

Sinclair Unit No. 3

Waterflood Progress Report 2018

January 1st through December 31st 2018

Prepared for:

Manitoba Industry, Economic Development and Mines

Petroleum Branch

Prepared by:

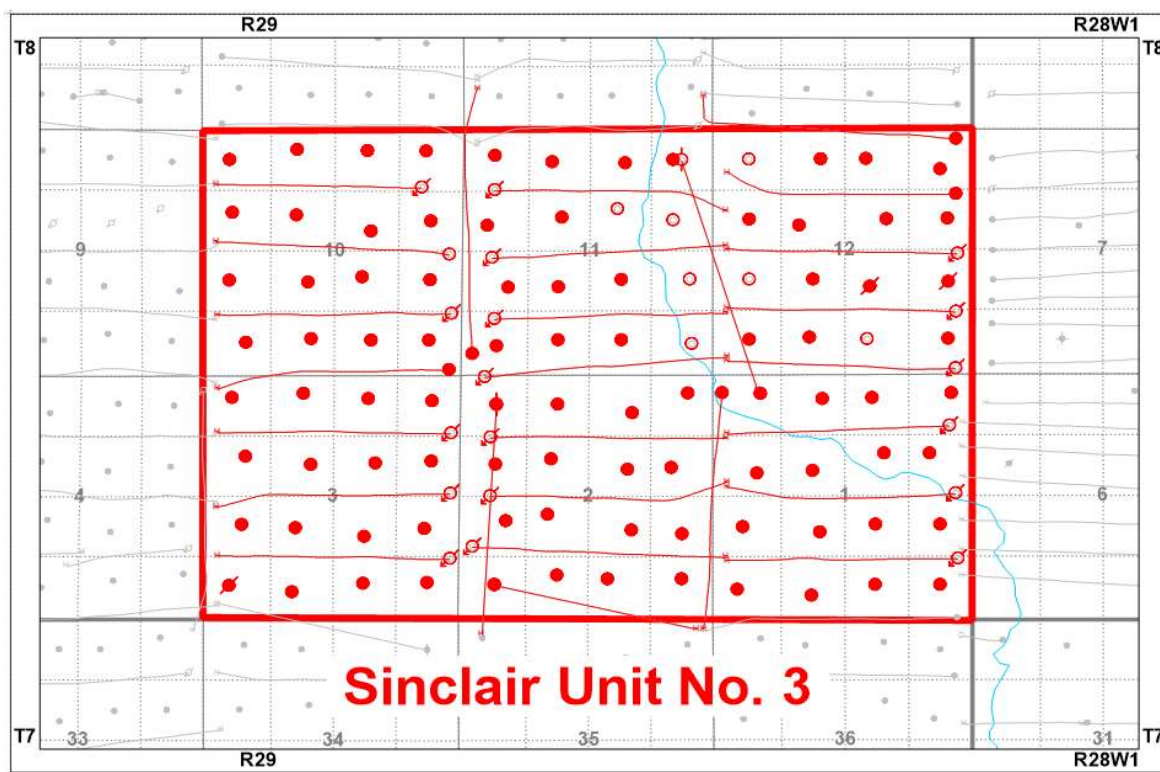
Tundra Oil and Gas

May 30, 2019

INTRODUCTION

Sinclair Unit No. 3 Enhanced Oil Recovery (EOR) Waterflood Project was approved under Waterflood Order No. 18 effective November 1, 2009 with Tundra Oil and Gas (Tundra) as Operator. The EOR project area contains 102 producing/inactive wells and 21 horizontal injectors in 6 sections in Township 8, Range 29 W1 as shown in the figure below.

Figure 1: Sinclair Unit No. 3 Area Outline



Sinclair Unit No. 3

Tundra Oil and Gas (Tundra), as the operator of the Sinclair Unit No. 3 Enhanced Oil Recovery (EOR) project hereby submits the 2018 EOR report as per section 73 of the Drilling and Production Regulations.

