

SPE WORKSHOP

MATURE FIELDS DEVELOPMENT

BRIDGING THE GAP TO ULTIMATE RECOVERY

**28 – 29 NOVEMBER 2017
Moscow, Russia**

**HOLIDAY INN SOKOLNIKI
RUSAKOVSKAYA ST., 24**

**Topic submission till 24 October
Registration open till 14 November**

Session 1. Localization of Remaining Oil In Place

Session 2. Technology selection by type of remaining oil in place
Is Enhanced Oil Recovery a universal remedy for depleted fields?

Session 3. Waterflooding of depleted fields: expediency,
technological and economic efficiency

Session 4. Reservoir management for mature fields: integrated
approach

Round table discussion “Digital technologies, machine learning
and processes automatization”

Bringing greenfields into development always attracts attention of management, technology partners and news agencies. For example, today much attention is paid to a popular issue of Bazhenov formation deposits development. Meanwhile, geologists and engineers dedicate most of their time to the fields with a high water cut and major remaining oil reserves. Enhanced oil recovery at such brownfields will allow Russia to tap the potential of maintaining oil production rates.

We are going to draw universal attention to issues of remaining oil in place recovery and application of technologies. It has repeatedly been said that Russian fields, characterized by an oil recovery ratio of less than 40%, cannot achieve this rate in practice. At the workshop, we are planning to discuss recovery enhancement best practices and case studies. Remaining reserves have a great potential: about 75% of them are technically recoverable, but unprofitable. It is necessary to direct the efforts to find a solution to this problem, which can ensure a significant increase in recoverable reserves on the current basis, in regions characterized by extensive infrastructure and operating companies' presence.

We are also planning to identify the gap between companies' business plans and technical limits; what can reduce this gap - oil recovery enhancement, new well design? Is it possible to achieve technical limit in the cumulative production?



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Session 1. Localization of Remaining Oil In Place

For EOR methods effective implementation it is important to localize remaining oil reserves, prove its structure and EOR methods needed. To localize current and remaining oil reserves (for accepted development system) specialists usually use hydrodynamic models, history matched with production data, flow testing, geophysical field testing in production and injection wells.

To confirm model forecast we can use carbon-oxygen logging, resistivity logging or sonic waveform logging in multizone wells. Survey data is analyzed in combination with 4D seismic. Structure of current and remaining oil reserves means kind of saturation: closer to initial or remaining rate. Accuracy in current and remaining oil reserves localization, estimation and structure guarantee successful justification and implementation of EOR methods, aimed at increasing the displacement and/or sweep efficiency.

Session 2. Technology selection by type of remaining oil in place Is Enhanced Oil Recovery a universal remedy for depleted fields?

In Russia and worldwide the largest contribution in oil production overall is achieved by development of the deposits, put into exploitation more than twenty years ago. Definitely, the main production growth is provided by greenfields but brownfields still have significant potential. For example, during the last five years improvements of drilling and completion technologies led to their cost reduction, which helped operating companies to develop remaining reserves in areas with low poroperm properties (ex. Saturation index -10-20 mDm and less). Modern production well logging technologies help localize deposits in the subsurface and provide horizontal wells construction.

Wide application of WMD and the shift to digital fields allows companies to manage the daily production, increasing water flooding sweep efficiency. There are plenty of examples, when fields demonstrate production growth at the 3rd or 4th development stage.

For a long time EOR methods have been considered to be an unavoidable step in maintaining oil recovery levels. However, in the past few years, the global hydrocarbon reserves expanded as a result of “shale revolution”; and oil prices forecasts went down to 50-60\$/bbl. Does this lead to revision of paradigm “production till the last drop”? There is no easy answer. In some cases, cost reduction of technologies application leads to a higher profitability of these methods. As an example: growth of polymer flooding for high-viscosity oil in Canada, India and Kazakhstan. Such “chemical revolution” takes place in sphere of surfactant development – does it mean that we should expect production projects growth in Russia and worldwide or will risk aversion prevail and the investments will go to other projects?



Session 3. Waterflooding of depleted fields: expediency, technological and economic efficiency

One of the basic issues on maximally effective oil production and mature fields profitability prolongation – is optimization of waterflooding. Waterflooding optimization is a set of technological actions, which includes analysis of production and injection wells operation, waterflooding front action in conjunction with reservoir geology and remaining oil reserves analysis. The quality of the analysis depends on the availability of sufficient quantity of data, received during drilling, well monitoring, as well as understanding of the structure and deposits characteristics in general. Data collection is primarily targeted at the monitoring of injection and production level, identifying of water breakthrough reasons; sources of water influx in specific wells and its origin, distribution of remaining reserves. Engineering and geological surveys result in optimizing the waterflooding plan. Accurate choice and waterflooding technologies optimization leads to successful development of mature and depleted fields.

