

Technical Reviewers' Rating Summary

Proposal Number **G-58-03** Application Title **Bakken Production Optimiza** Submitted By
EERC Request For **\$6,000,000.00** Total Project Costs
\$12,000,000.00

Section A. Scoring

Statement	Weighting Factor	G-58-03A	G-58-03B	G-58-03C	Average Weighted Score
1. Objectives	9	5	4	5	36
2. Achievability	7	4	4	4	28
3. Methodology	8	4	4	5	32
4. Contribution	8	5	3	4	32
5. Awareness / Background	5	5	5	4	20
6. Project Management	3	3	4	5	12
7. Equipment / Facilities	2	3	3	4	6
8. Value / Industry - Budget	4	4	3	5	16
9. Financial Match - Budget	4	3	3	5	12
Average Weighted Score		213	187	228	209
	Total: 50				250 possible points

OVERALL RECOMMENDATION

FUND **X X X**
 FUNDING TO BE CONSIDERED
 DO NOT FUND

Section B. Ratings and Comments

- 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 goals and objectives of BPOP are very consistent with most of the OGRP goals and purposes. The proposal objectives align very well with the following stated goals: -Promote efficient, economic, and environmentally sound exploration, development, and use of North Dakota's oil and gas resources. -Preserve and create jobs involved in the exploration, production and utilization of North Dakota's oil and gas resources. -Ensure economic stability, growth, and opportunity in the oil and gas industry -Encourage, and promote the use of new technologies and ideas that will have a positive economic and environmental impact on oil and gas exploration, development, and production in North Dakota. -Positively effect ultimate recovery from North Dakota's existing oil and gas pools. -Preserve existing jobs and production levels. -Identify oil and gas exploration and production technologies presently not used in North Dakota. -Develop baseline information that will lead to other projects, processes, ideas, and activities.

- Reviewer: G-58-03A
 - Rating: 5

Goals and objectives align well with the ND OGRP and the state of ND oil and gas regulatory policy. The goals and objectives mesh well with previous projects and should continue the very successful program into the future. Economic and environmental goals will help with several key goals of the state of ND.

- Reviewer: G-58-03B

- Rating: 4

EERC is nationally well known for its professionalism and clarity in its research and its grant proposals.

- Reviewer: G-58-03C

- Rating: 5

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

I have no concerns about the adequacy of the proposed approach, timeline, or budget to achieve the stated objectives. Considering the extensive program history, I recommend reviewing past BPOP actions to assess the level of success achieved and determine if it meets the desired standards.

- Reviewer: G-58-03A

- Rating: 4

The EERC has a proven track record of completing projects within the scope of budget and time, while producing useful data for the industry and public.

- Reviewer: G-58-03B

- Rating: 4

While every project can encounter delays or unanticipated roadblocks, EERC has a track record of being close to the mark.

- Reviewer: G-58-03C

- Rating: 4

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

I did not identify any significant omissions and have no reservations about the proposed methodology. The EERC team, and partners, should be fully capable of carrying out the tasks. Moreover, the EERC facilities and the available technical resources are more than sufficient to meet the outlined tasks and goals.

- Reviewer: G-58-03A

- Rating: 4

The EERC has access to state-of-the-art laboratory and computer software, in their facility, to use to develop, monitor, analyze, and model the results of their field tests. They will be continuing some of their existing work as well as continuing to develop new and improved processes and technologies.

- Reviewer: G-58-03B

- Rating: 4

EERC is widely respected for its scientific design proposals and methodologies. Nothing within this proposal appears to be outside of the success scope for BPOP.

- Reviewer: G-58-03C

- Rating: 5

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:

If North Dakota is to continue as a dominant energy producer, recovery technology and techniques will need to evolve. The best estimates are that industry is recovering 12-18% of the OOIP with today's technology. Even modest advancements in production strategies could add decades of life to this world-class oilfield. I believe the first nine years of BPOP were very successful and that the focus areas for BPOP 4.0 will yield significant value for the industry's future.

- Reviewer: G-58-03A

- Rating: 5

A significant portion of the proposed projects are continuations of existing projects, so the improvements and developments will likely be incremental, as opposed to producing large technological step changes.

- Reviewer: G-58-03B

- Rating: 3

Reducing the oil and gas industry's carbon footprint is a significant accomplishment, in and of itself. EOR utilization of carbon dioxide in the process has the potential to bring worldwide acclaim for ND's ingenuity. Capturing tank vapors using Polar Bear is another area of national interest. Its implications for EPA methane rules and environmental concerns are significant to the O&G industry's social license to operate within our state and nation.

