COURSE OVERVIEW DE0624-4D
Understand Water Flooding, Reservoir Souring & Water Breakthrough

Course Title
Understand Water Flooding, Reservoir Souring & Water Breakthrough

Course Date/Venue
December 09-12, 2024/ Al Aziziya Hall, The Proud Hotel Al Khobar, Al Khobar, KSA

Course Reference
DE0624-4D

Course Duration/Credits
Four days/2.4 CEUs/24 PDHs

2.4 CEUs (24 PDHs) AWARD

H-STK© INCLUDED

Course Description

This practical and highly-interactive course includes real-life case studies where participants will be engaged in a series of interactive small groups and class workshops.

This course is designed to provide participants with a detailed and up-to-date overview of water flooding, reservoir souring and water breakthrough. It covers the basic concepts of reservoir souring and water breakthrough; the operational troubleshooting techniques to arrive to the cause and to eliminate it through a solution development; the process and equipment problems including past problems associated with start up, shut down, ESD and standard non-compliance; and the prolonged feed specification, sea water and effluent water quality and chemical dosage problems.

Further, the course will also discuss the pressure management and problems; the factors affecting waterflood success; the types of oil reservoirs more favorable for water flood; the integrity management in water injection wells; the water flood plant injection water quality and chemical treatment; the annulus pressure management, water injection problems and injection well integrity; the injection profiles, drilling patterns and reservoirs response to water influx; and the water lifting/transfer from source location and filtration and chemical injection.

During this interactive course, participants will learn the water property monitoring/recording; the high pressure and high flow rate pumping equipment; installing and operating temporary injection facilities; the optimization of chemicals and quality control; the water treatment plant operator, water sources and treatment; the reservoir management and intake structures; the types of water problems, corrosion control and tools of diagnosis the water problems; the methods of water control; monitoring and analysing water production; the water separation and treatment; the layouts of field production facilities, scale, bacteria and corrosion problems; the water treatment methods and corrosion monitoring; the chemical treatment and corrosion control; and the role of operations optimizations to avoid corrosion.

Course Competency

- Multi-dimensional and multi-discipline level problem solving
- Troubleshoot basic operations and equipment
- Grip on typical problem and the underlying failures covering hands on examples
- Communicate results within plant and between several plants using Company prescribed procedures, protocols and media to attain others
- Communicate observations, findings and results to Fields Development (FD) and Reservoir Studies (RST) Teams through designated person-in-charge of Water Handling Facilities.
- Analyze start-up, shut-down, utility failure, ESD, process major upsets, cause & effects scenarios, flare scenarios, material safety data sheets etc.

Course Objectives

Upon the successful completion of this course, each participant will be able to:-

- Apply and gain an in-depth knowledge on water flooding, reservoir souring and water breakthrough
- Define reservoir souring and water breakthrough issues for sea water and effluent water injection wells of Water Handling Facilities (CIF & CIPF Extension)
- Monitor and understand different operational parameters as well as eliminate the source of trouble in a structured manner
- Discuss basic concepts of reservoir souring and water breakthrough
- Identify and define reservoir souring and water breakthrough
- Apply operational troubleshooting techniques to arrive at the cause and eliminate it through a solution development
- Carryout process and equipment problems and include past problems associated with start-up, shut down, ESDS and standards non-compliance
- Recognize prolonged feed specification, sea water, effluent water quality and chemical dosage problems
- Identify pressure management and problems, water flood example, factors affecting waterflood success and types of oil reservoirs more favorable for water flood
- Apply integrity management in water injection wells including water flood plant injection water quality and chemical treatment

