GVERSE® GeoGraphix®

GeoGraphix 2019.4
Release Notes

Contents

GeoGraphix® and Discovery™ on OpenWorks® 2019.4

We are pleased to announce the release of the GeoGraphix® and Discovery™ on OpenWorks® 2019.4 software.

GeoGraphix 2019.4 is an integrated product suite that incorporates shared data management and geological, petrophysical, and geophysical interpretation software. It utilizes a Sybase (SAP SQL Anywhere) database in GeoGraphix Discovery mode, or accesses the OpenWorks®/SeisWorks® (Oracle) database in Discovery on OpenWorks mode.

<u>**Note**</u>: New users or users upgrading from other versions of GeoGraphix need a valid license. The License Management Tool (LMT) must be installed to configure the license. Download the latest LMT from the GVERSE GeoGraphix Support Portal > Downloads page. See the **Licensing** section of the Installation Guide for Release 2019.4 for more information.

<u>**Note:**</u> If working in a network environment, in order for all computers to work together on shared projects, ALL computers (clients and servers) must be updated to the same version of the software. It is intentional that computers with different versions of GeoGraphix software cannot and should not be connected with each other.

This release consists of the following:

GVERSE® Petrophysics

- GVERSE® Petrophysics is designed to assist geoscientists and petrophysicists in analyzing and interpreting well log data, and characterization of the reservoir using simple to advanced log interpretation workflows in a large multi-well multi-user environment.

GVERSE® Geomodeling

- An integrated environment for modeling that incorporates existing mapping and cross section features of smartSECTION® with a newly built 3D View. It takes your smartSECTION interpretations to a whole new level with 3D modeling, while also enabling you to fully utilize the existing smartSECTION features.

GVERSE® Geophysics

- An intuitive and easy-to-use seismic interpretation system with powerful 3D visualization and interpretation capabilities. GVERSE Geophysics enables geoscientists to execute end-to-end workflows for basic interpretation and more advanced geophysical tasks.

GVERSE® FieldPlanner

- This application intelligently populates wells over an entire field based on defined hazards, lease areas, and constraints. It uses an advanced optimization algorithm to lay out hundreds of wells in minutes. It works with you by taking into account surface hazards, existing wells in the area, and lease boundaries to maximize lateral length in the zone.

Pro 3D

▪ Enables interpreters to get the most from their data by quickly creating powerful and informative base maps, fence diagrams and seismic backdrops. Using the Pro 3D window you can show IsoMap® structural surfaces, cultural layers, wells, seismic data, cross sections and fence diagrams in the 3D Scene.

Field Planning

▪ The advanced field planning tool is designed to reduce the time required for efficient field development. It provides the ability to create, save, analyze and manage multiple field plan scenarios before committing them to the database. Designed for horizontal well plans, the Field Planner includes determination of the optimum location and orientation of wells. These proposed wells can all be visualized by creating a layer for display in GeoAtlas™.

Data Manager™ includes ProjectExplorer™, Coordinate System Manager™, WellBase™, SeisBase™, QueryBuilder™, LandNet™, LeaseMap™, and ZoneManager™.

▪ The GeoGraphix and Discovery on OpenWorks project and data management engine.

GeoAtlas™

▪ The map display and montage environment working on ESRI MapObjects.

IsoMap®

▪ The gridding contouring engine, featuring 10 powerful gridding algorithms.

XSection™

▪ A fully integrated geological interpretation tool and cross section display tool.

smartSECTION®

▪ Map view for viewing GeoAtlas layers and defining cross sections for picking tops and faults for structural and sequence stratigraphic analysis.

Discovery™ 3D

▪ The 3D scene viewer that uses the most recent video and X-Box tools to display seismic and geologic data in three dimensions.

pStaX™

▪ The post stack processing module for enhancing seismic character and detecting anomalies related to geologic features.

SCAN™

▪ The patented semblance calculation for enhanced fault interpretation.

LogM Advanced Synthetics™

- The geophysical application used for interactively editing well logs and evaluating synthetic trace character response.

LogM Modeling™

- The 2D forward seismic waveform, ray tracing and structural modeling tool to predict seismic response away from the well.

STRUCT™ Model Entry

- The comprehensive forward seismic structural modeling tool that is used to determine the seismic response of complex geologic structures in areas where there is little or no well control.

Discovery™ on OpenWorks®

- Enables the GeoGraphix software to access OpenWorks and SeisWorks projects, and uses the OpenWorks and SeisWorks data within the GeoGraphix framework.

Xchange Tools

WellXchangePlus™

- Transfer well information to or from two GeoGraphix projects, or between GeoGraphix and OpenWorks.

SeisXchange™

- Transfer seismic data between GVERSE Geophysics and SeisWorks.

GridXchange

- Transfer of map point sets and grids from GeoGraphix to OpenWorks.

Note: SeisBase, LandNet, LeaseMap, LogMModelBuilder (LogM Modeling), LogM Well Editor (LogM Advanced Synthetics), Field Planner, and Advanced 3D Visualization (Pro 3D) are not available in the current version of Discovery on OpenWorks.

New Features at a Glance

The new features available in the GeoGraphix 2019.4 release are listed below.

GVERSE Petrophysics

- Curve sets can be deleted from a filtered set of wells to clean the data set. Deletion does not apply to Field data.
- Generated curves using User Defined Equations (UDEs) can be saved to the default curves list, which makes them readily available to be used in templates and various workflows easily.
- You can now export log curves with different depth index and depth units using the Export Curves option.
- Multiple UI improvements to help the user perform actions for the petrophysical interpretations.
- An extensive tool is introduced to run K-Means clustering on a set of input log curves for a selection of wells, which helps in identifying electrofacies curves using the log curve data.
- You can now calculate curve data statistics over an interval around a fault or formation pick. This helps you in extracting petrophysical attributes around the markers.
- The readability of logs display has improved by allowing the user to control the number of decimal places of log values to display.
- You can now post chamber recovery information on presentation templates, which enables users to view information on logs and perform insightful analysis.
- Formation tops and fault cuts can be displayed with log presentation in Crossplot view, which helps you in quickly identifying intervals of interest on the crossplot view log presentation.
- You can now choose not to import unwanted curves while importing a LAS file by filtering curves.
- You can choose whether to display all the aliased curve names in the respective curve header or not, while applying Combined Curve Aliasing (CCA).
- In the Set Parameters dialog box, the Zone column is frozen and does not hide from view while scrolling towards the right side.
- Formatting has significantly improved while using the 'Copy to Clipboard' option in Curve Set Inventory.
- Curves can now be added to an existing curve set while importing LAS files for a single well.
- Curve sets can be merged in multiple wells, which allows users to organize and manage curve data easily in larger projects.
- You can now add curve name mnemonics up to 40 characters in the database.

GVERSE Geomodeling

- Create a Survey Point report of the position of the well within zone(s). This helps in ascertaining the distance of the survey point from the zone boundary.
- The user can now color the type logs and correlation logs, which allows users to differentiate between the correlation/type logs and the actual logs.
- The users can now view and save geobodies in Cross Section view. The geobody properties can also be set in Cross Section view.
- The users can now view and save geobodies in the 3D view. The geobody properties can also be set in the 3D view.

- Performance has been improved in various Well Zone Calculations workflows. The performance is enhanced specially while:

  - Generating the error log.
  - Calculating well parameters.
  - Generating reports.
  - Saving reports.
  - Copying data from clipboard and pasting in any compatible application.
  - Using Angle as the starting parameter for calculations.
  - Reusing calculated data.

- Calculate the length and percent of the wellbore and other core and test date within a zone for multiple zones.
- Generate on-the-fly property maps from attributes stored in any ZoneManager zone.
- The mouse cursor tracking functionality is now enabled between the views in GVERSE Geomodeling and GVERSE Geophysics. This results in an effective correlation between the two applications.
- Export well and interwell points either from map or cross section. Points can be exported as a CSV, tab or space delimited file.
- You can now open any GVERSE Geomodeling cross section as an arbitrary line (arbline) in GVERSE Geophysics.
- Surface points can be imported as interwell points in ASCII XYZ format, which aids in updating the geomodel.
- Individual color palettes can now be saved with different seismic versions, which allows you to view all versions with their respective color palettes.
- The mechanism to download items from the TGS shopping cart has been improved.
- Well Length, Percentage, and some other parameters such as DST, Completions can now be calculated inside the geobody. This helps in determining high production or high risk areas.
- Well zone statistics can now be calculated for multiple zones at the same time. This reduces the effort in calculating these statistics for different zones.
- GVERSE Geomodeling saves the zoom level and state of the cross section and displays the same zoom level the next time a saved cross section is opened.
- The users can now post numeric data up to the desired decimal places in Cross Section/Block diagrams.
- You can now create an offset surface which is same as the parent surface. This new surface can be shifted to any place. This offset surface can be used to create pre-drilled cross sections for target zones.
- Both the Surface Name and the Strat Column Name (SCM) can now be posted on wells along with surfaces correlation. The SCM name and surface posting can either be displayed between the first and the last well, or between all wells.
- The MD values of the wellbore can be displayed along with horizontal distance values in Projected Cross Sections, which enables users to determine MD of the wellbore at a plane of cross section on a specific vertical scale.
- Wells, ZoneManager Zones and Attribute Maps can have a name of up to 40 characters, which can be displayed within the entire GVERSE Geomodeling application.
- The Zones tab has been renamed to Thickness Maps in the GeoSurface Model Properties dialog, as well as the Data panel.
- A What's New dialog box launches when GVERSE Geomodeling is opened, which shows a list of new features being added to the release.

GVERSE Geophysics

- Horizon, fault surfaces, and timeslices can now be viewed in depth mode of time interpretations to enable a better understanding of subsurface structures according to their respective depth.
- Grid velocities and depths for all horizons in the interpretation automatically with a single click instead of re-gridding each horizon manually.
- Digitize or import depth control points and use them in velocity model building for more accurate depth conversion.
- You can now flatten the scene and enable the Depth mode at the same time. Depth conversion occurs before flattening the scene. Geobodies can also be flattened now.
- All possible transmission paths including internal inter-layer paths can be added to a synthetic to reflect any multiples in seismic within the synthetic.
- Upscale sonic and density logs data to create more robust synthetics with Backus Averaging.
- Geobodies can now be picked and generated in bulk using multiple volumes to define picking criteria. Bulk picking provides a quick way to identify possible structures of interest in the subsurface.
- Multiple geobodies can now be merged into a single geobody. Merged geobodies can be split in multiple geobodies.
- Multiple geobodies can now be selected in 3D view and deleted from the scene.
- Edit geobody surfaces and interactively remove undesirable portions of the geobody surface directly in the 3D view.
- More flexibility in defining amplitude thresholds for geobody tracking allowing easier use of more kinds of seismic and attribute data for tracking geobodies.
- Create proportionally sliced horizons between two existing horizons to get deeper stratigraphic insights.
- Create, save and re-use polygons on maps. Polygons can be named and saved with the interpretation and reused as and when required. Polygons can also be shared across interpretations.
- You can now open any GVERSE Geomodeling cross section as an arbitrary line in GVERSE Geophysics.
- The mouse cursor is now tracked between GVERSE Geomodeling and GVERSE Geophysics. The cursor is tracked between the 3D, map, and section views of both applications.
- Color palettes defined in GVERSE Geophysics interpretations can be used to display seismic data in GVERSE Geomodeling cross sections.
- When any part of a new digitization overlaps the existing manual fault polygon, the two polygons can be merged to create a single fault polygon.
- Stereonet plots can now be created for faults which are used to perform detailed fault orientation and stress analysis.
- Fault intersections and projections can be converted into a separate fault segment.
- Fault segment splitting functionality is now also available on vertical sections. Split segments can be edited, deleted, unassigned or reassigned individually.
- Velocity surveys can now be activated for wells in bulk, enabling easier switching and/or activation of time depth tables for all wells in the interpretation.
- Version information can now be edited, enabling you to change basic information, and correct any mistakes in the metadata.
- Automatically detect survey geometry, line increments and start depths in SEG-Y data.

- Choose the data version to create SEG-Y for when exporting 3D seismic instead of only exporting the active version.
- Extract data from multiple seismic volumes at multiple well locations and save as log curves in the database or as LAS files on disk.
- Length of the section is now posted on the vertical seismic section header, which shows the distance along an arbline or any other seismic section.
- Open arblines along wellbores. Choose to open the arbline only along the horizontal portion of the well. Add trailing and leading distance to extend arbline in front and behind the bore.
- View distances in more units including feet, meters, miles, and kilometers. Area calculations include square miles and square kilometers. Volume units for thousand, million, billion, and trillion cubic feet and cubic meters are also supported.
- Change the color of deviated wellbores on the main map view to easily identify wellbores on the map.
- Buttons in the seismic view sidebar let you quickly control the horizontal and vertical scale of the seismic without having to adjust display settings from the dialog.
- Surveys can now be chosen when autopicking horizons. This makes horizon picking faster as there is no need to re-pick an already picked horizon.
- Flatten a vertical section on a horizon using the right-click context menu of the horizon.
- Launch SEG-Y Loaders directly from the interpretation without launching a separate instance of GVERSE Geophysics.
- Access the Interpretation Browser from the 3D module for quicker access to horizons, faults, geobodies, 2D shifts, and polygons from other interpretations.
- You can now access the Layer Creation dialog box directly from GVERSE Geophysics 3D module, instead of switching to the main interface to create IsoMap layers.
- Pick modes are now synchronized across GVERSE Geophysics. When a pick mode is enabled is one module, it is also enabled in the other module of GVERSE Geophysics.
- Significantly faster horizon export, fault polygon editing, working with the Fault Manager, and 3D autopick interpolation.

GeoAtlas

- In WellBase Layer Create, a comma can be added after every 3rd digit from the right to make very large numeric values easily readable.
- Support has been added for working with larger grids with smaller grid spacing for building large regional structure maps.
- OOIP and OGIP can now be calculated. It helps in determining the total amount of oil and gas in the reservoir. Volume and area statistics can also be calculated.
- You can now save customized layout changes for different toolbars and dialogs.
- Lateral lengths and other Well Survey fields can now be posted on a WellBase layer.
- Support for importing much larger ZMap+/ASCII XYZ files has been added to GeoAtlas. There is also a provision to export large ZMap+/ASCII XYZ files.
- A new feature is introduced which allows you to calculate daily or monthly production rate by dividing the production data by any number.

ProjectExplorer

- Dipmeter import history is now maintained in GeoGraphix, which gives you a complete record of imported dipmeter data.
- New layer types are added to the Quick Filter drop-down list, which allows for searching of layers quickly and easily. The layer types added to this list are; CAD, ESRI Shapefles, ArcGIS, and Area of Interest.

QueryBuilder

- Wells can now be selected directly from the query results page and viewed either in GeoAtlas or WellBase.
- Formations can now be filtered either by Active Strat Column or Public Strat Column.

WellBase

- A parsing option has been added to WellBase Layer Create, which allows the division of posted numeric data by any number. This is especially useful in calculating daily production rates from monthly production data.
- In WellBase Layer Create, you can post additional survey data such as BH Latitude/Longitude values from the Survey tab, BH TVD, and calculated lateral lengths from a user-specified well inclination.
- Columns in multiple WellBase grids (Formation, IP, Core, Well Header) can now be rearranged and resized. WellBase retains the size and order of these columns and displays them in the user preferred order the next time WellBase is launched.
- Users can apply statistical operations when saving zone attributes from Spotfire to ZoneManager. This is especially useful when calculating a single aggregate attribute value for the entire zone.
- Perforation data recorded during production tests (IHS297 GD) is now stored in Perforations tab in WellBase.
- The Quick Filter tool has been optimized with the addition of multiple new filtering options, which aids in efficient data querying.
- You can now delete a formation or a group of formations by source.
- While calculating surveys, an option is introduced to replace Well TD with the deepest point of the MD if well TD is less than the survey point MD.
- The character length of well name has increased to accommodate longer well names.
- There are now separate Wellbore Viewers for Proposed Surveys and Drilled Surveys.
- There are multiple UI improvements in WellBase in this release. Some of them include an expandable Strat Column Manager, and retaining the size and state of the WellBase bar.

XSection

- Support has been added for generating much larger cross sections, allowing users to work with basin wide sequence stratigraphic interpretations.
- The 'Edit Cross Section Layout' dialog box has been resized and expanded, which allows you to view all relevant information without scrolling a lot.

ZoneManager

- An Import template has been added to facilitate repeated ASCII imports for the same spreadsheet. This also saves a considerable amount of manual work when mapping many attribute fields.
- You can now apply zone and attributes filter globally for both WellBase and ZoneManager applications. This allows you to focus on your active zones wherever you are in the application.
- The Zone and Attribute's name length has been increased to 40 characters to accommodate longer names in the database.

Common Changes

- The character length for curve name, well name, ZoneManager zone, and attribute name has increased. It allows the full name of these objects to be saved in the database without any truncation.

System Requirements

In the following sections, you will find hardware and software system requirements for this release of GeoGraphix and Discovery on OpenWorks:

- GeoGraphix Workstation
- GeoGraphix Project Server

System requirements can vary considerably, depending on your computing environment and software objectives. Please contact your Sales Representative or Customer Support if you have questions or need more information about system requirements.

Important Notes:

- New users or users upgrading from other versions of GeoGraphix also need valid licenses. Refer to the GVERSE GeoGraphix Customer Support > Knowledge Center > Licenses page to request a license. For information on license requirements for GVERSE applications, refer to their respective release notes and installation documents on the GVERSE GeoGraphix Support Portal > Knowledge Center > Release Notes and Installation Guides page.
  The License Management Tool (LMT) must be installed to configure the license. Download the latest LMT from the GVERSE GeoGraphix Customer Support Portal > Downloads page. See the **Licensing** section of the Installation Guide for Release 2019.4 for more information.
- Discovery on OpenWorks is compatible with OpenWorks for Windows 5000.10.6.03 and SeisWorks 5000.10.
- Refer to the GVERSE GeoGraphix Customer Support > Knowledge Center > System Requirements page for up-to-date information on system requirements for all GeoGraphix and GVERSE applications.

Workstation

System Requirements

We recommend using the latest Microsoft service packs and security patches. The following table lists the supported operating systems and the hardware requirements.

Supported Operating System	Memory	CPU
Windows® 10 Professional x64 Windows® 10 Enterprise x64 Windows® 7 Professional x64 Windows® 7 Enterprise x64 Windows® 7 Ultimate x64	8 GB RAM Minimum 16+ GB RAM recommended **Note:** 32 GB RAM recommended for GVERSE Geophysics. SSD drives recommended	Core i5 Minimum Core i7 Quad-core and above with latest generation recommended

Graphics Requirements

Applications Support Level	Graphic Card Requirements
All GeoGraphix Applications including Discovery 3D, advanced 3D visualization (Pro 3D), and GVERSE Geomodeling	2 GB VRAM Minimum 4 GB VRAM Recommended DirectX 11 capable hardware **(see Note 2 below)**
GVERSE Geophysics	**Minimum** • Any DirectX 11.1 capable card comparable with Nvidia® GeForce GTX 430 with 1GB VRAM. DirectX is not shipped with GeoGraphix 2019.4. You must download and install it separately. • 1366 x 768 screen resolution **Recommended** • Any DirectX 11.1 capable card comparable with Nvidia® GeForce GTX 1060 with 6GB VRAM. DirectX is not shipped with GeoGraphix 2019.4. You must download and install it separately. • 1920 x 1080 screen resolution

Note 1: Microsoft DirectX End-User Runtime (June 2010) is required to run Discovery 3D, advanced 3D visualization (Pro 3D), GVERSE Geomodeling, and GVERSE Geophysics.

