

Sinclair Unit No. 11

Waterflood Progress Report 2019

January 1st through December 31st 2019

Prepared for:

Manitoba Industry, Economic Development and Mines

Petroleum Branch

Prepared by:

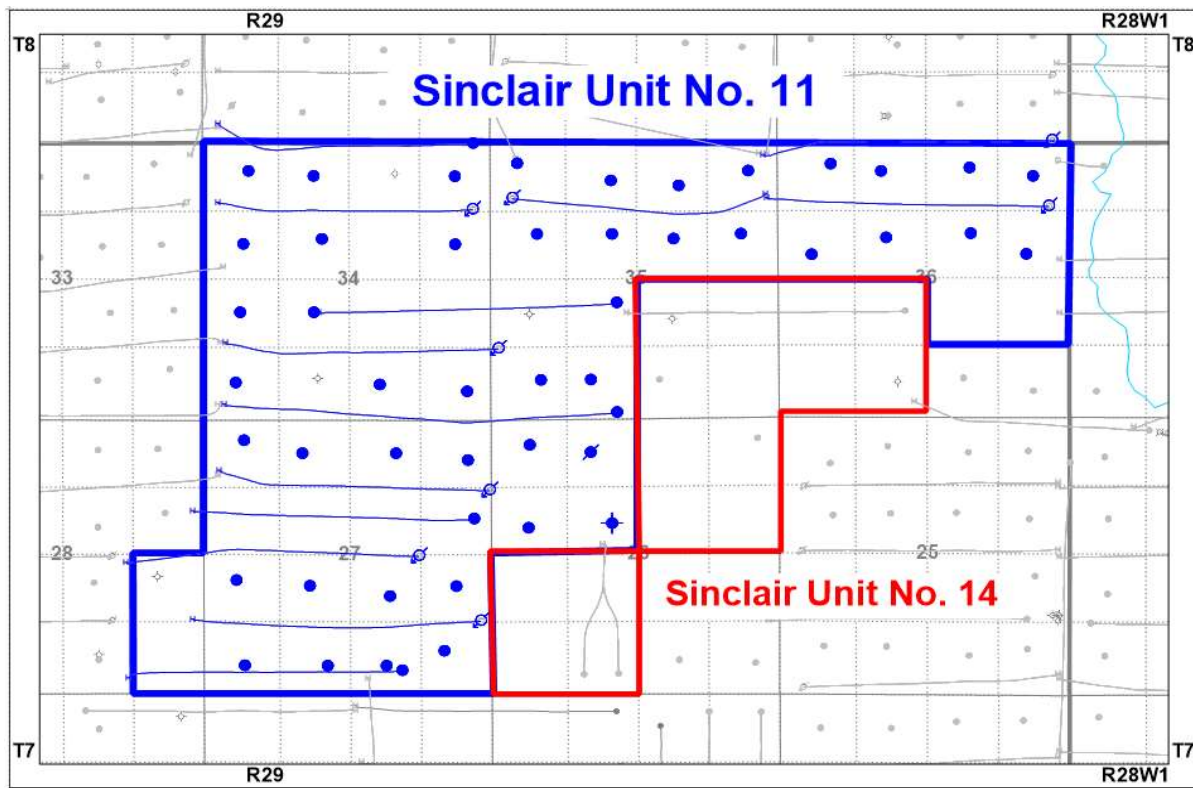
Tundra Oil and Gas

June 9, 2020

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 8 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 2019 EOR report as per section 73 of the Drilling and Production Regulations.

