

Clean Sustainable Energy Authority  

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North Dakota Industrial Commission

## Application

**Project Title: Prairie Horizon Energy Solutions  
LLC Clean H<sub>2</sub> and N-fertilizer Production Facility**

**Applicant: Prairie Horizon Energy Solutions LLC**

**Date of Application:  
October 16, 2023**

**Amount of Request  
Grant: \$0  
Loan: \$125,000,000**

**Total Amount of Proposed Project:  
\$2,200,000,000**

**Duration of Project: Estimated .  
(August 2025 – December 2028)**

**Point of Contact (POC):  
Justin Gutknecht**

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312-576-8004**

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**POC Address:  
180 N LaSalle St, Suite 3030  
Chicago, IL 60601**

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## ABSTRACT

The two major energy companies, TC Energy Development Holdings Inc. (“TCE”) and MPC Investment LLC (“MPC”) collectively “Partners”, each wholly owned subsidiaries of publicly traded enterprises with annual revenues in excess of \$10B (billion), with encouragement from state governments, form the core of Prairie Horizon Energy Solutions LLC (“PHES”), a new potential clean hydrogen (“H<sub>2</sub>”) and clean ammonia (“NH<sub>3</sub>”) production facility paired with carbon dioxide (“CO<sub>2</sub>”) capture, transport and sequestration (“CCTS”) and potential long term H<sub>2</sub> subsurface storage (“PHES Project”) in Stark County, North Dakota (ND). The proposed Project, contingent on a Final Investment Decision (“FID”) by the PHES Partners, through a Joint Venture (“JV”) being finalized, and potentially other strategics, are exploring the feasibility to install 200 metric tons/day (tpd) of clean H<sub>2</sub> (Carbon intensity [CI] of <0.45 kg CO<sub>2</sub>eq/kg H<sub>2</sub>) and up to ~1,150 tpd of clean NH<sub>3</sub> production capacity, with an additional investment to construct a urea production facility. Clean H<sub>2</sub> as a feedstock to NH<sub>3</sub> production would help decarbonize the fundamental building block of the nitrogen-based fertilizer (“N-fertilizer”) consumed in large quantities across the Northern Great Plains Region (“NGP”).

### **Objectives and Expected Results:**

The proposed PHES Project will support the Clean Sustainable Energy Authority’s (CSEA’s) mission to develop and deploy large-scale commercial projects that reduce environmental impacts and increase the sustainability of energy production. The CSEA loan would provide critical support to the Partner investment in commercial deployment of clean H<sub>2</sub> and NH<sub>3</sub> that can diversify North Dakota’s economy, leverage existing energy resources, create sustainable jobs, and reduce the environmental footprint of energy production and use in the region and beyond.

### **Duration:**

Planned EPC Contract Execution through commercial operations date is estimated May 2026 through December 2028.

### **Total Project Cost:**

About \$1.8B for H<sub>2</sub> and NH<sub>3</sub> production and storage, and \$0.4B for urea production.

### **Participants:**

The Project will be managed and sponsored by the Project Partners. The Project is progressing pre-FID engineering in partnership with the North Dakota Industrial Commission (“NDIC”) through CSEA, Wood Group USA Inc., Black & Veatch, Sargent & Lundy, and ERM. Post-FID, detailed engineering, equipment procurement and construction may rely on work from parties outside the current Project.

## PROJECT DESCRIPTION

### **Objectives:**

The CSEA loan will provide critical investment support to the Project Partners, to construct large-scale facilities and infrastructure to support the Northern Great Plains (“NGP”) agriculture industry. Project objectives meet the Clean Sustainable Energy Authority’s (CSEA) purpose of deploying large-scale projects that reduce the environmental impacts and increase the sustainability of energy production and delivery. Completion of this Project will achieve the necessary next step in building the H<sub>2</sub> and n-fertilizer infrastructure that can help diversify North Dakota’s economy, leverage existing energy resources, and reduce the environmental footprint of energy production and use in the region.

### **Methodology:**

FEED can be categorized into four phases defined as front-end loading (FEL) Levels 1–3 followed by Detailed Engineering and Construction. FEL-1 typically consists of planning and screening studies. FEL-2 consists of feasibility studies and preliminary design. FEL-3 includes a complete system design with sufficient detail to enable a business decision to invest in the project. Detailed Engineering and Construction consists of final engineering design, procurement, and facility construction through start of operations. This proposal requests funds to advance the project after FID (at the conclusion of FEL-3) and through Detailed Engineering and Construction.

### **Expected Results:**

The proposed Project will synergistically balance cost and carbon intensity to fulfill an existing supply deficit, reduce transportation costs from Canadian and Gulf imports, and lower CI by 30-50% compared to conventional NH<sub>3</sub> production. This will ensure market longevity and relies on creative partnerships through financial incentives (grants and low-interest loans) from Federal and State partners.

The value of low-CI products is expected to increase given Scope 3 emissions expectations on consumer products. For example, the benefits of low-CI H<sub>2</sub> as feedstock to N-fertilizer translates to an estimated ~15% reduction in ethanol (EtOH) CI given that the EtOH feedstock used low-CI N-fertilizer. This virtuous cycle could help the NGP region producers further integrate into low-CI liquid fuels markets that use agricultural feedstock. Linkage of customers into the supply chain is anticipated to create a strong market incentive and customer loyalty in a large market. The Project will provide the necessary information for the project sponsors to invest in and execute commercial deployment of clean H<sub>2</sub>, NH<sub>3</sub> and urea production technologies. That investment and subsequent operation would generate clean H<sub>2</sub> and n-fertilizer for use in multiple sectors and enable emerging use cases in North Dakota.

### **Environmental and Economic Impacts:**

Project Partners have initiated permit screening and preliminary consultations associated with the Project. The team has significant experience in successfully permitting high-priority projects. This work is completed by a combination of internal environmental services staff and consultants. Project Partners have experience and expertise working with all applicable federal, tribal, state, and local authorities having jurisdiction (AHJs), and employ the practice of early AHJ engagement. Principles of environmental stewardship, protection, and performance are core to the effective development and operation of assets as well as establishing healthy partnerships with employees, industry partners, Indigenous groups, and regulatory agencies. The Project Partners anticipate taking similar approaches for the PHES Project.

### **Ultimate Economic and Technological Impacts:**

The PHES Project represents a significant economic development opportunity for North Dakota. With equipment, materials, and labor investment of more than \$500 million expected for construction in North Dakota alone, the PHES Project is projected to provide a significant boost in local wages and spending during both the construction process and throughout the life of operations. High-level projections include:

- Creation of hundreds of megawatts of new electrical demand from low-carbon or renewable sources to support clean H<sub>2</sub> production via electrolysis.
- Reduction of 1,770 tpd (about 650,000 tpy) of industrial CO<sub>2</sub> emissions.
- Additional transportation needs, supply chain demand, and secondary jobs created by increased local spending.
- Millions annually in local tax revenue over the life of the project.
- Tens of millions of dollars in new economic activity in North Dakota, including construction and operations wages, landowner payments, and new local tax revenue, creating stable revenue to fund local schools and other taxing bodies.

PHES partnered with the ND State University (“NDSU”) Agriculture Department to perform an analysis of the induced direct economic benefits of the Project (modeled for 2025). The analysis indicates that upon start-up of Operations, the H<sub>2</sub> and NH<sub>3</sub> production facility would result in 75 direct well-paying jobs, with expected gross annual employee compensation of \$12.5 million (wages, salary, bonus, benefits, payroll taxes). Further, the taxable value of the H<sub>2</sub> and NH<sub>3</sub> production facility is estimated to be \$210 million, representing a 5% increase in Stark County’s taxable valuation (against the current 7-year average).

PHES Partners have robust selection processes for securing contractors and evaluate them on safety performance, diversity metrics, historical performance, and other criteria. The value of retaining a well-trained staff to maintain a long-term workforce by providing quality jobs and investing in their employees is recognized. PHES Partners each benchmark their salary and benefits packages annually to confirm they are offering competitive pay packages for recruitment and retention efforts. They invest significantly in their employees through continued education, training, retraining, and professional skill development, and plan to require contractors to ensure their laborers and mechanics are paid prevailing wages, as defined in the Davis–Bacon Act, and required by the Inflation Reduction Act of 2022 (IRA). PHES Partners will collaborate with their contractors to meet or exceed IRA apprenticeship requirements.

At the state level, benefits of the Project are twofold. First, the Project is supportive of multiple sectors of the ND economy and not narrowly focused on decarbonization. The products to be generated by the Project (low-CI H<sub>2</sub> and NH<sub>3</sub>) have clear pathways to market today (industrial and agricultural sectors) and growth prospects going forward (energy and transportation sectors). The Project will help to proliferate and strengthen ND’s dominant economic sectors (e.g., energy, agriculture, etc.) by offering resilience to N-fertilizer supply shortages from out of state through use of energy generated from within. Local production provides a competitive advantage to a remote fertilizer manufacturer by offering insulation from drastic price swings and transportation disruptions. Second, the successful buildout of the Project will provide Stark and potential surrounding Counties with a first mover advantage as the clean H<sub>2</sub> economy continues to grow. As the U.S. economy appears to move towards carbon neutrality and associated economic development, clean H<sub>2</sub> and NH<sub>3</sub> production are set to play leading roles.

The ultimate technological impacts include:

- Production of 200 tpd of clean H<sub>2</sub> and up to ~1,150 tpd of clean NH<sub>3</sub> production capacity.
- Commercial deployment of clean H<sub>2</sub> technology based on innovative ATR/electrolysis integration.
- Geologic storage for gaseous H<sub>2</sub>, truck- and rail-loading facilities, and H<sub>2</sub> pipeline to deliver H<sub>2</sub> to market. An underground salt cavern will provide long-duration H<sub>2</sub> storage to ensure reliable supply for large industrial users.
- Geologic sequestration of CO<sub>2</sub> from H<sub>2</sub> production (ATR) and other sources in the surrounding area, enabling decarbonization of facilities beyond the scope of the PHES Project.

### **Why the Project Is Needed:**

The proposed project is needed to catalyze meaningful investment in new, clean H<sub>2</sub> energy technology that can diversify North Dakota’s economy, leverage and expand use of North Dakota’s vast resources, materially reduce the CI of the state’s economy, and address regional supply gaps for n-fertilizer. Clean H<sub>2</sub> supports Governor Burgum’s goal for North Dakota to become carbon-neutral by 2030, and DOE has declared clean H<sub>2</sub> crucial to achieving President Biden’s goals of a 100% clean electrical grid by 2035 and net-zero carbon emissions by 2050.

### **STANDARDS OF SUCCESS**

Successful commercial deployment of clean H<sub>2</sub> energy and N-fertilizer production technology in North Dakota, resulting in economic and environmental benefits consistent with CSEA goals and enumerated in the previous section “Ultimate Economic and Technological Impacts.”

### **BACKGROUND/QUALIFICATIONS**

MPC is a subsidiary of Marathon Petroleum Corporation, a leading integrated downstream energy company headquartered in Findlay, Ohio and operating the nation’s largest refining system, including refineries in Mandan, North Dakota, and Saint Paul, Minnesota, as well as a renewable fuels facility in Dickinson, North Dakota. Marathon Petroleum Corporation is also the general partner and majority limited partner of MPLX LP (MPLX), a midstream company that owns and operates gathering, processing, and fractionation assets and crude oil and product logistics infrastructure. MPC and MPLX have extensive management experience and an engineering team of 100 professionals assembled on a project-by-project basis to meet the specific needs relative to project controls, environment and safety, and design. Since 2012, MPC has managed over \$2B in large capital growth projects consisting of new pipeline construction, cavern development, tank farm expansions, and dock expansions.

