

# SCT Object Grid Tab in RiverWare 6.2

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This document describes a new tab in the SCT which presents a grid of simulation objects with scalar and table slots.

## 0.1 Document Status

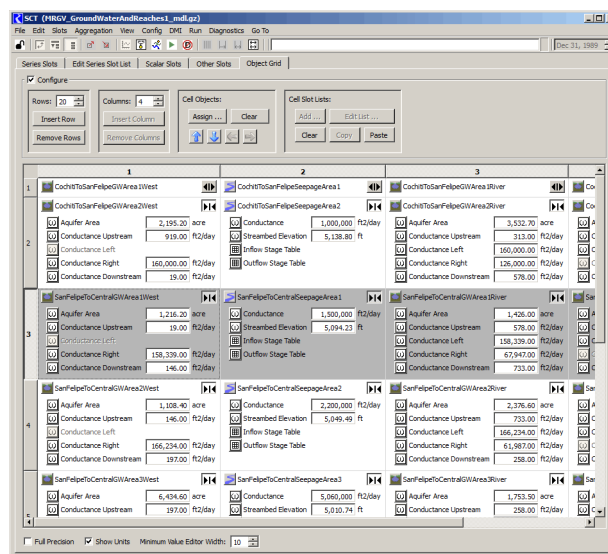
11-19-2011: Initial writing; Ready for review.

## 1.0 Overview

The SCT's Object Grid Tab is a new, fifth tab in the SCT which presents a user-configured grid of simulation objects with a small set of physical scalar and table slots. Numeric values of scalar slots and single-cell table slots are displayed and are directly editable.

The user can:

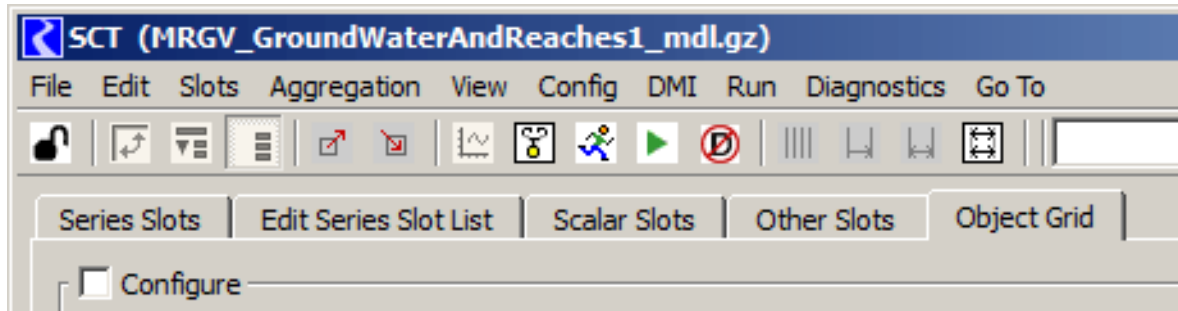
- Configure the number of rows and columns in the grid; insert rows and columns before a cell selection; and delete selected rows and columns.
- Assign existing simulation objects to individual grid cells.
- Move an arbitrary selection of defined cells up, down, left or right within the grid.
- Pick scalar and table slots from a cell's simulation object to display in that cell.
- Show the open object dialog or open slot dialog for included objects or slots.
- Modify the composition and order of a cell's slot list.
- Apply a cell's slot lists to an arbitrary selection of other defined cells. The "target" cells are configured with similarly-named slots on the cells' simulation objects. Slot items which don't exist on the target cells' objects are shown as inactive (grey).
- Show or hide the slots within an arbitrary cell selection in a single operation.
- Directly modify the values of scalar slots and single-cell table slots.
- Display slot values with either configured precision or "full" precision; optionally show slot value *units*; and adjust the width of value editors.
- Export and import the whole object grid configuration to and from external files.



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## 2.0 Object Grid Tab

The Object Grid Tab is the last (5th) tab in the SCT.

