

PROPOSED EWART UNIT NO. 18

Application for Enhanced Oil Recovery Waterflood Project

Middle Bakken/Three Forks Formations

Bakken – Three Forks A Pool (01 62A)

Daly Sinclair Field, Manitoba

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 northern 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. 18 (LSDs 1-4, 7,8 Section 6-009-28W1, S/2 Section 1-009-29W1) 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-Three Forks A Pool of the Daly Sinclair Oilfield ([Figure 3](#)).

SUMMARY

1. The proposed Ewart Unit No. 18 will include 5 horizontal wells and 1 vertical well, within 14 Legal Sub-Divisions (LSD) of the Middle Bakken/Three Forks producing reservoir. The project is located north of Sinclair Unit No. 17 and Ewart Unit No. 4 (Figure 2).
2. Total Net Original Oil in Place (OOIP) in Ewart Unit No. 18 has been calculated to be **625.6** e³m³ (3,935 Mbbbl) for an average of **44.7** net e³m³ (281.0 Mbbbl) OOIP per 40 acre LSD.
3. Cumulative allocated production to the end of February 2020 from the 6 wells within the proposed Ewart Unit No. 18 project area was **35.8** e³m³ (225.2 Mbbbl) of oil, and **108.2** e³m³ (680.6 Mbbbl) of water, representing a **5.7%** Recovery Factor (RF) of the Net OOIP.
4. Estimated Ultimate Recovery (EUR) of Primary Proved Producing oil reserves in the proposed Ewart Unit No. 18 project area has been calculated to be **45.8** e³m³ (288.1 Mbbbl), with **10.0** e³m³ (62.9 Mbbbl) remaining as of the end of February 2020.
5. Ultimate oil recovery of the proposed Ewart Unit No. 18 OOIP, under the current Primary Production method, is forecasted to be **7.3%**.
6. Figure 4 shows the production from the Ewart Unit No. 18 peaked in March 2014 at **47.0** m³ (OPD). As of February 2020, production was **3.9** m³ OPD, **18.7** m³ of water per day (WPD) and an **82.8%** watercut.
7. In March 2014, production averaged **7.8** m³ OPD per well in Ewart Unit No. 18. As of February 2020, average per well production has declined to **0.78** m³ OPD. Decline analysis of the group primary production data forecasts total oil to continue declining at an annual rate of approximately **33%** in the project area.
8. Estimated Ultimate Recovery (EUR) of proved oil reserves under Secondary WF EOR for the proposed Ewart Unit No. 18 has been calculated to be **70.6** e³m³ (444.1 Mbbbl), with **34.8** e³m³ (218.9 Mbbbl) remaining. An incremental **24.8** e³m³ (156.1 Mbbbl) of proved oil reserves, or **4.0%**, 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. 18 is estimated to be **11.3%**.
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. 18, to complete waterflood patterns with effective 20 acre spacing similar to that of Ewart Unit No. 4.

DISCUSSION

The proposed Ewart Unit No. 18 project area is located within Township 9, Range 28-29 W1 of the Daly Sinclair oil field. The proposed Ewart Unit No. 18 currently consists of 5 horizontal and 1 vertical well, within an area covering 14 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 west to east through the proposed unit area. The producing sequence in descending order consists of the Upper Bakken Shale, Middle Bakken Siltstone, the Red Shale Marker, Lyleton B Siltstone and the Torquay Silty Shale. The reservoir units are represented by the Middle Bakken 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 formations in the proposed unit are analogous to the Bakken / Lyleton producing reservoirs that have been approved adjacent to the proposed unit (Sinclair Unit 17, Sinclair Unit 19, Ewart Unit 16 and Ewart Unit 4) 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 based on 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. Within the proposed unit, the Middle Bakken thickness ranges from 3.1m to 4.7m (Appendix 4).

The Red Shale Marker lies between the overlying Middle Bakken 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 Sub-crops within the proposed unit area ranging from 3m to 0m. 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 5.5m-3.2m thick within the proposed unit (Appendix 5).

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 with regional dip to the SW (Appendix 3).

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, reservoir formations, the Middle Bakken and Lyleton B, are continuous throughout the proposed unit area.

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

Gross OOIP Estimates

Total volumetric OOIP for the Middle Bakken Lyleton A and Lyleton B within the proposed unit has been calculated to be **625.6** e³m³ (**3,935** Mbbbl) using Tundra internally created maps. Maps used were generated from core data from wells available in the greater Sinclair area (Appendix 6).

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

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

or

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

where

OOIP	= Original Oil in Place by LSD (Mbbbl, or m3)
A	= Area (40acres, or 16.187 hectares, per LSD)
h * ϕ	= 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. 18 is shown as **Figure 4**. Oil production commenced from the proposed Unit area in March 2008 and peaked during March 2014 at 47.0 m³ OPD. As of February 2020, production was 3.9 m³ OPD, 18.7 m³ WPD and an 82.8% watercut.

For the horizontal wells that are partly within the proposed unit boundary, an allocation factor of 17.34% was given to 100/13-06-009-28W1/0 and 45.65% to 100/16-06-009-28W1/0.

From peak production in March 2014 to date, oil production is declining at an annual rate of approximately 33% 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. 18.

Unit Operator

Tundra Oil and Gas (Tundra) will be the Operator of record for Ewart Unit No. 18.

Unitized Zone

The Unitized zone(s) to be waterflooded in Ewart Unit No. 18 will be the Middle Bakken and Three Forks formations.

Unit Wells

The 5 horizontal wells and 1 vertical well to be included in the proposed Ewart Unit No. 18 are outlined in **Table 3**.

Unit Lands

Ewart Unit No. 18 will consist of 14 LSDs as follows:

LSDs 1-4, 7-8 of Section 6 of Township 9, Range 28, W1M
S/2 Section 1 of Township 9, Range 29, W1M

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

Tract Factors

The proposed Ewart Unit No. 18 will consist of 14 Tracts based on the 40 acre LSDs containing the existing 5 horizontal and 1 vertical well.

The Tract Factor contribution for each of the LSD's within the proposed Ewart Unit No. 18 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. 18. 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. 18.

WATERFLOOD EOR DEVELOPMENT

Technical Studies

The waterflood performance predictions for the proposed Ewart Unit No. 18 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. 18 OOIP (Table 4).

Pre-Production of New Horizontal Injection Wells

Four (4) 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. 18.

Primary production from the original vertical/horizontal producing wells in the proposed Ewart Unit No. 18 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. 18 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 allocated production in the Ewart Unit No. 18 project area, to the end of February 2020 from the 6 wells, was 35.8 e³m³ of oil and 108.2 e³m³ of water for a recovery factor of 5.7% of the calculated Net OOIP.

Ultimate Primary Proved Producing oil reserves recovery for Ewart Unit No. 18 has been estimated to be 45.8 e³m³, or a 7.3% Recovery Factor (RF) of OOIP. Remaining Producing Primary Reserves has been estimated to be 10.0 e³m³ to the end of February 2020.

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. 18, while maximizing reservoir knowledge.

Criteria for Conversion to Water Injection Well

Four (4) 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. 18 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. 18 is estimated to be 70.6 e³m³ with 34.8 e³m³ remaining representing a total secondary recovery factor of 11.3 % for the proposed Unit area. An incremental 24.8 e³m³ of oil, or an incremental 4.0% 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. 18 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. 18 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. 18.

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. 18 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. 18 horizontal water injection well rate is forecasted to average **10 – 40 m³** WPD, based on expected reservoir permeability and pressure.

Reservoir Pressure

No representative initial pressure surveys are available for the proposed Ewart Unit No. 18 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. 18 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. 18 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. 18.

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. 18 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. 18 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. 18 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. 18. 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. 18 Application.

Ewart Unit No. 18 Unitization, and execution of the formal Ewart Unit No. 18 Agreement by affected Mineral Owners, is expected during Q3 2020. Copies of same will be forwarded to the Petroleum Branch, when available, to complete the Ewart Unit No. 18 Application.

