OLGA®

_RELEASE **NOTES**

VERSION 7.2

be dynamic®

SPT GROUP

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About this Release

Features included in this release

The main development for OLGA 7.2 has been the following features:

- New Shut-in functionality. *Read more…*
- Model changes for entrainment of liquid droplets in gas. *Read more...*
- Improved simulation speed and stability. *Read more…*
- Improved OLGA HD. *Read more…*
- A variety of changes to the OLGA GUI. *Read more…*
- A well editor to enter the well trajectory, completion and reservoir inflow details. *Read more...*
- A new well library in the Well editor. *Read more…*
- Improvements to the OPC server. *Read more...*
- Twin screw multiphase pumps. *Read more...*
- Standing valve is added as new model in the VALVE keyword. *Read more...*
- Numerous error fixes. *Read more…*

Licence information

- As of OLGA 7.2 you will not need any additional license to run the Well editor. Note however that if you activate functionality in the Well module, you are not able to run the generated OLGA cases.
- A separate license file for the use of Compositional Tracking is now installed as part of the SPT License Handler. The license is checked each time a case which uses Compositional Tracking, is started.

- The license handler could in some situations not be uninstalled. A window without an error message was displayed and the uninstalling stopped. You had to replace a dll file in the SPT Group\FlexLM folder. This is fixed for all future license handler installations. To install the latest version of the license handler (which is also digitally signed), you must uninstall the existing license handler installation via Control Panel - Programs and Features (Windows 7) or Control Panel - Add/Remove Programs (Windows XP). (OLGA-12363)

Forward compatibility

Cases built with OLGA 7.2 cannot be imported into previous version of OLGA without manually editing the *.key file. See the FAQ on the OLGA support center for more information.

Disclaimer

Every effort has been made to supply complete and accurate information, however the information in this document is subject to change without notice. SPT Group assumes no responsibility for any errors that may occur in the documentation. Please contact olgasupport@sptgroup.com if you have any questions.

Shut-in enhancement

SHUTIN keyword available

The keyword SHUTIN is now available as an FA-model in FLOWPATH and can be selectively active/inactive in both time and space. When this keyword is active, the numerical scheme is altered to better represent the situation of no-flow and high hold-up gradients. In addition, the flow regime is fixed to stratified/annular and droplets will settle (no entrainment).

Modified Interface Level Gradient term

The Interface level gradient term in the momentum equations has been adjusted to be more consistent with the pressure gradient term. This may lead to more stable solutions in situations with no flow (typically shut-in scenarios with horizontal pipes). (OLGA-07114)

Entrainment of liquid droplets in gas

Improved model

The model for entrainment of liquid droplets in the gas is improved.

- The scaling with pipe diameter (D) is changed from (0.1/D) to (0.1/D)**0.7.
- The amount of droplets entrained is made dependent on the pipe inclination.
- The three phase treatment is changed. In the new model, the computation of the total amount of liquid droplets entrained in the gas is based on all liquid available (water + hydrocarbon). Then, the total computed entrainment is distributed on oil and water droplets according to the water cut. Finally, the amount of water droplets is reduced based on a simplified model for the amount of water dispersed into the oil layer. If no oil layer exists, the amount of liquid in the water layer is used.

The model changes will have the following expected effects on the predictions:

- OLGA 7.2 will predict more entrainment of liquid droplets for larger pipe diameters than OLGA 7.1.4, leading to lower liquid loading. The effect is stronger for higher flow rates.
- OLGA 7.2 will often predict a larger amount of water droplets in the gas than OLGA 7.1.4, leading to a lower liquid loading. The changes may be significant for cases with a thin condensate/oil layer on top of a thicker water layer, but almost negligible in other cases.
- OLGA 7.2 typically predicts the same liquid accumulation point as OLGA 7.1.4

See also the *Entrainment of liquid droplets in gas.pdf*, included in the Documentation folder in OLGA.

OLGA HD

OLGA HD stratified flow model

The OLGA HD module features the *OLGA HD stratified flow model*. This flow model is based on developments in the joint industry projects HORIZON I & II and covers stratified and large wave

flow regimes. The model is developed to provide more consistent, scalable and accurate predictions of pressure drop and holdup for systems dominated by these flow regimes.
OLGA HD applies a parameterized 2D velocity distribution to obtain frictions and velocity shape factors in the cross section. Combining the 2D velocity distribution with the 1D conservation equations yields a 3D representation of a slowly evolving flow. The model handles 1-3 phase flow using the same generic layer model for all phases. Coupling the layers yields a full three-phase model comprising a 3D flow description at 1D evaluation speed.
The 7.2 version of the OLGA HD Stratified Flow Model features 4 main areas of improvement:

Area 1: Improved closures for interfacial turbulence

OLGA HD has closure for interfacial turbulence (as do most CFD models). Waves are represented by a hydrodynamic roughness as in oceanographic models, however, also coupling to the liquid. The turbulence closures largely determine the outcome of the predictions. We are thus constantly working to improve these closures

Area 2: No-slip at all points across the interface

OLGA 7.2 has no-slip in all points across the interface as opposed to earlier versions which had no-slip at the walls and centre point of the interface only.

Area 3: Improved criterion for onset of laminar flow

The onset of laminar flow is now governed by the shear Reynolds numbers at the wall and interface. This secures a more correct transition to laminar flow in e.g. gravity dominated up flows where the liquid bulk velocity and corresponding Reynolds number (traditionally used for this transition) may be very low, while the flow remains to be highly turbulent.

Area 4: Improved velocity distributions

The velocity distributions in OLGA 7.2 HD are improved, removing unphysical velocity distributions occurring for high interfacial turbulence levels in gravity dominated up flows in earlier versions.

Speed enhancements

Network simulations

OLGA utilizes multi-core CPUs by distributing tasks to different CPU cores and performing them in parallel. A major improvement is made in this release: The task distribution is now performed across the entire network, whereas it used to be limited to individual branches. This leads to significantly improved multi-core load balancing and better scalability on a wider range of network cases. The effect of this work is most noticeable in networks dominated by many and short branches.
In addition, a more efficient linear solver is implemented to solve the equations in dynamic flow networks. This speed-up results in better serial (single processor) performance as well as better scalability on multi-core CPUs.

Steady state pre-processor

The majority of the computational effort in the pre-processor is spent finding solutions to the point model (frictions and volume fractions) for each section. These computations are done in parallel for all sections within a flowpath. Generally, this will lead to a significant speedup on computers with multi-core CPU's. (OLGA-11239)

Handling internal nodes for tracking components

A more efficient implementation for internal nodes when modules which track components are used (e.g. Composition Tracking, Inhibitor Tracking etc.) is developed. This may lead to improved computational speed for cases with many internal nodes and short flowpaths. (OLGA-11201)

Solution scheme in Valve

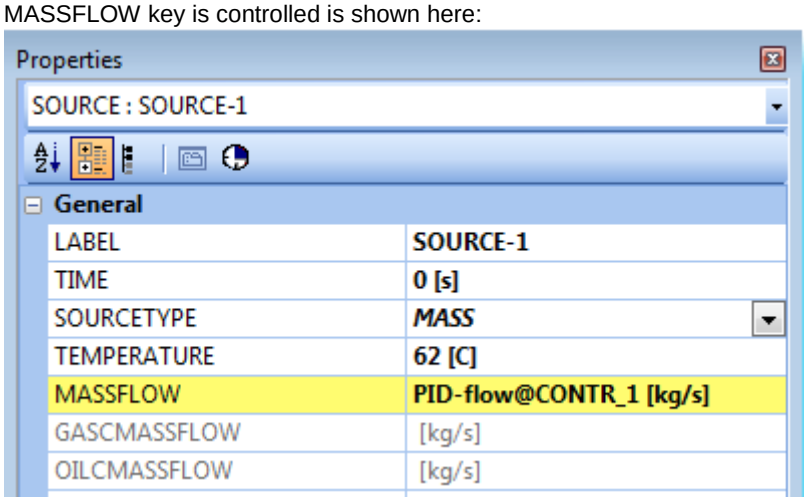
The solution scheme in Valve is improved in order to speed up simulations. The changes should not affect the simulation results nor should they affect the usability. The changes include improvements in the calculations of the sensitivities of flowrate with respect to upstream and downstream pressure, gas fraction and water fraction. (OLGA-11298)

Ability to control input keys

The input keys

You are now able to use the output value from a controller to give the value for some input keys. You connect the controller graphically or in the connection table to the key you want to define via a controller. The output value from the controller is then used directly. The unit for this value is defined in SI units (apart from Temperature, which is defined in Celsius).

The controlled key is marked with a yellow background in the Property editor. The controller label and its output signal together with the unit are displayed. An example for a source where the MASSFLOW key is controlled is shown here:



Control the HEATTRANSFER keys

You can now use an OLGA controller for the following keys for the HEATTRANSFER keyword: TAMBIENT, HMININNERWALL, INHAMBIENT and OUTHAMBIENT

Control the CORROSION keys

You can now use an OLGA controller for the following keys for the CORROSION keyword: BICARBONATE, IONICSTRENGTH, INHIBITOREFFICIENCY, WCWET, GLYCOLFRACTION and PTMAX.

Control the TUNING keys

You can now use an OLGA controller for the following keys for the TUNING keyword:

AREA, ENTRAINMENT, GROUGHNESS, LAM_LGI, LAM_WOI, OILVISC, MASSTRANSFER, OILDENSITY, ROUGHNESS, WATERVISC and WATERDENSITY.

Control the SOURCE keys

You can now use an OLGA controller for the following keys for the SOURCE keyword: TEMPERATURE, MASSFLOW, GASCMASSFLOW, WATERCMASSFLOW, OILCMASSFLOW, DGGDP, DGLTHLDP and DGLTWTDP.

Control the NODE keys

You can now use an OLGA controller for the MASSFLOW key in the NODE keyword.

OPC enhancements

TRACER keys for SOURCE exposable through OPC server

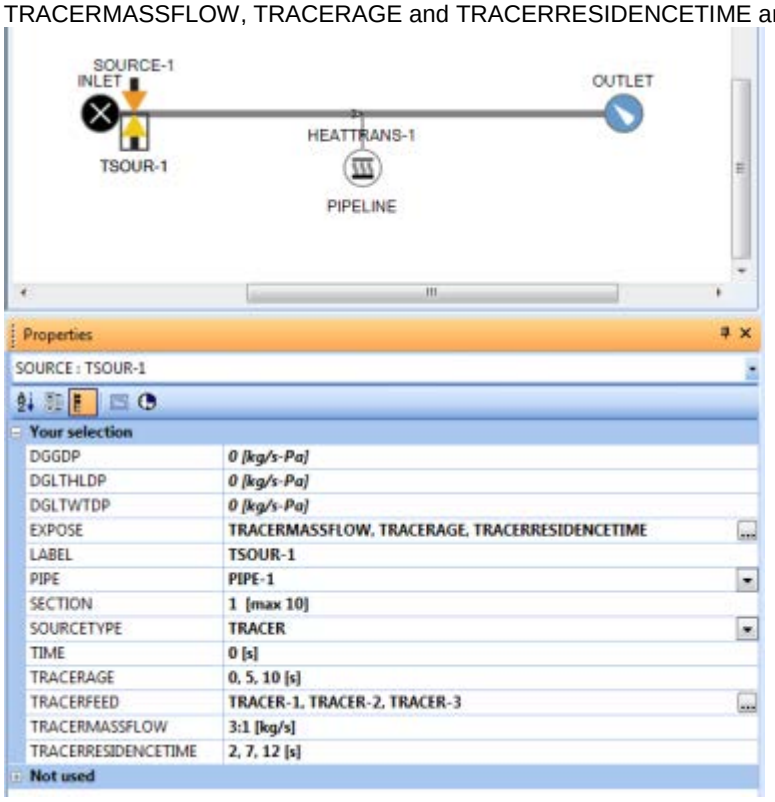
When server modus is enabled in OLGA, you can expose the TRACER keys (TRACERMASSFLOW, TRACERAGE AND TRACERRESIDENCETIME) defined in a tracer source. The keys are made available on the OPC name space with this tag pattern: <module name>.<model name>.<source label>.<key>

Several TRACER in one source

If you define a tracer key in a tracer source as a list, the resulting OPC item becomes a vector of values. The order of the values on the vector follows the same order as in the lists defined in the source.

Illustration

Below is an illustration of how to set up a tracer source with three tracers. The tracer keys TRACERMASSFLOW, TRACERAGE and TRACERRESIDENCETIME are exposed:



WELL keys exposable through the OPC server

In the WELL keyword, the following keys can be defined in EXPOSE to create input OPC tags: EXPONENTN, KPERM, HPAY, SKINS, SKIND, RESEXT, WGR, CGR and GORST

RESERVOIRINFLOW keys available with EXPOSE

A set of keys in keyword RESERVOIRINFLOW can be given as arguments to the EXPOSE key. The set matches the keys that can be used with EXPOSE in keyword WELL such that inflow zones can be used with the OLGA OPC Server too. The set of keys are:
GASFRACTION, WATERCUT, WATERFRACTION, TOTALWATERFRACTION, AINJ, BINJ, CINJ, APROD, BPROD, CPROD, INJECTIVITY, GORST, SKIND, KPERM, HPAY, SKINS, RESEXT, EXPONENTN, PRODI, CGR, WGR
Please see the document “OLGA OPC Server Guide” for general information on how to set up the OPC server, and how to create OPC tags with the EXPOSE key.

Wax

Improved model

Major improvements have been made to the Wax module. In situations of low hold-up and when you use a pig to strip the deposited wax, previous versions of OLGA could sometimes crash or show unphysical variations in the temperature.

Improvements for OLGA 7.2 have been made at all levels, including for example the following:

- User interaction: improve wax-related warning messages; disable WAXDEPOSITION option if COMPOSITIONAL is not OFF.
- Input keys: check for size consistency of table-defining keys (e.g. DISSOLPRES, DISSOLRATE and DISSOLTDIFF); disable entering a list of values for one-value variables; improve description of some input variables.
- Output plots: fix component-wise plots; fix units and labels for some output variables; avoid plotting wax-related component-wise plots for non-waxy components; make the plots of the wax-related variables consistent (e.g. PIGWXLEN, ACCPWXV and DXWX).
- Models: a large number of issues in the implementation of the models for entrainment/deposition, viscosity, mass transfer rates, wax pigging, etc. ; implementation of a global mass balance to limit the amount of mass transferred from convection, precipitation, deposition and shear.
- Code structure: improve robustness, speed and readability.
- Restart: add pig-wax variables (e.g. PIGWXLEN) to restart file. It is recommend to re-run all simulations included in a restart with OLGA 7.2.

The result is a more robust wax module.

Bornemann pump available

Description

The Bornemann pump can now be used in OLGA with the BORNEMANNPUMP keyword. Use the Bornemann pump to increase the flow rate in the pipeline, typically if the inlet pressure of a pipeline is too low to drive the fluid to the outlet of the pipeline, or if you want to increase the oil production. With the Bornemann pump, you can rigorously model the transient operation of a particular multiphase Bornemann twin-screw pump. OLGA calculations are based on specific data from the manufacturer for each pump model type. Read more in the Model descriptions in the User manual.

Note: Access to this functionality requires the Multiphase Pump Module.

Additional hydrate file information

Description

OLGA now reads temperature and pressure information in 3 different formats in the hydrate file. These are the formats:

1. Temperature (C) Pressure (bara)
2. !Temperature/°C Pressure/bara
3. Temperature Pressure
_C bara

(OLGA-10238)

Compositional Tracking recovery

Activate/deactivate Recovery mode

In order to make simulations with Compositional Tracking more robust, a Recovery mode is introduced. You can now activate and deactivate Recovery mode by setting RECOVERYMODE to ON or OFF. If you set the key to ON, OLGA attempts to recover if it encounters a problem in the flash calculations. If the flash fails, OLGA attempts to recover following this procedure:

1. OLGA switches to classic mixing if Heuron&Vidal mixing is applied. Then OLGA reruns the flash.
2. If the flash still fails, initial guesses about flash mole-fractions are removed.
3. OLGA reruns the flash.
4. If the flash still fails, the level of flash is lowered to SIMPLIFIEDTHREEPHASE and/or TWOPHASE (water inert).

Note that the new settings for the flash calculations are not retained after the recovery from the failed flash. OLGA proceeds with original settings after the recovery. The accumulated number of recoveries in a simulation is logged at the end of the simulation in the output file. It can also be plotted using the ACCRECOVERIES output variable during a simulation. (OLGA-10807)

Mass of pig in momentum calculation

Description

The pig mass is now used in the momentum calculation. This causes a heavy pig to accelerate longer.

Note: When a pig is inserted into a pipeline, it obtains the velocity of the fluid. Thus, there is no acceleration effect just after the pig is inserted. (OLGA-10497)

Standing valve

New model in VALVE keyword

Standing valve in combination with back pressure valve is added as new model in the VALVE keyword. A standing valve opens when the pressure upstream of the valve is larger than the downstream pressure. Otherwise, it is closed. An optional back pressure valve opens when the pressure upstream of the allowed flow direction is larger than the downstream pressure by a set value, otherwise, the valve is closed. Furthermore, counter-current flow between the phases is not allowed.

