



25 October 2007

Ms. Karlene Fine, Executive Director
North Dakota Industrial Commission
State Capitol, 14th Floor
600 East Boulevard Ave., Dept 405
Bismarck, ND 58505-0840

Dear Ms. Fine:

Accompanying this cover letter is a grant application from Headington Oil Company, L.P. on behalf of its working interest partners Hess Corporation and Continental Resources, Inc., and technical partner Schlumberger Oilfield Services (together the "Consortium"), to the North Dakota Oil and Gas Research Council for support funding of a research project involving the Bakken Formation in eastern Williams County, North Dakota.

The project includes the drilling of three parallel horizontal wells (two producing wells and one monitoring well) into the middle member of the Bakken Formation within a single 640-acre spacing unit. The monitoring well will also include a vertical pilot hole through the Bakken and into the Three Forks for the purpose of obtaining continuous core samples from productive intervals for analysis of rock properties and to allow for conventional and select special logging of the interval. Geophones will be employed in the horizontal section of the monitoring well to record micro-seismic responses during the hydraulic fracturing of offsetting producing wells to test different completion methods. The project also includes plans for the conversion of the monitoring well to an infill producing well for the evaluation of incremental oil recovery and potential interference. This well may ultimately be re-completed as an injector for future EOR pilot project considerations, which may also have an application for CO₂ sequestration.

Pending approval by the NDIC of the requested spacing unit, this letter shall form a binding commitment on behalf of the Consortium to complete the proposed project should the Research Council agree to provide financial support. Please advise if you need any additional information for the consideration of this application.

Sincerely,

James R. Ehrets, VP Exploration
Headington Oil Company, L.P.

7114 West Jefferson Avenue, Suite 305 Denver, CO 80235 303.969.8280 Main 303.969.8201 FAX

Hydraulic Fracturing and Microseismic Monitoring Project

Bakken Research Consortium

Grant Application submitted to:
the North Dakota Oil & Gas Research Council
for the amount of \$750,000.

Submitted by:
Headington Oil Company, L.P.
on behalf of Continental Resources, Inc., Hess Corporation,
and Schlumberger Oilfield Services

25 October 2007

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Abstract

The Bakken Research Consortium has proposed a microseismic monitoring project designed to evaluate hydraulic fracture stimulation in horizontal wells. The project includes the drilling of three parallel horizontal wells in the middle member of the Bakken Formation on a 640-acre spacing unit. The project is located in eastern Williams County on the eastern flank of the Nesson Anticline, and the proposed spacing unit is a State of North Dakota lease uncomplicated by mineral ownership issues, surface culture, or land-use constraints. The key component of the project is a central horizontal monitoring well flanked by parallel horizontal producing wells that will be fracture stimulated by different methods. Fracture initiation points and directions of propagation will be monitored by microseismic methods through the employment of geophones in the monitoring well which should allow for seismic events (induced fractures) to be recorded along the entire lengths of the offsetting producing wells. Substantial geological, engineering, and geophysical data acquired by this project should allow for the better understanding of completion effectiveness and oil recovery in the Bakken Formation. This project also has potential use as an EOR pilot project which may have implications for CO₂ sequestration studies.

The Consortium currently consists of Headington Oil Company, L.P., Continental Resources, Inc., and Hess Corporation as working interest participants and Schlumberger Oilfield Services as technical partner. A committee comprised of engineering and geological representatives from the four involved parties will plan and manage the technical aspects of the project, and Headington Oil Company has been designated as operator for the drilling and completion phases. The project is scheduled to commence in December 2008 and has a total budget of \$14 million. The Consortium is requesting consideration for grant support for this project in the amount of \$750,000.

Section 1. Project Description

The project includes the drilling of three parallel horizontal wells in the middle member of the Bakken Formation on a 640-acre spacing unit. Hydraulic fracture stimulations of different designs will be performed for comparison purposes in the two outside wellbores initially designated as producing wells. The middle wellbore will initially be used for microseismic monitoring purposes, and will include a vertical pilot hole from which conventional cores and logs will be acquired. Technical details, procedures and project objectives are described herein.

