INDUSTRIAL COMMISSION OF NORTH DAKOTA

Kelly Armstrong
Governor

Drew H. Wrigley
Attorney General

Doug Goehring
Agriculture Commissioner

Tuesday, January 28, 2025
Governor's Conference Room or Microsoft Teams – 12:30 pm
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+1 701-328-0950,,346842963#

I. Roll Call and Pledge of Allegiance

(approximately 12:35 pm)

II. State Energy Research Center, Office of the State Tax Commissioner, Bank of North Dakota - Enhanced Oil Recovery Forecast and Financial Analysis - Charlie Gorecki, CEO, EERC, Brian Kroshus, Tax Commissioner

A. Update on CO_2 Enhanced Oil Recovery Forecast prepared under Contract SERC-2019 Task 2 – Charlie Gorecki (Attachment 1)
B. Presentation of CO2-EOR Financial Analysis - North Dakota Tax Commissioner Brian Kroshus (Attachment 2)

(approximately 1:05 pm)

III. North Dakota Housing Finance Agency – Dave Flohr, Executive Director

A. **Consideration of Resolution Authorizing Volume Cap Carry Forward Procedures for NDHFA –** (Attachment 3, 3A)
B. Report on Authorizing Declaration of Intent to Issue Multifamily Revenue Bonds, Pleasant Valley TC Apartments Dickinson (Attachment 4)
C. Legislative Update
D. Other Housing Finance Agency Business

(approximately 1:15 pm)

IV. North Dakota Public Finance Authority – DeAnn Ament, Executive Director

A. **Consideration of Approval of the Following Loans:**
    i. City of Galesburg – Clean Water - $3,000,000 (Attachment 5)

ii. City of Grand Forks – Clean Water - $4,352,000 increase to previously approved $3,167,000 loan (Attachment 6)
iii. City of Beach – Drinking Water - $2,819,000 (Attachment 7)
iv. City of Fargo – Drinking Water - $12,050,000 increase to previously approved $23,950,000 loan (Attachment 8)

B. Presentation of Memo of State Revolving Fund Loans Approved by PFA Advisory Committee: (Attachment 9)
   i. City of Grafton – Clean Water - $750,000 (Attachment 9A)
   ii. City of Rhame – Drinking Water - $615,000 increase to previously approved $1,199,000 loan (Attachment 9B)
C. Legislative Update
D. Other Public Finance Authority Business

(approximately 1:30 pm)

V. Department of Mineral Resources – Nathan Anderson, Mark Bohrer

A. **Consideration of Approval of Recommended Orders in the Following Cases**:
   i. Order 34025 in Case 31325 - Application of Phoenix Operating LLC to amend order for Big Stone-Bakken Pool for overlapping 5120-acre spacing unit as described, authorize 1 horizontal well, and grant other relief as appropriate – (Attachment 10)
   ii. Order 34223 in Case 31502 – related to approval of transfer of Red Trail Richardton Ethanol Broom Creek Storage Facility #1 authorized and created by Order 31453 and transfer of RTE #10 well and RTE #10.2 well from Red Trail Energy LLC to Richardton CCS (Attachment 11)
B. Legislative Update
C. Other Department of Mineral Resources Business

(approximately 2:00 pm)

VI. North Dakota Pipeline Authority – Justin Kringstad, Executive Director

A. Overview of WBI Energy Transmission Bakken East Pipeline Non-Binding Open Season – (Attachment 12)
B. **Consideration of Approval of Letter of Support –** (Attachment 13)
C. Legislative Update
D. Other Pipeline Authority Business

(approximately 2:30 pm)

VII. Industrial Commission Oil and Gas Research Program Grant Round 61 Consideration of Approval of Projects Approved by the Oil and Gas Research Council – Brent Brannan, Erin Stieg

A. Presentation of Project Management and Financial Report (Attachment 14)
B. G-061-A: **Breaking New Ground in Flaring Reduction** – University of North Dakota Energy & Environmental Research Center; Total Project Cost $5,132,682; Request for: $2,566,341 (Attachment 15)
C. G-061-B: **Maximizing Lateral Well Oil Production from Conventional Carbonate Mission Canyon Reservoirs in North Dakota** – Cobra Oil & Gas Corporation Total Project Cost $2,000,000; Request for: $1,000,000 (Attachment 16)
D. G-061-C: **North Dakota Petroleum Foundation Outreach and Education Program** – North Dakota Petroleum Foundation; Total Project Cost $2,126,415; Request for: $930,245.00 (Attachment 17)
E. G-061-D: **Injection Testing with Propane to Inform Future Bakken CO2 EOR Pilot** – University of North Dakota Energy & Environmental Research Center; Total Project Cost $4,000,000; Request for: $1,800,000 (Attachment 18)
F. Legislative Update
G. Other Oil and Gas Research Program Business

(approximately 3:00 pm)

VIII. Legal Update* – Phil Axt, Matt Sagsveen, David Garner

A. Challenges to State Law:
   i. NW Landowners v. State
   ii. Summit Carbon Storage Appeal
B. Challenges to Federal Rules:
   i. EPA Mercury and Air Toxics Rule (DC Cir)
   ii. EPA Carbon Rule (DC Cir)
   iii. EPA Methane Tax Rule (DC Cir)
   iv. EPA Methane OOOO Rule (DC Cir)
   v. EPA PM2.5 Rule (DC Cir)
   vi. EPA Legacy CCR Rule (DC Cir)
   vii. EPA WOTUS Rule (DND)
   viii. EPA/DOT Vehicle Mandate Rules (DC Cir; CA6)
   ix. BLM Venting & Flaring Rule (CA8)
   x. BLM Conservation Rule (DND)
   xi. CEQ NEPA Phase 2 Rule (DND)
   xii. OSM 10-Day Notice Rule (DDC)

xiii. SEC GHG Disclosure Rule (CA8)

C. Interventions to Defend Against Federal Actions:
   i. DAPL Operation (DDC)

D. Other Federal Actions of Concern:
   i. BLM Resource Management Plan
   ii. EPA Inaction on State CCR Application

E. Other States' Actions of Concern:
   i. Minnesota Clean Power Plan
   ii. State Tort Lawsuits Targeting Fossil Fuel Use

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

(approximately 3:15pm)

IX. Bank of North Dakota – Don Morgan, Rob Pfennig, Craig Hanson

A. **Consideration of Approval of the 2025 BND Annual Budget – Rob Pfennig** (Attachment 19)
B. **Consideration of Approval of Amendments to BND Funds Management Policy – Rob Pfennig** (Attachment 20)
C. Presentation of Fourth Quarter 2024 Performance Highlights – Rob Pfennig (Attachment 21)
D. **Consideration of Approval of 2024 Ag Disaster Relief Loan Program – Craig Hanson** (Attachment 22)
E. Legislative Update
F. Presentation of November 20, 21, 2024 Non-Confidential Committee and Advisory Board Minutes (Attachment 23)
G. 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 4:00 pm)

X. Bank of North Dakota Executive Session – Don Morgan, Kirby Evanger, Craig Hanson, Kaylen Hausauer (online), Joel Erickson (online)

A. **Consideration of Approval of Two Loans – Don Morgan, Kaylen Hausauer, Joel Erickson** (Confidential Attachment 24, 25)

B. Ten-year Summary of Charge-Offs and **Consideration of Approval of Loan Charge-Offs and Recoveries YTD 12/31/2024 – Kirby Evanger** (Confidential Attachment 26)
C. **Consideration of approval of Determination of Uncollectable Loans – Kirby Evanger** (Confidential Attachment 27)
D. Presentation on Non-Accrual Loans Quarterly Recap/Detail – Kirby Evanger (Confidential Attachment 28)
E. Presentation of Problem Loans as of 11/30/2024 – Kirby Evanger (Confidential Attachment 29)
F. Presentation of Problem Loans – Adversely Classified Quarterly Recap – Kirby Evanger (Confidential Attachment 30)
G. Presentation of Off-Balance Sheet Risk Quarterly Recap – Kirby Evanger (Confidential Attachment 31)
H. Presentation of November 20, 21, 2024, Confidential Committee and Advisory Board Minutes (Confidential Attachment 32)
I. Other Bank of North Dakota Confidential Business

Meeting Returns to Public Session

XI. Action on Executive Session Items

(approximately 5:00 pm)

XII. Office of the Industrial Commission – Karen Tyler, Jordan Kannianen

A. **Consideration of December 12, 2024, and January 8, 2025, Industrial Commission Meeting Minutes** (Attachment 33)
B. Legislative Update
C. Other Office of Industrial Commission business

XIII. Adjournment

Next Meeting – February 19, 2025, 1:00 pm
Governor's Conference Room

Energy & Environmental Research Center (EERC)

Project Summary: North Dakota's Enhanced Oil Recovery Forecast and Financial Analysis

Originally Presented to
North Dakota Industrial Commission
Bismarck, North Dakota
January 28, 2025

Charlie Gorecki
CEO

CO_2 EOR Study Goals and Outcomes

- **Goal:** Forecast plausible CO_2 EOR development scenarios (5–20 million tons CO_2/year) in North Dakota's unconventional and conventional reservoirs over 20 years.

Bakken

- Incremental oil recoveries ranged from 337 million barrels (MMbbl) to 1 billion barrels (Bbbl) under low- and high-CO_2-availability scenarios, with an average of 694 MMbbl under the baseline CO_2 scenario of 10 million tonnes (MMt) CO_2/year.
- CO_2 supply demands ranged from 93 to 294 MMt, depending on the scenario.
- If EOR were operated to maintain higher CO_2-utilization rates or we achieved greater increased oil recovery (IOR) ratios, greater than 15 MMt CO_2/year would be needed (CO_2 supply constrained).

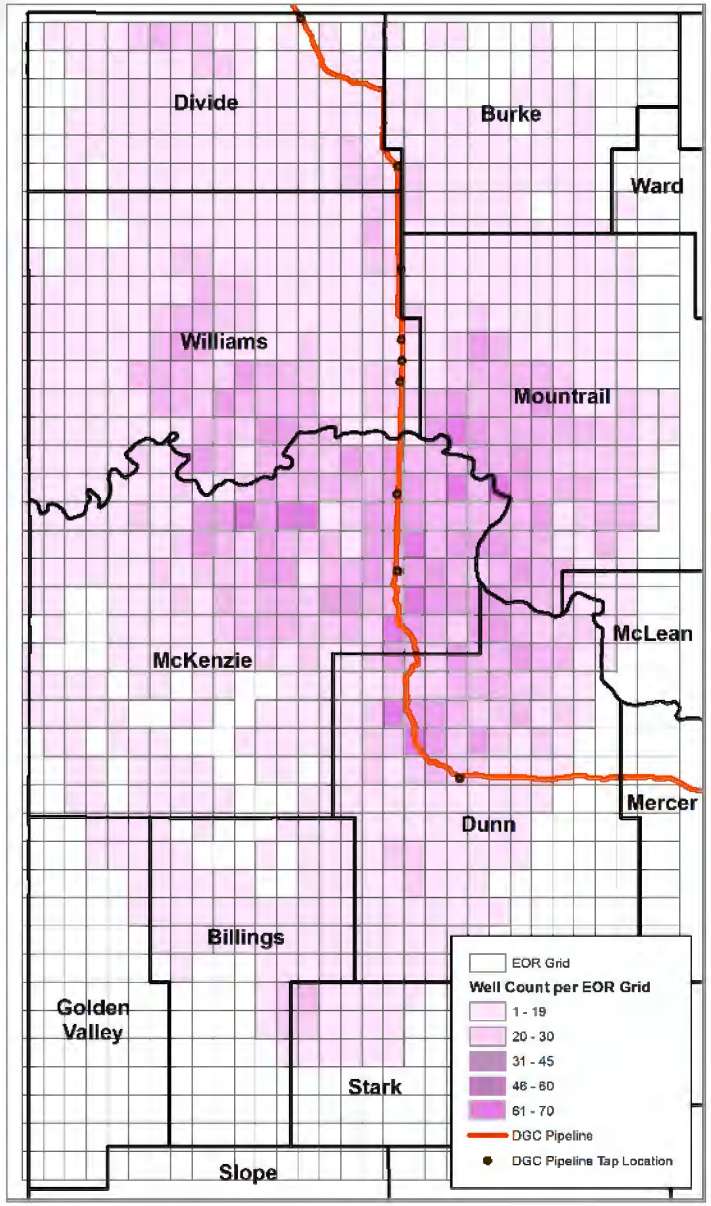
Conventional Reservoirs

- Incremental oil recoveries were 105 MMbbl, and CO_2 supply demand was 88 MMt.

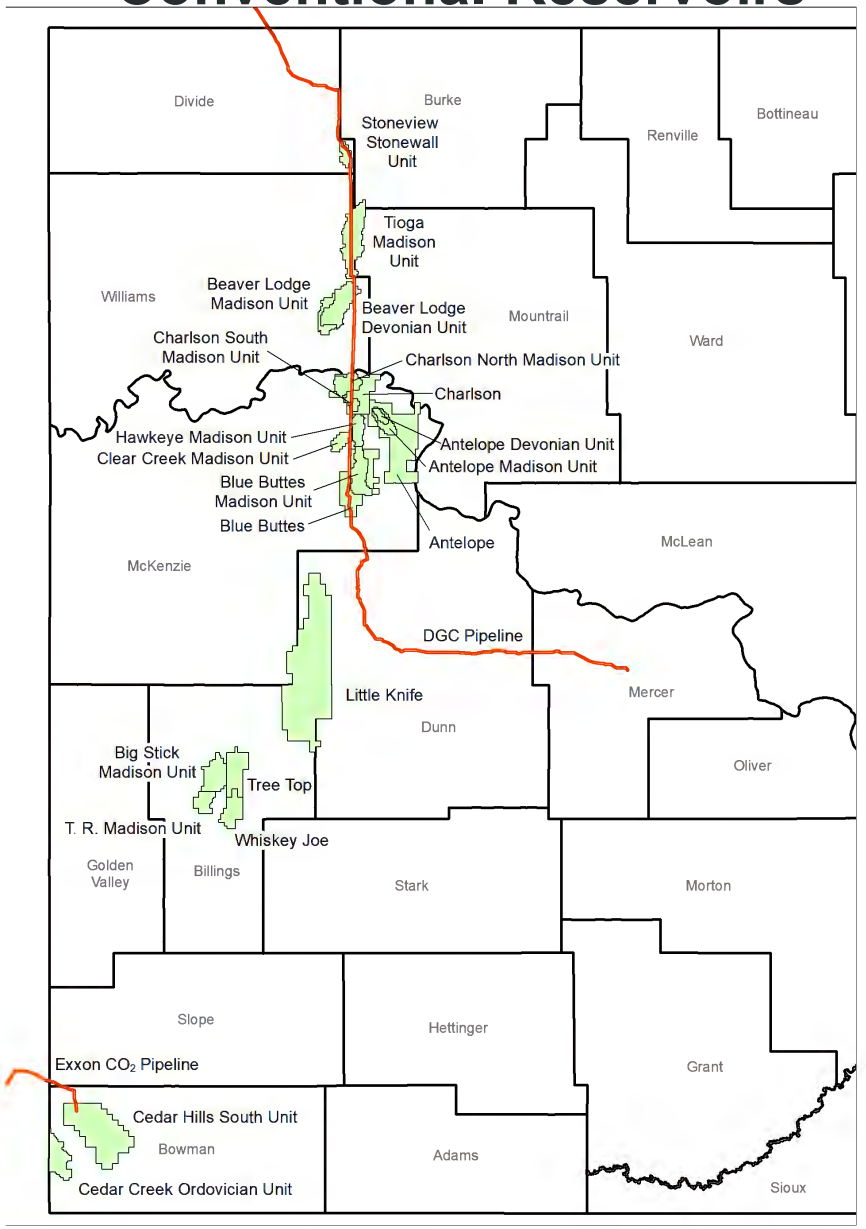
Bakken CO_2 EOR Development Assumptions

- **Baseline case:** CO_2 was limited to 10 MMt of CO_2/year. The baseline case assumed 6 thousand cubic feet (Mcf)/bbl (0.3 tonnes/bbl) and an IOR ratio of 1.3.
- **Low-/high-CO_2-availability cases:** Two additional sensitivity cases were considered using 50% less (5 MMt CO_2/year) and 50% more (15 MMt CO_2/year).
- **High-CO_2-utilization case:** The high-CO_2-utilization case used 3x more CO_2 per incremental barrel than the baseline case (17.3 Mcf/bbl, or 0.9 tonnes/bbl) to explore a scenario where operators were incentivized to store CO_2.
- **High-IOR case:** The high-IOR case increased the IOR from 1.3 to 1.6, and CO_2 utilization was 9.6 Mcf/bbl (0.5 tonnes/bbl).

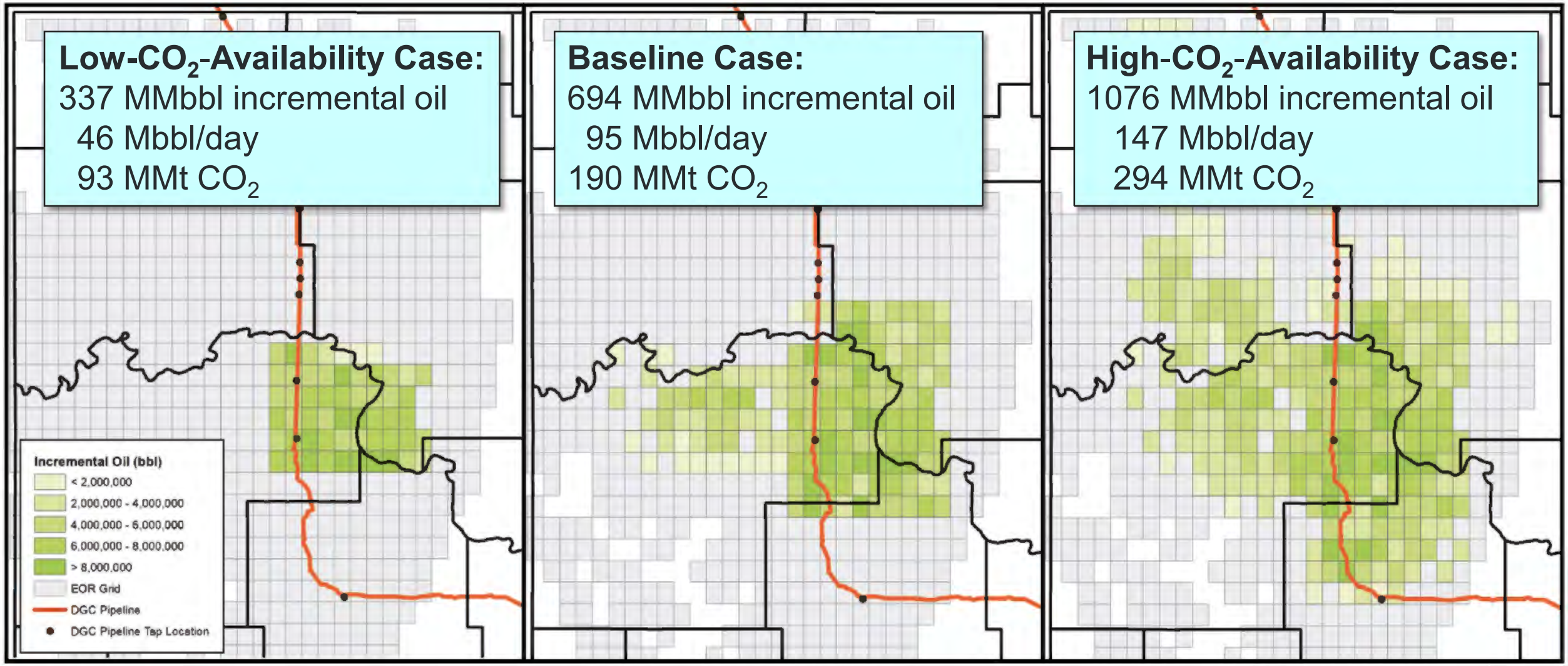
Bakken



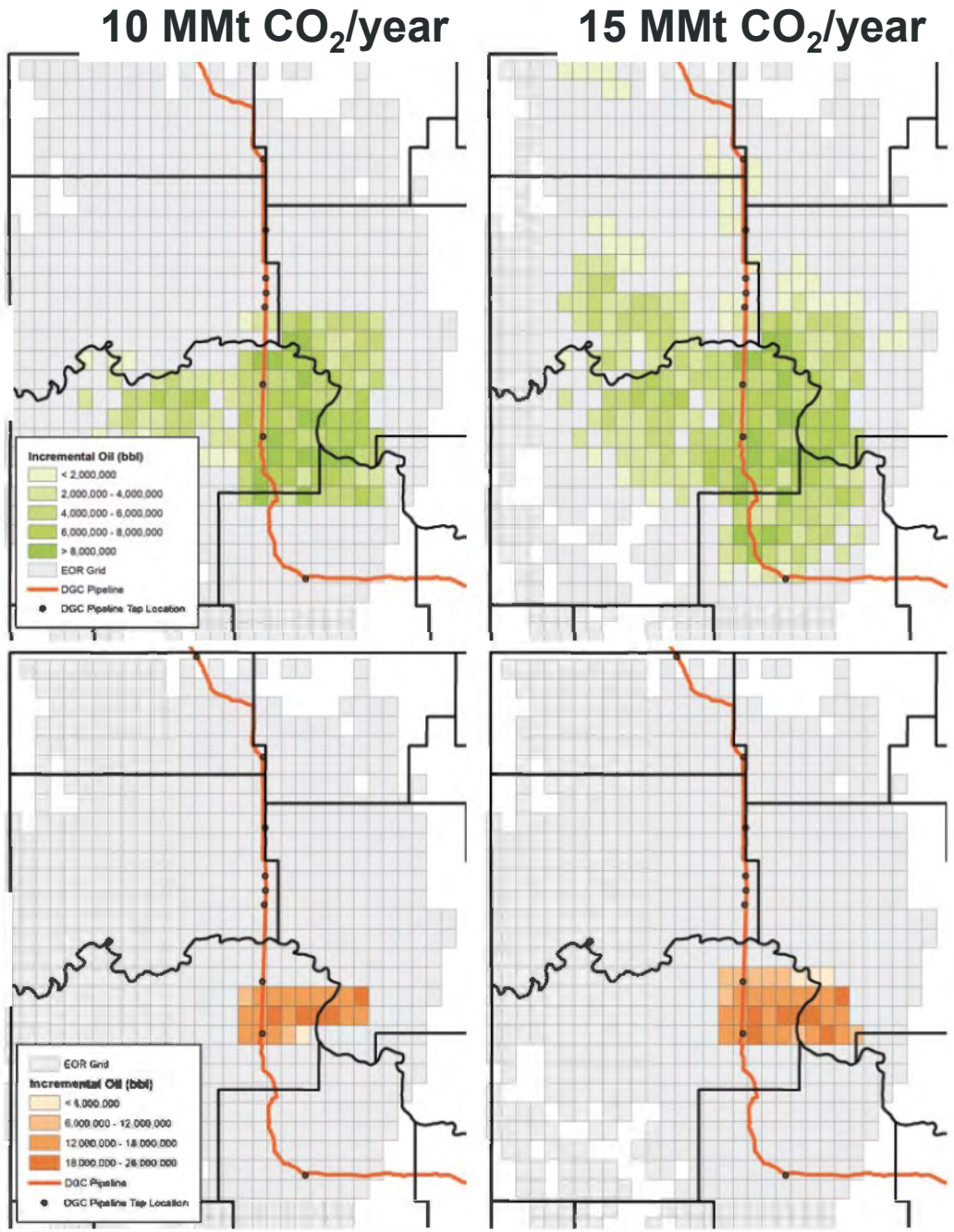
Conventional Reservoirs



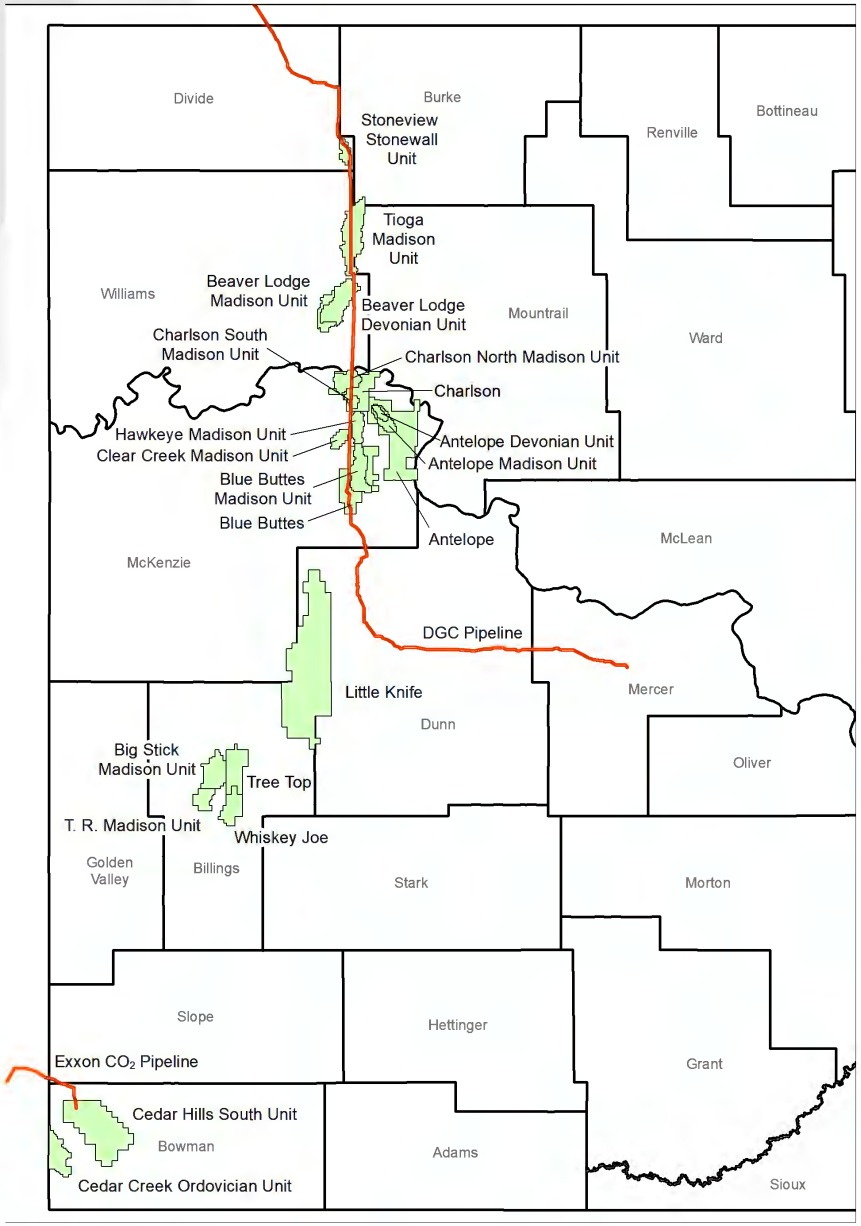
Bakken 20-Year CO_2 EOR Performance



Bakken CO_2 EOR Performance – Sensitivity



- High IOR/baseline:
  - 42 grids (69% decrease)
  - 295 MMbbl (58% decrease)
  - 172 MMt CO_2 (19% decrease)
- High IOR/high CO_2 availability:
  - 36 grids (86% decrease)
  - 513 MMbbl (52% decrease)
  - 269 MMt CO_2 (3% decrease)
- Similar results for the high-CO_2-utilization cases



Conventional 20-Year CO_2 EOR Performance

- Maximum daily oil rate: 23 Mbbl/day
- Average daily oil rate: 14 Mbbl/day
- Cumulative incremental oil production over 20 years: 105 MMbbl
- Maximum and average CO_2 utilization were 17,000 and 12,000 tonnes of CO_2/day, respectively
- Cumulative purchased CO_2 over 20 years: 88 MMt CO_2

Summary

Bakken

- Incremental oil recoveries over 20 years ranged from 337 MMbbl under a low-CO_2-availability scenario to 1 Bbbl under a high-CO_2-availability scenario, with an average of 694 MMbbl under the baseline CO_2 scenario of 10 MMt CO_2/year.
- CO_2 supply demands ranged from 93 to 294 MMt, depending on the scenario.
- Results show more than 15 MMt CO_2/year would be needed if EOR were operated to maintain higher CO_2-utilization rates or IOR ratios.
- Effectively optimizing Bakken EOR could use considerably more CO_2. Also, 10,000 new Bakken wells are expected to be drilled over the 20-year period of this study, which were not included in these EOR scenarios.
- Next-generation EOR will likely be able to produce even higher IOR than postulated in this study, requiring even more CO_2.

Conventional Reservoirs

- Incremental oil recoveries over 20 years were estimated at 105 MMbbl.
- CO_2 supply demand was estimated at 88 MMt CO_2.

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THANK YOU

Critical Challenges. Practical Solutions.

Attachment 2

North Dakota CO_2-EOR Financial Analysis

November 15, 2024

Summary

The following document explores and evaluates various financial considerations related to CO2-EOR in North Dakota, potential synergies across multiple energy-sectors, and the influence policy will have on future CO2-based tertiary efforts in the state.

The U.S. Geological Survey estimates that up to 3.3 billion barrels of undiscovered, technically recoverable oil are in the Bakken formation, with much of that oil in North Dakota. CO2-EOR can play a central role in the recovery of these untapped resources.

By: Brian Kroshus
North Dakota Tax Commissioner

Table of Contents

Introduction

Enhanced oil recovery (EOR) development in North Dakota utilizing CO_2, particularly from CO_2 feedstocks sourced from in-state coal conversion facilities, biofuel plants and synfuels production, represents a significant economic opportunity.

Supporting and further enhancing an already favorable economic and regulatory environment to encourage CO_2-EOR versus CO_2 sequestration and permanent, geologic storage, will require evaluating both existing and new policy offerings to mitigate the current $25 differential between two of the three primary 45Q tax credit incentives currently available.

These incentives and economics on the surface favor sequestration over enhanced oil recovery. However, state policy from both a tax and regulatory perspective at least in part, holds the potential to offset the monetary gap and positively influence adoption of CO_2-EOR within our borders, promoting new, long-term capital investment in North Dakota.

From an industry perspective, beyond production-related economics, CO_2-EOR can play a key role in addressing and meeting corporate sustainability objectives, serving as a valuable extension of existing ecocentric practices.

Both internal and external factors will invariably influence CO_2 usage patterns. They include commodity pricing, other investment and capital deployment opportunities, and the regulatory and tax policy environment at the federal, state and local levels.

Further, recognizing the importance of fostering an environment that supports effective public-private partnerships and working collaboratively with tribal interests, is essential.

Arguably, CO_2-EOR in conjunction with existing energy resources in the state signifies the next chapter of oil production in North Dakota. For industry and public sector alike, there exists the potential to further monetize current oil, lignite, and biofuel energy infrastructure.

As North Dakota evaluates a path forward, it is important to recognize other oil and gas producing states including Texas, Oklahoma, New Mexico, and in proximity to North Dakota, Wyoming, are also actively positioning and competing to attract the same CO_2 supplies and capital investment dollars necessary to advance CO_2-EOR projects within their respective geographies.

To counter that reality, new incentive opportunities from a tax policy perspective to complement existing mechanisms and encourage CO_2-EOR and supporting infrastructure development, may be required to attract in-state capital investment for conventional and unconventional oil production alike, where CO_2-EOR is deemed economically viable and applied.

Further, supporting the development of critical CO_2 transportation infrastructure necessary to move feedstock from point-of-capture to application in North Dakota oil fields, will also play an important role in advancing CO_2-EOR efforts in the state.

The ability to establish greater CO_2 supply assurances necessary for industry to justify capital investment within and outside the Bakken, will be an essential element in the level of success experienced. Potential in-state supplies of CO_2 are optimal in the sense they support multiple industrial energy segments including oil, lignite, and agriculture, each playing an important role in the state's economy.

In essence, state regulatory and tax policy as previously mentioned will play a key role in advancing CO_2-EOR in what can best be described as a rapidly developing and highly competitive landscape.

It is important to emphasis that the benefits of CO_2-EOR are not exclusive to the production of oil. North Dakota's fleet of coal-fired plants in proximity to the Bakken and lone synfuels plant, Dakota Gasification, are also strategically positioned to benefit from the application of CO_2-EOR as suppliers and sellers of CO_2. That in turn supports the advancement of carbon capture technology and ultimately, implementation of CO_2-EOR.

North Dakota, with its diverse energy resource portfolio, is arguably more strategically positioned to implement CO_2-EOR in comparison to other oil-producing states, again in large part due to proximity and volume of interrelated energy resources.

While CO_2 transport challenges from an infrastructure placement standpoint currently exist, the ability to move feedstock from point-of-capture to actual use, while not entirely removed, is arguably less pronounced due to the relatively short distance between in-state supplies of CO_2 and oil field application.

North Dakota is in a unique position in that it also has very favorable geology for the sequestration and permanent storage of CO_2. Still, an equally compelling if not stronger argument to support CO_2-EOR can be made, the latter providing a broader and in effect, more favorable long-term economic platform to support incremental production in the Bakken. That in turn provides an attractive return on investment not only in the state, but nation from an energy production and security perspective.

Ultimately, the potential to sustain and increase oil production in North Dakota and subsequently, support and bolster associated revenue collections resulting from carbon capture and EOR, is significant. However, for that to become a reality, it is essential that the economic potential of CO_2-EOR exceeds sequestration.

Conversely, the opportunity cost and loss in potential revenue if sequestration instead displaces CO_2-EOR, particularly in oil-producing states like North Dakota, cannot be overlooked as the following analysis explains.

CO_2 EOR Incentives and Infrastructure by State

As previously noted, effectively competing for investment dollars targeted for carbon capture and transportation, whether from existing industry reserves or venture capital groups, will be paramount in determining the level of success experienced in North Dakota.

In many respects, North Dakota already heavily incentivizes utilizing CO_2 for EOR development. Numerous tax incentives currently exist to support CO_2-EOR, including as specified in NDCC § 57-51.1-02:

- Incremental production from a qualifying tertiary recovery project is exempt for a period of 10 years.
- Incremental production from a qualifying tertiary recovery project located outside the Bakken or Three Forks formations and that injects more than fifty percent carbon dioxide produced from coal, is exempt for twenty years from the date incremental production begins.
- Incremental production from a qualifying tertiary recovery project located within the Bakken or Three Forks formations and that injects more than fifty percent carbon dioxide produced from coal, is exempt for ten years from the date incremental production begins.

Beyond CO_2-EOR incentives, North Dakota exempts low-producing or marginal wells from the oil extraction tax. These wells, often referred to as "stripper wells," can qualify for tax-reduction incentives based on production and location criteria and then be exempt from the state's oil extraction tax for the remaining life of the well, once designated as a stripper well by the North Dakota Industrial Commission. While not necessarily a direct CO_2-EOR incentive, the net effect is still the same through elimination of the extraction tax obligation.

Additionally in North Dakota, the oil extraction tax rate for restimulated wells, identified as previously completed and producing oil and subsequently treated with an application of fluid under pressure for the purpose of creating additional fractures in a targeted geological formation outside the Bakken and Three Forks formations, is reduced from 5% to 2%,

effective for the first 75,000 barrels (bbl) or 18 months, whichever occurs first, after restimulation is complete.

To encourage carbon capture projects and development of infrastructure to support EOR, state policy provides a sales and use tax exemption for materials used in compressing, gathering, collecting, storing, transporting, or injecting carbon dioxide for secure geological storage or use in enhanced recovery of oil or natural gas (NDCC § 57-39.2-04.14) The incentive is broad-based in nature, applying not only to primary pipeline transportation projects but oilfield distribution networks as well.

For projects to be exempt under NDCC § 57-39.2-04.14, tangible personal property must be incorporated into a system used to compress, gather, collect, store, transport, or inject carbon dioxide for secure geologic storage or use in enhanced recovery of oil or natural gas.

Tangible personal property to replace an existing system to compress, gather, collect, store, transport, or inject carbon dioxide for secure geologic storage or use in enhanced recovery of oil or natural gas qualifies as sales tax exempt if the replacement creates an expansion of the original system.

Additionally, a CO_2 pipeline project exemption as specified in NDCC § 57-06-17.1, exempts property, not including land, from taxation during construction and for the first 10 full taxable years following initial operation. Associated equipment necessary for the transportation or storage of CO_2 for secure geological storage or for use in enhanced recovery of oil or natural gas, is also exempt.

Finally, under NDCC § 57-39.2-04.49, Gross receipts from sales of carbon dioxide used for enhanced recovery of oil or natural gas, or secure geologic storage, are exempt from sales tax.

Similarly, other oil-producing states in the U.S. are also aggressively positioning and engaging in policy discussions to incentivize CO_2-EOR within their borders and capture market share.

Virtually all oil producing states in the U.S. currently have mechanisms in place to address low-price cycles for crude oil, similar to previous North Dakota statute which established a low-price trigger and subsequent suspension of the oil extraction tax during market downturns to protect oil producers in the state. While the low-price trigger protection was repealed by North Dakota lawmakers in exchange for a permanent reduction in the extraction tax rate, from 6% to 5%, that same concept is still applicable in other states.

In Texas, the Texas Railroad Commission, the counterpart to North Dakota Public Service Commission, has the authority to incentivize CO_2-EOR projects. Under their current incentive, the producer of oil recovered through a CO_2-EOR project that qualifies, is entitled to an additional 50% reduction in the oil tax rate in Texas if in the recovery of the oil the EOR project uses CO_2 that:

- Is captured from an anthropogenic source in this state;
- Would otherwise be released into the atmosphere as industrial emissions;
- Is measurable at the source of capture; and
- Is sequestered in one or more geological formations as part of the enhanced oil recovery process

Other states, like Wyoming, continue to actively pursue new legislation to support CO_2-EOR development, to effectively compete for regional supplies of CO_2.

In some cases, CO_2 transportation infrastructure designated for CO_2-EOR is already operational, including the Kinder Morgan Cortez Pipeline, delivering approximately 800 million cubic feet or 22,654 metric tonnes of naturally occurring CO_2 daily from the McElmo Dome site in southwest Colorado to oil fields in the Permian Basin in New Mexico and West Texas. Incremental oil production attributed to that project is approximately 50,000 barrels per day (bbl/d).

Active CO_2-EOR projects in North Dakota include the Denbury CO_2 pipeline, stretching 105 miles from Wyoming to Southeast Montana and Southwest North Dakota, targeting the Cedar Creek Anticline.

Additionally, Dakota Gasification Company, a subsidiary of Basin Electric Power Cooperative, has been transporting CO_2 since October 2000 from the Great Plains Synfuels Plant through a 205-mile pipeline operated by Souris Valley Pipeline, Ltd. to the Weyburn-Midale oil fields in Canada, currently shipping up to 155 million cubic feet, or 4,389 tonnes of CO_2 daily for EOR.

In 2022, Red Trail Energy located outside of Richardton began operating North Dakota's first CO_2 storage well in June of 2022. Preceding that effort, test wells were drilled in Mercer and Oliver counties located in North Dakota, in 2018 to study the geologic potential for CO_2 sequestration sourced from North Dakota coal-conversion facilities.

While CO_2-EOR production accounts for only a small fraction of oil currently produced in the U.S. and even globally, new CO_2-EOR policy and projects as previously mentioned continue to be actively explored both in North Dakota and throughout the U.S.

While advancements in carbon capture technology and associated capital investment are rightfully at the forefront of the discussion, the ability to secure, transport and distribute economically viable volumes of CO_2 necessary to support large-scale CO_2-EOR is equally important, particularly from a North Dakota perspective given the opportunity to link multiple energy industry segments to one another.

In summary, North Dakota energy resources and current policy, will serve as a benchmark for future discussions supporting the advancement and application of CO_2-EOR in the state.

Economic Analysis – Current Oil and Gas Collections

Economic estimates are often constructed from a direct or linear, incremental gains' perspective, with limited focus placed on opportunity cost. In evaluating the application and potential economic benefit of CO_2-EOR in North Dakota, it not only has the potential to provide incremental benefits to the state as referenced, but equally important, help preserve existing production levels and associated revenue streams.

That latter aspect or preservation will be particularly evident during periods of oil price declines, whether cyclical or due to unanticipated market conditions, unfavorable supply and demand dynamics, or consequential geopolitical events.

The North Dakota Legislature, recognizing the finite nature of oil resources in the state, has established various reserve funds, most notably the Legacy Fund, intended to benefit future generations by protecting revenue streams should production levels drop below the current range.

Until that time, however, oil production and associated revenue collections in the state can be better optimized through strategic initiatives intended to improve recovery rates in western North Dakota, including CO_2-EOR.

As an energy producing state, North Dakota relies heavily on oil-related revenue to fund state and local government both within and beyond oil producing counties. Oil production and extraction tax collections alone are substantial, most recently exceeding $3 billion in FY2023 and FY2024 respectively, as illustrated in Figure 1. Beyond those collections, associated economic activity plays a vital role in supporting the state's economy, covered later in this document.

As shown on the following graph, oil revenue collections in aggregate over just the past decade, equate to $23 billion.

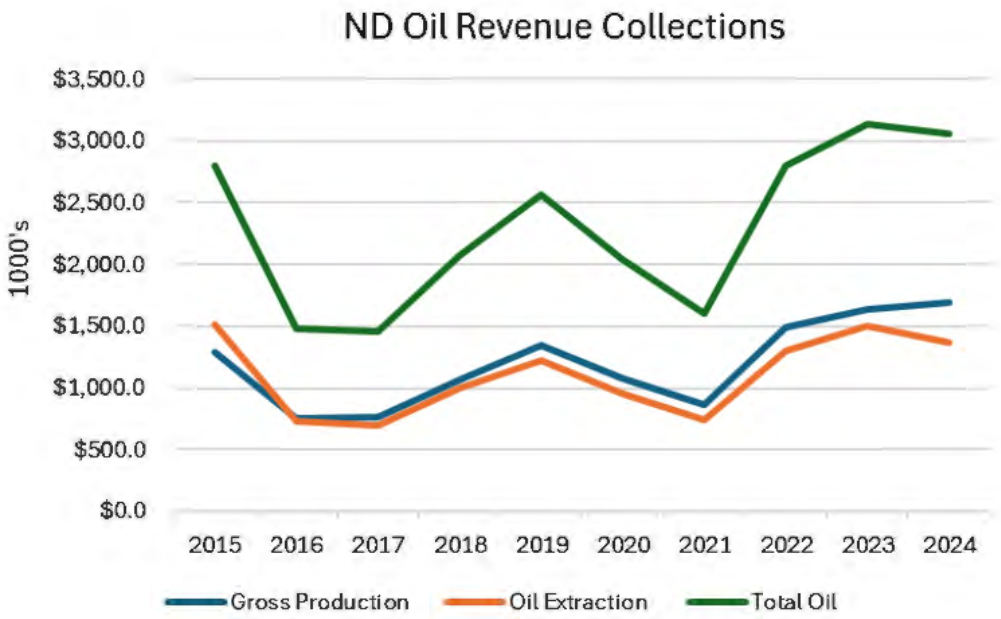

Figure 1

Figure 1 underscores the financial significance associated with oil production in North Dakota and illustrates the impact cyclical pricing, particularly price spikes and declines at various times (Figure 2), predictably has on revenue collections. This is most pronounced during the 2016-2017, 2020 and 2022 timeframes.

Figure 2

As noted, CO_2-EOR efforts have the potential to increase revenue collections, but equally importantly, preserve existing revenue streams by mitigating market-influenced price declines that inhibit drilling activity and subsequently, negatively impact production.

Historically, the ability to increase or maintain oil production levels in North Dakota has predominately correlated to drilling activity and the introduction of new wells. Absent that, output predictably declines due to high depletion rates experienced by wells drilled in shale plays like the Bakken, often exceeding 50% during the first year of production and falling below 10% of initial production, within 5 to 7 years.

Figure 3 illustrates shifts in economic value or revenue collected from a production and extraction tax standpoint, between 2014 and 2023, for every 100,000 bbl produced. The economic impact shown underscores the importance of maintaining production, particularly when oil prices are depressed over prolonged periods of time.

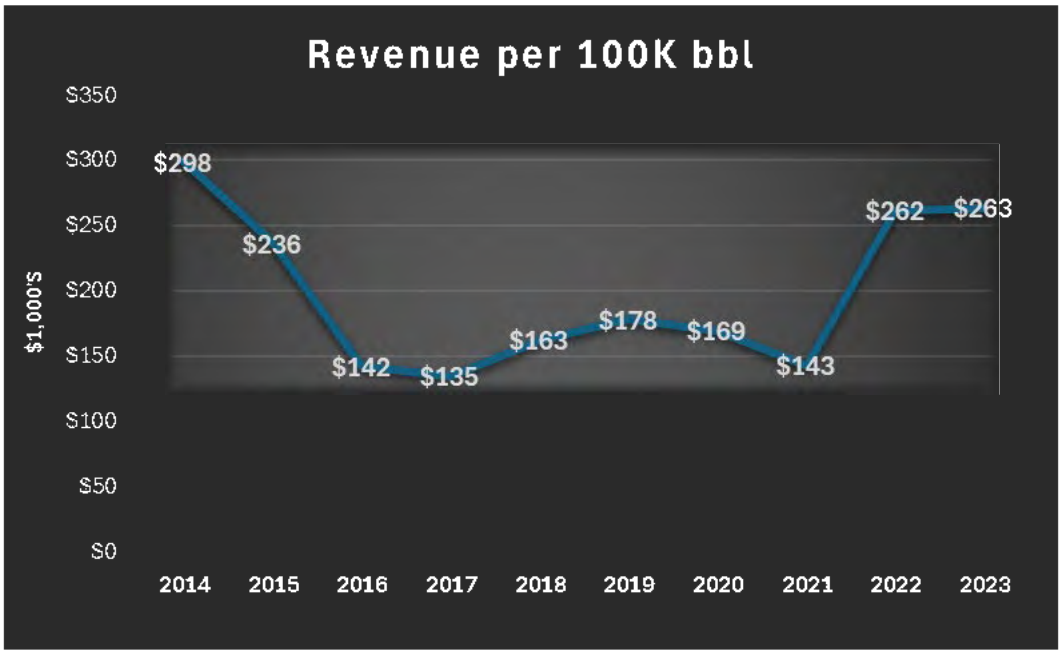

Figure 3

CO_2-EOR Fiscal Impact

Future commodity pricing combined with input costs including the cost of CO_2 itself, will significantly influence the degree of opportunity producers have to pursue CO_2-EOR. Unlocking additional crude oil from existing wells in inventory, reflected in the CO_2-EOR single well revenue models shown in Tables 2-5 to follow, demonstrate the revenue potential to the state, primarily from oil production tax collected on incremental barrels produced, based on different incentive scenarios including:

- 5-year extraction tax exempt models
- 10-year extraction tax exempt models

Models are formulated using the same, single well production estimates over the first 10 years following initiation of CO_2-EOR. Twenty-year and low producing, or stripper well models, are not calculated due to relatively immaterial, residual oil output and respective collections beyond the 10-year mark, resulting from rapid depletion rates associated with and prevalent in shale plays.

The following calculations (Tables 2-5) are based on oil pricing estimates over both 5-year and 10-year timeframes, using the U.S. Energy Information Administration (EIA) price outlook for Brent Crude as of June 2024 (Table 1) for the years 2028-2037 and for comparative purposes, applying an average net price of $80.00/bbl for Bakken crude.

U.S EIA Price Estimates/bbl – June 2024

Year range	Brent crude price projections (ave.)*	WTI after discount to Brent (3%)	Bakken discount to WTI ($3.75-$2.65)	Net price to Bakken producers
2025-2029	$61.00	$59.17	$3.20	$55.97
2030-2034	$73.00	$70.81	$3.20	$67.61
2035-2039	$80.00	$77.60	$3.20	$74.40
2040-2044	$87.00	$84.39	$3.20	$81.19
2045-2049	$91.00	$88.27	$3.20	$85.07
2050	$95.00	$92.15	$3.20	$88.95

Table 1

Net prices reflected in Table 1 and received by Bakken producers are extrapolated from EIA Brent price projections, applying a 3% discount to approximate the price for West Texas Intermediate and assuming an additional average discount rate of $3.20/bbl for Bakken crude, to determine net price.

