

Sinclair Unit No. 10

Waterflood Progress Report 2019

January 1st through December 31st 2019

Prepared for:

Manitoba Industry, Economic Development and Mines

Petroleum Branch

Prepared by:

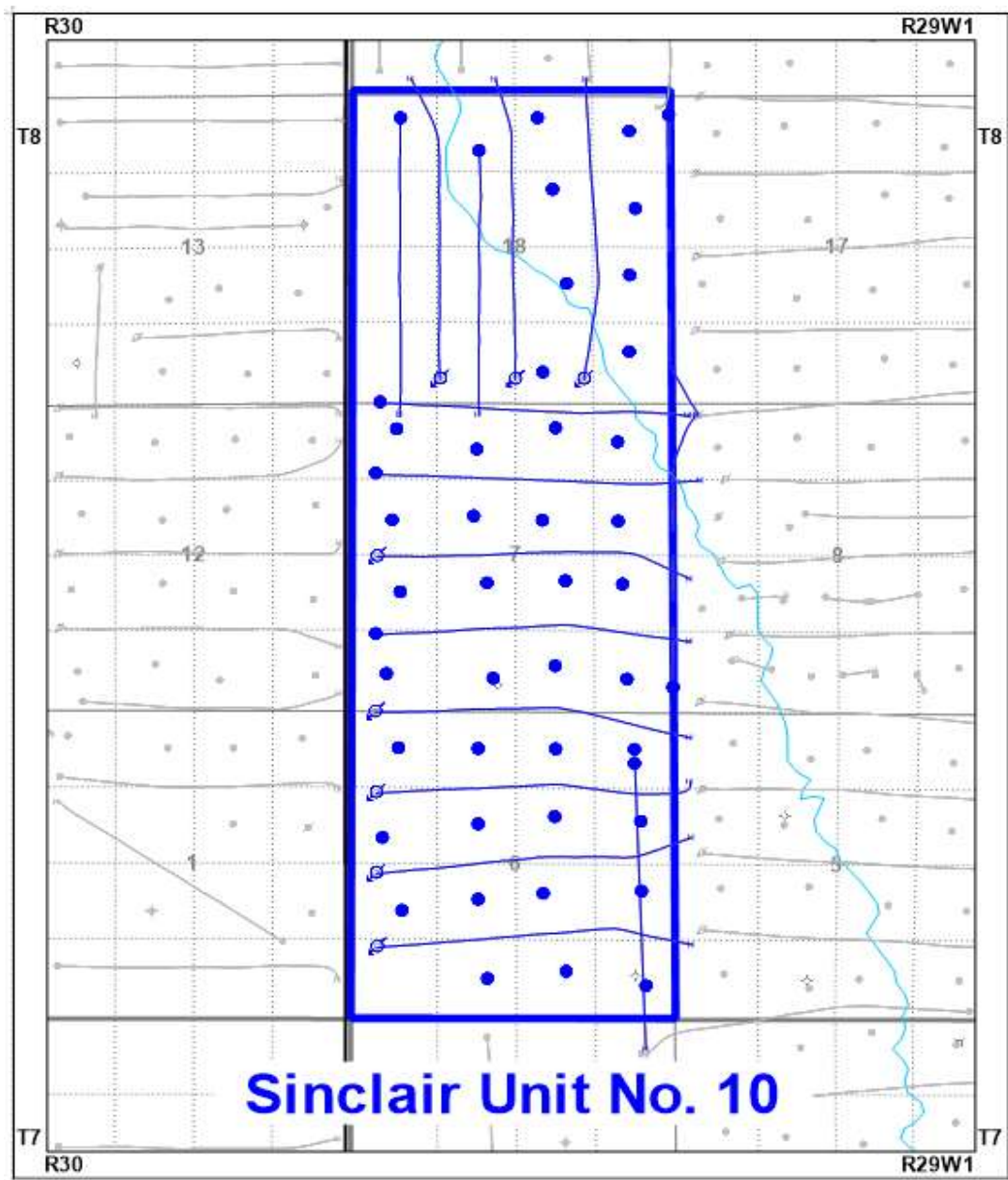
Tundra Oil and Gas

June 9, 2020

INTRODUCTION

Sinclair Unit No. 10 was approved on August 1, 2013 with Tundra Oil and Gas (Tundra) as Operator. The Unit area contains 47 producing wells and 8 injection wells, in 48 LSDs in Township 8 Range 29 W1 as shown in the figure below.

Figure 1: Sinclair Unit No. 10 Area Outline



Sinclair Unit No.10

Tundra Oil and Gas (Tundra), as the operator of the Sinclair Unit No. 10 Enhanced Oil Recovery (EOR) project hereby submits the 2019 EOR report as per section 73 of the Drilling and Production Regulations.

