

Technical Reviewers' Rating Summary

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| Proposal Number | G-61-02 |
| Application Title | Maximizing Lateral Well Oil Production from Conventiaonal Carbonate Mission Canyon R... |
| Submitted By | Cobra Oil & Gas Corporation |
| Request For | \$1,000,000.00 |
| Total Project Costs | \$2,000,000.00 |

Section A. Scoring

| Statement | Weight | G-61-02A | G-61-02B | Avg. Score |
|------------------------------|--------|------------|------------|------------|
| 1. Objectives | 9 | 3 | 2 | 22 |
| 2. Achievability | 7 | 3 | 3 | 21 |
| 3. Methodology | 8 | 4 | 3 | 28 |
| 4. Contribution | 8 | 4 | 2 | 24 |
| 5. Awareness / Background | 5 | 5 | 4 | 22 |
| 6. Project Management | 3 | 4 | 3 | 10 |
| 7. Equipment / Facilities | 2 | 3 | 3 | 6 |
| 8. Value / Industry - Budget | 4 | 4 | 3 | 14 |
| 9. Financial Match - Budget | 4 | 3 | 4 | 14 |
| Avg. Weighted Score | | 183 | 142 | 162 |
| OVERALL | | | | |
| FUND | | X | | |
| TO BE CONSIDERED | | | X | |
| DO NOT FUND | | | | |

Section B. Ratings and Comments

1. The objectives or goals of the proposed project with respect to clarity and consistency with North Dakota Industrial Commission/Oil and Gas Research Council goals are:

“The project will attempt to mitigate and reduce water production while minimizing loses in oil and natural gas production. The method proposed will involve the installation of mechanical downhole isolation using a liner, with laterally spaced open-hole packers, to divide the wellbore into segments. Testing of each segment will be accomplished by opening and closing mechanically operated ports located in each wellbore segment.”

- Reviewer: G-61-02A

- Rating: 3 (Clear)

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- Applicant

“The project objectives are somewhat unclear as the standards of success lacks a benchmark from which success itself can be measured. Any meaningful improvement in production is assumed to be the project goal.”

- Reviewer: G-61-02B

- Rating: 2 (Unclear)

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- Applicant

2. With the approach suggested and time and budget available, the objectives are:

“While the mechanical installation of a liner with open-hole packers in an existing open-hole lateral isn't new science or technology, it isn't without risk either. As is the case with any liner running operation, preparation and cleaning of the lateral is good practice, but not as simple in a partially depleted formation. Additionally, naturally fractured and vuggy carbonates can be difficult to isolate with open-hole packers, so the packer seating area and actual open-hole size in that location will be important considerations. Natural fracture orientation versus wellbore lateral azimuth will have a strong bearing on success of isolation. A more northwest to southeast the azimuth the better the odds of success. All of these risk variables and associated costs can often be reduced with adequate research of wellbore information from well logs, MWD, LWD, and mud-logs, etc.”

- Reviewer: G-61-02A

- Rating: 3 (Likely Achievable)

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- Applicant

“The objectives are likely achievable with the assumed budget.”

- Reviewer: G-61-02B

- Rating: 3 (Likely Achievable)

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- Applicant

3. The quality of the methodology displayed in the proposal is:

“While running a liner and even using open-hole packers is not revolutionary science or technology, it is relatively rare in the Williston Basin, as a water-cut mitigation technique. More commonly, it is deployed as a selective stimulation system or selective injection control, but the installation requirements and methods are very similar, so I don't anticipate much concern there, as long as the upfront evaluation, cleanout, etc., is done. The EERC should have access to all the available wellbore data for adequately researching well candidates.”

- Reviewer: G-61-02A

- Rating: 4 (Above Average)

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- Applicant

“The quality of methodology in the proposal is somewhat lacking in detail as to how it will specifically address the water coning issue with the open hole packer systems.”

- Reviewer: G-61-02B

- Rating: 3 (Average)

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- Applicant

4. The scientific and/or technical contribution of the proposed work to specifically address North Dakota Industrial Commission/Oil and Gas Research Council goals will likely be:

“The successful demonstration of a technically and economically feasible method to re-enter many of the existing open-hole carbonate formations in the Williston Basin would increase existing recoverable reserves, tax proceeds, and jobs for all operators with qualified candidate wells.

It must be noted that although this candidate horizontal well lateral is in the Madison carbonate, there are several other carbonate formations within the Williston basin that have been completed in the past with horizontal open-hole laterals. Those formations, like the Birdbear (Nisku), Duperow, Winnepegosis, Interlake, Stonewall, Gunton, and Red River, may also see a benefit with this science and technology, perhaps even coupled with stimulation. Using this technology in the deeper and significantly higher temperature and pressure reservoirs in the future, even deeper Madison reservoirs located on the west side of the basin, will determine the viability of the wellbore isolation technique under more rigorous wellbore conditions.”

- Reviewer: G-61-02A

- Rating: 4 (Very Significant)

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- Applicant

“As this is a single field test, it is somewhat doubtful that this can be transferred to other Mississippian fields as reservoir drive mechanisms vary widely across the Williston basin. This is likely to benefit Cobra more than other operators.”