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

TUNDRA OIL & GAS LIMITED

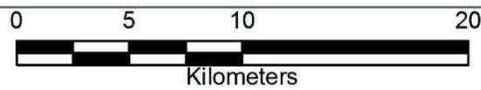
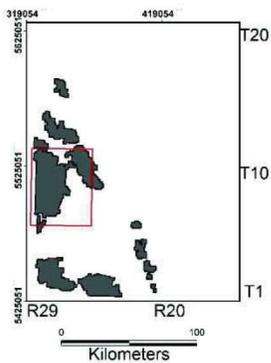
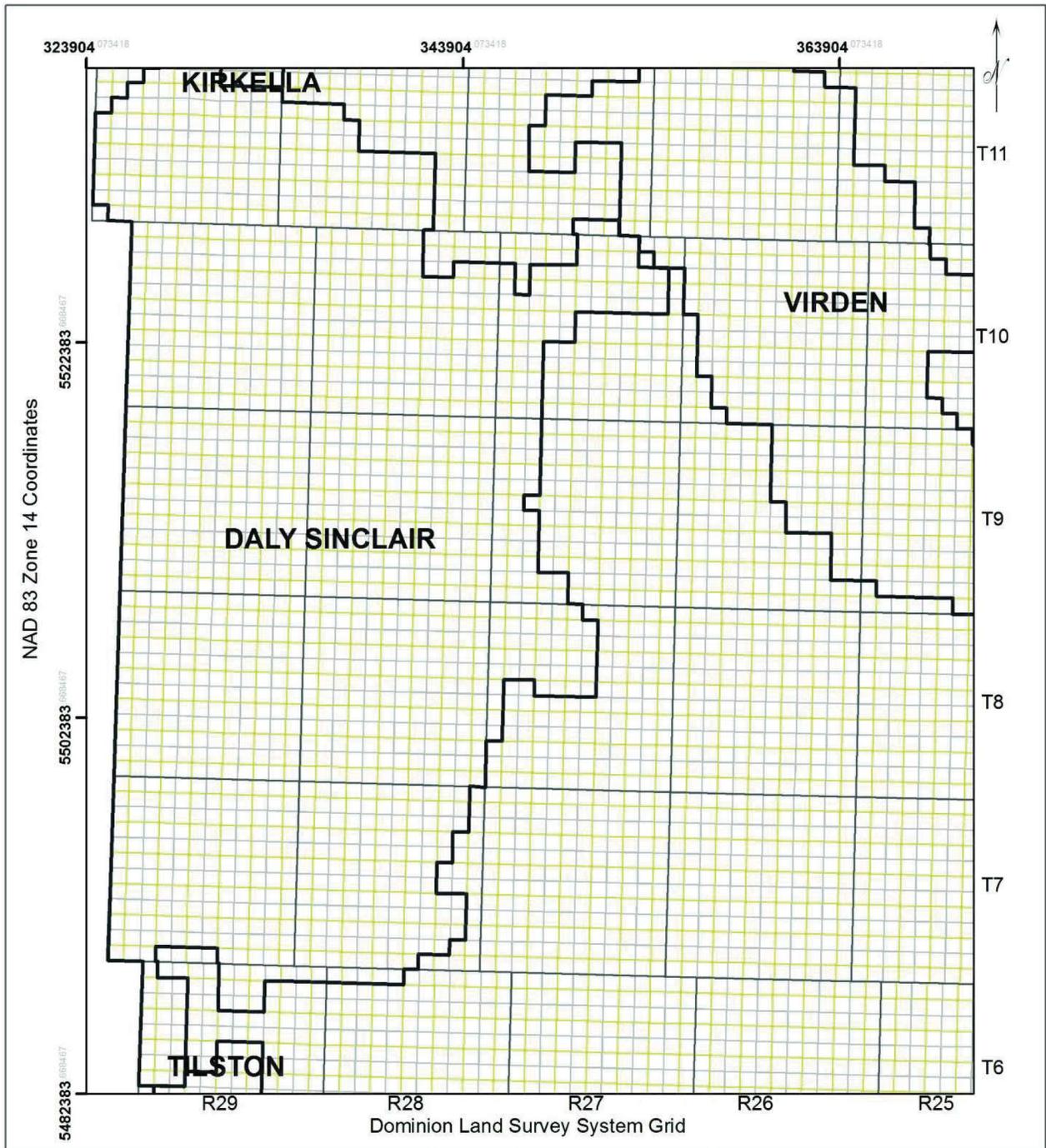
Original Signed by Eric [REDACTED] June 15, 2020 in Calgary, AB

Proposed Ewart Unit No. 18

Application for Enhanced Oil Recovery Waterflood Project

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Map 3

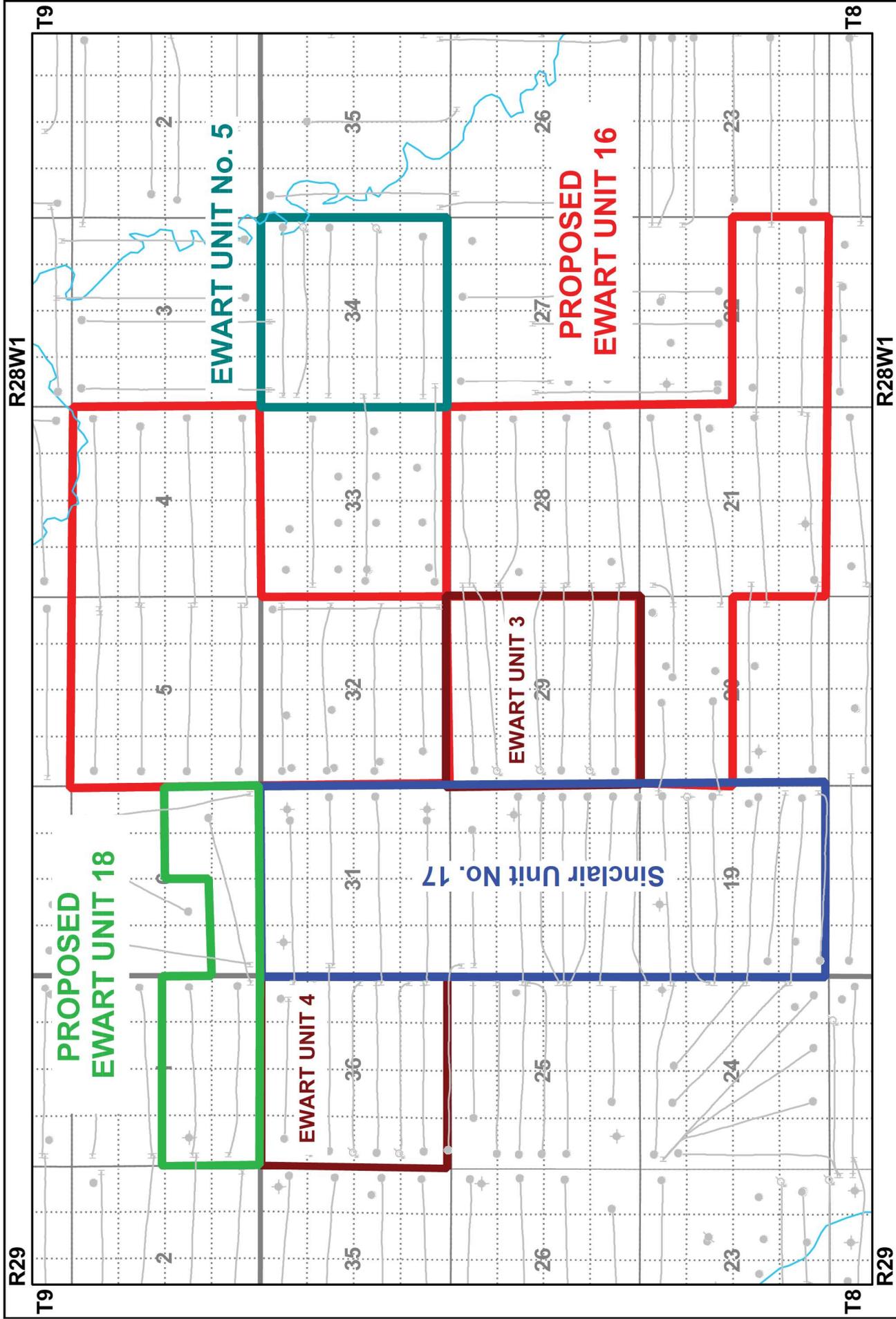
Manitoba's Designated Fields & Pools 2016
 Well Information: January 1, 2016.
 Geology by: P. Fulton
 Petroleum Branch

Legend

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

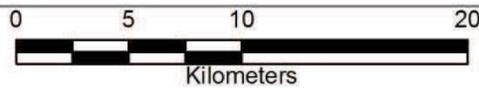
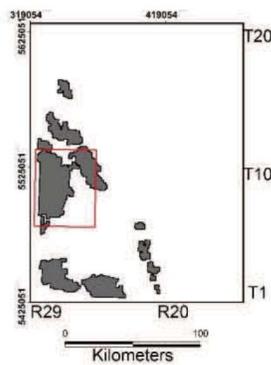
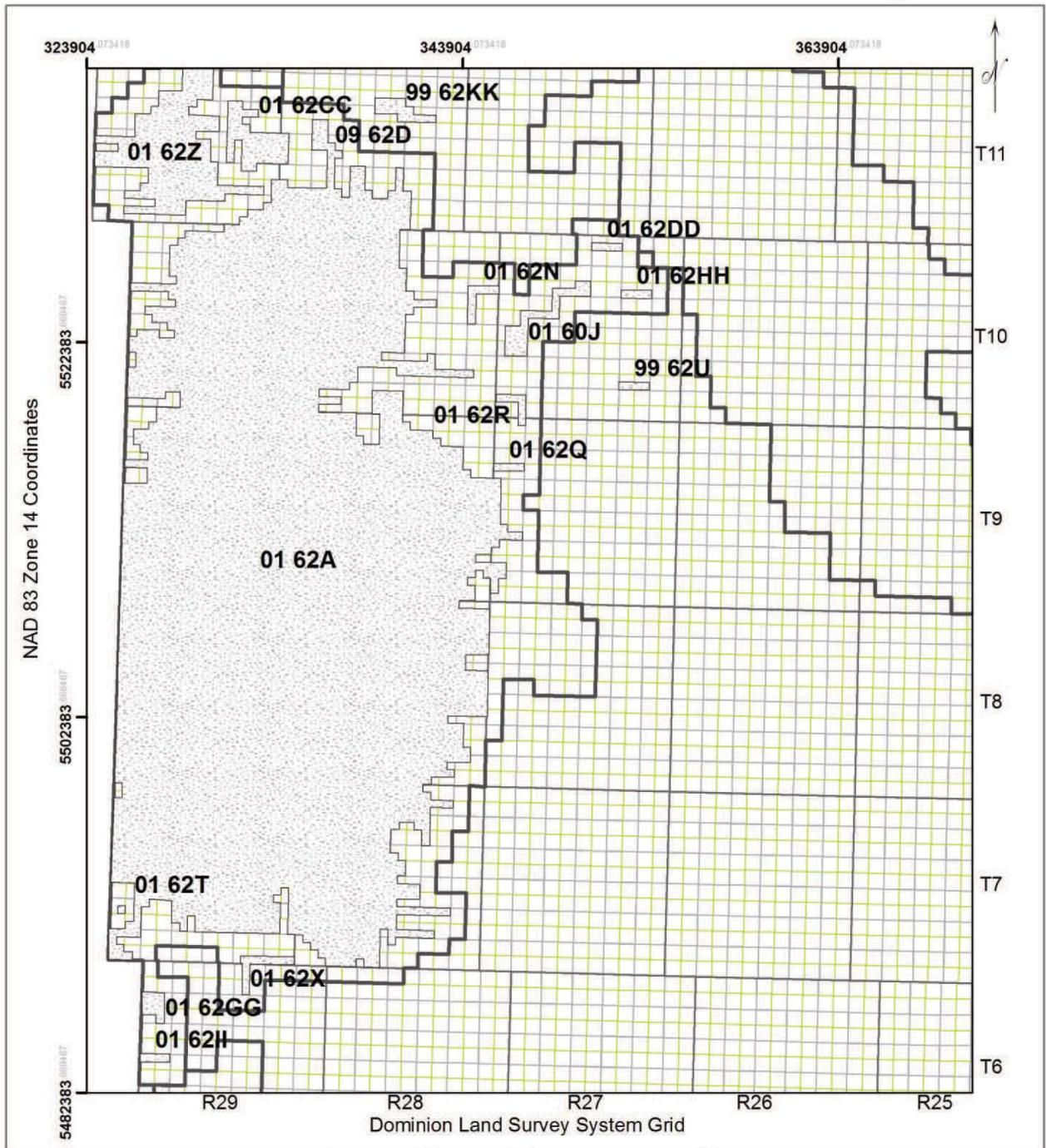


