

Ewart Unit No. 3

Waterflood Progress Report 2019

January 1st through December 31st 2019

Prepared for:

Manitoba Industry, Economic Development and Mines

Petroleum Branch

Prepared by:

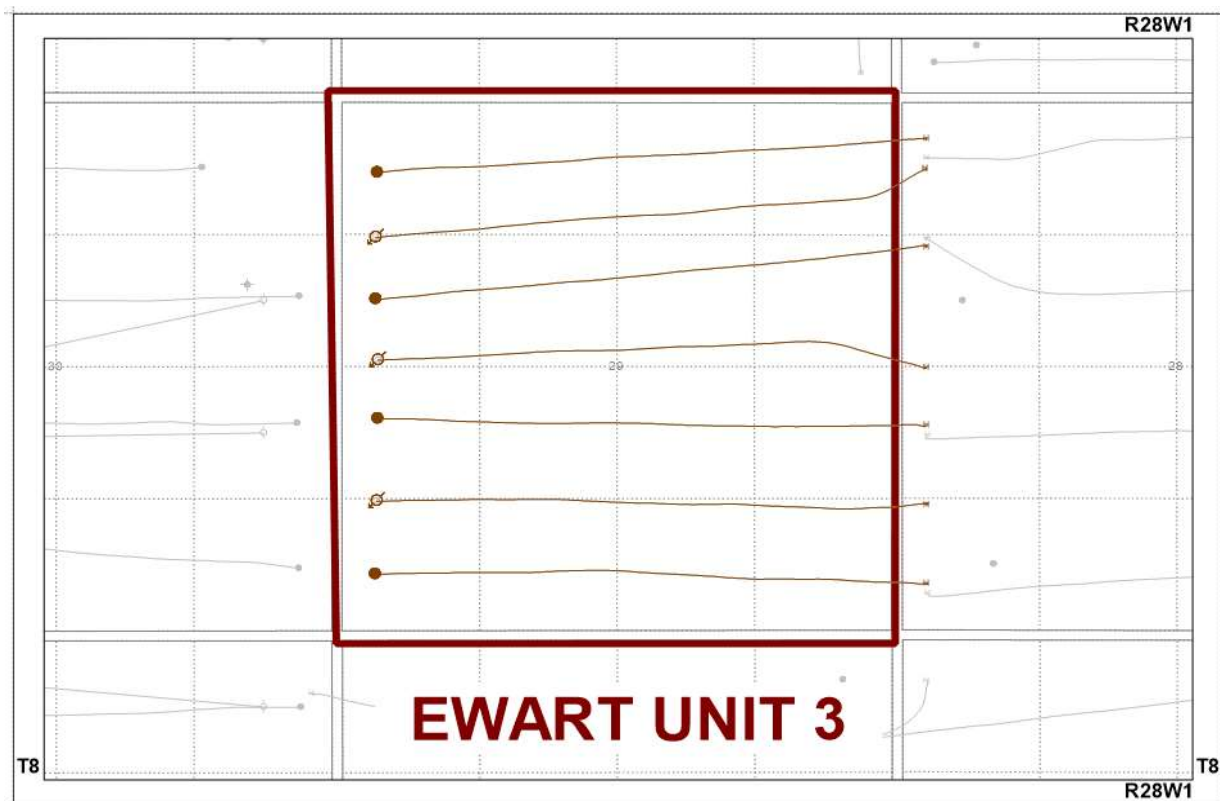
Tundra Oil and Gas

May 25, 2020

INTRODUCTION

Ewart Unit No. 3 Enhance Oil Recovery (EOR) Waterflood Project was approved under Waterflood Order No. 30 effective August 1, 2013 with Tundra Oil and Gas (Tundra) as Operator. The Unit area contains 4 producing wells and 3 injectors in 16 LSDs in Township 8 Range 28 W1 as shown in the figure below.

Figure 1: Ewart Unit No. 3 Area Outline



Ewart Unit No. 3

Tundra Oil and Gas (Tundra), as the operator of the Ewart Unit No. 3 Enhanced Oil Recovery (EOR) project hereby submits the 2019 EOR report as per section 73 of the Drilling and Production Regulations.

