Well Cost ™ Software Version 5000.1.6.0 Release Notes

Contents

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Introduction

Well Cost 5000.1.6.0 is an upgrade to Well Cost 5000.1.0, and supports the SQL Express, SQL, or Oracle instance of the EDM 5000.1.6.0 database. Well Cost 5000.1.6.0 must be installed on EDT 5000.1.0 or later

- a standalone version of Well Cost 2003.16.1.0, or
- an EDM 2003.16.1.7 platform where no Well Cost installation exists.

Refer to the 'Installation' section of the *Engineer's Desktop 2003.16.1.0 Drilling Summary Level Release Notes* for details about how to perform various database version upgrades.

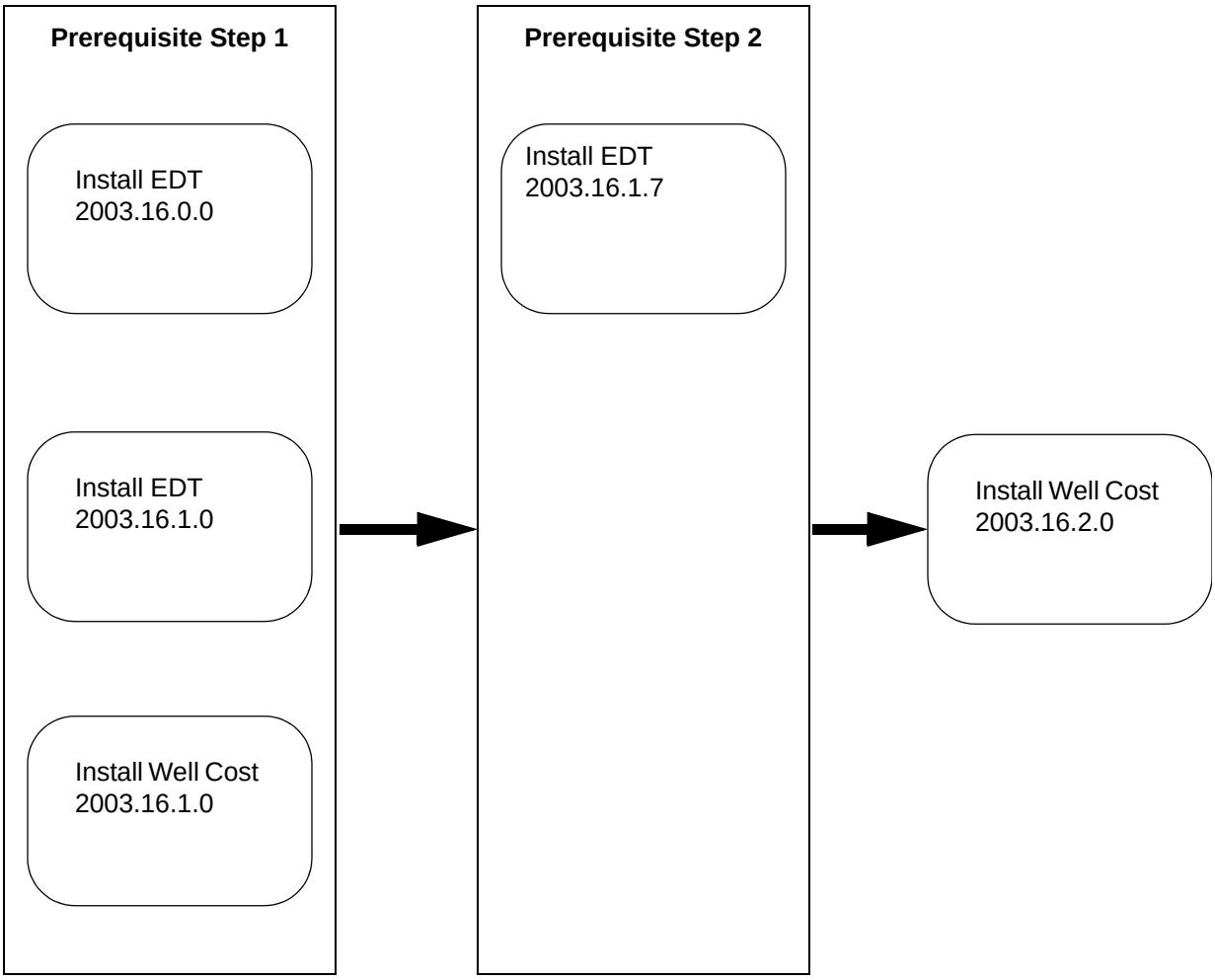
The EDT 2003.16.1.7 patch is located on the LGC ftp site for download. For assistance, contact Landmark Support.

Deployment Procedure

The Well Cost 2003.16.1.0 installation, based on the EDM 2003.16 (06.01.00.078) database version, supported two scenarios

- Install EDT 2003.16.0.0 + EDT 2003.16.1.0, and then install Well Cost 2003.16.1.0
- Install Well Cost 2003.16.1.0 as a stand alone product

The Well Cost 2003.16.2.0 installation can not be installed on the Well Cost 2003.16.1.0 stand alone product. The diagram below shows the supported procedure to install Well Cost 2003.16.2.0

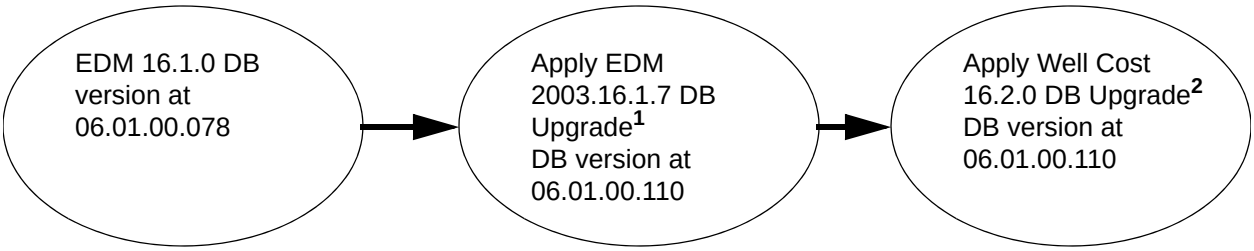


Well Cost 2003.16.2.0 will not have a separate Windows Add/Remove Program entry.

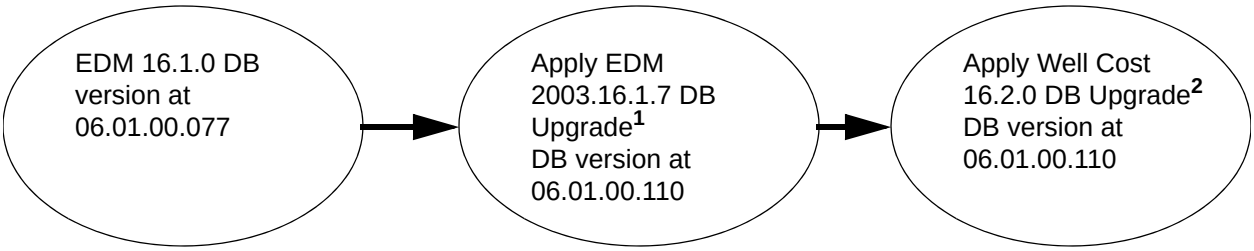
Well Cost 2003.16.2.0 Database Upgrade

Well Cost 2003.16.2.0 ships with database upgrades. The supported procedures to apply the database upgrades are shown in the diagrams below:

Scenario One (Best Scenario)



Scenario Two (Secondary Scenario)



1 EDM 2003.16.1.7 Database Upgrades are in <EDT Install Directory>\EDM\Updates\SQL Server and Oracle directories respectively. For example C:\Program Files\Landmark\EDT_2003.16\EDM\Updates\SQLServer\2003_16_1_7_SQL_Update.exe

2 Well Cost 2003.16.2.0 Database Upgrades are in EDT Install Directory>\Well Cost\EDM\Updates\SQL Server and Oracle directories respectively. For example, C:\Program Files\Landmark\EDT_2003.16\Well Cost\EDM\Updates\2003_16_2_0_WC_SQL_Update.exe

Fixed Problems

The following problems were either fixed or have workarounds for the 2003.16.2.0 release.

Defect/Enhancement No.	Description
717426	Adjusting column width and then adding/deleting/inserting a new row causes the Pore Pressure columns to shrink to default settings.
737232	Plot views are not preserved with the design save.
737233	Tabs are not saved with Design.
739471	Deselecting “Opaque background” does not remove background.
743610	Need rationalization of Unplanned Time.
745048	Phases not associated to any casing do not get loaded in absence of data in Casing/ Hole section.
746735	MIRU/RDMO type phases/activities should not necessarily be part of a Casing/Hole section.
746921	Sequence_no is not being filled in properly to link back to WELLPLAN and StressCheck.
748303	Probabilistic unplanned time is negative for low probabilities.
750095	Extra casing trip added for every bit trip.
751709	MIRU single phase plot is not showing.
753793	Wellpath not calculated with survey import.
754191	Deleting plot tab causes crash.
754337	Single Phase histogram needs legend.
756969	Cost spreadsheet has issue with regional settings where coma and decimal are flipped.
756970	Duplicate casings appear in Well Cost sometimes after creating Cases from casing design in WELLPLAN.
758971	Bug in delete Wellpath survey points.
762328	Detail report does not show SI units.
762423	Problem entering time probabilistic time manually.
764827	Time & Cost Configuration dialog issues w/ SI units.
764828	Need WellCost to support open hole completions.
767174	Tubing/Casing Size displays in inches instead of mm in drop down menu.

Defect/Enhancement No.	Description
767247	Crystal report file does not include database changes.
767365	Remove constraint on WC_ACTIVITY_CONFIG.phase_config_id field.
767538	Offset well selector has no scroll bar in the left window.
767540	Cost list tab in the Time and Cost configuration is not expandable and takes up only half of the screen.
767541	Lock the header bar in the cost section so that it scrolls with the cost estimate.
767542	Apply button in the Time and Cost Configuration is always greyed out.
767543	Plot tab labels do not expand for text.
767552	Unable to add a trip rate in the Activity Config Tab in the Time and Cost Configuration.
767784	Auto Calculation in the cost section does not work. Workaround: re-select the Type for it to calculate.
768254	Need to have the new Well Cost O/P Reports for 16.1.X.
768363	Save State of the Plot Area after closing and reopening.
768365	Fixed crash with multiple plots opened (Insert multiple tabs and delete the middle one and it crashes).
768366	Cost page (cost item loading/creation, GUI engine updates etc) - Performance Issues and Improvements.
768367	Added functionality for mapping unplanned time to be used within Well Cost.
768368	Added functionality for the user to pick the event to transfer to when there are multiple instances of the same Event.
768369	Added support for sections that are not linked with any existing assemblies. (That allows user to work on data without existing casing components).
768370	Added GUI bar on plots pane.
768372	Single phase histogram is now using graphics server.
768374	Added support for intermediate phases on casings, production, etc (not only intermediate).
768375	Added time feedback for long processes (gas gauge).
768376	Improved display of cost data to support individual groups with no items.
768377	Improved cost data configuration. User can select by individual, groups and classes.
768378	Optimized performance from entering data to loading and displaying cost data.

Defect/Enhancement No.	Description
768382	User has ability to update list of phases from the offset well data. New phases are assigned to default (not linked) hole section. That allows user to work with application without actual design.
768383	Loading phases is now available from probabilistic page via a button.
768384	Added delays when updating to improve application performance and enhance user interaction when entering and updating data on cost grids.
768385	Well Cost crashes when switching plots and schematic view.
768386	Pick list where pulled from incorrect locations.
768387	Added support for complex filters.
768388	Incorrect reference to objects which caused improper behavior when editing cell data.
768389	Fixed memory leaks.
768738	Phase loading logic is not working.
768743	Corrected color mismatch in single phase histogram plot key for Simulation and Offset Wells.
768747	Casing costs update erratically.
768749	Freeze line & graphs respond erratically.
768751	Controls at top of graph area do not work.
769021	Exported configuration files no longer import - extra columns.
769517	The Well Schematic displays incorrect depths when using the SI unit system.
769606	Need to have an Update button in Deterministic/Probabilistic section to update Plots accordingly so that users do not have to go to Cost spread sheet to see updated Plots.
769789	Need filtering mechanism to include in EDM Offset Well Selector (use the existing Well Explorer - Find feature).
769868	Need to remember the already selected Offset Wells in right hand side of the Offset Wellbore Selector dialog.
770301	Fixed problem when not saving when closing a Design from the Well Explorer pop-up menu.
770302	Fixed crash when saving new design with schematic on the plot area.
770303	Fixed problem when reopening design with schematic on the plot area
770304	Re-named Plot Names are not saved after re-opening the Design
770330	Depths out of order message while entering data in Well Path for SI Units

Defect/Enhancement No.	Description
770392	Save As Default/Import causes a message - Problem with format of PhaseToActivity file.
770422	Associated F5 key to Cost tab refresh (same as clicking on green check mark button).
770504	Hide Line followed by right-click on mouse in plots causes Well Cost to crash (in mod: wpcomposeru.dll).
770640	Single Phase Histogram invocation in No Offset Well Data in Probabilistic spread sheet cause crash.
770651	Changing from SI to API changes wellpath Origin units but not values.
770654	No units and too many decimal places in General Info SI units.
770690	Entering data in SI Units in Well Path causes incorrect results.

Well Cost 2003.16.1.0 Release Notes

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Contents

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Introduction

Drilling and completions engineers must generate accurate and efficient cost estimates for operations throughout the life of a well. Cost estimates are required for both low-level budgeting purposes (as used in scoping) and for more detailed authorization for expenditure (AFE). Well Cost provides engineers with a quick and easy way to generate cost AFE using both deterministic and probabilistic methods. Well Cost is integrated with operations reporting, engineering analysis and design tools, and with actual cost tracking systems such as OpenWells.

