

CROMER UNIT NO. 3
WATERFLOOD EOR PROJECT
ANNUAL REPORT FOR 2016

July 31, 2017

Tundra Oil and Gas Partnership

Table of Contents

INTRODUCTION	3
DISCUSSION	4
Production History	4
Waterflood Development Plan	5
Waterflood EOR Operating Strategy and Performance	6
Water Source and Quality	6
Injection Wellhead Pressures.....	6
Reservoir Pressure	6
Well Servicing	6
Voidage Replacement.....	6
Waterflood Performance Discussion	6
List of Appendices.....	7
Appendix A: Well Name and Well Status	
Appendix B: Injection Wellhead Pressures Plots and Table	
Appendix C: Cromer Unit No. 1 Injection Pattern Summary	
Appendix D: Injector Pattern Production/Injection Rates, Cumulative and VRR Plots and Tables	

Cromer Unit No. 3 Enhanced Oil Recovery (EOR) Waterflood Project was approved on June 30, 2016. It succeeded as an expansion of the now cancelled Cromer Unit No.1, which was approved under Waterflood Order No. 6 effective November 1, 1998 with Tundra Oil and Gas as Operator. The EOR project area, outlined in purple in the attached Figure 1, contains 22 wells in 38 LSDs in Township 9, Range 28W1. Well list and well status is available in Appendix A.

R28W1

Cromer Unit #3

T9

T9

R28W1

Map Title: *Diagram: NPLCZ - Topographic DLS version: 7/6/2023 30: P 22 26, 54-5, 8-23, 7/6/2023*

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3

DISCUSSION

Production History

For the wells included in Cromer No 3, production started in July 1992 with 00/02-23-009-28W1/0. Oil production peaked at 37.42 m³/d in November of 2014, following the drilling of two horizontal wells (00/01-23 and 02/14-13). The water oil ratio (WOR) averaged 4.97 m³/m³ over 2016. In December 2016, the Unit was producing 10.57 m³/d of oil and 60.29 m³/d of water. The oil production rate, injection rate, and WOR during each month for each injection pattern and for whole project are presented in Appendix D. The rates and WOR are presented in Figure 2.

Figure 2: Cromer Unit No.3 Production/Injection Rates and WOR vs Time

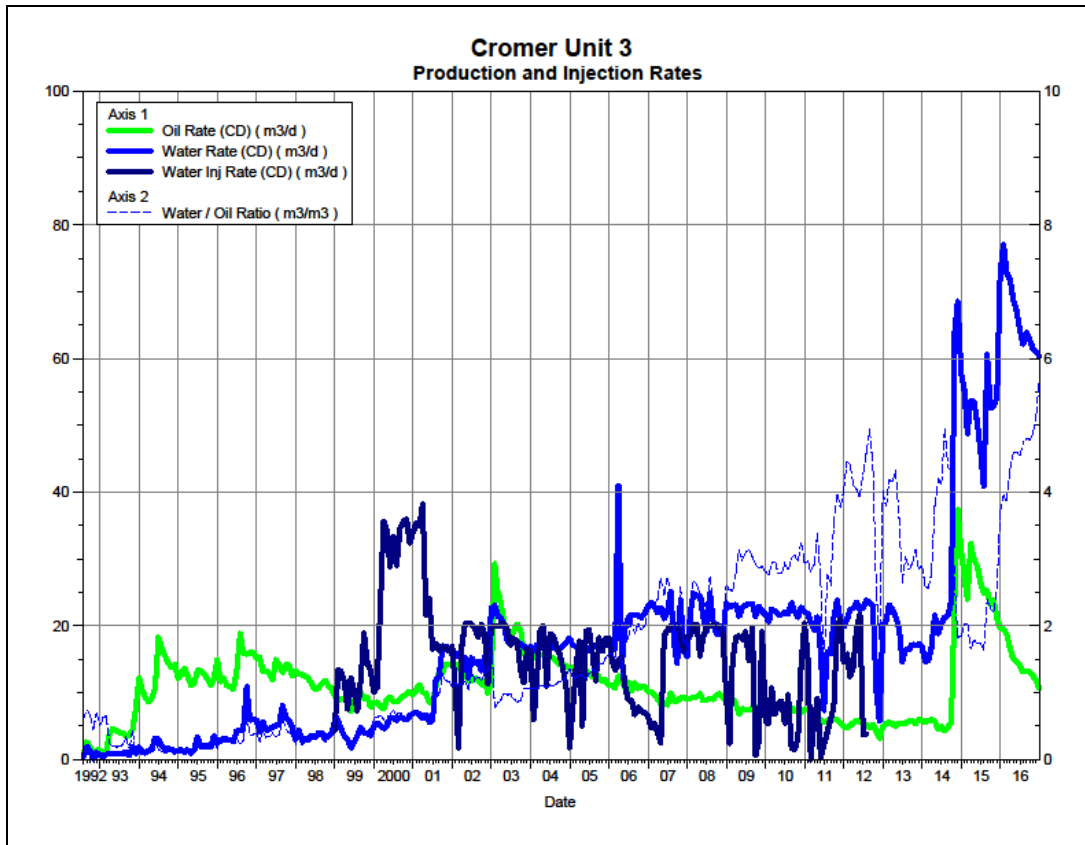
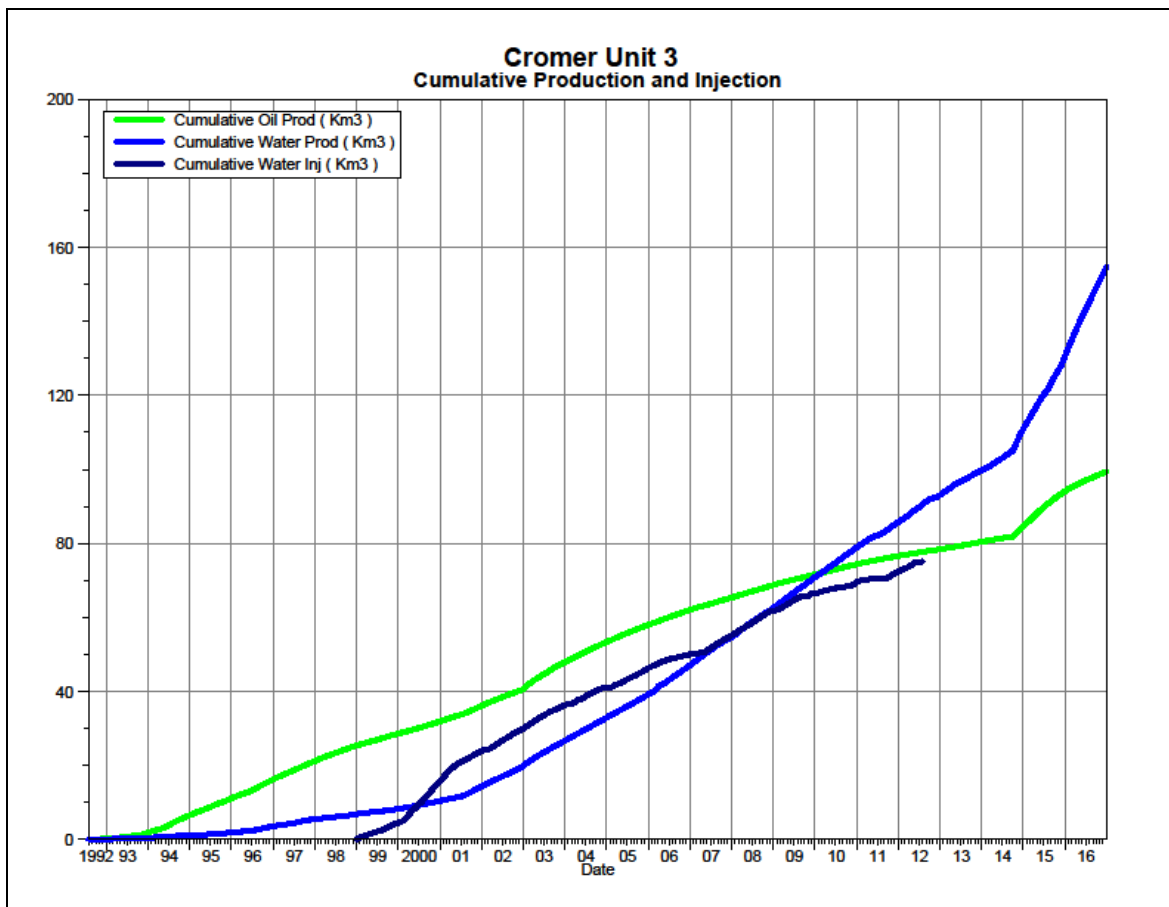


