



MIS Software Products

MIS Technology Center

MIS Software Products



PVT Pro



ML Pro



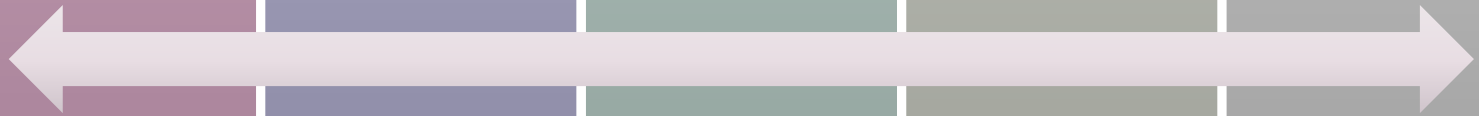
Centri Pro

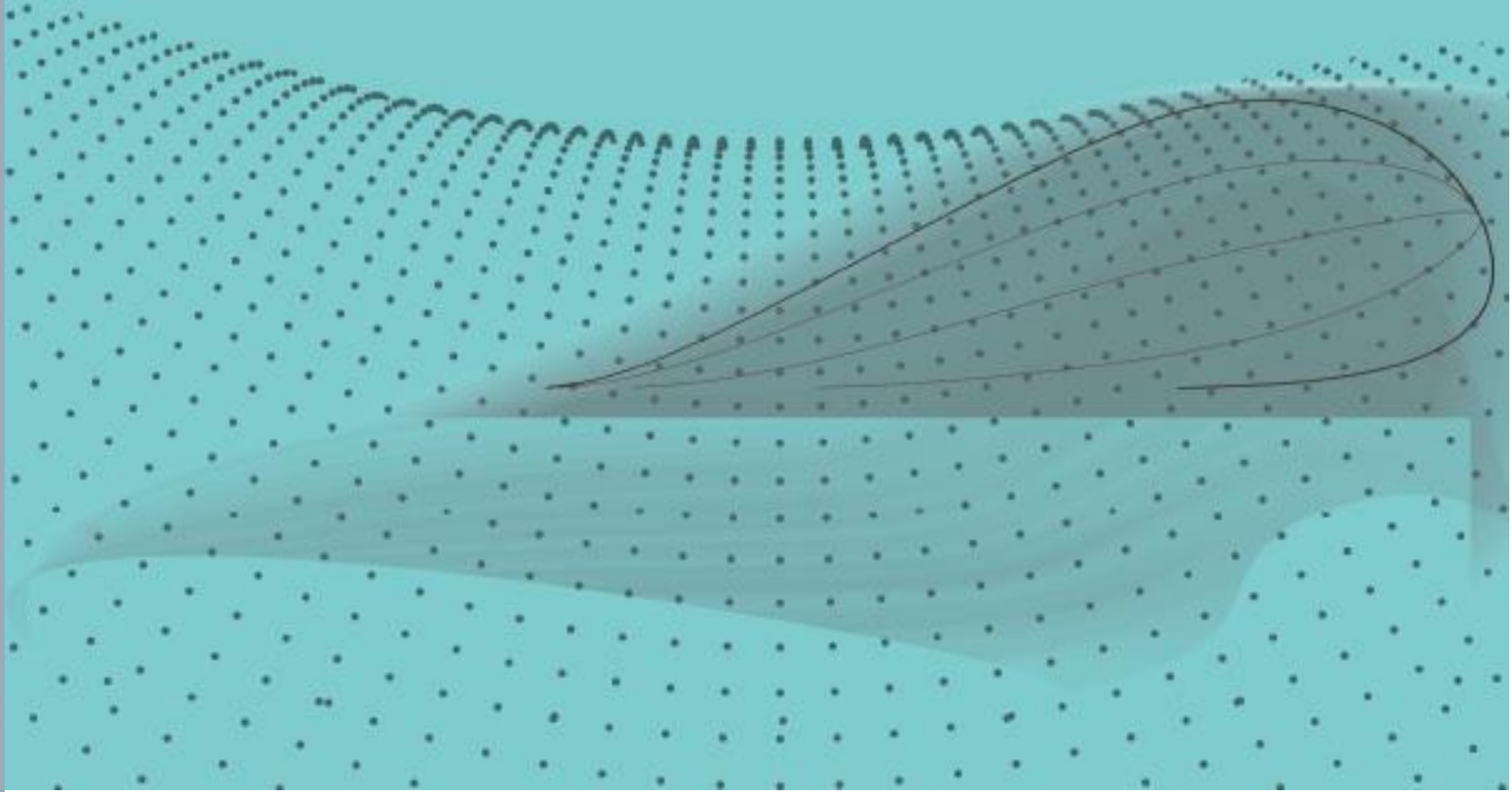


Flow Pro



Lab
Reporter





PVT Pro Software

A Comprehensive & Practical Tool for PVT Experts







Technical Features



PVT & Lab Simulations

Single-Step Simulations

- 2-Phase Flash
- Bubble Point
- Lower Dew Point
- Upper Dew Point
- Saturation Pressure
- Critical Pressure

Multi-Step Simulations

- Constant Composition Expansion
- Differential Liberation
- Constant Volume Depletion
- Separators
- Compositional Gradient



Technical Features



Quality Control of Sampling Data



Bottom-Hole Samples



Surface Samples



**Comprehensive
QC Report:**

Export in Word
Format

Evaluation	Pass	Fail	Not Performed
Evaluation Parameter 1		X	
Evaluation Parameter 2		X	
Evaluation Parameter 3	X		
Evaluation Parameter 4	X		
Evaluation Parameter 5	X		
Evaluation Parameter 6	X		
Evaluation Parameter 7	X		



Technical Features



Miscibility Analysis

EOS Based Methods

- First Contact Miscibility Pressure
- Semi-Analytical Key Tie Line
- Multiple Mixing Cell
- Slim Tube Experiment

Correlations

- Glaso (1980)
- Koch-Hutchinson (1958)
- Hudgins-Liave-Chung (1990)
- Firoozabadi-Aziz-Khalid (1986)
- Khazam-Arebi-Mahmoud-Froja (2006)
- Kuo (1985)

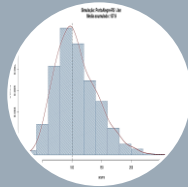


Technical Features



Automated Plus Fraction Characterization

Splitting and **Grouping** options are optimized with respect to experimental data.



Splitting Options
(α , β , γ , ...)



Experimental Data
(DL, CCE, Pb, ...)





Technical Features



EOS Calibration

PVT Pro provides a powerful tool for tuning EOS parameters against experimental PVT data.



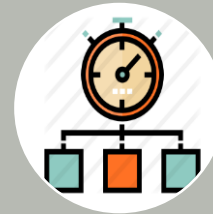
**Domain
Sensitivity
Analysis**



**Graphical
Sensitivity
Analysis**



**Search-
Based
Optimization**



**Multiple-
Mixture
Regression**



**Auto-
Regression**





Technical Features

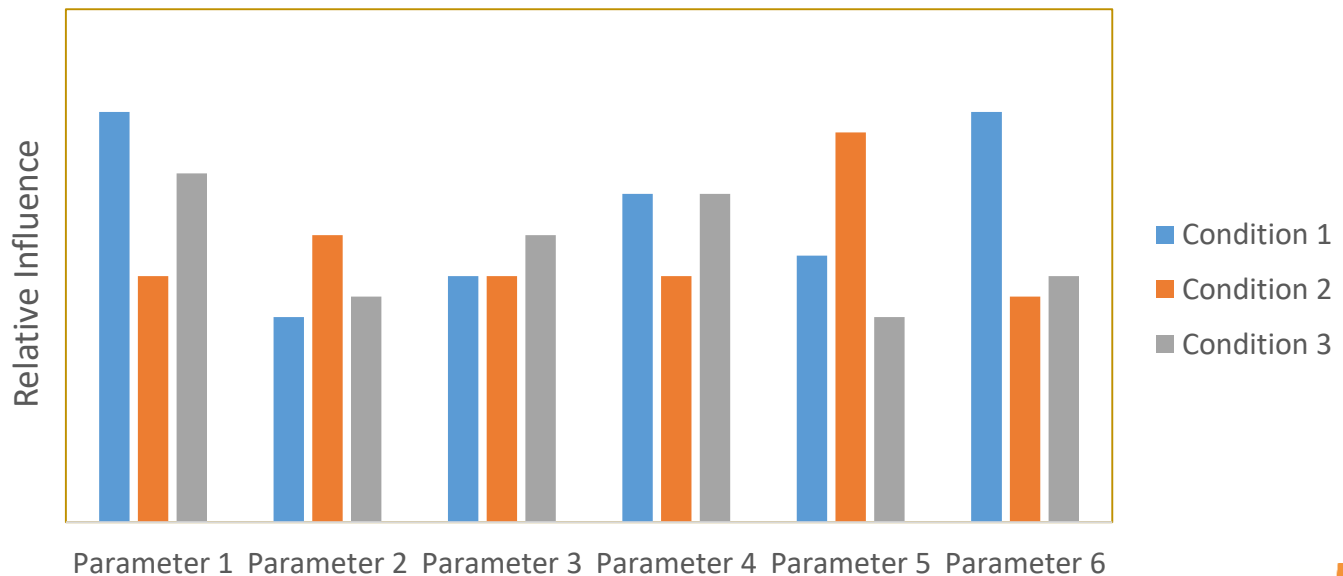


EOS Calibration



Domain Sensitivity Analysis

Helps users finding the most effective regression parameters





Technical Features

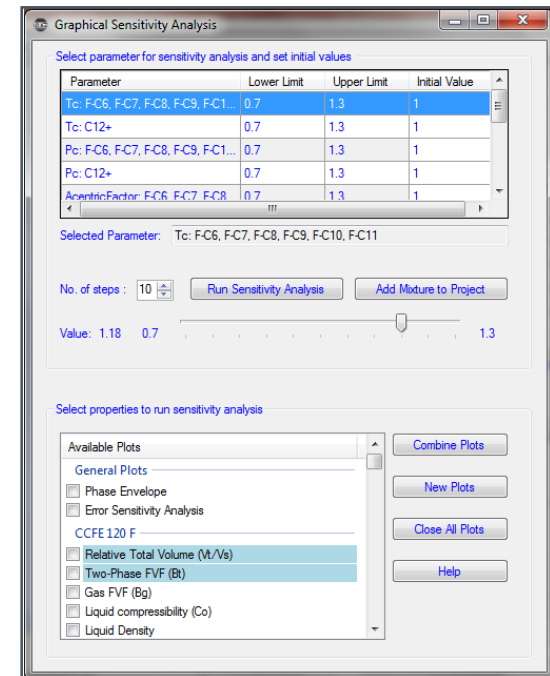
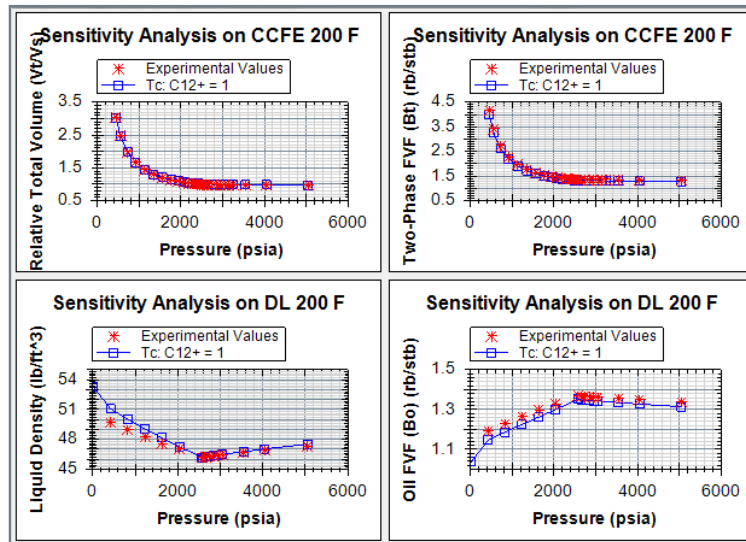


