

**EWART UNIT NO. 9  
WATERFLOOD EOR PROJECT  
  
ANNUAL REPORT FOR 2016**

**June 29, 2017**

**Tundra Oil and Gas Partnership**

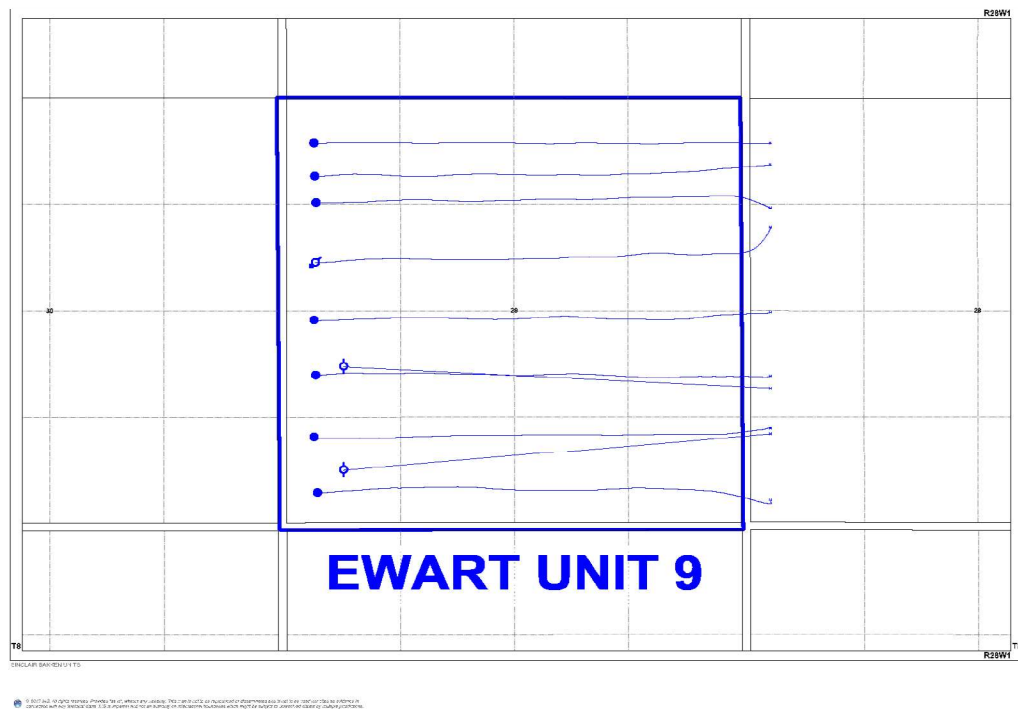
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## **INTRODUCTION**

Ewart Unit No. 9 Enhanced Oil Recovery (EOR) Waterflood Project was approved effective September 1st, 2015 with Tundra Oil and Gas as Operator. The EOR project area, outlined in blue in Figure 1, contains 7 horizontal producing wells, 1 horizontal injector and 2 horizontal wells waiting to be completed in 16 LSDs in Township 8, Range 28W1. Well list and well status is available in Appendix A.

**Figure 1: Ewart Unit No. 9 Area Outline**



In accordance with Section 73 of the Manitoba Drilling and Production Regulation, Tundra submits the following 2016 Annual Progress Report for Ewart Unit No. 9.

## **DISCUSSION**

### **Production History**

For the wells included in Ewart Unit No. 9, production started in November 2011 with the 02/13-29-008-28W1/00 horizontal well. Oil production peaked at 63.3 m<sup>3</sup>/d in July 2014. In December 2016, the Unit was producing 54.53 m<sup>3</sup>/d of oil and 6.25 m<sup>3</sup>/d of water and had an average WOR of 0.11 m<sup>3</sup>/m<sup>3</sup> in 2016. Water injection commenced in Ewart Unit No. 9 in March 2016. The rates and WOR are presented in Figure 2.

**Figure 2: Ewart Unit No. 9 Production/Injection Rates and WOR vs. Time**

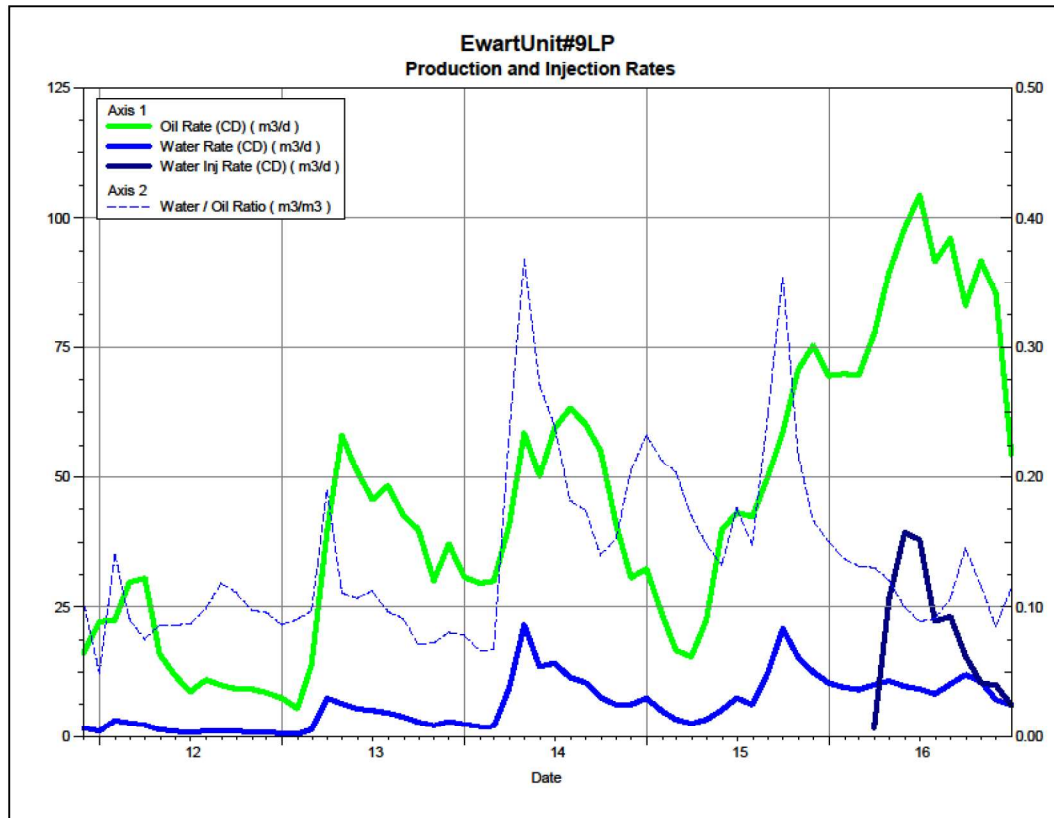
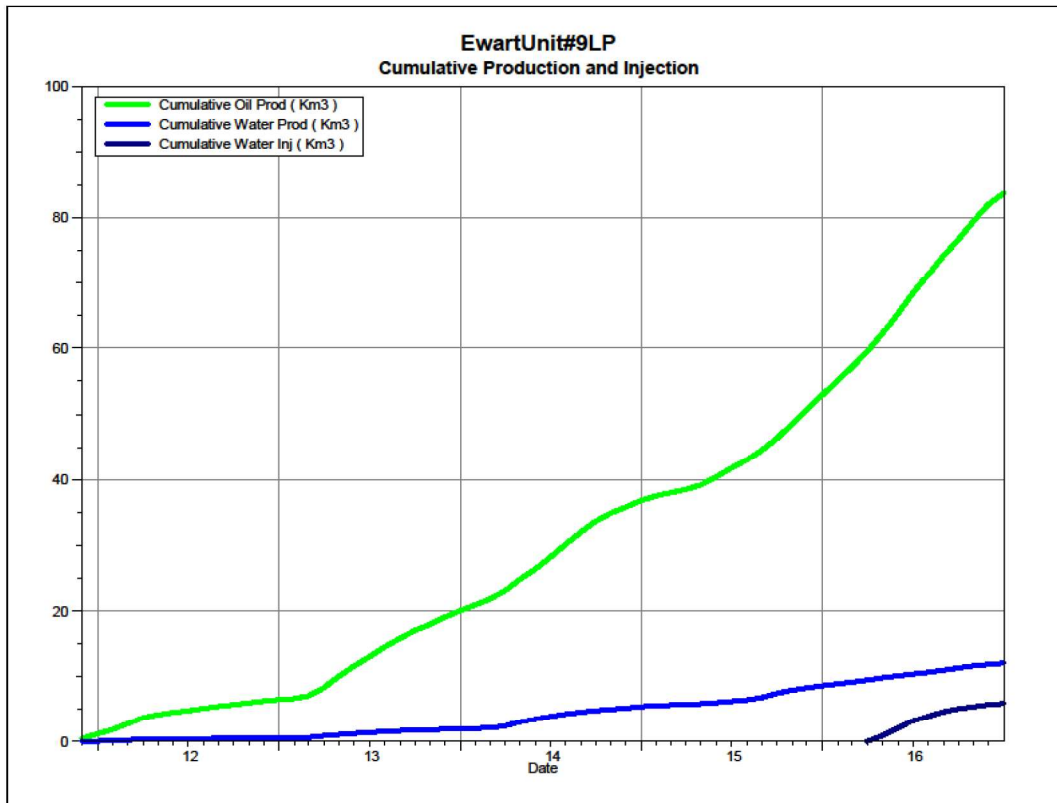


Figure 3 shows the cumulative production for Ewart Unit No. 9 to the end of December 2016 as 83.73 e³m³ of oil and 12.09 e³m³ of water, representing a 3.0% recovery factor of the OOIP. The cumulative water injected is 5.90 e³m³.



**Figure 3: Ewart Unit No. 9 Cumulative Oil, Water and Water Injected vs. Time**



### **Waterflood History**

Ewart Unit No. 9 is still in the development phase at the end of 2016. Three (3) water injection wells are required for Ewart Unit No. 9. Three (3) of the existing producing horizontal wells will be converted to horizontal injection wells, completing 200m horizontal to horizontal waterflood patterns within Ewart Unit No. 9. Since the proposed horizontal injection wells have already been on production for a period of time there will not be a need for an additional pre-production period within this unit. In March 2016, the 04/12-29-008-28W1/2 producer was converted to an injector. Tundra is planning to convert the 02/13-29-008-28W1/0 well to injection in 2017. All of the horizontal wells are fracture stimulated to improve the injection rates.

