

**Daly Unit No. 12**

**Waterflood Progress Report 2017**

**January 1<sup>st</sup> through December 31<sup>st</sup> 2017**

**Prepared for:**

**Manitoba Industry, Economic Development and Mines**

**Petroleum Branch**

**Prepared by:**

**Tundra Oil and Gas**

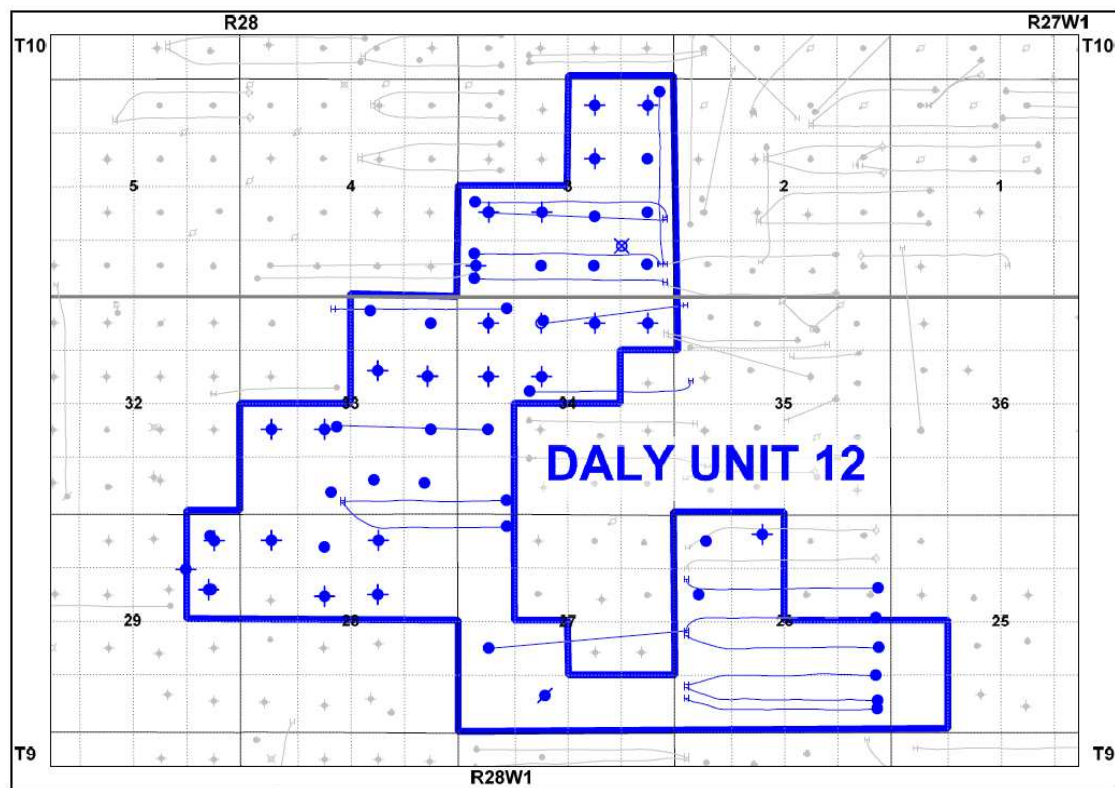
**August 7, 2018**

## INTRODUCTION

Daly Unit No. 12 Enhanced Oil Recovery (EOR) Waterflood Project was approved on January 1, 2016 with Tundra Oil and Gas (Tundra) as Operator. The EOR project area, outlined in blue in Figure 1, contains 45 vertical wells (19 producing, 26 abandoned/suspended) and 16 horizontal wells (15 producing, 1 drilled & cased) in 65 LSDs in Townships 9-10, Range 28W1.

**This unit is currently not on injection.**

**Figure 1: Daly Unit No. 12 Area Outline**



## Daly Unit No. 12

Tundra Oil and Gas (Tundra), as the operator of the Daly Unit No. 12 Enhanced Oil Recovery (EOR) project hereby submits the 2017 EOR report as per section 73 of the Drilling and Production Regulations.

