ON THE LEVEL

Water Monitoring News and Updates

Solinst®

High Quality Groundwater and Surface Water Monitoring Instrumentation

IN THIS ISSUE

FALL 2008

TLC Meter Simplifies Swedish Saltwater Intrusion Monitoring

Sweden is a country with a lot of coastal area and has groundwater as the major freshwater source. Therefore, it has become extremely important to monitor any drilled holes for potential saltwater intrusion. For over 20 years, drillers in Sweden have been searching for geothermal heat to use as an alternative energy source. In 2006 there were over 50,000 boreholes drilled for fresh water and geothermal heat investigations.

Saltwater intrusion, the induced flow of seawater into freshwater aquifers, is caused by groundwater development near the coast. Often it results in water being unusable for drinking, agriculture or industry. In order to regulate and monitor the situation, the Geological Survey of Sweden has developed a guideline for all drillers to adopt, *Normbrunn 07*.

Normbrunn 07 requires drillers to record the chloride content (conductivity) of water at a number of different levels in each drilled hole, along with the elevation of the water in the borehole. If a heightened chloride content is discovered (greater than 50 mg/L or 500 µS/cm), the driller has to seal the intrusion area or seal the entire borehole with bentonite and abandon the drilling location.

David Haag, of Geawelltech, Solinst distributor and manufacturer of drilling equipment and accessories in Sweden, sees the Solinst Model 107 TLC Meter as a perfect tool for meeting these requirements. He notes the following advantages:

- The flat tape allows very accurate recording of water levels
- Reliable conductivity readings (in µS/cm), which can be related to chloride concentration, are measured at each level
- The durable design and convenient carry bag are excellent for rugged drilling environments

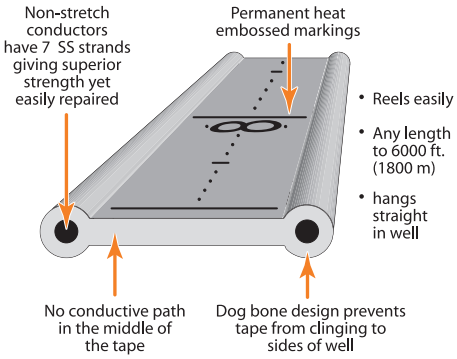
The Solinst TLC Meter provides an all-in-one tool, allowing the drillers to more easily meet their requirements while maintaining efficiency and productivity.

Acknowledgement: Solinst would like thank David Haag of Geawelltech for providing background information for this article.

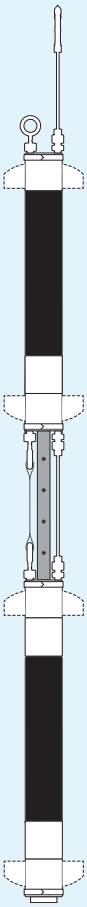
THE SECRET IS IN THE TAPE

It's not a question of "if" you get the probe stuck, or nick the tape on the well casing, but rather "when", so it's a good thing Solinst Water Level, Interface and TLC Meters are fully repairable! Solinst products are rugged and built-to-last, and Solinst does provide tape guides with all its meters to help prevent damage to the tape, but accidents do happen.

Users need not be intimidated when faced with repairs, especially when it comes to a tape splice. Solinst provides easy-to-use splice kits for flat tape and coaxial cable meters, with easy-to-follow instructions for adding new tape sections, or even replacing your probe on a short length of tape. Replacement tapes are also available, which are simply connected to the existing probes and reels.



Isolate Discrete Zones for High Resolution Monitoring



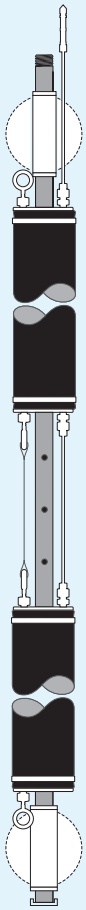
Solinst Low Pressure Pneumatic Packers are inflatable seals, ideal for isolating discrete zones in long-screened wells and various other formations for:

- Groundwater sampling and monitoring
- Minimizing purge volumes
- Reducing well development time
- Slug and pump tests
- Air sparging (low pressure)
- Hydraulic conductivity testing, and more

Single and Straddle Packers fit 2" – 5" (50 mm – 125 mm) monitoring wells. They are easily lowered into the well and inflated with a hand pump to create sealing pressures of 20-50 psi.

