

Ebor Unit No. 3

Waterflood Progress Report 2018

January 1st through December 31st 2018

Prepared for:

Manitoba Industry, Economic Development and Mines

Petroleum Branch

Prepared by:

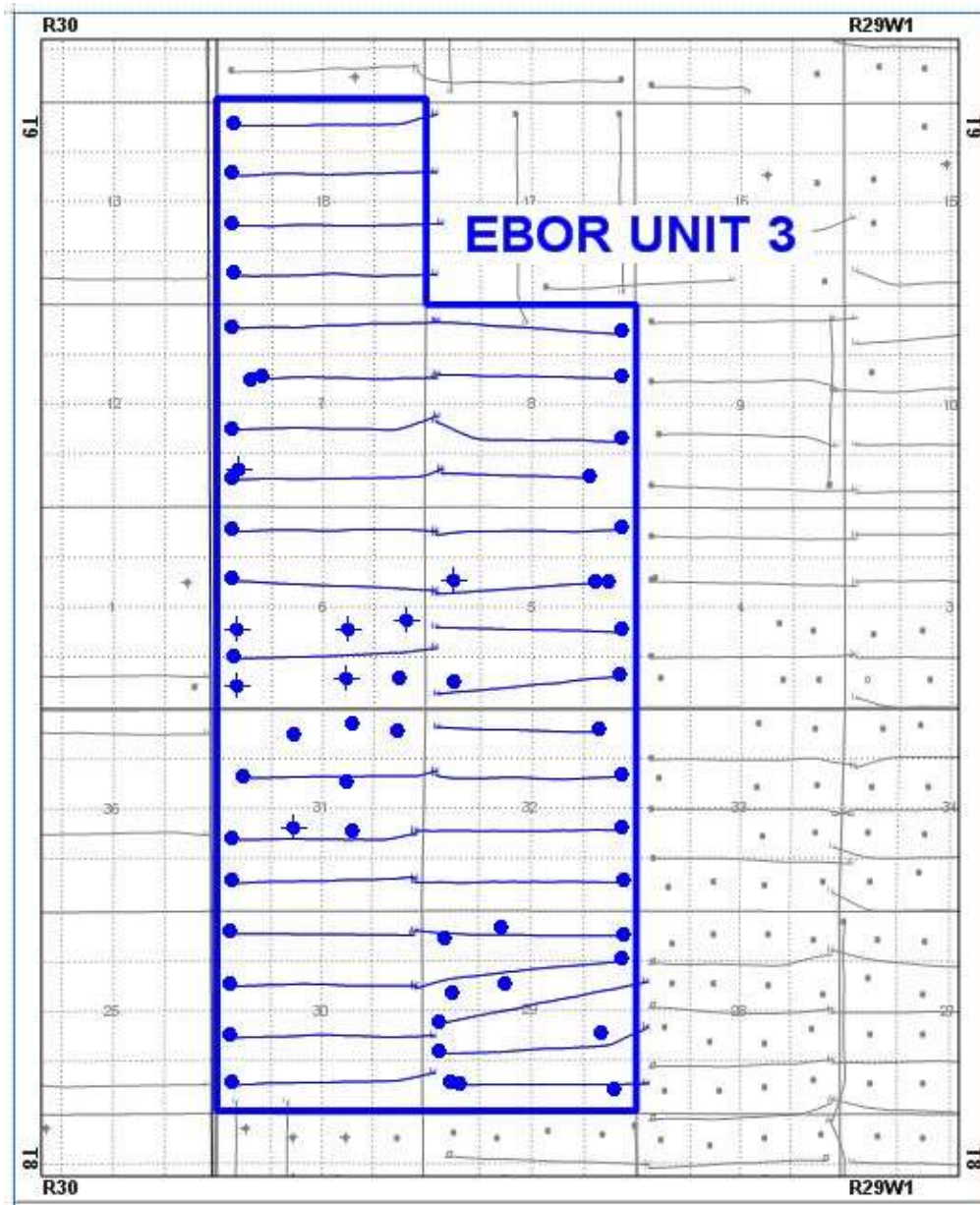
Tundra Oil and Gas

July 8, 2019

INTRODUCTION

Ebor Unit No. 3 Enhanced Oil Recovery (EOR) Waterflood Project was approved under Board Order No. 62 effective October 2017. The Unit area contains 16 abandoned/suspended wells, 38 producing wells, 5 injection wells and 3 wells waiting to be completed, in Townships 8 & 9, Ranges 29 W1 as shown in the figure below.

