

# ON THE LEVEL



Water Monitoring News and Updates

**Solinst**<sup>®</sup>

High Quality  
Groundwater  
and Surface Water  
Monitoring  
Instrumentation

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FALL 2007

## Junior ...

... the newest addition to the Levellogger Family

Designed to reduce your bottom line, the Levellogger Junior is a low cost alternative for measuring groundwater and surface water level and temperatures. The Levellogger Junior combines a data logger, temperature thermistor, and pressure transducer in one small watertight housing. Features include:

- Compatible with Levellogger Gold Series software and accessories
- 5 year battery life
- Memory for 32,000 data points
- Accuracy of 0.1% FS
- 1 year warranty



**A low cost alternative in the Levellogger Series**

## Solinst Double Valve Pumps Preferred in the UK



Cory Environmental, a leading recycling and waste management company, operates in over 30 locations around the UK developing and maintaining recycling and landfill facilities. Over the years, they have purchased and tested a number of groundwater sampling instruments for use in monitoring programs at their landfill sites.

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## Barologgers Can Take the Heat

Researchers at the University of South Florida have undertaken a 4-year study to address hydrological and ecological questions regarding clay-storage areas (CSAs). CSAs are produced as a result of the disposal of sand and clay from the mining of Phosphate-rich deposits in the Florida peninsula. The study is being aided by the use of Solinst Levelloggers and Barologgers for measurements of stages and hydraulic head, and supplementary barometric data.

On June 25, 2007 a lightning strike ignited a wildfire on a 75-hectare CSA study site. Unfortunately, much of the standpipe and meteorological instrumentation was destroyed in the fast moving fire. Upon inspection, three Solinst Barologgers, which were deployed on or near the ground in close proximity to the meteorological station, were still able to communicate and measure barometric pressure. The Barologgers registered temperatures that ranged from 65°C to 80°C (150°F to 175°F) during the fire that lasted for about one hour.

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## Solinst Double Valve Pumps Preferred in the UK *(Cont'd)*

In the past, portable submersible pumps and specialized air drive pumps were used without much success. These pumps were costly to maintain and purchase, and difficult to operate. Unsatisfied, the search continued for an alternative. Their search criteria included:

- Adjustable pumping to 1 L/min +
- Ability to cope with silty water
- Economical and easy to maintain
- Following installation, sampling possible by one technician

In 2005, Cory selected one landfill site as a test bed for dedicated pumps. After a series of field trials, the Solinst Double Valve Pump (DVP) was chosen as the preferred option, as it met all of their criteria and outperformed the other competitor air driven systems. Since then, Cory has purchased and installed 60 Solinst dedicated DVP's, at a number of sites with varying hydrogeological conditions. They have been satisfied with both dedicated PVC and portable Stainless Steel versions purchased in 2006. Malcolm Cox, of Cory, says: "The Double Valve Pumps have proven to be the best solution for obtaining high quality purged samples, whilst at the same time reducing the amount of time required to obtain each sample".

*Acknowledgements: Solinst would like to thank Malcolm Cox of Cory Environmental and WaTerra UK, for providing details on their applications and equipment performance for this newsletter*



Advantages of the Solinst DVP noted by Cory Environmental included:

- Easy installation in 50 mm (2") boreholes
- Successful purging in deep applications
- Handled silt in wells without difficulty
- Utilized to remove silt from boreholes
- Performed in wells with low water levels
- Technicians quick to learn operation
- Low costs allowed pump dedication
- Custom alterations to design made almost every sampling location manageable by one field technician
- No significant loss in performance using air supply source 500 m (1,640 ft) away

At Solinst, we are very proud that Cory Environmental, with their expertise and experience in groundwater monitoring, selected the Solinst Double Valve Pump as their preferred sampling option. In the series of challenging field trials, the Solinst DVP proved itself.

## Why Use Bladder Pumps?

We all know that bladder pumps are ideal for obtaining extremely accurate, representative groundwater samples. For this reason site regulators, owners, and consultants rely on bladder pumps for reproducible data that is defensible, time and time again.

Although there may be a high initial capital investment, the bladder pump will pay for itself quickly. Only one pump controller is required, and can be re-used on numerous sites and sampling applications. Dedication of customized, pre-assembled systems significantly reduces the time needed in the field for setup. Portable pumps are easily disassembled for decontamination between sampling events.

Bladder pumps are EPA-approved for low flow sampling and groundwater collection for Volatile Organic Compound (VOC) analysis. Using low flow methods, only the sampling zone is purged, thus reducing purge volumes, sampling time, and disposal costs. High quality samples with no turbidity or de-gassing cut down the need for repeated sampling.



