Title

GeoGraphix® Release Notes

Introduction

LMKR is pleased to announce the release of the GeoGraphix® and Discovery™on OpenWorks® 2014 software.

This release contains many new features for GeoGraphix. This guide provides important information regarding new improvements, system requirements, and valuable resources that will allow you to get the most out of the GeoGraphix 2014 release. The GeoGraphix 2014 Release contains the 2014.0 version of GeoGraphix software.

To go directly to the new features, defect fixes, known issues and system requirements for the GeoGraphix applications, click on the blue links below:

Note: 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.

GeoGraphix 2014 is an integrated product suite that incorporates shared data management and geological, petrophysical, and geophysical interpretation software. It utilizes a Sybase (GXDB) database in GeoGraphix Discovery mode, or accesses the OpenWorks/SeisWorks (Oracle) database in Discovery on OpenWorks mode. The GeoGraphix software consist of the following:

New Package: LMKR GeoGraphix Pro is a new upgrade option that provides geoscientists with advanced technologies to enhance their productivity and maximize their existing GeoGraphix investment. GeoGraphix Pro is a licensed upgrade to the GeoGraphix software and requires the purchase of a separate license.

For Release 2014, these include:

- Advanced 3D visualization (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 view you can show IsoMap structural surfaces, cultural layers, wells, seismic data, cross sections and fence diagrams in 3D view.

- 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.

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

- The GeoGraphix Discovery 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

PRIZM™

- An interactive petrophysical and log analysis system

smartSECTION® with FrameBuilder™

- The next generation geologic modeling and cross section tool for complex structural and sequence stratigraphic analysis and unconventional well planning and monitoring

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

SeisVision™

- The SeisVision comprehensive 2D/3D seismic interpretation system, which also includes a dynamic real-time link to SeisWorks/OpenWorks™

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 SeisVision and SeisWorks

GridXchange

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

Note: SeisBase, LandNet, LeaseMap, LogM ModelBuilder (LogM Modeling), LogM Well Editor (LogM Advanced Synthetics), Field Planner, and Pro3D are not available in the current version of Discovery on OpenWorks.

System Requirements

On the following pages, you will find hardware and software system requirements tables 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:

- ***Clients using Discovery on OpenWorks must upgrade to OpenWorks 5000.8.3.01 and SeisWorks 5000.8.0.2***

- ***Please also refer to the GeoGraphix Customer Support Portal (http://support.lmkr.com) for up-to-date information on system requirements for all GeoGraphix products.***

GeoGraphix Workstation & Laptops

Operating System Requirements		
Supported Operating System	**RAM**	**CPU**
Windows® 7 Professional x64 Or Windows® 7 Enterprise x64 Or Windows® 7 Ultimate x64	4 GB Minimum 8+ GB recommended	Pentium i5/i7 or any Quad Core Processor
Notes		
Note 1 – We recommend using the latest Microsoft service packs and security patches		

Graphics Hardware Requirements		
Application Support Level	**Required Operating System**	**Required Graphics Hardware**
All GeoGraphix Applications including Discovery 3D and Pro 3D	All Supported	DirectX 11 capable hardware (see note 2)
GeoGraphix Applications except for Discovery 3D and Pro 3D	All Supported	All Supported
Notes		
Note 1 – Microsoft DirectX End-User Runtime (June 2010) is required to run Discovery 3D and Pro 3D. Note 2 - To run Discovery 3D, and Pro 3D 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 install. Download install available through Electronic Software Delivery at http://Support.lmkr.com.
- DCOM/Firewalls configured to allow remote access. Only necessary if sharing projects.
- Microsoft .NET 4.0 (or 4.5) runtime required.

GeoGraphix Workstation (continued)

Optional Software Requirements	
For spreadsheet import utility in WellBase, SeisBase, and LeaseMap	Excel 2007 or 2010 (32 or 64 bit)
For Selected Help files	Adobe reader
For Discovery on OpenWorks, GridXchange, SeisXchange	OpenWorks for Windows 5000.8.3.01 – Basic or Full (recommended) Install available on Landmark's LSM (See Notes below), and SeisWorks 5000.8.0.2 (for seismic workflows)
For Esri geo-referenced images and Esri CAD file import in GeoAtlas	Esri ArcGIS Runtime Engine 10.0 (SP 4) or 10.1 (SP 1) (included in the 3rd Party Installer)
For LOGarc™ Version 3.2.1.00 access in smartSECTION	To use the LOGarc™ feature the LOGarc™ Version 3.2.1.00 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.
For TracPlanner Xpress in GeoGraphix	WellPlanning for GeoGraphix 2013.0 (contained within the DecisionSpace 5000.0.3.0 install, which is available on the Landmark LSM). Oracle Express Client or Oracle 10g Client 10.2.0.4 (32 bit)

Notes for Discovery on OpenWorks: The OpenWorks Full install 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.

Hummingbird Exceed is not required for the OpenWorks Basic install. If 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, with this install type the following components must be installed:

- Oracle Database Utilities 10.2.0.1.0 or Oracle client 11.2.0.2
- SQL*Plus 10.2.0.1.0, or Oracle client 11.2.0.2
- Oracle JDBC/THIN Interfaces 10.2.0.1.0, or Oracle client 11.2.0.2
- Oracle Net 10.2.0.1.0, or Oracle client 11.2.0.2

After these Oracle components are installed, run the upgrade patch to Oracle 10g 10.2.0.4 (32 bit)

GeoGraphix Project Server

Operating System Requirements		
Supported Operating System	**RAM**	**CPU**
Windows® Server 2008 R2 Standard x64 or Windows® Server 2008 R2 Enterprise x64	8 GB Minimum 16+ GB Recommended	Pentium 4x64 class or better Multiple (2-4) processors/cores
Notes		
Note – We recommend using the latest Microsoft service packs and security patches.		

Additional Requirements and Recommendations

- DVD-Rom required for media install. Download install available.
- DCOM/Firewall must be configured to allow remote access

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 or fiber connections 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 project size, number of users, and other load consideration. 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 LMKR 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.

LMKR performs 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, LMKR performs compatibility testing 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 LMKR does not anticipate any integration issue, In these cases it is recommended that customers also verify compatibility in their own environment.

LMKR supports the versions listed as Release in the table. However, while LMKR has completed compatibility testing, LMKR/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, LMKR/GeoGraphix Support works on a best effort basis to troubleshoot any issues, and if an issue needs additional attention, LMKR/GeoGraphix Support reports such issues to LMKR Research & Development. LMKR/GeoGraphix Support 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 LMKR Technical Support Solution Document KBA-65218-F9D7D5.