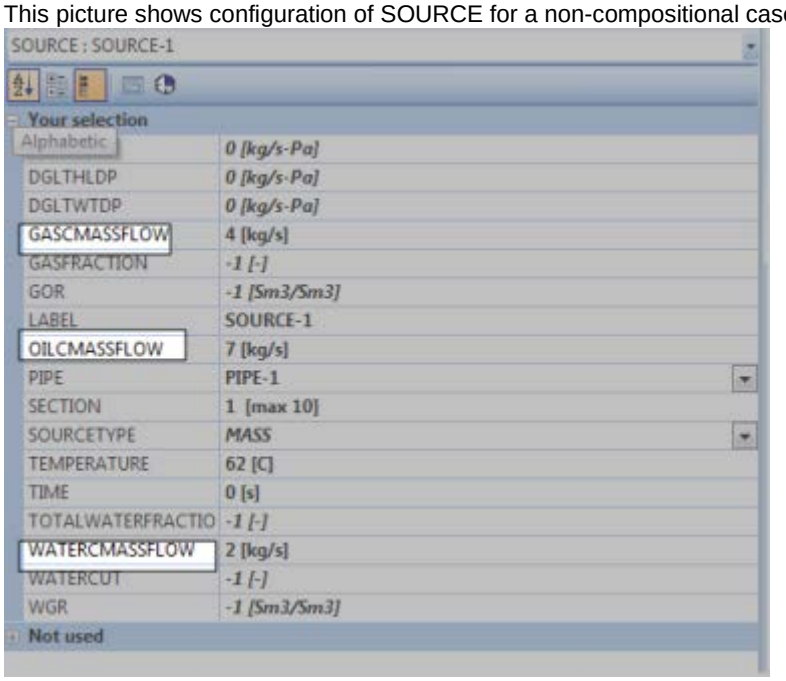
SOURCE accepting phase-wise massflows

Description

You can now use the new keys GASCMASSFLOW, OILCMASSFLOW and WATERCMASSFLOW to set the massflow for each phase separately in the SOURCE keyword.
This can typically be used for cases with crossflow - for example when gas flows out of source while oil and water flows in.

Illustration

This picture shows configuration of SOURCE for a non-compositional case:



Cases with compositions

- When a key name includes the letter C, you can give a composition through the key. See illustration above with highlighted rows.
- The elements of the vector value must be the massflow (restricted to the phase) for the components of the composition.
- The order of the elements must follow the order of the component in the composition:
  - For inhibitor: Hydrocarbon (1) , H2O (2) , inhibitor (3)
  - For Compositional Tracking.: same order as in *.ctm file
  - For Blackoil: H2O(1), BO-gas(2), BO- oil(3)
  - For drilling fluids: Hydrocarbon(1), H2O(2), MEG(3), GASMUD(4), OILMUD(5), CUTTING(6)

Set rotational speed on pumps

The key PREFSPEED is now available for the ESPUMP. With this key, you can set the preferred rotational speed of a pump. This overrides any speed given in the pump description file. If you set the PREFSPEED key, the pump also runs when no signal is connected.

Specify ESPUMP in Property editor

In prior OLGA versions, the speed of an ESP pump was only given via choice of pump model.

It is now possible to ignore these settings, and prescribe the speed in key PREFSPEED. The value is a vector, allowing for time-variation, and thus you must also fill in key TIME. The new ESPUMP keys PREFSPEEDand TIME are optional. When PREFSPEED is given, it is not necessary to connect a controller to the pump's SPEEDSIG signal terminal. Still, if a speed signal is connected, then this value is taken as a multiplier, so that the pump speed is equal to the product of the speed signal and the PREFSPEED. Typically the value of the signal will be in the range (0, 1), but also values greater than 1 can be used. A negative signal value is treated as 0, and hence will stop the pump.

New binary and unary functions and operators

The new functions

A new set of binary and unary functions and operators is now available for the algebraic controllers, extending the capabilities of signal processing in OLGA. Among the functions are: exponential, power, trigonometric, logarithmic, random, ceil, floor and sign functions. (OLGA-11888)

Ambient conditions without using AMBIENTDATA

Ambient conditions taken from largest bundle component

Previously, if you did not give AMBIENTDATA in a FEMTherm case, the ambient conditions were taken from the HEATTRANSFER keyword of an arbitrary bundle component in the solid bundle.

This is changed. Ambient conditions are now taken from the largest bundle component. This change may impact cases where there are more than one bundle component in the solid bundle, AMBIENTDATA is not given and the ambient conditions (HEATTRANSFER) specified for the pipes in the different bundle components are not equal.

A similar improvement is implemented for FLUIDBUNDLE and ANNULUS. Ambient conditions are now taken from the outermost bundle component. Earlier the ambient data from the first bundle component were used. (OLGA-12050)

Enhancements in OLGA GUI

Introduction

This section explains all the enhancements made to the OLGA GUI for this version.

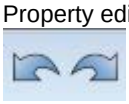
This includes:

- Undo/Redo actions
- Colour flowpaths in different colours
- Add comments to the Diagram view
- Adjustable sliding windows to interactive trend plots
- Rotate labels in the Diagram view
- Copy/paste subnetworks

Undo and redo actions in Diagram view, Model view and in the Property editor

Description

You can now undo and redo actions you have done in the Diagram view, the Model view and in the Property editor. Use these buttons to undo and redo actions:



The buttons are located in the Tools menu and in the Context menu (displayed on right-click) in the Diagram view. You can also use the shortcut keys Ctrl+Z to undo and Ctrl+Y to redo actions.

Actions to undo and redo

You can undo and redo the following actions:

- Move and re-size objects
- Add objects and keywords
- Delete objects and keywords
- Change keywords
- Change units
- Auto-arrange items
- Paste actions
- Connections
- Text changed in Comment field

You can undo all actions until you start a new operation. E.g. Do 5 actions, undo 3 of these and then do a new action. The 2 remaining actions can now not be undone.

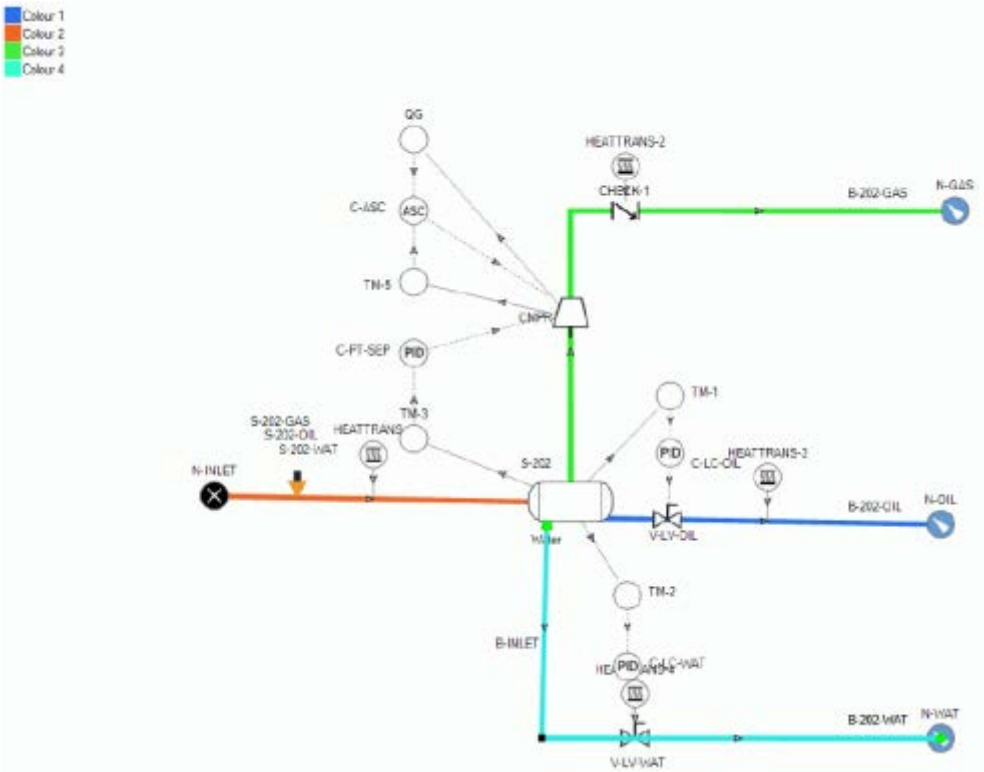
Different colours on flowpaths

Description

You can now use different colours on flowpaths. This is useful if you want to visualise separate flowing streams.

Illustration

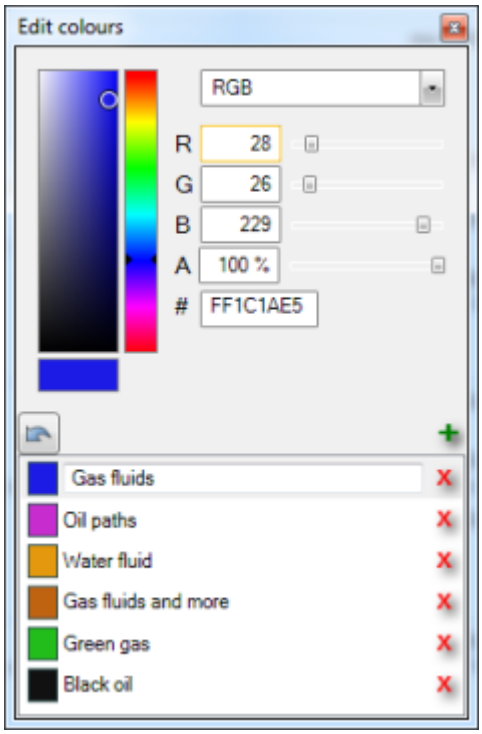
This is an illustration of a separate system with different colours for each flowpath:



Select a colour

This is how to select the colours you want to use:

1. Open the Context menu while you are positioned on a flowpath.
2. Choose **Set colours** and **Edit colours**.
3. Select the colours you want to use and click the plus ( ) sign . You can also type in the RGB value instead of selecting a colour:



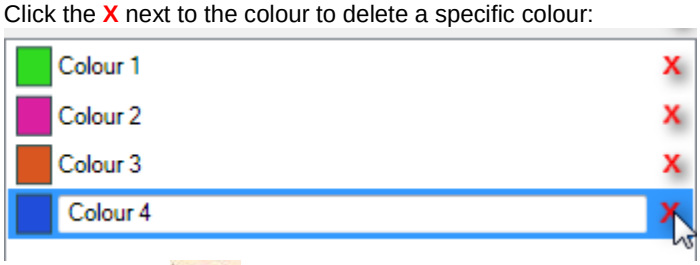
4. Enter a unique name for the colour you selected.

The **Set colours** menu is displayed with the selected colours.

4. Click the colour you want to use for a flowpath.

Delete colours

Click the **X** next to the colour to delete a specific colour:



Click the arrow  to discard all your latest changes.

Show legend

Click **Show legend** to view the colours used on the flowpath canvas.

Note: The selected colours are saved in the case file and in the central settings file and can be used for other cases.

Add comments in Diagram view

Description

A *comment* field is added to the Results and Comments section on the Components bar. In this field, you can enter user defined text and links to external pages (URLs) as well as paste in formatted text with images from other editors in the Diagram view. This makes it easier to save important information with the case input.

Add a comment

1. Select *Comment* in the Result and Comments section in the Component bar:

2. Drag the *Comment* field anywhere in the Diagram view.
3. Enter comments, URLs or paste in content from the clipboard in the text field. Note that **Ctrl+V** cannot be used. Choose **Paste** from the Context menu instead.
4. Resize and position the text field by dragging the field frames.
5. Minimize the comment with a double-click in the header bar. Double-click to restore.
6. Click **Save**. The position, size and comments are saved in the case file and restored when the case is reopened.

Formatting

These are the formatting options available for the comments:

- **Ctrl+I** - Italic
- **Ctrl+B** - Bold
- **Ctrl+U** - Underline
- **Ctrl+A** - Select all
- **Ctrl+Z** - Undo
- **Ctrl - End** - End of text

- **Ctrl+Home** - Beginning of text
- **Delete**.- Deletes highlighted text
- **End** - End of line
- **Home** - Beginning of line

You can only use one set of formatting on the comment text. To use more formatting, you must make these in MS Word and paste this text into the *Comment* field.

Context menu options

These are the option available when you open the Context menu by right-clicking in the **Comment** window:
Copy - Copy the comments you have entered.
Paste - Paste in text, URLs or formatted text with images from other sources.
Minimise - Minimise the comment to a yellow icon. Double-click the icon to re-open it.

Adjustable sliding window in interactive trend plots

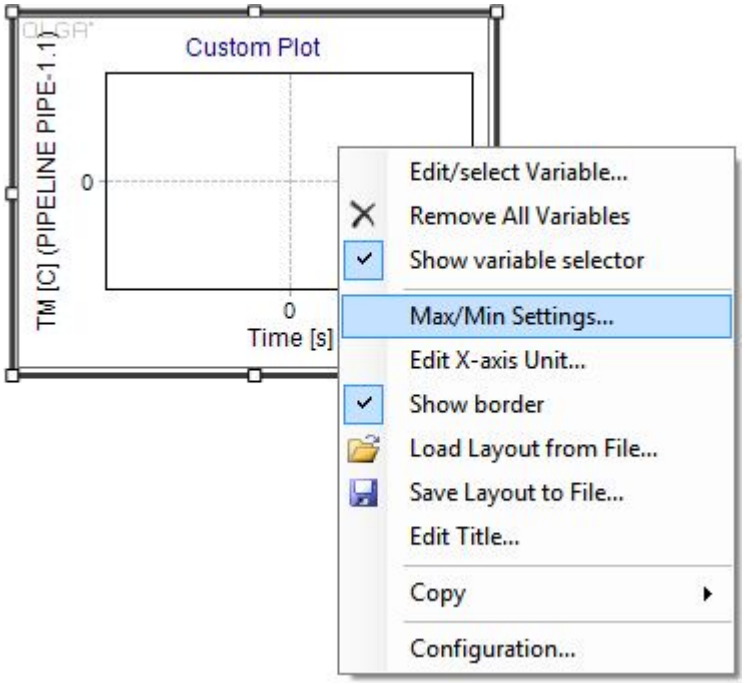
Background

If you run a long simulation in OLGA with interactive plotting of trend variables, the increasing amount of plot data-points will eventually slow down the plot update resulting in a longer simulation time. With the new adjustable sliding plot window the number of data points is reduced. This gives a predictable and constant plot update time.

Note: Sliding window is enabled as default in interactive window simulation plots with a time span of 3600s (1h)

Description

Adjustable sliding window functionality can be used on the horizontal (time) axis of **interactive trend plots** in OLGA. To define a sliding window select the menu item *Max/Min Settings..* in an interactive trend plot context menu:



You define the sliding window setting for a plot in the *Time axis sliding window* section.

Note

- Windowing is only available for interactive trend plots.
- Changes are **only** submitted when you click **Ok** or **Apply**.
- The sliding window settings for a plot are saved to the case file.

Explanation of fields

Activate
Select this check box to enable the sliding window in current plot.

Span
This field is only accessible when *Activate* is selected. In this field, you define the width of the window used on the horizontal axis, given in the horizontal axis unit.

For example: If you specify a sliding window span to be 1000s and the simulation has run for more than the given time span, data points are removed at start to allow place for the new data points. This reduces the amount of points to be updated in the plot.

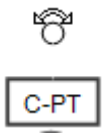
Use this setting for all plots in case
Select this check box to force all plots in this case to use the current sliding window setting. All new interactive trend plots are also initialised with this setting. Note that you can still change the setting locally: Define the local setting, clear *Use this setting for all plots in case* and submit change by clicking **Ok** or **Apply.**

Rotate labels in the Diagram view

Description

You can rotate the labels you have used in the Diagram view, for example for nodes and flowpaths. This is how you do it:

1. Mark the relevant label. A rotation wheel is displayed above the label:



2. Left- or right-click the mouse pointer and drag the wheel in the direction you want to set the label. Note that you can undo and redo the label editing.
3. Save the case.

Note: The label rotation setting is saved in the case file.

Copy and paste sub-networks

Description

It is now possible to copy and paste sub-networks. Select one or more graphical items to copy. The shortcut keys **Ctrl+C** and **Ctrl+V** may be used. The connections shared between the selected objects are also copied but may need to be edited with reference to the main model.

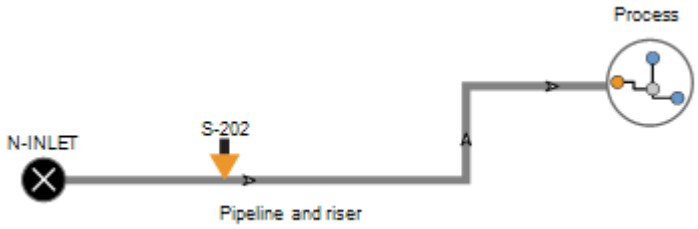
New Group view available

What is a Group view?

A Group view is a subgroup to a model made in the Home view. You use this functionality to build up cases with assembled networks by connecting flowpaths to and from the main model.
Using Groups does not affect or change the modelling engine in any way. Rather, it provides a proper method of organising large networks into workable sections.