"We used Solinst Model 800 Low Pressure Inflatable Packers to isolate the screened intervals of observation wells during a critical fractured rock aquifer test. The test involved the use of the Hsieh "cross-hole" technique to define the areal and vertical anisotropy of the rock. The high permeability of the rock dictated that the observation wells had to be able to record drawdown instantaneously with no appreciable time lag. The Solinst Packers, equipped with a Solinst Levelogger mounted within the isolated screened interval of the observation wells, performed perfectly."

Robert D. Mutch Jr., P.Hg., P.E.
Executive Vice President and
Principal Groundwater Hydrogeologist
HydroQual, Inc., New Jersey



CMT Ideal for Chlorinated Solvent Assessment

Certified CMT Installer Michael Early, of ZEBRA Environmental, Tampa, a company specializing in direct push sampling and probing services to consulting firms, recently installed three multilevel groundwater monitoring systems in Pinellas County, Florida. The purpose of this phase of their study is to assess the possible extent of chlorinated solvents in shallow sandy sediments at each site. The Solinst CMT (Continuous Multichannel Tubing) System was chosen for all three drilling locations.

Using direct push methods, a 3-Channel CMT System (1.1" (28 mm) in diameter), was installed at each location, to a depth of 40 ft. (12 m). Solinst sand cartridges were placed over the screened ports and bentonite cartridges used to seal between ports. Bentonite cartridges are specifically designed for use with the 3-Channel CMT, ensuring that each sampling port is isolated and that vertical and horizontal groundwater data is accurate and reliable. All drilling, sampling, and well construction was completed in just two days. Post installation sampling and water level data has shown that this is another successful installation for ZEBRA.

ZEBRA worked closely with the Solinst support team in choosing the most appropriate Multilevel System for their client. The low profile design of CMT, combined with the ease of construction, installation and sampling options, provided the client with high quality results.

"The 3-Channel CMT technology is a wonderful tool for multilevel sampling. With our technical expertise and the support service from Solinst, the clients who utilize the technology have realized the benefits of a single installation with multiple levels of data."

Michael Early
ZEBRA Environmental, Tampa, Florida

Acknowledgement: Solinst would like to thank Michael Early of ZEBRA Environmental, Tampa for providing the details of this application.

Easy and Effective Sealing of Zones with CMT Sand and Bentonite Cartridges

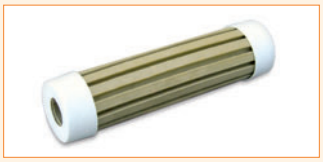
The 3-Channel CMT® Multilevel Monitoring System is ideal for direct push installations, as it is only 1.1" (28 mm) in diameter. Often with these installations, the annulus available is too small to accurately place sand and bentonite layers for isolating the monitoring zones. Therefore, bentonite cartridges (spring and pre-formed) have been developed to give reliable seals between zones. Accompanying sand cartridges are used to complete the installation. The cartridges are approximately 2.4" (61 mm) in diameter, slide easily onto the CMT, and will fit inside larger direct push drill rods.

Remember to consider CMT Multilevel Systems as a quick and cost effective way to delineate soil gas concentrations below buildings. Multilevel monitoring allows chemistry comparisons of near-slab, sub-slab, and groundwater data.

Choosing Cartridges

Clients source and choose sand for filling cartridges to suit their application and the information they are monitoring. Coarse sand will allow fine particles to reach the screened port, while fine sand will filter out smaller particles before reaching the port. The client also sources the bentonite pellets used in the spring cartridges. The bentonite pellets in the spring cartridges set more quickly than pre-formed bentonite cartridges - days versus weeks. As such, the spring cartridge is recommended as the primary seal. The choice between bentonite cartridges is also based on application and client preference.

Sand Cartridge Filled in the Field



Pre-formed Bentonite Cartridge Ideal for Infilling

Spring Cartridges use Bentonite Pellets

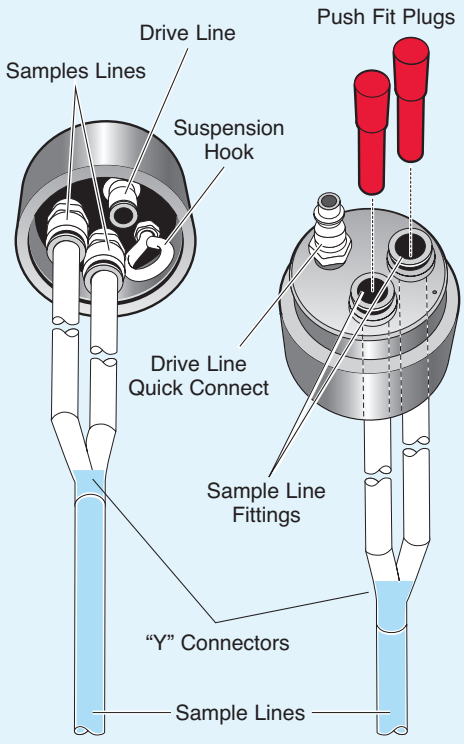
7-Channel CMT Installation to Monitor Groundwater and Soil Gas Beneath a Building

