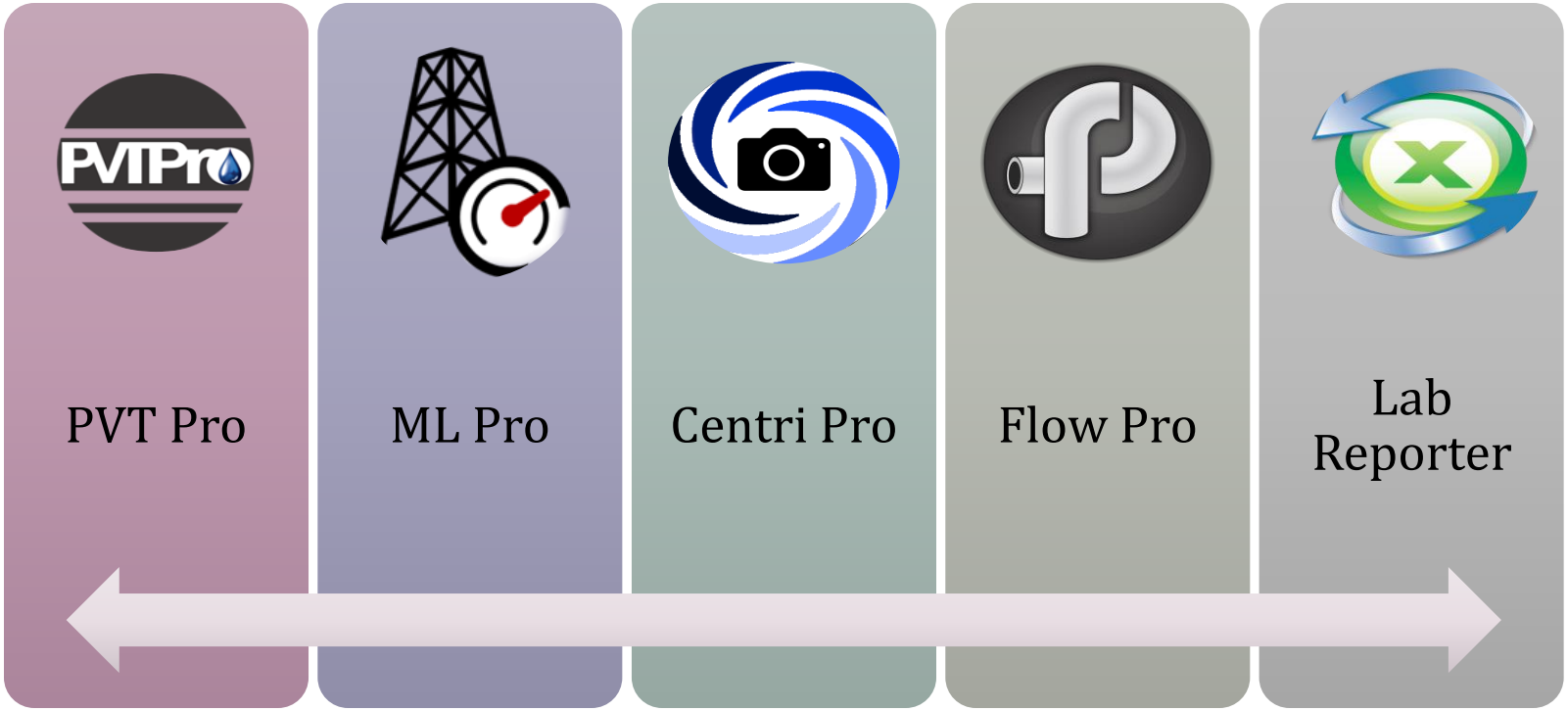
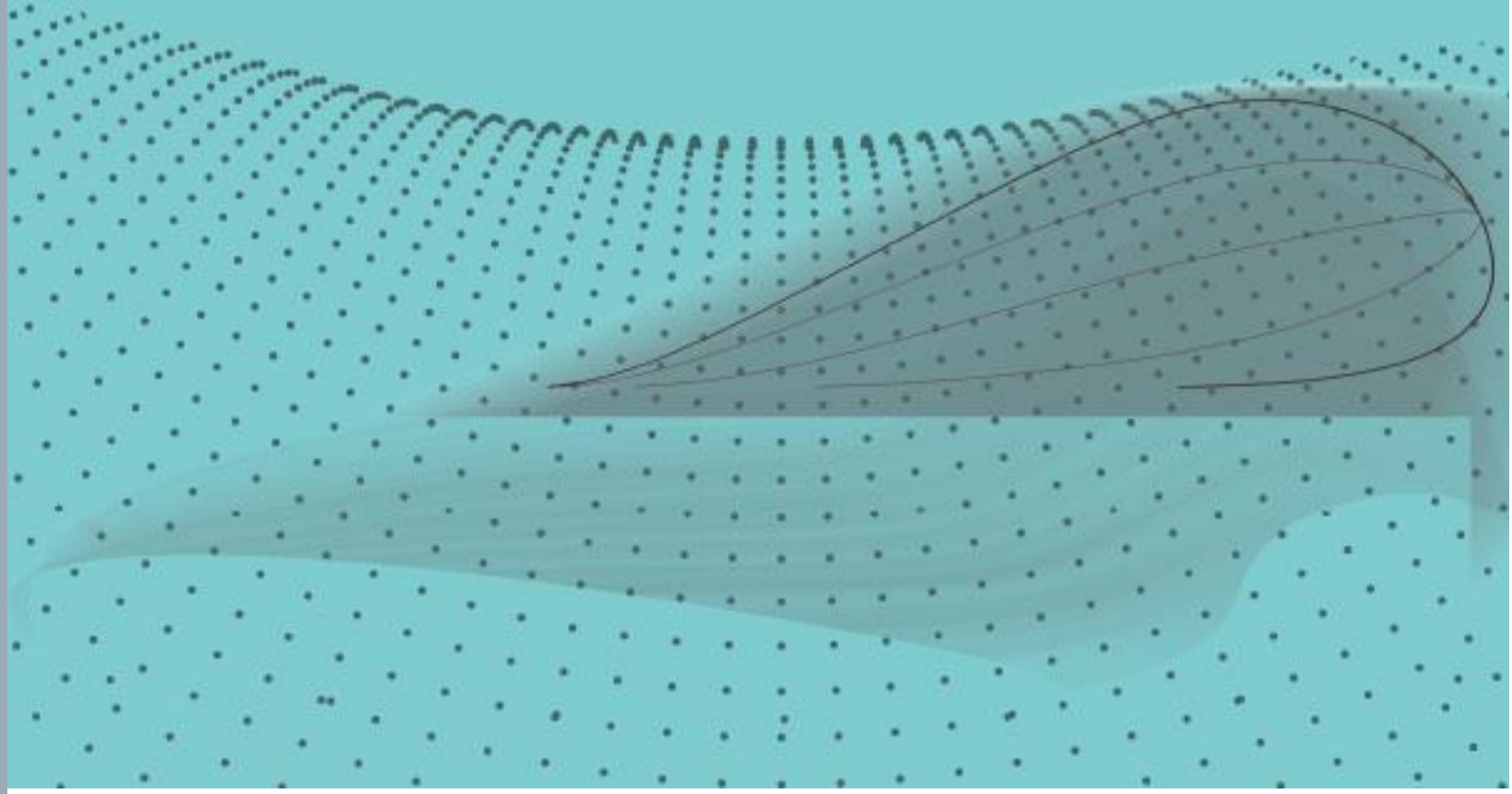
MIS INTERNATIONAL LTD. INC.

MIS Software Products

MIS Technology Center

MIS Software Products





PVT Pro Software

A Comprehensive & Practical Tool for PVT Experts


PVT Pro
FILE
Mixture
Experiments
Asphaltene
Tools
Plot
Export
View
Help
Add
Insert
Edit
Rename
Delete
Duplicate
Move Up
Move Down
Split
Group
Mixing
Clean
Single Mixture
Multiple Mixture
Fast PVT Calculator
Add Mixture
Edit Mixture
Splitting & Grouping
Sample Preparation
Regression
Tools
File Browser
Reservoir Sample
Experiments
CCFE 160 F
DL 250 F
DL 250 F - Viscosity Data
Bubble Point 160 F
Bubble Point 200 F
Bubble Point 250 F
Asphaltene Models
Reservoir Sample (After Tuning)
Experiments
CCFE 160 F
DL 250 F
DL 250 F - Viscosity Data
Bubble Point 160 F
Bubble Point 200 F
Bubble Point 250 F
Asphaltene Models
PC-SAFT Model
Fast Composition
Mixture Name: Reservoir Sample
Composition Type : Mole Fraction
Component
Mole Fraction
Hydrogen Sulp... 0.018698
Nitrogen (N2) 0.0031
Carbon Dioxid... 0.033697
Methane (C1) 0.435856
Ethane (C2) 0.085791
Propane (C3) 0.062694
i-Butane (i-C4) 0.016398
Fast Phase Envelope
Regression History
11/29/2018|7:56:48 PM
Result of regression performed at: 11/29/2018|7:56:48 PM
• Optimization Algorithm: Nelder-Mead (Search-based)
Unlimited number of iterations (stop by user)
Regression History
Project Log File
Name/Comment Editor
D:\Asphaltene Modeling-PC-SAFT Model 1.pvtp

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

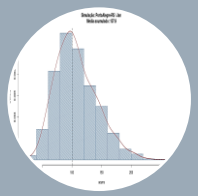
Miscibility Analysis

EOS Based Methods	Correlations
• First Contact Miscibility Pressure • Semi-Analytical Key Tie Line • Multiple Mixing Cell • Slim Tube Experiment	• 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.



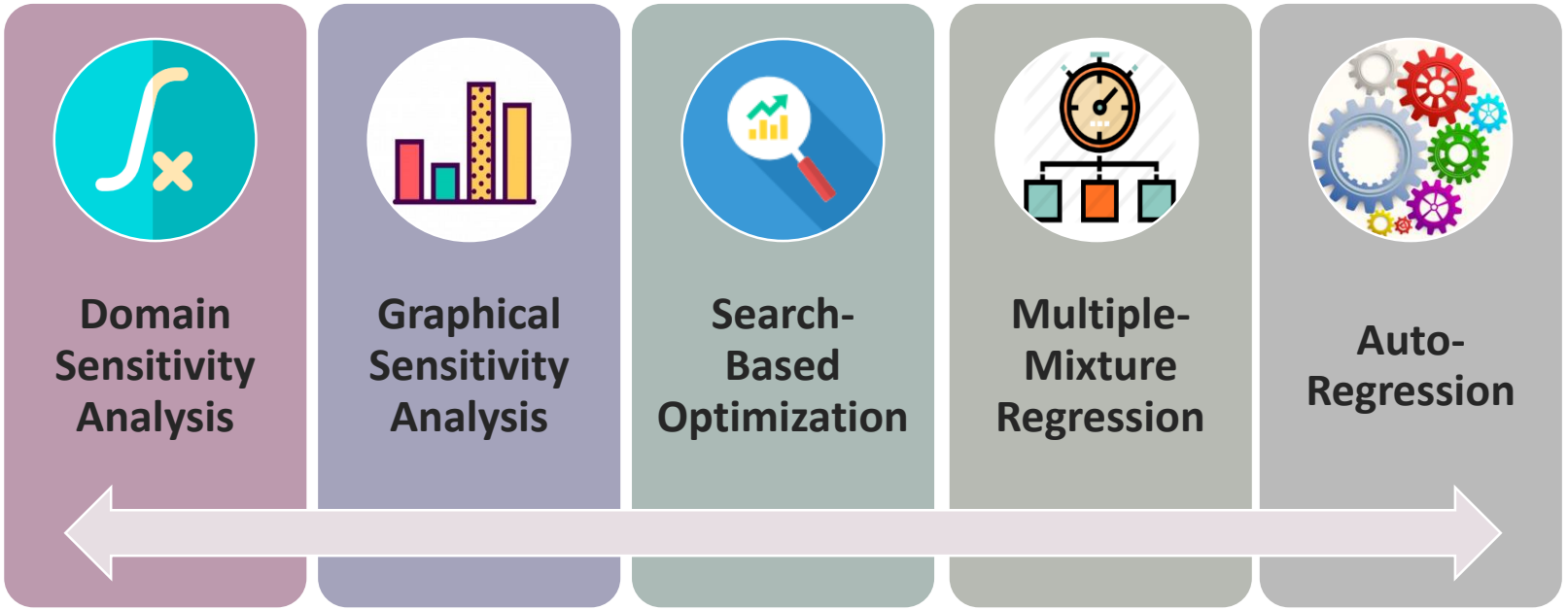
Splitting Options
(α, β, γ, …)

Experimental Data
(DL, CCE, Pb, …)

