

**BIRDTAIL UNIT NO. 1**  
**WATERFLOOD EOR PROJECT**  
  
**ANNUAL REPORT FOR 2011**

**March 7, 2012**

**Tundra Oil and Gas Partnership**

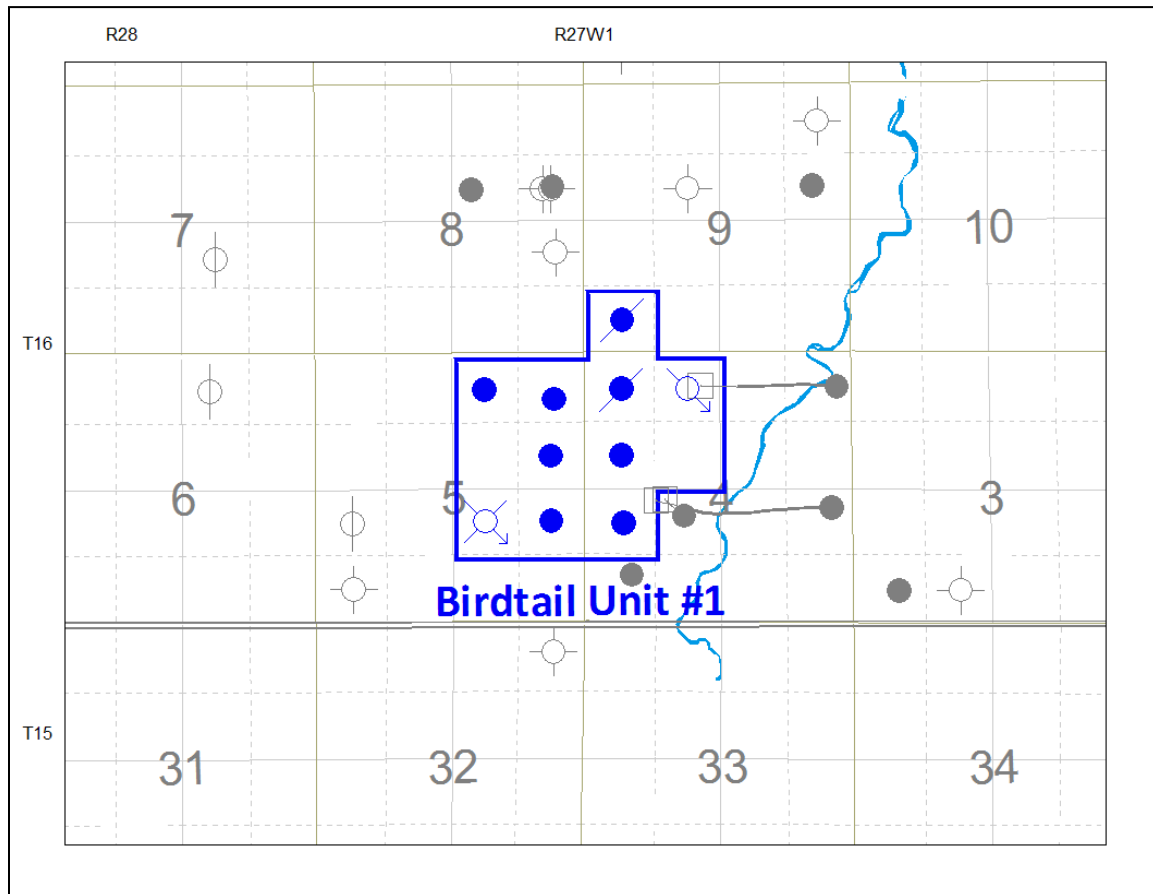
## Table of Contents

INTRODUCTION .....	3
DISCUSSION.....	3
Production History .....	3
Waterflood History .....	5
Waterflood EOR Operations .....	5
Water Source and Quality .....	5
Injection Wellhead Pressures .....	6
Reservoir Pressure .....	6
Well Servicing .....	6
Voidage Replacement.....	6
Waterflood Performance Discussion.....	6
List of Appendices.....	8
Appendix A: Well Name and Well Status	
Appendix B: Monthly Injection Wellhead Pressures Table and Plots	
Appendix C: Birdtail Unit No. 1 Injection Pattern Summary	
Appendix D: Injector Pattern Production/Injection Rates, Cumulative and VRRs, Plots and Tables	

## **INTRODUCTION**

Birdtail Unit No. 1 Enhanced Oil Recovery (EOR) Waterflood Project was approved under Water flood Order No. 7 effective August 1, 1999 with Progress Energy Production Partnership as Operator. Tundra acquired the unit from Progress Energy Production Partnership and become operator in October 2003. The EOR project area contains 10 wells in 12 LSDs in Township 16, Range 27 W1 as shown in the figure below. Well list and well status is available in Appendix A.

**Figure 1: Birdtail Unit No. 1 Area Outline**



In accordance with Section 73 of the Manitoba Drilling and Production Regulation, Tundra hereby submits the 2011 Annual Progress Report for Birdtail Unit No. 1 as required by Waterflood Order No. 7.

## **DISCUSSION**

### **Production History**

For the wells included in Birdtail Unit No. 1, production started September 1996 with the 00/16-05-016-27W1/0 well. Oil production peaked at 17.9 m<sup>3</sup>/d in October 1997. The Unit was producing 3.8 m<sup>3</sup>/d of oil and 8.7 m<sup>3</sup>/d of water in December 2011 and had an

average WOR of 2.3 m<sup>3</sup>/m<sup>3</sup> in 2011. 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 plotted in Figure 2.

