Formation Damage
Prevention and Treatments

Learn the latest techniques of prevention and treatments for formation damage
08th June 2015 - 12th June 2015 at Kuala Lumpur, Malaysia

PetroSync Distinguished Instructor:
MICHAEL ETUHOKO, P.Eng., PMP
President & Founder, Protekz Inc Canada

- Over 22 years of engineering, operations, and management experience in Completion, Workover & Well Services, and Drilling
- Highly sought after Consultant, President & Founder of Protekz Inc Canada, an independent well and production engineering consultancy
- Leads major completion and workover projects with companies such as Shell Canada, KNOC, KPO etc in North America, Europe, Africa, Central Asia, & Far East Asia
- Authored and presented SPE Papers at the SPE Asia Pacific Oil & Gas Conference (Australia, 2004) & SPE Annual Technical Conference & Exhibition (Texas USA, 2004)

Course Objectives
- UNDERSTAND the effect of formation damage on revenue to the operator
- UNDERSTAND the mechanism of formation damage
- LEARN how to select the best fluid at every phase of the well development
- LEARN the ways and steps how to diagnose formation damage problems
- GAIN the praticals of best treatment to a sandstone and carbonate reservoir
- LEARN how to stimulate tight reservoir with low porosity, low permeability and high permeability reservoir

Specially designed for:
The course is designed for, but not limited to Completion Engineers, Workover Engineers, Production Engineers, and those who are involved with well completions, workovers, well interventions, and production.

- Completion Engineer
- Workover Engineer
- Well Services / Intervention Engineer
- Production Engineer
- Drilling Engineer
- Well Site Engineer

Supported by
The purpose of this 5-day course is to provide attendees with adequate knowledge in formation damage prevention and treatments. The course will take participants through the types and mechanics of formation damage, and their preventions and treatments. This course will educate participants on how to avoid plugging and how to restore wells with plugging problems in the perforations or formation face. Beyond taking steps to eliminate severe permeability reduction in the near wellbore area, the next step is to obtain the best communication of the wellbore with the virgin formation. Therefore, fluids selection is critical as damage to the reservoir can result in impaired production and substantial loss of revenue to the Operator. This course has been designed to cover the laboratory techniques involved in formation damage testing and different well stimulation techniques to achieve the best reservoir-wellbore communications.

In this course, the causes and consequences of sand production will be discussed, followed by the prediction measures to decide or delay sand control in oil and gas project development. All the types of sandface completions and emerging technologies available in the industry today to prevent sand production and to boost well productivity results will be discussed.

### Course Content

**Day One: Formation Damage**

**Course Introduction & Overview**

Formation Damage:
- Types of formation damage
- Classification of Formation damage by process
- Sources of formation damage
- Skin and impact on well productivity
- Formation damage laboratory tests (return permeability test, formation initiation pressure test, cake lift off test, etc)
- Formation damage from drilling mud / processes
- Formation damage from perforations
- Formation damage from Completion and workover fluid
- Formation damage from oil and gas production activities
- Formation damage from scales
- Formation damage from organic deposits
- Formation damage from Wettability changes
- Formation damage from Acid stimulation
- Formation damage from Injection (water injection, CO2 injection, polymer flooding, steam flooding)

**Class exercise:**

- Class exercise: The objectives of the class exercise on formation damage are as follows:
  - Skin calculations
  - Productivity ratio calculations
  - Diagnoses of formation damages and proposing a treatment solution to remedy the problem etc

**Laboratory techniques:**

- Core flood test
- Formation damage test
- Screen plugging test
- Sand retention test
- Particle size distribution (PSD)
- Rheological measurements
- Compatibility tests / Emulsion stability
- Solubility Tests

**IN-HOUSE SOLUTIONS**

**SAVE COST • IMPROVE PERFORMANCE • REDUCE RISK**

PetroSync understands that in current economic climate, getting an excellent return on your training investment is critical. This training can be conducted exclusively for your organization. The training can be tailored to meet your specific needs at your preferred location and time. We will meet you anywhere around the globe.

If you would like to know more about this program, please contact us on +65 6415 4500 or email general@petrosync.com
Day Two: Stimulation of Sandstone Reservoir

Stimulation of Sandstone reservoir:
- Why stimulating a Sandstone reservoir
- Sandstone reservoir description – mineralogy
- Acid formulation and lab tests e.g. acid response curve, compatibility test, return permeability test, etc
- How much overflush is required
- How to avoid fluoride precipitation in sandstone stimulation

Stimulation of Carbonate reservoir
- Why stimulating a carbonate reservoir
- Carbonate reservoir description - mineralogy
- Acid formulation and lab tests e.g. acid response curve, compatibility test, return permeability test, etc
- What is the big deal about wormholes?
- How to ensure the best acid coverage? Open hole? Cased hole?
- Acid placement in heterogeneous reservoir? Use of diverting agents
- How to ensure the best zonal coverage?
- Practical guidelines on how to select and evaluate acid treatment