EOS Calibration



Graphical Sensitivity Analysis

Helps users to understand the effect of each parameter on simulation results





Technical Features



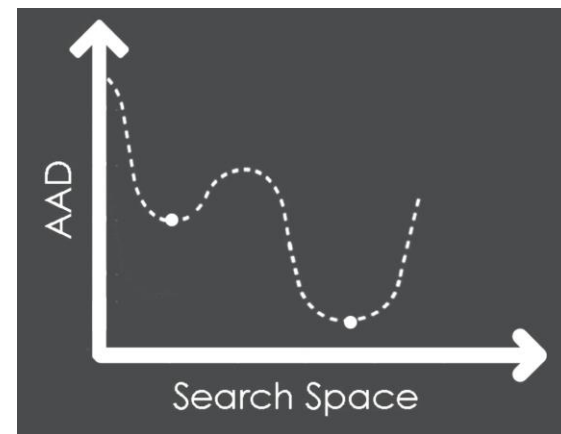
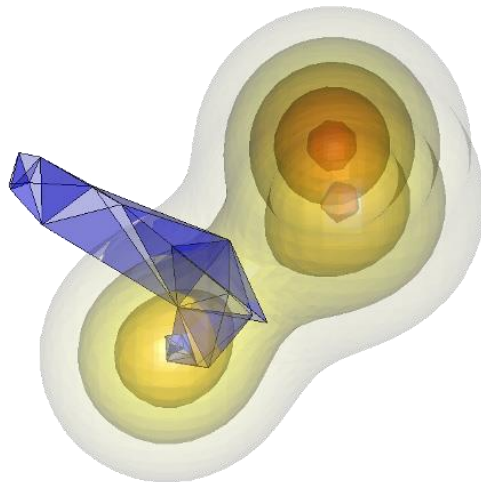
EOS Calibration



Search-Based Optimization Algorithms

Nelder-Mead Algorithm

Global Minimum





Technical Features



EOS Calibration



Auto-Regression

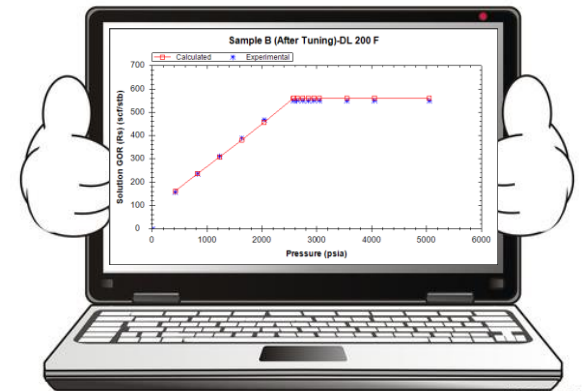
Insert your Data!



Wait a little bit!



Done!



- **Automatic** Parameter Selection!
- **Automatic** Interval Specification!
- **Automatic** Optimization Algorithm Selection!
- **Automatic** EOS Tuning!



Technical Features



Interactions with Simulators

- PVTi
- WinProp
- Las Files

Import



- Eclipse
- CMG
- Pipesim
- OLGA
- HYSYS
- Prosper

Export

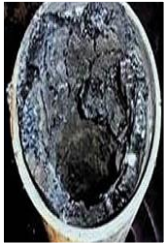




Technical Features



Flow Assurance



Asphaltene
Precipitation



Wax Appearance



Hydrate Formation



Elemental Sulfur



Technical Features

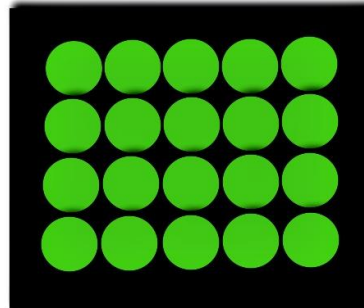


Asphaltene Precipitation

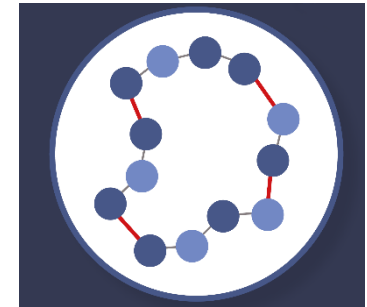


Polymer Models:

1. Flory-Huggins
2. Modified Flory-Huggins
3. Scott-Magat
4. Scott-Magat (4-Parameter)



Solid Model



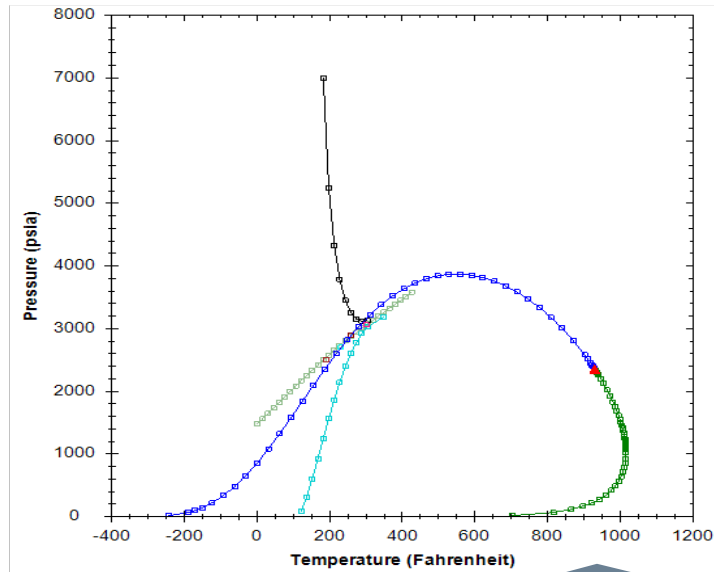
PC-SAFT EOS



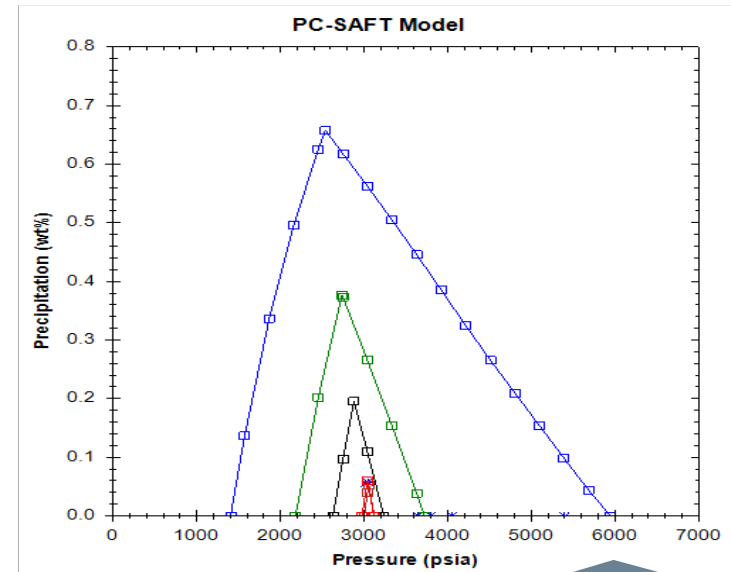
Technical Features



Asphaltene Precipitation



Phase Envelope



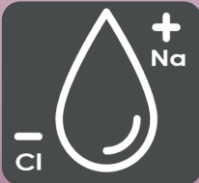
Precipitation Envelope



Technical Features



Water Package



Water Analysis Package

- Solubility Prediction and Brines Compatibility



Stiff Diagram Analyzer

- Dynamic Stiff Diagram and Type Curve Analysis



Comprehensive Flash

- Handling Oil-Gas-Brine-Deposited Salt Equilibrium



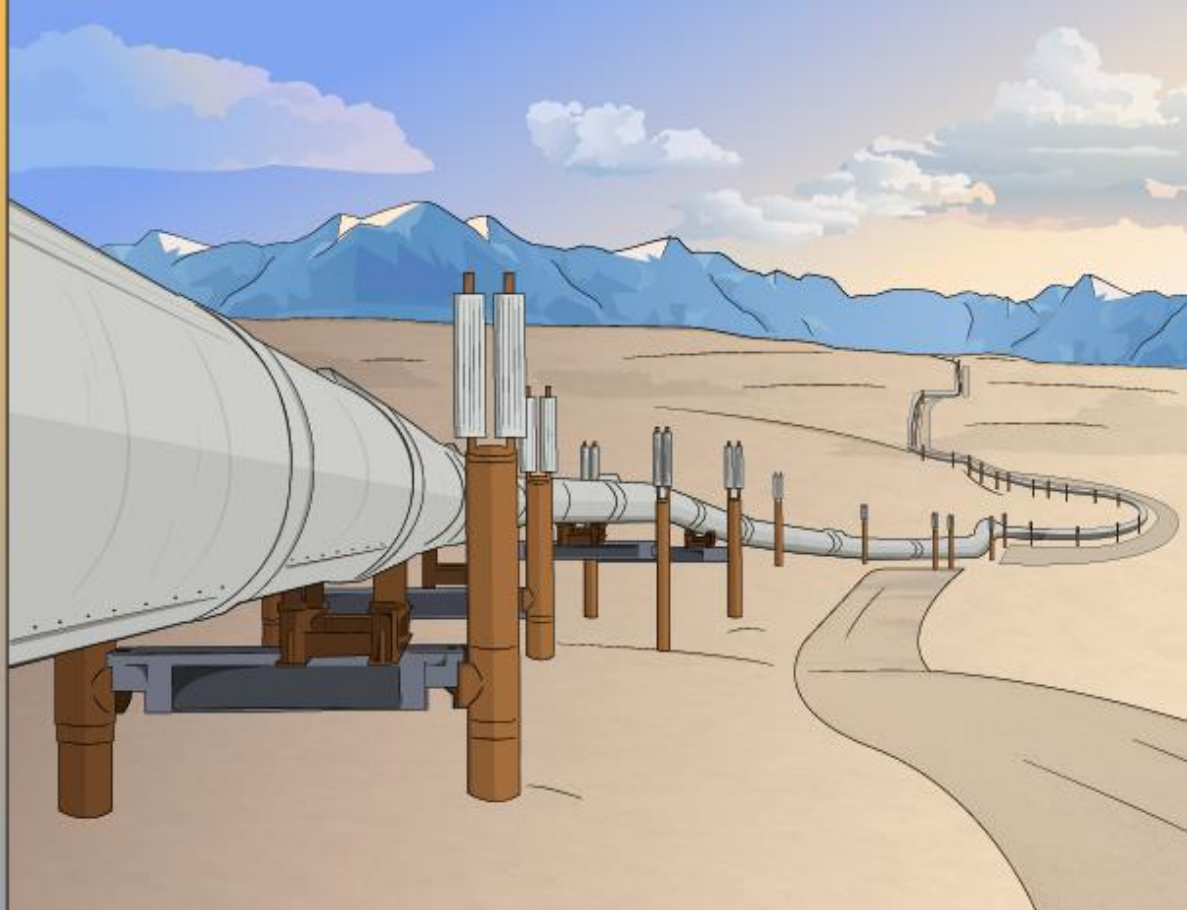
Steady-State Multiphase Flow Simulator

FlowPro

FlowPro is a mark of MTC
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are the properties of their respective owners.
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2018 Release
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MTC



Flow Pro Software

A Robust Multiphase Simulator for Well & Surface Facilities





Flow Pro

Well Tools

Main Insert Template Export

New Project Open Project Save Save As Simulation Fluid Unit System Unit Converter Inputs Overview Zoom To Fit Reset Zoom Zoom in Zoom out

Files Tasks Fluid Units

Well Settings

General Tubulars **Deviation Survey** Downhole Equipment Heat Transfer

	MD	TVD	INC	AZM	NS	EW	DLG	DX	DY	D _h
	m	m	°	°	m	m	%ft	m	m	m
1	0	0	0	0	0	0	0	0	0	0
2	500	497.465	10	0	43.5226	0	0.006096	0	43.5226	4
3	1000	989.869	10	0	130.347	0	0	0	86.8241	4
4	1500	1457.33	30	0	300.49	0	0.012192	0	170.143	4
5	2000	1806.86	60	0	650.018	0	0.018288	0	349.529	4

