PROPOSED EWART UNIT NO. 14

Application for Enhanced Oil Recovery Waterflood Project

Middle Bakken/Three Forks Formations

Bakken – Three Forks B Pool (01 62B)

Daly Sinclair Field, Manitoba

April 23, 2018
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, 17-20 and Ewart Units 1-8, 10 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. 14 (S/2, NW/4 Section 2, N/2 Section 3, NE/4 Section 4, Sections 10, SW/4, N/2 Section 11, SW/4 Section 14 and SE/4 Section 15-8-28W1) 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. 14 will include 14 horizontal wells and 5 vertical wells, within 60 Legal Sub Divisions (LSD) of the Middle Bakken/Three Forks producing reservoir. The project is located east of Ewart Units No. 1, 7 and northeast of Ewart Unit No. 10 (Figure 2).

2. Total Net Original Oil in Place (OOIP) in Ewart Unit No. 14 has been calculated to be **2,185** e^3m^3 (13,744 Mbbl) for an average of **36.4** net e^3m^3 (229.1 Mbbl) OOIP per 40 acre LSD.

3. Cumulative production to the end of January 2018 from the 19 wells within the proposed Ewart Unit No. 14 project area was **115.9** e^3m^3 (729.2 Mbbl) of oil, and **251.5** e^3m^3 (1582.6 Mbbl) of water, representing a **5.3%** Recovery Factor (RF) of the Net OOIP.

4. Estimated Ultimate Recovery (EUR) of Primary Proved Producing oil reserves in the proposed Ewart Unit No. 14 project area has been calculated to be **153.04** e^3m^3 (959.8 Mbbl), with **37.2** e^3m^3 (230.6 Mbbl) remaining as of the end of January 2018 .

5. Ultimate oil recovery of the proposed Ewart Unit No. 14 OOIP, under the current Primary Production method, is forecasted to be **6.98%**.

6. Figure 4 shows the production from the Ewart Unit No. 14 peaked in April 2011 at 81.8 m^3 (OPD). As of January 2018, production was 17.0 m^3 OPD, 62.8 m^3 of water per day (WPD) and a 78.7% watercut.

7. In April 2011, production averaged 4.8 m^3 OPD per well in Ewart Unit No. 14. As of January 2018, average per well production has declined to 0.99 m^3 OPD. Decline analysis of the group primary production data forecasts total oil to continue declining at an annual rate of approximately **20.5%** in the project area.

8. Estimated Ultimate Recovery (EUR) of proved oil reserves under Secondary WF EOR for the proposed Ewart Unit No. 14 has been calculated to be **279.6** e^3m^3 (1759.8 Mbbl), with **163.8** e^3m^3 (1030.6 Mbbl) remaining. An incremental **126.6** e^3m^3 (800.0 Mbbl) of proved oil reserves, or **5.8%**, 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. 14 is estimated to be **12.8%**.

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/vertical producing wells (Figure 5) within the proposed Ewart Unit No. 14, to complete waterflood patterns with effective 20 acre spacing similar to that of Sinclair Unit No. 5.

DISCUSSION

The proposed Ewart Unit No. 14 project area is located within Township 8, Range 28 W1 of the Daly Sinclair oil field. The proposed Ewart Unit No. 14 currently consists of 14 horizontal and 5 vertical wells, within an area covering 60 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 SE to NW through the proposed Unit area. The producing sequence in descending order consists of the Upper Bakken Shale, Middle Bakken Siltstone, 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 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 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 between 3m to 5m (Appendix 4).

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 thickness ranges between just under 2m to almost 5m 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, dipping primarily toward the South (Appendix 3). This is due to the regional SW dip to the West of the proposed unit, and the edge of a large paleo high associated with the Sinclair Daly field to the East.

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

Vertical continuity between the Middle Bakken and underlying Lyleton B reservoir exists throughout the proposed unit as they are in direct contact.

Fluid Contacts:

There is no oil/water contacts proximal to the proposed unit area.

Gross OOIP Estimates

Total volumetric OOIP for the Middle Bakken Lyleton A and Lyleton B within the proposed unit has been calculated to be **2,185** e^3m^3 (**13,744** Mbbl) using Tundra internally created maps. Maps used were generated from core data 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 also calculated 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

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

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 Bakken intervals of 100/02-17-009-29W1 and 100/13-19-009-28W1 which are representative of the fluid characteristics in the reservoir.

Historical Production

A historical group production history plot for the proposed Ewart Unit No. 14 is shown as Figure 4. Oil production commenced from the proposed Unit area in November 2006 and peaked during April 2011 at 81.8 m^3 OPD. As of January 2018, production was 17.0 m^3 OPD, 62.8 m^3 WPD and a 78.7% watercut.

From peak production in April 2011 to date, oil production is declining at an annual rate of approximately **20.5%** 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. 14.

Unit Operator

Tundra Oil and Gas Limited (Tundra) will be the Operator of record for Ewart Unit No. 14.

Unitized Zone

The Unitized zone(s) to be waterflooded in Ewart Unit No. 14 will be the Middle Bakken and Three Forks formations.

Unit Wells

The 14 horizontal wells and 5 vertical wells to be included in the proposed Ewart Unit No. 14 are outlined in Table 3.

Unit Lands

Ewart Unit No. 14 will consist of 60 LSDs as follows:

S/2, NW/4 Section 2 of Township 8, Range 28, W1M
N/2 Section 3 of Township 8, Range 28, W1M
NE/4 Section 4 of Township 8, Range 28, W1M
Section 10 of Township 8, Range 28, W1M
SW/4, N/2 Section 11 of Township 8, Range 28, W1M
SW/4 Section 14 of Township 8, Range 28, W1M
SE/4 Section 15 of Township 8, Range 28, W1M

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

Tract Factors

The proposed Ewart Unit No. 14 will consist of 60 Tracts based on the 40 acre LSDs containing the existing 14 horizontal and 5 vertical wells.

The Tract Factor contribution for each of the LSD's within the proposed Ewart Unit No. 14 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. 14. 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. 14.

WATERFLOOD EOR DEVELOPMENT

Technical Studies

The waterflood performance predictions for the proposed Ewart Unit No. 14 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

Fourteen (14) 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. 14.

Primary production from the original vertical/horizontal producing wells in the proposed Ewart Unit No. 14 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 14 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. 14 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. 14 project area, to the end of January 2018 from 19 wells, was 115.9 e^3m^3 of oil and 251.5 e^3m^3 of water for a recovery factor of **5.3%** of the calculated Net OOIP.

Ultimate Primary Proved Producing oil reserves recovery for Ewart Unit No. 14 has been estimated to be **153.04** e^3m^3, or a **6.8**% Recovery Factor (RF) of OOIP. Remaining Producing Primary Reserves has been estimated to be **37.2** e^3m^3 to the end of January 2018.

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. 14, while maximizing reservoir knowledge.

Criteria for Conversion to Water Injection Well

Fourteen (14) 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. 14 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. 14 is estimated to be **279.6** e^3m^3 with **163.8** e^3m^3 remaining representing a total secondary recovery factor of **12.8 %** for the proposed Unit area. An incremental **126.6** e^3m^3 of oil, or an incremental **5.8%** 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. 14 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. 14 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. 14.

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. 14 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. 14 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. 14 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. 14 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. 14 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. 14.

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. 14 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. 14 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. 14 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. 14. 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. 14 Application.

Ewart Unit No. 14 Unitization, and execution of the formal Ewart Unit No. 14 Agreement by affected Mineral Owners, is expected during Q2 2018. Copies of same will be forwarded to the Petroleum Branch, when available, to complete the Ewart Unit No. 14 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], April 23, 2018, in Calgary, AB

Proposed Ewart Unit No. 14

Application for Enhanced Oil Recovery Waterflood Project

List of Figures

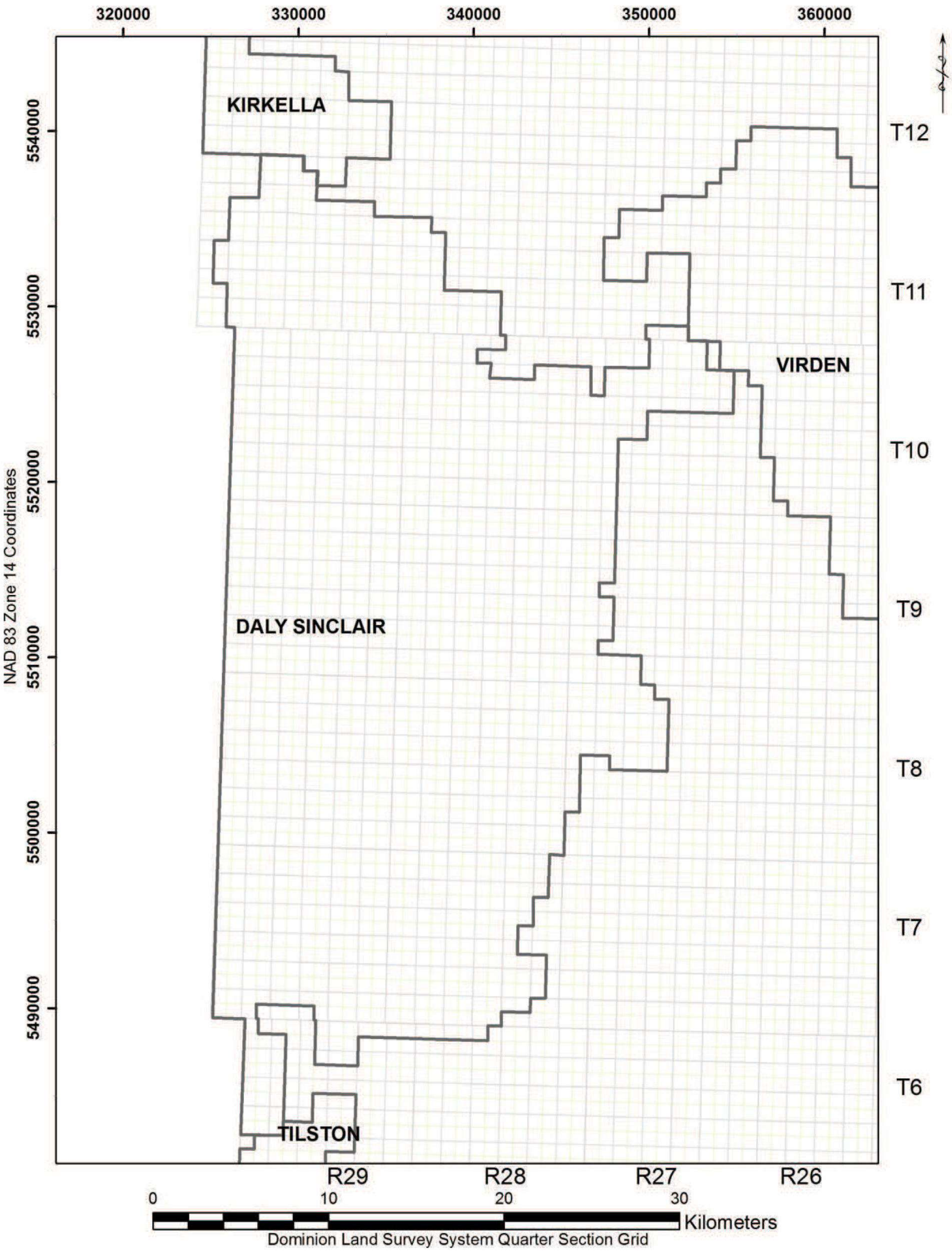
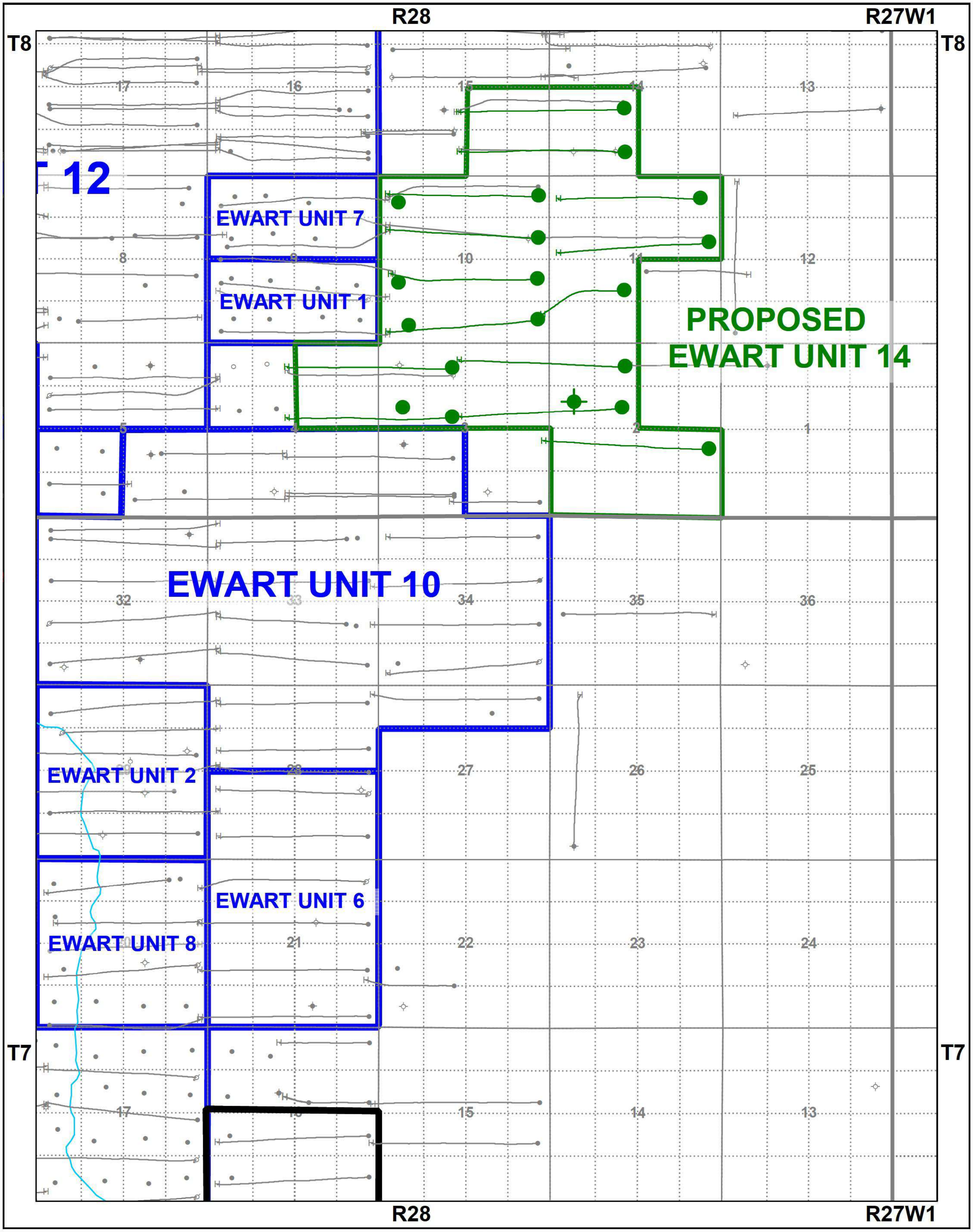