Technical Features

EOS Calibration

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

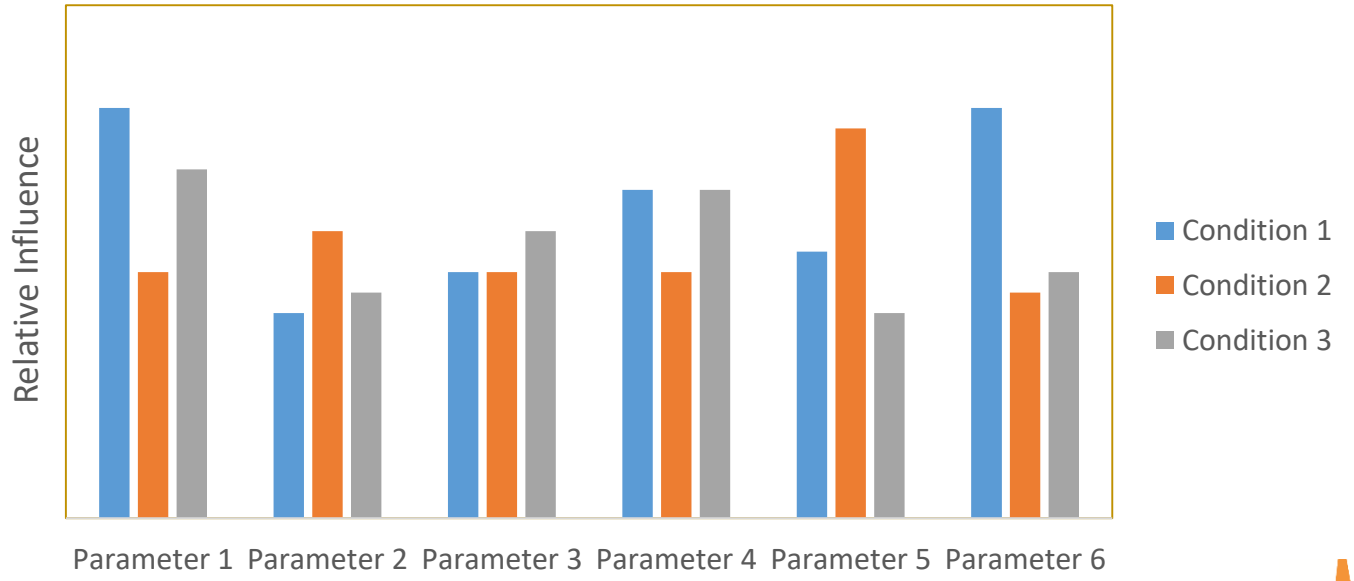


Technical Features

EOS Calibration

Domain Sensitivity Analysis

Helps users finding the most effective regression parameters

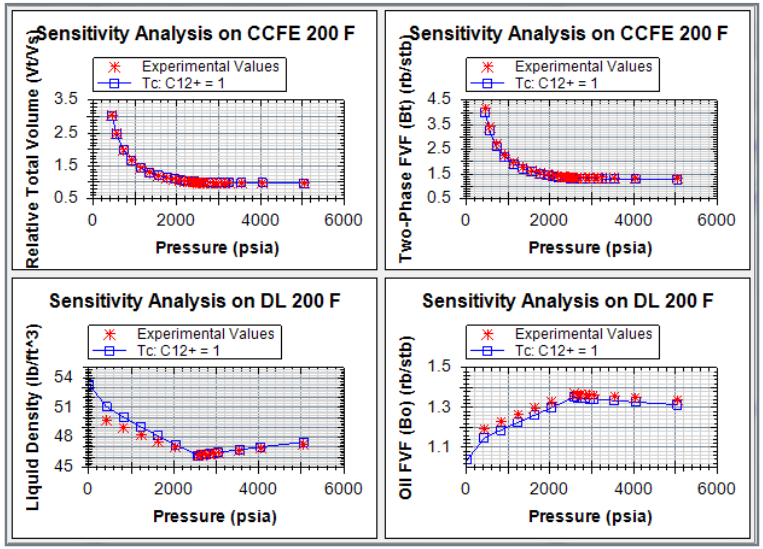


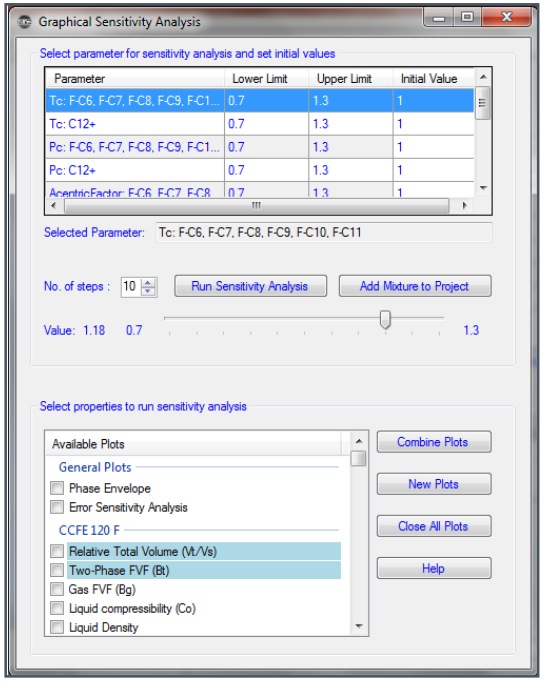
Technical Features

EOS Calibration

Graphical Sensitivity Analysis

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



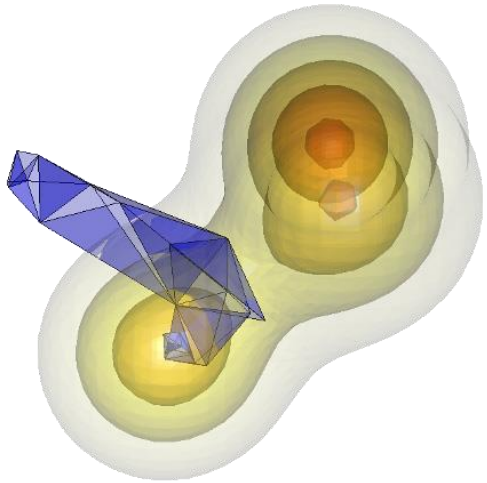


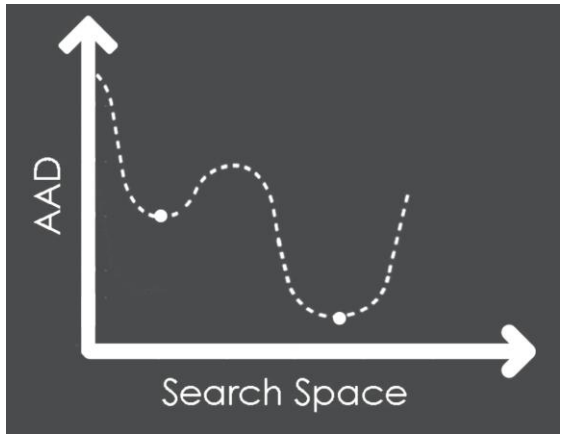
Technical Features

EOS Calibration

Search-Based Optimization Algorithms

Nelder-Mead Algorithm → Global Minimum





Technical Features

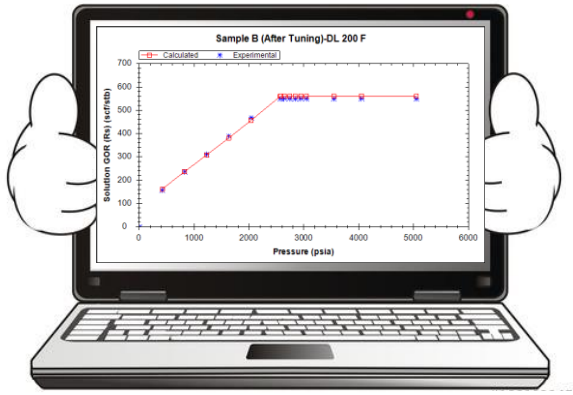
EOS Calibration

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

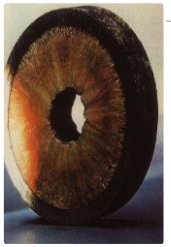
- Eclipse
- CMG
- Pipesim
- OLGA
- HYSYS
- Prosper

Export

Technical Features

Flow Assurance

Asphaltene Precipitation



Wax Appearance

Hydrate Formation

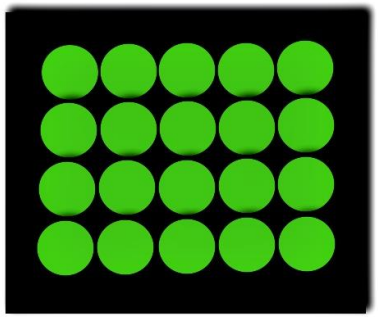
Elemental Sulfur

Technical Features

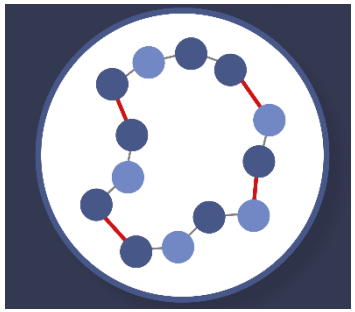
Asphaltene Precipitation

Polymer Models:

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



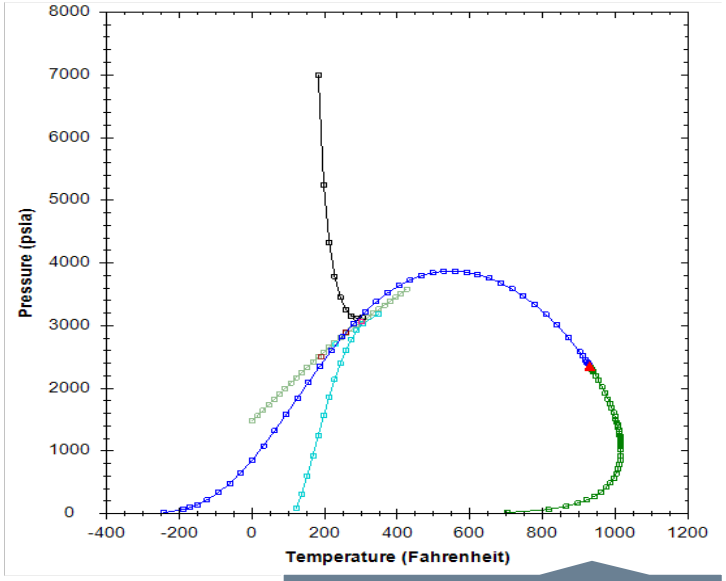
Solid Model



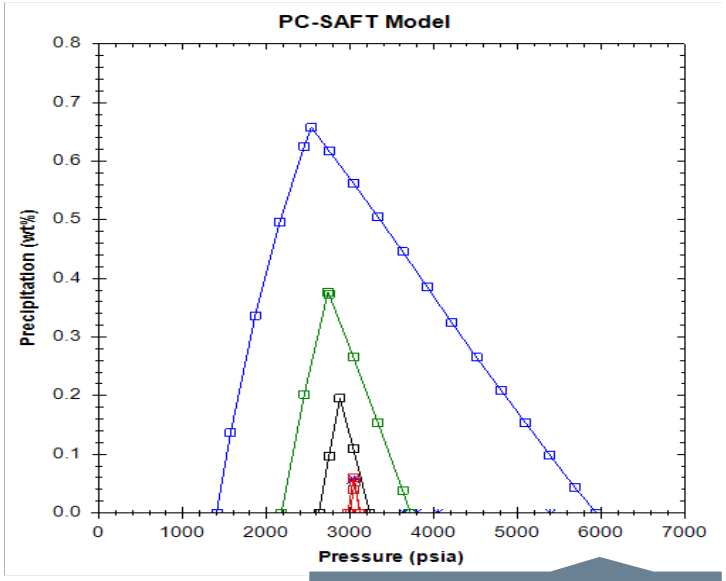
PC-SAFT EOS

Technical Features

Asphaltene Precipitation



Phase Envelope



Precipitation Envelope

Technical Features

Water Package

Water Analysis Package

- Solubility Prediction and Brines Compatibility

Stiff Diagram Analyzer

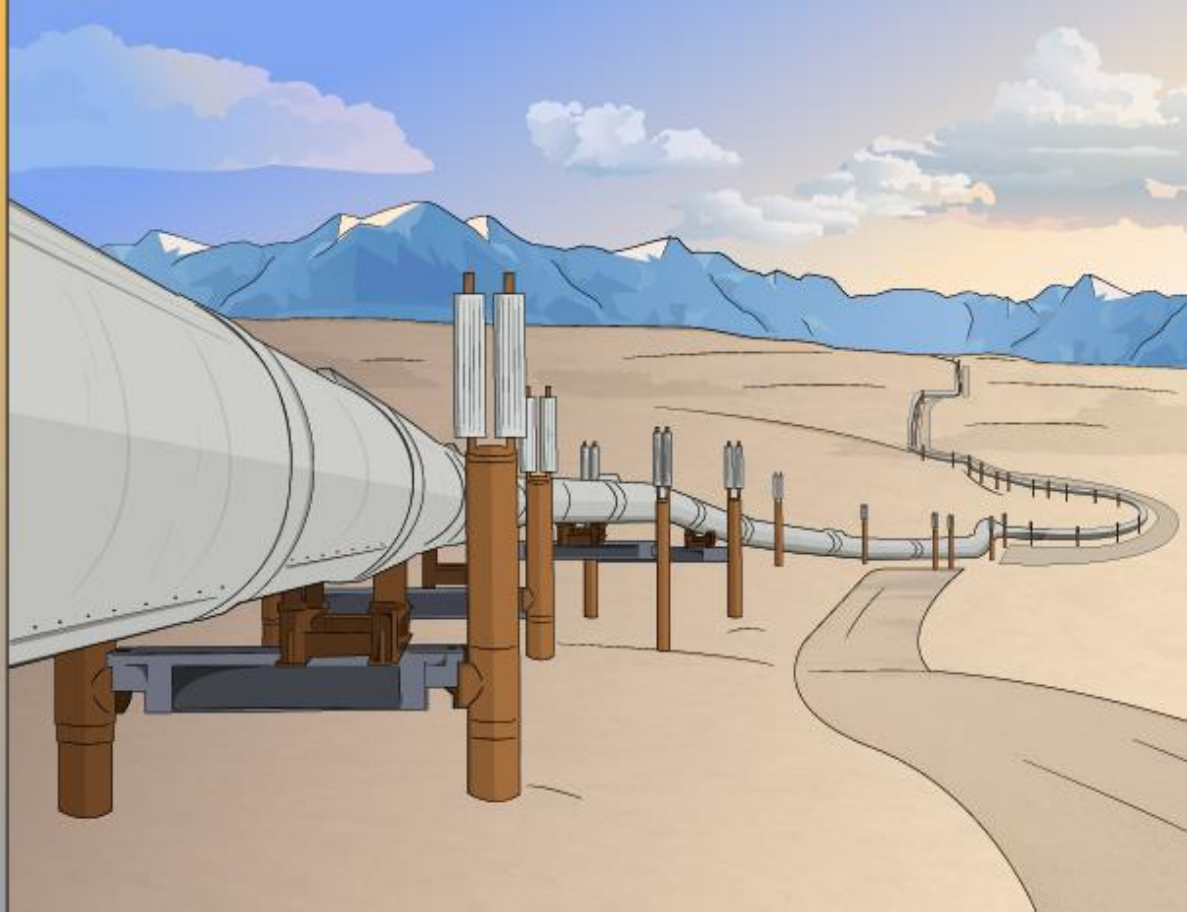
- Dynamic Stiff Diagram and Type Curve Analysis

Comprehensive Flash

- Handling Oil-Gas-Brine-Deposited Salt Equilibrium

Steady-State Multiphase Flow Simulator

FlowPro



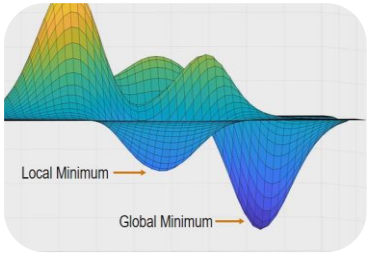
MTC

Flow Pro Software

A Robust Multiphase Simulator for Well & Surface Facilities

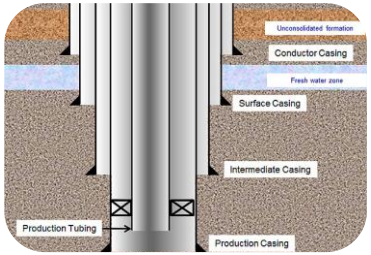

Well Tools
Flow Pro
Main
Insert
Template
Export
New Project
Open Project
Save
Save As
Simulation
Fluid
Unit System
Unit Converter
Inputs
Overview
Zoom To Fit
Reset Zoom
Zoom in
Zoom out
Files
Tasks
Fluid
Units
Views
Pump(s) (0)
Choke(s) (0)
Compressor(s) (0)
Well(s) (2)
Well
Wellc
Sink(s) (0)
Source(s) (0)
Seperator(s) (0)
Junction(s) (0)
Connector(s) (0)
Flow Line(s) (0)
Fluid(s) (0)
Well Settings
General
Tubulars
Deviation Survey
Downhole Equipment
Heat Transfer
MD
TVD
INC
AZM
NS
EW
DLG
DX
DY
1 0 0 0 0 0 0 0 0 0
2 500 497.465 10 0 43.5226 0 0.006096 0 43.5226
3 1000 989.869 10 0 130.347 0 0 0 86.8241
4 1500 1457.33 30 0 300.49 0 0.012192 0 170.143
5 2000 1806.86 60 0 650.018 0 0.018288 0 349.529
Graph
TVD (ft)
Horizontal displacement at 0° (ft)
Vertical section (°):
Table
Tubing
Casing
Perforation
Packer
ESP
Sliding Sleeve
Tubing Plug
Active
OK
Revert
Cancel
Apply