TCE is a wholly owned subsidiary of TC Energy Corporation, a company with over 70 years of experience and a leader in the responsible development and reliable operation of North American energy infrastructure, including NG pipelines (57,900 miles, 25% of North American NG pipelines), liquid pipelines (3,000-mile network), power generation (4,200 MW), and gas storage facilities (653 Bcf). TC Energy’s assets will be utilized to lower the cost and increase the speed of H<sub>2</sub> delivery. TC Energy employs over 4,400 highly skilled engineers, developers, scientists, and project managers who have been transforming the energy landscape across North America. TC Energy’s U.S. power and emissions commercial trading and marketing business provides customers with various physical and financial products, with a measured approach to risk management and a focus on financial discipline, compliance, and operational excellence. TC Energy is in the process of decarbonizing its midstream network through securing renewable energy projects. Additionally, TC Energy has entered into joint development agreements for the development of H<sub>2</sub> hubs across North America. On CCS, TC Energy has partnered to develop Project Tundra which will capture and sequester up to 4 million TPY of CO<sub>2</sub> produced from the Milton R. Young Station.

### **MANAGEMENT**

Project Partners have corporate management and operational strategies unique to the organization and business. Nonetheless, all possess core elements that drive toward successful project execution, budget, and schedule compliance. PHES Partner management and operating practices and operational performance are continuously scrutinized by shareholders, industry analysts, and government regulators, and their management systems, tools, and trained personnel provide consistent planning, management of capital, operations and maintenance, plant improvement/optimization projects, community engagement, environmental stewardship; successful delivery of new assets; and project development for a variety of energy projects that include traditional and emerging technologies.

Qualifications of Key Personnel can be found in Appendix D-Qualifications of Key Personnel.

Project Partners have management systems, tools, and trained personnel to provide consistent planning and management of capital, operations and maintenance (O&M), plant improvement/optimization projects, community engagement, and environmental stewardship; successful delivery of new assets;

and project development for a variety of energy projects that include traditional and emerging technologies and full supply chain from energy generation through use.

#### **TIMETABLE**

**Project Schedule:** Long-lead material order as soon as February 2025, and EPC Contract Execution through commercial operations date estimated May 2026 through December 2028, respectively.

#### **BUDGET**

About \$1.8B for H<sub>2</sub> and NH<sub>3</sub> production and \$0.4B for urea production will be subsidized with a \$125,000,000 forgivable loan from CSEA (being sought in this application), and the remainder in cash from Project Partners is anticipated during the detailed engineering and construction phase under consideration for this loan opportunity. Potential additional grant support from State and Federal Sources is pending at the time of application. Nonetheless, a leverage ratio in excess of 8x for the CSEA loan in question would be maintained.

The PHES Partners have a strong track record of living up to its fiduciary duty to manage the capital of its stakeholders. The PHES Project strategic advantage is the participation of two of the largest infrastructure companies operating in North Dakota and in North America. The capital barrier to entry into emerging technologies is significant, as demonstrated by the cost estimate above; however, it represents a massive investment on behalf of the proponents, over and above the proposed grant value. MPLX and TC Energy are dedicated to innovation and to bringing carbon reduction services to industry, but there is still significant risk involved in being a first mover. Government incentives such as the 45Q tax credit, grants and low-interest loans are imperative to commercializing these emerging technologies. The financial investment being sought from the CSEA will help ensure Project success contingent on FID by the PHES Partners.

#### **TAX LIABILITY**

The signed Tax Liability form is contained in Appendix H.

#### **CONFIDENTIAL INFORMATION**

This proposal contains confidential information. A confidential request form is provided in Appendix A. Additional confidential information is contained in Appendixes A, B, E, F, G and I.

#### **PATENTS/RIGHTS TO TECHNICAL DATA**

Project design (currently undergoing pre-FEED and long-lead development) will rely on technology licensors to provide the core process equipment along with rights to use of IP required to design, build, operate, and maintain the equipment. The project will not seek to develop any new IP. Patented processes could be anticipated for CH<sub>4</sub> Reforming; Air Separation Unit (ASU); Pressure Swing Adsorption (PSA); CO<sub>2</sub> Capture; Oxygen compression and dehydration; Electrolysis, and NH<sub>3</sub> synthesis.

#### **STATE PROGRAMS AND INCENTIVES (PHES)**

Pending and awarded State support to the applicant is listed in Appendix B.

**APPENDIX C**  
**LETTERS OF SUPPORT**





October 7, 2023

North Dakota Industrial Commission  
Attn: Clean Sustainable Energy Authority  
State Capitol – 14<sup>th</sup> Floor  
600 E. Boulevard Ave. Dept. 405  
Bismarck, ND, 58503-0804  
Email:Sustainableenergy@nd.gov

Subject: Proposed Prairie Horizon Energy Solutions Clean H<sub>2</sub> and Ammonia Project

Dear Executive Director Al Anderson and the Clean Sustainable Energy Authority

TC Energy Development Holdings Inc. (together with its affiliates, TC Energy) and MPC Investment LLC (MPC) form the core of **Prairie Horizon Energy Solutions LLC (PHES)**. TC Energy and MPC will be collaborating within PHES to support development of a new potential clean hydrogen and ammonia production facility in Stark County, North Dakota (the Project), and are pleased to jointly submit this proposal to secure funding from the Agriculture Diversification and Development Fund as established in House Bill No. 1276 and Senate Bill 2015.

Over the past year, TC Energy and MPC have collaborated through PHES to perform front-end engineering work on the Project. In partnership with the Energy & Environmental Research Center (EERC) and the state of North Dakota's Clean Sustainable Energy Authority (CSEA) the project development was kickstarted with \$14.29 MM partner investment and \$10MM CSEA funds. The Project will include clean hydrogen production powered by renewable electricity and renewable natural gas paired with carbon capture and sequestration technology. The Project plans to initially produce 200 metric tons per day (TPD) of clean hydrogen for industrial use within renewable liquid fuel manufacturing, newly constructed ammonia fertilizer manufacture, and blending to decarbonize natural gas. Both renewable diesel and ammonia manufacture represent hydrogen offtake occurring within the project and being both producer and consumer of hydrogen will increase the likelihood of commercial success. Through these investments, PHES is positioned to successfully execute the proposed infrastructure development with an expectation to achieve full facility operations in 2028.

PHES is seeking \$125M in available loan funds from the CSEA through the Bank of North Dakota to support portions of forthcoming equipment procurement and construction. The financial investment being sought from the CSEA will help ensure project success contingent on a Final Investment Decision ("FID") by the PHES partners.

TC Energy and MPC have established commitments to the communities in which they operate and see CSEA investment in the Project as a catalyst to expand the benefits, quality jobs, economic expansion, and growth in diversity, equity, inclusion, and accessibility (DEIA) to the communities of western North Dakota. TC Energy and MPC have a long and successful history developing, constructing, and operating large energy infrastructure projects:

**TC Energy**

TC Energy has over 70 years of experience and is a leader in the responsible development and reliable operation of North American energy infrastructure, including NG pipelines (57,900 miles, 25% of North American NG pipelines), liquid pipelines (3,000-mile network), power generation (4,200 MW), and gas storage facilities (653 Bcf). TC Energy's assets will be utilized to lower the cost and increase the speed of H2 delivery. TC Energy employs over 4,400 highly skilled engineers, developers, scientists, and project managers who have been transforming the energy landscape across North America. TC Energy's U.S. power and emissions commercial trading and marketing business provides customers with various physical and financial products, with a measured approach to risk management and a focus on financial discipline, compliance, and operational excellence. TC Energy is in the process of decarbonizing its midstream network through securing renewable energy projects. Additionally, TC Energy has entered into joint development agreements for the development of H2 hubs across North America. On CCS, TC Energy has partnered to develop Project Tundra which will capture and sequester up to 4 million TPY of CO2 produced from the Milton R. Young Station.

**MPC**

MPC is a subsidiary of Marathon Petroleum Corporation, a leading integrated downstream energy company headquartered in Findlay, Ohio and operating the nation's largest refining system, including refineries in Mandan, North Dakota, and Saint Paul, Minnesota, as well as a renewable fuels facility in Dickinson, North Dakota. Marathon Petroleum Corporation is also the general partner and majority limited partner of MPLX LP (MPLX), a midstream company that owns and operates gathering, processing, and fractionation assets and crude oil and product logistics infrastructure. MPC and MPLX have extensive management experience and an engineering team of 100 professionals assembled on a project-by-project basis to meet the specific needs relative to project controls, environment and safety, and design. Since 2012, MPC has managed over \$2B in large capital growth projects consisting of new pipeline construction, cavern development, tank farm expansions, and dock expansions.

Prairie Horizon Energy Solutions LLC and its partners look forward to being a valuable partner to the CSEA in the development of this Project and improving the prosperity of the State of North Dakota.

Sincerely,

*Omar Khayum*

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Omar Khayum  
President  
TC Energy Development Holdings Inc.

October 05, 2023

North Dakota Industrial Commission  
Attn: Clean Sustainable Energy Authority  
State Capitol – 14<sup>th</sup> Floor  
600 E. Boulevard Ave. Dept. 405  
Bismarck, ND, 58503-0804  
Email:Sustainableenergy@nd.gov

Subject: Proposed Prairie Horizon Energy Solutions Clean H<sub>2</sub> and Ammonia Project

Dear Executive Director Al Anderson and the Clean Sustainable Energy Authority

Sumitomo Corporation of Americas, a New York Corporation (SCOA), is pleased to participate in the proposal submitted by Prairie Horizon Energy Solutions LLC (“PHES”) to secure funding from the Agriculture Diversification and Development Fund as established in House Bill No. 1276 and Senate Bill 2015 to construct a hydrogen and ammonia production facility in North Dakota.

Sumitomo Corporation, the parent company of SCOA, aims to reach carbon neutrality in 2050 through developing technologies and business models for creating a sustainable energy cycle by reducing CO<sub>2</sub> emissions and achieving negative emissions for society as-a-whole. In August 2022, SCOA entered a MOU with the State of North Dakota with the intention of accelerating the progress towards carbon neutrality of the state and wider societies. ND Department of Commerce has highly valued SCOA’s active engagement in various, on-going de-carbonization projects and, in Nov 2022, they introduced SCOA to the PHES partners with the intention to participate as a partner in the proposed Heartland Hydrogen Hub (an applicant to the U.S. Department of Energy Office of Clean Energy Demonstration Funding Opportunity Announcement DE-FOA-0002779 to establish regional clean hydrogen hubs).

Leveraging broad industry coverage and diverse business experience, SCOA is taking a leading role in creating low CO<sub>2</sub> H<sub>2</sub> demand that is the fundamental challenge for inland states and requires long-term, committed, persistent efforts. Over the last few months, SCOA has retained market, engineering & tax consultants to understand the feasibility of producing & marketing lower carbon intensity fertilizer from low CI H<sub>2</sub> in the Northern Great Plains region. In addition, SCOA intends to collaborate with potentially “stranded” ethanol producers with hart to abate sources of biogenic CO<sub>2</sub> to produce urea fertilizer. This provides a platform to decarbonize ethanol businesses and create a circularity in the agricultural industry.

