PROPOSED EWART UNIT NO. 17

Application for Enhanced Oil Recovery Waterflood Project

Middle Bakken/Three Forks Formations

Bakken – Three Forks B Pool (01 62B)

Daly Sinclair Field, Manitoba

February 21, 2020
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. 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 1-3, 5-8, 10-14, 17-21 and Ewart Units 1-8, 10, 14 as shown on Figure 1.

In the eastern 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 Ewart Unit No. 17 (Section 9-007-28W1, S/2, NW/4 Section 16-007-28W1) 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 01-62B Bakken-Three Forks B Pool of the Daly Sinclair Oilfield (Figure 3).

SUMMARY

1. The proposed Ewart Unit No. 17 will include 5 horizontal wells and 7 vertical wells, within 28 Legal Sub Divisions (LSD) of the Middle Bakken/Three Forks producing reservoir. The project is located east of Sinclair Unit No. 2 and south of Ewart Unit No. 6 (Figure 2).

2. Total Net Original Oil in Place (OOIP) in Ewart Unit No. 17 has been calculated to be **1,689** e^3m^3 (10,620 Mbbl) for an average of **60.3** net e^3m^3 (379.3 Mbbl) OOIP per 40 acre LSD.

3. Cumulative production to the end of November 2019 from the 12 wells within the proposed Ewart Unit No. 17 project area was **63.6** e^3m^3 (400.2 Mbbl) of oil, and **108.4** e^3m^3 (682.0 Mbbl) of water, representing a **3.8%** Recovery Factor (RF) of the Net OOIP.

4. Estimated Ultimate Recovery (EUR) of Primary Proved Producing oil reserves in the proposed Ewart Unit No. 17 project area has been calculated to be **93.1** e^3m^3 (585.6 Mbbl), with **29.7** e^3m^3 (186.0 Mbbl) remaining as of the end of November 2019.

5. Ultimate oil recovery of the proposed Ewart Unit No. 17 OOIP, under the current Primary Production method, is forecasted to be **5.5%**.

6. Figure 4 shows the production from the Ewart Unit No. 17 peaked in November 2010 at **45.9** m^3 (OPD). As of November 2019, production was **6.5** m^3 OPD, **11.2** m^3 of water per day (WPD) and a **63.2%** watercut.

7. In November 2010, production averaged **3.8** m^3 OPD per well in Ewart Unit No. 17. As of November 2019, average per well production has declined to **0.59** m^3 OPD. Decline analysis of the group primary production data forecasts total oil to continue declining at an annual rate of approximately **21%** in the project area.

8. Estimated Ultimate Recovery (EUR) of proved oil reserves under Secondary WF EOR for the proposed Ewart Unit No. 17 has been calculated to be **187.3** e^3m^3 (1,178.3 Mbbl), with **123.8** e^3m^3 (779.0 Mbbl) remaining. An incremental **94.3** e^3m^3 (593.3 Mbbl) of proved oil reserves, or **5.6%**, 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 Ewart Unit No. 17 is estimated to be **11.1%**.

10. Based on 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. Future horizontal injectors, with multi-stage hydraulic fractures, will be drilled between existing horizontal producing wells (Figure 5) within the proposed Ewart Unit No. 17, to complete waterflood patterns with effective 20 acre spacing similar to that of Ewart Unit No. 2.

DISCUSSION

The proposed Ewart Unit No. 17 project area is located within Township 7, Range 28 W1 of the Daly Sinclair oil field. The proposed Ewart Unit No. 17 currently consists of 5 horizontal and 7 vertical wells, within an area covering 28 LSDs (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 to north 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 (Sinclair Unit 2, Ewart Unit 8 and Ewart Unit 6) as noted on the Offsetting Units Map at 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 is highly variable within the Unit area. Within the proposed unit, the Middle Bakken thickness ranges from 0.3m to 5.1m (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 part 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 ranges from 0m, cropping out entirely, up to over 3.0m (Appendix 5). The Lower Lyleton A in the proposed unit area ranges from 3.8m to 0m (Appendix 6).

The Red Shale Marker lies between the overlying Middle Bakken / Lyleton A and the underlying Lyleton B reservoir. It consists of brick red dolomitic siltstone which is highly water soluble and has low permeability. The Red Shale Marker is fairly consistent throughout the proposed unit area at about 3.5m thickness. The effectiveness of the Red Shale Marker unit as a permeability barrier is significantly decreased by induced hydraulic fracturing. As such, the Red Shale Marker is not an effective barrier to flow between the Middle Bakken and the Lyleton B over the proposed unit area.

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 between 3.3m-5.1m thick within the proposed unit (Appendix 7).

The Torquay (Three Forks) forms the base of the reservoir sequence and is a brick red or mint green dolomitic very fine siltstone similar to the Red Shale Marker and it forms a good basal seal to the Lyleton B reservoir.

Structure:

The structure within the proposed unit area is relatively consistent, dipping toward the southeast (Appendix 3).

Gross OOIP Estimates

Total volumetric OOIP for the Middle Bakken, Lyleton A and Lyleton B within the proposed unit has been calculated to be **1,689** e^3m^3 (10,620 Mbbl) using Tundra internally created maps. Maps used were generated from core data from wells available in the greater Sinclair area (Appendix 8).

An average net to gross ratio was calculated for the reservoir formations using pressure decay profile permeameter data (PDPK) with a cut off of 0.5mD on surrounding cored wells. To determine net pay the ratio is then applied to each formation thickness from isopach maps based on logs. Porosity is calculated in the same way, using an average for the reservoir formations, from surrounding core data after a 0.5mD cutoff.

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

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

or

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

where

OOIP	= Original Oil in Place by LSD (Mbbl, or m3)
A	= Area (40acres, or 16.187 hectares, per LSD)
h * Ø	= Net Pay * Porosity, or Phi * h (ft, or m)
Bo	= Formation Volume Factor of Oil (stb/rb, or sm3/rm3)
Sw	= Water Saturation (decimal)

The initial oil formation volume factor was adopted from PVT information taken from the 100/02-17-009-29W1 and 100/13-19-009-28W1 Bakken wells and is thought to be representative of the fluid characteristics in the reservoir.

Historical Production

A historical group production history plot for the proposed Ewart Unit No. 17 is shown as Figure 4. Oil production commenced from the proposed Unit area in March 2005 and peaked during November 2010 at 45.9 m^3 OPD. As of November 2019, production was 6.5 m^3 OPD, 11.2 m^3 WPD and a 63.2% watercut.

From peak production in November 2010 to date, oil production is declining at an annual rate of approximately 21% 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 Ewart Unit No. 17.

Unit Operator

Tundra Oil and Gas (Tundra) will be the Operator of record for Ewart Unit No. 17.

Unitized Zone

The Unitized zone(s) to be waterflooded in Ewart Unit No. 17 will be the Middle Bakken and Three Forks formations.

Unit Wells

The 5 horizontal wells and 7 vertical wells to be included in the proposed Ewart Unit No. 17 are outlined in Table 3.

Unit Lands

Ewart Unit No. 17 will consist of 28 LSDs as follows:

Section 9 of Township 7, Range 28, W1M
S/2, NW/4 Section 16 of Township 7, Range 28, W1M

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

Tract Factors

The proposed Ewart Unit No. 17 will consist of 28 Tracts based on the 40 acre LSDs containing the existing 5 horizontal and 7 vertical wells.

The Tract Factor contribution for each of the LSD's within the proposed Ewart Unit No. 17 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 Ewart Unit No. 17. 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 Ewart Unit No. 17.

WATERFLOOD EOR DEVELOPMENT

Technical Studies

The waterflood performance predictions for the proposed Ewart Unit No. 17 are based on internal engineering assessments. Project area specific reservoir and geological parameters were used to guide the overall Secondary Waterflood recovery factor. Internal reviews included analysis of available open-hole logs, core data, petrophysics, seismic, drilling and completion information, and production information. These parameters were reviewed to develop a suite of geological maps and establish reservoir parameters to support the calculation of the proposed Ewart Unit No. 17 OOIP (Table 4).

Pre-Production of New Horizontal Injection Wells

Six (6) new horizontal injection wells will be drilled between the existing vertical/horizontal producing wells as shown in Figure 5, which will result in an effective 20 acre line drive waterflood pattern within Ewart Unit No. 17.

Primary production from the original vertical/horizontal producing wells in the proposed Ewart Unit No. 17 has declined significantly from peak rate indicating a need for secondary pressure support. Through the process of developing similar waterfloods, Tundra has measured a significant variation in reservoir pressure depletion by the existing primary producing wells. Placing new horizontal wells immediately on water injection in areas without significant reservoir pressure depletion has been problematic in similar low permeability formations, and has a negative impact on the ultimate total recovery factor of OOIP.

Considering the expected reservoir pressures and reservoir lithology described, Tundra believes an initial period of producing all 6 horizontal wells prior to placing them on permanent water injection is essential and all Unit mineral owners will benefit.

Tundra monitors reservoir pressure, fluid production and decline rates in each pattern to determine when the well will be converted to water injection

Reserves Recovery Profiles and Production Forecasts

The primary waterflood performance predictions for the proposed Ewart Unit No. 17 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.

Primary Production Forecast

Cumulative production in the Ewart Unit No. 17 project area, to the end of November 2019 from the 12 wells, was 63.6 e^3m^3 of oil and 108.4 e^3m^3 of water for a recovery factor of 3.8% of the calculated Net OOIP.

Ultimate Primary Proved Producing oil reserves recovery for Ewart Unit No. 17 has been estimated to be 93.1 e^3m^3, or a 5.5% Recovery Factor (RF) of OOIP. Remaining Producing Primary Reserves has been estimated to be 29.6 e^3m^3 to the end of November 2019.

The expected production decline and forecasted cumulative oil recovery under continued Primary Production is shown in Figures 6 and 7.

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 Ewart Unit No. 17, while maximizing reservoir knowledge.

Criteria for Conversion to Water Injection Well

Six (6) 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 schedule allows for the proposed Ewart Unit No. 17 project to be developed equitably, efficiently, and moves to project to the best condition for the start of waterflood as quickly as possible. 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

Secondary Waterflood plots of the expected oil production forecast over time and the expected oil production vs. cumulative oil are plotted in Figures 8 and 9, respectively. Total Secondary EUR for the proposed Ewart Unit No. 17 is estimated to be 187.3 e^3m^3 with 123.8 e^3m^3 remaining representing a total secondary recovery factor of 11.1 % for the proposed Unit area. An incremental 94.3 e^3m^3 of oil, or an incremental 5.6% 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 Ewart Unit No. 17 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 102/14-30-7-28W1 (102/14-30) licensed water source well. Mannville water from the 102/14-30 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 Ewart Unit No. 17 project area injection wells is shown as Figure 10.

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 Ewart Unit No. 17.

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

New water injection wells for the proposed Ewart Unit No. 17 will be drilled and configured downhole for injection as shown in Figure 11. The horizontal injection well will be 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.

The new water injection wells will be placed on injection after approval to inject. 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 Ewart Unit No. 17 horizontal water injection well rate is forecasted to average **10 – 40** m^3 WPD, based on expected reservoir permeability and pressure.

Reservoir Pressure

No representative initial pressure surveys are available for the proposed Ewart Unit No. 17 project area in the Bakken producing zone. The extremely long shut-in and build-up times required to obtain a possible representative reservoir pressures were economically prohibitive at the time of drilling these locations.

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

Ewart Unit No. 17 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 Ewart Unit No. 17 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 Ewart Unit No. 17.

On Going Reservoir Pressure Surveys

Any pressures taken during the operation of the proposed unit will be reported within the Annual Progress Reports for Ewart Unit No. 17 as per Section 73 of the Drilling and Production Regulation.