Figure 1 - Daly Sinclair Field (01)

Figure No. 2



SINCLAIR BAKKEN UNITS

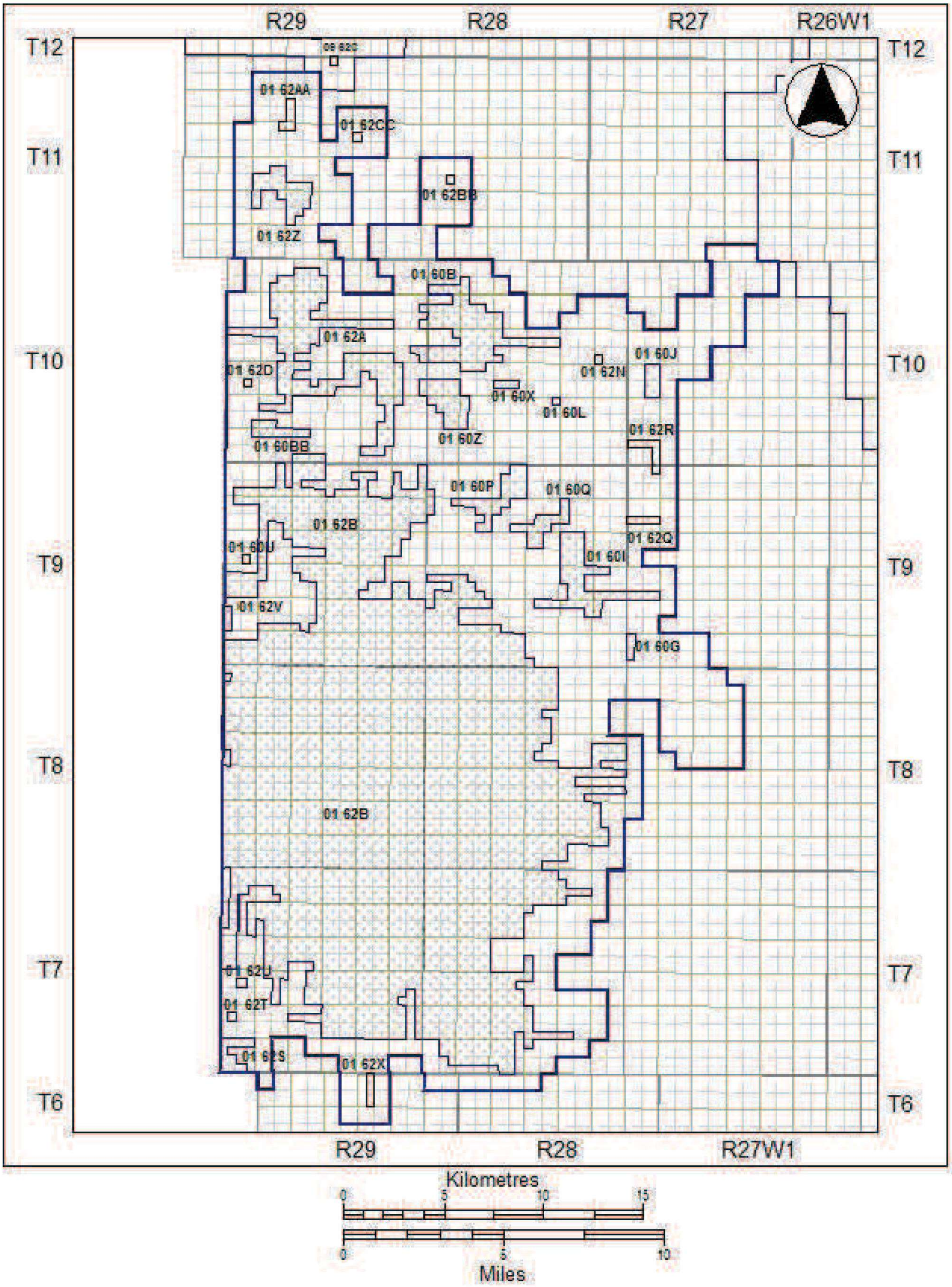


FIGURE 14 - DALY SINCLAIR BAKKEN & BAKKEN-THREE FORKS POOLS (01 60A - 01 60BB & 01 62A – 01 62CC) (Drawn on the DLS System Quarter Section Grid)

Well Information as of 3/16/2018 - Group Well Report

Figure No. 4

Production Graph

Group:	ewart unit 14 well list.lwell	**On Prod:**	2006-11 to 2018-01	**Cum Oil:**	115877.4 m3
# of Wells:	19	**Prod Form:**	BAKKEN; TORQUAY; THREEFK	**Cum Gas:**	0.0 E3m3
Fluid:	Oil	**Field:**	DALY (MB1)	**Cum Wtr:**	251498.5 m3
Mode:	Producing; Abandoned Zone	**Pool Code:**	MB000162A	**Cum Inj Oil:**	0.0 m3
		Unit Code:		**Cum Inj Gas:**	0.0 E3m3
				Cum Inj Wtr:	0.0 m3

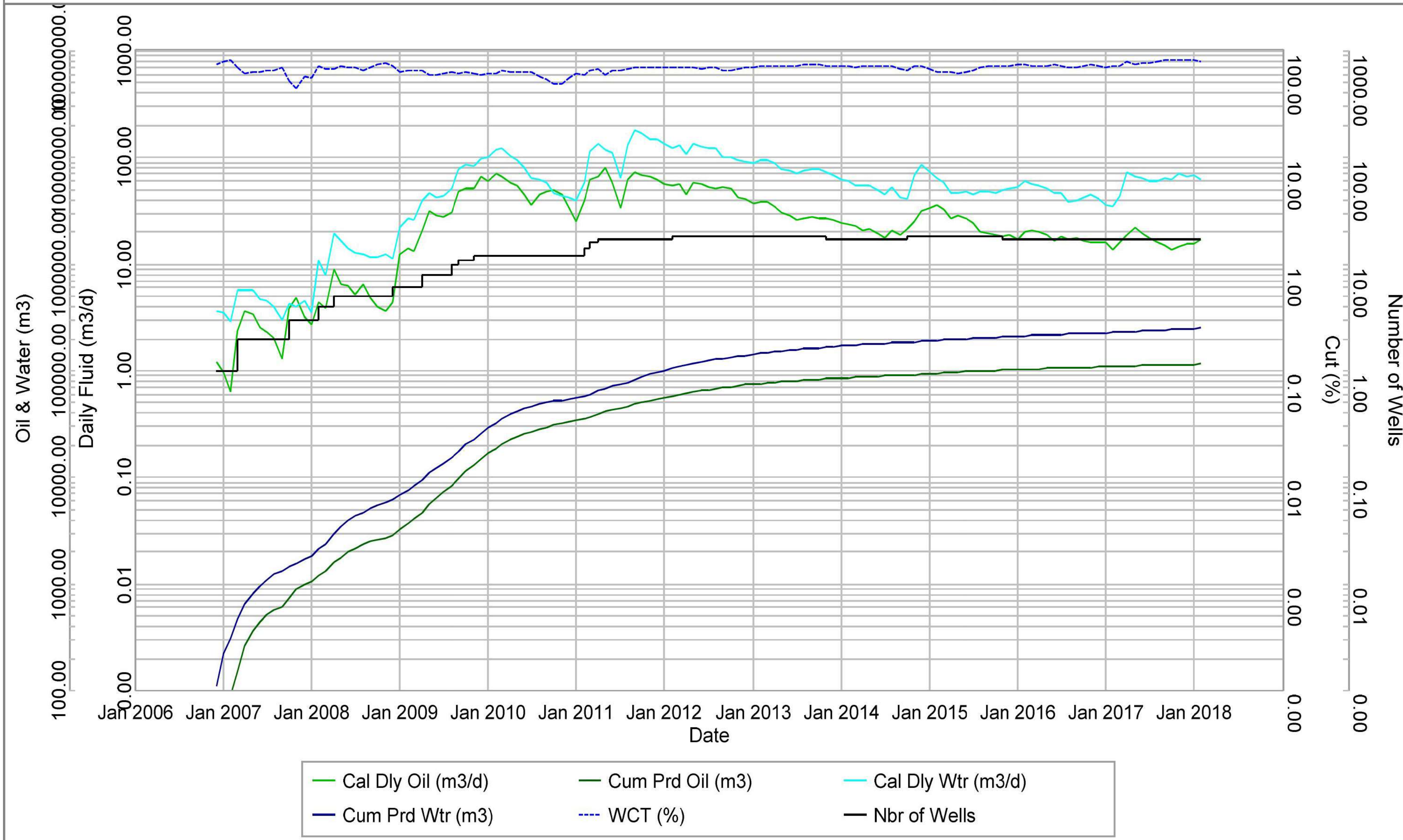
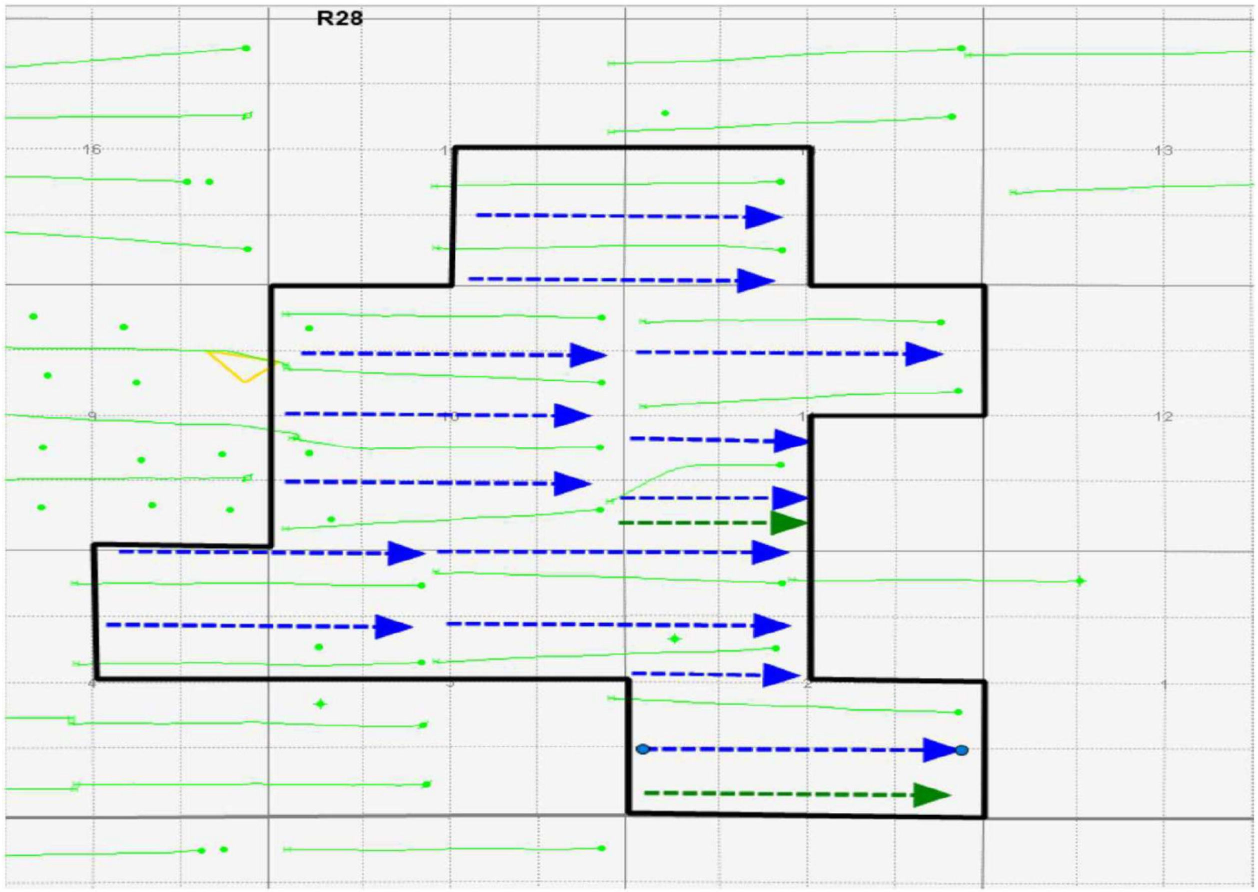


