

SINCLAIR UNIT NO. 5
WATERFLOOD EOR PROJECT

ANNUAL REPORT FOR 2014

March 27, 2015

Tundra Oil and Gas Partnership

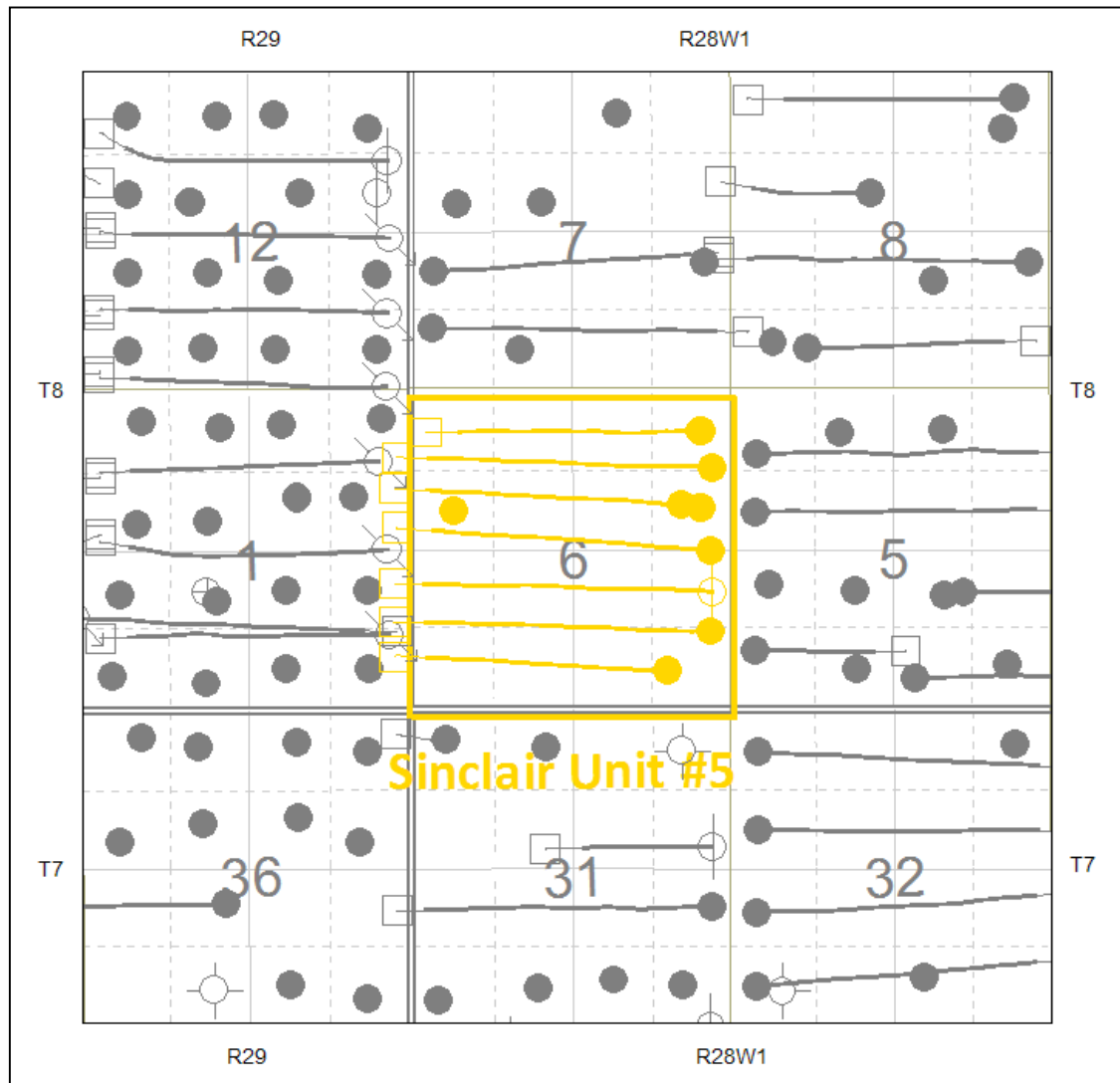
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02/01-06-008-28W1	
02/08-06-008-28W1	
02/16-06-008-28W1	

INTRODUCTION

Sinclair Unit No. 5 Enhanced Oil Recovery (EOR) Waterflood Project was approved under Waterflood Order No. 21 effective October 1, 2010 with Tundra Oil and Gas (Tundra) as Operator. The EOR project area, outlined in yellow on Figure 1, contains 9 producing wells within Section 6 in Township 8, Range 28 W1.

Figure 1: Sinclair Unit No. 5 Area Outline



In accordance with Section 73 of the Manitoba Drilling and Production Regulation, Tundra submits the following 2014 Annual Progress Report for Sinclair Unit No. 5 as required by Waterflood Order No. 21.

