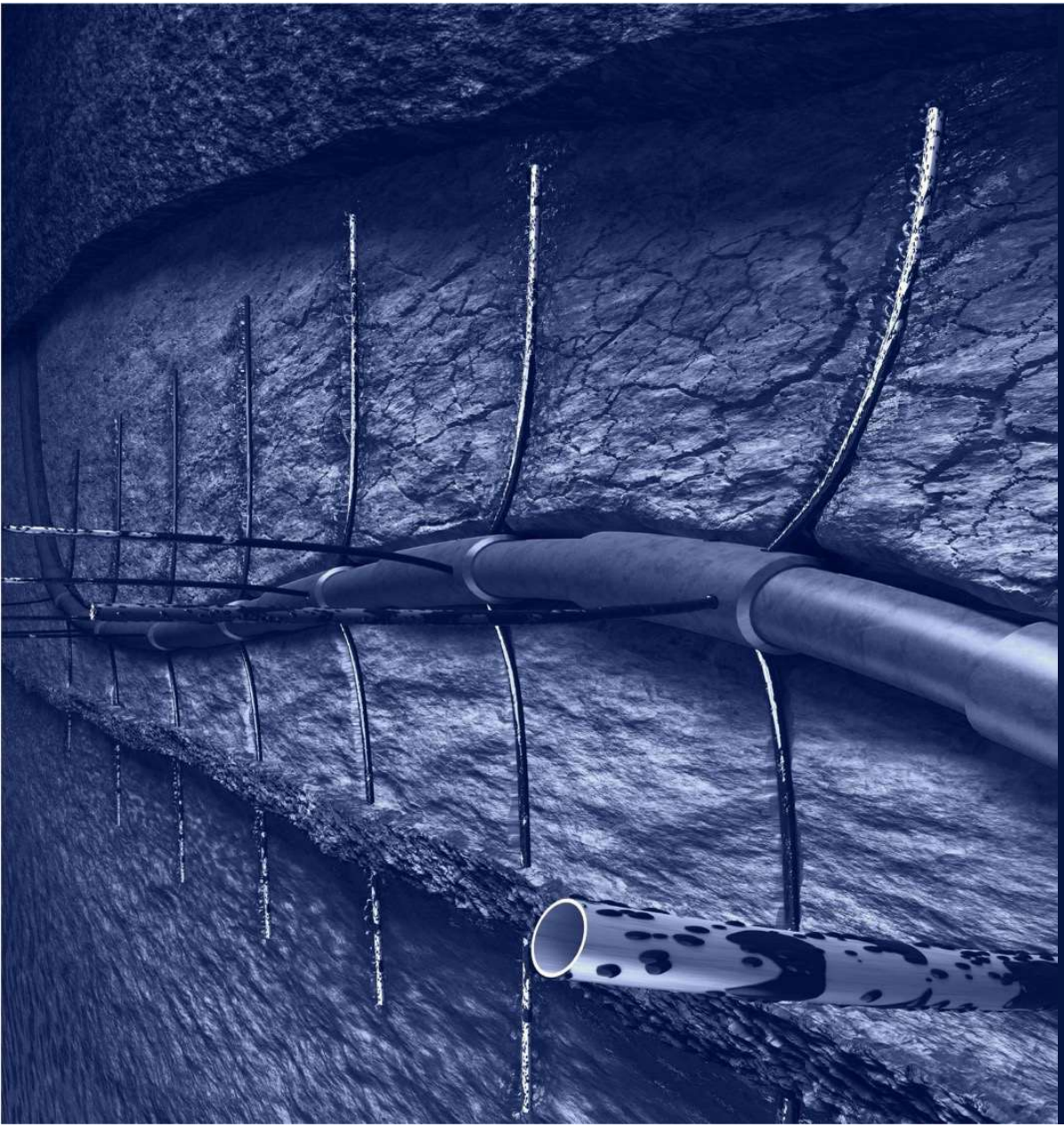

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Fishbones Stimulation

Kristian Solhaug, May 2024

Case Study: India offshore installation

Fishbones Jetting selected as field development solution (2022)

