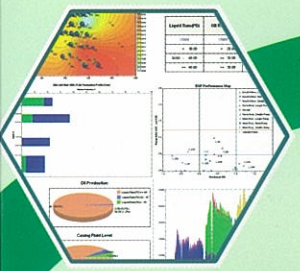
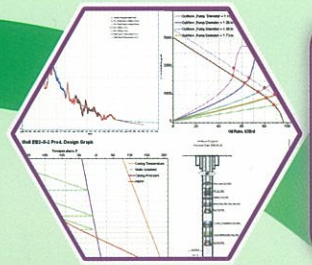


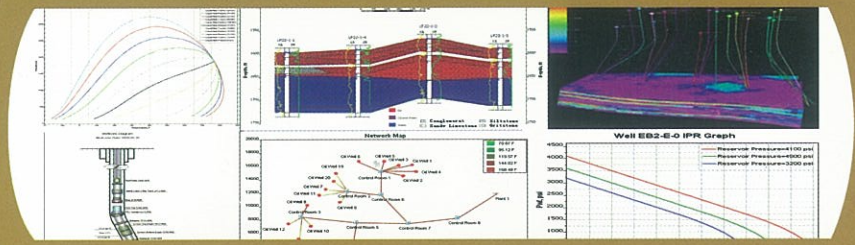


+ Production Optimization and Forecast

On the basis of production fine numerical model, accurately identify production behavior, forecast production index and optimize production parameters by combing present and historical data.

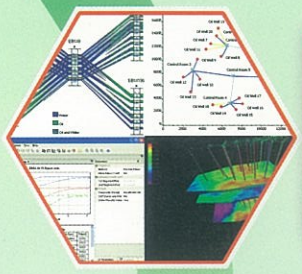
Oil & Gas Production Description

Establish an integrated oil and gas production system model by coupling with fine-scaled geological model through matching analysis of history and test data. The production system model includes three parts, i.e., reservoir numerical simulation, well inflow/outflow and surface gathering flow. The seamless connection with field production database further keeps optimizing and refining the system model.



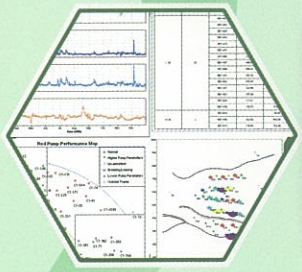
Data Analysis, Integration and Management

PEOffice is one of a few worldwide oil and gas production software programs which are able to realize data integration. PEOffice employs a database-based application mode which enables users to acquire data through the PEOffice data engine in an easy, fast, effective, and safe manner, thus making full use of client data resources. PEOffice database server guarantees data to be consistent and achieves data and function sharing between different modules.



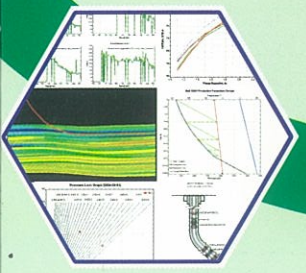
+ Production Issue Analysis

On the basis of production fine numerical model, quickly analyze and diagnose oil and gas production problems in a systematic manner from overall aspects including formation, wellbore and surface system.



+ Production Surveillance

Monitor oil and gas well production behavior by the aid of comprehensive analysis, including production index comparison, performance evaluation and production curve and bubble map view.



With advanced software solutions and most skilled professional team,OPT provides routine analysis and design services to achieve oil & gas production objectives. Our accomplished professionals combined with customized consulting services deliver great customer outcomes.

Company Profile

Founded in 1998, Optimization Petroleum Technologies, Inc. (OPT) is the worldwide leading provider of software for oil and gas reservoir exploitation and production optimization. The company continuously provides the most advanced technology products and precise service for our clients to realize the maximized oil & gas production potential and improve field development economics.

PEOffice (OPT's core product) is a software platform for integrated reservoir management and oil & gas production analysis and design. The professional R&D teams in OPT guarantee the continuous update, innovation and enhancement of software. OPT provides comprehensive after-sale technology support and services.

OPT offers a high-level and PEOffice-based consulting services for clients by incorporating other excellent software. The typical consulting services include: Establishing PEOffice application platform based on client's oilfield development database; Integrating the static data of reservoir and wellbore (including geological model) and dynamic production data into the database of PEOffice; Further implementing reservoir performance analysis and production optimization design with the aim to provide solutions of maximizing recovery potential and optimized production.

Specializing in the integration of petroleum engineering and computer technology, OPT also provides software customization and information system development for oil & gas fields while focusing on the R&D and popularization of PEOffice.

OPT has high-level, professional R&D and customer support teams and has established a rigorous system for product development and service & management.

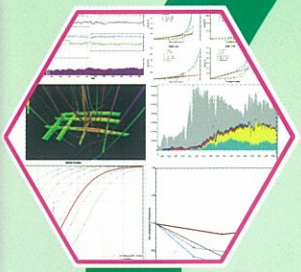
Working with PEOffice, enjoying life.

+ Production Characterization

In connection with production database, based on the production fine numerical model, perform fast and accurate statistical analysis of oil and gas production behaviors, such as production compositions, recovery percentage, water cut and well lift performance, etc..

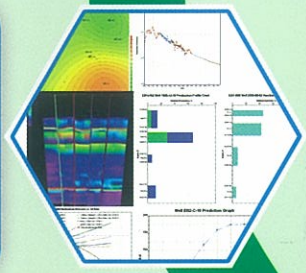
+ Production History Characterization and Production Forecast

In connection with production database, on the basis of production fine numerical model, perform an integrated analysis of index variations of production rate, water cut, pressure and evaluation of post-treatment effects, by combing production data with geological structure, reservoir property characteristics and well pattern arrangement.



+ Potential Production Enhancement Analysis

On the basis of production fine numerical model, through multiple procedures such as statistics, empirical correlations and numerical simulation; evaluate production potential of reservoir, well and surface gathering system and further forecast index variations including production rate, water cut and pressure.



+ Production Optimization

On the basis of production fine numerical model and potential evaluations under constraining conditions of oil and gas production system; optimize pattern arrangement, layer regrouping, producer and injector design, and well production parameter adjustments, with the aim of maximizing oil and gas production potential.

WellMap
— Well Location Map Editor

WellMap is the core module required to visualize reservoir and production performance map based operations throughout the PEOffice software system. It enables users to quickly create well location maps or to edit digital maps saved with popular image file formats (from Texas RRC, SONRIS, etc). WellMap offers a simple way to query both reservoir and production data and illustrate their distribution on a map.

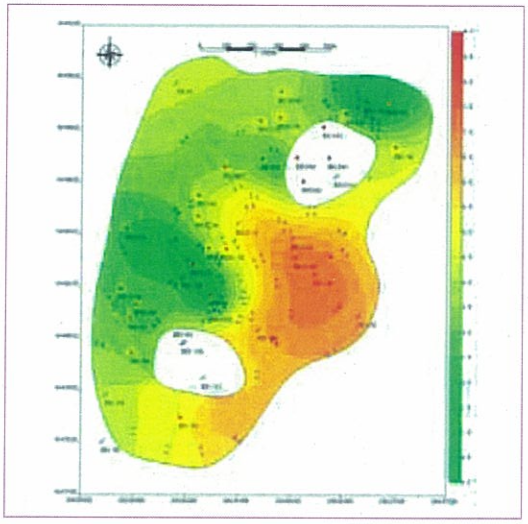
Main Functions

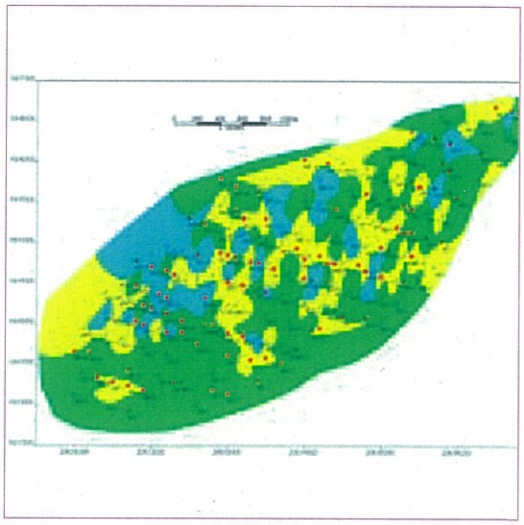
Well Location Map

- Quickly create bitmap and digital well location maps; display of vertical wells, deviated wells (trajectories) and multi-target wells
- Well type symbols available
- Flexible template settings associate display names with alias and symbol
- Flexible batch processing of well type
- Capability of digitizing well location bitmap

Contour Map

- Perform multiple grid interpolation methods like Kriging
- Steady and convergent fault interpolation calculation
- Auto-create or manually edit contour map
- Display contour map in grid map view
- Support superposition of well location map and contour map
- Flexible iso-line attributes settings
- Support output iso-line, fault and boundary as data file

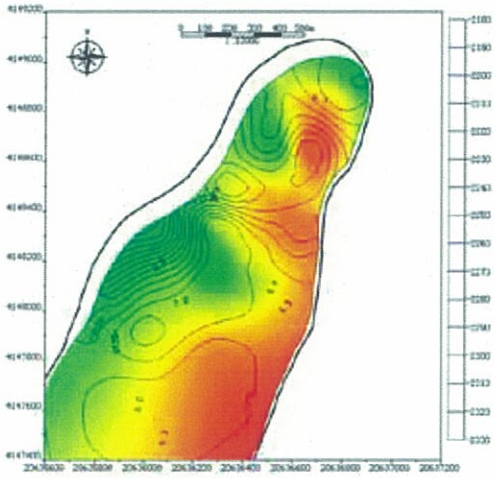




WellMap — Well Location Map Editor

Sedimentary facies map

- Auto-create sedimentary facies map using well location and well logging interpretation data
- Allow users to flexibly configure facies display name, type alias and display mode
- Support stack display of well location and sedimentary facies
- Supports manual edit

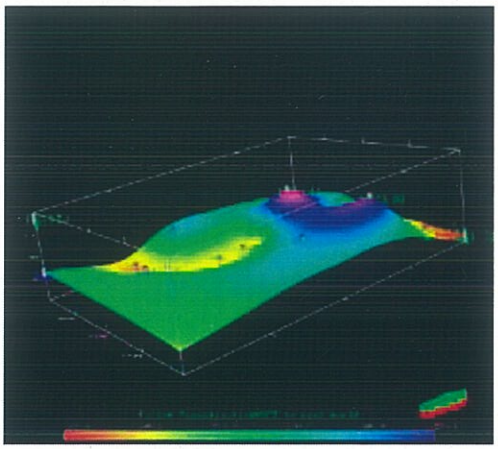


Surface pipeline network map

- Easy to create surface pipeline network map based on well location map

Main Features

- Capability of creating complex well location map
- Rich graphical display
- Flexible and useful template settings
- Provide multiple interpolation algorithms to enhance contour mapping effects
- Provide digitization of paper map
- Measure Distances (to lease lines, pipelines, etc)Measure area (acreage)
- X,Y and Lat/Long coordinate conversion (with datums preloaded)



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WellInfo
— Static Well Data Visualization

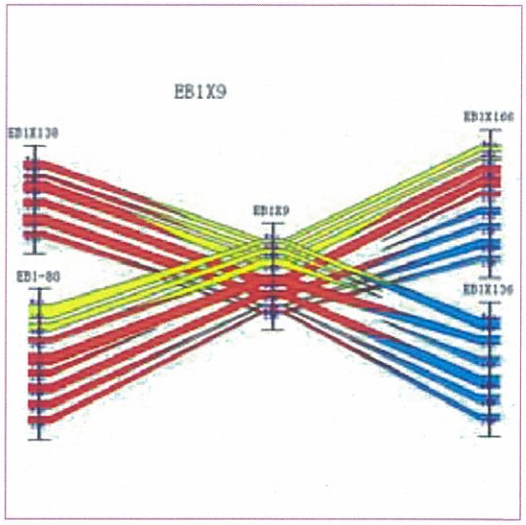
WellInfo is a comprehensive tool to create a variety of geological and reservoir graphs including: cross sections, 2D & 3D well trajectories, 2D& 3D fence diagrams and composite stratigraphic column. WellInfo can also store well logs in .LAS format and view them. WellInfo can also view wellbore schematics created in the PEOffice module WellString.

