SCADA Run

Introduction to SCADA

A Supervisory Control and Data Acquisition system (SCADA) stores information useful for network many modeling applications. This system compiles both real-time and historical operational data for local and remote facility sites. Such information is useful to define input data conditions for InfoWater Pro including loading conditions in temporal format for pressure zone and system demands, boundary conditions for reservoir and tank water levels, as well as pipe status and pump and control valve settings. The SCADA output for pressure and flow measurements can also be used in model calibration to verify the reliability of the model results. The ability to interface with SCADA systems can offer a number of benefits including at a minimum (Orr et al. 1999):

- Confirmation of normal system performance
- Real-time calibration
- System trouble-shooting
- Projection of operating scenarios
- Performing “what-if" scenarios
- Training for emergency response
- Testing of case studies
- Improvement of overall operations

These benefits can only be realized if both systems communicate properly with one another, so that information gathered by the SCADA system can be shared with InfoWater Pro and could be used in simulation runs. The intent is to update InfoWater Pro with the most recent SCADA data. The goal is to monitor as opposed to control (one way communication). The new or most recent SCADA values would replace the existing boundary data in the active InfoWater Pro project.

InfoWater Pro provides the capability to extract pertinent modeling data from SCADA in ASCII format. All communications between InfoWater and the SCADA system are file-based. The ASCII file can reside anywhere on the computer systems, including a network path. The key to the successful transfer of information is the format of the file. It must adhere to a specific format so that a correct exchange of information between the two platforms is obtained. The data consist of tank water levels, pipe status, pump status and settings, control valve status and settings, and three demand scaling options. This information is used to update the InfoWater Pro boundary conditions. Recorded pressure and flow measurements can also be imported for comparison (calibration/verification) purpose. Alarm settings for tank levels (minimum/maximum), node pressures (minimum/maximum) and pipe velocities (maximum) can also be specified. The alarm is activated when the modeled results are above or below the maximum or minimum specified settings, respectively.

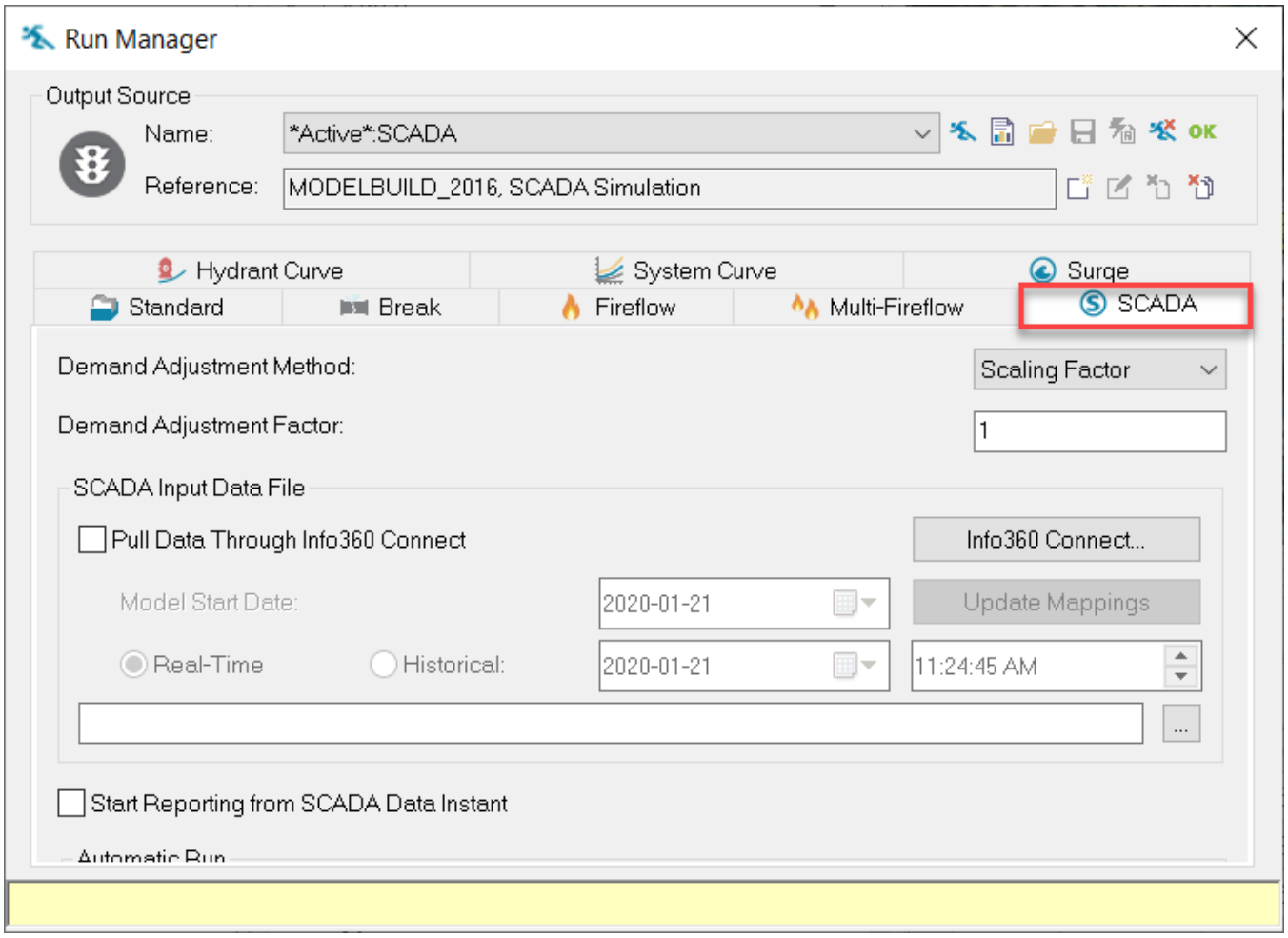
An initialization phase must first be carried out for proper system configuration and to match SCADA IDs with model IDs (one-to-one match) for any system element, to define the format and units of measurement data, and to optionally specify the lower and upper limits for alarm settings. Configuration data is required only for those network elements whose settings or status are to be updated from the SCADA system and/or a comparison between modeled and measured data is desirable.

