

ON THE LEVEL



Water Monitoring News and Updates

Solinst[®]

High Quality
Groundwater
and Surface Water
Monitoring
Instrumentation

**IN THIS
ISSUE**

SOLINST SYMPOSIUM

October 28 - 29, 2010

New Guidance Document
for Site Characterization

Data Collection, Design
Integration & Sharing

Better Investigations for
Better Decision Making

Site Characterization:
Important to Remediation

Regional Scale
Groundwater
Understanding

Municipal Groundwater
Monitoring

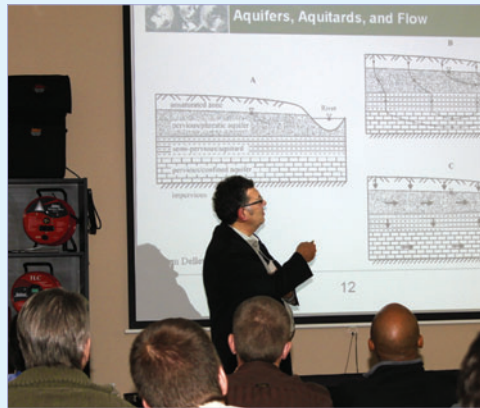
High Resolution
Multi-level Monitoring

Groundwater Resource
Management



**SPECIAL EDITION
FALL 2010**

Positive Response to New Guidance Document for Groundwater Site Characterization



At this year's Symposium, attendees were thoroughly intrigued when Guy Patrick described the new guidance document for groundwater site characterization in B.C. The response was immensely positive and it is clear that Guy is setting the bar to increase the level of competency and accountability for groundwater monitoring and remediation applications. This is a real step forward for the entire industry and really drove the point home that high quality data not only needs to be captured and shared, but also analyzed and utilized to ensure public safety.

...more on page 2

Data Collection, Site Design Integration & Sharing a common theme at Solinst Symposium



The 2010 Solinst Symposium came to a close with great response and feedback from the presenters and attendees. The sold-out event provided all in attendance with an excellent exchange of knowledge and networking opportunity with top-level industry professionals and researchers. The speakers provided insight through case studies, their own experiences, and data from ongoing groundwater monitoring programs.

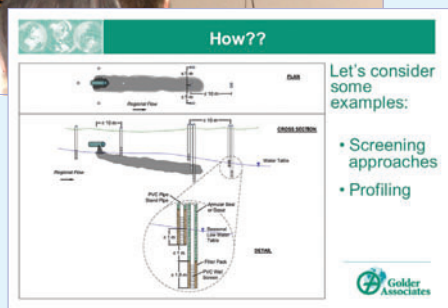
There were definitely overwhelming, common themes throughout the Symposium presentations. It was made clear that successful groundwater monitoring for the 21st century involves obtaining high resolution water level and underground chemistry data, storing it in a database, and making it available to all those who need it. The presenters also highlighted the need for setting project objectives, and extensive field research and testing in order to create detailed site conceptual models to better understand what is happening in the subsurface.

For more highlights from the Symposium, visit: <http://www.solinst.com/Symposium/>

New Guidance Document Provides Better Investigations for Better Decision Making



Technical Guidance for Groundwater Investigation and Characterization in British Columbia, comes into effect February 2011



Guy Patrick had the Symposium audience fully engaged with his presentation of the new site characterization guidance document for British Columbia. The new guidance is designed to allow environmental consultants to meet government requirements, as well as meet monetary and time constraints put on them by clients.

It aims to do this by providing answers to important site characterization questions, including:

- When is groundwater investigation necessary?
- How do you design the field program?
- What is a conceptual site model?
- What about LNAPL and DNAPL?
- What level of investigation is necessary?
- What are acceptable methods and approaches?

The approaches set out in the guidance favour those that increase the amount of spatial and temporal data, as well as chemistry, with the overall objective of creating a larger three-dimensional data set.

The guidance also aims to correct common issues seen throughout the industry, such as not enough monitoring wells at a site, the use of long screened wells that average groundwater chemistry, and not enough sampling. These issues lead to erroneous conceptual models being created, and therefore the wrong conclusions and decisions made.

Guy hopes this document will ultimately even-out the playing field for the consulting industry in the province, and reduce the number of “professional judgement” decisions made during site characterizations, and replace them with decisions based on accurate, representative data.



ABOUT THE SPEAKER - Guy Patrick, M.Sc., P.Eng., Golder Associates Ltd.

Guy is a Principal with Golder Associates Ltd., and has over 25 years of experience in environmental consulting.

