ckt #3	1	219	T138N R73W 28	Kidder	North Dakota	Yes
Steele Ckt #3	1	219	T137N R73W 5	Kidder	North Dakota	Yes
Steele Ckt #3	1	219	T137N R74W 10	Kidder	North Dakota	Yes
Steele Ckt #3	1	219	T137N R74W 3	Kidder	North Dakota	Yes
Steele Ckt #3	1	219	T139N R73W 1	Kidder	North Dakota	Yes
Steele Ckt #2	2	62	T139N R74W 4	Kidder	North Dakota	Yes
Steele Ckt #2	1	62	T139N R74W 15	Kidder	North Dakota	Yes
Steele Ckt #2	1	62	T138N R74W 3	Kidder	North Dakota	Yes
Steele Ckt #2	1	62	T139N R74W 29	Kidder	North Dakota	Yes
Hazelton Ckt #3	1	128	T136N R76W 30	Emmons	North Dakota	Partial
Hazelton Ckt #3	2	128	T136N R75W 19	Emmons	North Dakota	Partial
Hazelton Ckt #3	1	128	T135N R77W 6	Emmons	North Dakota	Partial
Hazelton Ckt #3	1	128	T134N R76W 6	Emmons	North Dakota	Partial
Hazelton Ckt #3	1	128	T134N R77W 13	Emmons	North Dakota	Partial

The S&C TripSavers are a good option for single-phase lines but are not as economical for three-phase lines as other devices on the market. KEM has chosen Siemen’s Compact Modular Reclosure (CRM) to replace 9 hydraulic reclosures in 3 locations on multi-phase distribution lines. Again, this will reduce annual maintenance costs, reduce mis-operations, better coordinate between devices, reduce outage hours, reduce outage frequency, and provide data such as fault current and load current for informed decision making. The Siemen CRMs are also SCADA capable and will be tied into KEM’s SCADA network in the future to reduce or eliminate outages during planned switching scenarios. KEM has not used these particular devices yet, however the local sales rep will provide training before, during, and after installation for the best success possible. In addition to training, KEM has part ownership of Maintenance Solutions Cooperative and Innovative Energy Alliance Cooperative, which supports the day to day technical and engineering needs of the cooperative. Proposed locations of Siemen’s CRMs are listed in Table 3 on the following page.

Table 3: Siemen CRM Locations

Substation-Circuit #	# CRMs	# Controllers	# Meters Impacted	T/R/S	County	State	DAC
Steele Ckt #3	3	1	219	T137N R74W 34	Kidder	North Dakota	Yes
Hazelton Ckt #3	3	1	128	T135N R77W 13	Emmons	North Dakota	Partial
Hazelton Ckt #3	3	1	128	T135N R77W 24	Emmons	North Dakota	Partial

Standards of Success

Objective 1: Reduce the magnitude and duration of grid outages caused by major disruptive storm and non-storm events.

This project will meet Objective 1 by improving coordination between sectionalizing devices therefore reducing the miles of line and number of meters that are out of power during storm and non-storm events. The mechanisms in the older devices start to wear out over time and no longer operate as precisely as they once did, therefore causing multiple devices to sometimes operate during a fault or causing some devices to not operate at all. If a device that should have operated does not operate at all, it causes the upstream device to operate leaving more meters out of power. Mis-operation of devices makes it harder for line workers to find the fault location, causing the outage duration to be longer. Replacing these older devices with new and more modern devices will reduce the number of meters impacted by interruptions and decrease the longevity of the outage. We have found a reduction of 80-90% in KEM's SAIDI numbers on substation areas converted from oil filled hydraulic style reclosers to TripSavers.

The substation NovaT/S with Form 7 Controllers will be SCADA operable, which will reduce outage times. Instead of having to drive to the substation to manually close the reclosers, there are many instances where the reclosers can be closed remotely with SCADA, reducing outages times dramatically. It is estimated this project will decrease the average duration of outages per member (SAIDI) by at least 50%, and more likely by up to 80%.

Objective 2: Reduce the frequency and impacts of grid outages caused by major disruptive storms and non-storm events.

This project will meet Objective 2 similarly to how it meets Objective 1. The mechanisms in the older devices start to wear out over time and no longer operate as precisely as they once did, therefore causing multiple devices to sometimes operate during a fault or causing some devices to not operate at all. If a device that should have operated does not operate at all, it causes the upstream device to operate leaving more meters out of power. When this happens, meters are out of power that would have never been out of power had the devices all worked as they should have. In addition, the upgraded Nova T/S, TripSavers, and CRMs collect and record fault information that can be used to make informed decisions. The fault information can be

analyzed to determine what is causing the interruptions allowing potential repairs to be made to reduce the frequency of interruptions. We have found a 20-30% reduction in outage frequency on substation areas that have already been converted from oil filled hydraulic reclosers to TripSavers.

The substation Nova T/S with Form 7 Controllers will be SCADA operable. This will help to reduce the frequency of outages as operators can remotely control the devices for preplanned switching scenarios instead of line crews driving to each substation to perform switching. KEM operates with a lean crew and generally would leave line out of power for planned maintenance due to staffing, whereas with SCADA they can perform more remote switching leaving more members with power during planned maintenance. It is estimated that this project will reduce the frequency of outages by at least 15-20%.

Objective 3: Implement grid modernization projects to develop energy solutions to provide lower-cost energy access to disadvantages or underserved communities.

Replacing older oil filled hydraulic sectionalizing devices with Cooper Nova T/S, S&C TripSavers, and Siemen CRMs, will allow for better coordination between devices, resulting in fewer outages, shorter outages, less overtime hours, less truck rolls, and less maintenance costs for the cooperative. Reduced costs for the cooperative positively impacts membership power costs. Reduced frequency and magnitude of power outages positively impacts area businesses and agricultural operations as well. This project will positively impact 209 commercial meters with improved service reliability and increased up-time allowing for increased business opportunities in Disadvantaged Communities across KEM's service area.

KEM's last work plan budgeted for the beginning of a SCADA program and continued TripSaver installations. This grant will allow more members to be positively impacted at a faster rate without raising KEM's rates to do so. In addition to remote operation and improved coordination between devices, the loading information provided by the devices will allow KEM to monitor loading and operate the system more efficiently to allow for increased loading due to EVs as well as possible two-way power flow due to increases in solar generation and other distributed generation.

This project is expected to positively impact all of KEM's 902 meters in Kidder County, which is classified as a Disadvantaged Community according to the Justice40 Initiative, as well as 280 meters in Emmons County which is considered partially Disadvantaged by the Justice40 Initiative.

All of the improvements will take place either within existing substation yards or at existing pole locations. No new ground will be disturbed. Existing oil tank filled reclosers will be

recycled. This eliminates the possibility of ground contamination from any possible oil leaks from the old oil filled tanks. Due to no new ground being disturbed, work being done on existing poles and within existing substations, CFR1970.53 (d)(10) applies and no environmental report should be needed.

It is estimated that KEM will utilize 2-3 contract individuals (temporary) to install the Cooper Nova T/Ss, 2 engineers (mostly temporary), and 4 line workers (existing) to plan for and program the devices. The contractors and engineers will be needed for maintenance and troubleshooting for the life of the devices but are not expected to be retained full-time.

Project Timeline

KEM plans to order all devices after grant approval and will replace the substation devices with the 11 Cooper Novas within 12 months of receiving the devices. The Cooperative will replace old line reclosers with TripSavers and CRMs within 18 months of receiving the devices. It is expected there will be a roughly 12-month lead time on all equipment.

Project Budget

The total project cost is estimated to be \$835,000. That total is made up of \$550,000 to replace substation devices with 11 Cooper Novas and Form 7 Controllers, \$210,000 to replace distribution line devices with 35 S&C TripSavers, and \$75,000 to replace distribution line reclosers with 9 CRMs with 3 Siemen Controllers. This includes cooperative or contract labor to install new devices and retire existing devices. It also includes engineering services to plan for optimal device placement, device settings, and programming of the new protective devices.

Build American/Buy American

KEM Electric Cooperative is a current RUS borrower and thus follows Build American/Buy American. However, if for whatever reason the manufacturers of the three products are not certified in Buy American, KEM will follow the proper path to apply for waivers or choose a certified Build American/Buy American manufacturer that offers similar devices.

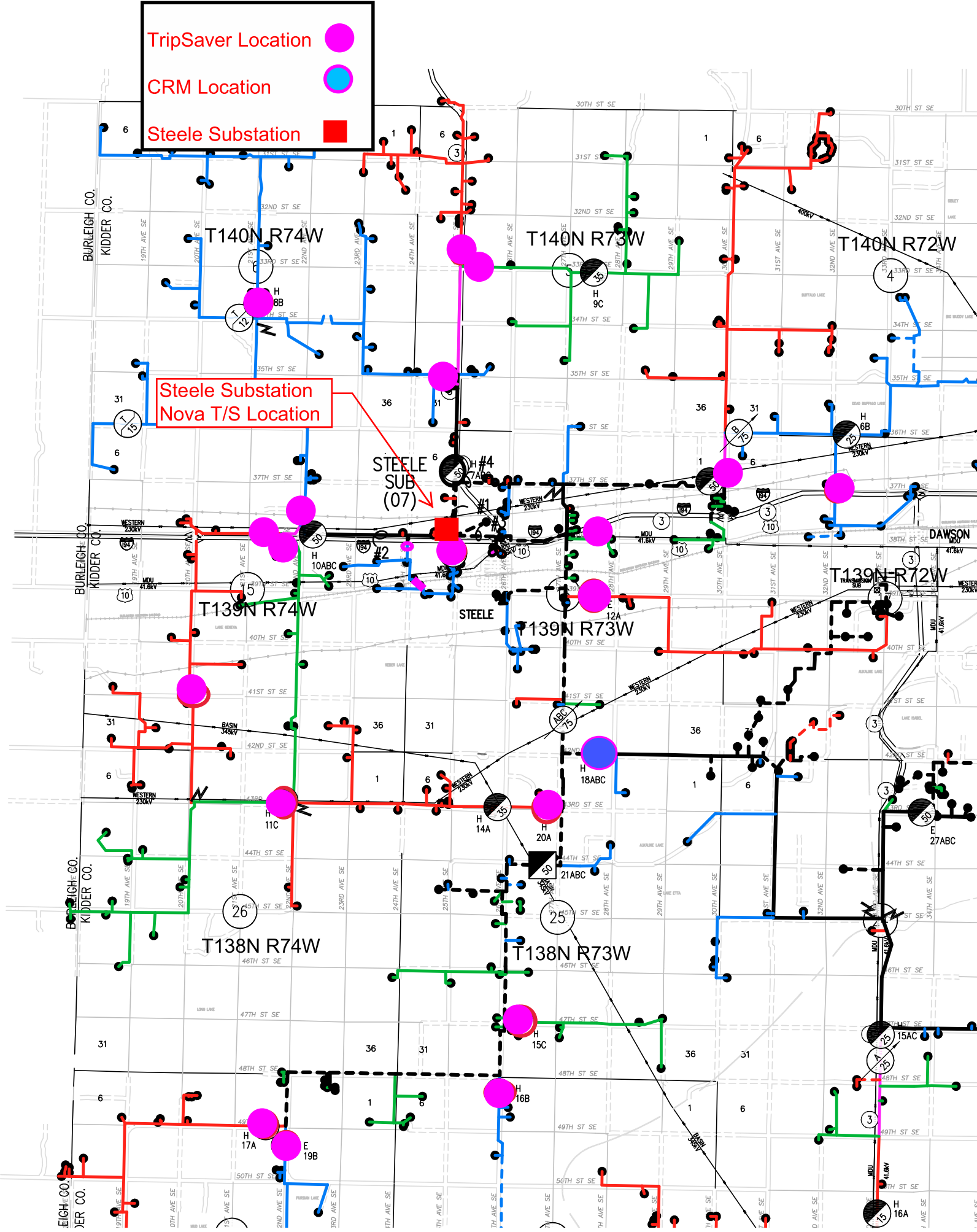
Davis Bacon Act

KEM's line crew are members of the IBEW Union and are paid wages and benefits not less than the prevailing wage in the local area. Union contracts can be furnished if required.

Appendix A – Project Exhibits

● TripSaver Location
● CRM Location
■ Steele Substation

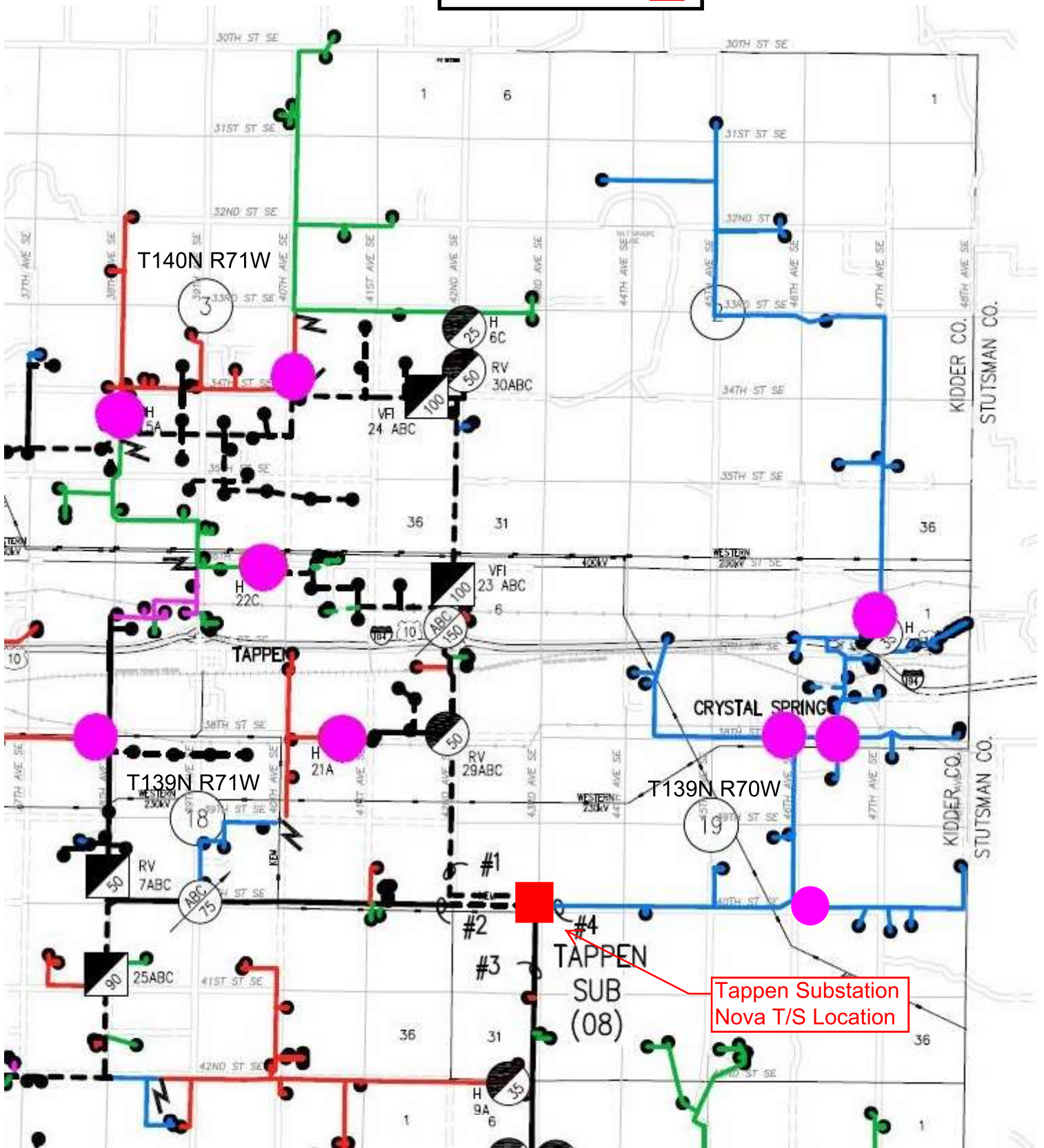
Steele Substation
Nova T/S Location



TripSaver Locations



Tappen Substation



Appendix B – DAC Exhibit Exports

Zooming in and selecting shows information about each census tract.

and shapefile from the downloads page.

Search for an address, city, state or ZIP

48 AK HI PR GU AS MP VI

Map labels: Bismarck, Menoken, Sterling, Cannon Ball, Hazleton, Braddock, Linton, Rock, Soten, Long Lake, 1804, 1806, 83, 34, 13, 85, 24.

Tract information

Number: 38029966500
 County: Emmons County
 State: North Dakota
 Population: 3,310

Tract demographics

Race / Ethnicity (Show v)
 Age (Show v)

Identified as disadvantaged?

PARTIALLY

The lands of Federally Recognized Tribes that cover less than 1% of this tract are considered disadvantaged.

Send feedback [icon]

Climate change	+
Energy	+
Health	+
Housing	+
Legacy pollution	+
Transportation	+
Water and	+

and shapefile from the [downloads](#) page.

Zooming in and selecting shows information about each census tract.

Search for an address, city, state or ZIP
 + -
 48 AK HI PR GU AS MP VI

Tract information
 Number: 3804396800
 County: Kidder County
 State: North Dakota
 Population: 2,466

Tract demographics
 Race / Ethnicity ([Show](#) v)
 Age ([Show](#) v)

Identified as disadvantaged?
YES
 This tract is considered disadvantaged because it meets more than 1 burden threshold **AND** the associated socioeconomic threshold.

[Send feedback](#)

Climate change	+
Energy	+
Health	+
Housing	+
Legacy pollution	+
Transportation	+

Appendix C – Project Manager Resume

Trisha Samuelson

Manager of Engineering

1600 E. Interstate Ave, Suite 2

Bismarck, ND 58503

701-989-4551, tsamuelson@iea.coop

Education

University of Mary, Bismarck, ND

Master of Science in Business (MSB), Business, 2019-2021

North Dakota State University, Fargo, ND

Bachelor of Science in Engineering, Engineering, 2004-2006

Bismarck State College, Bismarck, ND

Associate of Science, General, 2002-2004

Training

- Licensed Professional Engineer in ND
- NRECA Supervisor and Management Development Program Certificate

Professional Experience

Innovative Energy Alliance Cooperative (IEA) – Bismarck, ND (2012-current)

Manager of Engineering (2018-current)

Responsible for overseeing IEA's engineering department and ensuring all four IEA member cooperatives are operating and complying with NESC and RUS standards. This includes overseeing construction work plans, line design, substation construction, and maintenance plans and developing annual construction budgets.

Assistance Engineering Manager (2016-2018)

Responsible for performing or overseeing construction work plans and other electrical system studies. In addition, this position is responsible for providing assistance and direction to IEA's engineering department as well as IEA's four-member cooperatives.

System Engineer (2012-2016)

Responsible for performing system studies like construction work plans, long-range plans, sectionalizing studies, and daily operational questions. This position also coordinated with outside consultants for substation and transmission line design and construction.

