Petrophysics 2019.3
Integrated log analysis for comprehensive interpretation

intelligent geoscience solutions

GVERSE® Petrophysics

Integrated log analysis for comprehensive interpretation

GVERSE® Petrophysics is a 64-bit petrophysical application designed to assist geoscientists and petrophysicists in analyzing and interpreting well log data and characterizing the reservoir using simple to advanced log interpretation workflows in a large multi-well multi-user environment.

GVERSE Petrophysics supports the import of digital data from numerous sources and provides you with integrated data views and analysis. Using this application you can view, edit, and analyze well log data in three different views:

- **Log View**
- **Crossplot View**
- **Report View**

GVERSE Petrophysics enables you to quickly analyze well log data using industry standard petrophysical algorithms. In addition, the Petrophysics Development Kit allows you to write user-defined interpretive models in C, C++, and Visual Basic programming languages for application in GVERSE Petrophysics.

GVERSE Petrophysics works on the Windows platform and is integrated with the GeoGraphix Discovery applications, and GVERSE Geophysics and GVERSE Geomodeling. GVERSE

Petrophysics accesses log and well data from the common project database, displays this data in log and cross plot templates, and creates petrophysical parameters extracted for the petrophysical model for display or export for further analysis. You can use log templates created in GVERSE Petrophysics to display curves in GVERSE Geomodeling and XSection, create cross sections from wells displayed in GVERSE Petrophysics, view WellBase information for wells displayed in GVERSE Petrophysics, and create IsoMap layers from GVERSE Petrophysics curve data statistics. In addition to these integration features, when working with well data in GeoAtlas, GVERSE Geomodeling, or XSection, you can instantly view the selected wells in GVERSE Petrophysics.

Key Benefits

Intuitive Language: GVERSE Petrophysics uses a simple and intuitive scripting language. With little effort, users create sophisticated petrophysical models. These models can then be applied to individual wells for detailed analysis or to thousands of wells to generate reservoir-to-regional scale formation characterizations. Utilizing log template displays and petrophysical interpretations, users then multi-dimensionally view the petrophysical models from single-well log templates to multi-well cross sections to 3D fence diagrams.

Scalable Functionality: GVERSE Petrophysics includes over 250 predefined standard log analysis equations as well as several predefined water saturation, lithology, and coal bed methane (CBM) models. The equations are grouped into easy-to-understand families of calculations that can be copied and edited into a script to solve most formation-analysis problems. For the more sophisticated user, GVERSE Petrophysics can be linked to external models created in Visual Basic, C, or C++ code. External models offer unlimited analytical complexity as well as integration with presentation, attribute extraction, and mapping utilities.

Seamless Petrophysical Analysis, Attribute Extraction, and Mapping: Users can extract attributes generated in the petrophysical models within formation zones of interest and/or filtered well-sets for direct map layer creation, statistical analysis, or export. GVERSE Petrophysics easily links to ZoneManager, GeoGraphix attribute analysis application, to support well-by-well/zone-by-zone parameters for petrophysical models or read/write parameters for Pickett Plot analysis.

Key Features

Multi-Well Interpretation

- Perform one-step reservoir pay summations for common reservoir attributes such as gross, net, net/gross, porosity feet, and hydrocarbon-filled porosity with corrections for true, vertical, and stratigraphic thickness
- Generate virtually any statistic from curve-derived attributes over a zone or depth interval of interest with Curve Data Statistics
- Easily confirm results using data-distribution histograms, statistics, and cross plots
- Map the results directly in GeoAtlas or save results to ZoneManager attributes
- Create proposed completion stages and perforation cluster intervals, then save as proposed completion records in the WellBase Completion table. These records are available for data posting symbology on the well log templates.
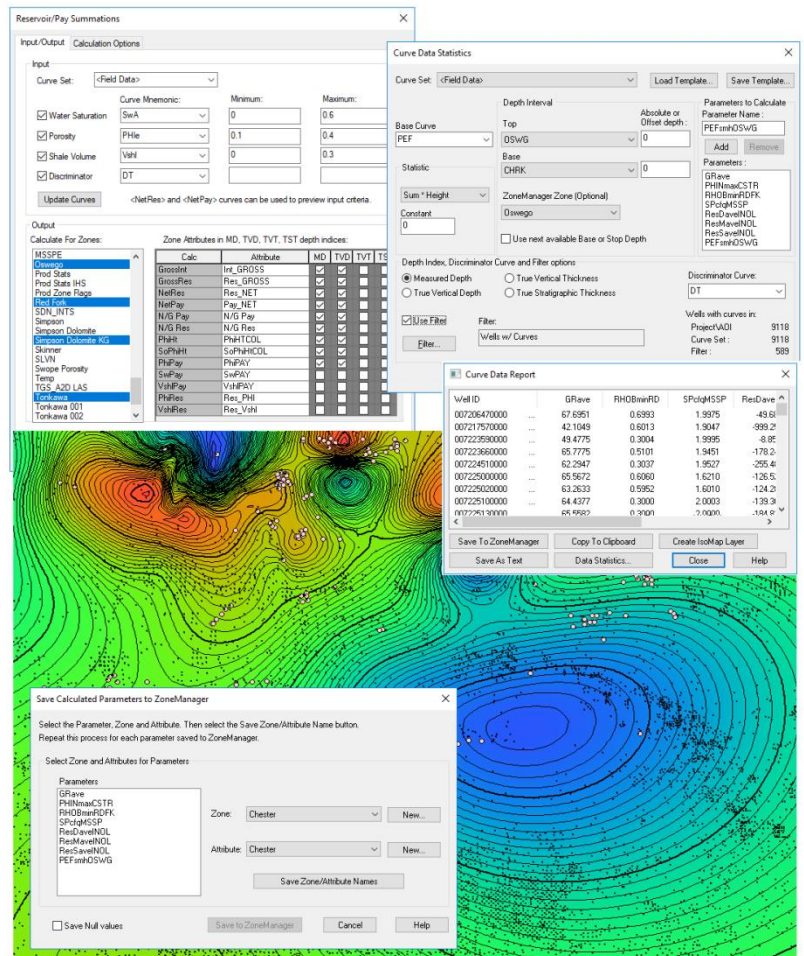
Petrophysical Analysis

