

RESEARCH PROGRAMME: Production optimization

ERC-RPM

Engineering Research Center in Reservoir and Production Management

Workshop, 7th of June 2017

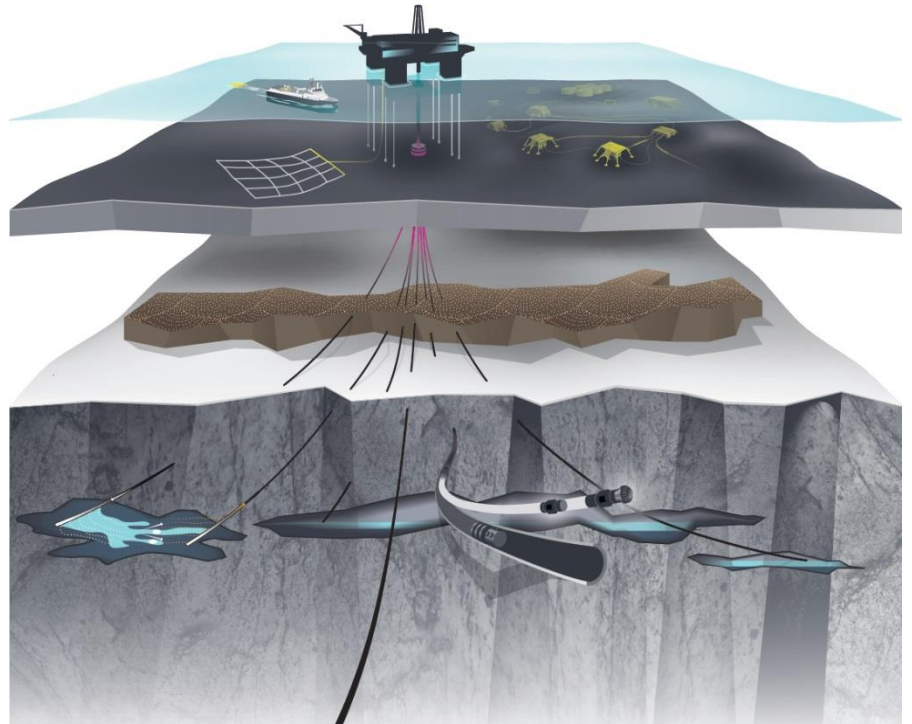
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- Challenges
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Challenges

Call of Proposal – Production Optimization

- Reservoir characterization in pre-salt carbonate reservoirs
- Improve the energy efficiency in field operations
- Optimize production
- Enable production for as long as possible with minimal costs
- Scope:
 - Efficiency of ESPs
 - Optimization methodology
 - Development of “look-around” technology for production and injection wells
 - Field optimization



Technology Solutions

ESP

Challenge

- Improve the ESP performance and run-life with the objective of reducing the field cost and oil break-even.
- Large instabilities in ESP caused by emulsion instabilities

Statoil technology needs

- Understand mechanisms for emulsion instabilities and the effect on pump by multivariate data analysis on field and lab data. Identify and test chemical to change emulsions.
- Propose method to avoid instabilities
- Electrical models of the ESP



Technology Solutions

Optimization methodology

Challenge

- Understand well and reservoir behavior
- Utilization of well and process measurements
- Production optimization; including transportation constraints.

Statoil technology needs

- Use of Big Data for analyzing production, constrains and optimizations
- Instrumentation required for production optimization
- Methods for data reconciliation, Novel soft-sensing techniques
- Tools for efficient optimization and robust measurements



Technology Solutions

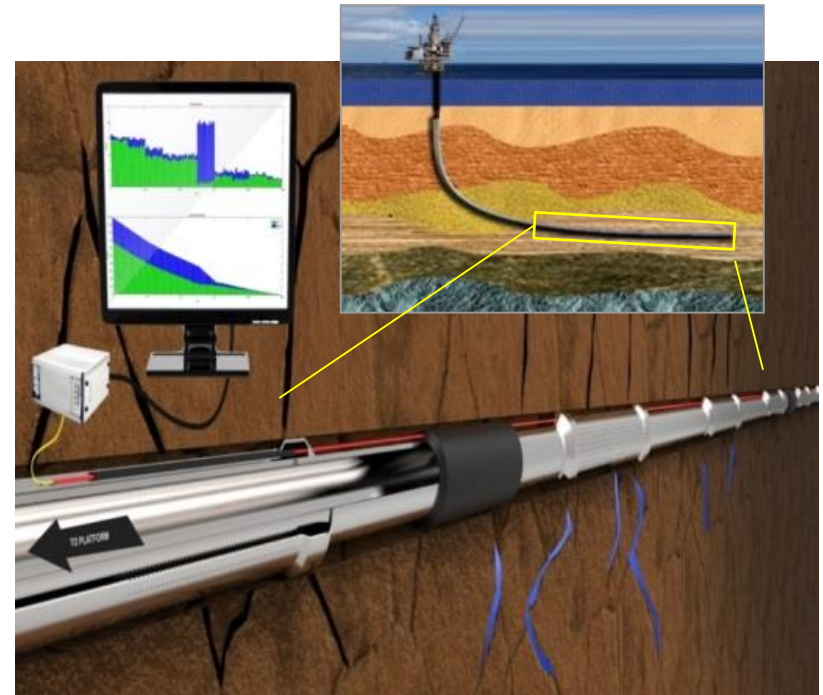
Development of “Look-around” technologies for production and injection wells

