

Enhancements, New Functionality, and Fixed Problems

Release 5000.0.0 contains major changes and new functionality. The primary new functionality for the Classic applications is the incorporation of the new Seismic Data Management functionality in OpenWorks. It offers a high value to the management of seismic data in the end application.

This section includes enhancements for many of the Release 5000.0.0 products that will be released throughout 2008. It also contains new functionality and fixed problems for the products.

Because OpenWorks enhancements are among the most far-reaching, they are listed first. After OpenWorks, the products are grouped according to business lines and listed alphabetically within the groupings. More details of new functionality can be found in the New Features manuals or Release Notes for each point product.

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OpenWorks Release 5000.0.0

Seismic Data Management in OpenWorks

- **Integration.** Seismic data is more tightly integrated in the OpenWorks 5000.0.0 database. Some seismic data is catalogued and referenced in the OpenWorks database. Other seismic data is stored in the OpenWorks database.
 - Catalogued: seismic data sets, 3D horizons, and prestack and poststack seismic data
 - Stored: 2D horizons, misties, static shifts, horizon lists, and fault lists
- The Seismic Data Manager in OpenWorks 5000.0.0 allows you to:
 - Manage the data it previously did: 2D and 3D surveys.
 - Manage the seismic data listed above, which SeisWorks utilities managed in previous releases.

- **Seismic Project Manager Eliminated.** With the change in project structure in OpenWorks, and because seismic data has been integrated into the OpenWorks database, the Seismic Project Manager no longer exists in Release 5000.0.0. Project Administration in OpenWorks now performs all project management.
- **Project Data Transfer (PDT).** To support the new data stored in the OpenWorks database, Project Data Transfer (PDT) has also been enhanced to support the transfer of 2D horizons, misties, and static shifts.

New Interpretation Project Optimizes Project Administration

Project administration has been simplified and optimized in OpenWorks 5000.0.0. A project can now be a view or subset of another project, and the master and working projects in SeisWorks have been integrated into the new OpenWorks project structure.

- ***Views of an OpenWorks Project***

Projects have been renamed *project databases*. Each project database contains one or more interpretation projects. The interpretation projects are subsets or views of the data in the project database. Each interpretation project can have its own Cartographic Reference System (CRS) and lists of lines, surveys, and wells. With this new design, one copy of the data can have separate views, lessening the demands on computing resources and project and data administration. If data updates are needed, only the project database needs to be updated. Each interpretation project can be configured to automatically refresh the data in its view.

- ***SeisWorks Projects Replaced by OpenWorks Projects***

OpenWorks projects are restored into the database, and the data from the SeisWorks projects are restored to the location where seismic data is to be stored in the environment. When the OpenWorks project is upgraded to Release 5000.0.0 in Project Administration, the SeisWorks project information is integrated into the OpenWorks project database. Each of the working projects from SeisWorks can become an interpretation project of the project database, depending on the configurations chosen by the person upgrading the restored OpenWorks project.

Projects and Districts

- **The Ability to Separate Data.** OpenWorks and its database now directly support districts. Districts allow a company to separate OpenWorks projects and seismic data into more manageable and secure groups. They become especially useful when a company may have large numbers of projects and when a company wants to separate data by business unit for better data security or storage ownership.
- **Implementing Districts.** In an installation of OpenWorks, a company can decide whether it will implement districts or not. To implement districts, *dir.dat* and *owdir.dat* must be configured for each district, and a new file, *district.dat*, must be configured with the name of each district and the directory of each district's *dir.dat* and *owdir.dat*. Utilities, such as Project Administration and Project Status Tool, support districts in their interfaces. For example, when a user of OpenWorks creates a new project in Project Administration, part of the project configuration includes selecting the district to which it will belong.

Data Model Enhancements and Removed Tables

The data model in Release 5000.0.0 contains enhancements and removes unused parts of the OpenWorks data model.

- **Enhancements**

- Storage for seismic data (2D horizons, misties, static shifts, horizon lists, and fault lists)
- References to seismic data stored in flat files (seismic data sets, 3D horizons, and prestack and poststack seismic data)
- Each Well Master table now has a Well Location table assigned to it. This table allows well data to be more easily transferred between an OpenWorks database and the Well/Wellbore model of an EDM database.
- Storage for processing history
- Simplification of the fault plane trimesh model
- Storage for offset synthetics and vertical seismic profiles (VSPs) for Well Seismic Fusion
- Some validation (VC) tables have been converted to reference tables (R), and each reference table now has timestamp and source fields.
- Storage for interpretation notes
- Storage for interpretation sets
- Storage for 3D earth model frameworks
- Remarks attributes increased to 200 characters
- ID's generated with sequences not OW_UID_VALUES
- Data Dictionary (support for Reference Data Manager)
- Storage of additional list tables (grid lists, fault lists, and horizon lists)
- Support for automatic position log computation when adding directional surveys
- Support for automatic handling of tie points
- Simplification of the data model for Depth Team Express

- **Removed Tables**

- PDEN production data model: The PDEN tables have been replaced with the PDM tables.
- ARIES Reserves Management
- VIP simulation grids
- Gocad model BLOBs
- OpenExplorer tables
- OpenWorks culture model: These tables were replaced by ZGF files in OpenWorks R2003.

Development Kit Enhancements

The Development Kit for OpenWorks 5000.0.0 has been updated to:

- include functions to access the data in new tables of the OpenWorks data model.
- include functions to support data change messaging provided by Oracle's Streams Advanced Queuing.
- remove functions related to tables that have been removed.

