



# *RELEASE NOTES*

## GOHFER 2007 SP2

Release Date: January 26, 2009

GOHFER 2007 SP2 contains all of the updates included in 2005 (SP1 & SP2), 2007, 2007 SP1 as well as the following updates. It is necessary to un-install Version 2005 or 2007 prior to installing Version 2007 SP2. The installer will perform this task for you.

### **GOHFER . EXE :**

- Modified PDL and storage sensitivity to more adequately represent measured data
- Added variable Vspurt
- Updated leakoff model to handle relative permeability and damage factors more effectively as well as dynamic leakoff and formation controlled (CVC) leakoff.
- Hardwired the fracture shear rate at the perfs to  $2000 \text{ sec}^{-1}$  to more effectively model shear through the perforations. Added an internal viscosity delay factor to model the viscosity recovery after transitioning from the high shear environment to the low shear rate in the fracture.
- Fixed a problem with Proppant type NONE causing screenouts.
- Fixed a problem with N2 mist and N2 friction.
- Fixed a problem that arose when gas was placed in the wellbore
- Fixed a problem with pressure spikes at the start of injection after a shut down, primarily with any tortuosity or high process zone stress.
- The option has been added under Help/Additional Files to create a QLK output file upon each simulation. This is a space delimited ASCII file with grid information and proppant identifiers for use with the Halliburton Quiklook program. For each output grid, there is an index of the proppant with the maximum concentration in each node, fracture width, and cumulative volume lost through each node at the user defined print frequency.

### **WinGOHFER :**

- Log Processing:
  - Added ability to process logs in metric units. Log processing must now be performed in the same units as the input LAS or CSV file. Each source curve now has a defined unit type and in unit. Output curve units will match the source file units.
  - Added Scatter Plot capability in order to analyze existing correlations or generate new user defined correlations to determine associated slope and intercept.
  - Added simple way to edit the output LAS depths via the Tools menu bar command or toolbar.
  - Fixed problem with phantom folders in the output column.

- Cursor location pop-up box on the Zone Setup tab now displays both the TVD and MD. This should make marking zones and perforations easier based on MD.
- Each individual grid block on all the grid tabs now reflects the defined node aspect ratio. A value greater than 1 will now result in a grid block that is rectangular as opposed to square in an effort to maintain the aspect ratio.
- A horizontal scroll bar has been added to the top of the grid on each tab. This allows the user to scroll along the length of the grid. The grids no longer attempt to display the entire grid on the screen. This should make building horizontal simulations easier.
- The cursor location pop-up box on each individual grid tab now displays the distance from the left edge of the grid and the depth as opposed to the previous X/Y coordinates.
- In the grid tabs, added the separate ability to send the current grid picture (screenshot) to MS PowerPoint as well as the full grid picture (area of grid that extends beyond the visible screen).
- Removed warning dialog box after selecting top and bottom depths on the Formation Zone Setup & Grid tab.
- Added Spurt Volume at 1000 md to each fluid in the fluid database.
- Increased the number of decimal places for K' in the fluid database.

#### **WinParse:**

- Removed Start/Stop/Skip dialog box when opening a bin file in WinPARSE.

#### **GOHFER Production:**

- **Horizontal Simulation Production Calculations** - In addition to the existing ability to perform the production calculations on vertical wells, GOHFER can now perform these calculations on horizontal (longitudinal and transverse) simulations. User now defines the well orientation (vertical or horizontal). Selecting horizontal will display additional parameters including:
  - Horizontal Type (longitudinal and transverse)
  - Angle
  - Lateral Length
  - Lateral Vertical Position
  - Frac Contributing Lateral
  - Horizontal Perm ratio (Kv/Kh)
  - Number of Transverse Fractures
  - Treated Lateral Length
- Added ability to perform production calculations on asymmetric simulation. Added a 2<sup>nd</sup> red line on output grid data plot in WinPARSE in order to bracket the entire frac length. Frac half length will be calculated by dividing the distance between the red lines by 2.
- The average proppant concentration used for the production calculations is averaged over the user-defined net pay height as opposed to the entire frac height between the red lines on the output grid data plots.

#### **Sentinel Protection Installer:**

- Included upgrade to Sentinel Protection Installer 7.5.0.



# **RELEASE NOTES**

## **GOHFER 2007 SP1**

Release Date: February 8, 2008

GOHFER 2007 SP1 contains all of the updates included in 2005 (SP1 & SP2), 2007 as well as the following updates. It is necessary to un-install Version 2005 or 2007 prior to installing Version 2007 SP1.

