

PROPOSED SINCLAIR UNIT NO. 20

Application for Enhanced Oil Recovery Waterflood Project

Middle Bakken/Three Forks Formations

Bakken – Torquay Pool (01 62A)

Daly Sinclair Field, Manitoba

July 14th, 2017
Tundra Oil and Gas Limited

INTRODUCTION

The Sinclair portion of the Daly Sinclair Oil Field is located in Ranges 28 and 29 W1 in Townships 7 and 8 (Figure 1). Since discovery in 2004, the main oilfield area was developed with vertical and horizontal wells at 40 acre spacing on Primary Production. Since early 2009, a significant portion of the main oilfield has been unitized and placed on Secondary Waterflood (WF) Enhanced Oil Recovery (EOR) Production, mainly from the Lyleton A & B members of the Three Forks Formation. Tundra Oil and Gas Limited (Tundra) currently operates and continues to develop Sinclair Units 1, 2, 3, 5, 6, 7, 8, 10, 11, 12, 13, 14, 17 and 18.

In the southern part of the Sinclair field, potential exists for incremental production and reserves from a Waterflood EOR project in the Three Forks and Middle Bakken oil reservoirs. The following represents an application by Tundra to establish Sinclair Unit No. 20 (Section 24-8-29W1) and implement a Secondary Waterflood EOR scheme within the Three Forks and Middle Bakken formations as outlined on Figure 2.

The proposed project area falls within the existing designated 01-62A Bakken-Torquay Pool of the Daly Sinclair Oilfield (Figure 3).

SUMMARY

1. The proposed Sinclair Unit No. 20 will include 8 horizontal wells and 2 vertical wells, within 16 Legal Sub Divisions (LSD) of the Middle Bakken/Three Forks producing reservoir. The project is located north of Sinclair Unit No. 7 and 12 and west of Sinclair Unit No. 17 (**Figure 2**).
2. Total Net Original Oil in Place (OOIP) in Sinclair Unit No. 20 has been calculated to be **994.5** e³m³ (6,256 Mbbl) for an average of **62.1** net e³m³ (390.9 Mbbl) OOIP per 40 acre LSD based on a 0.5 md cutoff.
3. Cumulative production to the end of March 2017 from the 10 wells within the proposed Sinclair Unit No. 20 project area was **32.99** e³m³ (207.5 Mbbl) of oil, and **124.18** e³m³ (781.0 Mbbl) of water, representing a **3.3%** Recovery Factor (RF) of the Net OOIP.
4. **Figure 4** shows the production from the Sinclair Unit No. 20 peaked in February 2011 at 36.1 m³ of oil per day (OPD). As of March 2017, production was 3.4 m³ OPD, 15.3 m³ of water per day (WPD) and an 81.2% watercut.
5. In February 2011, production averaged 9.02 m³ OPD per well in Sinclair Unit No. 20. As of March 2017, average per well production has declined to 0.85 m³ OPD. Decline analysis of the group primary production data forecasts total oil to continue declining at an annual rate of approximately **22.7%** in the project area.
6. Estimated Ultimate Recovery (EUR) of Primary Proved Producing oil reserves in the proposed Sinclair Unit No. 20 project area has been calculated to be **52.2** e³m³ (328.7 Mbbl), with **19.2** e³m³ (121.1 Mbbl) remaining as of the end of March 2017.
7. Ultimate oil recovery of the proposed Sinclair Unit No. 20 OOIP, under the current Primary Production method, is forecasted to be **5.2%**.
8. Estimated Ultimate Recovery (EUR) of proved oil reserves under Secondary WF EOR for the proposed Sinclair Unit No. 20 has been calculated to be **77.7** e³m³ (488.8 Mbbl), with **44.7** e³m³ (281.2 Mbbl) remaining. An incremental **25.5** e³m³ (160.4 Mbbl) of proved oil reserves, or **2.6%**, are forecasted to be recovered under the proposed Unitization and Secondary EOR production vs the existing Primary Production method.
9. Total RF under Secondary WF in the proposed Sinclair Unit No. 20 is estimated to be **7.8%**.
10. Based on the waterflood response in the adjacent main portion of the Sinclair field, the Three Forks and Middle Bakken Formations in the proposed project area are believed to be suitable reservoirs for WF EOR operations.
11. Existing horizontal wells, with multi-stage hydraulic fractures, will be converted to injection wells (**Figure 5**) within the proposed Sinclair Unit No. 20, to complete waterflood patterns with effective 20 acre spacing similar to Sinclair Unit No. 5.

DISCUSSION

The proposed Sinclair Unit No. 20 project area is located within Township 8, Range 29 W1 of the Daly Sinclair Oil Field. The proposed Sinclair Unit No. 20 currently consists of 8 horizontal and 2 vertical wells, within an area covering 16 LSDs in Section 24-008-29W1 (Figure 2). A project area well list complete with recent production statistics is attached as Table 3.

Tundra believes that the waterflood response in the adjacent main portion of the Sinclair field demonstrates potential for incremental production and reserves from a WF EOR project in the subject Middle Bakken and/or Three Forks oil reservoirs.

Geology

Stratigraphy:

The stratigraphy of the reservoir section for the proposed unit is shown on the structural cross-section attached as Appendix 2. The section runs South East to North West through the proposed Unit area. The producing sequence in descending order consists of the Upper Bakken Shale, Middle Bakken Siltstone, Lyleton A Siltstone (broken into Upper and Lower members), the Red Shale Marker, Lyleton B Siltstone and the Torquay Silty Shale. The reservoir units are represented by the Middle Bakken, Lyleton A and Lyleton B Siltstones. The Upper Bakken Shale is a black, organic rich, platy shale which forms the top seal for the underlying Middle Bakken and Lyleton reservoirs. The reservoir units in the proposed unit are analogous to the Bakken / Lyleton producing reservoirs that have been approved adjacent to the proposed unit as noted on the Offsetting Units Map, Appendix 1.

Sedimentology:

The Middle Bakken reservoir consists of fine to coarse grained grey siltstone to fine sandstone which may be subdivided on the basis of lithologic characteristics into upper and lower units. The upper portion is very often heavily bioturbated and is generally non-reservoir. These bioturbated beds often contain an impoverished fauna consisting of well-worn brachiopod, coral and occasional crinoid fragments suggesting deposition in a marginal marine environment. The lower part of the Middle Bakken is generally finely laminated with alternating light and dark laminations with occasional bioturbation. Reservoir quality fairly consistent within the unit area. Within the proposed unit, the Middle Bakken thickness ranges from less than 1m in the North East, to 3.1m in the South East (Appendix 4).

The Lyleton A reservoir within the proposed unit area consists of buff to tan medium to coarse siltstone (occasionally fine sandstone) made up of quartz, feldspar and detrital dolomite with minor mica and clay mostly in the form of clay clasts or chips. Clays do not generally occur as pore filling material, but rather as discrete grains within the siltstone. The Upper Lyleton A is generally well bedded and shows evidence of parallel lamination with occasional wind ripples. The coarser siltstones are interbedded with finer grained grey-green siltstone similar in composition to the reservoir siltstone, but generally with lower permeability (i.e. < 0.1mD). These finer grained siltstones show evidence of haloturbation producing smeared siltstone clasts floating in a fine grained grey-green siltstone matrix. The lower part of the Lyleton

A generally shows a greater proportion of the grey-green fine-grained siltstone than the Upper and is generally a poorer reservoir. It also tends to exhibit greater amounts of haloturbation and pseudo-breccia of siltstone clasts in a finer grained siltstone matrix. Because of the fine grained matrix in this pseudo-breccia the connectivity between the clasts is much lower than the bedded siltstone and the Lower part of the Lyleton A is generally a poorer reservoir than the Upper part of the Lyleton A. Within the proposed unit area the Upper Lyleton A has a limited occurrence and has been thinned, where it exists (Appendix 5). The Lower Lyleton A ranges above 3m in the North and West of the proposed unit, thinning toward the South East and completely sub-cropping before the edge of the unit boundary (Appendix 6).

The Lyleton B reservoir consists of buff to tan fine grained siltstone (occasionally very fine siltstone) made up of quartz, feldspar and detrital dolomite with minor mica and clay mostly in the form of clay clasts or chips. The Lyleton B is generally well bedded and shows evidence of parallel lamination with occasional wind ripples. The coarser siltstones are interbedded with dark grey-green or red very fine grained siltstone which is generally non-reservoir. The Lyleton B is fairly consistent over the unit area ranging between 4.9m-5.2m thick (Appendix 7).

Structure:

A structure contour map is provided for the top of the reservoir sequence (Appendices 3). The structure within the proposed unit area generally consists of an overall dip to the Southeast. Structural variations in the area are interpreted as being caused by dissolution of the underlying Prairie Evaporites. Structural variations cause by dissolution are common in the Sinclair Field but do not appear to represent continuous barriers to lateral fluid flow within the reservoir as they do not appear to interrupt the lateral continuity of the reservoir beds (see cross-section Appendix 2).

Reservoir Continuity:

Lateral continuity of the reservoir units is an essential requirement of a successful waterflood. As demonstrated by the cross section and the isopach maps, all reservoir formations, the Middle Bakken, Lyleton A, and Lyleton B, are continuous throughout most of the proposed unit area. The Upper Lyleton A pinches out to the North West and in the South East the Upper and Lower Lyleton A are both absent in only a small portion of the proposed unit.

Vertical continuity between the Middle Bakken and underlying Lyleton A reservoir exists throughout the proposed unit as they are in direct contact. Vertical continuity between the Middle Bakken and Lyleton A to the underlying Lyleton B reservoir is broken by the Red Shale marker in this area. This break in vertical continuity will not impede waterflood or production as induced hydraulic fracturing allows flow across the Red Shale.

Fluid Contacts:

The oil/water contact for the Middle Bakken and Lyleton reservoir is estimated from production to be at about -525 m subsea. In tight reservoirs such as these, the transition zone could be considerable and the top of the transition zone is estimated to be at about -490 m subsea based on production and simulation studies of the reservoir. The postulated oil/water contact at -525 m subsea is well below the lowest elevation the reservoir reaches within the unit area (Appendix 3).

Gross OOIP Estimates

Total volumetric OOIP for the reservoir within the proposed unit has been calculated to be **994.5 e³m³ (6,256 Mbbbl)** using Tundra internally created maps. Maps used were generated from core data from wells available in the greater Sinclair area (Appendix 8).

A net to gross ratio was calculated from high resolution pressure-decay profile permeameter (PDPK) core data proximal to the proposed unit, using a 0.3mD cutoff. To determine net-pay the net to gross ratio, calculated at 38%, was then applied to the reservoir isopach thickness derived from logs. The average porosity (phi) of all pay intervals was calculated from the cored, PDPK sampled wells.

Tabulated parameters for each LSD from the calculations can be found in Table 4.

OOIP values were calculated using the following volumetric equation:

$$OOIP = \frac{Area * Net Pay * Porosity * (1 - Water Saturation)}{Initial Formation Volume Factor of Oil}$$

or

$$OOIP(m3) = \frac{A * h * \phi * (1 - Sw)}{Bo} * \frac{10,000m2}{ha}$$

or

$$OOIP(Mbbbl) = \frac{A * h * \phi * (1 - Sw)}{Bo} * 3.28084 \frac{ft}{m} * 7,758.367 \frac{bbl}{acre * ft} * \frac{1Mbbbl}{1,000bbl}$$

where

OOIP	= Original Oil in Place by LSD	=6,256Mbbbl (total)
A	= Area	=40 acres/LSD
h * ϕ	= Net Pay * Porosity, or Phi * h	=16.5%*38.0%*Gross thickness(m)
Bo	= Formation Volume Factor of Oil	=1.1 stb/rb
Sw	= Water Saturation	=30%

The initial oil formation volume factor (Boi) was adopted from historical PVT information taken from the Sinclair Daly area and is representative of the fluid characteristics in the reservoir.

Historical Production

A historical group production history plot for the proposed Sinclair Unit No. 20 is shown as **Figure 4**. Oil production commenced from the proposed Unit area in November 2005 and peaked during February 2011 at 36.1 m³ (OPD). As of March 2017, production was 3.4 m³ OPD, 15.3 m³ of water per day (WPD) and an 81.2% watercut.

From peak production in February 2011 to date, oil production is declining at an annual rate of approximately **22.7%** under the current Primary Production method.

The remainder of the field's production and decline rates indicate the need for pressure restoration and maintenance. Waterflooding is deemed to be the most efficient means of secondary recovery to introduce energy back into the system and provide areal sweep between wells.

UNITIZATION

Unitization and implementation of a Waterflood EOR project is forecasted to increase overall recovery of OOIP from the proposed project area.

Unit Name

Tundra proposes that the official name of the new Unit shall be Sinclair Unit No. 20.

Unit Operator

Tundra Oil and Gas Limited (Tundra) will be the Operator of record for Sinclair Unit No. 20.

Unitized Zone

The Unitized zone(s) to be waterflooded in the Sinclair Unit No. 20 will be the Middle Bakken and Three Forks formations.

Unit Wells

The 8 horizontal wells and 2 vertical wells to be included in the proposed Sinclair Unit No. 20 are outlined in **Table 3**.

Unit Lands

The Sinclair Unit No. 20 will consist of 16 LSDs as follows:

Section 24 of Township 8, Range 29, W1M

The lands included in the 40 acre tracts are outlined in **Table 1**.

Tract Factors

The proposed Sinclair Unit No. 20 will consist of 16 Tracts based on the 40 acre LSDs containing the existing 8 horizontal and 2 vertical wells.

The Tract Factor contribution for each of the LSD's within the proposed Sinclair Unit No. 20 was calculated as follows:

- Gross OOIP by LSD, minus cumulative production to date for the LSD as distributed by the LSD specific Production Allocation (PA) % in the applicable producing horizontal or vertical well (to yield Remaining Gross OOIP)
- Tract Factor by LSD = the product of Remaining Gross OOIP by LSD as a % of total proposed Unit Remaining Gross OOIP

Tract Factor calculations for all individual LSDs based on the above methodology are outlined within Table 2.

Working Interest Owners

Table 1 outlines the working interest (WI) for each recommended Tract within the proposed Sinclair Unit No. 20. Tundra Oil and Gas Limited holds a 100% WI ownership in all the proposed Tracts.

Tundra Oil and Gas Limited will have a 100% WI in the proposed Sinclair Unit No. 20.