- Easily perform quick and interactive log calculations for standard interpretations and reconnaissance with user-defined equations
- Utilize pre-written interpretations for 3 and 4-mineral determinations and Archie, Dual-Water, Indonesian, and Modified Simandoux saturation models
- Link complex, external models written in C, C++, or Visual Basic
- Build and save personal equations with user-defined equations comprised of over 250 pre-defined standard log analysis equations
- Calculate Poisson's Ratio and Young's Modulus using mechanical properties/UDE Group

- Utilize standard Halliburton, Schlumberger, and Baker Atlas charts for environmental corrections or digitize additional charts
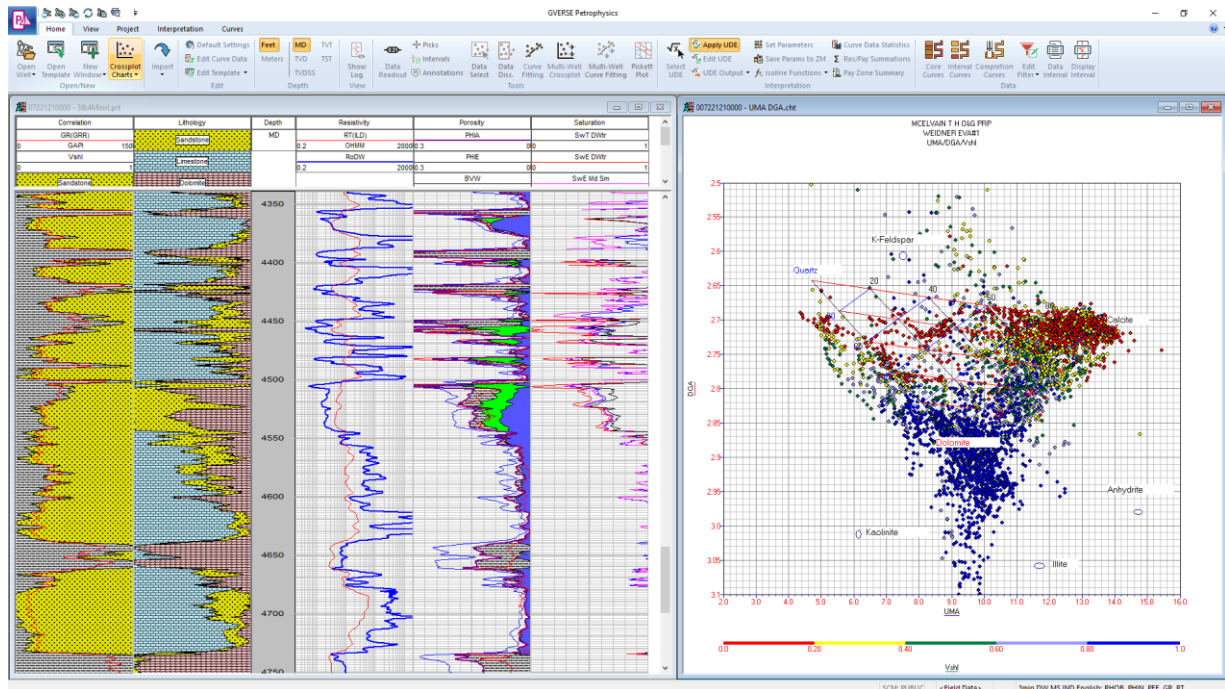

Curve Data Management

- Import standard LAS, LBS, ASCII, DLIS, and LIS/TIF data files
- Automatically merge and splice curves using the curve import tool or optionally merge or splice at user defined depths
- Benefit from project-based mnemonic inventory, mnemonic aliases, and unit conversions
- Manually or bulk normalize curves using the graphical curve normalization utility which includes average, single, and two-point normalization methods
- Utilize single or multi-well curve copy, renaming, deletion, rescaling, min/max clipping and filter smoothing tools
- View standard core curve analysis attributes plus 200 new user-defined core curves
- Combine multiple curve mnemonics for similar curve types in hierarchical order based on a pre-determined preference
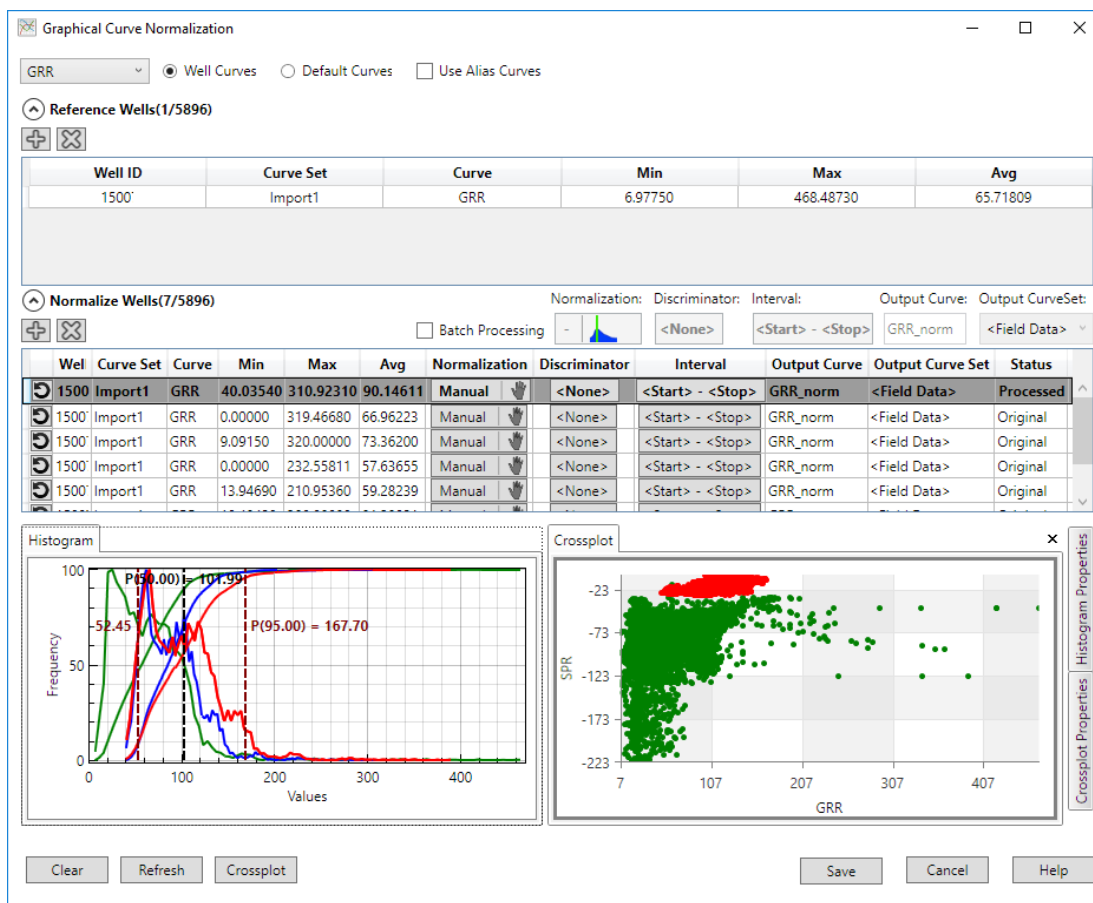
Log Analysis and Display

