

North Pierson Unit No. 2

Waterflood Progress Report 2019

January 1st through December 31st 2019

Prepared for:

Manitoba Industry, Economic Development and Mines

Petroleum Branch

Prepared by:

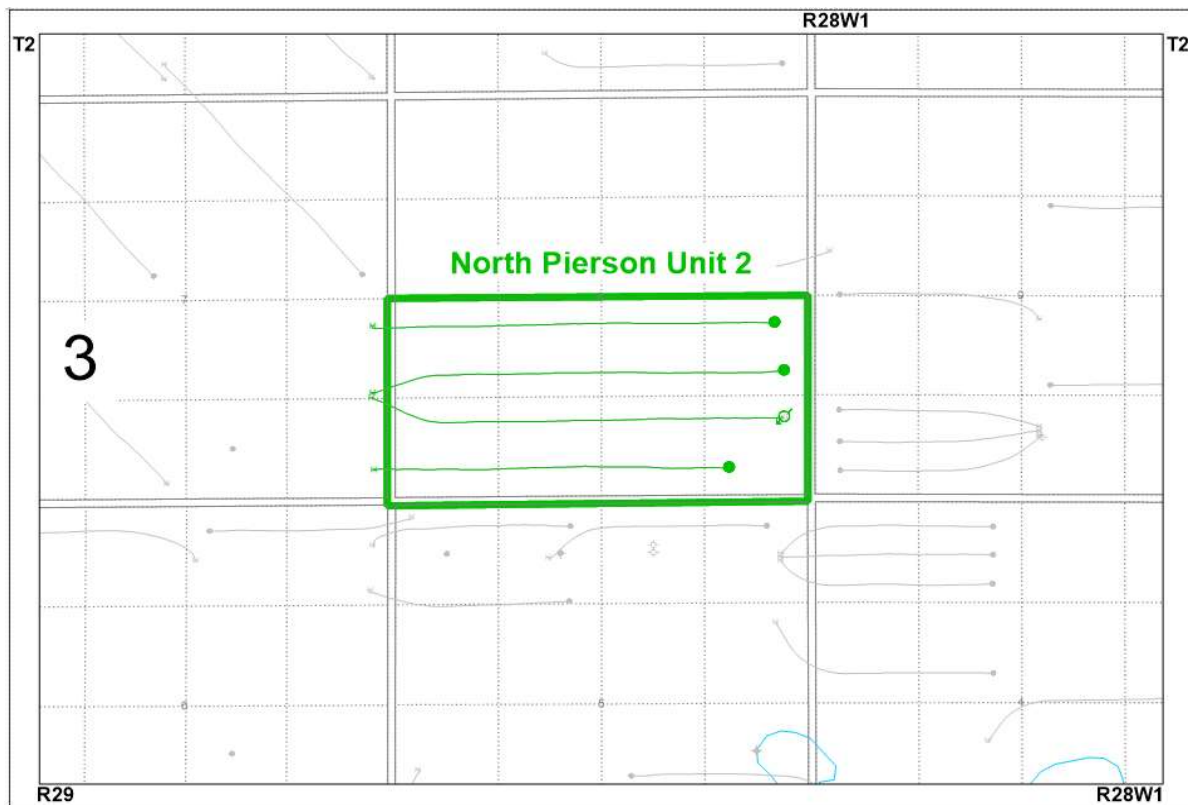
Tundra Oil and Gas

August 12, 2020

INTRODUCTION

North Pierson Unit No. 2 Enhanced Oil Recovery (EOR) Waterflood Project was approved under Waterflood Order No. 33, effective June 1, 2014 with Legacy Oil and Gas Inc. as Operator. In 2019, Tundra Oil and Gas Limited acquired the unit and became operator. The EOR project area, outlined in green in Figure 1, contains 3 producing horizontal wells and 1 injection well in the S/2 Section 8 Township 2, Range 28W1.

Figure 1: North Pierson Unit No. 2 Area Outline



North Pierson Unit No. 2

Tundra Oil and Gas (Tundra), as the operator of the North Pierson Unit No. 2 Enhanced Oil Recovery (EOR) project hereby submits the 2019 EOR report as per section 73 of the Drilling and Production Regulations.

