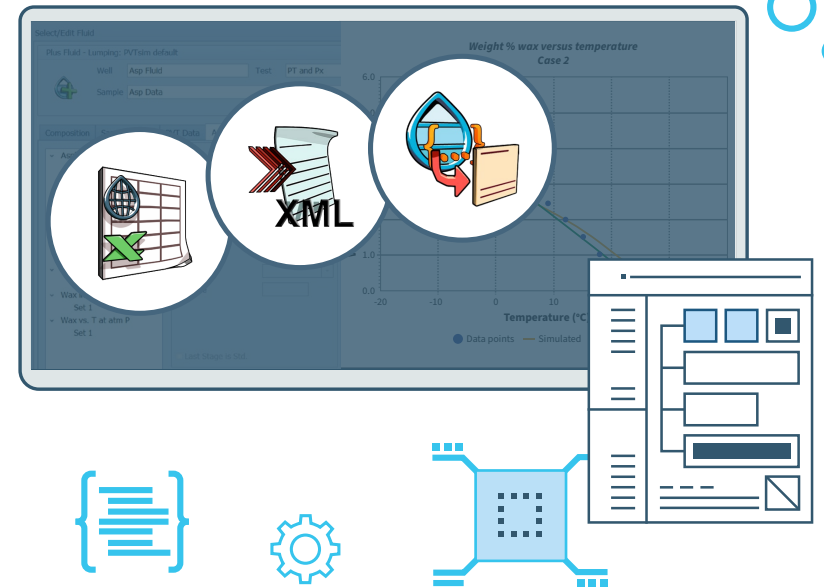
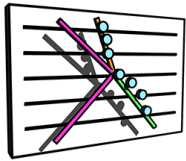

PVTsim Nova 7.0

RELEASE HIGHLIGHTS

Import of several PVT reports
in one operation



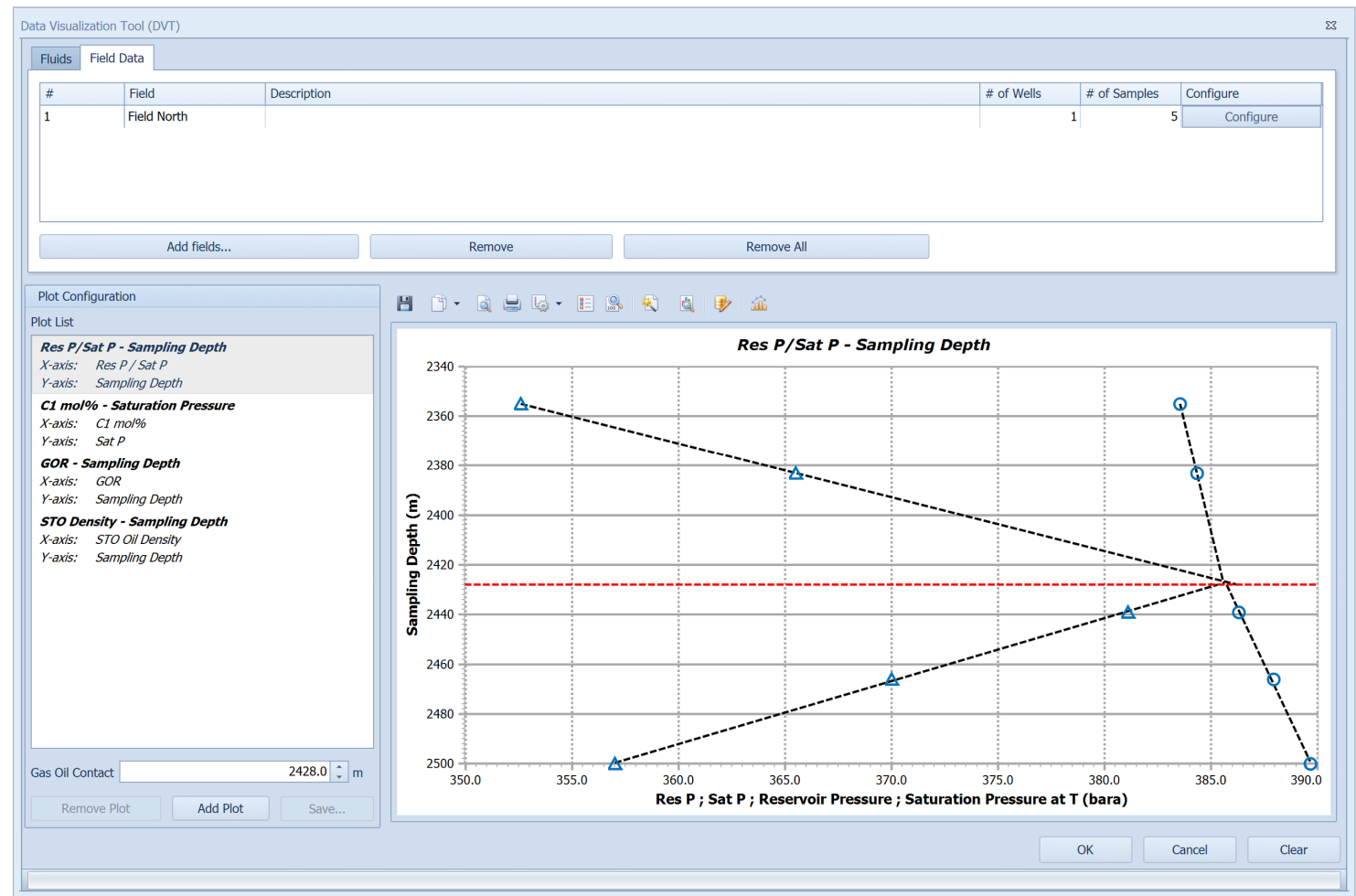
Rapidly visualize compositions and key fluid property trends vs. depth. Fluid data can be integrated with field data, such as reservoir temperature, reservoir pressure, or saturation pressure without requiring a compositional sample. This data can be plotted vs. depth or used in cross plots to visualize and estimate fluid property trends in the reservoir.



