



«ADVANCED GEOLOGICAL MODELING», 5 days

COURSE OBJECTIVE:

Development of professional competencies in database building and geological modeling according to features of geological structure and final task of modeling.

ACQUIRED ABILITIES:

- Estimate required details of conceptual model depending on the final objectives of modeling;
- Form an optimal input data base according to modeling tasks;
- Select the best modeling methods and algorithms based on conceptual geological model and main tasks of the modeling;
- Define criteria for model estimation based on conceptual geological model and main tasks of the simulation.

COURSE CONTENT:

Module Name	Content
Target setting as a basis of geological modeling	Model definition. Tasks and objectives of geological simulation. Model type selection depending on tasks of modeling, standard algorithm of geological modeling and its updating.
Geological model database	List of input data for geological simulation. Direct, indirect and prior information. Input data sources, quality and scale limitation. Features of geo-model database formation according to simulation tasks and geological structure of the object.
Conceptual modeling	Definition of conceptual model. Fundamentals of depositional modeling – core description, electric facies and seismo-facial analysis. Detailed interwell correlation. Petrophysical confirmation of depositional model. Conceptual tectonic model. Detection of conceptual model optimal complexity degree depending on modeling tasks, input data volume and geological structure features.
Structural modeling	Stages of structural modeling. Input data for structural simulation. Methods and features of formation boundary chart. Fluid contacts, structural model evaluation. Fold and disjunctive tectonic models, its realization during structural modeling.
Development of 3D grid, well	3D grid. Classification of 3D grids. Brief description of main types. The impact of depositional and tectonic models on 3D grid main

data transfer to grid	parameters.
Geostatistics fundamentals	Definition of geostatistics. Random value. Distribution bar charts. Expectation function, dispersion, mean square deviation. Correlation ratio. Regression equation. Variogram analysis.
Lithofacies modeling	Update of lithofacies models. Stages of lithofacies modeling. Input data, and quality assessment according to simulation tasks. Influence of conceptual model on the lithofacies simulation methodology – trend setting, anisotropy metering, and choice of simulation algorithm. Lithofacies model evaluation according to tasks of modeling.
Formation properties modeling	Stages of formation reservoir properties modeling. Input data and its evaluation according to simulation tasks. Influence of conceptual model on the lithofacies simulation methodology – statistical distribution of FRP, trends setting, anisotropy metering, and choice of simulation algorithm. Determination of oil-gas saturation. Methods of HC saturation cube construction, J-function.
Reserves estimation	Reserves estimation methods. Volumetric method. Geological model uncertainty. Monte-Carlo technique for reserves uncertainty estimation.