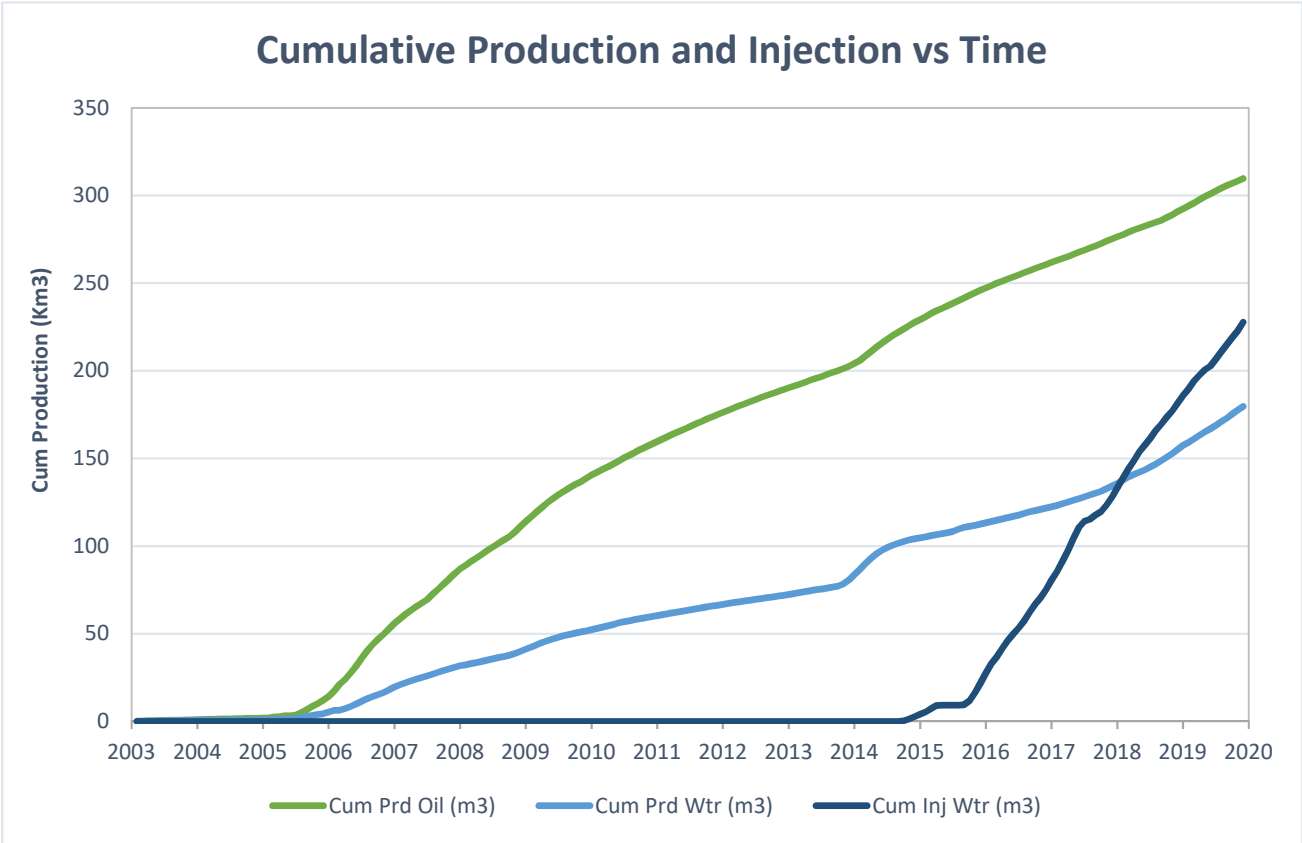
a) Monthly oil and water production rates, injection rate, GOR and WOR

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	55.54	75.61	141.94	1.36	0
Feb-2019	55.61	60.63	140.46	1.09	0
Mar-2019	55.51	63.15	136.81	1.14	0
Apr-2019	57.28	66.62	119.47	1.16	0
May-2019	61.19	62.67	99.58	1.02	0
Jun-2019	56.80	62.68	70.30	1.10	0
Jul-2019	52.48	59.60	131.74	1.14	0
Aug-2019	51.50	69.67	134.03	1.35	0
Sep-2019	46.08	68.85	133.57	1.49	0
Oct-2019	46.81	76.23	132.06	1.63	0
Nov-2019	42.51	72.78	128.63	1.71	0
Dec-2019	42.81	68.00	154.97	1.59	0