Production performance by injector pattern are summarized in Appendix B.

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 Ewart Unit No. 9 will be sourced from the 02/14-30-007-28W1 well (Mannville formation). The water is treated at the 04-01-008-29W1 filtration plant where it is filtered to 0.1 microns and has scale inhibitor and biocide added. The injection water is then distributed to the injectors through the dedicated infrastructure system.

### **Injection Wellhead Pressures**

Injection started in this Ewart Unit No. 9 in March 2016. The average monthly wellhead injection pressure for each injector is summarized in Appendix D. 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**

Where practical, Tundra is committed to collecting pressure data from newly drilled injection wells. For Ewart Unit No. 9, pressure data is currently available for the 02/13-29, 03/13-29 and 04/13-29-008-28W1 Lodgepole locations (Appendix C).

### **Well Servicing**

No maintenance was required on the 10 wells in Ewart Unit No. 9 in 2016.

## **Waterflood Performance Discussion**

At the end of 2016, Ewart Unit No. 9 had 1 injection pattern in place. Conversion of the horizontal wells to water injection wells began in March 2016, with the conversion of the 04/12-29-008-28W1/2 existing producer to an injector. Since water injection started in March 2016, there is no waterflood analysis that can be done at this time.

A summary table of the injector pattern(s) is presented in Appendix B. Plots of the production and injection data are presented in Appendix D for each of the injection pattern(s).

## **List of Appendices**

Appendix A: Well List and Well Status

Appendix B: Injection Pattern Summary

Appendix C: Reservoir Pressure Tests

Appendix D: Monthly Injection Pressures

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

03/05-29-008-28W1/0

04/12-29-008-28W1/0

04/13-29-008-28W1/0

## Appendix A

UWI	Surface Location	Licence Number	Well Status
103/04-29-008-28W1/0	03/04-28-008-28W1/0	009136	Capable of OIL Prod
104/04-29-008-28W1/0	04/04-28-008-28W1/0	009683	Capable of OIL Prod
105/04-29-008-28W1/0	05/04-28-008-28W1/0	010587	Completing
103/05-29-008-28W1/0	03/05-28-008-28W1/0	009135	Capable of OIL Prod
104/05-29-008-28W1/0	04/12-28-008-28W1/0	009673	Capable of OIL Prod
105/05-29-008-28W1/0	05/05-28-008-28W1/0	010586	Completing
104/12-29-008-28W1/2	04/12-28-008-28W1/2	009169	Capable of OIL Prod
102/13-29-008-28W1/0	02/13-28-008-28W1/0	008217	Capable of OIL Prod
103/13-29-008-28W1/0	03/13-28-008-28W1/0	009676	Capable of OIL Prod
104/13-29-008-28W1/0	04/13-28-008-28W1/0	010320	Capable of OIL Prod

Appendix B

Ewart Unit No. 9 Pattern Summary as of December 2016

Pattern Name	Injector Location (008-28W1)	Surface Location (008-28W1)	Status	No. of Supported Wells	Supported Wells (008-28W1)	Allocation Factor	Pattern Prod Start Month	Inj Start Month	Oil Rate (m <sup>3</sup> /d)	Water Rate (m <sup>3</sup> /d)	WOR (m <sup>3</sup> /m <sup>3</sup> )	Water Injection (m <sup>3</sup> /d)	Cum Oil (E <sup>3</sup> m <sup>3</sup> )	Cum Water (E <sup>3</sup> m <sup>3</sup> )	Cum Inj Water (E <sup>3</sup> m <sup>3</sup> )	Monthly VRR	Cum VRR
04/04-29-008-28Inj	04/04-29	04/04-28	Capable of Prod	2	03/04-29, 03/05-29	1	Mar 2013	-	14.84	0.77	0.05	-	29.0	3.6	0.0	0.000	0.000
04/12-29-008-28Inj	04/12-29	04/12-28	Wtr Injection	2	04/05-29, 03/13-29	0.5	Feb 2013	Mar 2016	12.64	0.55	0.04	6.16	19.0	2.4	5.9	0.446	0.264
02/13-29-008-28Inj	02/13-29	04/13-28	Capable of Prod	1	04/13-29	1	Nov 2011	-	14.43	4.38	0.30	-	24.6	4.4	0.0	0.000	0.000



## TUNDRA OIL & GAS PARTNERSHIP

TUNDRA DALY SINCLAIR PROV HZNTL A13C-29-8-28

102/13-29-008-28W1/00

LICENSE #: 8217

LODGEPOLE FORMATION

RESERVOIR PRESSURE SURVEY TEST

AUGUST 4<sup>th</sup> - 17<sup>th</sup>, 2016

Prepared by: **DOLLCO Well Data Services**  
e-mail: [dollco@shaw.ca](mailto:dollco@shaw.ca)

PO Box 326  
417A Mississippian Drive  
Estevan, SK  
S4A 2A4

Cell: (306) 421 - 7330  
Fax: (306) 634 - 7976  
Res: (306) 634 - 8761

E-mail: [qualityw@sasktel.net](mailto:qualityw@sasktel.net)



# Pressure Survey Report

## Company Information

Company Name  
Contact  
e-mail  
Phone  
Site Contact  
Site Phone

TUNDRA OIL & GAS PARTNERSHIP  
CRAIG [REDACTED]  
craig.lane@tundraoilandgas.com  
(204) 748-4409  
CHAD [REDACTED]  
(204) 851-2654

## Well Information

Well Name  
Unique Well ID  
Surface Location  
Well License Number  
Well Type  
Well Fluid Type  
Field

TUNDRA DALY SINCLAIR PROV HZNTL A13C-29-8-28  
102/13-29-008-28W1/00  
(13-28) 13C-29-8-28W1  
8217  
Horizontal  
01 Oil  
DALY SINCLAIR

KB Elevation (SL)  
CF Elevation (SL)  
GL Elevation (SL)  
Distance from KB to CF (Log)  
KB-GL Offset

501.63 m  
m  
497.53 m  
m  
4.10 m

Tubing ID  
Tubing OD  
Tubing Depth(Log KB)  
Tubing Depth(TVD KB)  
Casing ID  
Casing OD  
Casing Depth(Log KB)  
Casing Depth(TVD KB)  
PBSD(Log KB)  
PBSD(TVD KB)