Economic Limits

Under the current Primary recovery method, existing wells within the proposed Ewart Unit No. 17 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 Ewart Unit No. 17 waterflood operation will utilize the existing Tundra operated source well supply and water plant (WP) facilities located at 4-1-8-29 W1M 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 12.

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 Ewart Unit No. 17. 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 Ewart Unit No. 17 Application.

Ewart Unit No. 17 Unitization, and execution of the formal Ewart Unit No. 17 Agreement by affected Mineral Owners, is expected during Q1 2020. Copies of same will be forwarded to the Petroleum Branch, when available, to complete the Ewart Unit No. 17 Application.

Should the Petroleum Branch have further questions or require more information, please contact Eric Fraser at 587.747.5363 or by email at eric.fraser@tundraoilandgas.com.

TUNDRA OIL & GAS LIMITED

Original Signed by Eric Fraser, February 21, 2020 in Calgary, AB

Proposed Ewart Unit No. 17

Application for Enhanced Oil Recovery Waterflood Project

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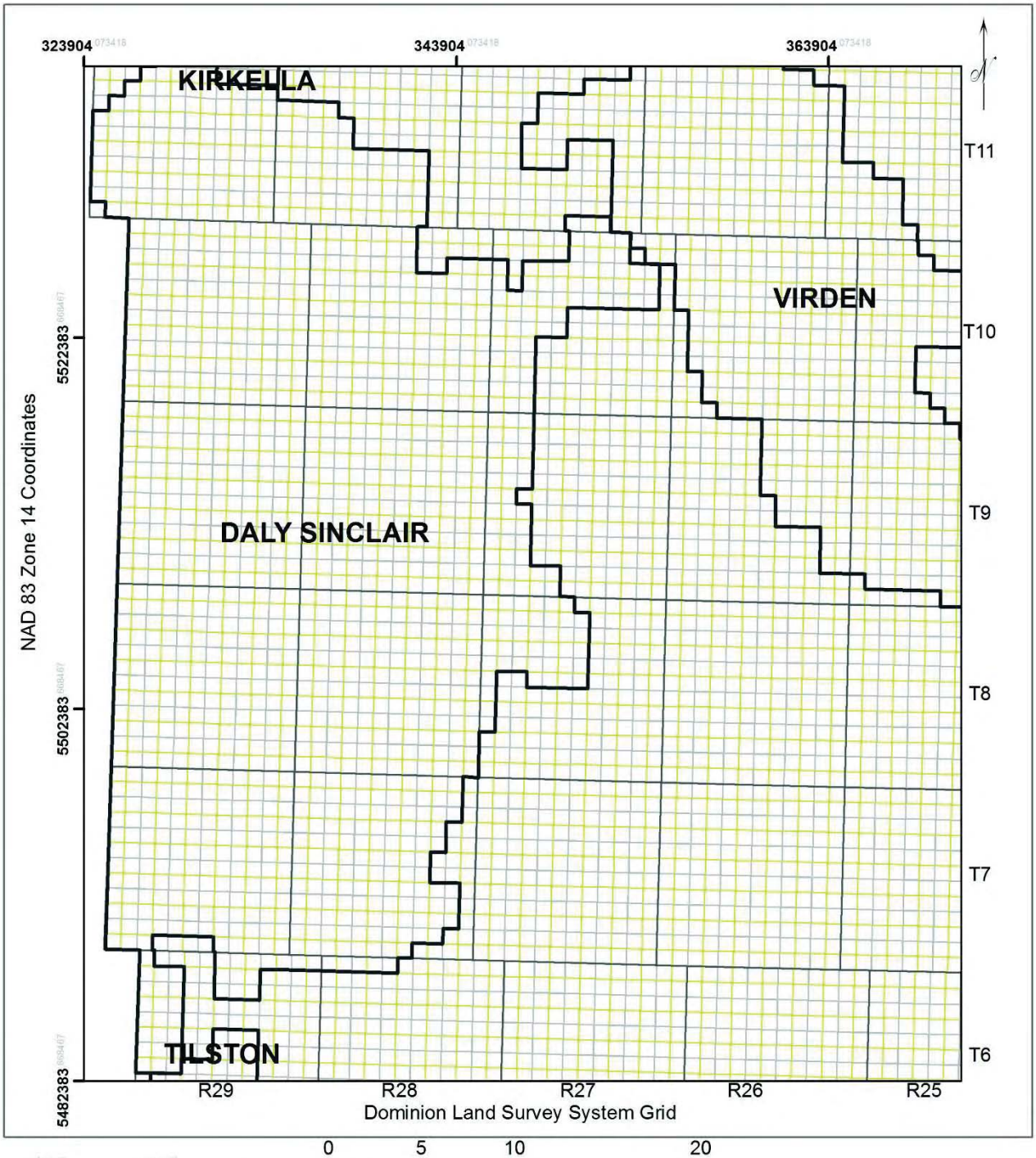
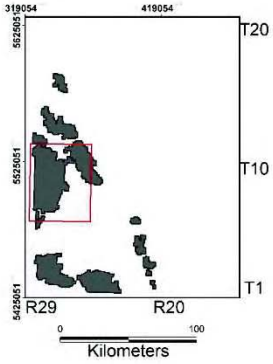
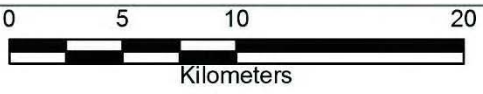






Map 3

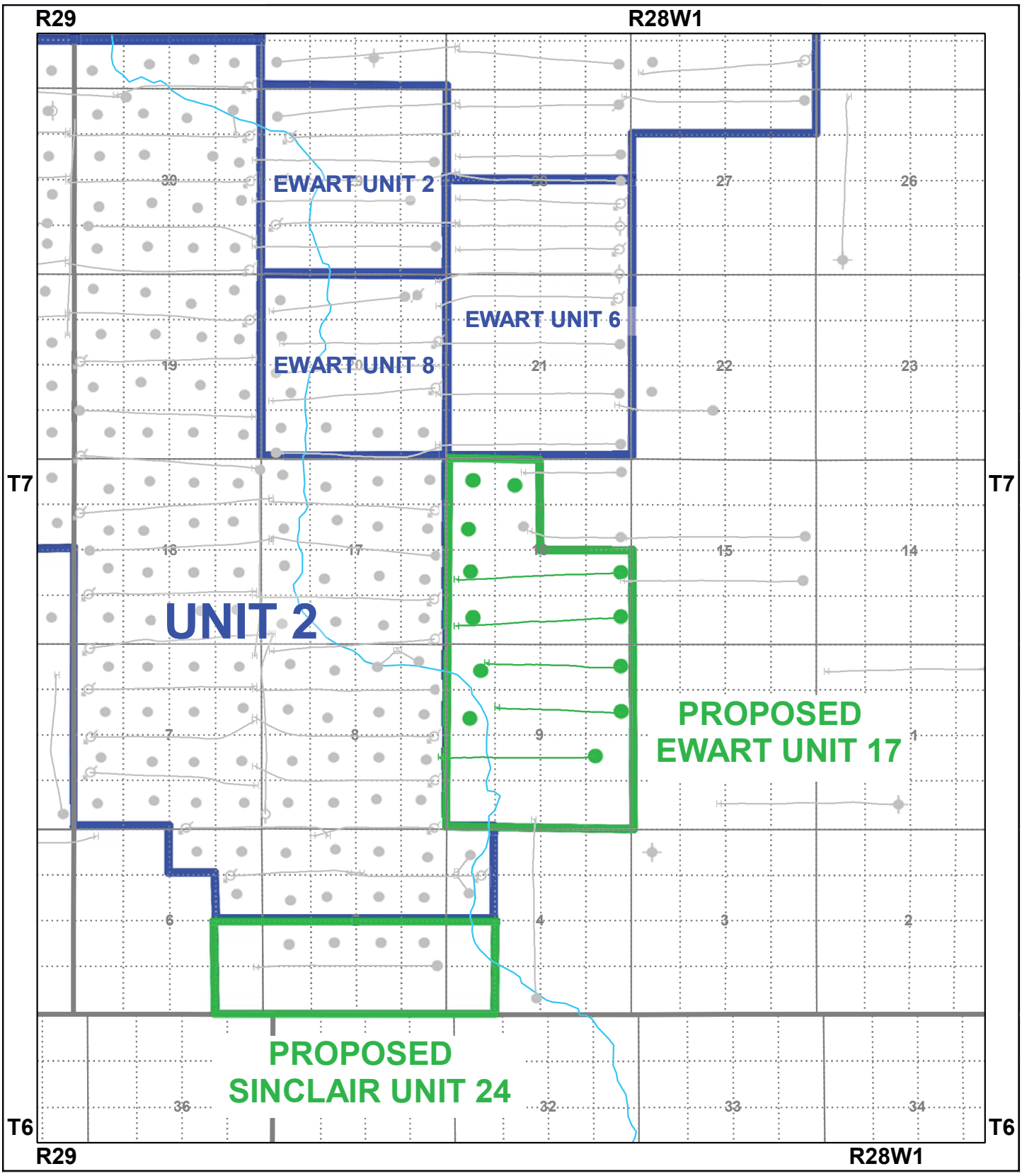
Manitoba's Designated Fields & Pools 2016
Well Information: January 1, 2016.
Geology by: P. Fulton-Regula
Petroleum Branch

Legend

- 2016 Fields
- Township Grid
- Section Grid
- Quarter Section Grid

Manitoba

Figure No. 2



SINCLAIR UNITS

Well Legend

Abandoned Gas	Drilling	Location	Suspended Heavy Oil
Abandoned Heavy Oil	Dry & Abandoned	Oil	Suspended Oil
Abandoned Oil	Gas	Oil & Gas	Suspended Oil & Gas
Abandoned Oil & Gas	Gas Injection	Service or Drain	Lists
Abandoned Service	Heavy Oil	Suspended	Wells - Ewart Unit 17 Well List
Canceled	Injection	Suspended Gas	Wells - Sinclair Bakken Locations

