North Virden Scallion Unit No. 2

Waterflood Progress Report 2018

January 1st through December 31st 2018

Prepared for:

Manitoba Industry, Economic Development and Mines

Petroleum Branch

Prepared by:

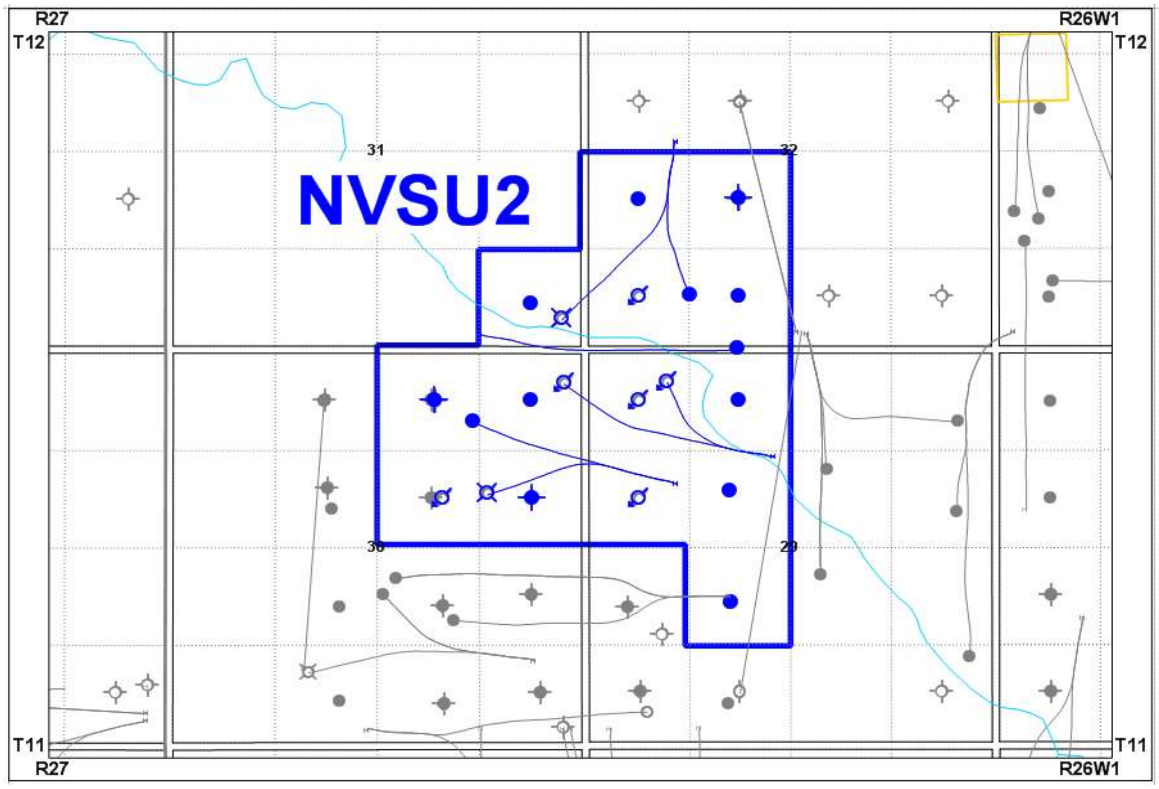
Tundra Oil and Gas

July 10, 2019

INTRODUCTION

North Virden Scallion Unit No. 2 (NVSU2) Enhanced Oil Recovery (EOR) Waterflood Project was approved under Board Order No. PM 59 effective August 1989 with Saskoil and Gas Corporation as Operator. Mountcliff Resources Ltd. acquired the unit from Saskoil and Gas Corporation and became operator in January 1993. Tundra Oil and Gas (Tundra) acquired the unit from Mountcliff Resources Ltd. in January 2000 and is the current operator of the unit. The EOR project area contains 21 wells in 14 LSDs in Township 11, Range 26 W1 as shown in the figure below.

Figure 1: North Virden Scallion Unit No. 2 Area Outline



North Virden Scallion Unit No. 2

Tundra Oil and Gas (Tundra), as the operator of the North Virden Scallion Unit No. 2 Enhanced Oil Recovery (EOR) project hereby submits the 2018 EOR report as per section 73 of the Drilling and Production Regulations.