DISCUSSION

Production History

For the wells included in Sinclair Unit No. 5, production started in March 2005 with 00/09-06-008-28W1. Oil production peaked at 76 m³/d in March of 2009, just after the four horizontal wells were brought on production. The water oil ratio (WOR) averaged 1.50 m³/m³ in 2014. Water injection started in Sinclair Unit No. 5 in April 2012. In December 2014, the Unit was producing 20.80 m³/d of oil and 39.22 m³/d of water. The rates and WOR are presented in Figure 2.

Figure 2: Sinclair Unit No. 5 Production/Injection Rates and WOR vs Time

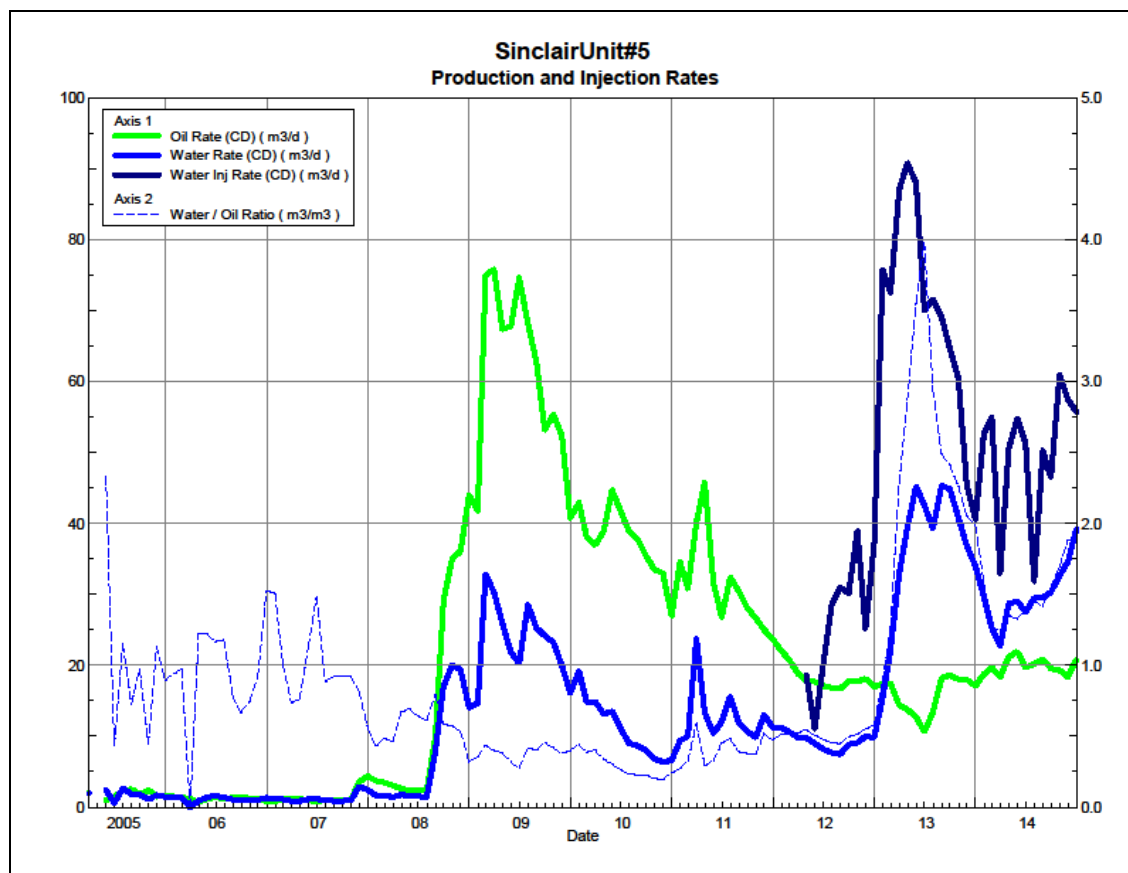
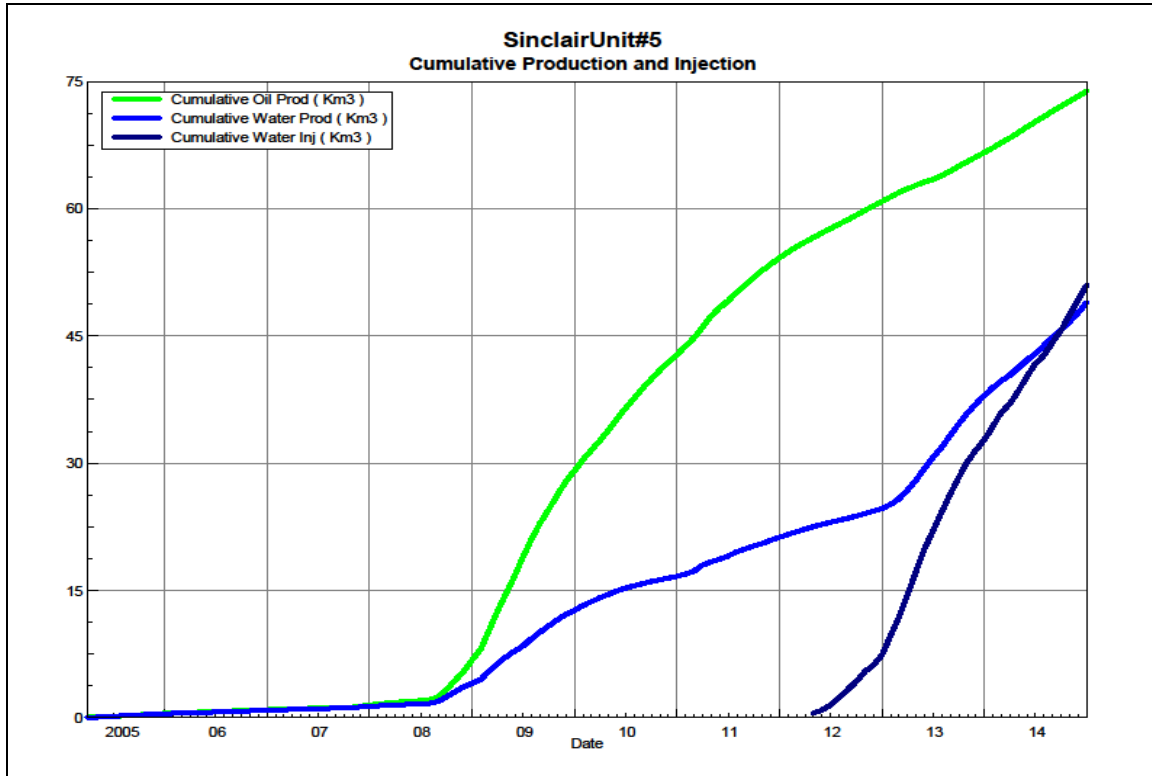


