



## **VIRTUAL HERMIT<sup>®</sup> TUTORIAL**



**MAY 2010**

**FOR BEST RESULTS, PLEASE READ THIS TUTORIAL PRIOR TO USE.**

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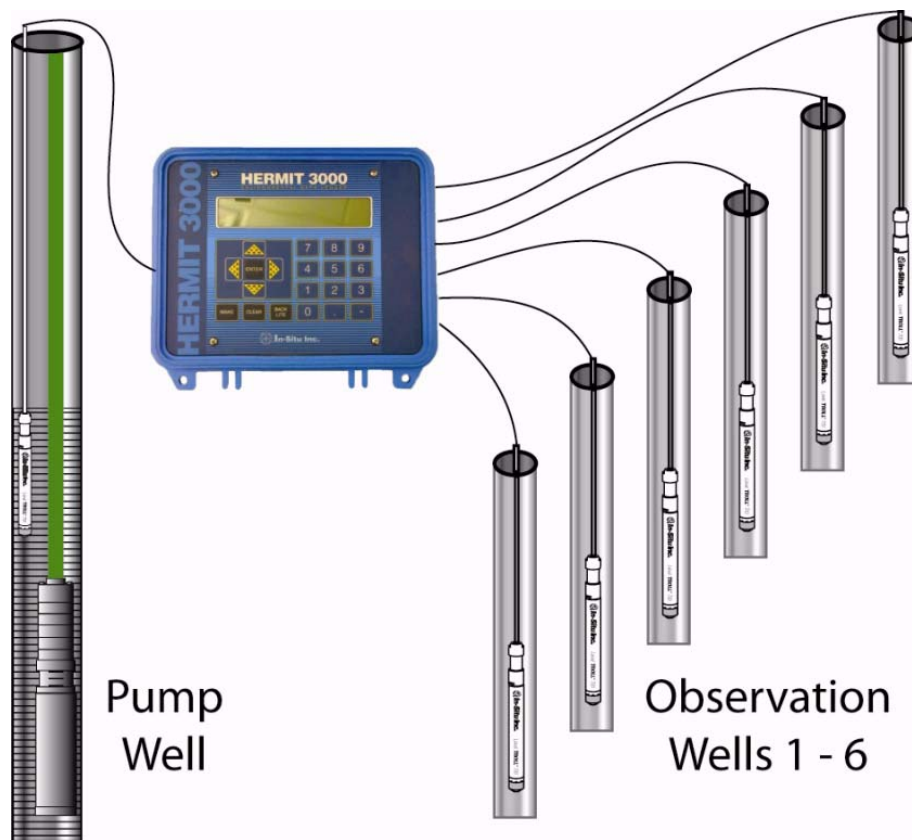


# Chapter 1 Software Overview

## 1.1 HERMIT® 3000 VS. THE VIRTUAL HERMIT® AQUIFER TESTING KIT

Virtual HERMIT software, when combined with Level TROLL® 700 instruments, mimics the pump test functionality found in the original In-Situ HERMIT® series of loggers. On the original HERMIT platform, up to 16 analog pressure transducers were connected to the HERMIT logger, which both logged the data and provided the user interface, as shown in Figure 1.

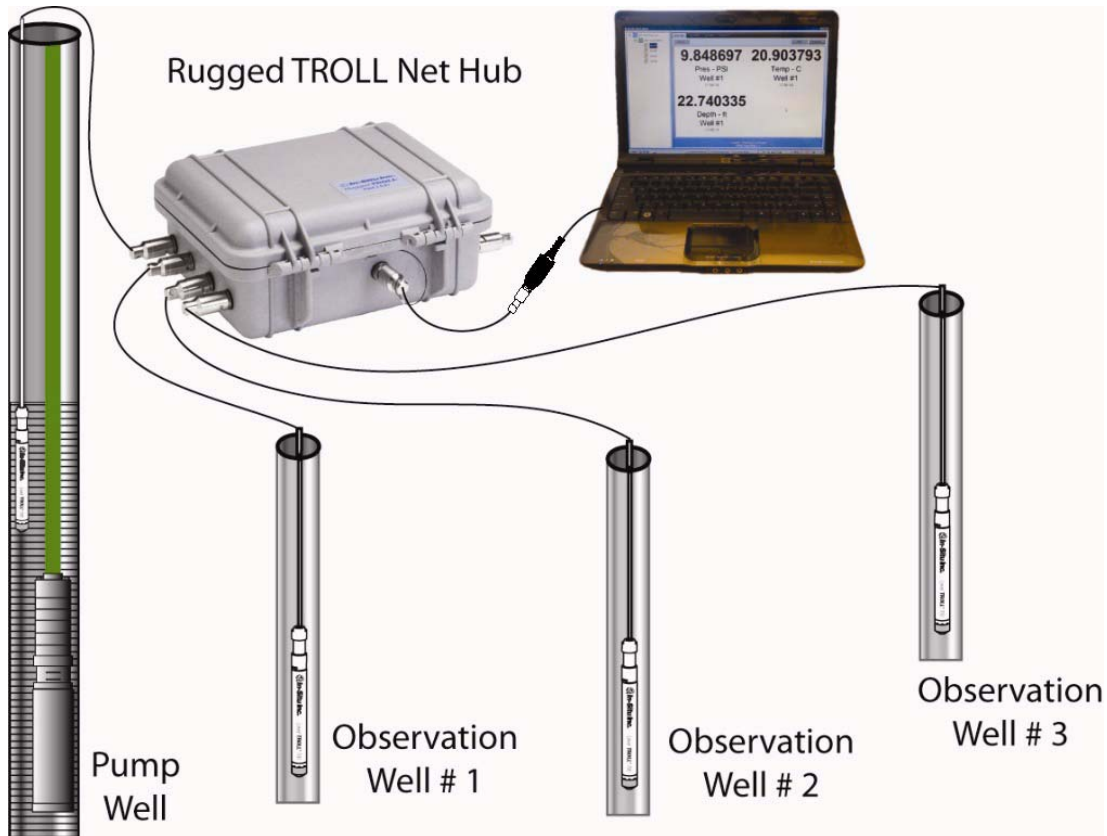
FIGURE 1. HERMIT 3000 logger and well setup



Today, the Virtual HERMIT software works with Level TROLL 700 instruments and the Rugged TROLL<sup>®</sup> Net Hub to provide similar functionality in a different set of tools (Figure 2):

- The Virtual HERMIT software provides the user interface via the laptop computer.
- The Rugged TROLL Net Hub connects multiple Level TROLL 700 instruments to the laptop.
- The Level TROLL 700 instruments log the data.

**FIGURE 2. Virtual HERMIT with Level TROLL 700 instruments and the Rugged TROLL Net Hub**



In the configuration above, the Level TROLL instruments are connected to the hub, which is connected to the laptop running Virtual HERMIT software. The software provides logging configuration and control such as “stepping the test”. Additionally, as the Level TROLL instruments log data, users can view tabular and graphical water levels and drawdown in real-time.

## **1.2 ADVANTAGES OF THE VIRTUAL HERMIT AQUIFER TESTING KIT**

### **1.2.1 Disconnecting the Laptop PC, TROLL Net Hub, and Cables During Recovery**

One major advantage of the Virtual HERMIT kit is that previously, during the recovery phase, the old-style HERMIT loggers had to remain in the field connected to the pressure transducers. Now, during the aquifer recovery phase, the cables, Rugged TROLL Net Hub, and laptop can be taken out of the field. The Level TROLL instruments can be locked inside the well caps and can continue to log data. The recovery data can later be downloaded well-by-well using a RuggedReader<sup>®</sup> handheld PC, and Win-Situ<sup>®</sup> Mobile software or by reconnecting the instruments to the TROLL Net Hub and PC

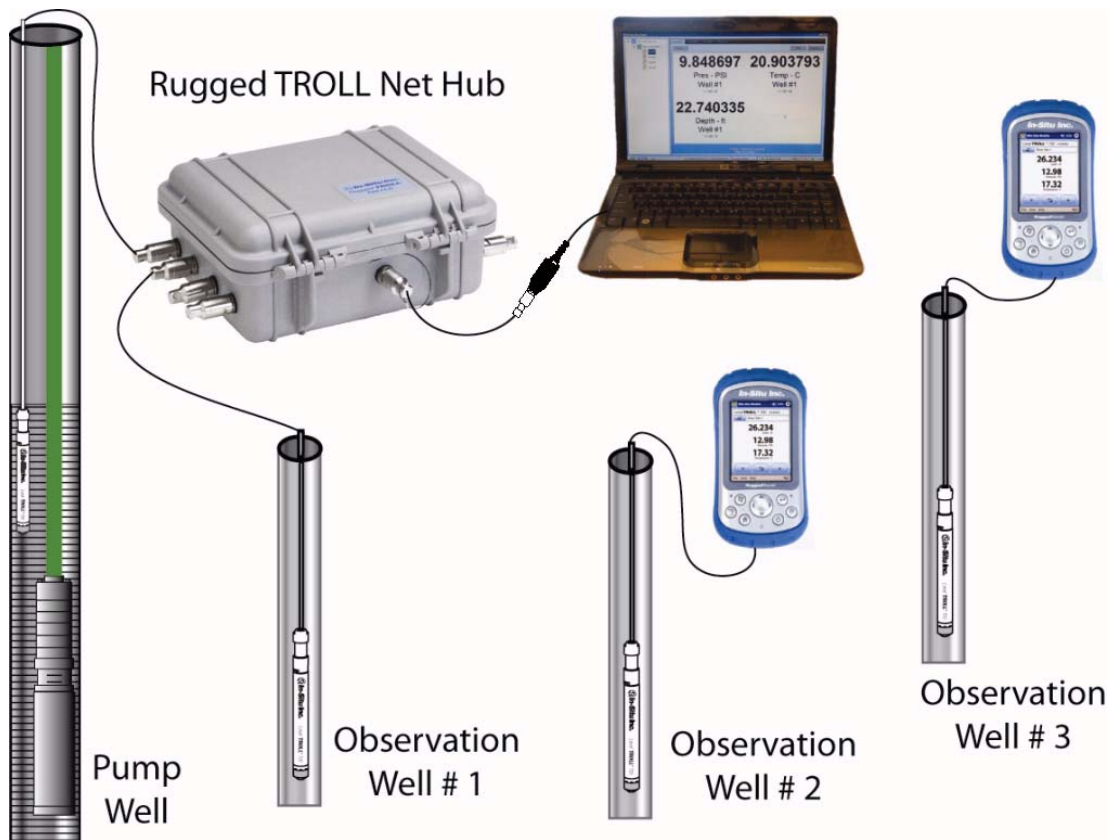
and downloading all the data sets simultaneously using the Virtual HERMIT software.

When using the RuggedReader and Win-Situ Mobile to collect data, the data logs are synchronized back to the laptop using Win-Situ® Sync. Virtual HERMIT software automatically imports the data.

### 1.2.2 Alternatives to Long or Awkward Cable Runs

Virtual HERMIT software can also be used in a “disconnected” scenario where the cable lengths required to connect the observation wells are prohibitive, or physical barriers such as roads or buildings prevent having all the Level TROLL instruments networked into the laptop. In this situation, the Level TROLL 700s are all configured while connected to the Virtual HERMIT using short cables and a scheduled start time. They are then deployed individually using a RuggedReader handheld PC loaded with Win-Situ Mobile software to set level references for each observation well (Figure 3).

**FIGURE 3. Virtual HERMIT configuration with disconnected Level TROLL instruments**

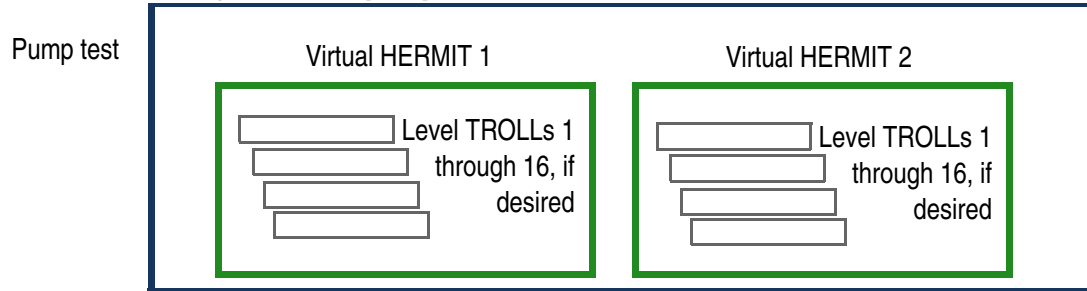


At the scheduled start time, all the Level TROLL instruments start logging data and the pump test begins. The Rugged Reader can be used to collect observation well data at any time during the test. Then the user may upload the data to the PC and synchronize the files with the data from the Virtual HERMIT software.

### 1.3 SOFTWARE CONCEPTS

The Virtual HERMIT software organizes a named “Pump Test” into one or more “Virtual HERMITs”. Each “Virtual HERMIT” may have between 1 and 16 Level TROLL instruments (Figure 4). Each Level TROLL will have a standard Win-Situ data log associated with it.

**FIGURE 4. Configuration of pump tests, “HERMITs”, and “TROLLs”**



All Level TROLL instruments on a given HERMIT get the same log configuration (type, sample interval, units of measure, scheduled start, etc.). However, the software allows the user to configure **individual level references for each Level TROLL**.