mm  
mm  
m  
m  
mm  
177.8 mm  
917.00000 m  
777.83000 m  
m  
m



# Pressure Survey Report

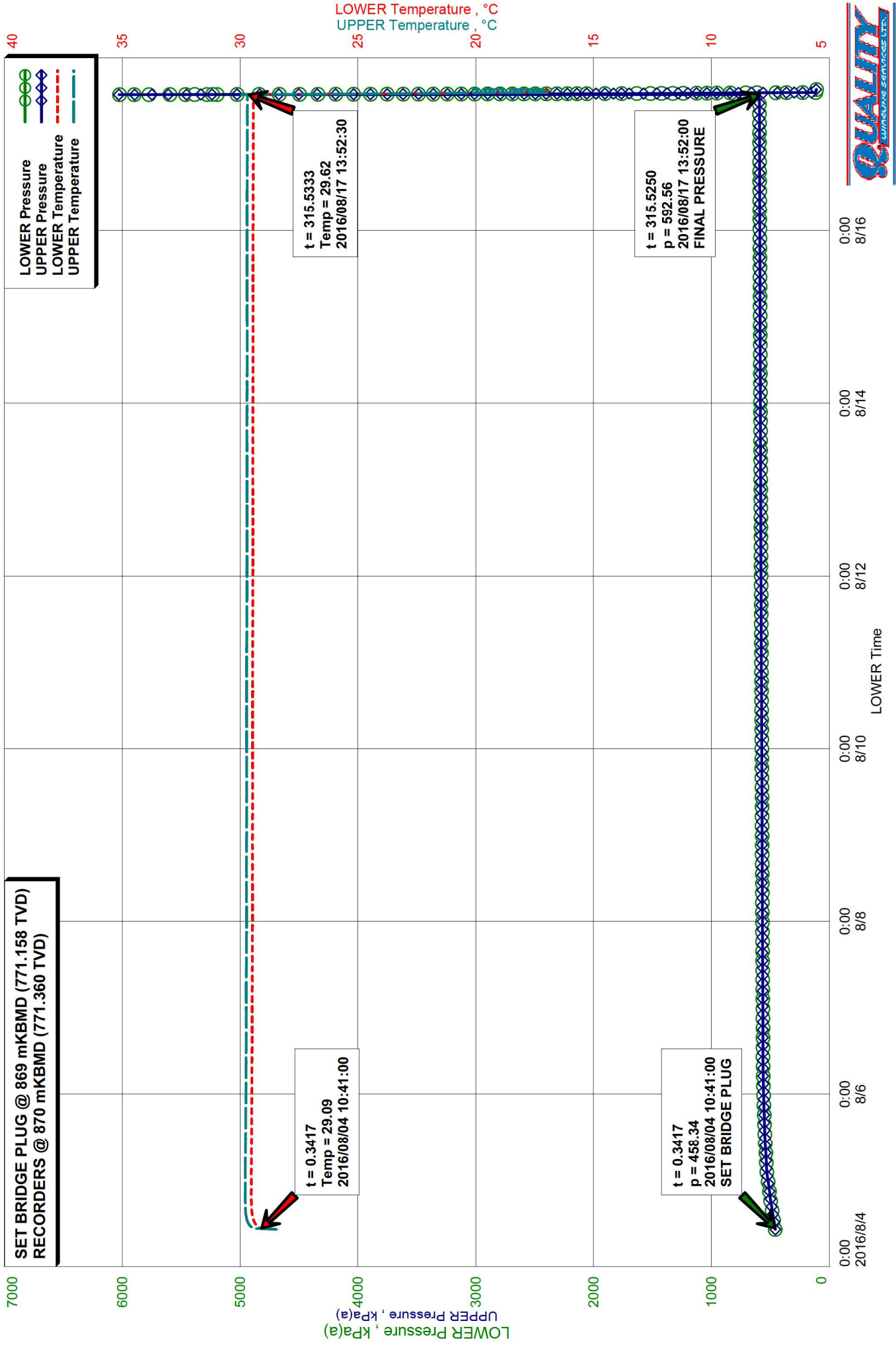
## Test Information

Well Name	TUNDRA DALY SINCLAIR PROV HZNTL A13C-29-8-28
Unique Well ID	102/13-29-008-28W1/00
Surface Location	(13-28) 13C-29-8-28W1
Well License Number	8217
Well Fluid Type	01 Oil
Test Purpose	Initial Test
Test Type	RESERVOIR PRESSURE SURVEY
Formation	LODGEPOLE
Well Type Indicator	Horizontal
Test/Prod. Interval Top KB (Log)	899.31 m
Test/Prod. Interval Base KB (Log)	2296.00 m
MPP(Log KB)	1597.65 m
Test/Prod Interval Top KB (TVD)	776.33 m
Test/Prod. Interval Base m KB (TVD)	784.57 m
MPP(TVD KB)	780.45 m
Tubing Pressure Initial	kPa(a)
Casing Pressure Initial	85.00 kPa(a)
Tubing Pressure: Final	kPa(a)
Casing Pressure: Final	85.00 kPa(a)
Time/Date Well Shut-In	2016/08/04 10:41:00
Final Test Date/Time	2016/08/17 13:52:00
Gauge Serial Number Used in Summary	VXF
Last Measured Pressure at Run Depth	592.56 kPa(a)
Reservoir Temperature	29.44 °C
Service Company	Quality Wireline Services Ltd.
Representative	BART [REDACTED]
Prepared By	DOLLCO Well Data Services
Qualified By	RICK [REDACTED]
Report Date	2016/08/22
RECORDERS LANDED @ 870 mKBMD (771.36 TVD)	
BRIDGE PLUG SET @ 869 mKBMD (771.158 TVD)	
114.3mm LINER: 899.31 - 2296 mKBMD (776.328 - 784.574 TVD)	

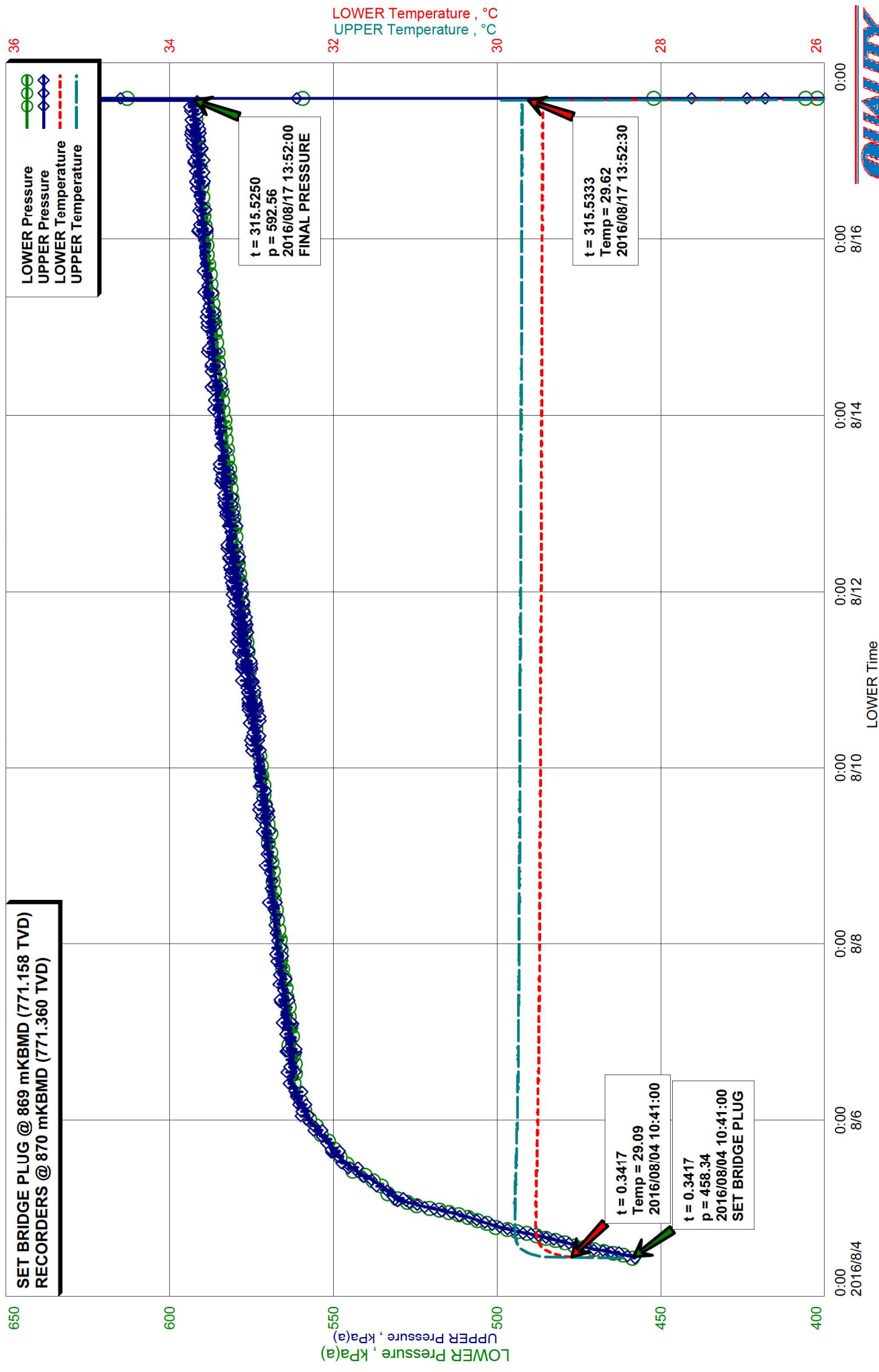




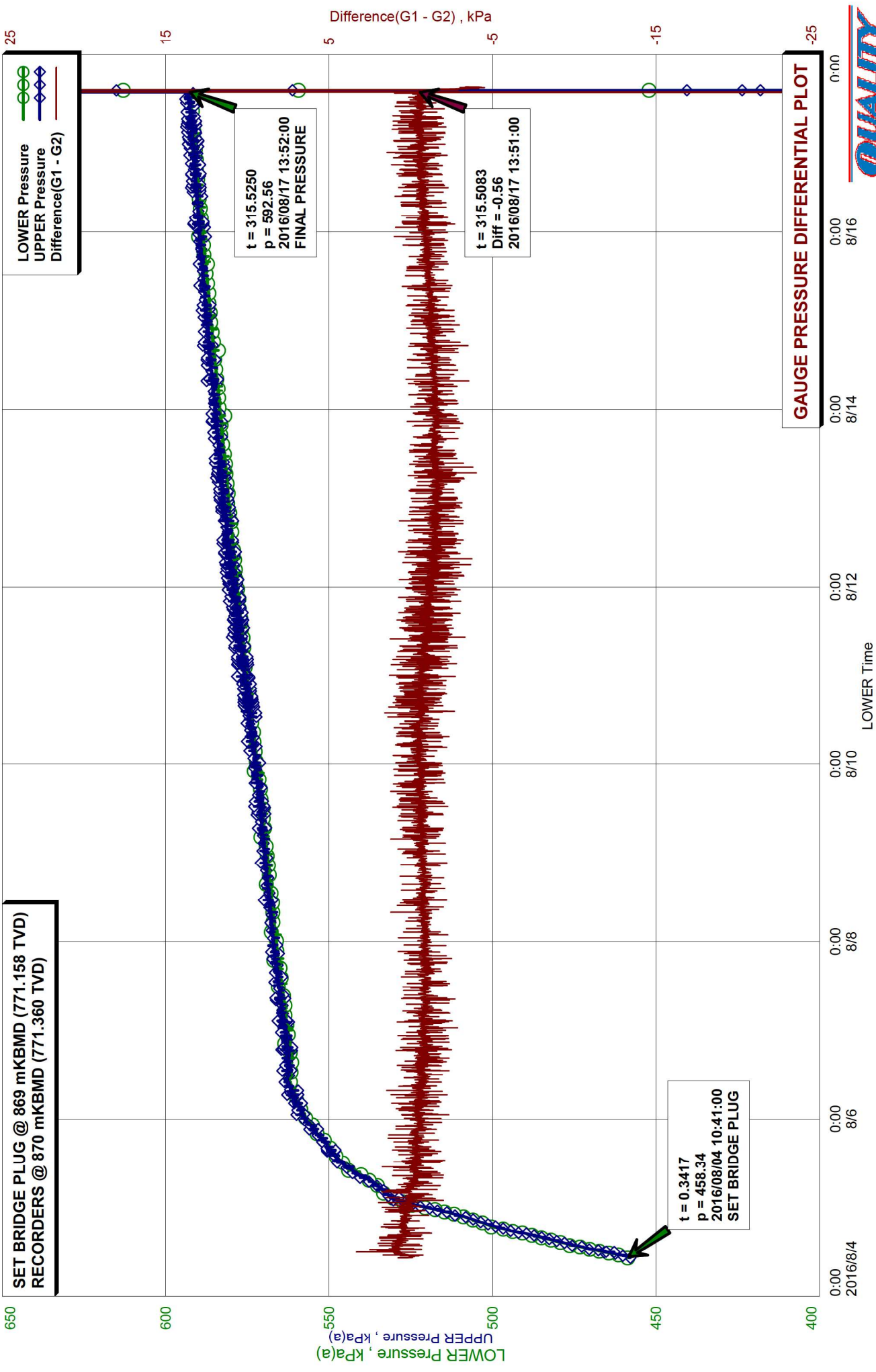
# TUNDRA DALY SINCLAIR PROV HZNTL A13C-29-8-28



# TUNDRA DALY SINCLAIR PROV HZNTL A13C-29-8-28



# TUNDRA DALY SINCLAIR PROV HZNTL A13C-29-8-28





# Recorder Information

Company Name	TUNDRA OIL & GAS PARTNERSHIP
Unique Well ID	102/13-29-008-28W1/00
Well Name	TUNDRA DALY SINCLAIR PROV HZNTL A13C-29-8-28
Formation	LODGEPOLE
Start Test Date	2016/08/04
Final Test Date	2016/08/17