WATERFLOOD EOR DEVELOPMENT

Technical Studies

The waterflood performance predictions for the proposed Sinclair Unit No. 20 Bakken project are based on internal engineering assessments. Project area specific reservoir and geological parameters were utilized and then compared to Sinclair Unit No. 5 parameters, yielding the WF EOR response observed there to date.

Reserves Recovery Profiles and Production Forecasts

The primary waterflood performance predictions for the proposed Sinclair Unit No. 20 are based on oil production decline curve analysis, and the secondary predictions are based on internal engineering analysis performed by the Tundra reservoir engineering group using Sinclair Unit No. 5 as an analogy because it is developed with a similar waterflood pattern design of a horizontal injector with offsetting horizontal producers at 20 acre spacing.

Primary Production Forecast

Cumulative production in the Sinclair Unit No. 20 project area, to the end of March 2017 from the 10 wells, was **32.99** e³m³ of oil and **124.18** e³m³ of water for a recovery factor of **3.3%** of the calculated Net OOIP.

Ultimate Primary Proved Producing oil reserves recovery for Sinclair Unit No. 20 has been estimated to be **52.2** e³m³, or a **5.2%** Recovery Factor (RF) of OOIP. Remaining Producing Primary Reserves has been estimated to be **19.2** e³m³ to end of March 2017.

The expected production decline and forecasted cumulative oil recovery under continued Primary Production is shown in **Figures 7 & 8**.

Pre-Production Schedule/Timing for Conversion of Horizontal Wells to Water Injection

Tundra will plan an injection conversion schedule to allow for the most expeditious development of the waterflood within the proposed Sinclair Unit No. 20, while maximizing reservoir knowledge.

Criteria for Conversion to Water Injection Well

Three (3) water injection wells are required for this proposed unit as shown in **Figure 5**.

Tundra will monitor the following parameters to assess the best timing for each individual horizontal well to be converted from primary production to water injection service.

- Measured reservoir pressures at start of and/or through primary production
- Fluid production rates and any changes in decline rate
- Any observed production interference effects with adjacent vertical and horizontal wells

- Pattern mass balance and/or oil recovery factor estimates
- Reservoir pressure relative to bubble point pressure

The above allows for the proposed Sinclair Unit No. 20 project to be developed equitably and efficiently. It also provides the Unit Operator flexibility to manage the reservoir conditions and response to help ensure maximum ultimate recovery of OOIP.

Secondary EOR Production Forecast

The proposed project oil production profile under Secondary Waterflood has been developed based on the response observed to date in the Sinclair Unit No. 5 Waterflood (Figure 6).

Secondary Waterflood plots of the expected oil production forecast over time and the expected oil production vs. cumulative oil are plotted in Figures 9 & 10, respectively. Total Secondary EUR for the proposed Sinclair Unit No. 20 is estimated to be 77.7 e³m³ with 44.7 e³m³ remaining, representing a total secondary recovery factor of 7.8% for the proposed Unit area. An incremental 25.5 e³m³ of oil, or a 2.6% recovery factor, are forecasted to be recovered under the proposed Unitization and Secondary EOR production scheme vs. the existing Primary Production method.

Estimated Fracture Pressure

Completion data from the existing producing wells within the project area indicate an actual fracture pressure gradient range of 18.0 to 22.0 kPa/m true vertical depth (TVD).

WATERFLOOD OPERATING STRATEGY

Water Source

The injection water for the proposed Sinclair Unit No. 20 will be supplied from the existing Sinclair 4-1-8-29W1 Battery source and injection water system. All existing injection water is obtained from the Mannville formation in the 100/14-30-7-28W1 licensed water source well. Mannville water from the 100/14-30 source well is pumped to the main Sinclair Units Water Plant at 4-1-8-29W1, filtered, and pumped up to injection system pressure. A diagram of the Sinclair water injection system and new pipeline connection to the proposed Sinclair Unit No. 20 project area injection wells is shown as Figure 11.

Produced water is not currently used for any water injection in the Tundra operated Sinclair Units due to technical and economic factors that limit Tundra's ability to filter down to the necessary particle size for this tight formation. Therefore, there are no current plans to use produced water as a source supply for Sinclair Unit No. 20.

Since all producing Middle Bakken/Three Forks wells in the Daly Sinclair areas, whether vertical or horizontal, have been hydraulically fractured, produced waters from these wells are inherently a mixture of Three Forks and Bakken native sources. This mixture of produced waters has been extensively tested for compatibility with 100/14-30 source Mannville water, by a highly qualified third party, prior to implementation by Tundra. All potential mixture ratios between the two waters, under a range of temperatures, have been simulated and evaluated for scaling and precipitate producing tendencies.

Testing of multiple scale inhibitors has also been conducted and minimum inhibition concentration requirements for the source water volume determined. At present, continuous scale inhibitor application is maintained into the source water stream out of the Sinclair injection water facility. Review and monitoring of the source water scale inhibition system is also part of an existing routine maintenance program.

Injection Wells

The water injection wells for the proposed Sinclair Unit No. 20 will be current producing wells configured downhole for injection as shown in **Figure 12**. The horizontal injection wells will have been stimulated by multiple hydraulic fracture treatments to obtain suitable injection. Tundra has extensive experience with horizontal fracturing in the area, and all jobs are rigorously programmed and monitored during execution. This helps ensure optimum placement of each fracture stage to prevent, or minimize, the potential for out-of-zone fracture growth and thereby limit the potential for future out-of-zone injection.

Wellhead injection pressures will be maintained below the least value of either:

- the area specific known and calculated fracture gradient, or
- the licensed surface injection Maximum Allowable Pressure (MOP)

Tundra has a thorough understanding of area fracture gradients. A management program will be utilized to set and routinely review injection target rates and pressures vs. surface MOP and the known area formation fracture pressures.

All new water injection wells are surface equipped with injection volume metering and rate/pressure control. An operating procedure for monitoring water injection volumes and meter balancing will also be utilized to monitor the entire system measurement and integrity on a daily basis.

The proposed Sinclair Unit No. 20 horizontal water injection well rate is forecasted to average **10 - 30 m³ WPD**, based on expected reservoir permeability and pressure.

Reservoir Pressure

A month long pressure build-up test was conducted on 103/16-13-008-29 at the time of drilling, from February 3rd, 2017 to March 2nd, 2017.

UWI	Depth (mTVD)	Pressure (kPa)	Temperature (°C)
03/16-13-008-29W1/0	923.2	4334.3	30.6

Reservoir Pressure Management during Waterflood

Tundra expects it will take 2-4 years to re-pressurize the reservoir due to cumulative primary production voidage and pressure depletion. Initial monthly Voidage Replacement Ratio (VRR) is expected to be approximately 1.25 to 2.00 within the patterns during the fill up period. As the cumulative VRR approaches

1, target reservoir operating pressure for waterflood operations will be 75-90% of original reservoir pressure.

Waterflood Surveillance and Optimization

Sinclair Unit No. 20 EOR response and waterflood surveillance will consist of the following:

- Regular production well rate and WCT testing
- Daily water injection rate and pressure monitoring vs target
- Water injection rate/pressure/time vs. cumulative injection plot
- Reservoir pressure surveys as required to establish pressure trends
- Pattern VRR
- Potential use of chemical tracers to track water injector/producer responses
- Use of some or all of: Water Oil Ratio (WOR) trends, Log WOR vs Cum Oil, Hydrocarbon Pore Volumes Injected, Conformance Plots

The above surveillance methods will provide an ever increasing understanding of reservoir performance, and provide data to continually control and optimize the Sinclair Unit No. 20 waterflood operation. Controlling the waterflood operation will significantly reduce or eliminate the potential for out-of-zone injection, undesired channeling or water breakthrough, or out-of-Unit migration. The monitoring and surveillance will also provide early indicators of any such issues so that waterflood operations may be altered to maximize ultimate secondary reserves recovery from the proposed Sinclair Unit No. 20.

On Going Reservoir Pressure Surveys

Any pressures taken during the operation of the proposed unit will be reported within the Annual Progress Reports for Sinclair Unit No. 20 as per Section 73 of the Drilling and Production Regulation.

Economic Limits

Under the current Primary recovery method, existing wells within the proposed Sinclair Unit No. 20 will be deemed uneconomic when the net oil rate and net oil price revenue stream becomes less than the current producing operating costs. With any positive oil production response under the proposed Secondary recovery method, the economic limit will be significantly pushed out into the future. The actual economic cut off point will then again be a function of net oil price, the magnitude and duration of production rate response to the waterflood, and then current operating costs. Waterflood projects generally become uneconomic to operate when Water Oil Ratios (WOR's) exceed 100.

WATER INJECTION FACILITIES

The Sinclair Unit No. 20 waterflood operation will utilize the existing Tundra operated source well supply and water plant (WP) facilities located at 4-1-8-29W1 Battery. Injection wells will be connected to the existing high pressure water pipeline system supplying other Tundra-operated Waterflood Units.

A complete description of all planned system design and operational practices to prevent corrosion related failures is shown in **Figure 13**.

NOTIFICATION OF MINERAL AND SURFACE RIGHTS OWNERS

Tundra is in the process of notifying all mineral rights and surface rights owners of this proposed EOR project and formation of Sinclair Unit No. 20. Copies of the notices and proof of service, to all surface and mineral rights owners will be forwarded to the Petroleum Branch when available to complete the Sinclair Unit No. 20 Application.

Sinclair Unit No. 20 Unitization, and execution of the formal Sinclair Unit No. 20 Agreement by affected Mineral Owners, is expected during Q3 2017. Copies of same will be forwarded to the Petroleum Branch, when available, to complete the Sinclair Unit No. 20 Application.

Should the Petroleum Branch have further questions or require more information, please contact Abhy [REDACTED] at 403.767.1247 or by email at abhy.pandey@tundraoilandgas.com.

TUNDRA OIL & GAS LIMITED

Original Signed by Abhy [REDACTED] July 14th, 2017, in Calgary, AB

Proposed Sinclair Unit No. 20

Application for Enhanced Oil Recovery Waterflood Project

List of Figures

Figure 1	Daly Sinclair Field Area Map
Figure 2	Sinclair Unit No. 20 Proposed Boundary
Figure 3	Bakken-Three Forks A Pool
Figure 4	Sinclair Unit No. 20 Historical Production
Figure 5	Sinclair Unit No. 20 Development Plan
Figure 6	Sinclair Unit No. 5 Production Profile
Figure 7	Sinclair Unit No. 20 Primary Recovery – Rate v. Time
Figure 8	Sinclair Unit No. 20 Primary Recovery – Rate v. Cumulative Oil
Figure 9	Sinclair Unit No. 20 Primary + Secondary Recovery – Rate v. Time
Figure 10	Sinclair Unit No. 20 Primary + Secondary Recovery – Rate v. Cumulative Oil
Figure 11	Sinclair Unit No. 20 Injection Facilities Process Flow Diagram
Figure 12a	Typical Cemented Liner Water Injection Well Downhole Diagram
Figure 12b	Typical Openhole Water Injection Well Downhole Diagram
Figure 13	Planned Corrosion Program

