

Sinclair Unit No. 12

Waterflood Progress Report 2019

January 1st through December 31st 2019

Prepared for:

Manitoba Industry, Economic Development and Mines

Petroleum Branch

Prepared by:

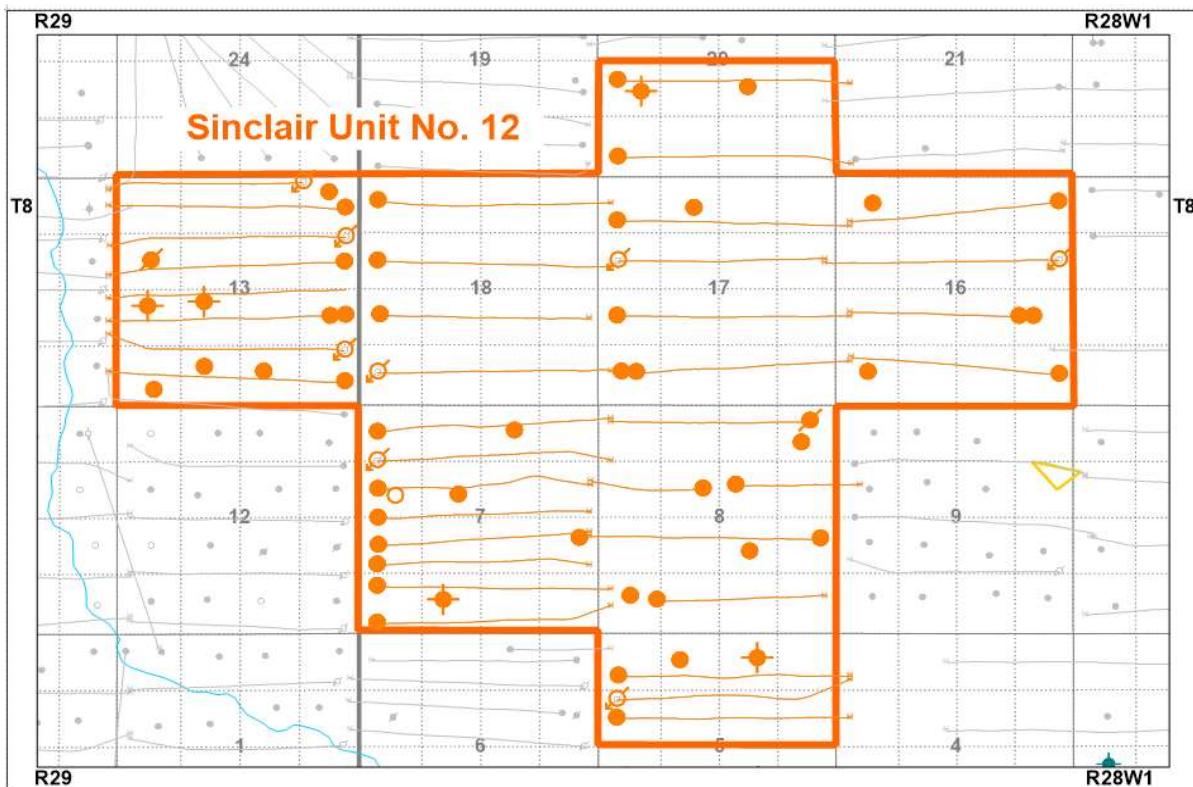
Tundra Oil and Gas

June 10, 2020

INTRODUCTION

Sinclair Unit No. 12 Enhanced Oil Recovery (EOR) Waterflood Project was approved under Waterflood Order No. 44, effective February 1, 2015 with Tundra Oil and Gas (Tundra) as Operator. The EOR Unit area, outlined in orange, contains 45 producing wells and 10 injection wells in 112 LSDs in Township 8 Ranges 28 & 29 W1 as shown in the figure below.