Solinst offers the Integra Bladder Pump, which is versatile in design and application:

Stainless steel pumps are ideal for VOC monitoring

- Teflon® bladders guaranteed for 10 years
- 1.66" or 1" (42 mm or 25 mm) diameter
- Stainless steel effective to 500 ft (150 m) below grade (deeper using a drop tube).
- Operates effectively at almost any angle
- Optional freeze protection assembly
- Use Model 800 Low-Pressure Packers to further reduce purge volumes
- Dedicated or portable
- Still effective in water only 2" (50 mm) above pump inlet
- Inexpensive disposable polyethylene bladders available
- PVC pumps excellent for sampling metals and corrosive leachate
- 'One touch' pumping presets, make operation easy



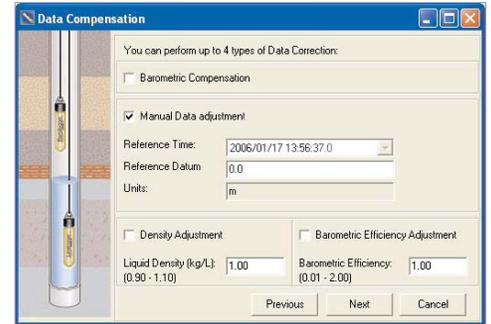
## Adjusting Pneumatic Pumps – it's Easy!

What do you do when your Pneumatic Pump is properly connected, yet there is no sample discharge? A simple 'trick' is to submerge the sample discharge line into a clear container of water. During the drive cycle you should see bubbles. An aggressive blast of bubbles can mean that there is no water available, while a steady mild bubbling indicates that the pump is operating and sample water is on the way up.

Once sample water is being discharged, you can adjust the flow rate using a pump controller. Make sure that your controller has easy to follow pre-set pumping options, such as the Solinst Electronic Control Units. This helps take the guesswork out of determining suitable drive and vent times for your Integra® Bladder Pump or Double Valve Pump.

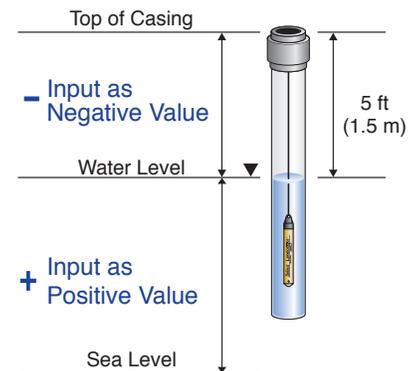
Determining the amount of applied pumping pressure to retrieve a sample is simple. 1 psi of pressure can raise a 2.3 ft column of water, this is about half of the column height of water in feet, expressed as psi. If a Bladder Pump's intake is at 100 ft below ground surface, you will require approximately 50 psi of pressure to get a sample. When sampling with a Double Valve Pump, this calculation is made from ground level to static water level (as a minimum, but can be made from total pump depth to maximize purging rates). Therefore, if a Double Valve Pump is 100 ft below ground surface, and static water level is at 50 ft, you can select a pressure of between 25 and 50 psi. In both cases, add an extra 10 psi to allow for line loss.

The Solinst Levellogger Gold PC Software is intuitive and user-friendly. The simple Windows® based software allows you to easily customize and manage data to meet your own requirements. A key feature of the Levellogger Gold Software is the 'Data Compensation Wizard'. Most users are familiar with Barometric Compensation and Density Adjustment, but may overlook how useful the Manual Data Adjustment can be.



The Manual Data Adjustment allows you to use the 'Reference Datum' field to adjust your data to top of casing or sea level for instance, simply by replacing the datalogged water level reading with a manual water level measurement. The program then computes a correction factor using the reference datum and adjusts all of the data in the file to this new zero point. This adjustment is performed after barometric and density compensations have been performed.

It is important to remember, if the reference datum is above the water level reading (e.g. top of well casing), the datum must be input as a negative value. If the reference datum is below water level (e.g. sea level), a positive value is input.



For example, if the manual water level measurement shows that the water level is 5 ft (1.5 m) below top of casing, then you would input the Reference Datum as a negative number -5 ft (-1.5 m). Subsequently a pressure reading of -4 ft (-1.2 m), for example, would indicate that the water level was 4 ft (1.2 m) below top of casing.

## Just Released from Solinst

### Levellogger with SDI-12



The Solinst Levellogger Gold Series is now SDI-12 compatible, and able to link to PLC and SCADA systems. Current Levellogger Gold customers can upgrade their data loggers to communicate in SDI-12 mode. Using new firmware and SDI-12 interface cable, Levelloggers, Barologgers, and Rainloggers are easily added to a system with a communication distance up to 1700 ft (520 m). Levelloggers can be programmed to record independently of SDI-12 operation, providing reliable back-up data.

### New Rainlogger



The 3002 Rainlogger is designed for use with Levellogger Gold Software and most standard tipping-bucket rain gauges. Compact in design, this durable field unit offers long-term reliability with a 10-year battery, and non-volatile memory for up to 40,000 readings. Rainfall level per sampling period and a five-minute maximum rainfall are logged, with sampling set at 1 min. to 99 hrs. Compatible with Solinst Telemetry Systems, Rainloggers are excellent for measuring local precipitation, larger scale remote monitoring of watersheds and localized stormwater event monitoring.

## Product Advancements

### Peristaltic Pump



The latest version of the Solinst Peristaltic Pump features improvements designed to make the pump even easier to operate and use in the field.

- One easy-access control enables reversible flow and varied speeds
- Steadier flow, with rates ranging from 40 mL/min. to 3.5 L/min.

