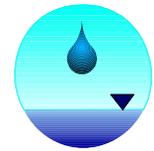


# The CEDRA Corporation's COMMAND OF THE MONTH

A monthly information bulletin

October 2010

FEATURED COMMAND  
Creating EPANET  
EPS Graphs



## Application Description

Those who work with water modeling applications are familiar with the EPANET modeling software. For those who are not, EPANET is a stand-alone software program that models water distribution piping systems and was designed to perform extended-period simulation of the hydraulic and water quality behavior within pressurized pipe networks.

The CEDRA-AVwater software integrates the modeling capabilities of EPANET with ArcGIS. That is to say, CEDRA-AVwater enables the user to create, simulate and post-process an EPANET water model entirely within the ArcGIS environment.

One of the key post-processing tools offered by EPANET is the ability to generate extended period simulation (EPS) graphs. These graphs show the computational result over a period of time. Examples of an EPS graph would be flow rate versus time, velocity versus time and the like.

CEDRA-AVwater offers the user the ability to generate EPS graphs similar to the graphs generated by EPANET. However, these graphs are in the form of line and annotation features which are stored in a personal geodatabase. In creating these graphs, the user has total control over the grid scales, datum and other grid parameters.

Recently, we were asked if it was possible to generate EPS graphs that were not stored in a personal geodatabase,

but rather, as graphic elements. In so doing, the graphs could be generated quicker and with less user-interaction.

## The CEDRA Solution

To address this request, the [Create EPS Graph], , button within the CEDRA-AVwater-Tools-2 toolbar was developed, see Figure 1. This new button can be employed to create a graphic-based EPS graph and is complementary to the existing [EPS Graphs] menu command which is available in the CEDRA-AVwater-Menus toolbar.

### *Command Of The Month bulletin*

*This month's issue addresses how a user can create graphic-based EPS graphs for a selected set of nodes or pipes quickly and easily.*

Note, to use this new button the user must be using ArcGIS Version 9.3 or higher. Earlier versions of ArcGIS do not support this functionality.

## Create EPS Graph Tool Overview

The [Create EPS Graphs] button operates on the basis that the user has activated in the Table of Contents the node or pipe layer to be processed and has selected the node(s)/pipe(s) to be graphed.

If a node or pipe layer has not been activated, an appropriate error message will be displayed. Likewise, if the ac-



Figure 1

## The CEDRA-AVwater-Tools-2 Toolbar

tive layer does not contain any selected node/pipe features, an appropriate error message is also displayed. Note, either the node or pipe layer must be active prior to selecting the command, both can not be.

Depending upon which layer is active, that is, a node layer or a pipe layer, the user is presented with a choice-list dialog box containing the various computation results which can be graphed. The user is able to select one of the displayed items. Should the user wish to graph multiple computational results, the [Create EPS Graphs] button will need to be re-selected. Only one computation result can be graphed at a time.

In addition to selecting the computation result to be graphed, the user must also specify the EPS Graph Table to be processed. Since it is possible for an ArcMap document file to contain multiple EPS runs (multiple EPS Graph Tables), the user must specify which table is to be processed.

Once these parameters have been selected, the user selects the OK button to create the graph, or the Cancel button to abort.

In creating the EPS graph, native ArcMap graphing functionality is used.



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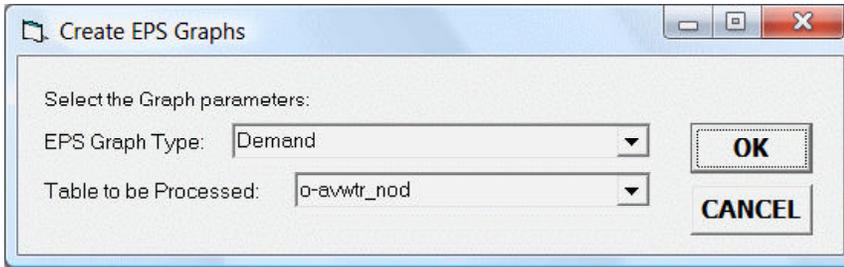


