GMI•WellCheck™ 2.04
Release Notes

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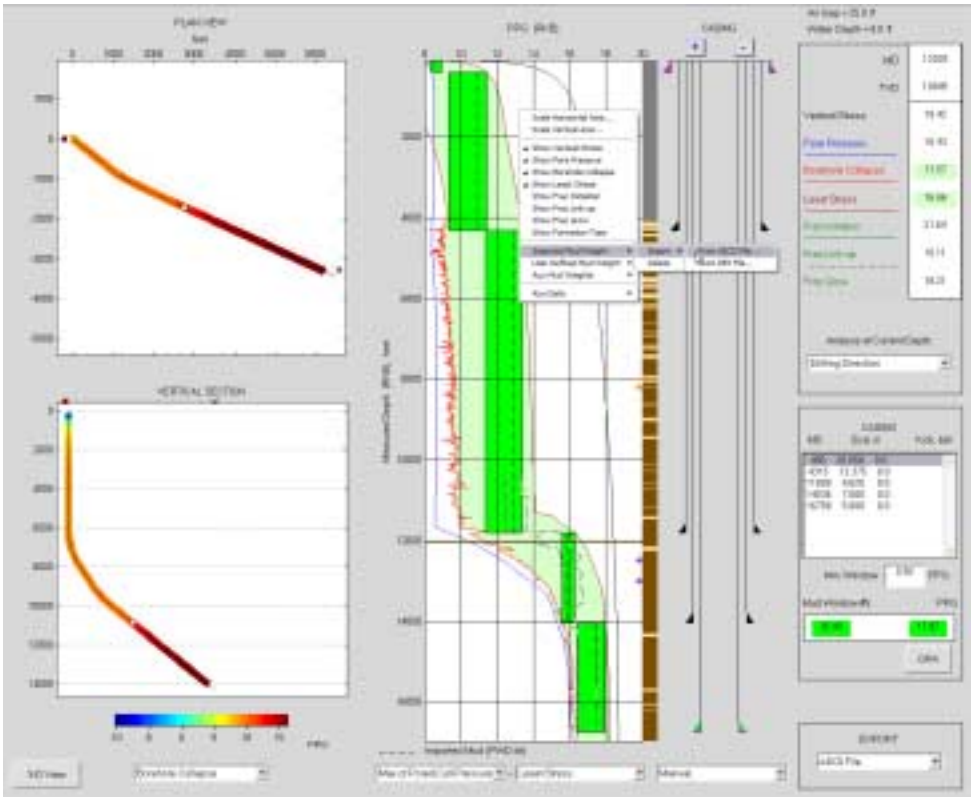
Product Overview

GMI•WellCheck™ is an interactive program for well planning and wellbore stability. It is designed for easy use by drilling engineers and drilling supervisors to optimize mud weight, well direction, and casing seat selection while preventing catastrophic wellbore failures and lost circulation. GMI•WellCheck takes into consideration pore pressure, fracture gradient, collapse pressure, rock properties, kick tolerance, different directional profiles, and risk associated with input model uncertainties. With GMI•WellCheck, wells may be drilled with lighter mud weights, fewer casing strings, less trouble time, and substantial cost savings.