For example, on Virtual HERMIT 1 we could configure a Step Linear log type on the Level TROLL instruments. On Virtual HERMIT 2 we could configure a Simple Linear log type on the remaining Level TROLL instruments.

After data collection begins, the logged data will always be linked to this Pump Test. When the pump test is complete, the same Level TROLL instruments can be used on a new pump test with a different name.

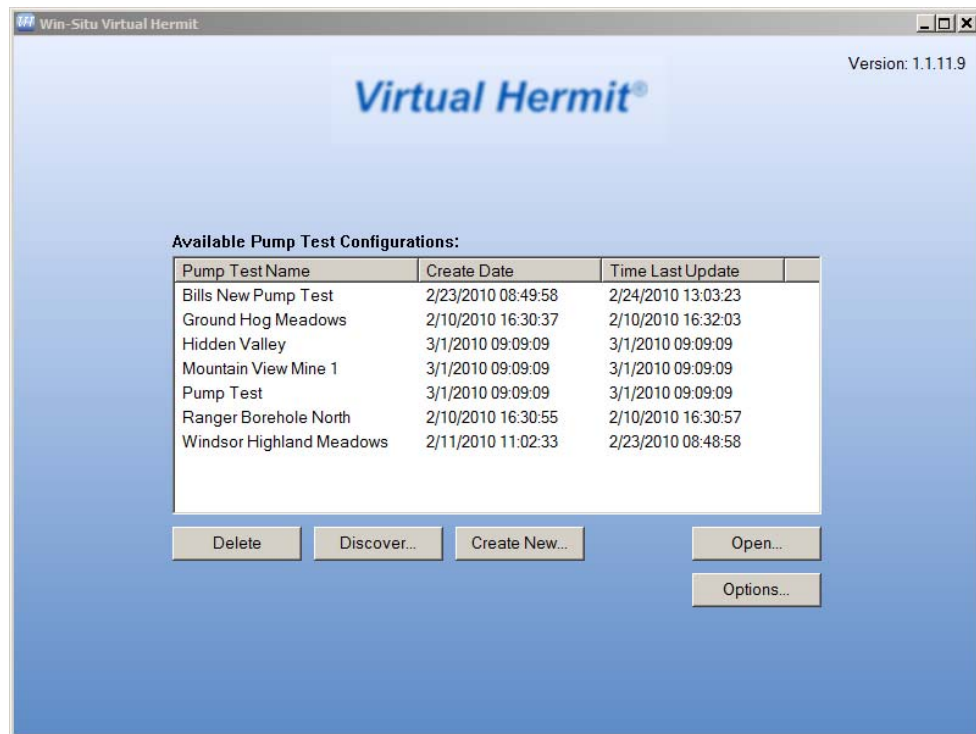


# Chapter 2

# Getting Started

Each Level TROLL used with the Virtual HERMIT software must be configured to a unique network address. When ordering from In-Situ Rentals, the Level TROLL instruments will arrive pre-configured and ready to use with the software.

After initially installing and opening the software, the list of named pump tests will be empty. When creating subsequent pump tests, you will see a list of the pump tests that have already been created.



Each time you create a new Pump Test and collect data, the software will remember which data logs were created with that particular Pump Test.

At any time after the logged data is created and downloaded to the computer, the software will allow you to open the Pump Test, and view or export the data.

The data logs created by Virtual HERMIT software are identical to Win-Situ® 5 data logs, except that two special tags are added to the header of each log: the Pump Test name and Virtual HERMIT ID for that log. All of the Virtual HERMIT logs can be opened by Win-Situ 5 and the In-Situ® Software Developer's Kit (SDK).

All the Pump Test log files are downloaded to the Win-Situ 5 working directory's "Site Data" directory—just like in Win-Situ 5. Also note:



- **Delete**—*Be careful! If you “Delete” a Pump Test, the Pump Test configuration and the data logs associated with it are also deleted from your hard drive.*
- **Discover**—If you install the Virtual HERMIT software on a computer other than the one used to create the Pump Test, you can **discover** the Pump Test with this button. The Pump Test information can be located from existing log files on the hard drive or by connecting to the Level TROLLS in the field and downloading their Pump Test data logs.

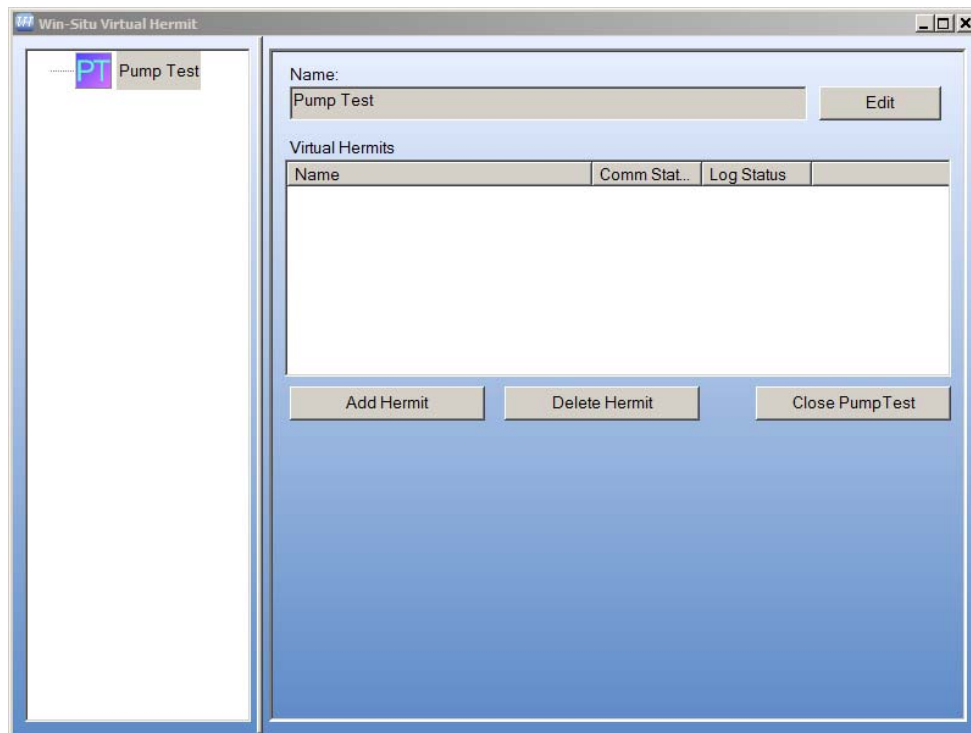
## 2.1 MAKING THE PHYSICAL CONNECTIONS

**Note:** If you have trouble removing the port bulkheads, stick a screwdriver through the bulkhead for added torque.

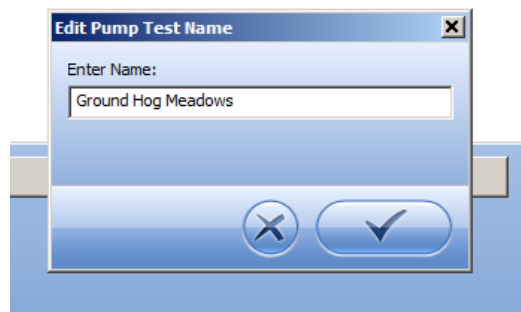
Connect the Level TROLL 700 instruments to the side ports on the Rugged TROLL Net Hub using the RuggedCable. Connect the single top port on the Rugged TROLL Net Hub to the laptop with the USB TROLL Com in the kit.

## 2.2 CREATING A NEW PUMP TEST

From the main window shown on page 9, click the “Create New” button. This will create a new Pump Test and open the empty configuration shown below:

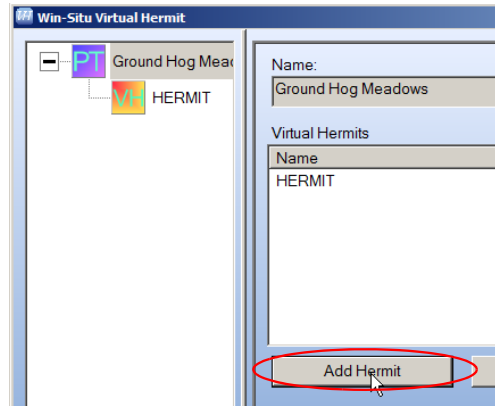


Click the “Edit” button next to name the pump test. In the example below, the pump test is named “Ground Hog Meadows”.

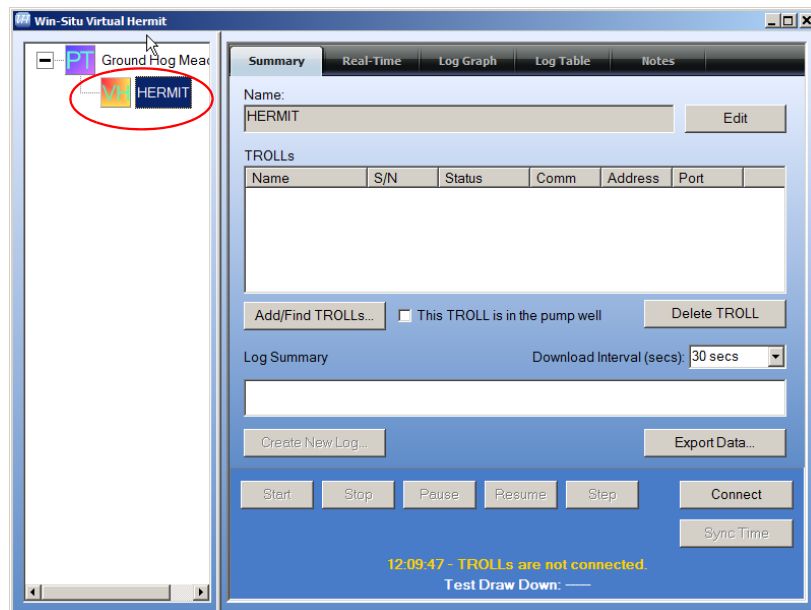


## 2.3 ADDING A VIRTUAL HERMIT

Next Add a Virtual HERMIT by clicking the “Add Hermit” button. You can add any number of Virtual HERMITs to the Pump Test.



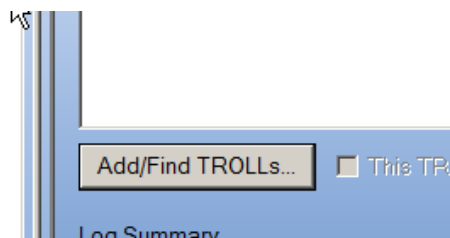
Select the Virtual HERMIT icon on the left window. This will activate the Virtual HERMIT windows on the right as shown below. By default, the Summary screen is the first selected tab.



## 2.4 ADDING A TROLL

**Note:** Always use the “Add/Find TROLLs” button before the “Connect” button. “Add/Find” will populate a HERMIT with Level TROLLs. “Connect” will establish a software connection with the TROLLs and allow you to configure your pump test. It is always best to physically connect all the TROLLs to the hub before establishing a software connection.

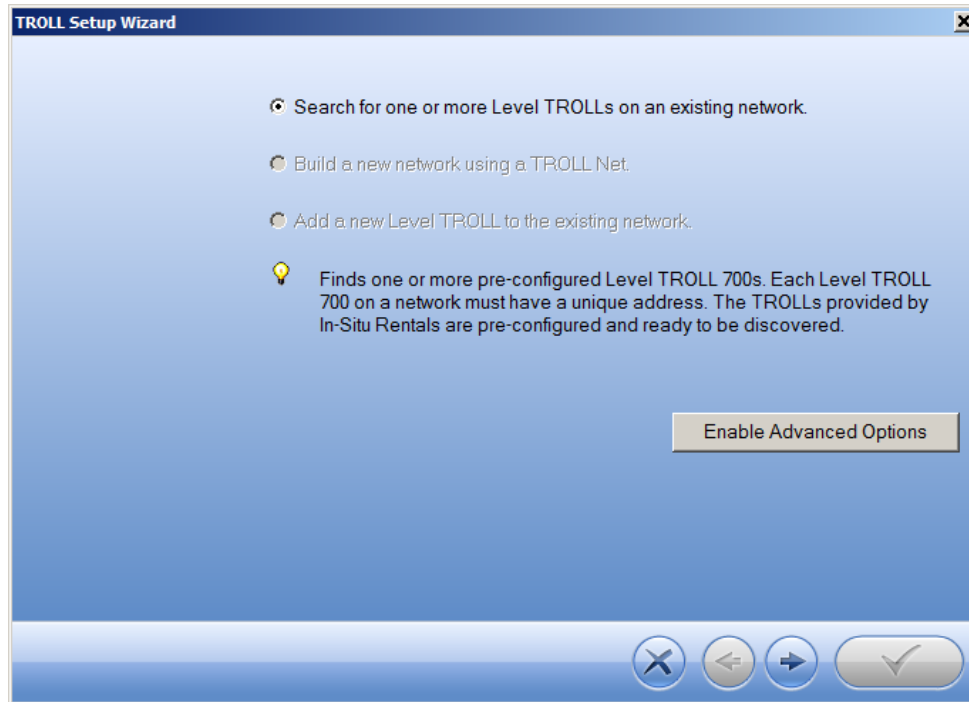
Select the Virtual HERMIT added in the previous step (on the left window pane). From the Summary screen, click the “Add/Find TROLLs” button.