The Development Kit is built with Microsoft's Visual Studio 8. For detailed information about changes in the Development Kit for OpenWorks, see the documentation included in the Development Kit. The Development Kit for OpenWorks is available separately from OpenWorks. Consult your Customer Support Representative for more information about acquiring the Development Kit.

Redesigned Data Management Utilities

OpenWorks 5000.0.0 includes several redesigned project management utilities and data managers.

- **Project Utilities:** Project Administration and Project Status Tool
- **Data Managers:** Data Domain Manager (now allows editing of the data dictionary as well as reference data), Curve Dictionary, Map Data Manager, Seismic Data Manager, and Well Data Manager

These new utilities and managers have the following benefits:

- Cross-platform Java applications, which do not require X Window System or Motif support in any operating system.
- Enhanced integration with more Landmark applications, because they are based on components from Landmark's DecisionSpace products.
- Powerful table functions that allow users to search, sort, view, and manipulate the data displaying in a project utility or data manager.

Private Interpretation IDs

Interpretation ID Manager replaces the Interpreters utility. The manager allows you to create interpretation IDs that are comparable to the names you would have created in the Interpreters utility, plus more.

- **New Tables for Searching, Editing, And More.** The interpretation IDs, along with their associated data, are presented in a table that allow you to sort, filter, and search the table; change the appearance of the table to make some data more prominent; and export rows of data to a file.

- **Editing IDs.** You can edit an ID in the table or in a form view.
- **More Room for Remarks.** The Description field in the Interpreters utility has become a Long Remark field that allows remarks of indefinite length.

Interpretation IDs can be public or private. Public IDs are similar to the names created in the Interpreters utility and are accessible by any user of the OpenWorks database. Private IDs allow you to create an ID limited to only certain users. Each user added to a private ID has one of three security levels: owner, manager, or interpreter. An asset team can manage one or more private IDs to fit the purposes of the team.

Support for Oracle Streams Advanced Queuing (AQ) for Data Change Messaging

OpenWorks now uses Pointing Dispatcher (PD) just for communications between its client applications. Oracle's Streams Advanced Queuing (AQ) now conducts data change messaging with the OpenWorks database.

Advanced Queuing has several advantages:

- **Communication.** Changes to the data in an OpenWorks project are reliably communicated to any application accessing the project across a network.
- **Monitoring Updates.** AQ allows Landmark applications accessing the OpenWorks database to more easily and efficiently monitor data updates from multiple workstations on a network in real-time.
- **Configuration.** Previously, PD sometimes required special configurations and environment variables for some applications to be able to receive notifications about data changes. With AQ, those configurations are unnecessary. If the application can communicate with the OpenWorks database, the application can receive data change notifications.
- **Faster Communication.** AQ messages can indicate the boundaries of a transaction with the database. The applications accessing the OpenWorks database can then commit a set of change messages at the end of the transaction instead of at each individual change. This capability speeds up communication with the database.

OpenWorks Users are Now Internally Authenticated Users

OpenWorks now uses the Oracle Secure Enterprise Password Store (Oracle Wallet) to store passwords to the database and to handle the security of the passwords.

When a new user is added to the OpenWorks database, the user is associated with the user's name in the operating system. When the OpenWorks user first starts an OpenWorks application, the user must provide a password to the OpenWorks database. The user name in the operating system and the database must be the same, but the passwords can be different.

When a user accesses an OpenWorks database with a web-based application, the application prompts the user for a user name and password. Then, access to the data is allowed.

Data Model Rationalization Between OpenWorks and Engineering Data Model (EDM)

OpenWorks now includes a table for well locations. Each wellbore (Well Master table) is associated with a Well Location table that relates to the well/wellbore data model in EDM. The new well data model in OpenWorks allows well data to be more easily transferred between Open Works and EDM.

Other Changes

- **Processing History.** OpenWorks now captures the data types of the input and output data and captures the parameters that transform the data from input data to output data. Specifically, the processing history retains interpretation knowledge and the context of the data. It allows you to revise interpretations with new data, and makes cleaning and archiving projects easier. It allows one team to easily hand off a project to another team, and can minimize productivity loss when the composition of an asset team changes.
- **Application Preferences.** In the rewritten utilities and managers, a user can save preferences. Besides user preferences, each application has default preferences, and some preferences can be set for the entire OpenWorks site.
- **New Error Logging Console.** In the rewritten utilities and managers, a Tools menu allows you to display the Error Logging Console. The Error Logging Console allows you to view errors as they occur without resorting to a terminal window, and to dynamically set the error reporting level for the console window and the error log file separately.
- **Updated Geographic Component.** Release 5000.0.0 includes components from GeoCalc 6.3 (from Blue Marble Geographics) for coordinate transformations.

Drilling and Completions

Engineer's Desktop (Entire Suite of Products)

- **Platforms and Databases.** The Engineer's Desktop suite of applications is now available on Windows Vista Enterprise for the 5000.0.0 release. Supported databases for 5000.0.0 are Oracle 10g, Microsoft SQL Server 2005, and Microsoft SQL Server 2005 Express.

AFE Management System to EDT Link

- **Platform.** AFE Management System to AFE Link is an application on Engineer's Desktop 5000.0.0. For this release, AFE Management System to AFE Link is available on Windows Vista Enterprise.