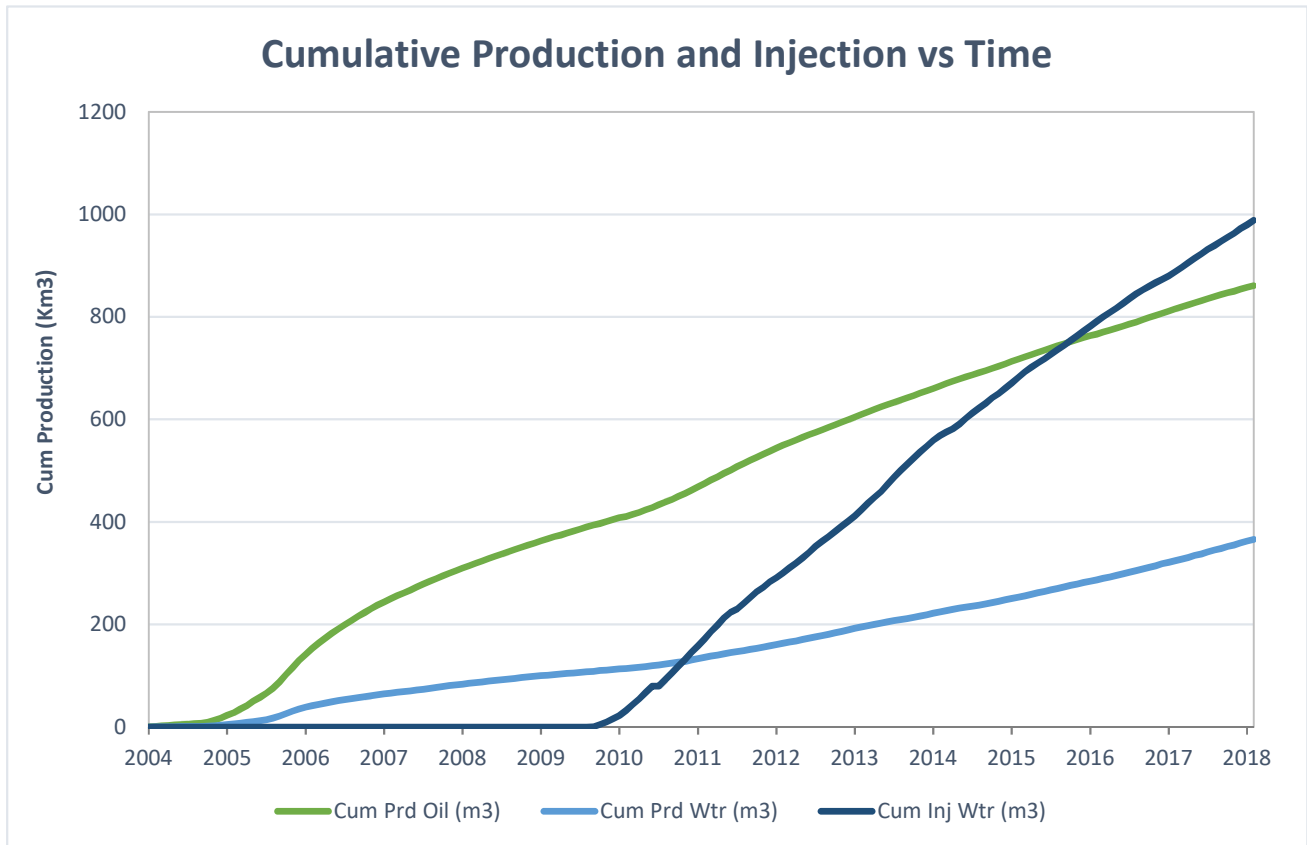
a) Monthly oil and water production rates, injection rate, GOR and WOR

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	129.18	106.10	286.52	0.82	2.95
Feb-2018	128.57	102.15	309.07	0.79	2.25
Mar-2018	139.70	119.99	295.68	0.86	1.94
Apr-2018	133.33	109.08	283.20	0.82	1.1
May-2018	126.74	116.70	286.00	0.92	1.73
Jun-2018	126.06	113.23	244.87	0.90	2.14
Jul-2018	121.76	111.63	259.94	0.92	1.64
Aug-2018	118.54	113.86	255.45	0.96	2.67
Sep-2018	119.76	117.20	260.67	0.98	1.75
Oct-2018	116.45	121.58	289.77	1.04	1.91
Nov-2018	115.40	116.99	266.37	1.01	2.72
Dec-2018	112.81	116.69	273.84	1.03	2.77

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

2018 PRODUCTION	
Produced Oil (m ³)	45,257
Produced Gas (m ³)	96
Produced Water (m ³)	41,558
Fluid Injected (m ³)	100,670
CUMULATIVE PRODUCTION	
Produced Oil (m ³)	860,874
Produced Water (m ³)	366,061