Figure 1: Ebor Unit No. 3 Area Outline



Ebor Unit No. 3

Tundra Oil and Gas (Tundra), as the operator of the Ebor Unit No. 3 Enhanced Oil Recovery (EOR) project hereby submits the 2018 EOR report as per section 73 of the Drilling and Production Regulations.

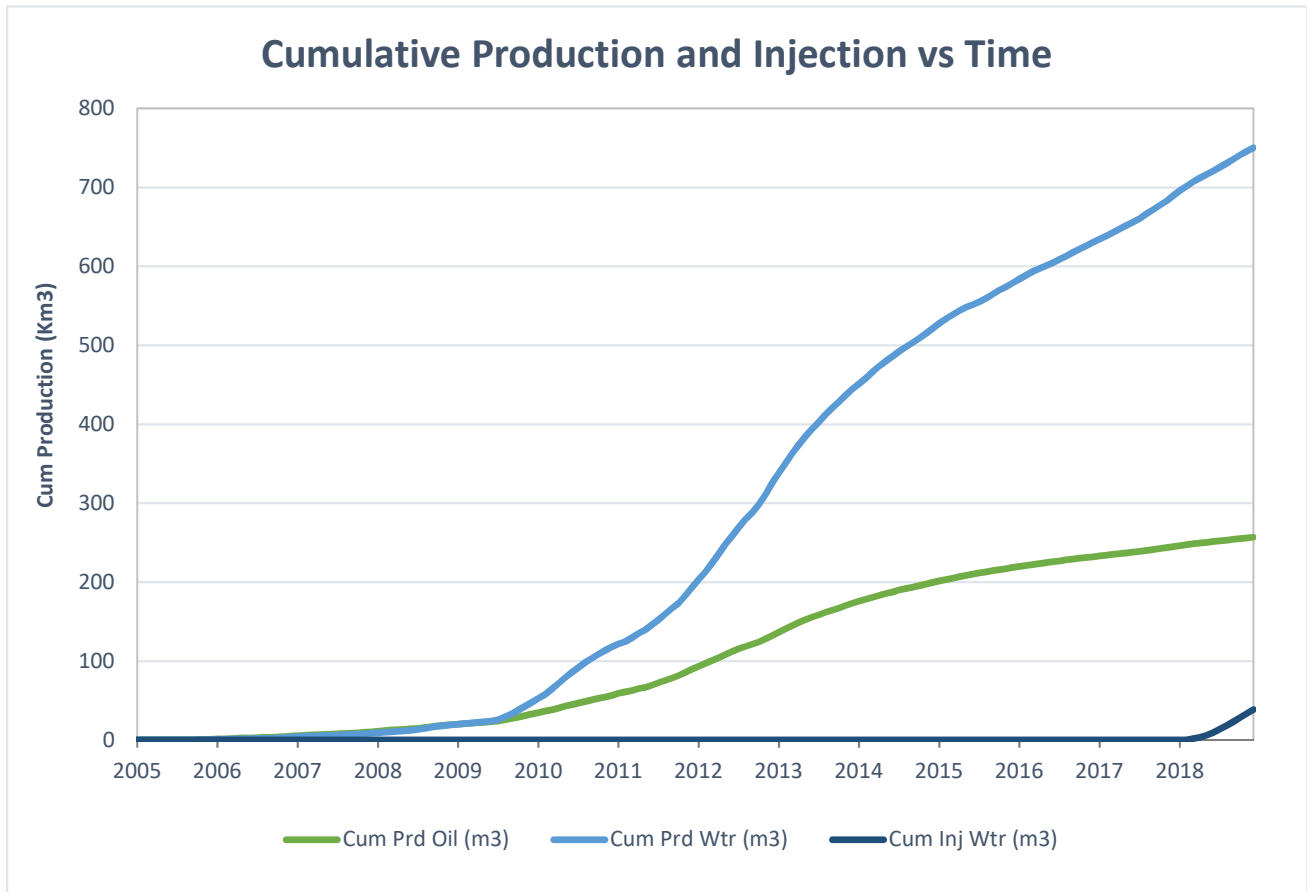
a) Monthly oil and water production rates, injection rate, GOR and WOR