Freezing Conditions?
You Can Still Dedicate Your Bladder Pump

Solinst provides a special "Freeze Protection Assembly" for anyone wishing to dedicate Integra® Bladder Pumps in conditions where there is a risk of the sample line freezing. The assembly is simple to install in the field and may be retrofitted with ease to existing Pumps. The assembly can be used with 1.66" and 1" Pumps, PVC or stainless steel versions. The assembly consists of a specialized dedicated wellhead and "Y" connector. The wellhead allows the attachment of a second sample line, and the "Y" connector creates a "U" with the sample tubing.

By placing the "Y" connector at or below the frost line, water can be flushed from the sample tubing after your sampling round is complete. Just attach a hand pump, peristaltic pump, or compressed air source to one sample line at the wellhead, and water above the "Y" Connector is pushed through the "U" and out the second sample line. Use the wellhead plugs to ensure your sample tubing remains dry and free of ice until your next sampling event.

Freeze Protection Assembly Wellhead Setup



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Lithuania Selects Levelogger for National Groundwater Monitoring Program

Groundwater is the sole source of drinking water in Lithuania; therefore, the importance of protecting this resource was recognized many years ago. To maintain their supply, a regular groundwater monitoring program was established in 1946. By 1962 the monitoring network had spread across most of the country, with more than 20 monitoring stations, including 190 observation wells.

Approximate Location of Observation Wells in National Groundwater Monitoring Network

Today the monitoring program consists of over 150 monitoring stations with more than 250 observation wells, primarily overseen by the Lithuanian Geological Survey. Numerous wells are installed in areas with varying hydrological conditions and are monitored for water levels, contamination, and general chemical and physical characteristics. The detailed long-term data obtained through the network allowed a map of groundwater recharge rates to be created for the entire country.

Up until 2005 contracted personnel used tapes, 2 to 5 times every month, to manually measure water levels in the observation wells. When it was realized that more frequent data would be required to increase management of groundwater resources and improve estimates of recharge rates, the Lithuanian Geological Survey decided to purchase Solinst Leveloggers to automate the monitoring process.

The Geological Survey installed Leveloggers at 61 monitoring stations in 73 wells, and set them to record daily water level readings. Field technicians download the data twice a year, in some cases using a Leveloader field data transfer device. All groundwater data is stored in a central database by the Geological Survey.

The Leveloggers are found to provide highly accurate readings, which are instrumental in evaluating groundwater recharge conditions. Using Leveloggers decreased monitoring costs and time in the field, while the amount of valuable data increased. As the demand for more detailed data continues to grow, there are plans to install ten Telemetry Systems in 2009, in order to view daily groundwater fluctuations.

Acknowledgements: Solinst would like to thank Kestutis Kadunas of the Lithuanian Geological Survey and Bernardas Paukstys, Solinst Agent in Lithuania, for providing details and assisting in the completion of this article.

International Training

In March, Randy Blackburn, Sales Manager of Solinst traveled to Brazil to provide CMT training to more than 40 workshop attendees. Over two days, Randy assisted Ag Solve, the Solinst Agent in Brazil, with informative seminars and interactive field demonstrations.

Attendees of the CMT Training in Brazil

A group of International Agents came to Solinst for training in May and a follow-up group in July. Agents were welcomed from various parts of the world, including: Argentina, Bolivia, China, Denmark, England, Greece, Hungary, India, Iran, Lithuania, Romania and Spain.

International Agent Training at Solinst

Hands-on training is also available at our facility or on-site, to any group wanting to learn more about Solinst products.

Come See Solinst Equipment (for more, visit: www.solinst.com/Tradeshows/)

Date	Event	Place	Booth #
September 21-24	GeoEdmonton '08	Edmonton AB, Canada	41
September 24-26	GRA Annual Meeting	Costa Mesa CA, USA	1
October 5-9	GSA Joint Annual Meeting	Houston TX, USA	809
October 18-22	WEFTEC 2008	Chicago IL, USA	11029
November 19-21	2008 Conservation Symposium	Alliston ON, Canada	28
December 3-5	NGWA Expo	Las Vegas NV, USA	200 and 202

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