- Control presentation templates to display curve and depth-registered images with virtually unlimited tracks, curves, colors, and pattern fills

- Display different track types including linear, logarithmic, mineral percent, depth registered images, text, core description, lithology pattern fills, tadpoles, and descriptions

- Easily cut, copy, and paste curves between tracks using the on-screen presentation editing feature

- Automatically post DST, core, perforation, mechanicals, IP, casing, tubing, and zone information

- Interactively pick and display formation and fault markers and user-defined attribute intervals

- On-screen QC editing of curves including performing simple or complex depth shifting, adjusting SP baseline shifting, and utilizing curve patch tools
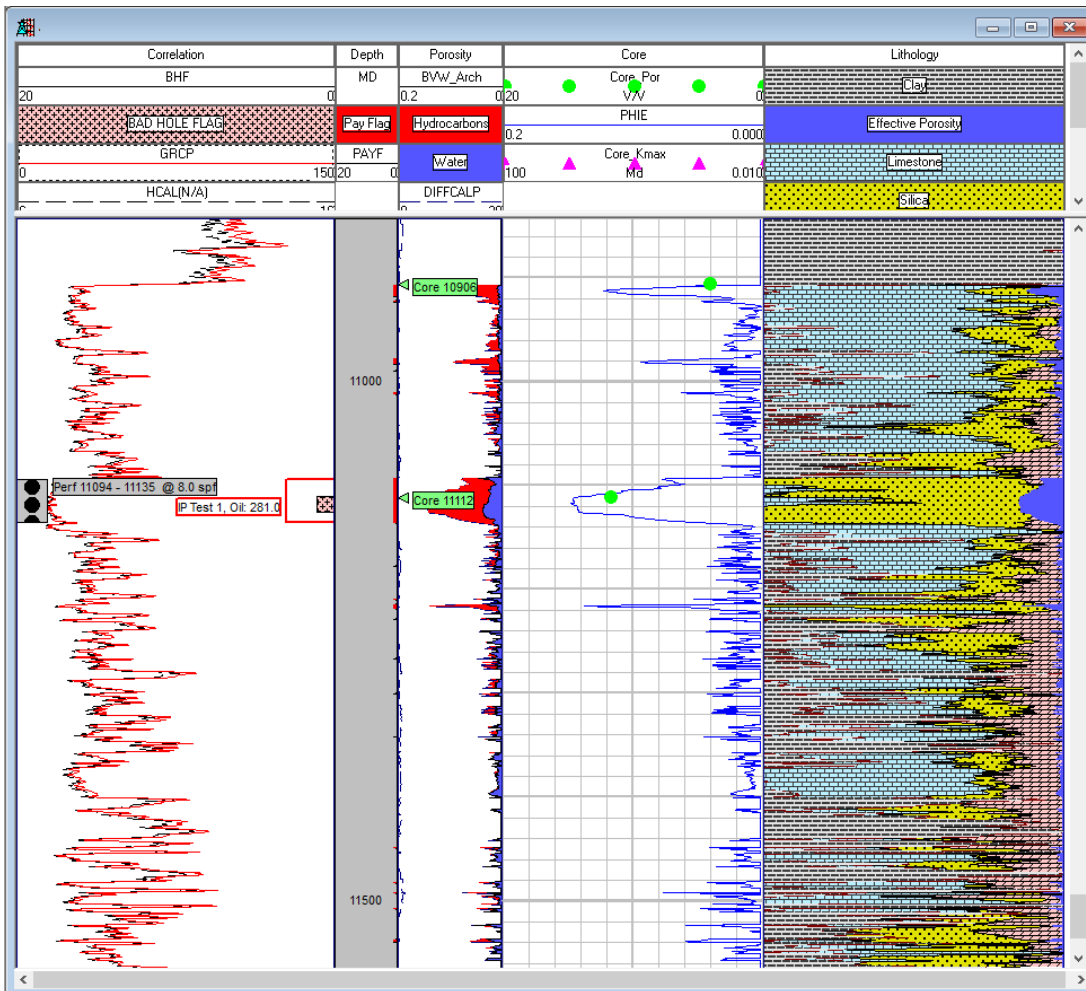
Cross Plot Analysis and Display

