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August 15, 2026

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

Dear Mr. Kannianen:

Subject: Proposal Entitled "Enhanced Oil Recovery and Advanced Completion Design for Tight Carbonate Reservoirs in Western North Dakota"

Cobra Oil & Gas Corporation (Cobra) is pleased to submit the subject proposal to the Oil and Gas Research Program. This proposal will investigate and demonstrate the enhanced oil recovery (EOR) potential of the Stoneview-Stonewall Unit (SSU) through reservoir characterization, laboratory analysis, historical production analysis, numerical simulation, improved downhole well designs, and field implementation of targeted EOR strategies. The expectation is that the proposed project will increase oil recovery from the SSU through reservoir understanding and improved field development strategies as well as providing baseline operational EOR and completion strategies for oil production from tight carbonate reservoirs. The key successes and lessons learned through the proposed effort will be applicable to other fields producing tight carbonates both conventional and unconventional across North Dakota.

The \$100 application fee was shipped to the North Dakota Industrial Commission through UPS on August 14, 2025, tracking number 1Z7804750161234546. Cobra is committed to completing the project as described in this proposal. If you have any questions, please contact me by telephone at (940) 716-5100 or by email at kgardner@cobraogc.com.

Sincerely,

DocuSigned by:

809473914E3E4AB...

Kyle Gardner
Vice President – Engineering
Cobra Oil & Gas Corporation

KG/rlo
Attachments

c: Erin Stieg, North Dakota Industrial Commission

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Oil and Gas Research Program

North Dakota

Industrial Commission



Application

Project Title: Enhanced Oil Recovery and
Advanced Completion Design for Tight
Carbonate Reservoirs in Western North Dakota

Applicant: Cobra Oil & Gas

Principal Investigator: Kyle Gardner

Date of Application: August 15, 2025

Amount of Request: \$5,000,000

Total Amount of Proposed Project:
\$10,000,000

Duration of Project: 21 months

Point of Contact (POC): Kyle Gardner

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ABSTRACT

Objective: Cobra Oil & Gas Corporation (Cobra) is seeking funding from the North Dakota Industrial Commission (NDIC) Oil and Gas Research Program (OGRP) for a research project to evaluate enhanced oil recovery (EOR) and advanced completion methods to increase oil production from tight carbonate reservoirs such as the lower Interlake Formation of the Stoneview Field in western North Dakota. The goal of the project is to identify and implement methods to increase the recovery factor of tight carbonate reservoirs through reservoir characterization and numerical simulation of different completion, stimulation, and EOR scenarios. The Stoneview-Stonewall Unit (SSU), with existing vertical and horizontal wells, provides an opportunity for field validation of modeled EOR, completion, and stimulation strategies that can be replicated in other tight reservoirs across North Dakota, including the Bakken petroleum system (Bakken).

Expected Results: The expected results will be field-validated operational and completion strategies for optimizing oil production for the lower Interlake Formation case study. Although the work will focus on the project field operated by Cobra, the learnings from this project will establish baseline operational EOR and completion strategies for oil production from the many other tight reservoirs throughout the Williston Basin, including the Bakken.

Duration: The anticipated project duration is 21 months (October 1, 2025 – June 30, 2027).

Total Project Cost: The total project cost is \$10,000,000. Cobra is requesting \$5,000,000 from NDIC OGRP. Cobra is providing \$5,000,000 of cost share.

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

PROJECT DESCRIPTION

Cobra Oil & Gas Corporation (Cobra) operates the Stoneview-Stonewall Unit (SSU) of Divide County, ND, as shown in Appendix A (Figure A-1), which, based on estimated remaining resource and previous gas and water flooding results, is an excellent candidate for evaluation and implementation of enhanced oil recovery (EOR) and advanced completion strategies. The SSU is unitized for the Salisbury interval of the lower Interlake Formation at Stoneview Field and contains both vertical and horizontal wells (Figure A-2). Statewide, the stratigraphically similar Interlake and Stonewall pools have produced approximately 83.6 million barrels of oil from 355 wells according to Department of Mineral Resources production records, with an average of ~235,500 barrels of oil per well. The Salisbury provides an analog for tight Williston Basin carbonates, and successful EOR and completion strategies will have impacts for conventional (e.g., Mission Canyon) and unconventional plays (e.g., Bakken–Three Forks) across the state.

