

EWART UNIT NO. 1
WATERFLOOD EOR PROJECT
ANNUAL REPORT FOR 2017

May 4, 2018

Tundra Oil and Gas Partnership

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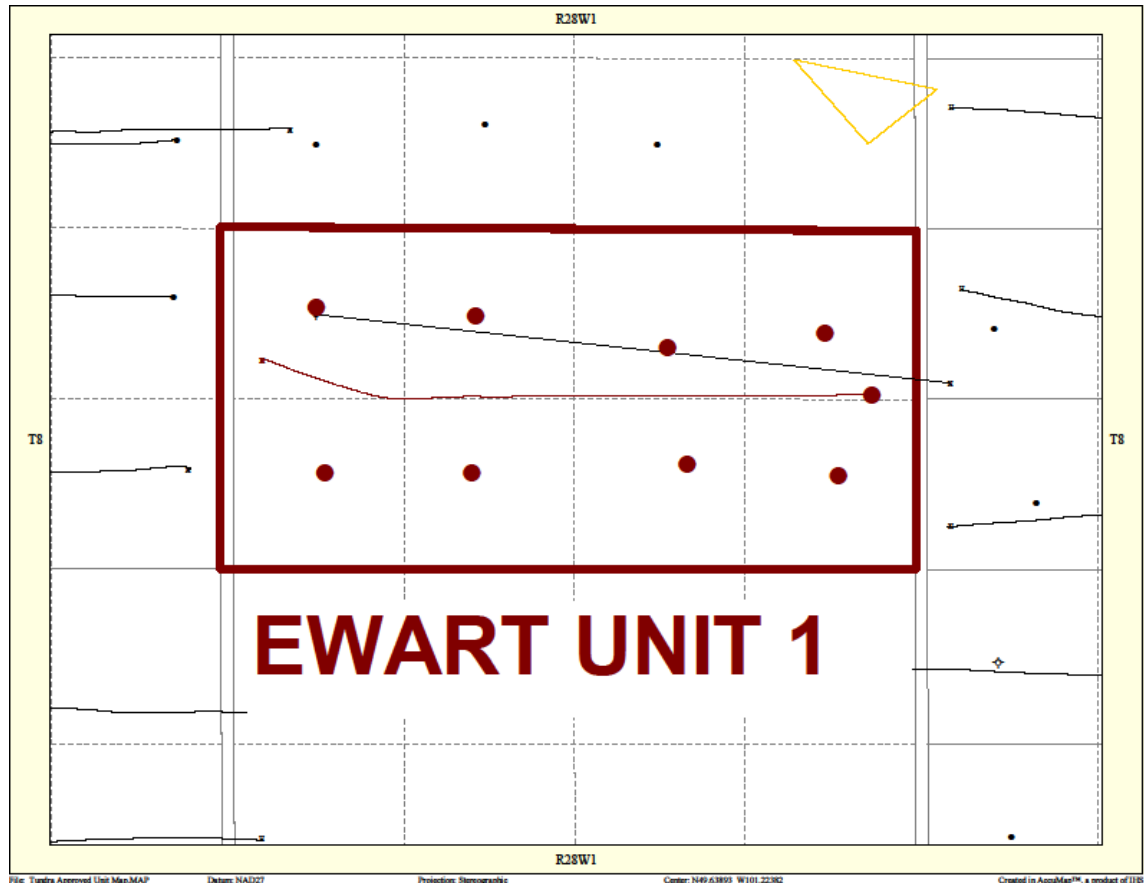
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102/08-09-008-28W1

INTRODUCTION

Ewart Unit No. 1 Enhanced Oil Recovery (EOR) Waterflood Project was approved under Waterflood Order No. 23, effective March 1, 2013 with Tundra Oil and Gas (Tundra) as Operator. The Unit area contains 8 producing vertical wells and 1 horizontal injector in 8 LSDs in Township 8 Range 28 W1 as shown in the figure below.

Figure 1: Ewart Unit No. 1 Area Outline



In accordance with Section 73 of the Manitoba Drilling and Production Regulation, Tundra hereby submits the following 2017 Annual Progress Report for Ewart Unit No. 1.

DISCUSSION

Production History

For the wells included in Ewart Unit No. 1, production started in November 2005 with the 00/02-09-008-28W1 well. Average oil production peaked at 3.68 m³/d per well in March

2008. This production was coming from 8 wells and totaled 29.44 m³/d for the Unit. In December 2017, the Unit was producing 3.39 m³/d of oil and 8.58 m³/d of water. The water oil ratio (WOR) averaged 2.03 m³/m³ over 2017. Water injection commenced in Ewart Unit No. 1 in July 2013. The rates and WOR are presented in Figure 2.