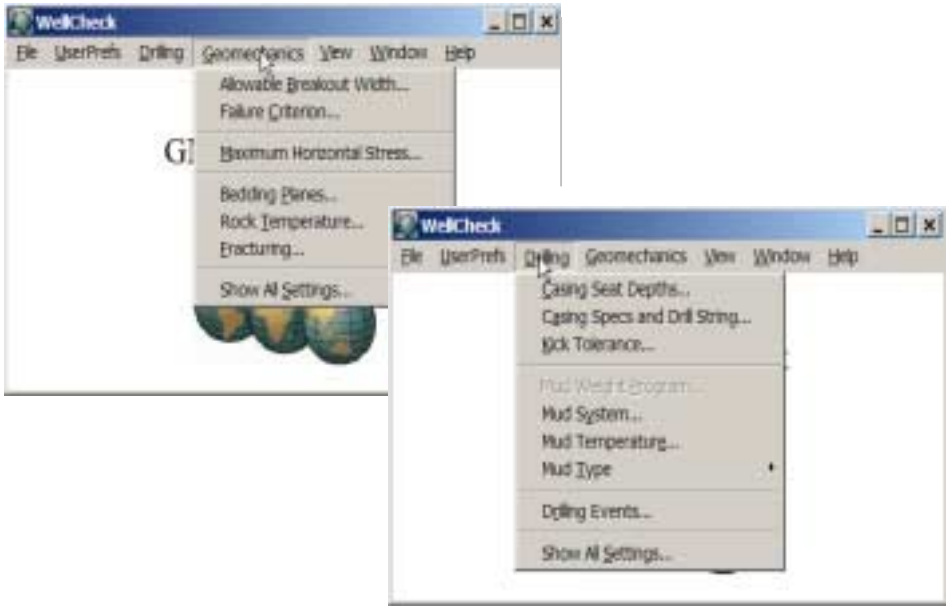


What's New

GMI•WellCheck 2.04 is a significantly enhanced version of the software with many new features, extensions, and improvements. Additional training is available by contacting one of the GMI offices.

New Features and Extensions

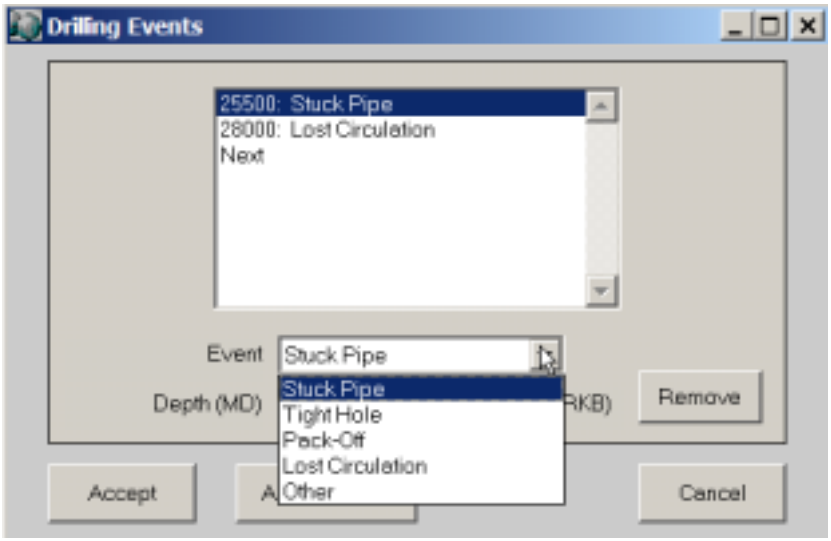
- **New menu structure.** The new **Drilling** and **Geomechanics** menus enable the user to display and interactively change drilling and geomechanical settings. The new **UserPrefs** menu allows the user to modify, load, and save user preferences. The **File**, **View**, and **Help** menus are significantly extended, with window selection functions transferred to the new **Windows** menu.



- **Wellbore trajectory builder.** The **Build Well File...** option in the **File** menu is a new interactive tool for creating and viewing a trajectory defined by survey points.
- **User-defined casing program.** The **Casing Seat Depths...** option under the **Drilling** menu allows the user to define his own casing program interactively, which may then be displayed at any time