Figure 2 - Create EPS Graph Dialog Box for Nodes

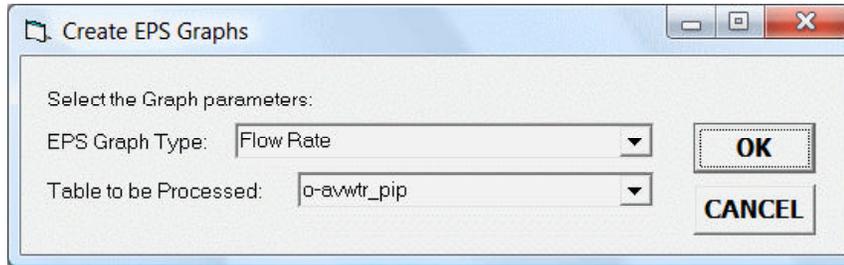


Figure 4 - Create EPS Graph Dialog Box for Pipes

As such, to generate the graph the [Create EPS Graph] button only requires the specification of the computational result and the EPS Graph Table. In so doing, the user is able to quickly and easily create an EPS graph.

Should the user desire to customize or modify the graph, native ArcMap functionality can be employed to do so. Furthermore, native ArcMap functionality can be used to manage the EPS graphs that are generated. That is, renaming, deleting, exporting and that sort of graph management.

### Create EPS Graph Tool Operation

To use this tool, the user should:

- **1** **Activate** the node or pipe layer in the Table of Contents (TOC) to be processed.
- **2** **Click** at the *Select Features*  tool, and make a rectangle to select the feature(s) to be graphed.
- **3** **Click** at the  *Create EPS Graph* button.

➤ **4** From the displayed multi-input dialog box **select** the computational result to be graphed, that is, the EPS Graph Type parameter. See Figure 2 when processing nodes, Figure 4 when processing pipes.

➤ **5** From the displayed multi-input dialog box **select** the EPS Graph Table to be processed, that is, the Table to be Processed parameter. See Figure 2 when processing nodes, Figure 4 when processing pipes.

➤ **6** **Click** at the **OK** button to begin the graph generation process, or **click** at the **Cancel** button to abort the command

Shown in Figure 6 is a sample EPS graph of Pressure versus Time for a selected node feature. In this case a single node was selected when the tool was activated. Shown in Figure 7 is a sample when multiple nodes are selected. As can be seen, when multiple nodes are selected, the results of each node are superimposed upon the same graph.

Figure 3  
Node Computational Results  
which can be graphedFigure 5  
Pipe Computational Results  
which can be graphed

Furthermore, the value for each data point comprising the graph is annotated. Shown above a data point is a pop-up box that contains two values separated by a space. The first value denotes the Y axis value, while the second value represents the X axis value for the data point.

The graph line for each node is shown in a different color. When multiple features are processed, a different color is assigned for the first 11 features, numbers 12 and higher will appear in the same color.

Shown in Figures 8 and 9 are sample EPS graphs for one and two pipes, respectively.

### Graph Modification

To modify an EPS graph the user should move the cursor into the graph window and make a right-click with the mouse button. The pop-up menu item list shown in Figure 10 will appear. Depending upon the type of modification to be performed, the user should select the *Advanced Properties...* or *Properties...* menu item. Refer to the ArcGIS Desktop Help for further information.