Figure 2: Ewart Unit 1 Production/Injection Rates and WOR vs Time

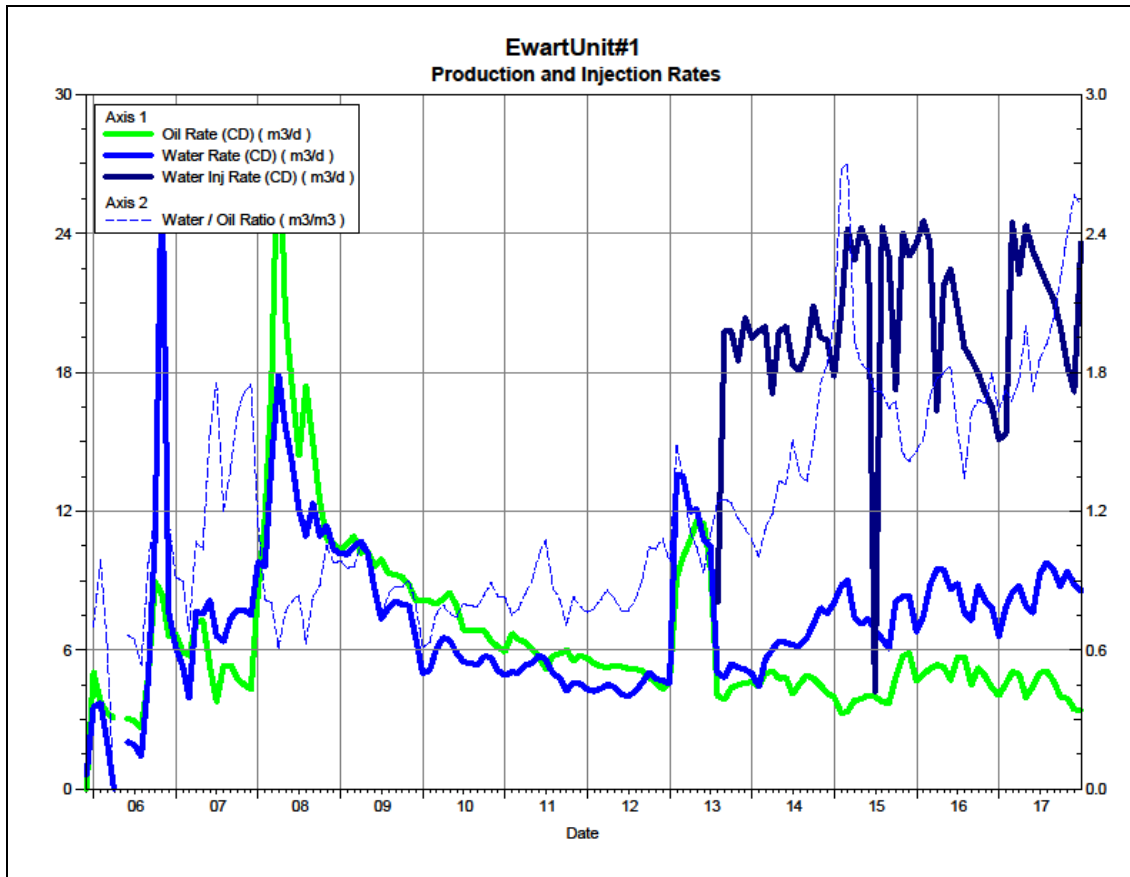
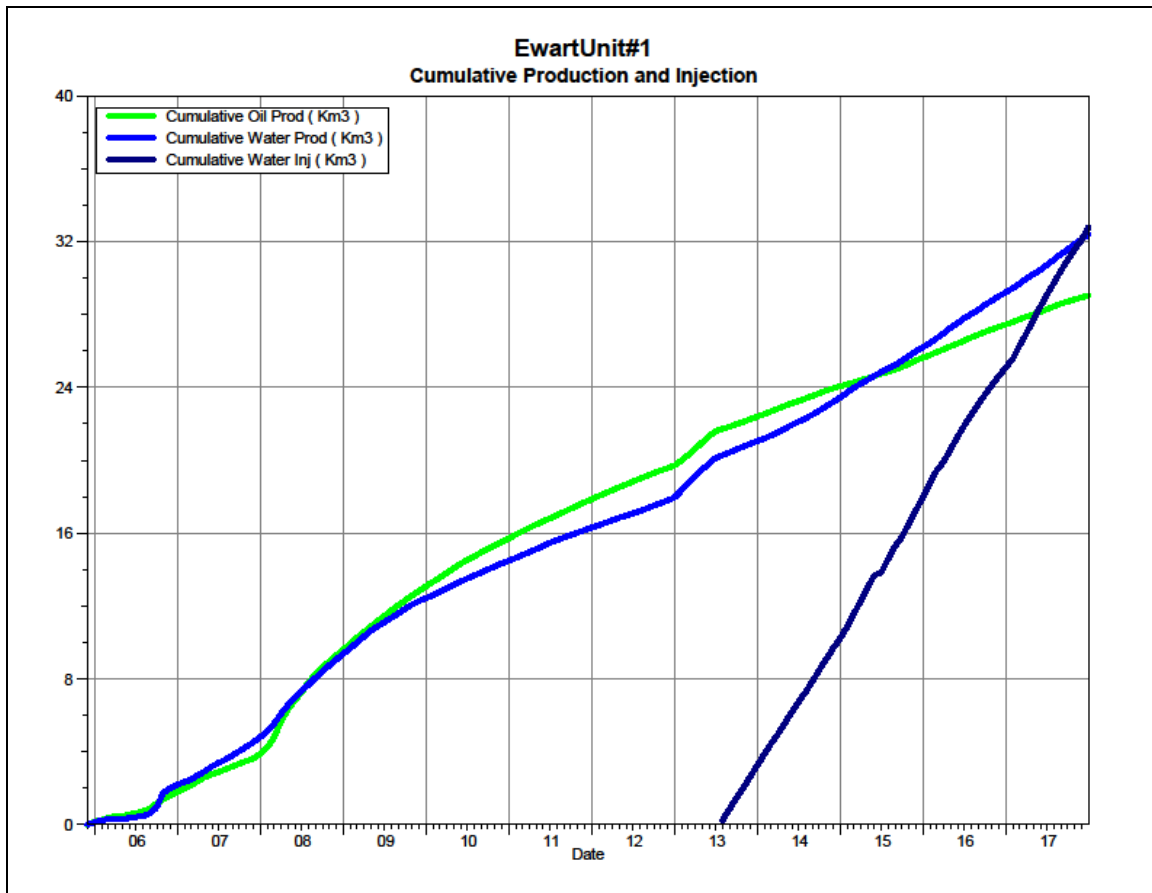