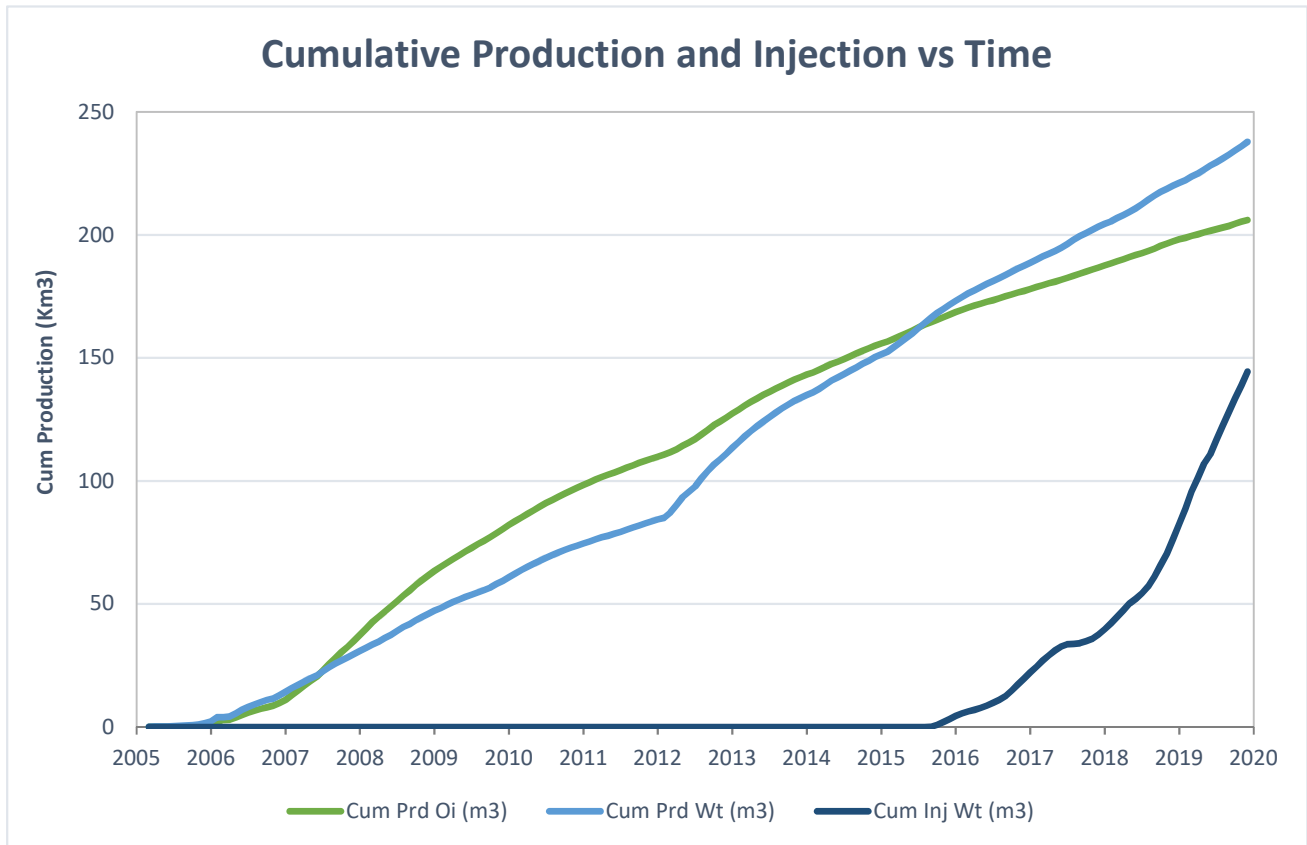
a) Monthly oil and water production rates, injection rate, GOR and WOR

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-2019	25.62	40.26	206.32	1.57	0.63
Feb-2019	23.82	36.32	216.46	1.52	0.75
Mar-2019	25.21	45.48	222.68	1.80	0.77
Apr-2019	22.75	45.41	186.77	2.00	0.44
May-2019	24.28	50.92	184.71	2.10	0
Jun-2019	22.48	53.81	133.30	2.39	0
Jul-2019	22.00	43.47	186.29	1.98	0
Aug-2019	19.90	46.75	182.97	2.35	0
Sep-2019	22.64	52.76	188.17	2.33	0.88
Oct-2019	28.03	56.70	177.16	2.02	0
Nov-2019	25.50	56.07	179.70	2.20	0
Dec-2019	23.23	58.94	177.23	2.54	0.42

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

2019 PRODUCTION	
Produced Oil (m ³)	8,684
Produced Gas (m ³)	3
Produced Water (m ³)	17,876
Fluid Injected (m ³)	68,157
CUMULATIVE PRODUCTION	
Produced Oil (m ³)	206,026
Produced Water (m ³)	237,834

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-2019	1197.0	801	783.0	2301	1228.0	2377	506.0	2834	1210.0	-95	427.0	-94
Feb-2019	1099.0	793	695.0	2372	1106.0	3462	321.0	2713	1105.0	-94	601.0	-95
Mar-2019	1184.0	1595	764.0	2570	1204.0	2810	283.0	2743	1211.0	172	921.0	-92
Apr-2019	502.0	3534	658.0	2486	1040.0	2736	253.0	2865	1048.0	1087	696.0	-95
May-2019	382.0	3233	681.0	2567	1026.0	2541	276.0	2977	934.0	1921	777.0	-95
Jun-2019	240.0	2893	439.0	2280	638.0	2076	243.0	2972	575.0	2141	681.0	-95
Jul-2019	439.0	3139	705.0	2806	1145.0	3021	243.0	3456	786.0	2943	775.0	-94
Aug-2019	661.0	3996	698.0	3068	1097.0	3350	217.0	3106	116.0	2139	1033.0	-92
Sep-2019	809.0	4930	625.0	2941	1000.0	3439	215.0	2549	0.0	2080	1155.0	-93
Oct-2019	741.0	5126	601.0	2946	988.0	3421	224.0	2584	0.0	2080	1204.0	-93
Nov-2019	700.0	5469	568.0	2982	906.0	3420	219.0	2831	256.0	1130	1143.0	-93
Dec-2019	651.0	5631	553.0	3809	815.0	3057	219.0	2631	578.0	1394	1141.0	-91
Total	8605.0		7770.0		12193.0		3219.0		7819.0		10554.0	
Avg Inj P		3428		2761		2976		2855		1408		-93

