

Ewart Unit No. 8
Waterflood Progress Report 2019
January 1st through December 31st 2019

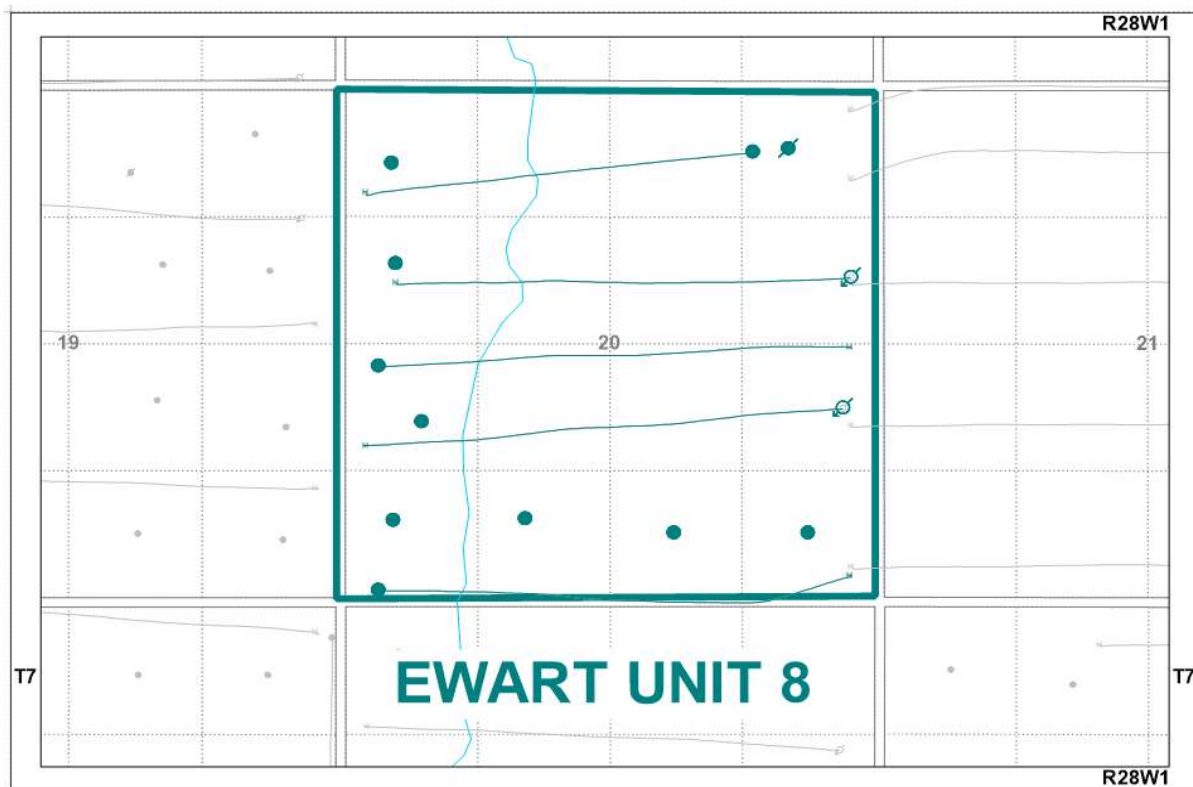
Prepared for:
Manitoba Industry, Economic Development and Mines
Petroleum Branch

Prepared by:
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INTRODUCTION

Ewart Unit No. 8 Enhanced Oil Recovery (EOR) Waterflood Project was approved under Waterflood Order No. 41, effective January 1, 2015 with Tundra Oil and Gas (Tundra) as Operator. The EOR project area, outlined in blue in Figure 1, contains 8 vertical and 3 horizontal producing wells and 2 horizontal injection wells in 16 LSDs in Township 7, Range 28W1.

Figure 1: Ewart Unit No. 8 Area Outline



Ewart Unit No. 8

Tundra Oil and Gas (Tundra), as the operator of the Ewart Unit No. 8 Enhanced Oil Recovery (EOR) project hereby submits the 2019 EOR report as per section 73 of the Drilling and Production Regulations.