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The Add Wizard will be activated. The Add/Find wizard has three different modes as follows:

- Search for one or more Level TROLLs on an existing network
- Build a new network using a TROLL Net
- Add a new Level TROLL to an existing network



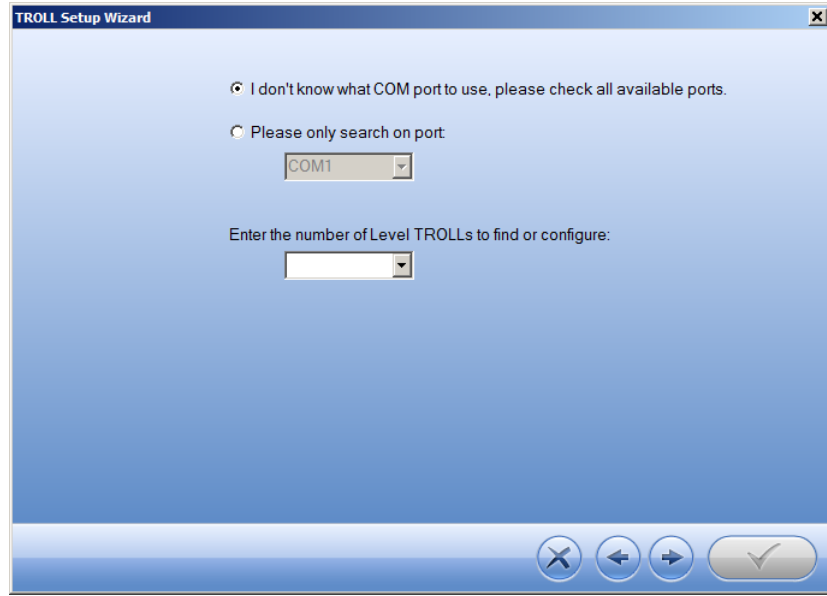
#### 2.4.1 Search for One or More Level TROLLs on an Existing Network



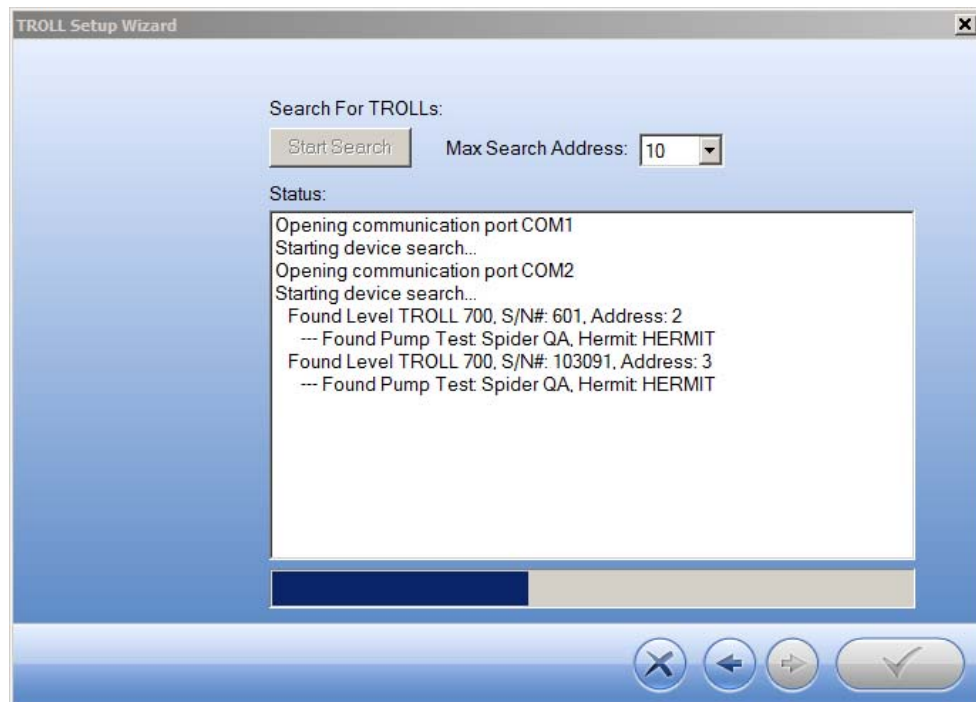
**This is the option you will use for the Level TROLLs provided from In-Situ Rentals.**

Use this option when the TROLLs you are searching for have already been configured for use with the network – that is, they all have unique device addresses and have been configured with the correct baud rate settings for the Virtual HERMIT software. This configuration will be complete when you receive your order.

1. After selecting the Search option, click the Next (arrow) button. The wizard will prompt you for the serial port and the number of TROLLs to configure.



- If you do not know the serial port that the TROLL Net Hub is plugged into, then use the first option to search on all ports. This can take some time.
  - If you do know the serial port that the TROLL Net Hub is plugged into, then select it to reduce the search time.
  - Tell the software how many Level TROLL 700s to search for so that it knows when to stop searching.
2. Click Next to activate the search window and automatically start searching for your connected TROLLs.

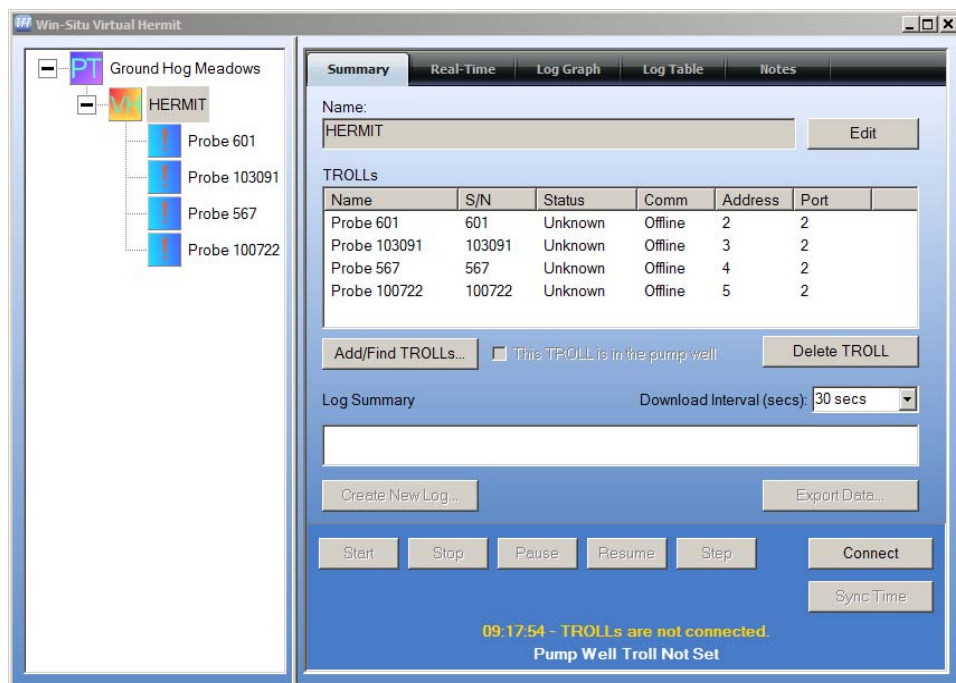


- 
3. After all of the TROLLs have been found, the wizard will activate the OK button (the check mark). Click OK.
  4. You will be prompted to select one of the TROLLs as the "Pump Well TROLL". This TROLL will be used as the reference for step times and drawdown calculations. Click OK.
  5. You will be prompted to connect to the TROLLs that were found. If you click Yes, the TROLLs will be connected and become active. If you click No, you can connect later, either with the Virtual HERMIT software or Win-Situ Mobile software on the RuggedReader handheld PC.

# Chapter 3 Software Features

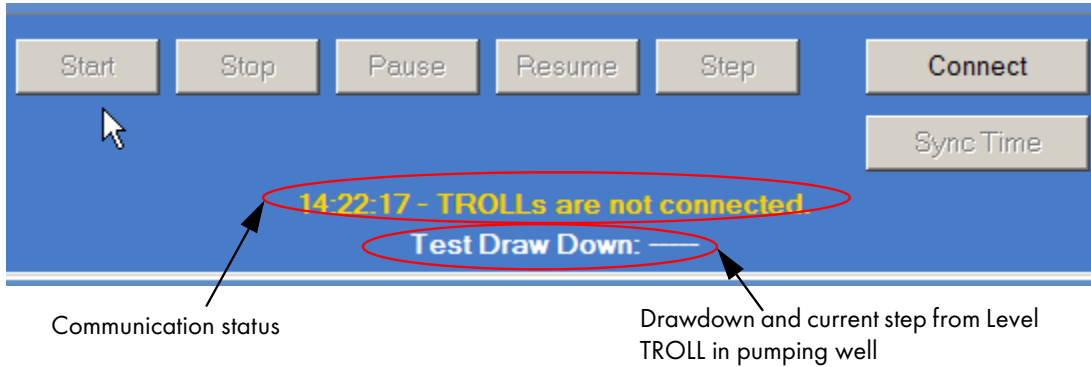
The Virtual HERMIT screen has five tabs across the top that activate different views of the pump test information. The views are as follows:

- Summary—general information and functions for adding Level TROLL instruments and exporting data.
- Real-Time—shows the real-time readings of the connected Level TROLL instruments.
- Log Graph—shows a chart of the downloaded logged data.
- Log Table—shows a tabular view of the logged data.
- Notes—allows users to enter and edit notes for the Pump Test.



### 3.1 VIRTUAL HERMIT CONTROL PANEL

The bottom panel on the Virtual HERMIT screen displays the buttons for controlling the logging states of the connected Level TROLL instruments and for connecting/disconnecting from the network. The bottom panel also shows the current download activity and the current Draw Down values in the units of measure chosen for the Level/Depth parameter.

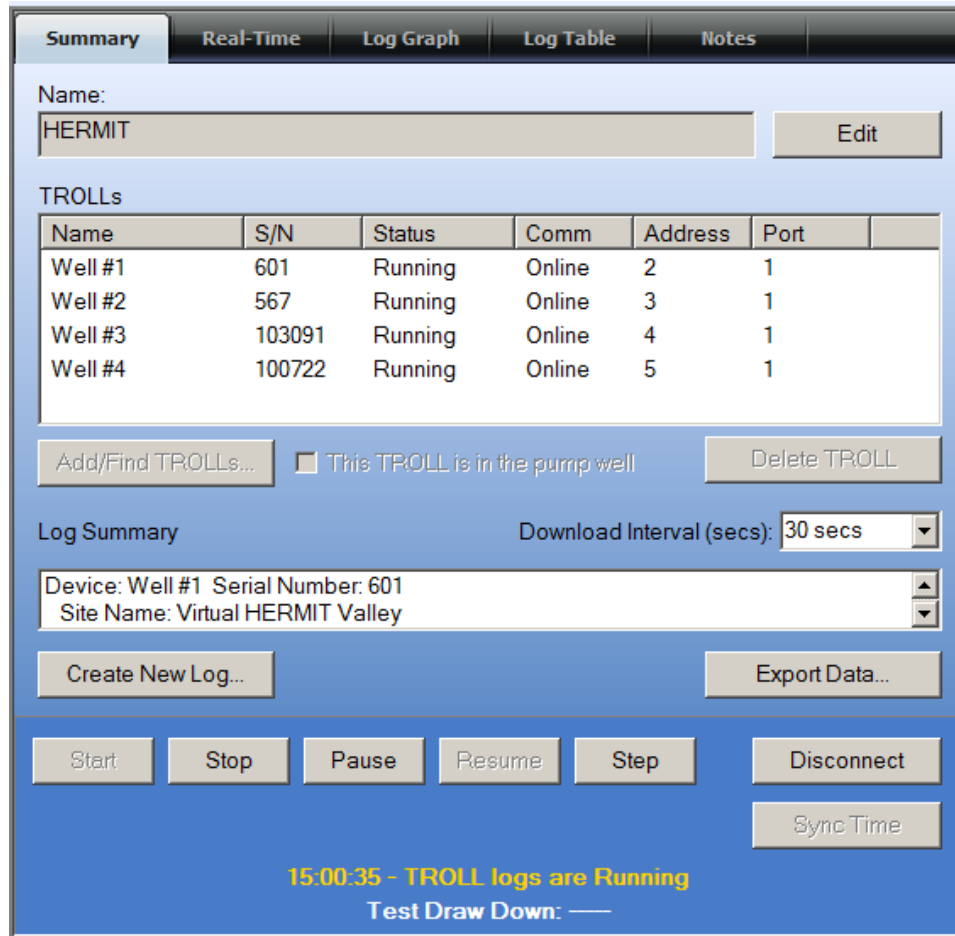


Regardless of which Tab is selected, the bottom control panel remains fixed.

### 3.2 VIRTUAL HERMIT TABS

#### 3.2.1 Summary Tab (Add/Name/Delete a Level TROLL, Create a Log, Export Data)

The Summary view allows users to edit the HERMIT name, add or delete Level TROLL instruments, create a new log, and export data.





### 3.2.2 Real-Time Tab (View Level TROLL Readings)

When connected, the real-time view will show the current readings from all of the connected Level TROLL instruments in one screen.

The Depth and the Level values are shown on the real-time screen. This can help operators ensure that the Level TROLL instruments are still under water as the water level drops.

