Technical Reviewers' Rating Summary

Proposal Number G-55-02 Application Title Development of Formulations Submitted By University of North Dakota Request For $451,427.00 Total Project Costs $1,603,163.00

Section A. Scoring

Statement	Weighting Factor	G-55-02B	G-55-02A	G-55-03C	Average Weighted Score
1. Objectives	9	**4**	**4**	**4**	**36**
2. Achievability	7	**4**	**4**	**2**	**21**
3. Methodology	8	**3**	**4**	**4**	**24**
4. Contribution	8	**3**	**4**	**4**	**24**
5. Awareness / Background	5	**4**	**5**	**4**	**20**
6. Project Management	3	**2**	**3**	**4**	**9**
7. Equipment / Facilities	2	**3**	**3**	**3**	**6**
8. Value / Industry - Budget	4	**3**	**4**	**4**	**12**
9. Financial Match - Budget	4	**4**	**3**	**3**	**12**
Average Weighted Score		**172**	**196**	**180**	**182**
	Total: 50				**250 possible points**

OVERALL RECOMMENDATION

FUND	**X**	**X**	**X**
FUNDING TO BE CONSIDERED			
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 goals for this project are clearly provided and are consistent with NDIC OGRC goals. Development of effective and economical scale inhibitors could positively impact ultimate recovery of oil and gas and meet the goal of identification of technologies.
   - Reviewer: G-55-02B
   - Rating: 4

   The goals of the project are very clear and meet the objectives of the Commission and the Oil and Gas Research Council.
   - Reviewer: G-55-02A
   - Rating: 4

   The project goal of reducing the negative impact of oil and gas well mineral scaling, on the productivity and economics of wells located in North Dakota, by creating a new and novel technique and chemistry to inhibit and remove those mineral scales, aligns very well with the goals of the NDIC/OGRC.

- Reviewer: G-55-03C
- Rating: 4

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

   The application indicates the principal investigator has developed and tested three new formulations that demonstrate superior scale inhibition results, increasing the likely hood of achieving the objectives.
   - Reviewer: G-55-02B
   - Rating: 4

   The proposed budget seems to be below what would be expected for the development of a solution to solve such a significant problem. Oil Field service companies have spent significant amounts of money to solve or eliminate this very issue.
   - Reviewer: G-55-02A
   - Rating: 4

   The proposed goals, while being very bold in scope, could be achieved, and according to the grant application, are already in motion in some areas. Even a partial success, in regard to practical and economical inhibition and removal o some of the targeted mineral scales, would result in a win for the oil and gas industry.
   - Reviewer: G-55-03C
   - Rating: 2

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

   The methodology appears to be a logical and sequential approach.
   - Reviewer: G-55-02B
   - Rating: 3

   The propose methodology is systematic and well planned in the discussions that will be made throughout the program.
   - Reviewer: G-55-02A
   - Rating: 4

   The combination of both laboratory simulation and field testing of the products appears to be quite thorough. Certainly, access to some of the petroleum engineering departments simulation equipment will provide excellent screening capabilities, unlikely to have been readily available in the past, or elsewhere today.
   - Reviewer: G-55-03C
   - Rating: 4

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:

   Development of new and superior scale inhibitors should have a significant impact on efficiency of completions and long term production. Support letters from operators and service companies support this position.
   - Reviewer: G-55-02B
   - Rating: 3

   If the project is successful, it will be a significant cost to the Oil & Gas industry.
   - Reviewer: G-55-02A
   - Rating: 4

The goals of this project involve creating new technologies that do not exist today, if successful, and as such, would be significant contributions addressing the goals of the NDIC/OGRC, in the area of scientific and technical research. Even a partial success or failure would be valuable information in the area of advancing research.
- Reviewer: G-55-03C
- 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 principal investigator appears to be well qualified based on the resume and publications provided.
   - Reviewer: G-55-02B
   - Rating: 4