Technical Features



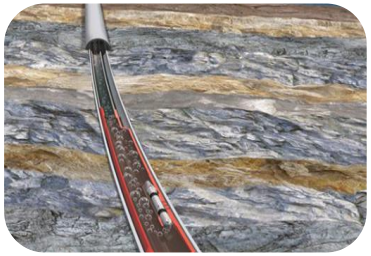
Well Parameter Optimization

Diverse Well Completion Models



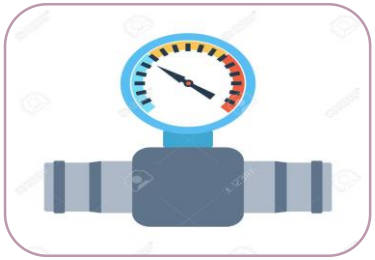
Well Modeling

Pipeline Simulations

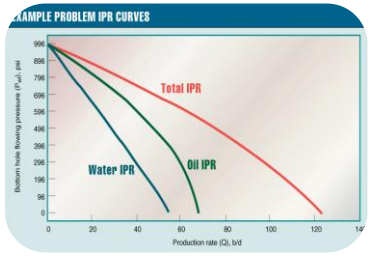


Artificial Lift

Downhole & Surface Facilities



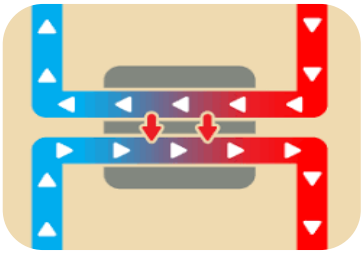
Pressure Drop Calculations



Well IPR Calculations

Technical Features

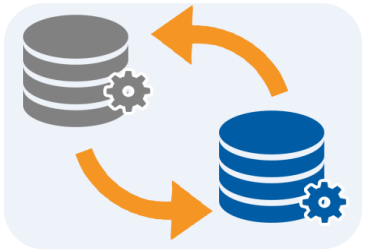
Corrosion & Erosion



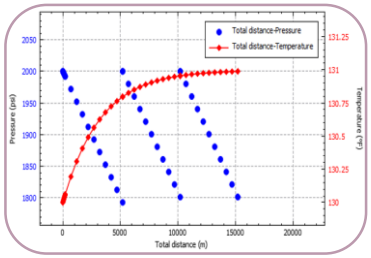
Heat Transfer Modeling

Flow Assurance

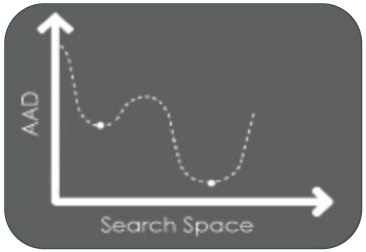
Fluid Modeling



Imports/Exports



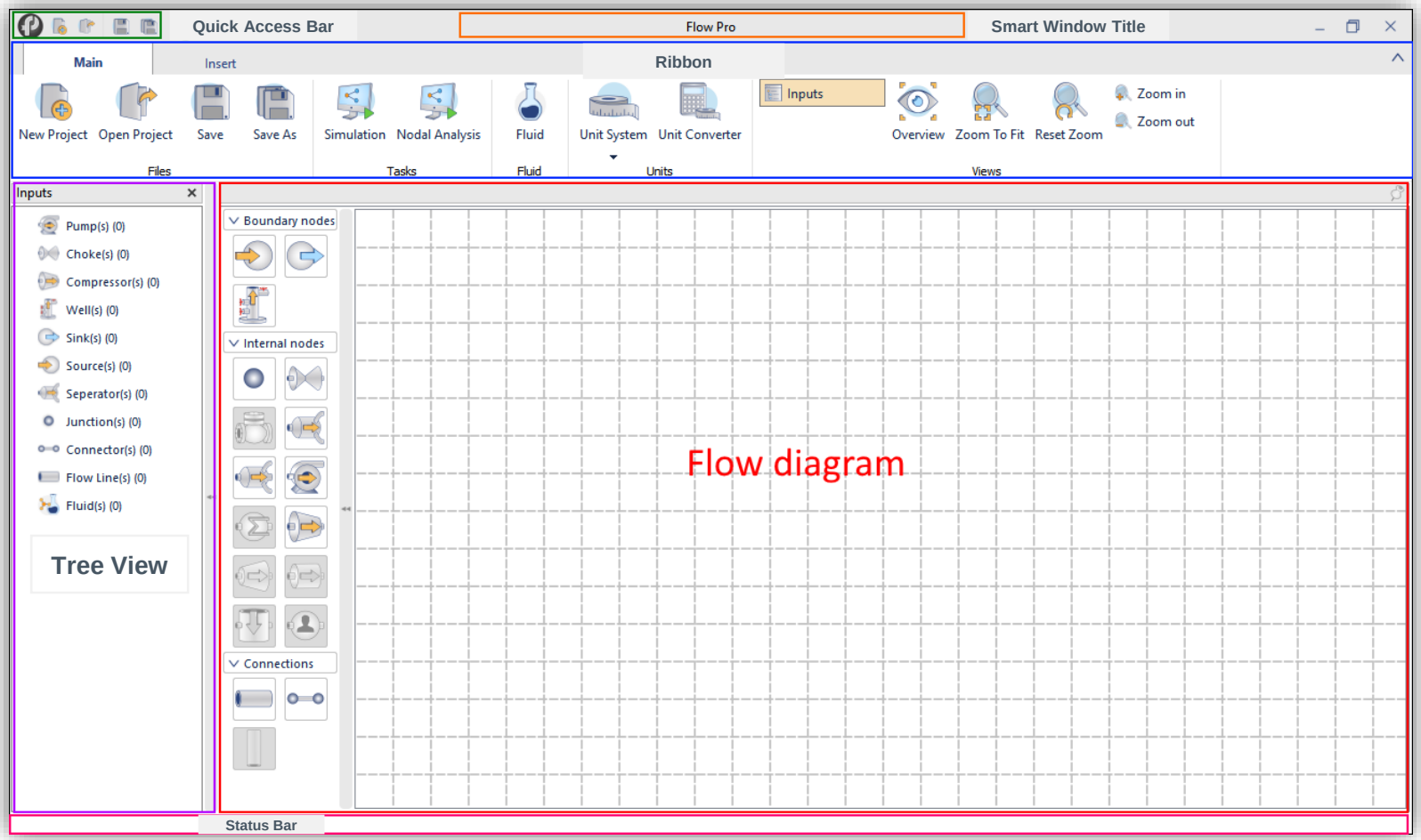
Nodal Analysis



Sensitivity Analysis

Graphs/Tables

Main Window



MIS INTERNATIONAL LTD, INC.

Facilities

General Facilities

- Injection point
- Rate/Pressure Multiplier/Adder

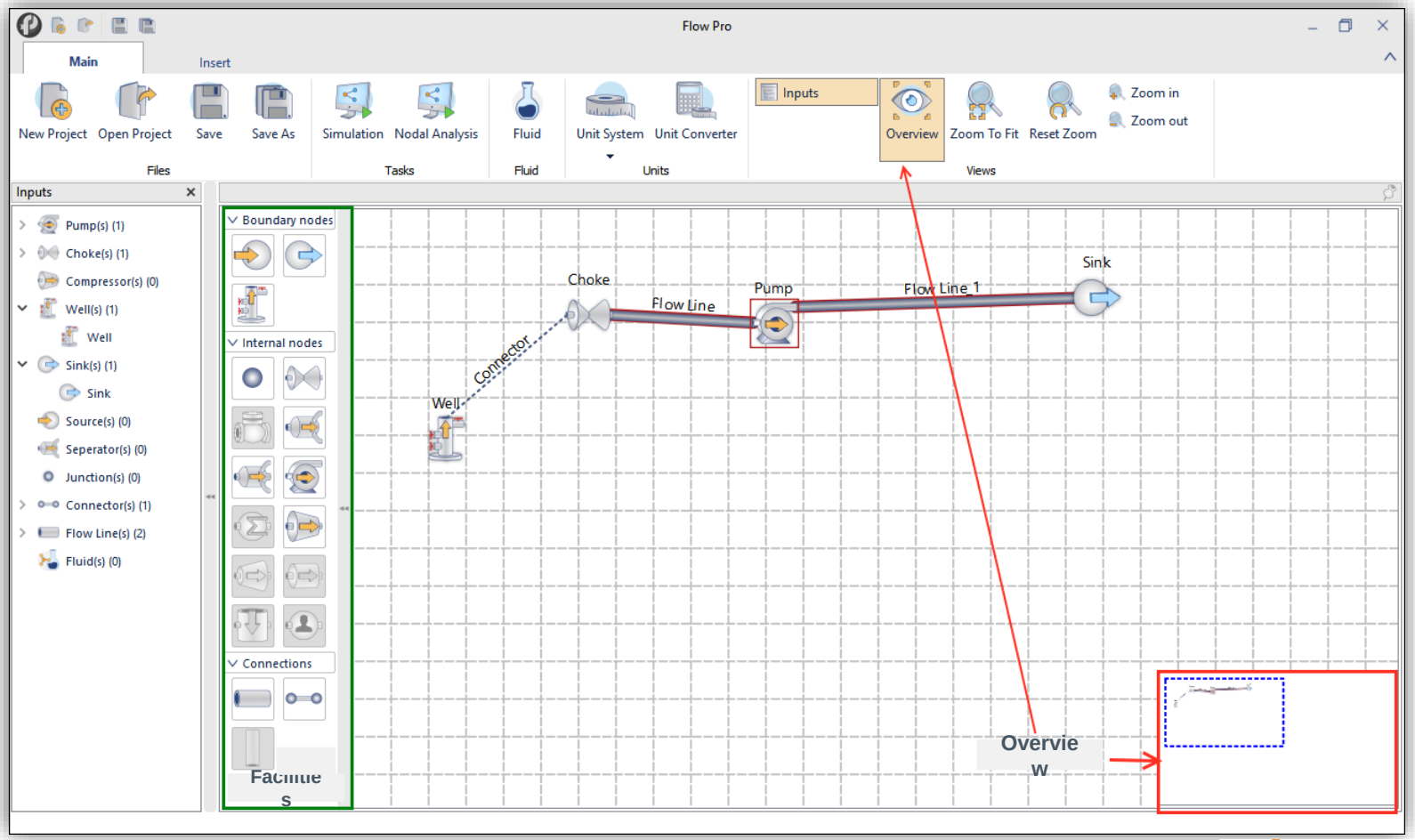
Downhole Facilities

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

Surface Facililties

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

Flow Diagram Tool



MIS INTERNATIONAL LTD. INC.

Well Modeling

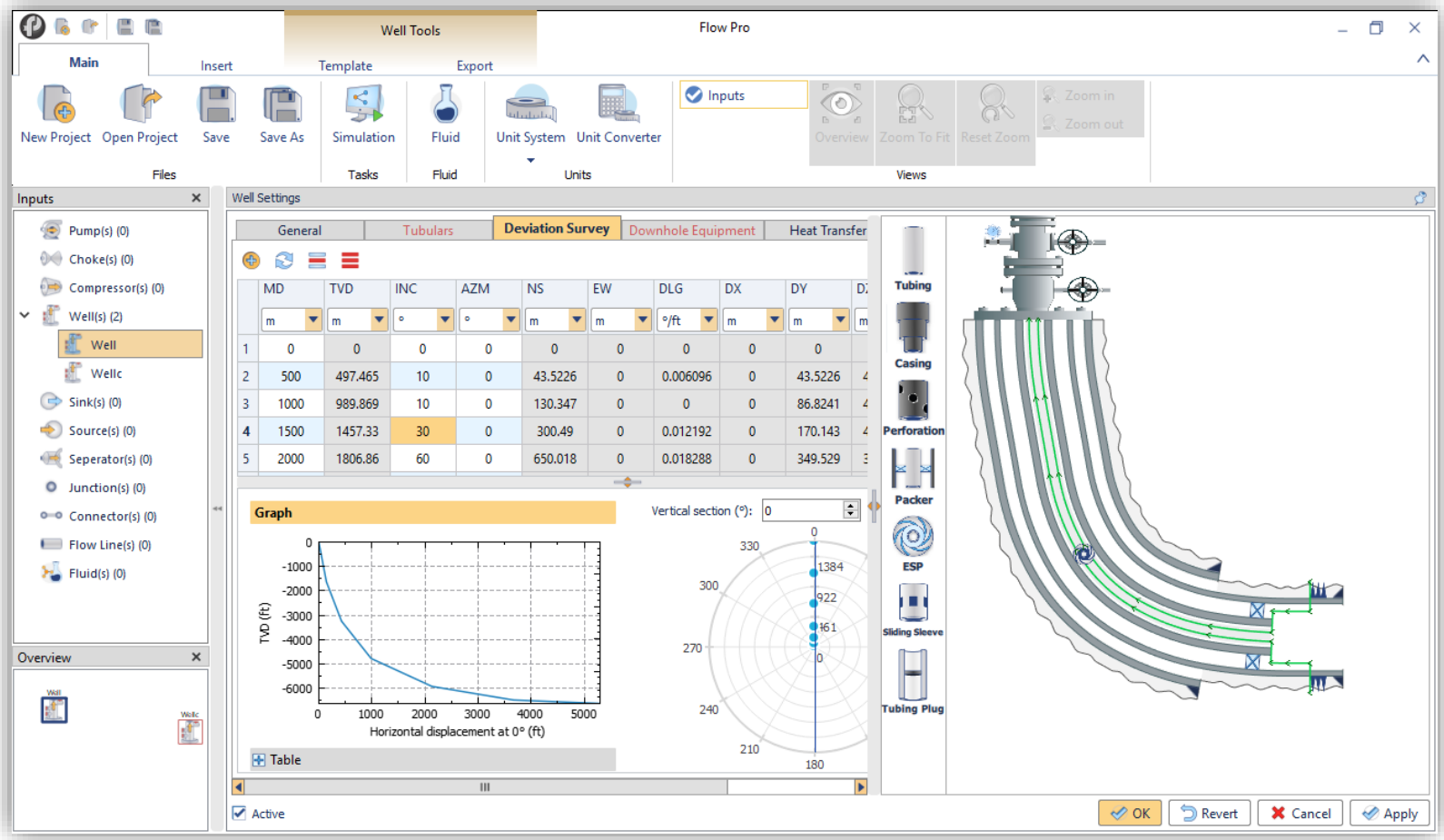
General Well Modeling

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

Well Design

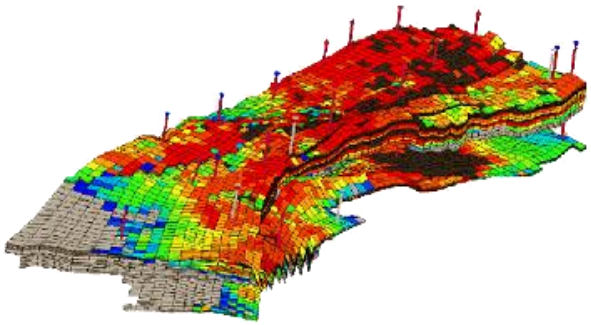
- Optimal Tubing and Casing size
- Optimal Horizontal Completion Length
- Match Completion Parameters and Pressure-Temperature Profiles
- Detailed Sensitivity Analysis

Well Modeling Module



MIS INTERNATIONAL LTD. INC.

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

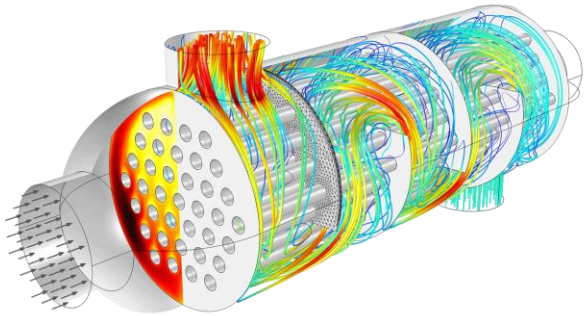
Convection (Free and Forced)

Conduction (Fixed overall heat transfer)