Well Cost delivers comprehensive, fast and accurate cost estimation tools in a single software package. This software package offers streamlined cost estimation and reporting workflows through integration with Engineer's Desktop design and planning tools as well as the Engineer's Data Model™ (EDM) platform.

Completions Engineers, Rig Supervisors, and Business Analysts can visualize planned, prototypical, currently installed, and historical Wellbore information in order to analyze the data. Detailed analysis is possible using Well Cost's data editors, Wellbore Schematics, and Reports. The primary value of Well Cost is to enable engineers to add or edit completions or drilling operations information, then produce deterministic or probabilistic well cost analysis. Once the Wellbore information is entered into the Engineer's Desktop, the cost results can be regenerated at any time by Well Cost users.

Well Cost replaces Landmark's DrillModel™ application, which is no longer supported.

This document contains important information and last minute changes related to Well Cost 2003.16.1.0 that is not documented elsewhere. Well Cost provides major new functionality in support of the Drilling and Completions applications on the shared EDM database.

System Requirements

For details, refer to the ‘System Requirements’ section of the *Well Cost 2003.16.1.0 Installation Guide*.

Installation

For details, refer to the ‘Installation’ section of the *Well Cost 2003.16.1.0 Installation Guide*.

IMPORTANT:

Well Cost 2003.16.1.0 is a new product that runs only on an MSDE or Oracle instance of the EDM 2003.16.1.0 database. Well Cost distributes an updated EDM 2003.16.1.0 MSDE database with Well Cost tables, and ships with scripts to insert Well Cost specific table entries into an existing 2003.16.1.0 database.

Refer to the ‘Installation’ section of the *Engineer’s Desktop 2003.16.1.0 Drilling Summary Level Release Notes* for details about how to perform various database version upgrades.

Licensing

Well Cost supports the use of FLEXlm® licensing, which is the only licensing mechanism supported by Landmark.

Refer to the *LAM 2003.0—Windows Release Notes* (LAMReleaseNotes.pdf) for details.

IMPORTANT! If you have a version of LAM server older than 7.2e (Release 2003.0 and later), you must uninstall it before installing the LAM 2003 server.

Failure to uninstall all previous versions of LAM Server before installing LAM Server 2003 will result in a duplicate FLEXlm service that replicates itself until it crashes Windows.

The procedures for uninstalling LAM server are detailed in the section "LAM Server Uninstall" in the LAM 2003.0—Windows Release Notes (LAMReleaseNotes.pdf). Products that were licensed under the older server will still work with the new LAM server.

Note that if you use USB bitlock security, you will have to upgrade your client license to FLEXlm 7.2i; server license can remain at version 7.2e.

The licensing scheme for Well Cost 2003.16.1.0 allows you to purchase either the:

- Well Cost Advanced Package, or
- Well Cost Deterministic Package

The Well Cost Deterministic Package allows users to perform Deterministic Time and Cost analysis of Wellbores. The Advanced Package is a full-feature license that includes both the Deterministic and Probabilistic Time and Cost analysis features.

Database Upgrade (MSDE and Oracle)

Refer to the "Installation" section of the *2003.16.1.0 Drilling Summary Level Release Notes* for information on upgrading your EDM database from previous versions to 2003.16.1.0.

To use existing EDM databases with Well Cost, upgrade your database(s) to version 2003.16.1.0

Well Cost ships with a MSDE Utility to create 2003.16.1.0 database(s) which contains all Well Cost required tables. In order to use existing EDM database(s), you must upgrade to version 2003.16.1.0, and then apply the Well Cost database update scripts.

Existing 2003.16.1.0 databases can also be updated during the Well Cost installation by running scripts to include Well Cost specific tables.

Features

Well Cost includes the following features for the 2003.16.1.0 release, which are discussed in more detail later in this document:

- Easy to use workflow-centric graphical interface with a Wizard that streamlines input and access to Well data. The Wizard opens Work and View panels that contain:

  — Editors for Wellpath, Casings, and Formations

  — Tools and visualizations to perform planned and actual Cost Analysis of Wellbore data:

    - Plots (XY Graph, Pie Charts, Monte Carlo Histograms)
    - Wellbore Visualizations (Schematic Diagrams)
    - Other Features (Customizable Plot and Schematic Properties, Printing, Multiple File Format Export)

- Time and Cost estimation at the Planning and Design level using Deterministic and Probabilistic analysis
- Monte Carlo simulation that models current Well data against data from multiple offset wells
- Unplanned (Non-Productive) Time factored into the analysis
- Ability to apply various probability distributions at the individual Phase level
- Reports rendered through the EDM Report Manager can be displayed in an electronic format (e.g., .PDF, .XML) file, then saved, emailed, or printed using any printer that is supported by Windows. Minimal effort and data input is required to generate a Well Cost report or AFE.

  Well Cost output reports include:

    - **Well Cost AFE Report** - Event-based cost items from this report are transferred to the OpenWells Cost Estimate and AFE Report, which stores the estimated costs of a Well prior to the start of operations. This report is typically completed in the office by a Well Planning team, rather than in the field.
    - **Well Cost Detailed Report** - Displays details of the estimated cost of drilling a Well determined by Well Cost with either deterministic or probabilistic time based calculations.

- Flexibility to customize Phases, Activities, and Cost
- Easy to use Import/Export feature for Wellpath, Formation, and Cost data

- Integrated with EDT Applications on the EDM Database Platform
  - —Common Well Explorer integration with other EDT applications
  - —Status Bar and Simultaneous Activity Monitor (SAM)
- Wall Plot Composer

Well Cost Interface

Figure 1 shows the main screen of Well Cost, which is an easy to use workflow centric interface designed to streamline the cost estimate process. Fully integrated with EDM and possessing all the common features available through the Well Explorer, the Well Cost interface facilitates the ability to navigate through the required elements of a Wellbore, then quickly generate accurate time and cost estimates.

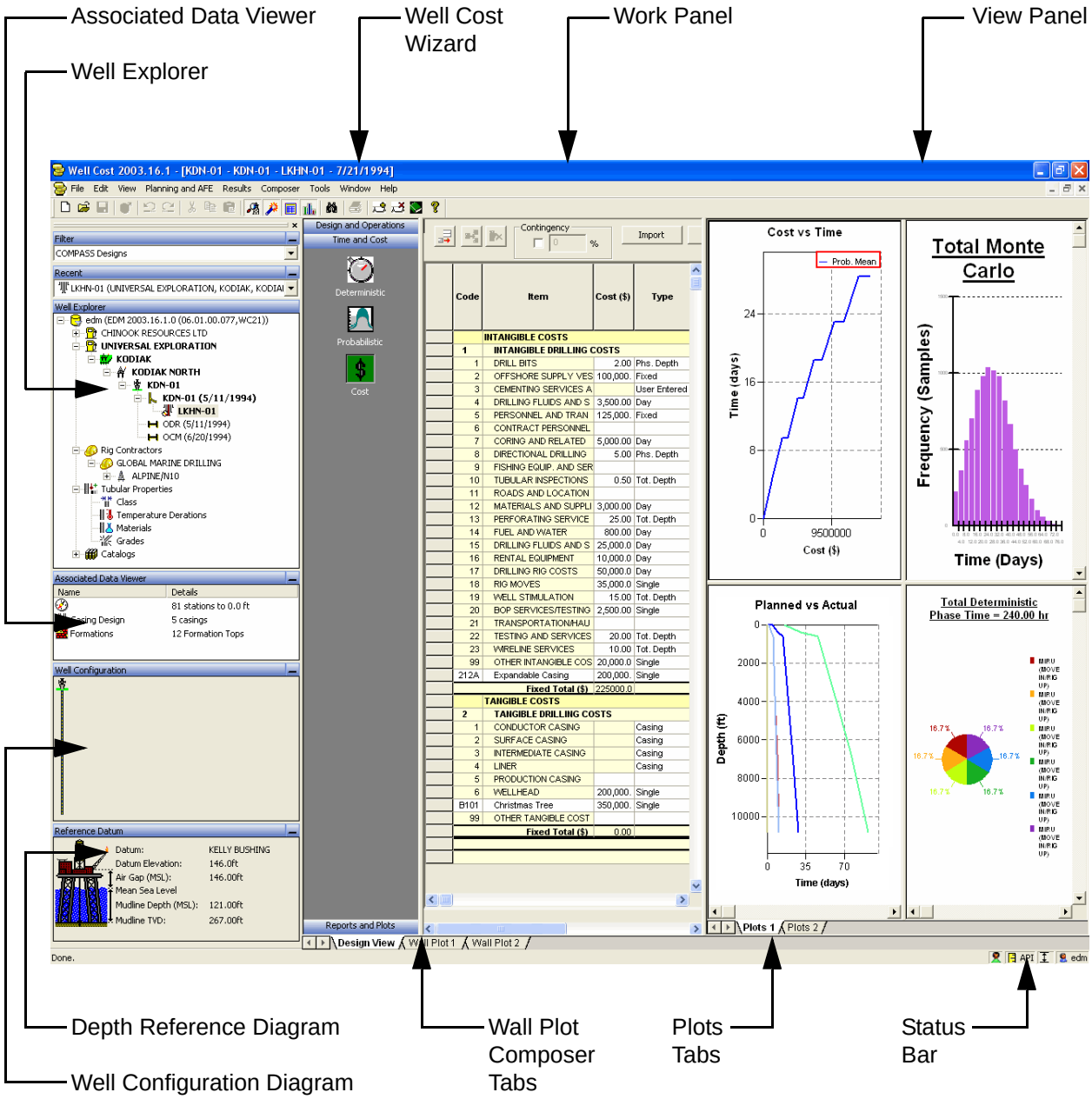


Figure 1: Well Cost Main Window

Buttons and menu commands on the main screen allow you to toggle the display of panels and a Wizard as you work. The Wizard layout is designed to lead you through a cost estimate workflow, which consists of Work and View panels that provide immediate access to data through the following editors, tools, and visualizations:

- Editors for Wellpath, Casings, and Formations
- Tools and visualizations to perform planned and actual Cost Analysis of Wellbore data:

Plots

- Time, Cost and Depth XY Plots
- Time and Cost Breakdown Pie Charts
- Monte Carlo Histograms
- Deviation Plots
- Actual vs. Planned XY Plots

Wellbore Visualization

- Live Schematic
- Schematic Customization
  - Labels
  - Schematic view options
- Wall Plots

Other Features

- Fully customizable plot properties
- Plot and Schematic Printing
- Plot Export to image file

Wellpath, Casings, and Formation Editors

Well Cost uses editors that display in the Work panel to allow users the ability to quickly add, review, or change Wellbore data as needed.

Access the editors as follows:

- Select a Design and double-click on the associated icon, such as the Wellpath icon (), in the Well Explorer's Associated Data Viewer
- Select the Planning and AFE > Design and Operations > Wellpath menu command

- From the Design and Operations bar, seen in Figure 2, click on the Wellpath icon ( ) or other icons related to the editor you wish to open.

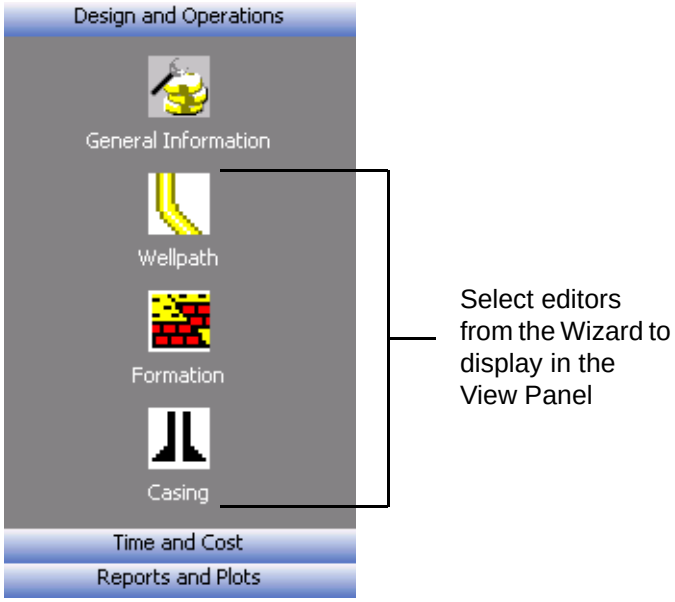
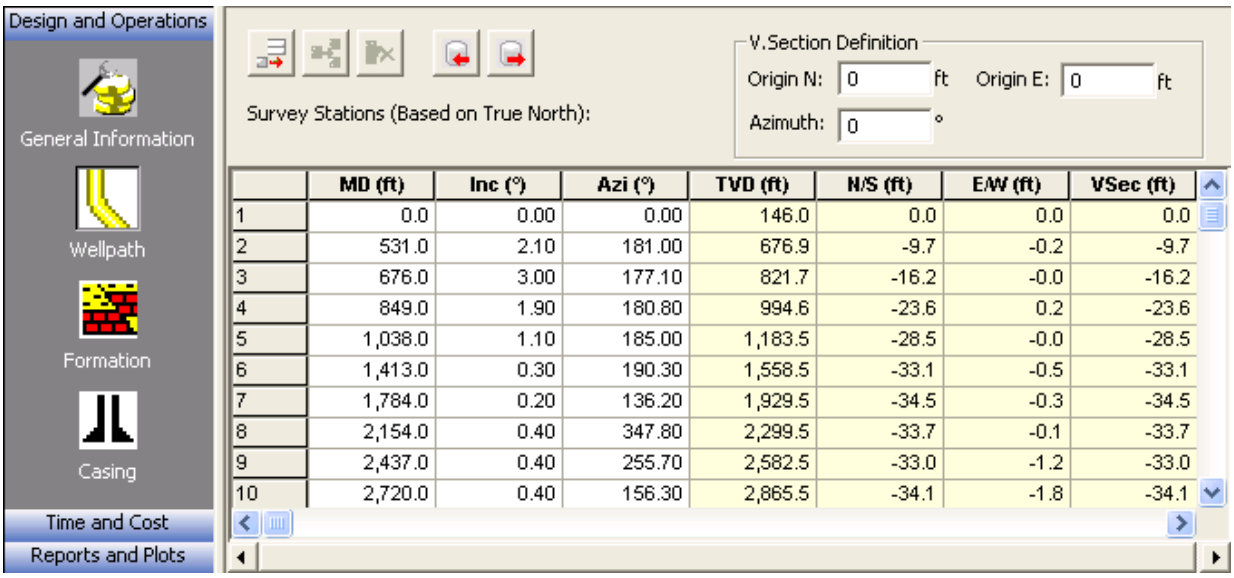


Figure 2: Well Cost Wizard - Design and Operations Bar

Wellpaths, Casings, and Formations can be either manually entered from the spreadsheet, imported from an external source, or copied from existing Designs via the Copy Command or Drag and Drop in the Well Explorer.