Figure 3 shows the cumulative production for Cromer Unit No. 1 to the end of December 2016 as 99.36 e³m³ of oil, and 154.68 e³m³ of water. The cumulative water injected is 75.15 e³m³. The cumulative volume of oil, and water produced and fluid injected for each injection pattern is presented in Appendix D.

Figure 3: Cromer Unit No. 1 Cumulative Oil, Water and Water Injected vs. Time



Waterflood Development Plan

Water injection started in December 1998 in the 00/11-14-009-28W1/0 injector. In July 2012, injection into the 00/11-14-009-28W1/0 well was suspended because of safety concerns associated with using old pipelines and injection infrastructure.

Tundra no longer wants to use produced water for injection in this Unit, so they are currently evaluating a new source of water. Tundra is also working on reconfiguring the waterflood in this Unit and expanding the current unit boundary. It is anticipated that additional wells will be drilled or current wells re-configured to inject water in this Unit by 2017.

Any future revisions to the waterflood development or surveillance plan would be based on new production or performance response data, technical studies, or observed reservoir behavior and reserves recovery interpretations.

Waterflood EOR Operating Strategy and Performance

Water Source and Quality

There is currently no injection in Cromer Unit No. 3.

Injection Wellhead Pressures

The average monthly wellhead injection pressures are summarized in Appendix B, and shows injection pressures since August 2002. Injection was suspended in Cromer Unit No. 3 in July 2012, so no wellhead injection pressures are currently available for 2016.

Reservoir Pressure

No reservoir pressure measurements were taken at Cromer Unit No. 3 in 2016.

Well Servicing

No well servicing was performed on the Cromer Unit No. 3 wells in 2016.

Voidage Replacement

Cumulative voidage for the Cromer Unit No. 3 was 0.288 in December 2016. Calculation, plots and tables of the Voidage replacement ratio on a monthly and cumulative basis for each injection pattern are presented in Appendix D.

Waterflood Performance Discussion

Given an OOIP of 748 e³m³, the current recovery factor is 13.3%. The ultimate expected recoverable reserve based on decline analysis is 135 e³m³ or an ultimate recovery factor of 18.0%.

The overall performance of this waterflood has been poor as indicated by the low recovery factor, and obvious lack of waterflood response in producers. This is certainly due to having only one injector where multiple injectors are required in patterns to provide the necessary areal sweep and injected water volumes.

The long term decline trends for oil and water are very stable and not expected to change. The Unit will require additional water injector wells in addition to increased fluid handling throughput in order to make this an effective waterflood.

List of Appendices

Appendix A: Well Name and Well Status

Appendix B: Injection Wellhead Pressures Plots and Table

Appendix C: Cromer Unit No. 1 Injection Pattern Summary

Appendix D: Injector Pattern Production/Injection Rates, Cumulative and VRR Plots
and Tables

Appendix A

UWI	Well Status
100/16-11-009-28W1/2	Capable of OIL Prod
100/11-13-009-28W1/0	Capable of OIL Prod
100/14-13-009-28W1/2	Capable of OIL Prod
102/14-13-009-28W1/0	Capable of OIL Prod
100/02-14-009-28W1/2	Capable of OIL Prod
102/06-14-009-28W1/2	Capable of OIL Prod
100/10-14-009-28W1/0	Capable of OIL Prod
100/11-14-009-28W1/0	WTR Injection
100/13-14-009-28W1/3	Capable of OIL Prod
100/14-14-009-28W1/0	Capable of OIL Prod
100/01-23-009-28W1/0	Capable of OIL Prod
100/02-23-009-28W1/2	Capable of OIL Prod
100/03-23-009-28W1/0	Capable of OIL Prod
100/04-23-009-28W1/3	Capable of OIL Prod
100/05-23-009-28W1/0	Capable of OIL Prod
100/06-23-009-28W1/2	Capable of OIL Prod
100/07-23-009-28W1/2	Capable of OIL Prod
100/10-23-009-28W1/2	Capable of OIL Prod
100/11-23-009-28W1/0	Capable of OIL Prod
100/12-23-009-28W1/0	Capable of OIL Prod
100/13-23-009-28W1/0	Capable of OIL Prod
100/14-23-009-28W1/0	Capable of OIL Prod

Appendix B

Average Monthly Injection Pressure (kPag)