- Display data relationships over total well depths, user-specified depth range, or one or more zone(s)
- Create three-axis display with linear or logarithmic scale, user-controlled symbols, size and color, Z-axis color spectrum, and X and Y axis histograms
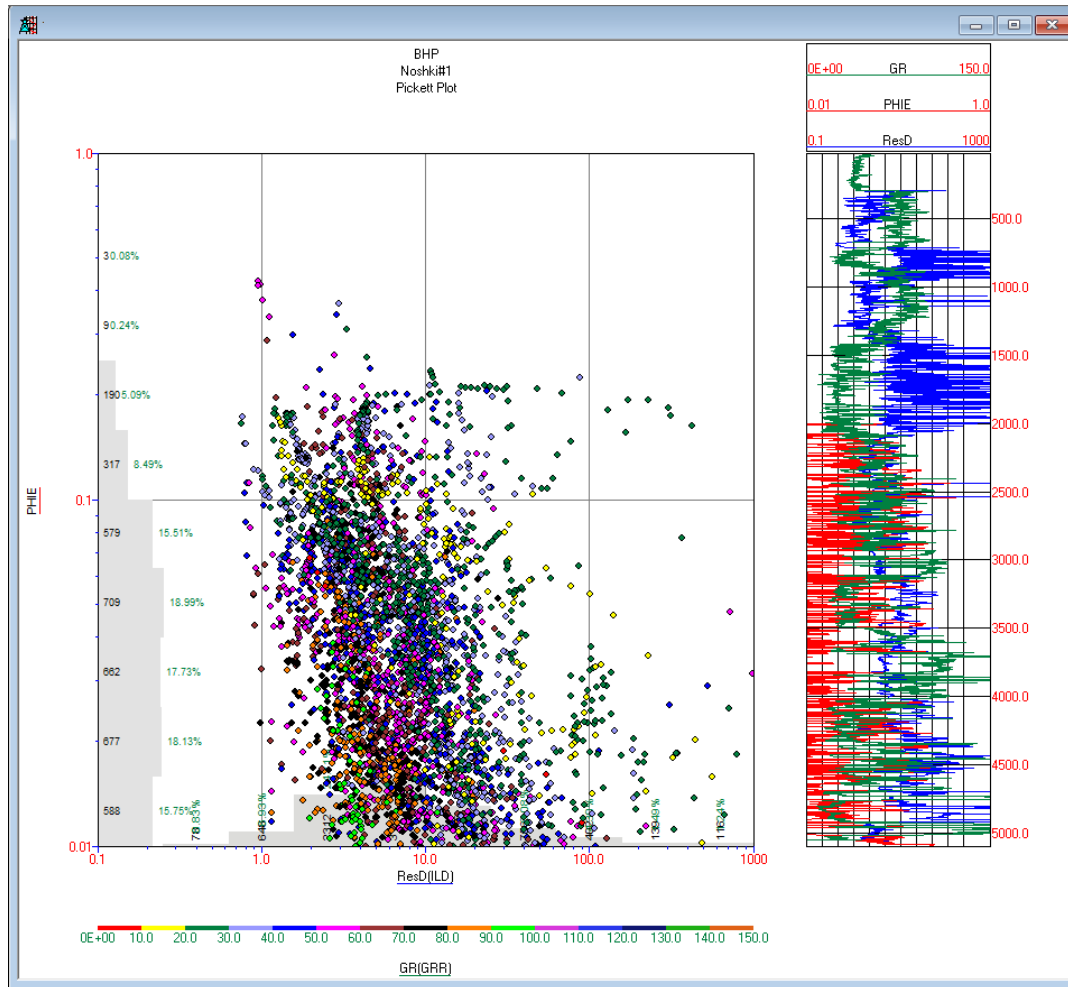
Multi-Well Cross Plots

- Benefit from multi-level discrimination with user-drawn polygon capabilities
- Differentiate between wells by assigning colors to individual wells for better analysis
- Fit curves using linear regression, reduced to major axis, and polynomial regression capabilities
- Interactively determine the Formation Water Resistivity (Rw), Bound Water Resistivity (Rwb) and Cementation Exponent (m) using the Pickett plot
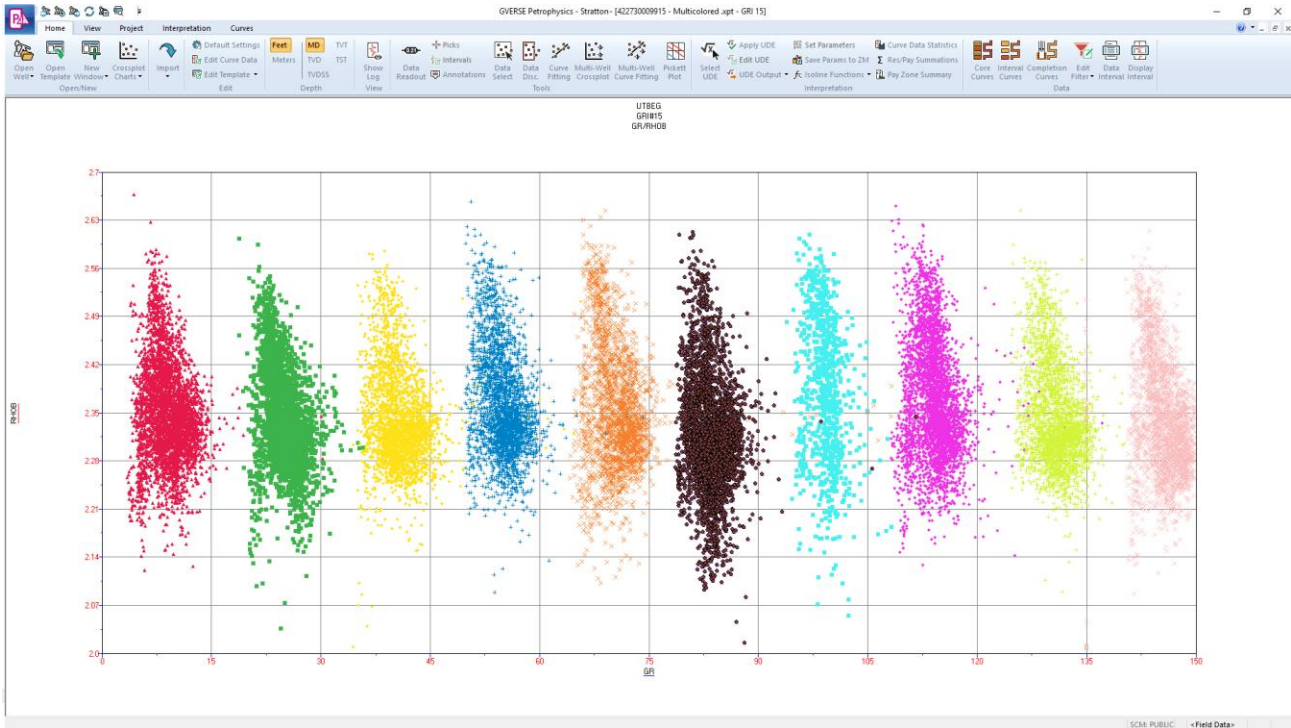
Customizable Reports