CasingSeat

- **Platform.** CasingSeat is an application on Engineer's Desktop 5000.0.0. For this release, CasingSeat is available on Windows Vista Enterprise.
- **New Default Tabs.** Tabs are saved at the Design level. In the past, tab layout was saved by individual users. Now when a Design is saved, the tab layout and content are saved as the default view setting for the Design. The new tab settings become the view for all other users who open the Design.
- **Internationalization.** CasingSeat is now designed to support regional settings in Windows.
- **Well Explorer Virtual Folders Added to the Well Explorer Tree.** These folders allow users to organize data items (such as Projects, Wells, Designs, etc.) in a customizable hierarchy that can be up to three levels deep.
- **OpenWire 2003.0.8.** It can be launched directly from the Well Explorer with a right-click menu command at the Database level.
- **Formations Added to the Associated Data Viewer.** They allow formations to be copied between Designs.
- **New Assemblies Added to the Associated Data Viewer.** They have copy/paste functionality: Casing. Not valid for Actual Designs.
- **Catalogs Added for Well Completion Components.** Support for these catalogs was added to OpenWells, PROFILE, WELLPLAN, and Catalog Editor.

COMPASS

- **Platform.** COMPASS is an application on Engineer's Desktop 5000.0.0. For this release, COMPASS is available on Windows Vista Enterprise.
- **Targets.** They can now be assigned to additional hierarchical data levels, including Project, Site, Well, Wellbore, and Design.

- **Printing.** It is now possible to print, or use print preview, from the Survey and Plan Editors.
- **Column Order on the Survey and Plan Editors.** It can now be changed.
- **Well Explorer Virtual Folders Added to the Well Explorer Tree.** These folders allow users to organize data items (such as Projects, Wells, Designs, etc.) in a customizable hierarchy that can be up to three levels deep.
- **Integrated WITSML v. 1.2 Support.** It allows the creation of OpenWire 2003.0.8 pipelines from the Well Explorer tree to load data into the EDM database directly from a remote WITSML server.
- **OpenWire 2003.0.8.** It can be launched directly from the Well Explorer with a right-click menu command at the Database level.

Data Analyzer

- **Platform.** Data Analyzer is an application on Engineer's Desktop 5000.0.0. For this release, Data Analyzer is available on Windows Vista Enterprise.
- **Metadata Update.** The Selection Tree metadata used for both Data Analyzer and the Data Validation feature within OpenWells (including EDM Administration Rule Book Editor) has been updated to reflect data model changes and additions that are new for this release. This includes being able to query data in the new Completions Catalogues, Multi-Wellbore Well Planning, and Oilfield Waste Management extensions to OpenWells.
- **Fixed Defects.** The following significant defects for Data Analyzer were corrected:
 - Defect #728645: Catalog Editor tree should be in sort order.
 - Defect #730022: Fluids (CD_Fluid) View should not be linked in when reporting on Stimulation Views.
 - Defect #735916: Graph Wizard Step 3 Dialog Name is incorrect.

OpenWells

- **Platforms.** OpenWells is an application on Engineer's Desktop 5000.0.0. For this release, OpenWells is available on Windows Vista Enterprise.
- **Planning of Multilateral Wells.** The Well Planning input form was enhanced to enable planning of multilateral wells, so that multiple wellbores and designs are now supported.
- **Completions Catalogs.** Enhancements were added.
- **Well Explorer Virtual Folders Added to the Well Explorer Tree.** These folders allow users to organize data items (such as Projects, Wells, Designs, etc.) in a customizable hierarchy that can be up to three levels deep.
- **Catalogs Added for Well Completion Components.** Support for these catalogs was added to OpenWells, PROFILE, WELLPLAN, and Catalog Editor.

PROFILE

- **Platform.** PROFILE is an application on Engineer's Desktop 5000.0.0. For this release, PROFILE is available on Windows Vista Enterprise.
- **Extended Planning and Reporting.** The primary focus for this release of PROFILE has been to extend planning and reporting for Completions and Multi-Laterals (OpenWells) through new Completions equipment catalog selection architecture and associated completions-related enhancements. The goal is to enable completions and well services teams to better document and manage completions from planning to installation and management through to abandonment. In addition to the catalog selection architecture, assembly and component description interfaces are extended so that additional information and supporting documentation can be saved with the data. In addition, PROFILE is now extended to support description and visualization of equipment attached to Casing and Completion assemblies.
- **Completion Catalogs Selection.** This feature is now enabled in the Well Designer Wellbore Equipment and Wellheads tabs. In the Wellheads tab, Completion Catalogs are grouped by wellhead components and hangers in accordance with Catalog Editor organization.
- **New Equipment Section Types.** To support better segregation of different types of completion tools, a number of new equipment section types with supporting component type lists have been added to the Landmark standard list of equipment for this release.
- **Well Explorer Virtual Folders Added to the Well Explorer Tree.** These folders allow users to organize data items (such as Projects, Wells, Designs, etc.) in a customizable hierarchy that can be up to three levels deep.
- **Catalogs.** They were added for Well Completion components. Support for the catalogs was added to OpenWells, PROFILE, WELLPLAN, and Catalog Editor.

Real-Time View

- **Platform.** Real-Time View is an application on Engineer's Desktop 5000.0.0. For this release, Real-Time View is available on Windows Vista Enterprise.
- **Key New Features.** This release of Real-Time View sees the introduction of a number of key new features that enable operators to manage more effectively both time-based and depth-based log data within their Engineer's Desktop environment. These improvements include:
 - **Depth-based log storage and visualization.** Real-Time View has been extended to also support depth-based logs. A new LAS import feature is available for Depth-based logs so that log files available in that format can be imported, stored in EDM, and visualized within Real-Time View.
 - **Log and Curve Header Editor.** For active logs, a new Log Header Editor feature is available from the Tools menu (**Tools > Edit Log Header...**). This feature enables engineers to review and edit Log and Curve Header information inaccessible in previous versions of Real-Time View.
 - **Internationalization.** Real-Time View has been extended to enable the user interface text to be translated into other languages.

