CEMENTING PRINCIPLES & PRACTICES

COURSE LEVEL: ADVANCED TRAINING SERIES

COURSE CODE: CD-WS-ATS

COURSE DURATION: 3 days. Each day will be broken into three full sessions of around 2 hours each. 45 mins of lunch break and two tea breaks of 15 mins each will be included in the schedule.

INTRODUCTION: Cementing is a fundamental element of effective well construction. By understanding cement chemistry, additive use, and lab procedures the participants will able to build a solid foundation to design and execute cement jobs. Mud removal and centralization will be taught so that the participants can apply effective processes to ensure cement job success.

Special purpose cements will be discussed in a way to show when they should and should not be used, as well as how they can be used to solve challenges encountered in complex and extreme well environments. Foamed, engineered particle sized, flexible, and salt cements will also be covered in detail.

During this course, participants will practice cementing calculations, as well as job design exercises and cement evaluation methods using real-life examples. Liner cementing and stage cementing jobs will be developed in the classroom. Cement design software will also be demonstrated.

MODE OF TRAINING: The course will be delivered in a class room environment. The instructor will teach via presentation slides. Lectures will be laced with class room discussions and exercises to enhance assimilation if concepts discussed. Detailed discussion of the solutions to the exercises will be done to ensure learning for all participants. Sessions will be designed to accommodate ample time for Q&A and clearing of doubts. A quick quiz will be conducted each day to ensure attentiveness and focused participation. The participants will be provided a copy of WELL SCHOOL's CEMENTING TECHNOLOGIES Manual, capturing the subject in depth, for the course as well as future reference.

Candidates are required to carry a calculator.

COURSE OUTLINE:

- Overview of Primary & Secondary Cementing
- Cement Placement (Job Execution and Procedures)
- Cement Calculations
- Cement Additives and Mud Removal
- Effective Cement Placement
- Cement Job Evaluation
- HSE and Cementing

COURSE STRUCTURE:

Day 1

- Introduction to Cementing Operations
- One stage cement jobs
- Two stage jobs
- Liner cementing
- Squeeze cementing
- Cement head and wiper plugs
- Calculations: Volume of cement slurry, number of Sks, mix water, additives, displacement volumes required
- Calculator for all parameters of the cement job
- Pressures during and at end of displacement
- Quiz, Q&A session

Day 2-

- Cementing Operations Planning and Execution
- Buoyancy effect on casing
- Relevant factors that influence the success of any cement job
- Cement job planning and execution
- Casing hardware
- Cement chemistry (focus on class G cement)
- Compressive strength and permeability
- Strength retrogression
- Thixotropic cement slurries
- The importance of BHCT and BHST
- Mud removal and the effect of mud contamination on compressive strength
- Gas migration
- Mud Removal and Cement Placement
- Lost circulation
- Cementing horizontal wells
- Cement laboratory equipment
- Rheology and its application in oil well cementing
- Flow modules and mud removal
- Spaces and washes
- Cement placement: turbulent and laminar flow
- Quiz, Q&A session

Day3

- Special cement systems
- Engineered particle size cements
- Salt cementing
- Thixotropic cement systems
- Light weight cements

- Foam cement
- Permafrost cement
- Cement Quality Evaluation
- Cement quality evaluation logs (cement bond logs)
- Overview of sonic and ultrasonic logs
- Examples of CBL/VDL Log displays and evaluation of cement quality
- CBL VDL: pros and cons
- The bond index
- SCMT: slim cementing mapping tool
- Ultrasonic tools: USIT
- Ultrasonic log USIT over sonic log CBL
- Cement logs summary
- Examples of CBL/VDL log displays and evaluation of cement quality
- Major hazards on a cementing operation
- Risk assessment
- Safety hazards related to a cementing operation
- Quiz & Q&A session
- Feedbacks

The exact schedule and depth of content covered during the course will be tailored to the interest and needs of the audience and may deviate a bit from what is shown in the daily schedule.

TARGET AUDIENCE: The course is meant for Drilling professionals needing to advance their knowledge of cementing. Both persons responsible for design, as well as the execution of cement jobs will benefit from this course.

PRE-REQUISITES: Participants should have a basic knowledge of the oil and gas industry. Some understanding of cement use will be needed. They will also need to bring a hand calculator and be prepared to perform exercises in class.