Compatibility Table

		Discovery on OpenWorks						
	OW License 5000	DOW License 5000.02						
	GeoGraphix Version	2014.0	2013.0	2012.0.0	5000.0.2.5	5000.0.2.1	5000.0.2.0	5000.0.1.1
	OW 5000.8.3.01	**C**						
	OW 5000.8.1.1		**R**					
	OW 5000.8.0.0			**R**				
	OW 5000.0.3.5			C	**R**			
	OW 5000.0.3.0			C	C	**R**		
	OW 5000.0.2.9			**U**	**U**	**U**	**U**	
	OW 5000.0.2.8			**U**	**U**	**U**	**U**	
	OW 5000.0.2.7			**U**	**R**	**R**	**R**	
	OW 5000.0.2.2							**R**
	OW 5000.0.2.0							
	OW 5000.0.1.7							
	OW 5000.0.1.6							
	OW 5000.0.1.5							
	OW 5000.0.1.4							
	OW 5000.0.1.2							
	OW 5000.0.1.1							
	OW 5000.0.0.3							**R**

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 2014 release.

GeoGraphix Pro

GeoGraphix Pro is a licensed upgrade to the GeoGraphix software and requires the purchase of a separate license.

Advanced 3D visualization (Pro 3D)

Gain a better understanding of your reservoir with Fence Diagrams. Utilize existing PRIZM templates or lathe displays. Use interpolated log curves to predict reservoir character between wells. Lithology fill provides quick and easy geomodel clarity. Leverage all available data with integrated seismic attribute backdrops. Scene persistence streamlines the interpretation and visualization workflow. Seismic section displays track the wellbore exactly. Easily define your 3D visualization area of interest and content by selecting from your working map view.

Field Planning

Features include: New Pad design capabilities: Set number of slots and wells per pad site, orient slots and set slot spacing. Create proposed track plans for all wells on a pad. Select heel and toe targets, and set target offset above or below a surface. Field Planning calculates well “sticks” and analyzes multiple Field Plan scenarios.

Create pad location and well spacing scenarios. Analyze scenarios without saving to the database. Create proposed wells only when needed and view Field Plan pads and proposed well locations on a single GeoAtlas Layer. Save Field Plan scenarios as separate layers for easy management.

GeoAtlas

Esri ArcGIS and ArcSDE 10.1

In addition to supporting ArcGIS10.0, GeoAtlas now provides support for ArcGIS and ArcSDE 10.1.

Applying Thematic Mapping to Deviated Wellbores

By applying thematic mapping you can color-code deviated wellbores on WellBase Layers, in order to visually identify them on a map, based on attributes of your choice.

Applying Thematic Mapping for Well Pads based on Pad Type & Parcel

Thematic mapping for well pads has been introduced in this release. Applying thematic mapping lets you color-code well pads on WellBase Layers, in order to visually identify them on a map.

Cursor position coordinate system

The Cursor Position Coordinate System is a new feature which lets you view and edit information about the coordinate system at the position of the cursor on the map. This system defines the information used by GeoAtlas to display the map coordinates of the cursor position on a continuous basis.

DepthRegistration

Truncate or Pad Well IDs on import.

Starting with the 2014 release of DepthRegistration you can Trim or Pad the number of characters in the Well ID during import. The trim/pad feature is available for all import formats (GGX DRA files, MJ Systems REG files, TGS SIF files, and Petra LIC files). The control for the Trim/Pad feature is located on the import dialog box for each file format.

Padding or Truncating Well IDs will ensure that raster logs will be associated with wells in the project even if the import file contains fewer or more digits defining the existing Well ID.

Import Image Files if the UWI is Not Present in the Database

A checkbox on the import files dialog box for all available formats (GGX DRA files, MJ Systems REG files, TGS SIF files, and Petra LIC files) allows you to import image files even if there is no matching UWI in the data base. In these circumstances, a well will be created using the UWI in the import file and the image file will be associated with the new well.

PRIZM

Larger User Defined Equations Text Window

The Edit User Defined Equations dialog box has been modified with the ability to show the User Defined Equations pane on the entire dialog box instead of on the lower half only.

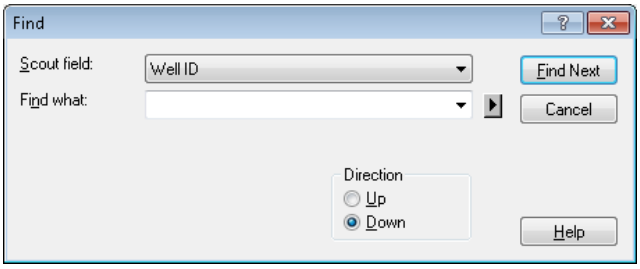
A button has been added just above the User Defined Equations pane that toggles the pane onto the entire dialog box or onto the lower half, allowing you to view more of the petrophysical model.

Increase UDE Font Size

The font size of the User Defined Equations box on the Edit User Defined Equations dialog box can be increased or decreased using the buttons located just above the User Defined Equations box.

Find Well Utility

The Find function is new to PRIZM version 2014.0. Click the Find button on the Open Well dialog box in PRIZM to open the Find dialog box.



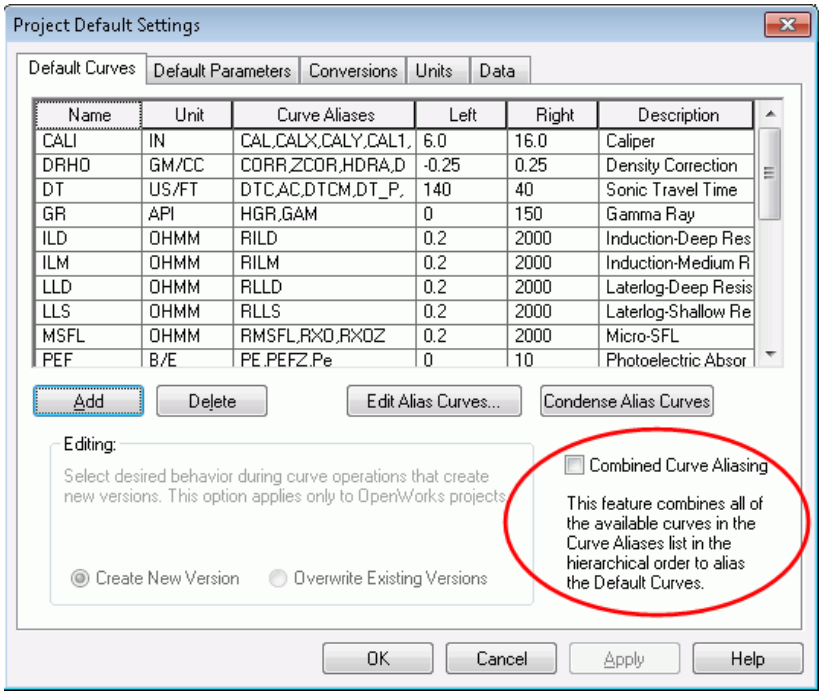
Use the Find dialog box to search for a specific well in the Open Well list. The Open Well list can be expanded or limited using the CurveSet, Show All wells, and Filter settings on the Open Well dialog box.

The Find dialog box searches for any of the columns on the Open Well list (Well ID, Operator, Well Name, Well Number, TD and Datum Elevation).

Combined Curve Aliasing

On occasion, several different logging runs can be made in a single well at increasingly deeper depths, measuring a single type of log but with different mnemonics depending on the logging company. This is more frequently the case in horizontal wells.

The Combined Curve Aliasing feature was added to the Default Curves page of the Project Default Settings dialog box (Project >> Default Settings).