Trisha Samuelson

HDR Engineering, Inc. – Bismarck, ND (2006-2012)

Engineering Supervisor (2009-2012)

Responsible for overseeing electrical system studies, managing workload for the Bismarck, ND engineering planning department, and mentoring three younger electrical engineers. This position worked hand and hand with operations personnel at client rural electric cooperatives as well.

System Engineer (2006-2009)

Responsible for assisting or completing electrical system studies such as construction work plans, long range plans, sectionalizing studies, and motor starting analysis. This position also worked daily with Operations Managers or Line Superintendents at rural electric cooperatives across North Dakota.

Appendix D – Cooper Nova T/S; S&C TripSaver; Siemens Compact Modular Recloser



Coordinated, dependable and precise automation

Standardize on the triple-single recloser that provides real benefits and real value. Eaton's Cooper Power series NOVA™-TS triple-single recloser system allows multi-mode configuration for coordinated, dependable and precise automation.

Application versatility, automatic overcurrent protection

The NOVA-TS triple-single recloser system is comprised of the following:

- Three single-phase NOVA-TS reclosers, each with:
 - Manual trip lever
 - Mechanical contact position indicator
- Form 6-TS recloser control
- One compatible, common junction box, which includes:
 - Three interconnecting cables (user-specified length)
 - One receptacle to provide easy access to the Form 6-TS control cable
- Control cable (user-specified length)

The NOVA-TS recloser has three modes of operation:

- **Three-phase trip, three-phase lockout (MODE A)**
All three phases simultaneously trip on an overcurrent, reclose and sequence together.
- **Single-phase trip, three-phase lockout (MODE B)**
Each individual phase will sense line current and only the phase corresponding to the faulted phase will trip.

If any one phase sequences to lockout, the other two phases also lock out, eliminating permanent single-phasing of three-phase loads.

- **Single-phase trip, single-phase lockout (MODE C)**
Each individual phase trips and sequences to lockout independently of each other. This is primarily for residential loads and/or where single-phasing of three-phase loads is protected by other means.



EATON

Powering Business Worldwide

Form 6-TS control operation

One Form 6-TS control for three reclosers, easily configured using ProView™ interface software provides:

- Flexible coordination
- Advanced event recorder/data profiler analysis tools
- Voltage, current and harmonic metering

Additionally, the front panel allows the user to manually open and close any phase independently without menu navigation.

Proven reliability

- Automation to improve substation performance
- Light-weight design well-suited for retrofit or new applications

Enhanced protection with dynamic phase tripping

A configurable option for MODE C operation is available to trip and lockout all three phases in the event of a phase-to-phase or three-phase fault. Normal operations occur per the programmed sequence for a single phase-to-ground fault; however, if a phase-to-phase fault occurs, the control will trip and lock out all three reclosers when any one phase sequences to lockout. This avoids any multiphase energization from one phase.

Internal voltage sensing

Using a high-voltage resistor within each interrupter module with source-side connections, the sensing option and control support a magnitude accuracy of 2% or better and a phase degree accuracy of $\pm 1.5^\circ$.

Modernize substation applications

- Cost-effective solution for your protection, metering and communication applications
- Automation features of the Form 6-TS control will improve your substation performance
- Add the remote operation, status and analog metering functions to your automation system through standard industry protocols for real-time system analysis and optimization
- Light weight of recloser system may allow for retrofit of existing structure without the expense of foundations or other structural changes

Effective NOVA-TS recloser application

Multiple fault scenarios were analyzed to provide proper system coordination for both phase and ground faults.

- Phase-to-ground, phase-to-phase and three-phase faults, along with multiple faults on different phases, were studied to verify the correct sequencing of each recloser with proper time-current curves
 - Load-side fuse protection is maintained even if two faults occur on different phases prior to resetting the control
- Should problems occur, utility operators would discover great benefits in repairs made on an individual phase basis
- Replacement of individual phase devices brings lower inventory economics and shorter system restoration and bypass intervals

Eaton
1000 Eaton Boulevard
Cleveland, OH 44122
United States
Eaton.com

Eaton's Power Systems Division
2300 Badger Drive
Waukesha, WI 53188
Eaton.com/cooperpowerseries

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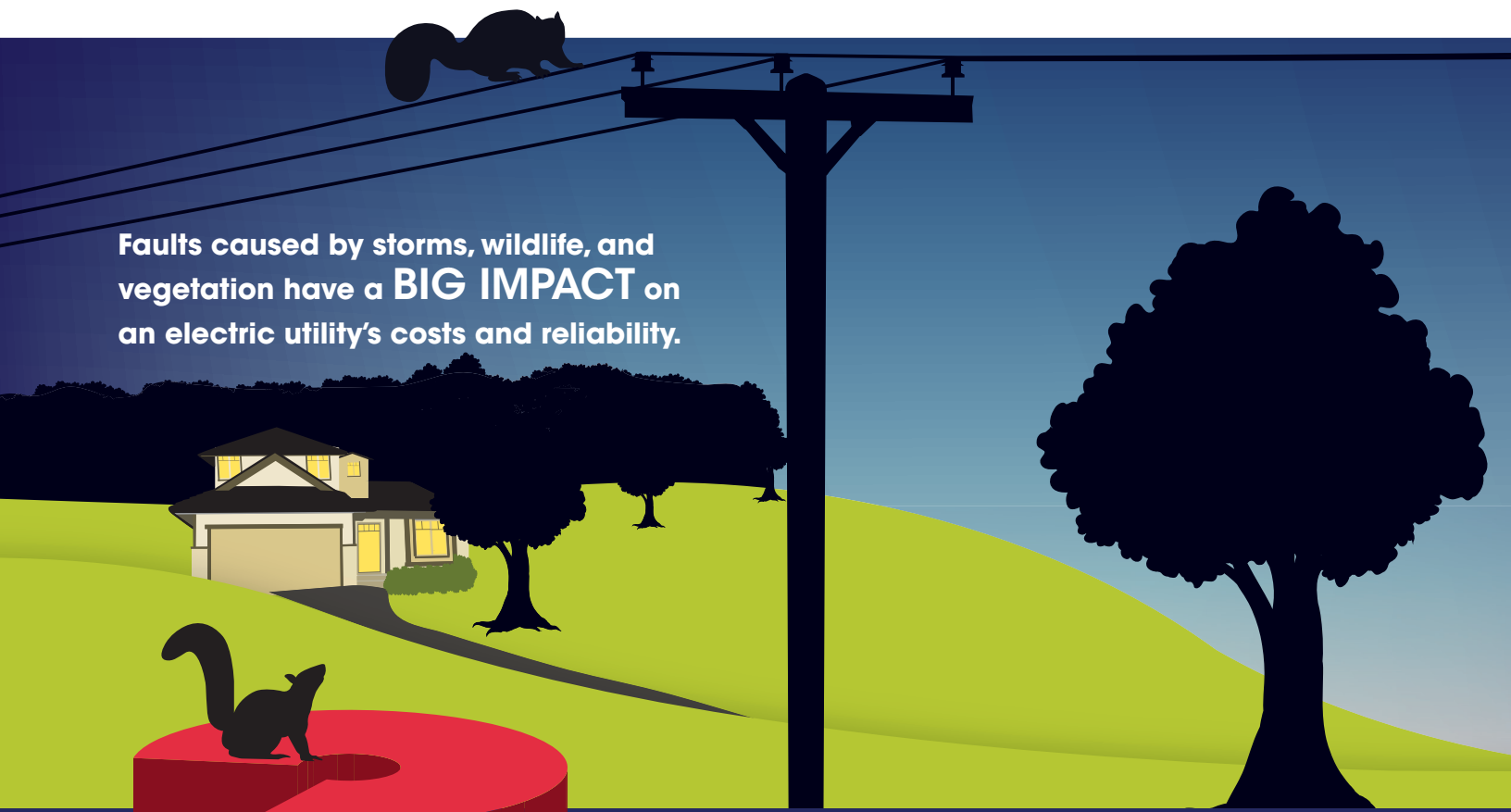
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For Eaton's Cooper Power series Switchgear Support Group, call 1-800-497-5953 or visit: [Eaton.com/cooperpowerseries](https://www.eaton.com/cooperpowerseries)

A New Way to Think About **Lateral**
Protection





Faults caused by storms, wildlife, and vegetation have a **BIG IMPACT** on an electric utility's costs and reliability.



80% of overhead faults are temporary.

Until now, there were only two strategies for protecting lateral lines from faults: fuse blowing, fuse saving, or a mix of two approaches. **These strategies hurt your reliability and cost you money.**

Fuse Blowing

Any fault—permanent or temporary—causes the lateral fuse to operate, **resulting in a costly truck roll** to locate the blown fuse, inspect miles of line, and finally replace the fuse.

Fuse Saving

Before the fuse blows, upstream equipment “blinks” the line to determine whether the fault is temporary or permanent. Blinking results in **more momentary outages** for everyone connected to the main feeder.

	Truck roll required for temporary fault	Truck roll required for permanent fault	Causes momentary or sustained outage for temporary fault
Fuse Blowing	✓	✓	✓
Fuse Saving		✓	✓

The TripSaver® II Cutout-Mounted Recloser combines the best of fuse-saving and fuse-blowing strategies without any of the drawbacks. When a temporary fault occurs, the TripSaver II recloser **eliminates momentary outages** for customers on the main feeder by only blinking the affected laterals. This lateral-protection strategy **improves a utility's reliability and bottom line.**



The TripSaver II recloser is so effective, it pays for itself in 4 avoided truck rolls.



In rural areas with longer lateral lines, utilities can save **\$45,000** a year. That is a **90%** rate of return.



S&C has proven that the TripSaver II recloser can help utility customers save up to **\$500,000** per feeder, per year.



Speak with your S&C representative or visit sandc.com/ts2 today.

sandc.com

461-G366

March 14, 2016

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SIEMENS

Ingenuity for life

Compact Modular Recloser (CMR)

Intelligent. Compact. Self-powered by voltage.

[siemens.com/compact-recloser](https://www.siemens.com/compact-recloser)

Leading the way

For greater flexibility, utilities can choose between pre-configured options as a drop-in alternative to a traditional hydraulic recloser or to self-configure the devices to take advantage of advanced protection, measurement and logging features.

Superior ratings up to 38 kV and unique self-powering via line voltage put the CMR at the forefront of the single-phase auto-recloser market. It presents a quantum leap in technology for cost effectively improving the reliability of overhead medium voltage networks. Featuring a fully insulated housing in a compact design, the lightweight device (<25 kg) permits easy installation and fast commissioning. An intuitive interface, wireless connectivity and SCADA integration capability ensure a high degree of user convenience and flexibility. The comprehensive rating options and practical design of the CMR enable unrestricted deployment onto both urban and rural networks. By eliminating the need for regular maintenance and utilising line voltage as power supply, this new generation of single-phase auto-recloser addresses all common problems of obsolete hydraulic reclosers.

Benefits



Elimination of oil filled reclosers



No scheduled maintenance^(a)



Fast & easy installation



Highly versatile



Flexible for the future



Fast ROI



Intuitive interface

Key Features

Fully integrated self-powered system:

- Power supply using line voltage
- Rechargeable battery for back-up power
- Magnetic actuated vacuum interrupter
- Fully insulated design for improved operator safety
- Integrated protection relay and controller
- Flexible mounting options

Intelligent

- Wireless connectivity
- Simple and intuitive configuration tools
- GPS time reference
- SCADA capability (future)
- Voltage and current measurement

- Fault passage indication (FPI)
- Comprehensive event log
- Full range of TCC curves

Reliable and maintenance free

The auto-recloser is suitable for all sites, even those with inconsistent or no line current. Featuring fully configurable protection and four operations in a sequence, the unit is the ideal solution for sectioning faults on long rural distribution lines.

Unlike hydraulic reclosers, which need removal to be serviced and maintained regularly, the CMR switch unit has no need of periodic inspection and maintenance. It is designed to deliver a 25-year uninterrupted service life^(a).

Contact us via fusesaver.au@siemens.com to receive more information.

Compact Recloser Ratings

Type tested according to IEC 62271-111 / IEEE C37.60

Switch Unit Parameters	Unit	Rating	Rating
Rated voltage	kV	up to 27 kV	38
Rated frequency f_r	Hz	50/60	50/60
Rated continuous current I_r	A	630	630
Rated short-time withstand current I_k	kA	12.5	6.3
Rated peak-withstand current I_p	kA	32.5	16.4
Rated duration of short circuit t_k	s	3	3
Rated symmetrical interrupting current I_{sc}	kA	12.5	6.3
Rated symmetrical fault-making current	kA	12.5	6.3
Rated operating sequence		O – 0.3s – CO – 2s – CO – 2s – CO	O – 0.3s – CO – 2s – CO – 2s – CO
Opening/closing times	ms	<20 ms	<20 ms
Clearing time	ms	<50 ms	<50 ms
Rated line-charging interrupting current	A	5	5
Rated cable-charging interrupting current	A	25	40
Minimum number of operations at rated short-circuit current		70	240
Minimum number of load-break operations at rated current/mechanical operations		10,000	10,000
IP rating		67	67

Ratings Description	Unit	Model ^(b)				
Rated maximum voltage (P-P) U_r	kV	12	17.5	27	27	38
Rated power-frequency withstand – dry U_d	kV	28	50	60	60	70
Rated impulse-withstand voltage U_p	kV	95	110	125	150	170
Minimum system voltage for operation (P-P)	kV	7	10	15.5	15.5	20

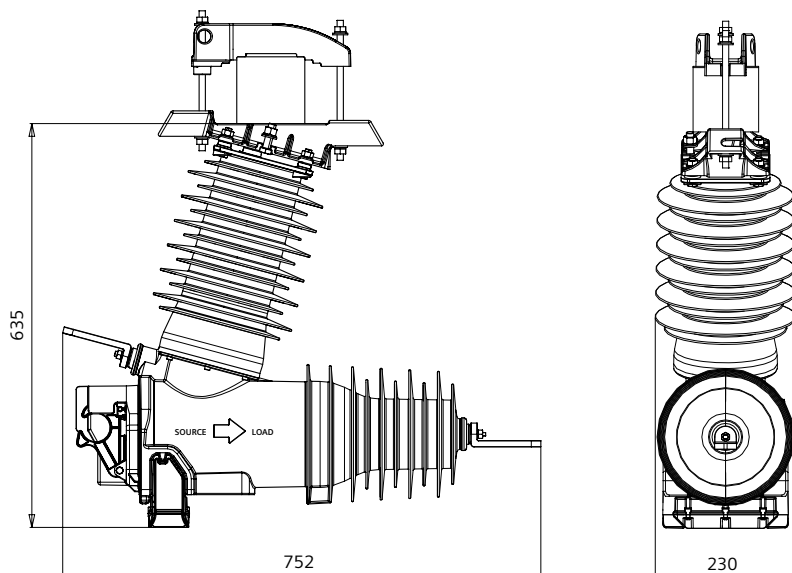
Service Environment	Rating
Operating temperature range	–40 ^(c) to +55°C
Humidity	0 to 100%
Maximum altitude	4,000m ^(d)
Pollution class	Very Heavy

(a) Excludes routine battery replacements every eight years.

(b) Correct model must be selected for the applicable system voltage (27kV model cannot be used on a 12kV network).

(c) Reclose intervals must be extended at temperatures below –35°C.

(d) De-rating required above 1,000m.



Dimensions are in millimetres

North Dakota Transmission Authority

North Dakota Industrial Commission

BIL 40101(d) Application

Project Title: Transmission Line

Applicant: City of Valley City

Date of Application: 11/16/23

Revised Application 10/1/24

Amount of Grant Request:

\$1,053,000

Total Amount of Proposed Project:

\$1,620,000

Duration of Project: 2 Years

**Point of Contact (POC): Gwen
Crawford & Marshall Senf**

**POC Telephone: 701-845-8120 &
701-845-4255**

POC Email:

**gcrawford@valleycity.us &
msenf@valleycity.us**

POC Address:

Valley City Public Works

254 2nd Ave NE

Valley City, ND 58072

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Applicant Description

The City of Valley City is a government entity. The structure of the City of Valley City is a City Commission. The commission consists of a President and 4 commissioners. 16

President – Dave Carlsrud
Commissioner – Duane Magnuson
Commissioner – Mike Bishop
Commissioner – Jeff Erickson
Commissioner – Dick Gulmon

City Hall includes an Assessor, Attorney, Auditor, Deputy Auditor, Police Department (14 officers), Volunteer Fire Department with chief and assistant chief, Building/Fire Inspector, City Administrator, City Commission and Forestry Department.

The City of Valley City has their own Public Works that provides electric, water, wastewater and sanitation services and maintains city streets for Valley City. The city operates an electrical distribution utility with long term purchase power contracts with Western Area Power Administration (WAPA) and Missouri River Energy Services (MRES). This provides over 8,000 MWh annually in electricity to our residents and businesses.

Project Description

Transmission and Insulator Replacement Project

Approximately 1.8 miles of 69KV transmission line poles and insulators will be replaced. The transmission line will be upgraded to 41 new steel poles replacing pole for pole. New hardware will be installed on the new poles using up to date material including 123 epoxy insulators that will replace old porcelain insulators. Grounding rods will be replaced on each of the new poles with proper copper weld that includes arrestor protection.

Given our limited staff, we will need to hire a contractor for this project, leveraging their technical expertise. Approximately **1,200 labor hours** will be dedicated to this effort, provided by a contractor outside our utility company.

With our experience in the City of Valley City's construction projects, we are well-versed in compliance with the **Build America/Buy America** provisions and the **Davis-Bacon Act**. We are committed to adhering to all requirements associated with those within this grant.

While the cost-benefit analysis for this project may be challenging to quantify, it is important to note that we are presenting it as a replacement and upgrade of an existing above-ground electrical transmission line, rather than a new installation. As such, the project scope is not expected to have any significant environmental impact. Should any environmental studies be required, we will ensure they are completed.

This project is both achievable and technically feasible, with a straightforward implementation process. Ultimately, it aims to reduce the frequency of outages, enhancing the reliability of our service.

The transmission line installed in 1969 has exceeded its expected lifespan. Over time, woodpeckers have damaged the poles, and the insulators have deteriorated, leading to cracks that require constant repairs. This ongoing wear increases the risk of frequent power outages. While the Public Works Department has been addressing these issues over the past five years, the fixes are temporary and do not ensure long-term reliability. Replacing the line now will save valuable employee time, reduce future repair costs, and improve system dependability.

Replacing our aging transmission line poles and insulators is essential for maintaining the safety, reliability, and efficiency of our electrical system. By upgrading this critical infrastructure, we will improve service quality, reduce risks, and meet the growing demands on the electrical grid.

Poles deteriorate due to environmental factors and wear, increasing the risk of collapse. Similarly, insulators degrade over time, raising the possibility of electrical failures or short circuits, which pose significant safety hazards. By replacing these components, it will mitigate such risks.

Aging infrastructure is more prone to failures that can result in power outages. By replacing the poles and insulators, we can enhance system reliability and minimize service disruptions. Additionally, planned replacements are more cost-effective than frequent repairs or emergency replacements due to sudden failures. Modern infrastructure is also more resilient to extreme weather, reducing the likelihood of damage during storms.