SINCLAIR UNITS

Sharon Baker, December 16, 2019

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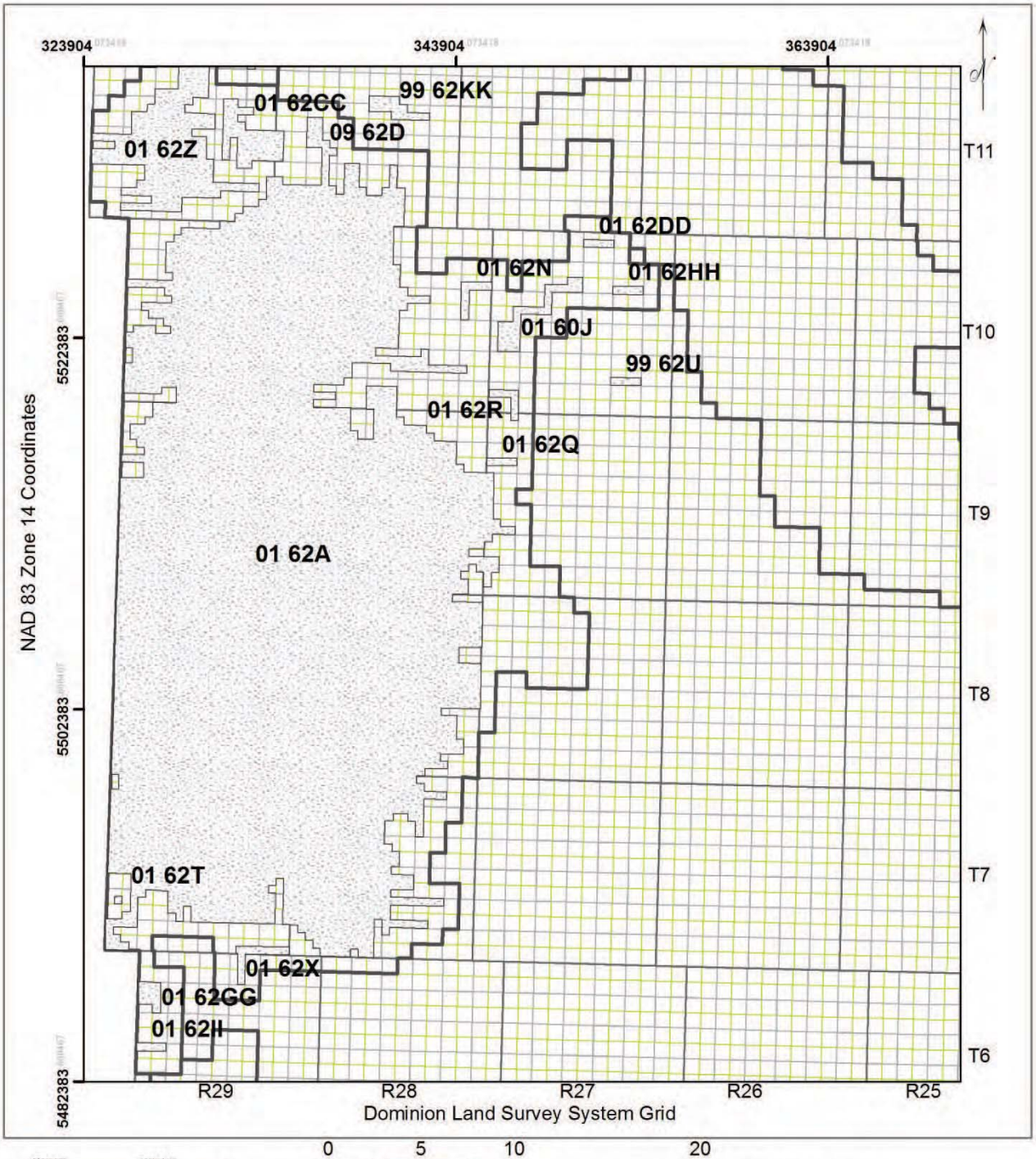
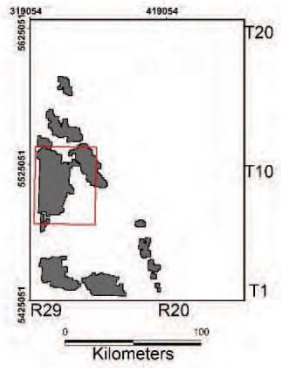
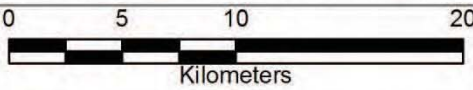
Figure No. 3







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Legend

- 2016 Fields
- Oil Pools
- Township Grid
- Section Grid
- Quarter Section Grid

Manitoba

Figure No. 4

Production Graph

Group:	ewart unit 17 well list.lwell	On Prod:	2005-03 to 2019-11	Cum Oil:	63596.0 m3
# of Wells:	12	Prod Form:	TORQUAY; BAKKEN; THREEFK	Cum Gas:	0.0 E3m3
Fluid:	Oil	Field:	DALY (MB1)	Cum Wtr:	108376.7 m3
Mode:	Producing	Pool Code:	MB000162A	Cum Inj Oil:	0.0 m3
		Unit Code:		Cum Inj Gas:	0.0 E3m3
				Cum Inj Wtr:	0.0 m3

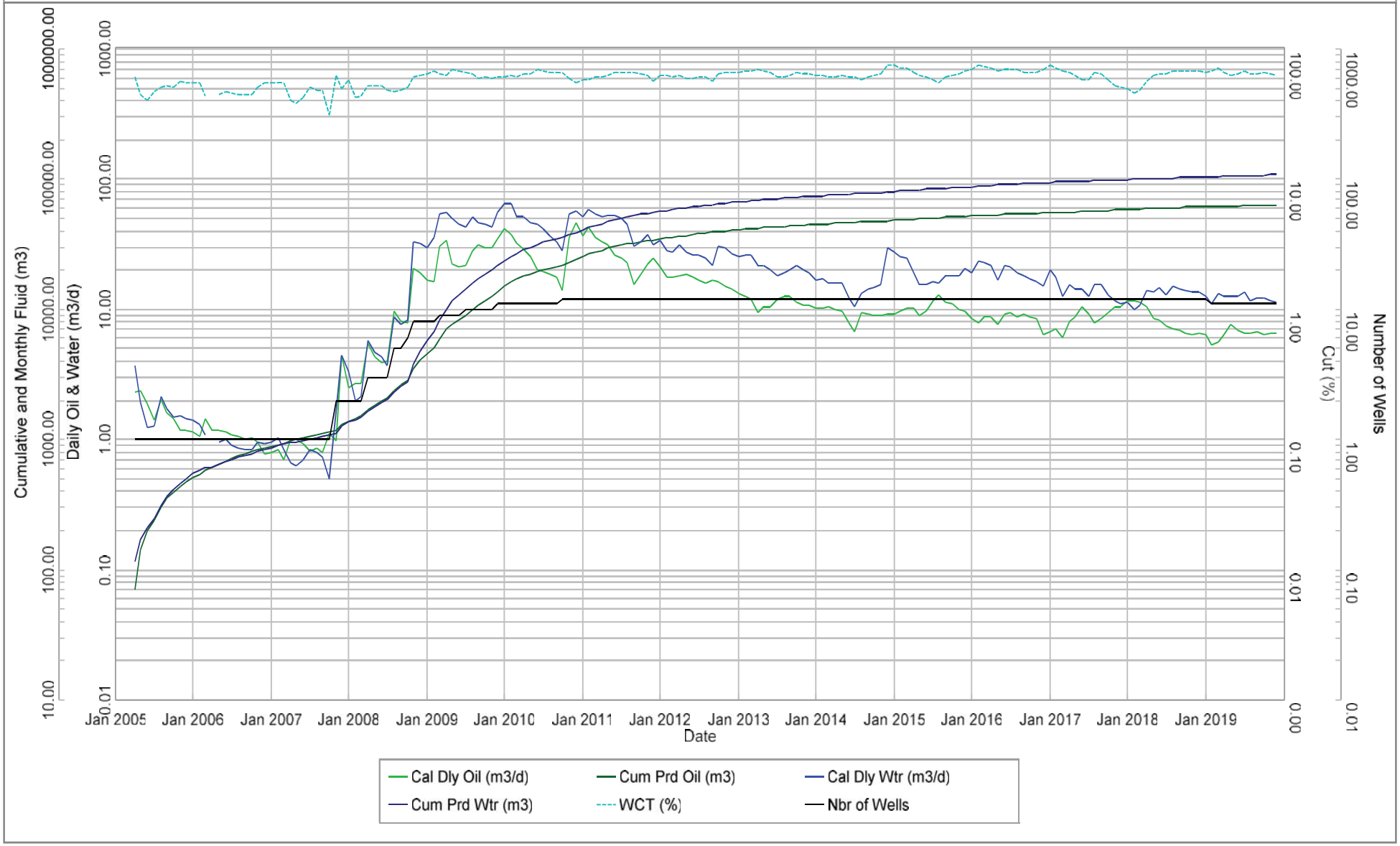

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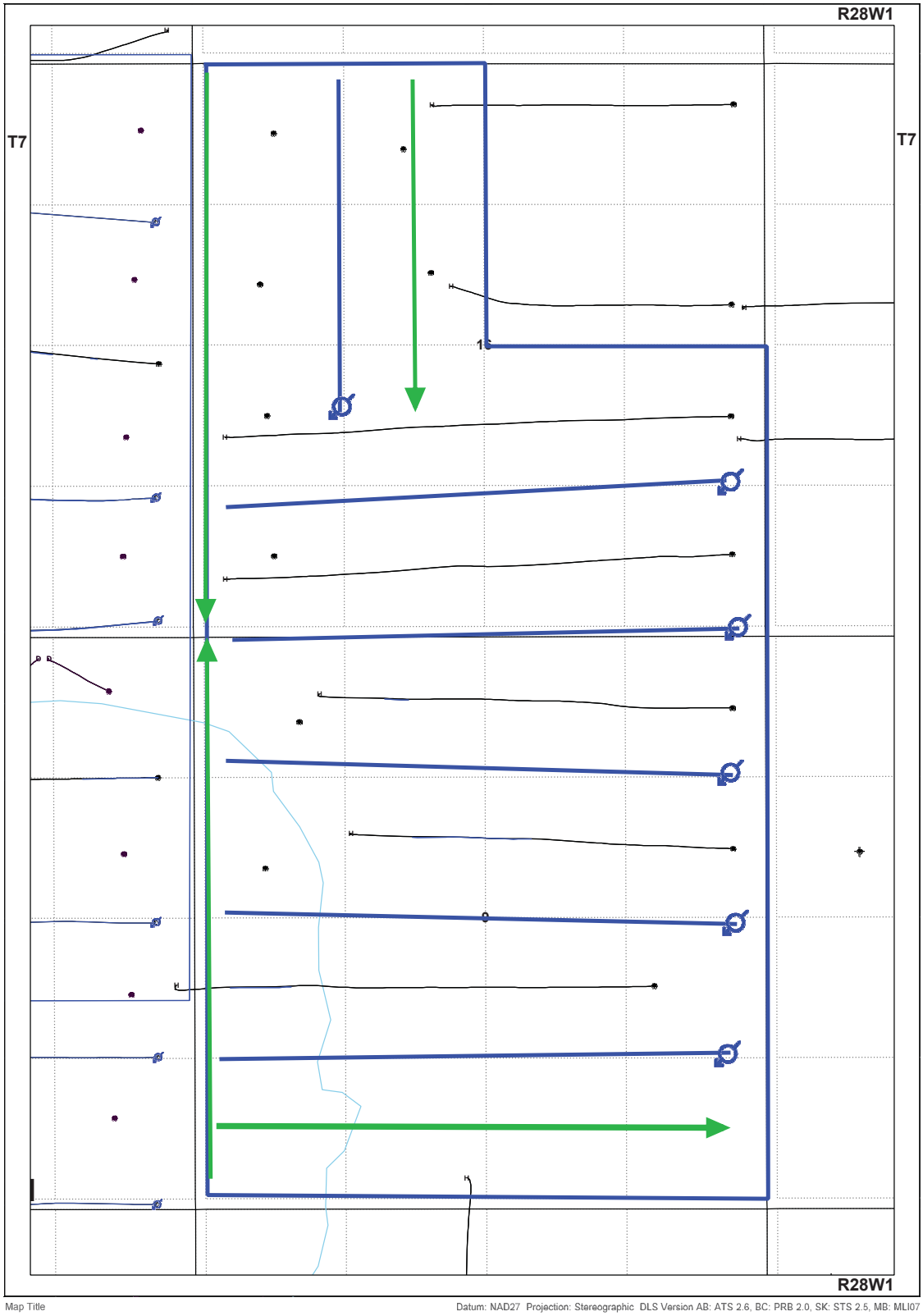
Figure No. 5



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
- Abandoned Heavy Oil
- Abandoned Oil
- Abandoned Oil & Gas
- Abandoned Service
- Canceled
- Drilling
- Dry & Abandoned
- Gas
- Gas Injection
- Heavy Oil
- Injection
- Location
- Oil
- Oil & Gas
- Service or Drain
- Suspended
- Suspended Gas
- Suspended Heavy Oil
- Suspended Oil
- Suspended Oil & Gas