- Employ annulus pressure management and discuss water injection problems and the injection well integrity
- Determine injection profiles, design drilling patterns and determine the reservoirs response to water influx
- Illustrate water lifting/transfer from source location, filtration, chemical injection and water property monitoring/recording
- Identify high pressure, high flow rate pumping equipment as well as install and operate temporary injection facilities
- Optimize chemicals and quality control and recognize the water treatment plant operator
- Carryout water sources and treatment, reservoir management and intake structures
- Recognize the types of water problems and corrosion control, tools of diagnosis the water problems and methods of water control
- Monitor and analyze water production and illustrate water separation and treatment including layouts of field production facilities
- Identify scale, bacteria and corrosion problems and apply water treatment methods and corrosion monitoring
- Carryout chemical treatment and corrosion control and discuss the role of operations optimizations to avoid corrosion

Exclusive Smart Training Kit - H-STK®

*Participants of this course will receive the exclusive "Haward Smart Training Kit" (**H-STK®**). The **H-STK®** consists of a comprehensive set of technical content which includes **electronic version** of the course materials, sample video clips of the instructor's actual lectures & practical sessions during the course conveniently saved in a **Tablet PC**.*

Who Should Attend

This course provides a basic overview of all significant aspects and considerations of water flooding, reservoir souring and water breakthrough for water handling field operators, production engineers, petroleum engineers, reservoir engineers, chemists and operators who need to understand water problems in water flooding project.

Exam Eligibility & Structure

Exam Candidates shall have the following minimum prerequisites:-

Knowledge and experience of operations & maintenance (O&M) manuals, basic troubleshooting methodology for reservoir sourcing and water breakthrough.

Accommodation

Accommodation is not included in the course fees. However, any accommodation required can be arranged at the time of booking.

Course Certificate(s)

Internationally recognized certificates will be issued to all participants of the course who completed a minimum of 80% of the total tuition hours.

Certificate Accreditations

Certificates are accredited by the following international accreditation organizations: -

- The International Accreditors for Continuing Education and Training (IACET - USA)

Haward Technology is an Authorized Training Provider by the International Accreditors for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 2018-1 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 2018-1 Standard**.

Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking **Continuing Education Units** (CEUs) in accordance with the rules & regulations of the International Accreditors for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

Haward Technology Middle East will award **2.4 CEUs** (Continuing Education Units) or **24 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation in and completion of Haward Technology programs. A permanent record of a participant's involvement and awarding of CEU will be maintained by Haward Technology. Haward Technology will provide a copy of the participant's CEU and PDH Transcript of Records upon request.

- British Accreditation Council (BAC)

Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international centre, Haward Technology meets all of the international higher education criteria and standards set by BAC.

Course Instructor(s)

This course will be conducted by the following instructor(s). However, we have the right to change the course instructor(s) prior to the course date and inform participants accordingly:

