

July 2021 – CSUR Technical Webinar

Water Disposal into the BC Montney Fairway



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TECHNICAL WEBINAR SERIES

SEAN CURRY
BC Oil and Gas Commission

TANNIS GIBSON
Saguaro Resources

RON STEFIK
BC Oil and Gas Commission

LOGAN GRAY
BC Oil and Gas Commission

BRAD HAYES
Petrel Robertson Consulting Ltd

WATER DISPOSAL INTO THE BC MONTNEY FAIRWAY

PRESENTED BY

DR. BRAD HAYES - PETREL ROBERTSON CONSULTING LTD.
LOGAN GRAY - BC OIL AND GAS COMMISSION
RON STEFIK - BC OIL AND GAS COMMISSION
TANNIS GIBSON - SAGUARO RESOURCES
SEAN CURRY - BC OIL AND GAS COMMISSION

CSUR's 1st Technical Webinar for July 2021 focused on Water Disposal into the Montney play fairway in Northeast BC. A panel was established to address various aspects of this very important and relevant topic, especially given the significance of the Montney play and the corresponding associated water issues (use, access, recycling & disposal). The panel consisted of Dr. Brad Hayes (President, Petrel Robertson Consulting), Ron Stefik (Supervisor of Reservoir Engineering, BC Oil & Gas Commission), Logan Gray (Reservoir Engineer-in-Training, BC OGC), Tannis Gibson (Vice President of Geology & Geophysics, Saguaro Resources), and Sean Curry (Vice President, Operational Policy & Environment, BC OGC). The session was moderated by CSUR's President & CEO, Dan Allan.

The objective of the session was to discuss and bring to the forefront various facets of this topic, including: geological assessment & recommendations of potential disposal zones in NE BC, to provide the regulatory framework for disposal & future capacity (together with a quick peek at BC OGC's excel-based forecasting & injectivity tool), and to provide an update on water recycling & stewardship initiative from the Montney Water Operators Group (MWOOG) & BC OGC. The impetus of this session was based on a study initiated by Geoscience BC in 2019 and the province's proactive approach to have solutions in place for a resource (water) that is critical for both the people of BC and the various industries that operate in the province (including an active and vibrant energy industry). This

approach is vastly in contrast to what's being reported in other basins around North America where it is being said that activity could be capped due to water shortages and / or flowback and produced water handling, storage and disposal capacity issues & concerns. A prime example would be the Permian Basin in Texas where there is no shortage of potential drill locations; however, the availability of water for operations is limited and post-completion logistics of flowback & produced water is severely constrained.

As activity into the Montney continues in the province (99% of wells now target the Montney), information presented during the session suggested that significant disposal capacity into various zones is available throughout the Montney corridor in NE BC. However, as Dr. Hayes pointed out, there are pockets, such as SW Heritage & Western North Montney, that are somewhat challenged for disposal capacity. There are also critically stressed faults throughout the fairway that would limit deep disposal in order to mitigate seismic activity. It was also recommended by the panel that more purpose drilled disposal wells were needed to maintain future capacity with an ever-increasing inventory of

Montney producers coming on stream. Additional disposal capacity is necessary even though technology has allowed for lower fresh water usage and data indicates that over 50% of all produced & flowback water is now being recycled, as noted by Tannis Gibson, who was representing the MWOG consortium. Finally, as mentioned by Sean Curry, there has been excellent progress made over the past number of years via collaborative initiatives like the MWOG and with continuous & open dialogue among the various stakeholders (Energy Industry, Regulators, Provincial Government, Indigenous Groups, Technical Associations, Public Consultations & Forums, etc.).

Summary

Presentation #1

Wastewater Disposal in the Montney Play Fairway of NE British Columbia – Assessment and Recommendations

Brad J. Hayes¹, Howard Anderson¹, Mark Cooper², Pat McLellan³, Ben Rostron⁴, Jason Clarke¹
1Petrel Robertson Consulting Ltd., 2Sherwood Geoconsulting Ltd., 3McLellan Energy Advisors, 4University of Alberta

Flowback from hydraulic fracturing and subsequent hydrocarbon production brings water to the surface that contains spent frac fluids and saline formation fluids. These cannot be allowed to contaminate fresh surface water or shallow groundwater zones, so provincial regulations dictate safe disposal in deep formations far below potable groundwater.

As tight Montney gas and liquids production ramps up in northeastern British Columbia, operators have developed a variety of strategies to deal with flowback and produced waters. Recycling frac flowback fluids reduces consumption of potable surface and shallow groundwater, and also minimizes disposal volumes. Substantial deep disposal must still take place, however, particularly when drilling and completion schedules do not allow timely re-use of available flowback and produced fluids.

Robust controls are in place to ensure that as disposal zones reach capacity, they do not breach reservoir containment, with potentially negative consequences such as water contamination or induced seismicity. New disposal locations must be identified and located to maximize their future capacity while minimizing risks.

Our final report has been submitted to Geoscience BC, highlighting the current situation for wastewater disposal in the Montney fairway of NEBC and mapping out future disposal capacity and challenges. We will review some key points today.

Presented by **Dr. Brad Hayes**, PhD, P.Geol, President - Petrel Robertson Consulting Ltd. and CSUR Outreach Director.

