

# **Development of Formulations for the Removal of Scale from Oil and Gas Wells in the Williston Basin**

**Submitted by:**

**University of North Dakota**

- Total Funding Request - \$451,427**  
**Total Project Costs - \$1,603,163**  
**Project Duration: 2 years**

# PROJECT DESCRIPTION

The overall objective of this project is to advance the development of a novel oilfield antiscalant formulations specifically tailored to the predominant scalants found in the Williston Basin formation. The PI has successfully developed and tested three new formulations that have shown superior scale inhibition results compared to currently available commercial formulations.

The proposed project will result in novel formulations development to inhibit and remove calcium carbonate, halite, and pyrite scale. The project's outcomes will greatly enhance oil recovery, prolong reservoir life, reduce operation cost, and substantially minimize environmental complications caused by discharged formation water laden with significant amounts of salts and chemicals.

A UND research team comprised of UND Associate Prof. Ali S. Alshami (lead-PI), Prof. Vamegh Rasouli, Asset. Prof. Minou Rabiei, and Ph.D. students from the Chemical and Petroleum Engineering Departments at the University of North Dakota will participate in the project. Industrial partners Creedence Energy Services, Hess Corporation, and Continental Resources will support the project by providing samples and laboratory and field-testing capabilities.

## TECHNICAL REVIEWERS' RATING SUMMARY

		Technical Reviewer			
Statement	Weighting Factor	<u>G-55-02A</u>	<u>G-55-02B</u>	<u>G-55-02C</u>	<u>Average Weighted Score</u>
Objectives	9	4	4	4	36
Achievability	7	4	4	2	21
Methodology	8	4	3	4	24
Contribution	8	4	3	4	24
Awareness / Background	5	5	4	4	20
Project Management	3	3	2	4	9
Equipment / Facilities	2	3	3	3	6
Value / Industry-Budget	4	4	3	4	12
Financial Match – Budget	4	3	4	3	12
<b>Average Weighted Score</b>		196	172	180	182
<b>Maximum Weighted Score</b>				<b>250 possible points</b>	

# TECHNICAL REVIEWER TOTALS

- G-55-02A

Average Weighted Score: **196 out of 250**

**FUND**

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- G-55-02B

Average Weighted Score: **172 out of 250**

**FUND**

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- G-55-02C

Average Weighted Score: **180 out of 250**

**FUND**

# TECHNICAL REVIEWER COMMENTS

## Reviewer G-55-02A

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 has 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 ensure 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.

**Recommendation: FUND**

## Reviewer G-55-02B

Key industry leaders are investing in the project and the UND team is clearly qualified and have the background to complete the project.

**Recommendation: FUND**

## Reviewer G-55-01C

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

**Recommendation: FUND**

## **Director's Recommendation:**

**Fund in the amount of \$451,427.**