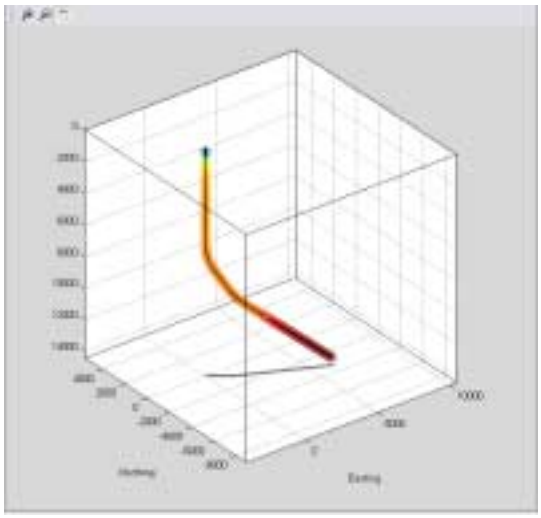
by using **Import User Definition** from the drop-down casing menu in the **Analysis** window.

- **Specification and display of drilling events.** The new **Drilling Events...** item in the **Drilling** menu enables definition of drilling events that are then displayed as vertical bars or dots of corresponding color on the right-hand side in the main plot of the **Analysis** window.

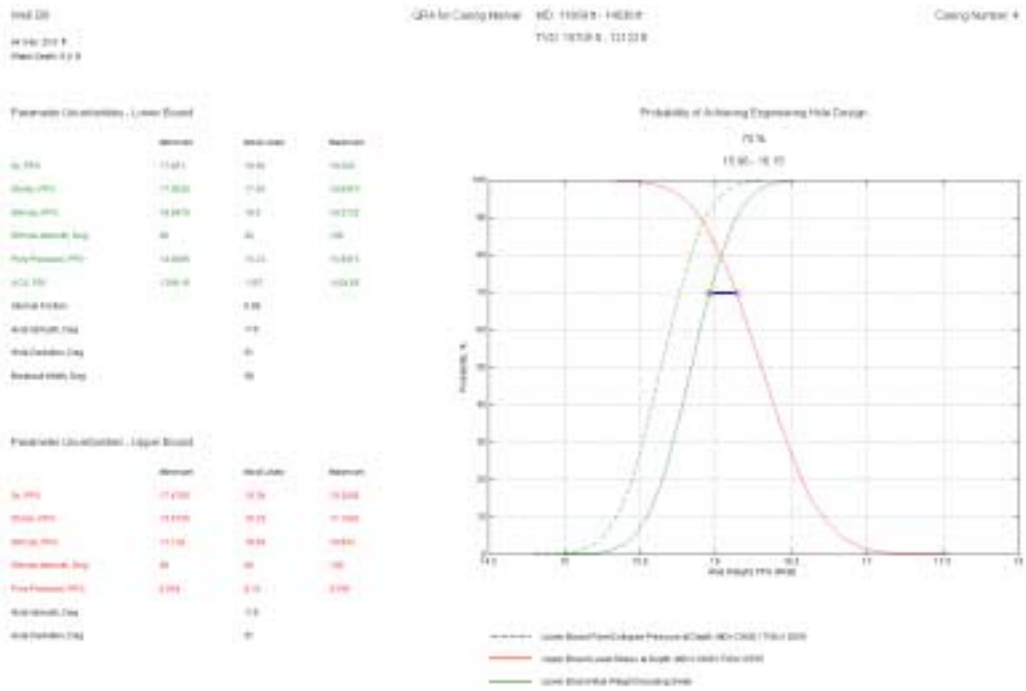


- **Display of lithology columns and formation tops.** Lithotypes and stratigraphic units defined in the **RockPrep** module are plotted on the **Analysis**, **Input Data** and **Stability** plot windows.
- **Failure criterion may be set for individual formations and depth ranges.** The **Failure Criterion** parameter in the **Geomechanics** menu may vary with depth according to given lithology or according to user defined depth intervals.
- **Allowable breakout width may be set for individual formations and depth ranges.** The **Allowable Breakout Width** parameter in the **Geomechanics** menu may vary with depth according to given lithology or according to user defined depth intervals.
- **Extended unit systems.** The **Units** submenu under the **View** menu is split into **Depth** and **Pressure** parts, which offer more unit options than before.