SCOA is committed to the communities in which we operate and envision Clean Sustainable Energy Authority investment in PHES project as a catalyst to expand the benefits, quality jobs,

economic expansion, and growth in diversity, equity, inclusion, and accessibility (DEIA) to the communities across the state.

We are committed to the development and operation of the hydrogen and ammonia production facility being developed by PHES through collaborative partnerships and through low CI H<sub>2</sub>, ammonia, fertilizer production & distribution, subject to the feasibility assessment, terms and conditions and our management approval.

SCOA, through its 400 year group history, has embraced and demonstrated the business philosophy that stresses the need for an enterprising spirit to stay a step ahead in dealing with change, while ascribing importance to maintaining integrity and sound management, avoiding easy gains, and working for the public interest, without being misled by short-term immediate changes. The energy transition challenge is the fundamental one, with which we are now faced with in our 400 year group history. We are confident that our participation could bring great value to the project.

We look forward to working with Prairie Horizon Energy Solutions LLC and the team on this exciting opportunity.

Sincerely,

A handwritten signature in black ink, appearing to read 'Shinichi Hasegawa', with a stylized flourish at the end.

Shinichi Hasegawa  
Senior Vice President  
General Manager, Energy Innovation Initiative Americas



# ADMINISTRATION

October 16, 2023

Mr. Al Anderson  
Director  
Clean Sustainable Energy Authority  
North Dakota Industrial Commission  
State Capitol – 14th Floor  
600 East Boulevard Avenue, Dept. 405  
Bismarck, ND 58505-0840

Dear Mr. Anderson:

Subject: Prairie Horizon Hydrogen Fertilizer Development Incentive Program Loan Application

On behalf of the community of Dickinson, ND, this letter expresses our support for the proposal submitted by Prairie Horizon Hydrogen LLC to secure funding from the North Dakota Industrial Commission Fertilizer Development Incentive Program Loan Application to develop a fertilizer facility in Dickinson, North Dakota.

We believe Prairie Horizon Hydrogen's proposed fertilizer facility would provide jobs for many and increase the growth of infrastructure within our community. Through a number of productive conversations, the City of Dickinson has advised TC on the City of Dickinson's extra-territorial zone, potential designated setbacks, and anticipated water usage. I appreciate TC Energy taking the time to include the City of Dickinson in these discussions. We look forward to accommodating a new workforce, children in our schools, and businesses that Prairie Horizon Hydrogen's fertilizer facility would bring to our community and others nearby.

We look forward to working with Prairie Horizon Hydrogen LLC and the team on this exciting effort.

Sincerely,

A handwritten signature in black ink, appearing to read "Dustin Dassinger", is written over a white background.

Dustin Dassinger  
City Administrator  
Dickinson, ND





October 16, 2023

To Whom It May Concern:

Subject: Prairie Horizon Hydrogen Fertilizer Project

On behalf of the Greater North Dakota Chamber (GNDC), this letter expresses our support for the project proposed by Prairie Horizon Hydrogen LLC to develop a fertilizer facility in Dickinson, North Dakota.

As North Dakota's oldest and largest business advocacy organization, GNDC is supportive of Prairie Horizon Hydrogen LLC's innovative approach to addressing North Dakota's energy needs. Further, GNDC is pleased to continue its support of Prairie Horizon Hydrogen member company TC Energy.

As a Cornerstone Member of the GNDC, TC Energy plays an essential role in the development of North Dakota's economy and is seen as a leader within the statewide business community. We believe Prairie Horizon Hydrogen's proposed North Dakota fertilizer facility, being developed by TC Energy and its partners, will provide jobs for many in the local community and will ultimately lead to further economic development across North Dakota.

We look forward to working with Prairie Horizon Hydrogen LLC and the team on this exciting effort.

Sincerely,

A handwritten signature in blue ink, appearing to read "Arik Spencer", with a long, sweeping underline that extends to the right.

Arik Spencer  
President & CEO  
Greater North Dakota Chamber  
arik@ndchamber.com



NORTH DAKOTA  
PETROLEUM  
COUNCIL

100 West Broadway, Ste. 200 | P.O. Box 1395 | Bismarck, ND 58501-1395  
701.223.6380 | ndpc@ndoil.org | www.NDOil.org

October 3, 2023

Mr. Al Anderson  
Director  
Clean Sustainable Energy Authority  
North Dakota Industrial Commission  
State Capitol – 14th Floor  
600 East Boulevard Avenue, Dept. 405  
Bismarck, ND 58505-0840

Dear Mr. Anderson:

Subject: Prairie Horizon Hydrogen Fertilizer Development Incentive Program Loan Application

On behalf of the North Dakota Petroleum Council (NDPC), this letter expresses our support for the proposal submitted by Prairie Horizon Hydrogen LLC to secure funding from the North Dakota Industrial Commission Fertilizer Development Incentive Program Loan Application to develop a fertilizer facility in Dickinson, North Dakota.

The North Dakota Petroleum Council is the primary voice of the oil and gas industry in North Dakota and advocates for enhancement and development across the entire oil and gas value chain. As such, we are supportive of Prairie Horizon Hydrogen's innovative approach to addressing North Dakota's energy needs. The region's favorable geology, strong infrastructure, and abundant fossil energy resources, coupled with significant carbon capture and storage potential, are attributes that make the proposed project one that NDPC encourages the North Dakota Industrial Commission to fund.

We look forward to working with Prairie Horizon Hydrogen LLC and the team on this exciting effort.

Sincerely,

Ron Ness  
President  
North Dakota Petroleum Council

Tuesday, October 3, 2023

Mr. Al Anderson  
Director  
Clean Sustainable Energy Authority  
North Dakota Industrial Commission  
State Capitol – 14th Floor  
600 East Boulevard Avenue, Dept. 405  
Bismarck, ND 58505-0840

Dear Mr. Anderson:

Subject: Prairie Horizon Hydrogen Fertilizer Development Incentive Program Loan Application

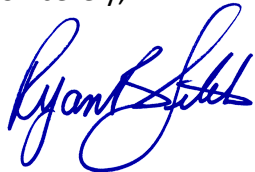
On behalf of Stark Development Corporation this letter expresses our support for the proposal submitted by Prairie Horizon Hydrogen LLC to secure funding from the North Dakota Industrial Commission Fertilizer Development Incentive Program Loan Application to develop a fertilizer facility in Dickinson, North Dakota.

As the economic development organization serving Dickinson and Stark County North Dakota, Stark Development is supportive of the proposed Prairie Horizon Hydrogen's proposed fertilizer facility. Stark Development Corporation works to promote economic development, innovation, and entrepreneurship, continuing to making Southwest North Dakota a great place to live. Further, Stark Development is supportive of Prairie Horizon Hydrogen LLC's innovative approach to addressing the energy needs of Stark County and the State of North Dakota.

Stark Development Corporation works closely with all sectors of industry and sees growing interest in low-carbon energy projects that can result in new industry opportunities. We look forward to accommodating a new workforce, children in our schools, and businesses that the Prairie Horizon Hydrogen and fertilizer facility would bring to our community and others nearby.

We look forward to working with Prairie Horizon Hydrogen LLC and the team on this exciting effort.

Sincerely,



Ryan Jilek, Executive Vice President  
Stark Development Corporation





**Plug Power**  
968 Albany Shaker Road  
Latham, NY 12110

October 5, 2023

North Dakota Industrial Commission  
Attn: Clean Sustainable Energy Authority  
State Capitol – 14<sup>th</sup> Floor  
600 E. Boulevard Ave. Dept. 405  
Bismarck, ND, 58503-0804  
Email: [SustainableEnergy@nd.gov](mailto:SustainableEnergy@nd.gov)

Subject: Proposed Prairie Horizon Energy Solutions Clean H<sub>2</sub> and Ammonia Project

Dear Executive Director Al Anderson and the Clean Sustainable Energy Authority:

On behalf of Plug Power Inc. (“Plug”), I am writing in support of the partnership between TC Energy Development Holdings Inc. & Marathon Petroleum Corporation through Prairie Horizon Energy Solutions LLC (“PHES”) and their proposal to secure funding from the Agriculture Diversification and Development Fund as established in House Bill No. 1276 and Senate Bill 2015 to construct the above-referenced hydrogen and ammonia production facility in North Dakota.

Plug (NASDAQ: PLUG) is the vertically integrated hydrogen leader with decades of innovation and experience in PEM electrolysis and fuel cells. With over 25,000 PEM electrolyzer stacks deployed and operating worldwide, we have built a global reputation for reliability and excellence serving commercial, industrial, and utility customers, including Amazon, Uniper, Walmart, GALP, Phillips 66, MOL Group, and Hydro Havrand. Our success serving the oil & gas sector including refiners is indicative of the value we deliver and risk we reduce for our partners. Together with the PHES consortium, we passionately believe in hydrogen as an important alternative to various traditional and carbon-intensive industrial fuels, chemical feedstocks, and commercial vehicles fuels.

Plug is pleased to offer our technical and industry experience to assist PHES through their design phase with our Basic Engineering & Design Package, and if the proposal is selected for award, Plug is ready to commit to supporting TC Energy and its partners as a vendor so that they may perform the work described in the application.

To our understanding, the proposed project will develop a strong hydrogen and fertilizer production facility to meet clean energy, transportation, and agricultural needs from multiple energy sources using innovative technologies to accelerate a clean energy portfolio and strengthen national energy security. These attributes make the proposed project one Plug encourages the CSEA through the Bank of North Dakota to fund.

We look forward to working with PHES and the team on this exciting opportunity. Please feel free to contact me at [kstrickland@plugpower.com](mailto:kstrickland@plugpower.com) if you would like additional information.

Sincerely,

*Kenneth Strickland*

Kenneth Strickland  
Vice President, Electrolyzer Sales - Americas



October 9<sup>th</sup>, 2023

North Dakota Industrial Commission  
Attn: Clean Sustainable Energy Authority  
State Capitol – 14th Floor  
600 E. Boulevard Ave. Dept. 405  
Bismarck, ND, 58503-0804

Subject: Proposed Prairie Horizon Energy Solutions Clean H2 and Ammonia Project

Dear Executive Director Al Anderson and the Clean Sustainable Energy Authority

On behalf of Accelerera by Cummins, I am writing in support of the partnership between TC Energy Development Holdings Inc. & Marathon Petroleum Corporation through Prairie Horizon Energy Solutions LLC and their proposal to secure funding from the Agriculture Diversification and Development Fund as established in House Bill No. 1276 and Senate Bill 2015 to construct a hydrogen and ammonia production facility in North Dakota.

Accelerera by Cummins is the new brand for Cummins' New Power business segment, launched March 8, 2023. Accelerera is an energy technology leader committed to securing a sustainable future for the industries that keep the world running. A diverse portfolio of zero-emissions solutions includes battery systems, fuel cells, ePowertrain systems and electrolyzers.

The proposed project will develop a strong hydrogen and fertilizer production facility to meet clean energy, transportation, and agricultural needs from multiple energy sources using innovative technologies to accelerate a clean energy portfolio and strengthen national energy security. These attributes make the proposed project one Accelerera encourages the CSEA through the Bank of North Dakota to fund.

We look forward to working with Prairie Horizon Energy Solutions LLC and the team on this exciting opportunity. Please feel free to contact me if you would like further background or any additional information.