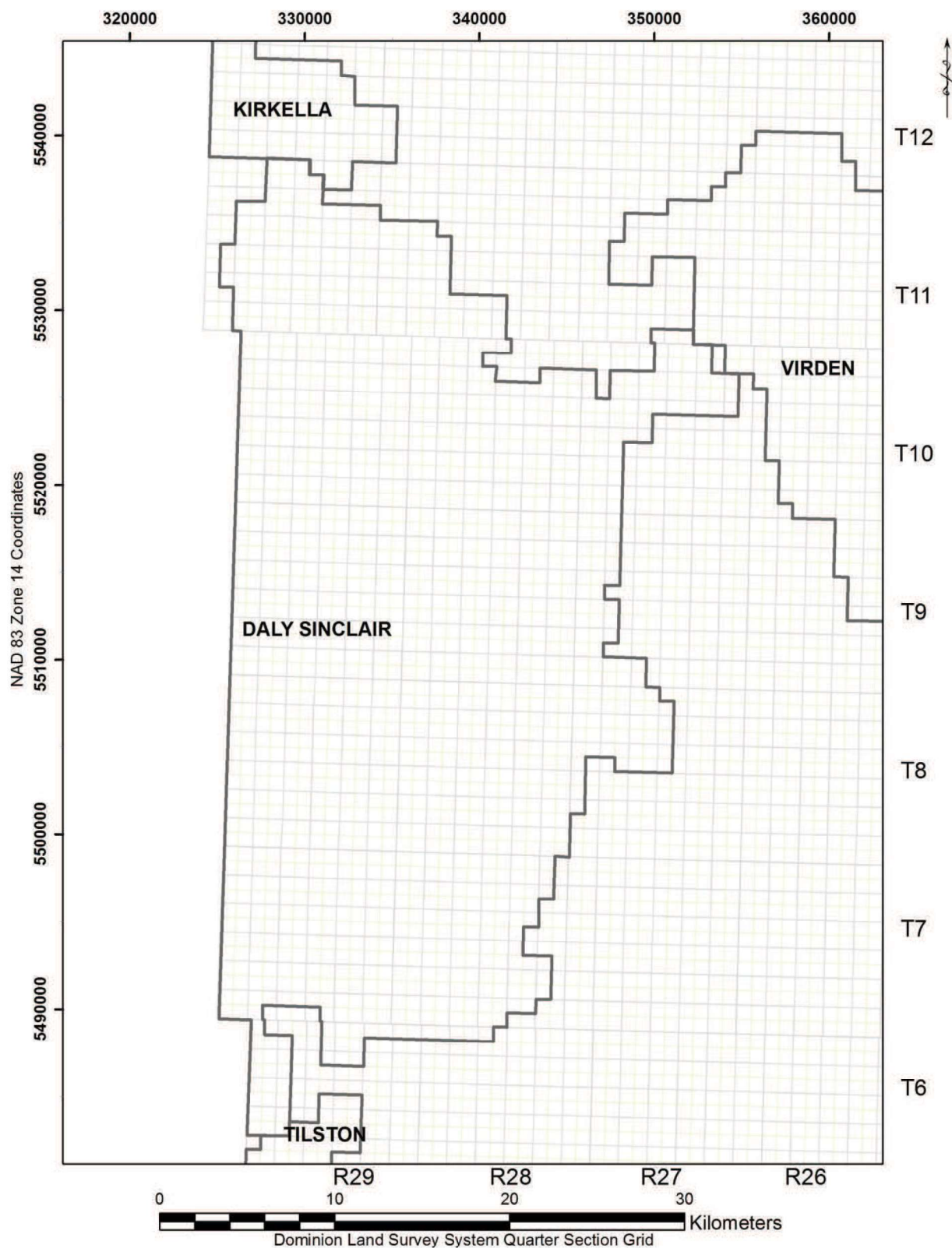
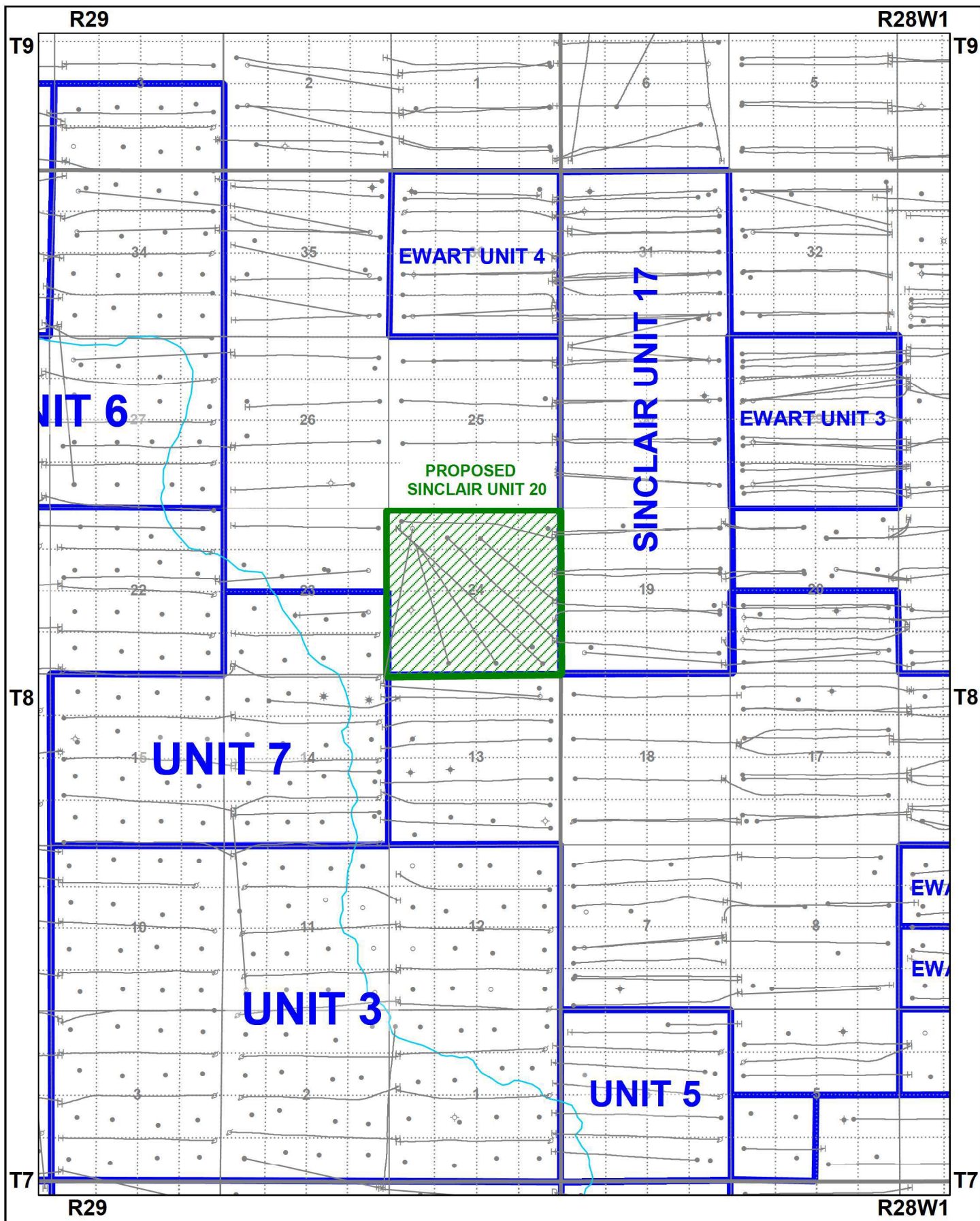


Figure 2 - Daly Sinclair Field (01)

Figure No. 2



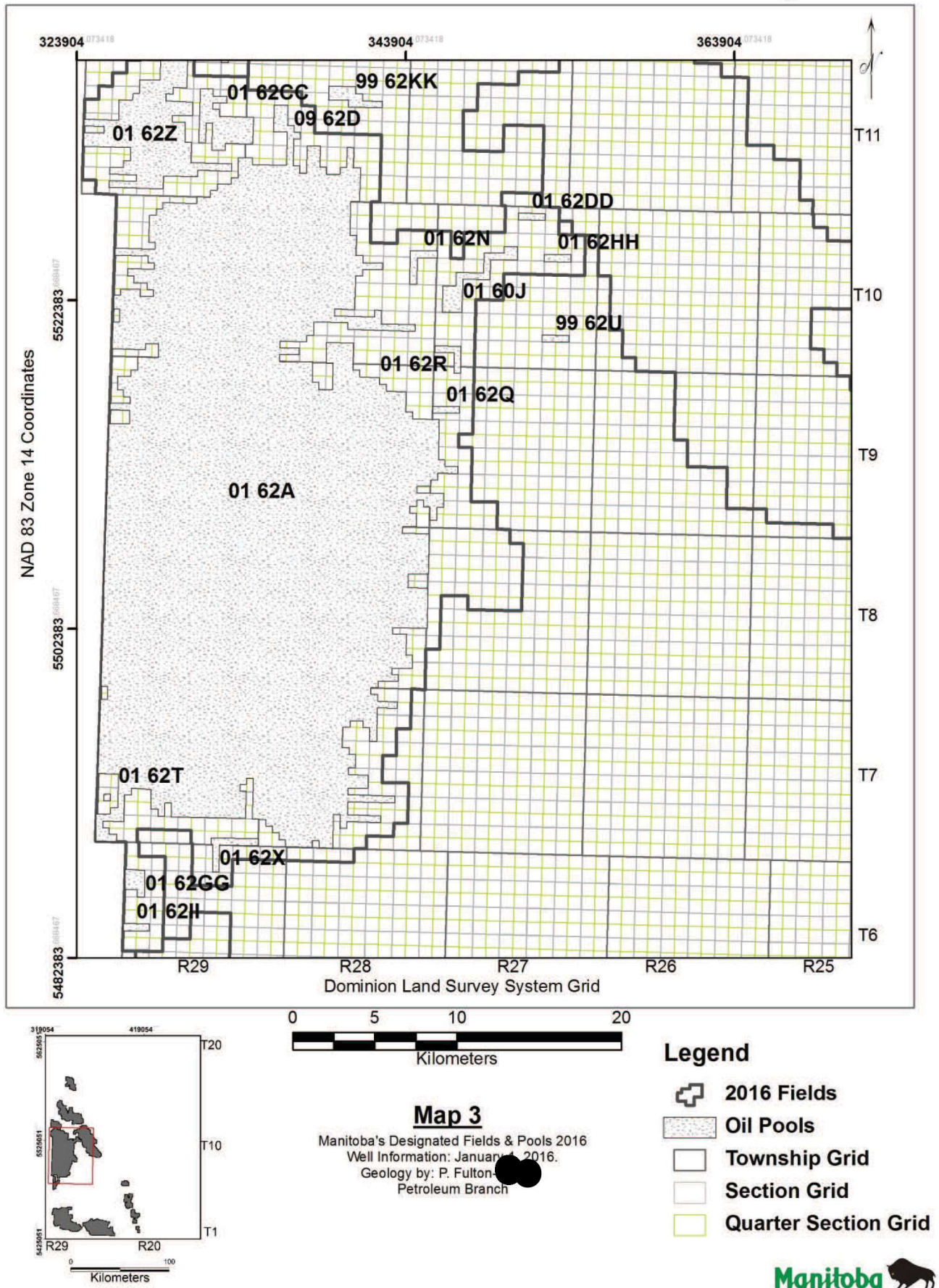
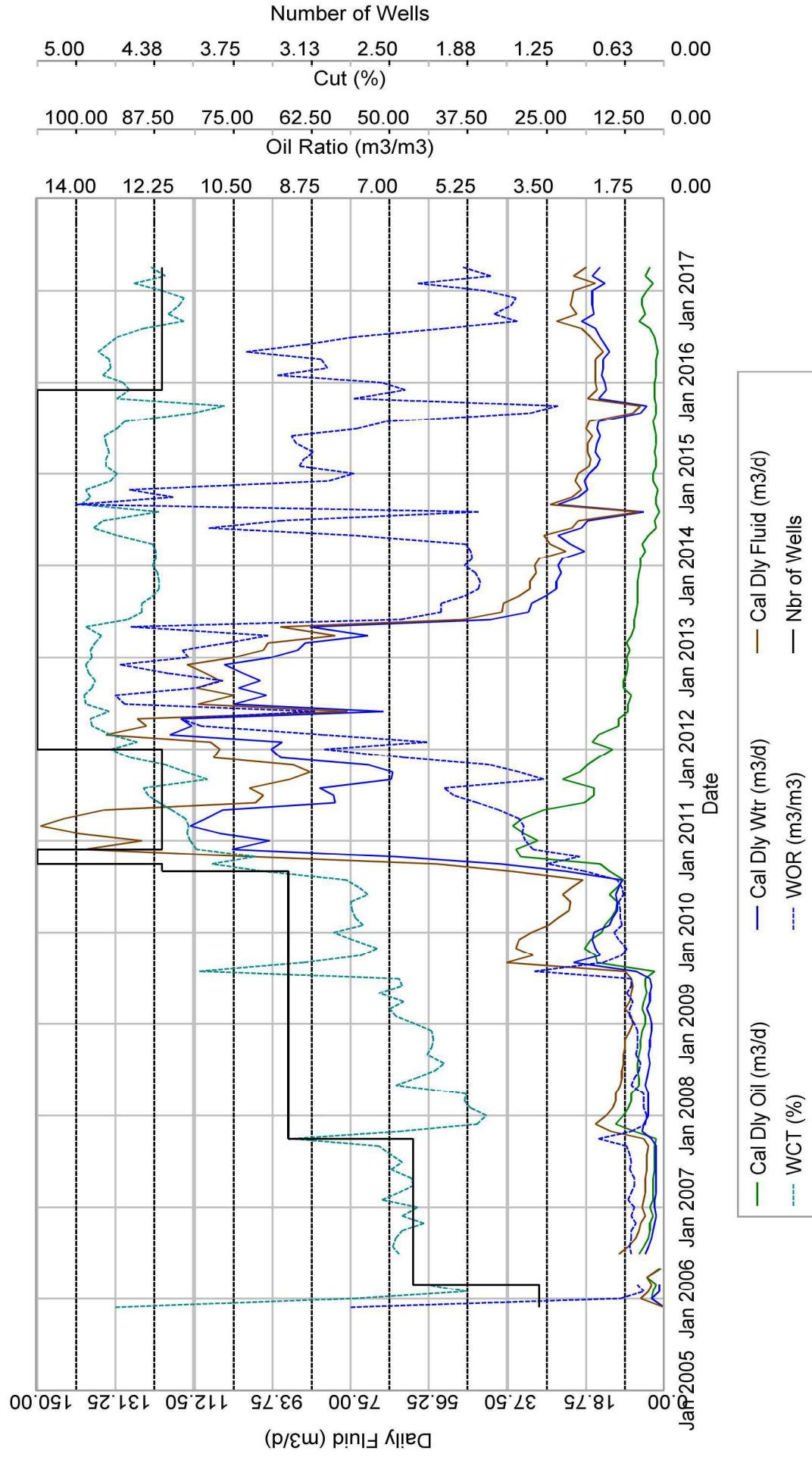


Figure No. 4

Production Graph

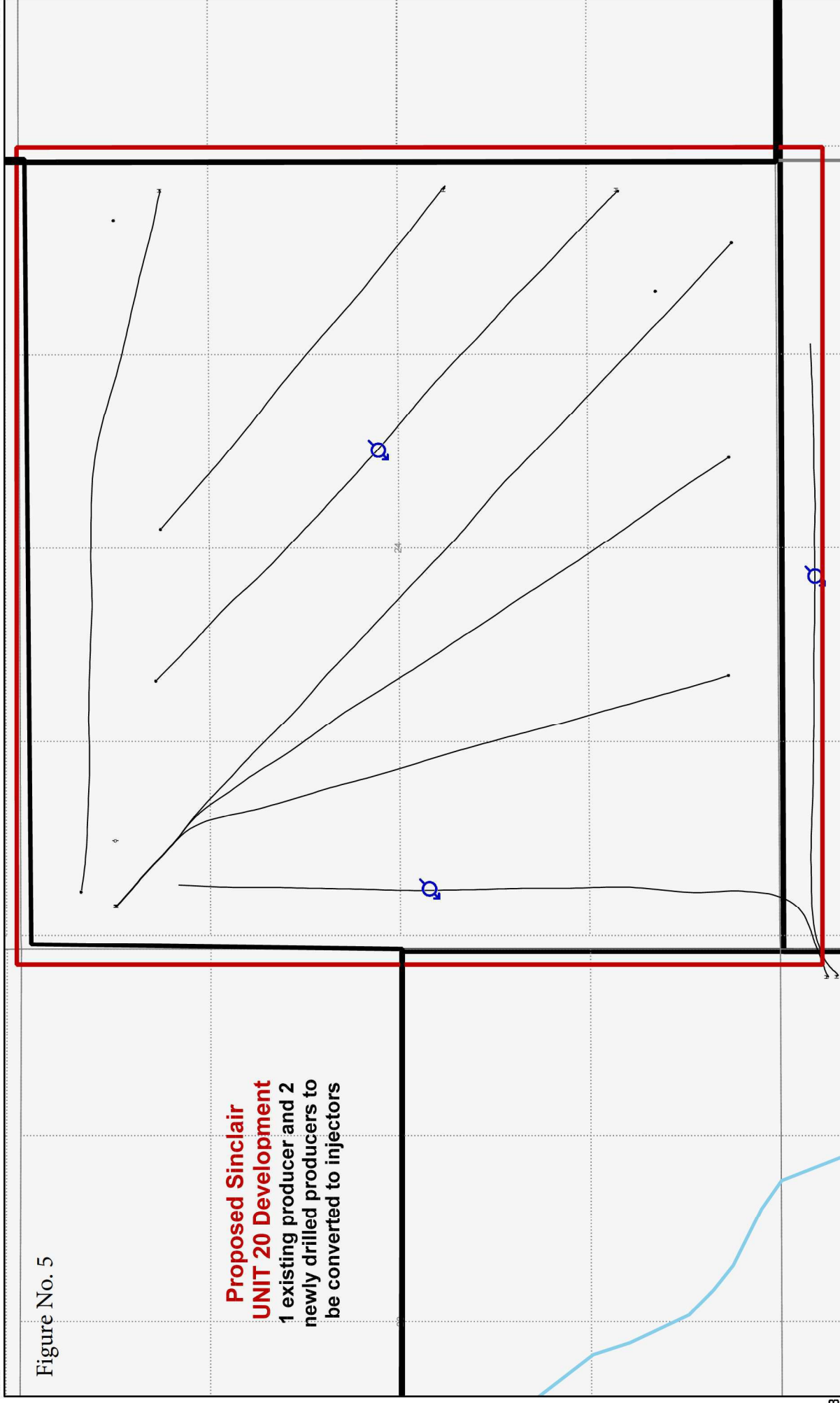
Group:	sinclair unit no. 20 well list.iwell	On Prod:	2005-11 to 2017-03	Cum Oil:	32990.2 m3
# of Wells:	10	Prod Form:	BAKKEN; TORQUAY	Cum Gas:	0.0 E3m3
Fluid:	Oil	Field:	DALY (MB1)	Cum Wtr:	124184.5 m3
Mode:	Drilled & Cased; Producing	Pool Code:	MB000162A	Cum Inj Oil:	0.0 m3
		Unit Code:		Cum Inj Gas:	0.0 E3m3
				Cum Inj Wtr:	0.0 m3