This replacement is a smarter investment, especially as we work with key customers who are requesting more power. The existing infrastructure may struggle to handle increased loads, but new poles and insulators will support higher-capacity transmission lines. Moreover, modern

equipment allows for the integration of smart grid technologies, further improving the efficiency and responsiveness of our electrical system.

Standards of Success

Objective 1: Reduce the magnitude and duration of grid outages caused by major disruptive storm and non-storm events.

We have 7 full-time employees in the field working with our electrical system who will be trained to manage the resilience project once it is finished.

Attached you will find a listing of totals of how many customers have lost power since 2018.

Power outages in Valley City are often caused by natural factors such as animals, high winds, storms, and flooding. The planned replacement of 1.8 miles of aging power lines will significantly reduce the frequency of outages, particularly those caused by the deterioration of our current infrastructure along that line.

Currently, we are proud to restore power within an average of one hour during outages. However, this infrastructure improvement will further enhance our ability to provide reliable service.

As part of this project, we will be transitioning from wood poles to steel poles, which offer a wide range of advantages. While both materials have their merits, steel poles provide superior durability, safety, and cost-effectiveness in electric service line installations. Their increased longevity and reduced maintenance requirements make them an ideal choice for modernizing our electrical infrastructure.

Steel poles are exceptionally resistant to rot, decay, and damage from pests like woodpeckers and insects, giving them a significantly longer lifespan than wood poles. The current condition of our wooden poles highlights the wear and tear these factors can cause over time. In addition to their durability, steel poles offer superior strength and load-bearing capacity, allowing them to support heavier electrical equipment—an essential feature in a region like ours, where severe weather is frequent. Furthermore, steel poles provide greater stability in high winds, minimizing the risk of downed lines during storms.

Steel poles require significantly less maintenance, as they do not need to be treated for pests or environmental degradation, leading to lower long-term costs. They are also inherently fire-resistant, eliminating the risk of pole failure due to fire—a concern with wooden poles. At the end of their lifecycle, steel poles can be fully recycled, making them a more environmentally sustainable option compared to wood, which relies on the continuous harvesting of trees.

Unlike wood, steel poles are less susceptible to environmental factors such as moisture and temperature fluctuations, allowing them to maintain structural integrity in a variety of climates.

Objective 2: Reduce the frequency and impacts of grid outages caused by major disruptive storm and non-storm events.

The City of Valley City is committed to reducing the frequency of power outages for its residents. In 2023 alone, 9,104 customers experienced power interruptions throughout the city.

While outages occur each month, they have become more frequent over time. We attribute this to the aging transmission line, particularly the last 1.8 miles that have yet to be replaced. The rest of the transmission line has already been upgraded, but the remaining section requires a complete overhaul to prevent further disruptions. While repairs have been made as necessary, these are temporary solutions, and a full replacement is essential for long-term reliability.

Winter weather in Valley City, especially the combination of ice, frost, and wind, poses a significant threat to our aging infrastructure. This harsh weather can cause older poles and insulators to fail. Additionally, sagging lines can clash during high winds, leading to power outages and surges. Upgrading these aging components will help safeguard against such weather-related failures and improve overall system resilience.

Objective 3: Implement grid modernization projects to develop energy solutions that provide lower-cost energy access to disadvantaged or underserved communities and promote energy sufficiency and energy justice in these communities while providing clean energy in alignment with the Biden Administration's Justice40 Initiative. Renewable energy (RE) and distributed energy resources (DERs) that are installed and managed locally give disadvantaged communities the opportunity to meet the energy needs of their community, take control of their energy resources, and enjoy the long-term environmental and economic advantages of these resources. These initiatives not only offer a source of clean, local, renewable energy but also reduce energy costs, generating savings that can be reinvested into the community.

Valley City, ND, faces significant socioeconomic challenges that hinder the well-being of its residents. Low income levels, an aging population, and high poverty rates create an environment of uncertainty and struggle. Receiving this grant would allow us to complete the project without the need to raise electrical rates, helping us maintain current rates and reduce the financial burden on our community.

The median household income is about \$56,000, which might seem okay at first glance, but the truth is that many residents struggle to get by. This income just doesn't stretch far enough for a

comfortable lifestyle, especially with rising living costs and everyday expenses. The reality of many residents is they find it difficult to make ends meet especially when factoring in rising costs of living and essential expenses.

A good number of people earn less than \$35,000 a year, which keeps many families stuck in a cycle of financial stress. There are not a lot of job opportunities, making it tough for residents to move up and improve their situation.

With an average age of 40 years, Valley City presents a demographic that is aging without attracting younger residents. This stagnation suggests a lack of opportunities for youth, leading many to leave the area in search of better prospects elsewhere. The aging population also raises concerns about future workforce sustainability and community vitality and the need for aging health care and services.

A poverty rate of approximately 12% indicates that a notable segment of the population is living in economic distress. This percentage is particularly alarming, as it reflects real families and individuals facing daily struggles for basic necessities.

Families, particularly single-parent households, are hit harder by poverty. These groups often don't have the support they need, which makes things even tougher and limits their chances for a better life.

The local economy, heavily reliant on agriculture and a few key sectors, offers few job prospects, leaving many residents with little choice but to accept low-wage positions. Even in this small town, the cost of living can be burdensome. Basic expenses such as housing, higher than average food costs and utilities can consume a significant portion of household incomes, making financial stability difficult.

In Valley City Schools, approximately 37% of students are eligible for subsidized meals. This statistic highlights the significant need for financial support among families in the district.

We offer a school education program for 5th graders called Smart Energy Squad. This program is the perfect opportunity to provide local students with invaluable knowledge for the future, and they will be taught the importance of energy efficiency, sources of electricity and renewable energy in a fun and interactive way. It offers digital tools, content customization and student kits.

Valley City participates in the scholarship program offerings through Missouri River Energy Services (MRES). Scholarships are awarded to students pursuing courses of study for careers related to the electric industry, such as an electrical technician (field service technician, wind turbine maintenance, power plant maintenance, etc.), electrical engineer or other engineering disciplines, mathematics, science or energy management.

In the past, we have successfully hired interns and provided students with opportunities to job shadow our crew. Notably, two of those interns went on to become full-time members of our team. Our internship program offers students a valuable chance to build credibility for their future careers. Participants gain essential skills such as effective communication, project ownership, deadline management, and teamwork.

Additionally, the program highlights the rewarding nature of a career in the electrical industry, especially given the growing demand for skilled workers in this field. For instance, we had an intern in early spring of 2024 who played a crucial role in our Ice Storm recovery efforts and he has full intentions of continuing on this career path after his time with our crew.

In the past, power outages and the resulting surges have caused significant damage to electronics and appliances. Upgrading our transmission line can help mitigate this risk and protect our valuable equipment.

Ensuring a continuous power supply is critical for the effective operation of hospitals, senior care centers, and health clinics. These facilities provide essential services to vulnerable populations, and any interruption in power can have severe consequences for patient care and safety.

The importance of maintaining an uninterrupted power supply in hospitals, senior care centers, and health clinics cannot be overstated. Reliable power is critical for ensuring patient safety, supporting emergency response, preserving medications, maintaining operational efficiency, securing data, and fostering public trust. Investment in backup power systems and infrastructure upgrades is essential to safeguard these facilities against power interruptions, ensuring they can provide the highest standard of care to the communities they serve.

Valley City has a Critical Access Hospital, 3 Assisted Living/Nursing Homes/Basic Care Facilities, along with 3 health clinics.

In healthcare facilities like these, power outages can jeopardize patient safety. Hospitals rely on electricity to power life-saving equipment, such as ventilators, infusion pumps, and monitoring systems. A sudden loss of power can lead to equipment failure, risking patient lives and compromising the quality of care. Similarly, in senior care centers, many residents depend on electrical devices for mobility and health monitoring. Maintaining a reliable power supply is paramount to ensuring that all patients receive uninterrupted care.

Many medications and medical supplies require refrigeration to remain effective. Power outages can lead to the spoilage of critical pharmaceuticals, potentially putting patients at risk. Hospitals and clinics must maintain proper storage conditions for vaccines, blood products, and other sensitive materials, all of which rely on stable power sources. A consistent electricity supply is essential for inventory management and ensuring that essential supplies are always available.

Modern healthcare relies heavily on electronic health records (EHR) and other digital systems to manage patient information. A power outage can compromise data integrity and security, risking the loss of crucial patient information. Ensuring an uninterrupted power supply is essential not only for maintaining operational efficiency but also for protecting patient privacy and confidentiality.

Maintaining a continuous power supply at water treatment plants is crucial for ensuring the delivery of safe and clean drinking water to communities. Any interruption in power can lead to significant public health risks, operational challenges, and environmental concerns.

The primary role of water treatment plants is to purify and deliver potable water to the public. A power outage can halt treatment processes, allowing contaminants to enter the water supply. This can lead to waterborne diseases, posing serious health risks, especially to vulnerable populations such as children, the elderly, and those with compromised immune systems. Ensuring a stable power supply is essential for protecting public health.

Water treatment plants must operate continuously to meet the demands of the community. Power outages can disrupt the pumping, filtration, and disinfection processes necessary for treating water. Interruptions can result in inadequate water pressure, leading to supply shortages and potentially impacting firefighting capabilities and other critical services that depend on a reliable water supply.

Our Water Treatment Plant relies on complex machinery and technology that requires a steady power supply to function efficiently. Valley City's Water Plant is unique due to its specialized ultra-filtration system, designed to manage higher concentrations of water from Devils Lake. This system faces challenges, requiring significant updates and maintenance to function effectively under varying conditions. Power outages can disrupt automated systems which would be detrimental to our complex system.

Project Timeline

The project would start in the spring of 2025, and it would take all summer to complete for a total time of 7 to 8 months.

We have asked for a 2-year project due to the possibility of products being unavailable or backordered with the anticipated supply chain constraints in our industry.

Project Budget

Please see attached estimate.

The budget estimates are:

Materials	\$ 900,000
Labor and equipment	\$ 450,000
Engineering and testing	\$ 270,000
Total	\$1,620,000

We are requesting a 65% grant for this project through NDTA. The total project cost is \$1,620,000 and we are asking for a grant award of \$1,053,000 with a 35% match of \$567,000 from the applicant.

Impacted Customers	Start Date Time	End Date Time
21	9/30/2024 10:30	9/30/2024 11:00
24	9/13/2024 12:00	9/13/2024 13:00
1	9/9/2024 21:30	9/9/2024 22:30
1	9/3/2024 16:30	9/3/2024 17:00
21	9/3/2024 13:30	9/3/2024 14:15
1	8/29/2024 8:30	8/29/2024 9:30
1	8/17/2024 11:30	8/17/2024 12:30
1	7/16/2024 8:30	7/16/2024 9:00
1	7/6/2024 16:30	7/6/2024 17:00
30	6/22/2024 9:30	6/22/2024 10:30
1	6/19/2024 21:30	6/19/2024 22:30
3	6/10/2024 19:00	6/10/2024 21:00
1	6/8/2024 16:30	6/8/2024 17:30
11	6/7/2024 9:00	6/7/2024 9:30
12	6/5/2024 10:00	6/5/2024 13:00
2	6/5/2024 5:10	6/5/2024 6:30
2	6/2/2024 9:15	6/2/2024 10:15
27	6/2/2024 9:15	6/2/2024 9:45
1	5/25/2024 10:30	5/25/2024 11:00
1	5/25/2024 9:15	5/25/2024 9:45
34	5/6/2024 15:45	5/6/2024 16:45
5	4/2/2024 11:00	4/2/2024 11:30
40	3/20/2024 20:00	3/20/2024 20:30
16	3/16/2024 21:00	3/16/2024 21:45
1	3/14/2024 15:10	3/14/2024 15:35
1	2/24/2024 12:00	2/24/2024 13:00
30	2/17/2024 14:00	2/17/2024 15:00
52	1/29/2024 9:30	1/29/2024 10:00
12	1/15/2024 18:45	1/16/2024 2:45
1	1/12/2024 16:00	1/12/2024 17:00
355	2024 Total as of 9/30/2024	

Impacted Customers	Start Date Time	End Date Time
1876	12/30/2023 14:00	12/30/2023 16:00
5430	12/28/2023 13:30	12/28/2023 15:30
7	12/17/2023 16:00	12/17/2023 16:45
2	12/9/2023 2:30	12/9/2023 3:30
5	12/7/2023 2:30	12/7/2023 3:00
1	11/20/2023 14:30	11/20/2023 15:00
17	11/19/2023 10:00	11/19/2023 10:45
17	11/17/2023 10:30	11/17/2023 11:00
12	11/11/2023 11:30	11/11/2023 12:00
18	10/22/2023 15:30	10/22/2023 17:30
24	10/12/2023 15:30	10/12/2023 16:00
6	10/10/2023 5:10	10/10/2023 6:10
43	10/8/2023 12:00	10/8/2023 12:30
43	10/7/2023 12:00	10/7/2023 12:30
10	9/28/2023 13:30	9/28/2023 14:00
40	9/27/2023 17:30	9/27/2023 19:00
3	9/25/2023 16:10	9/25/2023 17:10
1	8/8/2023 17:30	8/8/2023 18:00
52	7/17/2023 9:15	7/17/2023 9:45
17	7/8/2023 9:30	7/8/2023 10:00
1	7/1/2023 11:30	7/1/2023 12:30
43	6/19/2023 8:30	6/19/2023 9:00
11	6/16/2023 8:00	6/16/2023 8:30
7	6/11/2023 9:30	6/11/2023 11:30
30	6/10/2023 7:30	6/10/2023 8:30
1	6/8/2023 19:30	6/8/2023 22:30
1	6/7/2023 9:00	6/7/2023 9:30
15	5/29/2023 9:30	5/29/2023 13:30
8	5/26/2023 18:00	5/26/2023 18:45
2	5/2/2023 5:00	5/2/2023 6:00
80	4/2/2023 16:30	4/2/2023 19:30
4	3/1/2023 8:15	3/1/2023 8:45
1270	2/6/2023 0:30	2/6/2023 1:00
7	1/22/2023 19:00	1/23/2023 4:00
9104	2023 Total	

Impacted Customers	Start Date Time	End Date Time
55	12/29/2022 4:45	12/29/2022 5:15
20	12/28/2022 16:30	12/28/2022 17:30
9	12/16/2022 20:00	12/16/2022 21:00
1	11/25/2022 14:30	11/25/2022 15:00
15	11/25/2022 9:30	11/25/2022 10:30
39	10/30/2022 11:00	10/30/2022 11:30
1	10/29/2022 11:00	10/29/2022 12:30
39	10/29/2022 9:00	10/29/2022 9:30
30	10/25/2022 12:30	10/25/2022 13:00
12	10/24/2022 15:10	10/24/2022 15:35
1	10/10/2022 8:00	10/10/2022 9:00
1	10/9/2022 14:15	10/9/2022 14:45
9	9/30/2022 13:00	9/30/2022 13:30
39	9/30/2022 10:00	9/30/2022 10:30
12	9/27/2022 11:00	9/27/2022 14:00
11	9/27/2022 11:00	9/27/2022 12:00
49	9/24/2022 8:30	9/24/2022 9:00
49	9/24/2022 8:30	9/24/2022 9:00
0	9/23/2022 10:45	9/23/2022 10:45
1	9/14/2022 11:30	9/14/2022 12:00
1270	9/13/2022 14:20	9/13/2022 14:25
10	9/1/2022 2:45	9/1/2022 3:45
33	8/6/2022 14:30	8/6/2022 16:00
1	7/9/2022 14:30	7/9/2022 15:00
41	7/9/2022 7:30	7/9/2022 9:30
24	7/8/2022 6:30	7/8/2022 7:00
13	6/28/2022 10:00	6/28/2022 10:30
1	6/13/2022 16:00	6/13/2022 18:00
1	6/8/2022 7:15	6/8/2022 8:15
13	6/8/2022 5:30	6/8/2022 6:30
20	6/4/2022 8:30	6/4/2022 9:30
39	5/26/2022 9:00	5/26/2022 9:30
1	5/24/2022 12:30	5/24/2022 13:30
39	5/12/2022 19:30	5/12/2022 20:30
1	5/8/2022 10:30	5/8/2022 11:30
3	4/30/2022 7:00	4/30/2022 8:00
2	3/10/2022 18:00	3/10/2022 18:30
17	2/11/2022 1:00	2/11/2022 2:00
2137	1/21/2022 18:50	1/21/2022 19:50

11	1/17/2022 4:45	1/17/2022 6:45
5	1/10/2022 23:30	1/11/2022 2:30
4075	2022 Total	
Impacted Customers	Start Date Time	End Date Time
20	12/30/2021 19:00	12/30/2021 19:30
20	12/10/2021 14:00	12/10/2021 14:30
10	11/25/2021 18:00	11/25/2021 19:00
13	11/25/2021 13:00	11/25/2021 14:00
57	9/26/2021 7:30	9/26/2021 8:00
57	9/22/2021 8:30	9/22/2021 9:00
13	9/14/2021 9:00	9/14/2021 9:30
24	8/24/2021 1:45	8/24/2021 5:45
1	7/15/2021 15:00	7/15/2021 16:00
2	7/14/2021 15:00	7/14/2021 15:30
15	7/12/2021 8:30	7/12/2021 9:00
10	7/7/2021 9:30	7/7/2021 10:00
18	6/20/2021 15:30	6/20/2021 17:30
14	6/19/2021 9:30	6/19/2021 10:15
3	6/11/2021 16:00	6/11/2021 16:30
1	6/10/2021 6:00	6/10/2021 6:30
10	6/7/2021 21:15	6/7/2021 23:15
47	6/2/2021 18:45	6/2/2021 19:15
1	5/4/2021 22:30	5/4/2021 23:00
12	3/13/2021 8:30	3/13/2021 9:30
5180	2/16/2021 6:50	2/16/2021 7:40
4	2/15/2021 6:00	2/15/2021 7:15
30	2/3/2021 18:30	2/3/2021 22:30
5562	2021 Total	
Impacted Customers	Start Date Time	End Date Time
1	12/26/2020 11:00	12/26/2020 12:00
2	12/21/2020 6:30	12/21/2020 7:30
12	12/10/2020 15:00	12/10/2020 15:30
6	11/23/2020 23:30	11/24/2020 0:30
5	11/15/2020 9:30	11/15/2020 10:30
10	11/7/2020 15:00	11/7/2020 17:00
15	11/7/2020 14:30	11/7/2020 15:00
1	11/1/2020 12:30	11/1/2020 14:00
19	10/14/2020 11:30	10/14/2020 12:30