Figure No. 5

Development Map -Proposed EWART Unit #14



Blue – Injection wells
Dark Green- Primary Development wells

PRIMARY
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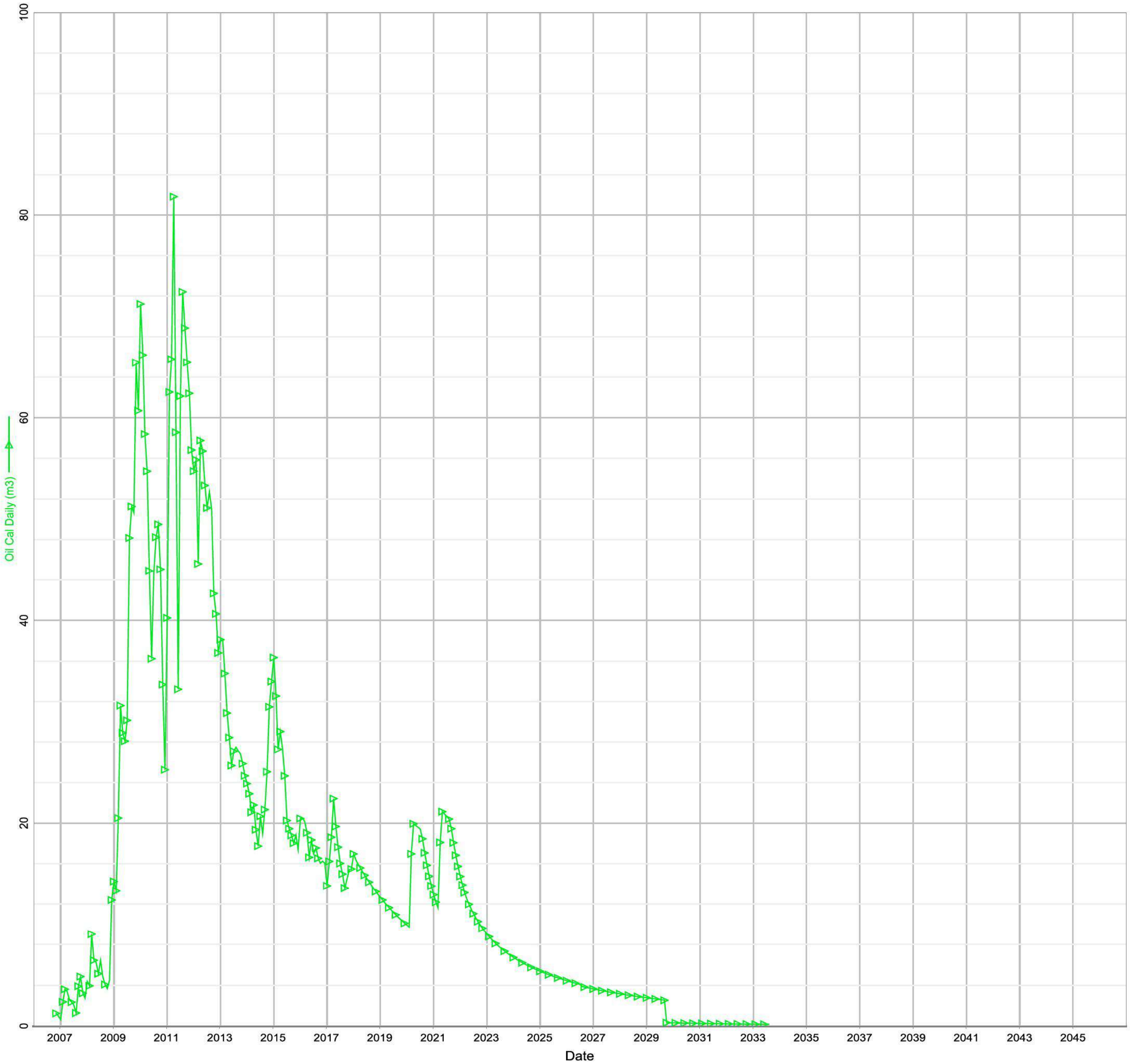
Ewart 14 Unit Application
VOLUME FORECAST
Evaluation WB List

Figure No. 6

Effective January 31, 2018



Selection: Evaluation WB List
Presentation: Secondary Application Base
Volume: Oil Production
Category: All
Aggregation: Sum
Normalization: None

Volume Summary

Oil	Cum (m3)	115,877	Gas	Cum (E3m3)	0	Water	Cum (m3)	251,498	FCond	Cum (m3)	0	NGL	Cum (m3)	0
	Rem Rec (m3)	37,162		Rem Rec (E3m3)	0		Rem Rec (m3)	137,560		Rem Rec (m3)	0		Rem Rec (m3)	0
	Ult Rec (m3)	153,039		Ult Rec (E3m3)	0		Ult Rec (m3)	389,059		Ult Rec (m3)	0		Ult Rec (m3)	0

Forecast and Indicators @ Eff Date

Forecast Product	Oil	Final Rate (m3/d)	0.16	Rem Rec (m3)	37,162	Dei (%)		Reserves Life (yrs)	15.496
Forecast Start	2018/02/01	OVIP (m3)		Gas Surface Loss		Desi (%)		RLI Full Year (yrs)	1.124
Forecast End	2033/08/01	Recovery Factor		Gas Sales (m3)		Dmin (%)		Reserves Half (yrs)	14.757
Initial Rate (m3/d)	16.34	Ult Rec (m3)	153,039	N		Service Factor		Calculation Type	

Report Time: Mon, 23 Apr 2018 10:55
Economic Case: Tundra 2017 Q3 /
Hierarchy: Reserves
DB: WORKING_BL : Mosaic10 Version: 2017.6.1

PRIMARY
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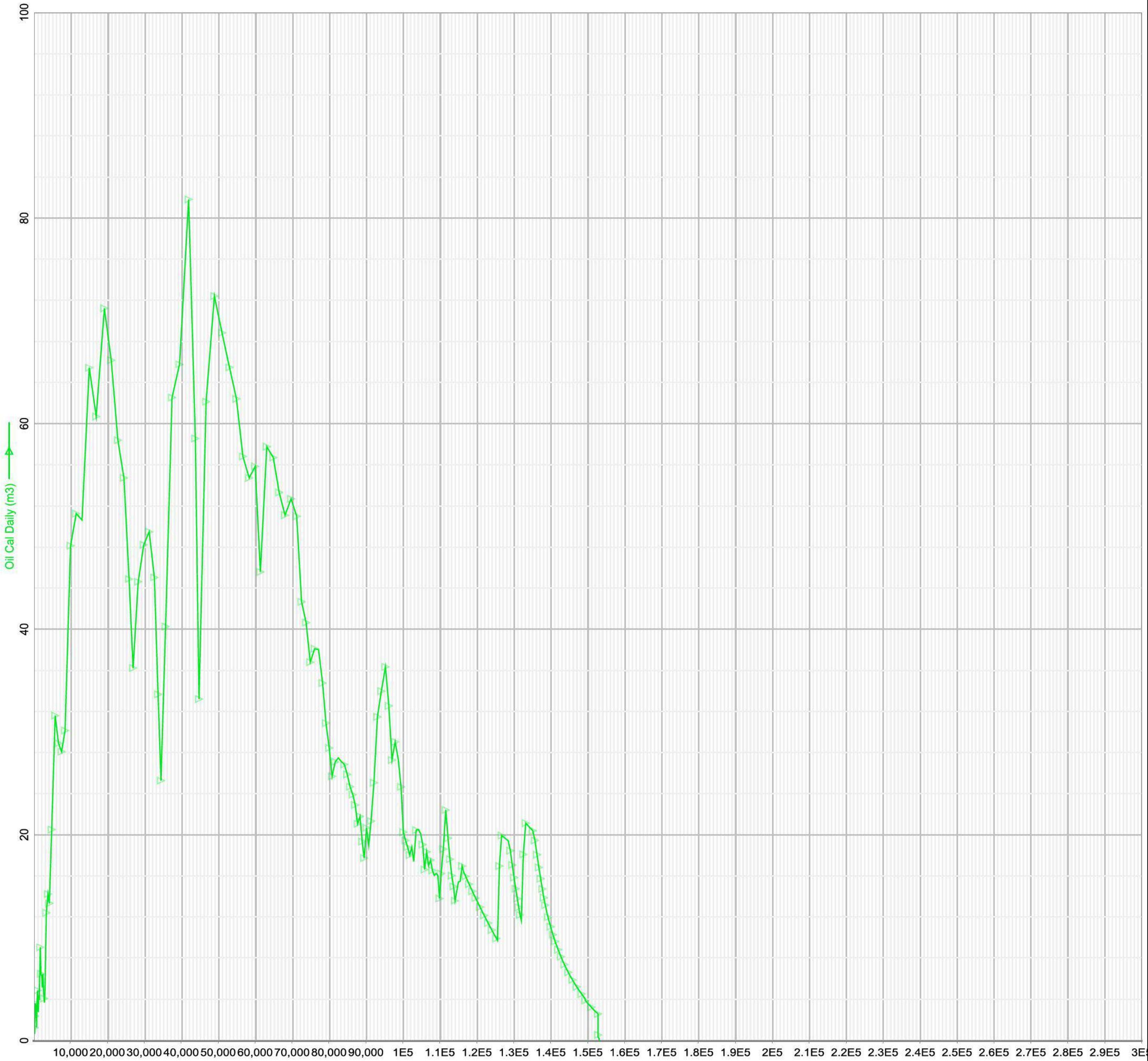
Ewart 14 Unit Application
VOLUME FORECAST
Evaluation WB List