Figure 3 shows the cumulative production for Sinclair Unit No. 5 to the end of December 2014 as 73.9 E³m³ of oil, and 49.0 E³m³ of water, representing a 23.5% recovery factor of the OOIP.

Figure 3: Sinclair Unit No. 5 Cumulative Oil, Water and Water Injected vs. Time



Waterflood Development Plan

Sinclair Unit No 5 Waterflood (WF) Development Plan

Injectors were drilled at the end of 2010 and were openhole fracture stimulated to improve the injection rates. After having produced the injectors for over a year, to create voidage and improve recovery, water injection commenced in Sinclair Unit No. 5 in April 2012. As of December 2014, Sinclair Unit No. 5 had 3 injection patterns in place.

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

The injection water for Sinclair Unit No. 5 will be sourced from the 16-32-007-29W1 well (Lodgepole formation). The water is treated at the 03-04-008-29W1 battery where it is filtered to 0.5 microns and has scale inhibitor added. The injection water is then distributed to the injectors through the dedicated infrastructure system.

Injection Wellhead Pressures

Injection started in this Unit in April 2012. The monthly wellhead injection pressure for each injector is summarized in Appendix C. Since injection in this Unit is still in the early stages, the injectors are still building up to a target injection pressure of 6300 kPaa.

Reservoir Pressure

Tundra undertook to collect pressures from every new injection well drilled in 2010. In addition to the three initial pressures in 2010 from the new drills in Sinclair Unit No. 5, the well at 00/12-06-008-28W1/0 was shut-in from April to October 2011. Prior to start up, Tundra obtained a build-up fluid level shot via AWS. The pressure was interpreted to be approximately 1.2 MPaa. This pressure data is low due to the nature of the reservoir (tight, low porosity and permeability) and this value does not represent the current reservoir pressure as a much longer time is required to obtain stabilized reservoir pressure. Tundra is endeavored to obtain reservoir pressures as required in order to monitor and optimize its waterflood.

Well Servicing

Table 1 lists the maintenance that was required in Sinclair Unit No. 5 in 2014.

Table 1: Service and Maintenance in Sinclair Unit No. 5

00/12-06-008-28W1/0	Pump Change	3/21/2014
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Voidage Replacement

Tundra intends to inject water to re-pressurize the reservoir due to cumulative primary production and corresponding pressure depletion. During the initial fill-up period, the instantaneous voidage replacement ratio (VRR) is expected to average approximately 1.25 to 2.0 by individual pattern. The injector pattern VRRs will be discussed in the waterflood performance section of the report.

Waterflood Performance Discussion

At the end of 2014, Sinclair Unit No. 5 waterflood area had 3 injector patterns in place. The patterns consist of an east-west horizontal injector placed between two horizontal producers, one to the north and one to the south. An overall summary for each injector pattern is presented in Appendix B.