Wellpath

Wellpath provides various trajectory display options based on Measured Depth (MD), Inclination (INC), Azimuth (AZI), East/West/North/South coordinates, and the horizontal projected distance of the Wellbore on a drawing plane (V.Section). Figure 3 shows one example, the Wellpath editor displayed in Well Cost. In all editor spreadsheets, white cells are editable, and yellow shaded cells are calculated by Well Cost and read-only.

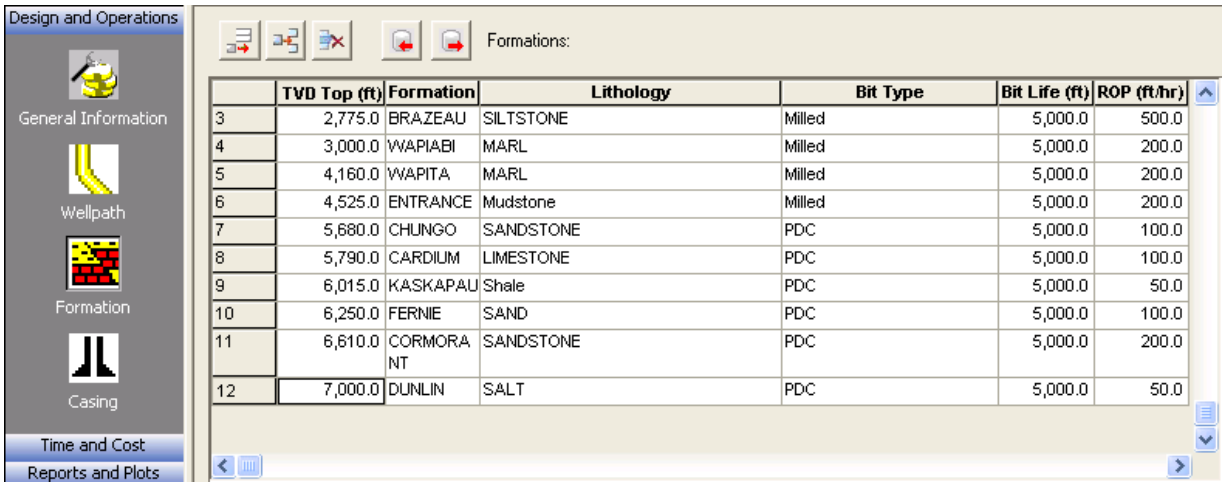


	MD (ft)	Inc (°)	Azi (°)	TVD (ft)	N/S (ft)	E/W (ft)	VSec (ft)
1	0.0	0.00	0.00	146.0	0.0	0.0	0.0
2	531.0	2.10	181.00	676.9	-9.7	-0.2	-9.7
3	676.0	3.00	177.10	821.7	-16.2	-0.0	-16.2
4	849.0	1.90	180.80	994.6	-23.6	0.2	-23.6
5	1,038.0	1.10	185.00	1,183.5	-28.5	-0.0	-28.5
6	1,413.0	0.30	190.30	1,558.5	-33.1	-0.5	-33.1
7	1,784.0	0.20	136.20	1,929.5	-34.5	-0.3	-34.5
8	2,154.0	0.40	347.80	2,299.5	-33.7	-0.1	-33.7
9	2,437.0	0.40	255.70	2,582.5	-33.0	-1.2	-33.0
10	2,720.0	0.40	156.30	2,865.5	-34.1	-1.8	-34.1

Figure 3: Wellpath Editor

Formation

Formation is used in Deterministic time calculations for ROP and Bit Life. The Formation pane consists of an editor, seen in Figure 4, that enables the Well Cost user to define formation tops for each drilled section.

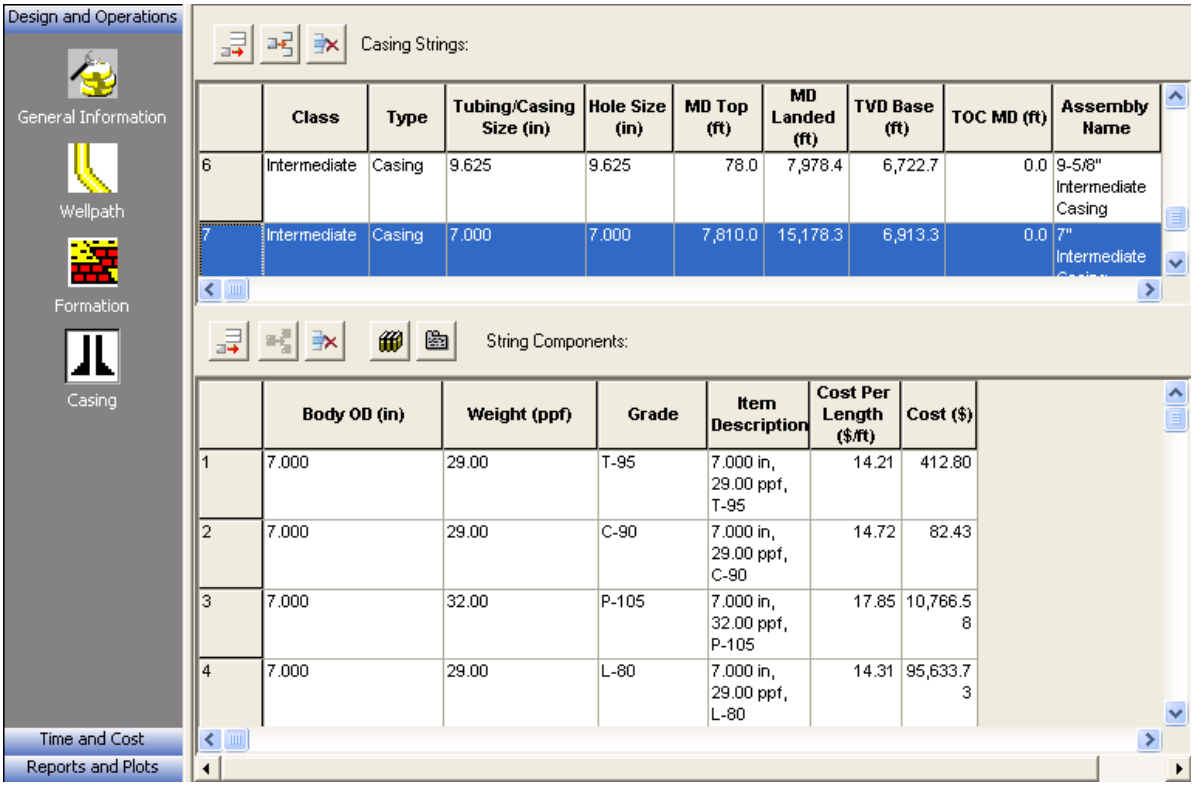


	TVD Top (ft)	Formation	Lithology	Bit Type	Bit Life (ft)	ROP (ft/hr)
3	2,775.0	BRAZEAU	SILTSTONE	Milled	5,000.0	500.0
4	3,000.0	WAPIABI	MARL	Milled	5,000.0	200.0
5	4,160.0	WAPITA	MARL	Milled	5,000.0	200.0
6	4,525.0	ENTRANCE	Mudstone	Milled	5,000.0	200.0
7	5,680.0	CHUNGO	SANDSTONE	PDC	5,000.0	100.0
8	5,790.0	CARDIUM	LIMESTONE	PDC	5,000.0	100.0
9	6,015.0	KASKAPAU	Shale	PDC	5,000.0	50.0
10	6,250.0	FERNIE	SAND	PDC	5,000.0	100.0
11	6,610.0	CORMORANT	SANDSTONE	PDC	5,000.0	200.0
12	7,000.0	DUNLIN	SALT	PDC	5,000.0	50.0

Figure 4: Formations Editor

Casing

Well Cost tracks Casings for all planned or actual Casings, Liners or Tie-backs in the Well. The Casing panel consists of an editor that is divided into two parts as seen in Figure 5. The top spreadsheet is the Casing Strings area where each string section is entered. When a Casing String row is selected, the lower spreadsheet displays String Components for the selected section. The String Components spreadsheet enables the user to enter information for each component type present in the string.



	Class	Type	Tubing/Casing Size (in)	Hole Size (in)	MD Top (ft)	MD Landed (ft)	TVD Base (ft)	TOC MD (ft)	Assembly Name
6	Intermediate	Casing	9.625	9.625	78.0	7,978.4	6,722.7	0.0	9-5/8" Intermediate Casing
7	Intermediate	Casing	7.000	7.000	7,810.0	15,178.3	6,913.3	0.0	7" Intermediate

	Body OD (in)	Weight (ppf)	Grade	Item Description	Cost Per Length ($/ft)	Cost ($)
1	7.000	29.00	T-95	7.000 in, 29.00 ppf, T-95	14.21	412.80
2	7.000	29.00	C-90	7.000 in, 29.00 ppf, C-90	14.72	82.43
3	7.000	32.00	P-105	7.000 in, 32.00 ppf, P-105	17.85	10,766.58
4	7.000	29.00	L-80	7.000 in, 29.00 ppf, L-80	14.31	95,633.73

Figure 5: Casings Editor

Live Schematic

The Wellbore schematic provides a dynamic representation of the downhole equipment configuration with depth and elevation scaling for the Planned or Prototype Design or data selected in an Actual Design. The live schematic is automatically updated when changes are made in the Well Cost application or the user changes a display date in an Actual Design.

A simple Print Preview feature allows users to print this schematic.

Plots and Charts

Well Cost offers two types of plots: XY and Histogram. A plot is two-dimensional collection of calculated or interpolated data displayed inside a window pane. Every plot has a vertical axis and a horizontal axis, both of which represent some physical parameter, such as depth, time, or cost. A single plot can display more than one set of data if each set uses the same physical parameters.

Charts are a graphical representation in which percentage values are represented as proportionally-sized slices of a pie.

Plots and charts available in Well Cost can be grouped as follows:

- Time, Cost and Depth XY Plots
- Time and Cost Breakdown Pie Charts - available as two-dimensional (2D) and three dimensional (3D) charts
- Monte Carlo and Single-Phase Histograms
- Deviation Plots
- Actual vs. Planned XY Plots

Figure 6 shows an example of a plots and chart available in Well Cost.

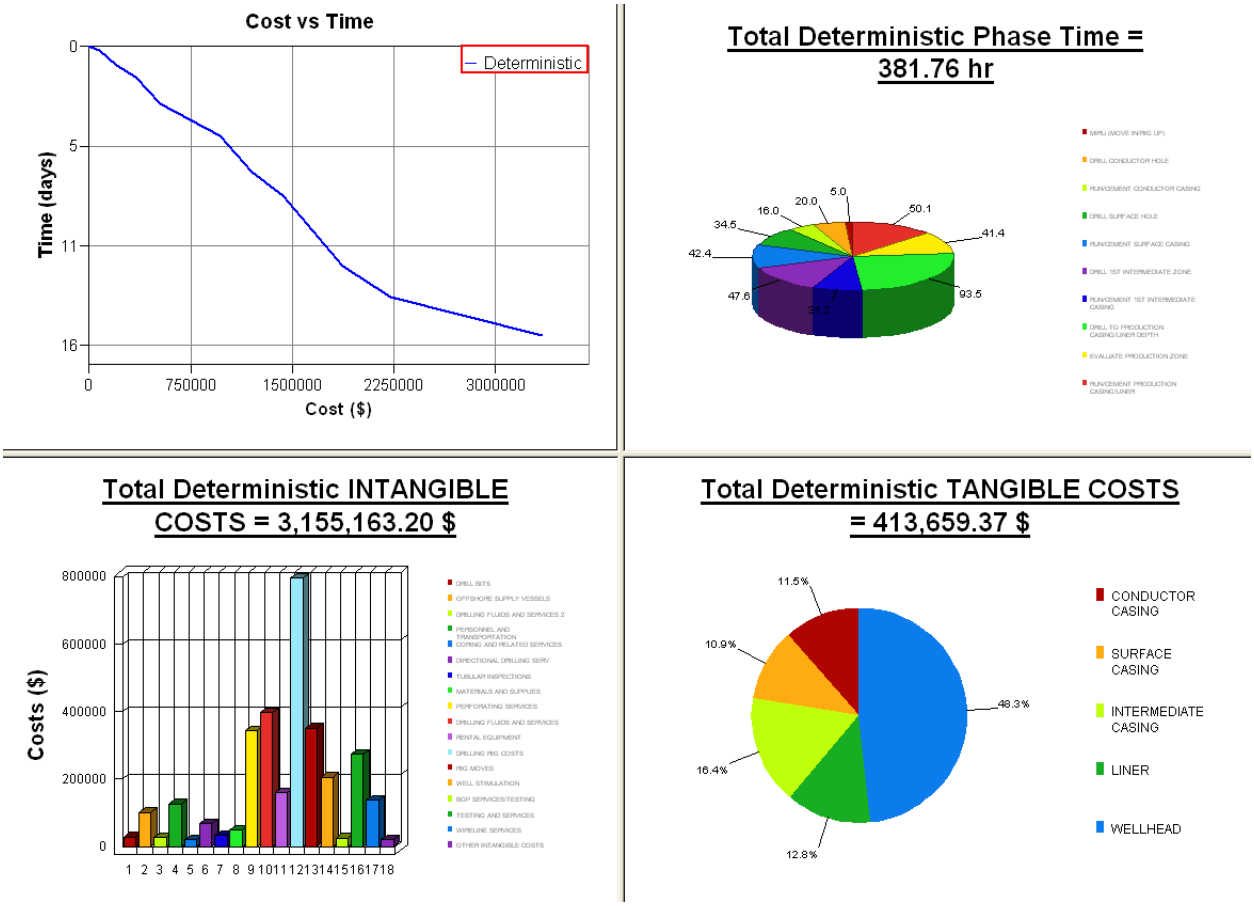


Figure 6: Well Cost XY Plot and Pie Chart

Plot Freeze Line and Curve Highlighting

Well Cost plots include a rich set of properties tools. Lines and curves displayed in plots can be frozen and hidden. Also, lines and curves are highlighted when moving the mouse on top of

an entry in the plot legend. The freeze line feature is helpful for visualizing plot line movement during cost analysis.

