

February 26, 2010

Manitoba Science, Technology, Energy and Mines  
Petroleum Branch  
Suite 360, 1395 Ellice Avenue  
Winnipeg, Manitoba  
R3G 3P2

**Attention: Mr. Keith Lowdon**  
**Director, Petroleum**

Dear Mr. Lowdon:

**RE: Sinclair Unit No. 3**  
**Waterflood Order No. 18**  
**2009 Annual Waterflood Progress Report**

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In accordance with Section 73 of the Manitoba Drilling and Production Regulation, Tundra hereby submits the 2009 Annual Waterflood Progress Report for Sinclair Unit No 3 as required by Waterflood Order No 18.

Enclosed are 2 hard copies of the Unit No 3 Progress Report. An electronic copy of the entire document is forthcoming under separate cover.

If you have any questions or require further discussion, please contact William Jenkins at 403-513-1018 or Sean Sodero at 403-513-1002.

Yours truly,

**TUNDRA OIL AND GAS PARTNERSHIP**



*for* Alex Solberg, P. Eng  
Vice President, Exploitation and Reservoir Engineering

enclosures

February 26, 2010

## **SUBJECT**

**Sinclair Unit No. 3**

**Waterflood Order No. 18**

**Enhanced Oil Recovery Waterflood Project**

**Annual Progress Report – 2009**

## **INTRODUCTION**

Sinclair Unit No. 3 Enhanced Oil Recovery (EOR) Waterflood Project was approved under Waterflood Order No 18 effective November 01, 2009 with Tundra Oil and Gas (Tundra) as Operator. The EOR project area, outlined in green on the attached Figure 1, contains 96 producing wells within 6 complete sections in Township 8, Range 29 W1.

In accordance with Section 73 of the Manitoba Drilling and Production Regulation, Tundra submits the following 2009 Annual Progress Report for Sinclair Unit No 3 as required by Waterflood Order No 18.

## **DISCUSSION**

### **Production History**

#### **Production Rates**

Production from Sinclair Unit No 3 peaked in September 2006 at 2,944 bbls of oil per day (OPD) (Figure 2). Production averaged 31 bbls OPD per well, from 96 active wells.

At the end of October 2009, Unit area oil production was 852 bbls OPD at an average of 8.9 bbls OPD per well. Overall Unit water production was 268 bbls water per day (WPD) at a relatively stable watercut of 24 % and a Water Oil Ratio (WOR) of 0.3 (Figure 2).

#### **Cumulative Production**

Cumulative production in the Sinclair Unit 3 area to end October 2009 was 2,256,994 bbls of oil, and 621,700 bbls of water, representing a 7.4 % Recovery Factor of Original Oil in Place (OOIP).

## **Well Servicing**

The following Table 1 summarizes the well servicing performed within Unit 3 during all of 2009:

**Table 1**  
**Sinclair Unit #3**

15-01-008-29	Pump Change	5/31/2009
11-02-008-29	Pump Change	5/30/2009
13-02-008-29	Pump Change	8/8/2009
13-02-008-29	Pump Change	9/27/2009
07-03-008-29	Pump Change	6/11/2009
10-03-008-29	Pump Change	3/17/2009
13-03-008-29	Pump Change	1/25/2009
15-03-008-29	Pump Change	1/25/2009
02-10-008-29	Pump Change	5/31/2009
08-10-008-29	Rod Repair	12/10/2009
09-10-008-29	Rod Repair	1/7/2009
11-10-008-29	Rod Repair	1/27/2009
15-10-008-29	Pump Change	10/31/2009
13-11-008-29	Pump Change	3/16/2009
11-12-008-29	Pump Change	5/31/2009

## **Waterflood Development and Injection History**

### **Injection Rates and Pressures**

As of the end of December 2009, there were no existing or active water injection wells within Sinclair Unit 3. Therefore, the balance of the Progress Report will focus on Waterflood development plans within 2010 and 2011.

### **Sinclair Unit No 3 Waterflood (WF) Development Plan**

As described in the original EOR Application, Tundra plans to construct all the new horizontal injection within Sinclair Unit No 3 over a 2 year period from 2010 to 2011. However, the injection development plan has been modified to add more wells during 2010 to address areas of higher cumulative production and more significant reservoir pressure depletion.