Single Well CO_2-EOR – 10 yr. extraction tax exempt

Based on EIA 2028-2037 Price Estimates (Table 1)

	Total Annual Production bbl	Legacy Production bbl	Incremental Production bbl	Ave. price Bakken Crude	Incremental Production Tax Revenue	Incremental Extraction Tax Revenue	Total Incremental Revenue
yr 1	71,781	9,211	62,570	$55.97	$175,102	$0	$175,102
yr 2	45,192	7,375	37,817	$55.97	$105,831	$0	$105,831
yr 3	33,222	5,905	27,317	$67.61	$92,345	$0	$92,345
yr 4	20,043	4,728	15,315	$67.61	$51,772	$0	$51,772
yr 5	12,911	3,785	9,126	$67.61	$30,850	$0	$30,850
yr 6	8,719	3,030	5,689	$67.61	$19,232	$0	$19,232
yr 7	6,016	2,426	3,590	$67.61	$12,136	$0	$12,136
yr 8	4,148	1,943	2,205	$74.40	$8,203	$0	$8,203
yr 9	3,010	1,555	1,455	$74.40	$5,413	$0	$5,413
yr 10	1,732	1,392	340	$74.40	$1,265	$0	$1,265
Total	**206,774**	**41,350**	**165,424**		**$502,149**	**$0**	**$502,149**

Table 2

Single Well CO_2-EOR - 10-yr. extraction tax exempt

Based on 10 yr. average price of $80

	Legacy Production bbl	Incremental Production bbl	Total Annual Production bbl	Ave. price Bakken Crude	Incremental Production Tax Revenue	Incremental Extraction Tax Revenue	Total Incremental Revenue
yr 1	9,211	62,570	71,781	$80.00	$250,280	$0	$250,280
yr 2	7,375	37,817	45,192	$80.00	$151,268	$0	$151,268
yr 3	5,905	27,317	33,222	$80.00	$109,268	$0	$109,268
yr 4	4,728	15,315	20,043	$80.00	$61,260	$0	$61,260
yr 5	3,785	9,126	12,911	$80.00	$36,504	$0	$36,504
yr 6	3,030	5,689	8,719	$80.00	$22,756	$0	$22,756
yr 7	2,426	3,590	6,016	$80.00	$14,360	$0	$14,360
yr 8	1,943	2,205	4,148	$80.00	$8,820	$0	$8,820
yr 9	1,555	1,455	3,010	$80.00	$5,820	$0	$5,820
yr 10	1,392	340	1,732	$80.00	$1,360	$0	$1,360
Total	**41,350**	**165,424**	**206,774**		**$661,696**	**$0**	**$661,696**

Table 3

Single Well – CO_2-EOR – 5 yr. extraction tax exempt

Based on EIA 2028-2037 Price Estimates (Table 1)

	Total Annual Production bbl	Legacy Production bbl	Incremental Production bbl	Ave. price Bakken Crude	Incremental Production Tax Revenue	Incremental Extraction Tax Revenue	Total Incremental Revenue
yr 1	71,781	9,211	62,570	$55.97	$175,102	$0	$175,102
yr 2	45,192	7,375	37,817	$55.97	$105,831	$0	$105,831
yr 3	33,222	5,905	27,317	$67.61	$92,345	$0	$92,345
yr 4	20,043	4,728	15,315	$67.61	$51,772	$0	$51,772
yr 5	12,911	3,785	9,126	$67.61	$30,850	$0	$30,850
yr 6	8,719	3,030	5,689	$67.61	$19,232	$19,232	$38,463
yr 7	6,016	2,426	3,590	$67.61	$12,136	$12,136	$24,272
yr 8	4,148	1,943	2,205	$74.40	$8,203	$8,203	$16,405
yr 9	3,010	1,555	1,455	$74.40	$5,413	$5,413	$10,825
yr 10	1,732	1,392	340	$74.40	$1,265	$1,265	$2,530
Total	**206,774**	**41,350**	**165,424**		**$502,149**	**$46,248**	**$548,396**

Table 4

Single Well CO_2-EOR– 5-yr. extraction tax exempt

Based on 10 yr. average price of $80.00

	Total Annual Production bbl	Legacy Production bbl	Incremental Production bbl	Ave. price Bakken Crude	Incremental Production Tax Revenue	Incremental Extraction Tax Revenue	Total Incremental Revenue
yr 1	71,781	9,211	62,570	$80.00	$250,280	$0	$250,280
yr 2	45,192	7,375	37,817	$80.00	$151,268	$0	$151,268
yr 3	33,222	5,905	27,317	$80.00	$109,268	$0	$109,268
yr 4	20,043	4,728	15,315	$80.00	$61,260	$0	$61,260
yr 5	12,911	3,785	9,126	$80.00	$36,504	$0	$36,504
yr 6	8,719	3,030	5,689	$80.00	$22,756	$22,756	$45,512
yr 7	6,016	2,426	3,590	$80.00	$14,360	$14,360	$28,720
yr 8	4,148	1,943	2,205	$80.00	$8,820	$8,820	$17,640
yr 9	3,010	1,555	1,455	$80.00	$5,820	$5,820	$11,640
yr 10	1,732	1,392	340	$80.00	$1,360	$1,360	$2,720
Total	**206,774**	**41,350**	**165,424**		**$661,696**	**$53,116**	**$714,812**

Table 5

Using the single well production model provided by the Energy & Environmental Research Center (EERC) North Dakota 20-year CO_2-EOR Forecast, incremental tax revenues generated on a per well basis range from $502,149 to $714,812 (Table 6) over the initial 10-year period of production following commencement of CO_2-EOR, depending on various pricing scenarios for crude oil.

Single Well CO_2-EOR - Revenue Model Comparisons

Single Well Revenue Model	Incremental Production Tax Revenue	Incremental Extraction Tax Revenue	Total - Single Well
EOR 10-year model - EIA Pricing	$502,149	$0	$502,149
EOR 10-year model - $80.00 WTI	$661,696	$0	$661,696
EOR 5-year model - EIA Pricing	$502,149	$46,248	$548,396
EOR 5-year model - $80.00 WTI	$661,696	$53,116	$714,812

Table 6

Applying the single well model to the estimated 271 grids and 5,744 associated EOR wells targeted in the EERC study, under the high-case scenario and current stripper well count in North Dakota as of July 2024 (12,515), in conjunction with EIA price estimates for Brent crude as illustrated in Tables 2 and 4 and average price of $80/bbl (Tables 3 and 5), generates approximately $2.9 to $9 billion in incremental revenue (Table 7) to the state, alone.

It's worth noting that high-end estimates exceed the available supply of CO_2 required to achieve production estimates, but nonetheless demonstrate the economic potential of CO_2-EOR from an incremental oil production and associated tax revenue perspective.

Overall CO_2-EOR Incremental Revenue Model - North Dakota

Single Well Revenue Model	Total - 5,744 Wells	Total - 12,515 Wells* (*Stripper Well Count - 7-24)
EOR 10-year model - EIA Pricing	$2,884,341,547	$6,284,389,704
EOR 10-year model - $80.00 WTI	$3,800,781,824	$8,281,125,440
EOR 5-year model - EIA Pricing	$3,149,988,103	$6,863,179,163
EOR 5-year model - $80.00 WTI	$4,105,880,128	$8,945,872,180

Table 7

As indicated, if every certified, low-producing or stripper well currently identified in North Dakota is targeted for CO_2-EOR, the economic benefit is significantly higher in comparison to the low estimate, even with low-producing wells in the state being exempted from extraction tax for the life of the well under current statute. Conversely, the opportunity cost or potential revenue loss absent CO_2-EOR as demonstrated, equates to billions of dollars in unrealized collections.

Associated Fiscal Impact – Oil Producing Counties in North Dakota

Beyond direct benefits resulting from incremental oil production, associated economic impacts for CO_2-EOR extend exponentially beyond revenues generated from production and oil extraction tax levied on oil produced in North Dakota.

Target energy sectors including oil and coal, support state and local economies through employment opportunities, sales and use tax collections, property tax or equivalent of, and a plethora of other economic benefits.

Over the most recent five-year period roughly $10 billion in purchases, with associated state sales tax collections totaling approximately $500 million, can be attributed to oil-induced economic activity in the state's four largest oil and gas producing counties comprised of McKenzie, Dunn, Mountrail and Williams.

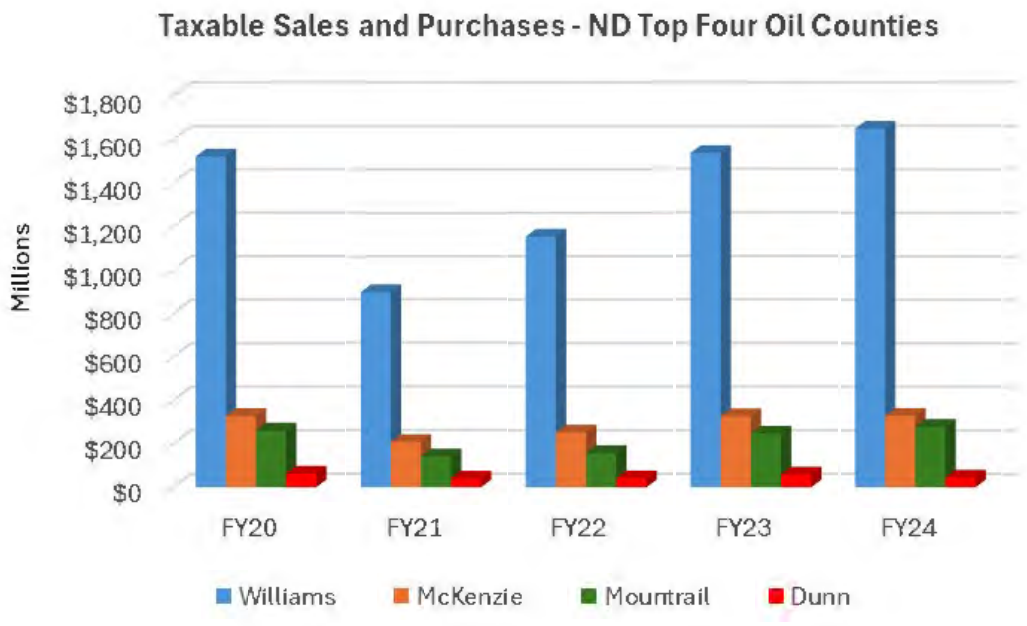

Figure 4

As shown in Figure 4, Williams County, including the city of Williston, continues to be an economic powerhouse in the region with approximately $7 billion in taxable purchases taking place over the past five fiscal years (FY20-FY24). While seemingly overshadowed by their larger economic cousin, the counties of McKenzie, Mountrail and Dunn combined still represent significant economic activity, approaching $3 billion in taxable sales and purchases over the same timeframe.

In addition to the 5% state sales and use tax rate, both cities and counties can levy and collect local sales and use tax in addition to the state requirement, with funds collected channeling directly back to the respective political subdivision.

While rates vary depending on location, the additional local options tax on qualifying purchases yields incremental collections equal to approximately one-third of the amount collected by the state, or $160-$170 million during the same 5-year period.

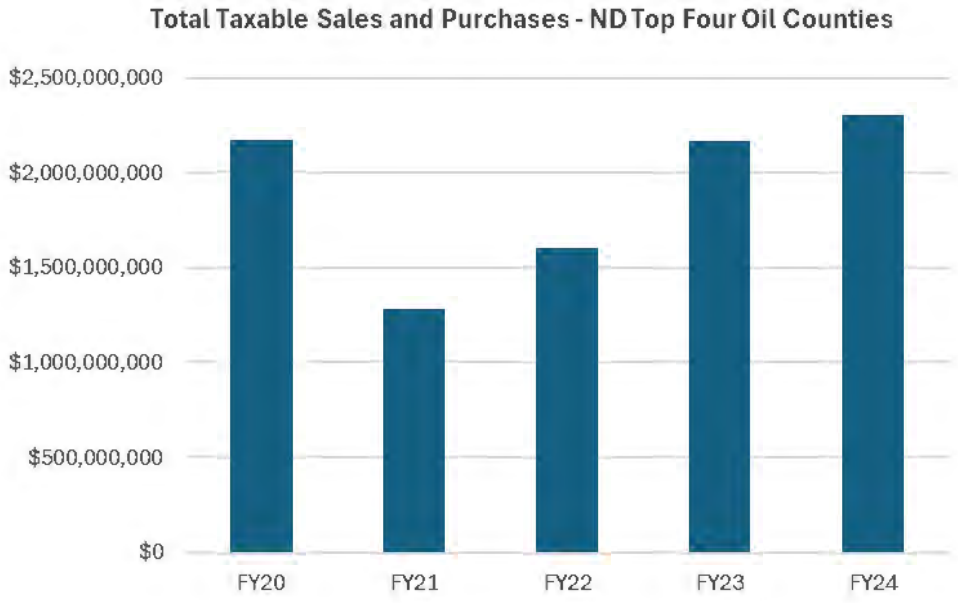

Figure 5

In aggregate, economic activity for North Dakota's four largest oil producing counties (Figures 4 and 5) is significant, despite challenges within the reflected period due to the effects of the pandemic, negatively impacting purchasing activity in FY20, FY21 and FY22.

While the agriculture sector throughout the state including in northwestern North Dakota continues to serve as the foundation of the state's economy, a predominant driver of the forementioned economic activity in the referenced region is energy, or more specifically oil-related, further supporting the case to advance CO_2-EOR in North Dakota.

Addressing the 45Q Incentive Gap

Given the significant economic opportunity related to CO_2-EOR development in North Dakota, ongoing discussions to evaluate and where applicable, improve upon existing policies and incentives to accentuate their influence on pricing models, are warranted.

Gaining a better understanding of the plethora of financial considerations and decisions industry is faced with, including addressing the $25 tax credit incentive differential between CO_2-EOR and permanent sequestration, and how policy-driven incentives and offsets can reduce the 45Q delta, will also be an important part of the conversation.

Production and infrastructure costs associated with CO_2-EOR and incurred by industry should also be recognized as key points of discussion, as prominent expense categories.

Specifically, primary expense centers include CO_2 acquisition cost, associated transportation and distribution costs, and well surface costs to support effective, large-scale implementation of CO_2-EOR, each an equally important factor in determining the financial outlook for tertiary recovery projects utilizing CO_2.

The cost model estimate below (Table 8) is based on the following criteria:

- Well development and surface costs represent approximately two-thirds of total project cost
- CO_2 supply expense equaling approximately one-third of total project cost
- No additional CO_2 compression costs
- Limited cost associated with filtration systems, waste fluid injection and electricity

CO_2-EOR Production Cost Model (Single Well)

Expense/Savings Centers	Cost per bbl	Tax savings/bbl	Tax savings/tonne CO_2	Net Cost/bbl
CO_2 Transportation [1,2]	$5.00	$0	$0	$5.00
CO_2 price/bbl ($30/t = 3 bbl) [2]	$10.00	$0.50	$1.50	$9.50
Royalty payment est. (19% of $80/bbl)	$15.20	$0	$0	$15.20
Well and surface (taxable) [3]	$17.50	$0.88	$2.63	$16.63
Well and surface (non-taxable)[4]	$7.50	$0	$0	$7.50
Extraction tax savings - $80/bbl*5%	$0	$4.00	$12.00	($4.00)
Totals	**$55.20**	**$5.375**	**$16.13**	**$49.83**

Table 8

[1] Primary distribution delivery cost est. = $15/tonne
[2] Per bbl based on $30/tonne CO2 and 3:1 bbl oil/tonne CO_2
[3] Includes well, distribution infrastructure & production costs
[4] Labor cost

Numerous price projection models for CO_2 exist with some in the $10-20 per tonne range. However, like other commodities, CO_2 pricing will vary by region and be influenced by a variety of factors including transportation capacity, available supply, industry demand, and proximity to end use whether geological storage or oil fields targeted for CO_2-EOR. Based on what is anticipated to be a highly competitive landscape for CO_2 acquisition in North Dakota, a $30/tonne estimate is used and reflected in Table 8.

Compression costs as previously noted are determined to be relatively inconsequential based on the assumption that CO_2 transportation projects, i.e. pipelines required to move CO_2 from point-of-origin to oil field distribution networks and ultimately targeted wells, will be accomplished with new infrastructure placement and not through the repurposing of existing facilities, which may be pressure limited.

A high percentage of project cost impacting economic performance is expected to originate from three primary areas including well and surface costs, royalty payments, and CO_2 acquisition costs. While not absent from the equation, filtration system, waste fluid injection, and electricity costs are anticipated to be relatively limited in scope compared to overall project costs and embedded in the "well and surface" cost category.

As demonstrated, tax savings resulting from various state-supported incentives are reflected in the cost model, representing an estimated savings of $5.375 per bbl of incremental oil produced, and based on a bbl of oil produced per tonne CO_2 ratio of 3:1, $16.13 in tax-related incentives per tonne of CO_2 acquired and deployed.

While the $25 credit differential for 45Q as described is not entirely removed through available North Dakota state tax incentives, current exemptions whether direct or indirect are nevertheless material from an economic standpoint, in the sense they offset approximately 64.5%, or almost two-thirds, of the 45Q tax credit differential per tonne of CO_2.

In aggregate, the model (Table 8) equates to $889,000 in tax-related savings, on a per well basis, assuming 165,424 bbl in incremental production over the immediate 10-year period following commencement of CO_2-EOR.

From a state revenue collection perspective using the same production estimates, taxes levied on incremental oil production generate an additional $502,000 to $715,000 (Table 6) in new revenue per well through production and extraction taxes levied, funds that would otherwise not materialize.

Summary

Encouraging industry to pursue CO_2-EOR, sets the stage to further monetize North Dakota energy resources in the Bakken and southwestern portion of the state, well into the future.

From a state perspective, CO_2-EOR certainly provides a considerably greater economic return in comparison to permanent geological storage, with no incremental oil production and associated benefits. Mineral owners, shareholders, and North Dakota citizens benefit as well whether in the form of royalty payments, dividends, or tax-related collections used to fund state priorities.

Similar to the introduction of new wells in unconventional shale plays like the Bakken, CO_2-EOR can serve as a profit center and help mitigate risk for producers, particularly during an oil price downturn, if large volumes of CO_2 can be effectively secured and transported to distribution networks and targeted oil plays.

Producers, in order to justify significant upfront capital investment needed to support CO_2-EOR, will require long-term CO_2 supply contracts structured in a manner that ensures acceptable pricing, whether pricing is fixed or as a percentage of WTI, and the reliable delivery of economic viable quantities of CO_2.

Effectively addressing the 45Q incentive gap between CO_2-EOR and sequestration or permanent storage, will again require adequately incentivizing industry to pursue CO_2-EOR by:

- Funding research to advance technology
- Supporting the development of new energy infrastructure
- Maintaining a reasonable and consistent regulatory environment
- Promoting existing and exploring new CO_2-EOR tax-related policy deemed mutually beneficial to industry and state alike

As emphasized, CO_2-EOR development in states like North Dakota can assist energy producers in addressing increasingly rigid social and environmental standards, challenging federal emissions requirements and aggressive, self-identified sustainability targets.

Even though a federal carbon tax is not currently in place, discussion surrounding that topic will undoubtedly continue but even absent that, a growing number of states have either adopted or are considering cap-and-trade systems and regulations. California has a cap-and-trade program and Washington, a cap-and-invest program.

Eleven northeastern states have organized and participate in a program referred to as the Regional Greenhouse Gas Initiative (RGGI) including Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, Vermont, and Virginia.

Under RGGI, which was established in 2005 as the first market-based regulatory program in the United States, CO_2 emissions from power plants operating in that region are capped and the regulated power plants, participate in a program to auction or trade emission allowances, with each "allowance" permitting the holder to emit one short ton (2,000 lbs.) of CO_2.

Although these programs are beyond North Dakota's borders, state-driven greenhouse gas reduction initiatives arguably pose a future challenge from a trade standpoint. Subsequently, if not effectively countered, they create long-term risk to both industry and the state's ability to continue as a major exporter of energy and agriculture products, key contributors to the North Dakota economy.

CO_2-EOR as a mechanism to permanently store CO_2 in the reservoir, does not entirely remove those concerns, but holds the potential to certainly lessen the potential impact and reduce CO_2 intensity levels across multiple energy sectors operating in North Dakota.

Despite sequestration appearing to hold an economic advantage over CO_2-EOR due to the $25 dollar tax credit differential, CO_2-EOR nonetheless presents a unique and attractive opportunity for industry to further monetize existing holdings and more effectively distribute previously established costs over new, incremental barrels produced within the same geographic footprint.

While a degree of uncertainty exists regarding the direction federal policy will take long-term and future of the 45Q tax credit program, there remains an exceptional opportunity to pursue CO_2-EOR in North Dakota, given a current construction deadline date of January 1, 2033, and subsequent 12-year timeframe in which tax credits can be received under the program.

In closing, CO_2-EOR presents a significant opportunity to monetize existing resources, create new synergies among critical energy sectors in the state, and act as a catalyst to effectively enhance and extend the life of the Bakken for decades to come.

Industrial Commission of North Dakota

RESOLUTION AUTHORIZING CARRY FORWARD PROCEDURES FOR THE NORTH DAKOTA HOUSING FINANCE AGENCY

PRELIMINARY STATEMENT:

The Industrial Commission of North Dakota (the "Commission") is authorized to issue North Dakota Housing Finance Agency Mortgage Revenue Bonds (the "Bonds") pursuant to Section 54-17-07.4 of the North Dakota Century Code; and

The Bonds are private activity bonds which are "qualified bonds" on which the interest income earned is not included as gross income for federal income tax purposes under Section 103 of the Internal Revenue Code for 1986, as amended (the "Code"), when an "allocation" is obtained and, if necessary, "carried forward" pursuant to Section 146 of the Code; and

Executive Order 1988-13 (the "Order") Section 2(c) requires the submission of certain documents by an issuer in order to receive a carryforward allocation.

BE IT RESOLVED by the Commission as follows:

1. The Commission authorizes the Industrial Commission Executive Director's submission on behalf of the Commission in its capacity acting as the North Dakota Housing Finance Agency (the "Agency") of the application and additional information which are or may be required and requested pursuant to the Order to obtain a 2024 "carryforward allocation", as the term is described by the Code and the Order, in an amount not to exceed $362,730,000.

2. The Commission authorizes the Governor on behalf of the Agency upon the advice of counsel to the Commission, as the authorized public official and representative of the Agency, in executing and submitting to the Internal Revenue Service the appropriate forms pursuant to and in compliance with all necessary (i) requirements of Section 146 of the Code, and (ii) requirements of the Order.

Approved this 28th day of January 2025

_____ Attest:_____

Kelly Armstrong, Governor
Chairman, NDIC

Karen Tyler, Executive Director

State Capitol 14th Floor
600 E. Boulevard Ave.
Bismarck ND 58505-0840

Karen Tyler, Executive Director
Jordan Kannianen, Deputy Director

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NORTH DAKOTA housing FINANCE AGENCY

January 28, 2025

TO: Industrial Commission

FR: David Flohr, Executive Director

Report: Authorizing Declarations of Intent to Issue Multifamily Revenue Bonds

On December 20, 2024, NDHFA issued a Declaration of "Official Intent" to issue Multifamily Revenue Bonds in the amount not to exceed $9,500,000. The proceeds of the bonds will be used for the acquisition and rehabilitation of Pleasant Valley TC Apartments, a 60-unit affordable housing rental project located in Dickinson, 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.

Pleasant Valley Apartments includes thirty (30) two-bedroom apartments, twenty (20) three-bedroom apartments, eight (8) four-bedroom apartments designated as affordable units and three (3) additional market rate units. Originally constructed between 1978 and 1981, this property has not undergone any significant renovations since. The property has been owned and managed by California Commercial Investment Companies (CCI) since 2018.

The property currently has a full-time onsite property manager and maintenance technician and provide 24/7 emergency services and 58 units are covered by a Section 8 HAP contract, ensuring that most Pleasant Valley families never pay more than 30% of their income toward rent.

Rehabilitation scope includes $30,000 per unit to replace kitchens, appliances, and flooring, in addition to ensuring compliance with current ADA guidelines. Another $2,600,000 will be devoted to replacing or modernizing all building systems, upgrading the exterior doors and siding, and adding insulation. Finally, over $400,000 will be allocated to improving the grounds including the parking areas, walkways, fencing, landscaping, and adding new resident amenities.

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.

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www.ndhfa.org
hfainfo@nd.gov

NORTH DAKOTA housing FINANCE AGENCY

MEMORANDUM

TO: PLEASANT VALLEY TC APARTMENTS, LP

FROM: David Flohr, Executive Director

DATE: DECEMBER 20, 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 **$9,500,000** to provide funds to finance a loan with respect to the Project noted above (a **60** unit family/general occupancy affordable housing rental project located in **Dickinson**, 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 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.

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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 Galesburg (the "Political Subdivision") has requested a loan in the amount of $3,000,000 from the Program to replace faulty components of the lagoon system, update the lift station and replace portions of the sewer collection 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: January 28, 2024

_____
Governor Kelly Armstrong, Chairman

Attest:

_____
Karen Tyler, Executive Director
Industrial Commission of North Dakota

January 21, 2025

PUBLIC FINANCE AUTHORITY ADVISORY COMMITTEE

RECOMMENDATION TO THE INDUSTRIAL COMMISSION

The Advisory Committee, at its January 21, 2025 meeting, reviewed, discussed, and recommends approval of a $3,000,000 Clean Water State Revolving Fund Program loan to the City of Galesburg.

North Dakota Public Finance Authority
Advisory Committee

Keith Lund, Chairman
Linda Svihovec
John Phillips

NORTH Dakota | Public Finance Authority
Be Legendary.

Memorandum

To: Public Finance Authority Advisory Committee
Miles Silberg, Public Financial Management LLC
Kylee Merkel, Bank of North Dakota

From: DeAnn Ament, Executive Director

Date: January 6, 2025

Re: City of Galesburg
Clean Water State Revolving Fund Program Loan

Purpose of the Project: Replace faulty components of the lagoon system, update the lift station and replace portions of the sewer collection system.

Project Amount:

CWSRF Request/Total Project	$ 3,000,000
CWSRF Loan Forgiveness	-2,250,000
Net Project Loan	$ 750,000

Population to Benefit from the Project: 118; $25,424 per person
Population Served by the System: 118
Is the Project Area in the Extraterritorial Jurisdiction of a City: No

The requested Clean Water State Revolving Fund (CWSRF) loan term is 30 years. The average annual payment will be $31,743. The City will issue improvement bonds payable with special assessments. The improvement bonds will be a contingent general obligation of the City, backed by the statutory requirement that the City will levy a general deficiency tax in the event that the revenues from the collection of special assessments are not sufficient to pay the debt service on the improvement bonds.

The City has 57 connections which currently pay a base rate of $10 per connection per month.

Sewer Fund:

	2020	2021	2022	2023
Operating Revenue	$6,246	$6,780	$10,399	$8,028
Operating Expenses	631	18,689	2,176	2,176
Net Operating Revenue (Expenses)	$5,615	-$11,909	$8,223	$5,852

The City has one Drinking Water State Revolving Fund improvement bond outstanding of $365,348 and payments have been made as agreed.

The outstanding debt including the new CWSRF bond will be $1,115,348 and the average annual payment of all debt will be $58,863 which is $499 per resident. With 100 parcels to be assessed for this project, the average annual assessment per parcel will be approximately $317.

The City of Galesburg is located in Traill County approximately 53 miles northwest of Fargo. The total population according to the 2020 census is 118; this is an increase of 10 from the 2010 census. The largest employers in the area are American Crystal Sugar with 333 employees, Mayville State University which employs 305 and Sanford Health with 247 employees.

May-Port CG K-12 School Enrollment:

2021-2022	2022-2023	2023-2024	2024-2025
496	504	504	513

The City's 2023 taxable valuation was $677,783. This is an increase of $319,698 over the 2019 taxable valuation.

Property Tax Collections as of October 11, 2024:

Levy Year	Dollar Amount of Levy	Amount Collected to Date of Application	Percentage Collected
2023	$34,117	$32,748	96%
2022	$32,284	$31,634	98%
2021	$29,485	$29,010	98%

Special Assessment Collections as of October 11, 2024:

Year	Dollar Amount	Amount Collected to Date of Application	Percentage Collected
2023	$2,325	$524	23%
2022	$1,289	$1,029	80%
2021	--	--	--

Galesburg Mill Levy History:

Year	City	School	State and County	Other	Total for Each Year
2023	50.34	86.83	110.46	5.00	252.63
2022	61.79	84.00	115.21	5.00	266.00
2021	66.24	84.24	120.01	5.00	275.49
2020	64.97	84.24	111.14	5.00	265.35
2019	65.76	89.24	107.20	1.47	263.67

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Memorandum

TO: DeAnn Ament, Executive Director
North Dakota Public Finance Authority

FROM: PFM Financial Advisors LLC

DATE: January 16, 2025

RE: Marketplace Analysis - Clean Water State Revolving Fund Program
City of Galesburg

The City of Galesburg (the "City") has presented a request to the Authority and the North Dakota Department of Environmental Quality ("Department") for a $3,000,000 loan of which $2,250,000 will be loan forgiveness, for a total of $750,000 under the Clean Water State Revolving Fund Program ("CWSRF Program"). The CWSRF Program is used to make subsidized interest rate loans to political subdivisions for the purpose of constructing various wastewater treatment projects and landfill projects as approved by the Department in accordance with federal and state regulations and an updated Intended Use Plan prepared by the Department.

The City intends to use the proceeds to replace faulty components of the lagoon system, update the lift station, and replace portions of the sewer collection system.

The proposed term of the special assessment loan is 30 years with a subsidized interest rate of 1.50%. The City's average annual payment under the proposed loan will be approximately $31,743. The improvement bonds will be a contingent general obligation of the City, which will be required by law to levy a general deficiency tax if the revenues collected from the levy of special assessments are insufficient to make the debt service payments.

The City currently has one Drinking Water SRF loan with an outstanding amount of $365,348. The City is current in its payments for its outstanding Authority loan.

Funding for the construction of the City's projects has been included in a list of approved projects as prepared and updated by the Department. As an authorized participant in the CWSRF Program, the City will benefit substantially from the subsidized fixed rate loans made under the Program. Consequently, no other financing mechanism can provide a greater cost advantage than that offered by the CWSRF Program.

BND
Bank of North Dakota

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Bismarck, ND 58506-5509
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Attachment 5D

Memorandum

To: Industrial Commission

From: Kylee Merkel, Business Banker
Bank of North Dakota

Date: January 7, 2025

RE: City of Galesburg
Clean Water State Revolving Fund Program

ND Public Finance Authority has delivered to BND their memo which recommends approval of a $3,000,000 loan to the City of Galesburg under the Clean Water State Revolving Fund (CWSRF). This project is eligible for $2,250,000 of loan forgiveness under the CWSRF, making the net loan amount $750,000. The entire cost of the project is $3,000,000, with CWSRF financing the entire project.

The project is for sewer system improvements including to replace faulty components of the lagoon system, update the lift station and replace portions of the collection system. The requested loan term is 30 years. The City will issue an improvement bond payable with special assessment collections. The annual payment will average $31,743.

Sewer Fund:

Sewer Fund	2021	2022	2023
Operating Revenue	6,780	10,399	8,028
Operating Expenses	-18,689	-2,176	-2,176
Net Operating Revenue	-11,909	8,223	5,852

The City of Galesburg has one outstanding improvement bond, with a current balance of $365,348.

Average annual debt service requirements are estimated at $58,863, which is an average of $498.84 per resident.

Historical census populations for the City of Galesburg were 118 in 2020, 108 in 2010 and 157 in 2000. The largest employers in the City are Clifford Farmers Cooperative Elevator, ADM Edible Bean Specialties and Valley Plains Equipment.

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Based upon the PFA recommendation and the benefits obtained with this project, BND concurs with their evaluation and support of the request.

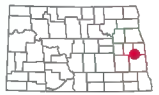
Kylee Merkel
Business Banker

www.ae2s.com | Advanced Engineering and Environmental Services, LLC

N

0 250 500

Feet



Locator Map Not to Scale

Galesburg
Traill County, ND

GALESBURG SEWER IMPROVEMENTS

- Lift Station
- Sanitary Manhole
- Sanitary Line

Date: 8/22/2024

AE2S

Information depicted may include data unverified by AE2S. Any reliance upon such data is at the user's own risk. AE2S does not warrant this map or its features are either spatially or temporally accurate.

Coordinate System: NAD 1983 2011 Contiguous USA Albers | Edited by: cclauson | W:\G\Galesburg\00218-2020-001\GIS\City of Galesburg Infrastructure Improvements - Mapping and Analysis.aprx | Galesburg - sewer

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 Grand Forks (the "Political Subdivision") has requested a $4,352,000 increase to a previously approved $3,167,000 loan (total $7,519,000) from the Program for installation of a regional storm water detention pond and associated outfall to serve the storm water needs of the newly annexed area; 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: January 28, 2024

_____
Governor Kelly Armstrong, Chairman

Attest:

_____
Karen Tyler, Executive Director
Industrial Commission of North Dakota

January 21, 2025

PUBLIC FINANCE AUTHORITY ADVISORY COMMITTEE

RECOMMENDATION TO THE INDUSTRIAL COMMISSION

The Advisory Committee, at its January 21, 2025 meeting, reviewed, discussed, and recommends approval of a $4,352,000 increase to a previously approved $3,167,000 (total $7,519,000) Drinking Water State Revolving Fund Program loan to the City of Grand Forks.

North Dakota Public Finance Authority
Advisory Committee

Keith Lund, Chairman
Linda Svihovec
John Phillips

NORTH Dakota | Public Finance Authority
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Memorandum

To: Public Finance Authority Advisory Committee
Miles Silbert, Public Financial Management
Kylee Merkel, Bank of North Dakota

From: DeAnn Ament, Executive Director

Date: December 23, 2024

Re: City of Grand Forks
Clean Water State Revolving Fund

Purpose of the Project: Installation of a regional storm water detention pond and associated outfall to serve the storm water needs of the newly annexed area.

Project Amount:

CWSRF Increase Request	$ 4,352,000
CWSRF Original Request	3,167,000
Total Project Cost	$ 7,519,000

The requested term for the Clean Water State Revolving Fund (CWSRF) loan is 30 years. The average annual payment will be approximately $182,309. Combined with the original loan average annual payment of $133,099 the total will be $315,408. The City will issue improvement bonds payable with special assessments. The improvement bonds will be a contingent general obligation of the City, backed by the statutory requirement that the City levy a general deficiency tax in the event that the revenues from the collection of special assessments are not sufficient to pay the debt service on the improvement bonds.

The City has 15,387 residential and 1,780 commercial users that pay a monthly stormwater fee of $3.71. The commercial users pay $1.63/run off unit monthly. The City annually reviews and adjusts the base and volume rate.

Stormwater Fund:

	2020	2021	2022	2023
Interest Revenue	$46,958	$325	(9,063)	$68,146
Operating Revenue	2,943,097	3,098,587	3,127,975	3,267,623
Operating Expenses	2,579,818	3,573,840	3,285,838	3,257,288
Net Operating Revenue	410,237	(474,928)	(166,926)	78,481
Non-cash Pension Adjustment	-	683,209	24,665	-
Adjusted Net Operating Revenue	$410,237	$208,281	-$142,261	$78,481

The City's outstanding indebtedness as of December 31, 2023:

	Original Amount	Outstanding Amount
General Obligation Bonds	$ 2,735,000	$ 885,000
Special Assessment Bonds	126,899,989	111,421,047
Water/Sewer Revenue Bonds *	184,015,496	99,088,079
Sales Tax Revenue Bonds	40,380,000	20,770,000
	$ 354,030,485	$232,164,126

*All payments have been made as agreed. The City has seven CWSRF and two DWSRF loans with outstanding balances of $76,010,889 as of December 31, 2023. In 2024, an additional CWSRF of $6,922,000 and DWSRF $1,050,000 loan were approved but had not closed.

With $122,695,047 of outstanding improvement bonds (including this and the 2024 request) and an estimated population of 59,166 the improvement bond debt is $2,074 per person. The 60 industrial and commercial parcels assessed for the CWSRF project will have an average annual payment of $3,038.

The City of Grand Forks is located in Grand Forks County 82 miles north of Fargo on Interstate 29. Based on the 2020 census, the total population is 59,166; this is an increase of 6,328 from the 2010 census. The largest employers in the City are University of North Dakota which has 5,562 employees, Altru Health Services with 3,400 employees, and Grand Forks Air Force Base employs 2,897.

K-12 School Enrollment:

			Current	Estimated
2021-2022	2022-2023	2023-2024	2024-2025	2025-2026
7,407	7,440	7,428	7679	7,700

The City's 2024 taxable valuation was $285,657,667. This is an increase of $51,148,346 over the 2020 taxable valuation.

Property Tax Collections 11/30/2024:

Levy Year	Dollar Amount of Levy	Amount Collected to Date of Application	Percentage Collected
2024	$25,210,983	-	-
2023	$25,870,743	$24,461,824	95%
2022	$24,347,205	$23,190,627	95%

Special Assessment Collections 11/30/2024:

Year	Dollar Amount	Amount Collected to Date of Application	Percentage Collected
2024	$10,161,885	-	-
2023	$9,286,257	$8,697,085	94%
2022	$9,270,607	$8,900,326	96%

Mill Levy History:

Year	City	School	Park District	State and County	Total for Each Year
2024	92.25	130.50	36.79	87.00	346.54
2023	96.37	131.69	37.31	87.16	352.53
2022	96.84	110.79	37.80	82.63	328.06
2021	97.02	111.00	37.88	79.29	325.19
2020	97.87	100.94	38.19	80.82	317.82

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Memorandum

TO: DeAnn Ament, Executive Director
North Dakota Public Finance Authority

FROM: PFM Financial Advisors LLC

DATE: January 16, 2025

RE: Marketplace Analysis - Clean Water State Revolving Fund Program
City of Grand Forks

The City of Grand Forks ("City") has presented a request to the Authority and the North Dakota Department of Environmental Quality ("Department") for a $4,352,000 increase to a previously approved $3,167,000 loan for a total of $7,519,000 under the Clean Water State Revolving Fund Program ("CWSRF Program"). The CWSRF Program is used to make subsidized interest rate loans to political subdivisions for the purpose of constructing various wastewater treatment projects and landfill projects as approved by the Department in accordance with federal and state regulations and an updated Intended Use Plan prepared by the Department.

The City intends to use the proceeds for installation of a regional storm water detention pond and associated outfall to serve the storm water needs of the newly annexed area.

The municipal securities to be acquired by the Authority will be improvement bonds of the City payable from special assessments levied against the benefited property. The City's average annual payment under the proposed loan will be approximately $182,309. The improvement bonds will be a contingent general obligation of the City, which will be required by law to levy a general deficiency tax if the revenues collected from the levy of special assessments are insufficient to make the debt service payments.

As of December 31, 2023, the City has $885,000 of General Obligation Bonds, $111,421,047 of Special Assessment Bonds, $20,770,00 of Sales Tax Revenue Bonds and $99,088,079 of Water/Sewer Revenue Bonds outstanding. The City currently has seven Clean Water and two Drinking Water loans outstanding totaling $76,010,889. In 2024, a $6,922,000 Clean Water loan and $1,050,000 Drinking Water loan were approved but have not closed. The City is current in its payments for its outstanding Authority loans.

Funding for the construction of the City's projects has been included in a list of approved projects as prepared and updated by the Department. As an authorized participant in the CWSRF Program, the City will benefit substantially from the subsidized fixed rate loans made under the Program. Consequently, no other financing mechanism can provide a greater cost advantage than that offered by the CWSRF Program.

BND
Bank of North Dakota

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Attachment 6D

Memorandum

To: Industrial Commission

From: Kylee Merkel, Business Banker
Bank of North Dakota

Date: January 3, 2025

RE: City of Grand Forks
Clean Water State Revolving Fund Program

ND Public Finance Authority has delivered to BND their memo which recommends approval of a $4,352,000 increase to an existing loan (from $3,167,000 to $7,519,000) to the City of Grand Forks under the Clean Water State Revolving Fund (CWSRF). The entire cost of the project is $7,519,000, with CWSRF financing the full project.

The project is for installation of a regional storm water detention pond, to serve the needs of a newly annexed area. The requested loan term is 30 years. The City will issue an improvement bond payable with special assessment collections. The annual payment for the increase will average $182,309. Combined with the initial $133,099, total annual debt service for the project will average $315,408. The improvement district includes approximately 60 light industrial and commercial parcels.

Storm Water Fund:

Storm Water Fund	2021	2022	2023
Operating Revenue	3,098,587	3,127,975	3,267,623
Interest Revenue	325	-9,063	68,146
Operating Expenses	-3,573,840	-3,285,838	-3,257,288
Net Operating Revenue	-474,928	-166,926	78,481
Plus: Pension Adjustment	683,209	24,665	0
Adjusted Net Operating Income	208,281	-142,261	78,481

The City currently serves 15,387 residential connections that pay a monthly storm water fee of $3.71. The City also serves 1,780 commercial connections that pay a monthly storm water fee of $1.63. The City annually reviews and adjust rates as needed.

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Outstanding Debt (as of December 31, 2023):

	Original Amount	Current Balance
General Obligation Bonds	2,735,000	885,000
Special Assessment Bonds	126,899,989	111,421,047
Sales Tax Revenue Bonds	40,380,000	20,770,000
Water & Sewer Revenue Bonds	184,015,496	99,088,079
	354,030,485	232,164,126

Average annual debt service requirements are estimated at $20,209,672, which is an average of $341.55 per resident.

Historical census populations for the City of Grand Forks were 59,170 in 2020, 52,838 in 2010 and 49,342 in 2000. The largest employers in the City are Altru Health System, University of North Dakota and Grand Forks Air Force Base.

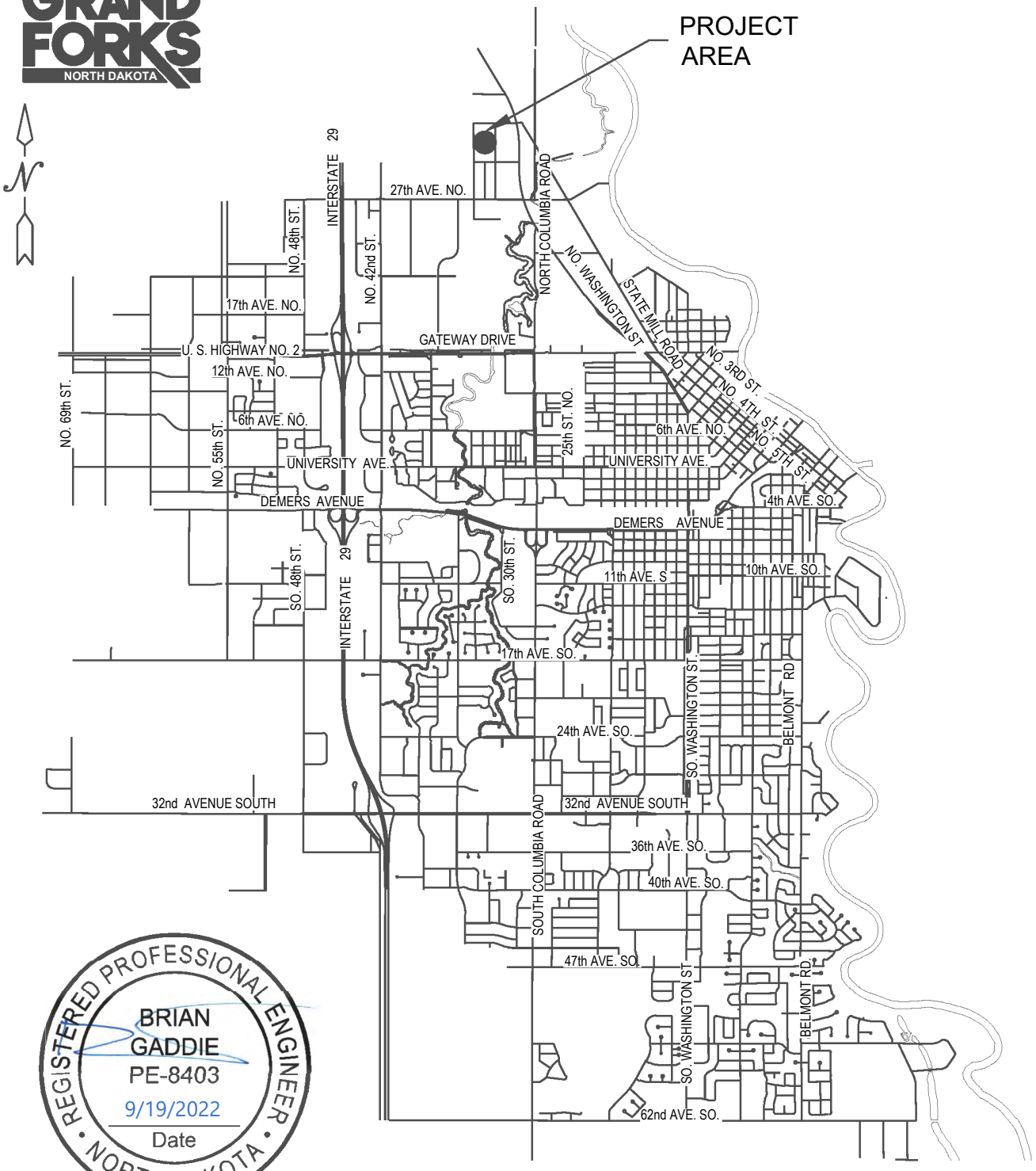
Based upon the PFA recommendation and the benefits obtained with this project, BND concurs with their evaluation and support of the request.

Kylee Merkel
Business Banker

HIGHWAY 81 AND ASSOCIATED AREA REGIONAL STORMWATER POND AND TEMP ACCESS IMPROVMENTS

PROJECT 8485 / ASSESSMENT DIST. 589

CITY OF GRAND FORKS NORTH DAKOTA



REGISTERED PROFESSIONAL ENGINEER
BRIAN GADDIE
PE-8403
9/19/2022
Date
NORTH DAKOTA

RESOLUTION APPROVING
LOAN FROM DRINKING WATER STATE REVOLVING FUND

WHEREAS, the Industrial Commission has heretofore authorized the creation of a Drinking Water State Revolving Fund Program (the “Program”) pursuant to N.D.C.C. chs. 6-09.4, 61-28.1, and 61-28.2; and

WHEREAS, the 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 (the “NDPFA”) and the Bank of North Dakota (the “Trustee”); and

WHEREAS, the City of Beach (the "Political Subdivision") has requested a loan in the amount of $2,819,000 from the Program for water main, sewer main, and street improvements including replacement of aged cast iron water mains with new PVC pipe to increase water quality, redundancy, and decrease operating and maintenance costs due to flushing, leaks, and breaks; and

WHEREAS, 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 Drinking 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: January 28, 2024

_____
Governor Kelly Armstrong, Chairman

Attest:

_____
Karen Tyler, Executive Director
Industrial Commission of North Dakota

January 21, 2025

PUBLIC FINANCE AUTHORITY ADVISORY COMMITTEE

RECOMMENDATION TO THE INDUSTRIAL COMMISSION

The Advisory Committee, at its January 21, 2025 meeting, reviewed, discussed, and recommends approval of a $2,819,000 Drinking Water State Revolving Fund Program loan to the City of Beach.

North Dakota Public Finance Authority
Advisory Committee

Keith Lund, Chairman
Linda Svihovec
John Phillips

NORTH Dakota | Public Finance Authority
Be Legendary.

Memorandum

To: Public Finance Authority Advisory Committee
Miles Silbert, Public Financial Management LLC
Kylee Merkel, Bank of North Dakota

From: DeAnn Ament, Executive Director

Date: January 3, 2025

Re: City of Beach
Drinking Water State Revolving Fund

Purpose of the Project: Water main, sewer main, and street improvements including replacement of aged cast iron water mains with new PVC pipe to increase water quality, redundancy, and decrease operating and maintenance costs due to flushing, leaks, and breaks.

Project Amount:

DWSRF Request	$ 2,819,000
DWR Cost Share	4,226,000
BND IRFL	1,096,000
Project Total	$ 8,141,000

Population to Benefit from the Project: 500; $16,282/person
Population Served by the System: 981
Is the Project Area Within the Extraterritorial Jurisdiction of a City: No

The requested term for the Drinking Water State Revolving Fund (DWSRF) loan is 30 years. The City will issue $2,819,000 improvement bonds payable with special assessments. The average annual payment for the improvement bonds will be $118,124. The improvement bonds will be a contingent general obligation of the City, backed by the statutory requirement that the City will levy a general deficiency tax in the event that the revenues from the collection of special assessments are not sufficient to pay the debt service on the improvement bonds.

Water Fund:

			Unaudited	
	2020	2021	2022	2023
Operating Revenue	$332,268	$416,624	$407,115	$397,864
Operating Expenses	455,147[1]	301,342	363,398	394,265
Net Operating Revenue (Expense)	-122,879	115,282	43,717	3,599
Depreciation	8,821	28,938	-	-
Adjusted Net Operating Revenue (Expense)	-$114,058	$144,220	$43,717	$3,599
Revenue Bond Payments	-	8,940	28,987	38,885
Net Operating Coverage Ratio	-	1,613%	151%	9%

[1] Expenses increased due to watermain project.

The City's outstanding indebtedness as of June 30, 2024:

	Original Amount	Amount Outstanding
Revenue Bonds	$ 772,000	$ 728,673
Improvement Bonds [1]	1,664,043	1,448,816
	$ 2,436,043	$ 2,177,489

[1] Payments have been made as agreed. The City has one DWSRF loan with an outstanding balance of $349,000.

With outstanding debt of $6,092,489 including the new DWSRF and BND IRLF improvement bonds and the and an estimated population of 981, the average annual debt payment per person is $275. The average annual payment of all bonded debt will be $269,822. With 233 parcels to be assessed, the average annual assessment per parcel for the DWSRF portion of the project will be approximately $507.

The City of Beach is located in Golden Valley County three miles east of the Montana state line on Interstate 94. Based on the 2020 census, the total population is 981; this is a decrease of 38 from the 2010 census. The largest employers in the City are Beach School District with 121 employees, Farmer's Union Oil Co (oil & natural gas) with 40 employees, and Pilot Travel Center (gas station) which employs 45.

K-12 School Enrollment:

				Projected
2021-2022	2022-2023	2023-2024	2024-2025	2024-2025
257	254	251	265	270

The City's 2023 taxable valuation was $4,229,184. This is an increase of $347,540 over the 2019 taxable valuation.

Property Tax Collections 11/12/2024:

Levy Year	Dollar Amount of Levy	Amount Collected to Date of Application	Percentage Collected
2023	$195,000	$173,842	89%
2022	$185,500	$174,972	94%
2021	$174,400	$174,400	100%

Special Assessment Collections 11/12/2024:

Year	Dollar Amount	Amount Collected to Date of Application	Percentage Collected
2023	$81,247	$77,811	96%
2022	$77,787	$79,198	102%
2021	$83,403	$83,403	100%

Mill Levy History:

Year	City	School	Park District	State and County	Total for Each Year
2023	46.12	70.00	11.84	64.97	192.93
2022	47.50	68.67	12.82	66.12	195.11
2021	43.45	63.02	12.47	63.03	181.97
2020	38.37	56.77	11.27	65.12	171.53
2019	36.78	52.18	10.28	64.86	164.10

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Memorandum

TO: DeAnn Ament, Executive Director
North Dakota Public Finance Authority

FROM: PFM Financial Advisors LLC

DATE: January 16, 2025

RE: Marketplace Analysis - Drinking Water State Revolving Fund Program
City of Beach

The City of Beach (the "City") has presented a request to the Authority and the North Dakota Department of Environmental Quality ("Department") for a $2,819,000 loan under the Drinking Water State Revolving Fund Program ("DWSRF Program"). The DWSRF Program is used to make subsidized interest rate loans to political subdivisions for the purpose of constructing various water treatment, distribution and storage facilities as approved by the Department in accordance with federal and state regulations and an updated Intended Use Plan prepared by the Department.

The City intends to use the proceeds to replace aging cast iron water mains with new PVC pipe to increase water quality, redundancy, and decrease operating maintenance costs due to flushing, leaks and breaks.