Main Functions

Single Well Information

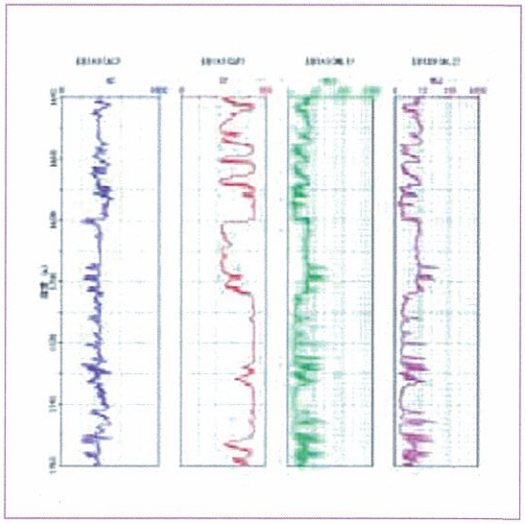
Comprehensive tool for viewing and query of static well data based on well location map

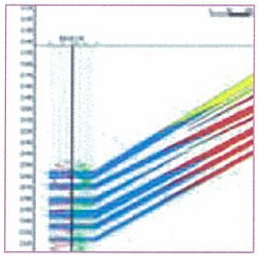
- Wellbore trajectory data
- Production casing data
- Tubing data
- Lift equipment data
- Combined casing/tubing data
- Well logging curves
- Formation data
- Fault and breakpoint data

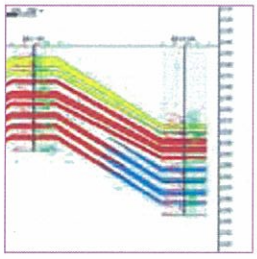


Fast query

- 3-D well trajectory diagrams can display wellbore component information at appropriate places according to their real downhole positions, thus assisting field engineers to analyze downhole situations comprehensively.
- Well logging curve
- Downhole string diagram
- Single well composite stratigraphic column



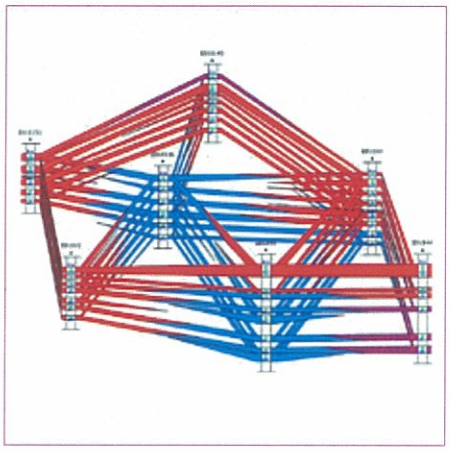




WellInfo — Static Well Data Visualization

2-D Cross-Section Diagram

- Fence diagrams can be created through well location map
- User defined faults and oil-water contact.
- Automatically display fault and breakpoint.
- User definedadjustments of between-well distance and pinch out position
- Provide display of directional well track projection
- Allow to select formation filling pattern and display of well logging curve
- Multiple graphs can be mapped for comparison analysis



2-D Fence Diagram

- Fence diagram by well location map, well names, well groups and layers
- Users can edit Faults and well logging curves
- Multiple graphs can be mapped for comparison analysis

3-D Fence Diagram

- Auto-create 3-D fence diagram. Graphs by rotatedto analyze between-well connectivity

Main Features

- Query data and auto-create maps based on well location map
- View Well logs and maintain database in .LAS format
- Create and display wellbore diagram
- Display component information on 3-D well trajectory diagram
- Manually add fault and oil-water contact and adjust pinch out in fence diagram
- Display track projection of directional well in fence diagram

PEOffice® is a PC/network-based software platform for integrating oil and gas reservoir management, production analysis and design. PEOffice® provides systematic computations and comprehensive analysis for reservoir model management, reservoir performance analysis, production problem diagnosis, optimized design of production parameters and analysis of oil/gas gathering and transportation system. PEOffice is widely utilized by petroleum engineers onsite and in the back office to resolve production problems and to manage oil and gas field development.

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WellString — Wellbore Design and Loading Stress Analysis

WellString is a wellbore design and tubing/casing loading stress analysis module enabling engineers to create and edit wellbore schematic diagrams in seconds. WellString also provides casing, tubing and rod stress verification and deformation analyses.

Main Functions

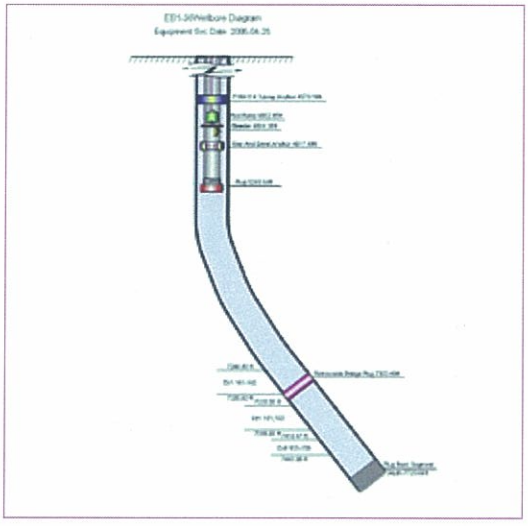
Wellbore Diagram Creation

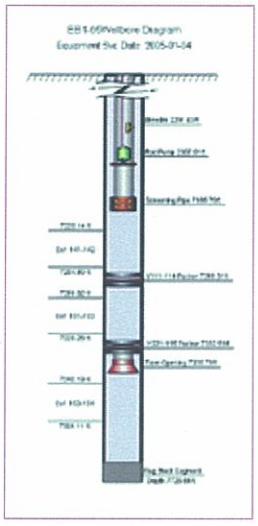
Three ways to create a wellbore diagram

- Create Automatically from database
- Create Automatically from custom settings
- Create Manually using pre-defined or user defined component icons

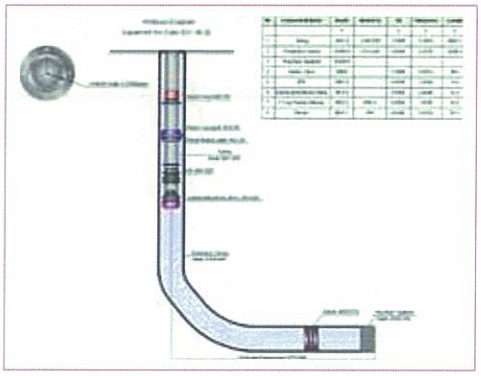
Wellbore Schematic Diagram Display

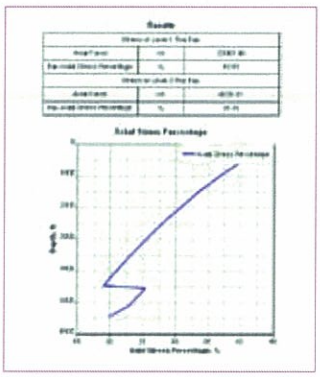
- Built-in template settings for vertical, deviated, horizontal and multi-lateral well
- Display tubing, casing and rod by segments;
- Black and white, color and 3-D effects
- Support text, table and graph display





WellString — Wellbore Design and Loading Stress Analysis





Component Editing Function

- Offer a variety of built-in standard component icons
- Easy to edit wellbore components

Loading Stress Analysis

- Safety strength calculation for casing, tubing and rod stress
- Quick check of downhole tool performance
- Loading and deformation calculation under various operation conditions

Main Features

- Powerful graphical capabilities
- Diagram can be created from data in database
- Database for well trajectory and component templates
- Easy editing for wellbore diagram

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ReModel — 3-D Model for Geological Analysis and Data Management

ReModel is used to display reservoirs in 3D by importing geological data from pre-built geological models and/or reservoir simulation results. ReModel provides geologists and engineers with the ability to spatially analyze oil and gas reservoirs in a visual 3D environment and allows geological models to be more fully correlated to production analysis.

Main Functions

Data Import from Various Sources

- Support ASCII code input from popular geological models and reservoir simulators
- Support corner-pointand block-center data format

3-D Grid Display

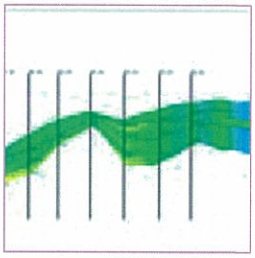
- High-precision display of geological information - spatial distribution of sand bodies, formation attributes, facies belt and flow unit, etc.
- Display Capabilities include: - rotate, zoom, shift 3-D model with dot view, wireframe or combined view, etc.
- Display by layer, block fault, attribute and/or level
- Animated display of reservoir cross-section along I, J, K (X,Y,Z)- direction or in time series order.

Flexible Model Editing

- Versatile and easy to use editing capabilities - single well or multi-well reservoir cross-sections, etc. allowing engineers to quickly visualize and to better understand between-well geological relationships and reservoir attributes distribution.
- Any zone of interest can be sliced in the 3-D reservoir geological model and its associated reserves can also be determined. Results can be exported to any reservoir simulator for further analysis.

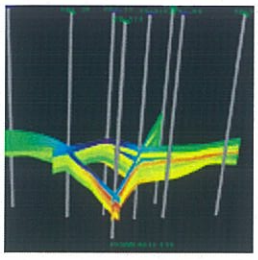
Advanced 2-D Map Display

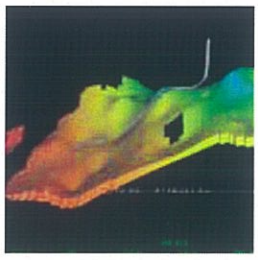
- 2-D map display by different layers or by various attributes
- Output could be in various types of image formats (BMP, JPG and Gif, etc.)

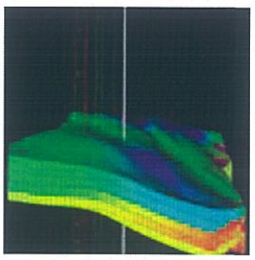


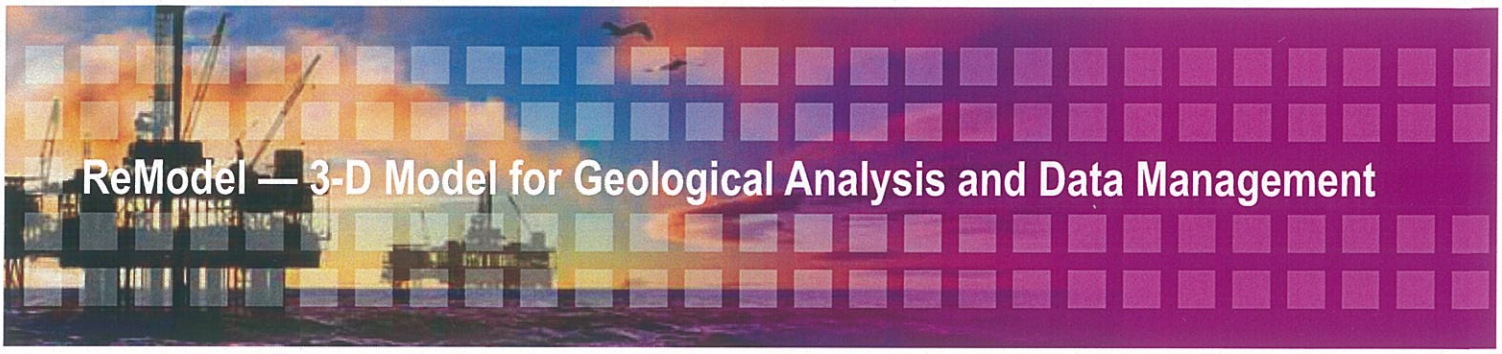
Statistical Analysis and Reserve Estimation Capabilities

- Generate statistics reports to better understand subsurface properties distribution
- Reserves estimation for the entire reservoir or regions of the pool









ReModel — 3-D Model for Geological Analysis and Data Management

Single Well Information Display

- Information display on single well or multi-well cross-section
- Instant display of well related information - location, trajectory, logs and subzone, etc.

Filtering

- Filtering makes it easy to illustrate reservoir attribute variation at different intervals and spatial distribution of sand bodies

Upscaling

- Scale used by the geological model can be easily modified and resulting upscaled model can be exported to reservoir simulators.

Contour Mapping

- Multiple contour mapping functions, including 3-D model surface tracking and mapping, 2-D and 3-D reservoir model based contour, well scatter based 2-D contour and joint attributes contour with color and iso-line representing different attribute.

2-D Reservoir Cross-Section

- Simple 2-D cross-sections can be easily generated from a 3-D cross-section. The 2-D cross-section can include single- and multiple wells.

Main Features

- 3-D model display by multi-modes

  Display 3D model by dot, wireframe, solid or any combinations of three modes.
- Convenient 3-D model operations

  Provide flexible, quick and convenient operations such as rotation, zoom or shift as well as cross-section

  Reservoir cross-sections can be performed for single or multiplewells; and image can also be saved.
- Easy and quick data access and transformation. ReModel supports seamless database connection, data uploading and downloading andmanagement of model and well dataset.
- Display geological and reservoir characteristics, , static well data and dynamic production data to understand current production behavior and to identify potential production issues.

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FluidCal
— Fluid Properties Analysis

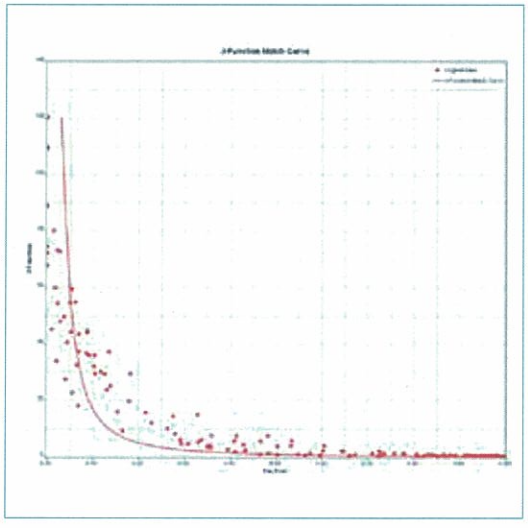
FluidCal is an application used to compute fluid properties in black oil or compositional-based models such as multiphase flow, artificial lift design and reservoir simulation. The computations include: density, viscosity, formation volume factor, Z factor and gas-oil ratio (GOR), etc. When used for compositional models FluidCal can also compute bubble point ,phase diagram and lab test simulation of CCE and different liberation expansion.