MONTH	Cal Dly Oil m ³ /day	Cal Dly Wtr m ³ /day	Cal Inj Wtr m ³ /day	WOR m ³ /m ³	GOR m ³ /m ³
Jan-2018	44.50	212.52	0.00	4.78	0.00
Feb-2018	37.71	188.12	12.73	4.99	0.00
Mar-2018	34.69	174.24	40.37	5.02	0.00
Apr-2018	33.38	165.38	56.14	4.95	0.00
May-2018	30.06	142.26	77.74	4.73	0.64
Jun-2018	32.19	151.37	123.08	4.70	0.10
Jul-2018	31.32	158.40	142.39	5.06	0.00
Aug-2018	30.01	160.65	152.10	5.35	0.00
Sep-2018	31.43	171.67	162.55	5.46	0.00
Oct-2018	31.88	166.97	169.11	5.24	0.00
Nov-2018	30.20	155.86	159.08	5.16	3.53
Dec-2018	26.67	145.61	165.95	5.46	0.00

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

2018 PRODUCTION	
Produced Oil (m ³)	11,975
Produced Gas (m ³)	4
Produced Water (m ³)	60,576
Fluid Injected (m ³)	38,560
CUMULATIVE PRODUCTION	
Produced Oil (m ³)	256,932
Produced Water (m ³)	750,346

Ebor Unit No. 3



c) Monthly wellhead injection pressure for each injection well

	02/12-07 Inj		00/09-29 Inj		02/05-29 Inj		00/13-07 Inj		00/05-07 Inj		EBOR3	
MONTH	Inj Water (m ³)	Avg Inj P (kPa)	Inj Water (m ³)	Avg Inj P (kPa)	Inj Water (m ³)	Avg Inj P (kPa)	Inj Water (m ³)	Avg Inj P (kPa)	Inj Water (m ³)	Avg Inj P (kPa)	Inj Water (m ³)	Avg Inj P (kPa)
Jan-2018	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Feb-2018	0.0	0	180.1	-78	176.4	-49	0.0	0	0.0	0	356.5	-63
Mar-2018	0.0	0	634.0	-93	617.5	-94	0.0	0	0.0	0	1251.5	-93
Apr-2018	53.4	2444	699.7	-89	818.7	-94	47.1	2488	65.2	2443	1684.1	959
May-2018	279.1	-91	1030.2	-92	413.1	-93	331.4	-87	356.1	-93	2409.9	-91
Jun-2018	353.5	-90	968.1	-94	1597.2	-93	381.4	-92	392.1	-93	3692.3	-92
Jul-2018	674.0	-90	1203.6	337	1184.2	-81	671.9	-93	680.5	-93	4414.2	-4
Aug-2018	770.5	-52	1219.4	1626	1195.3	803	754.5	-93	775.4	-49	4715.1	447
Sep-2018	852.6	985	1167.8	2416	1153.5	2082	849.9	-65	852.7	701	4876.5	1224
Oct-2018	1008.7	2210	1121.5	2935	1089.6	2914	1010.0	755	1012.7	1561	5242.5	2075
Nov-2018	823.9	2849	1043.3	2356	777.8	2976	1065.9	2435	1061.5	2477	4772.4	2619
Dec-2018	908.6	3452	1085.7	2944	822.9	3201	1128.4	2695	1199.0	3212	5144.6	3101
Total	5724.3		10353.4		9846.2		6240.5		6395.2		38559.6	
Avg Inj P		968		1014		956		662		839		840

MONTH	Jan-2018	Feb-2018	Mar-2018	Apr-2018	May-2018	Jun-2018	Jul-2018	Aug-2018	Sep-2018	Oct-2018	Nov-2018	Dec-2018
Total m3	-	356.5	1251.5	1684.1	2409.9	3692.3	4414.2	4715.1	4876.5	5242.5	4772.4	5144.6
Daily (m³/d)	-	12.73	40.37	56.14	77.74	123.08	142.39	152.10	162.55	169.11	159.08	165.95

