



PETRONAS

Produced Water Treatment and Management (Onshore and Offshore)

26 - 28 April 2021 | Virtual [UTC+8]



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EARLY BIRD DISCOUNT!



Who Should Attend

Professionals involved in:

- Asset Operations and Management
- Data Science and Analytics
- Drilling and Completions
- Field Development Planning
- Water Treatment Research and Technology
- Reservoir Engineering
- Wells Engineering
- Produced Water Reinjection
- HSE

Produced water contains a complex mixture of inorganic (dissolved salts, trace metals, suspended particles) and organic (dispersed and dissolved hydrocarbons, organic acids) compounds, and in many cases, residual chemical additives (such as scale and corrosion inhibitors) that are added into the hydrocarbon production process. These substances may have varying degrees of impact to the receiving environment and need to be treated prior to discharge into surface water or marine environment. Alternatively, treated produced water may be injected into disposal wells or into evaporation pits.

Treatment of produced water is driven by local legal requirement, technology availability and cost. As the industry looks at recovering output from mature fields and develop new fields in challenging environments, produced water management is becoming more challenging due to high water cut, presence of emulsion and significant volume of contaminants such as mercury, fine sand, and H₂S.

These challenges are driving the needs for the industry to explore new or enhanced feasible alternatives for a more cost-effective and sustainable management and disposal of produced water. This may include reduction at subsurface source by using methods such as mechanical blocking devices, water shut-off chemicals and downhole separation. Another alternative is to reuse produced water through reinjection into the reservoir, to enhance oil recovery or reuse for industrial, agricultural and recreational purposes. Digitalisation may also be optimised in allowing automation of produced water treatment, real-time or online sampling, and monitoring of produced water treatment system performance and discharge quality.

This workshop will serve as a platform for industry practitioners and subject matter experts to share and exchange knowledge on:

- Regulatory trends
- Overall produced water treatment challenges
- Aging facilities, new fields, and deepwater operation challenges
- Emerging Technologies solutions and Digitalisation
- Best practices and lessons learnt

Operators need to determine on whether the “cradle-to-cradle or cradle-to-grave” option is most suitable for each of their fields.

Session Highlights

Regulation on Produced Water Treatment and Environmental Impact

Application of Produced Water Re-injection

Field Development Plan with Produced Water Management in Mind

Produced Water Treatment from Aging Assets and Mature Fields

Managing Challenging Applications in High Contaminants and Deepwater Operations

Emerging Technologies - Solutions and Digitalisation

GROUP REGISTRATIONS AVAILABLE
Contact us at apweb@spe.org to arrange your group.

go.spe.org/21WM02W

Workshop Objectives

This workshop provides opportunities for sharing and discussing views, experience, success stories, technology, advancement, and challenges from operators, service providers, regulators, and decision makers. The programme discusses lessons learnt and value improvements generated through strategic collaborations, and innovative strategies to design for disassembly instead of for decommissioning, improve development commercial viability, and execution efficiency to sustain and prolong the field life.



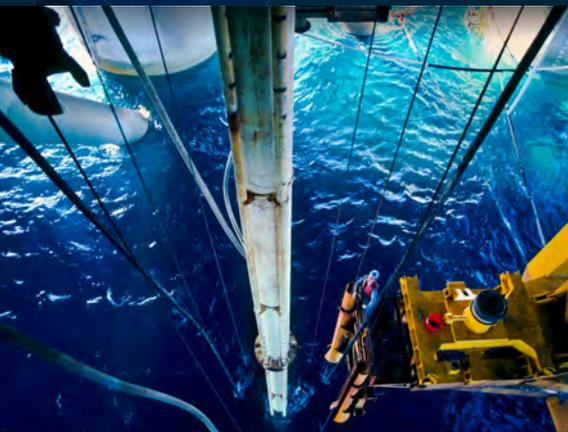
hours of peer-to-peer networking opportunities



hours of knowledge sharing and technical discussion



expert-led technical discussion topics



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Principal (Environment)
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Programme Schedule