- **WELLPLAN Integration.** You can now use Real-Time View Template Viewer to display Depth-based drilling data logs within WELLPLAN. This feature allows real-time data imported into EDM via OpenWire to be displayed inside WELLPLAN for a particular Design/Case. The capability provides the engineer with a valuable reference when comparing predicted actual loads against those actually measured during well construction.
- **Well Explorer Virtual Folders Added to the Well Explorer Tree.** These folders let you organize data items (such as Projects, Wells, Designs, etc.) in a customizable hierarchy that can be up to three levels deep.

StressCheck

- **Platform.** StressCheck is an application on Engineer's Desktop 5000.0.0. For this release, StressCheck is available on Windows Vista Enterprise.
- **Tab Layout.** Default tabs were added. (Tabs are saved at the Design level.) In the past, tab layout was saved by individual users. Now, when a Design is saved, the tab layout and content are saved as the default view setting for the Design. The new tab settings become the view for all other users who open the Design.
- **Viewing of Classic Well Schematic.** You now have the option to view the Classic Well Schematic. When StressCheck is installed, the default schematic view displays. To change to the Classic view, select **Tools > Options** and activate the Classic Schematic View checkbox. Deactivation of this checkbox will return the schematic display to the default setting.
- **Internationalization.** StressCheck is now designed to support regional settings in Windows.
- **Well Explorer Virtual Folders Added to the Well Explorer Tree.** These folders allow users to organize data items (such as Projects, Wells, Designs, etc.) in a customizable hierarchy that can be up to three levels deep.
- **New Assemblies.** There were added to the Associated Data Viewer with copy/paste functionality: Casing, Tubing. Not valid for Actual Designs.
- **Catalogs.** These were added for Well Completion components. Support for these catalogs was added to OpenWells, PROFILE, WELLPLAN, and Catalog Editor.

WELLPLAN

- **Platform.** WELLPLAN is an application on Engineer's Desktop 5000.0.0. For this release, WELLPLAN is available on Windows Vista Enterprise.
- **New Friction Calibration Torque Drag Chart.** This new feature allows for graphical calibration of friction factors.
- **New Plot.** The pressure to break the gel strength at various times can be determined using the Pressure-ECD Chart (Pressure: Pump Rate Fixed).
- **Back Pressure Available in Analysis.** You can use the Pressure: Pump Rate Fixed Analysis Mode and the Pressure: Pump Rate Range Analysis Mode.

- **Reverse Circulation.** This procedure, which pumps cement and spacers directly down the annulus, can now be modeled.
- **Well Explorer Virtual Folders Added to the Well Explorer Tree.** These folders let you organize data items (such as Projects, Wells, Designs, etc.) in a customizable hierarchy that can be up to three levels deep.
- **Integrated WITSML v. 1.2 Support.** This feature allows creation of OpenWire 2003.0.8 pipelines from the Well Explorer tree to load data into the EDM database directly from a remote WITSML server.
- **OpenWire Pipelines.** These can be created directly from the Well Explorer. You can launch the Real-Time View application directly from the Associated Data Viewer and use it to compare actual and planned log data.
- **Catalogs.** These were added for Well Completion components. Support for the catalogs was added to OpenWells, PROFILE, WELLPLAN, and Catalog Editor.
- **New Assemblies.** These were added to the Associated Data Viewer with copy/paste functionality: Casing, Tubing, and Drillstrings. Not valid for Actual Designs.
- **Fixed WELLPLAN Problems.** The following significant defects were fixed:
 - Defect #743765: Java Exception warning when creating a WELLPLAN case from a StressCheck casing design.
 - Defect #748119: Backreaming results not updating when changing friction factors when all loads were selected on the Mode Data dialog.
 - Defect #750148: Cannot change the mud density units to specific gravity for an API-based custom unit set, or to ppg from an SI-based unit set.
 - Defect #752276: The cuttings loading option does not affect the Hydraulics drag chart analysis results.
 - Defect #752297: When using the Hydraulics Pump Rate Fixed analysis, the tool joint option does not affect the results displayed in the Hydraulics drag chart or the Annulus ECD plot.

3D Drill View KM

- **Platforms.** 3D Drill View KM is a DecisionSpace application. For Release 5000.0.0, 3D Drill View KM will be available on the official Release 5000.0.0 Linux and Windows XP platforms, and will access OpenWorks 5000.0.0 on Oracle 10g.
- **Create Knowledge Attachments in 3D View.** To create a Knowledge Attachment in the 3D View, right-click on a wellbore and select Add EDM Knowledge Attachment, or Add DIMS Knowledge Attachment depending on the drilling database you are using. Note that you must have checked the Enable box on the corresponding KM EDM or KM DIMS tab.
- **Knowledge Attachment Symbols Stored in EDM Database.** KM symbols are now stored in the EDM database. (Prior to R2003.19.1, the symbols were stored in files.) Any symbols stored in files will be uploaded into the EDM database the first time you open the database.

- **3DDV KM Runs on Linux.** 3DDV KM now runs on Linux and can connect to either Oracle or SQL Server EDM databases.
- **Select All and Clear All Buttons.** The buttons were added to the Choose Items dialog box to improve its usability.

