

Sinclair Unit No. 10

Waterflood Progress Report 2017

January 1st through December 31st 2017

Prepared for:

Manitoba Industry, Economic Development and Mines

Petroleum Branch

Prepared by:

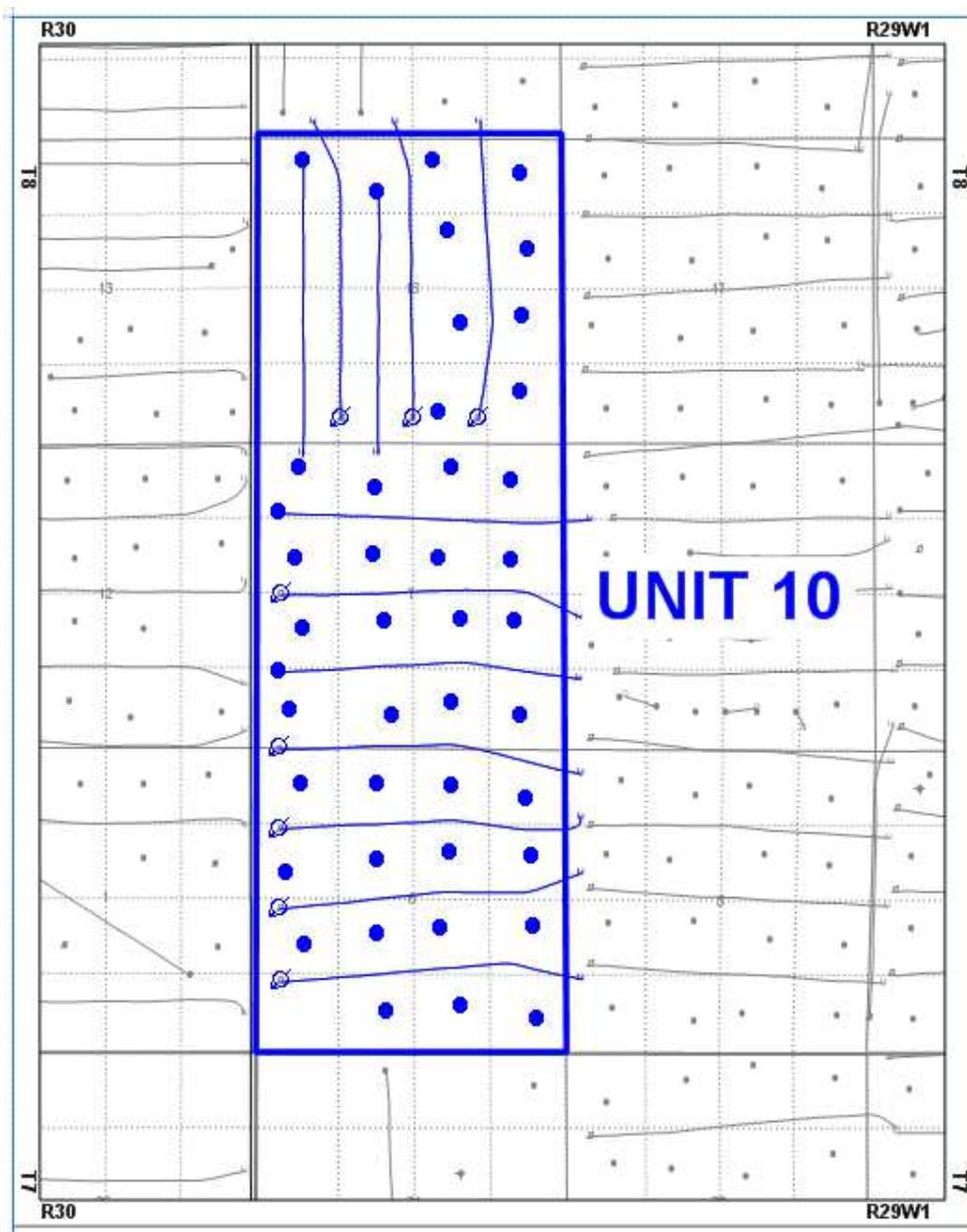
Tundra Oil and Gas

July 25, 2018

INTRODUCTION

Sinclair Unit No. 10 was approved on August 1, 2013 with Tundra Oil and Gas (Tundra) as Operator. The Unit area contains 43 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 2017 EOR report as per section 73 of the Drilling and Production Regulations.

