

Fundamentals of Horizontal Well Technology

Course Objective:

This course provides a broad background necessary to understand and successfully apply the technology of horizontal wells. Practical examples will illustrate how candidate horizontal wells are selected and designed using multi-disciplined team efforts to ensure both the technical and economic benefits are maximized. Methods to predict well performance such as expected producing rate, drainage area, and fluid coning will be explained through class problems. The latest technology of well drilling and completion such as multi-stage fracturing, multi-laterals, underbalanced drilling, and will be reviewed.

Who Should Attend:

This course is aimed at reservoir, petroleum and exploitation engineers/technologists, and geologists who are involved in the area of horizontal well applications

Course Instructors:

Mr. Saad Ibrahim, P. Eng, president of Petro Management Group Ltd., with 30 years of diversified experience in the oil and gas industry (please see his professional profile).



Roger Hough has worked for over 40 years in the industry. He has extensive drilling, operations and research experience with Shell International and has worked in many countries during his career. He has chaired a number of Society of Petroleum Engineers technical conferences, and was an SPE Distinguished Lecturer on the topic of Slim Hole Drilling. Since retiring from Shell, he teaches drilling technology at the University of Calgary and was recently inducted as an SPE Distinguished Member.



Course Agenda:

- **Introduction:** History and level/types of activities

- **Benefits/applications of horizontal wells**
 - ▶ Uncertainties and risks; geological, engineering and economical
 - ▶ Well constrains; reservoir - drilling - completion

- **Well productivity**
 - ▶ Factors influencing well productivity
 - ▶ Horizontal well drainage area
 - ▶ Productivity estimates of Hz wells with multi-stage fracing
 - ▶ Productivity of slanted wells

- **Coning prediction**
 - ▶ Determination of the “Critical” rate and time to breakthrough
 - ▶ Completion optimizing in the presence of fluid contact(s)

- **Horizontal well drilling**
 - ▶ Design/planning considerations
 - ▶ Horizontal well profile and types; long/medieum/short radius
 - ▶ Horizontal well re-entry
 - ▶ Underbalanced drilling and formation damage
 - ▶ Slim hole drilling

- **Horizontal well completion**
 - ▶ Well completion options and multi-laterals
 - ▶ Well cementing and stimulation
 - ▶ Sand control and gravel pack

- **Well testing**
 - ▶ Flow geometry/regimes for Hz and slanted wells
 - ▶ Well test analysis techniques; conventional and history matching

- **Reserve estimates**
 - ▶ Estimate of recoverable reserves (Plahn method)
 - ▶ Decline analysis, statistical and empirical methods

- **Screening for horizontal well applications**