Elevation

Joule-Thompson Cooling and Heating

Frictional heating



PVT Modeling

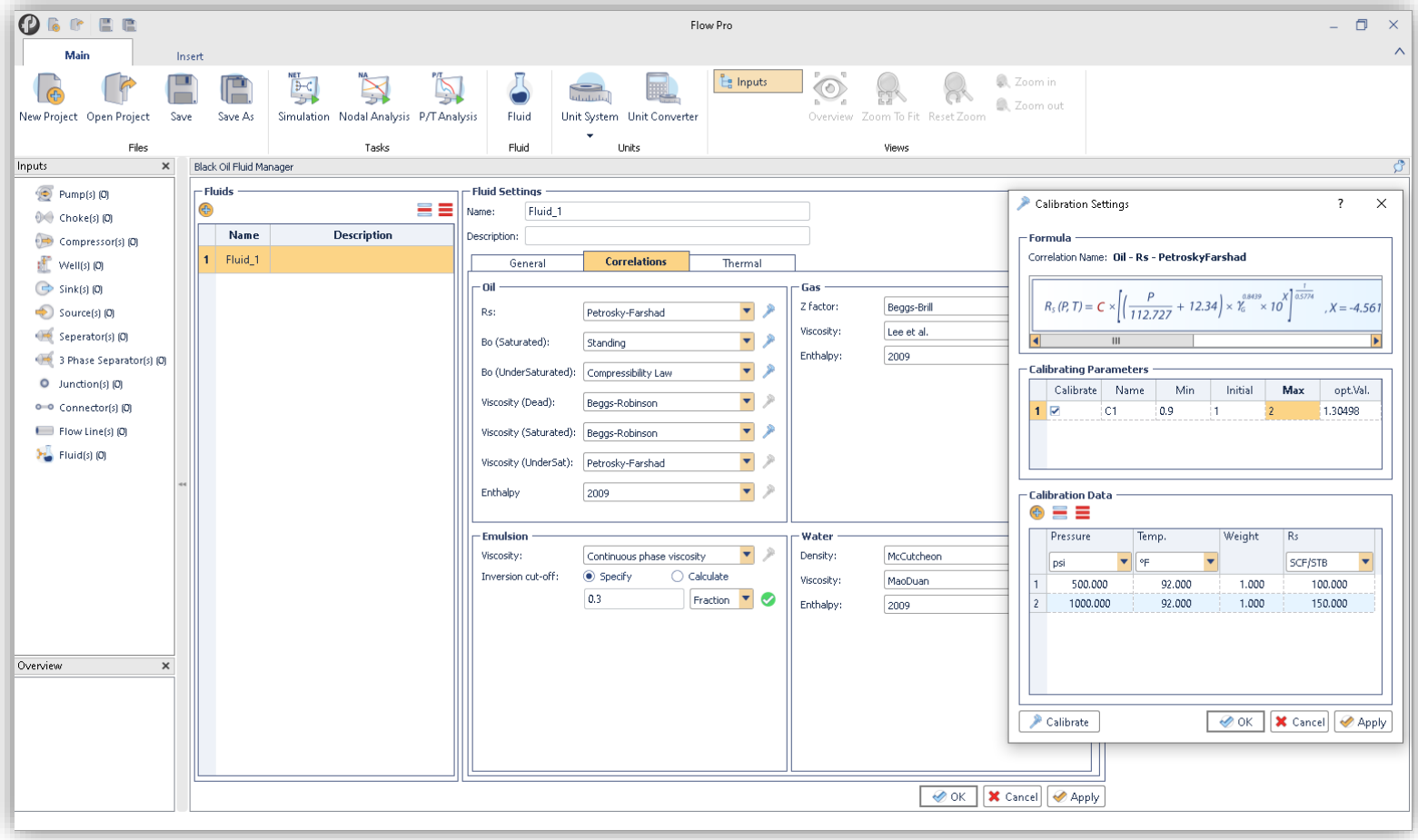
Black Oil

- Imported from PVT Pro
- Correlation Calibration

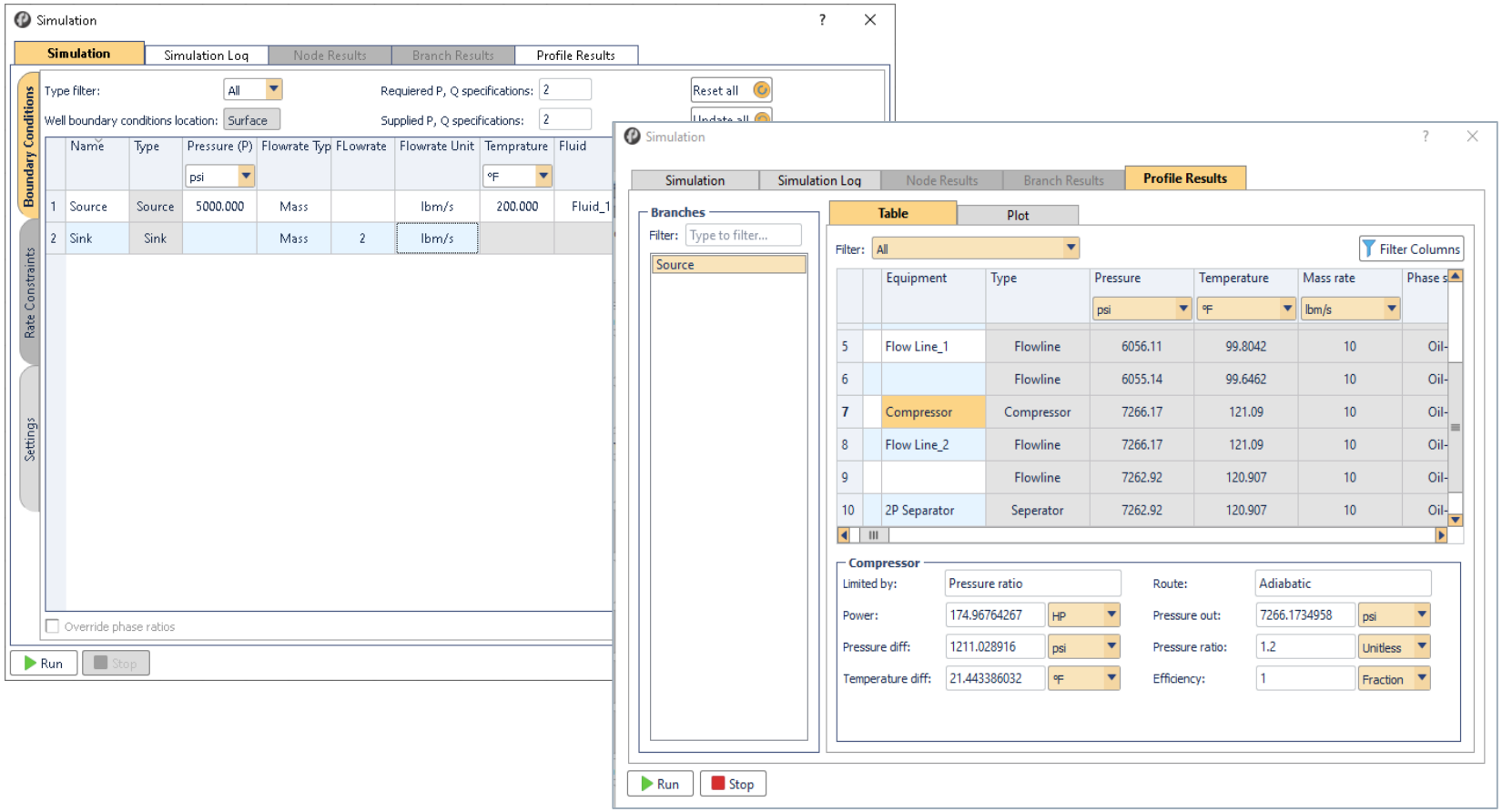
Compositional

- EOS Models
- Aqueous Component Modeling
- Import PVT file

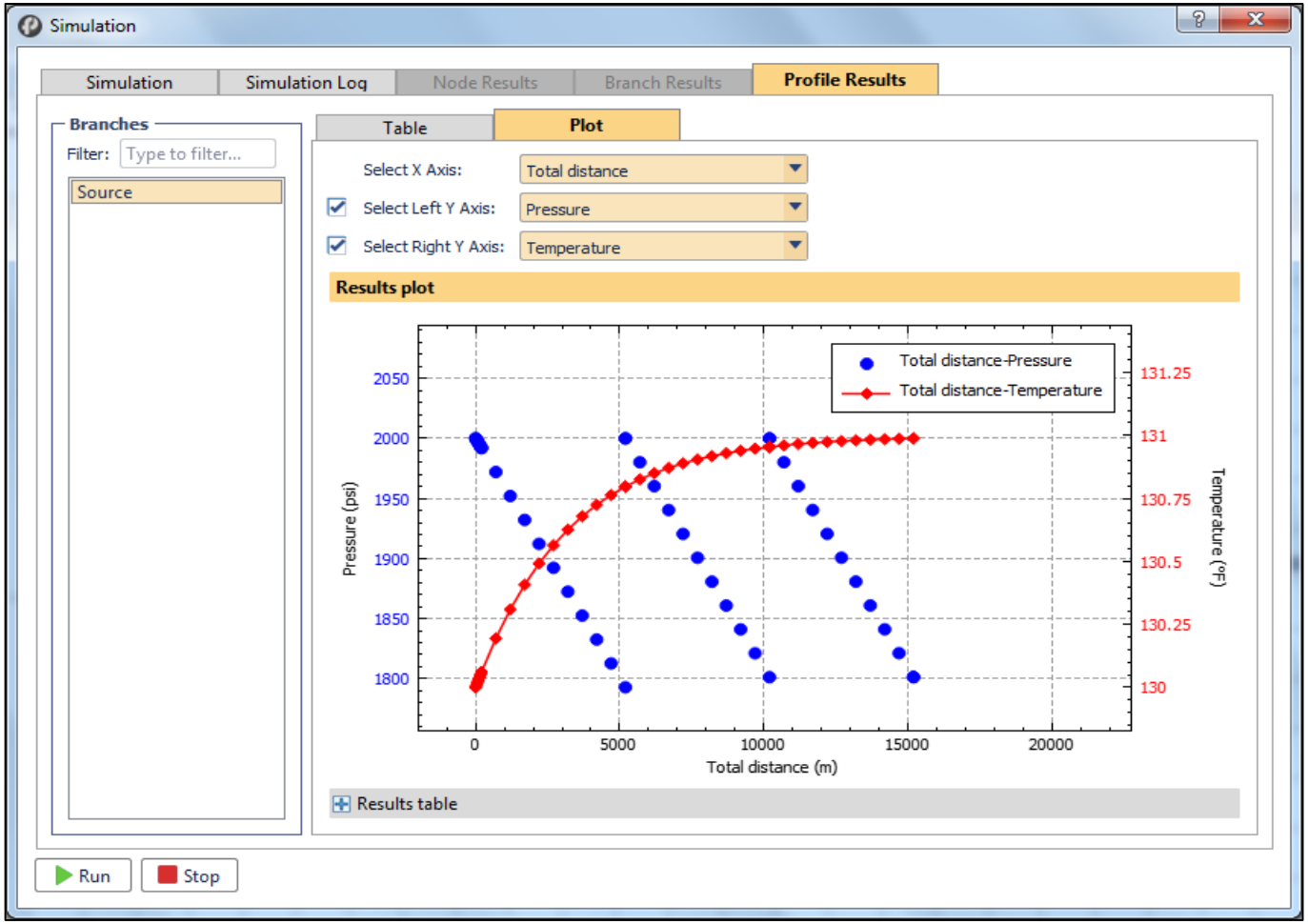
PVT Correlation Matching



Simulation Results



NODAL Analysis

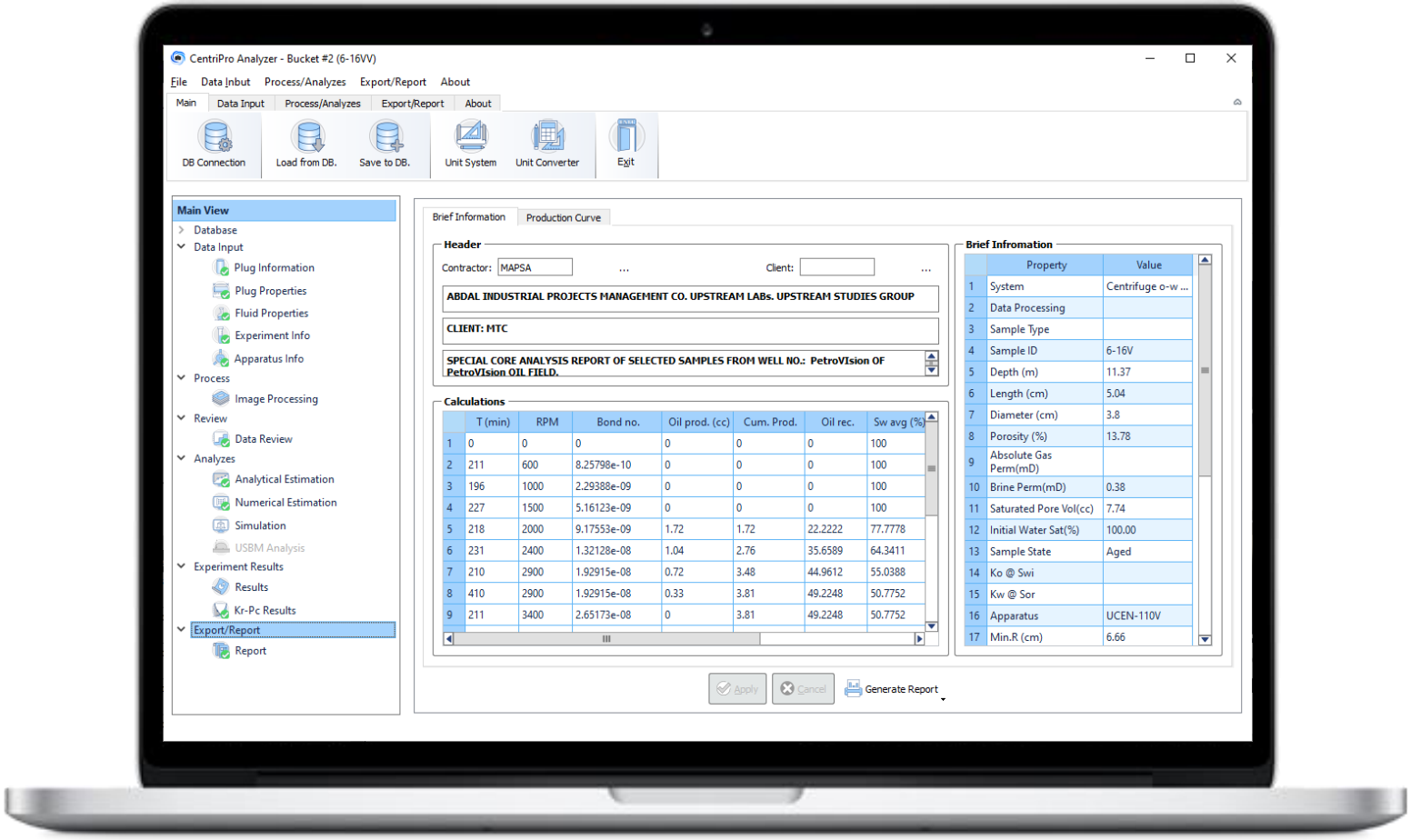


MIS INTERNATIONAL LTD. INC.

Centri Pro Software

Centrifuge Lab Equipment
Data Management & Processing

Main Window

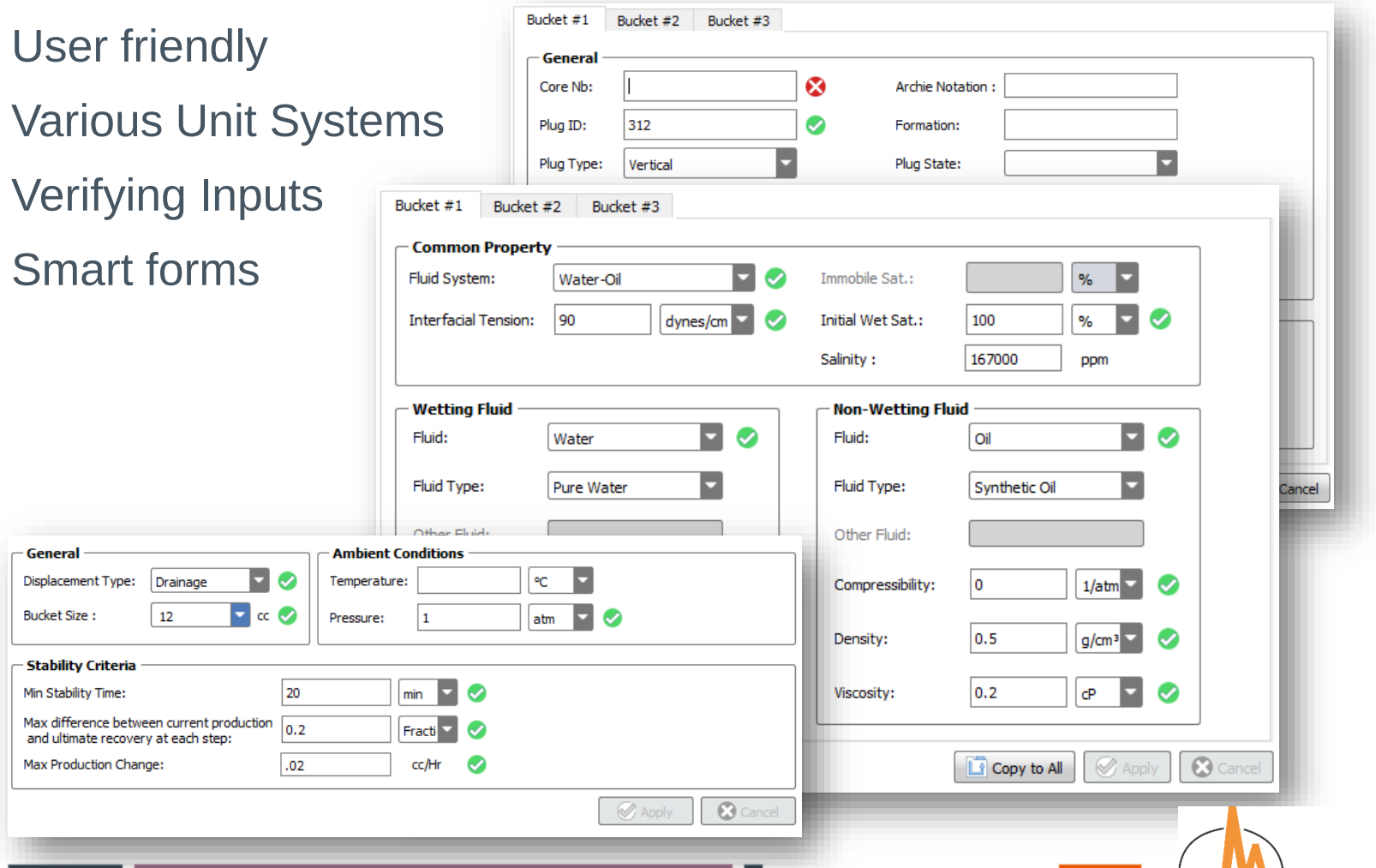

CentriPro Analyzer - Bucket #2 (6-16VV)
File Data Inbut Process/Analyzes Export/Report About
Main Data Input Process/Analyzes Export/Report About
DB Connection
Load from DB.
Save to DB.
Unit System
Unit Converter
Exit
Main View
Database
Data Input
Plug Information
Plug Properties
Fluid Properties
Experiment Info
Apparatus Info
Process
Image Processing
Review
Data Review
Analyzes
Analytical Estimation
Numerical Estimation
Simulation
USBM Analysis
Experiment Results
Results
Kr-Pc Results
Export/Report
Report
Brief Information
Production Curve
Header
Contractor: MAPSA
Client:
ABDAL INDUSTRIAL PROJECTS MANAGEMENT CO. UPSTREAM LABs. UPSTREAM STUDIES GROUP
CLIENT: MTC
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 Infromation
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
Apply
Cancel
Generate Report