Sinclair Unit No. 3



c) Monthly wellhead injection pressure for each injection well

	02/01-01 Inj		02/01-03 Inj		02/01-10 Inj		02/04-11 Inj		02/05-02 Inj		02/05-11 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	580.0	6564	502.0	6012	370.0	6468	407.0	5727	469.0	6559	416.0	6566
Feb-2018	505.0	6535	473.0	6294	301.0	6451	452.0	6542	413.0	6544	360.0	6564
Mar-2018	550.0	6563	507.0	6421	326.0	6561	400.0	6577	453.0	6541	384.0	6551
Apr-2018	531.0	6551	459.0	6401	290.0	6554	338.0	6596	434.0	6549	413.0	6561
May-2018	550.0	6552	471.0	6460	308.0	6567	331.0	6594	455.0	6543	393.0	6564
Jun-2018	435.0	6180	416.0	6238	268.0	6473	293.0	6510	417.0	6332	341.0	6490
Jul-2018	563.0	6549	471.0	6377	302.0	6560	311.0	6594	452.0	6543	358.0	6565
Aug-2018	537.0	6568	452.0	6460	293.0	6581	299.0	6601	450.0	6565	348.0	6450
Sep-2018	495.0	6520	433.0	6432	277.0	6558	275.0	6572	423.0	6489	332.0	6544
Oct-2018	518.0	6566	445.0	6410	283.0	6543	293.0	6598	446.0	6563	342.0	6569
Nov-2018	495.0	6564	416.0	6390	260.0	6537	281.0	6596	434.0	6562	319.0	6568
Dec-2018	500.0	6558	459.0	6414	282.0	6555	289.0	6595	454.0	6557	330.0	6561
Total	6259.0		5504.0		3560.0		3969.0		5300.0		4336.0	
Avg Inj P		6523		6359		6534		6509		6529		6546

	02/08-03 Inj		02/08-10 Inj		02/09-01 Inj		02/12-02 Inj		02/13-02 Inj		02/13-11 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	408.0	4452	296.0	4541	784.0	6213	471.0	6531	297.0	6421	431.0	6569
Feb-2018	692.0	5878	410.0	5477	718.0	6483	416.0	6530	270.0	6457	360.0	6561
Mar-2018	757.0	6422	458.0	5810	778.0	6527	443.0	6510	291.0	6484	389.0	6538
Apr-2018	622.0	6549	444.0	5876	731.0	6516	424.0	6519	277.0	6486	368.0	6550
May-2018	594.0	6583	572.0	6581	783.0	6535	456.0	6516	288.0	6464	377.0	6552
Jun-2018	156.0	5697	446.0	6396	704.0	6283	403.0	6200	257.0	6381	346.0	6434
Jul-2018	0.0	4446	510.0	6598	766.0	6527	441.0	6459	294.0	6536	366.0	6550
Aug-2018	0.0	3866	484.0	6616	750.0	6563	451.0	6537	291.0	6572	363.0	6556
Sep-2018	421.0	4602	452.0	6583	696.0	6477	409.0	6423	268.0	6525	336.0	6403
Oct-2018	1244.0	5513	456.0	6541	734.0	6563	443.0	6518	281.0	6554	349.0	6568
Nov-2018	673.0	6261	421.0	6519	697.0	6561	422.0	6532	269.0	6567	332.0	6565
Dec-2018	701.0	6550	461.0	6580	707.0	6553	427.0	6523	274.0	6565	339.0	6555
Total	6268.0		5410.0		8848.0		5206.0		3357.0		4356.0	
Avg Inj P		5568		6177		6483		6483		6501		6533

c) Monthly wellhead injection pressure for each injection well

	02/16-01 Inj		02/16-03 Inj		02/16-10 Inj		03/01-10 Inj		03/05-02 Inj		02/01-12 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	660.0	6566	397.0	5264	344.0	5465	502.0	6102	407.0	6559	411.0	6537
Feb-2018	574.0	6590	474.0	6548	406.0	6378	490.0	6538	355.0	6531	366.0	6514
Mar-2018	624.0	6555	447.0	6574	415.0	6559	496.0	6564	386.0	6531	394.0	6496
Apr-2018	592.0	6506	398.0	6538	360.0	6510	457.0	6543	345.0	6482	371.0	6497
May-2018	612.0	6566	383.0	6582	368.0	6569	468.0	6565	399.0	6547	392.0	6514
Jun-2018	555.0	6407	322.0	6186	306.0	6424	416.0	6466	312.0	6083	351.0	6373
Jul-2018	602.0	6541	407.0	6591	290.0	6334	469.0	6558	405.0	6545	394.0	6529
Aug-2018	590.0	6570	383.0	6577	331.0	6227	458.0	6565	393.0	6564	398.0	6544
Sep-2018	553.0	6507	357.0	6562	314.0	6410	439.0	6557	367.0	6501	373.0	6503
Oct-2018	588.0	6564	366.0	6554	335.0	6494	449.0	6538	389.0	6552	387.0	6534
Nov-2018	557.0	6566	340.0	6524	304.0	6511	420.0	6511	373.0	6559	369.0	6538
Dec-2018	564.0	6555	367.0	6586	332.0	6561	466.0	6561	382.0	6555	379.0	6536
Total	7071.0		4641.0		4105.0		5530.0		4513.0		4585.0	
Avg Inj P		6541		6424		6370		6506		6501		6510