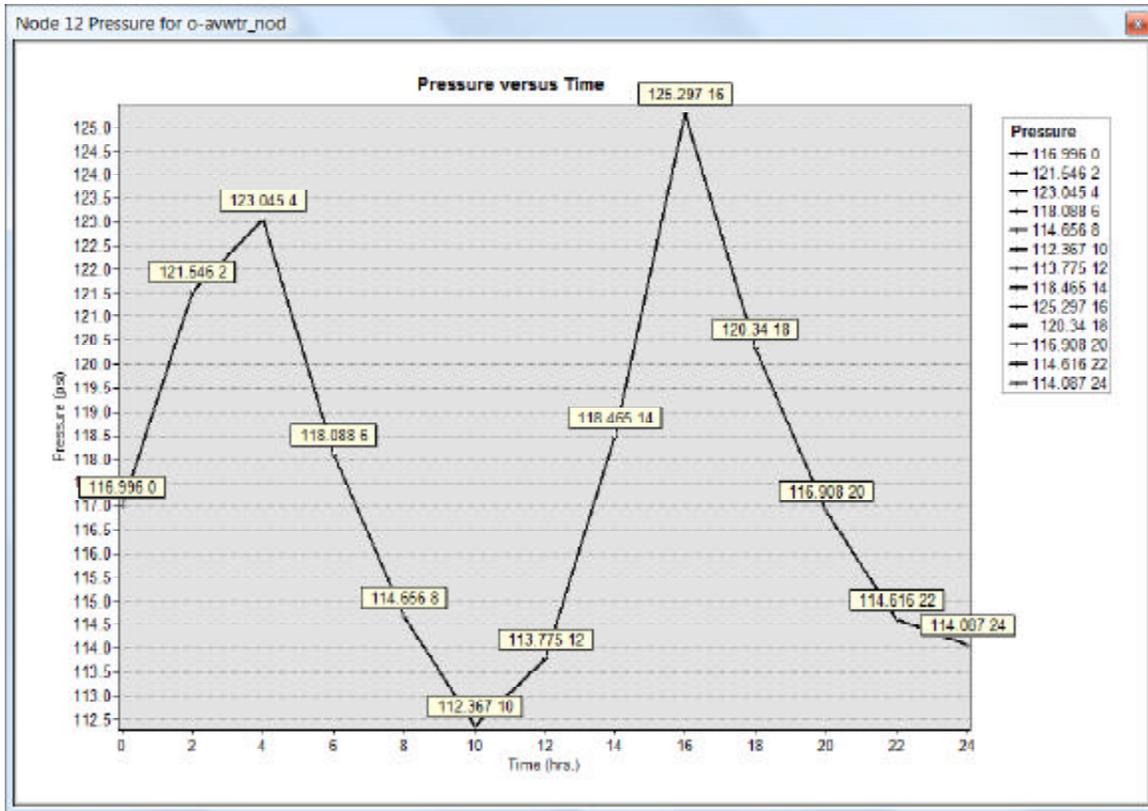


Figure 6 - Sample EPS Graph of Pressure versus Time for One Selected Node

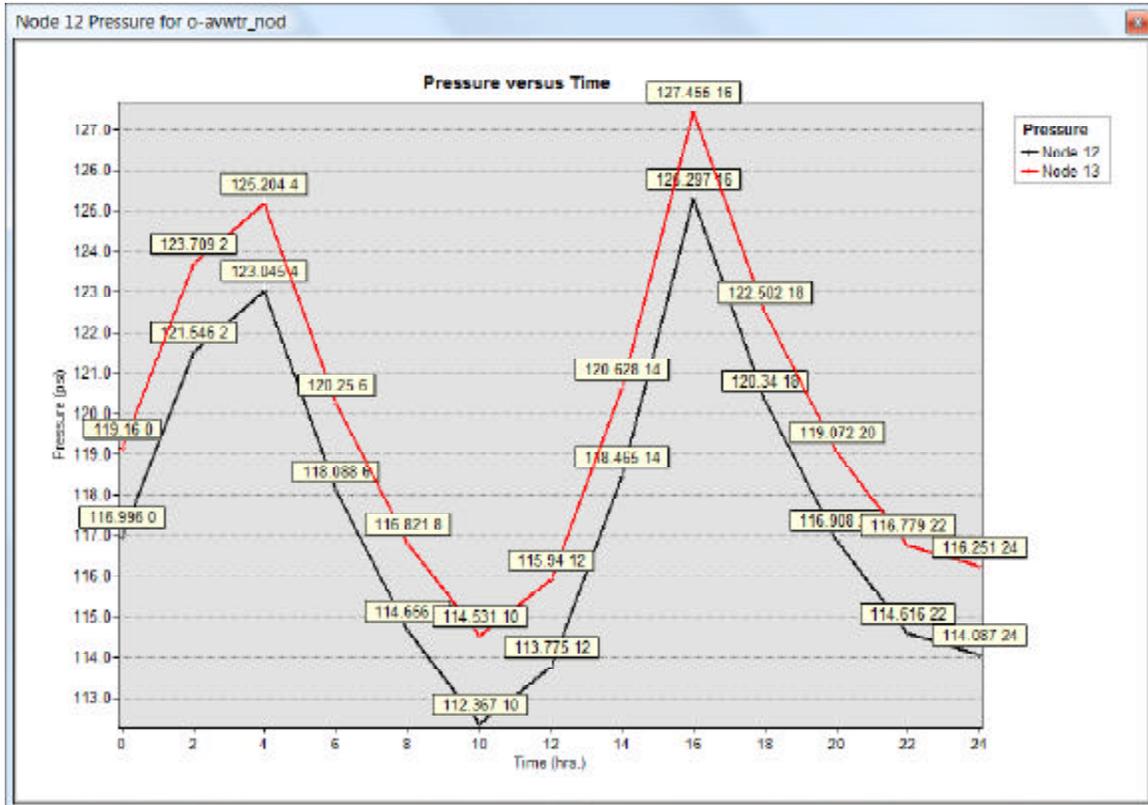


Figure 7 - Sample EPS Graph of Pressure versus Time for Two Selected Nodes

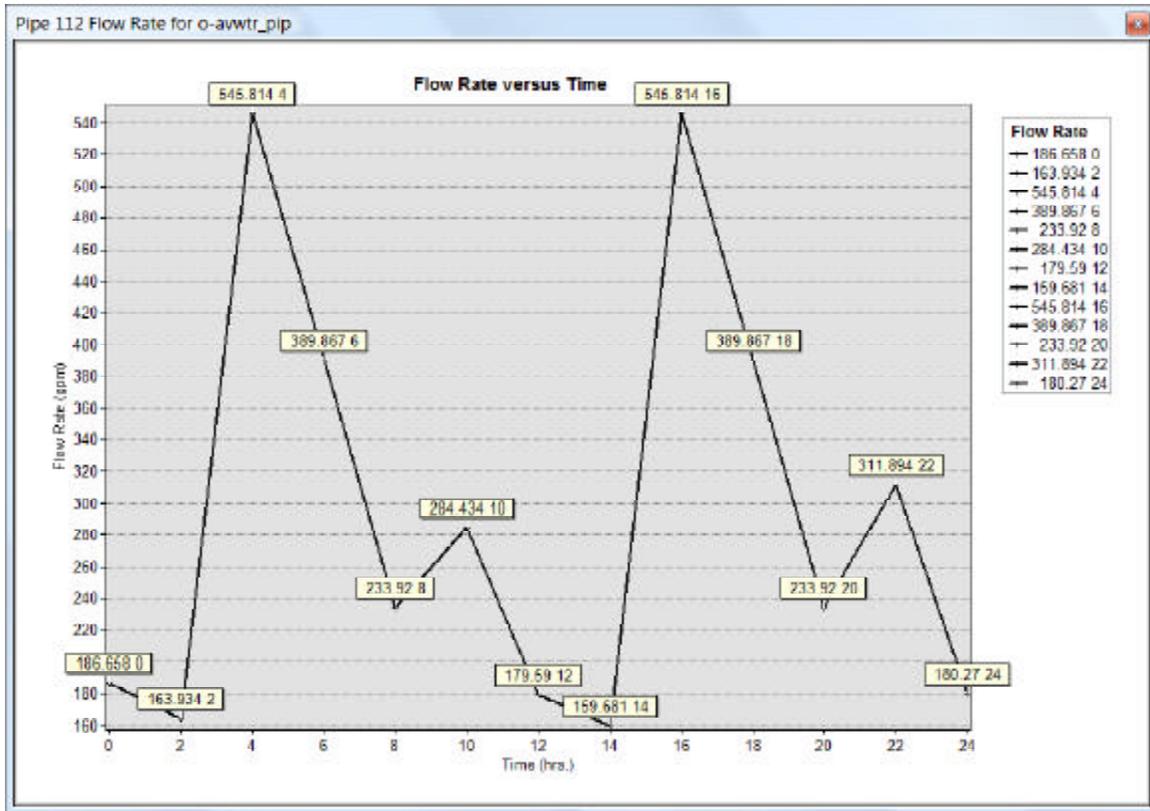


Figure 8 - Sample EPS Graph of Flow Rate versus Time for One Selected Pipe