- Create user-defined well reports such as net pay, average porosity, water saturation, total porosity feet, or hydrocarbon-filled porosity

- Define curve choices, sample rates, depth interval, or zone selection using the provided tabular list

- Export to tab or comma delimited text files, or copy results to the Microsoft® Windows® clipboard

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| DEPTH	PHIN(NPSS)	RHOB	PHID	PHIA	GR	VshI	PHIE	RT(ILD)	Ro	SwA	BVW
6719.0000	0.4363	2.111	0.339	0.388	83.7	0.796	0.0791	0.60	6.39	1.000	0.0791
6720.0000	0.4285	2.148	0.317	0.373	83.4	0.792	0.0775	0.61	6.67	1.000	0.0775
6721.0000	0.4607	2.147	0.318	0.389	82.5	0.782	0.0850	0.61	5.54	1.000	0.0850
6722.0000	0.4722	2.189	0.292	0.382	81.7	0.771	0.0875	0.62	5.22	1.000	0.0875
6723.0000	0.4405	2.129	0.328	0.384	81.8	0.772	0.0876	0.63	5.21	1.000	0.0876
6724.0000	0.3778	2.131	0.327	0.352	82.6	0.783	0.0765	0.65	6.84	1.000	0.0765
6725.0000	0.4161	2.137	0.323	0.370	83.6	0.795	0.0757	0.76	6.98	1.000	0.0757
6726.0000	0.4138	2.210	0.280	0.347	82.4	0.780	0.0761	0.93	6.90	1.000	0.0761
6727.0000	0.3195	2.239	0.263	0.291	81.4	0.767	0.0677	1.16	8.73	1.000	0.0677
6728.0000	0.3252	2.316	0.217	0.271	81.5	0.769	0.0627	1.49	10.17	1.000	0.0627
6729.0000	0.3301	2.312	0.219	0.274	81.0	0.762	0.0653	1.98	9.38	1.000	0.0653
6730.0000	0.3110	2.359	0.191	0.251	80.8	0.760	0.0604	2.30	10.97	1.000	0.0604
6731.0000	0.2932	2.389	0.173	0.233	81.5	0.769	0.0538	2.45	13.81	1.000	0.0538
6732.0000	0.2808	2.332	0.207	0.244	81.8	0.772	0.0556	2.70	12.95	1.000	0.0556
6733.0000	0.3400	2.318	0.216	0.278	82.0	0.775	0.0624	2.77	10.26	1.000	0.0624
6734.0000	0.3944	2.237	0.264	0.329	81.9	0.774	0.0745	2.31	7.20	1.000	0.0745
6735.0000	0.4524	2.127	0.329	0.391	82.5	0.781	0.0855	1.63	5.47	1.000	0.0855
6736.0000	0.4407	2.172	0.302	0.372	84.3	0.804	0.0730	1.30	7.52	1.000	0.0730
6737.0000	0.4172	2.213	0.278	0.348	82.8	0.785	0.0747	1.13	7.16	1.000	0.0747
6738.0000	0.3767	2.203	0.284	0.330	81.5	0.769	0.0764	1.06	6.85	1.000	0.0764
6739.0000	0.3727	2.238	0.263	0.318	82.3	0.778	0.0705	1.13	8.06	1.000	0.0705
6740.0000	0.3974	2.216	0.276	0.337	82.2	0.778	0.0749	1.23	7.14	1.000	0.0749
6741.0000	0.3962	2.188	0.293	0.345	82.5	0.781	0.0754	1.29	7.03	1.000	0.0754
6742.0000	0.3930	2.188	0.293	0.343	82.3	0.779	0.0757	1.33	6.98	1.000	0.0757
6743.0000	0.4112	2.175	0.300	0.356	81.9	0.774	0.0806	1.39	6.16	1.000	0.0806
6744.0000	0.3402	2.201	0.285	0.313	81.7	0.771	0.0715	1.50	7.82	1.000	0.0715
6745.0000	0.3710	2.295	0.229	0.300	82.6	0.782	0.0653	1.57	9.99	1.000	0.0653
6746.0000	0.3852	2.280	0.238	0.312	83.2	0.790	0.0655	1.59	9.32	1.000	0.0655
6747.0000	0.3556	2.251	0.255	0.305	83.3	0.792	0.0636	1.49	9.90	1.000	0.0636
6748.0000	0.3996	2.222	0.273	0.336	82.3	0.778	0.0746	1.25	7.19	1.000	0.0746
6749.0000	0.4137	2.219	0.274	0.344	82.9	0.786	0.0735	1.21	7.40	1.000	0.0735
6750.0000	0.3554	2.228	0.269	0.312	83.2	0.790	0.0654	1.19	9.34	1.000	0.0654
6751.0000	0.3676	2.236	0.264	0.316	82.5	0.782	0.0689	1.18	8.42	1.000	0.0689
6752.0000	0.3237	2.257	0.252	0.288	82.2	0.778	0.0639	1.25	9.81	1.000	0.0639
6753.0000	0.3400	2.289	0.232	0.286	82.9	0.786	0.0611	1.36	10.71	1.000	0.0611
6754.0000	0.3685	2.358	0.191	0.280	83.8	0.798	0.0567	1.39	12.46	1.000	0.0567
6755.0000	0.3729	2.274	0.242	0.307	83.0	0.787	0.0654	1.42	9.35	1.000	0.0654
6756.0000	0.3294	2.204	0.283	0.306	82.5	0.782	0.0669	1.39	8.93	1.000	0.0669
6757.0000	0.3600	2.253	0.254	0.307	82.2	0.777	0.0684	1.31	8.55	1.000	0.0684
6758.0000	0.3421	2.186	0.294	0.318	82.5	0.781	0.0697	1.16	8.23	1.000	0.0697
6759.0000	0.3910	2.222	0.273	0.332	82.7	0.784	0.0716	0.81	7.80	1.000	0.0716
6760.0000	0.4326	2.236	0.264	0.348	81.9	0.773	0.0789	0.71	6.42	1.000	0.0789
6761.0000	0.4088	2.098	0.346	0.377	82.6	0.783	0.0821	0.70	5.93	1.000	0.0821
6762.0000	0.3767	2.129	0.328	0.352	83.0	0.788	0.0748	0.69	7.15	1.000	0.0748
6763.0000	0.3586	2.256	0.252	0.305	83.3	0.791	0.0638	0.76	9.81	1.000	0.0638
6764.0000	0.2319	2.349	0.197	0.214	81.8	0.772	0.0488	1.00	16.78	1.000	0.0488
6765.0000	0.1772	2.468	0.126	0.152	80.9	0.761	0.0363	1.44	30.37	1.000	0.0363
6766.0000	0.1886	2.482	0.118	0.153	80.8	0.761	0.0367	2.13	29.70	1.000	0.0367
6767.0000	0.2216	2.445	0.140	0.181	82.2	0.778	0.0402	2.21	24.80	1.000	0.0402
6768.0000	0.2146	2.448	0.138	0.176	82.1	0.776	0.0395	1.90	25.67	1.000	0.0395
6769.0000	0.2459	2.371	0.184	0.215	82.4	0.781	0.0471	1.46	18.00	1.000	0.0471
6770.0000	0.3806	2.161	0.309	0.345	83.9	0.799	0.0692	1.01	8.36	1.000	0.0692
6771.0000	0.4469	2.121	0.333	0.390	86.4	0.830	0.0662	0.86	9.12	1.000	0.0662
6772.0000	0.3531	2.195	0.289	0.321	85.0	0.812	0.0603	0.85	10.99	1.000	0.0603
	0.3366	2.322	0.213	0.275	111.6	0.742	104.3054				
	AVG	AVG	AVG	AVG	MAX	MIN	TOT				

