

WHI E-News

Waterloo Hydrogeologic, Inc.

October Edition

Protecting Groundwater Is Our Business

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Product News

Software & Equipment Bundles now available from Waterloo Hydrogeologic.

Choose from one of our Monitoring Solution Bundles Now and Save 25%!

- [Monitoring Network Bundle](#)
- [Saltwater Intrusion Bundle](#)
- [Aquifer Pumping Test Kit](#)



Offer ends December 31st, 2005!

Monitoring Solution Bundles from Waterloo Hydrogeologic

The Challenge

To truly understand the subsurface flow regime, groundwater monitoring projects typically require continuous monitoring of water elevations. Additionally, recording water temperature and conductivity data provides the critical parameters required to anticipate impacts to groundwater quality. Every effective groundwater management plan comprises field-scale data collection, data management, and reporting.

The Solution

For a limited-time only, you can purchase [Diver](#)® dataloggers bundled with globally recognized Waterloo Hydrogeologic software for managing and reporting your groundwater monitoring project data! As a compact, accurate and automated monitoring tool, the Diver from Van Essen Instruments is an ideal instrument for capturing the information necessary to analyze environmental changes. WHI has bundled the Diver with our popular [HydroGeo Analyst](#), [Visual MODFLOW Pro](#), and [AquiferTest Pro](#) software packages to create powerful monitoring solutions. See below for more detail on these value-added bundles.

Monitoring Network Bundle

The **Monitoring Network Bundle** combines Diver groundwater dataloggers with HydroGeo Analyst software. HydroGeo Analyst is an all-in-one data management and reporting solution for groundwater monitoring and environmental projects. Take advantage of this limited-time bundle offer and save up to 25% OFF the regular price!

- 20 x Diver dataloggers
- 1 x BaroDiver (measures barometric pressure)
- 1 x license of HydroGeo Analyst
- Up to 2000ft of Direct Read Cable (DRC)
- 1 x DRC to PC Interface cable
- 1 x LoggerDataManager software

Learn more...[download the Monitoring Bundles PDF, 230kB](#)

Saltwater Intrusion Bundle

The **Saltwater Intrusion Bundle** combines CTD-Diver, a multi-parameter datalogger, with Visual MODFLOW Pro, a globally-recognized modeling program, which is ideally suited for projects in coastal regions or in areas with high concentrations of dissolved salt in groundwater. Take advantage of this limited-time bundle offer and save up to 25% OFF the regular price!

- 5 x CTD-Diver dataloggers
- 1 x BaroDiver (measures barometric pressure)
- 1 x license of Visual MODFLOW Pro (with SEAWAT-2000)
- Up to 500ft of Direct Read Cable (DRC)
- 1 x DRC to PC Interface cable
- 1 x LoggerDataManager software

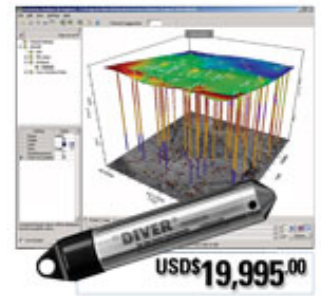
Learn more...[download the Monitoring Bundles PDF, 230kB](#)

Aquifer Pumping Test Kit

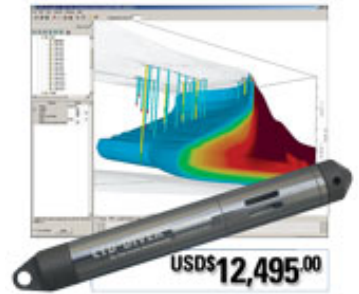
The **Aquifer Pumping Test Kit** combines Diver dataloggers with AquiferTest Pro software for recording and analyzing changes in water table elevation during pumping tests. Take advantage of this limited-time bundle offer and save up to 25% OFF the regular price!

- 4 x Diver dataloggers
- 1 x BaroDiver (measures barometric pressure)
- 1 x license of AquiferTest Pro
- Up to 400ft of Direct Read Cable (DRC)
- 1 x DRC to PC Interface cable
- 1 x LoggerDataManager software

Learn more...[download the Monitoring Bundles PDF, 230kB](#)



Monitoring Network Bundle



Saltwater Intrusion Bundle



Aquifer Pumping Test Kit



For more information [download the Monitoring Bundles PDF, 230kB!](#)

For more information or to order a monitoring solution bundle today, please contact us via phone at +1-519-746-1798, or via email at sales@waterloohydrogeologic.com.

Website: <http://www.waterloohydrogeologic.com>

Phone: (519) 746-1798



Consulting Services News

Using Diver Groundwater Dataloggers to Characterize Groundwater Flow and Quality

Applying [Diver Groundwater Dataloggers](#) to gather data at a cluster of sinkholes in Southwestern Ontario, Canada

Conservation Authorities, Municipalities, and the Ministry of Environment in Ontario, Canada recently completed more than 65 regional groundwater studies to characterize aquifers, and to evaluate groundwater resources in support of source water protection initiatives.