## Gauge 1

Gauge Name	LOWER	Gauge Type	ELECTRONIC
Gauge Serial Number	0	Gauge Manufacturer	REAL TIME MEASUREMENTS
Run Depth (Log KB)	870.00 m	Gauge Model	KC3 STRAIN
Date of Last Calibration	2015/09/24	Maximum Recorder Range	41360.00 kPa
Gauge Start Date	2016/08/04	Gauge Start Time	10:20:30
Gauge Stop Date	2016/08/17	Gauge Stop Time	15:18:00
Date Gauge On Bottom	2016/08/04	Time Gauge On Bottom	10:41:00
Date Gauge Off Bottom	2016/08/17	Time Gauge Off Bottom	14:20:00

## Gauge 2

Gauge Name	UPPER	Gauge Type	ELECTRONIC
Gauge Serial Number	0	Gauge Manufacturer	REAL TIME MEASUREMENTS
Run Depth (Log KB)	870.00 m	Gauge Model	KC3 STRAIN
Date of Last Calibration	2015/09/15	Maximum Recorder Range	41360.00 kPa
Gauge Start Date	2016/08/04	Gauge Start Time	10:20:30
Gauge Stop Date	2016/08/17	Gauge Stop Time	15:18:00
Date Gauge On Bottom	2016/08/04	Time Gauge On Bottom	10:41:00
Date Gauge Off Bottom	2016/08/17	Time Gauge Off Bottom	14:20:00

TUNDRA OIL & GAS PARTNERSHIP  
102/13-29-008-28W1/00  
Start Test Date: 2016/08/04  
Final Test Date: 2016/08/17

**RESERVOIR PRESSURE SURVEY**  
**RECORDERS @ 870 mKBMD (771.36 TVD)**

TUNDRA DALY SINCLAIR PROV HZNTL A13C-29-8-28  
Formation: LODGEPOLE

	LOWER Date yyyy/mm/dd	LOWER Clk Time hh:mm:ss	LOWER Time hr	LOWER Pres. kPa(a)	LOWER Temp. °C	UPPER Time hr	UPPER Pres. kPa(a)	UPPER Temp. °C	Diff. G1 - G2 kPa
1	2016/08/04	10:20:30	0.0000	458.67	28.55	0.0000	457.88	28.46	0.79
2	2016/08/04	10:20:30	0.0000	ACTIVATE RECORDERS S/N: VXF(L) & VC6(U)					
3	2016/08/04	10:21:00	0.0083	458.64	28.55	0.0083	457.88	28.47	0.76
4	2016/08/04	10:41:00	0.3417	458.34	29.09	0.3417	458.52	29.42	-0.18
5	2016/08/04	10:41:00	0.3417	RECORDERS ON DEPTH @ 870 mKBMD (771.36 TVD)					
6	2016/08/04	10:41:00	0.3417	SET BRIDGE PLUG @ 869 mKBMD (771.158 TVD)					
7	2016/08/04	10:41:30	0.3500	458.34	29.10	0.3500	458.56	29.42	-0.22
8	2016/08/04	12:20:30	2.0000	467.98	29.39	2.0000	467.17	29.67	0.81
9	2016/08/04	14:20:30	4.0000	478.20	29.48	4.0000	477.07	29.75	1.13
10	2016/08/04	16:20:30	6.0000	487.35	29.51	6.0000	486.72	29.78	0.63
11	2016/08/04	18:20:30	8.0000	497.54	29.53	8.0000	497.06	29.79	0.48
12	2016/08/04	20:20:30	10.0000	505.37	29.53	10.0000	505.05	29.78	0.32
13	2016/08/04	22:20:30	12.0000	512.45	29.52	12.0000	512.11	29.78	0.34
14	2016/08/05	00:20:30	14.0000	522.11	29.52	14.0000	522.01	29.78	0.10
15	2016/08/05	02:20:30	16.0000	529.64	29.53	16.0000	529.82	29.78	-0.18
16	2016/08/05	04:20:30	18.0000	533.29	29.52	18.0000	533.27	29.78	0.02
17	2016/08/05	06:20:30	20.0000	535.89	29.52	20.0000	536.14	29.77	-0.25
18	2016/08/05	08:20:30	22.0000	539.33	29.52	22.0000	539.70	29.77	-0.37
19	2016/08/05	10:20:30	24.0000	543.06	29.51	24.0000	543.35	29.77	-0.29
20	2016/08/05	12:20:30	26.0000	546.29	29.51	26.0000	546.58	29.77	-0.29
21	2016/08/05	14:20:30	28.0000	548.11	29.51	28.0000	548.41	29.76	-0.30
22	2016/08/05	16:20:30	30.0000	549.73	29.51	30.0000	549.97	29.76	-0.24
23	2016/08/05	18:20:30	32.0000	551.52	29.51	32.0000	552.02	29.76	-0.50
24	2016/08/05	20:20:30	34.0000	553.92	29.50	34.0000	554.34	29.76	-0.42
25	2016/08/05	22:20:30	36.0000	554.79	29.51	36.0000	555.34	29.75	-0.55
26	2016/08/06	00:20:30	38.0000	557.29	29.51	38.0000	557.68	29.75	-0.39
27	2016/08/06	02:20:30	40.0000	558.30	29.50	40.0000	558.66	29.75	-0.36
28	2016/08/06	04:20:30	42.0000	559.36	29.50	42.0000	559.78	29.75	-0.42
29	2016/08/06	06:20:30	44.0000	560.38	29.50	44.0000	560.96	29.75	-0.58
30	2016/08/06	08:20:30	46.0000	561.49	29.50	46.0000	561.78	29.75	-0.29
31	2016/08/06	10:20:30	48.0000	562.40	29.50	48.0000	563.01	29.75	-0.61
32	2016/08/06	12:20:30	50.0000	561.96	29.49	50.0000	562.48	29.74	-0.52
33	2016/08/06	14:20:30	52.0000	561.59	29.49	52.0000	562.00	29.74	-0.41
34	2016/08/06	16:20:30	54.0000	561.88	29.49	54.0000	562.73	29.74	-0.85
35	2016/08/06	18:20:30	56.0000	561.51	29.49	56.0000	562.15	29.74	-0.64
36	2016/08/06	20:20:30	58.0000	562.34	29.49	58.0000	563.33	29.74	-0.99
37	2016/08/06	22:20:30	60.0000	562.19	29.49	60.0000	562.93	29.74	-0.74
38	2016/08/07	00:20:30	62.0000	562.62	29.49	62.0000	563.33	29.74	-0.71
39	2016/08/07	02:20:30	64.0000	563.23	29.49	64.0000	564.04	29.74	-0.81
40	2016/08/07	04:20:30	66.0000	563.26	29.49	66.0000	564.15	29.74	-0.89

LOWER Serial Number: 0 Start Date: 2016/08/04 10:20:30 Run Depth: 870.00  
UPPER Serial Number: 0 Start Date: 2016/08/04 10:20:30 Run Depth: 870.00  
Print Filter: Print every 2 hour



TUNDRA OIL & GAS PARTNERSHIP  
102/13-29-008-28W1/00  
Start Test Date: 2016/08/04  
Final Test Date: 2016/08/17

**RESERVOIR PRESSURE SURVEY**  
**RECORDERS @ 870 mKBMD (771.36 TVD)**

TUNDRA DALY SINCLAIR PROV HZNTL A13C-29-8-28  
Formation: LODGEPOLE

	LOWER Date yyyy/mm/dd	LOWER Clk Time hh:mm:ss	LOWER Time hr	LOWER Pres. kPa(a)	LOWER Temp. °C	UPPER Time hr	UPPER Pres. kPa(a)	UPPER Temp. °C	Diff. G1 - G2 kPa
41	2016/08/07	06:20:30	68.0000	563.76	29.49	68.0000	564.88	29.74	-1.12
42	2016/08/07	08:20:30	70.0000	563.73	29.49	70.0000	565.04	29.74	-1.31
43	2016/08/07	10:20:30	72.0000	564.24	29.49	72.0000	565.33	29.74	-1.09
44	2016/08/07	12:20:30	74.0000	564.84	29.49	74.0000	565.93	29.73	-1.09
45	2016/08/07	14:20:30	76.0000	564.86	29.48	76.0000	565.77	29.73	-0.91
46	2016/08/07	16:20:30	78.0000	565.27	29.48	78.0000	566.18	29.73	-0.91
47	2016/08/07	18:20:30	80.0000	565.48	29.48	80.0000	566.38	29.73	-0.90
48	2016/08/07	20:20:30	82.0000	565.64	29.48	82.0000	566.52	29.73	-0.88
49	2016/08/07	22:20:30	84.0000	565.99	29.48	84.0000	566.65	29.73	-0.66
50	2016/08/08	00:20:30	86.0000	566.18	29.48	86.0000	567.03	29.73	-0.85
51	2016/08/08	02:20:30	88.0000	566.63	29.48	88.0000	567.65	29.73	-1.02
52	2016/08/08	04:20:30	90.0000	566.91	29.48	90.0000	567.79	29.73	-0.88
53	2016/08/08	06:20:30	92.0000	566.92	29.48	92.0000	567.64	29.73	-0.72
54	2016/08/08	08:20:30	94.0000	567.81	29.48	94.0000	568.34	29.73	-0.53
55	2016/08/08	10:20:30	96.0000	567.53	29.48	96.0000	566.88	29.73	0.65
56	2016/08/08	12:20:30	98.0000	567.69	29.48	98.0000	568.45	29.73	-0.76
57	2016/08/08	14:20:30	100.0000	567.98	29.48	100.0000	568.74	29.73	-0.76
58	2016/08/08	16:20:30	102.0000	568.13	29.47	102.0000	568.79	29.73	-0.66
59	2016/08/08	18:20:30	104.0000	568.43	29.48	104.0000	569.18	29.73	-0.75
60	2016/08/08	20:20:30	106.0000	568.96	29.48	106.0000	569.52	29.73	-0.56
61	2016/08/08	22:20:30	108.0000	568.79	29.47	108.0000	569.45	29.73	-0.66
62	2016/08/09	00:20:30	110.0000	569.05	29.47	110.0000	569.82	29.72	-0.77
63	2016/08/09	02:20:30	112.0000	569.62	29.48	112.0000	570.16	29.73	-0.54
64	2016/08/09	04:20:30	114.0000	569.87	29.48	114.0000	570.47	29.72	-0.60
65	2016/08/09	06:20:30	116.0000	569.80	29.47	116.0000	570.39	29.72	-0.59
66	2016/08/09	08:20:30	118.0000	570.13	29.47	118.0000	570.66	29.72	-0.53
67	2016/08/09	10:20:30	120.0000	570.20	29.47	120.0000	570.99	29.72	-0.79
68	2016/08/09	12:20:30	122.0000	570.44	29.47	122.0000	570.80	29.72	-0.36
69	2016/08/09	14:20:30	124.0000	571.02	29.47	124.0000	571.53	29.72	-0.51
70	2016/08/09	16:20:30	126.0000	570.98	29.47	126.0000	571.62	29.72	-0.64
71	2016/08/09	18:20:30	128.0000	571.36	29.47	128.0000	571.79	29.72	-0.43
72	2016/08/09	20:20:30	130.0000	571.63	29.47	130.0000	572.39	29.72	-0.76
73	2016/08/09	22:20:30	132.0000	571.82	29.47	132.0000	572.34	29.72	-0.52
74	2016/08/10	00:20:30	134.0000	572.10	29.47	134.0000	572.46	29.72	-0.36
75	2016/08/10	02:20:30	136.0000	572.37	29.47	136.0000	572.77	29.72	-0.40
76	2016/08/10	04:20:30	138.0000	572.68	29.47	138.0000	573.13	29.72	-0.45
77	2016/08/10	06:20:30	140.0000	573.07	29.47	140.0000	573.50	29.72	-0.43
78	2016/08/10	08:20:30	142.0000	573.23	29.47	142.0000	573.65	29.72	-0.42
79	2016/08/10	10:20:30	144.0000	573.85	29.47	144.0000	574.03	29.72	-0.18
80	2016/08/10	12:20:30	146.0000	573.64	29.47	146.0000	574.33	29.72	-0.69

