

Russian Onshore Oil Discovery with MT

An innovative combined MT and seismic onshore survey has led to a reef discovery in Russia.

St. Petersburg State Mining Institute (SPMI) has carried out seismic and MT exploration since 2004 over a large Devonian reef prospect in the Nenets Region in the well-known Timan-Pechora hydrocarbon province of northwest Russia.

Phoenix assisted SPMI with field work and interpretation of selected data, under the umbrella of the long-term cooperation agreement signed in 2002 (*see Issues 24 and 30 and the Phoenix website*). The results were presented at the 6th Modern Electroprospecting Seminar at SPMI in March, 2008.

Although Timan-Pechora is a relatively mature oil and gas province with many producing fields of various ages, there are large fields, both onshore and offshore, yet to be developed in the Nenets region. Estimated remaining known recoverable reserves are at least 15 billion barrels of oil equivalent.

Russia is rapidly developing new production from this region, targeting approximately one million barrels a day. One advantage of Nenets is the relative ease of export by tanker compared to delivery through the long, costly pipelines required for discoveries in other areas.



Russian fieldworkers, using Phoenix equipment, carry out an onshore MT survey near the Barents Sea coast, Russia

The Russian oil company Lukoil is a major player in the region, with a recent discovery of 500 million barrels. Lukoil has built a pipeline and a marine export terminal, Varandey, on the Barents Sea coast. Ice-breaking tankers load oil from a special fixed offshore ice-resistant terminal at Varandey for markets in western Europe and North America. ■

See: www.blackbourn.co.uk/databases/hydrocarbon/timanpechora.html
www.neurope.eu/articles/87870.php

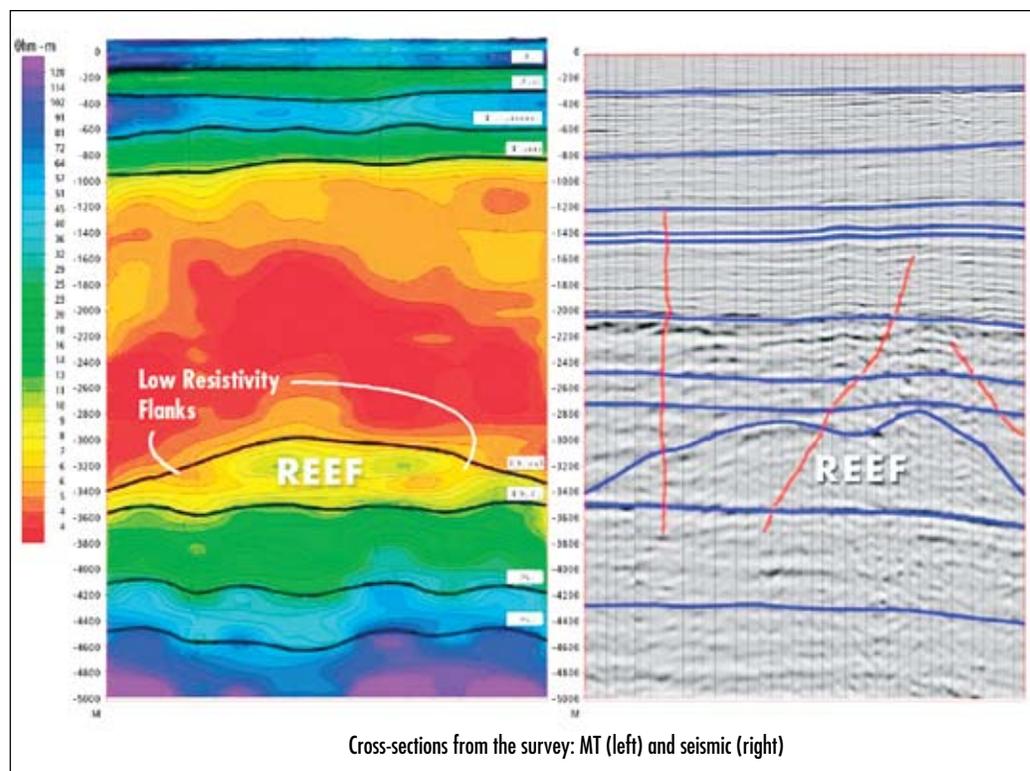
continued on page 2

CONTENTS

- 2** Russian Discovery continued
President's Message
In Memoriam
- 3** Around the World
Visitors
New MTC-43 Coil
- 4** On the Road
Philippines Survey
Coming Up