Challenge

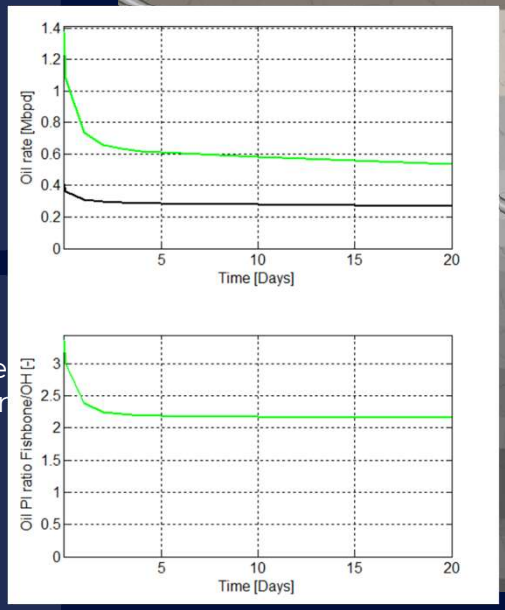
- Appraisal well
- Acid bullheading did not yield sustainable results in offset wells
- Multi-layered limestone formation
- 2 mD avg. permeability
- 60 deg. deviation
- Increase rates from 250 bpd seen in offset wells to 600 bpd

Solution

- 4 ½" Fishbones liner with 6 Fishbones Jetting subs (24 laterals) across the lower object, 150 meter (500 ft) open hole section

Results

- Initial production stabilize at 1,800 bpd, 720% higher rates than offset wells
- Operator has selected Fishbones as solution for the field development



Simfish model pre-job

Case Study: Middle East offshore installation

Fishbones Jetting shows 10 times expected rates (2021)

Challenge

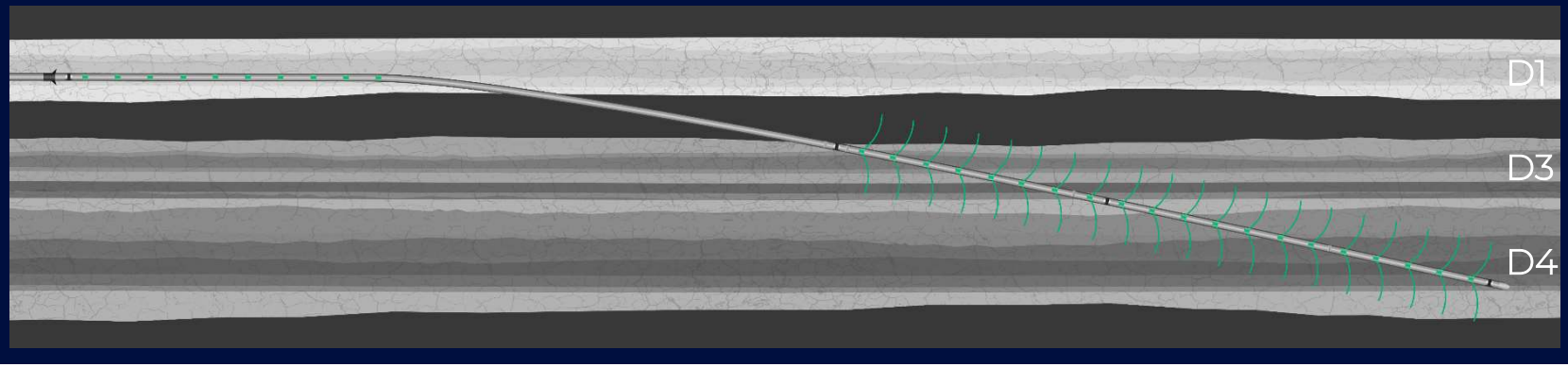
- Multilayered, naturally fractured limestone reservoir
- Good reservoir quality in upper zone (D1), poorer in lower zones (D3/D4)
- 0.2-0.3 mD permeability in D3/D4
- 4085ft / 1245m open hole

Solution

- Horizontal well in D1, sub-horizontal in D3/D4
- 4 ½" production subs in D1 (10 subs, no needles)
- 4 ½" Fishbones Jetting system with 20 subs (80 needles) across D3/D4 to connect layers

Results

- PLT confirmed 2600 bpd rate from D3/D4 compared to 250 bpd expected.
- Stable, high production
- No ESP required
- This well achieved 3-well production target
- Fishbones is base case solution in field development plan, contract awarded 13 May 2024



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Case Study: North Africa onshore installation

Fishbones Jetting unlocks hydrocarbons and reduces well costs (2018)