Month	Injection Pressure 100/11-14	Month	Injection Pressure 100/11-14	Month	Injection Pressure 100/11-14	Month	Injection Pressure 100/11-14	Month	Injection Pressure 100/11-14
Jun-02	0	Jan-05	11600	Jan-08	12210	Jan-11	11890	Jan-14	0
Jul-02	1560	Feb-05	9914	Feb-08	12014	Feb-11	10800	Feb-14	0
Aug-02	1527	Mar-05	10981	Mar-08	12226	Mar-11	10577	Mar-14	0
Sep-02	3609	Apr-05	11107	Apr-08	12307	Apr-11	10078	Apr-14	0
Oct-02	10508	May-05	11097	May-08	12342	May-11	10800	May-14	0
Nov-02	10392	Jun-05	11493	Jun-08	12836	Jun-11	10800	Jun-14	0
Dec-02	10596	Jul-05	11600	Jul-08	12442	Jul-11	10800	Jul-14	0
Jan-03	10851	Aug-05	11606	Aug-08	12320	Aug-11	10800	Aug-14	0
Feb-03	10880	Sep-05	11800	Sep-08	12301	Sep-11	9174	Sep-14	0
Mar-03	10880	Oct-05	11800	Oct-08	12261	Oct-11	9010	Oct-14	0
Apr-03	11029	Nov-05	11800	Nov-08	12220	Nov-11	9010	Nov-14	0
May-03	11124	Dec-05	11839	Dec-08	6123	Dec-11	10615	Dec-14	0
Jun-03	11140	Jan-06	12100	Jan-09	2774	Jan-12	11000	Jan-15	0
Jul-03	11140	Feb-06	12021	Feb-09	9021	Feb-12	11155	Feb-15	0
Aug-03	11140	Mar-06	12000	Mar-09	11688	Mar-12	12314	Mar-15	0
Sep-03	11140	Apr-06	12600	Apr-09	11765	Apr-12	16000	Apr-15	0
Oct-03	11140	May-06	12839	May-09	11765	May-12	12368	May-15	0
Nov-03	11146	Jun-06	12801	Jun-09	11893	Jun-12	11500	Jun-15	0
Dec-03	11170	Jul-06	11839	Jul-09	8723	Jul-12	3539	Jul-15	0
Jan-04	11170	Aug-06	3387	Aug-09	11000	Aug-12	0	Aug-15	0
Feb-04	11170	Sep-06	8613	Sep-09	11000	Sep-12	0	Sep-15	0
Mar-04	11170	Oct-06	7889	Oct-09	4077	Oct-12	0	Oct-15	0
Apr-04	11170	Nov-06	7507	Nov-09	11182	Nov-12	0	Nov-15	0
May-04	11170	Dec-06	6752	Dec-09	3491	Dec-12	0	Dec-15	0
Jun-04	11170	Jan-07	6329	Jan-10	5497	Jan-13	0	Jan-16	0
Jul-04	11475	Feb-07	6122	Feb-10	7254	Feb-13	0	Feb-16	0
Aug-04	11800	Mar-07	4821	Mar-10	6348	Mar-13	0	Mar-16	0
Sep-04	11800	Apr-07	0	Apr-10	8417	Apr-13	0	Apr-16	0
Oct-04	11800	May-07	4271	May-10	9478	May-13	0	May-16	0
Nov-04	11367	Jun-07	10953	Jun-10	5850	Jun-13	0	Jun-16	0
Dec-04	11600	Jul-07	10491	Jul-10	9167	Jul-13	0	Jul-16	0
		Aug-07	11394	Aug-10	4987	Aug-13	0	Aug-16	0
		Sep-07	11693	Sep-10	6333	Sep-13	0	Sep-16	0
		Oct-07	11868	Oct-10	7632	Oct-13	0	Oct-16	0
		Nov-07	9743	Nov-10	9055	Nov-13	0	Nov-16	0
		Dec-07	11535	Dec-10	11466	Dec-13	0	Dec-16	0

Appendix C

Cromer Unit No. 3 Pattern Summary as of December 2016

Pattern Name	Injector Location (009-28W)	Injector Surf. Location (009-28W1)	Status	No. of Supported Wells	Supported Wells (009-28W1)	Allocation Factor	Pattern Prod Start Month	Inj Start Month	Oil Rate (m³/d)	Water Rate (m³/d)	WOR (m³/m³)	Water Injection (m³/d)	Cum Oil (E³m³)	Cum Water (E³m³)	Cum Inj Water (E³m³)	Monthly VRR	Cum VRR
00/11-14-009-28W1 Injector	00/11-14	Vertical Well	WTR Injection	16	01-23	0.25	Jul 1992	Dec 1998	7.5	52.8	7.01	-	70.0	110.5	75.2	0.0	0.41
					02/02-14, 00/11-13, 02/14-13	0.66											
					02-14, 02-23, 03-23, 04-23, 05-23, 06-23, 10-14, 12-12, 13-14, 14-14, 16-11, 02/06-14	1											

Pattern was changed from previous Cromer Unit #1 pattern, in order to include the 00/11-13 and 02/14-13 horizontals.

