

Sinclair Unit No. 11

Waterflood Progress Report 2018

January 1st through December 31st 2018

Prepared for:

Manitoba Industry, Economic Development and Mines

Petroleum Branch

Prepared by:

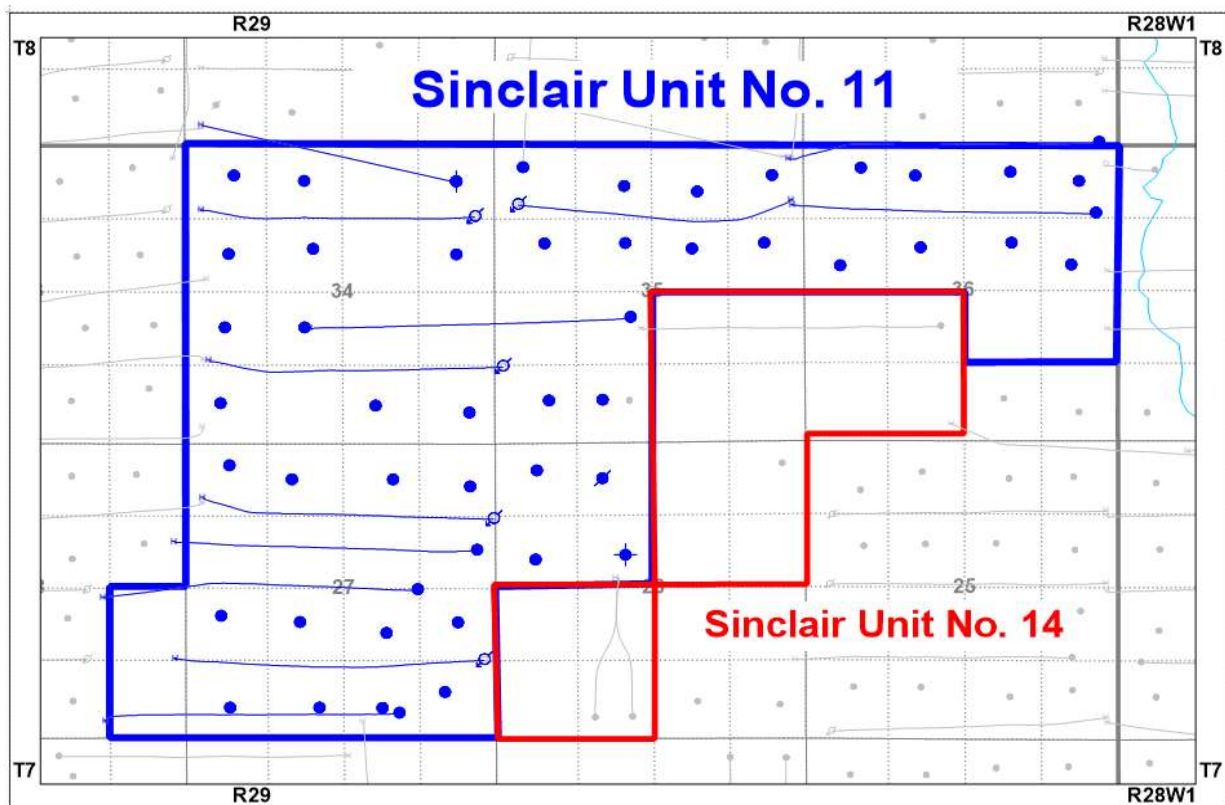
Tundra Oil and Gas

May 30, 2019

INTRODUCTION

Sinclair Unit No. 11 Enhanced Oil Recovery (EOR) Waterflood Project was approved under Waterflood Order No. 47, effective August 1, 2015 with Tundra Oil and Gas (Tundra) as Operator. The Unit area contains 48 producing wells, 2 abandoned/ suspended wells and 7 injection wells in 60 LSDs in Township 7 Range 29 W1 as shown in the figure below.

Figure 1: Sinclair Unit No. 11 Area Outline



Sinclair Unit No. 11

Tundra Oil and Gas (Tundra), as the operator of the Sinclair Unit No. 11 Enhanced Oil Recovery (EOR) project hereby submits the 2018 EOR report as per section 73 of the Drilling and Production Regulations.