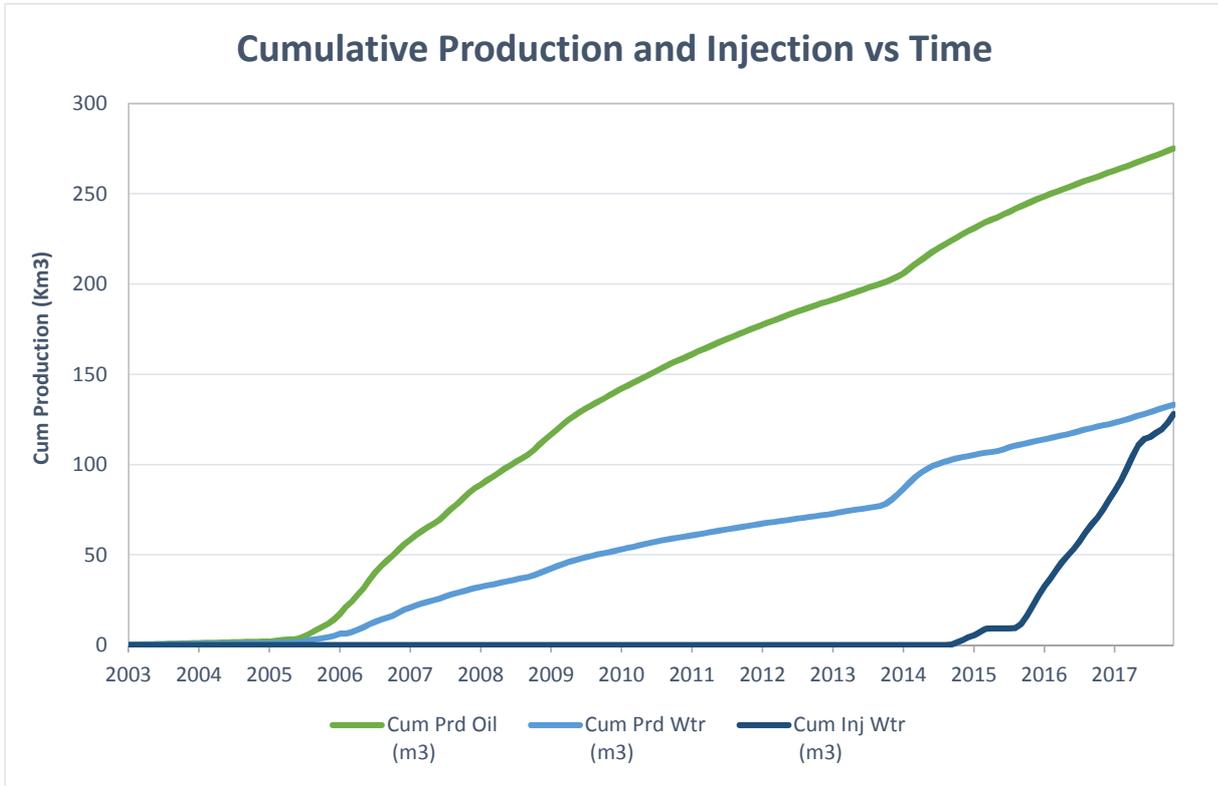
a) Monthly oil and water production rates, injection rate, GOR and WOR

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-2017	36.15	21.53	171.51	0.60	0
Feb-2017	40.86	26.27	174.83	0.64	0
Mar-2017	39.29	31.90	184.54	0.81	0
Apr-2017	34.75	30.68	214.12	0.88	0
May-2017	41.05	33.66	223.50	0.82	0
Jun-2017	38.93	31.29	208.72	0.80	0
Jul-2017	40.27	32.45	114.12	0.81	0
Aug-2017	37.89	33.68	32.06	0.89	0
Sep-2017	39.94	32.81	78.64	0.82	0
Oct-2017	41.02	32.94	61.54	0.80	0
Nov-2017	43.85	35.22	122.78	0.80	0
Dec-2017	39.56	33.00	151.22	0.83	0

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

2017 PRODUCTION	
Produced Oil (m ³)	14,400
Produced Gas (m ³)	0
Produced Water (m ³)	11,430
Fluid Injected (m ³)	52,716
CUMULATIVE PRODUCTION	
Produced Oil (m ³)	275,105
Produced Water (m ³)	133,217

Sinclair Unit No.10



c) Monthly wellhead injection pressure for each injection well

MONTH	00/03-18 Inj		00/04-06 Inj		02/02-18 Inj		02/03-18 Inj		02/05-06 Inj		02/05-07 Inj	
	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-2017	0.0	0	529.0	6243	0.0	0	1091.7	-90	916.0	5995	1040.0	5726
Feb-2017	0.6	-25	463.0	6268	0.0	0	1150.6	-88	745.0	6178	878.0	6000
Mar-2017	466.0	-56	388.0	6224	157.1	-2	1209.5	125	711.0	6198	904.0	5911
Apr-2017	1045.4	-85	313.0	6122	792.2	-74	1172.1	1635	624.0	6087	829.0	6030
May-2017	1223.3	-85	275.0	6172	1217.4	-85	1088.9	2923	641.0	6135	845.0	6098
Jun-2017	1179.0	-85	226.0	6242	1099.8	-84	807.9	2997	606.0	6201	805.0	6184
Jul-2017	686.7	-84	113.0	6267	692.5	-84	414.5	2999	341.0	6263	447.0	6243
Aug-2017	43.0	-85	53.0	5311	58.0	-85	21.0	2405	176.0	5537	221.0	4564
Sep-2017	212.8	-92	86.0	5589	148.1	-92	210.2	-74	342.0	5293	469.0	4125
Oct-2017	163.3	-86	66.0	5095	164.1	-84	231.2	-90	230.0	4954	373.0	3713
Nov-2017	416.8	-76	144.0	6248	284.3	-60	441.4	323	465.0	4954	647.0	4626
Dec-2017	683.1	-94	112.0	5973	485.5	-93	713.2	1885	537.0	5336	809.0	4843
Total	6120.0		2768.0		5099.0		8552.2		6334.0		8267.0	
Avg Inj P		-71		5980		-62		1246		5761		5339