The proposed term of the special assessment loan is 30 years with a subsidized interest rate of 1.50%. The City's average annual payment under the proposed loan will be approximately $118,124. The improvement bonds will be a contingent general obligation of the City, which will be required by law to levy a general deficiency tax if the revenues collected from the levy of special assessments are insufficient to make the debt service payments.

As of June 30, 2024, the City has $1,448,816 of improvement bonds outstanding and $728,673 of revenue bonds outstanding. The City currently has one Drinking Water SRF loan with an outstanding amount of $349,000. The City is current in its payments for its outstanding Authority loan.

Funding the construction of the City's improvements has been included in a list of approved uses as prepared and updated by the Department. As an authorized participant in the DWSRF Program, the City will benefit substantially from the subsidized fixed rate loans made under the Program. Consequently, no other financing mechanism can provide a greater cost advantage than that offered by the DWSRF Program.

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Attachment 7D

Memorandum

To: Industrial Commission

From: Kylee Merkel, Business Banker
Bank of North Dakota

Date: January 4, 2025

RE: City of Beach
Drinking Water State Revolving Fund Program

ND Public Finance Authority has delivered to BND their memo which recommends approval of a $2,819,000 loan to the City of Beach under the Drinking Water State Revolving Fund (DWSRF). The entire cost of the project is $8,141,000, which includes a $1,096,000 from the BND Infrastructure Revolving Loan Fund and a $4,226,000 cost-share grant from the State Water Commission.

The project is for water main, sewer main, and street improvements to aging infrastructure located in an existing area of the City. The requested loan term is 30 years. The City will issue an improvement bond payable with special assessment collections. The annual payment will average $118,124. The improvement district includes approximately 233 parcels.

Water Fund:

Water Fund	2019	2020	2021	Unaudited 2022	Unaudited 2023
Operating Revenue	291,806	332,268	416,624	407,115	397,864
Operating Expenses	-371,555	-455,147	-301,342	-363,398	-394,265
Net Operating Revenue	-79,749	-122,879	115,282	43,717	3,599
Depreciation	9,672	8,821	28,938	0	0
Adjusted Net Operating Income	-70,077	-114,058	144,220	43,717	3,599
Current Debt Service			8,940	28,987	38,885
Debt Service Coverage			1613%	151%	9%

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Bismarck, ND 58506-5509

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Outstanding Debt (as of June 30, 2024):

	Original Amount	Current Balance
Revenue Bonds	772,000	728,673
Improvement Bonds	1,664,043	1,448,816
	2,436,043	2,177,489

Average annual debt service requirements are estimated at $290,709, which is an average of $296.34 per resident.

Historical census populations for the City of Beach were 981 in 2020, 1,019 in 2010 and 1,116 in 2000. The largest employers in the City are Beach School District, Pilot Travel Center, and Farmers Union Oil Company.

Based upon the PFA recommendation and the benefits obtained with this project, BND concurs with their evaluation and support of the request.

Kylee Merkel
Business Banker

PROJECT AREA 1

N

0 100 200

Feet

1 inch = 200 feet

Locator Map Not to Scale

City of Beach
Golden Valley County, ND

Proposed Trench Width Asphalt Replacement with Street Crowning

Proposed Full Width Asphalt Replacement

Proposed Water Main
(Includes hydrants, valves, and services)

Proposed Sanitary Sewer

CITY OF BEACH

Date: 12/29/2023

Date: 1/4/2024

City of Beach
North Dakota

AE2S

Type text here

Information depicted may include data unverified by AE2S. Any reliance upon such data is at the user's own risk. AE2S does not warrant this map or its features are either spatially or temporally accurate.

Coordinate System: NAD 1983 StatePlane North Dakota South FIPS 3302 Feet Intl | Edited by: dlissick | W:\B\Beach\05066-2022-001\GIS\P05066-2022-001 - Mapping and Analysis.aprx | Area One - Improvement District

RESOLUTION APPROVING
LOAN FROM DRINKING WATER STATE REVOLVING FUND

WHEREAS, the Industrial Commission has heretofore authorized the creation of a Drinking Water State Revolving Fund Program (the "Program") pursuant to N.D.C.C. chs. 6-09.4, 61-28.1, and 61-28.2; and

WHEREAS, the 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 (the "NDPFA") and the Bank of North Dakota (the "Trustee"); and

WHEREAS, the City of Fargo (the "Political Subdivision") has requested a $12,050,000 increase to a previously approved $23,950,000 loan (total $36,000,000) from the Program for improvements to the raw water supply and drinking water treatment processes; and

WHEREAS, 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 Drinking 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: January 28, 2025

_____
Governor Kelly Armstrong, Chairman

Attest:

_____
Karen Tyler, Executive Director
Industrial Commission of North Dakota

January 21, 2025

PUBLIC FINANCE AUTHORITY ADVISORY COMMITTEE

RECOMMENDATION TO THE INDUSTRIAL COMMISSION

The Advisory Committee, at its January 21, 2025 meeting, reviewed, discussed, and recommends approval of a $12,050,000 increase to a previously approved $23,950,000 (total $36,000,000) Drinking Water State Revolving Fund Program loan to the City of Fargo.

North Dakota Public Finance Authority
Advisory Committee

Keith Lund, Chairman
Linda Svihovec
John Phillips

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Memorandum

To: Public Finance Authority Advisory Committee
Miles Silbert, PFM Financial Advisors LLC
Kylee Merkel, Bank of North Dakota

From: DeAnn Ament, Executive Director

Date: January 9, 2025

Re: City of Fargo
Drinking Water State Revolving Fund

Purpose of the Project: Improvements to the raw water supply and drinking water treatment processes.

Project Amount:

DWSRF Increase Request	$ 12,050,000
DWSRF Original Request	23,950,000
DWSRF Loan	$ 36,000,000

Population to Benefit from the Project: 184,525; $195/resident
Population Served by the System: 184,525
Is the Project Area Within the Extraterritorial Jurisdiction of a City: No

The requested term for the Drinking Water State Revolving Fund (DWSRF) loan is 30 years. The City of Fargo will issue revenue bonds payable with sales tax and water fund revenues. The average annual payment for the revenue bonds will be $1,482,020. The 110% coverage requirement will be $1,630,222 and the required debt service reserve will be $1,552,950.

City Sales Tax:

The City collects a 2% sales tax and ½ of 1% is dedicated to CWSRF and DWSRF financed infrastructure.

	2020	2021	2022	2023	2024
2% City Sales Tax	$51,720,983	$60,456,732	$65,918,347	$69,144,866	$69,524,792
1/2 of 1%	$12,930,246	$15,114,183	$16,479,587	$17,286,217	$17,381,198
Debt Service	$5,636,083	$5,930,876	$5,957,230	$5,935,800	$14,033,478
Excess Sales Tax	$7,294,163	$9,183,307	$10,522,357	$11,350,417	$3,347,720

The City has 26,130 residential water accounts that pay a monthly base charge of $20.20 which includes 2,000 gallons; the base rate increased $2.65 per month effective January 1st. There are 5,750 commercial accounts that pay a monthly base charge which ranges from $64.35 to $857.85 depending on the meter size; January 1st, these rates increased $8.40 to $111.90 per month. The volume charge increased $.80 to $5.70/1,000 above the first 2,000 gallons effective the first of the year.

Water Fund:

	2020	2021	2022	2023
Interest Revenue	$4,535	$57,825	$24,729	$22,661
Operating Revenue	23,773,689	26,123,374	25,679,019	29,109,021
Operating Expenses	23,191,294	23,128,967	25,557,494	27,424,202
Net Operating Expenditures	586,930	3,052,232	146,254	1,707,480
Depreciation	7,601,751	7,746,117	7,847,571	8,110,737
Adjusted Net Operating Income	$8,188,681	$10,798,349	$7,993,825	$9,818,217
Revenue Bond Payments	$4,817,427	$4,889,982	$4,975,904	$5,789,292
Net Operating Coverage	170%	221%	161%	170%

Projected Water Fund Net Operating Coverage:

	2025	2026	2027	2028
Proforma Net Operating Revenue[1]	$17,800,797	$15,298,289	$17,724,659	$19,989,093
Proforma Debt Service	$6,546,728	$7,105,159	$7,672,525	$9,908,853
Proforma Net Operating Coverage	272%	215%	231%	202%

[1] Includes water rate revenues and sales tax which is ½ of the ½ of 1% since this is only a water projection.

The existing excess sales tax will be sufficient to meet the 110% net operating coverage. The City annually reviews the rates and adjusts as needed every two years. The net operating revenues of the water fund provide satisfactory backing should sales tax be inadequate.

The City's outstanding indebtedness as of December 31, 2023:

	Original Amount	Amount Outstanding
Governmental Activities		
Improvement Bonds	$ 672,725,000	$ 506,650,000
GO Bonds	38,745,000	27,255,000
Sales Tax Revenue Bonds *	83,887,000	50,083,000
Taxable Appropriation Bonds	28,840,000	27,235,000
Appropriation Bonds	8,103,000	7,670,000
SRF Notes Payable *	97,505,936	40,333,837
TIF Revenue Notes	6,433,705	4,690,989
Direct Bank Loan	6,000,000	2,319,516
Mercantile Parking Garage	2,000,000	2,000,000
BND Infrastructure Loan	15,000,000	11,279,481
	$ 959,239,641	$ 679,516,823
Business-Type Activities		
Revenue Bonds	$ 2,875,000	$ 1,463,495
Direct Bank Loan	3,000,000	300,000
SRF Notes Payable *	305,699,000	250,863,977
Appropriation Bonds	7,810,000	3,370,000
	$ 319,384,000	$ 255,997,472

*All payments have been made as agreed. The City has ten CWSRF and five DWSRF loans with outstanding balances of $291,197,814 and two CFP loans with outstanding balances of $50,083,000. In 2024, there were three new CWSRF loans, one CWSRF increase and one new DWSRF loan approved for a total of $77,348,000.

With $935,514,295 total debt outstanding, the debt per person is $6,900.

The City of Fargo is located in Cass County at the intersection of Interstate Highways 94 and 29. The estimated current population is 135,588. Based on the 2020 census, the total population was 125,990; this is an increase of 20,441 from the 2010 census. The largest employers in the City are Sanford Health Facilities with 9,181 employees, North Dakota State University has 2,324 employees and Fargo Public Schools employs 2,273.

K-12 School Enrollment:

2021-2022	2022-2023	2023-2024	2024-2025
11,195	11,288	11,319	11,281

The City's 2023 taxable valuation was $808,920,288. This is an increase of $202,534,286 over the 2019 taxable valuation.

Property Tax Collections 11/30/2024:

Levy Year	Dollar Amount of Levy	Amount Collected to Date of Application	Percentage Collected
2023	$47,682,349	$44,610,770	94%
2022	$40,652,011	$38,769,601	95%
2021	$36,279,891	$34,476,618	95%

Special Assessment Collections 11/30/2024:

Year	Dollar Amount	Amount Collected to Date of Application	Percentage Collected
2023	$42,562,481	$41,339,533	97%
2022	$39,463,391	$39,090,608	99%
2021	$38,099,705	$38,009,751	100%

Mill Levy History:

Year	City	School	Park District	State and County	Other	Total for Each Year
2023	57.00	154.13	34.08	46.00	5.39	296.60
2022	55.00	154.38	38.09	48.00	6.03	301.50
2021	53.00	154.38	33.85	48.75	6.03	296.01
2020	53.00	154.38	29.60	48.92	6.22	292.12
2019	53.00	154.38	28.67	50.00	6.39	292.44

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Memorandum

TO: DeAnn Ament, Executive Director
North Dakota Public Finance Authority

FROM: PFM Financial Advisors LLC

DATE: January 16, 2025

RE: Marketplace Analysis - Drinking Water State Revolving Fund Program
City of Fargo

The City of Fargo ("City") has presented a request to the Authority and the North Dakota Department of Environmental Quality ("Department") for a $12,050,000 increase to their previously approved $23,950,000 loan for a total of $36,000,000 under the Drinking Water State Revolving Fund Program ("DWSRF Program"). The DWSRF Program is used to make subsidized interest rate loans to political subdivisions for the purpose of constructing various water treatment, distribution and storage facilities as approved by the Department in accordance with federal and state regulations and an updated Intended Use Plan prepared by the Department.

The City intends to use the proceeds for improvements to the raw water supply and drinking water treatment process.

The municipal securities to be acquired by the Authority will be revenue bonds payable from water fund and sales tax fund revenues. The City's average annual payment under the proposed loan will be approximately $1,482,020 indicating a 110% net revenue coverage requirement of approximately $1,630,222. The City will be required to deposit $1,552,950 into a reserve fund with payments of $310,590 per year for the first five years of the loan. Net operating coverage of the water fund was 1.70x, 2.21x 1.61x, and 1.70x for 2020-2023, respectively. In addition to the water fund, one half of one percent of the City's two percent sales tax is dedicated to the CWSRF and DWSRF. The projected pro forma net operating coverage, which includes the sales tax and water revenues, is 2.72x, 2.15x, 2.31x and 2.02x respectively, for years 2025-2028. The City reviews their sales tax and water rates annually and adjusts the rates as needed. The excess sales tax, water fund, and as needed rate increases will provide sufficient net revenues to meet the 110% coverage requirement.

As of December 31, 2023, the City has the following outstanding debt:

	Amount Outstanding
Governmental Activities	
Improvement Bonds	$ 506,650,000
GO Bonds	27,255,000
Sales Tax Revenue Bonds *	50,083,000
Taxable Appropriation Bonds	27,235,000
Appropriation Bonds	7,670,000
SRF Notes Payable *	40,333,837
TIF Revenue Notes	4,690,989
Direct Bank Loan	2,319,516
Mercantile Parking Garage	2,000,000
BND Infrastructure Loan	11,279,481
	$ 679,516,823
Business-Type Activities	
Revenue Bonds	$ 1,463,495
Direct Bank Loan	300,000
SRF Notes Payable *	250,863,977
Appropriation Bonds	3,370,000
	$ 255,997,472

The City currently has two CFP loans with an outstanding amount of $50,083,000, and ten CWSRF and five DWSRF loans with a total outstanding amount of $291,197,814. The City is current in its payments for its outstanding Authority loans. In 2024, there were three CWSRF loans and one DWSRF loan approved for a total of $77,348,000.

Funding for the construction of the City's projects has been included in a list of approved projects as prepared and updated by the Department. As an authorized participant in the DWSRF Program, the City will benefit substantially from the subsidized fixed rate loans made under the Program. Consequently, no other financing mechanism can provide a greater cost advantage than that offered by the DWSRF Program.

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Attachment 8D

Memorandum

To: Industrial Commission

From: Kylee Merkel, Business Banker
Bank of North Dakota

Date: January 9, 2025

RE: City of Fargo
Drinking Water State Revolving Fund Program

ND Public Finance Authority has delivered to BND their memo which recommends approval of a $12,050,000 increase to an existing loan (from $23,950,000 to $36,000,000) to the City of Fargo under the Drinking Water State Revolving Fund (DWSRF). The entire cost of the project is $36,000,000, with DWSRF financing the full project.

Proceeds of the loan will be used to complete improvements to the raw water supply and drinking water treatment processes. The requested loan term is 30 years. The City will issue a revenue bond payable from sales tax and water fund revenues. The annual payment will average $1,482,020.

The City collects a 2% sales tax, of which ½ of 1% is dedicated to clean water and drinking water state revolving fund financed infrastructure. The sales tax sunsets in 2028. If the city sales tax collections would be insufficient to meet the required 110% net operating coverage, or the city sales tax is not extended, the City would utilize water user fees and implement any necessary rate increases.

½ of 1% City Sales Tax Debt Service Coverage:

	2021	2022	2023	2024
2% City Sales Tax Collections	60,456,732	65,918,347	69,144,866	69,524,792
1/2 of 1%	15,114,183	16,479,587	17,286,217	17,381,198
Total Debt Payments	5,930,876	5,957,230	5,935,800	14,033,478
Debt Service Coverage	254.84%	276.63%	291.22%	123.86%

The existing sales tax collections will be sufficient to service both the existing and proposed State Revolving Fund loans. Should sales tax collections be insufficient to service the debt, the water fund also has capacity to service the debt.

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Water Fund Debt Service Coverage:

Water Fund	2021	2022	2023
Operating Revenue	26,123,374	25,679,019	29,109,021
Interest Revenue	57,825	24,729	22,661
Operating Expenses	-23,128,967	-25,557,494	-27,424,202
Net Operating Revenue	3,052,232	146,254	1,707,480
Plus: Depreciation	7,746,117	7,847,571	8,110,737
Adjusted Net Operating Revenue	10,798,349	7,993,825	9,818,217
Current Annual Debt Service	4,889,982	4,975,904	5,789,292
Debt Service Coverage	220.83%	160.65%	169.59%

The City currently serves 26,130 residential water accounts that pay a monthly base rate of $20.20. There are also 5,750 commercial water accounts that pay a monthly base rate ranging from $64.35 to $857.85, depending on meter size. All accounts pay a volume charge of $5.70 per 1,000 gallons, above the first 2,000 gallons. The City annually reviews and adjusts rates as needed.

Outstanding Debt (as of December 31, 2023):

	Original Amount	Amount Outstanding
Governmental Activities		
Improvement Bonds	$672,725,000	$506,650,000
GO Bonds	38,745,000	27,255,000
Sales Tax Revenue Bonds	83,887,000	50,083,000
Taxable Appropriation Bonds	28,840,000	27,235,000
Appropriation Bonds	8,103,000	7,670,000
SRF Notes Payable	97,505,936	40,333,837
TIF Revenue Notes	6,433,705	4,690,988
Direct Bank Loan	6,000,000	2,319,516
Mercantile Parking Garage	2,000,000	2,000,000
BND Infrastructure Loan	15,000,000	11,279,481
	959,239,641	679,516,822
Business-Type Activities		
Revenue Bonds	2,875,000	1,463,495
Direct Bank Loan	3,000,000	300,000
SRF Notes Payable	305,699,000	250,863,977
Appropriation Bonds	7,810,000	3,370,000
	319,384,000	255,997,472
Total Debt	$1,278,623,641	$935,514,294

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Average annual debt service requirements are estimated at $65,273,614, which is an average of $481.41 per resident.

Current population estimate for the City is 135,588. Historical census populations for the City of Fargo were 125,990 in 2020, 106,024 in 2010 and 91,324 in 2000. The largest employers in the City are Sanford Health Facilities, North Dakota State University and Fargo Public Schools.

Based upon the PFA recommendation and the benefits obtained with this project, BND concurs with their evaluation and support of the request.

Kylee Merkel
Business Banker

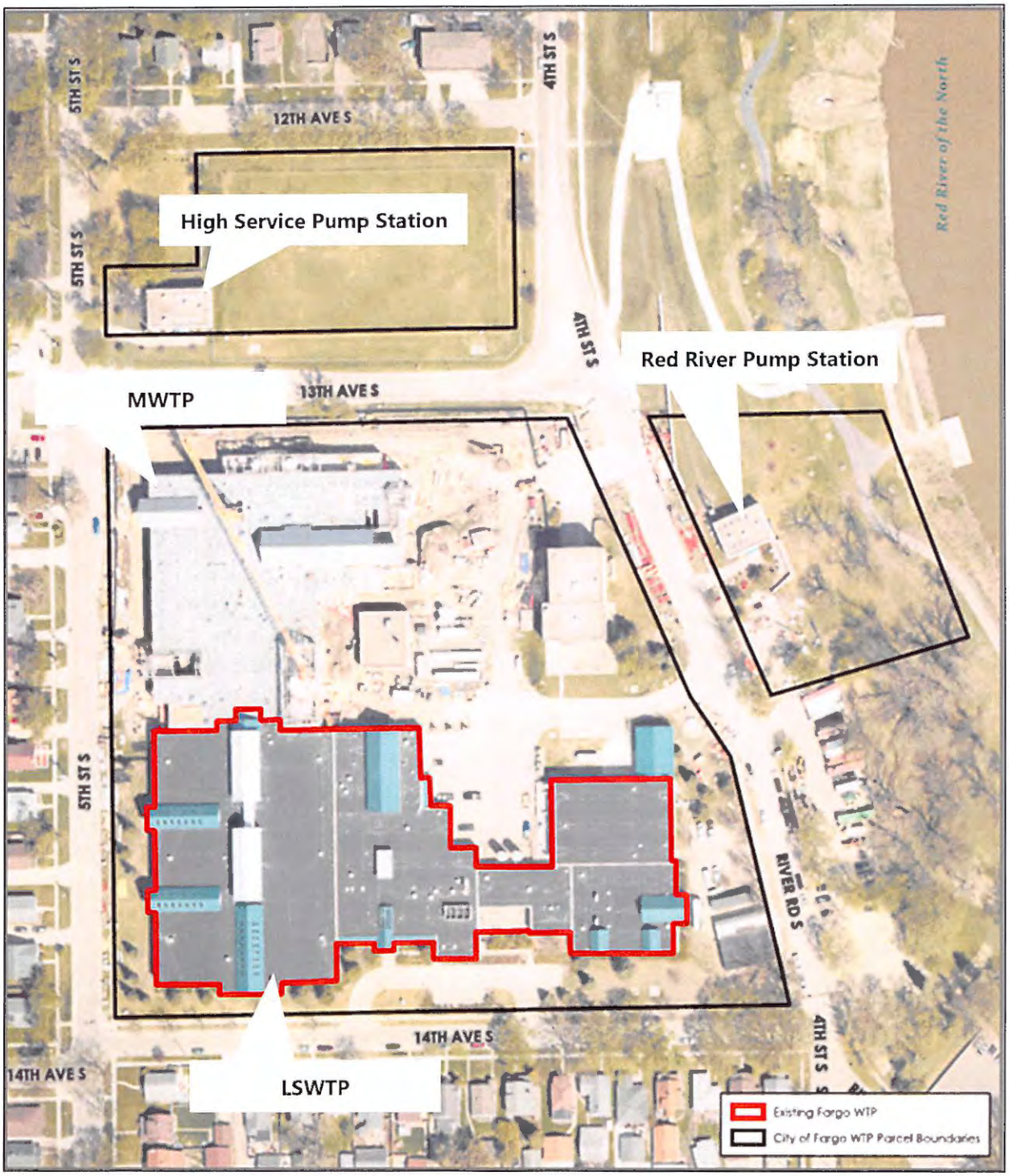


Figure 1.3 Fargo WTP Campus (LSWTP Shown in Red)

NORTH Dakota Be Legendary. | Public Finance Authority

Memorandum

To: Industrial Commission: Governor Kelly Armstrong, Attorney General Drew H. Wrigley, Agriculture Commissioner Doug Goehring

From: DeAnn Ament, Executive Director

Date: January 21, 2025

Re: Grafton, Clean Water State Revolving Fund
Rhame, Drinking Water State Revolving Fund

Under current policy, the Public Finance Authority can make loans under the State Revolving Fund Program in an amount not to exceed $2,000,000 and under the Capital Financing Program in an amount not to exceed $500,000 without seeking the final approval of the Industrial Commission. Within this policy, once the loan has been approved, the Public Finance Authority is required to provide the details of the loan to the Industrial Commission. Accordingly, the Public Finance Authority and its Advisory Committee used this policy to approve the following loans.

The committee reviewed the City of Grafton's Clean Water State Revolving Fund application for a $750,000 loan to replace the control panel and two pumps at the lift station and make improvements to the aeration cell of the lagoon. The requested term for the loan is 15 years. The City will issue revenue bonds payable with wastewater fee revenue.

The committee reviewed the City of Rhame's Drinking Water State Revolving Fund application for an increase of $615,000 to the previously approved $1,199,000 loan ($1,814,000 total loan) towards a $6,185,000 project. The Department of Water Resources Cost Share will provide $3,421,000, Bowman County granted $750,000 and local funds of $200,000 will be used. This project will replace aging asbestos cement pipe water main which has needed extensive repairs over the years with PVC water main on the north side of the railroad tracks. The requested term for the loan is 30 years. The improvement bonds will be a contingent general obligation of the City, backed by the statutory requirement that the City will levy a general deficiency tax in the event that the revenues from the collection of special assessments are not sufficient to pay the debt service on the improvement bonds.

The Public Finance Authority's Advisory Committee approved these loans at their January 21, 2025, meeting.

NORTH Dakota | Public Finance Authority
Be Legendary.

Memorandum

To: Public Finance Authority Advisory Committee

From: DeAnn Ament, Executive Director

Date: January 16, 2025

Re: City of Grafton
Clean Water State Revolving Fund

Purpose of the Project: Replace the control panel and two pumps at the lift station and make improvements to the aeration cell of the lagoon.

Project Amount:

CWSRF Request	$ 750,000
Total Project	$ 750,000

Population Served by the System: 4,170; $180/resident
Is the Project Area Within the Extraterritorial Jurisdiction of a City: No

The requested term for the Clean Water State Revolving Fund (CWSRF) loan is 15 years. The City will issue revenue bonds payable with wastewater fee revenue. The average annual payment for the revenue bonds will be $57,066. The reserve requirement will be $59,125 and the 110% coverage requirement will be $62,772.

The City has 2,218 users paying a monthly wastewater base rate of $9.50 and a volume charge of $3.52/1,000 gallons of water. Commercial and industrial users pay an additional surcharge for strengths greater than domestic wastewater.

Wastewater Fund:

	2021	2022	2023
Interest Revenue	$501	$1,549	$9,202
Operating Revenue	550,471	551,928	523,660
Operating Expenses	536,459	518,926	545,021
Net Operating Revenue (Expense)	14,513	34,551	-12,159
Depreciation	165,687	169,220	165,267
Adjusted Net Operating Revenue	$180,200	$203,771	$153,108
Revenue Bond Payments	$52,615	$54,000	$58,100
Net Operating Coverage	342%	377%	264%
Proforma CWSRF Bond Payment	$57,066	$57,066	$57,066
Proforma Net Operating Coverage	164%	183%	133%

The existing net operating revenue coupled with the proposed rate increase will provide sufficient revenue to meet the 110% net coverage requirement.

The City's outstanding indebtedness as of December 1, 2024:

	Original Amount	Amount Outstanding
Improvement Bonds	$ 22,417,375	$ 16,700,547
Revenue Bonds [1]	4,966,517	2,519,545
	$ 27,383,892	$ 19,220,942

[1] Bond payments have been made as agreed. The City has one CWSRF loan with $305,000 outstanding and one Drinking Water State Revolving Fund loan with $1,175,000 outstanding.

The average annual payment of all bonded debt will be $1,962,869 or $471 per resident.

The City of Grafton is located in Walsh County 41 miles northwest of Grand Forks on US Highway 81. Based on the 2020 census, the total population is 4,170; this is a decrease of 114 from the 2010 census. The largest employers in the City are Marvin Windows (manufacturing) with 380 employees, Life Skills & Transition Center (nursing and residential care) has approximately 304 employees and Grafton Public School employs 175.

K-12 School Enrollment:

			Current	Projected
2021-2022	2022-2023	2023-2024	2024-2025	2025-2026
899	878	877	880	900

The City's 2024 taxable valuation was $10,285,080. This is an increase of $2,312,927 over the 2020 taxable valuation.

Property Tax Collections 12/31/2024:

Year	Dollar Amount	Amount Collected to Date of Application	Percentage Collected
2024	$475,977	$25,397	5%
2023	$220,566	$203,484	92%
2022	$235,020	$224,612	96%

Special Assessment Collections 1/16/2025:

Year	Dollar Amount	Amount Collected to Date of Application	Percentage Collected
2024	$475,977	$25,397	5%
2023	$220,566	$203,484	92%
2022	$235,020	$224,612	96%

Grafton Mill Levy History:

Year	City	School	Park District	State and County	Other	Total for Each Year
2024	115.98	126.40	43.90	119.55	0.96	406.79
2023	116.01	127.76	43.65	128.77	1.90	418.09
2022	120.06	130.00	43.67	119.70	1.08	414.51
2021	123.52	130.00	43.00	111.00	1.50	409.02
2020	126.43	145.00	42.97	119.25	1.50	435.15

PROJECT LOCATION MAP

City of Grafton

Existing Sanitary Lift Station

Lift Station Pump Replacement Projects
Grafton, North Dakota

CITY OF GRAFTON

KLJ

NORTH Dakota | Public Finance Authority
Be Legendary.

Memorandum

To: Public Finance Authority Advisory Committee

From: DeAnn Ament, Executive Director

Date: January 13, 2025

Re: City of Rhame
Drinking Water State Revolving Fund

Purpose of the Project: Replace aging asbestos cement pipe water main which has needed extensive repairs over the years with PVC water main on the north side of the railroad tracks.

Project Amount:

DWSRF Increase Request	$ 615,000
DWSRF Original Request	1,199,000
DWSRF Total	$ 1,814,000

DWR Cost Share	$ 3,421,000
Bowman County	750,000
Local Funds	200,000
Project Total	$ 6,185,000

Population to Benefit from the Project: 158; $39,146/person
Population Served by the System: 158
Is the Project Area Within the Extraterritorial Jurisdiction of a City: No

The requested term for the Drinking Water State Revolving Fund (DWSRF) loan is 30 years. The average annual payment for the improvement bonds will be $76,564. The improvement bonds will be a contingent general obligation of the City, backed by the statutory requirement that the City will levy a general deficiency tax in the event that the revenues from the collection of special assessments are not sufficient to pay the debt service on the improvement bonds.

The City has 90 water connections which pay a monthly base rate of $30 per user.

Water Fund:

	2020	2021	2022	2023
Operating Revenue	$46,349	$42,420	$47,796	$44,920
Operating Expenses	31,316	48,130[1]	25,211	46,463[1]
Net Operating Revenue (Expense)	$15,033	-$ 5,710	$22,585	-$ 1,544

[1] Expenses have increased due to water main repairs.

The City's outstanding indebtedness as of December 31, 2023:

	Original Amount	Amount Outstanding
Improvement Bonds	$ 145,000	$ 58,000
	$ 145,000	$ 58,000

With 200 parcels to be assessed, the average annual assessment per parcel for this project will be approximately $383. The average annual payment of all bonded debt will be $91,064 or $576 per resident.

The City of Rhame is located in Bowman County 87 miles southwest of Dickinson. Based on the 2020 census, the total population is 158; this is a decrease of 11 from the 2010 census. The largest employers in the City are Bowman County Schools with 8 employees, Kruger's Kitchen (restaurant) has 7 employees, and Waterhole Bar employs 5.

Rhame K-6 School Enrollment:

				Projected
2021-2022	2022-2023	2023-2024	2024-2025	2025-20265
29	23	22	13	13

The City's 2024 taxable valuation was $355,560. This is an increase of $19,765 over the 2020 taxable valuation.

Property Tax Collections 12/18/2024:

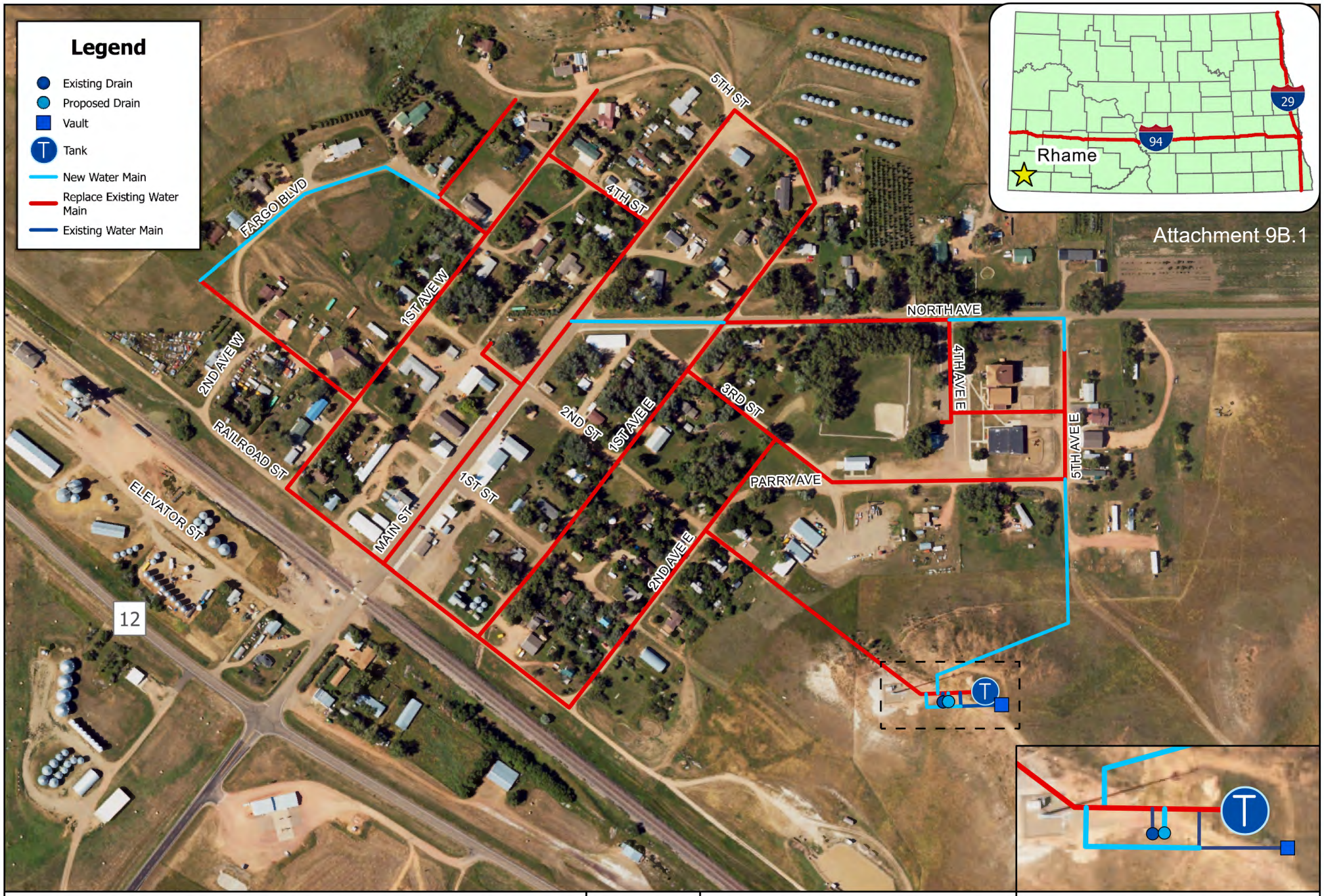
Levy Year	Dollar Amount of Levy	Amount Collected to Date of Application	Percentage Collected
2024	$34,536	-	-
2023	$11,540	$9,229	80%
2022	$36,556	$35,836	98%
2021	$35,795	$35,635	100%

Special Assessment Collections 12/18/2024:

Year	Dollar Amount	Amount Collected to Date of Application	Percentage Collected
2024	-	-	-
2023	$43	-	-
2022	-	-	-
2021	-	-	-

Mill Levy History:

Year	City	School	Park District	State and County	Other	Total for Each Year
2024	97.13	93.31	1.57	58.61	3.50	254.12
2023	31.90	89.82	5.43	55.52	3.50	186.17
2022	105.00	89.65	5.43	53.81	3.50	257.39
2021	103.87	86.78	10.03	52.43	3.50	256.61
2020	105.00	85.00	10.37	52.17	3.50	256.04



2024 WATER MAIN REPLACEMENT
RHAME, NORTH DAKOTA

Created By: BAS Date Created: 11/27/2023 Date Saved: 11/28/23 Date Plotted: N/A Date Exported: 12/15/23
Plotted By: brook.smith Aerial Image: 2022 County NAIP SIDS
Horizontal Datum: N/A Vertical Datum: NAVD1988
T:\Projects\22900\22951_Rhame_WaterSystemImprovements\10_ArcPro\22951_Rhame_WaterSystemImprovements.aprx

N W E S

0 200 400 600 800 Feet

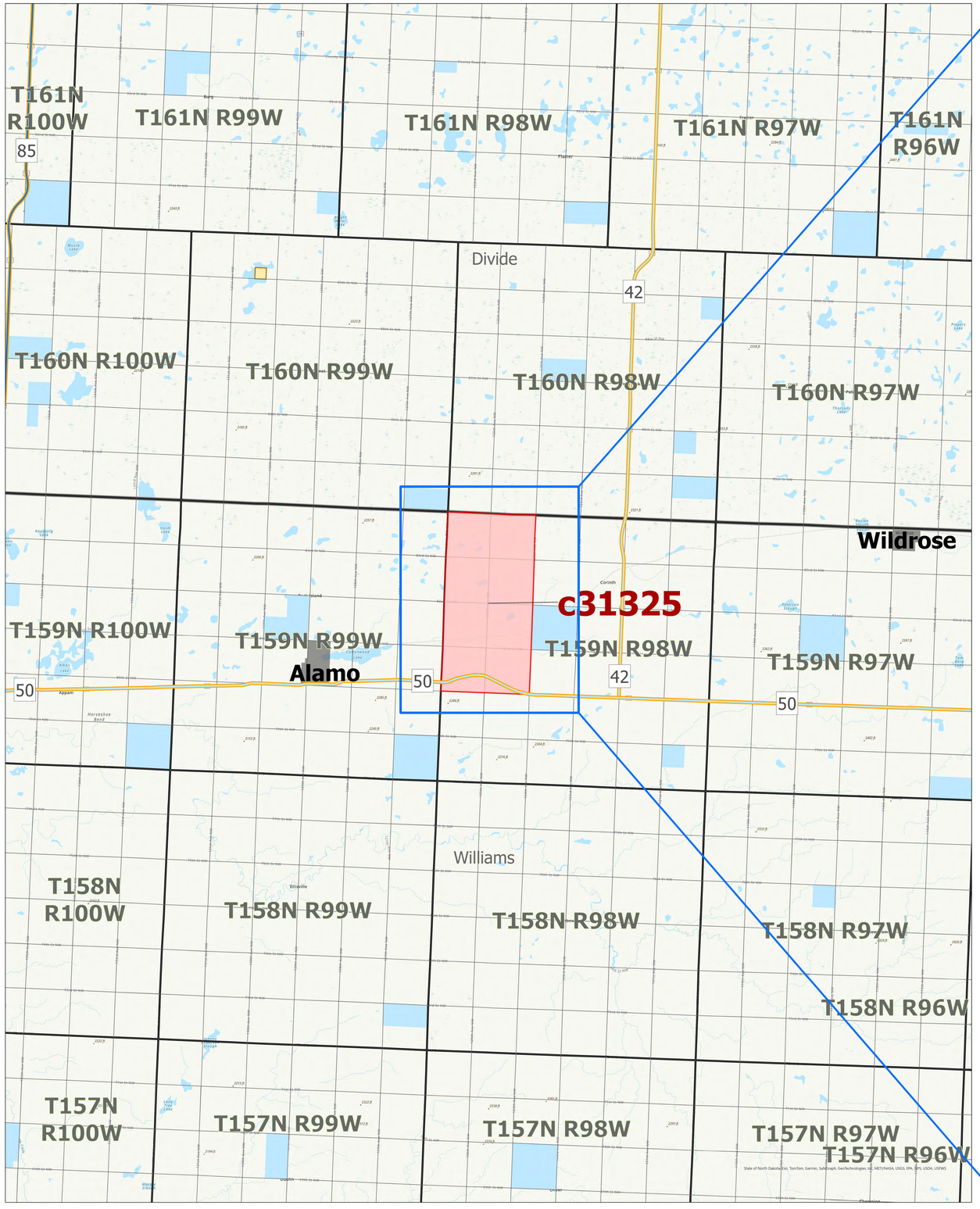
moore engineering, inc.

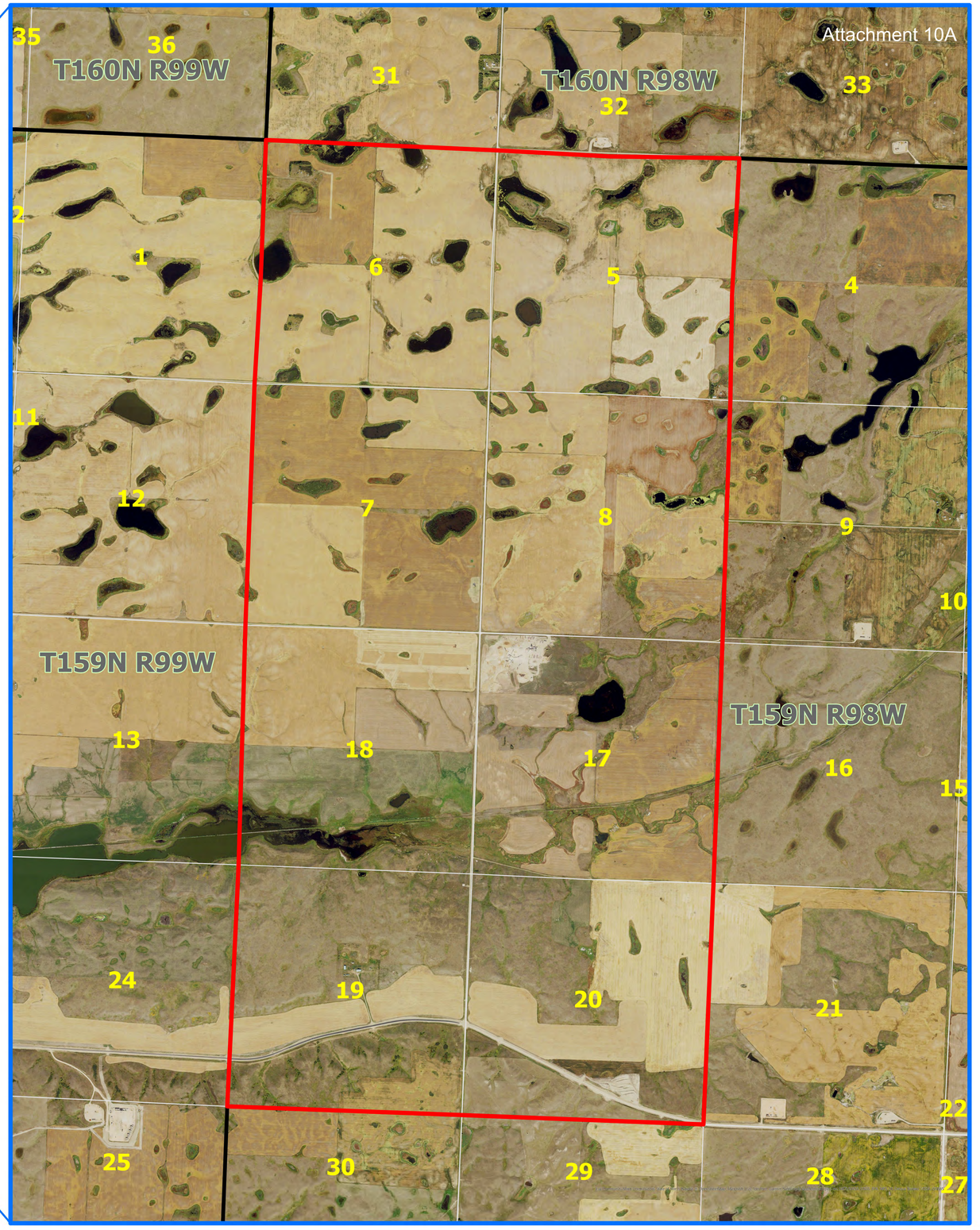
Attachment 10

Docket for Hearing
Wednesday, November 20, 2024
N.D. Oil & Gas Division N.D. Oil & Gas Division 1000 East Calgary Avenue

Case No. 31325, Order No. 34025: Application of Phoenix Operating LLC for an order amending the applicable orders for Big Stone-Bakken Pool to establish an overlapping 5120-acre spacing unit described as Sections 5, 6, 7, 8, 17, 18, 19 and 20 T.159N., R.98W., Williams County, ND and to authorize 1 horizontal well to be drilled on such unit and granting such other relief as may be appropriate.

Industrial Commission c31325

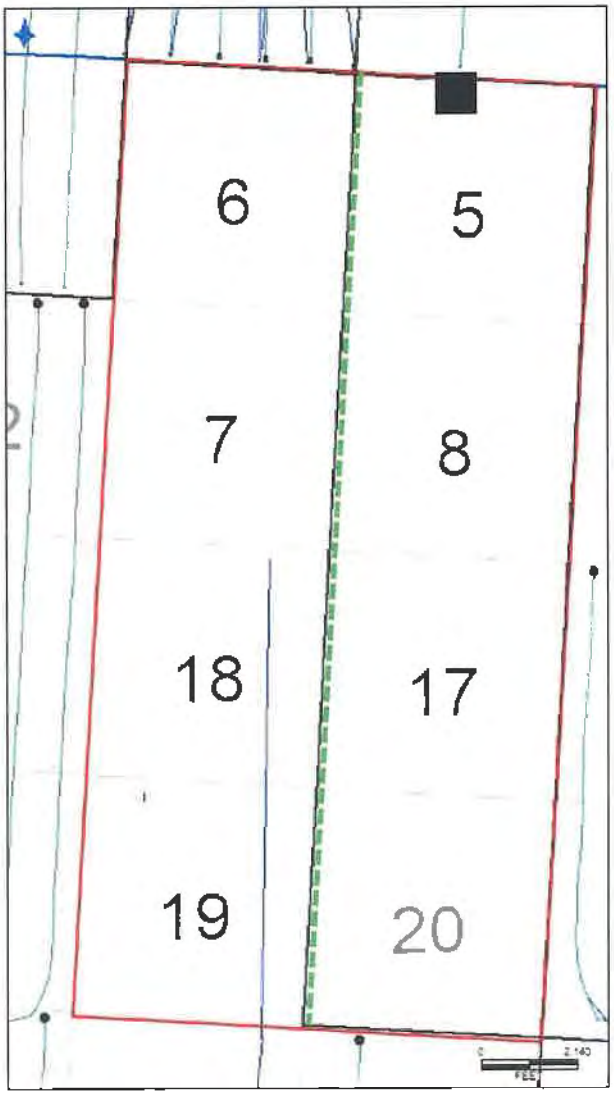




Sections
Townships
City Boundary
Surface Trust Land
Bureau of Land Management

NORTH DAKOTA
OIL AND GAS DIVISION

1/20/2025



- Proposed 5120-acre Spacing Unit
- Middle Bakken Horizontal Wells
- Three Forks Horizontal Wells

Proposed Multi-Well Pad

Proposed Middle Bakken Horizontal Well

Proposed Spacing Unit

11/20/24 CASE NO. 31325
Produced By Phoenix
Exhibit #7
Identified By Shivey

Case 31325 - Protest

Kraken RESOURCES

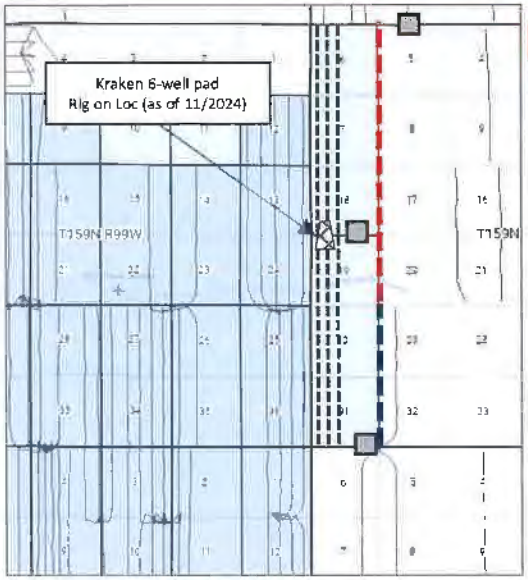
Case 31325 - Proposed

Kraken currently drilling 6-well pad with Nabors rig on location (wells shown in dashed lines)

Case 31325 proposes 4-mile leaseline (shown in red) adjacent to Kraken acreage

4-mile leaseline results in Kraken drilling 2-mile leaseline (shown in dark blue)

Scenario results in suboptimal economics and three future pad locations compared to dual 3-mile leaseline wells



Leaseline 1		Leaseline 2	
4-mile EUR,	845 MBO	2-mile EUR,mbo	425 MBO
4-mile CAPEX	$13.50 MM	2-mile CAPEX	$9.0 MM
4-mile F&D	$16/BO	2-mile F&D	$21/BO
4-mile IRR and PV10	63% / $8.0 MM	2-mile IRR and PV10	25% / $2.0 MM

Total Project	
Total Project EUR, mbo	1,270 MBO
Total Project CAPEX, $MM	$22.5 MM
Total Project F&D, $/EUR	$18/BO
Total Project IRR and PV10	45% / $10.0 MM

Future Pad Locations	
# Future Pad Locations	3

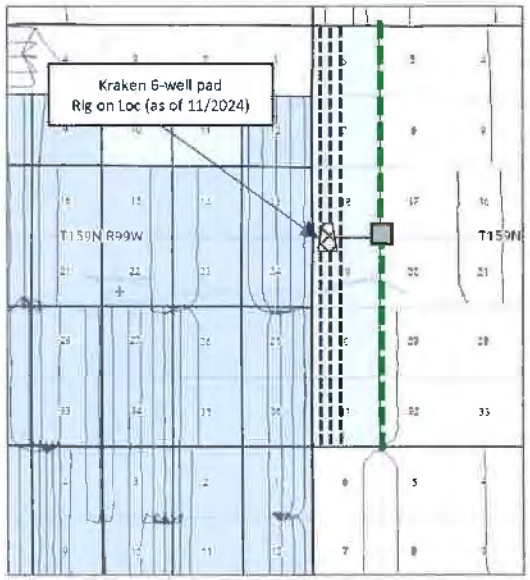
Case 31325 - Protest

Kraken currently drilling 6-well pad with Nabors rig on location (wells shown in dashed lines)

Kraken has always planned to drill 3-mile leaseline wells (shown in green) but did not apply for spacing due to no production in adjacent sections

Kraken planned to propose 3-mile leaseline wells once the 6 work-in-progress wells began production

Scenario results in single pad location with optimized economics vs. one 4-mile leaseline and one 2-mile leaseline



Leaseline 1		Leaseline 2	
3-mile EUR	635 MBO	3-mile EUR,mbo	635 MBO
3-mile CAPEX	$10.90 MM	3-mile CAPEX	$10.90 MM
3-mile F&D	$17/BO	3-mile F&D	$17/BO
3-mile IRR and PV10	51% / $5.5 MM	3-mile IRR and PV10	51% / $5.5 MM

Total Project		vs. Case 31325
Total Project EUR, mbo	1,270 MBO	Same Recovery
Total Project CAPEX, $MM	$21.81 MM	Less CAPEX
Total Project F&D, $/EUR	$17/BO	More capital efficient
Total Project IRR and PV10	51% / $11.0 MM	More economic

Future Pad Locations		
# Future Pad Locations	1	Fewer surface locations

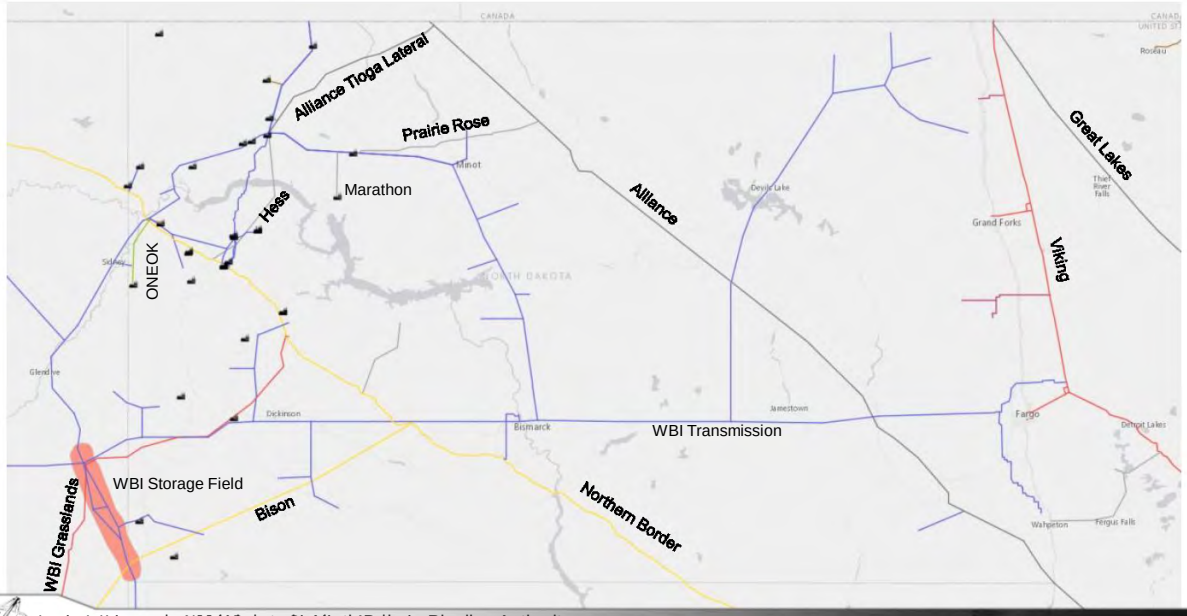
N.D. Oil & Gas Division N.D. Oil & Gas Division 1000 East Calgary Avenue

Case No. 31502, Order No. 34223: In the matter of the Commission approving the transfer of the Red Trail Richardton Ethanol Broom Creek Storage Facility #1 (Facility No. 90000317) authorized and created by Order No. 31453 and the transfer of the RTE #10 well (File No. 37229) and RTE #10.2 well (File No. 37858) from Red Trail Energy, LLC to Richardton CCS, LLC pursuant to North Dakota Administrative Sections 43-05-01-06 and 43-05-01-12.1.

