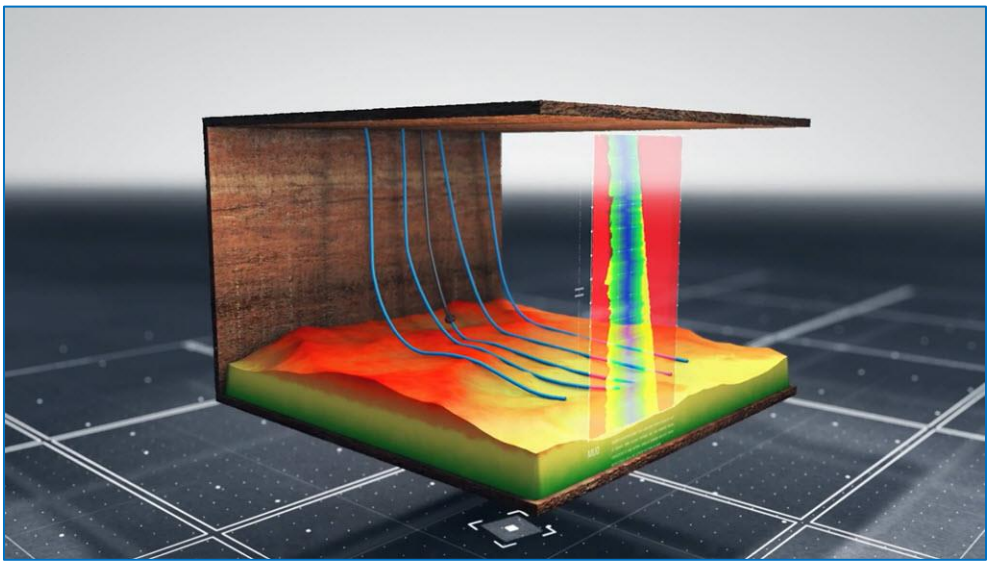
Tel No:+97126654546 | Fax No:+97126654182 | Email: training@cmc-me.com | www.cmc-me.com



DE307:
Petrel Reservoir Geomechanics Introduction

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Training Description:

This training course covers the necessary fundamentals of reservoir geomechanics in a 3D environment; the origin of stresses in the subsurface and how in situ stresses could be understood using wellbore data, seismic and geological interpretations. Using the Finite Element Method, computed stresses and deformations could be calibrated against measurements, but moreover, changes in the in-situ stress state could be computed due to changes in reservoir pressures along with their impact on reservoir performance; mechanical properties such as rock strength, deformability and pore collapse, how they can be measured in the laboratory and translated into numerical modeling.

The training course then proceeds to show how these data are applied through building a 3D Mechanical Earth Model to critical problems in exploration and field development. There are detailed case studies on 3D and 4D reservoir geomechanics, showing the geomechanical influence of pressure changes in the reservoir. The course blends theoretical lectures with hands-on software training on the PetrelRG suite of software.

Training Objectives:

By the end of the training, participants will be able to:

- ✓ Use static and dynamic reservoir models as input to build a 3D reservoir geomechanics model
- ✓ Select and design data acquisition for 3D geomechanical studies
- ✓ Understand geomodeling and reservoir simulations needs to successfully build coupled reservoir geomechanics models
- ✓ Design reservoir geomechanics studies to contribute to common reservoir management problems

Training Designed for:

This course is intended for Geomechanicists, geologists, geophysicists, production engineers, completion engineers, reservoir engineers, and asset managers concerned with reservoir management, gas and / or water injection, EOR, HPHT field management and long-term reservoir forecasting. Ideally, a pair of geomodeller/geophysicist/geologist and reservoir engineer from an asset team to attend together.

Training Requirement:

"Hand's on practical sessions, equipment and software will be applied during the course if required and as per the client's request." (This hands-on, highly-interactive training includes simulator, real-life case studies and exercises).

Contents can be adapted to your specific wishes. It is therefore possible to focus on specific modules of the training course as per client's learning needs and objectives. Further, it should be forwarded to us a month prior to the course dates.

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Training Program:

DAY ONE:

- Fundamentals of reservoir geomechanics
  - Value of full-field geomechanics in the petroleum industry
  - Review of geomechanics concepts and how these are applied in the petroleum industry; understand the concepts of stress, strain, effective stress, principals stresses, elasticity , plasticity and failure
  - Geomechanics property modeling; use of wireline derived rock mechanical properties together with seismic attributes and geostatistical methods for 3D property modeling
  - Experimental rock mechanics for reservoir geomechanics studies; Review of standard rock mechanics testing and introduction to laboratory measurements specific to reservoir geomechanics applications; understanding of test results and ability to analyze and evaluate laboratory reports

DAY TWO:

- Reservoir geomechanics processes and introduction to PetrelRG
  - Understand the mechanics of depletion, stress transfer between reservoir and surrounding formations, theory and compaction and subsidence, importance of stress path, thermal effect, impact of faults and fractures; Understand the importance and stress initialization to model in-situ stress state
  - Introduction to reservoir Geomechanics modeling with PetrelRG
  - Building reservoir geomechanics grids, design geomechanics materials and perform property modeling and property population

DAY THREE:

- Geomechanical property modeling and stress initialization with PetrelRG
  - Case study: geomechanics property modeling using seismic inversion as input
  - Discontinuities (faults and fractures) in reservoir geomechanics models
  - Apply initial pressure, temperature and saturation to reservoir geomechanics models, define boundary conditions and perform stress initialization

DAY FOUR:

- Coupled reservoir Geomechanics simulation with PetrelRG
  - Case study: practical aspects of in-situ stress calibration
  - Define and submit simulation cases with coupled reservoir simulator
  - Perform 1-way and 2-way coupled simulations
  - Basic ECLIPSE knowledge important for coupled reservoir geomechanics modeling and introduction to history matching assisted by 2-way reservoir geomechanics modeling

DAY FIVE:

- Reservoir geomechanics model results analysis with PetrelRG
  - Results analysis; import coupled simulator results to PetrelRG; stress charting and results QC
  - Application of reservoir geomechanics to reservoir management; utilization of reservoir geomechanics models to examine cap-rock integrity and casing deformation in depleting reservoirs

- Post processing case studies – application of reservoir geomechanics model results to common reservoir management tasks; 3D wellbore stability planning, hydraulic fracture design, geomechanics-driven permeability updating

❖ Course Conclusion
❖ POST-ASSESSMENT and EVALUATION

Training Methodology:

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:

- 30% Lectures, Concepts, Role Play
- 70% Workshops & Work Presentations, Techniques, Based on Case Studies & Practical Exercises, Gamification, Software & General Discussions
- Pre and Post Test

Training Certificate(s):

CMCT Internationally recognized certificate(s) will be issued to each participant who completed the course.

Training Fees:

TBA as per the course location - This rate includes participant's manual, hand-outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Note: The 5% VAT (Value Added Tax), will be effective starting 01st of January 2018 as per the new regulation from the UAE Government. The VAT applies for all quotation both for local and abroad.

Training Timings:

Daily Timings:

07:45 - 08:00	Morning Coffee / Tea
08:00 - 10:00	First Session
10:00 - 10:20	Recess (Coffee/Tea/Snacks)
10:20 - 12:20	Second Session
12:20 - 13:00	Recess (Prayer Break & Lunch)
13:00 - 14:00	Last Session

For training registrations or in-house enquiries, please contact:
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