Sincerely,

**Alex Savelli**

Managing Director - Americas for Hydrogen Technologies

☎ [+1 612 430 3794](tel:+16124303794)

✉ [alex.savelli@cummins.com](mailto:alex.savelli@cummins.com)

[LinkedIn](#) [Twitter](#) [Instagram](#) accelerate the shift™

3850 North Victoria Street  
Shoreview, MN 55126 USA

October 2, 2023

Justin Gutknecht  
Director | Energy Origination and Development  
TC Energy

RE: Proposed Prairie Horizon Energy Solutions Clean H2 and Ammonia Project

Dear Justin:

Black & Veatch is pleased to provide this Expression of Support and participate in the proposal submitted by Prairie Horizon Energy Solutions LLC (“PHES”) to secure funding from the Agriculture Diversification and Development Fund as established in House Bill No. 1276 and Senate Bill 2015 to construct a hydrogen and ammonia production facility in North Dakota.

We are interested in collaborating with TC Energy, Marathon, and the hub stakeholders on the Engineering, Procurement, and Construction (EPC) scope for the project.

Black & Veatch is a market leader in hydrogen engineering and construction, with more than 365MW of electrolysis projects in construction and more than 80 years’ experience in hydrogen and ammonia. We are committed to advancing implementation of hydrogen production, storage, transportation, and utilization with upmost safety through our decades of lessons learned. As an executive member of the Center of Hydrogen Safety, we are collaborating across many industrial partners to implement our lessons learned across projects such as the one proposed by PHES.

It is our pleasure to provide this Expression of Support regarding such a future collaboration that would benefit PHES and Black & Veatch. We understand any future commercial arrangements would be subject to the completion of all necessary due diligence, satisfactory documentation, and our management’s approval. Please note that this Expression of Support does NOT constitute or create any legally binding or enforceable obligation for TC Energy, Marathon, PHES, or Black & Veatch.

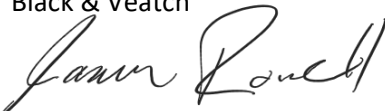
The proposed project will develop a strong hydrogen and fertilizer production facility to meet clean energy, transportation, and agricultural needs from multiple energy sources using innovative technologies to accelerate a clean energy portfolio and strengthen national energy security. These attributes make the proposed project one Black & Veatch encourages the Clean Sustainable Energy Authority through the Bank of North Dakota to fund.

We look forward to working with Prairie Horizon Energy Solutions LLC and the team on this exciting opportunity.

Please contact me if you have any questions on our support of the project.

Very truly yours,

Black & Veatch



Jason Rowell  
Vice President, Sustainable Process Portfolio Leader

**APPENDIX D**

**QUALIFICATIONS OF KEY PERSONNEL**



Key Personnel Name	Company	Title	Position/Role
Zack Thobe	MPC	Business Development Representative	Business Development and Management
Justin Gutknecht	TCE	Director, Energy Origination & Development	Business Development and Management
Andrew Isherwood	TCE	Director, Energy Origination & Development	Business Development and Management
Jake Chenevey	MPC	Project Manager, Logistics & Storage Support Services - Major Projects	EPC Implementation Risk Analysis/Mitigation
Joseph Brisebois	TCE	Senior Developer	Development
Dr. Prashanth Mandalaparty	TCE	Senior Reservoir Engineer	EPC Implementation
Jason Martin	TCE	Manager, Storage Program Support	EPC Implementation
Chad Guthrie	MPC	Project Engineer	Pipeline and EPC Implementation
Ryan Dick	MPC	Project Engineer	Pipeline and EPC Implementation
Brian Adams	MPC	Senior Project Engineer	Pipeline and EPC Implementation
Colin Daly	TCE	Senior Originator	Development
Lisa Leland	TCE	Senior Manager, Energy Origination & Development	Technical Data/Analysis
Tayla Snapp	TCE	State Government & Community Relations Specialist	Community Engagement
Jean Gould	MPC	Stakeholder and Issues Management Advisor	Community Engagement

## ZACHARY D. THOBE

BUSINESS DEVELOPMENT – MARATHON PETROLEUM COMPANY LP  
(419) 429-2588, zdthobe@marathonpetroleum.com

### LIBERTY PRINCIPAL INVESTIGATOR

#### EDUCATION AND TRAINING

Master of Business Administration, Bowling Green State University, December 2014

Bachelor of Mechanical Engineering, The Ohio State University, June 2012

#### PROFESSIONAL EXPERIENCE

Mr. Thobe has over a decade of experience in the energy industry. In 2012, Mr. Thobe joined Marathon Petroleum Company (MPC) as a Project Engineer where he developed and managed long-haul pipeline system integrity projects throughout the United States. This role included multiple technology inspections through in-line inspection tools and any in-field rehabilitation scope that followed. Following this role, he supported the Company's Major Capital Projects organization by developing new pipeline systems and expansions of existing systems. In this role, Mr. Thobe had the unique opportunity to support a portfolio of projects from concept to close-out. Through this four-year tenure, he was able to effectively accomplish key technical aspects as well as manage several hundred contract employees throughout field implementation. After his experience within the Engineering organization, Mr. Thobe transitioned to the Commercial organization within the Logistics and Storage business segment where he originated, managed, and sought approval of growth projects across MPC's crude oil business. Mr. Thobe now supports MPC's Renewable and Emerging Technology organization within the Business Development unit. Given his experience and successful track-record developing and managing major capital projects as well as his financial acumen, Mr. Thobe is well equipped to support the project as the **Liberty Principal Investigator**.

#### PROFESSIONAL HISTORY

- In his Commercial role, Mr. Thobe managed a portfolio reflecting **several hundred million** in earnings before interest, taxes, depreciation, and amortization (EBITDA) and he consistently grew many assets at 30 percent or higher compound annual growth rate (CAGR).
- Mr. Thobe has developed and managed projects across various energy commodities including; crude oil, natural gas, liquified petroleum gas, butane, condensate, diesel, gasoline, propylene, ammonia, carbon dioxide, and hydrogen and through various transportation modes, pipeline, rail, marine, and truck. He has designed pressure spheres and commercially justified new above ground storage tanks for crude oil storage.

- Within his Major Capital Projects engineering role, Mr. Thobe pioneered the engineering development of a portfolio which consisted of a collection of new pipeline systems and expansions of existing systems with an objective of becoming the pipeline transportation solution for shale producers and customers – **\$400 million portfolio**.
- Mr. Thobe developed and led a charity event raising over \$50,000 which was donated across four counties in Ohio; giving back to communities in which the projects were implemented and the company operates the new assets.
- **Ohio, United States, New Pipeline Construction and Completion**
  - Mr. Thobe led three years of engineering development and management of the project. He worked closely with company stakeholders and external partners to develop pipeline routing to achieve long term operations, right-of-way acquisition, project quality plan, and obtain necessary federal and state environmental and regulatory permits.
  - He thoroughly evaluated contracts for the mainline construction scope offering a \$20 MM cost savings opportunity to the company.
  - Mr. Thobe successfully managed 12-months of project construction with a diverse team of over 450 resources across a 50-mile pipeline alignment.
  - The project achieved a best-in-class weld repair percentage of 0.7 percent on over 5,300 welds and zero construction anomalies during construction over the alignment marking high in quality and outperforming industry standards.
  - The project accomplished an accelerated pipeline connectivity scope.
  - Mr. Thobe directed a **\$300 million project** and achieved completion ahead of schedule and on budget; while maintaining a solid safety record.
- **Ohio, United States, Major Pipeline Expansion**
  - Mr. Thobe worked closely with company stakeholders to evaluate pipeline risks by developing and executing a pipeline removal project purposed to implement cyclic and pressure testing. The results were used to inform stakeholders and ultimately to validate operating pressures early within the project development cycle. The outcome further justified the project and prevented inefficiently carrying multiple scoping options into late-stage engineering development.
  - Mr. Thobe developed complete replacement scope for seven miles of line pipe and a mainline hydrostatic test of a 100-mile system. The outcome increased the maximum operating pressure (MOP) by two times allowing for more commodity throughputs.
  - Successfully implemented the project over 11-months of construction including 90-days of system downtime.
  - Mr. Thobe effectively managed a **\$100 million project** and achieved completion on schedule; and maintained a solid safety record. The project's budget was impacted by the hydrostatic scope, but Mr. Thobe proactively managed internal and external requirements.

- **Gulf Coast, United States, Major Pipeline System Decommissioning**
  - Mr. Thobe established a novel technical scope to nitrogen purge/ displace and decommission a 750-mile pipeline system originating in Texas and terminating in Illinois.
  - Mr. Thobe managed the execution of Phase I and II which displaced over 440 miles of pipe; 1.50 MMbbls of product utilizing over 175 MMscf of nitrogen; the company's largest of similar scope. Based on the systems pressure profile, the nitrogen displacement occurred by creating multiple injection sites across the system.
  - Collaborated with company stakeholders and third-party joint owner to convey technical information as well as cost and schedule updates which aided in making informed decisions.
  - Mr. Thobe lucratively managed the **\$20 million** project.



**Justin Gutknecht**  
Director, Energy Origination and Development  
TC Energy  
180 N LaSalle Street, Suite 3030, Chicago, IL 60601  
(312) 576-8004, Justin\_Gutknecht@tcenergy.com

### ***Education and Training***

**The University of Chicago Booth School of Business** 2014 – 2017  
Master of Business Administration (M.B.A.), Accounting, Finance and Strategy, Graduated with Honors

**University of Illinois at Urbana-Champaign** 2001 – 2004  
Bachelor of Science in Finance

#### Designations

- Chartered Financial Analyst (CFA) Charterholder, 2013 – Current
- CFA Society of Chicago, 2013 – Current

### ***Research and Professional Experience***

**TC Energy** 2021 - Current

#### Director, Energy Origination and Development

- Manage TCE Energy’s origination and development of utility scale renewable power projects and low carbon hydrogen production projects in the United States
- Identify new customers and joint venture partnership opportunities and develop and commercialize new trading products to grow TC Energy’s commodity marketing business
- Manage project development activities, including but not limited to site origination, due diligence, permitting and project management, for new energy projects
- Lead negotiations with clients and internal support staff such as legal, risk, credit and other teams

**Annova LNG** 2017 - 2021

#### Senior Vice President, Finance and Development

- Manage the proposed project finance structure consisting of \$3.9 billion of non-recourse debt and \$1.3 billion of equity including the preparation of financial models and presentation materials for the Board of Directors
- Lead due diligence, development and execution efforts in multi-phase equity financings with joint venture partners, including Enbridge Inc., Black & Veatch Corporation and Kiewit Corporation
- Assist outside counsel with developing and negotiating the commercial terms of financing term sheets, letters of interest, commitment letters and definitive equity sales agreements, Sales and Purchase Agreements (SPAs), Pipeline Precedent Agreement, and Engineering, Procurement and Construction (EPC) contracts
- Supervise the financial advisor, coordinating lead debt arranger, and insurance advisor engagements to support the bankability of terms and conditions of various project contracts and provide general structuring advice
- Support Origination for pricing, technical and legal aspects of structuring LNG transactions, assist in LNG marketing, and coordinate customer due diligence for prospective LNG supply and co-investment opportunities

**Exelon Corporation**

2015 - 2017

Manager, Generation Development Analytics

- Supported the financial evaluation and development of new power generation assets (gas, wind, solar, and storage) related to external acquisitions and organic development
- Led project management and transaction execution support for the acquisition of 198 MW Bluestem Wind Energy, a \$300+ million wind facility in Beaver County, Oklahoma
- Expanded the pipeline of Energy Storage to over 120 MW of projects and managed development activities such as site control, permitting, interconnection, engineering, vendor partnerships, technology evaluation, and offtake