The project area is located in Section 36-T156N-R95W in eastern Williams County on the eastern flank of the Nesson Anticline. The 640-acre unit is uncomplicated with regard to surface topography, and proposed horizontal wells can be drilled either in the North-South or East-West orientation (Appendix A; wells shown in E-W orientation for discussion purposes only; actual orientation will be determined by the technical committee). The 640-acre spacing unit is a State of North Dakota lease, and does not have any mineral ownership issues, surface culture restrictions, or land-use constraints. NDIC approval of the spacing unit is anticipated in mid-November, and permits will be applied for immediately thereafter.

Stratigraphic and reservoir characteristics of the Bakken Formation in this area are believed to be generally representative of a large part of the overpressured productive trend in North Dakota, and results from this project should have widespread implications. Proximity to the Nesson Anticline could provide for structural enhancement of natural fractures. Several horizontal Bakken wells have been drilled in the general vicinity of the project spacing unit, and results indicate that this area displays a broad range of reservoir quality in terms of both matrix porosity and fractures of various origin.

The central monitoring well will have a vertical pilot hole drilled through the Bakken and into the Three Forks Formation, and oriented cores will be taken from the basal Lodgepole Formation into the upper Three Forks Formation (Sanish equivalent). Routine and special core analyses will be performed on these cores for the determination of various rock and fluid properties. Fracture-identification logs and conventional open-hole logs will be acquired in this vertical wellbore. The pilot hole will then be plugged back and the horizontal leg drilled. The

horizontal wells on either side of the central monitoring well will be the initial producers and will be positioned approximately 1500 feet from and parallel to the monitoring well to allow for potential microseismic monitoring of their entire lengths. It is noted that the deployment of the required array of geophones in the horizontal monitoring wellbore bears some operational risk, and because of unpredictable variations in rock properties the quality of the sound waves expected to be recorded at these interwell distances is not guaranteed. The drilling of all three horizontal wellbores will be carefully monitored using MWD Gamma-ray and conventional mud-gas logging, and will include detailed descriptions of drill cuttings and sample shows by an onsite geological team. All three horizontal wellbores will have fracture-identification logs acquired in them.

The first producer will be drilled and initially placed on natural (flowing) production, or placed on pump if necessary, and the monitoring well will be drilled and various reservoir data sets collected and analyzed. The second producer will then be drilled and will be shut-in while the monitoring well is equipped for microseismic monitoring. The two producers will then be consecutively hydraulically fractured, and fracture initiation points and directions of propagation will be monitored. Production rates and pressures will be recorded for each well during the natural flowing phase, and both wells will ultimately be placed on pump as rates and pressures decline. The producers will be metered or tested separately for an extended period of time to allow for relative performance comparison.

The research project has multiple objectives. One prime objective is to determine the most efficient design for fracture stimulation of Bakken horizontal wells for the optimization of oil recovery. Many Bakken completions have been problematic with regard to losing frac energy out of the Bakken reservoir zone and communicating with sources of water in the overlying Lodgepole and Mission Canyon formations. Recent modifications in frac design have demonstrated that better results can be realized by proper selection of gel type and careful monitoring of frac pressures. Results of recent multistage completion techniques have also been encouraging, indicating that a considerable learning curve remains in the understanding of frac effectiveness in various Bakken reservoirs.

This project will also provide the opportunity to perform microseismic monitoring of re-fracture stimulations after a period of production and normal decline. This phase of the project will help gain an understanding of how new

fractures might initiate and propagate which would be extremely valuable to the assessment of incremental recovery. After all fracture-stimulations phases have been conducted, the monitoring well will be converted to an “infill” producer to further investigate incremental oil recovery and potential interference phenomena.

Another objective of the project is to assist operators in selecting optimum drilling locations and wellbore azimuths and in determining the most cost-efficient well design. This should greatly improve economic recovery from currently defined areas of development as well as to extend drilling activity into areas still considered to be marginally economic. This information could also lead to improved production from existing wells through re-stimulation or the drilling and stimulation of additional horizontal legs.

The data and interpretations derived from this project are expected to improve the understanding of reservoir performance and recovery efficiency in the Bakken which should improve the economic potential of the Bakken throughout the basin. These three wells will provide a wide array of information from nearly 12,000 feet of horizontal pay in independently frac'd horizontal wells, and will provide useful data for the evaluation of optimum development and drainage scenarios. This project could also provide a base study and ideal design for an EOR pilot program that might also have implications for the study of CO₂ sequestration.