Graph

Vertical section (°): 0

Table

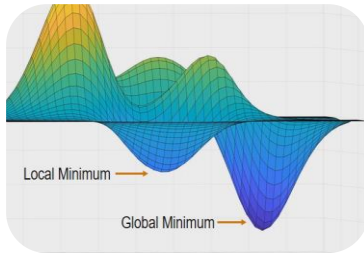
Active

OK Revert Cancel Apply

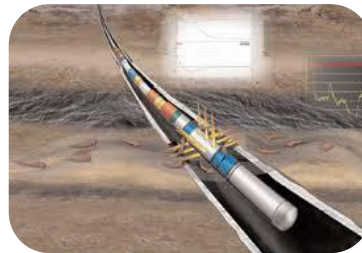
Tubing Casing Perforation Packer ESP Sliding Sleeve Tubing Plug



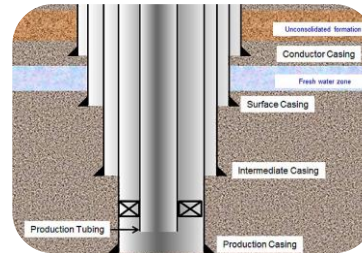
Technical Features



Well Parameter Optimization



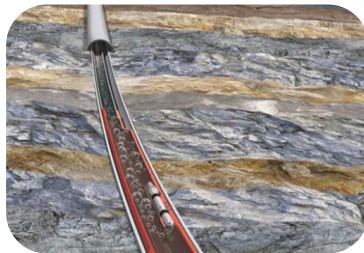
Diverse Well Completion Models



Well Modeling



Pipeline Simulations



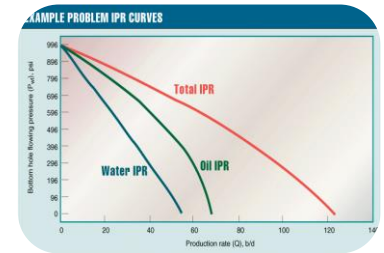
Artificial Lift



Downhole & Surface Facilities



Pressure Drop Calculations



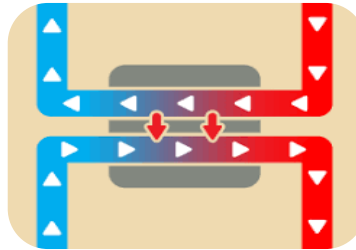
Well IPR Calculations



Technical Features



Corrosion & Erosion



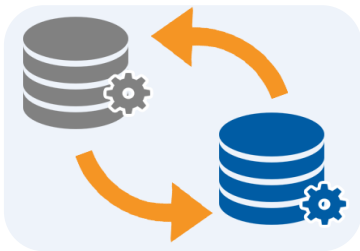
Heat Transfer Modeling



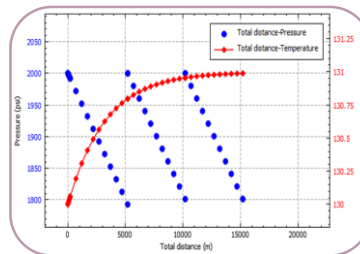
Flow Assurance



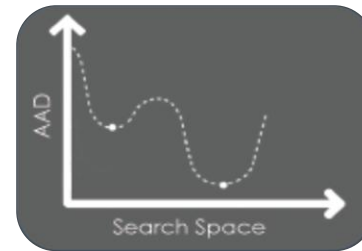
Fluid Modeling



Imports/Exports



Nodal Analysis



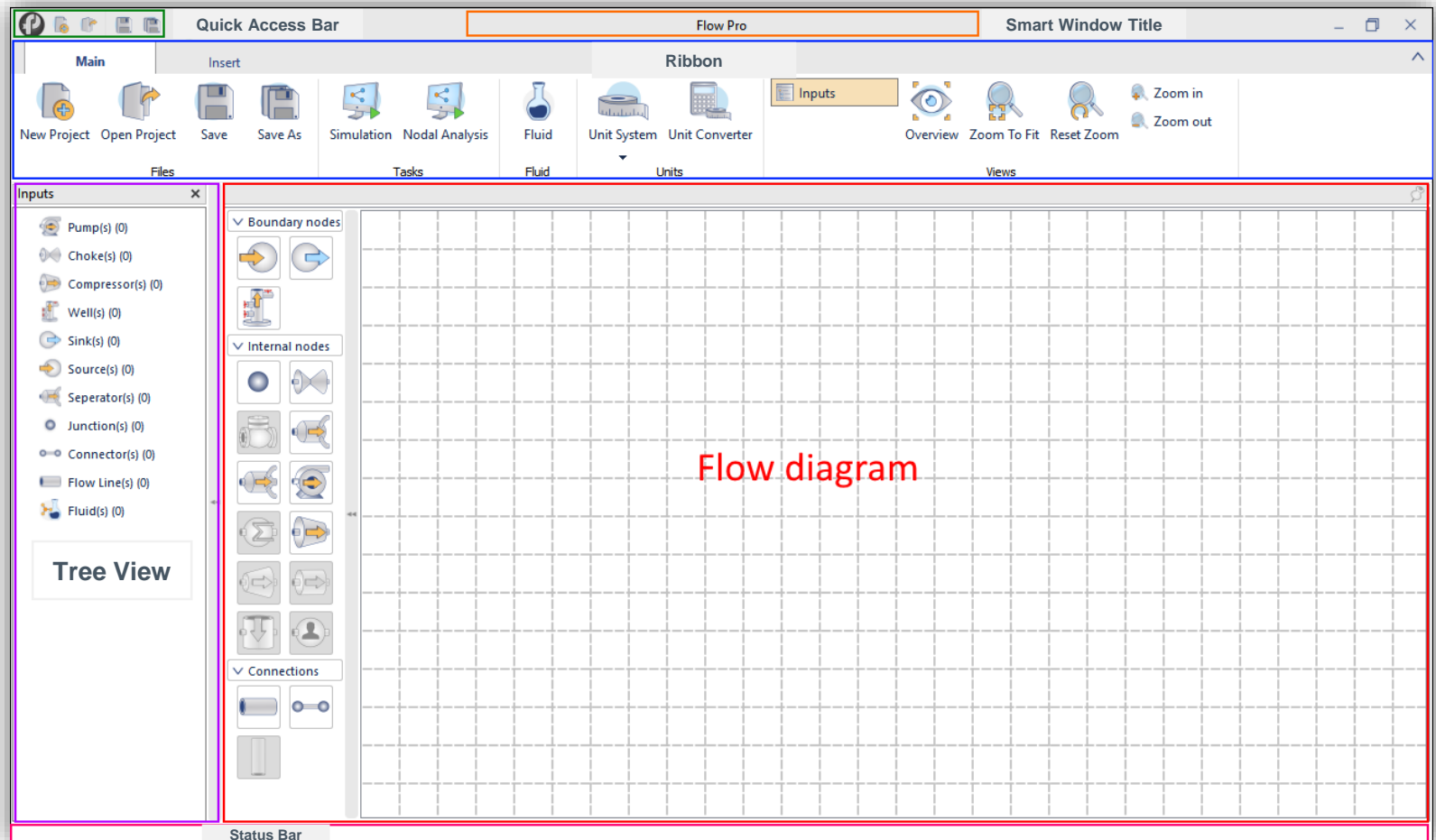
Sensitivity Analysis



Graphs/Tables



Main Window





Facilities



General Facilities

- Injection point
- Rate/Pressure Multiplier/Adder

Downhole Facilities

- SSSV
- Down Hole Separator
- No-Go Nipple
- Down Hole Choke

Surface Facilities

- Separator
- Heat Exchanger
- Pumps
- Compressor
- Expander
- Mixer
- Multiphase Booster
- Process Controllers



Flow Diagram Tool



The screenshot displays the Flow Pro software interface. The main window shows a flow diagram on a grid background. The diagram includes a Well, a Connector, a Choke, a Pump, and a Sink, connected by Flow Lines. The Pump is highlighted with a red box. A red arrow points from the Pump to the Overview window in the bottom right corner. The Overview window shows a small thumbnail of the flow diagram. The software interface includes a menu bar with options like New Project, Open Project, Save, Save As, Simulation, Nodal Analysis, Fluid, Unit System, and Unit Converter. A toolbar on the right contains icons for Overview, Zoom To Fit, Reset Zoom, Zoom in, and Zoom out. A left sidebar lists various components under 'Inputs', including Pump(s), Choke(s), Compressor(s), Well(s), Sink(s), Source(s), Separator(s), Junction(s), Connector(s), Flow Line(s), and Fluid(s). A central panel shows 'Boundary nodes', 'Internal nodes', and 'Connections' with corresponding icons. The word 'Facilities' is partially visible at the bottom of this panel.



Well Modeling



General Well Modeling

- Well Schematic
- Production Well (Vertical, Horizontal, Inclined)
- Injection Well
- Flow in Annulus
- Multiple Tabular/Annular Production

Well Design

- Optimal Tubing and Casing size
- Optimal Horizontal Completion Length
- Match Completion Parameters and Pressure-Temperature Profiles
- Detailed Sensitivity Analysis



Well Modeling Module



Flow Pro

Well Tools

Main Insert Template Export

New Project Open Project Save Save As Simulation Fluid Unit System Unit Converter

Inputs Overview Zoom To Fit Reset Zoom Zoom in Zoom out

Inputs

Well Settings

General Tubulars **Deviation Survey** Downhole Equipment Heat Transfer

	MD	TVD	INC	AZM	NS	EW	DLG	DX	DY	D...
	m	m	°	°	m	m	%/ft	m	m	m
1	0	0	0	0	0	0	0	0	0	
2	500	497.465	10	0	43.5226	0	0.006096	0	43.5226	4
3	1000	989.869	10	0	130.347	0	0	0	86.8241	4
4	1500	1457.33	30	0	300.49	0	0.012192	0	170.143	4
5	2000	1806.86	60	0	650.018	0	0.018288	0	349.529	4

Graph

Vertical section (°): 0

Table

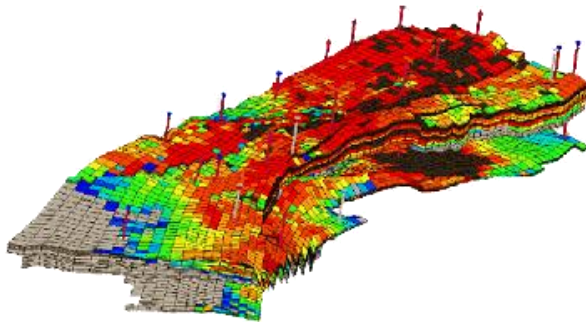
Active

OK Revert Cancel Apply

Tubing Casing Perforation Packer ESP Sliding Sleeve Tubing Plug



Reservoir IPR Modeling



Vertical IPR models

Horizontal IPR models

External IPR import

Well Completion models

Skin Analysis Model

Dietz shape factor

Multilayer Reservoir Modeling



Heat Transfer Modeling



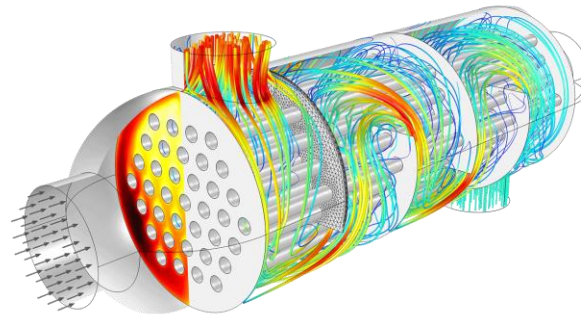
Convection (Free and Forced)

Conduction (Fixed overall heat transfer)

Elevation

Joule-Thompson Cooling and Heating

Frictional heating





PVT Modeling



Black Oil

- Imported from PVT Pro
- Correlation Calibration

Compositional

- EOS Models
- Aqueous Component Modeling
- Import PVT file



PVT Correlation Matching



Flow Pro

Main | Insert

Files | Tasks | Fluid | Units | Views

Inputs

Black Oil Fluid Manager

Fluids

Name	Description
1 Fluid_1	

Fluid Settings

Name: Fluid_1
Description:

General | **Correlations** | Thermal

Oil

Rs: Petrosky-Farshad
Bo (Saturated): Standing
Bo (UnderSaturated): Compressibility Law
Viscosity (Dead): Beggs-Robinson
Viscosity (Saturated): Beggs-Robinson
Viscosity (UnderSat): Petrosky-Farshad
Enthalpy: 2009

Gas

Z factor: Beggs-Brill
Viscosity: Lee et al.
Enthalpy: 2009

Emulsion

Viscosity: Continuous phase viscosity
Inversion cut-off: Specify Calculate
0.3 Fraction

Water

Density: McCutcheon
Viscosity: MaoDuan
Enthalpy: 2009

Calibration Settings

Formula

Correlation Name: Oil - Rs - PetroskyFarshad

$$R_s(P, T) = C \times \left[\left(\frac{P}{112,727 + 12.34} \right) \times \% \times 10^{\frac{-0.8439}{0.5774}} \right]^{-1}, X = -4.561$$

Calibrating Parameters

Calibrate	Name	Min	Initial	Max	opt.Val.
<input checked="" type="checkbox"/>	C1	0.9	1	2	1.30498

Calibration Data

	Pressure	Temp.	Weight	Rs
	psi	°F		SCF/STB
1	500.000	92.000	1.000	100.000
2	1000.000	92.000	1.000	150.000

OK Cancel Apply



Simulation Results



Simulation

Simulation Simulation Log Node Results Branch Results Profile Results

Boundary Conditions

Type filter: All Required P, Q specifications: 2 Reset all

Well boundary conditions location: Surface Supplied P, Q specifications: 2 Update all

Name	Type	Pressure (P)	Flowrate Type	Flowrate	Flowrate Unit	Temperature	Fluid
1 Source	Source	5000.000 psi	Mass		lbm/s	200.000 °F	Fluid_1
2 Sink	Sink		Mass	2	lbm/s		

Rate Constraints

Settings

Override phase ratios

Run Stop

Simulation

Simulation Simulation Log Node Results Branch Results Profile Results

Branches

Filter: Type to filter...

Source

Table Plot

Filter: All Filter Columns

	Equipment	Type	Pressure	Temperature	Mass rate	Phase s
5	Flow Line_1	Flowline	6056.11 psi	99.8042 °F	10 lbm/s	Oil-
6		Flowline	6055.14	99.6462	10	Oil-
7	Compressor	Compressor	7266.17	121.09	10	Oil-
8	Flow Line_2	Flowline	7266.17	121.09	10	Oil-
9		Flowline	7262.92	120.907	10	Oil-
10	2P Separator	Seperator	7262.92	120.907	10	Oil-

Compressor

Limited by: Pressure ratio Route: Adiabatic

Power: 174.96764267 HP Pressure out: 7266.1734958 psi

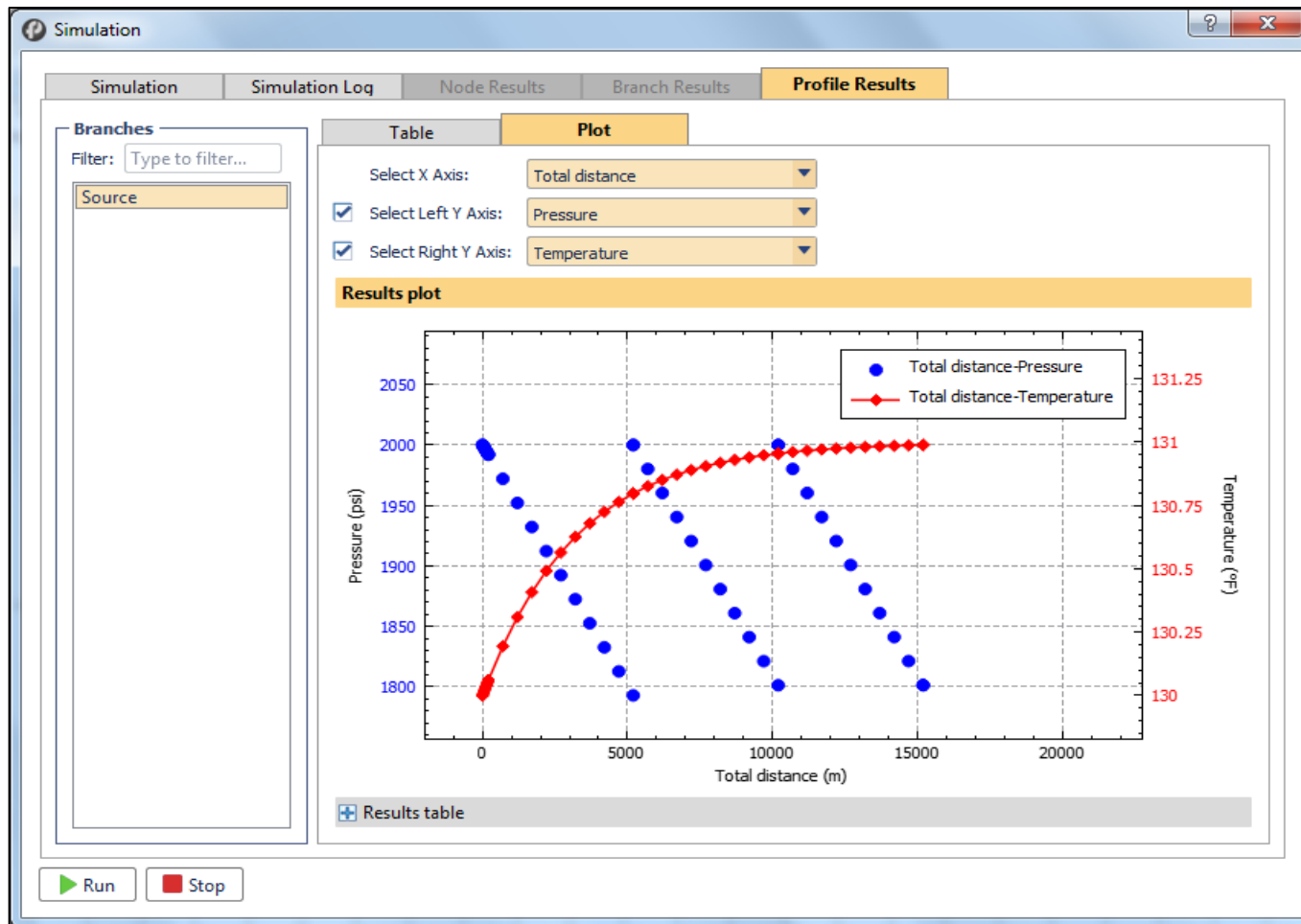
Pressure diff: 1211.028916 psi Pressure ratio: 1.2 Unitless

Temperature diff: 21.443386032 °F Efficiency: 1 Fraction

Run Stop



NODAL Analysis





Centri Pro Software

Centrifuge Lab Equipment
Data Management & Processing





Main Window

Header

Contractor: ... Client: ...

ABDOL INDUSTRIAL PROJECTS MANAGEMENT CO. UPSTREAM LABS. UPSTREAM STUDIES GROUP

CLIENT: HTC

SPECIAL CORE ANALYSIS REPORT OF SELECTED SAMPLES FROM WELL NO.: PetroVision OF PetroVision OIL FIELD.

Calculations

	T (min)	RPM	Bond no.	Oil prod. (cc)	Cum. Prod.	Oil rec.	Sw avg (%)
1	0	0	0	0	0	0	100
2	211	600	8.25798e-10	0	0	0	100
3	196	1000	2.29388e-09	0	0	0	100
4	227	1500	5.16123e-09	0	0	0	100
5	218	2000	9.17553e-09	1.72	1.72	22.2222	77.7778
6	231	2400	1.32128e-08	1.04	2.76	35.6589	64.3411
7	210	2900	1.92915e-08	0.72	3.48	44.9612	55.0388
8	410	2900	1.92915e-08	0.33	3.81	49.2248	50.7752
9	211	3400	2.65173e-08	0	3.81	49.2248	50.7752

Brief Information

	Property	Value
1	System	Centrifuge o-w ...
2	Data Processing	
3	Sample Type	
4	Sample ID	6-16V
5	Depth (m)	11.37
6	Length (cm)	5.04
7	Diameter (cm)	3.8
8	Porosity (%)	13.78
9	Absolute Gas Perm(mD)	
10	Brine Perm(mD)	0.38
11	Saturated Pore Vol(cc)	7.74
12	Initial Water Sat(%)	100.00
13	Sample State	Aged
14	Ko @ Swi	
15	Kw @ Sor	
16	Apparatus	UCEN-110V
17	Min.R (cm)	6.66

Buttons:



Main Features

Apparatus
Connection

Capturing Image
Automatically

Experiment Data
Management

Detect Volumes by
Image Processing

Calculating Rock
SCAL Parameters

Comprehensive
Report/ Export



Experiment Data Input

- › User friendly
- › Various Unit Systems
- › Verifying Inputs
- › Smart forms

The screenshot displays several overlapping windows for data input in the ML PRO software. The windows are organized into sections:

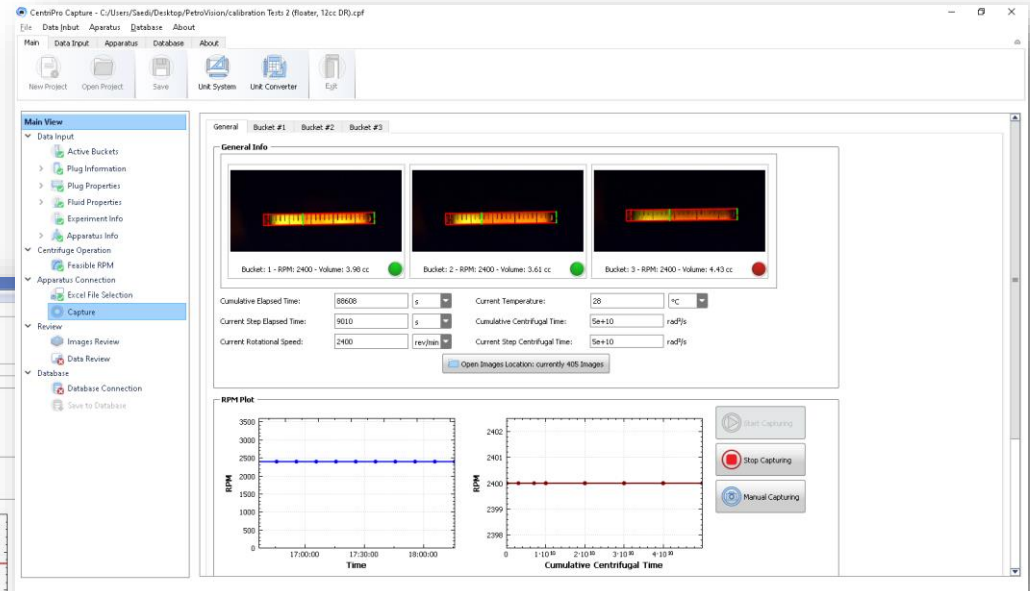
- General:** Core Nb: [] (marked with a red X), Plug ID: 312 (marked with a green checkmark), Plug Type: Vertical (dropdown), Archie Notation: [], Formation: [], Plug State: [] (dropdown).
- Common Property:** Fluid System: Water-Oil (dropdown, marked with a green checkmark), Interfacial Tension: 90 dynes/cm (dropdown, marked with a green checkmark), Immobile Sat.: [] %, Initial Wet Sat.: 100 % (dropdown, marked with a green checkmark), Salinity: 167000 ppm.
- Wetting Fluid:** Fluid: Water (dropdown, marked with a green checkmark), Fluid Type: Pure Water (dropdown).
- Non-Wetting Fluid:** Fluid: Oil (dropdown, marked with a green checkmark), Fluid Type: Synthetic Oil (dropdown), Other Fluid: [], Compressibility: 0 1/atm (dropdown, marked with a green checkmark), Density: 0.5 g/cm³ (dropdown, marked with a green checkmark), Viscosity: 0.2 cP (dropdown, marked with a green checkmark).
- General (bottom window):** Displacement Type: Drainage (dropdown, marked with a green checkmark), Bucket Size: 12 cc (dropdown, marked with a green checkmark).
- Ambient Conditions (bottom window):** Temperature: [] °C (dropdown), Pressure: 1 atm (dropdown, marked with a green checkmark).
- Stability Criteria (bottom window):** Min Stability Time: 20 min (dropdown, marked with a green checkmark), Max difference between current production and ultimate recovery at each step: 0.2 Fract (dropdown, marked with a green checkmark), Max Production Change: .02 cc/hr (dropdown, marked with a green checkmark).