Figure No. 7

Effective January 31, 2018



Selection:		Volume:		Aggregation:	
Presentation:		Category:	PDP	Normalization:	

Volume Summary

Oil	Cum (m3)	115,877	Gas	Cum (E3m3)	0	Water	Cum (m3)	0	FCond	Cum (m3)	0	NGL	Cum (m3)	0
	Rem Rec (m3)	37,162		Rem Rec (E3m3)	0		Rem Rec (m3)	0		Rem Rec (m3)	0		Rem Rec (m3)	0
	Ult Rec (m3)	153,039		Ult Rec (E3m3)	0		Ult Rec (m3)	0		Ult Rec (m3)	0		Ult Rec (m3)	0

Forecast and Indicators @ Eff Date

Forecast Product	Oil	Final Rate (m3/d)	0.39	Rem Rec (m3)	37,162	Dei (%)	0.00	Reserves Life (yrs)	15.581
Forecast Start	2018/02/01	OVIP (m3)		Gas Surface Loss		Desi (%)	0.00	RLI Full Year (yrs)	7.076
Forecast End	2033/08/31	Recovery Factor		Gas Sales (m3)		Dmin (%)	0.00	Reserves Half (yrs)	3.505
Initial Rate (m3/d)	102.85	Ult Rec (m3)	153,039	N	0.00	Service Factor	1.00	Calculation Type	

Report Time: Mon, 23 Apr 2018 11:27
Economic Case: Tundra 2017 Q3 /
Hierarchy: Reserves
DB: WORKING_BL : Mosaic10 Version: 2017.6.1

PRIMARY & SECONDARY
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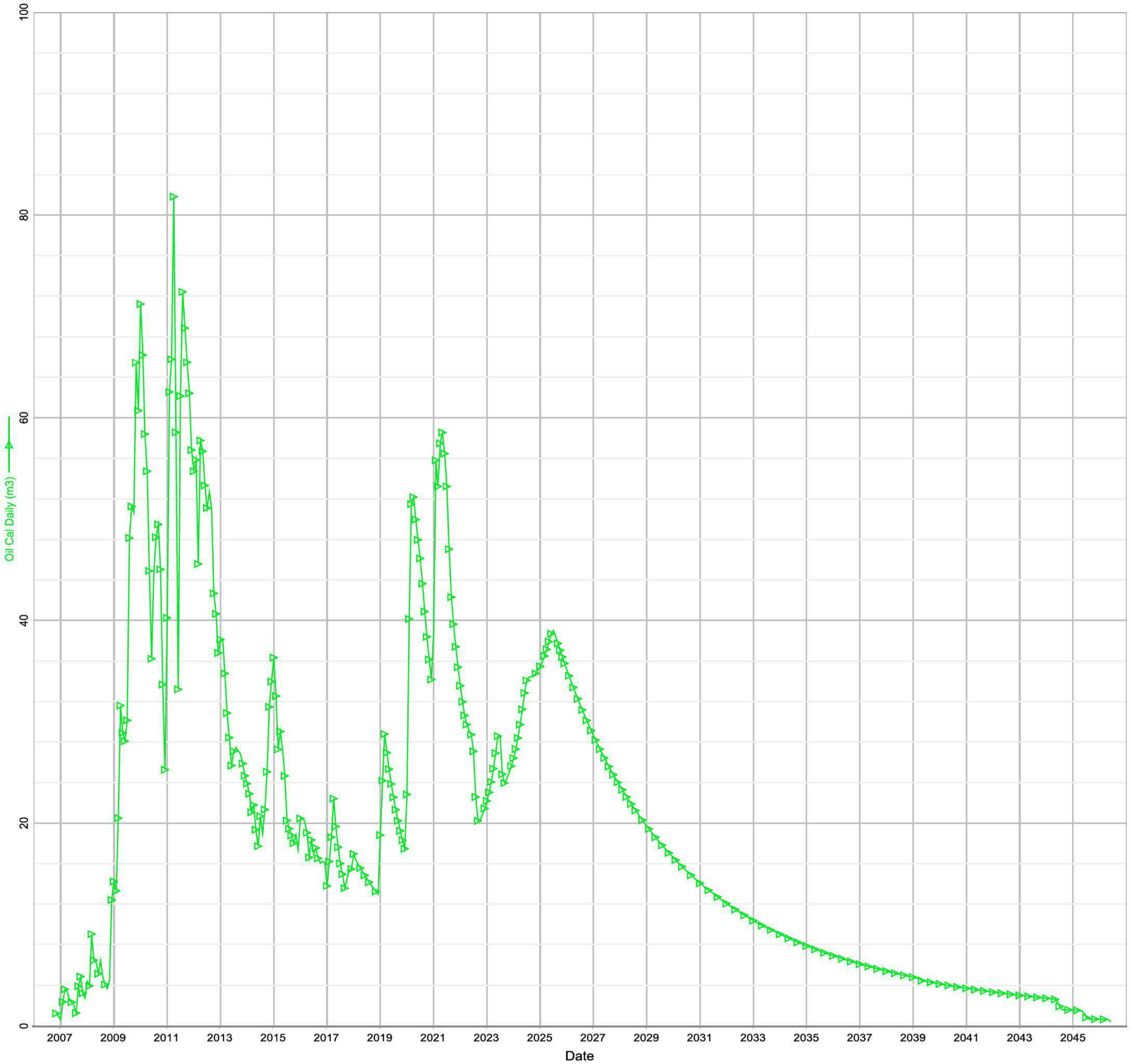
Ewart 14 Unit Application
VOLUME FORECAST
Evaluation WB List

Figure No. 8

Effective January 31, 2018



Selection:	Evaluation WB List	Volume:	Oil Production	Aggregation:	Sum
Presentation:	Secondary Application Base	Category:	All	Normalization:	None

Volume Summary

Oil	Cum (m3)	115,877	Gas	Cum (E3m3)	0	Water	Cum (m3)	251,498	FCond	Cum (m3)	0	NGL	Cum (m3)	0
	Rem Rec (m3)	163,771		Rem Rec (E3m3)	0		Rem Rec (m3)	574,494		Rem Rec (m3)	0		Rem Rec (m3)	0
	Ult Rec (m3)	279,649		Ult Rec (E3m3)	0		Ult Rec (m3)	825,993		Ult Rec (m3)	0		Ult Rec (m3)	0

Forecast and Indicators @ Eff Date

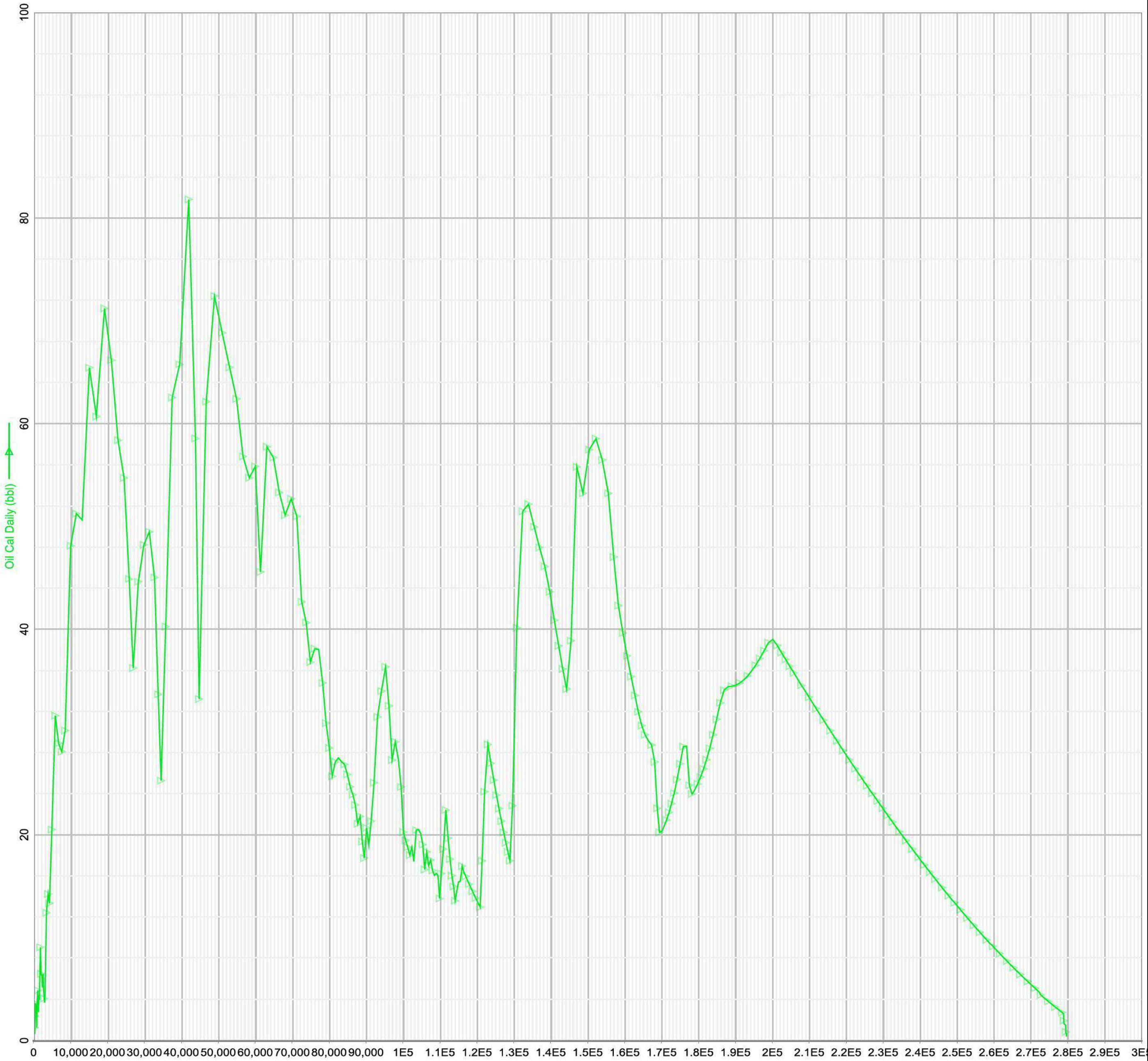
Forecast Product	Oil	Final Rate (m3/d)	0.45	Rem Rec (m3)	163,771	Dei (%)		Reserves Life (yrs)	28.329
Forecast Start	2018/02/01	OVIP (m3)		Gas Surface Loss		Desi (%)		RLI Full Year (yrs)	4.819
Forecast End	2046/06/01	Recovery Factor		Gas Sales (m3)		Dmin (%)		Reserves Half (yrs)	18.587
Initial Rate (m3/d)	16.34	Ult Rec (m3)	279,649	N		Service Factor		Calculation Type	

Report Time: Mon, 23 Apr 2018 10:57
Economic Case: Tundra 2017 Q3 /
Hierarchy: Reserves
DB: WORKING_BL : Mosaic10 Version: 2017.6.1

PRIMARY & SECONDARY
TUNDRA OIL & GAS
Ewart 14 Unit Application
VOLUME FORECAST
Evaluation WB List

Figure No. 9

Effective January 31, 2018



Entity Name:	Primar & Secondary Unit #14_ Ewart	Operator:		Pool:	
UWI:	Primar & Secondary Unit #14_ Ewart	Province/State:	Manitoba	Formation:	
Category:	PDP	Field:		Unit:	
		Property:	Type Curves	Status:	

Volume Summary

Oil	Cum (bbl)	115,877	Gas	Cum (Mcf)	0	Water	Cum (bbl)	0	FCond	Cum (bbl)	0	NGL	Cum (bbl)	0
	Rem Rec (bbl)	163,771		Rem Rec (Mcf)	0		Rem Rec (bbl)	0		Rem Rec (bbl)	0		Rem Rec (bbl)	0
	Ult Rec (bbl)	279,649		Ult Rec (Mcf)	0		Ult Rec (bbl)	0		Ult Rec (bbl)	0		Ult Rec (bbl)	0

