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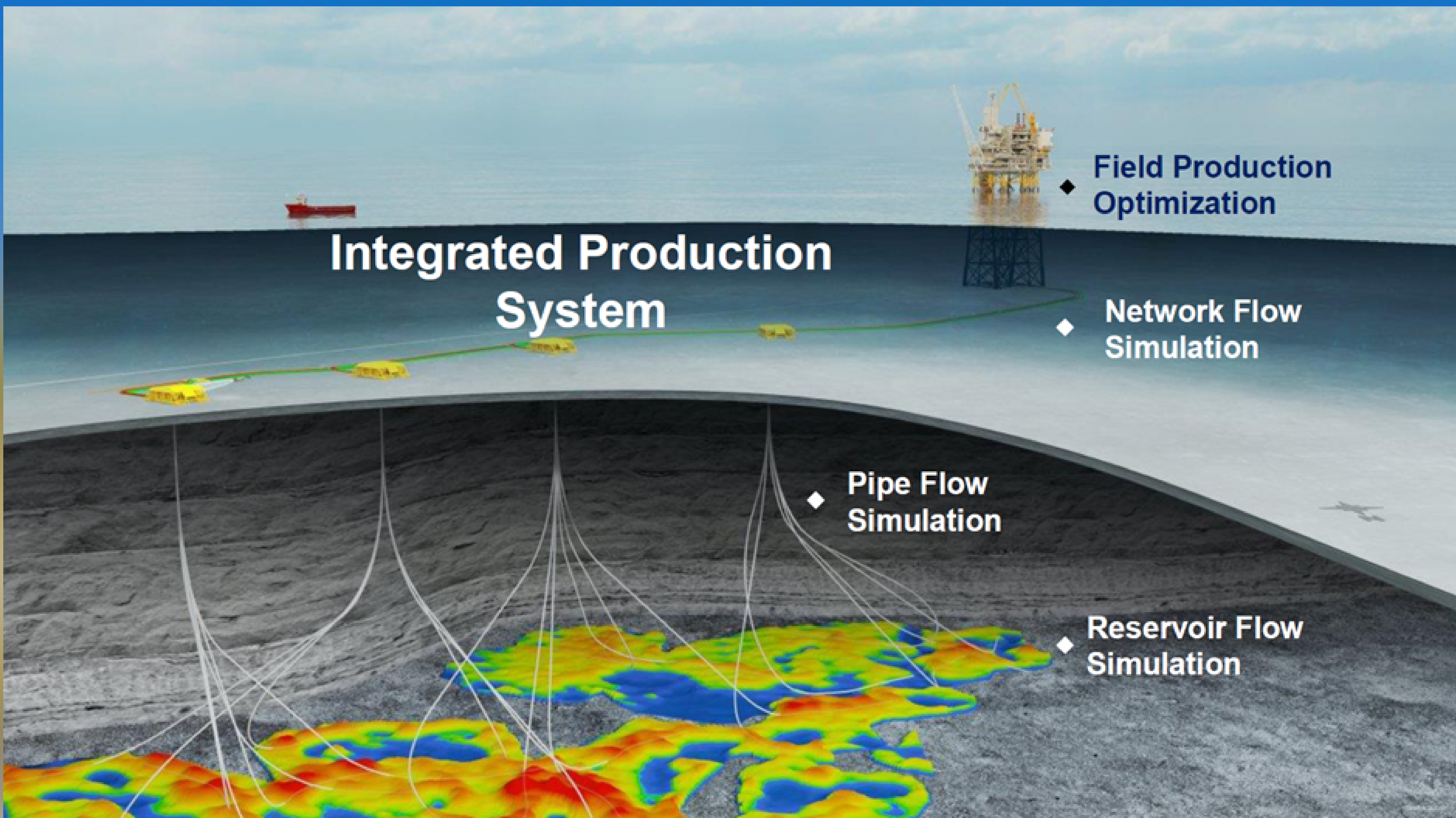
PETROLEUM ENGINEERS ASSOCIATION

AN ISO 9001:2015 & MSME CERTIFIED COMPANY

2 Weeks VILT Hands-on Training on

Integrated Production Modeling & Optimization



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WHO SHOULD ATTEND

- RESERVOIR ENGINEERS
- PETROLEUM ENGINEERS
- PRODUCTION ENGINEERS
- FIELD ENGINEERS
- PROCESSING ENGINEERS

DESCRIPTION

This provides an extensive and practical knowledge for understanding of the concepts and practical applications of full field modelling including reservoir, pipe, and surface network flow simulations. Analysis of the reservoir component is critical for identifying the original resources (STOIIP and GIIP) and understanding the main reservoir driving energies and mechanisms. Additionally, reservoir modelling with material balance analysis can predict full field performance. At the bottomhole terminal, the system must be solved for appropriate operating point using inflow and outflow models. Recently, several inflow and outflow models can be applied based on the field type and the operating conditions. At surface, analysis of the production systems is important for optimizing the field performance and maximizing the revenues. Integrated network modeling offers this opportunity by full system analysis and predict the possible bottlenecks. Accordingly, actions can be applied for optimization and improvement. Network and field performance covers the interactions of wells and pipelines and optimization of oil or gas flowrates subject to constraints. When linked to reservoir models, the network model becomes predictive with time allowing forecasting of production profiles, timing changes of production and injection wells etc.