Class exercise: The objectives of the class exercise on Well stimulation are as follows:
- Calculations on the effect of formation damage on well production
- Calculations on flow efficiency
- Use of production history to assess formation damage
- Stimulation well candidate selection
Class group exercises on Matrix treatment design methodology

Day Three: Fracturing Technology

Introduction to Hydraulic Fracturing
- Basic principles in fracturing
- Frac height prediction
- Frac height design
- Frac pressure prediction
- Completion design for Frac well candidates
- Perforation strategy
- Fluid selection,
- Proppant selection

Class exercise: The objectives of the class exercise on hydraulic fracturing are as follows:
- Calculations on Fold of Increase (FOI) as a screening tool to select wells for hydraulic fracturing candidate.
- Calculations to compare acid frac versus propped frac in a carbonate reservoir

Multistage Fracturing technology
- Application in open hole horizontal well using swelling packer and stimulation sleeves
- Application in cased hole vertical to deviated wells using composite plug technology
- Real life field case history from planning, design, completion installation, stimulation to clean-up
- Example from a world class carbonate reservoir
**Day Four: Modern Well Completion & Intro to Well Intervention**

**Sand Control completion overview:**
- How much of a problem is sand production?
- What are the consequences of sand production?

**Sand detection:**
- Sand monitoring
- Measuring Sand production

**Sand prediction and monitoring**
- What causes sand production?
- Types of sand failure
- How to predict sand production in new wells
- How to predict sand failure during well production

**Sand Control completion:**
- Selective perforation method
- Cased hole gravel pack
- Frack pack
- Perforating for sand control
- Frac pack completion: success of a frac pack, frac pack limitations,
- Frac pack fluids, frac pack installation and treatment procedure
- Gravel pack / Frac pack evaluation
- Sand Control field operations step
- Case histories

*Sand Control design exercise*

**Production problems**

**Scales**
- Introduction to scale
- Sources of scale deposition
- Types of scales
- Why scale forms?
- Impact of scale on well productivity
- Scale control and prevention
- Scale treatments

**Paraffin /Wax**
- Consequences on flow assurance
- Root cause of paraffin /wax problems
- Preventive solutions
- Wax removal

**Asphaltene**
- Where and why are they formed?
- Asphaltene removal?

**Hydrates**
- Impact on productivity
- Hydrate formation envelope
- Hydrate prevention

**Day Five: Well Control & Well Workover**

**Water and gas shut off**

**Problem types**
- Near wellbore flow
- Fissures to injectors
- Poor areal sweep
- High permeability layer with or without cross flow
- Gravity segregation layer
- Coning etc

**Diagnostics**
- Data collection techniques
- Water / gas shut off techniques

*Field case histories*

---

**HYBRID TRAINING SOLUTIONS**

**FOCUS TRAINING • REDUCE COST • ENHANCED RESULTS**

Over the years, there has been a growing demand for hybrid training programs. It is an excellent option to maximize your training dollar for your specific needs. We make it possible to run a program that is customized to your training requirements at a fraction of an in-house budget!

If you would like to know more about this program, please contact us on +65 6415 4500 or email general@petrosync.com
Mike operates his own consultancy firm, which provides well and production engineering services to various international oil & gas companies in Europe, North America, Africa, Central Asia, and Far East Asia. He specializes and consults for Well Completion, Workover and Well Services, Sand Control, and Formation Damage Prevention and Treatments. Before becoming a consultant, he trained and worked in Shell and Total E&P.

His Current and Recent Assignments Include the Following:
- **Lead Completions & Intervention for Karachaganak Field, Kazakhstan**
  Completion & Intervention for Field with Characteristics: Deep wells (± 6200m TVD on the average), light oil/condensate and gas, High GOR, H2S > 7%, CO2 > 6%, low porosity, low permeability and HPHT reservoir environment
- **Subsea Intervention/Workover/Completion for Korean National Oil Company**
  Diagnose and restore Donghiae 1-4P Sub-sea well back to production
- **Completions, Sand Control, & Well Testing (Deepwater Exploration Asset) for BG Nigeria**
  Responsible for “Well Completion and Testing” operations in deepwater exploration campaign
- **Well Productivity for Total E&P**
  Scales Squeeze treatment for Dunbar, Alwyn, Otter and Elgin/Franklin fields; Fracturing design and operations in HPHT wells; Sand Control in HPHT wells, Water shut-off in HPHT wells

Mike has presented for several international conferences including Offshore Technology Conference, SPE Asia Pacific Oil & Gas Conference, and SPE Annual Technical Conference Exhibition. He has also authored SPE papers on “Monobore Completion Using Interventionless Technology” and “Open Hole Multistage Fracturing Completion in Carbonate Reservoir.”