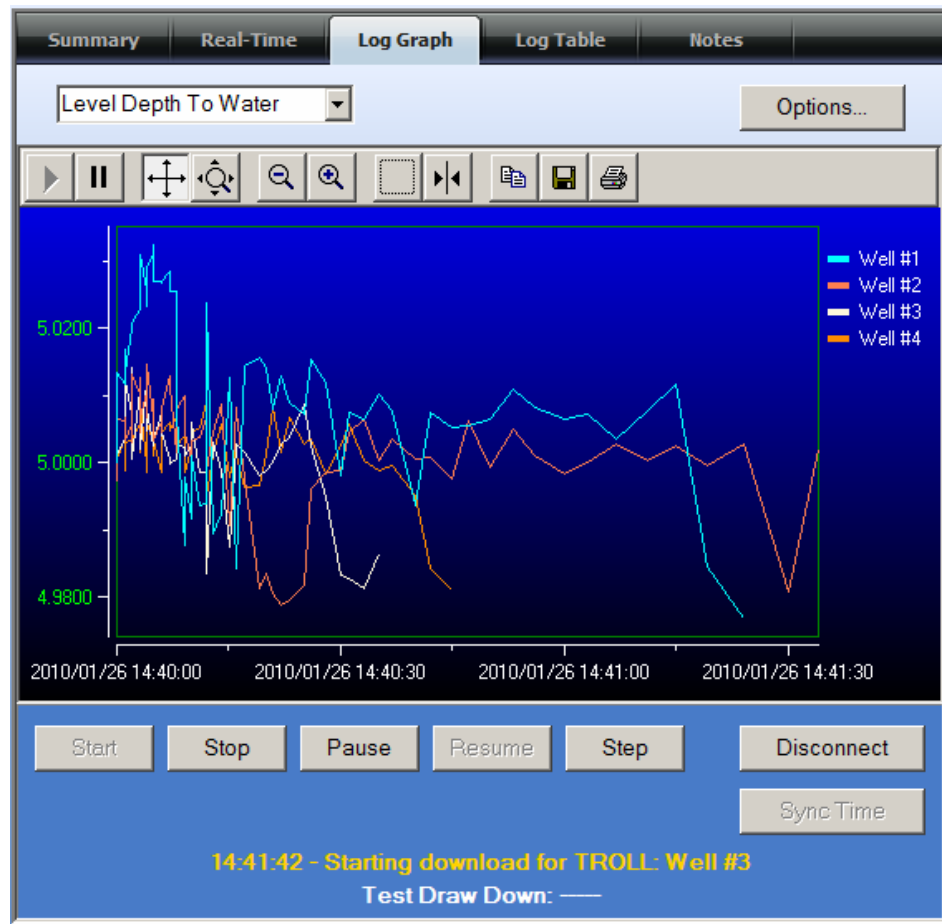
The screenshot displays a software interface with a top navigation bar containing 'Summary', 'Real-Time', 'Log Graph', 'Log Table', and 'Notes'. Below the navigation bar are three buttons: 'Options...', 'Stop', and 'Parameters...'. The main area is a table with four columns of data for four wells. The data is as follows:

Well #	Pres - PSI	Temp - C	Depth - ft	Level (DTW) - ft
Well #1 14:57:18	31.681	20.757	73.151	0.024
Well #2 14:57:18	9.846	21.571	22.734	0.026
Well #3 14:57:19	3.987	20.828	9.205	0.038
Well #4 14:57:19	8.476	20.169	19.571	0.026

At the bottom of the interface, there is a row of control buttons: 'Start', 'Stop', 'Pause', 'Resume', 'Step', 'Disconnect', and 'Sync Time'. Below these buttons, a status message reads: '14:57:21 - Starting download for TROLL: Well #2' and 'Test Draw Down: —'.

### 3.2.3 Log Graph Tab (Graphical View of Downloaded Data)

This view shows a graph of the logged data for all the **downloaded** log files. The data is always displayed, even if no active connection exists, because this view shows logged data that has been downloaded into the Win-Situ working directory.



(Note: Not real pump test data.)

### 3.2.4 Virtual HERMIT Log Table (Tabular View of Logged Data)

The log table view will show the logged data in tabular format.

The screenshot displays the 'Log Table' tab in a software interface. At the top, there are navigation tabs: 'Summary', 'Real-Time', 'Log Graph', 'Log Table' (selected), and 'Notes'. Below the tabs, there is a dropdown menu set to 'Level Depth To Water' and a 'Time Interval' field set to '1' with a unit dropdown set to 'Seconds'. The main area contains a table with the following data:

Time Stamp	Well #1	Well #2	Well #3	Well #4
1/26/2010 14:41:40	5	5	5	5
1/26/2010 14:41:39	5.01343	5.00683	5.00132	5.00066
1/26/2010 14:41:38	5.01343	5.0033	5.01211	5.00308
1/26/2010 14:41:37	5.02092	5.01321	5.00044	5.0033
1/26/2010 14:41:36	5.03105	5.00639	5.00198	5.00859
1/26/2010 14:41:35	5.02907	5.01453	5.00793	5.00595
1/26/2010 14:41:34	5.02708	5.0033	5.0033	5.00352
1/26/2010 14:41:33	5.02708	5.00793	5.0044	5.00462
1/26/2010 14:41:32	5.02554	5.01145	4.99978	5.00484
1/26/2010 14:41:31	5.00727	5.00793	5.00286	5.00242
1/26/2010 14:41:30	4.9978	5.00462	5.0011	4.99868
1/26/2010 14:41:29	5.0011	5.0033	5.00595	5.0044
1/26/2010 14:41:28	4.99361	5.00374	4.99868	5.00528
1/26/2010 14:41:27	5.02378	4.9989	4.98348	4.99494
1/26/2010 14:41:26	4.98943	5.00462	5.00308	5.00132

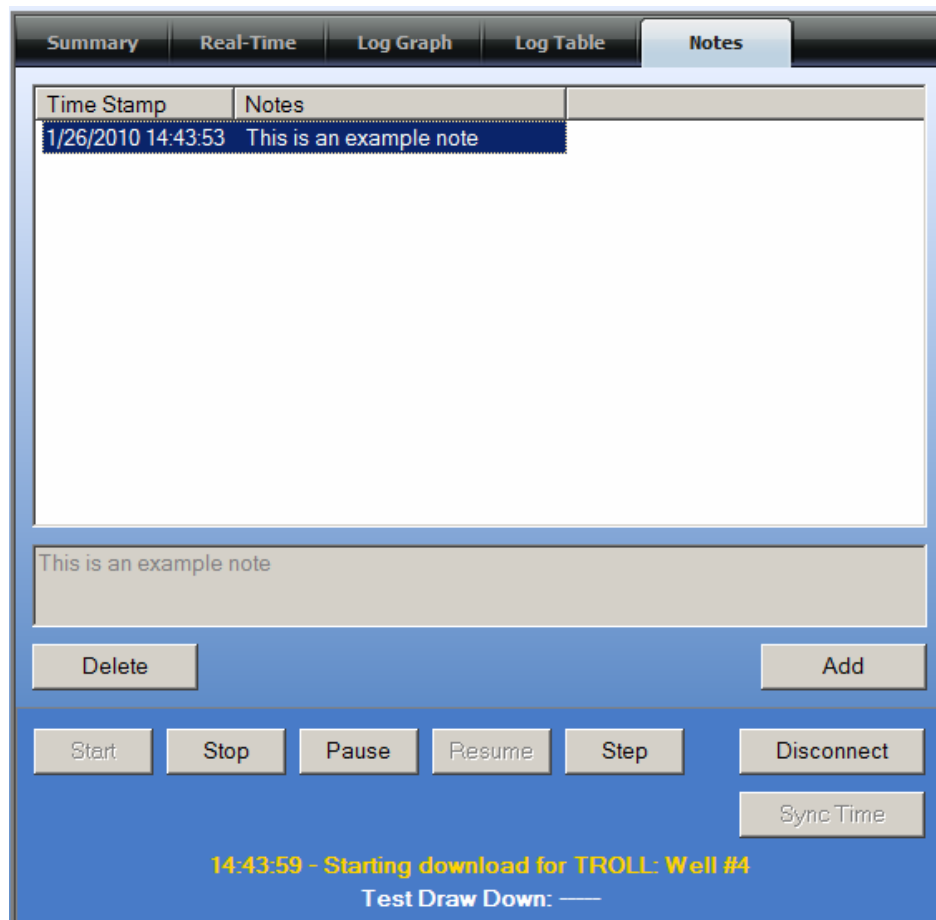
Below the table, there are control buttons: 'Start', 'Stop', 'Pause', 'Resume', 'Step', 'Disconnect', and 'Sync Time'. A status bar at the bottom displays the message: '14:42:47 - Starting download for TROLL: Well #3' and 'Test Draw Down: —'.

The user has the option of selecting the time units for the data rows. The actual time stamps of the logged data files are not used for this window since each Level TROLL might have logged data at different times. The first time value is determined by the first logged data point of all TROLLs. For TROLLs that do not have a matching logged record, the last known value is displayed.

### 3.2.5 Notes Tab

The notes view allows the user to enter, edit, and delete notes regarding the pump test. For example, you may want to record the pumping rate here, rather than on paper.

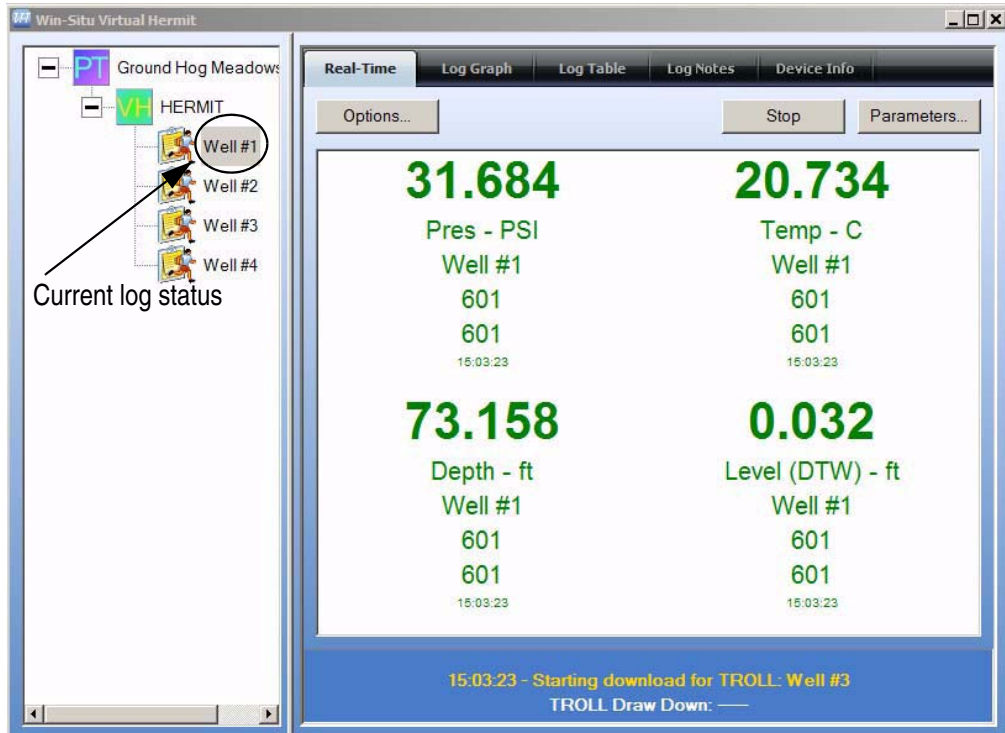
Notes added to this window are saved to the configuration file on the computer's hard drive. These are different from log notes written into the Level TROLL logs while they run.










### 3.3 LEVEL TROLL VIEW FEATURES

Like the Virtual HERMIT screen, the TROLL view has tabs that enable different views of the Level TROLL information. The views are as follows:

- Real-Time—shows the real-time readings of the connected TROLL.
- Log Graph—shows a chart of the downloaded logged data.
- Log Table—shows a tabular view of the logged data.
- Log Notes—shows actions and status of the individual Level TROLL.
- Device Info—displays general information and control functions for the specific TROLL.



#### 3.3.1 Log Status Icons

	No Log or Error		Suspended/Paused
	Pending – Manual Start		Stopped
	Pending – Scheduled Start		Deleted
	Running		

### 3.3.2 Real-Time Tab

Shows the real-time readings for the selected Level TROLL instrument.