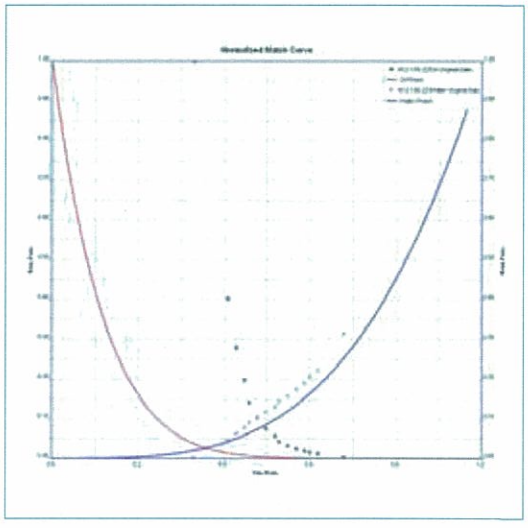
Main Functions

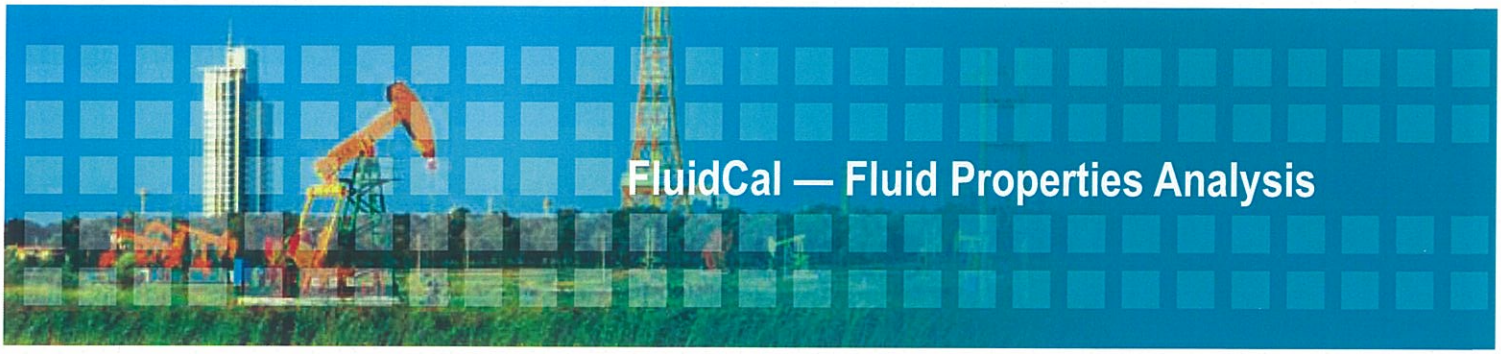
Compositional Model

Results such as detailed phase behavior and PVT parameters from FluidCal can be input into an equation-of-state,compositional model. FluidCal can be used for all types of reservoir fluids by performing the following functions in a compositional model:

- Split and regroup fluid components
- Flash calculation under given pressure and temperature
- Critical point calculation
- Bubble point and dew point calculation under given temperature
- Phase diagram modeling
- Lab test simulation, including CCE, CVD, different liberation expansion, separator test, multi-separator and swell-test
- Regression matching: Tune components model based on lab test data
- Import and export model data





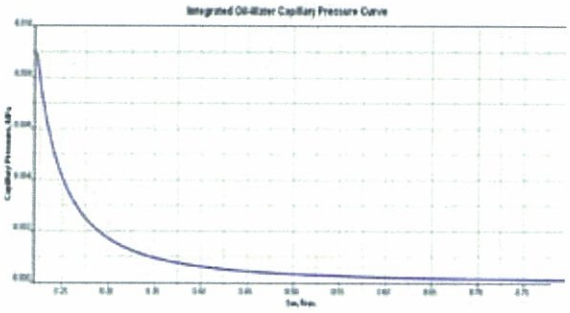


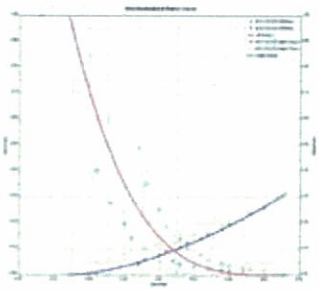
FluidCal — Fluid Properties Analysis

Black Oil Model

Results such as detailed phase behavior and PVT parameters from FluidCal can be input into a Black Oil Model. FluidCal can be used for all types of reservoir fluids as well as the following functions in a black oil model:

- Basic fluid properties estimation including gas-oil ratio, density, viscosity, volume factor, Z factor, etc.
- Provide multiple correlations capability
- Match and optimize to obtain the best PVT correlation





Main Features

- Easy to use with very few input steps required for calculations
- Accurate and reliable estimation on phase behavior and properties of fluids.
- Versatility. FluidCal can be applied to many fluid types under various conditions such as bottom hole, wellbore and surface.
- Calculations can be performed to model two-phase or multi-phase behavior
- Powerful matching function. The matching between lab and field test data is employed to find the best calculation method
- Provides complete post-processing. Results can be presented either in graph or table format or both with export to Word and Exce

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RockProperty
— Rock Properties Analysis

RockProperty is a petro-physical application used to compute and/or verify reservoir rock properties including: compressibility, elasticity, relative permeability and capillary pressure curves and formation heterogeneity.

Main Functions

Rock Compressibility Estimation

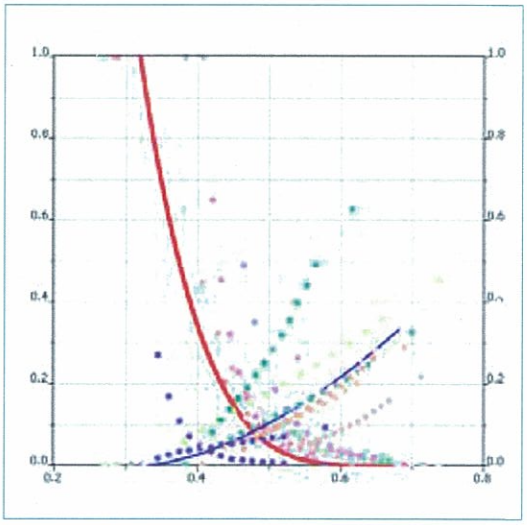
- Provide empirical correlations to estimate rock compressibility as well as oil, water and formation total compressibility.

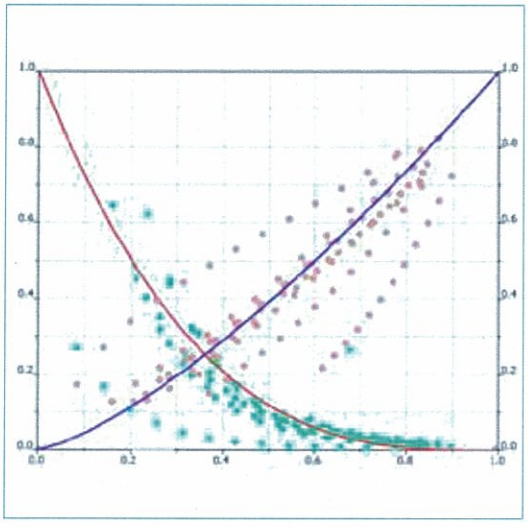
Reservoir Heterogeneity Analysis

- Use statistical and Lorenz Factor methods to analyze heterogeneity of any single layer or a group of layers.

Evaluation of Parameters of Rock Mechanics

- Employ test data to compute parameters of rock mechanics, including Poisson's Ratio, elasticity modulus, tensile strength, shear strength, compressive strength, lateral and longitudinal strains.





RockProperty — Rock Properties Analysis

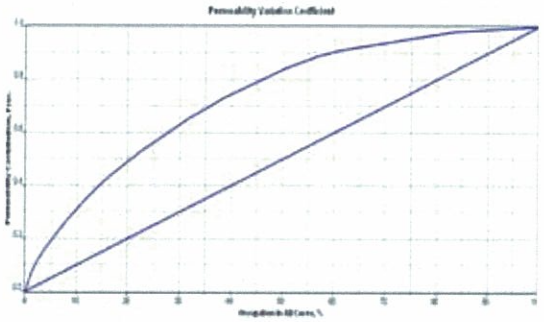
Relative Permeability Curve

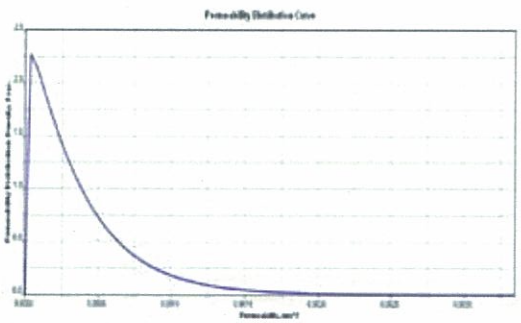
Based on Experimental method

- Relative permeability curve can be derived through manual or automatic matching of normalized data
- **Based on Empirical Correlations**
- Empirical correlations such as Corey, Pirson, Jones and Cheng, can be used to generate relative permeability curves.

Capillary Pressure Curve

- Automatic or manual regression on correlations between water saturation - capillary pressure and water saturation - average capillary pressure using J-function.





Main Features

- Provides complete post-processing. Results can be in graph and/or table format and exported to Word and Excel
- User-friendly interface enables fast queries and analysis of reservoir characteristics
- Data and results can be exchanged with 3rd party applications and reservoir simulators or directly used with other PEOffice modules for further reservoir engineering evaluation.

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ProdAna (for Oil & Gas) — Production Statistics and Analysis

PEOffice®
Petroleum Engineering Office

Some of the most important tasks associated to routine production analysis or long-term oilfield development are to capture production behaviors by statistics and analysis. Given the overwhelming amount of production or injection data, ProdAna is the ideal tool for engineers to quickly and easily: query data, calculate statistics, compare production by wells or periods and generate powerful production plots, contour maps and bubble maps and create user-define production indexes.

Main Functions

Quick Production Data Processing

- Quick field data access and preparation of data for analysis
- Statistical analysis and theoretical production evaluation

User Defined Production Data Query

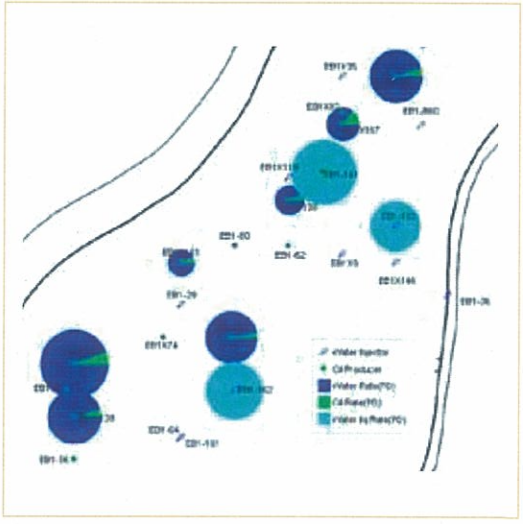
- User-defined query filters and report formats.
- Reports can be scheduled and generated on daily, weekly and monthly basis.
- Production and injection data can be tabulated and plotted in user defined format.
- Production and injection plots can be generated by well, well group , or field basis.
- Production plots can be annotated with important events/ notes.
- Comparisons of production or injection with a pre-selected sample can be easily performed and a correlation can then be generated.

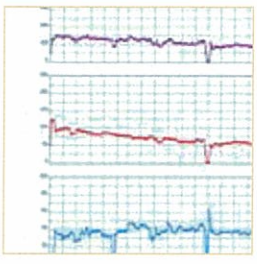
Production Statistical Analysis

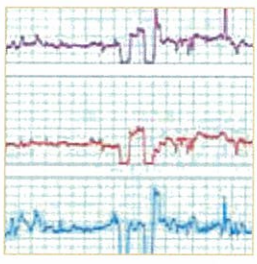
- Production statistical analysis including oil and water production and pressure (casing liquid fluid level and bottom hole).

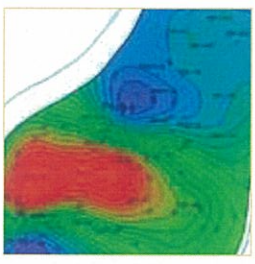
Integrated statistical analysis of different production indices

- Production index statistical analysis can be based on a pre-set time period.









ProdAna (for Oil & Gas) — Production Statistics and Analysis

Production Data Comparison Capability

- Comparison can be performed against a pre-set standard or among groups on production data including liquid rate, oil rate, water cut, pressure (casing liquid level and static liquid level), cumulative production and water injection rate.
- Comparison can be performed based on pre-set conditions including time.
- Dynamic comparison can be performed as the pre-set standard varies.

Quick Map Creation Capability

- Quick creation of various types of production map such as bubble map, and contour map.

Production and Injection Profile

- Production-injection profile analysis for single well, multiple wells or a group of wells

Advanced Statistical Analysis Capability

- User can define custom statistical parameters, settings, tables and plots

User Defined Functions

- For repetitive procedures, sub-routines can be defined.

Main Features

- Geologically integrated 2-D/3-D reservoir model, which provides for a visual production analysis
- Rapid database access and user-defined filtering functions
- User-friendly data query and statistical functions
- Record all user's operations to avoid repetitiveness
- Graphic and illustration capabilities
  - Integrate petroleum industry standards with field application
  - Flexible plot format - single X-Y, single X-multiple Y and multiple X-Y
  - Curve dragging capability
  - Graph fill effects and attributes
- Multiple Units of Measure with unit conversion between Metric and Imperial units

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ProdForecast — Production Forecast for Oil Reservoir

PEOffice®
Petroleum Engineering Office

ProdForecast provides a variety of reservoir engineering applications to estimate reserves and forecast production from primary and secondary recovery. Functions include: Arps'decline curves, waterflood type curve, Tong type curve statistical and stream tube models, etc. Additionally, Prod Forecast's material balance analysis can compute OOIP, water influx, drive mechanism identification and replacement contribution factor.