Interlake productivity within Stonview Field was discovered by Anschutz in 1990 (Petzet, 1991). In 1991, Conoco obtained full interest of the Stoneview Interlake and formed the SSU in 1994 to implement a natural gas flood. Through reservoir characterization, Conoco concluded the SSU to be an oil-wet reservoir with a solution gas drive. Solution gas drives in oil-wet reservoirs typically yield lower primary recovery over water drives, and traditional waterflooding is not effective compared to water-wet reservoirs. Conoco began a natural gas injection in 1995 after primary recovery waned. Injection ended after 18 months, prior to any gas breakthrough, with oil production increasing for affected wells even after injection stopped. A waterflood of the field was later attempted by an operator prior to Cobra with no flood breakthrough or reserve sweep occurring, resulting in pressure maintenance of the reservoir. In addition to Conoco's natural gas flood study, in 2003 a reservoir study was conducted for CO₂ flooding the SSU, concluding that an additional 30+ years of incremental production could be possible. None of the CO₂ study recommendations were enacted.

Since July 2018, Cobra has operated the SSU and diligently collected bottomhole pressure recordings and acoustic fluid levels of producing wells. Pressure and fluid level data indicate a bottomhole pressure of ~3300 psi, which exceeds calculated bubble point pressure. Cobra is investing in redevelopment of the SSU and believes the outcomes of the proposed project will ensure the viability of EOR and advanced completion techniques to increase oil production and recovery along with informing EOR strategies for ND's many tight carbonate conventional and unconventional reservoirs.

EOR working fluids like CO₂, rich gas, natural gas liquids (NGL), and surfactants all work to change oil behavior within the reservoir to improve mobility. Currently, surfactants have a low cost and easier operational advantage over other EOR methods (Jin and others, 2025) and can be injected to alter the rock wettability within the reservoir, increasing performance of water floods. To evaluate the alteration of reservoir wettability via surfactants, the team will perform lab testing and simulation of various surfactant fluid formulations with best-performing surfactants used to treat the reservoir along with Cobra-planned stimulation and injection operations. Finding a surfactant that works well for SSU is likely to extend to other reservoirs within the Williston Basin with similar temperatures, pressures, and salinity. Lab testing and computer modeling will assess reservoir response to other EOR methods (e.g., CO₂, rich gas, and NGL) to identify their efficacy. CO₂, rich gas, and NGL are appealing, and if they become more cost-effective, both the Dakota Gasification Company (DGC) CO₂ pipeline and the Kinder Morgan Norse natural gas plant are within the boundary of the SSU (Figure 1).

Any production, injection, or stimulation operation for EOR

requires controlled take points and injection points within the wellbore. In openhole horizontal wells, a liner system with stages of actuating sleeves could increase this control. The Energy & Environmental

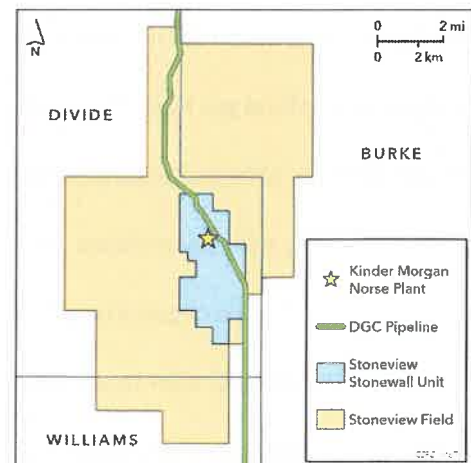


Figure 1. Stoneview Field map illustrating the proximity of the DGC pipeline and Norse gas plant to the SSU.