- **Extended reference level systems.** Reference levels may be defined separately for **Depth** and **Mud Weight**. For example, the user may relate mud weights to RKB and plot depths with respect to MGL.
- **Options added to the Input Data window.** The current depth line consistent with the **Analysis** plot is now displayed on the **Input Data** window. The user may show the value of any input parameter at a desired depth, and change its scale using the right-click popup menu on the **Input Data** window plots.
- **Enhanced graphics in the Analysis window.** The user may open a **3-D View** of the wellbore trajectory, with options to zoom in, zoom out, and rotate the trajectory. The default cross-section and legend have been extended. The **Analysis** window of the *Predict Mud Weight* program mode has new capabilities for displaying additional data such as PWD data, discrete leak-off tests, or mud programs defined interactively by mouse. The **Analysis** window of the *Check Mud Weight* mode enables import and display of single-arm, four-arm, or processed six-arm caliper data. Both program modes can show auxiliary data such as gamma ray.



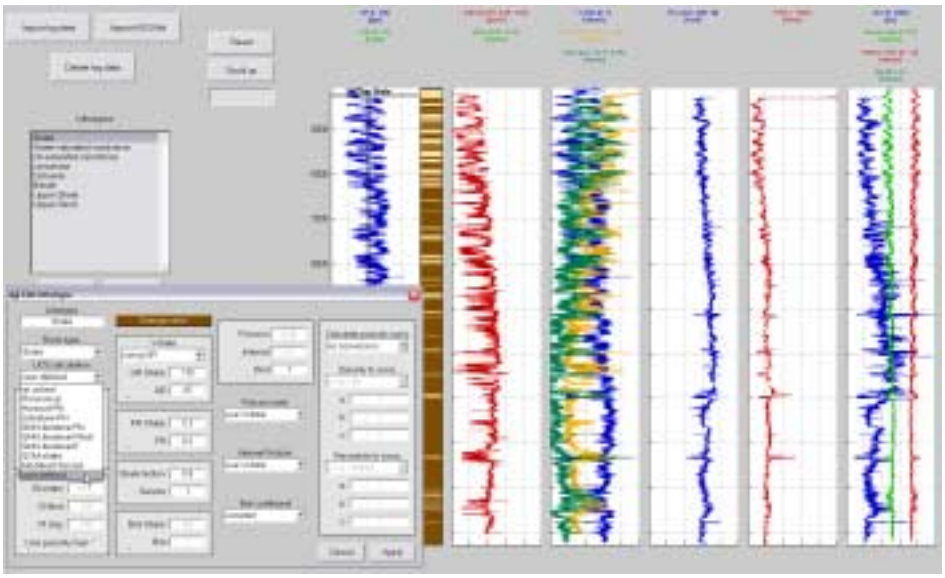
- **Extended options for casing design.** The new **Automatic Bottom-Up** option allows the user to calculate casing design upward from a user-specified bottom depth. The **Import User Definition** option in the **Drilling** menu allows the user to display user-defined casing seats.
- **New ASCII file importers.** Data from ASCII files of mud weights, aux data, and wellbore trajectory may be imported easily into GMI•WellCheck. The importers offer file preview, interactive definition of data columns and units, and an option to import data from clipboard.
- **Extended Quantitative Risk Assessment.** In the **QRA** input table, all uncertainties of input parameters may be defined quickly by means of percentage or absolute deviation from the most likely value. New **Surge** and **Swab** options allow the user to assess impact of surging and swabbing pressures on the mud window at selected depths. The settings in the table are kept in memory or may be saved and loaded later.



- **New summary plots are available.** The user may select plots that summarize data input and analysis results from the **Export** popup menu in the **Analysis** window of both program modes. These summary plots may be edited, and then printed directly from the program for use in project reports. Three types of **QRA** summary plots can be generated from **Summary** popup menu available in **QRA** output windows.