Buttons for 'Copy to All', 'Apply', and 'Cancel' are visible at the bottom of the windows.



Capturing Image Automatically

- › Online Image Processing (volume detection)
- › Manual/ Auto Capturing
- › Smart steady notify
- › RPM suggestion
- › Experiment Statistics





Images Management

- › Image Enhancements
- › Removing Inappropriate Images
- › Auto Assigning image to tubes (modifiable by drag n drop)

All Images (465 are loaded)

Bucket #1 (155 Images) Bucket #2 (155 Images) Bucket #3 (155 Images)

2019.09.05 21-25-56 2019.09.05 21-25-56 2019.09.05 21-25-56

2019.09.05 21-15-55 2019.09.05 21-15-55 2019.09.05 21-15-55

2019.09.05 21-05-54 2019.09.05 21-05-54 2019.09.05 21-05-54

2019.09.05 20-55-53 2019.09.05 20-55-53 2019.09.05 20-55-53

2019.09.05 20-45-52 2019.09.05 20-45-52 2019.09.05 20-45-52

2019.09.05 20-35-52 2019.09.05 20-35-52 2019.09.05 20-35-52

Selected Image

show Detected Volume

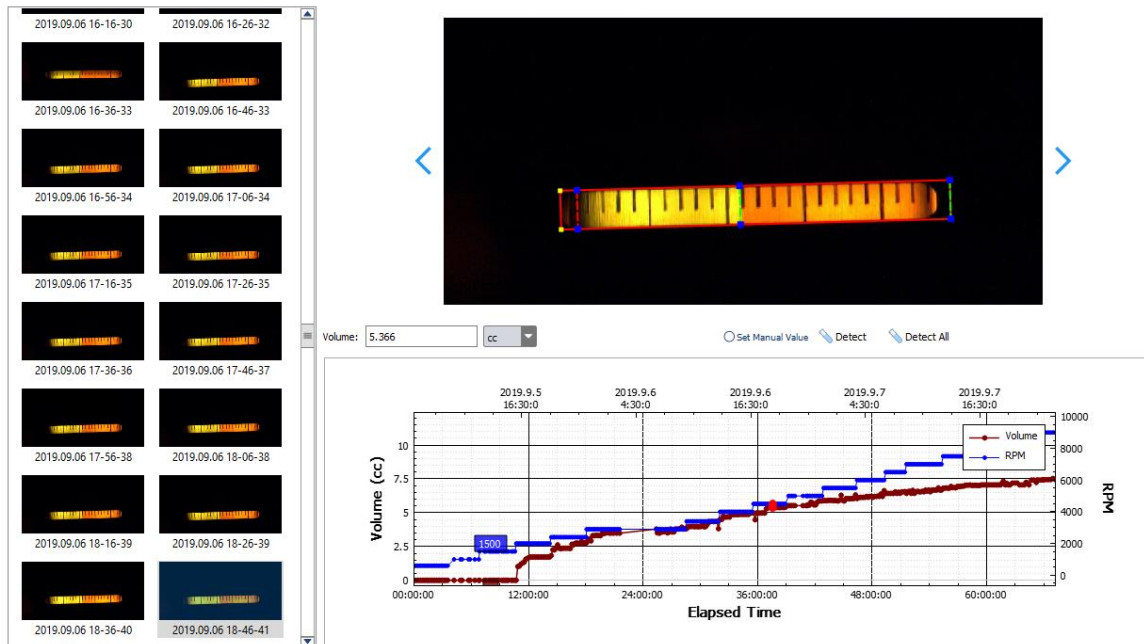
Bucket: 3 - RPM: 2900
Time: 2019.09.05 21-15-55
Temp: 28
Volume 4.60 CC

Save Changes Reload



Images Processing

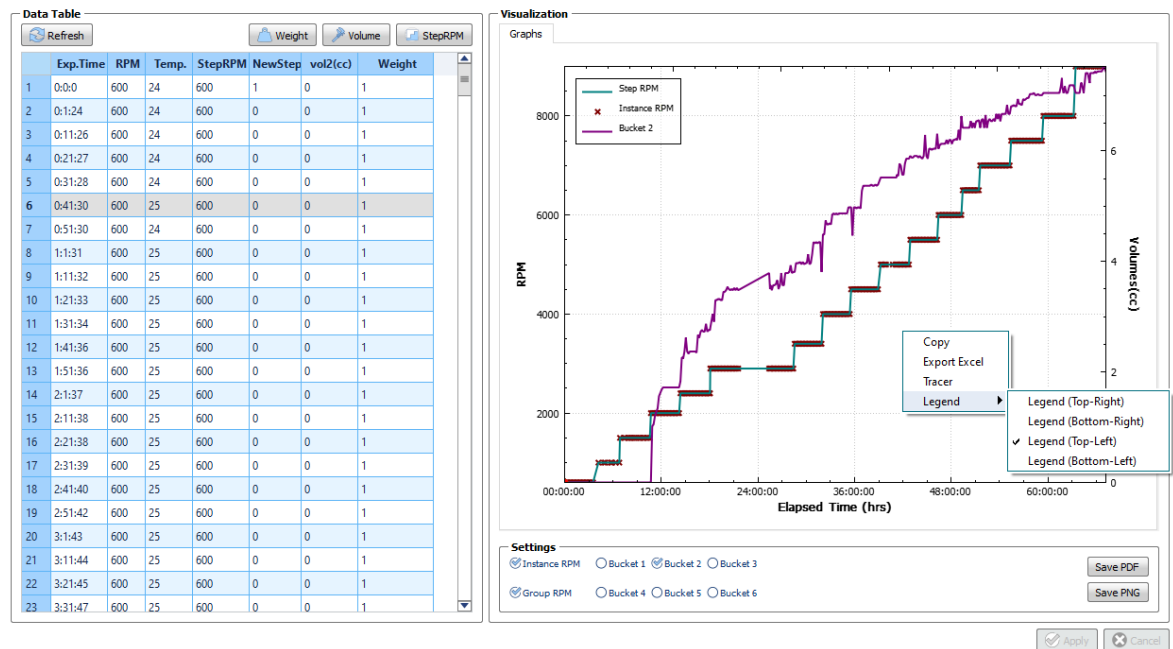
- › Calculating Displaced Fluid Volume
- › Image Enhancement
- › Manual Volume Override
- › Volume/ Time & RPM Plot





Data Review

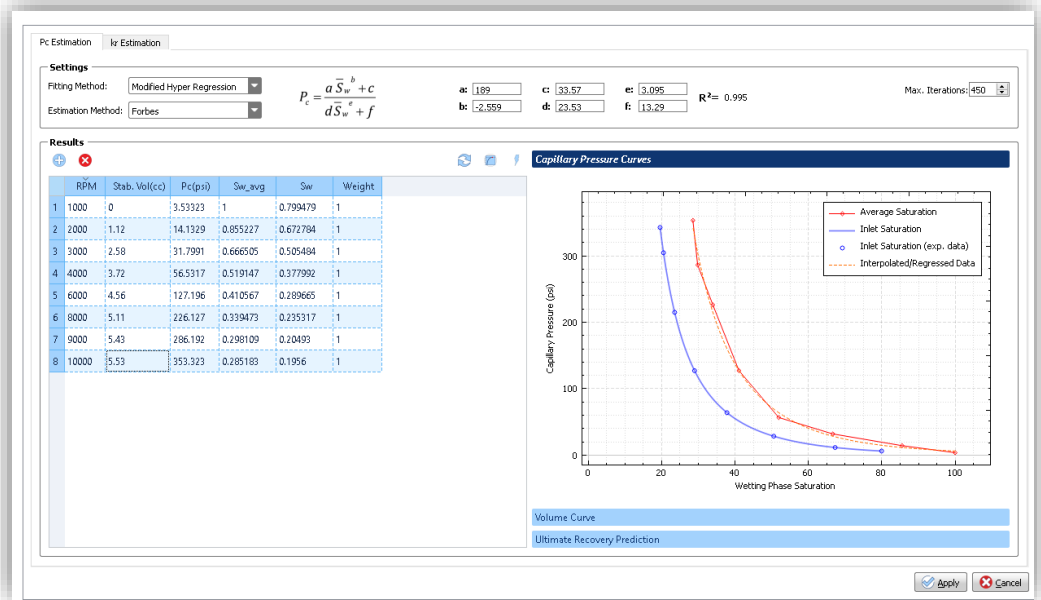
- › Modifying Volume/ RPM Manually
- › Assigning Weight
- › Comprehensive Plot
- › Export Plot





Analytical Estimation

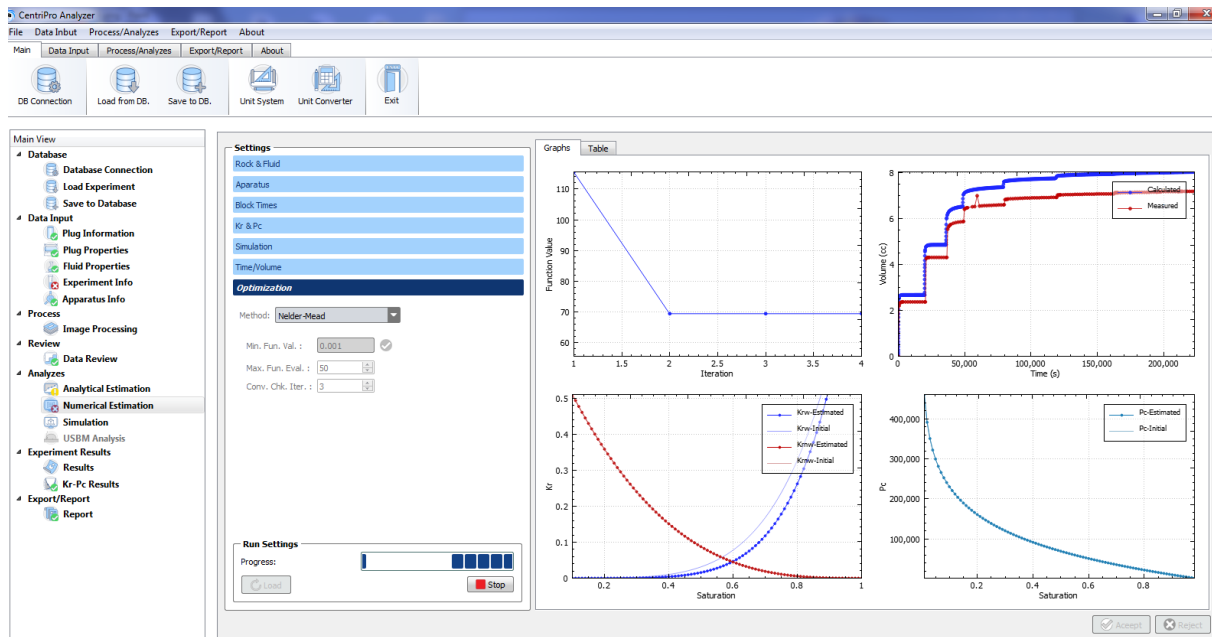
- › Capillary Pressure & Relative Perm Estimation
- › Ultimate Recovery Prediction
- › Latest Estimation Methods
- › Multiple Fitting Methods
- › Fast & Robust