Research Center (EERC) is working to acquire an interval control valve (ICV) system, valued at over \$800K, that has a very high likelihood of being installed and demonstrated through this effort. The ICV system would allow for highly controlled injection of EOR fluids along a horizontal well with the goal of optimizing oil production within the wellbore. In addition, deployment of the ICV system would allow the project team to bring funding from the U.S. Department of Energy to the project.

Objectives: Cobra is seeking to investigate approaches and strategies to increase oil recovery within tight carbonate reservoirs using the SSU in ND as an analog. The field is a tight carbonate reservoir with porosities ranging from 2% to 15%, permeabilities between 1 and 10mD, and high specific gravity oil (46° API). To increase the recovery factor for the field, laboratory testing, reservoir characterization, and numeric simulation will evaluate different completion and EOR scenarios and test optimization strategies with tasks defined in this proposal to work in conjunction with field testing for feedback of potential EOR and completion strategies. Viable strategies will have implications for other tight carbonate Williston Basin reservoirs in ND.

Methodology: This project will incorporate data gathering and processing, laboratory analysis, modeling and simulation, and field testing to determine optimized EOR operations and completion strategies for production from the SSU. The work will be conducted in five tasks leading to the successful completion of the stated project goal. Tasks 1–4 will be led by the EERC, which has experience in each of the tasks. The EERC’s letter of support is found in Appendix B. Task 5 will be led by Cobra. Specific activities under each task are defined in the following:

Task 1 – Data Assembly: The EERC will collaborate with Cobra on data assembly to identify knowledge gaps, including data necessary for subsequent tasks. Activities in this task include collecting and conditioning public and Cobra-provided well data (e.g., well logs, core analysis) and review of assembled data for gap analysis. This will include the assessment of core data available in the Wilson M. Laird Core

and Sample Library in Grand Forks, ND. Data gathered will be summarized in maps, statistics, and PowerPoint slides to be used as input data in other tasks.

Task 2 – Reservoir Characterization: The EERC will collaborate with Cobra to create a field-scale geologic model for the lower Interlake of the Stoneview Field. This will include petrophysical evaluations and stratigraphic correlation, leveraging existing core data and geophysical well logs. Petrophysical interpretations and core analyses will be used to populate the geologic model with applicable properties (e.g., lithofacies, porosity, permeability, and saturations). Petrophysical property uncertainty analyses will be conducted to create a suite of geologic models. As applicable, a geomechanical review of the lower Interlake will be completed to better understand drilling and hydraulic fracturing. Results will be provided in maps, well interpretations, summaries of models and uncertainty analysis, applicable geomechanical summaries, and a knowledge gap assessment with data collection recommendations.

Task 3 - Laboratory Measurements: The EERC will collaborate with Cobra to collect rock and fluid samples to acquire fundamental data to develop reservoir simulation models for the evaluation of EOR effects from various working fluids (e.g., surfactants, rich gas, NGL, CO₂). Tests will be performed on rock samples from existing core available in the Wilson M. Laird Core and Sample Library. Testing will include gas chromatography (GC), minimum miscibility pressure (MMP), rock wettability, and fluid interfacial tension (IFT) to develop reservoir models and assess fluid flow within the reservoir. Oil and gas samples from the reservoir will be characterized using qualitative and quantitative GC compositional analyses. CO₂ and NGL MMP will be measured to determine reservoir pressures required to achieve miscible flooding. Rock wettability (contact angle) and IFT will be collected to identify fluid forces controlling flow within the reservoir and are useful for evaluating surfactant effectiveness for oil production in oil-wet rocks. Sequential flow-through testing will use water, surfactant, CO₂, and NGL to assess potential ultimate oil recovery for representative core samples of the reservoir. Deliverables from this work will be summarized in tables and appropriate graphics for each laboratory result.