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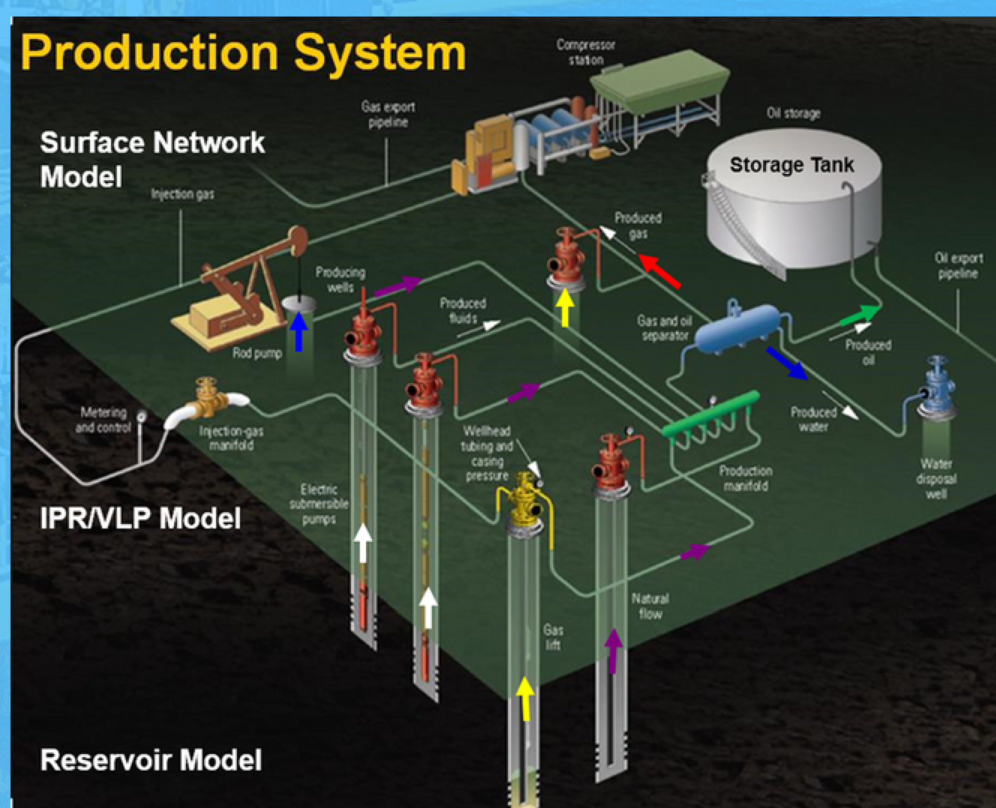
OBJECTIVES

- Explain the principles of reservoir fluid composition, properties and modelling.
- Explain the principle and limitations of the material balance method and the influence of drive mechanisms on the recovery factor
- Build a material balance model for a new oil field development
- Evaluate the range of possible inflow and outflow performance relationships for wells.
- Applying the nodal analysis to predict well performance and the effect of artificial lift
- Build, validate, and match a naturally flowing oil well model
- Apply and interpret more complex inflow modelling options
- Run nodal analysis sensitivities, interpret the results and export lift curves.
- Perform history matching and run production forecasts
- Run a full field model with production forecasting including producers and injectors
- Analyze and optimize the surface production and injection networks
- Demonstrate proficiency in the use of production optimization and modelling software



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COURSE AGENDA

- Reservoir fluid and rock systems
- Integrated production system
- Field development stages
- Overall system approach
- Methodology of pressure loss in the wellbore
- Importance of PVT data for integrated production system analysis
- Inflow performance models

