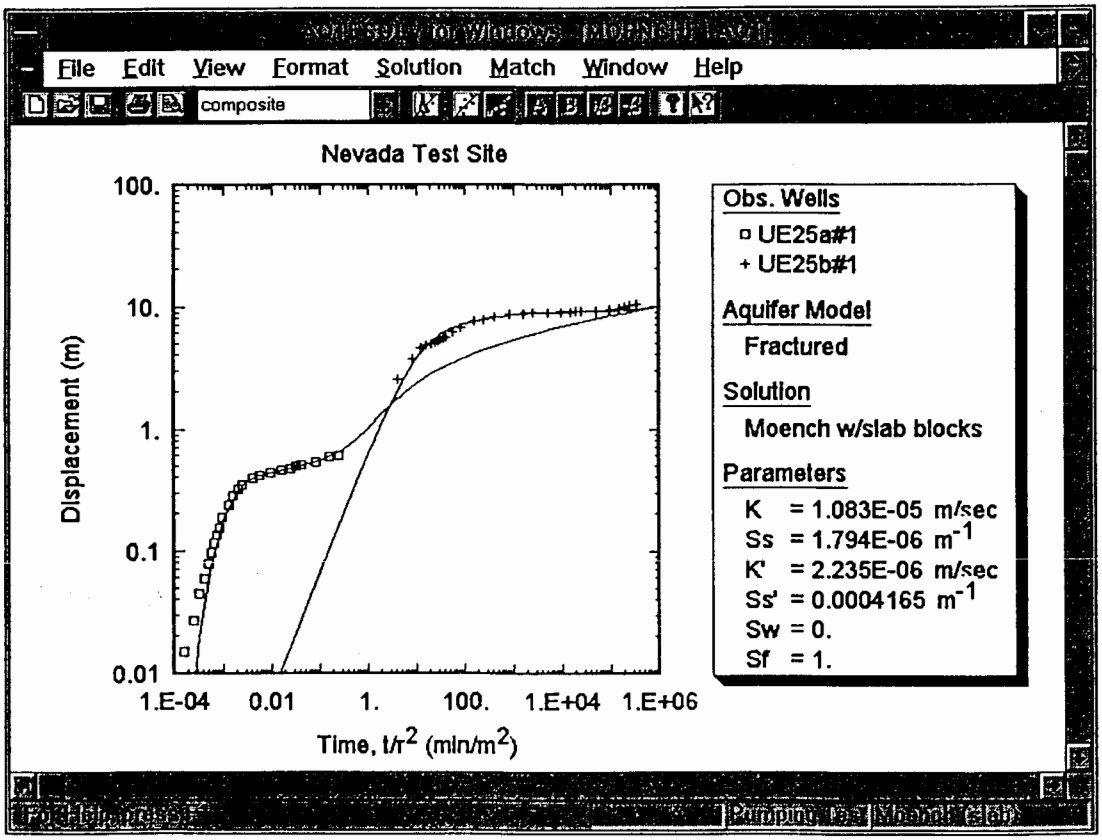
User's Guide


File Edit View Format Solution Match Window Help
composite
Nevada Test Site
Displacement (m)
100.
10.
1.
0.1
0.01
1.E-04
0.01
1.
100.
1.E+04
1.E+06
Time, t/r2 (min/m2)
Obs. Wells
UE25a#1
UE25b#1
Aquifer Model
Fractured
Solution
Moench w/slab blocks
Parameters
K = 1.083E-05 m/sec
Ss = 1.794E-06 m-1
K' = 2.235E-06 m/sec
Ss' = 0.0004165 m-1
Sw = 0.
Sf = 1.

Contents

Getting Started

AQTESOLV for Windows Features

AQTESOLV for Windows is a powerful yet easy-to-use tool for hydrogeologists that features a suite of analytical solutions for determining aquifer properties from pumping tests and slug tests. After first entering or importing data from an aquifer test, you can access visual and automatic curve matching methods for confined, unconfined, leaky and fractured aquifers. Visual curve matching is analogous to traditional methods of aquifer test analysis with graph paper and type curves. The sophisticated automatic curve matching feature enhances aquifer test analysis by providing greater objectivity and a detailed statistical evaluation of the results. AQTESOLV for Windows also features many options for obtaining report quality graphics to summarize the results of your analysis.