Numerical Estimation

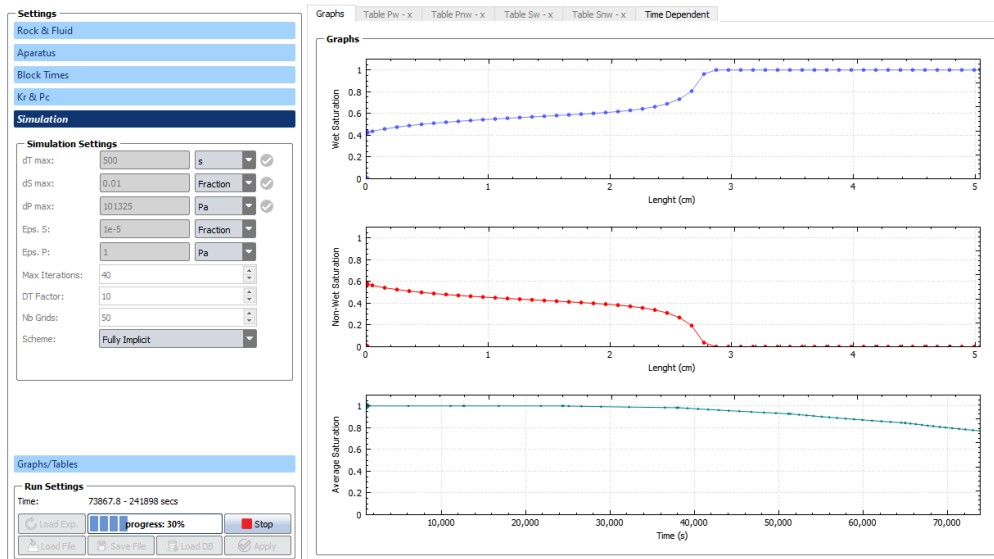
- › Estimation by History Matching
- › Capillary Pressure/ Relative Perm Function Tuning
- › Search Base/ Evolutionary Optimization Methods
- › Fully Implicit Scheme





Centrifuge Experiment Simulation

- › Multiple Capillary Pressure & Relative Perm Models
- › Fully Implicit Scheme
- › Numerical Settings
- › Fast & Robust
- › Customizable Graph/ Table Outputs





Reporting

- › Full Report of Results
- › Customizable Template
- › Microsoft Word & Excel 2007 format

Brief Information Production Curve

Header

Contractor: ... Client: ...

SCHLUMBERGER UPSTREAM LABS. UPSTREAM STUDIES GROUP

CLIENT: MTC

SPECIAL CORE ANALYSIS REPORT OF SELECTED SAMPLES FROM WELL NO.: 125

Calculations

	T (min)	RPM	Bond no.	Oil prod. (cc)	Cum. Prod.	Oil rec.	Sw avg (%)	Inlet Pc	Remarks
1	0	0	0	0	0	0	100	0	
2	211	600	8.25798e-10	0	0	0	100	1.27161	
3	196	1000	2.29388e-09	0	0	0	100	3.53226	
4	227	1500	5.16123e-09	0	0	0	100	7.94759	
5	218	2000	9.17553e-09	1.72	1.72	22.2222	77.7778	14.129	
6	231	2400	1.32128e-08	1.04	2.76	35.6589	64.3411	20.3458	
7	210	2900	1.92915e-08	0.72	3.48	44.9612	55.0388	29.7063	
8	410	2900	1.92915e-08	0.33	3.81	49.2248	50.7752	29.7063	
9	211	3400	2.65173e-08	0	3.81	49.2248	50.7752	40.8329	
10	210	4000	3.67021e-08	1.17	4.98	64.3411	35.6589	56.5162	
11	210	4500	4.64511e-08	0.41	5.39	69.6382	30.3618	71.5283	
12	230	5000	5.7347e-08	0.47	5.86	75.7106	24.2894	88.3065	
13	211	5500	6.93899e-08	0.45	6.31	81.5245	18.4755	106.851	
14	180	6000	8.25798e-08	0.32	6.63	85.6589	14.3411	127.161	
15	130	6500	9.69165e-08	-0.07	6.56	84.7545	15.2455	149.238	

Brief Information

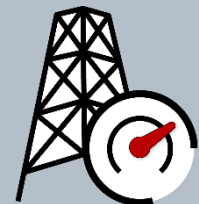
Property	Value
1 System	Centrifuge o-w ...
2 Data Processing	
3 Sample Type	
4 Sample ID	6-16V
5 Depth (m)	11.37
6 Length (cm)	5.04
7 Diameter (cm)	3.8
8 Porosity (%)	13.78
9 Absolute Gas Perm(mD)	
10 Brine Perm(mD)	0.38
11 Saturated Pore Vol(cc)	7.74
12 Initial Water Sat(%)	100.00
13 Sample State	Aged
14 Ko @ Swi	
15 Kw @ Sor	
16 Apparatus	UCEN-110V
17 Min.R (cm)	6.66
18 Max.R(cm)	11.70
19 Mean.R(cm)	3.33
20 Temp(°C)	26.00
21 NonWet-Fluid	Synthetic Oil
22 Wet-Fluid	Synthetic Brine

Apply Cancel Generate Report



ML Pro Software

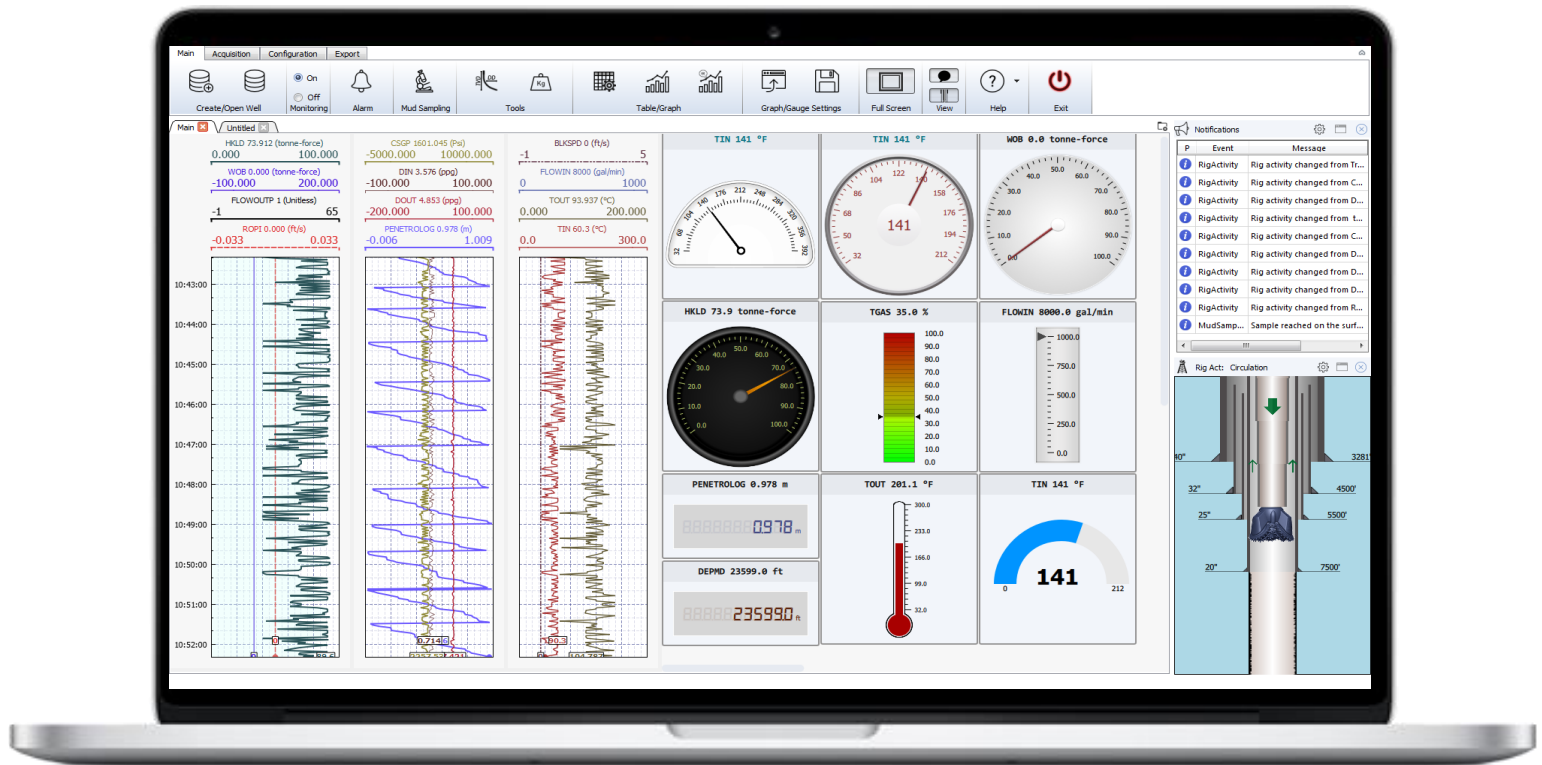
Mud Logging Unit Software





Main Window

Multi-tab Monitoring Panels

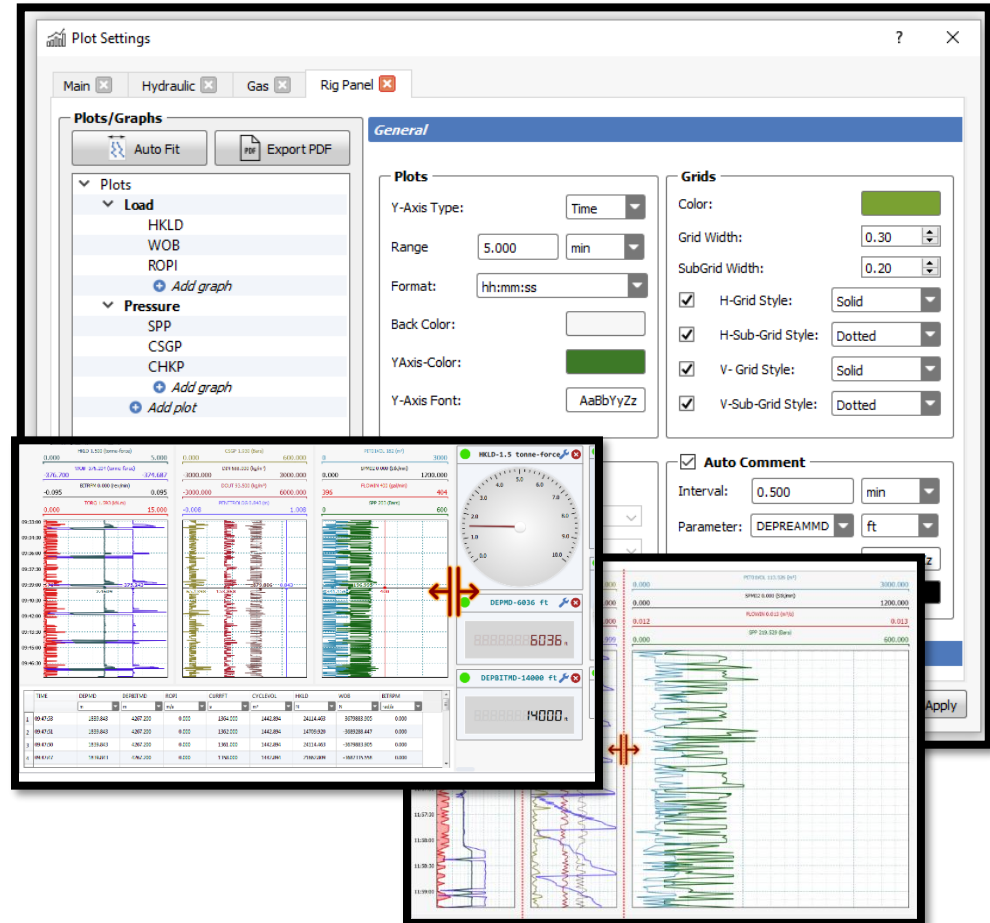




Monitoring Panels - Graphs

Full Customization (Online)

- › Add/Remove Plot/Graph
- › Fonts
- › Colors
- › Ranges
- › Sizes
- › Time/Depth-based
- › Grid/Sub-Grids
- › Parameters Unit
- › **Easily Resizable**
- › Panels
- › Graphs