R29

Figure No. 5

**Proposed Sinclair
UNIT 20 Development**
1 existing producer and 2
newly drilled producers to
be converted to injectors



T8

R29

R28W1

T8

Datum: NAD27 Projection: Stereographic DLS Version AB: ATIS 2.6, BC: PRB 2.0, SK: STS 2.5, MB: ML07



Figure No. 6

Production Graph

Group:	sinclair unit no. 5 well list.lwell	On Prod:	2005-03 to 2017-03	Cum Oil:	87984.9 m3
# of Wells:	11	Prod Form:	TORQUAY; BAKKEN; BAKKENM; THREEFK	Cum Gas:	0.0 E3m3
Fluid:	Oil; Water Injection	Field:	DALY (MB1)	Cum Wtr:	76333.3 m3
Mode:	Producing; Injection	Pool Code:	MB000162A	Cum Inj Oil:	0.0 m3
		Unit Code:	162A05	Cum Inj Gas:	0.0 E3m3
				Cum Inj Wtr:	89650.9 m3

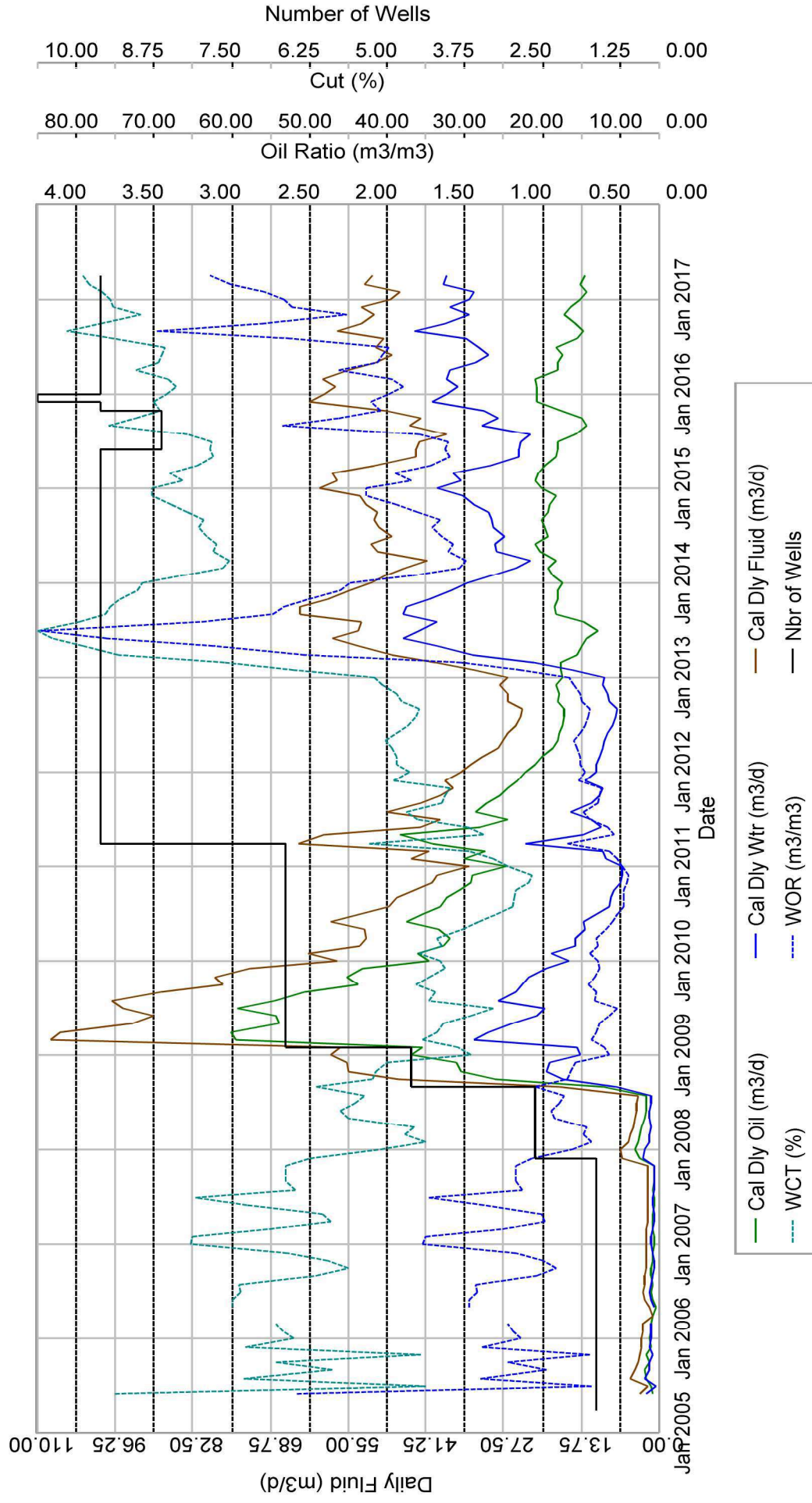


Figure No. 7

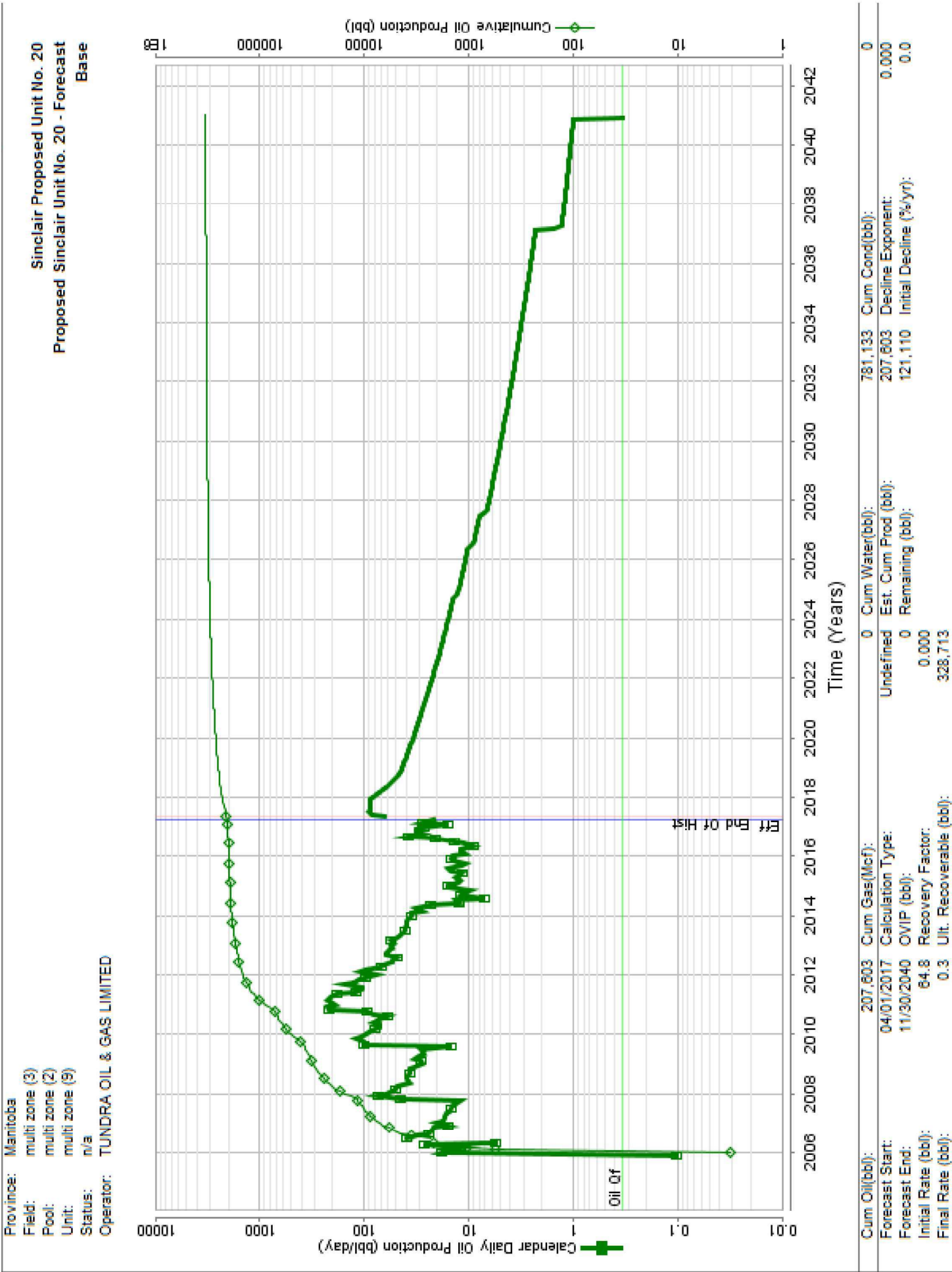
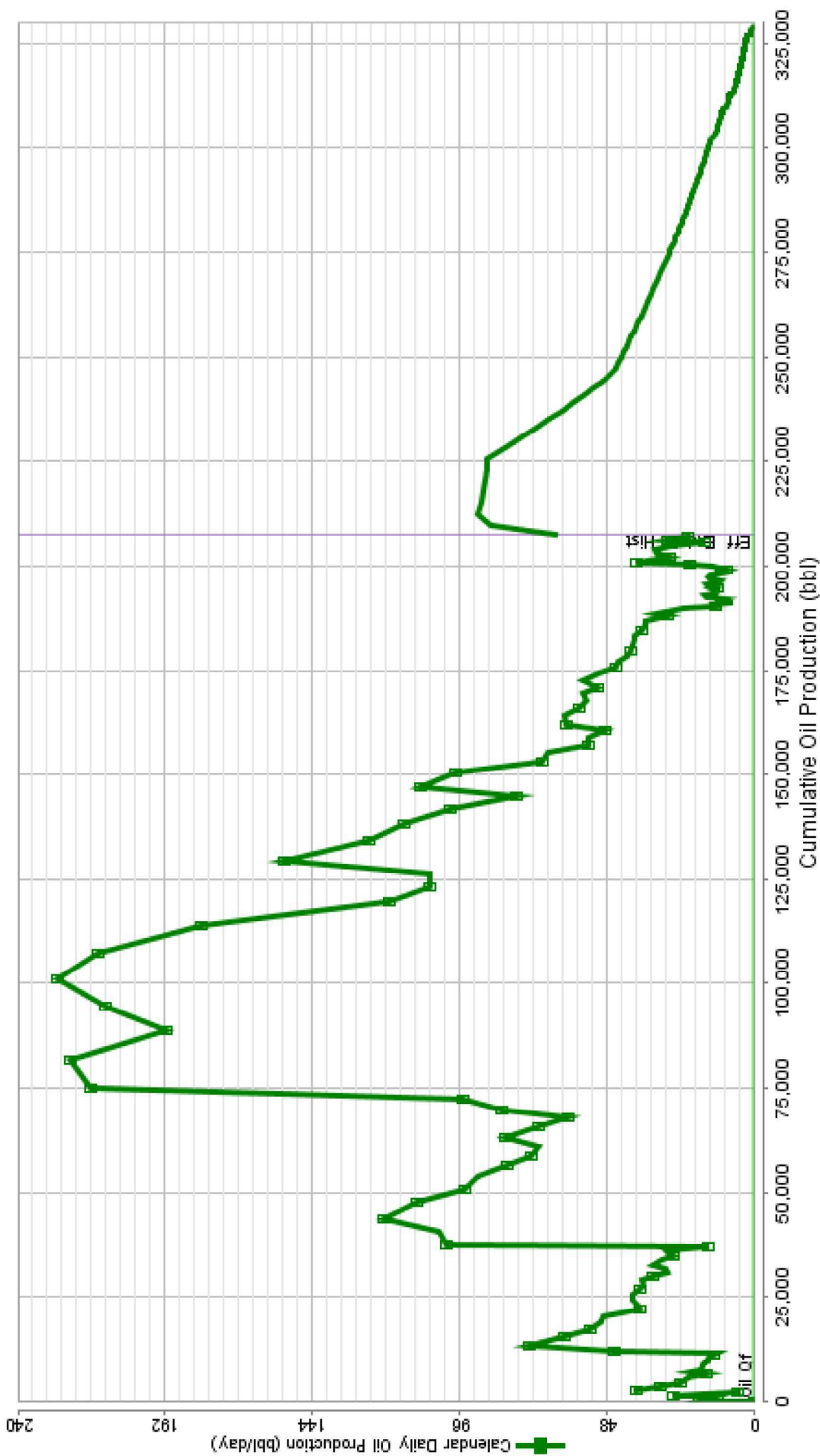


Figure No. 8

Sinclair Proposed Unit No. 20
Proposed Sinclair Unit No. 20 - Forecast
Base

Province: Manitoba
Field: multi zone (3)
Pool: multi zone (2)
Unit: multi zone (9)
Status: n/a
Operator: TUNDRA OIL & GAS LIMITED

