



## Taming the Disposal Cost Dragon

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### Summary

Disposal of flowback water is a major cost in developing a well to production. Disposal of produced water from a developed field is an ongoing and aggregating expense that significantly increases OPEX. For the exploration phase, new technologies and approaches are replacing disposal wells full stop. For fully developed fields, we see the cost center of waste water pivoting to becoming a commodity that is re-used again and again.

### Introduction

With current disposal costs of flowback or produced water weighing heavily on CAPEX/OPEX, we believe there are significant opportunities emerging to reduce wastewater disposal cost, and risk, in the Western Canadian Sedimentary Basin (the Basin). The key challenges we have identified are:

- Formation over pressuring (short and long term) as more and more disposal wells are developed
- Wellbore and formation plugging that require expensive maintenance and often additional wells
- Geological and regulatory risks of advancing additional disposal wells at scale

### Theory and/or Method

The central premise of this paper is that the value of one unit of flowback or produced water is actually its substitution value. If we look at the full cost of replacing a m<sup>3</sup> of frac fluid for future completions, we can say Conveyance + Disposal + Make-up water sourcing + Make-up water conveyance = Total Value. If producers valued this at a nominal \$20/m<sup>3</sup> (amortized CAPEX/cost of capital in), there has been more than >\$400mm of water value eroded from Duvernay-Kaybob producers alone since 2013.

### Examples

Re-use is both technically feasible and economic, while conversely the Basin's competitiveness is falling behind as disposal costs multiply. Successful re-use strategies tested in B.C. and the Permian are set to accelerate adoption of recycling frac fluids as the scale of announced development plans cast serious doubt on the very feasibility of doubling and tripling disposal volumes.

### Conclusions

There are several opportunities for producers to not only reduce or eliminate produced water as a cost centre, but to also in effect create a revenue centre through either re-use (eliminating the replacement

cost) or remarketing to smaller players in the area, especially when they find themselves with excess water after their completion schedule has concluded. This paper outlines sequentially the puzzle pieces needed to successfully re-use frac fluids:

- Flowback vs Produced water storage at scale
- Transitioning from trucking to pipe
- “Goldilocks” water treatment; a process for selecting the right re-use approaches and treatment technologies
- New technologies that eliminate disposal wells, including being able to release to environment