

Water Disposal Well Regulation and Capacity Forecasting in British Columbia

*Logan Gray, EIT, Reservoir Engineer
British Columbia Oil and Gas Commission*

Summary

Disposal of produced water (including flowback from hydraulic fracturing operations) is a key part of the development of petroleum and natural gas resources. The availability of water disposal factors into economics and development decisions. The benefits of disposal wells come with several risks, largely environmental. To address these risks and the ever-increasing public concern with disposal injection, operators and the BC Oil and Gas Commission (the Commission) perform thorough reviews of the wellbore integrity and disposal formation; sufficient integrity of both the wellbore and geological formation are required to ensure safe and responsible disposal of fluids. Additionally, disposal well approvals granted by the Commission also impose several conditions that promote good operation of the well and on-going monitoring of risks. Conditions may vary from well to well depending on the individual circumstances, but typical conditions include the monitoring of the wellbore condition, injecting below fracture pressure of the formation, and annual measurement of the stabilized reservoir pressure to ensure that it does not exceed the maximum approved storage pressure.

The quality and performance of disposal wells depends on multiple factors, primarily the geology but also operating conditions. Injection of disposal fluids incompatible with reservoir fluids or injection of other materials or scale that damage the reservoir by blocking pore throats can significantly reduce the life and capacity of a disposal well.

Finding and effectively utilizing disposal capacity in the BC Montney fairway is challenging and requires resource science formerly only applied to production pools. Recent improved regulatory requirements, namely the collection of stabilized reservoir pressure, provide the ability to predict the remaining disposal capacity lifespan of operating disposal wells for industry management decisions. The Commission has compiled all disposal data and developed a simple, automated program (figure 1) that forecasts the remaining capacity of each disposal well in the province. These forecasts are approximations that will continue to improve with future data submissions. The results of the initial forecasting confirms that significant additional disposal wells are needed to continue development in the BC Montney fairway.

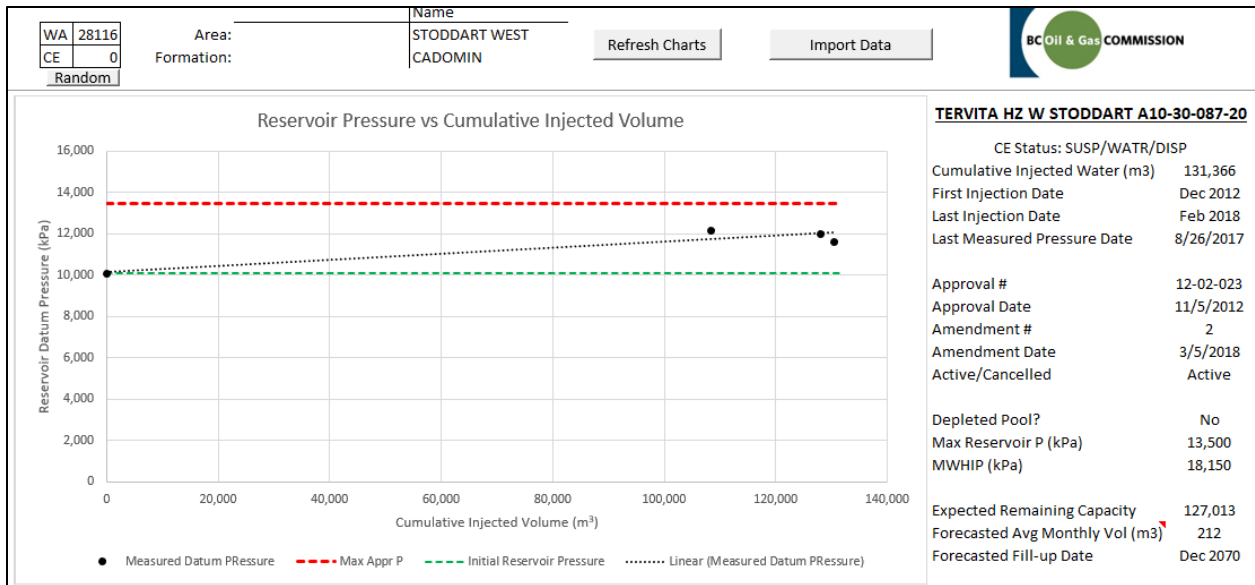


Figure 1: Commission "Disposal Dashboard" Forecasting Tool

Acknowledgements

BCOGC Reservoir Engineering Department; disposal team
Ron Stefik, Michelle Gaucher, Kathryn Archibald