**Figure 2: Birdtail Unit No. 1 Production/Injection Rates and WOR vs. Time**

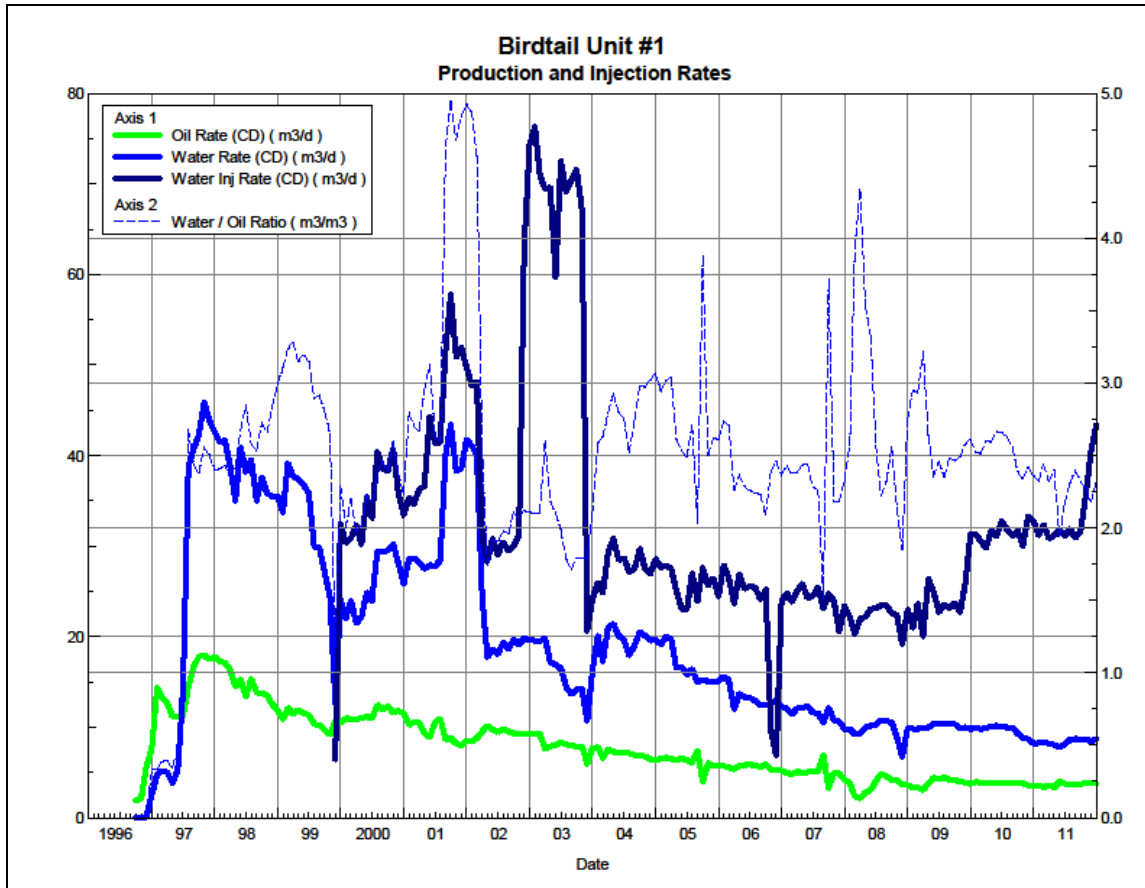
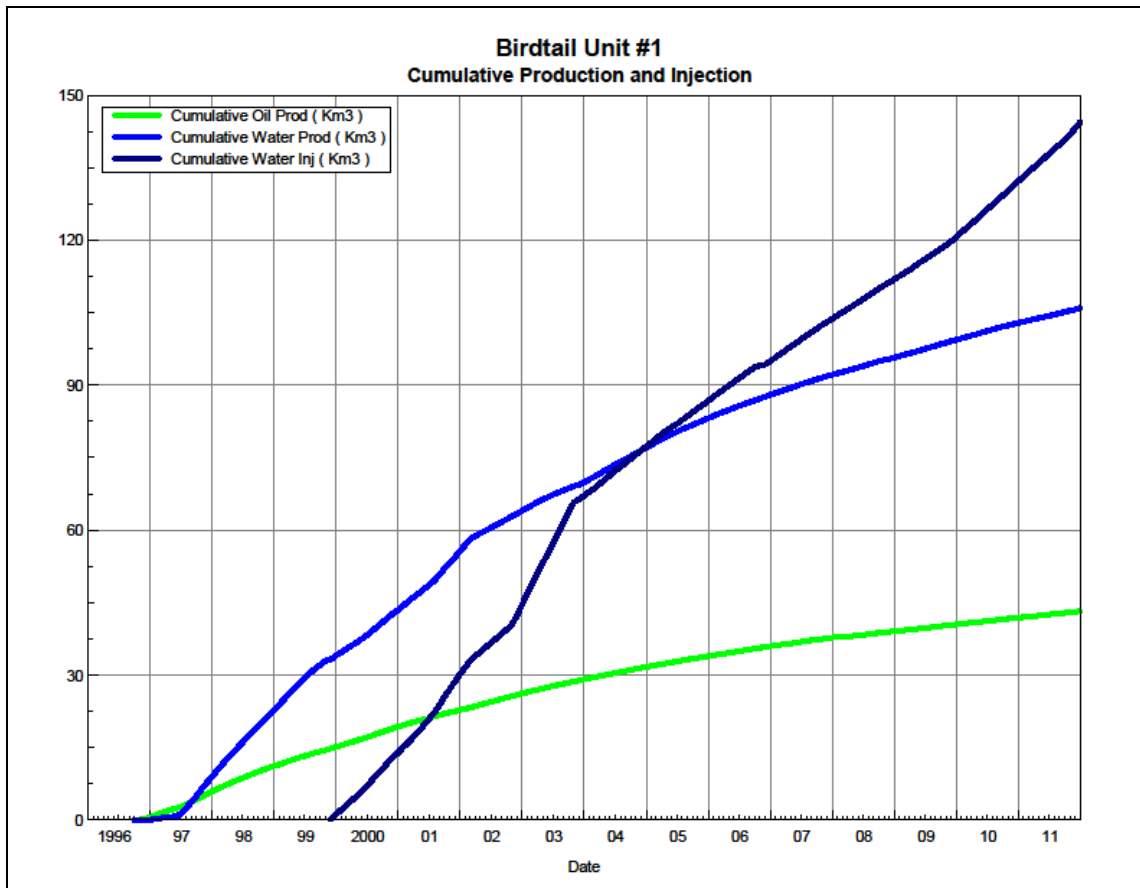


Figure 3 shows the cumulative production for Birdtail Unit No. 1 to the end of December 2011 as 43.2 E<sup>3</sup>m<sup>3</sup> of oil, and 106 E<sup>3</sup>m<sup>3</sup> of water. The cumulative water injected is 144 E<sup>3</sup>m<sup>3</sup>. The cumulative volume of oil, and water produced and fluid injected for each injection pattern and for the whole project for each injection well is presented in Appendix D.