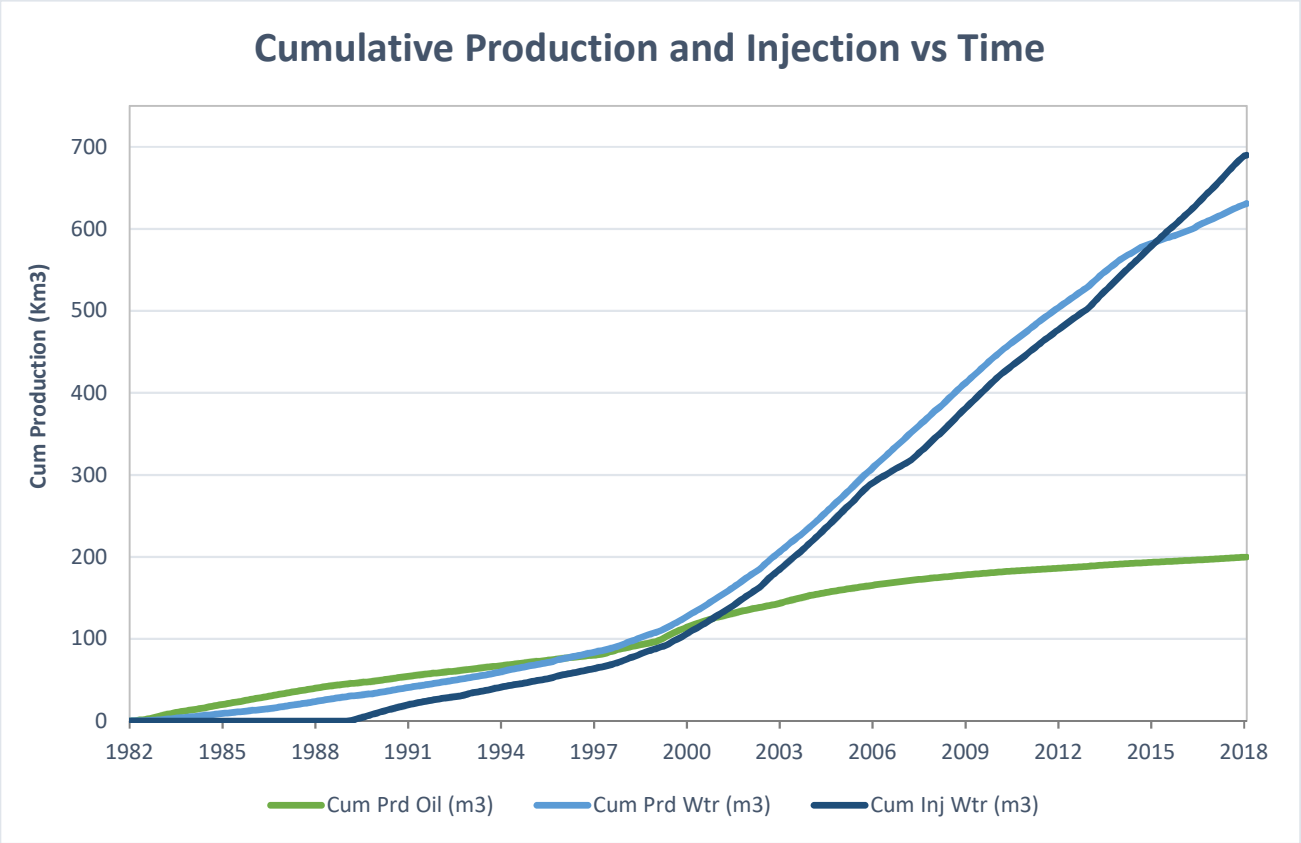
a) Monthly oil and water production rates, injection rate, GOR and WOR

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-2018	6.27	49.23	110.55	7.85	0
Feb-2018	6.20	50.28	113.16	8.11	0
Mar-2018	6.29	50.47	113.59	8.03	0
Apr-2018	6.12	49.71	111.73	8.12	0
May-2018	6.04	48.95	110.94	8.11	0
Jun-2018	6.09	48.79	108.44	8.01	0
Jul-2018	6.22	48.69	107.62	7.83	0
Aug-2018	5.87	48.00	102.26	8.17	0
Sep-2018	5.70	43.51	95.38	7.64	0
Oct-2018	5.45	41.62	91.51	7.63	0
Nov-2018	5.36	41.78	93.33	7.79	0
Dec-2018	4.50	39.16	29.15	8.70	0

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

2018 PRODUCTION	
Produced Oil (m^3)	2,132
Produced Gas (m^3)	0
Produced Water (m^3)	17,031
Fluid Injected (m^3)	36,319
CUMULATIVE PRODUCTION	
Produced Oil (m^3)	199,751
Produced Water (m^3)	630,924

North Virden Scallion Unit No. 2



c) Monthly wellhead injection pressure for each injection well

MONTH	02/16-30 Inj		00/12-29 Inj		02/10-30 Inj		00/04-32 Inj		00/13-29 Inj		NVSU2	
	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)	Inj Water (m^3)	Avg Inj P (kPa)	Inj Water (m^3)	Avg Inj P (kPa)
Jan-2018	1120.0	5470	589.1	6000	0.0	0	1182.0	6000	536.0	5800	3427.1	4654
Feb-2018	1008.0	5449	539.5	6000	0.0	0	1107.0	6000	514.0	5800	3168.5	4650
Mar-2018	1107.0	5080	614.3	6000	0.0	0	1210.0	6000	590.0	5800	3521.3	4576
Apr-2018	1069.0	5473	590.9	6000	0.0	0	1151.0	6000	541.0	5800	3351.9	4655
May-2018	1106.0	5222	603.1	6000	0.0	0	1141.0	6000	589.0	5800	3439.1	4604
Jun-2018	1134.0	5173	545.1	6000	0.0	0	1029.0	6000	545.0	5800	3253.1	4595
Jul-2018	1224.0	5185	545.1	6000	0.0	0	986.0	6000	581.0	5800	3336.1	4597
Aug-2018	1212.0	5092	601.2	6000	0.0	0	964.0	6000	393.0	5800	3170.2	4578
Sep-2018	1184.0	4644	571.3	6000	0.0	0	1106.0	6000	230.0	5800	3091.3	4489
Oct-2018	1107.0	3987	592.8	6000	0.0	0	1137.0	6000	20.0	5800	2856.8	4053
Nov-2018	1138.0	4010	577.8	6000	0.0	0	1084.0	6000	0.0	0	2799.8	4003
Dec-2018	374.0	1398	193.5	6000	0.0	0	336.0	2118	0.0	0	903.5	2082
Total	12783.0		6563.7		0.0		12433.0		4539.0		36318.7	
Avg Inj P		4682		6000		0		5676		4833		4295