Note 2: To run Discovery 3D, advanced 3D visualization (Pro 3D), and GVERSE Geomodeling, it is recommended that an NVIDIA DirectX 11 compatible card be used. We recommend using the latest video drivers and MS updates for your system.

Additional Requirements and Recommendations

▪ DVD - ROM required for media installation. You do not need this if you have downloaded the installation from the **GVERSE GeoGraphix Support Portal > Downloads** page.
▪ DCOM/Firewalls configured to allow remote access. Only necessary if sharing projects on the network. For DCOM configuration recommendations, refer to the **GVERSE GeoGraphix Support Portal > Knowledge Center > White Papers** page.
▪ Microsoft .NET Framework 4.7.2 runtime is required.

Software Prerequisites

This release has several prerequisites that are required to run the software, as well as prerequisites that are used to enhance the software. The prerequisites can be downloaded from the GVERSE GeoGraphix Support Portal, or from the respective link(s) provided.

Microsoft .NET Framework 3.5

This is specifically required if you are using smartSECTION on a Microsoft Windows® 10 operating system. The Microsoft .NET 3.5 can be downloaded from Microsoft's website and then installed. It is also available in the 3rd Party installers shipped with Discovery 2019.4.

MATLAB Runtime R2018a (9.4)

GVERSE Field Planner requires MATLAB Runtime R2018a (9.4).

The MATLAB Runtime R2018a (9.4) software can be downloaded from MATLAB's website and then installed. It is also available in the Downloads section of the GVERSE GeoGraphix Support Portal.

Microsoft .NET Framework 4.7.2

Discovery 2019.4 must have Microsoft's .NET 4.7.2 installed. The Microsoft .NET 4.7.2 can be downloaded from Microsoft's website, and then installed. It is also available in the 3rd Party installer shipped with Discovery 2019.4.

ESRI ArcGIS Runtime Engine

The functionality within GeoAtlas related to geo-referenced images and CAD files requires the ESRI ArcGIS 10 Engine Runtime with ESRI ArcGIS 10.2.x through 10.8.x. ESRI ArcGIS license must be configured by running **ArcGIS Administrator** with administrative rights, and selecting the **ArcGIS Engine Runtime (Single Use)** option in the wizard. If the ArcGIS Engine is not installed, a message box will appear but the setup will continue.

The **ArcGISConfigurationTool.exe** utility is provided in **Utilities** shipped with GeoGraphix. IT Support teams can program and run this utility to remotely configure GeoGraphix on network machine(s) that have ArcGIS Runtime installed. For details, refer to the **Utilities** documentation.

ESRI ArcGIS Engine 10.6.1 Patch Installation

If ESRI ArcGIS Engine 10.6.1 is installed on the machine, you must also install the ESRI ArcGIS Engine patch (ArcGIS-1061-E-BDP-Patch.msp) to ensure smooth execution of various Field Planner and GeoAtlas workflows. The patch can be downloaded from the ESRI website here.

Microsoft DirectX 11 End-User Runtimes

Discovery 3D, Pro3D, smartSECTION, GVERSE Geophysics and GVERSE Geomodeling require Microsoft's DirectX 11 June 2010 End-User Runtimes to work properly. The Discovery 3D application works only on the Windows 7 (64-bit) or higher operating system. Discovery 3D is not installed unless the computer has Windows 7 (64-bit) or higher. Further Discovery 3D requires a DirectX 11 compatible display card. DirectX 11 June 2010 End-User Runtimes can be installed by downloading the Discovery Third Party Installer.

Microsoft Internet Explorer 10 or 11

Microsoft Internet Explorer 10 or 11 must be installed in order to launch GVERSE NOW.

Optional Software Requirements

The following table lists the software requirements for using different tools available in GeoGraphix.

Tools	Software Requirements
Spreadsheet import utility in WellBase, SeisBase, and LeaseMap	Excel 2007, 2010, 2013, 2016 or 2019 (32 or 64 bit), including Office 365 (offline version). In case the macros are not working in Excel, ensure the **gxdb.xla** file is present in the relevant Microsoft Office Library installation folder.
Selected Help files	Adobe Reader
For Discovery on OpenWorks, GridXchange, and SeisXchange	OpenWorks for Windows 5000.10.6.03 – Basic or Full (recommended) Install available on Landmark's LSM. (See Notes on the next page), and SeisWorks 5000.10 (for seismic workflows)
ESRI geo-referenced images and ESRI CAD file import in GeoAtlas	ESRI ArcGIS Runtime Engine 10.2.x or 10.3.x or 10.4.x or 10.5.x or 10.6.x or 10.7.x or 10.8.x (included in the 3rd Party Installer).
For LOGarc™ Version 4.1.0.3 access in smartSECTION	To use the LOGarc™ feature, the LOGarc™ Version 4.1.0.3 software must be downloaded from IHS LogTech Canada, LTD and a valid account must be in place. You must have administrator rights to the computer on which you will load the software.

Note for Discovery on OpenWorks: The OpenWorks Full installation requires Hummingbird Exceed. The Oracle client installation in use with the OpenWorks Full installation requires that the "Administrator" option be selected. The "Administrator" option type includes the SQL Plus and the Oracle Database Utilities components, which are needed to run Discovery on OpenWorks, as part of the total OpenWorks package.

Note: Hummingbird Exceed is not required for the OpenWorks Basic installation. If the OpenWorks Basic installation is used, the Oracle client installation can use the "Administrator" option, which will include all of the needed components. Or, the Oracle client installation for the OpenWorks Basic installation can use the "Custom" installation type. However, the following components must be installed with the "Custom" installation type:

- Oracle Database Utilities 12.1.0.2
- SQL *Plus 12.1.0.2
- Oracle JDBC/THIN Interfaces 12.1.0.2
- Oracle Net 12.1.0.2

You may experience the following error related to Oracle installation:

The SQLLoader.exe error may generate when working with Filters in GeoGraphix due to a missing Oracle DLL file. This is a known issue of Oracle 12.1.0.2 where oranfsodm12.dll is not shipped with the installer.

Workaround: After Oracle installation, create a copy of the oraodm12.dll file, rename it as oranfsodm12.dll, and then place the renamed file in the BIN folder of both 32-bit and 64-bit Oracle installations.

GeoGraphix Project Server

System Requirements

We recommend using the latest Microsoft service packs and security patches. The following table lists the operating systems which are supported.

Supported Operating System	Memory	CPU
Windows® Server 2012 R2 Standard x64 Windows® Server 2016 Standard x64	32 GB minimum 64+ GB recommended SSD drives recommended	Intel Xeon Processor or equivalent Quad 2.4GHz 64-bit or better

Additional Requirements and Recommendations

- DVD-ROM is required for media installation.
- DCOM/Firewall must be configured to allow remote access. For DCOM configuration recommendations, refer to the **GVERSE GeoGraphix Support Portal > Knowledge Center > White Papers** page.

Server performance is subject to a large number of variables. It is impossible to give specific recommendations here, but these are some guiding principles to use. In general, multi-user performance of a GeoGraphix project server is best when the server is dedicated to GeoGraphix and not shared with other applications, especially database applications or intensive file-system applications. In addition, consideration should be made for the number of GeoGraphix users and the size and number of concurrently accessed projects. At some point, having multiple project servers becomes a better solution than having all users on one server. Generally, somewhere between 10 and 20 users is when a second server might be suggested.

Networking

Networking performance depends on the number of users trying to access a server simultaneously, as well as the bandwidth requirements for those users. Recommendations for server bandwidth typically specify server connectivity at a higher bandwidth than an individual user. For instance, users running at 100 Mbit should be accessing a server running on a 1-Gbit backbone. If users are at 1 Gbit, consider running multiple 1-Gbit connections or a single higher-bandwidth connection on the server.

Database Cache

A large database cache is an important factor to consider when dealing with multiple users accessing large databases. The database engine is capable of addressing a practically unlimited amount of cache memory. The best way to size the memory is to estimate the memory requirements for other running applications and allow the database cache to dynamically allocate any remaining free memory. The engine will only allocate what it needs when using dynamic allocation up to the maximum specified.

It is highly recommended that you let the database engine use as much cache memory as it requires on the host server. Increasing database cache memory is the quickest and most effective way to improve database- related performance on large network projects.

On a workstation, it might be appropriate to reserve 1 to 2 GB for the OS and file system cache and 2 to 4 GB for other running applications. On a dedicated project server, not much memory needs to be reserved for other applications. The ideal maximum varies by the project size, the number of users, and other load considerations. But as a general rule, the higher you can set the maximum, the better.

Storage

A great deal of GeoGraphix's access patterns on a server deal with file I/O. Database access, raster images, and seismic data are examples of files that benefit substantially from a fast disk sub-system. Server environments also place a high importance on data integrity and reliability. At a minimum, consider using a RAID 5 (stripe-set with parity) array. As the size of disks increase, you may also want to consider a hot swap drive and/or RAID 6 (striped with dual parity). Using a controller card with its own cache can also help improve performance.

Network Attached Storage (NAS), Storage Area Networks (SAN), and Other Non-Windows Storage Solutions

There are two typical methods used for accessing external storage devices from a project server: iSCSI and CIFS.

- iSCSI allocates a block of storage on the external device and makes it appear to be a physical disk on the project server. This has the advantage of a 100% compliant file system. However, since the external device sees the allocation as one big file, it can make backing up and restoring of individual files using the external device's capabilities more difficult. Standard backup and restore procedures from the server will still work.
- Using CIFS for external storage devices depends greatly on the vendor's implementation of the CIFS protocol used by the Windows platform. In general, a 100% compliant implementation of CIFS for a performant system is required. In particular, vendor's implementation of the "File Change/Notify" functionality has been problematic. Devices based on Windows Storage Server should be 100% compatible since it shares its components with Windows. Implementations based on UNIX/Linux are where problems occur due to the fact that the kernel level support is not present. Due to these uncertainties with CIFS implementations, GVERSE GeoGraphix does not technically support CIFS.

Compatibility with OpenWorks Software

The Discovery™ on OpenWorks® (DOW) software directly links a GeoGraphix application to the data in an OpenWorks® project, and provides a shared project environment for interpretation applications. Landmark Software has delivered the OpenWorks and DOW software for Release 5000 and will continue to provide updates and enhancements to these products. When planning your uptake of Release 5000 and verifying your workflow, you should consider version compatibility between the OpenWorks software and the Discovery on OpenWorks software.

In the compatibility table below, the table indicates the level of compatibility of previous releases and of upcoming scheduled and planned releases. This table will be updated as new releases are planned. The objective is to provide closely coupled compatible versions of the software to allow you to more easily take up current releases.

We perform full release testing for those combinations indicated as Release, R, in the table, but may not exercise full release testing on other version combinations. For these iterative releases, compatibility testing is performed between the OpenWorks and DOW software (indicated as Compatibility, C, in the table). See the table below for the level of testing for each version combination. Although we do not anticipate any integration issue, in these cases it is recommended that customers also verify compatibility in their own environment.

GVERSE GeoGraphix supports the versions listed as Release in the table. However, while we have completed compatibility testing, GVERSE GeoGraphix Support may not be able to fully support the versions listed as Compatibility in the table. When customers request support for a Compatibility environment, GVERSE GeoGraphix Support works on a best effort basis to troubleshoot any issues, and if an issue needs additional attention, GVERSE GeoGraphix Support reports such issues to GVERSE GeoGraphix Research & Development. The GVERSE GeoGraphix Support Team cannot guarantee any resolution service levels associated with issues from a compatibility environment.

Combinations which have not been tested, either in the full release or in a compatibility environment, are indicated by U (untested). P indicates the indicated versions are probably incompatible, as the OpenWorks version has a newer development kit (devkit) than that of the indicated DOW version. Blank cells in the table indicate that OpenWorks and GeoGraphix are incompatible and will not operate together.

For the most current version of this information and an overview of suggested compatibility test paths, please refer to the GVERSE GeoGraphix Technical Support Solution Document KBA-65218-F9D7D5.

Compatibility Matrix

Discovery on OpenWorks (DOW)

OW License 5000	DOW License 5000.02						
GeoGraphix Version	**2019.4**	**2019.3**	**2019.2**	**2019.1**	**2017.3**	**2017.2**	**2017.1**
OW 5000.10.6.03	C	R	R	R	R	R	R
OW 5000.10.3.02	U	C	C	C	C	R	R
OW 5000.10.1.05							
OW 5000.8.3.01							
OW 5000.8.1.1							
OW 5000.8.0.0							
OW 5000.0.3.5							

OpenWorks Version

Legend

R = Release level full testing

C = Compatibility level basic testing

U = Untested

P = Probably incompatible since OW and GeoGraphix are running different OW devkits.

A blank cell indicates that OW and GeoGraphix are incompatible

New Features

This section contains a brief description of the exciting new features included in the 2019.4 release.

GVERSE Petrophysics

Delete Curve Sets from a Filtered Set of Wells

Curve sets can be deleted from a filtered set of wells to clean the data set. Deletion does not apply to Field data.
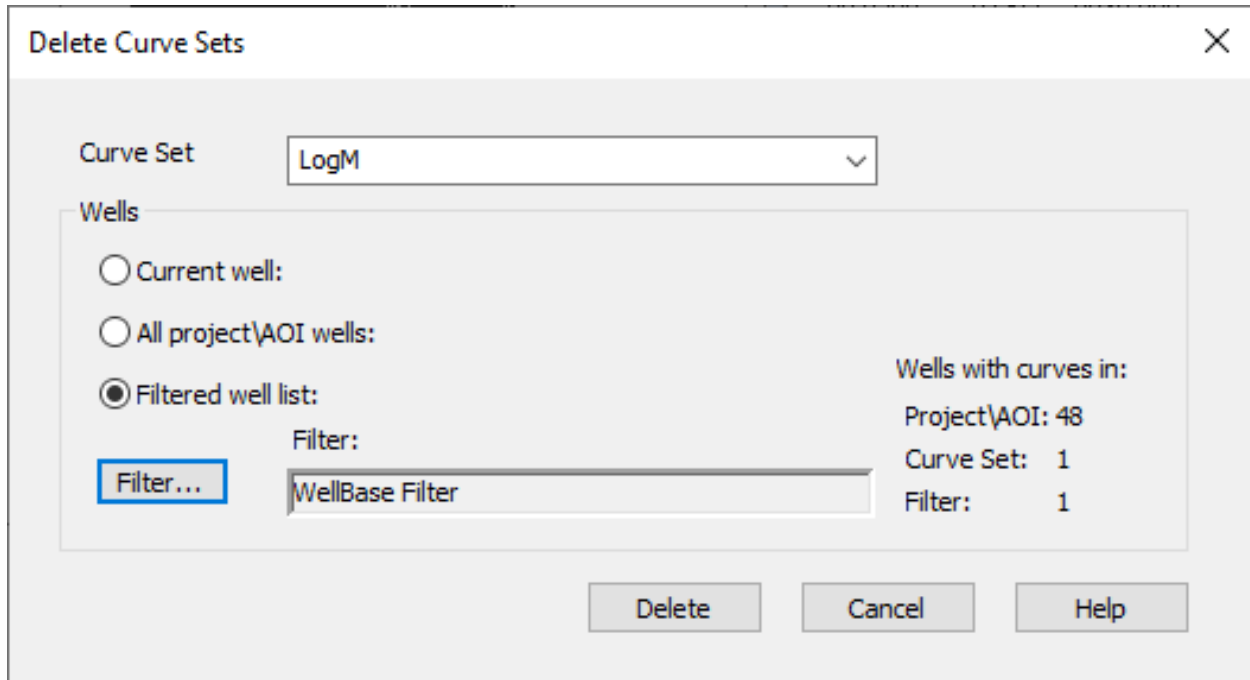
UDE Output Curves to Default List

Generated curves using User Defined Equations (UDEs) can be saved to the default list, which makes them readily available to be used in templates and various workflows easily.

Exporting Log Curves for Single and Multiple Wells

You can now export depth interval, depth index and depth units using the Single Well LAS/CSV Export option.

Multiple UI Improvements

Multiple UI improvements to help the user perform actions for the petrophysical interpretations.

Electrofacies Analysis

An extensive tool is introduced to run K-Means clustering on a set of input log curves for a selection of wells, which helps in identifying electrofacies curves using the log curve data.
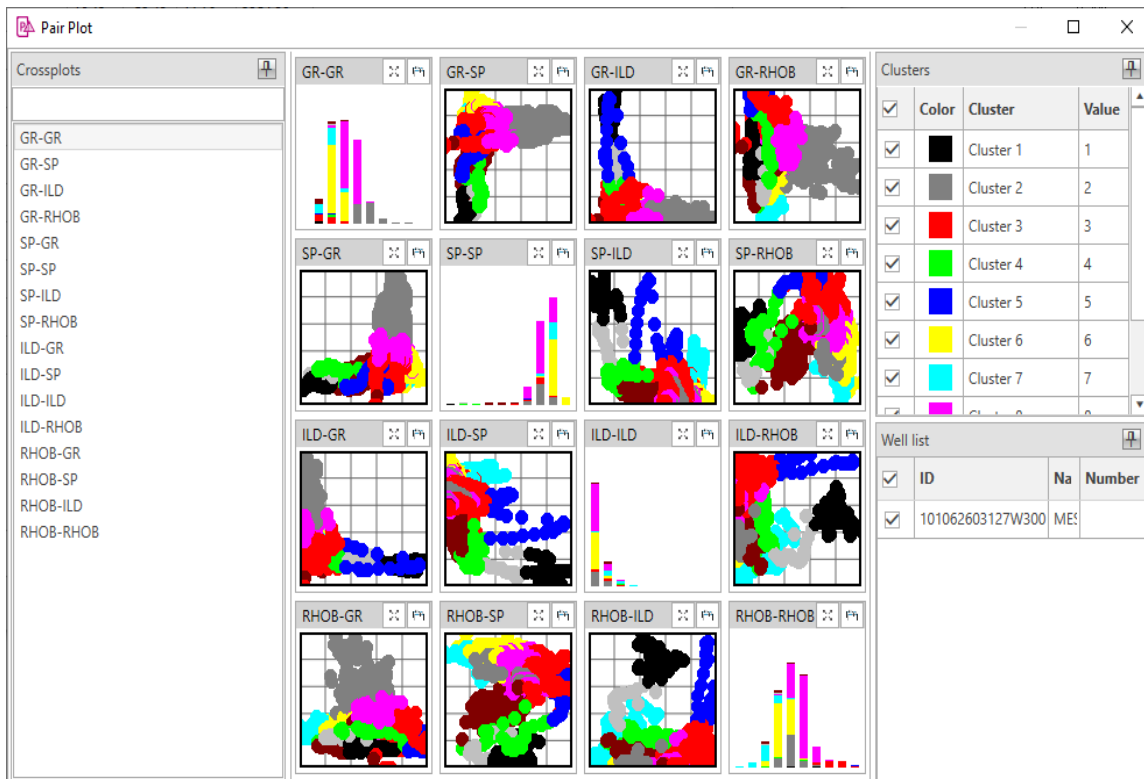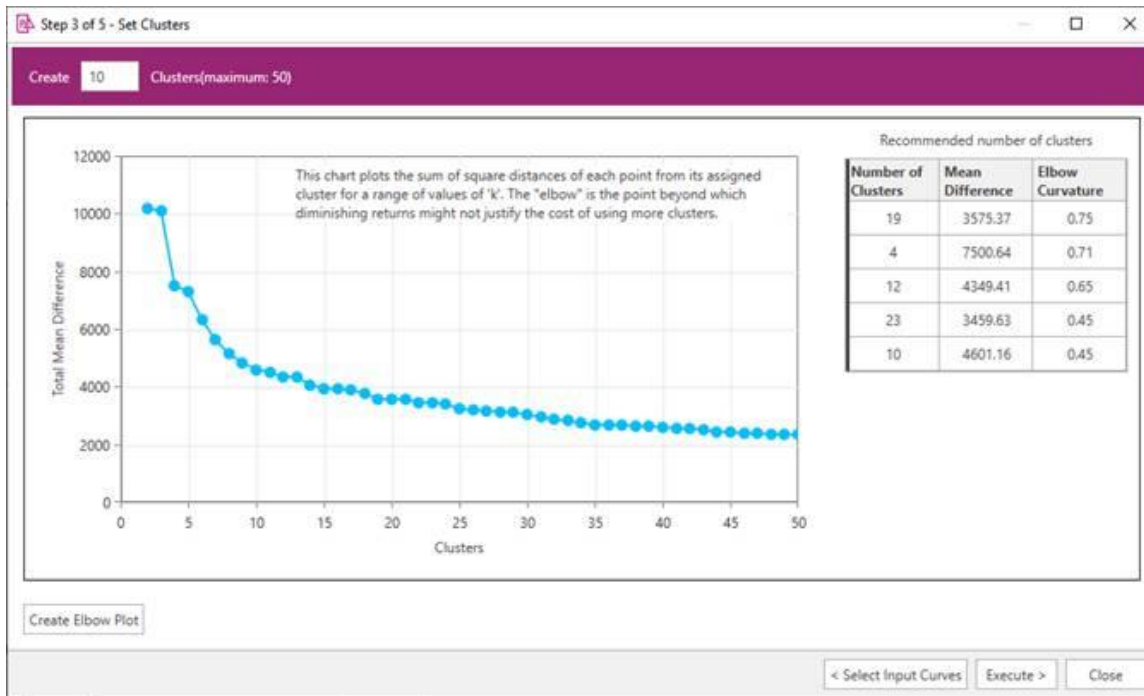
Extracting Petrophysical Attributes from Faults/Formations

You can now calculate curve data statistics over an interval around a fault or formation pick. This helps you in extracting petrophysical attributes around the markers.