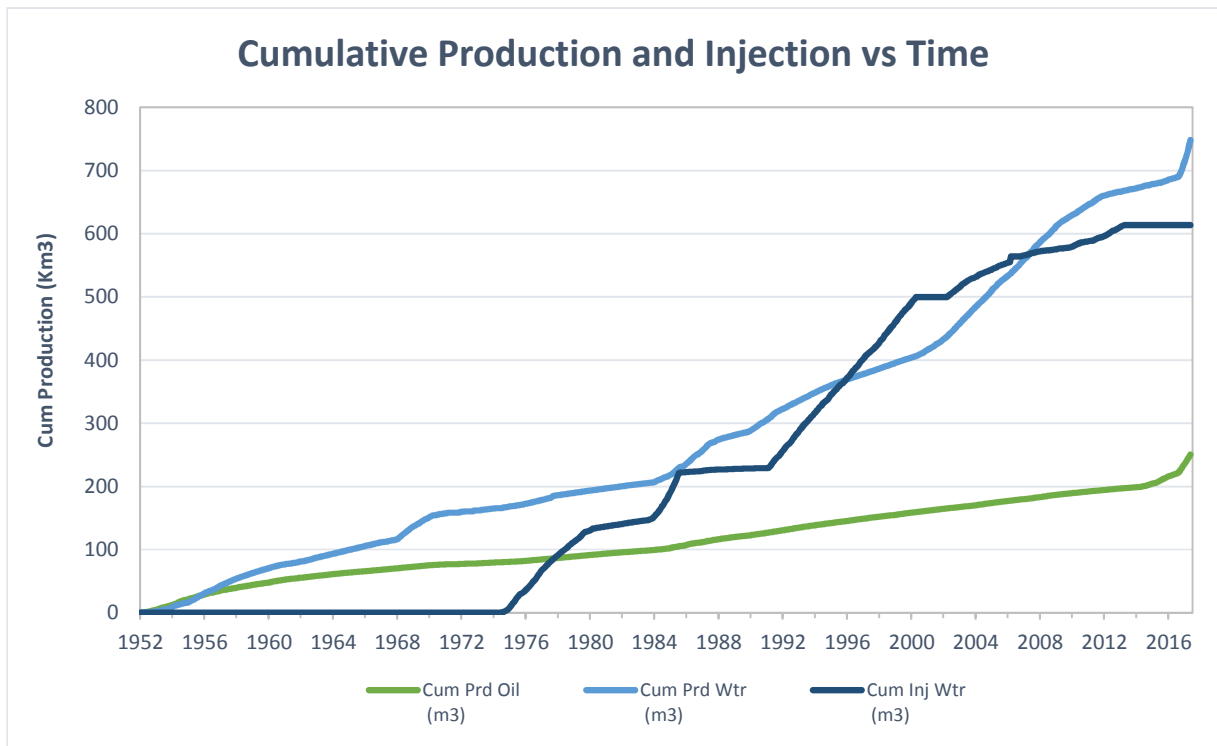
**a) Monthly oil and water production rates, injection rate, GOR and WOR**

MONTH	Cal Dly Oil m <sup>3</sup> /day	Cal Dly Wtr m <sup>3</sup> /day	Cal Inj Wtr m <sup>3</sup> /day	WOR m <sup>3</sup> /m <sup>3</sup>	GOR m <sup>3</sup> /m <sup>3</sup>
Jan-2017	24.22	18.18	0.00	0.75	0
Feb-2017	22.93	21.18	0.00	0.92	0
Mar-2017	35.01	39.57	0.00	1.13	0
Apr-2017	91.87	111.81	0.00	1.22	0
May-2017	93.61	133.25	0.00	1.42	0
Jun-2017	99.38	173.88	0.00	1.75	0
Jul-2017	100.20	228.01	0.00	2.28	0
Aug-2017	112.47	233.88	0.00	2.08	0
Sep-2017	104.20	217.87	0.00	2.09	0
Oct-2017	106.06	198.80	0.00	1.87	0
Nov-2017	115.44	286.72	0.00	2.48	0
Dec-2017	120.80	309.25	0.00	2.56	0

**b) Cumulative volume of oil, gas and water produced and fluid injected**

2017 PRODUCTION	
Produced Oil (m <sup>3</sup> )	31,332
Produced Gas (m <sup>3</sup> )	0
Produced Water (m <sup>3</sup> )	60,291
Fluid Injected (m <sup>3</sup> )	0
CUMULATIVE PRODUCTION	
Produced Oil (m <sup>3</sup> )	250,340
Produced Water (m <sup>3</sup> )	748,209