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



### **Waterflood History**

As of December 2011 the Unit has 1 active vertical injector and 1 injector pattern in place. Water injection started in November 1999 in the two injector's 00/14-04-016-27W1 and 00/07-05-016-27W1. The 00/07-05-016-27W1 injector has been abandoned since July 2003, and water has only been injected through 00/14-04-016-27W1.

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 Operations**

#### **Water Source and Quality**

Injected fluid consists of water produced from the Lodgepole formation, from the unit and surrounding area. Water is filtered to 25 microns prior to re-injection.

### **Injection Wellhead Pressures**

The monthly wellhead injection pressure for the injection well is summarized in Appendix B, and shows all injection pressure since 2003. Average Injection pressure for injector 00/14-04-016-27W1/0 was 6400 kPag in 2011. Injection pressure for 00/14-04-16-27W1/0 has been consistent since 2003, averaging 6700 kPag.

### **Reservoir Pressure**

No reservoir pressure measurements were taken in Birdtail Unit No. 1 in 2011.

### **Well Servicing**

Table 1 lists the maintenance that was required in Birdtail Unit No. 1, in 2011.

**Table 1: Service and Maintenance in Birdtail Unit No.1**

00/08-05-016-27W1/0	Pump Change	11/22/2011
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### **Voidage Replacement**

Cumulative voidage for the Birdtail Unit No. 1 was 1.22 in December 2011. As of 2000, monthly voidage is significantly greater than 1, and Birdtail Unit No. 1 has exceeded a cumulative VRR of 1. Calculation, plots and tables of the Voidage replacement ratio on a monthly and cumulative basis for each injection pattern and for the project area are presented in Appendix D.

### **Waterflood Performance Discussion**

The original oil-in-place (OOIP) is estimated based on 3.5 m pay, 15% porosity, 45% water saturation, formation volume factor of 1.003, and a 192 ha area. The resulting OOIP is 572.4 E<sup>3</sup>m<sup>3</sup>. The cumulative oil recovered to date is 43.2 E<sup>3</sup>m<sup>3</sup> or a recovery factor of 7.6%. The ultimate expected recoverable reserve based on decline analysis is 52.5 E<sup>3</sup>m<sup>3</sup> or an ultimate recovery factor of 9.2%.

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 likely due to the poorer than average reservoir quality of the injector wells, the location of the injectors, and the resulting poor areal sweep efficiency.

Trends in production in 2012 continue to show very low decline production. Despite the slightly flattened oil decline trends, no significant change in production trends for produced water or oil is expected until waterflood optimization operations are undertaken, possibly at the same time as facility enhancements to increase total fluid throughput.

## **List of Appendices**

Appendix A: Well Name and Well Status

Appendix B: Monthly Injection Wellhead Pressures Table and Plots

Appendix C: Birdtail Unit No. 1 Injection Pattern Summary

Appendix D: Injector Pattern Production/Injection Rates, Cumulative and VRRs

Plots and Tables for the following injectors:

00/14-04-016-27W1/0

## Appendix A

UWI	Well Status
100/05-04-016-27W1/00	Capable of OIL Prod
100/12-04-016-27W1/00	Capable of OIL Prod
100/13-04-016-27W1/00	ABD Producer
100/14-04-016-27W1/00	WTR Injection
100/07-05-016-27W1/00	ABD WTR Injection
100/08-05-016-27W1/00	Capable of OIL Prod
100/09-05-016-27W1/00	Capable of OIL Prod
100/15-05-016-27W1/00	Capable of OIL Prod
100/16-05-016-27W1/00	Capable of OIL Prod
100/04-09-016-27W1/00	ABD Producer

## Appendix B

### Average Monthly Injection Pressure (kPag)

	Injection Pressure		Injection Pressure		Injection Pressure
Month	100/14-04	Month	100/14-04	Month	100/14-04
		Jan-06	6729	Jan-09	6984
		Feb-06	6814	Feb-09	6768
		Mar-06	6777	Mar-09	6695
		Apr-06	6933	Apr-09	6980
		May-06	7090	May-09	7026
		Jun-06	6793	Jun-09	7320
		Jul-06	6839	Jul-09	7068
		Aug-06	6771	Aug-09	6892
		Sep-06	6362	Sep-09	7147
Oct-03	7220	Oct-06	5352	Oct-09	6871
Nov-03	6587	Nov-06	4522	Nov-09	7000
Dec-03	6445	Dec-06	6387	Dec-09	7065
Jan-04	6413	Jan-07	8106	Jan-10	7187
Feb-04	6224	Feb-07	6468	Feb-10	7014
Mar-04	6694	Mar-07	6594	Mar-10	7148
Apr-04	6400	Apr-07	6693	Apr-10	7207
May-04	6442	May-07	8645	May-10	6684
Jun-04	6373	Jun-07	6593	Jun-10	6580
Jul-04	6419	Jul-07	6681	Jul-10	6697
Aug-04	6813	Aug-07	7019	Aug-10	6626
Sep-04	6930	Sep-07	6753	Sep-10	6583
Oct-04	6839	Oct-07	6797	Oct-10	6542
Nov-04	6730	Nov-07	6937	Nov-10	6480
Dec-04	6839	Dec-07	6616	Dec-10	6458
Jan-05	6816	Jan-08	6710	Jan-11	6371
Feb-05	6775	Feb-08	6741	Feb-11	6446
Mar-05	6939	Mar-08	6713	Mar-11	6365
Apr-05	6940	Apr-08	6850	Apr-11	6334
May-05	6948	May-08	7006	May-11	6394
Jun-05	6707	Jun-08	6987	Jun-11	6400
Jul-05	6732	Jul-08	7113	Jul-11	6395
Aug-05	6771	Aug-08	7068	Aug-11	6355
Sep-05	6870	Sep-08	6970	Sep-11	6363
Oct-05	7206	Oct-08	6748	Oct-11	6374
Nov-05	7157	Nov-08	6807	Nov-11	6577
Dec-05	6771	Dec-08	6958	Dec-11	6600

