OVERVIEW

Permedia™ Petroleum Systems 1D software is a powerful set of tools for conducting 1D basin modeling and well-focused analysis in frontier exploration areas and shale field developments. While most 1D packages start with a spreadsheet entry of well information, Permedia Petroleum Systems 1D uniquely starts with actual well data (including a link with Landmark’s OpenWorks® database), allowing users to perform studies in the context of both the well’s spatial positioning and wireline data collected on the well. Model sediment maturities, heat flow, compaction, source rock potential and any number of derived properties based on a user’s own workflows and create full 1D basin models from an earth model with a single click.

BENEFITS

**Better assess frontier exploration risk**

Permedia Petroleum Systems 1D software’s broad data support, drag-and-drop data integration, fast processing and flexible scripting all add up to an extremely easy to use and productive set of tools that gets users from data to decisions as quickly as possible.

**Predict well-based shale properties**

Accurate shale property prediction is key to maximizing stimulation. Permedia Petroleum Systems 1D software includes well-based tools to estimate the clay content (proportion of particles smaller than two micrometer in diameter), grain density, porosity, permeability, and total organic content (TOC) of mudstones and shales from standard wireline log data.
Permedia Petroleum Systems 1D software uses the Permedia BasinPT simulator for generating 1D basin models – the same simulator used in the Permedia 2D and 3D products. BasinPT uses a finite volume scheme to ensure mass conservation and accuracy. Simulator outputs are manifold, including effective stress, heat flow, mud weight, vitrinite reflectance and much more. These properties can be further used as inputs to Landmark’s complementary tools and a user’s proprietary scripts. 1D models can include a full lithosphere, unconformities and source rocks, and users can generate a full 1D basin model from an earth model with a single click.

**Powerful data integration and analysis**
The software can integrate data from dozens of data sources. This integration goes beyond simple visualization: different data types can be brought into your modeling project to provide spatial context and extended analysis capabilities. For example, drag-and-drop a set of horizons into Well Viewer to derive markers. Drop in a seismic volume and its properties are extracted and merged with the well data. Drop in any basin or reservoir model to compare model results. Drop in a calibration table to compare modeled and observed data.

**Dynamic rock properties**
Rock properties are specified using flexible data curves and constants. Curves can be pasted in from other tools, digitized interactively, fitted from data, or assigned from user-defined equations.

The software features a unique dynamic mixing system. Specify the end member lithology proportions (e.g., percent sand / shale). These pass through a mixing rule to derive new properties, saving an enormous amount of time up front, since users don’t have to hard-code mixtures for the simulator: they’re created on the fly. Users can even specify mixing proportions based on an input or derived trace values such as a Vshale log.
Extend analysis with custom scripts
Permedia Petroleum Systems 1D software can be easily extended with Javascript, allowing users to create any derived calculations they need and display the results the way the users want. Create a variety of petrophysical analysis tools, derive shale field producibility parameters – there’s no limit to what you can do.

The software can be used with complementary tools including DlogR for TOC estimation, ShaleQuant for TOC and shale permeability estimates, as well as a Source Rock Assessment tool.

Share results
Permedia Petroleum Systems 1D software seamlessly integrates with Landmark’s OpenWorks® database. Drag-and-drop OpenWorks wells into Well Viewer and get started right away with your modeling. Write calculated traces back to the well in the database.

SEE DATA IN CONTEXT
Permedia Petroleum Systems 1D software includes a complete set of analysis and visualization tools, including a full OpenGL-accelerated 3D visualization environment, a suite of mapping analysis tools, as well as powerful reporting tools for querying and analyzing data. Co-render and analyze data from multiple packages to get a whole new perspective on the complex plumbing of petroleum systems.

DATA SUPPORT
Use Permedia software seamlessly with existing tools. Now compatible with Landmark’s OpenWorks® database, the software reads files created by virtually every major package, including Temis, PetroMod, Eclipse, Irap™, and GOCAD applications, as well as industry-standard seismic, map, and well files:

• Geostatistical data – reads GSLib volumes
• Seismic surveys – supports SEGY data from a variety of sources, and reads VoxelGeo volumes
• Cultural data – co-render cultural data from Landmark’s Z-Map Plus™, GOCAD, Irap, and Temis applications
• Well data – reads all industry-standard well formats (Irap ASCII well file, GOCAD wells, LAS well file), supports well markers and zones, and writes to GOCAD well format
• Mapping – reads all industry-standard mapping formats (Beicip, Z-MAP 2D Regular Grids, Generic 2D Regular Grid, Irap Grids, Grass 2D Raster Map, CPS-3 2D Regular Grid), and writes to Z-Map Plus, Beicip and Irap formats
• Native GOCAD support – provides native support for most standard GOCAD objects
“We were able to create our own shale gas and proprietary geochemistry extensions to Permedia software using its powerful scripting system.”

**USER, INDEPENDENT EXPLORATION COMPANY**