Compact, and lightweight, the metal case is extremely robust and water resistant. The pump has no grates, vents, or openings, making it easy to maintain and repair. Simple connection with alligator clips to a 12V power source provides convenient operation. Effective to depths up to the suction lift limit, which varies with elevation, and can be as much as 33 ft or 10 m at sea level.

### Leveloader Gold



The Leveloader Gold is a data transfer device for use with all versions of the Solinst Levellogger. This handheld device features a rugged, waterproof, ergonomic exterior and stores up to 1,390,000 LT readings, 930,000 LTC readings, or 34 full Levellogger downloads. It comes ready with USB and RS232 cables, and one convenient 'Y' cable with optical and direct connectors. The Leveloader can be used to reprogram a Levellogger in the field. It also displays useful information on battery life and available memory of the Leveloader itself and the attached Levellogger. Real Time View is ideal for observing live water level and temperature fluctuations.

## CMT System the Clear Choice for a German Air Force Base

Contaminants were identified in the subsurface at Rhine Main Air Base, Germany, in a sand and gravel aquifer. The contamination was complex due to two separate sources: a fire training pit, and a former gas station that had leaked various compounds, including BTEX, TPH, PAH, and TCE. The aquifer extends from 7 m up to 40 m below ground surface, with static levels varying from 6-10 m over the site.

In 2005, the consulting group, Peschla & Rochmes, was retained to further define and monitor the contaminant plume. Their focus was to investigate the vertical and spatial distribution of the contaminants, and to better quantify vertical groundwater flow. Based on the following advantages, a multilevel monitoring system was determined to be the best option for this site investigation:

- Eliminates contaminant mixing
- Collects vertically discrete samples
- Prevents biases due to ambient flow
- Improves sample quality
- Reduces costs

A comparative analysis of multilevel systems resulted in the CMT system being selected for



this project. The 7-channel CMT system was installed in 16 locations on the site, 6 of which monitor the pit and gas station areas. During drilling, core was collected to determine port locations, which were placed at approximately 8, 12, 17, 22, 27, 32, and 36 m. The tubing was installed in boreholes, and completed using sand around the ports and grout injected to seal between monitoring zones. A Tag Line was used to accurately place and confirm the thickness of sand and grout during construction.

The Mini Inertial Pump was chosen as the sampling device for this application, as it is inexpensive and very easy to operate. As HDPE tubing is susceptible to both positive

and negative biases caused by sorption, desorption, and diffusion by many of the target contaminants, a sampling protocol was developed. Channels were purged prior to sampling, and separate 0.25" Teflon<sup>®</sup> tubing was used to obtain samples. The CMT system was able to provide valuable data on vertical and spatial distribution of the contaminants and their concentrations, as well as vertical flow gradients.

In addition to the benefits of superior data collection, a comparative analysis showed that the CMT should provide significant cost savings. The comparison was performed by looking at the cost to place 4 single wells, with either 6" or 2" pipe, versus the CMT system. Estimates for both well construction and sampling showed significant savings in both areas, up to 40% in construction costs and 65% in sampling costs using the CMT. In actuality, the sampling savings were not as significant as hoped in this case, due to turbid samples.

The study concluded that the CMT was a valuable tool in the assessment and monitoring of the site. The system not only provides excellent data, but also considerable cost savings.

*Acknowledgements: Solinst would like to thank Mr. Kropp of Peschla & Rochmes and Hans Weiss from IMW Innovative Messtechnik Weiss, for providing data, and details on the project and system performance for this newsletter.*

## The Solinst Training Commitment

At Solinst we see our International Agents and North American Distributors as an integral and important part of our company connection to our clients. To this end, we have had a very busy year both offering training courses here at Solinst and visiting our Agents and Distributors.



In May 2007 Solinst held a 2-day training session for International Agents from France, Peru, Israel, Mexico, Korea, UK, Columbia and China. A lot was learned and a lot of fun was had by all. It was great to see everyone. In August we ran a similar training for North American Distributors. We welcomed 13 reps from 5 different companies. Thank you all for coming.

There were road shows too. In March it was Australia, and June through August saw numerous visits to important Distributors and clients across the United States and Canada. September saw Sarah Belshaw and Jim Pianosi doing a whirlwind tour around Europe, visiting the UK, Sweden, Lithuania, Czech Republic, Hungary and Germany. Then, of course, there were numerous trade shows at which we have exhibited and are going to exhibit. You can look up our website at <http://www.solinst.com> to see where we've been and where we're going.

We thank all who participated and our great employees for their commitment to everyone's success. At Solinst we are dedicated to providing our clients with first-rate customer service through our own staff, and through Distributors and Agents who represent our products around the world. Thanks to everyone!

## Barologgers Can Take the Heat

(Cont'd)



Although the data collected during the incident showed that re-calibration was definitely needed, the Barologgers continued to record in the heat of the grassfire, without much visible damage. Solinst does not recommend you subject your data loggers to such conditions, but it is nice to know these ones did *take the heat!*

*Acknowledgement: Solinst would like to thank Mark Rains of the University of South Florida for providing details of this study and event.*