FORMATION DAMAGE, ACIDIZING & HYDRAULIC FRACTURING TECHNOLOGY

7 – 11 December 2009
Kuala Lumpur, Malaysia

Expert Course Trainer:
Dr. Charles F. Alcocer

petroEDGE
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Course Description

The primary topics that will be covered include skin effects and formation damage. The course starts with detailed discussions of the various types of formation damage, causes and effect flow rate. The various stimulation and damage removal methods are then introduced with detailed study of the theory, design and analysis of sandstone and carbonate matrix acidizing. Upon completion of the course, the student should be able to design a complete stimulation job starting from the selection of the suitable fluids and ending with the post-treatment performance evaluation.

The course provides the student with the knowledge and tools needed to design and analyze hydraulic and acid fracturing jobs. The key to acidizing success is in the understanding of how it works, the optimum conditions for its application, and proper evaluation of well response after the acidizing treatment.

This course will teach many of the practical aspects of acidizing applications and help provide a better understanding of acidizing as a tool for enhancing well performance. Today, hydraulic fracturing is used in 35 to 40% of wells and in USA where the procedure is more widespread, it has increased oil reserves by 25 to 30%. Application of the technology is expanding. This course presents description of theory, techniques, equipment and treatment planning & design.

Course Objectives:

- Understand basic reservoir properties that influence reservoir performance, as well as the potential for formation damage and its removal
- Demonstrate an understanding of clay mineralogy, how formation clays can cause damage, and current methods to prevent this type of damage from occurring
- Determine why scale, paraffin, and asphaltene can cause significant reduction in production and how you can control this type of damage
- Prevent damage during drilling, completion, and production phases - this includes everything from underbalanced drilling to the use of new drill-in and completion fluids, to general production practices
- Determine what is important in the evaluation of damage - is your damage real or is it related to restrictions in the completion system? Without a proper understanding of poor well performance, stimulation approaches may be unsuccessful
- Remove damage. The subject goes beyond just acidizing, which is thoroughly covered. It also includes non-acid approaches such as wellbore washes, perforating techniques, hydraulic fracturing application, etc.
- Causes of formation damage and how to prevent and remove it during production operations
- How to select appropriate candidates for well stimulation, design and evaluation of hydraulic and acid fracture jobs.
- Concepts involved in design of all essential elements of well stimulation system (Skin calculation acidizing, and hydraulic fracturing)
- Optimization of Hydraulic Fracture Dimensions

Who Should Attend

This 5-day course is designed for engineers, geologists, petroleum technologists and operations personnel and presents the principles and practices of formation damage, acidizing and hydraulic fracturing. The course includes a review of theoretical components of formation damage, acidizing and fracturing, but places a significant emphasis on candidate selection and design fundamentals and case field studies and exercises.

Course Timings and Intervals

Class will begin at 9am on each day and complete by 5pm the latest. There will be 3 intervals on each day, coffee breaks at 10am and 3.30pm and lunch will be served at 12:30pm. This is subject to change by the course facilitator, depending on the course requirement and participants attending.

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Course Outline

Module A. Formation Damage - *Duration: 1.5 days*

- Reservoir properties review
- Properties most influence the effect of formation damage.
- Reservoir performance influenced by stress sensitivity
- Damage mechanisms
- Sandstones and carbonates damaged
- Formation mineralogy and clay chemistry influence damage?
- Fines migration, scale, paraffin and asphaltene effect on formation damage
- Damage Prevention on drilling, completion, and production methods, drilling/completion fluid and additive selection, clay control
- Evaluation of damage by production performance, logging, pressure analysis review
- Damage removal by acidizing materials and methods.
- Damage removal by wellbore washes, perforating techniques.
- Damage removal by hydraulic fracturing to bypass damage
- Exercises and field case example and discussion

Module B. Acidizing Technology – *Duration: 1.5 days*

- Well stimulation objectives
- Types of formation damage
- Influence of skin factor
- Production improvement with skin removal
- Well stimulation and reservoir management
- Perforating techniques and well stimulation
- Acidizing for well stimulation
- Chemistry of sandstone acidizing
- Chemistry of carbonate acidizing
- Acid additives
- Treatment diversion
- Acid fracturing
- Types of acids
- Sandstone acidizing guidelines
- Carbonate acidizing guidelines
- Re-stimulation of acidized wells
- Exercises and Field Case Example and Discussion

Module C. Hydraulic Fracturing – ***Duration: 2 days***

- Concepts and terminology
- Mechanics of the hydraulic fracturing
- Rock Behaviours
- Rock Strength
- Fracture Geometry
  - Fluid Along a Fracture
  - Fluid Leak-off
- Fracturing Fluids and Additives
- Proppants
  - Transport
  - Material
- Frac Pack technology and application to control formation damage
- Production Increase from Fracturing
  - General
  - Horizontal fracture
  - Vertical Fracture

- **Exercises and Field Case Example and Discussion**

- **Discussion and Conclusions on the three modules**

About your Expert Trainer – Dr Charles F Alcocer

Dr Charles F Alcocer has more than 25 years of domestic and international experience in the Oil & Gas industry in the areas of Nitrogen Injection, CO2 Flooding Processes, Waterflooding Processes, Thermal Recovery Processes, Reservoir Engineering, Production and Environmental Engineering.

During 1997 - 98, he was a Production/Reservoir Engineer Consultant-in-Residency with Shell Offshsore, Inc headquartered in New Orleans. He was also a consultant worldwide with Schlumberger. He has more than 15 years of academic experience teaching graduate and undergraduate petroleum courses and conducting research in the areas of EOR Processes, Production, Reservoir, Environmental Engineering, Paraffin and Asphaltene deposition prevention and/or control. He is active in consulting and teaching worldwide for the Oil & Gas Industry. Being a result and problem solving oriented engineer and environmentalist, Dr. Alcocer holds a BS, MS, Ph.D. and Post Doctoral Research in Petroleum Engineering from Oklahoma University. Dr. Alcocer is a former professor of Oklahoma University, Montana University System, and The University of Louisiana, Lafayette, USA

Inventions:
- "Electromagnetic Fluid Conditioning Apparatus and Method", US Patent Number 5,673,721 US Patent awarded October 7, 1997.
- "Advanced Electromagnetic Fluid Conditioning Apparatus and Method", US Patent Number 5,899,220 US Patent awarded May 4, 1999.
- "Apparatus & System for Removing Nitrogen & Nitrogen Compounds from Wastewater and/or Sewage", Patent Pending # RB669-535-768US.

Publications:
- Authored and/or co-authored 38 publications (Refereed Journals and Proceedings)
- Ph.D. Dissertation: Enhanced Oil Recovery topic
- Special work for Ph.D. Qualification, The Data System of North America and Canada
- Master's Thesis: High Viscosity Crude Oil Technology Applies to Venezuelan Fields
- Engineering Thesis: Laboratory work on Relative Permeability Determination
- Authored 3 laboratory manuals for instruction

Notes about the Course:
- Technical papers, field reports, and adequate bibliography will be provided in CD to each participant
- Printed Teaching Manual and Power Point course material will be provided in CD.
- Technical Video on Hydraulic Fracturing
- Technical Video on Acidizing Technology

About petroEDGE

The core competencies of professionals in the Oil & Gas industry are constantly evolving. To meet this ever growing gap, PetroEDGE provides targeted up- to-date, practical and technically sound training solutions that enable professionals to be continuously relevant in industry.

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REGISTRATION FORM

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