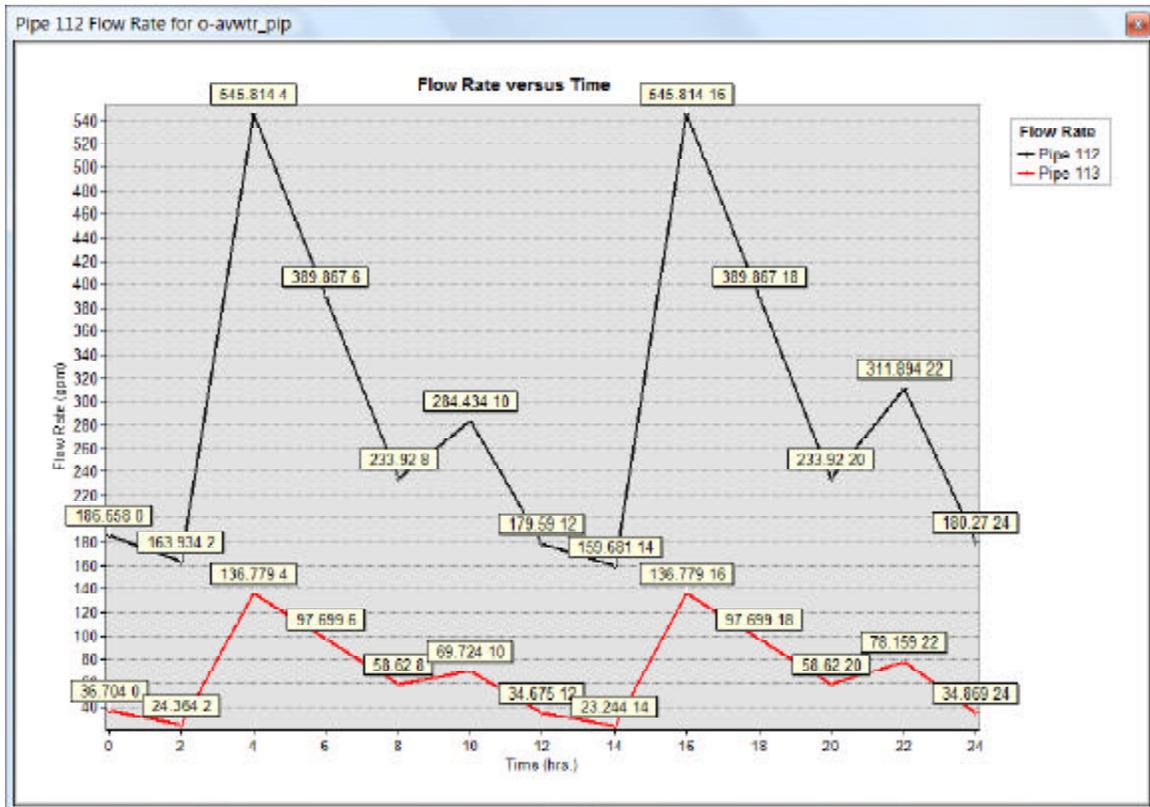


Figure 9 - Sample EPS Graph of Flow Rate versus Time for Two Selected Pipes

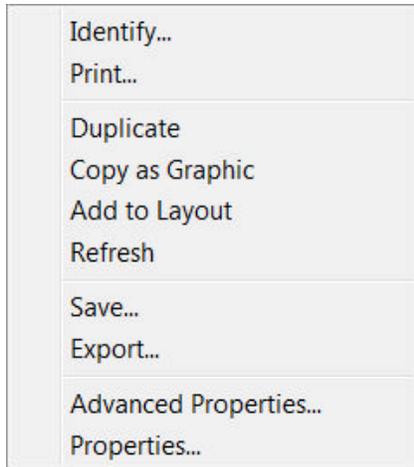


Figure 10  
ArcMap Graph Pop-Up Menu List

**Graph Management**

To manage the EPS graphs that are created, the {Tools} [Graphs] [Manage] command can be employed, see Figure 11. The Graph Manager dialog box will then be displayed, see Figure 12.

Note that under the Name column, shown in Figure 12, the name that appears is generated by the [Create EPS Graphs] button. The node or pipe number that is processed, as well as, the computational result that is being graphed are used in establishing the name of the graph. When multiple features are processed, the first node/pipe number encountered is used.

