These release notes cover Harmony Enterprise versions 2017.1 - 2018.3. For prior release information, please contact our custom care team: www.ihsmarkit.com/supportform

Harmony Enterprise 2018.3 Release Notes

This release has the following features:

Scenarios

Create alternate scenarios on wells using different well properties, wellbores, and calculated sandface pressures. Wells and their scenarios can be analyzed individually and their results and inputs compared. A scenario can be promoted to replace the primary well and become the official version. Harmony Enterprise saves the following information: scenario name, created by, last modified date, and last modified by.

Unconventional Multi-well model (beta)

With the Unconventional Multi-well model, history-match and forecast a group of wells with Horizontal Multifrac completions.

- **Requirement of symmetry**: for this release, all wells within the model are considered parallel, have the same horizontal wellbore length, and the same number of fractures.
- **Flexibility for completions**: you can model asymmetrical fractures (i.e., left fracture wing not equal to right), or define stimulated reservoir volume (SRV) that extends less than, or beyond fractures.
- **Clipboard functionality**: copy the multi-well model from one group to another.
- **Position Lines**: are used to indicate the progress during simulation, and can be moved after the simulation, so you can view spatial distribution of pressures or saturations at any desired date.
- **Ability to exclude wells**: specify whether a well is included during simulation to identify interference.
- **Water and gas injection**: this model supports injection. For example, injection can be used to simulate water injection during fracturing, and to match water rates during flow-back.

Enhancements to the Conventional Multi-well model

With the Conventional Multi-well model, you can history-match and forecast groups of wells that are vertical or horizontal. This release features the following enhancements:

- **Clipboard functionality**: you can copy the multi-well model from one group to another.
- **Position Lines**: are used to indicate the progress during simulation, and can be moved after the simulation, so you can view spatial distribution of pressures or saturations at any desired date.
- **Ability to exclude wells**: specify whether a well is included during simulation to identify interference.

Interoperability with Piper 2018.1 or later

Create export files for Piper with calibration data for building models, or analytical models for field forecasting. Wells are validated prior to exporting to ensure only complete and accurate information is imported to Piper. Well forecasts that have been created or updated in Piper 2018.1 or later can be imported into Harmony Enterprise for comparison and update purposes.

Gauge Depth correction

Convert gauge depth pressures (run depth pressures) to sandface pressures. This functionality is available for tubing, pumping, and casing flowpaths for configurations where the gauge and tubing are landed above datum (MPP).

Decline and Multi Segment decline enhancements

Enhancements include the following:

- **Undo**: revert analysis changes while making edits (e.g., line manipulation, parameter edits, best fit, etc.).
- **Change b and d_{lim} as a bulk process**: the Bulk Edit Declines dialog box has been expanded to support changing the first segment's b value, or the d_{lim} value for any segment.

Enerdeq Import | New Completion and Production fields

Additional completion and production attributes now exist in the Harmony Enterprise database, and can be directly imported from Enerdeq. Attributes such as Lateral Length, Proppant Amount, IP Oil, and IP Gas have been added.

Importing Numerical models from Harmony

Numerical models created in Harmony are now migrated to Harmony Enterprise as analogous Hybrid models.

Enhancements for Comparison plots

Datasets in Comparison plots are now grouped to indicate that they originated from the same plot. This makes comparing results between different cases easier.

Gas Lift in DB Connection

The Valve Depth when using Gas Lift in the wellbore schematic can now be imported through the Database Connection.