Pattern: 00/11-14-009-28W1Inj Set: CromerUnit#3

Oil Formation Vol Factor : 1.07100 m3/m3

Water Formation Vol Factor : 1.00150 m3/m3

Water / Oil Ratio : 3.72 m3/m3

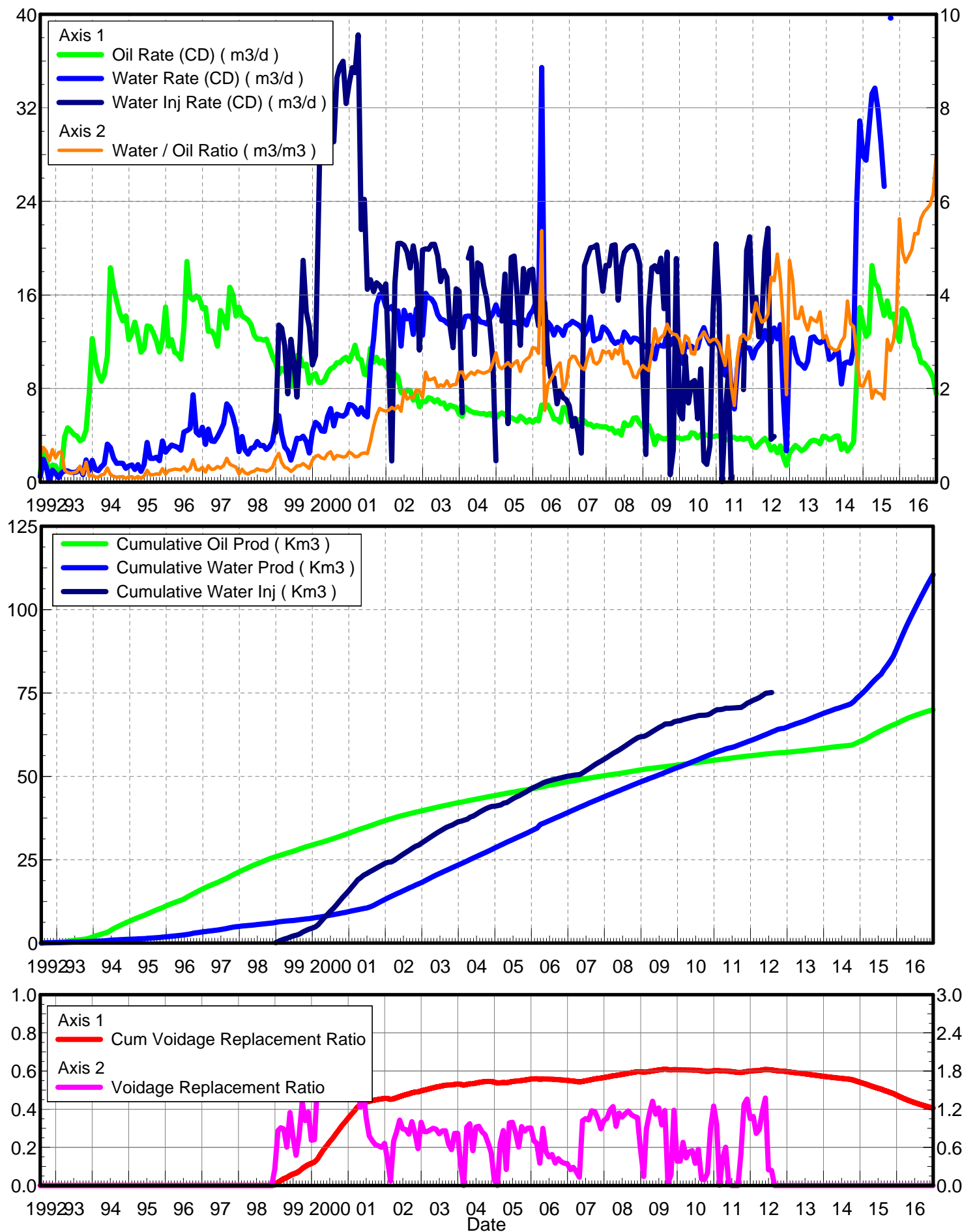
Operator: TUNDRA_OIL_&_GAS_LIMITED

Oil Rate (CD) : 8.00 m3/d

Water Rate (CD) : 79.30 m3/d

Water Inj Rate (CD) : 3.90 m3/d

July 31, 2017



Date	Oil Rate (CD) m3/d	Water Rate (CD) m3/d	Water Oil Ratio m3/m3	Water Inj Rate (CD) m3/d	Cum Oil Prod Km3	Cum Water Prod Km3	Cum Water Inj Km3	Voidage Replacement Ratio	Cum Voidage Replacement Ratio
7/31/1992	0.78	0.46	0.59		0.02	0.01	0.00	0.000	0.000
8/31/1992	2.65	1.96	0.74		0.11	0.07	0.00	0.000	0.000
9/30/1992	1.93	1.27	0.66		0.16	0.11	0.00	0.000	0.000
10/31/1992	0.20	0.09	0.46		0.17	0.12	0.00	0.000	0.000
11/30/1992	1.47	1.02	0.70		0.21	0.15	0.00	0.000	0.000
12/31/1992	1.40	0.73	0.52		0.26	0.17	0.00	0.000	0.000
1/31/1993	0.59	0.37	0.63		0.28	0.18	0.00	0.000	0.000
2/28/1993	1.22	0.79	0.65		0.31	0.20	0.00	0.000	0.000
3/31/1993	3.86	0.98	0.25		0.43	0.23	0.00	0.000	0.000
4/30/1993	4.65	0.96	0.21		0.57	0.26	0.00	0.000	0.000
5/31/1993	4.40	0.83	0.19		0.71	0.29	0.00	0.000	0.000
6/30/1993	4.07	0.82	0.20		0.83	0.31	0.00	0.000	0.000
7/31/1993	3.94	0.87	0.22		0.95	0.34	0.00	0.000	0.000
8/31/1993	3.53	1.21	0.34		1.06	0.38	0.00	0.000	0.000
9/30/1993	3.67	0.63	0.17		1.17	0.40	0.00	0.000	0.000
10/31/1993	4.45	1.89	0.43		1.31	0.45	0.00	0.000	0.000
11/30/1993	7.53	0.96	0.13		1.53	0.48	0.00	0.000	0.000
12/31/1993	12.28	1.86	0.15		1.91	0.54	0.00	0.000	0.000
1/31/1994	10.36	1.07	0.10		2.23	0.57	0.00	0.000	0.000
2/28/1994	9.29	0.97	0.10		2.50	0.60	0.00	0.000	0.000
3/31/1994	8.64	1.32	0.15		2.76	0.64	0.00	0.000	0.000
4/30/1994	9.19	1.55	0.17		3.04	0.69	0.00	0.000	0.000
5/31/1994	10.77	3.25	0.30		3.37	0.79	0.00	0.000	0.000
6/30/1994	18.33	2.96	0.16		3.92	0.88	0.00	0.000	0.000
7/31/1994	16.63	2.04	0.12		4.44	0.94	0.00	0.000	0.000
8/31/1994	15.49	1.60	0.10		4.92	0.99	0.00	0.000	0.000
9/30/1994	14.46	1.62	0.11		5.35	1.04	0.00	0.000	0.000
10/31/1994	13.78	1.60	0.12		5.78	1.09	0.00	0.000	0.000
11/30/1994	14.21	1.17	0.08		6.21	1.13	0.00	0.000	0.000
12/31/1994	12.17	1.38	0.11		6.58	1.17	0.00	0.000	0.000
1/31/1995	12.79	1.47	0.11		6.98	1.21	0.00	0.000	0.000
2/28/1995	13.68	1.07	0.08		7.36	1.24	0.00	0.000	0.000
3/31/1995	12.48	1.49	0.12		7.75	1.29	0.00	0.000	0.000
4/30/1995	11.10	0.91	0.08		8.08	1.32	0.00	0.000	0.000
5/31/1995	11.41	1.51	0.13		8.44	1.36	0.00	0.000	0.000
6/30/1995	13.36	3.39	0.25		8.84	1.47	0.00	0.000	0.000
7/31/1995	13.28	2.03	0.15		9.25	1.53	0.00	0.000	0.000
8/31/1995	12.75	2.02	0.16		9.64	1.59	0.00	0.000	0.000
9/30/1995	12.06	2.12	0.18		10.01	1.65	0.00	0.000	0.000
10/31/1995	11.11	1.84	0.17		10.35	1.71	0.00	0.000	0.000
11/30/1995	12.16	3.52	0.29		10.72	1.82	0.00	0.000	0.000
12/31/1995	14.97	2.56	0.17		11.18	1.90	0.00	0.000	0.000
1/31/1996	11.62	2.89	0.25		11.54	1.99	0.00	0.000	0.000
2/29/1996	12.19	3.17	0.26		11.89	2.08	0.00	0.000	0.000
3/31/1996	11.08	3.07	0.28		12.24	2.17	0.00	0.000	0.000
4/30/1996	10.95	2.97	0.27		12.57	2.26	0.00	0.000	0.000
5/31/1996	10.52	2.73	0.26		12.89	2.35	0.00	0.000	0.000
6/30/1996	13.20	4.28	0.32		13.29	2.48	0.00	0.000	0.000
7/31/1996	18.87	4.40	0.23		13.87	2.61	0.00	0.000	0.000
8/31/1996	15.80	4.59	0.29		14.36	2.75	0.00	0.000	0.000
9/30/1996	15.76	10.95	0.69		14.84	3.08	0.00	0.000	0.000
10/31/1996	16.01	5.91	0.37		15.33	3.27	0.00	0.000	0.000
11/30/1996	16.08	6.03	0.37		15.81	3.45	0.00	0.000	0.000
12/31/1996	15.09	5.91	0.39		16.28	3.63	0.00	0.000	0.000