Main Functions

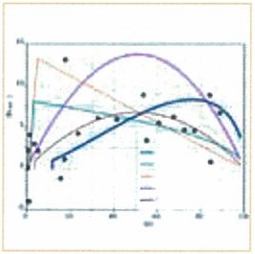
Reserve, Recovery and Production Rate Analyses by Well, Groups or Field

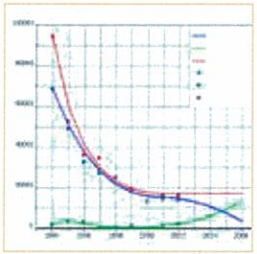
OOIP

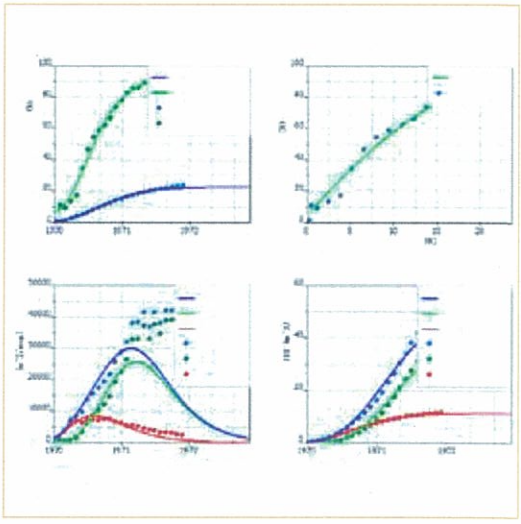
- Volumetric analysis
- Waterflood type curve analysis

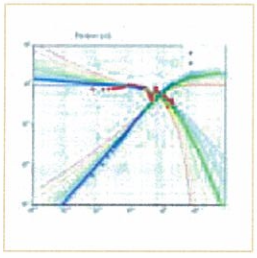
Recovery

- Empirical analysis, such as Guthrie & Greenberger, API, Koxaknh, etc.
- Waterflood type curve analysis, including dual-period type curve post-treatment analysis
- Waterflood type curve analysis with constant production rate
- Decline curve analysis for multi-periods as well as forecast with parameters setting option for Each analysis period
- Various statistical model analyses (Weibull, Logistic, Gaussian, etc.)
- Stream Tube analysis with production forecast under waterflood conditions
- Tong Type Curve
- Joint solution analysis with displacement efficiency and relative permeability. Water cut analysis with varying recovery
- Oil rate (PD) and water cut analysis
- Waterflood type curve analysis
- Decline curve analysis
- Statistical model analysis
- Joint solution analysis
- Stream tube analysis
- Waterflood type curve analysis with constant production rate









ProdForecast – Production Forecast for Oil Reservoir

Reserve, Recovery and Production Rate Analyses for Single Well

Oil rate (PD)

- Decline curve analysis
- Waterflood type curve analysis with constant production rate
- Recovery
- Decline curve analysis
- Waterflood type curve analysis

IPR

- Traditional IPR Analysis (under single-phase, two-phase and three-phase flow)
- Analytical formulas model
- Fractured well model (Infinite and finite conductivity)
- Heavy oil well model (With / without kickoff pressure)
- Horizontal well model (Various completion types)

Material Balance Analysis

- OOIP calculation without water influx, including FE, Campbell and Havlena & Odeh models
- Pseudo steady-state flow: Pot and Schilthus aquifer (radial, linear and hemispherical flow)
- Unsteady state flow: bottom aquifer (Chatas), radial aquifer (Van Everdingen & Hurst) and linear aquifer (Nabor-Barham).
- Three types of unsteady state aquifer boundaries: finite closed, infinite and finite open.
- Drive mechanism identification with Dake, PE and Campbell type curves
- Simultaneous calculation of OOIP, water influx and replacement contribution factor

Main Features

- Advanced reservoir engineering models coupled with strict robust algorithm to ensure accurate production forecast
- Users can perform various analysis and comparison for the same production index using different methods
- Sensitivity analysis capability
- Multiple Units of Measure with unit conversion between Metric and Imperial units
- Recommended Input data value range

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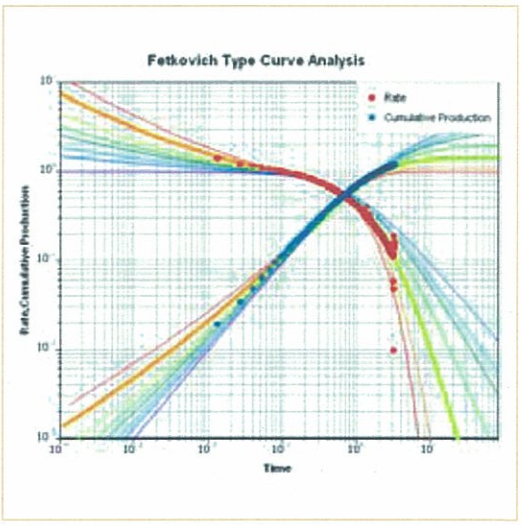
ProdForecast for Gas
— Production Forecast for Gas Reservoirs

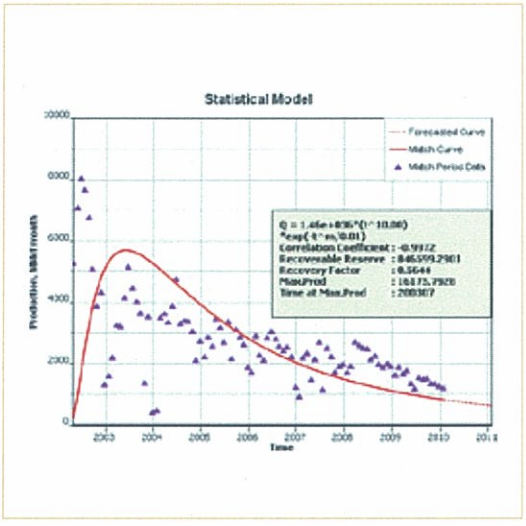
PEOffice®
Petroleum Engineering Office

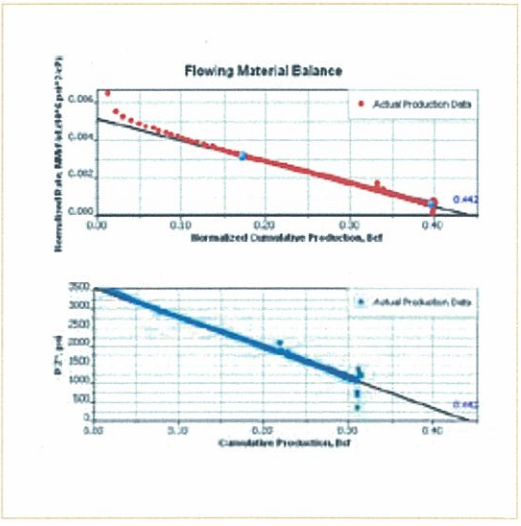
Similar to ProdForecast for oil reservoirs, ProdForecast for Gas offers a variety of engineering applications for gas analysis, such as volume metrics, material balance, Arps decline curve and statistical models to calculate OGIP, recovery, well spacing and initial gas-water contact. ProdForecast for Gas also provides advanced decline curve analysis methods by Fetkovich, Blasingame and Agarwal that can uniquely use gas rate and wellhead pressure without transient well test to calculate permeability, skin, recoverable reserves, EUR and drainage area and can forecast formation pressure, bottomhole flowing pressure and gas rate.

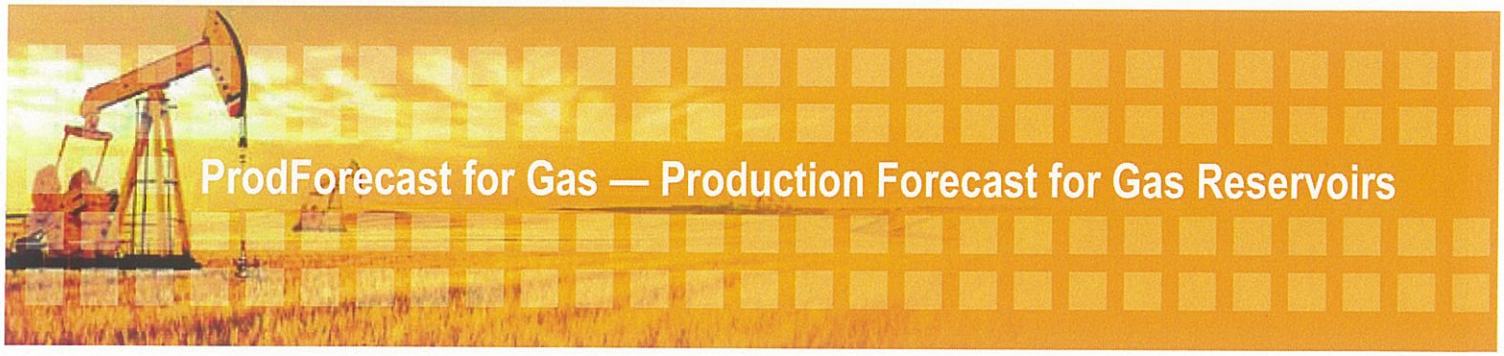
Main Functions

- OGIP Evaluation: volumetric analysis, material balance analysis
- Recovery Calculation: Decline curve analysis, statistical model analysis, material balance analysis, transient pressure analysis
- Gas Rate Forecast: Decline curve analysis, statistical model analysis
- Well Spacing Calculation: single well under known reserve volume, economic limit model, yearly gas recovery model, etc.
- Drive Mechanism Identification: P/Z vs. Gp analysis, water encroachment volumetric coefficient analysis
- Initial Gas-water Contact Analysis



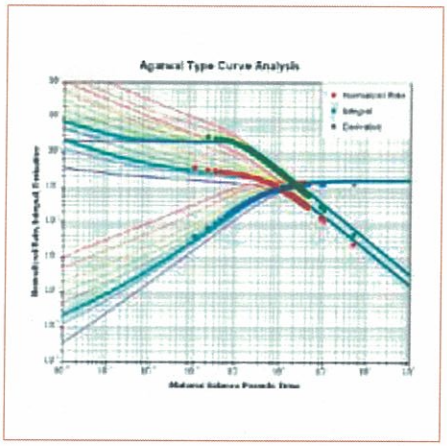


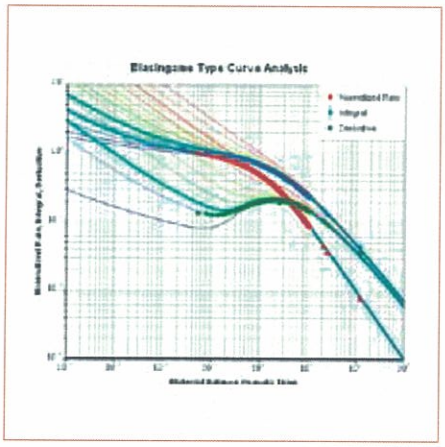


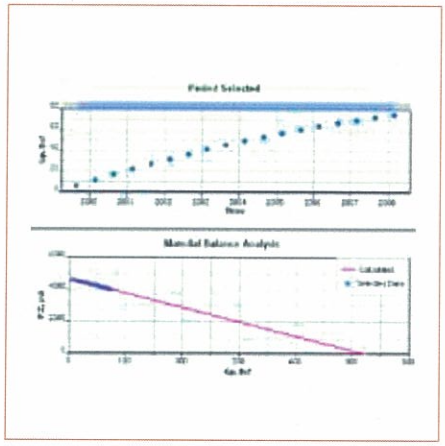


ProdForecast for Gas — Production Forecast for Gas Reservoirs

- Formation Pressure Estimation: pressure gradient method, pressure average method
- Water influx Calculation: steady state flow model, unsteady state flow model
- Advanced Decline Curve Analysis (Advanced DCA) is designed especially for analyzing well production data. Without transient pressure test, Fetkovich, Blasingame, Agawal Typecure Analysis and Flowing Material Balance are used here to determine OGIP, Estimated Ultimate Recovery, Permeability, Skin Factor, Half length of fracture and Production Index, based on which the well future production can be forecasted.







Main Features

- Advanced and versatile software package for gas reservoirs with a streamline work flow design
- Multiple engineering calculation methods
- Quick database access
- User friendly functions and features, metric-field unit conversion capability

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SimON
— Reservoir Numerical Simulator

PEOffice®
Petroleum Engineering Office

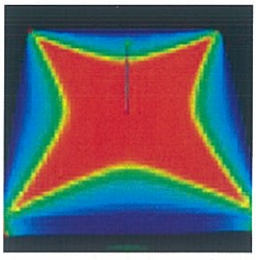
SimON is a finite difference, three-phase black oil reservoir simulator used to simulate and forecast production performance from black oil reservoirs with complex geological structures. Pre-processing workflows are significantly streamlined through: concise project and data management, data input wizard and direct production data loading and model compatibility with popular geological building and reservoir simulation software. Engineers can easily visualize (post-process) simulation results through versatile and excellent curve, 2-D contour and 3-D illustrations. SimON has been field tested and validated with SPE test cases to ensure precise and reliable simulation results.