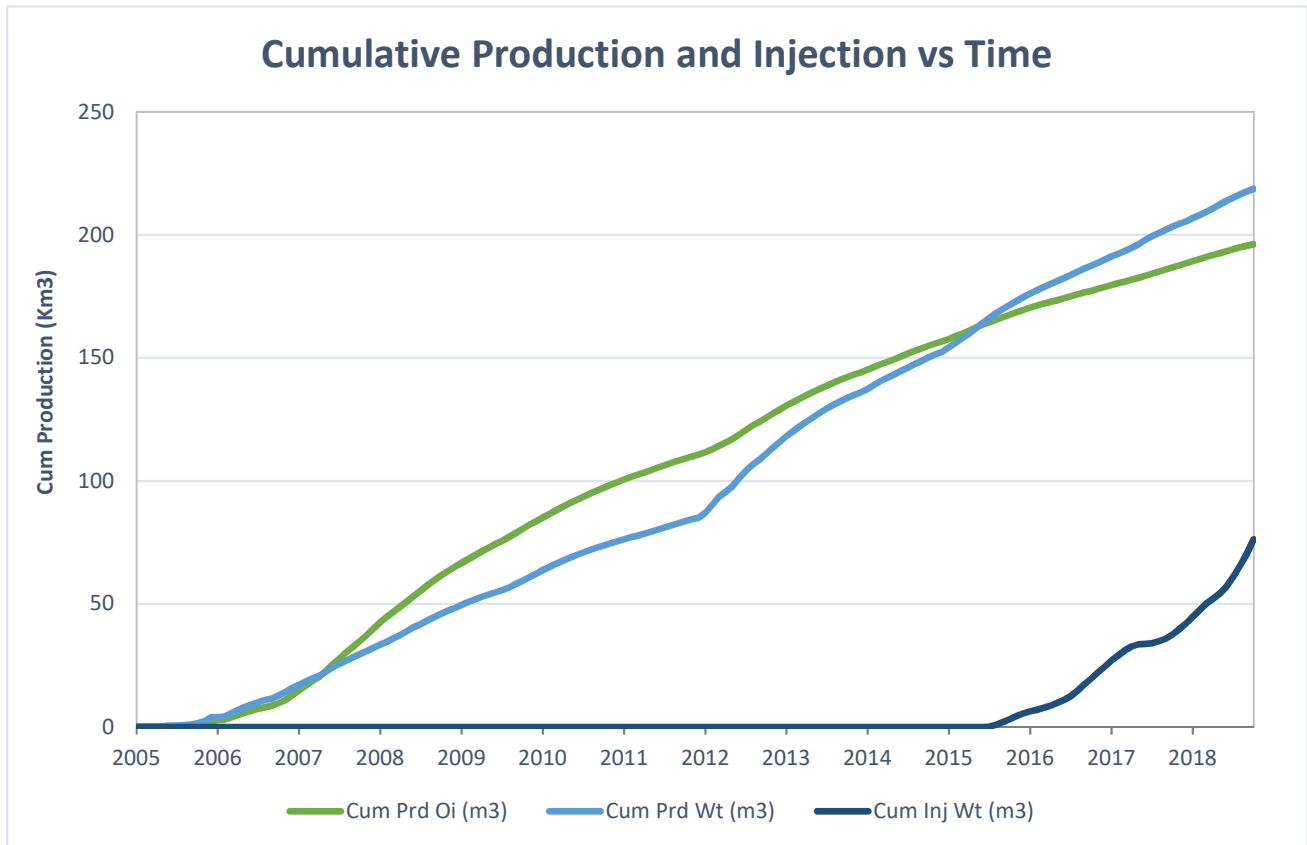
a) Monthly oil and water production rates, injection rate, GOR and WOR

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	27.26	39.47	70.81	1.45	0
Feb-2018	25.80	31.78	83.50	1.23	0
Mar-2018	30.19	44.86	88.39	1.49	0
Apr-2018	28.74	39.46	84.37	1.37	0
May-2018	27.67	41.50	89.26	1.50	0
Jun-2018	28.25	48.24	64.37	1.71	0
Jul-2018	25.24	53.02	69.52	2.10	0
Aug-2018	23.65	46.49	94.65	1.97	0
Sep-2018	25.53	45.92	130.97	1.80	0.26
Oct-2018	24.60	39.87	147.00	1.62	0.79
Nov-2018	21.65	39.83	159.07	1.84	0.77
Dec-2018	20.98	35.76	187.42	1.70	0.77

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

2018 PRODUCTION	
Produced Oil (m ³)	9,414
Produced Gas (m ³)	2
Produced Water (m ³)	15,423
Fluid Injected (m ³)	38,659
CUMULATIVE PRODUCTION	
Produced Oil (m ³)	196,190
Produced Water (m ³)	218,757

