Mobilization of Resources for Efficient Development and Production Management Based on AVIST Oil & Gas Platform

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Despite the fact that Russia has a margin of safety to withstand low oil prices for a long time, the entire industry is wondering how to go through this difficult period. The previous crisis of 2014 confirmed that any difficult situation can be used as an impetus for development. A vivid example is the confident growth of American companies specializing in shale oil production, which became possible despite the market situation and negative forecasts. The effect was achieved through the use of digital innovation, improved performance and proper management of available resources.

INTELLIGENT FIELD

Nowadays, the oil and gas market participants face an urgent question: how to optimize management and achieve maximum efficiency without acquiring any extra facilities? The answer to this question will be provided by the top companies implementing the Intelligent Field concept (Digital Field, I-Field, Asset of the Future, etc.). In fact, it is effective production management with the help of integrated innovative approaches and tools (integrated modeling, integrated planning, choke model, etc.), and modern mathematical methods and analysis, forecasting and optimization tools.

'Intelligent Field' is not some expensive reckless scheme, but an effective way to mobilize available resources, determine and unfold unrealized potential, and withstand the onslaught of future changes. In-depth analysis and processing of geological and geophysical and field data allows getting an exhaustive understanding of production processes, evaluating their efficiency and adjusting equipment operating modes so that the enterprise brings the best business result, taking into account all influencing factors, both current and potential.

It should be pointed out many of the tools that proved useful during the crisis of 2014 are no longer relevant today. Integrated solutions that have been continuously developed and adapted to the rapidly changing market conditions are of the highest value nowadays. They are industry-specific, can be integrated into manufacturing processes, and work well with any applied software. Information security and sanctions affecting the pricing policy of vendors and service support in the Russian Federation are also taken into account. In light of the current situation, the Intelligent Field concept is best implemented on the basis of the Russian integration platform AVIST Oil & Gas.

ONE SOLUTION

The idea to use a solution developed in Russia with a stable cost in Russian rubles, was not a new one, but a good one though. We can offer something more – our own development based on project experience unique for Russia and the best international practices. When we began digitalizing oil and gas fields many years ago and studied international experience, we discovered an interesting pattern: none of the industry leaders limited themselves to the implementation of information systems only. All of them were transforming production and business simultaneously in several dimensions (processes, organization, people, information and technology). The main difference between the innovative management model and the traditional one is that the first one is based not on the accumulated statistics and experience of individual specialists, but on integrated predictive models defining the optimal scenario for the operation and development of an asset with a high degree of accuracy. The value of the AVIST Oil & Gas platform

is that it guides the user through each step of the end-to-end business process of production optimization, pulling up the necessary data at the right time or launching calculations from a variety of specialized systems used to solve production, technology and management issues. All this allows making the best decision possible.

It should be noted that the approaches and capabilities embodied in AVIST Oil & Gas have been recognized by the scientific community. The practical effects achieved with the help of the platform and tools of integrated operations formed the basis of the advanced training course at the Russian State Gubkin University of Oil and Gas. The course participants were the heads of departments, chief technologists and project managers of well-known Russian enterprises.

THE FOUR PILLARS OF EFFICIENCY

The solution consists of the four main functional units: digital twin of the field, choke modeling and optimization, integrated planning, and real-time monitoring.

The AVIST.Prediction and AVIST.Choke Modeling modules are designed to automate the production and development management workflows of oil and gas fields based on integrated models (IM), as well as work with the production system potentials and restrictions. In fact, integrated modeling is the backbone of the AVIST Oil & Gas platform, allowing creating a digital twin of an asset by integrating various component models (hydrodynamic models, well models and gathering systems, etc.). The models can be created in various specialized software products (Schlumberger, Petex, Roxar, RFD, etc.).

The AVIST.Planning module ensures development of a unified integrated production plan of measures for an oil and gas production asset and its optimization, taking into account predetermined scenario conditions and existing restrictions. Integrated planning allows eliminating contradictions in the plans of various departments and achieving economic benefits by minimizing downtime and optimizing the use of resources.

The AVIST.Operation module collects data in real time from telemetry systems, automated process control systems, directly from equipment using wireless IIoT technologies, runs dozens of thousands of parameters through 'smart rules', identifying the most significant deviations and exceptions, and also provides tools for monitoring the state of the production system as a whole. The solution also displays key performance indicators on management dashboards and provides more than 60 types of various reports. This option guarantees that not a single significant factor slips away from the attention of the manager.

In 2019, the functionality of the module was expanded and adapted to the needs of enterprises. The functionality of managing field installations, monitoring events was expanded especially for them and the model for improving business processes was described. The system includes a mechanism based on algorithms for processing large arrays of data, which makes it possible to reduce the cost of a remote well stock maintenance.

This basic functionality is sufficient to build a digital enterprise with unlimited possibilities for process optimization using artificial intelligence technologies, Big Data, IIoT, human capital management, predictive maintenance and repair management and many other tools that can be implemented all together or step by step.

AVIST Oil&Gas allows solving production problems such as decision support at the design stage of production, gathering, transportation and processing systems (long-term perspective), monitoring of field

performance and equipment condition (for a day, week, month), short-term forecasting, production optimization and operational daily production system management, mid-term and long-term forecasting and production optimization.

The ITPS Group of Companies has successfully implemented more than 100 complex projects aimed at improvement of economic and operational efficiency at the world's major fields. The company's staff includes experts having special knowledge in the field of oil and gas production and international experience unique for Russia. AVIST Oil & Gas can be modified to meet changing market needs, taking into account the development trends of the IT and oil and gas industry. The ITPS project portfolio is constantly expanding, which allows the Group of Companies to integrate more and more competencies into the functionality of its core development.