Challenge

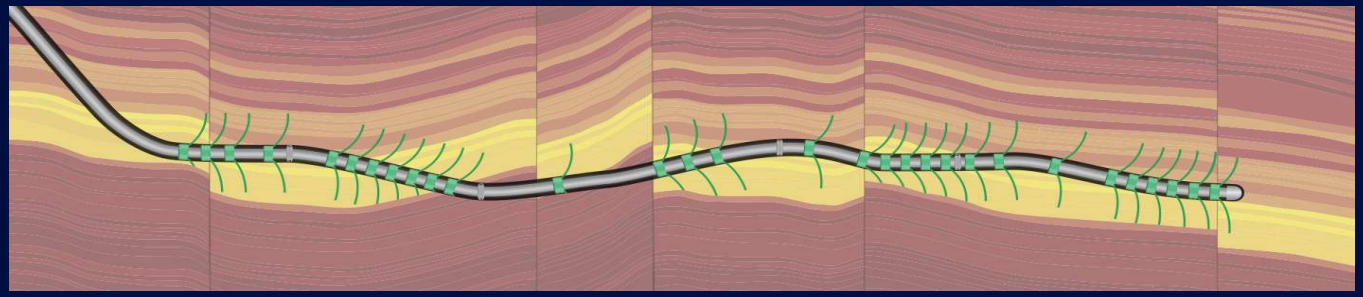
- 3280ft / 1000m 6” open hole section in tight, heterogeneous limestone formation
- Offset wells were hydraulically fractured, experienced water influx

Solution

- 4 ½” Fishbones liner with 30 Fishbones Jetting subs (120 laterals)
- Jetting testing on core samples confirmed no penetration below target zone

Results

- Production rates exceed customer expectations (150% more)
- No water production
- Significant reduction in well costs
- Best performing well in the field
- Potential 2025 wells



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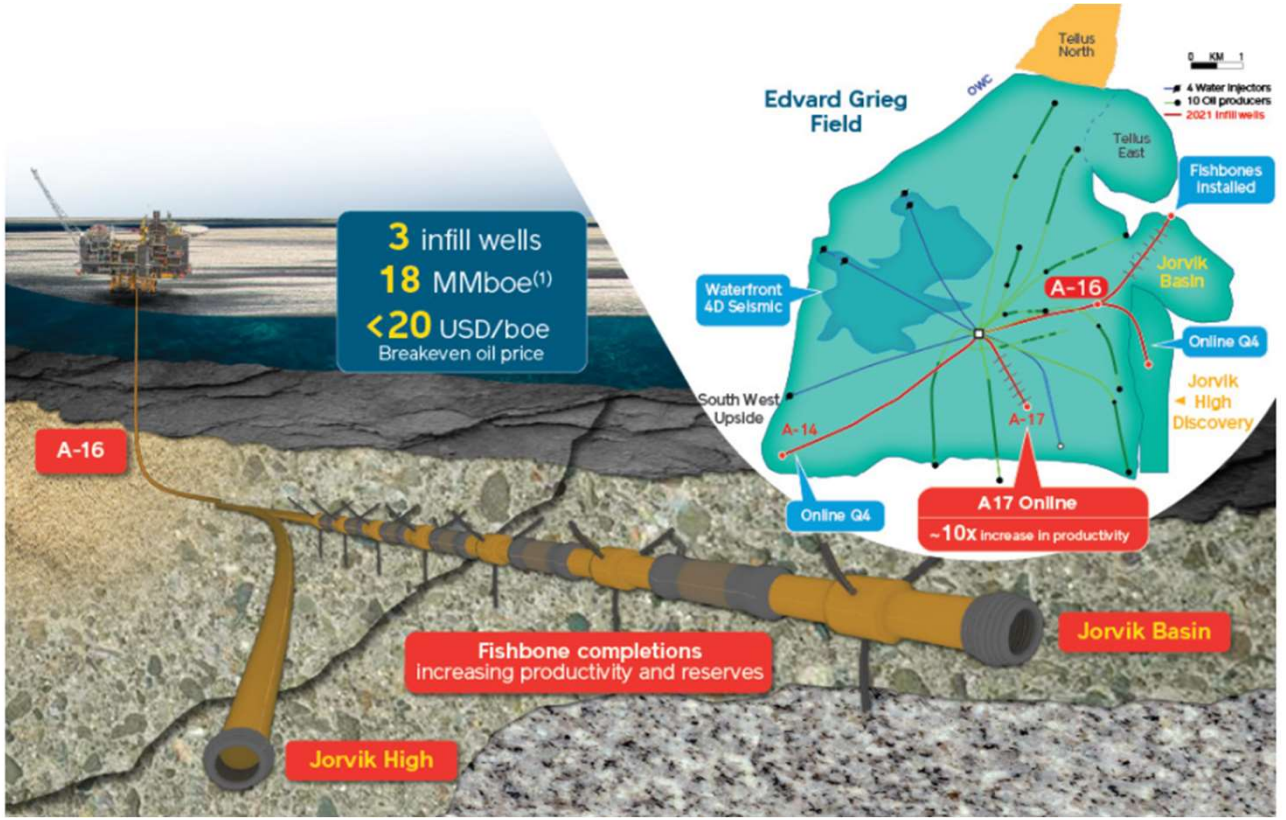
Edvard Grieg – from development to commercial success

