

**SINCLAIR UNIT NO. 14**  
**WATERFLOOD EOR PROJECT**  
**ANNUAL REPORT FOR 2016**

**May 29, 2017**

**Tundra Oil and Gas Partnership**

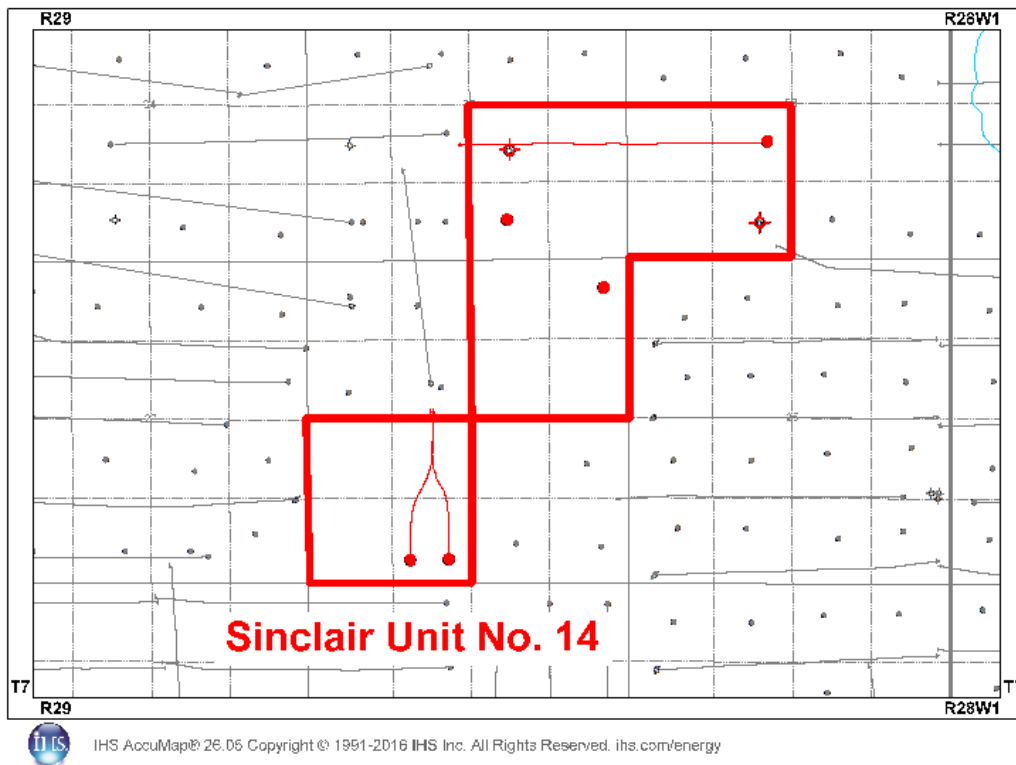
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## **INTRODUCTION**

Sinclair Unit No. 14 Enhanced Oil Recovery (EOR) Waterflood Project was approved on November 1, 2015 with Tundra Oil and Gas (Tundra) as Operator. The EOR Unit area, outlined in red, contains 2 abandoned wells, 2 producing vertical wells and 2 producing horizontal wells in 16 LSDs in Township 7 Range 29 W1 as shown in the figure below. Well list and well status is available in Appendix A.

**Figure 1: Sinclair Unit No. 14 Area Outline**



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. 14.

## **DISCUSSION**

### **Production History**

For the wells included in Sinclair Unit No. 14, production started in February 2006 with the 00/16-26-007-29W1 well. Oil production peaked at 4.64 m<sup>3</sup>/d per well in January 2010. This production was coming from 4 wells and totaled 18.56 m<sup>3</sup>/d for the Unit. In

December 2016, the Unit was producing 1.53 m<sup>3</sup>/d of oil and 4.57 m<sup>3</sup>/d of water. There is currently no water injection in Sinclair Unit No. 14. The rates and WOR are presented in Figure 2.