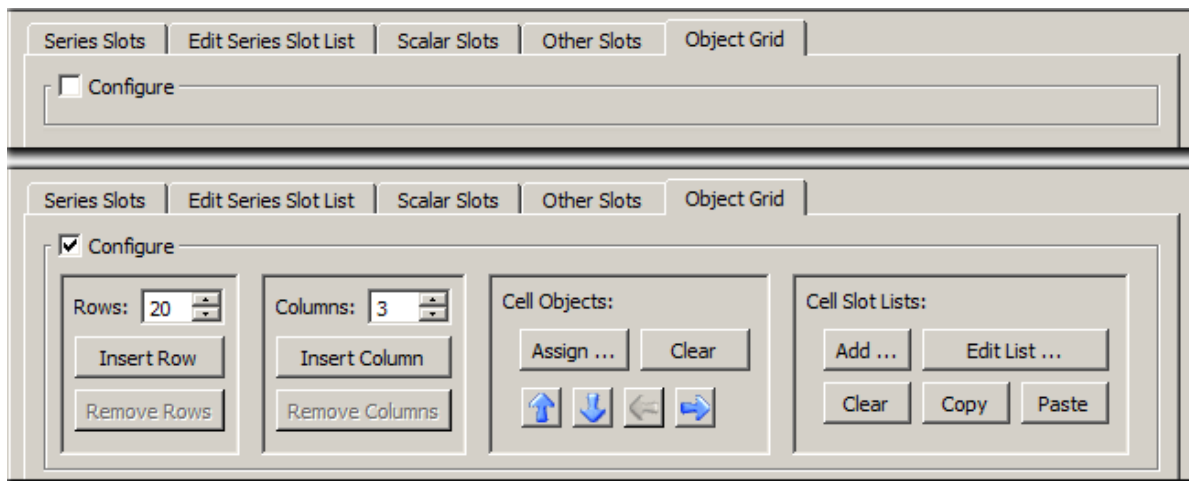


Very few of the SCT's menubar and toolbar controls operate on the object grid. Currently, the only SCT controls outside of the Object Grid tab which operate on the object grid are:

- View >> Fit Data Columns: Auto-adjust grid row and column sizes.
- View >> Refresh: Rebuild the table. This isn't (or shouldn't ever be) necessary. It may be useful as a work-around for a malfunction until a fix is available.

## 3.0 Object Grid Configuration

The primary configuration controls are optionally shown at the top of the object grid, based on the "Configure" group box toggle:



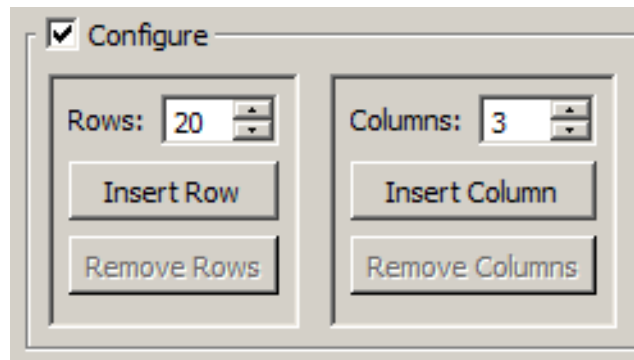
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### 3.1 Row and Column Configuration

The number of rows and columns in the grid can be directly entered or “stepped” using **spin-box** controls.

The “**Insert Row**” and “**Insert Column**” buttons are enabled when the cell selection is limited to a single row or a single column (including the case of just a single cell being selected). Those operations insert an empty row above, or an empty column to the left of the selected row or column.

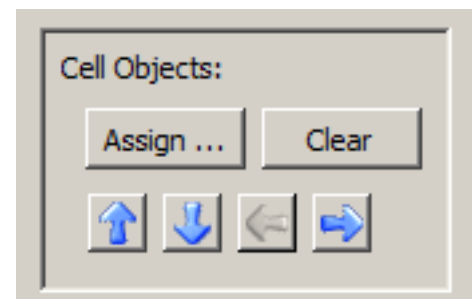
The “**Remove Rows**” and “**Remove Columns**” buttons are enabled when whole rows or whole columns are selected (e.g. by clicking in, or dragging along the row or column headers).



Removing rows and columns deletes any defined cells (i.e. cells with an assigned simulation object) in those selected rows or columns. However such cells are *not deleted* when the number of rows or columns is (temporarily) reduced to visually exclude those cells. Those defined cells become visible again when the number of rows or columns is sufficiently increased. But when the SCT configuration is saved, those “out of range” cells are dropped.