Data Management

AQTESOLV for Windows helps you manage aquifer test data with data management tools for entering, editing and importing data. Error checking ensures consistent and complete data entry. Flexible specification of measurement units lets you enter data in English and metric systems. Retrieval of data from a pressure transducer is easy using the data import feature in AQTESOLV for Windows.

Visual Curve Matching

The visual curve matching feature in AQTESOLV for Windows lets you analyze aquifer tests using the traditional method of matching type curves or straight lines to time-displacement data measured during an aquifer test.

With a plot of the data displayed on the computer screen, you can match a type curve to your data in an interactive manner. By simply moving your mouse, you can move a type curve on the screen and watch AQTESOLV for Windows update the values of aquifer properties.

Automatic Curve Matching

The powerful automatic curve matching feature provided by AQTESOLV for Windows uses a nonlinear weighted least-squares parameter estimation algorithm to

match type curves or straight lines to time-displacement data measured during an aquifer test.

The automatic curve matching feature minimizes the errors between the position of the type curve and your data and provides statistical measures of the type curve "fit" such as the precision of the estimated aquifer properties and error distributions.

Statistical Analysis

Automatic curve matching provides statistical criteria measuring the "fit" of a type curve to your data. The statistics give you an objective basis for comparing the match of several different solutions to the same set of data.

Automatic curve matching computes standard errors of the estimated parameters that allow you to evaluate the precision of the parameter estimates and to construct approximate confidence intervals. Statistics for the model errors provide a basis for choosing between different aquifer test solutions that produce similar visual matches.

Plots and Reports

AQTESOLV for Windows helps you visualize the results of your aquifer test analyses by providing five graphical representations.

- displacement vs. time plot
- composite plot
- residuals vs. time plot
- residuals vs. simulated displacement plot
- normality test for residuals

In addition, AQTESOLV for Windows includes report options that document the contents of data sets and summarize the results of matching analytical solutions to data.

- complete aquifer test analysis report
- diagnostic statistics summary
- error log

The error log feature enables you to quickly identify any deficiencies or inconsistencies detected in your data set.

Installation

The AQTESOLV for Windows diskette provided with this manual contains an installation program that prompts you for the destination directory for the program files, the type of installation you are performing, and the Program Group for the AQTESOLV for Windows icons. To install the program, perform the following steps:

1. Insert the program diskette in a floppy drive (e.g., drive a:).
2. Select **Run...** from the **File** menu and enter the following command: **a:setup <enter>**

3. The installation program prompts you to close any applications that are currently running. Click **Continue** to proceed or **Exit Setup** to close any currently running applications.
4. When the installation program prompts you for a destination directory for the program files, choose the default path (**\aqtw**) or click **Change Directory...** to enter a different path. Click **Continue** when you have selected a destination directory.
5. When the installation program prompts you for the type of installation, click the **Typical** button to begin installing AQTESOLV for Windows.
6. After installation is complete, enter a name for the Program Group that will contain the AQTESOLV for Windows icons. Accept the default name (**AQTESOLV for Windows**) or enter a new name for the Program Group. Click the **OK** button install the icons in the Program Group.
7. After viewing last-minute information, close the viewer window. Start the application by double-clicking the AQTESOLV for Windows icon.

Uninstallation

To uninstall AQTESOLV for Windows, simply delete the Program Group (e.g., AQTESOLV for Windows) and the subdirectory (e.g., c:\aqtw) containing the program files. AQTESOLV for Windows does not modify any Windows system files, so no additional uninstallation is necessary.

Using Help

The **Help** menu provides you with options for exploring the AQTESOLV for Windows on-line User's Guide.

Index

Use **Index** in the **Help** menu to view the table of contents in the AQTESOLV for Windows help manual. Once you have entered Help, you can perform searches for specific topics using the **Search** button.

To obtain Help about a specific menu option or button, click on the toolbar. Release the mouse on the option or button for which you wish to obtain Help.

Using Help

Choose **Using Help** from the **Help** menu to view instructions for navigating the Windows help system.

About AQTESOLV

Choose **About AQTESOLV...** from the **Help** menu or click on the toolbar to display program copyright and version information for AQTESOLV for Windows.

Working With Data Sets

What is an AQTESOLV for Windows Data Set?