Figure 3 shows the cumulative production for Ewart Unit No. 1 to the end of December 2017 as 29.04 e³m³ of oil, and 32.39 e³m³ of water, representing an 12.0% recovery factor of the OOIP (242.0 e³m³). The cumulative water injected is 32.81 e³m³.

Figure 3: Ewart Unit 1 Cumulative Oil, Water and Water Injected vs Time



Waterflood Development Plan

Ewart Unit No. 1 Waterflood (WF) Development Plan

Ewart Unit No. 1 is still in the development phase at the end of 2017. In November 2012, the single proposed horizontal injector for the unit was drilled (02/08-09-008-28W1/0) and put on production January 2013. In July 2013, the 02/08-09 well was converted to an injector. In July 2015, a horizontal well was drilled as a future inter-unit injector at 03/05-09-008-28W1/0 (Ewart Units 1/7) to improve waterflood recovery. Tundra has no immediate plans to convert the 03/05-09 producer to an injector and will continue to produce it.

Production performance by injector pattern is summarized in Appendix A.

Any future revisions to the waterflood development or surveillance plan would be based on new production or performance response data, technical studies, or observed reservoir behavior and reserves recovery interpretations.

Waterflood EOR Operating Strategy and Performance

Water Source and Quality

The injection water for Ewart Unit No. 1 will be sourced from the 02/14-30-007-28W1 well (Mannville formation). The water is treated at the 04-01-008-29W1 filtration plant where it is filtered to 0.1 microns and has scale inhibitor and biocide added. The injection water is then distributed to the injectors through the dedicated infrastructure system.

Injection Wellhead Pressures

Injection started in this Unit in July 2013. The average monthly wellhead injection pressure for the single injector in this Unit is summarized in Appendix C. Since injection in this Unit is still in the early stages, the injector is still building up to a target injection pressure of 6300 kPaa.

Reservoir Pressure

Where practical, Tundra is committed to collecting pressure data from newly drilled injection wells. For Ewart Unit No. 1, pressure data is currently available for the 02/08-09-008-28W1 location. A summary table is presented in Appendix B. Pressures are corrected to a common datum of -450 m SS for comparison with other units in the area.

Well Servicing

Table 1 lists the maintenance that was required in Ewart Unit No. 1 in 2017.

Table 1: Service and Maintenance in Ewart Unit No. 1

100.01-09-008-28W1.00	Suspended	12/15/2017
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Waterflood Performance Discussion

At the end of 2017, Ewart Unit No. 1 had 1 injection pattern in place. Water injection commenced in Ewart Unit No. 1 in July 2013, however, until water injection commences in Ewart Unit No. 7, any waterflood performance analysis will not be relevant at this time.

A summary table of the injector pattern is presented in Appendix A. Plots of the production and injection data along with the VRR information are presented in Appendix D for each injector pattern(s).

List of Appendices

Appendix A: Injection Pattern Summary

Appendix B: Reservoir Pressure Summary

Appendix C: Average Monthly Injection Pressure Summary

Appendix D: Injector Pattern Production/Injection Rates, Cumulative and VRR Plot for
the following injector:

102/08-09-008-28W1

Appendix A

Ewart Unit No. 1 Injection Pattern Summary as of December 2017

Pattern Name	Injector BH Location (008-28W1)	Injector Surf. Location (008-28W1)	Status	Supported Wells (008-28W1)	No. of Supported Wells	Allocation Factor	Pattern Prod Start Month	Inj Start Month	Oil Rate (m³/d)	Water Rate (m³/d)	WOR (m³/m³)	Water Injection (m³/d)	Cum Oil (E³m³)	Cum Water (E³m³)	Cum Inj Water (E³m³)	Monthly VRR	Cum VRR
02/08-09-008-28W1 Injector	02/08-09	02/05-09	Water Injection	01-09, 02-09, 03-09, 04-09, 05-09, 06-09, 07-09, 08-09	8	0.5	Nov 2005	Jul 2013	1.0	3.5	3.53	23.6	14.2	15.8	32.8	5.221	1.057

APPENDIX B

Ewart Unit No. 1 - Pressure Summary

Location	Test Date	Final Pressure (kPaa)	MPP (mTVD)	KB	Datum Depth	Gradient	Pressure @ -450 masl
102/08-09-008-28W1/00	Nov 15 - Dec 8, 2012	4432.5	912.26	501.65	-450	8.25	4757