Main Features

- Apparatus Connection
- Capturing Image Automatically
- Experiment Data Management
- Detect Volumes by Image Processing
- Calculating Rock SCAL Parameters
- Comprehensive Report/ Export

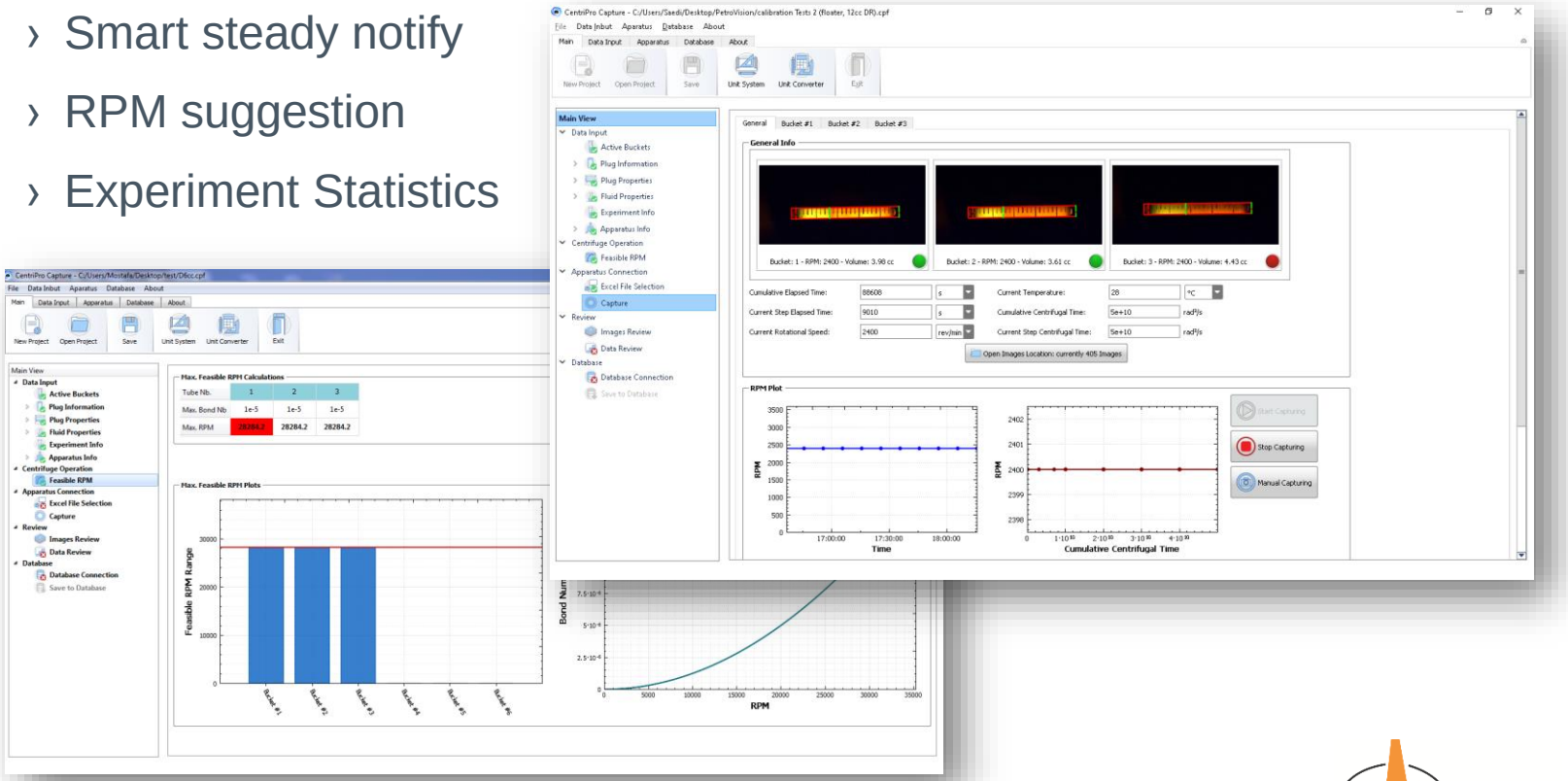
Experiment Data Input

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



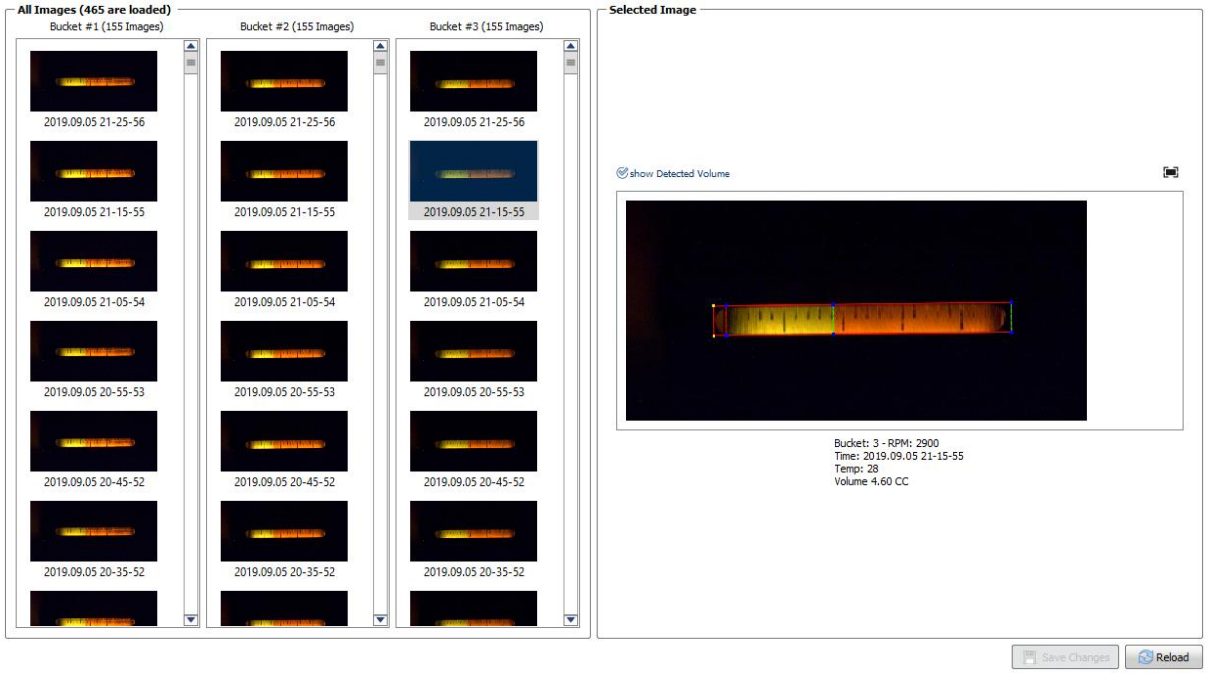
Capturing Image Automatically

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



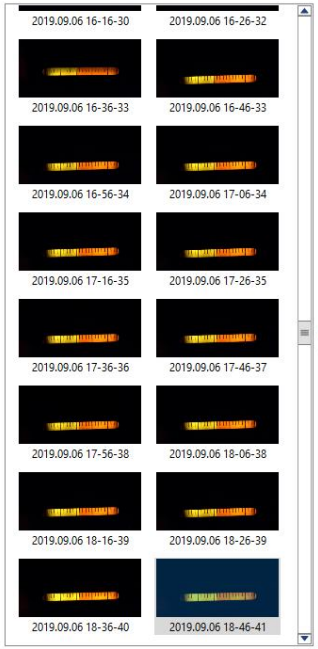
Images Management

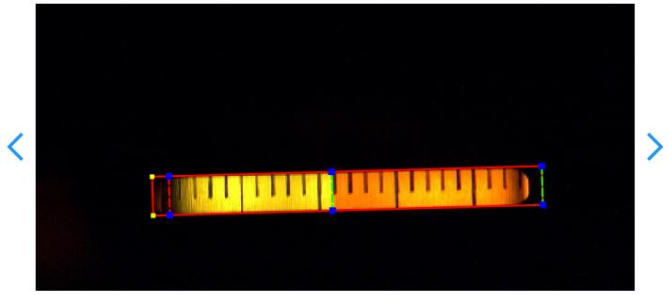
- Image Enhancements
- Removing Inappropriate Images
- Auto Assigning image to tubes (modifiable by drag n drop)