An AQTESOLV for Windows data set is a file created by AQTESOLV for Windows that records your work during an aquifer test analysis session. It contains data from an aquifer test (e.g., aquifer geometry data, test well data, pumping data, and time-displacement data) and information concerning the solution method used to analyze the test data (e.g., solution method and aquifer properties). A data set also contains data that you enter to format plots and reports. In other words, an AQTESOLV for Windows data set contains a complete record of your aquifer test analysis at the time you save it.

Managing Data Set Files

Creating a New Data Set

Click 🗋 *on the toolbar to open a new data set*

Select **New** from the **File** menu to create a new AQTESOLV for Windows data set.

Editing a new data set

1. Creating a new data set opens a new **Error Log** window and initializes data with default values.
2. To modify the default values, select options for editing data sets.

Saving a new data set

After you have completed entering data into a newly created data set, choose **Save As...** from the **File** menu to save the data set on disk.

Importing an AQTESOLV for DOS data set

You can import a data set created with a DOS version of AQTESOLV (see "Importing Data Sets" on page 14) after you create a new data set.

Saving a Data Set

You have two options for saving an AQTESOLV for Windows data set.

Click on the toolbar to save the active data se

Save data set using current file name

Choose **Save** from the **File** menu to save an AQTESOLV for Windows data set on disk using the current file name.

Save data set with new file name

1. Select **Save As...** from the **File** menu to specify a file name before you save the data set.
2. Enter a name for the data set you want to save in the dialog box.
3. Click the **OK** button to save the data set.

Opening a Data Set

Click on the toolbar to open an existing data set

Choose **Open...** from the **File** menu to open an existing data set saved with AQTESOLV for Windows.

1. Enter the name of the data set you want to open in the dialog box.
2. Click the **OK** button to retrieve the data set.

Closing a Data Set

Choose **Close** from the **File** menu to close the active data set. If you have changed any data, AQTESOLV for Windows will prompt you to save the modified data set.

Importing Data Sets

Importing an AQTESOLV for DOS Data Set

1. Create a new data set by selecting **New** from the **File** menu.
2. Choose **Import/AQTESOLV for DOS...** from the **File** menu to import a data set created with a DOS version of AQTESOLV.

Importing Observation Data

Importing test measurements

Do not use the **File/Import/AQTESOLV for DOS...** option to import time-displacement measurements collected during an aquifer test. To import measurements for an aquifer test, refer to "Importing Measurements from File" on page 20.

Editing Data Sets

The **Edit** menu provides options for entering or modifying data in the active data set. Selecting any of the options will open dialog boxes which prompt you for information stored in AQTESOLV data sets.

Pumping Well

Choose **Pumping Well** from the **Edit** menu to edit, add or delete data for a pumping well. If you want to enter or edit pumping well data, select **Edit...** from the popup menu. To add a pumping well to a data set (e.g., for more than one pumping well or an image well), choose the **Add...** option. Choose **Delete...** if you want to remove a pumping well from a data set.

The **Pumping Well Data** dialog box allows you to enter some or all of the following data for each pumping well:

- pumping well name
- x-coordinate location [L]
- y-coordinate location [L]
- casing radius [L]
- wellbore radius [L]
- full or partial penetration data

Pumping Well Coordinates

1. AQTESOLV for Windows uses an x-y coordinate system to compute distances between pumping wells and observation wells.
2. For a simple pumping test involving only one pumping well and one observation well, locate the pumping well at x=0.0 and y=0.0. Locate the observation well at x=r and y=0.0 where r is the radial distance between the pumping and observation wells.

Large-Diameter Well Data

1. To analyze pumping tests using large-diameter well solutions, enter values for the casing radius and wellbore radius of the pumping well.
2. If the value for either of these two variables is 0.0, AQTESOLV for Windows will assume the pumping well has an infinitesimal radius.

Pumping Well Penetration Data

1. A well is fully penetrating if its screen or perforated interval extends over the full saturated thickness of the aquifer.
2. The screen of a partially penetrating well only extends over a portion of an aquifer's saturated thickness. For a partially penetrating well, enter depths from the top of the aquifer (or water table) to the top and bottom of the well screen.
3. The bottom of well screen depth must be greater than the top of well screen depth. The minimum depth for the top of the well screen is 0.0; the maximum depth for the bottom of the well screen is the saturated thickness of the aquifer.

The **Edit** button opens the **Pumping Period Data** dialog box for entering variable pumping rates from the keyboard. The **Import** button imports rates from a text file.