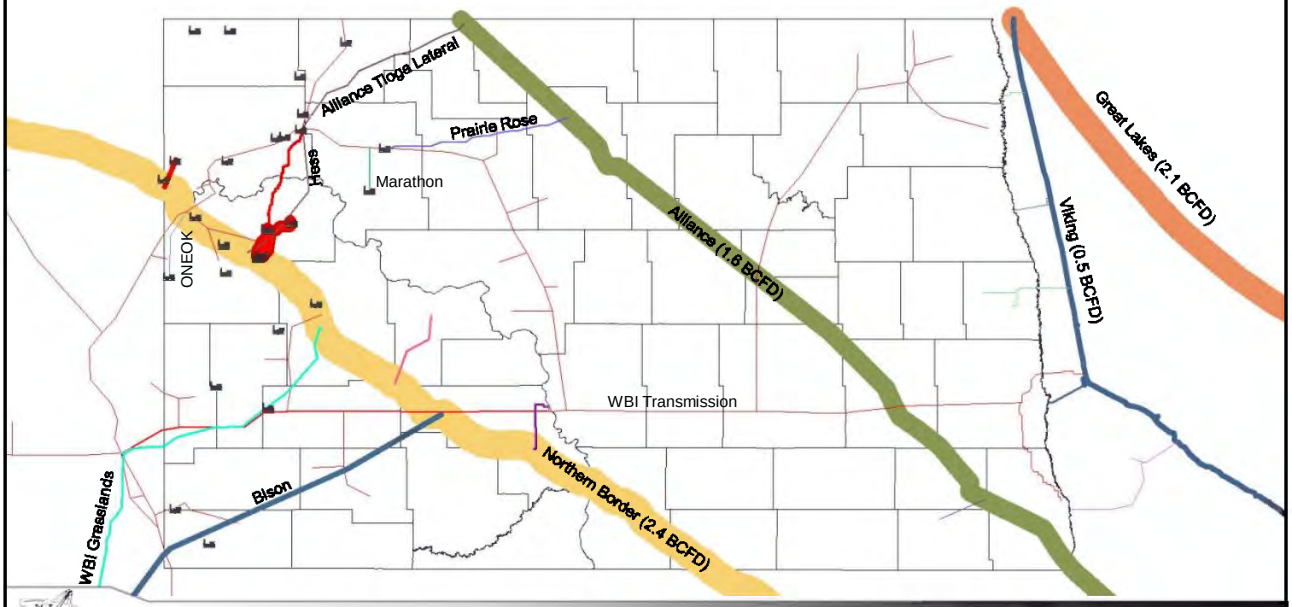
WBI Energy: Proposed Bakken East Pipeline

Image: Library of Congress

Major Residue Gas Pipeline Infrastructure



Residue Gas Pipeline Capacity Visualization



WBI Energy: Proposed Bakken East Project

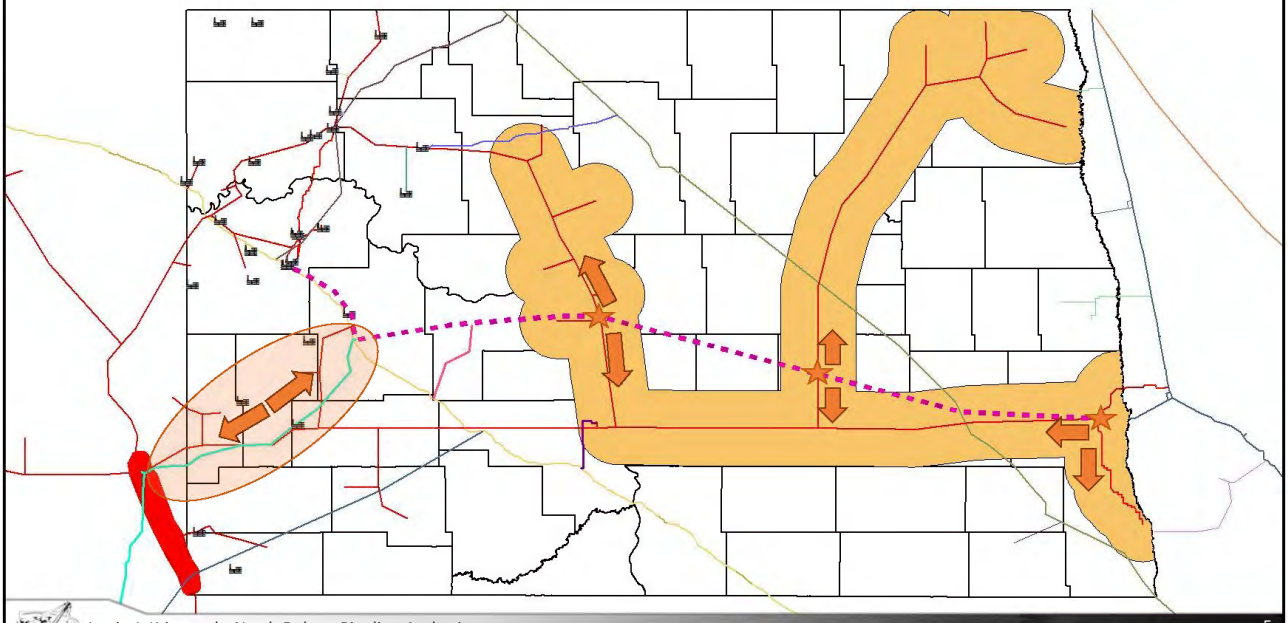
Natural Gas Pipeline Project Highlights

- Non-binding open season Dec 16 – Jan 31, 2025
- 375 Miles: 30" & 24" Pipe
- Proposed Capacity 760,000 Dth/Day
- Phase 1 (West) : Nov 2028 targeted in-service
- Phase 1 (East) : Nov 2029 targeted in-service
- Seeking commitments 20yrs or Longer

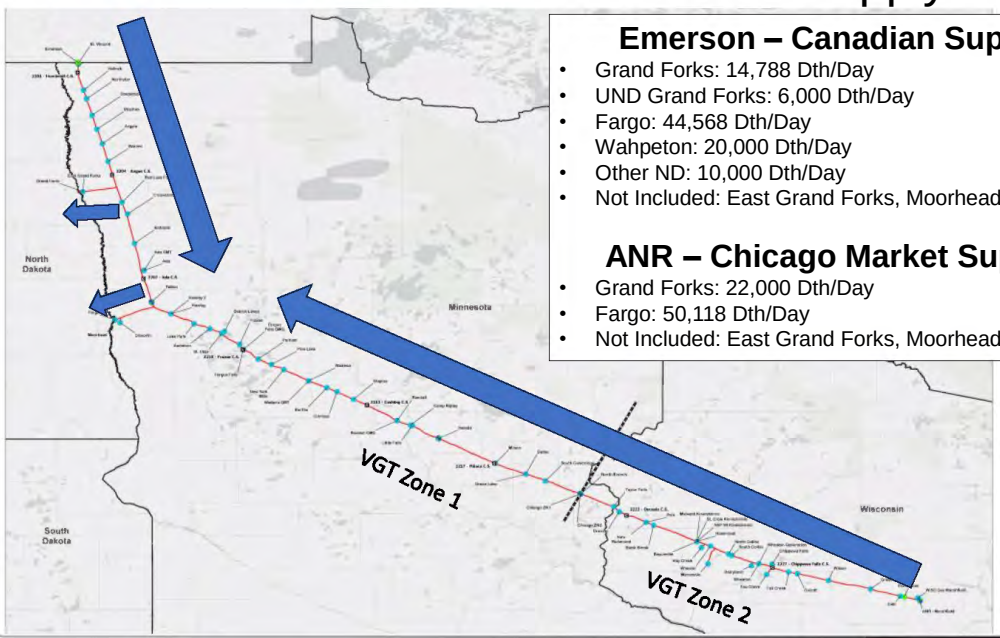
Estimated Rates

- $0.85 to $0.90/Dth + Fuel/Electric/Commodity
- Anchor Shipper Minimum: 100,000 Dth/Day
- Foundation Shipper Minimum: 250,000 Dth/Day

Bakken East: Benefits Could Extend Beyond Route



Current Eastern North Dakota Gas Supply



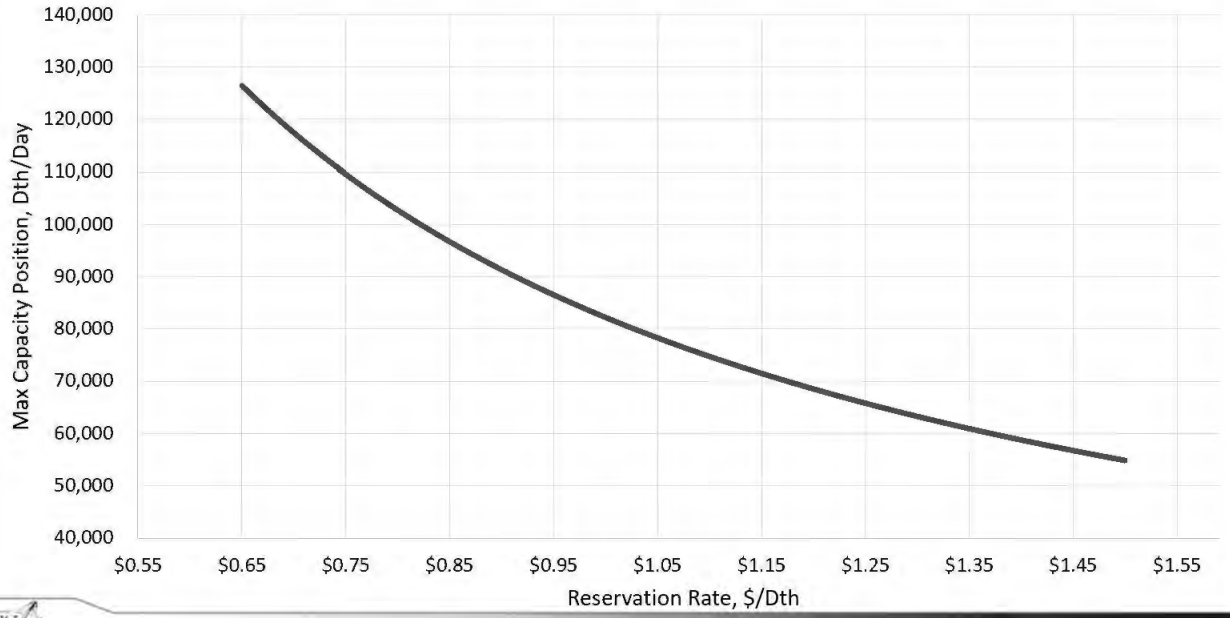
Emerson – Canadian Supply

- Grand Forks: 14,788 Dth/Day
- UND Grand Forks: 6,000 Dth/Day
- Fargo: 44,568 Dth/Day
- Wahpeton: 20,000 Dth/Day
- Other ND: 10,000 Dth/Day
- Not Included: East Grand Forks, Moorhead, Etc.

ANR – Chicago Market Supply

- Grand Forks: 22,000 Dth/Day
- Fargo: 50,118 Dth/Day
- Not Included: East Grand Forks, Moorhead, Etc.

Capacity and Reservation Rate at $30M/Yr



How Could NDPA Manage Contracted Capacity?

Most Desirable

Least Desirable

- Release capacity to replacement shipper(s) in increments greater than one year at FERC required rate structure
- Release capacity to replacement shipper(s) in increments less than one year at bid rates *(Limited by 54-17.7-04 Subsection 3)*
- Release of capacity to an asset manager for an appropriate term length
- Pay obligated precedent agreement rates until a release or asset management agreement is established

Pipeline Authority Century Code– 54-17.7-04.

3. Acquire, purchase, hold, use, lease, license, sell, transfer, and dispose of an undivided or other interest in or the right to capacity in any pipeline system or systems, including interconnection of pipeline systems, within or without the state of North Dakota in order to facilitate the production, transportation, distribution, or delivery of energy-related commodities produced in North Dakota. If the authority acquires, purchases, holds, uses, or leases capacity positions, the authority shall sell, transfer, release, or dispose of the capacity positions at intervals that are no more frequent than monthly and in an amount that is equal to or greater than the market rate, but only if the sale, transfer, release, or disposal of the capacity positions is sufficient to cover the expenses and obligations incurred. The authority's contract obligations for the capacity positions are limited to the capacity rates, charges, and terms.

Contact Information

Justin J. Kringstad, Director
North Dakota Pipeline Authority

600 E. Boulevard Ave. Dept. 405
Bismarck, ND 58505-0840

Phone: (701)220-6227
E-mail: jjkringstad@ndpipelines.com

811 Know what's below. Call before you dig.

Website:
www.northdakotapipelines.com

WBI Energy Transmission, Inc.
Bakken East Pipeline Project
December 16, 2024
Non-Binding Open Season

WBI Energy Transmission, Inc., announces a Non-Binding Open Season for the sale of long term, firm natural gas transportation capacity on the Bakken East Pipeline Project.

Purpose

WBI Energy Transmission, Inc. ("WBI Energy") hereby announces the commencement of a Non-Binding Open Season ("Open Season") for firm natural gas transportation service on the proposed Bakken East Pipeline Project ("Project"). This Open Season is being held so that WBI Energy can further define expressed market interest in new firm transportation capacity to be utilized to transport natural gas from the Bakken producing region in western North Dakota to serve new power generation, industrial and local distribution company natural gas demand in central and eastern North Dakota. The Project may also interconnect with existing interstate pipelines serving the Midwestern United States. WBI Energy is soliciting non-binding indications of interest from shippers interested in firm natural gas transportation capacity on the Project. Any shipper desiring firm transportation service under the Project must complete the attached Non-binding Indication of Interest Sheet ("Interest Sheet") as detailed in the Open Season Procedure section. WBI Energy will engage those parties submitting Interest Sheets to further refine the final design of the Project.

Project Overview

The Project will create new firm transportation capacity which will be primarily utilized to transport increasing volumes of natural gas, from the prolific Bakken producing region in western North Dakota, to serve new power generation, industrial and local distribution company demand in central and eastern North Dakota. The Project may also interconnect with existing third-party interstate pipeline systems located along the proposed Project route including Northern Border Pipeline and Alliance Pipeline L.P. Deliveries to Viking Gas Transmission Company may also be possible through the utilization of existing WBI Energy pipeline facilities in combination with the Project. A map showing the proposed route for the Project is attached.

Capacity

The initial design of the Project includes approximately 375 miles of new 30-inch and 24-inch diameter high pressure steel pipeline, compression and various measurement and interconnection facilities. Based on this initial design, the Project will have a capacity of up to 760,000 equivalent dekatherms per day (dkt/day). The final design of the Project will ultimately depend on the results

of this Open Season and any subsequent binding open season(s). It is anticipated that the Project will be constructed over two construction seasons and will be placed into service in two phases. The first phase of the Project has a targeted in-service date of November 1, 2028, and the second phase has a targeted in-service date of November 1, 2029. The first phase of the Project is expected to commence in western North Dakota and terminate in central North Dakota.

Length of Open Season

The Open Season will commence on December 16, 2024, and conclude at 4:00 PM Central Time on January 31, 2025. The Open Season is available to any party.

Receipt and Delivery Locations

The Project, as contemplated, will be integrated with WBI Energy's existing natural gas transmission system to provide access to receipt locations throughout the Bakken region, including certain receipt locations in Burke, Dunn, McKenzie, Mountrail and Williams Counties in North Dakota. WBI Energy will consider requests for new receipt and delivery locations along the Project route, as well as receipt locations on WBI Energy's existing natural gas transmission system. Physical constraints may limit WBI Energy's ability to accept certain requested receipt locations.

Gas Quality

Natural gas received by WBI Energy shall comply with the gas quality standards established in WBI Energy's Federal Energy Regulatory Commission ("FERC") Gas Tariff, Third Revised Volume No. 1 ("Tariff"). Shippers desiring to deliver gas to an interconnecting pipeline shall be responsible for ensuring that such gas complies with the gas quality standards of the interconnecting pipeline.

Rates

Service on the Project will be provided pursuant to WBI Energy's Rate Schedule FT-1 as more fully described in WBI Energy's Tariff.

Based on the initial project design contemplated in this Open Season, WBI Energy estimates a, cost-of-service based, project recourse rate of $0.85 to $0.90 per dkt may be necessary to support this Project. The estimated project recourse rate is subject to change based on the outcome of this Open Season. A revised project recourse rate will be made available at the time of any future binding open season. WBI Energy may also negotiate a reservation rate for firm transportation service under the Project with shippers.

In addition to the reservation rate, shippers will also be responsible for fuel use, lost and unaccounted for gas, electric power charges, commodity charges and all applicable surcharges as

approved by the FERC, for firm transportation service under the Project, as such may be in effect from time to time.

Term

The contract term is negotiable, however, WBI Energy estimates that a minimum term of twenty (20) years may be necessary to support the Project as proposed.

Foundation Shipper and Anchor Shipper Status

WBI Energy may consider negotiating foundation shipper and/or anchor shipper status for shippers that submit Interest Sheets during this Open Season that meet the minimum volume thresholds detailed below:

- Foundation Shipper - Commit to a Maximum Daily Delivery Quantity ("MDDQ") of at least 250,000 equivalent dkt/day.
- Anchor Shipper – Commit to a MDDQ of at least 100,000 equivalent dkt/day.

Additionally, WBI Energy may negotiate a Precedent Agreement with any shipper satisfying the initial requirements for a foundation shipper or an anchor shipper, as defined in this Open Season, prior to or concurrent with WBI Energy's commencement of the first Binding Open Season for the Project.

Shippers that qualify for foundation shipper or anchor shipper status may be entitled to certain incentives related to rate, term or priority related to the awarding of Project capacity. Qualifying foundation shippers and anchor shippers may request additional incentives or benefits.

Open Season Procedure

Any shipper desiring firm transportation service under the Project must complete an Interest Sheet. Completed Interest Sheets must be e-mailed to josh.hager@wbienergy.com or david.dahms@wbienergy.com. Alternately, completed Interest Sheets may be mailed (to ensure receipt by WBI Energy prior to the end of the Open Season) to:

WBI Energy Transmission, Inc.
Market Services Department
P.O. Box 5601
Bismarck, ND 58506-5601

Interest Sheets must be signed by a duly authorized representative of the requesting shipper and delivered to WBI Energy by the date and time indicated above.

At the conclusion of the Open Season, WBI Energy will evaluate all timely submitted Interest Sheets and determine its next steps. WBI Energy will look to initiate discussions regarding binding Precedent Agreements with those parties who submitted Interest Sheets. If WBI Energy receives sufficient interest in this Open Season, it is anticipated that one or more binding open seasons will be held sometime thereafter, wherein WBI Energy and interested shippers will finalize binding Precedent Agreements.

All transportation services proposed as part of this Open Season are expressly subject to WBI Energy's receipt of all regulatory approvals required to effectuate the services contemplated hereunder in form and substance satisfactory to WBI Energy. WBI Energy, in its sole discretion, may (i) revise the anticipated scope and/or capacity of the Project, (ii) decide not to pursue the Project or (iii) develop alternatives to the Project that suit the needs reflected in the results of this Open Season or a subsequent open season.

Participation in this Open Season will be considered non-binding on both the participating shippers and WBI Energy, until such time as the parties have executed a Precedent Agreement or some other form of agreement related to the Project.

We urge you to respond promptly to this Open Season.

If you have any questions please contact Josh Hager at (701) 530-1532, or David Dahms at (701) 530-1565.

Bakken East Pipeline Project
Non-binding Indication of Interest Sheet

- Shipper Name: _____
- Contact Person: _____
- Mailing Address: _____
- Phone: _____
- E-Mail: _____

Primary Receipt and Delivery Location(s):

Receipt Location	Delivery Location	MDDQ (Equivalent dkt/day)	Rate $/Dkt[1]	Requested Start Date
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Total Maximum Daily Delivery Quantity (MDDQ) Requested: _____ (equivalent dkt/day)

Length of Term: _____ (years following the in-service date of the facilities)

Shipper Comments:

- Please provide any additional comments or feedback in the space below.

Signed By: _____

Name: _____

Title: _____

Date: _____

[1] In addition to reservation charges, shippers will also be responsible for fuel use, lost and unaccounted for gas, electric power charges, commodity charges and all applicable surcharges as approved by the FERC for firm transportation service under the Project, as such may be in effect from time to time.

Proposed Bakken East Pipeline Project

Overview
Exhibit

CANADA

North Dakota

South Dakota

Montana

Minnesota

Crosby
Kenmare
Bottineau
Rolla
Walhalla
Cavalier
Hallock
Langdon
Cando
Rugby
Park River
Grafton
Warren
Devils Lake
Velva
Tioga
Stanley
Burlington
Minot
Williston
New Town
Watford City
Sidney
Larimore
East Grand Forks
Grand Forks
Thompson
Crookston
Harvey
Garrison
New Rockford
Carrington
Mayville
Cooperstown
Hillsboro
Ada
Beulah
Hazen
Washburn
Beach
Dickinson
Mandan
Bismarck
Lincoln
Jamestown
Valley City
Casselton
West Fargo
Fargo
Moorhead
Dilworth
Glyndon
Barnesville
Lisbon
Bowman
Linton
Wishek
Breckenridge
Oakes
Hankinson
Hettinger
Lemmon
Ellendale
Britton
Wheaton
Eureka
Sisseton

N

0 5 10 20 30 40
Miles

Legend

- Cities
- Bakken East Pipeline Project
- Existing WBI Energy System

Foreign Natural Gas Pipelines

- Alliance Pipeline
- Northern Border Pipeline
- Viking Gas Transmission

- County Boundaries
- State Boundaries

Scale: 1:1,750,000

WBI ENERGY TRANSMISSION
An MDU Resources Group company

OIL AND GAS RESEARCH PROGRAM PROJECT MANAGEMENT REPORT

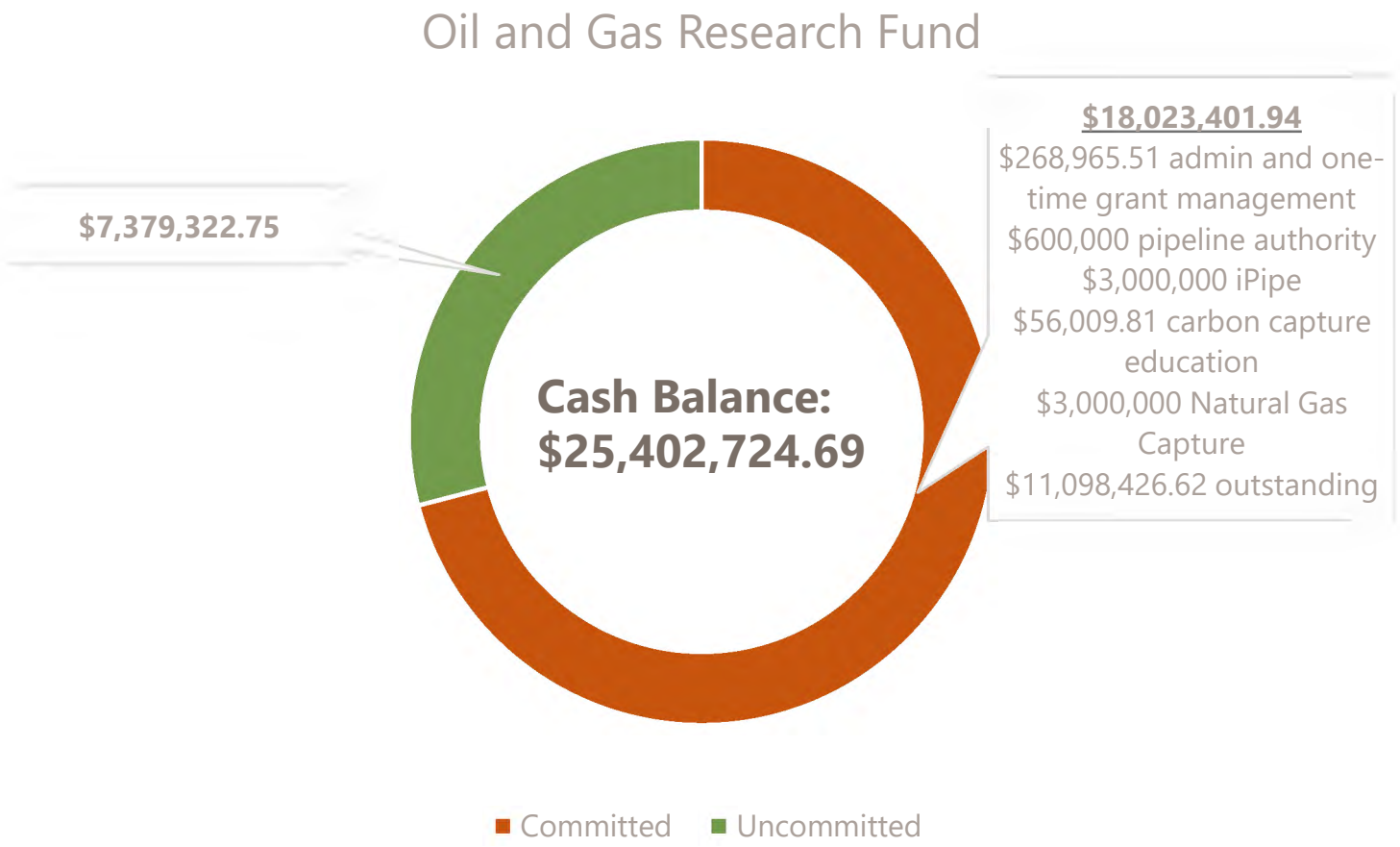
Jordan Kannianen, Deputy Executive Director, NDIC

January 21, 2025

NORTH Dakota

Be Legendary.™

OIL AND GAS RESEARCH FUND BALANCE JUNE 24, 2024



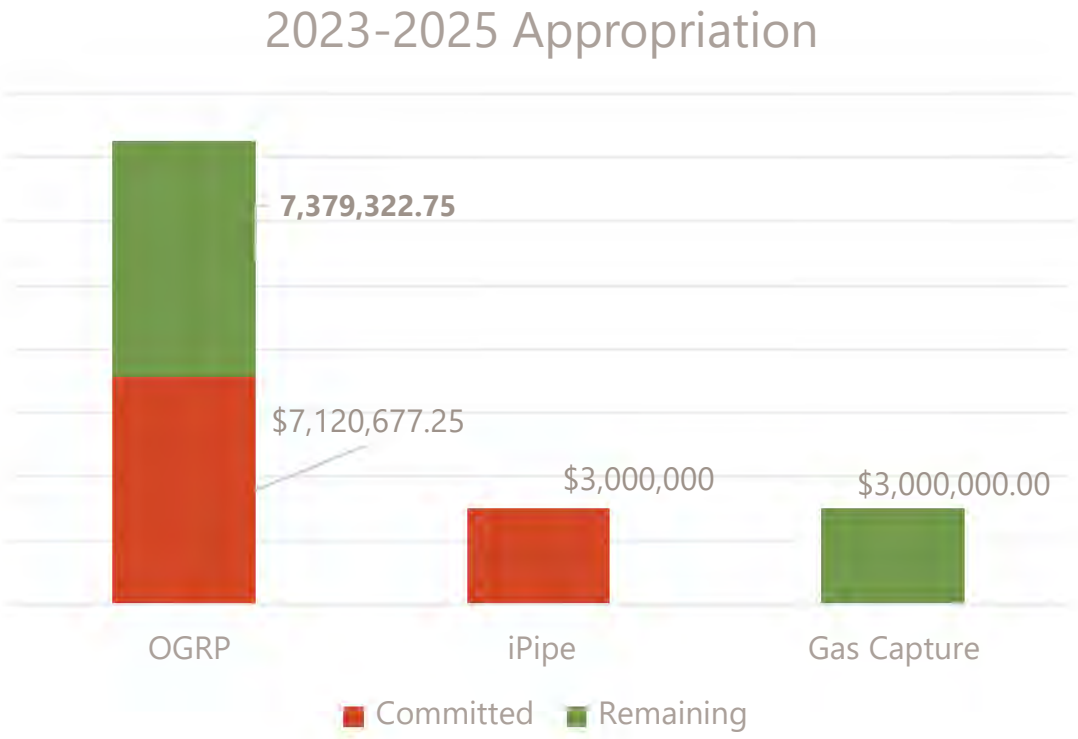
Funding Source:
- **$17.5 million oil production and extraction tax**
- **$3 million SIIF for iPipe**

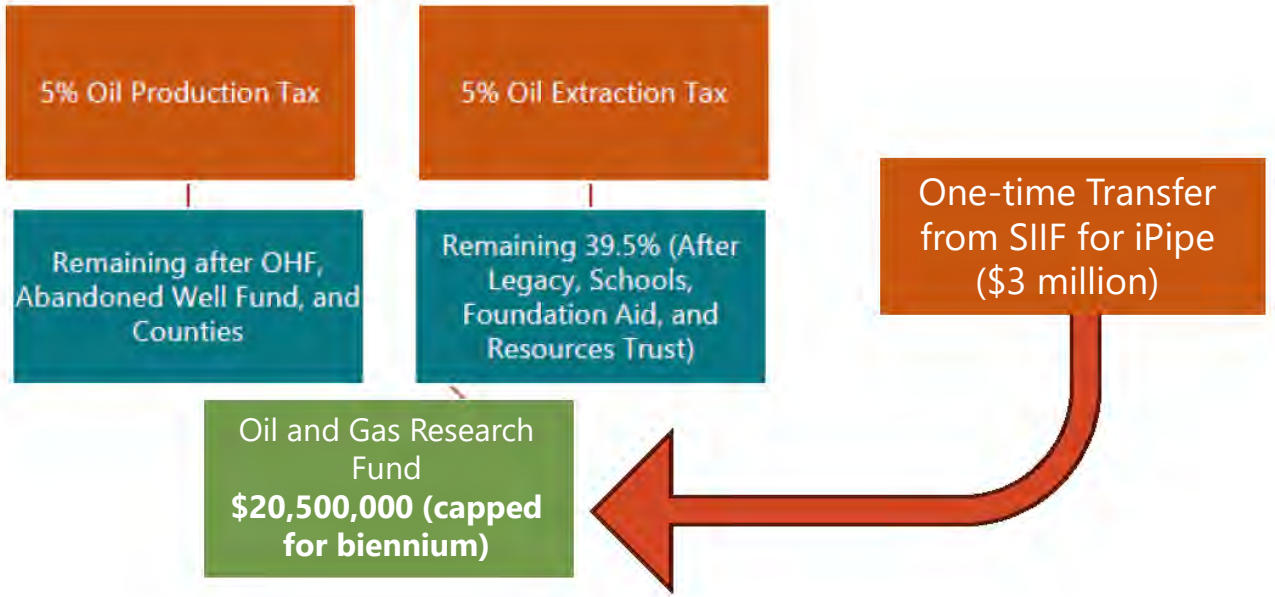
117 Cumulative Projects

13 Active Projects

Cumulative Value:
- **$93.75 million granted**
- **$531.52 million project value**

2023-2025 BIENNIUM FUNDING:





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

November 1, 2024

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

Dear Mr. Haase:

Subject: EERC Proposal No. 2025-0054 Entitled "Breaking New Ground in Flaring Reduction" in Response to the North Dakota Industrial Commission Oil and Gas Research Program Clean Natural Gas Capture and Emissions Reduction Program

The Energy & Environmental Research Center (EERC) is pleased to propose a project that will capture natural gas which would have otherwise been flared and will implement advanced technology on oil and gas wellsites. Steffes LLC and Advanced Flow Solutions Inc. are providing project cost share. These organizations provide manufacturing and servicing support for the flare reduction technology (Polar Bear™) that is under joint development with the EERC. The technology targets most of the remaining flared gas in North Dakota, designed to accomplish near-zero emissions.

The EERC, a research organization within the University of North Dakota, an institution of higher education within the state of North Dakota, is not a taxable entity; therefore, it has no tax liability.

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) 777-5201 or by email at dschmidt@undeerc.org.

Sincerely,

DocuSigned by:
Darren Schmidt
DBBB990DF8C34D8...

Darren D. Schmidt
Assistant Director for Energy, Oil, and Gas

Approved by:

DocuSigned by:
Tami Votava
E7468BBB3DE440E...

for

Charles D. Gorecki, CEO
Energy & Environmental Research Center

DDS/rlo
Attachments

c/att: Erin Stieg, NDIC OGRP

Oil and Gas Research Program:

Clean Natural Gas Capture and Emissions Reduction Program

North Dakota Industrial Commission

Application

Project Title: Breaking New Ground in Flaring Reduction

Applicant: University of North Dakota Energy & Environmental Research Center

Principal Investigator: Darren D. Schmidt

Date of Application: November 1, 2024

Amount of Request: $2,566,341

Total Amount of Proposed Project: $5,132,682

Duration of Project: 12 months

Point of Contact (POC): Darren D. Schmidt

POC Telephone: (701) 777-5201

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

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ABSTRACT

Objective: The objective is to deploy 30 gas capture units on well pad facilities in North Dakota to reduce or eliminate gas flaring. The purpose is to achieve near-zero wellsite emissions and accelerate the adoption of state-of-the-art technology. An adequate sample size is proposed to assess gas capture performance for multiple operators including variations of wellsite facilities. Advancements include oil-free natural gas compression and new methods for facility integration that boost economics, simplify installation, and lower operational costs compared to conventional vapor recovery.

Expected Results: A summary of work performed, description of site locations, installation photos, project costs, and rates and volumes of gas captured will be reported to the Oil and Gas Research Program (OGRP) on an interim basis. Results will reduce the cost and risk for owners and operators to capture gas that would otherwise be flared, reduce emissions, accelerate commercial deployment of new technology, and continue to deliver impacts beyond the term of the project.

Duration: 1 year (January 1, 2025 – December 31, 2025).

Total Cost: The total value of the project is $5,132,682. The OGRP request is for 50%, $2,566,341. Cost-share commitments are provided from Advanced Flow Solutions Inc. and Steffes LLC at $1,824,500 and $741,841, respectively.

Participants: Energy & Environmental Research Center, Advanced Flow Solutions Inc., Steffes LLC, and selected operators.

PROJECT DESCRIPTION

Polar Bear™ is a technology catalyzed and patented by the Energy & Environmental Research Center (EERC) designed to capture most of the remaining flared gas in North Dakota. Iconically named to symbolize robustness, adaptiveness, and environmental sensitivity, successful implementation can lower the carbon footprint of oil and gas production and is aligned with the industry's priorities for reducing methane emissions and achieving compliance with new U.S. Environmental Protection Agency (EPA) regulations. The EERC is partnered with Steffes LLC, a respected local manufacturer, and Advanced Flow Solutions Inc. to deploy the first Polar Bear™ systems within the Bakken. The project will capture flared gas and demonstrate that economically challenging circumstances for gas flaring can be overcome, resulting in cost-effective solutions.

Objectives: The objective is to deploy 30 gas capture units on well pad facilities in North Dakota to reduce or eliminate gas flaring. The purpose is to achieve near-zero wellsite emissions and accelerate the adoption of state-of-the-art technology. An adequate sample size is proposed to assess gas capture performance for multiple operators including variations of wellsite facilities. Advancements include oil-free natural gas compression and new methods for facility integration that boost economics, simplify installation, and lower operational costs compared to conventional vapor recovery.

Methodology: The EERC will lead the contract with the North Dakota Industrial Commission (NDIC) and provide interim reporting to the Oil and Gas Research Program (OGRP) in accordance with the Oil and Gas Research Council (OGRC) policies of the Clean Natural Gas Capture and Emissions Reduction Program. The work will include coordination with operators in North Dakota to host Polar Bear™ gas capture units; procurement of the units from Steffes LLC; and coordination with service providers and operators for installation, commissioning, and operation. The gas capture units will be fitted with gas flowmeters and the capability to record volume and rates of gas captured. The EERC will report on the gas captured and locations of installed equipment, summarize work performed, provide equipment

photos, and report project costs and matching cost share. The operators will take ownership of the gas capture units upon delivery and operate beyond the project term.

The project is designed to provide a meaningful implementation pilot to cover a diversity of wellsites and facility types and a variety of operators to demonstrate gas capture for most of North Dakota's remaining flared gas, which is economically challenging to recover. The pilot will help reduce the cost and risk for operators looking to adopt new technology and to accelerate commercial deployment and manufacturing. Gas capture units can be applied to heater treaters, separation equipment, tank vapor recovery, liquids production, and utilization for fuel on-site. Specifically designed to capture gas volumes from an average producing well, units have application to single-well leasehold facilities, comingled bulk and test facilities, and unique layouts of separation equipment. Presently a capacity of 50 Mcfd is available per unit; however, units can be installed in parallel to achieve higher capacity. Given the diversity of facilities in North Dakota and present manufacturing capacity, deployment of 30 units appears to cover the diversity of applications and operators with some level of repeated demonstration. Priority will include capture of gas from high-pressure flares and recovery of tank vapors, with preference to operators expressing support for the project.

Anticipated Results: Project results are anticipated to further the purpose of the Clean Natural Gas Capture and Emissions Reduction Program that was authorized in 2023 by Senate Bill 2089. The program is an incentive payment for projects that capture or utilize natural gas which would otherwise be flared and replaces a prior tax incentive for similar projects. The proposed Polar Bear™ gas capture technology is an equipment skid that is designed to capture and compress 50 Mcfd of low-pressure gas. Innovations of the technology include facility integration, hydrocarbon recovery, and eliminating compressor oil maintenance. During the 1-year project, 30 units will be deployed, commissioned, and operated to quantify and report the rates and volumes of captured gas. The Polar Bear™ technology specifically addresses the challenges associated with the remaining volume of flared gas in North Dakota. To reduce

flaring to near-zero, gas must be captured at a large number of well locations that flare small amounts of gas in which the economics are independently challenging for the operator and mineral owners. The proposed project is designed to implement technology in a field pilot for the purpose of accelerating adoption by the industry. The goal is to tackle the present challenges associated with the remaining gas flaring in North Dakota, which will result in a cleaner barrel of oil, commensurate economic benefits, industry performance, and additional tax revenue.

Facilities, Resources, and Techniques to Be Used and Their Availability and Capability: The project will be conducted in the field at wellsite locations provided by North Dakota operators. Letters indicating interest on behalf of operators are included in Appendix A.

Resources for the project are provided by the EERC, Steffes LLC, and Advanced Flow Solutions Inc. in collaboration with participating oil and gas operators in North Dakota to host the technology at various wellsites. The project partners have available personnel to dedicate to the project who are experienced engineers and technicians qualified in oil and gas facility engineering, servicing, and manufacturing. Steffes is the supplier of the equipment skids. Advanced stocking of inventory will allow the project team to meet accelerated delivery of units to the field. Equipment preparation and delivery can occur within the first quarter of the project for the first skids.

Environmental and Economic Impacts: According to the most recent director's cut,[1] which includes the Department of Mineral Resources monthly production reporting, gas captured in July 2024 is 3,245,517 Mcfd at a rate of 94% and 217,343 Mcfd of gas was flared at a rate of 6%. The commercial value of the flared gas, assuming a price of $5.00 per Mcf, which includes both dry gas and natural gas liquids (NGLs), is equivalent to $33.4 million. The gas tax rate provided by the North Dakota State Tax

[1] www.dmr.nd.gov/dmr/sites/www/files/documents/Oil-and-Gas/DirectorsCut/October%202024%20Directors%20Cut.pdf (accessed Oct 2024).

Commissioner for the fiscal year July 1, 2024, to June 30, 2025, is $0.0646 per Mcf.[2] Therefore, the estimated uncollected tax value for the July flared volume is approximately $435,000.

EPA published rules to significantly reduce greenhouse gas emissions from the oil and gas industry on March 8, 2024, focused on methane emissions. The rules in the Federal Register, 40 Code of Federal Regulations (CFR) part 60 subpart OOOOb, set standards for new, modified, and reconstructed sources after December 6, 2022, and subpart OOOOc applies to existing sources. EPA's methane regulations include many aspects that significantly impact oil and gas operations as summarized:

- Super Emitter Program – EPA's program to certify third parties to report methane emissions exceeding 100 kg/hr.
- Elimination of routine flaring – The flaring of associated gas from wells in the absence of temporary or emergency circumstances necessitating such flaring.
- Methane fee – $900/ton 2024, $1200/ton 2025, $1500/ton 2026.
- Advanced leak detection and monitoring techniques.
- Liquid unloading requirements – submission of best management plans and reporting.
- Process controller and pumps – zero-emission standard for pneumatic controllers.
- Storage tanks – tank battery emissions subject to federal standards versus individual tank emissions at 6 tpy of volatile organic compounds (VOCs) and 20 tpy of methane.
- Plugging and abandoned well requirements – Required well closure plans, monitoring of fugitive emissions, and optical gas-imaging surveys.

[2] www.tax.nd.gov/sites/www/files/documents/newsletters/oil-gas/gat-tax-rate-notice.pdf (accessed Oct 2024).

EPA methane rules mandate over a 2-year period a phaseout of routine flaring from new oil and gas wells. Some flexibility is provided for existing wells that may not have cost-effective alternatives to flaring. States have a 2-year period to submit plans to EPA regarding rules for existing wells.[3]

Why the Project Is Needed: North Dakota's Department of Mineral Resources in collaboration with industry set policies for gas capture which began October 1, 2014.[4] The policy goals include reducing the flared volume of gas, reducing the number of wells flaring, and reducing the duration of flaring from wells. Figure 1 provides an annual history of gas flaring from 2010 to 2023 and performance with respect to policy goals. Today, the industry exceeds the 91% gas capture policy target and, in 2023, achieved 95% gas capture for the year. What contributes to the gas capture success is the industry's investment in midstream infrastructure enabling more gas to be gathered via pipeline and processed.

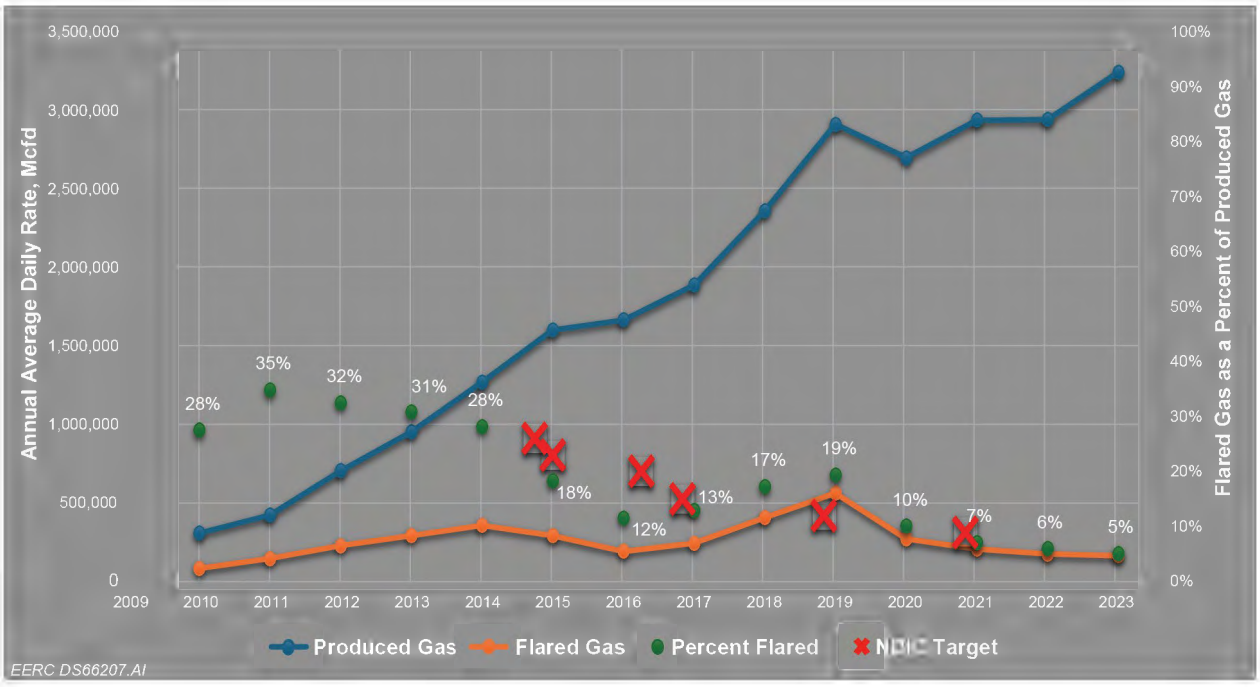

Figure 1. North Dakota's history of gas production and flaring with respect to policy goals.[5]

[3] www.epa.gov/system/files/documents/2023-12/epas-final-rule-for-oil-and-gas-operations.-overview-fact-sheet.pdf (accessed Oct 2024).
[4] www.dmr.nd.gov/oilgas/GuidancePolicyNorthDakotaIndustrialCommissionorder24665.pdf (accessed Oct 2024).
[5] Production data from the North Dakota Department of Mineral Resources (accessed Oct 2024).

Since 2019, industry has also shifted drilling plans away from areas that do not have gas takeaway capacity. These actions along with innovations such as data centers, mobile skids to capture NGLs, utilization of compressed natural gas (CNG), and installation of vapor recovery units (VRUs) have all contributed to decreasing the flaring rate.

Although the state's policies to reduce flaring have largely been achieved, Governor Burgum set a goal to keep North Dakota's energy production globally competitive by becoming carbon-neutral by 2030.[6] Industry objectives are to achieve near-zero emissions, and federal compliance continues to become more restrictive. This project is needed to further reduce gas flaring in North Dakota and maintain a competitive industry within the state.

North Dakota's production is primarily light sweet crude oil from the Bakken and Three Forks Formations. The Bakken petroleum system uniquely produces a rich gas that is associated with oil production. Associated gas, on a revenue basis per well, is a much lower revenue stream than the oil produced per well. Despite the lower monetary value, North Dakota is presently the tenth largest producer of gas in the country. Additionally, the gas-to-oil ratio in the Bakken is increasing and has nearly doubled since 2016.[7] Unlike dry gas production, associated gas does not always get the advanced build-out investment and instead requires more time as oil properties develop across the play. The project is needed to help overcome challenges associated with limitations in gas takeaway capacity.

Where conventional technology has enabled industry to exceed North Dakota's gas capture policies, eliminating the remaining 5% of gas flaring is exponentially more difficult and requires new approaches. The remaining volume of flared gas is at a significant economic disadvantage. These gas volumes are geographically dispersed across many wells producing much less oil than the initial production, typically under 100 bpd. This flared gas volume in aggregate is primarily sourced from wells

[6] https://news.prairiepublic.org/local-news/2021-05-12/burgum-nd-carbon-neutral-by-2030 (accessed Oct 2024).
[7] https://northdakotapipelines.com/wp-content/uploads/2024/09/justin-kringstad-ndpc-9-19-24.pdf (accessed Oct 2024).

that also flare less than 10% of their produced volume.[8] Therefore, technology must be able to capture intermittent small volumes of gas and be cost-effective based on the limited gas volume. One benefit is that most of these wells are connected to a gathering line versus completely stranded from any gas gathering. Wellhead pressure typically declines after initial production, and in many cases, the gas production can be interrupted by intermittent spikes in pipeline pressure due to neighboring production. Polar Bear™ is designed to economically capture small volumes of gas, reprocess within the facility, and maintain gas pressures to keep gas in the pipe. The process enables low-pressure gas at the wellhead, from heater-treaters, or tank vapors to be used as fuel on-site, to be sold as hydrocarbon liquid, or boosted to gas sales. The process is described in eight patents issued by the U.S. Patent and Trade Office between 2022 and 2024.[9] The project is needed to accelerate the implementation of new technology that can address the challenges associated with the remaining gas flaring in North Dakota.