LOWER Serial Number: 0 Start Date: 2016/08/04 10:20:30 Run Depth: 870.00  
UPPER Serial Number: 0 Start Date: 2016/08/04 10:20:30 Run Depth: 870.00  
Print Filter: Print every 2 hour



TUNDRA OIL & GAS PARTNERSHIP  
102/13-29-008-28W1/00  
Start Test Date: 2016/08/04  
Final Test Date: 2016/08/17

**RESERVOIR PRESSURE SURVEY**  
**RECORDERS @ 870 mKBMD (771.36 TVD)**

TUNDRA DALY SINCLAIR PROV HZNTL A13C-29-8-28  
Formation: LODGEPOLE

	LOWER Date yyyy/mm/dd	LOWER Clk Time hh:mm:ss	LOWER Time hr	LOWER Pres. kPa(a)	LOWER Temp. °C	UPPER Time hr	UPPER Pres. kPa(a)	UPPER Temp. °C	Diff. G1 - G2 kPa
81	2016/08/10	14:20:30	148.0000	574.23	29.47	148.0000	574.94	29.72	-0.71
82	2016/08/10	16:20:30	150.0000	574.39	29.47	150.0000	574.85	29.72	-0.46
83	2016/08/10	18:20:30	152.0000	574.59	29.47	152.0000	574.82	29.72	-0.23
84	2016/08/10	20:20:30	154.0000	574.69	29.47	154.0000	575.18	29.72	-0.49
85	2016/08/10	22:20:30	156.0000	575.07	29.47	156.0000	575.76	29.72	-0.69
86	2016/08/11	00:20:30	158.0000	575.32	29.47	158.0000	576.06	29.72	-0.74
87	2016/08/11	02:20:30	160.0000	575.72	29.47	160.0000	576.29	29.72	-0.57
88	2016/08/11	04:20:30	162.0000	575.77	29.47	162.0000	576.16	29.71	-0.39
89	2016/08/11	06:20:30	164.0000	576.08	29.47	164.0000	576.74	29.72	-0.66
90	2016/08/11	08:20:30	166.0000	576.30	29.46	166.0000	576.90	29.72	-0.60
91	2016/08/11	10:20:30	168.0000	576.48	29.47	168.0000	578.19	29.71	-1.71
92	2016/08/11	12:20:30	170.0000	576.80	29.46	170.0000	577.73	29.71	-0.93
93	2016/08/11	14:20:30	172.0000	576.92	29.46	172.0000	577.87	29.71	-0.95
94	2016/08/11	16:20:30	174.0000	577.20	29.47	174.0000	578.31	29.71	-1.11
95	2016/08/11	18:20:30	176.0000	577.46	29.46	176.0000	578.47	29.71	-1.01
96	2016/08/11	20:20:30	178.0000	577.59	29.46	178.0000	578.75	29.71	-1.16
97	2016/08/11	22:20:30	180.0000	577.88	29.46	180.0000	579.08	29.71	-1.20
98	2016/08/12	00:20:30	182.0000	578.33	29.46	182.0000	579.46	29.71	-1.13
99	2016/08/12	02:20:30	184.0000	578.39	29.46	184.0000	579.61	29.71	-1.22
100	2016/08/12	04:20:30	186.0000	578.61	29.46	186.0000	580.30	29.71	-1.69
101	2016/08/12	06:20:30	188.0000	578.84	29.46	188.0000	580.22	29.71	-1.38
102	2016/08/12	08:20:30	190.0000	579.23	29.46	190.0000	580.57	29.71	-1.34
103	2016/08/12	10:20:30	192.0000	579.48	29.46	192.0000	580.81	29.71	-1.33
104	2016/08/12	12:20:30	194.0000	579.55	29.46	194.0000	581.06	29.71	-1.51
105	2016/08/12	14:20:30	196.0000	579.46	29.46	196.0000	581.19	29.71	-1.73
106	2016/08/12	16:20:30	198.0000	579.96	29.46	198.0000	581.69	29.71	-1.73
107	2016/08/12	18:20:30	200.0000	580.30	29.46	200.0000	581.61	29.71	-1.31
108	2016/08/12	20:20:30	202.0000	580.39	29.46	202.0000	581.86	29.71	-1.47
109	2016/08/12	22:20:30	204.0000	580.55	29.46	204.0000	582.32	29.71	-1.77
110	2016/08/13	00:20:30	206.0000	580.82	29.46	206.0000	582.11	29.71	-1.29
111	2016/08/13	02:20:30	208.0000	581.11	29.46	208.0000	582.73	29.71	-1.62
112	2016/08/13	04:20:30	210.0000	581.13	29.46	210.0000	582.74	29.71	-1.61
113	2016/08/13	06:20:30	212.0000	581.42	29.46	212.0000	582.92	29.71	-1.50
114	2016/08/13	08:20:30	214.0000	581.55	29.46	214.0000	583.28	29.71	-1.73
115	2016/08/13	10:20:30	216.0000	581.71	29.46	216.0000	583.31	29.71	-1.60
116	2016/08/13	12:20:30	218.0000	582.12	29.46	218.0000	583.69	29.71	-1.57
117	2016/08/13	14:20:30	220.0000	582.44	29.46	220.0000	583.93	29.71	-1.49
118	2016/08/13	16:20:30	222.0000	582.65	29.45	222.0000	584.18	29.71	-1.53
119	2016/08/13	18:20:30	224.0000	582.74	29.46	224.0000	584.08	29.71	-1.34
120	2016/08/13	20:20:30	226.0000	583.05	29.46	226.0000	584.66	29.70	-1.61

LOWER Serial Number: 0 Start Date: 2016/08/04 10:20:30 Run Depth: 870.00  
UPPER Serial Number: 0 Start Date: 2016/08/04 10:20:30 Run Depth: 870.00  
Print Filter: Print every 2 hour



TUNDRA OIL & GAS PARTNERSHIP  
102/13-29-008-28W1/00  
Start Test Date: 2016/08/04  
Final Test Date: 2016/08/17