- Reviewer: G-58-03C

- Rating: 4

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 team at the EERC is exceptionally well-suited for the work described in the proposal. In my opinion, no other organization is as suitable or capable of carrying out the outlined tasks.

- Reviewer: G-58-03A

- Rating: 5

The principal investigator has decades of experience in this type of research and has the support of other seasoned researchers and personnel with real-world experience in the oil and gas production sector.

- Reviewer: G-58-03B

- Rating: 5

No comment

- Reviewer: G-58-03C

- Rating: 4

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:

Based on the proposed work, the schedule and financial outline seem suitable. Currently, there is no cause for concern, and I would trust in the NDIC/OGRP's previous projects involving the EERC as indicators of their success in adhering to timelines, budgets, and maintaining effective communication.

- Reviewer: G-58-03A

- Rating: 3

The plan is quite detailed and likely the result of this project's continuation of similar long-standing oil and gas projects with proven track records.

- Reviewer: G-58-03B

- Rating: 4

All these requirements are well laid out within the proposal.

- Reviewer: G-58-03C

- Rating: 5

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

The application budget does not include any specific equipment purchases apart from routine expendables (documentation, software, lab analysis, etc). The EERC's world-class facilities and resources are more than sufficient to undertake the outlined scope of work.

- Reviewer: G-58-03A

- Rating: 3

The equipment purchase appears to be related to a DOE awarded research project called Polar Bear.

- Reviewer: G-58-03B

- Rating: 3

With several major producers within the Bakken participating in the BPOP program, most of the equipment and facilities are provided as in-kind donations to the project.

- Reviewer: G-58-03C

- Rating: 4

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

Given the significant level of industry engagement and backing, it seems highly likely that both the state and industry will obtain substantial value for the funds expended. The previous nine years of BPOP have provided significant value for numerous stakeholders, and I believe that the next 4.0 phase will produce comparable outcomes.

- Reviewer: G-58-03A

- Rating: 4

The industry support is largely in-kind contributions from partners in the project for two field projects, associated labor contributions, and \$1 Million from the DOE award for the included Polar Bear research project. The in-kind value is estimated at nearly 40% of the total project cost of \$12 million. The expected research cost versus potential deliverables over the duration of the project appears to be reasonable and normal.

- Reviewer: G-58-03B

- Rating: 3

EERC and BPOP together provide a well-thought-out budget for execution of the proposal.

- Reviewer: G-58-03C

- Rating: 5

9. The "financial commitment"² from other sources in terms of "match funding" have been identified:

It appears the applicant's industry and DOE matching funds are at the threshold to meet the minimum program requirements. Although it is challenging to quantify in monetary terms, I firmly believe that the BPOP partners bring immense value to the overall goals and objectives of the proposed work.

- Reviewer: G-58-03A

- Rating: 3

The commitment of in-kind industry partner contributions and the DOE Polar Bear award meet the 50% match funding, as proposed.

- Reviewer: G-58-03B

- Rating: 3

EERC and BPOP together provide a well-thought-out budget for execution of the proposal.

- Reviewer: G-58-03C

- Rating: 5

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.

General Comments

Based on the accomplishments of the first nine years, I strongly support the continuation of BPOP. The program's mission is closely aligned with that of the OGRP, and it has consistently delivered substantial value to the stakeholders who rely on the success of North Dakota's petroleum industry. BPOP's track record of success and its ability to cater to the needs of various stakeholders make it a worthy endeavor that should be continued. I commend the joint efforts of the EERC and industry in establishing the key areas of emphasis for BPOP 4.0. Among the many important topics included in BPOP 4.0, I feel the continued efforts towards developing a commercial CO2 EOR strategy for the Bakken/Three Forks will be of highest value.

- Reviewer: G-58-03A

The project is a continuation of the long running and successful Bakken Production Optimization program operated by the EERC, and this extension should continue to produce valuable insight and recommendations into the most efficient, economical, and environmentally friendly use of this ND resource.

- Reviewer: G-58-03B

This proposal is exciting for the industry and for North Dakota. As in the past, BPOP and EERC will increase the scientific data set for the industry and regulators to use as a roadmap for future oil and gas development and optimization.

- Reviewer: G-58-03C