In early 2013, the horizontal producers at 00/08-06 & 02/09-06 had indications of premature breakthrough. On December 18, 2013, a fiber optic temperature log was ran in the 02/08-06 injector. With the log results, a packer was set to isolate the toe and heel sections of the horizontal injector. Both affected producers responded positively with reductions in water volumes and an increase in oil volumes.

A well review in 2014, showed potential for improving the recovery from this unit. In 2015, it is Tundra's plan to drill a short horizontal well in LSD 15 and 16 and a vertical well (103/01-06-008-28W1) to improve oil recovery in that portion of the unit.

Plots and tables of the production and injection data along with the VRR information are presented in Appendix D for each of the injector patterns.

List of Appendices

Appendix A: Sinclair Unit No. 5 Well Name and Status Table

Appendix B: Sinclair Unit No. 5 Injection Pattern Summary

Appendix C: Sinclair Unit No. 5 Average Monthly Injection Pressure Table

Appendix D: Injector Pattern Production/Injection Rates, Cumulative and VRR
Plots and Tables for the following injectors:

02/01-06-008-28W1

02/08-06-008-28W1

02/16-06-008-28W1

Appendix A

<i>UWI</i>	<i>Surface Hole Location</i>	<i>Well Status</i>	<i>Type</i>
100/01-06-008-28W1/0	100010100829W100	Capable of OIL Production	Horizontal
102/01-06-008-28W1/0	102080100829W100	Water Injection	Horizontal
100/08-06-008-28W1/0	100080100829W100	Capable of OIL Production	Horizontal
102/08-06-008-28W1/0	103090100829W100	Water Injection	Horizontal
100/09-06-008-28W1/0	100090600828W100	Capable of OIL Production	Vertical
102/09-06-008-28W1/0	102090100829W100	Capable of OIL Production	Horizontal
100/12-06-008-28W1/0	100120600828W100	Capable of OIL Production	Vertical
100/16-06-008-28W1/0	100130600828W100	Capable of OIL Production	Horizontal
102/16-06-008-28W1/0	102160100829W100	Water Injection	Horizontal

Appendix B

Sinclair Unit No. 5 Injection Pattern Summary as of December 2014

Pattern Name	Injector BH Location (008-28W1)	Injector Surf. Location (008-28W1)	Status	No. of Supported Wells	Supported Wells (008-28W1)	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
02/01-06-008-28W1 Injector	02/01-06	08-01	W/tr Injection	2	01-06 08-06	0.7 0.5	Aug 2008	Jul 2012	8.6	10.3	1.19	19.7	21.8	13.7	19.7	1.0	0.53
02/08-06-008-28W1 Injector	02/08-06	09-01	W/tr Injection	4	08-06, 09-06, 02/09-06, 12-06	1.0 (for 12-06) 0.5 (for others)	Mar 2005	Apr 2012	4.6	14.6	3.18	16.4	23.0	17.6	16.8	0.8	0.40
02/16-06-008-28W1 Injector	02/16-06	16-01	W/tr Injection	3	09-06, 02/09-06 16-06	0.5 0.7	Mar 2005	Dec 2012	5.3	12.0	2.28	19.6	18.3	13.3	14.5	1.1	0.44

Appendix C

Average Monthly Injection Pressure (kPag)

Month	Injection Pressure		
	102/01-06	102/08-06	102/16-06
Jan-12	0	0	0
Feb-12	0	0	0
Mar-12	0	0	0
Apr-12	0	0	0
May-12	0	31	0
Jun-12	0	790	0
Jul-12	2	1609	0
Aug-12	0	2313	0
Sep-12	88	2398	0
Oct-12	1337	3050	0
Nov-12	1047	1820	0
Dec-12	1577	1349	2
Jan-13	3000	3573	-45
Feb-13	3387	3978	-66
Mar-13	3795	4497	-71
Apr-13	4116	4708	26
May-13	4246	4959	1186
Jun-13	4319	4719	1402
Jul-13	4572	4904	1719
Aug-13	4750	6466	1975
Sep-13	4835	4976	2309
Oct-13	5006	4985	2411
Nov-13	4990	2408	2821
Dec-13	4998	1305	3823
Jan-14	4741	3131	3469
Feb-14	4985	4892	2974
Mar-14	4377	1596	2330
Apr-14	4973	3640	2627
May-14	5006	4753	2798
Jun-14	5038	4932	3028
Jul-14	4912	2257	2060
Aug-14	5411	2649	3001
Sep-14	5545	1046	3294
Oct-14	5633	4684	3452
Nov-14	5654	4979	3313
Dec-14	5723	4995	3212

