

Goodlands Unit No. 1

Waterflood Progress Report 2017

January 1st through December 31st 2017

Prepared for:

Manitoba Industry, Economic Development and Mines

Petroleum Branch

Prepared by:

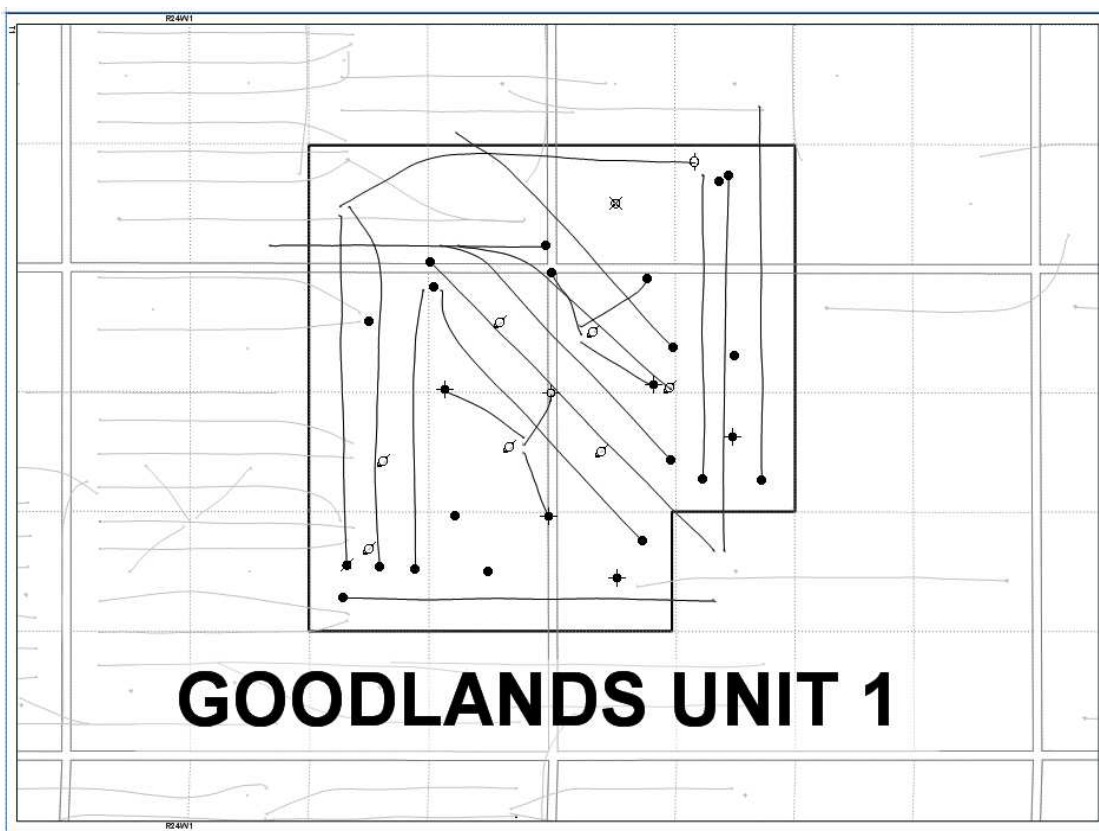
Tundra Oil and Gas

July 23, 2018

INTRODUCTION

Goodlands Unit No. 1 Enhanced Oil Recovery (EOR) Waterflood Project was approved under Waterflood Order No. 13 effective August 2002. The Unit area contains 7 abandoned wells, 21 producing/inactive wells, and 7 active/inactive injectors in 15 LSDs in Township 1, Range 24 W1 as shown in the figure below.