This feature allows you to combine differently named logs into a single log. For example, the Gamma Ray curve (GR) may consist of three different logging runs at overlapping depths, which are called GR1, GR2, and GR3. All three of these curves can be combined into a single GR curve based on the hierarchy set in the Curve Alias column on the Default Curves page of the Project Default Settings dialog box.

Log Bad wells during LAS Import

If a bad or corrupt LAS file is encountered during an LAS import (either Single Well or Multi Well), the import routine will write a message to a log file in the project folder instead of stopping the import and asking for resolution of the problem.

For Multi Well imports it doesn't matter which Import Option is selected, the behavior is the same in that all wells will be imported before the message informing you of import errors appears.

This change was implemented to streamline the imports and decreases load times. The log file contains information about the date and time of the failure, the Well ID and a reason for the failure.

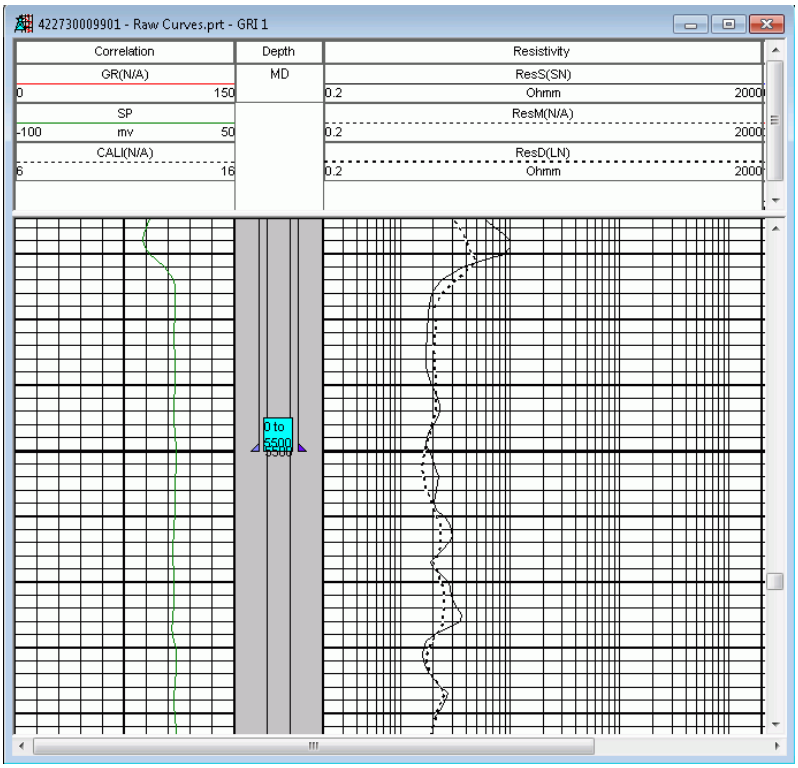
Unlimited Number of Curve Data Statistics Parameters

You can now include an unlimited number of Parameters on the Curve Data Statistics dialog box.

Previously, the number of parameters was limited to five. By calculating more parameters at once, the workflow is streamlined and your productivity is increased.

Casing and Liner Symbols in Log view

You can now post casing and liner schematic symbols on the Log View in PRIZM. New options have been added to the Edit >> Data Postings list, which include casing and liner.



You can justify the posting on the left or right side of the track. The casing posting shown above was posted twice in the Depth Track, once on the left and once on the right, with annotation on only one posting.

Option to Not Import Header Data on LAS/LBS Imports

Starting with GeoGraphix Release 2014 there is an option on the Import Wells dialog box (File >> Import >> LAS/LBS Import) to either fill in empty fields on the WellBase Header or ignore the data on the LAS/LBS file. Existing data on the WellBase Header will never be overwritten by the LAS/LBS import, however this option allows you to either fill in empty fields with data on the import file or not.

SmartSECTION

COSMO 8.3

The latest version of COSMO, the underlying modeling engine for smartSECTION, has been incorporated into the software. This change is mostly hidden from users but takes advantage of the latest COSMO features and bug fixes.

Migrate Projected XSection cross section to smartSECTION

Starting in GeoGraphix Release 2014 you can move projected cross sections from XSection to smartSECTION using the XSection Converter. Previously the XSection Converter could convert only Well to Well cross sections into smartSECTION format. This feature facilitates moving the inventory of XSection cross sections to smartSECTION. It also preserves your investment in the XSection interpretation for use in smartSECTION

Surface Point Editor

The name of the Data Point Editor dialog box has been changed to the Surface Point Editor to more precisely represent the dialog box use.

This dialog box can be used to set depth of Surfaces, Faults, and Unconformities, and record the Vertical Separation (for Faults) and Missing Section (for Unconformities).

The Surface Point Editor dialog box is accessed in Cross Section view by selecting an editable surface then selecting Edit Current Selection from a right-click menu. In Map View the surface Point Editor is available from a right-click menu when an inter well point is selected.

Move Inter Well Points Using the Keyboard

In cross Section View, Inter well points can be moved using the arrow keys or the Page Up/Down keys on the keyboard.

Highlight an inter-well point. Then hold down the Shift key and press the arrow keys or the Page up or Page Down keys. The Up/Down arrows move the point one depth unit up or down. The Page Up or Page Down keys move the point up or down 10 depth units. The left or right arrow keys move the point laterally by 10 depth units.

Show/Hide Wells in Cross Section View

A new feature in smartSECTION allows you to hide wells and inter-well points in Cross Section View without having to remove them from the cross section. This feature helps viewing multiple deviated or horizontal wells with the same surface location.

Eyeball icons have been added to the **Cross Section Display Preferences – Wells/Logs page**, the **Cross section View Wells page** and a menu command has been added to the shortcut menu in **Cross Section View** when a well or inter well point is selected.

The wells and inter well points can be turned on or off by clicking the eyeball or selecting the menu command.

Launch XSection from smartSECTION Cross Section View

Starting with GeoGraphix Release 2014 you can open a smartSECTION cross section in XSection.

A menu command has been added to the shortcut menu in Cross Section View, the shortcut menu in Map View when a line of section is selected on the map, and the shortcut menu in the Map View tree pane.

With this feature, you can quickly pick tops in XSection and refresh the smartSECTION/FrameBuilder geomodel at will.

New Interpretation – Getting Started Dialog box

When smartSECTION is launched in GeoGraphix 2014, a **New Interpretation – Getting Started** dialog box automatically appears. This dialog box is designed to help new users of smartSECTION who are unfamiliar with the setup options. Use this dialog box to select options for loading wells and selecting surfaces and faults to include on the interpretation.

Layer Transparency

You can now adjust the transparency of surface and attribute layers in smartSECTION so that layers and entities below the surface or attribute layer are visible in Map View. A slider bar has been added to the **Fill Page** of the **Contour Options** dialog box, which is accessed from a right-click menu when a layer is selected in the Tree Pane in Map View.

Line of Section Color Weight and Style

With the 2014 release of GeoGraphix you can customize individual cross section line of section display to distinguish their appearance in Map View. This control is available from a right-click menu command when a cross section line is selected in Map view, from a right-click menu on the Tree Pane in Map View or from a shortcut menu in Cross Section View.