![GVERSE GeoGraphix logo]

Graphical Curve Splice

- Graphically splices the curve data for different runs in a well.
- Combine two or more input curves logged on different depth ranges to form a continuous composite curve into one single dataset, so that the measurements are available over the greatest possible depth interval.
- Display the single composite curve as a new curve in Log View of GVERSE Petrophysics.
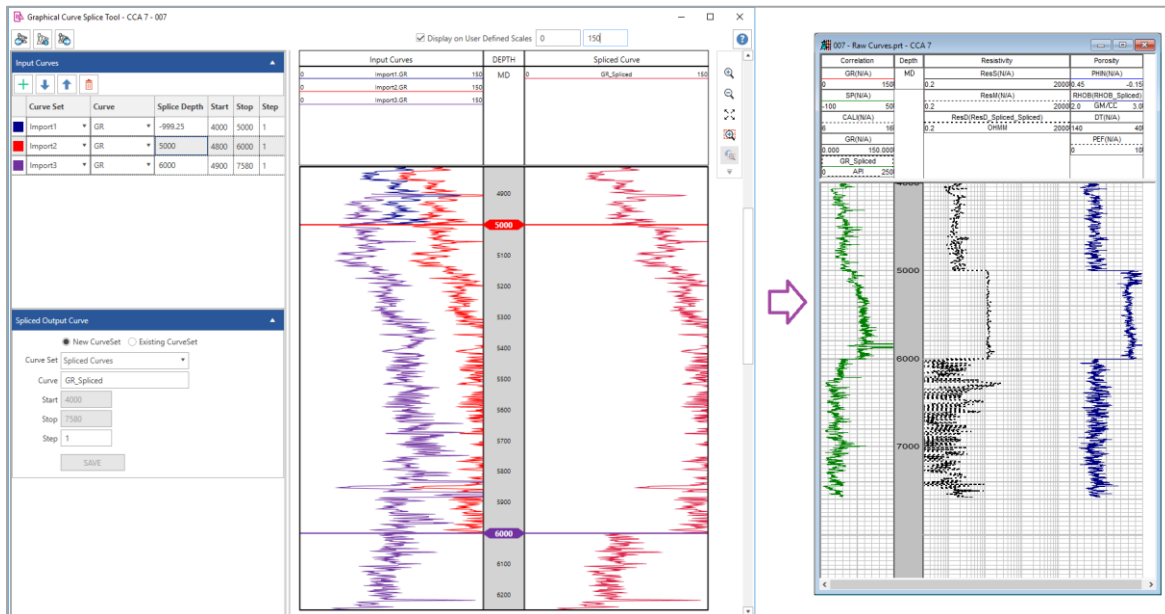

Filter Wells with Curves in Zone

- Define Wells with Curves in Zone filter to refine the inventory.
- The filter focuses on only the wells with curves lying fully or partially in the corresponding zones.
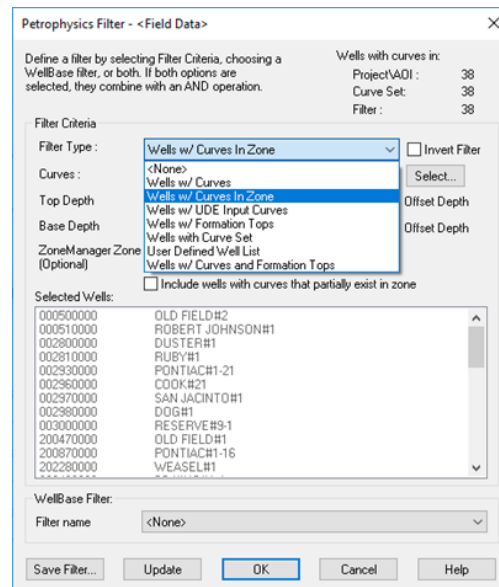
Survey Curves