STANDARDS OF SUCCESS

Success will be measured in accordance with the reporting requirements of the Clean Natural Gas Capture and Emissions Reduction Program. Requirements include a comprehensive report to the Commission including a summary of the work performed, photos of installed equipment, documentation of project costs and matching cost share, locations of installed equipment, and rates and volumes of gas captured. The proposal includes installing 30 units at oil and gas facilities in North Dakota. A unit is depicted in Figure 2 which includes a compressor rated at 50 Mcfd at a pressure differential of 70 psi. A successful project will have completed installation and operation of 30 units with commensurate reporting of performance. It is anticipated the public and private sector would utilize the results to understand how the technology can be applied and replicated to tackle challenges with gas flaring and reduce emissions.

[8] Presentation at the Western Dakota Energy Association Annual Meeting, Minot, ND, Oct 9, 2024.
[9] U.S. Patents 11,505,750 B1, 11,542,439 B1, 11,697,773 B1, 11,725,154 B2, 11,814,591 B1, 11,884,887 B1, 12,024,682 B2, 12,065,619 B2.

Figure 2. Polar Bear™ unit.

BACKGROUND/QUALIFICATIONS

The EERC is a nonprofit branch of the University of North Dakota. Mr. Darren Schmidt, Assistant Director for Energy, Oil, and Gas, will serve as Project Manager. Mr. Schmidt is a registered professional engineer in mechanical and petroleum engineering and the author of ten patents regarding gas utilization technologies. Other key EERC personnel include Dr. Youcef Khetib, a Senior Petroleum Engineer, and Mr. Bradley Stevens, a Principal Research Engineer in Civil Engineering. Dr. Khetib holds a Ph.D. degree in Petroleum Engineering from UND. Mr. Stevens is a registered professional engineer in Civil Engineering in North Dakota and Minnesota. Both Dr. Khetib and Mr. Stevens have been integral in the design, engineering, and testing of the Polar Bear™ technology. Resumes of key personnel are provided in Appendix B.

Steffes LLC is a lean-operating original equipment manufacturer headquartered in Dickinson, North Dakota, with additional manufacturing facilities in Grand Forks, North Dakota; Shelby, North Carolina; and customer support facilities in Midland, Texas; Casper, Wyoming; and Oklahoma City, Oklahoma. Steffes is specialized in steel fabrication and electrical services for a variety of diverse industries, including oil and gas, contract manufacturing, and electric thermal storage. Steffes has been in business for more than 70 years and has achieved notable innovations in the oil and gas industry such

as the Steffes variable orifice flare, which achieves 99% destruction efficiency and accommodates the production decline associated with Bakken wells while maintaining environmental performance.

Advanced Flow Solutions Inc. is one of 50 business units under IDEX Corporation, encompassing 9000 employees. Specializing in compression and pumping solutions, the organization's 250 employees provide the resources for a century-old leader in industrial compression. Manufacturing expertise includes precision machining, welding, assembly, testing, and material handling. They specialize in creating high-quality components and systems that are used in a variety of applications, including fuel and gas handling, chemical processing, and other industrial sectors.

MANAGEMENT

The EERC manages over 200 contracts a year, with a total of over 1300 clients in 53 countries. Project management software and accounting systems are in place to ensure that projects are managed within budget, schedule, and scope. Mr. Schmidt will oversee the entire program, with assistance in management of program activities by Dr. Khetib and Mr. Stevens. Interim reports will be submitted to NDIC in accordance with the program requirements.

TIMETABLE

A project term of 1 year is proposed, starting January 1, 2025. The EERC will coordinate with host site operators and proceed with equipment orders within the first quarter of the project. Equipment deliveries will occur over the course of the project, with the majority of completion expected by June 30, 2025. Commissioning and operation will occur over the second half of the project, with completion by December 31, 2025.

BUDGET

The total estimated cost for the proposed effort is $5,132,682. $2,566,341 is requested from OGRP. Cost-share commitments are provided from Advanced Flow Solutions Inc. and Steffes LLC at $1,824,500 and $741,841, respectively. The in-kind cost share includes the engineering, development, and testing of

the Polar Bear™ technology during the legislative biennium (7/1/2023–6/30/2025) and through the end of the project term. Letters of commitment can be found in Appendix C. The budget breakdown is provided in Table 1. Budget notes can be found in Appendix D.

Table 1. Budget Breakdown

Project Associated Expense	NDIC Share (Cash)	Industry Share (In-kind)	Total Project
Labor	$421,720	$0	$421,720
Travel	$87,062	$0	$87,062
Equipment > $5000	$1,500,000	$0	$1,500,000
Supplies	$30,000	$0	$30,000
Subcontractor – TBD Site Support	$80,000	$0	$80,000
Communications	$78	$0	$78
Printing & Duplicating	$100	$0	$100
Laboratory Fees & Services			
Document Production Service	$5,068	$0	$5,068
Technical Software Fee	$17,543	$0	$17,543
Engineering Services Fee	$1,597	$0	$1,597
Field Safety Fee	$61,594	$0	$61,594
Outside Lab – Gas Sampling	$20,000	$0	$20,000
Total Direct Costs	$2,224,762	$0	$2,224,762
Facilities & Administration	$341,579	$0	$341,579
Total Cash Requested	**$2,566,341**	**$0**	**$2,566,341**
In-Kind Cost Share			
Advanced Flow Solutions	$0	$1,824,500	$1,824,500
Steffes	$0	$741,841	$741,841
Total In-Kind Cost Share	**$0**	**$2,566,341**	**$2,566,341**
Total Project Costs	**$2,566,341**	**$2,566,341**	**$5,132,682**

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 AND PATENTS/RIGHTS TO TECHNICAL DATA

This proposal has no confidential information. There are existing patents; no patentable technologies are expected to be created with respect to the project funding.

STATUS OF ONGOING PROJECTS

The EERC is currently engaged in five OGRP-funded projects. These ongoing projects, listed in Appendix E, are current on all deliverables.

APPENDIX A

OPERATOR LETTERS OF SUPPORT

Hess Corporation
1501 McKinney Street
Houston, TX 77010

October 16, 2024

Mr. Darren Schmidt
Assistant Director for Energy, Oil and Gas
Energy and Environmental Research Center
15 N. 23rd St.
Grand Forks, ND 58202-9018

Subject: Proposal Entitled: "Breaking New Ground in Flaring Reduction"

Dear Mr. Schmidt:

Hess Corporation is aware that the Energy and Environmental Research Center (EERC) is applying for funding from the Clean Natural Gas Capture and Emissions Reduction Program administered through the North Dakota Industrial Commission's Oil and Gas Research Program. Hess would be interested in participating by providing a host site for Polar Bear™ technology as part of the project.

Sincerely,

Brent Lohnes
General Manager – North Dakota

Petro-Hunt, L.L.C.

P.O. Box 935
Bismarck, ND 58502
Phone (701) 255-5666 Fax (701) 258-1562
e-mail - jherman@petrohunt.com

October 24, 2024

Mr. Darren Schmidt
Assistant Director for Energy, Oil and Gas
Energy and Environmental Research Center
15 N. 23rd St.
Grand Forks, ND 58202-9018

Subject: Proposal Entitled: "Breaking New Ground in Flaring Reduction"

Dear Mr. Schmidt:

Petro Hunt is interested in supporting well-site application of the Polar Bear™ gas capture technology as part of the Energy and Environmental Research Center's (EERC) proposal to the Clean Natural Gas Capture and Emissions Reduction Program. This work will help advance gas capture in North Dakota and offer the industry additional options for environmental compliance.

Sincerely,

Representative Name
Jeff Herman
Title – Region Manager

APPENDIX B

RESUMES OF KEY PERSONNEL

DARREN D. SCHMIDT
Assistant Director for Energy, Oil, and Gas
Energy & Environmental Research Center (EERC), University of North Dakota (UND)
15 North 23rd Street, Stop 9018, Grand Forks, North Dakota 58202-9018 USA
701.777.5201, dschmidt@undeerc.org

Education and Training

B.S., Mechanical Engineering, West Virginia University, 1994.
Registered Professional Engineer (Mechanical and Petroleum).

Research and Professional Experience

February 2021–Present: Assistant Director for Energy, Oil, and Gas, EERC, UND.

- Leads a team focused on research, development, and commercialization related to efficient and clean fossil fuel production, utilization, carbon management, and alternative fuels and renewable energy.

Principal areas of interest and expertise include oil and gas facilities, production, injection, well stimulation, enhanced recovery, power generation, and renewable technologies.

2016–January 2021: Principal Engineer, Research and Technology, Equinor, Williston, North Dakota.

- Provided leadership for Equinor's research portfolio in Bakken/Williston Basin, with focus on low carbon.
- Developed project focused on reducing flaring in which patent application was filed.
- Earlier work included leading team to develop CO_2 used in well stimulations.
- Through Equinor's involvement with North Dakota Oil and Gas Research Program, research was completed to address requirements surrounding crude oil vapor pressure.
- Worked closely with Equinor's Williston office regional manager to support operations, including serving as regulatory liaison for emergency response team.

2013–2016: Completions Engineer, Statoil Completions, Williston, North Dakota.

- Served as completions engineer for Williams County, with strong focus on safe operations.
- Led successful program in 2015 to use 10% produced water in Statoil hydraulic fracturing operations.
- Oversaw hydraulic fracture designs, quality of operations, implementing new procedures, enforcing standard operating procedures, and approving fieldwork.
- Mentored interns and completions-related research projects to improve performance.

2012–2013: Technical Advisor, Weatherford Fracturing Technologies, Williston, North Dakota.

- Provided leadership to Williston district to ensure job quality, safety, personnel management, education, and training.
- Supported revenue; provided intelligence; conducted marketing; provided urgent response to customers, field services, and client-based technical assistance; and ensured quality reporting.
- Provided technical guidance to district stimulation fluids laboratory.

2008–2012: Senior Research Advisor, EERC, UND.

- Oversaw procurement and execution of research projects related to Bakken Formation in Williston Basin. Projects included utilization of associated gas in drilling operations, laboratory investigation of conductivity associated with proppants, fracturing fluids, and rock formations, enhanced production from coal bed methane, geologic storage of CO_2, and oil-field drilling, production, and workover operations.
- Served as advisor to distributed biomass gasification development and contributed to organization's revenue through research proposals, publications, and intellectual property.

1998–2008: Research Manager, EERC, UND.

- Secured research contracts, managed projects, and performed engineering tasks in the areas of cofiring and biomass power systems, including combustion, fluidized-bed, gasification, microturbine, and internal combustion engine generators; energy efficiency; ground-source heat pumps; hydrogen production from biomass; and researching the behavior of biomass in combustion systems relative to ash fouling and trace elements.

1994–1998: Mechanical Engineer, Research Triangle Institute (RTI), Research Triangle Park, North Carolina.

- Served as project leader for $3M Cooperative Agreement with U.S. Environmental Protection Agency (EPA) to demonstrate electricity production using 1-MW wood gasification technology.
- Significant experience included permit, design, installation, operations, and reporting.
- Other activities included support of marketing activities and coauthoring publications.

Summer 1993: Internship, EERC, UND, Grand Forks, ND.

- Supported combustion and coal ash studies.

Summer 1992: Internship, Foster Wheeler Development Corporation, Livingston, New Jersey.

- Supported gasification research and development.

Professional Activities

Appointed Member, North Dakota Oil and Gas Research Council
Cochair, North Dakota Petroleum Council Technology Solutions Group
Section Chair, Williston Basin Society of Petroleum Engineers

Publications

Has authored or coauthored over 80 peer-reviewed and other professional publications.

Patents

Method and Apparatus for Supply of Low-Btu Gas to an Engine Generator. U.S. Patent 8,460,413, June 11, 2013.

Application of Microturbines to Control Emissions from Associated Gas. U.S. Patent 8,418,457, April 16, 2013.

Hydrocarbon Gas Recovery Methods. U.K. Application No. 2009516.2, filed June 22, 2020.

DR. YOUCEF KHETIB
Senior Petroleum Engineer
Energy & Environmental Research Center (EERC), University of North Dakota (UND)
15 North 23rd Street, Stop 9018, Grand Forks, North Dakota 58202-9018 USA
701.777.5268, ykhetib@undeerc.org

Education and Training

Ph.D., Petroleum Engineering, University of North Dakota, 2022.
M.Eng., Petroleum Engineering, University of Boumerdes, Algeria, 2013.
B.Eng., Petroleum Engineering, University of Boumerdes, Algeria, 2010.
Software: OLGA®, Pipesim®, OFM®, ECLIPSE®, PETREL®, Multiflash®, Aspen HYSYS®, DrillingInfo® (Everus), Salesforce®, and Medallia®.
Languages: Arabic, French, English, and German.

Research and Professional Experience

January 2023–Present: Senior Petroleum Engineer, EERC, UND.

- Evaluates oil production from unconventional wells using transient multiphase flow analysis.
- Conducts flow assurance and facility feasibility.
- Conducts modeling with advanced knowledge of software platforms specific to multiphase flow and equation of state.

Principal areas of interest and expertise include flow assurance analysis involving transient systems behavior; hydrates; organic and inorganic scale mitigation; pipeline thermohydraulic design and performance evaluation; process engineering for hydrocarbon-processing facilities; wellbore performance and flow dynamics; numerical simulation in reservoir engineering; well test interpretation; field start-up and commissioning operations; hydrocarbon production system design, commissioning, and operational optimization; CO_2 capture, transportation, and storage system design and performance evaluation; and plastics-recycling technologies; and produced water management for a higher circularity.

August 2021–January 2023: Research Assistant, EERC, UND.

- Developed two-phase flow loop for flow behavior study in unconventional extended-reach wells.
- Investigated undulated horizontal Bakken well transient multiphase flow behavior.
- Performed severe slugging attenuation experiments and dynamic simulation.
- Delivered process engineering design studies of flare reduction technology for surface facilities.
- Delivered transient multiphase flow performance of water alternating gas (WAG)–huff ‘n’ puff injection in horizontal wells.

July 2018–June 2021: Account Manager, Badische Anilin Und Soda Fabrik (BASF), Algiers, Algeria.

- Initiated business relationships for refinery, fuels, and lubricant products, increasing company’s revenue.
- Developed private and state-owned company portfolios, increasing product sales pipeline.
- Performed technical sales tasks ensuring customer refinery products complied with required standards.

- Led resid fluid catalytic cracking (RFCC) catalyst business sales operation, ensuring higher gasoline yields to customers.
- Demonstrated solid knowledge in large tender's management, leading to successful contracts signatures.
- Developed business strategy for key accounts, resulting in concise objectives.

September 2016–July 2018: Process and Flow Assurance Engineer, Japanese Gasoline Corporation (JGC), Algiers, Algeria.

- Delivered flow assurance studies for conceptual and feasibility, front-end engineering and design (FEED), and engineering, procurement, and construction (EPC) for hydrocarbon-processing facilities; hydrates; inorganic-scale formation and mitigation study delivery.
- Performed multiphase pump performance analysis study, enabling development scenario comparison; commissioning procedures preparation; enabling project-commissioning activities; and start-up activities execution, enabling LDBP-4 gas station start-up with start-up issues resolution.

May 2014–December 2015: Petro-Technical Engineer, Schlumberger, Algiers, Algeria.

- Delivered flow assurance consulting study, enabling operating company to relieve back-pressure effect on its wells.
- Performed technical sales tasks related to customer presentations, workshops, and delivery for North African region.
- Delivered software technical support for existing customers, solving PETREL®, OLGA®, PIPESIM®, and OFM® technical issues; and delivered software training courses on production software.

Publications

Has authored and coauthored several peer-reviewed and other professional publications.

BRADLEY G. STEVENS, P.E.
Principal Research Engineer, Civil Engineering
Energy & Environmental Research Center (EERC), University of North Dakota (UND)
15 North 23rd Street, Stop 9018, Grand Forks, North Dakota 58202-9018 USA
701.777.5293, bstevens@undeerc.org

Education and Training

B.S., Civil Engineering, University of North Dakota, 1989.
Registered Professional Engineer – North Dakota No. PE-4340.

Research and Professional Experience

2022–Present: Principal Research Engineer, Civil Engineering, EERC, UND.

- Responsibilities include managing variety of projects and tasks in areas of oil and gas production and processing, hydrogen production and utilization, electrical grid resiliency, and risk mitigation.
- Expertise includes soil, groundwater, and industrial process water remediation; process instrumentation and control; wind power generation; hydrogen production; and oil and gas production.

2021–2022: Senior Research Engineer, Civil Engineering Team Lead, EERC, UND.

2011–2021: Senior Research Engineer, EERC, UND.

- Responsibilities included execution of wide-ranging projects under EERC's Bakken Production Optimization Program, including study of alternative natural gas use, saline and hydrocarbon soil remediation, and statistical analysis of various oil and gas industry segments.

2005–2011: Research Manager/Engineer, EERC, UND.

- Responsibilities included management of the EERC's Plains Organization for Wind Energy Resources® (POWER®) wind energy program. POWER management duties included strategic planning, fiscal management, program presentation, proposal preparation, and personnel management. Technical duties included installation and setup of wind-monitoring equipment, assessment and analysis of wind resource data, wind turbine production estimates, and theoretical project economics.
- Other responsibilities included supervision of design, installation, and operation of electrolysis-derived hydrogen production and dispensing system.

1998–2005: Research Engineer, Remediation, EERC, UND.

- Responsibilities included management, testing, data analysis, and report preparation for commercial application of centrifugal membrane filtration; project management, specification, construction, and demonstration of freeze–thaw process for utilization of marginal waters; participation in Red River Water Management Consortium (RRWMC) as technical staff member advising RRWMC members regarding pertinent water supply and water quality issues; management and operation of and data analysis and report preparation for sorption and regeneration process for mercury removal from primary and secondary liquid wastes assessment; and data analysis activities related to wind energy.

1992–1998: Project Manager/Engineer, Summit Envirosolutions, Inc., Minneapolis, Minnesota.

- Responsibilities included specification and coordination of installation of remote data acquisition equipment for municipalities in Minnesota for use as aquifer resource management tools; specification, installation, and maintenance of groundwater flow control and flow measurement equipment in association with research and development cooperative agreement with NASA involving state-of-the-art methods of remote data acquisition, patented as RealFlow®; design, installation, and maintenance of permanent and mobile remediation systems in Minnesota, Wisconsin, Nevada, and Arizona, including groundwater pump-and-treat systems, soil vapor extraction systems, and coupled air sparging–soil vapor extraction systems; and management of 20 projects in Minnesota, Wisconsin, and Illinois involving mechanical and electrical control and data retrieval for remedial systems including telemetry-based remedial systems. Other pertinent experience included work with programmable logic controllers and ladder logic programming and training in the use of Intellution FIX DMACS human–machine interface software.

1990–1992: Project Engineer, Delta Environmental Consultants, Inc., St. Paul, Minnesota.

- Responsibilities included design, permitting, installation, and operation of treatment systems for remediation of contaminated groundwater and soils. Sites ranged from automotive service stations to railroad maintenance yards for projects located in a five-state region. Remediation technologies included subsurface air sparging and soil vapor extraction.
- Other project responsibilities included data interpretation and permit compliance for 14 remediation systems for a major oil company; supervising excavation of contaminated soils; and permitting and supervising in-place abandonment of 12,000-gal underground storage tank.

1988–1990: Research/Engineering Technician, EERC, UND.

- Responsibilities included design, construction, operation, maintenance, data collection and reduction, and formal report preparation for bench-scale treatability programs involving single-stage, two-stage, coupled nitrification–denitrification activated sludge systems, activated carbon adsorption, and ion exchange treatment of coal-processing waters. Maintained and operated pure oxygen plug flow reactor for biological treatment of synthetic wastewater. Assisted in production of pilot-scale wastewater treatment facility and design and analysis of bench-scale wastewater treatment models.

Patents

Barrett, D.P.; Davis, R.J.; Dustman, J.E.; Gibas, D.R.; Stevens, B.G.L.; Wilson, B.T. Measuring System for Measuring Real-Time Groundwater Data. U.S. Patent 5,553,492, Sept 10, 1996.

Publications

Has authored or coauthored numerous publications.

APPENDIX C

COST-SHARE COMMITMENT LETTERS

October 15, 2024

Mr. Brent Brannan
Director
Oil & Gas Research Program
State Capitol, 14th Floor
600 E Boulevard Ave.
Dept.405
Bismarck, ND 58505-0840

Subject: Proposal Entitled "Breaking New Ground in Flaring Reduction"

Dear Mr. Brannan:

Steffes, LLC located in Dickinson, ND is a lead supplier of oil and gas facility equipment and widely known for our innovative variable orifice flare which achieves 99% destruction efficiency. Steffes is innovating again through collaborating with the EERC to implement new technology for gas capture. The insight of the North Dakota legislature to incentivize the industry with the Clean Natural Gas Capture and Emissions Reduction Grant Program is timely given the compliance requirements that are presently evolving with respect to the EPA's OOOOb, and OOOOc regulations.

Steffes will provide $741,841 of in-kind cost share to support installation and piloting of 30 new gas capture units to the field to advance gas capture from well-sites. These units are a step-change in technology with respect to conventional vapor recovery and provide new tools for industry to capture the most economically challenging gas that would otherwise be flared.

Sincerely,

Todd Mayer
Steffes, LLC

ADVANCED FLOW SOLUTIONS

October 25, 2024

Mr. Brent Brannan
Director
Oil & Gas Research Program
State Capitol, 14th Floor
600 E Boulevard Ave.
Dept.405
Bismarck, ND 58505-0840

Subject:Proposal Entitled "Breaking New Ground in Flaring Reduction"

Dear Mr. Brannan:

On behalf of Advanced Flow Solutions, a Unit of IDEX Corporation, we are pleased to participate in the North Dakota Industrial Commission's (NDIC) Clean Natural Gas Capture and Emissions Reduction Program and in accordance with the proposal submitted to the North Dakota Oil and Gas Research Program (OGRP).

Advanced Flow Solutions is a manufacturer of natural gas compression with a century long history of suppling solutions for the oil and gas industry. We are providing innovations for reducing flaring across the natural gas value chain. The present opportunity is an excellent collaboration of industry, research, and state support to implement advanced technology.

We are bringing new products to the oil and gas industry to accelerate environmental performance and cost effectively meet compliance targets with new Methane rules. Advanced Flow Solutions is committing $1,824,500 of in-kind cost share[1] over the term of the project. The grant opportunity offered by the North Dakota legislature is an important and timely incentive.

We express our support for the proposed project and look forward to working with the project team.

Sincerely,

John Hays
Business Line Leader
Advanced Flow Solutions

[1] For methane recovery / abatement compressor technology development expenses incurred from 7/1/23 through 6/30/25

LIQUID CONTROLS® CORKEN
Advanced Flow Solutions Main Office & Mfg.
9201 North I-35 Service Road, Oklahoma City, OK 73131
+1 (405) 946-5576
www.LCmeter.com
www.Corken.com

S.A.M.P.I.
SAMPI S.P.A. Office and Mfg.
Via A. Vespucci, 1, 55011, Altopascio, Lucca – Italy
+39 0583 24751
www.sampi.it

APPENDIX D

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 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 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 which 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 (GSA) 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.

Equipment: The equipment for the project includes 30 gas capture units. Each unit has a capacity to capture 50 MCFD of associated gas at a pressure differential of 70 psi. The equipment is necessary to carry out the objectives of the Clean Natural Gas Capture and Emissions Reduction Program which includes capturing natural gas which would have otherwise been flared. The project will pilot the equipment for the purpose of accelerating industry adoption and reducing the flaring of gas in North Dakota.

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 – TBD Site Support: Potential for electrical services support for 30 field units

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.

Technical Software use fee for advanced project management tool. Costs associated with software, data entry, maintenance and enhancement of the system.

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.

Field safety fees cover safety training and certifications, providing necessary PPE, and annual physicals. The estimated cost is based on the number of days individuals are budgeted to work in the field.

Outside Lab – Gas Sampling: Will be utilized to collect and analyze gas samples from the project sites.

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 (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 - Advanced Flow Systems (AFS): – AFS is a natural gas compressor manufacturer. AFS has developed a completely new compressor for the oil and gas industry that is specifically designed for the liquids content of Bakken produced gas. The new design drastically reduces operation and maintenance costs and outcompetes conventional vapor recovery compression. AFS costs share during the legislative biennium 7/2023 – 6/2025 includes the engineering and development costs to produce this new machine, including product testing. AFS will support production and continued development costs during the project. AFS has committed to provide $1,824,500 in cost share.

Cost Share - Steffes: Steffes LLC is a manufacturer, supplier, and service provider for the oil and gas industry providing surface facility equipment. Steffes integrates the AFS compressor into a complete gas capture unit for oil and gas applications. Steffes cost share includes the engineering, drafting, and product testing occurring during the legislative biennium 7/2023 – 6/2025 and the continued development and service costs during the project. Steffes is the supplier of the equipment for the proposed project. Steffes has committed to provide $741,841 in cost share.

Cost share for this project is being proposed at $2,566,341, of which a portion has been incurred prior to the start of the NDIC portion of the project but within the legislative biennium 7/23 – 6/25.

APPENDIX E

STATUS-OF-ONGOING-PROJECTS LIST

STATUS-OF-ONGOING-PROJECTS LIST

Project Title	Contract Award No.
Bakken Production Optimization Program 4.0	G-058-115
Improving EOR Performance Through Data Analytics and Next-Generation Controllable Completions	G-050-97
iPIPE: The Intelligent Pipeline Integrity Program	G-046-88
iPIPE 3.0: The Intelligent Pipeline Integrity Program	G-059-116
PCOR Initiative to Accelerate CCUS Deployment	G-050-96

COBRA
OIL & GAS CORPORATION

Mailing Address
P.O. Box 8206
Wichita Falls, Texas 76307-8206
Telephone (940) 716-5100
www.cobraogc.com

November 1, 2024

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

Dear Mr. Haase:

Subject: Proposal Entitled "Maximizing Lateral Well Oil Production from Conventional Carbonate Mission Canyon Reservoirs in North Dakota"

Cobra Oil & Gas Corporation (Cobra) is pleased to submit the subject proposal to the Oil and Gas Research Program. This proposal will further investigate Wayne Field reservoir characterization and historical production analysis and explore field methods, downhole redesign, and redevelopment strategies to maximize oil recovery from the horizontal wells within the Mission Canyon Formation of the Wayne Field, North Dakota. The project will use new and existing well log and core data coupled with geological computer modeling and historical production analysis to design and implement field-scale strategies that will develop and optimize production from oil reservoirs observed to have water coning behavior in the Madison Group's Mission Canyon Formation.

The $100 application fee was shipped to the North Dakota Industrial Commission through UPS on October 31, 2024, tracking number 1Z7804750159694803. Cobra is committed to completing the project as described in this proposal. If you have any questions, please contact me by telephone at (940) 716-5100 or by email at kgardner@cobraogc.com.

Sincerely,

Kyle Gardner
Vice President – Engineering
Cobra Oil & Gas Corporation

KG/bjr

Attachments

Oil and Gas Research Program

North Dakota

Industrial Commission

COBRA OIL & GAS CORPORATION

Application

Project Title: Maximizing Lateral Well Oil Production from Conventional Carbonate Mission Canyon Reservoirs in North Dakota

Applicant: Cobra Oil & Gas Corporation

Principal Investigator: Kyle Gardner

Date of Application: November 1, 2024

Amount of Request: $1,000,000

Total Amount of Proposed Project: $2,000,000

Duration of Project: 2 years

Point of Contact (POC): Kyle Gardner

POC Telephone: (940) 716-5100

POC Email Address: kgardner@cobraogc.com

POC Address: PO Box 8206
Wichita Falls, TX 76307

TABLE OF CONTENTS

ABSTRACT

Objective: Cobra Oil & Gas Corporation (Cobra) is seeking funding for a research project to maximize recovery of stranded reserves through the implementation of downhole equipment of a horizontal well within the Mission Canyon Formation of the Wayne Field, Bottineau County, North Dakota. The goal of the project is to optimize the production of oil from a conventional reservoir through the design and implementation of downhole technology to better control the production of fluids along the length of lateral wellbores. This goal will be accomplished in the Wayne Field through the following objectives: 1) the evaluation of existing and newly collected data from the field through detailed reservoir characterization and production analysis and 2) the design, installation, and pilot-scale testing of a production liner equipped with multiple mechanically actuating production sleeves isolated with stages of openhole packers within a horizontal well to produce stranded reserves. The development and implementation of strategies to produce additional economic volumes of oil from North Dakota's vast Mission Canyon carbonate play will have significant economic and social benefits to the state, municipalities, citizens, and industry.

Expected Results: The expected results will be a pilot-scale installation and testing of downhole equipment to isolate stages within a horizontal well to produce stranded reserves. Along with the pilot testing, characterization and production analysis of the Mission Canyon Formation within the Wayne Field will be completed to identify production drivers and reservoir conditions to identify other potential horizontal candidates. Learnings from this project will establish baseline operational strategies for oil production from the resource-rich Mission Canyon throughout the Williston Basin.

Duration: The anticipated project duration is 24 months (April 1, 2025, to March 31, 2027).

Total Project Cost: The total project cost is $2,000,000. Cobra is requesting $1,000,000 from the North Dakota Industrial Commission (NDIC) Oil and Gas Research Program. Cobra is providing $1,000,000.

Participants: Cobra Oil & Gas Corporation and the Energy & Environmental Research Center at the University of North Dakota.

PROJECT DESCRIPTION

The Madison Group in North Dakota is a mature carbonate play that has produced nearly 1 billion barrels (Bbbl) of oil from ~6000 wells. Typically, the Madison Group (i.e., Mission Canyon Formation) has been bypassed historically because of higher water saturations. Total remaining oil-in-place reserves for the formation are estimated at up to 500 million barrels (Burton-Kelly and others, 2018). Conventional carbonate reservoir oil fields, such as Mission Canyon fields, can exhibit water coning behavior, where water preferentially flows from a deeper source causing oil to be bypassed. The stranded oil within reservoirs from water coning requires characterization of the field and unique production strategies to produce the trapped oil. The hypothesis of this project is that the implementation of downhole equipment to isolate production along Mission Canyon lateral wells can lead to improved oil production, resulting in greater ultimate recoveries from wells located in this oil play.

The Wayne Field was discovered in 1957 and produces oil from the Wayne interval of the Mission Canyon Formation. Wells were originally developed vertically, and after producing 160,000 bbl of oil, increased water cuts led to the field's first abandonment in 1986 despite redevelopment efforts from 1977 to 1985 (Jarvie, 2022). During 1994 and 1995, six horizontal wells were drilled to drain the reservoir more effectively and help minimize the effects of water production (Jennings and Johnson, 1996, Jarvie, 2022). Over time, production from these horizontal wells also declined, likely because of the strong water drive and water coning behavior, stranding oil within the reservoir.

In January 2024, Cobra Oil & Gas Corporation (Cobra) leased, bonded, and assumed operations of 11 orphaned wells (seven horizontal and four vertical) within the Wayne Field from the State of North Dakota that had been idle since 2020. During the shut-in period from 2020 to 2024, water cones are believed to have relaxed and dropped. When brought back online, some of the wells yielded larger oil cuts and greater oil production volumes than existed pre-abandonment. For the first 10 months of production at Wayne Field, Cobra observed a 20% increase in oil production, with oil cut increasing 10% over 2020 production records. Some individual wells are producing with oil cuts equivalent to 2020, but with 300% increases to oil production. Since January 2024, Cobra routinely acquired acoustic backside

fluid levels of each producing well as a proxy to monitor reservoir pressure and reservoir deliverability. Monitoring well conditions is critical to optimizing production from reservoirs undergoing water coning behavior.

Previous studies have demonstrated the potential of enhanced oil recovery (EOR) as a viable method to increase oil production an additional 60–90 million barrels of oil from the stranded oil of the Mission Canyon Formation throughout North Dakota (Dotzenrod and others, 2017; Burton-Kelly and others, 2018). The history of the Wayne Field demonstrates that mitigation of water coning behavior provides success in accessing stranded oil. This project entails characterization of the Wayne Field and implementation and demonstration of downhole equipment to redevelop horizontal wells and significantly improve access to the stranded oil of the Mission Canyon.

Objectives: Cobra is seeking to further investigate approaches and strategies to maximize oil recovery within Mission Canyon fields in western North Dakota. To mitigate the observed water coning behavior of lateral wells in the Wayne Field, a pilot project is proposed to implement mechanically actuating sleeves within a horizontal well to allow for production isolation and test if additional stranded resources can be accessed. To test this and other possible operation and completion strategies, Cobra will subcontract with the Energy & Environmental Research Center (EERC) at the University of North Dakota (UND) to evaluate existing data from the project field through detailed reservoir characterization and production analysis. The EERC has previous experience evaluating the recoveries of stranded oil and increasing recoveries in the Williston Basin (Dotzenrod and others, 2017; Burton-Kelly and others, 2018). Currently, Cobra and the EERC are in the process of completing Oil and Gas Research Program (OGRP) contract G-058-114 “Maximizing Production from Residual Oil Zones in Western North Dakota.” Production histories of some wells in the project demonstrated water coning behavior similar to the wells of Wayne Field. The Wayne Field lateral wells provide an opportunity to test hypotheses for the water coning in the Mission Canyon that may have implications for other similar fields. The end goal of the pilot test is to determine the viability of a downhole production isolation technology coupled with operational strategies for stimulating oil production in the Mission Canyon Formation.

Methodology: This project will incorporate data gathering and processing, petrophysical analysis of the existing geophysical logs and core, geological modeling, production analysis, downhole log data collection, and equipping a lateral section of a well with multiple stages of mechanically actuating sleeves. Data analysis from the field and well will be used to determine optimized operations and completion strategies for production for other similar Mission Canyon lateral wells and development plans for similar producing fields. The work will be conducted over five tasks leading to the successful completion of the stated project goal. Tasks 1–3 will be led by the EERC, which has demonstrated experience relevant to each of the tasks. The EERC's letter of support is found in Appendix A. Tasks 4–5 will be led by Cobra. Specific activities under each task will be conducted and are defined in the following.

Task 1 – Data Assembly: The EERC will work with Cobra on data assembly and task auditing to identify knowledge gaps, including data necessary for subsequent tasks. Activities in this task include a core description workshop for Wayne and other nearby fields to determine the need for additional analyses of existing core, collection of public and Cobra-released well data (e.g., well logs, core analysis, production data, fluid characterization, well histories), and review of assembled data for gap analysis. Results will include maps, statistics, and summary PowerPoint slides for input data to be used in other tasks.

Task 2 – Reservoir Characterization: The EERC will collaborate with Cobra to create a field-scale geologic model for the Wayne Field. This will include petrophysical evaluations and stratigraphic correlation leveraging existing core data and geophysical well logs. Petrophysical interpretations and core analyses will be used to populate the geologic model with applicable properties (e.g., lithofacies, porosity, permeability, and water and oil saturations). Petrophysical property uncertainty analyses will be conducted to create a suite of geologic models. Results will include maps, well interpretations, summaries of created models and uncertainty analysis, and a knowledge gap assessment with data collection recommendations.

Task 3 – Production Analysis: The EERC will coordinate with Cobra to evaluate historic production from the Wayne Field. EERC-proposed activities will include a review of the reservoir characterization tasks with results from the decline curve analysis (DCA) and production key performance indicators (KPI) of the historic production data. Results from this task will include an evaluation of well production and performance, DCA results, and tables of KPI results with summaries in PowerPoint slides.

Task 4 – Data Collection and Field Testing: To facilitate Tasks 2 and 3, additional data collection is required to fill knowledge gaps. Activities for this task will be discussed and designed based on Cobra's planned operations. Activities for this task could include:

- Downhole pressure data to characterize oil behavior.
- Petrophysical and borehole image logging data for the lateral section.
- Sampling for fluid testing and backside fluid levels.

Task 5 – Installation and Testing of Downhole Equipment: Cobra will install a production liner equipped with multiple stages of mechanically actuating production sleeves within a Wayne Field horizontal well. Using openhole rock packers, the production sleeves will be isolated into segments. Field tests will be conducted by adjusting take points along the lateral sections through recurrent phases of open-and-shut for the installed sleeves over time while monitoring the fluids and pressures. Testing will identify if stranded oil is being accessed and any mitigation of water coning behavior.

Anticipated Results: The anticipated results of this project will be a pilot-scale installation and testing of a production liner equipped with multiple mechanically actuating production sleeves isolated with stages of openhole packers within a horizontal well to produce stranded reserves. Along with the field testing, characterization and production analysis of the Mission Canyon Formation within the Wayne Field will be completed to identify production drivers and reservoir conditions to identify other potential horizontal candidates. Results will be instructive for additional field development and will be prepared for later numerical simulation after enough production histories have been collected. Although the work will focus on the project field operated by Cobra, the learnings from this project will establish baseline operational

strategies for oil production from the resource-rich Mission Canyon throughout the Williston Basin. Identification of strategies to produce economic volumes of oil from North Dakota's vast Mission Canyon carbonate play will have significant economic and social benefit to the state, municipalities, citizens, and industry.

Facilities and Resources: This project is highly enabled by the operational knowledge and existing field facilities provided by Cobra. Cobra brings operated wells, tank batteries, gathering systems, previously recorded data and results, well records, and technical project field knowledge to the proposed research project. Within the project field, Cobra operates 11 producing wells (four vertical and seven horizontal) and one water injection/disposal well. All producing wells Cobra operates in the project field are completed in the referenced Mission Canyon subinterval. At the time of this application, Cobra does not propose to drill any new wells within the project field. With respect to institutional knowledge and production expertise, Cobra offers over 100 years of total engineering experience and over 50 years of geological experience from its North Dakota technical team. Among technical team capabilities are advanced petrophysics, reservoir engineering, operations engineering, drilling engineering, advanced geophysics, and 9 years of detailed team research of the Mission Canyon Formation. Cobra also offers robust field supervision with over 100 years of experience in direct oversight of the project field. Cobra field employee experience includes North Dakota operations, facilities construction, digital analytics, completions supervision, downhole fishing, and lease operations. In addition to employee expertise, Cobra offers use of software subscriptions for DrillingInfo, PRAMS, PHDWin, Petra, and Kingdom for the research project. In field equipment, Cobra can provide well-testing operations, remote production monitoring, and Echometer equipment for dynamometers and fluid levels.

Project partner EERC employs a multidisciplinary staff of about 270 employees and has 254,000 square feet of state-of-the-art offices, laboratories, and technology demonstration facilities. EERC engineering and scientific research staff members are equipped with state-of-the-art analytical, modeling, and engineering facilities. The EERC has extensive geologic modeling and reservoir simulation capabilities, including multiple high-end workstation computers and a dedicated high-performance

parallel computing cluster. The project team has access to commercial-grade software for use in geologic modeling and process modeling and numerical simulation and database capabilities for managing data that will be collected and generated during the project. The EERC has designed and implemented field activities that include the drilling of stratigraphic test wells, collection of core samples, industry-standard and advanced downhole geophysical logging, downhole pressure and temperature monitoring and collaboration with multiple industry partners on the implementation of field pilots to evaluate EOR techniques in the Bakken Play. EERC laboratory facilities may be utilized through this effort for routine and advanced core analysis, including petrophysical, petrographic, geochemical, and geomechanical rock analysis.

Techniques to Be Used, Their Availability, and Capability: Core-based lithofacies and fracture studies will be conducted on slabbed existing core housed at the Wilson M. Laird Core and Sample Library in Grand Forks, North Dakota. Selected core-based analytical activities will be conducted at the EERC, as necessary, using currently available optical microscopes, porosity testing equipment, and relative permeability testing equipment. Geologic modeling activities will be conducted using industry standard software at the EERC.

Field efforts will take place at a Cobra-operated acreage in Wayne Field within Bottineau County, North Dakota. Cobra has successfully increased oil production, reservoir deliverability, and oil cut up to 10% from the horizontal wells since the field last produced in 2020. Cobra routinely acquires acoustic backside fluid levels of each producing well. This fluid level data provides a proxy for reservoir pressure and reservoir deliverability; it is critical to optimizing production from depleted reservoirs due to the water coning behavior.

All horizontal wells at Wayne Field were completed with an intermediate casing string set to the end of the curve and an openhole lateral. The effective first take point of a well with this design is immediately outside of the intermediate casing at the base of the curve at the heel of the well. It should be assumed that when an openhole horizontal well cones at Wayne Field, the cone will exist around the heel of the well but may not extend down the lateral. When a water cone is formed around the heel of a horizontal well,

artificial lift capacity is occupied by coned fluid rendering the lateral section ineffective. A solution to offset a developed water cone at the heel of an openhole horizontal is to run a liner and isolate multiple take points throughout the lateral. To protect natural permeability, liner application for lateral wells at Wayne Field should be fixed in place with segments of openhole rock packers and not cemented in place. The openhole packers will give near-wellbore isolation and allow segments of the toe portion of the well to also be drained. Liner for the lateral wells at Wayne Field will be unperforated and equipped with multiple stages of mechanically actuating sleeves. These sleeves will be repeatedly opened and closed over time, adjusting the production take point. When a cone develops at a specific take point, that sleeve can be closed to allow the cone time to relax and decrease water production.

Environmental and Economic Impacts While Project Is Underway: No significant environmental or economic impacts are anticipated above and beyond normal operations of oil and gas wells because of these proposed activities. Cobra has upgraded remote monitoring equipment on facilities for production fluid levels and emergency shut-offs.

Ultimate Technological and Economic Impacts: This project will seek to exploit existing oil play infrastructure in the western part of the state to revitalize the Mission Canyon Play. There are more than 600 lateral Madison wells that may benefit from isolated production along the lateral to maximize well productivity. Over 15,000 Bakken wells also penetrate through the Madison Group, which create opportunities to repurpose obsolete or underutilized Bakken well infrastructure to possibly support Mission Canyon production. Potential benefits and impacts of the proposed technology are recognized by members of the oil and gas industry, as noted in the letters of support provided in Appendix A.

Why the Project Is Needed: Maximizing productivity of the Madison system and prolonging productive life of the play ensures the continued long-term economic growth from a proven prolific oil reservoir in North Dakota. Optimizing operational and EOR strategies for legacy fields of the Madison system allows for bypassed pay zones to be accessed and produced. The high water cut of the Madison system requires an innovative alternative approach for recovery, and the proposed research activities are necessary to

expand the critical knowledge base regarding production and EOR strategies to maximize oil production from the formation. The results of the project will provide industry and the state of North Dakota with a foundation for developing a pathway to improve Mission Canyon oil recovery efficiently and economically. Previous tests by Cobra have proven the viability of certain production strategies to improve Mission Canyon oil recovery. The results of this project will significantly expand and demonstrate the current understanding of completion and production optimization strategies that can be applied to Madison Fields throughout North Dakota. Additionally, recompleting wells within the Madison may be a way to extend the life of existing Bakken infrastructure previously deemed unprofitable.

STANDARDS OF SUCCESS

Success will be measured according to the timely achievement of project milestones and development of deliverables that meet the goal of the project. The value to North Dakota is improved understanding of the Mission Canyon Formation with respect to future well operations and potentially improved oil production from the Mission Canyon Formation. Results may directly influence industry practices and lead to improved oil recovery that could increase job opportunities and increase income revenue for North Dakota and its citizens.

BACKGROUND/QUALIFICATIONS

Summary of Prior Work: In January 2024, Cobra leased, bonded, and assumed operations of 11 orphaned wells (seven horizontal and four vertical) from the State of North Dakota at Wayne Field, in Bottineau County, North Dakota. Cobra recognized the potential of the Wayne subinterval of the Mission Canyon Formation. After Cobra's first 10 months of production at Wayne Field, oil production is up 20% and oil cut is up 10% since the field last produced in 2020. Some individual wells are produced with equivalent oil cuts as they had in 2020, but with 300% increases to oil production. Since January 2024, Cobra routinely acquires acoustic backside fluid levels of each producing well. This fluid level data gives a pulse for reservoir pressure and reservoir deliverability and is critical to optimizing production from a reservoir undergoing water coning with a strong underlying water drive.

Experience and Qualifications: Cobra is a privately held independent oil and gas company based in Wichita Falls, Texas, and has been in business for approximately 50 years. Cobra has a legacy of using cutting-edge geologic, geophysical, and engineering technologies for exploration discoveries and operational advancements. Cobra has operated wells in 14 different states and internationally since the company was formed. In 2015, Cobra entered the Williston Basin as a North Dakota Mission Canyon Formation operator of a legacy waterflood. Cobra began extensive research regarding the reservoir characteristics of the Madison Group's Mission Canyon Formation, with emphasis on the hydrodynamic effects of the tilted accumulations in the Billings County area. With proven success in the Mission Canyon Formation, Cobra expanded its asset position in 2018 and now operates in ten different counties of North Dakota. Cobra operates wells that produce exclusively from 12 different conventional formations of the Williston Basin. Cobra's Williston Basin focus for enhancing well productivity revolves around petrophysical and geological evaluation of pipe pay of conventional formations and stressing of fundamental operating techniques. Cobra employs a technical staff of three full-time geologists and five full-time engineers.

The EERC is a high-tech, nonprofit branch of UND, exclusively conducting applied research for a multinational client base. Through 70+ years of collaborating with industry and government on hydrogen technology development, the EERC is globally recognized for its role in advancing commercial deployment of technologies for producing, purifying, and utilizing hydrogen from coal, natural gas, and renewables. The EERC-housed research initiatives focus on techno-economic studies, technology development, and pilot- and demonstration-scale testing.

Personnel: Mr. Kyle Gardner, Cobra Vice President of Engineering, will serve as Project Manager and lead Cobra activities. Mr. Gardner will be supported by Mr. Josh Aaron and Mr. Bud Dillard, Cobra Geologists. Mr. Matthew Belobraydic, EERC Assistant Director for Geosciences, will oversee the entire project. Mr. Belobraydic will have project support from Dr. Kyoung Min, EERC Senior Reservoir Engineer; Dr. Fazilatun N. Mahmood, EERC Geochemist; and Mr. Jamie Schod, EERC Research

Manager. Project advisors from the EERC include John Harju, EERC Vice President for Strategic Partnerships and Bethany Kurz, EERC Director of Subsurface Characterization and Community Engagement. Resumes of key personnel are included in Appendix B.

MANAGEMENT

Overall management and reporting of the project will be handled by subcontractor EERC in close partnership with Cobra. Mr. Gardner will lead Cobra activities. Mr. Belobraydic will oversee the entire project. Mr. Belobraydic will be assisted in management of project activities by the EERC leadership team. The EERC manages over 200 contracts a year, with a total of more than 1300 clients in 53 countries. Systems are in place to ensure that projects are managed within budget, schedule, and scope. Mr. Belobraydic will be responsible for project coordination, guidance, and supervision to ensure consistent progress and adherence to budget and schedule constraints. Status reports will be submitted to the North Dakota Industrial Commission (NDIC) within 30 days after the end of each status period to provide timely highlights of ongoing research activities. A final report will be provided to legislative management, NDIC, and the Oil and Gas Research Council summarizing the results of the study.

TIMETABLE

The proposed project duration is estimated at 24 months. The timeline in Figure 1 shows the anticipated timing and duration of each task. The timeline will be adjusted if Cobra receives the proposed funding from OGRP past the anticipated start date.

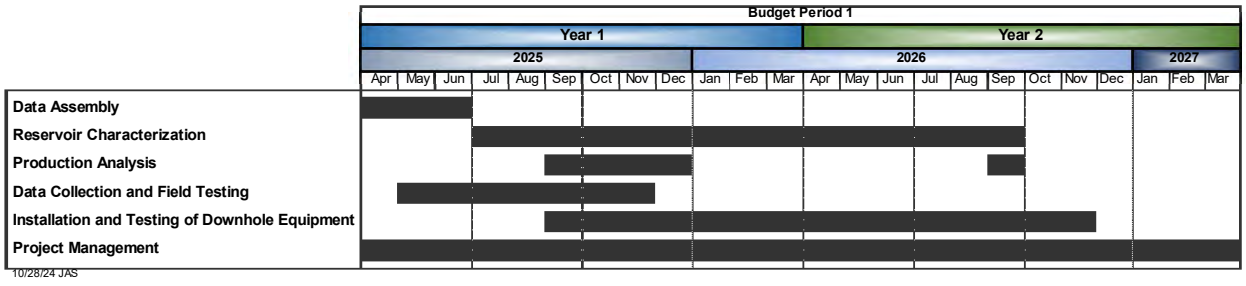

Figure 1. Project timeline.

BUDGET

The total estimated cost for the proposed scope of work is $2,000,000. The request from OGRP is $1,000,000. Cobra will provide $1,000,000 in cash cost share toward the project. The budget provided in the table was developed based on estimates to perform the proposed scope of work and experience with similar projects.

Project-Associated Expense	NDIC Share	Cobra Share (cash)	Total Project
Labor – Engineering and Field	$87,500	$87,500	$175,000
Facilities, Equipment, Gathering	$62,500	$62,500	$125,000
Stimulation	$175,000	$175,000	$350,000
Field Services – Rigs, Wireline, Testing, Coil	$125,000	$125,000	$250,000
Downhole Production Equipment	$200,000	$200,000	$400,000
Subcontractor – EERC	$350,000	$350,000	$700,000
Total Project Cost	$1,000,000	$1,000,000	$2,000,000

AFFIDAVIT OF TAX LIABILITY

Cobra has no outstanding tax liability to the State of North Dakota nor any of its political subdivisions.

CONFIDENTIAL INFORMATION

There is no confidential information included in this proposal.

PATENTS/RIGHTS TO TECHNICAL DATA

No patentable technologies are expected to be created during this work.

