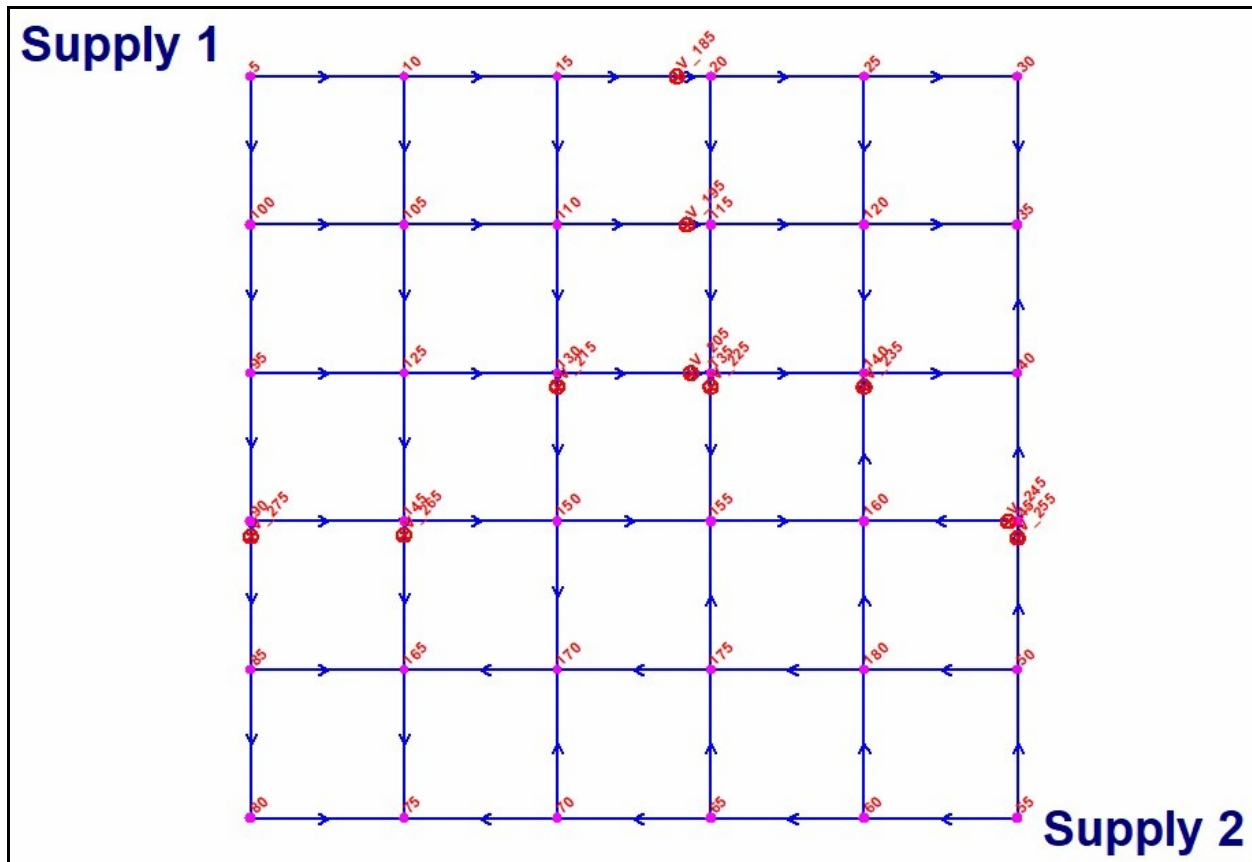


Summary

In this example, an existing model will be used to demonstrate the use of the GASWorkS trace features. The Trace routine will be used to determine the extent of the system served by a supply node, and work with valve node isolation areas. The model used with this example consists of a grided network containing two supply nodes and several valve nodes.



Steps

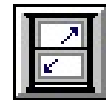
The following assumes that GASWorkS has already been started. If a model is already open, close it by selecting the *Close* item from the *File* menu. Use the following procedure to work this example...

1) Open The Existing Model

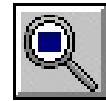
- From the *File* menu, select the *Open* item. The Model Selection screen will be displayed. Use the *Drives* and *Directories* lists to navigate to the directory containing the desired file - **tracing example.hdr**. Select the file, then click the *Continue* command button.