Data Visualization Tool (DVT)



Field Data



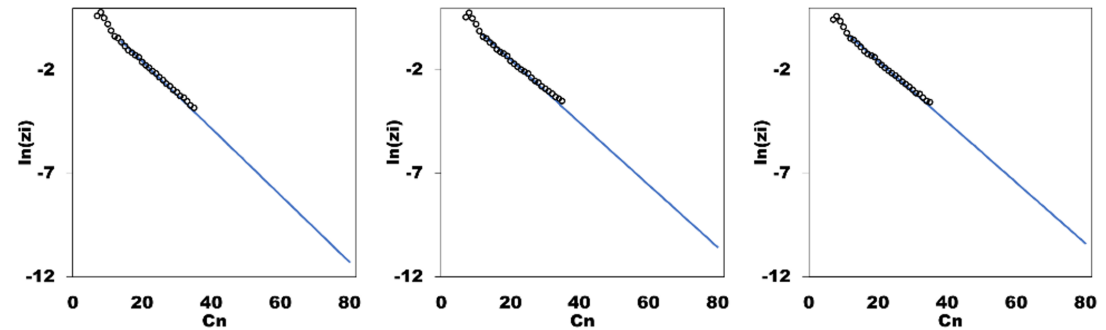


Fluid Preparation for EoS modeling

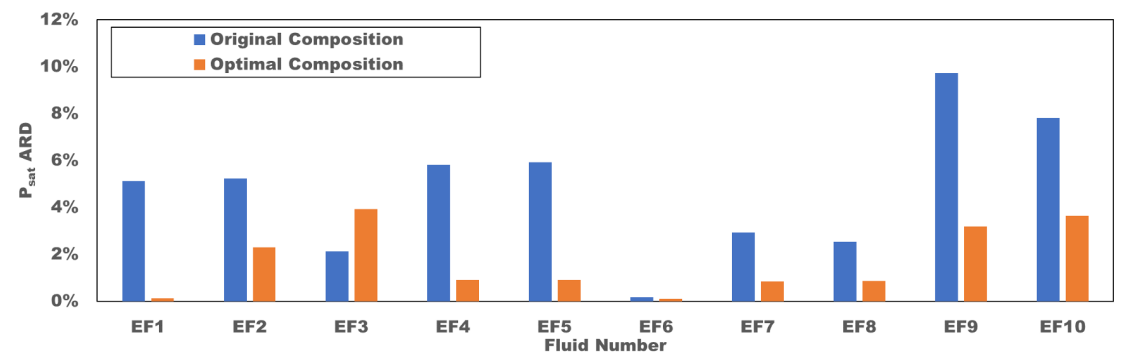
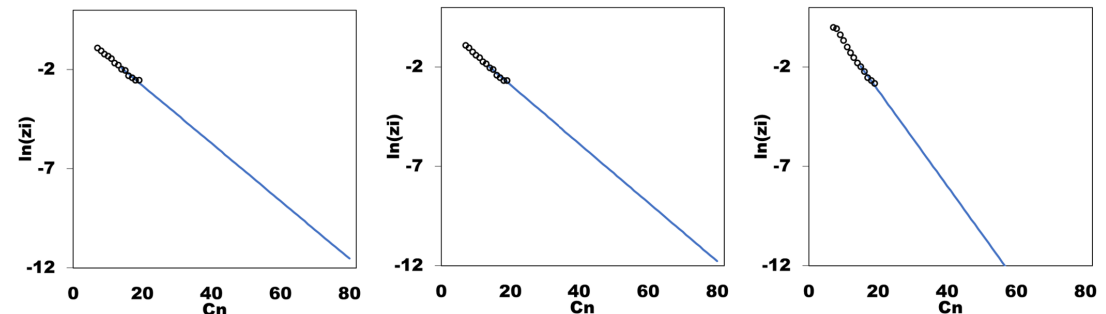
To address the uncertainty in reservoir fluid composition measurements, the Auto QC procedure in PVTsim Nova 7 has been updated to improve predictions of the phase behavior in gas condensates.

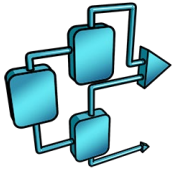
The new procedure uses a lump-back method while keeping the measured weight% composition constant (SPE-216783-MS).

Eagle Ford Fluids



Middle East Fluids





Separation

In the Separation App, a separator can be specified by pressure and temperature. In PVTsim Nova 7, it is now possible to also specify a separator by component K-factors or Oil Recovery Factors.

Comp Split Separator Info:

Name:

K-Factor
 Oil Recovery Factor

Oil Recovery Factor	
N2+C1	9.48E-3
CO2+C2+C3	0.025
iC4-C6	0.110
C7-C10	0.333
C11-C20	0.878
C21-C35	0.999
C36-C80	1.000

OK

Comp Split Separator input Options

- K-Factor
- Oil Recovery Factor



The new Separator Optimization option finds the temperature and pressure of the separators that provide the lowest GOR (highest liquid yield) of a separation process. This option can be used for separation processes simulated in the Separation App.

Optimize Conditions

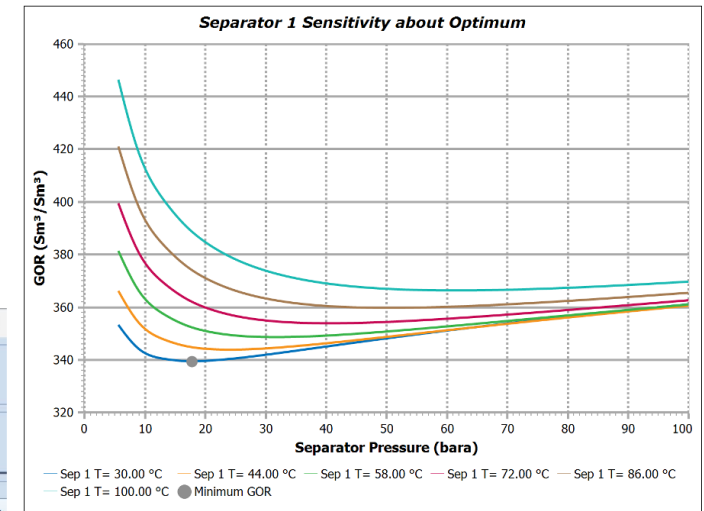
Separation Optimization

Separation Info
 Name: Description:

Fluid
 Selected Fluid Fluid Defined in Sep App Feed: #5. TEST 4. BHS. OIL. Sampling Data. OIL LAB

Separators	Include Pressure	Min Pressure bara	Max Pressure bara	Include Temperature	Min Temperature °C	Max Temperature °C
Separator 1	<input checked="" type="checkbox"/>	5.00	100.00	<input checked="" type="checkbox"/>	30.00	100.00
Separator 2	<input type="checkbox"/>			<input type="checkbox"/>		

OK Cancel





New PVTsim LedaFlow API.