Figure 1: Sinclair Unit No. 12 Area Outline



Sinclair Unit No. 12

Tundra Oil and Gas (Tundra), as the operator of the Sinclair Unit No. 12 Enhanced Oil Recovery (EOR) project hereby submits the 2019 EOR report as per section 73 of the Drilling and Production Regulations.

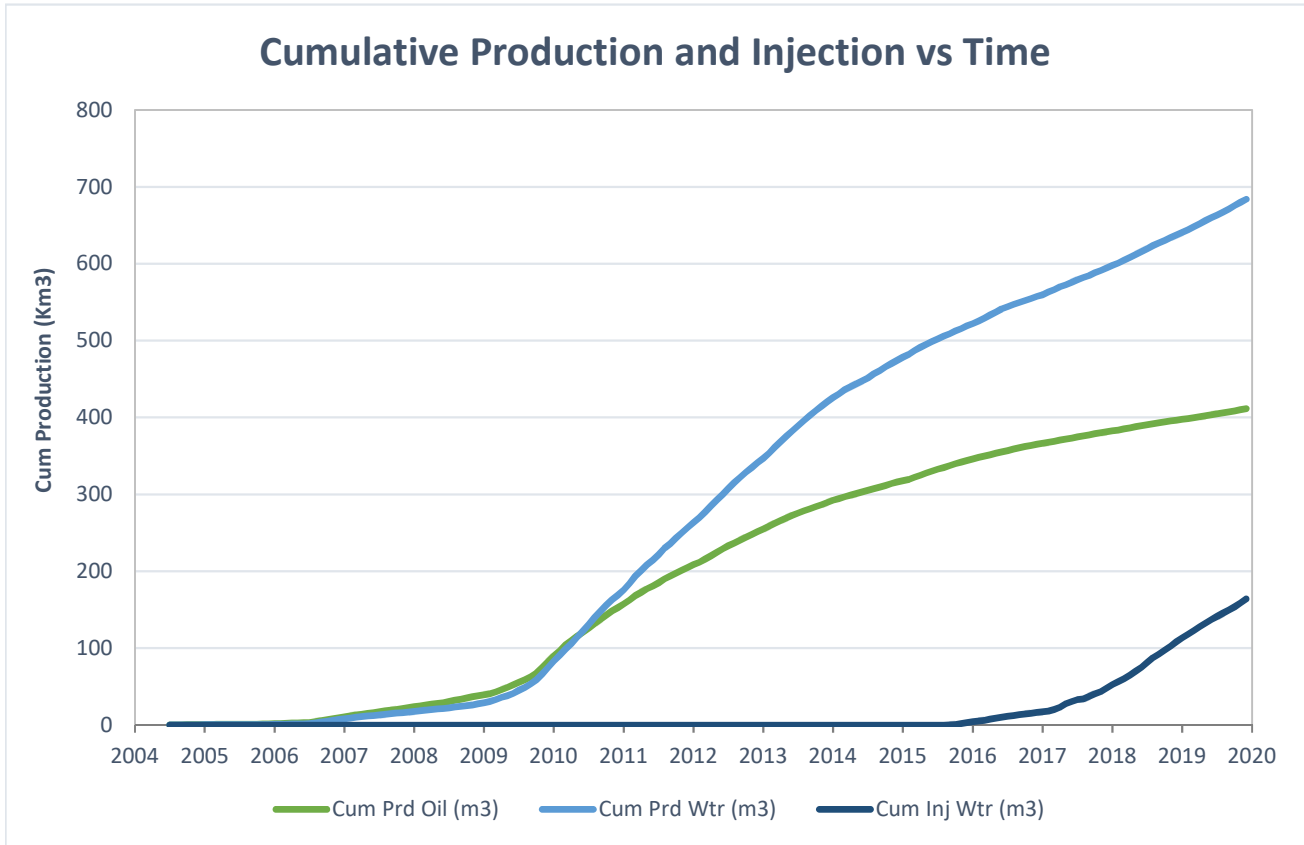
a) Monthly oil and water production rates, injection rate, GOR and WOR