30	10/11/2020 6:30	10/11/2020 8:30
25	10/4/2020 8:30	10/4/2020 9:00
2	10/2/2020 8:30	10/2/2020 10:00
10	10/1/2020 13:00	10/1/2020 14:00
1270	9/20/2020 10:30	9/20/2020 11:30
10	9/20/2020 8:30	9/20/2020 9:00
3	8/31/2020 7:15	8/31/2020 8:15
1	8/17/2020 11:00	8/17/2020 12:00
125	7/25/2020 23:30	7/26/2020 1:00
19	7/25/2020 6:15	7/25/2020 7:45
2	7/20/2020 23:30	7/21/2020 1:00
1	7/19/2020 11:00	7/19/2020 12:00
1	7/9/2020 13:30	7/9/2020 14:30
29	6/28/2020 10:00	6/28/2020 10:30
1	6/27/2020 9:30	6/27/2020 10:30
1	6/22/2020 20:30	6/22/2020 21:00
1	6/22/2020 20:00	6/22/2020 20:30
30	6/19/2020 8:00	6/19/2020 8:30
50	6/18/2020 8:30	6/18/2020 9:30
2	6/7/2020 22:00	6/7/2020 23:00
10	6/7/2020 20:30	6/7/2020 22:00
1	6/7/2020 9:30	6/7/2020 11:30
4	6/2/2020 19:45	6/2/2020 20:45
6	6/1/2020 22:30	6/2/2020 0:00
1	5/31/2020 7:45	5/31/2020 8:15
1	5/28/2020 6:15	5/28/2020 7:15
24	5/24/2020 12:00	5/24/2020 13:00
1	5/23/2020 14:00	5/23/2020 15:00
1	4/29/2020 4:00	4/29/2020 5:00
8	3/27/2020 15:00	3/27/2020 16:30
4	3/6/2020 18:00	3/6/2020 18:30
1	1/21/2020 11:00	1/21/2020 11:30
1746	2020 Total	

Impacted Customers	Start Date Time	End Date Time
1	12/9/2019 15:30	12/9/2019 16:30
8	10/11/2019 8:00	10/11/2019 10:00
10	10/1/2019 8:00	10/1/2019 8:30
1	9/24/2019 20:00	9/24/2019 21:00
1	9/24/2019 0:30	9/24/2019 1:00
4	9/2/2019 21:15	9/2/2019 22:00
4	9/2/2019 8:00	9/2/2019 10:00
1270	9/2/2019 5:20	9/2/2019 6:20
10	8/17/2019 8:00	8/17/2019 8:30
1	8/13/2019 7:00	8/13/2019 8:00
52	8/5/2019 3:30	8/5/2019 5:00
5	8/3/2019 9:00	8/3/2019 10:00
2	7/25/2019 9:30	7/25/2019 11:30
40	7/25/2019 7:00	7/25/2019 7:30
21	7/18/2019 9:00	7/18/2019 9:30
4	7/16/2019 23:30	7/17/2019 1:00
9	7/14/2019 21:30	7/14/2019 22:30
3	7/9/2019 12:30	7/9/2019 13:30
10	6/30/2019 9:00	6/30/2019 10:00
8	6/29/2019 23:30	6/30/2019 1:30
7	6/13/2019 22:00	6/13/2019 23:00
57	6/8/2019 7:30	6/8/2019 8:30
3	5/30/2019 17:30	5/30/2019 19:30
1256	5/29/2019 15:30	5/29/2019 16:00
42	5/12/2019 2:00	5/12/2019 2:30
4	5/10/2019 1:00	5/10/2019 3:00
4	4/25/2019 12:30	4/25/2019 13:30
8	4/23/2019 13:30	4/23/2019 14:00
1	4/19/2019 10:30	4/19/2019 11:00
1	4/2/2019 14:00	4/2/2019 15:00
12	3/1/2019 9:00	3/1/2019 9:30
18	1/8/2019 17:00	1/8/2019 18:30
2877	2019 Total	

Impacted Customers	Start Date Time	End Date Time
2	12/22/2018 8:00	12/22/2018 10:00
1	11/15/2018 13:00	11/15/2018 13:30
129	10/10/2018 5:00	10/10/2018 6:30
1	10/8/2018 22:00	10/9/2018 0:30
1	10/5/2018 8:30	10/5/2018 9:00
2	9/28/2018 19:00	9/28/2018 20:30
18	9/14/2018 10:30	9/14/2018 11:30
75	9/14/2018 0:00	9/14/2018 2:00
1	8/23/2018 15:00	8/23/2018 15:30
1	8/23/2018 12:30	8/23/2018 14:30
1	8/16/2018 12:00	8/16/2018 12:30
2	8/5/2018 7:30	8/5/2018 8:00
47	8/4/2018 22:00	8/5/2018 0:30
15	8/3/2018 22:00	8/3/2018 23:45
10	7/28/2018 7:00	7/28/2018 7:30
6	7/27/2018 9:30	7/27/2018 10:00
18	7/15/2018 7:00	7/15/2018 7:30
1	6/22/2018 10:30	6/22/2018 10:45
12	6/8/2018 7:00	6/8/2018 8:25
1627	4/30/2018 20:20	4/30/2018 20:50
1970	2018 Total	

It was moved by _____ and seconded by _____ that the Industrial Commission authorize the North Dakota Transmission Authority Executive Director to Apply for the FY 2025 Federal IJJA Grid Resiliency Grant Funding in the amount of approximately \$3,885, 295.



INDUSTRIAL COMMISSION OF NORTH DAKOTA

NORTH DAKOTA TRANSMISSION AUTHORITY

Governor
Doug Burgum
 Attorney General
Drew H. Wrigley
 Agriculture Commissioner
Doug Goehring

Memo: FY25 IJJA Grid Resiliency Grant Application

November 21, 2024

North Dakota Industrial Commission Members & Karen Tyler, Executive Director:

We were notified by DOE on Monday, November 18th that the FY25 IJJA Grid Resilience Grant Application window will be opened January 2025. The applications will be approved by DOE in the order they are received so an early application would be beneficial to North Dakota and its sub-awardees.

The exact dollar amount of the IJJA Grid Resilience Formula Grant has not been calculated but is expected to be plus/minus \$3,885,295. The grant requires a 15% State Match.

We will be requesting the State Match for the FY24 Award, the FY25 award and the FY26 award from the 69th ND Legislative Session. The State Match Request is \$582,794 per year or a total of \$1,748,382.

We would like authorization from the North Dakota Industrial Commission to apply for the FY25 IJJA Grid Resiliency Formula Grant when the application window opens in January 2025.

Sincerely

Claire Vigesaa
 Executive Director



Memorandum

Attachment 13

To: North Dakota Industrial Commission
From: Don Morgan, President and CEO of BND
Date: November 17, 2024
Re: 2025 Legislative Agenda

Per the request of the Industrial Commission, following is a summary of the key issues for the Bank in the 2025 legislative Session.

Internal Operations of BND

1. Implementation of the capital management plan in coordination with the Industrial Commission and Legislative Leadership. The intent of this effort is to maintain capital at a level to ensure the anticipated risk profile of the Bank is accounted for in the 2025-2027 biennium.
2. Seeking legislative approval to only require public disclosure of direct loans or other BND sponsored program records.
3. Seeking Legislative approval to spend up to \$25,000 per biennium on employee training events to include food and non-alcoholic beverages.
4. Propose an amendment to the Career Builders program to ensure the North Dakota Dollars for Scholars program scholarships can be matched with a career builders' scholarship for students seeking a teaching degree.
5. Coordinate with the Office of Management and Budget and Legislative Council to consolidate appropriation language related to the PACE programs.
6. Support legislation for implementation of cash management recommendations.

Legislatively Directed Programs

1. Monitor actions and provide information related to the various legislatively directed loan programs administered by Bank of North Dakota.

Loan Program Changes

1. Finalizing a recommendation for the PACE program related to an increase in the maximum buydown amount from \$500,000 to \$750,000.

Proposed Amendment to Current Disclosure Language

6-08.1-02. Exemptions.

This chapter does not apply to any of the following:

7. The release by the industrial commission, in its capacity as the managing body of the Bank of North Dakota, of the following:

- a. The name of any person who has obtained approval for direct ~~or indirect~~ financing, buydown program approval or security, including a loan guarantee or a letter of credit, through the Bank of North Dakota primarily for purposes other than personal, family, or household purposes.
- b. The amount of any financing or security referenced in subdivision a.
- c. The amount of any net write off or loan forgiveness ~~associated with the financing or security referenced in subdivision a~~ which the industrial commission determines is uncollectible.
- d. The program under which any financing or security referenced in subdivision a was made.

Proposed Language to Support Employee Training Events

Spending Authority. Notwithstanding any other provision of law, the Bank may spend funds of up to \$25,000 per biennium for the purpose of four employee training sessions per biennium to include the purchase of food and non-alcoholic beverages. All expenses authorized under this section must be recorded in a separate expense code for reporting purposes.

15-10-38.2. Skilled workforce scholarship program - Skilled workforce scholarship fund - Continuing appropriation - Report.

9. The state board of higher education, in conjunction with the Bank of North Dakota, may allow an individual who received payment under this section to delay or cancel repayment under this section due to financial difficulty, military service, death, or total disability. An individual receiving a scholarship from the North Dakota Dollars for Scholars program administered by the Bank who is seeking a teaching degree from a qualified North Dakota institution of higher education shall not be required to repay any amount awarded to the individual by the Dollars for Scholars program.

GEOLOGICAL SURVEY QUARTERLY REPORT

*July 1, 2024 to September 30, 2024
to the*

NORTH DAKOTA INDUSTRIAL COMMISSION

Edward C. Murphy
State Geologist
Geological Survey
Department of Mineral Resources
North Dakota Industrial Commission

November 26, 2024

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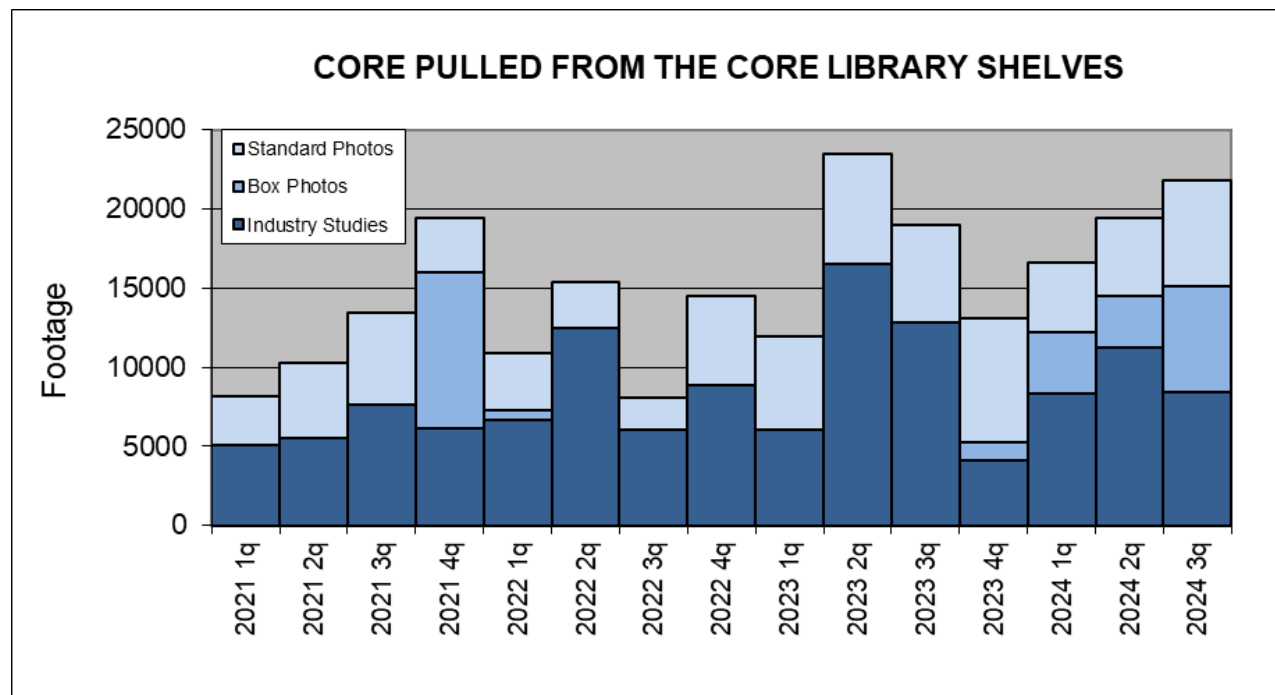
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Wilson M. Laird Core and Sample Library

During the third quarter of 2024, geologists from the Geological Survey, Energy and Environmental Research Center, as well as University of North Dakota graduate students and participants in a September core workshop studied 8,381 feet of core. A total of 6,736 feet of core was photographed generating 9,206 standard photographs and 6,687 feet of core was photographed with a tripod generating 540 photographs for the subscription site.



Workers pulled 21,804 feet of core from library shelves during the third quarter of 2024.

Williston Basin Carbonate Core Workshop

The North Dakota Geological Survey, with assistance from the University of North Dakota, put on a three-day core workshop from September 9 – 11. Additionally, several attendees returned for a fourth, informal day of discussions and core review on the morning of September 12. The core workshop had four presenters: Sven Egenhoff (University of North Dakota), Antun Husinec (St. Lawrence University), Bob Lindsay (Consulting Geologist), and Timothy Nesheim (North Dakota Geological Survey). The 50 attendees came from four oil companies, EERC, four state and provincial agencies, and two universities. The core workshop focused on carbonate rocks and sold out one month prior to the event.

High-Level Radioactive Waste Advisory Council Biennial Report

The North Dakota Century Code (38-23) establishes a High-Level Radioactive Waste Advisory Council that is to meet at least once per year, review the site suitability of any proposed high-level radioactive waste facility and issue a report to the Legislative Assembly and the Industrial Commission, review high-level radioactive waste rules and standards and make recommendations to the Industrial Commission, consider any other matters related to high-level radioactive waste that the council deems as appropriate, and make recommendations to the Industrial Commission regarding the administration of the program. On October 21, 2024, the Advisory Council issued the following report to the Energy Development and Transmission Committee.

The current membership of the High-Level Radioactive Waste Advisory Council Members

Senator Jim Roers, District 46; HLRWAC Chairman

Representative Dan Ruby, District 38

Representative Jon Nelson, District 14

Senator Dale Patten, District 39

Jeb Williams, Director, Game and Fish Department

Nizar Wehbi, State Health Officer, Department of Health

Josh Teigen, Commissioner, Department of Commerce

Andrea Travnicek, Director, Department of Water Resources

David Glatt, Director, Department of Environmental Quality

Ron Henke, Director, Department of Transportation

Kenneth Vein, City Government Representative

Jana Hennessy, County Government Representative

Mirek Petrovic, Agriculture Representative

Ed Murphy, State Geologist, Dept of Mineral Resources - Geological Survey; HLRWAC Executive Secretary

The last report of the activities of the Advisory Council was presented to the Energy Development and Transmission Committee on July 26, 2022 and to the Industrial Commission on August 22, 2022. Since then, the Advisory Council met on November 22, 2022 and again on November 22, 2023. The minutes to those meetings are attached to this report and links to those minutes are posted on the DMR – Geological Survey website along with the video recordings of those meetings. The High-Level Radioactive Waste Advisory Council was established in 2019. The four legislative appointees and the three Governor’s appointees all serve four-year terms. Three legislators were reappointed, Representative Mark Owens did not return to the state legislature and was replaced by Representative Jon Nelson. Of the Governor’s appointees, the city government representative agreed to serve an additional four-year term, the county government representative retired and was replaced by Jana Hennessy (Mountrail County Engineer), and the agricultural representative declined an additional term and was replaced by Mirek Petrovic (Pierce County). Additionally, a number of the agency directors have come and gone during this time period.

There are three federal agencies that are involved with high-level radioactive waste: the Nuclear Regulatory Commission (NRC), the Department of Energy (DOE), and the Environmental Protection Agency (EPA). In previous meetings, we had heard from representatives of the NRC and DOE, during this reporting period we heard from a representative of EPA.

The featured speaker for the November 22, 2022 meeting was Dan Schultheisz, the EPA

Associate Director for the Center of Waste Management & Regulation. Dan Schultheisz spelled out EPA’s roles and responsibilities for high-level radioactive waste and spent nuclear fuel, EPA’s statutory authority for high-level waste and spent fuel repositories, the current EPA standards, the process for establishing these protection standards; and what EPA is anticipating Congress will do regarding high-level radioactive waste in the next few years. The current law states that Yucca Mountain is the federal repository and there is no alternative. Contrary to popular belief, the operating permit for Yucca Mountain was not denied. Instead, the permitting process for that facility is on hold. Schultheisz said that spent fuel rods are currently being safely stored adjacent to operating or abandoned nuclear power plants and it is not viewed as an immediate safety concern by the federal government. However, it is not the optimal condition as onsite dry cask storage was not intended to be a permanent solution. There are private efforts to develop interim storage where the fuel can be moved off-site to a centralized location. DOE has also started its consent-based siting process for those interim facilities.

	Regulator		
	Site Developer	General Standards	Compliance Criteria
WIPP			
Yucca Mountain or other DGR			

11/22/2022 Radiation Protection Program 3

Participant list: DP, DG, KV, MG, EM, RL, JP, DS, JR

A screen capture from Dan Schultheisz (EPA) PowerPoint presentation on November 22, 2022.



A screen capture from David Stradinger’s (ND DEQ) PowerPoint presentation on November 22, 2022.

David Stradinger, Division of Waste Management, DEQ, spoke on low-level, and technologically enhanced naturally occurring radioactive material (TENORM). He described high-level, low-level, and TENORM wastes, noted the concerns expressed for high-level waste, presented spent fuel pools and dry cask storage examples, noted the transportation challenges of high-level radioactive waste, the authorities that regulate TENORM, the active low-level waste disposal sites in the nation, TENORM waste examples, the radioactive material licenses required for TENORM waste in the state of North Dakota, as well as the financial assurance requirements and transportation requirements for TENORM.

The featured speakers for the November 22, 2023 meeting were Tim Nesheim (DMR), Chris Bader (DWR), and Damon Grabow (DWR). Their talks demonstrated the geologic and hydrologic databases that both agencies maintain that would form the backbone of a report to either the Legislature or the Industrial Commission should a high-level radioactive waste facility be proposed for North Dakota. Dave Glatt (DEQ) also spoke on carbon capture and a Climate Pollution Reduction Plan.

Tim Nesheim, Head of the Subsurface Section and Acting Core Library Manager, Geological Survey, DMR, spoke on the tectonic framework of North Dakota, the deep test wells drilled across North Dakota that provided the data that has enabled a determination of the stratigraphy at depth in the Williston Basin. Tim also discussed oil and gas production in the state as well as disposal of produced waters, an overview of the core and samples housed in the core and sample library in Grand Forks, and the potential for future production of helium, deep geothermal, potash, lithium, and rare earth elements in North Dakota.

