

Ewart Unit No. 6
Waterflood Progress Report 2019
January 1st through December 31st 2019

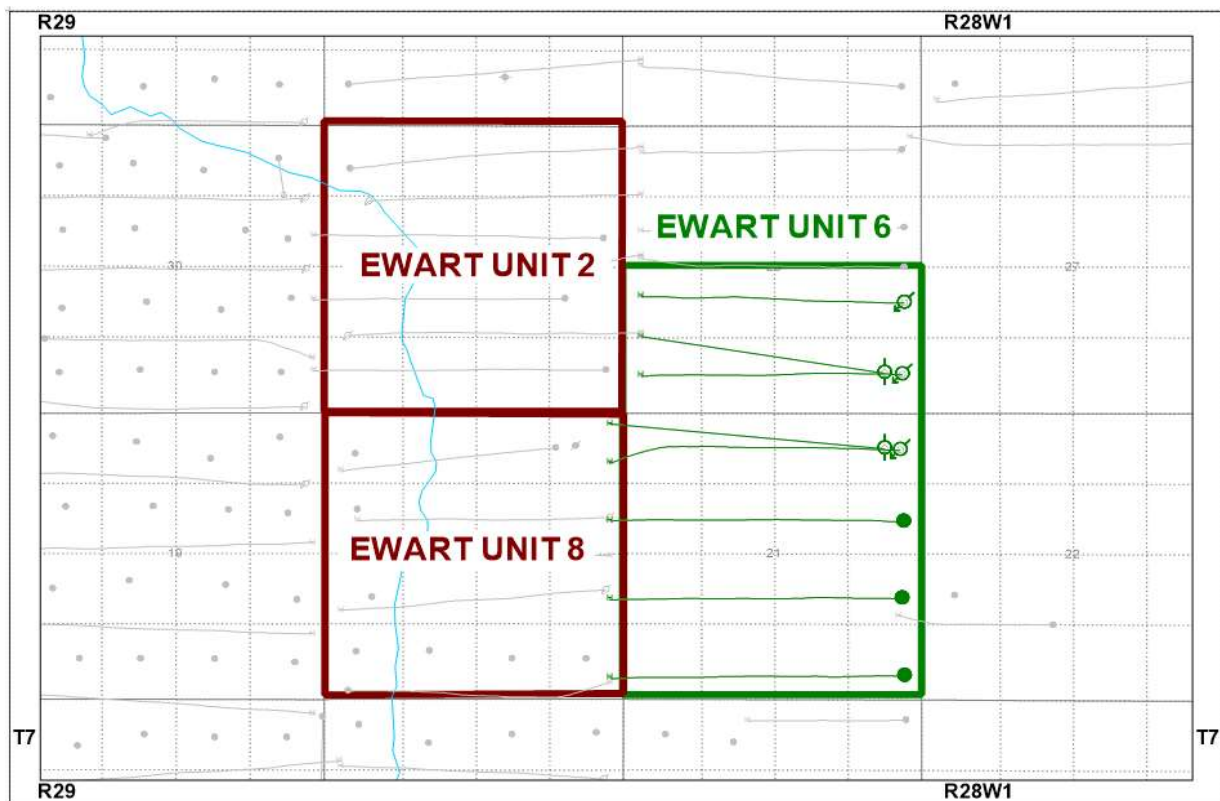
Prepared for:
Manitoba Industry, Economic Development and Mines
Petroleum Branch

Prepared by:
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INTRODUCTION

Ewart Unit No. 6 Enhanced Oil Recovery (EOR) Waterflood Project was approved under Waterflood Order No. 42, effective January 1, 2015 with Tundra Oil and Gas (Tundra) as Operator. The EOR Unit area, outlined in blue, contains 5 producing horizontal wells and 3 water injection wells, in 24 LSDs in Township 7 Range 28 W1 as shown in Figure 1.

Figure 1: Ewart Unit No. 6 Area Outline



Ewart Unit No. 6

Tundra Oil and Gas (Tundra), as the operator of the Ewart Unit No. 6 Enhanced Oil Recovery (EOR) project hereby submits the 2019 EOR report as per section 73 of the Drilling and Production Regulations.