Use PVTsim as the thermodynamic engine
in LedaFlow Composition Tracking simulations.

New Interfaces

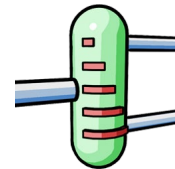


Reveal (IPM)

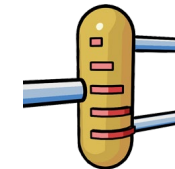


Harmony

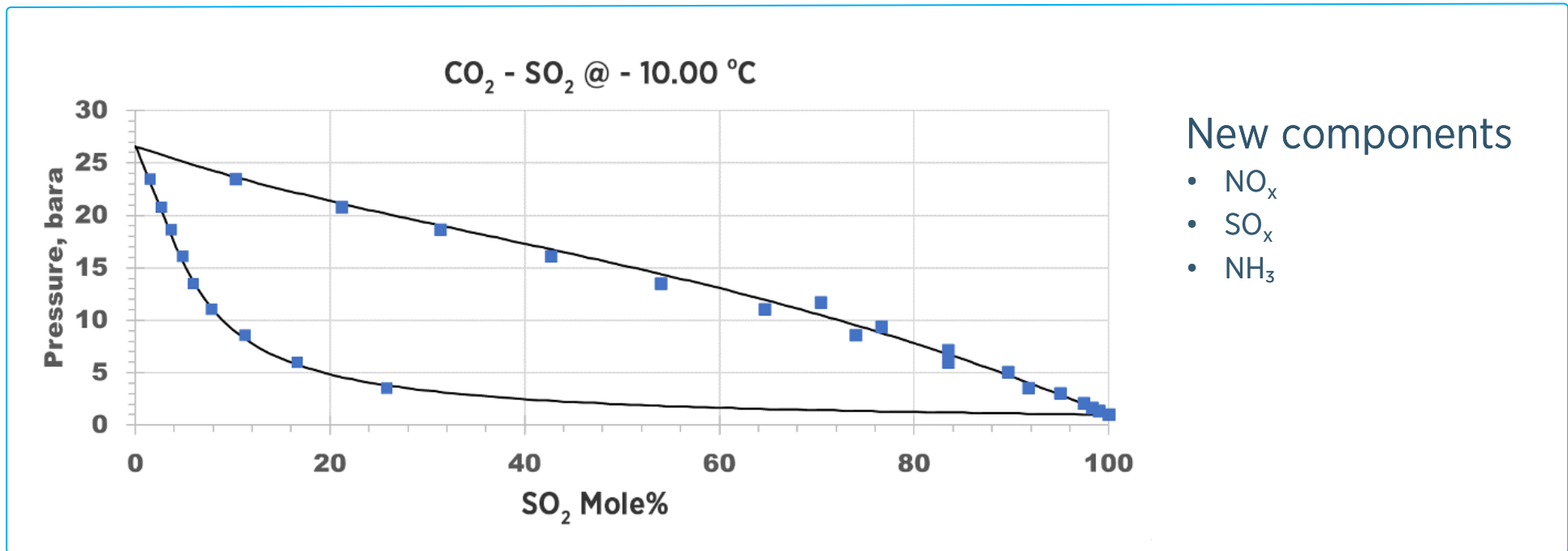
Updated export of EoS parameters



UniSim:
T-dep kij & LBC
coefficients



Hysys:
LBC coefficients & CSP
correction factors

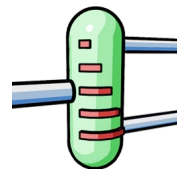


New functions

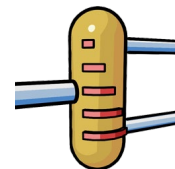
- Saturate fluid with salt water
- Saturate salt water with impure CO₂



New Interfaces



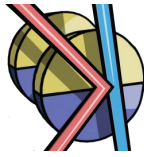
UniSim



Hysys



Depth Gradient Regression



Depth Gradient Compare with Data

PVTsim Nova 7 allows for regression to saturation pressure and Gas-Oil Contact (GOC) data in addition to compositions at different depths.