Chris Bader, Director of the Water Appropriation Division, DWR, gave an overview of the department, the extent of North Dakota's water resources-including the bedrock and glacial aquifers, Missouri River hydrology, a delineation of the state's watersheds, the department's surface water monitoring and precipitation data sites, the permitted water intakes, and an explanation of the DWR PRESENS (REmote SENSors) network. Damon Grabow, Dam Safety Engineer, Regulatory Division, DWR, explained the ND Statewide Probable Maximum Precipitation (PMP) two-year study. His presentation included the project background, the study area, the PMP storm process, the precipitation events that make up the datasets, a probable maximum precipitation event map, and a snow water equivalent data map.

Dave Glatt, Director of the DEQ, presented on energy transformation, noting that both the federal government and the state governments have established major goals for a carbon-constrained future. He noted that DEQ is currently putting together a Climate Pollution Reduction Plan, mentioning the Project Tundra facility as an alternative. Additionally, he recapped a meeting he recently attended in Kemmerer, Wyoming where they are looking to build a nuclear power plant at a former coal-fired power plant site.

High-Level Radioactive Waste Advisory Council Minutes of the November 22, 2022 Meeting
Virtual Meeting via Teams

The meeting was called to order by Chairman Roers at 1:41 pm.

Chairman Roers welcomed everyone to the meeting. He welcomed and introduced two new Council members, Joshua Teigen (Dept of Commerce Commissioner) and Ron Henke (NDDOT Director).

Ed Murphy was asked to assist with the roll call.

Advisory Council attendees:

Representative Dan Ruby, District 38

Senator Dale Patten, District 39

Senator Jim Roers, District 46

David Glatt, Dept. of Environmental Quality

John Paczkowski, Dept of Water Resources

Joshua Teigen, Dept of Commerce

Ron Henke, NDDOT Director

Dr. Nizar Wehbi, ND State Health Officer

Kenneth Vein, City Government Rep

Rebecca Leier, Agricultural Community Rep

Ed Murphy, Geological Survey

Council members not in attendance: Representative Mark Owens, District 17; Jeb Williams, ND Game and Fish; Dean Pearson, County Government Rep. Ed Murphy stated that the Council is looking for a new County Rep, due to the retirement of Dean Pearson. Murphy noted that a quorum was present. Additional people attending the meeting were: Featured Presenter Dan Schultheisz (EPA), Featured Presenter David Stradinger (DEQ), Jay Santillan (EPA), Tom Peake (EPA), Marina Gasser (DMR).

The first order of business was to approve the June 14, 2022 meeting minutes. John Paczkowski made a motion to approve the June 2022 minutes. Josh Teigen seconded the motion. The motion was unanimously carried out to approve the written June 14, 2022 meeting minutes.

The second order of business was a presentation from Featured Speaker, Dan Schultheisz, the EPA Associate Director for the Center of Waste Management & Regulation. The main points of his "EPA Standards for High-Level Waste and Spent Fuel" presentation were: EPA's roles and responsibilities for high-level waste and spent nuclear fuel; EPA's statutory authorities for high-level waste and spent fuel repositories; the existing EPA standards; the standard-setting process; the elements of protection standards; additional considerations for future standards; and what EPA is anticipating from Congress in the next few years.

Senator Roers asked when things will become critical, and at what time something will need to be done. Schultheisz stated that there is no formal activity now as the law says that Yucca Mountain is the repository, without another alternative. He said that the EPA has done everything that Congress has asked them to do. Although, they do anticipate that Congress will be asking them to develop new standards in the future. Senator Roers asked when spent nuclear fuel stored onsite at power plants will ever become a critical situation. Schultheisz said that the cells are currently being stored safely and it is not an immediate safety concern, but it is not the optimal condition as onsite dry cask storage was not intended to be a permanent solution. There are private efforts to develop interim storage where the fuel can be moved off-site to a centralized location. DOE has also started its consent-based siting process.

The third order of business was a presentation on high-level, low-level, and technologically enhanced naturally occurring radioactive material (TENORM) waste from David Stradinger, North Dakota Department of Environmental Quality Division of Waste Management. The main points of discussion were: descriptions of high-level, low-level, and TENORM wastes; the process of nuclear fission; a nuclear fuel assembly depiction; concerns of high-level waste; spent fuel pools; dry cask storage examples; transportation challenges of HLRW; transuranic waste; the authorities that regulate TENORM and high and low-level waste; active low-level waste disposal sites; TENORM waste examples; radioactive material licenses required for TENORM waste in the state of North Dakota; financial assurance requirements for TENORM; and transportation requirements of TENORM.

Chairman ROERS stated that the Council has now heard reports from the three federal agencies on high-level radioactive waste: The Nuclear Regulatory Commission, the Department of Energy, and the Environmental Protection Agency, and asked members what they would like to hear and learn more about in the future. Chairman Roers asked if the Council should consider investigating the opportunity of using today's technology to capture the unutilized energy from the State's current wastes. Josh Teigen agreed that it would be in North Dakota's best interest and considered it a valuable option and worth looking into. Chairman Roers asked if anyone had any more discussion or comments regarding the meeting.

Chairman Roers asked for a motion to adjourn the meeting. Senator Dale Patten moved to adjourn the meeting, John Paczkowski moved to second the motion. The motion was unanimously carried.

Chairman Roers adjourned the meeting at 3:09 pm.

High-Level Radioactive Waste Advisory Council Minutes of the November 22, 2023 Meeting
Virtual Meeting via Teams

The meeting was called to order by Chairman Roers at 1:04 pm.
Chairman Roers welcomed everyone to the meeting.
He welcomed new Council member, Representative Jon Nelson (District 14)
Ed Murphy was asked to assist with the roll call.

Advisory Council attendees:

Representative Jon Nelson, District 14

Representative Dan Ruby, District 38

Senator Dale Patten, District 39

Senator Jim Roers, District 46

David Glatt, Dept. of Environmental Quality

Andrea Travnicek, Dept. of Water Resources

Ron Henke, NDDOT Director

Joshua Teigen, Dept of Commerce

Jeb Williams, ND Game and Fish

Kenneth Vein, City Government Rep

Rebecca Leier, Agricultural Community Rep

Ed Murphy, Geological Survey

Council members not in attendance: Dr. Nizar Wehbi, ND State Health Officer. Murphy noted that a quorum was present. Murphy pointed out the legislative appointments of the committee and their terms. Murphy stated that the Council has found a new County Rep due to the retirement of Dean Pearson. Jana Hennessy, Mountrail County Engineer, has agreed to serve on the committee and is currently going through the appointment process. Additional people attending the meeting were: Featured Presenter Tim Nesheim (DMR NDGS), Featured Presenter Chris Bader (DWR), Featured Presenter Damon Grabow (DWR), John Paczkowski (DWR), David Stradinger (DEQ), Marina Gasser (DMR), and Abby Ebach.

The first order of business was to approve the November 22, 2022 meeting minutes. Senator Patten made a motion to approve the November 2022 minutes. Jeb Williams seconded the motion. The motion was unanimously carried out to approve the November 22, 2022 meeting minutes as written.

Ed Murphy reviewed the purpose and the duties of the Council as written in NDCC 38-23. He went over the role the Council would play in issuing a site suitability report and the timeline of events if a waste facility site were to be nominated/proposed in North Dakota.

The second order of business was a presentation from Featured Speaker, Tim Nesheim, Head of the Subsurface Section and Acting Core Library Manager for the North Dakota Geological Survey. The main points of his "North Dakota Geology: Geologic History & Resource Review" presentation were: Tectonic Assemblage of North Dakota; mineral test exploration well graphics and maps; Williston Basin stratigraphy and the sedimentary rock layers; helium, geothermal, potash, lithium, and rare earth elements potential; North Dakota oil & gas production and produced water disposal areas; the Surficial geology of North Dakota graphics and maps; coal mining and the coal-fired power plants; and a NDGS Core Library overview. Tim closed his presentation by reiterating that NDGS geologists are always gathering new information and data to improve upon their understanding of North Dakota's history.

Joshua Teigen asked if North Dakota is at the point where the State should be looking for companies to come in and explore for resources such as lithium and potash. Nesheim stated that lithium exploration might be close, and helium is already being produced and the technology is in place, but our lithium and helium resources overlap with oil and gas fields. Chairman Roers asked for more of an update on rare earth elements. Ed Murphy stated that the NDGS has taken over 2,000 coal samples in Western North Dakota. The department has added a portable X-ray fluorescence machine so geologists can get an indication of rare earth concentrations while they are in the field. The team expects to triple the previous concentrations with their newest samples from November. NDGS will be doing a drilling program on trust lands in the Summer of 2024. They have narrowed the search area down to 2, 20-foot-thick zones that could have some potential for mining. Currently, North Dakota and West Virginia are both in the running for a possible \$125m DOE grant towards the construction of a processing plant, to be awarded in the next 2-3 years.

The third order of business was a presentation on North Dakota's water management from Chris Bader, North Dakota Department of Water Resources Water Appropriation Division. The main points of discussion were: an overview of the Department of Water Resources; the extent of North Dakota's water resources; Missouri River specifics; identification of ND's bedrock and glacial drift aquifers; maps of ground water sites/types, private contractor sites, watershed sites, surface water monitoring sites, precipitation data sites, and permitted water intakes; and an explanation of the DWR PRESENS (Pushing REmote SENSors) network, data, history, future and costs.

The fourth order of business was a presentation from Damon Grabow, Dam Safety Engineer, North Dakota Department of Water Resources Regulatory Division. The main points of his "ND Statewide Probable Maximum Precipitation (PMP)" presentation were: the definition of PMP; its background, updates, and uses; the PMP storm process, and the study area; maps of historical local, general, and cool season storm events that make up the datasets; an example map of probable maximum precipitation; and a snow water equivalent data map.

Ed Murphy expressed his excitement with the work that DWR is doing in their precipitation tracking efforts. He stated that this information would have been useful in NDGS projects during the 70s & 80s. Additionally, he asked if NDAWN (North Dakota Agricultural Weather Network) and PRESENS were connected. Bader said they were not connected, but the data is compatible if someone wants to use both. Andrea Travnicek, Director of DWR, noted that DWR is trying to make sure that their PRESENS information, NDAWN info, USGS stream gauges, core data, and any National Weather Service data have a centralized location during flood events in the Department of Emergency Services Watch Center. The PRESENS DWR system information is filling in some of the gaps in the NDAWN data across the state.

The fifth order of business was a presentation by David Glatt, Dept. of Environmental Quality. The main topic of his presentation was energy transformation. He noted that federal and state governments have major goals for a carbon-constrained future. DEQ is currently putting together a Climate Pollution Reduction Plan. What are our options in North Dakota for reliable, affordable energy, as a current fossil fuel state? He briefly touched on the Project Tundra facility as an alternative. He recapped a meeting he recently attended in Kemmerer, Wyoming with TerraPower. Wyoming is looking to build a nuclear power plant at a former coal-fired power plant site. What issues would North Dakota face in doing the same, and how it would impact our state?

Chairman Roers moved on to future meetings and topics. He pointed out that the Energy Development Transmission Committee will be meeting on December 18 and will feature Jeff Merrifield, the former Commissioner of the United States Nuclear Regulatory Commission. Merrifield will be speaking about advanced nuclear energy. The presentation will be recorded, and Roers anticipates that portions will be played at the next Council meeting. Chairman Roers asked if anyone on the Board had any topics regarding nuclear challenges that the Council should investigate and report on at the next meeting. Rebecca Leier stated that she would like David Glatt to give another update on the Wyoming plant at the next meeting. She also asked for a glossary of nuclear terms to be shared at the next meeting.

Chairman Roers asked Ed Murphy, Council Secretary, to review the terms of Board appointments in hopes that they are staggered, to maintain a balance of continuity and turnover. Ed Murphy commended Tim Nesheim, Chris Bader, Damon Grabow, and David Glatt on their presentations. Chairman Roers agreed and thanked Ed Murphy for finding the speakers on such short notice due to unforeseen circumstances surrounding the formerly scheduled presentation.

Chairman Roers asked if anyone had any other discussion or comments regarding the meeting.

Chairman Roers asked for a motion to adjourn the meeting. Senator Dale Patten moved to adjourn the meeting.

Joshua Tiegen moved to second the motion.

The motion was unanimously carried.

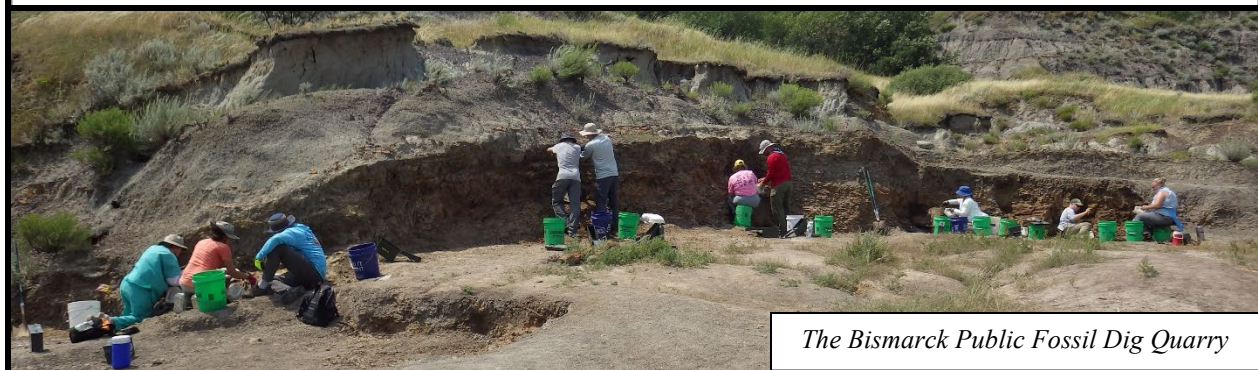
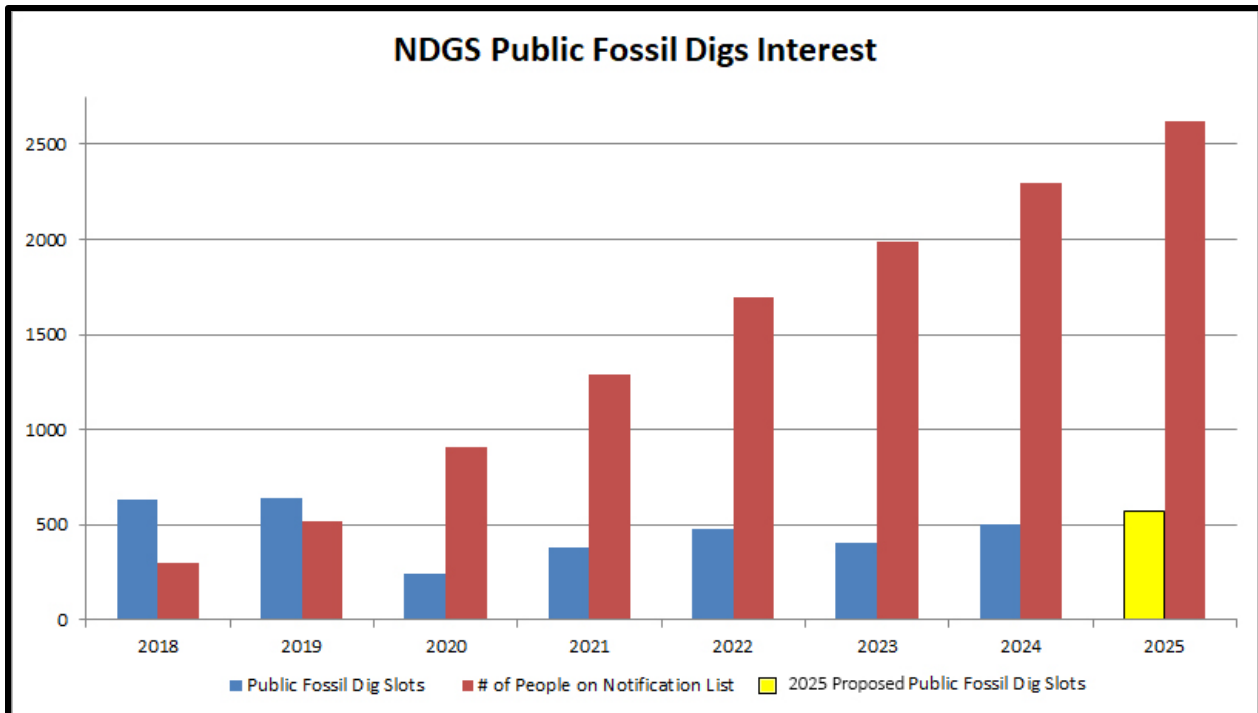
Chairman Roers adjourned the meeting at 3:01 pm.

Critical Minerals Drilling Project

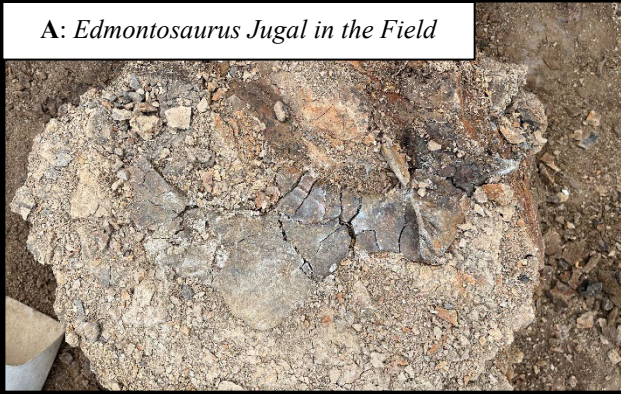
Fifty-three holes were drilled from September 3 thru October 9 in six counties in western and central North Dakota. The drilling and logging total was 8,600 feet and the coring total was 1,040 feet. So far, we have sent 169 samples of core out for critical mineral analysis and have analyzed 2,300 points on the cores with the portable X-ray fluorescence analyzer.

Public Fossil Digs Wrap-up

The 2024 Public Fossil Digs experienced another year of increasing public interest and successful fieldwork. We once again hosted the high school summer biology classes from Bismarck and Mandan at our Medora dig site (54 students). At our Bismarck dig we continued to uncover dozens of dinosaur bones, including a beautiful skull bone from the duck-billed dinosaur *Edmontosaurus*. We returned to our fossil mammal site south of Dickinson and recovered several well-preserved bones from ancient rhinos, including a lower jaw with teeth. At our Pembina Gorge dig site, we finished the recovery of the large field jacket that contains a full skeleton of an eight-foot-long specimen of the fish *Ichthyodectes*. That specimen took four years to uncover, jacket, and remove from the field, and had to be moved 55 feet down the outcrop using electric and hand operated winches to get to the road. That project would not have been possible without the assistance of the staff at the Pembina Gorge State Recreation Area. Looking ahead to 2025, we will return to the Medora, Bismarck, and Pembina sites, providing a total of 570 dig spots. There are currently 2,622 people signed up for our 2025 dig notification announcements email list, which continues to grow every year. To address this increasing demand, we have requested another paleontology technician position so we can expand the Public Fossil Dig program by 40%.



