Sand Control and Mitigation

Implementing Theoretical and Laboratory knowledge to Enhance Sand Control Experience

JW Marriott Hotel, Kuala Lumpur, Malaysia • 26th - 28th July 2010

Capitalise on the Expert Knowledge to Gain Maximum Value on these Vital Issues:

- DETERMINE causes of sand production
- LEARN basic rock mechanics related to sand control
- GAIN a theoretical background on establishing sandstone failure criteria
- DEVELOP your knowledge on sand-free production rate selection
- SELECT the best sand control method
- OPTIMIZE recent sand control and sand management methods
- CITE practical examples on sand control issues
- FIND out about case histories in sand production

Course Facilitator:

Musaed N. J. Al-Awad, Ph.D., Professor and Head of Petroleum and Natural Gas Engineering Department, King Saud University, Riyadh, Saudi Arabia

UNI training courses are thoroughly researched and carefully structured to provide practical and exclusive training applicable to your organisation. Benefits include:
- Thorough and customised programmes to address current market concerns
- Illustrations of real life case studies
- Comprehensive course documentation
- Strictly limited numbers

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Workshop Overview

Participants at the end of this course will be able to have a well rounded knowledge of the causes that make wells to sand, while you learn the various methods of sand control. He will be familiar with basic rock mechanics necessary for sand control applications. Additionally, the participant will be able to run laboratory tests necessary for evaluating sanding rock properties as vital input parameters for most sand control techniques. Finally, the trainers will calculate and solve practical examples. The 1st day will focus on rock mechanics testing related to sand production issues. The 2nd day will be devoted to sand production from intact sandstone formations. The 3rd day will focus on sand control in unconsolidated sand formations.

### DAY 1 | 26th July 2010

#### ROCK TESTING BACKGROUND RELATED TO SAND PRODUCTION

**Morning Session 1**
- Introduction to Oil and Gas Industry
- Reservoir Rock Types and Properties
  - Unconsolidated sand
  - Weak to Moderate Strong Sandstone
  - Others

**Afternoon Session 1**
- Rock Failure Criteria
- Discrete and Multi-State Triaxial Compression Test
- Rock Elastic and Frictional Properties Measurement

### DAY 2 | 27th July 2010

#### SAND PRODUCTION IN INTACT SANDSTONE FORMATIONS

**Morning Session 1**
- Application of Rock Mechanics in Petroleum Engineering Practices
- Causes and effects of sand production

**Afternoon Session 1**
- Yield-Zone Theory
- Sanding Capability Prediction Approach
- Typical Sand Control Laboratory Set-Up
- Sand and Sandstone Samples Demonstration

### DAY 3 | 28th July 2010

#### SAND PRODUCTION IN INTACT SANDSTONE FORMATIONS

**Morning Session 1**
- Sand Downhole Control Concept:
  - Completion Techniques in Unstable Formations
  - Chemical Methods
  - Well and Perforations Orientation
  - Downhole Emulsification

**Afternoon Session 1**
- Sand Surface Management Concept:
  - Accumulation, Cleaning and Disposal
  - Sand Production Monitoring
  - Case Studies

**Morning Session 2**
- Linear-Poroelastice Solution for Stresses around Circular Boreholes (Kirch Solution)
- Coupled Darcy-Kirch Solution for Sand-free Production Rate Prediction

**Afternoon Session 2**
- Tutorial on Calculation of:
  - Production Induced Yield-Zone around the Productive Zone
  - Calculation of the amount of Movable Sand

**Review and Conclusions**
- Multiple Choice Assessment
About Your Course Facilitator

Professor Musaed N. J. Al-Awad, Ph.D., is the chairman of Petroleum and Natural Gas Engineering, King Saud University, Riyadh, Saudi Arabia. He published more than seventy articles in scientific journals and conferences proceedings and conducted numerous research projects. Most of them are directly related to petroleum related rock mechanics (sand control issues, wellbore stability analysis, permeability-Stress relationship, and shale characterization), and oil well drilling engineering (drilling fluids characterization, hard set cement characterization, high angle and horizontal well orientation analysis). He is the author of "Petroleum and Natural Gas Engineering Overview for Non-Specialists". Some of those related to sand production include:


Some of his projects and practical experience include:


Omar A. Almisned, Abdulrahman A. AlQuraishi, and Musaed N. J. Al-Awad: “Effect of In-Situ Stresses and Heterogeneities on Relative Permeability of Some Saudi Reservoirs.”

Musaed N. J. Al-Awad, and, Abdulrahman A. AlQuraishi: "Developing a New Filter to Prevent Sand Production from Unconsolidated Sandstone Oil & Gas Reservoirs."

Why you cannot miss this event

When developing a sandstone oil or gas reservoir, a prediction of sand production is required to evaluate the necessity of sand control. Sand prediction technology also assists in selecting the economically most attractive sand control techniques.

This course will enable participants to understand the key factors that need to be accounted for when managing the risk of sand production and how these are integrated into developing an effective and economical sand control process.

Program Schedule

(Day 1 - Day 3)

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>08:30</td>
<td>Registration</td>
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<tr>
<td>09:00</td>
<td>Morning Session Begins</td>
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<tr>
<td>10:40 - 11:00</td>
<td>Refreshments &amp; Networking Break</td>
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<tr>
<td>12:45</td>
<td>Luncheon</td>
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<tr>
<td>14:00</td>
<td>Afternoon Session begins</td>
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<tr>
<td>15:30 - 15:50</td>
<td>Refreshments &amp; Networking Break</td>
</tr>
<tr>
<td>17:00</td>
<td>Course Ends</td>
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</tbody>
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Who Should Attend

This course is suitable for intermediate level petroleum engineers, geologists, technologists and field personnel working in the oil and gas industry with a technical or operational interest in wells that produce sand.

In-House Training

Cost effective In-house courses, tailored specifically to your organisation’s needs, can be arranged at your preferred location and time. If you would like to discuss further, please contact our In-house division at iht@unistrategic.com.

PRE-COURSE QUESTIONNAIRE

To ensure that you gain maximum value from this course, a detailed questionnaire will be forwarded to you upon registration to establish your exact training needs and issues of concern. Your completed questionnaire will be analysed by the course trainer prior to the event and addressed during the event. You will receive a comprehensive set of course documentation to enable you to digest the subject matter in your own time.