Please Note: All times are Greenwich Mean Time (GMT) +8

Monday, 26 April 2021	
1300 - 1430 hours	Welcome Remarks and Session 1: Regulation on Produced Water Treatment and Environmental Impact
1430 - 1500 hours	Networking Break
1500 - 1630 hours	Session 2: Application of Produced Water Re-injection
1630 - 1700 hours	Networking Break
Tuesday, 27 April 2021	
1300 - 1430 hours	Session 3: Field Development Plan with Produced Water Management in Mind
1430 - 1500 hours	Networking Break
1500 - 1630 hours	Session 4: Produced Water Treatment from Aging Assets and Mature Fields
1630 - 1700 hours	Networking Break
Wednesday, 28 April 2021	
1300 - 1430 hours	Session 5: Managing Challenging Applications in High Contaminant Fields Operation
1430 - 1500 hours	Networking Break
1500 - 1630 hours	Session 6: Emerging Technologies - Solutions and Digitalisation
1630 - 1700 hours	Networking Break

Register and join the sessions at your local time:

0800 hours - Doha / Kuwait City / Manama / Riyadh
 0900 hours - Abu Dhabi / Dubai / Muscat
 1030 hours - New Delhi
 1130 hours - Yangon
 1200 hours - Bangkok / Hanoi / Jakarta

1300 hours - Bandar Seri Begawan / Beijing / Kuala Lumpur / Perth / Singapore
 1400 hours - Tokyo / Seoul
 1430 hours - Adelaide
 1500 hours - Brisbane
 1700 hours - Wellington

Technical Programme Preview

MONDAY, 26 APRIL 2021			
1300 - 1315 hours	<p>Welcome Remarks Co-Chair: Azlina Khairi, PETRONAS</p> <p>Keynote Address</p>	1430 - 1500 hours	Networking Break
1315 - 1430 hours	<p>Session 1: Regulation on Produced Water Treatment and Environmental Impact Session Chairpersons: Rohaizad Bin Mohd Norpiah, PETRONAS; Azlina Binti Khairi, PETRONAS; Zunita Binti Mahar Afandi, Malaysia Petroleum Management</p> <p>The potential harm caused by the ocean disposal of produced water to the ecology has become a major concern. Produced water is a complex mixture of dissolved and particulate organic and inorganic chemicals. The concern of the chemicals in produced water is due to their concentrations, that may be high enough to cause bioaccumulation and their toxicity. Marine organism and animals near a produced water discharge may bioaccumulate metals, phenols, and hydrocarbons from the ambient water, their food, or bottom sediments. Hence, the principal purpose of produced water related regulations is to protect the environment. While some produced water management activities are subject to regulatory standards, others are subject to operational standards set by operators or end users. In this session, we will discuss the various regulatory requirements and standards on produced water management, including discharges, that relate to the environmental impacts posed by produced water.</p>	1500 - 1630 hours	<p>Session 2: Application of Produced Water Re-injection Session Chairpersons: Siti Rohaida Mohd Shafian, PETRONAS Research Sdn Bhd; Raj Kumar Masilamoney, Petrotechnical Inspection (M) Sdn Bhd</p> <p>Produced water reinjection (PWRI) has been used for pressure maintenance during waterflood operations. It also been used as underground storage in order to minimise the impact of produced water handling at the surface.</p> <p>Poor water quality with the presence of residual hydrocarbons, inorganic materials, dissolved solids, chemicals, particulates and minerals from formation can lead to loss of injectivity and formation damage during reinjection process.</p> <p>Improved PWRI process integrate the conventional and advanced water treatment process such as treatment techniques, separation, filtration and coalescence technology to increase the water injection performance.</p>
		1630 - 1700 hours	Networking Break

TUESDAY, 27 APRIL 2021

1300 - 1430 hours **Session 3: Field Development Plan with Produced Water Management in Mind**
Session Chairpersons: Sriyanta Hadi, **PETRONAS**; Mior Zaiga Sariman, **PETRONAS**

Produced water is an inextricable part of any oil and gas production. Produced water forecast in Field Development Plan (FDP) exercises is crucial. The actual produced water volume that is away from FDP requires strategy restoration. Enforcement of more stringent environmental regulations can create an additional factor where this deviation can adversely affect the project economics.