**Evraz North America**

2011 - 2015

Manager, Financial Planning and Analysis

- Supervised on-site mill financial managers in monthly forecasting and annual budget processes and consolidated the financial results of the Tubular Product Division
- Obtained approvals for \$200 million of capital investment projects and provided technical financial support and recommendations on the evaluation of potential alliances, acquisitions, capital investments and other issues affecting operations

**Telephone and Data Systems Inc.**

2004 - 2011

Senior Financial Analyst, Corporate Development

- Performed discounted cash flow analysis and other financial techniques to model valuations for the acquisitions of companies and minority interests with market values ranging from \$20 million to \$2 billion
- Participated in FCC spectrum auctions and successfully increased U.S. Cellular's wireless footprint
- Prepared presentations to bond rating agencies, reviewed credit metric ratios based on rating agency methodologies and analyzed strategic and financial initiatives to improve capital structure
- Constructed recommendations to Senior Management on the Company's cash investment strategy, monitored the investment environment, and evaluated suitable investment products

## **Jean Gould**

Stakeholder and Issues Management Advisor

Marathon Petroleum Corporation

210-542-1334; [jgould@marathonpetroleum.com](mailto:jgould@marathonpetroleum.com)

### **Education and Training**

New York University, Global Affairs, MS, 2008

University of Houston, MBA, 1991

Georgia Institute of Technology, Chemical Engineering, BS, 1985

### **Research and Professional Experience**

2021 – present: Stakeholder and Issues Management Advisor: Marathon Petroleum – TX

- Develop and implement strategic risk/issues management program for enterprise and regional business/operational activities
- Devise and execute stakeholder engagement, community relations and communications strategies to address operational issues

2020 – 2021: Deputy Assistant Director, Policy and Communications: City of Houston – TX

- Direct communications and policy development for City department responsible for creating affordable homes and community facilities
- Led the development and implementation of strategies/programs for stakeholder engagement, communications and media relations
- Managed team of 22 communications and community outreach professionals

2020 – 2020: Principal Consultant, Communications and Stakeholder Engagement:

Environmental Resources Management – Houston, TX

- Developed and implemented public affairs and communications strategies/campaigns for utility, energy and chemical clients
- Managed stakeholder and community relations initiatives for infrastructure projects

2018 – 2020: Sr. Advisor, Public and Government Affairs: Husky Energy – Superior, WI

- Managed communications, community relations and government affairs for the rebuild of the Superior Refinery (April 2018 incident resulted in an explosion/fire)

2016 – 2018: Sr. Director, Public Policy and Communications: Petroleum Equipment and Services Association – Houston, TX

- Directed government relations and public policy for upstream service providers trade association; managed federal/state legislative and regulatory affairs activities

2010 – 2015: Vice President, External Affairs: American Bureau of Shipping – Houston, TX

- Led global communications and international affairs for leading marine classification society which promoted safety in marine and energy industries
- Accountable for global reputation and executive communications strategies
- Managed global team of 20 professionals

2006 – 2010: Director, Government and Corporate Affairs: Coyne Public Relations – NJ

- Conceived, developed and executed communications and government relations strategies and programs for energy, healthcare and manufacturing clients

1997 – 2003: International Corporate Affairs Advisor: Exxon Mobil – Florham Park, NJ

- Directed corporate affairs activities for operations in Africa and Latin America
- Stewarded issues management process and community investment programs for international affiliates

1991 – 1997: International Government Affairs Representative: Exxon Mobil – D.C.

- Managed public policy and business issues affection operations and interest in Asia, Africa and Latin America
- Managed relations with Department of State, DOE, embassies, World Bank, IMF and business associations

1988 – 1991: Natural Gas Business Development Advisor: Exxon Mobil – Houston, TX

- Managed client portfolio for natural gas business in TX/LA; sales revenue \$300 M/yr.

1985 – 1988: Engineer: Exxon Mobil – Houston, TX

- Reservoir engineer for Texas operations; planning analyst for Gulf Coast operation

### **Synergistic Activities**

- Exxon Mobil: Chad-Cameroon Upstream Development Project  
Directed public affairs campaign for \$4 billion energy development project in Sub-Saharan Africa, including a 600-mile pipeline through environmentally sensitive regions of Cameroon. The multi-year campaign involved activities on three continents and involved IMF, World Bank and IFC. Objective to secure World Bank participation in the project was achieved in 2000. Oil production began 2003.
- Husky Energy: Superior Refinery Rebuild Project  
Developed and implemented stakeholder engagement program to rebuild trust in the community; it had been evacuated in 2018 due to the fire/explosion at the refinery. Developed and implement outreach program to garner support from the community, labor and other key stakeholders for Husky to acquire necessary federal/state permits for the rebuild. Permits were obtained in 3<sup>rd</sup> quarter 2019.
- City of Houston: New multi-family home development projects  
Developed and implemented community engagement programs for the 5 multi-family homes developments. The developments were in 5 different neighborhoods with different socioeconomic characteristics. The engagement programs were tailored to unique characteristics of each community. The objective of generating support for and minimizing opposition to the project was achieved.

**ANDREW ISHERWOOD**  
Director, Energy Origination & Development  
TC Energy  
700 Louisiana Street, Houston, Texas, 77002  
713-828-4609, andrew\_isherwood@tcenergy.com

***Education and Training***

- CFA Institute (2016-Present) – Chartered Financial Analyst
- University of Calgary (2004-2008) – Bachelor of Commerce (Finance with Distinction)

***Research and Professional Experience***

- TC Energy - Director of Energy Origination & Development (2022-Present) - Houston, TX
  - Responsible for the origination and development of customer-focused, low carbon infrastructure and products across North America
  - Includes customer solutions for energy efficiency, renewable power, green feedstocks and carbon capture and sequestration
- TC Energy - Director of US Gas Innovation (2021-2022) - Houston, TX
  - Responsible for developing the emission reduction plan for the US Gas Pipelines business unit which included the development of a roadmap to business unit targets in support of emission reduction targets for TC Energy
- TC Energy - Manager of Business Development (2018-2021) - Houston, TX
  - Identify, develop, and commercially executing new development opportunities across entire U.S. regulated natural gas footprint
  - Developed commercial underpinning, including precedent agreements, for over \$2,500 million of projects across the United States with annual EBITDA in excess of ~\$500 million
- TC Energy - Commercial Manager, Columbia Midstream (2017-2018) - Houston, TX
  - Develop both new unregulated natural gas pipeline projects within the U.S. along with developing the business unit's strategy.

- TC Energy - Senior Financial Analyst, Strategy and Corporate Development (2015-2017) - Calgary, AB
  - Responsible for the development and execution of corporate development initiatives in Canada, U.S., and Mexico, which included playing a critical role in the \$14 billion acquisition of Columbia Pipeline Group.
  - Lead the divestiture of ~\$1 billion of non-core assets
- TC Energy - Senior Financial Analyst, Investment & Market Analysis (2012-2015) - Calgary, AB
  - Co-ordinate and develop long-term financial forecasts for natural gas and oil pipelines, including conducting a sum-of-parts valuation of business units
  - Assist with financial and transactional work for ~\$1 billion of non-core asset divestments
- TC Energy - Business Analyst, Commercial East (2010-2012) - Calgary, AB
  - Provide analytical support to internal stakeholders on natural gas pricing, flows, and market dynamics throughout North America
- TC Energy - Business Analyst, New Grad Rotational Program (2008-2010) - Calgary, AB
  - Program included a variety of Commercial Operations roles within the Canadian Pipelines business unit

***Publications***

- None

**Jacob Chenevey**  
**Marathon Petroleum Corporation-MPLX**

**Education and Training**

Ohio University, Civil Engineering, BS, 1999

**Research and Professional Experience**

2014 to Present: Project Manager: Logistics & Storage Support Services – Major Projects

- Responsible for managing large capital growth projects for MPLX Logistics & Storage organization
- Leads teams of engineers of all disciplines on projects from conceptual engineering through project commissioning. The project manager is responsible for the entire project life cycle.
- Requires managing multiple projects concurrently.
- Currently involved in the development of renewable/emerging energy (hydrogen, ammonia, carbon capture, etc.)

2012 – 2014: Corrosion Management Services Supervisor: Marathon Pipe Line Company

- Managed the Marathon Pipe Line (MPL) corrosion department that was responsible for cathodic protection design and monitoring of all the company's corrosive assets such as MPL pipelines, tank bottoms, marine facilities, and convenient stores
- Managed a budget of roughly \$30 million and a staff of approximately 12 direct reports
- Was a member of several corrosion related industry committees such as committees through PRCI and NACE

2010 - 2012: Project Manager: Marketing and Transportation Engineering – Major Projects

- Responsible for managing large capital growth project throughout the United States including facility flare design, pipeline rehabilitation, and other pipeline speed to market projects
- Designed, constructed, and commissioned three successful major projects during his first experience in major projects

2008 - 2010: Supervisor: Global Procurement

- Supervised the department within global procurement that supported the brand marketing organization within Marathon Petroleum Company
- Organization supported the marketing supply chain efforts for the Marathon retail convenient store organization, tasked with negotiating contracts with key suppliers and vendors
- Department successfully supported a re-branding program of many brand marketing locations

2004 - 2008: Supervisor: Marketing and Transportation Engineering

- Supervised various engineering departments during this time
- Managed teams of engineers that completed a large volume of integrity and corrosion small projects for Marathon Pipe Line
- Organization routinely employed new engineers for development. Responsible for developing, mentoring, and training these new engineers through their projects to become leaders within Marathon Petroleum Company

2001 - 2004: Project Engineer: Marketing and Transportation Engineering

- Successfully completed many pipeline integrity projects ranging from inline inspection tool runs to major pipeline hydrotest projects.
- Led the design and construction of several Speedway convenient stores and truck stops.

- Gained valuable time management and prioritization skills while leading many projects simultaneously

1999 - 2001: Engineer: Johnson and Associates – Oklahoma City, OK

- Successfully designed several civil packages for businesses throughout the greater Oklahoma City Area

1999 - 1999: Engineer: HNTB – Oklahoma City, OK

- Worked as a project engineer on several large railroad projects.
- Completed extensive hydraulic studies of rivers throughout the Midwest to support structural analysis of railroad bridges

## **Publications**

None

## **Synergistic Activities**

MPLX Logistics & Storage Project Management

- Step-Out Energy Projects
  - Led an engineering team through pre-conceptual and conceptual engineering development of various “step-out” opportunities to date including: carbon transportation and sequestration, hydrogen terminal, and hydrogen fueling stations. The team has provided scope development, estimates, and schedule recommendations to internal Business Development.
- Southwest Gathering - Undaunted Pipeline System
  - Led the design and construction of a 15-mile new pipeline system in Texas and New Mexico and four new/modified facilities. Project schedule was accelerated to hit customer required completion date. Project costs totaled \$22 million.
- Mt. Airy Expansion Projects
  - Led the design and construction of a major expansion of Marathon’s Mt. Airy Terminal. Expansion includes 9 new 150-barrel storage tanks, two pipelines, and a new large Mississippi river dock. The facility and pipeline work included 10,500 feet of installation via HDD’s; 4,231 controlled modulus columns for the tank foundations; six major pumping units and miles of facility piping. The facility expansion was commissioned remotely during a worldwide pandemic.
- Cornerstone Pipeline Projects
  - Led the design and construction of a new 50-mile pipeline from Cadiz, Ohio to Canton, Ohio with two new origination stations and two new receipt stations. Construction of this pipeline was through mountainous terrain which provided many logistic challenges. The project was completed on time and on budget for a total of \$180 million.