Control Decimal Places for Logs

The readability of logs display has improved by allowing the user to control the number of decimal places of log values to display.

Post Chamber Recovery Information on Presentation Templates

You can now post chamber recovery information on presentation templates, which enables users to view information on logs and perform insightful analysis.

Show Formation Tops/Fault Cuts on Log Presentation in Crossplot View

Formation tops and fault cuts can be displayed with log presentation in Crossplot view, which helps you in quickly identifying intervals of interest on the crossplot view log presentation.

Filter Curves while Importing LAS Files

You can now choose not to import unwanted curves while importing a LAS file by filtering curves.

Toggle Display of Aliased Curve Names in Curve Headers while Applying Combined Curve Aliasing

You can choose whether to display all the aliased curve names in the respective curve header or not, while applying Combined Curve Aliasing (CCA).

Ability to Lock Zone Column while Scrolling

In the Set Parameters dialog box, the Zone column is frozen and does not hide from view while scrolling towards the right side.

Improved Formatting while Using Copy to Clipboard Option

Formatting has significantly improved while using the 'Copy to Clipboard' option in GVERSE Petrophysics.

Add Curves to an Existing Curve Set while Importing LAS Files

Curves can now be added to an existing curve set while importing LAS files for a single well.

Merge Curve Sets in Multiple Wells

Curve sets can be merged in multiple wells, which allows users to organize and manage curve date easily in larger projects.
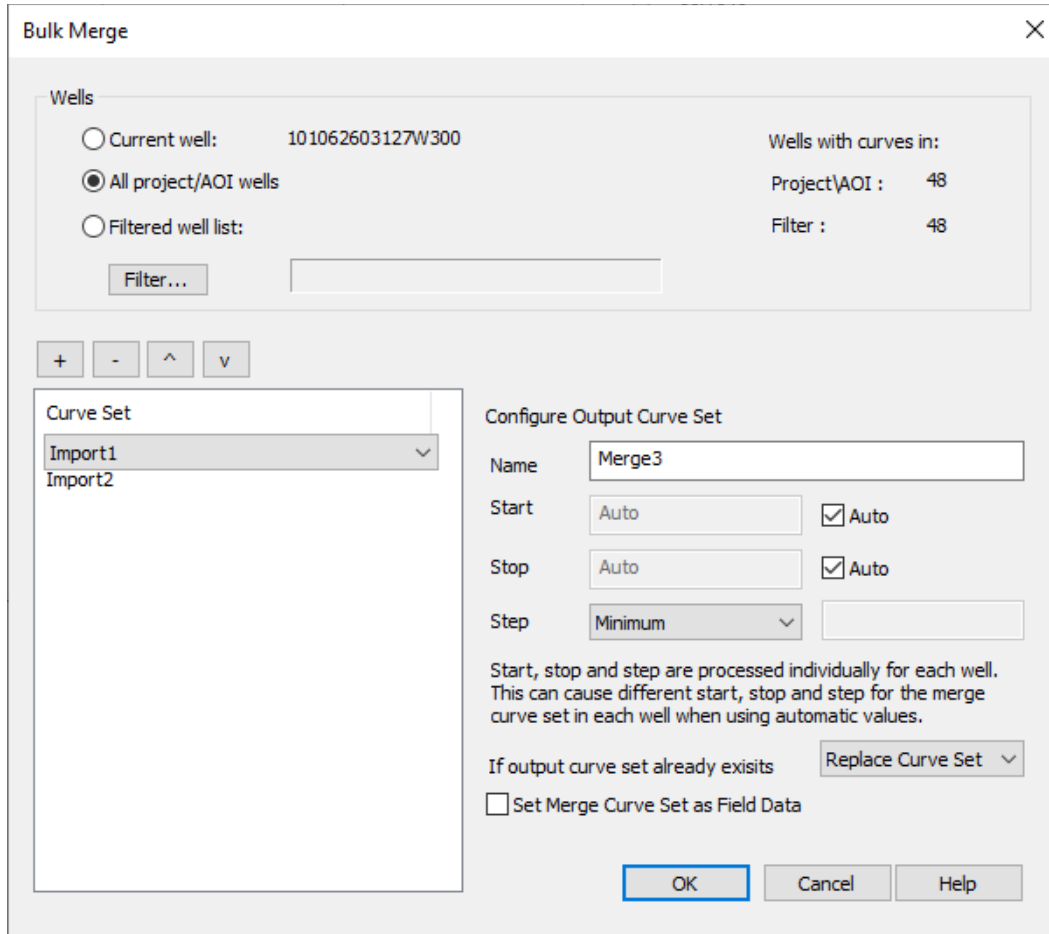
GVERSE Geomodeling/smartSECTION

Survey Points in Zone Reports

Create a Survey Point report of the position of the well within a zones(s).
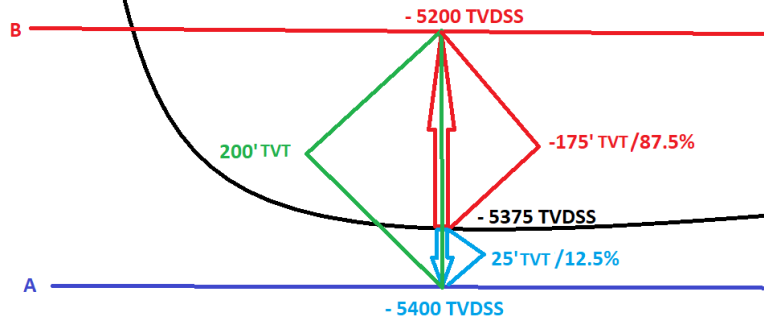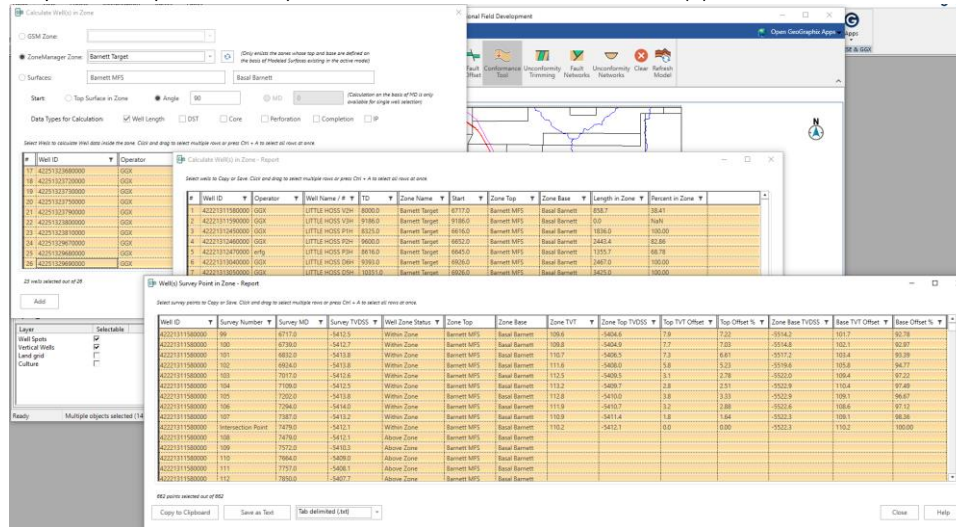
Apply Color on Type Logs and Correlation Logs

The user can now color the type logs and correlation logs, which allows users to differentiate between the correlation/type logs and the actual logs.

View and Save Geobodies in Cross Section View

The users can now view and save geobodies in Cross Section view. The geobody properties can also be set in Cross Section view.
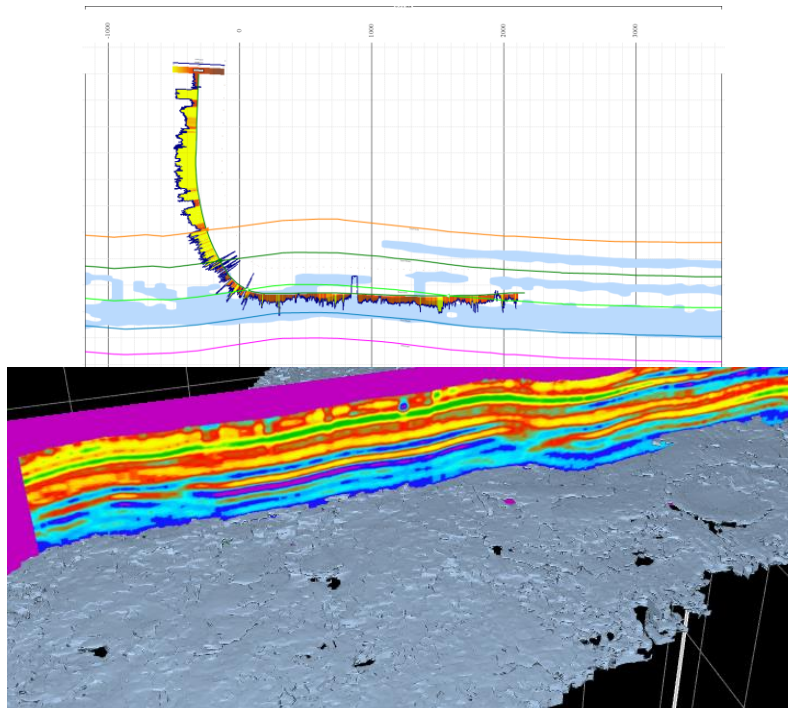
Geobodies in 3D View

The users can now view and save geobodies in the 3D view. The geobody properties can also be set in the 3D view.
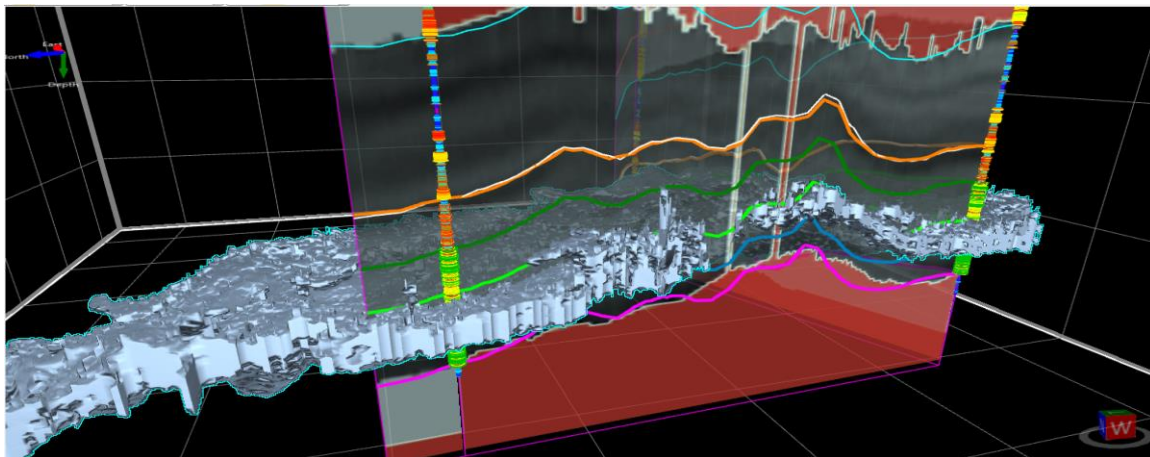
Performance Improvements in Well Zone Calculations

Performance has been improved in various Well Zone Calculations workflows. The performance is enhanced specially while:

- Generating the error log.
- Calculating well parameters.
- Generating reports.
- Saving reports
- Copying data from clipboard and pasting in any compatible application.
- Using Angle as the starting parameter for calculations.
- Reusing calculated data.
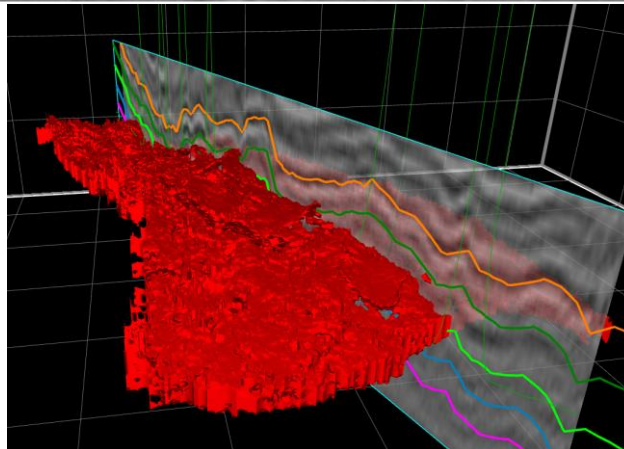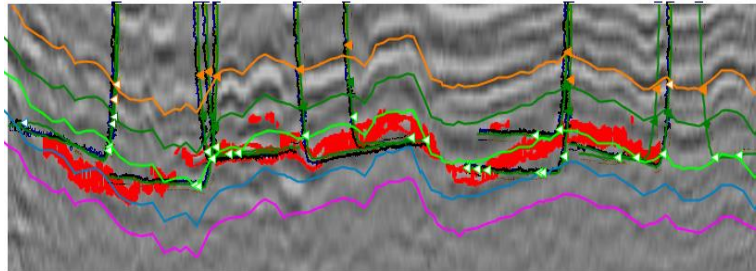
Calculate Well in Zone for Multiple Zones

Calculate the length and percent of the well bore and other core and test data within a zone for multiple zones.

Property maps from ZoneManager attributes

Generate on-the-fly property maps from attributes stored in any ZoneManager zone
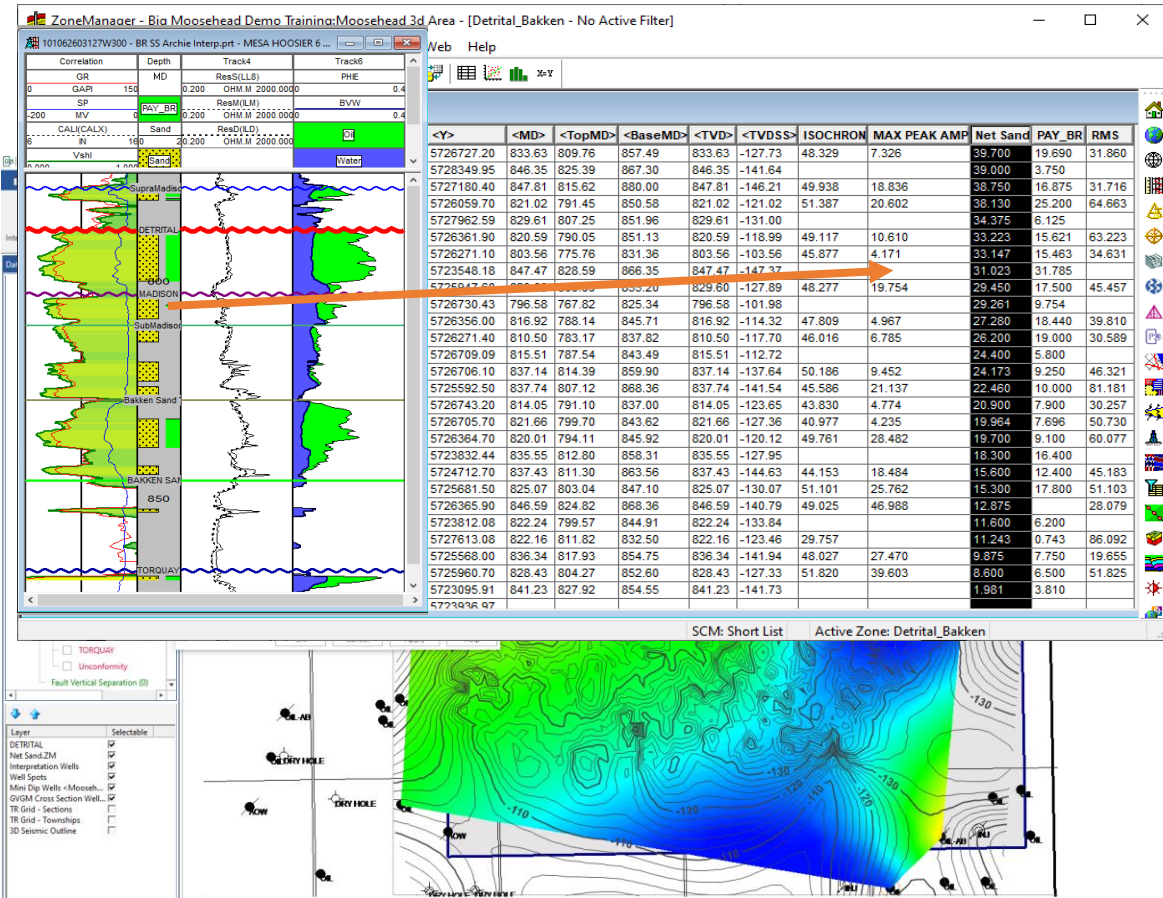
Cursor Tracking between GVERSE Geomodeling and GVERSE Geophysics