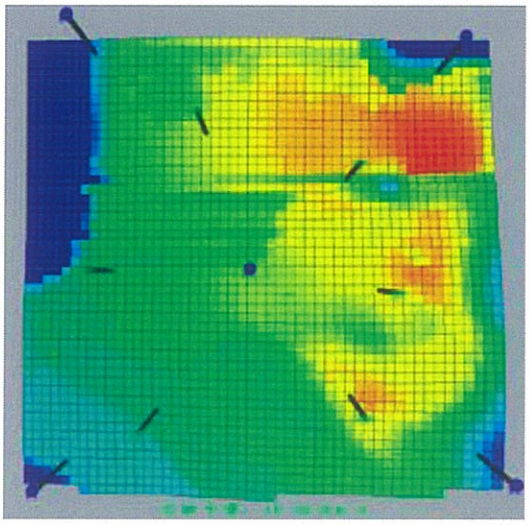
Main Functions

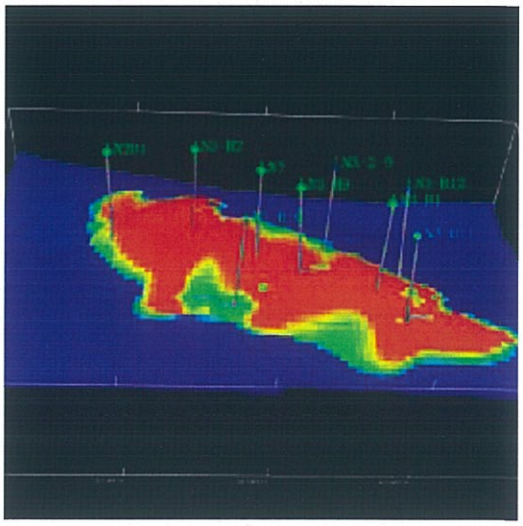
Compositional Model

SimON is a fully implicit, three-dimensional and three-phase black oil reservoir simulator. It can be used to simulate gas-water, oil-water, and oil-gas-water flow.

- Whole reservoir (multiple wells) or single well simulation
- Coordinate System: Cartesian and radial coordinate
- Grid Type: Corner point and block center
- Region Type: Rock, fluid, aquifer and equilibrium
- Capillary pressure and relative permeability hysteresis effects simulation
- Aquifer Type: Analytical and numerical aquifer
- Well Type: Vertical, horizontal and deviated well
- Powerful post-processing: Curve plots, 2D and 3D grid view







SimON — Reservoir Numerical Simulator

Main Features

Fully Implicit Solver

Results such as detailed phase behavior and PVT parameters from FluidCal can be input into a Black Oil Model. FluidCal can be used for all types of reservoir fluids as well as the following functions in a black oil model:

- SimON uses fully-implicit method to ensure the stability of simulation with extended time steps. The fully-implicit method is the most complex yetstable solver compared to others, for example, IMPES and half-implicit.

Rapid Grid Block Data Preparation

- Easy and quick pre-processing to create and visualize grid system
- Capability of loading grid data from other simulators such as Eclipse™, CMG and VIP™; and converting data to SimON data format

Concise Project and Data Management

- Manage and display project information, case description, running status and error messages.

Clear and Concise Interface

- Data input wizard: automatically verify and process data; prompt error message
- Apply graphic and tabular forms to input data; provide empirical correlations and default values

Efficient Data Management

- Capable of processing massive grid block data with advanced database technologies. Efficient data access makes it easy to share results in the powerful PEOffice database

Effective Well Control and History Match

- Apply fully-implicit method to solve bottomhole pressure and other parameters at well grid. Provide complete well controls and constraints on well related parameters, such as bottomhole pressure, production rate and water cut, etc.
- Simultaneously display simulation and history data during each run, thus effectively reducing time cost compared to traditional history match.

Batch run function

Powerful Post- Process

- Versatile curve and table presentation; excellent 3D visualized effects

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FieldAssist — Reservoir Production Performance Evaluation

FieldAssist is used to evaluate oil well production performance, identify potential production failure by correlating reservoir formation inflow and well production outflow against baseline conditions and typically used with PEOffice ProdDiag as part of a comprehensive Artificial Lift Analysis program. FieldAssist can quickly locate and evaluate the production status of wells by creating performance and utilizing well location maps created previously in PEOffice WellMap.

Main Functions

Performance map template

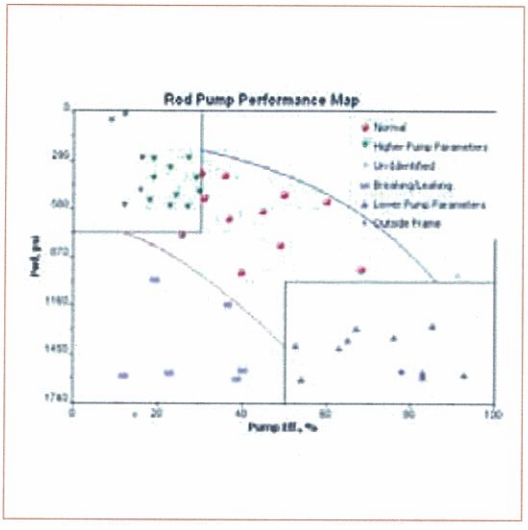
- Performance map template for rod pump well

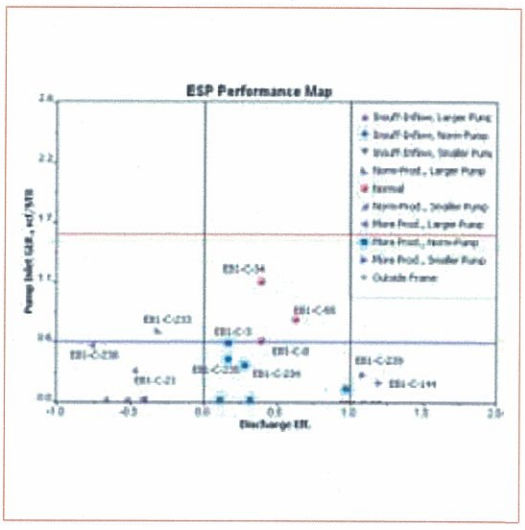
  Provides three types of templates: Inlet Pressure vs. Pump Efficiency, Flowing Bottom-hole Pressure vs. Pump Efficiency, and the Ratio of Flowing Bottom-hole Pressure over Bubble Point Pressure vs. Pump Efficiency
- Control lines calculated by the statistical and theoretical methods
- Performance map template for ESP well

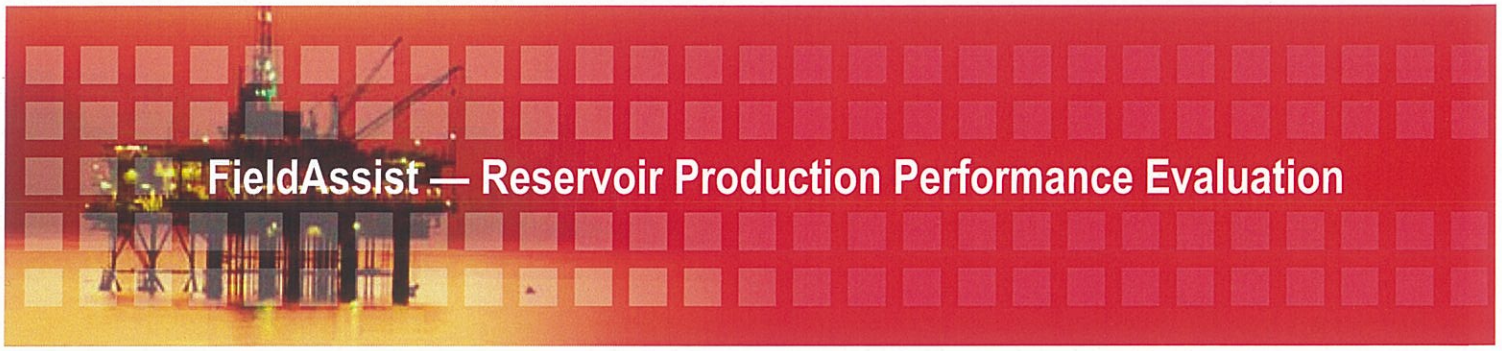
  Provides two types of templates: Pump Inlet Gas-liquid Ratio (GLR) vs. Pump Discharge Efficiency and Pump Inlet Pressure vs. Pump Discharge Efficiency
- Template management

  Flexible template settings

  Allows to save, import and export templates







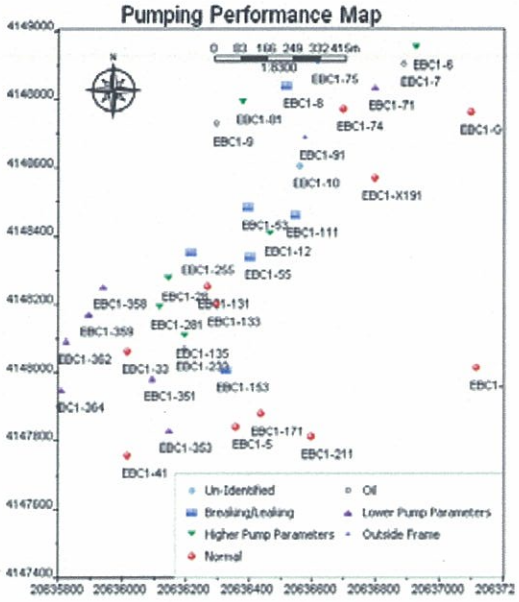
FieldAssist — Reservoir Production Performance Evaluation

Performance map creation

- Easy to input production data from the database or Excel file
- Precise calculation of the parameters, such as flowing bottom-hole pressure, pump inlet pressure, pump inlet GLR, etc.. Oil emulsion calculation is available for the heavy oil wells.
- Provides three and two types of templates for rod pump and ESP well, respectively

Results management

- Automatically completes statistics of evaluation results and quickly creates the summary report
- Displays evaluation results on the well location map



Main Features

- Easy to acquire production data from field databases
- Simplified work flow and fast template creation
- Flexible custom settings of performance maps
- Provides template and data sharing
- Allows users to open multiple performance maps simultaneously for comparison analysis
- Simple to create the performance map evaluation report
- Well location map based operation enables users to clearly understand the relationship between the production performance and the reservoir physical properties.

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Optimization Petroleum Technologies, Inc

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ProdDesign
— Oil Well Production Optimization

ProdDesign is used to precisely: model production and optimize design parameters for (vertical, inclined and horizontal) oil wells having various lift types such as flowing, beam pump, ESP, gas lift and screw pump. ProdDesign offers rich calculations for well design, including: IPR, multiphase flow and nodal analysis in wellbore as well as PVT, productivity, production index and forecast and optimum design for maximum production rate under a given rate or specific constraints. ProdDesign further enables match and forecast variation of inflow capability parameters (such as formation pressure and fluid productivity index) according to oil rate history.

Main Functions

Accurate matching and calculation of fluid PVT, IPR and wellbore multiphase flow

ProdDesign assists users to find the best appropriate calculation method and tune model parameters by matching lab and field data. ProdDesign provides total 19 types of fluid PVT models, 14 types of IPR models and over 10 types of multiphase flow models.

- Fluid PVT matching and calculation (including black oil and compositional model)
- IPR matching and calculation
- Wellbore pressure and temperature profile matching and calculation

Nodal analysis

- Calculate pressure and flow rate at any node in the wellbore (bottomhole, wellhead, choke) to determine the optimal production point under various production conditions.
- Offer parameter sensitivity analysis

Optimization of well production parameters

- Design at constant rate

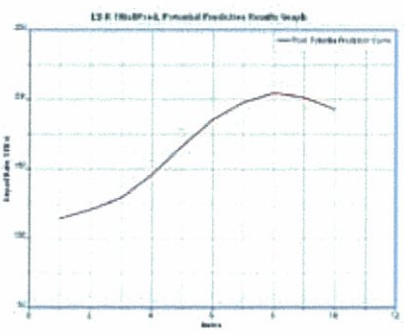
Optimize pumping equipment and production parameters according to given rate and conditions

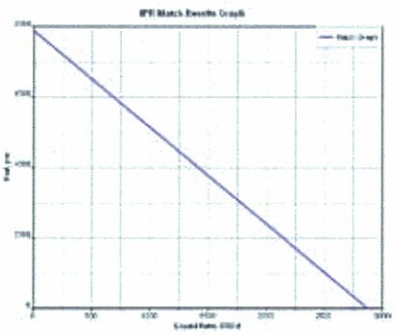
- Design at maximum rate

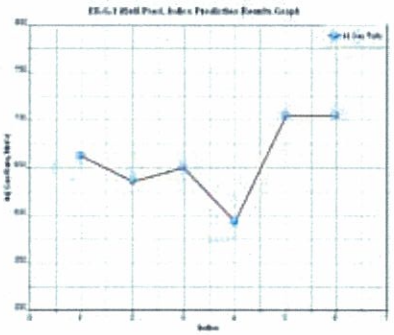
Design production parameters at maximum rate subject to constraints

Formation supply forecast

Offer multiple methods to match historical formation supply data and to forecast future formation supply changes.