**RESERVOIR PRESSURE SURVEY**  
**RECORDERS @ 870 mKBMD (771.36 TVD)**

TUNDRA DALY SINCLAIR PROV HZNTL A13C-29-8-28  
Formation: LODGEPOLE

	LOWER Date yyyy/mm/dd	LOWER Clk Time hh:mm:ss	LOWER Time hr	LOWER Pres. kPa(a)	LOWER Temp. °C	UPPER Time hr	UPPER Pres. kPa(a)	UPPER Temp. °C	Diff. G1 - G2 kPa
121	2016/08/13	22:20:30	228.0000	583.05	29.46	228.0000	584.73	29.71	-1.68
122	2016/08/14	00:20:30	230.0000	583.50	29.46	230.0000	585.05	29.70	-1.55
123	2016/08/14	02:20:30	232.0000	583.48	29.45	232.0000	585.42	29.71	-1.94
124	2016/08/14	04:20:30	234.0000	583.74	29.45	234.0000	585.35	29.70	-1.61
125	2016/08/14	06:20:30	236.0000	584.46	29.45	236.0000	585.65	29.71	-1.19
126	2016/08/14	08:20:30	238.0000	584.36	29.45	238.0000	586.69	29.70	-2.33
127	2016/08/14	10:20:30	240.0000	584.61	29.45	240.0000	585.95	29.70	-1.34
128	2016/08/14	12:20:30	242.0000	584.85	29.45	242.0000	585.94	29.70	-1.09
129	2016/08/14	14:20:30	244.0000	584.90	29.45	244.0000	586.45	29.70	-1.55
130	2016/08/14	16:20:30	246.0000	585.22	29.45	246.0000	586.77	29.70	-1.55
131	2016/08/14	18:20:30	248.0000	585.35	29.45	248.0000	586.83	29.70	-1.48
132	2016/08/14	20:20:30	250.0000	585.77	29.45	250.0000	586.96	29.70	-1.19
133	2016/08/14	22:20:30	252.0000	585.89	29.45	252.0000	587.12	29.70	-1.23
134	2016/08/15	00:20:30	254.0000	586.20	29.45	254.0000	587.49	29.70	-1.29
135	2016/08/15	02:20:30	256.0000	586.32	29.45	256.0000	587.55	29.70	-1.23
136	2016/08/15	04:20:30	258.0000	586.49	29.45	258.0000	587.87	29.70	-1.38
137	2016/08/15	06:20:30	260.0000	586.83	29.45	260.0000	587.93	29.70	-1.10
138	2016/08/15	08:20:30	262.0000	587.08	29.45	262.0000	588.31	29.70	-1.23
139	2016/08/15	10:20:30	264.0000	587.32	29.45	264.0000	588.45	29.70	-1.13
140	2016/08/15	12:20:30	266.0000	587.47	29.45	266.0000	588.57	29.70	-1.10
141	2016/08/15	14:20:30	268.0000	587.60	29.45	268.0000	587.45	29.70	0.15
142	2016/08/15	16:20:30	270.0000	587.96	29.45	270.0000	588.90	29.70	-0.94
143	2016/08/15	18:20:30	272.0000	588.22	29.45	272.0000	589.19	29.70	-0.97
144	2016/08/15	20:20:30	274.0000	588.47	29.45	274.0000	589.40	29.70	-0.93
145	2016/08/15	22:20:30	276.0000	588.64	29.45	276.0000	589.48	29.70	-0.84
146	2016/08/16	00:20:30	278.0000	588.77	29.45	278.0000	589.48	29.70	-0.71
147	2016/08/16	02:20:30	280.0000	588.83	29.45	280.0000	589.65	29.70	-0.82
148	2016/08/16	04:20:30	282.0000	589.14	29.45	282.0000	590.03	29.70	-0.89
149	2016/08/16	06:20:30	284.0000	589.40	29.45	284.0000	590.19	29.70	-0.79
150	2016/08/16	08:20:30	286.0000	589.53	29.45	286.0000	590.29	29.70	-0.76
151	2016/08/16	10:20:30	288.0000	589.79	29.45	288.0000	590.52	29.70	-0.73
152	2016/08/16	12:20:30	290.0000	589.97	29.45	290.0000	590.74	29.70	-0.77
153	2016/08/16	14:20:30	292.0000	590.23	29.45	292.0000	590.81	29.70	-0.58
154	2016/08/16	16:20:30	294.0000	590.20	29.44	294.0000	590.92	29.70	-0.72
155	2016/08/16	18:20:30	296.0000	590.68	29.44	296.0000	591.20	29.70	-0.52
156	2016/08/16	20:20:30	298.0000	590.71	29.45	298.0000	590.99	29.69	-0.28
157	2016/08/16	22:20:30	300.0000	590.96	29.44	300.0000	591.46	29.70	-0.50
158	2016/08/17	00:20:30	302.0000	591.12	29.44	302.0000	591.54	29.70	-0.42
159	2016/08/17	02:20:30	304.0000	591.22	29.44	304.0000	591.72	29.70	-0.50
160	2016/08/17	04:20:30	306.0000	591.50	29.44	306.0000	592.11	29.69	-0.61

LOWER Serial Number: 0 Start Date: 2016/08/04 10:20:30 Run Depth: 870.00  
UPPER Serial Number: 0 Start Date: 2016/08/04 10:20:30 Run Depth: 870.00  
Print Filter: Print every 2 hour



TUNDRA OIL & GAS PARTNERSHIP  
 102/13-29-008-28W1/00  
 Start Test Date: 2016/08/04  
 Final Test Date: 2016/08/17

**RESERVOIR PRESSURE SURVEY**  
**RECORDERS @ 870 mKBMD (771.36 TVD)**

TUNDRA DALY SINCLAIR PROV HZNTL A13C-29-8-28  
 Formation: LODGEPOLE

	LOWER Date yyyy/mm/dd	LOWER Clk Time hh:mm:ss	LOWER Time hr	LOWER Pres. kPa(a)	LOWER Temp. °C	UPPER Time hr	UPPER Pres. kPa(a)	UPPER Temp. °C	Diff. G1 - G2 kPa
161	2016/08/17	06:20:30	308.0000	591.71	29.44	308.0000	592.21	29.69	-0.50
162	2016/08/17	08:20:30	310.0000	591.60	29.44	310.0000	591.01	29.69	0.59
163	2016/08/17	10:20:30	312.0000	592.20	29.44	312.0000	592.60	29.70	-0.40
164	2016/08/17	12:20:30	314.0000	592.46	29.44	314.0000	592.95	29.69	-0.49
165	2016/08/17	13:52:00	315.5250	592.56	29.44	315.5250	5894.96	29.88	-5302.40
166	2016/08/17	13:52:00	315.5250	FINAL PRESSURE, PREPARE TO UNSET BRIDGE PLUG					
167	2016/08/17	13:52:30	315.5333	6023.45	29.62	315.5333	5748.67	29.79	274.78
168	2016/08/17	13:53:00	315.5417	5898.48	29.63	315.5417	5610.07	29.70	288.41
169	2016/08/17	13:53:00	315.5417	BRIDGE PLUG IS UNSET					
170	2016/08/17	13:53:30	315.5500	5773.49	29.57	315.5500	5454.50	29.61	318.99
171	2016/08/17	14:20:00	315.9917	911.02	20.56	315.9917	843.30	20.36	67.72
172	2016/08/17	14:20:00	315.9917	TOOLS ARE PULLED FROM WELL BY THE SERVICE RIG					
173	2016/08/17	14:20:30	316.0000	888.40	20.45	316.0000	816.24	20.17	72.16
174	2016/08/17	15:17:00	316.9417	107.27	16.90	316.9417	110.74	18.72	-3.47
175	2016/08/17	15:17:00	316.9417	RECORDERS AT SURFACE					
176	2016/08/17	15:17:30	316.9500	106.60	17.07	316.9500	110.76	18.87	-4.16
177	2016/08/17	15:18:00	316.9583	107.48	17.49	316.9583	110.82	20.11	-3.34

LOWER Serial Number: 0 Start Date: 2016/08/04 10:20:30 Run Depth: 870.00  
 UPPER Serial Number: 0 Start Date: 2016/08/04 10:20:30 Run Depth: 870.00  
 Print Filter: Print every 2 hour



DATE: August 4 - 17, 2016	COMPANY: Tundra Oil & Gas Partnership
WELLNAME: Daly Sinclair Prov Hzntrl A13C-29-08-28W1M	ADDRESS: Virden, MB
LOCATION: (13-28)13C-29-08-28W1M	UWI:102.13-29-008-28W1.00
FIELD: Daly Sinclair	FORMATION: Lodgepole
CO HQ REP: Craig [REDACTED]	PHONE: 204-748-4409
FIELD REP: Chad [REDACTED]	PHONE: 204-851-2654

REPORTS TO (NAME & EMAIL ADDRESS):

Brett [REDACTED] - brett.howell@tundraoilandgas.com  
 Robert [REDACTED] - robert.prefontaine@tundraoilandgas.com  
 Adam [REDACTED] - adam.berke@tundraoilandgas.com  
 Shellanne [REDACTED] - shellanne.langlois@tundraoilandgas.com  
 Allan [REDACTED] - allan.bertram@tundraoilandgas.com  
 Bill [REDACTED] - bill.jenkins@tundraoilandgas.com  
 Chris [REDACTED] - chris.perkins@tundraoilandgas.com  
 Craig [REDACTED] - craig.lane@tundraoilandgas.com  
 Eric [REDACTED] - eric.bjornsson@tundraoilandgas.com  
 Jane [REDACTED] - jane.mctaggart@tundraoilandgas.com  
 Anh [REDACTED] - anh.hguyen@tundraoilandgas.com  
 Justin [REDACTED] - justin.robertson@tundraoilandgas.com  
 Andrew [REDACTED] - andrew.taylor@tundraoilandgas.com  
 Tim [REDACTED] - tim.howell@tundraoilandgas.com  
 Tyler [REDACTED] - tyler.routledge@tundraoilandgas.com  
 Geoff [REDACTED] - geoff.puckett@tundraoilandgas.com  
 Kim [REDACTED] - kim.cowan@tundraoilandgas.com  
 Abhy [REDACTED] - abhy.pandey@tundraoilandgas.com

STATUS: oil well (work over)		TEST TYPE: build up
ESTIMATED H2S CONTENT: unknown		ESTIMATED CO2 CONTENT: 0
PRODUCING THROUGH: tubing		SHUT IN TIME/DATE: 10:15 Aug 4, 2016
KOP: 548 mKB	TVD: see survey	LICENCE #: 8217
PBTD: 2296 mKB	TD: 2311 mKB	WELL TYPE: horizontal
CASING SIZE: 177.8 mm	CSG WEIGHT: 34.23 kg/m	CSG DEPTH: 917 mKB
LINER SIZE: 114.3 mm	LNR WEIGHT: 17.26 kg/m	LNR DEPTH: 899.31-2296mKB
TUBING SIZE: none	TBG WEIGHT: n/a	TBG DEPTH: n/a
Elevations KB: 501.63 m	GRD: 497.53 m	CF: n/a

PRODUCING INTERVAL

TYPE: frac port	SIZE: n/a	INTERVAL: 899.31 - 2296 mKB
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RECORDER INFORMATION

TOP S/N: VC6	FILE NAME: 13-28{102}13-29-8-28w1,8547t	RANGE: 41,360 kPa
BOTTOM S/N: VXF	FILE NAME: 13-28{102}13-29-8-28w1,8547b	RANGE: 41,360 kPa
TOP BATTERY S/N: n/a	BOTTOM BATTERY S/N: n/a	
CONNECT TIME: 10:20 Aug 4, 2016	DISCONNECT TIME: 15:19 Aug 17, 2016	

SURFACE TEMP: 29 deg C	LEASE CONDITION: good
WIRELINE OPERATOR: Bart [REDACTED]	PHONE: 306-421-9700
WIRELINE ASSISTANT: n/a	
DIRECTIONS: 3.6km south of Cromer and east into well.	