Figure No. 2



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Map 3

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

Legend

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



Production Graph

Group: ewart unit 18 well list.lwell
 # of Wells: 6
 Fluid: Oil
 Mode: Producing; Abandoned Zone

On Prod: 2008-03 to 2020-02
 Prod Form: BAKKEN; TORQUAY; BAKKENM
 Field: DALY (MB1)
 Pool Code: MB000162A
 Unit Code:

Cum Oil: 45286.6 m3
 Cum Gas: 0.0 E3m3
 Cum Wtr: 164329.9 m3
 Cum Inj Oil: 0.0 m3
 Cum Inj Gas: 0.0 E3m3
 Cum Inj Wtr: 0.0 m3

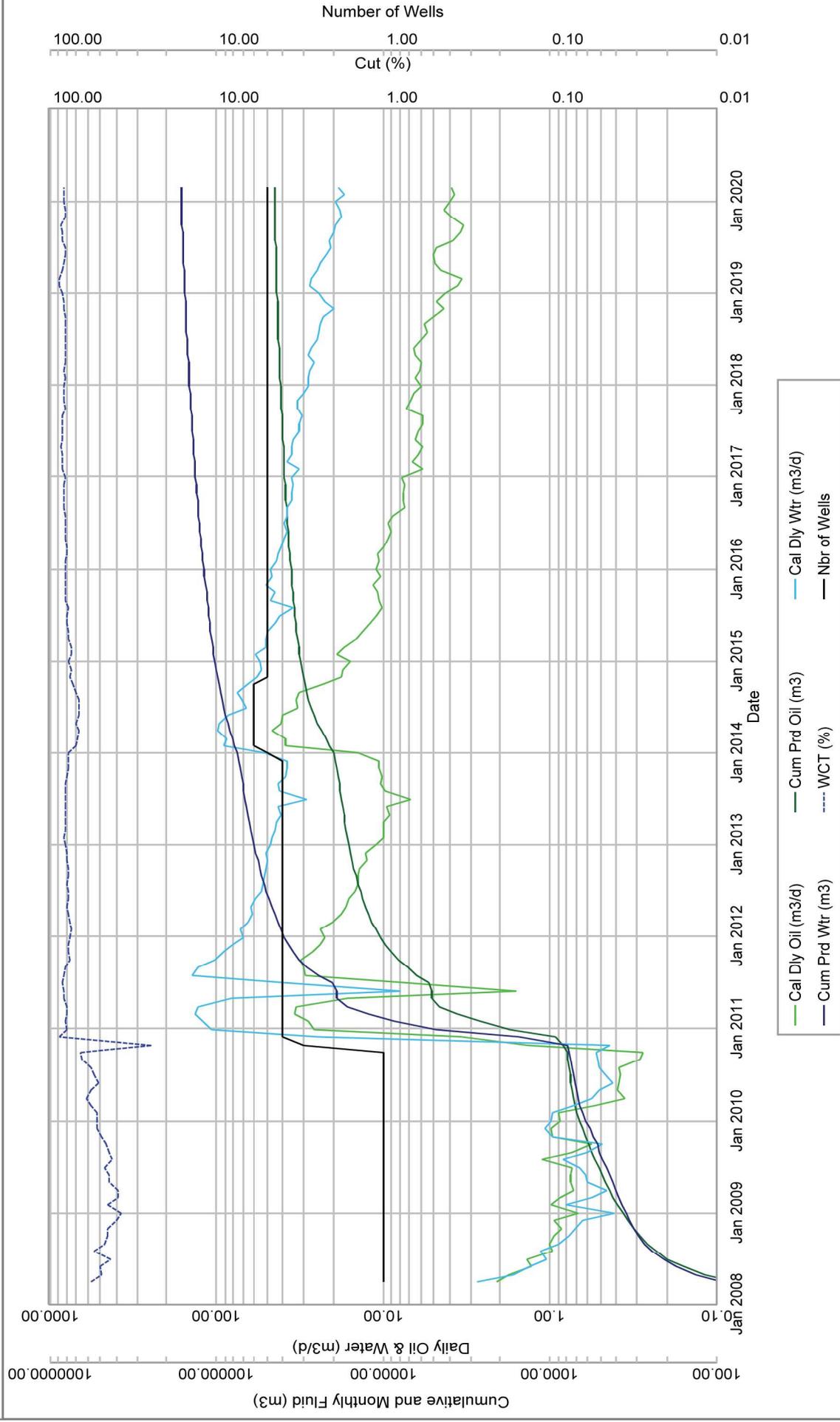
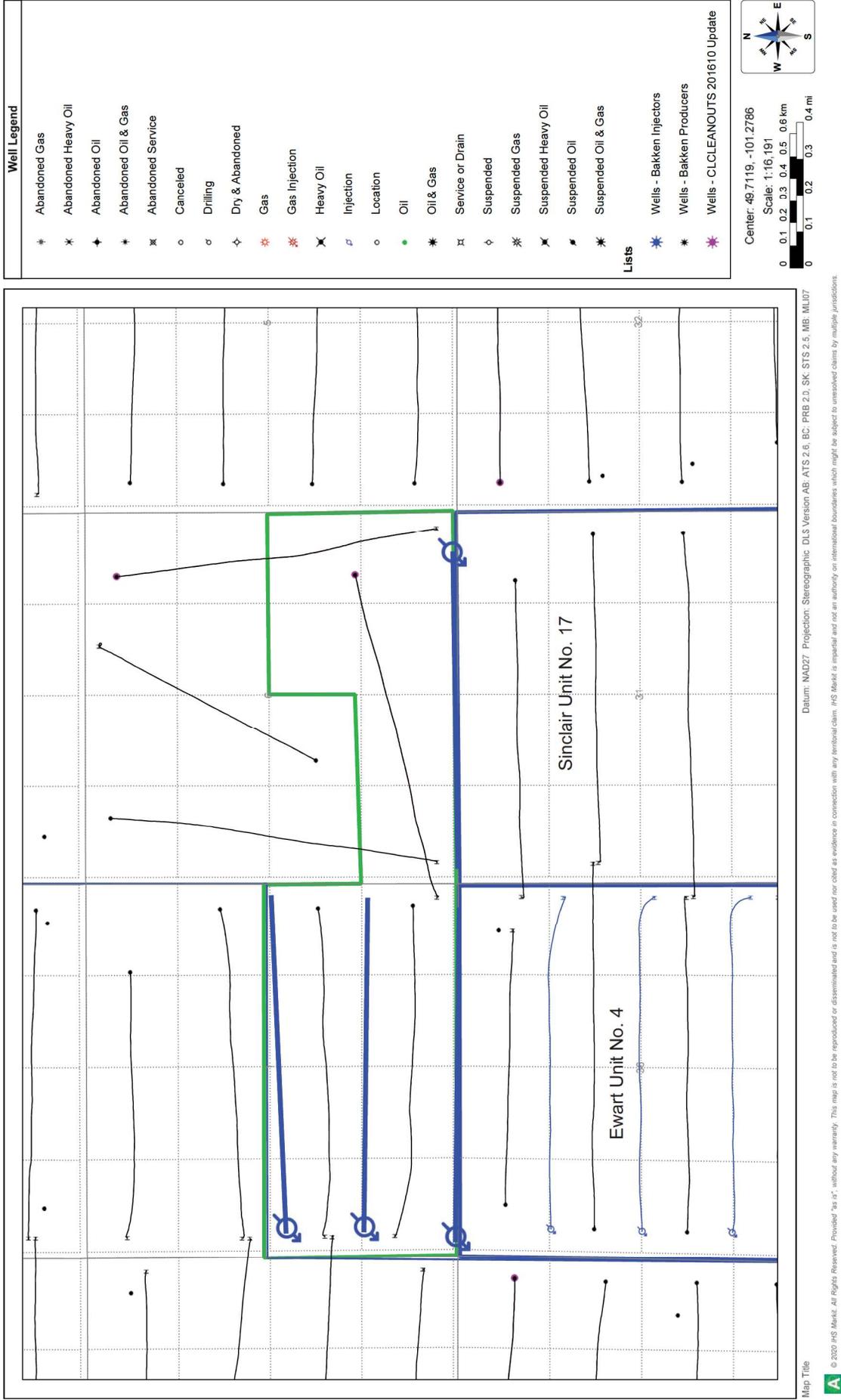