	02/08-12 Inj		03/01-12 Inj		02/09-12 Inj		SU3	
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)
Jan-2018	439.0	6565	291.0	6567	0.0	0	8882.0	6112
Feb-2018	373.0	6549	246.0	6563	0.0	0	8654.0	6426
Mar-2018	402.0	6569	266.0	6541	0.0	0	9166.0	6495
Apr-2018	383.0	6506	259.0	6565	0.0	0	8496.0	6493
May-2018	407.0	6539	259.0	6512	0.0	0	8866.0	6545
Jun-2018	363.0	6349	239.0	6434	0.0	0	7346.0	6317
Jul-2018	402.0	6545	255.0	6555	0.0	0	8058.0	6425
Aug-2018	398.0	6554	250.0	6571	0.0	0	7919.0	6405
Sep-2018	369.0	6507	231.0	10464	0.0	0	7820.0	6607
Oct-2018	392.0	6567	243.0	6572	0.0	0	8983.0	6494
Nov-2018	377.0	6563	232.0	6565	0.0	0	7991.0	6528
Dec-2018	388.0	6550	235.0	6556	153.0	-79	8489.0	6354
Total	4693.0		3006.0		153.0		100670.0	
Avg Inj P		6530		6872		-7		6434

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	8882.0	8654.0	9166.0	8496.0	8866.0	7346.0	8058.0	7919.0	7820.0	8983.0	7991.0	8489.0
Daily (m³/d)	286.52	309.07	295.68	283.20	286.00	244.87	259.94	255.45	260.67	289.77	266.37	273.84

c) Monthly wellhead injection pressure for each injection well

2018 AVG. ANNUAL DAILY INJECTION =	275.95 m3/d
CUMULATIVE INJECTION TO Dec 31, 2017 =	887,910 m3
TOTAL 2018 ANNUAL INJECTION =	100,670 m3
CUMULATIVE INJECTION TO Dec 31, 2018 =	988,580 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
100.01-03-008-29W1.00	Polish Rod Repair/Ratigan Install	8/3/2018
100.02-02-008-29W1.00	Pump Change	12/10/2018
100.02-10-008-29W1.00	Pump Change/Acid Job	6/8/2018
100.03-01-008-29W1.00	Pump Change/Acid Job	9/25/2018
100.04-02-008-29W1.00	Tbg Repair	4/10/2018
100.04-03-008-29W1.00	Pump Change/Acid Job	10/25/2018
100.05-02-008-29W1.00	Pump Change/Acid Job	8/3/2018
100.05-10-008-29W1.00	Scale Squeeze SCW8234 + WAW3901	1/17/2018
100.06-02-008-29W1.00	Tbg Leak & Acid Job	5/22/2018
100.06-03-008-29W1.00	Pump Change	3/3/2018
100.08-10-008-29W1.00	Pump Change	10/24/2018
100.12-02-008-29W1.00	Pump Change/Acid Job	10/23/2018
100.15-03-008-29W1.00	Pump Change/Acid Job	9/20/2018
100.16-02-008-29W1.00	Pump Change	8/21/2018
100.16-12-008-29W1.00	Pump Change/Acid Job	8/7/2018
102.09-12-008-29W1.00	Pump Change	1/5/2018
102.09-12-008-29W1.00	Pump Change	6/25/2018
102.09-12-008-29W1.00	WIW Conversion	12/1/2018

