

Technical Advisor's Comments

G-010-C

"Vertical Seismic Profiling Test of Seismic Fault and Fracture Detection in the Bakken Formation"

Submitted by: Marathon Oil Company

Principal Investigator: Chuck Meeder & Chris Tuttle

Request for \$150,000; Total Project \$300,000

Duration: 5 months

Project Description

Marathon Oil is requesting funds from the Research Council to conduct a vertical seismic (VSP) profile in a well to be drilled in Dunn County in the first half of 2007. A VSP is a high-resolution seismic image of the borehole. A VSP image is used to identify near-borehole fractures. The VSP image is generated through recording signals received from a series of recorders placed in the borehole as they respond to energy created from surface point sources. The surface energy sources are placed above the horizontal lateral leg of the well. By comparing the VSP to other well data, wells can be designed to maximize productivity of wells by better understanding the occurrence of natural occurring fractures.

Technical Advisor's Recommendation: FUND

I recommend that this project be funded for the total amount requested.

It is my understanding that the technology recommended for this project is suitable to attain the desired results. Marathon provides this project with a large and very competent technical staff. At this time Marathon is also recommending that a tiltmeter survey be run in the same borehole. By doing so they are maximizing the utility of the data set being collected.

Geologically the project is sound and an appropriate location for the project has been recommended. It can be shown that the middle Bakken reservoir in the Marathon project area is fractured and therefore well productivity should be enhanced by the proper orientation of stimulated fractures. Use of this technology will probably be limited to that geographic area within the State where productivity from the middle Bakken reservoir is significantly enhanced by natural fractures.

There are many problems associated with the development of a successful middle Bakken play in North Dakota. These problems are brought about in part by the fact that in North Dakota there are a series of facies; unlike in Montana where there is a single producing reservoir facies. These facies can be significantly different from each other. Because of these differences, one set of procedures may not be adequate to develop the play in multiple reservoir facies. It is therefore necessary that a variety of technologies be reviewed and attempted prior to developing a successful drilling and completion template for each reservoir facies.