In many cases, these regional studies identified conditions that require additional characterization at a local scale to assess potential groundwater management issues. Sinkholes identified in Perth and Huron Counties during recent groundwater studies provided the motivation for the Ausable Bayfield Conservation Authority (ABCA) Sinkhole Investigation Study.

WHI's Consulting Services team worked together with the ABCA to:

- Determine the locations of sinkholes in the study area,
- Map the extent of karst conditions throughout the region, and
- Develop a plan that addresses potential groundwater quality concerns.

The team chose to deploy Diver Groundwater Datalogger pressure transducers in a number of monitoring wells and sinkholes within the study area based on Divers' proven track record and reasonable cost. The Divers collected water-level data essential to developing a conceptualization of how surface water moved to sinkholes, and then to the underlying karst aquifer.

During the study, more than 50 sinkholes were identified within a 100 km² area, primarily off the flanks of the Seaforth and Lucan Moraines in Perth and Huron Counties. Land use in this area is primarily intense agricultural, with cash crop farming and livestock operations. In many cases, surface runoff from agricultural lands drains directly to sinkholes, providing a link to the bedrock aquifer—and creating potential groundwater quality concerns since residents of the rural area and surrounding urban centers derive all of their water from groundwater sources.

A Diver installed at the base of the largest sinkhole in the study area was used to evaluate changing water levels during the spring thaw. To prevent the Diver from freezing, it was encased within a sac of anti-freeze. Even during exposure to winter temperatures colder than -15 °C, the Diver's hermetically sealed, stainless steel housing kept it insensitive to moisture. The Diver's built-in battery and large memory capacity allowed the team to set the data collection frequency, leave the datalogger successfully deployed without maintenance for the entire winter, and then download and analyze the data after the spring thaw ended.

The adjacent photos show how water levels in the sinkhole can vary in response to a rainfall event resulting in focused groundwater recharge that may negatively affect groundwater quality in the bedrock aquifer.

Data collected from Diver Groundwater Dataloggers provided invaluable information that led to a more thorough understanding of the role sinkholes play in the region, and has empowered the team to formulate a plan that will address future water quality concerns throughout the region. The plan will be used to



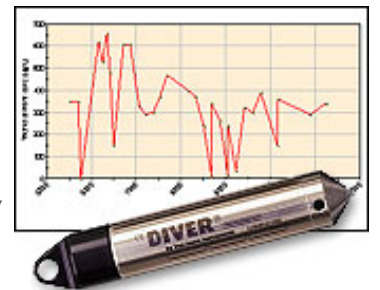
Sinkhole prior to a rainfall event



Sinkhole after a rainfall event



Large diameter sinkhole within the study area



Diver Groundwater Datalogger

develop a sound groundwater management strategy and provide protection measures to help ensure long-term sustainability of the water resource.



[Download the Diver Datalogger PDF! \(720 KB\)](#)

[Learn more about WHI's Consulting Services on the WHI website!](#)

Additional information about the project is available at the study website: www.abcasinkholestudy.on.ca

For additional information regarding Waterloo Hydrogeologic's experiences during this and other projects, please contact consulting@waterloohydrogeologic.com or visit: www.waterloohydrogeologic.com/consulting/consulting_services.htm

Phone: (519) 746-1798



Training News

WHI's Line-Up of Environmental & Groundwater Modeling Courses!

The 2005 Waterloo Hydrogeologic Open Enrollment schedule has been set. In response to comments from groundwater professionals who have taken our Groundwater Modeling Courses in the past, and from those who would like to attend courses in the future, WHI has combined the strengths of our previous Groundwater Modeling, Advanced Groundwater Modeling, and Model Calibration courses into one [Applied Groundwater Flow & Contaminant Transport Modeling](#) course. This course includes updated lecture material, as well as new hands-on laboratories to support the new course material.

WHI has also created a new short course entitled [GIS Data Management for Groundwater Modelers](#), which teaches the theory and hands-on application of GIS data integration and interpolation to support groundwater modeling efforts, as well as 3-dimensional visualization of modeling results in Visual MODFLOW, HydroGeo Analyst, and GIS environments.

Click on the titles below and see which courses are appropriate for you!

- » [Applied Groundwater Flow & Contaminant Transport Modeling](#) - NEW
- » [Groundwater Contamination & Remediation](#) - UPDATED
- » [Finite Element Groundwater Modeling](#) - UPDATED
- » [Aquifer Test Analysis](#) - NEW
- » [Unsaturated Zone Modeling and Evaluation of Landfill Impacts](#) - UPDATED
- » [The Human Health Risk Assessment Course](#) - NEW
- » [Water Quality Data Management & Modeling](#) - UPDATED
- » [Regulatory Review of Hydrogeology Studies](#) - UPDATED
- » [GIS Data Management for Groundwater Modelers](#) - NEW

Who Can Benefit?