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	4004.5	819.62	3289.2	327.79	8882.0	896.79	1.172	0.744
Feb-2018	3599.9	823.22	2860.2	330.65	8654.0	905.45	1.289	0.747
Mar-2018	4330.8	827.55	3719.6	334.37	9166.0	914.61	1.097	0.749
Apr-2018	4000.0	831.55	3272.4	337.64	8496.0	923.11	1.124	0.752
May-2018	3928.9	835.48	3617.8	341.26	8866.0	931.97	1.133	0.754
Jun-2018	3781.8	839.26	3396.9	344.66	7346.0	939.32	0.986	0.755
Jul-2018	3774.7	843.04	3460.4	348.12	8058.0	947.38	1.074	0.757
Aug-2018	3674.6	846.71	3529.6	351.65	7919.0	955.30	1.061	0.759
Sep-2018	3592.8	850.31	3516.1	355.16	7820.0	963.12	1.062	0.761
Oct-2018	3610.0	853.92	3769.1	358.93	8983.0	972.10	1.176	0.763
Nov-2018	3462.0	857.38	3509.6	362.44	7991.0	980.09	1.107	0.765
Dec-2018	3497.0	860.87	3617.3	366.06	8489.0	988.58	1.153	0.767

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

The injection water for Sinclair Unit No. 3 is 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>
100/01-01-008-29W1/0	Vertical	Producing	-
102/01-01-008-29W1/0	Horizontal	Injection	-
100/02-01-008-29W1/0	Vertical	Producing	-
100/03-01-008-29W1/0	Vertical	Producing	-
100/04-01-008-29W1/0	Vertical	Producing	-
100/05-01-008-29W1/0	Vertical	Producing	-
102/06-01-008-29W1/0	Vertical	Producing	-
100/07-01-008-29W1/0	Vertical	Producing	-
100/08-01-008-29W1/0	Vertical	Producing	-
100/09-01-008-29W1/0	Vertical	Producing	-
102/09-01-008-29W1/0	Horizontal	Injection	-
100/10-01-008-29W1/0	Vertical	Producing	-
100/11-01-008-29W1/0	Vertical	Producing	-
100/12-01-008-29W1/0	Vertical	Producing	-
100/13-01-008-29W1/0	Vertical	Producing	-
102/13-01-008-29W1/0	Horizontal	Producing	-
100/14-01-008-29W1/0	Vertical	Producing	-
100/15-01-008-29W1/0	Vertical	Producing	-
100/16-01-008-29W1/0	Vertical	Producing	-
102/16-01-008-29W1/0	Horizontal	Injection	-
100/01-02-008-29W1/0	Vertical	Producing	-
100/02-02-008-29W1/0	Vertical	Producing	-
100/03-02-008-29W1/0	Vertical	Producing	-
100/04-02-008-29W1/0	Vertical	Producing	-
102/04-02-008-29W1/0	Horizontal	Producing	-
100/05-02-008-29W1/0	Vertical	Producing	-
102/05-02-008-29W1/0	Horizontal	Injection	-
103/05-02-008-29W1/0	Horizontal	Injection	-
100/06-02-008-29W1/0	Vertical	Producing	-
100/07-02-008-29W1/0	Vertical	Producing	-
100/08-02-008-29W1/0	Vertical	Producing	-
100/09-02-008-29W1/0	Vertical	Producing	-
100/10-02-008-29W1/0	Vertical	Producing	-
100/11-02-008-29W1/0	Vertical	Producing	-
100/12-02-008-29W1/0	Vertical	Producing	-
102/12-02-008-29W1/0	Horizontal	Injection	-
100/13-02-008-29W1/0	Vertical	Producing	-
102/13-02-008-29W1/0	Horizontal	Injection	-
103/13-02-008-29W1/0	Horizontal	Drilled & Cased	-
100/14-02-008-29W1/0	Vertical	Producing	-
100/15-02-008-29W1/0	Vertical	Producing	-
100/16-02-008-29W1/0	Vertical	Producing	-
100/01-03-008-29W1/0	Vertical	Producing	-
102/01-03-008-29W1/0	Horizontal	Injection	-
100/02-03-008-29W1/0	Vertical	Producing	-