### 3.2 Cell Object Configuration

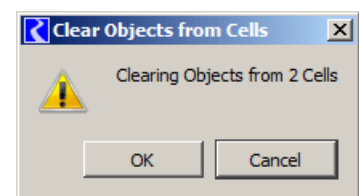
The Cell Object “**Assign**” button is enabled when one *or more* cells are selected. Clicking that button brings up the Simulation Object selector. Each time the selector’s “Apply” button is clicked, the picked object is assigned to the “first” selected cell, and that cell is deselected. This allows the assignment of objects to multiple cells with a single invocation of the Simulation Object selector. The “first” selected cell is the topmost selected cell in the left-most column containing selected cells. (The assignment sequence proceeds *downward* in the left-most column until all selected cells in that column have been assigned objects).



It is valid to assign a particular simulation object to multiple distinct cells. Each of those cells could potentially show different slots from that object.

The Cell Object “**Clear**” button is enabled when one or more defined cells (having simulation objects) are selected. This operation removes the selected cells’ simulation object (and slots). If more than one cell is selected when “Clear” is clicked, the user is queried for permission to proceed.

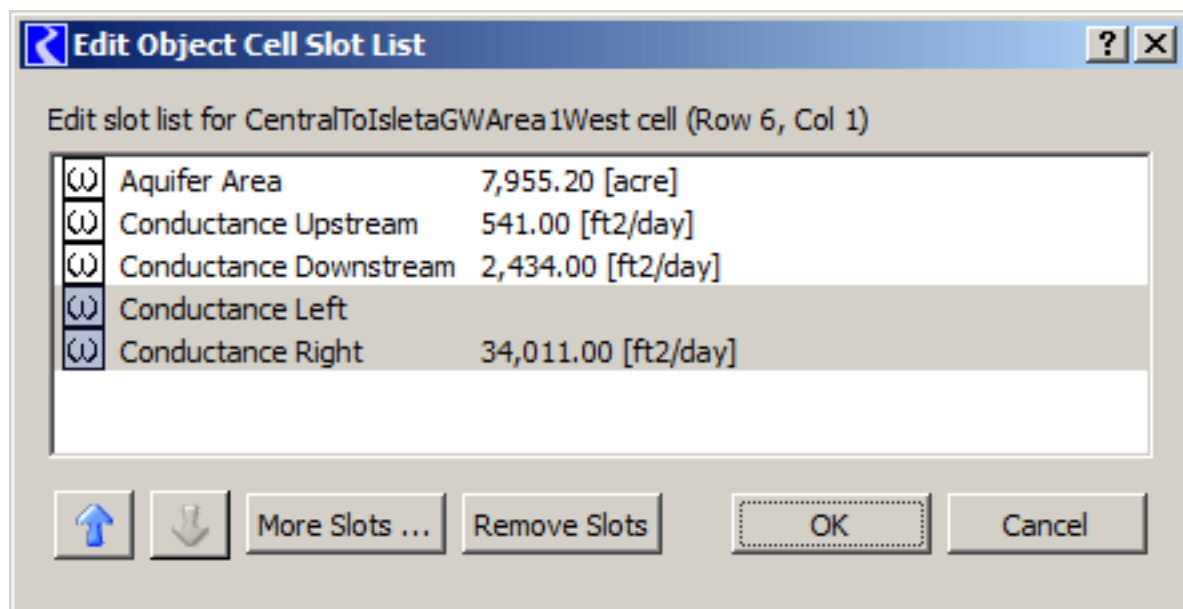
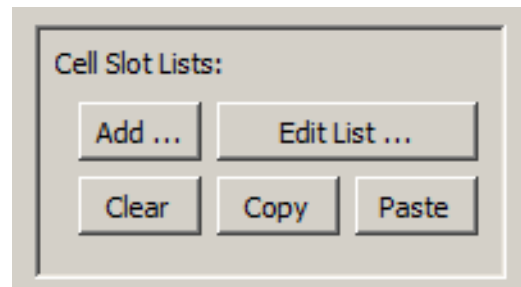
The four **arrow buttons** shift the set of selected *defined* cells one position in the indicated position. Each button is independently enabled based on the set of selected defined cells not already being up against the “edge” of the grid (in the direction of the arrow).



### 3.3 Cell Slot List Configuration

The “Cell Slot Lists” configuration controls are enabled only when the current cell selection contains at least one defined cell (having an associated simulation object). The “Add ...”, “Edit List ...” and “Copy” buttons are enabled only if *exactly one* defined cell is selected. The “Clear” and “Paste” buttons can be applied to multiple selected cells in a single operation.

