



## **Assisted History Matching and Reservoir Uncertainty Training Course**

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### Overview

Assisted History Matching and Reservoir Uncertainty Training Course is a five-day advanced course for reservoir, simulation, subsurface, geoscience, production, and uncertainty professionals who leave with a Calibrated Reservoir Forecast and Uncertainty Pack. The course connects dynamic reservoir model calibration, production and pressure data, objective functions, sensitivity screening, proxy modeling, optimization, ensemble history matching, forecast uncertainty, and governance. Participants replace isolated manual adjustments with a traceable assisted history matching workflow. Agile Leaders Training Center delivers this course on reservoir uncertainty quantification.

### Who Should Attend

- Reservoir engineering functions responsible for simulation model calibration and development forecasts
- Subsurface modeling functions responsible for static-to-dynamic uncertainty parameterization
- Geoscience functions responsible for geological plausibility and uncertainty ranges
- Production technology functions responsible for surveillance data and well-performance interpretation
- Uncertainty analysis functions responsible for ensembles, probability ranges, and decision scenarios
- Asset planning functions responsible for development options and forecast assurance

The course assumes participants already use reservoir simulation models and production data at work, and it leaves out introductory simulation setup, generic data analytics, and basic production-history analysis.

### Departments and Industries

The course supports model calibration and uncertainty-informed decisions across subsurface and asset teams.

- Reservoir engineering, simulation, and subsurface assurance departments
- Geology, geophysics, and integrated asset-modeling functions
- Production technology, surveillance, and field-development teams
- Oil, gas, geothermal, and subsurface storage organizations
- Energy consulting, technical assurance, and engineering-service providers

### Learning Objectives

By the end of this course, participants will be able to:



- Analyze surveillance evidence and define calibration acceptance criteria
- Build parameterization, experimental-design, and sensitivity-screening plans
- Apply proxy, optimization, and ensemble history matching methods
- Diagnose convergence, non-uniqueness, and geological consistency issues
- Evaluate posterior uncertainty and reservoir production forecasting envelopes
- Assemble governed model evidence for development decisions

## **Course Agenda**

### **Day 1: Evidence and Calibration Scope**

- Production and Pressure Data Quality Register
- Dynamic Reservoir Model Calibration Boundary Map
- Observation Weighting and Objective Function Design
- Geological and Dynamic Uncertainty Parameter Register
- History-Match Acceptance and Governance Criteria

### **Day 2: Parameterization and Sensitivity**

- Reservoir Parameterization and Regionalization Strategy
- Experimental Design and Sampling Plan
- Sensitivity Screening and Response Ranking
- Proxy Model Construction and Validation Method
- Identifiability and Non-Uniqueness Diagnostic

### **Day 3: Assisted Matching Workflows**

- Optimization Algorithm Selection Matrix
- Automated Simulation Run Management Workflow
- Ensemble History Matching Update Cycle
- Multi-Objective Match Quality Dashboard
- Convergence, Constraint, and Failure Diagnostic

### **Day 4: Posterior Uncertainty and Forecasts**

- Posterior Ensemble and Uncertainty Range
- Forecast Envelope and Percentile Analysis
- Decision Scenario Conditioning Map
- Development Option Robustness Scorecard
- Model Governance and Technical Reporting Pack



## Day 5: Reservoir Calibration Practice

- Suggested Exercise: Data Weighting and Objective Function
- Suggested Exercise: Sensitivity and Proxy Review
- Suggested Exercise: Assisted Match Diagnostics
- Suggested Exercise: Forecast Uncertainty Decision Briefing
- Capstone Exercise: Calibrated Reservoir Forecast and Uncertainty Pack

## Practical Exercises

The course uses suggested activities to convert reservoir evidence into calibrated forecasts and decision-ready uncertainty ranges.

- Suggested activity: design observation weights and objective functions for pressure, rate, and water-cut evidence.
- Suggested activity: screen uncertain properties and validate a proxy before optimization runs.
- Suggested activity: diagnose an ensemble with acceptable global fit but weak well-level behavior.
- Suggested activity: brief an asset team on forecast percentiles, robust options, limitations, and governance actions.

## FAQs

### Who suits assisted history matching training, and what does it assume?

Assisted history matching training suits experienced reservoir, simulation, subsurface, geoscience, production, uncertainty, and asset professionals who already work with dynamic reservoir models and surveillance evidence.

### How does assisted history matching differ from introductory reservoir simulation training?

Assisted history matching focuses on calibrating an existing dynamic model, diagnosing fit, preserving plausible geology, and quantifying forecast uncertainty, while introductory reservoir simulation training focuses on model construction, numerical concepts, and basic simulation runs.

### Why does reservoir uncertainty quantification use an ensemble rather than one matched model?

An ensemble retains multiple models that satisfy evidence and constraints, allowing teams to examine non-uniqueness, posterior ranges, forecast percentiles, and decision robustness instead of treating one calibration as certain.



## **What does an objective function contribute to assisted history matching?**

An objective function converts mismatches between simulated and observed responses into measurable criteria, with weights reflecting data quality, scale, business relevance, and the balance between field-level and well-level behavior.

## **What belongs in a calibrated reservoir forecast and uncertainty pack?**

A calibrated reservoir forecast and uncertainty pack contains evidence checks, parameter ranges, objective functions, sensitivity results, accepted ensembles, diagnostics, forecast envelopes, decision scenarios, limitations, governance records, and technical reporting.

## **Conclusion**

Participants leave with a Calibrated Reservoir Forecast and Uncertainty Pack containing evidence controls, parameterization, sensitivity results, assisted-match diagnostics, posterior ensembles, forecast ranges, decision scenarios, and governance records. The pack changes model tuning into a traceable engineering workflow. It supports clearer development choices across reservoir, production, geoscience, and asset functions.



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