Figure No. 5



Primary Recovery - Rate vs Time

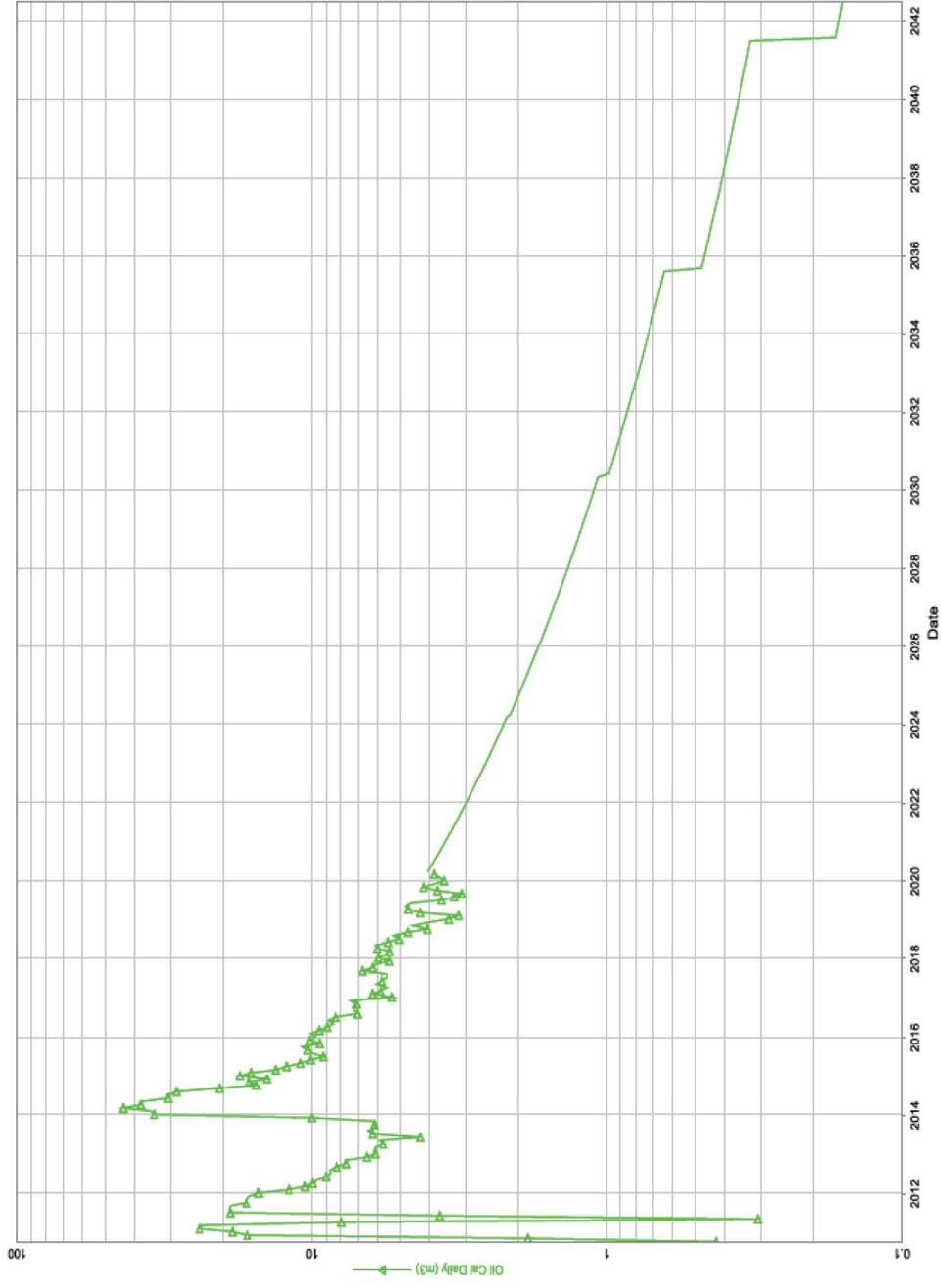


Figure No. 6

Primary Recovery - Rate vs Cum

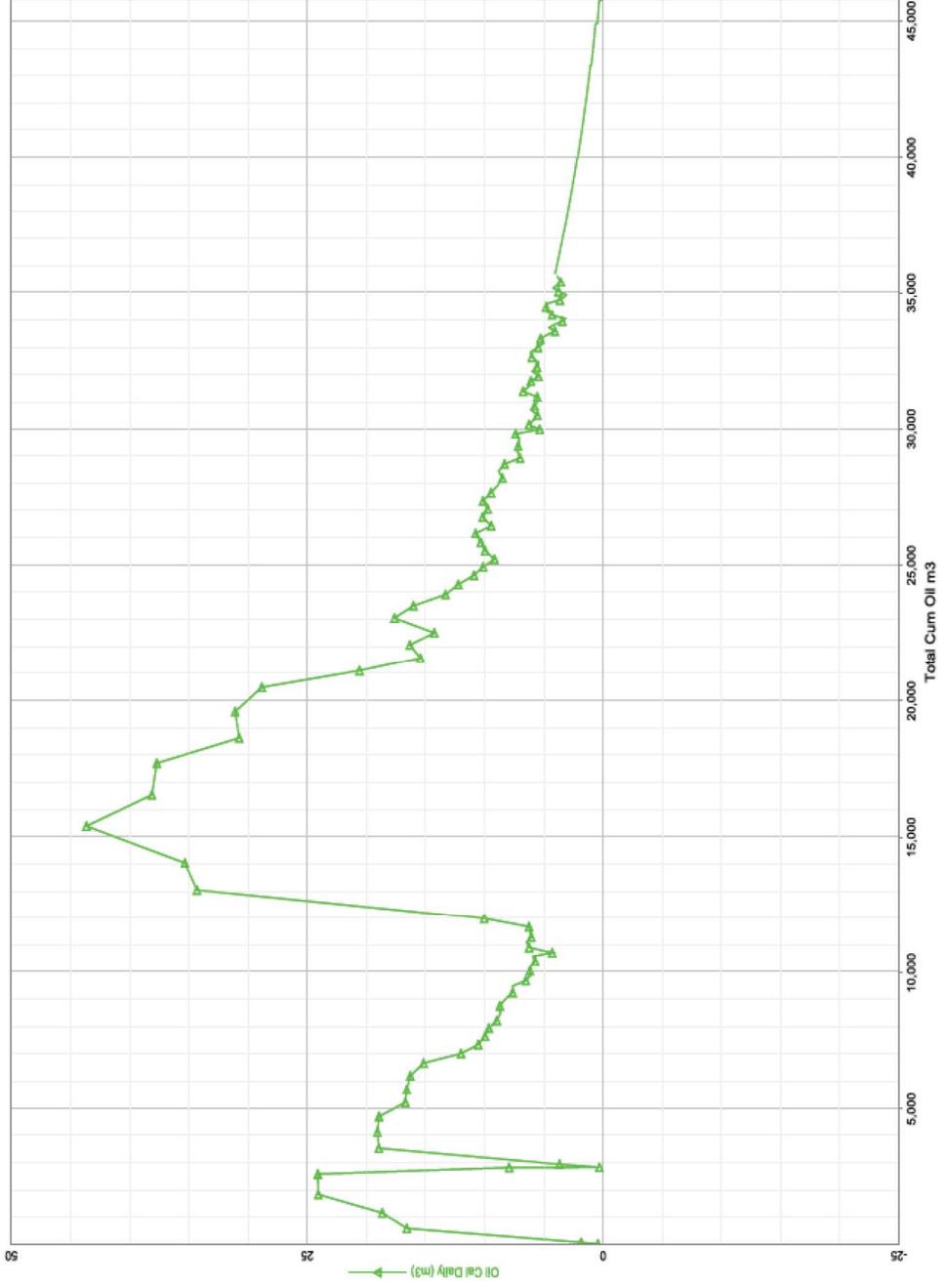


Figure No. 7