Presentation #2

Regulatory Disposal Well Dashboard & Capacity Forecasting

Finding and operating disposal capacity in the BC Montney fairway is challenging and requires resource science formerly only applied to production pools. Also, public interest and concern with disposal injection is ever increasing. Improved regulatory requirements now provide the ability to ensure transparent operational compliance for public confidence, and the ability to predict the remaining disposal capacity lifespan of operating disposal wells for industry management decisions.

Presented by **Logan Gray** E.I.T., reservoir engineer-in-training - British Columbia Oil and Gas Commission and **Ron Stefik**, P.L.Eng., Supervisor of Reservoir Engineering - British Columbia Oil and Gas Commission.

Presentation #3

BC Operators – Setting the Industry Standard for Water Recycling.

BC Montney Operators have been tracking their water usage as a group since 2016. The group breaks the water source into the following categories,

1. Recycled Water which is comprised of water from Plants or water produced at the well head as well as frac flowback
2. Saline Water which is comprised of Licensed saline subsurface source wells
3. Fresh water which is comprised of Licensed Surface water such as pits, rivers and lakes; Licensed subsurface water which are source wells and fresh water sources, sourced from private land owners
4. Other water which is grey water from the Town of Dawson Creek and water from mines

Since 2016, NEBC oil and gas water re-use has varied above/below 70%, and the Oil and Gas industry has been using greater than 50% Recycled, Saline or Other water for completions operations. This is the highest recycling rate in Canada, with many operators using up to 99% of their produced water, meaning very little goes to disposal.

This high rate of recycling has resulted in less than 4% of allowable fresh water being drawn from Short Term Water Approval and 10% of allowable fresh water being drawn from Water Licences.

The success of this recycling is due to operators and the BC Oil and Gas Commission both striving to reduce the amount of fresh water used in completion operations. You can't recycle water if you can't store it and move it, and the Oil and Gas Commission has enabled operators in BC to do both, with strict safety and environmental regulations in effect.

Presented by **Tannis Gibson**, VP, Geology & Geophysics - Saguaro Resources and **Sean Curry**, VP, Operational Policy and Environment - BC Oil and Gas Commission.

PRESENTERS:

Dr. Brad Hayes

Petrel Robertson Consulting Ltd.

Brad Hayes is President of Petrel Robertson Consulting Ltd., a geoscience consulting firm applying subsurface skills to energy technologies in conventional and unconventional oil and gas, non-petroleum resource exploration, energy storage and geothermal applications.

Brad earned a PhD in geology from the University of Alberta, and a BSc from the University of Toronto. He joined PRCL in 1996 after 15 years of exploration experience in the petroleum industry. Brad is a Director for the Canadian Society for Unconventional Resources (CSUR), and an active member and Past-President of the Canadian Society of Petroleum Geologists (CSPG). He recently completed a six-year term as Councillor for the Association of Professional Engineers and Geoscientists of Alberta (APEGA), and is also registered as a Professional Geoscientist in BC and Nova Scotia.

Brad is an active Adjunct Professor in the University of Alberta Department of Earth and Atmospheric Sciences, and a sessional lecturer at Mount Royal University. With CSUR, Brad manages the Outreach Program, sharing accurate, unbiased scientific information related to unconventional oil and gas development.

Logan Gray

BC Oil and Gas Commission

Logan Gray E.I.T. is a reservoir engineer-in-training at the British Columbia Oil and Gas Commission. He has been at the Commission for almost 2 years following his graduation from the University of Calgary, including an exploitation engineering internship with Crescent Point Energy. Logan's work at the Commission has largely been focused on the regulatory and technical aspects of disposal wells.

Ron Stefik

BC Oil and Gas Commission

Ron Stefik, P.L.Eng. is the Supervisor of Reservoir Engineering at the British Columbia Oil and Gas Commission, having risen through the positions in that department. Ron has been with the Commission since its beginning in 1998, and previously with the BC Ministry of Energy since 1989. Prior to that, Ron worked in the petroleum service sector and minerals exploration.

Tannis Gibson

Saguaro Resources

Tannis is Vice President, Geology & Geophysics of Saguaro Resources. Prior to cofounding Saguaro Resources, Tannis held many diversified technical and managerial positions including Manager of Exploration and Bakken Business Unit Manager at Petrobakken Energy, Vice President Geosciences at Seven Generations Energy, Manager / Vice President Geology and Geophysics at North American Oil Sands / Statoil and Senior Geologist at Husky Energy.

Tannis is a Professional Geologist with APEGA and holds a Bachelor of Science Specialist Degree in Geology from Brandon University.

Tannis will be speaking on behalf of the Montney Water Operators Group of B.C.

Sean Curry

BC Oil and Gas Commission

Sean graduated with a BSc in Forestry from UBC. He has over 30 years of experience developing and implementing innovative solutions to complex and sensitive environmental and resource management problems, primarily in the Western Canadian forest industry, and more recently for the BC Oil and Gas Commission. In his current role, Sean oversees a large and diverse team that provides environmental and geological subject matter expertise throughout the oil and gas activity lifecycle to ensure the petroleum resource is developed responsibly and to continually improve environmental outcomes. In addition, Sean oversees the development of operational policy in the areas of environment,



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company audits, and aboriginal liaison. Sean and his partner Diane live in Victoria B.C., have a large and growing blended family, six bicycles, two sea kayaks, a large hound dog and thoroughly enjoy the West Coast life style.

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TECHNICAL WEBINAR

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Tuesday, July 6th, 2021 | 10:00am MT
****pre-registration is mandatory****

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