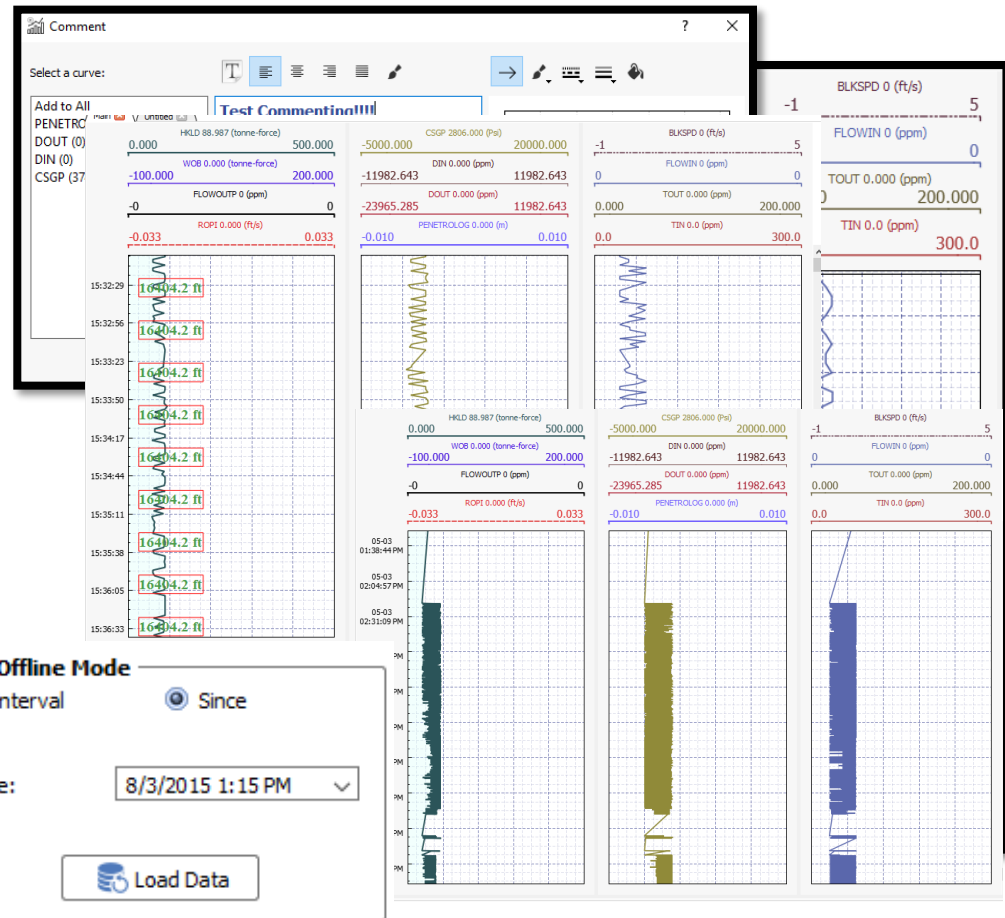




Monitoring Panels - Graphs

Commenting

- › Manual Commenting
- › Auto Commenting
- › **Offline Data Loader**
- › Panning/Zooming
- › Time/Depth Based





Monitoring Panels - Gauges

› Full Customization (Online)

- › Data Source
- › Caption
- › Control Settings
- › Alarm
- › Color

› Other Features

- › Multi-Selection
- › Auto Arrange
- › Screen Panning
- › Copy/Paste gauges
- › Custom Gauges/Themes

The screenshot displays a configuration window for a gauge. On the left, the 'Control Settings' section includes:

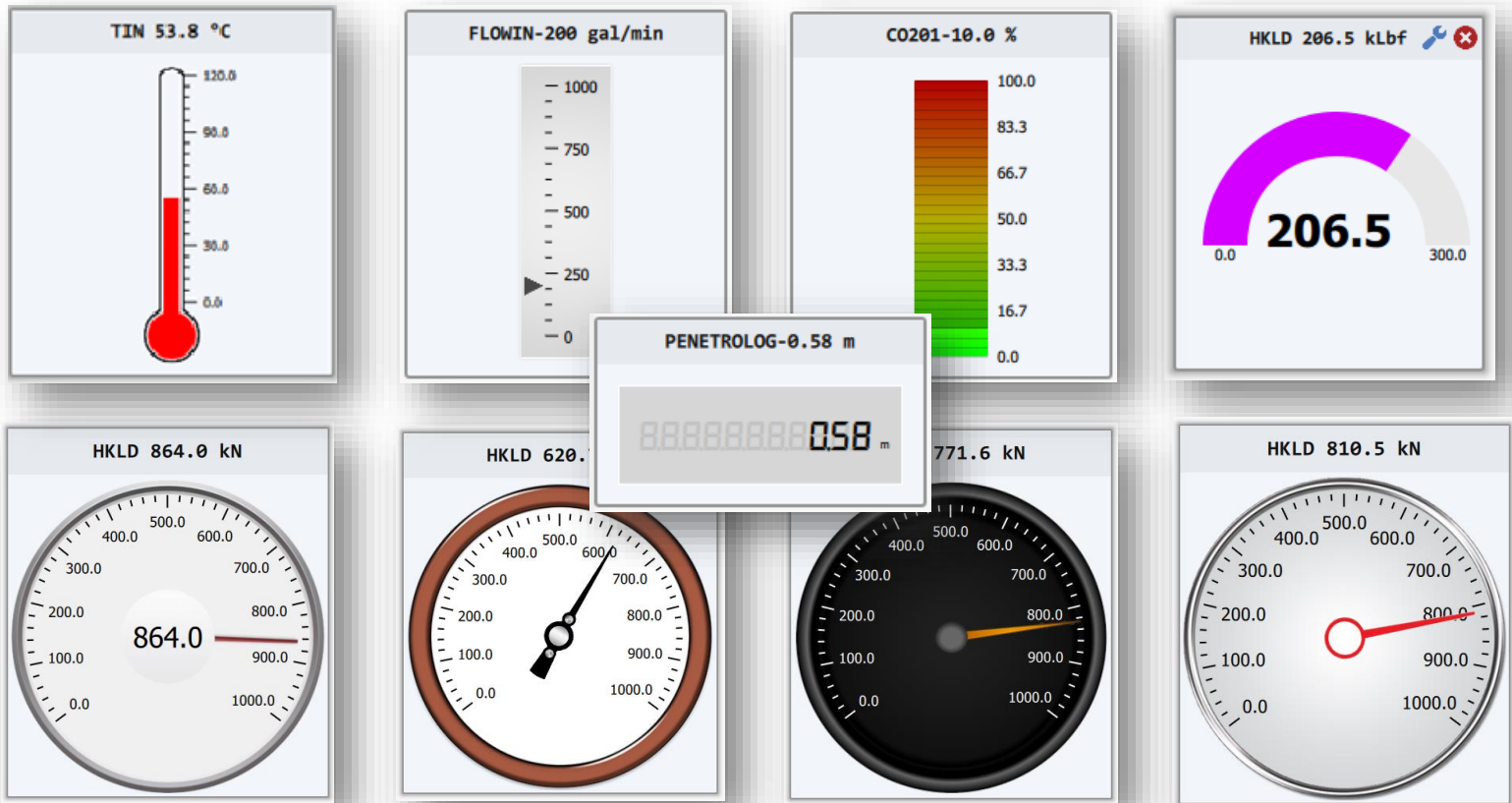
- Data:** (dropdown)
- Caption:** (dropdown)
- Control Settings:**
 - Minimum: 0 ft/min
 - Maximum: 1000 ft/min
 - Theme: Theme 4
 - Auto Scaling:
 - Scale Ratio: 1.2
 - Tick Radius: 108
 - Font Size: 11
 - MajorTick Length: 10
 - MinorTick Length: 0.5
 - Major Tick Num: 11
 - Minor Tick Num: 4
 - Decimal Number: 1
- Alarm Settings:** (dropdown)
- Color Settings:** (dropdown)

On the right, a preview of the gauge is shown with the caption 'ROPI 500.0 ft/min'. The gauge face has a scale from 0.0 to 1000.0 with major ticks every 100.0 and minor ticks every 20.0. The needle points to 500.0. At the bottom of the window are 'Reset', 'Ok', and 'Cancel' buttons.



Monitoring Panels - Gauges

› Rich Predefined Gauges





Monitoring Panels - Online Table

- › Displaying online data in grid view
- › Customizable Parameter Selection

	DEPMD	TIME	GASRETMD	CHRRETMD	RIGHEAVE	BLOCKSEP	BITDIST
	ft		ft	ft	ft	ft	ft
1	16404.199	18:09:28	5000.000	0.000	0.000	0.000	16404.199
2	16404.199	18:09:26	5000.000	0.000	0.000	0.000	16404.199
3	16404.199	18:09:24	5000.000	0.000	0.000	0.000	16404.199
4	16404.199	18:09:22	5000.000	0.000	0.000	0.000	16404.199
5	16404.199	18:09:20	5000.000	0.000	0.000	0.000	16404.199
6	16404.199	18:09:18	5000.000	0.000	0.000	0.000	16404.199
7	16404.199	18:09:16	5000.000	0.000	0.000	0.000	16404.199
8	16404.199	18:09:14	5000.000	0.000	0.000	0.000	16404.199
9	16404.199	18:09:12	5000.000	0.000	0.000	0.000	16404.199
10	16404.199	18:09:10	5000.000	0.000	0.000	0.000	16404.199
11	16404.199	18:09:08	5000.000	0.000	0.000	0.000	16404.199



Other User Interfaces

Well Schematic

- › Real Time/ Real Scale
- › Interactive
- › Rig Activity Type
- › Mud Circulation/ Mud Samples
- › Bit Rotation/ Bit Type
- › Wash-Out Leakage
- › Open Hole/ Case Hole

Notification Panel

- › Smart Notifications
- › Default Notifications for Rig Activity, Alarms, Mud Sampling, Washout, Kick Detection Analysis, etc.

The screenshot displays two windows from the software. The top window, titled 'Rig Act: Circulation', shows a well schematic with a central pipe and surrounding casing. The schematic is divided into sections with depth markers: 40', 32', 25', and 20' on the left; and 3281', 4500', 5500', and 7500' on the right. A green arrow points down in the center pipe, and two green arrows point up in the casing. The bottom window, titled 'Notifications', is a table with columns for 'P', 'Event', 'Message', and a date/time column. It lists several 'Alarm' events with 'Notification Message' and 'Washout' events with 'Washout has been occurred ...'. Below the table, there are three notification cards, each with a yellow information icon and the text 'Sample reached on the surface'.

P	Event	Message	
!	Alarm	Notification Message	3/7/16 11
!	Alarm	Notification Message	3/7/16 11
!	Alarm	Notification Message	3/6/16 6:
!	Alarm	Notification Message	3/6/16 6:
!	Alarm	Notification Message	3/6/16 6:
!	Alarm	Notification Message	3/6/16 6:
!	Alarm	Notification Message	3/6/16 6:
i	Washout	Washout has been occurred ...	3/6/16 5:
i	Washout	Washout has been occurred ...	3/6/16 5:
!	Alarm	Sample reached on the surface	
!	Alarm	Sample reached on the surface	
!	Alarm	Sample reached on the surface	



Rig Properties

Properties

- › Pumps
- › Pits
- › Surface Lines

Hook Position Calibration Methods:

- › Direct Pully
- › Calibration Table
- › Drawwork Characteristics

Rig Properties

General Pumps Pits Surface Lines **Hook Position**

Calibration Mode
Mode: Calibration Table Drawworks Characteristics Direct Pully

Current Values
Pulse: 1196
Hook Pos/Rotary Table: 49.163 ft

Settings

Initial Values
Pulse: 1000
Hook Pos/Rotary Table: 47.520 ft
Nb of Full Layers: 5
Turns on Last Layer: 2

Drum/Cable Properties
Drum Diameter: 0.984 ft
Cable Diameter: 0.058 ft
Space Between Two Turns: 0.008 ft
Nb of Pulses/Revolution: 50
Nb of Drill Lines: 10
Max. Turns on 1st Layer: 50
Max. Turns on Other Layers: 50
Max. Number of Layers: 20
Correction Factor: 1.000000



Parameter Settings

Data Source:

- ❖ Computed ❖ Analog ❖ Coder ❖ Counter ❖ Chromatograph
- ❖ Total Gas ❖ WITS ❖ Formula ❖ Manual Value

Analog Calibration

Interpolation Methods:

- › Hermit
- › Piecewise
- › Least Square

The screenshot displays two windows from the software. The 'Parameters Setting' window on the left shows a list of parameters with 'RETDEPMD' selected. The 'Analog Calibration' window on the right is active, showing a table of calibration points, a graph of the calibration curve, and various settings.