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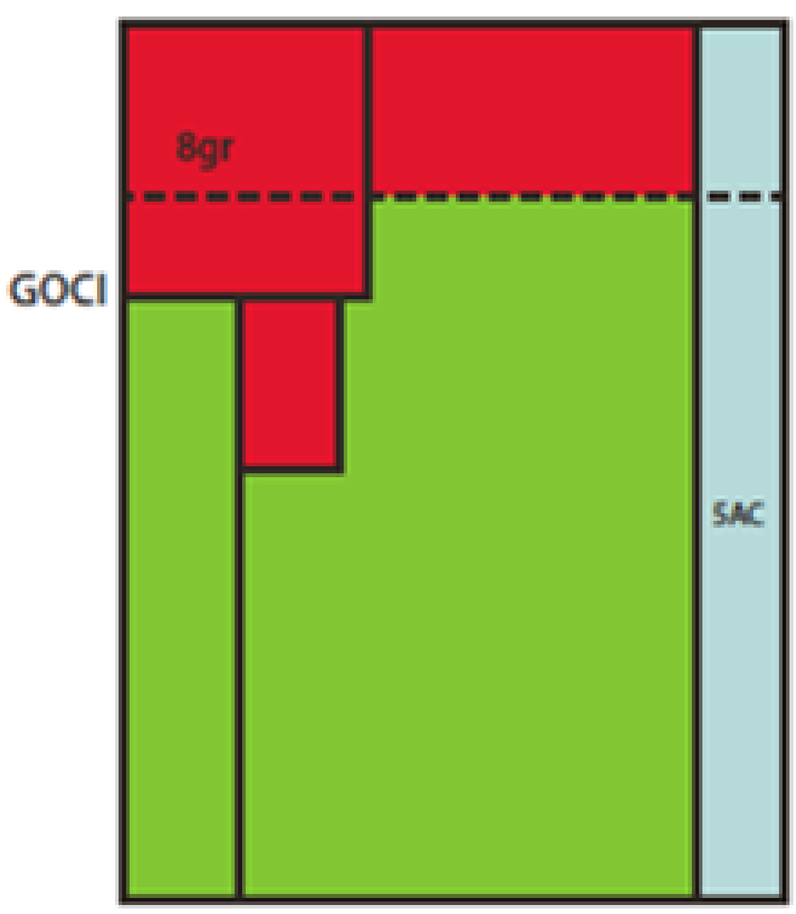
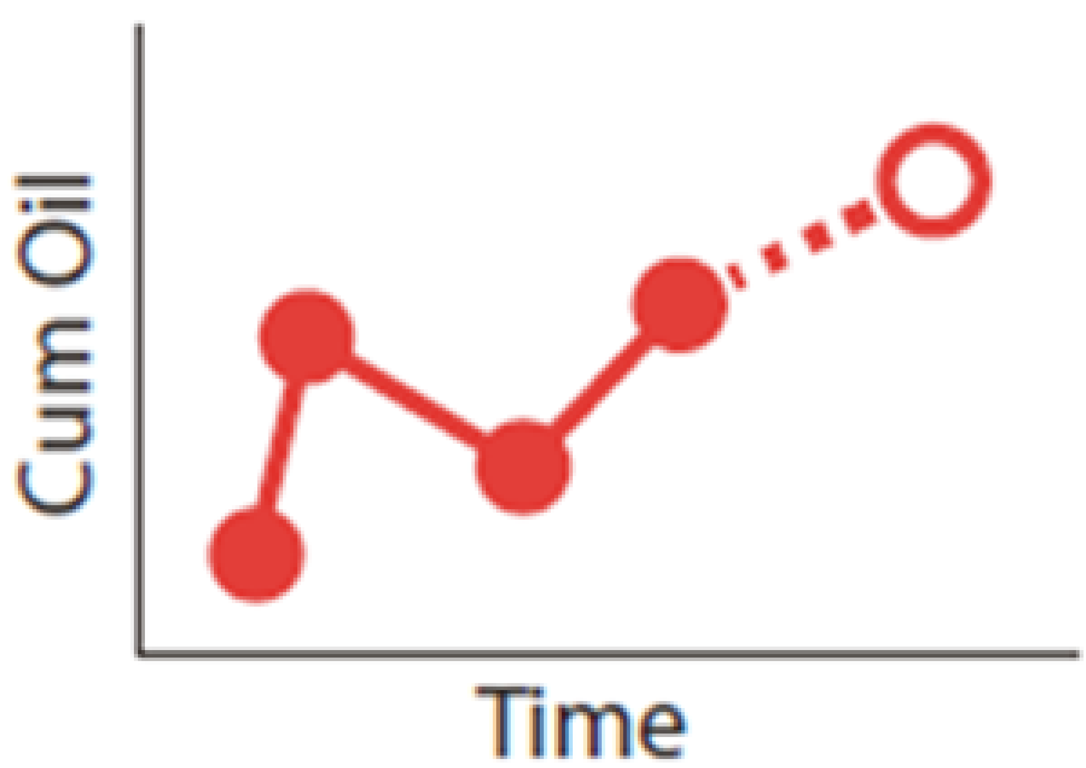
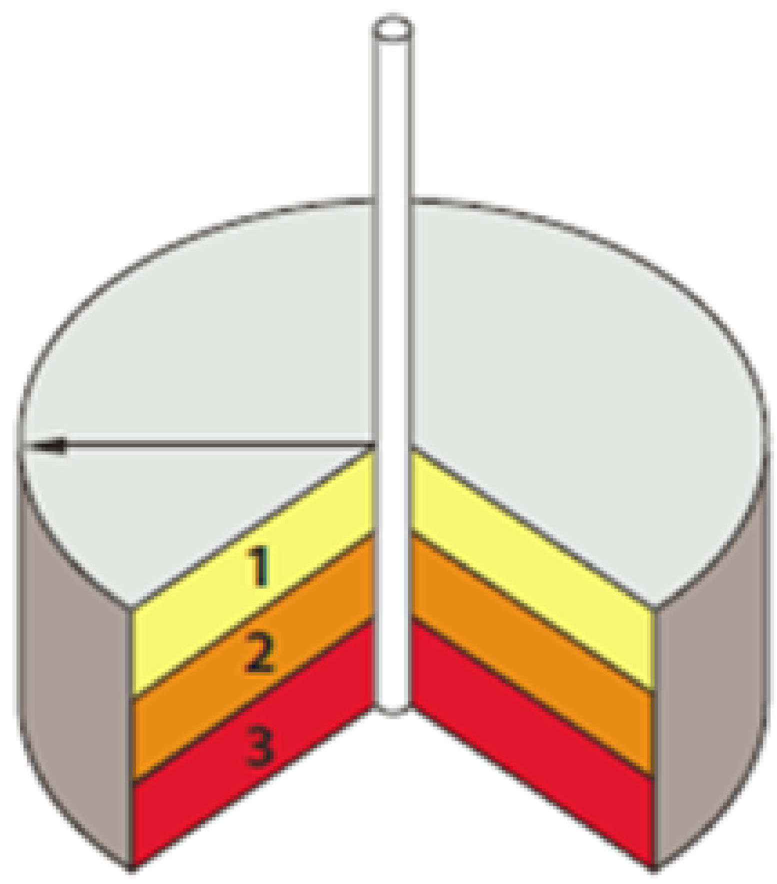
COURSE AGENDA

- Reservoir to surface integrated modeling and optimization
- Material balance Theory and applications
- Material balance for oil reservoirs
- Material balance for oil reservoirs (solving for oil in place and aquifer size)
- Summary of drive mechanisms as applied to material balance
- Linear form of MBE (Havlena & Odeh approach)
- Straight-line analysis techniques
- Analytical and graphical tools
- Drive indices and energy plots
- Dake & Campbell diagnostic plots, their applications
- Using material balance models for prediction
- Analytical aquifer models - concepts
- History matching techniques (analytical and graphical)