Task 4 – Numerical Simulation for Production Optimization: The EERC will coordinate with Cobra to evaluate strategies to optimize production from the oil-wet field using numerical simulation to assess different EOR methods. The EERC-proposed activities will include the creation of a fluid model based on available pressure, volume, temperature data for the reservoir; calibration of the geologic models from reservoir characterization through a history-matching process using historical operational data for the selected field; and conducting predictive simulations designed to improve oil production from the field using advance completions and EOR methods. Working with Cobra, the EERC will develop a simulation framework and case matrix of strategic scenarios for numerical evaluation. Suggested scenarios include evaluating production changes from recompletion, operational changes, and responses from EOR methods (e.g., surfactant, rich-gas, NGL, CO₂). A sensitivity analysis will inform plans to optimize potential EOR design and support field development. Results from this task will include predicted incremental oil production and associated pressure response for the cases investigated and learnings from the sensitivity analysis, including a recommended optimization strategy.

Task 5 – Data Collection and Field Testing: To facilitate Tasks 2, 3, and 4, additional data collection may be required to fill knowledge gaps or test hypotheses against field results. Activities for this task will be discussed and designed based on Cobra's planned operations. Activities for the task could include:

- Well testing and operational changes to existing wells.
- Additional testing of existing cores and geophysical well logging.
- Hydraulic fracturing and acidized stimulation testing.
- Downhole liner system with actuating sleeves and packer isolation equipment.

Anticipated Results: Anticipated results of this project will be field-validated operational and completion strategies for optimizing oil production for the SSU. Based on current reservoir volumetric and pressure levels, the SSU could add 20+ years of incremental production to the field with a successful EOR project. Although the work will focus on the project field operated by Cobra, the learnings from this project will

establish baseline operational EOR and completion strategies for oil production from tight carbonate and other unconventional reservoirs throughout the Williston Basin, including the Bakken.

Facility, Resources, and Techniques to Be Used, Their Availability and Capability: Field efforts will take place at the Cobra-operated SSU in Divide County. Cobra brings operational knowledge, 17 operated wells (seven horizontal), tank batteries, gathering systems, previously recorded data and results, well records, and technical project field knowledge to the proposed project. At the time of this application, Cobra does not propose to drill any new wells within the project field.

Cobra's ND technical team offers over 100 years of total engineering experience and over 50 years of geological experience providing institutional knowledge and production expertise. Among technical team capabilities are advanced petrophysics, reservoir engineering, operations engineering, drilling engineering, advanced geophysics, and 8 years of dedicated research into the lower Interlake Formation. Cobra's field team offers over 100 years of field supervision experience with employee experience in ND operations, facilities construction, digital analytics, completions supervision, downhole fishing, and lease operations. Cobra also offers use of DrillingInfo, PRAMS, PHDWin, Petra, and Kingdom software subscriptions for the project. Cobra provides well-testing operations, remote production monitoring, and Echometer equipment for dynamometers and fluid levels.

Project partner EERC employs a multidisciplinary staff of about 270 employees and has 254,000 square feet of state-of-the-art offices, laboratories, and technology demonstration facilities. EERC engineering and scientific research staff are equipped with cutting edge analytical, modeling, and engineering facilities. The EERC has extensive geologic modeling and reservoir simulation capabilities, including high-end workstation computers and a dedicated high-performance computing cluster. The project team has access to commercial-grade software for use in geologic modeling, process modeling, and numerical simulation and database capabilities for managing data collected and generated during the project. The EERC has designed and implemented field activities including the drilling of stratigraphic

test wells, collection of core samples, industry-standard and advanced downhole geophysical logging, downhole pressure and temperature monitoring, and collaboration with industry partners on field pilots to evaluate EOR techniques in the Bakken play. EERC laboratory facilities may be utilized through this effort for routine and advanced core analysis, including petrophysical, petrographic, geochemical, and geomechanical rock analysis.

Core descriptions and studies will be conducted on existing core housed at the Wilson M. Laird Core and Sample Library in Grand Forks, ND.

Environmental and Economic Impacts while Project Is Underway: These proposed activities are not anticipated to have any significant environmental or economic impacts above and beyond normal operations of oil and gas wells. Cobra has upgraded remote monitoring equipment on facilities for production fluid levels and emergency shut-offs.