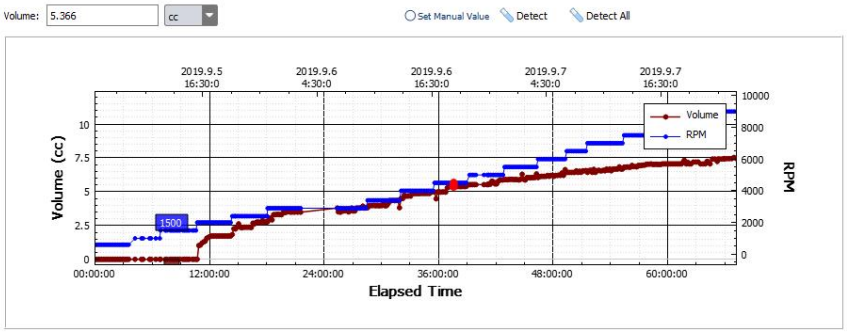


Images Processing

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

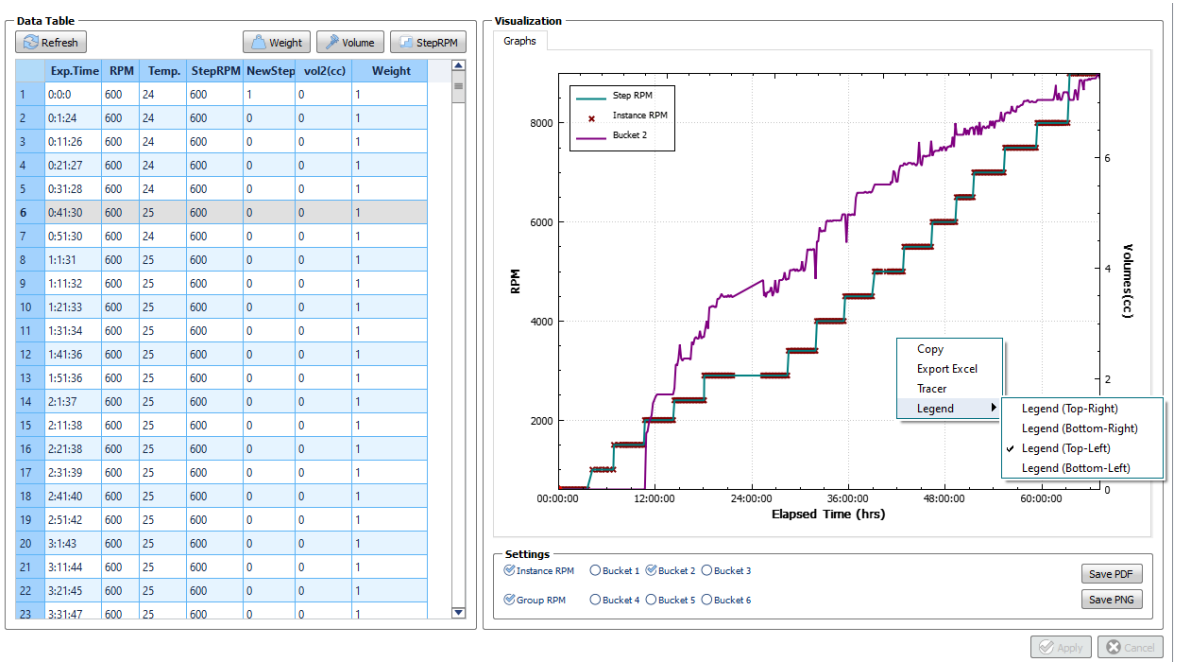






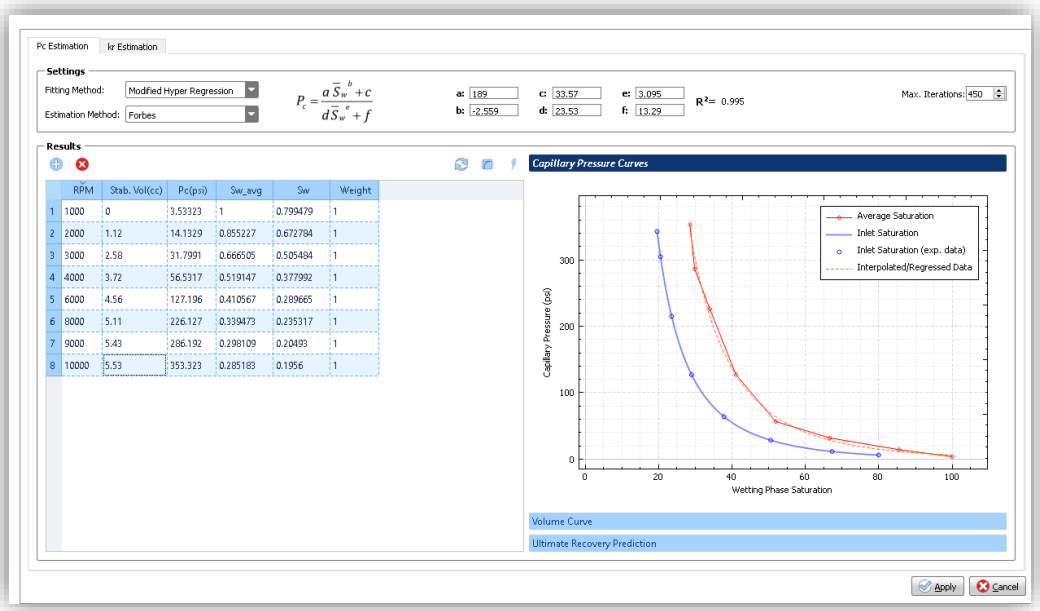
Data Review

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



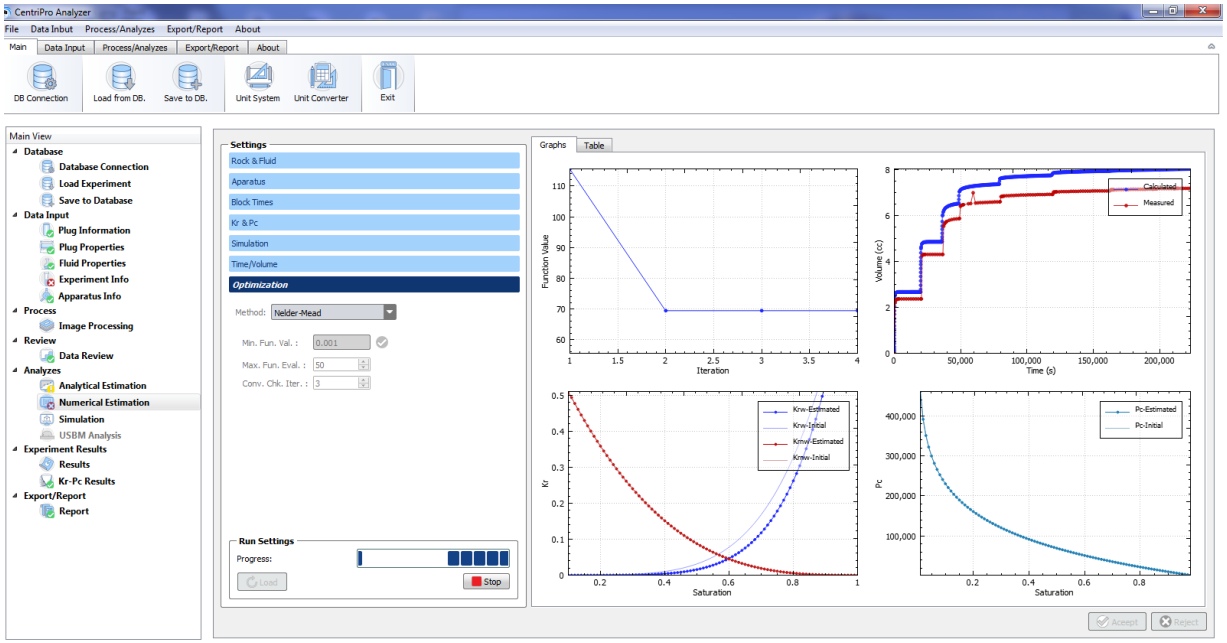
Analytical Estimation

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



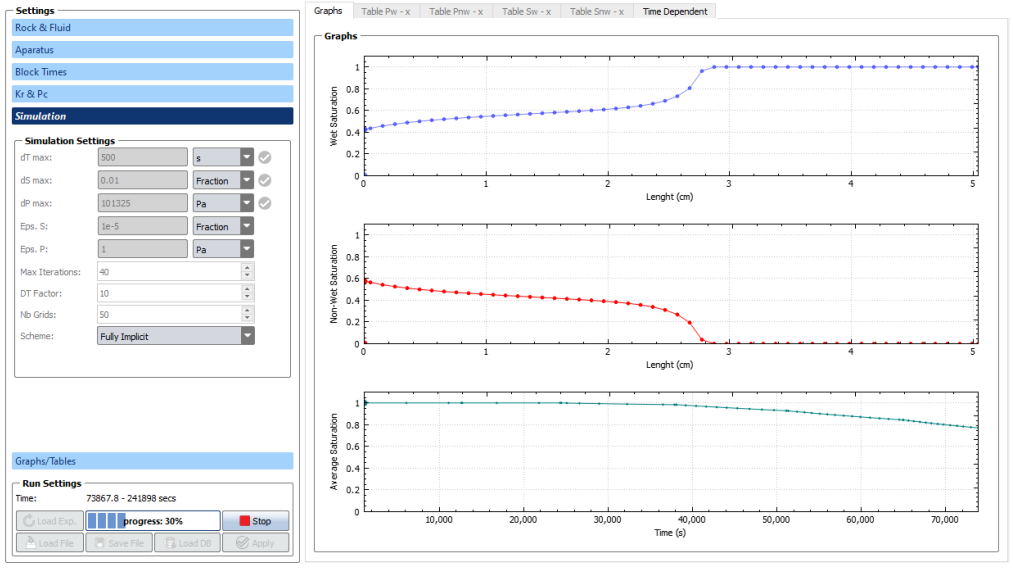
Numerical Estimation

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



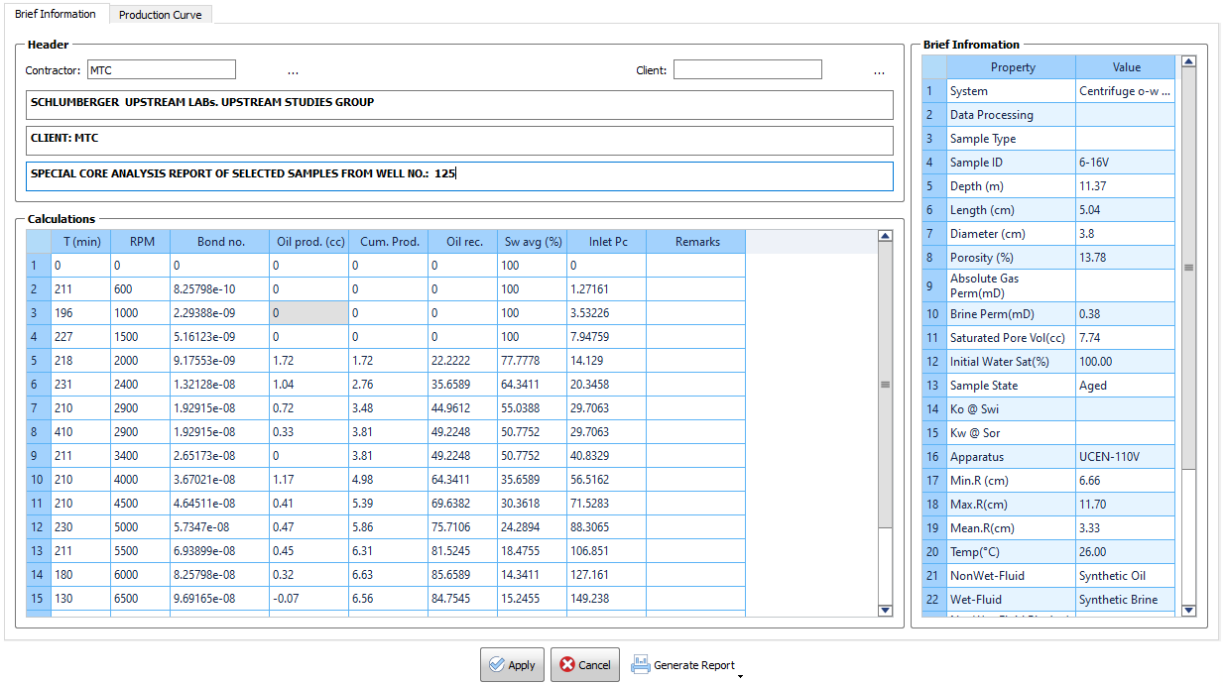
Centrifuge Experiment Simulation

- 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



	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	

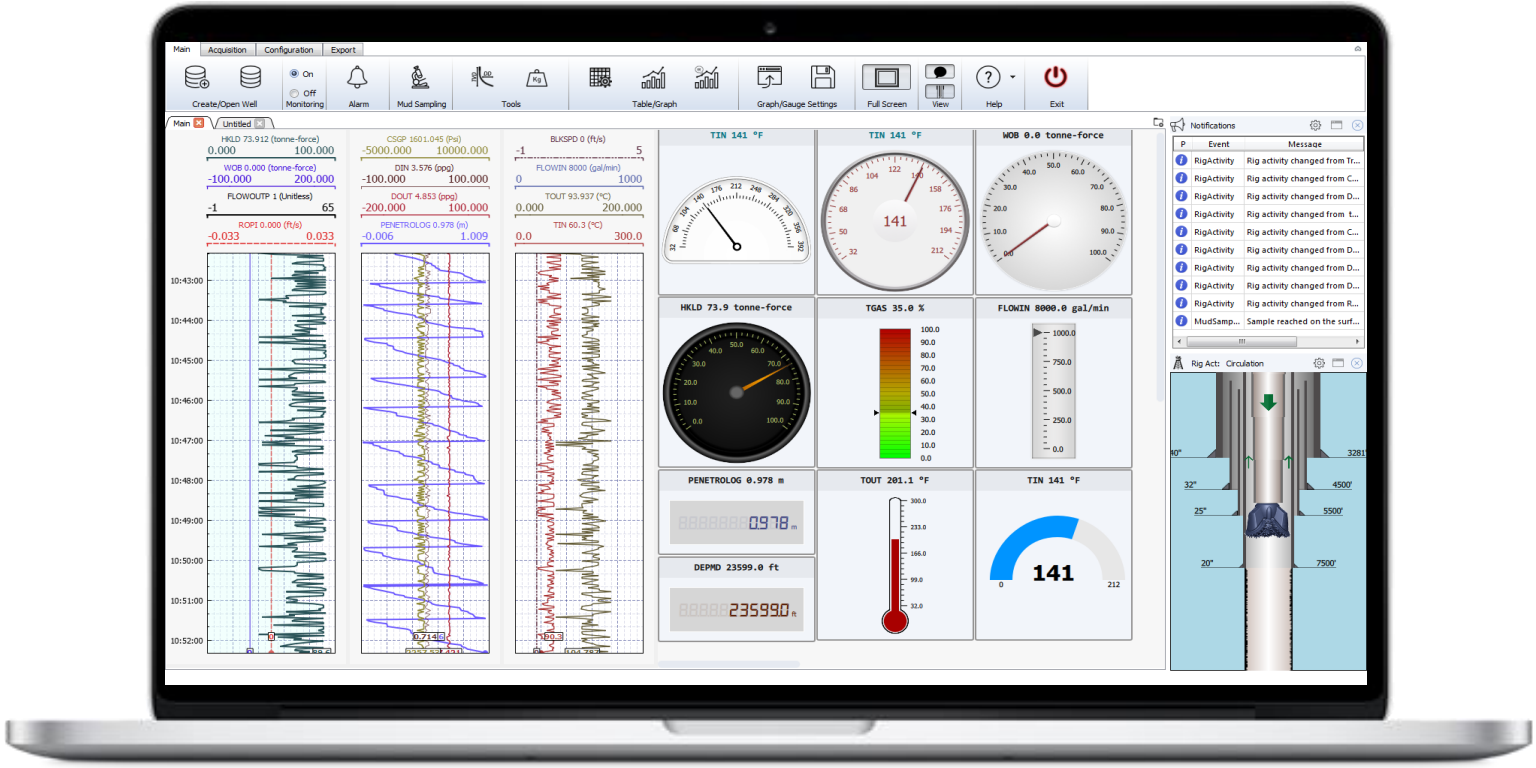
	Property	Value
1	System	Centrifuge o-w ...
2	Data Processing	
3	Sample Type	
4	Sample ID	6-16V
5	Depth (m)	11.37
6	Length (cm)	5.04
7	Diameter (cm)	3.8
8	Porosity (%)	13.78
9	Absolute Gas Perm(mD)	
10	Brine Perm(mD)	0.38
11	Saturated Pore Vol(cc)	7.74
12	Initial Water Sat(%)	100.00
13	Sample State	Aged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

ML Pro Software

Mud Logging Unit Software

Main Window

Multi-tab Monitoring Panels

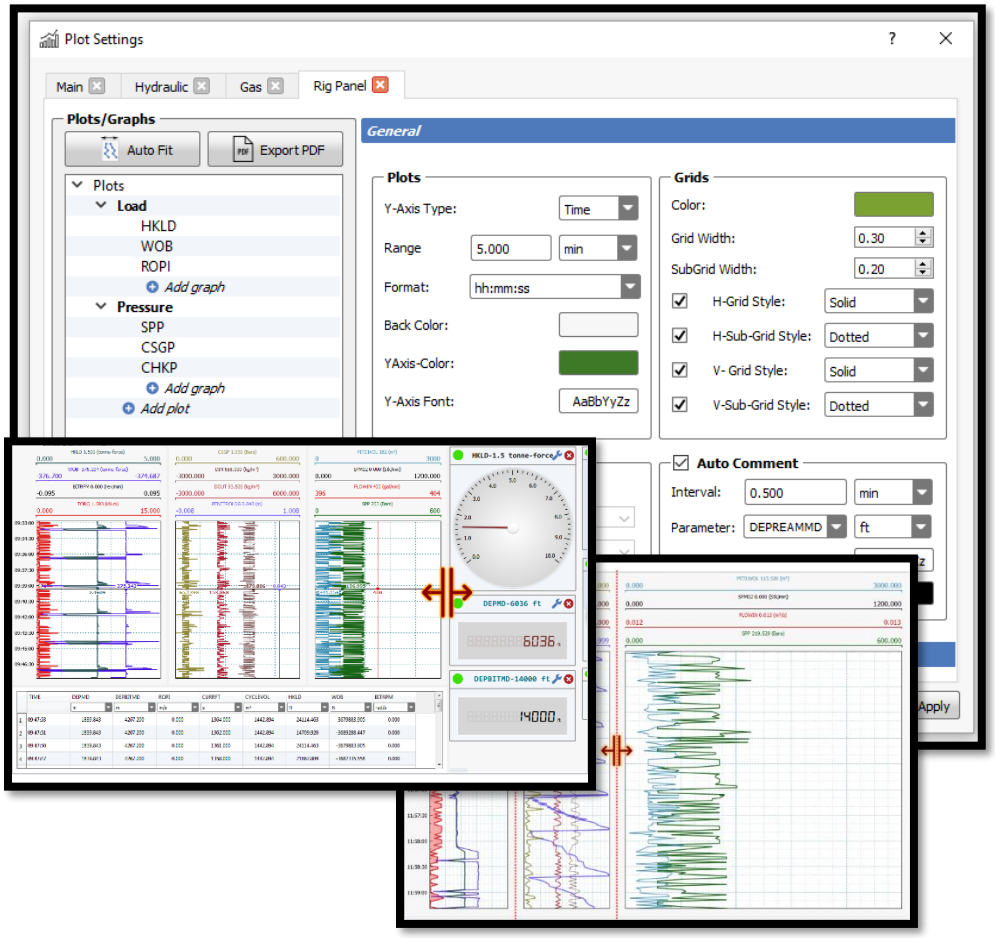


Monitoring Panels - Graphs

Full Customization (Online)

- Add/Remove Plot/Graph
- Fonts
- Colors
- Ranges
- Sizes
- Time/Depth-based
- Grid/Sub-Grids
- Parameters Unit