In the recent years, Mike has provided intensive trainings in well completion and workovers with different oil and gas companies. Some of these training are “Well Completion & Intervention Training (Level 1&2)” for KPO, “Sub-Sea Workover Operations Training” for KNOC, and “Deep Water Sand Control” for Total E&P International.
**Course Details**

**Title:** Formation Damage Prevention and Treatments  
**Date:** 08th - 12th June 2015  
**Location:** Kuala Lumpur, Malaysia

### INVESTMENT PACKAGES

<table>
<thead>
<tr>
<th>Investment Package</th>
<th>Deadline</th>
<th>FULL MASTERCLASS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Price</td>
<td>5 JUNE 2015</td>
<td>SGD $ 5,995</td>
</tr>
<tr>
<td>Early Bird Offer</td>
<td>8 MAY 2015</td>
<td>SGD $ 5,795</td>
</tr>
<tr>
<td>Group Discount (3 or more Delegates)</td>
<td>5 JUNE 2015</td>
<td>SGD $ 5,695</td>
</tr>
</tbody>
</table>

*Group Discount is based on Standard Price*

- To enjoy the promotion & discount offer, payment must be made before deadline
- For 7 or more delegates, please inquire for more attractive package.
- Prices include lunches, refreshments and materials. Promotion & discount cannot be combined with other promotional offers.
- Important: Please note that registration without payment will incur a SGD 200 administration fee.

### DELEGATES DETAILS

1st Delegate Name

- Direct Line Number:  
- Email:  
- Job Title:  
- Department:  
- Head of Department:  

2nd Delegate Name

- Direct Line Number:  
- Email:  
- Job Title:  
- Department:  
- Head of Department:  

3rd Delegate Name

- Direct Line Number:  
- Email:  
- Job Title:  
- Department:  
- Head of Department:  

### PAYMENT METHODS

- By Credit Card:  
  - Please debit my credit card:  
  - Card Number:  
  - Security Code:  
  - Expiry Date:  
- By Direct Transfer:  
  - Please quote invoice number(s) on remittance advice

**PAYMENT TERMS:** Payment is due in full at the time of registration. Full payment is mandatory for event attendance.

### TERMS AND CONDITIONS

**DECLARATION**

Please note that trainers and topics were confirmed at the time of publishing; however, PetroSync may necessitate substitutions, alterations or cancellations of the trainers or topics. As such, PetroSync reserves the right to change or cancel any part of its published programme due to unforeseen circumstances. Any substitutions or cancellations will be updated on our web page as soon as possible.

**DATA PROTECTION**

The information you provide will be safeguarded by PetroSync that may be used to keep you informed of relevant products and services. As an international group we may transfer your data on a global basis for the purpose indicated above. If you do not want us to share your information with other reputable companies, please tick this box.

**CANCELLATION POLICY**

You may substitute delegates at any time as long as reasonable advance notice is given to PetroSync. For any cancellation received in writing not less than fourteen (14) working days prior to the training course, you will receive credit voucher less a SGD $200 administration fee and any related bank or credit card charges.

Delegates who cancel less than fourteen (14) working days of the training course, or who do not attend the course, are liable to pay the full course fee and no refunds will be granted.

In the event that PetroSync cancels or postpones an event for any reason and that the delegate is unable or unwilling to attend in on the rescheduled date, you will receive a credit voucher for 100% of the contract fee paid. You may use this credit voucher for another PetroSync event to be mutually agreed with PetroSync, which must occur within a year from the date of postponement.

PetroSync is not responsible for any loss or damage as a result of the cancellation policy. PetroSync will assume no liability whatsoever in the event this event is cancelled, rescheduled or postponed due to any Act of God, fire, act of government or state, war, civil commotion, insurrection, embargo, industrial action, or any other reason beyond management control.

**CERTIFICATE OF ATTENDANCE**

70% attendance is required for PetroSync's Certificate of Attendance.

**DATA PROTECTION**

Please accept our apologies for mail or email that is incorrectly addressed. Please email us at registration@petrosync.com and inform us of any incorrect details. We will amend them accordingly.

**CHARGES & FEE(s)**

- For Payment by Direct Telegraphic Transfer, client has to bear both local and overseas bank charges.
- For credit card payment, there is additional 4% credit card processing fee.

All bank charges to be borne by payer. Please ensure that PetroSync Global Pte Ltd receives the full invoiced amount.

**Course Confirmation**

I agree to PetroSync's terms & conditions, payment terms and cancellation policy.

**Authorized Signature:**

**PAYMENT TERMS:** Payment is due in full at the time of registration. Full payment is mandatory for event attendance.