Collaborative Well Planning

- **Software Family in the DecisionSpace Environment.** It now includes AssetPlanner, TracPlanner, PrecisionTarget, and the new Field Scenario Planner applications.
- **Platforms.** For Release 5000.0.0, the Collaborative Well Planning applications will be available on the official Release 5000.0.0 Linux, Solaris, and Windows XP platforms and will access OpenWorks 5000.0.0 on Oracle 10g.
- **Manual Targeting.** Several enhancements were included to allow better use of geologic models and to provide more control when creating targets for both manual and automatic planning.
- **References to OpenWorks Saved in OpenWorks WellPlanning Projects.** WellPlanning objects created from OpenWorks wells are saved with the OpenWorks Well-Planning project. Therefore, OpenWorks will automatically load these wells when the OpenWorks well is opened.
- **Recommended Surface Location or Kickoff Depth Based on Hold Angle.** The software can recommend a surface location or kickoff depth based on a specified hold angle. The surface location or kickoff depth will be calculated using a hold angle as close as possible to the requested hold angle.
- **Sidetrack Plan Type Added to the AssetPlanner Advanced Mode.** AssetPlanner can now create sidetracks from existing or planned wells. Sidetracks can be based on three plan types, including sidetrack, horizontal sidetrack, and S-shaped sidetrack. It is possible to restrict the creation of sidetracks to a certain well type such as shut-in, etc.
- **Snap Penetration Points in Reference Targets.** When working with TracPlanner, use **Plans > Snap Reference Targets** to move the reference target penetration point to the point where the wellbore intersects the target. (The default penetration point for the reference target is the center of the target.)
- **Casing and Liner Data.** A Casing tab has been added to the Well Plan Properties dialog box. Casing and liner data available in OpenWorks is displayed (read-only) on this tab. When creating a new plan, data can be entered into this tab. This data is used when creating sidetracks to ensure the minimum inside diameter criteria is met.
- **Improved Sidetrack Options.** Existing sidetracks now have the same planning options as new sidetracks. This functionality includes investigating alternative millout depths within a specified distance from the current millout depth. You can specify a minimum inside diameter to determine if a sidetrack is possible at any depth by comparing this diameter to the casing and liner data.
- **New Setting.** Set **Back TVD - Use Plans > Apply SetBack** to ensure the wellpath has the same inclination and azimuth from the last target to the specified (Set Back) TVD above the

second to last target as it does between these two targets. This functionality applies to surface or platform plans using Optimum Align and consisting of at least two targets.

- **Plan Optimization Enhancement - Optimization.** It now includes penetration points, kickoff depths, and millout points, as well as automatically testing for more efficient plans using reference targets. Anticollision and hazard avoidance will be considered if the AssetPlanner module is licensed.
- **Table Editing.** Several changes were made to improve table editing. Buttons were renamed for consistency, and cell contents are automatically overwritten when typing begins in the cell.
- **Editing of Well Types.** It is now possible to change the type of a well (producer, injector, etc.). If the well is an OpenWorks well, the change is only within the context of the current Well Planning project and does not change the actual OpenWorks type.
- **Saving and Retrieving Plan Parameters.** In AssetPlanner and ScenarioPlanner, plan setups can now be saved and retrieved for later use.
- **Improved Completion Calculation.** A parameter titled "Default Reservoir Penetration" has been added to the Costs tab in AssetPlanner. This field is used to determine where to begin completion costs. In the past, completion costs were based on the perforation length. For wells without a perforation length, a zero length completion interval resulted.
- **Editing Target, Plan, and Scenario Parameters.** Any numeric column can now be edited and saved to the project. Columns can also be added or deleted. Note that this save applies only to the WellPlanning project and does not affect OpenWorks data or wbp files.
- **Importing Paths as TurnPoints.** Turn points can now be derived from imported survey data.
- **New Plan Type Parameters.** Additional parameters were added to several plan types.
- **Field Scenario Planner.** A new module titled Field Scenario Planner has been added. This module includes three modes: Scenario Setup, View Scenario Set, and Scenario Target Analysis.
 - The **Scenario Setup** mode facilitates the creation and editing of a set of development scenarios.
 - The **View Scenario Set** mode is used to compare the scenarios created using the Scenario Setup mode.
 - The **Scenario Target Analysis** mode is used to compare scenarios on a target-by-target basis.
- **Scenes.** A new Scenes tab takes advantage of AssetView's multi-scene, multi-view functionality.
- **EDM Import and EDM Export - EDM Import and EDM Export Options.** These have been added to the File menu. Use these options to import or export data between Well Planning and an Oracle EDM database (version 2003.16.0 or later).
- **Surface Grids.** You can now use surface grids when you are working with AssetPlanner. For example, a sea floor grid can be used to obtain water depth. Using the water depth from the grid, AssetPlanner can put platforms in a specified water depth. You could also use a topography grid to place platforms or wells only where the surface is less than a certain inclination.

- **Site Slot Templates Setups.** These can now be saved. The site setup that is saved can include multiple templates and/or individual wells. After the setup is saved, it can be used as a basis for other sites.

OpenWire

- **Platforms.** For Release 5000.0.0, OpenWire is available on Windows Vista Enterprise Client (Vista Server is not supported), Windows XP Client, and Windows 2003 Server.
- **Supported Versions.** OpenWire will support WITSML version 1.3.1 as well as version 1.2.0 for the standard objects.
- **Integrated Workflow.** OpenWire supports an integrated workflow with the EDM-based applications, allowing simplified creation of Pipelines from within the Engineering applications.
- **Support for Reports Objects.** OpenWire now supports the reports objects for simplifying the data entry into OpenWells when data is available in a digital format.