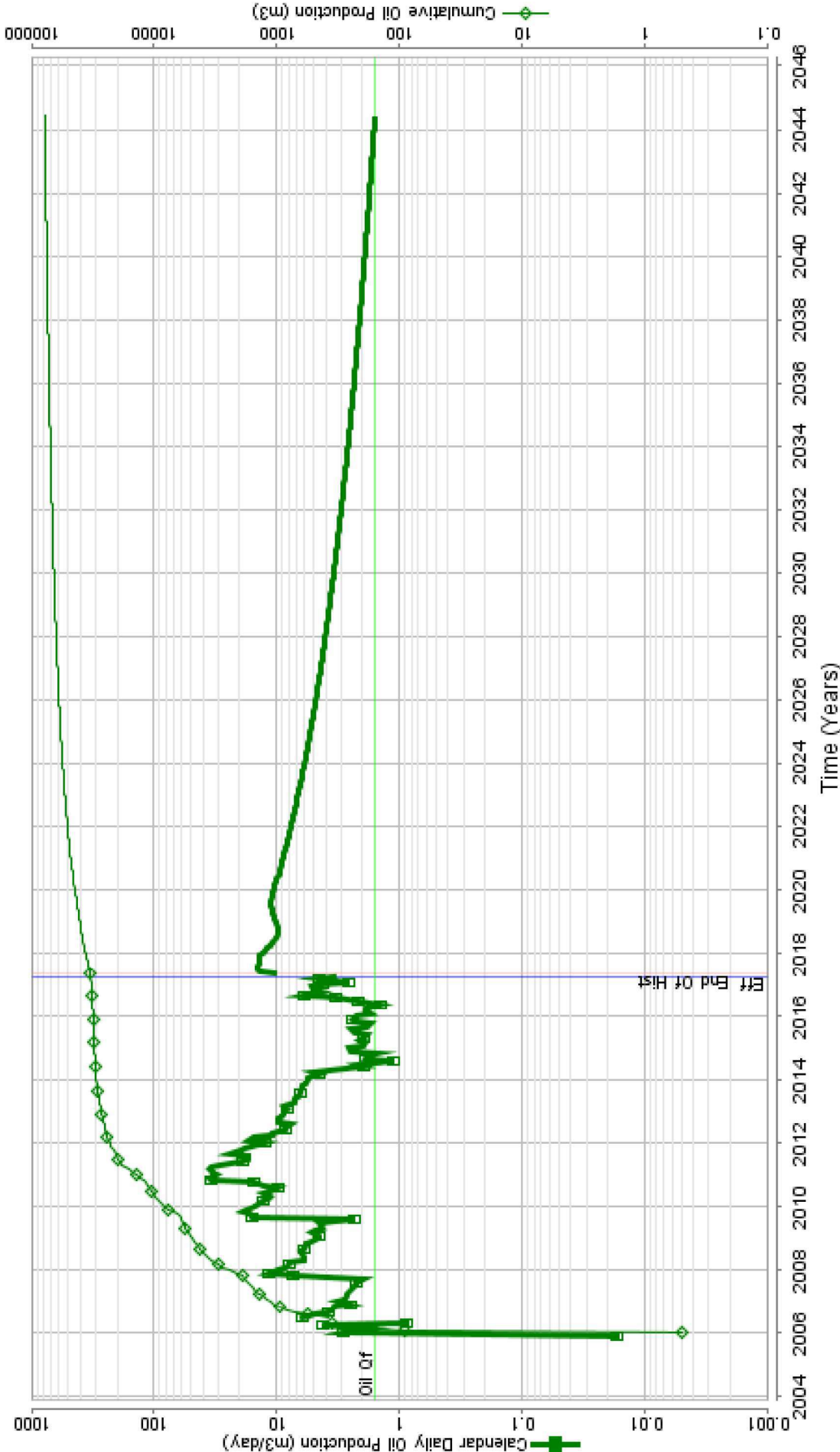


Cum Oil(bbl):	207,803	Cum Gas(Mcf):	0	Cum Water(bbl):	781,133	Cum Cond(bbl):	0
Forecast Start:	04/01/2017	Calculation Type:	Undefined	Est. Cum Prod (bbl):	207,803	Decline Exponent:	0.000
Forecast End:	11/30/2040	OVIIP (bbl):	0	Remaining (bbl):	121,110	Initial Decline (%/yr):	0.0
Initial Rate (bbl):	84.8	Recovery Factor:	0.000				
Final Rate (bbl):	0.3	Ult. Recoverable (bbl):	328,713				

Figure No. 9

Sinclair Proposed Unit No. 20
Proposed Sinclair Unit No. 20 - Forecast
Base + Growth 1

Province: Manitoba
Field: multi zone (3)
Pool: multi zone (2)
Unit: multi zone (9)
Status: n/a
Operator: TUNDRA OIL & GAS LIMITED

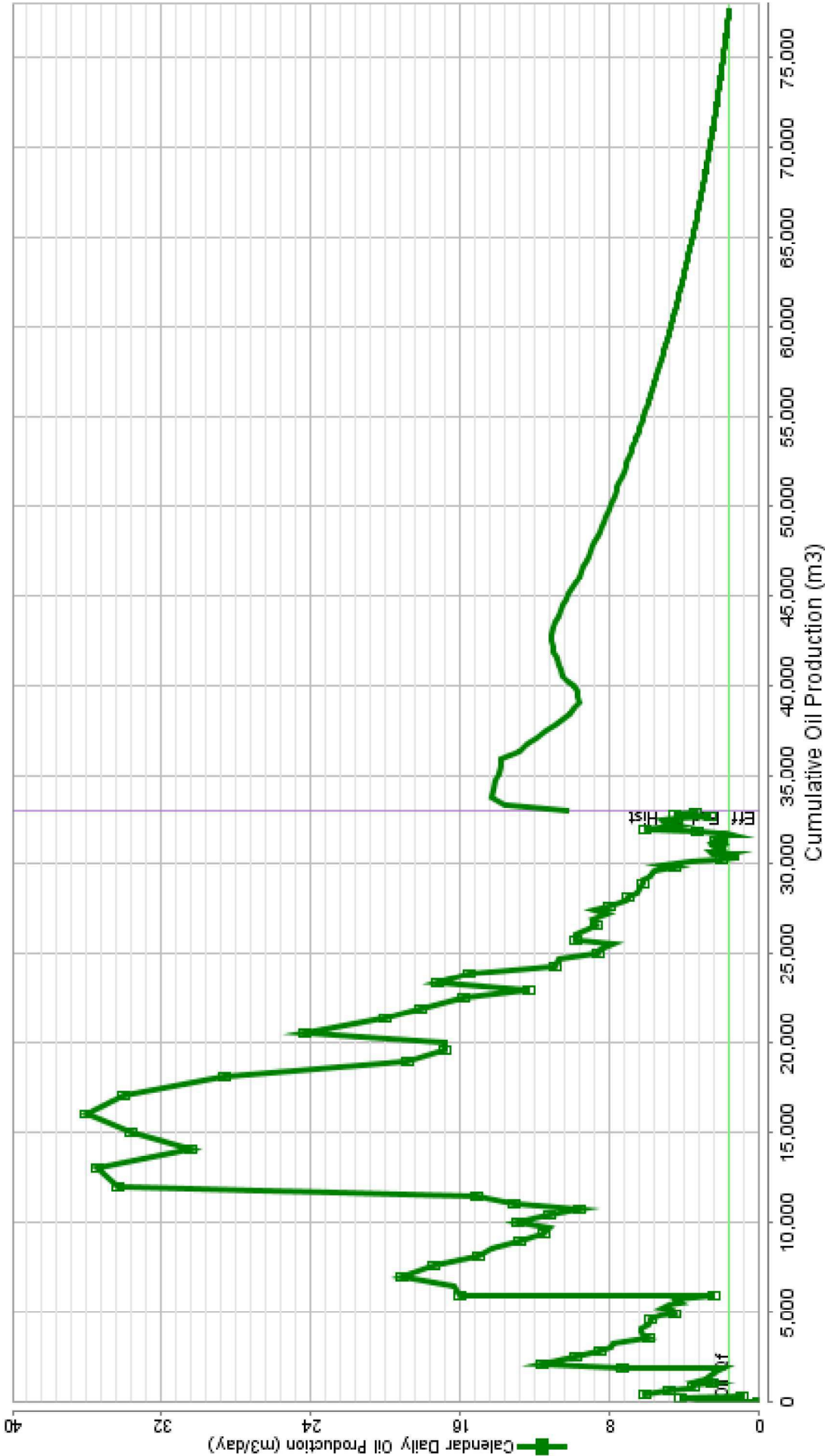


Cum Oil(m3):	32,990	Cum Gas(E3m3):	0	Cum Water(m3):	124,184	Cum Cond(m3):	0
Forecast Start:	04/01/2017	Calculation Type:	Undefined	Est. Cum Prod (m3):	32,990	Decline Exponent:	0.000
Forecast End:	04/25/2044	OVIP (m3):	0	Remaining (m3):	44,883	Initial Decline (%/yr):	0.0
Initial Rate (m3):	10.3	Recovery Factor:	0.000				
Final Rate (m3):	1.6	Ult. Recoverable (m3):	77,673				

Figure No. 10

Sinclair Proposed Unit No. 20
Proposed Sinclair Unit No. 20 - Forecast
Base + Growth 1

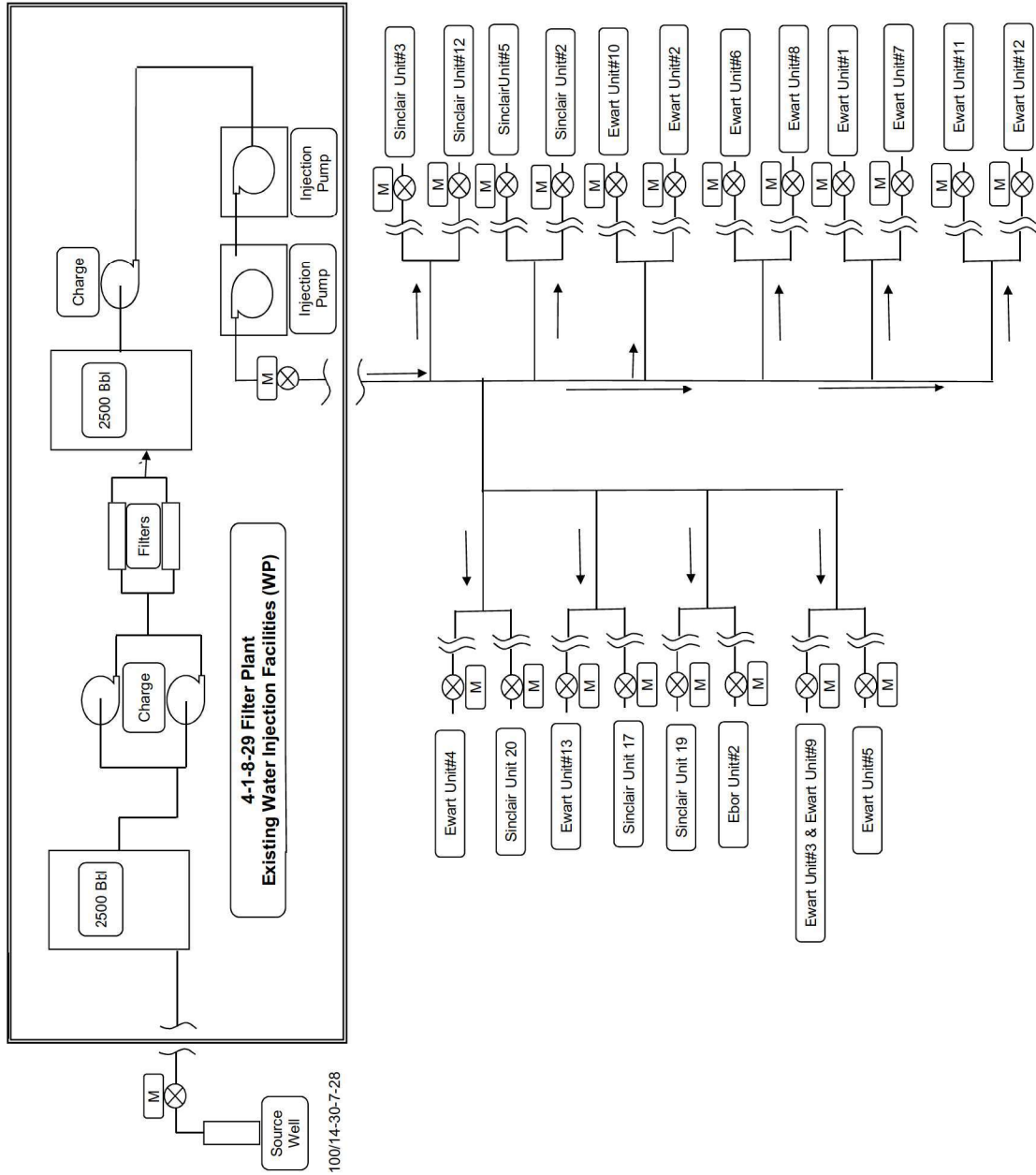
Province: Manitoba
Field: multi zone (3)
Pool: multi zone (2)
Unit: multi zone (9)
Status: n/a
Operator: TUNDRA OIL & GAS LIMITED



Cum Oil(m3):	32,990	Cum Gas(E3m3):	0	Cum Water(m3):	124,184	Cum Cond(m3):	0
Forecast Start:	04/01/2017	Calculation Type:	Undefined	Est. Cum Prod (m3):	32,990	Decline Exponent:	0.000
Forecast End:	04/25/2044	OVIP (m3):	0	Remaining (m3):	44,683	Initial Decline (%/yr):	0.0
Initial Rate (m3):	10.3	Recovery Factor:	0.000				
Final Rate (m3):	1.6	Ult. Recoverable (m3):	77,673				

FIGURE NO. 11

Sinclair Water Injection System



100/14-30-7-28

[illegible]

[illegible]

Sinclair Unit No. 20

EOR Waterflood Project

Planned Corrosion Control Program **

Source Well

- Continuous downhole corrosion inhibition
- Continuous surface corrosion inhibitor injection
- Downhole scale inhibitor injection
- Corrosion resistant valves and internally coated surface piping

Pipelines

- Source well to 3-4-8-29 Water Plant – Fiberglass
- New High Pressure Pipeline to Unit 9 injection wells – 2000 psi high pressure Fiberglass

Facilities

- 3-4-8-29 Water Plant and New Injection Pump Station
 - Plant piping – 600 ANSI schedule 80 pipe, Fiberglass or Internally coated
 - Filtration – Stainless steel bodies and PVC piping
 - Pumping – Ceramic plungers, stainless steel disc valves
 - Tanks – Fiberglass shell, corrosion resistant valves