For more information, refer to the ArcGIS Desktop Help.

**Summary**

The [Create EPS Graphs], , button provides a quick and easy mechanism for generating EPS graphs for selected node and/or pipe features. This button provides the user the ability to create an EPS graph using the ArcMap graphing functionality, which some users may find preferable to storing the EPS graph in a personal geodatabase.

Note that the [Create EPS Graphs] button is a recent addition. Users with a

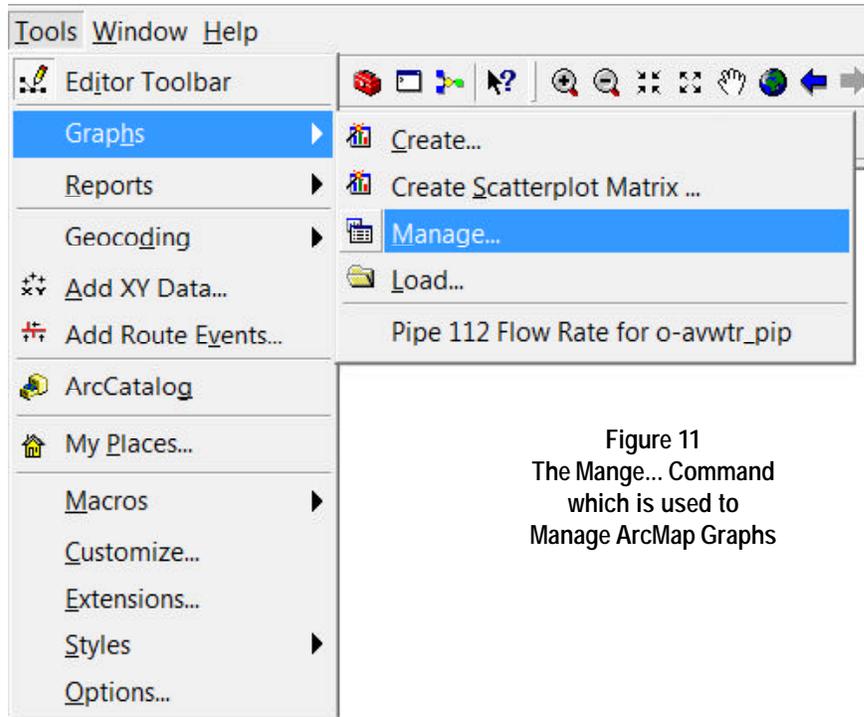


Figure 11  
The Manage... Command which is used to Manage ArcMap Graphs

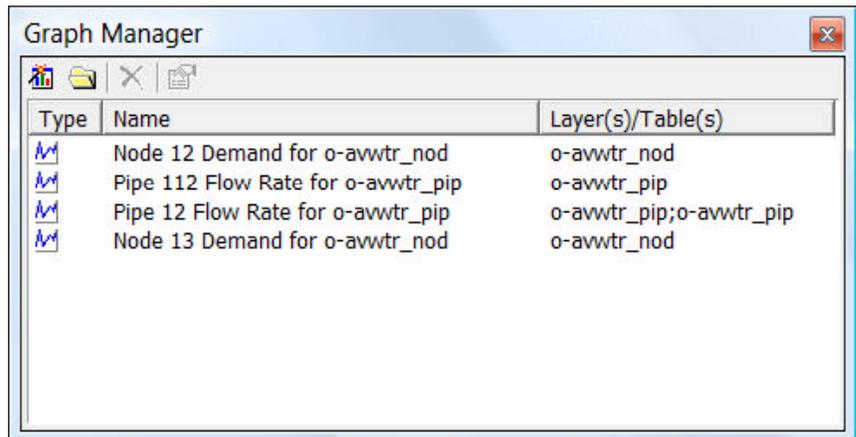


Figure 12 - ArcMap Graph Manager Dialog Box

software support agreement should check with The CEDRA Corporation on how to obtain a software update so as to be able to utilize this new functionality.

As always, users who have a need for functionality that is not presently available in CEDRA software should feel free to forward these requests to CEDRA, as well as, any other comments or suggestion you may have.

*If you have a request for Command Of The Month, feel free to phone, fax or e-mail your request to The CEDRA Corporation.*