Wellbore Planner

- **Platforms.** Wellbore Planner is now available on the official Release 5000.0.0 Linux and Solaris platforms and will access OpenWorks 5000.0.0 on Oracle 10g.
- **Wellbore Planner Fixed Problems:**
 - Defect #163061: Wellbore Planner does not populate the Original location information for a well when created from a well plan.
 - Defect #722088: Recalculation of wellpath (position log) causes duplicate line in poslog table. As a result, the wellpath will not display in OpenVision, and an error message will display indicating the wellpath cannot be loaded.
 - Defect #177358: When a WBP plan is saved as an OpenWorks well, the time/depth table created is not set to be the preferred time/depth table.
 - Defect #702580: Import of ASCII file containing survey data (knee points) is limited to 197 data points.
 - Defect #719633: Wellbore Planner freezes when importing a COMPASS ASCII file with more than 196 lines.
 - Defect #306010: COMPASS file fails to import if comment line exceeds 78 characters.
 - Defect #732053: Wellbore planner not saving platform wells correctly.
 - Defect #732054: Wellbore planner not saving turn point correctly for extend sections.
 - Defect #156683: Parent well not retained after saving plan and reopening second time.
 - Defect #118667: Entering large character strings into the **Uncertainty > Survey Tools > Edit Name** and **Description** fields produces an error when the **Add/Update** icon is selected.

Geological and Geophysical Technologies

These applications use the new Seismic Data Management functionality in OpenWorks. For more information, see [Seismic Data Management in OpenWorks](#) on page 49.

GeoProbe + ezModel

- **OpenWorks 5000.0.0. Port.** For Release 5000.0.0, the OpenWorks data model has been streamlined to reduce data duplication. Now, you can view subsets—called interpretation projects—of a project database; the data in the interpretation project is shared dynamically by reference. In addition, seismic and horizon data can have a processing history attached to them. GeoProbe's data structure has been modified to accommodate these changes.
- **Multi-Survey States.** GeoProbe's data structure has been re-configured to take into account individual surveys located within a larger project. Now, Multi-Survey instances in GeoProbe can be saved into a single state file.
- **Data on Demand.** In addition to loading volumes into shared memory, you can now load volumes directly from disk into GeoProbe using Data on Demand. When you use this new *.d3d disk caching format, loaded volumes are no longer limited to the amount of memory on a given system. Therefore, you can load large data volumes without compromising visualization speed.
- **Seismic 2D Data Direct from SeisWorks.** Seismic 2D Data can now be loaded into GeoProbe directly from SeisWorks. swFault segments are easily interpreted on these 2D lines and saved back to OpenWorks. In addition, horizons are picked using ManuTrack and can be interpolated on demand using the SeisWorks gridding library. To further improve the interpretation workflow with PowerView, 2D line locations are now shared via PD messaging.
- **Direct Data Access.** Data loading has been reconfigured to remove the requirement for an external DataServer. This change has greatly optimized the loading of swFaults, Horizons, and 2D Data; they are now loading 10 to 20 times faster than in previous versions.
- **Culture Object.** A new Culture object lets you load and manipulate ZGF layers. These culture files can be clipped to volume extents, and individual layers in single files can be enabled and disabled from view.
- **Blending Volumes into a Single Display.** Advances in graphics card development give GeoProbe the ability to “blend” two volumes into a single display. For example, by using a seismic amplitude volume as a base volume, you can now overlay a velocity volume on the seismic. The second volume still has a color map of its own, and transparency values on this color map determine the saturation of the volume on the display. In addition, when you use the new dynamic waveform display, wiggle traces can be displayed on the faces of a Probe. Parameters that determine the size, spacing, and overall appearance of these traces can be set.
- **Horizon Curvature.** A variety of Horizon Curvature attributes are now available for display on the selected horizon. These attributes aid in the prediction of fractures and faults.

- **ezTracker Fault Blocking Option.** ezTracker can now use a “fault blocking” volume created from within PowerView. Using this volume in conjunction with the tracking algorithm will quickly create horizons that are constrained by the faults in the survey. You will not have to interpret the fault network first.
- **ezModel Additions.** More options have been added for working with horizons in the structural model. Horizons can now be sealed against one another; based on the order they occur in time/depth. In addition, specifying each horizon interval's minimum thickness allows for a wider variety of stratigraphic models.
- **Well Section.** This new feature creates a vertical plane of seismic data through the path of the selected wellbore. These planes display the data around the wellbore as well as any enabled horizon and fault interpretations that intersect the plane.
- **Usability Improvements.** All objects in the GeoProbe viewer are now selectable and can be disabled using Mouse Button 2. The object's full menu can be accessed using MB3. Tabs for swFaults and ezFaults have been added to the User Preferences dialog box. They let you configure display and interpretation settings that will persist in the GeoProbe session.

PetroWorks

- **OpenWorks Project Optimization.** The 5000.0.0 release supports OpenWorks Project Optimization, which enhances the data model to support new workflows, reduce cycle time, and fully migrate all seismic project data into the OpenWorks project framework. Integration is built into the Data Model, not the application. Highlights include enhancements to the OpenWorks Data Model to enable the storage and management of seismic and associated data, major enhancements to the Interpretation ID Model, the addition of metadata and Processing History Model, redesigned Data Managers, and OpenWorks and Engineer's Data Model (EDM) rationalization.
- **Log Modeling Package.** The PetroWorks Log Modeling Package now includes log normalization and the ability to create pseudo logs.