Lists

- Wells - Bakken Injectors
- Wells - Bakken Producers
- Wells - Bakken Wells
- Wells - CO2 Expansion Producers
- Wells - CO2 Injection
- Wells - CO2 Pilot Fence Injection
- Wells - CO2 Producers
- Wells - Fill and Drill Wells
- Wells - SU 17 Wells
- Wells - SU 2 Verticals

Center: 49.5618, -101.2247

Scale: 1:11,503

0 0.1 0.2 0.3 0.4 km

0 0.1 0.2 0.3 mi

N NE E SE S SW W NW

Map Title

Description

Eric Fraser, November 12, 2019

\\AP51\AccuMapData$\eric.fraser\AccuMap\Master Map.accumap

Primary Reserves Forecast - Rate vs Time

Figure No. 6

Primary Reserves Forecast - Rate vs Cum

Figure No. 7

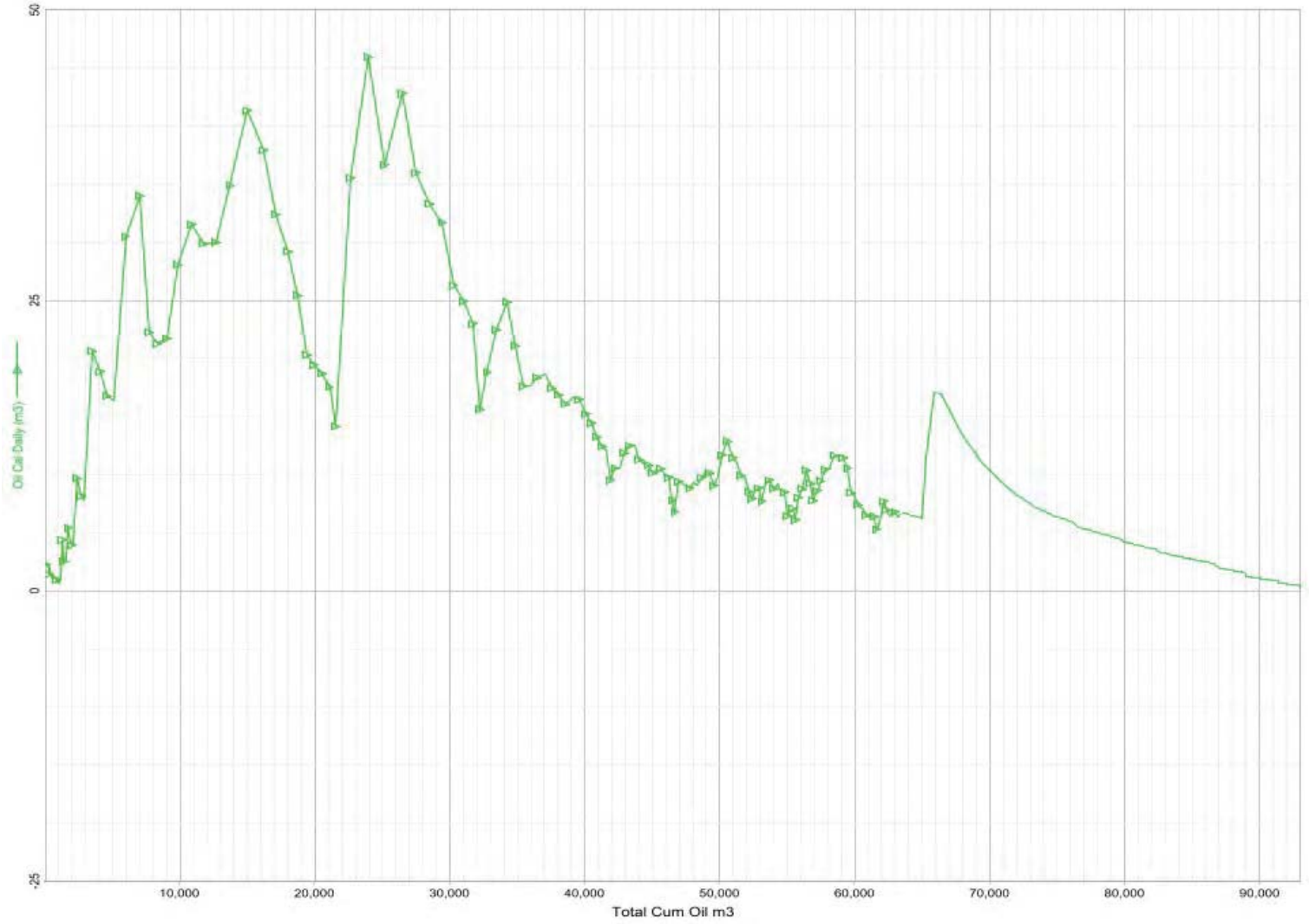
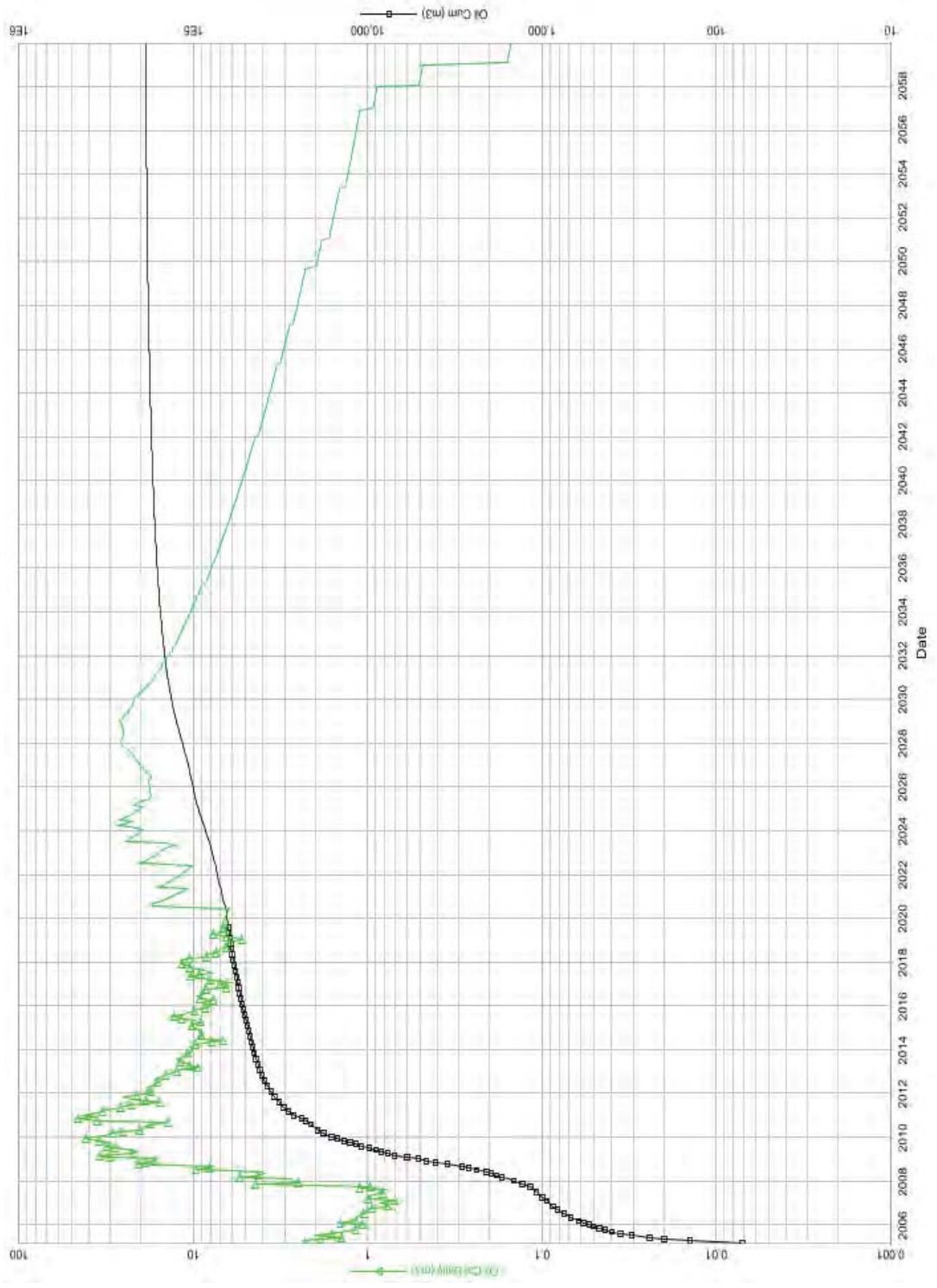


