APPLICATION

**GEOLOGICAL MODELING**
3D-modeling and analysis of hydrocarbon deposits

**GEOMECHANICAL MODELING**
Geomechanical modeling and stability analysis of slanted and horizontal wells

**GEOSTEERING**
Geological drilling support of horizontal wells and sidetracks

**REAL-TIME DATA VISUALIZATION**
Data collection, processing and visualization on the control station of coiled tubing / hydraulic fracturing fleet

**TECHNOLOGICAL PROCESS MODELING**
Modeling of technological process of transportation, preparation and product primary processing

**MODELING COILED TUBING OPERATIONS**
Modeling and analysis of coiled tubing operations

**HYDRAULIC FRACTURING MODELING**
Engineering calculations for hydraulic fracturing modeling

**DOWNHOLE EQUIPMENT DESIGN**
Selection, modeling and analysis of production wells
RN-GEOSIM is a modern software product for 3D geological modeling and analysis of hydrocarbon deposits. It provides a wide range of functionalities to solve the most complex geological modeling tasks. The product is under development, the implementation phase is planned for 4 quarter of 2020.

RN-GEOSIM offers a full range of geomodeling tools: interactive visualization, data import and data management, well section correlation, structural and fault modeling, facies and petrophysical 3D modeling, reserves calculation, reporting.

**DESCRIPTION**

RN-GEOSIM is an integrated multi-user platform for geological modeling, which allows to create full-sized geological models.

- High-performance calculations
- Modeling of giant fields
- Universal any-fault modeling
- Multi-well log automatic correlation
- Repeatable and fully traceable workflow management
- Fast and flexible data access
- Multi-user environment
- Corner point grids up to $10^9$ elements
- All-known and custom geostatistics algorithms
- Automatic workflow creation
- Seamless all product line integration

**PLANS**

Up to 2020 release, RN-GEOSIM will be supplemented with the following functions:

- Adaptive data loaders
- Structural modeling of any-fault systems
- Modeling templates and multi-variant modeling
- GPU computing
- Basic elements of seismic interpretation and visualization
- Hydrodynamic modeling adaptation
RN-SIGMA is a geomechanical modeling software for inclined and horizontal wellbore stability analysis. RN-SIGMA offers a full-set of geomechanical modeling tools for data collection, analysis and pre-processing, 1D geomechanical models construction and data exchange, prediction of geological drilling complications, trajectory and well design optimization, safe mud density window calculation.

Every algorithm in RN-SIGMA is based on world’s best practices. RN-SIGMA includes all necessary algorithms and interface solutions for complex geomechanical wellbore stability modeling. It also includes some actual non-standard functionality (elastic anisotropy, temperature etc).

- Full cycle of wellbore stability geomechanical modeling
- Custom templates for typical multiple well processing routines
- Customized user algorithms in Python
- Python scripts support for geomechanical correlations and user defined processing routines
- Additional non-standard extensions
- Easy to use and learn interface
- Seamless product line integration

RN-SIGMA is a rapidly improving software product. In the nearest updates the following features will be introduced:

- Real-time wellbore stability analysis while drilling
- Dynamic wellbore stability model using time-domain structural rock changes
- Risk assessment of the potential sand production and cement ring destruction during the well operation
- 3D geomechanical model of the wellbore stability
- Drilling hydraulics
RN–VISOR is a real-time data acquisition, processing and visualization software that is installed on the control station of coiled tubing/hydraulic fracturing fleet.

RN–VISOR provides the collection of the combined data flow from COM and TCP ports on the control station, its initial filtering, correction and processing according to user-defined formulas and scripts, data storage, visualization of coiled tubing or hydraulic fracturing operations and data transmission in a user-friendly mode.

**UNIQUE FEATURES**

- Convenient user settings for text input data flow parsing to adapt to various control data flow protocols
- Unlimited input data channels
- Various customizable graphs and scales visualization templates
- Custom Python-based calculated channels
- Original input text data storage for instant reparsing
- Customizable channels threshold warnings
- Min–max channel data memorizing
- Convenient data and visualization export to various graphical formats

**PLANS**

- OPC support for equipment data acquisition
- Protection of ports configuration from unintended changes
- Automatic data stitching after shutdown
- Injection stages visualization in coiled tubing and wellbore
- CT/fracturing verification by measured parameters, situation forecast
RN-HORIZON+ is a top-performing software for horizontal well geosteering. It implements state of the art techniques for rapid importing of initial project data from various sources, building 3D geosteering model, updating the model in real time through WITSML, identifying structural grid angles and predicting drilling direction at any time followed by automatical formatting and sending reports.

As a comprehensive solution, RN-HORIZON+ contains tools for geosteering complementary tasks, such as interactive well correlation, image and mud logs interpretation, advanced well logs calculator, structural surfaces manager, etc.

**DESCRIPTION**

**UNIQUE FEATURES**

- All geosteering related tools incorporated into single software
- Real-time wells data and model update through WITSML
- Solving related tasks: analyzing images, mud logs, building wells correlation scheme, etc
- Automated reports generation and delivery
- Multiwell 3D algorithms for modeling stratum structure and properties
- Parallel multi-using geosteering projects access
- Advanced analytics with embedded Python interpreter
- Seamless all product line integration

**GEOLOGICAL MODEL IN RN-HORIZON+**

**IMAGE LOG INTERPRETATION IN RN-HORIZON+**

**PLANS**

RN-HORIZON+ tends to be in the forefront of advanced geonavigation software. The following features are going to be implemented in the nearest future:

- New geosteering methods including stratigraphic approach
- Fast trajectory calculation
- Automated well completions placement
- Distributed platform for keeping and managing geosteering projects
- Light version of Horizon+ for displaying and administering geosteering projects on the go
- 3D geosteering models visualization
- Smart geosteering assistant based on machine learning technologies
DESCRIPTION
RN-SIMTEP is a software package for modeling technological processes taken place in transportation, treatment and primary processing of well products. The tool is designed to solve problems at the stage of oil fields design and operation.