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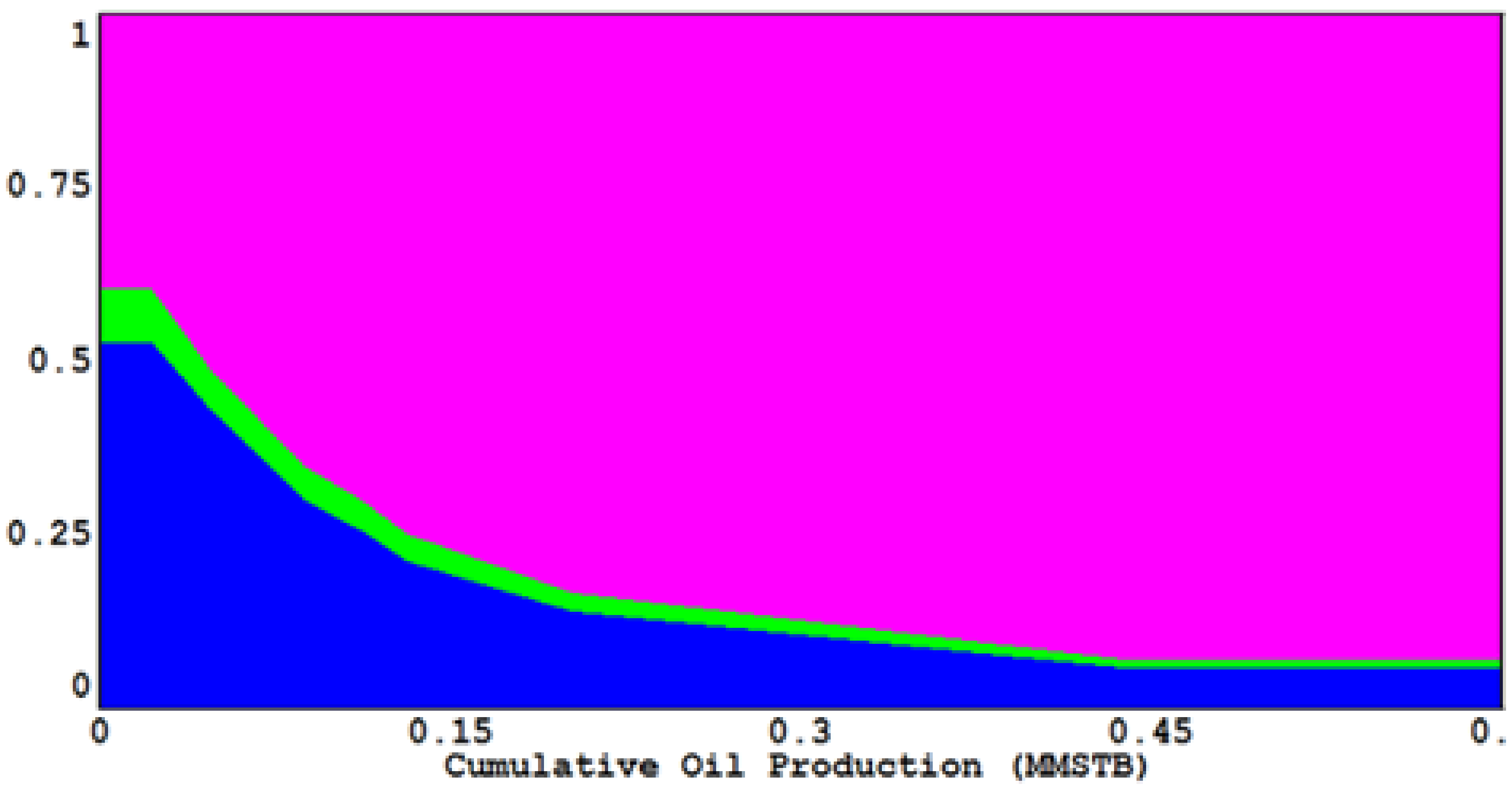
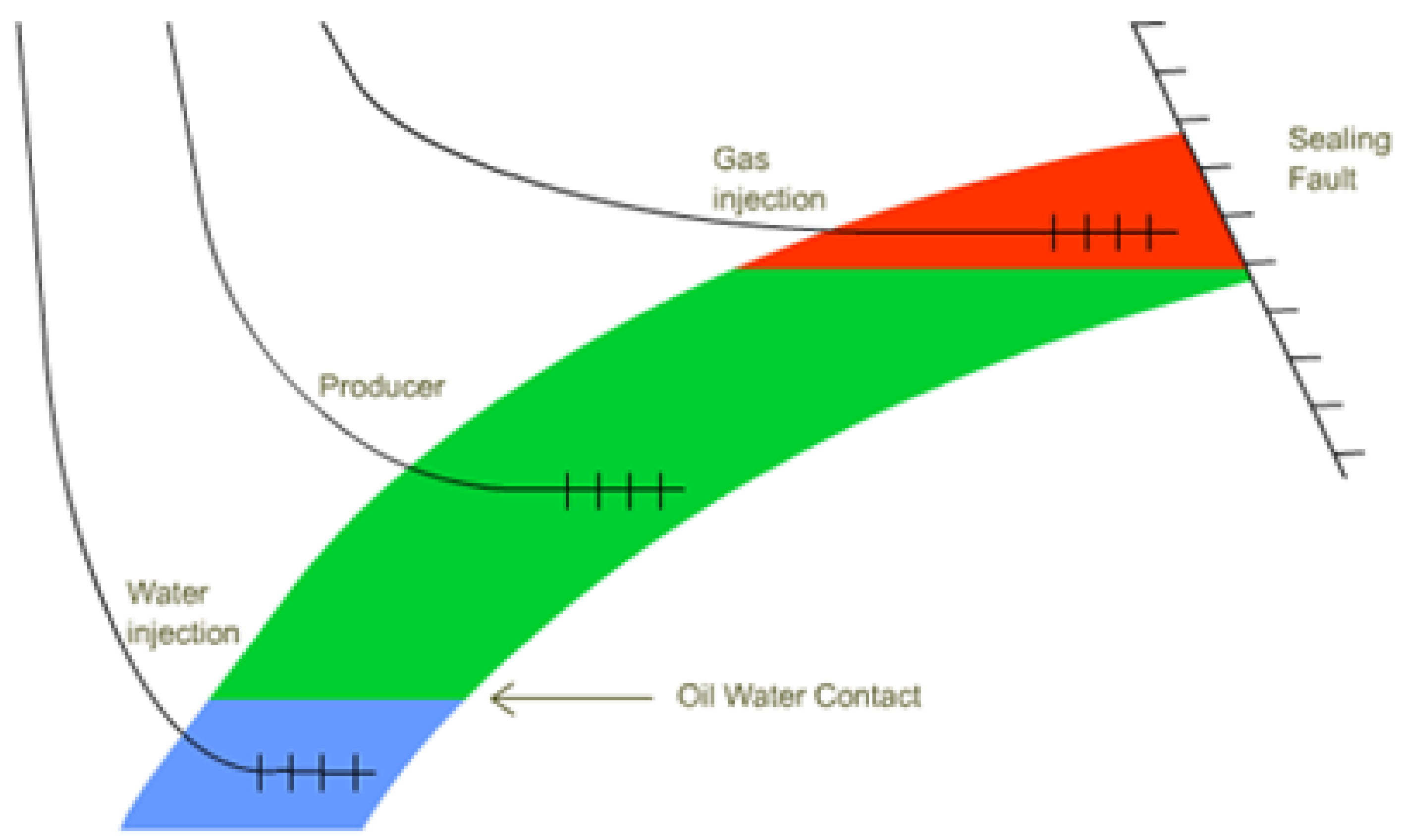
COURSE AGENDA