Ultimate Technological and Economic Impacts: Because the SSU is a productive oil-wet conventional reservoir with conditions analogous to other tight carbonate reservoirs within ND, the successful demonstration of EOR and improved well completion methods through the proposed effort would provide the oil and gas industry with strategies to revitalize ND's conventional reservoirs and provide insight to support EOR deployment in the Bakken petroleum system. A 2014 study focused only on 86 unitized conventional oil fields in ND estimated an incremental oil recovery potential between 280 and 630 million barrels using tertiary EOR (ND Legislative Management, 2014). Unlocking unrecovered reserves in ND's conventional and unconventional oil reservoirs would yield generational socioeconomic impacts to the state through the growth of direct and indirect labor markets, increased income for mineral owners, and increased tax revenues for the state.

Why the Project Is Needed: Significant resources remain in ND's conventional oil reservoirs; however, there have been a lack of investment and an associated decline in production in conventional fields resulting from industry's shift in focus away from conventional reservoirs to the Bakken. Because of

Cobra's willingness to use the SSU field as a case study for EOR, the proposed project will provide the oil and gas industry with data and technical insight needed to revitalize and extend oil production in ND's many tight reservoirs, including both conventional reservoirs as well as the Bakken. Initial EOR efforts within the SSU have a proven track record of success with limited follow-through allowing for experimental geological models and numeric simulations to provide a road map to better assess EOR working fluids (e.g., CO₂, rich gas, NGL, surfactant) and completion methods to be tested in the field. The project will result in workflows and best practices that prolong field life, guarantee resources are fully utilized, and ensure long-term economic growth throughout the state.

All references can be found in Appendix C.

STANDARDS OF SUCCESS

Success will be measured according to the timely achievement of project milestones and development of deliverables that meet the goals of the project. The value to ND is improved understanding of the Interlake Formation with respect to future well operations and increased oil production along with gained knowledge of EOR methods and working fluids for Williston Basin tight carbonate reservoirs. Results may directly influence industry practices and improve oil recovery from EOR that could increase job opportunities and income revenue for ND and its citizens.

BACKGROUND/QUALIFICATIONS

Summary of Prior Work: After acquiring the SSU in 2018, Cobra began routinely acquiring downhole pressure data via wireline measurements and acoustic fluid levels. Cobra has executed geological and petrophysical studies within the SSU and the Interlake Formation along the Nesson Anticline. From a material balance review and decline curve analysis, the field has significant remaining oil in place that will require additional development, recompletion, EOR methods, or a combination of all three.

Experience and Qualifications: Cobra is a privately held independent oil and gas company based in Wichita Falls, Texas, and has been in business for approximately 50 years. Cobra has a legacy of using

innovative geological, geophysical, and engineering technologies for exploration discoveries and operational advancements. Cobra has operated wells in 14 different states and internationally. With previous success in the Mission Canyon Formation starting in 2015, Cobra expanded its asset position in 2018 and now operates in 10 counties of North Dakota. Cobra operates wells that produce exclusively from 12 different Williston Basin conventional formations. In 2018, Cobra acquired the SSU as part of asset expansion and began evaluating the reservoir and legacy waterflood. Cobra began researching the reservoir characteristics of the lower Interlake Formation, with emphasis on wettability, field pressures, pore structure, and permeability. Cobra's Williston Basin focus for enhancing well productivity focused on petrophysical and geological evaluation of pipe pay of conventional formations and stressing of fundamental operating techniques. Cobra employs a technical staff of three full-time geologists and five full-time engineers.

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

Personnel: Mr. Kyle Gardner, Cobra Vice President of Engineering, will serve as project manager and lead Cobra activities. Mr. Gardner will be supported by Mr. Josh Aaron and Mr. Bud Dillard, Cobra Geologists. Mr. Matthew Belobraydic, EERC Assistant Director for Geosciences, will oversee the entire project. Mr. Belobraydic will have project support from Dr. Lu Jin, EERC Distinguished Reservoir Engineer, and Mr. Jamie Schod, EERC Research Manager. Project advisors from the EERC include Dr. John Harju, EERC Vice President for Strategic Partnerships, and Ms. Bethany Kurz, EERC Director of Subsurface Characterization and Data Analytics. Resumes of key personnel are included in Appendix D.