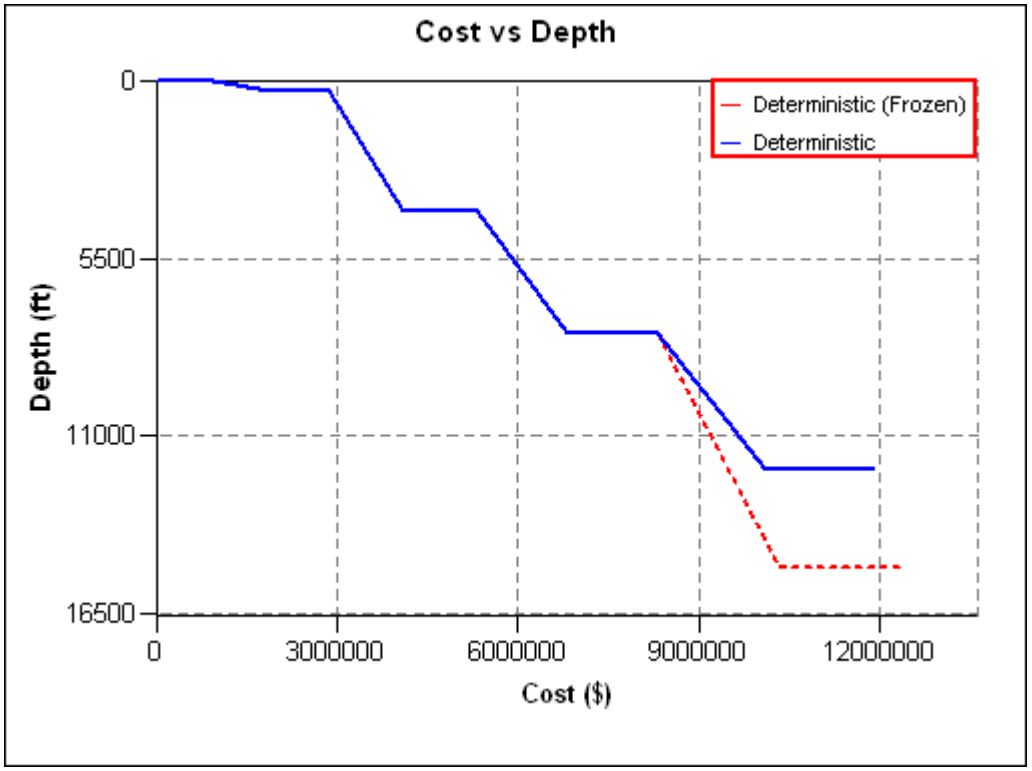


Figure 7: Plot Freeze Line

In Figure 7 above, notice that the original freeze line was configured to display as a dotted red line. After a change is made to reflect a shallower depth for the Well, the new deterministic line is drawn and displays a cost and depth less than the original value.

Histograms

Well Cost generates two types of histograms: Monte Carlo and Single Phase. Display options for the Monte Carlo Histogram are Total or Cumulative time, as seen in Figure 8.

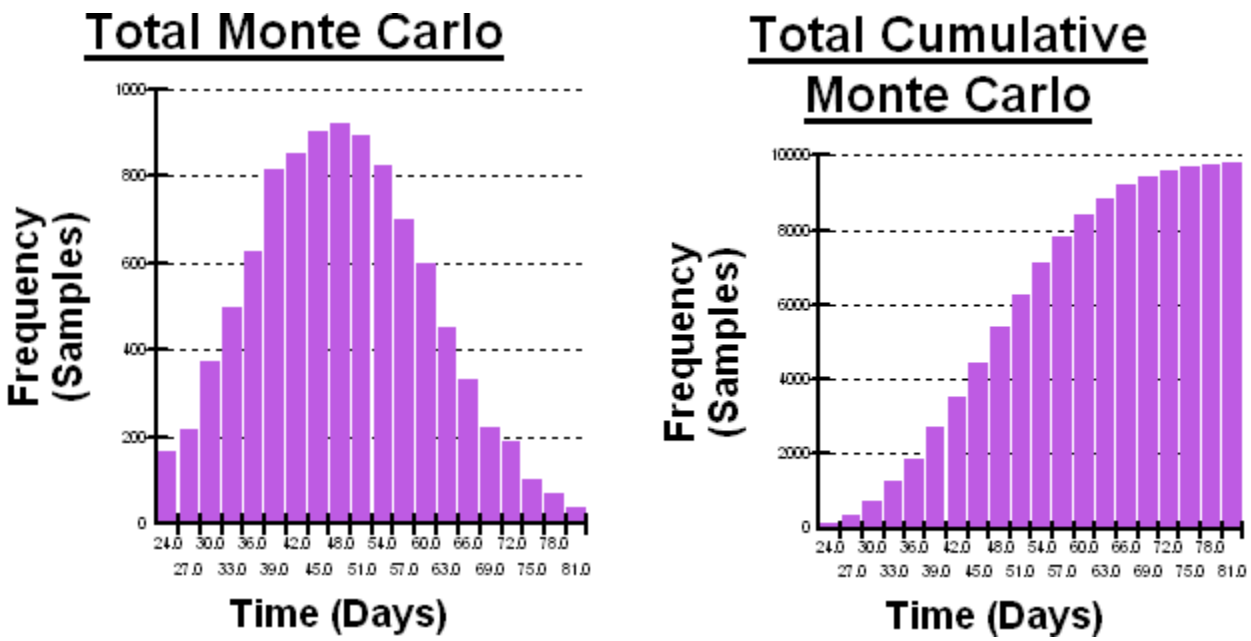
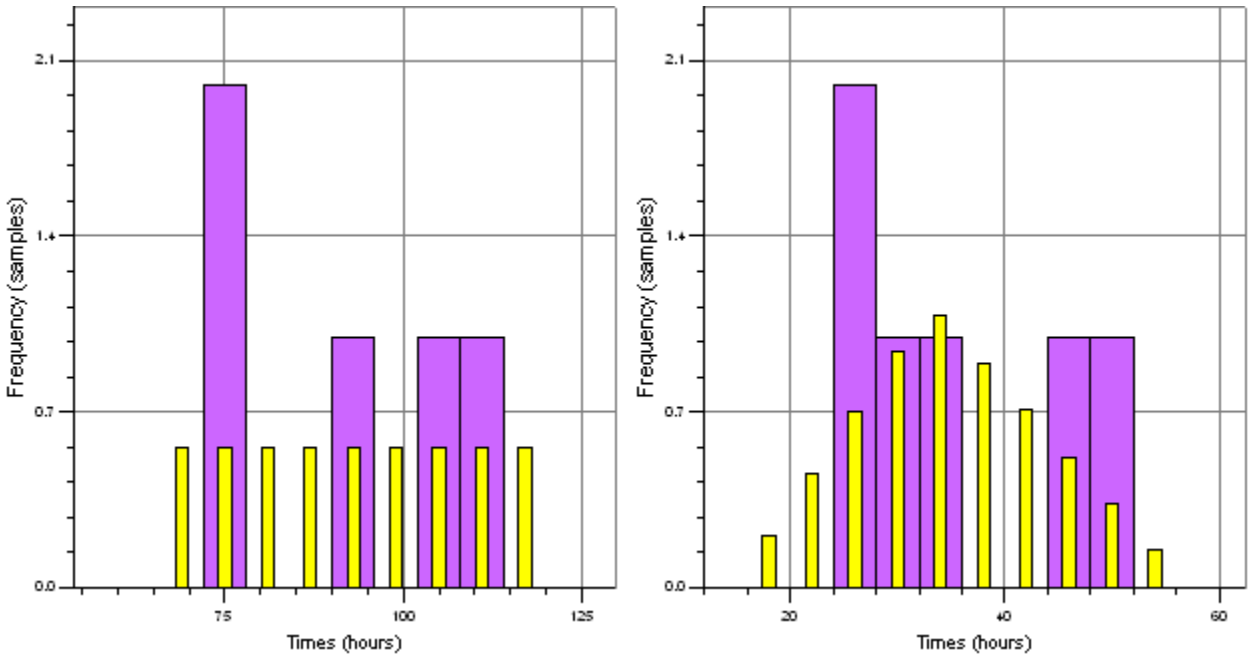


Figure 8: Monte Carlo Histogram - Total and Cumulative

Monte Carlo histograms provide a quick check of Mean and confidence levels for different time results based on the total number of iterations selected for the simulation. In the example above, there is a 80% probability that it will take about 58 days to complete the Well. Similarly, there is a 20% likelihood that the Well will be completed in approximately 36 days.

Single Phase histograms, such as those seen in Figure 9, allow you to see raw offset Well data (largest bars, shaded purple in application), then display the chosen distribution (smaller bars, shaded yellow in application).



Uniform Distribution

Triangular Distribution

Figure 9: Single Phase Histogram

When offset well data is sampled, Well Cost examines the data and assigns a suggested distribution based on the array of the data points. Notice that the distributions overlay the raw data. Users can activate the Advanced checkbox in the lower Probabilistic spreadsheet and adjust the parameters for each distribution. For example, we changed the **Min**, **Likely**, and

Max values for the triangular distribution above and then clicked on the **Calculate** button to see the new results (Figure 10).

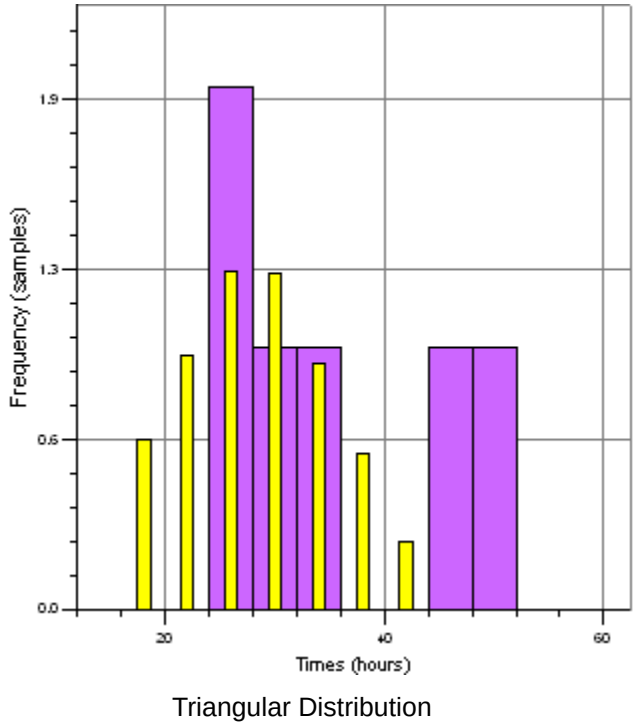


Figure 10: Results of Adjusted Parameters for Triangular Distribution

Notice that the distribution shifted slightly to the left and now has less tail.

The process of changing the distribution parameters and viewing the changes dynamically on one screen, can be helpful to make adjustments on default distributions for individual phases.

To reset the distribution parameters, click on the **Sample Statistics** button.

Deterministic and Probabilistic Analysis of Time and Cost at the Planning and Design Level

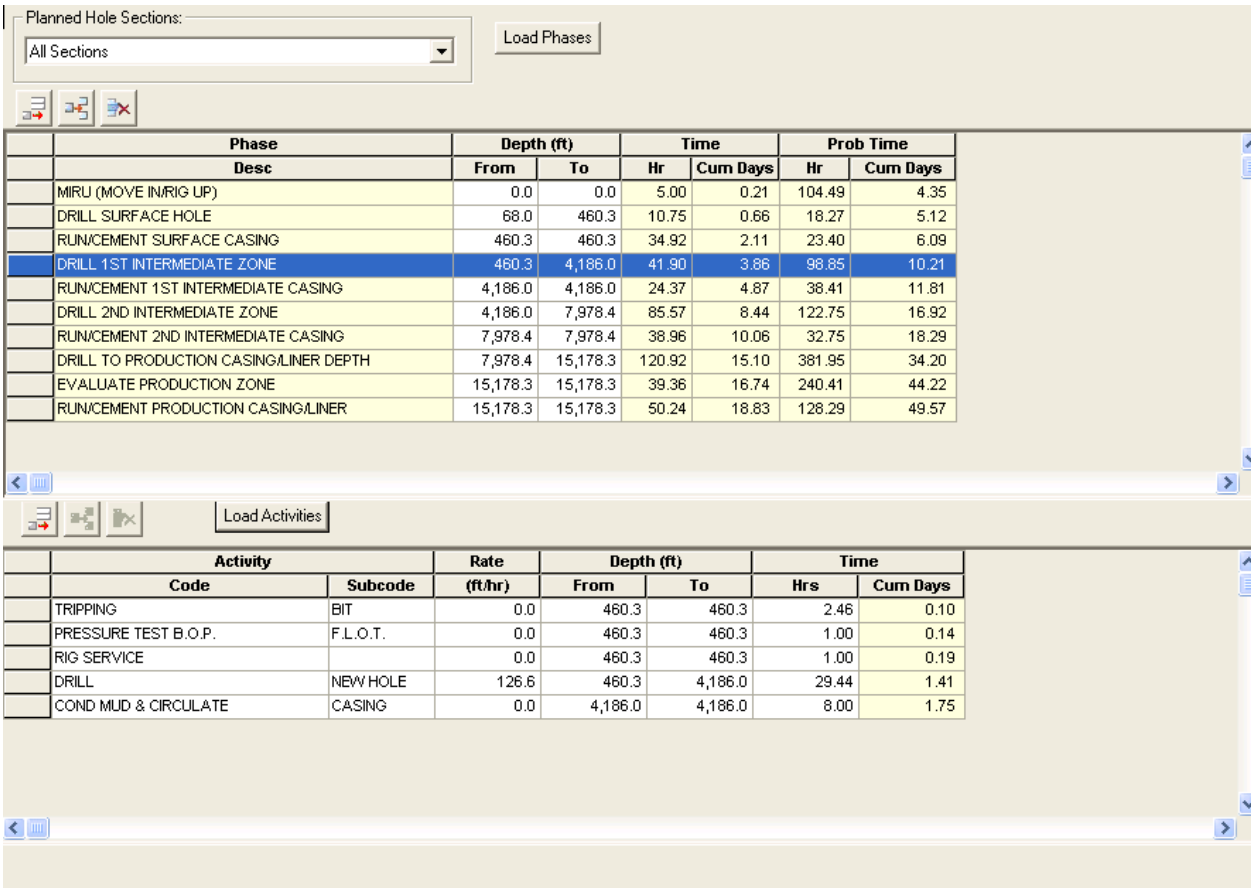
Well Cost offers two types of cost estimation methods: Deterministic (standard with all licenses) and Probabilistic (features only available with the Well Cost Advanced Package license). Each estimation method results in a calculated Cost breakdown appraised by Phase Activities associated with the Event.