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	33.15	109.25	163.81	3.30	0.58
Feb-2019	30.64	108.18	156.21	3.53	0
Mar-2019	43.11	135.99	167.42	3.15	10.48
Apr-2019	42.33	130.93	163.73	3.09	0
May-2019	42.56	127.68	155.10	3.00	0
Jun-2019	39.33	129.03	149.77	3.28	0
Jul-2019	36.95	109.44	132.68	2.96	0
Aug-2019	38.38	113.82	128.39	2.97	0
Sep-2019	39.59	145.29	141.70	3.67	0
Oct-2019	47.14	141.64	133.13	3.00	0
Nov-2019	50.55	139.96	173.37	2.77	0
Dec-2019	45.08	128.18	166.32	2.84	0.29

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

2019 PRODUCTION	
Produced Oil (m ³)	14,889
Produced Gas (m ³)	15
Produced Water (m ³)	46,231
Fluid Injected (m ³)	55,683
CUMULATIVE PRODUCTION	
Produced Oil (m ³)	411,526
Produced Water (m ³)	683,810

Sinclair Unit No. 12



c) Monthly wellhead injection pressure for each injection well

	02/05-07 Inj		03/05-07 Inj		02/12-05 Inj		00/04-18 Inj		00/09-16 Inj		00/12-17 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	613.0	-95	0.0	0	0.0	-92	709.0	6478	455.0	6334	442.0	6543
Feb-2019	597.0	-94	0.0	0	0.0	-92	599.0	6339	394.0	6503	367.0	6514
Mar-2019	878.0	-94	317.0	-86	0.0	-92	685.0	6467	373.0	6416	375.0	6474
Apr-2019	789.0	-94	427.0	-95	0.0	-92	640.0	6312	337.0	6376	356.0	6442
May-2019	729.0	-94	414.0	-95	0.0	-92	640.0	6294	332.0	6308	340.0	6350
Jun-2019	736.0	-91	383.0	-95	0.0	-92	601.0	6101	304.0	6317	323.0	6318
Jul-2019	828.0	79	450.0	-94	0.0	-92	609.0	6216	303.0	6334	311.0	6133
Aug-2019	1068.0	819	545.0	-93	0.0	-92	578.0	5916	283.0	6373	311.0	6425
Sep-2019	1157.0	1746	581.0	296	425.0	-86	539.0	5856	245.0	6340	276.0	6379
Oct-2019	1206.0	2215	609.0	661	210.0	-94	556.0	5958	215.0	6065	247.0	6107
Nov-2019	1161.0	1971	578.0	1127	0.0	-94	564.0	6266	221.0	6102	241.0	6158
Dec-2019	1166.0	2545	588.0	1502	0.0	-94	571.0	6275	215.0	5914	246.0	6100
Total	10928.0		4892.0		635.0		7291.0		3677.0		3835.0	
Avg Inj P		734		252		-92		6207		6282		6328

	03/12-07 Inj		03/09-13 Inj		03/16-13 Inj		03/01-13 Inj		SU12	
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)
Jan-2019	1058.0	2980	462.0	842	518.0	2962	821.0	3471	5078.0	3223
Feb-2019	892.0	2978	413.0	677	436.0	3117	676.0	3471	4374.0	3268
Mar-2019	950.0	2960	459.0	715	456.0	2971	697.0	3480	5190.0	2970
Apr-2019	887.0	2974	425.0	702	417.0	2927	634.0	3439	4912.0	2889
May-2019	956.0	3352	410.0	772	389.0	3180	598.0	3477	4808.0	2945
Jun-2019	815.0	3347	391.0	655	371.0	2874	569.0	3385	4493.0	2872
Jul-2019	205.0	1231	446.0	927	385.0	2928	576.0	3430	4113.0	2709
Aug-2019	0.0	-64	452.0	1078	100.0	1221	643.0	3729	3980.0	2531
Sep-2019	0.0	-96	435.0	1461	0.0	-98	593.0	3961	4251.0	2576
Oct-2019	0.0	-96	453.0	1752	0.0	-98	631.0	4151	4127.0	2662
Nov-2019	491.0	205	440.0	1508	502.0	2298	1003.0	5423	5201.0	3096
Dec-2019	589.0	791	442.0	1619	449.0	2971	890.0	5468	5156.0	3309
Total	6843.0		5228.0		4023.0		8331.0		55683.0	
Avg Inj P		1713		1059		2271		3907		2921