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

2019 PRODUCTION	
Produced Oil (m ³)	18,979
Produced Gas (m ³)	0
Produced Water (m ³)	24,549
Fluid Injected (m ³)	46,357
CUMULATIVE PRODUCTION	
Produced Oil (m ³)	309,682
Produced Water (m ³)	179,687

Sinclair Unit No.10



c) Monthly wellhead injection pressure for each injection well

	00/03-18 Inj		00/04-06 Inj		02/02-18 Inj		02/03-18 Inj		02/05-06 Inj		02/05-07 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	556.0	3290	297.0	522	943.0	4974	513.0	1734	431.0	6104	685.0	6099
Feb-2019	531.0	3738	271.0	836	788.0	4971	426.0	2965	405.0	6204	607.0	6190
Mar-2019	567.0	3977	357.0	1280	811.0	4977	370.0	2980	453.0	6305	665.0	6306
Apr-2019	477.0	3984	401.0	2026	631.0	4848	306.0	2986	340.0	6110	600.0	6116
May-2019	510.0	3910	395.0	2390	368.0	3579	315.0	2922	269.0	5678	570.0	5602
Jun-2019	388.0	3441	262.0	2118	0.0	1747	239.0	2614	222.0	5211	453.0	4758
Jul-2019	486.0	4054	377.0	2957	688.0	2420	301.0	3091	465.0	5933	707.0	5941
Aug-2019	570.0	4279	267.0	2933	988.0	4538	368.0	3342	352.0	5762	671.0	5872
Sep-2019	495.0	4487	372.0	3574	678.0	4897	318.0	3498	474.0	6165	679.0	6175
Oct-2019	480.0	4325	418.0	4377	871.0	4919	316.0	3218	417.0	6143	668.0	6141
Nov-2019	448.0	4481	435.0	5097	1015.0	5855	290.0	3487	476.0	6339	400.0	6314
Dec-2019	689.0	5202	464.0	7443	871.0	5969	463.0	4191	418.0	6349	798.0	6207
Total	6197.0		4316.0		8652.0		4225.0		4722.0		7503.0	
Avg Inj P		4097		2963		4475		3086		6025		5977

	02/12-06 Inj		02/13-06 Inj		SU10	
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	467.0	6097	508.0	6108	4400.0	4366
Feb-2019	437.0	6191	468.0	6206	3933.0	4663
Mar-2019	490.0	6295	528.0	6297	4241.0	4802
Apr-2019	388.0	6171	441.0	6129	3584.0	4796
May-2019	284.0	5679	376.0	5625	3087.0	4423
Jun-2019	218.0	5185	327.0	4926	2109.0	3750
Jul-2019	494.0	5946	566.0	5938	4084.0	4535
Aug-2019	433.0	5883	506.0	5877	4155.0	4811
Sep-2019	472.0	6181	519.0	6180	4007.0	5145
Oct-2019	430.0	6139	494.0	6139	4094.0	5175
Nov-2019	496.0	6273	299.0	6319	3859.0	5521
Dec-2019	460.0	6334	641.0	6257	4804.0	5994
Total	5069.0		5673.0		46357.0	
Avg Inj P		6031		6000		4832

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	4400.0	3933.0	4241.0	3584.0	3087.0	2109.0	4084.0	4155.0	4007.0	4094.0	3859.0	4804.0
Daily (m³/d)	141.94	140.46	136.81	119.47	99.58	70.30	131.74	134.03	133.57	132.06	128.63	154.97

c) Monthly wellhead injection pressure for each injection well

2019 AVG. ANNUAL DAILY INJECTION =	126.96 m3/d
CUMULATIVE INJECTION TO Dec 31, 2018 =	181,359 m3
TOTAL 2019 ANNUAL INJECTION =	46,357 m3
CUMULATIVE INJECTION TO Dec 31, 2019 =	227,716 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
100.02-06-008-29W1.00	Scale Squeeze	6/18/2019
100.09-06-008-29W1.00	Scale Squeeze	1/4/2019
100.09-18-008-29W1.00	Pump Change	6/19/2019
100.10-18-008-29W1.00	Scale Squeeze	10/30/2019
100.11-06-008-29W1.00	PC & Acid Job	9/20/2019
100.12-06-008-29W1.00	PC & Acid Job	9/17/2019
102.04-07-008-29W1.00	Pump Change	8/21/2019