Appendix D

Rates and VRR Plots

Pattern: 02/01-06-008-28Inj Set: SinclairUnit#5

Oil Formation Vol Factor : 1.07100 m3/m3

Water Formation Vol Factor : 1.00150 m3/m3

Water / Oil Ratio : 1.19 m3/m3

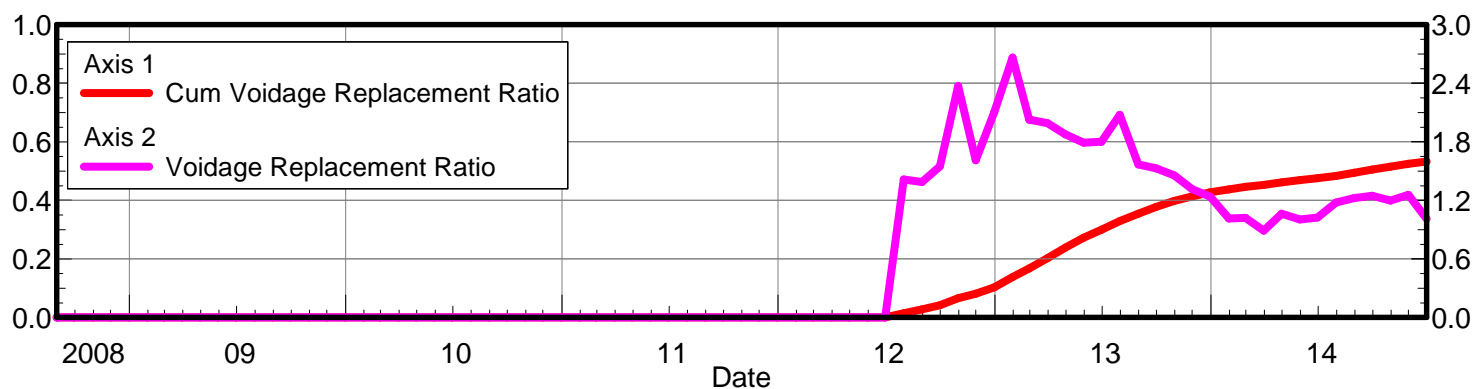
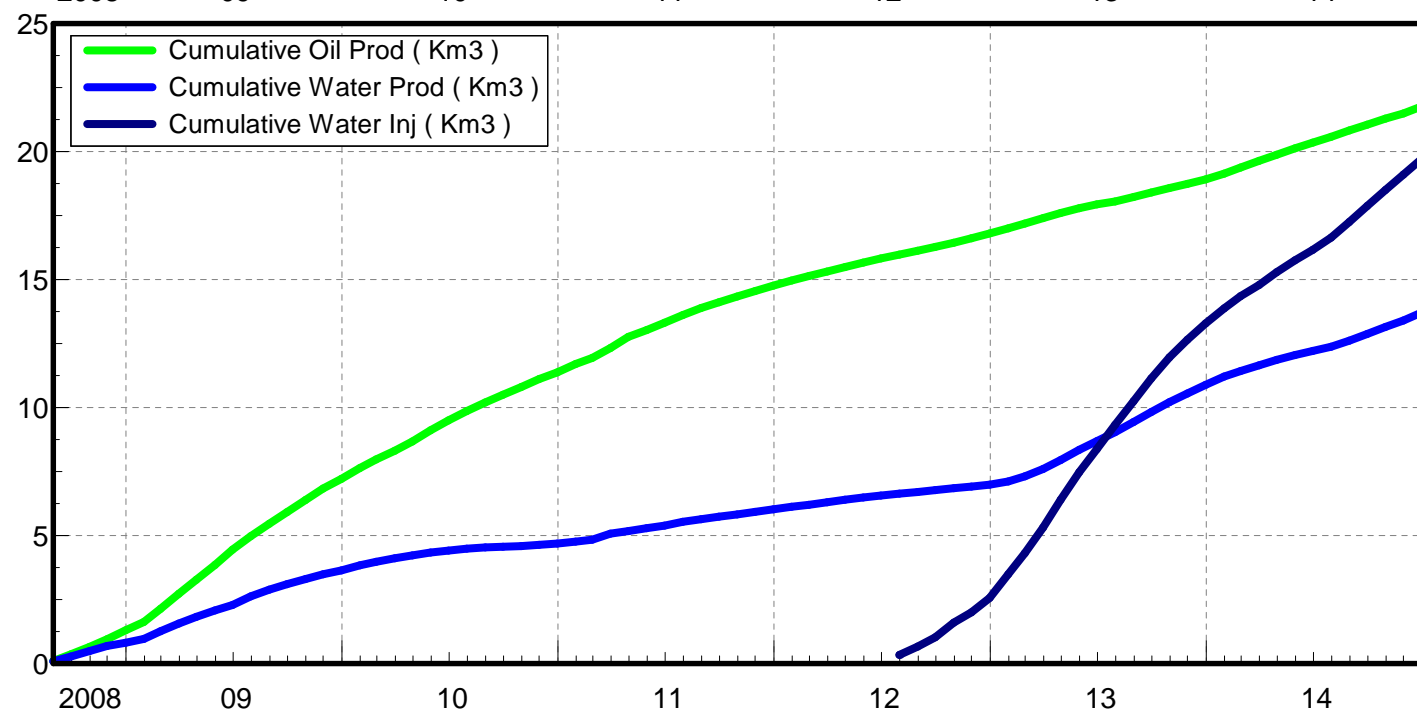
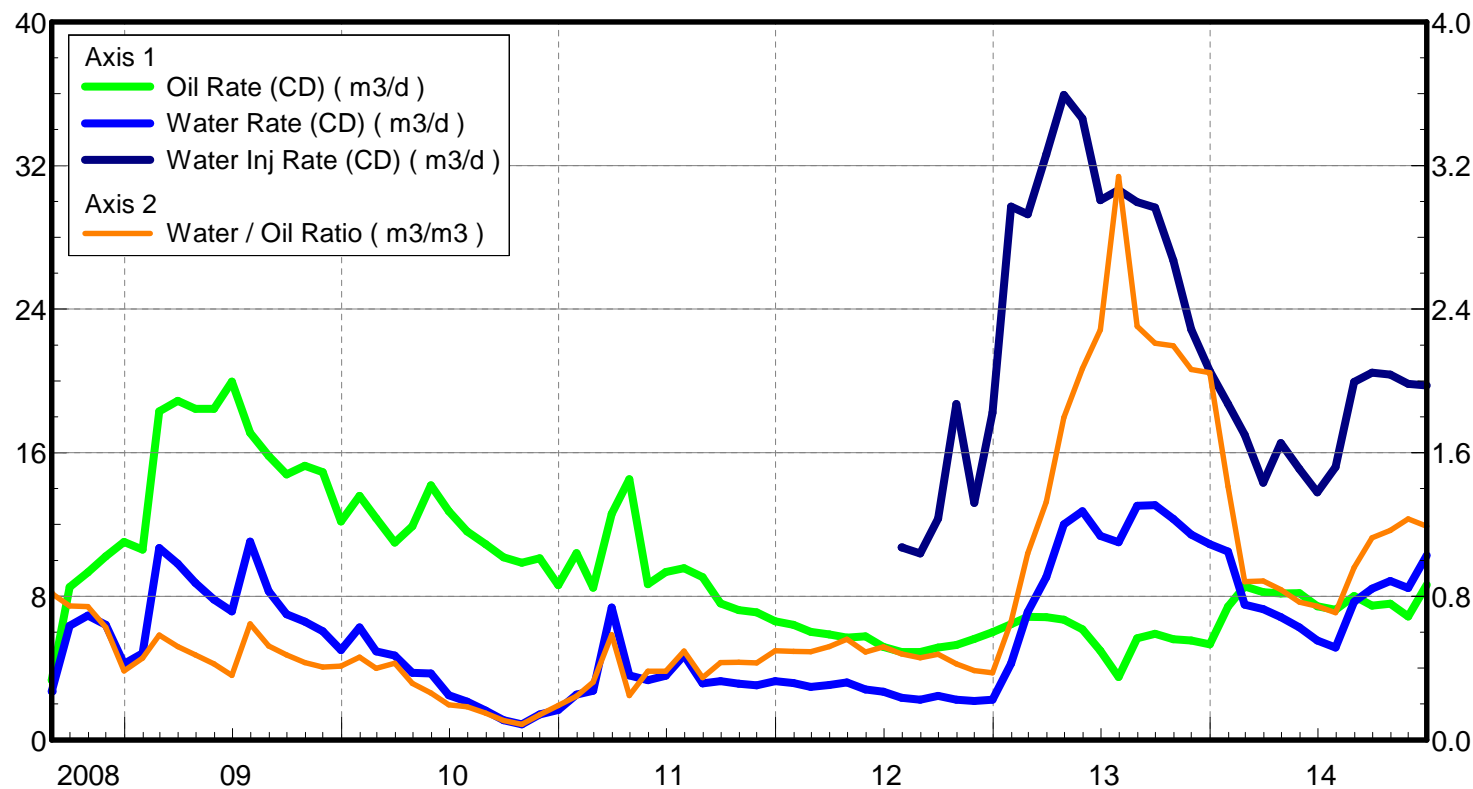
March 26, 2015