Injection Wellhead / Surface Piping

- Corrosion resistant valves and stainless steel and/or internally coated steel surface piping

Injection Well

- Casing cathodic protection where required
- Wetted surfaces coated downhole packer
- Corrosion inhibited water in the annulus between tubing / casing
- Internally coated tubing surface to packer
- Surface freeze protection of annular fluid
- Corrosion resistant master valve
- Corrosion resistant pipeline valve

Producing Wells

- Casing cathodic protection where required
- Downhole batch corrosion inhibition as required
- Downhole scale inhibitor injection as required

Figure 13

** subject to final design and engineering

Proposed Sinclair Unit No. 20

Application for Enhanced Oil Recovery Waterflood Project

List of Tables

Table 1	Tract Participation
Table 2	Tract Factor Calculation
Table 3	Current Well List and Status
Table 4	Original Oil in Place and Recovery Factors

TABLE NO. 1: TRACT PARTICIPATION FOR PROPOSED SINCLAIR UNIT NO. 20

Tract No.	Working Interest		Royalty Interest		Share (%)	Tract Participation
	Land Description	Owner	Share (%)	Owner		
1	01-24-008-29W1M	Tundra Oil & Gas Limited	100%	Minister of Finance - Manitoba	100%	5.375408169%
2	02-24-008-29W1M	Tundra Oil & Gas Limited	100%	Minister of Finance - Manitoba	100%	5.055500036%
3	03-24-008-29W1M	Tundra Oil & Gas Limited	100%	Minister of Finance - Manitoba	100%	4.662640997%
4	04-24-008-29W1M	Tundra Oil & Gas Limited	100%	Minister of Finance - Manitoba	100%	5.218753118%
5	05-24-008-29W1M	Tundra Oil & Gas Limited	100%	Minister of Finance - Manitoba	100%	7.942780337%
6	06-24-008-29W1M	Tundra Oil & Gas Limited	100%	Minister of Finance - Manitoba	100%	5.721480913%
7	07-24-008-29W1M	Tundra Oil & Gas Limited	100%	Minister of Finance - Manitoba	100%	5.310194749%
8	08-24-008-29W1M	Tundra Oil & Gas Limited	100%	Minister of Finance - Manitoba	100%	5.224787650%
9	09-24-008-29W1M	Tundra Oil & Gas Limited	100%	Minister of Finance - Manitoba	100%	6.550428192%
10	10-24-008-29W1M	Tundra Oil & Gas Limited	100%	Minister of Finance - Manitoba	100%	6.187170464%
11	11-24-008-29W1M	Tundra Oil & Gas Limited	100%	Minister of Finance - Manitoba	100%	7.058138723%
12	12-24-008-29W1M	Tundra Oil & Gas Limited	100%	Minister of Finance - Manitoba	100%	7.082971404%
13	13-24-008-29W1M	Tundra Oil & Gas Limited	100%	Minister of Finance - Manitoba	100%	6.522429558%
14	14-24-008-29W1M	Tundra Oil & Gas Limited	100%	Minister of Finance - Manitoba	100%	7.035202633%
15	15-24-008-29W1M	Tundra Oil & Gas Limited	100%	Minister of Finance - Manitoba	100%	7.478434150%
16	16-24-008-29W1M	Tundra Oil & Gas Limited	100%	Minister of Finance - Manitoba	100%	7.573678907%
						100.0000000000%

TABLE NO. 2: TRACT FACTOR CALCULATIONS FOR SINCLAIR UNIT NO. 20
TRACT FACTORS BASED ON OIL-IN-PLACE (OOIP) - CUMULATIVE PRODUCTION TO MARCH 2017

LS-SE	Tract	OOIP (m3)	HZ Wells Alloc Prod (m3)	Vert Wells Cum Prodn (m3)	Sum Hz + Vert Alloc Cum Prodn	OOIP - Cum	OOIP - Cum Tract Factor	Tract
01-24	01-24-008-29W1M	56,444	1,605.7	3149.9	4,755.6	51,688	5.375408169%	01-24-008-29W1M
02-24	02-24-008-29W1M	50,475	1,862.6	0.0	1,862.6	48,612	5.055500036%	02-24-008-29W1M
03-24	03-24-008-29W1M	46,441	1,606.8	0.0	1,606.8	44,834	4.662640997%	03-24-008-29W1M
04-24	04-24-008-29W1M	50,253	70.9	0.0	70.9	50,182	5.218753118%	04-24-008-29W1M
05-24	05-24-008-29W1M	77,151	775.3	0.0	775.3	76,375	7.942780337%	05-24-008-29W1M
06-24	06-24-008-29W1M	57,768	2,751.7	0.0	2,751.7	55,016	5.721480913%	06-24-008-29W1M
07-24	07-24-008-29W1M	53,520	2,459.2	0.0	2,459.2	51,061	5.310194749%	07-24-008-29W1M
08-24	08-24-008-29W1M	52,101	1,860.8	0.0	1,860.8	50,240	5.224787650%	08-24-008-29W1M
09-24	09-24-008-29W1M	65,687	2,700.0	0.0	2,700.0	62,987	6.550428192%	09-24-008-29W1M
10-24	10-24-008-29W1M	63,704	4,210.6	0.0	4,210.6	59,494	6.187170464%	10-24-008-29W1M
11-24	11-24-008-29W1M	70,385	2,516.3	0.0	2,516.3	67,869	7.058138723%	11-24-008-29W1M
12-24	12-24-008-29W1M	69,750	1,642.2	0.0	1,642.2	68,108	7.082971404%	12-24-008-29W1M
13-24	13-24-008-29W1M	63,623	905.7	0.0	905.7	62,718	6.522429558%	13-24-008-29W1M
14-24	14-24-008-29W1M	68,855	1,206.3	0.0	1,206.3	67,648	7.035202633%	14-24-008-29W1M
15-24	15-24-008-29W1M	73,876	1,965.8	0.0	1,965.8	71,910	7.478434150%	15-24-008-29W1M
16-24	16-24-008-29W1M	74,526	66.0	1634.1	1,700.1	72,826	7.573678907%	16-24-008-29W1M
		994,558	28,206.2	4,784.0	32,990.2	961,568	100.0000000000%	

Table No. 3: Sinclair Unit No. 20

UWI	License Number	Type	Pool Name	Producing Zone	Mode	On Production Date	Prod Date	Cal Dly Oil (m3/d)	Monthly Oil (m3)	Cum Prd Oil (m3)	Cal Dly Water (m3/d)	Monthly Water (m3)	Cum Prd Water (m3)	WCT (%)
103/16-13-008-29W1/0	010636	Horizontal	N/A		Drilled & Cased	N/A								
100/01-24-008-29W1/0	005788	Vertical	BAKKEN-THREE FORKS A	BAKKEN	Producing	2/23/2006	Mar-2017	0.6	19.5	3149.9	1.2	36.4	4542.2	65.12
102/01-24-008-29W1/0	006401	Horizontal	BAKKEN-THREE FORKS A	BAKKEN,TORQUAY	Producing	10/1/2007	Mar-2017	2.1	66.2	14706.0	3.5	109.2	14110.1	62.26
100/02-24-008-29W1/2	006401	Horizontal	BAKKEN-THREE FORKS A		Producing	10/1/2007								
100/03-24-008-29W1/3	006401	Horizontal	BAKKEN-THREE FORKS A		Producing	10/1/2007								
100/13-24-008-29W1/0	007408	Horizontal	BAKKEN-THREE FORKS A	BAKKEN	Producing	12/20/2011	Oct-2015	0.0	0.7	394.0	1.4	43.3	17856.8	98.41
102/13-24-008-29W1/0	010647	Horizontal	N/A		Drilled & Cased	N/A								
100/14-24-008-29W1/0	007409	Horizontal	BAKKEN-THREE FORKS A	BAKKEN	Producing	8/10/2010	Mar-2017	0.1	3.2	4649.5	0.2	5.2	37353.2	61.90
100/15-24-008-29W1/0	007410	Horizontal	BAKKEN-THREE FORKS A	BAKKEN	Producing	9/20/2010	Mar-2017	0.5	16.6	8456.7	10.4	322.9	49569.7	95.11
100/16-24-008-29W1/0	005431	Vertical	BAKKEN-THREE FORKS A	BAKKEN,TORQUAY	Producing	11/30/2005	Oct-2010	0.2	6.0	1634.1	0.6	19.9	752.5	76.83
										32990.2			124184.5	

Table No. 4: OOIP Calculation

Tract	Total Area (MTR x MTR)	Isopach SUM (m)	OOIP (m3)	OOIP (bbl)
1-24-8-29W1	168409	8.4	56,444	355,020
2-24-8-29W1	168671	7.5	50,475	317,476
3-24-8-29W1	161659	7.2	46,441	292,106
4-24-8-29W1	161470	7.8	50,253	316,080
5-24-8-29W1	162487	11.9	77,151	485,262
6-24-8-29W1	162675	8.9	57,768	363,347
7-24-8-29W1	167670	8.0	53,520	336,632
8-24-8-29W1	167408	7.8	52,101	327,703
9-24-8-29W1	166292	9.9	65,687	413,157
10-24-8-29W1	166313	9.6	63,704	400,689
11-24-8-29W1	163337	10.8	70,385	442,708
12-24-8-29W1	163375	10.7	69,750	438,712
13-24-8-29W1	164389	9.7	63,623	400,178
14-24-8-29W1	164350	10.5	68,855	433,081
15-24-8-29W1	165315	11.2	73,876	464,665
16-24-8-29W1	165294	11.3	74,526	468,755
		SUM:	994,558	6,255,572

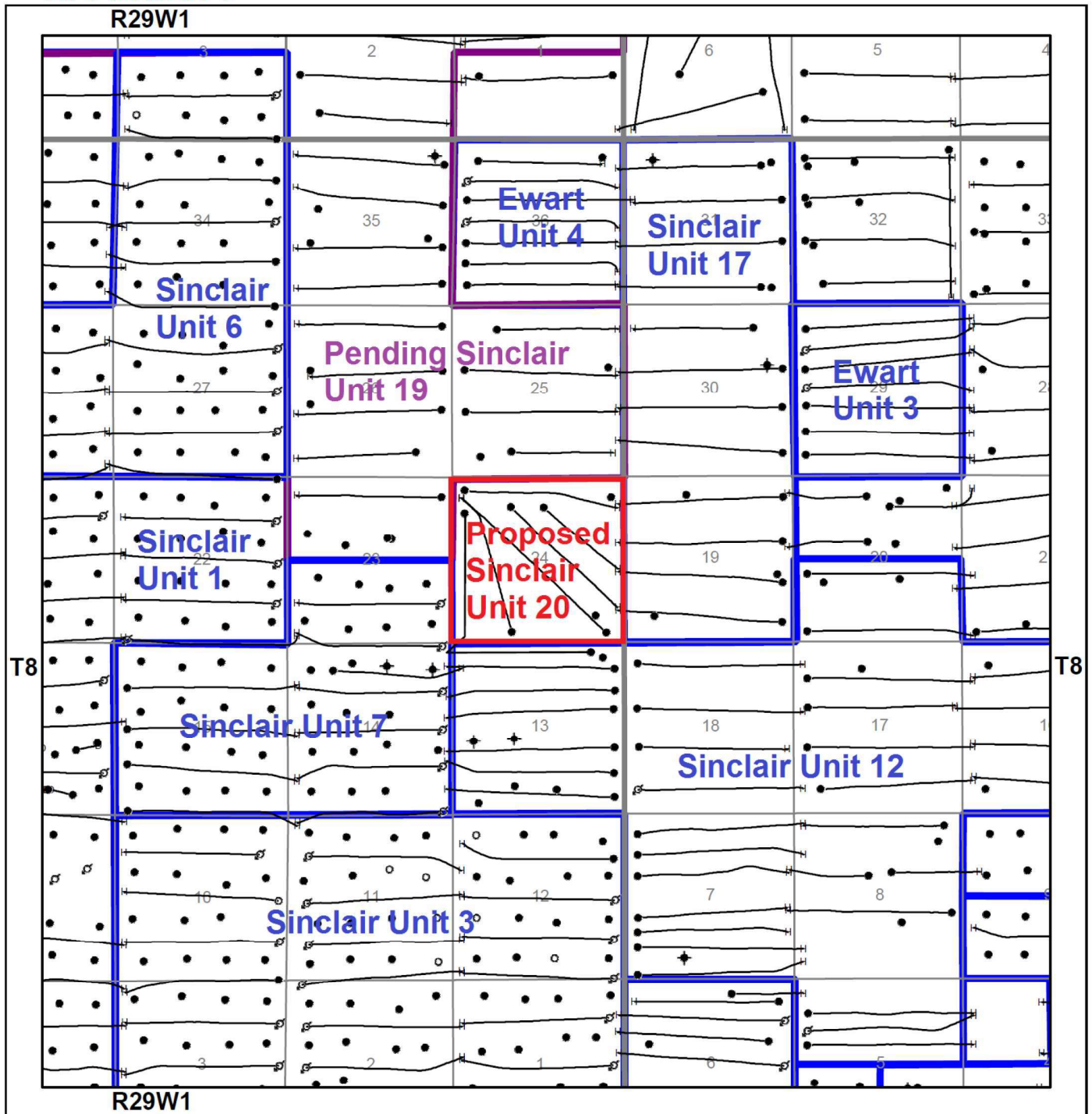
Proposed Sinclair Unit No. 20

Application for Enhanced Oil Recovery Waterflood Project

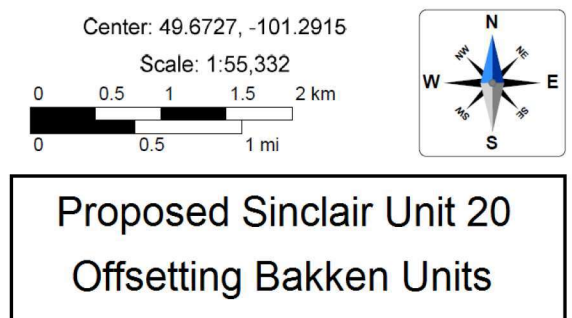
LIST OF APPENDICES

Appendix 1	Sinclair Unit No. 20 – Offsetting Units
Appendix 2	Sinclair Unit No. 20 - Structural Cross Section
Appendix 3	Sinclair Unit No. 20 – Middle Bakken Structure
Appendix 4	Sinclair Unit No. 20 – Middle Bakken Isopach
Appendix 5	Sinclair Unit No. 20 – Upper Lyleton A Isopach
Appendix 6	Sinclair Unit No. 20 – Lower Lyleton A Isopach
Appendix 7	Sinclair Unit No. 20 - Lyleton B Isopach
Appendix 8	Core PDPK Data

