Title: EFFECTIVENESS IN OPERATION OF MULTIPHASE PUMPS

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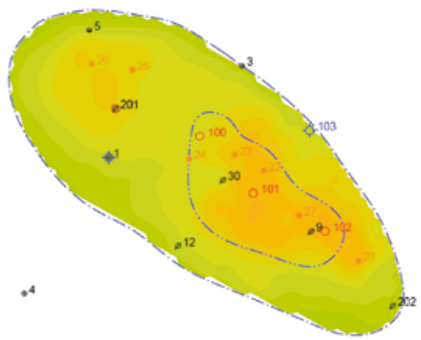
Since the Multiphase Pump technology has been introduced to the oil and gas industry as a new solution, it has shown a lot of advantages. It has proven to be a more efficient alternative, as no field separation is required, only a single flowline can be used, and for this early gas transport no extra compressor is required.

In the Tasbolat Oil Field in Kazakhstan two Multiphase Pumps have been installed, where one is operating and the other provides for full redundancy. While several production issues could be resolved, moreover the operation of those pumps has led to a considerable production increase. Our company one of the first operators of multiphase pumps in Kazakhstan.

AKTAS OIL FIELD:



Technological Scheme of Reservoir

Horizon	Oil Density at 20°C, g/cm³	Dynamic Viscosity, mPa*c, at temperatures, °C			Content, % mass.			Temperature, °C	
		40	50	60	paraffin	asphaltene, resin,	sulfur	crystallizing	boiling point
J-3	0,8913	119,9	48,2	28,5	21,4	9,5		+38	
J-4	0,881	56,82	34,4	22,6	24,88	13,12	0,422	+36	112
J-11	0,8645	24,09	15,5	9,51	23,98	10,55	0,25	+35	104

Physical and Chemical Properties of Oil

MULTIPHASE PUMPS

BORNEMANN Multiphase Twin Screw Pump Type MPC 268-68/38

Pumping Distance: GS Aktas – CPF =10km

LESITRITZ Multiphase Twin Screw Pump Type L4HK

Pumping Distance: GS Turkmenoi – CPF =28km

COMPARATIVE ANALYSIS OF PRODUCTION

MPC 268

Fliud Production without Multiphase Pump:

Wells:20	Fluid:35$_{m3/d}$	Gas:20000$_{m3/d}$	**Total:**
100	40$_{m3/d}$	250$_{m3/d}$	F:**120,5**$_{m3/d}$
101	41$_{m3/d}$	500$_{m3/d}$	G:**21000**$_{m3/d}$
102	4,5$_{m3/d}$	250$_{m3/d}$	P_L=**33**bar

Fliud Production with Multiphase Pump:

Wells:20	Fluid:40$_{m3/d}$	Gas:26000$_{m3/d}$	**Total:**
100	44$_{m3/d}$	100$_{m3/d}$	F:**137**$_{m3/d}$
101	46$_{m3/d}$	250$_{m3/d}$	G:**26650**$_{m3/d}$
102	7$_{m3/d}$	300$_{m3/d}$	P_S=**6**bar
			P_d=**28**bar

Production Increase of Fluid up > 14%

Production Increase of Gas up > 27%

EFFECTIVENESS & BENEFITS FOR THE COMPANY

Eliminated back pressure, releases the load on ALS equipments (BPU, ESP):

- Frequency of polished rod replacement extends
- Frequency of BPU parts replacement extends
- Load on electrical motor decreases, working ratio between 30A-50A (without multiphase pump 30A-80A)
- Less consumption of power

EFFECTIVENESS & BENEFITS FOR THE COMPANY

- Pipeline flushing against paraffin formation from well to pump once a week (previously once every 3 days)
- Released high pressure on pipelines by the pump, provides safe operation on pipelines, avoids leakages on the line.
- Transportation of fluid from GS (Group Station) till Central Process Plant (10km) threw one pipeline (D159mm).
- Eliminate the extra equipments such as separator, compressor, pipeline for gas and saves the budget.
- Save repair and maintenance hours on pumps, because of high technology of controlling.
- Easy to operate and monitor on PLC.

EFFECTIVENESS & BENEFITS FOR THE COMPANY

Continues upstream fluid flow saves Workover activity hours:

- Prevents paraffin formation on tubing
- Frequency of Sucker Rod Pump (SRP) replacements extends
- Frequency of Electrical Submersible Pump (ESP) replacements extends

EFFECTIVENESS & BENEFITS FOR THE COMPANY

PRE-HEATER ПП-0,63

Not required heating of fluid during summer period:

- Crystallization of paraffin in fluid starts at +36°C
- Pump heats up the fluid: from 30°C up to 50°C
- Extends pre-heaters service life
- Gas combustion not required

GAS FACTOR & OPTIMIZATIOIN

- High content of gas influence on discharge temperature of the pump, t° increases up to 120°C and shuts down the system.
- Regulation of flow and decreasing of production on gaseous wells.
- Modernization of pipeline: gaseous wells connects to main line after the multiphase pumps to avoid gas factor.
- Low yield wells works to open tank, fluid priming threw multiphase pumps.

THANK YOU FOR YOUR ATTENTION!

BERIK TAGANOV