Low oil price scenario is a challenging situation, and a detail strategy must be envisaged in FDP to address all challenges throughout the whole field life. The production forecast that includes produced water and associated contaminants is important in produced water system design and strategy. Generic unspecific content for the produced water management in the FDP is a thing of the past. A well-planned and strategic development concept in produced water management at the early stages of FDP is crucial.

1430 - 1500 hours Networking Break

1500 - 1630 hours **Session 4: Produced Water Treatment from Aging Assets and Mature Fields**
Session Chairpersons: Syarifah Noorlia Wan Bujang, **PETRONAS**; Ana Hasrinatullina Binti Basri, **PETRONAS Carigali Sdn Bhd**; Hooi Ling Lee, **Mubadala Petroleum**

Produced water is the largest waste stream in the oil and gas industry and its volume varies as fields mature along with its aging assets. The characteristics of produced water is dependent rock formations such as in Middle East and Upper Midwest of America, produced water is up to 10 times more saline than sea water while produced water in Malaysia is less saline compared to sea water.

Produced water is also a carrier for organic compounds, produced sand, sludge, naturally occurring radioactive materials (NORM) and production chemicals. Produced water characteristics and quantity also varies significantly over the lifetime of a field, and these changes are complex and site specific. This leads to a need to have customised strategies with periodic review for each field to prevent and mitigate issues related to produced water management and optimise operation and maintenance cost. This combination, along with increasingly stringent environmental regulations creates a challenge to operate safely and sustainably. Determining an optimal produced water management strategy requires a holistic techno-economic approach such as treating and disposing water at an abandoned well can minimise expenditure required for well abandonment.

1630 - 1700 hours Networking Break

WEDNESDAY, 28 APRIL 2021

1300 - 1430 hours **Session 5: Managing Challenging Applications in High Contaminant Fields Operations**
Session Chairpersons: Muhammad Muhsin Ahmad Fuad, **PETRONAS**; Idzham Fauzi M Ariff, **PETRONAS**; Elizabeth James, **SEA Hibiscus Sdn Bhd**

Presence of contaminants in reservoir production fluid including solids, acid gases, injected chemicals and organic acids can lead to produced water treatment inefficiencies and can adversely impact facilities integrity. In deepwater operations, produced water breakthrough often worsens the existing flow assurance issues for the field such as hydrates formation and slugging operation due to bulk increase in water or liquid presence in the system. Managing these issues including liquid handling and assuring discharge compliance may require extensive resources, strategic long-term planning, prudent asset maintenance program and enhanced technology solutions. This session shall outline the operational experience in these challenging applications and what effective produced water management strategies are available to mitigate their impact.

1430 - 1500 hours Networking Break

1500 - 1630 hours **Session 6: Emerging Technologies - Solutions and Digitalisation**
Session Chairpersons: Khor Siak Foo, **PTTEP**; Dr. Ming Yang, **TÜV SÜD National Engineering Laboratory**

Digital tools are increasingly used for oil and gas production to improve operations efficiency and to reduce costs. Real time measurement technology plays an important part in these tools. For produced water management and handling, produced water quality must be measured in terms of its oil or solids content regardless if the produced water is to be discharged, re-injected or re-used. Online oil-in-water measurement technology has been available for the oil and gas industry for many years. It has been predominantly used for process trending and optimisation to date. However, it is now increasingly considered for oil-in-produced water discharge reporting and for produced water treatment automation in particular for remote unmanned installations. In this session, we shall discuss the latest in using online oil-in-water measurement technologies for produced water treatment, management and their roles in a production digitalisation era.

1630 - 1700 hours Networking Break

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- b. Work in progress, new ideas, and interesting projects are sought.
- c. Resource documents may be provided as pre-reads and during the live event.

2. Workshop Deliverables

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- b. Provision of the live event sessions and presentation materials by Discussion Leaders will signify their permission for SPE to do so.

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