Appendix C

Birdtail Unit 1 Pattern Summary as of December 2011

Pattern Name	Injector Location (016-27W1)	Status	Supported Wells (016-27W1)	No. of Supported Wells	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
00/14-04-016-27W1 Injector	00/14-04	WTR Injection	04-09, 05-04, 07-05, 08-05, 09-05, 12-04, 13-04, 15-05, 16-05	9	1	Oct 1996	Nov 1999	3.8	8.7	2.32	43.4	43.2	106.0	144.5	4.4	1.22

**Appendix D**  
**Rates and VRR**  
**Plots and Tables**

# Pattern: 14-04-016-27 Set: Birdtail Unit #1

Oil Formation Vol. Factor : 1.05 m3/m3

Water Formation Vol Factor : 1.00 m3/m3

Water / Oil Ratio : 2.32 m3/m3

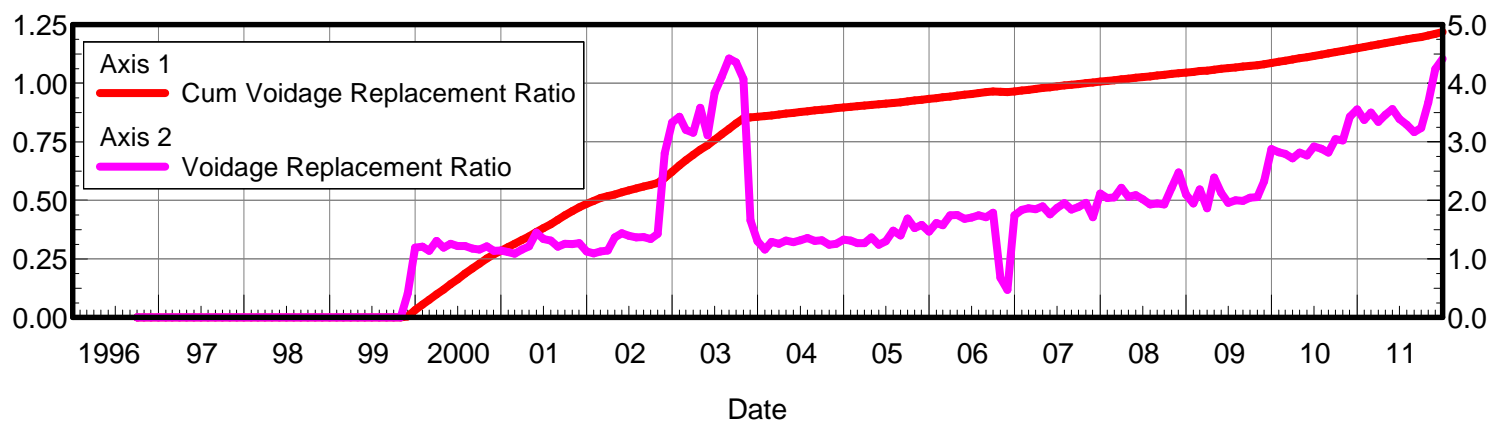
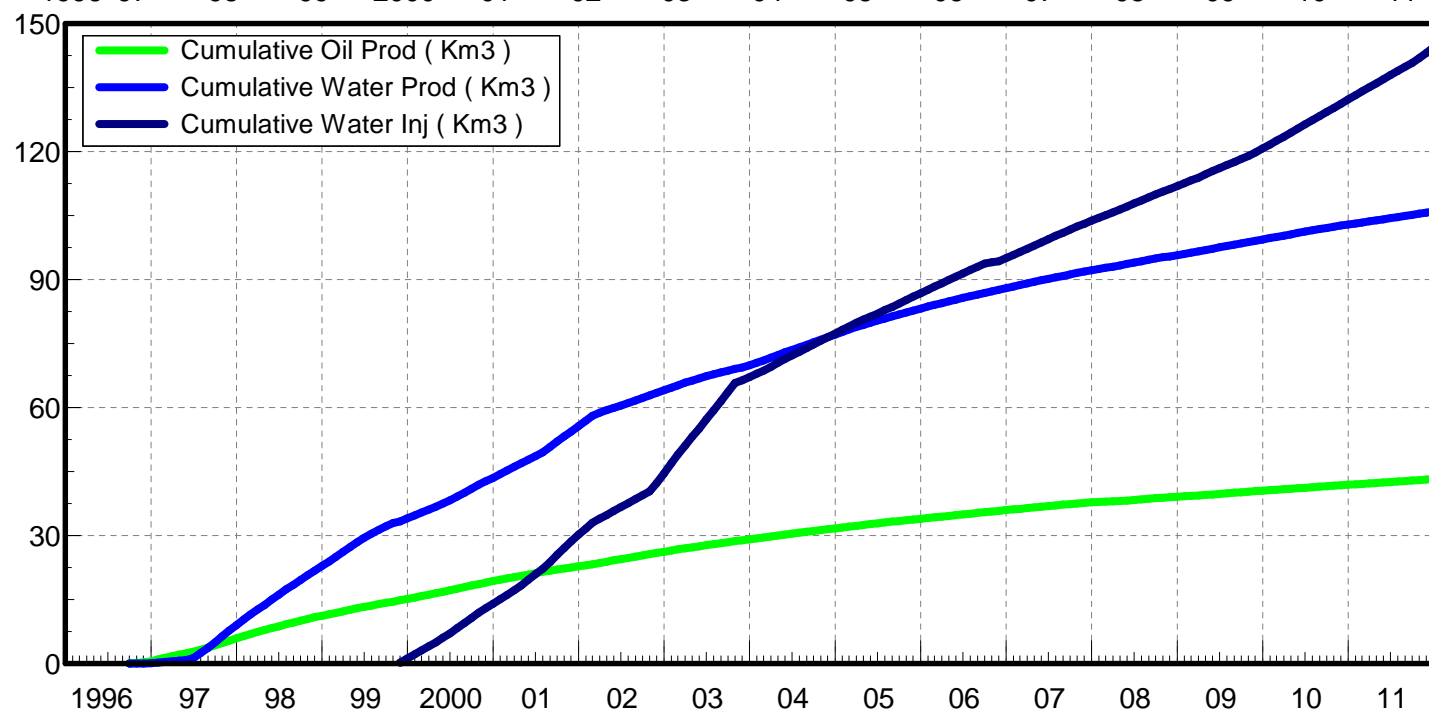
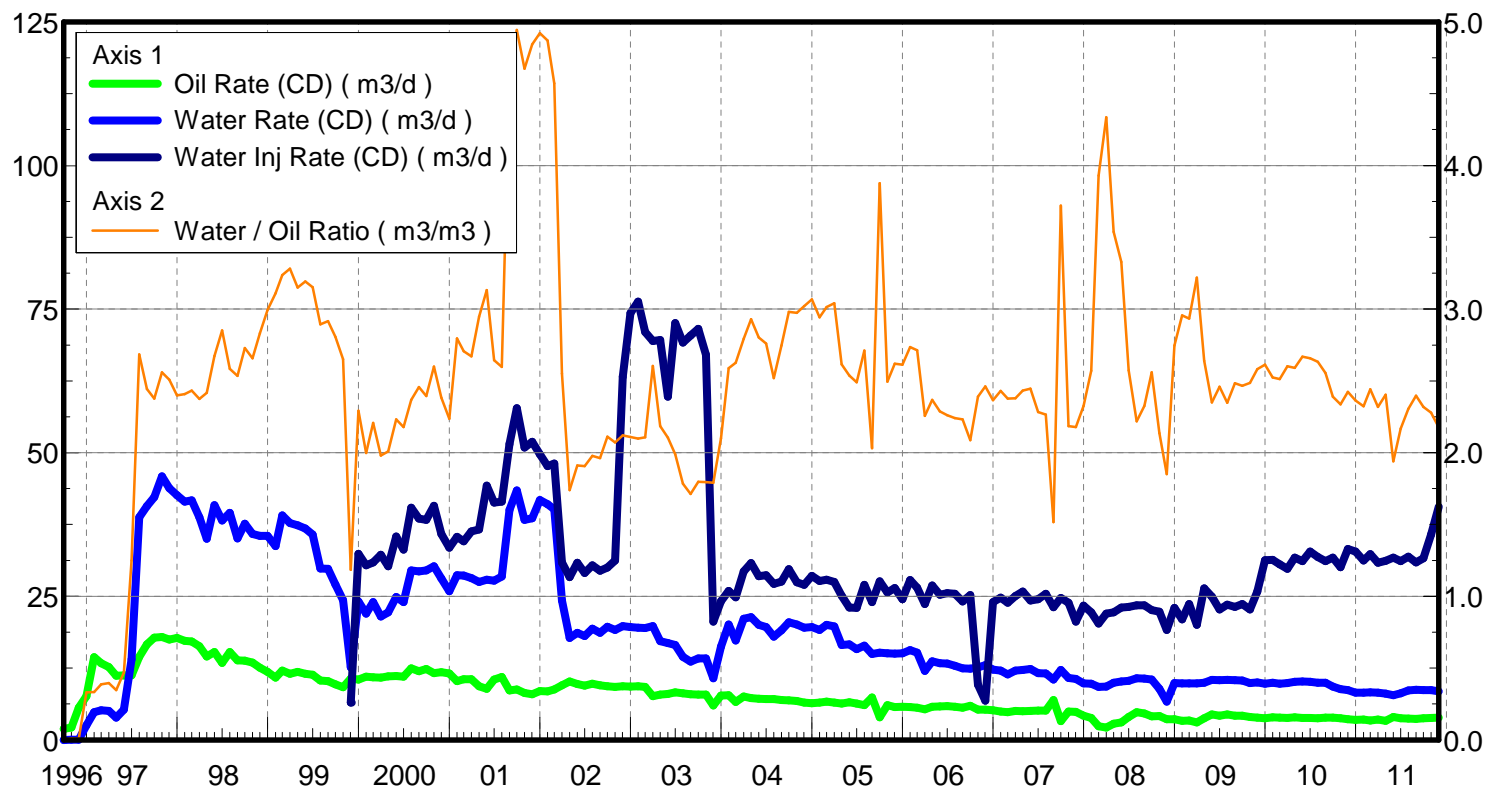
February 22, 2012