The “Add ...” (slots) button is actually a shortcut. Clicking it shows the “Edit Object Cell Slot List” dialog (see below) -- as does the “Edit List ...” button -- and automatically presses the “More Slots ...” button in that dialog to bring up the Slot Selector dialog.

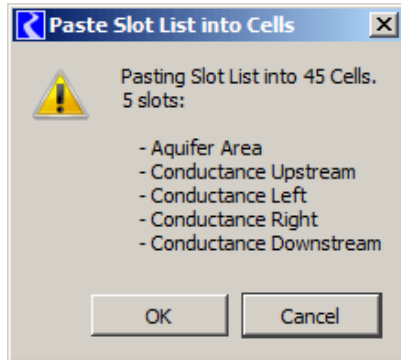


The **Edit Object Cell Slot List dialog** *tentatively* edits the slot list for a single cell. As mentioned above, its “More Slots ...” button brings up the Slot Selector to pick physical scalar and table slots (including table slot subclasses, e.g. periodic slots) on the cell’s simulation object. The slot selector is limited to the object type of that slot, but it is possible to select slots on other simulation objects of that object type (e.g. on *other* reservoirs). (This is only because of the limited capabilities of the slot selector). If slots (on other objects) are selected which don’t exist on the cell’s simulation object, the slot items added to the cell will be disabled (gray).

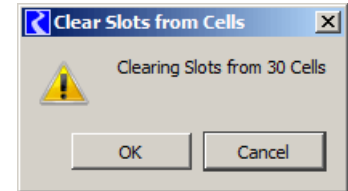
The “Remove Slots” button and the **up and down arrow buttons** operate on the slots selected within the list.

The revised slot list is applied to the cell only if the “OK” button is clicked. Clicking the “Cancel” button dismisses the dialog without applying the revised slot list to the cell.

Returning to the SCT object grid configuration controls, the “Clear”, “Copy” and “Paste” buttons operate on the set of selected defined cells.



The “**Clear**” button removes the slot lists from the selected cells. If more than one cell is selected, the user is queried for permission to proceed.

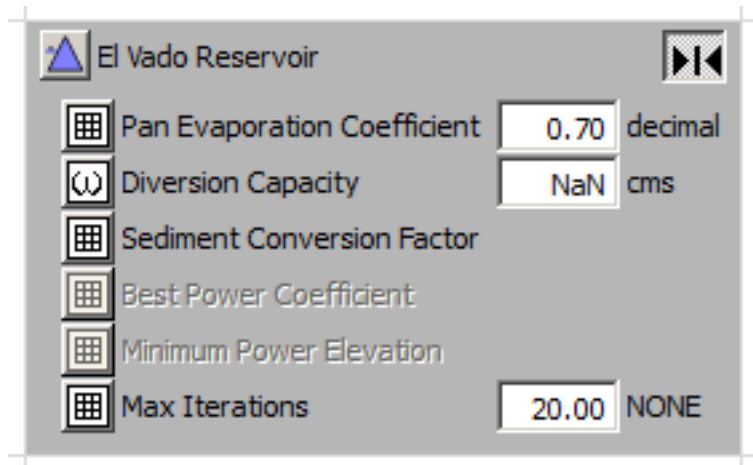


The “**Copy**” button is enabled when a single defined cell is selected. Clicking “Copy” copies the selected cell’s slot list to the **Slot Clipboard**. (There is no visual indication that anything has happened). Note that the Slot Clipboard is assigned a slot list *also when* a the user completes an edit with the Edit Object Cell Slot List dialog.

The “**Paste**” button pops up a dialog showing the number of selected cells and the list of slots in the Slot Clipboard (see above). Actually, only the *first eight* slots are listed, but the total number of slots in the clipboard is indicated. Clicking “OK” causes the selected cells’ slot lists to be replaced by the slot list from the Slot Clipboard.

Slots will appear in a cell in basically three different ways.

1. Slots which don’t actually exist on the cell’s simulation object will be shown as disabled (in grey).
2. Table slots having more than one cell will be shown with an active “slot icon button”, but will not be shown with any numeric values.
3. Scalar slots and single-cell table slots will be shown with an active “slot icon button” and with an editable numeric value (and unit specification, if those are turned on in the dialog).



When slots are added to a cell, the cell is automatically “opened” -- i.e. set to show slots.