Resolved Issues from Harmony Enterprise 2018.2

- If an analysis has multiple fluids, the Typewell history + forecast now displays the correct forecast.
- Duplicate production rows are deleted when importing a well from a *.harmony file. Previously, the well was not imported, nor any groups the well belonged to.
- Fixed copying parameters between Analytical and Hybrid Fracture models.
- Fixed incorrect average pressure calculations for Hybrid models with adsorption.
- Fixed the scrolling issue with the Production editor. Previously, if you selected beyond the bottom of the Production editor, it scrolled to the top, which caused incorrect selections.
- If you use the database connection and have proprietary field names that match IHS Markit views, it is no longer mandatory to map these field names.
- The latest wellbore configuration data is always imported and used for the linear temperature profile, detailed temperature profile, and deviation survey

Harmony Enterprise 2018.2 Release Notes

This release has the following features:

Multi-well Model Enhancements

With the Multi-well model, you can history-match and forecast groups of wells while accounting for interference between wells. This release features the following enhancements:

- **Horizontal completions**: any well within a multi-well model can now have a vertical or horizontal completion type.
- **Aquifer support**: you can now model additional pressure support by connecting an aquifer to the reservoir. You can model an edge aquifer (connected to the reservoir boundary or a part of it) or a bottom aquifer (connected to the reservoir bottom or a part of it).
- **Water and gas injection**: the multi-well model supports injection. You can specify water and gas injection rates in the Production editor for individual wells to model injection during the history. You can also set up a forecast to model injection.
- **Display shapefile**: shapefiles that are available in the GIS tab can now be displayed on the schematic of the multi-well model. (This enables you to use a shapefile as a reference when creating or editing the reservoir boundary.)
- **Display Lat / Long**: the latitude and longitude of the current position of the mouse pointer are displayed in a model schematic and can be copied to the clipboard. (This functionality can be used to add a new infill well at the location you want).
- **Copy a Multi-well model**: use defaults manager to copy all the parameters of the existing multi-well model to a new one.

Project Economics

Perform project economics on traditional or rate transient analysis (RTA) forecasts, and compare cash flows and key performance indicators (KPIs) (e.g., net present value, internal rate of return, etc.).

Import PowerTools Projects

Import well attributes and production data, along with the analyses associated with them, which includes declines, volumetrics and material balance analyses.

Resolved Issues from Harmony Enterprise 2018.1

- Sandface pressures are now calculated correctly during import when production data is added using the "Append" option, and the pressure source is not explicitly set in the final row of the table.
- When migrating wells from *.harmony files (when the data is in an invalid state), pressure-loss-calculation settings are now set to default values.

Harmony Enterprise 2018.1 Release Notes

This release has the following features:

Bulk Reporting

Create report sets to print one or multiple worksheets for a batch of wells. The report format is selected for each worksheet when printing, instead of upfront when the worksheet is created.

Bulk Delete Analyses/Worksheets

View and delete analyses and worksheets for a selection of entities.

Bulk Export Production

Export historical production for a selection of wells for use in third party applications.

Multiphase URM and FMB

Now incorporates multiphase pseudo-pressure to account for simultaneous flow of oil / gas / water. The FMB can be used to model flowing pressure, rate, and average reservoir pressure. Additionally, the Productivity Index is available for oil.

Group FMB and Typecurves

Analyze total group production using FMB and Typecurves available on Hierarchy and Custom groups, and account for both production and injection.

Vertical Multi-well Model

With the new Multi-well model, you can history-match and forecast groups of vertical wells. This model accounts for interference between wells, while the wells have individual reservoir and completion properties in each well region.

Gas Static Material Balance

Estimate original gas-in-place (OGIP) for gas depletion drive and storage reservoirs using shut-in pressure data in a modified p/Z technique (p/Z**). This technique enhances the conventional gas material balance method to include water drive, connected reservoir concept (composite permeability or layered), and geomechanical effected reservoirs by modifying Z to a Z** formulation. This formulation is based on SPE paper 139428, "Advanced Gas Material Balance in a Simplified Format" by Moghadam, Jeje, and Mattar, first published in the January 2011 edition of the JCPT.