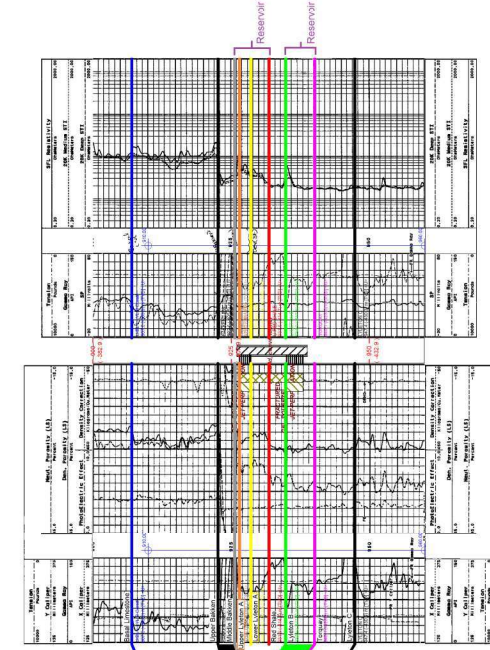
APPENDIX 1



Well Legend	
✱ Abandoned Gas	○ Location
✱ Abandoned Heavy Oil	● Oil
✱ Abandoned Oil	✱ Oil & Gas
✱ Abandoned Oil & Gas	✱ Service or Drain
✱ Abandoned Service	✱ Suspended
○ Canceled	✱ Suspended Gas
○ Drilling	✱ Suspended Heavy Oil
○ Dry & Abandoned	✱ Suspended Oil
✱ Gas	✱ Suspended Oil & Gas
✱ Gas Injection	
✱ Heavy Oil	
✱ Injection	
	Lists
	✱ Wells - Bakken Producing Wells



A



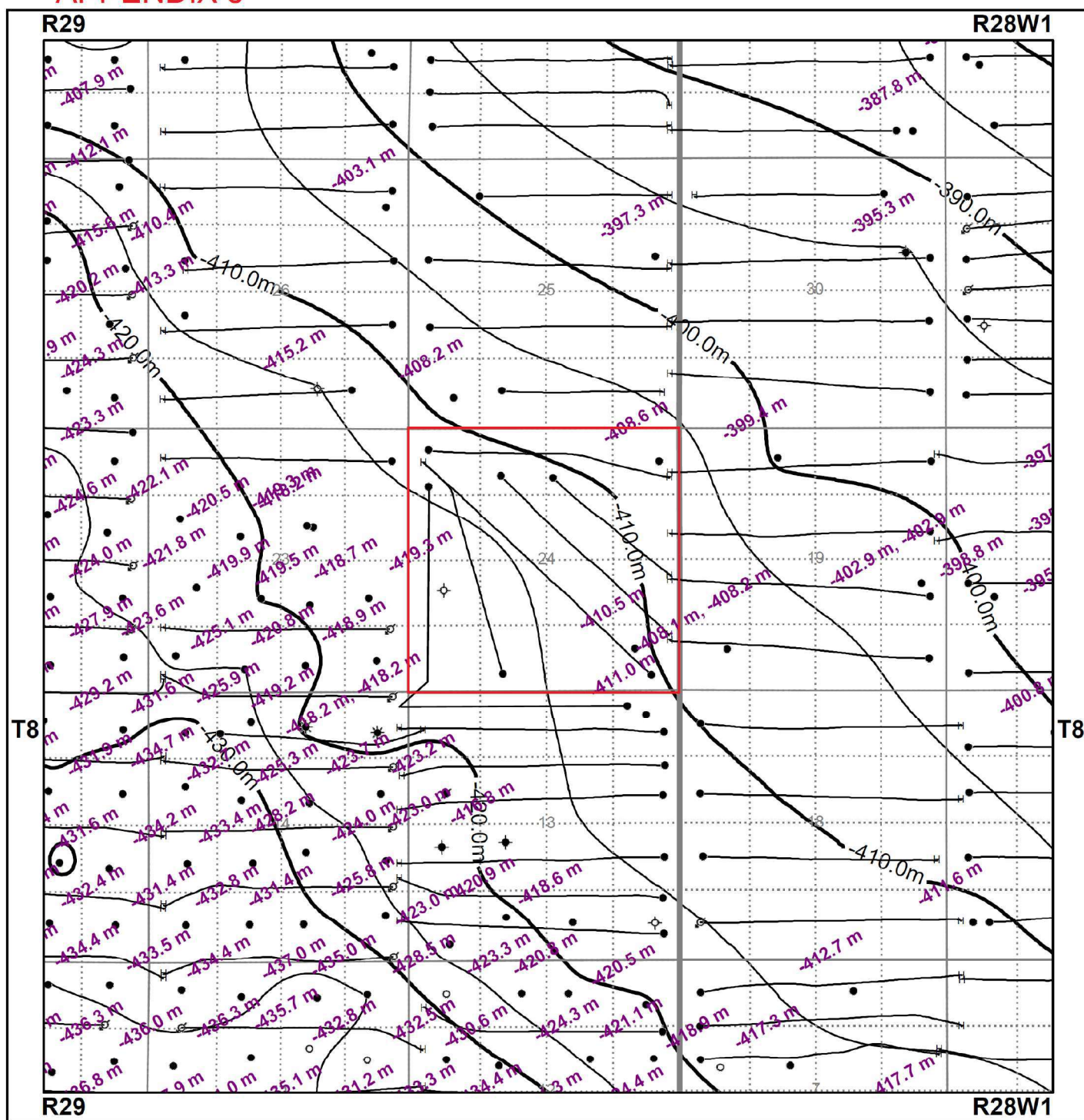
Proposed Sinclair Unit 20
Structural Cross Section
-South West to North East-
Through Proposed Unit Area



Produced by:
AccuLogs
Version 9.0.4 207880
Datum: NAD27
Copyright 2016, IHS

























Author:
Modified On: Thursday, April 13, 2017 09:54AM
Printed On: Thursday, April 13, 2017 09:54AM
Start Formation: 15m. above BAKKEN UPR
End Formation: 10m. below TOROLIAN
Cross Section Name: DALY373

APPENDIX 3



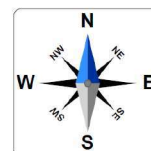
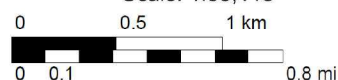
Map Title

Datum: NAD27 Projection: Stereographic DLS Version AB: ATS 2.6, BC: PRB 2.0, SK: STS 2.5, MB: MLI07

Well Legend			
	Abandoned Gas		Gas Injection
	Abandoned Heavy Oil		Heavy Oil
	Abandoned Oil		Injection
	Abandoned Oil & Gas		Location
	Abandoned Service		Oil
	Canceled		Oil & Gas
	Drilling		Service or Drain
	Dry & Abandoned		Suspended
	Gas		Suspended Gas
			Suspended Heavy Oil
			Suspended Oil
			Suspended Oil & Gas
		Lists	
			Wells - Bakken Producing Wells
			Wells - Sinc Daly Verts
		Wells Postings	
		U-Sub (m) (BAKKEN MID)	
			

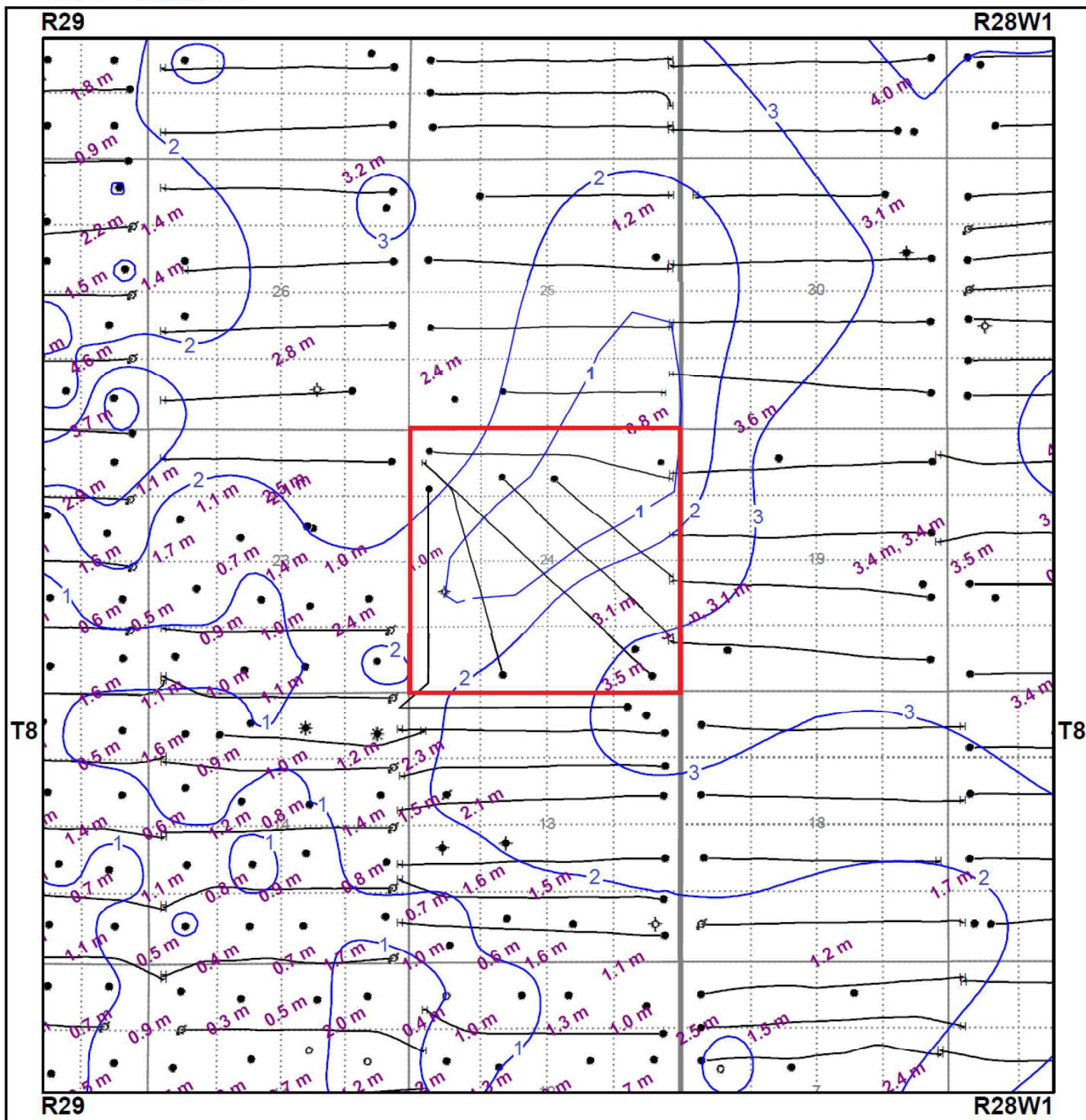
Center: 49.6725, -101.2922

Scale: 1:35.115



Proposed Sinclair Unit 20
Middle Bakken Structure (5m CI)

APPENDIX 4



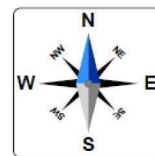
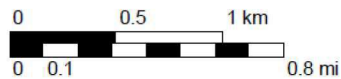
Map Title

Datum: NAD27 Projection: Stereographic DLS Version AB: ATS 2.6, BC: PRB 2.0, SK: STS 2.5, MB: MLI07

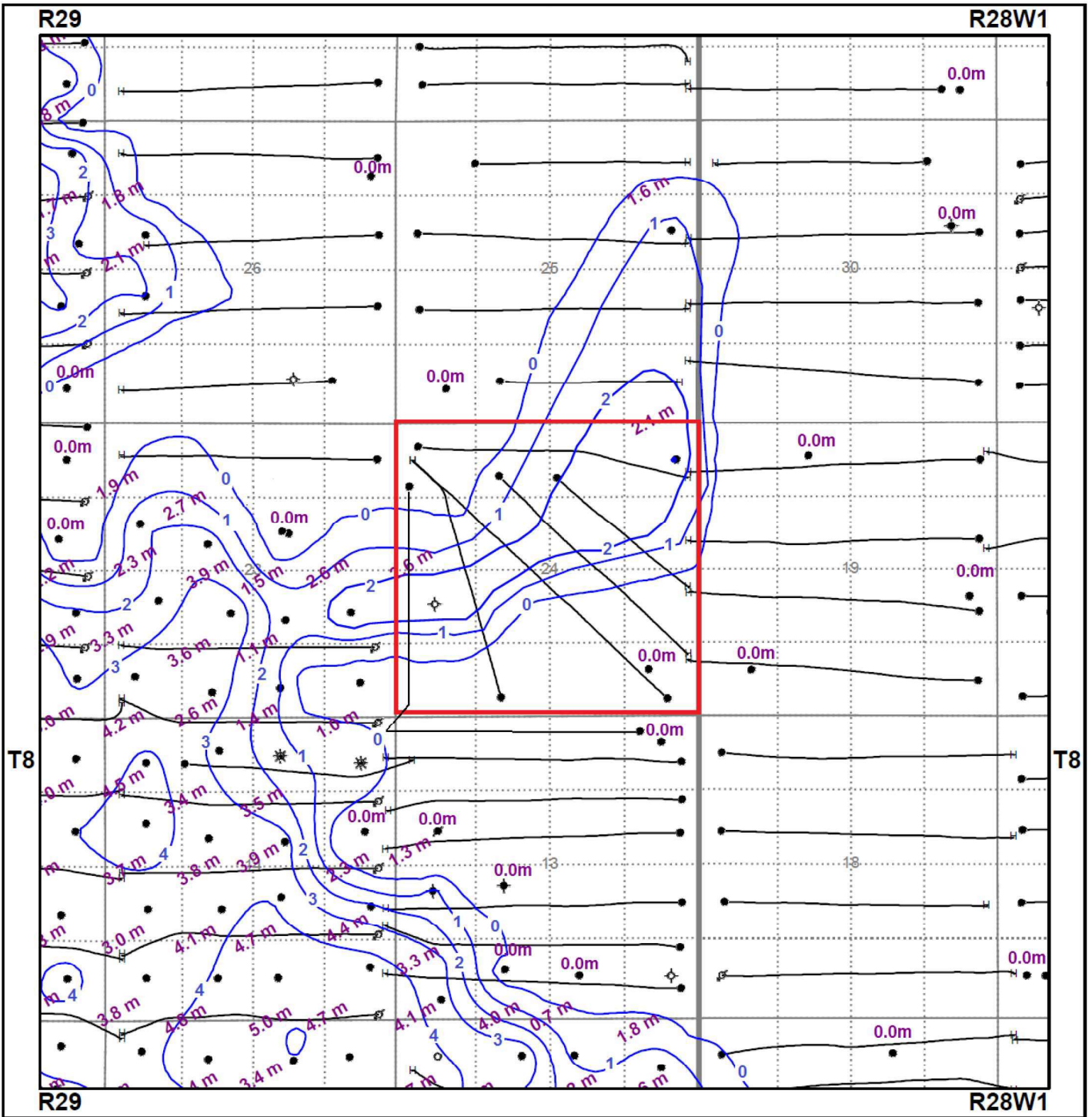
Middle Bakken Isopach
(1m CI)

