BASIC GOHFER TRAINING COURSE AGENDA (3 Day)

Objective: To demonstrate, along with class participation, the GOHFER project workflow with actual data while discussing individual inputs, functions and features of the application. Provide basic understanding of how to use and navigate the user interface and apply the program to individual projects. This course targets individuals who are new to the GOHFER software or those who want a refresher course. All facets and modules of the GOHFER software will be discussed and demonstrated including the new GOHFER v9.0 Multi-Well Fully 3D Geo-Mechanical Model.

Day 1 – Administrative / Vertical Well Class Example

- **Introductions**
- **Software Overview**
  - Installation
  - License Access
- **Vertical Well Class Example**
  - Simple Project Workflow Example
  - LAS (Log Processing)
    - Input Data Requirements
    - Mechanical Property and Stress Profile Construction
  - Geologic Section
    - Define wellbore segment(s) – treatment string / wellbore fluid
    - Define Grid Dimensions
  - Treatment Design
    - Perforations
    - Pump Schedule
  - Engine Output Viewer
    - Output Grid Data
  - Production
    - Conductivity & Well Performance
- **Pressure Diagnostics**
  - Import Data / Analysis Input
  - Input File Preprocessor
  - Pre-Falloff / Closure / After Closure Analysis
  - Synchronize 2 Data Files
  - Rate Schedule

Day 2 – Vertical Well Example (continued)

- **Vertical Well Class Example – History Match**
  - How to build an actual pump schedule
  - Pressure Matching Strategies
  - Matching Stresses (Pore pressure, Closure pressure, PZS) and leakoff
  - Matching Frictional Effects (Pipe / perf / near wellbore)
- ***Class Exercise*** **- Economic Optimization**
  - Design / Production / Economic Optimization
- **GOHFER Variable Sensitivity**
  - Demonstration / discuss individual input variables and impact on the model

GOHFER Databases

Proppant Database

Review proppant database inputs and functions

Fluid Database

Review fluid database inputs and functions

How to add a fluid to the fluid database

Reports

Report management/editing

Adding images to reports

Day 3 – Horizontal Well Examples

Horizontal Transverse Shale Model & Production Example

Treatment / Reference Wells

3D Surveys

LAS (Shale / Carbonate Log Processing)

Treatment Stage

Longitudinal vs. Transverse Fractures

Breakdown Pressure

Fracture Orientation

Breakdown Gradient / Breakdown Angle

Treatment Design

Perforations

Interference / Stress Shadowing / Stress Anisotropy

Single Horizontal Transverse (single stage / multiple cluster)

Multiple Horizontal Transverse (multiple stages / multiple clusters)

Ball Drop Horizontal Transverse (single treatment / multiple stages)

Engine Output Viewer

3D Grid Output

Production

Longitudinal / Transverse production parameters

Multi-Well Fully 3D GeoModel

3D Example 1 – Multi-Well Model w/ Reference Logs only (No Geologic Model)

Site & Well Location Entry

Log Processing & Integration

Grid Setup & Map View

3D Example 2 – Add 2D Surface Map to Previous Example

Grid Setup & Map View

3D Example 3 – Add 3D Geologic Model to Previous Example

Create Core to Replace Reference LAS

LAS Mapping from Core (Full 3D Distribution vs. Reference LAS (Layer Cake)

Import Geologic Model / Requirements

Offset Depletion / Well Bashing

Zipper frac simulations

Wrap-up / Discussion

Optional Topics

Microseismic Class Example

Import Microseismic data into GOHFER

Real-Time Data Acquisition Demonstration

Real-Time Settings / Monitoring

Real-Time Pressure Diagnostics / Pumping Schedule Creation / Simulation