

SPE Norway Subsurface Conference 2022

Bergen, Norway
27 April 2022

ISBN: 978-1-7138 5278-0

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2022) by Society of Petroleum Engineers
All rights reserved.

Printed with permission by Curran Associates, Inc. (2022)

For permission requests, please contact Society of Petroleum Engineers
at the address below.

Society of Petroleum Engineers
P. O. Box 833836
Richardson, Texas 75083-3836

Phone: (800) 456-6863
Fax: (972) 952-9435

books@spe.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

DRILLING I

Design, Optimization, and Visualization of Wellbore Trajectory in 3D	1
<i>Hamed Sahebi, Ekaterina Wiktorski, Dan Sui</i>	
Autonomous Directional Drilling with a Miniature-Scale Research Rig	12
<i>Magnus Steinstå, Gaute Hånsnar, Benedicte Gjersdal, Alexey Pavlov, Fred Florence</i>	
Materials for Well Integrity – Rheological Behavior Study	22
<i>Mohammadreza Kamali, Mahmoud Khalifeh, Arild Saasen, Laurent Delabroy, Rune Godøy</i>	

LOW CARBON SUBSURFACE CONTRIBUTION TO ENERGY TRANSITION I

Energy Efficient Operation of Petroleum Production Plants	37
<i>Torleif Holt, Heiner Schümann</i>	
Subsurface Hydrogen Generation: Low Cost and Low Footprint Method of Hydrogen Production	50
<i>Roman Berenblyum, Michael Surguchev</i>	
CO2 Caprock Threshold Pressure Measurements for the Northern Lights Reservoir	57
<i>John Zuta, Kåre Olav Vatne, Reza Askarhinade, Jan Erik Iversen, Arild Lohne, Mohammed Mousa Al-Noth, Ali Mehrabi, Nicolas Thompson</i>	

RESERVOIR I

Persistent Reservoir Management to Handle Unintended Crossflow Between Multiple Gas-Oil Zones in the Alvheim Field	68
<i>Kåre Langaas, Kolbjørn Stenvold, Ivar Skjærpe, Andor Hjellbakk</i>	
Integration of Johan Sverdrup PRM 4D Data Into the Dynamic Model.....	87
<i>Monica Anne Calvert, Yuri Tsaplin, Hans Peder Hansen</i>	
Rock and Fluid Data: An Integrated Effort on Improving Subsurface Analysis and Modelling Workflows	95
<i>Egil Boye Petersen, Alex Larsen, Lee Craig, Erlend Øian, Thomas Schøyen, Alif Be, Erik Zakariassen</i>	

DRILLING II

Implementation of a Safe, Efficient, and Robust Whipstock System	114
<i>Philip Matthew Gregurek, Morten Eidem, Tuan Anh Nguyen, Gaute Grindhaug, Valerie Ferdin, Mohsen Ali, Greg Hern, Waqas Munir</i>	
Ensuring Well Safety and Integrity Through Risk Identification, Job Planning and Gas-Tight Multistage Cementing Tools in the Norwegian Martin Linge Field.....	124
<i>Brett Hrabovsky, Fernando Zapata-Bermudez, Therese Karlbom, Andreas Fliss</i>	

Dynamic Rig Heave Limits Reduce NPT for Drilling and Completions – Case Studies	132
<i>Dmitri Gorski, Martin Kvernland, Knut Hals, Margrethe Blaaflat, Johannes Ladenhauf, Ole Morten Aamo, Sigbjørn Sangesland</i>	

RESERVOIR II

Joint History Matching of Production, Tracer, and 4D Seismic Data in a 3D Field-Scale Case Study	145
<i>William Chalub Cruz, Xiaodong Luo, Kurt Rachares Petvipusit</i>	
Ula WAG – Measuring the Flood. Characterising Sweep for Improved Reservoir Management.....	165
<i>Jon Duncan, Christian Fougner, Neal Morgan, Gunnar Tjetland, Eirik Rosseland Knutsen, Bjørn Emil Wik Halleråker</i>	
Water-Alternating-Gas Injection in Brage Staffjord Reservoir - A Case Study	183
<i>Yasir Yousuf Thara, Connie Wergeland, Saeed Fallah Bolandtaba</i>	

LOW CARBON SUBSURFACE CONTRIBUTION TO ENERGY TRANSITION II

ECalc - A Computationally Efficient Tool for Emission Forecasting	199
<i>Kari Børset Skjerve, Frode Martinsen, Even Solbraa, Øystein Espelid</i>	
Effects of Well Placement on CO2 Emissions from Waterflooding Operation.....	213
<i>I. Gusti Agung Gede Angga, Handita Reksi Dwitantra Sutoyo, Mathias Bellout, Per Eirik Strand Bergmo, Per Arne Slotte, Carl Fredrik Berg</i>	
Data Mining of In-Situ Stress Database Towards Development of Regional and Global Stress Trends and Pore Pressure Relationships.....	223
<i>Nicholas Thompson, Jamie Stuart Andrews, Håvard Reitan, Nuno Eládio Teixeira Rodrigues</i>	

PRODUCTION AND WELL OPERATIONS

Real-Time Fiber Optics: A Door Opener for the Wellbore Environment	239
<i>Håkon Sunde Bakka, Stefan Dümmling, Kjetil Eik Haavik, Qin Li, Per Atle Olsen</i>	
Water Shutoff Technologies for Reduced Energy Consumption.....	251
<i>Per Eirik Strand Bergmo, Alv-Arne Grimstad</i>	
Streamlining Oil and Gas Operations Using Data-Driven Solids Management Services.....	261
<i>Olof Nilsson, Aksel Skåland, Anders Areffjord, Steve Greenland</i>	