2018 AVG. ANNUAL DAILY INJECTION =	114.66 m3/d
------------------------------------	-------------

CUMULATIVE INJECTION TO Dec 31, 2017 =	0 m3
--	------

TOTAL 2018 ANNUAL INJECTION =	38,560 m3
-------------------------------	-----------

CUMULATIVE INJECTION TO Dec 31, 2018 =	38,560 m3
--	-----------

d) Summary of the result of any survey of reservoir pressure conducted in 2018. N/A

e) **Date and type of any well servicing.**

Well	Service Description	Date
100.01-32-008-29W1.00	Pump Change	3/2/2018
100.09-29-008-29W1.00	WIW Conversion	1/29/2018
100.13-30-008-29W1.00	Cemented Liner Clean Out	7/14/2018
100.13-30-008-29W1.00	Cemented Liner Clean Out	7/14/2018
100.16-32-008-29W1.00	Packers Plus Drill out	8/5/2018
102.05-29-008-29W1.00	WIW Conversion	2/1/2018
100.04-18-009-29W1.00	Pump Change	5/29/2018
100.05-07-009-29W1.00	WIW Conversion	3/12/2018
100.09-08-009-29W1.00	Pump Change	8/24/2018
100.12-18-009-29W1.00	Pump Change	2/2/2018
100.12-18-009-29W1.00	Pump Change	5/31/2018
100.13-07-009-29W1.00	WIW Conversion	3/17/2018
102.01-08-009-29W1.00	Pump Change/Tubing Reconfiguration	4/5/2018
102.12-07-009-29W1.00	WIW Conversion	3/3/2018

f) **Calculations of voidage replacement ratio on a monthly and cumulative basis**

VOIDAGE CALCULATIONS

OIL FORMATION VOLUME FACTOR (Rm3/Sm3) = 1.071

MONTH	Mth Oil Prod (m3)	Cum Oil Prod (Km3)	Mth Water Prod (m3)	Cum Water Prod (Km3)	Mth Water Inj (m3)	Cum Water Inj (Km3)	VRR	Cum VRR
Jan-2018	1379.5	246.34	6588.2	696.36	0.0	0.00	0.000	0.000
Feb-2018	1055.8	247.39	5267.3	701.63	356.5	0.36	0.056	0.000
Mar-2018	1075.3	248.47	5401.5	707.03	1251.5	1.61	0.191	0.002
Apr-2018	1001.4	249.47	4961.5	711.99	1684.1	3.29	0.279	0.003
May-2018	932.0	250.40	4410	716.40	2409.9	5.70	0.446	0.006
Jun-2018	965.8	251.37	4541.1	720.94	3692.3	9.39	0.662	0.009
Jul-2018	971.0	252.34	4910.4	725.85	4414.2	13.81	0.742	0.014
Aug-2018	930.4	253.27	4980	730.83	4715.1	18.52	0.789	0.018
Sep-2018	942.8	254.21	5150.1	735.98	4876.5	23.40	0.792	0.023
Oct-2018	988.4	255.20	5176.1	741.16	5242.5	28.64	0.841	0.028
Nov-2018	906.0	256.11	4675.8	745.83	4772.4	33.42	0.845	0.033
Dec-2018	826.8	256.93	4514	750.35	5144.6	38.56	0.953	0.038

g) **An outline of the method used for quality control and treatment of the injected fluid**

The injection water for Ebor Unit No. 3 comes from the Sinclair 3-4-8-29W1 Battery source and injection water system. All existing injection water is obtained from the Lodgepole formation in the 102/16-32-7-29W1 licensed water source well. Lodgepole water from the 102/16-32 source well is pumped to the main Sinclair Units Water Plant at 3-4-8-29W1, filtered, and pumped up to injection system pressure.