Figure 1: Goodlands Unit No. 1 Area Outline



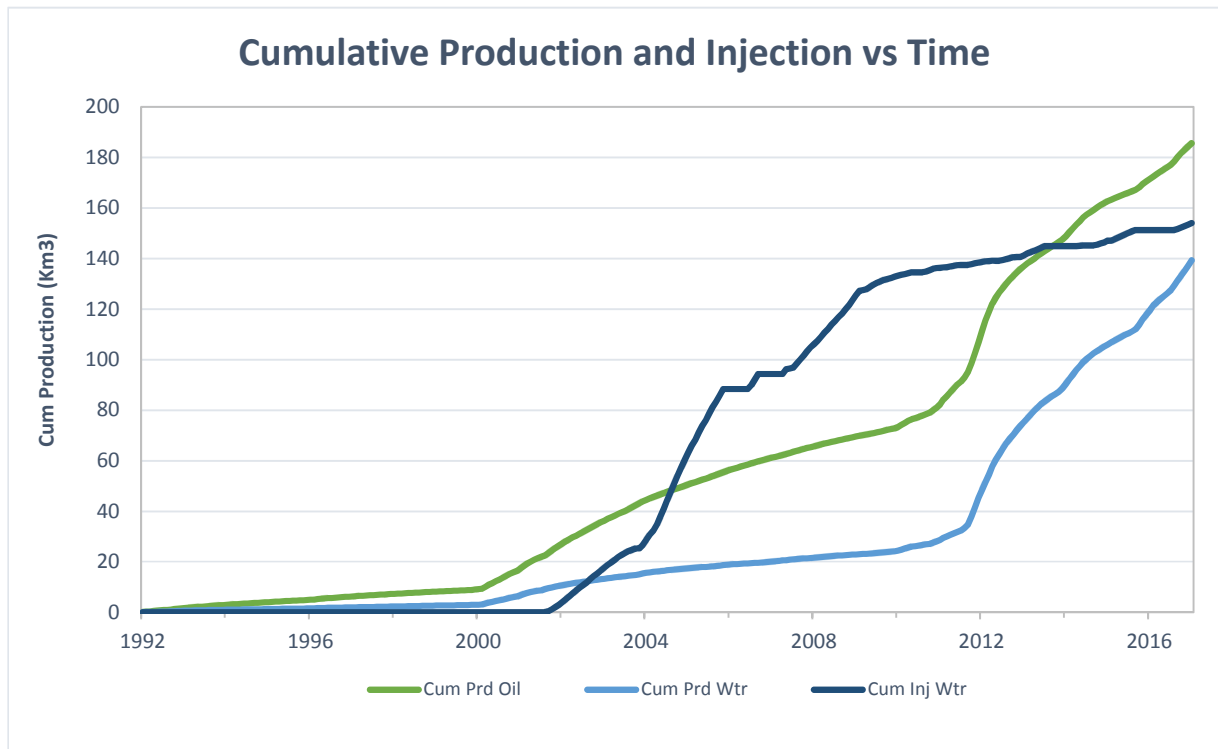
Tundra Oil and Gas (Tundra), as the operator of the Goodlands Unit No. 1 Enhanced Oil Recovery (EOR) project hereby submits the 2017 EOR report as per section 73 of the Drilling and Production Regulations.

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	33.59	63.42	0.00	1.89	0
Feb-2017	34.16	44.90	0.00	1.31	0
Mar-2017	29.11	42.18	0.00	1.45	0
Apr-2017	28.78	37.07	0.00	1.29	0
May-2017	28.19	37.27	0.00	1.32	0
Jun-2017	32.22	42.19	0.00	1.31	0
Jul-2017	46.24	63.18	0.00	1.37	0
Aug-2017	54.26	59.17	11.10	1.09	0
Sep-2017	49.19	62.55	19.20	1.27	0
Oct-2017	45.77	62.05	19.39	1.36	0
Nov-2017	42.86	69.11	19.70	1.61	0
Dec-2017	41.50	72.25	19.03	1.74	0

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

2017 PRODUCTION	
Produced Oil (m ³)	14,187
Produced Gas (m ³)	0
Produced Water (m ³)	19,970
Fluid Injected (m ³)	2,702
CUMULATIVE PRODUCTION	
Produced Oil (m ³)	185,639
Produced Water (m ³)	139,341



c) Monthly wellhead injection pressure for each injection well

MONTH	00/12-11 Inj			00/13-11 Inj			06/13-11 Inj			Goodlands Unit No. 1		
	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	6750		0.0	6300		0.0	0		0.0	6525	
Feb-2017	0.0	6750		0.0	6300		0.0	0		0.0	6525	
Mar-2017	0.0	6750		0.0	6300		0.0	0		0.0	6525	
Apr-2017	0.0	6750		0.0	6300		0.0	0		0.0	6525	
May-2017	0.0	6750		0.0	6300		0.0	0		0.0	6525	
Jun-2017	0.0	6750		0.0	6300		0.0	0		0.0	6525	
Jul-2017	0.0	6750		0.0	6300		0.0	0		0.0	6525	
Aug-2017	0.0	6750		0.0	6300		344.0	-53		344.0	4745	
Sep-2017	0.0	6750		0.0	6300		576.0	-84		576.0	4322	
Oct-2017	0.0	6750		0.0	6300		601.0	-86		601.0	4321	
Nov-2017	0.0	6750		0.0	6300		591.0	-82		591.0	4323	
Dec-2017	0.0	6750		0.0	6300		590.0	-77		590.0	4324	
Total	0.0			0.0			2702.0			2702.0		
Avg Inj P		6750			6300			-32			5643	

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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	344.0	576.0	601.0	591.0	590.0
Daily (m ³ /d)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.10	19.20	19.39	19.70	19.03