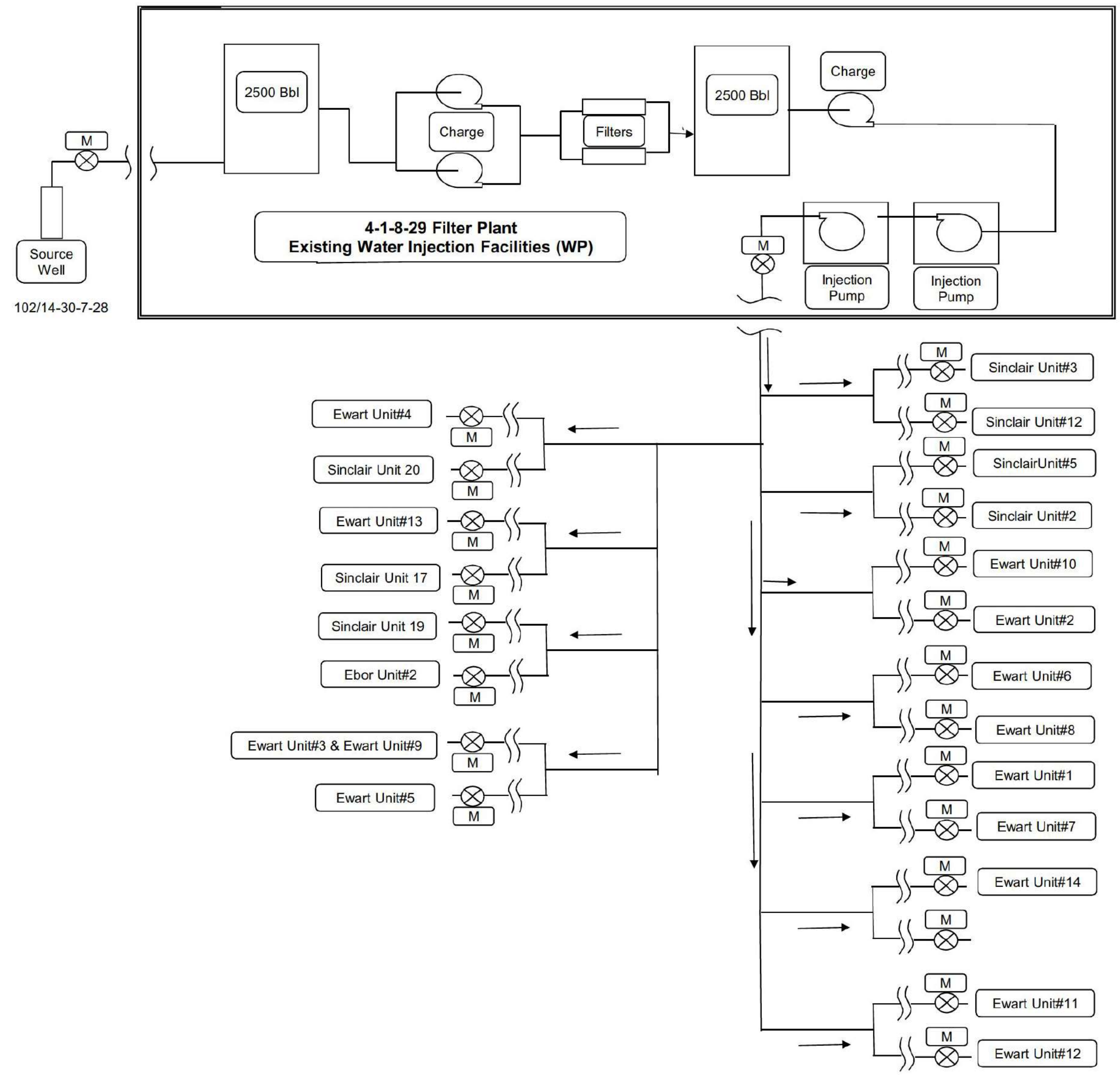
Forecast and Indicators @ Eff Date

Forecast Product	Oil	Final Rate (bbl/d)	0.45	Rem Rec (bbl)	163,771	Dei (%)	0.00	Reserves Life (yrs)	28.411
Forecast Start	2018/02/01	OVIP (bbl)		Gas Surface Loss		Desi (%)	0.00	RLI Full Year (yrs)	30.323
Forecast End	2046/06/30	Recovery Factor		Gas Sales (bbl)		Dmin (%)	0.00	Reserves Half (yrs)	7.334
Initial Rate (bbl/d)	16.34	Ult Rec (bbl)	279,649	N	0.00	Service Factor	1.00	Calculation Type	

Report Time: Mon, 23 Apr 2018 11:37
Economic Case: Tundra 2017 Q3 /
Hierarchy: Reserves
DB: WORKING_BL : Mosaic10 Version: 2017.6.1

FIGURE NO. 10

Sinclair Water Injection System



Tundra Oil And Gas Limited

Figure No. 11

TYPICAL OPEN HOLE WATER INJECTION WELL (WIW) DOWNHOLE DIAGRAM

WELL NAME:	**Tundra Ewart Unit 14 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

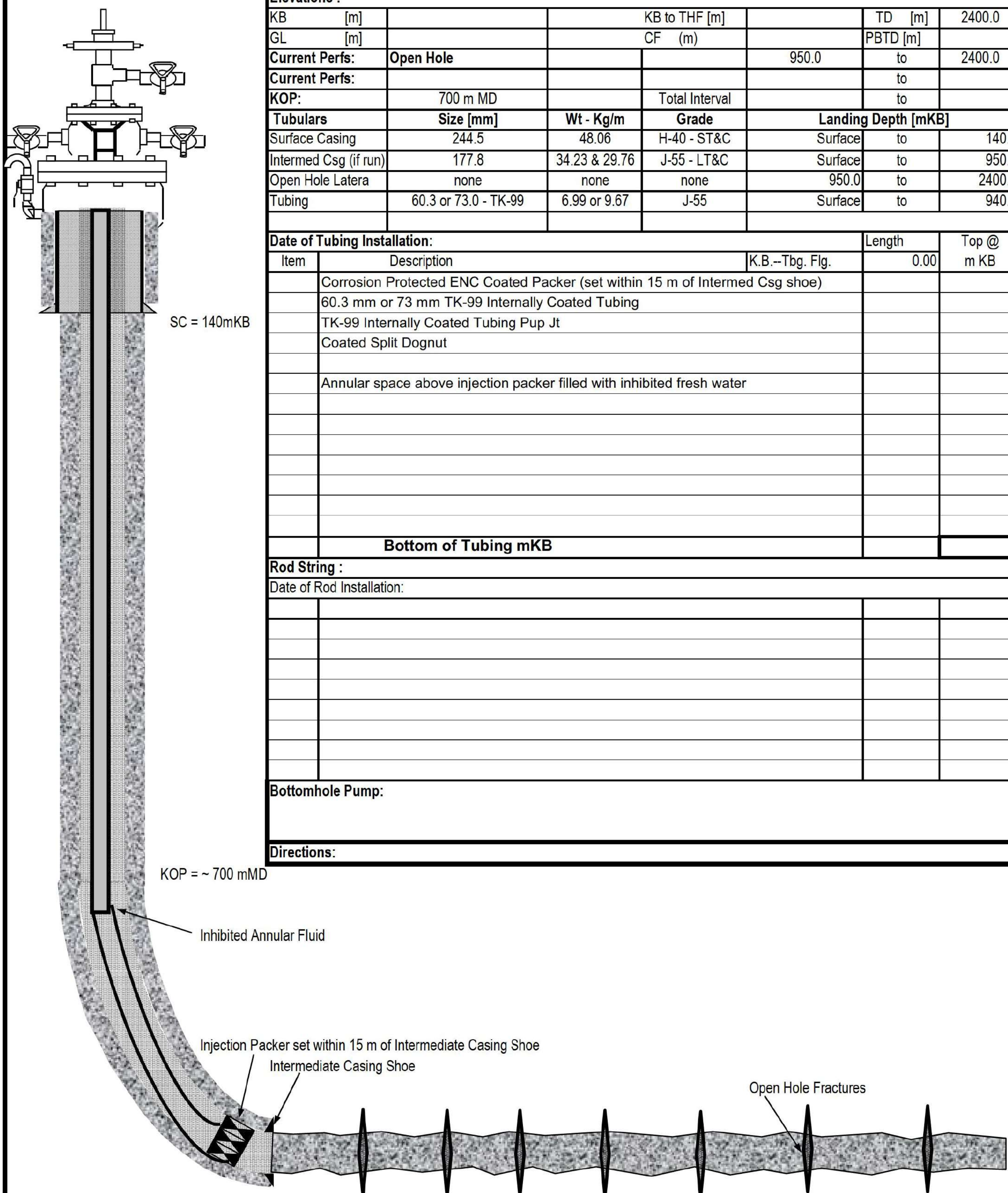
Date of Tubing Installation:			Length	Top @
Item	Description	K.B.--Tbg. Flg.	0.00	m KB
	Corrosion Protected ENC Coated Packer (set within 15 m of Intermed Csg shoe)			
	60.3 mm or 73 mm TK-99 Internally Coated Tubing			
	TK-99 Internally Coated Tubing Pup Jt			
	Coated Split Dognut			
	Annular space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

Rod String :

Date of Rod Installation:

Bottomhole Pump:

Directions:



Ewart Unit No. 14

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 12

** subject to final design and engineering

Proposed Ewart Unit No. 14

Application for Enhanced Oil Recovery Waterflood Project

List of Tables

TABLE NO. 2: TRACT FACTOR CALCULATIONS FOR EWART BAKKEN UNIT NO. 14 APPLICATION

TRACT FACTORS BASED ON OIL-IN-PLACE (OOIP) - CUMULATIVE PRODUCTION TO JANUARY 2018

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
01-02	01-02-008-28W1M	28,505	0.0	0.0	0.0	28,505	1.377354876%	01-02-008-28W1M
02-02	02-02-008-28W1M	28,238	0.0	0.0	0.0	28,238	1.364459885%	02-02-008-28W1M
03-02	03-02-008-28W1M	26,831	0.0	0.0	0.0	26,831	1.296463484%	03-02-008-28W1M
04-02	04-02-008-28W1M	23,935	0.0	0.0	0.0	23,935	1.156512051%	04-02-008-28W1M
05-02	05-02-008-28W1M	31,815	1,207.8	0.0	1,207.8	30,607	1.478931855%	05-02-008-28W1M
06-02	06-02-008-28W1M	32,257	1,293.9	0.0	1,293.9	30,963	1.496103993%	06-02-008-28W1M
07-02	07-02-008-28W1M	30,850	1,292.9	0.0	1,292.9	29,557	1.428171685%	07-02-008-28W1M
08-02	08-02-008-28W1M	29,515	1,180.0	0.0	1,180.0	28,335	1.369121025%	08-02-008-28W1M
11-02	11-02-008-28W1M	36,535	1,318.8	0.0	1,318.8	35,217	1.701655639%	11-02-008-28W1M
12-02	12-02-008-28W1M	36,838	1,617.6	663.3	2,280.9	34,558	1.669808813%	12-02-008-28W1M
13-02	13-02-008-28W1M	35,872	2,121.6	0.0	2,121.6	33,750	1.630802757%	13-02-008-28W1M
14-02	14-02-008-28W1M	32,118	1,877.4	0.0	1,877.4	30,240	1.461203590%	14-02-008-28W1M
09-03	09-03-008-28W1M	34,684	1,613.4	0.0	1,613.4	33,071	1.597955959%	09-03-008-28W1M
10-03	10-03-008-28W1M	34,591	1,305.5	0.0	1,305.5	33,285	1.608336061%	10-03-008-28W1M
11-03	11-03-008-28W1M	37,178	2,120.3	0.0	2,120.3	35,057	1.693960647%	11-03-008-28W1M
12-03	12-03-008-28W1M	42,792	2,478.6	1,267.1	3,745.7	39,046	1.886685284%	12-03-008-28W1M
13-03	13-03-008-28W1M	41,701	3,238.6	0.0	3,238.6	38,463	1.858511231%	13-03-008-28W1M
14-03	14-03-008-28W1M	39,753	2,744.4	0.0	2,744.4	37,009	1.788263212%	14-03-008-28W1M
15-03	15-03-008-28W1M	37,041	1,764.7	0.0	1,764.7	35,277	1.704554439%	15-03-008-28W1M
16-03	16-03-008-28W1M	35,644	2,114.5	0.0	2,114.5	33,529	1.620111547%	16-03-008-28W1M
09-04	09-04-008-28W1M	41,584	2,508.3	0.0	2,508.3	39,076	1.888133022%	09-04-008-28W1M
10-04	10-04-008-28W1M	41,492	2,176.0	0.0	2,176.0	39,316	1.899732133%	10-04-008-28W1M
15-04	15-04-008-28W1M	44,333	2,790.8	0.0	2,790.8	41,542	2.007301223%	15-04-008-28W1M
16-04	16-04-008-28W1M	43,505	3,234.4	0.0	3,234.4	40,270	1.945845679%	16-04-008-28W1M
01-10	01-10-008-28W1M	36,055	2,476.6	0.0	2,476.6	33,578	1.622477401%	01-10-008-28W1M
02-10	02-10-008-28W1M	37,472	2,678.9	0.0	2,678.9	34,793	1.681169864%	02-10-008-28W1M
03-10	03-10-008-28W1M	39,048	2,678.1	0.0	2,678.1	36,370	1.757365832%	03-10-008-28W1M
04-10	04-10-008-28W1M	40,311	1,538.1	1,826.6	3,364.7	36,947	1.785243318%	04-10-008-28W1M
05-10	05-10-008-28W1M	41,924	1,354.5	2,452.1	3,806.6	38,117	1.841814504%	05-10-008-28W1M
06-10	06-10-008-28W1M	39,785	2,517.3	0.0	2,517.3	37,268	1.800765887%	06-10-008-28W1M
07-10	07-10-008-28W1M	38,293	2,517.1	0.0	2,517.1	35,776	1.728670277%	07-10-008-28W1M
08-10	08-10-008-28W1M	37,308	2,293.8	0.0	2,293.8	35,014	1.691886337%	08-10-008-28W1M
09-10	09-10-008-28W1M	37,930	2,089.1	0.0	2,089.1	35,841	1.731835883%	09-10-008-28W1M
10-10	10-10-008-28W1M	38,192	2,255.4	0.0	2,255.4	35,936	1.736436726%	10-10-008-28W1M
11-10	11-10-008-28W1M	39,127	2,254.6	0.0	2,254.6	36,873	1.781681716%	11-10-008-28W1M
12-10	12-10-008-28W1M	40,220	1,248.6	0.0	1,248.6	38,971	1.883065471%	12-10-008-28W1M
13-10	13-10-008-28W1M	37,855	1,650.1	1,641.6	3,291.7	34,563	1.670064646%	13-10-008-28W1M
14-10	14-10-008-28W1M	37,932	3,043.0	0.0	3,043.0	34,889	1.685821023%	14-10-008-28W1M
15-10	15-10-008-28W1M	37,687	3,035.6	0.0	3,035.6	34,652	1.674350622%	15-10-008-28W1M
16-10	16-10-008-28W1M	36,687	2,855.7	0.0	2,855.7	33,831	1.634711150%	16-10-008-28W1M
03-11	03-11-008-28W1M	33,077	13.7	0.0	13.7	33,064	1.597623144%	03-11-008-28W1M
04-11	04-11-008-28W1M	35,049	408.1	0.0	408.1	34,641	1.673858854%	04-11-008-28W1M
05-11	05-11-008-28W1M	35,754	1,770.3	0.0	1,770.3	33,984	1.642083448%	05-11-008-28W1M
06-11	06-11-008-28W1M	33,831	1,977.7	0.0	1,977.7	31,854	1.539150569%	06-11-008-28W1M
09-11	09-11-008-28W1M	41,383	1,667.4	0.0	1,667.4	39,715	1.919037507%	09-11-008-28W1M
10-11	10-11-008-28W1M	37,929	1,797.6	0.0	1,797.6	36,132	1.745867063%	10-11-008-28W1M
11-11	11-11-008-28W1M	35,516	1,766.4	0.0	1,766.4	33,750	1.630779434%	11-11-008-28W1M
12-11	12-11-008-28W1M	36,326	987.9	0.0	987.9	35,338	1.707526218%	12-11-008-28W1M
13-11	13-11-008-28W1M	35,728	881.9	0.0	881.9	34,846	1.683744517%	13-11-008-28W1M
14-11	14-11-008-28W1M	34,891	1,540.9	0.0	1,540.9	33,350	1.611463522%	14-11-008-28W1M
15-11	15-11-008-28W1M	38,090	1,542.4	0.0	1,542.4	36,548	1.765962882%	15-11-008-28W1M
16-11	16-11-008-28W1M	43,951	1,115.1	0.0	1,115.1	42,836	2.069813664%	16-11-008-28W1M
03-14	03-14-008-28W1M	32,200	2,226.1	0.0	2,226.1	29,974	1.448329983%	03-14-008-28W1M
04-14	04-14-008-28W1M	37,217	2,493.5	0.0	2,493.5	34,724	1.677832752%	04-14-008-28W1M
05-14	05-14-008-28W1M	34,688	1,825.7	0.0	1,825.7	32,863	1.587908198%	05-14-008-28W1M
06-14	06-14-008-28W1M	30,722	1,600.3	0.0	1,600.3	29,122	1.407167267%	06-14-008-28W1M
01-15	01-15-008-28W1M	36,996	2,496.6	0.0	2,496.6	34,500	1.667006036%	01-15-008-28W1M
02-15	02-15-008-28W1M	37,081	2,065.5	0.0	2,065.5	35,015	1.691915589%	02-15-008-28W1M
07-15	07-15-008-28W1M	35,877	1,537.8	0.0	1,537.8	34,340	1.659272439%	07-15-008-28W1M
08-15	08-15-008-28W1M	35,690	1,825.7	0.0	1,825.7	33,864	1.636316167%	08-15-008-28W1M
		2,185,430	**108,026.7**	**7,850.7**	**115,877.4**	**2,069,553**	**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 (%)
100/08-02-008-28W1/0	007811	Horizontal	BAKKEN-THREE FORKS A	BAKKEN	Producing	3/31/2011	Jan-2018	0.46	14.20	4974.60	3.66	113.60	16650.50	88.89
100/11-02-008-28W1/0	008377	Horizontal	BAKKEN-THREE FORKS A	BAKKEN	Producing	1/31/2012	Jan-2018	2.70	83.60	5855.20	15.83	490.80	17287.50	85.45
100/12-02-008-28W1/0	006101	Vertical	BAKKEN-THREE FORKS A	BAKKEN	Abandoned Zone	11/15/2006	Sep-2015	0.11	3.30	663.30	0.40	11.90	2298.70	78.29
100/14-02-008-28W1/0	007663	Horizontal	BAKKEN-THREE FORKS A	BAKKEN	Producing	1/13/2011	Jan-2018	1.51	46.80	7878.10	9.20	285.20	21463.90	85.90
100/11-03-008-28W1/0	007273	Horizontal	BAKKEN-THREE FORKS A	BAKKEN	Producing	2/28/2011	Jan-2018	2.85	88.30	9283.30	2.12	65.70	13250.30	42.66
100/12-03-008-28W1/0	005958	Vertical	BAKKEN-THREE FORKS A	BAKKEN	Producing	9/16/2007	Sep-2013	0.04	1.30	1267.10	0.06	1.70	1160.00	56.67
100/14-03-008-28W1/0	006989	Horizontal	BAKKEN-THREE FORKS A	BAKKEN	Producing	8/21/2009	Jan-2018	1.42	44.00	12008.20	8.98	278.40	41392.30	86.35
100/01-10-008-28W1/0	006922	Horizontal	BAKKEN-THREE FORKS A	BAKKEN	Producing	3/19/2009	Jan-2018	0.56	17.40	9371.70	1.24	38.50	12577.10	68.87
100/04-10-008-28W1/0	006241	Vertical	BAKKEN-THREE FORKS A	BAKKEN,TORQUAY	Producing	2/20/2007	Jan-2018	0.16	5.10	1826.60	0.43	13.30	3733.10	72.28
100/05-10-008-28W1/0	006527	Vertical	BAKKEN-THREE FORKS A	BAKKEN	Producing	1/17/2008	Jan-2018	0.00	0.00	2452.10	3.43	106.20	14718.40	100.00
100/08-10-008-28W1/0	007602	Horizontal	BAKKEN-THREE FORKS A	BAKKEN	Producing	2/28/2011	Jan-2018	2.15	66.70	8682.60	4.74	146.90	14796.70	68.77
100/09-10-008-28W1/0	006904	Horizontal	BAKKEN-THREE FORKS A	BAKKEN	Producing	3/11/2009	Jan-2018	1.15	35.60	7847.70	2.69	83.30	13540.70	70.06
100/13-10-008-28W1/0	006590	Vertical	BAKKEN-THREE FORKS A	BAKKEN	Producing	3/11/2008	Jan-2018	0.12	3.70	1641.60	0.00	0.00	1976.20	0.00
100/16-10-008-28W1/0	007499	Horizontal	BAKKEN-THREE FORKS A	BAKKEN	Producing	1/31/2011	Jan-2018	0.33	10.30	10584.50	2.19	67.80	23054.80	86.81
100/06-11-008-28W1/0	009986	Horizontal	BAKKEN-THREE FORKS A	THREEFK,BAKKEN	Producing	9/30/2014	Jan-2018	1.11	34.30	4024.70	1.67	51.70	5461.20	60.12
100/09-11-008-28W1/0	006981	Horizontal	BAKKEN-THREE FORKS A	BAKKEN	Producing	7/29/2009	Jan-2018	0.59	18.30	6364.50	1.89	58.70	11636.30	76.23
100/16-11-008-28W1/0	006751	Horizontal	BAKKEN-THREE FORKS A	BAKKEN	Producing	11/30/2008	Jan-2018	0.25	7.60	5080.30	0.62	19.20	9757.80	71.64
100/03-14-008-28W1/0	007063	Horizontal	BAKKEN-THREE FORKS A	BAKKEN	Producing	10/29/2009	Jan-2018	0.87	27.10	9281.80	1.67	51.80	13337.60	65.65
100/06-14-008-28W1/0	006974	Horizontal	BAKKEN-THREE FORKS A	BAKKEN	Producing	7/22/2009	Jan-2018	0.73	22.60	6789.50	2.41	74.60	13405.40	76.75
										115877.4			**251498.5**	