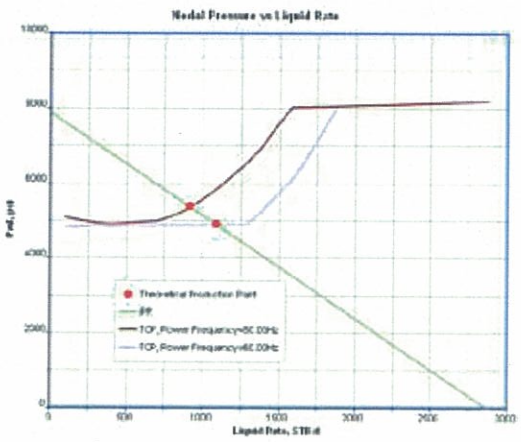
ProdDesign — Oil Well Production Optimization

Production potential forecast

- Analyze variation of well productivity over time
- Compare results with various lift means to assist lift type select

Production index forecast

- Analyze variations of production parameters over time, for example, wellhead tubing pressure and temperature, power consumption of electrical submersible pump, gas consumption in gas lift, etc.



Main Features

- Nodal analysis under rod pumping with accurate and stable calculations
- Unique forecast functionalities including inflow capability, maximum production potential and production index
- Rich fluid PVT, inflow and outflow models with easy matching operations
- Direct access to user's database resulting in enhanced program capabilities
- Metric and Field unit conversion ability
- Applicable to various types of oil well under various lifting mechanisms
- Well Location Map based operation enables to view all well input data, analyzed results and findings on map
- Optimal IPR data, fluid properties and multiphase flow regime can be easily stored for further analysis or exported to other modules
- Versatile reporting. Output can be tabulated and/or be depicted in graphic format, or exported to Microsoft Word and Excel
- Streamlined work flow and user-friendly interface

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ProdDesign for Gas
— Gas Well Production Optimization

ProdDesign for Gas is used to precisely: model production and optimize design parameters for (vertical, inclined and horizontal) dry gas and condensate gas wells by using black-oil or compositional models. ProdDesign for Gas calculates: PVT, IPR, P/T profile, nodal analysis, liquid loading, critical rate, downhole choke design as well as gas lift design for deliquification.

Main Functions

Gas PVT calculations

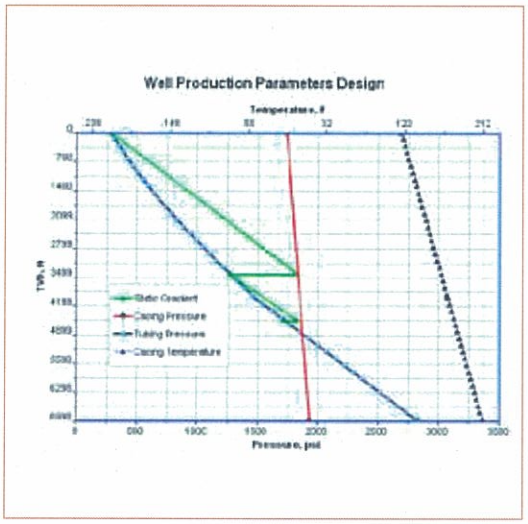
- Dry gas and condensate gas PVT calculation
- PVT model auto-tuning with test data

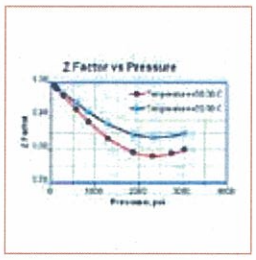
IPR forecast

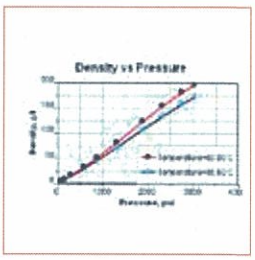
- IPR calculations under various production conditions
- Applicable to vertical, inclined and horizontal well

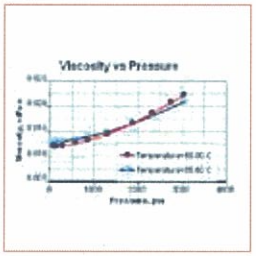
Well pressure and temperature profile analysis

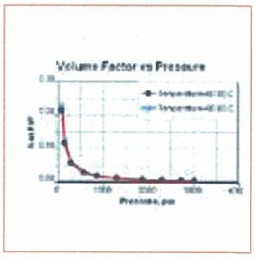
- Dry and condensate gas well profiles
- Auto-identifying the existence of hydrate and its position in the wellbore
- High-precision joint solution of both pressure and temperature











Nodal analysis

- Calculate pressure and flow rate at any node in the wellbore (bottomhole, wellhead, choke) to determine the optimal production point under various production conditions.

Downhole choke design

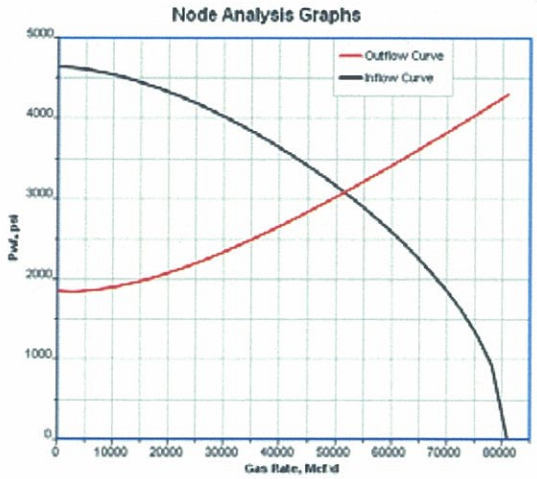
- Selection of the downhole choke diameter and its depth

Liquid loading analysis

Critical erosion rate calculation

Gas de-liquification design

- Calculate gas de-liquification parameters to resume production from dead wells or to slow down liquid loading



Main Features

- Applicable to different gas types (dry, condensate) and well types (vertical, inclined and horizontal)
- Exclusive design of the user-friendly interface for gas wells
- Flexible unit settings and high-precision calculation
- Versatile results presentation including data output in the forms of graphs and tables, as well as text reports. Also, results can be exported to Word and Excel

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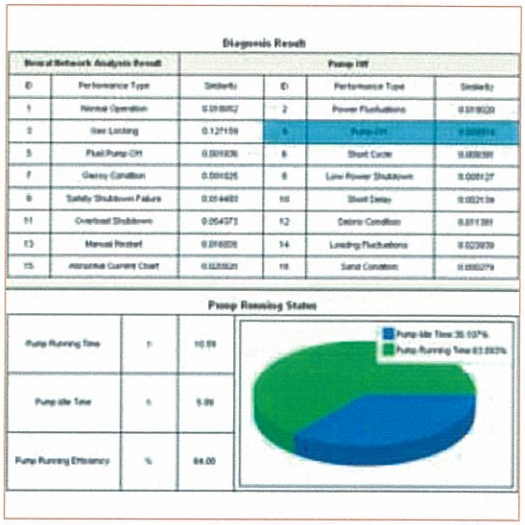
ProdDiag
— Beam Pump Well Diagnosis

Since Pumpers can only "see" surface conditions on your beam pump wells, they have to guess what is going on downhole. Using ProdDiag combined with pump-off controller/ dynacard readings takes the guesswork out of downhole conditions and enables engineers to decide whether downhole problems exist and, if so, determines a thoughtful diagnosis for those problems. ProdDiag performs deterministic, pattern recognition utilizing neural network (NN) technologies by comparing current patterns to a library of past patterns and diagnoses to intelligently diagnose production performance. ProdDiag also calculates production rate, rod-load and pump efficiency from dynacards.

Main Functions

Dynacard diagnosis

- Calculates the downhole dynacard at different depth from the surface dynacard
- Uses NN technology to automatically diagnose the production status of each beam pump well
- Diagnose more than 20 kinds of problems
- Perform batch well diagnosis



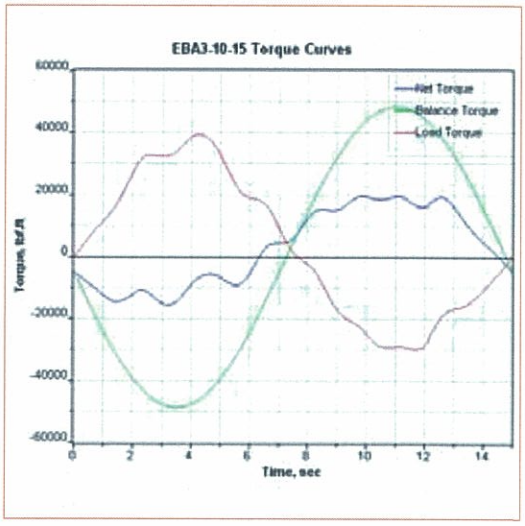
Surface dynacard diagnosis

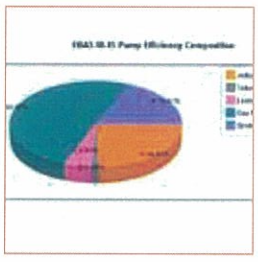
- Diagnose pump working conditions from a dynacard
- Calculate working pump parameters, such as pumping stroke, pumping efficiency, and the complete system efficiency, etc.

  Pump efficiency composition analysis
- Analyzes the impacts of stroke loss, filled gas, pump leaking and volume change on the pumping efficiency

  Rod stress analysis
- Calculates the rod stress and the percentage of the critical stress

  Torque curve calculation
- Calculates the torque curve from the dynacard
- Identify over-torqueing occurring in the gearbox from the torque plots





Main Features

- Advanced and reliable methods

  Calculates the downhole dynacard using wave equation and simulates the running beam pump unit using a precise dynamic model
- Intelligent and effective Identification Technology

  Uses advanced neural network recognition technology to improve diagnosis accuracy

  Provides many types of dynacard samples and allows users to create custom samples
- Complete information collection

  Comprehensive dyancard analysis will collect all the information included

  Analysis of torque curve, pump efficiency composition and rod stress enable the users to completely understand the running conditions of the pumping unit.
- Flexible dynacard data format

  Multiple data formats for creating / storing dynacard from/to file or database
- Highly efficient and convenient data processing

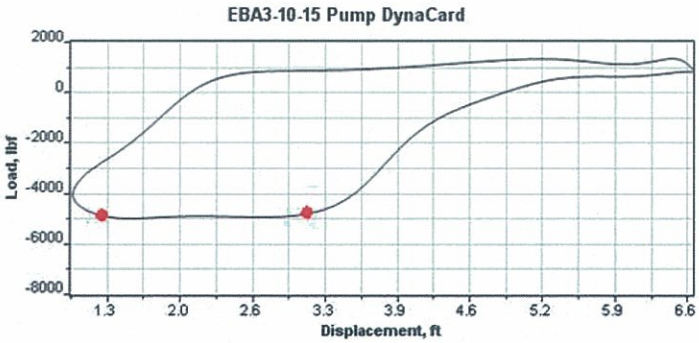
  Batch well processing run mode dramatically enhances the working efficiency

  Seamless access to the database ensures quick diagnosis and analysis

  User-friendly interface; convenient and versatile data input and output
- Diagnosis log

  Diagnosis log assists users to quicklyidentify problems not discovered during diagnosis
- Well location map based operation

  Displaying the diagnosis results on the well location map provides users with a cleaner view of each well's production status within a block



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ProdDiag for ESP
— ESP Well Diagnosis

PEOffice®
Petroleum Engineering Office

Electronic current cards are often used to identify how Electronic submersible Pumps (ESP) are working. ProdDiag for ESP uses neural network (NN) technology to compare prior current card readings to present readings as a means of determining whether problems exist and how to diagnose them. Using ProdDiag for ESP will ultimately help reduce production downtime associated to ESP failures.