Date	Oil Rate (CD) m3/d	Water Rate (CD) m3/d	Water Oil Ratio m3/m3	Water Inj Rate (CD) m3/d	Cum Oil Prod Km3	Cum Water Prod Km3	Cum Water Inj Km3	Voidage Replacement Ratio	Cum Voidage Replacement Ratio
1/31/1997	15.27	4.18	0.27		16.75	3.76	0.00	0.000	0.000
2/28/1997	13.21	5.70	0.43		17.12	3.92	0.00	0.000	0.000
3/31/1997	13.26	4.44	0.34		17.54	4.06	0.00	0.000	0.000
4/30/1997	12.85	4.53	0.35		17.92	4.19	0.00	0.000	0.000
5/31/1997	11.92	4.87	0.41		18.29	4.34	0.00	0.000	0.000
6/30/1997	14.97	5.05	0.34		18.74	4.49	0.00	0.000	0.000
7/31/1997	14.12	5.41	0.38		19.18	4.66	0.00	0.000	0.000
8/31/1997	13.03	8.11	0.62		19.58	4.91	0.00	0.000	0.000
9/30/1997	14.23	6.42	0.45		20.01	5.11	0.00	0.000	0.000
10/31/1997	14.14	5.76	0.41		20.45	5.29	0.00	0.000	0.000
11/30/1997	12.53	4.86	0.39		20.82	5.43	0.00	0.000	0.000
12/31/1997	13.33	2.94	0.22		21.24	5.52	0.00	0.000	0.000
1/31/1998	12.72	4.39	0.35		21.63	5.66	0.00	0.000	0.000
2/28/1998	12.73	2.83	0.22		21.99	5.74	0.00	0.000	0.000
3/31/1998	12.51	3.17	0.25		22.37	5.84	0.00	0.000	0.000
4/30/1998	12.11	3.19	0.26		22.74	5.93	0.00	0.000	0.000
5/31/1998	11.31	3.55	0.31		23.09	6.04	0.00	0.000	0.000
6/30/1998	10.47	3.25	0.31		23.40	6.14	0.00	0.000	0.000
7/31/1998	10.72	3.98	0.37		23.73	6.26	0.00	0.000	0.000
8/31/1998	11.33	4.02	0.35		24.09	6.39	0.00	0.000	0.000
9/30/1998	11.87	3.10	0.26		24.44	6.48	0.00	0.000	0.000
10/31/1998	11.06	3.55	0.32		24.79	6.59	0.00	0.000	0.000
11/30/1998	10.69	3.88	0.36		25.11	6.71	0.00	0.000	0.000
12/31/1998	9.55	5.75	0.60	4.25	25.40	6.89	0.13	0.266	0.004
1/31/1999	8.76	5.79	0.66	13.43	25.67	7.06	0.55	0.886	0.016
2/28/1999	9.16	4.60	0.50	13.18	25.93	7.19	0.92	0.916	0.026
3/31/1999	9.10	3.49	0.38	11.65	26.21	7.30	1.28	0.881	0.036
4/30/1999	8.71	3.02	0.35	7.54	26.47	7.39	1.50	0.612	0.042
5/31/1999	7.18	1.75	0.24	12.20	26.70	7.45	1.88	1.294	0.052
6/30/1999	8.71	2.57	0.30	10.16	26.96	7.52	2.19	0.855	0.060
7/31/1999	9.84	3.64	0.37	7.27	27.26	7.64	2.41	0.513	0.066
8/31/1999	9.97	4.82	0.48	11.95	27.57	7.79	2.78	0.772	0.075
9/30/1999	9.10	4.05	0.45	18.96	27.84	7.91	3.35	1.375	0.089
10/31/1999	9.40	4.01	0.43	14.57	28.14	8.03	3.80	1.036	0.100
11/30/1999	7.86	3.60	0.46	13.30	28.37	8.14	4.20	1.108	0.109
12/31/1999	8.51	5.02	0.59	10.02	28.64	8.30	4.51	0.710	0.116
1/31/2000	8.60	5.50	0.64	10.83	28.90	8.47	4.85	0.737	0.123
2/29/2000	7.90	5.15	0.65	22.71	29.13	8.61	5.51	1.671	0.139
3/31/2000	7.61	4.60	0.61	35.65	29.37	8.76	6.61	2.799	0.165
4/30/2000	8.98	4.99	0.56	34.32	29.64	8.91	7.64	2.353	0.188
5/31/2000	9.33	6.31	0.68	28.76	29.93	9.10	8.54	1.766	0.208
6/30/2000	8.67	6.32	0.73	33.40	30.19	9.29	9.54	2.143	0.229
7/31/2000	8.62	5.85	0.68	29.10	30.45	9.47	10.44	1.931	0.248
8/31/2000	9.14	6.41	0.70	34.59	30.74	9.67	11.51	2.137	0.271
9/30/2000	9.46	6.11	0.65	35.53	31.02	9.86	12.58	2.190	0.292
10/31/2000	9.83	5.92	0.60	35.99	31.32	10.04	13.69	2.190	0.315
11/30/2000	10.17	6.60	0.65	32.37	31.63	10.24	14.66	1.852	0.333
12/31/2000	9.72	6.94	0.71	34.03	31.93	10.45	15.72	1.964	0.352
1/31/2001	10.46	7.01	0.67	35.44	32.25	10.67	16.82	1.948	0.372
2/28/2001	11.23	6.86	0.61	35.00	32.57	10.86	17.80	1.855	0.390
3/31/2001	10.08	6.18	0.61	38.25	32.88	11.05	18.98	2.255	0.411
4/30/2001	9.92	6.70	0.68	21.60	33.18	11.25	19.63	1.248	0.420
5/31/2001	8.49	5.60	0.66	24.18	33.44	11.43	20.38	1.647	0.432
6/30/2001	8.51	5.86	0.69	16.49	33.70	11.60	20.88	1.102	0.438