Appendix C

Average Monthly Injection Pressure (kPag)

Month	102/08-09
Apr-14	160
May-14	479
Jun-14	756
Jul-14	756
Aug-14	1099
Sep-14	1387
Oct-14	1576
Nov-14	1764
Dec-14	1850
Jan-15	2163
Feb-15	2681
Mar-15	2926
Apr-15	3257
May-15	3468
Jun-15	3688
Jul-15	5378
Aug-15	5102
Sep-15	3605
Oct-15	4113
Nov-15	4202
Dec-15	4302
Jan-16	4498
Feb-16	4657
Mar-16	4535
Apr-16	4509
May-16	4701
Jun-16	4917
Jul-16	4952
Aug-16	4939
Sep-16	4952
Oct-16	4952
Nov-16	4949
Dec-16	4797
Jan-17	4845
Feb-17	5686
Mar-17	5729
Apr-17	6032
May-17	6074
Jun-17	6197
Jul-17	6237
Aug-17	6229
Sep-17	6200
Oct-17	6246
Nov-17	6062
Dec-17	6461

Appendix D

Rates and VRR Plots

Pattern: EU#1_02/08-09Inj Set: EwartUnit#1

Oil Formation Vol Factor : 1.07100 m3/m3

Water Formation Vol Factor : 1.00150 m3/m3

Water / Oil Ratio : 2.21 m3/m3

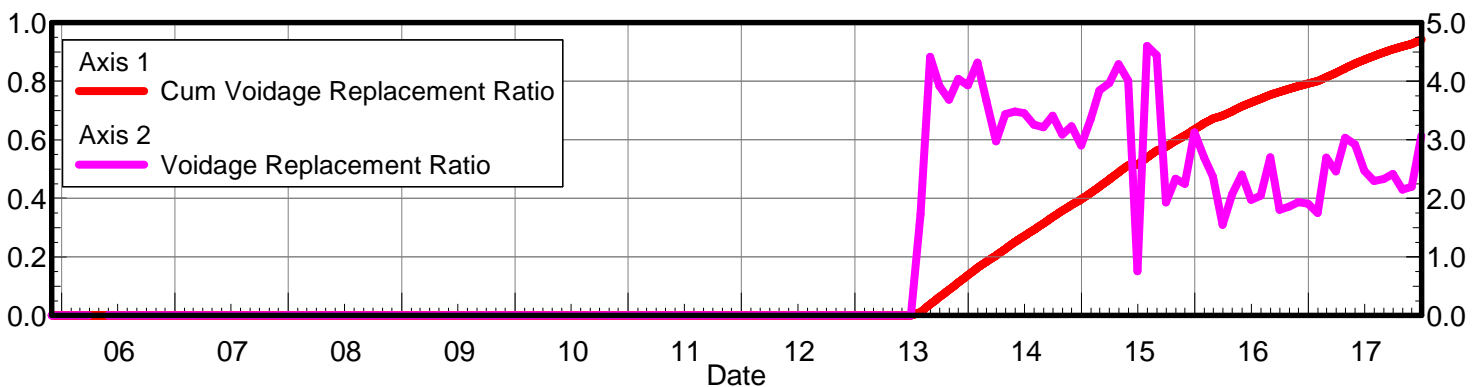
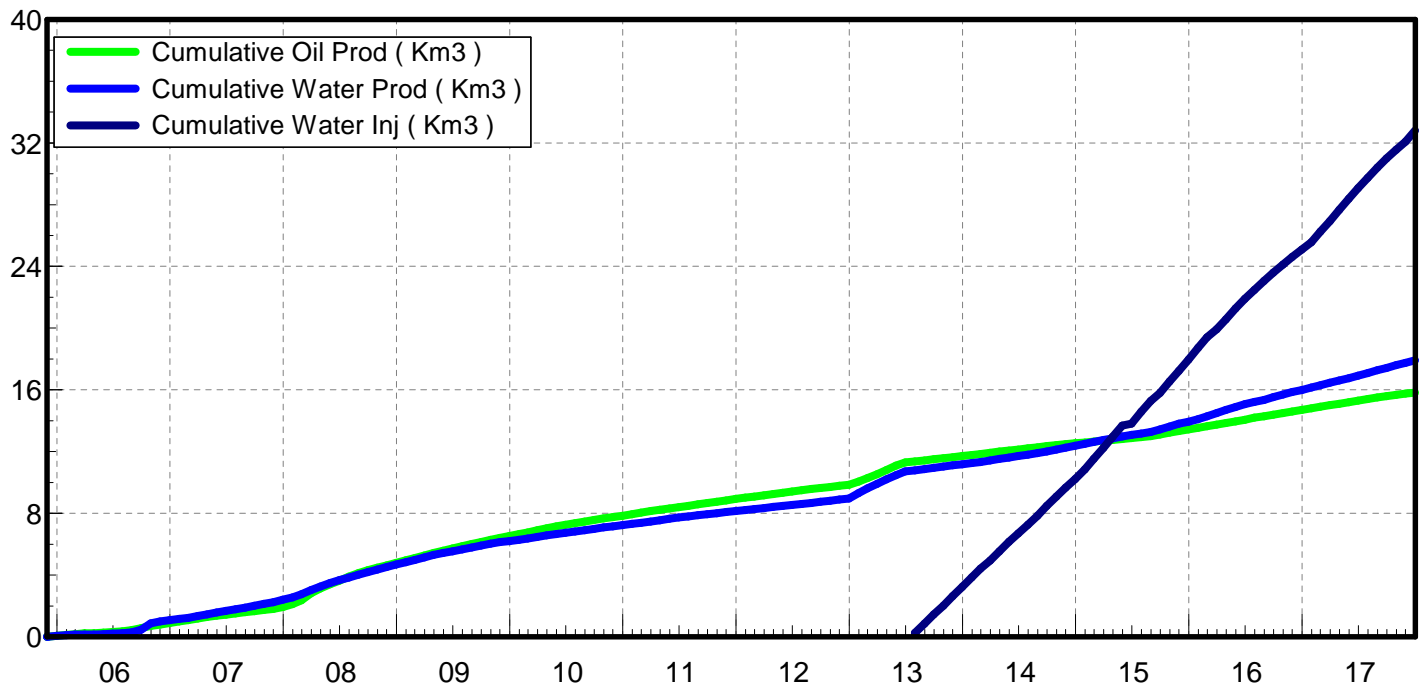
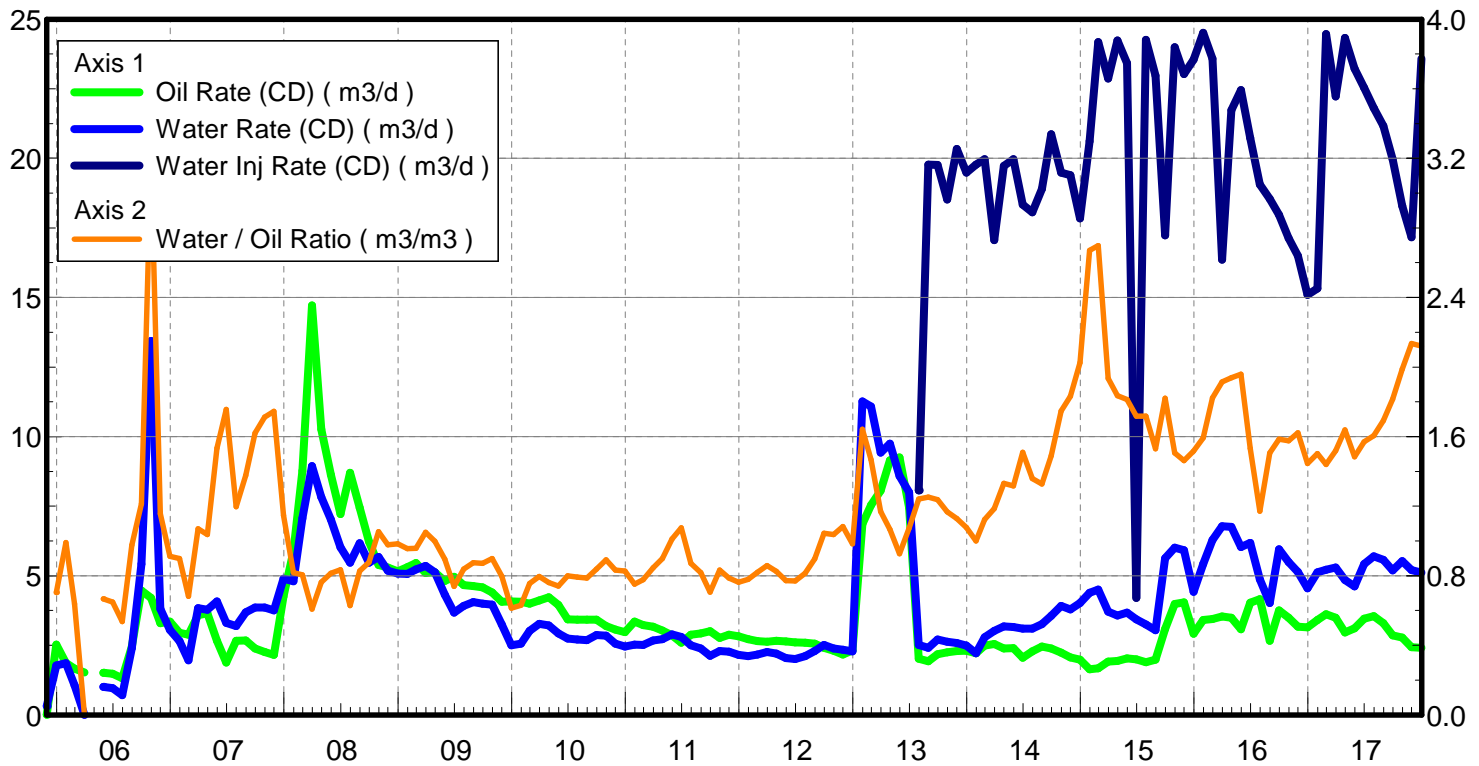
March 06, 2018