2017 AVG. ANNUAL DAILY INJECTION = 7.37 m3/d

CUMULATIVE INJECTION TO Dec 31, 2016 = 151,323 m3

TOTAL 2017 ANNUAL INJECTION = 2,702 m3

CUMULATIVE INJECTION TO Dec 31, 2017 = 154,025 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
100.16-10-001-24W1.00	Repair TBG Leak / Acid Stim / Pump Change	8/16/2017
105.07-10-001-24W1.00	Cemented Liner Clean Out	6/8/2017
102.05-11-001-24W1.00	Cemented Liner Clean Out	6/21/2017
103.11-11-001-24W1.00	Cemented Liner Clean Out	10/27/2017
105.13-11-001-24W1.00	Cemented Liner Clean Out	10/18/2017
106.13-11-001-24W1.00	Spearfish Producer to WIW Conversion	7/22/2017
106.13-11-001-24W1.00	Pump PODs - WI Offset Communication Shut Off	12/20/2017

f) Calculations of voidage replacement ratio on a monthly and cumulative basis

VOIDAGE CALCULATIONS

OIL FORMATION VOLUME FACTOR (Rm3/Sm3) = 1.17

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	1041.4	172.49	1966.1	121.34	0.0	151.32	0.000	0.468
Feb-2017	956.6	173.45	1257.2	122.59	0.0	151.32	0.000	0.465
Mar-2017	902.5	174.35	1307.5	123.90	0.0	151.32	0.000	0.461
Apr-2017	863.4	175.22	1112.2	125.01	0.0	151.32	0.000	0.459
May-2017	874.0	176.09	1155.5	126.17	0.0	151.32	0.000	0.456
Jun-2017	966.5	177.06	1265.6	127.43	0.0	151.32	0.000	0.452
Jul-2017	1433.4	178.49	1958.5	129.39	0.0	151.32	0.000	0.447
Aug-2017	1682.0	180.17	1834.4	131.23	344.0	151.67	0.090	0.443
Sep-2017	1475.7	181.65	1876.5	133.10	576.0	152.24	0.160	0.440
Oct-2017	1419.0	183.07	1923.7	135.03	601.0	152.84	0.168	0.438
Nov-2017	1285.8	184.35	2073.3	137.10	591.0	153.44	0.165	0.435
Dec-2017	1286.6	185.64	2239.6	139.34	590.0	154.03	0.158	0.432

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

The injected fluid is treated by filtration.

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>
100/07-10-001-24W1/0	Vertical	Injection	-
102/07-10-001-24W1/0	Horizontal	Producing	-
103/07-10-001-24W1/0	Horizontal	Suspended	-
104/07-10-001-24W1/0	Horizontal	Producing	-
105/07-10-001-24W1/0	Horizontal	Producing	-
100/08-10-001-24W1/0	Vertical	Pumping	-
1C0/08-10-001-24W1/0	Vertical	Producing	-
1D0/08-10-001-24W1/0	Dir/Dev	Abandoned Zone	-
100/09-10-001-24W1/0	Vertical	Injection	-
1W0/09-10-001-24W1/0	Dir/Dev	Abandoned	-
100/10-10-001-24W1/0	Vertical	Injection	-
100/15-10-001-24W1/0	Vertical	Pumping	-
100/16-10-001-24W1/0	Vertical	Injection	-
1B0/16-10-001-24W1/0	Dir/Dev	Abandoned Zone	-
1C0/16-10-001-24W1/0	Vertical	Producing	-
100/05-11-001-24W1/0	Vertical	Abandoned Zone	-
102/05-11-001-24W1/0	Horizontal	Producing	-
100/11-11-001-24W1/0	Vertical	Abandoned Zone	-
102/11-11-001-24W1/0	Horizontal	Producing	-
103/11-11-001-24W1/0	Horizontal	Producing	-
100/12-11-001-24W1/0	Vertical	Injection	-
102/12-11-001-24W1/0	Horizontal	Producing	-
100/13-11-001-24W1/0	Vertical	Injection	-
105/13-11-001-24W1/0	Horizontal	Producing	-
106/13-11-001-24W1/0	Horizontal	Injection	-
1A0/13-11-001-24W1/0	Dir/Dev	Abandoned Zone	-
1C0/13-11-001-24W1/0	Dir/Dev	Pumping	-
1D0/13-11-001-24W1/0	Dir/Dev	Producing	-
100/14-11-001-24W1/0	Vertical	Producing	-
100/03-14-001-24W1/0	Vertical	Producing	-
102/03-14-001-24W1/0	Horizontal	Producing	WIW Conversion
103/03-14-001-24W1/0	Horizontal	Drilled & Cased	-
100/04-14-001-24W1/0	Vertical	Abandoned	-
100/01-15-001-24W1/0	Horizontal	Producing	-
102/01-15-001-24W1/0	Horizontal	Producing	WIW Conversion