IsoMap Layer Data Points as Surface Points

In SmartSECTION 2014.0 you can use IsoMap layer data points as a source for the surface in smartSECTION. This option allows you to combine IsoMap data points with WellBase picks to triangulate the FrameBuilder modeled surface. This feature is implemented on the Surfaces page of the GeoSurface Model Properties dialog box.

This feature allows you to integrate depth converted seismic data or data from third party applications with the formation tops in WellBase to create a surface in smartSECTION.

IsoMap Layer Data Points as Fault Source

In a similar manner to the IsoMap data points as surface points in smartSECTION, you can also use IsoMap faults combined with WellBase faults to triangulate fault planes in FrameBuilder. This feature helps to integrate depth converted faults from SeisVision with smartSECTION. This feature also supports importing faults from third party applications into smartSECTION with FrameBuilder.

IsoMap Layer Name Displayed in smartSECTION Tool Tip

Starting with smartSECTION version 2014.0 the name of the IsoMap layer is displayed in a Tool Tip in the Correlations/Unconformities listing in the Tree View in Map View. This feature allows you to identify the source of the data used in the FrameBuilder model.

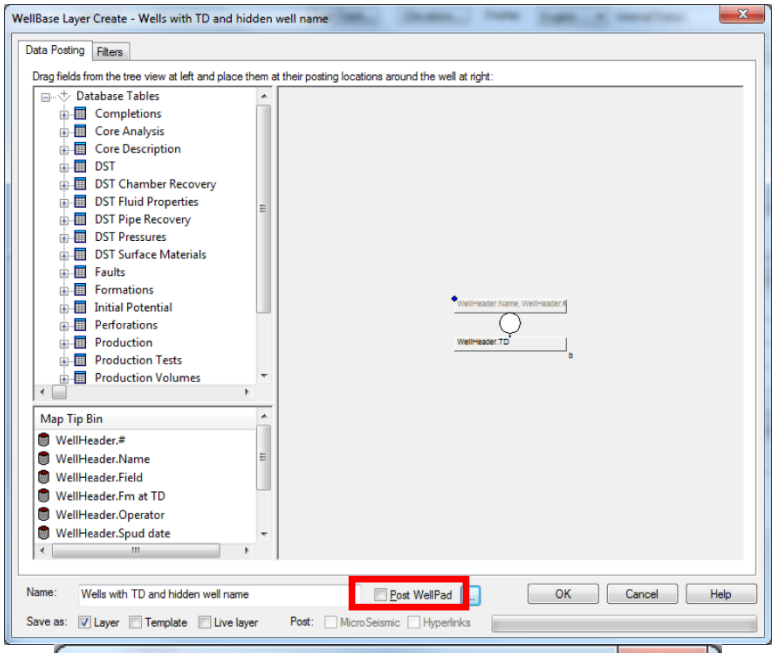
The check box to toggle on or off the Tool Tip is located on the User Preferences dialog box on the Cross Section and on the Map View page.

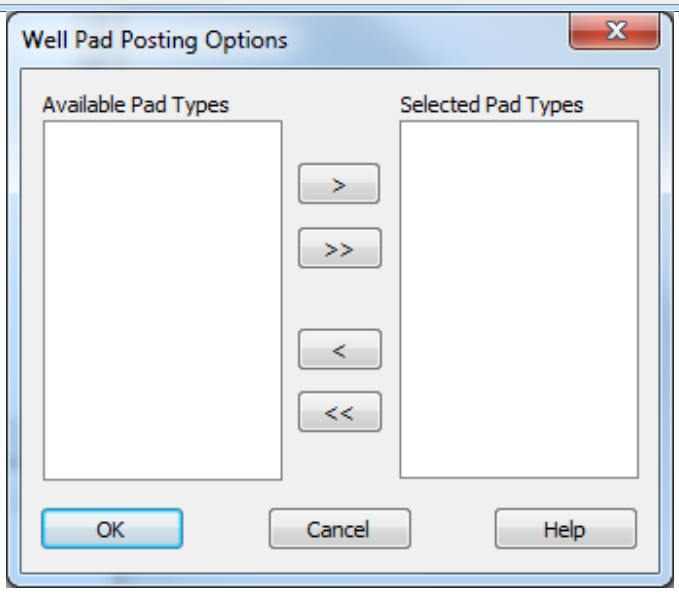
When the toggle is on for the Cross Section View the Tool Tip appears when you hover the cursor over the IsoMap layer name on the Surfaces tab. When this feature is turned on for the Map View the Tool Tip appears when you hover the cursor over the IsoMap layer name in the Tree View Pane of the Map View window.

WellBase

WellPad Posting Options dialog box

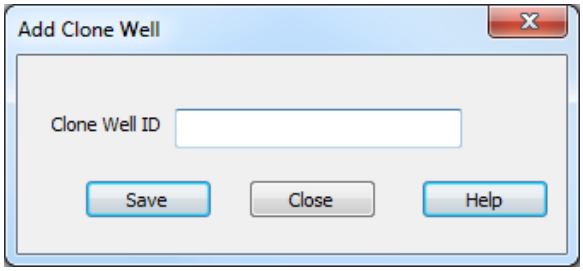
In the new release The **Well Pad Posting Options** dialog box in WellBase lets you post well pads to layers. You can post well pads to layers while creating layers or during a layer update.





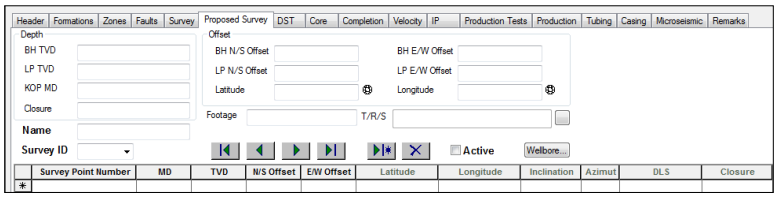
Ability to Clone a well

A new feature has been introduced in the release where you can Clone a well. You can also enter a unique ID for it and make changes to the data of the cloned well. Previously, data for a pilot well was exported, or migrated to the actual well. 'Cloning a well' eliminates the need to export pilot well data.



Proposed Survey Table

The Proposed Survey page has been added to the WellBase Information Manager. This page stores survey data for wells that are still in a proposed state. The Proposed surveys can be shown on a WellBase layer in GeoAtlas.



Import Data through Excel 64-bit

You can now import data into WellBase through Excel 64-bit, using the Import Spreadsheet command.

Batch Well Spotting on West Texas Polygon

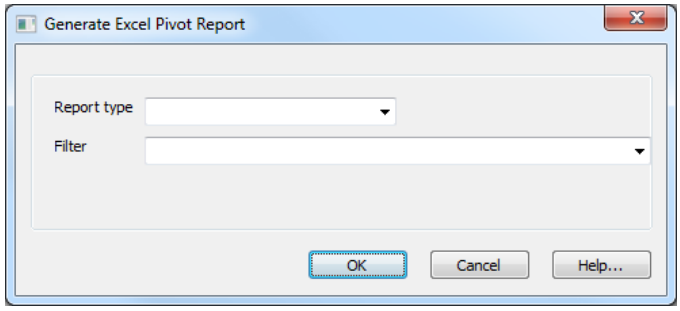
In WellBase version 2014.0 you can now perform Batch Well Spotting on a Texas Landgrid.