- Display the Survey Curves in GVERSE Petrophysics using the Azimuth and Inclination survey data from WellBase.
- Use the Survey Curves as discriminator curve or as equations in UDE and display them in cross sections.
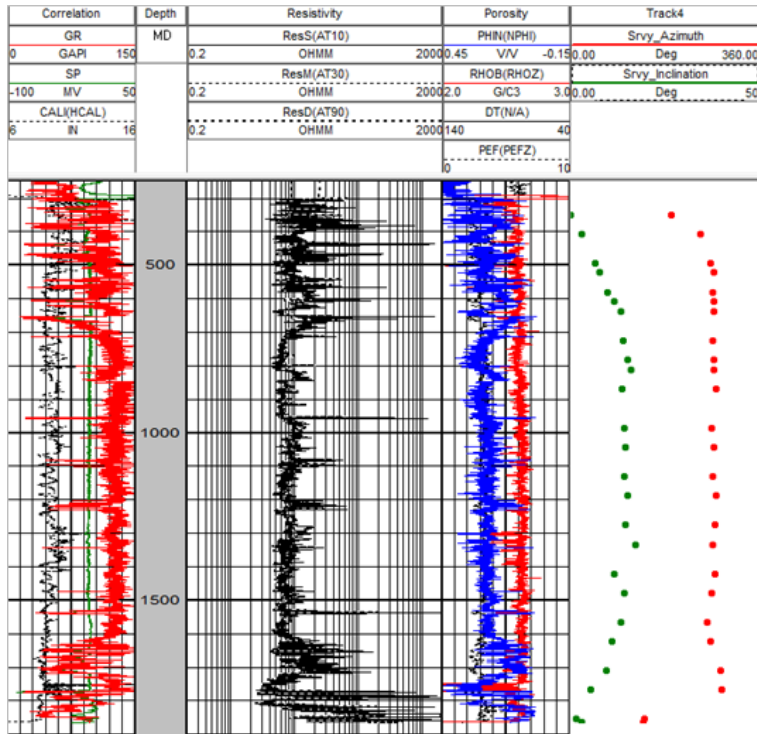

Release Highlights 2019.3

Graphical Curve Splice

Introducing a tool that graphically splices the curve data for different runs in a well by allowing the user to combine two or more curves logged on different depth ranges to form a continuous composite curve. To launch the Graphical Curve Splice utility, select **Curves** tab **>> Graphical Curve Splice** option.
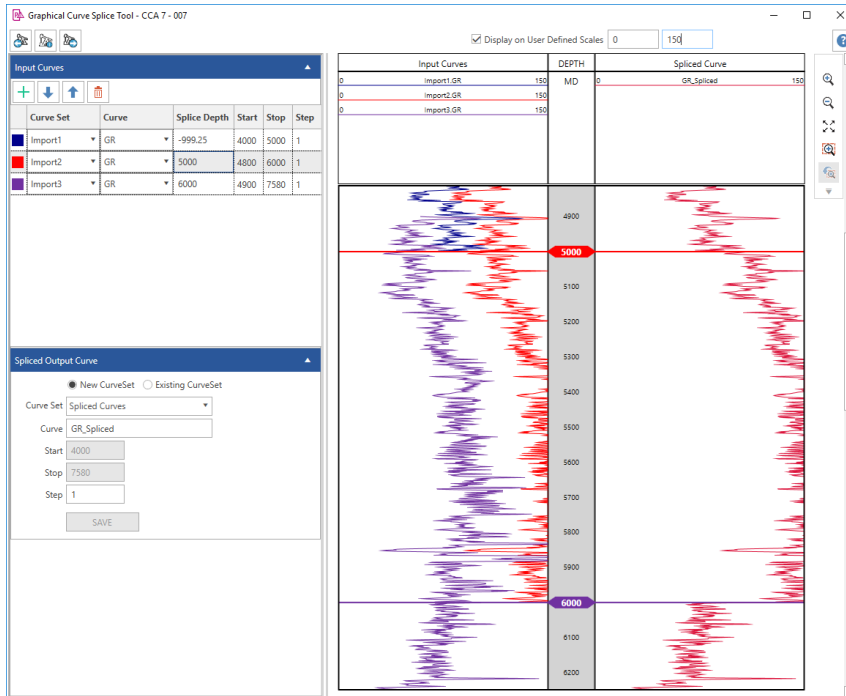
Survey Curves

Display the Survey Curves in GVERSE Petrophysics using the Azimuth and Inclination survey data from WellBase. Use the Survey Curves as discriminator curve or as equations in UDE and display them in cross sections. To display Survey Curves in Log View, select **Home tab >> Survey Curves** option.
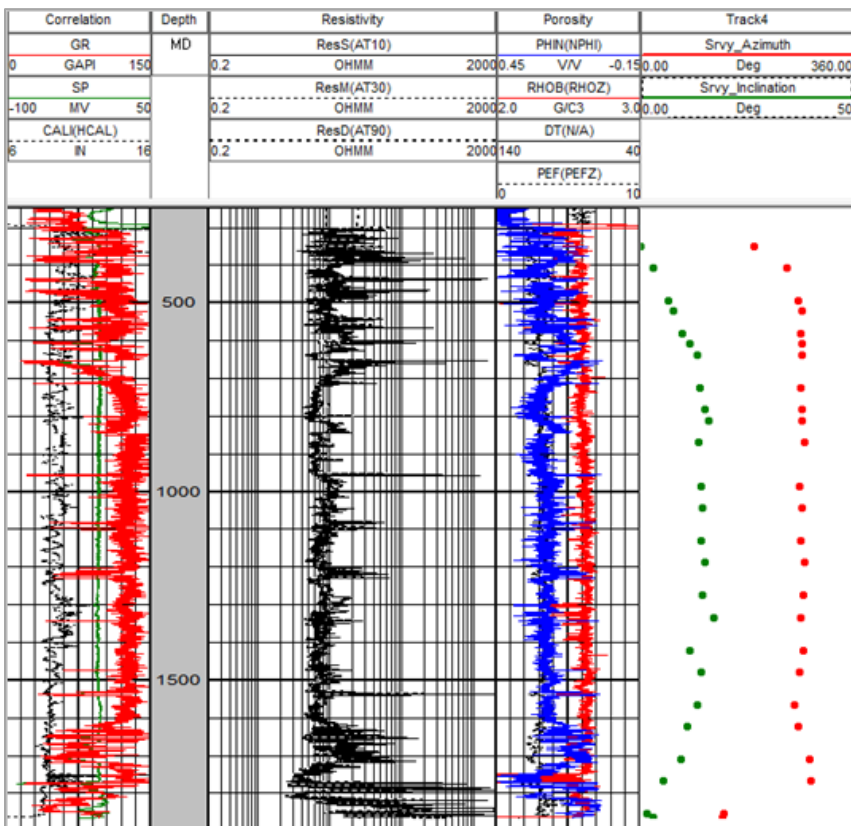
UDE Enhancements

