

February 14, 2020

8120-2010-32640-02

Noel Millions, PSL
Sr. Advisor, CAN Government Relations
Ovintiv Canada ULC
500 Centre Street SE, PO Box 2850
Calgary, Alberta T2P 2S5

Dear Mr. Millions,

**RE: PRODUCED WATER DISPOSAL WELLS
SUNRISE FIELD – PADDY-CADOTTE FORMATION**

The Commission has reviewed the application from Ovintiv Canada ULC (Ovintiv), dated October 7th, 2019, requesting an increase in the maximum reservoir storage pressure in the Paddy-Cadotte formation for four disposal wells in the Sunrise field (listed in Table 1), and modification to the reservoir pressure testing requirement for individual wells with consideration to measurements from eight proximal water source wells completed in the same formation. Ovintiv's formal application followed a presentation to Commission staff at our offices on September 12, 2019. The application is in response to Commission correspondence to Ovintiv dated July 4, 2019, which previously noted reservoir pressures approaching limit values in the associated Section 75 Special Project approval Orders. A draft of this letter was sent to Ovintiv on February 5th, 2020 to which Ovintiv replied via email on February 11th, 2020. Ovintiv affirmed a commitment to continued rigorous monitoring of the reservoir. This additional data gathering and information sharing will provide understanding for appropriate reservoir and well management.

Paddy Cadotte Reservoir Pressure Limit Subject Area

OGAA Section 75 Special Project approval orders (approval orders) for produced water disposal wells operating in the subject area and formation each contain a condition which limits the final reservoir storage pressure to a value which is equal to 120% of initial reservoir pressure, corrected to the well datum depth. This standard policy is based on an evaluation of maximum discovery pressures in conventional reservoirs, compared to normal hydrostatic pressure, for geologic containment of fluid.

The Paddy-Cadotte formation in this area was initially hydrostatically under-pressured for depth. Evaluation of geology, structure and potential migration pathways, based on well data and mapping, indicates formation integrity for fluid containment based on competent cap rock, formation elevations and fluid dispersion, and well penetrations.

With consideration of the Commission's review of available data and testing, and the points noted above, the Commission is amending the maximum reservoir pressure limit for disposal wells in the Paddy-Cadotte over the subject area to be equivalent to a value equal to a hydrostatic column of water to surface elevation, subject to the monitoring requirements noted below. The following Table 1 contains the present limit values and the new maximum limits. Note that a 60-day pressure (P60) value must be used for the comparison to the maximum reservoir pressure, a pressure extrapolated to infinite time is not appropriate. See the *Water Service Wells – Summary Information* document for details (<https://www.bcogc.ca/node/5997/download>)

PRODUCED WATER DISPOSAL WELLS, SUNRISE FIELD – PADDY-CADOTTE FORMATION

Table 1 Modified Reservoir Pressure (P60) Limit Values

Well Permit #	Well Name	Present (kPaa)	Amended (kPaa)
29140	OVV CRP HZ Sunrise B13-33-78-17	6,060	8,350
29739	OVV CRP HZ Sunrise A1-27-78-17	6,900	8,750
34056	OVV HZ Sunrise D13-1-79-17	6,110	8,300
10677	OVV CRP HZ Sunrise 14-35-78-17	6,290	8,475

Reservoir Pressure Testing and Monitoring Requirements

Disposal well order amendments will include a reservoir pressure test frequency requirement of a minimum of once every two years for each well, from the current requirement for annual testing prescribed under Section 73 of the Drilling and Production Regulation.

This amendment is in consideration of and conditional upon the ongoing reservoir pressure monitoring and reporting from Oviniv deep water source wells, listed in Table 2, completed in this same formation in pressure communication proximity with the disposal wells listed in Table 1. Collective data from the disposal and source wells will provide surveillance of the average reservoir storage pressure.

Where possible, reservoir pressure tests should be scheduled to coincide with inactive periods of disposal or sourcing from wells in the area to minimize interference effects and obtain a representative pressure value for the location.

Water Source Well Reservoir Pressure Testing and Chemical Analysis

Oviniv has indicated that the water source wells listed in Table 2 are equipped with bottom-hole pressure gauges with surface reading that enable continuous reservoir pressure measurement. The status of these wells is “gas production”, despite the primary purpose being “water source”, due to a low rate of associated produced natural gas from the Paddy-Cadotte.

As noted above, the Commission considers data from these water source wells important for the long term management of Paddy-Cadotte reservoir pressure across the subject area. Oviniv is reporting a reservoir pressure value monthly for each of these wells. This continued reporting will be a condition of the approval orders for the disposal wells.

If required, the Commission may consider limits on formation pressures at water source wells based on equivalent hydrostatic (as per the disposal wells).

In addition to the pressure monitoring at the water source wells, the Commission intends to require the collection of annual samples of deep groundwater from each of the active water source wells for chemical analysis. These data will be used to monitor wastewater migration aspects of disposal operations.

The Commission will use the above noted formation pressure data and deep groundwater chemistry data collected at the water source wells to provide additional confidence regarding reservoir response to disposal and sourcing activities.

PRODUCED WATER DISPOSAL WELLS, SUNRISE FIELD – PADDY-CADOTTE FORMATION

Table 2 Water Source Wells

Well Permit #	Well Name
22874	OVV CRP Sunrise 14-13-78-16
26471	OVV CRP HZ Sunrise A13-33-78-17
28495	OVV CRP HZ Sunrise 9-34-78-17
28496	OVV CRP HZ Sunrise A9-34-78-17
29717	OVV CRP HZ Sunrise A5-29-78-16
29726	OVV CRP HZ Sunrise A4-28-78-17
29740	OVV CRP HZ Sunrise B1-27-78-17
30817	OVV CRP HZ Sunrise 8-31-78-16

Enforcement of the reservoir pressure limits listed in Table 1 will take into consideration opportunity for reservoir pressure equalization across the reservoir based on demonstrated communication and effective reservoir capacity.

The Commission will be issuing amendments to the disposal approval orders in February 2020. Should you have any questions, please contact the undersigned at (250) 419-4430.

Sincerely,



Ron Stefik, Eng.L.
Supervisor, Reservoir Engineering
Oil and Gas Commission