STATUS OF ONGOING PROJECTS

Cobra has Contract G-058-144 “Maximizing Production from Residual Oil Zones in Western North Dakota” current in progress funded through NDIC OGRP. The project is in good standing and current with all reporting, within scope and budget, and is projected to be delivered on time.

APPENDIX A

LETTERS OF SUPPORT

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

October 28, 2024

Mr. Kyle Gardner
Vice President – Engineering
Cobra Oil & Gas Corporation
PO Box 8206
Wichita Falls, TX 76307

Dear Mr. Gardner:

Subject: EERC Proposal No. 2025-0050 Entitled "Reservoir Characterization and Production Analysis of the Wayne Field, North Dakota"

The Energy & Environmental Research Center (EERC) is pleased to provide the attached proposal outlining the scope of work (SOW) and associated cost to characterize the Wayne Field reservoir and investigate methods and strategies to maximize recovery from the horizontal wells within Wayne Field, North Dakota.

The estimated project cost is $700,000. Expenses will be invoiced monthly on a cost-reimbursable basis. Initiation of the proposed work is contingent upon the execution of a mutually negotiated agreement between our organizations.

If you have any questions concerning this proposal, please feel free to contact me by phone at (701) 777-5030 or by email at mbelobraydic@undeerc.org.

Sincerely,

DocuSigned by:
Matt Belobraydic
775DACB519E64A8...
Matthew L. Belobraydic
Assistant Director for Geosciences

MLB/bjr

Attachment

October 30, 2024

HAM'S WELL SERVICE INC. WESTHOPE, ND

Mr. Kyle Gardner
Vice President Engineering
Cobra Oil & Gas Corporation
PO Box 8206
Wichita Falls, TX 76307

Dear Mr. Gardner:

I am pleased to provide my support for Cobra Oil & Gas Corporation's (Cobra's) proposed project entitled, "Maximizing Lateral Well Oil Production from Conventional Carbonate Mission Canyon Reservoirs in North Dakota." As a member of the North Dakota Petroleum Council Board and Vice President of Ham's Well Service, I am excited about the technology that Cobra is proposing to implement and the benefit that this approach could bring to North Dakota's conventional oil reservoirs.

Technologies and production strategies to revitalize and/or extend the lifetime of our conventional oil fields, such as the Mission Canyon reservoir and other carbonate reservoirs within the prolific Madison system, are needed to support oil and gas production in the state, sustain North Dakota's oil and gas industry and provide ongoing economic opportunities for North Dakota's residents and communities. The technology being proposed by Cobra would provide a mechanism to isolate and control production from different zones along the length of lateral wellbores, thereby creating access to pay zones that had previously been bypassed.

Given that there are more than 600 lateral wells in the Madison system, the successful completion of the proposed pilot project will provide the oil and gas industry and the state of North Dakota with a strategy to significantly improve Mission Canyon oil recovery efficiently and economically. I support this proposed effort and look forward to the results and information derived from the project, if awarded.

Sincerely,

Shane Bryans
Vice President
Ham's Well Service Inc.
Westhope, ND 58793

APPENDIX B

RESUMES

KYLE GARDNER

Vice President – Engineering, Owner

Cobra Oil & Gas Corporation

2201 Kell Blvd, Wichita Falls, TX, 76308

Phone: 940-716-5100 Email: kgardner@cobraogc.com

Professional Summary

Mr. Kyle Gardner has over 14 years of experience as a petroleum engineer with privately held oil and gas companies. He currently manages Cobra Oil & Gas Corporation's operations, production, and engineering team. He is also leader of Cobra's technical reservoir and petrophysical team. Mr. Gardner has a background in drilling engineering and a forte in carbonate petrophysical formation evaluation. He has a B.S. degree in Petroleum Engineering from Texas Tech University in Lubbock, Texas.

- 14 years of operational experience of managing daily production, drilling activities, and completion efforts.
- Has planned, executed, and managed the vertical and horizontal drilling and completions of wells Cobra has operated in nine different states of depths from 4,000' TVD to 18,000' TVD, most of which were wildcats of conventional and unconventional targets.
- Leads petrophysical formation evaluator with emphasis in bypassed conventional pay zones of carbonates.
- Experienced in residual oil zone research and field application in the Permian and Williston Basins.
- Evaluates Cobra acquisitions and divestitures, creates operational budgeting, manages company operating expenses.
- Experienced in economic evaluation software, Echometer equipment and software, and remote production management software.

- Board Member of the North Dakota Petroleum Council
- Board Member of the Texas Alliance of Energy Producers
- Member of SPE, AADE, and AAPG.

Bud Dillard

Geologist

Cobra Oil & Gas Corporation

2201 Kell Blvd, Wichita Falls, TX, 76308

Phone: 682-429.5285; Email: bud@cobraogc.com

Education and Training

Robert L. Bolin Graduate School of Geology—Fall 2016 – May 2020

Midwestern State University, Wichita Falls, Texas

- M.S. Geology with Petroleum Geology Emphasis—GPA: 4.0
- Thesis Topic: Lower Spraberry, Jo-Mill Sandstone, Permian Basin -- Borden, Dawson, Howard and Martin Counties, West Texas

University of Texas at Arlington, Texas–Graduated in December 2014

- B.S. in Geology; Minor in Biology

Texas Christian University, Fort Worth, Texas—Fall 2008 – Fall 2011

Research and Professional Experience

Cobra Oil & Gas Corporation, Wichita Falls, Texas—May 2020 – Present

Williston Basin Geologist

- Working legacy fields with existing conventional PDP, stacked reservoirs on the Northern Madison Shelf, in addition to the Nesson and Billings Anticline areas.
- Provides subsurface interpretation and project management as well as conducts local and regional field studies to evaluate potential behind-pipe pay zones.

Cobra Oil & Gas Corporation, Wichita Falls, Texas—May 2017 – May 2020

Entry Level Geologist; Geo-Technician

- Proficient in IHS Petra software; some experience with IHS Kingdom and GeoGraphix software.
- Worked NW Shelf Delaware Basin, Permian San Andres D in Lea and Eddy Counties, New Mexico; Hardeman Basin, Mississippian Chappel Limestone in Hardeman County, Texas.

Stivers Consulting, Inc., Graham, Texas—January 2015 – May 2016

Mud Logger

- Analyzed/described rock lithology via microscopy, evaluated hydrocarbon shows, monitored drilling activity, prepared mud log.

University of Texas at Arlington, Arlington, Texas—August – November 2014

Student Research

- Assisted PhD student with processing rock samples for dissertation work: Reconstructing Paleogene paleoclimate and paleoenvironment for terrestrial rock of the Green River Basin, SW Wyoming, using carbon isotope ratio in sediments.

Professional Activities

Society of Sigma Gamma Epsilon, Texas Epsilon Zeta Chapter—Fall 2017 – Spring 2020

- National Honor Society for the Earth Sciences

American Association of Petroleum Geologists Student Chapter—Fall 2016 – Fall 2018

- Chapter President – Spring 2018 – Fall 2018
- Chapter Senator, Student Government Association – Fall 2016 – Fall 2017

North Texas Geological Society—Fall 2016 – Present

Fort Worth Geological Society—Fall 2022 – Present

JOSH AARON
6725 Kit Carson Trl, Wichita Falls, TX 76310 · 940-631-0408

jaaron@cobraogc.com

EXPERIENCE

JANUARY 2020 – PRESENT
WILLISTON BASIN PETROLEUM GEOLOGIST, cobra oil and gas co.

- *Provide subsurface interpretation and project management for oil and gas exploration in the conventional reservoirs (Ordovician-Mississippian, & Permian-Triassic Fms.) of the Williston Basin. Conduct local and regional field studies to determine extent and volumetric estimates of conventional oil & gas reservoirs and prioritize existing PDNP behind-pipe zones with greatest potential.*
- *Assisted on other projects including the Hardeman Basin (Mississippian Chappel Limestone), Uintah Basin (Entrada Sands), and Clay County, TX (Strawn Formation).*

JANUARY 2019 – JANUARY 2020
GEO TECHNICIAN/ ENTRY LEVEL GEOLOGIST, lmh energy

- *Performed all mud logging and actively participated in well logging and completions on exploration, and development wells. Constructed well log correlation and subsurface mapping on conventional prospects in KMA and Archer County fields, North Texas.*

MAY 2017 – AUGUST 2018
PRODUCTION OPERATOR, msb operating

- *Sustain production, maintain rig equipment, operate work-over rig, service flow and injection lines.*

EDUCATION

AUGUST 2017- DECEMBER 2019
MASTER OF SCIENCE IN PEROLEUM GEOLOGY, midwestern state university
The Robert L. Bolin Graduate School of Petroleum Geology
GPA: 4.0

- **THESIS**: Subsurface Isopach Mapping of the Major Depositional Sequences of the Ordovician Bromide Formation, South Central Oklahoma (Advisor: Jesse Carlucci, Ph. D.)
- ***LABORATORY/GRADUATE TEACHING ASSISTANT-*** *Lead multiple geology laboratory courses as an independent instructor. Developed management and oversight skills while directing these courses.*

AUGUST 2013- MAY 2017
BACHELOR OF SCIENCE IN GEOSCIENCES, midwestern state university

- **UNDERGRADUATE STUDENT RESEARCH**- Preformed facies examination through X-ray powder diffractometry (Rigaku Miniflex) on the Pontotoc Sandstone Submember of the Bromide Formation, Oklahoma.

MATTHEW L. BELOBRAYDIC

Assistant Director for Geoscience

Energy & Environmental Research Center (EERC), University of North Dakota (UND)

15 North 23rd Street, Stop 9018, Grand Forks, North Dakota 58202-9018 USA

701.777.5030, mbelobraydic@undeerc.org

Principal Areas of Expertise

Mr. Belobraydic's principal areas of interest and expertise include stratigraphic and structural interpretations, geologic characterization, data science, process automation, geostatistical analysis, geomodeling, and uncertainty analysis.

Education and Training

M.S., Geology, Ball State University, 2006. Thesis: "Drainage Basin Analysis and Fluvial Geomorphic Reconstruction Plan for the Killbuck–Mud Creek Subwatershed, Delaware County, Indiana."

B.S., Geology, University of Idaho, 2003. Senior Project: "Drainage Analysis for Colfax South, Diamond, Dusty, Thera, Thornton Quadrangles and an Experimental Quadrangle of Eastern Washington."

Research and Professional Experience

September 2022–Present: Assistant Director for Geoscience, EERC, UND. Mr. Belobraydic collaborates with EERC subject matter experts, principal investigators, and leadership to prepare proposals and pursue new business opportunities and leads and manages projects in the areas of enhanced oil recovery (EOR) in conventional and unconventional formations, CO_2 and produced

gas storage, natural resource management, critical materials resource characterization and recovery, geologic and synthetic materials characterization, produced water management, and the environmental aspects of energy development.

- Manages a team of petrophysicists and subsurface data management professionals.
- Coaches and mentors more than ten geoscientists in geology, stratigraphy, geostatistical, geologic modeling, and uncertainty methods.
- Develops strategic plans for petrophysical products and data-handling procedures for subsurface teams.
- Assists the Director of Analytical Solutions by providing business directions for technical reports and technical expertise.
- Creates project proposals and maintains client relationships.

December 2020–September 2022: Principal Geoscientist, Geoscience and Engineering Group, EERC, UND. Mr. Belobraydic collaborated with EERC subject matter experts and principal investigators to create geological interpretations and prepared proposals in the areas of EOR in conventional and unconventional formations, CO_2 and produced gas storage, natural resource management, geologic materials characterization, produced water management, and environmental aspects of energy development.

- Mentored geoscientists as subject matter expert in geology and geological modeling for more than ten federal, state, and private contracts.
- Coached modeling team members through team-building and workflow improvement exercises.
- Characterized reservoirs and depositional environments for projects to maximize subsurface understanding and minimize development risk.

- Managed resources, budgets, and timelines on projects to successfully complete within deadlines and scope.

October 2020 – December 2020: Geoscientist, EERC, UND. Mr. Belobraydic produced geology and geological modeling results for CO_2 storage projects as part of an integrated team of EERC subject matter experts. Specific activities included the following:

- Produced 3D geologic models for CO_2 storage for select clastic formation within the Williston Basin.
- Coached three geoscientists through geostatistical and geomodeling methods as on-the-job training.

September 2008–April 2020: Senior III Reservoir Geologist, Schlumberger, Denver, Colorado. Mr. Belobraydic produced data-driven client solutions as part of a multidisciplinary consulting team, improving internal technical processes and workflows to increase efficiency and maximize profits. Specific activities included the following:

- Managed team of petrophysicist, geophysicist, geologist, and reservoir engineers from proposal to project close as technical lead for more than ten client projects.
- Introduced Agile and Scrum project management to local consulting team, changing work processes, shortening turnaround times by 66% and increasing bottom line.
- Reviewed green energy workflows and processes for internal geothermal and carbon capture and storage teams as subject matter expert to mitigate risk and uncertainty.
- Initialized and maintained backlog for basin interpretation cloud subscription service as Scrum product owner to capture previously inaccessible market share.
- Adapted working style and deliverables to become trusted technical advisor for more than 20 client organizations, each with unique business priorities.

- Coordinated stakeholders and potential clients for four cloud subscription service offerings to maximize value, drive communication, and quantify feedback of results.
- Created harmonious and integrated team environments for technical staff from both Schlumberger and client organizations for project collaborations.
- Characterized petroleum systems and depositional environments for client acreage to maximize reservoir understanding and minimize development risk.
- Interpreted structure and stratigraphy for full 3D models, combining seismic data for conventional and unconventional plays in more than ten basins and 30 fields globally.
- Analyzed raw and interpreted data to generate geostastically accurate static reservoir models in Petrel on more than five projects per year for worldwide clients.
- Published and automated uncertainty optimization technique, reducing dynamic simulation iterations by 80% and generating a positive feedback loop to initial inputs.
- Built custom Python, SQL, and Petrel workflows, increasing productivity by up to 900%.
- Coached and mentored more than 30 individuals through organized team-building activities and formal career development.
- Created advanced modeling curriculum and training programs in Petrel for more than 25 junior geoscientists.
- Published results and methodologies for select client work as posters and papers to technical conferences and professional societies.
- Requested presenter to professional societies for geology, data science, and machine learning.
- Prepared and reviewed proposals, reports, and project documentation, effectively communicating technical results and methodology to clients and working teams.

September 2006–August 2008: CO_2 Enhanced Oil Recovery Research Assistant, UND. Mr. Belobraydic researched CO_2 EOR and sequestration potential for the Williston Basin alongside the EERC. Specific activities included the following:

- Generated systematic approach for assessing EOR and carbon dioxide sequestration for fields of interest.
- Produced 3D reservoir models to simulate EOR and carbon dioxide sequestration potential.

May 2005–May 2006: National Science Foundation GK–12 Fellow, Ball State University, Muncie, Indiana. Mr. Belobraydic provided in-classroom support to Indianapolis Public Schools (IPS) teachers through inquiry-based lessons and assisted in professional development for K–8 science standards. Specific activities included the following:

- Developed middle school Earth science curriculum and lessons for IPS.
- Provided aid in the professional development of IPS teachers as a knowledge resource.

Professional Activities

Member, American Association of Petroleum Geologists

Member, Rocky Mountain Association of Geologists

Publications

Mr. Belobraydic has authored or coauthored numerous professional 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

Principal Areas of Expertise

Dr. 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.

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. Dr. 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. He 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.

2003–June 2015: Associate Director for Research. Dr. 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. Dr. 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, WY. Dr. 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, IL.

2000–2002: Principal Scientist, Produced Water Management. Dr. 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. Dr. 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 RFPs, reviewed proposals, and formulated contracts; performed technology transfer activities; and supervised staff and contractors. He 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. He led GRI/GTI involvement with industry environmental consortia and organizations, such as PERF, SPE, AGA, IPEC, and API.

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. Dr. 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 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-PI on 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

Dr. Harju has authored or coauthored more than 100 professional publications and nearly 300 technical presentations.

BETHANY A. KURZ

Director of Analytical Solutions

Energy & Environmental Research Center (EERC), University of North Dakota (UND)

15 North 23rd Street, Stop 9018, Grand Forks, North Dakota 58202-9018 USA

701.777.5050, bkurz@undeerc.org

Principal Areas of Expertise

Ms. Kurz's principal areas of interest and technical expertise include carbon capture, utilization, and storage (CCUS); produced natural gas storage; enhanced oil recovery (EOR) in conventional and unconventional oil and gas reservoirs; application of machine learning and data analytics to CCUS and oil and gas development; produced water and drilling waste management; assessment of critical materials in coal and produced brine; and resource management related to energy development.

Education and Training

M.S., Hydrogeology, University of North Dakota, Grand Forks, ND, 1998.

B.S., Geochemistry, Bridgewater State University, Bridgewater, MA, 1995.

Research and Professional Experience

May 2021–Present: Director of Analytical Solutions, EERC, UND. Ms. Kurz is responsible for developing business and research opportunities to address challenges in all areas of energy and natural resources development and management. She leads programs and projects related to CCUS; application of machine learning and artificial intelligence to CCUS and conventional and unconventional oil and gas development; EOR; produced water and drilling waste management; and critical materials resource assessments. Ms. Kurz also leads the EERC's research laboratories and a multidisciplinary team of scientists and engineers focused on addressing the

needs of our partners and clients in areas related to energy development and management and environmental stewardship.

July 2018–April 2021: Assistant Director of Integrated Analytical Solutions, EERC, UND. Ms. Kurz was responsible for assisting the EERC's leadership team with developing business opportunities and successfully executing research projects related to oil and gas; natural resource management; and CCUS. She oversaw a multidisciplinary team of scientists and engineers who work in the EERC's applied research laboratories. In that role, she was responsible for ensuring the quality assurance/quality control of data and results generated by the EERC's laboratories and integrating those results into the applied research efforts conducted by the Subsurface R&D team.

2011–July 2018: Principal Hydrogeologist, Laboratory Analysis Group Lead, EERC, UND. Ms. Kurz oversaw a multidisciplinary team of scientists and engineers and several of the EERC's analytical research laboratories that focus on classical and advanced wet-chemistry analyses; petrochemical, geochemical and geomechanical evaluation of rocks and soils; and advanced characterization of various materials, including metals, alloys, catalysts, and corrosion and scale products. Her primary areas of interest included the evaluation of water supply sources for the oil and gas industry, produced water management, characterization of geologic media for carbon storage and development and testing of proppants for use in hydraulic fracturing.

2002–2011: Senior Research Manager, Water Management and Flood Mitigation Strategies, EERC, UND. Ms. Kurz's responsibilities included project management, technical report and proposal writing, public outreach, and the development of new research focus areas. Research activities included the evaluation of nontraditional water supply sources for municipal and

industrial use, flood and drought mitigation, watershed-scale water quality assessments using hydrologic models, and public education and outreach on various water and energy issues.

1998–2002: Research Scientist, Subsurface Remediation Research, EERC, UND. Ms. Kurz's responsibilities included managing and conducting research involving remediation technologies for contaminated groundwater and soils, groundwater sampling and analysis, technical report writing, and proposal research and preparation.

Publications

Ms. Kurz has coauthored numerous professional publications.

FAZILATUN NESSA MAHMOOD

Geochemist

Energy & Environmental Research Center (EERC), University of North Dakota (UND)

15 North 23rd Street, Stop 9018, Grand Forks, North Dakota 58202-9018 USA

701.777.5183, nmahmood@undeerc.org

Education and Training

Ph.D. Candidate, Geology, University of North Dakota, 2016–Present.

M.S., Geology, University of Saskatchewan, Saskatoon, Saskatchewan, Canada, 2016.

M.S., Hydrogeology, University of Dhaka, Dhaka, Bangladesh, 2005.

B.S., Geology, University of Dhaka, Dhaka, Bangladesh, 2002.

Software proficiency includes Microsoft Office Suite, MATLAB, ArcGIS, Grapher, Surfer (graphing, plotting, and analysis software), and Modflow (groundwater flow-modeling software).

Research and Professional Experience

March 2024–Present: Geochemist, EERC, UND.

- Interfaces with diverse team of scientists and engineers to assess project uncertainties in oil and gas development and geologic storage.
- Develops and oversees development of geophysical and geochemical models of subsurface.
- Performs regional geological characterization and analyses of data.
- Assists in preparation of technical proposals, reports, and presentations.

Work currently involves developing geophysical and geochemical models of the subsurface and performing regional geological characterization and analyses of data, testing, and application of NRAP tools (Open-IAM and DREAM).

November 2020–March 2024: Geoscientist, EERC, UND.

- Interfaced with diverse team of scientists and engineers to assess project uncertainties in oil and gas development and geologic storage.
- Developed and oversaw development of geophysical models of subsurface.
- Performed regional geological characterization and petrophysical analyses of geophysical well log data.
- Assisted in preparation of technical proposals, reports, and presentations.

May 2020–October 2020: Research Assistant (student intern), EERC, UND.

August 2016–Present: Research/Teaching Assistant, UND.

- Used pure strains of chemostat continuous cultured marine diatoms grown at different silicic acid concentrations to investigate effect of silica concentration on diatom's oxygen isotope ($\delta^{18}O$) composition.
- Studied stable carbon-isotope ($\delta^{13}C$) profiles of marine carbonate cores taken from the upper Red River Formation of the Williston Basin and its correlation with an isotope record established in the North American Midcontinent (Cincinnati region), Quebec, and Estonia.
- Team-taught 120 freshmen-year students (GEOL 101L, Introduction to Geology Laboratory, and GEOL 102L, The Earth Through Time Laboratory) and 20 graduate-level students (GEOL 540, Water Sampling and Analysis).

September 2012–June 2016: Research Assistant, University of Saskatchewan, Saskatoon, Saskatchewan, Canada.

- Researched origin and fate of nitrate in waste rock dump of coal mine in British Columbia using dual isotopes ($\delta^{15}N$ & $\delta^{18}O$) and high-resolution water-soluble and porewater chemistry data.

July 2006–April 2009: Geologist, Chevron International Exploration and Production, Dhaka, Bangladesh, and Chevron Energy Technology Company (ETC), Sugar Land, Texas.

- Worked on Bibiyana Gas Field Development Project including the following activities:
  - Performed operational geology responsibilities.
  - Crosschecked drilling and geological database collected from contractor/vendor and service companies and also guided them according to company demand.
  - Integrated seismic and well data from drilling program to evaluate reservoirs.
  - Performed preliminary formation evaluations for prospect identification using Landmark software (SeisWorks, StratWorks) and mapped planned and prospective horizons.
  - Performed geostatistical modeling using GOCAD (2.1.6).
  - Developed structural framework from seismic interpretation.
  - Performed petrophysical modeling.

July 2005–April 2006: Geologist, Department of Public Health Engineering, Dhaka, Bangladesh.

- Worked on Deep Aquifer Database Development Project Arsenic Policy Support Unit, DFID, and JICA.

Professional Activities

Member, American Association of Petroleum Geologists

Publications

Has coauthored numerous publications.

JAMIE A. SCHOD

Research Manager

Energy & Environmental Research Center (EERC), University of North Dakota (UND)

15 North 23rd Street, Stop 9018, Grand Forks, North Dakota 58202-9018 USA

701.777.5000, jschod@undeerc.org

Principal Areas of Expertise

Mr. Schod's primary areas of interest and expertise are igneous and metamorphic petrology, remediation, reclamation, stormwater management, and project management.

Education and Training

B.S., Geology, University of North Dakota, 2019. Thesis: "Distribution and Spatial Autocorrelation Analysis of Martian Periglacial Polygon Formations."

Research and Professional Experience

June 2023–Present: Research Manager, EERC, UND. Mr. Schod is responsible for working with principal investigators and project managers to facilitate scientific research; coordinating and writing proposals in response to federal, state, and commercial funding opportunities; monitoring project progress; supporting project management activities; coordinating scopes of work; planning budgets and timelines; and executing research activities.

March 2021–May 2023: Staff Geologist and Project Manager, Terracon Consultants, Inc. Mr. Schod developed business opportunities with commercial, state, and federal entities while managing and leading projects involved with environmental site assessments, limited site investigations, remediation, reclamation, stormwater management, and geotechnical industries.

Professional Activities

Member, North Dakota Geological Society

Member, The Planetary Society

DR. KYOUNG MIN

Reservoir Engineer

Energy & Environmental Research Center (EERC), University of North Dakota (UND)

15 North 23rd Street, Stop 9018, Grand Forks, North Dakota 58202-9018 USA

701.777.5169, kmin@undeerc.org

Education and Training

Ph.D., Petroleum Engineering, Texas A&M University, 2013.

M.E., Mechanical Engineering, Texas A&M University, 2008.

M.S., Mechanical Engineering, University of Michigan Ann Arbor, 2006.

Programming Skills

Languages: FORTRAN, C++, MATLAB, VBA, OpenMP for parallel computing

- Python libraries: scikit-learn, NumPy, pandas, matplotlib, keras

Programs: CMG, Eclipse, tNavigator, Kappa, Prosper, Petrel RE, GOCAD

- JMP, Spotfire, ABAQUS, HF software (GOHFER, Kinetix, FracPro)

Research and Professional Experience

March 2022–Present: Reservoir Engineer, EERC, UND.

- Pursues problem solving related to advanced challenges in conventional and unconventional reservoirs such as production mechanisms and enhanced oil recovery (EOR) in tight reservoir rocks, CO_2 or produced gas-based storage, and production data analysis and interpretation for unconventional reservoirs.

Principal areas of interest and expertise include data analytics (machine learning [ML]/artificial intelligence [AI]), geomechanics, and reservoir engineering.

July 2020–May 2021: Research Reservoir Engineer, Eden GeoTech, Somerville, Massachusetts.

- Developed reservoir stimulation/monitoring design for low-carbon EOR methods, funded by National Science Foundation (NSF).
- Produced research proposals (U.S. Department of Energy [DOE], NSF) and conducted industry meetings as project leader.
- Developed predictive models using data-driven methods and multiphysics simulation.

February–June 2020: Senior Research Associate, University of Oklahoma.

- Developed hybrid data-physics ML model to predict well interference and completion efficiency.

April–June 2019: Staff Reservoir Engineer, Pioneer Natural Resources.

- Developed integrated geomechanics–reservoir simulation workflow optimization for completion design, well-spacing/stacking, parent–child, well control, and EOR.
- Constructed and calibrated reservoir models for multiwell development in stacked reservoirs.

June 2014–March 2019: Senior Reservoir Engineer–Data Scientist, Anadarko Petroleum Corporation.

- Project leader in Advanced Analytics team to develop completion optimization and reservoir characterization tools using data analytics/ML techniques and physics-based simulation.
- Developed field development tool (EUR, CAPEX, OPEX) using public and internal data sources (RSEG, DrillingInfo, IHS). Identified data trends and key development factors to maximize NPV.
- Developed a coupled geomechanics–reservoir simulation to optimize well spacing, completion design, choke management, and targeting for full-field development plan.
- Developed hybrid data physics method for fast production forecast and uncertainty quantification using statistical methods, Monte-Carlo simulation, and Bayesian approach.

- Led multiteam collaboration to develop data-driven basin evaluation tool for key driver identification, sweet-spot recognition, and development optimization.
- Analyzed production, reservoir fluid, geology, and completion data to construct structured dataset.
- Utilized field data (RTA/PTA, DFIT, BHP) to estimate reservoir properties/performance.

April 2013–May 2014: Reservoir Geomechanics Consultant, Shell Oil Company.

- Assessed development risks by injection/depletion induced dynamics, compaction/subsidence, fault reactivation, and cap rock integrity using full-scale reservoir–geomechanics simulation.
- Multiscale geomechanics modeling for well integrity analysis for depleted deep-water reservoirs.

May–August 2011: Summer Intern, Idaho National Laboratory.

- Geomechanics module development; developed hydraulic fracturing simulation algorithm for enhanced geothermal system using C++ and parallel solver tool kits in HPC environment.

Professional Activities

Reviewer, *Journal of Petroleum Science and Engineering*, *Geomechanics and Geophysics for Geo-Energy and Geo-Resources*, *Rock Mechanics and Rock Engineering*, and *American Rock Mechanics Association*.

Publications

Has authored or coauthored numerous professional publications.

APPENDIX C

REFERENCES

Burton-Kelly, M.E., Dotzenrod, N.W., Feole, I.K., Pekot, L.J., He, J., Butler, S.K., Kurz, M.D., Kurz, B.A., Smith, S.A., and Gorecki, C.D., 2018, Identification of residual oil zones in the Williston and Powder River Basins (Final Report): Report prepared by the Energy & Environmental Research Center for DOE Cooperative Agreement No. DE-FE0024453.

Dotzenrod, N.W., Dalkhaa, C., Pekot, L.J., He, J., Burton-Kelly, M.E., Feole, I.K., Bosshart, N.W., Peck, W.D., Ayash, S.C., and Gorecki, C.D., 2017, Fine-scale modeling and simulation of the Big Stick and T.R. Fields, North Dakota, USA (update): Report prepared by the Energy & Environmental Research Center for DOE Cooperative Agreement No. DE-FE0024453.

Jarvie, D.M., 2022, The History of Madison Group Exploration and Production in the North Dakota Williston Basin with an Update on Madison Group Source Rocks. https://www.researchgate.net/publication/368745926_The_history_of_Madison_Group_exploration_and_production_in_the_North_Dakota_Williston_Basin_with_an_update_on_Madison_Group_source_rocks. DOI:10.31582/rmag.mg.59.3.201.

Jennings, J.B., and Johnson, R.P., 1996, Wayne Field: A Horizontal Drilling Case Study: Expanded Abstracts Volume: American Association of Petroleum Geologists. Rocky Mountain section meeting, Billings, MT, July 28–31, 1996.

Industrial Commission

Tax Liability Statement

Applicant:

Cobra Oil & Gas Corporation
2201 Kell Blvd.
Wichita Falls, TX 76308

Application Title:

Controlling Horizontal Well Oil and Water Production within Wayne Field, North Dakota

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.

Kyle Gaul
Signature

Vice President - Engineering
Title

11/1/24
Date

NORTH DAKOTA PETROLEUM FOUNDATION

November 1, 2024

Reice Haase, Deputy Executive Director
North Dakota Industrial Commission
State Capitol – 14th Floor
600 East Boulevard Ave Dept 405
Bismarck, ND 58505-0840
Re: Grant Application for the North Dakota Petroleum Foundation Program

Dear Mr. Haase:

Enclosed is a grant application requesting approval from the North Dakota Industrial Commission for funding from the Oil and Gas Research Council to support the North Dakota Petroleum Foundation's education and outreach programs. These programs include a range of public education, outreach, and promotional activities such as the Teachers Seminar, Bakken Rocks CookFest, public information sessions, T4 Summits, and ND Energy Education programs. Additionally, the initiative involves a public education campaign with various promotion and marketing strategies.

These components have proven highly effective and are now key tools for industry outreach. These education efforts offer well-balanced, impactful educational materials tailored to the needs of target audiences. The total projected cost for this program is $2,126,415.00 for the period from January 1, 2025, through December 31, 2026. We are requesting $880,245.00 in funding to support these educational and outreach efforts during this timeframe. A $100 check for the application fee will be mailed next week.

The North Dakota Petroleum Foundation is committed to fulfilling each component outlined in this grant application. Please contact me if additional information is needed.

Sincerely,

Tessa Sandstrom
Executive Director, North Dakota Petroleum Foundation

Enclosure

Applicant:	North Dakota Petroleum Foundation P.O. Box 7233 Bismarck, ND 58507 701-223-6380
Principal investigator:	Eric Delzer
Date of application:	November 1, 2024

Oil and Gas Research Program

North Dakota

Industrial Commission

Application

Project Title: North Dakota Petroleum Foundation Outreach and Education Program

Applicant: North Dakota Petroleum Foundation

Principal Investigator: Tessa Sandstrom

Date of Application: November 1, 2024

Amount of Request: $880,245.00

Total Amount of Proposed Project: $2,126,415.00

Duration of Project: Jan. 1, 2025 to Dec. 31, 2026

Point of Contact (POC): Eric Delzer

POC Telephone: 701-223-6380

POC E-Mail Address: edelzer@ndoil.org

POC Address: PO Box 7233, Bismarck, ND 58507

TABLE OF CONTENTS

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ABSTRACT

Objective:

The North Dakota Petroleum Foundation (Foundation) is applying for the OGRC grant to administer and continue their education and outreach programs. The mission of the Foundation is to provide and support education and outreach opportunities related to the petroleum industry, develop and advance quality-of-life initiatives, and promote and enhance the conservation heritage of North Dakota. The Foundation is currently operating this program with OGRC grant funding, which will end on December 31, 2024, and it plans to continue building on its success.

Expected Results:

The mission of the Oil and Gas Research Council (OGRC) is to promote the growth of the oil and gas industry through research and education. The Foundation programs outlined in this grant request are an effective way for the OGRC to accomplish this mission. We have been building on education, outreach, conservation, and awareness initiatives for several years and the feedback received is always positive. Our public opinion surveys also help guide our messages and show us that our efforts are working. These programs become more critical each year as the oil and gas industry strives to provide the information that North Dakotans want and need.

Duration:

The funding request for this program is for January 1, 2025 – December 31, 2026.

Total Project Cost:

The total budget for the North Dakota Petroleum Foundation program during this timeframe is $2,126,415.00, of which $880,245.00 is requested from the OGRC, which has been a critical partner in our past efforts, and through continued support, we look forward to taking this program to the next level.

Participants:

To enhance the ability of the Foundation to deliver these projects to the public in a meaningful way, we have several partners, all of whom bring unique professional experience to the table. Partners include the North Dakota Petroleum Council (NDPC), NDPC member companies, Western Dakota Energy Association (WDEA), Department of Mineral Resources (DMR), North Dakota Department of Transportation (NDDOT), North Dakota Highway Patrol (NDHP), UND's Energy and Environmental Research Center (EERC), the North Dakota Pipeline Authority (NDPA), North Dakota State Land Department (NDSLD), North Dakota Safety Council (NDSC), and civic and community groups, among others. Thanks to their help and insight, our programs have been a tremendous success and were nationally recognized by the Interstate Oil and Gas Compact Commission in October 2009 with its Energy Education Stewardship Award, in 2013 with the Environmental Partnership Award for the Pick Up the Patch program, and in 2021 with the Environmental Partnership Award for its Planting for the Future program.

PROJECT DESCRIPTION

Objectives:

The Foundation will continue to pursue its mission through public outreach, education, messaging, and informational opportunities. We will also continue developing online materials and messages that are smartly scalable, relatable to targeted audiences, and able to be deployed via multiple channels. The Foundation operates each of its initiatives with the support and oversight of North Dakota Petroleum Council staff. Each of these initiatives is further explained in this section. We conduct a Public Perception Survey biennially to measure the success of our efforts and stay abreast of issues and sentiments. Our latest survey, completed in January/February 2024, shows that a majority (85%) of North Dakotans favor oil and gas development in North Dakota and 90% believe the state should either increase production (52%) or keep tit the same (38%).

1) Outreach

Although individual outreach events typically reach a smaller number of people, the impact is significant, especially as events and projects gain recognition and popularity. We will continue our outreach efforts to maintain relationships and build new ones. Creating opportunities where North Dakotans can interact with the industry or see development first-hand is an important way to share information and create levels of trust among stakeholders. The North Dakota Petroleum Foundation programs are working to create these opportunities through several initiatives:

Bakken Rocks CookFest – The Bakken Rocks CookFest has long been one of our most popular and successful events. From 2009 to 2022 (with the exception of 2020), the Foundation hosted two CookFests in communities amid oil and gas development. This was reduced to one event in one community in 2023. This event includes a competitive BBQ event and entertainment for the community. Each event is free and open to the public and features a public information session that includes both general information about oil and gas development, as well as an opportunity to discuss hot topics that may be specific to each community. Government agencies and local nonprofits and organizations also have information booths set up to provide information on regulations, rights of way and easements, royalties, and more. The Mule Deer Foundation and educational groups like the Gateway to Science or Magic City Discovery Center have also set up booths providing activities for children and families. This event typically attracts upwards of 1,500 people, with recent events in Killdeer and Tioga attracting as many as 3,000 people.

This event is an important means of providing education opportunities in the western portion of the state where oil and gas is a significant part of the community. It also provides an enjoyable atmosphere where industry, residents, and other stakeholders can interact, build relationships and learn from one another.

Public Education Sessions – Educating the public about development activity and infrastructure needs, along with regulations and processes involved with the oil and natural gas industry, is a tremendous part of building goodwill within the state. Public Information Sessions, also known as town halls, provide an excellent and intimate opportunity for industry to provide information about operations and efforts to address impacts while giving individuals opportunities to ask questions of industry and regulatory authorities.

In addition to the Information Sessions hosted during the CookFest, the Foundation has also participated in and/or sponsored other meetings or sessions with North Dakota colleges and universities, leadership groups, community groups (such as Kiwanis or Lions groups) and others as requested.

Tours – As it is able, the Foundation also conducts oilfield tours and seminars for parties as requested and as time and resources of both the Foundation and North Dakota Petroleum Council (NDPC) member company volunteers are available. In the past, the NDPC and Foundation have hosted tours for elected officials and candidates (both from North Dakota or for national groups), Council for a Secure America, agriculture organization members and leaders, and others. These tours give participants a more in-depth and close-up look at the oil and gas industry. Participants often remark that these tours have been eye-opening and have given them a greater appreciation for the industry and its role in our nation's economy, energy security, and quality of life. Except for the tour for North Dakota elected leaders and candidates which is scheduled every even year, most tours are ad hoc.

Safety and Environment – Safety and protection of the environment continue to be top concerns for North Dakotans. The North Dakota Petroleum Foundation will continue to work toward resolving those issues through action and education. Our safety and environment programs include the Foundation's Planting for the Future Program and partnerships with the Mule Deer Foundation and Teddy Roosevelt Medora Foundation, though funds may be available for other issues as they arise.

Planting for the Future – The Foundation established a program dedicated to planting trees for wildlife and habitat in 2018. Since then, more than 522,000 trees have been planted through the program. Although OGRC funds are not requested to support this program, it factors heavily into Foundation messaging and its outreach efforts throughout the state and its mission to promote and enhance the conservation heritage of North Dakota.

Conservation Partnerships – Over the past few years, the Foundation has been developing a strong relationship with both the Mule Deer Foundation (MDF) and the Teddy Roosevelt Medora Foundation (TRMF) with a focus on conservation. Each year, the Foundation participates in at least one industry work day with the Mule Deer Foundation that has been well-received among industry and MDF leadership and volunteers. Past projects have varied in location, size and purpose, but the Foundation has consistently turned out more than a dozen volunteers and contributions of in-kind use of equipment for the past four years. We anticipate these projects will continue in the future.

Likewise, the Foundation has worked closely with the TRMF and has supported remediation and conservation of sensitive areas near the Bully Pulpit Golf Course. In return for the donation, the TRMF placed placards onsite and sharing information via social media and newsletters about the oil and gas industry and its contributions. The Foundation also sponsors the Teddy Roosevelt Show performed by Joe Weigand. Weigand incorporates Roosevelt's conservation efforts and appreciation for North Dakota's natural resources in his performances and will recognize both the Foundation and OGRC for their contribution. His performances annually reach an average of more than 7,000 people each summer and also includes performances at annual meetings or conventions, such as the US Forest Service Annual Meeting and NDPC events, among others.

2) Education

Among the major challenges faced by the energy industry during the early years of Bakken shale development was the availability of a skilled workforce. Although the Bakken has become a mature play, the challenge of maintaining a skilled workforce remains relevant today and into the future.

According to the National Academy of Sciences, one of the recommendations to help meet the workforce demand is to improve K-12 STEM education and increase the number of people pursuing STEM education. To help the industry achieve these goals, the North Dakota Petroleum Foundation plans to continue programs aimed at providing teachers the information and tools they need to better inform students about the industry, as well as piquing interest in STEM and careers in the petroleum industry among students.

Teacher Seminar – Although oil and gas development has grown to be a major part of the fabric of North Dakota, many educators—even those in western North Dakota—largely lack information about the industry. The objective of the Teacher Education Seminar is to provide both teachers and guidance counselors with basic information about oil and gas development and offer them a first-hand tour of drilling and production sites, a refinery, reclaimed locations and more as time or availability of sites permit. The Seminar is a four-day program open to primary and secondary educators. Participants receive complimentary course materials, lodging at BSC, and most meals in conjunction with the seminar. They are also able to earn two course credits from MSU, NDSU, or UND. During this proposed grant period, Teacher Seminar will occur in June 2025 and June 2026.

Educational sessions focus on a broad spectrum of topics, including history, geology, physics and engineering, as well as the industry's regulatory and social impacts, including employment needs, policy decisions and impacts of oil taxes on state tax revenues and the state's budget surplus. Topics are sometimes tweaked to address hot topics such as global energy supply and demand in times of conflict or high energy prices. Participants also try hands-on activities and receive various lesson plans and resources they can take back into the classroom. This program has been a success and many teachers leave with a better understanding of the industry and feel better equipped to provide students with the information they need about the industry and careers in oil and gas. Attendees complete surveys after each seminar so we can ensure we are meeting their needs and delivering our information in the best way possible.

ND Energy Education/T4 – The Foundation will continue initiatives to reach out directly to students through its ND Energy Education program and T4 Summits. Initiated in 2002, ND Energy Education program has been popular among educators and students across the state. Partnering with Bismarck Public Schools, the Lignite Energy Council, and Career and Technical Education, these programs have reached more than 80,000 North Dakota students, teachers, and parents through workshops in individual classrooms, job fairs and more. In fact, many teachers who attend the Teacher Education Seminar will request visits from instructors of the ND Energy Education program.

While some ND Energy Education visits are still conducted, more focus in the last four years has been placed on the T4 (Tools Trades Torque Tech) Summits. T4 introduces students to workforce skills, needs, training, and networking opportunities with industry leaders and technicians. Opportunities for industry career exploration give young people broader exposure to the working world they will one day enter and helps them "connect the dots" between school and career in ways that keep them motivated to learn the skills they will need for the future.

There have historically been between 7 and 10 T4 Summits held each year. Summits are two days and will typically host 500-700 students per day. Devil's Lake, Bottineau, Watford City, Bowman and tentatively Bismarck are already scheduled for 2024. Other communities that have held summits in recent years include Hillsboro, Wahpeton, Parshall, Stanley, Casselton and Grafton. Additional summits may be scheduled if other communities would like to host and as time and resources permit in the 2025-2026 school year.

The T4 Summits have been extremely popular among teachers, students, and industry participants. Students can learn about a trade or profession by participating in hands-on activities and instructors also give an overview of the job availability and salary and education expectations. There are usually more than 20 sessions at each summit to show students the diversity of jobs and careers available in industry-related fields.

3) Awareness and Public Perception

Even though the oil and gas industry's positive public perception continues to be high, the Foundation remains focused on continuing to promote public awareness of the benefits and opportunities provided by the industry.

Advertising, Branding, and Promotion – Early promotional efforts focused largely on providing information about the economic and job benefits of the oil and gas industry. The Foundation has developed and continues to share messages that illustrate the benefits of the state's oil and natural gas industry. This includes economic and career opportunities supported by oil and natural gas, technologies and products made available by petroleum that help improve quality of life, and resources and revenues generated by the industry that support schools, infrastructure and other priorities.

During this grant period, the Foundation will continue to promote these and other messages through both traditional and social media. The Foundation will also develop new material as necessary to respond to current public opinion and timely issues. Messages will be guided by public opinion research and studies and reports that provide data on economic progress, employment numbers and tax revenues.

While the Foundation strives to share messages through earned media whenever possible, the most effective means of reaching a broad audience is through paid advertising. The Foundation will continue to deploy messages via a multi-channel approach using television, digital, radio, billboards and social media. Materials, information, and TV ads will be available at www.NDPetroleumFoundation.org and on the Foundation's Facebook, YouTube, LinkedIn and Instagram channels. In addition to paid advertising, the Foundation also partners with North Dakota State University and University of North Dakota athletics, both of which have large captive audiences, to share similar messages on both television and radio broadcasts of games.

Website & Social Media – The Foundation has an extensive and informative website regarding programs and initiatives, opportunities to get involved, and information about the oil and gas industry. One goal is to develop more educational resources about oil and gas development that can serve as a resource for any visitors.

Social media continues to be a powerful and cost-effective tool in engaging and building relationships with key target audiences. The Foundation will continue the use of these platforms to educate and convey the industry's positive economic, fiscal, and educational impacts on the state, nation, and daily lives by creating factual and emotional connections. Focusing on Facebook and Instagram, content will be generated to be shared across both platforms. Depending on the best use of the content, adjustments may be made to accommodate platform strengths.

Studies – The Foundation uses information from three studies to help craft both its educational content as well as its awareness campaigns. These studies include the Public Perception Study which is completed every even year and the Economic Impact Study and Tax Study which are completed and published every odd year during the North Dakota legislative session. The next Economic Impact Study is currently underway and will examine the economic, job, and tax contributions by the oil and gas industry for 2023. The Tax Study, which is also sponsored by the Western Dakota Energy Association, will explore how oil and gas tax revenues are collected and distributed to different state funds and counties. Both will be released during the 2025 Legislative Session.

Methodology:

The Foundation will continue existing outreach and education programs and look for ways to expand the audience and reach of the messages and events. Using studies and survey results from previous events and campaigns, the Foundation will work to identify and implement suggested improvements.

While many of our education and outreach campaign initiatives have been dependable and effective, awareness requires some flexibility for changing attitudes and environments. As a result, the Foundation will monitor messages and content and reassess media buys as needed to ensure we are reaching target audiences with relevant and effective information and messages.

Anticipated Results:

Measuring the impact of some of our initiatives can be difficult. Past CookFests have been consistent with approximately 100-200 people attending the Information Session and an average of 2,000 attending the BBQ portion.

In addition, we are confident in past participation for each of our education events. We have consistently had 40-50 teachers at each Teacher Education Seminar, and the T4 Summits continue to grow with even the small, rural community of Parshall hosting more than 1,000 students and teachers over a two-day period.

Analytics software continues to provide more and better data and insights for digital and social advertising. Based on past ad performance, we can expect to reach more than 250,000 people with impressions[1] and engage[2] more than 20,000 per six-week ad cycle on social media. Digital ads have traditionally performed well with an average click-through-rate of .15% for social and .25% for digital (more than 50% higher than the benchmark). Video ads have averaged an 75% completion rate during past campaigns. This data can help us adjust messages and targeting as needed to meet a larger audience.

In addition to analytics, the Public Perception Study helps track attitudes and whether or not messages are reaching our intended audiences.

Facilities:

NDPC office in Bismarck.

[1] Impressions are the Number of times content has appeared or been viewed during the selected period. This includes paid, organic, and viral impressions.

[2] Engagements are the number of fan interactions (reactions, comments, shares, clicks and private messages) with an ad or post for the selected period.

Resources:

The Foundation does not have paid staff and instead is operated by NDPC staff as an in-kind contribution. In addition, the NDPC has more than 550 members, many of whom provide staff and expertise and contribute additional grant funds and sponsorship dollars for events.

Techniques to Be Used, Their Availability and Capability:

Communications and event planning: NDPC staff, as an in-kind contribution to the Foundation, plan and execute the various outreach events.

Environmental and Economic Impacts while Project is Underway:

The Foundation's conservation programs and partnerships all have a direct environmental impact where communities and industry employees come together to help remediate or rehabilitate habitat and plant trees. Also, an educated and informed public that has access to industry professionals can help address key issues and concerns and address new challenges immediately. The environmental and economic impacts of our program are only positive, we do not anticipate any negative impacts.

Ultimate Technological and Economic Impacts:

No technological impacts are expected. Potential positive economic impacts could be felt with stronger public support and understanding of the oil and gas industry. A more educated public could also benefit from the knowledge of the jobs and opportunities available in the industry.

Why the Project is Needed:

The ND Century Code states that the purpose of the oil and gas research council is to "coordinate a program designed to demonstrate to the general public the importance of the state oil and gas exploration and production industry… and to support research and educational activities concerning the oil and natural gas exploration and production industry." The Foundation programs help fulfill this purpose by educating and engaging the public to help them gain an understanding of the oil and gas industry in North Dakota and how it directly impacts the state and their communities. We will continue to pursue this goal through public outreach, education, promotion, and informational opportunities. This includes the continuation of many of our award-winning outreach programs. We will also continue developing online materials and messages that are smartly scalable and able to be deployed via multiple channels.

The Foundation programs have been focused on sharing information about the oil and gas industry in North Dakota, including its place as one of the largest contributors to the statewide economy. As well as the innovations and technologies that are being developed and deployed here in the state, and the continued focus on ensuring operations are always striving to be cleaner and safer for North Dakotans and their environment. An educated and supportive public will allow the oil and gas industry to continue operating in North Dakota in a positive manner. The industry is a strong economic driver for the state, as well as a good steward of the land, and it is our duty to help the public understand this.

STANDARDS OF SUCCESS

Measuring the impact of our programs is important to ensure we are reaching our audience and our messages are being absorbed. The Foundation will conduct public opinion surveys every other year to gauge the impact of our messaging and outreach efforts, as well as perceptions of the petroleum industry in North Dakota. Eight surveys have been conducted since 2010 to measure the overall opinion of oil and gas development in the state, the positives and negatives of development as viewed by respondents, the areas of greatest concern, and other issues. These surveys have established that North Dakotans continue to overwhelmingly favor oil development in the state. These surveys will help inform us of new issues or hot topics, as well as serve as a tool to measure any changes in attitudes toward the petroleum industry and the success of our education and outreach programs. They are useful for identifying new or emerging issues or concerns such as energy prices, socioeconomic impacts, environmental concerns, regulatory policies and others.

Monitoring the success and/or reach of media campaigns – particularly online – has become increasingly more efficient with the development of apps and analytics software. Based on the overarching goals of the campaign and its message and creative assets, a digital campaign strategy is currently being used. This strategy defines the digital goals, key performance indicators, metrics and direction of the digital media tactics. Website analytics, digital campaign metrics and multivariate testing results are used to measure each Key Performance Indicator and digital campaign effectiveness.

Measuring the success of our larger outreach events can be accomplished through feedback surveys and crossover engagement on our social media sites. Surveys, for example, are an effective way of measuring the success of the Teacher Education Seminar, while posts, tags, likes, and shared photos, among others, help provide insight on the popularity of events such as the Bakken Rocks CookFest.

