

Sinclair Unit No. 7

Waterflood Progress Report 2018

January 1st through December 31st 2018

Prepared for:

Manitoba Industry, Economic Development and Mines

Petroleum Branch

Prepared by:

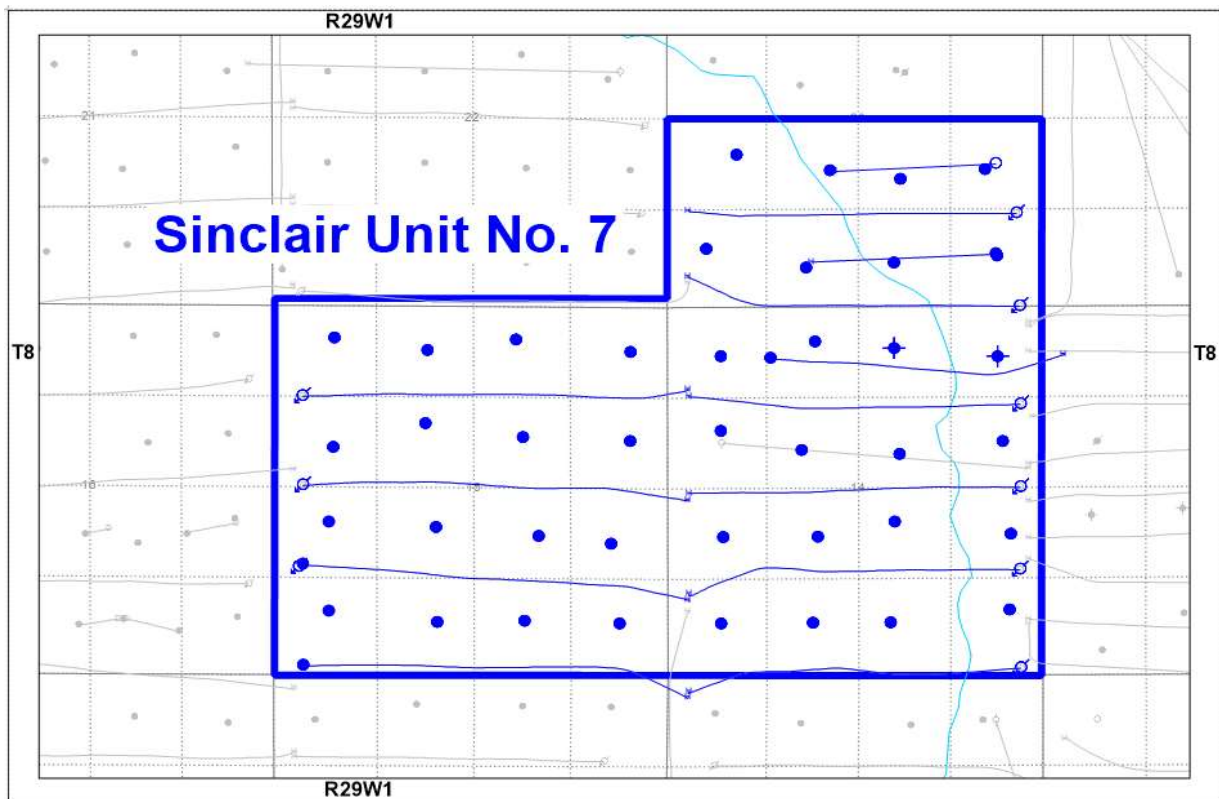
Tundra Oil and Gas

May 28, 2019

INTRODUCTION

Sinclair Unit No. 7 Enhanced Oil Recovery (EOR) Waterflood was approved under Waterflood Order No. 26 effective July 1, 2013 with Tundra Oil and Gas (Tundra) as operator. The Unit area contains 40 producing wells, 2 abandoned wells and 9 injection wells in 2.5 sections in Township 8 Range 29 W1 as shown in the figure below.

Figure 1: Sinclair Unit No. 7 Area Outline



Sinclair Unit No. 7

Tundra Oil and Gas (Tundra), as the operator of the Sinclair Unit No. 7 Enhanced Oil Recovery (EOR) project hereby submits the 2018 EOR report as per section 73 of the Drilling and Production Regulations.