Russian Onshore Oil Discovery with MT and Seismic, *continued from front*

The figure at right shows transverse sections through the reef as seen by MT (left) and seismic (right). The lines are approx. 6km long. The top of the reef is approx. 3000m subsurface. MT data shows that the upper portion of the reef is more resistive (green, yellow) than the seal (red, orange), suggesting the presence of hydrocarbons. The lower portion and flanks of the reef are more conductive (red, orange) than the upper portion, suggesting formation brines below the hydrocarbons. The two different techniques, interpreted completely independently, complement one another: seismic shows a more reliable configuration of the reef, and the MT resistivity suggests the degree of hydrocarbon charge.



The first MT lines were located based on the interpretation of older seismic data. However, the initial MT results did not agree with the old seismic interpretation. The first well (based on the old seismic data) was drilled on the flank of the reef, and did not find economic hydrocarbons within the reef. After reprocessing with modern software programs, the seismic result agreed more closely with the MT result.

A second well was drilled at a more favorable location defined by MT and reprocessed seismic, with satisfactory results. Detailed results are confidential.

In Memoriam

- We extend our sympathies to the family of Antonio (Tony) Anselmo, a long-time valued employee of Phoenix. Born in 1925 in Borba, Portugal, Tony died in Toronto, Sept 6, 2008.
- Prof. Ulrich Schmucker died at age 78 of complications from pneumonia while attending the EM Induction meeting in Beijing last October. The 11th IAGA meeting, 23-30 Aug. '09 in Sopron, Hungary, is dedicated to his memory.

PRESIDENT'S MESSAGE

Every spring, Phoenix and St. Petersburg State Mining Institute host a geophysical seminar focused on electroprospecting (EM) techniques. The seminar is carried out under our 2002 cooperation agreement.

Russia is the world's largest exporter of gas and the second largest (after Saudi Arabia) of oil. Because oil and gas provide more than 70 percent of the country's export earnings, Russia is very interested in more, and more effective, exploration.

It is well known that relatively small investments in geophysics can produce large returns at all scales, from corporate to global. For example, since about 2000, CSEM and Marine MT have been increasingly used after seismic surveys to check the resistivity of discovered offshore seismic structures and thereby reduce drilling risk (*see Issue 43*). Most of the published reports about this approach relate to offshore work because multinational oil companies such as ExxonMobil and Shell explore mainly offshore. Most multinational and large independent oil companies have paid little attention to work in former Soviet Union countries that clearly shows EM and MT can be used in a similar way onshore. (*See Issue 27*)

Most of Russia's oil and gas exploration is onshore, and Russia has therefore developed an effective combination of onshore CSEM/MT plus seismic to reduce onshore drilling risk. This issue's front page story gives one such example.

~ Leo Fox

Uganda

Phoenix's Tes Haile took part in the African Rift Geothermal Conference in Entebbe, 23-28 Nov. '08.

Right: Tes, left, is shown with Dr. Meseret Teklemariam, Geological Survey of Ethiopia and Dr. Toshihiro Uchida, Geological Survey of Japan.



Japan

In Dec. '08, Phoenix personnel upgraded the MT remote reference stations at Sawauchi (Honshu) and Kagoshima (Kyushu). A new type of power supply installed at the Honshu site provides uninterrupted power even in the middle of winter when solar panels are sometimes insufficient. The upgrades extend the utility of the sites for both research and remote reference.

The National Research Institute for Earth Science and Disaster Prevention (NIED) purchased two Phoenix MT monitoring systems that NMC installed at Kubono and Sogawa on Shikoku Island. NIED, a new client, will use the data primarily to study "slow slip events" related to subduction of the Philippine Sea Plate beneath Japan.

