

TECHNICAL REVIEWERS' RATING SUMMARY

G016-A

**Simultaneous Fracture Stimulation of Two Parallel Horizontal Bakken Wells within
a 1280 Acre Spacing Unit in Sanish Field, Mountrail County, North Dakota**

Submitted by Sinclair Oil and Gas Company

Principal Investigator: Robert Taylor

Request for \$600,000; Total Project Costs \$11,800,000

Rating Category	Weighting Factor	Technical Reviewer		Average Weighted Score
		16A-01	16A-02	
		Rating		
Objective	9	4	5	40.5
Availability	9	3	2	22.5
Methodology	7	4	3	24.5
Contribution	7	4	2	21.0
Awareness	5	3	2	12.5
Background	5	4	3	17.5
Project Management	2	3	2	5.0
Equipment Purchase	2	3	5	8.0
Facilities	2	3	4	7.0
Budget	2	3	5	8.0
Average Weighted Score		178	155	166.5
Maximum Weighted Score				250

OVERALL RECOMMENDATION

FUND

FUNDING TO BE CONSIDERED

X

X

DO NOT FUND

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within a 1280-Acre Spacing Unit in Sanish Field, Mountrail County, North Dakota

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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: 1 – very unclear; 2 – unclear; 3 – clear; 4 – very clear; or 5 – exceptionally clear.

Reviewer 16A-01 (Rating: 4)

High potential to bring in new oil and gas companies and investment—timing is right to conduct a Bakken study since release of USGS & NDIC-DMR reserve reports substantiate a tremendous oil resource.

High potential to create new oil and gas jobs and revenues—Optimum completion techniques may be the key to producing areas of the Williston Basin that currently appear to have marginal economic Bakken results. The Bakken Formation is a tremendous resource but the key to continued economic development lies in the effective completion technique utilizing hydraulic stimulation.

Data from this completion technique will provide educational opportunities for industry and the general public.

If successful, will increase the ultimate recovery from future Bakken Pools.

Will help preserve existing jobs and production levels—60 of the 77 rigs are currently drilling Bakken wells.

Could reduce footprint if study concludes smaller hydraulic stimulation is permissible. This would allow a smaller surface battery size since it would have to accommodate less frac trucks and equipment.

Could provide baseline information leading to other projects—hydraulic fracturing itself could lead to many different projects and processes, such as what frac fluid to use, what method to employ (i.e. swell packers), what type of proppant, etc.

Reviewer 16A-02 (Rating: 5)

The proposed activities support NDIC goals. However, benefits from the proposed study are questionable.

2. With the approach suggested and time and budget available, the objectives are: 1 – not achievable; 2 – possibly achievable; 3 – likely achievable; 4 – most likely achievable; or 5 – certainly achievable.

Reviewer 16A-01 (Rating: 3)

The project is slightly behind schedule since the first well was to spud by late June 2008, although no rig is on site as of July 14. Whiting has filed an application for hearing to allow two wells on the 1280-acre spacing unit and the Industrial Commission has docketed Case 10261 for July 23, 2008. Whiting currently operates 5 rigs drilling Bakken wells in the Williston Basin

and should have no trouble contracting a rig to timely drill the two horizontal wells. The timetable is realistic and likely achievable.

Reviewer 16A-02 (Rating: 2)

Sinclair Oil and Gas Company suggests drilling horizontal wells and simultaneous stimulation of the wells. Although the description of the drilling procedure contains a lot of details it is unclear what distance will separate the wells. It can be suggested that the Company hopes that mutual influence of the wells will improve the performance of the stimulation operations. However, it is known that the radius of the zone of influence of processes in a well usually is of the order of the well radius. From the text of the proposal it is evident that the radii of the laterals will not exceed 3.5" which provides the radius of likely mutual influence of not more than 100" (~8 ft.) This distance seems to be too small to allow for reasonable increase in productivity.

3. The quality of the methodology displayed in the proposal is: 1 – well below average; 2 – below average; 3 – average; 4 – above average; or 5 – well above average.

Reviewer 16A-01 (Rating: 4)

Hydraulic fracturing of horizontal wells in North Dakota is ever changing and advancing. Simultaneous stimulation may prove to be extremely effective, especially if transverse fracture grow between offset wells, then converge to create longitudinal fracture.

Reviewer 16A-02 (Rating: 3)

It would be reasonable to solve a complex geomechanical problem to understand the reasons for relatively poor performance of the currently employed stimulation techniques. The results of such study can suggest better ways of stimulation improvement.

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: 1 – extremely small; 2 – small; 3 – significant; 4 – very significant; or 5 – extremely significant.

