

## October 2021 – CSUR Technical Webinar #2

### Reducing Oilfield Produced Water Management Costs With Chemical Modelling and Databases



**OCT  
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**TECHNICAL  
WEBINAR  
SERIES**

**REDUCING OILFIELD PRODUCED WATER  
MANAGEMENT COSTS WITH CHEMICAL  
MODELLING AND DATABASES**

PRESENTED BY  
**ZEINA BAALBAKI, PH.D. CHEMICAL ENGINEERING,  
WATER TREATMENT SPECIALIST  
INTEGRATED SUSTAINABILITY**

Zeina Baalbaki (Ph.D.), a Water Treatment Specialist from Integrated Sustainability, was the keynote speaker for CSUR's final webinar for October 2021. Whether it involves storage, handling, recycling, or disposal of the water from producing wells, there are strict regulatory requirements in place that mandate field operations. As costs continue to escalate for this component of the business for the operators, our speaker elaborated on the potential available avenues that can be utilized for organizations to efficiently and cost-effectively manage their produced water volumes.

To begin the session, Zeina briefly reminded the attendees of some of the basics in assessing the produced water quality and the typical field operations for produced water. In particular, the speaker focused on the 2 most common setups: SAGD (Steam Assisted Gravity Drainage) and Frac flowback operations. In addition to the regulatory requirements, she described the cost & operational benefits of managing this task in a proactive manner. As regulations continue to become more stringent, including on the use of freshwater and disposal schemes, companies can utilize available tools and existing databases to optimize their operations.

Chemical modelling, using thermodynamic and mass balance principles, can be used to simulate the electrolytic behaviour of a given system or treatment technologies. This can aid in determining the optimal chemical dosage required to treat the produced water or alternatively, simulate the output with provided chemical dosage & treatment technology. These types of software tools can also be very useful in evaluating the compatibility of various water sources in order to avoid potential precipitate issues at surface or downhole.

Finally, the speaker reminded the audience of the vast public database that can be utilized to bridge the data gaps during the evaluation process. Together, chemical modelling and existing databases, can be powerful tools for analysts to develop effective produced water management systems that are formation & regionally specific.

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### SUMMARY

Significant water volumes are used in oil and gas production activities in Canada and globally. With decreases in freshwater volume and quality, producers are under pressure to reuse produced water in order to decrease freshwater consumption and reduce disposal volumes. In addition to promoting sustainability, these practices provide an economic advantage for many producers in Alberta and BC. However, the presence of contaminants in oilfield produced water, such as free oil, suspended solids, iron, hydrogen sulfide, polymers, hardness, and many others, could pose challenges in

reuse, disposal, or discharge applications of this water. As a result, various water treatment technologies now mitigate contaminants in order to comply with legislation, minimize safety risks, and optimize operations.

In this domain, chemical modelling serves as a time-saving and cost-effective approach for reliable water quality predictions. Chemical modelling relies on established electrolyte thermodynamic frameworks and has been used in the following applications that correspond to the various aspects of the produced water management cycle:

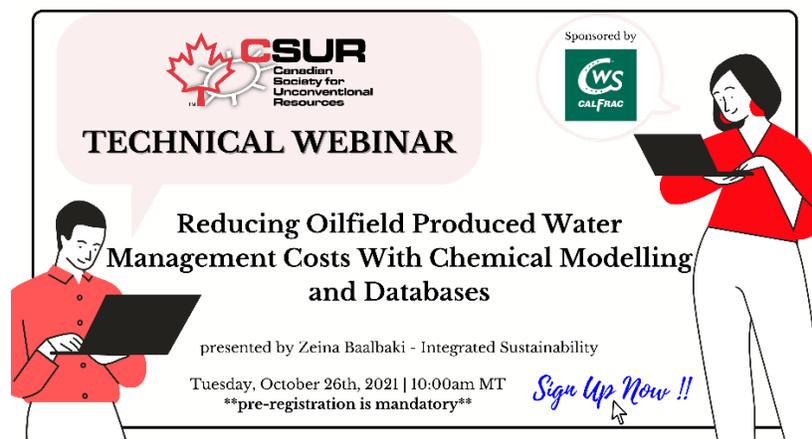
- Forecast the produced water quality in different scenarios
- Predict the fate of contaminants in various treatment technologies
- Evaluate and optimize the operation of treatment technologies
- Estimate the required chemical treatment dosages
- Evaluate compatibility in disposal wells

Besides chemical modelling, databases serve as a valuable tool to bridge data gaps and facilitate analysis in the produced water management domain. For example, water composition databases are being established by Integrated Sustainability to compile oilfield produced water quality data and categorize these according to the source of water, including recovery technique, formation and/or region. Additional examples of databases being established include water quality objectives and water treatment technology specifications. This talk will discuss how chemical models and databases have been developed and leveraged for produced water management projects in Alberta and BC.

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**PRESENTER:** *Zeina Baalbaki, Ph.D.* Chemical Engineering. Water Treatment Specialist - *Integrated Sustainability*

Zeina Baalbaki is a Water Treatment Specialist with Integrated Sustainability in Calgary, Alberta. She holds a Ph.D. degree in Chemical Engineering with a focus on monitoring and predicting the fate of micropollutants (such as pharmaceuticals and illicit drugs) in wastewater treatment systems. In the past 8 years, Zeina has worked on municipal and industrial water management projects in both research and consulting. Her work included water quality review, treatability test programs, as well as water treatment design, optimization and efficiency evaluation. She has presented at several national and international conferences, first-authors peer-reviewed publications, and has delivered university lectures. Since joining Integrated Sustainability, Zeina has brought her considerable expertise to bear on several water management projects across Canada; working with companies such as Suncor, EPFC Corp, Crew, Shell, and Velvet Energy to improve water treatment practices.



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**TECHNICAL WEBINAR**

**Reducing Oilfield Produced Water Management Costs With Chemical Modelling and Databases**

presented by Zeina Baalbaki - Integrated Sustainability

Tuesday, October 26th, 2021 | 10:00am MT  
\*\*pre-registration is mandatory\*\*

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