Right: NIED's Dr. Futoshi Yamashita at the Sogawa site
See http://www.fnet.bosai.go.jp/research_result/slowevent2008/



India

Using Phoenix MT monitoring stations, The National Geophysical Research Institute is studying micro earthquakes related to varying water levels in the Koyna hydroelectric reservoir.

Ethiopia

The Ethiopian Geological Survey purchased a five-channel SSMT 2000 Magnetotelluric data acquisition system.

Left: Tes Haile (centre) conducted acceptance testing and training with geophysicists Moges Tigabe and Yiheyis Kebede in Ethiopia in late 2008.

VISITORS

P. Allipeera and Habeeb Ali Khan of Atomic Minerals Directorate of India visited Phoenix for training last December.

Right: Khan took the photo of Allipeera (centre) with Phoenix geophysicists Tes Haile and Yann Avram, testing equipment in a frozen cornfield.



New MTC-43 coil is shorter, lighter



Phoenix has developed a new MT magnetic sensor, the MTC-43. The MTC-43 can replace the MTC-50 coil in many applications where lighter weight and smaller size are important factors, such as in surveys in mountainous areas.

The MTC-43 frequency range is 1 kHz to approx. 50,000 seconds. The improved performance at high frequencies expands the applications for shallow studies and mining exploration.

At 97cm long, the MTC-43 weighs only 5 kg (half the weight and 70% of the length of an MTC-50). The decreased weight and length make the coil easier to handle and more convenient for measuring the vertical magnetic field. The new coil consumes only about 30% of the power required by an MTC-50, prolonging battery life in the field.

Geophysicists from Kenya Electricity Generating Company took part in MT training at Phoenix in January.

Below: left to right, Tes Haile (Phoenix), Anastasia Wanjohi (KenGen), Gerry Graham (Phoenix) and Anna Mwangi (KenGen)



ON THE ROAD

Canada: Shown in the Phoenix booth at the 2008 Global Petroleum Show in Calgary last June are Tes Haile, Dr. Alexander Antonov, T. Babadjanov (General Director of Uzbekgeofizika), Carlos Guerrero and Georgiy Kim (Uzbekgeofizika).

Uzbekistan: Phoenix and Uzbekneftegaz hosted the First Uzbekistan Electro-prospecting Seminar in Bukhara in Nov. 2008. Fifty geoscientists attended from Uzbekistan, Kyrgyzstan, Kazakhstan, Ukraine and Canada. **Right:** Gennadiy Kim of Uzbekgeofizika giving a presentation



Turkmenistan: Sergey Musatov of our Central Asia Representative Office in Tashkent attended the Turkmenistan International Oil and Gas Expo, Nov. 2008. **Above:** Sergey with the Chief Geologist of TurkmenGeologiya, Ovez Gurbandurdyev



China: Leo Fox, Mits Yamashita and James Kok attended the 19th EM Induction Meeting in Beijing, Oct. 23-29, 2008.

Above: Phoenix was a sponsor of the dance performance. Thank you to Prof. Martyn Unsworth for the photo.

Argentina: Carlos Guerrero represented Phoenix at the VII Congreso de Exploración y Desarrollo de Hidrocarburos in Mar del Plata, in early November, 2008.



Brazil: Carlos Guerrero and Prof. Abel Carrasquilla in the Phoenix booth at the Brazil Onshore 2008 trade show held in Salvador, Bahia last October

Philippines



The Phoenix survey department recently carried out two MT surveys in the Philippines. The crews coped with heat, humidity and heavy rain in mountainous terrain and jungles.

Left: Phoenix personnel and local workers ford a rain-swollen stream on their way to an MT site.

COMING UP

- **April 7-8**, St. Petersburg, Russia: SPMI Seminar. See *President's Message* on page 2
- **June 8-11**, Amsterdam, The Netherlands: Phoenix will exhibit at the EAGE.



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