- Material balance model:
  - PVT data and tank parameters
  - Aquifer models and rel-perms
  - Water influx models
  - Production and reservoir history
  - Prediction of reservoir performance
- STOOIP calculation using Monte Carlo
- Decline curve analysis - history matching and prediction
- Waterflood analysis with Buckley Leverett 1D model
- Simulation & Running a prediction





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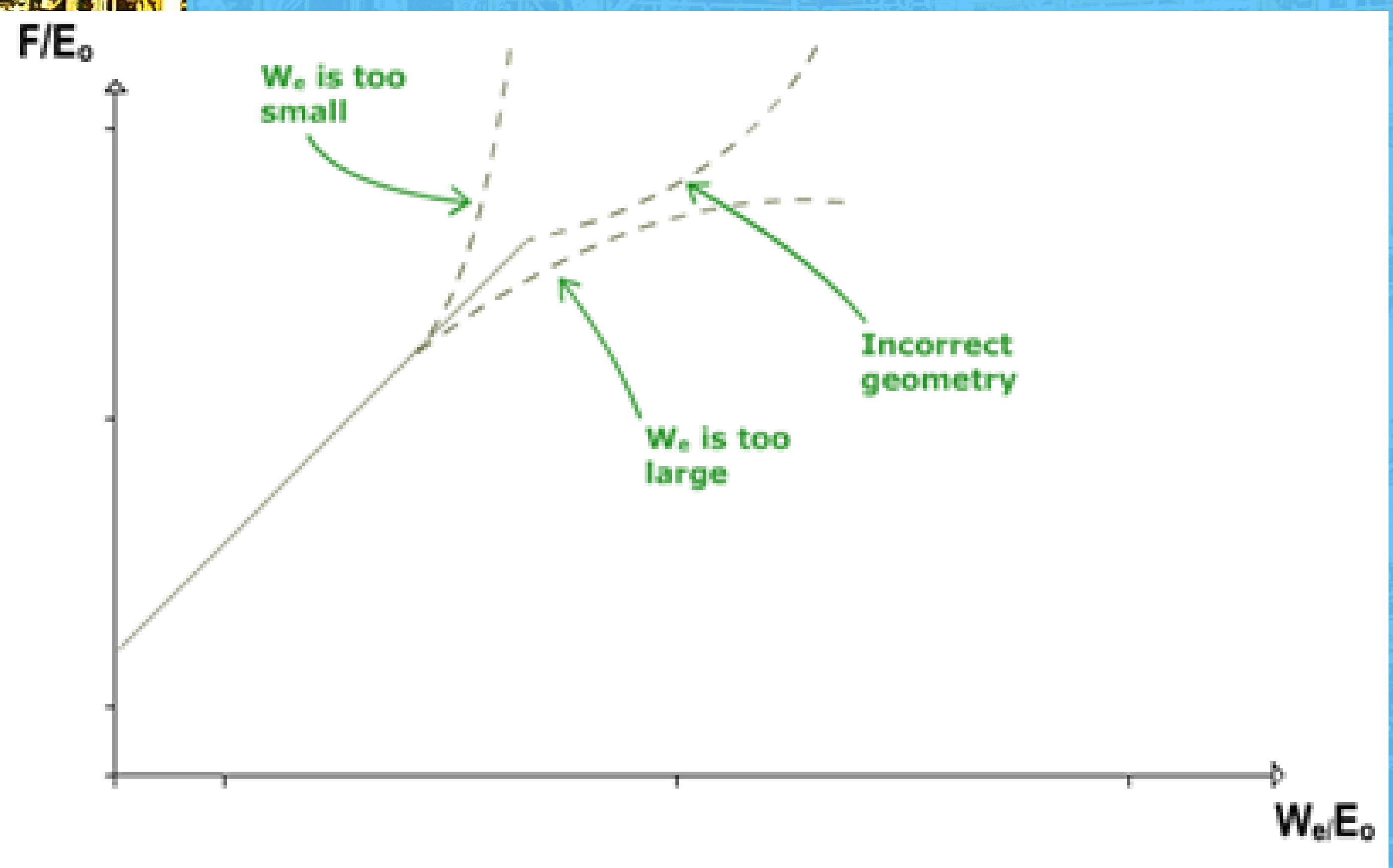
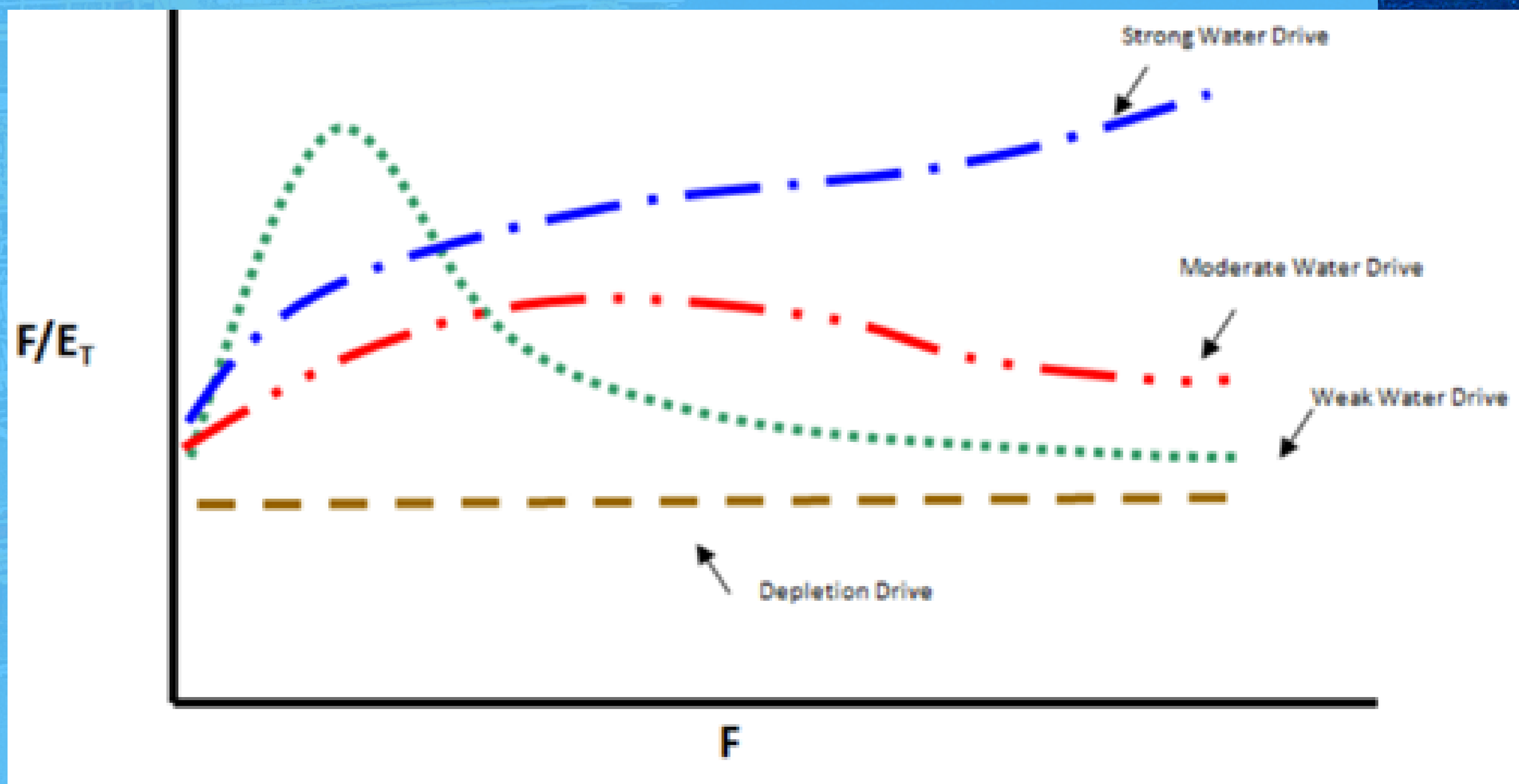
COURSE AGENDA