Date	Oil Rate (CD) m3/d	Water Rate (CD) m3/d	Water Oil Ratio m3/m3	Water Inj Rate (CD) m3/d	Cum Oil Prod Km3	Cum Water Prod Km3	Cum Water Inj Km3	Voidage Replacement Ratio	Cum Voidage Replacement Ratio
7/31/2001	10.78	11.74	1.09	17.31	34.03	11.97	21.41	0.744	0.443
8/31/2001	13.15	12.57	0.96	16.28	34.44	12.36	21.92	0.611	0.446
9/30/2001	12.95	16.67	1.29	17.04	34.83	12.86	22.43	0.558	0.448
10/31/2001	14.33	16.95	1.18	16.81	35.27	13.38	22.95	0.521	0.449
11/30/2001	14.23	16.70	1.17	16.28	35.70	13.88	23.44	0.510	0.450
12/31/2001	14.27	15.68	1.10	16.95	36.14	14.37	23.96	0.548	0.452
1/31/2002	13.50	15.42	1.14	9.85	36.56	14.85	24.27	0.330	0.450
2/28/2002	14.29	15.91	1.11	1.80	36.96	15.29	24.32	0.058	0.444
3/31/2002	12.84	14.91	1.16	17.01	37.36	15.76	24.85	0.594	0.446
4/30/2002	13.10	15.26	1.16	20.40	37.75	16.21	25.46	0.697	0.450
5/31/2002	11.72	12.25	1.04	20.42	38.11	16.59	26.09	0.824	0.455
6/30/2002	11.82	15.23	1.29	20.25	38.47	17.05	26.70	0.726	0.459
7/31/2002	12.22	14.37	1.18	19.68	38.85	17.50	27.31	0.717	0.463
8/31/2002	11.93	14.73	1.23	18.30	39.22	17.95	27.88	0.666	0.465
9/30/2002	11.19	13.30	1.19	20.21	39.55	18.35	28.48	0.800	0.470
10/31/2002	11.88	15.37	1.29	18.71	39.92	18.83	29.06	0.666	0.472
11/30/2002	9.94	13.21	1.33	11.29	40.22	19.22	29.40	0.474	0.472
12/31/2002	11.88	22.63	1.90	19.85	40.59	19.93	30.02	0.562	0.474
1/31/2003	29.33	23.07	0.79	19.94	41.50	20.64	30.63	0.366	0.471
2/28/2003	25.26	21.48	0.85	19.90	42.20	21.24	31.19	0.410	0.470
3/31/2003	23.37	21.12	0.90	20.33	42.93	21.90	31.82	0.441	0.469
4/30/2003	20.23	20.00	0.99	20.34	43.54	22.50	32.43	0.489	0.470
5/31/2003	18.16	17.62	0.97	19.35	44.10	23.04	33.03	0.522	0.471
6/30/2003	18.04	17.71	0.98	17.14	44.64	23.57	33.55	0.463	0.470
7/31/2003	19.34	17.51	0.91	18.09	45.24	24.12	34.11	0.474	0.470
8/31/2003	20.26	17.50	0.86	17.50	45.87	24.66	34.65	0.447	0.470
9/30/2003	19.40	17.25	0.89	13.39	46.45	25.18	35.05	0.352	0.468
10/31/2003	16.00	16.98	1.06	11.49	46.95	25.70	35.41	0.337	0.466
11/30/2003	15.27	16.41	1.07	16.53	47.40	26.20	35.90	0.505	0.467
12/31/2003	15.76	16.91	1.07	16.34	47.89	26.72	36.41	0.484	0.467
1/31/2004	15.33	16.27	1.06	5.94	48.37	27.22	36.59	0.182	0.464
2/29/2004	16.21	17.23	1.06		48.84	27.72	36.59	0.000	0.458
3/31/2004	15.58	17.19	1.10	19.15	49.32	28.26	37.19	0.566	0.459
4/30/2004	15.67	17.36	1.11	20.02	49.79	28.78	37.79	0.587	0.461
5/31/2004	15.44	16.60	1.07	10.91	50.27	29.29	38.13	0.330	0.459
6/30/2004	15.36	17.17	1.12	18.75	50.73	29.81	38.69	0.558	0.460
7/31/2004	15.15	16.75	1.11	18.55	51.20	30.33	39.26	0.563	0.461
8/31/2004	14.76	16.78	1.14	16.80	51.66	30.85	39.79	0.516	0.462
9/30/2004	14.13	16.51	1.17	15.71	52.08	31.34	40.26	0.497	0.463
10/31/2004	14.22	17.04	1.20	13.45	52.52	31.87	40.67	0.417	0.462
11/30/2004	14.02	17.55	1.25	10.52	52.94	32.40	40.99	0.323	0.460
12/31/2004	13.48	18.16	1.35	1.82	53.36	32.96	41.05	0.056	0.456
1/31/2005	13.85	17.05	1.23		53.79	33.49	41.05	0.000	0.451
2/28/2005	13.89	16.97	1.22	13.76	54.18	33.96	41.43	0.433	0.451
3/31/2005	13.55	16.97	1.25	17.78	54.60	34.49	41.98	0.565	0.452
4/30/2005	13.21	16.76	1.27	5.00	55.00	34.99	42.13	0.162	0.449
5/31/2005	13.30	16.28	1.22	19.21	55.41	35.50	42.73	0.630	0.451
6/30/2005	12.92	16.59	1.28	19.33	55.80	35.99	43.31	0.636	0.453
7/31/2005	12.38	16.76	1.35	15.87	56.18	36.51	43.80	0.529	0.453
8/31/2005	12.91	16.85	1.31	11.70	56.58	37.04	44.16	0.382	0.453
9/30/2005	12.28	17.45	1.42	18.26	56.95	37.56	44.71	0.597	0.454
10/31/2005	11.74	16.79	1.43	16.18	57.31	38.08	45.21	0.551	0.455
11/30/2005	11.98	18.12	1.51	18.08	57.67	38.62	45.75	0.585	0.456
12/31/2005	11.06	17.48	1.58	18.21	58.01	39.17	46.32	0.621	0.458