Center: 49.6726, -101.2923

Scale: 1:35,115



APPENDIX 5



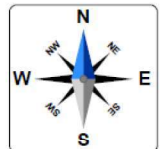
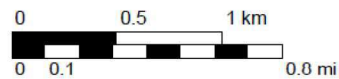
Map Title

Datum: NAD27 Projection: Stereographic DLS Version AB: ATS 2.6, BC: PRB 2.0, SK: STS 2.5, MB: MLI07

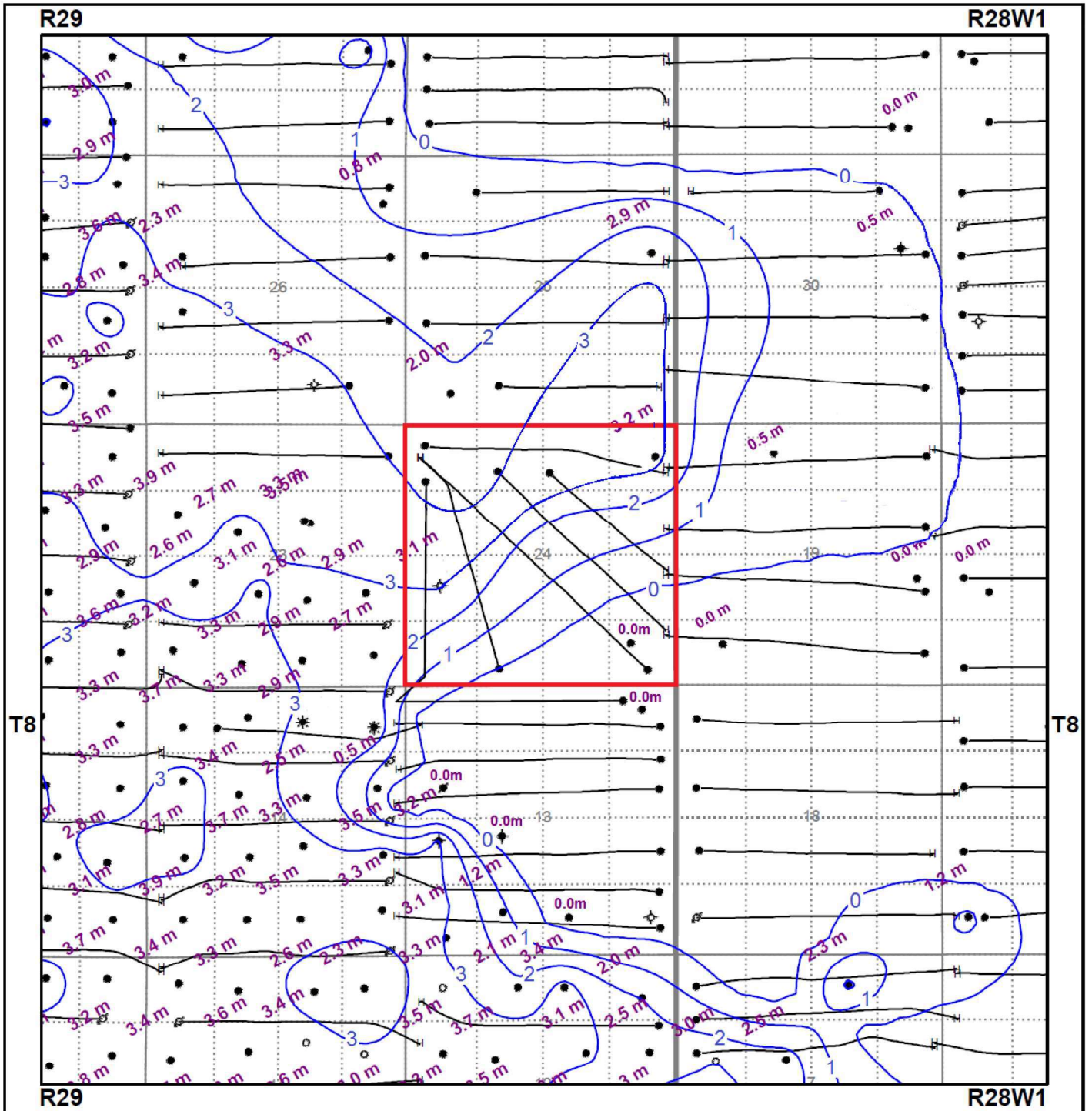
Upper Lyleton A Isopach
(1m CI)

Center: 49.6726, -101.2923

Scale: 1:35,115



APPENDIX 6



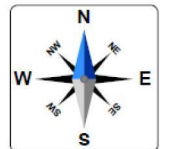
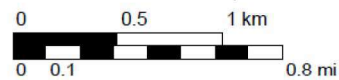
Map Title

Datum: NAD27 Projection: Stereographic DLS Version AB: ATS 2.6, BC: PRB 2.0, SK: STS 2.5, MB: MLI07

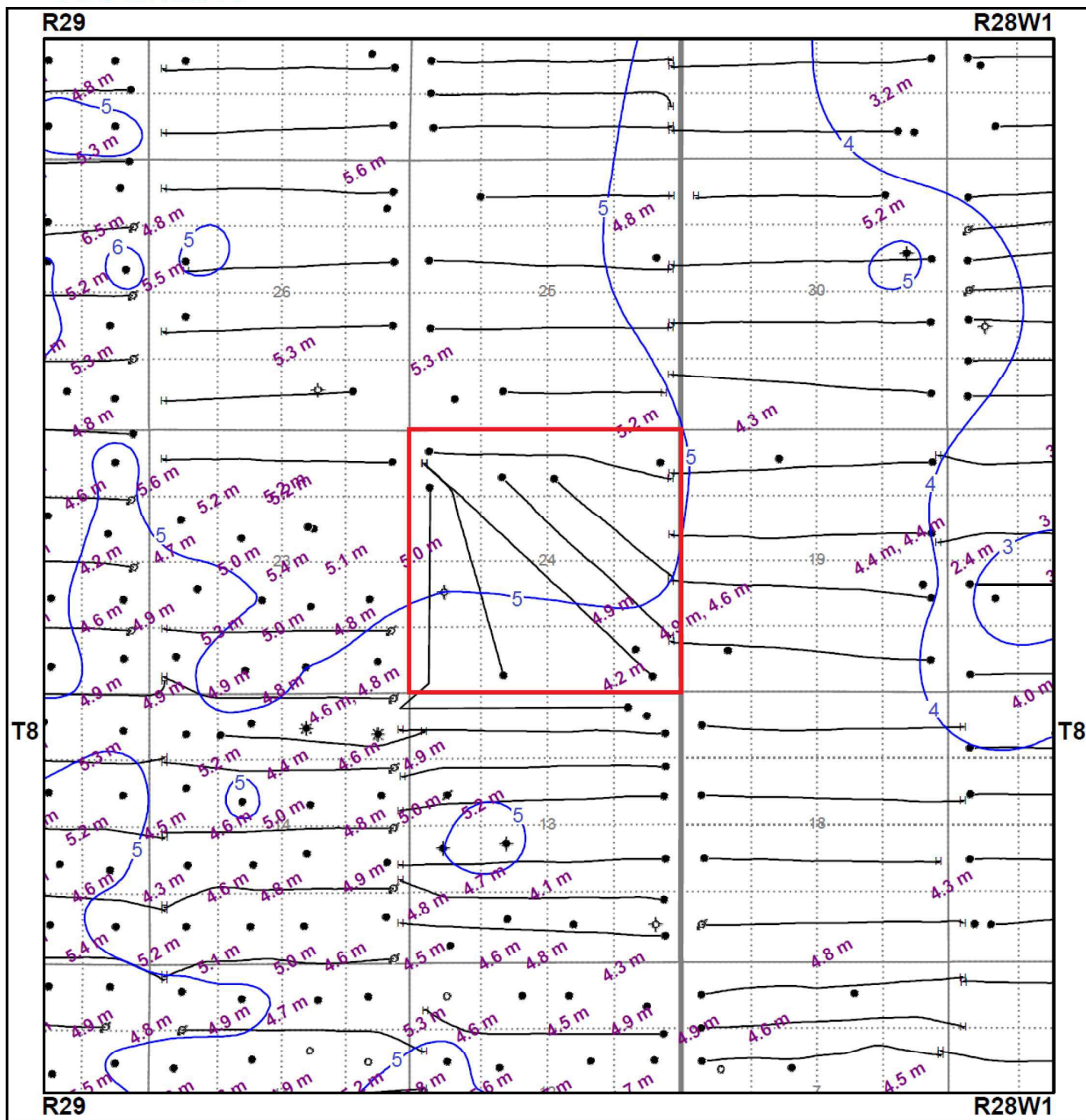
Lower Lyleton A Isopach
(1m CI)

Center: 49.6726, -101.2923

Scale: 1:35,115



APPENDIX 7



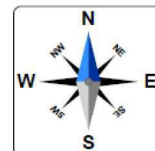
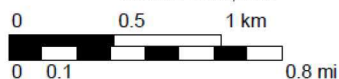
Map Title

Datum: NAD27 Projection: Stereographic DLS Version AB: ATS 2.6, BC: PRB 2.0, SK: STS 2.5, MB: MLI07

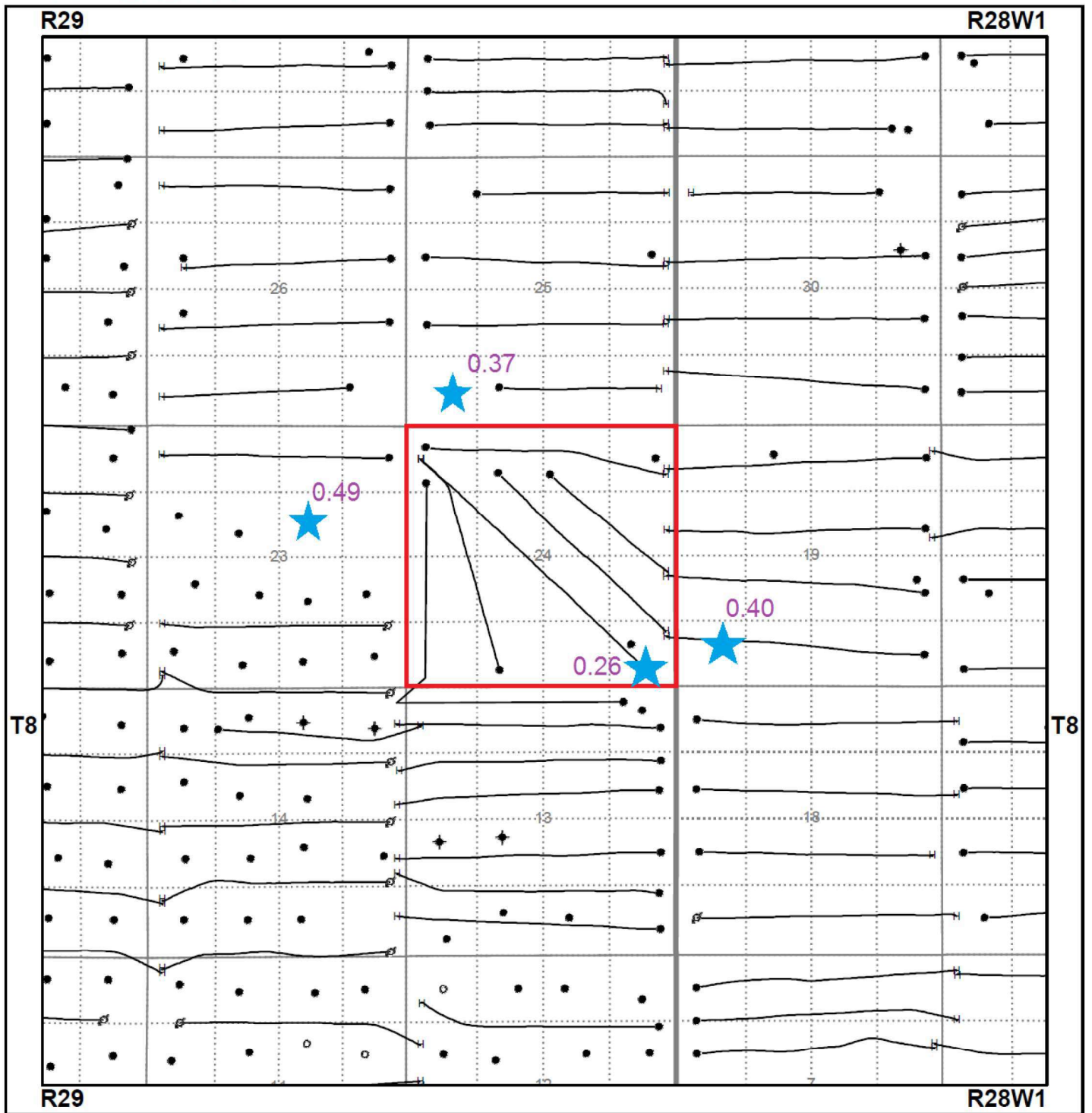
Lyleton B Isopach
(1m CI)

Center: 49.6726, -101.2923

Scale: 1:35,115



APPENDIX 8



Map Title

Datum: NAD27 Projection: Stereographic DLS Version AB: ATS 2.6, BC: PRB 2.0, SK: STS 2.5, MB: MLI07

★ Core PDPK Points Used for OOIP
- N/G Values Posted

Center: 49.6726, -101.2923

Scale: 1:35,115

0 0.1 0.5 1 km
0 0.1 0.8 mi