Illustration

This is an illustration of a main model in the Home view which has a connected Group model:



Make a Group view

To create a Group view, you must select a Group component and then open the Group view. You can add any component from the Components bar onto a Group view and connect the components in the same manner as on the Home view. You can also add components which are only used as visual elements, for instance the *Comments* field, plots, values, etc. You can also copy and paste components and sub-networks from the Home view into the Group view and vice versa. You can rename the Group to any user defined text and add groups within groups.

Note: When you close the Group view, only the view is closed. The information is kept and accessible from the Model view.

You can copy components between different groups. The copied object is defined with the owner ID of the Diagram view where it is pasted.

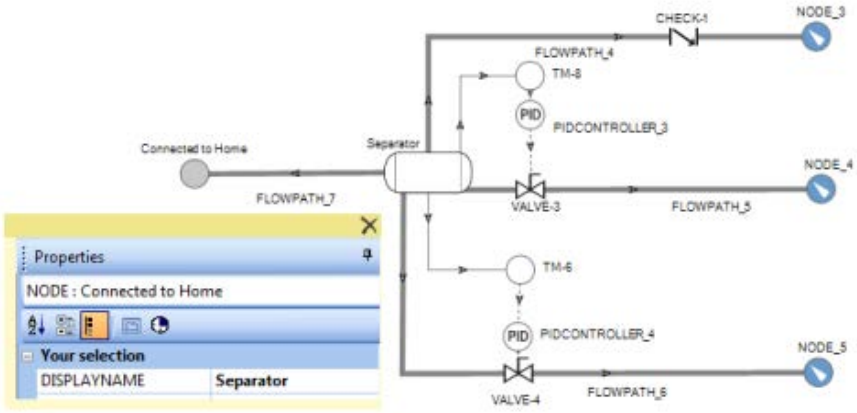
Expose Group view nodes in the Home view

You expose nodes from the Group view in the Home view by creating a network inside the group with minimum one internal node set with a property value in DISPLAYNAME.
The exposed node can be connected to an element in the main model on the Home view, such that a hydraulic connection is created between the Home view and the group.

Note: You can only delete the DISPLAYNAME and change the node type when the node is not connected.

Example

Below is an example where the flowpath in the Home view is connected to the internal node, using the DISPLAYNAME.



Show/hide objects in Diagram view

Description

You can now choose to show or hide visual objects in the Diagram view with the new command **Filter layout**, which is added to the Context menu.

Show/hide objects

This is how to show or hide objects in the Diagram view:

1. Right-click the marker while placed on a visual object in the Diagram view.
2. Select the **Filter layouts** command.
3. Select:
   a. **Signal lines** to show/hide all signal lines.
   b. **Flow and Process** to show/hide all flow components and process equipment apart from transmitters.
   c. **Instrumentation** to show/hide all controllers, signal lines and transmitters.
   d. **Heat transfer** to show/hide all heat transfer conditions.
   e. **Tuning and corrosion** to show/hide all tuning and corrosion objects.
   f. **Comments** to show/hide all comments.
   g. **Plots** to show/hide all plots and values.
   h. **Labels** to show/hide all labels.
   i. **User defined** to show/hide all objects added to a user defined layout filter.
4. To show/hide all filters simultaneously, select **Show all**.
5. Save your settings with the **Use filters** command.

Note: If you hide an object and then add an object of the same type, all the objects of the same type are displayed.

Make user defined filters

This is how you make user defined filters:

1. Select the **User defined filter** command under Filter Layout menu.
2. Choose **Add selected to filter** to add all selected objects to the user defined layout filter.
3. Choose **Add all of selected type to filter** to add all objects that equals the selected objects type to the filter. Note that only on object can be selected to access this item.
4. Choose **Clear filter to clear** the user defined filter.

Note: All objects are added to the same layout filer and the content of the user defined layout filter is case specific.

Refresh filters

This is how to refresh the filter settings if you have made changes:

- Deactivate and activate the **Use filters** command.
- Change the view you are currently in. For example from Home view to Group view.

More keywords available from components

Introduction

You can now add the keywords HEATRTRANSFER, CORROSION and TUNING to the **Diagram view**.

Description

- These keywords do not have a position and will automatically be placed in the middle of the flowpath.
- Use the **Use filters** option in the **Filter layout** menu item to show/hide the keywords.
- When you hover over these keywords, a tool-tip with positional information is displayed.
- You can only have one CORROSION item per flowpath.

Enhancements in the Well editor

This section explains all the enhancements made to the Well editor for this version.

This includes:

- New well library
- Various enhancements to the well trajectory, completion and reservoir inflow details

Introduction

The Well GUI is now renamed to Well editor. In this section, all enhancements made to the Well editor for this version of OLGA are described. Note that the access point to the Well editor is now via the Well editor icon on the Tool bar in the Diagram view or via an existing well case. The Well GUI templates are no longer in use.

Create dual tubing completion

Add an additional tubing

On the *Tubing & String* page you can now choose to add an additional tubing in the well. This new feature reduces the time required to create a dual tubing model with OLGA as it is now an integrated part of the Well editor.

Prerequisites

- You must select the check box Flow in Annulus on the *Case definition* page to get access to the *Dual tubing* button.
- You must select the Dual tubing option on the *Tubing & String* page to use the dual tubing.
- In order to simulate a dual tubing scenario, you must have a valid Well module licence. Without a licence, you can build the case but you will not be able to simulate.

Initial conditions for dual tubing

You can enter initial conditions for the second tubing. The data entered for the initial conditions is included in the plot to the right on the page. The entire length of both tubings must have an initial condition. The depth (in MD) for the top and bottom of the tubing is given automatically in each of the tables. You can insert additional rows in the table with the context menu (right-click anywhere in the table).

Boundary conditions for dual tubing

When adding an additional tubing, a second boundary condition tab is available on the *Boundary Conditions* page. On this tab, you specify pressure and temperature of the boundary as well as the influx fluid definition.

Note: This tab is only displayed when you choose Dual Tubing.

Offsets between the two tubings

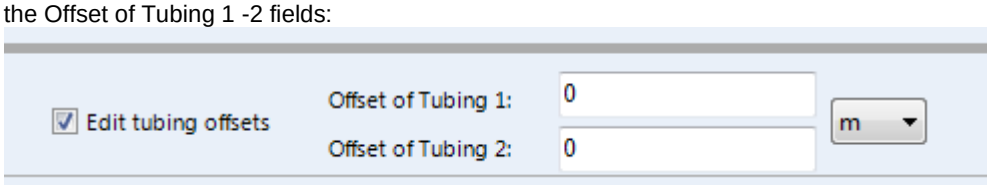
The two tubings are automatically positioned using an algorithm that takes the narrowest space along the well in consideration. This is how the offsets are calculated:

- The narrowest part of the well is determined (i.e. the position with the minimum value of inner diameter of casing - sum of outer diameters of tubings).

- If there are two tubings in the narrowest part of the well, the available spacing is equally distributed between the casing and the tubings.
- If there are two tubings and one is placed in the narrowest part (the other tubing shoe is placed higher) then this tubing is given a zero offset (concentric). The tubing placed higher will be offset to compensate for this and to avoid overlap. This algorithm does not fit all purposes and configurations and some adjustments may therefore be required when using the manual offset input.

User defined offset values

You can specify your own offset values. Select the Edit tubing offsets check box and enter values in the Offset of Tubing 1 -2 fields:



Simulation of dual tubing cases

You can simulate dual tubing cases in the OLGA model provided you have a valid license for the Well module.

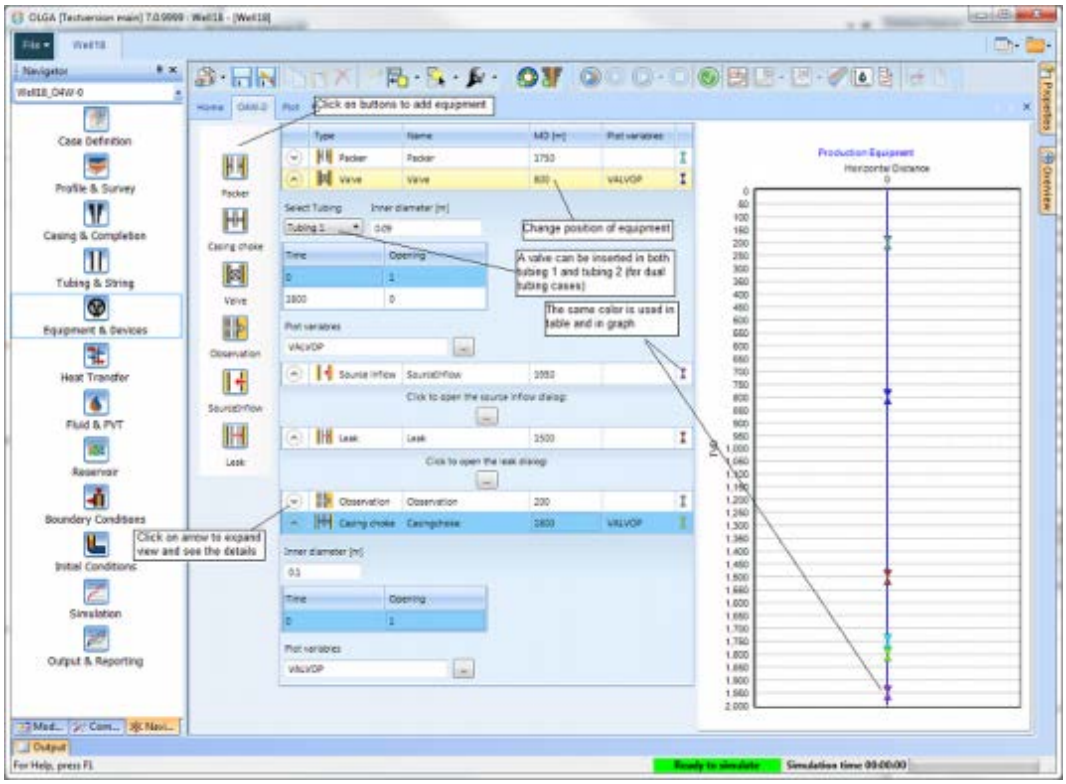
Dual tubing plotting

The plotting on the *Output & Reporting* page also supports dual tubing.

Enhancements to the Equipment & Devices page

User experience

The *Equipment & Devices* page is improved in order to enhance the user experience. These are the changes:



GLV, ICV and Plug added as equipment

You can now use gas lift valves (GLV), interval control valves (ICV) and plugs as equipment in a well. Double-click the *GLV*, *ICV* and *Plug* icons to enter details on this equipment.

Toggle between Well schematic and survey

Description

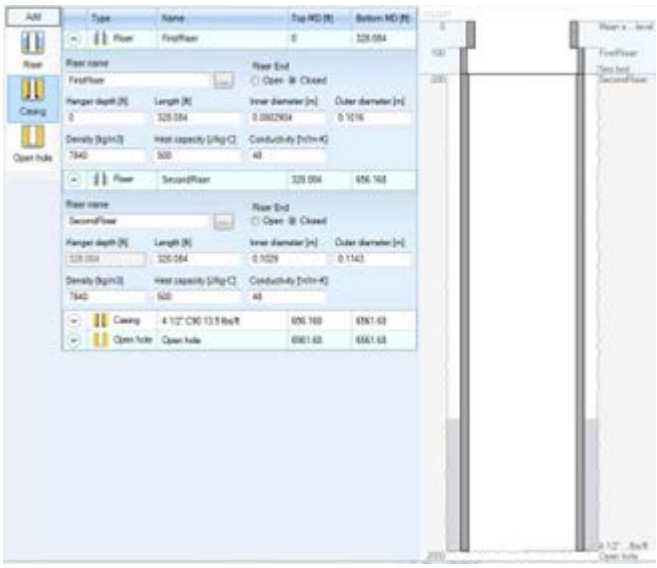
You can now view either the well schematic or the well survey on the *Equipment & Devices* page. Select either the *Well schematic* or *Survey* button located above the well schematic/survey to toggle the view:

The Casing and Completion page

Divide riser into sections

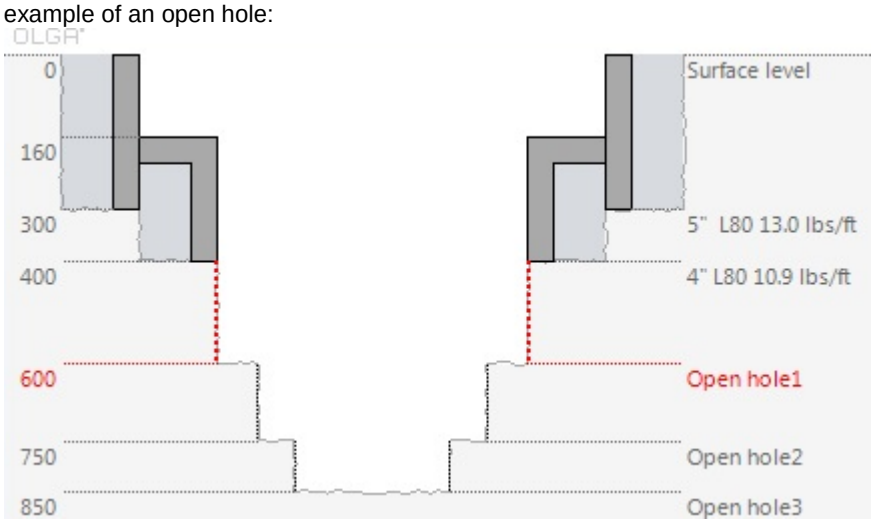
You can now divide a riser into several sections and set different diameters and material for each section. This enables you to build a more accurate model of your riser and model more accurately in terms of heat transfer between the various pipe walls, the volumes of fluids and the environment. Divide a riser by clicking the Riser icon for each section you want to add.

This is an example of a riser section definition:



Multiple open hole sections

You can add multiple open hole sections on the *Casing & Completion* page. This is useful if you want to model and account for multiple sections of open hole with varying diameters.
Add open holes by clicking the *Open hole* icon for each open hole you want to add. This is an example of an open hole:



Gravel or cement for material below fluid of casing

On the **Casing & Completion** page, you can now select between cement and gravel when you define the material below fluid for a casing. Make your choice with the *Cement* or *Gravel* buttons.

The cement and gravel properties are currently set with the following values:

	CAPACITY [J/kg-C]	CONDUCTIVITY [W/m-C]	DENSITY [kg/m3]	TYPE
Cement	2500	3	2100	SOLID
Gravel	1800	1	2650	SOLID

The Well information page

New fields

On the *Well info* page, the Case info section is replaced with the new Well info section. This section contains the following fields which allow for individual descriptions of each well:

Well - Name of the well. This is the former *Title* field.
Field - Name of the well field. This is the former *Project* field.
Information - User defined text.
Author - The user who created the well.
All these fields, apart from the *Author* field, are disconnected from OLGA in order to avoid overwriting the CASE keyword. You can now have unique case information for data in OLGA and Well editor.

The Profile & Survey page

New fields for import/export of surveys

- You can now both import and export surveys from this page. You use the *Import/Export from text file* buttons located in the top right corner of the page for this functionality.
- The import skip line functionality is replaced by the first (and last) data line functionality since it is easier to input the last data line to include rather than calculating the number of lines to skip at the end.
- You can choose to enter geometry with the *Give geometry by MD/Inclination/Azimuth* option in the Editing mode section.
- Besides the redundant points which are automatically removed, you can simplify the survey further by reducing the number in the *Number of data points actually used* field.

Improved Copy and Paste functions

The *Copy* and *Paste* functions are improved for the Well editor. These are the improvements:

- You have access to the *Copy/Paste* commands from the Context menu in any table. Note however that you cannot copy/paste in the tables on the *Equipment & Devices* and *Casing & Completion* pages.
- The *Ctrl+C* and *Ctrl+V* shortcuts can now be used in any table in the Well editor.

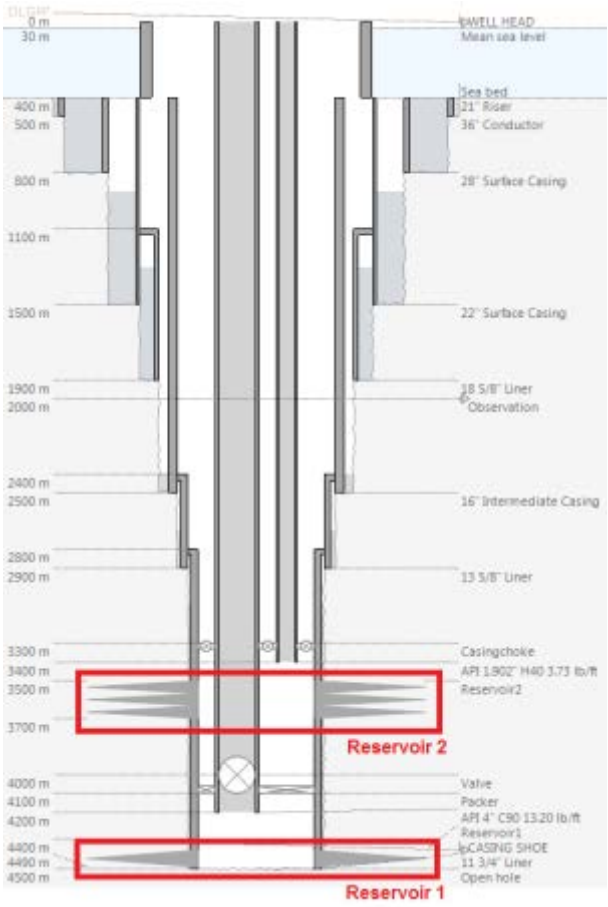
- The *Paste* and *Delete* functions in tables have improved performance.