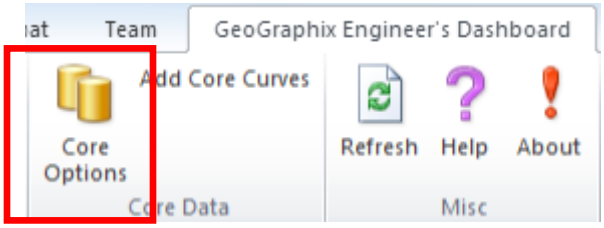
Engineer's Dashboard 64 bit

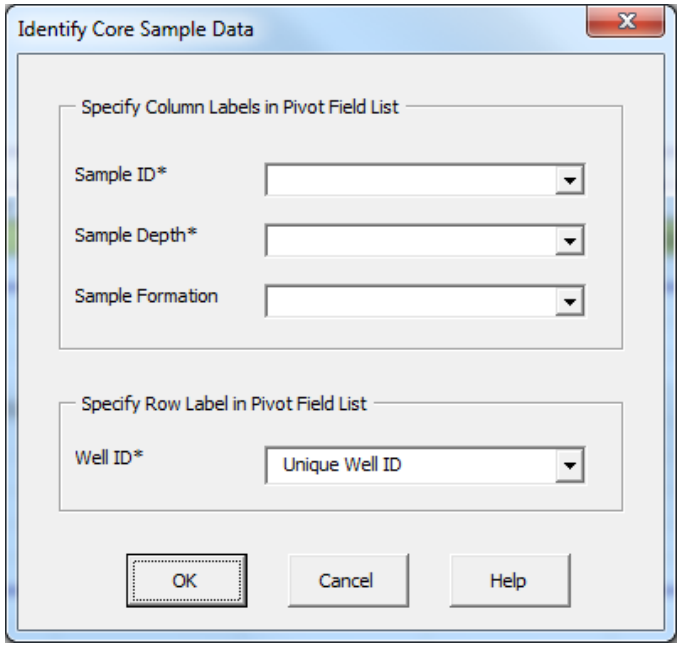
The 64 bit version has been introduced in the Engineer's Dashboard, which has enhanced performance.

Adding Core Sample Data to PivotTable Reports

Core Options have been added to the Pivot Table on the Engineer's Dashboard. The Identify Core Sample Data dialog box lets you add core sample data to PivotTable Reports. From the WellBase bar click Excel Report to open the Generate Pivot Report dialog box, where you can select the type of report to generate. On the GeoGraphix Engineer's Dashboard tab in Excel click the Core Options button to open the Identify Core Sample Data dialog box, where you can record core samples.







Updating existing GeoAtlas layer

You can now update an existing GeoAtlas layer when you save a bubble map or pie map layer on the Engineer's Dashboard.

SeisBase

Import Data through Excel 64-bit

You can now import data into SeisBase through Excel 64-bit, using the Import Spreadsheet command.

LeaseMap

Import Data through Excel 64-bit

You can now import data into LeaseMap through Excel 64-bit, using the Import Spreadsheet command.

QueryBuilder

Filter on Perf Cluster and Stage data

In the latest release, on the **Perforations** table you can filter on two new fields, **Perf Cluster** and **Stage**. By filtering on these fields you can create queries specific to horizontal well hydraulic fracturing perforations or quickly determine which wells have perforation stages and clusters.

Filter on Well Treatment data

The **Well Treatment** table is new to QueryBuilder 2014. By filtering on the contents of this table, you can create a filter based on several fields that pertain to unconventional treatment data, such as fracture dimensions, treatment type, injection volumes and proppant types.

Filter on New Core Analysis data

In QueryBuilder version 2014.0 new fields have been added to the **Core Analysis** table, allowing you to filter based on Total Organic Carbon (TOC), Vitrinite Reflectance (Ro), Poissons Ratio, Bulk Density, Youngs Modulus, Clay Percentage as well as 15 new user defined fields (user11 to user25).

Filter on Formation Group

With the latest release of QueryBuilder you can build a filter on the **Formation Group** of the Stratigraphic Column Manager. Using this feature you can create a well filter based on the stratigraphic group that your wells intersect.

Auto Complete Combo Box

The **Active Filter** List offers an autocomplete feature in QueryBuilder which predicts the word or phrase you want to type after you have typed the first letter of that word or phrase. This helps you find the filter you are looking for without having to scroll through a list of several filters.

Set Operation Dialog box. Sorting with Date and name

The **Set Operation** dialog box now sorts the filters on the basis of name and modification date. This helps you easily find the desired filters.

XSection

Alphabetically Sort Vector/Raster Templates and Raster Images

Starting with the 2014 release of XSection, the Vector Templates, Raster Templates and Raster Images are listed on the **Select Default Template or Image** dialog box in alphabetical order. The Select Default Template or Image dialog box is accessed by clicking the Select button next to the Log or Raster template box on the Wells/Logs page of the Edit Cross Section dialog box.

Hide Wells in Cross Section view

The Well List Grid on the Wells/Logs page of the Edit Cross Section dialog box has been expanded to include a Show check box for each well on the cross section. You can now hide or show individual wells along the cross section using these tools.

Individual wells can also be hidden in XSection using a new **Show Well <Well ID> in Cross Section** menu command, which has been added to the General Right-Click Shortcut Menu.

This is extremely useful if you are viewing several horizontal wells from a drilling pad or deviated wells on an offshore platform

SeisVision

64-bit SeisVision

SeisVision is now available as a 64 bit application, enabling it to fully leverage larger amounts of memory. This will provide significant performance benefits and improved stability, especially when working with large seismic volumes.

Depth Conversion (Velocity Modeling)

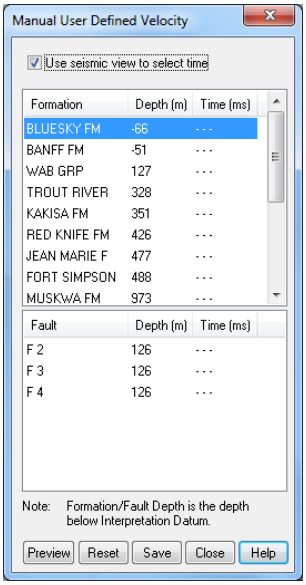
Multiple enhancements have been made to enable more accurate velocity model generation and lay the foundation for additional improvements in coming releases.