- » Experienced hydrogeologists with no prior groundwater modeling experience.
- » Regulators who review modeling reports.
- » Managers who want to understand what the modelers are doing.
- » Experienced modelers who want to enhance their skills.
- » Students who want to acquire new skills.
- » Lawyers who want to understand some of the technical issues.
- » Industry professionals who want to understand more about what their consultants are telling them.

For further details on any of these courses, please visit our Training Website at:

www.waterloohydrogeologic.com/training/training.htm

Or contact Miln Harvey, WHI Training Manager, at (519) 746-1798 x233.

Can't make it to one of our Open Enrollment Courses?

Call us about our [On-Site Custom Courses](#) designed to suit your specific needs!

APPLIED GROUNDWATER FLOW & CONTAMINANT TRANSPORT MODELING



Theory and Hands-on Applications using MODFLOW-2000, MODPATH, MT3D & WinPEST

Simple to complex applications of groundwater flow and contaminant transport models are covered in this 4-day hands-on course.

Course Objectives and Benefits

- Apply Visual MODFLOW Pro to 3D groundwater flow and contaminant transport projects.
- Use MODFLOW-2000 to develop several groundwater flow models.
- Calibrate your groundwater models to observed field data.
- Use MODPATH particle tracking features to determine preferential flow paths and delineate capture zones.
- Use ZoneBudget to assess subregional water budgets within your groundwater model.
- Simulate 3D contaminant transport using RT3D, MT3DMS & MT3D99.
- Use WinPEST to improve model calibration and understand model uncertainty.

For more details about this course, [visit the course web page](#).

[Sao Paulo, Brazil](#)
[Nov 8-11, 2005](#)

[Melbourne, Australia](#)
[Nov 15-17, 2005](#)

[Japan](#)
[Dec 13-16, 2005](#)

[Waterloo, Ontario](#)
[Jan 24-27, 2006](#)

[Saudi Arabia](#)
[Feb 12-15, 2006](#)

Optional PEST
[Melbourne, Australia](#)
[Nov 18, 2005](#)

[Register Now](#)

ADVANCED GROUNDWATER MODELING



This 3-day course goes beyond an introduction to the development, calibration and optimization of groundwater flow and transport models to provide hands-on experience in more advanced topics.

For more details about this course, [visit the course web page](#).

[Melbourne, Australia](#)
[Nov 21-23, 2005](#)

[Register Now](#)

GIS DATA MANAGEMENT FOR GROUNDWATER MODELERS



Understanding Data Sources, Data Analysis and Visualization

This 3-day hands-on course presents an introduction to the management and analysis of groundwater data for [Visual MODFLOW](#) modelers.

For more information about this course, [visit the course web page](#).

[Dubai,
United Arab Emirates
December 4-7, 2005](#)

[Waterloo, Ontario,
December 6-8, 2005](#)

[Register Now](#)

The NEW MODFLOW Course



Theory & Hands-on Applications using MODFLOW-2000, MODPATH, MT3D & WinPEST

Groundwater modeling is becoming a much more complicated, yet highly integrated component of hydrogeologic analysis and design. This 4-day course introduces the groundwater modeling process, and discusses the development of simple to complex groundwater models using MODFLOW-2000, MODPATH, ZoneBudget, MT3D/RT3D.

New exercises have been added to show the use of MGO for pumping well optimization and SEAWAT for saltwater intrusion into coastal aquifers. The course ends with the analysis of model calibration using WinPEST to assess the quality of model calibration, and the impact of parameter input uncertainty on model prediction uncertainty.

For more details about this course, [visit the NGWA course web page](#).

[Princeton, NJ,
Oct 25 -28, 2005](#)

[Register Now](#)

To register for this course you must be a member of the NGWA; if you are not, please call NGWA Customer Service at 800-551-7379, or [email](#).



[Get our full 2005 training schedule!](#)



[Request your free 2005 Training Course Schedule Catalog!](#)

For more information about our course offerings, visit our website or contact us today:

Website: www.waterloohydrogeologic.com/training/training.htm

Email: training@waterloohydrogeologic.com

Phone: (519) 746-1798

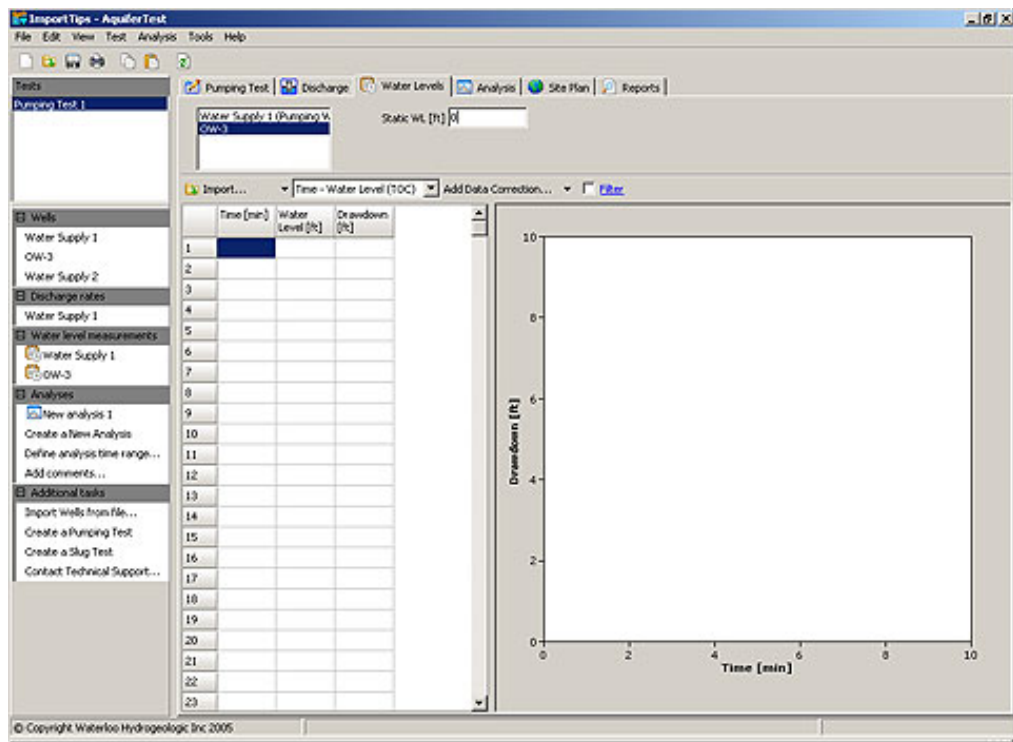


Tips & Tricks

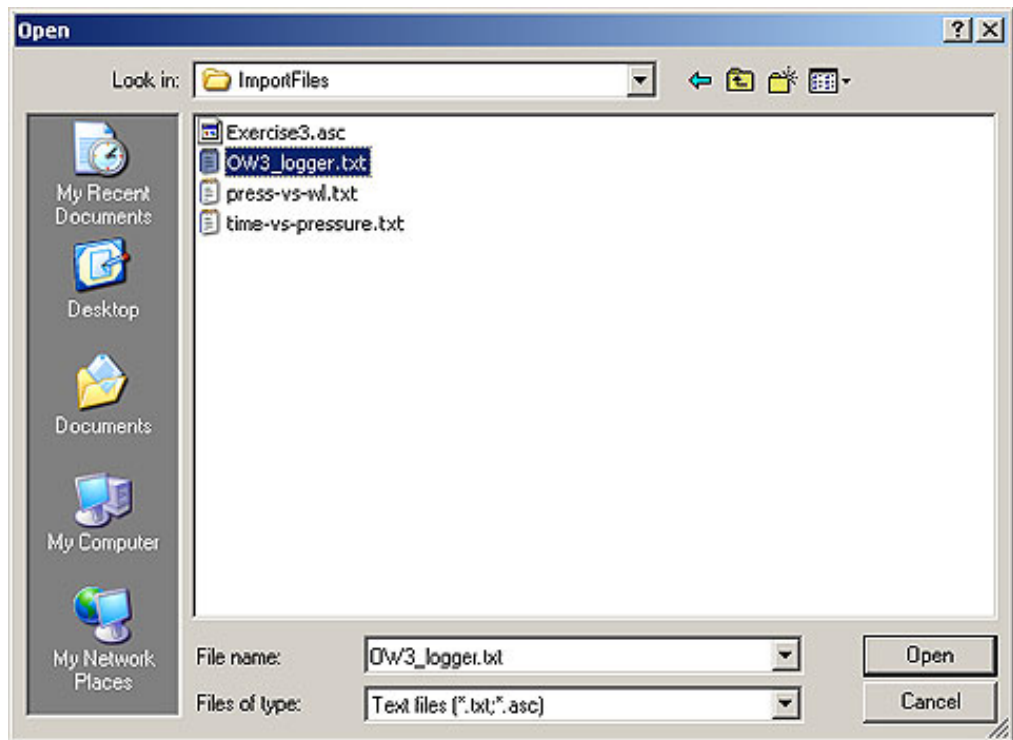
Importing Your Diver Datalogger File into AquiferTest Pro 4.0

Users of AquiferTest Pro 4.0 software have the ability to import datalogger files directly into the program. The following steps describe the simple process of importing a Diver datalogger file into AquiferTest 4.0.