## 4.0 Cell Operations

Each cell has three different types of buttons:

1. **Object Icon button** -- shows the Open Object dialog for the cell's simulation object.
2. **Slot Icon button** -- shows the Open Slot dialog for a slot on the cell's simulation object. This button will not be enabled if such a slot doesn't actually exist on the object.
3. **Open / Close toggle button** -- shows or hides the cell's slots. This action is applied to all selected cells -- not just the cell containing the button being clicked.



Click to open cell, and other selected cells.



Click to close cell, and other selected cells.

For the purpose of opening and closing multiple cells, it is useful to notice that whole rows or whole columns can be selected by clicking in -- *or dragging along* -- the row or column header. Also **all cells in the grid** can be selected by clicking in the square between the row and column headers in the *upper-left corner* of the grid.

The left screenshot shows a grid of 14 rows and 2 columns. The right screenshot shows the same grid with the 'Open' button clicked, revealing the 'SanFelipeToCentralGWArea1West' object details.

	1	
1	CochitiToSanFelipeGWArea1West	Co
2	CochitiToSanFelipeGWArea2West	Co
3	SanFelipeToCentralGWArea1West	San
4	SanFelipeToCentralGWArea2West	San
5	SanFelipeToCentralGWArea3West	San
6	SanFelipeToCentralGWArea4West	San
7	CentralToIsletaGWArea1West	Cen
8	CentralToIsletaGWArea2West	Cen
9	IsletaToBernardoGWArea1West	Isle
10	IsletaToBernardoGWArea3West	Isle
11	IsletaToBernardoGWArea5West	Isle
12	BernardoToSanAcaciaGWArea1West	Ber
13	SanAcaciaToSanMarcialGWArea1West	San
14	SanAcaciaToSanMarcialGWArea3West	San

The right screenshot shows the details for the 'SanFelipeToCentralGWArea1West' object:

	1	
1	CochitiToSanFelipeGWArea1West	Co
2	CochitiToSanFelipeGWArea2West	Co
3	SanFelipeToCentralGWArea1West	San
4	SanFelipeToCentralGWArea2West	San
5	SanFelipeToCentralGWArea3West	San
6	SanFelipeToCentralGWArea4West	San

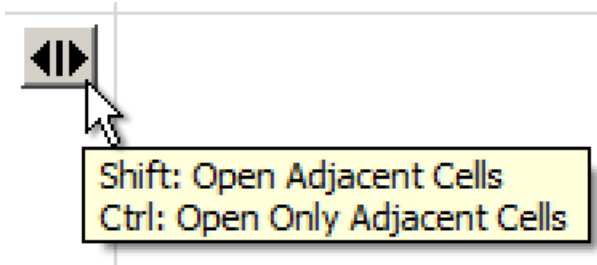
Details for SanFelipeToCentralGWArea1West:

	1	
1	CochitiToSanFelipeGWArea1West	Co
2	CochitiToSanFelipeGWArea2West	Co
3	SanFelipeToCentralGWArea1West	San
4	SanFelipeToCentralGWArea2West	San
5	SanFelipeToCentralGWArea3West	San
6	SanFelipeToCentralGWArea4West	San

Details for SanFelipeToCentralGWArea1West:

	1	
1	CochitiToSanFelipeGWArea1West	Co
2	CochitiToSanFelipeGWArea2West	Co
3	SanFelipeToCentralGWArea1West	San
4	SanFelipeToCentralGWArea2West	San
5	SanFelipeToCentralGWArea3West	San
6	SanFelipeToCentralGWArea4West	San

**Shifted** and **Control-clicked** operation of the Open / Close toggle button have special behaviors. They both open up the clicked cell and its four immediate neighbors. The Control-clicked operation also closes *all other* cells.