Primary + Secondary Recovery - Rate vs Time

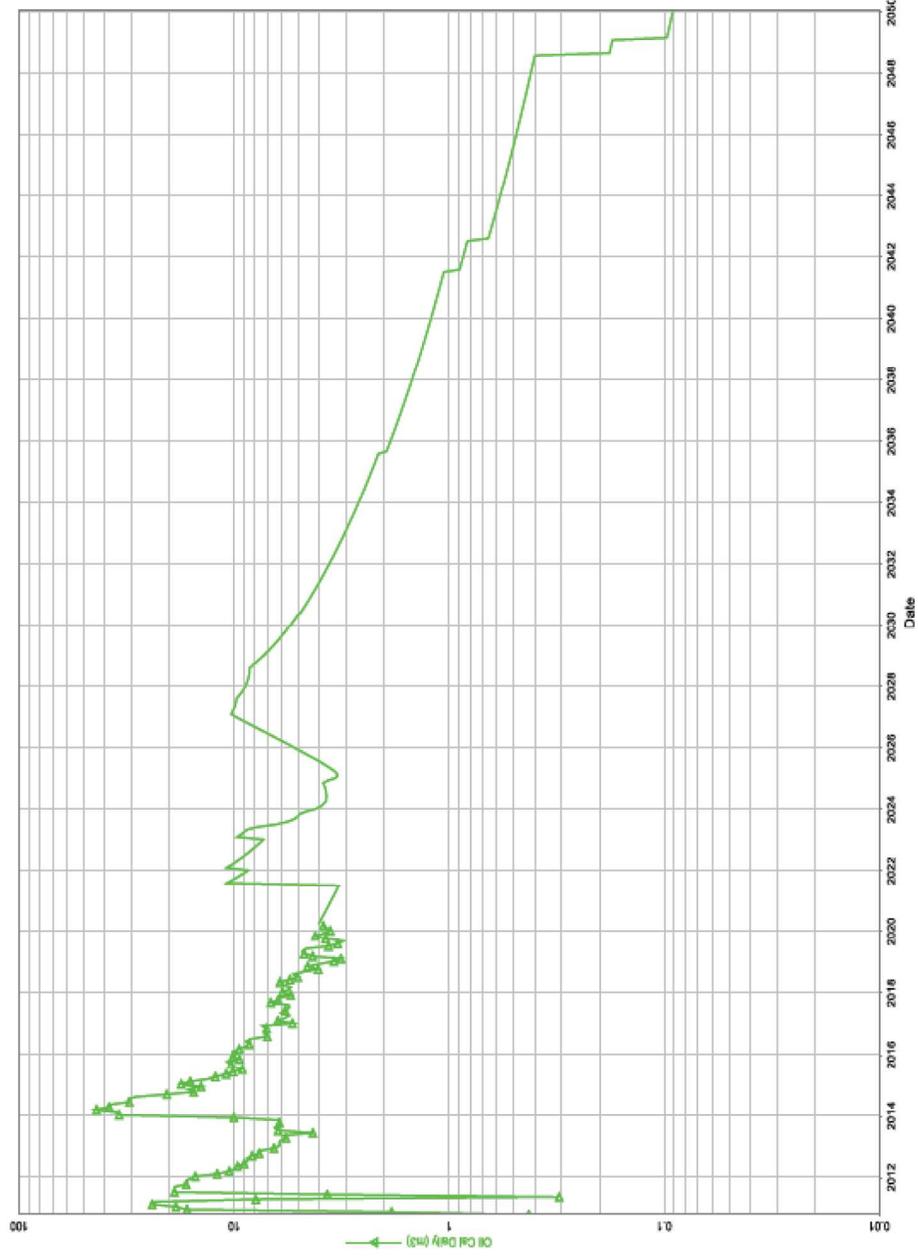


Figure No. 8

Primary + Secondary Recovery - Rate vs Cum

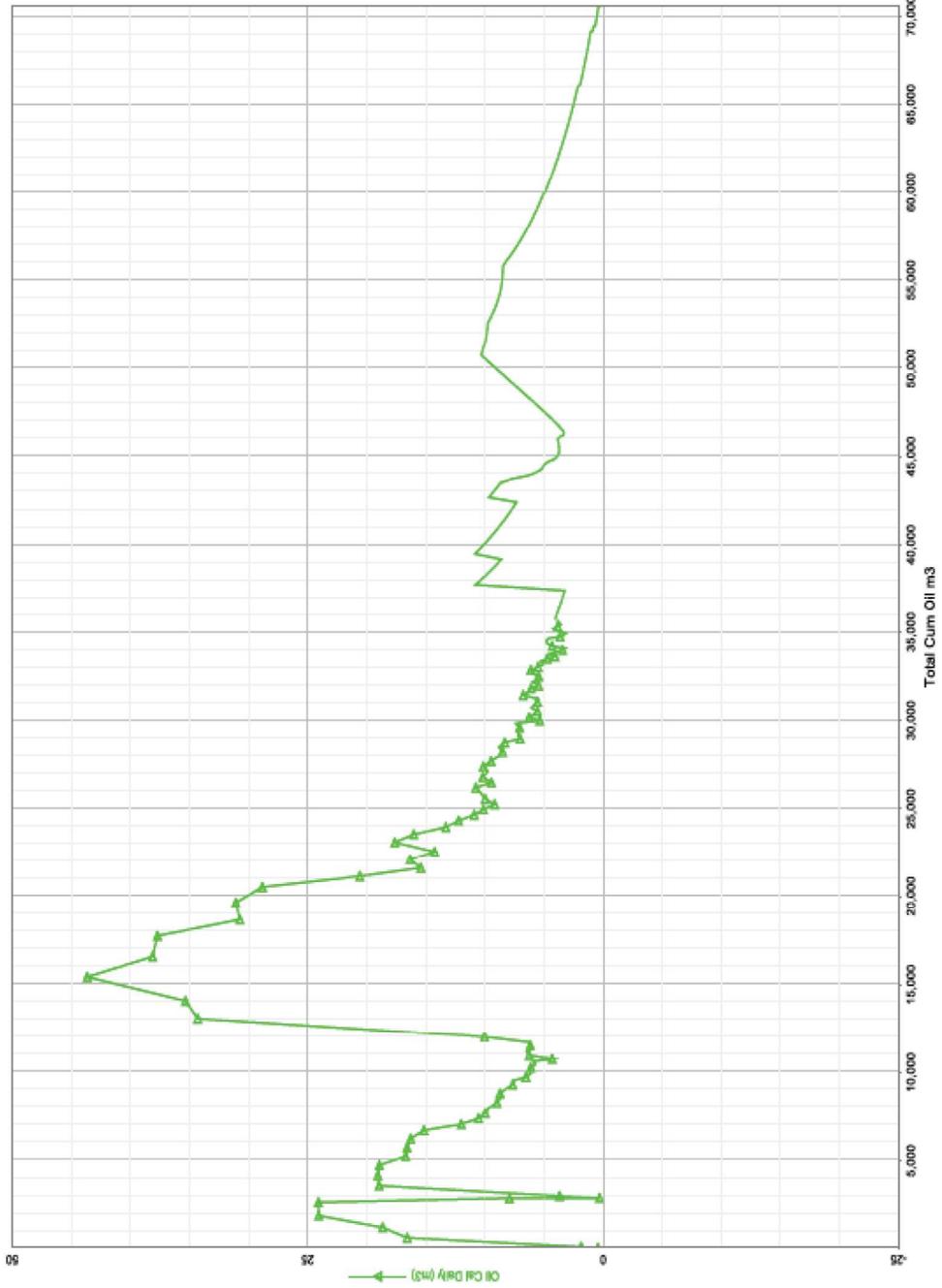
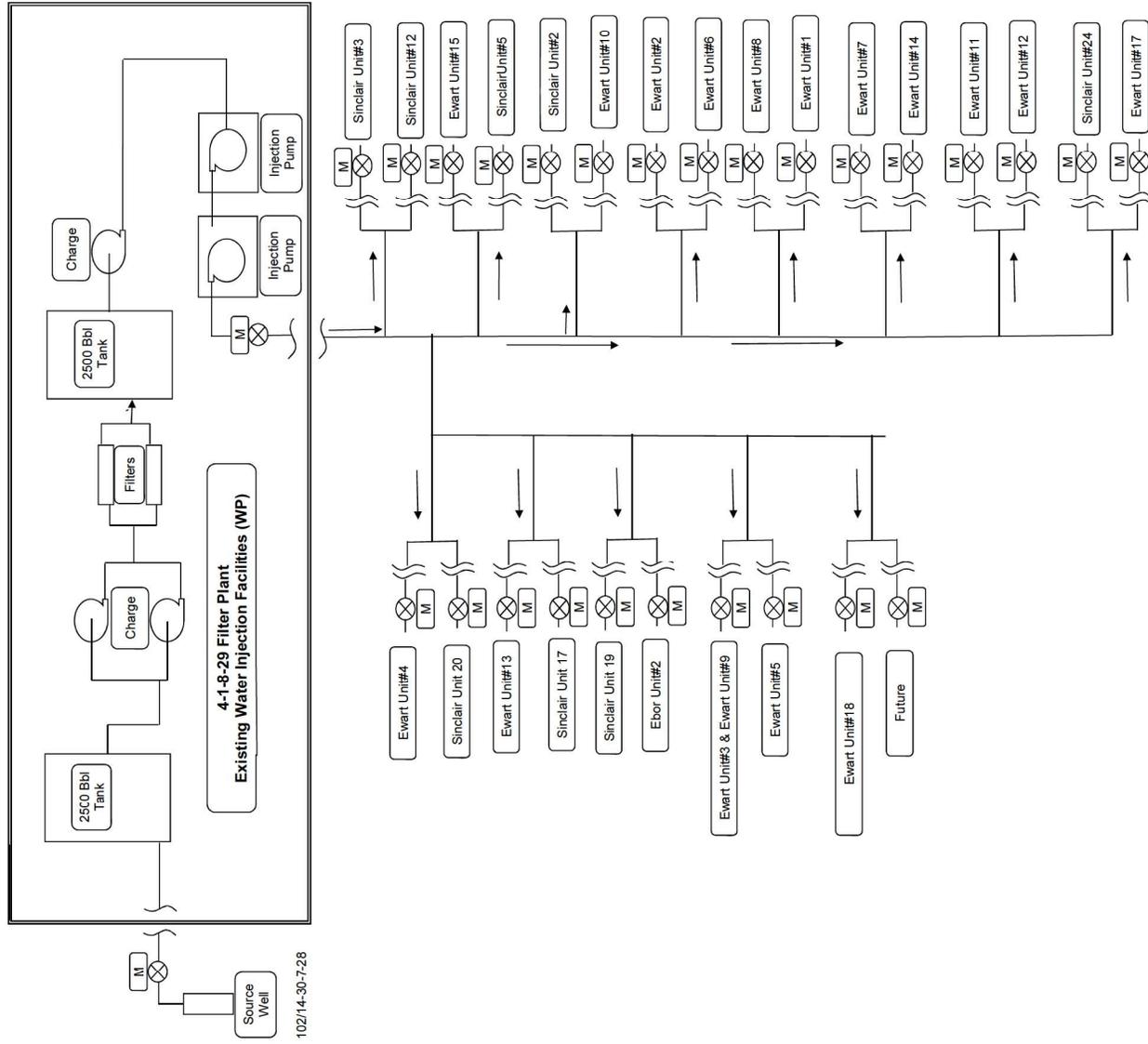