In the **Water Levels** tab, enter the **Static Water Level** (WL) of the well. Then, select the well relating to your datalogger file from the **Wells** frame. To start the import process, click on the **[Import]** icon located in the Water Levels Tab, or click **File>Import>Datalogger file...** from the Main Menu.



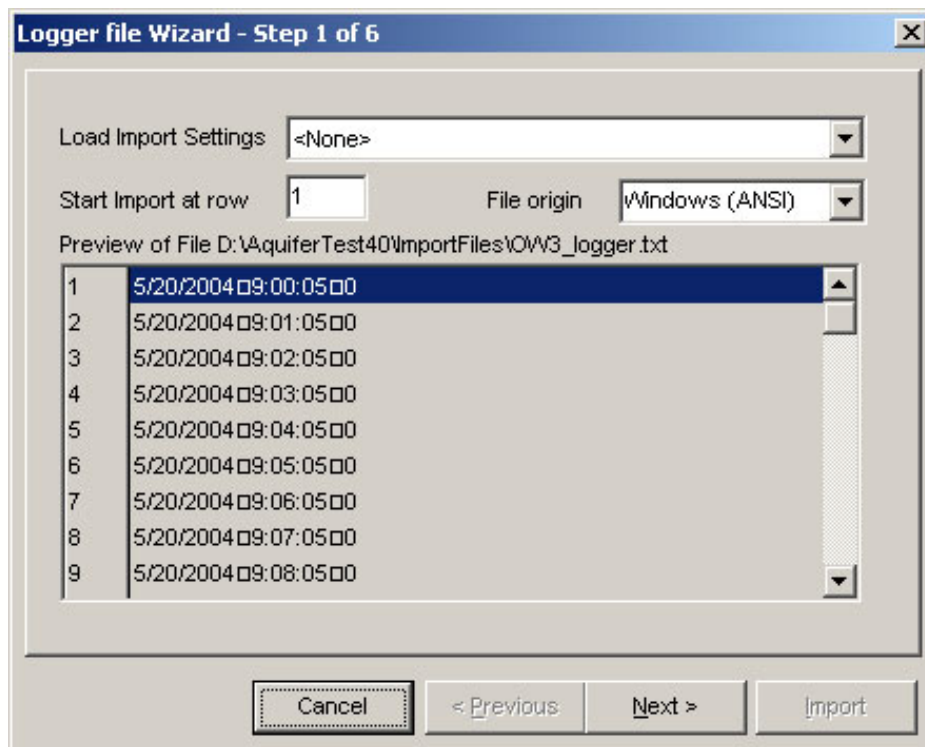
Navigate to the location of your Diver datalogger file, select the file, and click the **[Open]** button to start the Import Wizard.



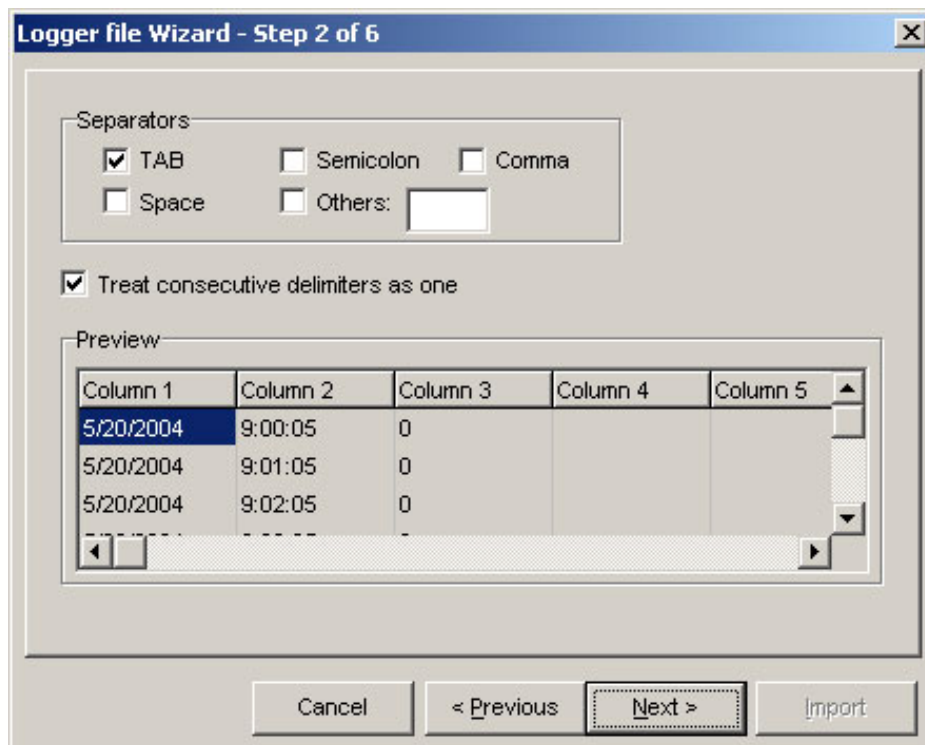
Step 1: The first step of the Import Wizard displays a preview of the file pathname and data. The **Load Import Settings** option allows you to load the settings specified during a previous import session.