**Dave Richards, P.Eng**  
Project Manager, TC Energy  
560 6th ave SE #404, Calgary AB, T2G1K7  
david\_richards@tcenergy.com 403-835-1143

**Education:**

- BSc. Mechanical Engineering - University of Calgary 2004
- Professional Engineer Registered in Alberta
- PMP Certification - PMBOK 2013

**Professional Experience:**

Dec 2017 to present, TC Energy Power & Storage

- Project Manager for hydrogen development projects, managing front end engineering, permitting and supporting commercial development.
- Participated in the Energy Transition GHG Reduction Working group. Developed CO2 reduction plans and conducted preliminary assessments of emerging low carbon technologies.
- Project Manager for a portfolio of operations and maintenance projects across multiple assets of co-gen and gas storage facilities.
- Managed a \$28M HRSG boiler tube bundle replacement including overseas fabrication, logistics and transportation, and installation during a tight outage duration.

Aug 2015 – Dec 2017, Shell Foothills Sour Gas Facilities Small Project Portfolio:

- Project manager for equipment installations, compressor station retrofits, pipeline construction and well pads.
- Project engineer for an acid gas (H<sub>2</sub>S/CO<sub>2</sub>) sequestration FEED project for a large brownfield sour gas plant.

Dec 2013 – Aug 2015, Shell Gas Plants:

- Developed construction scopes of work for lump sum contracts for a 70 mmscfd gas plant.
- Project Engineer for pre-FEED and FEED phases for a greenfield 200 mmscfd gas plant.

Oct 2010 – Nov 2013, Imperial Oil Resources Small Projects Portfolio:

- Project Engineer for a demonstration plant for oil sands extraction research project.
- Project Manager for FEED phase for thermal well pads.
- Project Engineer for construction and commissioning of a 30 mmscfd gas plant.
- Mechanical engineer for gas plant vendor packages, pipelines and thermal facility retrofits

Jun 2009 – Sep 2010, BP Small Projects Portfolio:

- Project Engineer for a \$2M produced water pipeline.
- Mechanical Engineer for equipment retrofits in NGL midstream facilities.

May 2006 – Jun 2009, Nexen Long Lake:

- Field engineer for construction, commissioning and operations for a 70 bbl/d SAGD facility.

Nov 2004 – May 2006, Imperial Oil Resources Taglu Gas Plant

- Mechanical EIT during FEED phase of a greenfield gas facility.

**Brian Adams**  
**Marathon Petroleum Corporation – MPLX**

**Education and Training**

Pennsylvania State University – Mechanical Engineering, BS, 2014

Bowling Green State University – Master of Business Administration, 2016

Project Management Institute – Project Management Professional, 2018 – present

**Research and Professional Experience**

2018 to Present: Project Engineer: Logistics & Storage Support Services – Major Projects

- Responsible for managing large scale capital projects
- Work on project teams to plan and execute high speed-to-market growth projects
- Key member of acquisition and buildout team for large Mississippi River storage facility
  - Responsible for the development and construction of 1.3 million barrels of product storage, infrastructure, and connectivity for in/out movements
- Paired with a senior engineer to execute a facility expansion project in West Texas
  - One-hundred-foot PDC building, large diameter piping, large booster pumps installed as part of this project
- Team member in future energy project evaluations
  - Contribute in the pre-conceptual and conceptual engineering development of various technologies including carbon sequestration, hydrogen creation, and hydrogen storage

2017 to 2018: Field Engineer: Logistics & Storage Support Services – Portfolio South

- Strategically placed at a facility for field support of Southeast terminal assets
- Worked through continued development and execution of a project portfolio
- Participated in troubleshooting facility issues as they arose, alongside operations technicians
- Underwent operations training and life critical safety courses

2014 – 2017: Project Engineer: Marketing & Transportation Engineering – Portfolio North

- Managed all phases of project development; from conceptual stages to overseeing construction and project closeout
- Project scopes encompassed civil, mechanical, and electrical engineering disciplines
- Projects improved terminal safety, functionality, and product throughput
- Managed a large portfolio of projects simultaneously
- Effectively communicated daily with management, vendors, contractors, operations personnel, etc.
- Frequently worked with local, state, and federal government agencies

**Publications**

None

**Ryan Dick**  
**Marathon Petroleum Corporation-MPLX**

**Education and Training**

Rose-Hulman Institute of Technology, Mechanical Engineering, BS, 2016

**Research and Professional Experience**

2022 to Present: Project Engineer: Logistics & Storage Support Services – Major Projects

- Core team member for managing large capital growth projects for MPLX Logistics & Storage organization, oftentimes assisting multiple projects at once.
- Perform development and management tasks on projects from conceptual engineering through project commissioning. Tasks range from engineering development to construction management.
- Work directly with internal/external stakeholders daily for all levels and phases of projects to design, construct, and commission per company standards.

2021 – 2022: Strategy & Business Development: Adv. Business Development Rep

- Assisted in the analysis of organic and inorganic M&A opportunities.
- Responsible for initiating and leading an internal team from all parts of the company (Finance, Accounting, Law, Engineering, etc.) to perform due diligence and vet opportunities.
- Responsible for effective communication on M&A prospects with external parties.
- Managed the acquisition of a cogeneration facility co-located at a Marathon refinery from an UK based parent company.

2020 – 2021: Project Engineer: Marathon Pipe Line (MPL) Operations & Logistics (O&L)

- Led a group of internal engineers, technicians, etc. across numerous organizations to onboard a pipeline for remote operations into the Findlay Operations Center.
- Provided 24-hour support for leading STOP-HELP-START (SHS) events for MPL by guiding stakeholders through the process to identify, analyze, and correct emergencies, incidents, and other abnormal operating conditions.
- Managed the budget, goal process, and assisted in the risk analysis process for the MPL O&L organization.

2016 - 2020: Project Engineer: Marketing & Transportation Engineering – Houston Region

- Managed a portfolio of pipeline projects ranging from equipment maintenance to large horizontal directional drills.
- Developed projects from the earliest conceptual phase all the way through construction and closeout. Worked with internal and external stakeholders to complete project on time, on budget, and according to company standards.

**Publications**

None

**Synergistic Activities**

MPLX Logistics & Storage Project Management

- Step-Out Energy Projects
  - Contributed to an engineering team performing pre-conceptual and conceptual engineering development of various “step-out” opportunities to date including: carbon transportation and sequestration, hydrogen terminal, and hydrogen fueling stations. The team has provided scope development, estimates, and schedule recommendations to internal Business Development.

## **Chad Guthrie**

Marathon Petroleum Corporation - MPLX

### **Education**

University of Toledo, Mechanical Engineering, BS, 2005

Bowling Green State University, Master of Business Administration, 2014

### **Professional Experience**

2022-Present: Senior Project Engineer: Marathon Petroleum, Major Projects

- Successfully completed a pipeline purge and cutouts for a 6" - 40 miles pipeline. Project include pipe fabrication, hydrotest, purge, cutouts, valve replacement and flaring.
- Managed alternate energy project which include electrolysis, pipeline design, auto thermal reforming and carbon capture.

2021-2022: Project Engineer: Marathon Petroleum, Mainline Integrity

- Successfully completed many pipeline integrity projects ranging from inline inspection tool runs to major pipeline hydrotest projects.
- Managed over 40 pipeline rehab digs and 8 ILI runs included trap modification and installation.

2019-2021: Project Engineer: Marathon Petroleum, Pipeline

- Lead pipeline projects that included piping design, fabrication, hydrotesting, construction verification and installation on pipeline projects.
- Developed the design and fabricated the Detroit meter run valve and piping replacement

2011-2019: Engineering Manager: Cooper Tire – Findlay, OH

- Completed Six Sigma Black Belt training and worked on continuous improvement and cost reduction projects.
- Managed the equipment design team for all domestic and international projects for new equipment.
- Managed the Continuous Improvement/Six Sigma Black Belt training and completion of continuous improvement projects.

2001-2011: Engineering Manager: Phoenix Technologies – Bowling Green, OH

- Successfully completed multiple process expansion and equipment upgrade projects
- Managed the maintenance and engineering departments for all equipment related issues.

Publications

None

**Colin Daly**  
Senior Originator  
TC Energy  
180 N LaSalle Street, Suite 3030, Chicago, IL 60601  
(312) 639-7372, colin\_daly@tcenergy.com

***Education and Training***

BS Civil and Environmental Engineering, University of Illinois, Urbana-Champaign 2011  
BS Physics, Illinois State University 2009

Professional Engineering License (PE) – Illinois 2015  
Project Management Professional (PMP) - 2019

***Research and Professional Experience***

**Senior Originator**

**TC Energy | Power & Energy Solutions, Chicago, Illinois** **10/2022 – Present**

Support TC Energy’s origination and development of utility scale power and hydrogen production projects in targeted markets through managing relationships with consultants and stakeholders from various disciplines.

Identify new market opportunities for TC Energy projects, working alongside TC Energy’s Marketing, Operations, and Corporate Development Teams. Coordinate closely with other internal TC Energy business units, including USNG, CNG, and Liquids.

**Project Manager**

**TC Energy | GPMC West, Tinley Park, Illinois** **3/2016 – 10/2022**

Lead teams of colleagues, consultants and contractors through design, permitting, contracting, execution, commissioning, and close out of projects with environmental, geotechnical, reliability, and natural gas pipe system integrity drivers. Control scope, schedule, quality, safety and budget performance against baseline in conjunction with monthly forecast and risk assessment of \$30M annual portfolio. Partner with and coordinate technical subject matter experts, regulatory permitting and legal counsel to generate project business cases, contract terms, scope alternatives, and organizational process improvements.

- Support multiple internal clients as part of the GPMC program with portfolio of pipeline expansions, replacements, abandonments and ROW improvements. Work through rugged, remote terrain as well as critical public and private infrastructure rights-of-way (levees, railroads, etc.) requiring extensive alternatives analysis, and permitting coordination.
- Collaborate with Supply Chain and contract analysts to efficiently bid, and negotiate contract terms.
- Incorporation and early adoption of emissions reduction by bypass or mobile compression on projects realizing over \$500k in savings in 2021.
- Development and implementation of a multi-year water management infrastructure remediation effort at compressor station facilities across the US, permanently reducing annual operating costs and regulatory liability.
- Coordinate and manage multiple nationwide integrity data gathering programs including, collection and assessment of data by LiDAR, sonar, and conventional survey methods.

**Environmental Engineer**

**O’Brien and Gere Engineers | Chicago, IL**  
**(seconded with TC Energy 2016-2018)**

**2/2014 – 5/2018**

Led investigation/remediation report writing and work plan design for sites enrolled in USEPA Superfund Program through collaboration with data scientists, engineers, geologists, and data visualization teams. Go-to resource for technical editing client deliverables. Design and field oversight of in-situ stabilization, in-situ chemical oxidation, dredging and capping remediation projects at former manufactured gas plant and industrial legacy remediation sites across Northern IL, WI and MI. Pivotal contributor to company quality management team.

**Environmental Engineer**

**Terracon Consultants, Inc. | Chicago, IL**

**6/2011 – 2/2014**

Environmental Site Assessment and Investigation proposals, reports, drawings, and field work for clients in private and public sectors. Supported performance of electrical resistance heating system at site with chlorinated hydrocarbon plume.