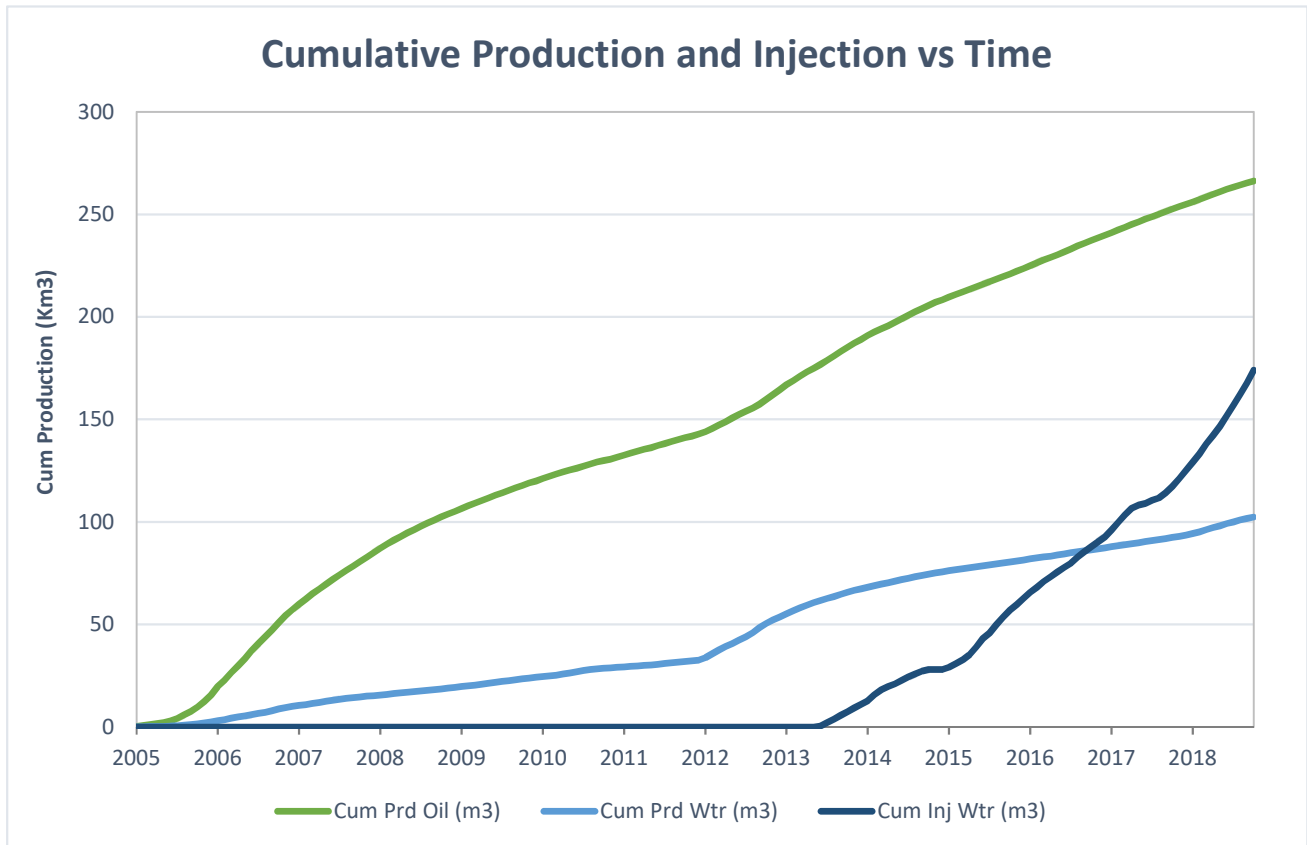
a) Monthly oil and water production rates, injection rate, GOR and WOR

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	41.33	17.83	127.16	0.43	0
Feb-2018	36.48	20.54	133.96	0.56	0
Mar-2018	38.28	26.94	135.61	0.70	0
Apr-2018	40.33	27.53	134.97	0.68	0
May-2018	41.46	34.42	153.94	0.83	0
Jun-2018	41.76	31.33	133.30	0.75	0
Jul-2018	40.62	30.51	149.71	0.75	0
Aug-2018	37.72	31.76	164.52	0.84	0
Sep-2018	34.83	29.29	169.93	0.84	0
Oct-2018	32.32	26.59	172.77	0.82	0
Nov-2018	32.49	26.02	182.53	0.80	0
Dec-2018	33.11	23.21	202.58	0.70	0

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

2018 PRODUCTION	
Produced Oil (m ³)	13,713
Produced Gas (m ³)	0
Produced Water (m ³)	9,929
Fluid Injected (m ³)	56,668
CUMULATIVE PRODUCTION	
Produced Oil (m ³)	266,300
Produced Water (m ³)	102,350