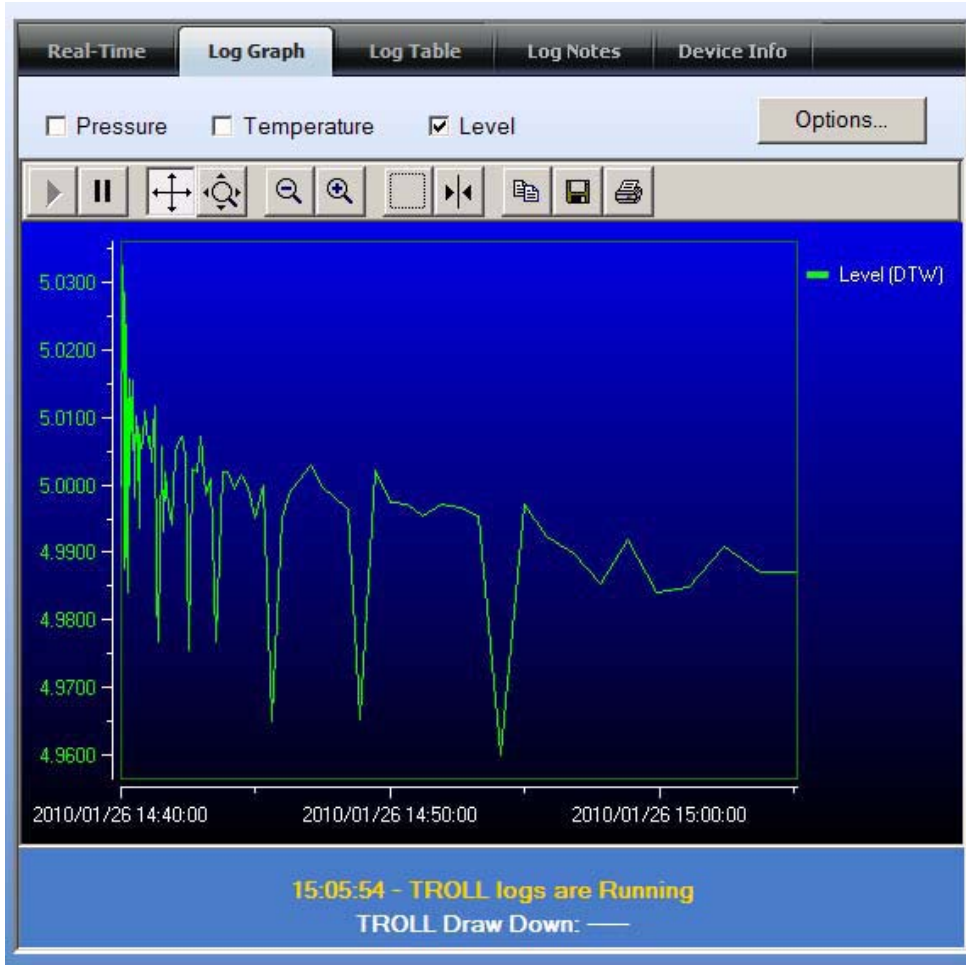
The screenshot displays a software interface with a dark header bar containing tabs: "Real-Time", "Log Graph", "Log Table", "Log Notes", and "Device Info". Below the header are three buttons: "Options...", "Stop", and "Parameters...". The main content area is divided into four quadrants, each showing a large green numerical value, a unit, and a well identifier. The top-left quadrant shows "31.685", "Pres - PSI", and "Well #1 601" with a timestamp "15:05:33". The top-right quadrant shows "20.720", "Temp - C", and "Well #1 601" with a timestamp "15:05:33". The bottom-left quadrant shows "73.160", "Depth - ft", and "Well #1 601" with a timestamp "15:05:33". The bottom-right quadrant shows "0.016", "Level (DTW) - ft", and "Well #1 601" with a timestamp "15:05:33". A blue status bar at the bottom contains the text "15:05:36 - Starting download for TROLL: Well #4" and "TROLL Draw Down: —".

Value	Unit	Well #1	Well #1	Timestamp
31.685	Pres - PSI	601	601	15:05:33
20.720	Temp - C	601	601	15:05:33
73.160	Depth - ft	601	601	15:05:33
0.016	Level (DTW) - ft	601	601	15:05:33

15:05:36 - Starting download for TROLL: Well #4  
TROLL Draw Down: —

### 3.3.3 Log Graph Tab

Shows a graph of the logged data for the selected TROLL instrument.



### 3.3.4 Log Table Tab

Shows a table of the logged data for the selected Level TROLL instrument.  
The times shown are the actual time stamps of the logged data for this Level TROLL.

Time Stamp	Pressure(PSI)	Temperature(C)	Level Depth To Water(ft)
1/26/2010 15:05:06	31.6959	20.6978	4.98701
1/26/2010 15:03:42	31.6958	20.7009	4.98723
1/26/2010 15:02:24	31.6941	20.6993	4.99097
1/26/2010 15:01:06	31.6968	20.7023	4.98481
1/26/2010 14:59:54	31.6971	20.7168	4.98415
1/26/2010 14:58:48	31.6938	20.7173	4.99185
1/26/2010 14:57:48	31.6966	20.7213	4.98525
1/26/2010 14:56:48	31.6946	20.7323	4.98987
1/26/2010 14:55:48	31.6936	20.7329	4.99229
1/26/2010 14:55:00	31.6915	20.7323	4.99714
1/26/2010 14:54:06	31.7075	20.7318	4.96014
1/26/2010 14:53:18	31.6922	20.7348	4.99538
1/26/2010 14:52:36	31.6917	20.7343	4.9967
1/26/2010 14:51:54	31.6915	20.7428	4.99714
1/26/2010 14:51:12	31.6922	20.7478	4.99538
1/26/2010 14:50:36	31.6915	20.7518	4.99714
1/26/2010 14:50:00	31.6914	20.7538	4.99736
1/26/2010 14:49:26	31.6893	20.7568	5.0022
1/26/2010 14:48:54	31.7053	20.7592	4.96521
1/26/2010 14:48:24	31.6918	20.7613	4.99648
1/26/2010 14:47:56	31.6911	20.7688	4.99802

15:06:14 - Starting download for TROLL: Well #1  
TROLL Draw Down: —



### 3.3.5 Log Notes Tab

Shows device specific notes for the selected Level TROLL instrument.

Time Stamp	Notes
4/20/2010 3:12:40...	Sensor: 10114883 Factory cal...
4/20/2010 3:12:42...	Used Battery: 19% Used Mem...
4/20/2010 3:15:20...	Manual Start Command
4/20/2010 3:20:28...	Restart Command
4/20/2010 3:23:03...	Restart Command
4/20/2010 3:27:55...	Restart Command
4/20/2010 3:28:56...	Used Battery: 19% Used Mem...
4/20/2010 3:28:56...	Manual Stop Command

15:06:14 - Starting download for TROLL: Well #1  
TROLL Draw Down: —

### 3.3.6 Device Info Tab

Shows device specific information and some control functions for the selected Level TROLL instrument.

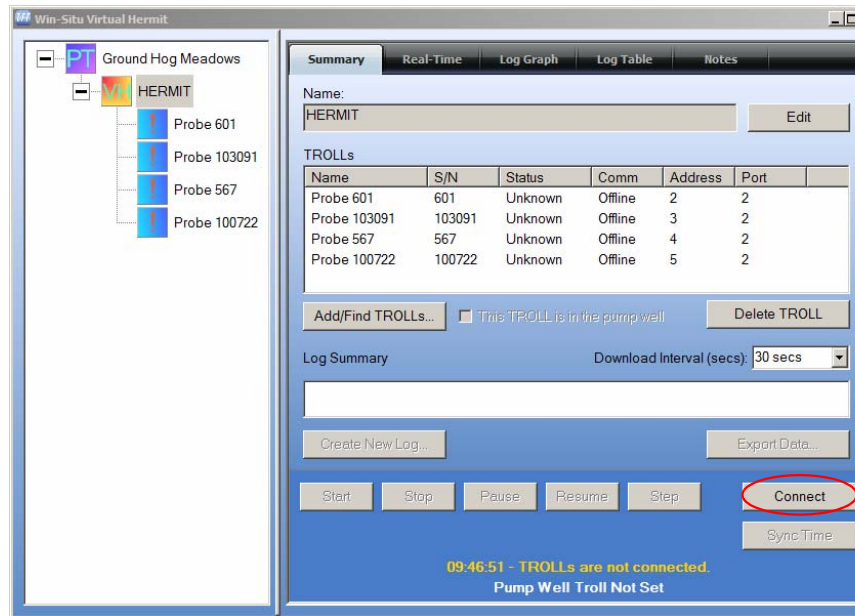
The screenshot displays the 'Device Info' tab of a software interface. The interface is organized into several sections:

- Navigation Tabs:** Real-Time, Log Graph, Log Table, Log Notes, and the active Device Info tab.
- Configuration Fields:**
  - Name: Well #1 (with an Edit button)
  - Site: Virtual HERMIT Valley (with a Disconnect button)
  - Log Name: X1 (with Stop and Pause buttons)
  - Log File: X1\_Append\_2010-01-26\_22-06-21-331.wsl (with a Step button)
- Status and Sensor Information:**
  - Log Status: Running (indicated by a green bar)
  - Sensor: Pres(G) 11.5ft
  - Ext Power (mV): None (yellow bar)
  - Int Battery (avail): 5% (red bar)
  - Port: 1 (with an Edit... button)
  - Address: 2
  - Log Memory (avail): 99% (green bar)
  - Level Mode: Level (DTW)
  - Firmware: 2.04
  - Hardware: 0
  - Level Units: ft
  - Boot Ver: 0.36
  - S/N: 601
  - Reference: 0 (with a Set button)
- Status Bar:** 15:06:31 - Starting download for TROLL: Well #3  
TROLL Draw Down: —

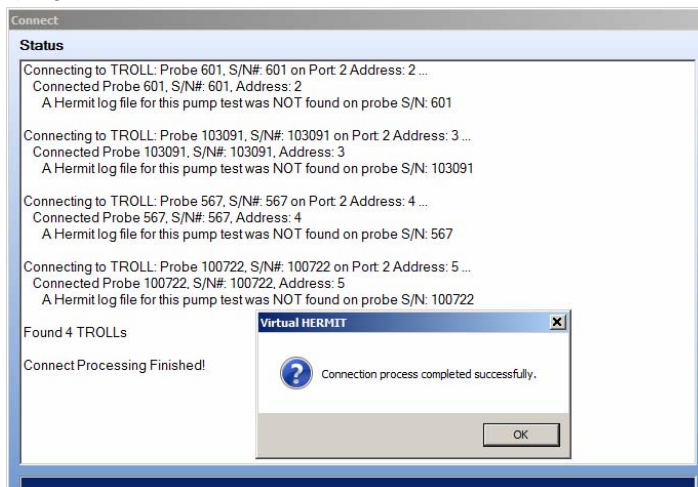
# Chapter 4

# Communications

Select the Virtual HERMIT on the tree in the left pane and select the “Summary” tab in the right pane. If you do not have an open communication session (not connected) then click the “Connect” button.



When you click the “Connect” button, the software will attempt to establish communication with each of the Level TROLL instruments that have been added to the Virtual HERMIT. The instruments can be on the same or different serial ports. A status window will show you the connect sequence as it progresses.

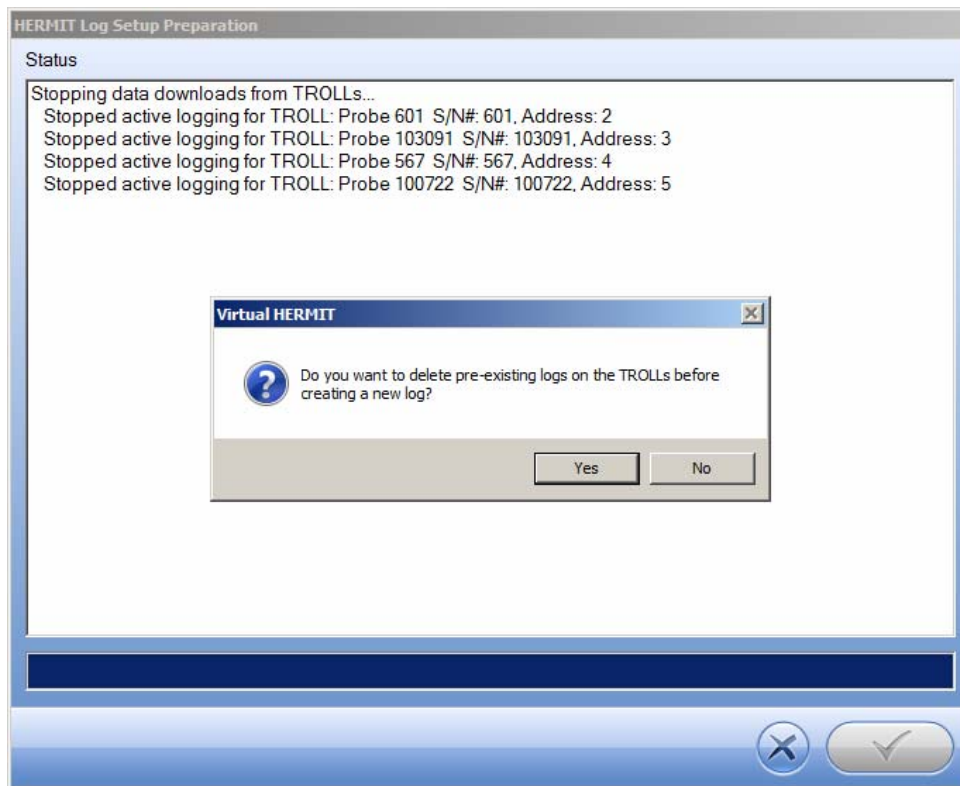



When you connect, the newest data will be downloaded automatically if a log is running on the Level TROLL. In some cases, the download may take a significant amount of time. The automatic downloads can be cancelled to speed up the connect process. Once connected, new data will be downloaded in the background.

#### 4.1 CREATE A NEW PUMP TEST LOG

If communications are established and there is no log running, you can create a new log on the connected Level TROLL instruments. You cannot create a new log unless one or more Level TROLL instruments are connected—and they all must be connected at the same time because they will all get the same log type (i.e. Step Linear, True Logarithmic, etc.)

To create a new log, click the “Create New Log...” button. Any active logs on the Level TROLL instruments will be stopped automatically. You will be prompted to delete any logs that are already on the instrument in order to free up memory for the new pump test.