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	1721.8	292.43	2343.9	157.48	4400.0	185.76	1.051	0.395
Feb-2019	1557.1	293.98	1697.6	159.18	3933.0	189.69	1.169	0.400
Mar-2019	1720.9	295.70	1957.8	161.14	4241.0	193.93	1.116	0.406
Apr-2019	1718.4	297.42	1998.7	163.14	3584.0	197.52	0.934	0.410
May-2019	1897.0	299.32	1942.8	165.08	3087.0	200.60	0.777	0.413
Jun-2019	1704.1	301.02	1880.3	166.96	2109.0	202.71	0.569	0.414
Jul-2019	1626.8	302.65	1847.5	168.81	4084.0	206.80	1.138	0.420
Aug-2019	1596.6	304.25	2159.8	170.97	4155.0	210.95	1.074	0.425
Sep-2019	1382.4	305.63	2065.5	173.03	4007.0	214.96	1.130	0.430
Oct-2019	1451.0	307.08	2363.2	175.40	4094.0	219.05	1.045	0.434
Nov-2019	1275.4	308.35	2183.5	177.58	3859.0	222.91	1.087	0.439
Dec-2019	1327.0	309.68	2108.1	179.69	4804.0	227.72	1.361	0.445

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

The injection water for Sinclair Unit No. 10 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>
102/01-06-008-29W1/0	Vertical	Producing	-
100/02-06-008-29W1/0	Vertical	Producing	-
100/03-06-008-29W1/0	Vertical	Producing	-
100/04-06-008-29W1/0	Horizontal	Injection	-
100/05-06-008-29W1/0	Vertical	Producing	-
102/05-06-008-29W1/0	Horizontal	Injection	-
100/06-06-008-29W1/0	Vertical	Producing	-
100/07-06-008-29W1/0	Vertical	Producing	-
100/08-06-008-29W1/0	Vertical	Producing	-
100/09-06-008-29W1/0	Vertical	Producing	-
100/10-06-008-29W1/0	Vertical	Producing	-
100/11-06-008-29W1/0	Vertical	Producing	-
100/12-06-008-29W1/0	Vertical	Producing	-
102/12-06-008-29W1/0	Horizontal	Injection	-
100/13-06-008-29W1/0	Vertical	Producing	-
102/13-06-008-29W1/0	Horizontal	Injection	-
100/14-06-008-29W1/0	Vertical	Producing	-
100/15-06-008-29W1/0	Vertical	Producing	-
100/16-06-008-29W1/0	Vertical	Producing	-
102/16-06-008-29W1/0	Horizontal	Producing	-
100/01-07-008-29W1/0	Vertical	Producing	-
102/01-07-008-29W1/0	Horizontal	Producing	-
100/02-07-008-29W1/0	Vertical	Producing	-
102/03-07-008-29W1/0	Vertical	Producing	-
100/04-07-008-29W1/0	Vertical	Producing	-
102/04-07-008-29W1/0	Horizontal	Producing	-
100/05-07-008-29W1/0	Vertical	Producing	-
102/05-07-008-29W1/0	Horizontal	Injection	-
100/06-07-008-29W1/0	Vertical	Producing	-
100/07-07-008-29W1/0	Vertical	Producing	-
100/08-07-008-29W1/0	Vertical	Producing	-
100/09-07-008-29W1/0	Vertical	Producing	-
100/10-07-008-29W1/0	Vertical	Producing	-
100/11-07-008-29W1/0	Vertical	Producing	-
100/12-07-008-29W1/0	Vertical	Producing	-
100/13-07-008-29W1/0	Vertical	Producing	-
102/13-07-008-29W1/0	Horizontal	Producing	-
103/13-07-008-29W1/0	Horizontal	Producing	-
100/14-07-008-29W1/0	Vertical	Producing	-
100/15-07-008-29W1/0	Vertical	Producing	-
100/16-07-008-29W1/0	Vertical	Producing	-
100/01-18-008-29W1/0	Vertical	Producing	-
100/02-18-008-29W1/0	Vertical	Producing	-
102/02-18-008-29W1/0	Horizontal	Injection	-
100/03-18-008-29W1/0	Horizontal	Injection	-

j) Well List

Sinclair Unit No. 10 Well List

<i>UWI</i>	<i>Type</i>	<i>Status</i>	<i>Future Plans</i>
102/03-18-008-29W1/0	Horizontal	Injection	-
100/07-18-008-29W1/0	Vertical	Producing	-
100/08-18-008-29W1/0	Vertical	Producing	-
100/09-18-008-29W1/0	Vertical	Producing	-
100/10-18-008-29W1/0	Vertical	Producing	-
100/13-18-008-29W1/0	Horizontal	Producing	-
100/14-18-008-29W1/0	Horizontal	Producing	-
100/15-18-008-29W1/0	Vertical	Producing	-
100/16-18-008-29W1/0	Vertical	Producing	-
102/16-18-008-29W1/0	Horizontal	Producing	-