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*Setting the
Pace for
Over 52 Years*

Tromino technology at the Michigan Geological Survey provides affordable method of identifying Michigan's freshwater resources, but seismic surveys for oil and gas can hold the key to identifying these resources on a much broader scale throughout the State

This September the Michigan Geological Survey launched its first efforts under a Groundwater Research and Education Foundation (GWREF) grant to develop a system for economically and rapidly mapping the contact between glacial materials and bedrock, called bedrock valleys. The demonstration project is located in Calhoun and Kalamazoo counties.

Bedrock valleys are the depressions in the bedrock formed by rivers prior to the glaciers or formed by the glaciers themselves. Not every bedrock valley is a potential source of freshwater, but most of them are.

"Glacial material in some parts of the state may be 1,000 feet thick, but typically water wells are only drilled until we get water, which can be the top 100 to 150 feet. We don't know what the geology of the lower part of that section is, but we do know that there are probably aquifers down there," said Michigan Geological Survey Director John Yellich. "These hidden aquifers need to be identified and protected, starting with areas of the state that are highly dependent on groundwater for their drinking water. If contamination of an aquifer ever occurred, we would already have alternatives identified and ready to provide safe water for Michigan communities from these deeper sources."

Using a technology developed in Italy called a Tromino unit, which is low cost at \$8,000, the MGS staff and Western Michigan University students can "listen" for the differences between the unconsolidated glacial materials and the bedrock. With sufficient data points they can map the entire bedrock / glacial interface and target areas for drilling confirmation test wells.

"Drilling test wells is very expensive," Yellich explained. "Identifying an affordable way to map these critical resources on a large scale, is one of the core goals of this project. And that is where the use of oil and gas seismic data comes into play."

Seismic data is shot over a very broad area. Having access to it allows the MGS researchers to more accurately identify where to apply the Tromino technology and drill test wells to confirm the potential for water resources. Without it, identifying freshwater aquifers over Michigan's vast landscape would be like trying to find a needle in a haystack.

The pilot project currently being conducted by MGS was able to utilize seismic



MICHIGAN OIL & GAS NEWS/Scott Bellinger

WESTERN MICHIGAN UNIVERSITY graduate student Tyler Norris makes notes on samples caught on one of two test holes drilled in Calhoun County as part of a demonstration project supported by a Groundwater Research Education Foundation grant received recently by the Michigan Geological Survey. The research project Norris is working on is attempting to validate indirect methods for mapping subsurface glacial geologic conditions by drilling to the glacial-bedrock contact. Donated oil and gas industry seismic data is being utilized as an aid to developing a more rapid method of mapping the glacial-bedrock interface. Behind Norris are WMU Hydrochemistry and Glacial Geology Professor Dr. Alan Kehew, Michigan Geological Survey Director John Yellich (catching drilling samples) and Katz Drilling driller Ryan Katz.

data collected on private lands and donated by two MOGA members, West Bay Exploration and Wolverine Gas & Oil Corporation. Analysis of this data allowed Western Michigan University Master of Science candidate Tyler Norris to apply the Tromino technology and identify the areas to drill two test holes. Norris is currently evaluating the technology to map the potential sources of freshwater resulting from this research.

"This demonstration project will confirm the ability to identify and map critical fresh water resources at a low cost and will show the broad applicability of applying these techniques throughout Michigan," said



Photos courtesy of Michigan Geological Survey

ABOVE, Western Michigan University Geophysicist Dr. William Sauk (left) and Geosciences student Ben Seiderman are shown taking a measurement with the Tromino Passive Seismic meter. **BELOW,** the Tromino device is shown at one of the Calhoun County drill sites.



Yellich. "The next step is gaining broader access to seismic data so we can more successfully pinpoint likely areas with deeper aquifers."

And that is where a new partnership between the Michigan Oil and Gas Association (MOGA), the Michigan Department of Natural Resources (MDNR) and the Michigan Geological Survey (MGS) comes into play.

Spearheaded by MOGA's Leasing & Land Committee, under the leadership of its Chairman, Ben Brower, this unique partnership started with a desire by the oil and gas industry to be able to collect

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seismic data more broadly on state lands.

"Seismic exploration holds the key to identifying more accurately than ever before where oil and gas is located. In order for it to be successful, you need a large tract of land to conduct the research on, even though you only need a small tract for the actual development," said Brower. "We've been hindered for years in conducting seismic exploration on state lands. This partnership allows the industry to more efficiently acquire seismic data on state lands. When we started meeting with the MDNR and MGS to discuss the possibility, the need for seismic data to map freshwater resources started everyone thinking about a possible partnership."

"As the largest landowner in the State of Michigan, the MDNR has a goal of better understanding all of its land-based

resources," said Mark Sweatman, Director of the Office of Minerals Management at the MDNR.

"Having a cost-effective way to identify previously unknown sources of freshwater that can be protected for and accessed by current and future generations is a tremendous opportunity for the state and provided a compelling reason for thinking about this partnership."

Seismic data for oil and gas is proprietary information, costing companies tens of thousands of dollars per square mile to collect. The likelihood of a company giving that away for free was low, but John Yellich made the case that a company would only need to donate the data from the surface to the base of the glacial drift, which is what is used to help pinpoint the bedrock valleys. Oil and gas companies are using the data

much deeper in the earth.

"Because of the cooperative spirit that made this agreement possible, our members, with approval of DNR, gain additional needed access to State-owned minerals for the purpose of more effectively exploring for oil and gas, while the data they contribute in the process will help further the understanding of Michigan's glacial geologic environment and promote the identification and protection of previously unidentified fresh water resources throughout the state," said MOGA President Erin McDonough.

When industry, the State of Michigan and the Geological Survey partner, innovative, cost-effective programs like this can drive new innovations that benefit our state as a whole.

Tool provides "sample core" of every inch drilled in o & g wells — (continued from page 9)

the tube, exposing hydrocarbon pay zones.

The two, 12-inch, sample core tubes provide up to 30 feet of core, never missing a single inch. The sample can be pumped into a pan to be analyzed.

The long sample core tube is marked every time a sample is caught providing a depth reference to confirm formation change and pay zones. The sample core can be pumped out at a later date for testing.

Additional benefits:

- Less exposure to potential hazards around the rig and shale shaker.
- More accurate samples when drilling at high rate of penetration.
- More time to analyze samples, creating less fatigue during 12-hour shifts for mud logger or sample catcher.

Interest in the sample coring tool has been expressed by companies both in the

U.S. and worldwide.

BlackGold Consulting can be retained for mud logging with the sample core tool or

can provide sample core tool services only.

Viegelahn may be contacted by phone at 989-370-1254 or by email at mhviegel@yahoo.com.

Nearly 15,800 acres to be offered at Oct. 30 state oil and gas lease auction

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standard minimum bid price of \$10 per acre.

At the auction's end, and at the option of the DNR, parcels for which no bids are received may be re-offered at a minimum bid of \$2 per acre.

The production royalty rate for state oil and gas leases is one-sixth.

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