The mouse cursor tracking functionality is now enabled between the views in GVERSE Geomodeling and GVERSE Geophysics. This results in an effective correlation between the two applications.
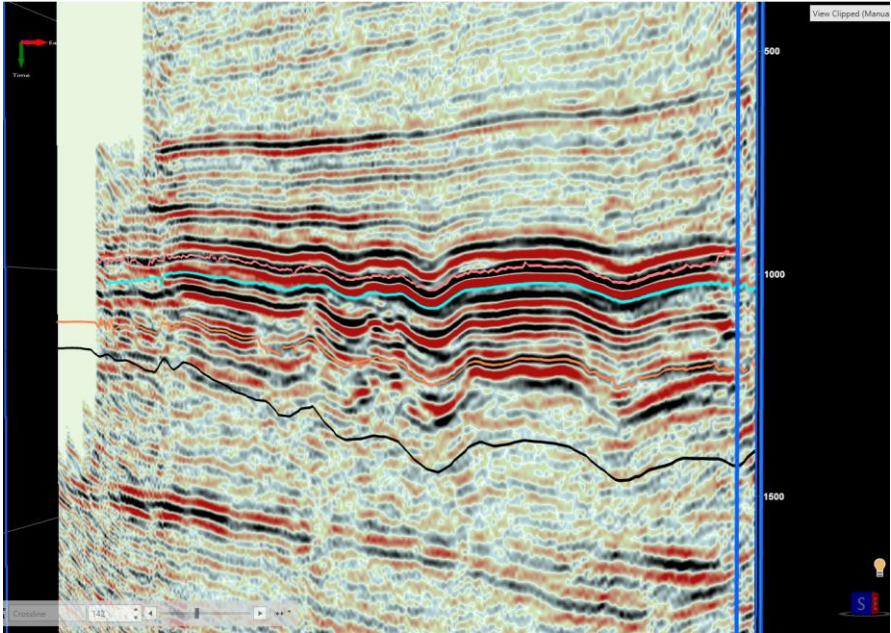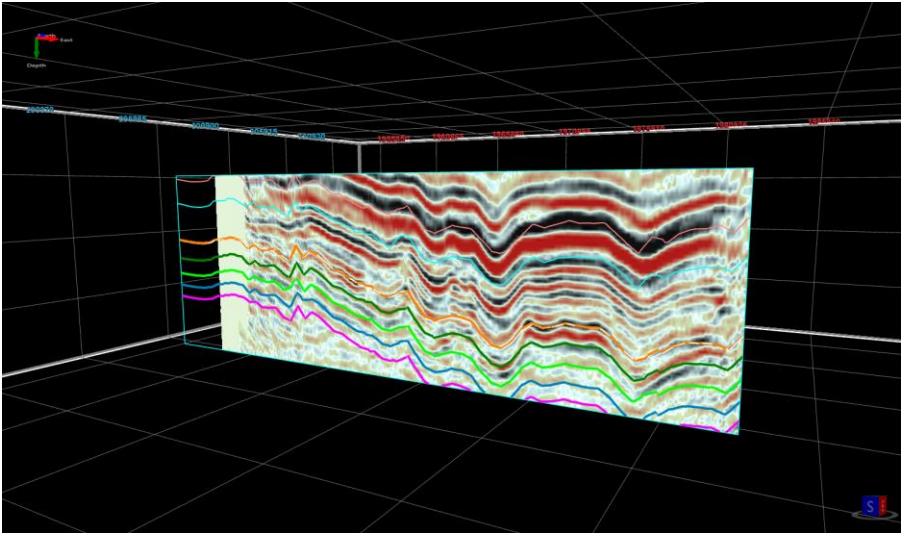
Export Surface Points

Export well and interwell points from either map or cross section. Points can be exported as CSV, tab, or space delimited file.

Export Surface Points ✕

The following Surface points will be exported:

| Surface Name	Surface Type	Point Type	Source	X	Y	Z	MD	Depth Units	Well ID
DETRITAL	UNCONFORMITY	WELL_TOP	Geologist	588228.000000	5725681.500000	-108.04	803.04	Meters	131152303127W300
DETRITAL	UNCONFORMITY	WELL_TOP	Geologist	588425.200000	5725960.700000	-103.17	804.27	Meters	150022603127W300
DETRITAL	UNCONFORMITY	WELL_TOP	Geologist	587105.800000	5726271.100000	-75.76	775.76	Meters	121082703127W300
DETRITAL	UNCONFORMITY	WELL_TOP	Geologist	587635.800000	5726271.400000	-90.37	783.17	Meters	111052603127W300
DETRITAL	UNCONFORMITY	WELL_TOP	Geologist	587955.700000	5726356.000000	-85.54	788.14	Meters	101062603127W300
DETRITAL	UNCONFORMITY	WELL_TOP	Geologist	588366.900000	5726361.900000	-88.45	790.05	Meters	101072603127W300
DETRITAL	UNCONFORMITY	WELL_TOP	Geologist	588784.400000	5726364.700000	-94.21	794.11	Meters	101082603127W300
DETRITAL	UNCONFORMITY	WELL_TOP	Geologist	587988.100000	5726705.700000	-105.70	799.70	Meters	111112603127W300
DETRITAL	UNCONFORMITY	WELL_TOP	Geologist	588327.000000	5726743.200000	-100.70	791.10	Meters	101102603127W300
DETRITAL	UNCONFORMITY	WELL_TOP	IPL	585147.962600	5723069.852000	-111.90	810.80	Meters	101071603127W300
DETRITAL	UNCONFORMITY	WELL_TOP	Geologist	589218.070500	5723095.911000	-128.42	827.92	Meters	101051303127W300
DETRITAL	UNCONFORMITY	WELL_TOP	Geologist	590057.895900	5723152.748000	-121.16	823.76	Meters	101071303127W300
DETRITAL	UNCONFORMITY	WELL_TOP	Geologist	589667.311000	5723548.177000	-128.49	828.59	Meters	101111303127W300

Map Display Coordinate System: UTM Zone 12 North (114 W - 108 W Longitude)   **Datum:** NAD 1927 - Canada - Alberta, British Columbia   **Unit:** Meters

Database Coordinate System: UTM Zone 12 North (114 W - 108 W Longitude)   **Datum:** NAD 1927 - Canada - Alberta, British Columbia   **Unit:** Meters

Coordinate System for Exporting Data Points: [Map Display Coordinate System ▾]

☑ Export Column Headers

☐ Export only X, Y and Z Columns

[Copy to Clipboard] [Save as Text] [Comma delimited (.csv) ▾]   [Close] ❓ Help
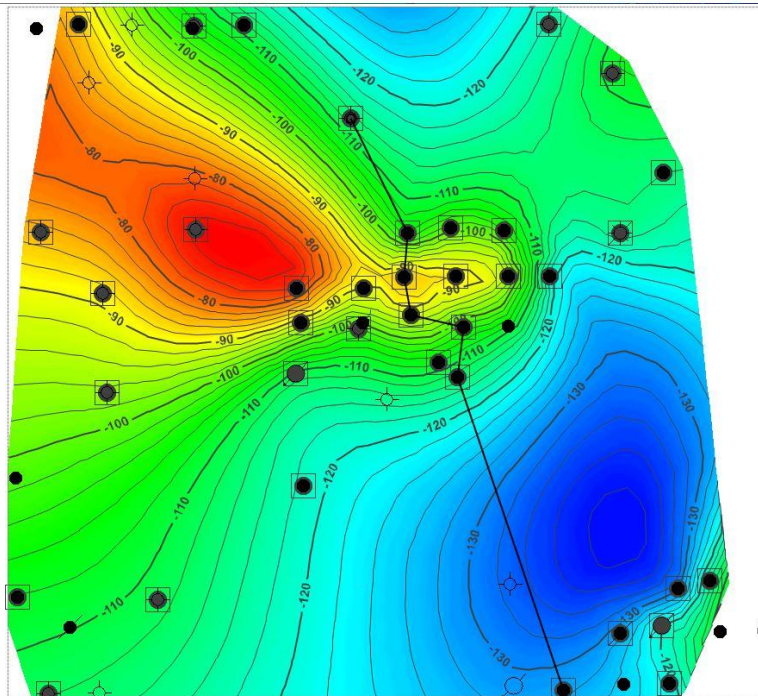
Open GVERSE Geomodeling Cross Section as an Arbitrary Line in GVERSE Geophysics

This is another example of applications cross functioning seamlessly within the GVERSE GeoGraphix solution. You can now open any GVERSE Geomodeling cross section as an arbitrary line (arbline) in GVERSE Geophysics.
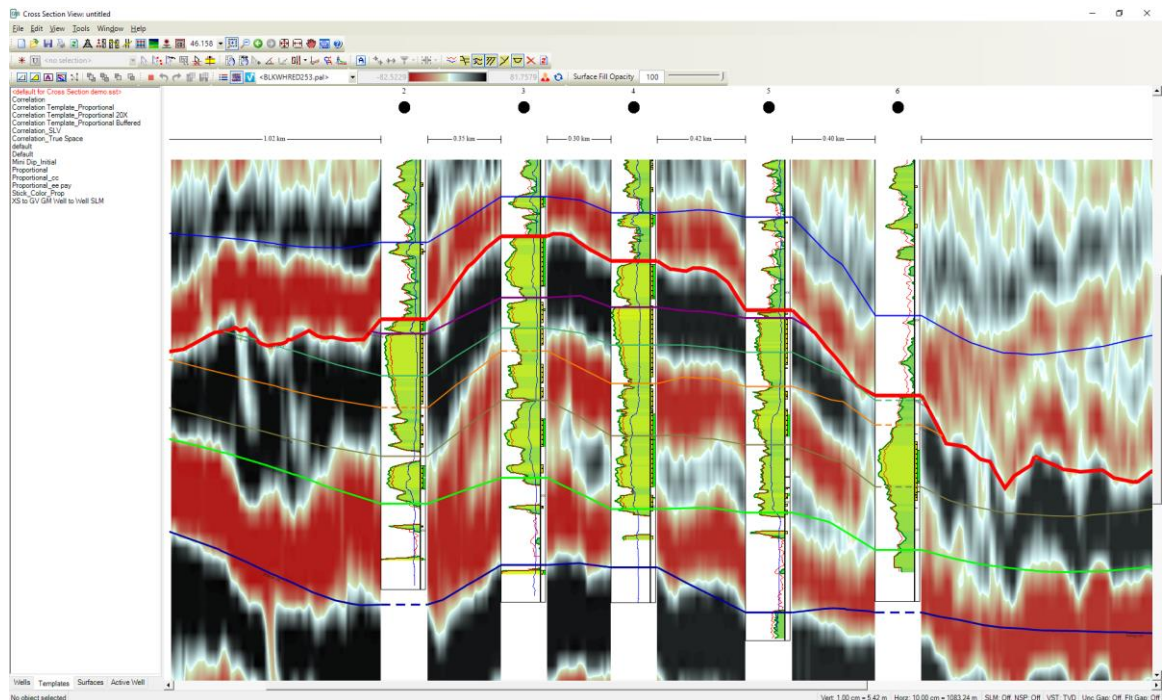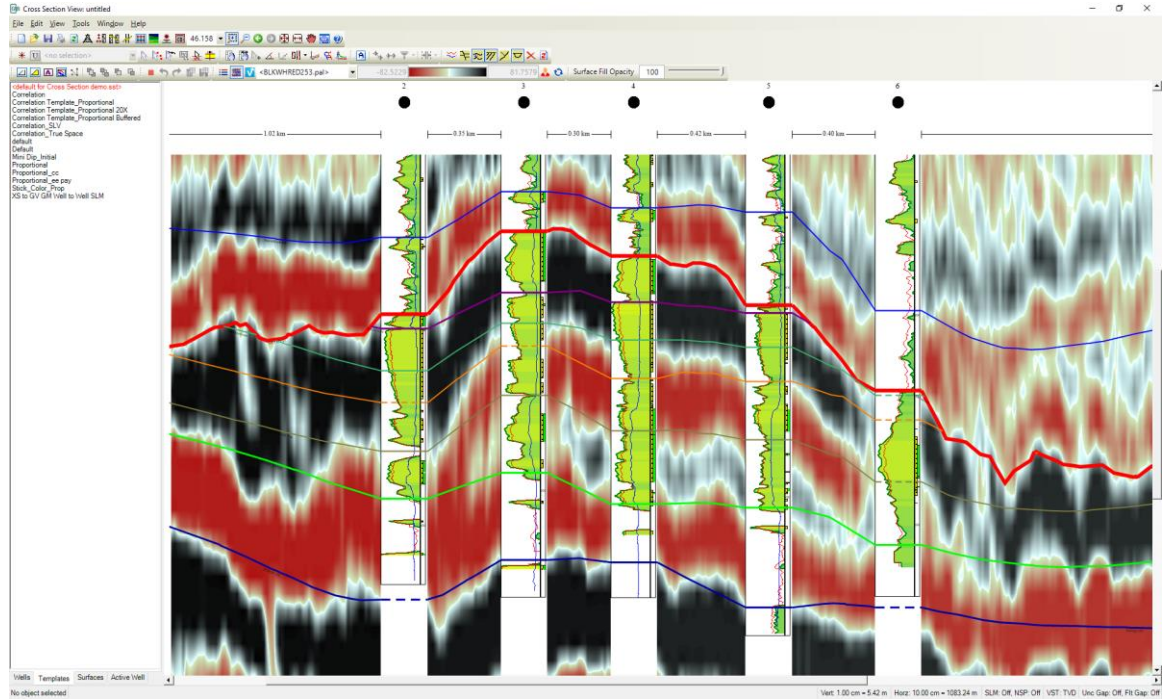
Import Surface Points in ASCII XYZ Format

Surface points can be imported as interwell points in ASCII XYZ format, which aids in updating the geomodel.

Color Palette Control for Individual Versions of Seismic Backdrop

Individual color palettes can now be saved with different seismic versions, which allows you to view all versions with their respective color palettes.
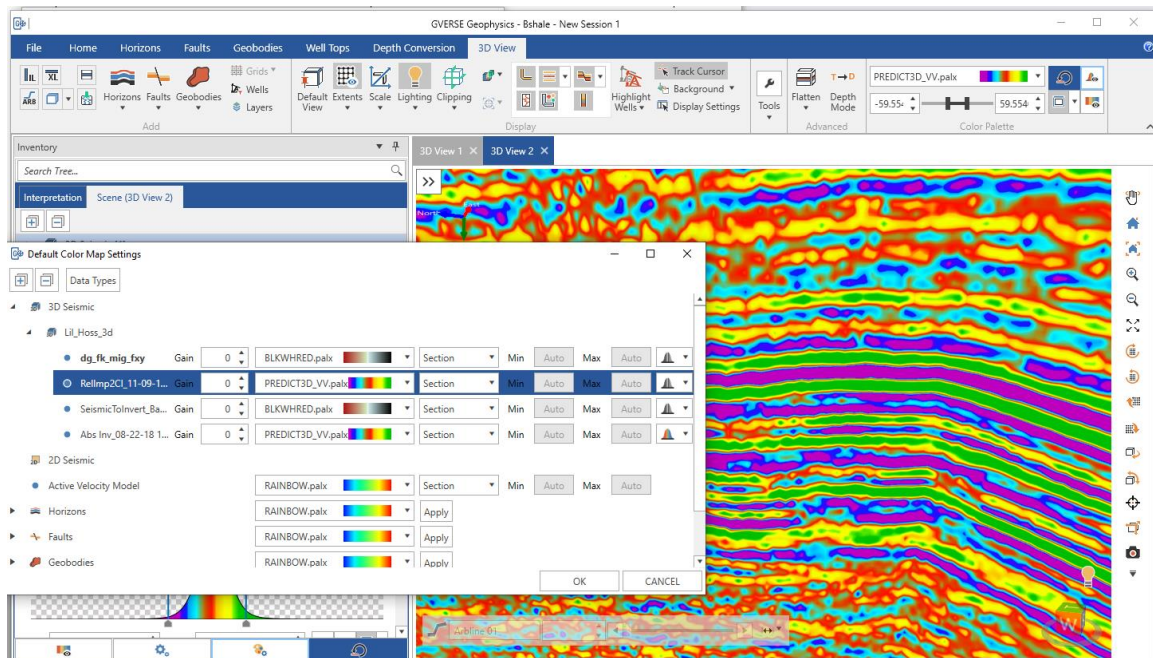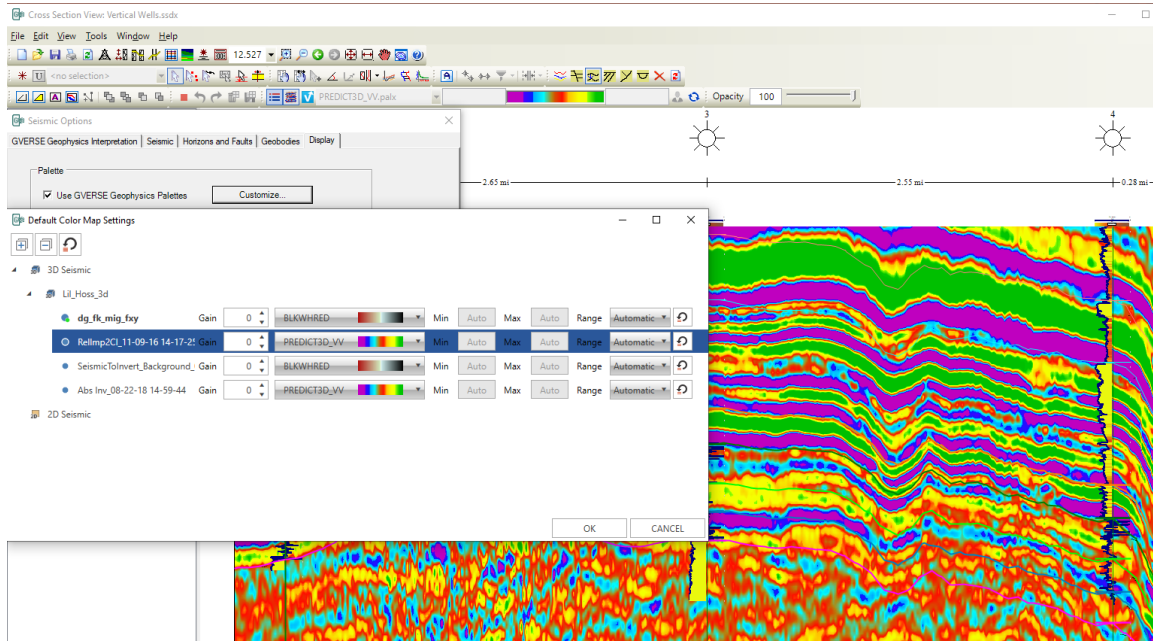
Save Zoom State