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	5078.0	4374.0	5190.0	4912.0	4808.0	4493.0	4113.0	3980.0	4251.0	4127.0	5201.0	5156.0
Daily (m³/d)	163.81	156.21	167.42	163.73	155.10	149.77	132.68	128.39	141.70	133.13	173.37	166.32

c) Monthly wellhead injection pressure for each injection well

2019 AVG. ANNUAL DAILY INJECTION =	152.63 m3/d
CUMULATIVE INJECTION TO Dec 31, 2018 =	108,382 m3
TOTAL 2019 ANNUAL INJECTION =	55,683 m3
CUMULATIVE INJECTION TO Dec 31, 2019 =	164,065 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
100.04-20-008-28W1.00	Pump Change	9/27/2019
100.04-20-008-28W1.00	Rigless Acid	10/16/2019
100.05-07-008-28W1.00	pump change	12/18/2019
100.07-08-008-28W1.00	Pump Change/Acid Job	2/6/2019
100.12-18-008-28W1.00	Pump Change/Acid Job	2/27/2019
100.13-07-008-28W1.00	Cemented Liner Clean Out	8/30/2019
100.13-16-008-28W1.00	Pump Change	5/31/2019
100.13-17-008-28W1.00	Pump Change	7/11/2019
100.13-18-008-28W1.00	BK Cleanout	2/4/2019
100.16-16-008-28W1.00	Pump Change	10/24/2019
102.04-17-008-28W1.00	PP Drillout	10/17/2019
102.08-16-008-28W1.00	Pump Change	1/15/2019
102.12-07-008-28W1.00	Bakken CLC	8/9/2019
103.04-20-008-28W1.00	Pump Change	3/1/2019
103.05-07-008-28W1.00	WIW Conversion	2/26/2019

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	1027.6	397.66	3386.9	640.97	5078.0	113.46	1.132	0.106
Feb-2019	857.9	398.52	3029	643.99	4374.0	117.83	1.108	0.110
Mar-2019	1336.5	399.86	4215.6	648.21	5190.0	123.02	0.919	0.114
Apr-2019	1269.8	401.13	3927.8	652.14	4912.0	127.94	0.929	0.118
May-2019	1319.3	402.45	3958.2	656.10	4808.0	132.74	0.895	0.122
Jun-2019	1179.9	403.63	3871	659.97	4493.0	137.24	0.875	0.126
Jul-2019	1145.6	404.77	3392.5	663.36	4113.0	141.35	0.890	0.129
Aug-2019	1189.7	405.96	3528.3	666.89	3980.0	145.33	0.829	0.132
Sep-2019	1187.7	407.15	4358.8	671.25	4251.0	149.58	0.755	0.135
Oct-2019	1461.3	408.61	4390.7	675.64	4127.0	153.71	0.693	0.138
Nov-2019	1516.4	410.13	4198.9	679.84	5201.0	158.91	0.893	0.142
Dec-2019	1397.6	411.53	3973.6	683.81	5156.0	164.07	0.943	0.146

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

The injection water for Sinclair Unit No. 12 was sourced from the 02/16-32-007-29W1 well (Lodgepole formation) until June 2016 when it was switched over to the newly recompleted source water well at 02/14-30-007-28W1 (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.