Mr. Stan Constantino, MSc, BSc, is a **Senior Petroleum & Reservoir Engineer** with over **35 years** of **Offshore & Onshore** extensive experience within the **Oil**, **Gas & Petroleum** industries**.** His area of expertise include **Reserves & Resources**, **Reserves Estimation & Uncertainty**, **Reservoir** Characterization, **Unconventional Resource & Reserves** Evaluation, **Oil & Gas Reserves** Estimation, Methods for **Aggregation of Reserves & Resources**, **Fractured Reservoir** Classification & Evaluation**, Petrophysics & Rock** Properties**, Seismic** Technology**, Geological** Modelling, **Water Saturation**, **Crude Oil & Natural Gas** Demand, **Exploration Agreements & Financial** Modelling, **Seismic Survey** Evaluation, **Exploration Well** Identification, **Field Production** Operation, **Field Development** Evaluation, Crude Oil Marketing, **Core & Log Data** Integration, **Core Logging**, Advanced **Core & Log Integration**, **Well Logs & Core Analysis**, Advanced Petrophysics/Interpretation of **Cased Hole Logs**, **Cased Hole Formation Evaluation**, **Cased Hole Formation** Evaluation, **Cased Hole Evaluation**, **Cased-Hole Logging**, Applied **Production Logging & Cased Hole & Production Log** Evaluation, **Cased Hole Logging & Formation** Evaluation, Open & Cased Hole Logging, Screening of Oil Reservoirs for **Enhanced Oil Recovery**, **Enhanced Oil Recovery**, **Enhanced Oil Recovery** Techniques, **Petroleum Economic** Analysis, **Oil Industry** Orientation, **Oil Production & Refining**, **Crude Oil Market**, **Global Oil Supply & Demand**, **Global Oil Reserves**, **Crude Oil** Types & Specifications, **Oil Processing**, **Oil Transportation-Methods**, **Oil & Gas** Exploration and Methods, **Oil & Gas** Extraction, Technology Usage in Industrial Security; **Upstream**, **Midstream** & **Downstream Operations**; **Oil Reservoir** Evaluation & Estimation, **Oil Supply & Demand**, **Oil Contracts**, **Government Legislation & Oil Contractual Agreements**, **Oil Projects** & Their Feasibility (revenue and profitability), **Water Flooding**, **Reservoir** Souring & Water Breakthrough, **Reservoir Performance** Using Classical Methods, **Fractured Reservoir** Evaluation & Management, **Reservoir Surveillance** & Management, **Reservoir Engineering** & Simulation, **Reservoir Monitoring**, **Pressure Transient** Testing & **Reservoir** Performance Evaluation, **Reservoir** Characterization, **Reservoir** Engineering Applications with ESP and Heavy Oil, **Reservoir** Volumetrics, Water Drive Reservoir, **Reserve** Evaluation, Rock & Fluid Properties, Fluid Flow Mechanics, PVT Analysis, Material Balance, Darcy's Law & Applications, Radial Flow, **Gas Well** Testing, Natural Water Influx, EOR Methods, Directional Drilling, **Drilling** Production & Operations, Field Development & Production of Oil & Gas, **Wireline Logging**, **Mud Logging**, **Cased Hole Logging**, **Production Logging**, **Slick Line**, **Coil Tubing**, Exploration Wells Evaluation, **Horizontal Wells**, **Well Surveillance**, **Well Testing**, **Design & Analysis**, **Well Testing & Oil Well Performance**, **Well Log Interpretation** (**WLI**), **Formation Evaluation**, **Well Workover Supervision**, **Pressure Transient Analysis** and **Petrophysical Log Analysis**. Currently, he is the **CEO** & **Managing Director** of **Geo Resources Technology** wherein he is responsible in managing the services and providing technical supports to underground energy related projects concerning **field development**, **production**, **drilling**, **reservoir engineering** and **simulation**.

Throughout his long career life, Mr. Stan has worked for many international companies such as the **Kavala Oil**, **North Aegean Petroleum Company** and **Texaco Inc.**, as the **Managing Director**, **Operations Manager**, **Technical Trainer**, **Training Consultant**, **Petroleum Engineering & Exploration Department Head**, **Assistant Chief Petroleum Engineer**, **Reservoir Engineer, Resident Petroleum Engineer**, **Senior Petroleum Engineer** and **Petroleum Engineer** wherein he has been managing the evaluation of exploration wells, reservoir simulation, development training, production monitoring, wireline logging and well testing including selection and field application of well completion methods.

Mr. Stan has a **Master's** degree in **Petroleum Engineering** and a **Bachelor's** degree in **Geology** from the **New Mexico Institute of Mining & Technology** (**USA**) and from the **Aristotelian University** (**Greece**) respectively. Further, he is a **Certified Instructor/Trainer**, a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership of Management (ILM**) and a member of the Society of Petroleum Engineers, USA (**SPE**), Society of Well Log Professional Analysts, USA (**SPWLA**) and European Association of Petroleum Geoscientists & Engineers (**EAGE**). Moreover, Mr. Stan published numerous scientific and technical papers and delivered various trainings, courses and workshops worldwide.