- **Network Capability** - GOHFER is now capable of working over a LAN (local area network) with the use of a network license key. Network capability is limited to network keys containing 2 or more licenses. Contact Kevin Svatek at 713-328-2304 or [kevin.svatek@corelab.com](mailto:kevin.svatek@corelab.com) for more information regarding the purchase of a network key.
- GOHFER installation is no longer limited to the C: root directory. GOHFER may be installed to a different drive (network drive for example). All of the installation components **must** be installed to the same desired directory. Installation default is to the C: drive.

### **GOHFER.EXE:**

- Implemented a new friction model based on fluid  $n'$  and  $K'$  to replace the previous model based on gel loading. Gel loading has been removed as an input and replaced with a friction correction factor (located under *Show Other Parameters*) defaulted to 1. The sand exponent was also removed and replaced with a crosslink delay factor. Crosslinked fluids default to 0.1 and linear, Newtonian fluids default 1.0.
- Added a Tortuosity Prefactor component that is available under the Advanced Reservoir Parameters. This allows the user to input the value of tortuosity measured from the step-down test.
- Added metric units to the RTD file generated from a GOHFER simulation. When the user uses depth in meters, the simulated RTD file will default to a pre-determined set of metric units for the output variables for use in HTG.
- Added a screenout warning so that a GOHFER simulation will now terminate once the fracture treatment screens out and will no longer continue to run the remainder of the pumping schedule.

### **WinGOHFER:**

- Log Processing:
  - If no RHOB is available, VCOAL will default to zero in order to allow a VSHALE to be calculated. (This feature only works if VCOAL is known to be zero.)
  - Added new correlations PERMEST (permeability calculated using PHIE) and PERMLAS (permeability calculated in raw LAS file) to allow the ability to compare multiple perms.

- Added a synthetic Bulk Density correlation (RHOBPHID) from a Density Porosity obtainable from a source LAS file (if available).
- Improved the ability to handle horizontal logs for horizontal fracture simulations and added the horizontal distance (HOFF) to each log point from the vertical well location.
- Reduced the options in the calculations box for each output curve to reflect only those that are applicable.
- Fixed a problem with the 1 ½ inch wide plot option display.
- Added an option to create additional files located under the Help menu bar command. GOHFER will no longer automatically create the .ASC, .OUT and .WDT files. The user may select to create any or all of the files for an individual simulation or default to create any or all of them on every job.
- Improved the link between the grids and the processed LAS file. The grids should now always auto-populate when the grids are initialized. Any changes made to the processed log *after* the grids are initialized will now be available to the grids via the *Read From Log* button.
- Added a tortuosity component discussed in the gohfer.exe section.
- Implemented new friction model discussed in the gohfer.exe section.

#### **WinParse:**

- In conjunction with the screenout warning added to the gohfer.exe, WinParse will notify the user of a possible screenout if the actual, simulated job time does not match the intended job time, indicating that the simulation ended prematurely.

#### **GOHFER Production:**

- Acid Frac Conductivity - When modeling acid frac treatments, WinPARSE will now calculate the acid frac conductivity based on the average acid reaction width. For acid fracs containing proppant (100 mesh for example), the model will compare the conductivity of both the proppant pack and the reaction width and display the dominant producing mechanism.
- Fixed a problem with the Young's Modulus unit being sent to the production simulator. YM unit is now set to MMpsi.
- For **Oil Reservoirs** only - set the default value for Water Production (Oil Reservoirs) to 0.1 bbl/bbl.

#### **GOHWIN (1.6.5):**

- Re-added the following GOHWIN objects:
  - CO2Calcs
  - FoamSchd
  - N2Calcs



# *RELEASE NOTES*

## GOHFER 2007

Release Date: March 12, 2007

GOHFER 2007 contains all of the updates included in 2005 SP1 & SP2 as well as the following updates. It is necessary to un-install Version 2005 prior to installing Version 2007.

- New installation interface that allows GohWin and HalWin users to select appropriate components for installation.