- **Easily Resizable**
- Panels
- Graphs

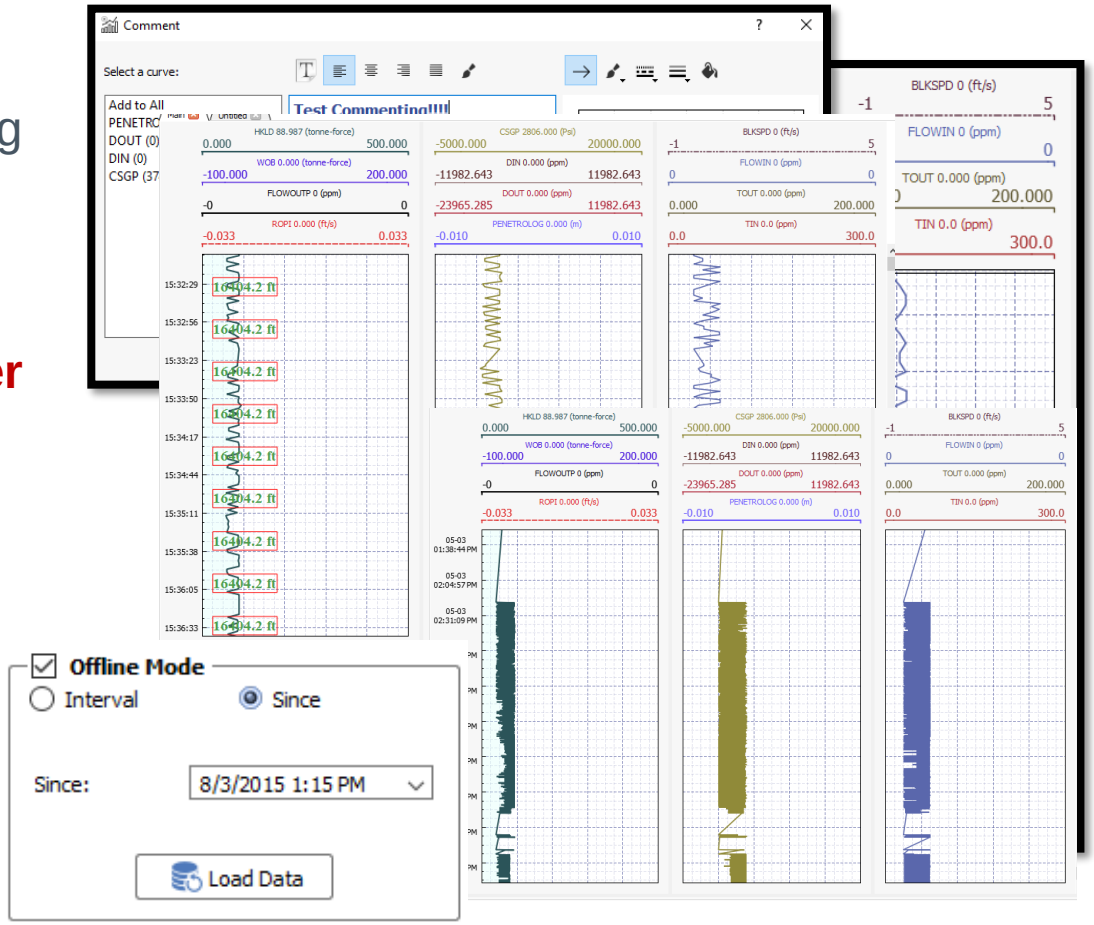


Monitoring Panels - Graphs

Commenting

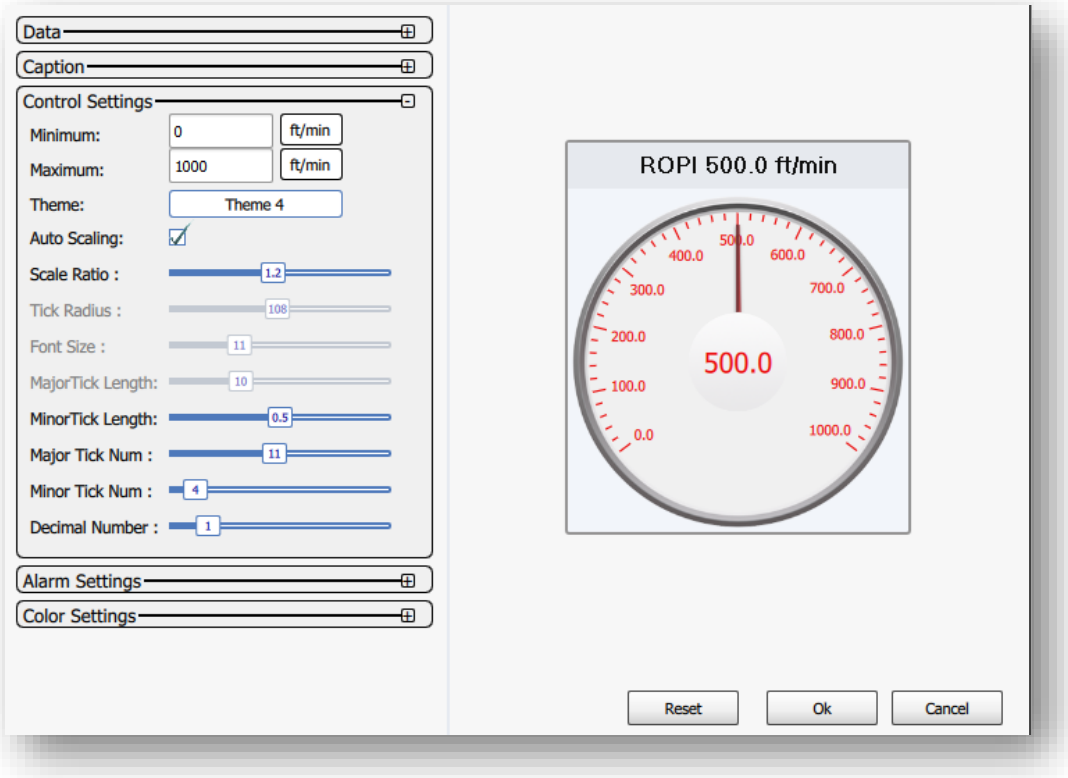
- Manual Commenting
- Auto Commenting

- **Offline Data Loader**
- Panning/Zooming
- Time/Depth Based



Monitoring Panels - Gauges

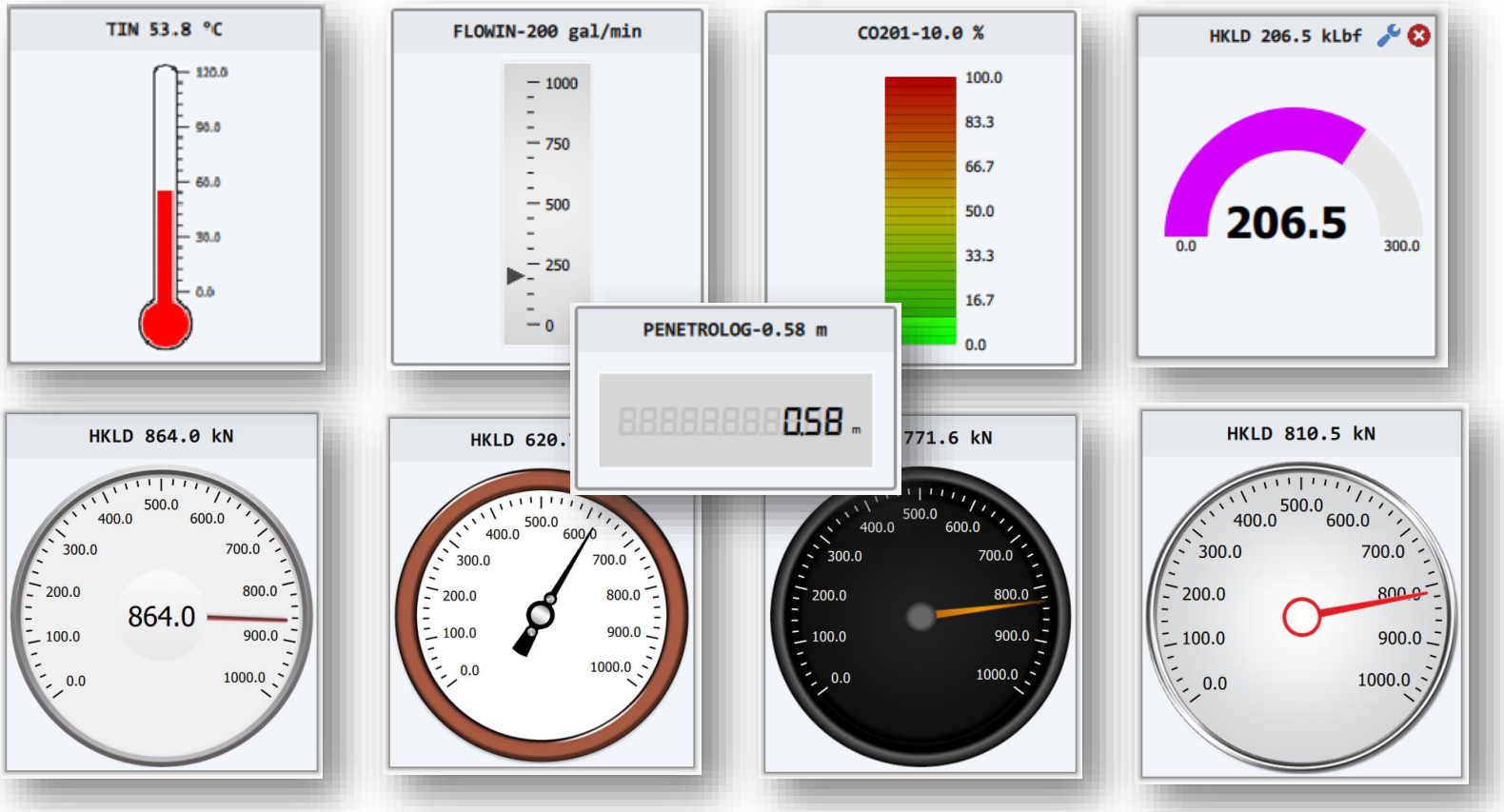
- **Full Customization (Online)**
- Data Source
- Caption
- Control Settings
- Alarm
- Color



- **Other Features**
- Multi-Selection
- Auto Arrange
- Screen Panning
- Copy/Paste gauges
- Custom Gauges/Themes

Monitoring Panels - Gauges

› **Rich Predefined Gauges**



Monitoring Panels - Online Table

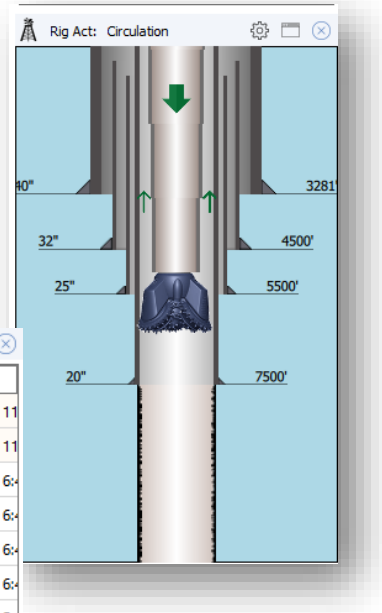
- Displaying online data in grid view
- Customizable Parameter Selection

	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

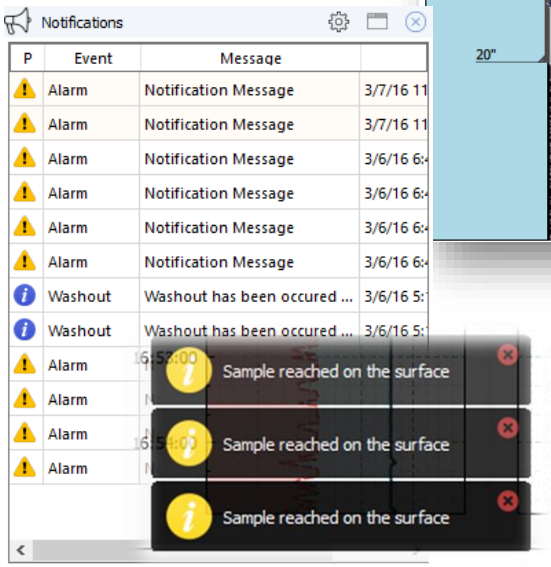
Well Schematic

- 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

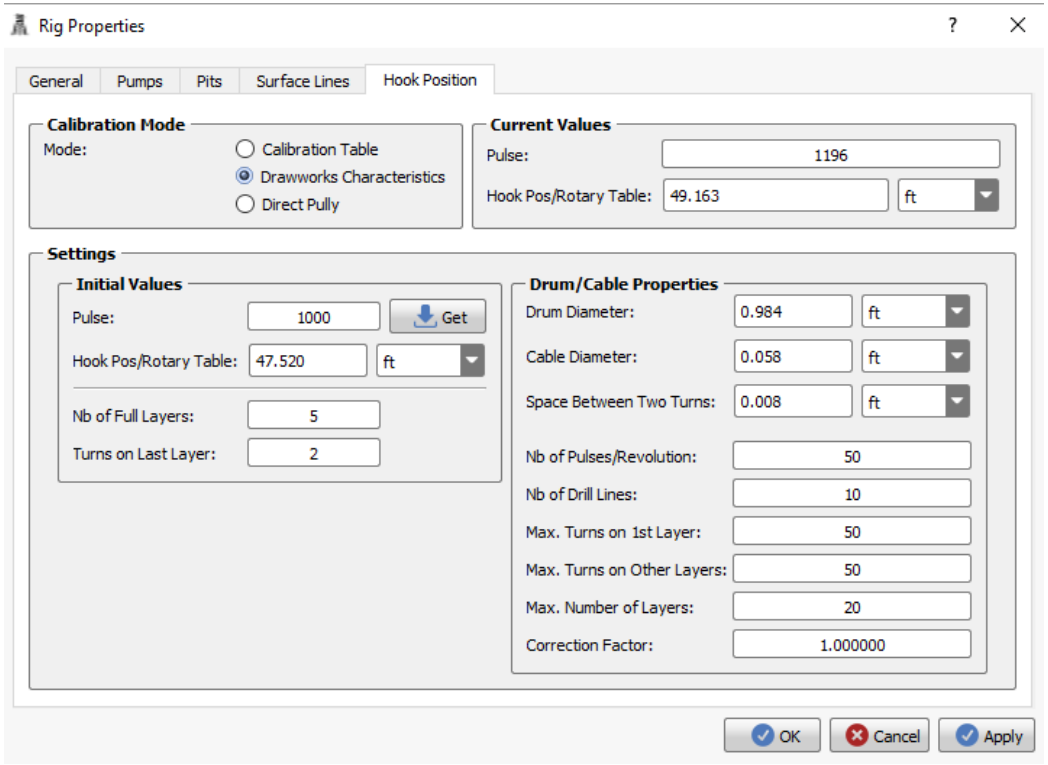
- Smart Notifications
- Default Notifications for Rig Activity, Alarms, Mud Sampling, Washout, Kick Detection Analysis, etc.



Rig Properties

Properties

- Pumps
- Pits
- Surface Lines



Hook Position Calibration Methods:

- Direct Pully
- Calibration Table
- Drawwork Characteristics

Parameter Settings

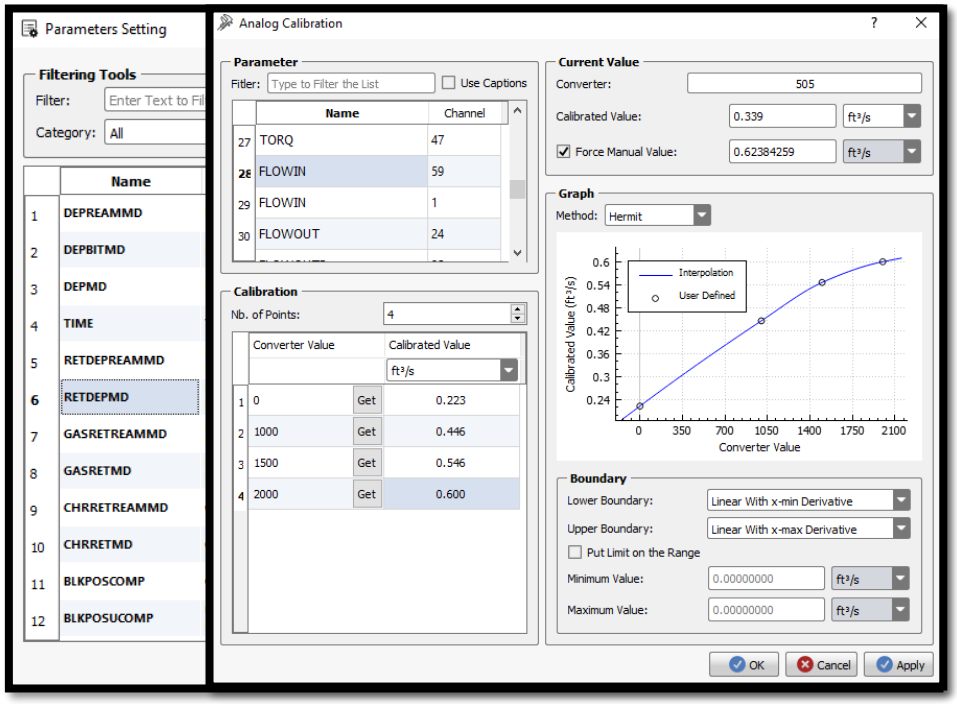
Data Source:

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

Analog Calibration

Interpolation Methods:

- Hermit
- Piecewise
- Least Square



Hydraulic Analysis

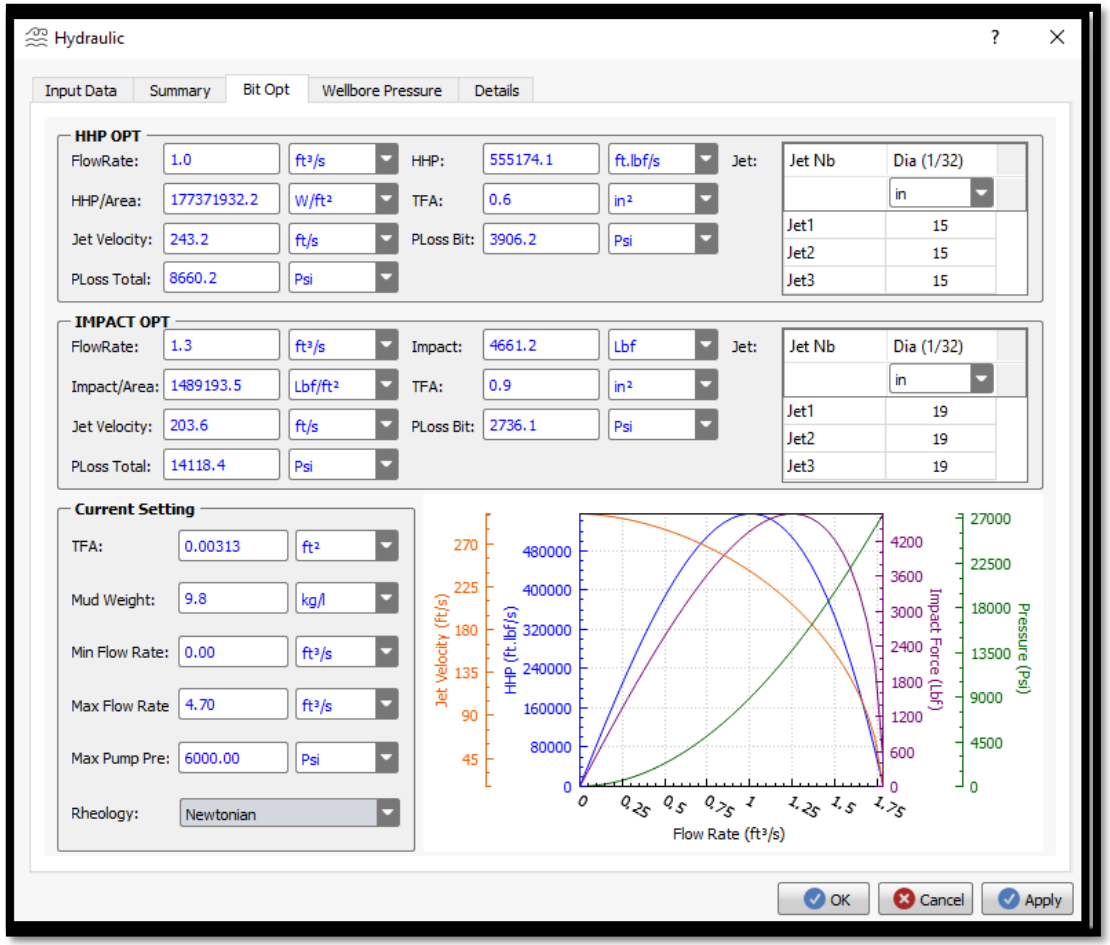
Summary Results

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

Optimization for:

- HHP
- Impact Force

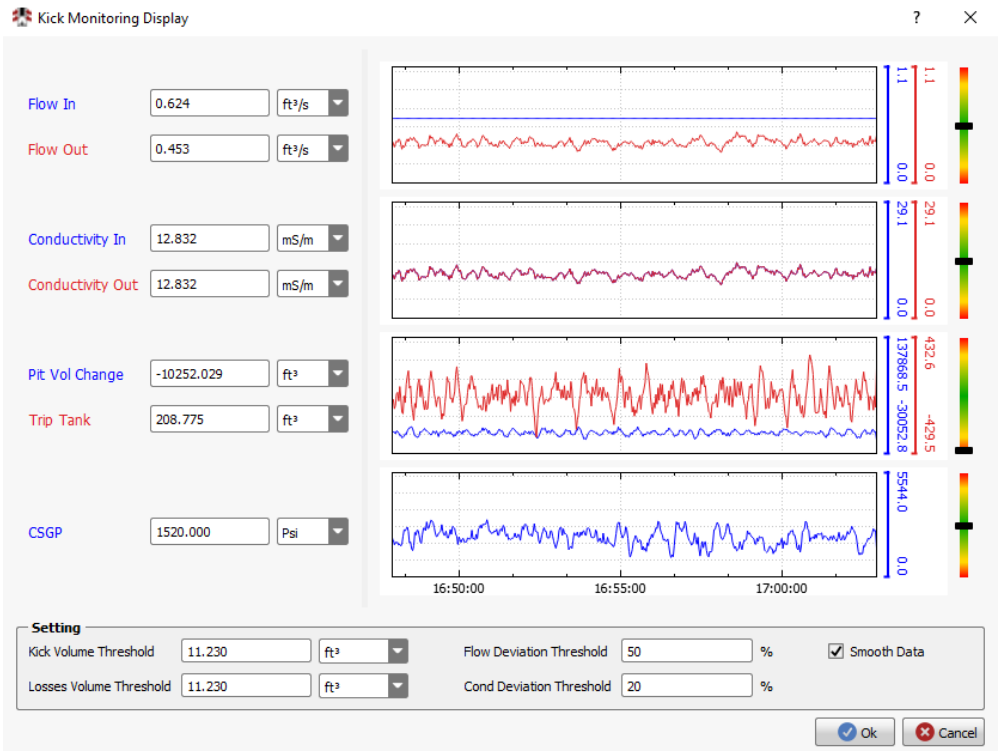
Optimized Nozzle Diameters



Kick Detection

Methods

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



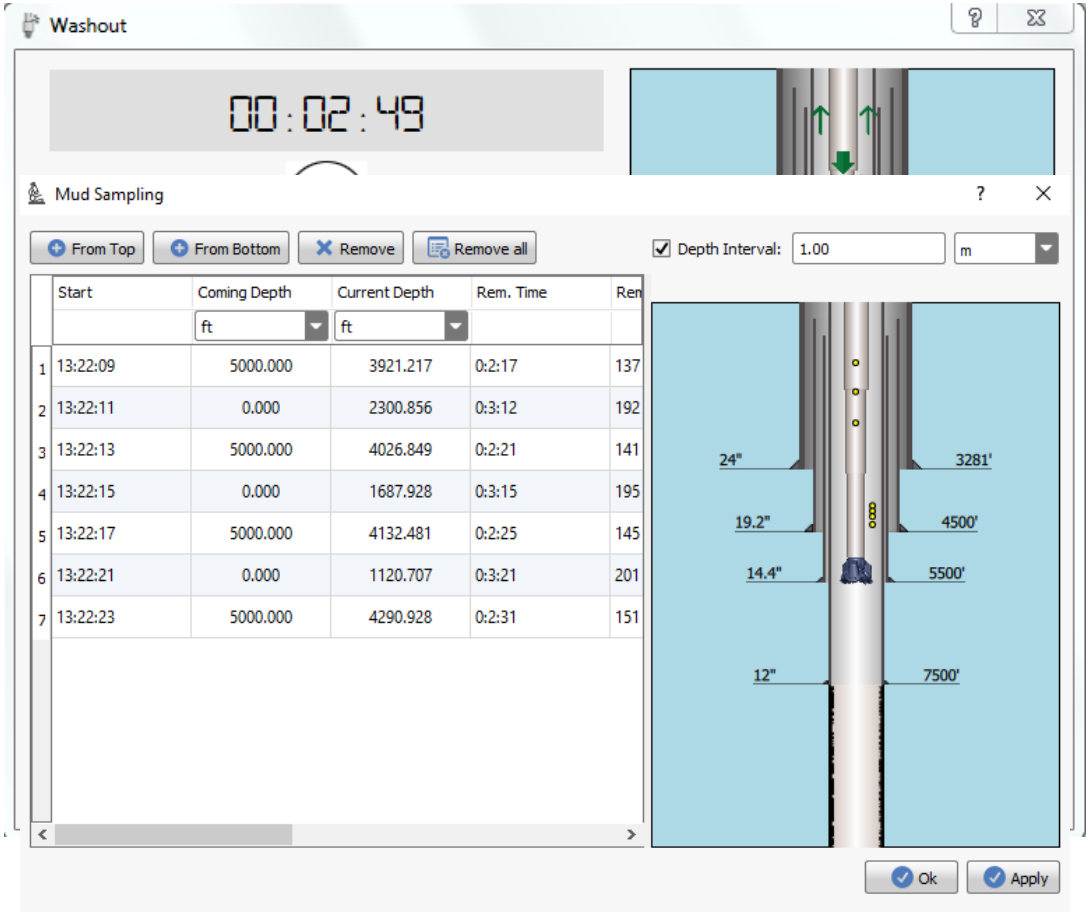
Washout Analysis

Tracer Type:

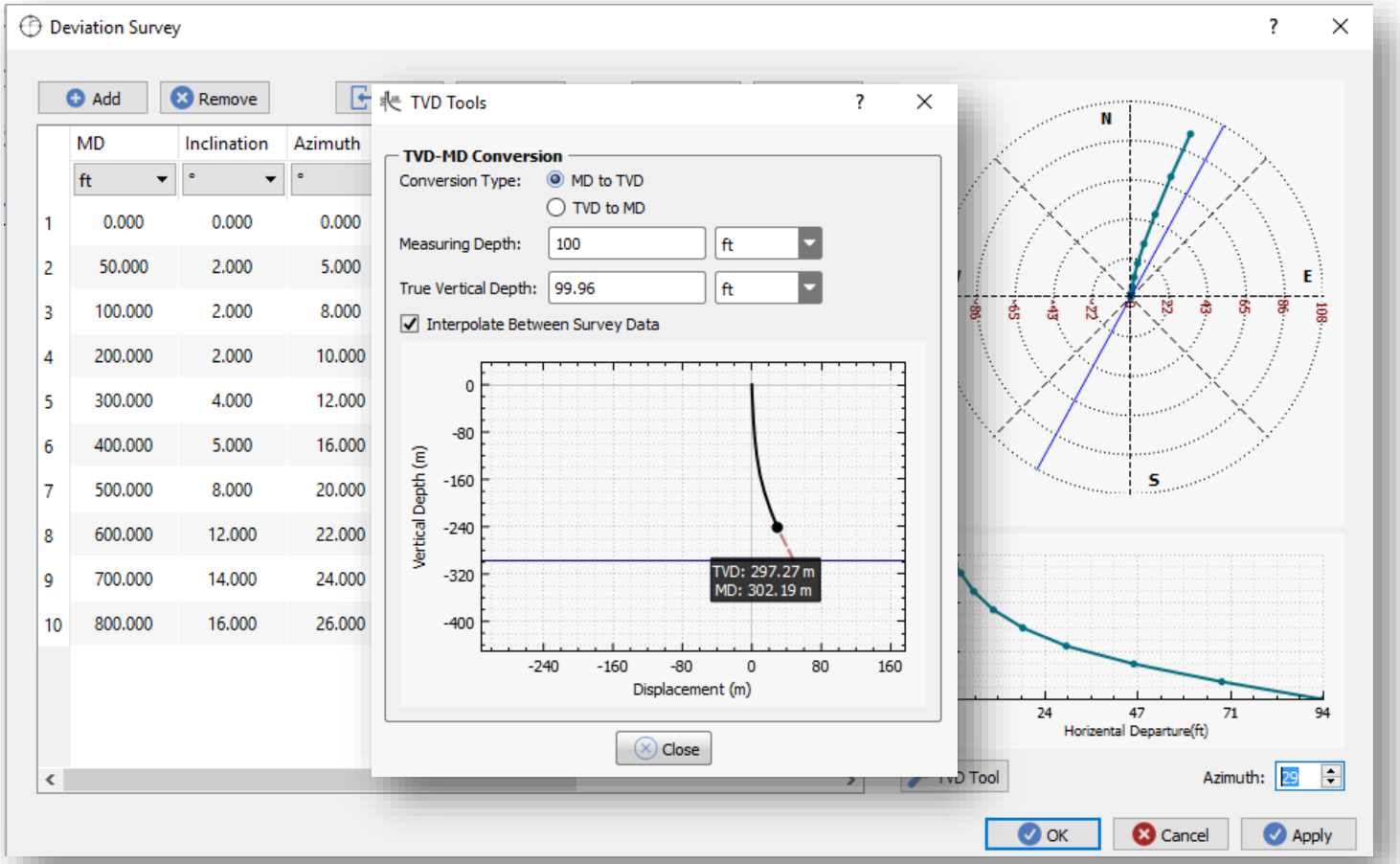
- Gas Tracer
- Solid Tracer

Mud Sampling

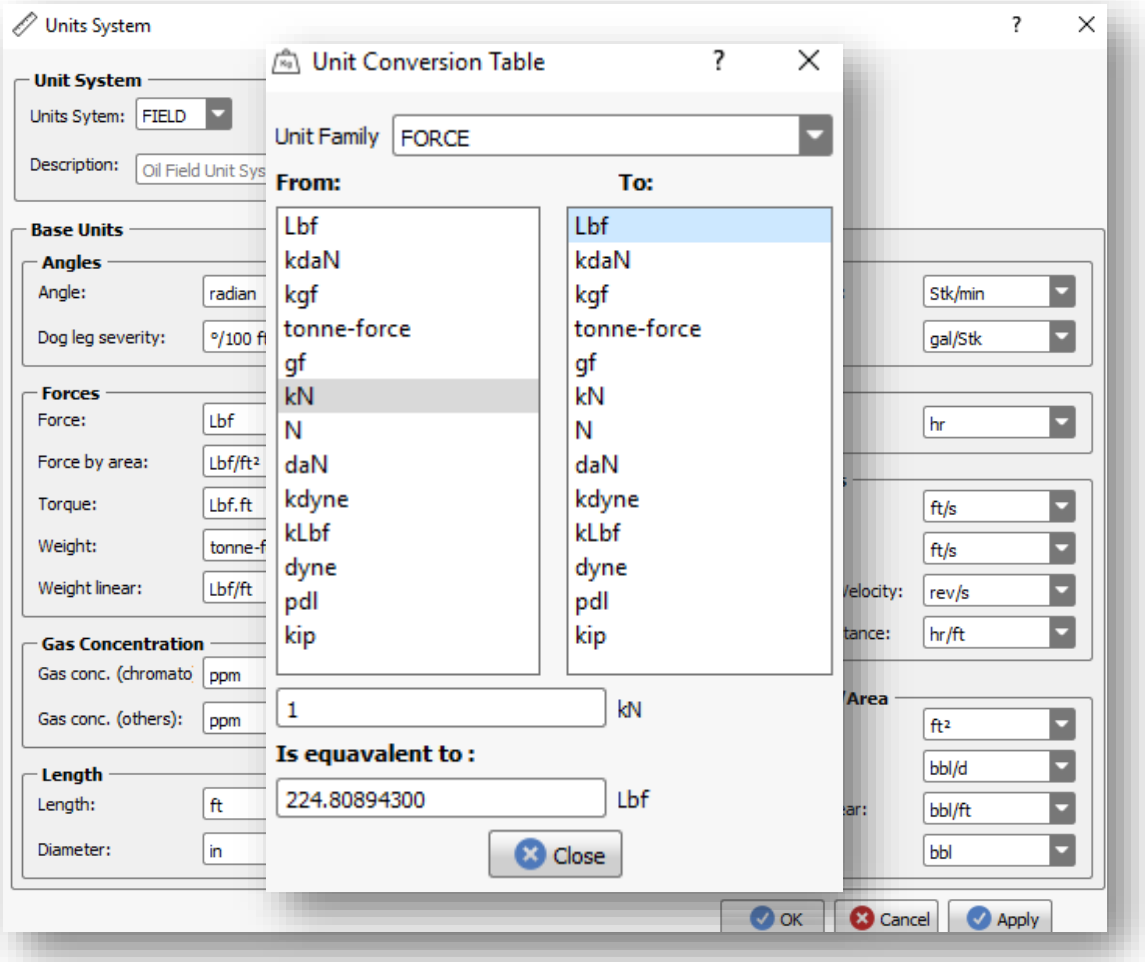
- Start Time
- Sample Location
- Velocity
- Notification
- Current/ Coming Depth
- Remaining Time/ Stroke/ Volume



Deviation Survey



Unit Conversion



Data Management

DataBase

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

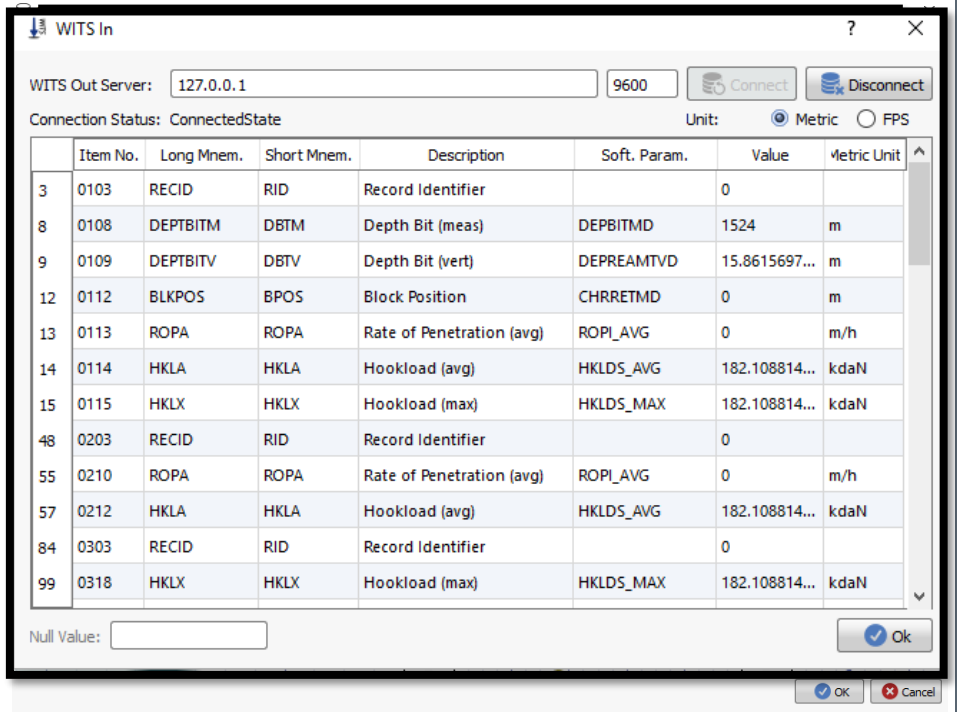
OFFLINE Importing/Exporting

- Multi-Threaded
- DataBase Selection
- Based on Rig Mode
- Different File Formats:

  XML/ WITSML/ ASCII/ EXCELL/ LAS

WITS (In/out)

- Multi-Threaded
- Multi-Client



	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

Thanks for Your Attention