PowerCalculator

- **New Data Types.** They include the following:
 - Support for 2D horizons for a variety of math computations.
 - Support for OpenWorks grids for complex math computations. In general, the grids can be used interchangeably with 3D horizons, making for some very powerful, yet simple, workflows.
 - OpenWorks polygons, which can be used in some new functions that support processing of the grid information.
- **New Calculations and Modes.** They include the following:
 - Calculations can be executed in “Multiple” mode, which enables operations between 3D horizons in different seismic projects.

- The QuickView now supports the display of multiple data simultaneously. This enhancement lets you quickly evaluate if and how disparate data types overlap within regions.
- A robust spatial interpolation algorithm is added for 3D horizon data. By being a part of the PowerCalculator processing flow engine, this algorithm enables a single button click to fill, smooth, and clip within the interpreter's favorite set of algorithms.
- The Blank function applies a specific polygon set, containing inclusive and/or exclusive polygons, to a 2D or 3D horizon, or to an OpenWorks grid.

PowerView

- **Interpretation Notes.** This enhancement provides advanced tools for interpreters to add x, y, z location markers containing text, images, and links to documents. Interpretation notes can also be attached to other data objects. This information is captured as a permanent part of the OpenWorks interpretation data record. Here are some of the many ways Interpretation Notes can be used:
 - As captured "To-Do" lists for completing the interpretation.
 - As "Why" notes that document the interpreter's reasoning at a key decision point.
 - As "Knowledge-Capture" notes that provide quick and easy access to published articles or previous interpretations.

These features combine for a significantly enhanced interpretation experience and provide opportunities for increased productivity and improved quality.

- **Interpretation Sets.** Effective data management is one of the more challenging tasks for today's interpreter. A multitude of different data types as well as different versions of data can collectively contribute to a specific decision. This combination of data can vary from the set of input horizons, picks, velocity model, and fault polygons that contribute to a particular surface grid construction to the appropriate set of horizons, faults, velocity model, and seismic that represent the properly versioned 85 percent confidence/risk prospect interpretation. Interpretation Sets allow the interpreter to create logical groupings of projects information, organized and named in hierarchical folders. These groupings, or mini-projects, can be easily and quickly recalled for scenario/version/risk-confidence workflows and operations.
- **GeoProbe 2D Line Probes.** With support for 2D seismic interpretation in GeoProbe, the tight GeoProbe > PowerView integration which syncs up a GeoProbe probe face to a PowerView Section is extended to include 2D seismic data.

SeisWorks

- **OpenWorks Project Optimization.** The 5000.0.0 release supports OpenWorks Project Optimization, which enhances the data model to support new workflows, reduce cycle time, and fully migrate all seismic project data into the OpenWorks project framework. Integration is built into the Data Model, not the application. Highlights include enhancements to the OpenWorks Data Model to enable the storage and management of seismic and associated data, major enhancements to the Interpretation ID Model, the addition of metadata and Processing

History Model, redesigned Data Managers, and OpenWorks and Engineer's Data Model (EDM) rationalization.

- **Horizons and 2D Lines.** There are no more limits on the number you can use.
- **Processing History.** You will be able to access this information for horizons and seismic. The enhancement eliminates the need for elaborate naming conventions.
- **Identification of Horizons.** They are identified by name, version, interpreter, and attribute.
- **Additional Meta Data.** This information is available for horizons, seismic, and faults.

StratWorks

- **OpenWorks Project Optimization.** The 5000.0.0 release supports OpenWorks Project Optimization, which enhances the data model to support new workflows, reduce cycle time, and fully migrate all seismic project data into the OpenWorks project framework. Integration is built into the Data Model, not the application. Highlights include enhancements to the OpenWorks Data Model to enable the storage and management of seismic and associated data; major enhancements to the Interpretation ID Model; the addition of metadata and the Processing History Model; redesigned Data Managers; and OpenWorks and Engineer's Data Model (EDM) rationalization.
- **Surface Mapping Enhancements.** StratWorks was enhanced to include dip and azimuth calculations with pick data and to grid dip data to use in surface mapping. The purpose of this enhancement is to calculate dip information to include with pick data in the PICK table. Dip meter table data is averaged to calculate values.

SynTool

- **OpenWorks Project Optimization.** The 5000.0.0 release supports OpenWorks Project Optimization, which enhances the data model to support new workflows, reduce cycle time, and fully migrate all seismic project data into the OpenWorks project framework. Integration is built into the Data Model, not the application. Highlights include enhancements to the OpenWorks Data Model to enable the storage and management of seismic and associated data; major enhancements to the Interpretation ID Model; the addition of the metadata and Processing History Model; redesigned Data Managers; and OpenWorks and Engineer's Data Model (EDM) rationalization.
- **Tighter integration with OpenWorks.** This release dramatically improves the way that seismic and associated data are managed and stored. SeisWorks projects have been eliminated, and OpenWorks is extended to manage seismic and other project data. Seismic data and 3D horizon data are stored externally but catalogued and managed through OpenWorks. 2D horizon data is stored within OpenWorks.
- **Datum Behavior.** Modifications in datum behavior make it work in conjunction with the automatic datuming of SeisWorks seismic data provided by the OpenWorks seismic data optimization in Release 5000.0.0. The changes mean there is both a datum and correctional

velocity tied to the Interpretation Project (IP) and a datum tied to the 3D survey and the 2D line seismic data. They work together to provide dynamic datuming of the seismic data to the datum of the IP. Because the datuming or start time modification of the seismic data is being performed on the OpenWorks side and is external to the SynTool application, SynTool now includes some minor changes concerning the initial Time datum setting and the updating of the datum when SeisWorks seismic data is selected for display.