- Building a wellbore model
- VLP flow correlations theory
- Matching PVT and flow correlations
- Nodal analysis
- Define IPR model
- Defining and matching well testing data
- Flow regimes of the vertical and horizontal pipes
- Defining and matching the VLP model
- Running sensitivities
- Generation of lift curves





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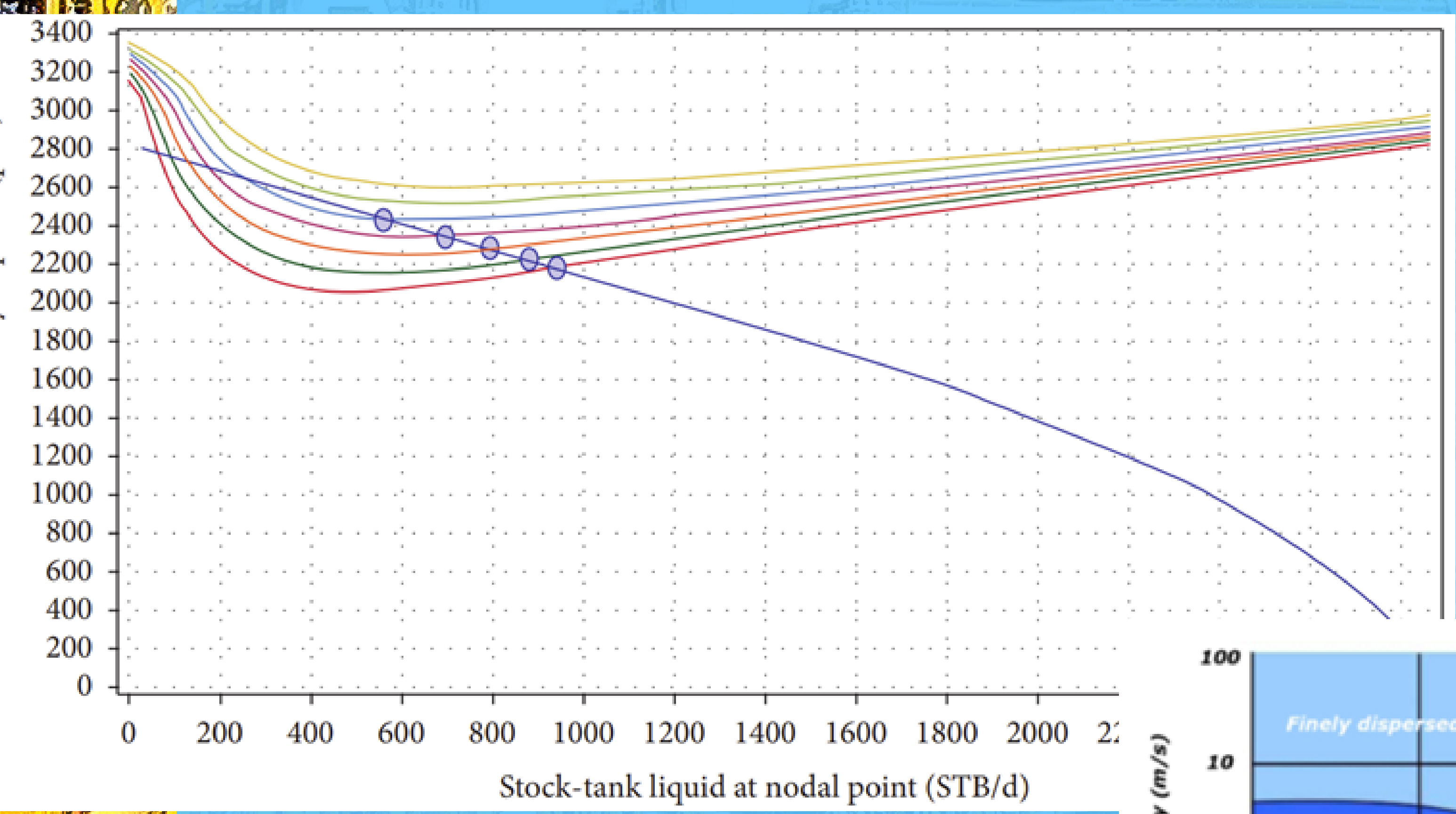
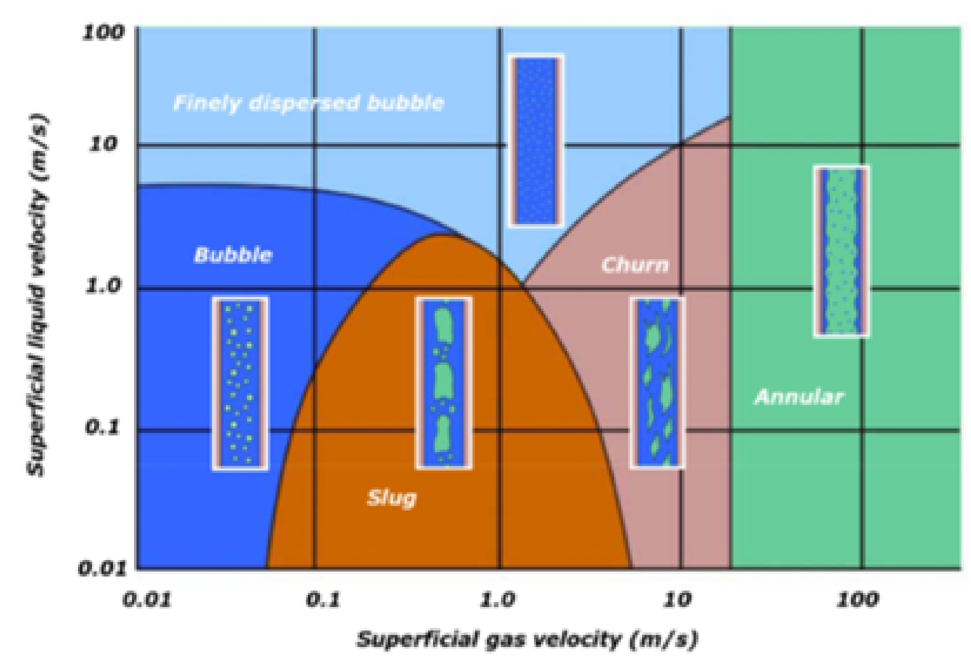
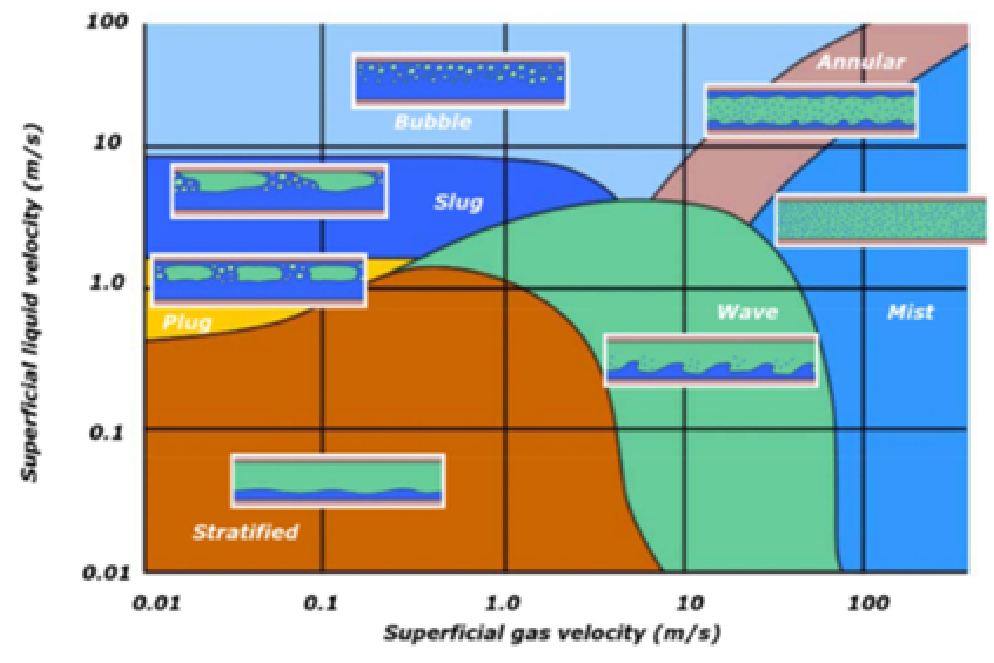
COURSE AGENDA

- Importing VLPs and IPRs
- Defining constraints
- Multi-tank and multi-PVT
- Field development example
- Well development schedule top meet target production profile
- Well inflow models of horizontal, vertical, deviated, multilayer and multilateral geometries







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COURSE AGENDA

- Nodal Analysis calculations
- Re-perforation studies, analysis of skin, the application of sand control
- Sensitivity analysis and prediction
- Multiphase pressure drop models
- Assessing the productivity of oil, gas and condensate wells
- Flow assurance studies
- Hydraulic investigations can be conducted on flow regimes, erosional velocities, superficial velocities, and slug catcher sizing
- Thermodynamic calculations can include studies on hydrate formation, waxing, and salt precipitation
- Hydrate and scale inhibition