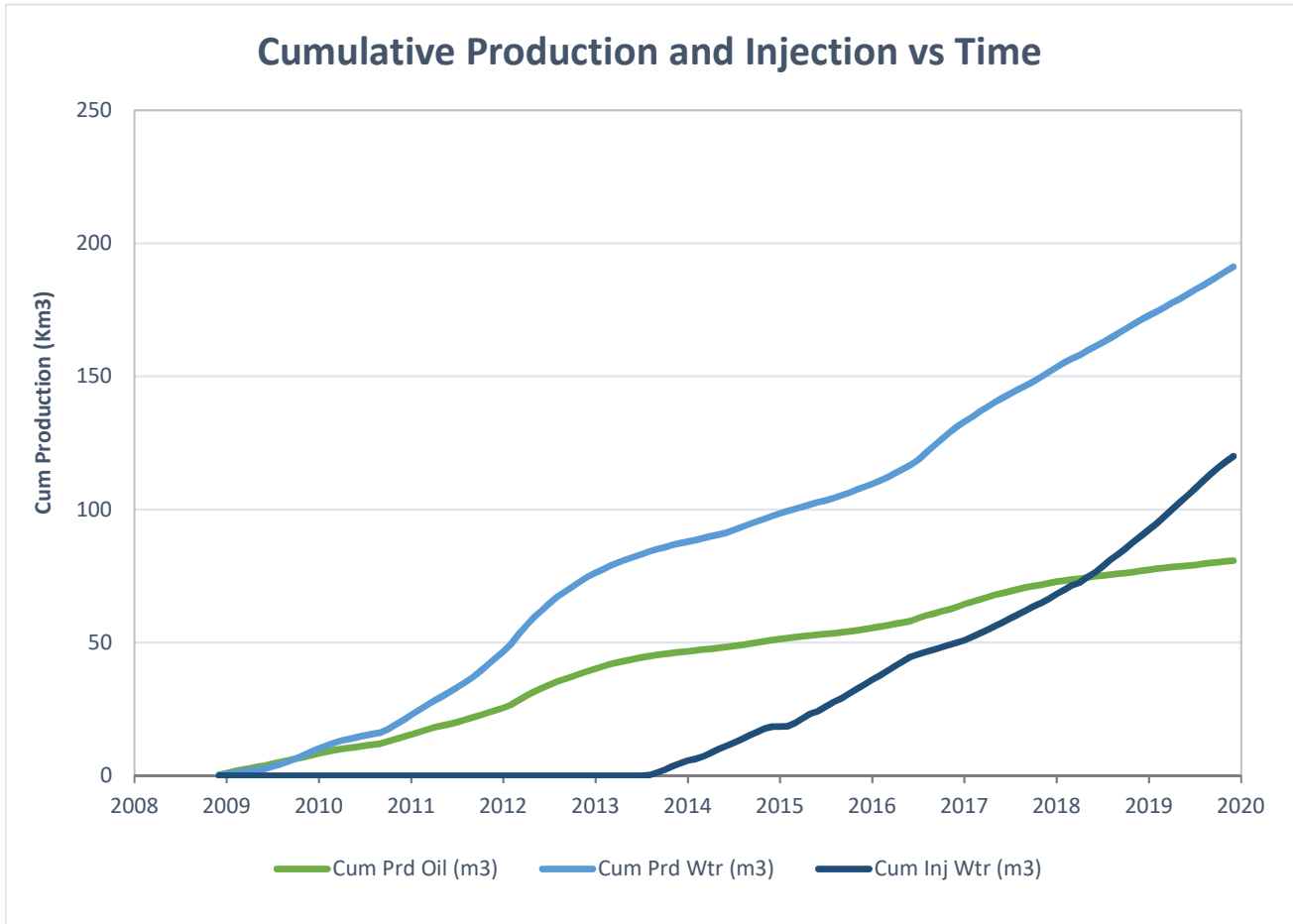
a) Monthly oil and water production rates, injection rate, GOR and WOR

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	13.35	54.62	76.06	4.09	0
Feb-2019	15.13	49.47	81.03	3.27	0
Mar-2019	10.56	51.43	86.63	4.87	0
Apr-2019	9.94	52.96	87.42	5.33	0
May-2019	8.59	50.34	86.53	5.86	0
Jun-2019	8.07	57.33	82.37	7.10	0
Jul-2019	8.78	56.96	86.68	6.49	0
Aug-2019	13.03	51.64	86.12	3.96	0
Sep-2019	13.32	52.49	87.01	3.94	0
Oct-2019	8.85	61.94	81.38	7.00	0
Nov-2019	8.94	61.60	76.33	6.89	0
Dec-2019	8.54	53.91	66.29	6.31	0