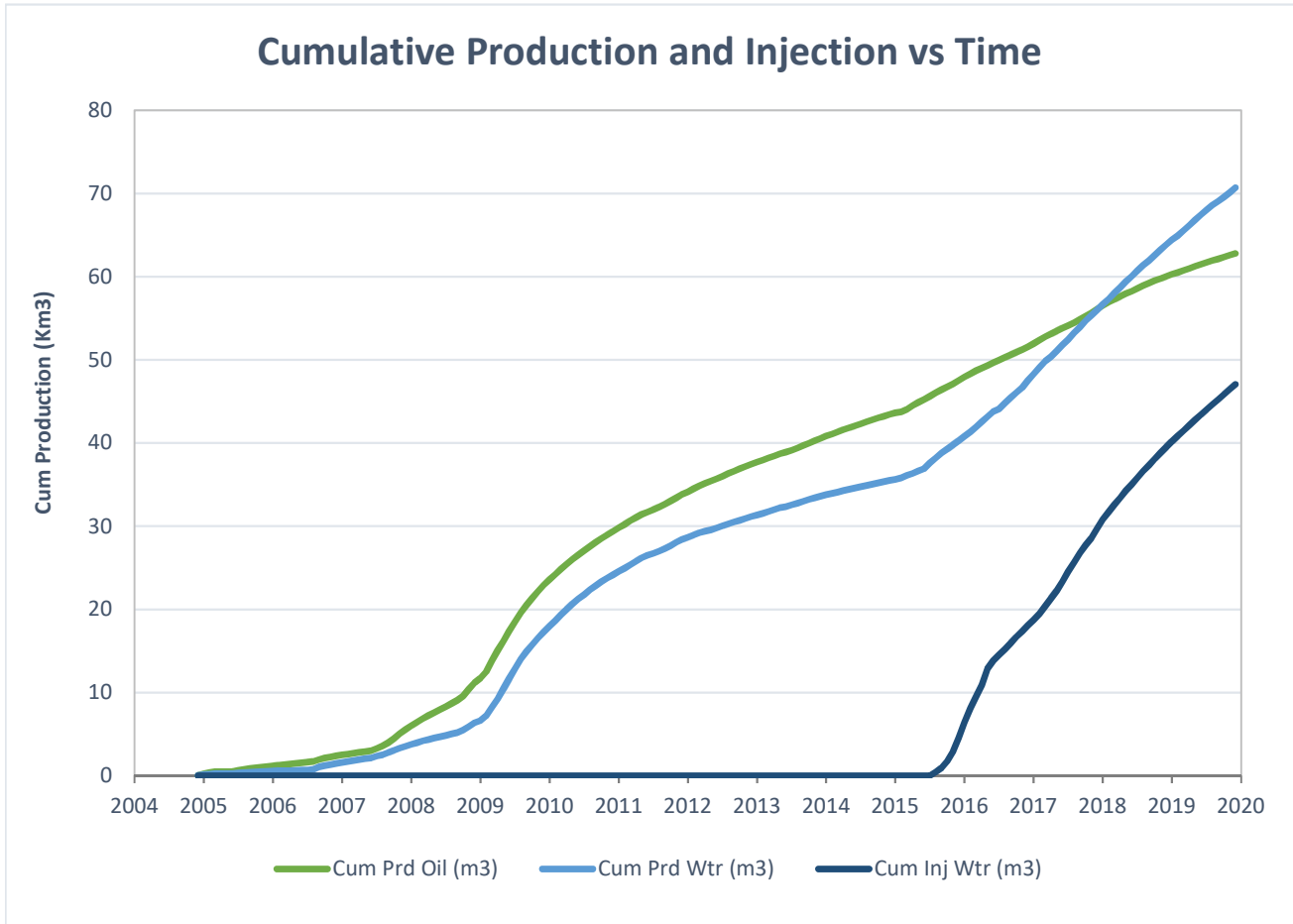
a) Monthly oil and water production rates, injection rate, GOR and WOR

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	8.05	18.36	22.00	2.28	0
Feb-2019	7.36	17.82	22.57	2.42	0
Mar-2019	7.97	21.33	21.32	2.68	0
Apr-2019	8.14	20.57	21.20	2.53	0
May-2019	8.27	20.52	20.68	2.48	0
Jun-2019	7.50	20.04	20.43	2.67	0
Jul-2019	7.70	18.79	20.61	2.44	0
Aug-2019	7.26	18.90	19.35	2.60	0
Sep-2019	6.52	16.08	20.30	2.46	0
Oct-2019	7.26	16.47	19.68	2.27	0
Nov-2019	7.58	17.76	20.13	2.34	0
Dec-2019	6.46	18.60	18.94	2.88	0