 **If you click “Yes”, then any logs on the Level TROLLs will be permanently deleted, the data cannot be recovered.**

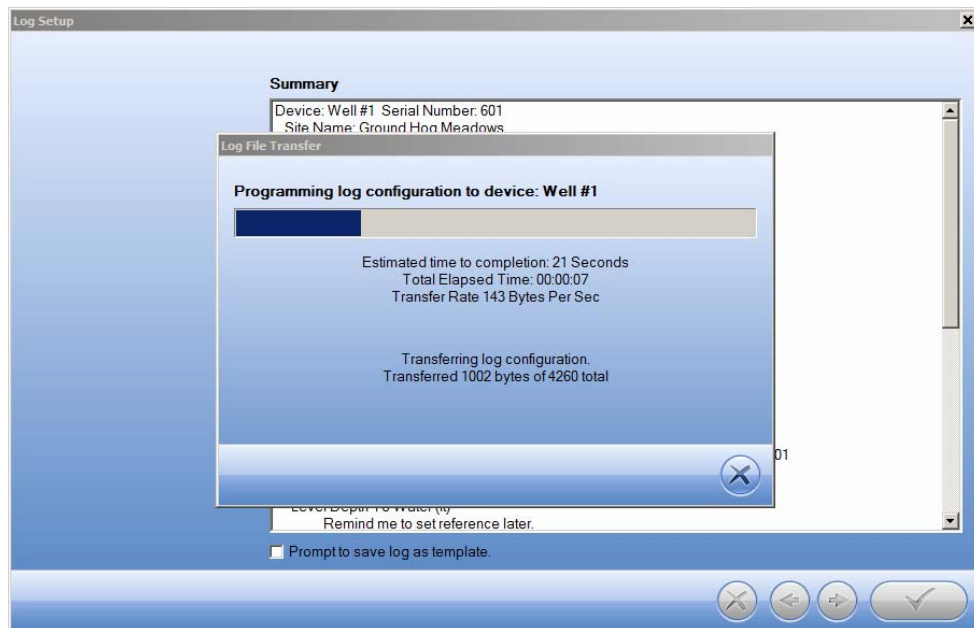
If the pump test already has log files associated with it, you will be prompted to archive those files or delete them. A pump test can have only one set of log data associated with it. If you want to run a second pump test at the same site, create a new pump test at the main window.

The logging wizard will walk you through the setup of the new logs. The user will be required to log all parameters (Temp, Pressure, Depth/Level). All Level TROLL instruments will get the same logging parameter order, the same parameter units and the same Depth/Level mode. Of course, each well can still have its level reference set independently and the “Remind Me

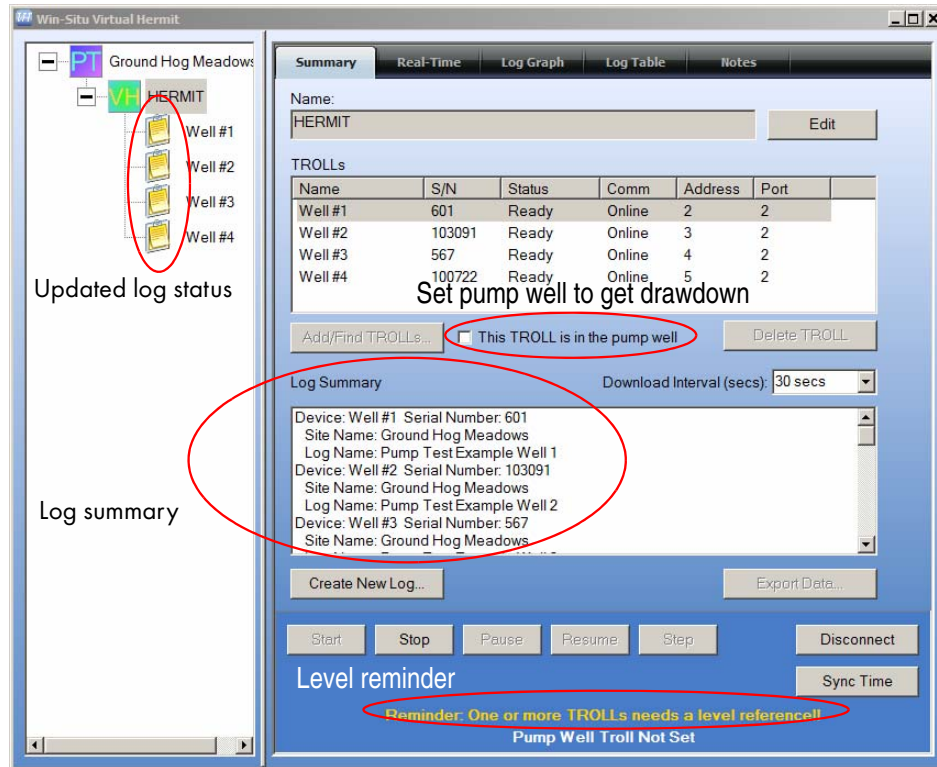
Later” option will allow you to configure the Level TROLL instruments and set the level references upon deployment.



At the end of the log wizard, the log will be written to each of the connected Level TROLL instruments.



After the log configuration has been successfully programmed, the log status on the tree will update and the log summary will be shown in the Virtual HERMIT summary screen. This example uses the “Remind Me Later” level reference value.

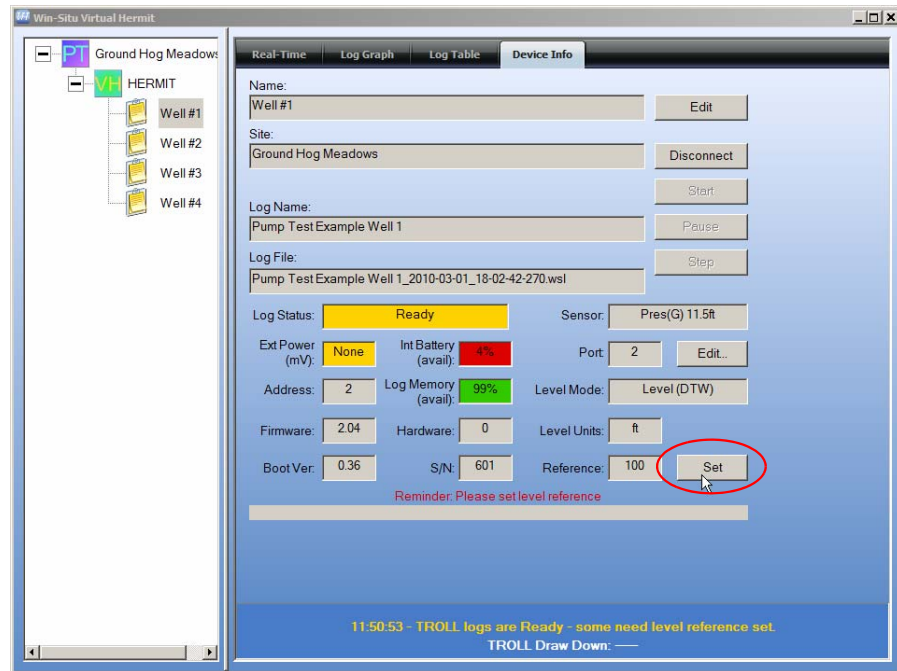


Set pump well to get drawdown

In this example, the Level Reference was not set in the Log Wizard. The buttons to start the log are disabled and will remain that way until all of the Level TROLL instruments have their level reference set or their communication session is dropped (they are disconnected and deployed). If the user operates the observation wells in disconnected mode, they can now deploy the instruments in the observation wells and configure their level reference using a RuggedReader handheld PC and Win-Situ Mobile.

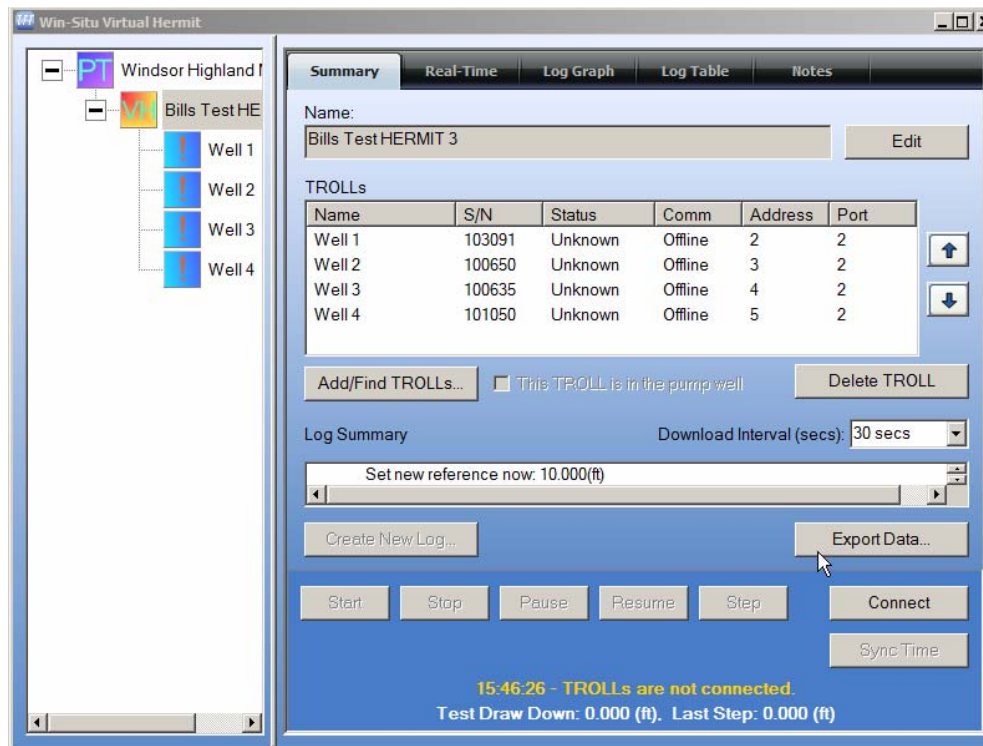
## 4.2 SETTING LEVEL REFERENCE REMINDER

When using the level reference reminder, the level reference can be set after the logs have been programmed into the Level TROLL instruments. To set a level reference on a TROLL that has the reminder flag set, select the TROLL on the tree and then click the “Set” button for the reference.



### 4.3 DATA EXPORT

The Virtual HERMIT allows you to export logged data from one or more Level TROLLs to a single time-synchronized text file. To begin export of logged data, select the Virtual HERMIT on the left window pane, select the “Summary” tab and click the “Export Data” button.



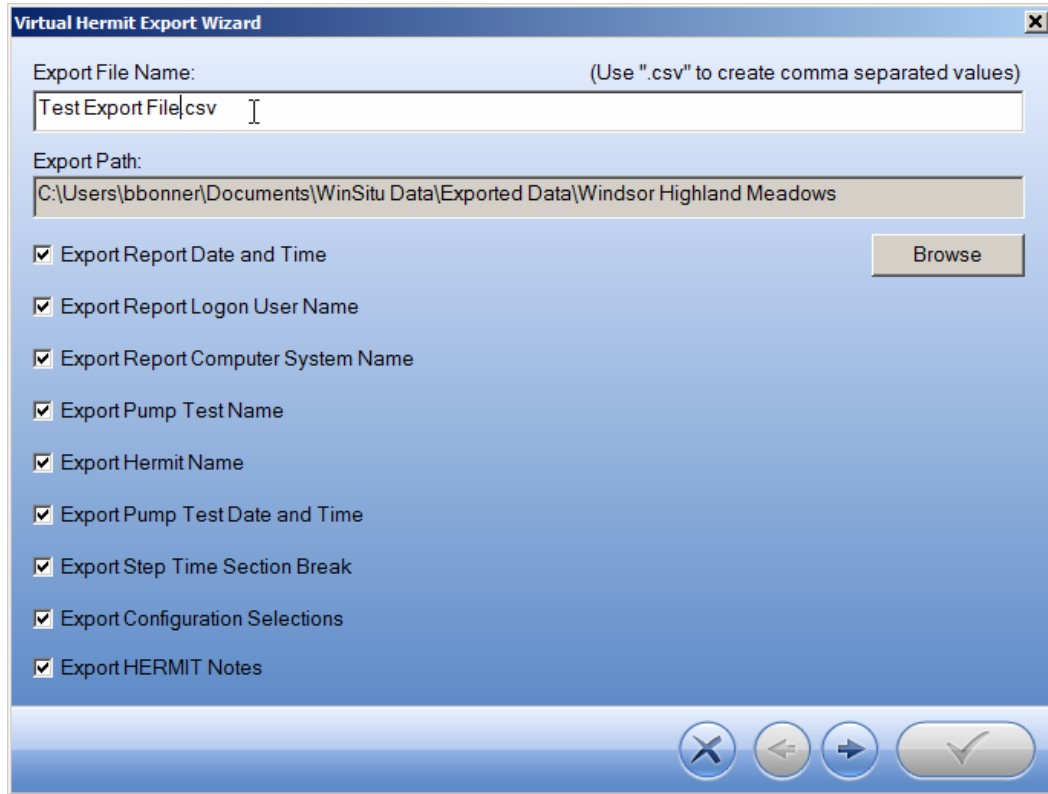
This will launch the export wizard that will walk you through the export options. At the end of the wizard, the data will be exported, and the exported file will be loaded into the tree on the left window pane for viewing.



## 4.4 DATA EXPORT WIZARD

### 4.4.1 Step 1—Choosing the File Name, Path, and Other Options

The first screen as shown below, allows you to enter an export file name, select the export directory, and check or uncheck several options.



