

INTEGRATED CHARACTERIZATION AND SIMULATION OF NATURALLY FRACTURED RESERVOIRS

TARGETED AUDIENCE

Geophysicists, Geologists and Reservoir engineers involved in integrated reservoir studies
geomodellers involved in fractured reservoirs looking for a full integration of all available data.
Application to clastics, carbonates and shale plays where natural fractures will play a major role.

LEARNING OBJECTIVES

- The course covers the geologic aspects of the natural fractures, and their impact on the reservoir performance.
- Using a real data of a complex fractured reservoir set, build and validate a predictive 3D fracture models, using blind wells and history match of well performances.
- Learn how to use geophysical and geological data in a neural network to understand what controls the fracture density.
- Sweet spot identification, fracture porosity and permeability models for the dynamic reservoir model
- Reservoir simulation and assisted history matching techniques
- Understand and estimate the stimulated permeability resulting from hydraulic fracturing and relate frac design to reservoir simulation

COURSE INFORMATION

- Lectures, practical exercises and hands-on activities on the Teapot data set using FracPredictor
- The attendees will use FracPredictor to build the fractures models and validate it with blind wells.
- Build the permeability model from the fracture model
- Build the dynamic model and validate it with well performances
- Understand the complex interaction between hydraulic and natural fractures and their impact on the stimulated permeability

COURSE CONTENT

Part 1

INTRODUCTION TO FRACTURATED RESERVOIRS

TYPES OF FRACTURES AND THEIR EFFECTS

- Fracture types
- Fractures in cores and anticlines
- Fractures effect on reservoir quality

SEISMIC ATTRIBUTES FOR FRACTURE MODELING

- Fractures from seismic
- Volumetric curvature
- Spectral decomposition
- Seismic inversions

MODELING FRACTURED RESERVOIRS TECHNIQUES

- Discrete fracture network (DFN)
- Continuous fracture model (CFM)
- Fracture model validations

INTERACTION BETWEEN NATURAL AND HYDRAULIC FRACTURES

- Stimulated Reservoir Volume
- Validation with Microseismic data
- Constrained Frac Design and Estimation of Stimulated Permeability

Part 2

INTEGRATED WORKFLOW FOR MODELING NFR

- Seismic attributes for fracture modeling
- 3D application on the Tensleep and Niobrara data (¹)

NATURALLY FRACTURED RESERVOIR ENGINEERING

- Production problems
- Well testing in fractured reservoirs
- Frac design and geomechanical modeling of interaction between natural and hydraulic fractures
- Simulation in fractured reservoirs
- Workshop presentation – wrap up & discussion

(¹): The data will be provided by FracGeo. Attendees will work on a 3G software (Geophysics, Geology, Geomechanics) for fractured reservoir modeling: **FRACPREDICTOR™**