Resolved Issues from Harmony Enterprise 2017.3

- The Typewell Wells pane now sorts consistently with the Entity Viewer.
- Fixed the issue where a subset of wells failed to update using the database connection, and the Status Window indicated the error: well is locked by current user.
- The Comments column is now correctly imported from text / Excel files.
- Wells no longer fail to import using the database connection when the well key includes leading or trailing spaces.
- All .harmony files are automatically unlocked before importing into Harmony Enterprise (a locked file would previously fail to import).

- Parsing of Aries declines has been updated to prevent unresponsiveness during updating when non-unique analysis names are produced. Previously imported Aries declines will not be updated following this change.

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Harmony Enterprise 2017.3 Release Notes

This release has the following features and resolved issues.

Database Connection: Import Performance Improvement

New well imports through the database connection are now approximately 15-18 times faster. Similar performance improvements can be realized when updating wells with the latest data by using the new option: "Overwrite Past 90 Days".

Spatial Explorer

To get more context for well locations, use map services, web map services (WMS), or Bing maps in the new Spatial Explorer tab.

Gemalto Sentinel RMS

With the Gemalto Entitlement Management System, clients have a self-service portal to manage their entitlements. This is a new licensing system with enhanced security measures.

Resolved Issues from Harmony Enterprise 2017.2

- Calculated custom datasets are now computed for groups
- The auto-scale state persists when a Diagnostic template is added as a worksheet
- Diagnostic lines are always initialized and visible regardless of plot axis ranges
- Dataset customizations persist on plots (e.g., line thickness, color)
- Resolved the inability to remap a linked Access table within the IHS database connection
- Resolved failures when migrating *.harmony files
- Regardless of the number of series displayed in a comparison plot, the Deselect All Series icon is now responsive when clicked

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Harmony Enterprise 2017.2 Release Notes

This release has the following features and resolved issues.

Decline Autoforecast

An automatic rigorous fit of an Arps' decline to a single or batch of wells. This initial best fit identifies the partition to fit to, excludes outliers, and minimizes b without sacrificing quality of fit.

Schedule Database Connection Imports

Using the Windows Task Scheduler, specify the frequency for a scheduled database connection to run (daily, weekly, etc.). The update runs on the machine used to schedule this import. A license is required to set up / modify a scheduled update, but a license is not required when the update is running.

Database Connection Support for Property and Wellbore Data

The supported data types for the database connection now include almost all the inputs in the Properties and Wellbore editors. If the data is available, wells can be almost fully populated using the database connection.

Well Query

Build a group of wells by specifying attribute criteria, or providing a well list. Groups can be quickly updated by re-running the query.

Calculate Sandface Pressures During Import

Sandface pressures can be calculated for all wells following an import / update, if this option is enabled.

Resolved Issues from Harmony Enterprise 2017.1

- A model's parameter pane doesn't scroll when changing units.
- When importing unsupported Aries decline analyses, Harmony Enterprise no longer crashes.

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Harmony Enterprise 2017.1 Release Notes

Probabilistic hybrid analysis

Specify a distribution for parameters with greatest uncertainty to understand the impact on the model forecast and EUR.

Volumetrics

Estimate the original hydrocarbon fluid volume in a reservoir or back-calculate well drainage area based on its EUR, recovery factor and certain reservoir and fluid properties.

Active directory

Manager user logins with Microsoft Active Directory

CDF Plot

In addition to the cross plot, display attribute or analysis results using a CDF to understand parameter distribution

Resolved issues from Harmony Enterprise 2016b

- Resolved failure in database connection when both custom attributes or datasets were mapped and more than 50 wells were imported (either crash or data not imported)
- Wellbore deviation survey retained when updating well via import regardless of update option
- All references to custom attributes within a custom calculated attribute are persisted when imported using a *.harmony file
- Line manipulations on a typewell worksheets no longer affect the selected datasets
- When using a workflow, your typewell custom attributes are now retained
- Trailing spaces are now trimmed when comparing well keys using the database connection
- Fixed drag handle behaviour when extending beyond end of screen