The screenshot shows the 'Virtual Hermit Export Wizard' dialog box. It has a title bar with a close button (X). The main area is light blue. At the top, there's a label 'Export File Name:' followed by a text box containing 'Test Export File|csv' and a small icon. To the right of the text box is the text '(Use ".csv" to create comma separated values)'. Below this is another label 'Export Path:' followed by a text box containing 'C:\Users\bbonner\Documents\WinSitu Data\Exported Data\Windsor Highland Meadows'. To the right of the text box is a 'Browse' button. Below the text boxes are several checkboxes, all of which are checked: 'Export Report Date and Time', 'Export Report Logon User Name', 'Export Report Computer System Name', 'Export Pump Test Name', 'Export Hermit Name', 'Export Pump Test Date and Time', 'Export Step Time Section Break', 'Export Configuration Selections', and 'Export HERMIT Notes'. At the bottom right of the dialog box are four buttons: a close button (X), a back button (left arrow), a forward button (right arrow), and a confirm button (checkmark).

**Export File Name**—if the file name you type in ends with the “.csv” extension, the file will be in comma separated value format. Any other file extension will result in a tab delimited formatted file.

**Export Path**—by default, the export path will be the normal Win-Situ export directory. You may click the “Browse” button to change this directory as desired.

#### Other Options:

- Export Report Date and Time—the current time on your computer when file created.
- Export Report User Name—the logon user name performing the export.
- Export Computer Name—the name of the computer performing the export.
- Export Pump Test Name—the name of the Pump Test to export.
- Export Hermit Name—the name of the Virtual HERMIT.
- Export Pump Test Date and Time—the date and time the pump data was collected.
- Export Step Time Section Break—when the data is transferred to the text file, at each step time a section break will be inserted into the data indicating a step occurred.
- Export Configuration Selections—the export wizard options selected will be written to the export file.

- Export HERMIT notes—the notes added to the Virtual HERMIT screen, those notes saved on the hard drive (not the notes in the log files), will be exported to the text file.

#### 4.4.2 Step 2—Set the Export Time Intervals, Resolve Time Stamps

The second export wizard screen shown below allows you to choose the export time and data processing methods used to generate the export file.

#### Export by Time Interval or Export by Step

- When you choose to export by interval, you can select the start and stop time of the exported data.
- When you choose to export by step, select which step of the pump test you want to export. The steps are determined by the step times of the TROLL designated as the Pump Well TROLL.
  - Use UTC—tells the software to display the interval and exported times in UTC.
  - Ignore DST—tells the software to ignore Daylight Savings Time offsets when exporting or displaying time. This eliminates the backward/forward jumps in time values when data crosses a daylight/standard time boundary.
  - Available Interval—displays the time of the first and last available data values for export.

#### Exported Time Stamps/Resolve Non-Matching Time Stamps

The time stamp values exported into the text file can be at a fixed interval or can be the actual logged time stamps of records from a selected Level TROLL. By default, the Pump Well TROLL is selected.

- **Use Fixed Interval**—starting from the first data point, the time stamp values for the exported data will be at the fixed interval selected. For time values that do not match exactly the times of the logged data, the data

values presented will be either “Last Logged Value” or an “Interpolated Value” as per the selection in the section “Resolve non-matching timestamps”.

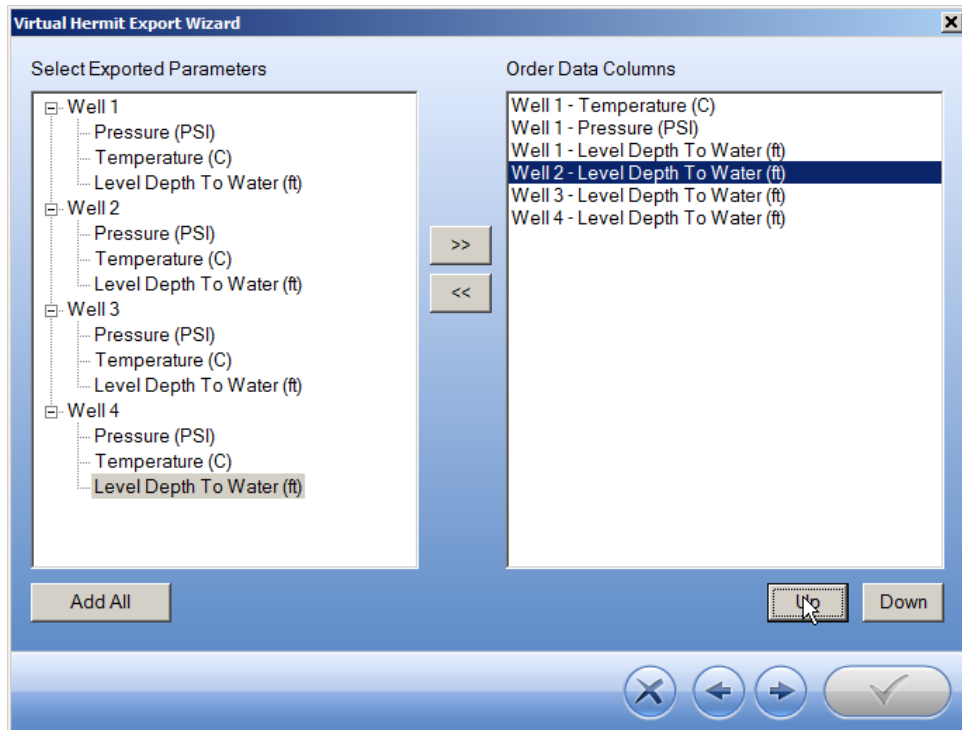
- **Use Time Stamps from a TROLL Log as Reference**—the time stamps of the logged records from the selected TROLL will be used. This ensures that the data records for that TROLL are the exact values that were logged. Data from other TROLLs that do not have identical matching time stamps will be shown as either “Last Logged Value” or an “Interpolated Value” as per the selection in the section “Resolve non-matching time stamps”.

### Show Elapsed Time

A column showing the elapsed time from the first data point or the start of the step will be inserted next to the timestamp column.

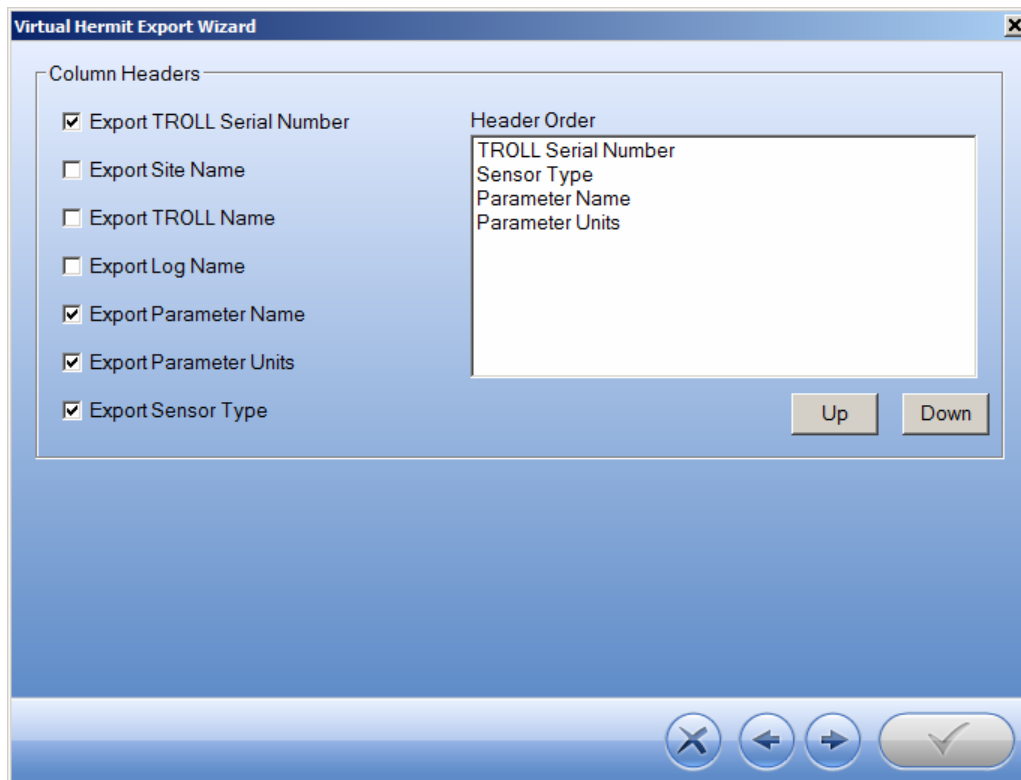
#### 4.4.3 Step 3—Choose the Parameters to Export

The third export wizard screen shown below allows you to choose which logged parameters are exported and their order. Any or all of the parameters can be selected.



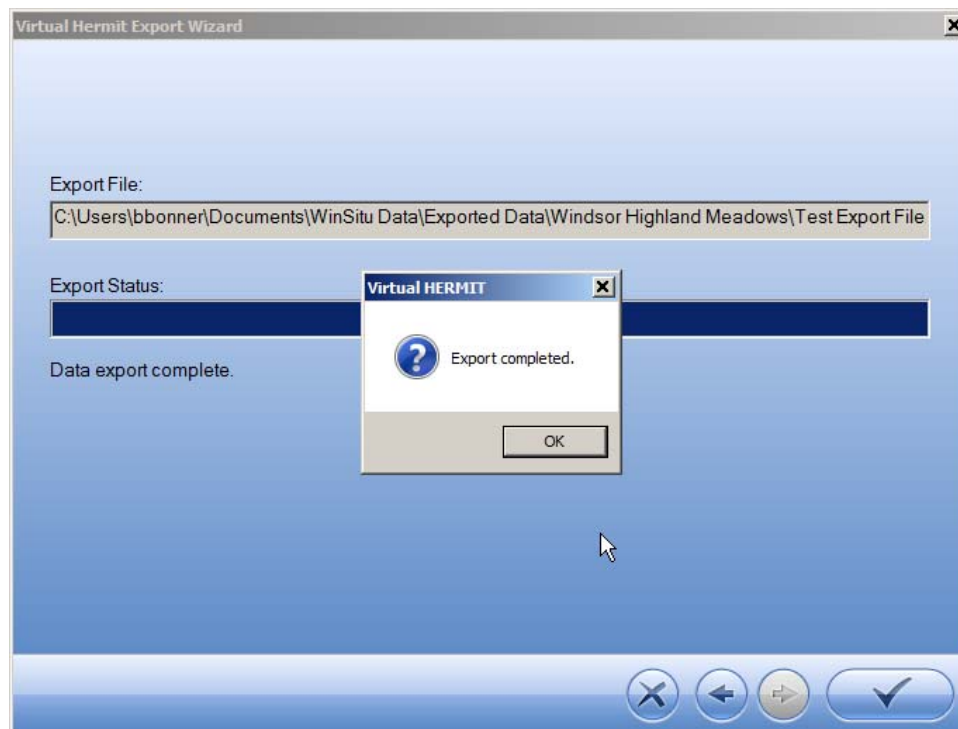
#### 4.4.4 Step 4—Define Column Headers

The fourth export wizard screen allows the user to define the header on top of each column of data exported. This allows the columns of exported text data to be traced back to the original TROLL, log file, and site.



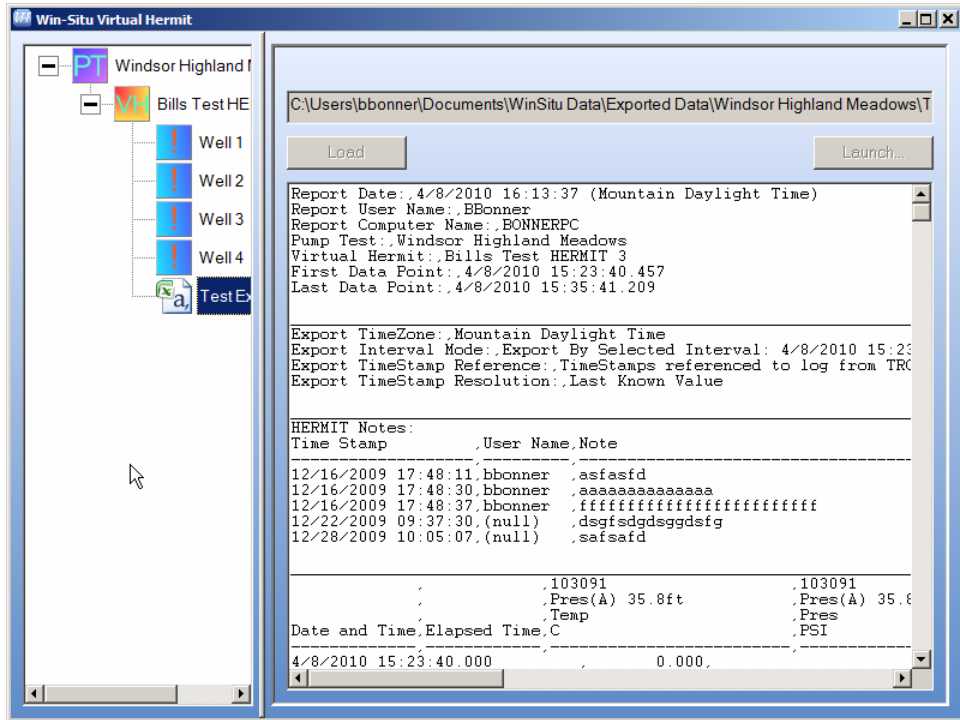
#### 4.4.5 Step 5—Progress Screen

The last export wizard screen shows the progress of the export process.