Sinclair Unit No. 11



c) Monthly wellhead injection pressure for each injection well

	02/01-27 Inj		02/04-35 Inj		02/09-27 Inj		02/13-35 Inj		02/16-34 Inj		02/16-36 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	354.0	-94	318.0	-93	609.0	-93	914.0	-96	0.0	0	0.0	0
Feb-2018	490.0	-95	387.0	-94	554.0	-93	907.0	-96	0.0	0	0.0	0
Mar-2018	612.0	-95	463.0	-93	612.0	-93	1053.0	48	0.0	0	0.0	0
Apr-2018	554.0	52	436.0	-93	561.0	-93	980.0	366	0.0	0	0.0	0
May-2018	615.0	703	474.0	-93	603.0	-93	1075.0	1381	0.0	0	0.0	0
Jun-2018	533.0	1223	331.0	-93	425.0	-93	642.0	236	0.0	0	0.0	0
Jul-2018	407.0	2719	480.0	-79	808.0	-92	460.0	331	0.0	0	0.0	0
Aug-2018	829.0	267	673.0	108	909.0	-14	389.0	-61	134.0	137	0.0	0
Sep-2018	881.0	796	596.0	231	1018.0	656	453.0	485	981.0	-64	0.0	0
Oct-2018	1025.0	821	730.0	811	1017.0	969	598.0	1784	1187.0	-90	0.0	0
Nov-2018	1024.0	823	966.0	1941	1116.0	2013	541.0	2633	1116.0	-90	0.0	0
Dec-2018	1017.0	815	1075.0	2630	1227.0	2145	560.0	2734	1225.0	-95	112.0	-41
Total	8341.0		6929.0		9459.0		8572.0		4643.0		112.0	
Avg Inj P		661		423		427		812		-17		-3

	02/07-27 Inj		SU11	
MONTH	Inj Water (m ³)	Avg Inj P (kPa)	Inj Water (m ³)	Avg Inj P (kPa)
Jan-2018	0.0	0	2195.0	-94
Feb-2018	0.0	0	2338.0	-94
Mar-2018	0.0	0	2740.0	-58
Apr-2018	0.0	0	2531.0	58
May-2018	0.0	0	2767.0	475
Jun-2018	0.0	0	1931.0	318
Jul-2018	0.0	0	2155.0	720
Aug-2018	0.0	0	2934.0	86
Sep-2018	0.0	0	3929.0	421
Oct-2018	0.0	0	4557.0	859
Nov-2018	9.0	94	4772.0	1411
Dec-2018	594.0	-49	5810.0	1191
Total	603.0		38659.0	
Avg Inj P		4		441

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	2195.0	2338.0	2740.0	2531.0	2767.0	1931.0	2155.0	2934.0	3929.0	4557.0	4772.0	5810.0
Daily (m³/d)	70.81	83.50	88.39	84.37	89.26	64.37	69.52	94.65	130.97	147.00	159.07	187.42

c) Monthly wellhead injection pressure for each injection well

2018 AVG. ANNUAL DAILY INJECTION =	105.77 m3/d
CUMULATIVE INJECTION TO Dec 31, 2017 =	37,587 m3
TOTAL 2018 ANNUAL INJECTION =	38,659 m3
CUMULATIVE INJECTION TO Dec 31, 2018 =	76,246 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
100.02-34-007-29W1.00	Scale Squeeze SCW8234 + WAW3901	1/10/2018
100.04-35-007-29W1.00	Scale Squeeze SCW8234 + WAW3901	1/17/2018
100.09-27-007-29W1.00	Pump Change	6/4/2018
100.10-35-007-29W1.00	Pump Change/Acid Job	8/3/2018
100.11-36-007-29W1.00	Pump Change/Acid Job	8/8/2018
100.12-36-007-29W1.00	Pump Change/Acid Job	9/5/2018
100.14-35-007-29W1.00	Scale Squeeze SCW8234 + WAW3901	2/13/2018
100.16-34-007-29W1.00	Pump Change/Acid Job	8/9/2018
100.16-36-007-29W1.00	Polish Rod Repair	8/7/2018
102.01-27-007-29W1.00	Packer Repair	7/31/2018
102.07-27-007-29W1.00	OH WIW Conversion	11/19/2018
102.16-34-007-29W1.00	Convert to WIW Well	8/4/2018
102.16-36-007-29W1.00	WIW Conversion	11/23/2018
103.16-36-007-29W1.00	Polish Rod Repair	11/14/2018