MONTH	02/12-06 Inj		02/13-06 Inj		SU10	
	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-2017	867.0	5643	873.0	4898	5316.7	4736
Feb-2017	896.0	6088	762.0	4974	4895.2	4845
Mar-2017	819.0	6119	1066.0	5797	5720.6	3836
Apr-2017	714.0	6049	934.0	6020	6423.7	3973
May-2017	727.0	6085	911.0	6083	6928.6	4166
Jun-2017	690.0	6172	848.0	6176	6261.7	4226
Jul-2017	382.0	6233	461.0	6242	3537.7	4260
Aug-2017	183.0	5513	239.0	4981	994.0	3518
Sep-2017	383.0	5280	508.0	5095	2359.1	3141
Oct-2017	293.0	4979	387.0	4731	1907.6	2902
Nov-2017	608.0	5225	677.0	4777	3683.5	3252
Dec-2017	663.0	5694	685.0	5302	4687.8	3606
Total	7225.0		8351.0		52716.2	
Avg Inj P		5757		5423		3872

c) Monthly wellhead injection pressure for each injection well

MONTH	Jan-2017	Feb-2017	Mar-2017	Apr-2017	May-2017	Jun-2017	Jul-2017	Aug-2017	Sep-2017	Oct-2017	Nov-2017	Dec-2017
Total m3	5316.7	4895.2	5720.6	6423.7	6928.6	6261.7	3537.7	994.0	2359.1	1907.6	3683.5	4687.8
Daily (m³/d)	171.51	174.83	184.54	214.12	223.50	208.72	114.12	32.06	78.64	61.54	122.78	151.22

2017 AVG. ANNUAL DAILY INJECTION = 144.80 m3/d
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CUMULATIVE INJECTION TO Dec 31, 2016 = 75,231 m3
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TOTAL 2017 ANNUAL INJECTION = 52,716 m3

CUMULATIVE INJECTION TO Dec 31, 2017 = 127,947 m3

d) Summary of the result of any survey of reservoir pressure conducted in 2017. N/A

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

Well	Service Description	Date
100.05-07-008-29W1.00	Broken Polish Rod	3/3/2017
100.05-07-008-29W1.00	Pump Change	10/19/2017
100.14-07-008-29W1.00	Pump Change & Acid Job	9/20/2017
100.15-07-008-29W1.00	Pump Change	9/19/2017
100.03-18-008-29W1.00	WIW Conversion	1/29/2017
100.08-18-008-29W1.00	Rigless Acid Stimulation	8/26/2017
100.14-18-008-29W1.00	Pump Change	3/4/2017
102.02-18-008-29W1.00	WIW Conversion	1/26/2017

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-2017	1120.5	261.83	667.3	122.45	5316.7	80.55	2.847	0.200
Feb-2017	1144.2	262.97	735.5	123.19	4895.2	85.44	2.496	0.211
Mar-2017	1218.0	264.19	988.8	124.18	5720.6	91.16	2.495	0.224
Apr-2017	1042.5	265.23	920.4	125.10	6423.7	97.59	3.154	0.239
May-2017	1272.5	266.50	1043.6	126.14	6928.6	104.52	2.879	0.254
Jun-2017	1167.8	267.67	938.6	127.08	6261.7	110.78	2.860	0.268
Jul-2017	1248.5	268.92	1006.0	128.09	3537.7	114.31	1.510	0.275
Aug-2017	1174.5	270.09	1044.2	129.13	994.0	115.31	0.432	0.276
Sep-2017	1198.2	271.29	984.4	130.12	2359.1	117.67	1.040	0.280
Oct-2017	1271.5	272.56	1021.1	131.14	1907.6	119.58	0.801	0.283
Nov-2017	1315.4	273.88	1056.7	132.19	3683.5	123.26	1.494	0.290
Dec-2017	1226.3	275.11	1022.9	133.22	4687.8	127.95	2.007	0.299

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	-
100/01-07-008-29W1/0	Vertical	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	-
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	-
102/03-18-008-29W1/0	Horizontal	Injection	-
100/07-18-008-29W1/0	Vertical	Producing	-
100/08-18-008-29W1/0	Vertical	Producing	-

<i>UWI</i>	<i>Type</i>	<i>Status</i>	<i>Future Plans</i>
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	-