- Multiphase network modeling and optimization
- Integrated analysis for production and injection networks
- Field development planning, testing various strategies, and forecasting
- Prediction using a fixed oil rate
- Prediction using a well model
- Building a new oil reservoir model - optimizing the production profile

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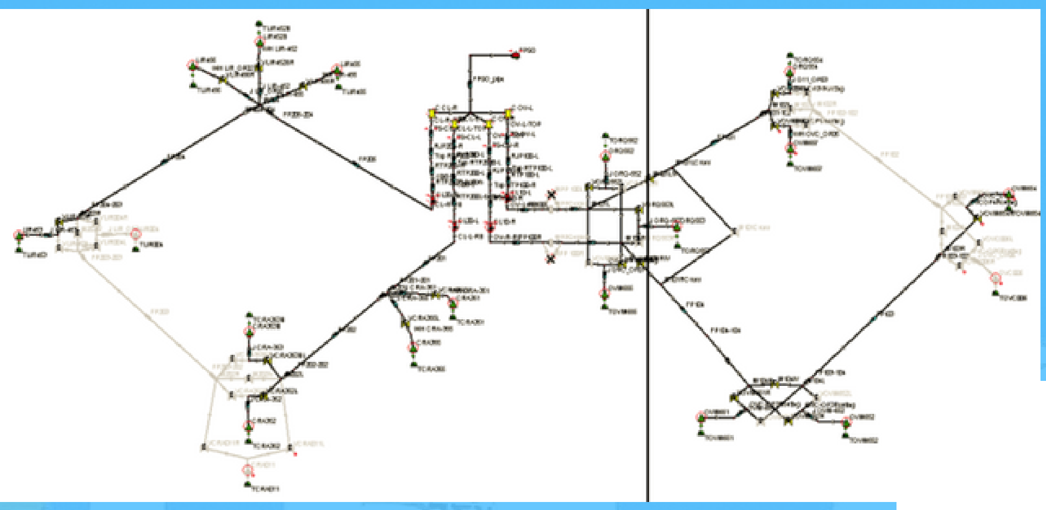

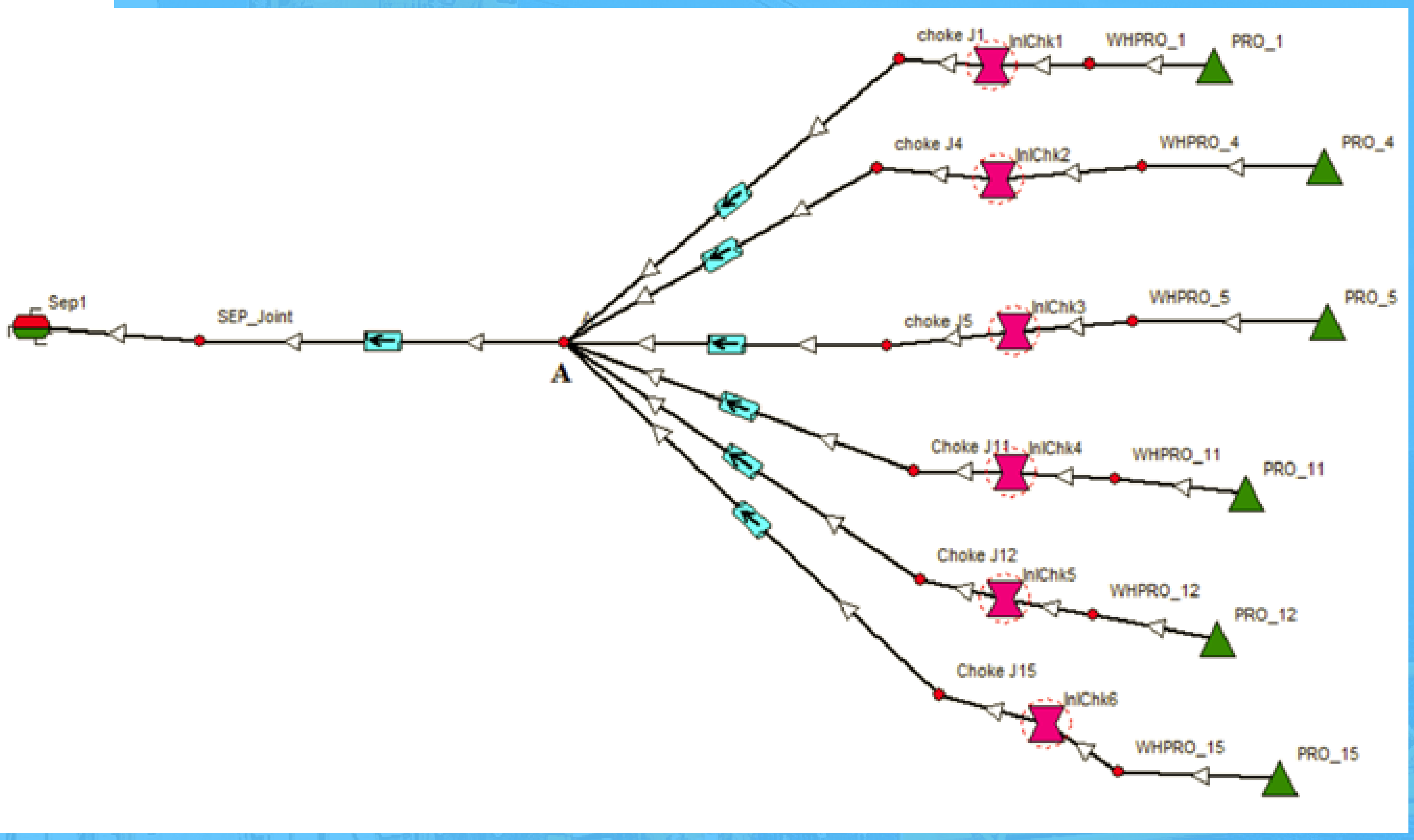

- Full field development planning
- Assigning production constrains
- Solving for the entire production network
- Defining rule-based constrains
- Case studies and field examples