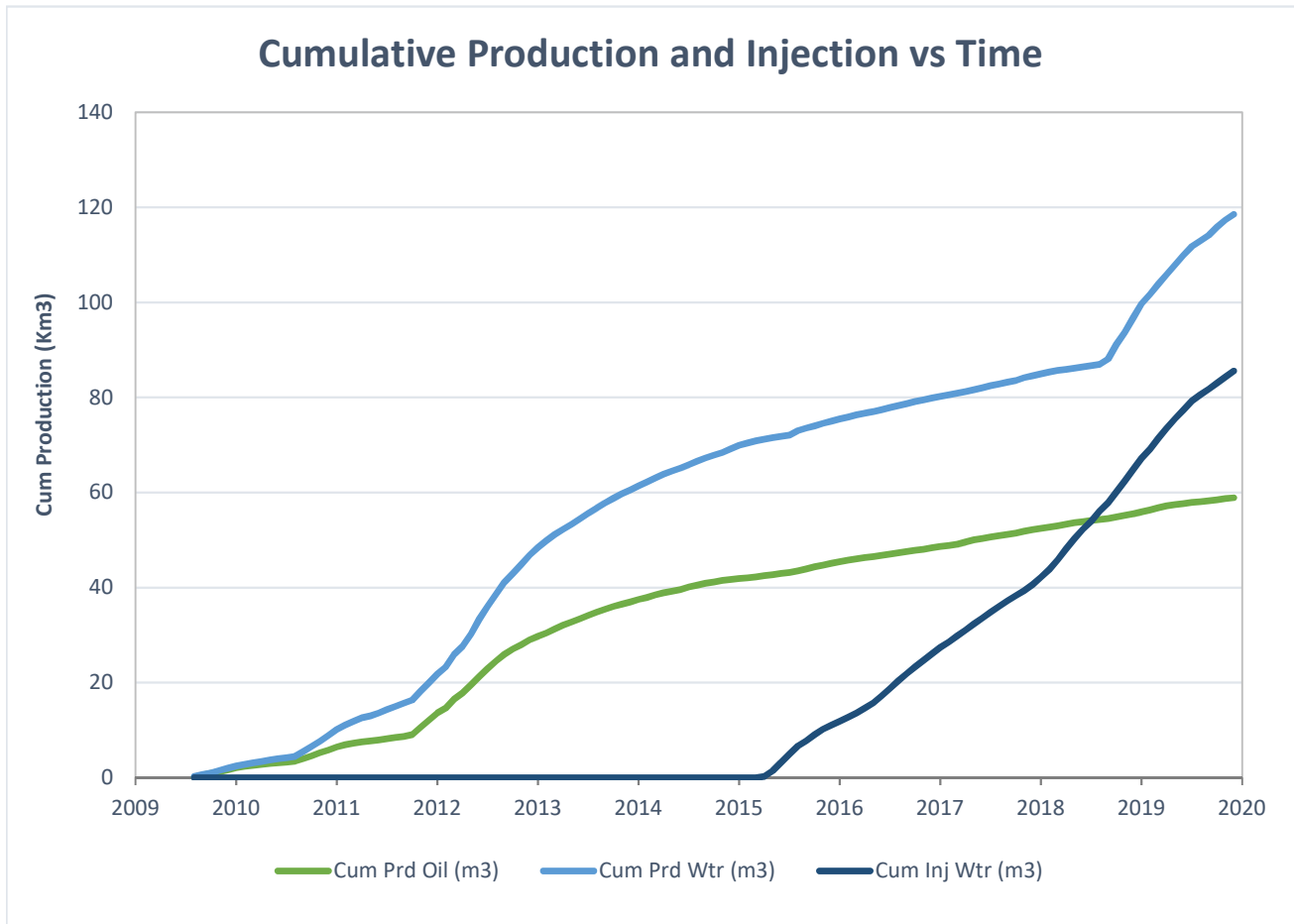
a) Monthly oil and water production rates, injection rate, GOR and WOR

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	12.65	94.92	76.68	7.51	0
Feb-2019	13.00	72.43	68.54	5.57	0
Mar-2019	15.30	69.74	72.84	4.56	0
Apr-2019	14.02	66.81	69.77	4.76	0
May-2019	8.67	65.90	66.48	7.60	0
Jun-2019	7.38	67.03	61.20	9.09	0
Jul-2019	6.81	58.97	61.52	8.66	0
Aug-2019	5.79	36.54	40.94	6.31	0
Sep-2019	6.28	41.47	40.60	6.61	0
Oct-2019	7.25	55.55	40.65	7.66	0
Nov-2019	6.74	47.95	41.67	7.11	0
Dec-2019	6.25	39.32	41.10	6.29	0