- The Graphic Data Interface (GDI) Window will be displayed. *Note* - If the GDI Window is not automatically displayed, select the *View/Edit* item from the *Graphics* menu to display the GDI Window.

- Resize the GDI Window using the *Maximize GDI Window* icon from the *GDI Window Controls Toolbar*.

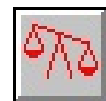


- Zoom the GDI Image to fill the GDI Display using the *Zoom To Fit* icon from the lower-left corner of the GDI Window.



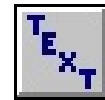
2) Solve The Model

Has the model been solved? Click the *Solve* icon from the lower-right corner of the GDI Window. The Solution Data screen will be displayed. Review the solution parameters, then click the *Solve* command button. The Solution Log will be displayed. Review the results, then click the *Close* command button to close the log.



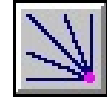
Note...

- If the flow arrows are not displayed, click the *Display Flow Arrows* icon from the *Display Controls Toolbar*.
- If the customer symbols are displayed, click the *Display Customer Symbols* icon from the *Customer Commands Toolbar* to turn the customer symbols “off”.
- If the node Names are not displayed, click the *Text Display Settings* icon from the *Display Controls Toolbar*. On the *Node Items* data tab, ensure that the *Display Node Text Items* option and the *Node Name* item are selected. Double-click in the *Display Limit* data field. Then click the *Apply* command button.



3) Trace All Directions

- Click the *Trace* icon from the *Utility Commands Toolbar*.



- The Trace Specifications screen will be displayed. Set the following values:

Trace Style = **Trace All Directions**

Start Trace At = **A Node**

Trace Highlight Color = **Red** *Note* - Click in the color box. The Color Palette will be displayed. Select the color “Red”, then click the *OK* command button.

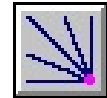
Highlight Customers = **Unselect**

Reset Feature Colors Before Tracing = **Unselect**

- Click the *Trace* command button.
- For the *Starting Node*, select any node in the system. If everything is connected, the trace should color the entire system red. Are all of the pipes colored red? Yes.
- Restore the original colors by typing **RESET** on the GDI Command Line and press the *Enter* key. This command will cause the original feature colors to be restored.

4) Trace Upstream From A Node

- Click the *Trace* icon from the *Utility Commands Toolbar*.



- The Trace Specifications screen will be displayed. Set the following values:

Trace Style = **Trace Upstream - All Flow Paths**

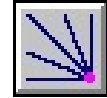
Start Trace At = **A Node**

Trace Highlight Color = **Red**

- Click the *Trace* command button.
- For the *Starting Node*, select one of the interior nodes (perhaps **Node 150**). The pipes feeding into (supplying) the node will be colored red. The trace should extend back to at least one of the supply nodes. Review the direction of the flow arrows - does the highlighted path look correct? All of the highlighted pipes should be feeding towards the selected starting node.
- Restore the original colors by typing **RESET** on the GDI Command Line and press the *Enter* key.

5) Trace Downstream From A Node

- Click the *Trace* icon from the *Utility Commands Toolbar*.



- The Trace Specifications screen will be displayed. Set the following values:

Trace Style = **Trace Downstream - All Flow Paths**

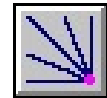
Start Trace At = **A Node**

Trace Highlight Color = **Red**

- Click the *Trace* command button.
- For the *Starting Node*, select one of the supply nodes (perhaps **Supply 2/Node 55**). The pipes feeding from (being supplied by) the selected node will be colored “Red”. The trace should extend out to all of the pipes and nodes supplied from the selected starting node. Review the direction of the flow arrows - does the highlighted path look correct? All of the highlighted pipes should be feeding from the selected starting node.

Trace from the other supply node.

- Click the *Trace* icon from the *Utility Commands Toolbar*.



- The Trace Specifications screen will be displayed. Set the following values:

Trace Style = **Trace Downstream - All Flow Paths**

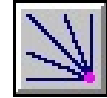
Start Trace At = **A Node**

Trace Highlight Color = **Green**

- Click the *Trace* command button.
- For the *Starting Node*, select the other supply node (**Supply 1/Node 5**). The pipes feeding from (being supplied by) the node, will be colored “Green”. The trace should extend out to all of the pipes and nodes supplied from the selected starting node. Review the direction of the flow arrows - does the highlighted path look correct? All of the highlighted pipes should be feeding from the selected starting node. Notice how the newest path is colored the “current” Trace Highlight Color “Green”, and how a portion of the previously highlighted path (colored “Red”) has been overwritten by another color. This occurs when a mixing of the two supply streams happens.
- Restore the original colors by typing **RESET** on the GDI Command Line and press the *Enter* key.