**Figure 2: Sinclair Unit No. 14 Production/Injection Rates and WOR vs Time**

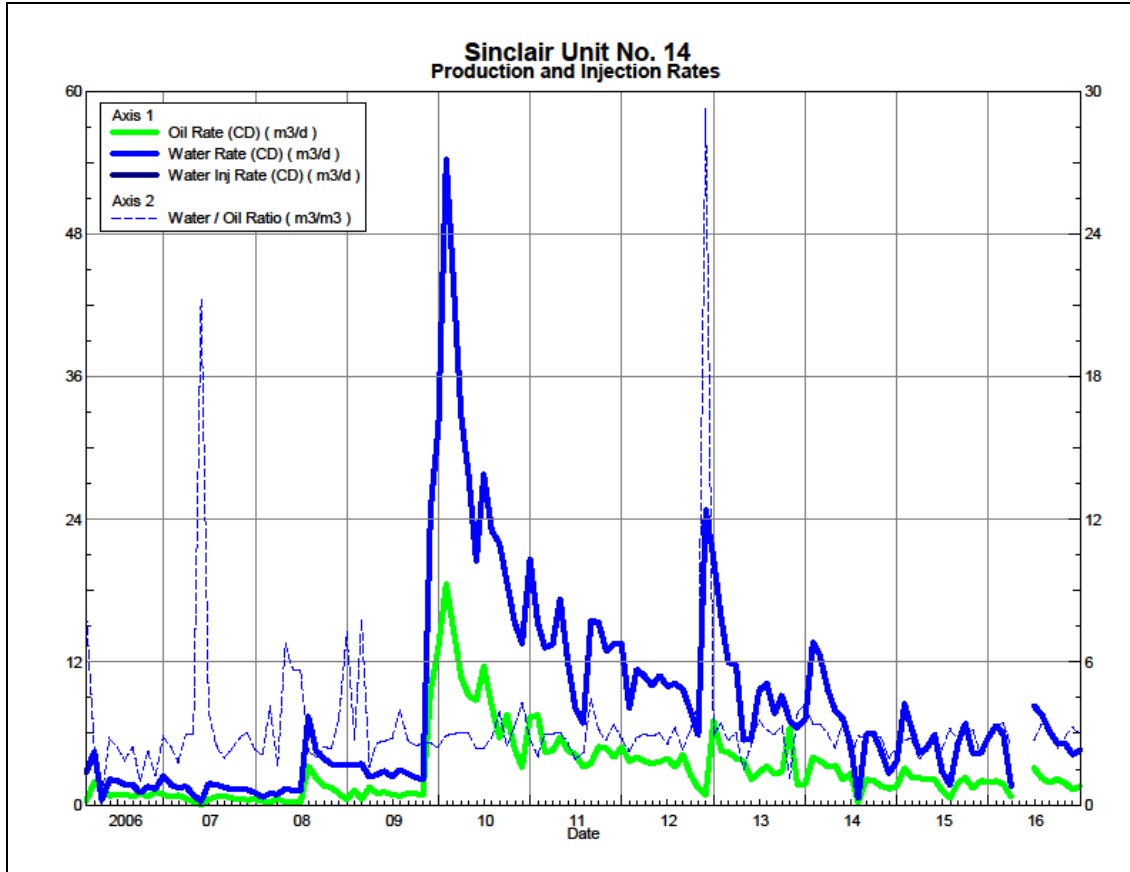
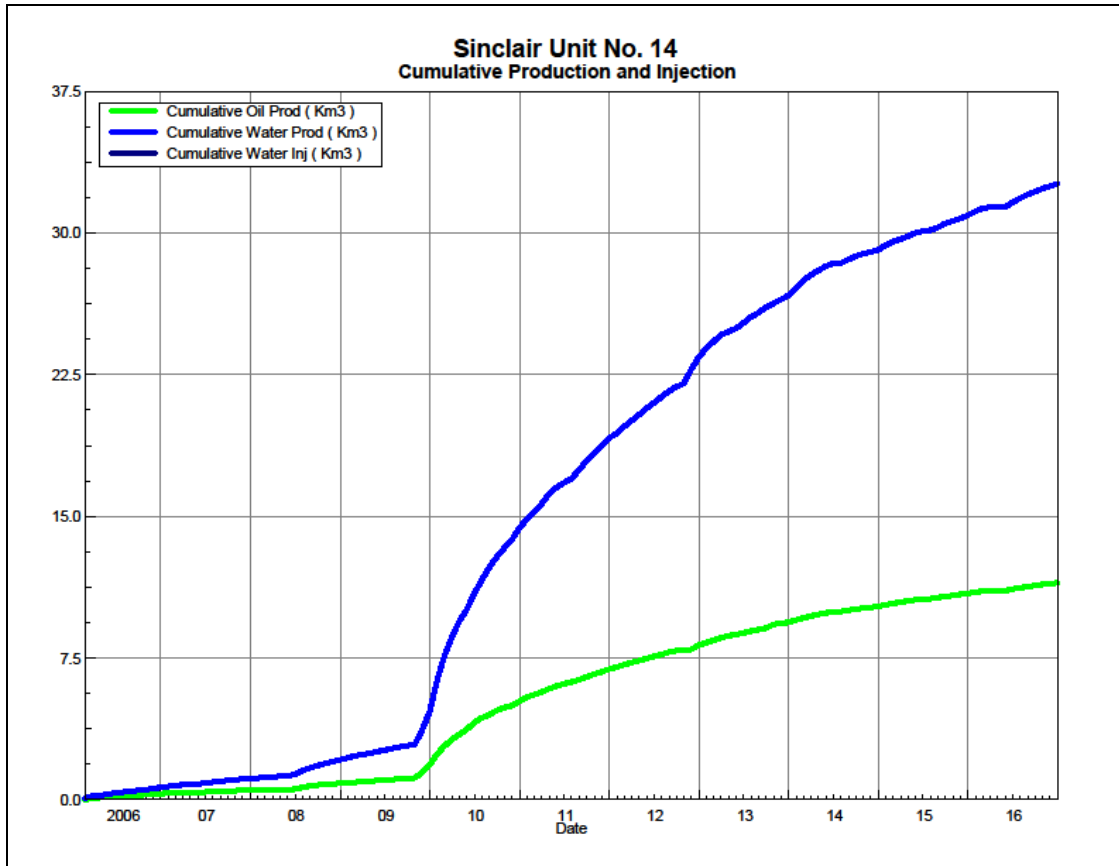