Figure No. 9

FIGURE NO. 10

Sinclair Water Injection System



102/14-30-7-28

Ewart Unit No. 18

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. 18

Application for Enhanced Oil Recovery Waterflood Project

List of Tables

Table 1	Tract Participation
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TABLE NO. 2: TRACT FACTOR CALCULATIONS FOR EWART BAKKEN UNIT NO. 18 APPLICATION
TRACT FACTORS BASED ON OIL-IN-PLACE (OOIP) - CUMULATIVE PRODUCTION TO FEBRUARY 2020

LSD-SEC	Tract	OOIP (m3)	HZ Wells Alloc Prodn (m3)	Vert Wells Cum Prodn (m3)	Sum Hz + Vert Alloc Cum Prodn	OOIP - Cum	OOIP Tract Factor (%)	Tract
01-06	01-06-009-28W1M	41,391	2,059.4	0.0	2,059.4	39,332	6.669384460%	01-06-009-28W1M
02-06	02-06-009-28W1M	42,441	2,765.8	0.0	2,765.8	39,676	6.727654003%	02-06-009-28W1M
03-06	03-06-009-28W1M	42,729	3,404.6	0.0	3,404.6	39,324	6.668046945%	03-06-009-28W1M
04-06	04-06-009-28W1M	43,281	4,010.3	0.0	4,010.3	39,270	6.658940915%	04-06-009-28W1M
07-06	07-06-009-28W1M	41,416	679.5	0.0	679.5	40,736	6.907532306%	07-06-009-28W1M
08-06	08-06-009-28W1M	41,401	3,368.5	0.0	3,368.5	38,033	6.449043380%	08-06-009-28W1M
01-01	01-01-009-29W1M	44,128	2,430.6	0.0	2,430.6	41,697	7.070459471%	01-01-009-29W1M
02-01	02-01-009-29W1M	44,663	2,538.0	0.0	2,538.0	42,125	7.142949458%	02-01-009-29W1M
03-01	03-01-009-29W1M	46,064	2,544.7	0.0	2,544.7	43,519	7.379428172%	03-01-009-29W1M
04-01	04-01-009-29W1M	47,129	1,432.4	0.0	1,432.4	45,697	7.748602317%	04-01-009-29W1M
05-01	05-01-009-29W1M	50,244	1,549.0	1,181.9	2,730.9	47,513	8.056624046%	05-01-009-29W1M
06-01	06-01-009-29W1M	48,655	2,698.2	0.0	2,698.2	45,957	7.792772587%	06-01-009-29W1M
07-01	07-01-009-29W1M	46,813	2,687.4	0.0	2,687.4	44,126	7.482258706%	07-01-009-29W1M
08-01	08-01-009-29W1M	45,237	2,502.5	0.0	2,502.5	42,734	7.246303234%	08-01-009-29W1M
		625,593	34,670.9	1,181.9	35,852.8	589,740	100.0000000000%	

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 (%)
100/08-06-009-28W1/0	007524	Horizontal	BAKKEN-THREE FORKS A	BAKKEN	Producing	11/29/2010	Feb-2020	1.17	33.80	11520.00	6.21	180.00	41964.20	84.19
100/13-06-009-28W1/0	007525	Horizontal	BAKKEN-THREE FORKS A	BAKKEN	Producing	10/31/2010	Feb-2020	0.06	1.60	6058.00	1.46	42.30	44524.20	96.36
100/16-06-009-28W1/0	007526	Horizontal	BAKKEN-THREE FORKS A	BAKKEN	Producing	10/31/2010	Feb-2020	0.29	8.50	8144.00	0.73	21.20	33504.10	71.38
100/01-01-009-29W1/0	009592	Horizontal	BAKKEN-THREE FORKS A	TORQUAY	Producing	1/10/2014	Feb-2020	1.29	37.50	8945.70	5.68	164.80	22936.30	81.46
100/05-01-009-29W1/0	006603	Vertical	BAKKEN-THREE FORKS A	BAKKEN	Abandoned Zone	3/13/2008	Sep-2014	0.03	1.00	1181.90	0.04	1.10	1113.00	52.38
100/08-01-009-29W1/0	009593	Horizontal	BAKKEN-THREE FORKS A	BAKKENM	Producing	12/21/2013	Feb-2020	1.08	31.40	9437.00	4.60	133.40	20288.10	80.95
										45286.6			164329.9	

TABLE NO. 4 - OOIP Calculation

LSD	Area (m ²)	Mid Bkn Isopach (m)	Lyl B Isopach (m)	Reservoir Isopach (m)	OOIP (m ³)	OOIP (bbl)
1-6-9-28W1	160,954	4.6	3.4	8.0	41391	260344
2-6-9-28W1	161,011	4.4	3.8	8.2	42441	266948
3-6-9-28W1	162,101	4.1	4.1	8.2	42729	268755
4-6-9-28W1	162,217	3.8	4.5	8.3	43281	272227
7-6-9-28W1	161,049	4.3	3.7	8.0	41416	260498
8-6-9-28W1	160,991	4.5	3.5	8.0	41401	260405
1-1-9-29W1	161,501	3.5	5.0	8.5	44128	277556
2-1-9-29W1	161,558	3.4	5.2	8.6	44663	280920
3-1-9-29W1	162,840	3.5	5.3	8.8	46064	289734
4-1-9-29W1	162,902	3.6	5.4	9.0	47129	296432
5-1-9-29W1	162,815	4.2	5.4	9.6	50244	316025
6-1-9-29W1	162,752	4.0	5.3	9.3	48655	306032
7-1-9-29W1	161,811	3.8	5.2	9.0	46813	294446
8-1-9-29W1	161,753	3.8	4.9	8.7	45237	284530
					625593	3934852

N/G	Phi	Sw	Boi
0.34	0.16	0.35	1.10

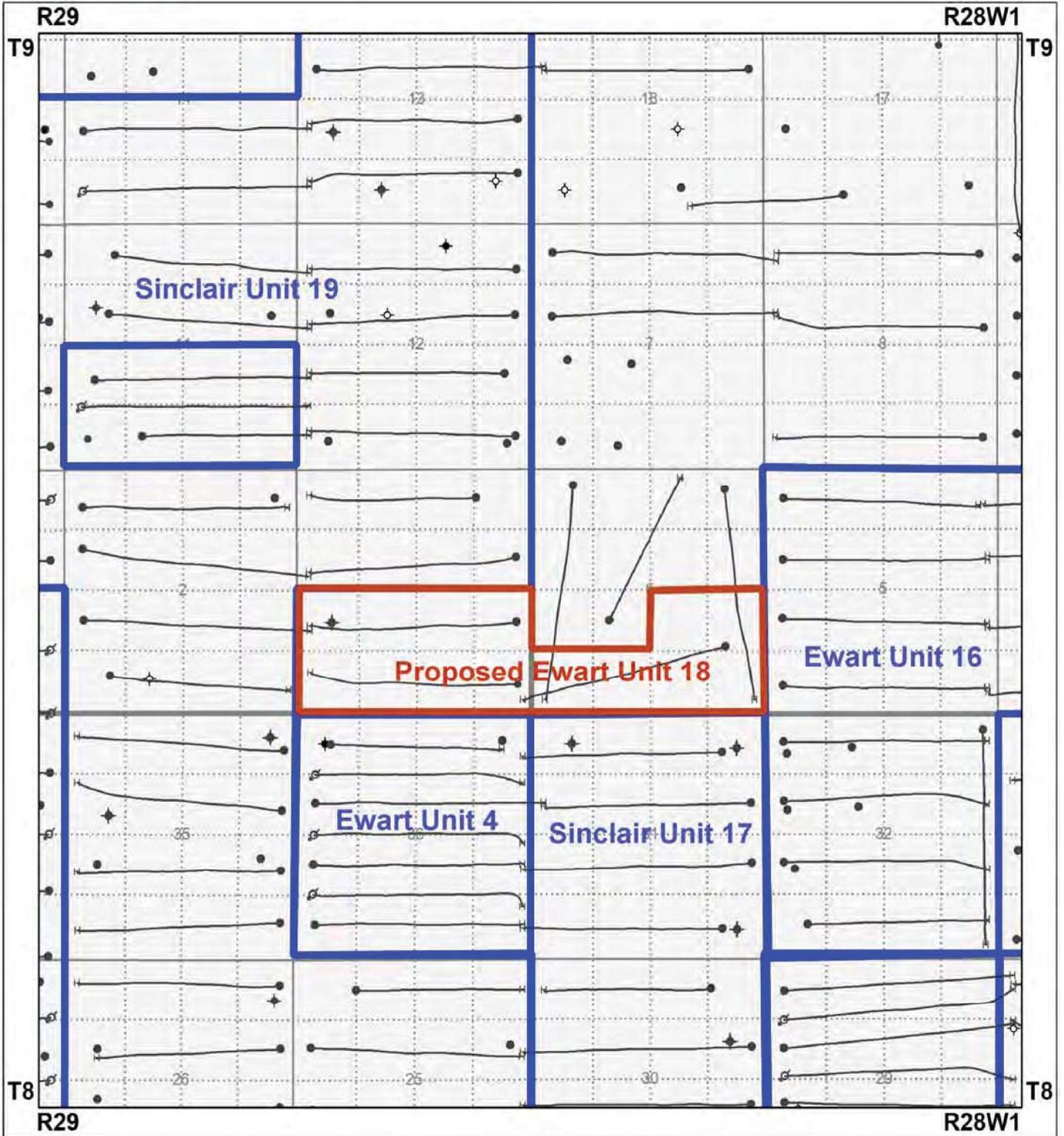
Proposed Ewart Unit No. 18

Application for Enhanced Oil Recovery Waterflood Project

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Appendix 6	Ewart Unit No. 18 – PDPK Core Data

