

NEW INDUSTRY STANDARD IP TRANSMITTER



Exciting nickel discovery: Remy Belanger (above) with his trusty Phoenix V5 IP Receiver used at the Nuinsco Mines nickel discovery near Lac Rocher, about 120 km northeast of Matagami, Quebec. A drill hole spotted on a V5 receiver IP anomaly intersected excellent thicknesses and values of nickel ore (see the Feb 1, 1999 issue of The Northern Miner). The Phase IP technique implemented in the V5 Receiver is fast in the field and excellent at locating subtle IP anomalies.

Lightweight, reliable, simple to operate, with flexible power supply options -- those were the transmitter specifications demanded by well-known Canadian IP contractor Remy Belanger when he requested Phoenix build a successor to our famous IPT-1.

We did what he asked, named it the TXU-3 IP Transmitter -- and Remy ordered the first two units.

Not many people know more than Remy about the requirements of field-worthy IP equipment. Based in Rouyn-

Noranda, Quebec, he's been an independent contractor since 1975 (the same year Phoenix was founded); before that he was an IP operator with McPhar Geophysics. The TXU-3's predecessor, the IPT-1 that we first sold in 1977, became the most popular IP transmitter in Canada due to its simple design, light weight, ease of operation and general durability. Nearly 300 units were sold world-wide and, at one time, one of Phoenix's survey competitors in Canada owned 18 of our units.

The new transmitter builds on the

success of the IPT-1. The shape and weight distribution make it suitable for backpacking, essential in the bush. It works well in either Arctic or desert conditions, operating over a temperature range of minus 40 degrees to plus 40 degrees Centigrade. Equipped with both time domain and frequency domain capability, it satisfies a client's requirements for either. The top-notch engineering group responsible for these developments includes Tim Butt, Jack Dodds, Yoichi Koguchi and Liang You.

The first units will be field-tested in April. Like the IPT-1 and McPhar's P660 before it, we expect to sell hundreds of this transmitter as it becomes the new industry standard for IP contractors. The TXU-3 IP Transmitter has an interesting upgrade path that we'll tell you more about in our next issue. ■

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MESSAGE FROM THE PRESIDENT

Our web site is up and running ... get on the net and have a look. Keep checking in -- you'll find many informative surprises on our site as it evolves and grows.

Technology is the great equalizer and net-based communication makes it possible for anyone, anywhere, to interact with us. Although Phoenix is new to the net, the net is not new to us. I first heard of "the net" in 1974 when I was a research associate in computer systems at the University of British Columbia. In those days, the net meant the ARPANET, a few mainframe computers and a few hundred terminals. The total population of computers in North America was about 200,000.

There were no PCs, although "mini-computers" were well established and just-barely portable computers (such as the Osborne) were beginning to appear.

Our research group used one of the first "intelligent terminals", a Datapoint 2200, for data concentration and access to the university's mainframe.

Fast forward 25 years: the net (or the web) is now a household term and tens of millions of computers, along with communication channels and software, now exist to make it all happen. Phoenix rises again, on the net.



Danny Tseng is responsible for the design and implementation of our new Web site. An 18-year-old University of Waterloo Electrical Engineering student from Vancouver, Danny is working at Phoenix for four months on his first co-operative work program.

Waterloo, 100 km west of Toronto, is renowned for having the largest such co-op program in the world; every four

months 4,000 students rotate in and out of university classes and in and out of "real-world" jobs. Over the course of a five-year degree, a student completes six four-month work terms.

Thanks, Danny, for a job well done.

-Leo Fox



Find Danny (above) and the new Phoenix web page at <http://www.phoenix-geophysics.com>

CO-OPERATIVE AMT RESEARCH WITH GEOLOGICAL SURVEY

Dr. Alan G. Jones of the Geological Survey of Canada and his research associate Xavier Garcia of Spain, have developed interesting insights into the use of AMT for mining.

Jones' research project (funded in part by Phoenix) studied the diurnal (daily) variation of AMT signal strength in an attempt to find out why the quality of data is so variable. Data was provided in the form of several hundred AMT time series by a mining company.

Alan and Xavier already suspected that, contrary to popular belief, mid-afternoon (local time) is not the best time for AMT data acquisition. The research clearly indicates that the AMT signal is anywhere from ten to 250 times stronger between 10 p.m. and 6 a.m. (local time) than it is in the mid-afternoon.

This means rapid daytime acquisition will usually not produce good quality



At the September 198 SEG held in New Orleans, Phoenix President Leo Fox is flanked by Xavier Garcia (left) and Dr. Alan G. Jones (right) of the Geological Survey of Canada

data; rather, an overnight recording strategy is optimal. The operation should comprise daytime installation

of as many recording units as are feasible and all units should perform synchronous overnight recording.

ON THE ROAD

As usual, Phoenix personnel attended trade shows, presented papers and participated in surveys worldwide since our last newsletter. Following are a few highlights from the last few months.