GVERSE Geomodeling saves the zoom level and state of the cross section and displays the same zoom level the next time a saved cross section is opened
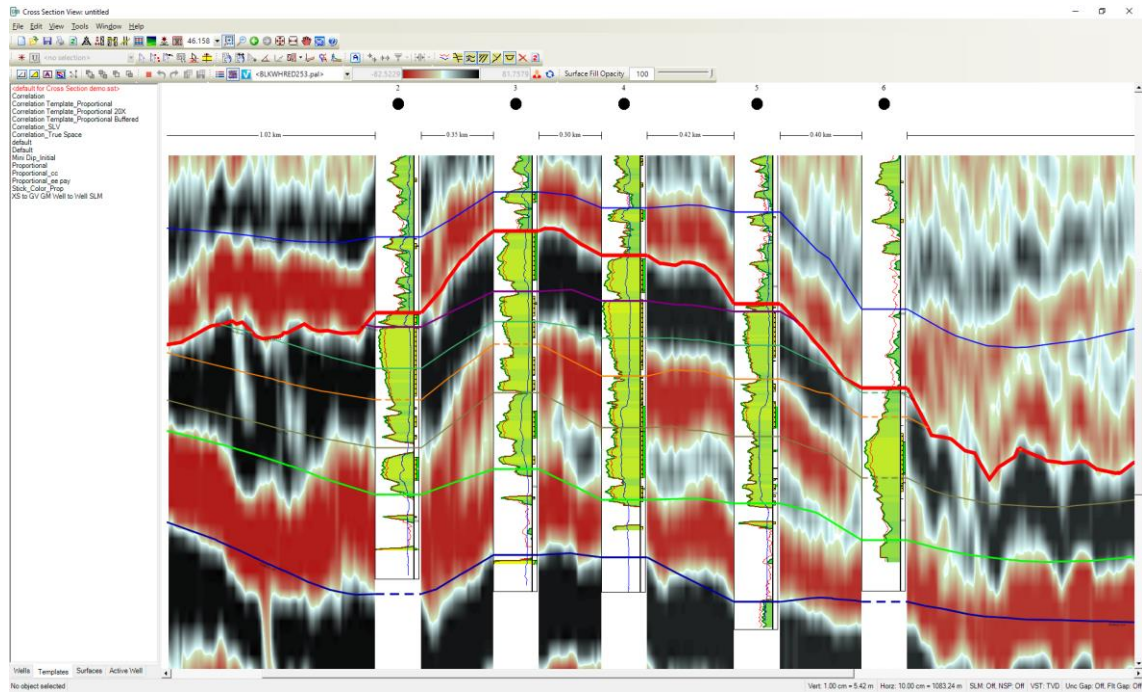
Offset Lines on Cross Sections hung on Modeled Surfaces

You can now create an offset surface which is same as the parent surface. This new surface can be shifted to any place. This offset surface can be used to create pre-drilled cross sections for target zones.
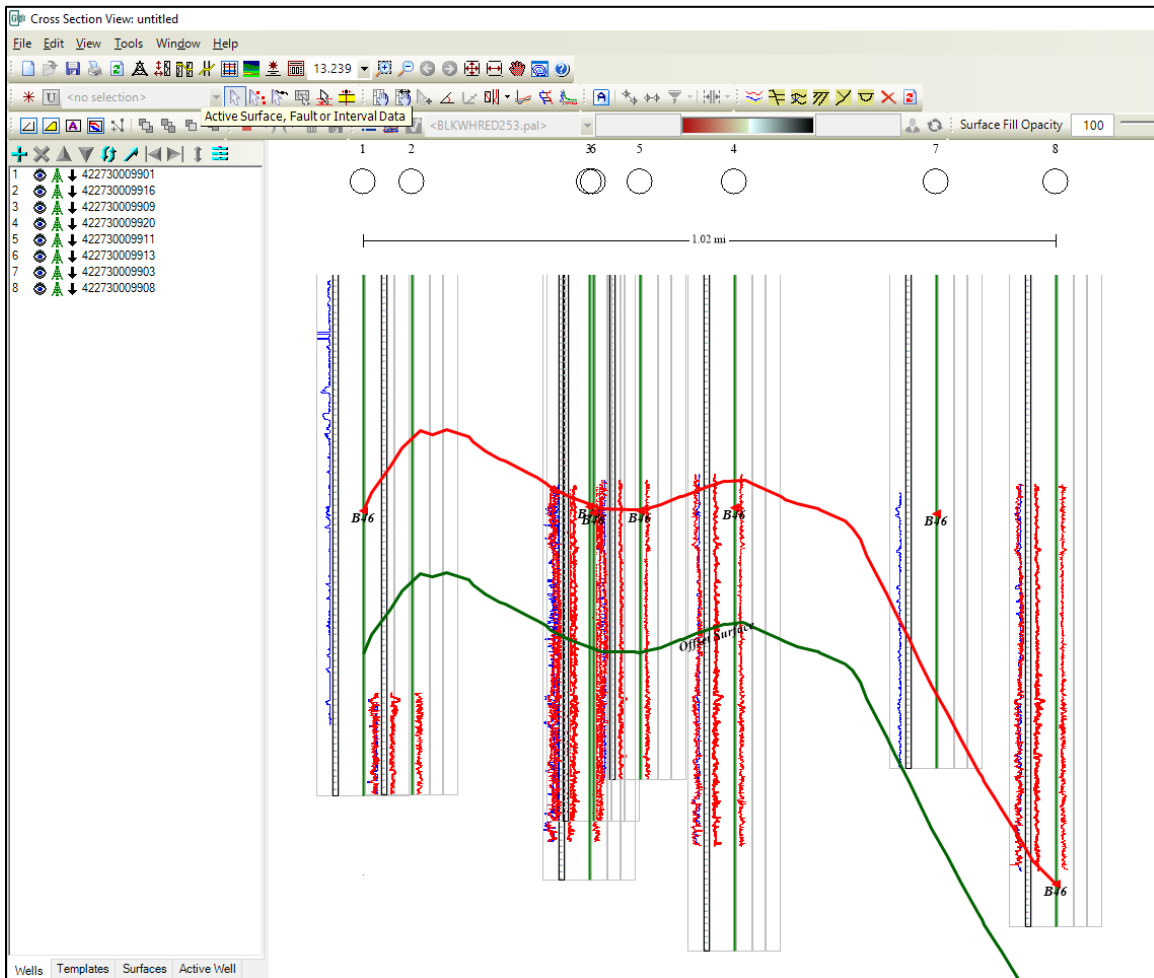
Post MD values along Horizontal Distance in Projected Cross Sections

The MD values of the wellbore can be displayed along with horizontal distance values in Projected Cross Sections, which enables users to determine MD of the wellbore at a plane of cross section on a specific vertical scale.

Support for Extended Well Name, ZoneManager Zone and Attributes map

Wells, ZoneManager Zones and Attribute Maps can have a name of up to 40 characters, which can be displayed within the entire GVERSE Geomodeling application.

Ability to Post SCM Name for Surfaces in the Cross Section

Both the Surface Name and the Strat Column Name (SCM) can now be posted on wells along with surfaces correlation. The SCM name and surface posting can either be displayed between the first and the last well, or between all wells.
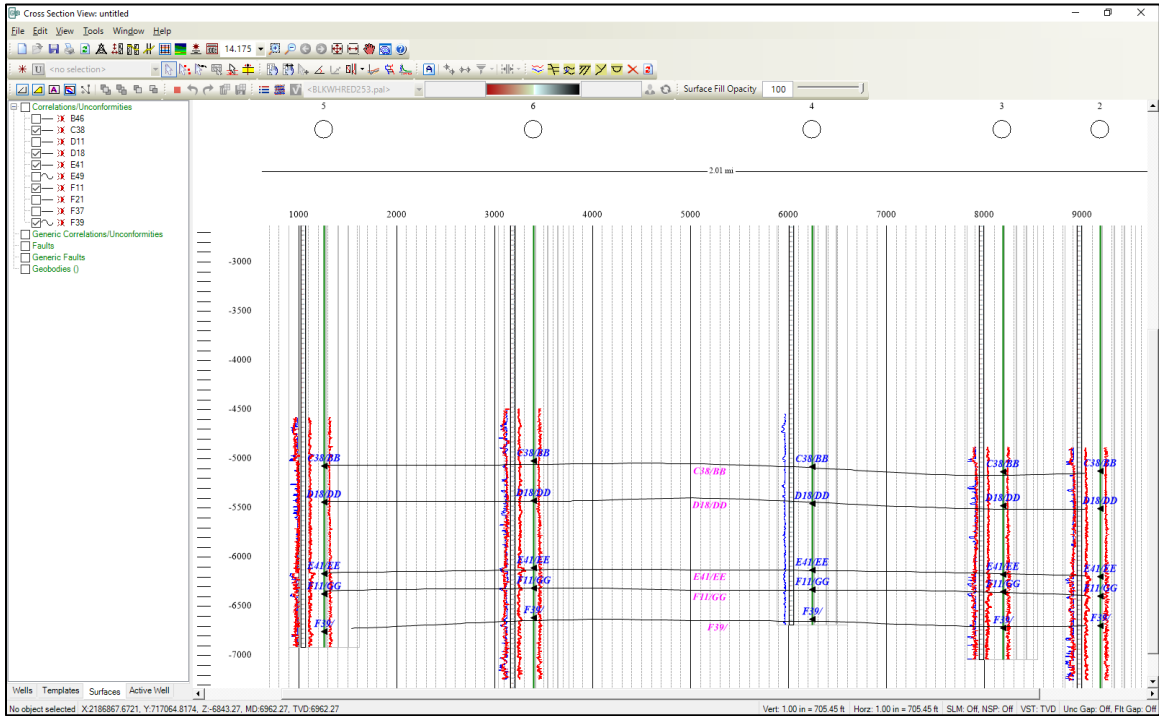
GVERSE Geophysics

Display Surfaces and Probes in Depth Mode

Horizon, fault surfaces, and timeslices can now be viewed in depth mode of time interpretations to enable a better understanding of subsurface structures according to their respective depth.
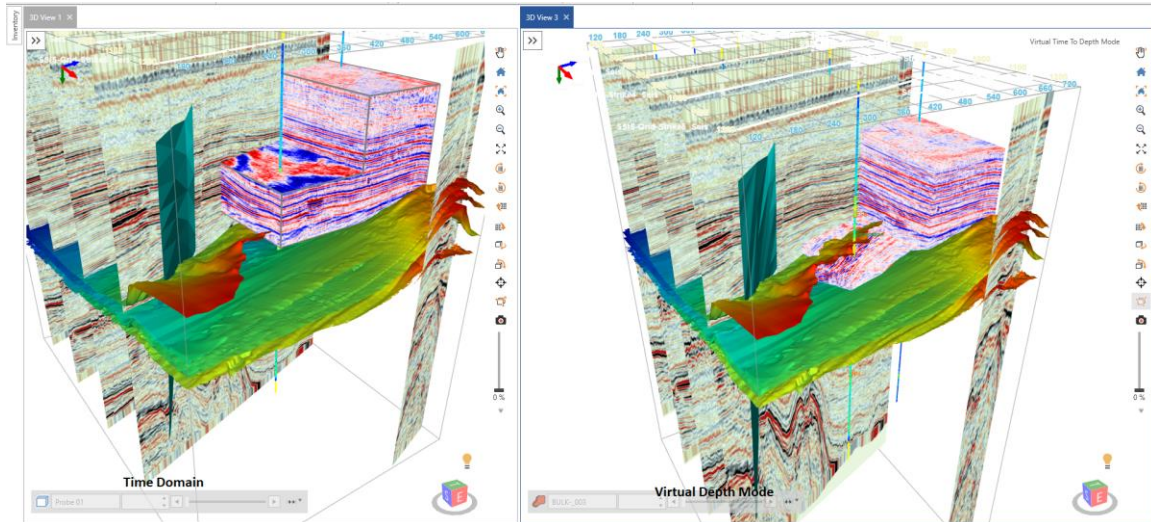
Automatically Grid Velocities and Depth for Horizons

Grid velocities and depths for all horizons in the interpretation automatically with a single click instead of re-gridding each horizon manually.
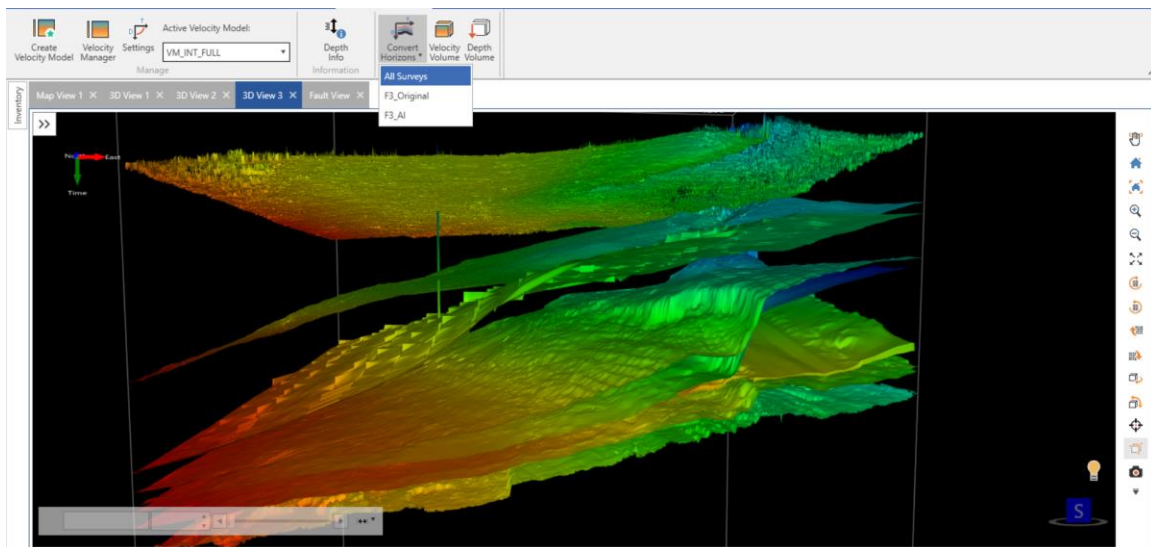
Depth Control Points in Velocity Model

Digitize or import depth control points and use them in velocity model building for more accurate depth conversion.

Simultaneous Flattening in Depth Mode

You can now flatten the scene and enable the Depth mode at the same time. Depth conversion occurs before flattening the scene. Geobodies can also be flattened now.

Add Multiples in Synthetic

All possible transmission paths including internal inter-layer paths can be added to a synthetic to reflect any multiples in seismic within the synthetic.
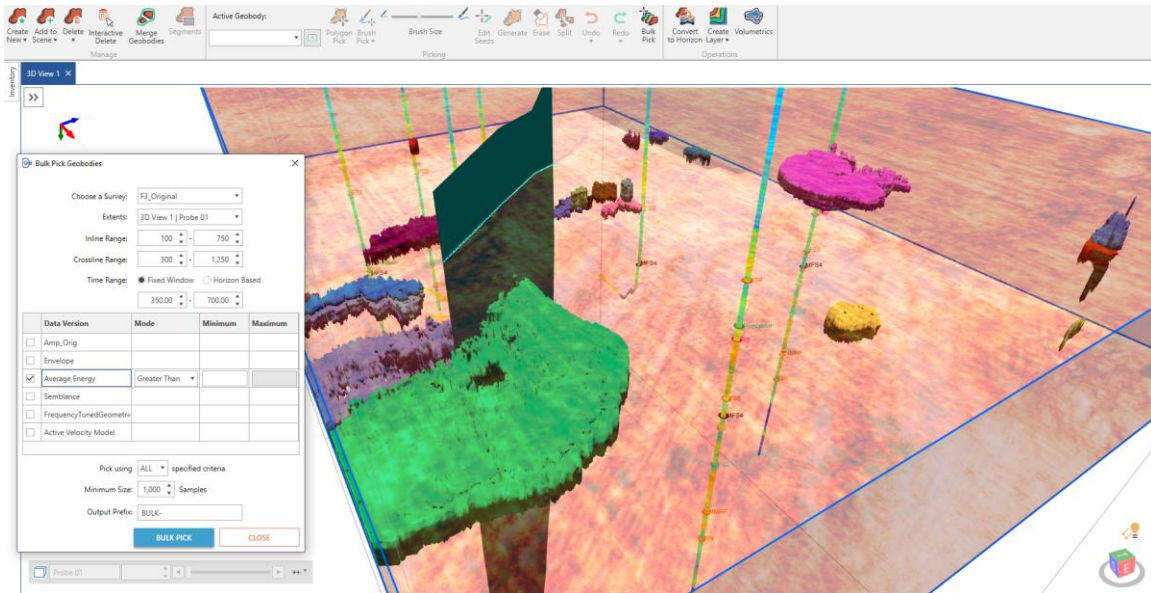
Backus Averaging

Upscale sonic and density logs data to create more robust synthetics with Backus Averaging.
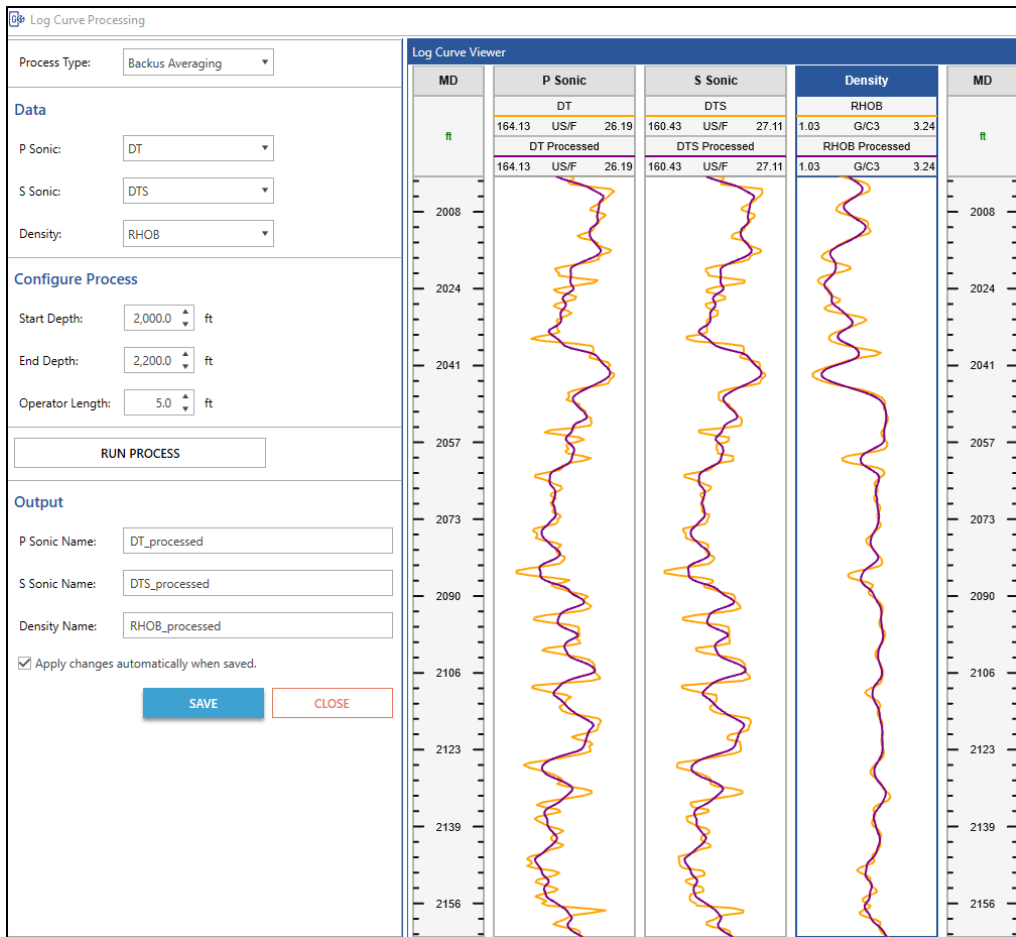
Bulk Pick Geobodies

Geobodies can now be picked and generated in bulk using multiple volumes to define picking criteria. Bulk picking provides a quick way to identify possible structures of interest in the subsurface.

