



**AGRICULTURE AND RESOURCE DEVELOPMENT**

Mining, Oil and Gas Branch  
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November 2, 2021

Ms. Kristin Rennie  
Tundra Oil & Gas Limited  
1700 - One Lombard Place  
Winnipeg, MB R3B 0X3

Dear Ms. Rennie,

**RE: Birdtail Unit No. 6 - Waterflood Order & Third Tier EOR Factor**

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With reference to our letter dated July 4, 2021, please find attached Waterflood Order No. 86 which applies to the unit. Tundra is reminded that separate conversion applications are required for any existing horizontals to be converted to injectors within this new Unit.

The Waterflood order requires Tundra to conduct annual pressure surveys and submit an annual progress report. Tundra is reminded that the 2021 report is to be submitted to the Director within 60 days after the end of the calendar year.

Birdtail Unit No. 6 will qualify for a Third Tier EOR Factor (TTEF). The Branch has calculated a proposed TTEF of 0.5751 to apply to all tracts in the unit. Table 1 shows the TTEF calculation. The TTEF is based on summed estimates of remaining primary recoverable reserves and incremental EOR recoverable reserves for unit. Please provide the Branch with any comments on the proposed TTEF by December 2, 2021.

If you have any questions in respect of the approvals or the TTEF calculations please contact Mr. Leo Leonen at (204) 945-6570.

Yours truly,

*(Original signed by Tafa Kennedy – Director of Mining, Oil and Gas)*

Ms. Tafa Kennedy  
Director

Cc: PB Virden District Office  
Brett Howell, Chris Perkins (Tundra)

**Table 1. Third Tier EOR Factor Calculation**

Birdtail Unit No. 6	
Unit	Birdtail Unit No. 6
Operator	Tundra Oil & Gas
Legal Subdivisions	22
Effective Date of Third EOR Production	November 1, 2021
Cumulative Unit Production to August 31, 2021 (m <sup>3</sup> )	50,277.0
Primary Recoverable Reserves (m <sup>3</sup> )	80,062.8
Incremental EOR Rec. Reserves (IERR) (m <sup>3</sup> )	40,323.0
Total Remaining Rec. Reserves (TRES) (m <sup>3</sup> )	70,108.8
Third Tier EOR Factor (TTEF)	0.5751



**Minister of  
Agriculture and Resource Development**

Legislative Building  
WINNIPEG, MANITOBA, CANADA  
R3C 0V8

**MINISTERIAL ORDER**

**Subsection 116(2)  
THE OIL AND GAS ACT**

**WATERFLOOD ORDER NO. 86**

**Pertaining to Waterflood Operations  
in Birdtail Unit No. 6**

- 1.0 The Unit Operator shall conduct waterflood operations by injecting water into the Birdtail Bakken-Torquay Pool underlying Birdtail Unit No. 6 ("the Unit") through the wells listed in Schedule A. The Director may approve the conversion of additional wells in the Unit to water injection.
- 1.1 Every injection well shall be completed as approved under Section 47 of the Drilling and Production Regulation ("The Regulation").
- 1.2 The maximum wellhead pressure at which water may be injected is 4 200 kPa.
- 1.3 The Director may, from time to time, establish a maximum or minimum rate at which water may be injected into a well.
- 1.4 The annulus of each injection well shall be pressure tested in accordance with Section 50 of the Regulation.
- 2.0 The Unit Operator shall conduct an annual survey to determine the level and distribution of reservoir pressure in the Unit. A summary of the results of any pressure surveys conducted during the year are to be included in the annual waterflood progress report required under Section 73 of the Regulation.
- 2.1 The frequency of pressure surveys may be reduced where the Director is satisfied that more frequent surveys will not assist the Unit Operator in monitoring the effectiveness of the waterflood.
- 2.2 The Unit Operator is responsible for monitoring the effectiveness of the waterflood and for collecting such reservoir data and other information as is necessary to evaluate and optimize waterflood performance.

- 2.3 The Unit Operator shall advise the Petroleum Branch of the suspension of water injection at any well, any indication of channelling or breakthrough of injected water to a producing well or out of zone and any other detrimental effects that may be attributable to the waterflood operations.
- 3.0 The Unit Operator shall file a report of production or injection for each well in the Unit in accordance with Section 120 of the Regulation.
- 4.0 The Unit Operator shall file an annual waterflood progress report in accordance with Section 73 of the Regulation.
- 5.0 Only Lodgepole Formation and/or Bakken-Torquay sources of water are approved to be injected into the Unit. Any other sources of water must be approved by the Petroleum Branch prior to injection.

Nov. 03, 2021

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*(Original signed by Tafa Kennedy – Director of Mining, Oil and Gas)*

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Date

Director of Mining, Oil and Gas for  
Minister Agriculture and Resource Development

**SCHEDULE A**

**WATERFLOOD ORDER NO. 86**

**BIRDTAIL UNIT NO. 6**

**WATER INJECTION WELLS**

<b>WELL NAME</b>	<b>LSD</b>	<b>SEC</b>	<b>TWP</b>	<b>RGE</b>
Birdtail Unit No. 6 HZNTL WIW	1	9	16	27
Birdtail Unit No. 6 HZNTL WIW	8	9	16	27