- Reviewer: G-61-02B

- Rating: 2 (Small)

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- Applicant

5. The background of the principal investigator and the awareness of current research activity and published literature as evidenced by literature referenced and its interpretation and by the reference to unpublished research related to the proposal is:

“The EERC has a long and successful history of operating research projects within the oil and gas sector of North Dakota. The researchers have published numerous papers and publications concerning nearly all phases of upstream oil and gas activity. The members of the EERC team will do the heavy lifting for the majority of the initial 3 phases of the project. EERC will coordinate with Cobra, as needed, to fill in missing data, gather necessary new data, and help the EERC understand and evaluate production data. Cobra will do the heavy lifting in regard to supervision of the installation and operation of the liner, and mechanically actuating isolation ports as needed. The EERC will assist with evaluation of the oil, gas, and water production data during the testing phase.”

- Reviewer: G-61-02A

- Rating: 5 (Exceptional)

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- Applicant

“The background the of the EERC and Cobra personnel on this project is impressive.”

- Reviewer: G-61-02B

- Rating: 4 (Better Than Average)

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- Applicant

6. The project management plan, including a well-defined milestone chart, schedule, financial plan, and plan for communications among the investigators and subcontractors, if any, is:

“The majority of the project will have some degree of oversight by EERC, so it seems likely that feedback between the EERC team and the Cobra staff should be continuous. The proposed timetable seems reasonable, with an extended time for equipment installation, which may be handy for the deep cold winter months with potential frost law restrictions for state and county roads in the area.”

- Reviewer: G-61-02A

- Rating: 4 (Very Good)

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- Applicant

“The project management plan was not overly detailed but clear.”

- Reviewer: G-61-02B

- Rating: 3 (Adequate)

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- Applicant

7. The proposed purchase of equipment and the facilities available is:

“The purchased equipment, although not described in great detail would be necessary for the project.

Liners run in laterals, especially if the build section is a relatively sharp curve, may necessitate a premium pipe connection, as well as the open-hole packers and mechanical ports, if the premium connection is needed for the entire liner length. Those would escalate the cost if not already considered. Stimulation cost is listed, but except for a very minimal comment, no details are included concerning the type of stimulation expected or proposed. Considering the carbonate nature of the reservoir, and the desire to minimize vertical water coning, I would anticipate some type of matrix acidizing treatment, but that is not mentioned.”

- Reviewer: G-61-02A

- Rating: 3 (Justified)

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- Applicant

“The proposed purchase of equipment was justified but lacked detail.”

- Reviewer: G-61-02B

- Rating: 3 (Justified)

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- Applicant

8. The proposed budget “value”¹ relative to the outlined work and the commitment from other sources is of:

“The suggested optimized work, determined by the evaluation of the project results, would eventually become standard practice in the field, if found to be successful in feasibly and economically increasing reserves. Currently, few operators are spending capital to produce, let alone optimize recovery, from the many oil and gas productive reservoirs in the Williston Basin not named Bakken or Three Forks. This is a good opportunity to research the viability of accessing those potential reserves and encourage others to consider developing those neglected reserves.”

- Reviewer: G-61-02A

- Rating: 4 (High Value)

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- Applicant

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- Reviewer: G-61-02B

- Rating: 3 (Average Value)

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- Applicant

9. The “financial commitment”² from other sources in terms of “match funding” have been identified:
“The matching value of 50% is stated to be \$1,000,000, and distributed equally with the same NDIC share, in each listed cost share category.”

- *Reviewer: G-61-02A*

- *Rating: 3 (Average Value)*

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- *Applicant*

“The financial commitment is 50% does exist in this project.”

- *Reviewer: G-61-02B*

- *Rating: 4 (High Value)*

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- *Applicant*

General Comments

“Overall, I like the idea that some operator is making an effort to extend the life of a non-core reservoir property ignored by the majority of operators pursuing the Bakken and Three Forks.

Often, the operators have no idea they even exist because they have only become involved in the Williston Basin in the last 15 years or so and only hear about the Bakken and Three Forks.

Further complicating that issue is the fact few engineers or geologists exist in the area who have ever worked the other 20 or so oil and gas producing formations in the basin, let alone heard of them.

With very few well penetrations being drilled past the Three Forks, very few geologists, log analysts, mud loggers, mud engineers, drilling engineers, etc., are still working, who helped solve the reservoir or formation issues that exist below the Bakken or Three Forks.

We need a reason for the money people to take a look at these again, and if successful, this might be a catalyst to get that ball rolling.”

- Reviewer: G-61-02A

“As a field-wide test, this project is likely to benefit Cobra in their increased production in the Wayne field itself. The likelihood of knowledge transfer to other Mississippian fields is probably somewhat low given the range of reservoir mechanisms present.”

- Reviewer: G-61-02B

1 “value” – The value of the projected work and technical outcome for the budgeted amount of the project, based on your estimate of what the work might cost in research settings with which you are familiar. A commitment of support from industry partners equates to a higher value.

2 “financial commitment” from other sources – A minimum of 50% of the total project must come from other sources to meet the program guidelines. Support less than 50% from Industrial Commission sources should be evaluated as favorable to the application; industry partnerships equates to increased favorability.