

**SINCLAIR UNIT NO. 17**  
**WATERFLOOD EOR PROJECT**  
**ANNUAL REPORT FOR 2016**

**June 30, 2017**

**Tundra Oil and Gas Partnership**

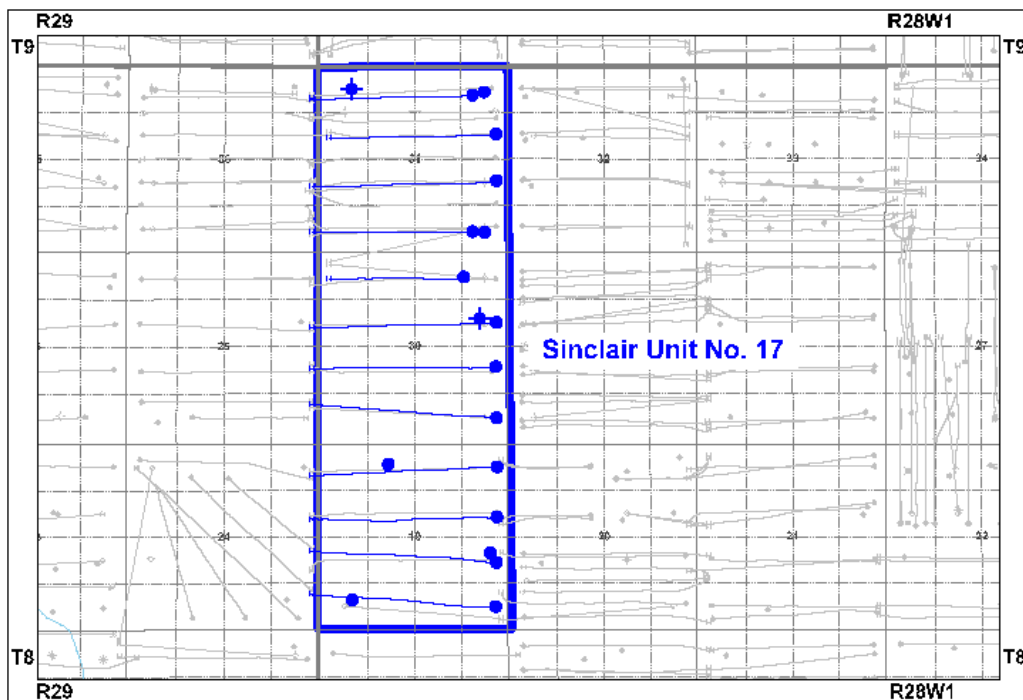
## **Table of Contents**

Introduction	3.
Discussion	3.
Production History	3.
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.
Waterflood Performance Discussion	6.
List of Appendices	7.
Appendix A: Well Name and Well Status	

## **INTRODUCTION**

Sinclair Unit No. 17 Enhanced Oil Recovery (EOR) Waterflood Project was approved on March 1, 2016 with Tundra Oil and Gas (Tundra) as Operator. The EOR Unit area, outlined in blue, contains 2 abandoned wells, 3 producing vertical wells and 14 producing horizontal wells in 48 LSDs in Township 8 Range 28 W1 as shown in the figure below. Well list and well status is available in Appendix A.

**Figure 1: Sinclair Unit No. 17 Area Outline**



© 2017 Tundra Oil and Gas. All rights reserved. Reproduction or distribution of this document is prohibited without the written consent of Tundra Oil and Gas. This document is for informational purposes only and is not to be used for any other purpose. This is a preliminary document and is subject to change without notice.

In accordance with Section 73 of the Manitoba Drilling and Production Regulation, Tundra hereby submits the following 2016 Annual Progress Report for Sinclair Unit No. 17.

## **DISCUSSION**

### **Production History**

For the wells included in Sinclair Unit No. 17, production started in September 2005 with the 00/14-19-008-28W1 well. Oil production peaked at 7.59 m<sup>3</sup>/d per well in February 2011. This production was coming from 16 wells and totaled 121.41 m<sup>3</sup>/d for the Unit. In

December 2016, the Unit was producing 18.84 m<sup>3</sup>/d of oil and 58.88 m<sup>3</sup>/d of water. There is currently no water injection in Sinclair Unit No. 17. The rates and WOR are presented in Figure 2.

