

# MULTIPLE INCREASE OF OIL RECOVERY ON PRODUCING WELLS

## **TECHNOLOGY ADVANTAGES**

- Russian development, local manufacturing and serious cost efficiency
- Combination with existing methods of enhanced oil recovery
- Absence of negative effect to environment and formation
- Effective treatment on wells with low and zero flowrates
- Compact equipment and mobile teams
- No damage for cement and casing
- Unlimited iterations on each well
- High performance on heavy oil
- A strong scientific background

# **CAPABILITIES**

# THE MOST EFFECTIVE NEAR-WELLBORE ZONE CLEANUP AFTER DRILLING

It allows you to achieve the maximum potential of the well from the very first hours of operations. The effect is achieved by breaking down the boundary layer which retains globules of mud filtrate in the pores of rocks and their subsequent complete removal during cleanup of the well on a smaller differential pressure and safer flowing regime.

### CLEANING OF PERFORATION CHANNELS FROM THE DEBRIS AND CRUST AFTER CUMULATIVE PERFORATION

High frequency ultrasonic promotes fragmentation and detachment of crust made by cumulative jet from the rock. It significantly increases productivity index of the well even on the same operating regime.

# PERIODICAL DECREASE OF THE NEAR-WELLBORE ZONE SKIN

Maintains maximum productivity index during well life period, often allows to avoid costly workover activities, additional acid treatments and perforation which may destroy cement and casing.

# ULTRASONIC TREATMENT OF THE WELLS WITH HEAVY OIL

Allows to significantly reduce oil viscosity, which favorably affects the oil flow and well productivity index on the same flow regimes. The effect persists up to 48 hours, then the treatment is repeated. In this case, the device is permanently installed in the well.



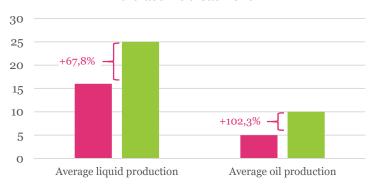
## CONFIRMATION OF EFFICIENCY

#### EXPERIENCE IN RUSSIAN FEDERATION

From 2012 to 2015 more than 100 treatments were carried out in Russian Federation by Centre of Ultrasonic Technologies. Liquid flowrate of the wells prior to treatment ranged from 0 to 36 m3 / day, after treatment - from 4 to 63 m3 / day, the effect of the treatment lasts from 3 to 12 months. Average oil production growth on the wells amounted to 102.3 %, which corresponds to a doubling of productivity.

At the same time, wells were not exposed to the damage by acidizing and multiple perforation that helped to preserve the original borehole conditions and the properties of the nearwellbore formation, in this way, unlimited multiplication of ultrasonic treatment and the absence of negative effects is certainly a unique feature of the technology.

#### Wells production, m<sup>3</sup>/day before and after ultrasonic treatment



■ Historical production ■ Production after treatment

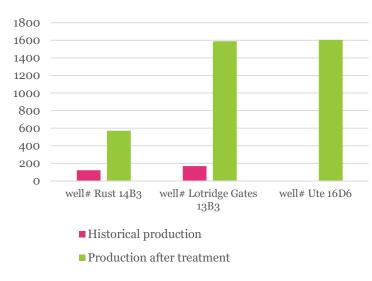
## **OUR CLIENTS**

- Samotlorneftegaz
- RN-Nizhnevartovsk
- RITEK-Beloyarskneft
- Tomskneft
- Samaraneftegaz
- Tatex

#### INTERNATIONAL EXPERIENCE

Permanent ultrasonic treatment of wells with high viscosity has been tested at low producing wells of Green River Formation, USA. This field was selected for pilot tests because represent traditional hard-to-recover oil deposits.

### Results on Green River formation, bbl/day



By results of pilot test of Russian technology of ultrasonic treatment US Department of Energy made following conclusion:

«... If the (AWS) technology becomes widely adapted in the *United States and throughout the* oil and gas industry, there may be a large increase in production of hydrocarbon fluids. The resulting increase in domestic production could decrease the dependency of the United States on foreign oil» ©

# EXISTING RESOURCES

LLC «Centre of Ultrasonic Technologies – Services» own over ten sets of ultrasonic equipment, five mobile units for treatment of vertical wells and wells with deviation up to 50 degree and one mobile unit for treatment of horizontal wells. In case of any additional needs of resources we may manufacture ultrasonic equipment and mobile units in a short period. Technology can be well combined with conventional technologies of enhanced oil recovery, treatment may be performed on balance, underbalance and overbalance. We are able to run geophysical survey before and after ultrasonic treatment. Business model allow provision of services through existed service providers and suppliers of oil companies including rental or lease of equipment.