Operator: TUNDRA_OIL_AND_GAS_PARTNER

Oil Rate (CD) : 2.41 m3/d

Water Rate (CD) : 5.11 m3/d

Water Inj Rate (CD) : 23.58 m3/d



Date	Oil Rate (CD) m3/d	Water Rate (CD) m3/d	Water Oil Ratio m3/m3	Water Inj Rate (CD) m3/d	Cum Oil Prod Km3	Cum Water Prod Km3	Cum Water Inj Km3	VRR	Cum VRR
11/30/2005	0.01	0.31	37.60		0.00	0.01	0.00	0.000	0.000
12/31/2005	2.53	1.78	0.70		0.08	0.06	0.00	0.000	0.000
1/31/2006	1.87	1.85	0.99		0.14	0.12	0.00	0.000	0.000
2/28/2006	1.66	1.06	0.64		0.18	0.15	0.00	0.000	0.000
3/31/2006	1.53	0.00	0.00		0.23	0.15	0.00	0.000	0.000
4/30/2006					0.23	0.15	0.00		0.000
5/31/2006	1.52	1.01	0.67		0.28	0.18	0.00	0.000	0.000
6/30/2006	1.48	0.96	0.65		0.32	0.21	0.00	0.000	0.000
7/31/2006	1.32	0.71	0.54		0.36	0.23	0.00	0.000	0.000
8/31/2006	2.46	2.40	0.98		0.44	0.31	0.00	0.000	0.000
9/30/2006	4.47	5.43	1.21		0.57	0.47	0.00	0.000	0.000
10/31/2006	4.20	13.44	3.20		0.70	0.89	0.00	0.000	0.000
11/30/2006	3.29	3.81	1.16		0.80	1.00	0.00	0.000	0.000
12/31/2006	3.35	3.05	0.91		0.91	1.10	0.00	0.000	0.000
1/31/2007	2.95	2.65	0.90		1.00	1.18	0.00	0.000	0.000
2/28/2007	2.89	1.97	0.68		1.08	1.23	0.00	0.000	0.000
3/31/2007	3.59	3.84	1.07		1.19	1.35	0.00	0.000	0.000
4/30/2007	3.65	3.78	1.04		1.30	1.47	0.00	0.000	0.000
5/31/2007	2.66	4.08	1.53		1.38	1.59	0.00	0.000	0.000
6/30/2007	1.89	3.31	1.76		1.44	1.69	0.00	0.000	0.000
7/31/2007	2.67	3.19	1.20		1.52	1.79	0.00	0.000	0.000
8/31/2007	2.67	3.68	1.38		1.60	1.91	0.00	0.000	0.000
9/30/2007	2.38	3.86	1.62		1.68	2.02	0.00	0.000	0.000
10/31/2007	2.26	3.86	1.71		1.75	2.14	0.00	0.000	0.000
11/30/2007	2.15	3.76	1.75		1.81	2.25	0.00	0.000	0.000
12/31/2007	4.27	4.90	1.15		1.94	2.41	0.00	0.000	0.000
1/31/2008	5.88	4.81	0.82		2.12	2.55	0.00	0.000	0.000
2/29/2008	8.77	7.06	0.81		2.38	2.76	0.00	0.000	0.000
3/31/2008	14.72	8.95	0.61		2.83	3.04	0.00	0.000	0.000
4/30/2008	10.27	7.83	0.76		3.14	3.27	0.00	0.000	0.000
5/31/2008	8.63	7.02	0.81		3.41	3.49	0.00	0.000	0.000
6/30/2008	7.21	6.03	0.84		3.63	3.67	0.00	0.000	0.000
7/31/2008	8.70	5.47	0.63		3.90	3.84	0.00	0.000	0.000
8/31/2008	7.45	6.17	0.83		4.13	4.03	0.00	0.000	0.000
9/30/2008	6.23	5.46	0.88		4.31	4.19	0.00	0.000	0.000
10/31/2008	5.39	5.68	1.05		4.48	4.37	0.00	0.000	0.000
11/30/2008	5.30	5.18	0.98		4.64	4.53	0.00	0.000	0.000
12/31/2008	5.16	5.08	0.98		4.80	4.68	0.00	0.000	0.000
1/31/2009	5.30	5.07	0.96		4.96	4.84	0.00	0.000	0.000
2/28/2009	5.46	5.23	0.96		5.12	4.99	0.00	0.000	0.000
3/31/2009	5.10	5.35	1.05		5.28	5.15	0.00	0.000	0.000
4/30/2009	5.13	5.12	1.00		5.43	5.31	0.00	0.000	0.000
5/31/2009	4.82	4.32	0.90		5.58	5.44	0.00	0.000	0.000
6/30/2009	4.96	3.67	0.74		5.73	5.55	0.00	0.000	0.000
7/31/2009	4.66	3.91	0.84		5.87	5.67	0.00	0.000	0.000