Instead of developing half the planned horizontal injectors in 2010, Tundra now expects to drill 75% of the proposed new Unit 3 wells in 2010. Up to five (5) new horizontal injection wells have been planned for Q1 2010 targeting best winter drill surface locations and/or sections 3 and 10 of 8-29 W1. As many of these as possible will be completed and placed on injection before spring break up given operational and services supply constraints.

Another 11 horizontal wells will be drilled, completed and placed on injection within Sinclair Unit No 3 from end Q2 – Q4, for a total of 16 during 2010. Two (2) injector well

pad locations will be used wherever possible to limit the surface footprint and overall development impact.

An additional 5 injector wells are currently planned for 2011 for a total of at least 21 new horizontal injection wells within Sinclair Unit No 3 (Figure 3).

### **Sinclair Unit No 2 WF Development Plan**

As described in the Original Section 71 Application, Tundra plans to construct up to 33 new horizontal injection wells within Sinclair Unit No 2 as well during 2010 and 2011.

Waterflood development within Sinclair Unit No 2 will also commence during Q3 2010, in conjunction with Unit 3 activities, to maximize operational efficiencies.

At present, Tundra plans to construct and start injection into 10 new horizontal wells within Unit 2 during 2010. Initial injection will target areas of most significant depletion within sections 17, 18, 19, and 30-7-28 W1 and section 25-7-29 W1. All remaining injection wells will be constructed in 2011. Two (2) injector well pad locations will also be used wherever possible in Unit 2 to limit the surface footprint and overall development impact.

## **Waterflood EOR Operating Strategy and Performance**

### **Water Source and Quality**

As described in the original Sinclair Unit 3 Application, water will be supplied from the existing Sinclair Unit 1 dedicated source injection water infrastructure system.

### **Voidage Replacement**

Unit 3 Voidage Replacement will be addressed in the 2010 Annual Progress Report.

### **Reservoir Pressure**

No recent or representative pressure surveys are currently available for the Unit 3 project area. The extremely long shut in and build up times required to obtain any possible representative surveys from the vertical producing wells are economically prohibitive.

However, Tundra plans to acquire good quality reservoir pressure data from selected new Unit 3 horizontal injection wells prior to first injection in 2010. These data will be summarized and presented within the 2010 Annual Progress Report.

### **Waterflood Performance Discussion**

To be addressed in the 2010 Annual Progress Report

## **Waterflood Surveillance and Optimization 2010**

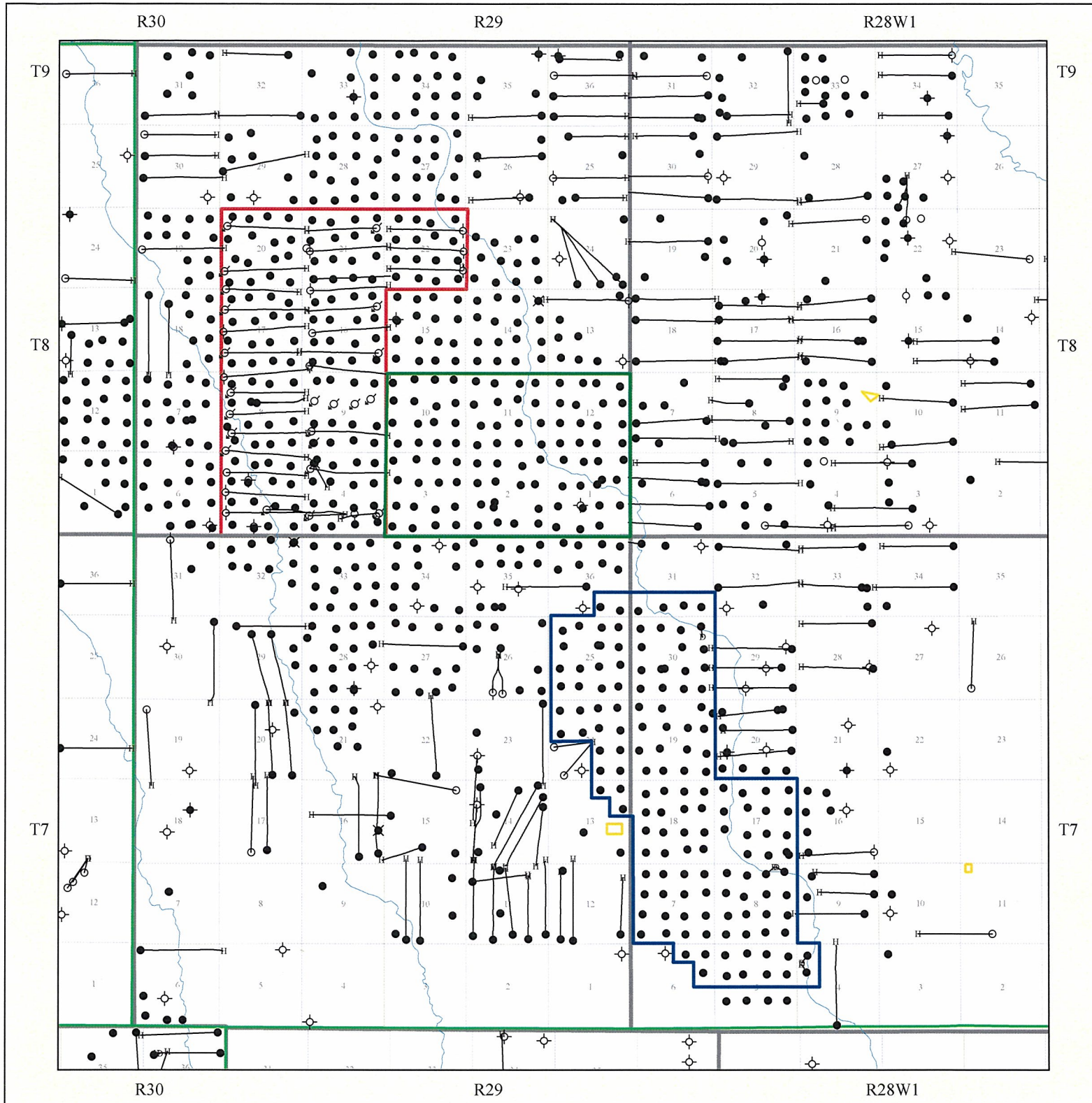
As Unit 3 water injection wells are developed in 2010, the following waterflood surveillance procedures will be continued or implemented:

- Regular production well rate and watercut testing
- Daily water injection rates and pressures monitoring vs targets
- Water injection rate / pressure / time vs cumulative injection plots
- Reservoir pressure surveys on selected new injection wells prior to start of first injection
- Reservoir pressure surveys on producers if practically and economically possible
- VRR by pattern

Any future revisions to the waterflood surveillance plan would be based on new production or performance response data, technical studies, or observed reservoir behavior and reserves recovery interpretations.

## **TUNDRA OIL & GAS PARTNERSHIP**

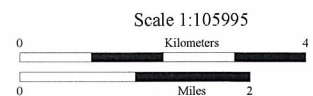
Calgary, AB



WELL LEGEND	
Bottom Hole Locations:	
○ Location	◇ Suspended
⊠ Service or Drain	● Oil
⊞ Dry & Abandoned	⬢ Abandoned Oil
⊞ Injection	
Surface Hole Locations:	
—○ Directional	— Horizontal

Existing Sinclair Units	
Sinclair Unit 1 Red Unit 2 Blue and Unit 3 Green	
<p>Created in AccuMap™ Product of IHS Datum: NAD27 Scale: 1 : 105995 Vol. 20 Nov. 01, Jan 19 2010 (403) 770-4646</p> <p>Grid Information: DLS: IHS Enhanced Grid NTS: Theoretical Grid FPS: Theoretical Grid US: IHS US Grid</p>	<p>Author: WRJ Date: February 26, 2010 File: Sinclair Units 1 2 3 .MAP Scale: 1 : 105995 Projection: Stereographic Center: N49.61752 W101.30182</p> <p>DLS Version Information: AB: ATS 2.6 BC: PRB 2.0 SK: STS 2.5 MB: MB 1.0</p>