Merge and Split Geobodies

Multiple geobodies can now be merged into a single geobody. Merged geobodies can be split in multiple geobodies.

Delete Geobodies Interactively

Multiple geobodies can now be selected in 3D view and deleted from the scene.

Edit Geobody Surfaces

Edit geobody surfaces and interactively remove undesirable portions of the geobody surface directly in the 3D view.

Amplitude Thresholds for Geobody Tracking

More flexibility in defining amplitude thresholds for geobody tracking allowing easier use of more kinds of seismic and attribute data for tracking geobodies.
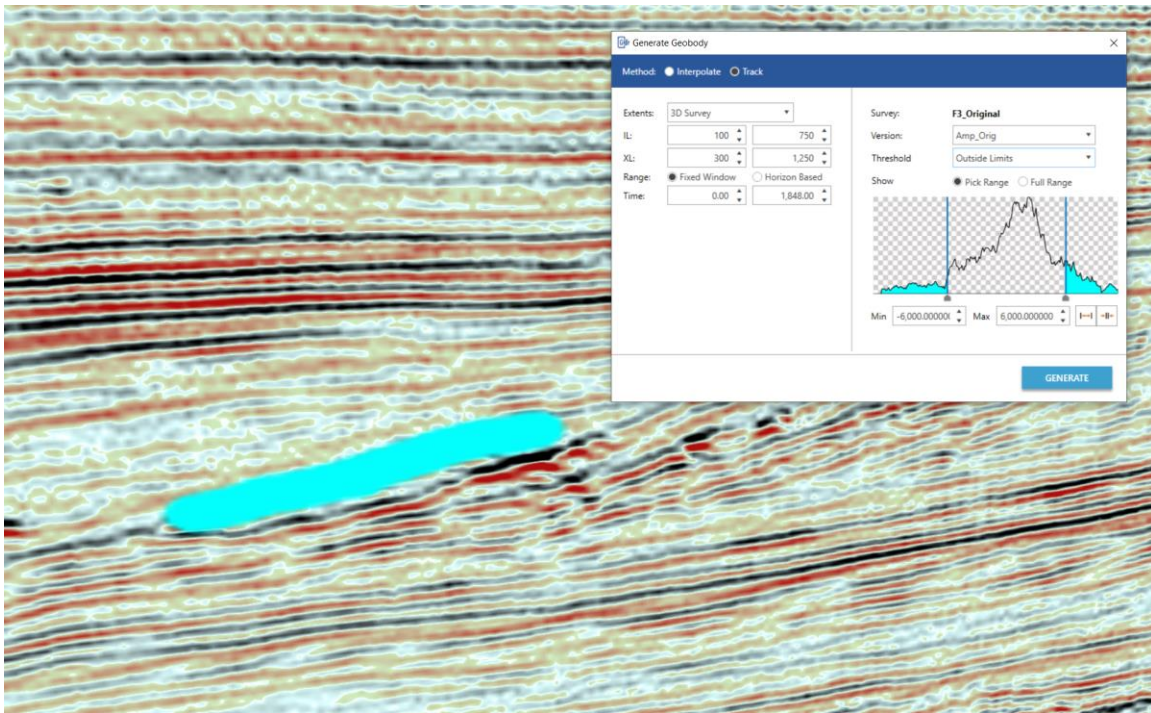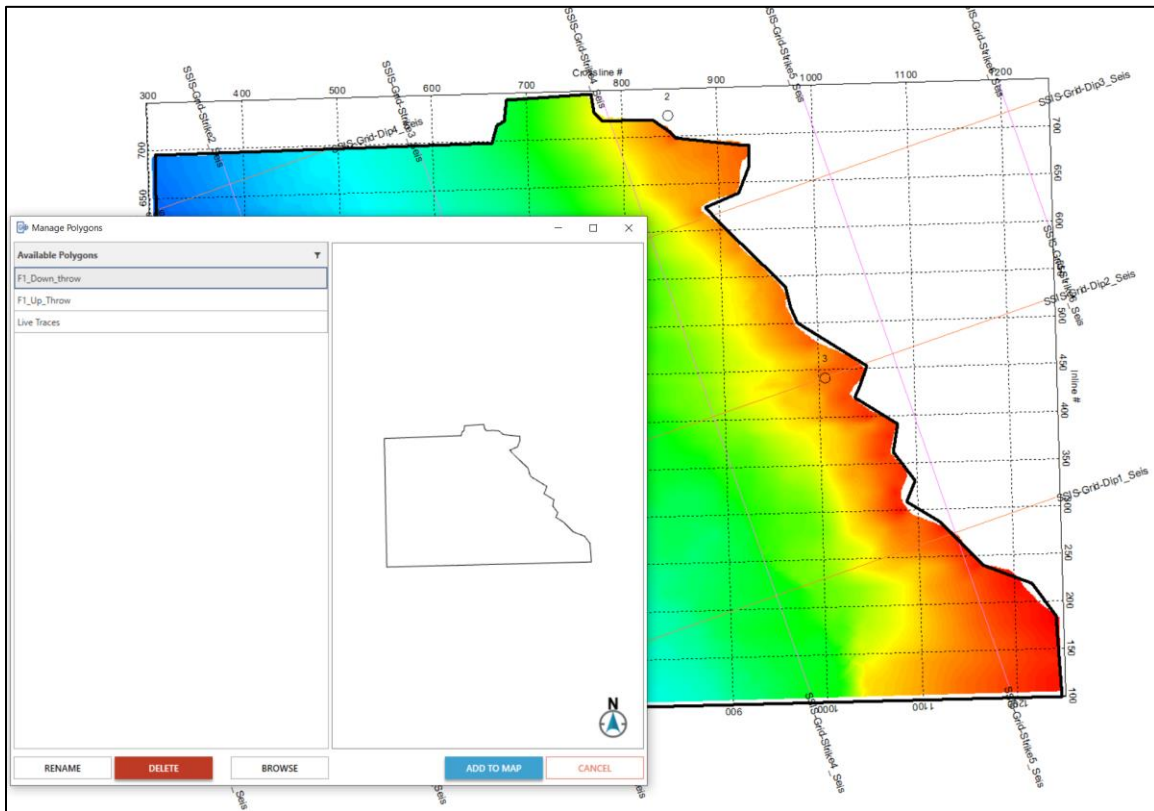

Stratal Slicing

Create proportionally sliced horizons between two existing horizons to get deeper stratigraphic insights.
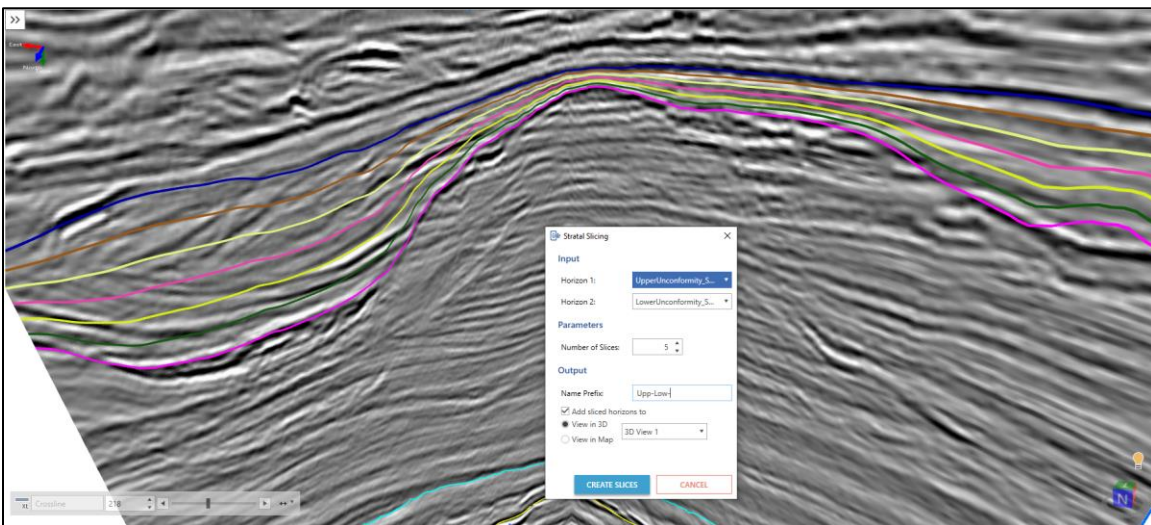
Polygon Management

Create, save and re-use polygons on maps. Polygons can be named and saved with the interpretation and reused as and when required. Polygons can also be shared across interpretations.

Open GVERSE Geomodeling Cross Sections as Arblines

You can now open any GVERSE Geomodeling cross section as an arbitrary line in GVERSE Geophysics.

Inter-App Cursor Tracking

The mouse cursor is now tracked between GVERSE Geomodeling and GVERSE Geophysics. The cursor is tracked between the 3D, map, and section views of both applications.
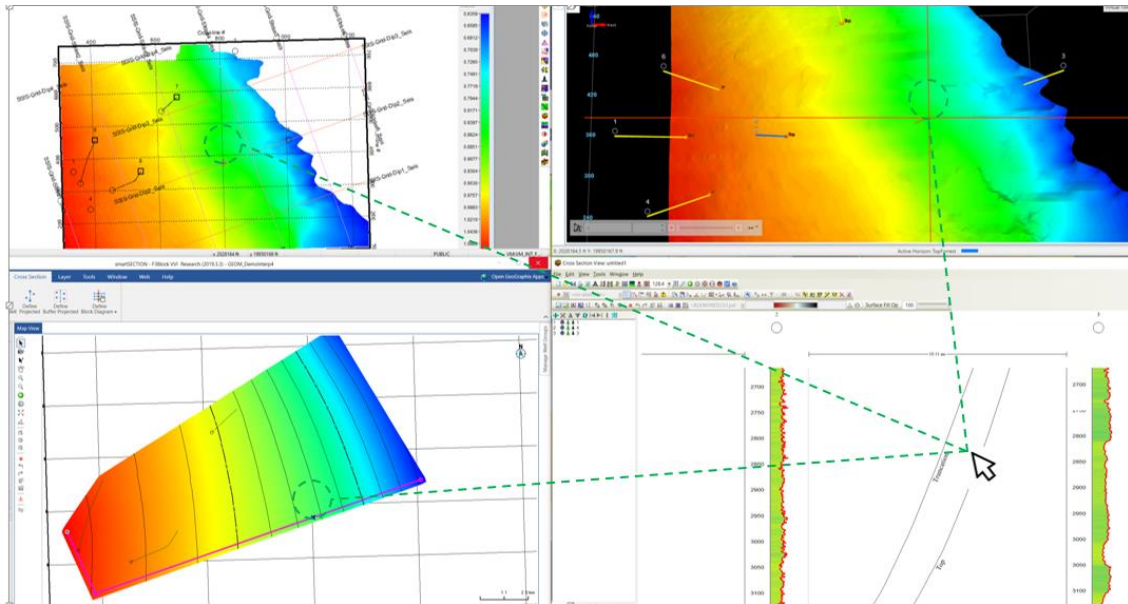
Common Color Palettes for Seismic Backdrops in GVERSE Geomodeling

Color palettes defined in GVERSE Geophysics interpretations can be used to display seismic data in GVERSE Geomodeling cross sections.
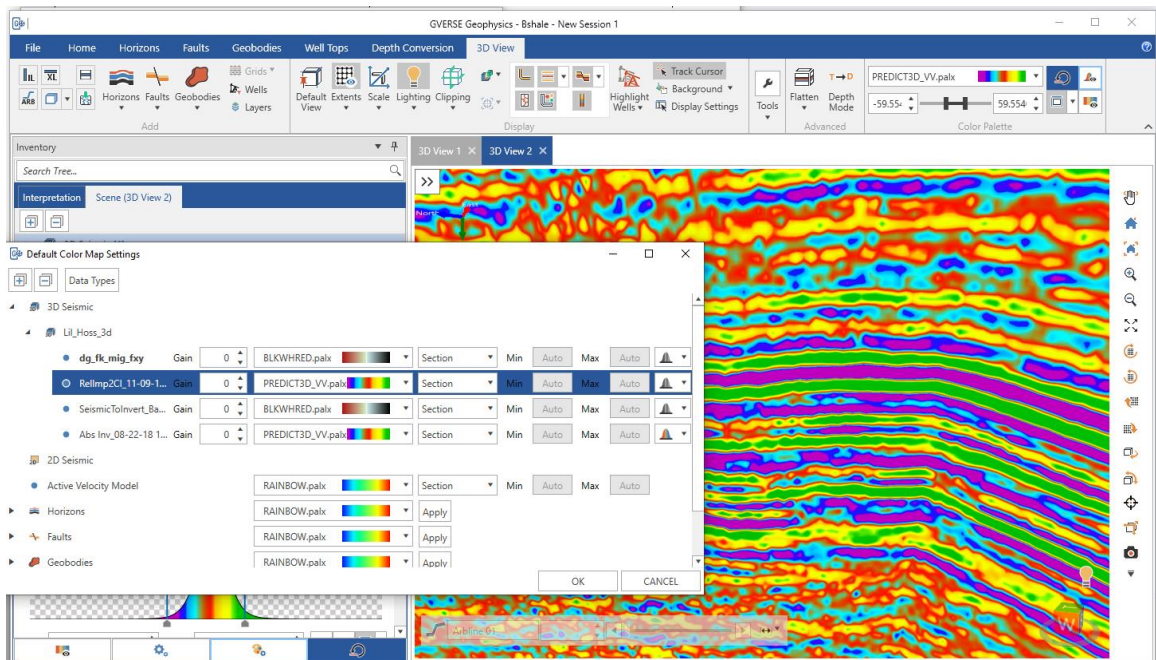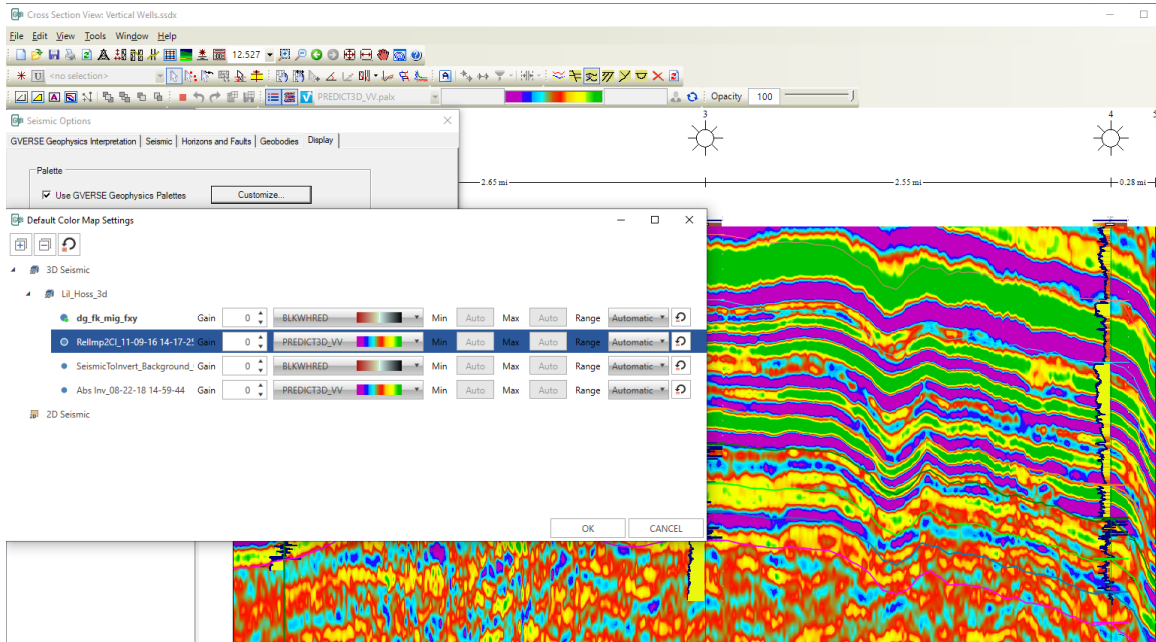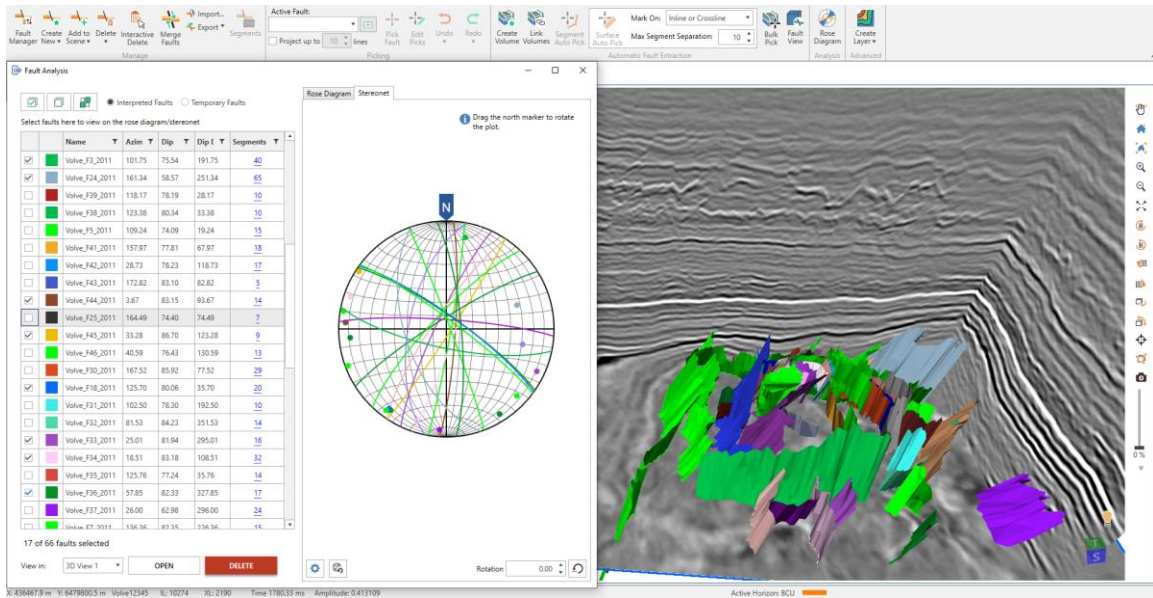

Merge Overlapping Fault Polygons on Map

When any part of a new digitization overlaps the existing manual fault polygon, the two polygons can be merged to create a single fault polygon.

Stereonet Plot

Stereonet plots can now be created for faults which are used to perform detailed fault orientation and stress analysis.

Convert Fault Intersection to Segment

Fault intersections and projections can be converted into a separate fault segment.

Split Fault Segments in Vertical Sections

Fault segment splitting functionality is now also available on vertical sections. Split segments can be edited, deleted, unassigned or reassigned individually.

Activate Velocity Surveys in Bulk

Velocity surveys can now be activated for wells in bulk, enabling easier switching and/or activation of time depth tables for all wells in the interpretation.

Edit Version Information

Version information can now be edited, enabling you to change basic information, and correct any mistakes in the metadata.

SEG-Y Loading Improvements

Automatically detect survey geometry, line increments and start depths in SEG-Y data.

Select Version for SEG-Y Export

Choose the data version to create SEG-Y for when exporting 3D seismic instead of only exporting the active version.