Operator: TUNDRA\_OIL\_&\_GAS\_LIMITED

Oil Rate (CD) : 3.77 m3/d

Water Rate (CD) : 8.74 m3/d

Water Inj Rate (CD) : 43.40 m3/d



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 Replacemt Ratio
9/30/1996	1.93	0.00	0.00		0.06	0.00	0.00	0.000	0.000
10/31/1996	2.13	0.02	0.01		0.12	0.00	0.00	0.000	0.000
11/30/1996	5.62	0.05	0.01		0.29	0.00	0.00	0.000	0.000
12/31/1996	7.62	2.52	0.33		0.53	0.08	0.00	0.000	0.000
1/31/1997	14.41	4.81	0.33		0.98	0.23	0.00	0.000	0.000
2/28/1997	13.33	5.15	0.39		1.35	0.37	0.00	0.000	0.000
3/31/1997	12.68	5.02	0.40		1.74	0.53	0.00	0.000	0.000
4/30/1997	11.16	3.87	0.35		2.08	0.65	0.00	0.000	0.000
5/31/1997	11.23	5.27	0.47		2.42	0.81	0.00	0.000	0.000
6/30/1997	11.22	14.00	1.25		2.76	1.23	0.00	0.000	0.000
7/31/1997	14.45	38.78	2.68		3.21	2.43	0.00	0.000	0.000
8/31/1997	16.66	40.72	2.44		3.73	3.69	0.00	0.000	0.000
9/30/1997	17.78	42.27	2.38		4.26	4.96	0.00	0.000	0.000
10/31/1997	17.94	45.89	2.56		4.81	6.38	0.00	0.000	0.000
11/30/1997	17.47	43.83	2.51		5.34	7.70	0.00	0.000	0.000
12/31/1997	17.75	42.61	2.40		5.89	9.02	0.00	0.000	0.000
1/31/1998	17.23	41.47	2.41		6.42	10.31	0.00	0.000	0.000
2/28/1998	17.13	41.68	2.43		6.90	11.47	0.00	0.000	0.000
3/31/1998	16.31	38.74	2.38		7.41	12.67	0.00	0.000	0.000
4/30/1998	14.49	35.03	2.42		7.84	13.72	0.00	0.000	0.000
5/31/1998	15.29	40.89	2.67		8.32	14.99	0.00	0.000	0.000
6/30/1998	13.40	38.19	2.85		8.72	16.14	0.00	0.000	0.000
7/31/1998	15.30	39.53	2.58		9.19	17.36	0.00	0.000	0.000
8/31/1998	13.82	35.05	2.54		9.62	18.45	0.00	0.000	0.000
9/30/1998	13.79	37.63	2.73		10.04	19.58	0.00	0.000	0.000
10/31/1998	13.48	35.84	2.66		10.45	20.69	0.00	0.000	0.000
11/30/1998	12.54	35.52	2.83		10.83	21.76	0.00	0.000	0.000
12/31/1998	11.87	35.54	2.99		11.20	22.86	0.00	0.000	0.000
1/31/1999	10.84	33.72	3.11		11.53	23.90	0.00	0.000	0.000
2/28/1999	12.09	39.11	3.24		11.87	25.00	0.00	0.000	0.000
3/31/1999	11.50	37.76	3.28		12.23	26.17	0.00	0.000	0.000
4/30/1999	11.87	37.39	3.15		12.59	27.29	0.00	0.000	0.000
5/31/1999	11.53	36.82	3.19		12.94	28.43	0.00	0.000	0.000
6/30/1999	11.34	35.76	3.15		13.28	29.50	0.00	0.000	0.000
7/31/1999	10.32	29.85	2.89		13.60	30.43	0.00	0.000	0.000
8/31/1999	10.22	29.81	2.92		13.92	31.35	0.00	0.000	0.000
9/30/1999	9.64	27.08	2.81		14.21	32.17	0.00	0.000	0.000
10/31/1999	9.16	24.30	2.65		14.49	32.92	0.00	0.000	0.000
11/30/1999	10.65	12.62	1.18	6.47	14.81	33.30	0.19	0.412	0.005
12/31/1999	10.52	24.12	2.29	32.40	15.14	34.04	1.20	1.193	0.031
1/31/2000	11.00	21.99	2.00	30.39	15.48	34.73	2.14	1.207	0.055
2/29/2000	10.88	24.00	2.21	30.92	15.79	35.42	3.04	1.139	0.076
3/31/2000	10.85	21.49	1.98	32.23	16.13	36.09	4.04	1.309	0.099
4/30/2000	11.04	22.18	2.01	30.23	16.46	36.75	4.94	1.191	0.119
5/31/2000	11.14	24.86	2.23	35.41	16.81	37.52	6.04	1.261	0.143
6/30/2000	11.00	23.97	2.18	33.10	17.14	38.24	7.03	1.219	0.163
7/31/2000	12.45	29.48	2.37	40.41	17.52	39.16	8.29	1.221	0.187
8/31/2000	11.93	29.32	2.46	38.55	17.89	40.07	9.48	1.176	0.210