Depth Gradient Regression

#	Well	Test	Fluid	Sample	Text	Type	EoS	Depth m	Sat Pressure bara	Reservoir Pressure bara	Reservoir Temperature °C
53	Well North	5	2355 m	Gas 1		Character...	SRK P...	2355.0	352.59	383.540	68.300
54	Well North	6	2383 m	Gas 2		Character...	SRK P...	2383.0	363.75	384.331	68.500
55	Well North	7	2439 m	Oil 1		Character...	SRK P...	2439.0	379.99	386.281	68.800
56	Well North	8 Ref	2466 m	Oil 2	GOC 2428m, DelT ...	Character...	SRK P...	2466.0	368.94	387.925	69.330
57	Well North	9	2500 m	Oil 3		Character...	SRK P...	2500.0	358.00	389.647	70.000

Fluid Type:

Lumping Schemes

Defined

Reference Sample
 Reference fluid:
 Vertical gradient: °C/m
 GOC: m
 Account for viscosity effect

Regression Options
 SatP Weight:
 GOC Weight:

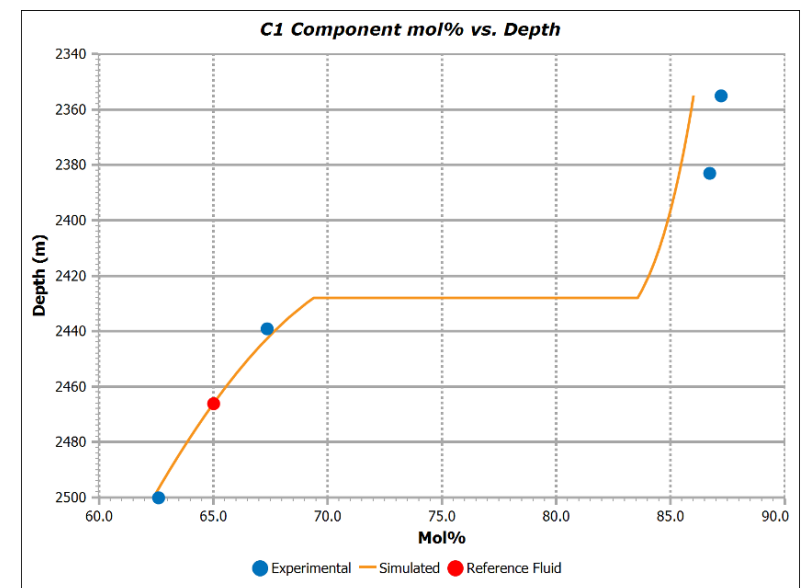
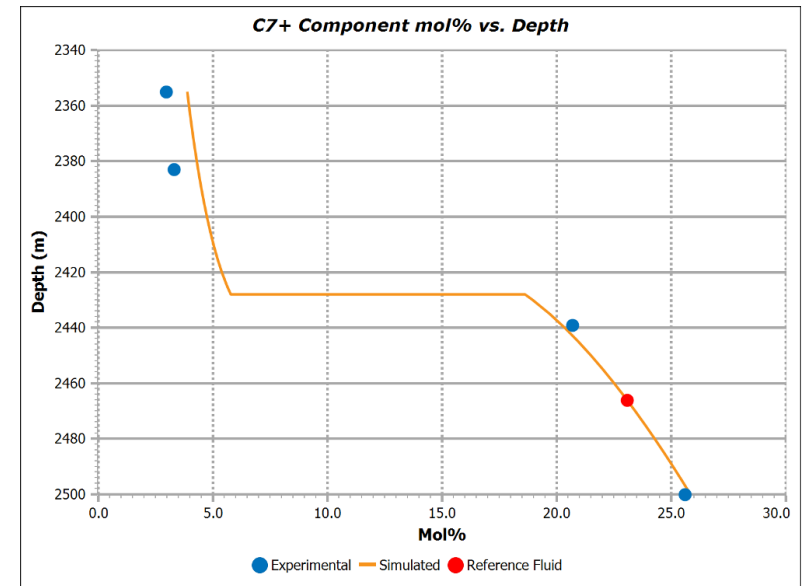
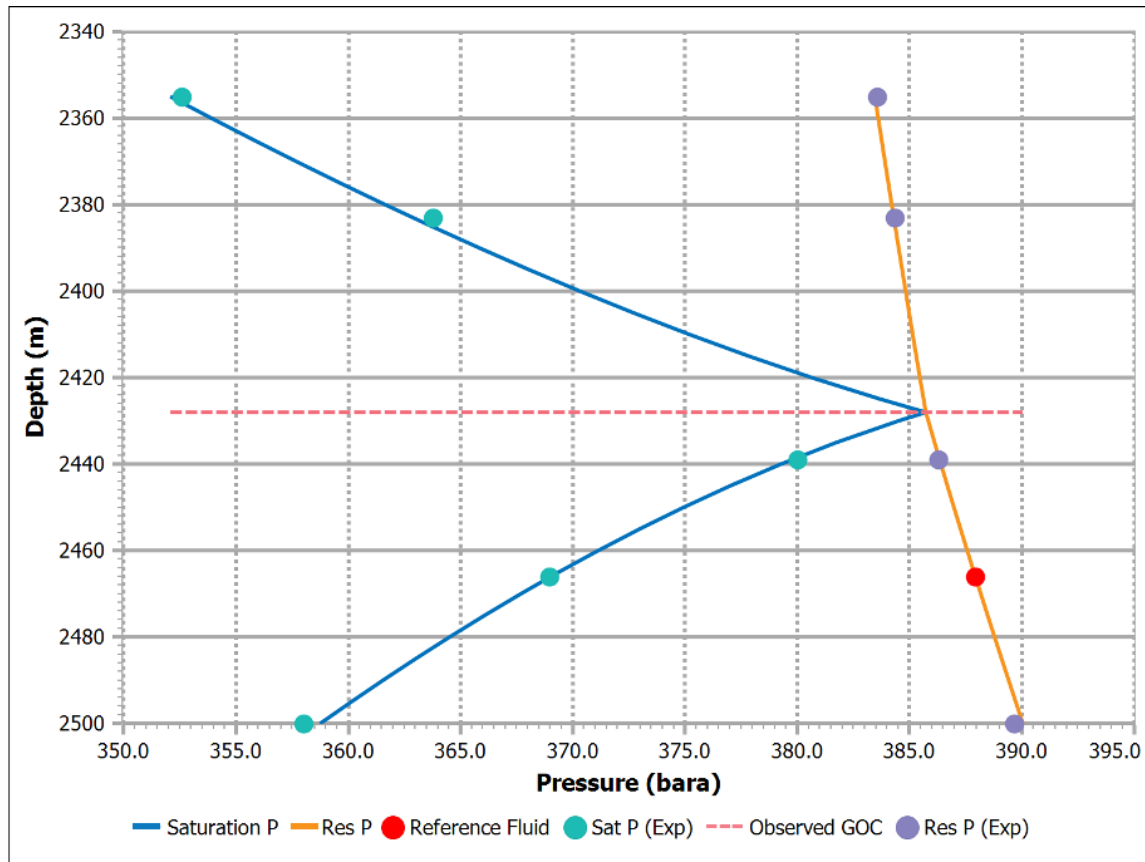
Common EoS
 Text:

Plus fluids or tuned Common EoS model

Reference fluid Temperature gradient (GOC)

Regression weight

Improved match of GOC, saturation pressure, and composition variation with depth.



Additional updates

- Single menu for editing Common EoS model parameters
- Bulk edit of fluid name and Sampling Data in the Fluid Explorer
- Lumping of existing common EoS models



Common EoS Lumping

Common EoS Lumping

#	Well	Test	Fluid	Sample	Text	Type	EoS	Weight
53	Well North	5	2355 m	Gas 1		Character...	SRK P...	1.00
54	Well North	6	2383 m	Gas 2		Character...	SRK P...	1.00
55	Well North	7	2439 m	Oil 1		Character...	SRK P...	1.00
56	Well North	8 Ref	2466 m	Oil 2	GOC 2428m, DelT ...	Character...	SRK P...	1.00
57	Well North	9	2500 m	Oil 3		Character...	SRK P...	1.00

Buttons: Add fluids..., Remove, Remove All

Components

- N2
- CO2
- C1
- C2
- C3
- IC4
- nC4
- IC5
- nC5
- C6

Buttons: Add, Add group, Remove, Remove All

- C7+C8+C9
 - C7
 - C8
 - C9
 - C10-C16
 - C10-C11
 - C12-C14
 - C15-C16
 - C17-C25
 - C17-C18
 - C19-C21
 - C22-C25
 - C26-C80
 - C26-C31
 - C32-C39
 - C40-C80