Batch Extract Curves

Extract data from multiple seismic volumes at multiple well locations and save as log curves in the database or as LAS files on disk.
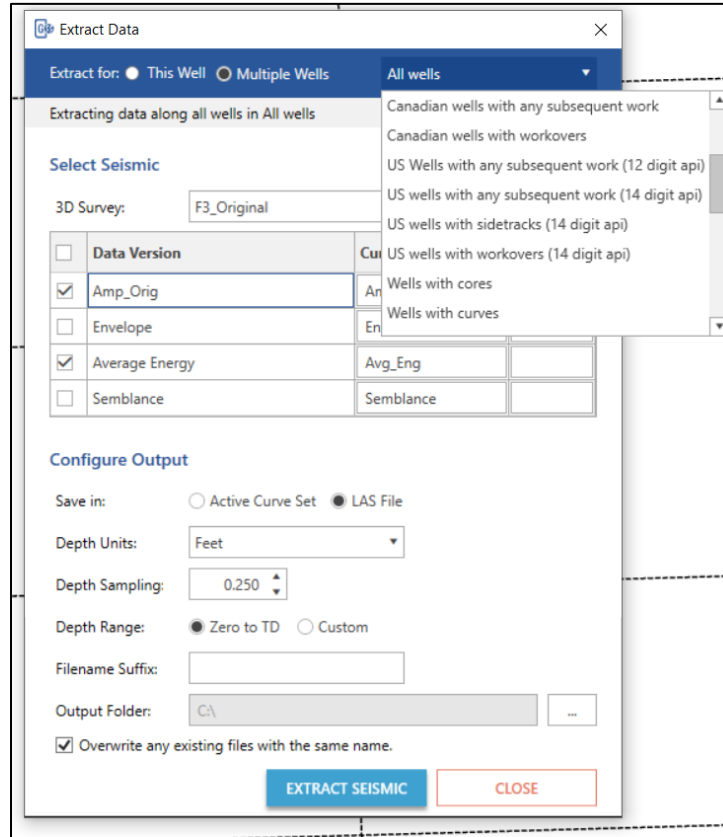

Post Distance on Seismic Section Header

Length of the section is now posted on the vertical seismic section header, which shows the distance along an arbline or any other seismic section.

Open Arbline along Wellbore

Open arblines along wellbores. Choose to open the arbline only along the horizontal portion of the well. Add trailing and leading distance to extend arbline in front and behind the bore.

More Units for Distances, Areas and Volumes

View distances in more units including feet, meters, miles, and kilometers. Area calculations include square miles and square kilometers. Volume units for thousand, million, billion, and trillion cubic feet and cubic meters are also supported.
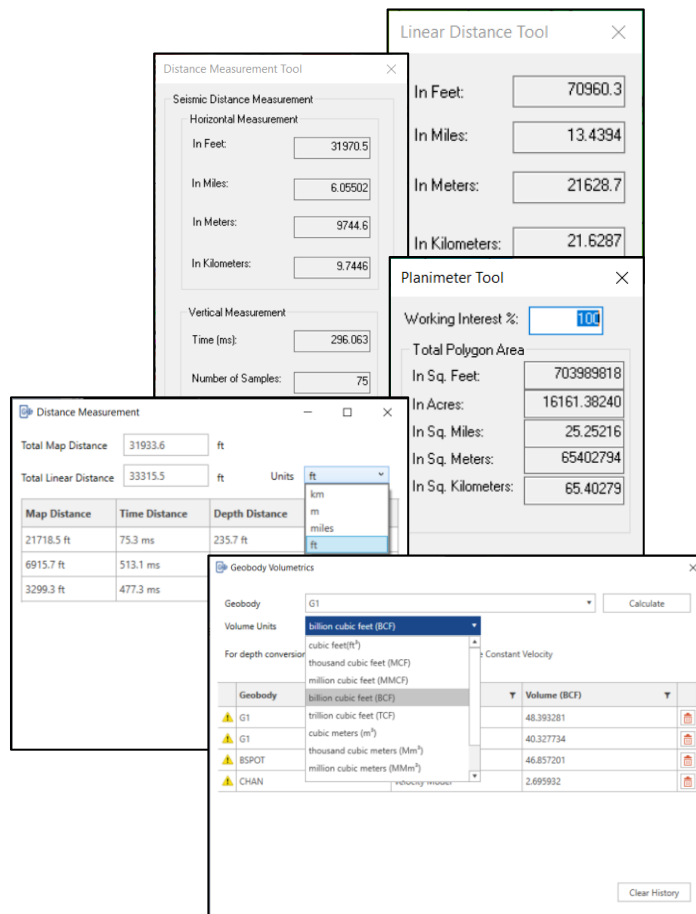

Change Wellbore Color

Change the color of deviated wellbores on the main map view to easily identify wellbores on the map.

Buttons to Control Horizontal and Vertical Scale

Buttons in the seismic view sidebar let you quickly control the horizontal and vertical scale of the seismic without having to adjust display settings from the dialog.

Multi-Survey Auto Pick

Surveys can now be chosen when autopicking horizons. This makes horizon picking faster as there is no need to re-pick an already picked horizon.
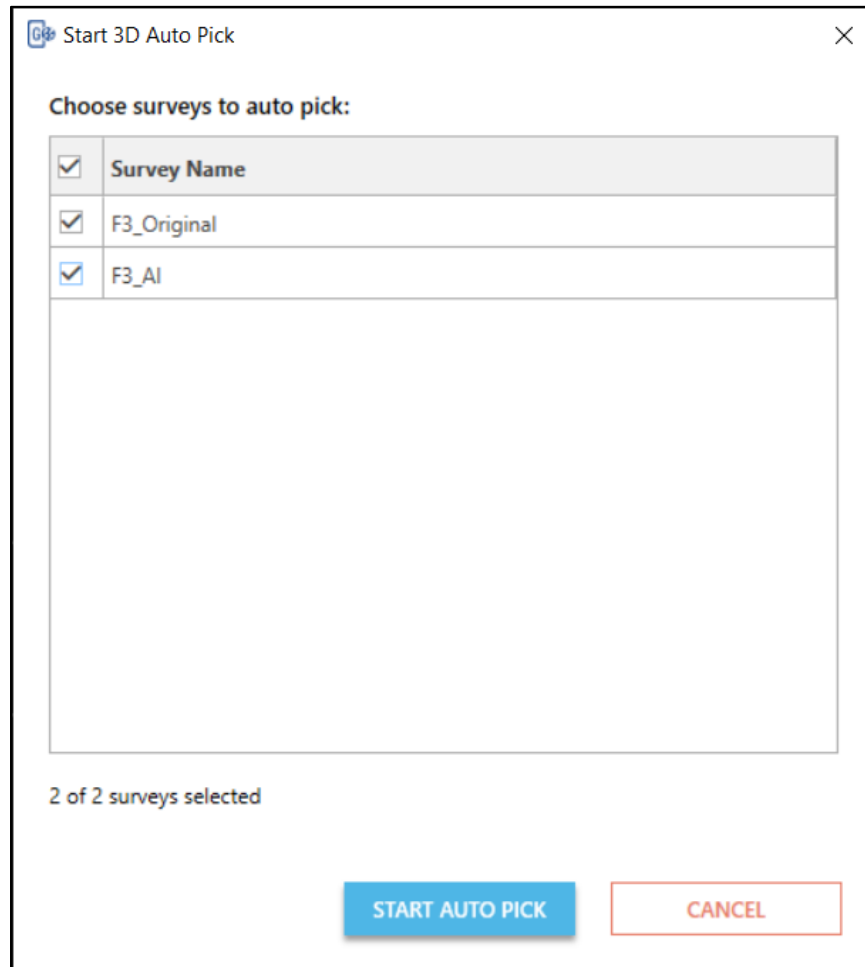
Flatten on Right-Click

Flatten a vertical section on a horizon using the right-click context menu of the horizon.

Easier Access to SEG-Y Loader

Launch SEG-Y Loaders directly from the interpretation without launching a separate instance of GVERSE Geophysics.

Easier Access to Interpretation Browser

Access the Interpretation Browser from the 3D module for quicker access to horizons, faults, geobodies, 2D shifts, and polygons from other interpretations.

Create IsoMap Layers in GVERSE Geophysics 3D Module

You can now access the Layer Creation dialog box directly from GVERSE Geophysics 3D module, instead of switching to the main interface to create IsoMap layers.

Consistent Pick Modes

Pick modes are now synchronized across GVERSE Geophysics. When a pick mode is enabled is one module, it is also enabled in the other module of GVERSE Geophysics.
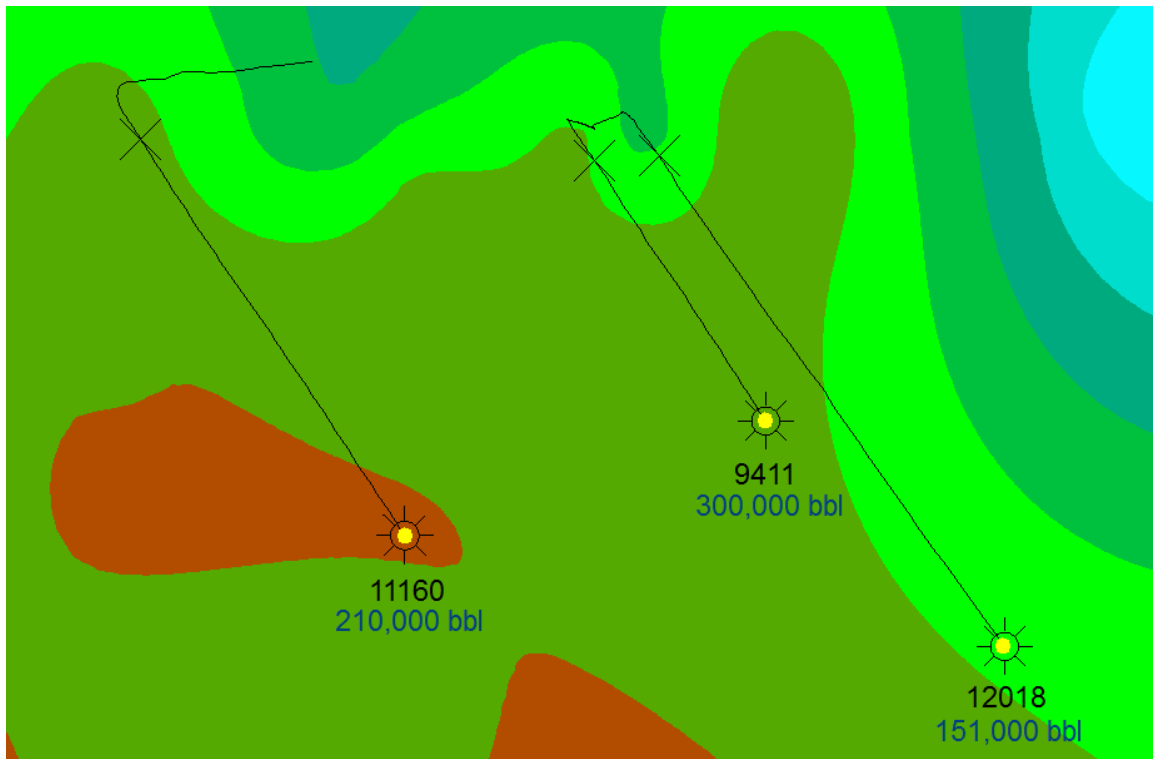
Performance Improvements

Significantly faster horizon export, fault polygon editing, working with the Fault Manager, and 3D autopick interpolation.
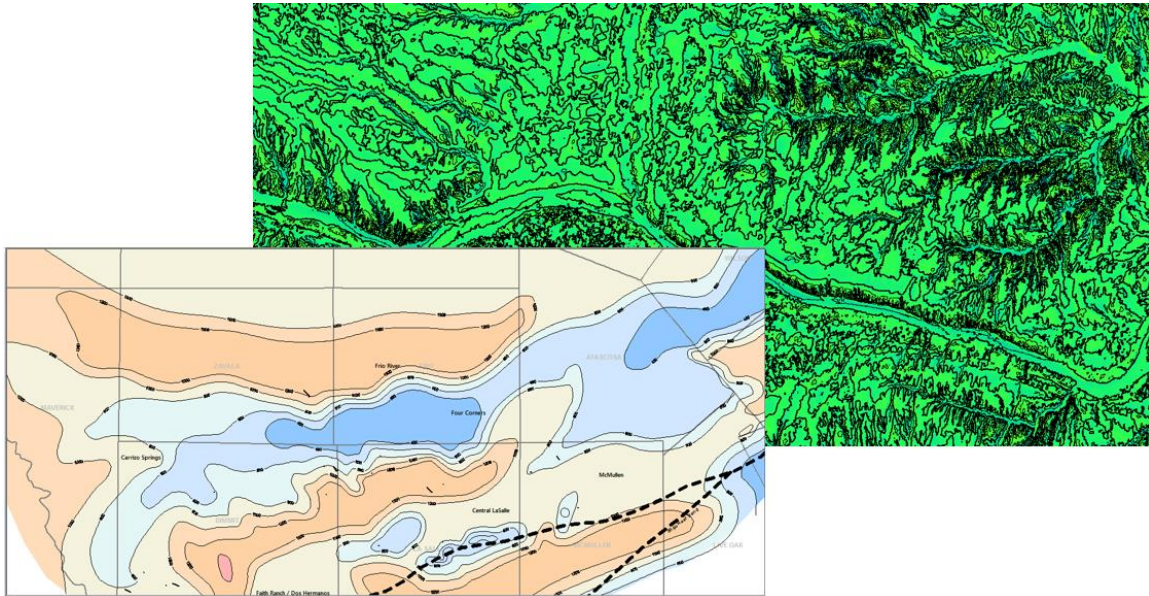
GeoAtlas

Add Commas while Posting Numbers

In WellBase Layer Create, a comma can be added after every 3rd digit from the right to make very large numeric values easily readable.

Enhanced Subsurface Mapping

Support has been added for working with larger grids with smaller grid spacing for building large regional structural maps.

Original Oil in Place (OOIP) & Original Gas in Place (OGIP) Calculation

OOIP and OGIP can now be calculated. It helps in determining the total amount of oil and gas in the reservoir. Volume and area statistics can also be calculated.

Save Layout Changes

You can now save customized layout changes for different toolbars and dialogs.

Post Well Survey Fields on WellBase Layer

Lateral lengths and other Well Survey fields can now be posted on a WellBase layer.
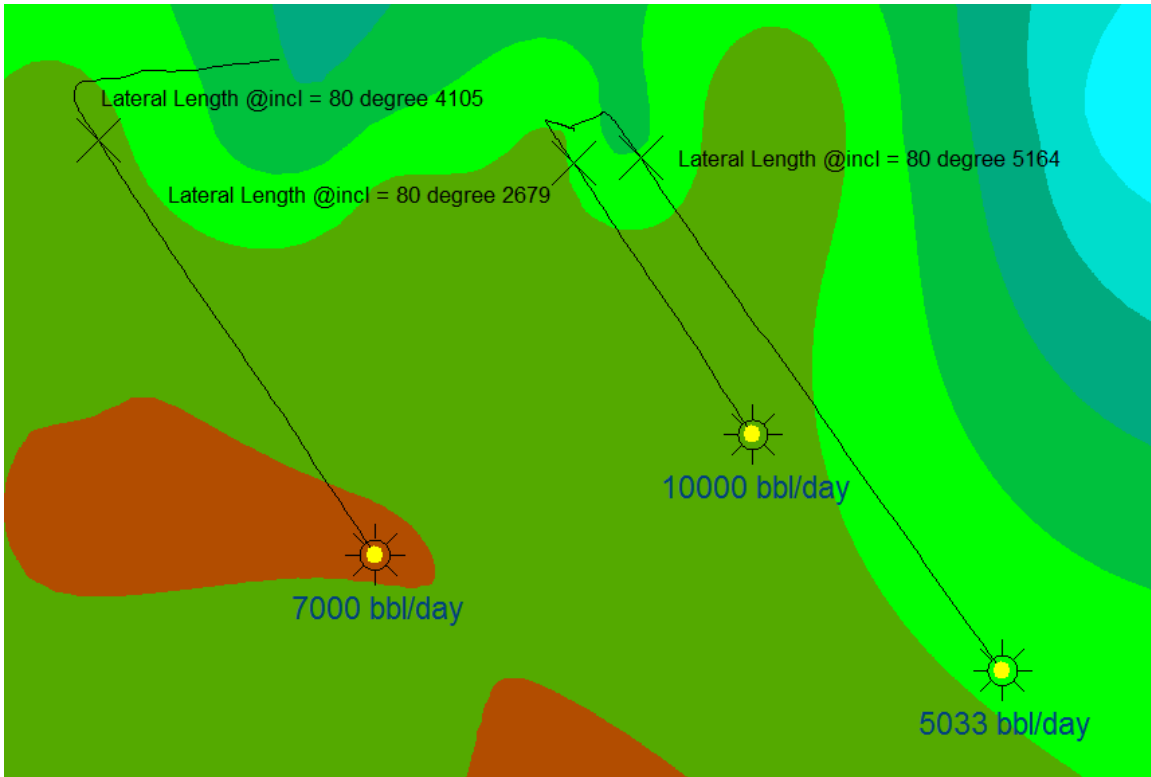
Calculate Daily or Monthly Production Rate

A new feature is introduced which allows you to calculate daily or monthly production rate by dividing the production data by any number.
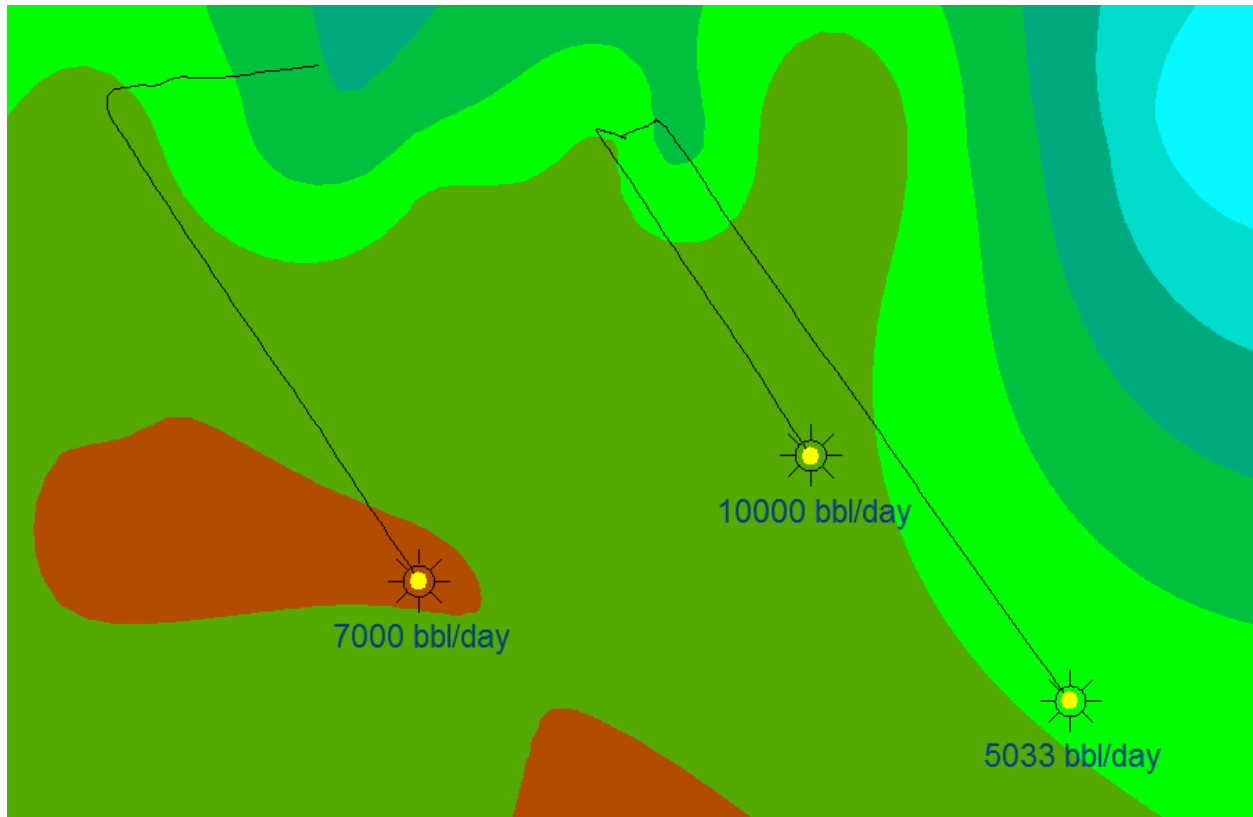
Import and Export Large ZMap+ Files

Support for importing much larger ZMap+/ASCII XYZ files has been added to GeoAtlas. There is also a provision to export large ZMap+/ASCII XYZ files.