MONTH	Jan-2018	Feb-2018	Mar-2018	Apr-2018	May-2018	Jun-2018	Jul-2018	Aug-2018	Sep-2018	Oct-2018	Nov-2018	Dec-2018
Total m3	3427.1	3168.5	3521.3	3351.9	3439.1	3253.1	3336.1	3170.2	3091.3	2856.8	2799.8	903.5
Daily (m^3/d)	110.55	113.16	113.59	111.73	110.94	108.44	107.62	102.26	103.04	92.15	93.33	29.15

2018 AVG. ANNUAL DAILY INJECTION =	99.66 m3/d
CUMULATIVE INJECTION TO Dec 31, 2017 =	653,543 m3
TOTAL 2018 ANNUAL INJECTION =	36,319 m3
CUMULATIVE INJECTION TO Dec 31, 2018 =	689,861 m3

d) Summary of the result of any survey of reservoir pressure conducted in 2018. N/A

e) Date and type of any well servicing.

Well	Service Description	Date
102.16-30-011-26W1.00	Rigless Acid Stimulation	6/5/2018

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

VOIDAGE CALCULATIONS

OIL FORMATION VOLUME FACTOR (Rm3/Sm3) = 1.05

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-2018	194.5	197.81	1526.1	615.42	3427.1	656.97	1.981	0.798
Feb-2018	173.6	197.99	1407.7	616.83	3168.5	660.14	1.993	0.800
Mar-2018	194.9	198.18	1564.6	618.39	3521.3	663.66	1.990	0.803
Apr-2018	183.6	198.37	1491.2	619.88	3351.9	667.01	1.990	0.805
May-2018	187.2	198.55	1517.5	621.40	3439.1	670.45	2.006	0.808
Jun-2018	182.8	198.74	1463.6	622.86	3253.1	673.70	1.965	0.810
Jul-2018	192.9	198.93	1509.5	624.37	3336.1	677.04	1.949	0.813
Aug-2018	182.1	199.11	1488.1	625.86	3170.2	680.21	1.888	0.815
Sep-2018	170.9	199.28	1305.2	627.17	3091.3	683.30	2.082	0.817
Oct-2018	169.1	199.45	1290.1	628.46	2856.8	686.16	1.946	0.819
Nov-2018	160.9	199.61	1253.4	629.71	2799.8	688.96	1.968	0.821
Dec-2018	139.5	199.75	1214.1	630.92	903.5	689.86	0.664	0.821

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

Currently there is no source water being used at NVSU2. Produced water is re-injected back into the formation after 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

j) Well List

North Virden Scallion Unit No. 2 Well List

UWI	*Type*	*Status*	*Future Plans*
100/06-29-011-26W1/0	Vertical	Producing	-
100/11-29-011-26W1/0	Vertical	Producing	-
100/12-29-011-26W1/0	Vertical	Injection	-
100/13-29-011-26W1/0	Vertical	Injection	-
102/13-29-011-26W1/2	Horizontal	Injection	-
100/14-29-011-26W1/0	Vertical	Producing	-
100/09-30-011-26W1/0	Vertical	Abandoned Zone	-
102/09-30-011-26W1/2	Horizontal	Drain	-
102/10-30-011-26W1/0	Vertical	Injection	-
102/15-30-011-26W1/0	Vertical	Abandoned	-
103/15-30-011-26W1/0	Horizontal	Pumping	-
100/16-30-011-26W1/0	Vertical	Producing	-
102/16-30-011-26W1/0	Horizontal	Injection	-
100/01-31-011-26W1/0	Vertical	Abandoned Zone	-
102/01-31-011-26W1/2	Horizontal	Drain	-
100/03-32-011-26W1/0	Vertical	Producing	-
102/03-32-011-26W1/0	Horizontal	Pumping	-
103/03-32-011-26W1/0	Horizontal	Producing	-
100/04-32-011-26W1/0	Vertical	Injection	-
100/05-32-011-26W1/0	Vertical	Producing	-
100/06-32-011-26W1/0	Vertical	Abandoned	-

k) Discussion

Tundra plans to alter the way in which the waterflood at NVSU2 is currently operating, by converting horizontal wells into injection, in order to change streamlines and optimize the waterflood.