MANAGEMENT

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

TIMETABLE

Proposed project duration is 21 months with a tentative start of October 1, 2025, and ending of June 30, 2027. The timeline in Figure 2 has expected timing and duration of each task. The timeline will be adjusted if funding from NDIC OGRP is received after October 1, 2025.

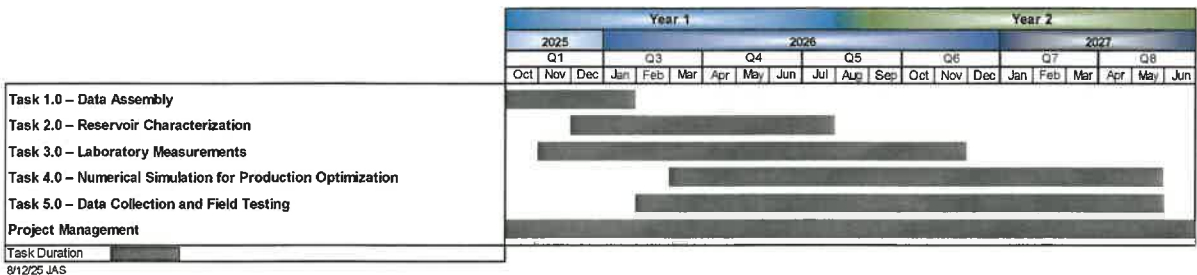


Figure 2. Project Timeline.

BUDGET

The total estimated cost for the proposed scope of work (SOW) is \$10,000,000. The request from OGRP is \$5,000,000. Cobra will provide \$5,000,000 in cash cost share toward the project. The budget provided in the table below was developed based on estimates for the SOW and similar project experience.

Associated project expenses are driven from the five tasks listed in the methodology section. This project has significant laboratory, simulation, and field components designed to gather necessary data and test reservoir response hypotheses of different EOR and completion techniques. In addition, there is a very high likelihood of substantial cost share being provided by an existing EERC project with DOE, the details of which are in the final stages of negotiation and are unable to be explicitly shared at this time.

Project-Associated Expense	NDIC Share	Cobra Share (cash)	Total Project
Labor – Engineering and Field	\$427,270	\$427,270	\$854,540
Facilities, Equipment, Gathering	\$235,000	\$235,000	\$470,000
Stimulation	\$750,000	\$750,000	\$1,500,000
Field Services – Rigs, Wireline, Testing, Coil	\$900,000	\$900,000	\$1,800,000
Downhole Production Equipment	\$1,250,000	\$1,250,000	\$2,500,000
Subcontractor – EERC	\$1,437,730	\$1,437,730	\$2,875,460
Total Project Cost	\$5,000,000	\$5,000,000	\$10,000,000

If less funding is available than requested, the project scope can be scaled down. For example, the model area can be reduced, fewer EOR strategies can be assessed, or lab scenarios can be removed. Reduced scope may only be a partial answer for operational strategies to optimize oil production for the lower Interlake Formation. Recommendations from the reduced scope will focus on remaining knowledge gaps. Project applicability to other Williston Basin plays and fields will be more uncertain.

AFFIDAVIT OF TAX LIABILITY

Cobra has no outstanding tax liability to the state of ND or any of its political subdivisions.

CONFIDENTIAL INFORMATION/PATENTS/RIGHTS TO TECHNICAL DATA

No confidential information is in this proposal. No patentable technologies are expected from this work.

STATUS OF ONGOING PROJECTS

Cobra has Contract G-058-144, “Maximizing Production from Residual Oil Zones in Western ND,” and Contract G-061-119, “Maximizing Lateral Well Oil Production from Conventional Carbonate Mission Canyon Reservoirs in ND,” funded through OGRP in progress. These projects are in good standing, current with reporting, within scope and budget, and projected to be delivered on time.