Text: Common EoS Lumping

Buttons: OK, Cancel

Existing Common EoS group

Select/Edit Fluid

Characterized Fluid

Well: Well North, Test: 5, Fluid: 2355 m, EoS: SRK Peneloux, Polar: -

Sample: Gas 1, Text:

Buttons: Add, Remove

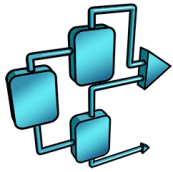
Component	Mol %	Molecular Weight	Liquid Density g/cm ³	Critical Temperature °C	Critical Pressure bara	Acentri Factor
H2O						
MeOH						
EtOH						
PG						
PGME						
MEG						
DEG						
TEG						
DPGME						
DPG						
Glycerol						
NaCl						
KCl						
NaBr						
CaCl2						
HCOONa						
HCOOK						
KBr						
HCOOCs						
CaBr2						
ZnBr2						
He						
H2						
Ar						
CO						
O2						
H2S						
Hg						
c-C3						
Me-Mercpt						
Me-Et-Sulf						

Buttons: Add, Remove

Buttons: Normalize, Mol to Weight, Complete

Buttons: OK, Cancel

New lumping for the Common EoS group



Fluid Inclusion Simulator

Developed to interpret optically derived micro-thermometric and volumetric data from hydrocarbon bearing fluid inclusions.

Fluid Inclusion Simulator Σ

Legal Fluid

Compositional Adjustment Strategy

Saturation Pressure Homogenization Temperature

Atmospheric Pressure Temperature 15 C

Atmospheric Pressure Homogenization Temperature

Atmospheric Pressure Homogenization Temperature 50 C

Measured Conditions

Room Temperature °C

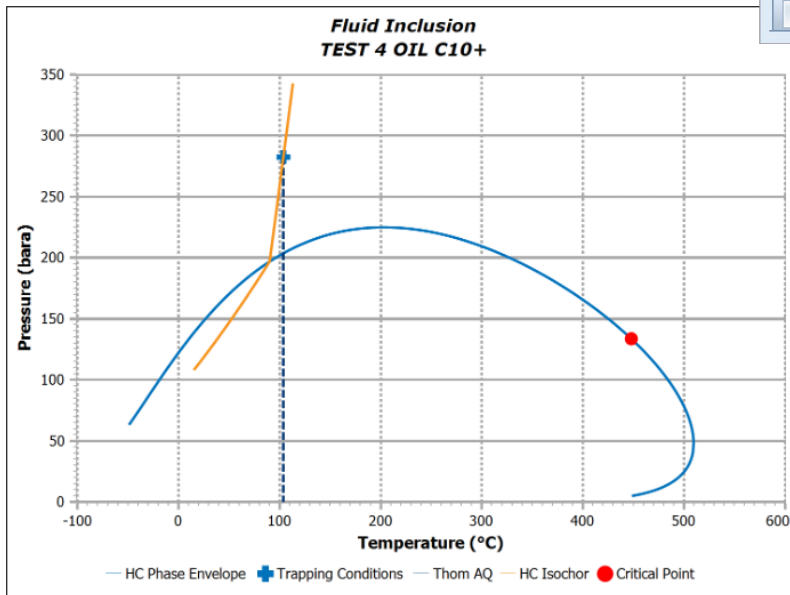
Volume Gas %

Volume Oil %

Homogenization Temperature

Hydrocarbon °C

Water °C



Optimum Composition Homogenization Conditions		Room Conditions		Trapping Conditions	
Temperature	90.00 °C	Temperature	15.00 °C	Temperature	103.60 °C
Pressure	196.89 bara	Pressure	108.05 bara	Pressure	282.40 bara
Molar Volume	174.48 cm ³ /mol	Molar Volume	174.48 cm ³ /mol		
Average Density	0.7338 g/cm ³	Average Density	0.7338 g/cm ³		
Surface Tension	16.012 mN/m	Volume% Gas	10.00 %		
Volume% Gas	0.00 %	Volume% Oil	90.00 %		
Volume% Oil	100.00 %	STP GOR	94.8 Sm ³ /Sm ³		

A composition is calculated, which satisfies the values of HC homogenization temperature and volume percent gas at room temperature.



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