Unplanned (Non-Productive) Time

Well Cost factors non-productive time (NPT), which is rolled up as one value into each Phase, into both the Deterministic and Probabilistic analysis. Therefore Well Cost can help identify where NPT issues exist, which can translate into millions of dollars in reduced drilling costs.

Deterministic Analysis

The Deterministic panel, seen in Figure 11, contains two spreadsheets that breakdown project time by Phase and Activity. The Phase spreadsheet (upper spreadsheet) lists the time allocated per each Hole Section Phase, and the Activity spreadsheet (lower spreadsheet) lists the Activities associated to each Hole Section and the time assigned to complete each Activity. Users can either manually edit the spreadsheets to enter and change data, or load (import) pre-existing data.



Phase		Depth (ft)		Time		Prob Time	
Desc		From	To	Hr	Cum Days	Hr	Cum Days
MIRU (MOVE IN/RIG UP)		0.0	0.0	5.00	0.21	104.49	4.35
DRILL SURFACE HOLE		68.0	460.3	10.75	0.66	18.27	5.12
RUN/CEMENT SURFACE CASING		460.3	460.3	34.92	2.11	23.40	6.09
DRILL 1ST INTERMEDIATE ZONE		460.3	4,186.0	41.90	3.86	98.85	10.21
RUN/CEMENT 1ST INTERMEDIATE CASING		4,186.0	4,186.0	24.37	4.87	38.41	11.81
DRILL 2ND INTERMEDIATE ZONE		4,186.0	7,978.4	85.57	8.44	122.75	16.92
RUN/CEMENT 2ND INTERMEDIATE CASING		7,978.4	7,978.4	38.96	10.06	32.75	18.29
DRILL TO PRODUCTION CASING/LINER DEPTH		7,978.4	15,178.3	120.92	15.10	381.95	34.20
EVALUATE PRODUCTION ZONE		15,178.3	15,178.3	39.36	16.74	240.41	44.22
RUN/CEMENT PRODUCTION CASING/LINER		15,178.3	15,178.3	50.24	18.83	128.29	49.57

Activity		Rate	Depth (ft)		Time	
Code	Subcode	(ft/hr)	From	To	Hrs	Cum Days
TRIPPING	BIT	0.0	460.3	460.3	2.46	0.10
PRESSURE TEST B.O.P.	F.L.O.T.	0.0	460.3	460.3	1.00	0.14
RIG SERVICE		0.0	460.3	460.3	1.00	0.19
DRILL	NEW HOLE	126.6	460.3	4,186.0	29.44	1.41
COND MUD & CIRCULATE	CASING	0.0	4,186.0	4,186.0	8.00	1.75

Figure 11: Deterministic Panel

On most occasions, users will load Phases and Activities that are developed and approved by a Company entity such as a Business Unit, Asset, or Field. This configuration data is loaded from the Time and Cost Configuration dialog.

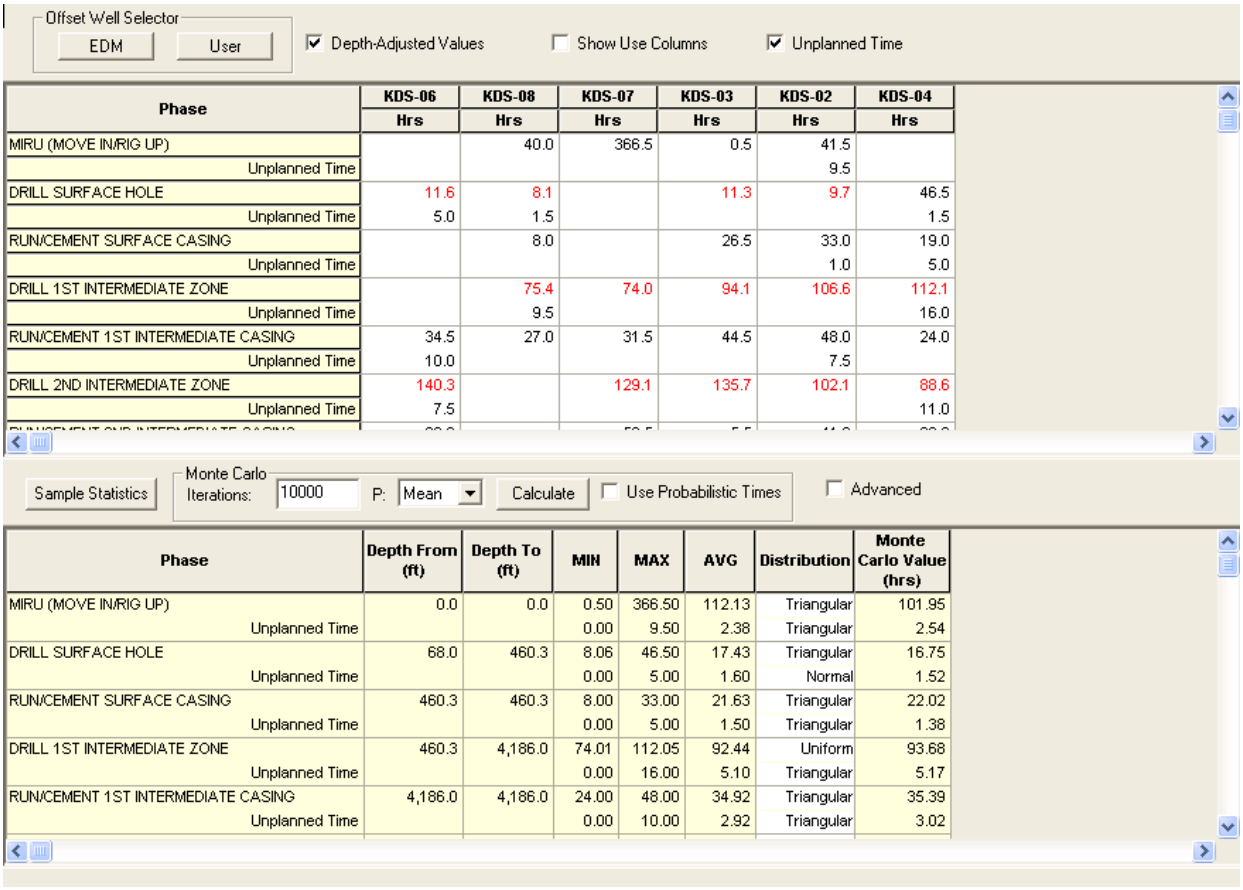
Probabilistic Analysis

The Probabilistic panel, seen in Figure 12, contains two spreadsheets, with several controls assigned to each, that list offset well data and display detailed results.

The upper spreadsheet displays raw data for all selected offset wells.

The lower spreadsheet displays:

- minimum, maximum and average time across all offset wells selected in the upper spreadsheet
- statistical distribution method applied to P1, P2, P3, and the Monte Carlo simulation



Phase	KDS-06 Hrs	KDS-08 Hrs	KDS-07 Hrs	KDS-03 Hrs	KDS-02 Hrs	KDS-04 Hrs
MIRU (MOVE IN/RIG UP)		40.0	366.5	0.5	41.5	
Unplanned Time					9.5	
DRILL SURFACE HOLE	11.6	8.1		11.3	9.7	46.5
Unplanned Time	5.0	1.5				1.5
RUN/CEMENT SURFACE CASING		8.0		26.5	33.0	19.0
Unplanned Time					1.0	5.0
DRILL 1ST INTERMEDIATE ZONE		75.4	74.0	94.1	106.6	112.1
Unplanned Time		9.5				16.0
RUN/CEMENT 1ST INTERMEDIATE CASING	34.5	27.0	31.5	44.5	48.0	24.0
Unplanned Time	10.0				7.5	
DRILL 2ND INTERMEDIATE ZONE	140.3		129.1	135.7	102.1	88.6
Unplanned Time	7.5					11.0

Phase	Depth From (ft)	Depth To (ft)	MIN	MAX	AVG	Distribution	Monte Carlo Value (hrs)
MIRU (MOVE IN/RIG UP)	0.0	0.0	0.50	366.50	112.13	Triangular	101.95
Unplanned Time			0.00	9.50	2.38	Triangular	2.54
DRILL SURFACE HOLE	68.0	460.3	8.06	46.50	17.43	Triangular	16.75
Unplanned Time			0.00	5.00	1.60	Normal	1.52
RUN/CEMENT SURFACE CASING	460.3	460.3	8.00	33.00	21.63	Triangular	22.02
Unplanned Time			0.00	5.00	1.50	Triangular	1.38
DRILL 1ST INTERMEDIATE ZONE	460.3	4,186.0	74.01	112.05	92.44	Uniform	93.68
Unplanned Time			0.00	16.00	5.10	Triangular	5.17
RUN/CEMENT 1ST INTERMEDIATE CASING	4,186.0	4,186.0	24.00	48.00	34.92	Triangular	35.39
Unplanned Time			0.00	10.00	2.92	Triangular	3.02

Figure 12: Probabilistic Panel

Offset Well data is loaded from either EDM or from an external spreadsheet such as Microsoft Excel.

It is recommended that at least three offset Wells are loaded into the upper spreadsheet. Selection of additional offset Wells improves analysis results.

Probability Distributions Applied to Individual Phases

Well Cost uses several distributions to calculate probabilistic time at the individual Phase level. These distributions are applied in the Probabilistic spreadsheet, which is available with the Well Cost Advanced Package license.

To select a distribution type, Well Cost examines the time entered for each offset Well Phase and displays a suggested distribution for each Phase.

The following distributions are available:

- **Uniform** - defines equal probability over a specific range for a continuous distribution. For this reason, it is important as a reference distribution.

- **Triangular** - typically used as a subjective description of a data set for which there is only limited sample data, and especially in cases where the relationship between variables is known but data is scarce. The Triangular distribution leads to a less conservative estimate of uncertainty because it gives a smaller standard deviation than the Uniform distribution.

  Both the Uniform and Triangular distributions are best suited to manipulate the start, middle, and end parameters.

- **Normal** - a Gaussian curve conducive to comparing with other types of distributions to validate the data follows the Normal distribution curve. In Well Cost, the single Phase plot is used to review the distribution for normality.

- **Lognormal** - generates the parameters (mean and standard deviation) and displays a slightly skewed result based on the Central Limit Theorem.

  The Normal and Lognormal distributions are used extensively in reliability applications to model failure times.

- **Weibull** - a continuous probability distribution that can mimic the behavior of the Normal distribution. The Weibull distribution is often used in place of the Normal distribution due to the fact that a Weibull variate can be generated through inversion, while Normal variates are typically generated using a more complicated method.

- **Probable** - a method for users to enter a mean time value and a probability of that occurrence happening directly into the spreadsheet on the Probabilistic pane. For example, the Probable distribution can provide a simple model to calculate Trouble time. In the portion of the Probabilistic spreadsheet shown in Figure 13, notice that with a 1 in 3 chance

of a sidetrack in a hole section lasting 48 hours, the Monte Carlo results are equal to 15.74 hours.

Distribution	Type	Value	Type	Value	Type	Value	Monte Carlo Value
Triangular	Min=	8.00	Likely=	27.00	Max=	365.05	134.67
Triangular	Min=	2.62	Likely=	25.75	Max=	44.23	24.61
Lognormal			Mean=	58.61	Std.Dev=	1.61	63.79
Triangular	Min=	3.54	Likely=	39.25	Max=	69.10	37.77
Triangular	Min=	18.32	Likely=	75.00	Max=	158.34	82.55
Triangular	Min=	13.31	Likely=	33.00	Max=	62.14	35.96
Triangular	Min=	15.08	Likely=	108.75	Max=	239.17	118.82
Triangular	Min=	5.73	Likely=	38.50	Max=	66.48	36.26
Uniform			Min=	75.48	Max=	490.12	294.00
Lognormal			Mean=	110.35	Std.Dev=	1.79	124.77
Probable			Time=	48.00	Prob 1:	3.00	15.74

Select Probable Distribution

Mean Time = 48 hours

1:3 ratio

Figure 13: Probable Distribution Type

Regardless of what distribution is used, statistically consistent results are obtained with Well Cost by providing complete and accurate data, and a valid Mean and Standard Deviation.