**JASON MARTIN**

Manager – Storage Program Support  
TC Energy  
301 Maple St., Sugar Grove, OH 43155  
(phone 740-503-4410), jason\_martin@tcenergy.com

**EDUCATION**

**West Virginia University** – Morgantown, WV  
*Bachelor of Science Petroleum & Natural Gas Engineering, 1994*

**PROFESSIONAL EXPERIENCE**

**TC Energy Corporation** - Sugar Grove, OH 8/1997 – present

*Manager – Storage Program Support 6/2021 – present*

- Newly created role to support energy transition efforts company-wide
- Responsible for supporting various business units in evaluation and implementation of carbon capture, transportation and sequestration along with hydrogen generation, transport and storage
- Responsibilities also include managing gas storage-related projects and programs at high levels and representing Storage Technical Services on various cross-functional teams and initiatives
- Evaluated and progressing multiple projects in Canada and the United States
- Continuing development as an industry subject matter expert on energy transition as it relates to pipeline companies and underground storage operators

*Manager – Well Engineering & Technology 6/2017 – 6/2021*

- Responsible for engineering, projects and programs for the continent’s largest underground gas storage operator with 4,400 wells in five US state and one province in Canada during a challenging period of new regulations and compliance
- Led a diverse team of 25 direct reports including engineers, technicians, and analysts in four US states while hiring nine positions throughout my tenure
- Successfully navigated through difficult integration of teams, processes and assets during the full absorption of Columbia Pipeline Group
- Active and supportive member of Storage Technical Services management team sharing in decisions, vision and direction
- Safely and prudently managed >\$10 MM in O&M budgets and >\$50 MM in capital projects annually with maintenance and Modernization programs

*Senior Storage Engineer 3/2004 – 6/2017*

- Lead storage engineer for Ohio depleted-reservoir gas storage fields
- Developed, implemented, and managed gas storage well workover and stimulation programs for over 100 wells annually
- Served as principal in developing new gas storage opportunities including drilling new wells, pipelines, land rights, permitting, and estimating
- Lead technical architect of well projects associated with the Modernization II program
- Repeatedly recognized for top-performance and selection for high-priority teams
- Developed reputation as technical expert in gas storage both internally and externally



***Storage Engineer III***

8/1997 – 3/2004

- Field engineer for Ohio depleted-reservoir gas storage fields
- Primary responsibilities included hands-on field engineering for drilling, completions, workovers, and fracture stimulations
- Developed innovative processes and procedures for gas storage well reconditioning and rehabilitation

**Northern Illinois Gas (Nicor Gas) – Naperville, IL**

5/1994 – 8/1997

***Engineer***

- Served as a field engineer responsible for five aquifer-based gas storage fields in north-central Illinois
- Performed reservoir engineering duties including managing storage volumes injected and withdrawn from wells
- Primary responsibilities included hands-on field engineering for drilling, completions, workovers, snubbing operations, and stimulation
- Secondary responsibilities for compression, measurement, dehydration, and regulation

**Joseph Brisebois**  
Senior Manager  
TC Energy  
180 N LaSalle Street, Suite 3030, Chicago, IL 60601  
(847) 714-6090, joseph\_brisebois@tcenergy.com

***Education and Training***

BS, Civil Engineering, McGill University, Montreal QC 2005

***Research and Professional Experience***

**TC Energy** 2021-Present

Senior Manager

- Lead development on several solar power generation and hydrogen production facilities within the US
- Manage permit process, land acquisition, preliminary engineering and EPC negotiations
- Negotiate water and electrical interconnection agreements with public utilities, including management of interconnection queue process
- Identify new customers for Hydrogen offtake and renewable power PPAs

**J-Power USA** 2017-2021

Director of Business Development

- Permitting, land acquisition, and preliminary engineering for Jackson Generation, a 1,200 MW combined cycle in Northern Illinois
- Lead development on a 50 MW brownfield solar project in Virginia

**Exelon** 2015-2016

Principal Generation Project Developer

- Initiated gas fired power plant development pipeline in the US
- Site identification and land acquisition for thermal and storage facilities

**Invenergy LLC** 2007-2015

Business Development Manager

- Managed development and construction for Ector County Energy Center, a 330MW gas fired peaker in west Texas
- Spearhead effort to identify new thermal development opportunities in the US
- Project engineer on 1000MW+ of wind projects in Canada and the US from early-stage development to COD

**Kiewit**

2006-2007

Project Engineer

- Cost controls, and scheduling for Chicago O'Hare International Airport, 10C-28C Mass Grading Project
- RFP proposal development for major infrastructure projects

**Lisa Leland**  
Senior Manager, Energy Origination & Development  
TC Energy  
700 Louisiana Street, Houston, Texas, 77002  
346-451-0340, lisa\_leland@tcenergy.com

***Education***

- University of Regina (1990) – Bachelor of Administration - Co-op Work/Study

***Professional Experience***

- TC Energy – Senior Manager, Energy Origination & Development (2021-Present) - Houston, TX
  - Originate and develop customer-focused, low carbon infrastructure and renewable products across the United States
  - Create customer solutions for energy efficiency, renewable power, green feedstocks and hydrogen development
  - Identify new customers and commercialize new trading products to grow TC Energy's commodity marketing business
- Annova LNG – Senior Vice President, Gas Supply (2019-2021) - Houston, TX
  - Led all aspects of natural gas procurement for the Annova LNG facility ranging from originating key assets to selecting and ensuring third party fuel manager performance, to managing natural gas portfolio risk
  - Negotiated firm transportation contracts to ensure deliverability of natural gas to the facility
  - Developed asset and portfolio strategy to manage long term natural gas supply security
  - Provided cross-functional support for off-take marketing, power procurement, finance and regulatory
- CFE International, LLC – Senior Gas Trader (2018-2019) - Houston, TX

- On the ground floor of developing and executing trading strategies to monetize and ensure optimal natural gas flow for over 2.5 Bcf/d on an 8 Bcf/d Texas pipeline asset base
- Created and implemented contingency plans to assure natural gas supply flowed to markets

**Prashanth Mandalaparty**  
Senior Reservoir Engineer  
TC Energy

[p\\_mandalaparty@tcenergy.com](mailto:p_mandalaparty@tcenergy.com)  
(336)-509-9709

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### Education

**University of Utah, Utah, USA**

PhD, Chemical Engineering

**GPA 3.8 / 4.00** August 2012

**Osmania University, Andhra Pradesh, India**

Bachelor of Technology, Chemical engineering. **GPA 3.98 / 4.00** May 2006

### Professional Experience

**Senior Reservoir Engineer**

September 2021-Present

TC Energy

5250 Corporate Dr Troy, MI 48098.

**Chief Geomodeler/ Reservoir Engineer**

December 2013- August 2021

PetroTel Inc

5240 Tennyson Pkwy, Suite 207, Plano TX.

**Research Scientist**

September 2011 – December 2013

Energy & Geoscience Institute, and Department of Civil & Environmental Engineering,

The University of Utah

### Relevant Publications

1. Mandalaparty, P., Deo, M., and Moore, J. 2011. *Gas-Compositional Effects on Mineralogical Reactions in Carbon Dioxide Sequestration*. *SPE J.* 16 (4): 949-958. SPE-124909-PA
2. McLin, K., Brinton, D., Mandalaparty, P., Jones, C., Moore, J., 2010, *The Chemical and thermal stability of proppants under geothermal conditions*: GRC Transactions, v. 34, p. 397-402. Published, 10/2010.
3. Moodie, N., McPherson, B., Mandalaparty, P., Lee, SY. *Fundamental Analysis of the Impacts Relative Permeability has on CO<sub>2</sub> Saturation Distribution and Phase Behavior*. *Transp Porous Med* **108**, 233–255 (2015).
4. Tan, H., Pan, F., Xu, T., McPherson, B.J., Yue, G., Mandalaparty, P., *Impacts of hydrological heterogeneities on caprock mineral alteration and containment of CO<sub>2</sub> in geologic Storage sites*, *International Journal for Green House Gas Control*, Issue 0, May 2014, Pgs 30-42.
5. Prashanth Mandalaparty, Milind Deo, Joe Moore and Brian McPherson, “*Carbon Dioxide Sequestration: Effect of the Presence of Sulfur Dioxide on the Mineralogical Reactions and on the Injectivity of CO<sub>2</sub>+SO<sub>2</sub> Mixtures*” Topical Report DOE award number: DE-FC26-06NT42808, September 2009.
6. Vivek Patil, Prashanth Mandalaparty, Brian McPherson, Hailong Tan, Tianfu Xu, “*Comparison of two geochemical Modeling simulators for CCUS*” Proceedings of the 12th Annual Conference on Carbon capture and sequestration, Pittsburgh, Pennsylvania, May 13-16 2013.
7. Vivek Patil, Brian McPherson, Hailong Tan, Prashanth Mandalaparty, Tianfu Xu “*Damkohler number framework for characterizing fault sealing vs opening in CCUS*” Proceedings of the 12th Annual Conference on Carbon capture and sequestration, Pittsburgh, Pennsylvania, May 13-16 2013.
8. Prashanth Mandalaparty, Brian McPherson, Milind Deo, Ramesh Goel, Kip Solomon,” *Aquifer Risk Assessment Framework*, “EPA STAR Annual review meeting, Washington D.C., January 2013.

9. Nathan Moodie, Brian McPherson, Si-Yong Lee and **Prashanth Mandalaparty**. “*Fundamental Analysis of heterogeneity and relative permeability on CO<sub>2</sub> storage and plume migration* “ Proceedings at TOUGH symposium, Berkeley, California. September 17-19 2012.
10. **Prashanth Mandalaparty**, Milind Deo, Robert Krumm, “ *A study of retorted shale formations as CO<sub>2</sub> sinks*”, proceedings of 2011 Annual AIChE meeting, Minneapolis, Minnesota,
11. Alan Burnham, Michael Herron, Susan Herron, Alyssa Charsky, Milind Deo, Robert Krumm, **Prashanth Mandalaparty**, Andre Levchenko, Pierre Allix; “*Comparison of various mineral analysis methods for green river formation oil shale*”, 31<sup>st</sup> Oil Shale Symposium, Colorado School of Mines, Colorado, 2011.
12. **Prashanth Mandalaparty**, Pankaj Tiwari and Milind Deo. “*Spent shale formations: Potential source for CO<sub>2</sub> sequestration*”. 30<sup>th</sup> Oil Shale Symposium at Colorado School of Mines, Colorado, USA, 2010.
13. Jacob Bauman, **Prashanth Mandalaparty**, Pankaj Tiwari, Milind Deo, “ *A low CO<sub>2</sub> hybrid in-situ oil shale liquid production process*”, 30<sup>th</sup> Oil Shale Symposium at Colorado school of mines, Colorado, 2010

### Static Modeling Experience

Barmer basin (India), Musandam Peninsula and Southern tight rock formations (Oman), Uinta basin, Gordon Creek (Utah), SACROC (Texas), Elk Hills Oil Field-Stevens Reservoirs (California), Gulf of Mexico (Coastal Plain), Mississippi Salt Basin, Southern Arabian Gulf basin (Bahrain), Appalachian basin, Michigan basin.