In this session, we will discuss the basic issues of depleted fields development and exploitation, modern and perspective methods of conformance increase by waterflooding and development management. Delegates will have an opportunity to share their experience, to see case studies and approaches in waterflooding optimization, efficiency estimation in different companies, discuss economic viability of these fields.

Session 4. Reservoir management for mature fields: integrated approach

Mature fields are about well-developed infrastructure – roads, pipelines, oil and gas treatment and delivery station, reservoir pressure maintenance systems, power supply and field critical infrastructure. But usually infrastructure facilities of mature fields have limited capacity and flow rate. Or vice versa these facilities in capacity, flow rate and often coverage significantly exceed the needs of current production and injection and are localized in zones hopeless in terms of production ramping up. Also, infrastructure facilities are often worn out and outdated. Which results in highly watered wells shutoff or potential upgrade of existing infrastructure.

Geologists, drilling engineers, production engineers, and reservoir engineers' plans to bring into development edge zones or bypassed zones with remaining reserves as well as plans to stimulate production via EOR may appear to be unprofitable due to vast investments into reconstruction or new construction. For example, it's important to properly estimate investments in equipment and technologies when planning surfactants polymer waterflooding and keep in mind higher operational costs if additional wellbore fluid with chemicals is required. In this case integrated planning approach to revitalization of mature asset is required to consider interference and integration of downhole (formation), technological (well) and surface (infrastructure) parts of the asset.

A balanced approach is crucial for mature fields development. This approach should be based on a careful analysis of targeted and long-term well intervention, production and injection with due regard to additional formation appraisal of the field and neighboring license blocks.

Systematic approach to mature fields reengineering processes should be embraced in advance, before production rates go down, Reengineering should then be done on an annual basis to include the analysis and reconstruction of facilities depending on prospective production.

One of relatively new instruments to solve this issue is integrated geological technical model "formation-well-infrastructure" which tracks the dynamics of interaction of reservoir properties, downhole equipment and surface facilities as a single system. Cross functional cooperation between oil and gas project management offices is critical for this work. This session allows companies to share experience in this area.

Also, we plan to discuss potential and case studies of modular surface facilities and technologies to cut operating costs – early water kick-off, water and associated petroleum gas local injection and recovery, small sized and alternative stand-alone power generation etc. Importance of correct management decision is tightly bound to risk assessment of launching new technological projects, implementation of new technologies, creation of cross-functional teams and benefits as a result of these decisions.



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Round table discussion “Digital technologies, machine learning and processes automatization”

Oil companies’ decisions are based on data, and the amount of data is growing at an exponential rate. A company cannot be a technological leader without big data and machine learning, when it has petabytes of data. Modern approaches to data analysis, super-precise neural nets, cognitive technologies allow companies to approach current issues in oil and gas industry in a conceptually new way. These approaches allow them to interpret data quickly and to the highest standards and come to a balanced decision, thinking a few steps ahead. Not a single modern company can operate without digital information processing, and such information growth rate is going up every day. Processing quality and completeness of information is a guaranty of proper management decisions.

POSTER SESSION

In addition to the main Technical Sessions the Program Committee is interested in organizing of Poster Session. Posers will give the participants additional opportunities to share their ideas and technologies. To get more information ant to participate in Poster Session you can contact Antonina Kozmina at akozmina@spe.org.

INFORMATION FOR PRESENTERS

If you are interested to be a speaker at the workshop, please send your presentation abstract (2-3 paragraphs with description of nature and scope of work, possible applications and summary of results or technical contributions) to Antonina Kozmina at akozmina@spe.org before **October 24, 2017**. Your abstract will be reviewed by the Programme Committee to consider its acceptance for the Workshop Program.

The following information is **required** for each abstract:

- Participant’s name, Company name;
- Contact details- phone number, address, e-mail address;
- Session’s title;
- Title of your presentation

The preference will be given to presentations that precisely correspond to the above listed themes and demonstrate the most illustrative cases providing the combination of experience and innovations, application of traditional and advanced practices.

COMMERCIALISM

In keeping with Workshop objectives and the SPE mission, excessive commercialism in posters or presentations will not be permitted. Company logo must be limited to the poster slide and used only to indicate the affiliation of the presenter and others involved in the work.



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For more information regarding sponsorship support please contact Antonina Kozmina at akozmina@spe.org , tel. +7-495-284-04-54

REGISTRATION

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Registration Rates	RUR, no VAT	VAT, RUR	RUR, incl. VAT
Non residential - SPE Members	37,000.00	6,660.00	43,660.00
Non residential - Non-members	40,000.00	7,200.00	47,200.00

Should you have any questions about workshop attendance and registration, please contact Ulyana Dmitrieva udmitrieva@spe.org and Irina Merkul imerkul@spe.org , +7 (495)268-04-54