Enhancements to the Well schematic

New options

In the well schematic it is now possible to

- view dual tubings.
- view reservoir inflow



Improved labels for materials, equipment and pipes

Material labels

The material labels generated in an OLGA model now reflect the names of Casing, Tubing Component, Formation, Drilling fluid, Cement/Gravel and Material above cement accordingly. This makes it easier to see the relationship between the Well editor model and the OLGA network representation of the model.

The OLGA network model requires walls to be defined and assigned. Each wall includes a list of material that is part of the wall. Each pipe in the OLGA model is associated with a wall and as you follow a flowpath from one pipe to another, the wall changes to account for changes in casings, tubings, cement, fluid, etc.

Identify the wall composition

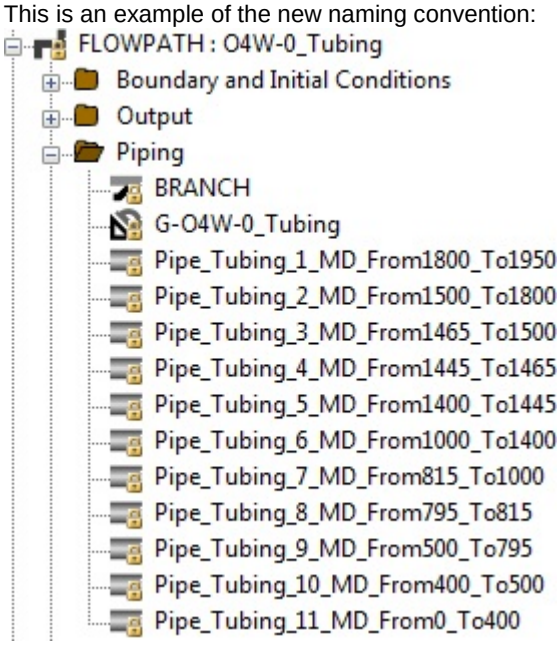
To identify the composition of a wall, you can click on the wall (in Library) to view the MATERIAL key (in the property) by hovering the mouse over the property. As shown below, a tool tip appears with a list of all the materials.

Equipment labels

The equipment label names define the labels in OLGA. For each observation point, POSITION is added (labelled by the observation name) in OLGA and this position is referred when you add output variables.
The observation points are added in the Well editor. The first is labelled Observation and the second is labelled WELLHEAD.

Pipe labels

The pipe label names are now suffixed with MD_From##_To## to explicitly tell the measured depth range in meters for each pipe.
This is an example of the new naming convention:



Input validation of Formation and Fluid outside production tubing values

Validation of input data

The values you enter in the Formation and Fluid outside production tubing sections on the *Heat transfer* page must follow predefined rules, specified below. Note that you only enter the bottom measured depth values, not top measured depth values. The following predefined rules are used to validate the values you enter:
Formation section

- The bottom measured depth must be ascending.
- The bottom measured depth of the first row must be below seabed/surface.
- The bottom measured depth of the last row must be at least equal to total depth.

Fluid outside production tubing section

- The bottom measured depth must be ascending.

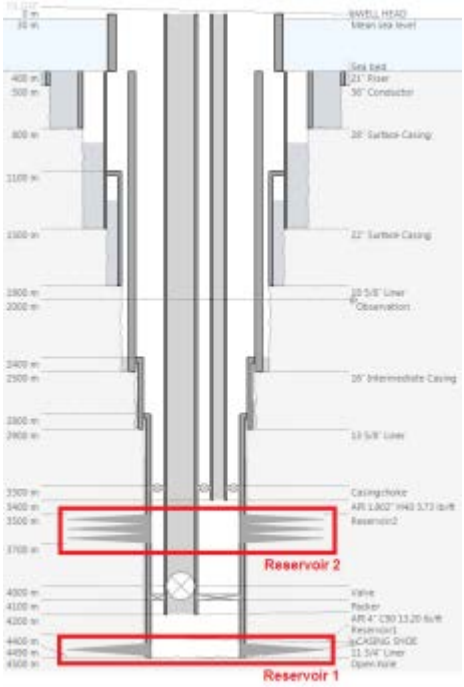
- The bottom measured depth of the last row must at least be equal to bottom measured depth of the tubing.

Improved drawing of liners and packers

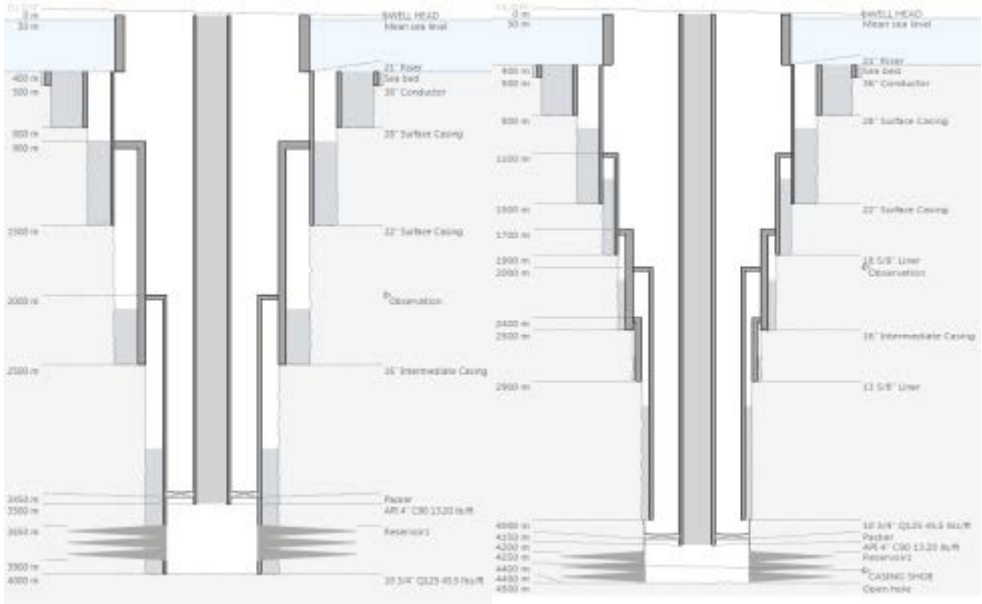
Well schematic draws casing as liner

When you define a casing with a lower starting depth than another casing, the well schematic will automatically draw the casing as a liner (with a liner hanger).

- The liner is the same as a casing, only with a starting depth not on surface (inside another casing). The liner is drawn as a casing with the addition of a hanger (not modelled and only visually in the well sketch)



- The hanger is drawn from the liner to the first casing it meets. You cannot add a liner as the outer casing (i.e. it must be inside another casing).



In addition to this, a packer inside the open hole is drawn from the tubing to the outer edge of the open hole. This was not drawn in previous versions.

Add well models to a well library

New well library

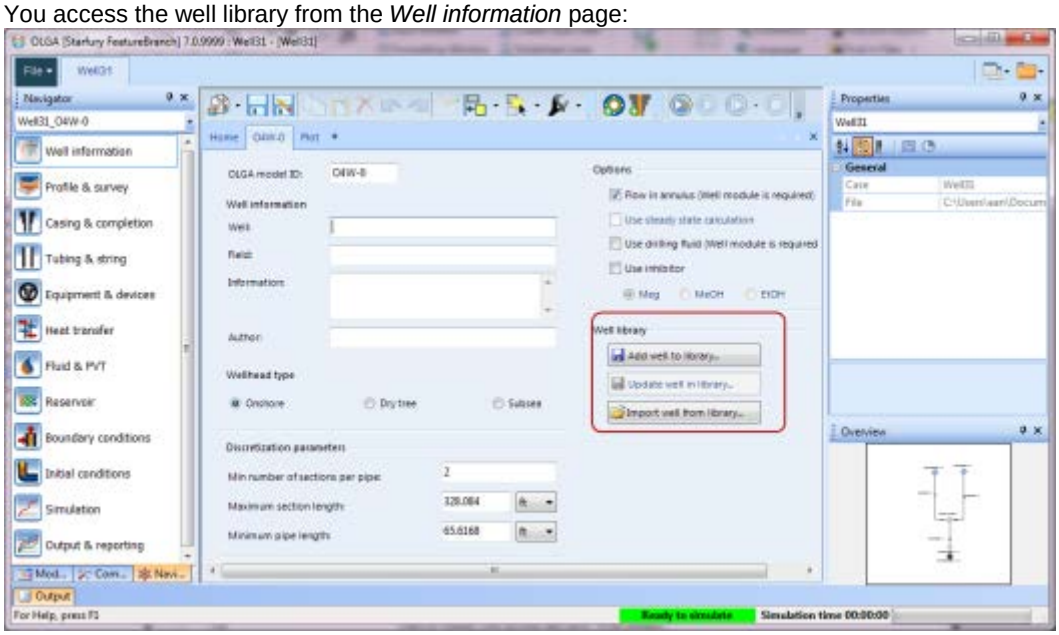
A well library is now added to the Well Editor. Use this library to manage and share well models. A well library enables you to:

- create a well model once and reuse it in different simulation scenarios
- store all well models in a common location
- get an overview of all your models
- perform powerful searches for a well
- export wells to other users
- import well from other users

Note: Only the physical data of the well is stored in the library. Initial conditions, boundary conditions and fluids are not stored in the library.

Access to the well library

You access the well library from the *Well information* page:



Note: The previous Well editor templates are removed from OLGA.

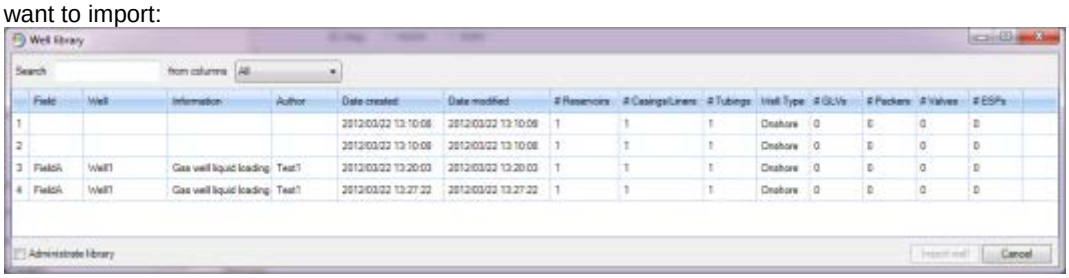
Add a well to the library

You add a well to the well library with the *Add well to library* button on the *Well information* page. Click this button to open the *Add well to library* window

The information you entered in the Well information fields on this page are set as default values in the fields in this window.
It is the currently open well which is added to the library and used to access the well library.

Import a well from the library

Click the *Import well from library* button to import a well. All existing well information for the current well open is replaced. The *Well library* window is displayed. In this window, you select the well you want to import:



Administrate library

When you select the check box Administrate library in the *Well library* window, the following options are made available:

Import from other library - Click this button to browser for other well libraries on your PC.

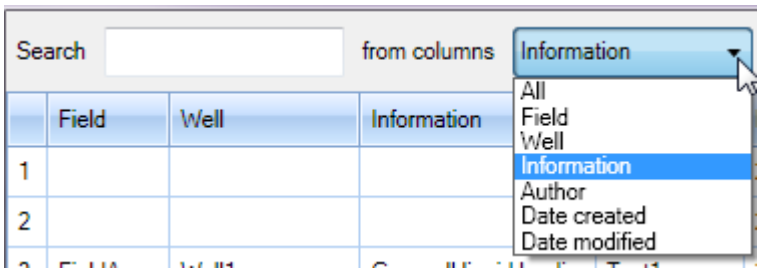
Export to other library - Click this button to change the location of the well library. Note that you must select a well in the table before this button is available. When you export a well, a zip file with all the selected files is created. This file is created as a *.wlib file type.

Delete from library - Click this button to delete a well from the library. Note that you must select a well in the table before this button is available.

Search for and sort wells

In the *Well library* window, you can search for wells:

- Enter search criteria in the Search field. Standard search query syntax can be used.
- Select where you want to search in the from columns field:



Or

- Click a table heading to sort the table rows in alphabetic order.

Update well in library

Click the *Update well in library* button to change the well information. All existing well information is replaced.

Well library storage

The well library is stored in this folder on your PC: C:\Users\Public\Documents\SPT Group\WellLibrary

You can change this located with the *Well library location* command on the Tools menu:

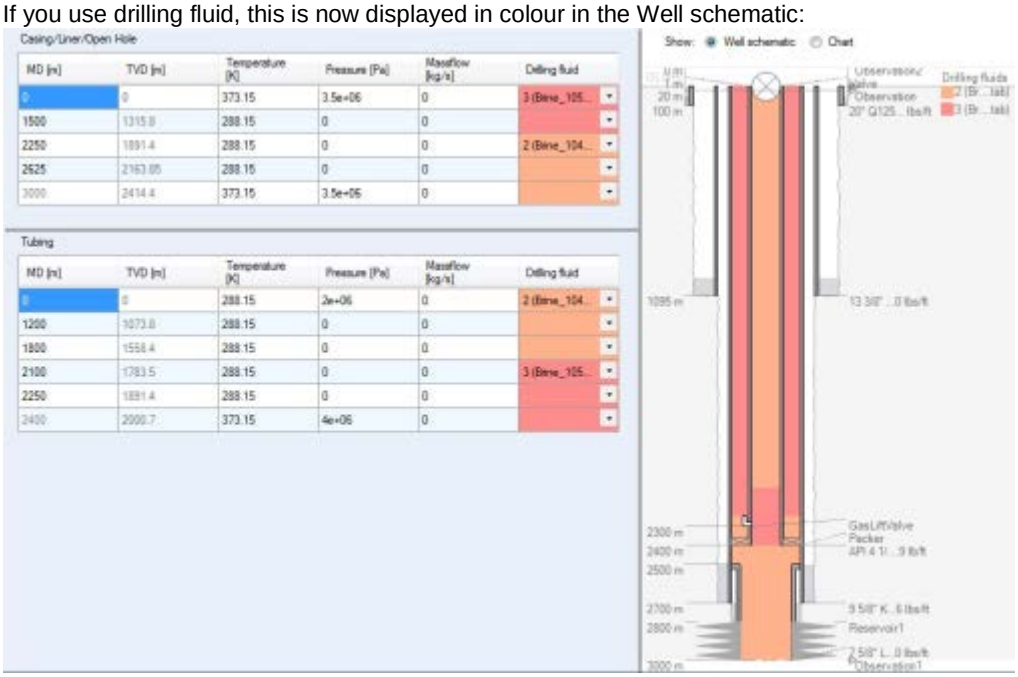
The Well schematic

View Well schematic or initial conditions chart on Initial conditions page

It is now possible to either view the Well schematic or the initial conditions chart on the *Initial conditions* page. Select the desired check boxes placed above the schematic/chart to display either the Well schematic or initial conditions chart.

Drilling fluid in colour

If you use drilling fluid, this is now displayed in colour in the Well schematic:



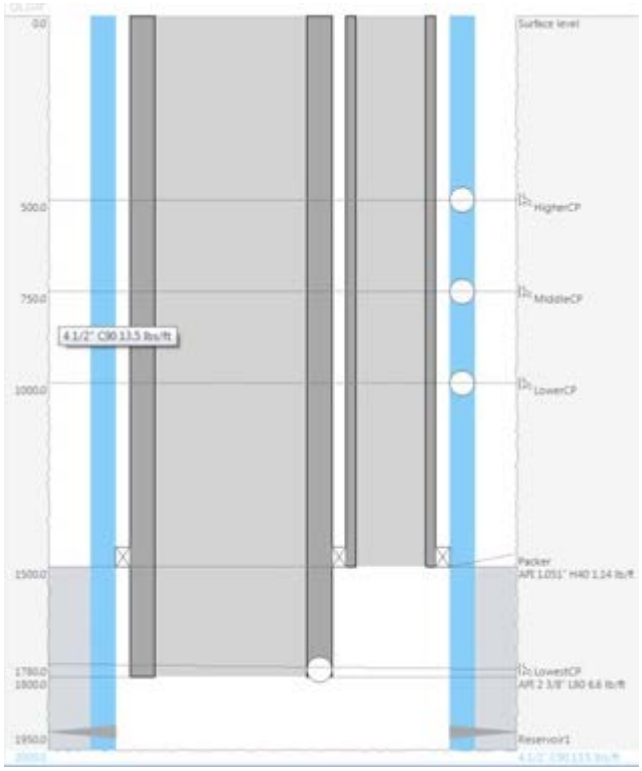
Connection points enhancements

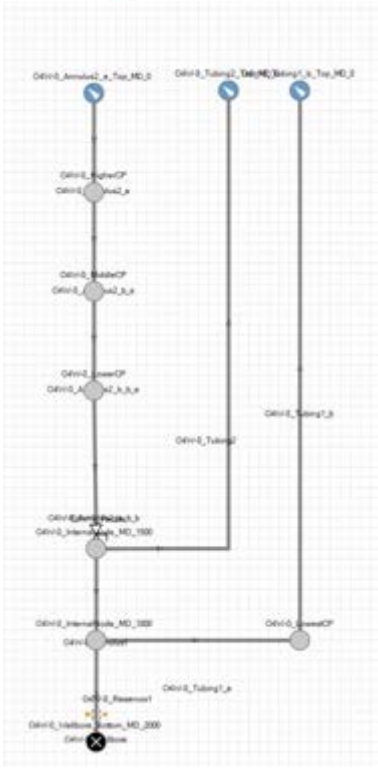
Connection points or boundary conditions in wells

You can now either use boundary conditions or insert connection points anywhere in the well.
To use connection points, select the *Use connection points* button on the *Boundary conditions* page and enter a unique name for the connection point.
The connection points convert to internal nodes when you generate an OLGA model. You can connect other flowpaths to these nodes. These connection points work in the same manner as the connection points on the *Equipment & devices* page.