Figure No. 8

Secondary Reserves Forecast - Rate vs Time



Secondary Reserves Forecast - Rate vs Cum

Figure No. 9

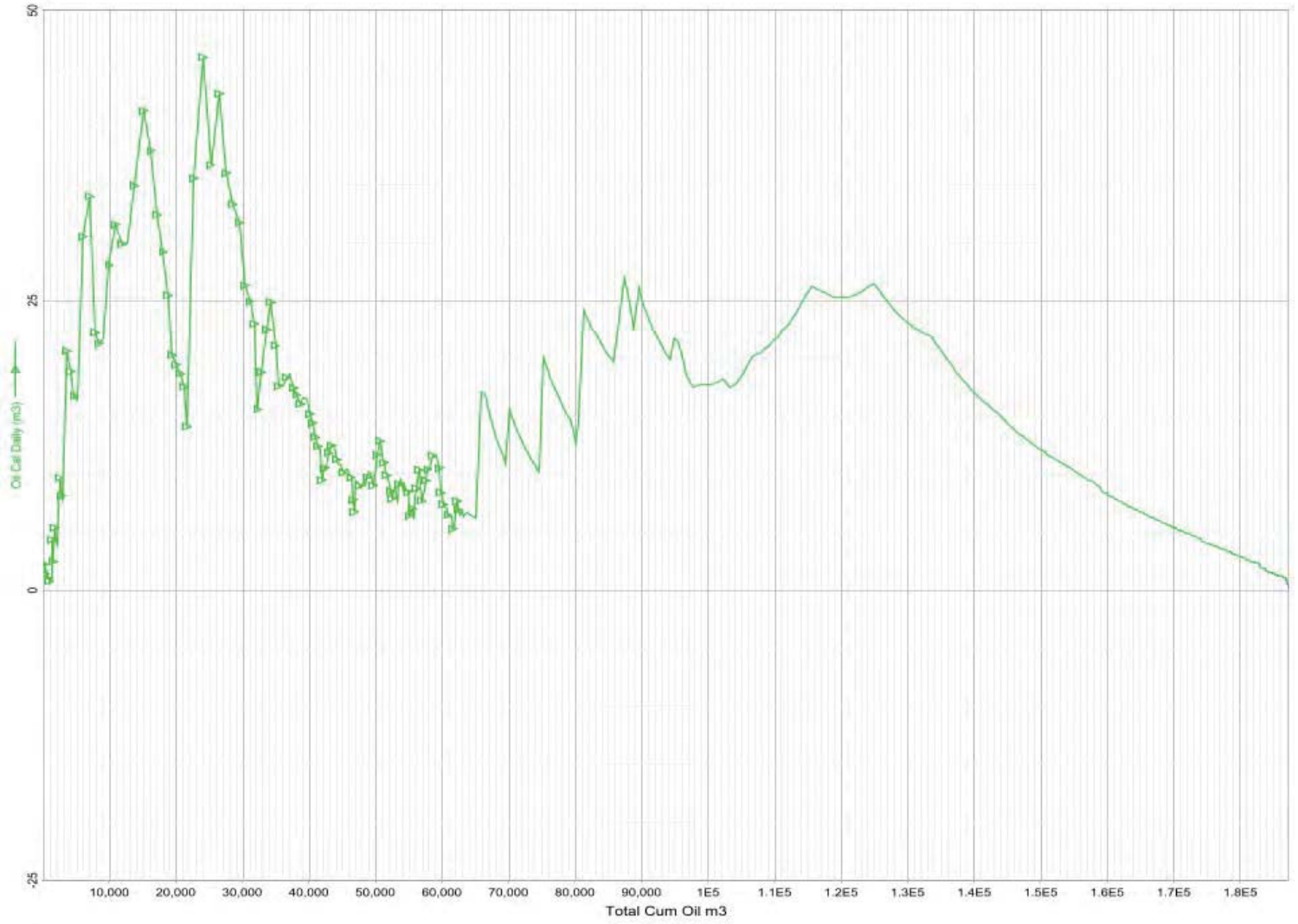
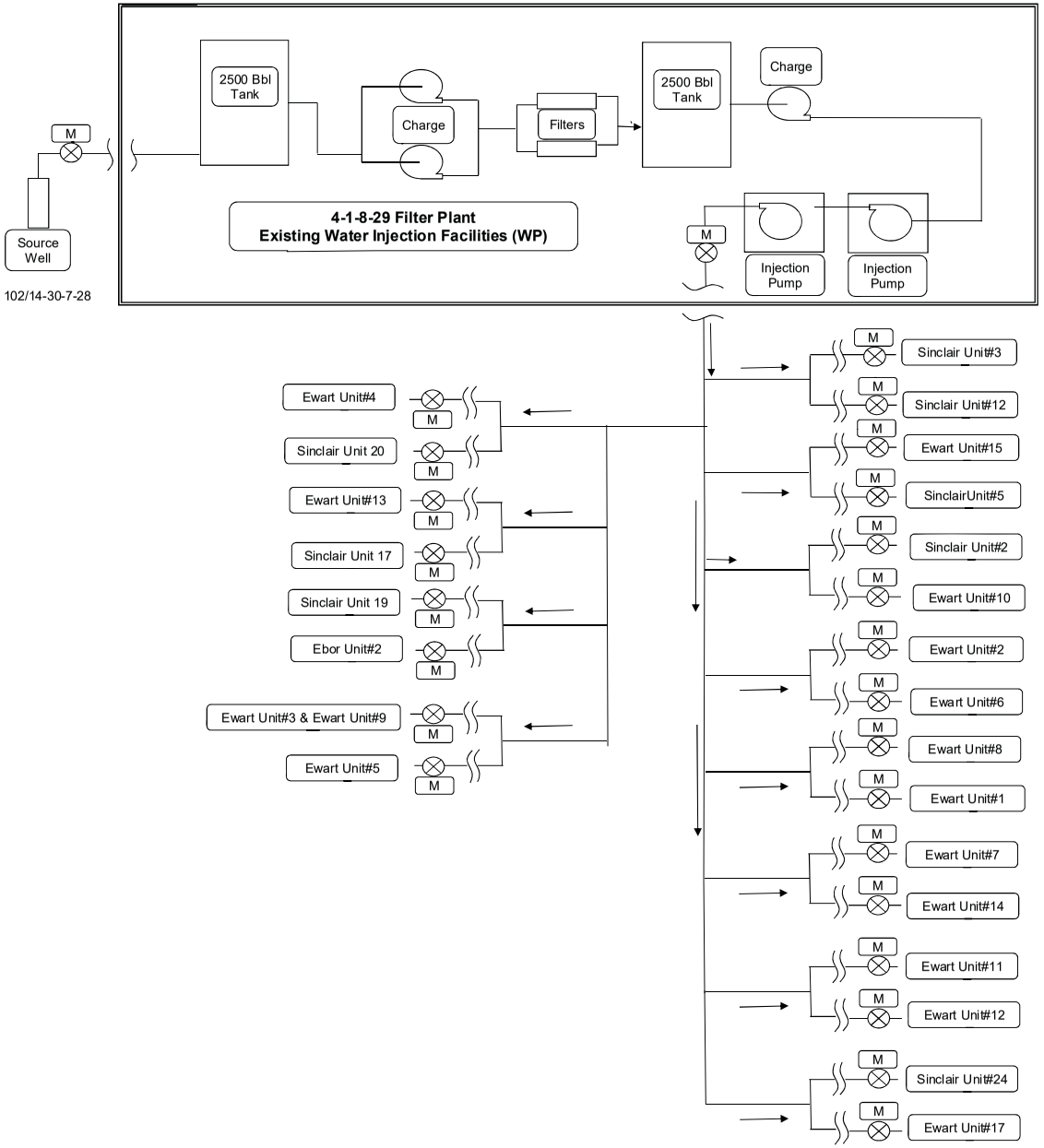


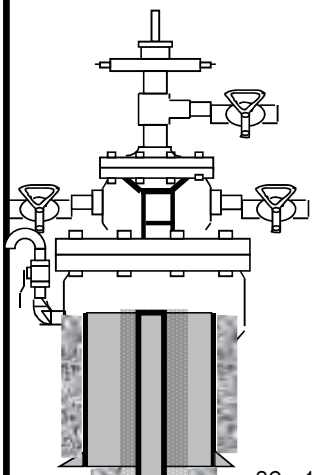
FIGURE NO. 10

Sinclair Water Injection System



Tundra Oil And Gas Limited Figure No. 11

TYPICAL OPEN HOLE WATER INJECTION WELL (WIW) DOWNHOLE DIAGRAM



SC = 140mKB

KOP = ~ 700 mMD

Inhibited Annular Fluid

Injection Packer set within 15 m of Intermediate Casing Shoe

Intermediate Casing Shoe

Open Hole Fractures

WELL NAME:	Tundra Ewart Unit 17 HZNTL Open Hole WIW				**WELL LICENCE:**	
Prepared by	WRJ	(average depths)		Date:	2012	
Elevations :						
KB [m]			KB to THF [m]		TD [m]	2400.0
GL [m]			CF (m)		PBTD [m]	
Current Perfs:	**Open Hole**			950.0	to	2400.0
Current Perfs:					to	
KOP:	700 m MD		Total Interval		to	

Tubulars	**Size [mm]**	**Wt - Kg/m**	**Grade**	**Landing Depth [mKB]**		
Surface Casing	244.5	48.06	H-40 - ST&C	Surface	to	140.0
Intermed Csg (if run)	177.8	34.23 & 29.76	J-55 - LT&C	Surface	to	950.0
Open Hole Latera	none	none	none	950.0	to	2400.0
Tubing	60.3 or 73.0 - TK-99	6.99 or 9.67	J-55	Surface	to	940.0

Date of Tubing Installation:

Item	Description	K.B.--Tbg. Flg.	Length 0.00	Top @ m KB
	Corrosion Protected ENC Coated Packer (set within 15 m of Intermed Csg shoe)			
	60.3 mm or 73 mm TK-99 Internally Coated Tubing			
	TK-99 Internally Coated Tubing Pup Jt			
	Coated Split Dognut			
	Annular space above injection packer filled with inhibited fresh water			
	Bottom of Tubing mKB			

Rod String :

Date of Rod Installation:

Bottomhole Pump:

Directions:

Ewart Unit No. 17

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

- 14-30-7-28 Source Well to 4-1-8-29 Water Plant – Fiberglass
- High Pressure Pipeline from 4-1 filter plant to injection wells – 2000 psi high pressure Fiberglass

Facilities

- 4-1-8-29 Filter Plant and Injection Plant
    - Plant piping –PCV, Fiberglass or Internally coated
    - Filtration – PVC membrane modules
    - Pumping – Ceramic plungers, stainless steel disc valves
    - Tanks – Steel coated tanks or Fiberglass, corrosion resistant SS 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, Building / Heat trace
- 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 No. 12

** subject to final design and engineering

Proposed Ewart Unit No. 17

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. 2: TRACT FACTOR CALCULATIONS FOR EWART BAKKEN UNIT NO. 17 APPLICATION

TRACT FACTORS BASED ON OIL-IN-PLACE (OOIP) - CUMULATIVE PRODUCTION TO NOVEMBER 2019

LSD-SEC	Tract	OOIP (m3)	HZ Wells Alloc Cum Prodn (m3)	Vert Wells Cum Prodn (m3)	Sum Hz + Vert Alloc Cum Prodn	OOIP - Cum	OOIP Tract Factor (%)	Tract
01-09	01-09-007-28W1M	58,826	0.0	0.0	0.0	58,826	3.620028377%	01-09-007-28W1M
02-09	02-09-007-28W1M	55,423	0.0	0.0	0.0	55,423	3.410603354%	02-09-007-28W1M
03-09	03-09-007-28W1M	58,702	0.0	0.0	0.0	58,702	3.612427323%	03-09-007-28W1M
04-09	04-09-007-28W1M	72,041	0.0	0.0	0.0	72,041	4.433268125%	04-09-007-28W1M
05-09	05-09-007-28W1M	75,368	2,568.1	0.0	2,568.1	72,800	4.479943532%	05-09-007-28W1M
06-09	06-09-007-28W1M	60,030	2,684.1	0.0	2,684.1	57,346	3.528930019%	06-09-007-28W1M
07-09	07-09-007-28W1M	56,072	2,682.3	0.0	2,682.3	53,390	3.285493699%	07-09-007-28W1M
08-09	08-09-007-28W1M	59,475	1,054.4	0.0	1,054.4	58,421	3.595078801%	08-09-007-28W1M
09-09	09-09-007-28W1M	57,467	1,900.1	0.0	1,900.1	55,567	3.419455092%	09-09-007-28W1M
10-09	10-09-007-28W1M	57,434	1,900.1	0.0	1,900.1	55,534	3.417461505%	10-09-007-28W1M
11-09	11-09-007-28W1M	63,409	1,900.1	0.0	1,900.1	61,509	3.785130380%	11-09-007-28W1M
12-09	12-09-007-28W1M	80,051	0.0	4,155.2	4,155.2	75,896	4.670484672%	12-09-007-28W1M
13-09	13-09-007-28W1M	72,038	0.0	2,595.2	2,595.2	69,443	4.273368058%	13-09-007-28W1M
14-09	14-09-007-28W1M	59,397	3,342.5	0.0	3,342.5	56,055	3.449506698%	14-09-007-28W1M
15-09	15-09-007-28W1M	56,080	3,342.5	0.0	3,342.5	52,738	3.245369980%	15-09-007-28W1M
16-09	16-09-007-28W1M	56,780	3,342.5	0.0	3,342.5	53,437	3.288417947%	16-09-007-28W1M
01-16	01-16-007-28W1M	56,228	1,840.3	0.0	1,840.3	54,388	3.346922891%	01-16-007-28W1M
02-16	02-16-007-28W1M	54,228	1,920.6	0.0	1,920.6	52,308	3.218898049%	02-16-007-28W1M
03-16	03-16-007-28W1M	54,923	1,917.2	0.0	1,917.2	53,006	3.261850080%	03-16-007-28W1M
04-16	04-16-007-28W1M	56,940	1,125.3	2,119.5	3,244.8	53,695	3.304286868%	04-16-007-28W1M
05-16	05-16-007-28W1M	59,012	2,387.9	1,647.9	4,035.8	54,976	3.383124996%	05-16-007-28W1M
06-16	06-16-007-28W1M	56,993	3,797.6	0.0	3,797.6	53,195	3.273517678%	06-16-007-28W1M
07-16	07-16-007-28W1M	54,286	3,804.4	0.0	3,804.4	50,481	3.106519668%	07-16-007-28W1M
08-16	08-16-007-28W1M	54,948	3,616.6	0.0	3,616.6	51,331	3.158817774%	08-16-007-28W1M
11-16	11-16-007-28W1M	58,396	0.0	0.0	0.0	58,396	3.593563667%	11-16-007-28W1M
12-16	12-16-007-28W1M	59,746	0.0	2,159.1	2,159.1	57,587	3.543807487%	12-16-007-28W1M
13-16	13-16-007-28W1M	66,530	0.0	2,691.5	2,691.5	63,838	3.928459608%	13-16-007-28W1M
14-16	14-16-007-28W1M	57,786	0.0	3,099.5	3,099.5	54,686	3.365263672%	14-16-007-28W1M
		1,688,609	**45,126.5**	**18,467.9**	**63,594.4**	**1,625,015**	**100.000000000%**	