Date	Oil Rate (CD) m3/d	Water Rate (CD) m3/d	Water Oil Ratio m3/m3	Water Inj Rate (CD) m3/d	Cum Oil Prod Km3	Cum Water Prod Km3	Cum Water Inj Km3	Voidage Replacement Ratio	Cum Voidage Replacement Ratio
1/31/2006	11.09	17.44	1.57	14.84	58.36	39.71	46.78	0.506	0.458
2/28/2006	10.72	16.51	1.54	13.35	58.66	40.17	47.15	0.477	0.458
3/31/2006	12.50	40.95	3.28	14.85	59.05	41.44	47.61	0.273	0.455
4/30/2006	11.72	13.84	1.18	15.38	59.40	41.85	48.07	0.583	0.456
5/31/2006	10.89	19.60	1.80	11.01	59.73	42.46	48.42	0.352	0.455
6/30/2006	11.65	21.15	1.81	8.94	60.08	43.10	48.68	0.266	0.454
7/31/2006	10.23	21.68	2.12	8.95	60.40	43.77	48.96	0.274	0.452
8/31/2006	11.49	21.67	1.89	6.69	60.76	44.44	49.17	0.197	0.449
9/30/2006	10.63	21.63	2.03	7.83	61.08	45.09	49.40	0.237	0.447
10/31/2006	10.91	21.24	1.95	7.21	61.41	45.75	49.63	0.219	0.445
11/30/2006	11.01	21.96	1.99	7.05	61.74	46.41	49.84	0.209	0.443
12/31/2006	10.24	22.88	2.24	6.53	62.06	47.11	50.04	0.193	0.441
1/31/2007	10.13	23.52	2.32	4.76	62.38	47.84	50.19	0.139	0.438
2/28/2007	9.71	22.90	2.36	5.44	62.65	48.48	50.34	0.164	0.436
3/31/2007	9.15	21.95	2.40	4.12	62.93	49.17	50.47	0.130	0.433
4/30/2007	8.38	22.73	2.71	2.47	63.18	49.85	50.54	0.078	0.430
5/31/2007	8.57	21.08	2.46	18.50	63.45	50.50	51.12	0.612	0.432
6/30/2007	8.14	22.08	2.71	19.30	63.69	51.16	51.70	0.627	0.433
7/31/2007	10.03	25.11	2.50	20.04	64.00	51.94	52.32	0.559	0.435
8/31/2007	8.71	17.72	2.03	20.10	64.27	52.49	52.94	0.744	0.437
9/30/2007	8.75	14.34	1.64	20.28	64.54	52.92	53.55	0.856	0.439
10/31/2007	9.25	23.97	2.59	18.31	64.82	53.66	54.12	0.541	0.440
11/30/2007	9.27	16.28	1.76	16.32	65.10	54.15	54.61	0.623	0.441
12/31/2007	9.05	15.41	1.70	18.53	65.38	54.63	55.18	0.739	0.443
1/31/2008	9.17	21.99	2.40	18.49	65.67	55.31	55.75	0.581	0.444
2/29/2008	9.29	24.85	2.67	20.22	65.93	56.03	56.34	0.581	0.445
3/31/2008	9.40	24.40	2.60	20.29	66.23	56.79	56.97	0.589	0.446
4/30/2008	9.88	24.50	2.48	15.55	66.52	57.52	57.43	0.443	0.446
5/31/2008	8.79	21.24	2.41	18.42	66.80	58.18	58.01	0.601	0.448
6/30/2008	8.92	19.11	2.14	19.65	67.06	58.76	58.60	0.686	0.449
7/31/2008	9.16	25.00	2.73	19.98	67.35	59.53	59.21	0.574	0.450
8/31/2008	8.98	20.58	2.29	20.17	67.63	60.17	59.84	0.668	0.452
9/30/2008	9.69	18.76	1.94	20.22	67.92	60.73	60.45	0.694	0.453
10/31/2008	9.87	18.75	1.90	19.72	68.22	61.31	61.06	0.673	0.455
11/30/2008	9.22	18.56	2.01	18.65	68.50	61.87	61.62	0.656	0.456
12/31/2008	9.02	23.46	2.60	9.42	68.78	62.60	61.91	0.285	0.455
1/31/2009	8.99	22.78	2.53	2.35	69.06	63.30	61.98	0.073	0.452
2/28/2009	9.14	23.12	2.53	14.88	69.31	63.95	62.40	0.452	0.452
3/31/2009	8.25	23.17	2.81	18.33	69.57	64.67	62.97	0.573	0.453
4/30/2009	6.83	21.45	3.14	18.50	69.77	65.31	63.52	0.643	0.454
5/31/2009	7.63	22.70	2.98	17.98	70.01	66.02	64.08	0.583	0.455
6/30/2009	7.45	23.09	3.10	19.15	70.23	66.71	64.65	0.617	0.456
7/31/2009	7.44	23.27	3.13	14.83	70.46	67.43	65.11	0.475	0.456
8/31/2009	7.72	23.36	3.03	19.67	70.70	68.16	65.72	0.622	0.457
9/30/2009	7.31	21.40	2.93	0.63	70.92	68.80	65.74	0.022	0.455
10/31/2009	8.01	22.96	2.87	2.76	71.17	69.51	65.83	0.087	0.452
11/30/2009	7.69	22.23	2.89	19.12	71.40	70.18	66.40	0.628	0.453
12/31/2009	7.71	21.73	2.82	5.90	71.64	70.85	66.58	0.197	0.452
1/31/2010	7.44	20.58	2.77	5.39	71.87	71.49	66.75	0.189	0.450
2/28/2010	7.66	22.54	2.94	10.79	72.09	72.12	67.05	0.351	0.449
3/31/2010	7.50	22.16	2.95	6.76	72.32	72.81	67.26	0.224	0.448
4/30/2010	7.75	21.67	2.80	8.50	72.55	73.46	67.52	0.284	0.447
5/31/2010	7.77	21.70	2.79	8.69	72.79	74.13	67.79	0.289	0.446
6/30/2010	7.47	22.02	2.95	5.42	73.02	74.79	67.95	0.181	0.444