The Windows standard editing tools, Undo, Cut, Copy, Paste, Delete, and Select All are now available from the context menu in the UDE text box.
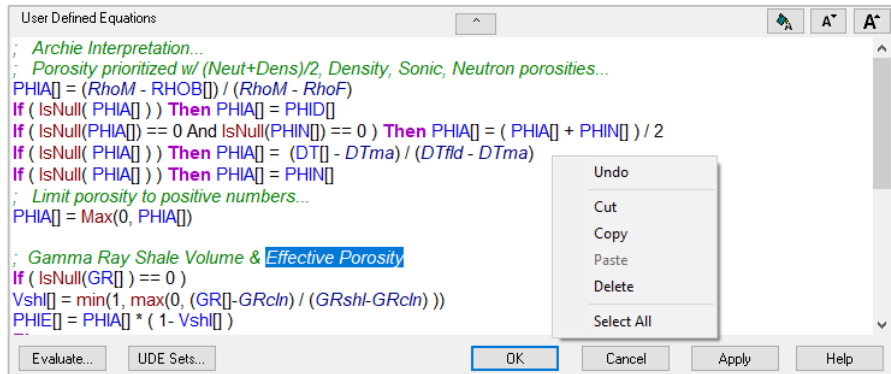
Define Wells with Curves in Zone

Define Wells with Curves in Zone filter to refine the inventory that focuses on only the wells with curves lying fully or partially in the corresponding zones. To apply the filter, select either **Home** tab **>> Open Well** option or **View** tab **>> Select Well** option and use **Filter** button.
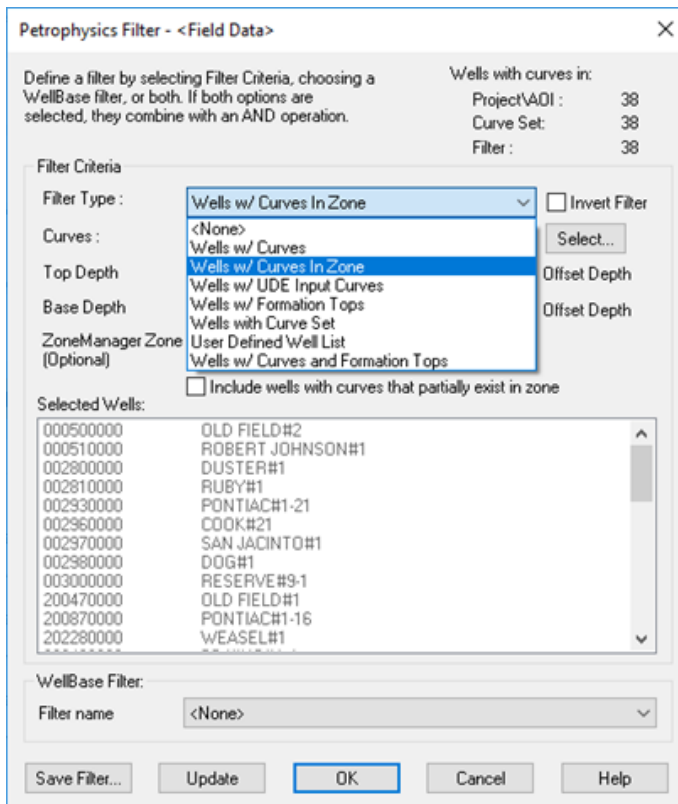
Data Sorting

Finding the right curve set is made easier with sorted list of Well with Computed Curve Sets in **Assign Field Data** and **Delete Computed Curves** feature.

Alphanumeric LAS Import

Alpha characters in numeric fields no longer throws and error and stops the import. These characters are converted to NULL values which allows the import to complete.

Filter Image Names

Easily find image names in a long list of image names to alias to a default image name group with the new Image Name filter.
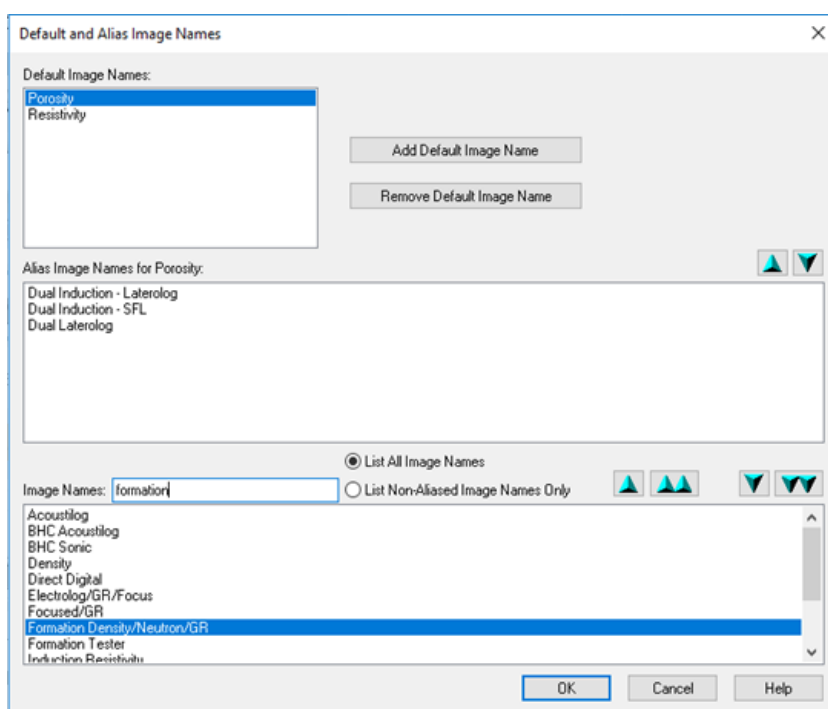
Requirements

Minimum

- 2.4GHz 64-bit Intel class or better
- 8 GB RAM
- 1,024 x 768 graphics resolution
- CD-ROM drive
- 19-inch monitor

Recommended

- Quad 2.4 GHz 64-bit Intel class or better
- 16 GB RAM or greater
- NVIDIA GeForce or Quadro - 2GB video RAM
- DVD-RW drive
- Dual 21+-inch monitors

Software

- Microsoft® .NET 4.5

- Microsoft DirectX 11

Operating System(s)

- Windows® 7 Professional x64
- Windows® 7 Enterprise x64
- Windows® 7 Ultimate x64
- Windows® 10 Professional x64
- Windows® 10 Enterprise