You can configure the import to start at a specific row in the file (for example, to skip header information).

Click **[Next]** to continue when you have adjusted the settings.

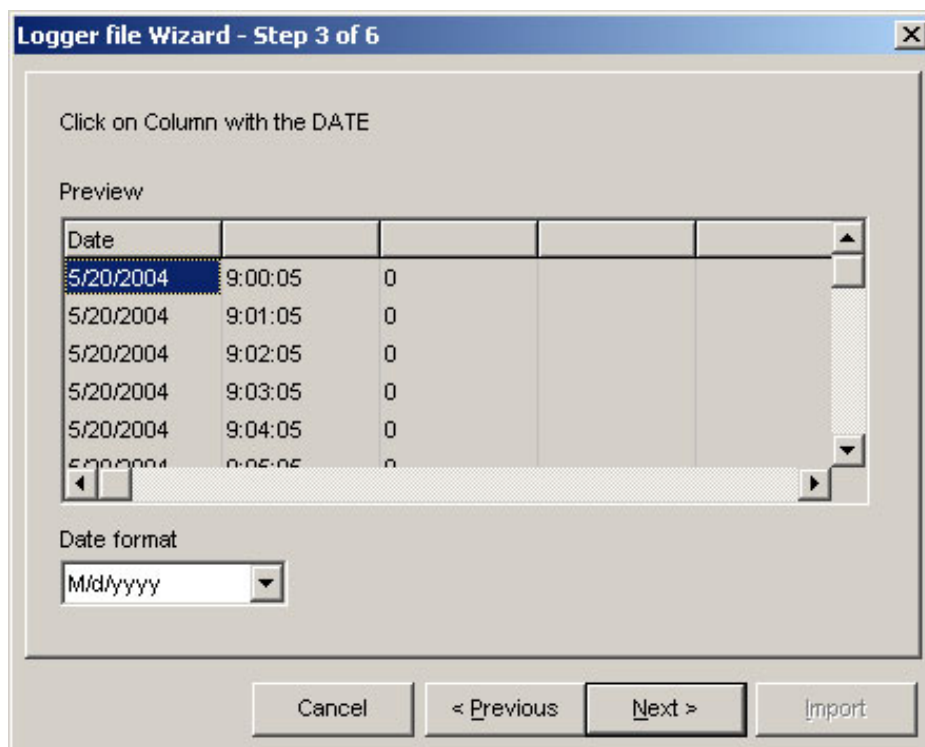


Step 2: Select the **Separators** (delimiters) used in the import file, then click [**Next**] to continue.



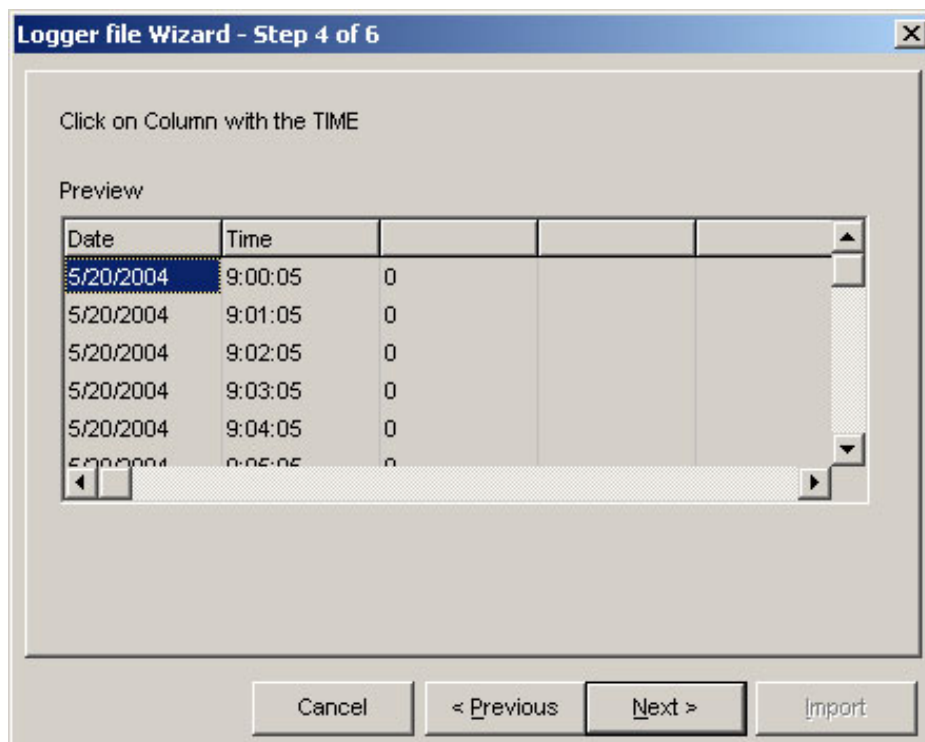
Step 3: Indicate which column in your data file contains the **Date** information by clicking on the column header, and select the **Date format** of your datalogger file.