DWG WELL HEAD PRESSURES:

TUBING (before survey): n/a	CASING (before survey): vacuum
TUBING (after survey): n/a	CASING (after survey): vacuum
FLUID LEVEL: n/a	RUN DEPTH: 870 mKB

TIME ON BOTTOM: 10:15 Aug 4, 2016	TIME OFF BOTTOM: 13:56 Aug 17, 2016
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GRADIENT STOPS

DEPTH mKB:	none	FROM:	n/a	UNTIL:	n/a
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COMMENTS:
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DESCRIPTION OF WORK DONE:

August 4, 2016

12:00 A Tryton bridge plug was ran into the well c/w 41 mPA KC-3 recorders by the service rig.

14:15 Tools are at set depth. the bridge plug was set and the well was shut in.

14:20 Pressure trigger activates, recorders are logging.

August 17, 2016

12:00 Travel base to location.

13:50 Prep to unset the bridge plug.

13:53 The Bridge plug is unset.

14:15 Arrive, sign in and get well data.

14:20 Tools are pulled from the well by the service rig.

15:14 Recorders are at surface.

15:19 Download data from recorders and do a preliminary data report.

16:00 Return to base.

## Appendix D

### Average Monthly Injection Pressure (kPag)

Month	104/12-29
Jan-16	-
Feb-16	-
Mar-16	148
Apr-16	-41
May-16	-88
Jun-16	685
Jul-16	1783
Aug-16	3587
Sep-16	4964
Oct-16	4957
Nov-16	5152
Dec-16	5277

**Appendix E**  
**Rates and VRR Plots**

# Pattern: 02/13-29-008-28Inj Set: EwartUnit#9LP

Oil Formation Vol Factor : 1.05000 m3/m3

Water Formation Vol Factor : 1.00000 m3/m3

Water / Oil Ratio : 1.28 m3/m3

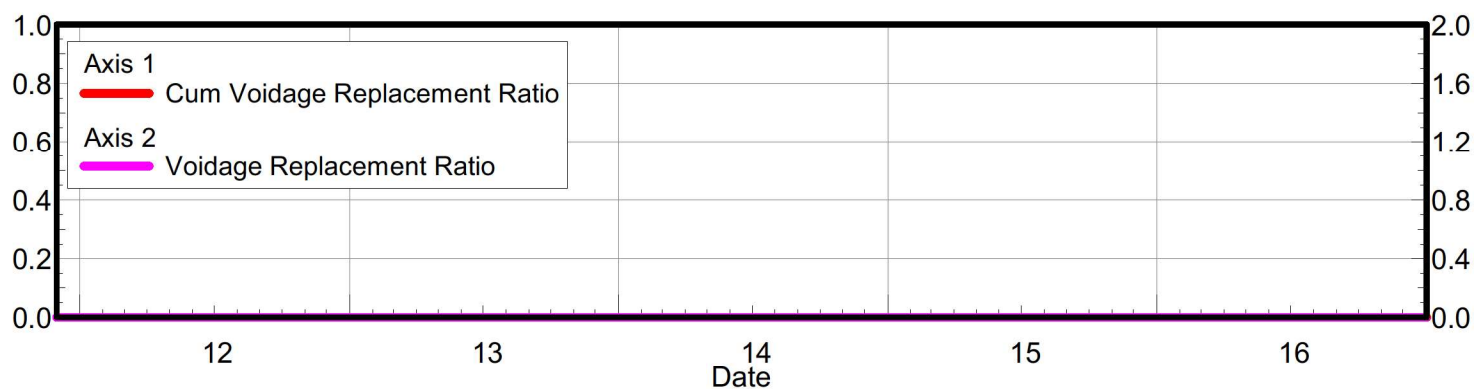
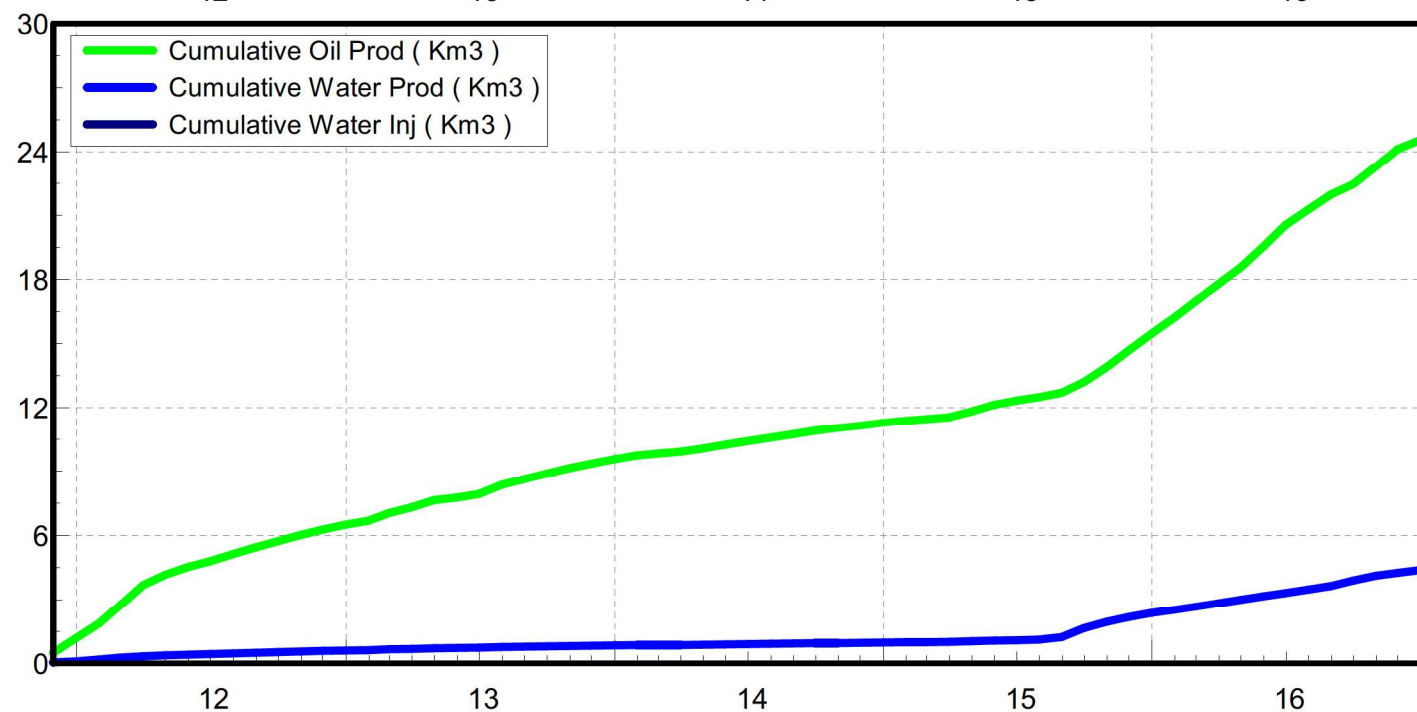
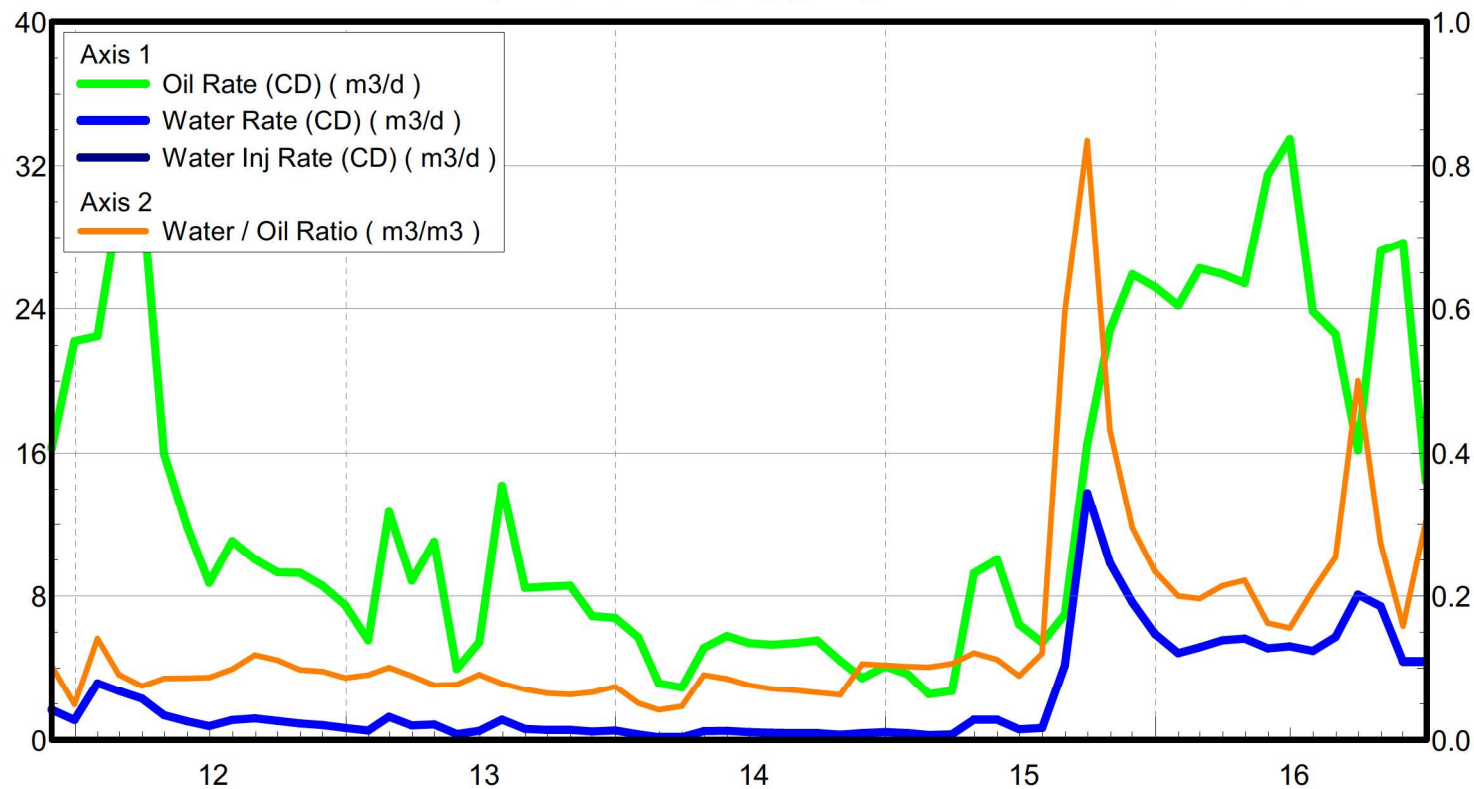
June 29, 2017