Course Fee

US$ 6,750 per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day

Training Methodology

All our Courses are including **Hands-on Practical Sessions** using equipment, State-of-the-Art Simulators, Drawings, Case Studies, Videos and Exercises. The courses include the following training methodologies as a percentage of the total tuition hours: -

30% Lectures
20% Practical Workshops & Work Presentations
30% Hands-on Practical Exercises & Case Studies
20% Simulators (Hardware & Software) & Videos

In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.

Course Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the course for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1 ***Monday 09th of December 2024***

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0900	***Basic Concepts of Reservoir Souring & Water Breakthrough***
0900 – 0930	***Identification & Definition of Reservoir Souring & Water Breakthrough***
0930 – 0945	*Break*
0945 – 1030	***What is a "Water Flood" & How does it Work?***
1030 - 1100	***What Types of Properties Make Better Candidates?***
1100 - 1130	***How does the Water Flood Work***
1130 – 1200	***Applying Operational Trouble Shooting Techniques to Arrive to the Cause & to Eliminate it Through a Solution Development***
1200 - 1230	***Process & Equipment Problems Including Past Problems Associated with Start Up, Shut Down, ESD & Standard Non-compliance***
1230 – 1245	*Break*
1245 – 1315	***Prolonged Feed Specification, Sea Water & Effluent Water Quality & Chemical Dosage Problems***
1315 – 1345	***Pressure Management & Problems***
1345 - 1420	***Water Flood Example***
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2 ***Tuesday 10th of December 2024***

0730 – 0830	***Factors Affecting Waterflood Success***
0830 – 0930	***Types of Oil Reservoirs More Favorable for Water Flood***
0930 – 0945	*Break*
0945 – 1030	***Integrity Management in Water Injection Wells***
1030 - 1100	***Real Case Study***

1100 - 1130	***Water Flood Plant Injection Water Quality***
1130 – 1200	***Water Flood Plant Chemical Treatment***
1200 - 1230	***Annulus Pressure Management***
1230 – 1245	*Break*
1245 – 1315	***Water Injection Problems***

1315 – 1345	***The Injection Well Integrity***
1345 - 1400	***Determining Injection Profiles***
1400 – 1420	***Designing Drilling Patterns***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3 ***Wednesday 11th of December 2024***

0730 – 0830	***Determining the Reservoirs Response to Water Influx***
0830 – 0930	***Water Lifting/Transfer from Source Location***
0930 – 0945	*Break*
0945 – 1030	***Filtration & Chemical Injection***
1030 - 1100	***Water Property Monitoring/Recording***
1100 - 1130	***High Pressure, High Flow Rate Pumping Equipment***
1130 – 1200	***Installation & Operation of Temporary Injection Facilities***
1200 - 1230	***Optimization of Chemicals & Quality Control***
1230 – 1245	*Break*
1245 – 1330	***The Water Treatment Plant Operator***
1300 – 1420	***Water Sources & Treatment***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4 ***Thursday 12th of December 2024***

0730 – 0830	***Reservoir Management & Intake Structures***
0830 – 0930	***Types of Water Problems & Corrosion Control***
0930 – 0945	*Break*
0945 – 1030	***Tools of Diagnosis the Water Problems***
1030 - 1100	***Methods of Water Control***
1100 - 1130	***Monitoring & Analysis the Water Production***
1130 – 1200	***Water Separation & Treatment***
1200 – 1230	***Layouts of Field Production Facilities***
1230 – 1245	*Break*
1215 – 1245	***Scale, Bacteria & Corrosion Problems***
1245 – 1315	***Water Treatment Methods & Corrosion Monitoring***
1315 – 1330	***Chemical Treatment & Corrosion Control***
1330 - 1345	***The Role of Operations Optimizations to Avoid Corrosion***
1345 – 1400	***Course Conclusion***
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Practical Sessions

This practical and highly-interactive course includes the real-life case studies and exercises:-

Course Coordinator

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