In previous releases, the initial SynTool Time datum would be set by selecting a SeisWorks project. You could then modify the datum value before completing the initialization of the SynTool session. For Release 5000.0.0, the initial time datum will be set to the datum of the Interpretation Project that you are using. This change is required to maintain integration with SeisWorks, which also uses the IP datum when initializing. Because the SeisWorks seismic data is tied to this datum, you will not be able to modify the datum during initialization. You can, however, modify the datum setting once the session has initialized by using Datum Info. Another change revolves around the selection of SeisWorks seismic for display. In the previous release of SynTool, if the selected seismic data was from a different SeisWorks project at a different datum from the SynTool, the SynTool session would change the current datum to this datum and use its internal method for calculating the correctional velocity for setting the datum shifted time scale. In Release 5000.0.0, because the SeisWorks seismic data is being dynamically datumed to the Interpretation project datum using the correctional velocity in the IP, this option is no longer required and has been removed. To maintain consistency with SeisWorks, use or modify the settings in the Interpretation Project if the initial datum needs to be set to a different value. If the datum of the seismic data needs to be changed, do so in the 3D Survey or 2D Line setting in Seismic Data Manager, before you launch SynTool.

Once the SynTool session has initialized, you can make datum modifications by selecting **Datum Info** from within the SynTool application. Likewise, if you are looking for the same behavior as in earlier releases, set the **IP datum** to 0 and the **3D Survey** or **2D Line datum** to 0. Then use **Datum Info** and SynTool's internal datuming calculations to provide the datum modifications for the SynTool session.

- **SynTool Fixed Problems:**

- Defect #760430: When saving a synthetic to SEG-Y you can now enter up to 200 characters for the file name. This has been increased from 54.
- Defect #631615: Extraction process hangs when you extract Wellbore Seismic for a horizontal well.
- Defect #739567: It is taking too long to access a seismic volume list or SeisWell. Need a patch to improve performance. (Fixed with the OpenWorks Seismic data management.)

TDQ

- **OpenWorks Project Optimization.** The 5000.0.0 release supports OpenWorks Project Optimization, which enhances the data model to support new workflows, reduce cycle time, and fully migrate all seismic project data into the OpenWorks project framework. Integration is built into the Data Model, not the application. Highlights include enhancements to the OpenWorks Data Model to enable the storage and management of seismic and associated

data; major enhancements to the Interpretation ID Model; the addition of the metadata and the Processing History Model; redesigned Data Managers; and OpenWorks and Engineer's Data Model (EDM) rationalization.

- **Tighter integration with OpenWorks.** This release dramatically improves the way that seismic and associated data are managed and stored. SeisWorks projects have been eliminated, and OpenWorks is extended to manage seismic and other project data. Seismic data and 3D horizon data are stored externally but catalogued and managed through OpenWorks. 2D horizon data is stored within OpenWorks.
- **Sharing of Models.** TDQ models are stored in the master project and not the Interpretation Project, so the model can be shared.
- **Simplified and Optimized Project Administration.** This change eliminates the need for seismic projects in SeisWorks. Master and working projects have been integrated into the new OpenWorks structure.
- **Identification of Horizons.** They are identified by name, version, interpreter, and attribute.
- **TDQ Fixed Problems:**
 - Defect #717279: Setting Sample Interval less than one defaults back to one upon conversion.
 - Defect #730538: Does not convert OpenWorks grids properly when depth units differ from project units.
 - Defect #632665: Does not like sub-millisecond sample intervals.
 - Defect #702403: Creates line thickness value of -98765 in SFDM.

Well Seismic Fusion

- **Prestack Seismic Data Management via OpenWorks.** To make prestack seismic data accessible to any interpreter at any time, Well Seismic Fusion now catalogs the prestack data in OpenWorks. The catalog contains basic survey geometry, parent/child relationships, and a pointer to where the prestack actually exists on disk.
- **Offset Synthetics and VSP Data Managed via OpenWorks.** Well Seismic Fusion now stores 2D offset-synthetics and offset-VSP data directly in OpenWorks. This change allows any interpreter to access these data types at any time.
- **Working with Multiple 2D Lines; 3D Surveys; and Interpretation Projects.** Well Seismic Fusion can now manage any number of 2D lines or 3D surveys within any number of interpretation projects in a single session.
- **“Basic” and “Full” Licensing of Well Seismic Fusion.** A less-expensive “Basic” License is now available for users who just want to view and crossplot prestack data. The “Full License” allows for much more in-depth AVO analysis on all data types.

Z-MAP Plus

- **OpenWorks Project Optimization.** The 5000.0.0 release supports OpenWorks Project Optimization, which enhances the data model to support new workflows, reduce cycle time, and fully migrate all seismic project data into the OpenWorks project framework. Integration is built into the Data Model, not the application. Highlights include enhancements to the OpenWorks Data Model to enable the storage and management of seismic and associated data; major enhancements to the Interpretation ID Model; the addition of metadata and Processing History Model; redesigned Data Managers; and OpenWorks and Engineer's Data Model (EDM) rationalization.
- **File Manager Enhancements.** The time of file creation is now displayed as well as the date. This allows for sorting of files by date and time. In addition, the number of ZGFs that can be listed has been increased from 1000 to 12000. The number of MFD and OpenWorks files (such as grids, pointsets, etc.) has increased from 1000 to 9999.
- **Text Posting Enhancement.** You can now specify that you want to clip text files posted on maps at the map border.
- **Contour Enhancements.** Z-MAP Plus has enhanced the Contouring GUI to include distance between labels; and bold, hachure, and dash contour settings. (60657)