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HiWAY Channel Fracturing Exceeds Production Predictions by 44%, Eliminates Screenouts

Stimulation treatment saves time, reduces costs, and improves well performance in remote Russian field

CHALLENGE

Optimize fracture conductivity and operational efficiency without increasing water cut in remote field.

SOLUTION

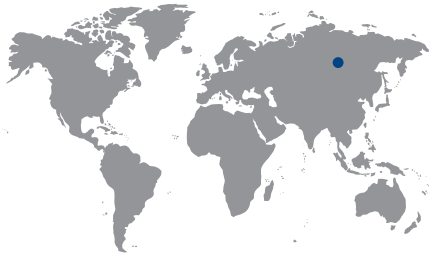
Apply HiWAY* flow-channel fracturing technique to speed flowback, improve cleanup, increase effective fracture half-length, and reduce the risk of screenouts.

RESULTS

- Increased oil production by 121 bbl/d per well, on average.
- Delivered 100% proppant placement rates, eliminating screenouts.
- Reduced proppant consumption by 45%.
- Realized 113% higher productivity index (PI) than predicted PI.

"The HiWAY service is helping us develop one of the most complicated reservoirs in Russia—the Jurassic formation of the Taylakovskoe field. Creating channels inside the fractures has allowed us to increase production in new wells and refracture mature wells."

Mikhail Alekseevich Vinokhodov
Chief Geologist
Taylakovskoe Field Operator



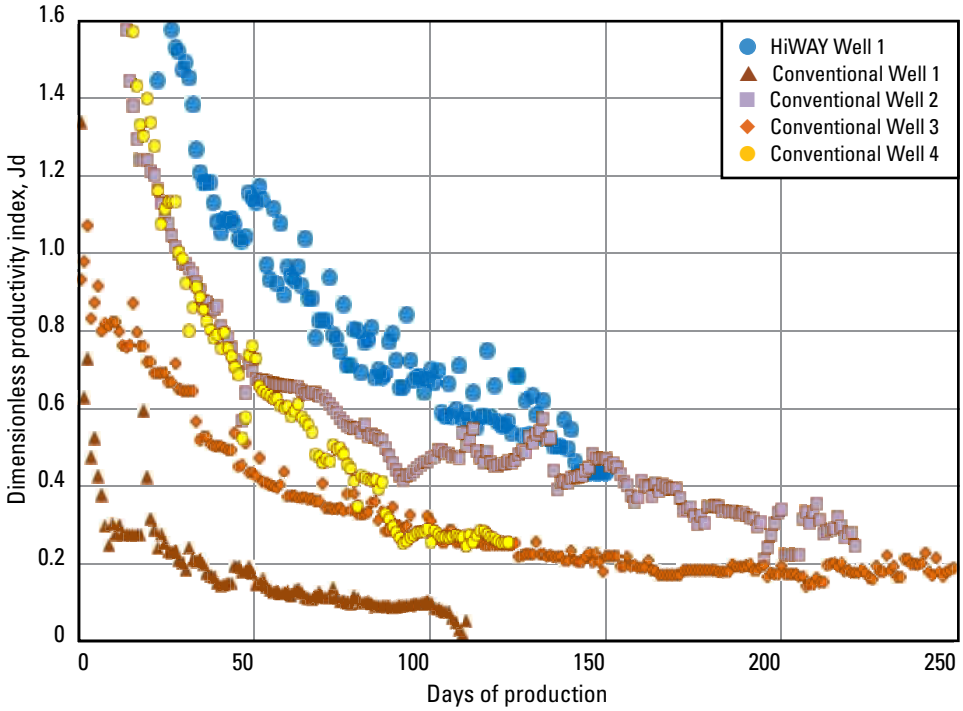
Operator needed to reduce screenout risk and enhance production in remote field

Western Siberia, the most prolific hydrocarbon-producing region in Russia, contributes to approximately 70% of the country's oil. Taylakovskoe field, a recently developed oil field in the Western Siberian basin, is 430 kilometers away from the nearest settlement, creating unique logistical and operational challenges. The majority of the Taylakovskoe field's recoverable reserves are located in thin, heterogeneous sandstone deposits with permeability in the range of 5–10 mD, necessitating hydraulic fracturing treatments for economic viability. However, frequent screenouts severely disrupted stimulation operations, leading to costly nonproductive time (NPT) and deferred production.

Schlumberger recommended HiWAY technology to increase fracture conductivity

The Russian operator typically increased proppant concentration and used low-polymer fluids to improve hydraulic fracturing treatments. While effective, these methods led to high screenout rates and cleanup costs. Schlumberger proposed HiWAY flow-channel hydraulic fracturing service with a customized perforation placement strategy. Unlike conventional well stimulation techniques, HiWAY fracturing technique uses engineered fibers and pulsed pumping to create stable, open channels within the fractures. Channel fracturing enables faster fluid and polymer flowback, improving cleanup and increasing fracture half-length.

To maximize performance, the operator and Schlumberger selected wells with pay zones at least 10-m thick and low risk of water breakthrough.



The first HiWAY treatment at Taylakovskoe field resulted in significantly higher dimensionless productivity index (Jd) than offset wells treated with conventional hydraulic fracturing techniques.

Productivity Data of the Taylakovskoe Wells Stimulated with HiWAY Channel Fracturing

Well	Oil rate prior, bbl/d	Planned production			Actual production			Additional oil over the plan, bbl/d	Additional PI over the plan, %
		Q liq, bbl/d	Q oil, bbl/d	PI, bbl/d/psi	Q liq, bbl/d	Q oil, bbl/d	PI, bbl/d/psi		
HiWAY 1	0	629	321	0.26	541	321	0.39	0	49
HiWAY 2	0	472	278	0.21	472	321	0.23	43	6
HiWAY 3	0	302	250	0.19	415	299	0.23	50	23
HiWAY 4	0	252	214	0.18	352	228	0.24	14	31
HiWAY 5	0	384	271	0.24	635	535	0.48	264	103
HiWAY 6	0	566	342	0.35	648	528	0.69	185	97
HiWAY 7	0	591	328	0.39	1,390	250	107.00	–78	206
HiWAY 8	278	786	592	0.38	925	677	0.56	86	45
HiWAY 9	378	868	684	0.59	1,327	1,155	0.43	471	142
HiWAY 10	214	535	321	0.40	862	485	1.39	164	244
Average	N/A[†]	541	364	0.32	755	478	0.68	121	113%

During the 10-well field trial, wells treated with HiWAY technology exceeded planned PI by 113% and planned production by 121 bbl/d, on average.

Operator eliminated screenouts and gained additional 121 bbl/d oil per well

The first well treated with HiWAY service achieved superior dimensionless productivity using 45% less proppant than offset wells. Based on these results, the campaign was expanded to include unstimulated wells with existing, conventional perforations. The operator also decided to trial HiWAY technology as a refracturing treatment in a mature well.

The 10-well HiWAY campaign was executed with no screenouts and no significant increases in water cut, dramatically reducing nonproductive time. HiWAY wells delivered an extra 121 bbl/d per well on average—a 44% increase over standard stimulation techniques in the field. In addition, productivity index was 113% higher than predicted.

Today, more than half of new and mature wells in Taylakovskoe field are treated with HiWAY channel fracturing. The operator has plans to expand HiWAY refracturing treatments to other brown fields, starting with three candidate wells.

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[†] Not applicable

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