Appendix 1



Center: 49.6120, -101.2691
Scale: 1:30,319
0 0.5 1 km
0 0.1 0.7 mi

Proposed Ewart Unit 18
Offsetting Bakken Units

APPENDIX 2

A

00/05-01-009-29W170
 KB: 525.0 m
 TD: 546.0 m (TV)
 FormID: BAKKEN
 EWART UNIT NO.1 (12-29) (WPM)

1427.1m to previous well

00/16-36-008-29W170
 KB: 515.1 m
 TD: 538.0 m (TV)
 FormID: BRIDGE
 EWART UNIT NO.4 PROV. CO.1 (16-36-29) (WPM)

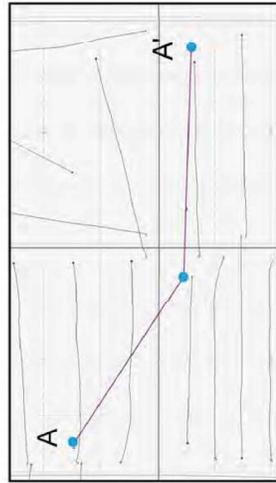
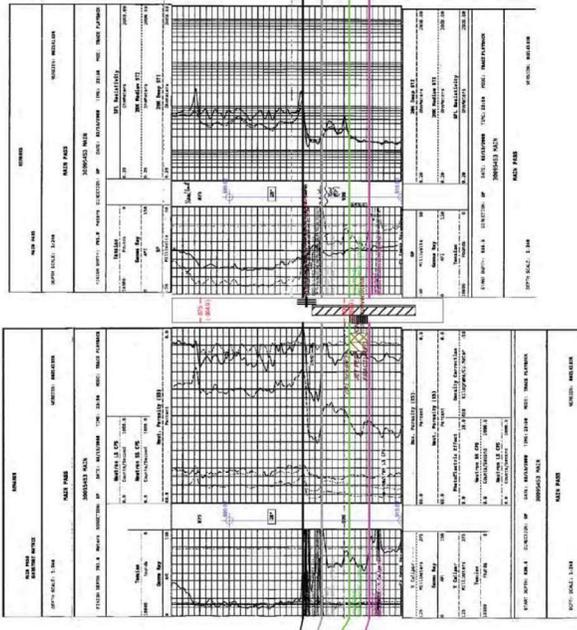
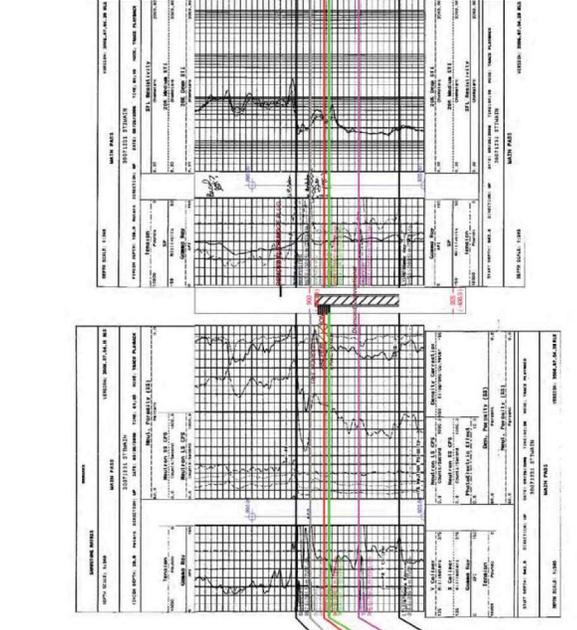
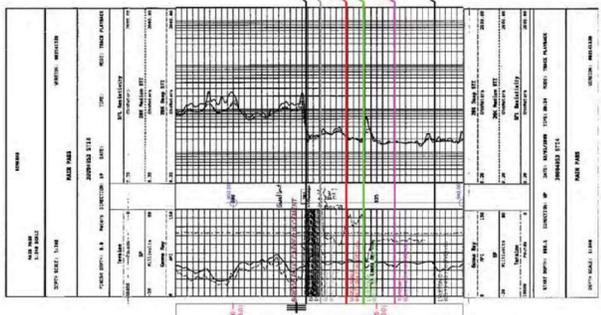
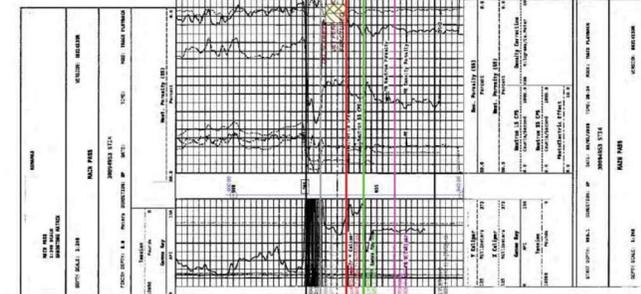
1437.1m to previous well

00/16-31-008-28W170
 KB: 510.1 m
 TD: 532.0 m (TV)
 FormID: TORQUAY
 EWART UNIT NO.13 (16-31-28) (WPM)

1645.2m to previous well

00/16-31-008-28W170
 KB: 510.1 m
 TD: 532.0 m (TV)
 FormID: TORQUAY
 EWART UNIT NO.13 (16-31-28) (WPM)

1645.2m to previous well



Proposed Ewart Unit 18

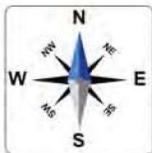
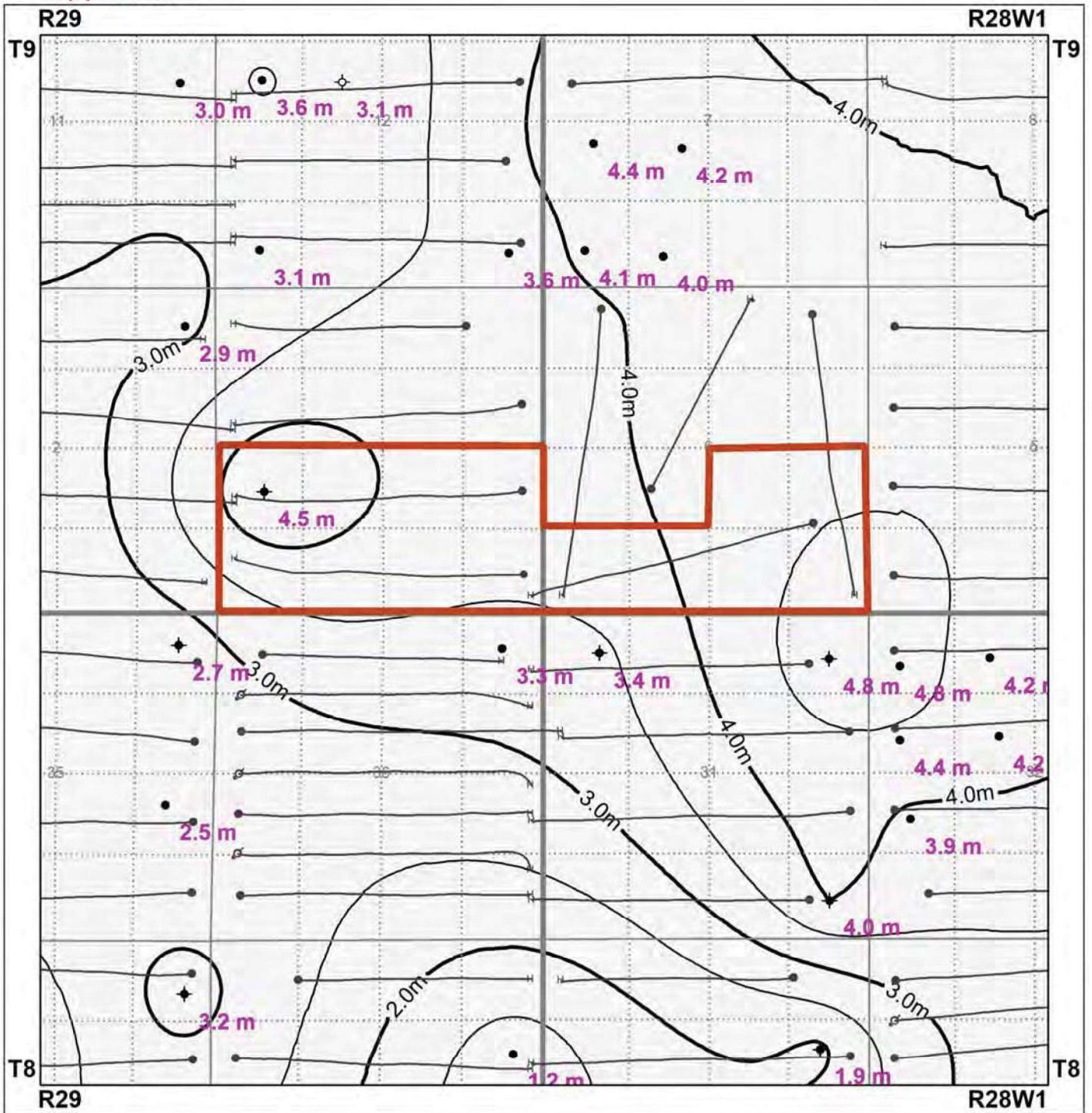
**Structural Cross Section
West to East
Through Proposed Unit Area**