Monte Carlo Simulation of Well Data

Well Cost models current Well data against data from multiple offset wells using Monte Carlo simulation. This feature is only available with the Well Cost Advanced Package license.

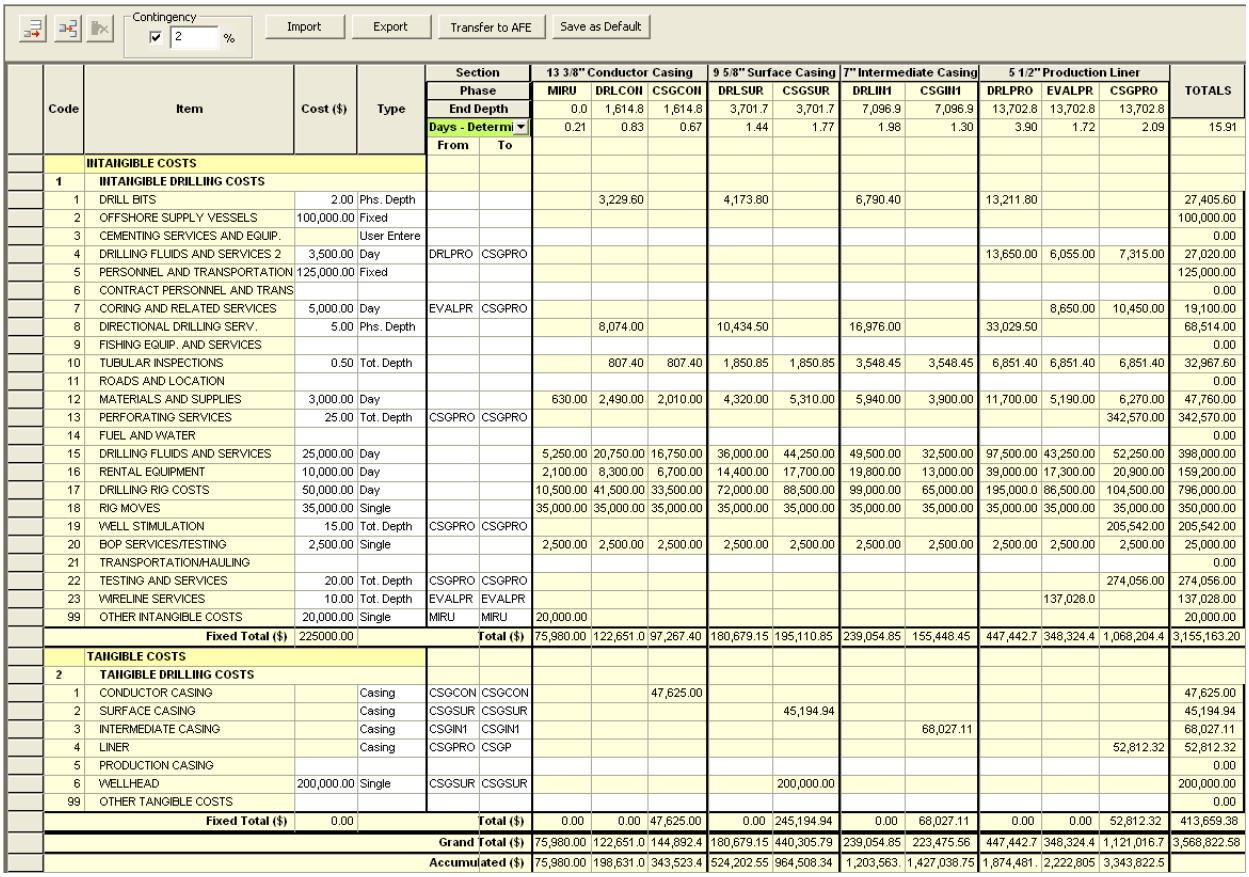
The simulator uses an algorithm that forecasts probable results from calculations performed on Well data.

Depth Adjusted Values

This option proportions the drilling times for the Hole Phases. This is a ratio between the offset Wells and the current Well while drilling through the same section depth. For example, the offset Well make take 50 hours to drill a 12 ¼" hole with a section length of 3000' (because it was 20degrees angle). The same section for the current well is 6000' long because it is inclined at 65 degrees. Therefore the Depth-Adjusted time value will be 50(6000)/3000 = 100 hours. This feature does not necessarily result in more accurate results. Instead, think of this option as a sensitivity adjustment for users who are very familiar with the selected offset Wells.

Cost Analysis

The Cost panel, seen in Figure 14, displays a phase driven spreadsheet that calculates all estimated and historical cost data for drilling, completion, and abandonment of the Wellbore. Cost displayed in the Cost spreadsheet are determined by the configuration chosen in the Cost Lists tab (see “Customizable Phases, Activities, and Cost” on page 34).



	Code	Item	Cost ($)	Type	Section		13 3/8" Conductor Casing			9 5/8" Surface Casing		7" Intermediate Casing		5 1/2" Production Liner			TOTALS
					Phase		MIRU	DRLCON	CSGCON	DRLSUR	CSGSUR	DRLIN1	CSGIN1	DRLPRO	EVALPR	CSGPRO	
					End Depth		0.0	1,614.8	1,614.8	3,701.7	3,701.7	7,096.9	7,096.9	13,702.8	13,702.8	13,702.8	
					Days - Determi		0.21	0.83	0.67	1.44	1.77	1.98	1.30	3.90	1.72	2.09	15.91
					From	To											
		INTANGIBLE COSTS															
	1	INTANGIBLE DRILLING COSTS															
	1	DRILL BITS	2.00	Phs. Depth				3,229.60		4,173.80		6,790.40		13,211.80			27,405.60
	2	OFFSHORE SUPPLY VESSELS	100,000.00	Fixed													100,000.00
	3	CEMENTING SERVICES AND EQUIP.		User Entere													0.00
	4	DRILLING FLUIDS AND SERVICES 2	3,500.00	Day	DRLPRO	CSGPRO								13,650.00	6,055.00	7,315.00	27,020.00
	5	PERSONNEL AND TRANSPORTATION	125,000.00	Fixed													125,000.00
	6	CONTRACT PERSONNEL AND TRANS															0.00
	7	CORING AND RELATED SERVICES	5,000.00	Day	EVALPR	CSGPRO									8,650.00	10,450.00	19,100.00
	8	DIRECTIONAL DRILLING SERV.	5.00	Phs. Depth				8,074.00		10,434.50		16,976.00		33,029.50			68,514.00
	9	FISHING EQUIP. AND SERVICES															0.00
	10	TUBULAR INSPECTIONS	0.50	Tot. Depth				807.40	807.40	1,850.85	1,850.85	3,548.45	3,548.45	6,851.40	6,851.40	6,851.40	32,967.60
	11	ROADS AND LOCATION															0.00
	12	MATERIALS AND SUPPLIES	3,000.00	Day			630.00	2,490.00	2,010.00	4,320.00	5,310.00	5,940.00	3,900.00	11,700.00	5,190.00	6,270.00	47,760.00
	13	PERFORATING SERVICES	25.00	Tot. Depth	CSGPRO	CSGPRO										342,570.00	342,570.00
	14	FUEL AND WATER															0.00
	15	DRILLING FLUIDS AND SERVICES	25,000.00	Day			5,250.00	20,750.00	16,750.00	36,000.00	44,250.00	49,500.00	32,500.00	97,500.00	43,250.00	52,250.00	398,000.00
	16	RENTAL EQUIPMENT	10,000.00	Day			2,100.00	8,300.00	6,700.00	14,400.00	17,700.00	19,800.00	13,000.00	39,000.00	17,300.00	20,900.00	159,200.00
	17	DRILLING RIG COSTS	50,000.00	Day			10,500.00	41,500.00	33,500.00	72,000.00	88,500.00	99,000.00	65,000.00	195,000.0	86,500.00	104,500.00	796,000.00
	18	RIG MOVES	35,000.00	Single			35,000.00	35,000.00	35,000.00	35,000.00	35,000.00	35,000.00	35,000.00	35,000.00	35,000.00	35,000.00	350,000.00
	19	WELL STIMULATION	15.00	Tot. Depth	CSGPRO	CSGPRO										205,542.00	205,542.00
	20	BOP SERVICES/TESTING	2,500.00	Single			2,500.00	2,500.00	2,500.00	2,500.00	2,500.00	2,500.00	2,500.00	2,500.00	2,500.00	2,500.00	25,000.00
	21	TRANSPORTATION/HAULING															0.00
	22	TESTING AND SERVICES	20.00	Tot. Depth	CSGPRO	CSGPRO										274,056.00	274,056.00
	23	WIRELINE SERVICES	10.00	Tot. Depth	EVALPR	EVALPR									137,028.0		137,028.00
	99	OTHER INTANGIBLE COSTS	20,000.00	Single	MIRU	MIRU	20,000.00										20,000.00
		Fixed Total ($)	225000.00			Total ($)	75,980.00	122,651.0	97,267.40	180,679.15	195,110.85	239,054.85	155,448.45	447,442.7	348,324.4	1,068,204.4	3,155,163.20
		TANGIBLE COSTS															
	2	TANGIBLE DRILLING COSTS															
	1	CONDUCTOR CASING		Casing	CSGCON	CSGCON			47,625.00								47,625.00
	2	SURFACE CASING		Casing	CSGSUR	CSGSUR					45,194.94						45,194.94
	3	INTERMEDIATE CASING		Casing	CSGIN1	CSGIN1							68,027.11				68,027.11
	4	LINER		Casing	CSGPRO	CSGP										52,812.32	52,812.32
	5	PRODUCTION CASING															0.00
	6	WELLHEAD	200,000.00	Single	CSGSUR	CSGSUR					200,000.00						200,000.00
	99	OTHER TANGIBLE COSTS															0.00
		Fixed Total ($)	0.00			Total ($)	0.00	0.00	47,625.00	0.00	245,194.94	0.00	68,027.11	0.00	0.00	52,812.32	413,659.38
						Grand Total ($)	75,980.00	122,651.0	144,892.4	180,679.15	440,305.79	239,054.85	223,475.56	447,442.7	348,324.4	1,121,016.7	3,568,822.58
						Accumulated ($)	75,980.00	198,631.0	343,523.4	524,202.55	964,508.34	1,203,563.	1,427,038.75	1,874,481.	2,222,805	3,343,822.5	

Figure 14: Cost Panel

Contingency

Contingency is the percentage applied to Item Total and Grand Total cost that accounts for variables such as currency exchange rates and other things not covered by contract. When the Contingency checkbox is activated, you can enter a value to inflate cost by a percentage. The contingency value is optional and distributed equally across all cost items as a cumulative sum total.

For example, assume a cost sheet Grand Total of $100,000 with two cost items originally estimated to be $50,000 each. If a 5% value is entered in the Contingency field, the new Grand Total is $105,000 with each cost item now $52,500.

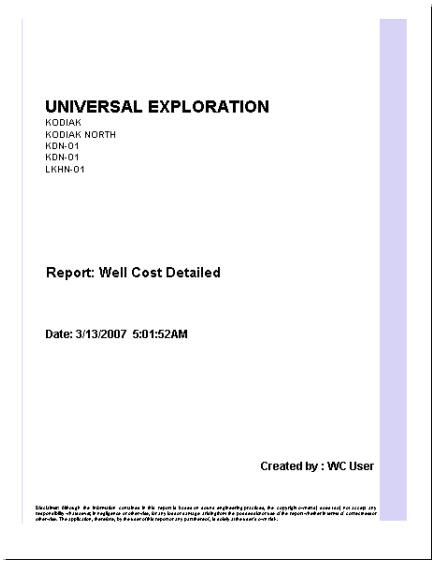
Reporting

Reports are rendered through the EDM Report Manager can be displayed in an electronic format file (e.g. .PDF, .XML), then saved, emailed, or printed using any printer that is supported by Windows. Minimal effort and data input is required to generate a Well Cost report or AFE.

Well Cost output reports include:

- **Well Cost AFE Report** - Event based cost items from this report are transferred to the OpenWells Cost Estimate and AFE Report, which stores the estimated costs of a Well prior to the start of operations. This report is typically completed in the office by a Well Planning team, rather than in the field.

- **Well Cost Detailed Report** - Displays details of the estimated cost of drilling a Well determined by Well Cost with either deterministic- or probabilistic-time-based calculations.

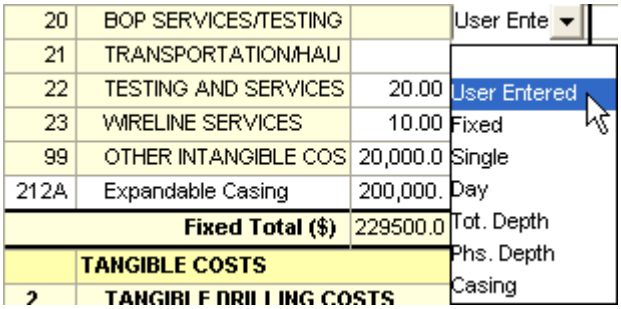


Detailed Report

AFE Report

Customizable Phases, Activities, and Cost

The flexibility to customize cost and activity codes through the EDM Admin Utility, which ships with Well Cost, allows specific activities and cost items to be tailored to each company's Well Planning and accounting system. Well Cost uses time and cost configuration files, which are more powerful than templates, and allows user-entered cost items (Figure 15), to provide flexible control over the estimation process.



User entered cost picklist in the Cost spreadsheet

Figure 15: Custom Cost Items

By default, Well Cost ships with sample configuration files for Hole Phases (Default.wcp), Activities (Default.wca), and Cost (***Default.wcc). The name of the Cost default file is set by the Event Code listed in the General Information pane. For example, if the Event code is set to Original Drilling, the default cost configuration file is named “ODRDefault.wcc”.

The configuration data is loaded into the Time and Cost Configuration dialog and used by Well Cost to populate the spreadsheets on the Deterministic pane and Cost pane. All default configuration files are located in the installation directory **Well Cost** folder (Figure 16).