RESERVOIR III

Reducing Subsurface Uncertainties by Ensemble Based Methods.....	275
<i>Ary N. Ahmed, Henrike Grunhagen, Bernardo Moyano, Charlotte Faust Andersen, Eivind Bøyum, Radzieman Mohamad, Saeed Fallah Bolandtaba, Wesam Ben Mansour, Olawale Ibrahim Ajala, Subhi Sadigov</i>	
The Effect of Oxidation of Core Material on Steady State Relative Permeability of Oil and Water	293
<i>Robert Orr, Dag Chun Standnes, Torleif Holt, Martin Røphaug</i>	
GOR Prediction from Advanced Mud Gas in Gas Flooded Reservoirs – A Simulation Study	309
<i>Gulnar Yerkinkyzy, Tao Yang, Nan Cheng, Knut Uleberg</i>	

DRILLING III

Sealing Performance of Geopolymer for Plugging and Abandonment; Apple-to-Apple Scenario	320
<i>Foster Dodzi Gomado, Mahmoud Khalifeh, Mohammadreza Kamali, Arild Saasen, Jan Aage Aasen</i>	
A Troublesome Well Section: The Rock Mechanics Analysis.....	332
<i>Tron Golder Kristiansen, Andreas Bauer, Assia Guida, Claudia Bonin</i>	
Field Validation of a Full Transient Hydraulics Model Leveraging Digital Twin and Real-Time Rheology Technology, Case Studies from North Sea Continental Shelf	353
<i>Alexander B. Starostin, Matthew J. Forshaw, Roger Aragall, Roland May, Thomas G. Dahl, John D. Macpherson</i>	

COMPLETION AND WELL INTERVENTION

Novel Use of Wired Drill Pipe for Real Time Remotely Operating Controls System During Well Completions.....	369
<i>R. Teelken, T. Wilenski, J. Mulholland, H. A. Øygarden, T. O. Lidal</i>	
Tracing of Induced Heatwaves to Determine Well Inflow Distribution.....	379
<i>Erik Skogen, Tore Ottesen, Sjur Mo, Terje Moen, Fridtjof Nyhavn, Stein Tore Johansen, Magnus Blihovde Hjelstuen</i>	
Development and Deployment of a Novel Single-Trip Multistage Proppant Fracturing System in the Norwegian Continental Shelf	390
<i>Dustin Young, Tom Rune Koløy, Vijay Keerthivasan, Serik Satimov</i>	

GREEN AND BROWN FIELD DEVELOPMENT

Overcoming Subsurface Challenges to Develop a Thin Oil Column - A Case Study from the Five Decade Old Gekko Discovery in the Alvheim Area.....	403
<i>Leif Kristian Tveiterå, Morten Fismen, Asgeir Bang, Amitabha Chatterjee, Ivar Frøland Osvoll</i>	
Dvalin Gas Field Developments and Optimization by Using the Inflow Tracer Technology Information.....	419
<i>Alireza Roostaee, Steve Pride, Eirik Jenssen, Reidar Birkeland, Robert Ritschel, Neal Hughes, Grethe Ledsaak</i>	
Smart Well Foundation, the Cost Efficient and Environmental Choice for Field Developments	432
<i>Wolfgang Mathis, Ole Kristian Holen, Trine Lise Bjørvik, Vidar Strand, Fredrik Witting</i>	

EMERGING WAYS OF WORKING

Virtual Field Trips: Experience from a Global Pandemic and Beyond	450
<i>Simon John Buckley, John Anthony Howell, Nicole Naumann, Jessica Pugsley, Joris Vanbiervliet, Kari Ringdal, Conor Lewis, Bowei Tong, Magda Chmielewska</i>	
Grane Case Study: From Data and Model Ensembles to Actionable Insights Using a Cloud-Based Innovation Toolkit.....	460
<i>Olav Barkved, Jarle Haukås, Anastasia Kochetygova, Konstantin Monastyrev</i>	

Overcoming the Seven Wastes of Reservoir Modelling Projects	480
<i>Jon Sætrom, T. C. Sandø</i>	

KNOWLEDGE SHARING EPOSTER SESSION 1

Utilization of Settled Barite as Permanent Well Barrier Element - Feasibility Study	490
<i>Mahmoud Khalifeh, Eskild Muri Bø, Mohammad Ali Shahmoradi</i>	
Novel Workflows to Model Fishbone Wells and Generate Reliable Production Forecasts, Employing an Economic Optimization Procedure	511
<i>Niek Dousi</i>	
A Bayesian Approach for Improved Estimation of Inflow Profiles in Oil Wells	522
<i>Ola Rasmus Moen, Sjur Mo, Damiano Varagnolo</i>	

KNOWLEDGE SHARING EPOSTER SESSION 2

E-line Milling of Isolation Valve Restores Well Access in the North Sea	535
<i>Xuan Dong Ngo</i>	
Assisted Cement Log Interpretation	537
<i>Eirik Time, Erlend Magnus Vigen, Siddharth Mishra, Eirik Berg</i>	
Digital and Automated Well Planning for Completions.....	552
<i>David Semwogerere, Bjørn Brechan, Sigbjørn Sangesland</i>	

Author Index