Date	Oil Rate (CD) m3/d	Water Rate (CD) m3/d	Water Oil Ratio m3/m3	Water Inj Rate (CD) m3/d	Cum Oil Prod Km3	Cum Water Prod Km3	Cum Water Inj Km3	VRR	Cum VRR
8/31/2009	4.63	4.05	0.88		6.02	5.80	0.00	0.000	0.000
9/30/2009	4.58	3.99	0.87		6.15	5.92	0.00	0.000	0.000
10/31/2009	4.40	3.96	0.90		6.29	6.04	0.00	0.000	0.000
11/30/2009	4.07	3.25	0.80		6.41	6.14	0.00	0.000	0.000
12/31/2009	4.07	2.50	0.61		6.54	6.22	0.00	0.000	0.000
1/31/2010	4.06	2.56	0.63		6.66	6.29	0.00	0.000	0.000
2/28/2010	3.99	3.02	0.76		6.78	6.38	0.00	0.000	0.000
3/31/2010	4.11	3.27	0.80		6.90	6.48	0.00	0.000	0.000
4/30/2010	4.23	3.22	0.76		7.03	6.58	0.00	0.000	0.000
5/31/2010	3.95	2.93	0.74		7.15	6.67	0.00	0.000	0.000
6/30/2010	3.43	2.75	0.80		7.26	6.75	0.00	0.000	0.000
7/31/2010	3.42	2.71	0.79		7.36	6.83	0.00	0.000	0.000
8/31/2010	3.42	2.69	0.79		7.47	6.92	0.00	0.000	0.000
9/30/2010	3.42	2.87	0.84		7.57	7.00	0.00	0.000	0.000
10/31/2010	3.19	2.84	0.89		7.67	7.09	0.00	0.000	0.000
11/30/2010	3.07	2.56	0.83		7.76	7.17	0.00	0.000	0.000
12/31/2010	2.97	2.46	0.83		7.85	7.24	0.00	0.000	0.000
1/31/2011	3.36	2.53	0.75		7.96	7.32	0.00	0.000	0.000
2/28/2011	3.23	2.51	0.78		8.05	7.39	0.00	0.000	0.000
3/31/2011	3.17	2.68	0.85		8.15	7.48	0.00	0.000	0.000
4/30/2011	3.03	2.72	0.90		8.24	7.56	0.00	0.000	0.000
5/31/2011	2.86	2.89	1.01		8.33	7.65	0.00	0.000	0.000
6/30/2011	2.60	2.80	1.08		8.40	7.73	0.00	0.000	0.000
7/31/2011	2.88	2.50	0.87		8.49	7.81	0.00	0.000	0.000
8/31/2011	2.92	2.39	0.82		8.58	7.88	0.00	0.000	0.000
9/30/2011	3.00	2.12	0.71		8.67	7.95	0.00	0.000	0.000
10/31/2011	2.76	2.30	0.83		8.76	8.02	0.00	0.000	0.000
11/30/2011	2.88	2.27	0.79		8.85	8.09	0.00	0.000	0.000
12/31/2011	2.82	2.15	0.76		8.93	8.15	0.00	0.000	0.000
1/31/2012	2.72	2.12	0.78		9.02	8.22	0.00	0.000	0.000
2/29/2012	2.65	2.17	0.82		9.09	8.28	0.00	0.000	0.000
3/31/2012	2.63	2.26	0.86		9.18	8.35	0.00	0.000	0.000
4/30/2012	2.67	2.20	0.82		9.26	8.42	0.00	0.000	0.000
5/31/2012	2.64	2.04	0.77		9.34	8.48	0.00	0.000	0.000
6/30/2012	2.60	2.01	0.77		9.42	8.54	0.00	0.000	0.000
7/31/2012	2.59	2.11	0.81		9.50	8.61	0.00	0.000	0.000
8/31/2012	2.56	2.30	0.90		9.58	8.68	0.00	0.000	0.000
9/30/2012	2.41	2.51	1.04		9.65	8.75	0.00	0.000	0.000
10/31/2012	2.30	2.39	1.04		9.72	8.83	0.00	0.000	0.000
11/30/2012	2.16	2.34	1.08		9.78	8.90	0.00	0.000	0.000
12/31/2012	2.32	2.28	0.98		9.86	8.97	0.00	0.000	0.000
1/31/2013	6.86	11.27	1.64		10.07	9.32	0.00	0.000	0.000
2/28/2013	7.54	11.07	1.47		10.28	9.63	0.00	0.000	0.000
3/31/2013	8.06	9.42	1.17		10.53	9.92	0.00	0.000	0.000
4/30/2013	9.15	9.75	1.07		10.80	10.21	0.00	0.000	0.000