Illustration

This enhancement can for example be used to construct multilateral wells and relief wells.





Connection points kept for regenerated model

External connection points are now kept whenever you connect a connection point to another flowpath in the Diagram view and regenerate the model in the Well editor. The external connections points are stored whenever you save a case.

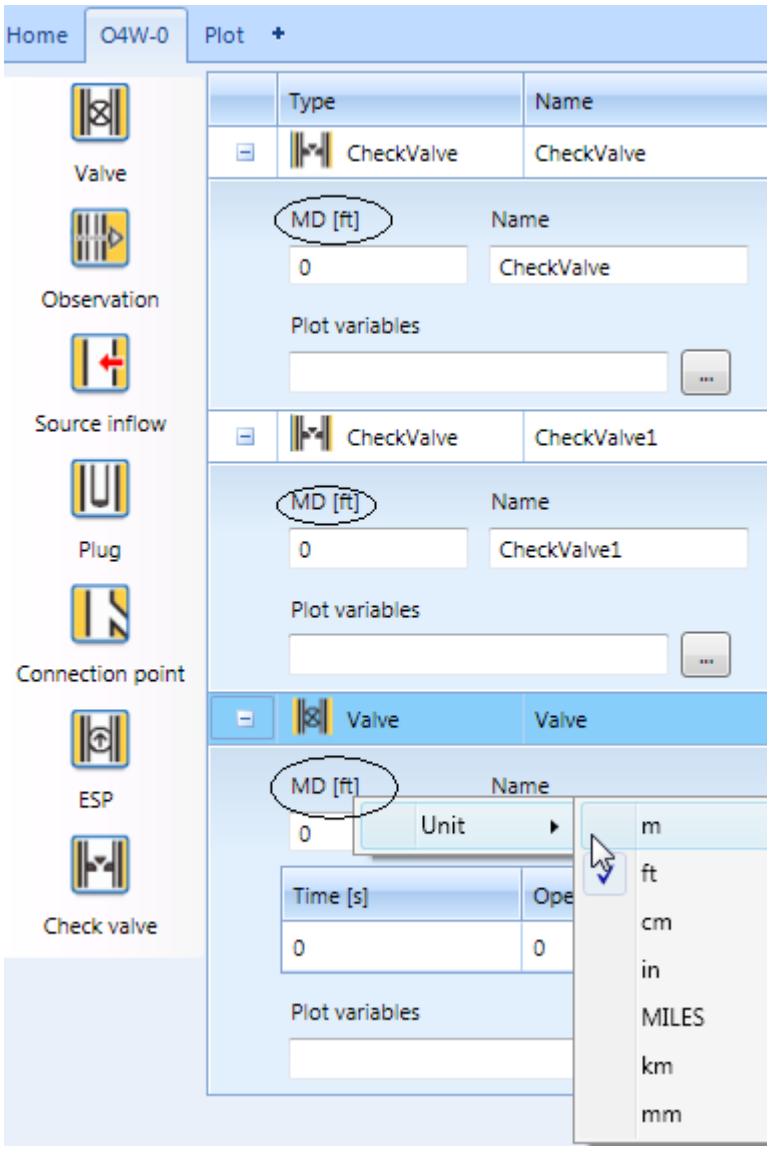
Note: The check boxes Generate Nodes and Recreate model on update are removed. These check boxes are redundant as OLGA always generate nodes and recreate models.

Unit handling

Unified measure unit handling

If you change the measure unit in a field, the unit is also changed for other fields of the same type on all the pages in the Well editor.
Example: If you change the unit in the MD field from feet to meter for a valve, the unit in all other MD fields are also changed.

The predefined unit sets (SI, Oilfield and Metric) can still be used.



Unit in fields and in well schematic correspond

The measure unit is now displayed in the Well schematic. The Well schematic units are updated whenever you change the measure unit for depth (MD, TVD, etc.) in the table.

Measure units transferred to OLGA

All client set units in the Well editor are transferred to the OLGA model. This also includes all nodes, equipment and position labels. For example: if the first annulus pipe is named Pipe_Annulus_1_MD_From0ft_To3280.84ft and the units of MD are changed to meters, the name is automatically updated to Pipe_Annulus_1_MD_From0m_To500m.

New equipment

Check valve

You can now add check valves as equipment in wells. Click the *Check valve* icon on the *Equipment & devices* page to enter details on this equipment.

ESP pump

You can add an Electric Submersible pump to wells. Click the *ESP* icon on the *Equipment and devices* page to enter details on this equipment. Note that only a subset of the ESP pump model types can currently be selected.
The new OLGA key PREFSPEED can be set from the Well editor.

Note: Access to this functionality requires the Multiphase Pump Module license.

Miscellaneous - Well editor

Access the Plotting page

To get access to the Plotting page, select the check box *Use extended well editor workflow* in the Options window.

Removed Simulation page fields

The simulation parameters in the Simulation editor - *Start time*, *End time*, *Max DT*and *Min DT*, are removed.

Instead, you must the edit these parameters via the *Integration* keyword in the Property editor.

Use linear phase-wise injectivity

The reservoir injection input is simplified and you can now use linear phase-wise injectivity. I.e. in the OLGA model: INJMODEL=LINEAR and specifying GASINJ, OILINJ and WATINJ.

Select the check box Phase-wise injectivity on the *Reservoir* page to use this functionality.
If you clear this check box, the injectivity model is set the same as the productivity model, copying the values from the productivity side. Example: PIinj=PIprod, Ainj=Aprod, Binj=Bprod, etc.
You must give injectivity for all three phases if you use phase-wise injectivity.

Change the OLGA model ID

You can now change the name you have entered in the OLGA model ID field on the *Well information* page. The new name is updated on the OLGA objects in the OLGA model. The name you enter must be unique in the case and you must enter a value in this field. This functionality applies to both locked and unlocked models.

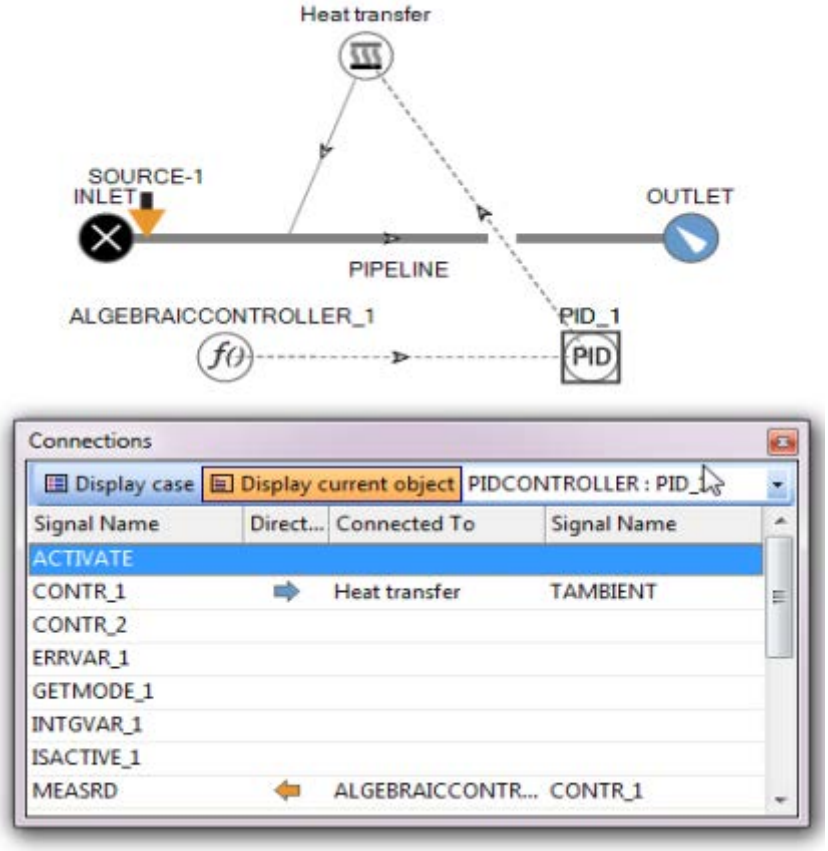
Miscellaneous

Signal connection directions

The column *Direction* is added to the Connection view list. Use this column to view the direction of the signal connection. This gives you a quick overview of all signals and their impact on the model parts. Inbound signal connections are coloured orange while outbound signal connections are coloured blue.

Illustration

This is an illustration of the Connection view with the new column:



Option to use right angles on flowpaths and signal lines

You can now choose to use right angles on flowpaths and signal lines.

Select **Right angles** from the Tool bar to

- change all flowpaths and signal lines from slanted lines to right angles.
- set the default mode. Select Right angle to use this on all new flowpaths and signal lines.

Select **Right angles** from the Context menu to

- change selected flowpaths and signal lines from slanted lines to right angles.

New menu item: Arrange

The menu item **Arrange** is added to the Context menu in the Diagram view. Under this menu item you will find the following options, which previously were placed directly in the Context menu
Bring forward
Bring to front

Send backward
Send to back

Use these options to arrange the order of text and plots.

The Duplicate button in Parametric study

The button **Duplicate** is added to the Parametric study view. Use this button to duplicate your parametric study.

1. Select the study to be duplicated.
2. Click the **Duplicate** button.

50 parameters possible in Parametric studies

You can now use up to 50 parameters in the **Parametric study** window. This was previous limited to 25 parameters.

Layout improvements in GUI

The layout of signal lines and transmitter lines is improved - lines are slimmer, arrows are larger and the transmitter line is also changed from a dotted line to a solid line.

*.key or *.inp converted to *.opi when you open a case

To open a * .key or *.inp file, it must be converted to *.opi format in order to load a case. The Open case window now has *.opi files as the default setting. The former *.inp and *.key are still supported and available when changing the filter in this window. If you load a *.key or *.inp file, a message is displayed where you can choose to convert to *.opi or abort loading the case. (OLGA-10777, 10776)

*.conv file removed

Previously, a *.conv file was created and placed together with the *.inp file when you converted an OLGA *.inp file to OLGA 7.
The *.conv file is now removed after the conversion. (OLGA-09329)

LOSS, NEARWELL and COMPRESSOR

The INPSIG signal for LOSS, NEARWELL and COMPRESSOR is removed as this signal had no real function.

New name for massflow and pressure input terminals/signals for NODE

Massflow and pressure terminal/signals for NODE are renamed to **Pressuresig** and **Massflowsig**.

New electric submergible pumps (ESPUMP)

New ESP pumps are added to the OLGA pump library. This includes pumps from Reda, Centrilift, WoodGroup, ODI, Ramco_Alnas and Trico. (OLGA-12648)

Velocity profile plots in Multiphase toolkit

It is now possible to copy the centre line velocity profile to the clipboard in the velocity profile plot in Multiphase toolkit. Use the new Copy data to clipboard button to copy. You can paste the data into MS Excel or any text editor (use space separated columns). (OLGA-12920)

Modifications to TUNING keyword

The TUNING keyword is extended to include separate keys for tuning of oil droplets and water droplets independently. The new keys, OILENTRAINMENT and WATERENTRAINMENT, can only be used if the key ENTRAINMENT is not used. If only either OILENTRAINMENT or WATERENTRAINMENT is given, the default value for the other is used. The default value is 1. Furthermore, the key ENTRAINMENTFACTOR under WATEROPTIONS is ignored wherever either OILENTRAINMENT or WATERENTRAINMENT is given.
In addition, the entrainment scaling was applied twice when you used the ENTRAINMENT key. This is fixed. (OLGA-11503)

Fluid definition tool available from Context menu

You can now open the Fluid definition tool via this option on the Tools bar. (OLGA-11790)

Smaller icons on the Tool bar

Choose to have smaller icons displayed on the Tools bar with the new *Use small toolbar icons* option accessed when you right-click the Tool bar. Typical use of the smaller icons is for example on notebooks and projectors.

Export video file of simulations

You can now export a video file of simulations run in the 3D viewer. The file format is '.avi.
Select the option **Save as Video clip (.avi)** on the Context menu.
The exported file uses your speed settings for the simulation. For example: If you have set the speed to fast, the video clip plays the simulation fast.

Default value for pipe wall roughness

The default value for pipe wall roughness was previously set to either 1e-05 or 2.8e-05.
This is changed. The default value for pipe wall roughness is now set to 5e-05 (default for carbon steel) when you add a new flowpath and for all template cases. (OLGA -11117)

FEMTherm plotting extension

Previously, the detailed plots of Finite Element results displayed in the FEMTherm viewer did not contain results for pipes within pipes.
This is changed. The generated *.osi file has now been extended to contain information about the temperatures in all pipes and pipe walls in the cross-section. (OLGA-10126)

Pig clearing out liquid in pipeline

Previously, a pig did sometimes not clear out all the liquid in the pipeline, especially for long pipelines with several sections.

This is fixed. All liquid is now cleared out by the pig. (OLGA-12239)

Pressure drop change

An improvement is made to the pressure drop for pig calculations. This change should not affect the simulation results much, but instead reduce unphysical oscillations in pig velocity (UPIG) when high pressure drop over the pig is specified by LINEARFRIC (or QUADRATICFRIC). (OLGA-10607)

Mass of pig used in momentum calculation

The pig mass is now used in the momentum calculation. The causes a heavy pig to accelerate longer.

Note: When a pig is inserted into a pipeline, it obtains the velocity of the fluid. Thus, there is no acceleration effect just after the pig is inserted. (OLGA-10497)

The SERVERDATA key classified as trend plot

The SERVERDATA key is now classified as a trend plot for process equipment variables even if no process equipment label is given. Previously, the key was classified as profile plots. (OLGA-11480)

Version number in *.genkey file

The *.genkey file, which is generated when you run a simulation in the OLGA GUI, now has a line at top showing the version of OLGA used to generate this file. (OLGA-12184)

NSIMINFO key available for INTEGRATION keyword

The NSIMINFO key is now available in the INTEGRATION keyword. This key sets the number of times to print progress messages.

Example: Set NSIMINFO=20 to print a progress message for every 5% of simulated time.
NSIMINFO controls progress reporting.
If DEBUG (in OPTIONS) is OFF, the default corresponds to NSIMINFO=10. If DEBUG is not set to OFF, the default corresponds to NSIMINFO=100. However, explicitly setting NSIMINFO, removes this dependency on the value of DEBUG.

The message which shows percentage of simulation completed now prints the percentage with one decimal digit. (OLGA-06199)

General issues

More stable OLGA

The stability of OLGA is improved, and several operations which could cause a crash situation are corrected. Some of the operations which could provoke a crash are listed below:

- OLGA sometimes crashed if you copied/pasted from other applications, such as MS Word or MS Excel. This is fixed. (OLGA-11724)
- OLGA crashed when you loaded geometry into a flowpath through the Geometry editor. This is fixed. (OLGA-11978)
- OLGA crashed when you plotted leak variables in a restart run. This is fixed. (OLGA-12135)
- OLGA crashed if you plotted trend data from the Case toolbar and the trend data was empty or corrupted from the first time step. This is fixed. An empty plot is now displayed if you plot empty or corrupted data. (OLGA-12127)
- OLGA crashed if a FEED specified a drilling fluid which did not exist. This is fixed. An error message is displayed if the drilling fluid does not exist. (OLGA – 12273)
- OLGA crashed when then maximum number of feeds (10) was defined in the *.ctm file. This is fixed. OLGA reads all 10 feeds correctly. (OLGA-12155)
- OLGA crashed when more than one command was issues at the same time from the OPC client. This was due to the wrong index used into the array. This is fixed. (OLGA-11881)
- The Well editor crashed when you added a fluid file to a wells case and the case was defined at a root directory, for example c:\. This is fixed. You can now add a case on root level. (OLGA-11959)
- Fluid properties were not properly initialised in a restart run for cases combining Compositional Tracking and Hydrate Kinetics. This could lead to a crash in the initialisation phase of the restart case. This is fixed. The fluid properties are now properly initialised in the restart run. (OLGA-10673)
- The Composition Tracking model did not handle negative mass source in a node. This led to a crash in the simulation. This is fixed. Now, the total negative mass flow is allocated to each individual phases in proportional to the masses in the node. (OLGA-10900)
- OLGA crashed when you enter XPOINTS or YPOINTS key value(s) when the SHAPE keyword type equals TYPE = POLYGON. This is fixed. (OLGA-12392)
- OLGA crashed when you defined CORRSION PTMAX to 0. This is fixed. (OLGA-12993)
- OLGA used the value 0 for all heat transfer coefficients on inner wall surface. This made OLGA crash. This is fixed. The heat transfer coefficient on inner wall surface is now initialised to minimum coefficient defined by the user (HMININNERWALL). (OLGA-12236)

Risk management and Optimisation (RMO)

The following enhancements are made to the RMO tool:

- You can now enter numbers in percentage in the Step sizes field on the Input parameter panel.
- Units are displayed on the Input parameter panel.
- The keywords MIN, MAX and MEAN are available in the Time field on the Response parameter panel.