TABLE NO. 3 - Well List and Status

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 (%)
100/08-09-007-28W1/0	006765	Horizontal	BAKKEN-THREE FORKS A	TORQUAY	Producing	9/28/2008	Nov-2019	1.86	55.90	8988.90	3.61	108.30	30273.50	65.96
100/09-09-007-28W1/0	006915	Horizontal	BAKKEN-THREE FORKS A	BAKKEN,TORQUAY	Producing	6/30/2009	Nov-2019	0.52	15.50	5700.80	1.71	51.20	14465.20	76.76
100/12-09-007-28W1/0	006760	Vertical	BAKKEN-THREE FORKS A	BAKKEN	Producing	10/8/2008	Nov-2019	0.45	13.60	4155.20	0.35	10.50	1918.20	43.57
100/13-09-007-28W1/0	006440	Vertical	BAKKEN-THREE FORKS A	BAKKEN,THREEFK	Producing	10/29/2007	Nov-2019	0.28	8.50	2595.20	0.68	20.50	2203.20	70.69
100/16-09-007-28W1/0	006888	Horizontal	BAKKEN-THREE FORKS A	BAKKEN	Producing	2/5/2009	Nov-2019	0.78	23.50	10028.40	1.80	54.10	14368.70	69.72
100/01-16-007-28W1/0	007073	Horizontal	BAKKEN-THREE FORKS A	BAKKEN	Producing	11/16/2009	Nov-2019	0.52	15.70	6803.50	1.11	33.20	15087.20	67.89
100/04-16-007-28W1/0	006562	Vertical	BAKKEN-THREE FORKS A	BAKKEN	Producing	3/13/2008	Nov-2019	0.23	6.80	2119.50	0.16	4.90	2075.40	41.88
100/05-16-007-28W1/0	006563	Vertical	BAKKEN-THREE FORKS A	BAKKEN	Producing	7/10/2008	Nov-2019	0.43	12.80	1647.90	0.23	6.90	1450.80	35.03
100/08-16-007-28W1/0	007479	Horizontal	BAKKEN-THREE FORKS A	BAKKEN	Producing	9/29/2010	Nov-2019	0.85	25.40	13606.50	0.97	29.10	20825.40	53.39
100/12-16-007-28W1/0	006761	Vertical	BAKKEN-THREE FORKS A	BAKKEN	Producing	10/8/2008	Dec-2018	0.11	3.40	2159.10	0.07	2.30	1799.50	40.35
100/13-16-007-28W1/0	006658	Vertical	BAKKEN-THREE FORKS A	BAKKEN	Producing	7/14/2008	Nov-2019	0.12	3.60	2691.50	0.23	6.90	1149.60	65.71
100/14-16-007-28W1/0	005409	Vertical	BAKKEN-THREE FORKS A	BAKKEN	Producing	3/15/2005	Nov-2019	0.48	14.30	3099.50	0.34	10.10	2760.00	41.39
										63596.0			**108376.7**	
										400007 bbl			681669 bbl	

TABLE NO. 4 - OOIP Calculation

UWI	Area (m2)	Middle Bakken Isopach (m)	Upper Lyleton A Isopach (m)	Lower Lyleton A Isopach (m)	Lyleton B Isopach (m)	Total Reservoir Isopach (m)	OOIP (m3)	OOIP (bbl)
01-09-007-28	162231	4.6	0.0	0.0	4.2	8.8	58826	369957
02-09-007-28	162053	3.4	0.0	0.5	4.4	8.3	55423	348554
03-09-007-28	161890	2.2	0.3	1.7	4.6	8.8	58702	369180
04-09-007-28	161884	1.2	2.1	2.8	4.7	10.8	72041	453067
05-09-007-28	161866	1.1	2.2	3.3	4.7	11.3	75368	473989
06-09-007-28	161872	2.0	0.2	2.2	4.6	9.0	60030	377527
07-09-007-28	162000	3.3	0.0	0.8	4.3	8.4	56072	352637
08-09-007-28	162178	4.5	0.0	0.1	4.3	8.9	59475	374038
09-09-007-28	162168	4.4	0.0	0.2	4.0	8.6	57467	361408
10-09-007-28	162077	3.3	0.1	1.0	4.2	8.6	57434	361205
11-09-007-28	161985	1.9	0.7	2.3	4.6	9.5	63409	398779
12-09-007-28	161895	0.9	2.6	3.6	4.9	12.0	80051	503442
13-09-007-28	161877	0.8	2.1	3.0	4.9	10.8	72038	453047
14-09-007-28	161966	2.2	0.6	1.6	4.5	8.9	59397	373551
15-09-007-28	162023	3.6	0.0	0.7	4.1	8.4	56080	352688
16-09-007-28	162114	4.6	0.0	0.2	3.7	8.5	56780	357088
01-16-007-28	162451	4.8	0.0	0.0	3.6	8.4	56228	353620
02-16-007-28	162475	4.3	0.0	0.0	3.8	8.1	54228	341041
03-16-007-28	162550	3.9	0.0	0.1	4.2	8.2	54923	345409
04-16-007-28	162572	3.5	0.2	0.3	4.5	8.5	56940	358095
05-16-007-28	162744	4.8	0.0	0.0	4.0	8.8	59012	371127
06-16-007-28	162723	4.7	0.0	0.0	3.8	8.5	56993	358427
07-16-007-28	162648	4.6	0.0	0.0	3.5	8.1	54286	341403
08-16-007-28	162624	4.8	0.0	0.0	3.4	8.2	54948	345567
11-16-007-28	162896	4.8	0.0	0.0	3.9	8.7	58396	367252
12-16-007-28	162918	4.3	0.1	0.5	4.0	8.9	59746	375746
13-16-007-28	163090	1.4	1.7	2.1	4.7	9.9	66530	418404
14-16-007-28	163068	3.7	0.0	0.2	4.7	8.6	57786	363413
							1688609	**10619663**

Phi	0.156
N/G	0.447
Boi	1.1
SW	0.35

Proposed Ewart Unit No. 17

Application for Enhanced Oil Recovery Waterflood Project

LIST OF APPENDICES

Appendix 1 Ewart Unit No. 17 -- Offsetting Units

Appendix 2 Ewart Unit No. 17 – Structural Cross-Section

Appendix 3 Ewart Unit No. 17 – Upper Bakken Structure

Appendix 4 Ewart Unit No. 17 – Middle Bakken Isopach

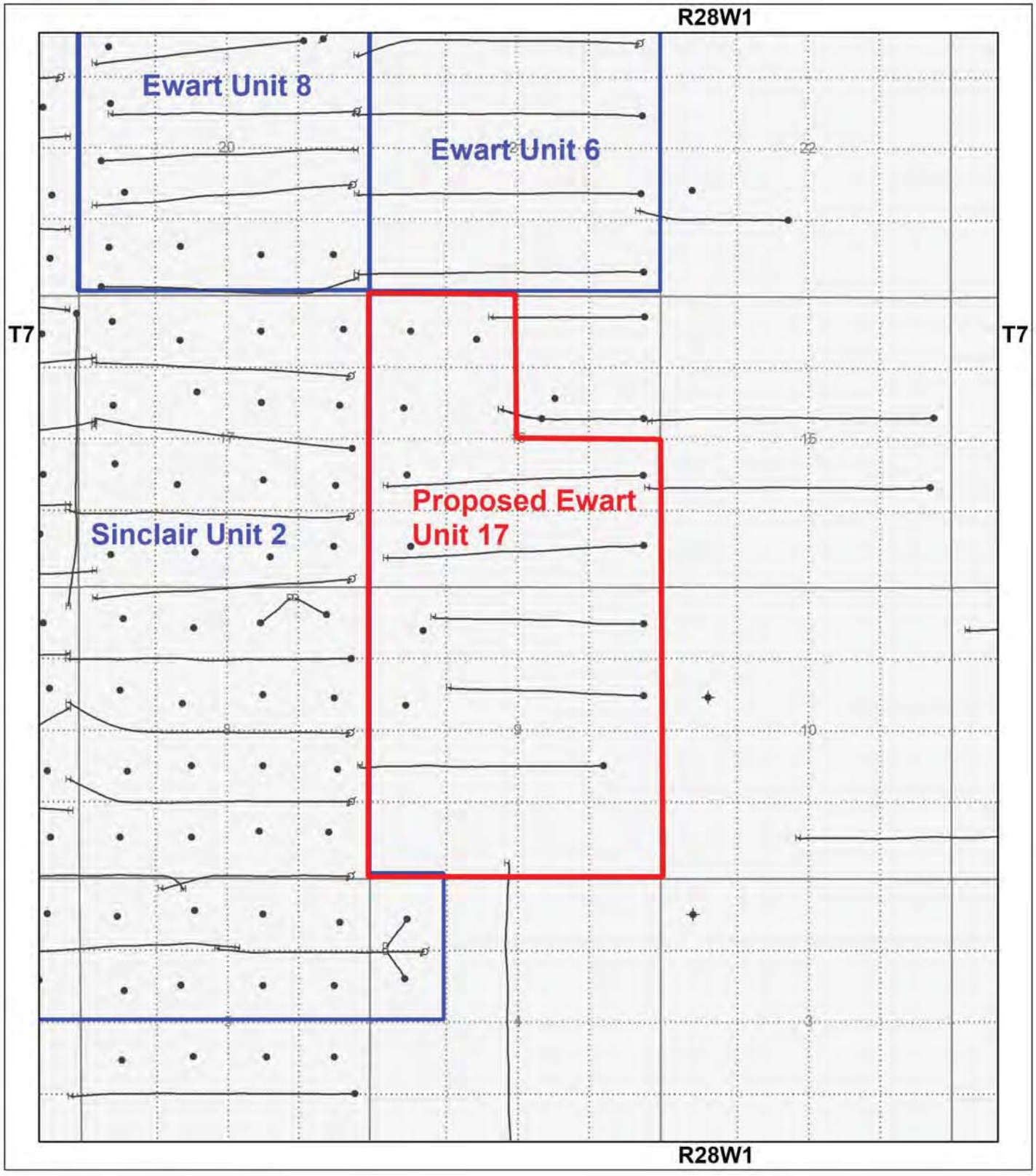
Appendix 5 Ewart Unit No. 17 – Upper Lyleton A Isopach