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	845.1	187.62	1223.5	204.56	2195.0	39.78	1.031	0.098
Feb-2018	722.3	188.34	889.8	205.45	2338.0	42.12	1.406	0.103
Mar-2018	935.8	189.28	1390.6	206.84	2740.0	44.86	1.145	0.110
Apr-2018	862.1	190.14	1183.8	208.02	2531.0	47.39	1.201	0.115
May-2018	857.7	191.00	1286.4	209.31	2767.0	50.16	1.255	0.121
Jun-2018	847.4	191.85	1447.1	210.76	1931.0	52.09	0.820	0.125
Jul-2018	782.5	192.63	1643.7	212.40	2155.0	54.24	0.868	0.130
Aug-2018	733.1	193.36	1441.2	213.84	2934.0	57.18	1.318	0.136
Sep-2018	765.8	194.13	1377.7	215.22	3929.0	61.11	1.788	0.144
Oct-2018	762.5	194.89	1235.9	216.45	4557.0	65.66	2.220	0.154
Nov-2018	649.5	195.54	1194.8	217.65	4772.0	70.44	2.524	0.165
Dec-2018	650.4	196.19	1108.7	218.76	5810.0	76.25	3.218	0.178

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

The injection water for Sinclair Unit No. 8 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>
100/11-26-007-29W1/0	Vertical	Abandoned Zone	-
100/12-26-007-29W1/0	Vertical	Producing	-
100/13-26-007-29W1/0	Vertical	Producing	-
100/14-26-007-29W1/0	Vertical	Suspended	-
100/01-27-007-29W1/0	Vertical	Producing	-
102/01-27-007-29W1/0	Horizontal	Injection	-
100/02-27-007-29W1/0	Vertical	Producing	-
102/02-27-007-29W1/0	Horizontal	Producing	-
100/03-27-007-29W1/0	Vertical	Producing	-
100/04-27-007-29W1/0	Vertical	Producing	-
100/05-27-007-29W1/0	Vertical	Producing	-
100/06-27-007-29W1/0	Vertical	Producing	-
100/07-27-007-29W1/0	Vertical	Producing	-
102/07-27-007-29W1/0	Horizontal	Injection	-
100/08-27-007-29W1/0	Vertical	Producing	-
100/09-27-007-29W1/0	Horizontal	Producing	-
102/09-27-007-29W1/0	Horizontal	Injection	-
100/13-27-007-29W1/0	Vertical	Producing	-
100/14-27-007-29W1/0	Vertical	Producing	-
100/15-27-007-29W1/0	Vertical	Producing	-
100/16-27-007-29W1/0	Vertical	Producing	-
100/01-34-007-29W1/0	Vertical	Producing	-
100/02-34-007-29W1/0	Vertical	Producing	-
100/04-34-007-29W1/0	Vertical	Producing	-
100/05-34-007-29W1/0	Vertical	Producing	-
100/06-34-007-29W1/0	Vertical	Producing	-
100/09-34-007-29W1/0	Vertical	Producing	-
100/11-34-007-29W1/0	Vertical	Producing	-
100/12-34-007-29W1/0	Vertical	Producing	-
100/13-34-007-29W1/0	Vertical	Producing	-
100/14-34-007-29W1/0	Vertical	Producing	-
100/16-34-007-29W1/0	Vertical	Producing	-
102/16-34-007-29W1/0	Horizontal	Injection	-
103/16-34-007-29W1/0	Horizontal	Drilled & Cased	-
100/03-35-007-29W1/0	Vertical	Producing	-
100/04-35-007-29W1/0	Vertical	Producing	-
102/04-35-007-29W1/0	Horizontal	Injection	-
100/06-35-007-29W1/0	Horizontal	Producing	-
100/09-35-007-29W1/0	Vertical	Producing	-
100/10-35-007-29W1/0	Vertical	Producing	-
100/11-35-007-29W1/0	Vertical	Producing	-
100/12-35-007-29W1/0	Vertical	Producing	-
100/13-35-007-29W1/0	Vertical	Producing	-
102/13-35-007-29W1/0	Horizontal	Injection	-
100/14-35-007-29W1/0	Vertical	Producing	-

j) Well List

Sinclair Unit No. 11 Well List

<i>UWI</i>	<i>Type</i>	<i>Status</i>	<i>Future Plans</i>
100/15-35-007-29W1/0	Vertical	Producing	-
100/16-35-007-29W1/0	Vertical	Producing	-
100/09-36-007-29W1/0	Vertical	Producing	-
100/10-36-007-29W1/0	Vertical	Producing	-
100/11-36-007-29W1/0	Vertical	Producing	-
100/12-36-007-29W1/0	Vertical	Producing	-
100/13-36-007-29W1/0	Vertical	Producing	-
100/14-36-007-29W1/0	Vertical	Producing	-
100/15-36-007-29W1/0	Vertical	Producing	-
100/16-36-007-29W1/0	Vertical	Producing	-
102/16-36-007-29W1/0	Horizontal	Injection	-
103/16-36-007-29W1/0	Horizontal	Producing	WIW Conversion