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

2019 PRODUCTION	
Produced Oil (m ³)	2,741
Produced Gas (m ³)	0
Produced Water (m ³)	6,854
Fluid Injected (m ³)	7,514
CUMULATIVE PRODUCTION	
Produced Oil (m ³)	62,782
Produced Water (m ³)	70,688

Ewart Unit No. 8



c) Monthly wellhead injection pressure for each injection well

	00/08-20 Inj		00/09-20 Inj		EU8	
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)
Jan-2019	315.0	6559	367.0	6562	682.0	6560
Feb-2019	280.0	6557	352.0	6564	632.0	6561
Mar-2019	285.0	6518	376.0	6452	661.0	6485
Apr-2019	274.0	6424	362.0	6258	636.0	6341
May-2019	301.0	6562	340.0	5938	641.0	6250
Jun-2019	282.0	6365	331.0	6032	613.0	6198
Jul-2019	302.0	6509	337.0	6003	639.0	6256
Aug-2019	285.0	6440	315.0	6204	600.0	6322
Sep-2019	276.0	6453	333.0	6183	609.0	6318
Oct-2019	281.0	6563	329.0	6396	610.0	6480
Nov-2019	266.0	6537	338.0	6469	604.0	6503
Dec-2019	261.0	6557	326.0	6442	587.0	6499
Total	3408.0		4106.0		7514.0	
Avg Inj P		6504		6292		6398

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	682.0	632.0	661.0	636.0	641.0	613.0	639.0	600.0	609.0	610.0	604.0	587.0
Daily (m³/d)	22.00	22.57	21.32	21.20	20.68	20.43	20.61	19.35	20.30	19.68	20.13	18.94

2019 AVG. ANNUAL DAILY INJECTION =	20.60 m3/d
CUMULATIVE INJECTION TO Dec 31, 2017 =	39,525 m3
TOTAL 2019 ANNUAL INJECTION =	7,514 m3
CUMULATIVE INJECTION TO Dec 31, 2019 =	47,039 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	249.4	60.29	569.2	64.40	682.0	40.21	0.815	0.312
Feb-2019	206.1	60.50	499	64.90	632.0	40.84	0.878	0.315
Mar-2019	247.0	60.74	661.2	65.56	661.0	41.50	0.714	0.318
Apr-2019	244.2	60.99	617.1	66.18	636.0	42.14	0.724	0.320
May-2019	256.5	61.25	636	66.82	641.0	42.78	0.704	0.323
Jun-2019	225.1	61.47	601.3	67.42	613.0	43.39	0.728	0.326
Jul-2019	238.6	61.71	582.5	68.00	639.0	44.03	0.762	0.328
Aug-2019	225.1	61.93	585.9	68.59	600.0	44.63	0.726	0.331
Sep-2019	195.7	62.13	482.3	69.07	609.0	45.24	0.880	0.334
Oct-2019	225.2	62.35	510.6	69.58	610.0	45.85	0.811	0.336
Nov-2019	227.4	62.58	532.8	70.11	604.0	46.45	0.778	0.339
Dec-2019	200.2	62.78	576.5	70.69	587.0	47.04	0.742	0.341

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

The injection water for Ewart Unit No. 8 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. 8 Well List

<i>UWI</i>	<i>Type</i>	<i>Status</i>	<i>Future Plans</i>
100/01-20-007-28W1/0	Vertical	Producing	-
100/02-20-007-28W1/0	Vertical	Producing	-
100/03-20-007-28W1/0	Vertical	Producing	-
100/04-20-007-28W1/0	Vertical	Producing	-
102/04-20-007-28W1/0	Horizontal	Producing	-
102/05-20-007-28W1/0	Vertical	Producing	-
103/05-20-007-28W1/0	Horizontal	Producing	-
100/08-20-007-28W1/0	Horizontal	Injection	-
100/09-20-007-28W1/0	Horizontal	Injection	-
100/12-20-007-28W1/0	Vertical	Producing	-
100/13-20-007-28W1/0	Vertical	Producing	-
100/16-20-007-28W1/0	Vertical	Suspended	-
102/16-20-007-28W1/0	Horizontal	Producing	-