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 Replacemt Ratio
9/30/2000	12.32	29.52	2.40	38.31	18.26	40.95	10.63	1.158	0.230
10/31/2000	11.62	30.21	2.60	40.76	18.62	41.89	11.89	1.214	0.252
11/30/2000	11.80	28.13	2.38	35.84	18.98	42.73	12.97	1.136	0.269
12/31/2000	11.57	25.87	2.24	33.44	19.34	43.53	14.01	1.144	0.285
1/31/2001	10.24	28.65	2.80	35.34	19.65	44.42	15.10	1.118	0.301
2/28/2001	10.58	28.64	2.71	34.59	19.95	45.22	16.07	1.091	0.315
3/31/2001	10.55	28.19	2.67	36.29	20.28	46.10	17.20	1.162	0.331
4/30/2001	9.32	27.48	2.95	36.61	20.56	46.92	18.29	1.213	0.346
5/31/2001	8.91	27.90	3.13	44.24	20.83	47.79	19.66	1.452	0.365
6/30/2001	10.49	27.74	2.64	41.31	21.15	48.62	20.90	1.342	0.382
7/31/2001	10.94	28.42	2.60	41.47	21.49	49.50	22.19	1.313	0.398
8/31/2001	8.64	40.02	4.63	51.53	21.75	50.74	23.79	1.212	0.417
9/30/2001	8.78	43.43	4.94	57.77	22.02	52.05	25.52	1.257	0.437
10/31/2001	8.19	38.30	4.67	50.91	22.27	53.23	27.10	1.252	0.454
11/30/2001	7.96	38.56	4.84	51.90	22.51	54.39	28.66	1.270	0.471
12/31/2001	8.48	41.76	4.92	49.75	22.77	55.68	30.20	1.125	0.485
1/31/2002	8.43	41.05	4.87	47.69	23.04	56.96	31.68	1.097	0.498
2/28/2002	8.78	40.14	4.57	48.14	23.28	58.08	33.02	1.128	0.510
3/31/2002	9.51	24.27	2.55	30.89	23.58	58.83	33.98	1.143	0.518
4/30/2002	10.20	17.74	1.74	28.34	23.88	59.37	34.83	1.370	0.526
5/31/2002	9.75	18.64	1.91	30.86	24.18	59.94	35.79	1.438	0.535
6/30/2002	9.47	18.07	1.91	29.08	24.47	60.48	36.66	1.398	0.543
7/31/2002	9.78	19.36	1.98	30.41	24.77	61.09	37.60	1.370	0.551
8/31/2002	9.51	18.66	1.96	29.46	25.07	61.66	38.52	1.376	0.559
9/30/2002	9.33	19.70	2.11	29.99	25.35	62.25	39.42	1.339	0.566
10/31/2002	9.24	19.15	2.07	31.21	25.63	62.85	40.38	1.430	0.575
11/30/2002	9.35	19.82	2.12	63.23	25.91	63.44	42.28	2.807	0.596
12/31/2002	9.30	19.62	2.11	74.32	26.20	64.05	44.59	3.332	0.622
1/31/2003	9.32	19.56	2.10	76.29	26.49	64.66	46.95	3.428	0.649
2/28/2003	9.25	19.48	2.11	71.01	26.75	65.20	48.94	3.205	0.671
3/31/2003	7.61	19.81	2.60	69.43	26.99	65.82	51.09	3.154	0.694
4/30/2003	7.86	17.18	2.18	69.62	27.22	66.33	53.18	3.578	0.717
5/31/2003	8.02	16.87	2.10	59.74	27.47	66.86	55.03	3.113	0.736
6/30/2003	8.30	16.51	1.99	72.57	27.72	67.35	57.21	3.837	0.759
7/31/2003	8.11	14.48	1.79	69.16	27.97	67.80	59.35	4.111	0.782
8/31/2003	7.95	13.61	1.71	70.40	28.22	68.22	61.53	4.425	0.806
9/30/2003	7.88	14.16	1.80	71.59	28.45	68.65	63.68	4.355	0.828
10/31/2003	7.91	14.19	1.79	67.08	28.70	69.09	65.76	4.070	0.850
11/30/2003	5.97	10.70	1.79	20.62	28.88	69.41	66.38	1.659	0.854
12/31/2003	7.74	16.26	2.10	24.14	29.12	69.91	67.13	1.305	0.857
1/31/2004	7.76	20.08	2.59	25.94	29.36	70.53	67.93	1.162	0.860
2/29/2004	6.58	17.30	2.63	24.84	29.55	71.04	68.65	1.294	0.863
3/31/2004	7.55	21.11	2.79	29.35	29.78	71.69	69.56	1.260	0.866
4/30/2004	7.30	21.37	2.93	30.81	30.00	72.33	70.49	1.312	0.870
5/31/2004	7.16	20.05	2.80	28.47	30.22	72.95	71.37	1.287	0.874
6/30/2004	7.12	19.65	2.76	28.68	30.44	73.54	72.23	1.321	0.877
7/31/2004	7.13	17.96	2.52	27.15	30.66	74.10	73.07	1.356	0.881
8/31/2004	6.94	19.06	2.75	27.54	30.87	74.69	73.93	1.307	0.884