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

2019 PRODUCTION	
Produced Oil (m ³)	3,854
Produced Gas (m ³)	0
Produced Water (m ³)	19,923
Fluid Injected (m ³)	29,923
CUMULATIVE PRODUCTION	
Produced Oil (m ³)	80,793
Produced Water (m ³)	191,213

Ewart Unit No. 3



c) Monthly wellhead injection pressure for each injection well

	02/12-29 Inj		03/12-29 Inj		02/04-29 Inj		EU3	
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-2019	887.9	4712	707.5	5051	762.4	-95	2357.7	3223
Feb-2019	859.4	4848	728.5	5560	680.9	-95	2268.8	3438
Mar-2019	1018.7	5089	929.1	5823	737.7	-93	2685.5	3606
Apr-2019	978.0	5246	932.0	5870	712.6	-94	2622.6	3674
May-2019	979.0	5248	987.0	6167	716.4	-94	2682.4	3773
Jun-2019	888.1	5096	928.5	6023	654.6	-94	2471.2	3675
Jul-2019	940.9	5282	998.7	6452	747.4	-93	2687.0	3880
Aug-2019	1026.8	5642	912.7	6184	730.1	-93	2669.6	3911
Sep-2019	985.5	5880	902.4	6402	722.5	-48	2610.4	4078
Oct-2019	977.2	5813	876.2	6300	669.5	-36	2522.9	4025
Nov-2019	932.9	5904	864.6	6424	492.3	-93	2289.8	4078
Dec-2019	908.1	5890	851.7	6448	295.1	-91	2054.9	4083
Total	11382.5		10618.8		7921.5		29922.8	
Avg Inj P		5388		6059		-85		3787

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	2357.7	2268.8	2685.5	2622.6	2682.4	2471.2	2687.0	2669.6	2610.4	2522.9	2289.8	2054.9
Daily (m³/d)	76.06	81.03	86.63	87.42	86.53	82.37	86.68	86.12	87.01	81.39	76.33	66.29

2019 AVG. ANNUAL DAILY INJECTION =	81.99 m3/d
CUMULATIVE INJECTION TO Dec 31, 2018 =	90,118 m3
TOTAL 2019 ANNUAL INJECTION =	29,923 m3
CUMULATIVE INJECTION TO Dec 31, 2019 =	120,040 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

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	413.8	77.35	1693.3	172.98	2357.8	92.48	1.104	0.361
Feb-2019	423.5	77.78	1385.2	174.37	2268.8	94.74	1.234	0.368
Mar-2019	327.3	78.10	1594.2	175.96	2685.5	97.43	1.381	0.375
Apr-2019	298.1	78.40	1588.7	177.55	2622.6	100.05	1.375	0.383
May-2019	266.4	78.67	1560.6	179.11	2682.4	102.73	1.453	0.390
Jun-2019	242.1	78.91	1720	180.83	2471.2	105.21	1.249	0.396
Jul-2019	272.1	79.18	1765.8	182.60	2687.0	107.89	1.306	0.403
Aug-2019	403.9	79.59	1600.7	184.20	2669.6	110.56	1.313	0.410
Sep-2019	399.5	79.99	1574.8	185.77	2610.4	113.17	1.303	0.417
Oct-2019	274.4	80.26	1920.1	187.69	2522.9	115.70	1.140	0.423
Nov-2019	268.1	80.53	1847.9	189.54	2289.8	117.99	1.072	0.428
Dec-2019	264.7	80.79	1671.3	191.21	2054.9	120.04	1.051	0.432

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

The injection water for Ewart Unit No. 3 is sourced from the 02/14-30-007-28W1 well (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

j) Well List**Ewart Unit No. 3 Well List**

<i>UWI</i>	<i>Type</i>	<i>Status</i>	<i>Future Plans</i>
100/04-29-008-28W1/0	Horizontal	Producing	-
102/04-29-008-28W1/0	Horizontal	Injection	-
102/05-29-008-28W1/0	Horizontal	Producing	-
100/12-29-008-28W1/0	Horizontal	Producing	-
102/12-29-008-28W1/0	Horizontal	Injection	-
103/12-29-008-28W1/0	Horizontal	Injection	-
100/13-29-008-28W1/0	Horizontal	Producing	-