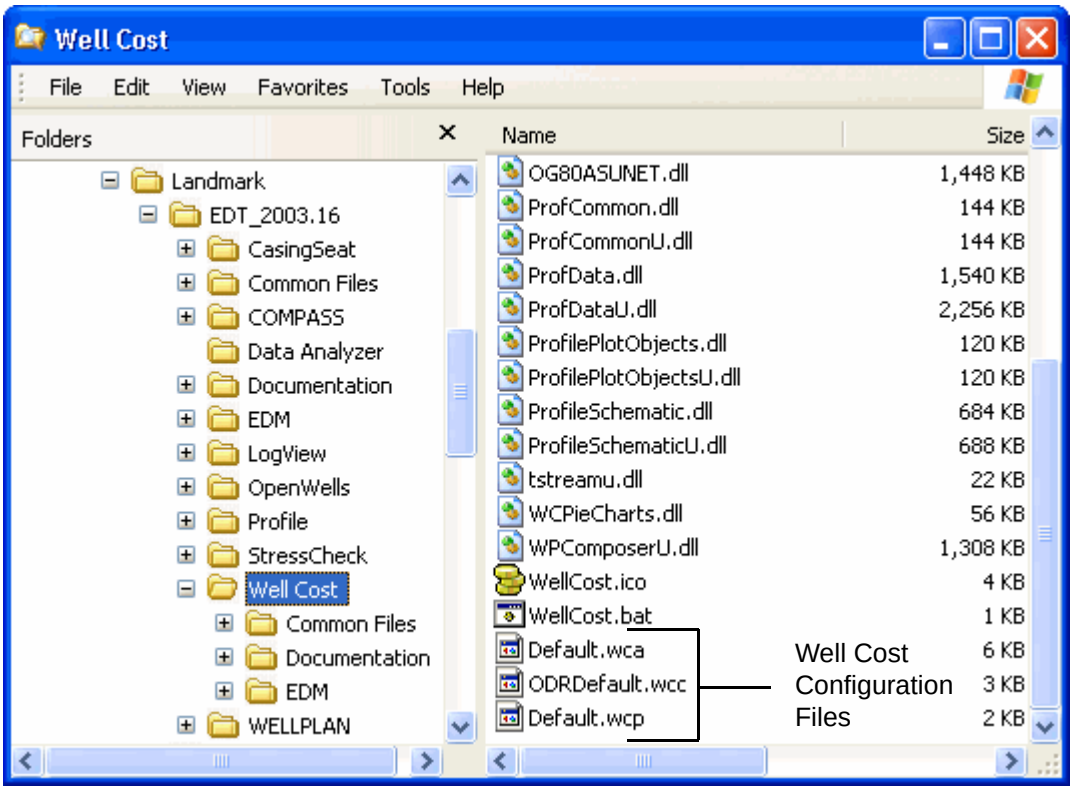


Figure 16: Default Configuration File Location

For additional details, including important information about recommended best practices for setting defaults, see *Well Cost Help*.

Import/Export of Wellbore Data

The Import feature for Wellpath, Formation, and Cost data allows you to use data in Well Cost from external applications, such as spreadsheets or text files.

Import buttons ( ) and Export buttons ( ), located on the Wellpath and Formation panels, open the Import File dialog and Export Wizard, where you can import/export data from or to a file or the Windows clipboard.

Cost data is stored in a text file with a .WCC file extension for import/export operations from the Cost panel.

Integrated with Engineer's Desktop on the EDM Database

Well Cost enjoys full integration with other EDT applications on the EDM Database through the common Well Explorer.

The underlying platform for the Engineer's Desktop, the Engineer's Data Model (EDM), is Landmark's Drilling, Completions, Production, and Economics integration platform. EDM provides a common database schema that allows for common data access, enables naturally integrated engineering workflows, and reduces data entry duplication across applications.

A significant advantage of the EDM database is improved integration between all Landmark applications. For example, integrated Engineering applications on EDM allow for improved Plan vs. Actual comparisons and complete store of Design iterations from Prototype to Plan to Actual.

For a complete listing of all Well Explorer features, see *Well Cost Help*.

Status Bar and Simultaneous Activity Monitor (SAM)

EDM supports full concurrency for multiple applications owning the same data set through the Simultaneous Activity Monitor (SAM). The Simultaneous Activity Monitor consists of a Messaging Server run as a Windows Service typically on a dedicated PC. Applications launching against an EDM database register with the SAM service and notify SAM of all data access made by the user. This server notifies a user of all data items currently open by other applications sharing the same database.

By default, the SAM server is enabled and connected, you will see a green "SAM" icon () in the status bar of your application and a tooltip "SAM - Connected"

If the SAM service is configured but not connected, the "SAM" icon will appear with a red "X" drawn through it () and a tooltip "SAM - Not Connected". Consult your System Administrator.

If the SAM service is enabled and connected then loses connectivity, you will see a red "SAM" icon () in the status bar of your application and a tooltip "SAM - No longer responding".

If the SAM service is not configured, there will be no SAM icon in the status bar. Consult your System Administrator.

> **Note**
>
> For in-depth information on configuring the SAM service, refer to *EDM Administration Utility Help*.

Common Well Explorer Features

The Well Explorer used by Well Cost is shared with other Engineer's Desktop applications such as WELLPLAN, PROFILE, CasingSeat, and StressCheck. Figure 17 shows the Well Explorer found in Well Cost, with the main features highlighted. For a definitive list of all Well Explorer features, and how to use them, see *Well Cost Help*.

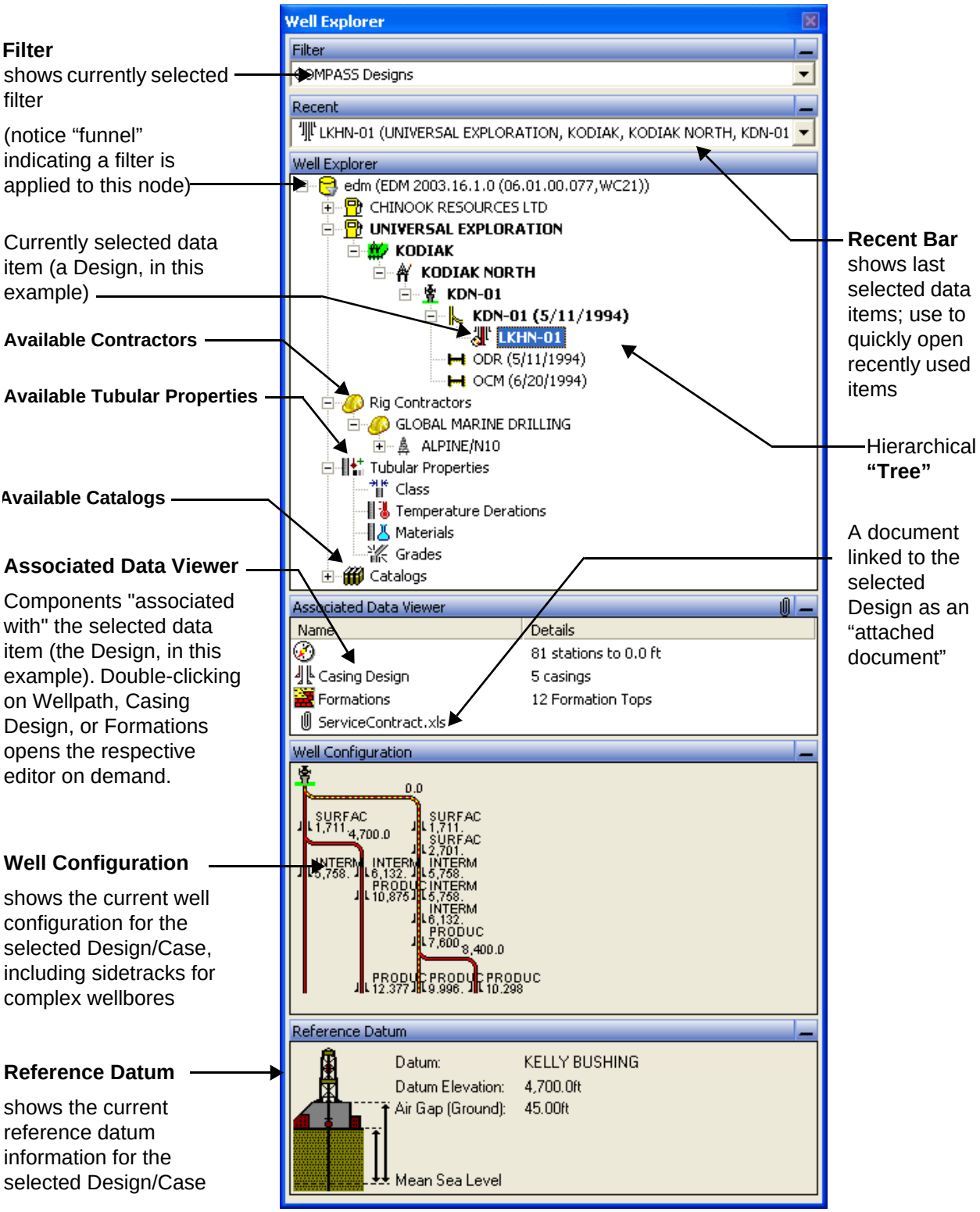


Figure 17: Common Well Explorer illustrating Filter list, Recent List, Well Configuration and Reference Datum display features

Well Explorer features include:

- A hierarchical “tree” graphical representation of the EDM Database. Use the Well Explorer to browse, open, copy, delete, and manage the main data items in the database hierarchy, including Companies, Projects, Sites, Wells, Wellbores, Designs, and Rig Contractors. The Catalog Editor can be opened from the Well Explorer. Open items in the hierarchy are shown in **bold typeface**.
- Well Explorer filtering capability, and the ability to save filters. This feature includes CTRL-F search, advanced Search, a filter drop-down menu, and the display of a filter “funnel” icon over an EDM database node when the filter is selected.
- Recent Bar to select and open recently used Designs with a picklist.
- Copy/Paste functionality from the keyboard or via context menus, including a convenient “Drag and drop” feature. Data and attached documents can be copied between hierarchical levels. For example, you can select a Project associated with one Company, and copy it to another Company. In this example, when you copy the Project all the data (Sites, Wellbores, etc.) associated with the Project are also copied. In Well Cost, this time-saving feature can be frequently used to drag and drop Formations, Wellpaths, and Casings as you work.
- Associated Data Viewer displays data components associated with Well Explorer nodes below the database level, such as attachments added to a Design.
- Common Rig, Sidetrack, etc. visualization in a Well Configuration panel. The Well Configuration panel includes a datum diagram and a sidetrack diagram.
- A Reference Datum diagram that displays other associated data, such as depths, direction, and origin that is specific to the Design selected on the Well Explorer tree. Depths are referenced from a specific datum point, such as from the Kelly Bushing.
- F7 and Ctrl+F7 Data Dictionary support in Well Explorer Properties dialogs
- Expanded transfer file extensions differentiate data into specific categories. For example, rig transfer files are *.rig.xml. All 2003.16.1.0 applications can read historical data and therefore are backwards compatible to 2003.5.
- Files can be associated to most Well Explorer nodes as attachments saved or linked to the database, including links to local and network folders.
- To save real estate on the main screen, display of the Well Explorer can be hidden when needed with a button () that toggles it on/off. You can also move the Well Explorer to various locations on the main screen and “dock” it as needed.
- Lessons Learned associated to the Well and Design levels. Lessons are saved in the EDM database CD_LESSONS_LEARNED table and are useful inputs to company Knowledge Management systems.

Wall Plot Composer

The Wall Plot Composer is the primary feature in a number of Engineer's Desktop applications that enables engineers the ability to output professional quality wallplots. Engineers can add text boxes, graphics and diagrams rendered from information entered into, or calculated from, EDM.

One of the benefits that Wall Plot Composer brings to Well Cost is that users can create customized layouts that feature Design objects that can either be viewed on screen, or printed as hard copy. The Wall Plot Composer is a comprehensive, interactive, live drafting package designed to produce

quality wellbore equipment schematic diagrams for small- or large-format printers or plotters. The Wall Plot Composer provides a large number of different drawing objects. Different schematics, data tracks, graphs, text boxes, and bitmaps can be incorporated into the Wall Plot page.