- A new **Velocity Manager** assists users with management of their velocity models and provides a more consistent application of velocity models for various time-depth conversion operations
- Two new velocity modeling methods are introduced. Both better accommodate lateral variation in velocities, and use gridded surfaces instead of triangulation, resulting in elimination of non-geologic artifacts.
    - **Horizon/Formation Based Velocity Models** use time horizons and associated formation tops to derive velocities at the wells, and are structurally guided, using the time horizons to guide the generation of the velocity models.
    - **Structurally based Velocity Models** use the time horizons and existing time-depth charts to derive velocities at the wells, with the time horizons providing structural guidance for the models. This method is better suited when well data enables accurate time-depth chart generation through synthetic seismograms.
- Depth conversion of time data and the display of well data in time can be based on the velocity model

Additional enhancements to velocity modeling include the next two items described below:

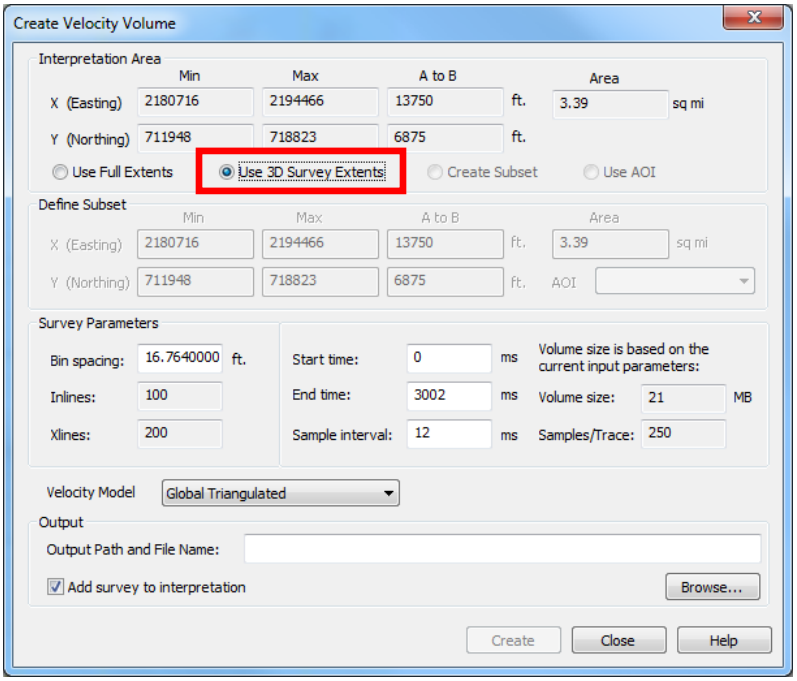
Fault Time-Depth list pane in User Defined Velocity

An option has been added to the **User Defined Velocity** dialog box, which allows you to manually assign times to fault cuts picked in wells, so that time-depth pairs for well faults can be added in the User Defined Velocity Survey.



Use 3D Survey Extents

The **Use 3D Survey Extents** option has been added to the **Create Velocity Volume** dialog box. When this option is selected, only the area within the 3D survey extents is selected for calculating the Velocity Volume. You may also create a velocity model using the full extents of all 2d and 3D surveys.

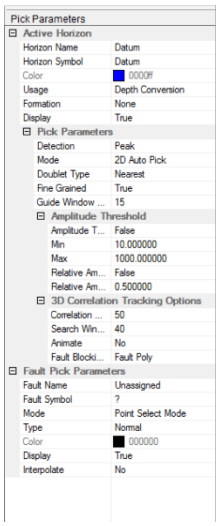


Improved Well Loading Performance

The up-front well loading time when opening SeisVision has been reduced significantly, allowing you to be productive more quickly.

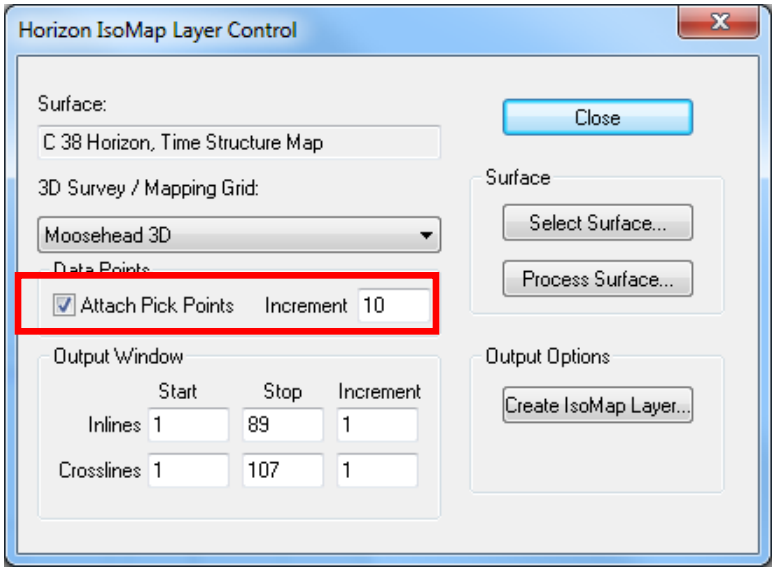
Pick Parameters Panel

The **Pick Parameters Panel** option has been added, providing you easy access to all horizon and fault picking parameters, streamlining the interpretation workflow



Attach 2D/3D Pick Points

The **Attach Pick Points** option has been added to the **Horizon IsoMap Layer Control** dialog box, which attaches the Z values of the SeisVision horizons as data points in the IsoMap layer.



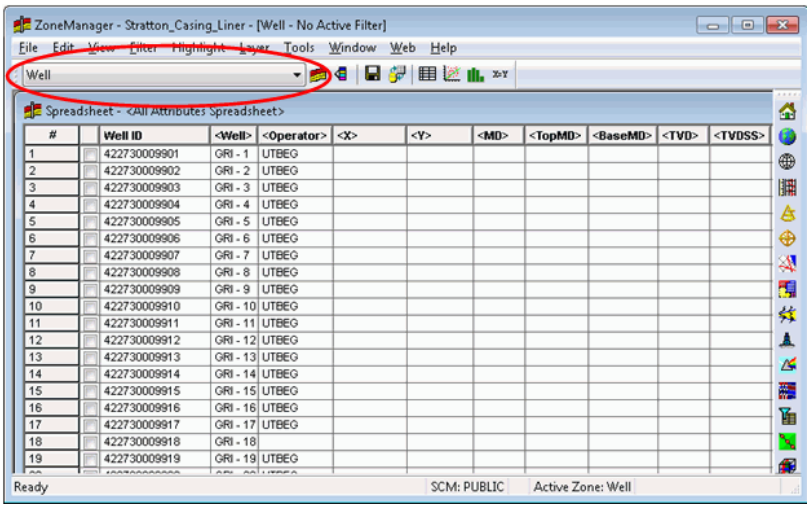
SeisVision - Create Cross Section in smartSECTION

The creation of corresponding cross-sections in smartSECTION from SeisVision displays has been made more precise and efficient. The wells are now displayed on the projected line of section, which shows the end points of the projected line of section. Previously, the line of section was created only from well to well.