Appendix 6 Ewart Unit No. 17 – Lower Lyleton A Isopach

Appendix 7 Ewart Unit No. 17 – Lyleton B Isopach

Appendix 8 Ewart Unit No. 17 – PDPK Core Data

APPENDIX 1



Center: 49.5622, -101.2237
Scale: 1:30,514
0 0.5 1 km
0 0.1 0.8 mi

N NE E SE S SW W NW

Ewart Unit 17
Offsetting Bakken Units

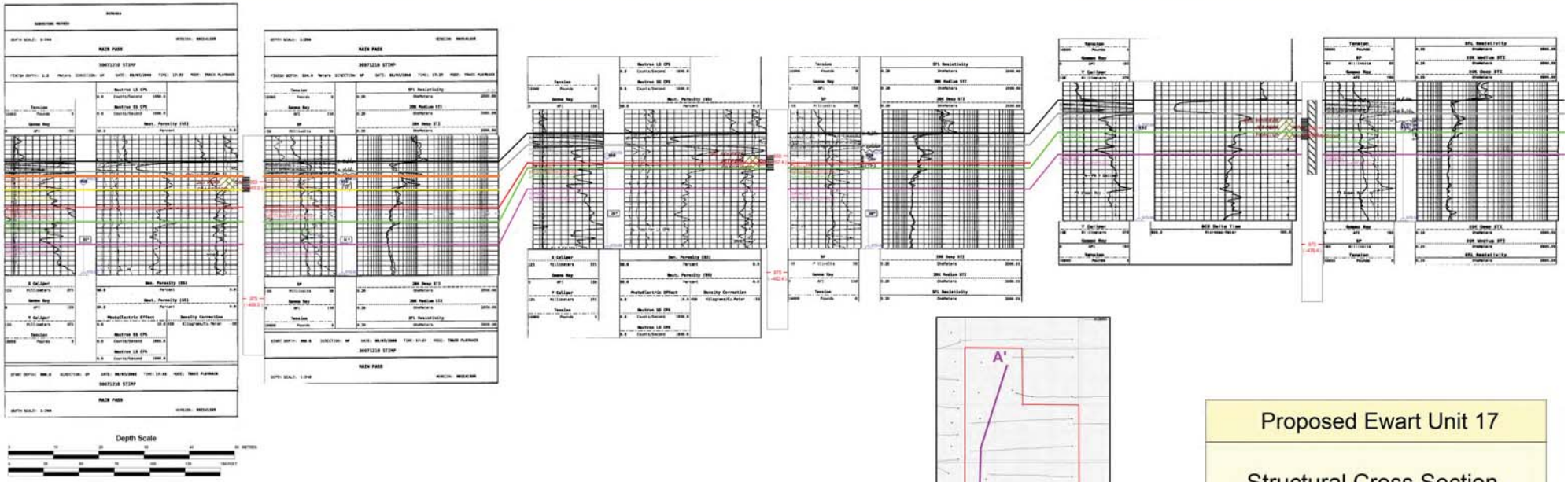
A APPENDIX 2

A'

00/12-09-007-28W1/0
KB: 487.0 m RR: 2008-09-08
TD: 993.0 m [TVD] FormTD: TORQUAY
Mode: Prod Fluid: Oil
TUNDRA SINCLAIR 12-9-7-28 (WPM)
896.4m to next well >

00/04-16-007-28W1/0
KB: 492.6 m RR: 2008-02-03
TD: 990.0 m [TVD] FormTD: BIRDBER
Mode: Prod Fluid: Oil
TUNDRA SINCLAIR PROV. 4-16-7-28 (WPM)
< 896.4m to previous well
1224.6m to next well >

00/14-16-007-28W1/0
KB: 498.6 m RR: 2005-02-23
TD: 988.0 m [TVD] FormTD: BIRDBER
Mode: Prod Fluid: Oil
TUNDRA SINCLAIR PROV. 14-16-7-28 (WPM)
< 1224.6m to previous well

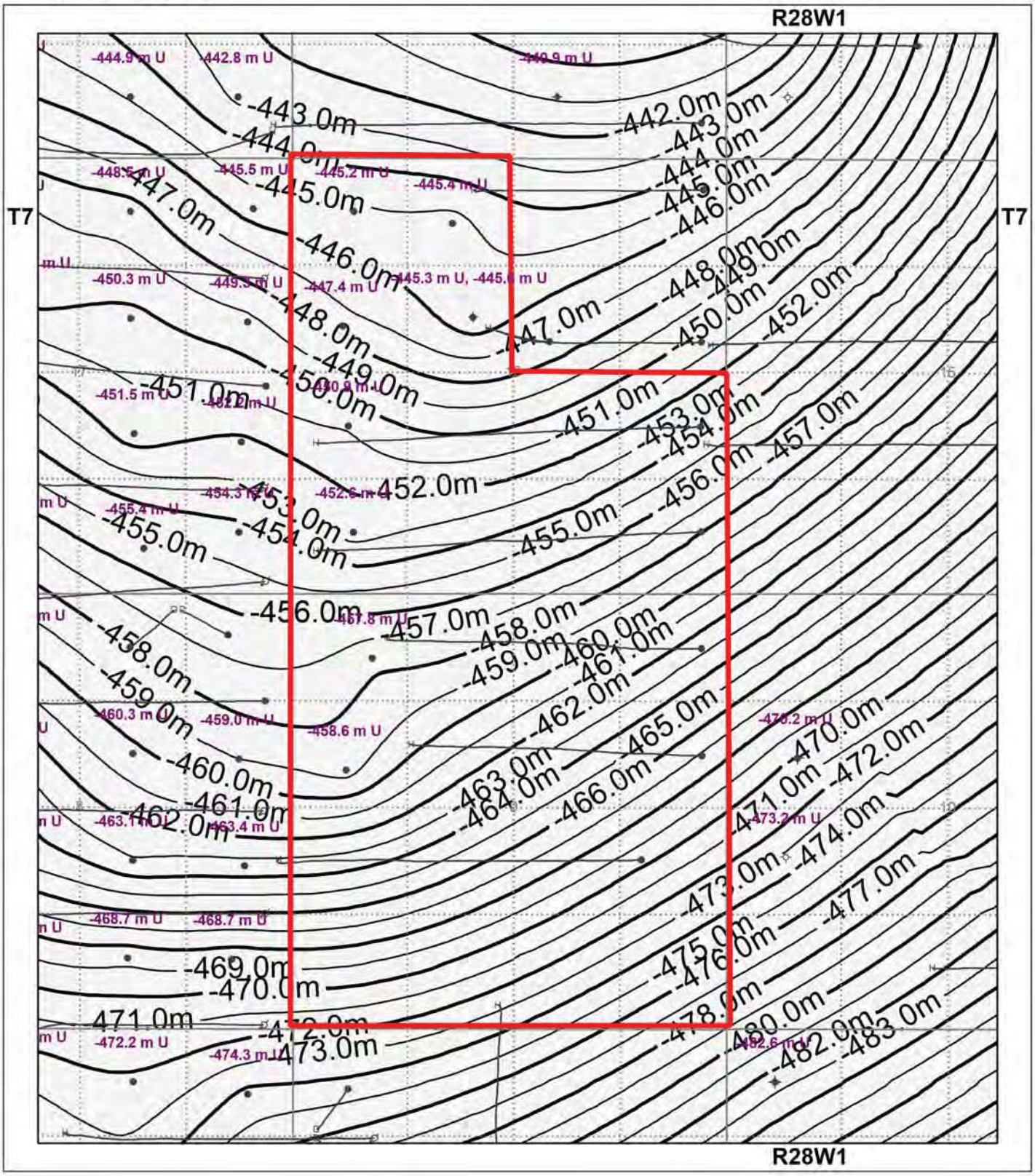


Depth Scale

Proposed Ewart Unit 17

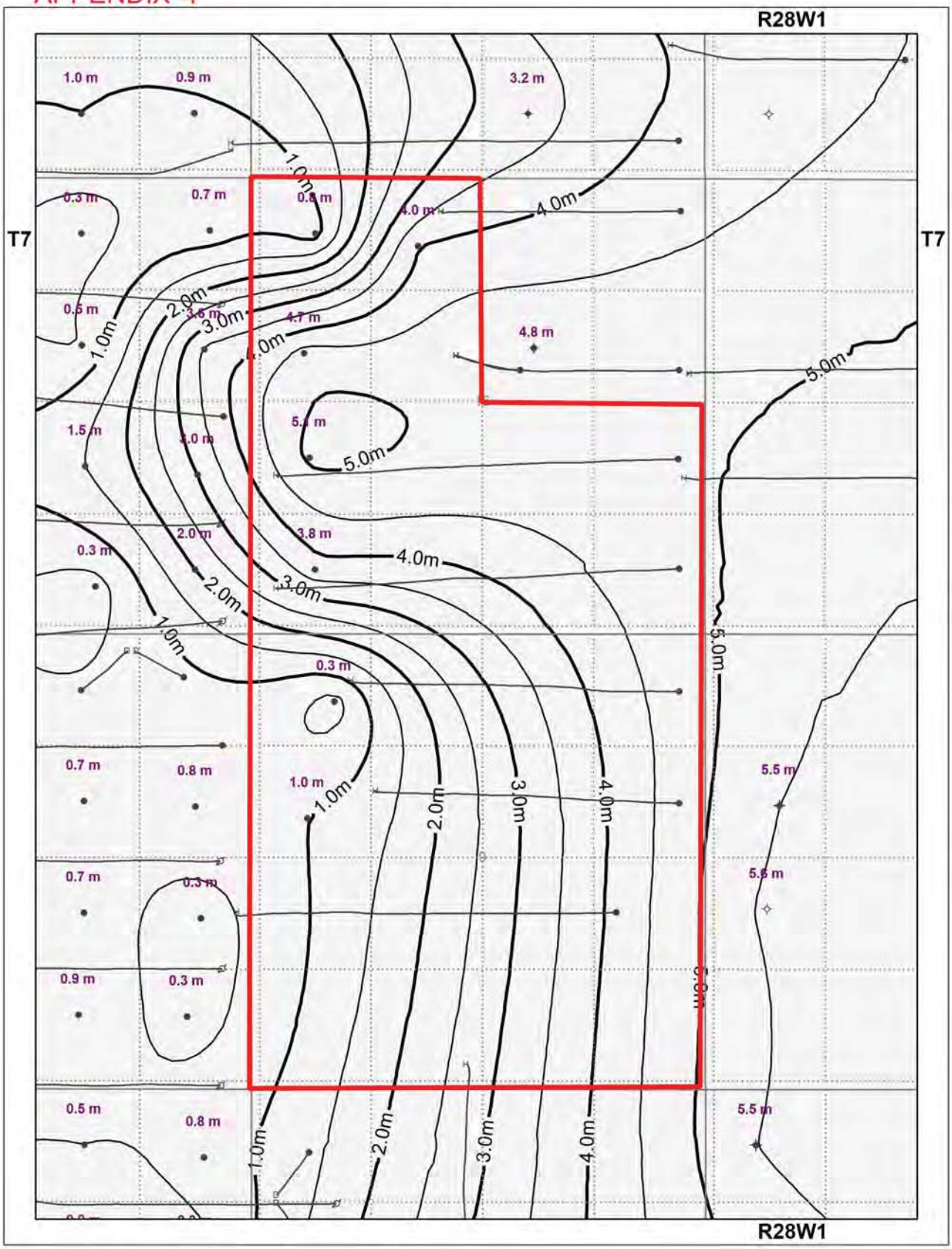
Structural Cross Section
-South to North-
Through Proposed Unit Area

APPENDIX 3



Proposed Ewart 17
Upper Bakken Structure
(mSS)