Sinclair Unit No. 7



c) Monthly wellhead injection pressure for each injection well

	02/16-14 Inj		02/09-14 Inj		02/01-23 Inj		02/05-15 Inj		03/05-15 Inj		03/01-14 Inj	
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	375.0	6560	371.0	6365	664.0	3323	900.0	-96	0.0	0	267.0	6566
Feb-2018	309.0	6307	215.0	6563	862.0	4909	1033.0	-96	0.0	0	197.0	6549
Mar-2018	452.0	6395	149.0	6483	927.0	5435	1131.0	-96	0.0	0	193.0	6564
Apr-2018	456.0	6315	347.0	6513	871.0	5967	1109.0	-96	0.0	0	142.0	6315
May-2018	521.0	6527	302.0	6576	1032.0	6341	1229.0	-97	0.0	0	164.0	6490
Jun-2018	392.0	6053	246.0	6530	798.0	6218	971.0	-97	0.0	0	122.0	6047
Jul-2018	31.0	1222	329.0	6529	1066.0	6345	1194.0	-96	0.0	0	147.0	6470
Aug-2018	591.0	5767	363.0	6563	1006.0	6549	1177.0	-95	0.0	0	137.0	6372
Sep-2018	589.0	5508	291.0	6568	914.0	6480	1181.0	-90	0.0	0	129.0	6489
Oct-2018	587.0	5237	315.0	6537	879.0	6451	1184.0	-83	240.0	17	131.0	6487
Nov-2018	636.0	6167	298.0	6534	801.0	6449	1125.0	366	460.0	8	117.0	6405
Dec-2018	713.0	6404	358.0	6557	817.0	6414	1226.0	1003	845.0	-90	57.0	5038
Total	5652.0		3584.0		10637.0		13460.0		1545.0		1803.0	
Avg Inj P		5705		6527		5907		36		-5		6316

	03/08-14 Inj		02/08-14 Inj		04/12-15 Inj		SU7	
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)
Jan-2018	811.0	6319	554.0	6559	0.0	0	3942.0	5085
Feb-2018	662.0	6550	444.0	6515	29.0	-9	3751.0	5069
Mar-2018	654.0	6523	459.0	6445	239.0	7	4204.0	4720
Apr-2018	561.0	6329	442.0	6527	121.0	-58	4049.0	4727
May-2018	605.0	6564	441.0	6568	478.0	-76	4772.0	4862
Jun-2018	489.0	6440	368.0	6490	613.0	-87	3999.0	4699
Jul-2018	567.0	6529	414.0	6544	893.0	-91	4641.0	4182
Aug-2018	526.0	6557	405.0	6561	895.0	-76	5100.0	4775
Sep-2018	500.0	8527	481.0	6548	1013.0	-6	5098.0	4982
Oct-2018	491.0	6519	496.0	6480	1033.0	2	5356.0	4213
Nov-2018	447.0	6480	467.0	6453	1125.0	-11	5476.0	4317
Dec-2018	492.0	6553	543.0	6522	1229.0	-92	6280.0	4256
Total	6805.0		5514.0		7668.0		56668.0	
Avg Inj P		6658		6518		-41		4657

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	3942.0	3751.0	4204.0	4049.0	4772.0	3999.0	4641.0	5100.0	5098.0	5356.0	5476.0	6280.0
Daily (m³/d)	127.16	133.96	135.61	134.97	153.94	133.30	149.71	164.52	169.93	172.77	182.53	202.58

c) Monthly wellhead injection pressure for each injection well

2018 AVG. ANNUAL DAILY INJECTION =	155.08 m3/d
CUMULATIVE INJECTION TO Dec 31, 2017 =	117,336 m3
TOTAL 2018 ANNUAL INJECTION =	56,668 m3
CUMULATIVE INJECTION TO Dec 31, 2018 =	174,004 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
100.01-23-008-29W1.00	Ratigan Install	2/24/2018
100.02-23-008-29W1.00	Ratigan Install	2/23/2018
100.06-15-008-29W1.00	Pump Change/Acid Job	8/9/2018
100.06-23-008-29W1.00	Pump Change	1/26/2018
100.06-23-008-29W1.00	Scale Squeeze SCW8234 + WAW3901	2/13/2018
100.07-14-008-29W1.00	Tubing Leak	5/15/2018
100.09-14-008-29W1.00	Pump Change/Acid Job	8/1/2018
100.09-15-008-29W1.00	Pump Change	5/31/2018
100.10-15-008-29W1.00	Broken Polish Rod- HCL Job	5/28/2018
100.14-15-008-29W1.00	Pump Change/Acid Job	7/9/2018
102.12-14-008-29W1.00	Pump Upsize	12/8/2018
103.01-23-008-29W1.00	Polish Rod Repair	12/6/2018
103.05-15-008-29W1.00	WIW Conversion	9/17/2018
104.12-15-008-29W1.00	WIW Conversion	2/3/2018