RN-SIMTEP contains modules for analyzing and setting reservoir fluids parameters, allows to carry out integrated modeling of oil collection and treatment, reservoir pressure maintenance and transportation systems.

UNIQUE FEATURES
- Modeling of production processes of oil collection, treatment and transportation systems
- Modeling in stationary and dynamic modes
- Risk analysis in surface facilities operation
- Mixing of flows with different PVT-models (compositional/black-oil model)
- Finished product parameters optimization
- Amine treatment processes modeling and flaring system simulation
- Integration with corporate software
- Capital expenditure and economic indicators assessment
- Energy consumption calculation

PLANS
The first version of RN-SIMTEP is planned to be released at the end of 2020 with the following features:
- Phase behavior calculation and creation of PVT-curves
- Flow modeling in pipelines and valves
- Surface facility parameters and operation modes calculation
- Analysis of possible complications
- Capital expenditure and economic indicators assessment
## MODELING COILED TUBING OPERATIONS

**DESCRIPTION**

Coiled tubing simulator RN-VECTOR is an industrial software for mathematical modeling and analysis of the coiled tubing operations.

Coiled tubing is used in oil and gas wells to perform a variety of technological operations: wellbore flushing and bottomhole cleaning, inflow stimulation and well completion, milling of restrictions to recover the flow area, fishing operations, installing and drilling the cement plugs and packer plugs, acid treatments, geophysical well logging, hydraulic jet perforation, etc.

Coiled tubing modeling is used in the oil and gas industry in the planning, control and analysis of a coiled tubing technology using.

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**UNIQUE FEATURES**

- Calculation of coiled tubing load and buckling criteria
- Accounting for the hydraulics influence on the coiled tubing stress state
- Consideration of the coiled tubing critical stress state conditions
- Calculation of multiphase hydraulics and solid particles transportation
- Calculation of coiled tubing metal fatigue wear
- Visual representation and editing of all the equipment input parameters and the RIH/POOH plan

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**COILED TUBING RIH/POOH SIMULATION IN RN-VECTOR**

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<th>PLANS</th>
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<td>✔️ Calculation of hydraulic characteristics for attachable equipment</td>
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<td>✔️ Calculation of the optimal wellbore flushing mode</td>
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- Taking into account the influence of temperature effects on CT
- Accounting for the reservoir inflow or fluid loss
- Calculation of unsteady flow hydraulics
RN–GRID is a new-generation hydraulic fracturing modeling software, created to be convenient, accurate and prompt. We’ve incorporated experience of hundreds of engineers who trust us their daily workflows.

RN–GRID covers the whole process of designing, performing and analyzing hydraulic fracturing operation, offers limitless treatment data import and visualization, convenient engineering analysis tools, smart geomechanic modeling, test injection analyses, treatment data matching, fracture geometry and production prediction, databases of fracturing fluids, proppants, casing and tubing.

RN–GRID single project file stores multiple wells, well logs, fracturing design variants, historical treatment data and fracture analyses.

**DESCRIPTION**

**UNIQUE FEATURES**

State-of-the-art RN–GRID Planar3D model most accurately describes complex hydraulic fracture geometry, RN–GRID covers most physical phenomena of the fracture growth and the fracturing slurry transport within formation and tubing for a reliable fracture geometry prediction with complex formation and operation conditions. Blazing-fast performance of Planar3D implementation in RN–GRID leaves behind that of older, simpler and less reliable Pseudo3D models on the recent hardware.

- Fully-implicit geomechanic and hydrodynamic solution
- Stratified geomechanic model
- Multiple fluids and proppants
- Proppant settling, bridging and mobilization
- Time and pressure-dependent fluid rheology
- Acid and acid-proppant fracturing
- Poroelasticity and fracture interference
- Rich leakoff models
- Optimization for recent multi-core CPU hardware (AVX2)
- Full software product line integration

**PLANS**

We constantly improve RN–GRID, releasing a new version for our engineers every 6 weeks. The upcoming versions will also include:

- Improved simulation speed
- Advanced interactive editing and 3D visualization of well geomechanics and construction
- Fracture productivity forecast through integration with hydrodynamic simulation software
**DESCRIPTION**

RosPump is a complex software environment designed to calculate and analyze the parameters of producing wells. RosPump can help to create designs for wells equipped by electric submersible pumps (ESPs) or sucker rod pumps (SRPs), or even for natural flow wells.

RN–ROSPUMP allows to analyze the well operation, and also to carry out a node-wise analysis of energy costs.

**UNIQUE FEATURES**

RosPump offers wide adjustment possibilities to tailor the tool for the needs of virtually any company / field of application. The application settings embrace PVT correlation sets, MS Excel data importing, the user-accessible part of the equipment catalog and report forms, to name just a few.

RN–ROSPUMP helps to provide the energy-efficient operation of the mechanized well stock.

- Designs automatization
- Using the latest hydrodynamic models
- PVT – correlations for any oil
- Wellbore curvature control in the pump suspension interval and on the equipment lowering site
- Assessment of designs energy efficiency
- ESP cone assembly design
- Modeling of the periodic well operation mode
- Consideration of complicating factors
- Packaging strength calculation
- Modeling of the SRP with submersible straight drive
- Accounting of additional equipment

**OPTIMAL INSTALLATION DESIGN**

**PLANS**

- Modeling of the progressive cavity pumps with submersible and surface drive
- Modeling of simultaneous and separate production systems
ANY QUESTIONS? VISIT OUR WEBSITE:

HTTPS://RN.DIGITAL/EN