6) Trace The Pipes In An Isolation Area

- Click the *Trace* icon from the *Utility Commands Toolbar*.



- The Trace Specifications screen will be displayed. Set the following values:

Trace Style = **Trace To Any Flow Control Device**

Start Trace At = **A Node**

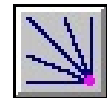
Trace Highlight Color = **Red**

- Click the *Trace* command button.

- For the *Starting Node*, select the node in the northeast corner (**Node 30**). All of the pipes connected to this node will be highlighted until a valve node, regulator, closed pipe, or compressor is encountered. The trace should define the isolation area associated with the selected starting node. Review the highlighted pipes - does it look like the area is properly highlighted?

Trace another area (there is intended to be three separate isolation areas).

- Click the *Trace* icon from the *Utility Commands Toolbar*.



- The Trace Specifications screen will be displayed. Set the following values:

Trace Style = **Trace To Any Flow Control Device**

Start Trace At = **A Node**

Trace Highlight Color = **Green**

- Click the *Trace* command button.

- For the *Starting Node*, select the node in the southeast corner (**Supply 2/Node 55**). All of the pipes connected to this node will be highlighted until a valve node, regulator, closed pipe, or compressor is encountered. The trace should define the isolation area associated with the selected starting node. Review the highlighted pipes - does it look like the area is properly highlighted?

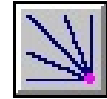
It looks like a valve node is missing - the remainder of the system is entirely highlighted. Do you see where the valve node should be? Try placing a valve node on the pipe segment between Node 145 and Node 150.

- Select the *Add Valve Node* item from the GDI Command List. Select the pipe segment between **Node 145** and **Node 150** by left-clicking on the pipe. For the *Valve Node Location*, left-click on a point near one end of the selected pipe segment. For the *Valve Node Number*, type **V_NEW** on the GDI Prompt Line and press the *Enter* key. For the *Valve Node Hydraulic Type*, select **Valve** from the GDI Prompt List.



Retrace the isolation areas to check our work.

- Click the *Trace* icon from the *Utility Commands Toolbar*.



- The Trace Specifications screen will be displayed. Set the following values:

Trace Style = **Trace To Any Flow Control Device**

Start Trace At = **A Node**

Trace Highlight Color = **Blue**

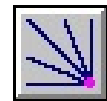
- Click the *Trace* command button.

- For the *Starting Node*, select the node in the southeast corner (**Supply 2/Node 55**). All of the pipes connected to this node will be highlighted until a valve node, regulator, closed pipe, or compressor is encountered. The trace should define the isolation area associated with the selected starting node. Review the highlighted pipes - does it look like the area is properly highlighted?

- Restore the original colors by typing **RESET** on the GDI Command Line and press the *Enter* key.

7) Create A Trace Results File

- Click the *Trace* icon from the *Utility Commands Toolbar*.



- The Trace Specifications screen will be displayed. Set the following values:

Trace Style = **Trace To Any Flow Control Device**

Start Trace At = **A Node**

Trace Highlight Color = **Red**

Create A Trace Results File = **Select**

Report Summary Of Features Along Route = **Select**

- Click the *Trace* command button.

- The File Selection screen will be displayed. Enter a *Filename* for the Trace Results, then click the *Continue* command button.

- For the *Starting Node*, select the node in the northwest corner (**Supply 1/Node 5**).

- The Trace Results will be displayed. Review the results, then click the *Close* command button.

- All of the pipes connected to this node will be highlighted until a valve node, regulator, closed off pipe, or compressor is encountered. The trace should define the isolation area associated with the selected starting node. Review the highlighted pipes - does it look like the area is properly highlighted?

Notes & Considerations

- If customers are included in the model, they can be included in the Trace Results depending on the options selected.
- The model used in this example contained several valve nodes. Valve nodes are different from hydraulic (flow element) valves. Hydraulic valves are included in the pressure and flow calculations, whereas valve nodes are only considered during the Trace routine. The inclusion of valve nodes is useful for designing and analyzing valve placement strategies.