Reviewer 16A-01 (Rating: 4)

The potentially productive portion of the Bakken Pool underlies most of the oil producing lands in North Dakota. The scientific and technical contribution of the proposed work could have a great impact on future jobs and ultimate recoveries throughout the north, west, and central portions of the Williston Basin. Continued research in fracture stimulation is ongoing and is critical to the continued success and development of the Bakken Formation.

Reviewer 16A-02 (Rating: 2)

Taking into account all the comments above there exist some concerns regarding the chances for the project success. Also a similar study by Marathon Oil was already funded by the NDIC.

5. The principal investigator's 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: 1 – very limited; 2 – limited; 3 – adequate; 4 – better than average; or 5 – exceptional.

Reviewer 16A-01 (Rating: 3)

References to published research was not documented in the proposal, although references are made to unpublished research, mainly that obtained by Whiting from drilling and completing their own wells. Whiting has extensive knowledge in drilling and completing Bakken horizontal wells.

Reviewer 16A-02 (Rating: 2)

The PI possesses extensive experience as a Petroleum Engineer. However, the project requires participation from a geomechanical specialist.

6. The background of the investigator(s) as related to the proposed work is: 1 – very limited; 2 – limited; 3 – adequate; 4 – better than average; or 5 – exceptional.

Reviewer 16A-01 (Rating: 4)

Sinclair has limited experience as operator of horizontal Bakken wells, although Whiting has drilled and completed approximately 15 horizontal Bakken wells in the Williston Basin and currently operates 5 rigs drilling horizontal Bakken wells. It is assumed that since Whiting is projected to be operator, they will provide much oversight of this project.

Reviewer 16A-02 (Rating: 3)

The group should include a geomechanical consultant.

7. 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: 1 – very inadequate; 2 – inadequate; 3 – adequate; 4 – very good; or 5 – exceptionally good.

Reviewer 16A-01 (Rating: 3)

The proposal has a realistic timeframe and financial outline although financial information was limited to only the total project cost of \$11,800,000. Whiting's expertise in drilling and completing horizontal Bakken wells is very valuable.

Reviewer 16A-02 (Rating: 2)

The details on the management plan provided in the text of the proposal are not sufficient to make a judgment.

8. The proposed purchase of equipment is: 1 – extremely poorly justified; 2 – poorly justified; 3 – justified; 4 – well justified; or 5 – extremely well justified. (Circle 5 if no equipment is to be purchased.)

Reviewer 16A-01 (Rating: 3)

The proposed equipment to purchase includes that necessary to drill and complete a well, plus conduct a hydraulic frac and monitor the results. The purchase is necessary, although the cost of the simultaneous fracture stimulation was not documented.

Reviewer 16A-02 (Rating: 5)

No equipment will be purchased.

9. The facilities and equipment available and to be purchased for the proposed research are: 1 – very inadequate; 2 – inadequate; 3 – adequate; 4 – notably good; or 5 – exceptionally good.

Reviewer 16A-01 (Rating: 3)

The proposal did not list the facilities and equipment in detail, but production facilities will be necessary since Whiting/Sinclair plan to document flow rates and pressures hourly. Reviewer is convinced Whiting/Sinclair will use adequate equipment and facilities to obtain accurate information.

Reviewer 16A-02 (Rating: 4)

It can be suggested that modern drilling and stimulation equipment will be employed.

10. The proposed budget “value”¹ relative to the outlined work and the financial commitment from other sources is of: 1 – very low value; 2 – low value; 3 – average value; 4 – high value; or 5 – very high value. (See below)

Reviewer 16A-01 (Rating: 3)

The grant request of \$600,000 is only 5.1% of the total cost of the \$11.8 million project, although no documentation is provided to compare grant request with fracture stimulation costs. Reviewer questions if entire cost should be considered in determining “value” or if only cost of stimulation should be considered.

Reviewer 16A-02 (Rating: 5)

The total cost of the project is estimated at \$11,800,000.00. The Company request for \$600,000 of the NDIC funds equals approximately 5% of the total project cost.

Section C. Overall Comments and Recommendations:

Please comment in a general way about the merits and flaws of the proposed project and make a recommendation whether or not to fund.

Reviewer 16A-01 (Fund May Be Considered)

Reviewer would have liked additional documentation on cost of stimulation services and possible contribution of discounts and services provided by the contracted stimulation company.

If the value of this project should be determined based upon the fracture stimulation cost only, then additional documentation of costs should be required, or possibly a reduced grant amount should be awarded.

Reviewer 16A-02 (Funding May Be Considered)

Due to the concerns regarding the feasibility of the proposed operations it is recommended that the performance of the similar study by Marathon Oil was assessed prior to making decision regarding this project.