BACKGROUND/QUALIFICIATIONS

The North Dakota Petroleum Foundation is a 501(c)(3) with the mission to provide and support education and outreach opportunities related to the petroleum industry, develop and advance quality of life initiatives, promote and enhance the conservation heritage of North Dakota, and advocate for the industry and its communities to ensure their voice is heard and respected. Although the Foundation wasn't formally incorporated until 2018, its successful programs and initiatives were founded over a period spanning two decades and have continued to grow and develop. The Foundation plans to build on this success and support from the OGRC is valuable and critical to their success and continuation.

The North Dakota Petroleum Council is a nonprofit trade association that has represented the industry in North Dakota since 1952. The NDPC has been working to educate the public about the oil and gas industry for decades. The Council has continually worked to enhance our education programs and communication with the public on issues that impact the communities where daily oil and gas operations are occurring. The NDPC will be providing the Foundation with staff resources and other financial support for this project.

MANAGEMENT

The North Dakota Petroleum Foundation, under direction of Ron Ness, will oversee the projects and events that make up the education and outreach program described in this application. Other NDPC staff and personnel will oversee and execute the program functions, and the Foundation Board of Directors will approve the budget and monitor implementation.

The Foundation, as well as other stakeholders and partners, including NDPC, Department of Mineral Resources, North Dakota Pipeline Authority, University of North Dakota Energy and Environmental Research Center, and others will continue to play a vital role in providing direction and expertise on the Foundation's efforts. The guidance and expertise of committee members are very valuable and ensure that issues are viewed from a variety of approaches.

TIMETABLE

The tentative timetable for 2025 is below. While the timetable for 2026 is not listed below, the timing of events and initiatives will be very similar since many events are scheduled the same week or day of the week each year. Exclusions include the T4 Summits, which must take school and consultant schedules into consideration, and tours, which are scheduled as requested. Advertising campaigns typically run the same time, but may be divided into three campaigns depending on the environment at that time.

January 2025	Commencement of Grant
January-May 2025	Collegiate Sponsorship Messaging
January 22-23, 2025	Devil's Lake T4 Summit
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April 30-May 1, 2025	Watford City T4 Summit
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July 17, 2025	Bakken Rocks CookFest, Alexander
August 2025 to May 2026	Collegiate Sponsorship Messaging
September 24-25, 2025	Bowman T4 Summit
October 2025	Second Ad Flight (digital, social, newspaper, radio, billboards)
February 2026	Public Perception Survey

The Foundation will meet several times a year to plan these events and discuss additional means of education and outreach on behalf of the industry based on topics of importance.

We propose submitting interim reports in August and December 2024 and 2025.

BUDGET

Project Associated Expense	NDIC's Share	Applicant's Share (Cash)	Applicant's Share (In-Kind)	Other Project Sponsor's Share
Outreach[3]	$17,435.00	$17,435.00	$5,945.00	$96,350.00
Education				
ND Energy Education[4]	$49,510.00	$49,510.00	$2,000.00	$136,450.00
Teacher Seminar[5]	$18,200.00	$18,190.00	$26,140.00	$73,800.00
Promotion, Marketing & Measurement[6]				
Advertising	$512,500.00	$512,500.00		
Administration & Consulting	$46,125.00	$46,125.00	$10,250.00	
Partnerships & Programs	$153,750.00	$153,750.00		
Publication, Printing & Web	$2,050.00	$2,050.00		
Economic Impact Study	$22,550.00	$22,550.00		
Statewide Oil Distribution Study	$7,500.00	$7,500.00		$15,000.00
Public Perception Study	$25,000.00	$25,000.00		
New Initiatives	$25,625.00	$25,625.00		
TOTAL	**$880,245.00**	**$880,235.00**	**$44,335.00**	**$321,600.00**

[3]Includes the cost for the Bakken Rocks CookFest, and the associated Public Education Sessions. This includes the costs of tents, facilities, advertising, waste disposal, amenities, and other operating expenditures. In-Kind support is provided by industry participants who contribute time and resources to provide food for the event (calculated at about 3,000 people served x $15 per serving). The value of their time, however, is too difficult and high to calculate.

[4] The ND Energy Education budget includes contractor fees, mileage, materials, rental fees, personnel. The Lignite Energy Council is a primary partner in the program and contributes funds to support its operation.

[5] The proposed budget for Teacher Seminar includes the cost of facility rental, buses, food and lodging for teachers, materials for hands-on activities, and lesson plans. In-kind includes the time of NDPC staff and other organizing partners (i.e. industry employees, speakers, etc.) that give time and resources to administer, organize, and support these events.

[6]Promotion, Marketing & Measurement includes message development and placement, economic, tax and public perception studies, and online and print publications of fact sheets and other materials. We have also included an Administration and Consulting line item for part time consultants who provide guidance and services related to the administration of programs and initiatives as well as in-kind staff salary to oversee the marketing and promotion efforts.

CONFIDENTIAL INFORMATION

Any information in the application that is entitled to confidentiality and which the applicant wants to be kept confidential should, if possible, be placed in an appendix to allow for administrative ease in protecting the information from public disclosure while allowing public access to the rest of the application. Such information must be clearly labeled as confidential and the applicant must explain why the information is entitled to confidentiality as described in North Dakota Century Code 54-17.6. Oil and gas well data that is a result of financial support of the Council shall be governed by North Dakota Century Code 38-08-04(6). ***If there is no confidential information please note that below.***

The Foundation does not request any of the information related to this application be confidential.

PATENTS/RIGHTS TO TECHNICAL DATA

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

The Foundation does not request to reserve any patent rights to technical data.

STATUS OF ONGOING PROJECTS (IF ANY)

The North Dakota Petroleum Foundation has received funding from the Commission for the Education and Outreach Program, the current grant will end December 31, 2024.

TAX LIABILITY STATEMENT

I, Jeff Herman, certify that the North Dakota Petroleum Foundation does not have any outstanding tax liability owed to the State of North Dakota or any of its political subdivisions.

Jeff Herman — 11/1/24

Jeff Herman
Treasurer, North Dakota Petroleum Foundation

Date

NORTH DAKOTA PETROLEUM FOUNDATION

January 22, 2025

Mr. Jordan Kannianen
North Dakota Industrial Commission
600 East Boulevard Avenue
Bismarck, ND 58505

Re: Grant Application Addendum for the North Dakota Petroleum Foundation's Outreach and Education Program

Dear Mr. Kannianen:

Enclosed is a requested addendum to the North Dakota Petroleum Council's grant application submitted in November of 2024. This program consists of education, outreach and promotion and marketing efforts consisting of specific components including Teachers Education Seminar, Bakken Rocks CookFests, and T4 Summits, among others. These programs and events have been very successful and have grown to become powerful tools for industry outreach.

The Petroleum Foundation, in partnership with the Lignite Energy Council and other energy interests, is continuing to expand our comprehensive all-of-the-above energy education through T4 Summits. The total amount requested in the November 1, 2024, application was $880,245.00. We are requesting that an additional $50,000 be added to our current grant request to help fund the increasing costs of the program. Further details of the position can be found in the attached addendum.

Please contact me if you have any questions or need additional information for the enclosed grant application.

Sincerely,

Eric Delzer

Enclosure

Applicant: *North Dakota Petroleum Foundation*
PO Box 7233, Bismarck, ND 58507
701-557-3972

Principal investigator: *Eric Delzer, Regulatory Affairs Manager*

Date of amendment: *January 22, 2025*

North Dakota Petroleum Foundation
Outreach and Education Program

Grant addendum requested from the

North Dakota Oil and Gas Research Council

Objective:

The North Dakota Petroleum Foundation (NDPF) is requesting an amendment to its grant application dated November 1, 2024, to help fund increasing costs of the program.

Background and Rationale for Additional Request:

Our T4 Summits have been around for many years now. We are excited to share that we are reaching new communities, many of which are outside of the Bakken region such as Carrington, East Grand Forks, and Devils Lake. We've also received a lot of interest in the program, and so far, three more locations have been added since the initial application was submitted in November of 2024, and we anticipate operational costs to continue to increase as the program garners more interest and continues to grow. With this growing interest and demand for T4 Summits to be brought to new and expanding communities, our costs to run the program continue to climb.

Therefore, we are submitting an addendum to the application, increasing the ND Energy Education NDIC share by $50,000 for the 2025-2026 grant period. The NDPF will also match that $50,000 to cover increasing costs in the next two years.

Expected Results:

The North Dakota Petroleum Foundation has made it a priority to expand its educational outreach to the entire state, not just the Bakken region. T4 Summits are a great way for us to bring our industry to children across the state with career exploration activities. This funding would help augment those efforts to continue expanding our reach.

Duration:

The funding request for this initiative is for January 1, 2025 – December 31, 2026.

Total Project Cost:

The North Dakota Petroleum Foundation originally requested $880,245.00 from the OGRC. With the addition of the increased T4 program expenses, the total budget for this grant period is $2,226,415.00. The Foundation's revised request is $930,245.00.

Participants:

The Foundation, Lignite Energy Council, and other key energy companies, organizations and interests will be partnering with the schools and communities interested in hosting T4 Summits. The Foundation will work with those participants and other organizations to develop and deploy T4 Summits that best suit North Dakota's energy industries education in those communities.

Timetable

The updated timetable for 2025-2026 is below. Three more events have been added since our November 1, 2024, application was submitted. While the exact dates for 2026 are not listed below, the timing of events and initiatives will be very similar since many events are scheduled the same week or day of the week each year. Exclusions include the T4 Summits, which must take school and consultant schedules into consideration, and tours, which are scheduled as requested. Advertising campaigns typically run at the same time, but may be divided into three campaigns depending on the environment at that time.*

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October 2025	*Second Ad Flight (digital, social, newspaper, radio, billboards)*
February 2026	*Public Perception Survey*
February 25-26, 2026	*Bismarck T4 Summit**

Updated Budget:

	NDIC's Share	Applicant's Share (Cash)	Applicant's Share (In-Kind)	Other Project Sponsor's Share
Outreach[1]	$17,435.00	$17,435.00	$5,945.00	$96,350.00
Education				
*ND Energy Education[2]	* $99,510.00	*$99,510.00	$2,000.00	$136,450.00
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Statewide Oil Distribution Study	$7,500.00	$7,500.00		$15,000.00
Public Perception Study	$25,000.00	$25,000.00		
New Initiatives	$25,625.00	$25,625.00		
TOTAL $2,226,415.00	**$930,245.00**	**$930,235.00**	**$44,335.00**	**$321,600**

**Grant addendum request for $50,000 with Foundation match (original request was $49,510 with Foundation match)*

[1]Includes the cost for the Bakken Rocks CookFest, and the associated Public Education Sessions. This includes the costs of tents, facilities, advertising, waste disposal, amenities, and other operating expenditures. In-Kind support is provided by industry participants who contribute time and resources to provide food for the event (calculated at about 3,000 people served x $15 per serving). The value of their time, however, is too difficult and high to calculate.

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

November 1, 2024

Mr. Reice Haase
Deputy Executive Director
ATTN: Oil and Gas 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. 2025-0053 Entitled "Injection Testing with Propane to Inform Future Bakken CO_2 EOR Pilot" in Response to the North Dakota Industrial Commission Oil and Gas Research Program Solicitation

The Energy & Environmental Research Center (EERC) at the University of North Dakota is pleased to submit the subject proposal to the Oil and Gas Research Program. The $100 application fee is provided through ACH transaction number 281611. The EERC is committed to completing the project as described in the proposal if the Commission makes the requested grant.

If you have any questions, please contact me by telephone at (701) 777-5287 or by email at jsorensen@undeerc.org.

Sincerely,

DocuSigned by:
Jim Sorensen
0671D00C8437443...

James A. Sorensen
Director of Subsurface Research and Development

Approved by:

DocuSigned by:
Tami Votava
E7468BBB3DE440E... *for*

Charles D. Gorecki, CEO
Energy & Environmental Research Center

JAS/rlo

Attachment

c: Erin Stieg, North Dakota Industrial Commission

Oil and Gas Research Program

North Dakota

Industrial Commission

Application

Project Title: Injection Testing with Propane to Inform Future Bakken CO_2 EOR Pilot

Applicant: University of North Dakota Energy & Environmental Research Center

Principal Investigator: James A. Sorensen

Date of Application: November 1, 2024

Amount of Request: $1,800,000

Total Amount of Proposed Project: $4,000,000

Duration of Project: 12 months

Point of Contact (POC): James A. Sorensen

POC Telephone: (701) 777-5287

POC E-Mail Address: jsoresen@undeerc.org

POC Address: 15 North 23rd Street, Stop 9018

Grand Forks, ND 58202-9018

TABLE OF CONTENTS

ABSTRACT

Objective: The Energy and Environmental Research Center (EERC) proposes to investigate the response of a Bakken reservoir to injecting propane or another readily available natural gas liquid (NGL) as a means of informing the design and operation of a future larger-scale CO_2 enhanced oil recovery (EOR) pilot test in the Bakken. This will be accomplished by completing a suite of activities, which include laboratory-based propane-rock interaction, propane-oil phase behavior and miscibility investigations, an injection test into a Bakken well, reservoir surveillance efforts to determine injectivity and reservoir response, and modeling-based activities to determine optimal injection scheme and operational strategies for the future CO_2 EOR pilot.

Expected Results: Specific data that will be developed by a propane injection test include bottomhole reservoir pressure data, injectivity data, pressure buildup and dissipation rates, evidence of communication with offset wells (i.e., injection conformance within the target reservoir), and fluid flowback rates (oil, gas, water, injectate). Aspects of the larger-scale CO_2 EOR pilot design that will be informed by the propane injection test include the sizing and design of compression, sizing and design of flowback management systems, and design of a cost-effective reservoir surveillance system.

Duration: The period of performance for the proposed project is 12 months.

Total Project Cost: A cash contribution of $1,800,000 from the North Dakota Industrial Commission Oil and Gas Research Program would be used to support EERC laboratory, modeling, and project management activities, and Chord Energy activities to execute the propane injection test. In-kind contributions estimated to be valued at a minimum of $2,200,000 would be provided by Chord Energy to implement and operate the propane injection test in the field. The in-kind contribution from Chord Energy would include, but not necessarily be limited to, the acquisition, delivery, and injection of propane or other readily available NGL into a selected Bakken well.

Participants: The EERC and Chord Energy.

PROJECT DESCRIPTION

In September 2024, the U.S. Department of Energy (DOE) formally awarded a contract to the Energy & Environmental Research Center (EERC) to establish the Bakken CO_2 Enhanced Oil Recovery and Storage Field Laboratory (Bakken CO_2 EORSFL). Chord Energy has committed to being the operating partner with the EERC on the Bakken CO_2 EORSFL, serving as the host and operator for a future CO_2 enhanced oil recovery (EOR) pilot test in one of its Bakken drill spacing units (DSUs) in the Grail Field in McKenzie County, North Dakota. The current timeline for the Bakken CO_2 EORSFL project calls to begin injecting CO_2 for the EOR pilot in late 2026 or early 2027. The EERC's experience with EOR pilots in the Bakken indicates that early injection tests can provide invaluable injectivity and reservoir response data that streamline and optimize design and planning for the larger pilot operations. Such pre-pilot injection tests do not necessarily need to use the same working fluid as the main pilot test if the reservoir behavior relationships (e.g., miscibility, swelling) between the pre-pilot working fluid and main pilot working fluid are well understood. To facilitate and accelerate the design and planning of the CO_2 EOR pilot for the Bakken CO_2 EORSFL, the EERC proposes partnering with Chord Energy to conduct a pre-pilot injectivity test using propane. The hypotheses for the proposed efforts build on several key factors:

1. **Small-scale injection tests inform design and operations of future large-scale injection tests:** Small-scale injection testing operations were a cost-effective means of developing valuable information for planning and operating three Bakken EOR pilots in which the EERC was involved (1–3). Key design factors informed by injection tests include reservoir pressure and temperature, injectivity, conformance of injectate within the target reservoir (i.e., connectivity with offset wells), pressure buildup rates during injection and decline rates after, compression design and sizing, and flowback management requirements.
2. **Availability:** The necessary volumes of propane and other natural gas liquids (NGLs) are readily available from multiple gas processing plants around Chord Energy's Bakken production. If

propane cannot be cost-effectively acquired, then other NGLs will be considered as an alternative working fluid.

3. **Phase behavior calibration and optimization:** Previous EERC laboratory and modeling studies have suggested CO_2 and other hydrocarbons (including propane) are working fluids with strongly similar reservoir behavior (4–6). These documented similarities allow for the results from tests using a hydrocarbon working fluid, such as propane, to be calibrated to predict the behavior and effects of CO_2 under the same reservoir conditions. This indicates that the results of an injection test that uses propane can be directly applied to predicting the results of an EOR operation that uses CO_2.
4. **Reduced formation damage:** Propane may help mitigate some of the issues associated with other working fluids used for injection tests (e.g., produced water, fresh water), such as formation damage or wettability alteration, maintaining the integrity of the reservoir for future CO_2 EOR operations.

Methodology: This project will consist of multiple tasks including project management and reporting, laboratory investigations, geologic modeling and reservoir simulation, and a field injection test.

***1.0 – Project Management and Reporting*:** In this task, EERC management will ensure all project activities stay within budget and on schedule and all project objectives are achieved. EERC management will ensure all technical activities are coordinated effectively between internal EERC laboratory and modeling teams and between EERC technical teams and the appropriate personnel at Chord.

***2.0 – Laboratory Investigation*:** In this task, Bakken rock and fluid samples from the Grail Field will be analyzed to determine how the targeted injection reservoir interacts with propane under reservoir conditions. The data generated will serve as necessary inputs for geologic modeling and reservoir simulation efforts.

2.1– Evaluation of Rock and Fluid Properties: Rock and fluid samples from the Grail Field will be evaluated to determine their physical properties. These evaluations aim to provide a detailed understanding of the properties of both rock and fluid samples, providing the fundamental data required to develop an accurate reservoir geomodel and serve as the basis for numerical simulations of both the preinjection predictive modeling and postinjection history matching exercises.

2.2 – Evaluation of Rock–Fluid and Fluid–Fluid Interactions: In this subtask, various rock–fluid and fluid–fluid interactions will be examined to provide insights into the behavior of propane and reservoir fluids in the Grail Field Bakken reservoir. The acquired data will provide input for reservoir simulation model calibration and tuning.

***3.0 – Reservoir Modeling, Simulation and Calibration*:** Reservoir modeling, simulation, and calibration will be performed throughout the project. A comprehensive reservoir simulation model including key geologic, reservoir, and operational elements will be developed to mimic the propane injection and associated reservoir response for the selected site.

3.1 – Geologic Modeling and Reservoir Simulation: A 3D geologic model will be constructed based on the geologic properties from well logs and/or existing core data from the pilot area. The target injection zones (the Bakken and Three Forks Formations) will be incorporated within the site geologic model. A compositional reservoir simulation model will be developed based on the geologic model and laboratory measurements of rock and fluid properties. A detailed history match of fluid production (oil, gas, water) will be conducted to tune the simulation model and make sure it can fully and accurately mimic the reservoir dynamics.

3.2 – Propane Injection Simulation and Injection Test Design: A simulation matrix will be designed to forecast the effectiveness of a propane injection test considering key operational variables. The simulation results will be used to design the operational parameters for the propane injection test. Advisement on the injection test design will be provided from an external reservoir engineering advisor,

Mr. Gordon Pospisil with Liberty Resources Advisors LLC, who has extensive experience using reservoir simulations to plan and execute injection tests in the Bakken and interpreting and analyzing their results (2–3).

3.3 – Injection Test Data Analysis and Model Calibration: A series of data monitoring, collection, and analysis activities will be performed to better understand the reservoir behavior and fully assess the response of the reservoir to the propane injection (Task 4.0). Key variables such as injection rate, wellhead and/or bottomhole injection pressure, offset well production responses, produced oil and gas composition, etc. will be closely monitored over the course of the injection test. The comprehensive dataset will be analyzed, processed and then used to calibrate the simulation model to ensure it can capture the reservoir dynamics in the Grail Field Bakken reservoir.

3.4 – Propane- and CO_2-EOR Correlation and Calibration: The similarities and differences between propane- and CO_2-EOR will be evaluated based on the laboratory measurements and propane injection test results from Tasks 2.0 and 4.0. This data will be used to correlate and calibrate the EOR processes of injecting propane and CO_2 under the same reservoir conditions. The insights from the propane injection test and the calibrated simulation model will facilitate and accelerate the design of an effective future large-scale CO_2 EOR pilot test.

***4.0 – Field Propane Injection Test and Reservoir Surveillance*:** A propane injection test into an existing hydraulically fractured horizontal Bakken well in the Grail Field (Figure 1) will be planned and conducted by Chord Energy, utilizing data and insights gained from Tasks 2.0 and 3.0. The volume of propane to be injected, the duration of injection, and the number of cycles of injection are critical operational parameters that will be directly informed by the reservoir modeling and simulation. Final DSU and well selection may be adjusted based on learnings from the reservoir simulation efforts but will ultimately be selected to ensure that the results directly apply to the later large-scale CO_2 EOR pilot test to be performed under the separate Bakken CO_2 EORSFL project.

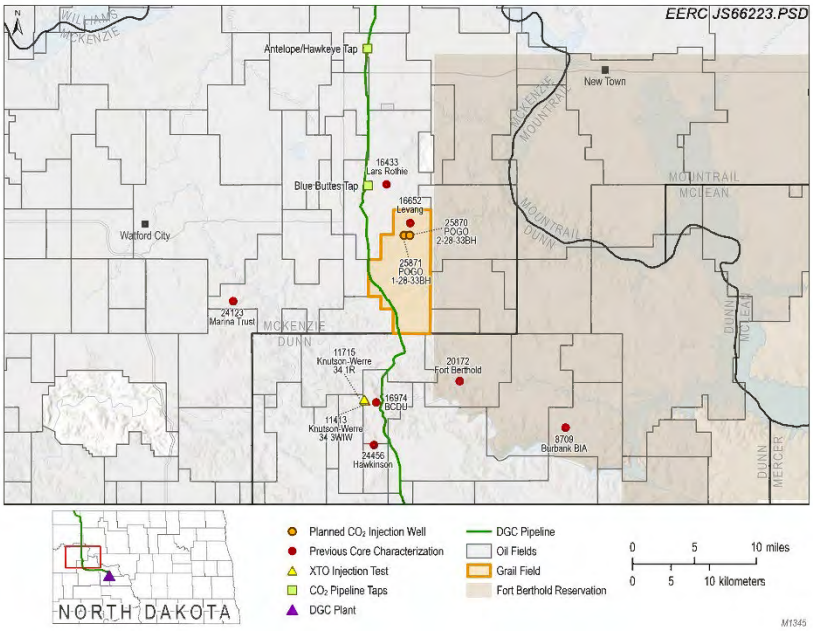


Figure 1. Map showing planned location of CO_2 EOR pilot in Grail Field, McKenzie County.

A reservoir surveillance system will be developed and implemented within the project area to determine injectivity and reservoir response. The ability to calibrate and ground truth the model with the data obtained from the propane injection test will facilitate and accelerate the design of the large-scale CO_2 EOR pilot test that is part of the Bakken CO_2 EORSFL.

Anticipated Results: A propane injection test into a Bakken reservoir will generate data that can provide invaluable insight regarding the detailed design and operation of the injection scheme for a future large-scale CO_2 EOR pilot. Specific data developed by the propane injection test that will be critical to planning the future CO_2 EOR pilot include bottomhole reservoir pressure data, injectivity data, pressure buildup and dissipation rates, evidence of communication with offset wells (i.e., injection conformance within the target reservoir), and fluid flowback rates (oil, gas, water, injectate). Aspects of the larger-scale CO_2 EOR pilot design that will be informed by the propane injection test include the sizing and design of compression, sizing and design of flowback management units, and design of an effective reservoir surveillance system. Laboratory evaluations of propane behavior in oil from the target Bakken reservoir and propane—oil—rock interactions using core samples from the area of the target reservoir can be

compared to the same evaluations that use CO_2 as the working fluid (to be conducted under the separate Bakken CO_2 EORSFL scope of work funded by the DOE). Modeling activities that incorporate the results of the propane injection test, when calibrated with data on CO_2 interactions with Bakken oil and rocks, will facilitate and accelerate the design of a large-scale CO_2 EOR pilot test anticipated to be performed in late 2026 or early 2027 under the Bakken CO_2 EORSFL.

Facility, Resources, and Techniques to Be Used, Their Availability and Capability: The EERC employs a multidisciplinary staff of about 300 and has 254,000 square feet of state-of-the-art offices, laboratories, and technology demonstration facilities, which enable staff to address a wide variety of research topics. The EERC houses eight analytical laboratories, including water resource characterization, petroleum resource characterization, and environmental chemistry. These laboratories have decades of experience and have been instrumental in previous Bakken research. The EERC has extensive Bakken-focused geologic modeling, reservoir simulation, and data analytics experience and capabilities, including high-end workstation computers and a dedicated high-performance parallel computing cluster.

Environmental and Economic Impacts while Project is Underway: Environmental impacts will be minimal during the execution of this project. Laboratory investigations, computer modeling and simulations, and ultimately a field injection test with associated reservoir surveillance will be conducted. Prior to the injection test, the necessary state regulatory approval process will be completed. Lab-scale evaluation of samples at the EERC will be in a controlled environment. The insignificant amount of materials used will be disposed of according to standard University of North Dakota (UND) environmental health and safety practices once the evaluations are complete. Economic impacts during the project will also be minimal and will not appreciably affect any of the organizations participating apart from regular employment economic effects for those working on the project.

Ultimate Technological and Economic Impacts: This project will offer new data, including laboratory- and field-validated insights regarding the detailed design and operation of the injection scheme for a

future large-scale CO_2 EOR pilot and serve as a basis for planning and procuring the proper associated infrastructure equipment and field services. This project combined with the larger CO_2 EOR pilot for the Bakken CO_2 EORSFL it is supporting could ultimately increase oil and gas industry operations in North Dakota by improving resource recovery, decreasing costs, reducing environmental impacts, and increasing revenue. Successful CO_2 EOR operations would extend the lifetime of the Bakken play by multiple decades and could yield billions of barrels of low-carbon-intensity incremental oil and natural gas, which would translate into billions of dollars of economic impact to North Dakota. Successful completion of the project will also demonstrate the technical viability and cost effectiveness of using propane and possibly other NGLs as a working fluid for injection tests and for EOR in its own right.

Why the Project is Needed: This project is needed to facilitate and accelerate the design and planning of the CO_2 EOR pilot for the Bakken CO_2 EORSFL. Its lessons will directly inform multiple aspects of the larger CO_2 EOR pilot scheduled to occur in late 2026 or early 2027. Successful CO_2 EOR pilot projects are crucial for unlocking the potential of this method of EOR in the Bakken petroleum system of North Dakota, and this project will directly provide data and insights that will enable the Bakken CO_2 EORSFL pilot to be designed cost-effectively, reducing the operational risk of the larger CO_2 EOR pilot and improving its chance of success. Ultimately, broad commercial deployment of CO_2 EOR has the potential to not only increase the North Dakota's oil production but also reduce the carbon intensity of the oil production through the storage of CO_2 underground that occurs during the process.

STANDARDS OF SUCCESS

Success will be measured in this project's ability to generate key data and insights that will influence the design, planning, and execution of the CO_2 EOR pilot for the Bakken CO_2 EORSFL. These projects are steps on the path to unlocking the vast potential of CO_2 EOR in the Bakken petroleum system and to ensuring the continued success of the oil and gas industry in North Dakota. A strong oil and gas industry contributes to a robust state economy, which includes the creation and continuation of jobs that

support or are positively impacted by oil and gas development in the state. As a measure of success, biweekly meetings with the project partner, Chord Energy, will be held to discuss project status and results and to coordinate and plan project activities. The current North Dakota Industrial Commission (NDIC) Oil and Gas Research Program (OGRP)-approved process of reporting will be employed to deliver results. High-level progress updates will be provided in semiannual reports to OGRP for inclusion on the OGRP website for immediate access by the public. A final report summarizing the project's outcomes will be prepared and delivered to OGRP at the end of the project.

BACKGROUND/QUALIFICIATIONS

The EERC is a nonprofit branch of UND. Resumes of key personnel are provided in Appendix A. James Sorensen, Director of Subsurface Research and Development, will serve as Principal Investigator. Other key EERC personnel will include Bethany Kurz, Director Subsurface Characterization and Community Engagement; Steven Smith, Assistant Director for Integrated Analytical Solutions; Dr. Lu Jin, Distinguished Reservoir Engineer; Dr. Nidhal Badrouchi, Senior Research Scientist; and Michael Warmack, Distinguished Oil and Gas Facilities Engineer. Chord Energy, headquartered in Houston, Texas, is a publicly traded, independent energy company that acquires, develops, and explores for crude oil, natural gas, and NGLs in the Williston Basin. Ryan McGuigan, Managing Director of Engineering, will oversee Chord's involvement in this project, specifically all aspects of the field-based injection operations, including injection test site selection, acquisition and transportation of propane for the pre-pilot injection test, design and execution of the injection test, and operation and monitoring of any well(s) included in the injection test (including offset wells).

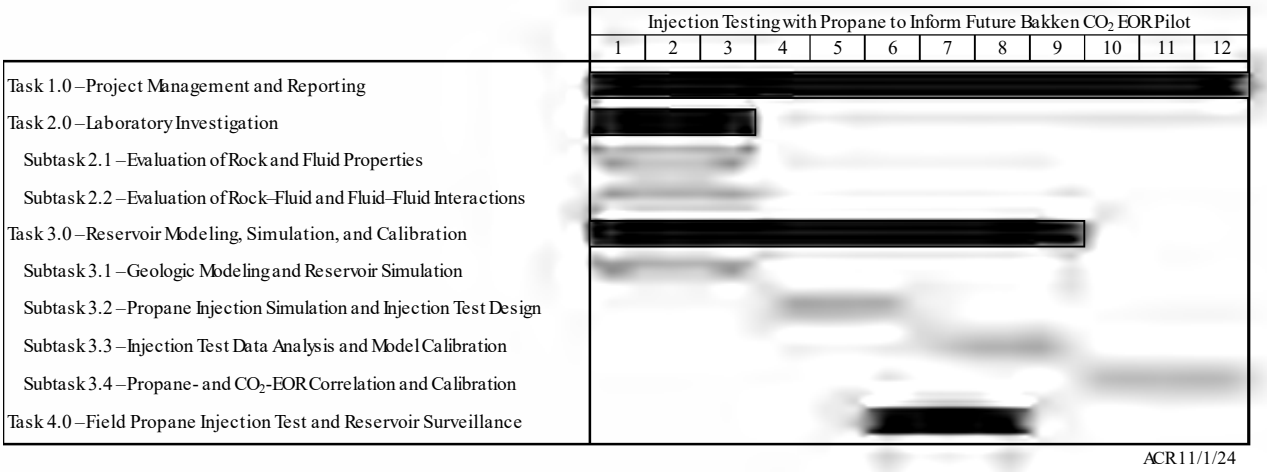
MANAGEMENT

The EERC manages over 200 contracts a year, with a total of over 1300 clients in 53 countries. Systems are in place to ensure that projects are managed within budget, schedule, and scope. Mr. Sorensen will oversee the project, with assistance in management of project tasks by Ms. Kurz, Mr. Smith, Dr. Lu., Dr.

Badrouchi, and Mr. Warmack. This will involve integration of tasks, project reporting, and collaboration with our project partner, Chord Energy.

TIMETABLE

The proposed project duration is 12 months (January 1, 2025 – December 31, 2025). The preliminary project timetable is summarized below.



BUDGET

The total estimated cost for the proposed effort is $4,000,000. $1,800,000 is requested from OGRP. Chord has estimated that the anticipated cost to conduct the propane injection activities in the field is approximately $3,000,000. Estimated costs for the field-based activities include, but are not necessarily limited to, purchase of propane, propane transportation costs, pumping costs, downhole work, and surface work to support the execution of the injection test. This proposal requests that $800,000 of NDIC OGRP funding goes toward paying for costs incurred by Chord over the course of site preparation and injection test operations, with Chord anticipating to pay for field-based costs of approximately $2,200,000 to be shown as in-kind cost share to the project. The remaining $1,000,000 of NDIC OGRP funding would go toward EERC expenses for laboratory evaluations, modeling, injection test design and interpretation support, and project management. A letter of interest from Chord Energy can be found in Appendix B. Budget notes can be found in Appendix C.

Project-Associated Expense	NDIC Share (cash)	Industry Share (in-kind)	Total Project
Labor	$565,103	$0	$565,103
Travel	$3,258	$0	$3,258
Supplies	$2,000	$0	$2,000
Subcontractor – Chord Energy	$800,000	$0	$800,000
Consultant – Gordon Pospisil	$9,000	$0	$9,000
Printing and Duplicating	$135		$135
Laboratory Fees and Services			
EERC Natural Materials Analytical Research Lab	$4,378	$0	$4,378
EERC Gas chromatography–mass spectrometry Lab	$54,590	$0	$54,590
EERC Document Production Service	$4,161	$0	$4,161
EERC Technical Software	$2,122	$0	$2,122
EERC Field Safety	$3,080	$0	$3,080
EERC Geoscience Services	$5,980	$0	$5,980
Total Direct Cost	$1,453,807	$0	$1,453,807
Facilities and Administration	$346,193	$0	$346,193
Total Cash Requested	$1,800,000	$0	$1,800,000
In-Kind Cost Share			
Chord Energy	$0	$2,200,000	$2,200,000
Total In-Kind Cost Share	$0	$2,200,000	$2,200,000
Total Project Cost	$1,800,000	$2,200,000	$4,000,000

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 AND PATENTS/RIGHTS TO TECHNICAL DATA

This proposal has no confidential information. No patentable technologies are expected to be created.

STATUS OF ONGOING PROJECTS

The EERC is currently engaged in five OGRP-funded projects. These ongoing projects, listed in Appendix D, are current on all deliverables.

References:

1. Sorensen, J.A., Pekot, L.J., Torres, J.A., Jin, L., Hawthorne, S.B., Smith, S.A., Jacobson, L.L., and Doll, T.E., 2018, Field test of CO_2 injection in a vertical Middle Bakken well to evaluate the potential for

enhanced oil recovery and CO_2 storage: Paper presented at the Unconventional Resources Technology Conference, Houston, Texas, July 23–25, 2018, URTeC Paper No. 2902813.

2. Pospisil, G., Griffin, L., Souther, T., Strickland, S., McChesney, J., Pearson, C.M., Dalkhaa, C., Sorensen, J.A., Hamling, J.A., Kurz, B.A., Bosshart, N.W., Warmack, M.P., Assady, A., Zhao, J., Schwanitz, B., Williams, A., Schechter, D., and Sarmah, A., 2022, East Nesson Bakken enhanced oil recovery pilot—coinjection of produced gas and a water–surfactant mixture: Paper presented at the SPE/AAPG/SEG Unconventional Resources Technology Conference, Houston, Texas, June 20–22, 2022, Paper No. URTEC-3722974-MS. DOI: /10.15530/urtec-2022-3722974.
3. Pospisil, G., Weddle, P., Strickland, S., McChesney, J., Tompkins, K., Neuroth, T., Pearson, C.M., Griffin, L., Kaier, T., Sorensen, J.A., Jin, L., Jiang, T., Pekot, L.J., Bosshart, N.W., and Hawthorne, S.B., 2020, Report on the first rich gas EOR cyclic multiwell huff 'n' puff pilot in the Bakken tight oil play: Presented at the 2020 Society of Petroleum Engineers (SPE) Annual Technical Conference and Exhibition, Denver, Colorado, October 5–7, 2020, SPE-201471-MS.
4. Hawthorne, S.B., Pekot, L.J., Miller, D.J., Grabanski, C.B., Azzolina, N.A., Kurz, B.A., and Sorensen, J.A., 2023, Measured sorption isotherms for Bakken petroleum system shales using carbon dioxide and produced gas hydrocarbons at 110°C and pressures up to 34.5 MPa: Energy & Fuels, v. 37, p. 10970–10979. DOI: /10.1021/acs.energyfuels.3c01661.
5. Wan, X., Jin, L., Azzolina, N.A., Zhao, J., Yu, X., Smith, S.A., and Sorensen, J.A., 2023, Optimization of operational strategies for rich gas enhanced oil recovery based on a pilot test in the Bakken tight oil reservoir: Petroleum Science, v. 20, no. 5, p. 2921–2938. DOI: /10.1016/j.petsci.2023.04.018.
6. Zhao, J., Jin, L., Azzolina, N.A., Wan, X., Yu, X., Sorensen, J.A., Kurz, B.A., Bosshart, N.W., Smith, S.A., Wu, C., Vrtis, J.L., Gorecki, C.D., and Ling, K., 2022, Investigating enhanced oil recovery in unconventional reservoirs based on field case review, laboratory and simulation studies: Energy & Fuels, v. 36, p. 14771–14788. DOI: /10.1021/acs.energyfuels.2c03056.

APPENDIX A

RESUMES OF KEY PERSONNEL

JAMES A. SORENSEN
Director of Subsurface Research and Development
Energy & Environmental Research Center (EERC), University of North Dakota (UND)
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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 CO_2; and other energy and environmental research.
Primary areas of interest and expertise are enhanced oil recovery (EOR) in unconventional tight oil formations, CO_2 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 CO_2 in geologic media and the sustainable development of tight oil resources.

1999–July 2018: Principal Geologist, EERC, UND.
Served as manager and co-PI for programs to develop strategies for CO_2 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.

BETHANY A. KURZ
Director of Subsurface Characterization and Community Engagement
Energy & Environmental Research Center (EERC), University of North Dakota (UND)
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Education and Training
M.S., Hydrogeology, University of North Dakota, 1998.
B.S., Geochemistry, Bridgewater State University, 1995.

Research and Professional Experience
February 2024–Present: Director of Subsurface Characterization and Community Engagement, EERC, UND.

- Leads programs, projects, and a multidisciplinary team of scientists and engineers in topics related to carbon capture, utilization, and storage (CCUS).
- Application of machine learning and artificial intelligence to CCUS and oil and gas development.
- Enhanced oil recovery (EOR).
- Produced water and drilling waste management.
- Critical materials resource assessments.
- Development and implementation of community benefits plans, societal impact assessments, stakeholder engagement, and public outreach.

May 2021–February 2024: Director of Analytical Solutions, EERC, UND.

- Developed business and research opportunities to address challenges in all areas of energy and natural resources development and management.
- Led programs and projects related to CCUS; application of machine learning and artificial intelligence to CCUS and conventional and unconventional oil and gas development; EOR; produced water and drilling waste management; and critical materials resource assessments.
- Led EERC research laboratories and a multidisciplinary team of scientists and engineers focused on addressing the needs of our partners and clients in areas related to energy development and management and environmental stewardship.

Principal areas of interest and technical expertise include CCUS; produced natural gas storage; EOR in conventional and unconventional oil and gas reservoirs; application of machine learning and data analytics to CCUS and oil and gas development; produced water and drilling waste management; assessment of critical materials in coal and produced brine; and resource management related to energy development.

July 2018–April 2021: Assistant Director of Integrated Analytical Solutions, EERC, UND.

- Assisted EERC leadership with developing business opportunities and successfully executing research projects related to oil and gas; natural resource management; and CCUS.
- Oversaw a multidisciplinary team of scientists and engineers who work in EERC applied research laboratories, ensuring the quality assurance/quality control of data and results generated by EERC

laboratories and integrating those results into the applied research efforts conducted by the Subsurface R&D team.

2011–July 2018: Principal Hydrogeologist, Laboratory Analysis Group Lead, EERC, UND.

- Oversaw a multidisciplinary team of scientists and engineers and several EERC analytical research laboratories that focus on classical and advanced wet-chemistry analyses; petrochemical, geochemical and geomechanical evaluation of rocks and soils; and advanced characterization of various materials, including metals, alloys, catalysts, and corrosion and scale products.

Primary areas of interest included the evaluation of water supply sources for the oil and gas industry, produced water management, characterization of geologic media for carbon storage, and development and testing of proppants for use in hydraulic fracturing.

2002–2011: Senior Research Manager, Water Management and Flood Mitigation Strategies, EERC, UND.

- Responsibilities included project management, technical report and proposal writing, public outreach, and the development of new research focus areas.
- Research activities included evaluation of nontraditional water supply sources for municipal and industrial use, flood and drought mitigation, watershed-scale water quality assessments using hydrologic models, and public education and outreach on various water and energy issues.

1998–2002: Research Scientist, Subsurface Remediation Research, EERC, UND.

- Responsibilities included managing and conducting research involving remediation technologies for contaminated groundwater and soils, groundwater sampling and analysis, technical report writing, and proposal research and preparation.

Publications

Has coauthored numerous professional publications.

STEVEN A. SMITH
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Education and Training
B.S., Geology, University of North Dakota, 2001.

Research and Professional Experience
2018–Present: Assistant Director, Integrated Analytical Solutions, EERC, UND.
- Develops new business opportunities related to laboratory- and field-based investigations of enhanced oil recovery (EOR), CO_2 storage, and resource assessment of unconventional oil plays.
- Focuses on research opportunities and methods development for core-scale rock characterization, fluid behavior, and organic petrology.

Principal areas of interest and expertise are petroleum geology, CO_2 EOR, laboratory investigation of fluid flow in conventional and unconventional reservoirs, and geological sequestration of CO_2.

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

2004–2010: Research Scientist, EERC, UND.
- Developed and implemented work plan for acid gas monitoring, verification, and accounting (MVA) for Zama acid gas disposal and EOR project in Alberta.
- Coordinated engineering, geological, geomechanical, and geochemical characterization activities for Zama project.
- Developed and maintained database of oil-bearing geologic reservoir characteristics as they pertain to CO_2 storage in states and provinces of Plains CO_2 Reduction (PCOR) Partnership region.
- Evaluated saline aquifer systems and determined potential for CO_2 sequestration.
- Developed estimates of CO_2 storage capacity within oil-bearing and saline strata of Williston, Alberta, Powder River, and Denver–Julesburg Basins.
- Worked as wellsite geologist in Williston Basin.

2001–2003: Wellsite Geologist, Subcontractor, Baker, Montana.
- Oversaw all of oil company's interests with respect to geologic decisions on location.
- Prepared morning report and geologic strip logs to summarize well progression.
- Directed interaction with oil company upper management.
- Evaluated sample cuttings, gas, and drill times while project well was drilling.

- Performed structural geologic correlation with offset wells.
- Worked in close communication with directional driller and rig crew to maintain accuracy in completion of well.

1994: Staff Geologist Intern, R.E. Wight Associates, Inc., Middletown, Pennsylvania.

- Performed system checks and operation at groundwater remediation sites, hazardous materials sampling and preparation, well purging, sampling, and recharge calculations.

Professional Activities

Member, Society of Petroleum Engineers
Member, Society of Organic Petrology

Publications

Has coauthored several publications.

DR. LU JIN
Distinguished Reservoir Engineer
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Education and Training

Ph.D., Petroleum Engineering, Louisiana State University, 2013.
M.S., Petroleum Engineering, Louisiana State University, 2009.
B.S., Petroleum Engineering, Northeast Petroleum University, 2005.

Research and Professional Experience

October 2022–Present: Distinguished Reservoir Engineer, EERC, UND.

- Develops novel methods for renewable energy development in Williston Basin, including geothermal development in Bakken Formation and hydrogen conversion in oil reservoirs.
- Serves as task lead and key reservoir engineer for U.S. Department of Energy (DOE)-sponsored project, "Williston Basin Resource Study for Commercial-Scale Subsurface Hydrogen Storage."
- Leads scientific research activities on machine learning applications, enhanced oil recovery (EOR) technologies, database development for EOR operations, effective simulation methods for unconventional reservoirs, etc.
- Serves as principal investigator (PI) for North Dakota Industrial Commission (NDIC)-sponsored project, "Extending the Shale Revolution from Oil and Gas to Geothermal Development in North Dakota."
- Serves as PI for NDIC-sponsored project, "Examination of In Situ Hydrogen Conversion in Oil Reservoirs."
- Serves as task lead and key reservoir engineer for U.S. Department of Energy (DOE)-sponsored project, "CO_2 Enhanced Oil Recovery Improvement in Conventional Fields Using Rich Gas."
- Serves as task lead and key reservoir engineer for DOE-sponsored project, "Improving Enhanced Oil Recovery Performance Through Data Analytics and Next-Generation Controllable Completions."
- Serves as task lead and key reservoir engineer for NDIC-sponsored project, "Unitized Legacy Oil Fields: Prototypes for Revitalizing Conventional Oil Fields in North Dakota."

Principal areas of interest and expertise include reservoir modeling and simulation, CO_2/rich gas EOR and associated CO_2 storage in both conventional and unconventional reservoirs, engineering optimization, water coning control, and multiphase flow in porous media, with particular interest in subsurface oil–water–gas interactions, EOR techniques and development of old oil fields/unconventional resources.

January 2020–September 2022: Principal Reservoir Engineer, EERC, UND.

- Developed dynamic numerical models for CO_2/rich gas enhanced oil recovery in different reservoirs.
- Oversaw technical areas in reservoir engineering, including conventional, unconventional and enhanced oil and gas production, geologic storage of CO_2 and natural gas, natural resource development, geocellular modeling, numerical simulation.

- Served as task lead and key reservoir engineer for DOE-sponsored project, "CO_2 Enhanced Oil Recovery Improvement in Conventional Fields Using Rich Gas."
- Served as task lead and key reservoir engineer for DOE-sponsored project, "Improving Enhanced Oil Recovery Performance Through Data Analytics and Next-Generation Controllable Completions."
- Served as key reservoir engineer for DOE-sponsored project, "Bakken Rich Gas Enhanced Oil Recovery Project."
- Served as co-PI for NDIC-sponsored project, "Exploration of Opportunities and Challenges for a North Dakota Petrochemical Industry."

July 2018–January 2020: Senior Reservoir Engineer, EERC, UND.

- Developed dynamic numerical models for CO2 flow monitoring and prediction in different reservoirs; designed well testing plans for both producers and injectors to support long-term success of field operations; developed innovative fractured reservoir models for Bakken unconventional petroleum system; and served as simulation task lead for variety of seismic projects.
- Served as task lead and key reservoir engineer for DOE-sponsored project, "Joint Inversion of Time-Lapse Seismic Data."
- Served as key reservoir engineer for DOE-sponsored project, "Scalable, Automated, Semi-permanent Seismic Method for Detecting CO_2 Plume Extent During Geological CO_2 Injection – Phase II."

February 2015–July 2018: Reservoir Engineer, Reservoir Modeling and Simulation, EERC, UND.

- Developed geophysical models of subsurface and ran dynamic simulations to determine long-term fate of produced/injected fluids, including hydrocarbons, CO_2 storage, and brine, using oil and gas industry simulation software.
- Served as task lead and key reservoir engineer for DOE-sponsored project, "Plains CO_2 Reduction (PCOR) Partnership Phase III – Bell Creek Test Site."
- Served as Co-PI and key reservoir engineer for DOE-sponsored project, "Improved Characterization and Modeling of Tight Oil Formations for CO_2 Enhanced Oil Recovery Potential and Storage Capacity Estimation."
- Served as key reservoir engineer for DOE-sponsored project, "Scalable, Automated, Semi-permanent Seismic Method for Detecting CO_2 Plume Extent During Geological CO_2 Injection – Phase I."

January 2014–January 2015: Reservoir Engineer, InPetro Technologies, Inc., Houston, Texas.

- Developed simulation and analytical models for unconventional reservoir development, especially for shale oil reservoirs; analyzing fluid PVT (pressure, volume, temperature) change during depletion and considering pore-size distribution (PSD) in simulations. Application of new model in Eagle Ford and Bakken Formations shows that oil reserves could be improved as much as 30% by integrating PVT and PSD effects.

August 2007–December 2013: Research Assistant and Reservoir Consultant, Department of Petroleum Engineering, Louisiana State University (LSU), Baton Rouge, Louisiana.

- Modeled and evaluated performance of downhole water loop (DWL) well system in different oil fields, developed economical models for evaluation of DWL system in various reservoir and market conditions, and identified best reservoir candidates for system; oil production rate could be improved as much as 200%. Constructed software (toolbox) using ECLIPSE and VBA for complex well system simulation, applied batch processing technology in simulation, achieved automatic task queuing, and reduced simulation time 67%.

January 2013–December 2013: Reservoir Consultant, Joint Industrial Program (JIP), LSU, and Pluspetrol, Baton Rouge, Louisiana. Simulated cold production of heavy oil in Massambala Field, Angola, identifying mechanisms of high water cut in current wells, optimizing perforation length for conventional wells, and proposing two well systems, which could improve cumulative oil up to 80% or reduce produced water 75%, respectively.

May 2012–August 2012: Internship, High Plains Operating Company, LLC (HPOC), San Francisco, California. Simulated and analyzed extra water production problems in Ojo Encino Field, New Mexico, designing DWS well system to produce oil from thick transition zone, which could improve oil production rate by up to 20%.

May 2011–August 2011: Internship, JIP, LSU, and HPOC, Baton Rouge, Louisiana. Simulated performance of vertical and horizontal wells in Ojo Encino Field, New Mexico, diagnosing water coning/cresting problems in thick transition zone, determining best location for water injection to minimize pressure interference, and suggesting well type to develop field, which saved costs up to 30%.

January 2011–January 2013: Senior Teaching Assistant, Drilling Fluids Laboratory, LSU, Baton Rouge, Louisiana. Served as lecturer and oversaw four teaching assistants and 80–100 students each year as well as supervised three senior students completing their senior design projects.

September 2005–August 2007: Production Consultant, JIP, China University of Petroleum, and CNPC.

- Optimized a large gas pipeline network in China, proposed new optimization algorithm, and programmed software package for best operation in different conditions, reducing operational cost up to 23% (more than $20,000/day).

Professional Activities

Member, Society of Petroleum Engineers

Publications

Has authored or coauthored numerous peer-reviewed and other professional publications.