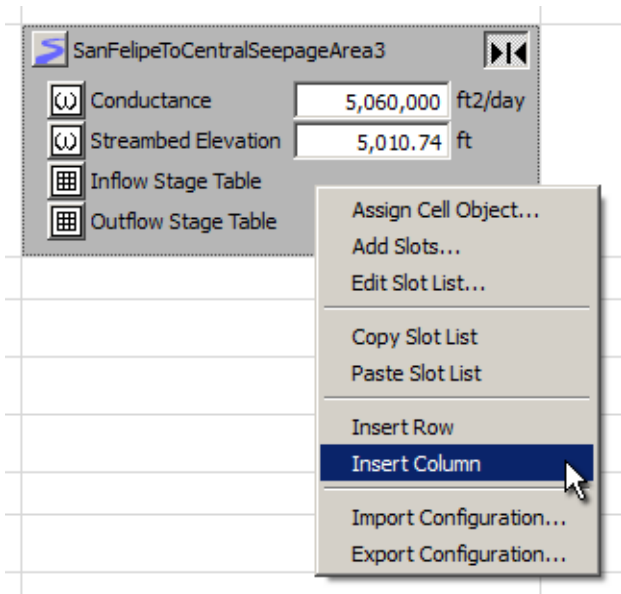
SanFelipeToCentralGWArea1West	SanFelipeToCentralGWArea1River	SanFelipeToCentralGWArea1East
SanFelipeToCentralGWArea2West	SanFelipeToCentralGWArea2River	SanFelipeToCentralGWArea2East
SanFelipeToCentralGWArea3West	SanFelipeToCentralGWArea3River	SanFelipeToCentralGWArea3East
SanFelipeToCentralGWArea4West	SanFelipeToCentralGWArea4River	SanFelipeToCentralGWArea4East
CentralToDeltaGWArea1West	CentralToDeltaGWArea1River	CentralToDeltaGWArea1East
CentralToDeltaGWArea2West	CentralToDeltaGWArea2River	CentralToDeltaGWArea2East
CentralToDeltaGWArea3West	CentralToDeltaGWArea3River	CentralToDeltaGWArea3East
CentralToDeltaGWArea4West	CentralToDeltaGWArea4River	CentralToDeltaGWArea4East
DeltaToBernardoGWArea1West	DeltaToBernardoGWArea1River	DeltaToBernardoGWArea1East
DeltaToBernardoGWArea2West	DeltaToBernardoGWArea2River	DeltaToBernardoGWArea2East
DeltaToBernardoGWArea3West	DeltaToBernardoGWArea3River	DeltaToBernardoGWArea3East
DeltaToBernardoGWArea4West	DeltaToBernardoGWArea4River	DeltaToBernardoGWArea4East

#### 4.1 Cell Context Menu

Right-clicking in a cell shows the illustrated context menu. All of the operations except the last two are redundant with buttons in the “Configure” panel above the grid, described above.

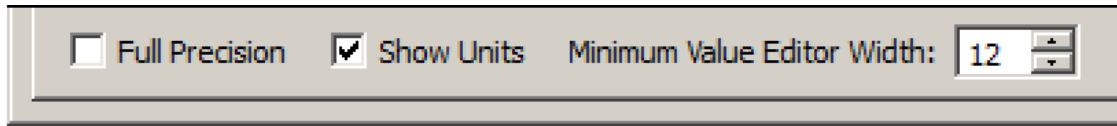
The “**Import Configuration ...**” and “**Export Configuration ...**” operations read or write the whole object grid’s configuration from, or to, an external file. (The file is an XML text file). This can be used for moving Object Grid configurations between different SCTs.

Clicking on these two context menu items brings up a file chooser for reading or writing, from which the user may cancel the operation. When *importing*, the current object grid configuration is entirely replaced with the imported configuration.

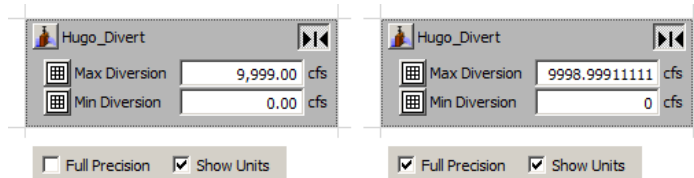


## 5.0 Display Settings

Controls along the bottom of the Object Grid tab modify the data display.



The “**Full Precision**” checkbox switches between configured display attributes (e.g. a particular number of fractional decimal digits) and “full precision”, showing the number of fractional digits necessary to precisely represent the internal floating-point numeric value. (“Full Precision” is also shown automatically when a cell value is edited).



The “**Show Units**” checkbox shows or hides the unit indication presented with each slot value. When units are hidden, they are available as a “tooltip” on the value editor (see bottom-right screenshot).

The “**Minimum Value Editor Width**” spinbox sets the width of slot value editors to insure visibility of the specified number of characters. The supported range is 5 to 22. The default is 14.

Note [11-19-2011]: As currently implemented, these display settings do not persist in the Object Grid configuration. But their *state* does reside in that data structure; all that’s needed for persistence is inclusion in the Object Grid configuration XML serialization.

--- (end) ---