Click [**Next**] to continue when you have adjusted the settings.



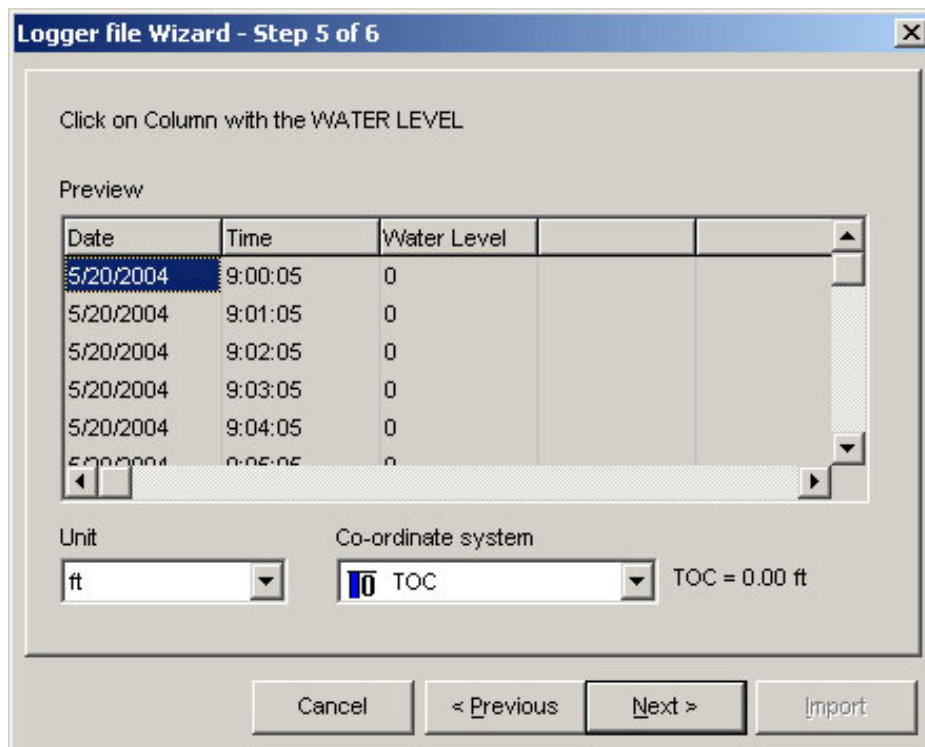
Step 4: Indicate which column in your data file contains the **Time** information by clicking on the column header.


Click [**Next**] to continue when you have adjusted the settings.



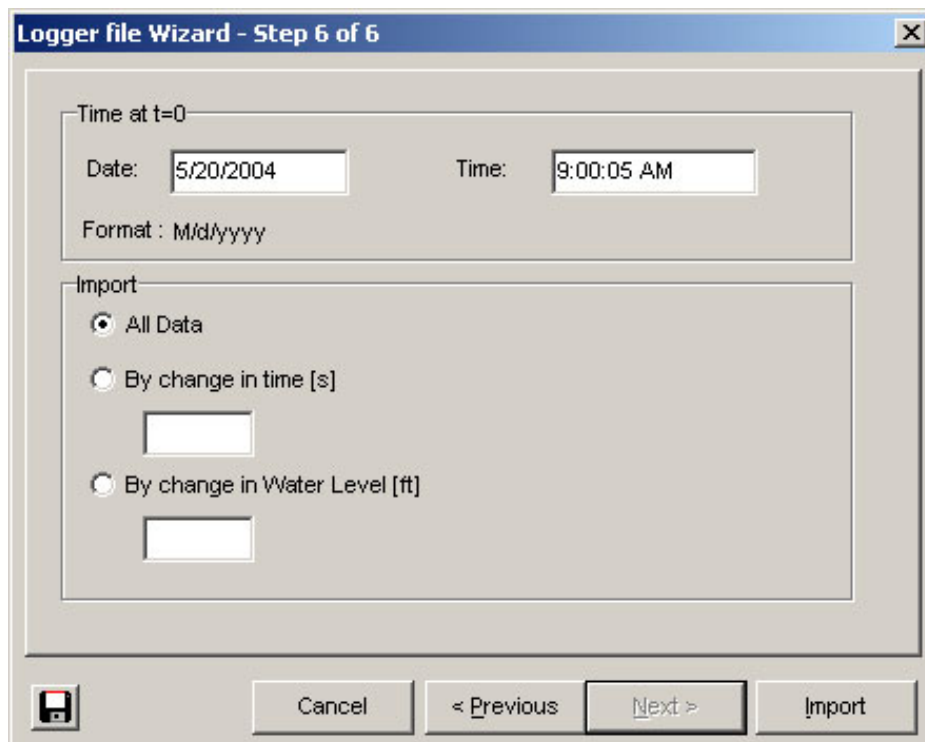
Step 5: Indicate which column in your data file contains the **Water Level** information by clicking on the column header. You may also specify the **Unit** of measurement, and the **Co-ordinate system** the date was recorded with.