Site Characterization: Important to Remediation Design

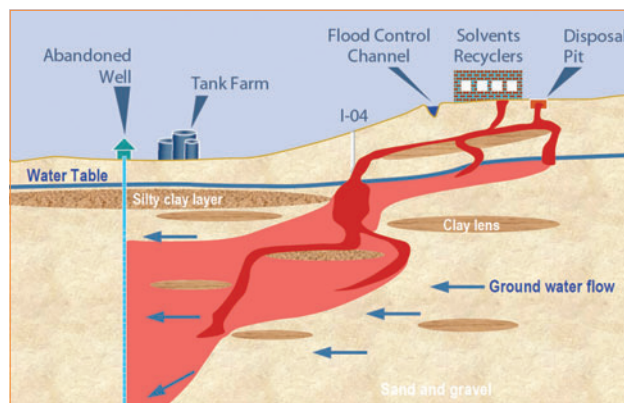
Richard Jackson delivered a very interesting presentation on the need for accurate and complete site conceptual models when dealing with contaminated sites. Richard used four unique case studies to illustrate how important it is to “get it right”. Getting the model right, allows the right decisions to be made - especially when it comes to determining the actual source of contamination.



First, he presented a case where two plumes of PCE (perchloroethylene) were found in the groundwater of an urban area. One plume was deep and much larger, the other was shallow, small, but had much higher concentrations of PCE. The smaller plume was attributed to a solvent recycling facility above the plume, and the larger plume was attributed to a nearby aerospace plant.

The recycling facility was ordered to pay \$0.25 million and had to clean up their plume. The aerospace plant was sued for natural resources damages of \$4.5 billion. A closer inspection of the field data with the help of a DNAPL flow model indicated that both plumes originated at the recycling facility. They had been split by infiltrating floodwaters from an unlined flood control channel (see figure below). The groundwater was found to be treatable and recoverable, and as such, there was no actual loss of the resource.

This case study, and the three others presented, reinforced the need for detailed site characterizations. They provide a clearer picture of what is actually happening and what can and cannot be achieved at a contaminated site.



ABOUT THE SPEAKER - Richard E. Jackson, Ph.D., P.Eng., Intera Engineering Ltd.

Richard has worked as a hydrogeologist since 1970. He is currently a Principal with Intera Engineering of Ottawa, ON.

Regional Scale Groundwater Understanding:

The collection, management and analysis of data for conceptual and numerical model development, application and testing



Extensive data sets for the program have been collected as a result of strong partnerships with numerous groups and agencies.

Attendees enjoyed the presentation by Steve Holysh and Rick Gerber of the Oak Ridges Moraine Coalition. They presented work being done for the Region's unique groundwater management program. Rapid growth and expansion on the Moraine triggered the program into action about 20 years ago, to more fully understand the extent, quality and movement of the groundwater resource.

Steve began the presentation with a look at where and what types of data are collected as part of the program. Water levels from wells across the region have been collected, many from the Ontario Ministry of Environment and Conservation Authority network, as well as their own network.

Hydrogeological field tests are performed to estimate groundwater parameters, and groundwater samples collected and tested for chemistry. Geological data is also an imperative part of the program; historical maps, outcrop studies, and drill records provide insight into subsurface features such as tunnel channels.

Rick continued the presentation with a discussion of how these integrated data sets are incorporated into numerical and site conceptual models, and how they are used to test estimates of hydrogeological parameters. As more data is added to these models, the more representative they become, allowing better management decisions to be made. Overall, their presentation stressed the importance of collecting and organizing detailed data sets, and sharing the information.

For more information about the work Steve & Rick are involved with, visit <http://www.ypdt-camc.ca/>

ABOUT THE SPEAKERS -



Steve Holysh, M.Sc., of the Oak Ridges Moraine Groundwater Management Program is primarily focused on the York Peel Durham Toronto groundwater program.



Rick Gerber, Ph.D., P.Geo., of the Oak Ridges Moraine Groundwater Management Program is a Senior Hydrogeologist with the program.

Municipal Groundwater Monitoring in the Region of Waterloo - A focus on The Ontario Clean Water Act

Day one of the symposium ended with a thought-provoking talk from Waterloo Region's Senior Hydrogeologist, Tammy Middleton. Tammy discussed the key objectives of the Region's groundwater management program.

The first objective of the program is to comply with legislation, while providing a safe and sufficient supply of water to the public. Recently, this involved incorporating new requirements of the *Ontario Clean Water Act*. Proactive monitoring has been another objective of the Region's program for numerous years. As such, their current data collection schedule became a key resource in completing their Source Water Assessment as prescribed by the *Clean Water Act*.

