

Development and Implementation of Integrated Production Model for Oil and Gas Field within the Framework of the Lukoil Intelligent Field Project

On December 10, 2019, LUKOIL announced it had implemented an integrated production model at the Yuzhno-Yagunskoye oil and gas field for LUKOIL-Western Siberia by the efforts of LUKOIL-Engineering LLC, LUKOIL-Technologies LLC with the participation of their IT-partner the ITPS Group.

According to the company, the project for the implementation of an integrated production model (IPM) at the Yuzhno-Yagunskoye field covered the facilities of the Yuzhno-Yagunskoye, Tevlinsko-Russkinskoye, Kustovoye, Vostochno-Ikilorskoye and Zapadno-Ikilorskoye fields.

The project was launched upon the initiative of LUKOIL in 2018 as part of the Intelligent Field project. At that time, the Company's oil producing subsidiaries had already gained significant experience in development and implementation of integrated models at oil and gas fields.

The knowledge and experience gained are accumulated at the Integrated Modeling Competence Center based on LUKOIL-Engineering LLC, which develops and tests innovative approaches in order to improve oil production processes and increase efficiency.

Moving in this direction, the Company's goal is to obtain an intelligent digital tool in order to solve the following production tasks:

- control over the technological operation mode of production and water injection wells, taking into account mutual interference;
- select the most efficient production optimization options;
- increase reservoir pressure maintenance system efficiency;
- define maximum throughput of the well gathering system, taking into account changes in the operating modes of production wells;
- select optimal downhole pumping equipment for the wells, taking into account operation forecast, time between repairs and energy efficiency requirements;
- identify bottlenecks and determine operational potential of the field production system.

While implementing the approaches mentioned above, all production information is accumulated in a unified transparent information environment, allowing quick analysis and flexible management of the key parameters in order to optimize production, save resources and reduce operating costs. Operational data processing also opens up vast opportunities for infrastructure condition monitoring, timely assessment and risk management.

The project was implemented by an expert team consisting of specialists from LUKOIL PJSC, LUKOIL-Western Siberia LLC, LUKOIL-Engineering, LUKOIL-Technologies LLC and the ITPS Group of Companies. In course of the project implementation, ITPS was responsible for analyzing initial data quality, preparing recommendations for improvement, development and configuration of component models.

A complex Intelligent Field solution is implemented in order to automate the integrated model operation, which is based on the platform of an automated control system for integrated modeling processes and a choke model both based on the AVIST Oil & Gas platform.

The integrated model is based on Petroleum Experts software such as: MBAL (reservoir models), PROSPER (well models), and GAP (pipeline models and integration of component models with each other). In course

of the project implementation, the regulatory and methodological framework for the use of integrated models was updated.

As a result of the successfully implemented project, a modern digital tool was introduced, which is now used to constantly monitor 12 production facilities and more than 1,700 wells. The use of this tool increases the company's efficiency by automating the key process of production planning and management. Automation tools also make it possible to significantly reduce labor costs when performing routine operations, improve the quality of development and justification of technological modes of production and operation of water injection wells.

"Digitization of oil industry enterprises is one the main goals in terms of the industry development and the Russian economy in general. Introduction of modern technology is inevitable. It is simply impossible to reach the required performance indicators without competent implementation and use of digital systems," stated **Vadim Voevodkin**, General Director at LUKOIL-Engineering LLC.

"LUKOIL Group is our top priority customer. As of December 2019, the group is one of the leaders in digital transformation in Russia. We, at the ITPS Group of Companies, are grateful to LUKOIL PJSC for the opportunity to apply and broaden our experience, exchange best practices, and build up industry expertise, thanks to which we manage to hold a special place in the IT market," said **Leonid Tikhomirov**, CEO of the ITPS Group.