



**MULTISTAGE
PHYSICO-CHEMICAL METHOD**

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Applications

- MPC Method can be applied for vertical, deviated and horizontal wells
- Oil, Gas and gas condensate wells
- Existing (producing) wells and wells for activation after drilling
- Can be adopted for all rock-types
- Onshore and offshore operations. No limitation in climate conditions

Challenge

- Activation of a new drilled well. Solving the problem of mud contamination.
- Production enhancement for heavy oil well
- Improvement of permeability in tight reservoirs
- In situ fluid mobility increase
- Bringing the well on to commercial production mode (depleted and mature fields)

Solution

Chemical fluid components A, B & C pumping inside the well. Spotting A&B on the well bottom.

When two components (A+B) are mixed together exothermic reaction is launched. Reaction intensity and temperature can be controlled. Generation of hot active gas as a result of the reaction. Hydrogen is the main body of the reaction. Multistage physical and chemical impact on the bottom hole zone.

East Scientific and Technological Center Ltd (ESTC) – company with Ukrainian registration, the patent holder company, the scientific and technological base for technologies research and development. ESTC is a company with a great experience in oil&gas industry with highly qualified staff.

Prestil Energy Ltd. – a partner of ESTC company with UK registration. Prestil was established for representing interests of ESTC out of Ukrainian territory. The consortium agreement is signed between Prestil and ESTC.

Multistage Physico-Chemical Method (MPC Method). MPC Method was invented by team of ESTC scientists. ESTC owns all necessary certificates and patent for the Technology implementing in any part of the world. Technology is patented in Ukraine (patent # 118482) and applied for international patent.

This is a unique Method which has no analogues in the world. The main principle of MPC Method is to deliver Chemical Components (produced by ESTC) to the well bottom where chemical reaction will be launched. A number of different hot chemically active gases will be generated in the bottom hole of the well during the chemical reaction. These hot gases penetrate through the formation and reacts with rock and hydrocarbons itself. The gas mixture consists of atomic and molecular hydrogen, nitrogen and carbon oxides, vapors of nitric and hydrochloric acids, etc. All these components have multifunctional impact on the fluid and rock and resulting energy evolving.



Features

- Eco-friendly chemicals
- Initiation of micro fracture network creation in the reservoir
- Short term cracking pyrolysis of heavy components of oil (paraffin, asphaltene, resin, etc.)
- Standard work over equipment is used
- MPC operation requires 2-3 days maximum
- Long lasting effect
- The MPC efficiency is proved by more than 550 wells operations
- MPC Method can be adopted to different reservoir conditions
- Permeability Increase
- Recoverability factor increase

Benefits

- additional fracturing
- opening of the closed pore space
- oil wells productivity increase by 1.5-10 times, gas wells by 3-15 times
- skin-effect reduction
- permeability increase
- rock consolidation
- extension of workover interval
- minimize expenses with unique cost-effective EOR technology

The following processes take place in the reservoir during the reaction:

- **breaking down chemical bonding between rock and hydrocarbons;**
- **short term in-situ cracking pyrolysis of heavy hydrocarbon fractions;**
- **temporary temperature increase (up to 500°C) of active well zone**
- **creating a new micro fractures and channels;**
- **enlarging of existing channels and pores;**
- **pay-zone cleaning form mud and contamination with heavy components of oil.**

The mentioned above leads to improving of natural reservoir conditions, significant increase of permeability (without damage to rock matrix), increase of recoverability factor (due to opening of closed pore space), skin-factor reduction, local fluid mobility improvement. Our experience in different types of oil shows that the application of the MPC Method, in some cases, may perform better results than hydraulic fracturing with lower cost.



MPC Method is actively applied in many countries and companies all over the world:

Kazakhstan: National Company "KazMunayGas", JSC «Ozenmunaigas», JSC «Karazhanbasmunai», JSC "Mangistaumunaigaz", Aktau-Transit, KNOС Kazakhstan, etc. One of the remarkable examples is the result of MPCM in JSC "Mangistaumunaigaz", where production was increased from 3 topd to 35 topd

India, Sun Pharmaceutical Industries, Sun Oil&Natural Gas. Two wells were treated in 2016-2017. Both wells were in shut-in conditions after drilling due to fields were not in the commercial development (around 15 years). A number of efforts brought no result. Both wells started producing 60-100 bopd after MPC Method had been applied.

Turkmenistan. The contract has been signed for 500 wells stimulation. 50% of the contract has been already done. Turkmennafta and Turkmengaz are the main customers in Turkmenistan. Average production gain after MPC is 65% plus.

Egypt. Client Company – Petrosannan, JV between EGPC & NakNaftoGas. Contractor – Saknafta. Before MPCM well production was 350 bopd, after MPCM – approx. 600 bopd.

Ukraine. Different modifications of MPC were successfully tested on Ukrainian wells for different purposes: gas production stimulation, consolidating of the rock and reducing of sloughing of sand, production increase of subsurface gas reservoir.

Russia. More than 20 wells were treated. Example: Client Company – Polar Light Company (JV between ConocoPhillips and RosNeft) Two wells were treated. Results:

Well#1 – 24 topd before treatment, 44 topd after MPC, NOTE: additional effect in 5 offset wells 31topd ; **Well#2** – 7,3 topd before, 15 topd after MPC.

China PetroChina, Sinopek