- 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>
100/12-05-008-28W1/0	Horizontal	Producing	-
102/12-05-008-28W1/0	Horizontal	Injection	-
100/13-05-008-28W1/0	Horizontal	Producing	-
100/14-05-008-28W1/0	Vertical	Producing	-
100/15-05-008-28W1/2	Vertical	Abandoned Zone	-
100/03-07-008-28W1/0	Vertical	Abandoned Zone	-
100/04-07-008-28W1/0	Horizontal	Producing	-
103/04-07-008-28W1/0	Horizontal	Producing	-
100/05-07-008-28W1/0	Horizontal	Producing	-
102/05-07-008-28W1/0	Horizontal	Injection	-
103/05-07-008-28W1/0	Horizontal	Injection	-
100/08-07-008-28W1/0	Vertical	Producing	-
100/11-07-008-28W1/0	Vertical	Producing	-
100/12-07-008-28W1/0	Vertical	Potential	-
102/12-07-008-28W1/0	Horizontal	Producing	-
103/12-07-008-28W1/0	Horizontal	Injection	-
100/13-07-008-28W1/0	Horizontal	Producing	-
100/15-07-008-28W1/0	Vertical	Producing	-
100/04-08-008-28W1/0	Vertical	Producing	-
102/04-08-008-28W1/0	Horizontal	Producing	-
100/07-08-008-28W1/0	Vertical	Producing	-
100/08-08-008-28W1/0	Horizontal	Producing	-
100/10-08-008-28W1/0	Horizontal	Producing	-
100/11-08-008-28W1/0	Horizontal	Producing	-
100/16-08-008-28W1/0	Vertical	Producing	-
102/16-08-008-28W1/0	Horizontal	Suspended	-
100/01-16-008-28W1/0	Horizontal	Producing	-
100/04-16-008-28W1/0	Vertical	Producing	-
100/08-16-008-28W1/0	Vertical	Producing	-
102/08-16-008-28W1/0	Horizontal	Producing	-
100/09-16-008-28W1/0	Horizontal	Injection	-
100/13-16-008-28W1/0	Vertical	Producing	-
100/16-16-008-28W1/0	Horizontal	Producing	-
100/04-17-008-28W1/0	Vertical	Producing	-
102/04-17-008-28W1/0	Horizontal	Producing	-
100/05-17-008-28W1/0	Horizontal	Producing	-
100/12-17-008-28W1/0	Horizontal	Injection	-
100/13-17-008-28W1/0	Horizontal	Producing	-
100/14-17-008-28W1/0	Vertical	Producing	-
100/04-18-008-28W1/0	Horizontal	Injection	-
100/05-18-008-28W1/0	Horizontal	Producing	-
100/12-18-008-28W1/0	Horizontal	Producing	-
100/13-18-008-28W1/0	Horizontal	Producing	-
100/04-20-008-28W1/0	Horizontal	Producing	-
103/04-20-008-28W1/0	Horizontal	Producing	-

j) Well List

Sinclair Unit No. 12 Well List

<i>UWI</i>	<i>Type</i>	<i>Status</i>	<i>Future Plans</i>
100/05-20-008-28W1/0	Vertical	Abandoned Zone	-
102/05-20-008-28W1/0	Horizontal	Producing	-
100/07-20-008-28W1/2	Vertical	Producing	-
102/01-13-008-29W1/0	Horizontal	Producing	-
103/01-13-008-29W1/0	Horizontal	Injection	-
100/02-13-008-29W1/0	Vertical	Producing	-
100/03-13-008-29W1/0	Vertical	Producing	-
100/04-13-008-29W1/0	Vertical	Producing	-
100/05-13-008-29W1/0	Vertical	Abandoned Zone	-
100/06-13-008-29W1/0	Vertical	Abandoned Zone	-
100/08-13-008-29W1/0	Horizontal	Producing	-
102/08-13-008-29W1/0	Horizontal	Producing	-
102/09-13-008-29W1/0	Horizontal	Producing	-
103/09-13-008-29W1/0	Horizontal	Injection	-
100/12-13-008-29W1/0	Vertical	Abandoned Zone	-
100/16-13-008-29W1/0	Vertical	Producing	-
102/16-13-008-29W1/0	Horizontal	Producing	-