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 Replacemt Ratio
9/30/2004	6.88	20.51	2.98	29.73	31.08	75.31	74.82	1.321	0.888
10/31/2004	6.76	20.10	2.97	27.44	31.29	75.93	75.67	1.244	0.890
11/30/2004	6.47	19.55	3.02	26.98	31.48	76.52	76.48	1.259	0.893
12/31/2004	6.41	19.66	3.07	28.55	31.68	77.12	77.36	1.327	0.897
1/31/2005	6.51	19.15	2.94	27.64	31.88	77.72	78.22	1.314	0.900
2/28/2005	6.64	20.01	3.01	27.88	32.07	78.28	79.00	1.271	0.902
3/31/2005	6.50	19.78	3.04	27.50	32.27	78.89	79.85	1.270	0.905
4/30/2005	6.33	16.54	2.61	25.11	32.46	79.39	80.61	1.367	0.908
5/31/2005	6.56	16.65	2.54	23.05	32.66	79.90	81.32	1.242	0.910
6/30/2005	6.35	15.82	2.49	22.97	32.86	80.38	82.01	1.301	0.912
7/31/2005	6.06	16.44	2.71	27.01	33.04	80.89	82.85	1.485	0.916
8/31/2005	7.37	14.96	2.03	23.96	33.27	81.35	83.59	1.402	0.919
9/30/2005	3.92	15.20	3.88	27.59	33.39	81.81	84.42	1.690	0.923
10/31/2005	6.04	15.08	2.50	25.68	33.58	82.28	85.21	1.526	0.926
11/30/2005	5.74	15.03	2.62	26.44	33.75	82.73	86.01	1.584	0.930
12/31/2005	5.76	15.05	2.61	24.49	33.93	83.19	86.77	1.465	0.933
1/31/2006	5.71	15.61	2.74	27.85	34.10	83.68	87.63	1.614	0.937
2/28/2006	5.60	15.20	2.71	26.50	34.26	84.10	88.37	1.575	0.940
3/31/2006	5.32	12.00	2.26	23.63	34.43	84.47	89.10	1.745	0.944
4/30/2006	5.78	13.68	2.37	26.91	34.60	84.89	89.91	1.753	0.948
5/31/2006	5.82	13.32	2.29	25.29	34.78	85.30	90.69	1.685	0.951
6/30/2006	5.87	13.27	2.26	25.57	34.96	85.70	91.46	1.709	0.955
7/31/2006	5.75	12.89	2.24	25.43	35.13	86.10	92.25	1.747	0.958
8/31/2006	5.58	12.46	2.23	24.10	35.31	86.48	93.00	1.711	0.962
9/30/2006	5.94	12.40	2.09	25.23	35.49	86.85	93.75	1.787	0.965
10/31/2006	5.29	12.64	2.39	9.59	35.65	87.25	94.05	0.677	0.964
11/30/2006	5.28	13.00	2.46	6.84	35.81	87.64	94.26	0.471	0.962
12/31/2006	5.18	12.26	2.36	23.99	35.97	88.02	95.00	1.744	0.965
1/31/2007	4.96	12.06	2.43	24.78	36.12	88.39	95.77	1.836	0.969
2/28/2007	4.80	11.41	2.38	23.85	36.26	88.71	96.44	1.863	0.972
3/31/2007	5.07	12.07	2.38	25.02	36.41	89.08	97.21	1.849	0.976
4/30/2007	5.00	12.16	2.43	25.83	36.56	89.45	97.99	1.898	0.980
5/31/2007	5.04	12.32	2.45	24.28	36.72	89.83	98.74	1.762	0.983
6/30/2007	5.08	11.60	2.28	24.48	36.87	90.18	99.47	1.872	0.986
7/31/2007	5.10	11.55	2.27	25.45	37.03	90.54	100.26	1.953	0.990
8/31/2007	6.94	10.52	1.52	23.11	37.25	90.86	100.98	1.845	0.994
9/30/2007	3.27	12.16	3.72	24.73	37.34	91.23	101.72	1.887	0.997
10/31/2007	4.93	10.77	2.19	23.90	37.50	91.56	102.46	1.960	1.001
11/30/2007	4.88	10.64	2.18	20.60	37.64	91.88	103.08	1.710	1.003
12/31/2007	4.23	9.83	2.33	23.39	37.77	92.19	103.81	2.117	1.007
1/31/2008	3.81	9.78	2.57	22.22	37.89	92.49	104.49	2.041	1.010
2/29/2008	2.34	9.21	3.93	20.27	37.96	92.76	105.08	2.049	1.013
3/31/2008	2.15	9.30	4.34	21.97	38.03	93.04	105.76	2.214	1.017
4/30/2008	2.82	9.96	3.54	22.21	38.11	93.34	106.43	2.061	1.020
5/31/2008	3.05	10.16	3.33	23.04	38.21	93.66	107.14	2.087	1.023
6/30/2008	4.01	10.31	2.57	23.16	38.33	93.97	107.84	2.020	1.027
7/31/2008	4.85	10.75	2.22	23.43	38.48	94.30	108.57	1.929	1.030
8/31/2008	4.60	10.70	2.33	23.44	38.62	94.63	109.29	1.948	1.033