Date	Oil Rate (CD) m3/d	Water Rate (CD) m3/d	Water Oil Ratio m3/m3	Water Inj Rate (CD) m3/d	Cum Oil Prod Km3	Cum Water Prod Km3	Cum Water Inj Km3	Voidage Replacement Ratio	Cum Voidage Replacement Ratio
7/31/2010	7.69	21.85	2.84	9.68	73.25	75.47	68.25	0.322	0.444
8/31/2010	7.81	23.44	3.00	1.79	73.50	76.19	68.31	0.056	0.441
9/30/2010	7.24	22.14	3.06	1.51	73.71	76.86	68.35	0.051	0.439
10/31/2010	7.15	21.29	2.98	3.13	73.93	77.52	68.45	0.108	0.437
11/30/2010	7.01	22.76	3.25	14.29	74.15	78.20	68.88	0.472	0.437
12/31/2010	7.53	22.12	2.94	20.37	74.38	78.89	69.51	0.675	0.439
1/31/2011	7.35	21.81	2.97	15.18	74.61	79.56	69.98	0.512	0.439
2/28/2011	7.30	20.50	2.81	0.04	74.81	80.14	69.98	0.002	0.437
3/31/2011	6.65	19.44	2.92	5.61	75.02	80.74	70.15	0.211	0.436
4/30/2011	6.33	21.38	3.38	9.17	75.21	81.38	70.43	0.326	0.435
5/31/2011	5.92	15.99	2.70	0.27	75.39	81.88	70.44	0.012	0.433
6/30/2011	5.60	7.35	1.31		75.56	82.10	70.44	0.000	0.432
7/31/2011	5.83	16.13	2.77		75.74	82.60	70.44	0.000	0.431
8/31/2011	6.08	15.84	2.60		75.93	83.09	70.44	0.000	0.429
9/30/2011	6.02	21.15	3.51	7.90	76.11	83.72	70.67	0.287	0.428
10/31/2011	6.02	23.86	3.97	19.81	76.29	84.46	71.29	0.654	0.429
11/30/2011	5.53	20.90	3.78	20.98	76.46	85.09	71.92	0.782	0.431
12/31/2011	4.92	19.85	4.03	14.60	76.61	85.70	72.37	0.581	0.432
1/31/2012	4.70	20.90	4.45	15.80	76.76	86.35	72.86	0.609	0.433
2/29/2012	5.11	22.48	4.40	12.42	76.91	87.00	73.22	0.445	0.433
3/31/2012	5.49	22.65	4.12	13.86	77.08	87.71	73.65	0.486	0.433
4/30/2012	5.84	23.58	4.03	19.74	77.25	88.41	74.24	0.662	0.434
5/31/2012	5.70	22.40	3.93	21.70	77.43	89.11	74.92	0.762	0.436
6/30/2012	5.31	22.78	4.29	3.66	77.59	89.79	75.03	0.129	0.434
7/31/2012	5.17	23.80	4.60	3.90	77.75	90.53	75.15	0.133	0.433
8/31/2012	4.75	23.44	4.94		77.90	91.25	75.15	0.000	0.430
9/30/2012	5.29	22.95	4.34		78.05	91.94	75.15	0.000	0.428
10/31/2012	4.11	10.26	2.50		78.18	92.26	75.15	0.000	0.427
11/30/2012	3.19	5.73	1.79		78.28	92.43	75.15	0.000	0.427
12/31/2012	4.98	19.99	4.02		78.43	93.05	75.15	0.000	0.425
1/31/2013	5.48	20.75	3.79		78.60	93.70	75.15	0.000	0.423
2/28/2013	5.54	23.17	4.19		78.76	94.34	75.15	0.000	0.421
3/31/2013	5.37	22.35	4.16		78.92	95.04	75.15	0.000	0.419
4/30/2013	4.94	21.35	4.32		79.07	95.68	75.15	0.000	0.417
5/31/2013	5.45	19.71	3.62		79.24	96.29	75.15	0.000	0.415
6/30/2013	5.49	14.55	2.65		79.41	96.73	75.15	0.000	0.414
7/31/2013	5.45	16.50	3.03		79.57	97.24	75.15	0.000	0.412
8/31/2013	5.79	16.45	2.84		79.75	97.75	75.15	0.000	0.411
9/30/2013	5.90	17.24	2.92		79.93	98.26	75.15	0.000	0.409
10/31/2013	5.40	17.00	3.15		80.10	98.79	75.15	0.000	0.407
11/30/2013	6.05	17.31	2.86		80.28	99.31	75.15	0.000	0.406
12/31/2013	5.80	16.82	2.90		80.46	99.83	75.15	0.000	0.404
1/31/2014	5.67	14.67	2.58		80.64	100.29	75.15	0.000	0.403
2/28/2014	5.81	14.86	2.56		80.80	100.70	75.15	0.000	0.402
3/31/2014	6.02	16.89	2.81		80.98	101.23	75.15	0.000	0.400
4/30/2014	5.71	21.68	3.79		81.16	101.88	75.15	0.000	0.398
5/31/2014	4.49	18.84	4.20		81.30	102.46	75.15	0.000	0.397
6/30/2014	4.94	20.32	4.12		81.44	103.07	75.15	0.000	0.395
7/31/2014	4.31	21.27	4.94		81.58	103.73	75.15	0.000	0.394
8/31/2014	4.90	21.53	4.39		81.73	104.40	75.15	0.000	0.392
9/30/2014	5.54	23.77	4.29		81.90	105.11	75.15	0.000	0.390
10/31/2014	23.98	63.86	2.66		82.64	107.09	75.15	0.000	0.384
11/30/2014	37.42	68.55	1.83		83.76	109.15	75.15	0.000	0.378
12/31/2014	31.36	57.84	1.84		84.73	110.94	75.15	0.000	0.373

Date	Oil Rate (CD) m3/d	Water Rate (CD) m3/d	Water Oil Ratio m3/m3	Water Inj Rate (CD) m3/d	Cum Oil Prod Km3	Cum Water Prod Km3	Cum Water Inj Km3	Voidage Replacement Ratio	Cum Voidage Replacement Ratio
1/31/2015	27.12	55.17	2.03		85.57	112.65	75.15	0.000	0.368
2/28/2015	23.98	48.73	2.03		86.25	114.01	75.15	0.000	0.364
3/31/2015	32.36	53.70	1.66		87.25	115.68	75.15	0.000	0.360
4/30/2015	29.97	53.54	1.79		88.15	117.29	75.15	0.000	0.355
5/31/2015	28.94	50.38	1.74		89.04	118.85	75.15	0.000	0.351
6/30/2015	26.50	46.16	1.74		89.84	120.23	75.15	0.000	0.347
7/31/2015	24.85	40.85	1.64		90.61	121.50	75.15	0.000	0.344
8/31/2015	25.32	60.57	2.39		91.39	123.38	75.15	0.000	0.340
9/30/2015	23.19	52.52	2.27		92.09	124.95	75.15	0.000	0.336
10/31/2015	23.84	52.91	2.22		92.83	126.59	75.15	0.000	0.333
11/30/2015	21.21	54.14	2.55		93.47	128.22	75.15	0.000	0.329
12/31/2015	19.69	72.82	3.70		94.08	130.47	75.15	0.000	0.325
1/31/2016	19.48	77.11	3.96		94.68	132.86	75.15	0.000	0.321
2/29/2016	18.81	72.78	3.87		95.23	134.97	75.15	0.000	0.317
3/31/2016	16.60	71.86	4.33		95.74	137.20	75.15	0.000	0.314
4/30/2016	15.04	68.82	4.58		96.19	139.27	75.15	0.000	0.310
5/31/2016	14.61	67.19	4.60		96.64	141.35	75.15	0.000	0.307
6/30/2016	14.13	64.35	4.55		97.07	143.28	75.15	0.000	0.304
7/31/2016	13.12	62.14	4.74		97.48	145.21	75.15	0.000	0.301
8/31/2016	13.32	63.88	4.80		97.89	147.19	75.15	0.000	0.298
9/30/2016	13.14	62.88	4.79		98.28	149.07	75.15	0.000	0.296
10/31/2016	12.56	61.42	4.89		98.67	150.98	75.15	0.000	0.293
11/30/2016	11.85	61.06	5.15		99.03	152.81	75.15	0.000	0.290
12/31/2016	10.57	60.29	5.70		99.36	154.68	75.15	0.000	0.288