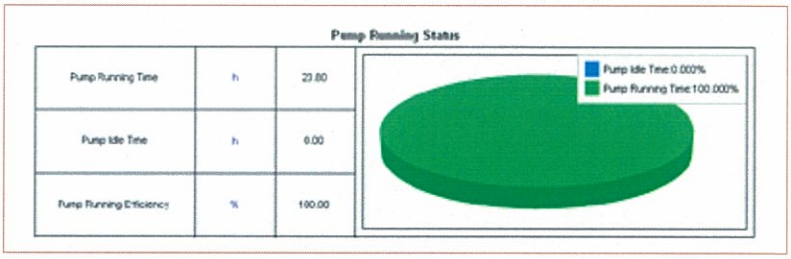
Main Functions

Convenient and flexible management of the performance samples curves

- 16 types of ESP performance sample curves provided
- Allows to create user-defined sample curves
- Supports picture and digital format

Performance diagnosis

- Diagnoses electronic current card data
- Recognizes electronic current card and transform it to the digital format
- Applies neural network technology to diagnose ESP performance
- Supports weekly and daily electronic current card analysis



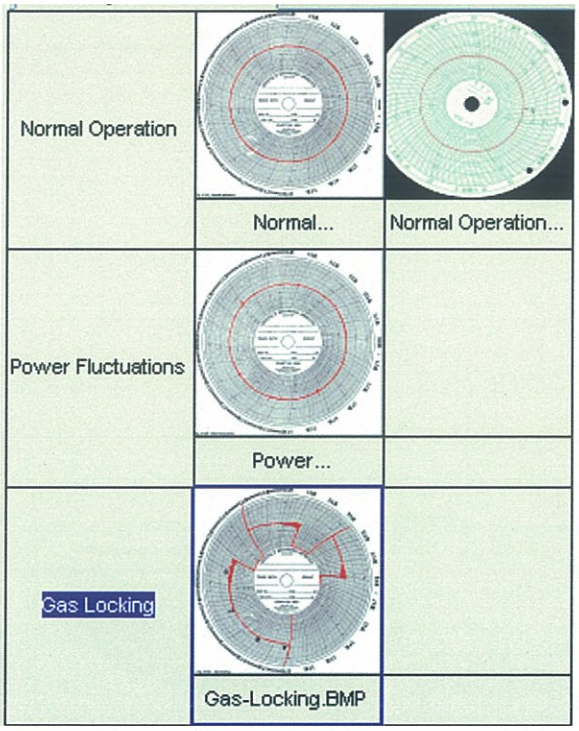
Diagnosis Result

ID	Performance Type	Similarity	ID	Performance Type	Similarity
1	Normal Operation	0.006124	2	Power Fluctuations	0.015645
3	Gas Locking	0.006125	4	Pump Off	0.007833
5	Fluid Pump Off	0.011266	6	Short Cycle	0.006259
7	Gassy Condition	0.998232	8	Low Power Shutdown	0.006487
9	Safety Shutdown Failure	0.009455	10	Short Delay	0.004517
11	Overload Shutdown	0.023215	12	Debris Condition	0.004665
13	Manual Restart	0.010381	14	Loading Fluctuations	0.002734
15	Abnormal Current Chart	0.015457	16	Sand Condition	0.000298
Neural Network Analysis Result		Gassy Condition			

ProdDiag for ESP — ESP Well Diagnosis

Main Features

- Uses neural network technology to ensures accurate and reliable recognition
- Offers numerous current curve samples
- Easy and flexible operations
- Applicable to digital current data format



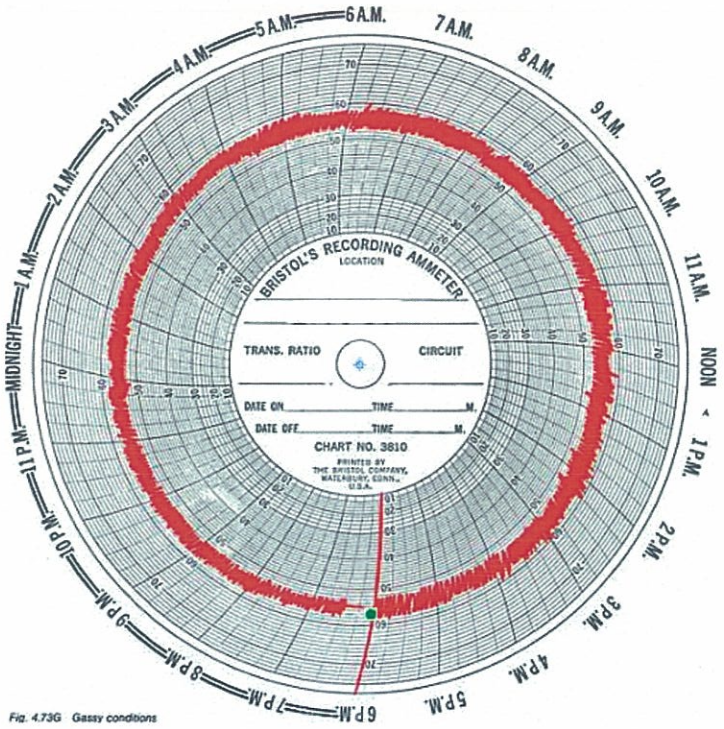


Fig. 4.73G Gassy conditions

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WIDesign — Water Injection Analysis and Optimization

WIDesign is used to design and analyze water injection systems for the secondary recovery of oil. By investigating the entire injection system consisting of injection equipment, surface pipeline network, wellbores and reservoir formation, WIDesign can be used to: Calculate injection allocation , water injectivity and P/T profiles in pipeline networks and wellbores, wellbore string load and deformation, choke screening for layering injection; Design injection pump sizes and combinations; and Identify and de-bottleneck choke points constraining injectivity.

Main Functions

Injection allocation

- Automatically imports production and injection data and exports analysis results
- Flexible customer settings of initial and boundary conditions

Water injectivity analysis

- Calculates water injectivity variations under hydraulic fracturing
- Calculates injectivity index and pseudo injectivity index using well test data
- Analyzes injectivity curves from different injection datasets to learn water injectivity variations

Wellbore temperature and pressure profile analysis

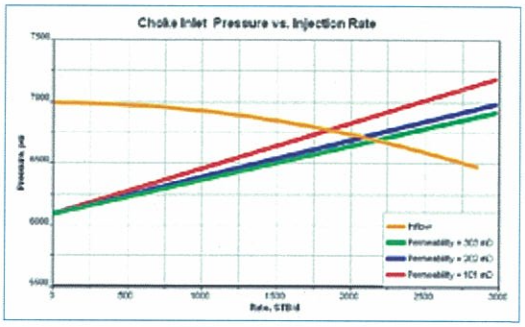
- Includes impact of well trajectory, wellbore structure and layer separation on wellbore temperature and pressure profile calculation

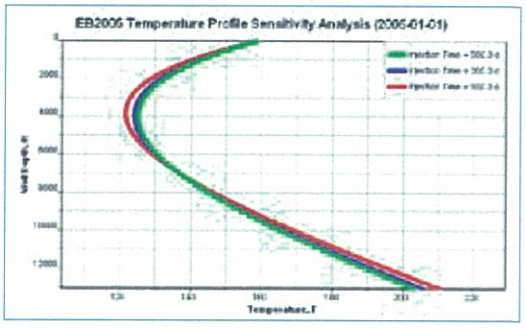
Injection string stress analysis

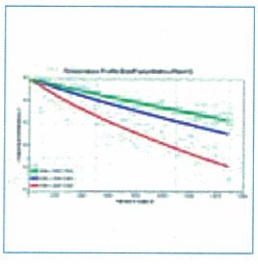
- Calculates wellbore string load and deformation under given injection conditions
- Includes the impacts of the gravity, piston, ballooning, spiral and temperature effect on injection string stress analysis

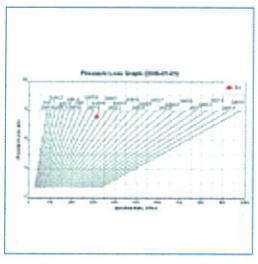
Choke analysis

- Calculates injection allocation and pressure loss to select the optimum choke type and diameter
- Analyzes the injection performance of each layer for layering injection









WIDesign — Water Injection Analysis and Optimization

Surface pipeline network analysis

- Creates surface pipeline map by manual editing or by importing from the database
- Includes terrain fluctuation, pipe structure and temperature variations in mapping
- Analyzes pressure distribution from the injection pump and the water distribution platform to the wellhead and the associated flux distribution

Pipeline analysis

- Displays which pipeline segment impacts network efficiency most within the system
- Optimize structure and temperature parameters for a specific pipeline segment and segment group

Pump station analysis

- Evaluate pump station capability todeliver the required injection water
- Visualizes the construction of the pump station and performs optimum design

Nodal analysis

- Analyzes efficiency of each component in water injection system to determinethe major factors impacting injection efficiency
- Performs sensitivity analysis from different aspects, such as the condition changes of the surface, the wellbore, the choke and the formation

Main Features

- Having a systematic model consisting of the injection pump station, the surface pipeline network, the wellbore and the reservoir formations enables a comprehensive investigation of the sensitivities to the various parameters
- Increased productivity and data integrity through direct access to client's database
- Portfolio functions as a industry commercial software, easy-to-use and high-precision calculation
- Versatile results presentation including data output. in the forms of graphs and tables, as well as text reports. Also, results can be exported to Word and Excel

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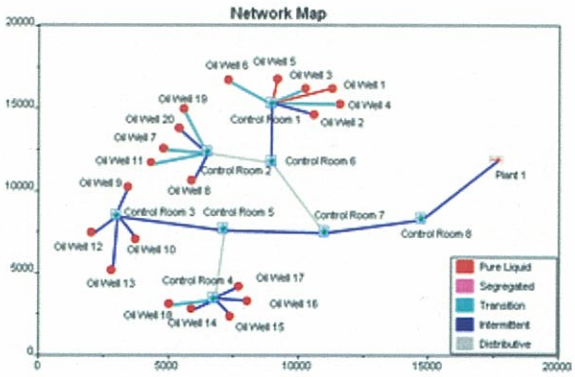
PipeNet — Pipeline Network Analysis & Optimization

PipeNet is used to design, analyze and optimize surface gathering and transportation pipeline networks. With black oil and compositional models included and by taking the effects of gathering equipment such as: pump, separator, compressor, heat exchanger, heater (or cooler), valve and choke into account, PipeNet can powerfully analyze the impact of pipeline network flow rates, pressure and capacity on production using multiphase flow modeling and heat exchange calculations. The main applications offered include: flow modeling in single pipeline and pipeline network, which models variation of flow rate, pressure, temperature and flow pattern and energy loss; system nodal analysis, which analyzes the impact of any parameter on pressure and temperature in system; system compatibility analysis, which models the compatibility of surface system with variation of production (pressure, temperature and rate); pipeline optimum design, which optimizes and adjusts well grouping, station layout, pipeline diameter and system equipment under energy and economic constraints.

Main Functions

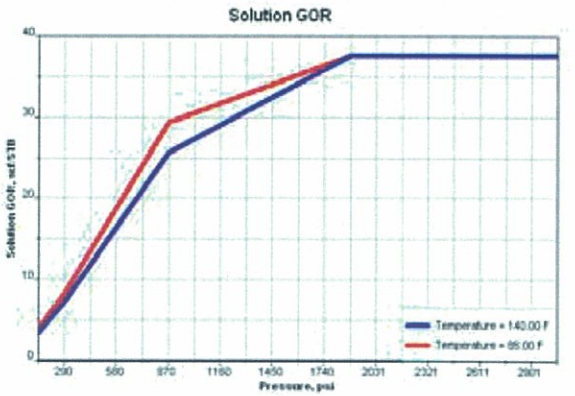
Pipeline network model building

- Provides two ways to create pipeline network model: by database data or by visualized design
- Allows default settings of network components
- Supports modeling of bending angle and choke
- Includes pipeline structure, equipments and heat preservation
- Offers views of component schematics



Fluid Flow modeling in single pipeline or in pipeline network

- Supports loop system
- Models fluid flow dynamics in pipeline network
- Includes different types of heat preservations
- Reports the locations of slug flow occurring
- Precise fluid PVT analysis
- Creates pipeline network analysis report



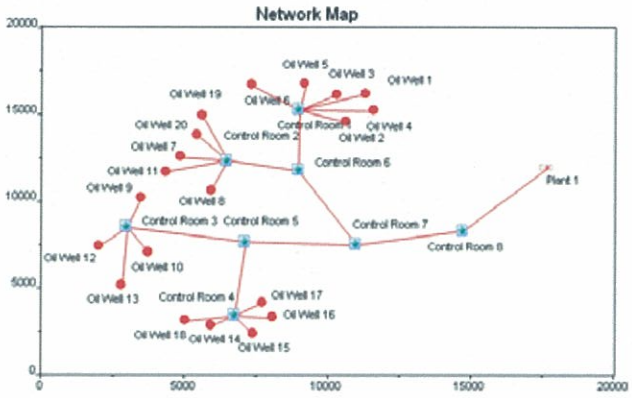
Equipment modeling

- Be capable of modeling equipments, such as gathering pump, separator, compressor, heat exchanger, cooler and valve, etc.
- Support parallel pump system
- Visualized operation

PipeNet — Pipeline Network Analysis & Optimization

Network optimization

- Optimizes well grouping, station layout and the cost of pipeline construction
- Calculates system efficiency of the fluid flow in network and compares the power loss of each component to find out the target to be optimized
- Optimize the network parameters and the equipment selection while minimizing the energy consumption



Nodal analysis

- Creates a nodal system from the sub-surface (reservoir) to the custody transfer/sales point.
- Takes into account the factors in the analysis on the whole system, such as terrain, environment temperature, pipeline structure, fluid PVT, etc...