Produced by:
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Author: C. Buckley
 Printed On: Tuesday, May 12, 2020 10:42 AM
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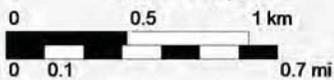


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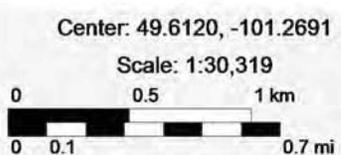
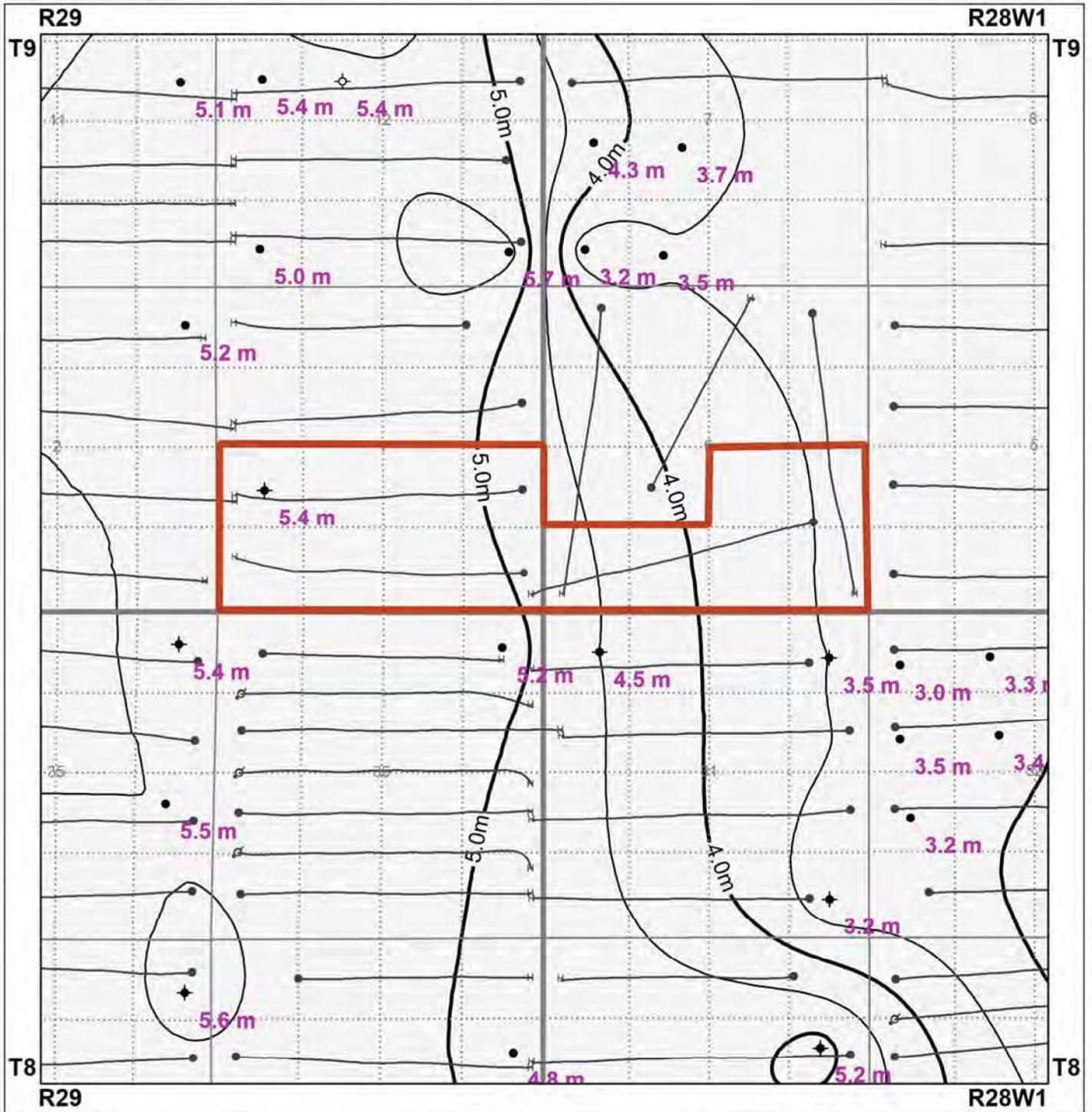
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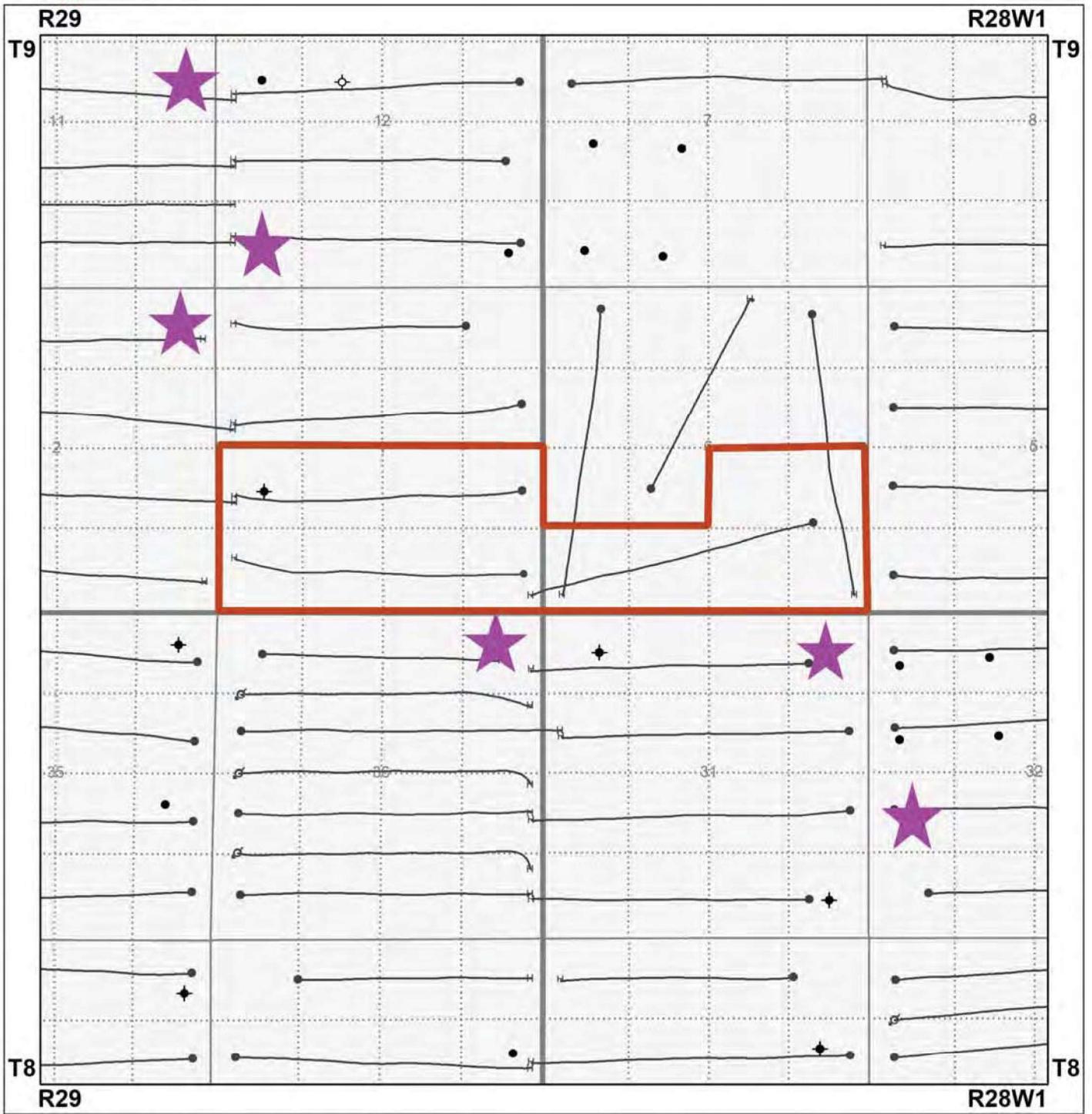
Proposed Ewart Unit 18
Middle Bakken Isopach
(m)

Appendix 5



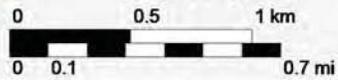
Proposed Ewart Unit 18
Lyleton B Isopach (m)

Appendix 6



Center: 49.6120, -101.2691

Scale: 1:30,319



Proposed Ewart Unit 18
Core Data Points