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

2019 PRODUCTION	
Produced Oil (m ³)	3,341
Produced Gas (m ³)	0
Produced Water (m ³)	21,775
Fluid Injected (m ³)	20,722
CUMULATIVE PRODUCTION	
Produced Oil (m ³)	58,897
Produced Water (m ³)	118,526

Ewart Unit No. 6



c) Monthly wellhead injection pressure for each injection well

	00/16-21 Inj		02/08-28 Inj		00/01-28 Inj		EU6	
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	477.0	6491	689.0	3445	1211.0	3017	2377.0	4318
Feb-2019	476.0	6529	521.0	2963	922.0	3108	1919.0	4200
Mar-2019	531.0	6370	578.0	2935	1149.0	3283	2258.0	4196
Apr-2019	513.0	6167	522.0	2964	1058.0	3648	2093.0	4260
May-2019	561.0	6757	506.0	2985	994.0	3658	2061.0	4467
Jun-2019	516.0	6239	461.0	2984	859.0	3612	1836.0	4278
Jul-2019	555.0	6242	475.0	8668	877.0	6052	1907.0	6987
Aug-2019	555.0	6287	684.0	3243	30.0	2289	1269.0	3940
Sep-2019	502.0	6183	716.0	4294	0.0	-95	1218.0	3461
Oct-2019	504.0	6056	756.0	2909	0.0	-95	1260.0	2957
Nov-2019	522.0	6201	728.0	2744	0.0	-95	1250.0	2950
Dec-2019	543.0	6215	731.0	2500	0.0	-95	1274.0	2873
Total	6255.0		7367.0		7100.0		20722.0	
Avg Inj P		6311		3553		2357		4074

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	2377.0	1919.0	2258.0	2093.0	2061.0	1836.0	1907.0	1269.0	1218.0	1260.0	1250.0	1274.0
Daily (m³/d)	76.68	68.54	72.84	69.77	66.48	61.20	61.52	40.94	40.60	40.65	41.67	41.10

2019 AVG. ANNUAL DAILY INJECTION =	56.83 m3/d
CUMULATIVE INJECTION TO Dec 31, 2018 =	64,845 m3
TOTAL 2019 ANNUAL INJECTION =	20,722 m3
CUMULATIVE INJECTION TO Dec 31, 2019 =	85,567 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	392.0	55.95	2942.6	99.69	2377.0	67.22	0.707	0.421
Feb-2019	364.1	56.31	2027.9	101.72	1919.0	69.14	0.794	0.427
Mar-2019	474.2	56.79	2161.9	103.88	2258.0	71.40	0.846	0.434
Apr-2019	420.7	57.21	2004.3	105.89	2093.0	73.49	0.853	0.440
May-2019	268.8	57.48	2043	107.93	2061.0	75.55	0.884	0.446
Jun-2019	221.3	57.70	2010.9	109.94	1836.0	77.39	0.817	0.451
Jul-2019	211.2	57.91	1828	111.77	1907.0	79.30	0.928	0.456
Aug-2019	179.4	58.09	1132.8	112.90	1269.0	80.57	0.958	0.460
Sep-2019	188.3	58.28	1244	114.15	1218.0	81.78	0.843	0.463
Oct-2019	224.9	58.50	1721.9	115.87	1260.0	83.04	0.642	0.465
Nov-2019	202.2	58.70	1438.5	117.31	1250.0	84.29	0.755	0.468
Dec-2019	193.8	58.90	1218.9	118.53	1274.0	85.57	0.893	0.471

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

The injection water for Ewart Unit No. 6 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. 6 Well List**

<i>UWI</i>	<i>Type</i>	<i>Status</i>	<i>Future Plans</i>
100/01-21-007-28W1/0	Horizontal	Producing	-
100/08-21-007-28W1/0	Horizontal	Producing	WIW Conversion
100/09-21-007-28W1/0	Horizontal	Producing	WIW Conversion
100/16-21-007-28W1/0	Horizontal	Injection	-
102/16-21-007-28W1/0	Horizontal	Producing	-
100/01-28-007-28W1/0	Horizontal	Injection	-
102/01-28-007-28W1/0	Horizontal	Producing	-
102/08-28-007-28W1/0	Horizontal	Injection	-