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

Oil Rate (CD) : 8.80 m3/d

Water Rate (CD) : 4.48 m3/d

Water Inj Rate (CD) : 37.23 m3/d





# Pattern: 04/04-29-008-28Inj Set: EwartUnit#9LP

Oil Formation Vol Factor : 1.05000 m3/m3

Water Formation Vol Factor : 1.00000 m3/m3

Water / Oil Ratio : 0.16 m3/m3

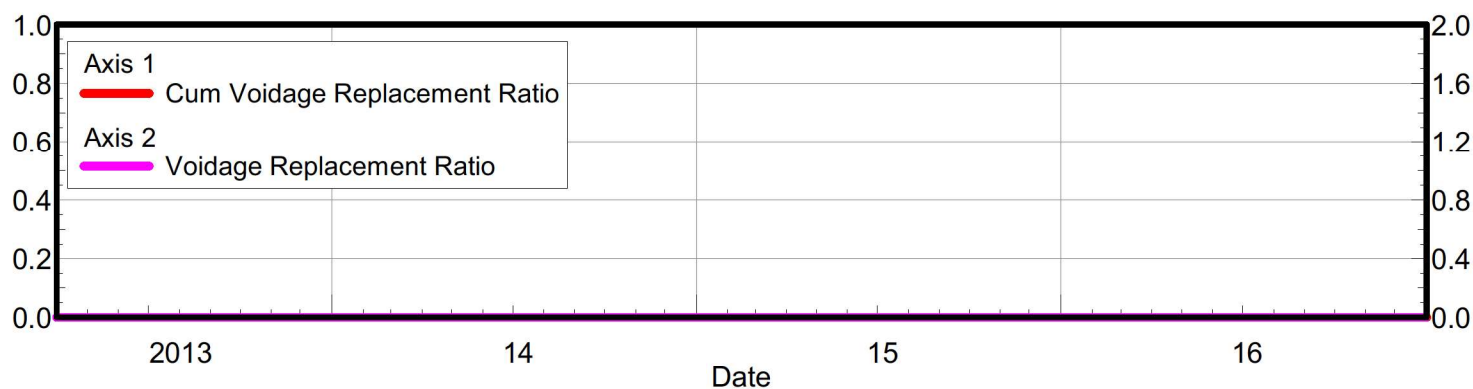
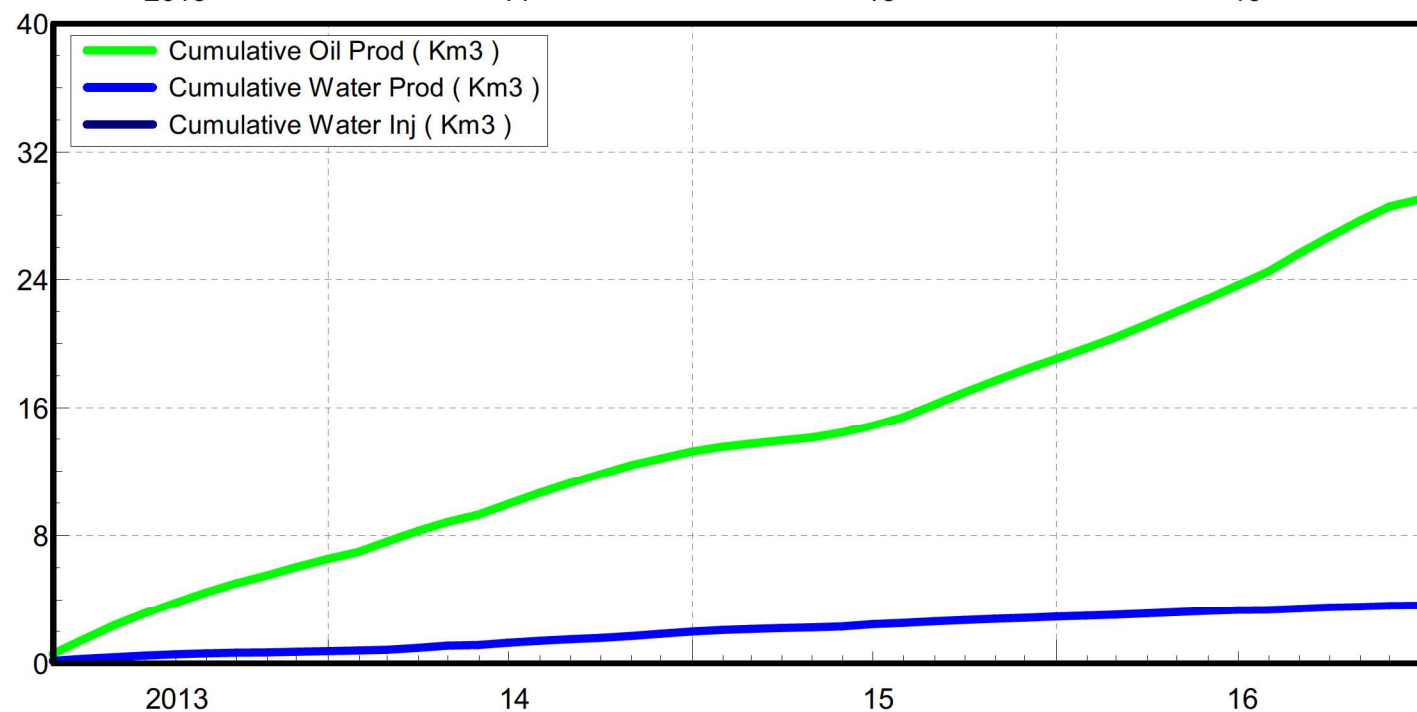
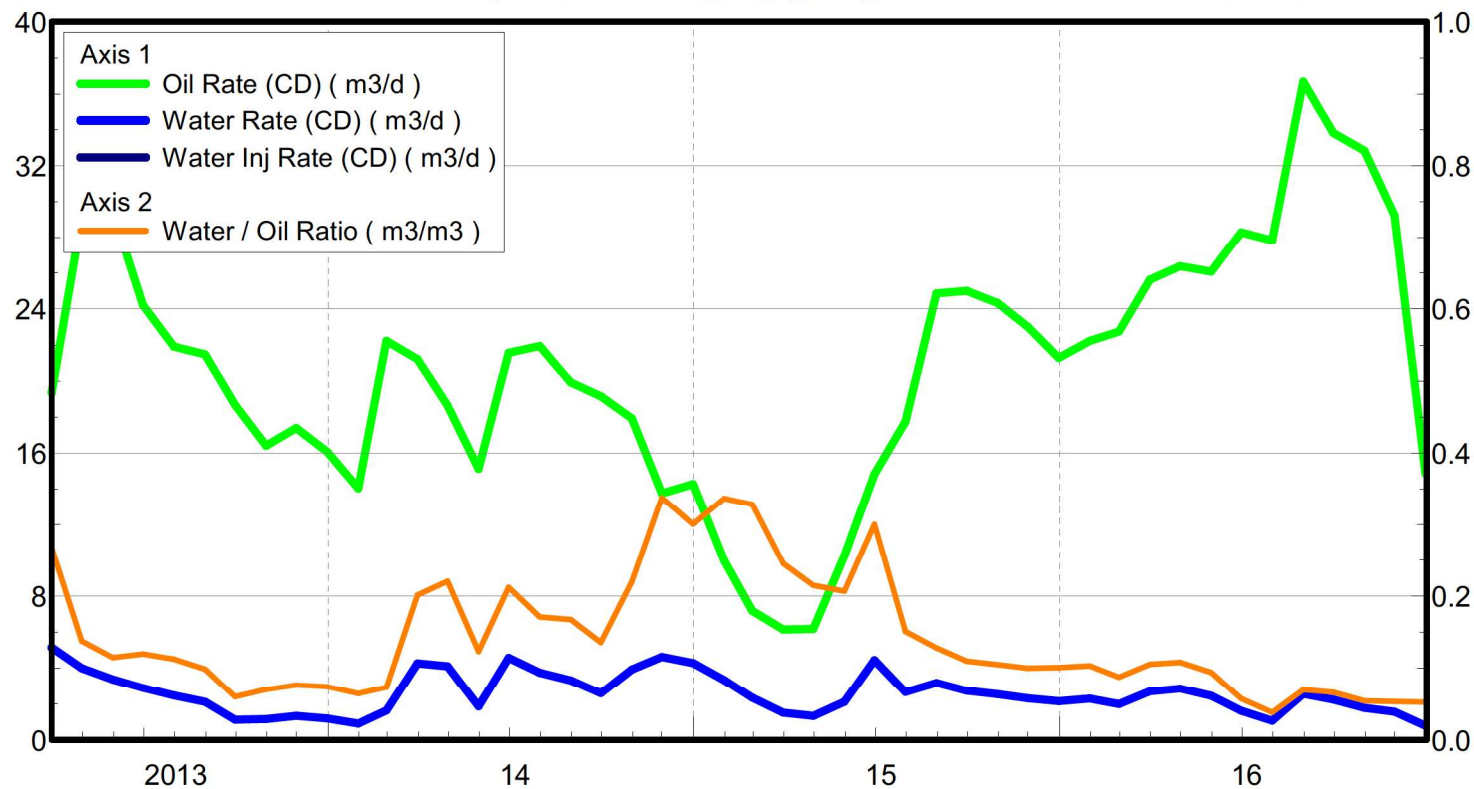
Operator: TUNDRA\_OIL\_&\_GAS\_LIMITED

June 29, 2017

Oil Rate (CD) : 26.42 m3/d

Water Rate (CD) : 1.33 m3/d

Water Inj Rate (CD) : \* m3/d



# Pattern: 04/12-29-008-28Inj Set: EwartUnit#9LP

Oil Formation Vol Factor : 1.05000 m3/m3

Water Formation Vol Factor : 1.00000 m3/m3

Water / Oil Ratio : 0.09 m3/m3

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

Oil Rate (CD) : 8.93 m3/d

Water Rate (CD) : 0.83 m3/d

Water Inj Rate (CD) : 8.23 m3/d

June 29, 2017