Improvements to the **RockPrep** module

- User-defined equations allowed for UCS, internal friction, Poisson's ratio, and Biot coefficient.
- Rock properties such as UCS and Vshale may be imported from user files.



- The TVD curve may be selected during log import.
- Values are automatically entered for airgap and water depth in the log import window.
- Depth stretching of rock properties and pore pressure/stress values may be done independently.
- Formation tops may be imported from an ASCII data file.

- Log data may be displayed in different depth references.
- Any log track may be selected and deleted independently.
- Input boxes are labeled with the units for the expected parameters.
- Length, pressure, and gradient units may be specified independently.
- Stress values may be selected and deleted individually.
- Stress profiles created in **RockPrep** may be exported as *.stress files for GMI•MohrFracs™.
- Axes for plots in main window may be scaled independently.
- Stress versus depth plots may be prepared with an option available from the main **RockPrep** window for use as figures in reports.
- Curve fitting options for SHmax and Shmin may be selected independently.
- Case study name displayed at top of main **RockPrep** window.
- Sampling is set to saved setting when opening a **RockPrep** case study.
- Import Pore Pressure, Overburden, and Fracture Gradient from log file.
- Preview rock file before loading into the GMI•WellCheck analysis.

System Requirements

For optimal program performance, GMI•WellCheck should be installed on computers with the following minimum hardware specifications:

- 266 MHz processor
- 256 MB RAM
- 74 MB of hard disk space for the application

Installation Procedures

NOTE: GMI•WellCheck is a Matlab®-based application. On Windows NT/2000/XP, an administrator needs to install and *start* GMI•WellCheck before other users run it. If the administrator installs but does not start GMI•WellCheck, other users get the following error message about writing to the registry when they start GMI•WellCheck.

```
Unable to set Registry value
CLSID\{B3044B60-97FF-11D1-8146-
00600815A7AD}\LocalServer32.
You may not have sufficient privileges. Rerun MATLAB as a
user with Admin access.
```

It is possible for non-privileged users to use the application after accepting (clicking **OK** on) each of a number of registry errors that occurs when the program is launched. Check with your IT manager or with GMI for further information.

New UserData example files

The example data files shipped with GMI•WellCheck 2.04 (copies of which are stored in the application folder structure under **OrigData**) are different from those shipped with previous versions of GMI•WellCheck. Therefore, the first time a user who has previously run an earlier GMI•WellCheck version launches GMI•WellCheck 2.04, these new files will be written into the default location,

C:\Documents and Settings\<username>\GeomechanicsInternational\ WellCheck\UserData.

In order to preserve the user's current files, a copy of the current **UserData** will first be written into a parallel folder, called:

C:\Documents and Settings\<username>\GeomechanicsInternational\ WellCheck\Backup\UserData.

In cases where this parallel folder already exists the user is prompted whether to overwrite it or to enter a new location into which the current folder and contents are written (or, to cancel the copy operation).

*NOTE: This process will happen once for each user of the application. The **UserPrefs** folder, which is located in the same folder in **Documents***

and Settings *as* ***UserData****, will not be replaced. In addition, the user preferences file* ***uprefs.mat*** *will be automatically copied from the current* ***UserData\Settings*** *folder into the new one, which will preserve other preferences such as font sizes.*

To Install GMI•WellCheck

IMPORTANT NOTE ABOUT UPDATING GMI•WellCheck: If you are updating your copy of GMI•WellCheck, please uninstall the old version first. This will not affect any of the case studies that have previously been saved in any of the UserData folders. If you would like to keep the older version as well as install the new version, be sure that the name of the new installation directory folder is different than the name of the folder in which GMI•WellCheck is currently installed. Otherwise, the new installation will overwrite the older version.