2021 North Sea case history

10 times increase in productivity in conglomerate formation (2021)

Lundin Energy website: "The first of the three infill wells came on stream in June 2021, equipped with the innovative "Fishbones" completion, which has contributed to well productivity around 10 times greater than the original prognosis. Lundin Energy has been part of developing this innovative technology for enhanced recovery from production wells. The technology increases the effective drainage area around the production wells by drilling several small holes out from the main well, resembling an image of a fish backbone. This increases reservoir penetration and enables us to produce more from the same reservoir rocks."



Edvard Grieg - Lundin Energy (lundin-energy.com)

Thank you

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SPE-218440-MS Modelling of Acid Stimulation Using Needles for Multilateral Fishbone Wells

SPE-212668-MS Application of Simulation Opportunity Index and Assisted History Matching for Fishbone Completion Strategy in the Existing Single Horizontal Well in Tight Gas Carbonate Reservoir, **SPE-212662-MS** Improved Reservoir Characterization of Tight Carbonate Rocks using Multiple High-Resolution Logging While Drilling Technologies for Completion and Stimulation Optimization with Fishbone Technologies; A Case Study from Offshore Abu Dhabi

SPE-209953-MS World's First Installation of a Revolutionary Multi-Zone StimulationTechnique in Conglomerate Formation, Unlocking Reserves and Proving Significant Productivity Increase

International Journal of Petroleum Technology: A Novel Approach by Needles in the Payzone of Heterogeneous Tight Carbonate: A Case Study for Offshore Marginal Field

IPTC-21959-MS: Multi-lateral jetting technology results in a 150% uplift in production during a second offshore application in Abu Dhabi Offshore Field

IPTC-21384-MS: Appraising the Development Potential of Ekofisk Over Tor Formation in the Halfdan Field, using a Multi-Disciplinary Approach to Well Planning and Applying Advances in Technology to Enhance Well Placement, Completion, Productivity and Recovery

SPE-205417-MS: North Sea Horizontal Well with Multi-Zone Completion Sets World Record Using Acid Jetting Technology

SPE-203086-MS: First Successful Fishbone Stimulation Completion in Onshore Oil Field in the United Arab Emirates

SPE-202636: Fishbone Stimulation a Game Changer for Tight Carbonate Productivity Enhancement, Case Study of First Successful Implementation at Adnoc Onshore Fields

SPE-197478-MS: First Retrievable Application of Lower Completion Stimulation Technology

SPE-195620-MS: World First Simultaneous Jetting of 72 Laterals with Solids Control - Technology Development and Field Trial

SPE-180390-MS: First Installation of Multilateral Drilling Stimulation Technology in Tight Sandstone Formation**SPE-174035-MS:** Technology Qualification and Installation Plan of Efficient and Accurate Multilaterals Drilling Stimulation Technology for Sandstone Oil Application

SPE-171804-MS: First Installation of Efficient and Accurate Multilaterals Stimulation Technology in Carbonate Reservoir

SPE 171021-MS: First Installation of Efficient and Accurate Multilaterals Stimulation Technology in Carbonate Oil Application

SPE 143381: Laterals Stimulation Method

SPE 121814: Multilateral System Allowing 100 Level 5 Laterals Drilled Simultaneously

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