Surface pipeline network analysis

- Creates surface pipeline map by manual editing or by importing from the database
- Includes terrain fluctuation, pipe structure and temperature variations in mapping
- Design pipeline networks and related equipment on a map

Main Features

- Surface gathering and transportation system construction to comprehensively analyze impacts of structure or fluid PVT parameters
- Increased productivity and data integrity through direct access to client's database
- Portfolio functions as a industry commercial software, easy-to-use and high-precision calculation
- Versatile results presentation including data output. in the forms of graphs and tables, as well as text reports. Also, results can be exported to Word and Excel

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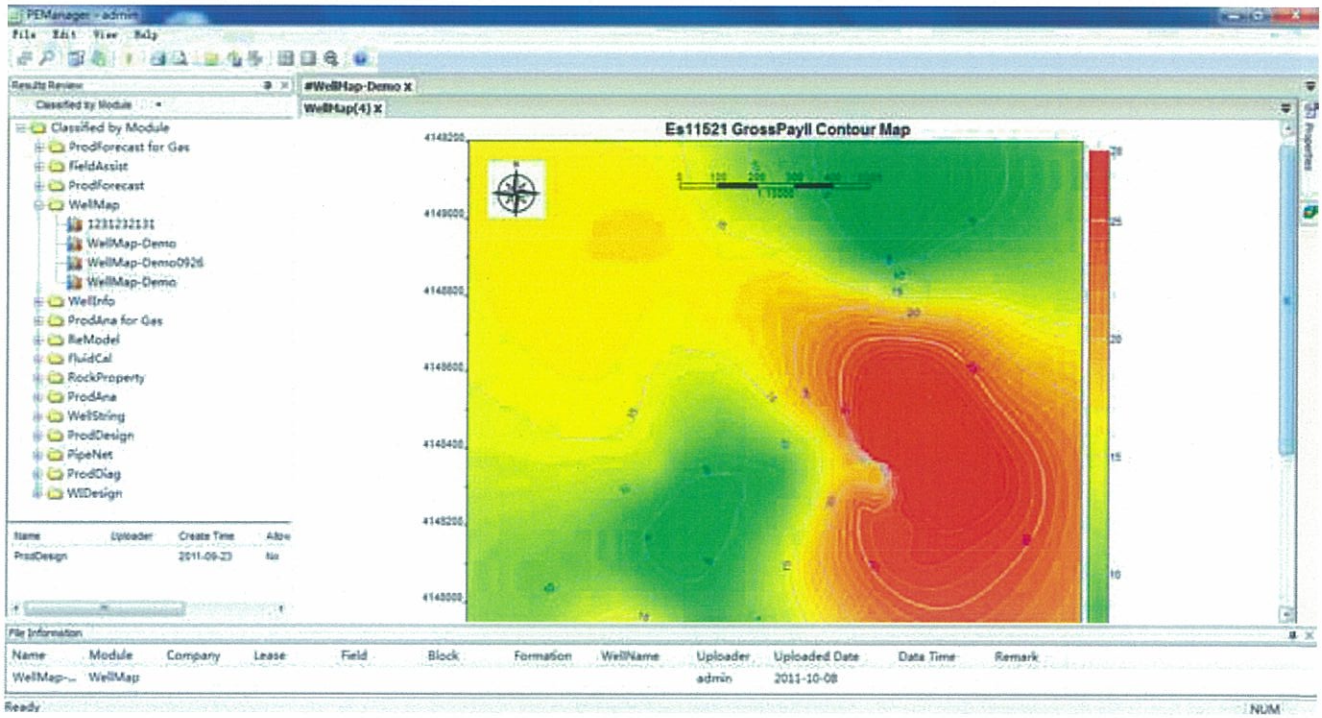
PEManager
— Results Management and Analysis

PEManager provides a portal to PEOffice users to systematically manage and collaboratively analyze different kinds of PEOffice-related analysis and results from each step from the entire engineering workflow of oil and gas field exploitation and production. It is easy to store PEOffice results into the users database utilizing a structured taxonomy. Users are allowed to browse and copy according to their assigned privileges by an administrator. More importantly, PEManager is able to display all types of results from PEOffice across disciplines or departments such as geology, reservoir, production engineering and surface engineering on one screen simultaneously, which will enable engineers and executives to view and manage a variety of PEOffice project results.

Main Functions

Results uploading

- Upload the results from PEOffice Modules to the PEManager server for query, change and output
  Results management
- Provides a simple way to browse different classifications of PEOffice-related results, including:
  By module By reservoir By administration
  By uploading date By uploader By user-defined



PEManager — Results Management and Analysis

Advanced search

Flexible search criteria according to one condition or multiple conditions

Project management

- Authorizes users to manage the project and the associated results within their privileges

Privilege control

Set read and write privilege of project or child project for specific user or user group

User-defined project

- Allows users to create custom project to quickly search results

Display and operation

- Display results consistently with their initial effects
- Allow changes to results properties
- Support copy or paste of graphs or tables

Main Features

- Comprehensive respository of PEOffice project results
- Powerful and flexible database functions offer easy results query and management
- Search settings are fully compatible with field application
- Complete user privileges control
- Easy to create user-defined project by unifying all projects'results
- Consistent display uses original settings

PEOffice® is a PC/network-based software platform for integrating oil and gas reservoir management, production analysis and design. PEOffice® provides systematic computations and comprehensive analysis for reservoir model management, reservoir performance analysis, production problem diagnosis, optimized design of production parameters and analysis of oil/gas gathering and transportation system. PEOffice is widely utilized by petroleum engineers onsite and in the back office to resolve production problems and to manage oil and gas field development.

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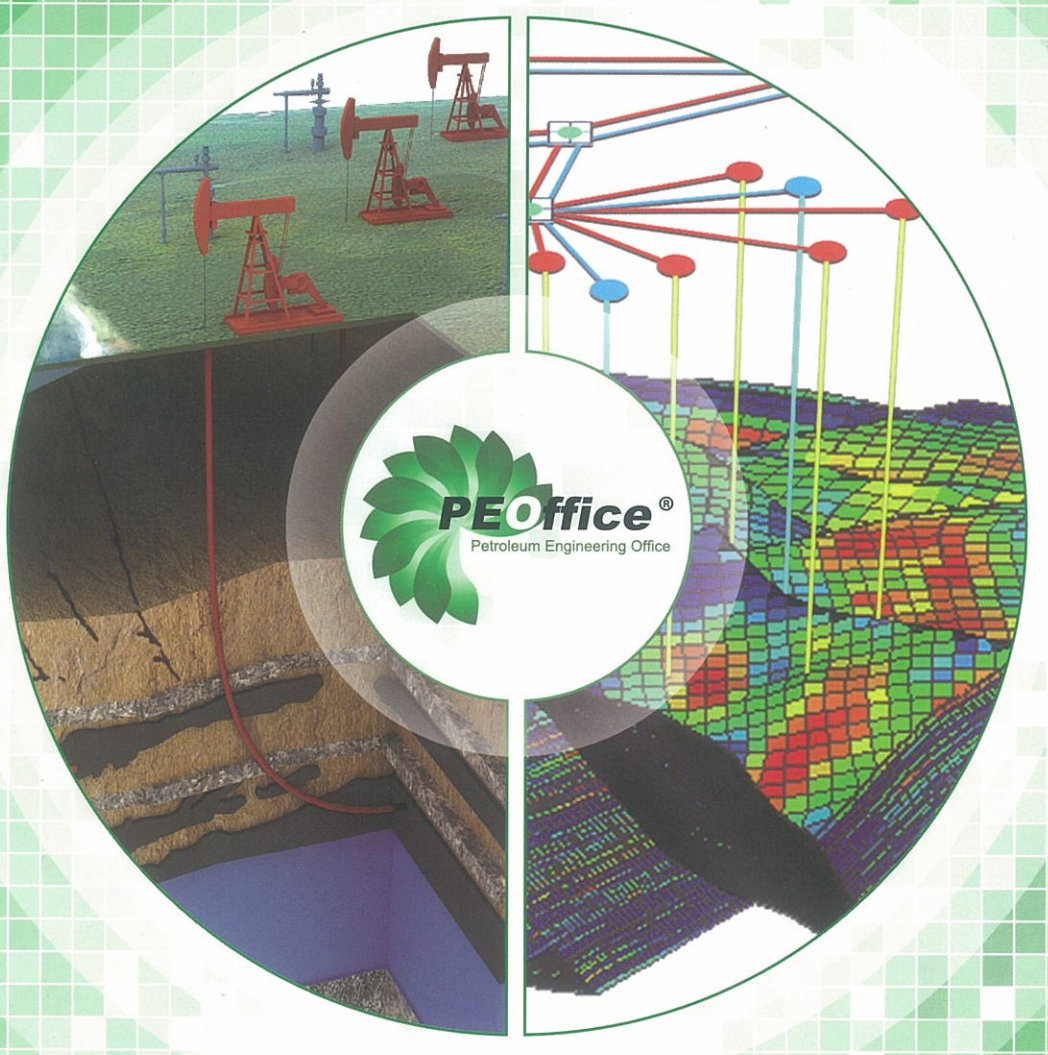
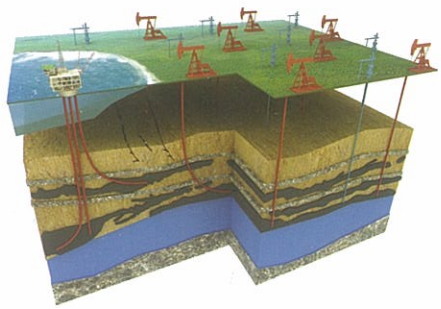


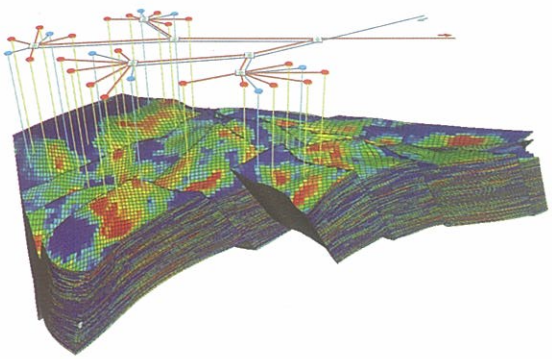
Integrated Software System for Reservoir Management and Oil & Gas Production Optimum Design

Optimization Petroleum Technologies, Inc.

PEOffice® - The industry's most comprehensive, PC-Based, reservoir, production and field operations software toolset.

PEOffice® integrates static reservoir and ever-changing production data together enabling producers to characterize reservoirs, visualize production trends and correlate reservoir and production together.





PEOffice® enables engineers in the field or in the back office to collaborate and perform integrated field studies for field development, recovery estimation and scheme adjustment or a variety of separate analyses and designs for reservoir and production engineering.

Quickly integrates with geoscience and production databases

With its user-based database application, users can use PEOffice® to directly access databases like Oracle, Sybase, Access, Dbase without any need to modify the user's database. Users can also read local MS Excel data tables and other data files or manually input relevant data from the PEOffice® graphical user interface.

Systematically performs oil and gas E&P analysis to solve everyday problems

While PEOffice's various modules target many different workflows across the technical reservoir and production disciplines, each PEOffice® module can be used individually to perform specific analysis, or collectively, to maximize oil and gas exploitation potential and improve efficiency based on the common data as well as model analysis and results associated to oil and gas reservoirs, wells, and gathering and transporting systems and water injection pipeline system, water injection wellbores.

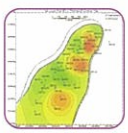
PEOffice® Framework

Client Database

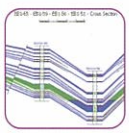
PEOffice Data Engine

Client Data Files

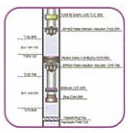
Access any type of database, such as Oracle, SQL Server, Access and Data files(spreadsheets). Highly efficient data optimization Access and Spreadsheets.



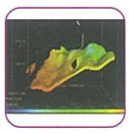
WellMap



WellInfo

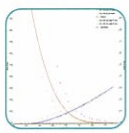


WellString

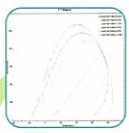


ReModel

Visualization of reservoir, wellbore and surface pipe network facilitates petroleum engineers to analyze problem and verify data in a straightforward manner.

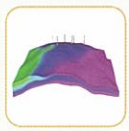


RockProperty

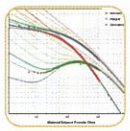


FluidCal

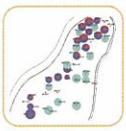
Accurately characterize rock and fluid petrophysics by RockProperty and FluidCal.



SimON

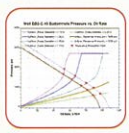


ProdForecast

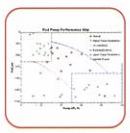


ProdAna

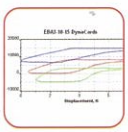
Provide integrated investigation of reservoir development and optimization through by coupling map-based classical reservoir engineering methods and statistics with black-oil simulation.



ProdDesign

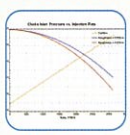


FieldAssist



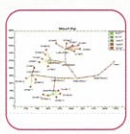
ProdDiag

Provide systematic solutions for production design, status assessment and problem diagnosis.



WIDesign

Provide water injection system parameters analysis and design.

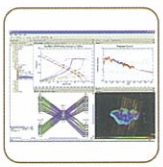


PipeNet

Simulate fluid flow in complex oil&gas gathering system and optimize surface pipeline network design.

Build integrated fluid flow models from reservoir, producer, and injector to surface pipeline work. Keep flow simulation consistent through data communication between different modules.

PEOffice Data Engine



PEManager

Integrate result from various modules to assist in oil and gas development scheme optimization.

PEOffice® Suite involves overall discipline areas, including geology, surface transporting, reservoir performance, production, economical evaluation and management.

WellMap — Well Location Map Editor

WellString — Wellbore Design and Loading Stress Analysis

WellInfo — Static Well Data Visualization

ReModel — 3-D Model for Geological Analysis and Data Management

RockProperty — Rock Properties Analysis

FluidCal — Fluid Properties Analysis

SimON — Reservoir Numerical Simulator

ProdAna (for Oil & Gas) — Production Statistics and Analysis

ProdForecast — Production Forecast for Oil Reservoir

ProdForecast for Gas — Production Forecast for Gas Reservoirs

ProdDesign — Oil Well Production Optimization

ProdDesign for Gas — Gas Well Production Optimization

WIDesign — Water Injection Analysis and Optimization

FieldAssist — Production Performance Evaluation

ProdDiag — Beam Pump Well Diagnosis

ProdDiag for ESP — ESP Well Diagnosis

PipeNet — Pipeline Network Analysis & Optimization

PEManager — Results Management and Analysis

Optimization Petroleum Technologies is a leading provider of Oil and Gas E&P Software and Consulting Services. OPT provides access to petroleum technologies and resources otherwise unavailable to or unaffordable by producers to increase production from their mature fields, maximize asset value and reduce their resource costs.

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