### Technical Support

- Lead the technical team on the development of a Comprehensive Aquifer Risk Assessment Framework (ARAF) to Model the effect of CO<sub>2</sub> injection on underground sources of drinking water (USDWs) as part of developing an Integrated Design for Monitoring the effect of Geologic sequestration of Anthropogenic Carbon dioxide on Sources of drinking water
- Technical lead on the development of Probability Density Functions (PDFs) by building static model of the reservoir units from the available well data, seismic data and petrophysical analysis to evaluate and build a platform for comprehensive, quantitative risk assessment of CO<sub>2</sub> Geologic Sequestration
- Provide technical support for evaluating the potential of deep saline formations for geological storage of CO<sub>2</sub> for Southwest Partnership (regional NETL funded sequestration partnership)
- Technical lead for the team to generate type curves and full field scale up for CO<sub>2</sub> flooding in Elk Hills Oil Field-Stevens Reservoirs, California by integrating data from a repository of 4200 wells, well surveys, multiple seismic 3D volumes, interpretations, surfaces and building a geocellular model, developing well designs, pattern optimizations and infill well recommendations for the field
- Key member of the technical team responsible for incremental oil recovery of 14 million barrels (~208M\$) through water flood studies, recommendation and field implementation in Mississippi Salt Basin
- Technical support for the team delivering an incremental oil recovery of 22 MMSTB (~600M \$) from depleted oil reservoir through CO<sub>2</sub> flooding studies and field operation optimization in Oligocene Frio formation, Gulf of Mexico Coastal Plain
- Chief member of the team involved in multiple hydrocarbon discoveries onshore and offshore Musandam peninsula
- Chief Geomodeler on the team responsible for discovery of 6TCF deep gas reservoir units in Barmer basin, Western India by building basin models for prospecting and volume estimations.
- Primary member of the team involved in the discovery and appraisal of 600 MMSTB of oil in place in Sarsang Block, Northern Kurdistan

# TAYLA SNAPP

700 Louisiana Street Houston TX 77002 • 406-366-3923 • tayla\_snapp@tcenergy.com

## Skills

- Able to work with a variety of people of diverse backgrounds, political views, and ethnicities in a friendly, professional manner
- Highly organized with a strong work ethic
- Team leader as well as a team player
- Skilled with computers and electronics
- Consistently willing to be a life-long learner

## Experience

### State Government & Community Relations Specialist | TC Energy | November 2018 - Current

- Act as a liaison between TC Energy and the communities and states in which TC Energy pipeline assets exist including Montana, Wyoming, North Dakota, South Dakota, and Minnesota
- Represent TC Energy within industry memberships and external organizations
- Communicate with local elected leaders and community organizations regarding projects that may be affecting them
- Manage a team of lobbying consultants in respective states and assist in monitoring proposed legislation
- Develop and implement stakeholder outreach plans, stakeholder engagement plans, stakeholder contact lists, and political risk assessments
- Actively support teams with the execution of solutions that address stakeholder concerns
- Incident Management Trained as a Liaison Officer

### Field Representative | United States Congressman Greg Gianforte | July 2017 – November 2018

- Agriculture Advisory Committee Chairperson – organized and effectively ran meetings
- Represent the office through attending and speaking at events on behalf of the Congressman
- Act as a liaison between DC Staff and constituents of 22 Counties in Eastern and North Central Montana
- Communicate with local elected leaders and community organizations
- Assist the Scheduler with logistics of district events in my area
- Train new field representatives

### Administrative Assistant | Waddell & Reed | September 2015 – July 2017

- Acted as office receptionist by greeting visitors and professionally handling of all public contacts in the office
- Audited and paid district office expenses and prepares expense reports for the financial advisors
- Reviewed orders/applications for completeness and accuracy while processing orders on a timely basis
- Scheduled appointments and readied paperwork for visit

### Filing Clerk | Bosch, Kuhr, Dugdale Lawfirm | May 2015 – September 2015

- Coded and filed records away in alphabetical and numerical order
- Made copies, faxed, and printed important documents
- Maintained minutes and agenda of business meetings

### Business Office Clerk/Cashier | Montana State University Northern | August 2014 – May 2015

- Prepared and processed reports, letters and documents as assigned
- Reviewed financial statements, and created student loans for different student accounts
- Executed general duties such as scheduling, mailings and filing
- Handled student account payments

## Education

### Bachelor of Technical Science | August 2013 – May 2017 | MSU-Northern

- Major: Business Administration
- Minor: Applied Agriculture, Marketing, Small Business Management
  - GPA: 3.7
  - Montana State University Northern Dean's List: Fall 2013 – Spring 2017



# TAYLA SNAPP

700 Louisiana Street Houston TX 77002 • 406-366-3923 • tayla\_snapp@tcenergy.com

## Activities

- **REAL (Resource Education and Agriculture Leadership) Montana**
  - Leadership Series | September 2019 – May 2022
    - Develop skills and acquire a network to advance the natural resource industries in Montana.
    - Attended seminars ranging from leadership training, educational tours, and networking.
    - Traveled to Washington DC to visit with the Department of Energy Coal Division
- **Montana Stockgrowers**
  - Leadership Series | December 2017 – June 2019
    - Develop personal leadership skills to maximize contribution to employers, organizations, and the community.
    - Study how to become a high impact leader by:
      - Communication to inspire action
      - Character to create followership
      - Courage to raise tough questions
      - Connections to get projects done
      - Competence to execute and drive results
- **MSU-Northern**
  - Collegiate Stockgrowers Secretary | January 2015 – May 2017
    - Assist with upholding Montana Stockgrowers Association mission and be an advocate for the livestock industry in Montana and the nation
    - Records and distributes the minutes from previous meetings
    - Responsible for official correspondence (i.e. email, agendas, minutes, and any other communication with members, students, and advisors)
    - Volunteer and lead community activities such as fundraisers, local producer brandings, ranching projects, etc.
  - Student Ambassador President | August 2014 – May 2017
    - Train and lead other Ambassadors in all duties assigned
    - Give campus tours to prospective students and their parents
    - Assist with all organization of Freshman Orientation
    - Organize and participate in community service projects
  - Student Senate Business Manager | August 2014 – May 2017
    - Prepare a detailed financial statement for Senate business meetings every month which will include the paid and/or outstanding bills
    - Handle all financial transactions
    - Work with the President and the appropriate committees of Senate on the yearly budget request and the final budget allocation to be approved by Student Senate

## Community Service

- SkillsUSA Montana Board Member
- REAL Montana Board Member
- Montana FFA Foundation Scholarship Committee
- Volunteer for local political campaign
- Volunteer at Central Montana Fair in 4-H
- Volunteer at local community cupboard

**Timothy J. Prather**  
Senior Originator  
TC Energy  
Houston, TX  
(817) 713-1899, tim\_prather@tcenergy.com

***Education and Training***

**The University of Texas at Austin**

Master of Science - Geological Sciences 2016  
Thesis - *Architecture, Depositional Systems, and Ichnology of the Loyd Sandstone of Northwest CO*

Bachelor of Science - Geology 2013  
Honor's Thesis - *Chlorine and Hydrogen Isotope Geochemistry: Behavior during Volcanic Degassing*

***Research and Professional Experience***

TC Energy August 2022 - Present

**Senior Originator – Power & Energy Solutions**

Lead for Carbon Capture (CCS) project business development efforts

- Interfaced with internal and external stakeholders to define economically viable carbon capture, transport, and sequestration opportunities
- Developed strategic geospatial databases and mapping tools to identify and screen projects
- Compiled various subsurface datasets to prospect for geologic formations across North America capable of storing in excess of 650 million tons of CO<sub>2</sub>
- Organized and managed external contractors to perform in-depth characterization of high-graded prospects

Premier Oilfield Group June 2017 – July 2022

**Senior Geologist, Senior Project Manager - U.S. Operations**

Lead for ESG & Carbon Capture (CCS) projects, technical programs, and business development efforts

- Served as lead Geologist & Project Manager for the CarbonSAFE Patterson KGS well core analysis program
- Organized a CCS Core Analysis workshop and guidebook for 40+ participants across 20+ organizations
- Identified and promoted key technologies to offer advanced CCS consulting and analytical services
- Designed and managed subsurface core analysis programs for clients to satisfy EPA Class VI UIC CO<sub>2</sub> well regulatory guidelines
- Generated written technical proposals for Class VI permit/RFP core analysis and geologic data requirements

Senior member of Customer Success Team for laboratory analysis programs and geology consulting

- Leveraged project management tools/software to guide operational priorities, update project stakeholders, organize data, and track budget forecasts for multiple concurrent projects
- Facilitated project scoping discussions between clients and technical teams to advise on services/consulting
- Reviewed, presented, and modeled data for client consumption across 100's of projects in U.S. Basins
- Trusted consultant to clients during all stages of projects (sales, data presentation, and technical services)

## **Geologist, Project Manager - Reservoir Geology & Geochemistry**

Subsurface geology lead in the Permian Basin and Williston Basin

- Integrated core, drill cuttings, and well log data to characterize geologic, mechanical, and petrophysical properties in unconventional formations
- Generated maps of the Wolfcamp, Spraberry, Bone Springs, Bakken, and Three Forks formations
- Leveraged data analytics to assess linkages between geochemistry datasets for development of ML models

Anadarko Petroleum

May - August 2016

## **Geoscience Intern - Colombia Exploration Team**

Generated a shallow geohazard and petroleum systems risk assessment in deepwater offshore Colombia

- Mapped seafloor/subsurface geohazards impacting drilling operations using 3-D seismic & multi-beam data
- Integrated seismic interpretations and organic geochemistry data to determine reservoir-source history

BHP Billiton

May - August 2015

## **Geoscience Intern - Pore Pressure Prediction Team**

Developed a geocellular model of a deepwater Gulf of Mexico field to aid in pore pressure prediction

- Modeled a probabilistic range of fluid migration from hypothesized source rock into the primary reservoir
- Compiled and input geologic, drilling, and reservoir pressure data parameters to design model

## ***Publications***

**Prather, T.**, et al. (2022) *A Journey Through a Carbon Capture Focused Core Analysis Program* – AAPG 2022 CCUS Conference Short Course Field Trip

**Prather, T.**, et al. (2022) *Core and Cuttings Repository Networks for Initiating CCUS Projects* – AAPG 2022 CCUS Conference Poster Presentation

Flaig, P., Hasiotis, S., **Prather, T.**, and Burton, D. (2019) *Characteristics of a Campanian delta deposit controlled by alternating river floods and tides: the Loyd Sandstone, Rangely Anticline, CO, U.S.A.*, *Journal of Sedimentary Research*, 89 (12): 1181-1206.

**Prather, T.** (2019) *Elemental and mechanical stratigraphy: rapid core-based rock-typing in the Wolfcamp Fm of NE Martin County, Midland Basin* – RMAG 2019 Symposium Presentation

Burton, D., Flaig, P., **Prather, T.** (2016) *Regional controls on depositional trends in tidally-modified deltas: insights from sequence stratigraphic correlation and mapping of the Sege and Loyd sandstones, Uinta and Piceance Basins of UT and CO, U.S.A.*, *Journal of Sedimentary Research*, 86 (7): 763–785

Barnes, J.D., **Prather, T.**, et al. (2013) *Stable chlorine isotope behavior during volcanic degassing of H<sub>2</sub>O and CO<sub>2</sub> at Mono Craters, CA*, *Bulletin of Volcanology*, V. 76, Issue 3

**APPENDIX H**

**TAX LIABILITY FORM**

**Industrial Commission**  
**Tax Liability Statement**

**Applicant:**

Prairie Horizon Energy Solutions LLC

**Application Title:**

Prairie Horizon Energy Solutions LLC Clean H2 and N-fertilizer Production Facility

**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.

*Omar Khayum*

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Signature

President

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Title

**10/7/2023**

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Date