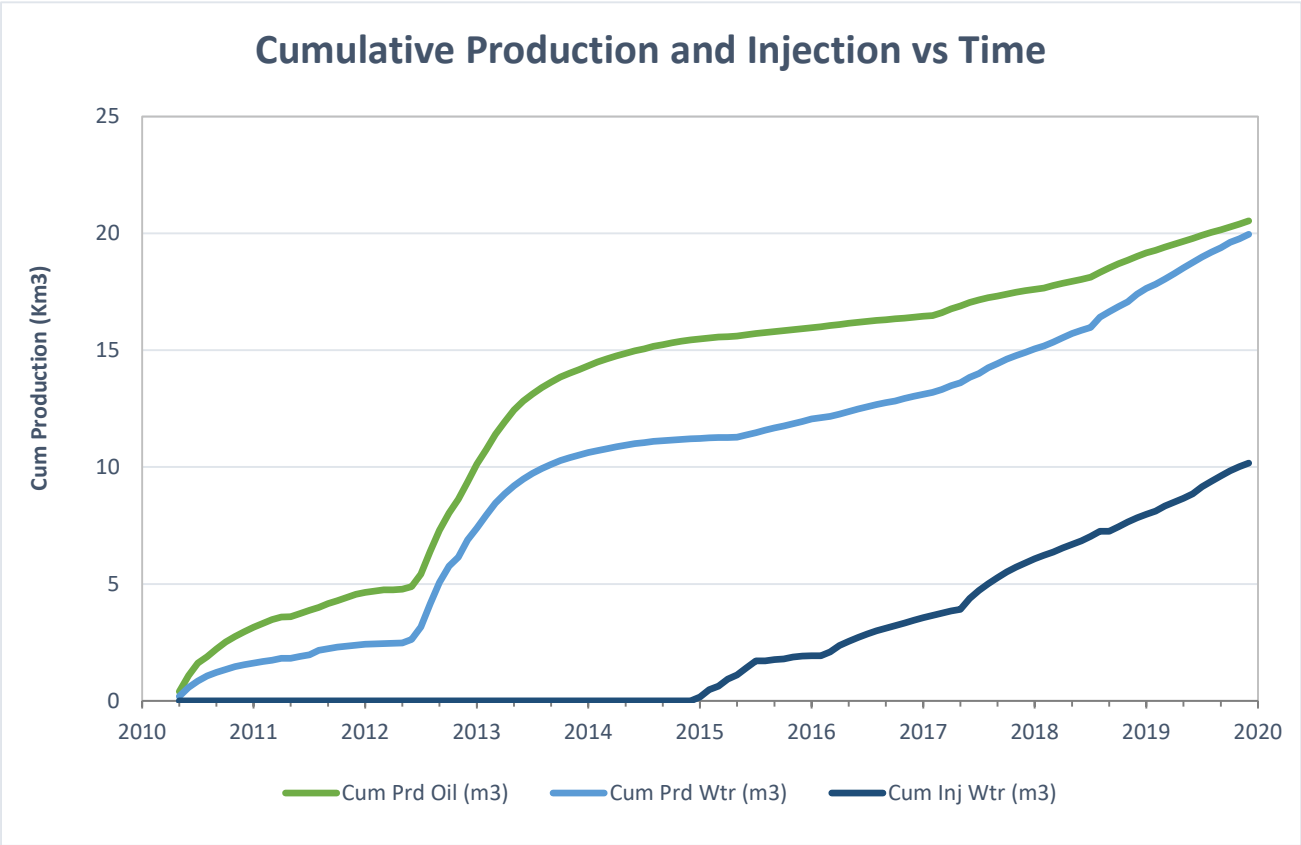
a) Monthly oil and water production rates, injection rate, GOR and WOR

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	4.99	7.92	5.14	1.59	5.81
Feb-2019	4.03	6.76	4.83	1.68	7.09
Mar-2019	4.19	6.97	6.81	1.66	8.47
Apr-2019	4.12	7.50	5.69	1.82	7.28
May-2019	4.21	8.13	5.20	1.93	1.53
Jun-2019	4.24	7.69	6.17	1.82	50.35
Jul-2019	4.17	7.40	9.83	1.77	39.41
Aug-2019	3.99	6.99	7.81	1.75	42.07
Sep-2019	3.71	6.40	7.64	1.73	6.29
Oct-2019	3.91	7.09	6.84	1.81	0
Nov-2019	4.28	5.41	6.04	1.26	0
Dec-2019	4.30	6.16	5.11	1.43	0