	02/07-27 Inj		03/16-36 Inj		SU11	
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)
Jan-2019	1045.0	-95	0.0	0	6396.0	1126
Feb-2019	1117.0	-95	17.0	0	6061.0	1231
Mar-2019	988.0	-89	348.0	-62	6903.0	1206
Apr-2019	854.0	-94	552.0	-94	5603.0	1553
May-2019	1077.0	69	573.0	-94	5726.0	1640
Jun-2019	698.0	66	485.0	-94	3999.0	1530
Jul-2019	1174.0	1300	508.0	-94	5775.0	2060
Aug-2019	1209.0	2226	641.0	-94	5672.0	2213
Sep-2019	1115.0	2942	726.0	-94	5645.0	2337
Oct-2019	975.0	3051	759.0	-94	5492.0	2377
Nov-2019	847.0	2977	752.0	-94	5391.0	2328
Dec-2019	804.0	2980	733.0	-93	5494.0	2415
Total	11903.0		6094.0		68157.0	
Avg Inj P		1270		-76		

MONTH	Jan-2019	Feb-2019	Mar-2019	Apr-2019	May-2019	Jun-2019	Jul-2019	Aug-2019	Sep-2019	Oct-2019	Nov-2019	Dec-2019
Total m3	6396.0	6061.0	6903.0	5603.0	5726.0	3999.0	5775.0	5672.0	5645.0	5492.0	5391.0	5494.0
Daily (m³/d)	206.32	216.46	222.68	186.77	184.71	133.30	186.29	182.97	188.17	177.16	179.70	177.23

c) Monthly wellhead injection pressure for each injection well

2019 AVG. ANNUAL DAILY INJECTION =	186.81 m3/d
CUMULATIVE INJECTION TO Dec 31, 2018 =	76,246 m3
TOTAL 2019 ANNUAL INJECTION =	68,157 m3
CUMULATIVE INJECTION TO Dec 31, 2019 =	144,403 m3

d) Summary of the result of any survey of reservoir pressure conducted in 2019. N/A

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

Well	Service Description	Date
100.01-34-007-29W1.00	Pump Change	8/19/2019
100.03-27-007-29W1.00	Scale Squeeze	7/25/2019
100.03-35-007-29W1.00	Rig Acid Stimulation	9/4/2019
100.04-34-007-29W1.00	Scale Squeeze	8/29/2019
100.05-27-007-29W1.00	Rod Repair	12/19/2019
100.05-34-007-29W1.00	Scale Squeeze	8/29/2019
100.09-35-007-29W1.00	Rig Acid Stimulation	8/30/2019
100.10-36-007-29W1.00	Scale Squeeze	7/25/2019
100.11-34-007-29W1.00	Rig Acid Stimulation	9/9/2019
100.12-34-007-29W1.00	Rig Acid Stimulation	9/16/2019
100.12-35-007-29W1.00	Pump Change & Acid Job	8/9/2019
100.13-34-007-29W1.00	Rig Acid Stimulation	9/5/2019
100.13-35-007-29W1.00	Rig Acid Stimulation	11/5/2019
100.14-34-007-29W1.00	Pump Change & Acid Job	8/21/2019
103.16-36-007-29W1.00	WIWConversion	2/12/2019

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-2019	794.1	198.14	1248.1	221.21	6396.0	82.64	3.048	0.191
Feb-2019	667.0	198.80	1017	222.22	6061.0	88.70	3.501	0.204
Mar-2019	781.4	199.58	1409.9	223.63	6903.0	95.61	3.072	0.219
Apr-2019	682.4	200.27	1362.2	224.99	5603.0	101.21	2.677	0.230
May-2019	752.7	201.02	1578.4	226.57	5726.0	106.94	2.401	0.242
Jun-2019	674.3	201.69	1614.2	228.19	3999.0	110.93	1.712	0.250
Jul-2019	682.0	202.38	1347.7	229.53	5775.0	116.71	2.779	0.262
Aug-2019	617.0	202.99	1449.2	230.98	5672.0	122.38	2.688	0.273
Sep-2019	679.3	203.67	1582.8	232.57	5645.0	128.03	2.443	0.284
Oct-2019	868.9	204.54	1757.7	234.32	5492.0	133.52	2.043	0.294
Nov-2019	765.1	205.31	1682.1	236.01	5391.0	138.91	2.155	0.305
Dec-2019	720.1	206.03	1827	237.83	5494.0	144.40	2.115	0.315

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

The injection water for Sinclair Unit No. 11 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	Producing	-
100/03-35-007-29W1/0	Vertical	Producing	-
102/03-35-007-29W1/0	Horizontal	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	-

j) Well List

Sinclair Unit No. 11 Well List

<i>UWI</i>	<i>Type</i>	<i>Status</i>	<i>Future Plans</i>
100/14-35-007-29W1/0	Vertical	Producing	-
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	-