- ★ China: In February '99, just after the Chinese New Year, Tim Butt, Lu Yi and Mits Yamashita visited several Phoenix clients in China, including the 5th Division of CNPC, Jiangnan Petroleum Institute and Xinjiang Petroleum. They installed Jiangnan's System 2000 (purchased in late 1998) and participated in LowTEM and other tests using Jiang-nan's T30 transmitter (recently upgraded to 70 ampere capability).
- ★ New Orleans, USA: Last September, Gary McNeice and Leo Fox attended the SEG in New Orleans. Gary co-authored a paper with Kevin Stevens of Falconbridge Nickel, describing the basic approach to use of AMT to detect 2km-deep nickel ore bodies in the Sudbury Basin in northern Ontario.
- ★ Kyoto, Japan: In November '98, Mits Yamashita presented a paper at the Third International Symposium on Recent Advances in Exploration Geophysics in Kyoto. He also published two other related papers in Japanese in late 1998.



- ★ Northwest Territories, Canada: in "Diamonds and Ice" in our June 1998 Issue #15, we described an innovative Arctic MT survey in which Phoenix pioneered through-the-ice data acquisition. That survey was a very successful test of a concept. This month we began Phase II, a larger survey based on the methodology developed during Phase I. This time we will survey further north into the new diamond mining regions of Canada. We'll have more information and pictures in our next issue.
- ★ Tokyo, Japan: The Tokyo Institute of Technology purchased a System 2000 based on MTU-5 units; the system was delivered in February and installation is taking place next month.

- ★ Toronto, Canada (photo above): Leo, Kieran and Damien Fox, sporting Phoenix hats, demonstrated the light weight and portability of the System 2000's MTU box by carrying it to the top of the CN Tower. Last fall, Phoenix president Leo Fox and his four sons participated in a charity fund raiser in Toronto, paying for the privilege of climbing nearly 1,800 stairs to the 350m level of the 553m tall CN Tower, the world's tallest free-standing structure. The CN Tower is our "ruler" for recent AMT surveys at Sudbury, where the System 2000 boxes are involved in exploration for nickel at depths of 2000m, approximately four times the height of the tower. ■

AMT FUNCTION FOR SYSTEM 2000

The widely-used Phoenix AMT function will soon be available for the System 2000.

Phoenix first developed the AMT function for the V5-16 receiver, starting in 1986, in a three-way cooperative development with the well-known AMT expert, Dr. David Strangway (then at University of Toronto) and equally well-known MT expert Dr. Alan Jones at the Geological Survey of Canada, Ottawa.

Many of the nearly 90 V5-16 systems sold were delivered with the AMT function. In 1997 Phoenix developed an excellent, low-noise, lightweight AMT magnetic sensor, MTC-30A (see The

Phoenix #16, Sept 1998).

The Phoenix audio-frequency MT band covers nearly four decades, from 1Hz to approximately 8,192Hz. Nearly three-quarters of this range overlaps with the existing Phoenix MT band (0.0006 Hz to 384Hz).

Depth of investigation is roughly proportional to square root of frequency. In simple terms, deep investigations use low frequencies; higher frequencies are useful for shallow mining exploration.

In most AMT mining exploration work in Canada since 1993, the useful information lies between approximately 10Hz and 1,000Hz, the latter frequency

just above the present MT band. AMT is less useful above 1KHz because other shallow investigation techniques such as loop-loop EM or IP are faster and cheaper.

To cover the bulk of mining applications, therefore, Version 1 of System 2000 AMT function will simply extend the MT range to approximately 1KHz, using the existing System 2000 technology and sensors. A parallel development (available later in 1999) will increase the upper limit to approximately 8,192Hz. ■

VISITORS



Dr. Shinichi Takakura (left) and Dr. Shigeo Okuma (centre) from the Geological Survey of Japan visited Phoenix's plant in late February. Phoenix technician Liang You (above, right) shows our visitors the top panel for the new Phoenix TXU-3 Transmitter (see front page story). Our visitors had a tight schedule of business appointments, but Phoenix President Leo Fox found time to escort them on a trip to view the frozen (but still beautiful) world-famous Niagara Falls.

HOPING TO SEE YOU...

Meeting & Exhibition Schedule

Phoenix will have a booth at the 61st European Association of Geoscientists and Engineers (EAGE) Conference & Technical Exhibition in Helsinki, Finland, June 7-10. We look forward to visiting with many clients that week. Come by our booth and pick up the June issue of The Phoenix. ■

PAPERS AVAILABLE

The many papers written and co-authored by Phoenix personnel, as well as our clients, are available to our readers. Just ask. We will soon post several on our web site as well. Here are a few of interest (besides those mentioned in "On the Road", p.3).

- ★ JNOC 3-D MT case history: Matsuo, et al, presented at EM Induction Symposium in Romania, August, 1998.
- ★ Gary McNeice and Dr. Alan Jones of GSC: Northwest Territories Ice Road MT Survey.
- ★ Hungarian Case History: an instructive 3-D MT oil exploration case history, comprising 81 soundings in a 36 square kilometre area, will be available soon on the Phoenix web site. The front page story of issue #16 of The Phoenix, September '98, described the field work for this case history.

Note: New e-mail address below



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