ZoneManager

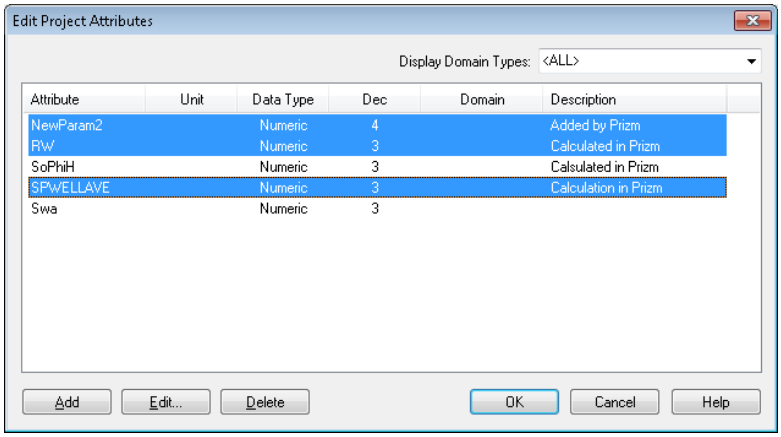
Larger Zone Dropdown list box

The Zone dropdown list box has been made larger in ZoneManager 2014.0. This change accommodates very long zone names.



Delete Multiple Attributes

You can now select multiple attributes for deletion on the Edit Project Attributes dialog box. This feature streamlines the ZoneManager workflow.



Larger font size on the Equation Editor

The **Equation Editor** in ZoneManager now has buttons that allow you to increase or decrease the font size of the equation shown on the Define Equation box.

The Increase Size button  and the Decrease size button  will change the font size so that the equations are easier to see.

Fixed Issues

Following customer reported bugs were fixed in this release.

ID	Title
DefCon	
41087	DC - Enerdeq import does not work. Import/Export throws exception.
33597	DC - Import Top MD/Top TVD and batch calculate surveys with “hold TVD constant”. Wellbores are straight after the batch calculation.
52149	DC – Reimporting HIS 297 file using the Regular import (not Batch Import) and using the “Preserve All” and Do Not Calculate” options causes null bottom Hole Lat, Long values in the survey Header record.
52167	Importing HIS 297 files into wells that already contain “T” records will re-calculate the survey during import.
GeoAtlas	
37751	Multiple overlapping satellite images show correctly in GeoAtlas, but when printed, only the top layer is printed.
41086	Conditional Pies for "Wells with Digital Logs" do not show on map in GeoAtlas. This defect is project specific.
39091	GeoGraphix is unable to open and use ArcGIS objects if the license used is an ArcEditor license.
41084	Hiding and removing layers from layer selection bar in an already opened map is causing GeoAtlas to consume more RAM.
43316	Import – Esri ArcGIS – ArcGIS SDE layer connect – ArcSDE Connection - Connection with ArcSDE server is producing a “DBMS Table not found error”.
41079	Importing IHS 297 well data using the Bulk Load option causes the Virtual Conditional Pies feature to not work properly.
31848	The Copy Coordinates dialog box transposes the northing and easting coordinate values when placed in the Clipboard Coordinates fields. i.e.Northing ends up in the easting field and easting ends up in the northing field.
46098	Volumetrics calculations run very slow with small IsoMap grid spacing.
39564	Fill as inset border option for polygons causes entities to disappear from map view (entities do not draw).
51218	Spanish Regional Settings cause incorrect version of Esri run Time causing a crash.
47415	GeoAtlas crash if LYR is linking to unavailable SDE data in the .gmp file.
48289	GeoAtlas crash if WMS layer is pointing to old or invalid URL in the .gmp file
30169	WMS Layer Connect list available layers twice in Data Source Selection dialog box.
IsoMap	
40207	Faults on an IsoMap layer from a DEPTH seismic interpretation do not have an associated data attribute.
41089	IsoMap is not honoring the source hierarchy and the observation numbers for a single source to calculate the grid.
LogM	
46751	LogM application crashes when opening a large size cross-section file.
46760	Saved Cross Section will not open in editxsec and the application crashes.

PRIZM	
39924	Long filter names in PRIZM Filter dialog box are not visible.
42356	Changing a parameter in the PRIZM parameter table in a metric project causes the application to crash.
41365	Selecting a curve set in the Curve Set drop-down list box in the Curve Data Statistics dialog box does not filter the wells to wells in that curve set.
47708	Interval curves are not added to the Curves list in the User Defined Equations dialog box.
30918	Option added to not import Well Header data into empty fields in WB on LAS imports.
42357	PRIZM crashes when clicking cancel after using evaluate button in UDE set.
42444	PRIZM filter: Wells W/Curves and Formation Tops is very slow.
41082	Curve Data Statistics calculations using TVD crashes on some deviated wells.
41076	After picking tops using a particular source, picks from other sources cannot be shown in Log View by moving the source to the top of the source hierarchy.
41085	On the Curve Data Edit dialog box the Source field is not populated for imports after the first import that makes Import 1 the active curve set.
44589	TVD depths are calculated incorrectly in PRIZM when deviation > 90 degrees.
39634	When installing a PEM, the status is not given if the registration fails.
17065	PRIZM will not add PEM external files in Windows 7.
42515	Incorrect values in exported TVD LAS file.
49439	Input file curves on the Curve Set dialog box are not totally visible because the dialog box is inactive after LAS import into well with existing LAS curves.
48937	Mud weight and logging company fail to come in on LAS import.
smartSECTION	
44904	Data Postings do not display at the bottom hole location for deviated wells.
43418	Reload of a single well reloads prt updates for other wells after the template is changed.
45312	When a vertical section is created, the LOS is drawn between the XY of TD and max TVT if the max TVT = XY of TVT
SeisVision	
42769	Create IsoMap Layer operation on layers with faults causes SeisVision to crash.
41083	SeisVision Initialization issue on startup
47002	Data is dislocated in Depth Interpretation on upgrading interpretation from older version of SeisVision.
41566	Faults exported out in SeisWorks format do not import into SeisVision
42772	Server Busy Error when opening SynView (project specific).
52213	Snap Up or Down does not work properly when using Local Min/Max.
52548	When opening seismic lines they appear off of the SeisVision window to the right.
40207	Faults on an IsoMap layer from a depth interpretation have no data attribute.
WellBase	
40660	ASCII4 import. Core Analysis User 24 is not imported.
33598	Batch Survey Calculation - Hold TVD constant - Formations with TVDs deeper than BH TVD of well have top MDs calculated.
46143	Copy/paste to survey table is slow.