A: *Edmontosaurus* Jugal in the Field



B: *Edmontosaurus* Jugal Cleaned



C: Rhino Bones at the Dickinson Site



D: High School Summer Biology Students



E: Preparing to Flip the Fish Jacket



F: The Path Down the Hillside



G: Slowly Winching the Jacket Down

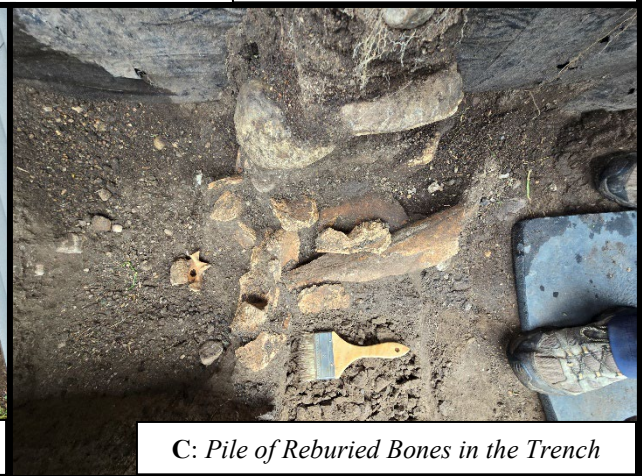
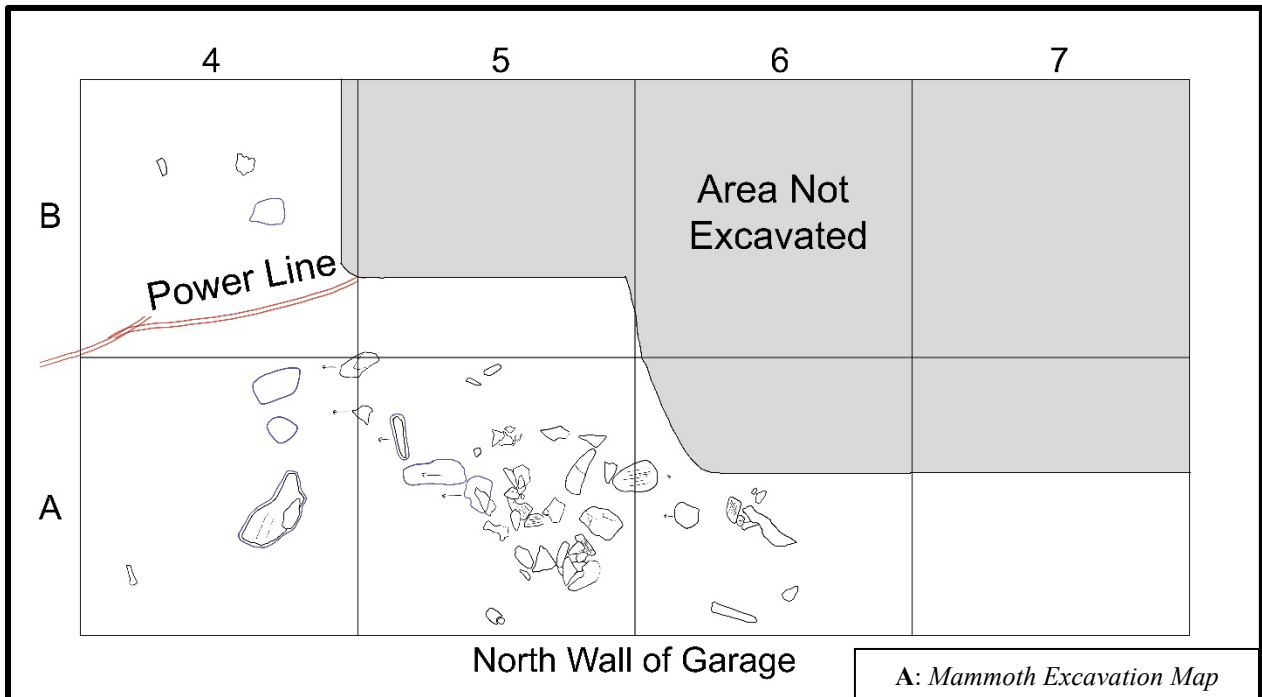


H: Winching the Jacket onto the Trailer



Mammoth Excavation

In September, the NDGS Paleontology Program and the State Historic Preservation Office returned to the site where we used ground penetrating radar in May to relocate a mammoth skeleton that was partially unearthed and reburied during the construction of a garage in 1988. Guided by maps produced from the ground penetrating radar data, we opened an excavation along the north wall of the garage in search for the skeleton. We found numerous chunks of bone and teeth within the backfill along the garage that were exposed and reburied in 1988. We also found several partial bones as we moved north, including some that were cut in half by the foundation trench. The largest concentration of bones was near the garage, but we did continue to find bones as we enlarged the excavation to the north. More excavations will be conducted next year as we continue to follow these bones. So far, everything we have found matches the stories obtained from workers that were on site in 1988, making it likely that a portion of the specimen remains in place under the slab of the garage. Full recovery of this specimen will require removing a portion of the slab inside the garage to recover those bones.



Proposed Viewable Fossil Preparation Lab

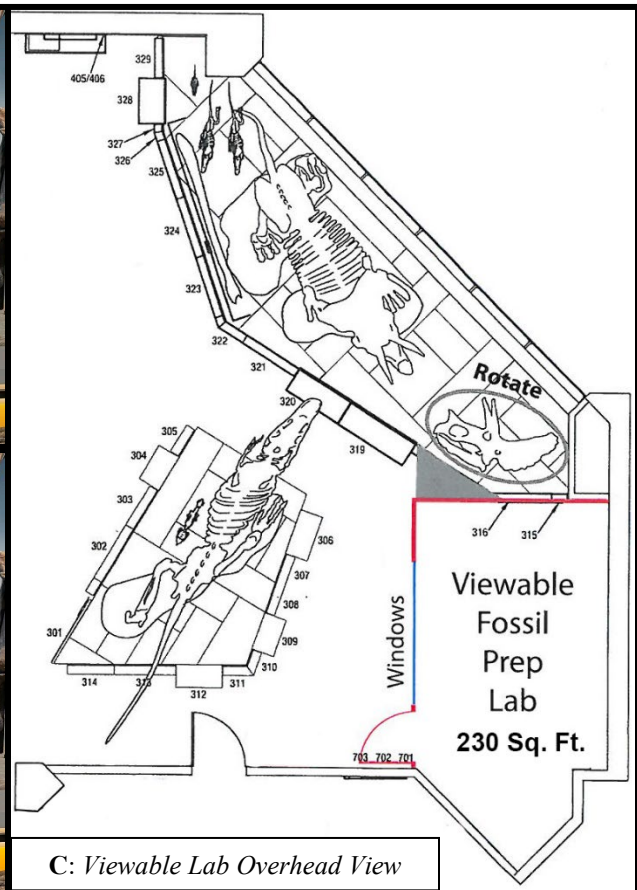
Public interest in learning more about paleontology remains high in North Dakota, as evidenced by the popularity of the public fossil digs and the Geologic Time Gallery in the North Dakota Heritage Center & State Museum. Those activities allow the public to see the first steps in how fossils are collected and the final display condition of fossils but leaves out the important process of how they are cleaned and stabilized. We do offer occasional tours of the fossil lab, but the lab is not in a publicly accessible area in the Heritage Center. To make our work on fossil preparation more accessible, we are proposing installation of a viewable fossil preparation lab within the Geologic Time Gallery in the Heritage Center. Similar labs in other museums are popular attractions that encourage repeat visitation to see how work is progressing on large projects. That lab would provide opportunities for the public to see the work that goes into cleaning fossils, to talk to the paleontologists performing the work, and provide a public venue to display recently discovered fossils and update the public on larger scale projects, like tracking our progress on cleaning exciting dinosaur skeletons. The lab would also provide additional opportunities for the public to volunteer with our staff working to clean fossils and provide an excellent location for outreach events like National Fossil Day.



A: Current Geologic Time Gallery



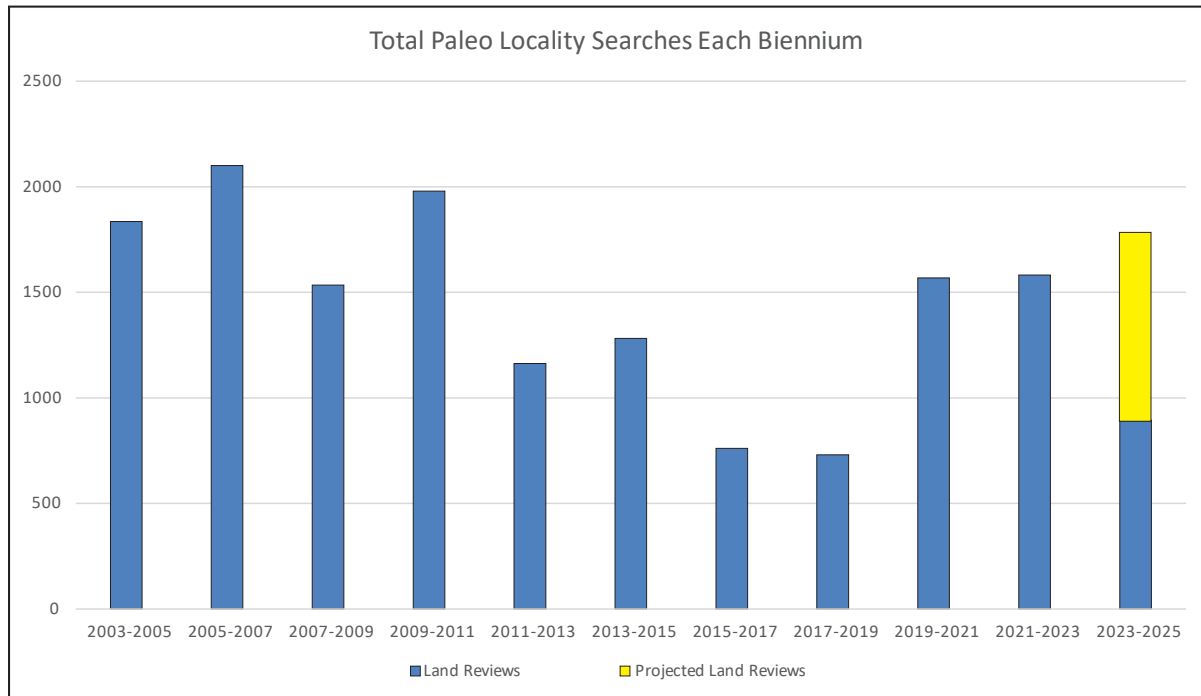
B: Viewable Fossil Lab Proposal



C: Viewable Lab Overhead View

Paleontological Land Reviews

The paleontology program continues to review proposed activities and construction projects on state owned and managed lands. Most of these reviews come from proposed oil and gas leases on State Trust Lands, where we provide data on areas to avoid surface disturbance to minimize impacts on fossil resources. Over the last 20 years we have reviewed an average of 1,500 State Trust Land tracts and construction projects each biennium. During the first half of the 2023-2025 biennium, we have reviewed 894 tracts/projects, putting us on pace for an above average number of reviews.



Regulatory Programs (July 1 to September 30, 2024)

Coal Exploration Program	Twelve permits were issued this quarter.
Subsurface Mineral Program	No permits were issued this quarter.
UIC Class III Well Program	No permits were issued this quarter.
Geothermal Program	Eight permits (7 residential, 1 commercial) were issued this quarter.
Paleontological Resource Program	No permits were issued this quarter.

Publications This Quarter (July 1 to September 30, 2024)

Maike, C.A. and Anderson, F. J., 2024, Areas of Landslides Manning NW Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. Mnng NW - 13.

Maike, C.A. and Anderson, F. J., 2024, Areas of Landslides Manning Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. Mnng - 13.

Maike, C.A. and Anderson, F. J., 2024, Areas of Landslides Marshall Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. Mrsl - 13.

Maike, C.A. and Anderson, F. J., 2024, Areas of Landslides Marshall NW Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. Mrsl NW - 13.

Maike, C.A. and Anderson, F. J., 2024, Areas of Landslides Emerson Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. Emrn - 13.

Maike, C.A. and Anderson, F. J., 2024, Areas of Landslides Ziner Butte Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. ZnrB - 13.

Maike, C.A. and Anderson, F. J., 2024, Areas of Landslides Halliday NE Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. Hldy NE - 13.

Maike, C.A. and Anderson, F. J., 2024, Areas of Landslides Oakdale Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. Okdl - 13.

Maike, C.A. and Anderson, F. J., 2024, Areas of Landslides Dunn Center NW Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. DnnC NW - 13.

Maike, C.A. and Anderson, F. J., 2024, Areas of Landslides Dunn Center NE Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. DnnC NE - 13.

Maike, C.A. and Anderson, F. J., 2024, Areas of Landslides Halliday NW Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. Hldy NW - 13.

Maike, C.A. and Anderson, F. J., 2024, Areas of Landslides Fayette Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. Fayt - 13.

Maike, C.A. and Anderson, F. J., 2024, Areas of Landslides Halliday Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. Hldy - 13.

Maike, C.A. and Anderson, F. J., 2024, Areas of Landslides Killdeer Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. Kldr - 13.

Maike, C.A. and Anderson, F. J., 2024, Areas of Landslides Lake Ilo Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. LkIo - 13.

Maike, C.A. and Anderson, F. J., 2024, Areas of Landslides Dunn Center Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. DnnC - 13.

Maike, C.A. and Anderson, F. J., 2024, Areas of Landslides Werner Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. Wrnr - 13.

Maike, C.A., 2024, Areas of Landslides Marshall SE Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. Mrsl SE - 13.

Maike, C.A., 2024, Areas of Landslides Marshall SW Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. Mrsl SW - 13.

Maike, C.A. and Anderson, F. J., 2024, Areas of Landslides Manning SE Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. Mnng SE - 13.

Maike, C.A., and Moxness, L. D., 2024, Areas of Landslides Hirschville SW Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. Hrvl SW - 13.

Maike, C.A. and Anderson, F. J., 2024, Areas of Landslides Hirschville Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. Hrvl - 13.

Maike, C.A., and Moxness, L. D., 2024, Areas of Landslides New Hradec North Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. NwHr N - 13.

York, B.C. and Anderson, F.J., 2024, Areas of Landslides Horse Creek School Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. HrCS - 13.

York, B.C. and Anderson, F.J., 2024, Areas of Landslides Cartwright Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. Crwt - 13.

York, B.C. and Anderson, F.J., 2024, Areas of Landslides Rawson Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. Rwsn - 13.

York, B.C. and Anderson, F.J., 2024, Areas of Landslides Charbonneau Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. Chbn - 13.

York, B.C. and Anderson, F.J., 2024, Areas of Landslides Schafer Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. Shfr - 13.

York, B.C. and Anderson, F.J., 2024, Areas of Landslides Alexander Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. Alxr - 13.

York, B.C. and Anderson, F.J., 2024, Areas of Landslides Arnegard Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. Arnd - 13.

York, B.C. and Anderson, F.J., 2024, Areas of Landslides Watford City Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. WfdC - 13.

York, B.C. and Moxness, L.D., 2024, Areas of Landslides Bear Butte Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. BarB - 13.

York, B.C. and Anderson, F.J., 2024, Areas of Landslides Sather Lake Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. SthL - 13.

York, B.C. and Moxness, L.D., 2024, Areas of Landslides Stocke Butte Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. StkB - 13.

York, B.C. and Anderson, F.J., 2024, Areas of Landslides Phillip Spring Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. PhlS - 13.

York, B.C. and Anderson, F.J., 2024, Areas of Landslides Burning Mine Butte Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. BrMB - 13.

York, B.C. and Moxness, L.D., 2024, Areas of Landslides Red Wing Creek Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. RdWC - 13.

York, B.C. and Anderson, F.J., 2024, Areas of Landslides Sheep Creek Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. ShpC - 13.

York, B.C. and Anderson, F.J., 2024, Areas of Landslides Sperati Point Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. SprP - 13.

York, B.C. and Maike, C.A., 2024, Areas of Landslides Fairview (MT) Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. Frvw - 13.

York, B.C. and Anderson, F.J., 2024, Areas of Landslides Moline School Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. MlnS - 13.

York, B.C. and Maike, C.A., 2024, Areas of Landslides Sidney NE (MT) Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. Sdny NE - 13.

York, B.C. and Maike, C.A., 2024, Areas of Landslides Sidney SE (MT) Quadrangle, ND Quadrangle: North Dakota Geological Survey 24K Map Series No. Sdny SE - 13.

Presentations This Quarter (July 1 to September 30, 2024)

B. Barnes, Dakota tour, volunteer family, Heritage Center, July 9.

T. Nesheim, Core Library Tour, ND Legislative nominees, core library warehouse and labs, July 19.

J. Person, Paleo exhibits, lab, and collections tour, VIPs from Grand Forks & Fargo, Heritage Center, August 6.

T. Nesheim, Core Library Tour, Wilson Laird family members, core library warehouse and labs, August 9.

J. Person, Paleo lab and collections tour, Poppy's Promise, Heritage Center, August 13.

J. Person, Paleo lab and collections tour, General Public, Heritage Center, August 15.

J. Person, Paleo lab and collections tour, General Public, Heritage Center, August 19.

T. Nesheim, Core Library Tour, ND Legislature Higher Ed Committee members, Core Library, August 21.

J. Person, B. Barnes, Dakota tour, Representative Munson & family, Heritage Center, August 22.

B. Barnes, Dakota tour, Heritage Center staff & public, Heritage Center, August 22.

B. Barnes, Dakota tour, General Public, Heritage Center, September 3.

B. Barnes, Paleo lab and collections tour, General Public, Heritage Center, September 4.

T. Nesheim Red River D Interval, Carbonate Core Workshop, Core Library, September 10.

T. Nesheim, Three Forks Formation, Carbonate Core Workshop, Core Library, September 10.

T. Nesheim, Ratcliffe Interval, Carbonate Core Workshop, Core Library, September 10.

T. Nesheim, Red River D Interval, Carbonate Core Workshop, Core Library, September 11.

T. Nesheim, Three Forks Formation, Carbonate Core Workshop, Core Library, September 11.

T. Nesheim, Ratcliffe Interval, Carbonate Core Workshop, Core Library, September 11.

C. Boyd, Paleo lab and collections tour, Turtle Mountain Community College, Heritage Center, September 13.



Docket for Hearing
Wednesday, May 29, 2024
N.D. Oil & Gas Division N.D. Oil & Gas Division 1000 East Calgary Avenue

Case No. 30890, Order No. 33550: Petition of Duke Royalty, LLC, for an order providing that Iron Oil Operating, LLC is not entitled to recovery of any drilling, completion, or production costs, or recovery of a risk penalty on Duke Royalty's interests in the Boxcar #1-4-16H well (File No. 37896), located in a spacing unit described as Sections 4, 9, and 16, T.148N., R.102W., McKenzie County, ND, as provided in NDCC § 38-08-08 and for such other relief as may be appropriate.