If the export file is locked by another application, for example Excel, then the software will generate an error message and you can try to re-export the data.

Once the exported file is written to the hard drive, the wizard will close automatically and your exported file will be available in the Pump Test tree for viewing.





# Chapter 5 Drawdown Calculations

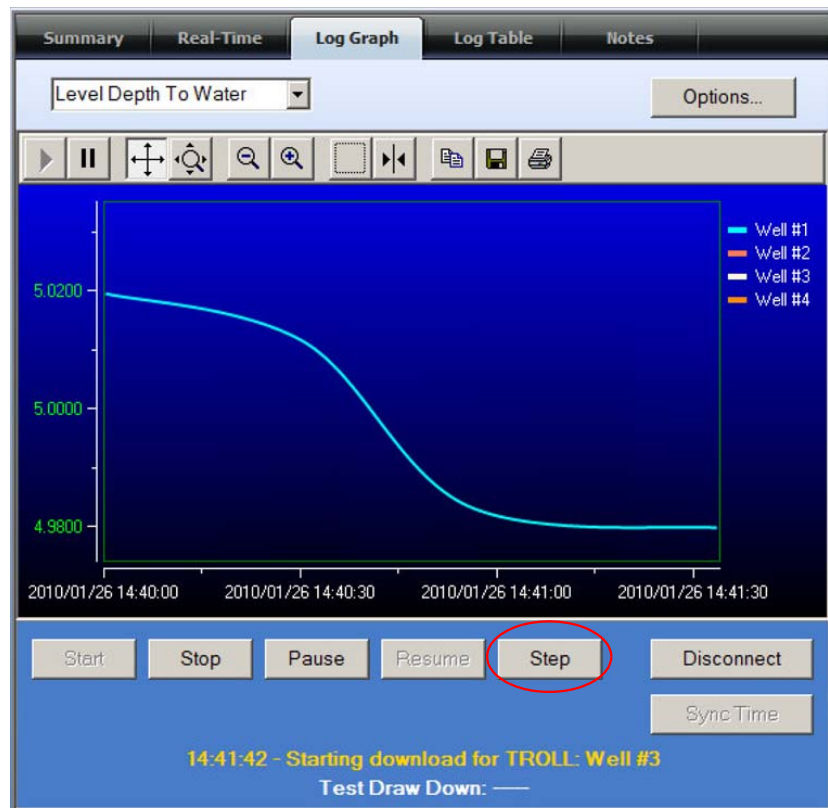
One of the key measurements in a pump test is the drawdown of the well for each pumping rate. During the test, the aquifer level changes shape—from having a flat water level to a cone-shaped level as the pump removes water from the aquifer. The drawdown is the difference between the water depth before pumping and the depth after pumping at a known pumping rate.

## 5.1 USING THE “STEP” FUNCTION

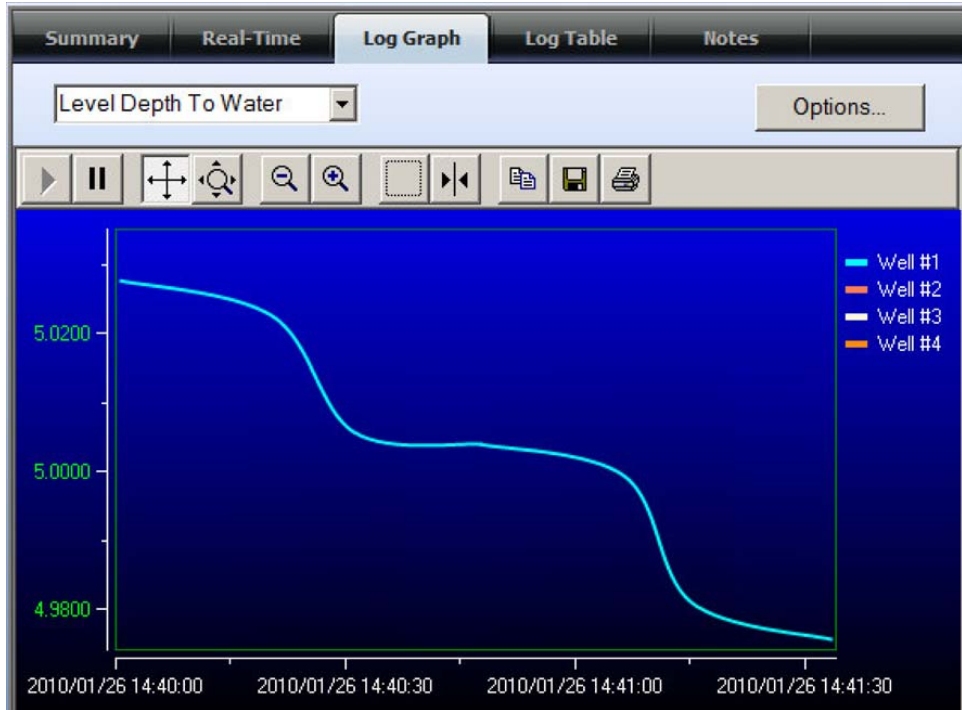
During the pump test, the pump will be run at a steady rate until the drawdown stabilizes. After stabilization occurs, the hydrologist may need to determine if the aquifer or well can sustain a higher rate of pumping, so the pumping rate is increased, or “stepped”. Each period of data collection at different pumping rates is called a “Step”.

By graphing the data collected from a Level TROLL during the first step, the graph will typically show the falling water level, then a transition to a steady state as shown in the example below.

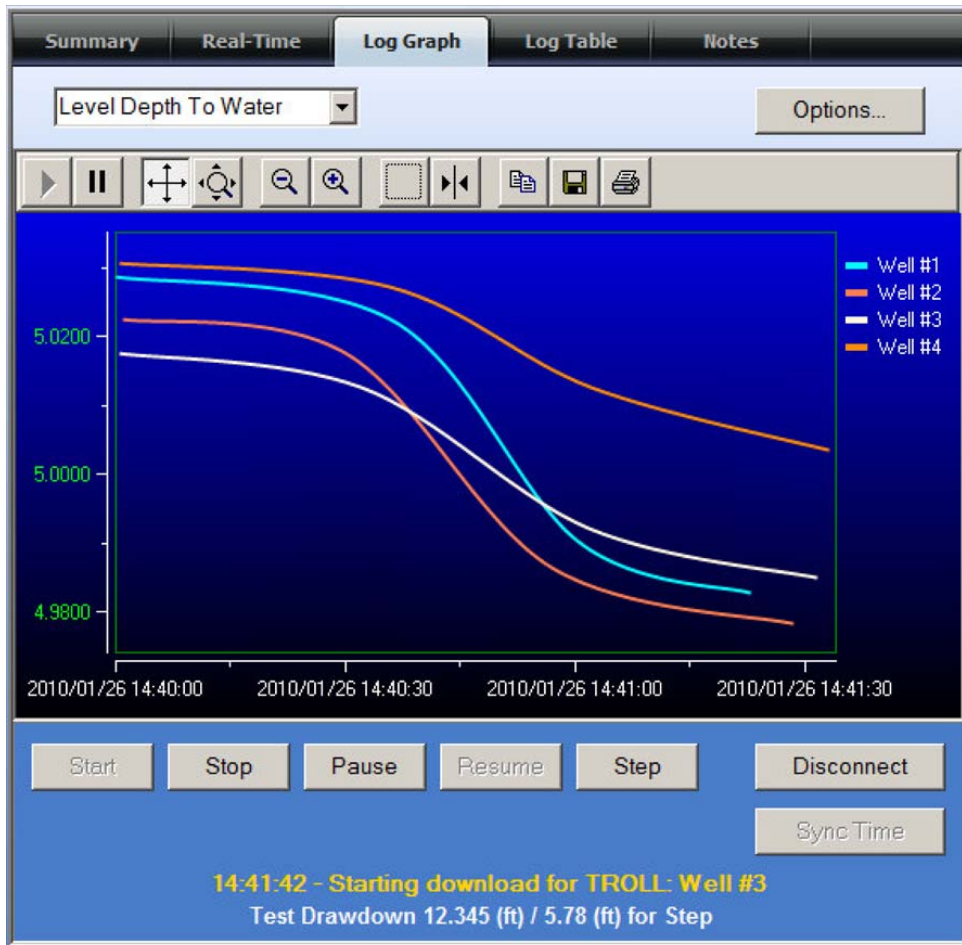
Click the Step button when you increase the pumping rate to create a second “step”. The software will make note of the time that the new step began. This option is most useful for a logarithmic data collection schedule where you wish to begin collecting data rapidly without configuring and starting a new log. If you have a linear data collection schedule set up, the data will still continue to be collected in a linear time frame, but you will know the time at which the pumping rate changed.



After increasing the pumping rate for a period of time, a second plateau will emerge. This is the second step.



These steps will also be apparent in the observation wells.



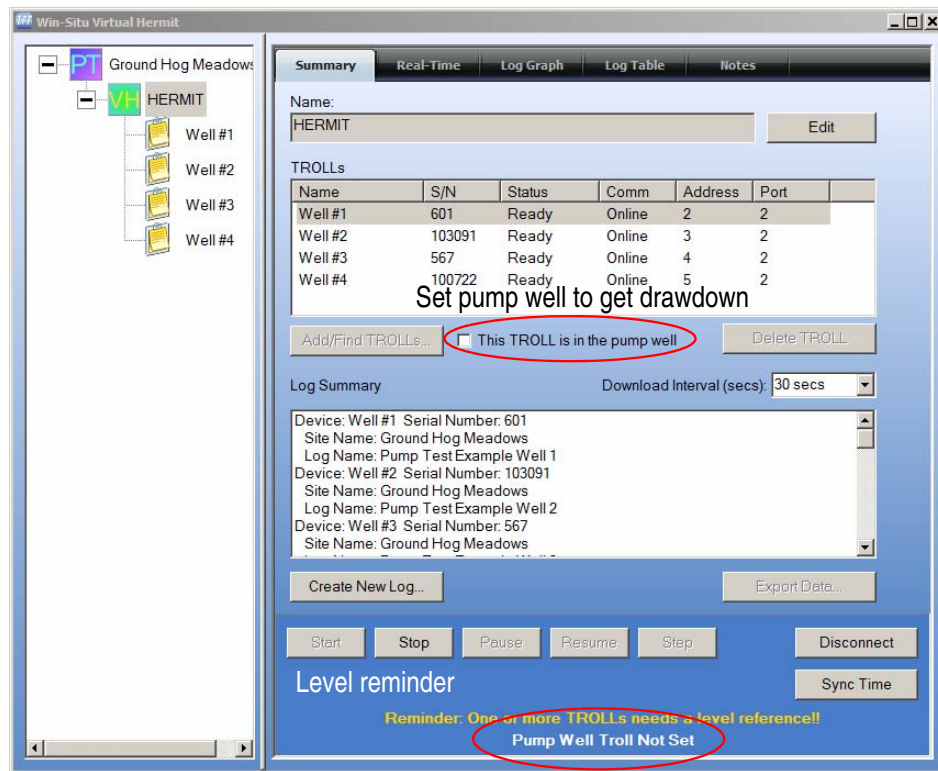
Start Stop Pause Resume Step Disconnect Sync Time

14:41:42 - Starting download for TROLL: Well #3  
Test Drawdown 12.345 (ft) / 5.78 (ft) for Step



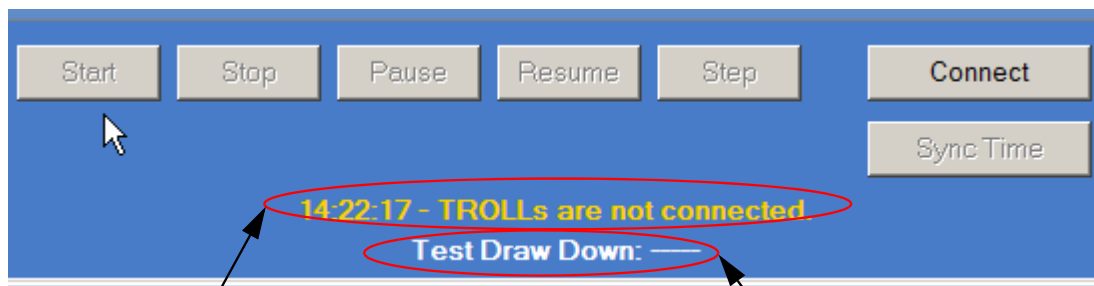
## 5.2 COMPUTING DRAWDOWN

The Virtual HERMIT software will also compute the *drawdown* while the pump test is running. The drawdown is computed using the Level TROLL that is in the pumping well (not the observation wells), which was selected during the configuration of the HERMIT and Level TROLL instruments.



Set pump well to get drawdown

After the pump well TROLL is designated, the drawdown (how much the water level has dropped from the start of data collection) is computed and displayed on the screen for both the pump test (since start of test) and the current step (since the last pump rate change).



Communication status

Drawdown and current step

The hydrologist can then see the drawdown values and the graphical representation of what is happening in the pump well while performing the test, allowing the hydrologist to determine when the next step should occur.

In the chart below, the white line indicates the drawdown for the entire test and the first step. These values are the same for step 1. The yellow line indicates the drawdown for the test, and step 2 (total drawdown minus step 1 drawdown).