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

2019 PRODUCTION	
Produced Oil (m ³)	1,526
Produced Gas (m ³)	21
Produced Water (m ³)	2,570
Fluid Injected (m ³)	2,350
CUMULATIVE PRODUCTION	
Produced Oil (m ³)	20,535
Produced Water (m ³)	19,964

North Pierson Unit No. 2



c) Monthly wellhead injection pressure for each injection well

MONTH	02/01-08 Inj		NPU2	
	Inj Water (m ³)	Avg Inj P (kPa)	Inj Water (m ³)	Avg Inj P (kPa)
Jan-2019	159.3	-	159.3	-
Feb-2019	135.3	-	135.3	-
Mar-2019	211.0	-	211.0	-
Apr-2019	170.8	-	170.8	-
May-2019	161.3	-	161.3	-
Jun-2019	185.1	-	185.1	-
Jul-2019	304.7	-	304.7	-
Aug-2019	242.0	-	242.0	-
Sep-2019	229.2	-	229.2	-
Oct-2019	212.0	2226	212.0	2226
Nov-2019	181.1	3250	181.1	3250
Dec-2019	158.4	3250	158.4	3250
Total	2350.2		2350.2	
Avg Inj P		2909		2909

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	159.3	135.3	211.0	170.8	161.3	185.1	304.7	242.0	229.2	212.0	181.1	158.4
Daily (m³/d)	5.14	4.83	6.81	5.69	5.20	6.17	9.83	7.81	7.64	6.84	6.04	5.11

2019 AVG. ANNUAL DAILY INJECTION =	6.43 m3/d
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CUMULATIVE INJECTION TO Dec 31, 2018 =	7,827 m3
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TOTAL 2019 ANNUAL INJECTION =	2,350 m3
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CUMULATIVE INJECTION TO Dec 31, 2019 =	10,177 m3
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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) = 1.24

MONTH	Mth Oil Prod (m ³)	Cum Oil Prod (Km ³)	Mth Water Prod (m ³)	Cum Water Prod (Km ³)	Mth Water Inj (m ³)	Cum Water Inj (Km ³)	VRR	Cum VRR
Jan-2019	154.8	19.16	245.5	17.64	159.3	7.99	0.364	0.193
Feb-2019	112.9	19.28	189.3	17.83	135.3	8.12	0.411	0.195
Mar-2019	129.9	19.41	216.2	18.05	211.0	8.33	0.559	0.198
Apr-2019	123.6	19.53	225	18.27	170.8	8.50	0.452	0.200
May-2019	130.6	19.66	251.9	18.52	161.3	8.66	0.390	0.202
Jun-2019	127.1	19.79	230.7	18.75	185.1	8.85	0.477	0.204
Jul-2019	129.4	19.92	229.5	18.98	304.7	9.15	0.781	0.210
Aug-2019	123.6	20.04	216.8	19.20	242.0	9.40	0.654	0.213
Sep-2019	111.2	20.15	191.9	19.39	229.2	9.63	0.695	0.217
Oct-2019	121.2	20.27	219.8	19.61	212.0	9.84	0.573	0.220
Nov-2019	128.5	20.40	162.3	19.77	181.1	10.02	0.563	0.222
Dec-2019	133.4	20.53	190.9	19.96	158.4	10.18	0.445	0.224

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

Injection water for NPU2 is produced water from the 9-32-1-28 battery where it is treated with scale inhibitor, filtered through 1.0 micron filter socks and distributed to the injection 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**North Pierson Unit No. 2 Well List**

<i>UWI</i>	<i>Type</i>	<i>Status</i>	<i>Future Plans</i>
100/01-08-002-28W1/0	Horizontal	Producing	-
102/01-08-002-28W1/0	Horizontal	Injection	-
100/08-08-002-28W1/0	Horizontal	Producing	-
102/08-08-002-28W1/0	Horizontal	Producing	-