Table No. 4 : OOIP Calculation

Polygon Name	Total Area (m2)	Iso sum (m)	OOIP (m3)	OOIP (bbl)
1-2-8-28W1	162,153	4.96	28,505	179,268
2-2-8-28W1	162,069	4.92	28,238	177,590
3-2-8-28W1	162,041	4.67	26,831	168,740
4-2-8-28W1	161,975	4.17	23,935	150,525
5-2-8-28W1	162,043	5.54	31,815	200,085
6-2-8-28W1	162,108	5.62	32,257	202,861
7-2-8-28W1	162,141	5.37	30,850	194,014
8-2-8-28W1	162,225	5.13	29,515	185,618
11-2-8-28W1	162,191	6.36	36,535	229,771
12-2-8-28W1	162,116	6.41	36,838	231,677
13-2-8-28W1	162,182	6.24	35,872	225,598
14-2-8-28W1	162,257	5.59	32,118	201,988
9-3-8-28W1	161,756	6.05	34,684	218,127
10-3-8-28W1	161,830	6.03	34,591	217,542
11-3-8-28W1	161,949	6.48	37,178	233,811
12-3-8-28W1	162,030	7.45	42,792	269,117
13-3-8-28W1	161,903	7.27	41,701	262,261
14-3-8-28W1	161,823	6.93	39,753	250,009
15-3-8-28W1	161,700	6.46	37,041	232,953
16-3-8-28W1	161,626	6.22	35,644	224,162
9-4-8-28W1	162,008	7.24	41,584	261,523
10-4-8-28W1	162,024	7.23	41,492	260,943
15-4-8-28W1	162,011	7.72	44,333	278,810
16-4-8-28W1	161,995	7.58	43,505	273,601
1-10-8-28W1	161,083	6.32	36,055	226,747
2-10-8-28W1	161,236	6.56	37,472	235,659
3-10-8-28W1	161,412	6.83	39,048	245,571
4-10-8-28W1	161,558	7.04	40,311	253,518
5-10-8-28W1	161,628	7.32	41,924	263,659
6-10-8-28W1	161,481	6.95	39,785	250,208
7-10-8-28W1	161,345	6.70	38,293	240,824
8-10-8-28W1	161,192	6.53	37,308	234,632
9-10-8-28W1	161,301	6.64	37,930	238,544
10-10-8-28W1	161,452	6.68	38,192	240,189
11-10-8-28W1	161,550	6.83	39,127	246,073
12-10-8-28W1	161,698	7.02	40,220	252,941
13-10-8-28W1	161,769	6.60	37,855	238,068
14-10-8-28W1	161,620	6.62	37,932	238,554
15-10-8-28W1	161,562	6.58	37,687	237,015
16-10-8-28W1	161,411	6.41	36,687	230,724
3-11-8-28W1	161,796	5.77	33,077	208,023
4-11-8-28W1	161,639	6.12	35,049	220,426
5-11-8-28W1	161,564	6.24	35,754	224,858
6-11-8-28W1	161,721	5.90	33,831	212,765
9-11-8-28W1	162,024	7.21	41,383	260,257
10-11-8-28W1	161,860	6.61	37,929	238,537
11-11-8-28W1	161,641	6.20	35,516	223,362
12-11-8-28W1	161,487	6.35	36,326	228,455
13-11-8-28W1	161,412	6.25	35,728	224,693
14-11-8-28W1	161,565	6.09	34,891	219,429
15-11-8-28W1	161,819	6.64	38,090	239,547
16-11-8-28W1	161,983	7.66	43,951	276,408
3-14-8-28W1	162,886	5.58	32,200	202,506
4-14-8-28W1	163,301	6.43	37,217	234,059
5-14-8-28W1	163,377	5.99	34,688	218,155
6-14-8-28W1	162,963	5.32	30,722	193,213
1-15-8-28W1	163,388	6.39	36,996	232,669
2-15-8-28W1	163,016	6.42	37,081	233,200
7-15-8-28W1	162,974	6.21	35,877	225,633
8-15-8-28W1	163,346	6.17	35,690	224,455
		SUM:	**2,185,430**	**13,744,171**

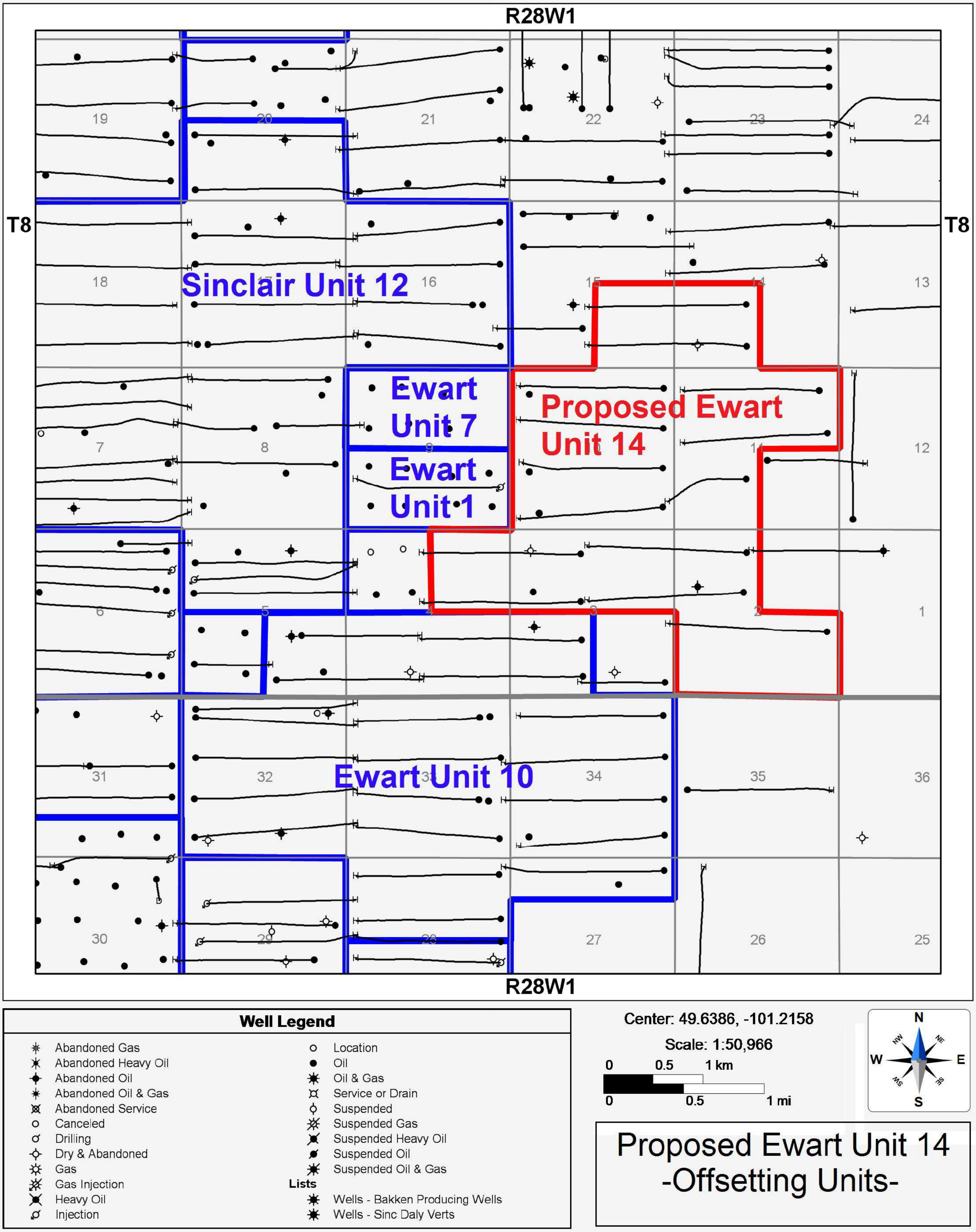
n/g	0.330
phi	0.169
Sw	0.3
Boi	1.1

Proposed Ewart Unit No. 14

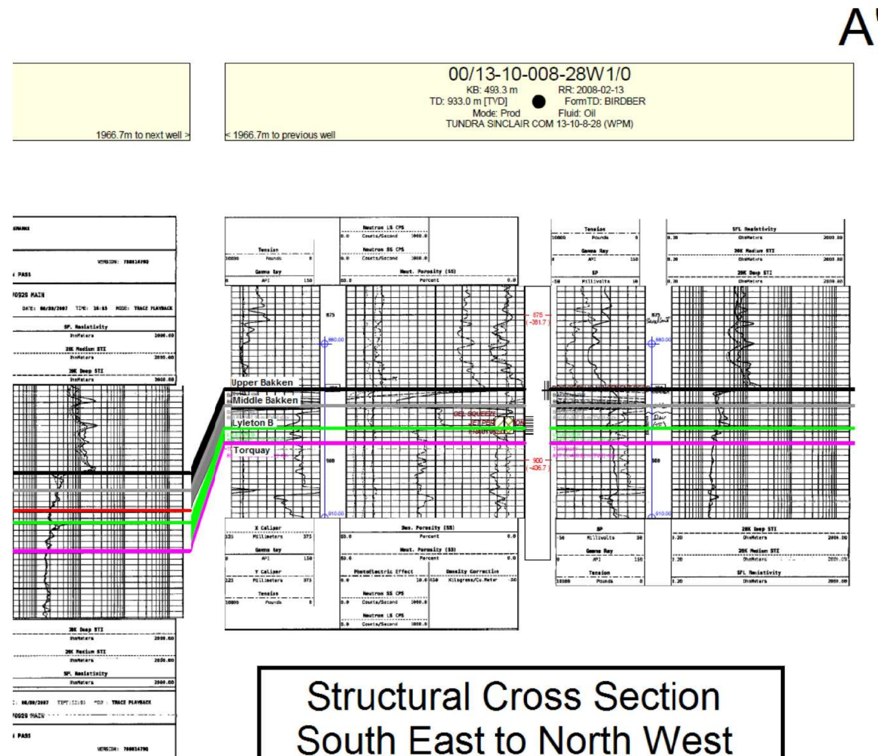
Application for Enhanced Oil Recovery Waterflood Project