Docket for Hearing
Thursday, May 30, 2024

N.D. Oil & Gas Division N.D. Oil & Gas Division 1000 East Calgary Avenue

Case No. 30774, Order No. 33433: In the matter of the petition for a risk penalty of Phoenix Operating, LLC requesting an order authorizing the recovery of a risk penalty from a certain nonparticipating owner, as provided by NDCC § 38-08-08 in the drilling and completing of the Nate 27-34-3 1H-LL (File No. 40469), Nate 27-34-3 2H (File No. 40403), Nate 27-34-3 3H (File No. 40329), Nate 27-34-3 4H (File No. 40404), and Nate 27-34-3 5H (File No. 40406) wells in the Burg-Bakken Pool, located in a spacing unit described as Sections 27 and 34, T.160N., R.99W., Divide County, ND, and Section 3, T.159N., R.99W., Williams County, ND, pursuant to NDAC § 43-02-03-88.1, and such other relief as is appropriate.

Docket for Hearing
Thursday, August 29, 2024
N.D. Oil & Gas Division N.D. Oil & Gas Division 1000 East Calgary Avenue

Case No. 31152, Order No. 33841: In the matter of a hearing called on a motion of the Commission to consider the application of Select Water Solutions, LLC for an order authorizing the drilling of a saltwater disposal well to be utilized for fracture injection into the Dakota Group in a well to be known as the McKenzie G&I 19-1 well, to be located in the NESW of Section 19, T.150N., R.99W., South Tobacco Garden Field, McKenzie County, ND, pursuant to NDAC chapter 43-02-05, and such other relief as is appropriate.

Case No. 31153, Order No. 33842: In the matter of a hearing called on a motion of the Commission to determine the amount of bond to be required of Select Water Solutions, LLC for the McKenzie G&I 19-1 well to be drilled in the NESW of Section 19, T.150N., R.99W., South Tobacco Garden Field, McKenzie County, ND, to be utilized for fracture injection into the Dakota Group, pursuant to NDAC § 43-02-03-15, and such other relief as is appropriate.

Docket for Hearing
Thursday, September 26, 2024
N.D. Oil & Gas Division N.D. Oil & Gas Division 1000 East Calgary Avenue

Case No. 31229, Order No. 33918: Application of EOG Resources, Inc. for an order amending the field rules for the Phaelens Butte-Bakken Pool, McKenzie County, ND, to create and establish an overlapping 960-acre spacing unit comprised of the SW/4 of Section 5, the W/2 of Sections 8 and 17, and the NW/4 of Section 20, T.149N., R.94W., authorizing the drilling, completing and producing of a total not to exceed three wells on said proposed overlapping 960-acre spacing unit and such other relief as appropriate.

Docket for Hearing
Thursday, October 31, 2024
N.D. Oil & Gas Division N.D. Oil & Gas Division 1000 East Calgary Avenue

Case No. 31305, Order No. 34001: In the matter of a hearing called on a motion of the Commission to consider the confiscation of all production-related equipment and salable oil at the Placid 28-1V well (File No. 32883), SWSW Section 28, T.146N., R.100W., Rough Rider Field, McKenzie County, ND, Operated by North Range Resources, LLC, or any working interest owner, pursuant to NDCC §§ 38-08-04 and 38-08-04.9.

Docket for Hearing
Thursday, October 31, 2024
N.D. Oil & Gas Division N.D. Oil & Gas Division 1000 East Calgary Avenue

Case No. 31306, Order No. 34002: In the matter of a hearing called on a motion of the Commission to consider the confiscation of all production-related equipment and salable oil at the Placid 28-2V well (File No. 33042), NESE Section 28, T.146N., R.100W., Rough Rider Field, Mckenzie County, ND, Operated by North Range Resources, LLC, or any working interest owner, pursuant to NDCC §§ 38-08-04 and 38-08-04.9.

Docket for Hearing
Thursday, October 31, 2024
N.D. Oil & Gas Division N.D. Oil & Gas Division 1000 East Calgary Avenue

Case No. 31307, Order No. 34003: In the matter of a hearing called on a motion of the Commission to consider the confiscation of all production-related equipment and salable oil at the Sheep Creek Storm 1-1V well (File No. 33126), SENE Section 1, T.145N., R.100W., Grassy Butte Field, Mckenzie County, ND, Operated by North Range Resources, LLC, or any working interest owner, pursuant to NDCC §§ 38-08-04 and 38-08-04.9.

Docket for Hearing
Thursday, October 31, 2024
N.D. Oil & Gas Division N.D. Oil & Gas Division 1000 East Calgary Avenue

Case No. 31308, Order No. 34004: In the matter of a hearing called on a motion of the Commission to consider the confiscation of all production-related equipment and salable oil at the Duncan Federal 20-14 well (File No. 7338), SWSW Section 20, T.145N., R.99W., Scairt Woman Field, McKenzie County, ND, Operated by North Range Resources, LLC, or any working interest owner, pursuant to NDCC §§ 38-08-04 and 38-08-04.9.

Docket for Hearing
Thursday, October 31, 2024
N.D. Oil & Gas Division N.D. Oil & Gas Division 1000 East Calgary Avenue

Case No. 31309, Order No. 34005: In the matter of a hearing called on a motion of the Commission to consider the confiscation of all production-related equipment and salable oil at the Duncan Federal 30-24 well (File No. 6959), SESW Section 30, T.145N., R.99W., Scairt Woman Field, McKenzie County, ND, Operated by North Range Resources, LLC, or any working interest owner, pursuant to NDCC §§ 38-08-04 and 38-08-04.9.

N.D. Oil & Gas Division N.D. Oil & Gas Division 1000 East Calgary Avenue

Case No. 31076, Order No. 33762: In the matter related to NDIC v. Rocky Top Energy, LLC, we are recommending a default order, civil penalties, and recovery of costs.

It was moved by _____ and seconded by _____ that the Industrial Commission approve the October 29, 2024, Industrial Commission meeting minutes.

Minutes of a Meeting of the Industrial Commission of North Dakota

Held on October 29th, 2024 beginning at 1:00 p.m.

Governor's Conference Room – State Capitol

Present: Governor Doug Burgum, Chairman
Attorney General Drew H. Wrigley
Agriculture Commissioner Doug Goehring

Also Present: This meeting was open through Microsoft Teams so not all attendees are known.
Agency representatives joined various portions of the meeting.

Governor Burgum called the meeting of the Industrial Commission to order at approximately 1:05 p.m.

Ms. Karen Tyler took roll call, and Governor Burgum, Commissioner Goehring, and Attorney General Wrigley were present.

Governor Burgum invited the room to stand and join the Commission in saying the Pledge of Allegiance.

NORTH DAKOTA PUBLIC FINANCE AGENCY

Ms. DeAnn Ament presented for consideration of approval the following State Revolving Fund Loan Application:

- i. Carpio – Clean Water - \$5,536,000. The purpose of this project is to replace the failing mechanical wastewater treatment plant and sanitary sewer improvements. The requested loan term is 30 years, and the City will issue revenue bonds payable with sewer fee revenue. The average annual payment for the revenue bonds will be \$64,269.

It was moved by Commissioner Goehring and seconded by Attorney General Wrigley that the Industrial Commission approve the Clean Water State Revolving Fund loan request for \$5,536,000 for the City of Carpio.

On a roll call vote, Governor Burgum, Attorney General Wrigley, and Commissioner Goehring voted aye. The motion carried unanimously.

A RESOLUTION WAS MADE

RESOLUTION APPROVING
LOAN FROM CLEAN WATER STATE REVOLVING FUND

WHEREAS, the Industrial Commission has heretofore authorized the creation of a Clean Water State Revolving Fund Program (the "Program") pursuant to N.D.C.C. chs. 6-09.4 and 61-28.2; and

WHEREAS, the Clean Water State Revolving Fund is governed in part by the Master Trust Indenture dated as of July 1, 2011 (the "Indenture"), between the North Dakota Public Finance Authority (NDPFA) and the Bank of North Dakota (the Trustee); and

WHEREAS, the City of Carpio (the "Political Subdivision") has requested a loan in the amount of \$5,536,000 from the Program to replace the failing mechanical wastewater treatment plant and improve the sanitary sewer system; and

WHEREAS, the NDPFA's Advisory Committee is recommending approval of the Loan; and

WHEREAS, there has been presented to this Commission a form of Loan Agreement proposed to be adopted by the Political Subdivision and entered into with the NDPFA;

NOW, THEREFORE, BE IT RESOLVED by the Industrial Commission of North Dakota as follows:

1. The Loan is hereby approved, as recommended by the Advisory Committee.
2. The form of Loan Agreement to be entered into with the Political Subdivision is hereby approved in substantially the form on file and the Executive Director is hereby authorized to execute the same with all such changes and revisions therein as the Executive Director shall approve.
3. The Executive Director is authorized to fund the Loan from funds on hand in the Clean Water Loan Fund established under the Indenture upon receipt of the Municipal Securities described in the Political Subdivisions bond resolution, to submit to the Trustee a NDPFA Request pursuant to the Indenture, and to make such other determinations as are required under the Indenture.
4. The Commission declares its intent pursuant to Treasury Regulations '1.150-2 that any Loan funds advanced from the Federally Capitalized Loan Account shall be reimbursed from the proceeds of bonds issued by the NDPFA under the Indenture.

Adopted: October 29,2024

Ms. Ament gave a presentation of a memo of State Revolving Fund Loans Approved by the Advisory Committee:

- i. Arthur – Clean Water - \$550,000 – The purpose of this project is to replace the sanitary sewer force main from the main lift station to the wastewater treatment lagoon and install a new inlet structure within the wastewater pond. The requested loan term is 30 years, and the City will issue revenue bonds payable with sewer user fees. The average annual payment will be \$23,177.
- ii. Jamestown – Clean Water - \$1,991,000 – The purpose of this project is to install plate filter presses to improve the wastewater treatment process and allow for recycling of the lime sludge. The requested loan term is 20 years, and the City will issue a revenue bond payable with water fund revenues. The average annual payment will be \$116,975.
- iii. Dickinson – Clean Water - \$2,000,000 – The purpose of this project is for Phase 2 construction of Sims Street sanitary and storm sewer improvements. The requested loan term is for 20 years, and the City will issue revenue bonds payable with wastewater fees and pledge oil and gas gross production tax collections as a secondary source of security. The average annual payment will be \$116,274.

- iv. Dickinson – Drinking Water - \$2,000,000 lead service lines – The purpose of this project is to begin replacing some of the approximately 200 existing lead service lines. The requested loan term is 20 years, and the City will issue revenue bonds payable with water fee revenues and a portion of city sales tax collections, and pledge oil and gas gross production tax collections as a secondary source of security. The average annual payment will be \$25,000.
- v. Dickinson – Drinking Water - \$1,591,000 – The purpose of this project is to replace 13 blocks of cast-iron watermain with PVC piping. The requested loan term is 20 years, and the City will issue revenue bonds payable with city sales tax collection, and pledge oil and gas gross production tax collections as secondary source of security. The average annual payment will be \$92,524.

NORTH DAKOTA HOUSING FINANCE AGENCY

Mr. Brandon Detlaff presented a report related to a North Dakota Supreme Court ruling on a foreclosure case involving a “super lien” on an HFA financed project. The super lien concept originated in Nevada and has been attempted in other states without success. It allows Homeowners associations to file a lien senior to other mortgages already in place. North Dakota law does not allow for this practice. The subject property is located in Williston and was purchased in 2019, and the foreclosure was started in January of 2022 due to delinquency. The borrower filed bankruptcy in February of 2022 and NDHFA received notice regarding the super lien filing in March 2022. The first hearing on the matter was in April of 2023 and the District Court ruled in favor of NDHFA citing there is no statutory authority for the implementation of a super lien. The case was appealed to the Supreme Court and the lower court ruling was upheld.

Ms. Jennifer Henderson presented a multi-family Bond Issuance Report on Lashkowitz Riverfront 4% and 9% bond issuances.

The first memo reads as follows:

“RE: **Summary Report on Issuance of Multifamily Revenue Bonds: Lashkowitz Riverfront 4**

On June 26, 2024 the Industrial Commission executed an Authorizing Resolution, authorizing the issuance of Multifamily Revenue Bonds not to exceed \$16,500,000 along with following operative documents

- a. Trust Indenture
- b. Financing Agreement
- c. Bond Regulatory Agreement

and authorized the Executive Director, Director of Planning and Housing Development or the Chief Financial Officer to execute documents in final form so long as changes fell within the approved parameters of the documents as drafted.

Transaction summary as authorized

Fargo Housing and Redevelopment Authority, a North Dakota Housing Authority, demolished the existing 248-unit public housing complex known as the Lashkowitz Highrise and will replace it with the new construction of 110 units to be developed as a twin 4 percent/9 percent transaction. The 4 percent transaction, for which tax-exempt bonds will be issued, will consist of 83 units and comprise floors 2-4.

The remaining 27 units will be financed as a separate asset using 9 percent competitive credits and a taxable bond issuance. This transaction will remove units from public housing and replace with traditional affordable housing as part of a repositioning strategy.

Total development costs for the entire deal is nearly \$38.5 million with about a 25/75 percent split between the 9% and 4% cost allocations. The total tax credit equity investment is projected to be over \$16 million. Co Developers BlueLine Development and Fargo Housing And Redevelopment Authority, lender is LUMENT/ORIX Real Estate Capital, LLC, and Equity Investor WNC.

The 4% issuance has two series, a short term and long term. Series 2024A (18-yr maturity) and Series 2024B (paid off at conversion - earlier of 90% occupancy or 36 months)

The transaction is structured as a tax-exempt privately placed bond issuance, proceeds from which will be used for construction financing. The Agency has conditionally committed \$1,202,021 in 4% Low-Income Housing Tax Credits. A final determination of allocation will be based on total costs and allowable credit basis.

Final Issuance Summary

The bond transaction closed on August 12, 2024 with no substantial changes to final documents. Final issuance was \$15,500,000.

Bond Allocation Approval No. 24-02
\$8,132,000
State of North Dakota
North Dakota Housing Finance Agency
Multifamily Revenue Bonds
(Lashkowitz Riverfront 4) Series 2024A

\$7,368,000
State of North Dakota
North Dakota Housing Finance Agency
Multifamily Revenue Bonds
(Lashkowitz Riverfront 4) Series 2024B

REPORT OF ISSUANCE

Issuer: Industrial Commission of North Dakota, acting as the North Dakota Housing Finance Agency.

Description of Project or Program: Proceeds from the above-captioned bonds were lent to Lashkowitz Riverfront Four, LLLP, a North Dakota limited liability limited partnership (the "Borrower"), to finance a portion of the costs of the acquisition, construction and equipping by the Borrower of the Lashkowitz Riverfront Four, an 83-unit multifamily residential rental project located in Fargo, North Dakota.

Aggregate Principal Amount of Indebtedness Issued: Series 2024 in the amount of \$15,500,000, all of which requires volume cap.

Date of Issuance: August 12, 2024."

The second memo reads as follows:

“RE: **Summary Report on Issuance of Multifamily Revenue Bonds: Lashkowitz Riverfront 9**

On June 26, 2024 the Industrial Commission executed an Authorizing Resolution, authorizing the issuance of Multifamily Revenue Bonds (Taxable) not to exceed \$6,000,000 along with following operative documents

- a. Trust Indenture
- b. Financing Agreement

and authorized the Executive Director, Director of Planning and Housing Development or the Chief Financial Officer to execute documents in final form so long as changes are within the approved parameters of the documents as drafted.

Transaction summary as authorized

Fargo Housing and Redevelopment Authority, a North Dakota Housing Authority, demolished the existing 248-unit public housing complex known as the Lashkowitz Highrise and will replace it with the new construction of 110 units to be developed as a twin 4 percent/9 percent transaction. The 4 percent transaction, for which tax-exempt bonds will be issued, will consist of 83 units and comprise floors 2-4. The remaining 27 units will be financed as a separate asset using 9 percent competitive credits and a taxable bond issuance. This transaction will remove units from public housing and replace with traditional affordable housing as part of a repositioning strategy.

Total development costs for the entire deal is nearly \$38.5 million with about a 25/75 percent split between the 9% and 4% cost allocations. The total tax credit equity investment is projected to be over \$16 million. Co Developers BlueLine Development and Fargo Housing And Redevelopment Authority, lender is LUMENT/ORIX Real Estate Capital, LLC, and Equity Investor WNC.

The 9% issuance will have two series, a short term and long term. The total aggregate amount not to exceed a total principal amount of \$6,000,000 Series 2024A (18-yr maturity) and Series 2024B (paid off at conversion - earlier of 90% occupancy or 36 months)

The transaction is structured as a taxable privately placed bond issuance, proceeds from which will be used for construction financing. The Agency has conditionally committed \$724,000 in 9% Low-Income Housing Tax Credits which will bring in around \$6.1 million credit equity.

Final Issuance Summary

The bond transaction closed on August 12, 2024 with no substantial changes to final documents. Final issuance was \$6,000,000

\$2,196,500

State of North Dakota
North Dakota Housing Finance Agency
Multifamily Revenue Bonds
(Lashkowitz Riverfront 9) Series 2024A

\$3,803,500

State of North Dakota

North Dakota Housing Finance Agency
Multifamily Revenue Bonds
(Lashkowitz Riverfront 9) Series 2024B

REPORT OF ISSUANCE

Issuer: Industrial Commission of North Dakota, acting as the North Dakota Housing Finance Agency.

Description of Project or Program: Proceeds from the above-captioned bonds were lent to Lashkowitz Riverfront Nine, LLLP, a North Dakota limited liability limited partnership (the "Borrower"), to finance a portion of the costs of the acquisition, construction and equipping by the Borrower of the Lashkowitz Riverfront Nine, an 27-unit multifamily residential rental project located in Fargo, North Dakota.

Aggregate Principal Amount of Indebtedness Issued: Series 2024 in the amount of \$6,000,000.

Date of Issuance: August 12, 2024."

Ms. Kayla Axtman presented a report on the results of the 2024C \$200 million Tax Exempt Bond Sale. Since the beginning of 2023, the Federal Reserve has raised interest rates four times bringing the fed funds rate to 5.25% - 5.50%. In September 2024, the Federal Reserve began decreasing the fed funds rate with a decrease of 0.50%. During this time, the Agency had adjusted the tax exempt 30-year mortgage rate twelve times and continues to be well below the current market rate for a 30-year conventional loan. The average 30-year FHA mortgage rate is a 5.78% and the average 30-year conventional mortgage right now is 6.26%. For the past two months the Agency is averaging just over \$2 million a day in First Home (tax-exempt) reservations and approximately \$175,000 om daily Roots (taxable) reservations. Currently, the average total payment (principal, interest, taxes and insurance) for a First Home borrower is \$1,191 and \$1,932 for a Roots borrower.

Ms. Axtman presented for consideration of approval the authorization of a 2024 Supplemental Annual Series Resolution for issuance of up to \$250 million short-term Mortgage Revenue Bonds for Q4 2024. (The resolution can be found on the website).

It was moved by Commissioner Goehring and seconded by Attorney General Wrigley that the Industrial Commission authorize the 2024 Supplemental Annual Series Resolution for the issuance of up to \$250,000,000 in long-term Mortgage Revenue Bonds for Q4 of 2024 for the North Dakota Housing Finance Agency Home Mortgage Finance Program

On a roll call vote, Governor Burgum, Attorney General Wrigley, and Commissioner Goehring voted aye. The motion carried unanimously.