**Figure 2: Sinclair Unit No. 17 Production/Injection Rates and WOR vs Time**

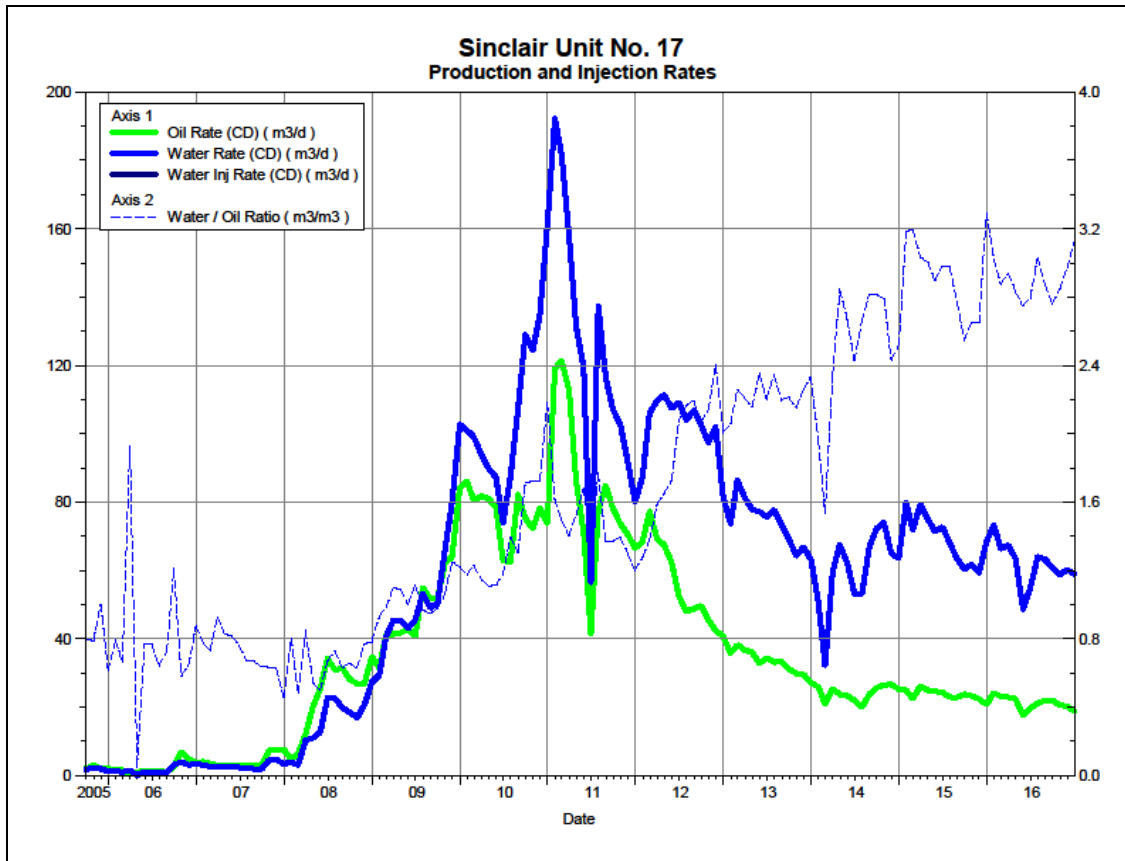
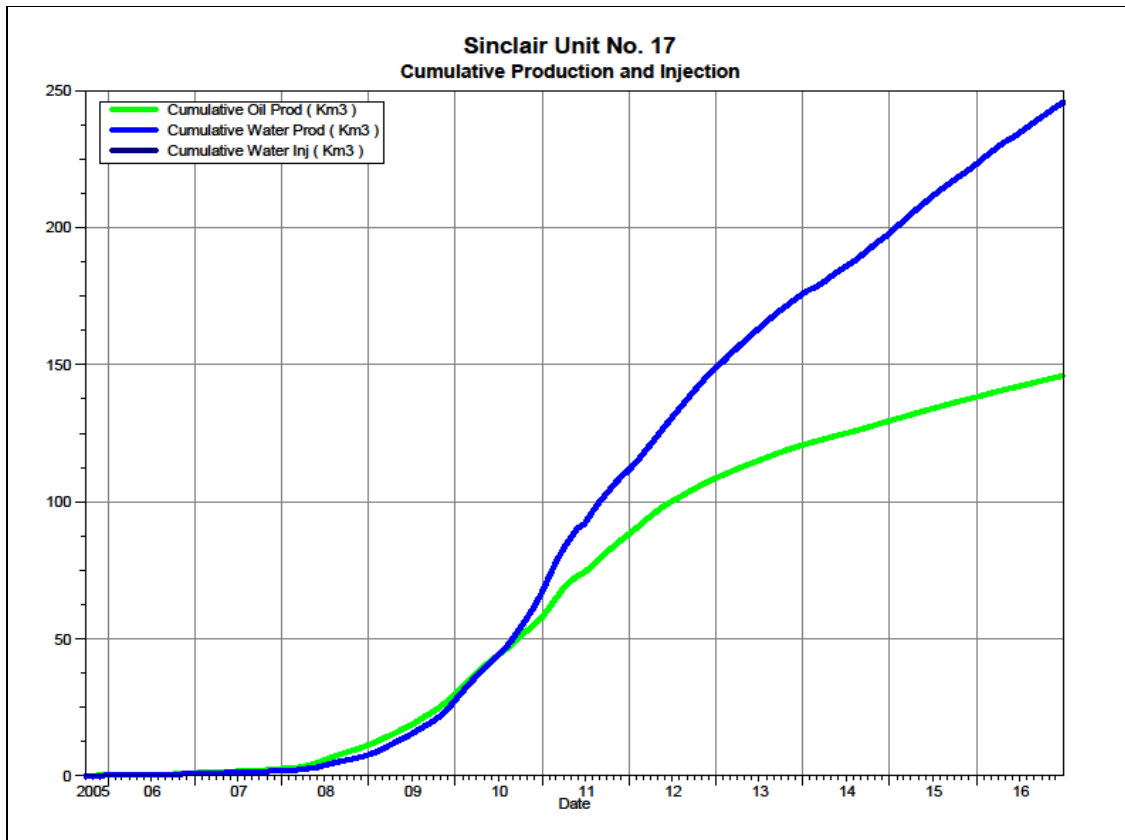