46902	Edit WellBase header and null Status and Classification fields populate with "UNKNOWN" on commit.
48887	PA - Production Analysis Graph is not calculating EURs and RRs with valid production streams.
44340	PA - Production Graph displays X axis / date grid line is drawn in wrong position.
33306	Performance issue (slow) on launching 'Pick Inventory'.
42625	Satellite viewer displays incorrect location when viewing well by right click >> Send well(s) in satellite viewer.
14434	Scout Ticket View displays the county code instead of name after project upgrade.
47886	WB > Zones tab - when highlighting a couple of rows of attributes and pressing the delete key, WellBase gives an error that won't go away.
42386	WB/DC – When importing data via Defcon. gxi and previously calculated surveys are corrupted.
46366	WellBase Spreadsheet import does not import Well Survey Dir.
42386	Import data using Defcon*.gxi causes previously calculated surveys to become corrupt
52166	Engineer's Dashboard – Wells appear multiple times in the Excel Pivot Report raw data if the Bottom Hole has a legal location.
48888	DOW – Use5r with Managerial rights cannot access the Source Lists created by another user having Interpreter rights.
30989	ASCII 4 format – Document Library is not included in export or import.
WellXChangePlus	
50282	Performance when transferring deviation surveys from OW to GXDB has been improved.
46739	WellXChangePlus gives the error "WELL_UWI invalid identifier" when transferring data
41640	WellXChangePlus error "Option Value Changed" when transferring curves either to or from OpenWorks.
XSection	
17177	Allow user to multi select wells in a cross section and remove them all at once.
41090	Correlate Formation Picks tool is leaving a ghost image after closing the tool.
41080	Log indicator for Vector wells not present unless set to <Field Data.
40754	Moving certain tops in stratigraphically hung section causes logs to jump to the wrong elevation.
42146	Unknown SEH Exception and Access Violation.
42118	XSection must be closed and reopened to see changes to UDE or curve aliasing.
41054	XSection must be closed and reopened to see newly imported LAS file.
Zone Manager	
41081	Zone Manager attributes disappear when a filter is applied to zone.
32833	Zone Manager IsoMap import fails when DB/Map Coordinate System of IP project does not match Database/Map CS of main DOW project.
32777	Zone Manager IsoMap import fails when Map CS does not match Database CS on DOW project.

Depth Registration, Excel Import. Query Builder and SynView	
41533	DR - update help files to make clear straightened images are not saved.
46366	Excel Import - WB Spreadsheet import for “Well Survey Dir” does not import.
26215	QB - Query Builder is not able to run Query based on Log Curve Name and Minimum Valid Depth
42772	SynView - Server Busy Error when opening SynView on some, but not all user projects.

Known Issues

Following is a known issue in this release and is a work in progress.

ID	Issue	Workaround
42491	smartSECTION: Adding several IsoMap layers for surface sources all at one time on the GeoSurface Model Properties dialog box, can cause an instability in FrameBuilder. And produce error messages.	Click the Apply button after adding each IsoMap source layer.

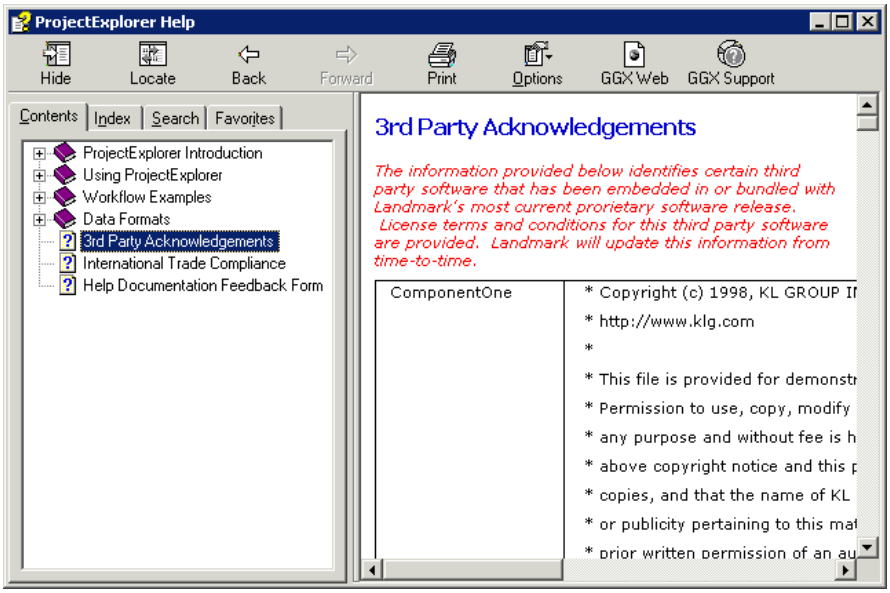
Third Party Applications

Halliburton and LMKR use various third-party applications in the development of its software.

Halliburton and LMKR acknowledge that certain third party code has been bundled with, or embedded in, its 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. To access the third party applications:

1. In any GeoGraphix application select Help >> Contents.

2. On the Help window contents page locate the Third Party Acknowledgements Help topic as shown below.



International Trade 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 ECCN's provided in Release Notes represent Halliburton's 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:

FHOUEXP@halliburton.com

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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.

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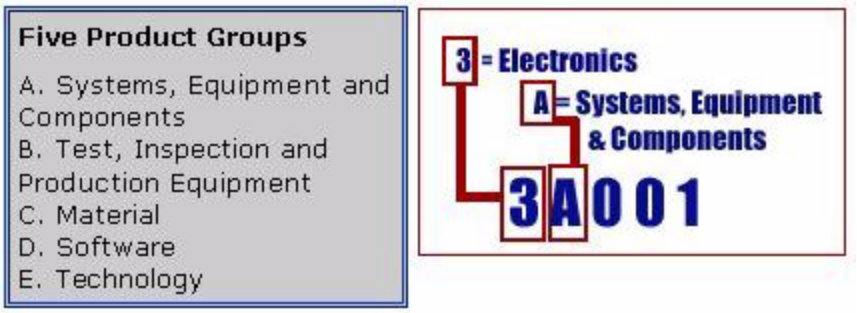

The ECCN Number, License Type, and the CCATS Numbers for this product are included in the table below. Also included is the date the table was last updated.

Product/Component/R5000	ECCN Number	License	CCATS Number	Last Date Updated
Discovery	5D002	ENC	G063964	11/5/2009
Landmark Software Manager (LSM)	5D002	ENC	G058319	2/11/2008
OpenWorks	5D002	ENC	G054746	2/11/2008
LMKR License Manager	5D002C.1	ENC	G055172	6/19/2012

Contacting Technical Support

If you have questions or issues that cannot be answered by the LMKR Help Systems, you can contact LMKR Customer Support via web: support.LMKR.com , email: support@lmkr.com or telephone at our various worldwide office locations:

The Americas	Europe, Middle East & Africa
8am-6pm CST [Monday – Friday] *Excluding bank holidays Toll Free (US/Canada): + 1 855 GGX LMKR Colombia: + 57 1381 4908 United States: + 1 303 295 0020 Canada: + 1 587 233 4004	UAE (Dubai GMT+4): 8am - 5pm [Sunday – Thursday] *Excluding bank holidays + 971 4 3727 999 UK: 8am - 5pm [Monday - Friday]*Excluding bank holidays + 44 20 3608 8042 Egypt: [Sunday – Thursday]*Excluding bank holidays + 0800 000 0635
Asia Pacific & Australian Continent	**Southwest Asian countries**
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Landmark Support Portal	http://css.lgc.com/InfoCenter/index?page=home
Landmark Software and Services home page	http://halliburton.com/landmark
SyBase home page	http://www.sybase.com
Microsoft SQL Server home page	http://www.microsoft.com/sqlserver
Oracle home page	http://www.oracle.com

LMKR Holdings
16th Floor, The H Dubai Office Tower,
One Sheikh Zayed Road, Dubai,U.A.E. P.O. Box 62163
Phone: +971.4.3727.900 Fax: +971.4.3586.386
Internet: www.lmkr.com/geographix