   Key industry leaders are investing in the project and the UND team is clearly qualified and have the background to complete the project.
   - Reviewer: G-55-02A
   - Rating: 5

   The experience and knowledge of the principal investigator and fellow members of the team are exceptional. The coordination between researchers from different departments within UND is noteworthy and commendable, allowing optimal access and utilization of available resources at UND.
   - Reviewer: G-55-03C
   - 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:

   While a short project management plan is provided in the application, it should be more detailed and structured to insure communication takes place throughout the team involved and that adjustments and modifications to the management plan can take place in a timely and efficient manner when needed.
   - Reviewer: G-55-02B
   - Rating: 2

   The milestones chart is clear; however, financial plan is very limited as too what will be purchased and the forecasted spend will be for the project.
   - Reviewer: G-55-02A
   - Rating: 3

   The milestone chart targets, research schedule, financial plan, and communication plan have exceptional detail. The management plan is bold in scope, but the reward potential for achieving the targets is huge.
   - Reviewer: G-55-03C
   - Rating: 4

   Agreed. The intent in the proposal was to present a short but concise plan. Key elements of the management plan were spread throughout the proposal within tables in the detailed work packages (WPs) . The PI intends to consolidate these elements into a stand-alone, comprehensive project management plan (PMP).
   - Applicant

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

Purchase of equipment is a very small portion of the project cost.
- Reviewer: G-55-02B
- Rating: 3

The facilities and equipment to be used to complete the project is exists and the UND lads.
- Reviewer: G-55-02A
- Rating: 3

Equipment to be acquired is well justified within the scope of the project, and after completion of the project, will be available for future use by the university staff and students.
- Reviewer: G-55-03C
- Rating: 3

Yes! Only one critical piece of equipment that is NOT readily available (DSL) was requested.
- Applicant

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

The overall project cost appears to be reasonable as compared to the scope and effort required.
- Reviewer: G-55-02B
- Rating: 3

Major Oil & Gas produces in the Bakken play are supporting project through. financial support and technical support.
- Reviewer: G-55-02A
- Rating: 4

This type of project would be difficult to achieve outside the framework of this academic setting and access to the advanced testing facilities, so the value is likely to be high relative to other sources, even if only partially successful.
- Reviewer: G-55-03C
- Rating: 4

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

The applicants have secured significant cash and in-kind funding from operators and service companies as well as a significant commitment from UND for salaries, student tuition and equipment. The NDIC contribution will be 39% of the total funding.
- Reviewer: G-55-02B
- Rating: 4

The matching funds meet the requirements of the NDIC/Oil and Gas Research Council and the project has financial commitment from key oil & gas companies operating in North Dakota.
- Reviewer: G-55-02A
- Rating: 3

The matching funds sources are good, with a significant excess over the NDIC/OGRC contributions, although a significant fraction of the excess appears to be in-kind valuations.
- Reviewer: G-55-03C
- Rating: 3

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

This project could provide important new technology to the Williston Basin oil and gas operations and have a significant benefit by reducing operating expenses and increasing ultimate recovery of reserves. Initial testing of new scale inhibitor formulations have provided encouraging results, reducing the risk for this project achieving the objectives. The team identified appear to be well qualified. The applicants have secured supporting funding from operators, service companies and from UND so that the NDIC OGRC funding is 39% of the total. The project management plan should be more detailed and structured to insure adequate communication takes place throughout the team involved and that adjustments and modifications to the management plan can take place in a timely and efficient manner.
- Reviewer: G-55-02B

If the project is successful, it would be a major cost saving to the Oil & Gas industry and increase the favorable position of the Bakken.
- Reviewer: G-55-02A

This is a real research project and as such, should be strongly considered for funding. Additionally, the potential for this project to produce results that could potentially benefit the economy of North Dakota is significant, even if only partially successful at mitigating the costly results of mineral scales impacting the production of the oil and gas in the state. The added bonus of further enhancing the UND engineering programs for the students and faculty is substantial.
- Reviewer: G-55-03C