<u>LIST OF APPENDICES</u>

APPENDIX 1

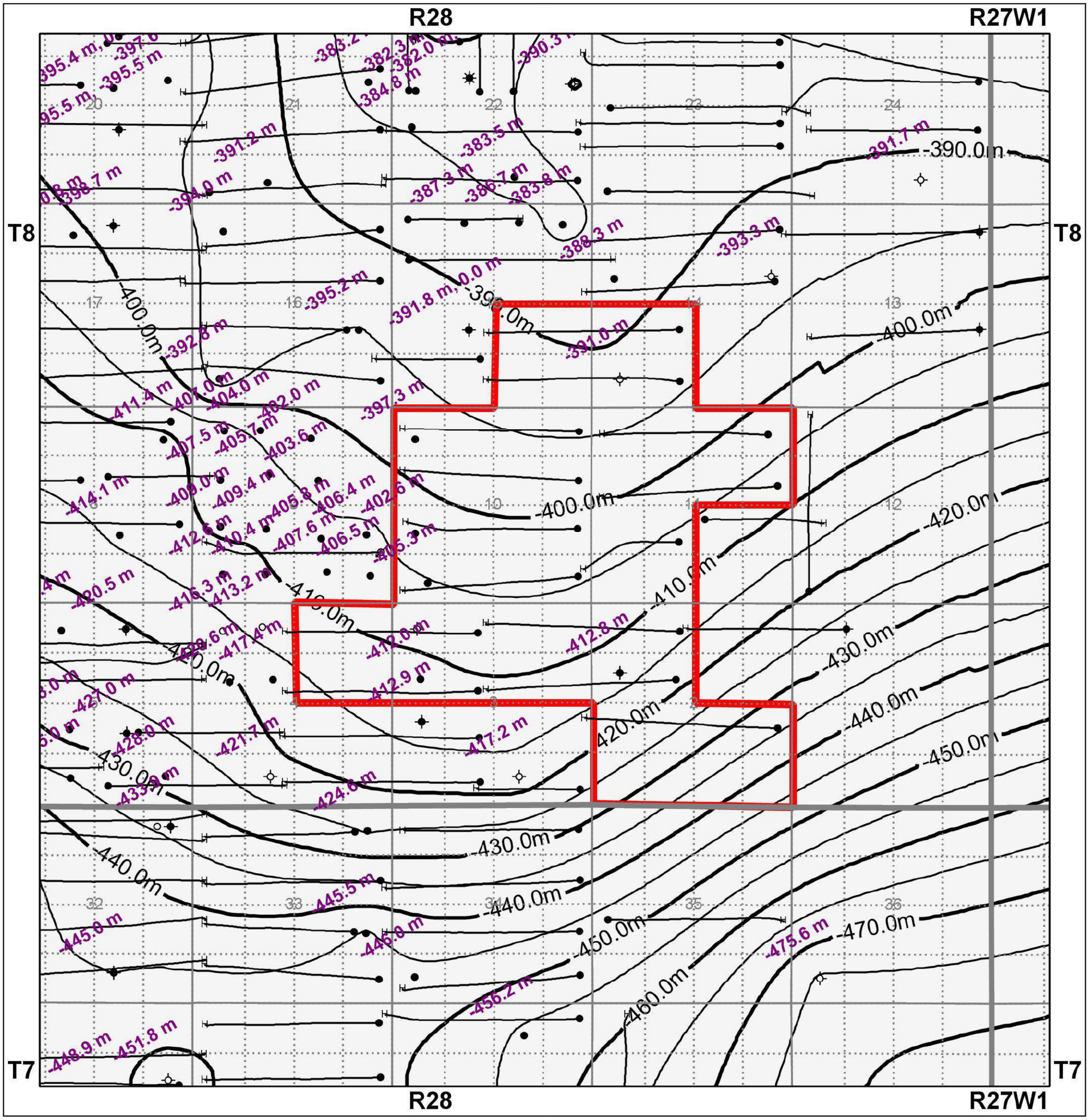


Proposed Ewart Unit 14
-Offsetting Units-



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

APPENDIX 3



Well Legend

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

Center: 49.6394, -101.1954

Scale: 1:46,765

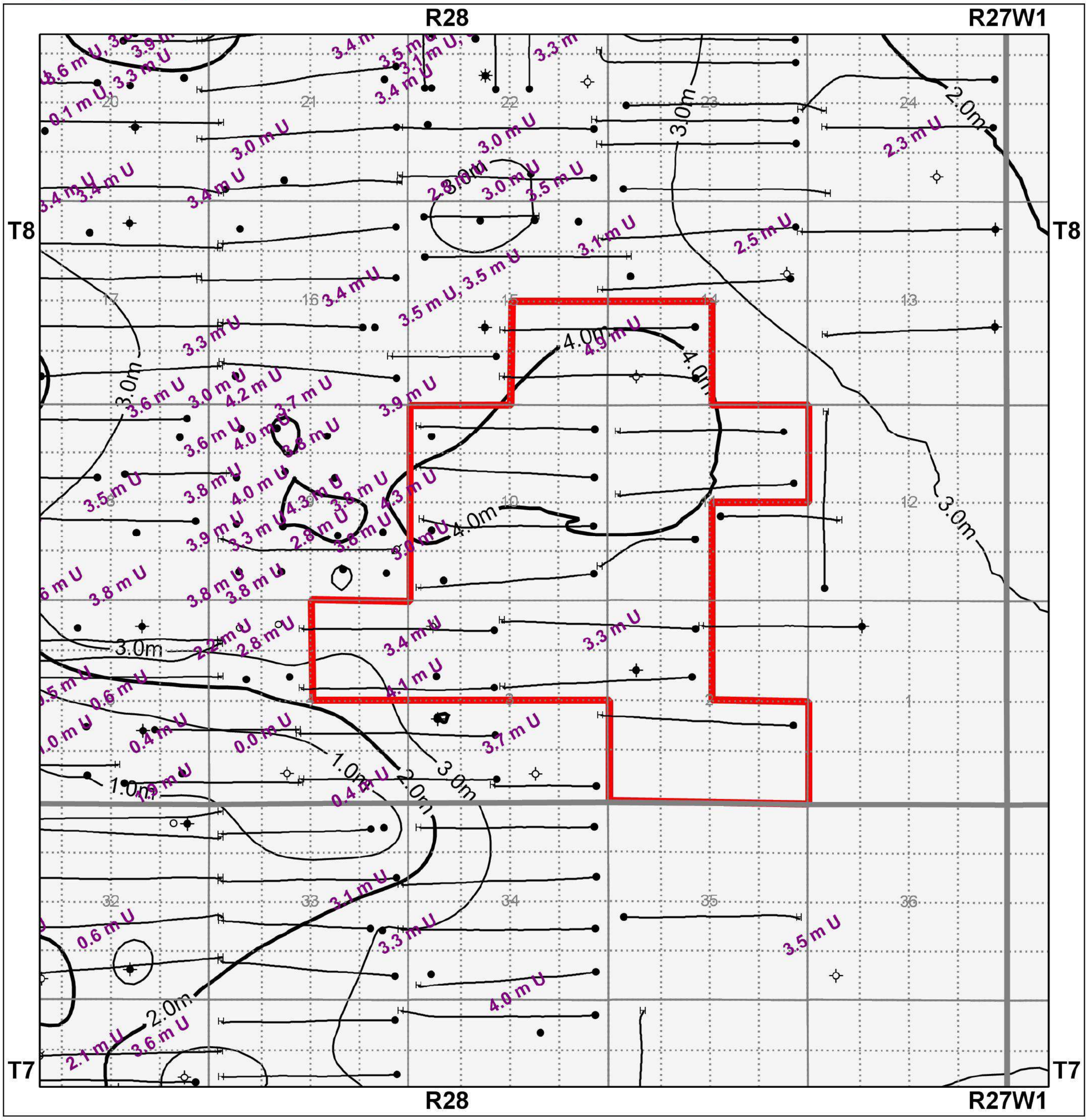
0 0.5 1 km

0 0.5 1 mi

N W E S

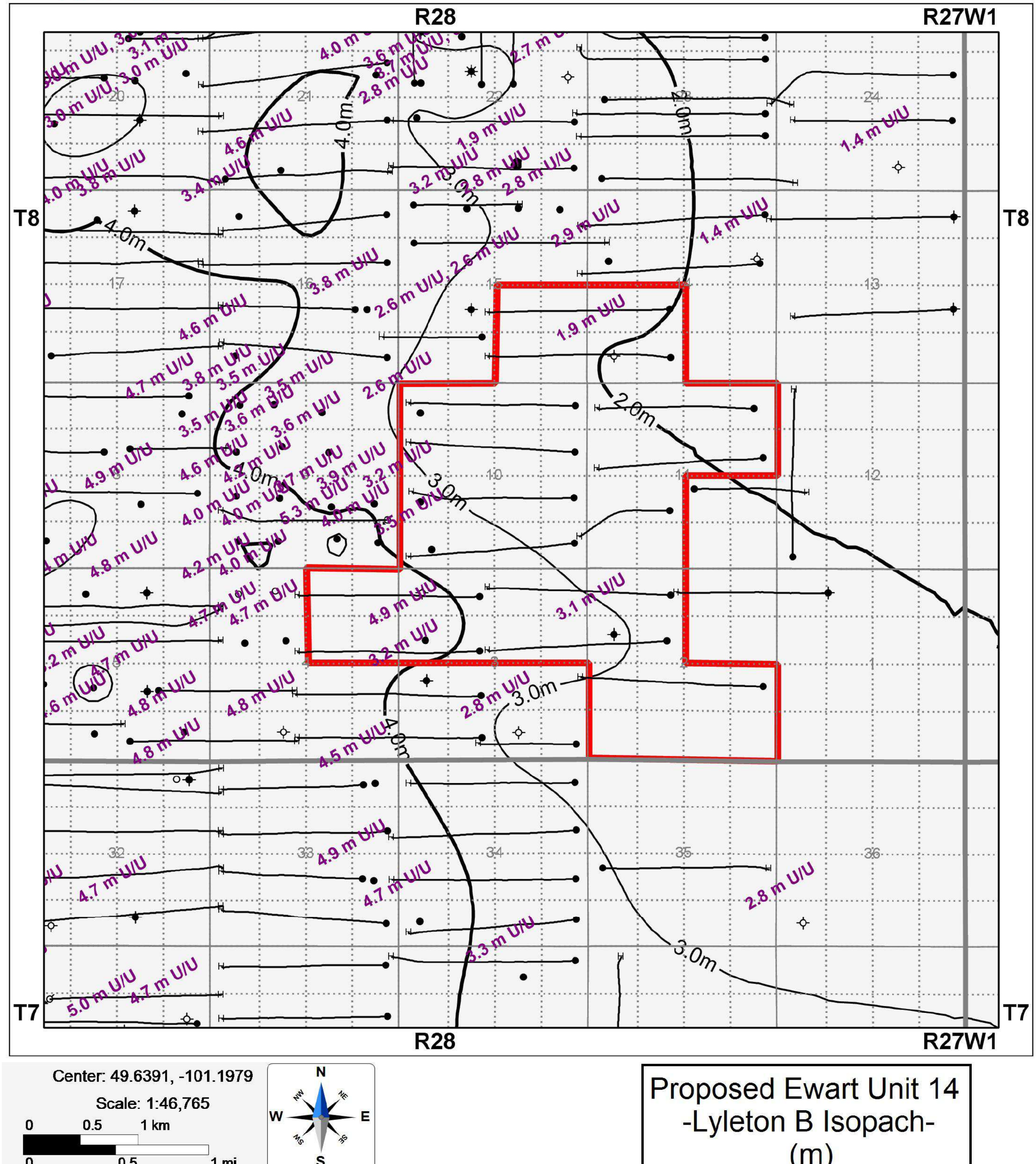
Proposed Ewart Unit 14
-Middle Bakken Structure-
(mSS)

APPENDIX 4



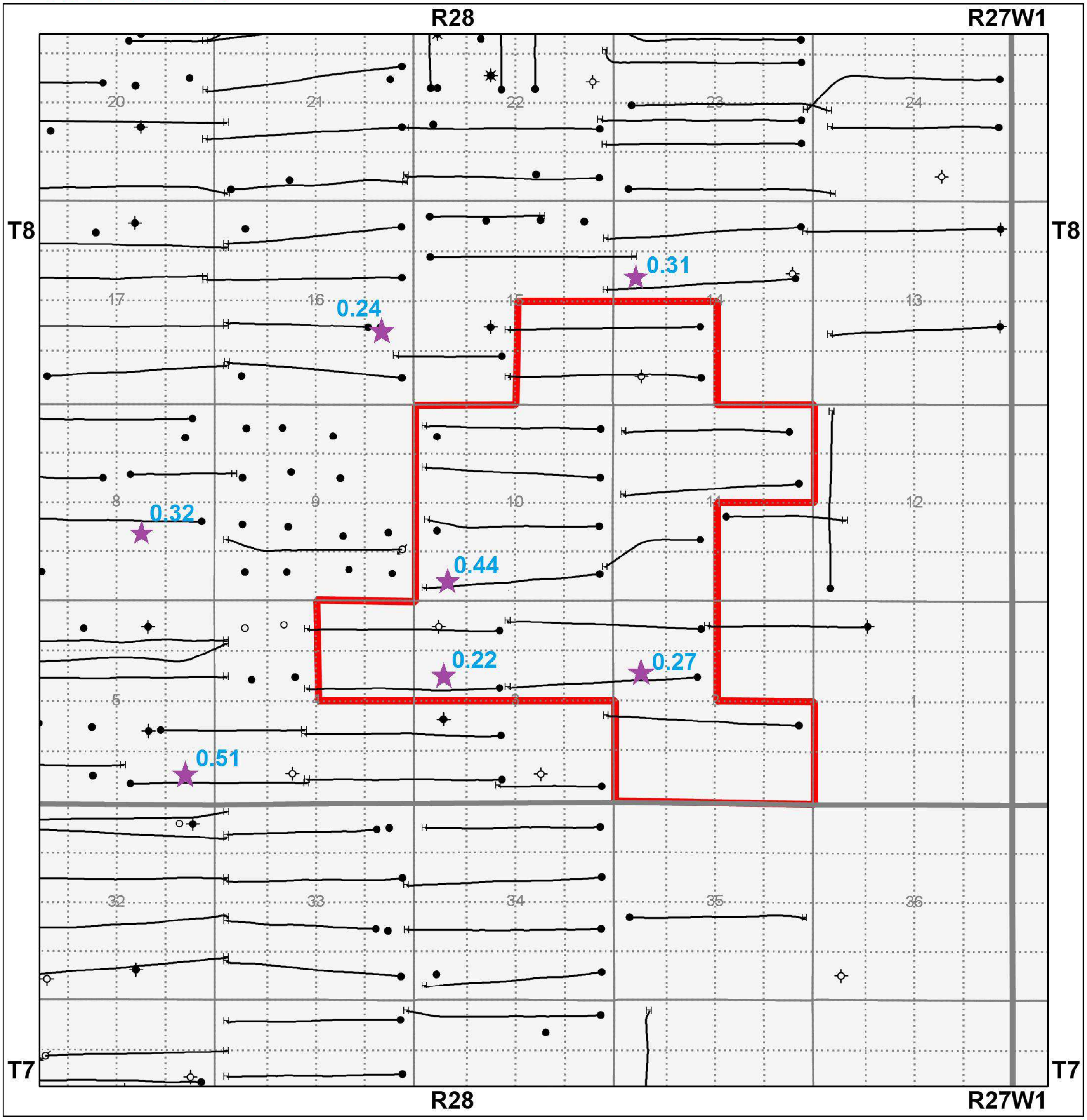
Proposed Ewart Unit 14
-Middle Bakken Isopach-
(m)

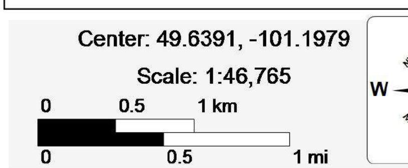
APPENDIX 5

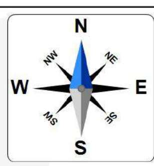


Proposed Ewart Unit 14
-Lyleton B Isopach-
(m)

APPENDIX 6







Proposed Ewart Unit 14
-Core Data Points-
N/G values posted