Ms. Axtman presented for consideration of approval the authorization of a 2025 Annual Series Resolution for issuance of up to \$750 million in long-term Mortgage Revenue Bonds and \$100 million in short-term Mortgage Revenue Bonds. (The resolution can be found on the website).

It was moved by Commissioner Goehring and seconded by Attorney General Wrigley that the Industrial Commission authorize the 2025 Annual Series Resolution for the issuance of up to

\$750,000,000 in long-term Mortgage Revenue Bonds and up to \$100,000,000 in short-term Mortgage Revenue Bonds for the North Dakota Housing Finance Agency Home Mortgage Finance Program

On a roll call vote, Governor Burgum, Attorney General Wrigley, and Commissioner Goehring voted aye. The motion carried unanimously.

Ms. Axtman presented for consideration of approval a review of RFP Results and Consideration of Approval for Selection of NDFHA Financial Advisor and Bond Counsel.

It was moved by Commissioner Goehring and seconded by Attorney General Wrigley that the Industrial Commission, upon review of the report of results of the Request for Proposal, and pursuant to the recommendation of the review committee, approve the selection of Caine Mitter & Associates as Financial Adviser to the Housing Finance Agency, and also approve the selection of Kutak Rock LLP as Bond Counsel to the Housing Finance Agency.

On a roll call vote, Governor Burgum, Attorney General Wrigley, and Commissioner Goehring voted aye. The motion carried unanimously.

OUTDOOR HERITAGE FUND

Ms. Brenna Jessen presented the Outdoor Heritage Fund Project Management and Financial Report. The Outdoor Heritage Fund is showing a cash balance of just over \$43.2 million dollars, and of that cash balance, \$38.5 million is committed with the vast amount of those funds going to existing projects and a small amount to administration. There is currently \$4.6 million uncommitted dollars, which exceeds the amount being requested of just over \$2.3 million between the four projects. Cumulatively, the Commission has approved 239 projects across the program since its inception, and today 77 of those projects are currently active and ongoing. The cumulative value that has been brought to the State of North Dakota is just over \$233 million dollars.

Mr. Tyler Dokken presented for consideration of approval the Outdoor Heritage Fund Advisory Board recommended projects for Grant Round 25:

- i. 25-1 (C) Mule Deer Foundation: Western Big Game Connectivity and Habitat Fragmentation, \$750,000
- ii. 25-5 (C) North Dakota Petroleum Foundation: Planting for the Future, \$220,177
- iii. 25-6 (B) Audubon Great Plains: North Dakota Grazing Management Toolbox, \$635,000
- iv. 25-10 (B) North Dakota Natural Resources Trust: Working Grasslands Partnership 7, \$762,500

It was moved by Commissioner Goehring and seconded by Attorney General Wrigley that the Industrial Commission accepts the recommendations of the Outdoor Heritage Fund Advisory Board, approves the following projects, and authorizes the Office of the Industrial Commission to enter into contracts for the following projects:

25-1 (C) Mule Deer Foundation: Western Big Game Connectivity and Habitat Fragmentation, \$750,000

25-5 (C) North Dakota Petroleum Foundation: Planting for the Future, \$220,177

25-6 (B) Audubon Great Plains: North Dakota Grazing Management Toolbox, \$635,000

25-10 (B) North Dakota Natural Resources Trust: Working Grasslands Partnership 7, \$762,500

On a roll call vote, Governor Burgum, Attorney General Wrigley, and Commissioner Goehring voted aye. The motion carried unanimously.

Ms. Jessen presented for consideration of approval an Outdoor Heritage Fund Advisory Board Recommendation for a special grant round for wildfire relief projects.

At the Outdoor Heritage Fund Advisory Board Meeting on October 24th, the Board voted in favor of holding a special grant round of the Outdoor Heritage Fund program for the purpose of funding Wildfire relief projects, contingent on the following items:

- Receipt of a proposal which meets Outdoor Heritage Fund requirements
- Review and approval of the proposal at a special meeting of the Outdoor Heritage Fund Advisory Board
- The special Outdoor Heritage Fund Advisory Board meeting will be scheduled in early 2025 after the North Dakota Treasurer's Office notifies the Office of the Industrial Commission that the remaining appropriation for the Outdoor Heritage Program has been deposited in the fund
- A needs assessment has been completed of the impacted areas and the funding of those needs have not been met by other relief funds

With the remaining funding currently available after funding the four projects that were just voted on and approved today, and the approximate \$4 million remaining appropriation for the Outdoor Heritage Fund for this biennium, there will be approximately \$6.2 million available. Any remaining funds after the Special Grant Round would still be available to other applicants for the OHF spring grant round, to be held after the completion of legislative session.

No motions were made, but guidance was given by the Commission members to the Office of the Industrial Commission and the Outdoor Heritage Fund Board Chairman.

NORTH DAKOTA TRANSMISSION AUTHORITY

Ms. Karen Tyler presented for consideration of approval to submit a comment letter to Stutsman County regarding a Zoning Ordinance proposal for a Transmission Line Set-back.

The comment letter reads as follows:

“RE: Stutsman County Zoning Ordinance – Setback of Electric, Gas or Liquid Transmission Infrastructure

The North Dakota Transmission Authority (NDTA) was created by the North Dakota Legislative Assembly in 2005 at the request of the North Dakota Industrial Commission. The NDTA's mission is to facilitate the development of transmission infrastructure in North Dakota. The NDTA was established to serve as a catalyst for new investment in transmission by facilitating, financing, developing and/or acquiring transmission to accommodate energy development. The NDTA is the builder of last resort, meaning private business has the first opportunity to invest in and/or build electric transmission lines.

As such, the NDTA has a keen interest in public policy impacting transmission planning, construction, and operation. The NDTA's interest is that adequate transmission infrastructure is built/maintained so

that the electric grid has ample capacity and proper access to maintain a reliable and resilient electric grid. Stutsman County's proposed setbacks of 2,600 feet from inhabited residences for electric, gas and liquid transmission lines is concerning for constructability, cost burdens on consumers, maintenance, energy independence, grid reliability and economic development.

Constructability: Even though North Dakota is a very rural state, setbacks of 2,600 feet from rural residences will create difficulty in locating transmission infrastructure. Utilities and landowners have a long history working together to plan and locate infrastructure so that lines are located to provide consumer safety, uniformly set (straight lines are preferred), with the least disruption to production agriculture and located so that access for maintenance is efficient. From a utility maintenance perspective, lines located along good roads facilitates the movement of large utility repair crews, especially important for storm restoration work. Construction of transmission line turns/corners adds a tremendous cost and exposure to projects, costs that are ultimately paid for by the consumers of electricity in North Dakota.

Cost Burdens on Consumers: Electric transmission construction is costly. From a pure cost perspective, the shortest distance from beginning to end would be the least expensive. While a straight line would be utopic, any effort to safely locate transmission line with minimal turns, guy wires, and corners will minimize cost of construction, exposure to weather events and ongoing maintenance costs.

Transmission Line Maintenance: Like other construction and agricultural equipment, utility line maintenance equipment is larger and heavier than ever before. The modern equipment enables utilities to repair and maintain the transmission lines more efficiently and effectively. Because of this equipment size, access to transmission infrastructure from township, county and state roads facilitates efficient and expeditious restoration and maintenance. The proposed setback of 2,600 feet would likely place transmission lines on minimum maintenance roads; creating difficulty in access and ultimately adding to restoration time and costs.

Energy Independence: North Dakota is fortunate to be an energy rich state. North Dakota has been a leader in mine-mouth coal electric generation, has developed significant wind energy farms and is a leader in oil & gas recovery. More recently, North Dakota has recognized great geology potential for carbon capture, an industry that could unlock significantly more oil/gas production.

In an unstable geo-political environment, these resources are more and more valuable to our nation's energy independence. From a more local perspective, the energy sector provides over 50% (and growing) of the state's tax revenue collections. While North Dakotans work to grow industry within the state to capitalize on the energy availability, North Dakota will remain an exporter of electricity, oil, and gas. Export capacity ultimately means more pipelines and more transmission lines, a good thing for North Dakota and our nation.

Grid Reliability: As we grow to depend more upon technology, the reliability of the grid is increasingly important for the safety and well being of our population. We've experienced cell phone interruptions in this fall, creating havoc for users. Grid interruptions go far beyond disrupting comfort and convenience – they are economically damaging and life threatening. . Businesses are unable to sell a carton of milk or a pair of gloves if the power is out. Moreover, many of our elderly are dependent on health care

equipment that requires power. Expanding and upgrading electric transmission backbone is vital for grid reliability...and locating and constructing the lines efficiently will yield long-term maintenance benefits.

More specifically, the 345kV JETx transmission project from Jamestown to Ellendale will create a “345kV transmission loop”. This looped system vastly improves the grid reliability for the City of Jamestown and surrounding area. Should a storm/fault impact the line, the power flow can come from the opposite direction.

Economic Development: Stutsman County has a long history of aggressive economic development from aerospace manufacturing and ag processing to data processing. Stutsman County is positioned well for further development. The automation of agriculture, automation of processing/manufacturing, smarter vehicles, and our insatiable appetites for information/data on our personal phones is driving data processing/AI demand. Further development, whether ag or data processing will require more electrical and natural gas capacity.

In conclusion, Stutsman County’s proposed setbacks of 2,600 feet from inhabited residences for electric, gas, and liquid transmission lines will be detrimental to constructability, affordability, maintenance, energy independence, grid reliability, and economic development and this proposal should be reconsidered. Utilities have had a long history of working closely with landowners to locate facilities thoughtfully for the safety and well-being of the community with cost awareness following.

Sincerely,

Claire Vigesaa”

It was moved by Commissioner Goehring and seconded by Attorney General Wrigley that the Industrial Commission approve the submission of a comment letter from the Executive Director of the North Dakota Transmission Authority to Stutsman County regarding a zoning ordinance proposal for transmission line set-back, subsequent to comment letter review by Commission members’ staff.

On a roll call vote, Governor Burgum, Attorney General Wrigley, and Commissioner Goehring voted aye. The motion carried unanimously.

BANK OF NORTH DAKOTA

Mr. Rob Pfennig gave a presentation of College SAVE Audit, December 31, 2023. The audit was a clean audit, and there were no recommendations or findings.

Mr. Jared Mack gave a presentation of North Dakota Student Loan Trust Audit, June 30, 2024. There were no findings or recommendations, and no internal control deficiencies that were determined to be material weakness or significant deficiency. No material non-compliance was identified, and there were no findings from the prior audit that needed correction.

Mr. Don Morgan gave a presentation of Third Quarter 2024 Performance Highlights. September’s assets came in at about \$10.7 billion and the loan portfolio was approximately \$6.1 billion. Commercial loans were lower than budgeted by about \$93 million mainly due to timing of state institution loans. There was increased activity in commercial participation in the Flex based program, particularly the AG loans, which were higher than budgeted by about \$53 million. Income year-to-date is \$151.9 million which is about \$6.8 million below budget.

Mr. Morgan presented for consideration of approval a Resolution designating a Depository of the Bank of North Dakota for the following Entities:

- i. Federal Home Loan Bank of Des Moines
- ii. JP Morgan Chase
- iii. US Bank
- iv. First Horizontal National
- v. Wells Fargo
- vi. Federal Reserve Bank (Open Accounts)
- vii. Federal Reserve Bank (Advances)

The memo reads as follows:

“On an annual basis the Bank of North Dakota must receive authorization from the Industrial Commission to execute with Depositories certain Resolutions and Certificates of Authorizations pertaining to officers authorized to act on behalf of the Bank. The following institutions are presented as Depositories for that purpose:

- i. Federal Home Loan Bank of Des Moines
- ii. JP Morgan Chase
- iii. US Bank
- iv. First Horizon National
- v. Wells Fargo
- vi. Federal Reserve Bank (Open Accounts)
- vii. Federal Reserve Bank (Advances)

The Governor as Chair of the Industrial Commission, the Industrial Commission Executive Director, and the authorized bank officers will execute the required Depository forms upon direction and authorization of the Commission.

The original executed Depository records will be held at the Bank of North Dakota.

The Executive Director respectfully requests approval for this action.”

It was moved by Attorney General Wrigley and seconded by Governor Burgum that the Industrial Commission approve the execution with Depositories certain Resolutions and Certificates of Authorizations pertaining to officers authorized to act on behalf of the Bank. The following institutions are presented as Depositories for that purpose:

- i. Federal Home Loan Bank of Des Moines**
- ii. JP Morgan Chase**
- iii. US Bank**
- iv. First Horizon National**
- v. Wells Fargo**
- vi. Federal Reserve Bank (Open Accounts)**
- vii. Federal Reserve Bank (Advances)**

Commissioner Goehring stepped out of the meeting so Governor Burgum requested the roll call vote take place after executive session so all three members could vote.

Mr. Don Morgan presented the Non-Confidential Committee and Advisory Board Minutes for the July and August meetings for the Commission member’s review.

It was moved by Attorney General Wrigley and seconded by Governor Burgum that under the authority of North Dakota Century Code Sections 6-09-35, 44-04-18.4, 44-04-19.1, 44-04-19.2, the Industrial Commission enter into executive session for the purpose of Bank of North Dakota confidential business and for the purpose of confidential business pertaining to the Pipeline Authority's capacity purchase program.

On a roll call vote Governor Burgum and Attorney General Wrigley voted aye. The motion carried.

The Commission is meeting in executive session regarding Bank of North Dakota confidential business pursuant to N.D.C.C. 6-09-35 and 44-04-19.2 to consider those items listed on the agenda under Bank of North Dakota confidential business. Only Commission members, their staff, Commission staff, and BND staff will participate in that executive session.

After the Bank of North Dakota confidential session, the Commission is meeting in executive session regarding Pipeline Authority confidential business pursuant to N.D.C.C. 44-04-18.4 to consider those items listed on the agenda. Only Commission members, their staff, Commission staff, Pipeline Authority staff and potential contract parties will participate in that executive session.

Any formal action taken by the Commission will occur after it reconvenes in open session.

Governor Burgum reminded the Commission members and those present in the executive session that the discussions must be limited to the announced purposes which is anticipated to last approximately 45 minutes.

The executive session began at approximately 3:20 p.m.

Meeting Closed to the Public for Executive Session Pursuant to NDCC 6-09-35, 44-04-18.4, 44-04-19.1 and 44-04-19.2.

BANK OF NORTH DAKOTA EXECUTIVE SESSION

Industrial Commission Members Present

Governor Doug Burgum
Attorney General Drew H. Wrigley
Agriculture Commissioner Doug Goehring

BND Members Present

Don Morgan
Kirby Evanger
Kelvin Hullet
Rob Pfennig

Others in attendance

John Reiten	Governor's Office
Jace Beehler	Governor's Office
Claire Ness	Attorney General's Office
Karen Tyler	Industrial Commission Office
Brenna Jessen	Industrial Commission Office

Erin Stieg

Industrial Commission Office

PIPELINE AUTHORITY EXECUTIVE SESSION

Industrial Commission Members Present

Governor Doug Burgum

Attorney General Drew H. Wrigley

Agriculture Commissioner Doug Goehring

Pipeline Authority Members Present

Justin Kringstad, Pipeline Authority

Others in attendance

Rob Johnson	WBI Energy
Mark Anderson	WBI Energy
John Reiten	Governor's Office
Jace Beehler	Governor's Office
Claire Ness	Attorney General's Office
Don Morgan	BND
Kelvin Hullet	BND
Kirby Evanger	BND
Rob Pfennig	BND
Karen Tyler	Industrial Commission Office
Brenna Jessen	Industrial Commission Office
Erin Stieg	Industrial Commission Office

The executive session ended at approximately 4:40 p.m. and the Commission reconvened in open session.

During the Bank of North Dakota executive session, the Commission discussed those items listed on the agenda under Bank of North Dakota confidential business.

During the Pipeline Authority executive session, the Commission discussed confidential business related to the Pipeline Authority's capacity purchase program.

No formal action was taken during either executive session.

PIPELINE AUTHORITY

Mr. Justin Kringstad gave a presentation of the Pipeline Authority Industry Update and Annual Report. It has been a challenging 2024 thus far with the availability of frac crews proving to be a disruption and impacting well completion numbers to the negative. Much focus has been placed on natural gas versus crude oil infrastructure. Currently North Dakota averages two trains per day moving crude oil out of the state with the remaining supply moving via pipeline.

Ms. Tyler reminded the Commission that a roll vote was needed for a Resolution designating a Depository of the Bank of North Dakota.

On a roll call vote, Governor Burgum, Attorney General Wrigley, and Commissioner Goehring voted aye. The motion carried unanimously.

LEGAL UPDATE

- A. Litigation updates were provided on the following matters:
 - i. EPA Mercury and Air Toxics Rule
 - ii. EPA Carbon Rule
 - iii. EPA Methane OOOO Rule
 - iv. EPA WOTUS
 - v. BLM Venting and Flaring Rule
 - vi. BLM Conservation Rule
 - vii. CEQ NEPA Phase 2 Rule
 - viii. NW Landowners v. State
- B. An update was provided on the following federal regulatory matter:
 - i. BLM Resource Management Plan – the State has submitted the Governor’s consistency review, which is the last step in the local protest process with the BLM. Upon BLM response, if the state is in disagreement, an appeal can be filed to the Director of the BLM and the states position will again be evaluated. There is no set timeframe for this response.
- C. An update was provided regarding a new lawsuit filed related to the Dakota Access Pipeline

OFFICE OF THE INDUSTRIAL COMMISSION

Ms. Tyler presented for consideration of approval the September 30, 2024, Industrial Commission meeting minutes.

It was moved by Commissioner Goehring and seconded by Attorney General Wrigley that the Commission approve the September 30, 2024, Industrial Commission meeting minutes.

On a roll call vote, Governor Burgum, Attorney General Wrigley, and Commissioner Goehring voted aye. The motion carried unanimously.

Ms. Tyler presented for consideration of approval the acceptance of Deputy Executive Director Reice Haase’s Resignation effective November 15, 2024 , and the direction for the Executive Director to hire a new Deputy Executive Director.

Governor Burgum and Commissioner Goehring shared their appreciation to Reice Haase and the work he has done for not only the Industrial Commission but the State of North Dakota during his time with the Commission. They wished Mr. Haase well on his future endeavors and stated their hope for him to stay connected with North Dakota and the energy industry.

It was moved by Commissioner Goehring and seconded by Attorney General Wrigley that the Commission accepts the resignation of the Deputy Executive Director effective November 15, 2024, and directs Director Tyler to hire a new Deputy Executive Director.

On a roll call vote, Governor Burgum, Attorney General Wrigley, and Commissioner Goehring voted aye. The motion carried unanimously.

With no further business, Governor Burgum adjourned the meeting of the Industrial Commission at 5:05 p.m.

North Dakota Industrial Commission

Brenna Jessen, Recording Secretary

Karen Tyler, Executive Director