APPENDIX 4



Center: 49.5956, -101.3762

Scale: 1:31,673

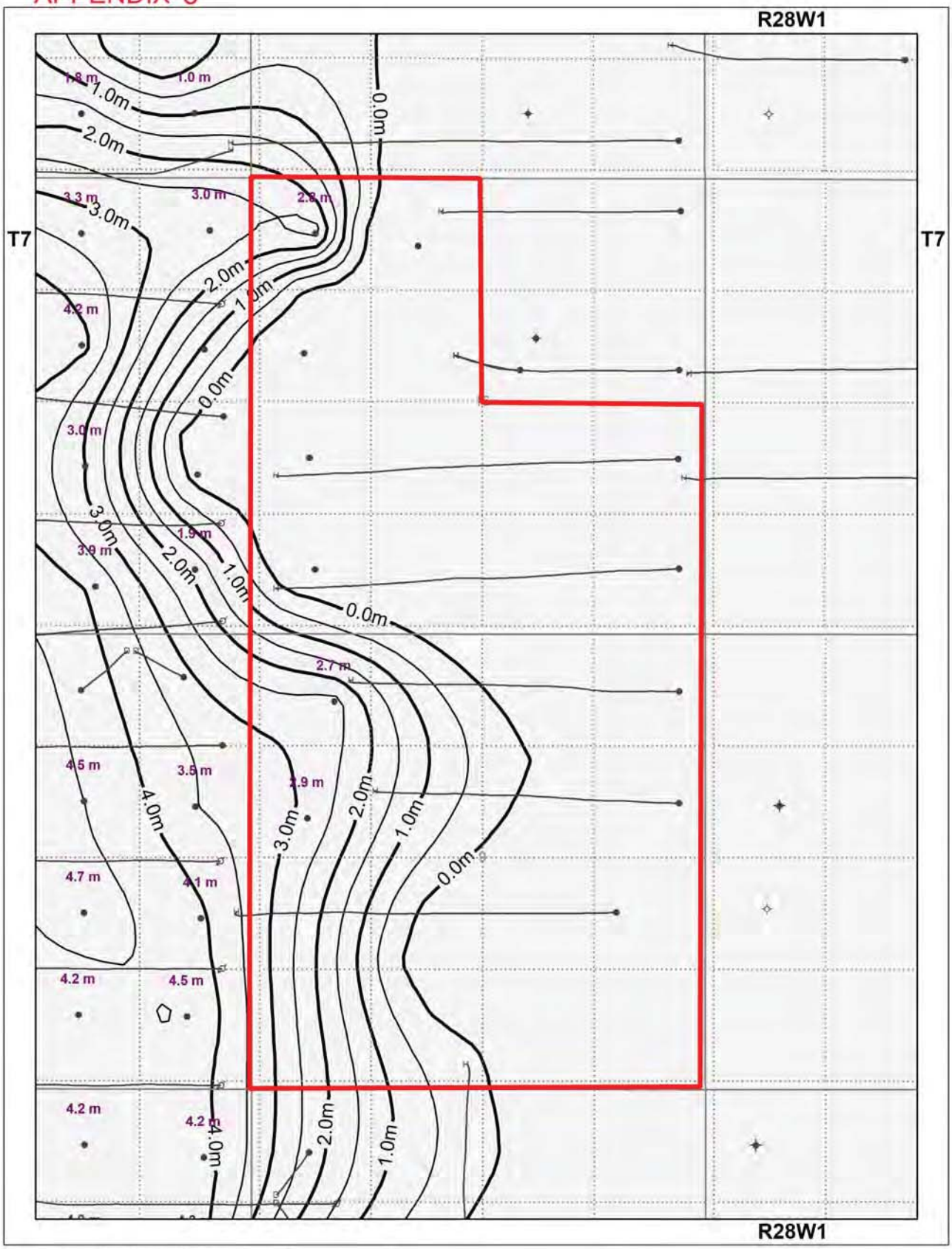
0 0.5 1 km

0 0.1 0.8 mi

N NW NE W E SW SE S

Proposed Ewart Unit 17
Middle Bakken Isopach
(m)

APPENDIX 5



Center: 49.5956, -101.3762

Scale: 1:31,673

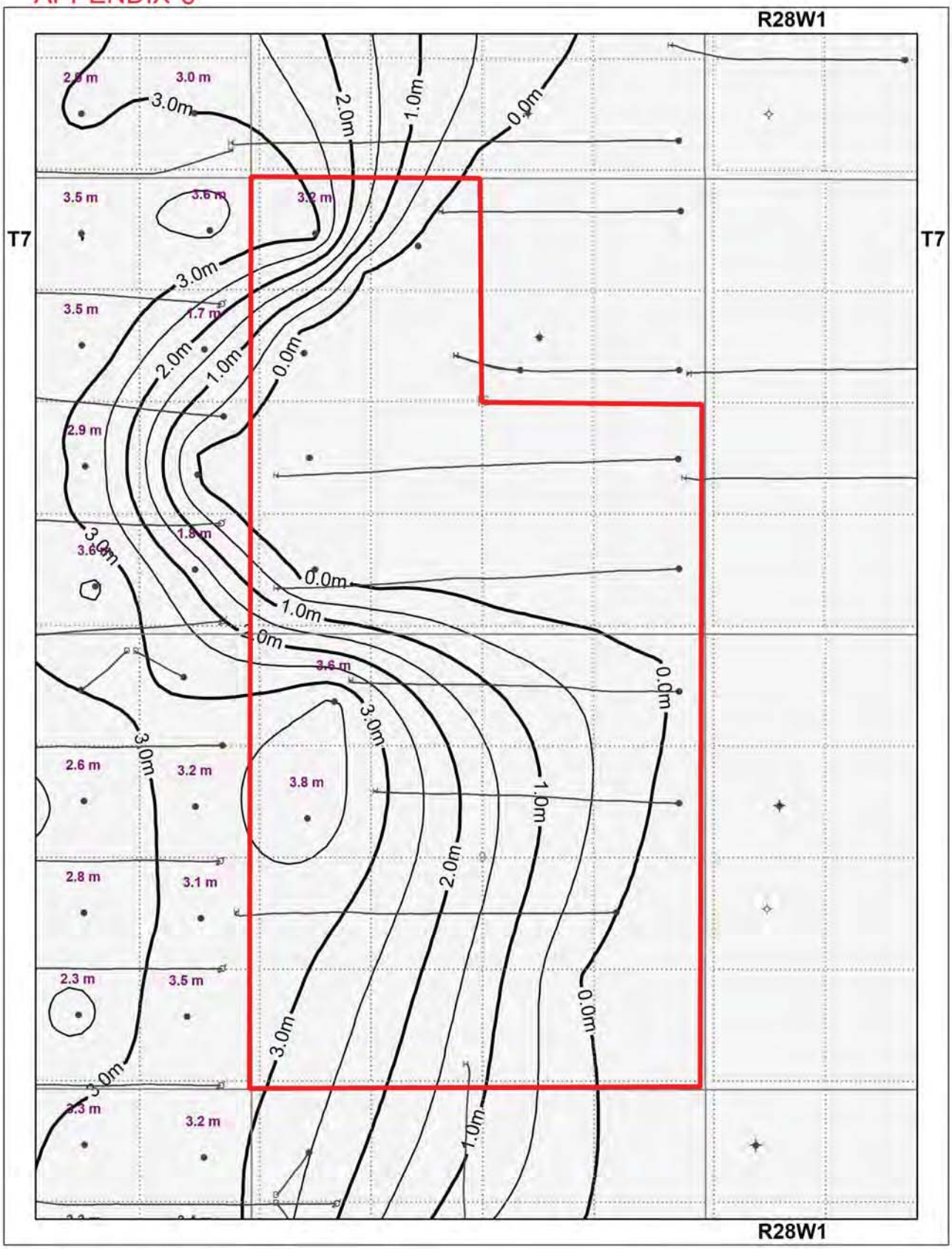
0 0.5 1 km

0 0.1 0.8 mi

N NE E SE S SW W NW

Proposed Ewart Unit 17
Upper Lyleton A Isopach
(m)

APPENDIX 6



Center: 49.5956, -101.3762

Scale: 1:31,673

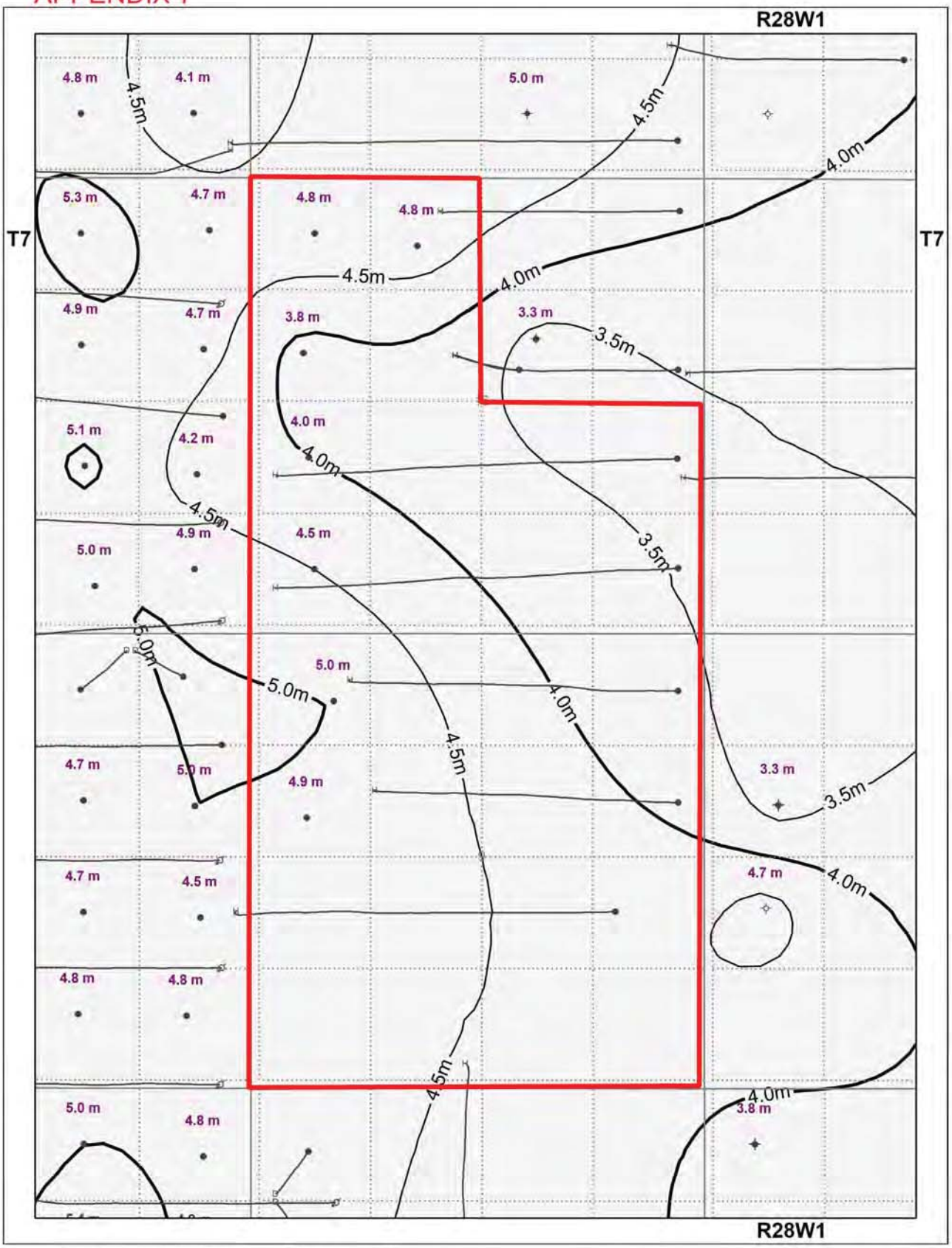
0 0.5 1 km

0 0.1 0.8 mi

N NE E SE S SW W NW

Proposed Ewart Unit 17
Lower Lyleton A Isopach
(m)

APPENDIX 7



Center: 49.5956, -101.3762
Scale: 1:31,673
0 0.5 1 km
0 0.1 0.8 mi

N NE E SE S SW W NW

Proposed Ewart Unit 17
Lyleton B Isopach
(m)

APPENDIX 8

Center: 49.5956, -101.3762
Scale: 1:31,673
0 0.5 1 km
0 0.1 0.8 mi

N NW NE W E SW SE S

Proposed Ewart Unit 17
Core Data Points