Figure 3 shows the cumulative production for Sinclair Unit No. 14 to the end of December 2016 as 11.48 e<sup>3</sup>m<sup>3</sup> of oil, and 32.62 e<sup>3</sup>m<sup>3</sup> of water, representing a 1.2% recovery factor of the OOIP.

**Figure 3: Sinclair Unit No. 14 Cumulative Oil, Water and Water Injected vs Time**



## **Waterflood Development Plan**

### **Sinclair Unit No. 14 Waterflood (WF) Development Plan**

Sinclair Unit No. 14 is still in the development phase at the end of 2016. There are 8 undrilled LSDs within the unit boundary that will be developed with three (3) horizontal wells (1 full horizontal, 2 short horizontals). Four (4) future horizontal injectors are planned to be drilled 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 expects to produce all of the injectors for a short period of time to clean-up the reservoir near the wellbores.

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. 14 will be sourced from the 16-32-007-29W1 well (Lodgepole formation). The water is treated at the 03-04-007-29W1 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**

There is currently no injection in Sinclair Unit No. 14.

### **Reservoir Pressure**

Where practical, Tundra is committed to collecting pressure data from newly drilled openhole injection wells. For Sinclair Unit No. 14, no reservoir pressure measurements were taken in 2016.

### **Well Servicing**

No maintenance was required on the 6 wells in Sinclair Unit No. 14 in 2016.

## **Waterflood Performance Discussion**

At the end of 2016, there is currently no water injection in Sinclair Unit No. 14, therefore, there is no waterflood analysis that can be done at this time. Four (4) future horizontal injectors are planned to be drilled 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>
100/03-26-007-29W1/0	100/11-26-007-29W1/0	007094	Horizontal	Capable of OIL Prod
100/03-26-007-29W1/2	100/11-26-007-29W1/2	007094	Horizontal	Capable of OIL Prod
100/16-26-007-29W1/0		005764	Vertical	Capable of OIL Prod
100/02-35-007-29W1/0		006678	Vertical	Capable of OIL Prod
100/07-35-007-29W1/0		006232	Vertical	Abandoned
100/03-36-007-29W1/0		006274	Vertical	Abandoned
100/06-36-007-29W1/0	100/06-35-007-29W1/0	007086	Horizontal	Capable of OIL Prod