Headington is currently acquiring an extensive 3D-seismic survey in this area of the Nesson Anticline which will cover the proposed project spacing unit. A part of that survey will be made available to the Consortium to assist in the interpretation of geophysical characteristics of the Bakken Formation identified by the microseismic monitoring project. Together with oriented cores from the pilot hole and fracture-identification logs from the three horizontal wells, this additional information should prove useful for the understanding of natural fracture controls over completions and resultant production.

The total cost of the project is estimated at \$14 million, including approximately \$2 million of product discounts and services provided by Schlumberger Oilfield Services. The Consortium requests consideration by the Oil and Gas Research Council for grant assistance of \$750,000 to partly offset the significant scientific costs associated with the

project. The Consortium working interest group will fund the remaining cost. Pending approval of the spacing unit by the North Dakota Industrial Commission, the project will move forward independent of outside financial assistance. However, it is suggested that involvement of the Research Council will provide the State of North Dakota with more comprehensive project results and will facilitate the timely dissemination of those results to industry.

Section 2. Standards of Success

The value of the considerable technical information that will be generated from this project to the oil and gas industry is significant. Integration of data sets, including the 3D-seismic program being independently acquired, should provide a greater understanding of reservoir controls over completion effectiveness and well performance. Positive results from the microseismic monitoring phase could lead to significant improvements in completion design and improved oil recovery from the Bakken across the Williston Basin and should provide incentive to the industry to extend the Bakken play into new areas. It could also assist in the improvement of existing wells through re-stimulation, and to guide operators in determining potential for additional horizontal legs on producing leases. This project could also evolve into a controlled pilot program for the evaluation of improved and enhanced recovery techniques for the Bakken which would assist operators in establishing EOR projects with optimum timing relative to declining reservoir pressure.

While the primary investment in the program's drilling and completion operations will provide significant benefit to local services along with associated local and state tax proceeds, additional benefits to the State of North Dakota exist beyond the completion of the project. Primarily, technical incentive would be provided for other operators to develop hundreds of square miles of additional land in the State that are currently deemed as economically challenged. In addition, any potential EOR program that might evolve from this project could have significant economic impact to Bakken development through enhanced recovery together with possible CO₂-sequestration implications. Lastly, the royalty revenue generated by the project on the State section will likely be in excess of one million dollars, representing a large and direct benefit to the people and State of North Dakota.

Section 3. Project Management Background and Qualifications

The Consortium currently consists of Headington Oil Company, L.P., Hess Corporation, and Continental Resources, Inc. as working interest participants and Schlumberger Oilfield Services as technical partner. A committee comprised of engineering and geological representatives from the four involved parties will plan and manage the technical aspects of the project, and Headington Oil Company has been designated as operator for drilling and completion phases.

Headington initiated its Bakken drilling program in 2001 in Richland County and has since drilled about 130 single- and multi-lateral wells throughout the Williston Basin. Currently, Headington is operating four drilling rigs in the Bakken play and is acquiring a large 3D-seismic survey on the eastern flank of the Nesson Anticline which includes the proposed 640-acre Consortium spacing unit. Headington is also constructing a gas plant in Williams County in response to the significant increase in Bakken production. Hess Corporation has historically controlled a large part of the Nesson Anticline and currently operates four drilling rigs in the heart of the North Dakota Bakken play, and is expanding its gathering-system infrastructure in response to Bakken activity. Continental has completed a large number of horizontal Bakken single- and multi-lateral wells, and currently operates four drilling rigs in the Bakken play. Continental has had an historical presence in various other plays throughout the Williston Basin

Together, these three operating companies have extensive drilling and completion experience in the Bakken play, and as a group represent a significant part of the current North Dakota Bakken drilling activity. All three companies have experienced technical staffs capable of handling all phases of the program. Schlumberger is well known for its oilfield services throughout the world, and maintains a substantial engineering, geological and research staff that will be significantly involved in this project.