j) Well List

Sinclair Unit No.3 Well List

<i>UWI</i>	<i>Type</i>	<i>Status</i>	<i>Future Plans</i>
100/03-03-008-29W1/0	Vertical	Producing	-
100/04-03-008-29W1/0	Vertical	Suspended	-
100/05-03-008-29W1/0	Vertical	Producing	-
100/06-03-008-29W1/0	Vertical	Producing	-
100/07-03-008-29W1/0	Vertical	Producing	-
100/08-03-008-29W1/0	Vertical	Producing	-
102/08-03-008-29W1/0	Horizontal	Injection	-
100/09-03-008-29W1/0	Vertical	Producing	-
100/10-03-008-29W1/0	Vertical	Producing	-
100/11-03-008-29W1/0	Vertical	Producing	-
100/12-03-008-29W1/0	Vertical	Producing	-
100/13-03-008-29W1/0	Vertical	Producing	-
100/14-03-008-29W1/0	Vertical	Producing	-
100/15-03-008-29W1/0	Vertical	Producing	-
100/16-03-008-29W1/0	Vertical	Producing	-
102/16-03-008-29W1/0	Horizontal	Injection	-
100/01-10-008-29W1/0	Vertical	Producing	-
102/01-10-008-29W1/0	Horizontal	Injection	-
103/01-10-008-29W1/0	Horizontal	Injection	-
100/02-10-008-29W1/0	Vertical	Producing	-
100/03-10-008-29W1/0	Vertical	Producing	-
100/04-10-008-29W1/0	Vertical	Producing	-
100/05-10-008-29W1/0	Vertical	Producing	-
100/06-10-008-29W1/0	Vertical	Producing	-
100/07-10-008-29W1/0	Vertical	Producing	-
100/08-10-008-29W1/0	Vertical	Producing	-
102/08-10-008-29W1/0	Horizontal	Injection	-
100/09-10-008-29W1/0	Vertical	Producing	-
100/10-10-008-29W1/0	Vertical	Producing	-
100/11-10-008-29W1/0	Vertical	Producing	-
100/12-10-008-29W1/0	Vertical	Producing	-
100/13-10-008-29W1/0	Vertical	Producing	-
100/14-10-008-29W1/0	Vertical	Producing	-
100/15-10-008-29W1/0	Vertical	Producing	-
100/16-10-008-29W1/0	Vertical	Producing	-
102/16-10-008-29W1/0	Horizontal	Injection	-
100/01-11-008-29W1/0	Vertical	Potential	-
100/02-11-008-29W1/0	Vertical	Producing	-
100/03-11-008-29W1/0	Vertical	Producing	-
100/04-11-008-29W1/0	Vertical	Producing	-
102/04-11-008-29W1/0	Horizontal	Injection	-
103/04-11-008-29W1/0	Horizontal	Producing	-
100/05-11-008-29W1/0	Vertical	Producing	-
102/05-11-008-29W1/0	Horizontal	Injection	-
100/06-11-008-29W1/0	Vertical	Producing	-
100/07-11-008-29W1/0	Vertical	Producing	-

j) Well List

Sinclair Unit No.3 Well List

<i>UWI</i>	<i>Type</i>	<i>Status</i>	<i>Future Plans</i>
100/08-11-008-29W1/0	Vertical	Potential	-
100/09-11-008-29W1/0	Vertical	Potential	-
100/10-11-008-29W1/0	Vertical	Potential	-
100/11-11-008-29W1/0	Vertical	Producing	-
100/12-11-008-29W1/0	Vertical	Producing	-
100/13-11-008-29W1/0	Vertical	Producing	-
102/13-11-008-29W1/0	Horizontal	Injection	-
100/14-11-008-29W1/0	Vertical	Producing	-
100/15-11-008-29W1/0	Vertical	Producing	-
100/16-11-008-29W1/0	Vertical	Producing	-
102/16-11-008-29W1/0	Horizontal	Drilled & Cased	-
100/01-12-008-29W1/0	Vertical	Producing	-
102/01-12-008-29W1/0	Horizontal	Injection	-
103/01-12-008-29W1/0	Horizontal	Injection	-
100/02-12-008-29W1/0	Vertical	Potential	-
100/03-12-008-29W1/0	Vertical	Producing	-
100/04-12-008-29W1/0	Vertical	Producing	-
100/05-12-008-29W1/0	Vertical	Potential	-
100/06-12-008-29W1/0	Vertical	Producing	-
100/07-12-008-29W1/0	Vertical	Suspended	-
100/08-12-008-29W1/0	Vertical	Suspended	-
102/08-12-008-29W1/0	Horizontal	Injection	-
100/09-12-008-29W1/0	Vertical	Producing	-
102/09-12-008-29W1/0	Horizontal	Injection	-
100/10-12-008-29W1/0	Vertical	Producing	-
100/11-12-008-29W1/0	Vertical	Producing	-
100/12-12-008-29W1/0	Vertical	Producing	-
100/13-12-008-29W1/0	Vertical	Potential	-
100/14-12-008-29W1/0	Vertical	Producing	-
100/15-12-008-29W1/0	Vertical	Producing	-
100/16-12-008-29W1/0	Vertical	Producing	-
102/16-12-008-29W1/0	Horizontal	Producing	-