Operator: Tundra_O&G_Prtshp

Oil Rate (CD) : 8.64 m3/d

Water Rate (CD) : 10.29 m3/d

Water Inj Rate (CD) : 19.74 m3/d



Pattern: 02/08-06-008-28Inj Set: SinclairUnit#5

Oil Formation Vol Factor : 1.07100 m3/m3

Water Formation Vol Factor : 1.00150 m3/m3

Water / Oil Ratio : 3.18 m3/m3

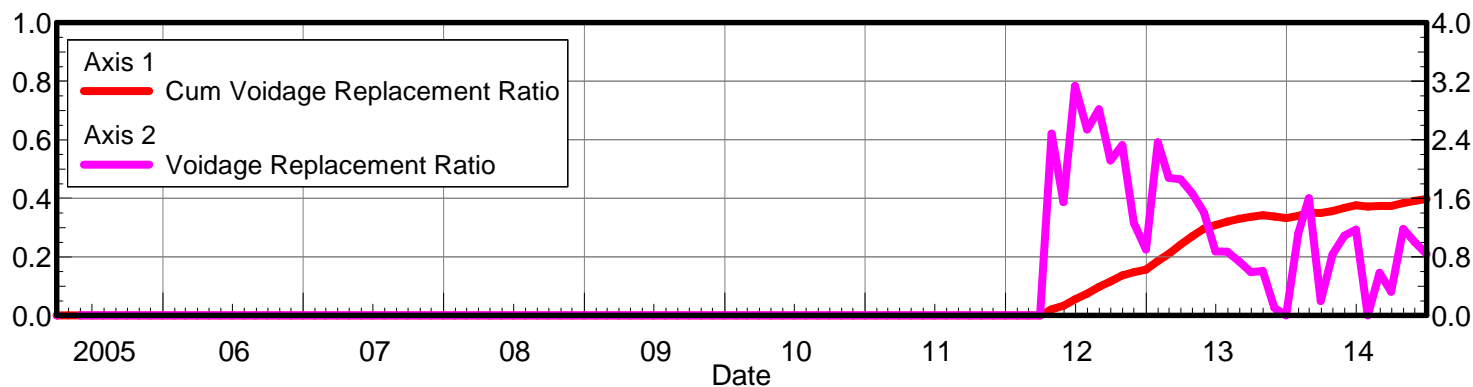
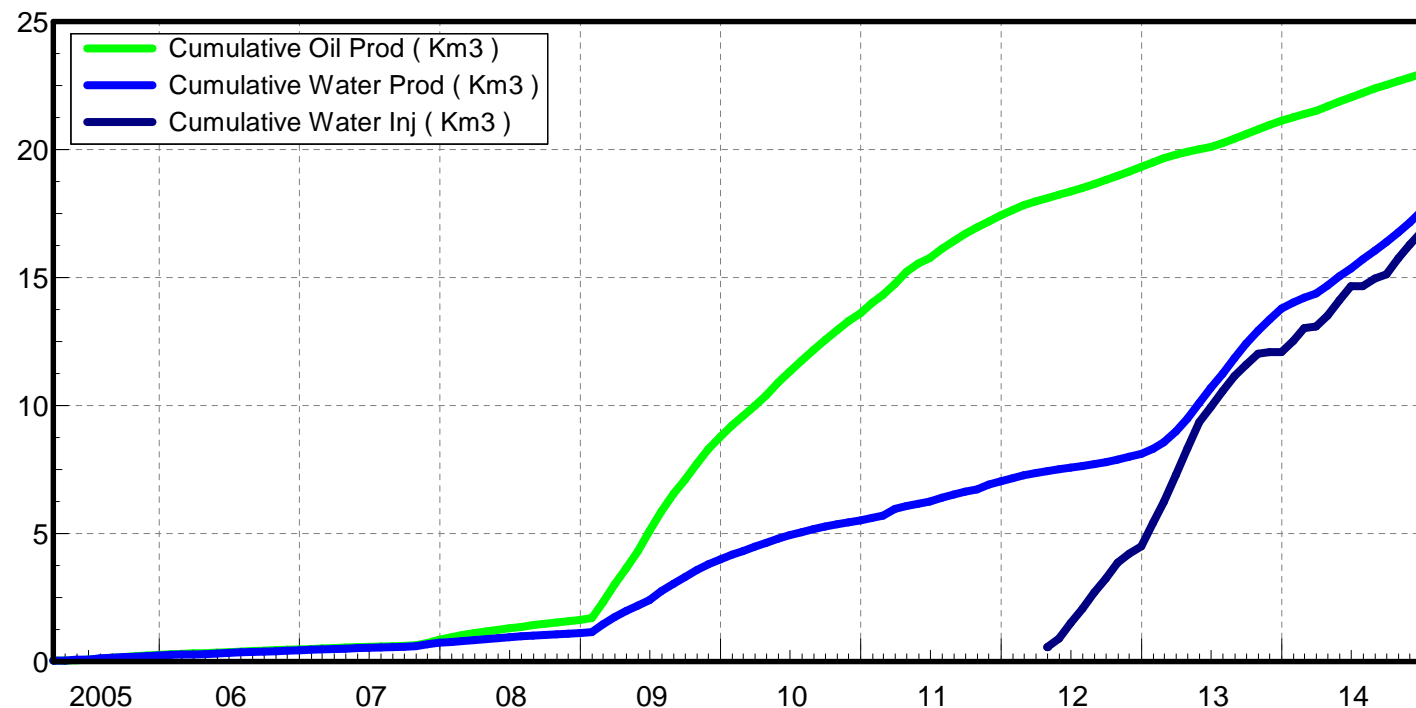
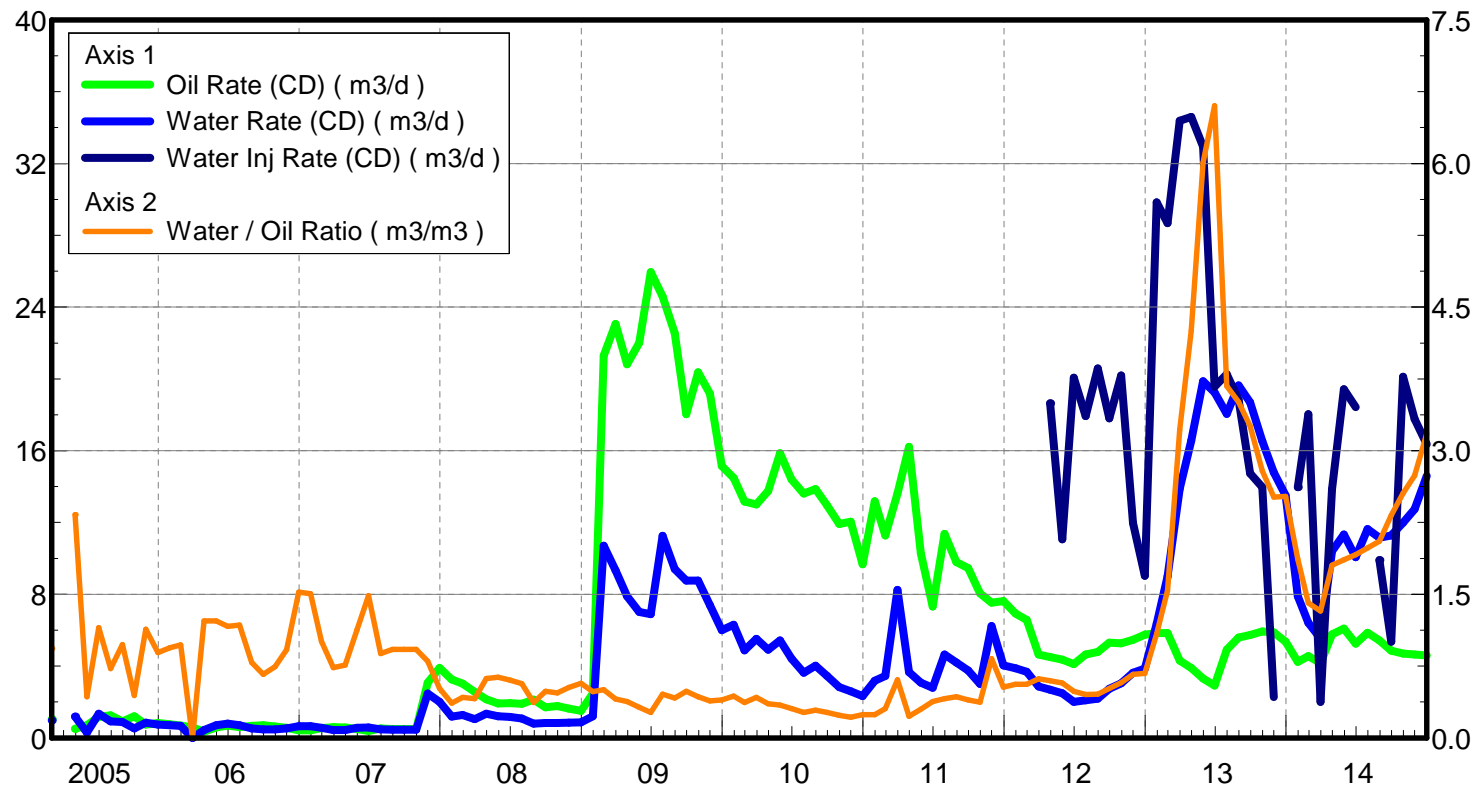
March 26, 2015

Operator: Tundra_O&G_Prtshp

Oil Rate (CD) : 4.59 m3/d

Water Rate (CD) : 14.60 m3/d

Water Inj Rate (CD) : 16.35 m3/d



Pattern: 02/16-06-008-28Inj Set: SinclairUnit#5

Oil Formation Vol Factor : 1.07100 m3/m3

Water Formation Vol Factor : 1.00150 m3/m3

Water / Oil Ratio : 2.28 m3/m3

March 26, 2015

Operator: Tundra_O&G_Prtshp

Oil Rate (CD) : 5.25 m3/d

Water Rate (CD) : 11.97 m3/d

Water Inj Rate (CD) : 19.61 m3/d