It is expected that the SCADA system is able to extract and write the relevant data in an ASCII format readable by InfoWater Pro. The SCADA system must also save this interface file within the computer network system that is accessible by InfoWater Pro. Upon activation of the SCADA option, InfoWater Pro locates the interface file and updates its network model definition accordingly.

This section summarizes the data information required to update the network model and outlines the interface data file format for SCADA system reference.

SCADA Tab

SCADA tab is available in the Run manager window, which allows you to create a simulation based on SCADA data.



Fields	Descriptions
Demand Adjustment Method	Select the appropriate option here and then enter the value in *Demand Adjustment Factor* field.

Scaling Factor	Scale the junction node demands according to a user defined scaling factor. The scaling factor is specified in the Demand Adjustment Factor entry field. For example, if the total system demand for all junctions is 1200 unit (at the specified Pattern Start Time) and the Demand Adjustment Factor is set to 5, then all junction demands will be multiplied by 5 to give a total system demand of 6000 unit.
Total System Demand	Divide the value specified in the Demand Adjustment Factor by the existing system demand (at the specified Pattern Start Time) and then multiply all junction node demands by the resulting ratio. For example, if the value specified in the Demand Adjustment Factor is 800 gpm and the actual junction demand at hour 2:00 is 1000 gpm, then all junction nodes will be multiplied by the resulting ratio (0.8).
% Inflow / Outflow	Adjust all junction nodes by the percentage value specified in the Demand Adjustment Factor to the difference between system inflows and outflows as specified from the SCADA System Data Edit. For example, if 25 (25%) is entered into the Demand Adjustment Factor field, all junction demands (as computed from the difference between system inflows and outflows) will be multiplied by the percentage value entered into the Demand Adjustment Factor. If the system inflow/outflow measurement option is chosen, the inflow/outflow measurement meters must first be configured using through the SCADA System Edit dialog box.

Demand Adjustment Factor	Specify the demand Adjustment factor. The factor will be dependant on the Demand Adjustment method and is a means to normalize the demands to reflect your true SCADA demands.

<table>
<tr><td>SCADA Input Data File</td><td>Specify the location of the manually created SCADA input data file. Click on Ellipsis to browse to the file path. If a SCADAWatch server is available, SCADA input data can be populated from the server. After setting up real-time access mappings, SCADA simulation can run by pulling data through Info360 Connect when the checkbox is selected. The live data file will be outputted at the location that you specify in the text window, shown above. Automatic run is also supported.

<table>
<tr><td>Pull Data Through SCADAWatch Connect</td><td>When this checkbox is checked, initial values are pulled from SCADAWatch as described in the Info360 Connect.</td></tr>
<tr><td>SCADAWatch Connect...</td><td>This button brings up the External Data Connect window.</td></tr>
<tr><td>Model Start Date</td><td>This date-time is only applicable when Real-Time radio is selected. Basically simulation starts from this date.</td></tr>
<tr><td>Update Mappings</td><td>When this button is pressed, mapping information entered at Data Channel tab of Info360 Connect will be modified to the selected date, and the Output will be set to SCADA.</td></tr>
<tr><td>Real-Time</td><td>This options uses the current time of the computer with the selected date to pull the information from SCADAWatch</td></tr>
<tr><td>Historical</td><td>This option allows to select any date and any time. Based on this date and time, information from SCADAWatch will be pulled and saved to SDA file.</td></tr>
<tr><td>SDA File Path</td><td>This field must be filled with a path to a file that has extension of .SDA.</td></tr>
<tr><td>Browse Ellipsis (... button)</td><td>This button will allow to either select existing SDA file or create a new file at selected location.</td></tr>
</table></td></tr>
<tr><td>Start Reporting from SCADA Data Instant</td><td></td></tr>
<tr><td>Automatic Run</td><td>When started, hydraulic simulation will be performed at every given time interval.

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<tr><td>Timer Interval (min)</td><td>Simulation will be performed at every this time interval.</td></tr>
<tr><td>Start</td><td>Starts performing the automated simulation at given time interval.</td></tr>
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