Section 4. Project Timetable

1. Spacing Approval Hearing	22 October 2007
2. First Consortium Technical Meeting	12 November 2007
3. Drilling Permit Applications	17 November 2007
4. Drilling Permit Approvals	8 December 2007
5. Begin Building Drilling Locations	10 December 2007
6. Spud Producing Well "A"	27 December 2007
7. Second Consortium Technical Meeting; <i>Interim Report</i>	15 January 2008
8. Spud Monitoring Well	8 February 2008
9. Begin Completion of First Well for Natural Production	12 February 2008
10. Initial Production from First Well	22 February 2008
11. Spud Producing Well "B"	1 April 2008
12. Third Consortium Technical Meeting; <i>Interim Report</i>	15 April 2008
13. Complete Frac Designs	18 April 2008
14. Deploy Microseismic Receivers in Monitoring Well	24 May 2008
15. Producing Well "A" Fracture Treatment	1 June 2008
16. Producing Well "B" Fracture Treatment	3 June 2008
17. Producing Wells "A" and "B" on Production	5 June 2008
18. Complete Interpretation of Area 3D-Seismic Program	15 June 2008
19. Complete Data Analysis; <i>Interim or Final Report</i>	15 August 2008
20. Fourth Consortium Technical Meeting	15 September 2008
21. Conduct and Monitor Re-fracs of Producing Wells	January 2010 (if warranted)
22. Complete Monitoring well as "Infill" Producer	June 2010 (if warranted)

Section 5. Project Budget

		<u>AFE Amount</u>
<i>Producing Well "A"</i>	Initial Drilling & Frac Completion.....	\$3.5 million
	Re-frac Completion.....	\$0.5 million
<i>Producing Well "B"</i>	Initial Drilling & Frac Completion.....	\$4.0 million
	Re-frac Completion.....	\$0.5 million
<i>Monitoring Well</i>	Initial Drilling & Microseismic Monitoring.....	\$4.5 million
	Microseismic Monitoring of Re-fracs.....	\$0.5 million
	Frac Completion (to "infill" producer).....	<u>\$0.5 million</u>
Total Project Budget.....		\$14.0 million

Budget Notes

1. Approximately \$2.0 million of product discounts and services will be provided by Schlumberger Oilfield Services. Remaining drilling and completion costs, less any outside funding, will be shared by Consortium working interest owners.
2. Estimated total cost for the microseismic research component of the project is \$5 million, including the cost of drilling the monitoring well and its vertical pilot hole.
3. Re-fracs will be performed only if determined to be necessary by the engineering committee. Timing of re-fracs is currently targeted at approximately 18 months after initial fracs.
4. The project will proceed regardless of the magnitude of any outside financial support.

Section 6. Confidential Information

The Consortium requests that data and results from this project required to be submitted to the Research Council and the North Dakota Industrial Commission be maintained in confidential status through 31 December 2008.

Section 7. Patents and Rights to Technical Data

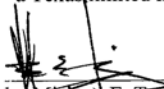
The Consortium retains all rights to technical data, results, and software developed under this project. The Consortium requests to retain principal patent rights worldwide to any invention derived from this project. Any manufacturing of inventions derived from this project shall substantially occur in North Dakota. No royalty fee will be charged to any citizen, company or corporation in North Dakota for a patent for an invention that was developed under this project.

Section 8. Tax Liability

Affidavit Regarding Outstanding Tax Liability

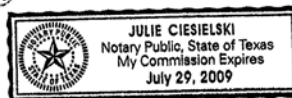
I am the Vice President of Headington Petroleum, L.L.C., which is the General Partner of Headington Oil Company, L.P. In that capacity I am ultimately responsible for the administration of all severance taxes. I certify that there are no outstanding severance taxes owed to the State of North Dakota or any of its political subdivisions. My signature certifies that all information provided in this affidavit is complete and accurate.

Headington Oil Company, L.P.,
a Texas limited partnership
by Headington Petroleum, L.L.C.,
a Texas limited liability company


by Michael E. Tregoning
Vice President, CFO

Affirmed and signed before me this 24th day of October, 2007 by Michael E. Tregoning,
who is personally known to me.


Notary Public



Appendix A. Project Area Wellbore Location Plat