ProjectExplorer

Dipmeter Import History

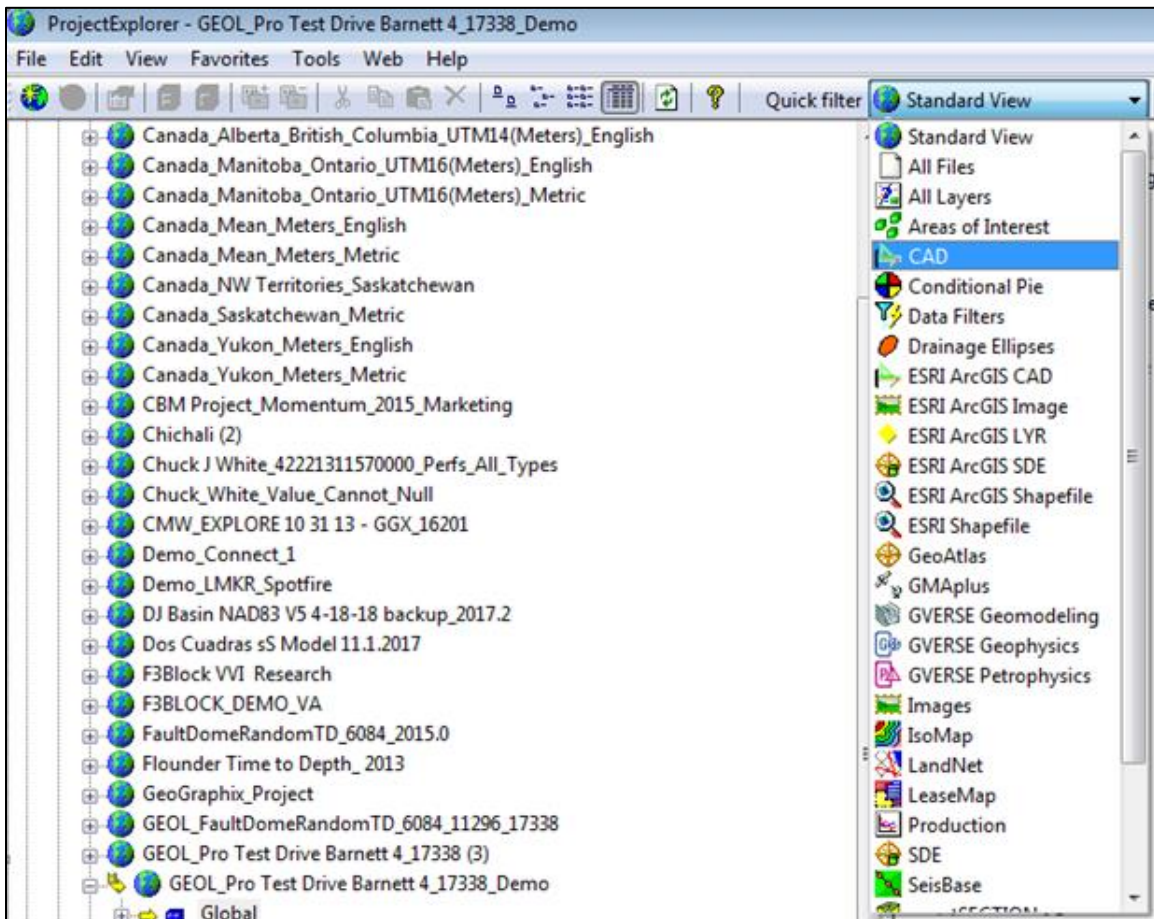Dipmeter import history is now maintained in GeoGraphix, which gives you a complete record of imported dipmeter data.

Addition of New Layer Types in Quick Filter

New layer types are added to the Quick Filter drop-down list, which allows for searching of layers quickly and easily. The layer types added to this list are; CAD, ESRI Shapefles, ArcGIS, and Area of Interest.

QueryBuilder

View Selected Wells from QueryBuilder in GeoAtlas or WellBase

Wells can now be selected directly from the query results page and viewed either in GeoAtlas or WellBase.

Filter Formations by Active or Public Strat Column

Formations can now be filtered either by Active Strat Column or Public Strat Column.

WellBase

Parse Posted Data on WellBase Layers

A parsing option has been added to WellBase Layer Create, which allows the division of posted numeric data by any number. This is especially useful in calculating daily production rates from monthly production data.

Post Additional Survey Information on WellBase Layers

Additional survey data can be posted on WellBase layters such as BH Latitude/Longitude, BH TVD, and well lateral length calculated from a user-specified well inclination.

Rearrange Columns in WellBase Grids

Columns in multiple WellBase grids (Formation, IP, Core, Well Header) can now be rearranged and resized. WellBase retains the size and order of these columns and displays them in the user preferred order the next time WellBase is launched.

Apply Statistical Operations when Saving Zone Attributes from Spotfire

Users can apply statistical operations when saving zone attributes from Spotfire to ZoneManager. This is especially useful when calculating a single aggregate attribute value for the entire zone.

Add IHS297 GD Record to ASCII4

Perforation data recorded during production tests (IHS297 GD) is now stored in Perforations tab in WellBase.

Quick Filter Tool Optimization

The Quick Filter tool has been optimized with the addition of multiple new filtering options, which aids in efficient data querying.

Delete Formations by Source

You can now delete a formation or a group of formations by source.

Survey Calculation Improvements

While calculating deviation surveys, an option is available to replace well's TD with the MD of the deepest survey station if well TD is less than the deepest survey station measured depth.

Well Name Character Length Increased

The character length of well name has increased to accommodate longer well names.

Enhanced Well Bore Viewer

There are now separate Wellbore Viewers for Proposed Surveys and Drilled Surveys.

UI Improvements

There are multiple UI improvements in WellBase in this release. Some of them include an expandable Strat Column Manager, and retaining the size and state of the WellBase bar.

XSection

Work with Larger Cross Sections

Support has been added for generating much larger cross sections, allowing users to work with basin wide sequence stratigraphic interpretations.

Edit Cross Section Layout Dialog Resized

The 'Edit Cross Section Layout' dialog box has been resized and expanded, which allows you to view all relevant information without scrolling a lot.

ZoneManager

Import Template for Repeated ASCII Imports

An Import template has been added to facilitate repeated ASCII imports for the same spreadsheet. This also saves a considerable amount of manual work when mapping many attribute fields.

Filter Zones and Attributes

You can now apply zone and attributes filter globally for both WellBase and ZoneManager applications. This allows you to focus on your active zones wherever you are in the application.

Increased Zone and Attribute Name Length

The Zone and Attribute's name length has been increased to 40 characters to accommodate longer names in the database.

Performance Improvement while Updating Zone Data

The performance of updating zone data has significantly improved in this release.

Fixed Issues

The following customer reported issues were fixed in this release.

GVERSE Geomodeling

ID	Description
220997	The surface did not show any kind of data (contours) in **Map view** when **GVERSE Geophysics** was selected as the surface source in the **Geosurface Model Properties** dialog box. This issue has been fixed.
218623	When the **Tie Points** panel was full of tie point records, a new record was added at the bottom of the list and was not visible without extensive scrolling. This issue has been fixed and now the new record is scrolled into view in the **Tie Points** panel.

GVERSE Geophysics

ID	Description
220823	While creating a velocity model, the **Control Points** column disappeared if the default gridding method was changed from **Minimum Curvature** to **Inverse Distance** or **Normalized Inverse Distance**. This issue has been fixed.
218495	Application crashed when subsetting Z-axis of the seismic data with phase shift already applied. This issue has been fixed.
216529	The **Print to PDF** functionality using the **Only Wiggles** option resulted in a black colored image of the seismic section in the PDF file. This issue has been fixed.
215872	The **Attribute and Surface Calculator** dialog box used to freeze when the secondary monitor was set as the main display. This issue has been fixed.
157503	Horizon correlation resulted in a surface containing spikes when executed for multiple surveys with shared horizons. This issue has been fixed.

Defcon

ID	Description
27243	Importing IHS files in Defcon ignored the GD records. This issue has been fixed.

LeaseMap

ID	Description
149198	The General tab for lease(s) with multiple tracts did not update when an LDF file was imported. This issue has been fixed.

ProjectExplorer

ID	Description
214716	During the database rebuild process, the Database Rebuilder tool could not reinitialize the materialized view which resulted in an error in the log file. This issue has been fixed.

GeoAtlas

ID	Description
14682	ZMap + threw an out of memory exception when a file larger than 1 GB was imported or exported. This issue has been fixed.
17847	There was no option to format large numbers with commas after every third digit from the right as a thousand separator. This issue has been fixed.
82037	Creating layers using the Quartering tool produced lots/lines instead of closed polygons. This resulted in color fill not working correctly. This issue has been fixed.
135215	GeoAtlas crashed when wells were imported that had extents that were blown or set to zero. This issue has been fixed.
214626	Importing shapefiles with spaces in fields does not honor for thematic maps and automatic labels in the Layer Display Attributes dialog box.
217882	Updating WellBase layers changed the thematic/bubble map size units and font sizes to Map Coordinate System (for countries outside the United States). This issue has been fixed.

WellBase

ID	Description
63487	The Quick Filter did not honor the active strat column when showing the list of formations.
213939	The Quick Access toolbar in WellBase did not remember/reflect customized user changes the next time it was launched. This issue has been fixed.
214627	Calculating survey or proposed survey while the TVD values were either null or missing prompted an error message which was not very clear. This issue has been fixed by updating the error message.
215341	Adding a cloned well failed if the well had top/picks with a private source. This issue has been fixed.
215940	The document library did not accept URLs starting with *https* and showed an error. This issue has been fixed.
216556	Grid convergence angle could not be calculated if the survey was not already calculated. This issue has been fixed.
216709	WellBase did not remember the Zone view selection in the Zones tab when it is relaunched. This issue has been fixed.
217914	Users could not add attributes for a zone in the Zones tab, unless the well had at least one attribute already entered for the given zone. This issue has been fixed.
217915	Modifying a zone attribute in the Zones tab and then moving on to another well resulted in data not saved correctly. This issue has been fixed.
217963	The Zones tab did not give a meaningful message if the data did not match the Attribute field type. This issue has been fixed.
218573	Importing formation tops data using the Import Spreadsheet option fails. This issue only occurred while using Microsoft Office 64-bit and has been fixed.
220041	On network projects, WellBase was slow when refreshing all the tabs on selecting wells. This issue has been fixed.
221050	Survey calculation for slant wells prompted an error stating that there was insufficient measured depth between one of the survey points. This issue has been fixed.

WellBase & ZoneManager

ID	Description
214434	While using the Zone Scan Calculator, the aliased Core Analysis fields were not recognized. This issue has been fixed.
220410	Selecting a large number of wells in ZoneManager and viewing them in WellBase resulted in incomplete transfer of wells. This could be verified by looking at the number of wells in the WellBase's spatial filter. This issue has been fixed.

Known Issues

This section lists the known issues in this release.

GVERSE Geomodeling/smartSECTION

ID	Description
222407	The **View Cross Section in GVERSE Geophysics** option is greyed out in the context menu if the cross sections are hidden from the **Map view**. **Workaround:** Display the cross sections in **Map view** by turning on their display from the **2D Data panel**. The option is enabled when cross sections are displayed in **Map view**.

Third Party Applications

We use various third-party applications in the development of our software.

We acknowledge that certain third party code has been bundled with, or embedded in, our software. The licensors of this third party code, and the terms and conditions of their respective licenses, may be found in the GeoGraphix Help files:

1. Open your help files.
2. In the list of topics on the left, locate the **3rd Party Acknowledgements** topic and click to open the topic.

   A list of third party applications and their details display.
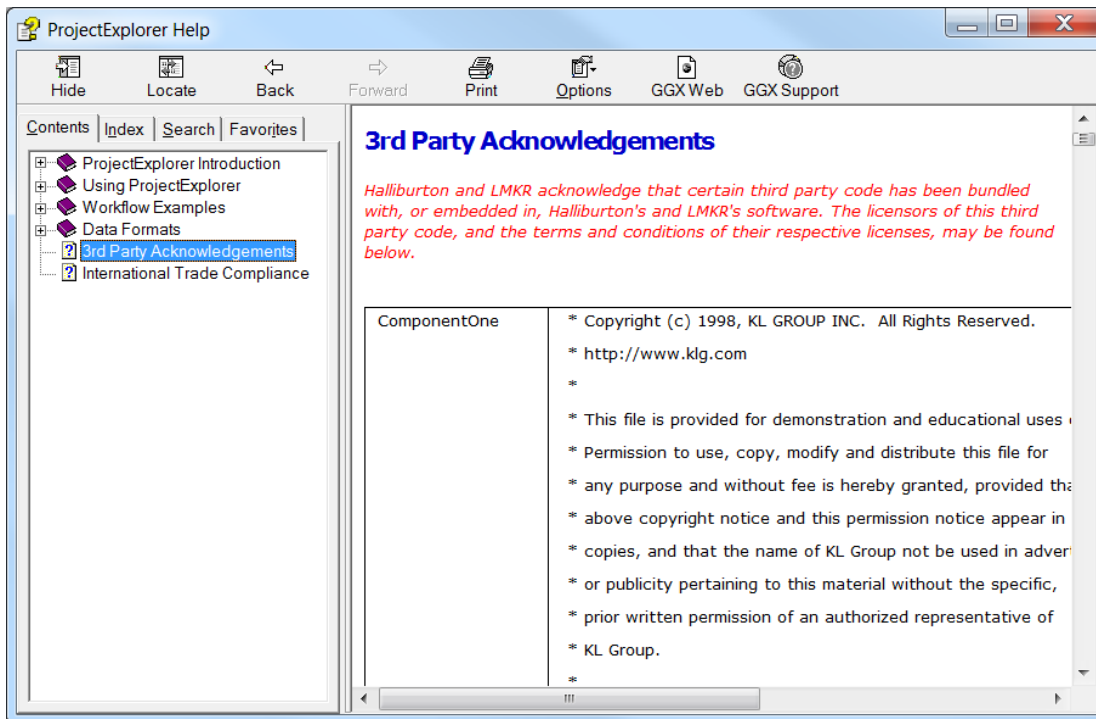
International Trademark Compliance

This application is manufactured or designed using U.S. origin technology and is therefore subject to the export control laws of the United States. Any use or further disposition of such items is subject to U.S. law. Exports from the United States and any re-export thereafter may require a formal export license authorization from the government. If there are doubts about the requirements of the applicable law, it is recommended that the buyer obtain qualified legal advice. These items cannot be used in the design, production, use, or storage of chemical, biological, or nuclear weapons, or missiles of any kind.

The ECCNs provided here represent our opinion of the correct classification for the product today (based on the original software and/or original hardware). Classifications are subject to change. If you have any questions or need assistance please contact us at GVERSE GeoGraphix Support

Under the U.S. Export Administration Regulations (EAR), the U.S. Government assigns your organization or client, as exporter/importer of record, responsibility for determining the correct authorization for the item at the time of export/import. Restrictions may apply to shipments based on the products, the customer, or the country of destination, and an export license may be required by the Department of Commerce prior to shipment. The U.S. Bureau of Industry and Security provides a website to assist you with determining the need for a license and with information regarding where to obtain help.

The URL is: http://www.bis.doc.gov.
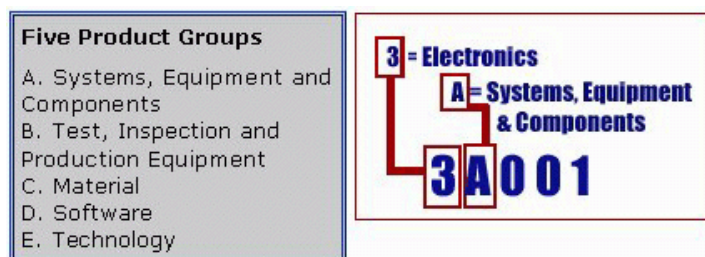
Definitions

CCATS (Commodity Classification Automated Tracking System) - the tracking number assigned by the U.S. Bureau of Industry and Security (BIS) to products formally reviewed and classified by the government. The CCATS provides information concerning export/re-export authorizations, available exceptions, and conditions.

ECCN - Export Control Classification Number - The ECCN is an alpha-numeric code, e.g., 3A001, that describes a particular item or type of item, and shows the controls placed on that item. The CCL (Commerce Control List) is divided into ten broad categories, and each category is further subdivided into five product groups. The CCL is available on the EAR Website.

The ECCN number, License Type, and the CCATS Numbers for this product are included in the table below. Also included is the date the table was last updated.

Product/Component/R5000	ECCN Number	License	CCATS Number	Last Updated On
GeoGraphix	--	-	-	-
LMKR License Manager	5D002C.1	ENC	G055172	6/19/2007

Contacting GVERSE GeoGraphix Support

We are committed to providing the highest level of technical customer support in the industry. With an average tenure of more than thirteen years, our highly trained and experienced staff of technical analysts is comprised of geoscientists, engineers, land professionals, petrophysicists, and system specialists.

Please refer to our Customer Support timings mentioned below to ensure that you have access to our support analysts assigned to your region. When getting in touch with GVERSE GeoGraphix support, please remember that real-time support will not be available during bank holidays or after office hours. If you do get in touch with GVERSE GeoGraphix Support outside of work hours, please leave a voice message with a brief description of the issue that you are facing. Your voice message will be used to automatically create a support case for you. This will enable our analysts to attend to your issue and provide you with a resolution as soon as possible.

North and South America	Europe, Middle East & Africa
Monday – Friday 8 am-6 pm CST* Toll Free (US/Canada) : +1 855 449 5657 **Colombia:** +57 1381 4908 **United States:** +1 303 295 0020 **Canada:** +1 587 233 4004 *Excluding bank holidays*	**UK:** Monday - Friday 8 am – 5 pm* +44 20 3608 8042 **UAE:** Sunday - Thursday (Dubai GMT+4) 8 am – 5 pm* +971 4 3727 999 *Excluding bank holidays*
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GeoGraphix® 2019.4 Release Notes

Helpful Links

Name	Website Address
GVERSE GeoGraphix Home page	http://www.gverse.com/geographix