## Daly Unit No. 12



<i>UWI</i>	<i>Type</i>	<i>Status</i>	<i>Future Plans</i>
102/01-26-009-28W1/0	Horizontal	Producing	-
103/01-26-009-28W1/0	Horizontal	Producing	-
104/01-26-009-28W1/0	Horizontal	Producing	-
102/08-26-009-28W1/0	Horizontal	Producing	-
100/12-26-009-28W1/0	Vertical	Producing	-
100/13-26-009-28W1/0	Vertical	Commingled	-
100/14-26-009-28W1/0	Vertical	Abandoned Zone	-
100/03-27-009-28W1/0	Vertical	Suspended	-
102/05-27-009-28W1/0	Horizontal	Producing	-
102/13-27-009-28W1/0	Horizontal	Producing	-
100/10-28-009-28W1/0	Vertical	Abandoned	-
100/11-28-009-28W1/0	Vertical	Abandoned	-
100/13-28-009-28W1/0	Vertical	Abandoned	-
100/14-28-009-28W1/0	Vertical	Producing	-
100/15-28-009-28W1/0	Vertical	Abandoned	-
100/09-29-009-28W1/0	Vertical	Abandoned Zone	-
102/09-29-009-28W1/0	Vertical	Producing	-
102/10-29-009-28W1/0	Vertical	Abandoned	-
100/16-29-009-28W1/0	Vertical	Abandoned	-
102/16-29-009-28W1/0	Vertical	Producing	-
100/01-33-009-28W1/0	Vertical	Producing	-
100/02-33-009-28W1/0	Vertical	Commingled	-
100/03-33-009-28W1/0	Vertical	Producing	-
100/05-33-009-28W1/0	Vertical	Abandoned	-
100/06-33-009-28W1/0	Vertical	Abandoned	-
102/06-33-009-28W1/0	Vertical	Commingled	-
100/08-33-009-28W1/0	Vertical	Producing	-
100/09-33-009-28W1/0	Vertical	Abandoned	-
100/09-33-009-28W1/2	Vertical	Abandoned Zone	-
100/10-33-009-28W1/0	Vertical	Abandoned	-
100/15-33-009-28W1/0	Vertical	Producing	-
100/16-33-009-28W1/0	Vertical	Producing	-
102/04-34-009-28W1/0	Horizontal	Producing	-
102/05-34-009-28W1/0	Horizontal	Producing	-
100/11-34-009-28W1/0	Vertical	Abandoned	-
102/11-34-009-28W1/0	Horizontal	Producing	-
100/12-34-009-28W1/0	Vertical	Abandoned Zone	-
100/13-34-009-28W1/0	Vertical	Abandoned Zone	-
102/13-34-009-28W1/0	Horizontal	Producing	-
100/14-34-009-28W1/0	Vertical	Producing	-
102/14-34-009-28W1/0	Horizontal	Drilled & Cased	-
100/15-34-009-28W1/0	Vertical	Abandoned	-
100/16-34-009-28W1/0	Vertical	Abandoned	-
100/01-03-010-28W1/0	Vertical	Abandoned	-
102/01-03-010-28W1/0	Vertical	Producing	-

<i><b>UWI</b></i>	<i><b>Type</b></i>	<i><b>Status</b></i>	<i><b>Future Plans</b></i>
100/02-03-010-28W1/0	Vertical	Producing	-
100/03-03-010-28W1/0	Vertical	Producing	-
100/04-03-010-28W1/0	Vertical	Abandoned	-
102/04-03-010-28W1/0	Horizontal	Producing	-
103/04-03-010-28W1/0	Horizontal	Producing	-
100/05-03-010-28W1/0	Vertical	Abandoned	-
102/05-03-010-28W1/0	Horizontal	Producing	-
103/05-03-010-28W1/0	Horizontal	Producing	-
100/06-03-010-28W1/0	Vertical	Abandoned	-
100/07-03-010-28W1/0	Vertical	Producing	-
100/08-03-010-28W1/0	Vertical	Producing	-
100/09-03-010-28W1/0	Vertical	Producing	-
100/10-03-010-28W1/0	Vertical	Abandoned	-
100/15-03-010-28W1/0	Vertical	Abandoned Zone	-
100/16-03-010-28W1/0	Vertical	Abandoned Zone	-
102/16-03-010-28W1/0	Horizontal	Producing	-

#### **d) Waterflood History and Development Plan**

Wells in Daly Unit No. 12 have been on 40 acre primary production since the early 1950's, coincident with primary developments in the offset Daly Unit Nos. 1 & 3. In the mid-1970's Chevron successfully implemented a pilot waterflood focused in the SE/4 of Sec 03-010-28W1, within the proposed Unit boundary. The pilot targeted the Lodgepole reservoir via an inverted 5-spot vertical pattern flood, whereby the 100/01-03-010-28W1 vertical was converted to injection to flood the offsetting 4 vertical producers. It appears the flood was successful in arresting decline rates and improving the overall recovery of the

Where there are existing undrilled DSU's in Daly Unit No. 12, Tundra plans to drill infill 40 acre verticals. Additional E-W horizontals will be drilled between existing rows of vertical wells, resulting in an effective 20 acre spacing over the Unit area. Every second horizontal will then be converted to water injection service after a period of production (expected 2-3 years after each well's first production). Plans are for the new future injection wells to be cemented liner horizontals, stimulated via multiple hydraulic fracture treatments to obtain suitable injection rates. This helps ensure optimum placement of each fracture stage to prevent, or minimize, the potential for out-of-zone fracture growth thereby limiting the potential for