The following issues are fixed:

- Previously, the RMO parameters were not visible when you converted a case from OLGA 7.1 to a newer version. This is fixed. The RMO parameter study is now copied from the original case when the case is converted from previous versions.

- RMO would not start when no profile plot file was part of an OLGA case. This is fixed and RMO can be run without this file in a case.
- Data vectors would occasionally not be plotted in the Line plot. This is fixed and data vectors are always plotted.
- Trend plot file files with different time series would not be correctly plotted. This is fixed.

Model changes

Calculation of pressure drop

For distributed flow regimes, a part of the friction term did not account for the effects of changes in the diameter. This is fixed. (OLGA-11957)

Gradual reduction of oil/water interfacial friction factors for very small oil volume fractions

Previously, the oil-water interfacial friction-factors for stratified flow grew to infinity when the oil layer disappeared (no-slip oil/water). This would occasionally cause numerical issues in OLGA.
This is changed. The oil/water interfacial friction factors goes towards zero when the oil volume fraction becomes very small (< 10^-5), thereby removing the numerical issues. In most cases, this change will not affect the results much, but some difference may be seen for cases that are sensitive to these friction factors. (OLGA-08949)

Input/Output

Stroke time coupled to RunTimestepAgain

Previously, the stroke time coupled to RUNTIMESTEPAGAIN in INTEGRATION was not always correct if you had set this option to ON. Setting the RUNTIMESTEPAGAIN option to OFF would however give the correct stroke time before the fix made for this version. After the fix, the stroke time is independent of the RUNTIMESTEPAGAIN setting.

This affected cases with controllers where the time step was often re-run. You can check if it has affected your cases by setting DEBUG to ON in OPTIONS and look for the console message ""INFO Running time step #xxx again"".
The problem is further limited to controllers operating in the RATELIMITED region. This can be checked by trending the RATELIMITED variable for controllers and check for RATELIMITED > 0. (OLGA-11803)

Interactive simulations with ENDTIME = STARTTIME

Interactive simulations do not generate results when ENDTIME equals STARTTIME. Since interactive data is not available when ENDTIME equals STARTTIME, the Run and Step buttons are now disabled for these simulations. Instead, use Run batch. (OLGA-11557)

Cases with STARTTIME = 0 and ENDTIME = 1 ms

OLGA terminated if you ran a case interactively with STARTTIME = 0 and ENDTIME = 1 ms or smaller.
This is fixed. You can now set STARTTIME = 0 and ENDTIME >= 1ms. (OLGA-11299)

Write default values to OLGA option removed

The *Write default values to OLGA* option is removed in OLGA. This did not work as intended. (OLGA-10914)

Default values in drop-down lists

If you entered a value which equalled the default value in any drop-down list in the OLGA GUI, the value was not set, but the key was cleared. Subsequently, the value was not written to the *.genkey file and could be ignored when running the simulation.
This is fixed. The value is now set when you enter it. To reset the default value, you must clear the key by deleting the value or selecting <none> in the list. (OLGA -12256)

Units of measured pressure for pressure changes

You could previously use units of measured pressure (for example barg, bara, psig and psia) for variables related to pressure changes, partial pressures, and yield stresses.
This is changed. Only mathematical units of pressure are allowed for the latter. (OLGA -11438)

Loading large cases

OLGA ran out of memory when attempting to load very large plot files. This applied both when you opened a plot file after a simulation had run and when you opened an old case with a corresponding very large plot file.
This is fixed. The size of the plot file is now checked before it is loaded and a message is displayed if the plot file is very large. (OLGA-10596)

Replaced button name in PVT file selection window

The Delete button in the PVT file selection window is renamed to Remove since it only removes the selected fluid files and does not delete the files. (OLGA-11123)

The Cancel button in the Options window

When you clicked on Cancel in the Options window, the values always reset to the default settings which were loaded during start-up.
This is fixed. When you click on Cancel, your previous settings are restored instead of the default settings. (OLGA-10317)

Material label with trailing white space

When a label is referenced, the leading and trailing white spaces are stripped away. The label itself however still contained these leading and trailing spaces. This made cases not runnable.
This is fixed. Leading and trailing white spaces in a label are now always trimmed out. (OLGA-11267)

Units for YVARIABLE data for TABLE

Units are now available for STDGASFLOW, PILIQ, VOLUME, WATER and WATFR for the YVARIABLE key in the TABLE keyword. CV and NOTGIVEN have no list menu with options for units. (OLGA-11262)

\ marker in PVT file

If the '\' ("continue on next line") marker in a PVT file was placed before a comma in the value list, parsing of the PVT file failed.

This is changed. A less restrictive parsing is implemented accepting the "\" to be placed before comma in a value list. In addition, a message is given if the parsing fails. (OLGA – 1196)

High Definition (HD)

Momentum transfer for HD point model solver

A term, accounting for momentum transfer from gas layer to liquid layer due to entrainment of liquid droplets in gas, has been corrected for 3-phase flow. This correction only applies for the HD model and only for 3-phase stratified flow in the Steady state pre-processor.
Thus, results when the pre-processor is used with the HD flow model may be affected, typically resulting in slightly higher pressure drop when significant amounts of liquid droplets in gas are predicted. (OLGA-10472)

Dispersion viscosities in OLGA HD stratified point model (pre-processor)

Previously, the OLGA HD stratified flow model used pure phase viscosities for 2-phase oil/water flow in the Steady state pre-processor.
This is changed. The dispersion viscosities are now used. This may affect pressure drop and hold-up in pre-processor simulations with regions of pure oil/water flow.

In addition, the user input dispersion viscosity model was not active for the HD model in the pre-processor; the Pal & Rhodes model was always used.
This is fixed. User input dispersion viscosity models can now be used. (OLGA-12231)

Shear stress output values in Multiphase Toolkit HD

The shear stress output values for Multiphase Toolkit with HD were not correct. This did not affect computed results, but only the values for the shear stress as an output value. (OLGA-10765)

Compositional Tracking

Simulations with one component only

When there was only one component in the Compositional Tracking simulation, masses were not correctly updated when the mass equations were solved.
This is fixed, and will affect results for Compositional Tracking simulations with only one component. (OLGA-12292)

Slowly changing compositions

Due to speed considerations, OLGA does not update the flash calculation when there are small changes in the composition from one time step to the next. The equilibrium masses from the last flash calculation are then slightly different from the actual masses in a section. OLGA forced these masses to equilibrium masses, which generated mass errors. The mass error for each section is small, but the accumulated error can be large for long or large diameter pipelines.
To reduce the mass error, the masses are now forced to the equilibrium masses only when flash calculation is updated. (OLGA-11715, 11854)

CH4 critical temperature in CSP method

There was an inconsistency in the CH4 critical temperature used in the CSP method in the Compositional Tracking.

This inconsistency is removed. Since the gas/liquid boundary is slightly moved, this affects the calculated viscosities in a narrow temperature interval. (OLGA-11875)

FEMTherm

Ambient conditions when running a restart case with FEMTherm

Previously, there was a problem related to ambient conditions when you ran a restart case containing FEMTherm. After the restart, the outer wall temperatures for inner pipes were not conserved. As a consequence of this, you could observe a discontinuity in the TWSO and TU output variables for inner pipes when you compared the original case with the restart case. This discontinuity introduced some transients in the restart run immediately after simulation start. In most cases, these transients would die off quickly.

A similar problem was related to the ambient heat transfer coefficient. In the restart run, the HAMBBUN variable was set to a very large value, leading to too much heat loss to the ambient. This is fixed. (OLGA-10885)

First pipe in a flowpath shows the bundle cross-section geometry

In the FEMTherm GUI, the bundle cross-section displayed the first pipe of a bundle component. Instead, it should show the geometry at the start position of the pipe.
This is fixed and the cross-section view now follows the change of start position of any bundle component. (OLGA-08675)

Solid bundles shapes covered by flow components

Previously, simulations would only stop when solid bundles were completely overlapped by a pipeline.
This is fixed. A validation is added to stop simulations when a shape is covered by a pipeline. (OLGA-12057)

Annulus in solid bundle

If you had a case with annulus in solid bundles, the case would abort due to an error in the input rule.
This is fixed. These cases are now runnable. (OLGA-11829)

Pig

Output produced for pig leakage factor (RPIG)

Previously, when you ran a pig simulation with bypass of the flow, the output variable for RPIG was equal to zero regardless of input.
This is fixed. The output is corrected in order to reflect the values specified through input keys. (OLGA-12372)

Restart run with pig and wax

Restart files could not be used in cases where pigs were used to remove wax from the wall. This was because the generated restart files did not save enough information. This is fixed. It is possible to run a case from a restart file once the pig has been deployed. (OLGA-12302)

Pig in small section lengths

Previously, the key STATICFORCE caused a pig to move when the force acting on the pig was greater than STATICFORCE. This only affected the pig before it moved. If the pig started to move shortly after launch, the bug had minor effect.
(OLGA-10138)

Pig crossing an internal node

OLGA had stability problems for pressure and temperature when a pig crossed an internal node. To increase stability, the time step is now set down when a pig approaches the end of the flowpath. This is expected to give more stable pressure and temperature when a pig crosses an internal node. (OLGA-11474)

Pig when TRACKSLUG=ON and COMPOSITIONAL=MEG/BLACKOIL/ON

An error occurred when a slug was initiated in front of a pig. If there was not enough liquid in front of the pig, the pig would catch up with the slug front and the slug front was removed. The slug front was then set up again. If the slug was removed/set up numerous times, it could affect the simulation results.
However, if the slug front travelled faster than the pig, it would not affect the results much. This is fixed. (OLGA-11514)

Pig running in infinite loop

An error occurred when a pig crossed from one flowpath to another flowpath. The error only occurred when the outlets or inlets of both flowpaths were coupled to the node. If the node was coupled to one inlet and one outlet, it worked as intended.
This is fixed. The new solution stabilizes the pig crossing to a new flowpath, but will only affect result around the crossing time and around the crossing point.
(OLGA-10066)

Slug Tracking

Keyword SLUGILLEGAL

Previously, SLUGILLEGAL ILLEGALSECTION=OFF, PIPE="PIPE_1A" was interpreted as SLUGILLEGAL ILLEGALSECTION=OFF. All invalid sections were removed from the flowpath, except for first and last section in flowpath.
This is fixed. (OLGA-12521)

Erroneous evaluation of additional pressure drop

The friction factors at sectional boundaries are used for calculating output variables for additional pressure drop. However, this yielded wrong values for boundary friction factors when Slug Tracking was used, and slugs were present.
This is fixed. The friction factors are now averaged over each liquid slug and slug bubble in the section. This does not affect the results, but only the output variables DPZA and ACCDPZA. (OLGA-10362)

Erroneous evaluation of output variables for pressure drops

The output variables for pressure drops were not properly evaluated for Slug Tracking. The pressure drop in a section upstream of a slug was not updated. Unless there was a slug in the section volume as well, the output was erroneously set to zero. This error became particular clear

when the pressure dropped over a flowpath, DPBR, did not equal to the difference in inlet and outlet pressures.
This is fixed. (OLGA-11312)

Redistribute liquid droplets masses

A long slug may be split into two slugs with a short bubble region when separated flow regime is predicted within a slug. The following procedure is now used to redistribute the liquid droplets masses in the section: the droplets volume fractions in the bubble region are the same as the droplet volume of the section before the slug splitting. The remaining droplets are put into the liquid films in the slug body. Previously, the droplets masses were just set to zero. (OLGA-12008)

Profile plot of Slug Tracking variables

The Slug Tracking output variables are now available as profile variables as well as trend plot variables. (OLGA-11170)

Process equipment

Override controller not defined for Steady state pre-processor

The output from the Override controller to the Steady state pre-processor was set to 1.0 independent of the sub-controllers output. This was due to a shortcoming in the implementation of the Override controller.
This is changed. The initial output to the Steady state pre-processor is now set according to the OVERRIDE function. (OLGA-12777)

Controller output variables MEASVAR and SETPVAR

The controller output variables MEASVAR and SETPVAR are now updated when the controller in mode is = MANUAL, EXTERNAL SIGNAL or FREEZE. Previously, they were only updated when the controller mode was = AUTOMATIC or EXTERNAL SETPOINT. The controller output CONTR is not affected by this change. (OLGA-11696).

Improved reporting from check valves

The check valves print messages about changing state when DEBUG is =ON or LIMITED. Previously, a check valve could in some instances, print two messages in the same time step, even though the check valve did not change its state.
This is fixed. The message *Check valve opened* is only printed if the check valve actually changes its state from closed to open at the current time step. (OLGA-10912)

Correlations for GasLiftValve

If you used the GLV database and selected the Camco BKR-5 as GasLiftValve, no correlations would be displayed.
This is fixed. The default correlation (i.e. the correlation given in the database file) is now always available. (OLGA-12229)

Valve opening during time step

If you changed the valve opening during a time step, the time step was reduced to a time when the valve opening should not have been altered. The new reduced time step was run again, and the simulated valve opening would be temporarily left in the wrong state. This could cause sudden pressure or velocity spikes/drops in the trend output.

This is fixed. The impact on overall results is believed to be minor, but certain cases could experience a more "noisy" behaviour than expected. (OLGA-11940)

Large flow and pressure transients in OLGA as check valve closes

A test for re-running the time step when the check valve closes is included to improve stability and numerics. (OLGA-11004)

Upper/lower letters in equipment labels

Previously, interactive plotting of output from process equipment was not displayed when the equipment label was not entered entirely in upper case letters.
This is fixed and both upper and lower case letters can be used without losing the ability to show plot data. (OLGA-11089)

Placement of equipment when reference POSITION contains spaces

The placement of equipment was incorrect when the referenced POSITION contained spaces.

This is fixed. The placement of equipment is now always correct. (OLGA-11103)

Pressure and temperature initialisation in SEPARATOR

The initial temperature and pressure given for a separator was previously not used.
This is changed. The values given in the user input are used to setup the initial temperature and pressure of the separator. (OLGA-11947)

Pumps

Negative flow through pumps

The friction had an unphysical large value in the friction calculation through a pump for centrifugal pump, ESP pump, pressure boost and simplified pump. If the negative flow occurred in one time step, the flow through the pump in the next time step would be zero due to great friction. The flow in the following time step would be negative again because friction had no effect when there was zero velocity. The result was that the flow through the pump switched between a negative value and zero for each time step. This made negative flow through the pump use more time as the velocities became zero every other time step.
This is fixed. (OLGA-10657)

Restart Framo pump

Previously, the restart data for the Framo pump was not read correctly.
This is fixed. The start-up of the pump after a restart is smooth. (OLGA-11955)

Default value for RELDPCONTR pump

The default value for the Framo pump RELDPCONTR is now set to **1**. (OLGA-11685)

Filter PUMP variables

Previously, it was not possible to filter the various pump variables.

This is fixed. Eight Framo pump specific output variables are gives as a separate subgroup filter. These are: GPMINFLOW, GPPOW, GPRECFLOW, GPTHRUST, GVFMIX, LLMIX, TEMPDISCH, TRIP. (OLGA-09615)

Wells

Data points in the Well survey

The number of data points used in the Well survey was wrongly updated on the scheme for the simplified well trajectory legend.
This is fixed. Now the legend shows correct number of data points for simplified survey. (OLGA-10966)

Use CGR or GORST for Forchheimer

It is now possible to give CGR or GORST for Forchheimer when the B and C constants are given. (OLGA-11417)

Wrong unit on WGR and CGR

The units for WGR and CGR in the Well editor were incorrectly set up as gas oil ratio units.
This is fixed. The units are now set up as condensate gas ratio units. (OLGA-11039)

Boundary equipment not always placed on the closest section boundary

When you placed equipment on the correct pipe and section, the section number with the depth was selected. Thus, for boundary equipment, it was always placed in the first boundary for the section. This was not necessarily the closest boundary.
This is changed. Boundary equipment (e.g. valves) is now placed on the closest numerical section boundary. The position of equipment that is moved due to the numerical sectioning is now reported to the user. (OLGA-11577)

Heat transfer interpolation for ambient temperature for non-vertical surveys

The heat transfer interpolation for ambient temperature was wrong for non-vertical surveys.
This is fixed.
In addition, a bug could lead to an empty TAMBIENT key in the lowest heat transfer keyword for the well.
This is fixed. (OLGA-11566)

Error messages for overlapping cross section

Previously, no error message was displayed if you defined a tubing diameter larger than the annulus diameter.