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 Replacemt Ratio
9/30/2008	4.11	10.51	2.56	22.58	38.74	94.95	109.97	1.929	1.036
10/31/2008	4.15	8.87	2.14	22.33	38.87	95.22	110.66	2.216	1.039
11/30/2008	3.61	6.68	1.85	19.13	38.98	95.42	111.24	2.476	1.043
12/31/2008	3.60	9.89	2.75	22.96	39.09	95.73	111.95	2.101	1.046
1/31/2009	3.32	9.82	2.96	20.97	39.19	96.03	112.60	1.946	1.049
2/28/2009	3.35	9.83	2.93	23.63	39.29	96.31	113.26	2.188	1.052
3/31/2009	3.06	9.85	3.22	20.02	39.38	96.62	113.88	1.864	1.054
4/30/2009	3.77	9.95	2.64	26.40	39.50	96.91	114.67	2.390	1.058
5/31/2009	4.44	10.43	2.35	24.94	39.63	97.24	115.44	2.130	1.062
6/30/2009	4.22	10.39	2.46	22.70	39.76	97.55	116.13	1.956	1.065
7/31/2009	4.45	10.46	2.35	23.53	39.90	97.87	116.85	2.003	1.068
8/31/2009	4.20	10.42	2.48	23.15	40.03	98.20	117.57	1.989	1.071
9/30/2009	4.20	10.35	2.47	23.66	40.15	98.51	118.28	2.047	1.074
10/31/2009	3.97	9.88	2.49	22.71	40.28	98.81	118.99	2.059	1.077
11/30/2009	3.87	10.00	2.58	25.84	40.39	99.11	119.76	2.325	1.081
12/31/2009	3.75	9.79	2.61	31.31	40.51	99.42	120.73	2.879	1.086
1/31/2010	3.95	9.96	2.52	31.33	40.63	99.73	121.70	2.822	1.092
2/28/2010	3.90	9.80	2.51	30.54	40.74	100.00	122.56	2.794	1.096
3/31/2010	3.79	9.87	2.60	29.80	40.86	100.31	123.48	2.716	1.101
4/30/2010	3.91	10.13	2.59	31.73	40.98	100.61	124.43	2.817	1.106
5/31/2010	3.81	10.15	2.67	31.12	41.09	100.92	125.40	2.764	1.112
6/30/2010	3.81	10.13	2.66	32.78	41.21	101.23	126.38	2.917	1.117
7/31/2010	3.78	9.95	2.63	31.85	41.33	101.54	127.37	2.883	1.122
8/31/2010	3.89	9.94	2.55	31.13	41.45	101.85	128.33	2.814	1.127
9/30/2010	3.88	9.28	2.39	31.72	41.56	102.12	129.29	3.048	1.133
10/31/2010	3.78	8.85	2.34	30.04	41.68	102.40	130.22	3.022	1.138
11/30/2010	3.58	8.67	2.42	33.25	41.79	102.66	131.21	3.427	1.144
12/31/2010	3.48	8.22	2.36	32.77	41.90	102.91	132.23	3.552	1.150
1/31/2011	3.54	8.23	2.32	31.22	42.01	103.17	133.20	3.372	1.155
2/28/2011	3.39	8.28	2.44	32.36	42.10	103.40	134.10	3.496	1.160
3/31/2011	3.54	8.21	2.32	30.84	42.21	103.65	135.06	3.338	1.166
4/30/2011	3.34	8.04	2.40	31.17	42.31	103.90	136.00	3.462	1.171
5/31/2011	4.00	7.76	1.94	31.74	42.43	104.14	136.98	3.560	1.177
6/30/2011	3.74	8.10	2.17	31.13	42.55	104.38	137.91	3.389	1.182
7/31/2011	3.74	8.62	2.31	31.90	42.66	104.65	138.90	3.290	1.187
8/31/2011	3.63	8.71	2.40	30.90	42.77	104.92	139.86	3.166	1.192
9/30/2011	3.75	8.69	2.32	31.64	42.89	105.18	140.81	3.237	1.198
10/31/2011	3.80	8.65	2.28	35.75	43.00	105.44	141.92	3.669	1.204
11/30/2011	3.88	8.45	2.18	40.58	43.12	105.70	143.13	4.240	1.211
12/31/2011	3.77	8.74	2.32	43.40	43.24	105.97	144.48	4.415	1.220