Supported objects include:

- Schematic
- XY Graph - examples include Wellpath Plan, Wellpath Section, Time vs Depth, Planned vs Actual (Time vs Depth), Time vs Cost, Monte Carlo Histogram, Single Phase Histogram, Deterministic and Probabilistic Phase Time Pie Charts, Deterministic Tangible and Intangible Costs Pie Charts, etc. Any plot associated with Probabilistic time is only available to users that own the Well Cost Advanced Package license.
- 3D Graph
- Data Box – User defined only
- Lithology Column
- Logos - Company and User defined
- Text Boxes
- Picture Boxes
- Free-Hand Drawing Objects - Rectangle, Polygon, Ellipse, Circle, Line, Polyline, Curved Line, and Arrow

The Wall Plot Composer is simple to use. An object type is selected from the Composer menu, Object toolbar, or via a right-click menu. Once an object is selected, drag an area on the plot to draw the object in that area. Objects can be resized later if required. Double-click on any object to display a set of object properties that provide control over scaling, drawing options, labels, fonts and shading. A suite of drawing tools enable a user to align, center, or adjust drawn objects to the desired position on the plot. Object layering is available so that an object can be displayed on top of another. Zoom In/Zoom Out is included with the Wall Plot Composer to view the plot with a different magnification level. Customized drawing objects are easily imported or exported to promote sharing between applications that use the Wall Plot Composer. Well Cost includes a portable storage format (.PPC file extension) that enables engineers to easily share their wall plot designs with other users. Two example files ship with Well Cost and are located in the installation directory \Well Cost folder:

- WC_Deterministic.ppc (default file loaded when a new Wall Plot tab is created, seen in Figure 18 below)
- WC_Probabilistic.ppc

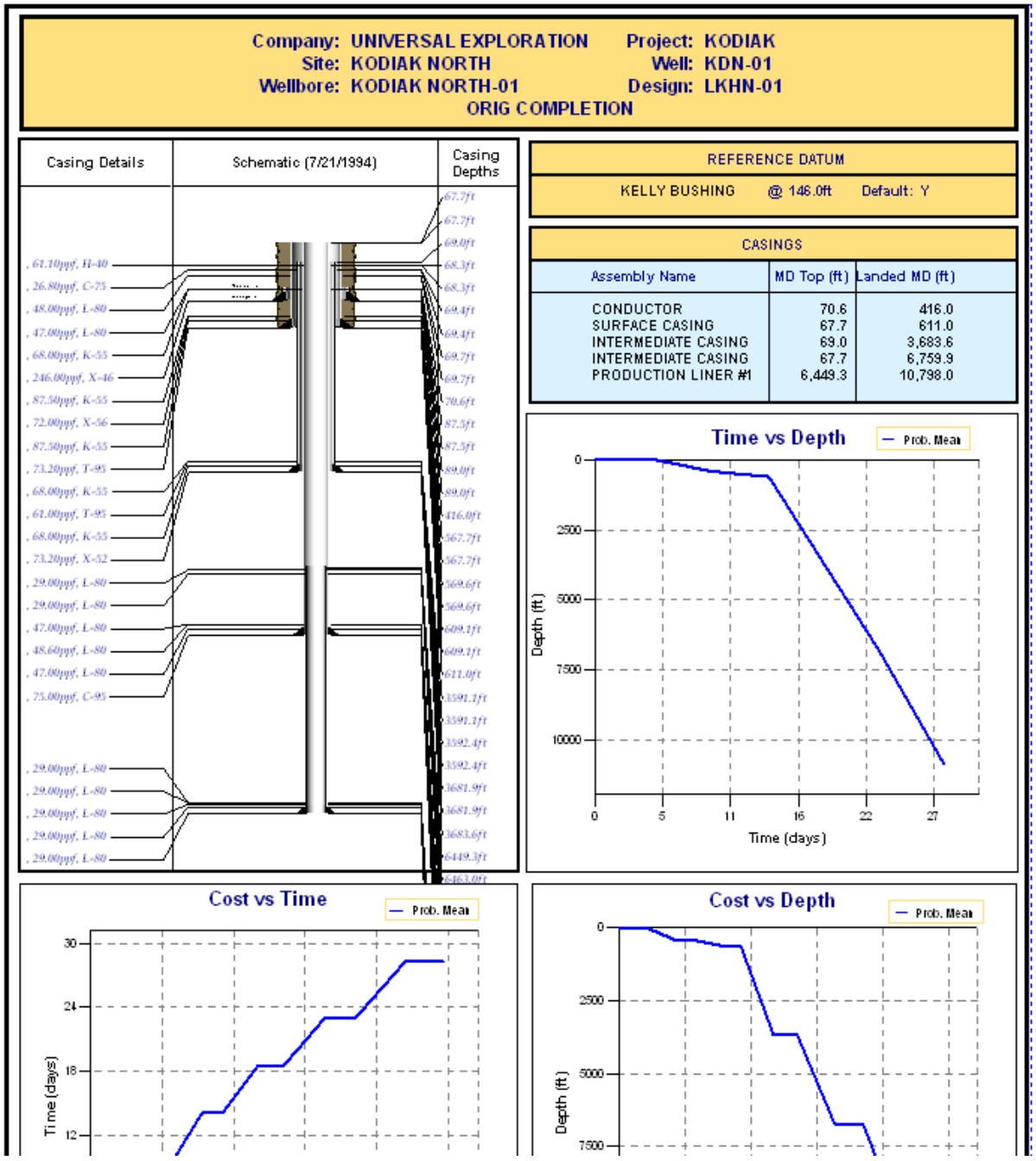


Figure 18: Wall Plot Composer

Various Wall Plots are created within the Engineer's Desktop for use by engineers. Schematic and object design layouts are saved as templates for future plots for the chosen paper size.

Within the Wall Plot Composer, you can export Wall Plot pages in various electronic formats:

- Windows Bitmap (*.bmp)
- Compuserve (*.gif)
- JPEG File Interchange (*.jpg)
- Portable Network Graphics (*.png)
- Tag Image File (*.tif)
- TARGA Image (*.tga)
- PC Paintbrush ((*.pcx)
- Enhanced Metafile (*.emf)
- Scalable Vector Graphics (*.svg)

Known Problems

Through the course of development of Well Cost 2003.16.1.0, a number of issues recorded during testing were identified but not resolved for this release. The issues listed here includes functionality and issues that are planned to be resolved for future releases of Well Cost:

Defect/Enhancement No.	Description
734001	Importing XML file displays a fail to import error dialog. During some import operations a warning that XML data failed to import displays even though the data imports into EDM. If the data does not immediately display in the Well Explorer after import, refresh the Well Explorer tree (press F5 key with focus on the Well Explorer or right-click on the Database node and select Refresh).
746719	Changes to plot scaling ($/inch) leaves a background artifact in the plot.
747124	Changes made to the Deterministic or Probabilistic spreadsheets are not updated in the Cost Sheet unless the Deterministic/Probabilistic picklist is set to match.
748766	Problems with TVD/MD logic when importing historical EDM Transfer Files (*.xml) Workaround: Close the imported Design in Well Cost. Open same Design in StressCheck then re-open in Well Cost.
750666	For Oracle, SERVER SITE IMPORT errors are known to cause problems with importing Well Cost reports during Well Cost installation. Workaround: If you receive SEVERE SITE IMPORT errors during a Well Cost installation on Oracle, and the date of the error corresponds to the date of the installation, import Well Cost reports into the EDM Administration Utility.
750771	Unable to open custom Wall Plots from user local drive while working in Citrix environment. Workaround: Load Wall Plot templates from a network drive accessible to the Citrix environment.
751519	Well Schematic will not print from Plot view. Workaround: Print the schematic from the Wall Plot Composer.
752138	Import of wellpath & formation from user local drive throws the following unnecessary warning while working in Citrix environment. Warning <The parameter is incorrect> Workaround: Ignore the warning and click OK on the dialog to complete the import operation.

Defect/Enhancement No.	Description
752140	Launching reports in Well Cost throws java exceptions when installed along with EDM 2003.16 and non-supported older releases. A conflict exists when the Report Manager shipped with Well Cost accesses code from the 2003.16.0 and non-supported older releases.

Contacting Support

Landmark operates Technical Assistance Centers (TACs) in Australia, the United Kingdom, and the United States. Additional support is also provided through local support offices around the world. Local support office information is listed below. If problems cannot be resolved at the district level, our escalation team is called to resolve your incidents quickly.

Support information is always available on the Landmark Graphics Support internet page located at: http://css.lgc.com/CustomerSupport/CustomerSupportHome.jsp.

Technical Assistance Centers

North America 7:30 am - 5:30 pm Central Standard Time Monday - Friday, excluding holidays	**713-839-2200 (Houston, TX, USA)** **Toll Free 1-877-435-7542** **(1-877-HELP-LGC)** Fax: 713-839-2168 (Houston, TX) Fax: 907-275-2655 (Anchorage, AK) Fax: 303-796-0807 (Denver, CO) Fax: 403-262-1929 (Calgary, Canada) Email: support@lgc.com
Latin America (Spanish, Portuguese, English) 7:00 am - 5:00 pm Central Standard Time Local normal business hours	**1-713-839-3405 (Houston,TX,USA)** Fax: 713-839-3646 Email: soporte@lgc.com Toll Free from: Argentina: 0800-800-5263 Brazil: 0800-891-0837 Chile: 800-201-898 Colombia: 01800-915-4743 Mexico: 001-888-438-1296 Peru: 0800-51634 Trinidad: 1-888-438-1296 Venezuela: 0-800-526-3627 Toll Free from local area: Ecuador (Quito) (02)226-1908
Europe, Africa, Middle East 8:00 am - 5:30 pm Local Time Monday - Friday, excluding holidays	**44-1372-868686 (Leatherhead, UK)** Fax: 44-1372-868601 (Leatherhead, UK) Fax: 44-1224-723260 (Aberdeen, UK) Email: eame_helpdesk@lgc.com ssasupport@lgc.com (Southern Africa)

Asia, Pacific
8:00 am - 5:00 pm Local Time
Monday-Friday, excluding holidays

61-8-9481-4488 (Perth, Australia)
Toll-free 1-800-448-488
Fax: 61-8-9481-1580
Email:
apsupport@lgc.com
FSU_support@lgc.com

Toll-Free from:

China:	10-800-6100-253
Indonesia:	001-803-61284
Japan:	00531-61-0021
Malaysia	1800-803-687
New Zealand	0800-400-555
Philippines	1800-1611-0207
South Korea	00308-61-0046
Taiwan	0080-161-1350
Thailand	001-800-611-2784

Toll Free from local area:
Vietnam: 84-8-9191901

District Support Offices

Algeria (Algiers)
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Saturday - Wednesday excluding holidays

213 21 37 72 39
Email: eame_helpdesk@lgc.com

Angola (Luanda)
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Email: eame_helpdesk@lgc.com

Argentina (Buenos Aires)
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Brazil (Rio de Janeiro)
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55-21-3974-4000 or
Toll Free 0800-891-0837
Fax: 55-21-3974-4002
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67-3-233-5319
Email: apsupport@lgc.com

Canada (Calgary) 7:30 am - 5:30 pm Central Standard Time Monday-Friday, excluding holidays	**Toll Free 1-877-435-7542** **(1-877-HELP-LGC)** Fax: 403-262-1929 (Calgary, Canada) Fax: 713-830-2168 (Houston, TX) Email: support@lgc.com
Chile (TAO TAC, Houston, Texas) Local normal business hours	**Toll Free 800-201-898** Fax: 1-713-839-3646 Email: soporte@lgc.com
Colombia (Bogota) 8:00 am - 5:00 pm Local Time	**57-1-326-4000** **57-1-326-6710** **Toll Free 01800-915-4743** Fax: 57-1-326-6717 Email: soporte@lgc.com
Ecuador (Quito) 8:00 am - 5:00 pm Local Time	**59-32-226-1844** **Toll Free from Quito (02)226-1908** Fax: 59-32-226-2590 Email: soporte@lgc.com
Egypt (Cairo) 8:00 am - 4:00 pm Local Time Saturday - Wednesday, excluding holidays	**20-2-759-1717** **(ask for Landmark Technical Support)** Email: eame_helpdesk@lgc.com
India (New Delhi) 9:00 am - 5:30 pm Local Time Local Business Days, excluding holidays	**91-11-622-1885** (c/o Samit Enterprises) Fax: 91-11-647-9246 Email: apsupport@lgc.com
Indonesia (Jakarta) 7:30 am - 4:30 pm Local Time Monday - Friday, excluding holidays	**62-21-3003-9039 or** **Toll Free 001-803-61284** Fax: 62-21-3003-9088 Email: apsupport@lgc.com
Japan 8:00 am - 5:00 pm Local Time Monday - Friday, excluding holidays	**Toll Free 00531-61-0021** Email: apsupport@lgc.com
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Mexico (Reynosa) 8:00 am - 6:00 pm Local Time	**52-555-208-3533** **52-555-208-3868** **Toll Free 001-888-438-1296** Local Office Fax: 52-555-514-7646 Support Fax: 1-713-839-3646 Email: soporte@lgc.com
New Zealand (New Plymouth) 8:00 am - 5:00 pm Local Time Monday - Friday, excluding holidays	**61-6-755-2318** **Toll Free 0800-400-555** Fax: 64-6-755-2407 Email: apsupport@lgc.com
Nigeria (Lagos) 8:00 am - 5:00 pm Local Time Monday - Friday, excluding holidays	**234-1-461-0780** **(ask for Landmark Technical Support)** Fax: 234-1-262-0769 Email: eame_helpdesk@lgc.com
People's Republic of China (Beijing) 9:00 am - 5:30 pm Local Time Monday - Friday, excluding holidays	**86-10-8486-4501** **Toll Free 10-800-6100-253 or** **10-800-810-0209** Fax: 86-10-8486-4819 Email bjsupport@lgc.com or apsupport@lgc.com
Peru (Lima) Local normal business hours	**Toll Free 0800-51634** Fax: 001-713-839-9646 Email: soporte@lgc.com
Russia (Moscow) 7:00 am - 5:00 pm Local Time Local Business Days, excluding holidays	**7-095-960-2926** **7-095-960-2927** **(ask for Landmark Technical Support)** Fax: 7-095-755-8301 Email: eame_helpdesk@lgc.com
South Korea 8:00 am - 5:00 pm Local Time Monday - Friday, excluding holidays	**Toll Free 00308-61-0046** Email: apsupport@lgc.com
Taiwan 8:30 am - 5:30 pm Local Time Monday-Friday, excluding holidays	**Toll Free 00801-61-1350** Email: apsupport@lgc.com
Thailand (Bangkok) 8:00 am - 5:00pm Local Time Monday - Friday, excluding holidays	**66-2-278-8100** **Toll Free 001-800-611-2784** Fax: 66-2-278-8199 Email: apsupport@lgc.com

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(Houston, TX)
Local normal business hours

Toll Free: 1-888-438-1296
Fax: 1-713-839-3646
Email: soporte@lgc.com

United Arab Emirates (Dubai)
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Local Business Days, excluding holidays

+971-4-3036446
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Fax: +971-4-3315837
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United Kingdom
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Fax 44-1224-723260 (Aberdeen)
Email: eame_helpdesk@lgc.com

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Landmark Graphics FTP Site	ftp://ftp.lgc.com
Oracle home page	http://www.oracle.com

Name	Website Address
FLEXlm license management software home page	http://www.macrovision.com/support/by_category/Software_Licensing.shtml
Microsoft SQL Server home page	http://www.microsoft.com/sql/default.asp
Adobe Acrobat Reader	http://www.adobe.com
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