This is changed. Rules are added to annulus bundle, cross sections are checked for overlapping for each pipe and error messages are displayed if cross sections overlap. (OLGA-11197)

Scaling input parameter for oil rate

An error in scaling the input parameter for theoretical maximum oil rate q0, max from ZONE to WELL is corrected. This parameter is used in Vogel's and backpressure IPR.
For equivalent cases ZONE and WELL now give identical results. (OLGA-11765)

Distance from tubing bottom to bottom of open hole

Previously, the distance from the tubing bottom to the bottom of the open hole could not be smaller than the diameter of the tubing. An error message would appear.
This is fixed. The small gap between the tubing and the bottom of the well will be ignored when generating an OLGA model from the Well editor. A warning is given in the output window when this occurs. (OLGA-11824)

Add tubing with inner and outer diameter

You can add a tubing without entering inner and outer diameter (both defaults to 0) in the Well editor. However, when the well model is converted to OLGA, it cannot be run due to missing wall thickness.
This is changed. Validation rules are added for inner and outer diameter of any casing/riser/tubing. If the inner diameter is larger than or equal to outer diameter, or any diameter is negative, you will receive validation error message. (OLGA-10515)

Position of well network

When you toggled from the Well editor to the Diagram view, the generated network had the bottom hole on top and tubing head at the bottom.
This is fixed. The tubing head now is on top. (OLGA-11784)

Well enthalpy in restart run

The enthalpy for a well was not always conserved when starting from a restart file. This could cause the restart case to deviate from the results in the original case.
This is fixed. (OLGA-11323)

PRODI and INJECTIVITY as time series

Only the first time point in a time series would yield the correct water cut/water gas ratio value when the WELL keyword was specified with time series and the water cut/water gas ratio had default values. Subsequent values would yield the value zero. This resulted in incorrect values from the well.

This is fixed. (OLGA-12085)

Connect two wells and set fluid name

The generated model in the Well editor was not correct if you used drilling fluids and had more than one well in the case. This was because the drilling fluid labels and feed labels did not have well identifiers.
This is fixed. (OLGA-12269)

EVRRHOMIX unit

The quantity for EVRRHOMIX is changed to DENSITY. The default unit is kg/m3.

(OLGA-10949)

Rocx

- An error in Rocx could cause a code crash for cases using NEARWELLSOURCE combined with Blackoil. This is fixed. (OLGA-12423)
- ROCX writes output in Eclipse format. The date and time output has until now only been on date level. This is improved. Time resolution is on day, hours and minutes. (OLGA-12481)
- Until now, there was an inconsistency between the Eclipse init and restart files, which caused errors when plotting and limited the number of possible trends. Now this error and limitation are gone. The date and time of the start of the simulation is however set to the real time at the start of the simulation. (OLGA-12481)

Geometry editor

Reversed geometries

The Geometry editor did not always position the sections correctly for reversed geometries. The sections of horizontal pipes given with decreasing x-coordinates were drawn outside the line representing the pipe.
This is fixed. (OLGA-12489)

Geometry visualization of vertical flowpath

The geometry of a vertical flowpath was not correctly visualized when loaded from the profile plot file. This is due to accumulation of round-off errors.

This is fixed, and a vertical flowpath is visualized vertically after loading from the profile plot file. (OLGA-10354)

Tools

Parametric study automatically displayed

The Parametric study tab is now stored and automatically displayed when you load a case if it was open before you saved the case. (OLGA-10309)

Storing parameter values in Parametric study

The parameter values in the Parametric study were not stored when you saved a case when the Parametric study was not run.
This is changed. The parameter values are stored when you save a case, even when the Parametric study is not yet run. (OLGA-11988)

Keywords, keys and output variables

Compositional mass/compositional mass rate output variables

All applicable compositional mass and mass rate variables are now available for the SERVERDATA keyword.

New output variables to assess amount of water in gas at standard conditions

New output variables are added to OLGA in order to assess the amount of water in the gas at standard conditions. The new variables are:

QGST_DRY - Dry gas volume flow at standard conditions. Water vapour is removed from flow.
GORST_DRY - Dry gas/oil ratio at standard conditions. Gas does not include water vapour.
WGR - Ratio between water (including water in gas phase) and dry gas (with water vapour).
CGR - Ratio between condensate and dry gas (with water vapour).
QWTST - Total water (liquid and vapour) volume flow at standard conditions. (OLGA-09863)

New output variables added for FLOWPATH

TOTMASS and TOTRHO are added as output variables for FLOWPATH. These are variables for component volume flow, accumulated volume flow and mass flow for Compositional Tracking and Blackoil. (OLGA-11559)

New unit for PRESSURE/TIME variable

The unit kgf/cm2-M is now available for the PRESSURE/TIME variable. (OLGA-10853)

Change values for BACKPRESSURE in LEAK

When you ran a restart file, it was not possible to change the time series for BACKPRESSURE for a leak.
This is fixed. You can now change values for BACKPRESSURE as a function of TIME in a restart run. (OLGA-11220)

ZONE trend plot re-implemented

The TRENDDATA ZONEDETAILS key is now available. Use this key to display the output variable for each inflow of each well zone. (OLGA-10945)

DELAY key disabled

The DELAY key appeared as input for controller types that did not use the key Switch, Algebraic and Selector.
Additionally, a bug caused the DELAY key to be ignored for the controllers of type Scaler. This is fixed. (OLGA-10616)

Default value removed

The default value (TBUNXY) is removed from the following variables:

- FLUIDBUNDLE
- SOLIDBUNDLE
- ANNULUS
- TRENDDATA
- SERVERDATA
- PROFILEDATA

If you import a case built in OLGA 7.1.4 or previous versions, OLGA requires that TBUNXY is selected for the keywords where it was included by default in the original case. (OLGA-10471)

INTERPOLATION for HEATTRANSFER and INTITIALCONDITIONS

For HEATTRANSFER and INITIALCONDITIONS, if INTERPOLATION was vertical on a horizontal pipe, or horizontal on a vertical pipe, and some in-values were different from the out-values, an error message was printed when the simulation was started. The case will no longer be runnable. In addition, if the in-values and out-values are identical, a warning is given. (OLGA-12130)

New validation in BLACKOILFEED

OLGA now only accepts GOR, GLR, OGR and LGR greater than or equal to zero in the BLACKOILFEED keyword. (OLGA-10768)

Plotting

Attribute columns in the Plot variable selection window

The dynamic range of *Attribute* columns in the **Plot variable selection** window was missing. These columns display additional attributes for some variables, and are especially useful for identifying e.g. age group variables. This feature is now re-introduced. (OLGA-11624)

DROHLDP plotting

Previously, OLGA could not plot the DROHLDP variable from PVTsim properly. The plot was either displayed as 1e-6 or minutes of zero.

This is fixed. OLGA now shows values down to 1e-8. (OLGA-11434)

Loading large plots

When you loaded a case in the OLGA GUI, the plots files were loaded and read into memory. This increased loading time and could cause OLGA to run out of memory.

This is fixed. The OLGA GUI now only loads the plot files when you open the Plot window. (OLGA-10078)

Memory of plot data

In the OLGA GUI, the memory of plot data was not released when you close the plot tab.
This is fixed. The memory occupied by plot data is now released when you close the plot tab. (OLGA-11569)

Minimum and maximum values of x-axis

Previously, the minimum and maximum values of x-axis were reset when you select another variable to plot, even when the *Reset on reload* option was disabled.
This is fixed. The minimum and maximum values of x-axis are kept instead of reset when you disable *Reset on reload* and select a new variable to plot. (OLGA-10057)

x-axis values/units and new variable from new file

Two issues are fixed:

The first issue occurred when you ran a simulation, plotted a trend variable, then changed the x-axis unit to a value different from the default value. Then opened the Variable selection window, added a new trend plot file (*.tpl), and selected a variable to plot from this file.

Then the x-axis unit was set back to the default value, but there was a mismatch between x-axis unit and plotted data. Sometimes plot appeared to be empty.

This is fixed. The plot now keeps the x-axis unit set prior to adding a new variable when same or new *.tpl file is selected, and the variable data is converted according to the x-axis unit set in the plot.

The second issue occurred when you plotted variables with different x-variables (with same quantity). The x-axis name was previously constructed by one of the variable names and the unit. I.e. if one variable was specified with Time as x-variable, and the other HT (both with quantity TIME) the x-axis name would be HT[<unit>] or Time[<unit>], depending of which was in the plot list first.
This is changed to only show the unit as x-axis name in these situations. (OLGA-11898)

Plotting data with cases not stored on default OS partition

It was not always possible to plot data when simulating a case located on another disk partition than default OS partition (C:), until the simulation was finished.
This is fixed. (OLGA-12357)

Refresh plots

The refresh of plots sometimes failed in the following situations:

- When you refreshed in an already open plot while you were simulating.
- When you plotted results from two different simulations in one plot.
- The plot in the last plot tab had to be refreshed before the plots in other tabs could be refreshed when a case was running.
- The results for a re-run case were not updated when the plot was made in another case window than the one for the re-run case.

All these issues are fixed. (OLGA-11907)

Drilling

Initialisation of pipeline networks

The initialisation of pipeline networks has been modified. The modification improves the convergence properties of the Steady state pre-processor in networks with split nodes. (OLGA-11663)

Conversion from Standard volume flow to massflow for drilling fluid sources

An error occurred during conversion from standard volume flow to massflow for drilling fluid sources. This was due to use of density from the production fluid table instead of from the mud table for this conversion. This is fixed. (OLGA-10653)

OPC bugs

OPC tags for inflow zone

You can now create OPC tags to control the parameters of an inflow zone by utilising key EXPOSE in keyword RESERVOIRINFLOW. (OLGA-08771)

Millisecond precision in ExternalClock tag

The OLGA OPC Server now supports millisecond precision in the ExternalClock tag. Due to round-offs, you would normally need to set the value of ExternalClock greater than SIMTIME + 5 ms to trigger the OLGA simulator to integrate the next time-steps. This is no longer necessary. (OLGA-09356)

*.rsw appended to restart files for OPC server

The file argument for saveSnap, loadSnap and deleteSnap in the OLGA OPC Server is now automatically given the extension *.rsw, unless you have explicitly set a different extension. (OLGA - 10507)

Reconnect after restart

OPC client was not able to reconnect after OPC server was restarted. This is fixed. (OLGA-09767)

Simulator mode for WELL

Simulator mode would initialise WELL twice. This gave WELL the wrong state. This is fixed. (OLGA-12861)

Server input

The server input was not read correctly before simulation start when INTEGRATION STARTTIME was greater than 0. This is fixed. (OLGA-12861)

Restart

Reading restart files when simulation time is negative

Previously, it was not possible to read restart files when the simulation time was negative.
This is changed. You can now generate a restart file with a negative end time, and load this restart file in a restart case. (OLGA-11289)

FASTWALL option

OLGA could in rare cases hang when you used the FASTWALL option. This occurred when you searched for the inner wall temperature if the solution did not converge.
This is fixed. (OLGA-11891)

GTSOUR values

GTSOUR decreased from the restart input value to zero when you ran a restart case with Compositional Tracking.
This is fixed. GTSOUR keeps the restart value. (OLGA-12272)

Restart for heat loss through wall

An error occurred when you restarted a case with heat loss through a wall with TEMPERATURE = WALL in OPTIONS.
This is fixed. Note that simulation results may deviate from prior running of a case. (OLGA – 12454)

Well phase fractions

Well phase fractions were not initialised properly in a restart run. This could cause unphysical transients to appear at the beginning of a simulation. Normally these transients would die off quickly because the phase fractions would be (correctly) recalculated after the first simulation step. The impact on simulation results are therefore believed to be minor. (OLGA-12150)

Add controllers in restart

If you added a controller in a restart simulation, the simulation stopped with an error message. This occurred for the following controllers: PSV, Scaler, STD, Switch, Table and Selector controllers.
This is fixed. You can add all controllers in restart simulations. (OLGA-12326)

Loading restart cases

A restart case where COMPOSITIONAL was set to ON and both PVTFILE and FLUID was specified, would sometimes not load correctly. This is fixed. (OLGA-12069)

Tuning

Tuning factors for pipe sections

You can only specify one set of tuning factors for any section in a pipe. This means, the TUNING keyword cannot be given twice with the same level of pipe-wise resolution.

You are allowed to use TUNING at high level, for example flowpath or pipe, and then repeat TUNING to change the factors for given sections in the flowpath or pipe, but you are not allowed to give tuning for a flowpath, pipe or section, and then give another TUNING for the same flowpath, pipe or section.
If you attempt to do this, the second TUNING keyword is ignored, and a warning is printed when OLGA starts. (OLGA-09976)

Entrainment scaling

A bug in the ENTRAINMENT key caused the entrainment scaling to be applied twice. This is fixed. (OLGA-11503)

Wax

Density and mass fraction at standard conditions retrieved directly from PVT file

Wax cases with keywords based PVT files now use the densities and mass fractions at standard conditions from the PVT file. Previously, the densities and mass fractions were calculated by linear interpolation. With the values from the PVT file, the numerical errors due to interpolation are eliminated, resulting in more accurate conversion of flowrate between the in-situ and standard conditions.
(OLGA-10708)

Wax precipitation considered for gas-oil mass transfer

The effect of the gas-oil mass transfer was not considered for wax precipitation. If the mass transfer was gas condensing to oil, too high wax precipitation was given. If the mass transfer was from the oil phase to the gas phase, too low wax precipitation was given. This is now fixed, and correct values are given.
(OLGA-11522)

Converting phase fractions at standard conditions in Wax module

When the volume ratios at standard conditions were used in the input of a source, a well, or a pressure node, converting the volume ratios at the standard conditions to the mass fractions at the in-situ pressure and temperature condition was not done correctly. Specifically, the gas, oil and water mass fractions were determined with the wax precipitation neglected, while the amount of wax phase was calculated using the liquid and gas mass fractions from the PVT table. This gave wrong in-situ phase mass fractions of gas, oil, water, and wax when the solid wax phase existed at the in-situ pressure and temperature.
(OLGA-10588)

Wax layer thickness in restart simulations

The wax layer thickness was increased whenever a restart simulation was triggered for cases using the Wax module. This is now fixed.
(OLGA-11625)

Wells

Problem initializing inflow zone not starting in first section of a flowpath

When an inflow zone did not include the first section of a flowpath, an additional well was introduced in the section preceding the first section of the inflow zone. For linear wells, the contribution from this well should be equal to zero, but due to numeric noise, minor contributions could be seen. For quadratic, Forchheimer, and simple Forchheimer type wells, the existence of this additional well caused the simulation to abort when initializing the simulation. This problem is now resolved.
(OLGA-11265)

Corrected production and injection index calculated from reservoir conditions

An error in the unit conversion caused the production and injection index calculated from reservoir conditions to be wrong. This affects both the linear and undersaturated models for well flow. The unit conversion is now correct. This applies to all versions from OLGA 6.
(OLGA-10971)

Sample fluids in Well GUI modified

The default value for the viscosity in some of the sample fluids in the Wells editor was set to zero. This prevented the generated OLGA model from running. This is fixed and the default value is now set to 0.02 in these sample fluids.
(OLGA-11436)

Rearranged field order on Casing page in Well GUI

The order of the fields in the Casing page in the Well GUI is rearranged to improve the workflow.
(OLGA-10933)

Save files in Fluid Definition Tool

The Fluid Definition Tool is now kept open when you have saved a file with the Save file command. This is useful if you want to continue working with other files.
(OLGA-11301)

Slug Tracking

Friction for water in slug tracking

In some situations, the friction forces acting on the water layer have been evaluated in an erroneous manner when using slug-tracking in OLGA 7. These issues have now been resolved. When water is present and slug tracking (or pig) is used, changes to the results are to be expected. However, the overall results should qualitatively be very similar.
(OLGA-11653)

Velocity for bend

An issue is fixed for bend (pipes with different inclination) handling in slug tracking. The OLGA 5 solution is implemented. This makes the velocity for bend in slug tracking simulations more stable. The overall results should qualitatively be very similar. This applies to all OLGA versions from OLGA 6.
(OLGA-10427)

Bubble flow regime allowed if no slugs

Previously, the bubble flow regime disappeared during hydrodynamic slug tracking. This is now changed and bubble flow regime is allowed for sections where there are no slugs.
(OLGA-10761)

Input/Output

Use space in output variable lists

Spaces in list of output variable are now allowed. When you typed output variables directly in the VARIABLE field for PROFILEDATA or TRENDDATA and included spaces between variables and commas, e.g. "USG , USL , USD", the variables were not always included in the plot files and shown in the Plotting window. If you used "Select output variables" window or avoided spaces in the text string "USG, USL, USD", the output variables were included. Now, you can enter spaces in

the VARIABLE field. These are automatically removed before running the simulation, and all defined output variables are plotted.
(OLGA-10461)

Change units in Surge Volume Options window

An error occurred in the Surge Volume Options window if you changed units used in the Max Surge volume and Qmax fields. This is fixed, and units are now handled correctly.
(OLGA-10778)

Change in definition of output variable GLTWT

GLTWT did not include contribution from the inhibitor component when inhibitor tracking was used. This applies to all OLGA versions from OLGA 6.3. For OLGA versions older than OLGA 6.3, GLTWT was set to 0 when inhibitor tracking was used.
(OLGA-11113)

Range for tuning keys increased

The upper range for tuning keys RELOW and REHIGH is increased to 10 000 000 and 10 000 200 respectively to be able to approximate the effects of drag reduction agent.
(OLGA-10944)

Set elevation larger than length

You cannot set the elevation to be higher than the length. An error message will be displayed. Previously, the case would crash if you set elevation higher than length.
(OLGA-10469)

Correction in Edit multiple keywords window

An error occurred in the Edit multiple keywords window for TABLE. This window is opened via the Global instances menu on the Context menu. When you updated a value in the XVARIABLEValueUnit field, the field would not show any variables. In addition, an error message was displayed when you clicked OK. This is fixed - variables are now displayed in the XVARIABLEValueUnit field.
(OLGA-10391)

Number of blackoil feeds

The limitation of maximum ten number of blackoil feeds allowed to use in an OLGA model has been removed. Now, there is no limit on how many blackoil feeds that can be used in a model.
(OLGA - 10852)

Trailing spaces in flowpath names

An error occurred for the Profile plot when you used trailing spaces in flowpath names. You can now use trailing spaces in flowpath names.
(OLGA-10837)

Positioning of components on canvas

A component would get the wrong position in the Diagram view if it included a position label containing space. The GUI now shows correct positions.
(OLGA-10584)

Increased number of digits for geometries generated by Geometry Editor.