### **GOHFER.EXE:**

- Changed near-well pressure drop calculation to use proppant concentration in fracture instead of wellbore to better model screenout development
- Changed leakoff model to improve high-perm cases
  - All fluids should have Cw\_1000 set to 0.1 to avoid filter-cake formation in Darcy-perm rock
  - New formulation better models viscous-controlled leakoff without filter-cake control in soft, high-perm rocks
  - New model allows transition from a filter-cake forming fluid to a non-FC fluid during a job
- Modified PDL and transverse storage to better match observed fracture half-lengths from micro-seismic mapping
- Implemented code changes to restrict growth of unstable fracture "fingers"

### **WinGOHFER:**

- Incorporated new log processing package - GOHFER\_LAS. GOHFER\_LAS is accessed the same as before via the Log Calculations button in WinGOHFER. This action will launch the sub-application and open GOHFER\_LAS in new window.
- Added an auto-populate grid feature when initializing grids. This feature is only available after processing a log (LAS file) in GOHFER\_LAS. The Perforation Diameter and Holes Perforated grid tabs still require manual entry.
- Updated with complete suite of metric unit options for all variables. Units Settings are accessed via the View menu bar command. Units Settings menu also includes a master unit selector to switch all variables to either English or metric units. Variable units can also be adjusted individually.
- Added Gel Loading units drop down menu on pumping schedule control panel.
- Added a "Clear Schedule" button to the pumping schedule control panel.
- Changed perf factor calculations to allow for fractional number rather than an integer.

- Fixed a problem with utilizing Save, Edit & Run if WinPARSE was left open.
- Updated proppant database.

**WinParse:**

- Updated with complete suite of metric unit options. WinPARSE units will reflect unit choices made in WinGOHFER prior to simulation. Each WinPARSE variable contains unit drop down menu.
- Added metric unit options to the toolbox.
- Removed CO2/N2/Acid columns from the pumping schedule if these values are zero.
- Applied proppant concentration cutoff value to the baseline conductivity.
- Re-titled Conductivity plot in output grid data to Baseline Conductivity.

**GOHFER Production:**

- Defaulted Un-stimulated Skin to a value of 5.
- Updated production calculations to allow user-specified cleanup time after frac.
- Added entries for Initial FCD and CleanupTime.

**GOHWIN:**

- Removed non-essential and unsupported GOHWIN objects.
- Updated PDAT
  - Option to perform ACA w/o performing BCA (made ACA events moveable)
  - Defaulted graph templates



# *RELEASE NOTES*

## GOHFER 2005 Service Pack 2 (SP2)

Release Date: January 27, 2006

GOHFER 2005 Service Pack 2 (SP2) contains all of the updates included in SP1 as well as the following updates. It is not necessary to install SP1 first if you have not already done so.

### **WinGOHFER:**

- Fixed units issue with international version of Windows.
- Fixed an error to the foam calculations when using the *Adjust Schedule based on Quality Function* to convert an actual surface foam schedule to bottomhole.
- WinGOHFER now checks to see if marked pay is equal to zero. If so, a warning pops up prior to execution indicating that production will not run until net pay is marked.
- Increased the dot size of imported data in the fluid database graphs.

### **WinParse:**

- Fixed units issue with international version of Windows.
- Updated so net pay is only calculated over the Area of Interest (grid top and bottom).
- Updated to calculate production over the currently displayed output grid data graph. Therefore, it is now possible to calculate production over the zoomed portion of the graph.
- Added numerical toolbox data to notes section of PowerPoint when plotting output grid data.
- Fixed a calculation problem with the Baseline Conductivity plot.
- Fixed an issue with tiling of 2 projects open simultaneously.
- Fixed a problem on the Input Data tab when trying to scale between 2 very small numbers producing an overflow error.
- Removed black bar alongside Input Data when sending to PowerPoint.

### **GOHFER Production:**

- Added the ability to enter a user defined Un-stimulated Skin value.
- Fixed a problem with a positive value for the Loss of Width caused by embedment and Filtercake for the Un-stimulated case.



# *RELEASE NOTES*

## GOHFER 2005 Service Pack 1 (SP1)

Release Date: September 9, 2005

GOHFER 2005 Service Pack 1 (SP1) contains the following updates:

### **WinGOHFER:**

- Contains AutoSave toggle located under Help menu bar command (a check indicates autosave on and no check indicates autosave off) GOHFER remembers the setting for each time you open. Default is autosave on. This should eliminate the issue requiring users to adjust their virus scan exclusions to avoid a slow program.
- Fixed the error received when performing a Fill Down in the wellbore fluid section of the pumping schedule.
- Fixed the problem with the Adjust Schedule Based on Quality function also changing the shut-in time when rate is zero.

### **WinParse:**

- Winparse now saves the location of the red line (effective frac length) on the output grid data to the gohfer file. Therefore, there is no longer a need to reset the effective frac length everytime an existing job is opened in WinParse.

### **GOHFER Production:**

- Fixed a problem with a positive value for the Completely Uncorrected Frac Width for the Un-Stimulated case.