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Education and Training

Ph.D., Petroleum Engineering, University of North Dakota, 2022.
MEng., Petroleum Engineering, University of North Dakota, 2019.
M.Sc., Chemical Process Engineer, National Engineering School of Gabes, Tunisia, 2013.
Engineering Cycle Preparatory Studies, National Institute of Applied Sciences and Technologies of Gabes, Tunisia, 2010.
Language proficiencies: Arabic (native), French and English (fluent), and German (basic).
Computer proficiencies: Microsoft Office Suite, LOTUS, Hysys, Aspen plus, Aspen HTFS, CMG, and KAPPA.

Research and Professional Experience

April 2023–Present: Senior Research Scientist, EERC, UND.

- Collaborates on research proposal writing and leads experimental efforts to support research activities related to enhanced oil recovery (EOR) in unconventional and conventional formations, geomechanics, and subsurface storage of CO_2 and/or rich gas.

Principal areas of interest and expertise include reservoir engineering, fluid flow in porous media, rock mechanics, CO_2 storage and utilization, and EOR.

August 2022–March 2023: Research Scientist, EERC, UND.

- Conducted laboratory analyses and interpreted lab data to support research activities related to improved production of unconventional oil and gas reservoirs, EOR in unconventional and conventional formations, geomechanics, and subsurface storage of CO_2 and/or rich gas.

August 2020–July 2022: Research Assistant, EERC, UND.

- Ran experiments related to gas injection.

September 2018–August 2020: Graduate Research Assistant, Department of Petroleum Engineering, UND.

- Coordinated advanced petroleum engineering lab work and ran experiments and simulations related to CO_2 EOR in the Bakken.

June 2015–April 2018: Production Team Leader, NEJMA, Tunis, Tunisia.

- Planned and ensured production sustainability and conformity regarding quality standards.

July 2013–May 2015: Professional Intern, ETAP (NOC of Tunisia), Tunis, Tunisia.

- Studied the design of a natural gas separation and compression unit.
-

March–June 2013: Graduate Project, British Gas Tunisia (now Shell Tunisia), Tunis, Tunisia.

- Worked on graduate project entitled Reduction of Energetic Consumption and Related Polluting Gases Emissions of a Gas Processing Plant.

July 2012: Summer Intern, STIR, Bizerte, Tunisia.

Publications

Has coauthored several professional publications.

MICHAEL P. WARMACK
Distinguished Oil and Gas Facilities Engineer
Energy & Environmental Research Center (EERC), University of North Dakota (UND)
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Education and Training
B.S., Chemical and Petroleum Refining Engineering, Colorado School of Mines, 1981.

Research and Professional Experience
2022–Present: Distinguished Oil and Gas Facilities Engineer, EERC, UND.

- Serves on EERC project teams and works with EERC clients by providing technical leadership/oversight on industrial and governmental projects relating to enhanced oil recovery (EOR) and carbon capture, utilization, and sequestration (CCUS) projects to improve development and production of domestic energy.
- Supports planning, design, selection of materials/treatment programs, costing, reporting, and/or upgrade/retrofit efforts related to production facilities optimization for unconventional oil plays; injection, production, and recycle infrastructure associated with EOR/incremental oil recovery (IOR) in conventional and unconventional oil and gas plays; infrastructure associated with capture and injection of CO_2 for geologic storage; and other emerging challenges associated with oil and gas injection/production processes.
- Has more than 40 years of experience in oil and gas production and operations, facilities design and installation, chemical treatment and optimization, and hands-on experience in multiple engineering disciplines.

2021–2022: Principal Oil and Gas Facilities Engineer, EERC, UND.

- Served on EERC project teams and worked with EERC clients to improve development and production of domestic energy.
- Supported planning, design, selection of materials/treatment programs, costing, reporting, and/or upgrade/retrofit efforts related to production facilities optimization for unconventional oil plays; injection, production, and recycle infrastructure associated with EOR/IOR in conventional and unconventional oil and gas plays; infrastructure associated with capture and injection of CO_2 for geologic storage; and other emerging challenges associated with oil and gas injection/production processes.

2015–2020: Denbury Resources, Plano, Texas.
Was directly involved with Denbury's CO_2 operations within Delhi EOR and natural gas liquids (NGL) facilities (Delhi, Louisiana) and Tinsley EOR unit (Tinsley, Mississippi). Positions held included the following:

Facilities and Optimization Engineer – Delhi EOR Unit

- Provided engineering support on operations for Delhi EOR and NGL facilities.

- Provided recommendations and designs for facility upgrades (EOR facility), new equipment installation (EOR and NGL facilities), programming changes to plant operations, and operational changes within facilities. Efforts resulted in increased operational run time of plant and field operations while providing more efficient separation through plant.
- Worked with vendor on operations of NGL plant, resulting in equipment upgrades and increasing run time of plant from 85% in 2018 to 95% in 2019.
- Initiated monthly mechanical integrity and chemical reviews of plant and field operations.
- Designed and installed oil line to third-party crude blending facility, resulting in additional revenues without costs to unit.

Facilities and Optimization Engineer – Tinsley EOR Facility

- Provided detailed engineering review and recommendations for reducing chemical treatments on injection wells and improving operations of Tinsley EOR facility. Recommendations reflected development of maximum operating rate of EOR facility in terms of momentum, culminating in $9.2 million investment to upgrade plant. After completion of plant upgrades, injection well treatments were reduced from 40+ treatments/month to ~1 per month while reducing treating chemical expenses by approximately $2.4 million per year.
- Led engineering review on reduced injection occurring in field. Provided detailed analysis on injection system resulting in recommendation to improve flow in two major distribution lines.
- Instituted monthly mechanical integrity and chemical treating reviews on field operations.

2001–2015: Chaparral Energy, Oklahoma City, Oklahoma.
Directly involved with Chaparral's EOR operations in Texas and Oklahoma Panhandle areas, northeast Oklahoma area, and primary production activities in Oklahoma and Texas Panhandle areas. Positions held included the following:

Facilities Advisor/Facilities Manager (2011–2015)

- Provided project management and engineering oversight for Chaparral's largest CO_2 development that included grassroots 68-mile CO_2 pipeline and grassroots CO_2 capture facility to serve new EOR project in northeast Oklahoma.
- Directly responsible for facility design and integration within all of Chaparral's ongoing and developing EOR projects, resulting in alternative design of field facilities to replace underperforming equipment.
- Initiated standardization of facility designs within EOR projects for compression, water facilities, CO_2 pumps, and cooling facilities.
- Directly involved with developing and maintaining Chaparral's EOR budget, including full field project development costs.
- Recognized as key contributing team member by leading Chaparral in achieving its initial and highest monthly oil production level of 1 MMBO in May 2014.

Operations Manager/Operations Engineer (2001–2011)

- Directly responsible for development of Chaparral's CO_2 expansion programs within active and three new EOR projects within Oklahoma and Texas Panhandle areas. Development work included well intervention, facilities design and installation, chemical reviews on ongoing operations, drilling, and completion programs, WAG design and implementation, and land work support. Chaparral's CO_2 expansion programs realized increase in gross production of over 5100 BOPD from nits involved.

- Directly responsible for securing CO_2 sourcing from Arkalon ethanol plant in Liberal, Kansas, resulting in development of grassroots CO_2 capture facility adjacent to ethanol plant.
- Directly responsible for development, installation, and monitoring of three pipeline projects in southwest Kansas and Oklahoma and Texas Panhandle areas to service new CO_2 projects.
- Instituted chemical squeeze treatment on submersible pump installations to stem scaling of downhome equipment. Treatments resulted in increasing run time of submersible pumps from less than 3 months to 18 months.
- Recognized by Chaparral as key personnel asset within its EOR operations during Chaparral's financial presentations.

1999–2001: WoodGroup ESP, Oklahoma City and Purcell, Oklahoma.
Alliance Manager (2000–2001)

- Directly responsible for alliance with Kerr McGee for submersible pump installation and operation.
- Instituted new design parameters on submersible pump installations that dramatically increased run time of installed equipment. This design resulted in savings of over $1 million per year to Kerr McGee. Recognized by Kerr McGee for savings to its operations.
- Developed plan for continuous improvement concerning submersible pump installations based upon review of equipment installations and cooperation of WoodGroup's personnel and Kerr McGee's Failure Analysis Team.

Reliability Engineer (1999–2000)

- Directly responsible for investigation into failures on domestic and international customer equipment. Provided summary reports of findings with proposed solutions to prevent future reoccurrence.
- Directly responsible for investigative review on WoodGroup's operating standards, equipment upgrades, and modifications.
- Provided engineering support to in-house quality control on procured and manufactured equipment.

1997–1998: Lead Field Engineer, Occidental Petroleum, Maracaibo, Venezuela.

- Supervised staff of up to 15 field personnel engaged in completions, nondrilling workovers, and downhole operations.
- Coordinated fieldwork with Maracaibo office and camp personnel for workover and production operations, submersible equipment design and installation, and workover rig movements.
- Recognized as key asset in ongoing operations through sale of operations from Occidental to Union Texas Petroleum to Arco and British Petroleum.

1981–1997: Occidental Petroleum and prior subsidiaries, Oklahoma City, Oklahoma.

- Directly involved with ongoing EOR projects in central Oklahoma area that included design of grassroots EOR project in acquired unit for plant and field facilities. Instituted new design for CO_2 distribution system within field.
- Implemented Failure Analysis Team (FAT Team) to extend run time of submersible pump installations within company's EOR operations. FAT Team consisted of operating personnel, a chemical supplier, and a submersible pump supplier. Work from FAT Team resulted in extending run times of submersible pumps from 15 months to over 24 months within 2 years, resulting in reduced operating and equipment costs.
- Led successful acquisition efforts on two producing properties valued at $3.0 million. Directly involved with unsuccessful acquisition of two companies.

- Continuously enhanced production base from wells ranging in depths from 3000 to 15,000 feet through workover programs, recompletions, stimulations, and changes in artificial lift equipment. Developed and instituted program for having pipeline connection installed prior to frac treatments, resulting in better completions and higher production from wells.
- Developed multistage frac design in vertical wells using bullet perforations, reducing frac time by 50% and resulting in savings of over $250,000 per job.
- Selected by Oxy to serve on worldwide ESP team to enhance run time and use of ESP equipment.

Publications

Has coauthored numerous professional publications.

RYAN MCGUIGAN
Reservoir Engineering Director
Chord Energy
713.303.2966, ryan.mcguigan@chordenergy.com

Education and Training

Ph.D. Candidate, Petroleum Engineering, University of Texas, estimated graduation: 2028.
M.S., Petroleum Engineering, University of Houston, 2014.
B.S., Petroleum Engineering, Texas Tech University, 2007.

Research and Professional Experience

2020–Present: Reservoir Engineer Director, Chord Energy.

- Manage a team of four reservoir engineers.
- Technical lead for all development planning in the Willison Basin.
- Technical lead for all in-basin acquisitions and divestitures.
- Technical lead for all subsurface studies.

2017–2020: Permian Asset Manager, Chord Energy.

- Managed a team of three reservoir engineers.
- Led all planning efforts for the Business Unit.
- Responsible for drill readiness and rig line scheduling.

2014–2017: Reservoir Engineering Manager, Chord Energy.

- Leadership and management responsibility for five reservoir engineers and two technicians.
- Led all development planning in the Williston Basin.
- Technical lead for all subsurface studies.

2013–2014: Reservoir Engineer, Chord Energy.

- Designed development plans for parts of the Williston Basin.
- Managed subsurface studies for the asset team:
  - Core and log capture/analysis
  - Pressure observation wells
  - Diagnostic fracture injections tests
  - Numerical stimulation and analytical well testing
  - Original oil in place (OOIP) calculations (unique challenges in the Bakken petroleum system)

2008–2013: Reservoir Engineer, Oxy USA Inc.

- Southwest Kansas – development planning, production optimization, completion operations support, and drilling operations support.
- Permian Basin – development planning.

2007–2008: Fracture Stimulation Engineer, BJ Services.

- On-site quality assurance/quality control (QA/QC) of fracture fluid systems and design recommendations.

Relevant Publications
None.

Synergistic Activities
None.

APPENDIX B

COST-SHARE COMMITMENT LETTERS

Chord Energy

October 31, 2024

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

Dear Dr. Harju:

Subject: Chord Energy LLC. – Letter of Interest for the Project Entitled "Injection Testing with Propane to Inform Future Bakken CO_2 EOR Pilot"

Chord Energy LLC (Chord) is interested in potentially working with the Energy & Environmental Research Center (EERC) in the subject proposed project to conduct a propane-based injection test into a Bakken well tentatively planned for summer of 2025. The proposed propane injection test being considered by Chord would be conducted in the same Bakken reservoir (Grail Field, McKenzie County) that has been chosen to host a large-scale carbon dioxide (CO_2) enhanced oil recovery (EOR) pilot test, currently anticipated to be initiated in late 2026 or early 2027. Conducting a propane injection test in the Grail Field Bakken reservoir prior to the larger CO_2 pilot, and the proposed laboratory and modeling efforts to support the propane injection test, would generate data that would inform Chord's decisions regarding the detailed design and operation of the injection scheme for the future large-scale CO_2 EOR pilot. In particular, the proposed lab, modeling, and field activities would be anticipated to yield critical information to ground-truth injectivity and reservoir response to injection, which in turn would inform proper selection and sizing of infrastructure design and equipment, including compression and flowback management equipment.

Chord is considering providing in-kind cost sharing to the proposed propane injection test program. In-kind contributions may include, but would not necessarily be limited to, acquisition and delivery of propane, procurement of the equipment and infrastructure, and contracting with the necessary oilfield service providers to execute the test. Should Chord decide to move forward with the proposed test, it is anticipated that the value of those contributions could exceed $2,200,000.

We look forward to continued discussions with the EERC to further advance the ultimate goal of broad commercial deployment of EOR in North Dakota. This letter, evidencing Chord's interest in the captioned project, does not create any obligation on the part of Chord to fund or participate in the project and no such obligation by Chord shall exist until Chord and the EERC mutually execute a written definitive and binding agreement covering the same.

Should you have any questions, please do not hesitate to contact me by phone at (281) 404-9671 or by email at Alex.Wall@chordenergy.com.

Sincerely,

Alex Wall
Vice President, Asset Management

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 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 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 which 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 (GSA) 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.

Subcontractor – Chord Energy: Chord Energy (Chord) is an independent energy company that acquires, develops, and explores for crude oil, natural gas, and natural gas liquids in the Williston Basin. Chord will conduct the propane injection activities in the field. Estimated costs for the field-based activities include, but are not necessarily limited to, purchase of propane, propane transportation costs, pumping costs, downhole work, and surface work to support the execution of the injection test. This proposal requests that $800,000 of NDIC OGRP funding goes towards paying for costs incurred by Chord over the course of site preparation and injection test operations.

Consultant – Gordon Pospisil: Gordon Pospisil is an independent petroleum engineer consultant. Mr. Pospisil will be providing advice on the design of the injection and the interpretation of the results.

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.

Technical software is a use fee for an advanced project management tool. Costs are associated with software, data entry, maintenance, and enhancement of the system software.

Field safety fees cover safety training and certifications, providing necessary PPE, and annual physicals. The estimated cost is based on the number of days individuals are budgeted to work in the field.

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.

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 (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: Chord Energy has committed to providing $2,200,000 of in-kind cost share.

APPENDIX D

STATUS OF ONGOING PROJECTS LIST

STATUS OF ONGOING PROJECTS LIST

Project Title	Contract Award No.
Bakken Production Optimization Program 4.0	G-058-115
Improving EOR Performance Through Data Analytics and Next-Generation Controllable Completions	G-050-97
iPIPE: The Intelligent Pipeline Integrity Program	G-046-88
iPIPE 3.0: The Intelligent Pipeline Integrity Program	G-059-116
PCOR Initiative to Accelerate CCUS Deployment	G-050-96

COMMISSIONER
DOUG GOEHRING

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

ndda@nd.gov
www.ndda.nd.gov

January 22, 2025

To:
North Dakota Industrial Commission
State Capitol 14th Floor
600 E. Boulevard Ave. Dept. 405
Bismarck, ND 58505-0840

Subject: Support of the Bank of North Dakota Ag Disaster Relief Program

Dear Industrial Commission,

The Credit Review Board expresses its support for the restoration of the Bank of North Dakota's Ag Disaster Relief Loan Program and the ability to refinance the existing Ag Disaster Relief Loan Program's loans.

Throughout our experiences as bank representatives, farmers, and ranchers alike, the benefits the program offers have become apparent. We are in a unique time in agriculture with record high input prices, drought, and relatively low commodity prices. Recently, fires have blazed through western North Dakota. Operating shortfalls have and are occurring more frequently by result of circumstances outside of the operators' control.

The Ag Disaster Relief Loan Program has provided North Dakota farmers and ranchers with the capability to carry over operating shortfalls, term debt payments, and to restructure current debts. The program will allow ownership retention of farm and ranch properties and minimize chattel asset sales.

We look forward to working with the Bank of North Dakota and providing services for financial relief to North Dakota farmers and ranchers so they may continue providing food for our tables.

Respectfully,

Gerald T Horner

Gerald T. Horner
Credit Review Board Chairman

Minutes of a Meeting of the Industrial Commission of North Dakota

Held on December 12th, 2024, beginning at 3:00 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 3:05 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.

ND DEPARTMENT OF MINERAL RESOURCES

Mr. Nathan Anderson presented for consideration of approval the 2025 Oil and Gas Division Hearing Schedule.

It was moved by Commissioner Goehring and seconded by Attorney General Wrigley that the Industrial Commission approve the proposed and tentative 2025 Oil and Gas Hearing Schedule as follows:

Hearing Date	Docket Closing Date
January 22, 2025 January 23, 2025	December 18, 2024
February 26, 2025 February 27, 2025	January 22, 2025
March 26, 2025 March 27, 2025	February 19, 2025
April 23, 2025 April 24, 2025	March 19, 2025
May 28, 2025 May 29, 2025	April 23, 2025
June 25, 2025 June 26, 2025	May 21, 2025
July 23, 2025 July 24, 2025	June 18, 2025
August 27, 2025 August 28, 2025	July 23, 2025
September 25, 2025 September 26, 2025	August 20, 2025
October 22, 2025 October 23, 2025	September 17, 2025
November 19, 2025 November 20, 2025	October 15, 2025
December 17, 2025 December 18, 2025	November 12, 2025
January 21, 2025 January 22, 2025	December 17, 2025

On a roll call vote, Governor Burgum, Attorney General Wrigley, and Commissioner Goehring voted aye. The motion carried unanimously.

Mr. Anderson and Mr. Mark Bohrer presented for consideration of approval the following cases:

i. Order 33550 in Case 30890 – Duke Royalty, overriding royalty interests, drilling, completion, production costs, risk penalty

It was moved by Commissioner Goehring and seconded by Attorney General Wrigley that the Industrial Commission approves Order 33550 issued in Case 30890 approving the 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.

On a roll call vote, Governor Burgum, Attorney General Wrigley, and Commissioner Goehring voted aye. The motion carried unanimously.

ii. Orders 33529, 33530, 33531 in Cases 30869, 30870, 30871 – Summit Carbon Storage #1, Storage Facility, Amalgamation, Financial Responsibility

It was moved by Commissioner Goehring and seconded by Attorney General Wrigley that the Industrial Commission approves Orders 33529, 33530, and 33531 proposed in Cases 30869, 30870 and 30871 respectively, regarding the applications of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline and other sources in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West; Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West; Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West; Sections 1, 2, 3, and 12, Township 140 North, Range 88 West; and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, North Dakota, pursuant to North Dakota Administrative Code Chapter 43-05-01; for the amalgamation of the storage reservoir pore space in the aforementioned lands, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage facility and subject to geological storage, as required to operate the requested storage facility, and granting the Director authority to issue an order establishing the effective date of said amalgamation of pore space pursuant to North Dakota Century Code § 38-22-10; and for requiring financial responsibility instruments consisting of $1,166,000 for two injection wells, $5,392,800 for postinjection site care and facility closure, and $13,795,000 for emergency and remedial response for the geologic storage of carbon dioxide in the Broom Creek Formation covering the requested storage facility, Mercer, Morton, and Oliver Counties, North Dakota pursuant to North Dakota Administrative Code § 43-05-01-09.1.

On a roll call vote, Governor Burgum, Attorney General Wrigley, and Commissioner Goehring voted aye. The motion carried unanimously.

iii. Orders 33533, 33534, 33535 in Cases 30873, 30874, 30875 – Summit Carbon Storage #2, Storage Facility, Amalgamation, Financial Responsibility

It was moved by Commissioner Goehring and seconded by Attorney General Wrigley that the Industrial Commission approves Order Nos. 33533, 33534, and 33535 proposed in Case Nos. 30873, 30874 and 30875, respectively, regarding the applications of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline and other sources in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West; Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West; Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West; and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, North Dakota, pursuant to North Dakota Administrative Code Chapter 43-05-01; for the amalgamation of the storage reservoir pore space in the aforementioned lands, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage facility and subject to geological storage, as required to operate the requested storage facility, and granting the Director authority to issue an order establishing the effective date of said amalgamation of pore space pursuant to North Dakota Century Code § 38-22-10; and for requiring financial responsibility instruments consisting of $1,166,000 for two injection wells, $5,577,800 for postinjection site care and facility closure, and $14,125,000 for emergency and remedial response for the geologic storage of carbon dioxide in the Broom Creek Formation covering the requested storage facility, Mercer and Oliver Counties, North Dakota pursuant to North Dakota Administrative Code § 43-05-01-09.1.

On a roll call vote, Governor Burgum, Attorney General Wrigley, and Commissioner Goehring voted aye. The motion carried unanimously.

iv. Orders 33537, 33538, 33539 in Cases 30877, 30878, 30879 – Summit Carbon Storage #3, Storage Facility, Amalgamation, Financial Responsibility

It was moved by Commissioner Goehring and seconded by Attorney General Wrigley that the Industrial Commission approves Order Nos. 33537, 33538, and 33539 proposed in Case Nos. 30877, 30878 and 30879, respectively, regarding the applications of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline and other sources in the storage facility located in Section 36, Township 143 North, Range 87 West; Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West; Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West; Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West; and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, North Dakota, pursuant to North Dakota Administrative Code Chapter 43-05-01; for the amalgamation of the storage reservoir pore space in the aforementioned lands, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage facility and subject to geological storage, as required to operate the requested storage facility, and granting the Director authority to issue an order establishing the effective date of said amalgamation of pore space pursuant to North Dakota Century Code § 38-22-10; and for requiring financial responsibility instruments consisting of $1,166,000 for two injection wells, $5,646,800 for postinjection site care and facility closure, and $14,005,000 for emergency and remedial response for the geologic storage of carbon dioxide in the Broom Creek Formation covering the requested storage facility, Oliver County, North Dakota pursuant to North Dakota Administrative Code § 4305-01-09.1.

On a roll call vote, Governor Burgum, Attorney General Wrigley, and Commissioner Goehring voted aye. The motion carried unanimously.

v. Order 34153 in Case 31229 to reconsider and vacate Order 33918 and approve application of EOG Resources Inc.

It was moved by Commissioner Goehring and seconded by Attorney General Wrigley that the Industrial Commission approve Order No. 34153 in Case No. 31229 to reconsider and vacate Order No. 33918 and approve the application of EOG Resources, Inc. to amend 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.

On a roll call vote, Governor Burgum, Attorney General Wrigley, and Commissioner Goehring voted aye. The motion carried unanimously.

ND HOUSING FINANCE AGENCY

Ms. Mindy Piatz with Brady Martz presented the Housing Finance Agency Audit Report dated June 30, 2024 and the Housing Incentive Fund Audit Report dated June 30, 2024.

The Independent Auditor's Report for the Housing Finance Agency states: "In our opinion, the financial statements present fairly, in all material respects, the respective financial position of the business-type activities of the North Dakota Housing Finance Agency, as of June 30, 2024 and 2023, and the respective changes in financial position, cash flows thereof and statement of appropriations for the years then ended in accordance with accounting principles generally accepted in the United States of America."

The Independent Auditor's Report for the Housing Incentive Fund states: "In our opinion, the financial statements present fairly, in all material respects, the financial position for the North Dakota Housing Incentive Fund, a special revenue fund of the State of North Dakota, as of June 30, 2024 and 2023, and the changes in financial position for the years then ended in accordance with accounting principles generally accepted in the United States of America."

Ms. Kayla Axtman presented a report on the NDHFA $195 million Series 2024D bond issuance pricing.

Mx Axtman's report included the following summary: The fed funds rate is currently sitting at 4.50-4.75%, a level that was last seen in 2023. In September 2024, the Federal Reserve began decreasing the fed funds rate with a decrease of 0.50 with continued decreases following. During this same time, the Agency had moved the tax exempt 30-year mortgage rate 16 times and continues to be well below the current market rate for a 30-year conventional loan. Currently, the average 30-year FHA mortgage rate is 6.22%, and the average 30-year conventional mortgage rate is 6.91%. For the past two months, the Agency is averaging just under $2 million a day in First Home (tax exempt) reservations and approximately $175,000 in daily Roots (taxable) reservations. Right now, the average total payment (principal, interest, taxes and insurance) for First Home borrowers is $1,191 and for Roots borrowers it is $1,932.

ND PUBLIC FINANCE AUTHORITY

Ms. DeAnn Ament presented for consideration of approval the following loan application:

i. **Fargo – Drinking Water - $35,000,000** Lead Service Line Replacement. The purpose of this project is to replace the over 2,500 known lead service lines in the City. The project total is $35,000,000 and $23,282,308 of loan forgiveness is applied for a net DWSRF loan of $11,717,692. The requested loan term for the Drinking Water State Revolving Fund loan is 30 years, and the City will issue revenue bonds payable with sales tax and water fund revenues. The average annual payment for the revenue bonds will be $390,590.

It was moved by Commissioner Goehring and seconded by Attorney General Wrigley that the Industrial Commission approve the Drinking Water State Revolving Fund loan request for $35,000,000 for the City of Fargo.

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 DRINKING WATER STATE REVOLVING FUND

WHEREAS, the Industrial Commission has heretofore authorized the creation of a Drinking Water State Revolving Fund Program (the "Program") pursuant to N.D.C.C. chs. 6-09.4, 61-28.1, and 61-28.2; and

WHEREAS, the 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 (the "NDPFA") and the Bank of North Dakota (the "Trustee"); and

WHEREAS, the City of Fargo (the "Political Subdivision") has requested a loan in the amount of $35,000,000 from the Program to replace the over 2,500 known lead service lines in the Political Subdivision; and

WHEREAS, 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 Drinking 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: December 12, 2024

Ms. Ament presented a memo of the State Revolving Fund loans approved by the Advisory Committee:

The committee reviewed the City of Center's Clean Water State Revolving Fund (CWSRF) application for an increase of $400,000 to the previously approved $4,930,000 loan ($5,330,000 total) to reconstruct two cells of the wastewater treatment, including replacing 2 feet of the existing pond bottom with new, locally sourced bentonite clay material or a synthetic liner. The requested term for the loan is 30 years. The City will issue revenue bonds payable with sewer user fees. The City also pledges $15,000 per month (or $180,000 annually) of their coal conversion and coal severance tax payments.

The committee reviewed the City of Fessenden's CWSRF application for a $2,000,000 loan towards a $4,000,000 project. The City has been awarded a $2,000,000 FEMA Building Resilient Infrastructure and Communities grant. The project will reconstruct the lagoons within the existing footprint bringing them up to current design standards. The requested term for the loan is 30 years. The City will issue revenue bonds payable water, sewer and garbage user fees and city sales tax.

The committee reviewed the City of Stanley's CWSRF application for a $1,099,000 loan towards a $2,371,000 project. The Drinking Water State Revolving Fund (DWSRF) will provide a $1,272,000 loan. This project will replace water and sanitary sewer lines and replace damaged storm pipe and install new manholes from 5th Street between 3rd and 6th Avenues. Repave and regrade the street and replace curbs and gutters to aid flow to current storm inlets. The requested term for the loan is 30 years. The City will issue improvement bonds payable with special assessments for $275,000 of the CWSRF project. The improvement bonds will be a contingent general obligation of the City, backed by the statutory requirement that the City will levy a general deficiency tax in the event that the revenues from the collection of special assessments are not sufficient to pay the debt service on the improvement bonds. The City will issue $824,000 in revenue bonds payable with sewer user fees and city sales tax.

The committee reviewed the City of Stanley's DWSRF application for a $1,272,000 loan towards a $2,371,000 project. The CWSRF will provide a $1,099,000 loan. This project will replace water and sanitary sewer lines and replace damaged storm pipe and install new manholes from 5th Street between 3rd and 6th Avenues. Repave and regrade the street and replace curbs and gutters to aid flow to current storm inlets. The requested term for the loan is 30 years. The City will issue improvement bonds payable with special assessments for $318,000 of the DWSRF project. The improvement bonds will be a contingent general obligation of the City, backed by the statutory requirement that the City will levy a general deficiency tax in the event that the revenues from the collection of special assessments are not sufficient to pay the debt service on the improvement bonds. The City will issue $954,000 in revenue bonds payable with water user fees and city sales tax.

The Public Finance Authority's Advisory Committee approved these loans at their December 3, 2024, meeting.

BANK OF NORTH DAKOTA

Mr. Don Morgan presented an update on the draft BND Capital Policy. The policy includes the policy statement, capital policy goals, risk management and capital planning, capital plan stress testing, and capital dividends. A final draft will be brought to the Industrial Commission for consideration of approval at a future meeting.

Mr. Don Morgan presented the Non-Confidential Committee and Advisory Board Minutes for October 2024 meetings for the Commission member's review.

It was moved by Attorney General Wrigley and seconded by Commissioner Goehring that under the authority of North Dakota Century Code Sections 6-09-35, 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 attorney consultation related to proposals for national monument designation.

On a roll call vote, Governor Burgum, Attorney General Wrigley, and Commissioner Goehring voted aye. The motion carried unanimously.

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 for attorney consultation pursuant to N.D.C.C. 44-04-19.1 and 44-04-19.2 for consultation related to the item listed on the agenda. Only Commission members, their staff, and Commission staff 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 5:10 p.m.

Meeting Closed to the Public for Executive Session Pursuant to NDCC 6-09-35, 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
Craig Hanson
Kaylen Hausauer
Courtney Heiser
Nicole Koons

Others in attendance

John Reiten	Governor's Office
Zac Greenberg	Governor's Office
Dutch Bialke	Ag Commissioner's Office
Karen Tyler	Industrial Commission Office
Brenna Jessen	Industrial Commission Office
Erin Stieg	Industrial Commission Office

ATTORNEY CONSULTATION EXECUTIVE SESSION

Industrial Commission Members Present
Governor Doug Burgum
Attorney General Drew H. Wrigley
Agriculture Commissioner Doug Goehring

Others in attendance

Phil Axt	Attorney General's Office
John Reiten	Governor's Office
Zac Greenberg	Governor's Office
Dutch Bialke	Ag Commissioner's Office
Karen Tyler	Industrial Commission Office
Brenna Jessen	Industrial Commission Office
Erin Stieg	Industrial Commission Office

The executive session ended at 6:00 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 and made motions to approve one loan and a resolution.

On a roll call vote, Governor Burgum, Attorney General Wrigley, and Commissioner Goehring voted aye. The motion carried unanimously.

During the Attorney Consultation executive session, the Commission consulted with its attorney regarding the item listed on the agenda. No formal action was taken during this executive session.

CO2 EDUCATION AND OUTREACH PROJECT UPDATES

Mr. Brent Bogar and Mr. Marty Doll with AE2S presented an update on the CO_2 Education and Outreach project.

In early 2024, through the appropriation of the North Dakota legislature, the ND Industrial Commission awarded a $300,000 grant to develop an Education and Outreach Strategic Plan and materials related to CO_2 capture, sequestration, and utilization in North Dakota. The project does not endorse any specific CO_2-related projects, and the scope of this grant includes plan, recommendation, and materials development through June 30, 2025, but does not include full-scale implementation beyond this date.

The executive team met monthly from March to November 2024 to provide input, direction, and review for all deliverables, serve as industry experts to ensure reliability of the information, and guide the development of appropriate outreach strategies.

The five plan goals are as follows:

1. Provide Factual information to audiences about the science of the CO_2 industry to address safety and landowner concerns, explore the potential benefits of an expanded CO_2 industry, and emphasize the importance of continued exploration and research related to CO_2.
2. Establish reliable sources for audiences to locate current information, in-depth studies, history, and details on North Dakota's role in CO_2 initiatives.
3. Create a library of branded materials for the State of North Dakota to use to communicate with various audiences from an official capacity that can be tailored for outreach needs, while remaining consistent and recognizable.
4. Provide an opportunity for audiences to ask questions, clarify information, and give feedback on CO_2 initiatives in North Dakota, and develop an ongoing education and outreach plan for the State.
5. Provide clarity around CO_2 regulations, industry challenges, and economic impacts.

The key themes if this project are safety, natural preservation, landowner rights, North Dakota pipeline and CO_2 history, and federal regulations and economic impact. The full report of the CO_2 Education and Outreach Project plan can be found on the website.

LEGAL AND REGULATORY UPDATE

A. Litigation status updates were provided on the following matters:
    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 provided:
    i. EPA Methane Tax Rule
C. Federal regulatory update provided:

i. BLM Resource Management Plan

OFFICE OF THE INDUSTRIAL COMMISSION

Ms. Karen Tyler presented for consideration of approval the November 26, 2024, Industrial Commission meeting minutes.

It was moved by Commissioner Goehring and seconded by Attorney General Wrigley that the Industrial Commission approve the November 26, 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 ND Mill President Annual Bonus.

The memo reads as follows:

"Fiscal Year 2024 was another record year for the North Dakota Mill. Profits were $20,795,168 which was an increase from the prior year's profits of 17,238,265 and an all-time record high for the Mill.

When Vance Taylor was hired by the Industrial Commission in June of 2000, his compensation package included an annual bonus opportunity based on performance, up to 30% of base salary. Thirty percent of Vance's current base salary of $379,881.00 is $113,964.

The Commission has previously determined that the 30% bonus payment provided for in Vance's contract is to be determined with two components: 20% of the bonus will be based on what had been distributed to Mill employees under the Mill's gain sharing plan. 10% of the bonus is based on other criteria, with the priority consideration being the achievement of goals established in the Mill Strategic Plan.

The gain sharing payout for FY 2024 for Mill employees was 29.84% as compared to 27.78% in 2023. The maximum bonus amount under this component of the compensation plan is $75,976. All four gain sharing criteria goals were met, and profits as previously stated were a new record for the Mill. Based on the gain sharing payout portion, it is my recommendation that Vance receive the full amount applicable under the 20% component.

The remaining 10% of the 30% bonus potential is $37,988. For this component I recommend $30,000. With Vance's leadership, and supported by executive management and the entire Mill team, the Mill achieved numerous goals that were established by the Commission in the Mill's 2024 strategic plan including increasing shipment volume by 10%, increasing exports by 40%, the addition of new significant customers, and improving efficiencies and reducing costs across a number or areas including truck scheduling, debt management, and energy efficiencies through their generator installation project. Employee engagement, and modernizing the Mill's policies related to human resources, information technology, and governance, and management practices related thereto, are areas of focus for improvement going forward.

Vance continues to do an excellent job leading the North Dakota Mill team in the operation of an enterprise that delivers exceptional products and services. **For the 2024 fiscal year I am recommending a bonus totaling $105,976.00.**"

It was moved by Commissioner Goehring and seconded by Attorney General Wrigley that the Industrial Commission approve a bonus for the North Dakota Mill President in accordance with the applicable employment contract and policy, in the amount of $105,976.00, with a required bonus calculation formula that is set at 20% related to gain sharing results for Mill employees and 10% based on other criteria, primarily achievement of goals established in the Mill Strategic Plan.

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 Industrial Commission Executive Director Compensation.

The memo reads as follows:

"Since August of 2022, I have held dual roles for the state, serving as both the North Dakota Securities Commissioner and Interim Executive Director for the Industrial Commission, and after June 26, 2024, Executive Director for the Industrial Commission. Effective December 14, 2024, I will hold only the position of Executive Director.

While serving in dual roles for the state, I did not collect the full salary for the Executive Director position. With this upcoming change I respectfully request the Industrial Commission consider the approval of a compensation adjustment at least equal to the full salary previously approved for the Executive Director by the Commission, which is currently $151,380.00.

Thank you,

Karen Tyler

Industrial Commission Executive Director"

Discussion was held based on the Governor's recommended salary range, and other Executive Director positions' salaries, and Attorney General Wrigley gave a recommendation that the new Executive Director salary should be $169,500 for the remainder of the biennium based on what is available in the budget. Further discussion was held that this was the low end of the salary range for this position and it should be re-evaluated at the start of the next biennium.

It was moved by Attorney General Wrigley and seconded by Commissioner Goehring that the Industrial Commission adjust the Executive Director salary to $169,500 for the remainder of the current biennium, with a reevaluation based on the increase that Governor Burgum proposed in his budget for the 2025-2027 biennium.

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 2025 Industrial Commission meeting schedule.

It was moved by Commissioner Goehring and seconded by Attorney General Wrigley that the Industrial Commission approve the proposed 2025 meeting dates as follows:

Tuesday, January 28, 2025

Thursday, February 20, 2025

Tuesday, March 25, 2025

Thursday, April 24, 2025

Thursday, May 22, 2025

Thursday, June 26, 2025

Tuesday, July 29, 2025

Tuesday, August 26, 2025

Tuesday, September 30, 2025

Tuesday, October 28, 2025

Tuesday, November 25, 2025

Wednesday, December 17, 2025

On a roll call vote, Governor Burgum, Attorney General Wrigley, and Commissioner Goehring voted aye. The motion carried unanimously.

Attorney General Wrigley presented a Resolution of Appreciation for Governor Doug Burgum.

A RESOLUTION WAS MADE

RESOLUTION HONORING GOVERNOR DOUG BURGUM FOR HIS SERVICE AS

CHAIRMAN OF THE INDUSTRIAL COMMISSION OF NORTH DAKOTA

WHEREAS: Governor Doug Burgum has led the oversight of the Industrial Commission's agencies and programs with distinction and dedication; and,

WHEREAS: During his eight-year tenure of leadership, Industrial Commission agencies and programs have achieved record milestones and impact for our citizens, communities, and the state overall, including:

- 3.4 billion barrels of oil produced under the oversight of the Industrial Commission and Department of Mineral Resources, as North Dakota remains the nation's No. 3 oil producing state.
- Securing the future of Coal Creek Station and the sale of the Nexus HVDC line through innovative Commission agency partnerships with the private sector to retain critical baseload electricity production and transmission.
- The securing by DMR of Class VI primacy for permitting active Carbon Capture Storage projects on April 24, 2018, making North Dakota the first state in the country to hold this status.
- Nearly 500 disaster relief loans produced by Bank of North Dakota totaling $162 million to help farmers, ranchers, businesses and citizens recover from extreme agriculture drought and unprecedented flooding.

- 123,463,000 hundred weights of flour sold by the North Dakota Mill generating over $112 million in profits, along with completion of an expansion in 2022 making it the largest single-site flour mill in the country.
- Over $1 billion in Clean Water and Drinking Water infrastructure projects financed through the Public Finance Authority's State Revolving Fund program, impacting communities large and small across the state.
- The approval of over $217.4 million in grant awards across the energy research and commercialization grant programs overseen by the Commission, driving critical innovations and private sector investment.
- The approval of more than $62.9 million in grant awards through the Commission's Outdoor Heritage Fund program supporting conservation, wildlife habitat, and outdoor recreation.
- $3.2 billion in bonds issued by the Housing Finance Agency to fund construction or rehabilitation of 3,016 single and multi-family housing units and help 11,421 homeowners purchase their first home.
- Overseeing the Geological Survey's expansion of the Fossil Dig program to one of the largest in the nation.

NOW, THEREFOR, BE IT RESOLVED, that the Industrial Commission of North Dakota expresses its deep gratitude to Governor Doug Burgum for his dedicated, innovative leadership of the Industrial Commission agencies, programs, and team members and for his committed service to the people of this great state.

Being no further business, Governor Burgum adjourned the meeting of the Industrial Commission at 7:10 p.m.

North Dakota Industrial Commission

Brenna Jessen, Recording Secretary

Karen Tyler, Executive Director

Jordan Kannianen, Deputy Director

Minutes of a Special Meeting of the Industrial Commission of North Dakota

Held on January 8th, 2025, beginning at 4:00 p.m.

Governor's Conference Room – State Capitol

Present: Governor Kelly Armstrong, 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 Armstrong called the meeting of the Industrial Commission to order at approximately 4:05 p.m.

Ms. Karen Tyler took roll call, and Governor Armstrong, Commissioner Goehring, and Attorney General Wrigley were present.

Governor Armstrong invited the room to stand and join the Commission in saying the Pledge of Allegiance.

BANK OF NORTH DAKOTA

Mr. Don Morgan, Mr. Rob Pfennig, and Mr. Kelvin Hullet presented for consideration of approval the new BND Capital Policy with Stress Testing and Dividend Recommendations.

The new formalized capital policy the Bank of North Dakota includes a capital plan, capital buffers, annual stress test and dividend recommendation, and must be reviewed and approved on an annual basis by the Industrial Commission. The Capital Policy is available on the bank's website.

BND

25-27 Dividend Recommendation

	Biennium	
	23-25 Actual	25-27 Proposed
Prior 2 Calendar Years Income	$ 335,321	$ 393,187
***Potential Dividend to Gen. Fund**	$ 140,000	$ 140,000
***Potential Dividends Buy Down**	$ 60,000	$ 60,000
***Potential Dividends Other**	$ 96,100	$ 12,800
Total Capital Dividends % to Earnings	88%	54%
General Fund	140,000	140,000
Interest Rate Buy Downs	60,000	60,000

Skilled Workforce/Dual Credit	8,300	8,300
UND SBDC	1,500	1,500
AGPUC	3,000	3,000
IRLF	52,000	
SIRN	20,000	
Disaster		
R-Wish	10,000	
FHLB Matching Housing	1,300	
New Program		

Total Capital Dividends **296,100** **212,800**

The dividend amounts (shown above) are the maximal calculated amounts potentially available that the range of required capital per the Capital Policy, Capital Buffers, and Capital Stress Test would indicate are available for the proposed biennium. These potential amounts, per the analysis, would maintain sufficient capital levels in the Bank for the period to accomplish strategic objectives, appropriately mitigate enterprise risk, generally continue to operate in a safe and sound manner, and to account for reasonably assumed unknowns and/or contingent situations the Bank may face in the upcoming period.

The categories of potential dividends are proposals and are subject to adjustment by the Board. Available alternatives to the "Potential Dividend to Gen. Fund" may include designating all or portions of this category to State programs aligned with the core mission of the Bank.

It was moved by Commissioner Goehring and seconded by Attorney General Wrigley that the Industrial Commission, as the governing body for the Bank of North Dakota, approve the bank's capital policy to ensure the safety and soundness of the bank, ensure the bank can meet its mission and objectives, is in full compliance with regulatory requirements and industry standards, and that such policy will require an annual review and approval by the Commission of the bank's capital plan, capital buffers, stress test and recommended dividend; that capital dividends will be determined based upon the previous ending two calendar years income prior to the start of a new biennium, that the Industrial Commission approve a recommended dividend for the 2025-2027 biennium of up to $212,800,000 which includes:

- **$140,000,000 for the state's general fund or legislatively directed use**
- **$60,000,000 for the PACE buy down programs**
- **$12,800,000 for other programs such as APUC, SBDC and skilled workforce/dual credit**

and that information about the approval of this capital policy and recommended dividend be provided to legislative leadership.

On a roll call vote, Governor Armstrong, Attorney General Wrigley, and Commissioner Goehring voted aye. The motion carried unanimously.

The Industrial Commission sent a letter to Legislative Leadership that read as follows:

January 8, 2025

Dear Senator Hogue, Representative Lefor, Senator Bekkedahl, and Representative Vigesaa,

At the January 8, 2025, Industrial Commission meeting the Commission adopted a formalized capital policy for the Bank of North Dakota which includes a capital plan, capital buffers, annual stress test and dividend recommendation. The purpose of this letter is to provide you with background on the need for the policy and details regarding its construct.

Background

Bank of North Dakota's mission is to deliver quality, sound financial services that promote agriculture, commerce, and industry in North Dakota. Today, BND holds and administers over $10 Billion in assets for the state and in coordination with financial institutions in North Dakota. As the governing body for the bank, the Industrial Commission undertook an effort in the last year to create a formal capital policy for the institution.

This policy is structured to achieve the essential functions served by appropriate capital levels:

1. **Ability to Absorb Losses**: Capital allows institutions to continue operating as going concerns during periods when operating losses or other adverse financial results are experienced.

2. **Promoting Public Confidence**: Capital provides a measure of assurance to the public that an institution will continue to provide financial services even when losses have been incurred or the bank is otherwise under stress, thereby helping to maintain confidence in the banking system and minimize liquidity concerns.

3. **Restricting Excessive Asset Growth**: Capital, along with minimum capital ratio standards, can act as a constraint on excessive expansion by requiring that asset growth be funded by a commensurate amount of capital.

4. **Protecting Depositors and the State**: BND is not an FDIC insured institution. With a significant risk of loss carried by the state should the institution fail, appropriate capital levels help to minimize the potential for moral hazard and promote safe and sound banking practices.

The bank is mission driven while also managing risk for the state primarily related to liquidity risk, credit risk, and interest rate risk. Notwithstanding these three primary risk categories, the bank takes an enterprise-wide approach to risk management, and this forms the basis of the new capital policy.

It is the goal of the bank to achieve a stable total return to the state while delivering on its mission. The bank has and will continue to take a conservative approach toward its lending and investing activities, prudently reserve for potential loan loss, remain prepared for potential state liquidity needs, and continue to manage risk through a robust and evolving enterprise risk management system.

Purpose of the Capital Policy

The overall purpose of the bank's new capital policy is to ensure the safety and soundness of the institution, ensure it can meet its mission and objectives, and is aligned with industry best practices. A strong capital policy benefits the bank and the state by providing a framework for achieving the bank's mission and strategic plan objectives consistent with maintaining regulatory guidance and providing for the protection of the bank's depositors and integrity of its operations.

The development of this capital policy was driven by the following factors:

1. The size and complexity of the bank's operations has reached a critical juncture where a robust, dynamic, industry best practice capital policy is prudent for continued safe and sound operations.

2. Upon conclusion of its biennial examination of the bank, the Department of Financial Institutions recommended the Industrial Commission develop a formal risk-based capital policy.

3. HB 1014 passed by the 68th Legislative Assembly included language in section 28 to "consider developing procedures or adopting legislative rules for introducing bills and amendments related to the use of Bank of North Dakota profits".

4. The need to create a dividend policy that provides a level of funding for use by the Legislature while maintaining appropriate capital levels to mitigate risk and comply with industry best practices and continued safe and sound operations.

Bank management, the bank's advisory board, and the Industrial Commission as the bank's board of directors, establish policies, procedures, and controls that mitigate material risks which include economic, interest rate, credit, liquidity, competitive, financial, operational, cybersecurity, and reputational risk. The bank must be prepared to respond quickly to unforeseen major events such as interest rate shock environments, natural disasters, economic disruptions, and state budget deficits.

Recommended Capital Dividend for the 2025-2027 Biennium

Based on all the factors accounted for in the new capital policy, together with capital buffers and capital stress testing, the Industrial Commission has approved a recommended dividend of up to $212,800,000 for the 2025-2027 biennium. This is 54% of the bank's 2023 and 2024 calendar year earnings. This recommended dividend includes:

- $140,000,000 for the state's general fund or legislatively directed use.
- $60,000,000 for the PACE buy down programs.
- $12,800,000 for other programs such as APUC, SBDC and skilled workforce/dual credit.

If legislative leadership determines that the recommended dividend from the bank is insufficient, we request the opportunity to discuss any proposed change.

Lines of Credit and Bank Deposits

The Legislature has historically utilized lines of credit from the bank to assist with cash management and to provide funding certainty. Current available lines of credit with the bank that have been directed by the legislature total approximately $428,000,000, with a total outstanding balance of $33,401,000. Similar to dividends, asset allocations and unfunded commitments affect the bank's dynamic capital

range. Complementary to the capital policy framework we are establishing, the bank analyzes lines of credit and forecasts expected or likely usage, probability of funding, and the overall impact to potential capital levels and ranges. Based on this analysis, for the 2025-2027 biennium, the Industrial Commission recommends that new legislatively directed lines of credit not exceed $400,000,000 and requests that any new lines of credit have an identified repayment source.

In addition, the Commission requests the opportunity to discuss with legislative leadership any legislation that could materially impact the bank's deposit base.

ND TRANSMISSION AUTHORITY

Mr. Jordan Kannianen, Deputy Director of the Industrial Commission, gave a report on NDTA studies and updates to be presented at the joint meeting of the House and Senate Energy and Natural Resources Committees on January 9, 2025.

The main terminology are the 3 R's: Resource Adequacy, Operational Reliability, and Grid Resilience.

The following are Grid Resilience Report Risks and Threats:

- Extreme weather events
- Supply chain interruptions
- Cyberattacks
- Aging infrastructure
- Resource Adequacy issues

The following are Grid Resilience Report Recommendations:

- Strengthen resource adequacy
- Enhance infrastructure resilience
- Centralize supply chain management
- Implement cybersecurity measures
- Prioritize Maintenance of aging infrastructure
- Establish continuous resilience assessment

The following are Utilities' Actions:

- Supply chain management
    - Utilities are good neighbors and share resources in emergency situations
- Continuous resilience assessments
- Cybersecurity
    - Utilities are held to NERC and FERC standards
- Modernizing aging infrastructure
    - Replacing analog meters and equipment with digital
    - Replacing old poles and cables
    - IIJA grants beginning to help

Proposed EPA Rules and Effects:

- Mercury and Air Toxins Standards (MATS) Impact Study
    - Decreases allowed mercury content from 1 part/billion to 1 part/10-billion
    - MISO would not be able to meet peak demand by 2029
- Greenhouse Gas Regulation Impact Study
    - Sets new standards for gas-fired combustion turbines at power plants
    - MISO would not be able to meet peak demand by 2028
    - SPP would not be able to met peak demand by 2030

Full reports are available upon request.

With no further business, Governor Armstrong adjourned the special meeting of the Industrial Commission at 4:55 p.m.

North Dakota Industrial Commission

Brenna Jessen, Recording Secretary

Karen Tyler, Executive Director

Jordan Kannianen, Deputy Director