Previously, the geometry data in the Geometry editor contained 6 significant digits. This could lead to inaccuracies in the geometry data. This is increased to 8 digits, which is equal to the accuracy of geometry data in the Property editor in OLGA.
(OLGA-11322)

Pig

Bug fix for TRAPPOSITION

Previously, an error caused pigs to be trapped in either the last and first section of a flowpath depending on how the pig was set up. This resulted in the pig not being trapped at the intended section boundary. This is fixed.
(OLGA – 10757)

Output variables REMDIST and REMTIME_AVRG for PIG

An issue in the output variables REMDIST and REMTIME_AVRG when the ROUTING key was used for a network caused unphysical jumps in plots. This is fixed.
(OLGA-10757)

Problems for pig with leakage in vertical pipe.

A pig could get stuck in the vertical pipe during simulations with OLGA 7. This only occurred when keys LEAKAGEFACTOR, LEAKDPCOEF or LEAKOPENING were given. This is fixed as the direction of the leakage is now in the propagation direction of the pig.
(OLGA-10308)

Framo Pump

Linearization improvement

The calculation of the linearization coefficients has been improved to give better stability of the Framo pump model.
(OLGA-11626)

Default value for RELDPCONTR

Previously, the RELDPCONTR did not contain any value. The default value is now set to 1. This is to simplify data entry for the user.
(OLGA-11675)

Other enhancements

More stable OLGA GUI

The stability of the OLGA GUI is improved, and several operations which could cause a crash situation are corrected. Some of the operations in the GUI which could provoke a crash are listed below:

Click Timeseries button for outlet node and change last pressure point.
(OLGA-10206)
Load of an OLGA 6 .opi file with transmitter and PID controller.
(OLGA-10193)
Add keyword to an OLGA model, right-click and choose Properties. Click OK without doing any changes.

(OLGA-10470)
Adding more than one flowpath as components in an Annulus.
(OLGA-11002)
Change the units for pipe length and pipe elevation when a case was loaded, the GUI crashed.
(OLGA-10469)

Restore to factory settings

The button Restore to factory settings in the Application options window did not restore to factory settings. This button now works as intended.
(OLGA-10739)

Removed Close window button on Main menu

The Close window button located in the top right corner of the Main menu bar is removed. The button is redundant.
(OLGA-10677)

Calculation of volume average of density derivate for drilling fluids

An error in the calculation of volume average of density derivatives for drilling fluids is corrected. The error affected cases with drilling fluids defined by mud tables.
(OLGA-11575)

Heat transfer calculations between pipeline wall and pipeline fluid

An error in the calculation of heat transfer between pipeline wall and fluid in the pipeline is corrected. The error only has an effect for pipelines in bundles and annuli (including buried pipelines), and only where void fraction and gas velocity are high. The correction may influence the temperature of the fluid. The error was introduced in OLGA 6.3.1.
(OLGA-11172)

Calculation of hydrate formation rate

An error in the calculation of hydrate formation rate is corrected. The error had an effect for cases utilizing the Hydrate Kinetics module when K1SCALINGFACTOR was set different from 1.0. The error could lead to a computer floating point overflow during runtime.
(OLGA-11027)

Calculations of temperature and flow rates at downstream pressure

The temperature and flow rates at the downstream pressure are now calculated based on isenthalpic expansion process regardless of the flow direction of an internal leak. Previously, the downstream temperature for positive flow is equal to the temperature of the downstream section.
(OLGA-10789)

Updating leak flow conditions for all leaks prior to linearization

Previously, the leak flow conditions were only updated when the flowpath, where the leak is placed, was linearized. For an internal leak, this led to a synchronization problem. This is now changed and flows are updated for all the leaks before the linearization.
(OLGA-10790)

MAXDT added to READTIME

The MAXDT value is now added to the READTIME value to account for any restart point written at a timestep which not exactly matches the given READTIME. Earlier OLGA could pick the previous restart data and not the data closest to READTIME. The time when the restart data is read, is listed in the output file. This error applies to all version from OLGA 7.0.
(OLGA-11637)

64 bits version of RMO

The OLGA installation comprises both a 32 bits version and a 64 bits version of RMO. Depending on the operating system on your computer, the 32 bits or 64 bits version will be installed. This is handled automatically by the installer.
(OLGA-11573)

User documentation

Corrected text in OLGA 7 User Manual

The OLGA 7 User Manual has the following new text in the OLGA Model basics topic:

This yields nine conservation equations and one equation of state to be solved. Three momentum equations, one for each layer and one overall energy equation. Nine mass balances are accounted for using five equations for mass transport: gas phase, oil droplets in the gas layer, water droplets in the gas layer, oil transported in the oil and water layer, water transported in the water and oil layer.

This replaces the following incorrect text:
This yields seven conservation equations and one equation of state to be solved: the seven conservation equations are three for mass, three for momentum, and one for energy, while the equation of state is pressure.
(OLGA – 11728)

Bug fixed for amount of wax generated

An error in the calculation of flash for wax did not limit the mass of wax components according to available masses. This only occurred when the pressure gradient with respect to time was negative. This will influence the total amount of wax in the pipeline. This applies to all versions of OLGA 6 and OLGA 7. (OLGA-10972)

Bug fixed for Unit conversion in Output variables

An error occurred in the Unit conversion if you did not use default units when defining the output variables. The following output variables were presented with the wrong unit:

A

AL, ALEXP, ALFSB, ALFSL,ALGL, ALGR, ALTSB, ALTSL

B

BE, BEEXP, BEFSB, BEFSL, BEHL, BEHLEXP, BEHLFSB, BEHLFSL, BEHLTSB, BEHLTSL, BEHYD, BETSB, BETSL, BEWT, BEWTEXP, BEWTFSB, BEWTFSL, BEWTTSB, BEWTTSL

C

CONDRATE, CORR1, CORR2, CORR3, CORRW1, CORRW2, CORRW3

D

DIAMEFF, DRGP, DRHLDP, DRLFROGSTD, DRWTDP, DXWL

E

ESRETIMEW

G

GA, GAEXP, GAFSB, GAFSL, GAHL, GAHLEXP, GAHLFSB, GAHLFSL, GAHLTSB, GAHLTSL, GAL, GAR, GASMFR, GASMFRBOUN, GATSB, GATSL, GAWT, GAWTEXP, GAWTFSB, GAWTFSL, GAWTTSB, GAWTTSL, GDOMUD, GDPHC, GDWMUD, GGGMUD, GGOMUD, GGPH2O, GGPHC, GGWMUD, GLOMUD, GLPH2O, GLPHC, GLTPH2O, GLTPHC, GLWMUD, GTOMUD, GTPH2O, GTPHC, GTWMUD

H

HOLEXP, HOLFSB, HOLFSL, HOLHL, HOLHLEXP, HOLHLFSB, HOLHLFSL, HOLHLL, HOLHLNS, HOLHLR, HOLHLTSB, HOLHLTSL, HOLHTOT, HOLNS, HOLTSB, HOLTSL, HOLWT, HOLWTEXP, HOLWTFSB, HOLWTFSL, HOLWTL, HOLWTNS, HOLWTOT, HOLWTR, HOLWTTSB, HOLWTTSL, HTKNWL, HYDFRAC

I

INHIBMFR,INHIBMFRBOUN

K

KAPPA , KAPPAWALL

M

MDOMUD, MDPH2O, MDPHC, MDWMUD, MFAMUD, MFGMUD, MFOMUD, MFPH2O, MFPHC, MFWMUD, MGGMUD, MGOMUD, MGPH2O, MGPHC, MGWMUD, MLOMUD, MLPH2O, MLPHC, MLWMUD, MTAMUD, MTOMUD, MTPH2O, MTPHC, MTWMUD

O

OILMFR

P

PCO2, PSAT, PSID, PSIE, PVAP

R

REDEL, REERR, RMDEL, RMERR, RS, RSW

S

SIMTIME

T
TIME, TSAT, TSV, TWATMFR, TWATMFRBOUN
V
VISHLEFF, VISRATIO, VISWTEFF, VOL, VOLCHANGE, VOLGBL
W
WACBEWA, WACWA, WALLROUGH, WATMFR, WATMFRBOUN, WAXPOROSITY, WC , WCRIT and WCWALL.

This applies to all versions from OLGA 7.0. (OLGA-10923)

Risk Management and Optimisation module (RMO)

A significant number of improvements of the RMO module is implemented:

Improved memory management to increase stability.
Space and hyphen (-) are now allowed in the folder path and in the OLGA case name when launching the RMO module. The name of the RMO input parameters can now contain the following characters: ()><&|=-*/'.?+$%§!{}^,\"
A contribution to the global objective function is now visualized in the response panel.
The full parameter name is now displayed in the Response parameters panel.
You can resize and change levels in the Tornado plot.
You can add and remove columns from the experiment list in the Simulation centre.
You can simulate selected (uncompleted) cases from the experiment list in

the Simulation centre.

You can plot both simulated and partials simulations in the same line plot, each experiment has the same colour for simulated and partial simulations.
You can choose the number of digits in the Experiment information window from the Simulation centre.
You can filter out experiments in the experiment list from the Simulation centre with extreme values and plot only the cases with reasonable/interesting values in Advanced Analysis.
You can resize the Line plot window.
Input files referenced by absolute paths in the main input file are not copied to the experiment folders.
The experiment list in the Simulation centre keeps the selection if the list is updated. In addition, the list is usable while a cycle is running.
You can use % of start value in Step size in Tuning-Optimisation. You can for example type 20%.The step size of an Input Parameter is adjusted automatically if you change the upper/lower limit. (Tuning Optimization only)
The plot variable Time is plotted.
The number of experiments simulated in the Simulation Centre is now 10 times the active parameters.
RMO now reads large PPL files.
Some users may have experienced difficulties when using different license servers for MEPO and OLGA. This is now simplified.

Correct output values from controller

The output values from the controller would always only yield values from the CONTR terminal. This applies to all versions from OLGA 7.0. The output values now yields values from the relevant terminal. This does affect results if other terminals than CONTR is in use by an OLGA case and old simulations must then be rerunned.
(OLGA – 10732)

Improved memory consumption when using the keyword ANIMATE

The computer memory allocated when using the HDF5 library is improved. The OLGA.exe file previously used a large amount of computer memory when the ANIMATE keyword was used. Depending on the plotting frequency, this could cause time consuming simulations to crash due to lack of memory on the PC. This applies to all versions from OLGA 7.0.
(OLGA – 10418)

Error in flashing due to the ISOTHERMAL option in well

Compositional Tracking and Blackoil:
When ISOTHERMAL was set to Yes, an error occurred in the flashing that resulted in a fluid temperature in the well section which was different than the anticipated temperature. This applies to all versions from OLGA 6.3.

PVT table approach:
When ISOTHERMAL was set to No, an error occurred in the flashing that resulted in a holdup in the well section which was different than the anticipated holdup. This applies to all versions from OLGA 6.3.

This may affect results and old simulations must be rerunned if you have large pressure drawdown or large Joule-Thomson effects in your OLGA case. If temperature or holdup was too low/too high depend on if you are in the retrograde area or not.
(OLGA – 10628)

Compositional Tracking - pig and source

OLGA could crash whenever a pig reached a section with a source and Compositional Tracking was activated. This applies to all versions of OLGA 6 and OLGA 7. This fix has minor effect on simulation results.
(OLGA – 10608)

Crash in Plotting tool when exporting data

A crash in the OLGA GUI would sometimes occur when you plotted and exported data (via the Export button) in the Plotting tool. This applies to all versions of OLGA 6 and OLGA 7.

OLGA 7.1.1

Compositional Tracking

Viscosity calculations in Compositional Tracking

The calculations of viscosity in Compositional Tracking for pure glycols, for water-glycol and water-methanol mixtures are improved for low temperatures.

Note that this improvement also is available in PVTSim 20.0.
(OLGA – 10384)

Improvements to Compositional Tracking

There have been several improvements to the Compositional Tracking module.

Firstly, the robustness of the flash calculations is improved for compositions containing very small mole-fractions of some component and for compositions with high concentrations of methanol in water. This improves the stability of Compositional Tracking calculations.

Secondly, a bug caused the component masses in the flash calculations to be wrong. This is fixed.
(OLGA – 10543) (OLGA – 10483)

Specification of compositions in FEED

In OLGA 7.1, MASSFRACTION and MOLEFRACTION for components in FEED were limited to range 0 - 1 and 0 - 100 for unit fraction and percent respectively. This limitation is removed, and the input is now unit-less. This means that the value 60% from an old version will now get the value 60. The values will be normalized inside OLGA before they are used.
(OLGA – 10557)

Parametric studies

Saving Parallel simulations

Parallel simulations could not be retrieved when you had saved a case and then tried to reopen it. This is fixed and the number of Parallel simulations is saved to the case.
(OLGA – 10599)

Run parallel simulations in Parametric Study

You can now run more than 1 parallel simulation in parametric study with the Run Study button in the Parametric study window. Due to an error this was not possible in OLGA 7.1. Note that this functionality is not implemented if you run a parametric study in batch.
(OLGA-10514)

Wells

Unit in Casing&Completion updated

The selected unit of top and bottom header columns of the casing completion table is now updated correctly when the unit is changed.

(OLGA – 10509)

Fixed error when changing the lumped reservoir depth to lower depths

In some circumstances, when you changed the depth of a lumped reservoir inflow, you could get a warning that the Top MD could not be below the Bottom MD. This error only appeared if you selected distributed inflow.
(OLGA– 10627)

Improved water viscosity for steam and single component

Previously, the water viscosity for WATEROPTIONS; STEAMWATER-HC and SINGLECOMPONENT was overpredicted for low temperatures. This is improved.
(OLGA – 10547)

Adiabatic wall temperature correction

The adiabatic wall temperature correction to inner surface wall temperature (TWS) is modified with a smoothing factor w to become:

$$\Delta T_{ws} = 0.5w\ \mu_G u_G^2/\lambda_G$$

The smoothing factor w is an S-shaped smooth curve going from zero to one as liquid volume fraction goes from 5.5% to 4.5%. The value of the smoothing factor w is 0.5 when the liquid volume fraction is 5%. The smoothing factor is continuous and has continuous differential in the range it is used. The change will affect the inner wall surface temperature (TWS) for high gas flow rate. In particular, you will not see discontinuities (sudden drop) in TWS when liquid volume fraction drops below 5% for high gas flow rates.
(OLGA – 10406)

Fixed bug in local flash in OLGA

An error in the flashing calculations caused the contribution from heat loss to the wall to be erroneous in some cases. This is fixed.
(OLGA-10483)

SERVERDATA and Plug-in variables

You can now select Plug-in variables as output through SERVERDATA.
(OLGA – 10541)

Fail to load a restart file for a well case

In OLGA 7.1 you could not add or remove a LEAK in a restart case. This functionality is now restored.
(OLGA – 10371)

Parsing of restart files

An error occurred in OLGA 7.1 during parsing of restart files when the version number was separated with the sign ",". The sign which is used depends on the local settings of the PC. This error prevented these cases from running. This is fixed.
(OLGA – 10490)

TABLETOLERANCE=UNLIMITED and multiple threads

There was an issue in OLGA 7.1 when TABLETOLERANCE=UNLIMITED and you were running multiple threads. This caused OLGA to crash in certain cases. This is fixed.
(OLGA – 10573)

Plotting MDTHYD when using WATERLIMIT

Previously, MDTHYD had value 0 when water content was below WATERLIMIT and MDTHYD was above hydrate forming temperature. This is now set to the correct value of MDTHYD.
(OLGA – 10486)

Positive, non-zero values for NORMRANGE

An error occurred when NORMRAGE = 0. Only positive, non-zero values are allowed for NORMRANGE, and you can now only enter legal values.
(OLGA – 10522)

Converting case with LEAK to OLGA 7.1 format

When an old case with leak is imported into OLGA 7.1.1, the VALVETYPE key is set according to the following rules:

1) If TABLE key is given, set VALVETYPE = "CVTABLE".
2) Else if GASLIFTTABLES key is given, set VALVETYPE = "GASLIFTTABLE".
3) Else if GASLIFTVALVE key is given, set VALVETYPE = "GASLIFTTABLE".
4) Else, set VALVETYPE = "OLGAVALVE".

(OLGA – 10493)

Label for Walls and Materials

You can now use the special character '=' in a label for walls and materials as in OLGA 6.
(OLGA – 10550)

Opening ppl plot with template while simulation is running

If you tried to open a plot template while simulating, the GUI would crash. This is fixed.
(OLGA-10639)