Name	Channel
27 TORQ	47
28 FLOWIN	59
29 FLOWIN	1
30 FLOWOUT	24

Converter Value	Calibrated Value
1 0	0.223
2 1000	0.446
3 1500	0.546
4 2000	0.600

The graph in the 'Analog Calibration' window shows a curve with four points labeled 'User Defined'. The x-axis is 'Converter Value' (0 to 2100) and the y-axis is 'Calibrated Value (ft³/s)' (0.24 to 0.6). The 'Boundary' section shows 'Lower Boundary: Linear With x-min Derivative' and 'Upper Boundary: Linear With x-max Derivative'. The 'Current Value' section shows 'Converter: 505', 'Calibrated Value: 0.339 ft³/s', and 'Force Manual Value: 0.62384259 ft³/s'.



Hydraulic Analysis

Summary Results

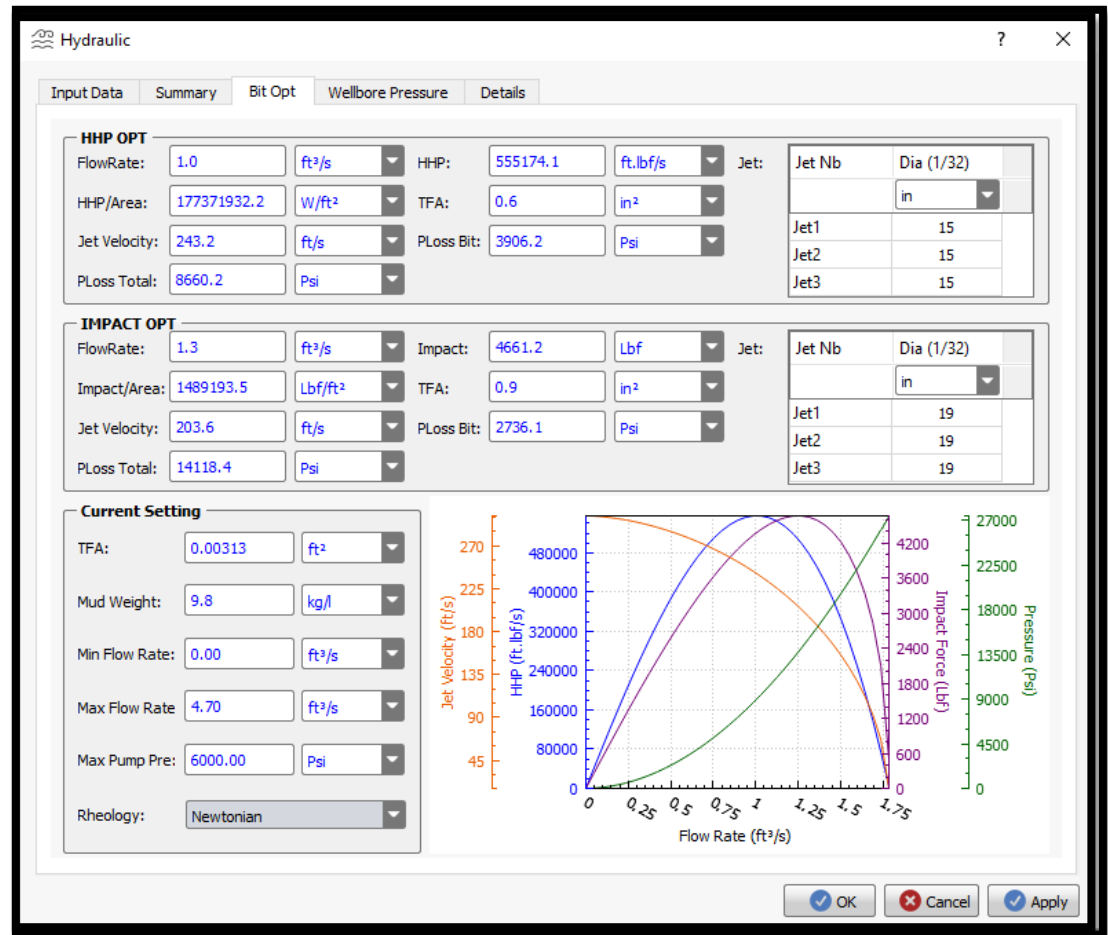
- › Detailed DPs
- › Bit Parameters
- › ECD Values
- › Bar Chart

Optimization for:

- HHP
- Impact Force



Optimized
Nozzle Diameters

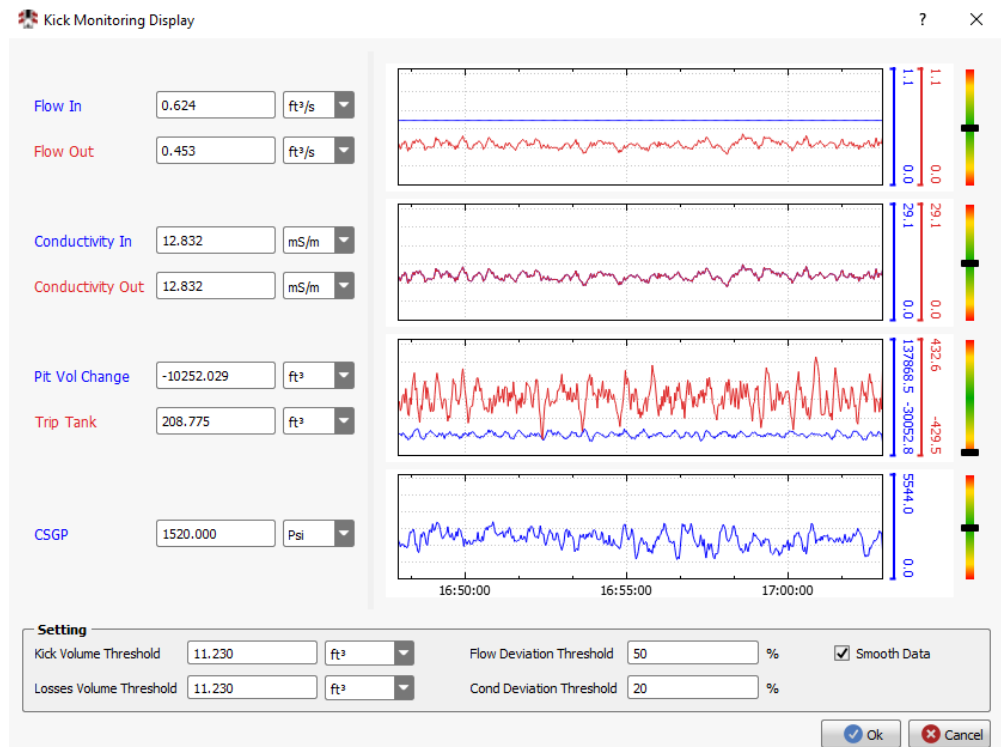




Kick Detection

Methods

- › Conductivity In/Out
- › Pit Vol Change
- › Flow In/Out
- › Trip Tank
- › CSGP





Washout Analysis

Tracer Type:

- › Gas Tracer
- › Solid Tracer

Mud Sampling

- › Start Time
- › Sample Location
- › Velocity
- › Notification
- › Current/
Coming Depth
- › Remaining
Time/ Stroke/ Volume

Washout

00:02:49

Mud Sampling

From Top From Bottom Remove Remove all

Depth Interval: 1.00 m

	Start	Coming Depth	Current Depth	Rem. Time	Rem
		ft	ft		
1	13:22:09	5000.000	3921.217	0:2:17	137
2	13:22:11	0.000	2300.856	0:3:12	192
3	13:22:13	5000.000	4026.849	0:2:21	141
4	13:22:15	0.000	1687.928	0:3:15	195
5	13:22:17	5000.000	4132.481	0:2:25	145
6	13:22:21	0.000	1120.707	0:3:21	201
7	13:22:23	5000.000	4290.928	0:2:31	151

24" 3281'

19.2" 4500'

14.4" 5500'

12" 7500'

Ok Apply



Deviation Survey

Deviation Survey

+ Add - Remove TVD Tools

MD	Inclination	Azimuth
ft	°	°
1	0.000	0.000
2	50.000	2.000
3	100.000	2.000
4	200.000	2.000
5	300.000	4.000
6	400.000	5.000
7	500.000	8.000
8	600.000	12.000
9	700.000	14.000
10	800.000	16.000

TVD-MD Conversion

Conversion Type: MD to TVD
 TVD to MD

Measuring Depth: 100 ft

True Vertical Depth: 99.96 ft

Interpolate Between Survey Data

Vertical Depth (m)

Displacement (m)

TVD: 297.27 m
MD: 302.19 m

Horizontal Departure(ft)

Azimuth: 80

OK Cancel Apply



Unit Conversion

Units System

Unit System: FIELD
Description: Oil Field Unit Sys

Base Units

Angles
Angle: radian
Dog leg severity: 9/100 ft

Forces
Force: Lbf
Force by area: Lbf/ft²
Torque: Lbf.ft
Weight: tonne-f
Weight linear: Lbf/ft

Gas Concentration
Gas conc. (chromato): ppm
Gas conc. (others): ppm

Length
Length: ft
Diameter: in

Unit Conversion Table

Unit Family: FORCE

From:

- Lbf
- kdaN
- kgf
- tonne-force
- gf
- kN
- N
- daN
- kdyne
- kLbf
- dyne
- pdl
- kip

To:

- Lbf
- kdaN
- kgf
- tonne-force
- gf
- kN
- N
- daN
- kdyne
- kLbf
- dyne
- pdl
- kip

1 kN

Is equivalent to :

224.80894300 Lbf

Close

OK Cancel Apply



Data Management

DataBase

- › Create New Well (New Database)
- › Open Well (Created Databases)

OFFLINE Importing/Exporting

- › Multi-Threaded
- › DataBase Selection
- › Based on Rig Mode
- › Different File Formats:
XML/ WITSML/ ASCII/ EXCELL/ LAS

WITS (In/out)

- › Multi-Threaded
- › Multi-Client

WITS In

WITS Out Server: 127.0.0.1 9600

Connection Status: ConnectedState Unit: Metric FPS

	Item No.	Long Mnem.	Short Mnem.	Description	Soft. Param.	Value	Metric Unit
3	0103	RECID	RID	Record Identifier		0	
8	0108	DEPTBITM	DBTM	Depth Bit (meas)	DEPBITMD	1524	m
9	0109	DEPTBITV	DBTV	Depth Bit (vert)	DEPREAMTVD	15.8615697...	m
12	0112	BLKPOS	BPOS	Block Position	CHRRETMD	0	m
13	0113	ROPA	ROPA	Rate of Penetration (avg)	ROPI_AVG	0	m/h
14	0114	HKLA	HKLA	Hookload (avg)	HKLDS_AVG	182.108814...	kdaN
15	0115	HKLX	HKLX	Hookload (max)	HKLDS_MAX	182.108814...	kdaN
48	0203	RECID	RID	Record Identifier		0	
55	0210	ROPA	ROPA	Rate of Penetration (avg)	ROPI_AVG	0	m/h
57	0212	HKLA	HKLA	Hookload (avg)	HKLDS_AVG	182.108814...	kdaN
84	0303	RECID	RID	Record Identifier		0	
99	0318	HKLX	HKLX	Hookload (max)	HKLDS_MAX	182.108814...	kdaN

Null Value:



Thanks for Your Attention