Another aspect of their proactive monitoring program, is monitoring beyond compliance. For the Region, this means testing for all regulated, as well as non-regulated chemicals, and collecting data on a more frequent schedule than required. Tammy pointed out the effectiveness of water level measurements, because of how much information they provide at such a small cost. Monitoring water levels at a greater frequency allowed the Region to see connectivity



between aquifers that may not have been discovered without a continuous water level monitoring program.

Testing for non-regulated chemicals also allowed the Region to discover a contamination issue in one of their well fields. Because of the proactive approach to monitoring, the Region is able to more effectively manage and monitor potential threats to their Water resources. Because of this, the work done at the region can serve as a model for other municipal or larger groundwater monitoring programs.

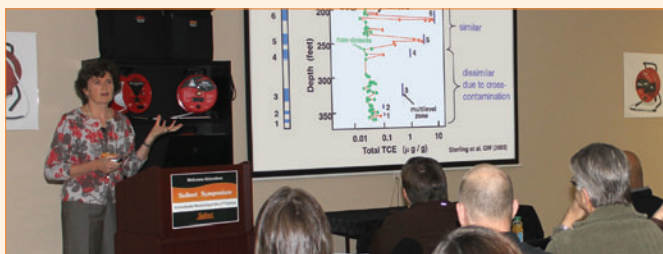
ABOUT THE SPEAKER



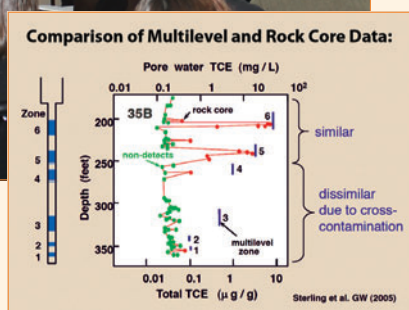
Tammy Middleton, M.Sc., Region of Waterloo

Tammy is a Senior Hydrogeologist and Professional Geoscientist working in the Water Services Division at the Region of Waterloo.

High Resolution Multi-level Monitoring for Bedrock Aquifers



High Resolution monitoring helps determine the nature of contamination in fractured sedimentary rock.



the fracture networks plays a large role in how contaminants move. Using chlorinated solvent plumes as tracers and numerical modeling using discrete fracture network models, she has found that sparse fracture networks lead to more rapid transport of contaminants and distant plumes from the source zone, while in more dense networks, plumes expand more slowly due to attenuation effects from diffusion into and sorption within the rock matrix, which in some cases is enhanced by contaminant degradation.

Beth uses two critical information sources for her research, rock cores and the drilled holes. Rock cores are utilized for determining the physical and chemical properties of the rock matrix and for rock core VOC subsampling to determine the contaminant distribution. The drilled holes are used to perform hydrogeological testing and high resolution monitoring using various different techniques.

As cross-contamination between fractures is an issue in open boreholes, Beth uses lined boreholes to limit cross-connection and multilevel monitoring systems to obtain high resolution, discrete zone data. Beth and her colleagues use the high resolution data to create models for predicting and testing the movement of contaminants in fractured sedimentary rock. This research is important, as many of the areas of sedimentary rock in North America are home to large population bases with many potential sources of contamination, and in many cases the sedimentary rock comprises important water supply aquifers.

ABOUT THE SPEAKER - Beth L. Parker, Ph.D., University of Guelph



Beth is a Professor in the School of Engineering and Scientific Director of the new Institute for Groundwater Research Innovation Partnerships at the University of Guelph.

Groundwater Resource Management in Ontario; past, present and future



From the induction of the Drillers Act in 1946 to the Walkerton tragedy in 2001, Christopher Munro and Heather Brodie-Brown discussed the major changes and events that have shaped how groundwater is managed in Ontario. In addition, their presentation included an overview of the major groundwater management initiatives taking place in Ontario today. This includes the Provincial

Groundwater Monitoring Network overseen by the Ministry of Environment and Conservation Authorities, the Ontario Geological Survey's Groundwater Mapping Program, the Permit to Take Water Program in Ontario, as well as the completion of Source Water Protection Plans under the *Ontario Clean Water Act*. They also touched on issues that will be the focus of groundwater management in the future, including integrated water and watershed management, cumulative impacts and sustainability, climate change adaptation, geothermal wells, and groundwater/surface water interactions.

At the end of the presentation, the focus was put on the attendees to provide ideas and suggestions to improve and advance groundwater management in the future.

ABOUT THE SPEAKERS -



Christopher R. Munro, MSc.Eng, P.Eng., of the Ontario Ministry of the Environment is a hydrogeologist with the Central Region Technical Support Section.



Heather Brodie-Brown, M.Sc., P.Geo., of the Ontario Ministry of the Environment is a hydrogeologist with the Standards Development Branch.