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	1281.3	253.87	552.8	92.97	3942.0	121.28	2.048	0.332
Feb-2018	1021.4	254.89	575	93.55	3751.0	125.03	2.248	0.341
Mar-2018	1186.6	256.08	835	94.38	4204.0	129.23	1.996	0.351
Apr-2018	1209.8	257.29	825.8	95.21	4049.0	133.28	1.909	0.359
May-2018	1285.3	258.57	1067	96.28	4772.0	138.05	1.953	0.370
Jun-2018	1252.9	259.82	939.8	97.22	3999.0	142.05	1.753	0.378
Jul-2018	1259.2	261.08	945.7	98.16	4641.0	146.69	2.023	0.388
Aug-2018	1169.2	262.25	984.6	99.15	5100.0	151.79	2.280	0.399
Sep-2018	1044.9	263.30	878.6	100.03	5098.0	156.89	2.552	0.411
Oct-2018	1001.8	264.30	824.2	100.85	5356.0	162.25	2.823	0.423
Nov-2018	974.6	265.27	780.5	101.63	5476.0	167.72	3.002	0.435
Dec-2018	1026.3	266.30	719.6	102.35	6280.0	174.00	3.453	0.449

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

The injection water for Sinclair Unit No. 7 will be sourced from the 16-32-007-29W1 well (Lodgepole formation). The water is treated at the 03-04-008-29W1 battery where it is filtered to 0.5 microns and has scale inhibitor added. The injection water is then distributed to the injectors through the dedicated infrastructure system.

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>
100/01-14-008-29W1/0	Vertical	Producing	-
103/01-14-008-29W1/0	Horizontal	Injection	-
100/02-14-008-29W1/0	Vertical	Producing	-
100/03-14-008-29W1/0	Vertical	Producing	-
100/04-14-008-29W1/0	Vertical	Producing	-
100/05-14-008-29W1/0	Vertical	Producing	-
100/06-14-008-29W1/0	Vertical	Producing	-
100/07-14-008-29W1/0	Vertical	Producing	-
100/08-14-008-29W1/0	Vertical	Producing	-
102/08-14-008-29W1/0	Horizontal	Injection	-
103/08-14-008-29W1/0	Horizontal	Injection	-
100/09-14-008-29W1/0	Vertical	Producing	-
102/09-14-008-29W1/0	Horizontal	Injection	-
100/10-14-008-29W1/0	Vertical	Producing	-
100/11-14-008-29W1/0	Vertical	Producing	-
100/12-14-008-29W1/0	Vertical	Producing	-
100/13-14-008-29W1/0	Vertical	Producing	-
100/14-14-008-29W1/0	Vertical	Producing	-
102/14-14-008-29W1/0	Horizontal	Producing	-
100/15-14-008-29W1/0	Vertical	Abandoned	-
100/16-14-008-29W1/0	Vertical	Abandoned	-
102/16-14-008-29W1/0	Horizontal	Injection	-
100/01-15-008-29W1/0	Vertical	Producing	-
100/02-15-008-29W1/0	Vertical	Producing	-
100/03-15-008-29W1/0	Vertical	Producing	-
100/04-15-008-29W1/0	Vertical	Producing	-
102/04-15-008-29W1/0	Horizontal	Producing	WIW Conversion
100/05-15-008-29W1/0	Vertical	Producing	-
102/05-15-008-29W1/0	Horizontal	Injection	-
103/05-15-008-29W1/0	Horizontal	Producing	-
100/06-15-008-29W1/0	Vertical	Producing	-
100/07-15-008-29W1/0	Vertical	Producing	-
100/08-15-008-29W1/0	Vertical	Producing	-
100/09-15-008-29W1/0	Vertical	Producing	-
100/10-15-008-29W1/0	Vertical	Producing	-
100/11-15-008-29W1/0	Vertical	Producing	-
102/12-15-008-29W1/0	Vertical	Producing	-
104/12-15-008-29W1/0	Horizontal	Injection	-
100/13-15-008-29W1/0	Vertical	Producing	-
100/14-15-008-29W1/0	Vertical	Producing	-
100/15-15-008-29W1/0	Vertical	Producing	-
100/16-15-008-29W1/0	Vertical	Producing	-
100/01-23-008-29W1/0	Vertical	Producing	-
102/01-23-008-29W1/0	Horizontal	Injection	-
103/01-23-008-29W1/0	Horizontal	Producing	-

j) Well List**Sinclair Unit No. 7 Well List**

<i>UWI</i>	<i>Type</i>	<i>Status</i>	<i>Future Plans</i>
100/02-23-008-29W1/0	Vertical	Producing	-
100/03-23-008-29W1/0	Vertical	Producing	-
100/04-23-008-29W1/0	Vertical	Producing	-
100/05-23-008-29W1/0	Vertical	Producing	-
100/06-23-008-29W1/0	Vertical	Producing	-
100/07-23-008-29W1/0	Vertical	Producing	-
100/08-23-008-29W1/0	Vertical	Producing	-