1. If you are using Windows NT, 2000 or XP be sure you have administrator privileges before attempting to install GMI•WellCheck.
2. Insert the GMI•WellCheck distribution CD into your CD-ROM drive.
3. Open the window for the CD-ROM drive and double click **Setup.exe**.

   or

   Go to the **Start** menu and choose **Run**. Type in the drive letter of your CD-ROM drive, followed by **:\setup** (e.g., **e:\setup**). Press **Enter**.
4. Follow the instructions and prompts provided by the NSIS® wizard. If you are using hardware keys as your licensing set-up, NSIS automatically loads the hardware key drivers and allows you to designate the folder name and location for the GMI•WellCheck program files. If you are using a FLEXlm licensing scheme, InstallShield allows you to designate a folder name and location for the GMI•WellCheck program file, but the FLEX*lm* licensing files will be installed separately. (See installation notes for FLEX*lm*.) The default installation directory for GMI•WellCheck program files is **C:\Program Files\GeoMechanics International\GMI WellCheck** and the default installation directory

for the FLEX*lm* license files is **C:\Program Files\GeoMechanics International\GMI License Server**.

5. Restart your machine at the end of the installation process.
6. If using a hardware key, attach it to the parallel port on your computer. If you have a printer or any other peripheral connected to that port, disconnect it, attach the hardware key, and reconnect it to the back of the hardware key. If using the parallel port is a problem, GMI can provide a license key that connects to the USB port.

NOTE: Peripherals that provide input through the parallel port (floppy disk drives, Zip drives, etc.) may not work if connected to the back of the hardware key. Also, some machines may not be able to recognize the hardware key when peripherals are attached. Please contact GMI if you have any questions regarding peripherals.

The protection algorithm allows GMI•WellCheck 2.04 to run on a machine with both a GMI•WellCheck license key and a license key for any other GMI product.

GMI•WellCheck Technical Reference and User's Manual

The GMI•WellCheck 2.04 Technical Reference and User's Manual is included on your GMI•WellCheck distribution CD. The file, called "WellCheck2.04Manual.pdf," can be read using the Adobe Acrobat Reader (latest Acrobat Reader may be downloaded for free from the Internet at http://www.adobe.com). The manual contains detailed descriptions and illustrations of GMI•WellCheck's many tools and features, and may be accessed directly in the program by way of the **Help** menu.

Known Bugs and Issues

- If you are running Windows 2000 or NT and you have uninstalled a previous version of GMI•WellCheck™ 1.30 or 1.30.5, you may notice that GMI•WellCheck™ 2.04 does not fully start the first time you run it. If you start the program a second time, you will

correct the problem and should not experience this issue again in the future.

- Under Windows XP, the Sentinel Superpro dongles must be version 5.39 or higher. If you are installing GMI•WellCheck for the first time from this release, the correct drivers should be installed.
- Under Windows XP, if the Sentinel Superpro parallel dongles are stacked, only the first device is active.
- When saving a case study file in the RockPrep module, the program will sometimes fail to put the *.mat file extension after the file name. If this happens, you will not be able to open this case study without using Window Explorer to manually add the file extension.
- In the log analysis window of the RockPrep module, occasionally the lithology column will display a sand formation when it should be a shale formation. The calculations being made for the rock properties are correct, however the graphics being displayed are not refreshed correctly.

Submitting New Bugs

Please inform GMI of any bugs by sending e-mail to using new bug reporting features in the help menu. When submitting bugs, the following information is helpful to resolve the bug:

1. Computer type, model and operating system version
2. Type of license
3. Location of the applications and data (network server or local)
4. Exact errors you are receiving (if any)
5. GMI•WellCheck burn date and update numbers (click on **About WellCheck…** under the **Help** menu and then click the **More Info** button)
6. A copy of the log file found at **C:\Documents and Settings\username\Local Settings\Temp\GMI_WellCheck.log**

GMI will follow up with you on additional information and temporary work-around solutions provided you leave contact details.

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