h) **A report of any unusual performance problems and remedial measures taken or being considered. N/A**

i) **Any other information necessary to evaluate the project**

<i>UWI</i>	<i>Type</i>	<i>Status</i>	<i>Future Plans</i>
100/01-29-008-29W1/0	Vertical	Producing	-
100/04-29-008-29W1/0	Vertical	Producing	-
102/04-29-008-29W1/0	Horizontal	Producing	-
100/05-29-008-29W1/0	Horizontal	Producing	-
102/05-29-008-29W1/0	Horizontal	Injection	-
100/08-29-008-29W1/0	Vertical	Producing	-
100/09-29-008-29W1/0	Horizontal	Injection	-
100/11-29-008-29W1/0	Vertical	Producing	-
100/12-29-008-29W1/0	Vertical	Producing	-
100/13-29-008-29W1/0	Vertical	Producing	-
100/14-29-008-29W1/0	Vertical	Producing	-
100/16-29-008-29W1/0	Horizontal	Producing	-
100/04-30-008-29W1/0	Horizontal	Producing	-
100/05-30-008-29W1/0	Horizontal	Producing	-
100/12-30-008-29W1/0	Horizontal	Producing	-
100/13-30-008-29W1/0	Horizontal	Producing	-
100/04-31-008-29W1/0	Horizontal	Producing	-
100/05-31-008-29W1/0	Horizontal	Producing	-
100/06-31-008-29W1/0	Vertical	Abandoned	-
100/07-31-008-29W1/0	Vertical	Producing	-
100/10-31-008-29W1/0	Vertical	Producing	-
100/12-31-008-29W1/0	Horizontal	Producing	-
100/14-31-008-29W1/0	Vertical	Producing	-
100/15-31-008-29W1/0	Vertical	Producing	-
100/16-31-008-29W1/0	Vertical	Producing	-
100/01-32-008-29W1/0	Horizontal	Producing	-
102/01-32-008-29W1/0	Horizontal	Drilled & Cased	-
100/08-32-008-29W1/0	Horizontal	Producing	-
103/08-32-008-29W1/0	Horizontal	Drilled & Cased	-
100/09-32-008-29W1/0	Horizontal	Producing	-
103/09-32-008-29W1/0	Horizontal	Drilled & Cased	-
100/16-32-008-29W1/0	Horizontal	Producing	-
100/01-05-009-29W1/0	Horizontal	Producing	-
100/04-05-009-29W1/0	Vertical	Producing	-
100/08-05-009-29W1/0	Horizontal	Producing	-
100/09-05-009-29W1/0	Vertical	Producing	-
102/09-05-009-29W1/0	Horizontal	Producing	-
100/12-05-009-29W1/2	Vertical	Abandoned	-
100/16-05-009-29W1/0	Horizontal	Producing	-
100/01-06-009-29W1/0	Vertical	Producing	-
100/02-06-009-29W1/0	Vertical	Abandoned Zone	-
100/04-06-009-29W1/2	Vertical	Abandoned Zone	-
102/04-06-009-29W1/0	Horizontal	Producing	-
100/05-06-009-29W1/2	Vertical	Abandoned Zone	-
100/07-06-009-29W1/2	Vertical	Abandoned Zone	-

j) Well List

Ebor Unit No. 3 Well List

<i>UWI</i>	<i>Type</i>	<i>Status</i>	<i>Future Plans</i>
100/08-06-009-29W1/0	Vertical	Abandoned Zone	-
100/12-06-009-29W1/0	Horizontal	Producing	-
100/13-06-009-29W1/0	Horizontal	Producing	-
100/04-07-009-29W1/0	Vertical	Abandoned Zone	-
102/04-07-009-29W1/0	Horizontal	Producing	WIW Conversion
100/05-07-009-29W1/0	Horizontal	Injection	-
100/12-07-009-29W1/0	Vertical	Suspended	-
102/12-07-009-29W1/0	Horizontal	Injection	-
100/13-07-009-29W1/0	Horizontal	Injection	-
102/01-08-009-29W1/0	Horizontal	Producing	-
100/08-08-009-29W1/0	Horizontal	Producing	-
100/09-08-009-29W1/0	Horizontal	Producing	-
100/16-08-009-29W1/0	Horizontal	Producing	-
100/04-18-009-29W1/0	Horizontal	Producing	WIW Conversion
100/05-18-009-29W1/2	Horizontal	Producing	-
100/12-18-009-29W1/0	Horizontal	Producing	-
100/13-18-009-29W1/0	Horizontal	Producing	-