Figure 3 shows the cumulative production for Sinclair Unit No. 17 to the end of December 2016 as 145.9 e<sup>3</sup>m<sup>3</sup> of oil, and 245.7 e<sup>3</sup>m<sup>3</sup> of water, representing a 7.3% recovery factor of the OOIP.

**Figure 3: Sinclair Unit No. 17 Cumulative Oil, Water and Water Injected vs Time**



## **Waterflood Development Plan**

### **Sinclair Unit No. 17 Waterflood (WF) Development Plan**

Sinclair Unit No. 17 is still in the development phase at the end of 2016. Tundra plans to drill eleven (11) future horizontal injectors between the existing vertical and horizontal producing wells, completing waterflood patterns with effective 20 acre spacing. All of the horizontal wells are fracture stimulated to improve the injection rates. In order to maximize recovery from this Unit, Tundra believes an initial period of producing all of the injectors for a short period of time to clean-up the reservoir near the wellbore is essential. Tundra's anticipates infill drilling in Sinclair Unit No. 17 will commence in 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**

The injection water for Sinclair Unit No. 17 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**

There is currently no water injection in Sinclair Unit No. 17.

### **Reservoir Pressure**

Where practical, Tundra is committed to collecting pressure data from newly drilled openhole wells. For Sinclair Unit No. 17, no reservoir pressure measurements were taken in 2016.

### **Well Servicing**

The following table summarizes the well servicing performed within Sinclair Unit No. 17 during 2016:

**Table 1: Sinclair Unit No. 17 Well Servicing**

102.09-30-008-28W1.00	Pump Change	12/9/2016
-----------------------	-------------	-----------

## **Waterflood Performance Discussion**

At the end of 2016, there is currently no water injection in Sinclair Unit No. 17, therefore, there is no waterflood analysis that can be done at this time. Eleven (11) future horizontal injectors are planned to be drilled starting in 2017 between the existing vertical and horizontal producing wells, completing waterflood patterns with effective 20 acre spacing.

## **List of Appendices**

Appendix A: Well Name and Well Status

## APPENDIX A

<i>UWI</i>	<i>Surface Hole Location</i>	<i>License Number</i>	<i>Type</i>	<i>Status</i>
100/01-19-008-28W1/0	100/01-24-008-29W1/0	007405	Horizontal	Capable of OIL Prod
100/04-19-008-28W1/0		005964	Vertical	Capable of OIL Prod
100/08-19-008-28W1/2		006124	Vertical	Capable of OIL Prod
102/08-19-008-28W1/0	102/08-24-008-29W1/0	007406	Horizontal	Capable of OIL Prod
100/09-19-008-28W1/0	100/09-24-008-29W1/0	007013	Horizontal	Capable of OIL Prod
100/14-19-008-28W1/0		005472	Vertical	Capable of OIL Prod
100/16-19-008-28W1/0	100/16-24-008-29W1/0	007407	Horizontal	Capable of OIL Prod
100/01-30-008-28W1/0	100/01-25-008-29W1/0	006799	Horizontal	Capable of OIL Prod
100/08-30-008-28W1/0	100/08-25-008-29W1/0	007075	Horizontal	Capable of OIL Prod
100/09-30-008-28W1/0		006037	Vertical	Abandoned Zone
102/09-30-008-28W1/0	102/09-25-008-29W1/0	007365	Horizontal	Capable of OIL Prod
100/16-30-008-28W1/0	100/13-30-008-28W1/0	006581	Horizontal	Capable of OIL Prod
100/01-31-008-28W1/0		006639	Vertical	Capable of OIL Prod
102/01-31-008-28W1/0	102/01-36-008-29W1/0	006853	Horizontal	Capable of OIL Prod
100/08-31-008-28W1/0	100/08-36-008-29W1/0	006940	Horizontal	Capable of OIL Prod
100/09-31-008-28W1/0	100/12-31-008-28W1/0	007095	Horizontal	Capable of OIL Prod
100/13-31-008-28W1/0		006631	Vertical	Abandoned Zone
100/16-31-008-28W1/0		006634	Vertical	Capable of OIL Prod
102/16-31-008-28W1/0	102/16-36-008-29W1/0	007548	Horizontal	Capable of OIL Prod