Date	Oil Rate (CD) m3/d	Water Rate (CD) m3/d	Water Oil Ratio m3/m3	Water Inj Rate (CD) m3/d	Cum Oil Prod Km3	Cum Water Prod Km3	Cum Water Inj Km3	VRR	Cum VRR
5/31/2013	9.25	8.58	0.93		11.09	10.48	0.00	0.000	0.000
6/30/2013	7.45	8.00	1.07		11.31	10.72	0.00	0.000	0.000
7/31/2013	2.02	2.51	1.24	8.06	11.38	10.80	0.25	1.727	0.011
8/31/2013	1.93	2.41	1.25	19.77	11.44	10.87	0.86	4.416	0.037
9/30/2013	2.19	2.71	1.24	19.77	11.50	10.95	1.46	3.921	0.063
10/31/2013	2.25	2.62	1.17	18.52	11.57	11.03	2.03	3.683	0.087
11/30/2013	2.29	2.59	1.13	20.33	11.64	11.11	2.64	4.039	0.112
12/31/2013	2.31	2.49	1.08	19.48	11.71	11.19	3.24	3.929	0.137
1/31/2014	2.21	2.21	1.00	19.77	11.78	11.26	3.86	4.318	0.162
2/28/2014	2.49	2.79	1.12	19.96	11.85	11.33	4.42	3.664	0.184
3/31/2014	2.55	3.02	1.19	17.06	11.93	11.43	4.95	2.973	0.204
4/30/2014	2.39	3.18	1.33	19.73	12.00	11.52	5.54	3.437	0.227
5/31/2014	2.40	3.16	1.32	19.97	12.08	11.62	6.16	3.483	0.251
6/30/2014	2.06	3.10	1.51	18.33	12.14	11.71	6.71	3.457	0.272
7/31/2014	2.28	3.10	1.36	18.06	12.21	11.81	7.27	3.259	0.292
8/31/2014	2.45	3.26	1.33	18.90	12.28	11.91	7.85	3.214	0.313
9/30/2014	2.39	3.56	1.49	20.87	12.36	12.02	8.48	3.410	0.336
10/31/2014	2.24	3.91	1.75	19.48	12.43	12.14	9.08	3.090	0.357
11/30/2014	2.07	3.79	1.83	19.40	12.49	12.25	9.66	3.230	0.377
12/31/2014	1.99	4.02	2.03	17.84	12.55	12.38	10.22	2.901	0.396
1/31/2015	1.64	4.39	2.67	20.61	12.60	12.51	10.86	3.356	0.418
2/28/2015	1.67	4.51	2.70	24.18	12.65	12.64	11.53	3.843	0.441
3/31/2015	1.92	3.71	1.94	22.87	12.71	12.76	12.24	3.969	0.465
4/30/2015	1.94	3.57	1.84	24.23	12.76	12.86	12.97	4.292	0.489
5/31/2015	2.03	3.67	1.81	23.42	12.83	12.98	13.70	4.011	0.513
6/30/2015	2.00	3.44	1.72	4.20	12.89	13.08	13.82	0.753	0.515
7/31/2015	1.89	3.25	1.72	24.26	12.95	13.18	14.57	4.605	0.539
8/31/2015	1.71	3.04	1.78	22.97	13.00	13.27	15.29	4.713	0.562
9/30/2015	1.74	2.46	1.42	17.23	13.05	13.35	15.80	3.989	0.579
10/31/2015	1.76	2.31	1.31	24.00	13.11	13.42	16.55	5.735	0.603
11/30/2015	1.81	2.39	1.32	23.03	13.16	13.49	17.24	5.323	0.625
12/31/2015	1.76	2.39	1.36	23.55	13.21	13.57	17.97	5.512	0.649
1/31/2016	1.55	2.04	1.32	24.52	13.26	13.63	18.73	6.633	0.673
2/29/2016	1.75	2.53	1.44	23.59	13.31	13.70	19.41	5.359	0.695
3/31/2016	1.82	2.72	1.49	16.35	13.37	13.79	19.92	3.510	0.709
4/30/2016	1.79	2.71	1.51	21.73	13.42	13.87	20.57	4.693	0.729
5/31/2016	1.64	2.58	1.57	22.45	13.47	13.95	21.27	5.181	0.750
6/30/2016	1.67	2.70	1.62	20.73	13.52	14.03	21.89	4.626	0.768
7/31/2016	1.54	2.76	1.79	19.06	13.57	14.11	22.48	4.320	0.785
8/31/2016	1.83	3.28	1.79	18.55	13.63	14.22	23.05	3.540	0.801
9/30/2016	1.48	2.84	1.92	17.97	13.67	14.30	23.59	4.062	0.816
10/31/2016	1.39	2.64	1.90	17.13	13.72	14.38	24.12	4.145	0.830
11/30/2016	1.19	2.69	2.26	16.50	13.75	14.46	24.62	4.164	0.844
12/31/2016	0.90	2.07	2.29	15.10	13.78	14.53	25.09	4.968	0.857
1/31/2017	1.14	2.72	2.39	15.32	13.82	14.61	25.56	3.889	0.870

Date	Oil Rate (CD) m3/d	Water Rate (CD) m3/d	Water Oil Ratio m3/m3	Water Inj Rate (CD) m3/d	Cum Oil Prod Km3	Cum Water Prod Km3	Cum Water Inj Km3	VRR	Cum VRR
2/28/2017	1.44	3.27	2.27	24.46	13.86	14.70	26.25	5.081	0.889
3/31/2017	1.48	3.47	2.34	22.23	13.90	14.81	26.94	4.402	0.908
4/30/2017	1.00	3.07	3.08	24.33	13.93	14.90	27.67	5.886	0.928
5/31/2017	1.32	3.00	2.28	23.23	13.97	15.00	28.39	5.260	0.948
6/30/2017	1.56	3.86	2.48	22.53	14.02	15.11	29.06	4.079	0.965
7/31/2017	1.54	4.08	2.65	21.81	14.07	15.24	29.74	3.803	0.982
8/31/2017	1.37	3.90	2.85	21.16	14.11	15.36	30.39	3.942	0.998
9/30/2017	1.12	3.56	3.17	19.97	14.14	15.47	30.99	4.201	1.013
10/31/2017	1.13	3.85	3.42	18.29	14.18	15.59	31.56	3.615	1.026
11/30/2017	1.01	3.64	3.60	17.17	14.21	15.70	32.08	3.637	1.038
12/31/2017	0.98	3.47	3.53	23.58	14.24	15.80	32.81	5.221	1.057