Challenge

- Reservoir characterisation:
 - Seismic data quality
 - Definition of conceptual geology, deposition and diagenesis, core sampling and special core analysis
- Flow functions in triple porosity reservoirs
- Detection of water or gas fronts approaching the well

Statoil technology needs

- Improved methodology for reservoir characterisation
- Understand responses to decide on instrumentation needs and acquisition strategy
- Robust and low cost technology (instrumentation and modelling workflows) that can measure inflow profile of oil, water and gas from reservoir into the well.



Technology Solutions

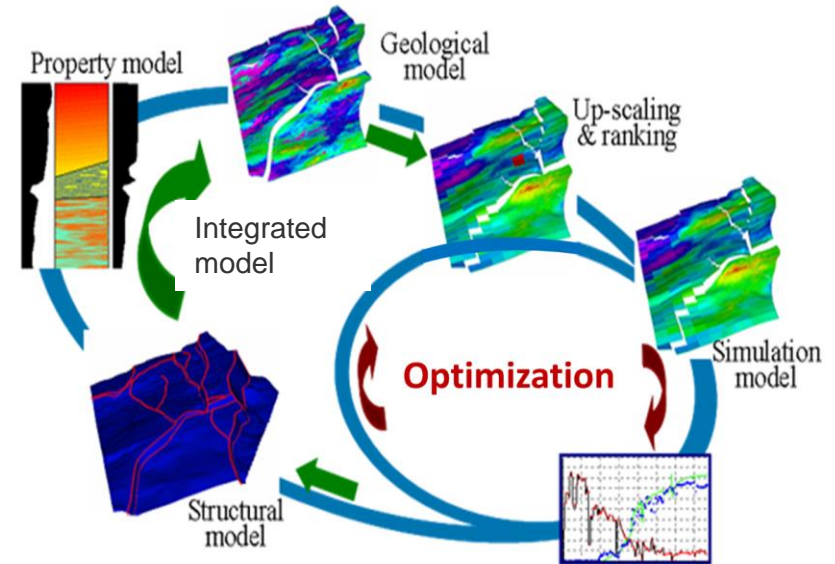
Field optimization: pre-salt reservoirs

Challenge

- Reservoir characterisation
- Optimization of field development by combining subsurface and facility technologies.

Statoil technology needs

- Improved methodology for reservoir characterisation on pre-salt reservoirs
- Improved dynamic modelling in dual/triple porosity reservoirs
- Effective and predictive reservoir modelling work processes
 - Upscaling of matrix, fractures and vuggs
 - Integrated and standardized workflows for reservoir modelling and facility models and flowlines

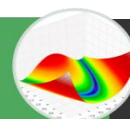


- Field optimization framework – coupling of reservoir and facility models

Uncertainties
Definition



Optimization
Problem



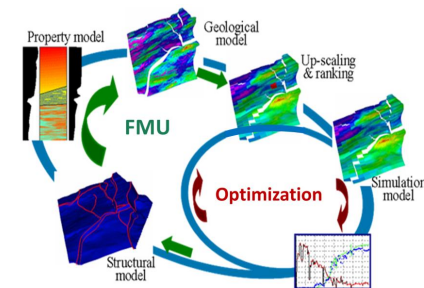
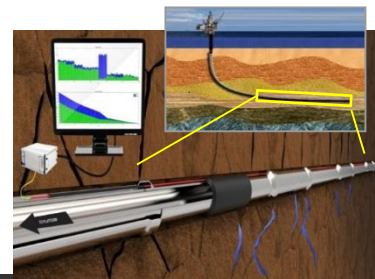
Post
Processing



Statoil Expectations

Production Optimization

- Develop Production Optimization methods
 - Increase value by integrating all data, and combining the reservoir understanding, well information with facility technologies from early phase development to mature fields, focusing on existing fields and low recovery reservoirs
 - Improve production and monitoring to produce more oil utilising less energy
 - Reduce carbon emission due to a optimized process
- Integration between local industry and the research institutions:
 - Some technology may require collaboration with suppliers



There's never been a better
time for **good ideas**