Click [**Next**] to continue when you have adjusted the settings.

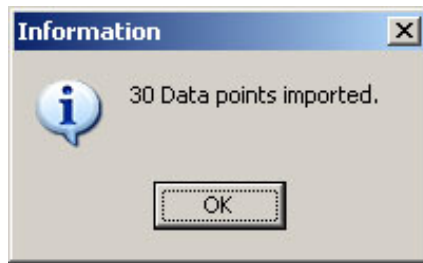



Step 6: The final step of the import wizard confirms the **Date** and **Time** format of the data. You have the option to apply a filter to the data during the import process, to reduce the amount of duplicate data points or reduce the amount of unnecessary data in your analysis. The **Save import settings** button  allows you to save the settings you have input, and to recall them the next time a similar datalogger file is imported.

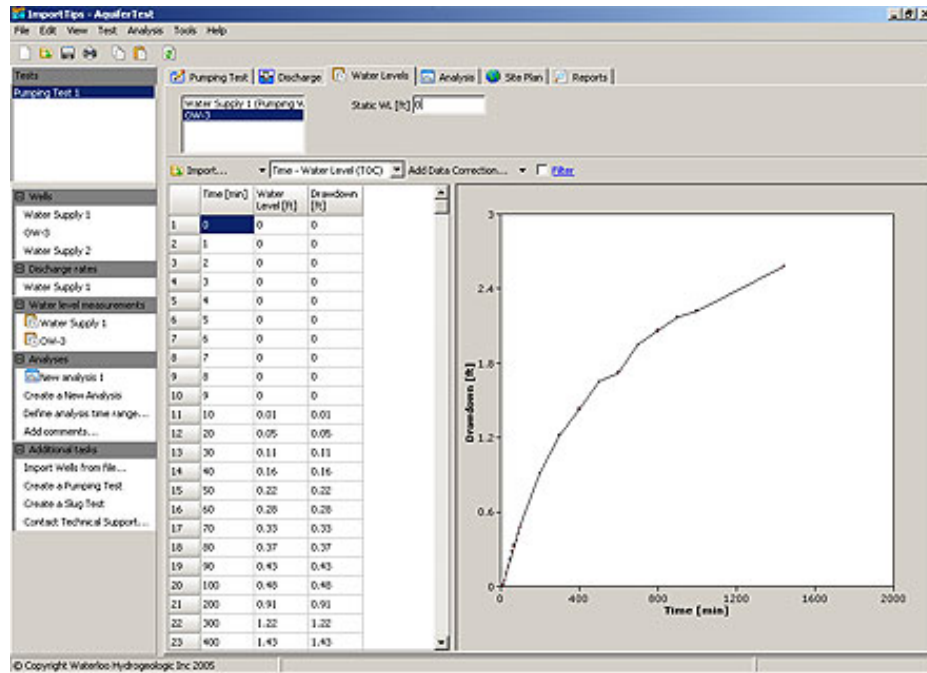
To finish the import process, click on [**Import**] to import the data.



Once completed, an information window will appear indicating the number of data points successfully imported. Click [**OK**] to return to the AquiferTest program window.



Once you have imported your data successfully, you can save your project by clicking **File>Save** from the Main Menu, or clicking on the Save button  in the toolbar.



For more information about WHI's Environmental Information Technology (EIT) services:
Email: techsupport@waterloohydrogeologic.com
Web: <http://www.waterloohydrogeologic.com/support.htm>



Thank you for reading this month's edition of WHI E-News! For more information about our products and services, please use the links below!

[Visit our Website](#) - See what Waterloo Hydrogeologic Inc. has to offer!

[Software Division](#) - Check out our groundwater modeling software.

[Consulting Division](#) - Visit our Consulting Division on the web to see how we can help you.

[Training Division](#) - Visit our Training Division on the web to find a course in your area.

[Equipment Division](#) - WHI is now selling groundwater monitoring equipment.

The preceding message was sent to you as a service by Waterloo Hydrogeologic, Inc. If you do not wish to receive future editions of WHI E-News, please reply to this message with the word 'Remove' in the subject line.





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A Schlumberger Company

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