Figure 1





Unit 3 well list.WLS  
February 26, 2010

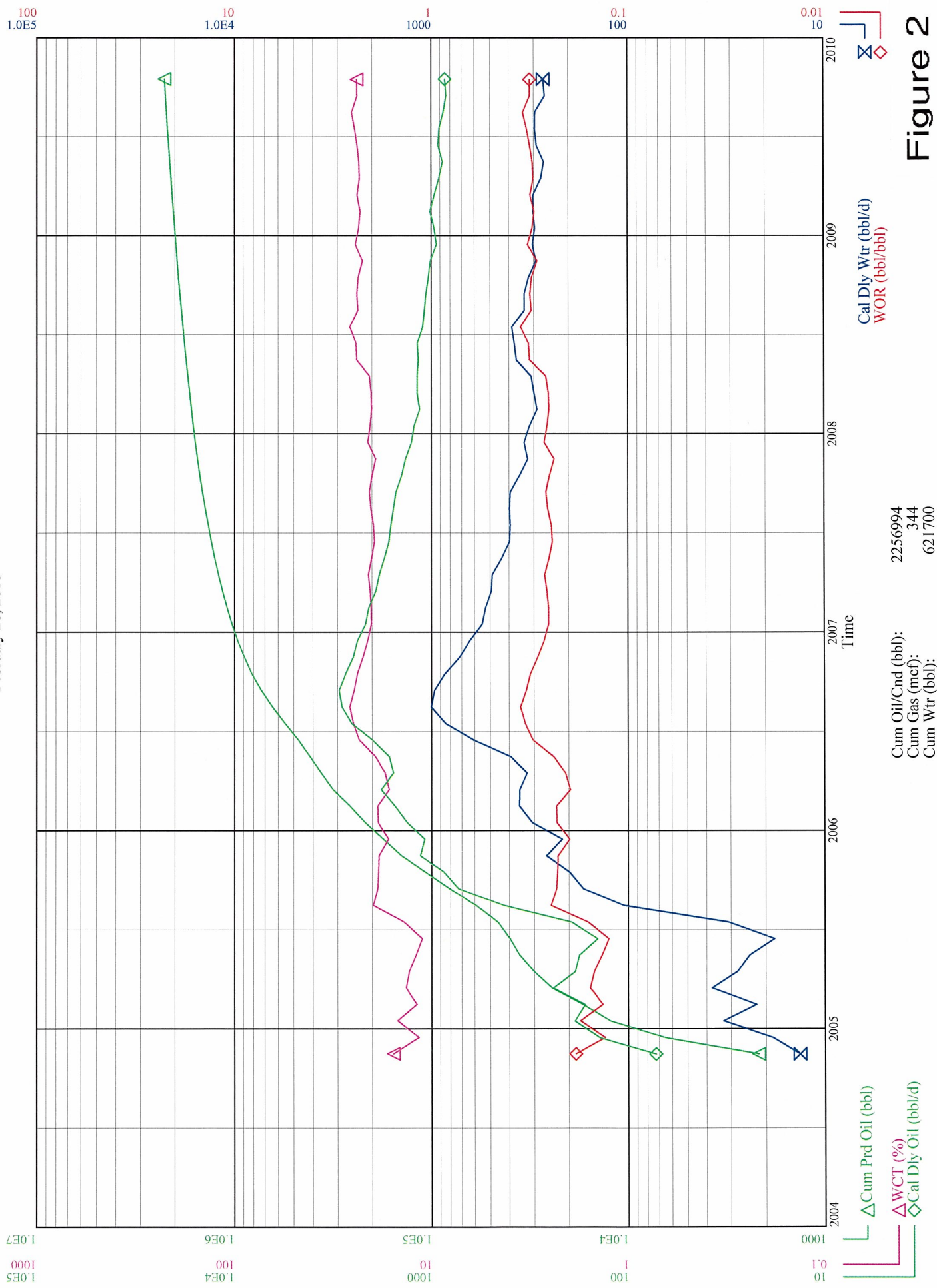


Figure 2



WELL LEGEND	
Bottom Hole Locations:	
○ Location	◇ Suspended
⊗ Service or Drain	● Oil
⊕ Dry & Abandoned	⊖ Injection
Surface Hole Locations:	
—○ Directional	—⊕ Horizontal

Sinclair Unit 3 HZ Injectors	
Red 2010, Blue 2011	
Figure 3	
Created in ArcMap™ Product of IHS Datum: NAD27 Vol. 20 No. 01, Jan 19 2010 (405) 770-4646	Author: WRJ Date: February 26, 2010 File: Proposed Unit 3 Phased Injecto Scale: 1:41744 Projection: Stereographic Center: N49.63555 W101.31464
Grid Information: DLS: IHS Enhanced Grid NTS: Theoretical Grid FPS: Theoretical Grid US: IHS US Grid	DLS Version Information: AB: ATS 2.6 BC: PRB 2.0 SK: STS 2.5 MB: MB 1.0

Figure 3

